CITY OF PORTLAND, MAINE
PLANNING BOARD



Sean Dundon, Chair
Brandon Mazer, Vice Chair
Bob Dunfey
David Eaton
David Silk
Austin Smith
Maggie Stanley

AGENDA
PORTLAND PLANNING BOARD MEETING

The Portland Planning Board will hold a meeting on Tuesday, May 28, 2019, Council Chambers, 2nd Floor, City Hall, 389 Congress Street. **Public comments will be taken for each item on the agenda during the estimated allotted time and written comments should be submitted to planningboard@portlandmaine.gov**.

WORKSHOP - 4:30 PM

i. Text Amendment to Conditional Zone Agreement (C-55); 18 Luther Street; Home Start, Applicant. (estimated time 4:30 - 5:15 p.m.) The Planning Board will hold a workshop on a proposal by Home Start to amend the conditional zone agreement (C-55) to allow an affordable accessory dwelling unit (ADU) of 400 sf to be added at the single family home at 18 Luther Street.

ii. Level III Site Plan and Conditional Use; 1884 Forest Avenue; John Chau, Applicant. (estimated time 5:15 - 6:00 p.m.) The Planning Board will hold a workshop on a proposal for a mixed-use development consisting of a convenience store, gas station with 4 fueling islands, and multi-tenant retail space at 1884 Forest Avenue. Two access drives are proposed off Forest Avenue with a third access off Riverton Drive. The 1.61 acre site is zoned Community Business B-2 and the proposal is subject to review under Portland's site plan standards, conditional use standards for auto related uses, and traffic movement permit.

PUBLIC HEARING - 6:30 PM

1. ROLL CALL AND DECLARATION OF QUORUM

2. COMMUNICATION AND REPORTS

3. REPORT OF ATTENDANCE AT THE MEETING HELD ON MAY 14, 2019

No Workshop

Public Hearing: Dundon, Mazer, Eaton, Silk, Smith and Stanley present; Dunfey absent. Silk was recused for the second item.

4. REPORTS OF DECISIONS AT THE MEETING HELD ON MAY 14, 2019

i. Waterfront Central Zone (WCZ) Text Amendments; City of Portland, Applicant. Mazer moved and Stanley seconded a motion to recommend adoption of proposed text amendments, not including reductions to the non-marine use overlay zone extent, to the City Council. Vote: 4-2 (Dundon and Stanley opposed, Dunfey absent).

ii. Amendment to Level III Subdivision/Site Plan and IZ Conditional Use Applications; 56 Hampshire Street; New Height Group, LLC., Applicant. Mazer moved and Stanley seconded a motion to approve the amendment to the Level III application with one condition of approval. Vote: 3-2 (Smith and Stanley opposed, Silk recused, and Dunfey absent). Mazer moved and Stanley seconded a motion to reconsider the motion. Vote: 5-0 (Silk recused and Dunfey absent). Mazer moved and Stanley seconded the motion to approve the amended application as written. Vote: 4-1 (Stanley opposed, Silk recused, and Dunfey absent).

5. NEW BUSINESS

i. Level III Site Plan; 1001 Westbrook Street; City of Portland Jetport Facility, Applicant. (estimated time 6:30 - 7:15 p.m.) The Planning Board will hold a public hearing on the 1.93 acre expansion of the terminal apron and disturbances of 4.54 acres of land within Portland's municipal boundaries at 1001 Westbrook Street. The proposal expands the terminal apron and adds 2 positions for long-term hold/deicing/overnight apron. The site plan is subject to review under the standards of Portland's Site Plan ordinance.

ii. Amendment to Level III Subdivision/Site Plan; 60 Parris Street; Horton, LLC., Applicant. (estimated time 7:15 - 7:45 p.m.) The Planning Board will hold a public hearing on the after-the-fact design review of exterior change to the building at 60 Parris Street.

6. EVENING WORKSHOP (IMMEDIATELY FOLLOWING THE PUBLIC HEARING)

i. Master Development Plan; 1 Portland Square; North River IV, LLC., Applicant. (estimated time 7:45 - 9:00 p.m.) The Planning Board will hold an evening workshop to consider a master development plan for the Portland Square properties located at 1 Portland Square. The 6.45 acre site is within the Downtown B-3 zone and is bound by Spring, Commercial, Center, Cotton and Cross Streets. The proposed Master Plan is a phased mixed-use development with the following uses and floor area: offices, 548,127 sf; retail space 48,153 sf; residential units,76 one and two-bedroom units; hotel, 135 rooms; and structured parking, 1336 spaces. The Master Plan is subject to review under Portland's Site Plan Standards.

ii. Level III Site Plan; 1 Portland Square; North River IV, LLC., Applicant. (estimated time 9:00 p.m.) The Planning Board will hold an evening workshop to consider a proposal to amend the existing parking space requirements for Portland Square One and Two located at 1 Portland Square. The application seeks to reduce the number of required parking spaces and reconfigure a parking lot. The site plan is subject to review under Portland's site plan standards and as an amendment to Maine's Site Location of Development permit, which will be reviewed under Portland's delegated review authority.

Memorandum
Planning and Urban Development Department
Planning Division

To: Sean Dundon, Chair and Members of the Portland Planning Board
From: Shukria Wiar, Planner
Date: May 24, 2019
Re: Text Amendment to Conditional Zone Agreement, 18 – 26 Luther Street, Home Start
Project #: ZN-000601-2019 CBL: 087 Z017001
Meeting Date: May 28, 2019

I. INTRODUCTION

Home Start, a non-profit affordable housing development organization on Peaks Island, has requested a text amendment to the original Conditional Zone Agreement (CZA #CC-55) for the properties at 18, 22, and 26 Luther Street on Peaks Island. The original CZA allowed the creation of three single family affordable units at 18 Luther Street on lots of approximately 5,300 SF. The underlying zoning is Island Residential IR-2 with the conditional rezoning agreement encompassing the original site of 16,271 SF. The applicant now seeks to add one accessory dwelling unit at 18 Luther Street, which would be an affordable housing unit. The Planning staff has recommended that this proposed change be handled as a proposed text amendment to the original CZA.

II. PROJECT DATA

Underlying Zoning:	Island Residential IR-2
Existing Zoning:	Conditional Rezoning #CC-55 to modify the existing lot at 18 Luther Street (Lot 17) to allow one accessory dwelling unit (ADU)
Building Height:	Proposed not to exceed the 35'limit.
Building Setbacks:	Minimum Lot Area is 5,300 with a front yard setback of 10 feet and side yard of 8 feet to the property line. The rear yard setback will stay at 25 feet as well at the building height of 35 feet. The frontage is 49 feet. These setbacks are included in the original Conditional Zone Agreement, Attachment 1, and no revisions are proposed to these dimensional standards.
Existing Uses:	Three single-family homes on three lots
Proposed Use:	One accessory dwelling unit added to the home at 18 Luther Street
Residential Data:	
Existing Residential Units:	Three single-family homes
Proposed Residential Units:	One ADU at 18 Luther Street
Number of Affordable Units:	Three single family homes and the one ADU

III. BACKGROUND AND EXISTING CONDITIONS

Home Start pursued a conditional rezoning in 2010, in order to enable the construction of two single family homes and the rehabilitation of the existing home at 18 Luther Street. The Planning Board supported the CZA (#CC-55, Attachment 1) to allow the reconstruction of the existing home and the addition of the two single-family houses, each with a lot size of approximately 5,300 SF. Under the rezoning agreement, all three homes are required to be affordable units and are allowed at a higher density than the underlying IR-2 zone. The City Council approved the

conditional rezoning on July 12, 2010 and in 2011, the applicant entered into the affordable housing agreement with the City to create two new affordable single-family homes at 22 and 26 Luther Street, and the rehabilitation of 18 Luther Street for the third home. The two new houses were completed and the renovation of 18 Luther Street were completed in 2013.

IV. PROPOSED DEVELOPMENT

18 Luther Street is part of the Conditional Rezoning Agreement C-55 (Attachment 2) and Home Start is seeking a text amendment to the agreement that would allow an affordable Accessory Dwelling Unit to be added at 18 Luther Street (Attachment D). The underlying and surrounding zoning is Island Residential Zone (IR-2), which permits accessory dwelling units as a conditional use. The original CZA states that "to the extent not otherwise altered herein, the zoning requirements for the IR-2 shall otherwise apply". Even though accessory dwelling units are allowed as a conditional use in the underlying IR-2 zone, the CZA specifically restricts the use of the Property to three single-family residential units. Home Start stated that the addition of an ADU will "increase the supply of year-round affordable housing on Peaks Island". The applicant is requesting to amend the original CZA to permit one affordable accessory dwelling unit with a minimum of 400 sf at 18 Luther Street.

The amendments ensure that the unit will meet all other requirements of the original CZA. Attachment D is the full amendment with all of the whereas statements and standard conditions. Below are the proposed provisions specific to the ADU:

> NOW, THEREFORE, in consideration of this Amendment, the Developer covenants and agrees as follows:
>
> 1. The requirements of the Existing CZA shall apply and are modified to allow an addition of one (1) ADU on the Property.
>
> 2. The ADU shall be a minimum of four hundred (400) square feet and subject to the applicable dimensional requirements of the Existing CZA, which are restated below:
>
> a. Minimum Lot Area 5,300 sq. ft.
> b. Min. Street Frontage 49 ft
> c. Min. Front Yard Setback (Lot 17) 1 ft
> d. Min. Rear Yard Setback 25 ft
> e. Min. Side Yard Setback (Lot 17) 6.5 ft
> f. Maximum Building Height 35 ft
> g. Min. Lot Width 49 ft
> h. Maximum Lot Coverage 28% of Lot
>
> 3. The Developer or its designee agrees to maintain the following affordability controls on the Proposed Development on the Property:
>
> a. The ADU shall be leased on an annual basis to households earning no more than 120% of the HUD AMI for Cumberland County, Maine.
>
> b. If the entire Property is sold, it shall be sold to a household earning no more than 120% of the HUD AMI for Cumberland County, Maine per the Existing CZA and the maximum sale price shall be calculated per the City of Portland's "Inclusionary Zoning Implementation Guidelines for Developers of Homeownership Housing" (the "Inclusionary Guidelines"). The potential

rental income of the ADU shall not be included in determining the buyer's eligibility as a household earning 120% AMI or less, however, in calculating the maximum sale price per the Inclusionary Guidelines, the ADU shall be considered a 1-person household in addition to the 3-person household size of the existing 3-bedroom single family residence. In the event the Inclusionary Guidelines are no longer in effect at the time of sale, the maximum allowable purchase price shall be based on calculating the present value of a 30 year fixed rate mortgage with a 5% down payment, an interest rate based on the average national mortgage rate over the past thirteen years as determined by the Freddie Mac Primary Mortgage Market Survey, and a monthly mortgage payment based on 30% of the gross monthly income for a 4-person household earning 120% AMI minus other monthly housing expenses such as real estate taxes, mortgage insurance, and insurance. Any future owner of the Property shall be required to rent the ADU on an annual basis to households earning no more than 120% AMI for Cumberland County, Maine per 3(a) above.

c. The above affordability restrictions shall be stated in and secured by a Declaration of Affordable Housing Covenants and Restrictions for the Property, which shall be enforceable by Home Start and the City of Portland, or their designees and shall be recorded in the Cumberland County Registry of Deeds along with an original of this Agreement.

According to the applicant, the proposed accessory dwelling units will be a minimum of four hundred square feet (400 SF) and the whereas statements confirm that they would maintain the single-family appearance of the existing building, as mentioned above in the draft amendment.

As proposed, the ADU would be a permitted use under the amendment and thus, would not be a conditional use, as it is in IR-2. The Board may want to consider including an additional provision in the agreement that reiterates the Whereas clause, which states "the Developer intends to maintain the single family appearance of the Property and complement the adjacent residential neighborhood." The addition of a unit will require a Building Permit and Site Plan review, so such a provision could be considered during the administrative review.

The site is served by public sewer and water. A conceptual site plan and architectural are in Attachment F and G.

V. PUBLIC COMMENTS

Staff recommended that this proposed change be handled as a text amendment. A legal ad for the Board workshop was posted on the city's web page and appeared in the *Portland Press Herald* on May 17th and 18th, 2019. Notices upon receipt of application and for the Planning Board workshop were sent to a hundred and twenty-two (122) property owners within 500 feet of the site and to the interested citizen list. At the time this memo was prepared, the Planning Division has not received any public comment.

VI. RIGHT, TITLE AND INTEREST

The owner of the property is Home Start. The applicant has provided a copy of a short form warranty deed, recorded at the Cumberland County Registry of Deeds (Book 25452 Page 211), which demonstrates their right, title and interest in the property.

VII. COMPREHENSIVE PLAN

The applicant has submitted their analysis on how this text amendment is meeting the Comprehensive Plan (Attachment E). Staff has identified the following goals and policies which are relevant to the proposed housing development and finds the proposal in conformance with the Comprehensive Plan:

The central vision of Portland's Plan 2030 is represented by the venn diagram demonstrating the integral interrelation of the community's core belief that Portland is equitable, sustainable, connected, dynamic, authentic and secure. The vision conveys the message of the City's need to balance many competing needs to assure the advance of the vision as a unified concept. In this instance, that the City's goals for job growth and transforming Portland through orderly growth and development be balanced with needs for connectivity of the street grid, sustainability of infrastructure and the ability to maintain that infrastructure, and security in the sense of public safety.



Portland Housing Goal: Ensure that an adequate supply of housing is available to meet the needs, preferences, and financial capabilities of all Portland households, now and in the future.

Policies

- Ensure the construction of a diverse mix of housing types that offers a continuum of options across all income levels, which are both renter and owner-occupied, including but not limited to the following:
    ii. Housing units for decreasing household size, such as young professionals, empty nesters, single-parent households, and senior citizens.
- Encourage higher density housing for both rental and home ownership opportunities, particularly located near services, such as schools, businesses, institutions, employers, and public transportation.
- Increase Portland's rental housing stock to maintain a reasonable balance between supply and demand yielding consumer choice, affordable rents, and reasonable return to landlords.
- Identify vacant land and redevelopment opportunities throughout the City to facilitate the construction of new housing.

VIII. NEXT STEPS

1. Address any additional information requested by the Planning Board.
2. Address and finalize all staff comments before the public hearing.

ATTACHMENTS

PLANNING BOARD MEMO ATTACHMENTS

1. Conditional Rezoning Agreement- C-55, as adopted by Council

APPLICANT'S SUBMITTALS

A. Application Form
B. Project Description
C. Right, Title and Interest
D. Amendment to Conditional Zone Agreement
E. Consistency with Comprehensive Plan

F. Conceptional Site Plan
G. Conceptional Floor Plan
H. Architectural Drawing

Order 273-09/10
Given first reading 6/21/10
Public hearing & Passage 7/19/10 8-0 (Skolnik absent)

NICHOLAS M. MAVODONES (MAYOR)
KEVIN J. DONOGHUE (1)
DAVID A. MARSHALL (2)
DANIEL S. SKOLNIK (3)
CHERYL A. LEEMAN (4)

CITY OF PORTLAND

IN THE CITY COUNCIL

JOHN R. COYNE (5)
JOHN M. ANTON (A/L)
DORY RICHARDS WAXMAN (A/L)
JILL C. DUSON (A/L)

AMENDMENT TO CITY CODE SEC. 14-49 (ZONING TEXT AND MAP AMENDMENT) RE: CONDITIONAL REZONING FOR PROPERTY LOCATED ON LUTHER STREET ON PEAKS ISLAND

ORDERED, that the zoning map and text of the City of Portland, dated December 2000 as amended and on file in the Department of Planning & Development, and incorporated by reference into the Zoning Ordinance by Sec. 14-49 of the Portland City Code, is hereby amended to reflect the conditional rezoning as substantially detailed and described below.

CONDITIONAL ZONE AGREEMENT RE: HOMESTART

AGREEMENT made this ____ day of _____, 2010 by HOMESTART, a 501 c 3 Non-profit corporation with a place of business in Portland, Maine ("Developer"), and its successors and assigns.

W I T N E S S E T H

WHEREAS, the Developer has acquired land and buildings located at 18 Luther Street, consisting of parcels shown on City of Portland Tax Map 87 Block Z, Lots 15, 16, and 17, and more particularly described in a deed from dated and recorded in the Cumberland County Registry of Deeds in Book 14020, Page 231 (the "Property"); and

WHEREAS, the existing building located on the Property is currently used to house a single family affordable residence; and

WHEREAS, the remaining portion of the Property remains undeveloped; and

WHEREAS, the homes on the Property will constructed to be energy efficient;

WHEREAS, there is available public water and sewer to service the Property;

WHEREAS, the Developer intends to develop two (2) affordable single family homes on the remaining undeveloped land, which shall be sold as affordable to buyers with household incomes one hundred and twenty (120%) percent or less of the U.S. Department of Housing and Urban Development moderate-income figure for metropolitan Cumberland County Maine; and

WHEREAS, if Maine State Housing funds are available for such purposes, the Developer intends to rehabilitate or replace the existing house located on Property, which shall be owned by the Developer or an appropriate designee and leased as affordable to tenants with household incomes less than one hundred and twenty percent (120%) of the U.S. Department of Housing and Urban Development moderate-income figure for metropolitan Cumberland County Maine; and

WHEREAS, if the Maine State Housing funds are unavailable, the Developer intends to sell the existing house located on the Property as affordable to buyers with household incomes less than one hundred and twenty percent (120%) of the U.S, Department of Housing and Urban Development moderate-income figure for metropolitan Cumberland County Maine; and

WHEREAS, the Developer intends to maintain the character of the Property and complement the adjacent residential neighborhood; and

WHEREAS, the existing zoning is IR-2 which requires 20,000 square feet of land area per unit, and which results in a limitation of one (1) unit upon the Property; and

WHEREAS, the Developer has requested a rezoning of the Property in order to permit the proposed redevelopment and reuse of the property from a single family residence to three (3) single family residential units; and

WHEREAS, the Portland Planning Board has determined the rezoning and proposed development would provide needed affordable housing on Peaks Island as is consistent with the housing component of the Comprehensive Plan; and

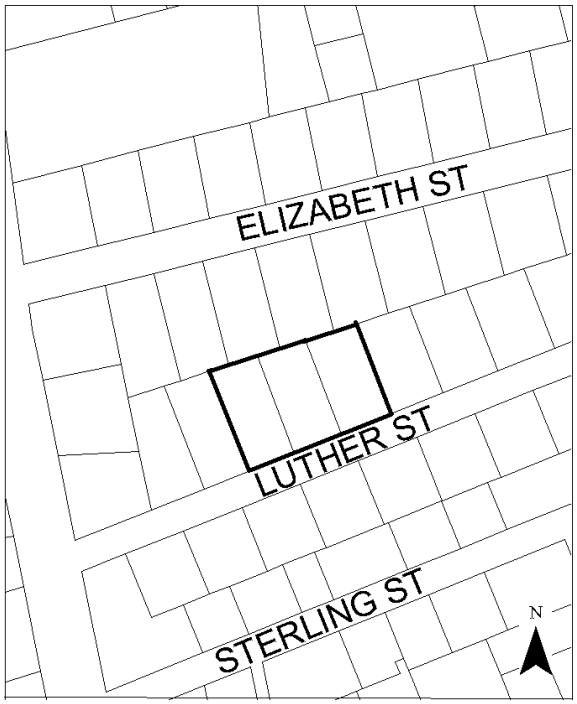
WHEREAS, the Planning Board, after notice and hearing and due deliberation thereon, recommended the rezoning of the Property as aforesaid, subject, however, to certain conditions contained in this Agreement; and

WHEREAS, the Portland City Council, pursuant to 30-A M.R.S.A. § 4352(8) and Portland City Land Use Code (the "Code") §§ 14-60 to 14-62, after notice, hearing and due deliberation thereon, has determined that because of the unusual nature and unique location of the proposed development, and its minimal impact on and compatibility with the surrounding community, it is necessary and appropriate to recommend the rezoning of the Property as aforesaid, with the following conditions and restrictions set forth in this Agreement; and

WHEREAS, the Portland City Council has on _____, 2010 approved this Agreement in its entirety, by City Council Order No. _____, a true copy of which is attached hereto as Attachment 1 (the "Order");

NOW, THEREFORE, in consideration of the rezoning, the Developer covenants and agrees as follows:

1. Pursuant to the Order, the City shall amend the Zoning Map of the City of Portland, dated September, 2000 (as amended from time to time and on file in the Department of Planning and Urban Development, and incorporated by reference into the Zoning Ordinance by § 14-49 of the Code) by adopting the map change amendment shown below to zone the property IR-2, subject to the conditions contained below.



16-18 Luther Street
Proposed Conditinal Rezoning

If this Agreement is not recorded within sixty (60) days after the effective date of the City Council's approval of the Order, then the conditional rezoning shall become null and void and the zoning of the Property shall revert to the pre-existing IR – 2 zone.

2. The use of the Property shall be for a maximum of three (3) affordable single-family residential homes (1 existing unit and 2 new units). No additional units shall be developed, and the two (2) new units shall be developed substantially as delineated and depicted on the Site Plan, attached hereto as Attachment 2, entitled "Site Plan – conditional zone 18 Luther Street, Peaks Island, Portland Maine" for HOMESTART Prepared by Walsh Engineering Associates, Inc.

3. The underlying dimensional requirements of the IR-2 zone shall apply and are modified as follows:

a.	Minimum Lot Area	5,300 Sq. ft.
b.	Min Street Frontage	49 ft
c.	Min. Front Yard Setback (Lots 15&16)	10 ft
d.	Min. Front Yard Setback (Lot 17)	1 ft*
e.	Min. Rear Yard Setback	25 ft

f.	Min. Side Yard Setback (Lots 15&16)	8 ft
g.	Min. Side Yard Setback (Lot 17)	6.5 ft.**
h.	Max. Building Height	35 ft
i.	Min. Lot Width	49 ft
j.	Max. Lot Coverage	28% of Lot

* Existing house on Lot 17 currently has a 1-foot front yard setback. If the house is reconstructed, it will be required to meet the 10-foot front yard setback requirement.

** Existing house on Lot 17 currently has a 6.5-foot side yard setback. If the house is reconstructed, it will be required to meet the 8-foot side yard setback requirement.

4. The Developer agrees to maintain the following affordability controls on the proposed development on the Property:

a. The two (2) new single family units shall be initially developed, marketed and sold to individuals with household incomes at 120% or less of the U.S. Department of Housing and Urban Development moderate-income income figure for metropolitan Cumberland County Maine, as calculated for the year in which the sale takes place (a "Qualified Purchaser"), and shall be priced to be affordable to a Qualified Purchaser. Each of the Qualified Purchasers of these two (2) single family units shall occupy the units as their principal residences, except that a Qualified Purchaser may rent a unit for a period not to exceed twelve (12) months in any thirty-six (36) month period, to enable the Qualified Purchaser to address matters such as divorce, transfer of employment, economic hardship and the like. Transient rentals shall not be permitted. Affordability shall be preserved in perpetuity through a deed restriction and legal documentation. Any such additional affordability restrictions or controls shall be reviewed and approved by the City of Portland corporation counsel's office. In the event that the purchase price for either of these two (2) single family units is subsidized as a result of public or private funds made available to make the purchase of such unit more affordable, a junior mortgage shall be placed upon such unit, representing the amount of the subsidy received. In the event that an initial Qualified Purchaser sells one of these two (2) units to another Qualified Purchaser, the junior mortgage shall not be repaid, but shall be assumed by the subsequent Qualified Purchaser, who shall own and hold these housing units subject to a junior mortgage in the same manner as an initial Qualified Purchaser.

b. The existing unit (whether rehabilitated or reconstructed) shall be developed, marketed, sold and resold and/or leased as long as the Property remains a residential unit, to Qualified Purchasers or Tenants

with household incomes at one hundred and twenty percent (120%) of the U.S. Department of Housing and Urban Development moderate-income income figure for metropolitan Cumberland County Maine, as calculated for the year in which the sale takes place. The Qualified Purchasers/Tenants of this single family unit shall occupy the unit as their principal residence, except that a Qualified Purchaser may rent a unit for a period not to exceed twelve (12) months in any thirty-six (36) month period, to enable the Qualified Purchaser to address matters such as divorce, transfer of employment, economic hardship and the like. Transient rentals shall not be permitted. A junior mortgage may be placed upon such housing unit, to further secure the continued affordability covenants contained in the Declaration of Affordability Covenants for Rental Property Owned by Developer.

c. All of these affordability restrictions shall be stated in and secured by a Declaration of Affordable Housing Covenants and Restrictions for the purchased and leased property, other deed restriction(s) and/or condition(s) in any deed(s) conveyed out by the Developer, shall be stated in the housing documents, shall be identified on the approved Site Plan for the Property, and shall be reviewed and approved by the City of Portland corporation counsel's office. The affordability covenants contained in the Declaration of Affordable Housing Covenants for the purchased and leased property shall be enforceable by HOMESTART and the City of Portland, or their designees.

5. The Qualified Purchasers/Tenants shall be responsible for ongoing maintenance of the Property, including snowplowing, salting, sanding, sweeping, lighting, trash pickup (at least weekly), mowing, etc. Qualified Purchasers will be required to take a home education course offered through MaineHousing to ensure that these responsibilities are fully outlined.

6. The provisions of this Agreement are intended to replace and/or supersede the requirements of the underlying IR-2 zone. As stated above, to the extent not otherwise altered herein, the zoning requirements for the IR-2 zone shall otherwise apply to the Property.

7. In the event of a breach by the Developer or its successors or assigns (including, but not limited to, any homeowners association) of the zoning provisions contained herein (whether the Zoning Administrator, the Zoning Board of Appeals or a court determines such breach), the Planning Board, after notice and hearing, may recommend to the City Council that the conditional zone and this Agreement be amended, or be rescinded, such rescission to result in the termination of this Agreement and a reversion of the Property to the IR-2 zone requirements in place before the execution of this Agreement.

8. The above stated restrictions, provisions, and conditions are an essential part of the rezoning, shall run with the Property, shall bind and benefit the Developer, any

entity affiliated with the Developer that takes title to the Property, its successors and assigns (including, but not limited to, any homeowners association), and any party in possession or occupancy of said Property or any part thereof, and shall inure to the benefit of and be enforceable by the City of Portland, by and through its duly authorized representatives. The Developer shall file a counterpart original of this Agreement in the Cumberland County Registry of Deeds.

9. This conditional rezoning shall become null and void and the Property shall revert to the existing I-R2 zone in the event that the Developer fails to commence construction within three (3) years from the date of the Council approval of this rezoning. This three (3) year period shall be extended up to an additional one (1) year period if:

a. The Developer has applied for all required approvals but has not received all required approvals within the aforementioned three (3) year period; or

b. Any other event beyond the control of the Developer has occurred which will delay the closing on some or all of the parcels and Developer has notified the City of such event.

If any required approval, including the Council's approval of this conditional rezoning, has been appealed, then this rezoning shall become null and void and shall revert if the Developer fails to commence construction within one (1) year from the final disposition of such appeal.

10. This conditional rezoning agreement shall be enforced pursuant to the land use enforcement provisions of state law including, but not limited to, 30-A MRSA § 4452 and the Portland City Code.

11. If any of the restrictions, provisions, conditions, or portions thereof set forth herein is for any reason held invalid or unconstitutional by any court of competent jurisdiction, such portion shall be deemed as a separate, distinct, and independent provision and such determination shall not affect the validity of the remaining portions hereof.

12. Except as expressly modified herein, the development shall be governed by and comply with the provisions of the Portland City Code and any applicable amendments thereto or replacement thereof.

WITNESS: _____

HOMESTART

_____

_____ BY:

STATE OF MAINE
CUMBERLAND, ss. _____, 2010

Personally appeared before me the above-named _____, in his/her capacity as _____ of HOMESTART , and acknowledged the foregoing instrument to be his/her free act and deed in his/her said capacity and the free act and deed of said corporation.

Before me,

_____
Notary Public/

CITY OF PORTLAND
Planning & Urban Development Department

TEXT AMENDMENT SUBMISSION CHECKLIST Please submit each document as a separate PDF file Please confirm by electronically checking the boxes to the left	
GENERAL APPLICATION DOCUMENTS	
☑	**Project Description** • Cover Letter with detailed project description
☑	**Proposed Text Amendment** • Provide proposed language for text amendment(s) and cite the relevant sections to be revised in the Land Use code.
☑	**Consistency with Comprehensive Plan** • Analysis of the consistency of the zone change request with the goals, policies and land use plan of Portland's Comprehensive Plan.
☑	**Completed Checklist – Text Amendment Application** **(this document)**
☑	**Right, Title and Interest** • Deeds, leases, or purchase and sales agreements

Att. B

HOMESTART

Affordable Housing for Peaks Island

April 18, 2019

Barbara Barhydt
Development Review Services Manager
City of Portland
389 Congress Street
Portland, ME 04101

Dear Barbara,

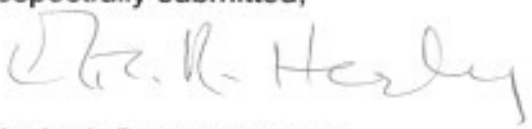
We are writing to submit a zoning text amendment application to amend an existing Conditional Zone Agreement (C-55) ("Existing CZA") for 18, 22, and 26 Luther Street ("CZA Property"). Home Start, a 501(c)(3) non-profit corporation with a mission to create year-round affordable housing on Peaks Island, owns and operates an affordable single family rental unit at 18 Luther Street on Peaks Island. The Existing CZA was entered into in 2011 to create two new affordable single family homes on 22 and 26 Luther Street in addition to the existing affordable rental unit at 18 Luther Street. These two new single family homes were completed in 2013 so there are three existing single family homes on the CZA Property under the Existing CZA.

The underlying and surrounding zoning of 18 Luther Street is Island Residential Zone (IR-2), which allows accessory dwelling units (ADUs) as a conditional use. Where the Existing CZA provides that "to the extent not otherwise altered herein, the zoning requirements for the IR-2 shall otherwise apply," Home Start would like to add an ADU to 18 Luther Street to increase the supply of year-round affordable housing on Peaks Island. ADUs are allowed as a conditional use in the IR-2 but the Existing CZA specifically limits the use of the CZA Property to three single family residential units. Therefore, Home Start is seeking to amend the Existing CZA to allow an addition of one ADU on 18 Luther Street while continuing to meet all other requirements of the Existing CZA (e.g. dimensional standards, affordability, etc.). A draft Amendment to Conditional Zone Agreement is attached.

The proposed ADU would be a minimum of four hundred square feet and would maintain the single family appearance of the existing building. The site is served by public sewer and water and is located in the heart of the village, within walking distance to the ferry. A conceptual site plan is attached.

With the recent text amendment to the Peaks ADU ordinance, Home Start wants to show that an ADU can be built affordably here. This will add a year round rental unit to our housing stock and hopefully also encourage others to do the same. We look forward to working with the Planning Board in support of this project.

Respectfully submitted,



Elizabeth Remage-Healey
President, Home Start

Att. C

Doc#: 56543 Bk:25452 Pg: 211

SHORT FORM WARRANTY DEED

SUSAN MORIARTY CADORETTE, formerly known as Susan Moriarty, of Belchertown, Massachusetts, FOR CONSIDERATION PAID, grants to HOME START, a Maine non-profit corporation having a mailing address of 196 Seashore Avenue, Peaks Island, Portland, Maine 04108, WITH WARRANTY COVENANTS, the following described real property located on Peaks Island, Portland, County of Cumberland and State of Maine:

SEE EXHIBIT "A" ATTACHED HERETO AND MADE A PART HEREOF.

Meaning and intending to convey the same premises described in three (3) deeds from Susan Moriarty Trustee of Moriarty Maine Property Realty Trust to Susan Moriarty, all dated June 4, 1998 and recorded in Cumberland County Registry of Deeds in Book 14020, Page 225, Book 14020, Page 228 and Book 14020, Page 231, respectively.

IN WITNESS WHEREOF, SUSAN MORIARTY CADORETTE has hereunto set her hand and seal this 7th day of September, 2007.

MAINE REAL ESTATE TAX PAID

WITNESS:

Susan Moriarty Cadorette
Susan Moriarty Cadorette

STATE OF MAINE
CUMBERLAND, SS.

September 7, 2007

Personally appeared the above-named SUSAN MORIARTY CADORETTE and acknowledged the foregoing instrument to be her free act and deed.

Before me,

~~Notary Public~~/Attorney-at-Law

Print Name: Amy N. Dunn
My commission expires: N/A

O:\MAS\31836 Genesis\Home Start\Transfer Documents\Warranty Deed.doc

EXHIBIT A
18 Luther Street, Peaks Island, Portland, Maine

Certain lots or parcels of land, with the buildings thereon, situated on Peaks Island, City of Portland, County of Cumberland and State of Maine, bounded and described as follows:

PARCEL 1:

A certain lot or parcel of land with the buildings thereon situated on the northerly side of Luther Street on said Peaks Island, County of Cumberland, bounded and described as follows:

Beginning on the northerly sideline of Luther Street, at a stake or stones located one hundred four and eight tenths (104.8) feet easterly thereon from the southeasterly corner of land conveyed by Luther Sterling to Melville C. Sterling; thence northerly at right angles with Luther Street one hundred eight and one-half (108.50) feet more or less, to a point half way to Elizabeth Street; thence easterly on a line half way between Luther Street and Elizabeth Street, forty nine and eight tenths (49.80) feet to the northwesterly corner of Lot #7 (seven); thence southerly by said Lot #7 (seven) one hundred four (104) feet, more or less, to the northerly side line of Luther Street; thence westerly by Luther Street, forty nine and eight tenths (49.80) feet to the point of beginning. Being Lot #5 (five) on the above mentioned Plan.

Being the same premises conveyed by warranty deed from Susan Moriarty, Trustee of the Moriarty Maine Property Realty Trust to Susan Moriarty dated June 4, 1998 and recorded in the Cumberland County Registry of Deeds in Book 14020, Page 225.

PARCEL 2:

A certain lot or parcel of land at Peaks Island, City of Portland, County of Cumberland and State of Maine, one (1) parcel bounded and described as follows:

A certain lot of land being known as designated as Lot #7 (seven) as shown on Plan of Homestead Lot of late Luther Sterling, Plan E, made by C. H. Howe, C.E. dated November, 1883 and recorded in Cumberland County Registry of Deeds in Book 516, between Pages 210 and 211.

Being the same premises conveyed by warranty deed from Susan Moriarty, Trustee of the Moriarty Maine Property Realty Trust to Susan Moriarty dated June 4, 1998 and recorded in the Cumberland County Registry of Deeds in Book 14020, Page 228.

PARCEL 3:

A certain lot or parcel of land at Peaks Island, City of Portland, County of Cumberland and State of Maine, one (1) parcel bounded and described as follows:

Beginning in the northerly line of Luther Street at a stone, distant two hundred five (205) feet from the home lot now or formerly of Melville C. Sterling; thence easterly by said Luther Street fifty-three and six tenths (53.60) feet to another stone bound and from these two stones extending northerly one-half way to Elizabeth Street, the easterly line of said lot being about ninety seven and one-half (97 ½) feet and the westerly line about one hundred eleven and one-half (111.50) feet in length and being Lot #9 on a plan made by C. W. Howe and recorded in the Cumberland County Registry of Deeds in Book 516, Page 210, being the lot of land conveyed to Elva E. Rich by Luther A. Sterling by deed dated November 3, 1892 and recorded in said Registry of Deeds in Book 596, Page 105.

Being the same premises conveyed by warranty deed from Susan Moriarty, Trustee of the Moriarty Maine Property Realty Trust to Susan Moriarty dated June 4, 1998 and recorded in the Cumberland County Registry of Deeds in Book 14020, Page 231.

Received
Recorded Register of Deeds
Sep 07,2007 02:44:38P
Cumberland County
Pamela E. Lovley

SHORT FORM QUITCLAIM DEED WITH COVENANT

HOME START, a Maine nonprofit corporation having its principal place of business on Peaks Island in Portland, Maine ("Grantor"), FOR CONSIDERATION PAID, grants to VOLUNTEERS OF AMERICA NORTHERN NEW ENGLAND, INC., a Maine nonprofit corporation with a place of business in Brunswick, Maine and having a mailing address of 14 Maine Street, Suite 301, Brunswick, Maine 04011 ("Grantee"), WITH QUITCLAIM COVENANT, the following described real property located at 22 and 26 Luther Street, Peaks Island in Portland, Cumberland County, Maine, and more particularly described on:

SEE EXHIBIT "A" ATTACHED HERETO AND MADE A PART HEREOF.

MAINE REAL ESTATE TAX PAID

The above-described property is conveyed subject to the terms and conditions of the Conditional Zoning Agreement dated January 5, 2011, attached to the copy of the City Council Order and recorded in the Cumberland County Registry of Deeds at Book 28433, Page 235, including the affordability restrictions that are provided within the Conditional Zoning Agreement. The affordability restrictions restrict the sale or lease of the above-described property to individuals with household incomes at 120% or less of the U.S. Department of Housing and Urban Development moderate-income figure for metropolitan Cumberland County Maine. The affordability restrictions shall be binding upon the Grantee, its successors and assigns.

The above-described property is also subject to a Declaration of Affordable Housing Covenants for Home to Be Sold to Qualified Purchasers by Grantee to be recorded of even or near date.

IN WITNESS WHEREOF, HOME START has caused this instrument to be signed and sealed by Ellen C. Mahoney, its duly authorized President, this 24 day of July, 2012.

WITNESS:

Susan Lucas

HOME START, Grantor

By: _____
Ellen C. Mahoney, its President

7/24, 2012

STATE OF MAINE
CUMBERLAND, SS.

Personally appeared the above-named Ellen C. Mahoney, President of HOME START, as aforesaid, and acknowledged the foregoing instrument to be her free act and deed in her said capacity and the free act and deed of said corporation.

Before me,

Susan Lucas

~~Notary Public~~/Attorney-at-Law
~~Print Name:~~ Susan Lucas
My commission expires: _____

EXHIBIT A

Two certain lots or parcels of land, together with all improvements thereon and all rights and easements related thereto, located on the northerly side of Luther Street on Peaks Island in Portland, Cumberland County, Maine, described as follows:

Parcel A:
[Map 87, Block Z, Lot 16]

The certain lot or parcel of land together with all improvements thereon and all rights and easements related thereto located on the northerly side of Luther Street on Peaks Island, in Portland, Cumberland County, Maine which is designated as Lot #7 (seven) on the plan entitled "Plan of Homestead of late Luther Sterling, Plan E, made by C.H. Howe, C.E., dated November, 1883", and recorded in the Cumberland County Registry of Deeds in Book 516, between Pages 210 and 211. Said Lot 7 has also been described as follows:

Commencing (but not beginning) at an iron marker found on the northerly side of Luther Street, at the southwesterly corner of land now or formerly of Leslie M. Kaynor and Edward D. Kaynor, (see Book 24723, Page 317);

Thence S 68°04'29" W along said sideline of Luther Street, a distance of 53.60 feet to the true point of beginning;

Thence N 21°55'31" W, along Lot 9 on the aforementioned 1883 plan by Howe, a distance of 104.10 feet to a point and land now or formerly of Samuel S. Saltonstall (see Book 25196, Page 268);

Thence S 71°10'46" W, along said Saltonstall land and land now or formerly of Lisa K. Lynch (See Book 15741, Page 68), a distance of 51.07 feet to a point;

Thence S 21°55'31" E, along being retained by the grantor herein and which is Lot #5 on said 1883 Howe plan, a distance of 106.87 feet to a point on the northerly sideline of said Luther Street;

Thence N 68°04'29" E along said sideline of Luther Street, a distance of 51.00 feet to the point of beginning.

Being and meaning to convey, and hereby conveying, the same premises as designated as " Parcel 2" in the deed to the grantor herein which is recorded in the Cumberland County Registry of Deeds in Book 25452, Page 211. Further reference is made to the plan depicting the herein conveyed parcel and other parcels, entitled "Boundary & Topographic Survey, on Luther Street, Peaks Island, Portland, Maine, Made for Record Owner Homestart (sic)", by Owen Haskell, Inc., dated September 23, 2009, and stamped by John C. Schwanda, PLS No. 1252, which is believed to be unrecorded. Further reference is made to the Subdivision Plan entitled "18 Luther Street, Peaks Island, Portland, Maine, for HOMESTART" dated August 5, 2010, as

revised on September 7, 2010 and further revised on November 22, 2010 by Walsh Engineering Associates, Inc. and recorded on June 13, 2012 in Plan Book 212, Page 177.

Parcel B:
[Map 87, Block Z, Lot 15]

The certain lot or parcel of land together with all improvements thereon and all rights and easements related thereto, located on the northerly side of Luther Street on Peaks Island, in Portland, Cumberland County, Maine which is designated as Lot #9 (nine) on the plan entitled "Plan of Homestead of late Luther Sterling, Plan E, made by C.H. Howe, C.E., dated November, 1883", and recorded in the Cumberland County Registry of Deeds in Book 516, between Pages 210 and 211. Said Lot 9 has also been described as follows:

Beginning at an iron marker found on the northerly side of Luther Street, at the southwesterly corner of land now or formerly of Leslie M. Kaynor and Edward D. Kaynor, (see Book 24723, Page 317);

Thence N 21°55'31" W, along said Kaynor land, a distance of 101.20 feet to another iron marker found;

Thence S 71°10'46" W, along land now or formerly of Samuel S. Saltonstall (see Book 25196, Page 268), a distance of 53.68 feet to a point;

Thence S 21°55'31" E, along Lot #7 on said 1883 plan by Howe, a distance of 104.10 feet to a point on the northerly sideline of said Luther Street;

Thence N 68°04'29" E along said sideline of Luther Street, a distance of 53.60 feet to the point of beginning.

Being and meaning to convey, and hereby conveying, the same premises as designated as " Parcel 3" in the deed to the grantor herein which is recorded in the Cumberland County Registry of Deeds in Book 25452, Page 211. Further reference is made to the plan depicting the herein conveyed parcel and other parcels, entitled "Boundary & Topographic Survey, on Luther Street, Peaks Island, Portland, Maine, Made for Record Owner Homestart (sic)", by Owen Haskell, Inc., dated September 23, 2009, and stamped by John C. Schwanda, PLS No. 1252, which is believed to be unrecorded. Further reference is made to the Subdivision Plan entitled "18 Luther Street, Peaks Island, Portland, Maine, for HOMESTART" dated August 5, 2010, as revised on September 7, 2010 and further revised on November 22, 2010 by Walsh Engineering Associates, Inc. and recorded on June 13, 2012 in Plan Book 212, Page 177.

Received
Recorded Register of Deeds
Jul 25,2012 03:10:32P
Cumberland County
Pamela E. Lovley

AMENDMENT TO CONDITIONAL ZONE AGREEMENT

RE: C-55

AGREEMENT made this ____ day of _____, 2019 by Home Start, a 501(c)(3) non-profit corporation with a place of business in Portland, Maine ("Developer"), and its successors and assigns.

WITNESSETH

WHEREAS, the Developer owns land and an existing building located at 18 Luther Street, shown on City of Portland Tax Map 87, Block Z, Lot 17, and more particularly described as Parcel 1 in a deed recorded in the Cumberland County Registry of Deeds in Book 14020, Page 231 (the "Property"); and

WHEREAS, the Property is one of three parcels subject to an existing Conditional Zone Agreement, dated January 5, 2011, ("Existing CZA") which limits the use of the three parcels to three (3) single family residential units; and

WHEREAS, the existing building located on the Property is currently used to house one single family affordable residence and the other two parcels of the Existing CZA are currently used to house one single family residence on each parcel for a total of three (3) single family residential units; and

WHEREAS, the Developer intends to add one (1) accessory dwelling unit ("ADU") to the Property (the "Proposed Development"), which shall be leased as affordable to households earning one hundred and twenty percent (120%) or less of the U.S. Department of Housing and Urban Development (HUD) Area Median Income (AMI) for Cumberland County, Maine; and

WHEREAS, ADUs are a conditional use in the surrounding and underlying Island Residential Zone (IR-2); and

WHEREAS, the Developer intends to maintain the single family appearance of the Property and complement the adjacent residential neighborhood; and

WHEREAS, the Proposed Development would provide needed affordable housing on Peaks Island and is consistent with the housing component of the Comprehensive Plan;

NOW, THEREFORE, in consideration of this Amendment, the Developer covenants and agrees as follows:

1. The requirements of the Existing CZA shall apply and are modified to allow an addition of one (1) ADU on the Property.

2. The ADU shall be a minimum of four hundred (400) square feet and subject to the applicable dimensional requirements of the Existing CZA, which are restated below:

a.	Minimum Lot Area	5,300 sq. ft.
b.	Min. Street Frontage	49 ft
c.	Min. Front Yard Setback (Lot 17)	1 ft
d.	Min. Rear Yard Setback	25 ft
e.	Min. Side Yard Setback (Lot 17)	6.5 ft
f.	Maximum Building Height	35 ft
g.	Min. Lot Width	49 ft
h.	Maximum Lot Coverage	28% of Lot

3. The Developer or its designee agrees to maintain the following affordability controls on the Proposed Development on the Property:

a. The ADU shall be leased on an annual basis to households earning no more than 120% of the HUD AMI for Cumberland County, Maine.
b. If the entire Property is sold, it shall be sold to a household earning no more than 120% of the HUD AMI for Cumberland County, Maine per the Existing CZA and the maximum sale price shall be calculated per the City of Portland's "Inclusionary Zoning Implementation Guidelines for Developers of Homeownership Housing" (the "Inclusionary Guidelines"). The potential rental income of the ADU shall not be included in determining the buyer's eligibility as a household earning 120% AMI or less, however, in calculating the maximum sale price per the Inclusionary Guidelines, the ADU shall be considered a 1-person household in addition to the 3-person household size of the existing 3-bedroom single family residence. In the event the Inclusionary Guidelines are no longer in effect at the time of sale, the maximum allowable purchase price shall be based on calculating the present value of a 30 year fixed rate mortgage with a 5% down payment, an interest rate based on the average national mortgage rate over the past thirteen years as determined by the Freddie Mac Primary Mortgage Market Survey, and a monthly mortgage payment based on 30% of the gross monthly income for a 4-person household earning 120% AMI minus other monthly housing expenses such as real estate taxes, mortgage insurance, and insurance. Any future owner of the Property shall be required to rent the ADU on an annual basis to households earning no more than 120% AMI for Cumberland County, Maine per 3(a) above.
c. The above affordability restrictions shall be stated in and secured by a Declaration of Affordable Housing Covenants and Restrictions for the Property, which shall be enforceable by Home Start and the City of Portland, or their designees and shall be recorded in the Cumberland County Registry of Deeds along with an original of this Agreement.

4. In the event of a breach by the Developer or its successors or assigns of the zoning provisions contained herein (whether the Zoning Administrator, the Zoning Board of Appeals or a court determines such breach), the Planning Board, after notice and hearing, may recommend to the City Council that the conditional zone and this Agreement be amended, or be rescinded, such rescission to result in the termination of this Agreement and a reversion of the

Property to the IR-2 zone requirements in place before execution of this Agreement. However, any action by the owner of the other two parcels included in the Existing CZA (identified on the City of Portland Tax Map 87, Block Z, Lots 15 and 16) shall not be determined to be a breach by the Developer of this Agreement.

5. This conditional rezoning agreement shall be enforced pursuant to the land use enforcement provisions of state law including, but not limited to, 30-A MRSA § 4452 and the Portland City Code.

6. If any of the restrictions, provisions, conditions, or portions thereof set forth herein is for any reason held invalid or unconstitutional by any court of competent jurisdiction, such portion shall be deemed as a separate, distinct, and independent provision and such determination shall not affect the validity of the remaining portions hereof.

7. Except as expressly modified herein, the development shall be governed by and comply with the provisions of the Portland City Code and any applicable amendments thereto or replacement thereof.

WITNESS: HOME START

_____ _____

Print Name: By:
Its:

STATE OF MAINE
CUMBERLAND, ss. _____, 2019

Personally appeared before me the above-named _____, in her capacity as President of Home Start, and acknowledged the foregoing instrument to be her free act and deed in her said capacity and the free act and deed of said corporation.

Before me,

_____

Notary Public/Attorney at Law

Doc#: 2061 Bk#28433 Pg: 235

Order 118-10/11
Feb 28 12-20-10

NICHOLAS M. MAVODONES (MAYOR)
KEVIN J. DONOGHUE (1)
DAVID A. MARSHALL (2)
EDWARD J. SUSLOVIC (3)
CHERYL A. LEEMAN (4)

CITY OF PORTLAND
IN THE CITY COUNCIL

JOHN R. COYNE (5)
JOHN M. ANTON (A/L)
DORY RICHARDS WAXMAN (A/L)
JILL C. DUSON (A/L)

ORDER APPROVING AMENDMENTS TO CONDITIONAL ZONING AGREEMENT WITH HOME START FOR PROPERTY LOCATED ON LUTHER STREET ON PEAKS ISLAND

ORDERED, that the Conditional Zoning Agreement with Home Start approved on July 19, 2010, is hereby amended in substantially the same form as shown on Attachment 1 hereto.

A TRUE COPY
ATTEST: Katherine A. Jones - Acting City Clerk

Portland, Maine
DATE 1/10/2011

SEAL

Given First Reading on 12/20/10
Public Hearing & Passage 1/3/11 7-0 (Anton, Suslovic out)

CONDITIONAL ZONE AGREEMENT
RE:
Home Start

AGREEMENT made this 5th day of January, 2011 by Home Start, a 501c 3 Non-profit corporation with a place of business in Portland, Maine ("Developer"), and its successors and assigns.

W I T N E S S E T H

WHEREAS, the Developer has acquired land and buildings located at 18 Luther Street, consisting of parcels shown on City of Portland Tax Map 87 Block Z, Lots 15, 16, and 17, and more particularly described in a deed from dated and recorded in the Cumberland County Registry of Deeds in Book 14020, Page 231 (the "Property"); and

WHEREAS, the existing building located on the Property is currently used to house a single family affordable residence; and

WHEREAS, the remaining portion of the Property remains undeveloped; and

WHEREAS, the homes on the Property will be constructed to be energy efficient;

WHEREAS, there is available public water and sewer to service the Property;

WHEREAS, the Developer intends to develop two (2) affordable single family homes on the remaining undeveloped land, which shall be sold or leased as affordable to buyers with household incomes one hundred and twenty (120%) percent or less of the U.S. Department of Housing and Urban Development moderate-income figure for metropolitan Cumberland County Maine; and

WHEREAS, if Maine State Housing funds are available for such purposes, the Developer intends to rehabilitate or replace the existing house located on Property, which shall be owned by the Developer or an appropriate designee and leased as affordable to tenants with household incomes less than one hundred and twenty percent (120%) of the U.S. Department of Housing and Urban Development moderate-income figure for metropolitan Cumberland County Maine; and

WHEREAS, if the Maine State Housing funds are unavailable, the Developer intends to sell the existing house located on the Property as affordable to buyers with household incomes less than one hundred and twenty percent (120%) of the U.S, Department of Housing and Urban Development moderate-income figure for metropolitan Cumberland County Maine; and

WHEREAS, the Developer intends to maintain the character of the Property and complement the adjacent residential neighborhood; and

WHEREAS, the existing zoning is IR-2 which requires 20,000 square feet of land area per unit, and which results in a limitation of one (1) unit upon the Property; and

WHEREAS, the Developer has requested a rezoning of the Property in order to permit the proposed redevelopment and reuse of the property from a single family residence to three (3) single family residential units; and

WHEREAS, the Portland Planning Board has determined the rezoning and proposed development would provide needed affordable housing on Peaks Island as is consistent with the housing component of the Comprehensive Plan; and

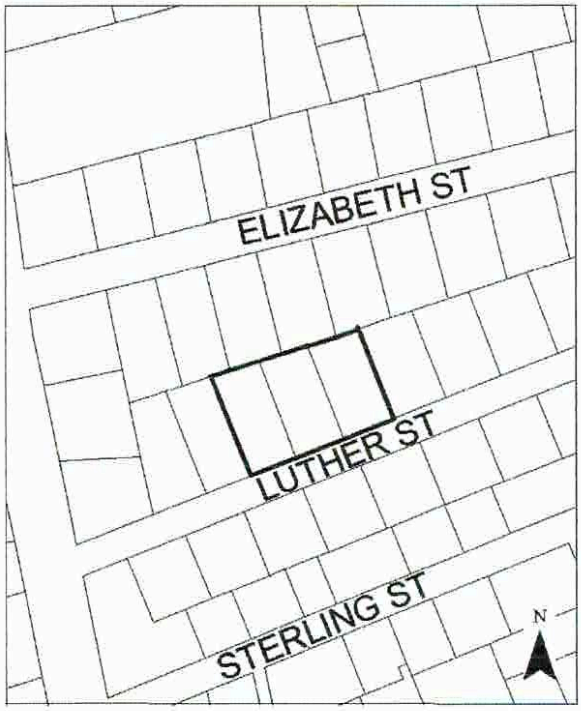
WHEREAS, the Planning Board, after notice and hearing and due deliberation thereon, recommended the rezoning of the Property as aforesaid, subject, however, to certain conditions contained in this Agreement; and

WHEREAS, the Portland City Council, pursuant to 30-A M.R.S.A. § 4352(8) and Portland City Land Use Code (the "Code") §§ 14-60 to 14-62, after notice, hearing and due deliberation thereon, has determined that because of the unusual nature and unique location of the proposed development, and its minimal impact on and compatibility with the surrounding community, it is necessary and appropriate to recommend the rezoning of the Property as aforesaid, with the following conditions and restrictions set forth in this Agreement; and

WHEREAS, the Portland City Council has on January 3, 2011 approved this Agreement in its entirety, by City Council Order No. 117-10/11, a true copy of which is attached hereto as Attachment 1 (the "Order");

NOW, THEREFORE, in consideration of the rezoning, the Developer covenants and agrees as follows:

1. Pursuant to the Order, the City shall amend the Zoning Map of the City of Portland, dated September, 2000 (as amended from time to time and on file in the Department of Planning and Urban Development, and incorporated by reference into the Zoning Ordinance by § 14-49 of the Code) by adopting the map change amendment shown below to zone the property IR-2, subject to the conditions contained below.



16-18 Luther Street
Proposed Conditinal Rezoning

If this Agreement is not recorded within sixty (60) days after the effective date of the City Council's approval of the Order, then the conditional rezoning shall become null and void and the zoning of the Property shall revert to the pre-existing IR – 2 zone.

2. The use of the Property shall be for a maximum of three (3) affordable single-family residential homes (1 existing unit and 2 new units). No additional units shall be developed, and the two (2) new units shall be developed substantially as delineated and depicted on the Site Plan, attached hereto as Attachment 2, entitled "Site Plan – conditional zone 18 Luther Street, Peaks Island, Portland Maine" for Home Start Prepared by Walsh Engineering Associates, Inc. dated September 7, 2010.

3. The underlying dimensional requirements of the IR-2 zone shall apply and are modified as follows:

a.	Minimum Lot Area	5,300 Sq. ft.
b.	Min Street Frontage	49 ft
c.	Min. Front Yard Setback (Lots 15&16)	10 ft
d.	Min. Front Yard Setback (Lot 17)	1 ft*
e.	Min. Rear Yard Setback	25 ft
f.	Min. Side Yard Setback (Lots 15&16)	8 ft
g.	Min. Side Yard Setback (Lot 17)	6.5 ft.**
h.	Max. Building Height	35 ft
i.	Min. Lot Width	49 ft
j.	Max. Lot Coverage	28% of Lot

* Existing house on Lot 17 currently has a 1-foot front yard setback. If the house is reconstructed, it will be required to meet the 10-foot front yard setback requirement.

** Existing house on Lot 17 currently has a 6.5-foot side yard setback. If the house is reconstructed, it will be required to meet the 8-foot side yard setback requirement.

4. The Developer or its designee agrees to maintain the following affordability controls on the proposed development on the Property:

a. The two (2) new single family units shall be initially developed, marketed and sold and or leased to individuals with household incomes at 120% or less of the U.S. Department of Housing and Urban Development moderate-income income figure for metropolitan Cumberland County Maine, as calculated for the year in which the sale takes place (a "Qualified Purchaser"), and shall be priced to be affordable to a Qualified Purchaser. Each of the Qualified Purchasers of these two (2) single family units shall occupy the units as their principal residences, except that a Qualified Purchaser may rent a unit for a period not to exceed twelve (12) months in any thirty-six (36) month period, to enable the Qualified Purchaser to address matters such as divorce, transfer of employment, economic hardship and the like. Transient rentals shall not be permitted. Affordability shall be preserved in perpetuity through a deed restriction and legal documentation. Any such additional affordability restrictions or controls shall be reviewed and approved by the City of Portland corporation counsel's office. In the event that the purchase price for either of these two (2) single family units is subsidized as a result of public or private funds made available to make the purchase of such unit more affordable, a junior mortgage shall be placed upon such unit, representing the amount of the subsidy received. In the event that an initial Qualified Purchaser sells one of these two (2) units to another Qualified Purchaser, the junior mortgage shall not be repaid, but shall be assumed by the subsequent Qualified Purchaser, who shall own and hold these housing units subject to a junior mortgage in the same manner as an initial Qualified Purchaser.

b. The existing unit shall be developed, marketed, sold and resold and/or leased as long as the Property remains a residential unit, to Qualified Purchasers or Tenants with household incomes at one hundred and twenty percent (120%) of the U.S. Department of Housing and Urban Development moderate-income income figure for metropolitan Cumberland County Maine, as calculated for the year in which the sale takes place. The Qualified Purchasers/Tenants of this single family unit shall occupy the unit as their principal residence, except that a Qualified Purchaser may rent a unit for a period not to exceed twelve

(12) months in any thirty-six (36) month period, to enable the Qualified Purchaser to address matters such as divorce, transfer of employment, economic hardship and the like. Transient rentals shall not be permitted. A junior mortgage may be placed upon such housing unit, to further secure the continued affordability covenants contained in the Declaration of Affordability Covenants for Rental Property Owned by Home Start.

c. All of these affordability restrictions shall be stated in and secured by a Declaration of Affordable Housing Covenants and Restrictions for the purchased and leased property, other deed restriction(s) and/or condition(s) in any deed(s) conveyed out by the Developer, shall be stated in the housing documents, shall be identified on the approved Site Plan for the Property, and shall be reviewed and approved by the City of Portland corporation counsel's office. The affordability covenants contained in the Declaration of Affordable Housing Covenants for the purchased and leased property shall be enforceable by Home Start and the City of Portland, or their designees.

5. The Qualified Purchasers/Tenants shall be responsible for ongoing maintenance of the Property, including snowplowing, salting, sanding, sweeping, lighting, trash pickup (at least weekly), mowing, etc. Qualified Purchasers will be required to take a home education course offered through MaineHousing to ensure that these responsibilities are fully outlined.

6. The provisions of this Agreement are intended to replace and/or supersede the requirements of the underlying IR-2 zone. As stated above, to the extent not otherwise altered herein, the zoning requirements for the IR-2 zone shall otherwise apply to the Property.

7. In the event of a breach by the Developer or its successors or assigns (including, but not limited to, any homeowners association) of the zoning provisions contained herein (whether the Zoning Administrator, the Zoning Board of Appeals or a court determines such breach), the Planning Board, after notice and hearing, may recommend to the City Council that the conditional zone and this Agreement be amended, or be rescinded, such rescission to result in the termination of this Agreement and a reversion of the Property to the IR-2 zone requirements in place before the execution of this Agreement.

8. The above stated restrictions, provisions, and conditions are an essential part of the rezoning, shall run with the Property, shall bind and benefit the Developer, any entity affiliated with the Developer that takes title to the Property, its successors and assigns (including, but not limited to, any homeowners association), and any party in possession or occupancy of said Property or any part thereof, and shall inure to the benefit of and be enforceable by the City of Portland, by and through its duly authorized representatives. The Developer shall file a counterpart original of this Agreement in the Cumberland County Registry of Deeds. Without limiting the generality of the forgoing,

WITNESS: Rosellen Walsh

Home Start

BY: Ellen C. Mahoney
President, HomeStart

STATE OF MAINE
CUMBERLAND, ss.

January 5, 2011

Personally appeared before me the above-named Ellen C. Mahoney, in her capacity as President of Home Start, and acknowledged the foregoing instrument to be her free act and deed in her said capacity and the free act and deed of said corporation.

Before me,

Priscilla Webster
Notary Public/Attorney at Law

Priscilla Webster

MY COMMISSION EXPIRES
MAY 30, 2011

SEAL

Received
Recorded Register of Deeds
Jan 10,2011 11:16:16A
Cumberland County
Pamela E. Lovley

Amendment to Conditional Zone Agreement Re: C-55
Consistency with Comprehensive Plan

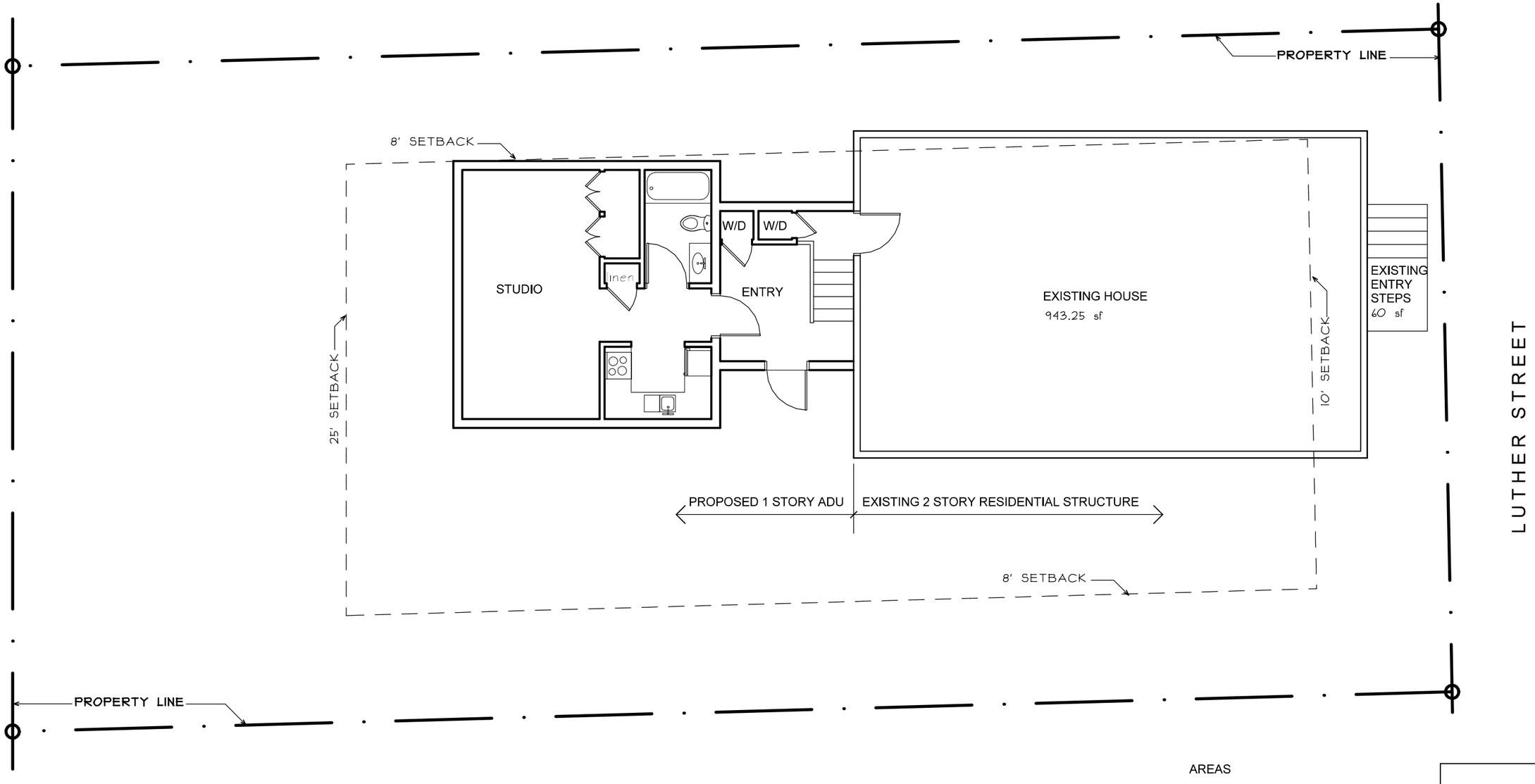
The requested Amendment to Conditional Zone Agreement Re: C-55 allowing the addition of a year-round accessory dwelling unit for an income-qualified household in a walkable neighborhood, is consistent with the goals, policies and land use plan of Portland's Comprehensive Plan.

Portland's Plan establishes a vision for a city that is equitable, sustainable, dynamic, secure, authentic, and connected. The proposed amendment would provide equitable, sustainable, and secure housing that contributes to a dynamic and authentic neighborhood in the village of Peaks Island.

The Housing Policy Guide states "the lack of sufficient housing supply and the affordability of that housing for a healthy socioeconomic cross-section of the population remain urgent challenges." It identifies zoning and policy changes as a tool to support a more equitable and diverse housing supply (including facilitating the creation of accessory dwelling units for income-qualified households). Through the creation of a year-round accessory dwelling unit for an income-qualified household in a walkable, complete neighborhood, this Amendment would contribute to the following local goals identified in Portland's Plan: (1) increase, preserve, and modify the overall supply of housing city-wide to meet the needs, preferences and financial capabilities of all Portland residents; (2) encourage additional contextually appropriate housing density in and proximate to neighborhood centers, concentrations of services, and transit nodes and corridors as a means of supporting complete neighborhoods; (3) pursue policies to enable people who work in Portland to have the option to live in Portland; and (4) encourage quality, sustainable design in new housing development. Furthermore, this Amendment is consistent with the City's future strategies for housing, specifically, to "support land use tools that encourage year-round residences in existing and new housing on Portland's islands, while maintaining their unique character and environment."

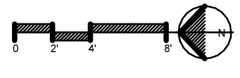
The village of Peaks Island is also identified as a priority node to be evaluated, an area "where the City recognizes the need to review existing conditions and develop a strategy for future change."

Att. F



AREAS

Existing footprint	1,003.25 sf
ADU Addition	525.75 sf
Total footprint	1,529.00 sf
Lot Area	5,389.31 sf
percentage lot coverage	28%



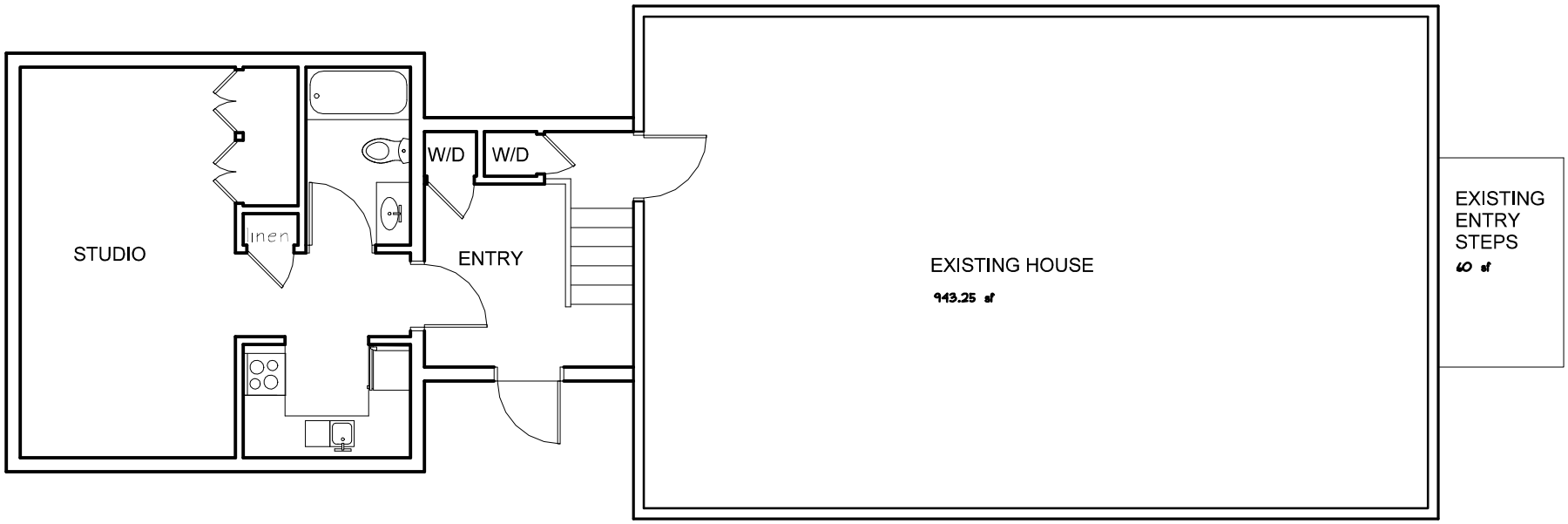
ACCESSORY DWELLING UNIT
18 LUTHER STREET
Peaks Island, Maine

Title:
SITE PLAN

Sheet No.
A-1.1

Scale: 1/8" = 1'-0"
Date: 10-9-17
Revised:

Att. G



AREAS

Existing footprint	1,003.25 sf
ADU Addition	525.75 sf
Total footprint	1,529.00 sf
Lot Area	5,389.31 sf
percentage lot coverage	28%



PROGRESS
7-20-16

ACCESSORY DWELLING UNIT
18 LUTHER STREET
Peaks Island, Maine

Title:
FIRST FLOOR PLAN

Sheet No.
A-1.1

Scale: 1/8" = 1'-0"
Date: 7-20-16
Revised:

Att. H



0 2' 4' 8'

PROGRESS
8-9-16

ACCESSORY DWELLING UNIT
18 LUTHER STREET
Peaks Island, Maine

Title:
WEST ELEVATION

Sheet No.
A-2.1

Scale: 1/8" = 1'-0"

Date:

Revised:

Memorandum
Planning and Urban Development Department
Planning Division

To: Sean Dundon, Chair, and Members of the Portland Planning Board
From: Shukria Wiar, Planner
Date: May 24, 2019
Re: 1884 Forest Avenue, John Chau
Project #: PL-000314-2018 **CBL:** 327-B-003
Meeting Date: May 28, 2019

I. INTRODUCTION

Jim Seymour of Sebago Technics on behalf of John Chau is requesting a workshop with the Planning Board for his project at 1884 Forest Avenue. The applicant is proposing to develop the site into two buildings that will consist of a convenience store with eight fueling stations and a mixed-use retail space. The area of the vacant parcel is 72,350 SF square feet (1.61 acres). The site was rezoned from R5 Residential to B2 Community Business in March 2009 to permit commercial development of the site. The applicant has submitted a preliminary site plan for the Planning Board's consideration. Since it is a preliminary application, there are a number of additional items that will be submitted in the final application. The primary points of interest for the Planning Board should be on the layout of the site, including internal traffic and pedestrian movement, building orientation and design, and landscaping.

Figure 1: Site of Proposed Development:



This proposal is a Level III Site Plan and a conditional use review requiring Planning Board review. The proposal is subject to the Site Plan Ordinance standard, B2 Design Standards, and the Conditional Use Standards for the auto service station. The project will also require a Traffic Movement Permit, which will be reviewed by the City under their delegated review authority.

Applicant Name	John Chau
Consultants	
Engineer	Jim Seymour, Sebago Technics
Architect	Ryan Senatore, Senatore Architecture
Surveyor	Matthew W. EK, Sebago Technics

II. PROJECT DATA

Waiver Requests	*Applicable Standards*
Number of driveways to a Site: The applicant proposes three driveways to the site. Two one-ways from Forest Ave and one two-way from Riverton Drive.	Technical Standard, Section 1.7.2.8, Number of Driveways, that states no more than two driveways shall be permitted for ingress and egress.

Review	*Applicable Standards*
Site Plan	*Section 14-526*
Conditional Use Standards	Sec. 14-183. Conditional uses
Design Review	B2 Design Standards
Traffic Movement Permit	

III. PROJECT DATA

Existing Zoning	B-2 Community Business
Existing Use	Vacant Site
Proposed Use	Auto Service Station and Retail
Parcel Size	72,350 SF (1.61) acres

	Existing	*Proposed*	*Net Change*
Impervious Area	443 SF	48,703 SF	SF
Building Footprint	0 SF	12,800 SF	12,800 SF
Building Floor Area	0 SF	12,800 SF	12,800 SF
Parking Spaces – Provided	0	48 of 4 are handicapped	
Parking Spaces – Required	54*		
Bicycle Parking Spaces	0	10	10
Estimated Cost of Project	$3,500,000		

* Both the proposed uses are retail. The total retail area is 12,800 SF. Under Section 14-332(h) exempts the first 2,000 SF of retail space. Therefore, 10,800 SF was used as the baseline, the total parking spaces need is 54 (at one space per 200 sf of retail space). It could also be interpreted that if the development consists of smaller individual retail units, the parking could be calculated for each unit separately (so a unit less than 2000 sf would not require any spaces). If the latter approach is taken, the individual retail spaces (1,302) would be exempt and only parking for the convenience store, which would be 15 spaces.

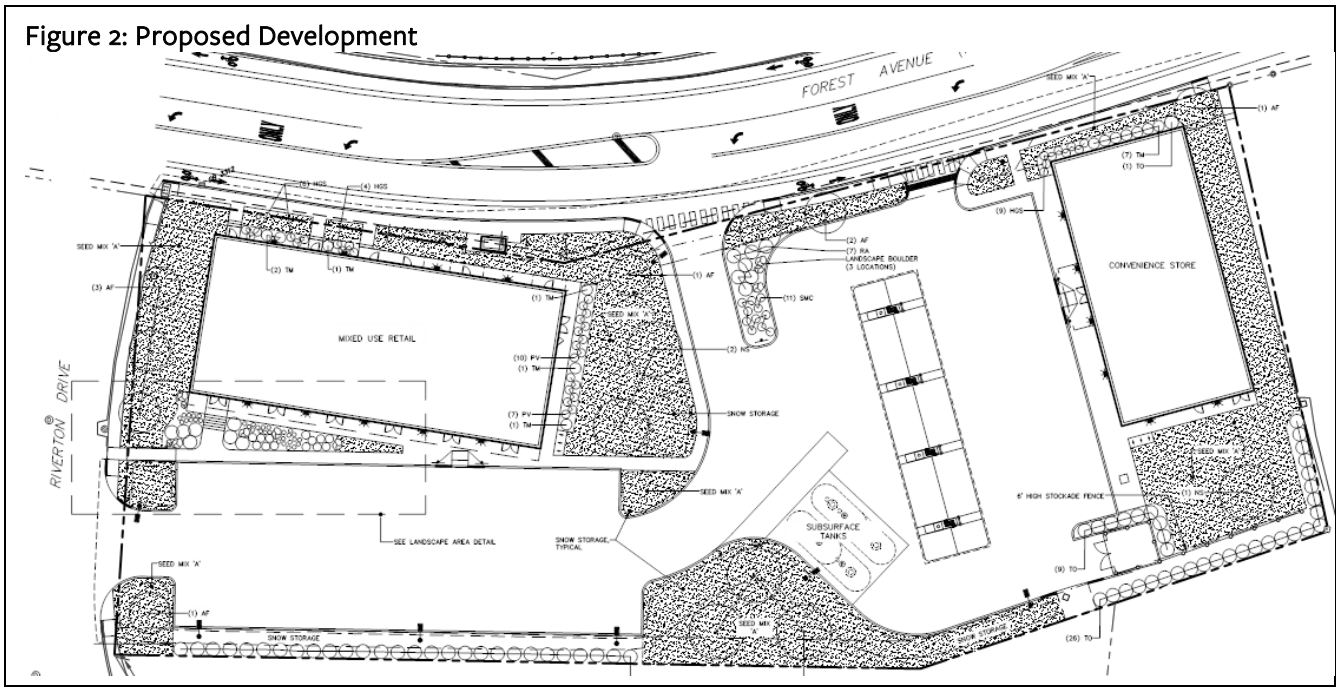
IV. EXISTING CONDITIONS

This parcel is currently undeveloped and is vegetated with mixed pine woods and high grass/brush field. The parcel abuts the Presumpscot Grange Hall to the south, which was converted to a karate studio. Riverton Park is a 150 residential unit development owned by the Portland Housing Authority to the west (rear) and Wellesley Estates is a 46 unit Planned Unit Residential Development (PRUD) to the southwest (rear). In addition to these properties, development in the immediate vicinity includes a 7-11 convenience store and gas station at the Riverside and Forest Avenue intersection; single and multi-family residential units (including Terrace Pond Apartments, a 21 unit multi-family residential development); an auto repair shop; a Family Dollar store; SCA Services Waste Management; Tortilla Flats Mexican restaurant; a Hannaford's supermarket; a plumbing and heating repair business; a landscaping contractor; and the Friends Quaker Meeting House. There was a zoning map amendment in March 2009 to change the zoning from R5 Residential to B2 Community Business to permit commercial development on the site. Presumpscot Grange Hall was included in the zoning map amendment.

IV. PROPOSED DEVELOPMENT

The applicant is proposing to develop the parcel with two buildings. The primary structure has a total ground floor area of 5,000 square foot that includes a convenience store with eight fueling pumps. The second structure is a 7,800 square foot mixed-use retail space. The site plans show a proposed ingress/ egress driveway that measures twenty-four (24) feet in width from Riverton Drive, one entry-only driveway of eighteen (18) feet, and an exit-only driveway of eighteen (18) feet. Both the latter driveways are located off of Forest Avenue. Vehicular access is proposed at each building. The building entrances for both structures are oriented internally. The mixed-use building does have entrances along Forest Ave but it is not clear if these entrances will be used as the primary entrances. The convenience store is without a direct connection to Forest Avenue.

Figure 2: Proposed Development



V. PUBLIC COMMENT

The Portland Housing Authority had submitted comments in regard to the project. Currently there is an access through way in the rear of the property from Riverton Park onto this site; Portland Housing Authority would like to maintain this access as the pedestrian access, which the applicant is willing to do. The survey plan does not show an access easement to Riverton Park.

A Neighborhood Meeting was held on January 3rd, 2019 at Riverton Elementary School. The attendance list and minutes of the meeting is included as Attachment B.

VI. RIGHT, TITLE AND INTEREST AND FINANCIAL/TECHNICAL CAPACITY

The owners of the property are John Chau and Phoung Neang. The applicant has provided a copy of a warranty deed, recorded at the Cumberland County Registry of Deeds (Book 26148 Page 266), which demonstrates their right, title and interest in the property. The estimated cost of the development is $3,500,000. The applicant has not submitted demonstration of their financial capacity to complete the proposed development, which will be required for the final plan review.

VII. ZONING ASSESSMENT

The proposed project is located in the B-2 Community Business Zone and an auto service station is a conditional use. The project is meeting the zoning requirements of the B-2 zone pending Planning Board approval for the conditional

use. Parking, impervious surface, and setbacks are being met. It is also noted that any HVAC equipment or other sound producing equipment will need to meet the B-2 zone maximum noise requirements.

The applicant will need to meet the conditional use criteria of the zoning ordinance. Since this project is for an auto service station, Section 14-183 (a) applies to this project:

> Notwithstanding section 14- 474(a)of this article or any other provision of this code, the Planning Board shall be substituted for the Board of Appeals as the reviewing authority and shall apply the following standards in addition to the provisions of section 14-474:
>
> 1. Signs: Signs shall not adversely affect visibility at intersections or access drives. Such signs shall be constructed, installed and maintained so as to ensure the safety of the public. Such signs shall advertise only services or goods available on the premises.
>
> Staff Review: A signage and wayfinding plans has been submitted for review. It appears that the signs are not adversely effecting visibility at interactions or access drives. Staff reviewing is pending.
>
> 2. Circulation: No ingress and egress driveways shall be located within thirty (30) feet from an intersection. No entrance or exit for vehicles shall be in such proximity to a playground, school, church, other places of public assembly, or any residential zone that the nearness poses a threat or potential danger to the safety of the public.
>
> Staff Review: The three proposed driveways are not located within thirty (30) feet from an intersection. The site is not in close proximity of a playground, school, church, other places of public assembly
>
> 3. Conditions specific to major or minor auto service stations, car washes and automobile dealerships:
>
> a. A landscaped buffer, no less than 5 feet wide, shall be located along street frontages (excluding driveways). The buffer shall consist of a variety of plantings in accordance with the City of Portland Technical Manual
>
> Staff Review: The proposed landscaping plan does not show a landscaped buffer along the street frontage. Jeff Tarling, City Arborist, has reviewed and recommended that street trees, as as well landscaped buffer, be proposed. Refer to Paragraph VIII.B.2. Environmental Quality Standards for Mr. Tarling's full recommendations.

VIII. DEVELOPMENT REVIEW

A. SITE PLAN SUBMISSION REQUIREMENTS (Section 14-527)

The applicant has submitted the material required for a preliminary plan and additional information meeting the submittal requirements for a final plan will be required at the time the final site plan is submitted.

B. SITE PLAN STANDARDS (Section 14-526)

The proposed development has been reviewed by staff for conformance with the relevant review standards of Portland's site plan ordinance and applicable regulations. Staff comments are listed below.

1. Transportation Standards

Tom Errico, Consultant Traffic Engineer with TY Lin, has reviewed the project and submitted information

from the applicant and has commented on the traffic. Mr. Errico's memorandum is included as Attachment 1. Some of the concerns expressed in the memorandum are about the layout of internal site circulation and the possible negative safety impacts to conditions on Forest Avenue, and the driveway spacing. Please refer to his memo for the full review comments.

a. Traffic Movement Permit

The proposed development will generate over 200 net new peak hour trips in the morning peak hour and the afternoon peak hour and thus a Maine DOT Traffic Movement Permit (TMP) is required due to the significant amount of traffic to be generated during the weekday peaks hours. The TMP scoping meeting was held on January 2nd, 2019. As part of the Traffic Movement Permit, the applicant was required to prepare a traffic impact study that assesses the project's impact at the driveways and at the Forest Avenue intersections with Riverside Street and Riverside Industrial Parkway, which the applicant has. Mr. Errico has reviewed this traffic impact study and has the following recommendations:

- *A review of driveways including elimination of the right-turn exit, is required. The Applicant shall provide supporting documentation for maintaining the right-turn only driveway. If the right-turn driveway is deemed necessary, the geometric alignment/configuration will need to seek a balance between vehicle movements, lower speeds, and pedestrian safety. I would note the current plan requires a waiver from City standards for the number of driveways.*

  Status: The study included a detailed evaluation of the driveway configurations and thus meets this requirement. The proposed driveway configuration is acceptable with recommended changes as identified by Mike Tremblay of DPW.

- *The Applicant shall evaluate the need for a left-turn lane on Forest Avenue. The site frontage shall reflect either a condition with a left-turn lane or, if not warranted, without. The current site plan is not acceptable given that it does not depict a left-turn lane and includes a westerly curb alignment with widening for a three-lane section on Forest Avenue.*

  Status: The applicant has provided an analysis of various access/egress scenarios. The study supports the need for a left-turn lane from an operational analysis perspective. I continue to review this and the plan details, but conceptually the provision of a left-turn lane seems appropriate.

- ***New Comments**: The study suggests improvements at the Forest/Riverside intersection. I continue to review the analysis and will provide comments in the future.*

b. Number of Driveways and Circulation

The development is currently proposed to have three driveways. This includes one full access drive on Riverton Drive, an entrance only-drive on Forest Avenue and a right-turn only exit drive on Forest Avenue. Per Technical Standard, Section 1.7.2.8, Number of Driveways, that states no more than two driveways shall be permitted for ingress and egress. The applicant will have to request a waiver of this standard to allow three driveways. Michael Tremblay, Senior Engineer with Department of Public Works, had reviewed the project and offers the following are some of his recommendation, refer to Attachment 2 for review comments:

- *The entrance driveway off of Forest Avenue is wider than desirable. While the technical manual does not outline a maximum width of a one-way driveway, a driveway width of 18 feet at its narrowest point seems excessive. Excessive driveway widths enable vehicles to make turns at*

higher speeds than narrow driveways, which can endanger other road users, especially pedestrians and bicyclists. [*For the record, we are working on updates to our technical manual and we will likely cap driveway width at 16 feet* (*at the property line*) *for one-way ingress, though widths closer to 12 to 12 feet are desirable.*] *The applicant should reduce this driveway width or provide vehicle turning movement diagrams that show that this width is necessary.*

- *The curb radius at the eastern corner of the entrance driveway from Forest Avenue need not be so large. It should be reduced to 5 feet to reduce the likelihood that the driveway will be mistaken for an exit. The curb ramp should be adjusted accordingly.*

- *A right-turn pavement marking, with "ONLY" stenciling, shall be provided at the exit driveway onto Forest Avenue. This restriction shall be reinforced with appropriate signage.*

- *Riverton Drive approaching Forest Avenue is striped as a left/thru lane. No pavement markings are necessary on this single-lane approach.*

- *The applicant can make a slightly more efficient use of their two parking areas by striping their HP-van spaces as two 8-foot spaces with an 8-foot access aisle, rather than two 11-foot spaces with 5-foot access aisle. This saves 3 feet in width in each area, which can be reallocated to snow storage or impervious surfaces.*

- *The applicant should conduct sight distance analysis* (*both stopping sight distance and intersection sight distance*) *to the west of the site entrance driveway. There is concern that a left-turning entering motorist may not be able to detect a Forest Avenue eastbound vehicle, particularly if there is a bus in the relocated bus stop.*

c. Internal Pedestrian Access, Sidewalks and Bus Stop

The applicant is proposing to install sidewalks along the frontage of the property. Parts of proposed sidewalk will be on the applicant's property. The bus stop is proposed to be placed at the northwest portion of the property. The applicant will need to give the City a pedestrian easement for these areas. The easements shall be part of the final application and Corporation counsel will need to review and approve the language. The applicant is also proposing internal pedestrian circulation from the main buildings to Forest Avenue. There is also pedestrian access from the mixed-use retail building to the convenience store. Mr. Tremlay has reviewed this and offers his recommendations:

- *The ADA ramps that adjoin two directions of sidewalk along Forest Ave are not oriented optimally. If possible, ramps should direct pedestrians across the crosswalk, rather than toward the roadway.*

- *The crosswalk across the entrance driveway from Forest Avenue is called out as 5 feet wide, and the crosswalk across the exit driveway is called out as 8 feet wide. Both are drawn as 5 feet wide. Because these crosswalks are in the city's ROW, they should be 8 feet wide and called out as such. The crosswalk across the driveway at Riverton Drive is drawn at 8 feet wide but called out as 5 feet wide; this should be drawn and called out at 8 feet wide. Crosswalk striping should be 24-inch wide, placed at 4 feet on center* (*so there is a 24-inch gap between each 24-inch marking*).

- *There are several building entrances located along the Forest Avenue frontage of the development. If these entrances are intended to be, or may possibly be, accessible to the general public, then an ADA-accessible path should be provided from the sidewalk along Forest Avenue, and access should be provided to all building entrances via an accessible walkway. As currently designed, two of these entrances are not ADA-accessible, and the remaining entrances would require someone to maneuver into the site and double back up toward Forest Avenue. If ADA-accessible entrances are not possible, then appropriate signage directing pedestrians toward the accessible entrance shall be provided in view of the inaccessible walkways so that those with accessibility needs know how to access the building.*

- *Related to the above, ensure that there are no stairs or other accessibility barricades within the areas of the buildings that are open to the public.*

2. Environmental Quality Standards

a. Landscaping and Landscape Preservation

The property currently has mature white pine trees that will be cleared for the proposed development. City staff members have encouraged the design team to consider opportunities to preserve the existing vegetation, but the condition of the trees and the on-site circulation does not make this feasible. The applicant is proposing plantings around the property. Due to the close proximity to residential development, there needs to be a thicker buffer around the rear of the property. Jeff Tarling, City Arborist, has reviewed the landscaping plan and suggests denser landscaping buffer area between this project and the residential dwellings in the rear of the property. Mr. Tarling comments state:

- *The proposed mixed-use development, convenience store, with fueling station is on a busy gateway into Portland and adjacent to a large housing project. The landscape treatment using trees and buffer planting are key elements to help this fit into the site given the nearby residential use. The site is currently wooded with a dense grove of White Pine. Two sides of the site should include wooden fencing with trees and shrub plantings to provide adequate screening from the noise and bright lights associated with the proposed use.*

He recommends the following to achieve a denser landscaping at the site:

a) Street trees - Forest Avenue edge - The current landscape plan offers little in the way of tree & landscape treatment along Forest Avenue in front of the mixed-use building where it is needed the most.... Improving the Forest Avenue streetscape with additional trees / landscape should be a condition of approval. This includes the mixed-use building and the ´bump out´ near the convenience store.

Additional trees & landscape -
Within the project site we noticed a few more areas that we would like to see trees and landscape to meet the parking lot landscape standards:

a) The include the ´bump out´ to the right of the mixed use retail parking space, shown as snow storage and SEED MIX ´A", while snow storage is needed the value of landscape exceeds snow storage or finding a compromise of tree and landscape that can take some winter snow loading as we see in similar sites.

b) The property boarder near the fueling station shown as 'Snow storage' should have a planting of 2 taller, upright shade trees or 5 Arborvitae directly below the fuel island, the future added height will help screen the canopy lights and glare.

c) Convenience store boarder - the property line along the southerly edge of the site should have some degree of landscape and or wood fencing to provide buffering on that side of the project. The adjacent site next door could see future changes and the back side of a convenience store should have some screening both from the northbound traffic on Forest Avenue and the next-door property. We can suggest options such as fencing with perhaps similar Arborvitae planting in groups vs a continuous line.

b. Water Quality, Storm Water Management and Erosion Control

This project is required to comply with the MaineDEP Basic and General Standards and the City will be the reviewing stormwater under it delegated review authority. In addition to the Basic and General Standards, the City of Portland requires that all Level III site plan applications conform to the Flooding Standards. The applicant has requested a waiver of this standard. The project development will require removal of most of the vegetation on the site. The site will be revegetated in accordance with the City regulations. The project will utilize a Subsurface Underdrained Soil Filter for stormwater treatment and detention. Lauren Swett, Consultant Engineer with Woodard and Curran, has conducted a review of the project and has requested to clarify the information submitted from the applicant, below:

- *The stormwater narrative notes that there is a 0.01 cfs increase in flow in the 10- and 25-year storm events. I think there was a page missing from the stormwater report with the comparison table, but they did have a table on the stormwater figure. I went through the model though, and I think there was a decimal point error and they are increasing flow in the 10-year storm by 0.1 cfs and in the 25-year storm by 0.28 cfs.*

- *They have requested a waiver of the flooding standard. …. they are tying into the Riverton Drive stormdrain. They have a significant system on their site, and their struggle is that with the undeveloped site it is essentially zero.*

3. Public Infrastructure and Community Safety Standards

a. Public Safety and Fire Prevention

Chief Robert Thompson of the Fire Department has reviewed the proposed project and states that the Fire Department has no concerns about this project as presented in the original site plan, and recommends the oneway entrance from Forest Avenue to be reduced to sixteen (16') feet.

b. Availability and Adequate Capacity of Public Utilities

The applicant will need to submit adequate capacity letters of public utilities as part of the final application

4. Site Design Standards

a. Snow and Ice Loading

The applicant shows the snow storage on the site plan. If snow is being removed from site, a management plan will need to be submitted as well.

b. Exterior Lighting

A lighting/ photometric plan been submitted for review. All the proposed lighting and catalogue cuts for all proposed fixtures and shall meet the new lighting standards of the Technical Manual, Section 12, specifically the lighting trespass at property boundaries and illumination levels.

c. Noise and Vibration

The applicant has not submitted any information on mechanical equipment (including emergency generator). All mechanical equipment will need to be shown on the site plans and noise levels information submitted for review.

d. Signage and Wayfinding

A signage plan has been submitted that shows the directional traffic signs. Staff review is pending.

e. Zoning Related Design Standards

The project at 1884 Forest Avenue was reviewed according to the *City of Portland Design Manual* standards by Caitlin Cameron, Urban Designer, Shukria Wiar, Planner, and Jean Fraser, Planner against *the B2 Commercial Business Zones Standards* (Design Manual).

- ***Standard (1) d. Windows*** – Windows provided on all street-facing façades. ***.7 VT required***.

- ***Standard (1) e. Façade Character*** – *Convenience Store*: The building location is relatively close to the street and includes some storefront windows and an entrance facing the street. ***The orientation of this building is away from the street towards the surface parking lot – does not meet the standard. Clarify whether there is a functional entrance facing the street.*** Mixed Use: Building meets this standard with direct orientation of storefront and doors to the street with canopies and signage. ***These doors must be functional.***

  Mixed-use: This building is oriented to the street and has storefront/entrances directly accessible from the sidewalk. However, ***retail frontage should have direct relationship to sidewalk with hardscape – update the site plan to show this connection and interface.***

- ***Standard (1) f. Building Design*** – The building design is consistent with the type of commercial building in the same streetscape and off-peninsula character. Though only one-story, building has some elements (dormers, pitched roofs) making it slightly more appropriate height for the wide commercial street and create a compatible character with the residential neighbors.

- ***Standard (1) g. Building Materials*** – Clapboard and storefront are considered compatible. Convenience Store: A strong, durable base material is logical - ***masonry base would be more appropriate than stone (which is not found in this context). The stone panels next to the entrance are heavy and out of place*** – clapboard would be more appropriate material placement.

- ***Standard (1) i. Landscaping and Buffers*** – Convenience Store: Is there a door from the sidewalk and does it include a direct connection to sidewalk? ***Do not landscape the curb extension – provide paved, direct path from cross walk to entrances.***

- Mixed-use: ***Loam and Seed between sidewalk and retail frontage is not appropriate*** – **revise to replicate the design found on the parking lot side of the building.** ***There should be a direct relationship from the sidewalk to the retail entrances/storefronts.***

VIII. NEXT STEPS

1. Address any additional information requested by the Planning Board.
2. Provide capacity letters from utility companies.
3. Provide evidence of financial and technical capacity.
4. Address technical issues raised in the memorandums from Jeff Tarling, Tom Errico, Lauren Swett, Mike Tremblay, and any others identified in this report.
5. Prepare final plan submission for a Planning Board Hearing.

ATTACHMENTS:

PLANNING BOARD REPORT ATTACHMENTS

1. Tom Errico Memorandum
2. Mike Tremblay Memorandum
3. Lauren Swett Memorandum
4. Jeff Tarling Memorandum
5. Caitlin Cameron Memorandum

APPLICANT'S SUBMITTAL

A. Cover Letter
   a. Cover Letter PB Comments Responses
B. Checklist, Application, NeighMtg
   b. Neighborhood Mtg Cert, Min, Sign In.01-03-2019
C. Right, Title, and Interest
D. State and Federal Approvals
E. Zoning Assessment
F. Exist+Prop Easement
G. Waiver Requests
H. Financial Capability
I. Technical
J. Transportation Analysis-Traffic Impact
K. Access & Circulation
L. Loading and Servicing
M. Sidewalks
N. Public Transit
O. Off-street Parking
P. Bicycle Parking
Q. Snow Storage
R. Traffic Demand Management
S. Pres of Sig Natural Features
T. Landscaping and Lighting Pres
U. Site Landscaping
V. Parking Lot Landscaping
W. Street Trees
X. WaterQual, SWtrMngmt, ESC
Y. Consistency with City Master Plan
Z. Public Safety and Fire Prevention
AA. Available and Adequacy Public Utilities
BB. Mass, Ventilation, Wind Impact
CC. Shadows

DD. Snow Ice Loading
EE. View Corridor
FF. Historic Resource
GG. Exterior Lighting
HH. Noise and Vibration
II. Signage Wayfinding
JJ. Zone Related Design Standards
KK. Construction Management Plan
LL. Financial Capacity Letter

PLANS

Plan 1 Cover Letter
Plan 2 Existing Conditions Plan
Plan 3 Signage and Wayfinding Plan
Plan 4 Grading and Utility Plan
Plan 5 Landscaping Plan
Plan 6 ESC Notes & Details
Plan 7 Details
Plan 8 Details
Plan 9 Details
Plan 10 PreDevWatershed Plan(1of2)
Plan 11 PostDevWatershed Plan(2of2)
Plan 12 Offsite Improvement Plan(1of1)
Plan 13 Convenience Store Renderings
Plan 14 Retail Renderings
Plan 15 Convenience Elevation E+W
Plan 16 Convenience Elevation N+S
Plan 17 Convenience, 1st Floor
Plan 18 Retail Elevation E+W
Plan 19 Retail Elevations N+S
Plan 20 Retail Floor Plan

Portland Maine Yes. Google's good here.

Shukria Wiar <shukriaw@portlandmaine.gov>

1884 Forest Avenue - Traffic Movement Permit Review

Tom Errico <thomas.errico@tylin.com> Fri, May 10, 2019 at 8:16 AM
To: Shukria Wiar <shukriaw@portlandmaine.gov>
Cc: Bruce Hyman <bhyman@portlandmaine.gov>, Jeremiah Bartlett <JBartlett@portlandmaine.gov>, Michael Tremblay <mtremblay@portlandmaine.gov>

Hi Shukria – The following is a status update regarding the Traffic Movement Permit comments provided in January in conjunction with the scoping meeting. The Applicant has submitted Section 7 (Traffic Study) for the project.

- The City will provide an updated list of other development projects, particularly projects on Riverside Street and Riverside Industrial Parkway.

Status: The Study reflects other development projects and I find the assumptions in the study to be acceptable.

- The City requests that the Trip Generation be based on the 7th Edition of the Trip Generation Manual to fully comply with MaineDOT requirements.

Status: The Study reflects this change and I find the assumptions in the study to be acceptable.

- A detailed evaluation (with mitigation strategies) of the High Crash Locations at Forest/Riverside and the Forest Avenue segment is required.

Status: The safety analysis needs further detail and refinement. We would like to identify some actions for mitigating both High Crash Locations. I will review with City staff and provide some specific guidance in the future.

- A review of driveways including elimination of the right-turn exit, is required. The Applicant shall provide supporting documentation for maintaining the right-turn only driveway. If the right-turn driveway is deemed necessary, the geometric alignment/configuration will need to seek a balance between vehicle movements, lower speeds, and pedestrian safety. I would note the current plan requires a waiver from City standards for the number of driveways.

Status: The study included a detailed evaluation of the driveway configurations and thus meets this requirement. The proposed driveway configuration is acceptable with recommended changes as identified by Mike Tremblay of DPW.

- A review of Saturday traffic volumes will be performed and if significantly less than weekday volumes, a Saturday analysis may be eliminated. This shall be coordinated with City staff.

Status: The traffic study included a review of Saturday peak hour conditions. I have no further comment.

- The traffic study shall include the Forest/Riverside, Forest/Riverside Industrial Parkway, Forest/Riverton Drive intersections.

Status: The traffic study included the noted intersections and I have no further comment.

- The bus shelter on project site shall be coordinated with METRO and pedestrian crossing of Forest Avenue shall be investigated.

Status: Bruce Hyman is conducting the review of this item. Refer to his comments.

- The Applicant shall evaluate the need for a left-turn lane on Forest Avenue. The site frontage shall reflect either a condition with a left-turn lane or, if not warranted, without. The current site plan is not acceptable given that it does not depict a left-turn lane and includes a westerly curb alignment with widening for a three-lane section on Forest Avenue.

Status: The applicant has provided an analysis of various access/egress scenarios. The study supports the need for a left-turn lane from an operational analysis perspective. I continue to review this and the plan details, but conceptually the provision of a left-turn lane seems appropriate.

- Safe and logical pedestrian facilities shall be provided between Riverton Drive and the store.

Status: I continue to review this.

New Comments

- **The study suggests improvements at the Forest/Riverside intersection. I continue to review the analysis and will provide comments in the future.**

If you have any questions, please contact me.

Best regards,

Thomas A. Errico, PE
Senior Associate
Traffic Engineering Director
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Att. 2

Portland Maine Yes. Google's good here.

Shukria Wiar <shukriaw@portlandmaine.gov>

1884 Forest Avenue,PL-000341-2018, Chau

Mike Tremblay <mtremblay@portlandmaine.gov> Tue, Apr 30, 2019 at 3:53 PM
To: Shukria Wiar <shukriaw@portlandmaine.gov>
Cc: Thomas Errico <thomas.errico@tylin.com>, Bruce Hyman <bhyman@portlandmaine.gov>, Lauren Swett <lswett@woodardcurran.com>, Barbara Barhydt <bab@portlandmaine.gov>

Shukria,

- The entrance driveway off of Forest Avenue is wider than desirable. While the technical manual does not outline a maximum width of a one-way driveway, a driveway width of 18 feet at its narrowest point seems excessive. Excessive driveway widths enable vehicles to make turns at higher speeds than narrow driveways, which can endanger other road users, especially pedestrians and bicyclists. [For the record, we are working on updates to our technical manual and we will likely cap driveway width at 16 feet (at the property line) for one-way ingress, though widths closer to 12 feet are desirable.] The applicant should reduce this driveway width or provide vehicle turning movement diagrams that show that this width is necessary.

- A right-turn pavement marking, with "ONLY" stenciling, shall be provided at the exit driveway onto Forest Avenue. This restriction shall be reinforced with appropriate signage.

- The applicant can make a slightly more efficient use of their two parking areas by striping their HP-van spaces as two 8-foot spaces with an 8-foot access aisle, rather than two 11-foot spaces with 5-foot access aisle. This saves 3 feet in width in each area, which can be reallocated to snow storage or impervious surfaces.

- The ADA ramps that adjoin two directions of sidewalk along Forest Ave are not oriented optimally. If possible, ramps should direct pedestrians across the crosswalk, rather than toward the roadway.

- The crosswalk across the entrance driveway from Forest Avenue is called out as 5 feet wide, and the crosswalk across the exit driveway is called out as 8 feet wide. Both are drawn as 5 feet wide. Because these crosswalks are in the city's ROW, they should be 8 feet wide and called out as such. The crosswalk across the driveway at Riverton Drive is drawn at 8 feet wide but called out as 5 feet wide; this should be drawn and called out at 8 feet wide. Crosswalk striping should be 24-inch wide, placed at 4 feet on center (so there is a 24-inch gap between each 24-inch marking).

- Riverton Drive approaching Forest Avenue is striped as a left/thru lane. No pavement markings are necessary on this single-lane approach.

- There are several building entrances located along the Forest Avenue frontage of the development. If these entrances are intended to be, or may possibly be, accessible to the general public, then an ADA-accessible path should be provided from the sidewalk along Forest Avenue, and access should be provided to all building entrances via an accessible walkway. As currently designed, two of these entrances are not ADA-accessible, and the remaining entrances would require someone to maneuver into the site and double back up toward Forest Avenue. If ADA-accessible entrances are not possible, then appropriate signage directing pedestrians toward the accessible entrance shall be provided in view of the inaccessible walkways so that those with accessibility needs know how to access the building.

- Related to the above, ensure that there are no stairs or other accessibility barricades within the areas of the buildings that are open to the public.

- The applicant should conduct sight distance analysis (both stopping sight distance and intersection sight distance) to the west of the site entrance driveway. There is concern that a left-turning entering motorist may not be able to detect a Forest Avenue eastbound vehicle, particularly if there is a bus in the relocated bus stop.

See you tomorrow, we can discuss then.

Mike Tremblay, P.E.
Senior Engineer
Engineering Division

Department of Public Works
City of Portland, ME
mtremblay@portlandmaine.gov
P. 207.874.8881 F. 207.874.8852

[Quoted text hidden]

Att. 2a

Portland Maine | Yes. Google's good here.

Shukria Wiar <shukriaw@portlandmaine.gov>

1884 Forest

Mike Tremblay <mtremblay@portlandmaine.gov> Wed, May 8, 2019 at 9:22 AM
To: Shukria Wiar <shukriaw@portlandmaine.gov>

Shukria,

I don't believe this was included in my first set of comments:

The curb radius at the eastern corner of the entrance driveway from Forest Avenue need not be so large. It should be reduced to 5 feet to reduce the likelihood that the driveway will be mistaken for an exit. The curb ramp should be adjusted accordingly.

-Mike

Mike Tremblay, P.E.
Senior Engineer
Engineering Division
Department of Public Works
City of Portland, ME
mtremblay@portlandmaine.gov
P. 207.874.8881 F. 207.874.8852

Portland Maine Yes. Google's good here.

Shukria Wiar <shukriaw@portlandmaine.gov>

1884 Forest Avenue

Lauren Swett <lswett@woodardcurran.com> Wed, May 15, 2019 at 10:34 AM
To: Shukria Wiar <shukriaw@portlandmaine.gov>
Cc: Bradley Roland <brad@portlandmaine.gov>

Hi Shukria,

I have reviewed the resubmission of 1884 Forest Avenue. I have the following remaining comments relative to their response:

Utility ability to serve confirmation is required (as they have noted).

The stormwater narrative notes that there is a 0.01 cfs increase in flow in the 10 and 25 year storm events. I think there was a page missing from the stormwater report with the comparison table, but they did have a table on the stormwater figure. I went through the model though, and I think there was a decimal point error and they are increasing flow in the 10-year storm by 0.1 cfs and in the 25-year storm by 0.28 cfs. They have requested a waiver of the flooding standard. **Brad** they are tying into the Riverton Drive stormdrain. They have a significant system on their site, and their struggle is that with the undeveloped site it is essentially zero. Would you have an issue with increases like that into Riverton?

Thanks,

Lauren

Lauren Swett, P.E.*

Technical Manager

Woodard & Curran

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Portland, Maine 04102

Phone: (207)558-3763 (direct)

(207)219-3591 (cell)

(800)426-4262 (office)

Email: lswett@woodardcurran.com

*Licensed in Maine and Wisconsin

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M.ASCE

Chair, Leader Training Committee

American Society of Civil Engineers

http://regions.asce.org/leader-training-committee/

Att. 4

Portland Maine Yes. Google's good here.

Shukria Wiar <shukriaw@portlandmaine.gov>

1884 Forest Avenue

Jeff Tarling <jst@portlandmaine.gov> Fri, May 10, 2019 at 4:29 PM
To: Shukria Wiar <shukriaw@portlandmaine.gov>

Hi Shukria -

The proposed mixed use development, convenience store, with fueling station is on a busy gateway into Portland and adjacent to a large housing project. The landscape treatment using trees and buffer planting are key elements to help this fit into the site given the nearby residential use. The site is currently wooded with a dense grove of White Pine. Two sides of the site should include wooden fencing with trees and shrub plantings to provide adequate screening from the noise and bright lights associated with the proposed use.

In review of the proposed 1884 Forest Avenue project we offer the following recommendations / conditions of approval:

a) Street trees - Forest Avenue edge, The current landscape plan offers little in the way of tree & landscape treatment along Forest Avenue in front of the mixed use building where it is needed the most. We can work with the project team to suggest trees and landscape or they can revisit and submit an updated plan. Improving the Forest Avenue streetscape with additional trees / landscape should be a condition of approval. This includes the Mixed use building and the 'bump out' near the convenience store.

Additional trees & landscape -
Within the project site we noticed a few more areas that we would like to see trees and landscape to meet the parking lot landscape standards:

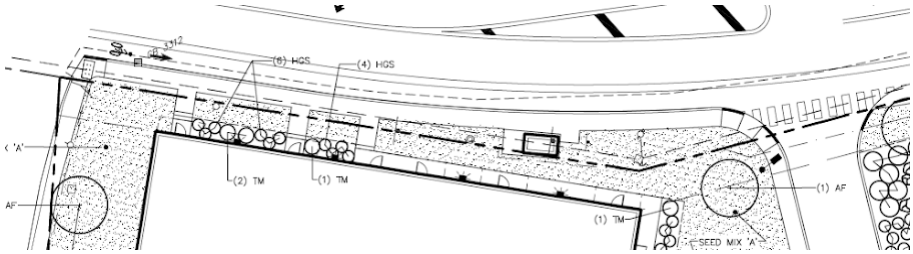
a) The include the 'bump out' to the right of the mixed use retail parking space, shown as snow storage and SEED MIX 'A", while snow storage is needed the value of landscape exceeds snow storage or finding a compromise of tree and landscape that can take some winter snow loading as we see in similar sites.

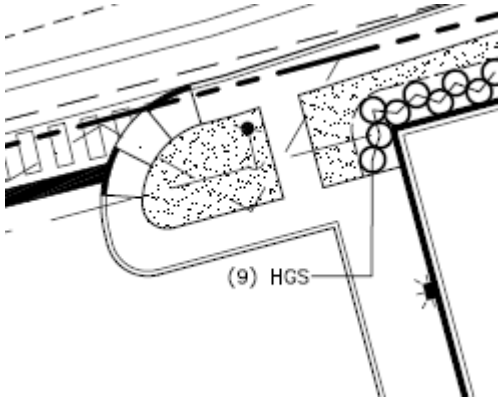
b) the property boarder near the fueling station shown as 'Snow storage' should have a planting of 2 taller, upright shade trees or 5 Arborvitae directly below the fuel island, the future added height will help screen the the canopy lights and glare.

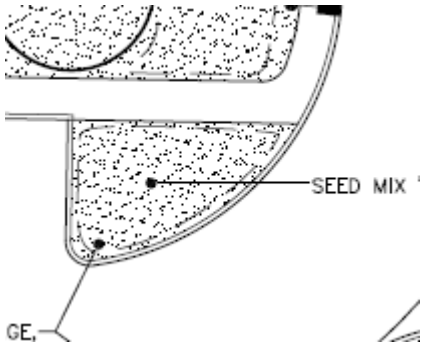
c) Convenience store boarder - the property line along the southerly edge of the site should have some degree of landscape and or wood fencing to provide buffering on that side of the project. The adjacent site next door could see future changes and the back side of a convenience store should have some screening both from the northbound traffic on Forest Avenue and the next door property. We can suggest options such as fencing with perhaps similar Arborvitae planting in groups vs a continuous line.

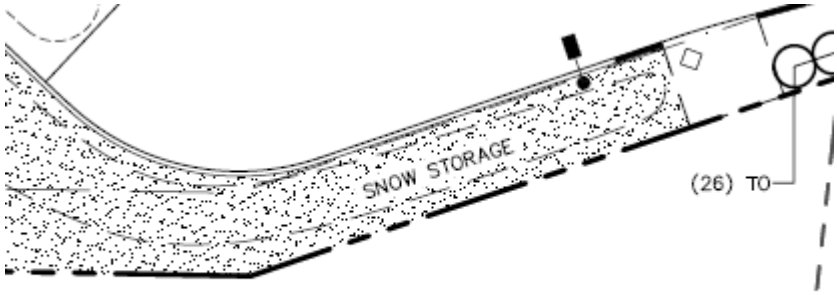
Tree sizes - the proposed 3" caliper tree sizes are larger then the city standard and we feel that 2-2.5" caliper size would be easier transplanted and add some economy to the planting budget, the evergreen plantings White Pine could be 7-8' height vs the 10-12' height, the Arborvitae could be 6-7' height vs the proposed 3" caliper.

Snap shots of some of the areas mentioned above in need of additional landscape:









PS

Jeff Tarling
City Arborist - City of Portland Maine
Parks, Recreation & Facilities Department
Forestry & Horticulture
212 Canco Road
Portland, ME. 04103
(207) 808-5446
jst@portlandmaine.gov

Planning and Urban Development Department
Planning Division

Subject:	B-2 Design Review – 1884 Forest Avenue
Written by:	Caitlin Cameron, Urban Designer
Date of Review:	Wednesday, March 25 2019

The project at 1884 Forest Avenue was reviewed according to the *City of Portland Design Manual* standards by Caitlin Cameron, Urban Designer, Shukria Wiar, Planner, and Jean Fraser, Planner against *the B2 Commercial Business Zones Standards* (Design Manual).

Design Review Comments*:*

- Provide coordinated site plan and landscape plan with correct landscape/building design

(d) B-2 Commercial Business Zones

Standard (1) a. Urban Street Wall – Not applicable – context does not have a street wall

Standard (1) b. Mixed Uses – Not applicable – B2 zone

Standard (1) c. Building Entrances – Not applicable

Standard (1) d. Windows – Windows provided on all street-facing façades. .7 VT required.

Standard (1) e. Façade Character – Convenience Store: The building location is relatively close to the street and includes some storefront windows and an entrance facing the street. The orientation of this building is away from the street towards the surface parking lot – does not meet the standard. Clarify whether there is a functional entrance facing the street. Mixed Use: Building meets this standard with direct orientation of storefront and doors to the street with canopies and signage. These doors must be functional.

Mixed-use: This building is oriented to the street and has storefront/entrances directly accessible from the sidewalk. However, retail frontage should have direct relationship to sidewalk with hardscape – update the site plan to show this connection and interface.

Standard (1) f. Building Design – The building design is consistent with the type of commercial building in the same streetscape and off-peninsula character. Though only one-story, building has some elements (dormers, pitched roofs) making it slightly more appropriate height for the wide commercial street and create a compatible character with the residential neighbors.

Standard (1) g. Building Materials – Clapboard and storefront are considered compatible.

Convenience Store: A strong, durable base material is logical - masonry base would be more appropriate than stone (which is not found in this context). The stone panels next to the entrance are heavy and out of place – clapboard would be more appropriate material placement.

Standard (1) h. Building Scale – Not applicable

Standard (1) i. Landscaping and Buffers – Convenience Store: Is there a door from the sidewalk and does it include a direct connection to sidewalk? Do not landscape the curb extension – provide paved, direct path from cross walk to entrances.

Mixed-use: Loam and Seed between sidewalk and retail frontage is not appropriate – revise to replicate the design found on the parking lot side of the building. There should be a direct relationship from the sidewalk to the retail entrances/storefronts.

April 17, 2019
11142

City of Portland Planning Department
Shukria Wiar, Planner
389 Congress Street, 4th Floor
Portland, Maine 04101

Revisions and Responses to Review Comments-Level III Site Plan Application Submittal
Applicant: Pine State Family Mart c/o John Chau
1884 Forest Avenue, Tax Reference: 327-B-3

Dear Ms Wiar:

On behalf of Mr. John Chau, we have assembled the following revised plan sets for the Level III Site Submittal for the mixed use retail space and convenience store/gas station located at 1884 Forest Avenue. The project, known as Pine State Family Mart has continued the planning and traffic design of the facility and would like to move forward with the City Planning Board review process. In parallel with the City Site Plan Review, the City is also reviewing a MDOT Traffic Movement Permit under the provisions of delegated review.

This location is within the B-2 Community Business Zoning. The project site is approximately 1.61 acres in size and has access to Forest Avenue and Riverton Drive. The development program includes construction of two new drives from Forest Avenue and access via Riverton Drive. The one-story retail building is 7,800 square-foot +/- and the convenience store will be 5,000 square feet +/- with four fueling islands. In total the disturbed area for development area is approximately 1.6 acres. The project will require a Maine Department of Transportation (MDOT) Traffic Movement Permit (TMP). The application has been submitted to the City for delegated review concurrently this application. No other State or Federal permits are required as part of the site development.

We received comments from the City in early 2019 from our September submission. Here within we are addressing those directly or with attached plans or other submitted documents. We received comments, relating to planning, transportation, landscaping and general site engineering/stormwater management reviews below:

Civil Engineering - Third Party Reviewer Lauren Swett:

1. Applicant has noted that verification of utility ability to serve will be provided upon receipt.

2. Based on the Storm Drain Structure Data table on the Grading and Utility Plan, some of the proposed stormdrain pipes will have less than 3 feet of cover (see CB3, CB4, and ICS1 for example). It is recommended that insulation be provided to address frost depth concerns.

   Insulation has been provided where cover is less than 3 feet, and is indicated on the grading and utility plan. Also, to be noted, ICS1 and OCS1 rim elevations were incorrectly reported in structure table and they have been corrected.

3. CB4 and the stormdrain piping between CB3 and CB4 is in close proximity to the dumpster enclosure and dumpster pad. It is suggested that a slight adjustment be made to the stormdrain to avoid construction conflicts.

   The dumpster pad has been moved back from the stormdrain system.

4. In accordance with the Maine DEP Chapter 500 Regulations and Section 5 of the City's Technical Manual, the Applicant is required to meet the Basic, General, and Flooding Standards for Stormwater Management. The Applicant has proposed erosion and sedimentation control features to meet the Basic Standard and an underdrained subsurface sand filter to help meet the General and Flooding Standards. The following comments should be addressed on the proposed stormwater management plan:

   We will amend the plan accordingly to add the requested information.

5. Please clarify the time of concentration line that is shown for subcatchment 10S on the post-development watershed plan. It appears that the line as drawn does not match what was utilized in the HydroCAD model. Likely the change will not impact the model results, but please clarify. It's also noted that the post-development drawing title is incorrectly listed as pre-development.

   The time of concentration line did match what was utilized in the model. However, a later change in stormdrain design moved a drainage structure which caused the time of concentration line to not appear over the stormdrain pipe. This has been corrected on both the plans and in the model. The sheet has also been corrected to read post-development watershed plan.

6. Looking at the HydroCAD output, it appears from the post development routing diagram that there will be a secondary discharge from ICS1 to the study point. This would be expected based on the weir detail for the inlet control structure on Sheet 8. The calculation output for the ICS1 node in HydroCAD does not show a secondary flow. Please clarify.

   There is no secondary outlet from ICS1, the HydroCAD (diagram only) showed this incorrectly. There is no weir in ICS1 or ICS2. The weir detail is located in the outlet control structure OCS1. Details have been eliminated/updated to correctly represent the system. The HydroCAD model has been updated to include a few more structures to better represent the system and its bypass.

7. Please clarify the design of ICS2. The Stormdrain Structure Data table identifies only a single invert out; however the plan appears to show two outlets. This structure has not been included in the overall HydroCAD model, but the Applicant should confirm that the elevation layout of the proposed structures will not result in any overflow at this location near the entrance. In addition, the Maine DEP BMP design guidelines indicate that multiple pre-treatment rows (isolator rows) are required if there are multiple inlet points to the system.

Details have been eliminated/updated to correctly represent the system.

8. Sheet 8 includes details for an inlet control structure and an outlet control structure and sheet 9 includes two outlet control structures and an inlet vault. Please clarify the appropriate details for use on the site, and update with elevations and pipe sizes specific to the project plans. Similarly, the elevations provided on all of the underdrained sand filter details should be updated specific to the project plans.

   Details have been eliminated/updated to correctly represent the system.

9. The subsurface underdrained sand filter details show a typical system layout with chambers, underdrains, cleanout manholes, inspection ports, header pipes, a single inlet, and a single outlet. A site-specific layout of the proposed chambers, underdrain piping, structures and other critical components should be provided, either in a detail or directly on the plan to show how the system will fit onto the site.

   Details have been eliminated/updated to correctly represent the system.

10. The Maine DEP BMP design guidelines indicate that a minimum of 1-foot separation be provided from the seasonal high groundwater table and bedrock. The soil type, per the submitted soil survey, would indicate that this will not be an issue, but the Applicant should verify that this separation can be met without the need for an impermeable liner, as this would impact the HydroCAD model's assumption of discarded exfiltration.

    Agreed, the Maine DEP does require separation. A test pit will need to be performed prior to construction to confirm depth of seasonal high ground water and presence (if any) of bedrock within the subsurface treatment's footprint. With the pre-development flow rates being so low, the discarded exfiltration is required for us meet our rates.

11. Note that the SPCC plans developed for the project should identify that a filtration stormwater treatment system is installed on site.

    We have added an oil water separator upstream of the treatment train, as means to further protect form accidental spills form the gas pump area. We also added snouts to each of the cathcbaisn within the gas pump drainage collection areas.

12. Cleanup procedures should consider the impact of spills at the proposed fueling station on the proposed stormwater treatment system.

    We agree, see recommendation above.

13. The stormdrain structure data table is missing diameter information for structure diameter. Based on the symbolism used on the plans, it appears that a smaller structure will be used. Details have been provided for field inlets and "Type F" catch basins. Please clarify.

    There are two "Type F" catch basins, the filed inlet catch basin detail is not being used has been removed. The structure data table has been updated to call out these structures.

Planning Shukri Wiar:

1. Evidence of financial and technical capacity

   That was submitted earlier via electronic submission.

2. Evidence of utilities' capacity to serve the development.

   Those were submitted with the original application and we have yet to hear from the City Departments.

3. Existing and proposed easements or public or private rights of way- show it on the site plans. Clarify the easement in question.
   We have added proposed easement on the plan, and the easement for the Portland Housing Authority has never been substantiated. Mr. Chau has agreed verbally to allow the Housing Authority permission to gain access across this site to their current gate for maintenance or emergency needs.
4. Written summary of solid waste generation and proposed management of solid waste.
   We have added a section regarding solid waste generation and handling which will be by all handled by private contractor.
5. Manufacturer's verification that HVAC and manufacturing equipment meets applicable state and federal emissions requirements. Show location of HVAC and mechanical equipment.
   All HVAC units will meet applicable state and federal emissions requirements, HVAC units are located within the building and the condenser units are located in a recessed roof on the retail building, and the HVAC units are locate in the attic of the Convenience store vented through the roof on the back side.
6. Submit a Construction management plan.
   A construction management plan has been previously submitted.
7. Provide cut sheets and photometric plan for all proposed exterior lights.
   A photometric plan and cut sheets have been previously submitted for all freestanding lights.
8. Please submit a Signage and Wayfinding plan.
   We have prepared a wayfinding Sign Plan for the proposed site internal traffic circulation.
9. Provide height calculation based on average grade. We believe the architect Ryan Senatore has provided the average grade for the buildings. The average grade and building height calculations are indicated on the Architectural Elevations. Only the Retail Building will have any variance due to the grading associated with the ground around the footprint.
10. Parking Calculation is pending – We provided our breakdown on the site plan for required parking.
11. Due to two buildings on site, EnerGov will have to be updated with data for both buildings.
    We understand that this will be addressed separately by the Architect.

Transportation/Planning Bruce Hyman

Site Plan

1.- The site plan is poorly oriented/designed for quality pedestrian access from Forest Avenue to the proposed buildings and storefronts. We have added direct access to the site buildings from Forest Avenue. Given that this is a very limited sized zone for outer Forest Avenue there are not many other similar businesses exposed to this requirement in this location.

2. - The site plan is poorly designed for quality pedestrian access along Forest Avenue. The frontage is highly oriented to automobile access with several features - notably the proposed driveways - that create a poor pedestrian experience and create safety issues for pedestrians. We have met with staff and re-orientated the second vehicle exit onto Forest Avenue which aligns, also the sidewalk to remain almost parallel to the street for the entire frontage and creates a safer crossing.

3. - The walkway along the parking lot for the mixed use building is to provide a usable 5' of width, possibly requiring provisions keeping motor vehicle bumpers (front or rear) from extending onto the walkway or providing a wider walkway. We have widened the sidewalk to 6 feet in the noted area which at worst case will leave a 4 foot wide opening if vehicle like a truck backs up to the curb.
4.- Crosswalks where provided adjacent to public streets are to be 8' in width (not 5').
We have corrected the width of crosswalks to 8 feet
5.- The easterly driveway is to be 1) eliminated [preferred] or 2) justified via a waiver request and if justified/approved, its orientation is to be revised so as to not interrupt the pedestrian access route along Forest Ave and to not create a pedestrian safety issue due to its configuration. We have revised the orientation and have requested a separate waiver request for the second access supported by the need that the site truly needs the access for safer turns for morning southbound access and without creates troubled conflicts internally, and that the gas station is restricted to access less in width than other gas service businesses that serve on Forest Avenue, and that zoning prohibits us to relocate the building further back to promote a safer exit movement strategy with the pump islands. The impact of the waiver request will not reduce pedestrian safety.
6. - Measures may be required to prohibit left turns from the central driveway on Forest Avenue pending traffic analysis. We have currently restricted movements out of the fForest avenue curb cuts and direct all left turn s out to the Riverside Drive access point, such they will turn left at the Riverside Dr Forest Ave intersection.
7. - There appear to be cobra head light fixtures across the street. Consideration should be given to providing additional street/sidewalk lighting along the project frontage. We have discussed adding building wall pac lighting at the Retail store Frontage and suggested a second light at the second curb cut/exit from the site. The close proximity of light from the building will add safety lighting for the sidewalk ten feet away. Lighting exists on the pole at the intersection of Riverside Drive.
8. - The curb alignment on the site frontage as shown does not make sense given the vehicular access (no turn lanes in or out of the site. IF the curb line is intended to accommodate different traffic movements than shown then that is to be shown on an updated site plan as part of the consideration/approval process for overall site access. If different site access than shown is not anticipated, the curb alignment is to be reconfigured for better pedestrian access along the frontage and to reduce the likelihood of high speed traffic entering/exiting the site. Revised alignments to accommodate discussed traffic patterns as proposed with documented traffic study counts and design have been provided with this revision.
9. - Improved pedestrian access/pedestrian crossing of Forest Avenue to the opposite side of the street to the existing or a relocated bus stop is to be considered as part of the traffic/transportation study. For instance, IF a NB left turn lane is anticipated into the site via the driveway on Forest Avenue, this introduces an opportunity for a pedestrian crossing/crosswalk in conjunction with that left turn lane to a relocated and more ADA accessible bus stop.
The Bus stop location is existing to the area, and the METRO bus system has been working to provide a new bus shelter at the location as proposed(Merely fee feet from wee the stop is now) Currently there is a crosswalk at the NB side of Forest Avenue which allows those

commuters to cross Forest Ave. nearer the intersection of Riverside Dr. (Just North of the intersection) The opposite side of the street from SB bus shelter is along a retaining wall section close to the sidewalk for the site on the opposite side, and is not the ideal location for a ADA ramp or gathering area, given the restricted room for grading and fitting against a wall.

10. Different retail building orientations relative to the street and site features (parking lot, etc) should be considered.
    This has been addressed by Ryan Senatore the Architect in separate response.

Details

11. Paver detectable warning panels are not to be used at crosswalks where they are needed/used.
    We will provide City approved warning surfaces at crosswalk ramp landings.
12. No detail was provided for sidewalks either internal to the site nor within the public ROW.
    Details of sidewalk cross sections have been added to the detail sheet.

Renderings

13. The provided renderings to not accurately reflect the site plan. We will update overall site rendering for the public meetings, and we believe that the architect has provided revised renderings of the buildings.

Landscaping Review –Jeff Tarling

In review of the proposed 1884 Forest Avenue project, offer the following tree & landscape recommendations and conditions:

a) Street & Parking Lot Trees - The project needs additional parking lot trees and landscape to meet the parking lot landscape standard. See attached. This would include planting trees in the three parking lot islands, two near the entrance / exit to the north along with additional three ornamental trees along the Forest Avenue street frontage and one additional street tree near the proposed convenience store, where the 'Seed Mix A' is shown on the plan. The parking lot islands could be landscaped in addition to the requested parking lot trees vs 'Seed Mix A' as shown. This should be a condition of approval.
   We have revised the landscape plan to incorporate the City Arborist request to the best of our abilities but have some reservation about the trees being able to withstand winter snow plowing removal

b) Snow storage behind the proposed convenience store? How would the snow get there and where would it drain to?
   That snow storage area was in error and has been removed.

c) Fencing - the property line edge along the southern edge and the property line to the nearby residential properties should include some type of fencing, this would be the two sides. Any existing fence should be evaluated to see if it is in adequate shape and would suffice for this condition.
   The fence along the southern property line is a fairly new chainlink fence installed by the PHA, and we have discussed the addition of stockade fence along the store end to protect

residents in Wellsley Estates from headlights turning into the store. The proposed fence is shown on our updated site plan and landscape plan.

Other site improvements associated with the site development include a new bus stop shelter, bicycle parking and trash receptacle at the existing bus stop located along the lot frontage at Forest Avenue. STI has been coordinating the bus shelter with traffic engineers, Gorrill-Palmer functioning as the liaison with Greater Portland Metro. The entries are curbed and designed in conformance with City standards. Two sidewalk easements are proposed as part of the site development and the descriptions and sketches are enclosed in this site plan review application.

We addressed comments separately through the Traffic Consultant, Tom Errico PE, for the information regarding traffic movements and offsite traffic counts at the site and nearby intersections, and that has been outlined in the latest t=Traffic report. Additionally we have provided anew plan that will include Offsite Traffic Improvements Plan for the widening of Foerst Avenue to accommodate the left turn as we have proposed. Of course should the entrance solutions differ than what we propose then the curb and street alignment may too.

The applicant is hopeful to complete the permitting process through the City and MDOT by the autumn of 2018 for winter/spring project commencement and completion within one year. We look forward to working with the City and Planning/Engineering staff through the permitting process for the proposed Pine State Family Mart. As always, please contact me if you have any questions or require further information.

Sincerely,
SEBAGO TECHNICS, INC.

Jim Seymour, P.E.
Senior Project Manager

JRS/jrs

enc.

cc: J. Chau

SEBAGO
TECHNICS

September 10, 2018
11142

City of Portland Planning Board
Mr. Sean Dundon, Chair
389 Congress Street, 4th Floor
Portland, Maine 04101

Level III Site Plan Application Submittal – Pine State Family Mart
1884 Forest Avenue, Tax Reference: 327-B-3

Dear Planning Board Members:

On behalf of Mr. John Chau, we have assembled the following Level III Site Plan Submittal for a new development consisting of two buildings providing mixed use retail space and convenience store/gas station located at 1884 Forest Avenue. The project is to be known as Pine State Family Mart. We have appreciated the opportunity to correspond with the City on multiple occasions during the initial phases of the project and permitting process. Over the past few months, the applicant has continued the planning and design of the facility and would like to move forward with the City Planning Board review process. In parallel with the City Site Plan Review, the City is also reviewing a MDOT Traffic Movement Permit under the provisions of delegated review.

The following narrative provides an overview of the project team and design/facility components.

Project Team:

Applicant:	John Chau
Record owners:	John Chau and Phuong Neang (JT)
Architect:	Ryan Senatore Architecture
Civil, Traffic Engineers, Survey:	Sebago Technics, Inc.

Project Site:

The project site is located in the City of Portland's Riverton section and is bounded by Forest Avenue to the north, Riverton Drive to the west and residential developments to the south and east. The project frontage is on Forest Avenue (Route 302) and will be accessed by drives on Forest Avenue and Riverton Drive. This location is opportune for the project given its size and B-2 Community Business Zoning. The project site is approximately 1.61 acres in size and has access to Forest Avenue and Riverton Drive. The site is partially wooded, flat and does not contain wetland or other waterbodies.

Development Program:
The development program includes construction of two new drives from Forest Avenue and access via Riverton Drive. The site design provides off-street parking for employees and patrons. The one-story retail building is 7,800 square-foot +/- and the convenience store will be 5,000 square feet +/- with four fueling islands. Additionally, the site will include a dedicated snow storage area and a subsurface under-drained soil filter for stormwater management. In total the disturbed area for development area is approximately 1.6 acres. Other site improvements associated with the site development include a new bus stop shelter, bicycle parking and trash receptacle at the existing bus stop located along the lot frontage at Forest Avenue. STI has been coordinating the bus shelter with traffic engineers, Gorrill-Palmer functioning as the liaison with Greater Portland Metro. The entries are curbed and designed in conformance with City standards. Two sidewalk easements are proposed as part of the site development and the descriptions and sketches are enclosed in this site plan review application.

State and Federal Permits:
The project will require a Maine Department of Transportation (MDOT) Traffic Movement Permit (TMP). The application will be submitted to the City for delegated review concurrently this application. No other State or Federal permits are required as part of the site development.

Utilities:
The project will be served by public water and sewer available from mains located in Forest Avenue. We have been in contact with Portland Water District and the City Sewer Department regarding the proposed site development. Electrical and communication services are available and will be coordinated with respective companies.

Lighting:
The project has been designed with patron safety and consideration of abutting residential uses. Swaney Lighting provided the enclosed Photometrics Plan and LED light cut sheets for proposed wall packs, sconces, pole-mounted and ceiling mount fixtures.

Landscaping:
The project development will require removal of all of the vegetation on the site. The site will be revegetated in accordance with the City regulations. Neighboring residential uses are buffered and all landscaping plant locations, types and sizes are shown on the enclosed Landscape Plan.

Stormwater Management and Erosion Control:
A stormwater management plan has been prepared to include treatment of runoff to meet Maine DEP and City of Portland requirements. Stormwater from the developed area will be treated through a subsurface under-drained soil filter.

Traffic:
Sebago Technics, Inc. has completed and will be submitting a MDOT Traffic Movement Permit Application to the City of Portland for delegated review.

Schedule:
The applicant is hopeful to complete the permitting process through the City and MDOT by the autumn of 2018 for winter/spring project commencement and completion within one year.

Closure:
We look forward to working with the City and Planning/Engineering staff through the permitting process for the proposed Pine State Family Mart. As always, please contact me if you have any questions or require further information.

Sincerely,
SEBAGO TECHNICS, INC.

Jim Seymour, P.E.
Senior Project Manager

JRS/skn

enc.

cc: J. Chau

27: Availability and Adequacy of Public Utilities (14-526 (c) 3)
Technical Manual, Sections 2 & 9

- Electrical services, including providing underground services

  Electrical service extend underground. See Grading and Utility Plan.

- Identify existing and proposed connections for public utilities and required public utility upgrades

  See enclosed plan set.

- Sewer line connections are required, if there is a main within 200 feet

  Each of the proposed buildings will connect individually to the existing sewer stubs extending from Forest Avenue. See Plan Set for locations and design specifics. The proposed sanitary sewer and stormwater utilities are designed to City standards in Sections 2 and 4, Chapter 500 Stormwater Management Standards of the Technical Manual.

- Proposed solid waste management facilities on-site and management for the site

  Solid waste disposal for the proposed new facility will be provided by contract with a licensed private waste hauler. A dumpster and enclosure is included in the site design and is shown on the plan set. Our best estimate would be that the site would generate 1lb/day /100SF thereby the site would generate approximately 12800/100x 1x 31 days/mo= 3968 lbs /mo or approximately 2 tons/month.

  Constrcution debris will be disposed of by the contarcors at a licensed facility.

  Any stumps or grubbing from the site will be ground on-site by a portable stump grinder and used as mulch in the stabilization of back slopes and for erosion control. The grinding must be completed within a 30-day time period if a DEP permit has not been obtained. Material that has been ground and is not being used on-site must be hauled off-site within a time-period of 30 days from the end of the grinding process by a licensed Non-Hazardous Waste Transporter.

- Written evidence of the ability to serve from utility companies, as applicable

  Utility ability/capacity confirmation has been solicited from respective utility companies. Responses will be provided to the City upon receipt. See Portland Water District inquiry and City of Portland Wastewater Capacity Application, this section.

CITY OF PORTLAND WASTEWATER CAPACITY APPLICATION

Department of Public Services,
55 Portland Street,
Portland, Maine 04101-2991

Date: 09/10/2018

Bradley Roland, P.E.
Water Resources Division

1. Please, Submit Utility, Site, and Locus Plans.

Site Address: 1884 Forest Avenue

Chart Block Lot Number: 327-B-3

Proposed Use: Retail, Convenience Store/Gas Station
Previous Use: n/a
Existing Sanitary Flows: n/a GPD
Existing Process Flows: n/a GPD
Description and location of City sewer that is to receive the proposed building sewer lateral.

Site Category

Commercial *(see part 4 below)*	
Industrial *(complete part 5 below)*	
Governmental	
Residential	
Other *(specify)* Retail	X

Clearly, indicate the proposed connections, on the submitted plans.

2. Please, Submit Contact Information.

City Planner's Name: Barbara Barhydt Phone: (207) 874-8699
Owner/Developer Name: John Chau (Project name: Pine State Family Mart)
Owner/Developer Address: 75 Arcadia Street, Portland, ME 04103
Phone: (207)761-0858 Fax: E-mail: jchau059@gmail.com
Engineering Consultant Name: James Seymour, P.E., Sebago Technics, Inc.
Engineering Consultant Address: 75A John Roberts Road, Suite 4A
Phone: (207) 200-2115 Fax: (207) 856-2206 E-mail: jseymour@sebagotechnics.com
shanf@sebagotechnics.com

Note: Consultants and Developers should allow +/- 15 days, for capacity status, prior to Planning Board Review.

3. Please, Submit Domestic Wastewater Design Flow Calculations.

Estimated Domestic Wastewater Flow Generated: 2,786 GPD
Peaking Factor/ Peak Times:
Specify the source of design guidelines: *(i.e.* X *"Handbook of Subsurface Wastewater Disposal in Maine,"* __ *"Plumbers and Pipe Fitters Calculation Manual,"* __ *Portland Water District Records, Other (specify)*

Note: Please submit calculations showing the derivation of your design flows, either on the following page, in the space provided, or attached, as a separate sheet.

4. Please, Submit External Grease Interceptor Calculations.

Total Drainage Fixture Unit (DFU) Values: n/a

Size of External Grease Interceptor: _____

Retention Time: _____

Peaking Factor/ Peak Times: _____

Note: In determining your restaurant process water flows, and the size of your external grease interceptor, please use The Uniform Plumbing Code. Note: In determining the retention time, sixty (60) minutes is the minimum retention time. Note: Please submit detailed calculations showing the derivation of your restaurant process water design flows, and please submit detailed calculations showing the derivation of the size of your external grease interceptor, either in the space provided below, or attached, as a separate sheet.

5. Please, Submit Industrial Process Wastewater Flow Calculations

Estimated Industrial Process Wastewater Flows Generated: n/a GPD

Do you currently hold Federal or State discharge permits? Yes ____ No ____

Is the process wastewater termed categorical under CFR 40? Yes ____ No ____

OSHA Standard Industrial Code (SIC): *(http://www.osha.gov/oshstats/sicser.html)*

Peaking Factor/Peak Process Times: _____

Note: On the submitted plans, please show where the building's domestic sanitary sewer laterals, as well as the building's industrial-commercial process wastewater sewer laterals exits the facility. Also, show where these building sewer laterals enter the city's sewer. Finally, show the location of the wet wells, control manholes, or other access points; and, the locations of filters, strainers, or grease traps.

Note: Please submit detailed calculations showing the derivation of your design flows, either in the space provided, or attached, as a separate sheet.

Neighborhood Meeting Certification

I, John Chau certify that a neighborhood meeting was held on January 3, 2019 at the Riverton Elementary School Community Room, 1600 Forest Avenue, Portland at 6 P.M. for the proposed new mixed-use retail building and convenience store/gas station project to be known as Pine State Family Mart located at 1884 Forest Avenue, Portland.

I also certify that on December 12, 2018 more than 10 days prior to the meeting, invitations were mailed to the following:

1. All addresses on the mailing lists provided by the Planning Division which includes property owners within 500 Feet of the proposed development or within 1,000 feet of a subdivision within an industrial zone or industrial zone change.

2. Residents on the "interested parties" list.

Sincerely,

John Chau, Applicant

Attached to this certification are:

1. Copy of invitation
2. Sign-in Sheet
3. Meeting minutes

Neighborhood Meeting Minutes

A neighborhood meeting was held on January 3, 2019 at the Riverton Elementary School Community Room, 1600 Forest Avenue, Portland at 6 P.M. for the proposed new mixed-use retail building and convenience store/gas station project to be known as Pine State Family Mart located at 1884 Forest Avenue, Portland.

Minutes:

Initially there were only 5 in attendance for the meeting starting at 6PM, and no one had questions or comments as they were all affiliated with the owner, or representing Mr. Chau. We waited until 615 to start and comments, and with none we started to pick up.

At approximately 630 PM, Mr. Adam Mack appeared as the meeting was closing. He had no opposition to the project, and asked if the design could take into account some screening or fence placement near the dumpster location to account for headlights from vehicles that may be turning within the parking lot, such they will not impact abutters in his development Wellesley Estates whom have windows on that side facing the proposed development.

We discussed that is something we would consider with the owner.

No other attendees appeared. The meeting adjourned at 635

Sincerely,

James R. Seymour, Sr Project Manager-
Sebago Technics !nc

NEIGHBORHOOD MEETING SIGN-IN

11142

Proposed New Mixed-Use Retail and Convenience Store/Gas Station
PINE STATE FAMILY MART

Date/Time of Meeting: January 3, 2018, 6 P.M.

Location: Riverton Elementary School Community Room
1600 Forest Avenue, Portland

Members of the Public in Attendance	
Printed Name	**E-mail**
1. Ryan Senatore	ryan@senatoarchitects.com
2. Phakdey Ang	Phakdeyang92@gmail.com
3. John Chau	Jchau059@Gmail.com
4. Pheap Neang	- none -
5.	
6. Adam Mack	~~For~~ wellesleyEstates
7. James Seymour	jseymour@sebagotechnics.com
8.	
9.	
10.	
11.	
12.	
Developer and Consultant Team in Attendance:	
1.	
2.	
3.	
4.	
5.	
6.	
7.	

28: Massing, Ventilations and Wind Impact (14-526(d) 1)

- Wind and ventilation impacts on adjoining structures and/or adjacent public spaces. Windy study, if applicable

  Not applicable.

- Bulk, location or height impacts on adjoining structures
- Identify and located HVAC equipment and venting away from public spaces and residential properties
- Identify screening and manufacturing specifications for noise, if applicable

  Not applicable.

a. The bulk and height of the proposed buildings will not result in health or safety problems due to reduction in ventilation to abutting structures. Please see the site plan.

b. The bulk, location, and height of the proposed buildings will not minimize the value or utility to neighboring structures. The proposed development is consistent with other neighborhood properties and is an allowed use in the district. Refer to the plan set.

c. The HVAC venting mechanisms have not been formally sited or sized. The venting system will be constructed in accordance with the requirements of this section requiring that they be directed away from public spaces.

Portland, Maine — Yes. Life's good here.

Planning & Urban Development Department

LEVEL II and LEVEL III APPLICATION SUBMISSION CHECKLIST

Please submit each document as a separate PDF file.
Please confirm by electronically checking the boxes to the left

General Application Documents

Checklist	Items to be Provided	
Yes ✔ NA Plan	PROJECT DESCRIPTION • Cover Letter with detailed project description	01
Yes ✔ NA Plan	COMPLETED CHECKLIST – LEVEL III APPLICATION	02
Yes ✔ NA Plan	RIGHT, TITLE AND INTEREST • Deeds, leases, or purchase and sales agreements	03
Yes ✔ NA Plan	EVIDENCE OF STATE OR FEDERAL APPROVALS, if applicable • Permits or letters of non-jurisdiction, if applicable	04
Yes ✔ NA Plan ✔	ZONING ASSESSMENT • Table listing required and proposed uses and dimensional standards Zoning Assessment Table	05
Yes ✔ NA Plan	EXISTING &/OR PROPOSED EASEMENTS OR COVENANTS, if applicable • Evidence of existing easements and any proposed easements	06
Yes NA ✔ Plan	WAIVER REQUESTS • Written request for waiver describing request and reason. Waiver Table	07
Yes ✔ NA Plan	FINANCIAL CAPABILITY • Letter or evidence from a financial institution or third party verifying financial capacity to undertake project	08
Yes ✔ NA Plan	TECHNICAL CAPABILITY • Evidence of technical capability of applicant and consultants – resumes and/or examples of past projects	09

LEVEL II AND LEVEL III SITE PLAN STANDARDS AND SUBMISSION CHECKLIST

Provide assessment of compliance with standards and include supplemental documentation, as applicable.

Please submit each document as a separate PDF file.

TRANSPORTATION

Check list	Assess/Provide/Document:
Yes NA Plan ✔ ✔	**Transportation Analysis- Traffic Impact (14-526 (a) 1)** 10 • Provisions for pedestrian, bicycle, vehicle, and loading circulation and incremental volume of traffic impacts • Traffic Impact Study (Technical Manual, Section 1) if applicable
Yes NA Plan ✔ ✔	**Access and Circulation (14-526 (a) 2 a)** 11 • Access and internal circulation, addressing ADA access • Access and egress impacts on traffic flows • Description and use of drive-up features, if applicable
Yes NA Plan ✔	**Loading and Servicing (14-526 (a) 2 b)** 12 • Loading and servicing needs, route and travel way geometrics for deliveries • Turning templates for delivery vehicles, if applicable
Yes NA Plan ✔ ✔	**Sidewalks (14-526 (a) 2 c)** 13 • Sidewalks and condition along street frontages and internal walkways • Engineered details for ADA ramps and public sidewalk details meeting sidewalk materials policy and ADA ramp construction details as applicable (Technical Manual, Section 1)
Yes NA Plan ✔	**Public Transit (14-526 (a) 3), if applicable** 14 • Existing available transit services • Proposed site plan design details, such as easement, pad base, and shelter
Yes NA Plan ✔ ✔	**Off-Street Parking: Vehicle & Motorcycle/Scooter) (14-526 (a) 4 a and c)** 15 • Expected parking demand, proposed parking supply, ADA parking, and applicable Zoning Requirements • Address Technical Manual standards (Section 1) for curb cut separation and parking lot layout and locate on site plan
Yes NA Plan ✔ ✔	**Bicycle Parking (14-526 (a) 4 b)** 16 • Address bicycle parking requirements and identify locations on-site • Construction details for bike racks (Technical Manual, Section 1)
Yes NA Plan ✔ ✔	**Snow Storage (14-526 (a) 4 d)** 17 • Management plan for snow removal and locate snow storage areas on plan
Yes NA Plan ✔	**Traffic Demand Management (TDM) (14-526 (a) 5), if applicable** 18 • Develop TDM with Trip Reduction Targets and Strategies

ENVIRONMENTAL AND LANDSCAPE FEATURES	
Check list	Assess/Provide/Document:
Yes NA Plan ✔	Preservation of Significant Natural Features (14-526 (b) 1), if applicable 19 • Trees, plants, habitats listed on State or Federal list of endangered or threatened • High and moderate value waterfowl and wading habitat • Aquifers on Casco Bay Islands • Waterbodies (including wetlands, watercourses, significant vernal pools and floodplains) • Proposed preservation areas and protection measures • Documentation from environmental consultants, determinations from applicable state agencies
Yes NA Plan ✔	Landscaping and Landscape Preservation (14-526 (b) 2 a) • Preservation of trees and preservation within required zoning setbacks (Technical Manual, Section 4) • Protection measures of existing vegetation during construction 20 • Protection measures within Shoreland Zone, if applicable
Yes NA Plan ✔ ✔	Site Landscaping (14-526 (b) 2 b) 21 • Screening and buffering of service areas and between non-residential and residential uses • Planting plans with plant schedule and sizes (Technical Manual, Section 4)
Yes NA Plan ✔	Parking Lot Landscaping (14-526 (b) 2 b ii), if applicable 22 • Landscaped islands within parking areas (Technical Manual, Section 4)
Yes NA Plan ✔ ✔	Street Trees (14-526 (b) 2 b iii) 23 • Existing Heritage or Feature Trees on site and measures to preserve • Identify street trees on the plan meeting the site plan and Technical Manual standards (Section 4) or identify alternative measures, if applicable

ENVIRONMENTAL AND STORMWATER	
Check list	Assess/Provide/Document:
Yes NA Plan ✔ ✔	Water Quality, Stormwater Management and Erosion Control (14-526 (b) 3 a) 24 • Stormwater report in compliance with Section 5 of Technical Manual and DEP Chapter 500 stormwater for basic, general and flooding standards, as applicable • Erosion control plan and measures • Evidence of compliance with Urban Impaired Stream Standards pursuant to DEP Chapter 500 stormwater, as applicable • Subsurface sanitary sewage disposal and groundwater protection

PUBLIC INFRASTRUCTURE AND SAFETY

Check list	Assess/Provide/Document:	
Yes NA Plan ✔	**Consistency with City Master Plans (14-526 (c) 1)** • Identify consistency with master plans • Proposed easements, rights and improvements to connect or continue off-premises public infrastructure, as applicable	25
Yes NA Plan ✔	**Public Safety and Fire Prevention (14-526 (c))** • Address Crime Prevention through Environmental Design (CPTED) (Technical Manual, Section 3) • Emergency vehicle access • Address consistency with public safety standards (Technical Manual, Section 3) • Submit a code summary referring NFPA 1 and all Fire Department standards (Technical Manual, Section 3) – Fire Checklist	26
Yes NA Plan ✔ ✔	**Availability and Adequacy of Public Utilities (14-526 (c) 3) (Technical Manual, Sections 2 & 9)** • Electrical services, including providing underground services • Identify existing and proposed connections for public utilities and required public utility upgrades • Sewer line connections are required, if there is a main within 200 feet • Proposed solid waste management facilities on-site and management for the site • Written evidence of the ability to serve from utility companies, as applicable	27

SITE DESIGN

Check list	Assess/Provide/Document:	
Yes NA Plan ✔	**Massing, Ventilations and Wind Impact (14-526 (d) 1)** • Wind and ventilation impacts on adjoining structures and/or adjacent public spaces. Wind study, if applicable • Bulk, location or height impacts on adjoining structures • Identify and locate HVAC equipment and venting away from public spaces and residential properties • Identify screening and manufacturing specifications for noise, if applicable	28
Yes NA Plan ✔	**Shadows (14-526 (d) 2), if applicable** • Shadow analysis of impacts on publicly accessible open space (Technical Manual, Section 11)	29
Yes NA Plan ✔	**Snow and Ice Loading (14-526 (d) 3)** • Building design to prevent snow and ice from loading or falling onto adjacent properties or public ways	30
Yes NA Plan ✔	**View Corridors (14-526 (d) 4), if applicable** • Protection of designated view corridors (Portland Design Manual, Appendix 1)	31

Yes NA Plan ☐ ✔ ☐	Historic Resources (14-526 (d) 5), if applicable • Identify developments within Historic Districts or affecting Designated Landmarks • Certificate of Appropriateness or other evidence • Identify Developments within 100 feet of Historic Districts or affecting Designated Landmarks. Advisory HP review may be required • Address preservation and documentation of Archaeological Resources	32
Yes NA Plan ✔ ☐ ✔	Exterior Lighting (14-526 (d) 6) • Cut sheets of on-site light fixtures and any architectural or specialty lights (Technical Manual, Section 12) • Engineered details for any lights proposed in street right-of-way (Technical Manual, Section 10)	33
Yes NA Plan ✔ ☐ ☐	Noise and Vibration (14-526 (d) 7) • Evidence of noise levels for equipment, such as equipment specifications, to demonstrate consistency with zoning requirements	34
Yes NA Plan ☐ ☐ ✔	Signage and Wayfinding (14-526 (d) 8), if applicable • Signage plan showing the location, dimensions, height and setback of all existing and proposed signs. Signs in Historic Districts are reviewed by Historic Preservation staff • Proposed commercial and directional signage on site	35
Yes NA Plan ☐ ✔ ☐	Zone Related Design Standards (14-526 (d) 5) • Address Historic Preservation Design Review, if applicable • Address any applicable design review standards by zone • Address submission requirements from Design Manual, page 1, addressing neighborhood context • Description of exterior materials, color, finish, and samples	36
Construction Management Plan		
Check list		
Yes NA Plan ✔ ☐ ✔	Construction Management Plan • Construction Management Document and Plan	37

Level II and Level III Site Plan Checklist

Please upload the following drawings with the listed details into e-Plan as separate pdfs.

☐ **RECENT BOUNDARY SURVEY** (stamped by Maine Licensed Surveyor)

Must be in compliance with Technical Manual, Section 13

SITE PLAN(s) (stamped by Maine Licensed Engineer) including:

☑ **Existing Conditions**

- Approximate location of structures on abutting property
- Topography
- Locate water courses
- Delineate wetlands
- Zone lines

☑ **Proposed Site Plan**

- Ground floor area, and grade elevations for all buildings

☑ **Access, Circulation, and Parking**

- Streets and intersections adjacent to site , any proposed geometric modifications
- Location, dimensions and materials of all existing and proposed driveways, vehicle, bicycle, & pedestrian access ways with corresponding curb lines
- Engineered specifications/ cross-sections for proposed driveways, sidewalks & paved areas
- Location and dimensions of proposed loading areas
- Existing and proposed transit infrastructure with dimensions/ engineering specifications
- Location of vehicle and bicycle parking with dimensions and engineering specifications

☑ **Site Considerations**

- Identify snow storage areas
- Location of fire hydrants
- Location of solid waste management facilities

☑ **UTILITY PLAN** including:

- Existing utilities on site and within public streets
- Location, sizing, and directional flows of all existing and proposed utilities
- Location and dimensions of off-premises public or publicly accessible infrastructure adjacent to site
- Electric utility infrastructure

☑ **GRADING and DRAINAGE PLAN** including:

- Existing grades and drainage
- Proposed grades
- Proposed stormwater management meeting Technical Manual (Section 5) standards
- Location and proposed alteration of a water course
- Preservation or alteration of wetlands

☑ **EROSION CONTROL**

- Must be in compliance with Technical Manual, Section 5

☑ **LANDSCAPE PLAN** including:

- Existing vegetation to be preserved and preservation measures
- Proposed landscaping and buffers
- Planting schedule

☐ **RECORDING PLAT**, if applicable

- IF SUBDIVISION: Must be in compliance with requirements of Section 14-496 (b)

☑ **ARCHITECTURAL PLANS & RENDERINGS** including:

- Exterior building elevations, color renderings, illustrations of all sides
- Location and dimensions of all existing & proposed HVAC & mechanical equipment, all proposed screening
- Provide context drawings, if applicable (Design Manual, page 1)
- Floor plans

Level III – Preliminary and Final Site Plans
Development Review Application
Portland, Maine

Planning and Urban Development Department
Planning Division

Portland's Planning and Urban Development Department coordinates the development review process for site plan, subdivision and other applications under the City's Land Use Code. Attached is the application form for a Level III: Preliminary or Final Site Plan. Please note that Portland has delegated review from the State of Maine for reviews under the Site Location of Development Act, Chapter 500 Stormwater Permits, and Traffic Movement Permits.

Level III: Site Plan Development includes:

- New structures with a total floor area of 10,000 sq. ft. or more except in Industrial Zones.
- New structures with a total floor area of 20,000 sq. ft. or more in Industrial Zones.
- New temporary or permanent parking area(s) or paving of existing unpaved parking areas for more than 75 vehicles.
- Building addition(s) with a total floor area of 10,000 sq. ft. or more (cumulatively within a 3 year period) except in Industrial Zones.
- Building addition(s) with a total floor area of 20,000 sq. ft. or more in Industrial Zones.
- A change in the use of a total floor area of 20,000 sq. ft. or more in any existing building (cumulatively within a 3 year period).
- Multiple family development (3 or more dwelling units) or the addition of any additional dwelling unit if subject to subdivision review.
- Any new major or minor auto business in the B-2 or B-5 Zone, or the construction of any new major or minor auto business greater than 10,000 sq. ft. of building area in any other permitted zone.
- Correctional prerelease facilities.
- Park improvements: New structures greater than 10,000 sq. ft. and/or facilities encompassing 20,000 sq. ft. or more (excludes rehabilitation or replacement of existing facilities); new nighttime outdoor lighting of sports, athletic or recreation facilities not previously illuminated.
- Land disturbance of 3 acres or more (includes stripping, grading, grubbing, filling or excavation).

Portland's development review process and requirements are outlined in the Land Use Code (Chapter 14), Design Manual and Technical Manual.

Planning Division
Fourth Floor, City Hall
389 Congress Street
(207) 874-8719
planning@portlandmaine.gov

Office Hours
Monday thru Friday
8:00 a.m. – 4:30 p.m.

I. Project Information (Please enter n/a on those fields that are not applicable)

Project Name:	Pine State Family Mart
Proposed Development Address:	1884 Forest Avenue, Portland, Maine
Project Description:	Retail space, convenience store/gas station - 2 Buildings
Chart/Block/Lot:	327-B-3
Preliminary Plan	
Final Plan	

II. Contact Information (Please enter n/a on those fields that are not applicable)

APPLICANT

Name:	John Chau
Business Name:	
Address:	75 Arcadia Street
City/State:	Portland, ME
Zip Code:	04103
Work #:	
Home #:	(207) 761-0858
Cell #:	
Fax #:	
E-mail:	Jchau059@gmail.com

OWNER

Name:	John Chau and Phuong Neang (JT)
Address:	75 Arcadia Street
City/State:	Portland, ME
Zip Code:	04103
Work #:	
Home #:	(207) 761-0858
Cell #:	
Fax #:	
E-mail:	Jchau059@gmail.com

AGENT/REPRESENTATIVE

Name:	James Seymour, P.E., Sebago Technics, Inc.
Address:	75 John Roberts Road, Suite 4A
City/State:	South Portland, ME
Zip Code:	04106
Work #:	(207) 200-2083
Home #:	
Cell #:	
Fax #:	(207) 856-2206
E-mail:	jseymour@sebagotechnics.com

BILLING (to whom invoices will be forwarded to)

Name:	John Chau
Address:	75 Arcadia Street
City/State:	Portland, ME
Zip Code:	04103
Work #:	
Home #:	(207) 761-0858
Cell #:	
Fax #:	
E-mail:	Jchau059@gmail.com

ENGINEER

Name:	James Seymour, P.E., Sebago Technics, Inc.
Address:	75 John Roberts Road, Suite 4A
City/State:	South Portland, ME
Zip Code:	04106
Work #:	(207) 200-2075
Home #:	
Cell #:	
Fax #:	(207) 856-2083
E-mail:	jseymour@sebagotechnics.com

SURVEYOR

Name:	Charlie Marchese, Sebago Technics, Inc.
Address:	75 John Roberts Road, Suite 4A
City/State:	South Portland, ME
Zip Code:	04106
Work #:	(207) 200-2069
Home #:	
Cell #:	
Fax #:	(207) 856-2206
E-mail:	cmarchese@sebagotechnics.com

ARCHITECT

Name:	Ryan Senatore Architecture
Address:	535 Congress Street, #304
City/State:	Portland, Maine
Zip Code:	04101
Work #:	(207) 747-5159
Home #:	
Cell #:	
Fax #:	
E-mail:	ryan@senatorearchitecture.com

ATTORNEY

Name:	N/A
Address:	
City/State:	
Zip Code:	
Work #:	
Home #:	
Cell #:	
Fax #:	
E-mail:	

DESIGNATED PERSON(S) FOR UPLOADING INTO e-PLAN

Name:	Stefanie Nichols
E-mail:	snichols@sebagotechnics.com
Name:	Rebecca Gabryszewki
E-mail:	rgabryszewski@sebagotechnics.com
Name:	Sarah Hanf
E-mail:	shanf@sebagotechnics.com

III. APPLICATION FEES

LEVEL III DEVELOPMENT (check applicable review)

☐	Less than 50,000 sq. ft.	$750.00
☑	50,000 – 100,000 sq. ft.	$1,000.00
☐	100,000 – 200,000 sq. ft.	$2,000.00
☐	200,000 – 300,000 sq. ft.	$3,000.00
☐	Over 300,000 sq. ft.	$5,000.00
☐	Parking lots over 100 spaces	$1,000.00
☐	After-the-fact Review	$1,000.00 + applicable application fee above

PLAN AMENDMENTS (check applicable review)

☐	Planning Staff Review	$250.00
☐	Planning Board Review	$500.00

OTHER REVIEWS (check applicable review)

☑	Traffic Movement	$1,500.00
☑	Stormwater Quality	$250.00
☐	Subdivision	$500.00 + applicable fee for lots/units below
	# of Subdivision Lots/Units [ ] x $25.00 each	$
☐	Site Location	$3,500.00 + applicable fee for lots/units below
	# of Site Location Lots/Units [ ] x $200.00 each	$
☐	Change of Use	
☐	Flood Plain	
☐	Shoreland	
☐	Design Review	
☐	Housing Replacement	
☐	Historic Preservation	
	TOTAL APPLICATION FEE DUE:	$ 2,750.00

IV. FEES ASSESSED AND INVOICED SEPARATELY

- Notices to abutters (receipt of application, workshop and public hearing meetings) ($.75 each)
- Legal Ad in the Newspaper (% of total ad)
- Planning Review ($52.00 hour)
- Legal Review ($75.00 hour)
- Third Party Review (all outside reviews or analysis, eg. Traffic/Peer Engineer, are the responsibility of the applicant and will be assessed and billed separately)

V. PROJECT DATA (Please enter n/a on those fields that are not applicable)

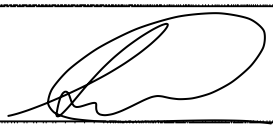
TOTAL AREA OF SITE	72,350	sq. ft.
PROPOSED DISTURBED AREA OF THE SITE	69,326	sq. ft.
If the proposed disturbance is greater than one acre, then the applicant shall apply for a Maine Construction General Permit (MCGP) with DEP and a Stormwater Management Permit, Chapter 500, with the City of Portland.		
IMPERVIOUS SURFACE AREA		
Impervious Area (Total Existing)	443	sq. ft.
Impervious Area (Total Proposed)	48703	sq. ft.
Building Ground Floor Area and Total Floor		
Building Footprint (Total Existing)	0	sq. ft.
Building Footprint (Total Proposed)	12,800	sq. ft.
Building Floor Area (Total Existing)	0	sq. ft.
Building Floor Area (Total Proposed)	12,800	sq. ft.
ZONING		
Existing	B-2	
Proposed, if applicable		
LAND USE		
Existing	Unimproved	
Proposed	Retail & Convenience Store/Gas	
RESIDENTIAL, IF APPLICABLE		
# of Residential Units (Total Existing)	n/a	
# of Residential Units (Total Proposed)	n/a	
# of Lots (Total Proposed)	n/a	
# of Affordable Housing Units (Total Proposed)	n/a	
PROPOSED BEDROOM MIX		
# of Efficiency Units (Total Proposed)	n/a	
# of One-Bedroom Units (Total Proposed)	n/a	
# of Two-Bedroom Units (Total Proposed)	n/a	
# of Three-Bedroom Units (Total Proposed)	n/a	
PARKING SPACES		
# of Parking Spaces (Total Existing)	0	
# of Parking Spaces (Total Proposed)	48	
# of Handicapped Spaces (Total Proposed)	4	
BICYCLE PARKING SPACES		
# of Bicycle Spaces (Total Existing)	0	
# of Bicycle Spaces (Total Proposed)	10	
ESTIMATED COST OF THE PROJECT	$3,500,000.00	

VI. APPLICANT SIGNATURE

By digitally signing the attached document(s), you are signifying your understanding this is a legal document and your electronic signature is considered a ***legal signature*** per Maine state law.

I hereby certify that I am the Owner of record of the named property, or that the owner of record authorizes the proposed work and that I have been authorized by the owner to make this application as his/her authorized agent. I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in this application is issued, I certify that the Planning Authority and Code Enforcement's authorized representative shall have the authority to enter all areas covered by this permit at any reasonable hour to enforce the provisions of the codes applicable to this permit.

This application is for a Level III Site Plan review. It is not a permit to begin construction. An approved site plan, a Performance Guarantee, Inspection Fee, Building Permit, and associated fees will be required prior to construction. Other Federal, State or local permits may be required prior to construction, which are the responsibility of the applicant to obtain.

Signature of Applicant:	
Date:	August 28, 2018

PRELIMINARY PLAN (Optional) - Level III Site Plan			
Applicant Checklist	Planner Checklist	# of Copies	**GENERAL WRITTEN SUBMISSIONS CHECKLIST**
		1	Completed Application form
		1	Application fees
		1	Written description of project
		1	Evidence of right, title and interest
		1	Evidence of state and/or federal approvals, if applicable
		1	Written assessment of proposed project's compliance with applicable zoning requirements
		1	Summary of existing and/or proposed easement, covenants, public or private rights-of-way, or other burdens on the site
		1	Written requests for waivers from site plan or technical standards, if applicable.
		1	Evidence of financial and technical capacity
		1	Traffic Analysis (may be preliminary, in nature, during the preliminary plan phase)
Applicant Checklist	Planner Checklist	# of Copies	**SITE PLAN SUBMISSIONS CHECKLIST**
		1	Boundary Survey meeting the requirements of Section 13 of the City of Portland's Technical Manual
		1	**Preliminary Site Plan including the following: (information provided may be preliminary in nature during preliminary plan phase)**
		Proposed grading and contours;	
		Existing structures with distances from property line;	
		Proposed site layout and dimensions for all proposed structures (including piers, docks or wharves in Shoreland Zone), paved areas, and pedestrian and vehicle access ways;	
		Preliminary design of proposed stormwater management system in accordance with Section 5 of the Technical Manual (note that Portland has a separate applicability section);	
		Preliminary infrastructure improvements;	
		Preliminary Landscape Plan in accordance with Section 4 of the Technical Manual;	
		Location of significant natural features (including wetlands, ponds, watercourses, floodplains, significant wildlife habitats and fisheries or other important natural features) located on the site as defined in Section 14-526 (b) (1);	
		Proposed buffers and preservation measures for significant natural features, as defined in Section 14-526 (b) (1);	
		Location , dimensions and ownership of easements, public or private rights of way, both existing and proposed;	
		Exterior building elevations.	

FINAL PLAN - Level III Site Plan			
Applicant Checklist	Planner Checklist	# of Copies	**GENERAL WRITTEN SUBMISSIONS CHECKLIST (* If applicant chooses to submit a Preliminary Plan, then the * items were submitted for that phase and only updates are required)**
		1	* Completed Application form
		1	* Application fees
		1	* Written description of project
		1	* Evidence of right, title and interest
		1	* Evidence of state and/or federal permits
		1	* Written assessment of proposed project's specific compliance with applicable Zoning requirements
		1	* Summary of existing and/or proposed easements, covenants, public or private rights-of-way, or other burdens on the site
		1	* Evidence of financial and technical capacity
		1	Construction Management Plan
		1	A traffic study and other applicable transportation plans in accordance with Section 1 of the technical Manual, where applicable.
		1	Written summary of significant natural features located on the site (Section 14-526 (b) (a))
		1	Stormwater management plan and stormwater calculations
		1	Written summary of project's consistency with related city master plans
		1	Evidence of utility capacity to serve
		1	Written summary of solid waste generation and proposed management of solid waste
		1	A code summary referencing NFPA 1 and all Fire Department technical standards
		1	Where applicable, an assessment of the development's consistency with any applicable design standards contained in Section 14-526 and in City of Portland Design Manual
		1	Manufacturer's verification that all proposed HVAC and manufacturing equipment meets applicable state and federal emissions requirements.

Applicant Checklist	Planner Checklist	# of Copies	**SITE PLAN SUBMISSIONS CHECKLIST** **(* If applicant chooses to submit a Preliminary Plan, then the * items were submitted for that phase and only updates are required)**
		1	* Boundary Survey meeting the requirements of Section 13 of the City of Portland's Technical Manual
		1	**Final Site Plans including the following:**
		Existing and proposed structures, as applicable, and distance from property line (including location of proposed piers, docks or wharves if in Shoreland Zone);	
		Existing and proposed structures on parcels abutting site;	
		All streets and intersections adjacent to the site and any proposed geometric modifications to those streets or intersections;	
		Location, dimensions and materials of all existing and proposed driveways, vehicle and pedestrian access ways, and bicycle access ways, with corresponding curb lines;	
		Engineered construction specifications and cross-sectional drawings for all proposed driveways, paved areas, sidewalks;	
		Location and dimensions of all proposed loading areas including turning templates for applicable design delivery vehicles;	
		Existing and proposed public transit infrastructure with applicable dimensions and engineering specifications;	
		Location of existing and proposed vehicle and bicycle parking spaces with applicable dimensional and engineering information;	
		Location of all snow storage areas and/or a snow removal plan;	
		A traffic control plan as detailed in Section 1 of the Technical Manual;	
		Proposed buffers and preservation measures for significant natural features, where applicable, as defined in Section 14-526(b)(1);	
		Location and proposed alteration to any watercourse;	
		A delineation of wetlands boundaries prepared by a qualified professional as detailed in Section 8 of the Technical Manual;	
		Proposed buffers and preservation measures for wetlands;	
		Existing soil conditions and location of test pits and test borings;	
		Existing vegetation to be preserved, proposed site landscaping, screening and proposed street trees, as applicable;	
		A stormwater management and drainage plan, in accordance with Section 5 of the Technical Manual;	
		Grading plan;	
		Ground water protection measures;	
		Existing and proposed sewer mains and connections;	

- Continued on next page -

		Location of all existing and proposed fire hydrants and a life safety plan in accordance with Section 3 of the Technical Manual;
		Location, sizing, and directional flows of all existing and proposed utilities within the project site and on all abutting streets;
		Location and dimensions of off-premises public or publicly accessible infrastructure immediately adjacent to the site;
		Location and size of all on site solid waste receptacles, including on site storage containers for recyclable materials for any commercial or industrial property;
		Plans showing the location, ground floor area, floor plans and grade elevations for all buildings;
		A shadow analysis as described in Section 11 of the Technical Manual, if applicable;
		A note on the plan identifying the Historic Preservation designation and a copy of the Application for Certificate of Appropriateness, if applicable, as specified in Section Article IX, the Historic Preservation Ordinance;
		Location and dimensions of all existing and proposed HVAC and mechanical equipment and all proposed screening, where applicable;
		An exterior lighting plan in accordance with Section 12 of the Technical Manual;
		A signage plan showing the location, dimensions, height and setback of all existing and proposed signs;
		Location, dimensions and ownership of easements, public or private rights of way, both existing and proposed.

A Guide to Holding Neighborhood Meetings
Portland, Maine

Planning and Urban Development Department
Planning Division and Planning Board

In order to improve communication between applicants and neighbors, the City of Portland requires applicants who are proposing certain types of development review projects, to hold a neighborhood meeting.

Developments requiring a neighborhood meeting

- Proposed map amendments, contract zones and zoning text amendments that would result in major development;
- Subdivisions of five or more units or lots;
- Master Development Plans; and
- Level III site plan proposals as defined in Section 14-523.

(The Land Use Code, including Article II (Planning Board) and Article V (Site Plan – which contains the neighborhood meeting requirements), are available on the City's web site at www.portlandmaine.gov/citycode/chapter014.pdf)

Timing of meeting

- **Subdivisions of 5 or more units or lots, zone changes, contract zones, zoning text amendments and Level III site plans:**
  - Preliminary Site Plan - The meeting should be held within 30 calendar days of filing the application.
  - Final Site Plan – If only a final plan is submitted, the meeting should be held within 21 calendar days of filing the application and no less than 7 calendar days before the public hearing.
- **Master Plan Development:**
  - The meeting should be held within 30 calendar days of filing the application.
  - The meeting should be held on a date no less than 7 calendar days before a public workshop or public hearing.
  - The meeting shall not be combined with any required neighborhood meeting for the Level III applications.

Location of meeting

- The meeting should be held in the evening, during the week, at a convenient location within the Portland neighborhood surrounding the proposed site. Community meeting spaces at libraries, schools or other places of assembly are recommended. Neighborhood schools are usually available for evening meetings.
- Meetings should not be held on the same day as scheduled Planning Board or City Council meetings. The City Council generally meets on the 1st and 3rd Monday of each month and the Planning Board generally meets on the 2nd and 4th Tuesday of each month; however additional meetings may be scheduled. An updated schedule may be found on the City's website: www.portlandmaine.gov

Invitation List

- Property owners within 500 feet of the proposed development (1000 feet for proposed industrial subdivisions and industrial zone changes)
- Interested citizens and neighborhood groups.

The Planning Division provides the mailing labels. We require at least 48 hours notice to generate the mailing labels and a charge of $1.00 per sheet will be payable upon receipt of the labels. An electronic version (excel or word format) of the labels can also be e-mailed upon request.

A digital copy of the notice must be provided to the Planning Office (jmy@portlandmaine.gov and ldobson@portlandmaine.gov) and the assigned planner, which will then be forwarded to those on the interested citizen list who receive e-mail notices.

When to Send Invitations

- Invitations must be sent **no less than 10 days (to include weekends)** prior to the neighborhood meeting.
- Notices may be sent by regular mail and do not need to be sent by certified mail.

Notice Description

A recommended invitation format is included in this packet of material.

Attendance Sheet and Meeting Minutes

- Sign-in sheet must be circulated for those in attendance.
- Applicant shall take accurate minutes of the meeting.
- The sign-in sheet and minutes shall be submitted to the Planning Division.

A public hearing will not be scheduled until the meeting minutes and sign-up sheet are submitted to the Planning Division.

A Certification form is included with this packet to be completed and signed by the applicant.

Please call the Planning Division at 874-8721 or 874-8719 if you have any questions.

Attachments

1. Neighborhood Meeting Invitation Format
2. Neighborhood Meeting Certification

EXAMPLE: Neighborhood Meeting Invitation Format

Applicant/Consultant
Letterhead

(Date)

Dear Neighbor:

Please join us for a neighborhood meeting to discuss our plans for a (development proposal) located at (location/number and street address).

Meeting Location: _____
Meeting Date: _____
Meeting Time: _____

(The City code requires that property owners within 500 feet (1000 feet for proposed industrial subdivisions and industrial zone changes) of the proposed development and residents on an "interested parties list", be invited to participate in a neighborhood meeting. A sign-in sheet will be circulated and minutes of the meeting will be taken. Both the sign-in sheet and minutes will be submitted to the Planning Board.)

If you have any questions, please call (telephone number of applicant or consultant).

Sincerely,

(Applicant)

Note:
Under Section 14-32(C) and 14-524(a)d of the City Code of Ordinances, an applicant for a Level III development, subdivision of over five lots/units, or zone change is required to hold a neighborhood meeting within 30 days of submitting a preliminary application or 21 days of submitting a final site plan application, if a preliminary plans was not submitted. The neighborhood meeting must be held at least seven days prior to the Planning Board public hearing on the proposal. Should you wish to offer additional comments on this proposed development, you may contact the Planning Division at 874-8721 or send written correspondence to the Planning and Urban Development Department, Planning Division 4th Floor, 389 Congress Street Portland, ME 04101 or by email: to bab@portlandmaine.gov

EXAMPLE: Neighborhood Meeting Certification

I, (applicant/consultant) hereby certify that a neighborhood meeting was held on (date) at (location) at (time).

I also certify that on (date at least ten (10) days prior to the neighborhood meeting), invitations were mailed to the following:

1. All addresses on the mailing list provided by the Planning Division which includes property owners within 500 feet of the proposed development or within 1000 feet of a proposed industrial subdivision or industrial zone change.

2. Residents on the "interested parties" list.

3. A digital copy of the notice was also provided to the Planning Division (jmy@portlandmaine.gov and ldobson@portlandmaine.gov) and the assigned planner to be forwarded to those on the interested citizen list who receive e-mail notices.

Signed,

_____ _____ (date)

Attached to this certification are:

1. Copy of the invitation sent
2. Sign-in sheet
3. Meeting minutes

29: Shadows (14-526 9d), if applicable

- Shadow analysis of impacts on publicly accessible open space (Technical Manual, Section 11)

  Not applicable. There are no publicly accessible open spaces areas adjacent to the property.

Att. C

03: Right, Title, Interest

The record owners are John Chau and Phuong Neang (JT) by deed 26148/266 recorded at the Cumberland County Registry of Deeds (CCRD). The parcel is identified by the City of Portland Assessor as 327-3-B. A copy of the referenced deed is included in this section.

11142

Doc#: 33674 Bk:26148 Ps: 266 DEED.

WARRANTY DEED
(Maine Statutory Short Form)

KNOW ALL BY THESE PRESENTS, that **OLD OCEAN HOUSE BUILDERS LLC**, a Maine limited liability company with a principal place of business in Cape Elizabeth, Maine, for consideration paid, GRANTS TO **JOHN CHAU** and **PHUONG NEANG**, whose mailing address is 75 Acadia Street, Portland Maine, with WARRANTY COVENANTS, AS JOINT TENANTS AND NOT AS TENANTS IN COMMON, the land in the City of Portland, Maine, described as follows:

A CERTAIN lot or parcel of land with any buildings thereon situated on the southwesterly side of Forest Avenue, in the City of Portland, County of Cumberland and State of Maine, bounded and described as follows:

BEGINNING AT an iron on the southwesterly sideline of Forest Avenue at the northwest corner of the lot of land conveyed by the City of Portland to the Presumpscot Grange by deed dated August 21, 1947 and recorded in the Cumberland County Registry of Deeds in Book 1871, Page 406;

Thence by said Presumpscot Grange land South 29 degrees 23 1/2' West one hundred sixty-seven and eighteen hundredths (167.18) feet to a concrete monument and land of Arthur Hawkes;

Thence by said Hawkes' land and land of Arthur Serunian North 66 degrees 40' West one hundred fifty-seven and seventy-seven hundredths (157.77) feet to an iron;

Thence by said Serunian land North 47 degrees 01' West two hundred ninety-five and twenty-one hundredths (295.21) feet to a stone monument;

Thence continuing by said Serunian land North 45 degrees 51 1/2' East one hundred sixty-eight and sixty-five hundredths (168.65) feet to an iron and the southwesterly sideline of Forest Avenue;

Thence by said Forest Avenue South 38 degrees 52' East one hundred fifty-five and thirty-nine hundredths (155.39) feet to a stake marking an angle point in said road, and continuing by Forest Avenue South 62 degrees 57' East two hundred fifty-one and eighty-nine hundredths (251.89) feet to the point of beginning.

Courses are magnetic and of the date of 1964.

Being the same premises described in a deed from Forest Avenue Associates dated January 28, 2008 and recorded in the Cumberland County Registry of Deeds in Book 25775, Page 152.

IN WITNESS WHEREOF, the undersigned has caused this instrument to be signed and sealed on June 20, 2008.

OLD OCEAN HOUSE BUILDERS LLC

Witness

by: _____
Patrick A. Tinsman, its Manager

State of Maine
County of Cumberland, ss.
2008

June 20, 2008

Then personally appeared before me the above-named Patrick A. Tinsman in his said capacity and acknowledged the foregoing to be his free act and deed and the free act and deed of said limited liability company.

Before me,

_____
Notary Public/Attorney-at-Law
Printed Name: Lauren R. Clough

Warranty Deed 1884 Forest Ave.DOC
6/16/2008

Received
Recorded Register of Deeds
Jun 23,2008 02:00:47P
Cumberland County
Pamela E. Lovley

Att. D

04: State and Federal Permits

The proposed site development requires a Traffic Movement Permit (TMP) Application. The permit application will be submitted concurrently with the Site Plan Application for delegated review by the City of Portland.

Att. DD

30: Snow and Ice Loading (14-526 (d) 3)

- Building design to prevent snow and ice from loading or falling onto adjacent properties or public ways

  The buildings are situated on the site to avoid significant amounts of accumulated snow and ice from loading or falling onto adjacent properties or public ways. See Site Plan for building location.

E

05: Zoning Assessment

The subject parcel is located within the B-2 Community Business Zone; and abuts an R-5 Residential zoning district. Two buildings will be constructed on site for mixed-use retail and the other building will be utilized as a convenience store/gas station.

In accordance with the dimensional requirements defined in Section 14-250 of the City of Portland Code of Ordinances, the proposed development meets or exceeds ordinance requirements. The required *Zoning Assessment Table* is included in this section and reference is made to the plan set for additional space and bulk information.

ZONING ANALYSIS Relevant Zone(s) B-2

All Projects:

	Required	Proposed
Lot Size	-	1.61 Acres +/-
Area Per Dwelling Unit	n/a	n/a
Minimum Street Frontage	20 feet	407.28 +/- feet
Front Yard Minimum	0 feet	10 feet
Front Yard Maximum	10 feet	10 feet
Rear Yard	10 feet	10 feet
Yard Right	0 feet	15 feet +/-
Yard Left	0 feet	21 feet +/-
Side Street Setback	n/a	n/a
Step Back	n/a	n/a
Maximum Lot Coverage	n/a	n/a
Minimum Lot Coverage	n/a	n/a
Maximum Height	45 feet	25'-8", 25'-6"
Open Space	n/a	n/a
Maximum Impervious Area	80%	67%
Pavement Setback		
Floor Area Ratio		
Off Street Parking Spaces	37	48
Loading Bays	-	0
Other 1		
Other 2		
Other 3		

Retail 25'-8", Conv. Store 25'-6"

Required:
Retail: 22
Convenience Store: 15

Planned Residential Unit Developments (PRUD) Requirements

	Required	Proposed
Minimum Lot Size	n/a	
Minimum Lot Area per Dwelling	n/a	
Maximum # Units per Building	n/a	
Maximum Building Length	n/a	
Maximum Accessory Building Length	n/a	
Minimum Setbacks	n/a	
Minimum Building Separation	n/a	
Minimum Open Space	n/a	

Affordable Housing Density Bonuses (if applicable)

	Bonus Increase or Decrease	Maximum Allowable With Bonus	Proposed
Density	n/a		
Height	n/a		
Setback Reduction	n/a		
Recreation Space	n/a		
Maximum Accessory Building Length	n/a		
Minimum Setbacks	n/a		
Minimum Building Separation	n/a		
Minimum Open Space	n/a		
Explanatory Text 1 (optional):			
Explanatory Text 2 (optional):			
Explanatory Text 3 (optional):			

31: View Corridors (14-526 (d)4)

- Protection of designated view corridors (Portland Design Manual, Appendix 1)

Not applicable. The site is not located in a designated view corridor.

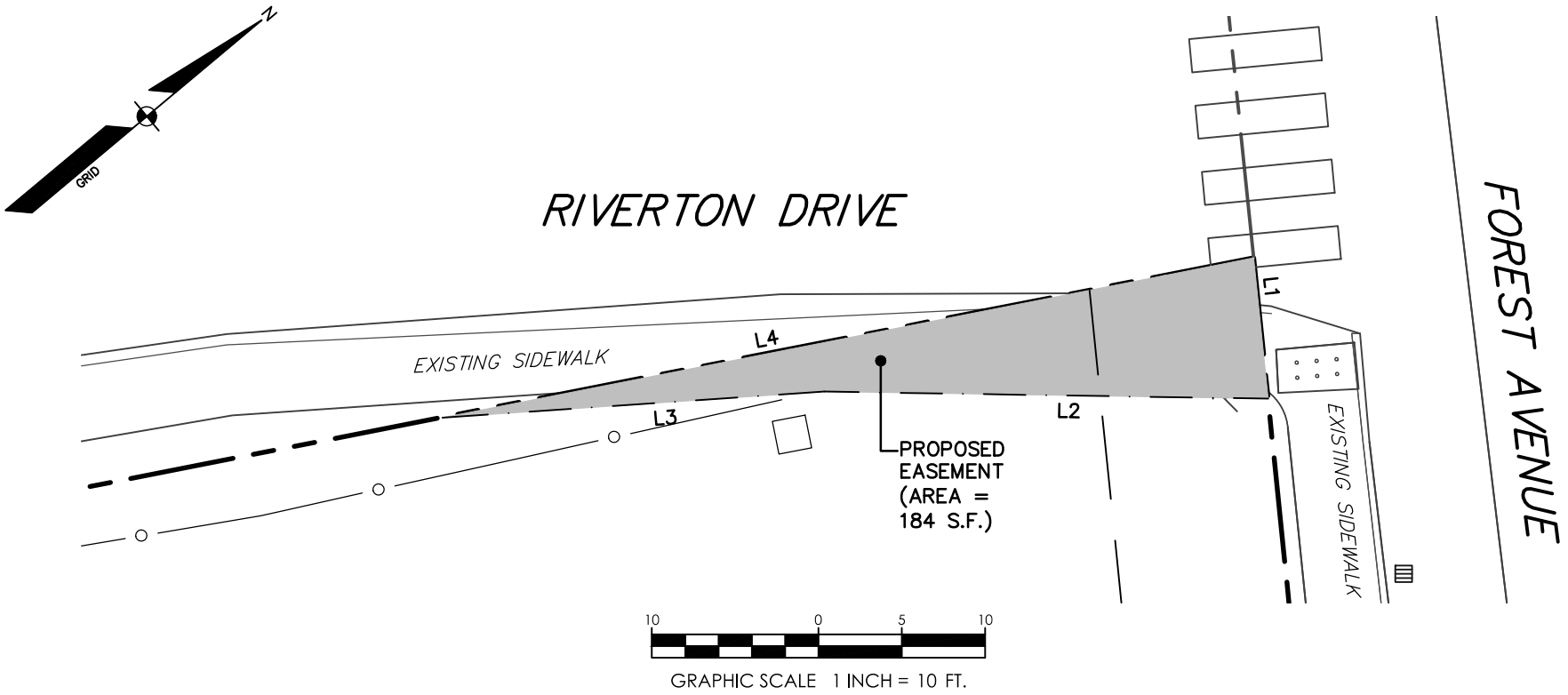
06: Existing and/or Proposed Easements or Covenants

Att. F

A. Existing Easements:
Per review of the deed, no existing easements or covenants are associated with the project site.

B. New Easements
Three new sidewalk easements are proposed as part of the site development.

A proposed pedestrian sidewalk easement will be created for the portion of sidewalk that will encroach into private property as a result of the proposed road/turning lane improvements. Per our discussions and agreements with METRO, a bus shelter will be added near the Forest Avenue entrance requiring an easement as well. Finally, as was originally proposed in 2012 with the previous approved site plan, we are offering an easement for the street encroachment at the intersection of Riverton Drive and Forest Avenue. See Exhibits 'A', 'B' & 'C' sketches, this section.



GENERAL NOTES:

1. THE RECORD OWNER OF THE LOCUS PARCEL IS JOHN CHAU AND PHUONG NEANG BY WARRANTY DEED DATED JUNE 20, 2008 AND RECORDED AT THE CUMBERLAND COUNTY REGISTRY OF DEEDS (CCRD) ON JUNE 23, 2008 IN BOOK 26148, PAGE 266.

2. THE PROPERTY IS SHOWN AS LOT 3, BLOCK B, ON THE CITY OF PORTLAND ASSESSORS MAP 327 AND IS LOCATED IN THE B-2 ZONE.

3. REFERENCE IS MADE TO PLANS ENTITLED "EXISTING CONDITIONS AND SITE PLAN OF PINE STATE FAMILY MART, 1884 FOREST AVE., PORTLAND, MAINE FOR JOHN CHAU" DATED SEPTEMBER 10, 2018, BY SEBAGO TECHNICS, INC.

EASEMENT LINE TABLE

LINE	DIRECTION	DISTANCE
L1	S 55°50'32" E	8.50'
L2	S 40°54'47" W	26.63'
L3	S 36°05'00" W	23.00'
L4	N 28°50'58" E	49.65'

SEBAGO TECHNICS
WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
Tel. 207-200-2100

EXHIBIT 'A' SKETCH
OF PROPOSED SIDEWALK EASEMENT

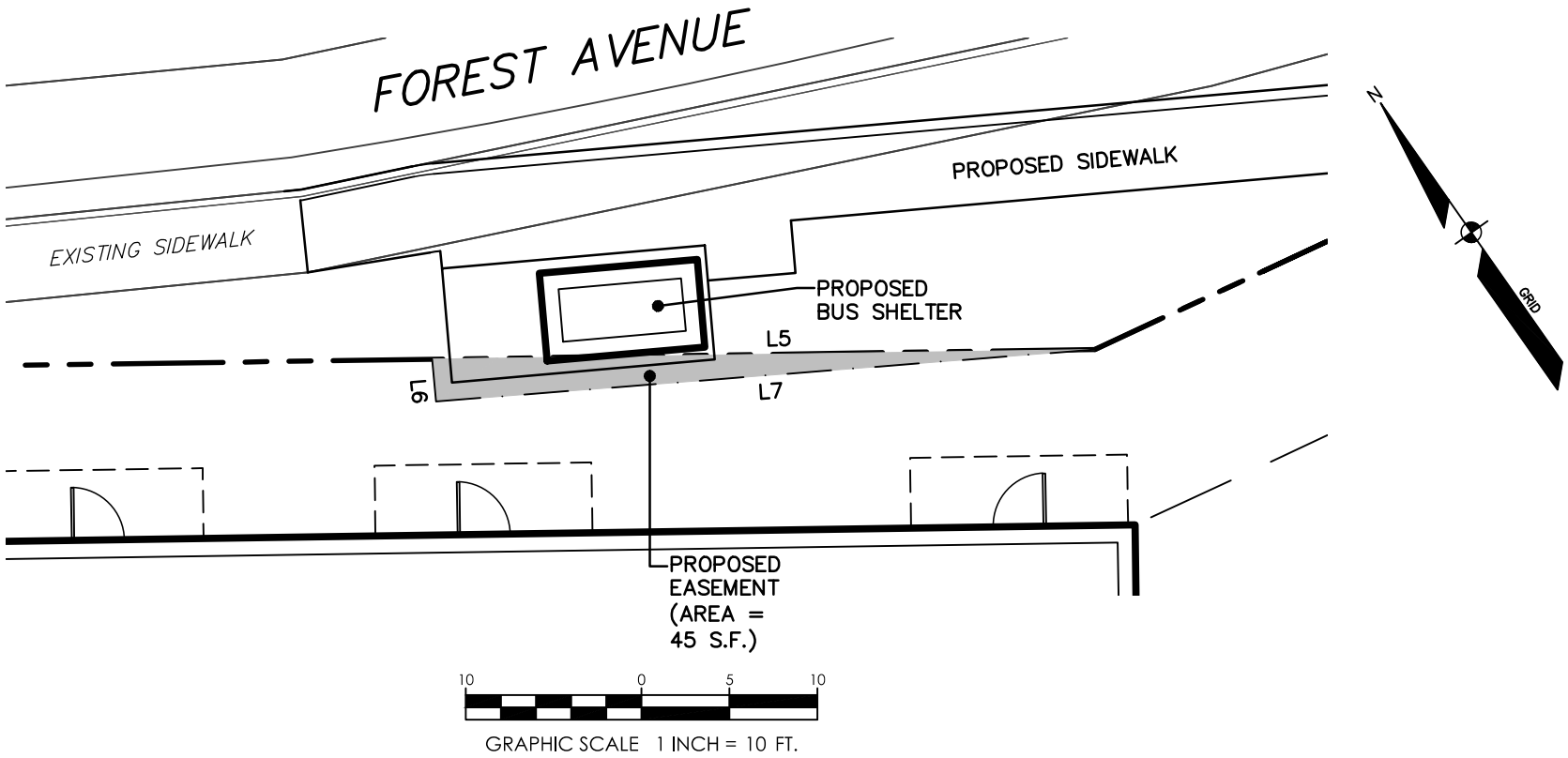
SCALE: 1" = 10'
DATE: 09-11-18

LOCATION:
RIVERTON DRIVE/FOREST AVENUE
PORTLAND, MAINE

FOR:
PINE STATE FAMILY MART
1884 FOREST AVE., PORTLAND, MAINE

SHEET:
1 OF 3

11142S.dwg, TAB: EX1



GENERAL NOTES:

1. THE RECORD OWNER OF THE LOCUS PARCEL IS JOHN CHAU AND PHUONG NEANG BY WARRANTY DEED DATED JUNE 20, 2008 AND RECORDED AT THE CUMBERLAND COUNTY REGISTRY OF DEEDS (CCRD) ON JUNE 23, 2008 IN BOOK 26148, PAGE 266.

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EASEMENT LINE TABLE

LINE	DIRECTION	DISTANCE
L5	N 55°50'32" W	37.68'
L6	S 30°00'00" W	2.41'
L7	S 59°30'29" E	37.58'

SEBAGO TECHNICS
WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
Tel. 207-200-2100

EXHIBIT 'B' SKETCH
OF PROPOSED SIDEWALK EASEMENT

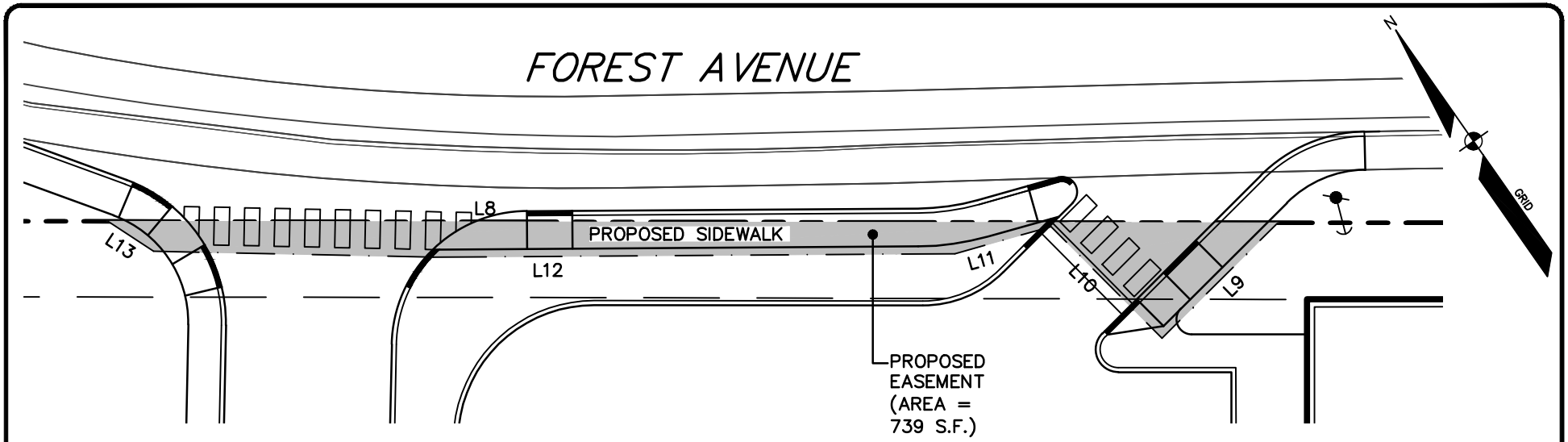
SCALE: 1" = 10'
DATE: 09-11-18

LOCATION:
RIVERTON DRIVE/FOREST AVENUE
PORTLAND, MAINE

FOR:
PINE STATE FAMILY MART
1884 FOREST AVE., PORTLAND, MAINE

SHEET:
2 OF 3

11142S.dwg, TAB: EX2



GENERAL NOTES:

1. THE RECORD OWNER OF THE LOCUS PARCEL IS JOHN CHAU AND PHUONG NEANG BY WARRANTY DEED DATED JUNE 20, 2008 AND RECORDED AT THE CUMBERLAND COUNTY REGISTRY OF DEEDS (CCRD) ON JUNE 23, 2008 IN BOOK 26148, PAGE 266.

2. THE PROPERTY IS SHOWN AS LOT 3, BLOCK B, ON THE CITY OF PORTLAND ASSESSORS MAP 327 AND IS LOCATED IN THE B-2 ZONE.

3. REFERENCE IS MADE TO PLANS ENTITLED "EXISTING CONDITIONS AND SITE PLAN OF PINE STATE FAMILY MART, 1884 FOREST AVE., PORTLAND, MAINE FOR JOHN CHAU" DATED SEPTEMBER 10, 2018, BY SEBAGO TECHNICS, INC.

EASEMENT LINE TABLE

LINE	DIRECTION	DISTANCE
L8	S 79°56'02" E	154.87'
L9	S 55°08'13" W	21.63'
L10	N 34°51'47" W	20.80'
L11	S 84°17'55" W	13.22'
L12	N 80°22'32" W	69.08'
L13	N 46°57'50" W	7.23'

SEBAGO TECHNICS
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75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
Tel. 207-200-2100

EXHIBIT 'C' SKETCH
OF PROPOSED SIDEWALK EASEMENT

SCALE: 1" = 20'
DATE: 09-11-18

LOCATION:
RIVERTON DRIVE/FOREST AVENUE
PORTLAND, MAINE

FOR:
PINE STATE FAMILY MART
1884 FOREST AVE., PORTLAND, MAINE

SHEET:
3 OF 3

11142S.dwg, TAB: EX3

Att. FF

32: Historic Resources (14-526(d) 5)

- Identify developments within Historic Districts or affecting Desginated Landmarks
- Certificate of Appropriateness or other evidence
- Identify Developments within 100 feet of Historic Districts of affecting Designated Landmarks. Advisory HP review may be required
- Address preservation and documentation of Archaelogical Resources

The proposed development is not located in a City Historic District and will not affect a Designated Landmark. Reference is made to Maine Historic Preservation Commission site review request for historic and archaeological features, this section. A copy of the response will be forwarded to the City upon receipt.

SEBAGO TECHNICS

CIVIL ENGINEERING ▪ SURVEYING ▪ LANDSCAPE ARCHITECTURE

August 28, 2018
11142

Mr. Kirk Mohney, State Historic Preservation Officer
Maine Historic Preservation Commission
State House Station 65
Augusta, Maine 04333

Re: Proposed Pine State Family Mart – 1884 Forest Avenue, Portland
Tax Parcel: 327-B-3
Record Owners: John Chau, Phuong Neang (JT)

Dear Mr. Mohney,

Sebago Technics, Inc. has been retained by Mr. John Chau for services related to the development of Pine State Family Mart on an unimproved property at 1884 Forest Avenue in the City of Portland. The site is 1.61± in size and will be developed by the addition of two buildings. The uses will consist of one mixed-use retail building ±7,800 square feet and a ±5,000 square foot convenience store with 4 fueling islands, access drive, parking, utilities, landscaping and other associated site improvements.

The site is currently wooded and is adjacent to residential uses (Riverton Park Family Apartments, Terrace Pond Apartments, Wellesley Estates Apartments) and is opposite Tortilla Flats restaurant and adjacent to a dance club/event center. Other site uses in the vicinity include a 7-Eleven convenience store/gas station and two automobile repair businesses. The site is located in B-2 Business Zone and the design and proposed uses are typical of, and consistent with outer Forest Avenue zoning and uses. The site is not located in a City historic district.

As part of the municipal site plan review respectfully request a site review by the Commission for the presence of any archaeological or historic sites within or adjacent to the project area determined in accordance with the provisions of the National Historic Preservation Act 36 CFR, Part 800, Section 106.

We have enclosed a site location map and aerial photograph for your reference. If you have any questions or require additional information please contact me at snichols@sebagotechnics.com or directly at (207) 200-2120.

Sincerely,
SEBAGO TECHNICS, INC.

Stefanie Nichols

Stefanie Nichols
Permitting Specialist/Project Coordinator

enc.

07: Waiver Requests

No waivers are requested.

33: Exterior Lighting (14-526 (d) 6)

- Cut sheets of on-site light fixtures and any architectural or specialty lights (Technical Manual, Section 12)
- Engineered details for any lights proposed in street right-of-way (Technical Manual, Section 10)

Light fixture cut sheets are included in this section. Lighting will be installed at building entrances along the building faces, as necessary, to provide illumination levels that are safe, comfortable and convenient. Light fixture cut sheets and a photometric plans prepared and provided by Swaney Lighting, this section. The site development abuts residential uses therefore shielding measures are incorporated into the lighting design.

ARCEOS™
ARS SERIES
SURFACE/CEILING/GARAGE

Cat.#

Job

Type

HUBBELL Outdoor Lighting

Approvals

SPECIFICATIONS

Intended Use:
Ceiling applications from eight to eighteen feet for surface, box or pendant mount. Applications include parking garage, walkway or building canopies, corridors, tunnels, large stairwells and other interior applications with ambient 40˚C. A wide range of lumen packages and optical distributions are available making the ARS Series luminaire both versatile and functional.

Construction:
- Die cast aluminum housing features vertical fins for two directional air flow that maximizes heat dissipation and ensures long electrical component life and luminaire performance
- LED light engines and electrical compartment are thermally isolated with an air gap for optimum component performance and long life
- One piece molded silicone gasket ensures weather proof seal around each individual LED; Stamped stainless steel bezel provides mechanical compression to seal the optical assembly; 18L and 24L luminaires include finish (color) matching blanking bezel
- IP65 luminaire rating
- Vandal resistant polycarbonate and low bright-ness acrylic shield accessories available

LED/Optics:
- Light engine is hexagonal LED module containing 6 high output LEDs with PMMA acrylic lenses that create precise photometric performance
- Choice of multiple light outputs based on quantity of hexagonal LED arrays: 3 = 18 LEDs, 4 = 24 LEDs or 6 = 36 LEDs hexagonal LED modules, lumen range 4,000-9,700
- Four distribution types: Type V Square (5M), Type V Rectangular (5R), Type V Wide (5W) or Type IV (4)
- Type V Rectangular (5R) lenses provides low brightness "drive aisle optics" solution for low mounting height applications when the lens is oriented perpendicular to the flow of traffic
- Variety of color temperatures offered: 3000K (70CRI), 4000K (70CRI) or 5000K (70 CRI) CCT
- Each hexagonal light engine comes with a connector for easy replacement

Electrical:
- 120V-277V 50/60Hz, 42-86 Watts 700mA configurations. Drivers RoHS compliant and IP66
- 0-10V dimming drivers. Up to 113 lumens per watt. Designed and certified for 40˚C ambient temperatures
- Thermal management protection device shuts driver/LED systems off when temperatures are too high. Operating temperature range -30˚C/-22˚F –40˚C/104˚F
- Surge protection – 20KA; Turns fixture off at end of life; Includes LED for end of life indication (see surge suppressor page 3)

Controls/Options:
- Occupancy Sensors, photocells controls available for on/off or dimming operation
- wiSCAPE in fixture wireless control module, features dimming, switching motion sensor
- Up light o ption available in 24L and 36L configurations

Installation:
Quick disconnect plate mounts over standard junction box and allows for simplified fixture installation. A 3/4" hub provides pendant stem mounting making the fixture adaptable to a variety of applications. Each mounting can be accomplished while maintaining a watertight seal. Four ½" conduit hubs allow side access as required. A pattern indicator on the mounting plate allows the installer to properly orient the fixture without energizing the light engines.

Listings:
Listed to UL 1598 for use in wet locations, 40˚ C ambient environments; Meets DesignLights Consortium (DLC) qualifications 4K & 5K models only, Consult DLC website for more details: http://www.designlights.org/QPL; IP65

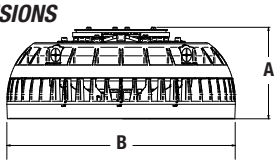
Warranty:
Five year limited warranty (for more information visit: http://www.hubbelllighting.com/resources/warranty/

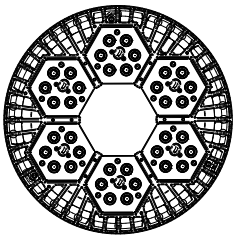
PRODUCT IMAGE(S)



Shown with motion control option

DIMENSIONS





A	B	Weight:
5.68" (144.22 mm)	14.00" (355.6 mm)	18 lbs 8.16 kg

CARTON DIMENSIONS

Length	Width	Height
15.88"	15.88"	7.5"

CERTIFICATIONS/LISTINGS

C SP US

IP65

DLC QPL LISTED

ida

*3000K and warmer CCTs only

ORDERING INFORMATION

ORDERING EXAMPLE: ARS-36L5K-070-5M-1-DB-PC

ARS - [ ] [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ]

SERIES	NUMBER OF LEDS	LED COLOR	DRIVE CURRENT	IES DISTRIBUTION	VOLTAGE[2]
ARS Arceos™ surface/ceiling/garage luminaire	**18L** 18 LEDs **24L** 24 LEDs **36L** 36 LEDs	**3K** 3000K **4K** 4000K **5K** 5000K	**070** 700mA **083**[1] 833mA **105**[1] 1050mA	**5M** Type V Square **5R** Type V Rectangle **5W** Type V Wide **4** Type IV	**U** 120V-277V **1** 120V **2** 208V **3** 240V **4** 277V **F**[6] 347V **5**[6] 480V

FINISH	FINISH	OPTIONS
DB Bronze **BL** Black **WH** White **PS** Platinum Silver **GR** Gray	**FG** Forest Green (premium color) **RD** Red (premium color) **CC** Custom Colors (Consult factory)	**F**[2] Fusing (voltage specified and determined by voltage field) **UD** Up light option, available in 24L and 36L only 700mA configuration only **LMB** Less moutning bracket (must order mounting bracket accessory) **CS** Comfort Shield **SPC** Vandal Shield

CONTROL OPTIONS

WIR wiSCAPE, In-fixture wireless control module

WIRSC wiSCAPE, In-fixture wireless control module w/ occupancy sensor

CONTROL OPTIONS

PC[2] Photocontrol (must specify voltage not available in 480V)

SCP[2,3,5] High/low control - for up to 20' mounting heights user programmable settings

SCPW[2,3,5] High/low control - wide lens for up to 8' mounting heights

[1] 833mA only available in 18L, 1050mA only available with 24L, 120-277V only
[2] Specify voltage for voltage specific options
[3] 0-10V fully adjustable dimming with automatic daylight calibration and different time delay settings; Must order minimum of one SCP-REMOTE to program dimming settings
[4] One per LED module e.g. 3 – 18L, 4 – 24L, and 6 – 36L luminaires (see page 3)
[5] PC option not applicable, included in sensor. For SCP, PC function turns on to lower setting until motion is detected
[6] 24L and 36L 700mA configuration only, not available with UD or WIRSC options

See page 2 and 3 for Accessories.

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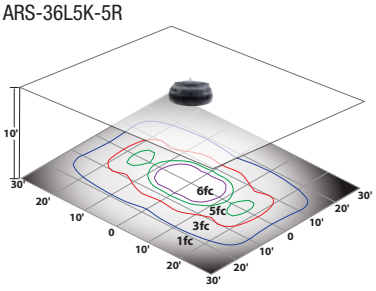
ACCESSORIES/REPLACEMENT PARTS - Order Separately

Catalog Number	Description
ARS-SPC[4]	Vandal shield (1 per LED module)
ARS-BS-XX*	Bird shield
ARS-CS[4]	Comfort shield - Reduces source brightness and imagining P95 acrylic with nominal 10% lumen reduction (1 per LED module)
ARS-MB-XX*	ARS mounting bracket for pre-installation of mounting bracket (accessory for LMB option)
SCP-REMOTE[3]	Remote control for SCP option; order at least on per project to program and control (not applicable for 347/480V)
SWUSB* **	SiteSync interface software loaded on USB flash drive for use with owner supplied PC (Windows based only). Includes SiteSync license, software and USB radio bridge node.
SWTAB* **	Windows tablet and SiteSync interface software. Includes tablet with preloaded software, SiteSync license and USB radio bridge node.
SWBRG+	SiteSync USB radio bridge node only. Order if a replacement is required or if an extra bridge node is requested.
93052458	20KA surge protection with an end of life LED indicator

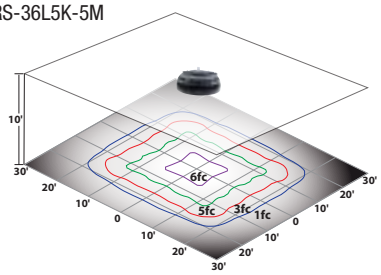
*XX = Color Options: DB, BL, WH, PS and GR
** When ordering with SiteSync, one of the following interface options must be chosen an ordered separately. Each option contains the SiteSync License, GUI and Bridge Node.
*** When ordering SiteSync at least one of these two interface options must be ordered per project.
+ If needed, an additional Bridge Node can be ordered.

PHOTOMETRICS

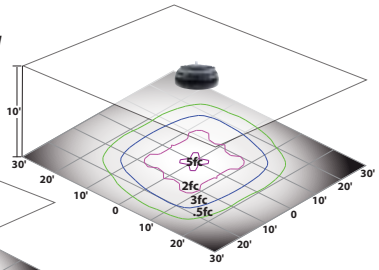
Type V Rectangle
Drive Aisle Optic
ARS-36L5K-5R



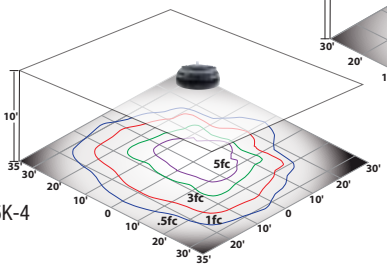
Type V Square – ARS-36L5K-5M



Type V Wide – ARS-36L5K-5W



Type IV – ARS-36L5K-4



PERFORMANCE DATA

				5K (5000K nominal, 70 CRI)					4K (4000K nominal, 70 CRI)					3K (3000K nominal, 70 CRI)				
# LED'S	DRIVE CURRENT (MILLIAMPS)	SYSTEM WATTS	DISTRIBUTION TYPE	LUMENS	LPW[1]	B	U	G	LUMENS	LPW[1]	B	U	G	LUMENS	LPW[1]	B	U	G
18	700mA	42	5M	4551	109	2	0	1	4376	105	2	0	1	4026	97	2	0	0
			5R	4727	113	2	0	2	4511	108	2	0	2	4150	100	2	0	2
			5W	4517	108	3	0	1	4182	100	3	0	2	3847	92	3	0	1
	833mA	54	5M	5401	100	2	0	1	5024	93	2	0	1	4622	85	2	0	1
			5R	5541	102	3	0	3	5179	96	2	0	2	4765	88	2	0	2
			5W	5171	95	3	0	1	4881	90	3	0	2	4491	83	3	0	2
24	700mA	56	5M	6068	109	2	0	1	5835	105	3	0	1	5368	97	2	0	1
			5R	6303	113	3	0	3	6015	108	3	0	3	5534	100	3	0	3
			5W	6022	108	3	0	2	5576	100	3	2	3	5130	92	3	0	1
	1050mA	85	5M	7888	93	3	0	1	7586	89	3	0	1	6979	82	3	0	1
			5R	8194	97	3	0	3	7820	92	3	0	3	7194	85	3	0	3
			5W	7829	92	3	0	2	7249	85	3	0	2	6669	79	3	0	2
36	700mA	86	5M	9391	109	3	0	1	8695	101	3	0	1	7999	93	3	0	1
			5R	9741	113	3	0	3	8962	104	3	0	3	8245	96	3	0	3
			5W	9100	105	4	0	2	8427	98	3	0	2	7753	90	3	0	2

[1]Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown. Actual performance may differ as a result of end-user environment and application.

ELECTRICAL DATA

# OF LEDS	NUMBER OF DRIVERS	DRIVE CURRENT (mA)	INPUT VOLTAGE (V)	SYSTEM POWER (w)	CURRENT (Amps)
18	1	700	120	41.7	0.35
			277		0.15
	1	833	120	54.2	0.45
			277		0.20
24	2	700	120	55.6	0.46
			277		0.20
			347		0.16
			480		0.12
	1	1050	120	84.8	0.71
			277		0.31
36	3	700	120	86.3	0.72
			277		0.31
			347		0.25
			480		0.18

LUMINAIRE AMBIENT TEMPERATURE FACTOR (LATF)

AMBIENT TEMPERATURE		LUMEN MULTIPLIER
0˚ C	32˚ F	1.02
10˚ C	50˚ F	1.01
20˚ C	68˚ F	1.00
25˚ C	77˚ F	1.00
30˚ C	86˚ F	1.00
40˚ C	104˚ F	0.99

Use these factors to determine relative lumen output for average ambient temperatures from 0-50°C (32-122°F).

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PROJECTED LUMEN MAINTENANCE

AMBIENT TEMP.	0	25,000	50,000	[1]TM-21-11 60,000	100,000	Calculated L70 (HOURS)
10°C / 50°F	1.01	1.00	0.99	0.99	0.97	>1,085,000
25°C / 77°F	1.00	0.99	0.98	0.98	0.96	>1,085,000
40°C / 104°F	0.97	0.96	0.96	0.95	0.94	>782,000

[1] Projected per IESNA TM-21-11 Data references the extrapolated performance projections for the **ARS-36LU-5K** base model in a 40°C ambient, based on 10,000 hours of LED testing per IESNA LM-80-08.

VERSATILE CONFIGURATIONS



ARS-18LU



ARS-24LU



ARS-36LU

MOUNTING OPTIONS & ACCESSORIES



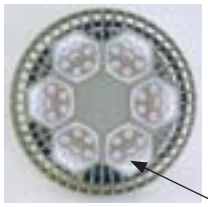
Specially designed internal hook and hinge allows easy access to wiring and internal components for easy installation



Pendant mount with ¾" wiring hub; Bird shield accessory available; J-Box mounting slots and wire way accommodate 3 ½" and 4" J-Box designs

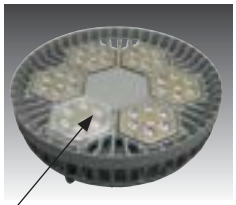


Four – ½" wiring hubs for surface conduit wiring and photocell option



ARS-SPC - Clear vandal shield installs over each hexagonal LED bezel with 3 provided screws, specify quantity when ordering:

- 3 for 18L
- 4 for 24L
- 6 for 36L



ARS-CS - Frosted comfort shield installs over each hexagonal LED bezel with 3 provided screws, improved uniformity and reduced LED brightness, specify quantity when ordering:

- 3 for 18L
- 4 for 24L
- 6 for 36L



Optional up light feature provides approximately 300 lumens of ambient light reducing the "cave effect" in parking garage applications (available in 24L and 36L, 700mA versions only)

SURGE PROTECTION

- Field replaceable surge protection device (SPD) provides 20KA and 10KV protection meeting ANSI/IEEE C62.41.2 Category C High and Surge Location Category C3
- The SPD is designed with a clamping voltage of 1600V at 20KA using industry standard 8/20µs waveform
- Max surge current = 20,000 Amps (see table)
- LED Indicator – Green LED is unlit at end of life

Pulse Rating (8 x 20 µSec)	
Strikes	Surge
1	20,000 A
2	15,000 A
15	10,000 A
120	3,000 A

	cRUus	CE
I_n	10KA	5KA

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CIMARRON LED CL1S

Cat.#

Job

Type

HUBBELL Outdoor Lighting

Approvals

SPECIFICATIONS

Construction:
- Stylish vertically finned die-cast solid top housing for maximum heat dissipation; Stops collection of unsightly debris
- Rugged lower die-cast aluminum heat sink optimizes thermal management and optical performance
- One piece die-cut silicone gasket with mechanically compressed stainless steel bezel ensures weather proof seal around each individual LED for IP65 rating
- Backlight Control (BC) option available for 85% spill light reduction, doesn't change fixture appearance or EPA, recommended for Type III and Type IV distributions
- Weight - 19 pounds, EPA - .45 ft^2

Optics:
- Choice of 126 high brightness LED configurations with individual acrylic lenses specially designed for IES Type II, III, IV and V distributions
- 3000K, 80 CRI; 4000K, 70 CRI; 5000K, 67 CRI, Turtle friendly Amber

Electrical:
- Universal input voltage 120-277 VAC, **50/60 Hz**
- Ambient operating temperature -40˚ C to 40˚ C
- Drivers have greater than 90% power factor and less than 10% THD
- 700mA drive current standard, 350mA and 525mA options available with 32L and 48L LED models
- LED drivers have output power over-voltage, over-current protection and short circuit protection with auto recovery
- Surge protection – 20KA; Turns fixture off at end of life; Includes LED for end of life indication (see surge suppressor page 3)
- Optional 0-10VDC continuous dimming to 10%
- Automatic thermal self-protection
- LED electrical assembly, including PR devices, consumes no power in the 'off' state

Controls:
- Drivers are 0-10V dimming standard. Photocell and occupancy sensors available for complete on/off and dimming control

Installation:
- Quick-mount plate included for easy installation
- The decorative integral arm houses two stage hinge mechanism
- Safety latch holds luminaire door to prevent "free swing"
- Quick-connect wiring for simplified, hassle-free installation
- Suitable for applications requiring 3G testing prescribed by ANSI @136.31

Finish:
- TGIC thermoset polyester powder paint finish applied at nominal 2.5 mil thickness

Warranty:
Five year limited warranty, for more information visit:
http://www.hubbelloutdoor.com/resources/warranty/

Listings:
- Listed to UL1598 and CSA C22.2#250.0-24 for wet locations
- 700mA models meet DesignLights Consortium (DLC) qualifications, consult DLC website for more details: http://www.designlights.org/QPL
- IDA approved
- IP66

PRODUCT IMAGE(S)



48 LED 3/4 VIEW



16 LED

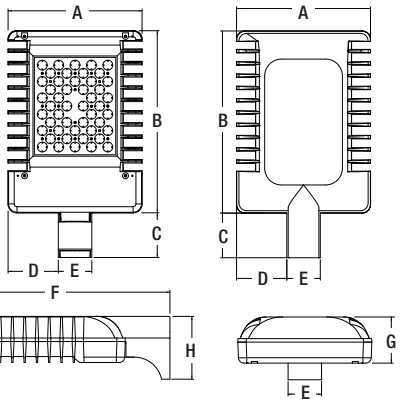


32 LED



48 LED

DIMENSIONS



Weight
19 lbs.
8.62 kgs.

A	B	C	D	E	F	G	H
12"	16.312"	4"	4.5"	3"	20.312"	4.13"	5.625"
305mm	414mm	102mm	114mm	76mm	515mm	105mm	143mm

CERTIFICATIONS/LISTINGS

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ORDERING INFORMATION ORDERING EXAMPLE: CL1S-A-48LU-5K-3-DB-RPA3

CL1S - A - [ ] [ ] - [ ] - [ ] - [ ] - [ ] - [ ]

SERIES
CL1S Cimarron LED Pedestrian Scale

NO. OF LEDS
16L 16 High brightness LEDs
32L 32 High brightness LEDs
48L 48 High brightness LEDs

MOUNTING
A 4" straight arm attached to housing complete with quick-mount plate

VOLTAGE
U[1] Universal 120V-277V, 50/60 Hz
1 120V
2 208V
3 240V
4 277V
5 480V, 60 Hz
F 347V, 60 Hz
E 220V, 50 Hz

CCT
3K 3000K, 80 CRI
4K 4000K, 70 CRI
5K 5000K, 67 CRI

DISTRIBUTION
2 Type II
3 Type III
4 Type IV
5M Type V Medium
5S Type V Short
5W Type V Wide
2L Type II rotated left
3L Type III rotated left
4L Type IV rotated left
2R Type II rotated right
3R Type III rotated right
4R Type IV rotated right

DRIVE CURRENT
Leave blank for 700mA (standard)
035[5] 350mA (32L, 48L)
053 525mA (32L) 520mA (48L)

COLOR
DB Dark Bronze
BL Black
WH White
GR Gray
PS Platinum Silver
CC Custom Color

OPTIONS
BC[3] Backlight control
CD Continuous dimming
F(X)[2] Fusing (replace X with voltage: 1-120V, 2-208V, 3-240V, 4-277V, 5-480V, F-347V)
RPA3 3" Round pole adapter
RPA4 4" Round pole adapter
TB Terminal block
WB Wall bracket
7PR Photocell receptacle

PIR MOTION/OCCUPANCY CONTROL OPTIONS
SCO_F[6,7,9] On/Off control (line voltage device not for use with 7PR receptacle option and external wireless control devices)
SCL_F[5,7] Add-on occupancy sensor for use with ext. wireless control device connected thru 7PR receptacle. Consult control manufacturer for compatibility.
SCP_F[4,5,7] Programmable dimming control (line voltage device not for use with 7PR receptacle option and external wireless control devices). A minimum of one SCP-REMOTE accessory remote control required for configuration; (Standard lens with greater sensitivity; motion detection radius equal to .75 X luminaire mounting height (approx. distance)
SWP[8,9] SiteSync Pre-Commission
SWPM[7,8,9] SiteSync Pre-Commission w/ Sensor

WIRELESS CONTROL OPTIONS
WIR[6] wiSCAPE Fixture Module, in-fixture relay for wireless lighting control
WIRSC[6] wiSCAPE Fixture Module, in-fixture relay for wireless lighting control and motion/occupancy control

Notes:
1 - Fuse option not available with universal voltage
2 - Select F3 fusing option for 220V
3 - Recommended for Type III and IV distributions only
4 - 0-10V fully adjustable dimming with automatic daylight calibration and different time delay settings, must order minimum of one SCP-REMOTE control to program dimming settings (see accessories)
5 - Not available with WIR or WIRSC
6 - Not available with SCO, SCL, SCP or SCPW
7 - Specify mounting height; 8 = 8' or less, 40 = 9' to 40'
8 - Specify group and zone. See SiteSync product page www.hubbelllighting.com/controls/SiteSync for more details
9 - 700MA only

Accessories and Services (Ordered Separately)

Catalog Number	Description
SCP-REMOTE	Remote Control for SCP/_F option. Order at least one per project to program and control the occupancy sensor
SWUSB*	SiteSync interface software loaded on USB flash drive for use with owner supplied PC (Windows based only). Includes SiteSync license, software and USB radio bridge node
SWTAB*	Windows tablet and SiteSync interface software. Includes tablet with preloaded software, SiteSync license and USB radio bridge node.
SWBRG	SiteSync USB radio bridge node only. Order if a replacement is required or if an extra bridge node is requested.
SW7PR+	SiteSync 7 Pin on fixture module On/Off/Dim, Daylight Sensor 120-480VAC

* When ordering SiteSync at least one of these two interface options must be ordered per project.
+ Available as a SiteSync retrofit solution for fixtures with an existing 7pin receptacle.

Hubbell Control Solutions - Accessories (sold separately)

Catalog Number	Description	HCS System
NXOFM-1R1D-UNV	On-fixture Module (7-pin), On / Off / Dim, Daylight Sensor with HubbNET Radio and Bluetooth® Radio, 120-480VAC	NX Distributed Intelligence™
WIR-RME-L	On-fixture Module (7-pin or 5-pin), On / Off / Dim, Daylight Sensor with wiSCAPE Radio, 110-480VAC	wiSCAPE® Lighting Control

For additional information related to these accessories please visit www.hubbellcontrolsolutions.com. Options provided for use with integrated sensor, please view specification sheet ordering information table for details.

SiteSync 7-Pin Module



SW7PR

- SiteSync Features in a new form
- Available as an accessory for new construction or retrofit applications (with existing 7-Pin receptacle)
- Available on all products that have a 7-Pin receptacl
- Does not interface with occupancy sensors

SiteSync LIGHTING CONTROLS

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PERFORMANCE DATA

				5K (5000K NOMINAL, 70 CRI)					4K (4000K NOMINAL, 70 CRI)					3K (3000K NOMINAL, 70 CRI)				
NUMBER OF LEDS	DRIVE CURRENT (MILLIAMPS)	SYSTEM WATTS	DISTRIBUTION TYPE	LUMENS	LPW*	B	U	G	LUMENS	LPW*	B	U	G	LUMENS	LPW*	B	U	G
16	700mA	38W	2	3937	104	1	0	2	3890	102	1	0	2	3096	81	1	0	2
			3	3971	104	1	0	2	3932	103	1	0	2	3116	82	1	0	1
			4	4021	106	1	0	1	3981	105	1	0	1	3155	83	1	0	1
			5S	4471	118	2	0	0	4427	117	2	0	0	3508	92	2	0	0
			5M	4430	117	2	0	1	4387	115	2	0	1	3485	89	2	0	0
			5W	4053	107	3	0	1	4013	106	3	0	1	3461	91	3	0	1
32	350mA	38W	2	4142	109	1	0	2	4102	108	1	0	2	3250	86	1	0	2
			3	4167	110	1	0	2	4126	109	1	0	2	3271	86	1	0	1
			4	4221	111	1	0	1	4179	110	1	0	1	3311	87	1	0	1
			5S	4692	123	2	0	0	4645	122	2	0	0	3682	97	2	0	0
			5M	4651	122	2	0	1	4604	121	2	0	1	3649	96	2	0	1
			5W	4255	112	3	0	1	4212	111	3	0	1	3337	88	2	0	1
32	525mA	56W	2	5855	105	2	0	3	5797	104	2	0	3	4595	82	1	0	2
			3	5889	105	2	0	2	5831	104	2	0	2	4622	83	1	0	2
			4	5963	106	1	0	2	5905	105	1	0	2	4679	84	1	0	2
			5S	6633	118	2	0	0	6567	117	2	0	0	5205	93	2	0	0
			5M	6572	117	3	0	1	6507	116	3	0	1	5157	92	2	0	1
			5W	6012	107	3	0	2	5954	106	3	0	2	4717	84	3	0	1
48	350mA	55W	2	6187	112	2	0	3	6126	111	2	0	3	4855	88	1	0	2
			3	6492	118	2	0	2	6428	117	2	0	2	4885	89	1	0	2
			4	6304	115	1	0	2	6242	113	1	0	2	4946	90	1	0	2
			5S	7010	127	3	0	0	6941	126	3	0	0	5500	100	2	0	0
			5M	6947	126	3	0	1	6878	125	3	0	1	5451	99	3	0	1
			5W	6353	116	3	0	2	6291	114	3	0	2	5409	98	3	0	2
32	700mA	76W	2	7751	102	2	0	3	7674	101	2	0	3	6082	80	2	0	3
			3	7767	102	2	0	2	7694	100	2	0	2	6119	81	2	0	2
			4	7896	104	1	0	2	7818	103	1	0	2	6196	82	1	0	2
			5S	8780	116	3	0	0	8693	114	3	0	0	6894	91	3	0	0
			5M	8700	114	3	0	1	8614	113	3	0	1	6827	90	3	0	1
			5W	7959	105	3	0	2	7881	104	3	0	2	6245	82	3	0	2
48	525mA	82W	2	8585	105	2	0	3	8500	104	2	0	3	6736	82	2	0	3
			3	9010	110	2	0	3	8920	109	2	0	3	6777	83	2	0	2
			4	8747	107	1	0	2	8660	106	1	0	2	6863	84	1	0	2
			5S	9725	119	3	0	0	9629	117	3	0	0	7630	93	3	0	0
			5M	9637	118	3	0	2	9541	116	3	0	2	7563	92	3	0	1
			5W	8816	108	4	0	2	8729	106	4	0	2	7506	92	3	0	2
48	700mA	110W	2	11713	106	3	0	3	11597	105	3	0	3	9191	84	2	0	3
			3	12293	112	3	0	3	12171	111	3	0	3	9247	84	2	0	3
			4	11935	108	2	0	3	11816	107	2	0	3	9364	85	2	0	2
			5S	13269	121	3	0	0	13138	119	3	0	0	10411	95	3	0	0
			5M	13149	120	4	0	2	13019	118	4	0	2	10317	94	3	0	2
			5W	12028	109	4	0	3	11910	108	4	0	3	9409	86	4	0	2

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown. Actual performance may differ as a result of end-user environment, application and inherent performance tolerances of the electrical components.

PROJECTED LUMEN MAINTENANCE

AMBIENT TEMP.	0	25,000	50,000	*TM-21-11 60,000	100,000	CALCULATED L70 (hours)
25°C / 77°F	1.00	0.98	0.96	0.96	0.94	>675,000
40°C / 104°F	0.98	0.96	0.95	0.94	0.92	>556,000

* Nichia 219B, 700mA, 85°C Ts, 10,000hrs

LUMINAIRE AMBIENT TEMPERATURE FACTOR (LATF)

AMBIENT DATA		
TEMP		LUMEN MULT.
0°C	32°F	1.02
10°C	50°F	1.01
20°C	68°F	1.00
25°C	77°F	1.00
30°C	86°F	1.00
40°C	104°F	0.98
50°C	122°F	0.98

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ELECTRICAL DATA

NUMBER OF LED's	NUMBER OF DRIVERS	Drive Current [milliamps]	INPUT VOLTAGE (VOLTS)	OPER. CURRENT [AMPS]	SYSTEM POWER [WATTS]	IN-RUSH CURRENT (AMPS)
16	1	std. (700mA)	120	0.32	37.8	
			277	0.15	37.5	
			347			
			480			
32	2		120	0.63	75.5	
			277	0.29	74.8	
			347			
			480			
48	3		120	0.95	110.5	
			277	0.44	110.9	
			347			
			480			

Consult factory for 350mA and 520mA electrical data

ACCESSORIES/REPLACEMENT PARTS - Order Separately

CATALOG NUMBER	DESCRIPTION
SCP-REMOTE	Remote control for SCP option. Order at least one per project to program and control
SWUSB*	SiteSync interface software loaded on USB flash drive for use with owner supplied PC (Windows based only). Includes SiteSync license, software and USB radio bridge node.
SWTAB*	Windows tablet and SiteSync interface software. Includes tablet with preloaded software, SiteSync license and USB radio bridge node.
SWBRG+	SiteSync USB radio bridge node only. Order if a replacement is required or if an extra bridge node is requested.
93052458	20KA surge protection with an end of life LED indicator

* When ordering SiteSync at least one of these two interface options must be ordered per project.
+ If needed, an additional Bridge Node can be ordered.

PHOTOCONTROL EQUIPMENT

CATALOG NUMBER	DESCRIPTION
PTL-1	Photocontrol - twist-lock cell (120V)
PTL-8	Photocontrol - twist-lock cell (120-277V)
PTL-5	Photocontrol - twist-lock cell (480V)
PTL-6	Photocontrol - twist-lock cell (347V)
PSC	Shorting cap - twist-lock

MOUNTING ACCESSORIES

CATALOG NUMBER	DESCRIPTION
CL1S-RPA3-ACC-XX[1]	Round pole adapter for straight arm (3¼ - 3¾")
CL1S-RPA4-ACC-XX[1]	Round pole adapter for straight arm (3⅞ - 4½")
WB-AREA-XX	Wall bracket

1 Replace XX with color choice, eg.: DB for Dark Bronze

TENON TOP POLE BRACKET ACCESSORIES

(2 3/8" OD tenon, RSS version requires 4" round pole adapter)

Catalog Number	Description
SETA2-XX[1]	Square pole tenon adapter (4 at 90 degrees)
RETA2-XX[1]	Round pole tenon adapter (4 at 90 degrees)
TETA-XX[1]	Triangular pole tenon adapter (3 at 120 degrees)

1 Replace XX with color choice, eg.: DB for Dark Bronze

SURGE PROTECTION

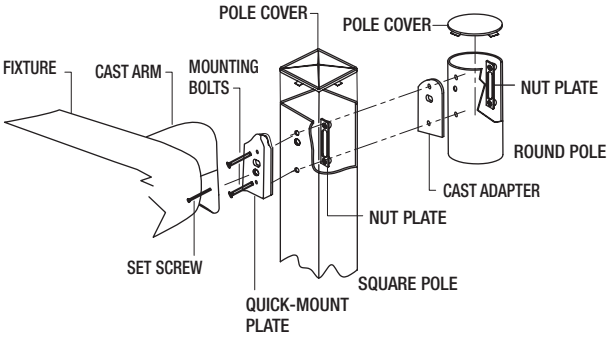
- Field replaceable surge protection device (SPD) provides 20KA and 10KV protection meeting ANSI/IEEE C62.41.2 Category C High and Surge Location Category C3
- The SPD is designed with a clamping voltage of 1600V at 20KA using industry standard 8/20µs waveform
- Max surge current = 20,000 Amps (see table)
- LED Indicator – Green LED is unlit at end of life

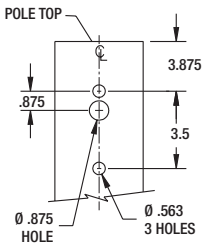
Pulse Rating (8 x 20 µSec)	
Strikes	**Surge**
1	20,000 A
2	15,000 A
15	10,000 A
120	3,000 A

	cRUus	CE
I_n	10KA	5KA

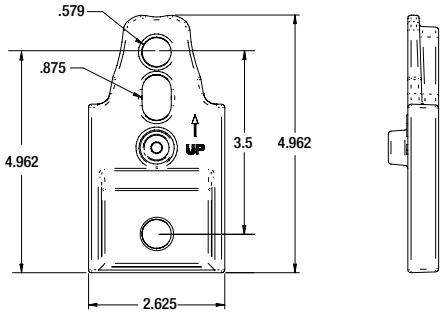
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FIXTURE MOUNTING





#2 DRILL PATTERN FOR POLES

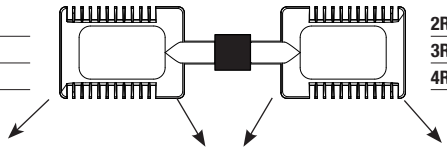


QUICK-MOUNT PLATE

FIXTURE MOUNTING – FACTORY ROTATED OPTICS

For proper light distribution and performance, rotated optics must be mounted as referenced in illustration. Consult instruction sheet included when mounting.

2L	Type II rotated 90˚ left
3L	Type III rotated 90˚ left
4L	Type IV rotated 90˚ left



2R	Type II rotated 90˚ right
3R	Type III rotated 90˚ right
4R	Type IV rotated 90˚ right

QUICK MOUNT INSTALLATION

The Cimarron CL1S installation features:

1 Quick-mount plate attaches to pole with two 3/4" bolts

2 4 - slot hex 1/4" captured screws secure luminaire door to top

3 Safety-latch holds luminaire door to prevent "free swing" door

4 Two stage hinge mechanism built into integral arm

5 Quick-connect wiring for a simplified, hassle-free installation

For installation video scan this code or visit link below:

http://www.youtube.com/user/hubbelloutdoorbrands













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PGN

High Performance LED Sconce

Catalog Number	
Comments	Type



FEATURES

Application

The PGN is an indoor or outdoor architectural high performance LED sconce which offers "Normally On" and emergency operation in one fixture. "Normally On" operation is powered by line voltage (120 or 277) that can be switched on/off and used for accent lighting, entrance/exit illumination. Failure of line voltage will result in automatic operation from secondary DC voltage which must be supplied from an external 6-12V DC emergency lighting unit. The PGN includes a field installable full cut-off shield to address "dark sky" compliant requirements.

Construction

Housing and mounting plate are constructed of $^1/_8$" die-cast aluminum and sealed with a $^1/_8$" closed-cell silicone gasket. The acrylic lens allows 92% light transmission. The reflector is electro-polished aluminum with 95% reflectance. Housing finish is powder coated electro-deposition paint available in four colors: dark bronze, white, platinum silver and black. Full cut-off shield constructed of cold-rolled steel, painted to match color as ordered.

Installation

Universal backplate knockouts for mounting to standard $3^1/_2$", 4" octagonal and 4" square electrical boxes. Backplate mounting is performed using installer supplied hardware. An adhesive-backed neoprene gasket is provided to ensure a waterproof seal.
A $^1/_2$" – $^1/_4$ NPT threaded conduit opening is provided at the top of the enclosure and sealed with a closure plug. The housing “snaps” to the back plate by a “pin and socket” arrangement, and is secured with two Phillips head screws.

Illumination

The unit is illuminated by 4 high power LED's arranged so that in the event of 1 or 2 LED failures the unit will continue to operate.

Compliances

UL 924 Listed
UL Wet Location Listed
NFPA 101 Life Safety Code
NFPA 70 National Electrical Code
OSHA
IES full cut-off compliant with application of field installed shield
U.S. Patent No. D627,916

Warranty

Three-year warranty for unit and electronics

ORDERING GUIDE

PGN

Model

Finish

W - White
Z - Dark Bronze
P - Platinum Silver
B - Black

HUBBELL Lighting

PGN

High Performance LED Sconce

SPECIFICATIONS

Electronics

The PGN has two modes of operation:
Normal mode: In normal mode, power is suppled from 120V or 277V AC source and may be switched on/off allowing the unit to behave like a typical luminaire.
Emergency mode: Upon failure of normal utility power, an external (6-12VDC) emergency power source (supplied separately) having transfer logic will operate the PGN as an emergency unit. In order for the unit to function properly as emergency lighting (NEC 700.12), the DC emergency source must be powered (under normal conditions) from the same AC circuit as that to the unit.

Number of Lamps: Four High Output LEDs
LED Lamplife: 48,000 hrs. at 70% of initial

Lamp Configuration: 4 individually driven LEDs provide illumination. In the event of 1 or 2 LED failures, the remaining LED's will continue to function.

Lamp Color: Neutral White, 4000K
Color Rendering Index (CRI): 75
Total Lamp Output: 445 Lumens min. initial
Input: 120/277VAC, 60 Hz. "Normal"
6-12VDC "Emergency"
Functional Circuitry: Transient surge protection

Operating Temperature Range

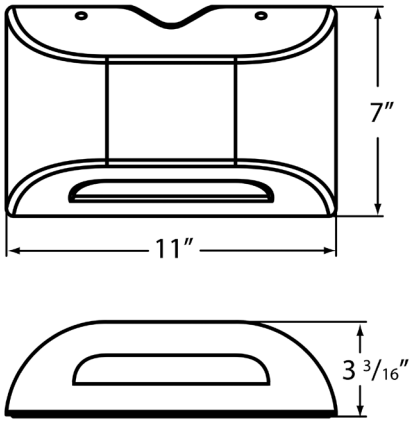
-30°C to 50°C (-22°F to 122°F)

Power Consumption:

Normal
17W @ 120VAC, 17W @277VAC
Emergency
12W @ 6VDC, 13W @12VDC

Power Factor: Average .80 (lagging)

DIMENSIONS



COMPATIBLE EMERGENCY UNITS

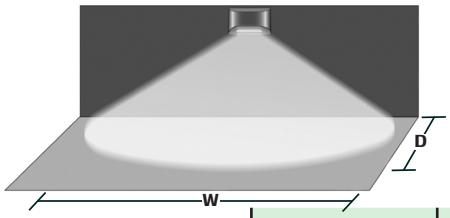
		6 V DC	12V DC	120/277 VAC	Remote Capacity	# of PGN
Combo(1)	HCXURWRC12	√			12 W	1
	HCXURW-0-RC12	√			23 W	1
Unit(1)	LZ30	√			20 W	1
	LZ65	√			55 W	4
	LM33	√			18 W	1
	LM40	√			25 W	2
	LM40-12V		√		25 W	2
	AS80	√			65 W	5
Inverter	LiteGear® LG125			√	125 Va	6

(1) Each instance assumes standard lamp-heads are used on the unit, except the **HCXURW-0-RC12**, which is supplied without lamp heads.

ILLUMINATION PATTERN

Single Unit Coverage

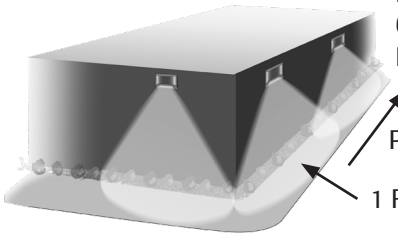
Mounting Height: 9'
Outdoor Reflectance: 0/30/10
Indoor Reflectance: 80/50/20



	Indoor	Outdoor
1 FC Average (W x D)	35' X 10'	29' X 10'
1 FC Minimum (W x D)	11' X 10'	10' X 10'

Multiple Unit Spacing

Mounting Height: 9'
Illuminated Path Depth: 6'
Outdoor Reflectance: 0/30/10
Indoor Reflectance: 80/50/20



	Indoor	Outdoor
1 FC Average	49'	37'
1 FC Minimum	19'	16'

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0603436 05/17

GEOPAK SERIES SIZE 1 LED

Architectural Wallpack

TRP1/RDI1/QSP1

NEW

Cat.#	
Job	Type

HUBBELL Outdoor Lighting

Approvals

SPECIFICATIONS

APPLICATIONS

- Small sized architectural wallpacks in three stylish shapes with molded contours to accentuate building architecture. Provides excellent illumination in energy-saving LED systems.
- Back box accessory available for surface conduit application.

Construction:

- Housing is made from die-cast aluminum with a hinged back-plate for ease of installation and maintenance.
- The LED bezel and trim-plate are made of stainless steel.
- Five powder coat standard finishes, plus custom color options.
- Wet Location Listed to UL924 and UL1598 Standard.

LED:

- 12 high power LEDs delivering up to 3,000 lumens.
- Up to 118 lumens per watt
- Type II, III and IV distributions for a wide variety of applications.
- Zero uplight (U0), dark sky, neighbor friendly

Electrical:

- 120-277 operation, 50/60Hz
- 0-10V dimming driver standard
- 10kA surge protector
- Photocell and occupancy sensor options available for complete on/off and dimming control

Battery Backup:

- Intergral Battery Backup provides emergency lighting for the required 90 minute path of egress.
- Includes a long-life Lithium Iron Phosphate battery with optional battery heater for cold temperature application.
- Utilizes 4 LEDs in emergency mode with 657 lumens. Each of the 4 LEDs in emergency are designed to function independently in the unlikely event of a single LED malfunction
- Spectron® self-testing/self-diagnostic electronics are included standard
- Independent dedicated driver and LED array for battery/emergency mode operation.

Installation:

- Universal plate for mounting to standard 3 1/2" and 4" square electrical boxes. All connections are made from connections at the rear of the unit.
- Optional back-box accessory available for surface conduit application. See BB-Geo accessories.

Listings:

- UL 1598 listed for use in wet locations
- Drivers IP66 and RoHS compliant
- DesignLights Consortium® (DLC) qualified. Please refer to the DLC website for specific product qualifications at www.designlights.org

Warranty:

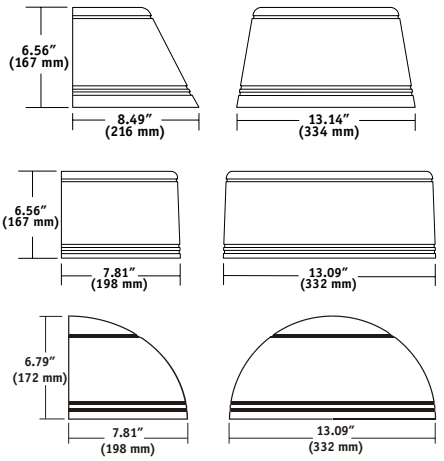
- For more information visit:

http://www.hubbelloutdoor.com/resources/warranty/

PRODUCT IMAGE(S)



DIMENSIONS



SHIPPING INFORMATION

Catalog Number	Weight (lbs)	Carton Dimensions		
		Length Inch (cm)	Width Inch (cm)	Height Inch (cm)
TRP1	11.5	17.0	9.9	10.0
RDI1	11.5	18.0	11.0	9.25
QSP1	10.5	17.0	9.6	10.5

CERTIFICATIONS/LISTINGS

C US

*3000K and warmer CCTs only

ORDERING INFORMATION

ORDERING EXAMPLE: TRP-12L-20-4K-3-1-BL-SCP-EH

[ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ]

HOUSING	VERSION	WATTAGE	CCT/CRI	DISTRIBUTION	VOLTAGE	FINISH	CONTROL OPTIONS	OPTIONS
TRP1 Trapezoid	**12L** 12 LEDS	**15** 15 watts	**3K7** 3000K, 70CRI	**2** Type II	**U** 120-277	**BL** Black	**PCU** Button Photocell	**F**[4] Fusing (only available with STD fixture configuration, 120-277V only)
RDI1 Radius		**20** 20 watts	**4K7** 4000K, 70CRI	**3** Type III	**1** 120	**DB** Bronze	**SCP**[2,3] Programmable Motion Sensor	**E**[1] Battery Pack (0˚C)
QSP1 Quartersphere		**30** 30 watts	**5K7** 5000K, 70CRI	**4** Type IV	**2** 208	**GR** Gray	**SPECIFY SCP HEIGHT**	**EH**[1] Battery Pack (-30˚C) with heater
					3 240	**PS** Platinum	**8F** Up to 8ft mount height	
					4 277	**WH** White	**20F** Up to 20ft mount height	
						CC Custom		

[1] Voltage specific (120 or 277V only)
[2] Must order minimum of one remote control to program dimming settings, 0-10V fully adjustable dimming with automatic daylight calibration and different time delay settings, 120-277V only
[3] PCU option not applicable, included in sensor
[4] Must specify input voltage (120, 208, 240 or 277)

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ACCESSORIES - Order separately

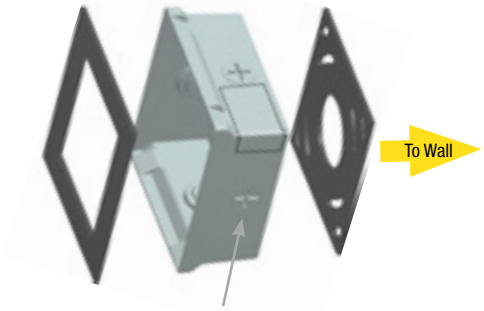
Catalog Number	Description
SCP-REMOTE[2]	Remote control for SCP option. Order at least one per project to program and control.
BB-GEO-XX	Back box with 4 - 1/2" threaded conduit holes, specify finish by replacing "XX" with finish selection, eg. Dark Bronze "DB"

[2] Must order minimum of one remote control to program dimming settings, 0-10V fully adjustable dimming with automatic daylight calibration and different time delay settings, 120V-277V only



BB-GEO-XX – Mounted to luminaire

BB-GEO-XX



PERFORMANCE DATA (AC/Standard Configurations)

				5K (5000K nominal, 70 CRI)					4K (4000K nominal, 70 CRI)					3K (3000K nominal, 70 CRI)				
# OF LEDS	DRIVE CURRENT	SYSTEM WATTS	DIST. TYPE	LUMENS	LPW[1]	B	U	G	LUMENS	LPW[1]	B	U	G	LUMENS	LPW[1]	B	U	G
12	350mA	13.9	2	1635	118	1	1	1	1577	113	1	1	1	1497	108	1	1	1
			3	1613	116	1	0	1	1556	112	1	0	1	1477	106	1	0	1
			4	1607	116	0	0	1	1550	111	0	0	1	1471	106	0	0	1
	500mA	19.9	2	2268	114	1	1	1	2176	109	1	1	1	2077	104	1	1	1
			3	2245	113	1	0	1	2140	108	1	0	1	2049	103	1	0	1
			4	2229	112	0	0	1	2150	108	0	0	1	2041	103	0	0	1
	700mA	28.2	2	2942	104	1	1	1	2885	102	1	1	2	2721	96	1	1	1
			3	2912	103	1	0	1	2836	101	1	0	1	2685	95	1	0	1
			4	2892	103	1	0	1	2789	99	1	0	1	2674	95	1	0	1

Electrical Data

Input Power Consumption

Drive Current (mA)	Input Voltage (V)	System Power (w)	Current (Amps)
350mA	120	13.9	0.12
	277		0.05
500mA	120	19.9	0.17
	277		0.07
700mA	120	28.2	0.24
	277		0.10

Battery backup units consume additional power during charging (maximum 32.2 watts for E, 50.7 watts for EH)

Projected Lumen Maintenance

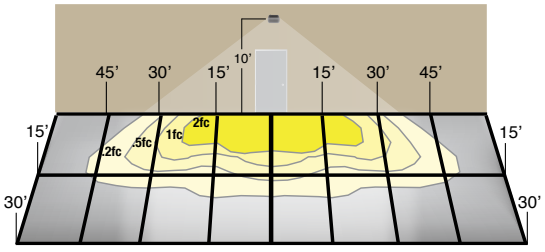
Ambient Temp.	Operating Hours 0	25,000	50,000	TM-21-11[1] 60,000	100,000	L70 (hours)
25°C/77°F	1.00	0.98	0.97	0.95	0.91	>345,000
40°C/104°F	1.00	0.96	0.95	0.92	0.87	>268,000

LUMINAIRE AMBIENT TEMPERATURE FACTOR (LATF)

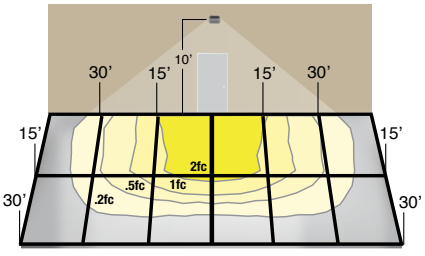
AMBIENT TEMPERATURE		LUMEN MULTIPLIER
0° C	32° F	1.02
10° C	50° F	1.01
20° C	68° F	1.00
25° C	77° F	1.00
30° C	86° F	1.00
40° C	104° F	0.99
50° C	122° F	0.98

Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

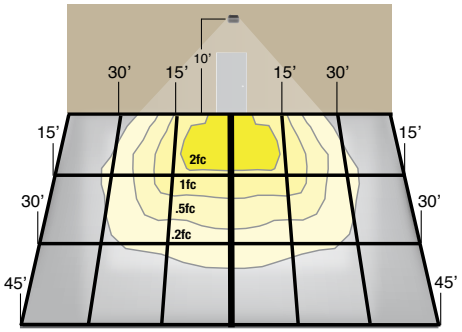
PHOTOMETRIC REPORTS
(30w, 4000K shown)



TYPE II



TYPE III



TYPE IV (Forward throw)

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GeoPak - Battery Back Up

Functional Circuitry: Transient surge protection device on AC input. Upon failure of the normal utility power, an LED driver is automatically activated to power the emergency LEDs. Upon resumption of normal utility power, the LED driver is turned off, and the battery is recharged through a micro-controller based 3-stage charger. The battery is a maintenance-free Lithium Iron Phosphate (LiFePo) type. A low voltage battery disconnect (LVD) feature protects the battery from severe damage during prolonged power failures. Manual testing is available at any time using the push-to-test button. The optional heater features a heating wrap and thermostat to maintain optimal battery temperature during charge or discharge. The GeoPak includes the following features:

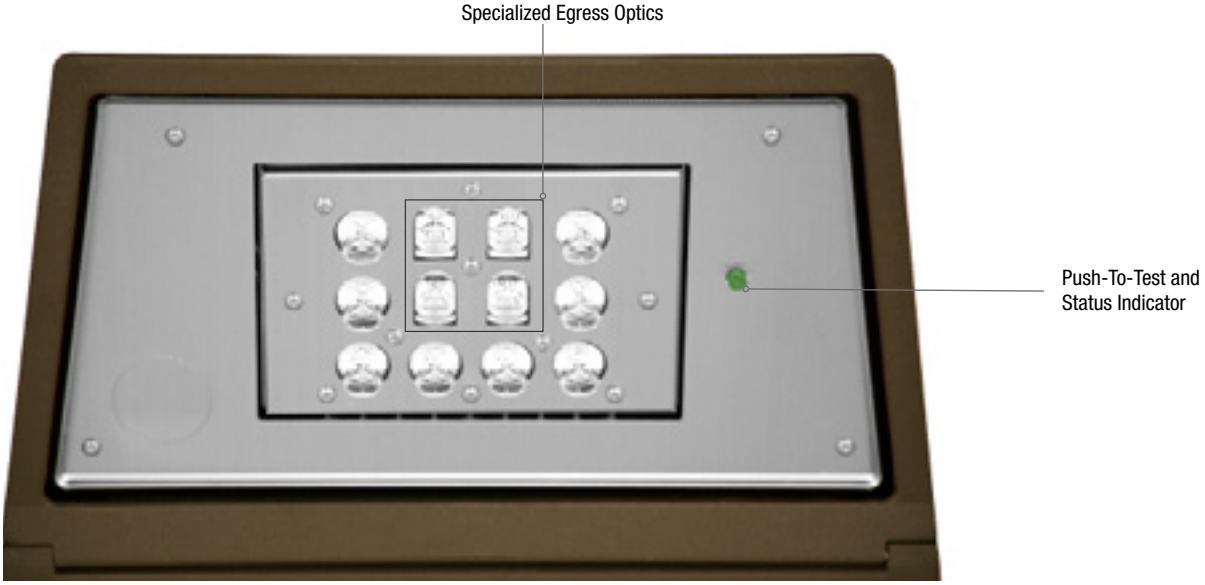
- Battery re-charge within 24 hours
- AC Lock-out circuit
- Self-diagnostics monitors LED status, LED driver circuit, battery capacity and charger function and displays any fault detection by means of a flashing code.
- Self-Test feature runs a 1 minute test once a month and an alternating 30 or 60 minute test once every 6 months. Multi-color LED indicator provides visible fault detection and charging status.
- User initiated 1, or 90-minute system test feature
- 15 minute re-transfer delay
- Automatic unit transfer in brown-out conditions (below 80% of nominal AC input voltage).
- Battery backup units consume 6 watts when charging a dead battery and 2 watts during maintenance charging. EH (units with a heater) consume up to an additional 8 watts when charging if the battery temp is lower than 10°C

Emergency Photometric Performance (1 fc average .1 fc minimum)

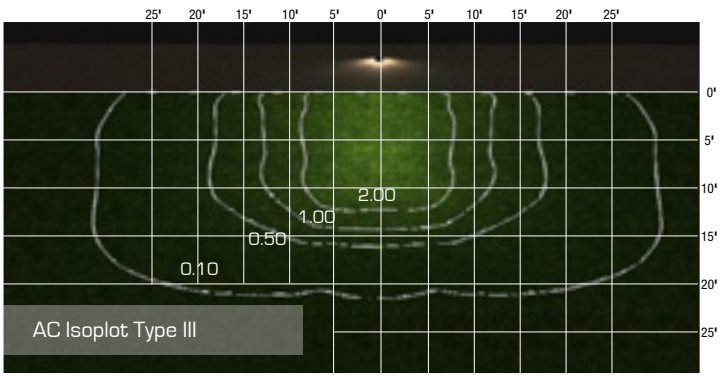
28’ multi-unit spacing at 10’ MH with 0/30/10 reflectances on a 6’ path

26’ x 10’ single unit coverage at 10’ MH with 0/30/10 reflectances

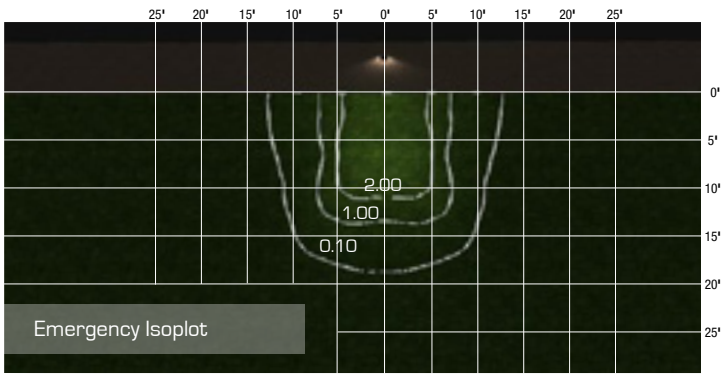
6’ x 19’ forward throw coverage at 10’ MH with 0/30/10 reflectances



Normal Mode



Emergency Mode



Provides Life Safety Code average illuminance of 1.0 fc. Assumes open space with no obstructions.

Diagrams for illustration purposes only, please consult factory for application layout.

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Calculation Summary					
Label	**Avg**	**Max**	**Min**	**Avg/Min**	**Max/Min**
PUMPS	10.18	12.1	6.3	1.6	1.9
SITE	0.81	10.9	0.0	N.A.	N.A.
RETAIL PARK	0.77	2.1	0.3	2.6	7.0

PUMP CANOPY LIGHTS "ON"

Luminaire Schedule (note fixture cataloge numbers are not complete)					
Type	**Qty**	**Lum. Lumens**	**LLF**	**Lum. Watts**	**Description**
CA	16	4915	0.900	55.6	ARS-24L4K-070-5M-CS
S3B	1	3561	0.900	56	CL1S-32L-4K-3-053-BC
S4B	7	2801	0.900	38	CL1S-32L-4K-4-035-BC
S4	1	5905	0.900	56	CL1S-32L-4K-4-053
W1	3	413	0.900	17.7	PGN WITH Full Cutoff Visor
W4	15	1550	0.900	13.9	TRP1-12L15-4K7-4

NOTES:
1) EXACT MOUNTING DETAILS TO BE DETERMINED AT JOBSITE BY OTHERS.
2) CALCULATIONS MAY or MAY NOT SHOW THE EFFECT OF SHADOWING CAUSED BY BUILDINGS AND OBJECTS WITHIN THE CALCULATED SPACE OR IN THE SITE AREA.
3) READINGS SHOWN ARE INITIAL HORIZONTAL FOOTCANDLES ON A FLAT SITE WITHOUT REFLECTIONS OR OBSTRUCTIONS UNLESS OTHERWISE INDICATED.
4) THIS CALCULATION IS BASED ON LIMITED INFORMATION SUPPLIED BY OTHERS TO SWANEY LIGHTING ASSOCIATES AND STANDARD ASSUMPTIONS OF THE SPACE AND/OR SITE.
5) CONFORMANCE TO CODES AND OTHER LOCAL REQUIREMENTS AS DETERMINED BY THE AHJ ARE THE RESPONSIBILITY OF THE OWNER AND/OR THE OWNER'S REPRESENTATIVE.
6) THIS LAYOUT DRAWING MUST BE COORDINATED WITH THE SITE LOCATION FOR CORRECT FIXTURE ORIENTATION.
7) DOCUMENTS PRINTED OR PLOTTED FROM ELECTRONIC FILES MAY APPEAR AT OTHER THAN THE DESIRED OR ASSUMED GRAPHIC SCALES. IT IS THE RESPONSIBILITY OF THE RECIPIENT TO VERIFY THAT THE PRINTED OR PLOTTED-TO-SCALE DRAWING IS PRINTED TO SCALE.

PLAN VIEW

TITLE
PINE STATE FAMILY MART
PORTLAND, ME
SITE LIGHTING LAYOUT

SITE 39214.AGI

GENERATED BY SWANEY LIGHTING, SCARBOROUGH ME - 207-883-7100 - swaneylighting.com

Date:8/8/2018

Page 1 of 1

SCALE NOT TO SCALE

GENERATED FOR:
SEBAGO TECH

SWANEY LIGHTING ASSOCIATES, INC.

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Calculation Summary					
Label	**Avg**	**Max**	**Min**	**Avg/Min**	**Max/Min**
PUMPS	0.15	0.4	0.1	1.5	4.0
SITE	0.40	4.6	0.0	N.A.	N.A.
RETAIL PARK	0.77	2.1	0.3	2.6	7.0

PUMP CANOPY LIGHTS "OFF"

Luminaire Schedule (note fixture cataloge numbers are not complete)					
Type	**Qty**	**Lum. Lumens**	**LLF**	**Lum. Watts**	**Description**
CA	16	4915	0.900	55.6	ARS-24L4K-070-5M-CS
S3B	1	3561	0.900	56	CL1S-32L-4K-3-053-BC
S4B	7	2801	0.900	38	CL1S-32L-4K-4-035-BC
S4	1	5905	0.900	56	CL1S-32L-4K-4-053
W1	3	413	0.900	17.7	PGN WITH Full Cutoff Visor
W4	15	1550	0.900	13.9	TRP1-12L15-4K7-4

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PLAN VIEW

TITLE
PINE STATE FAMILY MART
PORTLAND, ME
SITE LIGHTING LAYOUT

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GENERATED BY SWANEY LIGHTING, SCARBOROUGH ME - 207-883-7100 - swaneylighting.com

Date:8/8/2018

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GENERATED FOR:
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THE LIGHTING SYSTEM SHOWN ON THIS DRAWING IS PROVIDED AS AN EXAMPLE OF THE BEST UTILIZATION OF LIGHTING FIXTURES INCLUDED IN THIS DRAWING. IT IS PROVIDED USING FIXTURE PHOTOMETRICS FURNISHED BY THE MANUFACTURER. SWANEY LIGHTING ASSOCIATES MAKES NO WARRANTY AS TO THE PERFORMANCE SHOWN IN ES FILE IS NOT THE RESPONSIBILITY OF THE MANUFACTURER, IT'S USE FOR ANY OTHER PURPOSE IS NOT AUTHORIZED BY SWANEY LIGHTING ASSOCIATES.

08: Financial Capability

Demonstration of financial capability will be submitted under separate cover.

34: Noise and Vibration (14-526(d)7)

- Evidence of noise levels for equipment, such as equipment specifications, to demonstrate consistency with zoning requirements

(i), (ii) All heating, ventilation and air conditioning equipment (HVAC), air handling units (AHU), emergency generators, and similar equipment will meet applicable state and federal emission requirements and generator testing timing and noise levels shall be performed in accordance with City standards. A temporary submittal waiver from manufacturer verification of emissions is requested. A waiver from standards is not requested and the information will be submitted under separate cover when the design is finalized.

09: Technical Capability

The applicant has retained Sebago Technics, Inc., a consulting engineering firm, to assist in all aspects of the proposed site development. A firm introduction and key personnel resumes are included in this section.

Introduction to Sebago Technics, Inc.



Year Established: 1981 (36 years in business)

About Us: Sebago Technics, Inc. (STI) is a consulting firm of more than 65 design professionals and technical staff providing services throughout New England. From the start, our business plan was simple: "to provide quality, cost-effective civil engineering services that are responsive to a customer's goals, schedule and budget." Our One Company capabilities and resources provide clients with experience and solutions to respond to their planning, permitting and design needs.



Structure: Employee-owned since 1998

Services: Civil, environmental, transportation & traffic engineering; municipal engineering; local/state/federal permitting and planning; land surveying & laser scanning; GIS; landscape architecture; environmental services; and natural resources.

Employee Disciplines:
Professional Engineers, Civil Engineers, Transportation Engineers, Landscape Architects, Professional Land Surveyors, Survey Technicians, CADD Designers, Wetland Scientist, Soil Scientist, Construction Inspectors, Environmental Scientists, GIS Professionals, Marketing, Administrative & Financial



Professional Focus: Sebago Technics provides engineering and planning services to both public and private sector clients. In the municipal and government sectors we have provided multiple discipline services through General Services Contracts (GSC) and project specific contracts. A few examples include the Portland Jetport, City of Portland Public Services, City of South Portland, City of Lewiston, City of Westbrook and several smaller communities. Our municipal sector work includes street and utility infrastructure design, municipal facility planning and specialty work such as Island marine and solid waste planning & engineering.

Location: South Portland, ME



Geographic Service Area: Maine, New Hampshire, Vermont, Massachusetts

Web Site: www.sebagotechnics.com

JAMES R. SEYMOUR, PE

Senior Project Manager



Mr. Seymour has been with Sebago Technics, Inc. since 1993. His role encompasses management of projects relating to civil engineering designs for private residential and commercial developments, and providing planning and development review services for municipal clients. His specific engineering design experience includes roadways, sewer/utilities, stormwater management plans and permitting, sediment and erosion control plans, State and Federal wetland/environmental permits for residential and commercial developments.

Mr. Seymour has strong experience in providing municipal planning and permitting review services. He has consulted with planning, code enforcement, and public services departments to assist Planning Boards in various roles.

EXPERIENCE

Municipal Planning/Engineering Review Experience:

1998 - 2004: Consulted with the City of Portland, as Acting Development Review Coordinator providing engineering peer review services and onsite construction observations to assure compliance with approved plans.

1998 - 2008: Provided construction monitoring for the Town of Windham with responsibilities of reviewing bonding, stormwater management review, and provided and onsite construction observations/reports.

2008 - Present: Provided the Town of Casco planning services to assist the Planning Board with processing various site/subdivision applications, and prepared ordinance revisions, to the Shoreland Zoning per State requirements, and assisted in instituting a contract zone for Camp Sunshine.

2012 - Present: Mr. Seymour has been the consulting Planner for the Town of Raymond in charge of directing the Planning Board with processing various site/subdivision applications, coordinating new ordinance revisions, and maintains weekly hours at the Town for general planner assistance.

2011 - Present: Mr. Seymour has been the consulting engineer for the Town of Brunswick assisting the Town with peer reviews of site/subdivision applications, and has drafted new ordinance revisions.

2012 - Present: Mr. Seymour has been providing planning and engineering consultation to the Town of Poland on an as-needed basis to assist the Planning Board with plan reviews and drafting ordinances.

The variety of projects that Mr. Seymour has been involved with provides him with a well-balanced technical knowledge of planning and land use development issues and engineering experience. Additionally, his involvement with a variety of clientele gives him a unique and positive insight to successfully communicate and coordinate projects from design to construction stages.

EDUCATION

University of Maine, Orono, ME
Bachelor of Science, Civil Engineering

REGISTRATIONS

Professional Engineering:
Maine #9984

Certified Training for
Hazardous Waste Operations
40 hr. Training Compliance with OSHA
29CFR 1910.120

Certified Professional in Maintenance and Inspection for Best Management Practices by Maine DEP and Inclusion on the Qualified Third Party Inspector List for the Long Creek Watershed Management District (May 2011)

MEMBERSHIPS

Former Town of Windham Planning Board member

New England Sports Turf Manager's Association (NESTMA)

Scarborough Little League Board of Directors
League - President
2015 to Present

SEBAGO TECHNICS

207.200.2083 JSEYMOUR@SEBAGOTECHNICS.COM

DEREK H. CALDWELL, PE, PTOE

Transportation/Traffic Engineer



Mr. Caldwell joined Sebago Technics in 2016 as a Transportation/Traffic Engineer. He was previously employed by the Massachusetts Department of Transportation as a Traffic Engineer in the District Four office. Derek is a graduate of Worcester Polytechnic Institute with a B.S. in Civil Engineering and also has a M.S. in Transportation Engineering from the University of Massachusetts – Lowell.

He is proficient in the use of AutoCad, ArcGIS, Microstation, Synchro/SimTraffic and Vissim. Since joining the firm he has been actively involved in a variety of projects including traffic impact studies, traffic signal design, traffic signal operations, intersection design, and planning studies.

EXPERIENCE

Broadway at Evans Street and Lincoln Street – South Portland, ME: Design engineer for signal reconstruction project. Project involves two signalized intersections being modified from isolated to coordinated operation. Improvements are to address traffic operational efficiency as well as vehicle and pedestrian safety. Project completed under the MaineDOT Local Project Administration (LPA) program.

Route 108 Corridor Study – Dover, NH: Developed a VISSIM traffic simulation model to compare alternatives along an existing signalized corridor. The model contained multiple scenarios to include both signalized and roundabout traffic control.

Dirigo Plaza Off-Site Improvements – Portland/Westbrook, ME: Design of new traffic signals at five locations as part of mitigation for a major commercial development.

State of Maine Office Building – Augusta, ME: Traffic Impact Study for 125,000 square feet of new office space. Study including the analysis of an existing coordinated signal system.

383 Commercial Street – Portland, ME: Traffic Impact Study for hotel, residential and commercial mixed use development in Portland's Waterfront District. Study included alternatives analysis of proposed traffic signal configurations.

Municipal Peer Review Services– Portsmouth, Dover, Newington, and Somersworth, NH: Provide peer review of roadway plans and traffic studies for various municipalities.

CERTIFICATIONS

IMSA Work Zone Temporary Traffic Control Technician

ACI Concrete Field Testing Technician – Grade I

NETTCP Concrete Inspector

IMSA Traffic Signal Design/Engineering Technician Level II

IMSA Traffic Signal Construction Technician Level II

IMSA Traffic Signal Field Technician Level II

EDUCATION

Worcester Polytechnic Institute
Worcester, MA
B.S.,Civil Engineering, 2008

University of Massachusetts - Lowell
Lowell, MA
M.S., Civil Engineering - Transportation, 2013

MEMBERSHIPS

Institute of Transportation Engineers

REGISTRATIONS

Professional Engineer:
Maine #14400
Massachusetts #52626
New Hampshire #15272
Vermont #127175

Professional Traffic Operations Engineer #4273

SEBAGO TECHNICS

207.200.2053 DCALDWELL@SEBAGOTECHNICS.COM

SARAH A. HANF

Civil Engineer



Mrs. Hanf joined Sebago Technics, Inc. in 2017 as a Civil Engineer. With 7 years of experience in the civil engineering field Mrs. Hanf has been involved in a wide variety of projects in Maine and New Hampshire. Sarah has a vast experience within the education sector for primary and secondary schools. She has designed and permitted residential developments for private developers and college universities. Sarah has also been involved in private retail and commercial developments, municipal sewer separations and small roadway projects.

EXPERIENCE

Blueberry Lane Improvements – Falmouth, ME: Civil Engineer/Designer: Led the design team's efforts in coordinating with the Public Works Director and Town Engineer on a full-depth sidewalk reconstruction project with milling and overlay of 2800 LF of roadway in Blueberry Lane. Additional project work consisted of road-side parking spaces, lighting and utility upgrades. Sarah assisted the Town throughout the bidding process. The project is to be constructed this summer.

Bowdoin Park Row Residences – Brunswick, ME: Mrs. Hanf is currently working as a Civil Engineer/Designer for designing and permitting the addition of four three-story apartment buildings along Park Row on the Bowdoin Campus. Proposed site improvements supporting the housing consist of pedestrian walkways, patios, common areas, landscaping, and innovative stormwater treatment areas such as porous asphalt, permeable pavers and meadow basins.

The Residences at Clarks Pond – South Portland, ME: Mrs. Hanf was a lead engineer/assistant for designing and permitting a residential community consisting of four six-story residential buildings. Project work included site and parking layout, site circulation, and designated common areas. The proposed community had very particular requirements for utilities and it was determined that the use of subsurface soil filters would be needed for treatment due to site restrictions and portions of the property belonging to the Portland Water District.

Ottawa Road – Sewer Separation – South Portland, ME: Mrs. Hanf assisted in the phased sewer separation project in South Portland. Responsibilities included disconnecting foundation drains, trench drains to eliminate inflow, and repairing damages to reduce infiltration into the existing sanitary sewer system. Project work involved lining sewers mains, manholes, and repairing lateral connections, where damages were noted from video surveillance. Other project work involved drainage improvements, utility upgrades and resurfacing existing roadways.

Waterpark Expansion Phase II, Funtown/Splashtown USA - Saco, ME: Performed extensive site and stormwater drainage design and analysis for a water park expansion that included the addition of a restroom facility, restaurant, group event area, six new water slides, and a concrete deck for additional seating and lounging to obtain state environmental permitting. Project included careful selection and design of stormwater treatment in order to maximize usable space within the project boundary. Treatment included porous pavers, grassed underdrained soil filters and bioretention cells. Construction observation and construction administration tasks were also performed.

Falmouth Elementary School - Falmouth, ME: Civil engineer/design assistant for multi-year, multi-phase project including the complete redevelopment of an existing school campus and the construction of a 139,000 sf elementary school, including parking, circulation, community connectivity, and athletic fields. Site development constraints necessitated the use of innovative use of stormwater treatment methods to meet State requirements for stormwater runoff. Services included site selection and design, environmental permitting, creation of bidding documents, and construction administration.

EDUCATION

University of Maine, Orono, ME
Bachelor of Science,
Civil & Environmental Engineering
2007

CERTIFICATIONS

Maine DEP Certified BMP Inspector
(Pending)

MEMBERSHIPS

American Society of Civil Engineers
(ASCE)

SKILLS

AutoCAD – Civil 3D, HydroCAD,
SWMM Modeling, HEC-RAS

SEBAGO TECHNICS

207.200.2115 SHANF@SEBAGOTECHNICS.COM

DANIEL M. DANVERS

Landscape Designer



Mr. Danvers joined Sebago Technics, Inc. in 2017 as a Landscape Designer. Dan graduated from The University of Rhode Island with a degree in Landscape Architecture. Mr. Danvers previously worked at a landscape design-build firm in Rhode Island, where he worked on design teams to complete residential and commercial projects while managing construction and horticulture crews. Dan also has experience with concept drawings, planting plans renderings, construction documents, and attending Town meetings.

Dan is skilled in SketchUp, Adobe Suite, and has over 10 years working with AutoCAD.

EXPERIENCE

Residence - South Portland, Maine
As a part of a larger team Dan designed hardscape and landscape elements for a coastal residence in South Portland.

Summer Camp and Recreational Facilities - Auburn, Maine
Developed a master plan concept for a woodland camp for the YMCA. Included sports fields, outdoor classrooms, pool, accessible hiking, and mountain biking trails.

Hop Yard- Arundel, Maine
Designed a site plan for a hop yard, brewery and distillery in Arundel. Including circulation, crop, and building studies for the client.

Single Family House - Portland, Maine
Sited, graded, and prepared permit drawings for a single family house lot in Portland.

Car Dealership - Scarborough, Maine
Developed a site plan, conceptual grading, and application documents for a car dealership in Scarborough.

CMCC Field Enhancements - Auburn, Maine
Generated a 3D fly-over and renderings of proposed work on campus.

Days Inn - South Portland, Maine
Performed analysis and conceptualization of site improvements and re-development of the existing hotel.

Apartment Complex Landscape - South Portland, Maine
As a part of a larger team, developed planting plan and landscape drawings for a proposed apartment complex in South Portland.

EDUCATION

University of Rhode Island
Kingston, RI

Bachelors of Landscape Architecture
2014

CERTIFICATIONS

Rhode Island Certified Horticulturist
Rhode Island Nursery and Landscape Association, 2015

Certified Invasive Manager
Rhode Island Coastal Resource Management Council, 2016

AFFILIATIONS

Rhode Island Nursery and Landscape Associations, Executive Board Member 2016 - 2018

American Society of Landscape Architects 2012 - Present

Portland Society of Architects
Member 2017 - Present

Maine Chapter of the American Society of Landscape Architects
2017 - Present

SEBAGO TECHNICS

207.200.2125 DDANVERS@SEBAGOTECHNICS.COM

CHARLES D. MARCHESE, PLS

Director of Survey Operations



Mr. Marchese has over 40 years of experience in the land surveying field with an emphasis on boundary and engineering related projects. He joined Sebago Technics in November of 2009 after eighteen years with Civil Consultants as a survey project manager. Since joining Sebago Technics, Mr. Marchese has assisted with field and office duties relating to private, residential and public works projects. In his role as a Director, he continues to manage his survey team and provide the experience and knowledge necessary to provide quality and timely survey work to a wide variety of clients.

EXPERIENCE

During 1991 to 2009 while employed at Civil Consultants, Charlie worked on an assortment of boundary retracement surveys for various government agencies. This work included thirty-three miles of United States Forest Service boundary retracement in Lovell, Stoneham, Gilead and Bethel, Maine. Boundary work for the United States Fish and Wildlife Service comprised surveys for the acquisition of tracts for addition to the many refuges located throughout Maine and New Hampshire. The bulk of this work involved the establishment of the Lake Umbagog National Wildlife Refuge located in Errol, New Hampshire and localities along the shores of Lake Umbagog and its many waterways. This project ultimately surveyed in excess of 30,000 acres for inclusion within the National Wildlife Refuge System.

During the summers of 1994 through 1996 Charlie was the party chief for survey crews working on approximately 30 miles of boundary corridor survey along the Appalachian Trail for the National Park Service. This work involved surveying and monumenting the actual ownership lines of the lands surrounding the trail and other scenic areas owned by the National Park Service.

Charlie was the project surveyor, subcontracted through Sebago Technics, for the boundary and topographic survey associated with the Sanford, Maine site for the new Wal-Mart and Lowe's stores. He was responsible for the layout of the Wal-Mart site for Cleveland Construction throughout the building phase of the project. He has an extensive background in construction layout ranging from residential development to large scale retail and public works projects.

EDUCATION

The University of Maine, Orono, ME

Established 60 credit hours towards Bachelor of Science in Civil Engineering, 1976

Attended Business Administration classes University of Maine, Portland

Annual seminars and meetings pertaining to survey topics current to continuing practice

CERTIFICATIONS

OSHA 10-hour Construction Safety and Health

MEMBERSHIPS

Maine Society of Land Surveyors

National Society of Professional Land Surveyors

REGISTRATIONS

Professional Land Surveyor: Maine #2009

SEBAGO TECHNICS

207.200.2069 CMARCHESE@SEBAGOTECHNICS.COM

35: Signage and Wayfinding (14-526(d)8), if applicable

- Signage plan showing the location, dimensions, height and setback of all existing and proposed signs. Signs in Historic Districts are reviewed by Historic Preservation staff
- Proposed commercial and directional signage on site

All signage will meet applicable requirements of Division 22 of the City Code and the additional provisions of this section. The proposed directional signage table and locations are shown on the enclosed site plans.

Project identification signage has not been finalized and will be submitted under separate cover.

10: Transportation Analysis – Traffic Impact (14-526(a)1)

- Provisions for pedestrian, bicycle, vehicle, and loading circulation and incremental volume of traffic impacts.

    1. In accordance with Transportation Standards – Impacts on Surrounding Street Systems, provision has been made for vehicle loading, unloading and parking and for vehicular and pedestrian circulation on the site and onto Forest Avenue. Please see the attached site plans for additional circulation information.

- Traffic Impact Study (Technical Manual, Section 1), if applicable.

  Supplemental information, Section 7 Traffic Study dated April 22, 2019.

SEBAGO TECHNICS

CIVIL ENGINEERING ▪ SURVEYING ▪ LANDSCAPE ARCHITECTURE

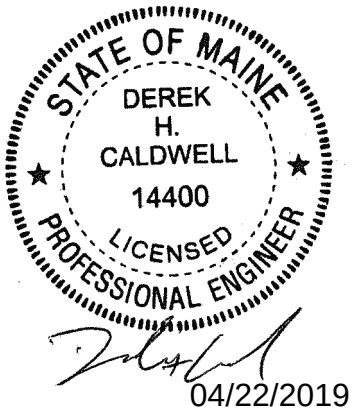
Section 7 Traffic Study Supplemental Information

Chau Property Development
1884 Forest Avenue
Portland, Maine 04074

Applicant:
Phuong Neang
75 Arcadia Street
Portland, Maine 04103

Prepared By:
Sebago Technics, Inc.
75 John Roberts Road, Suite 4A
South Portland, Maine 04106

April 22, 2019



This document provides information supplemental to the previously submitted Traffic Movement Permit Sections 1-7, Revision 1 dated March 13, 2019 for the proposed convenience store/gas station and general retail development at 1884 Forest Avenue in Portland. This supplemental information is provided as discussed at the meeting held with City Staff and the Applicant on March 13, 2019.

Site Driveway Alternative Configurations

The development is currently proposed to have three driveways. This includes one full access drive on Riverton Drive, an entrance only-drive on Forest Avenue and a right-turn only exit drive on Forest Avenue. This driveway configuration was evaluated as part of the previously submitted study dated March 13, 2019. As requested, we have also evaluated two alternative configurations, in addition to the proposed configuration:

Proposed - Entrance Drive and Right-Out Only Drive on Forest Avenue.
Alternative 1 - Right Turn In/Right Turn Out drive on Forest Avenue
Alternative 2 - One Full Access Drive on Forest Avenue

Under both scenarios the Riverton Drive access remains. In addition, the analysis assumes that Riverton Drive would have a left and right turn lane at the intersection with Forest Avenue. A left turn lane on Forest Avenue for the site driveway (applicable to the proposed and Alternative 2 scenarios) is also included. Attached is a warrant analysis sheet for the proposed left turn lane.

The following tables show the results of the capacity and queueing analysis for the site driveways as well as the intersection of Forest Avenue and Riverton Drive. Trip distribution remained consistent with the previous submission. Slight modifications were made for each driveway alternative. For Alternative 1, all left turns into the site would use Riverton Drive. In Alternative 2, left turns out of the site were assumed to be split evenly between using Riverton Drive and using the site driveway on Forest Avenue.

Table 1 – Capacity Analysis Summary
Forest Avenue at Riverton Drive (unsignalized)
AM Peak Hour

	Proposed		Alt 1		Alt 2	
Movement	**Delay (s/veh)**	**LOS**	**Delay (s/veh)**	**LOS**	**Delay (s/veh)**	**LOS**
AM PEAK HOUR						
Forest Ave EB TH	2	A	3	A	2	A
Forest Ave EB RT	1	A	1	A	1	A
Forest Ave WB LT	9	A	12	B	11	B
Forest Ave WB TH	0	A	1	A	0	A
Riverton Dr NB LT	22	C	28	D	20	C
Riverton DR NB RT	11	B	13	B	11	B
PM PEAK HOUR						
Forest Ave EB TH	2	A	3	A	2	A
Forest Ave EB RT	1	A	1	A	1	A
Forest Ave WB LT	8	A	10	A	9	A
Forest Ave WB TH	1	A	1	A	1	A
Riverton Dr NB LT	25	C	33	D	26	D
Riverton DR NB RT	9	A	8	A	8	A
SATURDAY PEAK HOUR						
Forest Ave EB TH	2	A	2	A	2	A
Forest Ave EB RT	1	A	1	A	1	A
Forest Ave WB LT	7	A	9	A	6	A
Forest Ave WB TH	0	A	1	A	0	A
Riverton Dr NB LT	18	C	35	D	17	C
Riverton DR NB RT	7	A	7	A	9	A

Table 2 – Capacity Analysis Summary
Forest Avenue at Site Driveway (unsignalized)

	Proposed		Alt 1		Alt 2	
Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
AM PEAK HOUR						
Forest Ave EB TH	2	A	2	A	2	A
Forest Ave EB RT	1	A	1	A	1	A
Forest Ave WB LT	11	B			9	A
Forest Ave WB TH	3	A			3	A
Site NB LT					23	C
Site NB RT	9	A	9	A	11	B
PM PEAK HOUR						
Forest Ave EB TH	2	A	2	A	2	A
Forest Ave EB RT	1	A	1	A	1	A
Forest Ave WB LT	9	A			10	A
Forest Ave WB TH	4	A			4	A
Site NB LT					24	C
Site NB RT	8	A	7	A	10	A
SATURDAY PEAK HOUR						
Forest Ave EB TH	2	A	2	A	2	A
Forest Ave EB RT	1	A	1	A	1	A
Forest Ave WB LT	9	A			9	A
Forest Ave WB TH	3	A			3	A
Site NB LT					17	A
Site NB RT	7	A	6	A	7	A

Table 3 – Capacity Analysis Summary
Riverton Drive at Site Driveway (unsignalized)

	Proposed		Alt 1		Alt 2	
Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
AM PEAK HOUR						
Riverton Dr NB TH	0	A	0	A	0	A
Riverton Dr SB LT	0	A	2	A	0	A
Riverton Dr SB TH	0	A	1	A	0	A
Site WB RT	3	A	3	A	2	A
PM PEAK HOUR						
Riverton Dr NB TH	0	A	0	A	0	A
Riverton Dr SB LT	0	A	1	A	0	A
Riverton Dr SB TH	0	A	1	A	0	A
Site WB RT	3	A	3	A	3	A
SATURDAY PEAK HOUR						
Riverton Dr NB TH	0	A	1	A	0	A
Riverton Dr SB LT	0	A	1	A	0	A
Riverton Dr SB TH	0	A	1	A	0	A
Site WB RT	3	A	3	A	2	A

The currently proposed driveway configuration as well as Alternative 2 (Full Access Drive on Forest Avenue) would result in similar delay and level-of-service for the site intersections and the intersection of Forest Avenue at Riverton Drive. Alternative 1 (right-in/right-out only) would result in an increase in delay on Riverton Drive, a result of all traffic turning left to enter or exit the site needing to use this approach.

The proposed configuration would not introduce a new conflict point on Forest Avenue for left turning traffic exiting from the site. This would limit left turns exiting the site to the existing intersection of Forest Avenue and Riverton Drive, which is not identified as a high crash location. Allowing for a third curb-cut accessing the site (two on Forest Avenue) would enable traffic entering the site and right-turning traffic exiting the site to Forest avenue to be separated. If these movements were to be combined in a single two-way driveway, it would be more difficult to restrict traffic from turning left out of the site driveway. The separate exit driveway geometry can be designed to discourage left turn movements. The entrance driveway would contain clear signage internal to the site to prohibit vehicles from exiting the site and rather be directed to either Riverton Drive or the proposed right-out only driveway.

The following tables show the calculated 95th percentile queue in feet for the three different driveway configuration scenarios.

Table 4 – Queueing Summary
Riverton Drive at Forest Avenue (unsignalized)

	Proposed	Alt 1	Alt 2
LANE	**95th Queue (FT)**	**95th Queue (FT)**	**95th Queue (FT)**
AM PEAK HOUR			
Forest Ave WB LT	47	81	55
Riverton Dr NB LT	93	92	75
Riverton Dr NB RT	81	84	83
PM PEAK HOUR			
Forest Ave WB LT	31	72	32
Riverton Dr NB LT	83	96	72
Riverton Dr NB RT	50	50	54
SATURDAY PEAK HOUR			
Forest Ave WB LT	30	68	30
Riverton Dr NB LT	85	89	59
Riverton Dr NB RT	39	40	37

Table 5– Queueing Summary
Site Driveway at Forest Avenue (unsignalized)

	Proposed	Alt 1	Alt 2
LANE	**95th Queue (FT)**	**95th Queue (FT)**	**95th Queue (FT)**
AM PEAK HOUR			
Forest Ave WB LT	52		40
Site Dr NB RT(LT)	60	59	71
PM PEAK HOUR			
Forest Ave WB LT	52		58
Site Dr NB RT(LT)	54	58	82
SATURDAY PEAK HOUR			
Forest Ave WB LT	57		58
Site Dr NB RT(LT)	53	58	75

Table 6– Queueing Summary
Site Driveway at Riverton Drive (unsignalized)

	Proposed	Alt 1	Alt 2
LANE	**95th Queue (FT)**	**95th Queue (FT)**	**95th Queue (FT)**
AM PEAK HOUR			
Site WB LTRT	51	50	36
PM PEAK HOUR			
Site WB LTRT	52	50	47
SATURDAY PEAK HOUR			
Site WB LTRT	53	49	44

Crash Data

As indicated in the submitted Section 7 study, there are two high crash locations in the vicinity of the project. These included the intersection of Forest Avenue and Riverside Street as well as the segment of Forest Avenue between Riverside Street and Riverton Drive.

The majority of crashes at the intersection of Forest Avenue and Riverside Street were rear end collisions, likely the result of traffic congestion on all approaches. On the segment of Forest Avenue between Riverside Street and Riverton Drive the detailed crash data indicates a majority of crashes caused by vehicles entering or exiting the 7 Eleven store on the corner of Riverside Street and Forest Avenue. Crashes were a result of vehicles exiting the store driveways turning left failing to yield to oncoming traffic, as well as rear end collisions involving a vehicle waiting to turn left into the store. There is not an auxiliary left-turn lane at this location.

Forest Avenue at Riverside Street Recommendations

We have evaluated the existing signalized intersection of Forest Avenue at Riverside Street to determine if any improvements could be made to relieve the existing congestion, and therefore potentially decrease the rate of rear-end collisions. In looking at the existing traffic volumes and lane usage, there may be an opportunity to increase capacity for the Forest Avenue eastbound approach. Currently this approach consists on one left turn lane, one thru lane, and one shared thru-right turn lane. Traffic volumes on this approach were shown to be most critical during the AM Peak Hour. Traffic volumes were found to be approximately equal for both thru and right-turning movements on this approach.

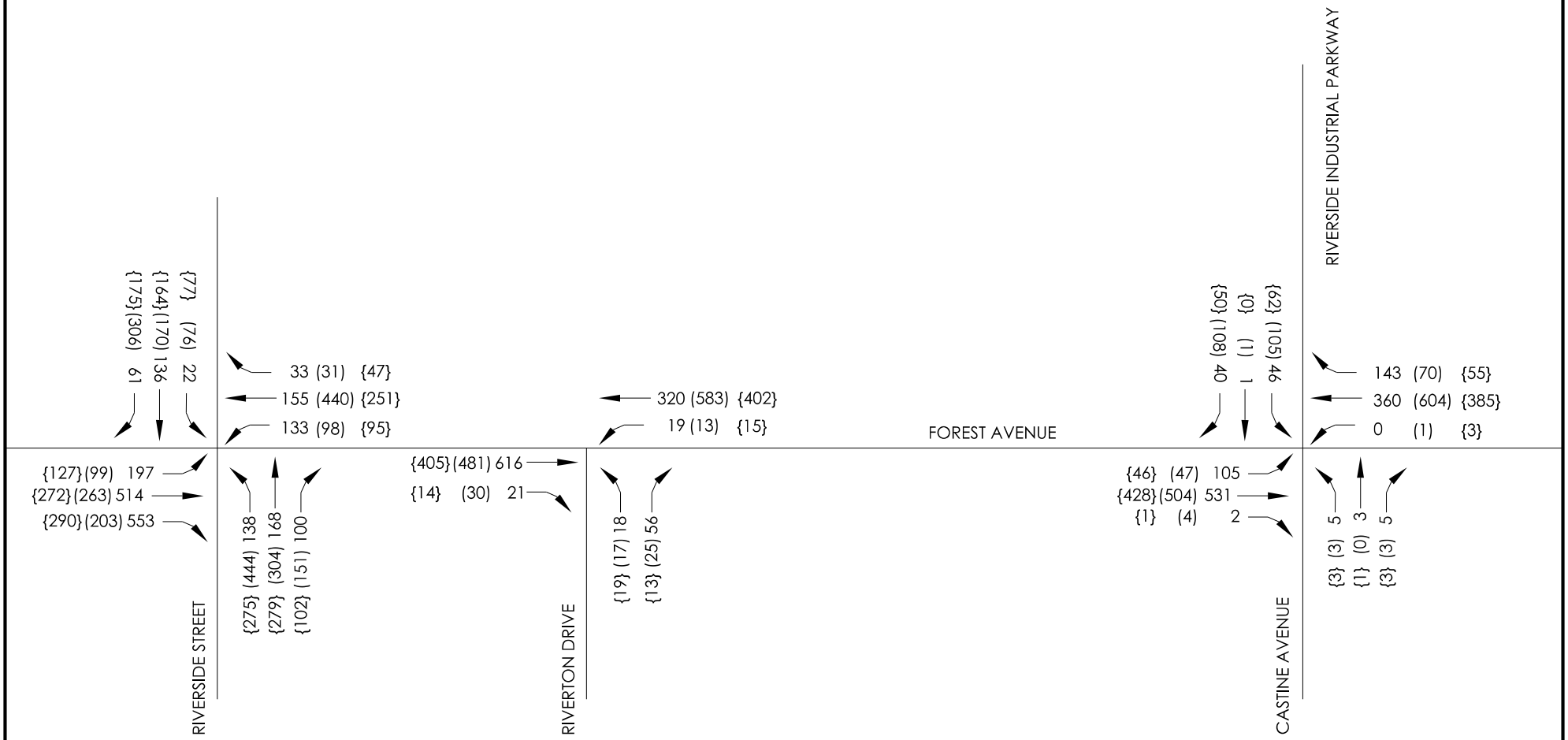
Immediately to the east of the intersection, Forest Avenue reduces to one travel lane. This immediate lane drop may cause for imbalanced lane utilization on the approach, with more thru vehicles favoring the left thru lane. It was also observed during the winter months that the right most lane on the exiting approach was not fully plowed, resulting in the roadway functioning as a single lane. Based on the existing traffic volumes and the observed imbalanced lane utilization, it may be beneficial to modify the lane use to be one left turn lane, one thru lane, and one right turn lane. If this were modified to include a right-turn only lane, then the signal equipment and phasing could also be modified to support an overlap to allow Forest Avenue eastbound right turn traffic to have a protected movement when the Riverside Street northbound left bound phase is active.

The following table shows the results of the capacity analysis showing the delay and level-of-service under 2022 Build conditions with no modifications to the signal and an alternative with the aforementioned phasing changes as well as signal timing optimization. As can be seen, multiple movements would still experience failing level-of-service during both the AM and PM Peak Hours. Overall intersection delay would be reduced.

Table 7 – Capacity Analysis Summary
Riverton Drive at Site Driveway (unsignalized)

	2023 AM		2023 AM ALT		2023 PM		2023 PM ALT	
Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
Forest Ave EB LT	158	F	130	F	63	E	85	F
Forest Ave EB TH	142	F	125	F	38	D	71	E
Forest Ave EB RT	139	F	103	F	35	D	23	C
Forest Ave WB LT	56	E	48	D	61	E	85	F
Forest Ave WB TH	21	C	22	C	29	C	48	D
Forest Ave WB RT	14	B	13	B	22	C	46	D
Riverside St NB LT	66	E	53	D	359	F	107	F
Riverside St NB TH	49	D	36	D	184	F	83	F
Riverside St NB RT	37	D	26	C	173	F	75	E
Riverside St SB LT	67	E	49	D	112	F	163	F
Riverside St SB TH	50	D	43	D	89	F	151	F
Riverside St SB RT	12	B	10	A	58	E	119	F
Intersection	92	F	77	E	96	F	83	F

Appendix A
Traffic Volume Figures



LEGEND

XX = AM PEAK HOUR
(XX) = PM PEAK HOUR
{XX} = SAT PEAK HOUR

NOTES:

TRAFFIC VOLUMES RECORDED THURSDAY 1/31/2019, SATURDAY 2/2/2019 AND SATURDAY 2/9/2019.

SEBAGO TECHNICS
WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
Tel. 207-200-2100

2019 EXISTING TRAFFIC VOLUMES

OF: ROUTE 302 (FOREST AVENUE)

SCALE: N.T.S

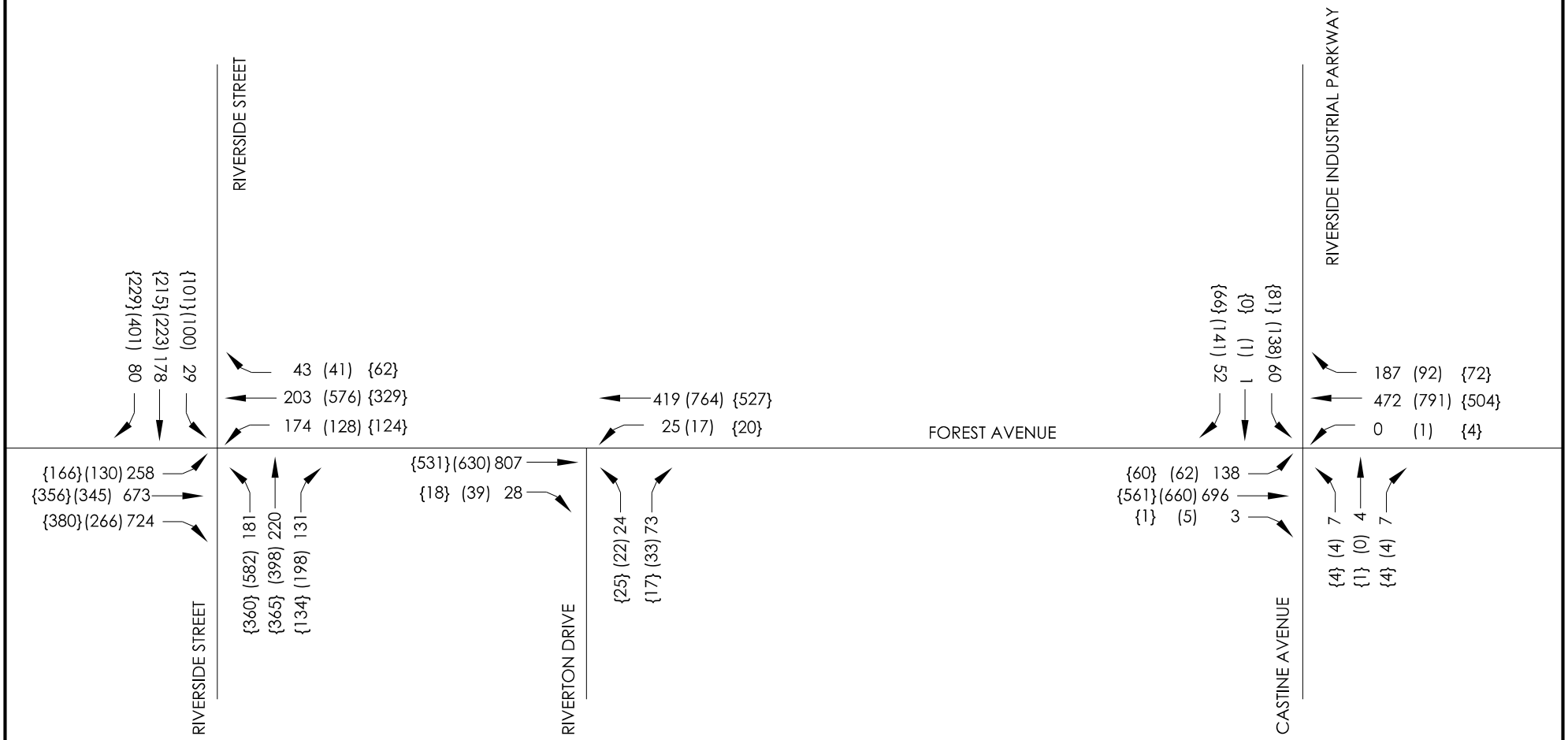
DATE: 02/19/2019

LOCATION:
1884 FOREST AVENUE
PORTLAND, MAINE

FOR:
JOHN CHAU
75 ARCADIA STREEET
PORTLAND, MAINE 04103

SHEET:
1 OF 9

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LEGEND

XX = AM PEAK HOUR
(XX) = PM PEAK HOUR
{XX} = SAT PEAK HOUR

NOTES:

VOLUMES SHOWN IN FIGURE 1 ADJUSTED USING MAINEDOT WEEKLY GROUP MEAN FACTORS TO A FACTOR OF 1.31 (1.31/0.84)

SEBAGO TECHNICS
WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
Tel. 207-200-2100

2019 ADJUSTED TRAFFIC VOLUMES

OF: ROUTE 302 (FOREST AVENUE)

SCALE: N.T.S

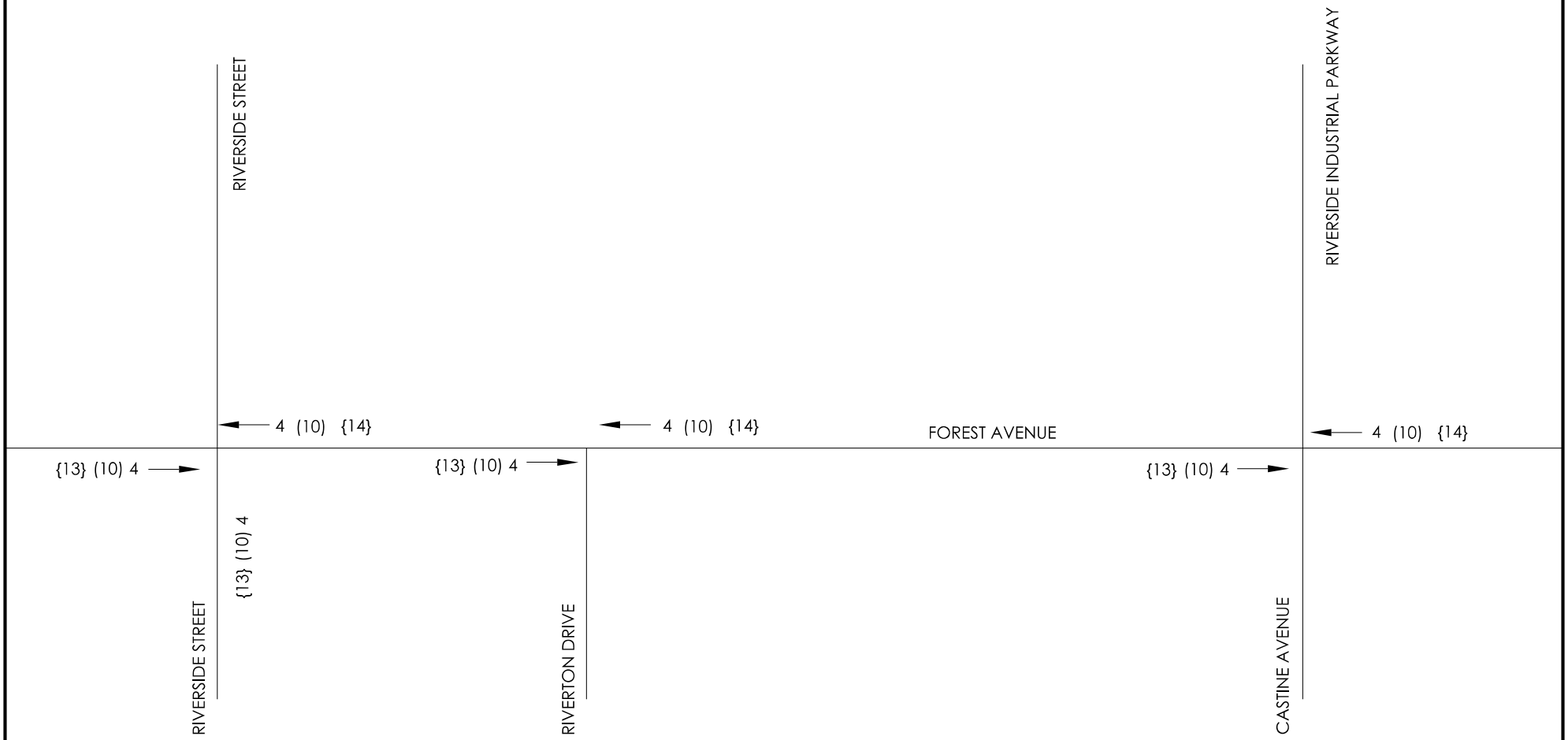
DATE: 02/19/2019

LOCATION:
1884 FOREST AVENUE
PORTLAND, MAINE

FOR:
JOHN CHAU
75 ARCADIA STREEET
PORTLAND, MAINE 04103

SHEET:
2 OF 9

...\DGN\11142_Traffic_Diagrams.dgn



LEGEND

XX = AM PEAK HOUR
(XX) = PM PEAK HOUR
{XX} = SAT PEAK HOUR

NOTES:

TRIP ENDS SHOWN REPRESENT TRIP ASSIGNMENTS FROM THE UNBUILT PORTIONS OF THE FOLLOWING APPROVED DEVELOPMENTS:

DIRIGO PLAZA
1884 FOREST AVENUE

SEBAGO TECHNICS
WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
Tel. 207-200-2100

OTHER DEVELOPMENT TRIPS

OF: ROUTE 302 (FOREST AVENUE)

LOCATION:
1884 FOREST AVENUE
PORTLAND, MAINE

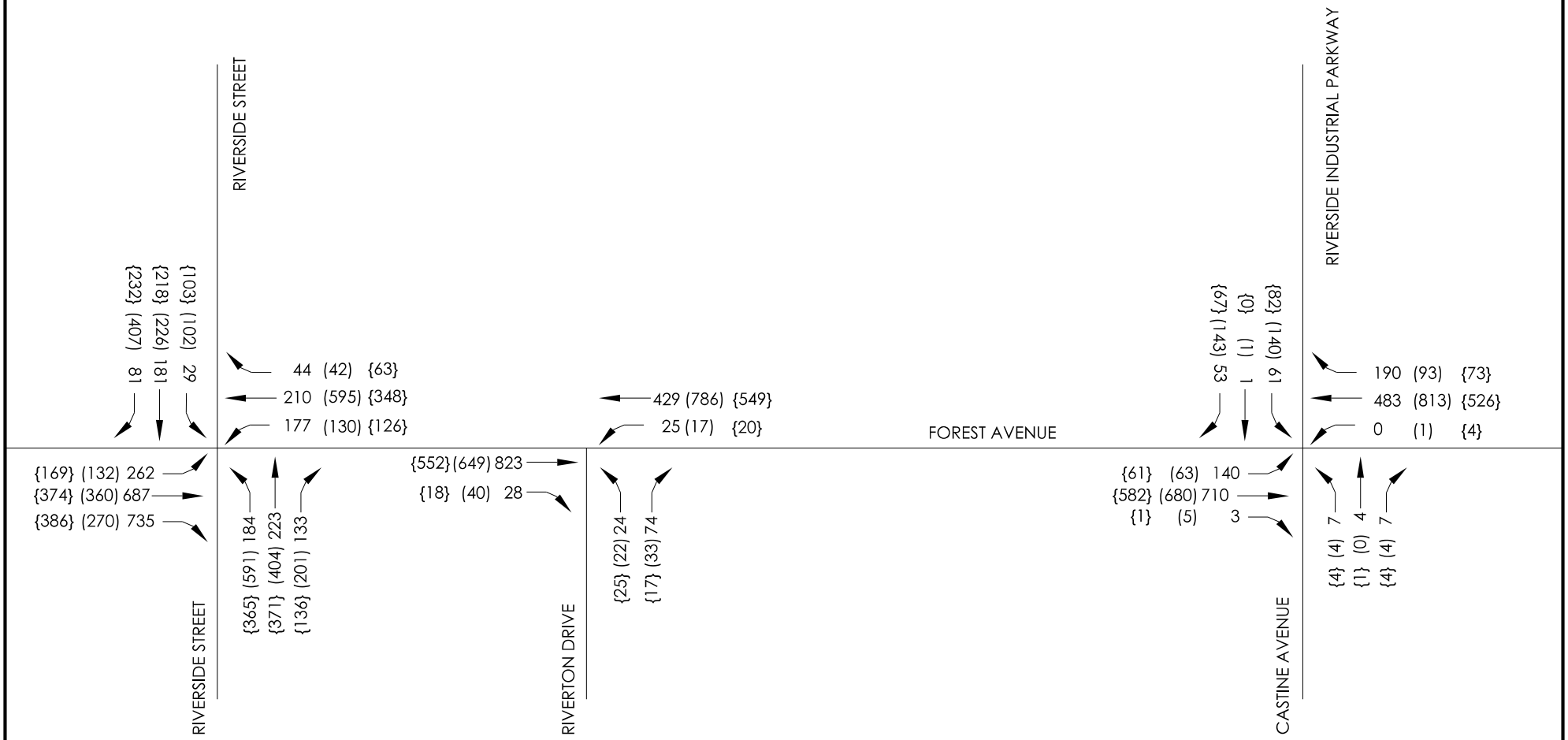
FOR:
JOHN CHAU
75 ARCADIA STREEET
PORTLAND, MAINE 04103

SCALE: N.T.S

DATE: 02/19/2019

SHEET:
3 OF 9

...\DGN\11142_Traffic_Diagrams.dgn



LEGEND

XX = AM PEAK HOUR
(XX) = PM PEAK HOUR
{XX} = SAT PEAK HOUR

NOTES:

VOLUMES SHOWN IN FIGURE 2 ADJUSTED USING A 1.0% ANNUAL GROWTH FACTOR.

SEBAGO TECHNICS
WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
Tel. 207-200-2100

2022 NO-BUILD TRAFFIC VOLUMES

OF: ROUTE 302 (FOREST AVENUE)

SCALE: N.T.S

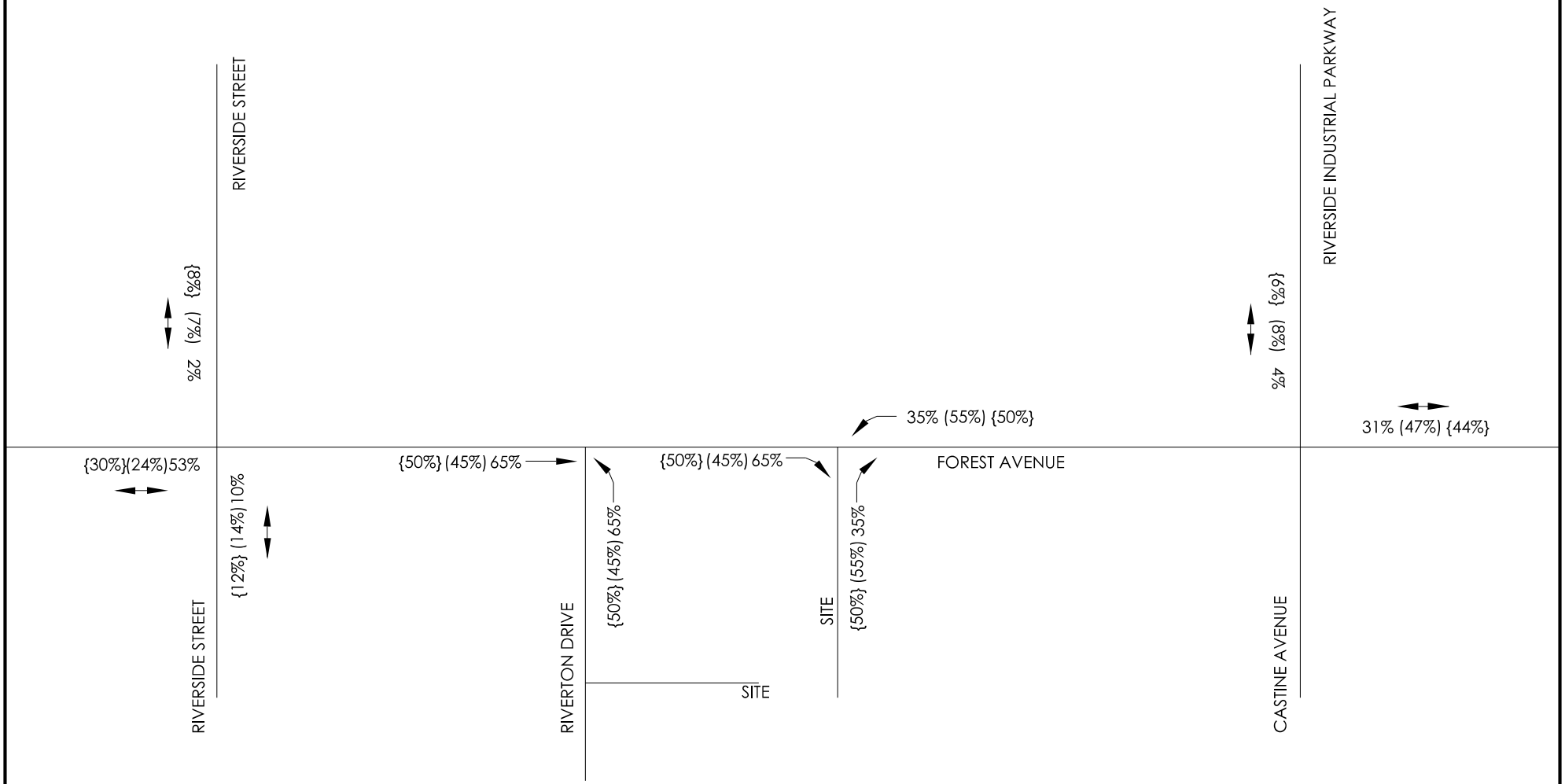
DATE: 02/19/2019

LOCATION:
1884 FOREST AVENUE
PORTLAND, MAINE

FOR:
JOHN CHAU
75 ARCADIA STREEET
PORTLAND, MAINE 04103

SHEET:
4 OF 9

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LEGEND

XX = AM PEAK HOUR
(XX) = PM PEAK HOUR
{XX} = SAT PEAK HOUR

NOTES:

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WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
Tel. 207-200-2100

TRIP ASSIGNMENT PERCENTAGE

OF: ROUTE 302 (FOREST AVENUE)

LOCATION:
1884 FOREST AVENUE
PORTLAND, MAINE

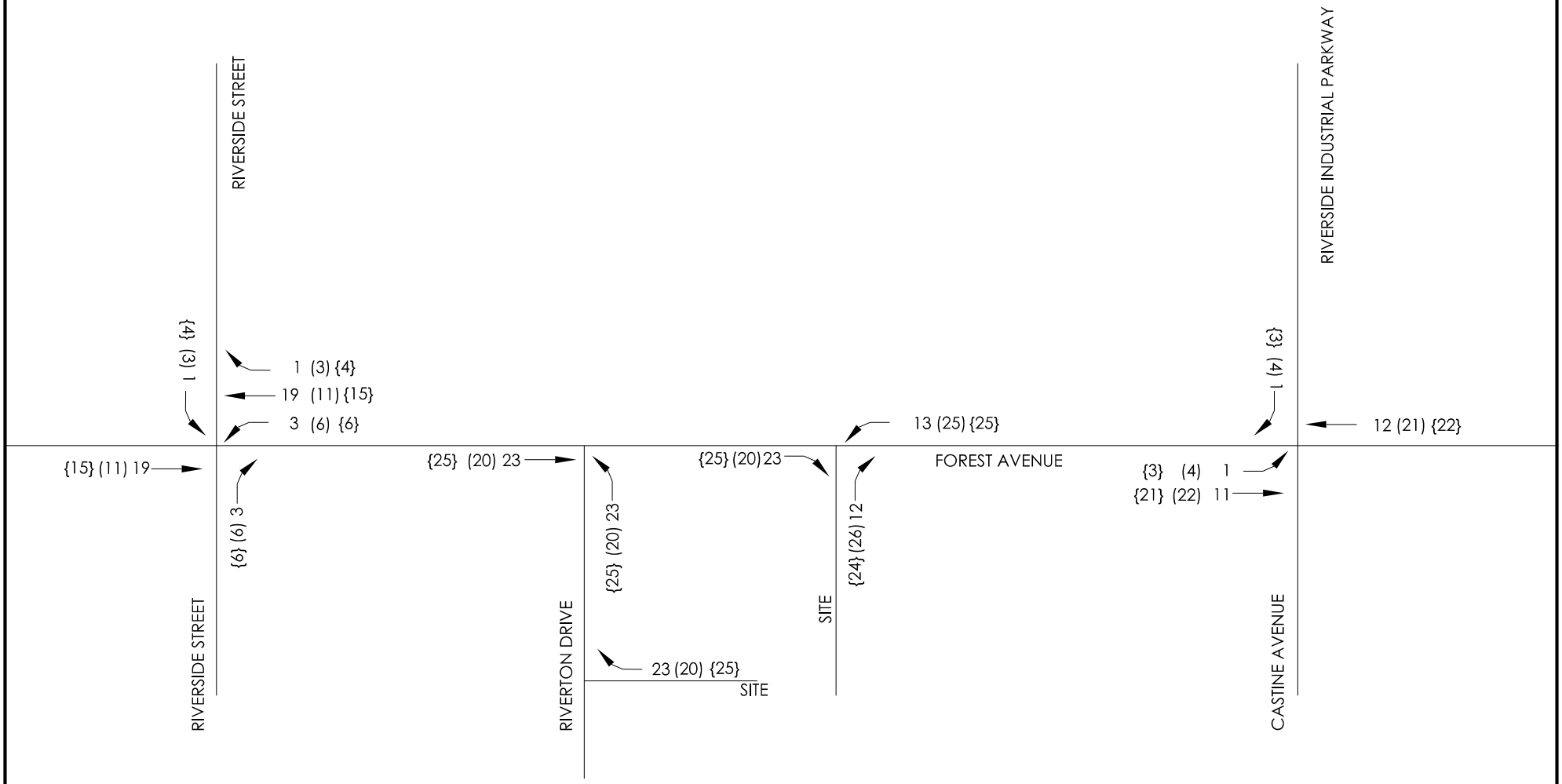
FOR:
JOHN CHAU
75 ARCADIA STREEET
PORTLAND, MAINE 04103

SCALE: N.T.S

DATE: 02/19/2019

SHEET:
5 OF 9

...\DGN\11142_Traffic_Diagrams.dgn



LEGEND

XX = AM PEAK HOUR
(XX) = PM PEAK HOUR
{XX} = SAT PEAK HOUR

PRIMARY TRIPS

	Total	Enter	Exit
AM Peak Hour of Adjacent Street (7-9 AM	71	36	35
PM Peak Hour of Adjacent Street (4-6 PM)	91	45	46
Saturday Peak Hour	99	50	49

SEBAGO TECHNICS
WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
Tel. 207-200-2100

TRIP ASSIGNMENT - PRIMARY TRIPS

OF: ROUTE 302 (FOREST AVENUE)

SCALE: N.T.S

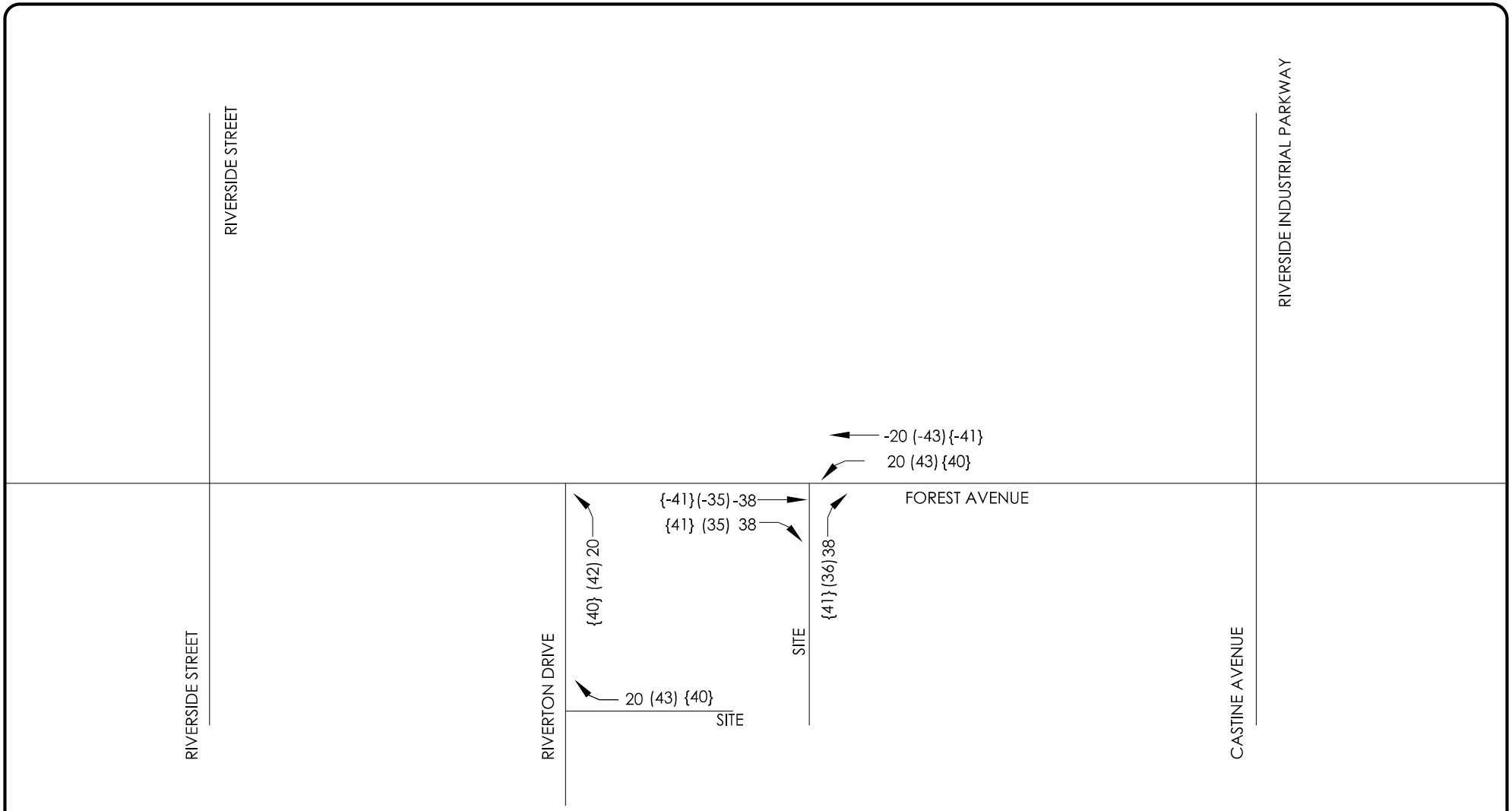
DATE: 02/19/2019

LOCATION:
1884 FOREST AVENUE
PORTLAND, MAINE

FOR: JOHN CHAU
75 ARCADIA STREEET
PORTLAND, MAINE 04103

SHEET: 6 OF 9

...\DGN\11142_Traffic_Diagrams.dgn



PASS-BY TRIPS

			20	Total	Enter	Exit
AM Peak Hour of Adjacent Street (7-9 AM				116	58	58
PM Peak Hour of Adjacent Street (4-6 PM				156	78	78
Saturday Peak Hour				162	81	81

LEGEND

XX = AM PEAK HOUR
(XX) = PM PEAK HOUR
{XX} = SAT PEAK HOUR

SEBAGO TECHNICS
WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
Tel. 207-200-2100

TRIP ASSIGNMENT - PASS-BY TRIPS

OF: ROUTE 302 (FOREST AVENUE)

SCALE: N.T.S

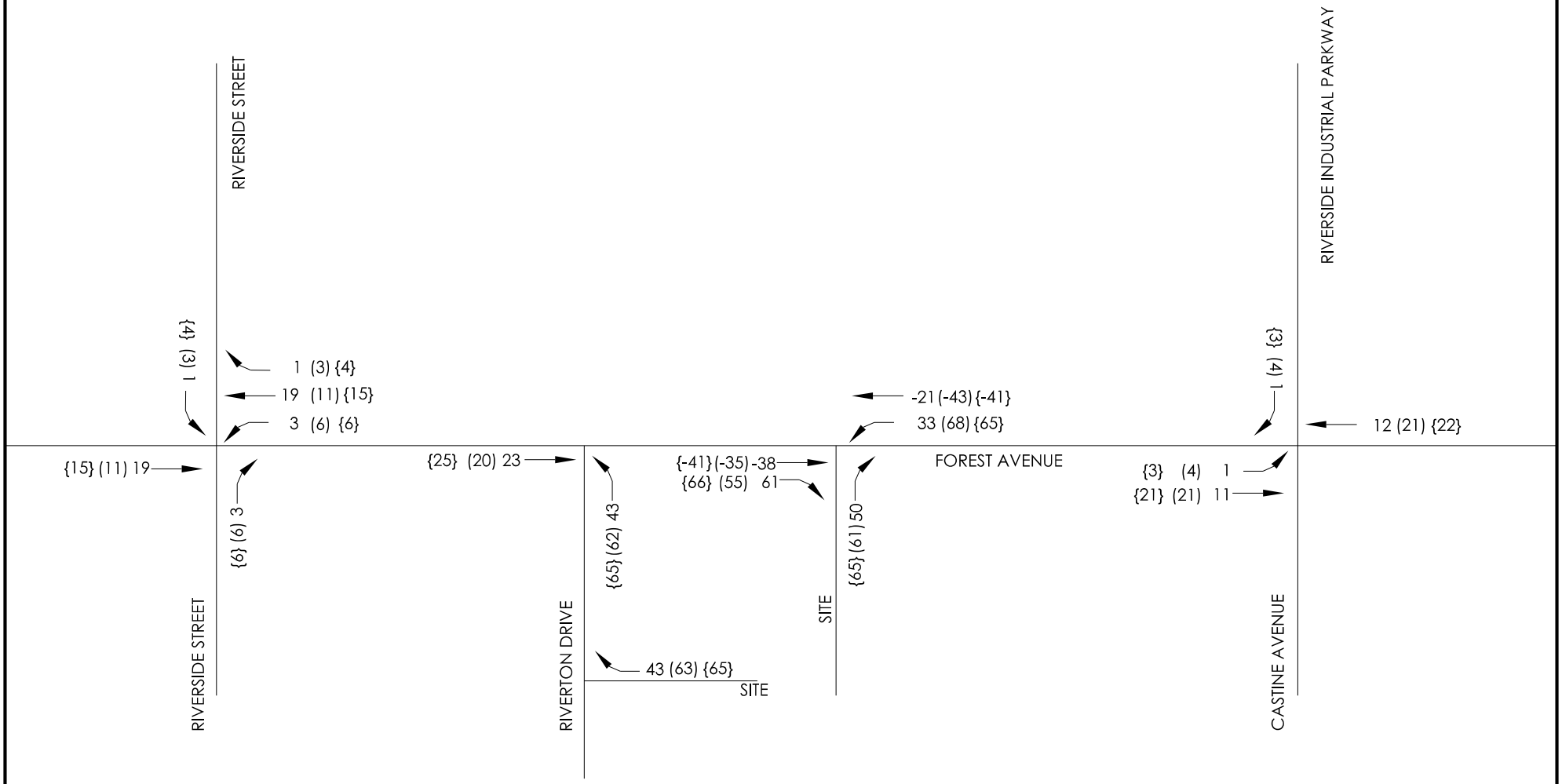
DATE: 02/19/2019

LOCATION:
1884 FOREST AVENUE
PORTLAND, MAINE

FOR:
JOHN CHAU
75 ARCADIA STREEET
PORTLAND, MAINE 04103

SHEET:
7 OF 9

...\DGN\11142_Traffic_Diagrams.dgn



LEGEND

XX = AM PEAK HOUR
(XX) = PM PEAK HOUR
{XX} = SAT PEAK HOUR

NOTE:

VOLUMES FOUND BY ADDING VALUES SHOWN IN FIGURES 6 AND 7.

SEBAGO TECHNICS
WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
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TRIP ASSIGNMENT - TOTAL

OF: ROUTE 302 (FOREST AVENUE)

SCALE: N.T.S

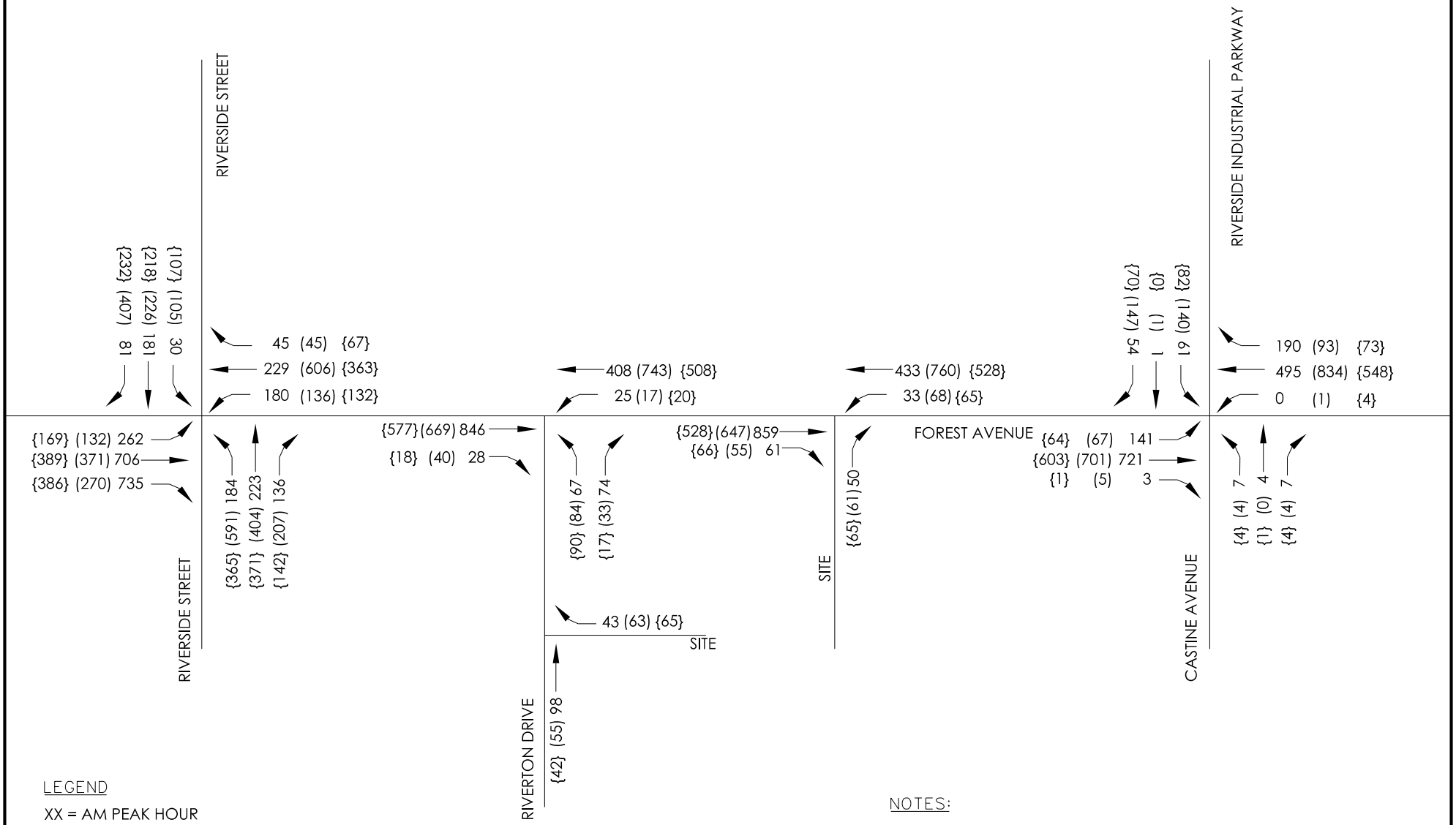
DATE: 02/19/2019

LOCATION:
1884 FOREST AVENUE
PORTLAND, MAINE

FOR:
JOHN CHAU
75 ARCADIA STREEET
PORTLAND, MAINE 04103

SHEET:
8 OF 9

...\DGN\11142_Traffic_Diagrams.dgn



LEGEND

XX = AM PEAK HOUR
(XX) = PM PEAK HOUR
{XX} = SAT PEAK HOUR

NOTES:

VOLUMES SHOWN BY ADDING VALUES IN FIGURES 4 AND 8.

SEBAGO TECHNICS
WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
Tel. 207-200-2100

2022 BUILD TRAFFIC VOLUMES

OF: ROUTE 302 (FOREST AVENUE)

SCALE: N.T.S

DATE: 02/19/2019

LOCATION:
1884 FOREST AVENUE
PORTLAND, MAINE

FOR:
JOHN CHAU
75 ARCADIA STREEET
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SHEET:
9 OF 9

...\DGN\11142_Traffic_Diagrams.dgn

Appendix C
SimTraffic Reports

3: Riverside St & Forest Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.4	1.7	1.7	0.7	0.3	0.5	424.0	407.3	401.5	4.3	2.4	4.4
Total Del/Veh (s)	74.9	49.7	47.2	54.3	28.1	23.4	271.9	202.7	194.4	71.8	58.0	24.7

3: Riverside St & Forest Ave Performance by movement

Movement	All
Denied Del/Veh (s)	125.8
Total Del/Veh (s)	96.1

6: Riverton Dr & Forest Ave Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Total Del/Veh (s)	1.7	0.8	6.7	0.4	17.6	0.3	7.3	2.5

9: Castine Ave/Riverside Industrial & Forest Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	All
Denied Del/Veh (s)	0.5	0.1	0.0	0.4	0.5	0.5	0.1	0.1	0.1	0.3	3.8	0.5
Total Del/Veh (s)	11.6	6.3	2.5	13.8	7.6	5.0	31.5	50.5	11.3	34.5	10.2	9.0

12: Site & Forest Ave Performance by movement

Movement	EBT	EBR	WBL	WBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.0
Total Del/Veh (s)	1.5	0.5	8.8	2.5	6.5	2.5

14: Riverton Dr & Site Performance by movement

Movement	WBR	NBT	SBT	All
Denied Del/Veh (s)	0.2	0.1	0.0	0.1
Total Del/Veh (s)	2.5	0.1	0.3	1.2

Total Zone Performance

Denied Del/Veh (s)	106.6
Total Del/Veh (s)	1223.5

Intersection: 3: Riverside St & Forest Ave

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	R
Maximum Queue (ft)	234	250	1051	144	169	168	525	1098	224	473	100
Average Queue (ft)	134	209	430	94	106	109	522	1081	109	266	82
95th Queue (ft)	220	309	982	148	169	170	561	1090	216	476	137
Link Distance (ft)			1734		145	145		1064		467	
Upstream Blk Time (%)			1	1	3	4		71		4	
Queuing Penalty (veh)			0	0	10	11		0		0	
Storage Bay Dist (ft)	225	225		140			500		200		75
Storage Blk Time (%)	1	1	19	2	4		38	36	0	46	1
Queuing Penalty (veh)	9	8	72	3	6		186	133	1	156	4

Intersection: 6: Riverton Dr & Forest Ave

Movement	EB	WB	NB	NB
Directions Served	TR	L	L	R
Maximum Queue (ft)	4	34	108	35
Average Queue (ft)	0	8	45	13
95th Queue (ft)	3	30	85	39
Link Distance (ft)	200		151	151
Upstream Blk Time (%)			0	
Queuing Penalty (veh)			0	
Storage Bay Dist (ft)		100		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: Castine Ave/Riverside Industrial & Forest Ave

Movement	EB	EB	WB	NB	SB	SB
Directions Served	L	TR	LTR	LTR	LT	R
Maximum Queue (ft)	110	253	244	47	118	82
Average Queue (ft)	26	79	98	10	58	32
95th Queue (ft)	70	184	198	35	100	65
Link Distance (ft)		1136	486	288	374	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	150					200
Storage Blk Time (%)		1				
Queuing Penalty (veh)		1				

Intersection: 12: Site & Forest Ave

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	11	69	62
Average Queue (ft)	1	24	32
95th Queue (ft)	8	57	53
Link Distance (ft)	180		156
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		100	
Storage Blk Time (%)		0	
Queuing Penalty (veh)		1	

Intersection: 14: Riverton Dr & Site

Movement	WB
Directions Served	LR
Maximum Queue (ft)	70
Average Queue (ft)	29
95th Queue (ft)	53
Link Distance (ft)	98
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 601

3: Riverside St & Forest Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	660.5	666.0	667.7	1.8	0.9	0.8	3.5	1.0	1.0	3.6	0.6	3.6
Total Del/Veh (s)	157.8	142.4	139.1	55.6	21.2	13.7	66.0	48.5	37.2	67.0	50.0	12.4

3: Riverside St & Forest Ave Performance by movement

Movement	All
Denied Del/Veh (s)	381.9
Total Del/Veh (s)	92.0

6: Riverton Dr & Forest Ave Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
Total Del/Veh (s)	2.2	1.1	9.4	0.4	21.9	0.4	10.7	3.2

9: Castine Ave/Riverside Industrial & Forest Ave Performance by movement

Movement	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.7	0.7	0.1	0.1	0.2	0.3	0.5	3.8	0.4
Total Del/Veh (s)	16.9	6.6	4.1	13.0	8.9	47.0	37.0	14.4	37.6	57.0	9.8	11.4

12: Site & Forest Ave Performance by movement

Movement	EBT	EBR	WBL	WBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.0
Total Del/Veh (s)	1.6	0.5	10.8	2.7	9.3	2.5

14: Riverton Dr & Site Performance by movement

Movement	WBR	NBT	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	2.6	0.1	0.4	0.7

Total Zone Performance

Denied Del/Veh (s)	316.5
Total Del/Veh (s)	801.0

Intersection: 3: Riverside St & Forest Ave

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	R
Maximum Queue (ft)	236	250	1774	143	167	146	396	438	198	286	100
Average Queue (ft)	143	245	1652	102	82	77	163	215	38	149	50
95th Queue (ft)	227	275	2130	149	162	137	308	379	116	261	129
Link Distance (ft)			1734		144	144		584		467	
Upstream Blk Time (%)			43	3	4	0		0			
Queuing Penalty (veh)			0	0	9	1		0			
Storage Bay Dist (ft)	225	225		140			500		200		75
Storage Blk Time (%)	1	2	35	4	4		0	0		37	0
Queuing Penalty (veh)	8	25	218	5	8		1	0		42	0

Intersection: 6: Riverton Dr & Forest Ave

Movement	EB	WB	NB	NB
Directions Served	TR	L	L	R
Maximum Queue (ft)	20	67	124	107
Average Queue (ft)	2	15	43	43
95th Queue (ft)	12	47	93	81
Link Distance (ft)	200		151	151
Upstream Blk Time (%)			0	
Queuing Penalty (veh)			0	
Storage Bay Dist (ft)		100		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: Castine Ave/Riverside Industrial & Forest Ave

Movement	EB	EB	WB	NB	SB	SB
Directions Served	L	TR	LTR	LTR	LT	R
Maximum Queue (ft)	165	342	380	60	133	82
Average Queue (ft)	49	87	149	16	50	33
95th Queue (ft)	107	221	310	47	106	66
Link Distance (ft)		1136	486	288	374	
Upstream Blk Time (%)			0			
Queuing Penalty (veh)			0			
Storage Bay Dist (ft)	150					200
Storage Blk Time (%)	0	2			0	
Queuing Penalty (veh)	0	3			0	

Intersection: 12: Site & Forest Ave

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	9	65	72
Average Queue (ft)	0	19	31
95th Queue (ft)	5	52	60
Link Distance (ft)	180		156
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		100	
Storage Blk Time (%)		0	
Queuing Penalty (veh)		1	

Intersection: 14: Riverton Dr & Site

Movement	WB
Directions Served	LR
Maximum Queue (ft)	66
Average Queue (ft)	23
95th Queue (ft)	51
Link Distance (ft)	98
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 321

3: Riverside St & Forest Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.0	0.9	0.9	0.3	0.1	0.1	1174.8	1176.0	1170.0	96.2	95.7	96.7
Total Del/Veh (s)	63.1	37.7	35.1	61.3	29.4	21.6	358.7	183.8	172.9	112.0	88.6	58.0

3: Riverside St & Forest Ave Performance by movement

Movement	All
Denied Del/Veh (s)	440.3
Total Del/Veh (s)	96.2

6: Riverton Dr & Forest Ave Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.1	0.0	0.0	0.4	0.0	0.0	0.0
Total Del/Veh (s)	2.2	0.9	7.6	0.7	24.7	0.3	8.8	2.8

9: Castine Ave/Riverside Industrial & Forest Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.3	0.1	0.0	15.4	3.8	3.9	0.3	0.1	0.6	0.2	3.7	2.2
Total Del/Veh (s)	25.7	8.9	8.0	32.1	19.1	15.5	47.5	18.4	36.9	44.8	21.3	17.3

12: Site & Forest Ave Performance by movement

Movement	EBT	EBR	WBL	WBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.0
Total Del/Veh (s)	1.6	0.6	9.4	3.6	7.5	3.2

14: Riverton Dr & Site Performance by movement

Movement	WBR	NBT	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	2.6	0.1	0.3	1.1

Total Zone Performance

Denied Del/Veh (s)	366.2
Total Del/Veh (s)	987.5

Intersection: 3: Riverside St & Forest Ave

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	R
Maximum Queue (ft)	217	250	601	144	190	180	525	1089	225	524	100
Average Queue (ft)	110	178	267	103	147	146	524	1080	159	468	98
95th Queue (ft)	191	292	463	164	192	187	527	1087	281	595	115
Link Distance (ft)			1734		145	145		1064		467	
Upstream Blk Time (%)				1	16	16		81		55	
Queuing Penalty (veh)				0	64	64		0		0	
Storage Bay Dist (ft)	225	225		140			500		200		75
Storage Blk Time (%)	0	1	10	2	18		81	0	2	51	11
Queuing Penalty (veh)	1	2	31	5	25		494	1	11	261	39

Intersection: 6: Riverton Dr & Forest Ave

Movement	EB	WB	WB	NB	NB
Directions Served	TR	L	T	L	R
Maximum Queue (ft)	22	43	11	95	57
Average Queue (ft)	1	7	1	44	22
95th Queue (ft)	9	31	9	83	50
Link Distance (ft)	200		179	109	109
Upstream Blk Time (%)				0	
Queuing Penalty (veh)				0	
Storage Bay Dist (ft)		100			
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 9: Castine Ave/Riverside Industrial & Forest Ave

Movement	EB	EB	WB	NB	SB	SB
Directions Served	L	TR	LTR	LTR	LT	R
Maximum Queue (ft)	141	339	510	48	173	191
Average Queue (ft)	43	120	252	7	85	74
95th Queue (ft)	98	264	492	30	140	140
Link Distance (ft)		1136	486	288	374	
Upstream Blk Time (%)			5			
Queuing Penalty (veh)			0			
Storage Bay Dist (ft)	150					200
Storage Blk Time (%)	0	4			0	0
Queuing Penalty (veh)	0	3			0	0

Intersection: 12: Site & Forest Ave

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	17	58	59
Average Queue (ft)	1	21	32
95th Queue (ft)	8	52	54
Link Distance (ft)	179		156
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		100	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 14: Riverton Dr & Site

Movement	WB
Directions Served	LR
Maximum Queue (ft)	60
Average Queue (ft)	26
95th Queue (ft)	52
Link Distance (ft)	98
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 1002

6: Riverton Dr & Forest Ave Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.0	1.1	0.0	0.2	0.1
Total Del/Veh (s)	2.5	1.3	11.7	0.6	28.1	0.3	12.8	4.0

12: Site & Forest Ave Performance by movement

Movement	EBT	EBR	WBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0
Total Del/Veh (s)	1.6	0.6	2.7	9.4	2.3

14: Riverton Dr & Site Performance by movement

Movement	WBR	NBT	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.1
Total Del/Veh (s)	2.6	0.1	1.7	0.7	0.9

Total Zone Performance

Denied Del/Veh (s)	0.5
Total Del/Veh (s)	48.9

Intersection: 6: Riverton Dr & Forest Ave

Movement	EB	WB	WB	NB	NB
Directions Served	TR	L	T	L	R
Maximum Queue (ft)	40	109	69	119	115
Average Queue (ft)	3	31	2	45	43
95th Queue (ft)	21	81	37	92	84
Link Distance (ft)	200		185	151	151
Upstream Blk Time (%)			0	0	
Queuing Penalty (veh)			1	0	
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		1	0		
Queuing Penalty (veh)		3	0		

Intersection: 12: Site & Forest Ave

Movement	WB	NB
Directions Served	T	R
Maximum Queue (ft)	34	66
Average Queue (ft)	1	32
95th Queue (ft)	25	59
Link Distance (ft)	1131	157
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 14: Riverton Dr & Site

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	66	36
Average Queue (ft)	23	3
95th Queue (ft)	50	19
Link Distance (ft)	98	151
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 4

6: Riverton Dr & Forest Ave Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.1	0.2	0.0	0.0	2.0	0.0	0.2	0.1
Total Del/Veh (s)	2.2	1.1	8.7	0.9	35.0	0.2	7.4	3.8

12: Site & Forest Ave Performance by movement

Movement	EBT	EBR	WBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0
Total Del/Veh (s)	1.6	0.5	3.5	6.4	2.9

14: Riverton Dr & Site Performance by movement

Movement	WBR	NBT	SBL	SBT	All
Denied Del/Veh (s)	0.2	0.1	0.1	0.0	0.1
Total Del/Veh (s)	2.8	0.6	1.2	0.5	1.3

Total Zone Performance

Denied Del/Veh (s)	1.0
Total Del/Veh (s)	44.7

Intersection: 6: Riverton Dr & Forest Ave

Movement	EB	WB	WB	NB	NB
Directions Served	TR	L	T	L	R
Maximum Queue (ft)	35	102	99	115	63
Average Queue (ft)	2	30	3	51	22
95th Queue (ft)	16	72	30	96	50
Link Distance (ft)	200		185	109	109
Upstream Blk Time (%)				2	
Queuing Penalty (veh)				1	
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	0		
Queuing Penalty (veh)		3	0		

Intersection: 12: Site & Forest Ave

Movement	NB
Directions Served	R
Maximum Queue (ft)	68
Average Queue (ft)	31
95th Queue (ft)	58
Link Distance (ft)	157
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 14: Riverton Dr & Site

Movement	WB	NB	SB
Directions Served	LR	T	LT
Maximum Queue (ft)	67	22	40
Average Queue (ft)	26	1	4
95th Queue (ft)	50	11	22
Link Distance (ft)	98	466	109
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

Zone wide Queuing Penalty: 4

6: Riverton Dr & Forest Ave Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	1.8	1.2	8.3	0.6	24.4	0.2	7.2	3.3

12: Site & Forest Ave Performance by movement

Movement	EBT	EBR	WBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0
Total Del/Veh (s)	1.6	0.6	2.6	6.4	2.2

14: Riverton Dr & Site Performance by movement

Movement	WBR	NBT	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.1
Total Del/Veh (s)	2.5	0.1	1.6	0.5	1.3

Total Zone Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	49.3

Intersection: 6: Riverton Dr & Forest Ave

Movement	EB	WB	NB	NB
Directions Served	TR	L	L	R
Maximum Queue (ft)	24	85	104	35
Average Queue (ft)	1	29	50	14
95th Queue (ft)	10	68	89	40
Link Distance (ft)	200		151	151
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		100		
Storage Blk Time (%)		1		
Queuing Penalty (veh)		3		

Intersection: 12: Site & Forest Ave

Movement	EB	NB
Directions Served	TR	R
Maximum Queue (ft)	11	76
Average Queue (ft)	1	30
95th Queue (ft)	10	58
Link Distance (ft)	185	157
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 14: Riverton Dr & Site

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	56	31
Average Queue (ft)	28	3
95th Queue (ft)	49	18
Link Distance (ft)	98	151
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 3

6: Riverton Dr & Forest Ave Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Total Del/Veh (s)	2.3	1.0	11.1	0.4	20.3	0.2	11.3	2.9

12: Site & Forest Ave Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.2	0.0
Total Del/Veh (s)	1.5	0.6	9.3	2.7	23.1	11.0	2.8

14: Riverton Dr & Site Performance by movement

Movement	WBR	NBT	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	2.4	0.1	0.4	0.5

Total Zone Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	49.4

Intersection: 6: Riverton Dr & Forest Ave

Movement	EB	WB	NB	NB
Directions Served	TR	L	L	R
Maximum Queue (ft)	35	72	92	98
Average Queue (ft)	1	18	32	44
95th Queue (ft)	16	55	75	83
Link Distance (ft)	200		151	151
Upstream Blk Time (%)				0
Queuing Penalty (veh)				0
Storage Bay Dist (ft)		100		
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Intersection: 12: Site & Forest Ave

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	47	83
Average Queue (ft)	14	38
95th Queue (ft)	40	71
Link Distance (ft)		156
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 14: Riverton Dr & Site

Movement	WB
Directions Served	LR
Maximum Queue (ft)	28
Average Queue (ft)	14
95th Queue (ft)	36
Link Distance (ft)	98
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 0

6: Riverton Dr & Forest Ave Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Total Del/Veh (s)	2.2	1.0	9.2	0.7	26.3	0.2	8.0	2.5

12: Site & Forest Ave Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.2	0.0
Total Del/Veh (s)	1.5	0.7	9.8	3.7	24.2	9.9	3.7

14: Riverton Dr & Site Performance by movement

Movement	WBR	NBT	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	2.5	0.1	0.3	0.7

Total Zone Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	46.5

Intersection: 6: Riverton Dr & Forest Ave

Movement	EB	WB	WB	NB	NB
Directions Served	TR	L	T	L	R
Maximum Queue (ft)	26	48	27	81	64
Average Queue (ft)	1	8	1	38	27
95th Queue (ft)	9	32	16	72	54
Link Distance (ft)	200		179	109	109
Upstream Blk Time (%)				0	
Queuing Penalty (veh)				0	
Storage Bay Dist (ft)		100			
Storage Blk Time (%)			0		
Queuing Penalty (veh)			0		

Intersection: 12: Site & Forest Ave

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	4	69	106
Average Queue (ft)	0	25	44
95th Queue (ft)	3	58	82
Link Distance (ft)	179		156
Upstream Blk Time (%)			0
Queuing Penalty (veh)			0
Storage Bay Dist (ft)		100	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 14: Riverton Dr & Site

Movement	WB
Directions Served	LR
Maximum Queue (ft)	56
Average Queue (ft)	20
95th Queue (ft)	47
Link Distance (ft)	98
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 0

6: Riverton Dr & Forest Ave Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	1.7	0.8	6.3	0.4	17.2	0.2	8.8	1.9

12: Site & Forest Ave Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.2	0.0
Total Del/Veh (s)	1.5	0.5	8.6	2.6	16.7	7.4	2.9

14: Riverton Dr & Site Performance by movement

Movement	WBR	NBT	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1
Total Del/Veh (s)	2.3	0.1	0.3	0.8

Total Zone Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	46.1

Intersection: 6: Riverton Dr & Forest Ave

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (ft)	39	73	35
Average Queue (ft)	8	32	12
95th Queue (ft)	30	59	37
Link Distance (ft)		151	151
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	100		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 12: Site & Forest Ave

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	14	61	88
Average Queue (ft)	1	21	39
95th Queue (ft)	8	52	75
Link Distance (ft)	180		156
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		100	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 14: Riverton Dr & Site

Movement	WB
Directions Served	LR
Maximum Queue (ft)	48
Average Queue (ft)	19
95th Queue (ft)	44
Link Distance (ft)	98
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 0

3: Riverside St & Forest Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	2.2	0.4	0.2	0.0	0.0	0.0	15.5	14.2	13.1	620.6	640.3	615.1
Total Del/Veh (s)	93.2	67.5	4.9	100.0	45.0	37.9	62.1	55.4	49.4	184.6	170.2	134.8

3: Riverside St & Forest Ave Performance by movement

Movement	All
Denied Del/Veh (s)	140.0
Total Del/Veh (s)	71.6

3: Riverside St & Forest Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	542.9	535.0	544.7	0.0	0.0	0.0	3.3	0.8	0.8	3.8	0.6	3.6
Total Del/Veh (s)	129.5	124.5	102.6	47.7	21.5	13.3	52.5	36.1	26.8	48.8	43.2	9.8

3: Riverside St & Forest Ave Performance by movement

Movement	All
Denied Del/Veh (s)	312.2
Total Del/Veh (s)	77.1

Intersection: 3: Riverside St & Forest Ave

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	TR	L	TR	L	T	R
Maximum Queue (ft)	237	250	1768	164	252	167	279	333	106	291	100
Average Queue (ft)	196	246	1519	111	75	75	131	159	27	137	45
95th Queue (ft)	290	264	2277	174	177	146	236	274	75	241	124
Link Distance (ft)			1734		380	380		921		701	
Upstream Blk Time (%)			28								
Queuing Penalty (veh)			0								
Storage Bay Dist (ft)	225	225		140			500		200		75
Storage Blk Time (%)	1	27	2	11	0				0	33	0
Queuing Penalty (veh)	9	198	20	14	0				0	38	0

Appendix D
Left Turn Lane Warrant Analaysis

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

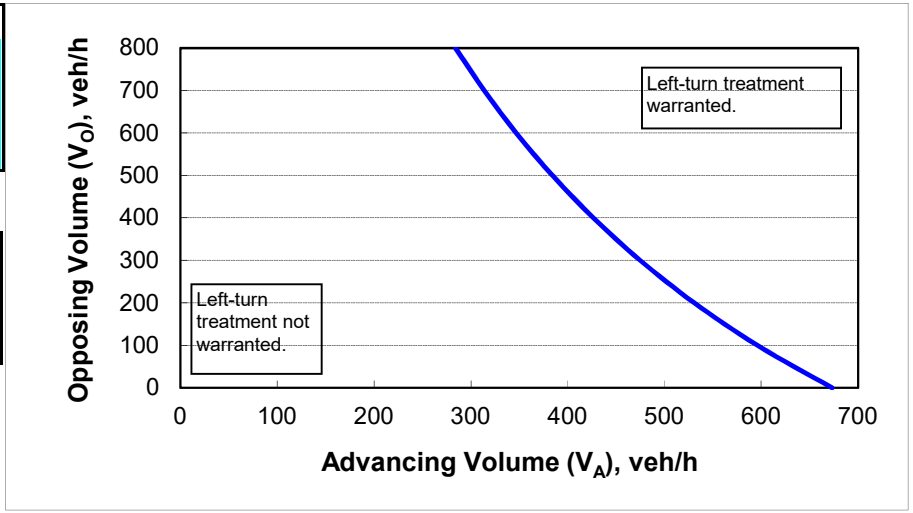
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	8%
Advancing volume (V_A), veh/h:	828
Opposing volume (V_O), veh/h:	702

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	313
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Appendix E
Crash Data

Prepared by Office of Safety

RFK3 2-21-19

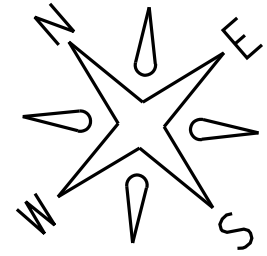
Portland

Link: 16892-18508

Element: 3106439

Study Period 2015-2017

of Crashes: 13 / CRF: 2.21



16892

7 Eleven Store

7 Eleven Store

Tortilla Flats

18508

19039 6-5-16 9:20P W/R Fail to Yield

3212 1-29-15 7:58A W/C Follow too Close

36125 12-10-16 5:55P
D/C Fail to Yield

23534 8-19-16 5:03P
D/C Fail to Yield

16745 5-28-15 5:46P W/CL Inattention

36775 7-29-15 5:01P
D/C Fail to Yield

12416 4-16-15 5:05P
D/C Fail to Yield

33597 11-21-16 5:10P D/C Fail to Yield

36875 12-15-16 8:47A D/C Fail to Yield

143615-10-17 7:31A D/C Follow too close

33002 11-3-17 3:42P D/CL Follow too close

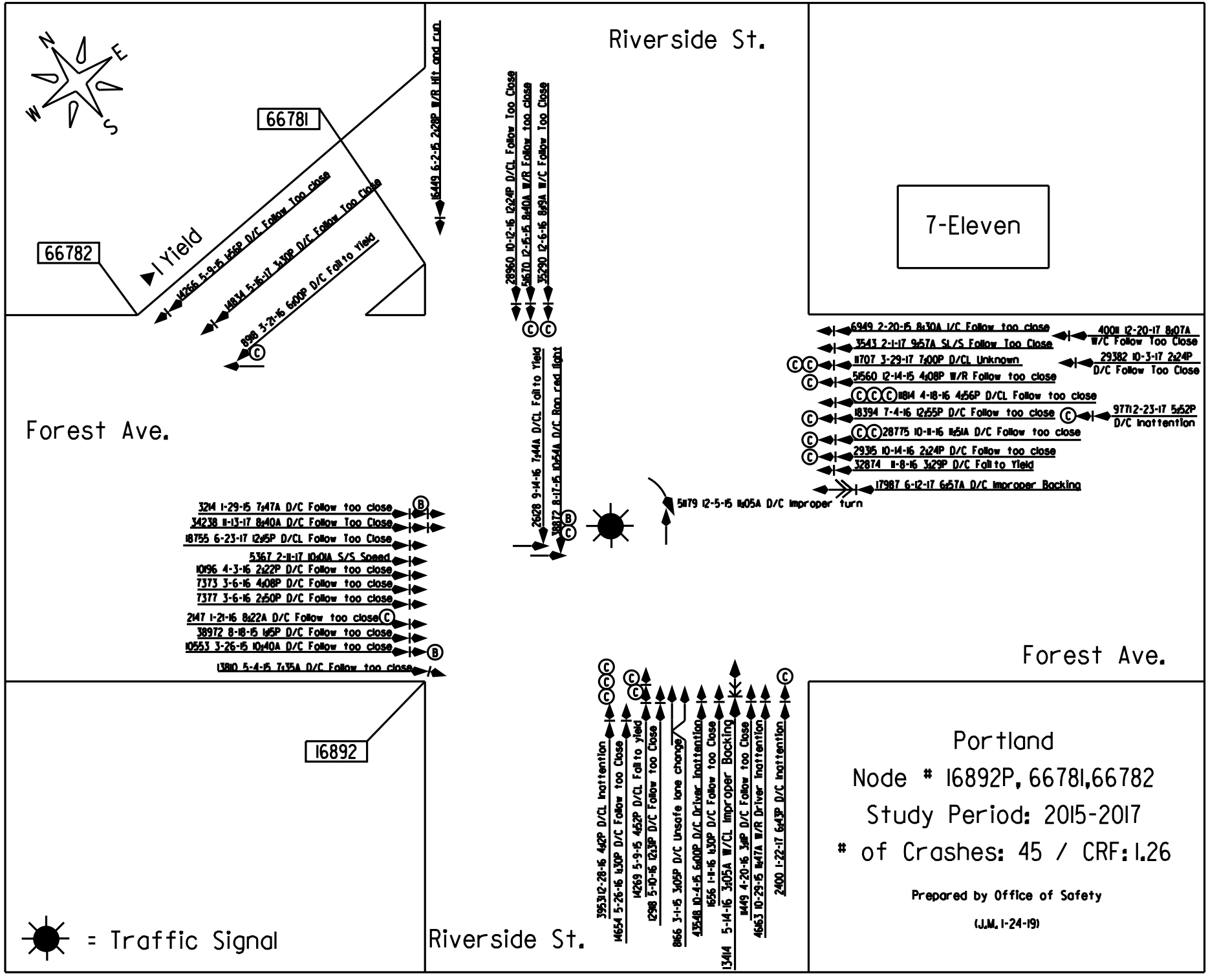
C

46097 10-21-15 5:20P D/C Follow too Close

P

488 1-5-17 11:07A D/C Fail to yield

Rte. 302 / Forest Ave.


Riverside St.
66781
66782
Yield
16449 6-2-15 2:28P W/R Hit and run
14266 5-9-15 1:56P D/C Follow Too close
14834 5-16-17 3:10P D/C Follow Too Close
8198 3-21-16 6:00P D/C Fail to Yield
28960 10-12-16 12:24P D/CL Follow Too Close
36170 12-15-15 8:40A W/R Follow too close
35290 12-6-16 8:19A W/C Follow Too Close
7-Eleven
6949 2-20-15 8:30A I/C Follow too close
3543 2-1-17 9:57A SL/S Follow Too Close
11707 3-29-17 7:00P D/CL Unknown
5560 12-14-15 4:08P W/R Follow too close
11814 4-18-16 4:56P D/CL Follow too close
18394 7-4-16 12:55P D/C Follow too close
28775 10-11-16 11:51A D/C Follow too close
29315 10-14-16 2:24P D/C Follow too close
32874 11-8-16 3:29P D/C Fail to Yield
17987 6-12-17 6:57A D/C Improper Backing
40011 12-20-17 8:07A W/C Follow Too Close
29382 10-3-17 2:24P D/C Follow Too Close
97712-23-17 5:52P D/C Inattention
Forest Ave.
26128 9-14-16 7:44A D/CL Fail to Yield
38872 8-17-15 10:54A D/C Ran red light
5879 12-5-15 11:05A D/C Improper turn
3214 1-29-15 7:47A D/C Follow too close
34238 11-13-17 8:40A D/C Follow Too Close
18755 6-23-17 12:15P D/CL Follow Too Close
5367 2-11-17 10:01A S/S Speed
10196 4-3-16 2:22P D/C Follow too close
7373 3-6-16 4:08P D/C Follow too close
7377 3-6-16 2:50P D/C Follow too close
2147 1-21-16 8:22A D/C Follow too close
38972 8-18-15 1:15P D/C Follow too close
10553 3-26-15 10:40A D/C Follow too close
13810 5-4-15 7:35A D/C Follow too close
Forest Ave.
16892
39531 2-28-16 4:42P D/CL Inattention
14654 5-26-16 1:30P D/C Follow too Close
14269 5-9-15 4:52P D/CL Fail to yield
1298 5-10-16 12:38P D/C Follow too Close
8866 3-1-15 3:05P D/C Unsafe lane change
43548 10-4-15 6:00P D/C Driver Inattention
1656 1-11-16 1:30P D/C Follow too Close
13414 5-14-16 3:05A W/CL Improper Backing
8449 4-20-16 3:4P D/C Follow too Close
46631 10-29-15 11:47A W/R Driver Inattention
2400 1-22-17 6:43P D/C Inattention
= Traffic Signal
Riverside St.
Portland
Node # 16892P, 66781, 66782
Study Period: 2015-2017
# of Crashes: 45 / CRF: 1.26
Prepared by Office of Safety
(J.M. 1-24-19)

Maine Department Of Transportation - Traffic Engineering, Crash Records Section

Crash Summary Report

Report Selections and Input Parameters

REPORT SELECTIONS

☑ **Crash Summary I** ☐ **Section Detail** ☑ **Crash Summary II** ☐ **1320 Public** ☐ **1320 Private** ☐ **1320 Summary**

REPORT DESCRIPTION

Portland - Rte 302 from Riverside St to Riverside Industrial Pkwy

REPORT PARAMETERS

Year 2015, Start Month 1 through Year 2017 End Month: 12

Route: **0302X**	Start Node: **13321**	Start Offset: **0**	☐ **Exclude First Node**
	End Node: **16892**	End Offset: **0**	☐ **Exclude Last Node**
Route: **0561174**	Start Node: **18508**	Start Offset: **0**	☑ **Exclude First Node**
	End Node: **18509**	End Offset: **0**	☑ **Exclude Last Node**

Crash Summary I

Nodes

Node	Route - MP	Node Description	U/R	Total Crashes	Injury Crashes K	A	B	C	PD	Percent Injury	Annual M Ent-Veh	Crash Rate	Critical Rate	CRF
P16892	0302X - 3.97	Int of FOREST AV RIVERSIDE ST	9	45	0	0	3	14	28	37.8	10.662	1.41	1.12	1.26
												Statewide Crash Rate:	0.74	
P13321	0302X - 3.61	Int of FOREST AV RIVERSIDE INDUSTRIAL PKWY	9	8	0	0	1	3	4	50.0	5.770	0.46	1.24	0.00
												Statewide Crash Rate:	0.74	
18508	0302X - 3.89	Int of FOREST AV RIVERTON DR	2	1	0	0	1	0	0	100.0	5.326	0.06	0.35	0.00
												Statewide Crash Rate:	0.14	
Study Years:	3.00	**NODE TOTALS:**		54	0	0	5	17	32	40.7	21.758	0.83	0.83	1.00

Crash Summary I

Sections

Start Node	End Node	Element	Offset Begin - End	Route - MP	Section Length	U/R	Total Crashes	Injury Crashes K	A	B	C	PD	Percent Injury	Annual HMVM	Crash Rate	Critical Rate	CRF
13321	18508	3123934	0 - 0.28	0302X - 3.61	0.28	2	14	0	0	0	6	7	46.2	0.01540	302.96	363.00	0.00
Int of FOREST AV	RIVERSIDE INDUSTRIAL PKWY			US 302											Statewide Crash Rate: 203.06		
16892	18508	3106439	0 - 0.08	0302X - 3.89	0.08	2	13	0	0	0	1	12	7.7	0.00395	1097.32	498.11	2.20
Int of FOREST AV	RIVERSIDE ST			US 302											Statewide Crash Rate: 203.06		
18508	18509	194012	0 - 0.18	0561174 - 0	0.18	2	2	0	0	0	1	0	100.0	0.00039	1731.59	1505.61	1.15
Int of FOREST AV	RIVERTON DR			RD INV 05 61174											Statewide Crash Rate: 407.82		
Study Years:	3.00			**Section Totals:**	0.54		29	0	0	0	8	19	27.6	0.01974	489.76	350.94	1.40
				Grand Totals:	0.54		83	0	0	5	25	51	36.1	0.01974	1401.72	484.07	2.90

Crash Summary

Section Details

Start Node	End Node	Element	Offset Begin - End	Route - MP	Total Crashes	Injury Crashes K	A	B	C	PD	Crash Report	Crash Date	Crash Mile Point	Injury Degree
13321	18508	3123934	0 - 0.28	0302X - 3.61	14	0	0	0	6	7	2016-32605	11/03/2016	3.62	
											2015-41237	09/10/2015	3.63	PD
											2017-31717	10/24/2017	3.71	PD
											2017-20693	07/07/2017	3.72	C
											2017-39138	12/18/2017	3.72	PD
											2017-11584	04/05/2017	3.76	C
											2016-14149	05/23/2016	3.76	PD
											2017-21436	07/20/2017	3.77	C
											2016-25208	09/05/2016	3.77	PD
											2016-26419	09/15/2016	3.78	C
											2016-10202	04/05/2016	3.80	PD
											2017-15063	05/18/2017	3.82	PD
											2015-7408	02/24/2015	3.85	C
											2017-23515	08/08/2017	3.88	C
16892	18508	3106439	0 - 0.08	0302X - 3.89	13	0	0	0	1	12	2015-12416	04/16/2015	3.90	PD
											2015-3212	01/29/2015	3.90	PD
											2015-46097	10/21/2015	3.91	PD
											2016-33597	11/21/2016	3.93	PD
											2017-33002	11/03/2017	3.94	C
											2015-16745	05/28/2015	3.94	PD
											2015-36775	07/29/2015	3.94	PD
											2016-23534	08/19/2016	3.94	PD
											2016-36125	12/10/2016	3.94	PD
											2016-19039	06/05/2016	3.94	PD
											2016-36875	12/15/2016	3.94	PD
											2017-14361	05/10/2017	3.94	PD
											2017-488	01/05/2017	3.95	PD
18508	18509	194012	0 - 0.18	0561174 - 0	2	0	0	0	1	0	2016-31035	10/24/2016	0.03	
											2016-8912	03/15/2016	0.10	C
				Totals:	29	0	0	0	8	19				

Crash Summary II - Characteristics

Crashes by Day and Hour

	AM												PM												
	Hour of Day																								
Day Of Week	**12**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**Un**	**Tot**
SUNDAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	2	0	0	1	0	0	0	7
MONDAY	0	0	0	0	0	0	1	1	2	0	1	0	1	1	0	0	2	2	1	1	1	0	0	0	0	14
TUESDAY	0	0	0	0	0	0	0	1	2	0	0	1	1	2	3	3	1	1	0	0	0	0	0	0	0	15
WEDNESDAY	0	0	0	0	0	0	1	2	2	1	0	0	1	0	1	1	2	2	0	1	0	0	0	0	0	14
THURSDAY	0	0	0	0	0	0	1	3	2	0	1	3	0	1	0	1	1	4	0	0	0	0	0	0	0	17
FRIDAY	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1	1	2	0	0	0	0	0	0	0	8
SATURDAY	0	0	0	1	0	0	0	0	1	0	1	1	0	1	0	1	1	1	0	0	0	0	0	0	0	8
Totals	0	0	0	1	0	0	3	7	10	1	3	5	4	6	7	8	9	12	3	2	1	1	0	0	0	**83**

Vehicle Counts by Type

Unit Type	Total
1-Passenger Car	88
2-(Sport) Utility Vehicle	45
3-Passenger Van	11
4-Cargo Van (10K lbs or Less)	2
5-Pickup	20
6-Motor Home	0
7-School Bus	0
8-Transit Bus	2
9-Motor Coach	0
10-Other Bus	0
11-Motorcycle	1
12-Moped	0
13-Low Speed Vehicle	0
14-Autocycle	0
15-Experimental	0
16-Other Light Trucks (10,000 lbs or Less)	0
17-Medium/Heavy Trucks (More than 10,000 lbs)	3
18-ATV - (4 wheel)	0
20-ATV - (2 wheel)	0
21-Snowmobile	0
22-Pedestrian	1
23-Bicyclist	1
24-Witness	8
25-Other	2
26-Construction	0
27-Farm Vehicle	0
Total	**184**

Crash Summary II - Characteristics

Crashes by Driver Action at Time of Crash

Driver Action at Time of Crash	Dr 1	Dr 2	Dr 3	Dr 4	Dr 5	Other	Total
No Contributing Action	17	59	8	1	1	0	86
Ran Off Roadway	0	0	0	0	0	0	0
Failed to Yield Right-of-Way	12	2	0	0	0	0	14
Ran Red Light	0	1	0	0	0	0	1
Ran Stop Sign	0	0	0	0	0	0	0
Disregarded Other Traffic Sign	0	0	0	0	0	0	0
Disregarded Other Road Markings	0	0	0	0	0	0	0
Exceeded Posted Speed Limit	0	0	0	0	0	0	0
Drove Too Fast For Conditions	1	1	0	0	0	0	2
Improper Turn	2	0	0	0	0	0	2
Improper Backing	3	0	0	0	0	0	3
Improper Passing	1	0	0	0	0	0	1
Wrong Way	0	0	0	0	0	0	0
Followed Too Closely	38	9	2	0	0	0	49
Failed to Keep in Proper Lane	2	3	0	0	0	0	5
Operated Motor Vehicle in Erratic, Reckless, Careless, Negligent or Aggressive Manner	1	0	0	0	0	0	1
Swerved or Avoided Due to Wind, Slippery Surface, Motor Vehicle, Object, Non-Motorist in Roadway	0	0	0	0	0	0	0
Over-Correcting/Over-Steering	0	0	0	0	0	0	0
Other Contributing Action	4	3	0	0	0	0	7
Unknown	0	0	0	0	0	0	0
Total	**81**	**78**	**10**	**1**	**1**	**0**	**171**

Crashes by Apparent Physical Condition And Driver

Apparent Physical Condition	Dr 1	Dr 2	Dr 3	Dr 4	Dr 5	Other	Total
Apparently Normal	77	77	10	1	1	1	167
Physically Impaired or Handicapped	1	0	0	0	0	0	1
Emotional(Depressed, Angry, Disturbed, etc.)	2	0	0	0	0	0	2
Ill (Sick)	1	0	0	0	0	0	1
Asleep or Fatigued	0	1	0	0	0	0	1
Under the Influence of Medications/Drugs/Alcohol	0	0	0	0	0	0	0
Other	0	0	0	0	0	1	1
Total	**81**	**78**	**10**	**1**	**1**	**2**	**173**

Driver Age by Unit Type

Age	Driver	Bicycle	SnowMobile	Pedestrian	ATV	Total
09-Under	0	0	0	0	0	0
10-14	0	0	0	0	0	0
15-19	13	0	0	0	0	13
20-24	21	0	0	0	0	21
25-29	25	0	0	0	0	25
30-39	35	0	0	0	0	35
40-49	29	0	0	0	0	29
50-59	25	0	0	0	0	25
60-69	18	0	0	0	0	18
70-79	4	0	0	0	0	4
80-Over	2	0	0	0	0	2
Unknown	2	1	0	1	0	4
Total	**174**	**1**	**0**	**1**	**0**	**176**

Crash Summary II - Characteristics

Most Harmful Event

Most Harmful Event	Total	Most Harmful Event	Total
1-Overturn / Rollover	0	38-Other Fixed Object (wall, building, tunnel, etc.)	0
2-Fire / Explosion	0	39-Unknown	3
3-Immersion	0	40-Gate or Cable	0
4-Jackknife	0	41-Pressure Ridge	1
5-Cargo / Equipment Loss Or Shift	0	**Total**	**174**
6-Fell / Jumped from Motor Vehicle	0		
7-Thrown or Falling Object	0		
8-Other Non-Collision	0		
9-Pedestrian	0		
10-Pedalcycle	0		
11-Railway Vehicle - Train, Engine	0		
12-Animal	0		
13-Motor Vehicle in Transport	167		
14-Parked Motor Vehicle	2		
15-Struck by Falling, Shifting Cargo or Anything Set in Motion by Motor Vehicle	1		
16-Work Zone / Maintenance Equipment	0		
17-Other Non-Fixed Object	0		
18-Impact Attenuator / Crash Cushion	0		
19-Bridge Overhead Structure	0		
20-Bridge Pier or Support	0		
21-Bridge Rail	0		
22-Cable Barrier	0		
23-Culvert	0		
24-Curb	0		
25-Ditch	0		
26-Embankment	0		
27-Guardrail Face	0		
28-Guardrail End	0		
29-Concrete Traffic Barrier	0		
30-Other Traffic Barrier	0		
31-Tree (Standing)	0		
32-Utility Pole / Light Support	0		
33-Traffic Sign Support	0		
34-Traffic Signal Support	0		
35-Fence	0		
36-Mailbox	0		
37-Other Post Pole or Support	0		

Injury Data

Severity Code	Injury Crashes	Number Of Injuries
K	0	0
A	0	0
B	5	5
C	25	39
PD	51	0
Total	**81**	**44**

Road Character

Road Grade	Total
1-Level	79
2-On Grade	4
3-Top of Hill	0
4-Bottom of Hill	0
5-Other	0
Total	**83**

Traffic Control Devices

Traffic Control Device	Total
1-Traffic Signals (Stop & Go)	57
2-Traffic Signals (Flashing)	0
3-Advisory/Warning Sign	0
4-Stop Signs - All Approaches	0
5-Stop Signs - Other	1
6-Yield Sign	2
7-Curve Warning Sign	0
8-Officer, Flagman, School Patrol	0
9-School Bus Stop Arm	0
10-School Zone Sign	0
11-R.R. Crossing Device	0
12-No Passing Zone	4
13-None	18
14-Other	1
Total	**83**

Light

Light Condition	Total
1-Daylight	67
2-Dawn	1
3-Dusk	5
4-Dark - Lighted	10
5-Dark - Not Lighted	0
6-Dark - Unknown Lighting	0
7-Unknown	0
Total	**83**

Crash Summary II - Characteristics

Crashes by Year and Month

Month	2015	2016	2017	Total
JANUARY	2	4	2	8
FEBRUARY	2	0	3	5
MARCH	2	4	1	7
APRIL	1	4	1	6
MAY	4	4	5	13
JUNE	2	1	2	5
JULY	1	1	2	4
AUGUST	3	1	1	5
SEPTEMBER	1	3	0	4
OCTOBER	3	4	2	9
NOVEMBER	1	3	3	7
DECEMBER	3	4	3	10
Total	**25**	**33**	**25**	**83**

Report is limited to the last 10 years of data.

Crash Summary II - Characteristics

Crashes by Crash Type and Type of Location

Crash Type	Straight Road	Curved Road	Three Leg Intersection	Four Leg Intersection	Five or More Leg Intersection	Driveways	Bridges	Interchanges	Other	Parking Lot	Private Way	Cross Over	Railroad Crossing	Traffic Circle-Roundabout	Total
Object in Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rear End - Sideswipe	13	1	10	39	0	4	0	0	0	0	0	0	0	0	67
Head-on - Sideswipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Intersection Movement	0	0	1	3	0	8	0	0	0	0	0	0	0	0	12
Pedestrians	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Train	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Went Off Road	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2
All Other Animal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycle	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jackknife	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rollover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Submersion	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thrown or Falling Object	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bear	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Moose	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turkey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**15**	**1**	**12**	**42**	**0**	**13**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**83**

Crash Summary II - Characteristics

Crashes by Weather, Light Condition and Road Surface

Weather Light	Dry	Ice/Frost	Mud, Dirt, Gravel	Oil	Other	Sand	Slush	Snow	Unknown	Water (Standing, Moving)	Wet	Total
Blowing Sand, Soil, Dirt												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Blowing Snow												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Clear												
Dark - Lighted	5	0	0	0	0	0	0	0	0	0	0	5
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	39	1	0	0	0	0	0	0	0	0	4	44
Dusk	2	0	0	0	0	0	0	0	0	0	0	2
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Cloudy												
Dark - Lighted	1	0	0	0	0	0	0	0	0	0	1	2
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	1	0	0	0	0	0	0	0	0	0	0	1
Daylight	12	0	0	0	0	0	0	0	0	0	2	14
Dusk	3	0	0	0	0	0	0	0	0	0	0	3
Unknown	0	0	0	0	0	0	0	0	0	0	0	0

Crash Summary II - Characteristics

Crashes by Weather, Light Condition and Road Surface

Weather Light	Dry	Ice/Frost	Mud, Dirt, Gravel	Oil	Other	Sand	Slush	Snow	Unknown	Water (Standing, Moving)	Wet	Total
Fog, Smog, Smoke												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Other												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Rain												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	2	2
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	6	6
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Severe Crosswinds												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0

Crash Summary II - Characteristics

Crashes by Weather, Light Condition and Road Surface

Weather Light	Dry	Ice/Frost	Mud, Dirt, Gravel	Oil	Other	Sand	Slush	Snow	Unknown	Water (Standing, Moving)	Wet	Total
Sleet, Hail (Freezing Rain or Drizzle)												
Dark - Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	0	0	0	0	0	0
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
Snow												
Dark - Lighted	0	0	0	0	0	0	0	1	0	0	0	1
Dark - Not Lighted	0	0	0	0	0	0	0	0	0	0	0	0
Dark - Unknown Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Dawn	0	0	0	0	0	0	0	0	0	0	0	0
Daylight	0	0	0	0	0	0	1	2	0	0	0	3
Dusk	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**63**	**1**	**0**	**0**	**0**	**0**	**1**	**3**	**0**	**0**	**15**	**83**

36: Zone Related Design Standards (14-526(d) 5)

- Address Historic Preservation Design Review, if applicable

  Not applicable

- Address any applicable design review standards by zone

  Per the City of Portland Design Manual(d)(1) a,c-I development in a B-2 Commercial Business the buildings have been placed to create an urban street wall, the dedicated mixed-use retail building includes windows along street frontage that are transparent and installed at a height to provide views by passersby. The façade character is oriented in a manner so that active and public portions of buildings create an active presence along the sidewalk. Building materials are compatible with the surrounding apartment buildings and other nearby commercial uses. See architectural plans included in this site plan submittal package.

  Landscaping will screen views to/from the project site from abutting properties. We understand that a densely planted landscape buffer and/or fencing is required to protect neighboring properties from development impacts such as lighting, parking, traffic, noise, odor, smoke or other incompatible uses.

- Address submission requirements from Design Manual, page 1, addressing neighborhood context

  The enclosed architectural plans and renderings address the proposed development and include building elevations, floor plans, color and proposed finishes. The plans as presented are progress only and are subject to revision. Final plans will be submitted to the City, as required.

- Description of exterior materials, color, finish, and samples

  See Architectural Plans for the proposed colors and finishes table.

11: Access and Circulation (14-526(a)2a)

- Access and internal circulation, addressing ADA access

  (i) The development provides safe and reasonable site access and provisions for internal circulation for all users of the site and complies with the standards set forth in Section 1 of the Technical Manual. Please see the site plans.

- Access and egress impacts on traffic flows

  (ii) The points of access and egress are located to avoid conflicts with the existing turning movements and traffic flows. Please see the site plan.

Att. KK

37: Construction Management Plan

August 28, 2018

City of Portland

1884 Forest Avenue – Pine State Family Mart

Applicant: John Chau

Purpose:

Construction Management Plans shall be depicted on the projects site plan and will include the overall planning, coordination, and control of a construction site, including phases as applicable, from beginning to completion. The City's goal for a construction management plan is to support a safe construction site and protect the public safety, accessibility (including preserving accessible pedestrian, bicycle, and vehicular modes of transport throughout the city), and welfare during construction. In addition, the construction management plan shall minimize construction impacts in their duration and magnitude to the surrounding area and develop an effective communication process for resolving concerns and conflicts.

Project Narrative:

The applicant/developer is proposing a new mixed-use retail building and a convenience store/gas station at 1884 Forest Avenue (Route 302) in the City of Portland. This project will disturb approximately 1.61 acres and the work will include:

1. Install erosion control measures and construction entrance;
2. Strip and stockpile loam for reuse;
3. Excavate and stockpile borrow;
4. Coordination with respective utilities regarding connections and required inspections;
5. Cut Forest Avenue and Riverton Drive, as necessary for utilities service connections;
6. Sanitary sewer connection coordination at existing main;
7. Preparation and utilities and drainage;
8. Installation of subsurface under-drained soil filters;
9. Building pads and parking preparation;
10. Installation of access drive/parking base course;
11. Installation of binder course of asphalt for drives/parking;
12. Building construction;
13. Service connections;
14. Final grading and drive/parking wearing course asphalt installation;
15. Installation landscaping;
16. Dumpster placement;
17. Loam, seed and mulch or sod to disturbed areas;
18. Temporary erosion control measures removed.

Performance Guarantees, Inspection Fees, Preconstruction Meeting, and Permits:
As a Level III Site Plan review, the developer of the project will be required to submit a performance guarantee for the proposed infrastructure work. This performance guarantee and site development inspection fees will be based upon a cost estimate submitted and approved by the City. The guarantee will be a letter of credit from an approved bank or credit union, deposited in a bank-held escrow account or a City- held escrow account. These fees/guarantees will need to be paid and in place prior to scheduling the pre-construction meeting.

As this project involves work within the right-of-way, the contractor will be responsible for obtaining street opening and street occupancy permits form the Department of Public Works. All construction in the right-of-way shall conform to Chapter 25 and all sewer and stormwater construction/connections shall conform to Chapters 24 & 32 of the Land Use Code. These permits will be for the connection to existing utilities and the drive connection at Forest Avenue and Riverton Drive. Work will be performed in conformance with applicable utility company standards. No blasting in anticipated for this project.

Construction Administration and Communication:
This project will be managed by a representation of the developer, Two Eisenhower Drive LLC along with a project manager from the land development construction firm hired by the developer.

1. Contact Person and contact information:
   - Developer : John Chau, (207761-0858
   - Site Contractor: TBD.
   - Engineer (Sebago Technics, Inc.): Jim Seymour, P.E., (207) 200-2083.
2. Signage will be placed at the site that will include the above contact information. This signage will be removed when the infrastructure for the project are complete.
3. The representative for the contractor /developer will reach out to adjacent abutter to notify them of the commencement of constructions and the proposed time frame to complete the infrastructure/roadway improvements for the project.

Construction Schedule*:
- Site Plan Approval: Expected –Autumn 2018.
- Preconstruction Meeting: November 2018
- Site preparation: Approximately 6 weeks.
- Stormwater management features, utilities, building construction: ± 24 weeks
- Expected Completion – Approximately June 2019. Paving – Spring 2019.

* Dates are subject to change at the discretion of the engineer, depending on construction progress.

Estimated construction time: ---------- 32 Weeks (8 Months)
Erosion Control Measures Placed: ---------- Week 1
Site clearing and grubbing ---------- Weeks 2-4
Construction of drive subbase for access ---------- Week 4

Stormwater and Utility Improvements ----------Weeks 4 – 20
Final yard grading and compaction ---------- Week 20-22
Final drive/parking paving ----------Week 22
Landscaping and seeding on prepared areas----------Week 24
Biweekly monitoring of vegetative growth ---------- Week 26-32
Replanting/seeding, if needed ---------- Week 26-32
Removal of erosion control devices ----------Upon Final Project Completion

1. From September 1st to May 31st, no person shall engage in construction activities generating noise exceeding fifty (50) decibels, between the hours of 7:00 p.m. and 7:00 a.m., of the following day within five hundred (500) feet of any buildings. From June 1st to August 31st construction activity may continue until 8:00 p.m.
2. Extended Hours or Night Work: Pursuant to Section 17-18, this section not apply to emergency utility work or "Situations where the public works authority or the office of building inspections determines that the construction activity is of a unique character which cannot reasonably be completed or performed during the permitted hours and which is not of a recurring nature, provided that prior to engaging in such activity the contractor or his representatives gives notice of the time and scope of such proposed activity, the notice to be given in a manner approved by the public works authority."
3. Pursuant to Section 25-129: "Each permittee shall conduct and carry out excavation work in such manner as to avoid unnecessary inconvenience and annoyance to the general public and occupants of neighboring property. To the fullest extent practicable, the permittee shall take appropriate measures to reduce noise, dust and unsightly debris in the performance of the excavation work. Excavation work, including the use of any tool, appliance, or equipment, shall be performed between the hours of 7:00 a.m. and 10:00 p.m. only, exclusive of emergency work. Time waiver requests may be submitted to the public works authority for work outside of this time period and will be subject to neighborhood concerns. Excavation work shall not occur on Sundays, holidays or on major holiday weekends, unless expressly authorized by the public works authority or as a result of emergency need.
4. If allowed, no construction activity shall begin before 8:00 a.m. on a Saturday, Sunday or legal holiday.
5. All deliveries for materials will comply with the noise requirements listed above or be restricted to the hours allowed for construction work.

Security and Public Safety:

1. Prior to commencing construction, site contractor shall install a "Construction Ahead" signs to warn bicyclists and motorists of construction with the area.
2. Contractor shall be responsible for the setup of construction staging area before construction begins. Contractor may provide fencing for staging area at their discretion. Fenced in areas shall be provided with gates passable by emergency vehicles and equipped with a Knox locking device.

3. Contractor shall be responsible for the safe storage of materials or equipment on-site.
4. Contractor shall have weekly tailgate meetings which shall include discussion relative to security and public security.
5. Contractor shall develop a fire safety and emergency protocol and contact the nearest fire station to advise them of the ongoing construction project.
6. All excavations with the right-of-way shall be filled or plated at night. Excavations within the site shall be provided with adequate barricades or warnings (i.e. construction area tape around excavation) at night.

Construction Permitting and Traffic Control Plans:

1. Construction Activity in Public Streets: Construction activity in the public right-of-way is controlled by Chapter 25 Article VII of the City Code of Ordinances. Required licenses and permits, restrictions on activity, and fees & area are outlined in that Chapter. Rules and Regulations for Excavation Activity are available through the Street Opening Clerk at the Department of Public Works. At no time can construction activity including delivery vehicles close or block streets or affect public safety access without prior notice and approval of the Department of Public Works.
2. Sewer and Stormwater: Sewer and stormwater water system connections are controlled by Chapters 24 and 32 of the City Code of Ordinance. Required permits for new connections and/or abandonment of existing connections are available through the Street Opening Clerk at the Department of Public Works. Rules and Regulations for these utility systems are available through the City Engineer's office of the Department of Public Works and in Section II of the Technical Manual.
3. Traffic Control Plans: Construction activity that impacts the existing public street system must be controlled to protect the safety of the construction workers and all modes of the traveling public.
    a. Contractor will be required to submit Maintenance of Traffic Plans for all construction within the right-of-way of Riverside Industrial Parkway.
    b. Flaggers will be required for temporary lane closures for construction.
    c. Traffic Control signs shall not be placed where they are an obstruction to bicycles or pedestrians.

Site Management and Controls:

1. The land development contractor shall be responsible for the site managements during construction of site infrastructure. Building contractors will be responsible for the building site management.
2. Contractor will be responsible for providing and maintaining a dumpster during construction.
3. Contractor will install and maintain the construction entrance as shown on the plans and will maintain Riverton Drive by including sweeping as necessary for removal of tracked materials.
4. Contractor shall be responsible for maintaining construction BMP's and executing good housekeeping measures as depicted on the approved plans and as included in the Inspection, Maintenance and Housekeeping Plan.

5. Dust controls: The construction shall comply with Portland's requirements under Section 25-129 on Noise, dust and debris.
6. Noise: The construction shall comply with Portland's requirements under Section 17-18 of the City Code and Section 25-129 on Noise, dust and debris. The Contractor and City will be responsible for adjusting work should noise become an issue.
7. Rodent Control is not expected for this project. Should it become necessary, it will be provided, if applicable, by a professional exterminator and consistent with Chapter 22 of the City Code or City of Portland Public Works.
8. Snow Removal: Pursuant to Section 25-173 Contractors to ensure a safe means of travel within the work zone.
    1) Snow/ice removal or commence automatically from (1" of snow and up) or Ice
    2) Remove snow as needed within the work zone, including parking spaces & not to block any driveways or site lines with the piles of snow.
    3) Clear all walks & ramps with the work zone
    4) Sand or Salt as needed
    5) Clear all basin basin or drainage structures to help snow melt
    6) This would include Monday-Friday Sat/Sunday/Holidays.
9. Site management and controls shall be discussed at each tailgate meeting including maintenance of BMP's and good housekeeping measures.

Erosion Control and Preservation of Trees:

1. The site contractor shall install all erosion and sedimentation controls as depicted on the approved erosion and sedimentation control plan prior to the pre-construction meeting for inspection by the City. The contractor shall regularly inspect the control measures, no less than weekly and after significant storm events, and maintain any installed temporary or permanent stormwater management systems in working order. The contractor shall document all inspection activities and corrective actions and be prepared to provide these documents for inspection by the City, Maine Department of Environmental Protection upon request.
2. The site contractor shall maintain storage and of materials and equipment away from the tree drip lines in an effort to preserve vegetation on adjacent properties. Due to development constraints, no vegetation will be preserved on the development site.

Construction Staging Area:

1. A Construction Management Plan is described on the site plan and depicts the location of the material (open storage) and equipment storage area. The exact location of these areas shall be up to the contractor but should be sufficiently away from any trees at the designated construction limit line.
2. Delivery Truck Holding Areas On-Site: The delivery holding area shall be adjacent to the site storage area shown on the plan and shall not be blocked during construction. On days when the construction activities require multiple truck deliveries, these deliveries will be carefully scheduled so that there is always adequate on-site area for the holding of the trucks until they can be unloaded. Once at the site all vehicles well be brought within the property and will make every attempt to avoid queueing on public streets.

3. Delivery Truck Holding Areas Off-Site: In the event that adequate on-site area for holding of trucks is not available, the contractor shall provide an area along the adjacent shoulder of Riverton Drive for offloading. This area shall be provided within the buffer area of a maintenance of traffic area with the appropriate cones, advanced warning signs and flaggers as necessary. All off-loading shall occur from the project side of the truck and not within the roadway.

Parking During Construction:

1. Construction Parking: Parking for construction workers shall be on the site as indicted on the Construction Management Plan. No parking shall occur along Forest Avenue. If sufficient space is not available on-site for parking, contractor shall make other parking arrangements and have workers brought or carpooled to the site.
2. Truck Routes and Volumes: All deliveries to and from site shall occur from Route 302 (Forest Avenue) or Riverside Street and proceed along Forest Avenue to the site. Drivers for the contractors shall be advised weekly of the residential nature of portions of the site approach over Riverside Street and Forest Avenue in the weekly tailgate meetings or by some other appropriate communication.

Prepared by:
Sebago Technics, Inc.

NOTE: MAINTENANCE OF TRAFFIC (MOT) SHOWN ONLY FOR CONSTRUCTION OF ENTRANCES. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL MOT FOR WORK WITHIN THE RIGHT-OF-WAY PER MDOT AND MUTCD REQUIREMENTS.

INSTALL ADVANCE WARNING SIGNS, TRAFFIC CONES AND PROVIDE FLAGGERS FOR ANY TEMPORARY LANE CLOSURES (TYPICAL BOTH DIRECTIONS OF TRAFFIC.

GRADING & EROSION NOTES

1. SIDESLOPES SHALL NOT BE STEEPER THAN 3:1 (H:V) EXCEPT AS OTHERWISE IDENTIFIED ON THIS PLAN. ALL SIDESLOPES STEEPER THAN 3:1 (H: V) SHALL BE LINED WITH EROSION CONTROL BLANKET, OR ADDITIONAL MEASURES AS INDICATED.
2. ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH "MAINE EROSION AND SEDIMENT CONTROL BMPS" MANUAL PUBLISHED BY BUREAU OF LAND AND WATER QUALITY MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION, MARCH 2003 OR LATEST EDITION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO POSSESS A COPY OF THE EROSION CONTROL PLAN AT ALL TIMES.
3. ALL AREAS DISTURBED DURING CONSTRUCTION AND NOT RESTORED WITH IMPERVIOUS SURFACES (BUILDINGS, PAVEMENT, WALKS, ETC.) SHALL RECIEVE LOAM AND SEED PER DETAIL.

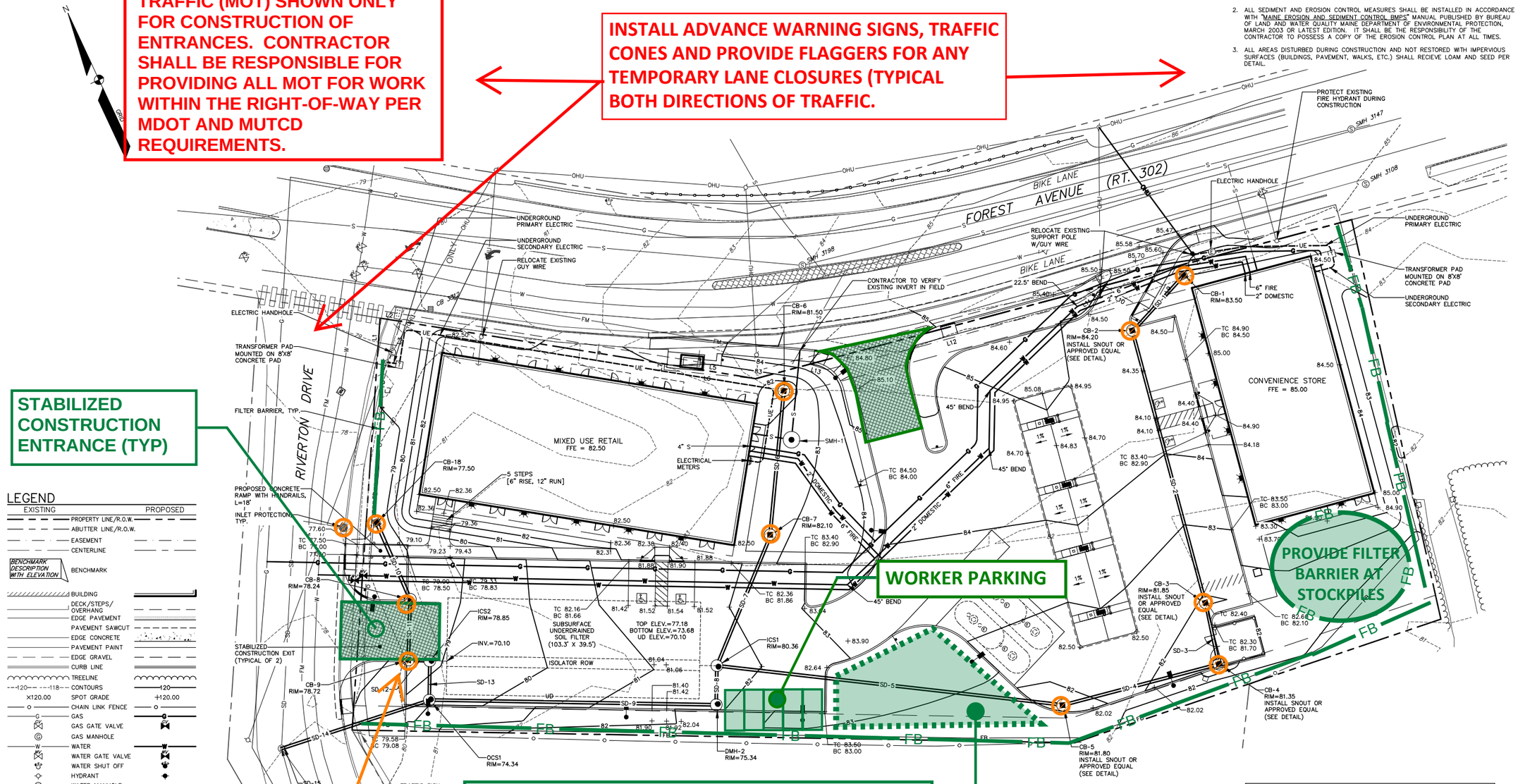
STABILIZED CONSTRUCTION ENTRANCE (TYP)

PROVIDE TEMPORARY INLET PROTECTION DURING CONSTRUCTION (TYPICAL)

WORKER PARKING

STORAGE AREA FOR CONTRACTOR EQUIPMENT AND MATERIALS. IF CONTRACTOR ELECTS TO CONSTRUCT FENCING, GATES SHALL HAVE KNOX LOCKING DEVICE.

PROVIDE FILTER BARRIER AT STOCKPILES



LEGEND

EXISTING	PROPOSED
PROPERTY LINE/R.O.W.	
ABUTTER LINE/R.O.W.	
EASEMENT	
CENTERLINE	
BENCHMARK DESCRIPTION WITH ELEVATION	BENCHMARK
BUILDING	
DECK/STEPS/ OVERHANG	
EDGE PAVEMENT	
PAVEMENT SAWCUT	
EDGE CONCRETE	
PAVEMENT PAINT	
EDGE GRAVEL	
CURB LINE	
TREELINE	
120 118 CONTOURS	120
X120.00 SPOT GRADE	+120.00
CHAIN LINK FENCE	
GAS	G
GAS GATE VALVE	
GAS MANHOLE	
WATER	W
WATER GATE VALVE	
WATER SHUT OFF	
HYDRANT	
WATER MANHOLE	
WELL	
SANITARY SEWER	S
FORCE MAIN	FM
SANITARY MANHOLE	
STORM DRAIN	SD
UNDER DRAIN	UD
DRAINAGE MANHOLE	
CATCH BASIN	
OVERHEAD UTILITY	OHU
UNDERGROUND UTILITY	UGU
TRANSFORMER PAD	
ELECTRICAL MANHOLE	
ELECTRIC METER	
TELEPHONE MANHOLE	
LIGHT POLE	
UTILITY POLE	
GUY WIRE	
EROSION CONTROL BLANKET	
FILTER BARRIER	FB
RIPRAP	
CHECK DAM	
INLET PROTECTION	

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 INCH = 20 FT.

STORM DRAIN PIPE DATA

NAME	SIZE	LENGTH	SLOPE
SD-1	12"	28'	0.53%
SD-2	12"	111'	0.49%
SD-3	12"	22'	0.46%
SD-4	12"	62'	0.57%
SD-5	12"	138'	0.51%
SD-6	12"	55'	0.64%
SD-7	12"	54'	0.82%
SD-8	12"	12'	0.63%
SD-9	12"	113'	0.78%
SD-10	12"	31'	0.61%
SD-11	12"	21'	0.58%
SD-12	12"	5'	0.91%

STORM DRAIN STRUCTURE DATA

STRUCTURE	RIM	INV. IN	INV. OUT:	DIAM.
CB-1	83.50		79.45 (SD-1)	???
CB-2	84.20	79.30 (SD-1)	79.20 (SD-2)	48"
CB-3	81.85	78.65 (SD-2)	78.55 (SD-3)	48"
CB-4	81.35	78.45 (SD-3)	78.35 (SD-4)	48"
CB-5	81.80	78.00 (SD-4)	77.90 (SD-5)	48"
CB-6	81.50		78.10 (SD-6)	48"
CB-7	82.10	77.75 (SD-6)	77.65 (SD-7)	48"
CB-8	78.24	73.34 (SD-10)	73.24 (SD-11)	48"
CB-9	78.72	73.12 (SD-11)	73.02 (SD-12)	48"
CB-18	77.50		73.55 (SD-10)	???
DMH-2	75.34	71.50 (SD-8)	71.40 (SD-9)	48"
ICS1	80.36	77.18 (SD-5) 77.18 (SD-7)	71.60 (SD-8)	48"
ICS2	78.85	72.98 (SD-12)	70.00 (SD-13)	48"

CONSTRUCTION MANAGEMENT PLAN

JAMES R. SEYMOUR, PE 9984
STATE OF MAINE — JAMES R. SEYMOUR — No. 9984 — REGISTERED PROFESSIONAL ENGINEER — 09-10-18

DESIGNED	CHECKED
SAH	RLM

REV.#	BY:	DATE:	STATUS:
A	RLM	9-10-18	SUBMIT TO CITY OF PORTLAND

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM SEBAGO TECHNICS, INC. ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO SEBAGO TECHNICS, INC.

SEBAGO TECHNICS
WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
Tel. 207-200-2100

GRADING & UTILITY PLAN
OF:
PINE STATE FAMILY MART
1884 FOREST AVENUE
PORTLAND, MAINE 04103
FOR:
JOHN CHAU
75 ARCADIA ST.
PORTLAND, MAINE 04103

PROJECT NO.	SCALE
11142	1" = 20'

SHEET 4 OF 9

11142GU.dwg, TAB:GU

12: Loading and Servicing (14-526 (a) 2 b)

Att. L

- Load and servicing needs, route and travel way geometrics for deliveries
- Turning templates for delivery vehicles, if applicable

(i) The site will be serviced occasionally by delivery vehicles. Access to the site includes a clear route that allows safe turning and backing for the anticipated vehicle lengths that will not impede site access, vehicle circulation, pedestrian movement, or affect the designated parking on the site.

Camden
NATIONAL BANK

Att. LL

November 13, 2018

Re: 1884 Forest Avenue, Portland, Maine Development Project ("Project")

To Whom It May Concern:

On behalf of Camden National Bank I am pleased to provide this letter in support of Sinoun Chau and Phuong Neang (collectively the "Developer") for the planned development of a convenience store and gas station at 1884 Forest Avenue in Portland ("Project"). Based on our review of the financial elements of the Project, we believe that the applicant has the ability to get the financing needed to support a budgeted Project cost of $2,120,124.

While this letter of support is not a commitment to lend, the Bank would welcome the opportunity to be a resource to the Developer for financing. This letter shall in no way obligate the bank, or the Developer, beyond the scope and intent of this letter.

Please feel free to contact me with questions.

Sincerely,

Elliott Barry, Senior Vice President
Commercial Banking Officer
207.344.6852
ebarry@camdennational.com

13: Sidewalks (14-526 (a) 2c)

Att. M

- Sidewalks and condition along street frontages and internal walkways

  (i) There is an existing sidewalk along Forest Avenue that will be interrupted for the project entry drives and will be modified to provide internal walkway connections.

  (ii) Continuous internal walkways are proposed between the existing public sidewalks located on Forest Avenue and Riverton Drive. A new transit shelter is proposed on Forest Avenue at the existing Metro bus stop. The transit stop shelter is being coordinated between Gorrill-Palmer Consulting Engineers and Greater Portland Metro.

  (iii) The public will be provided pedestrian connectivity to and through the site and to the retail businesses by a proposed sidewalk tying into the entrance of/and onto Riverton Drive.

- Engineered details for ADA ramps and public sidewalk details meeting sidewalk materials policy and ADA ramp construction details as applicable (Technical Manual, Section 1)

  Public sidewalk connections, building access walks including ADA ramps and details are shown on the enclosed site plans. The walks will be constructed in accordance with the City requirements shown in the Technical Manual, Section 1.

14: Public Transit (14-526(a)3, if applicable

Att. N

- Existing available transit services
  The proposed site is located on the Greater Portland Metro bus line. There is an existing bus stop located along the Forest Avenue street frontage.

- Proposed site plan design details, such as easement, pad base, and shelter

  The project does not include residential development, however, the proposed project includes provision and design that includes the installation of a METRO shelter with connection to the public sidewalk. The proposed shelter site is located in front of the proposed mixed-use retail building as shown on the enclosed site plans. The design is being coordinated between Sebago Technics, Gorrill-Palmer Consulting Engineers and Greater Portland METRO.

Att. O

15: Off-Street Parking: Vehicle & Motorcycle/Scooter) (14-526 (a) 4 a and c)

- Expected parking demand, proposed parking supply, ADA parking, and applicable Zoning Requirements

  a. Location and required number of vehicle spaces
  The proposed parking area is appropriate for the intended use/zone and the spaces/aisles meet the dimensional standard as detailed in Section 1 of the City Technical Standard. Thirty-seven spaces are required and forty-eight are proposed. Please see the site plans.

  b. Location and required number of bicycle parking spaces
  Ten bicycle parking spaces are required based on the proposed vehicle parking spaces (2 bicycle per 10 vehicle spaces). The locations shown conform to the *Bicycle Parking Rack Placement Criteria* as illustrated in Figure I-33 of the City of Portland Technical manual.

  c. Motorcycle/scooter parking
  There is adequate off-street parking to allow motorcycle/scooter parking. Please see site plan.

- Address Technical Manual standards (Section 1) for curb cut separation and parking lot layout and locate on site plan
  The proposed curb cut separation and parking lot layout is designed in accordance with Section 1 of the City Technical Standard as shown on the accompanying plan set.

16: Bicycle Parking (14-526(a)4b)

Att. P

- Address bicycle parking requirements and identify locations on-site

  b. Ten secure bicycle parking spaces are proposed for the project. The bicycle parking location is shown on the site plan and the number of spaces meets the requirements of this section.

- Constuction details for bike racks (Technical Manual, Section 1)

  A bike rack detail is included in the site plans.

17: Snow Storage (14-526(a)d)

Att. Q

- Management plan for snow removal and locate snow storage areas on plan

  (i) The designated snow storage area is shown on the site plan.

  (ii) The snow storage area will not adversely impact stormwater management systems and do not encroach on pedestrian, parking or accessways.

18: Traffic Design Management (TDM) (14-526(a)5)

Att. R

- Develop TDM with Trip Reduction Targets and Strategies

  Not applicable. The project does not meet the types of development required to implement a TMD Plan.

19: Preservation of Significant Natural Features (14-526 (b) 1), if applicable

Att. S

- Trees, plants, habitats listed on State or Federal list of endangered or threatened

  (i) The State of Maine Department of Agriculture, Conservation and Forestry Natural Areas Program (MNAP) did not identify known mapped significant natural features within the project site. Reference is made to the MNAP letter, this section. The Beginning with Habitat (BWH)-Primary Map 2, High Value Plants and Animals – Portland does not identify plant or animal habitats within the project area.

  (ii) Per the U.S. Department of Interior, Fish and Wildlife Service, no critical habitats are identified within the project area. The official species list is limited to the threatened Northern Long-eared bat *Myotis septentionalis*. No know hibernacula occurs on the site and tree removal will not take place during the spring-summer bat pup-rearing season. See attached letter received from the Maine Ecological Field Services Office, this section.

- High and moderate value waterfowl and wading habitat

  (iii) A site review request has been requested of Maine Department of Inland Fisheries and Wildlife. Available online mapping and the BWH map for Portland does not identify high or moderate waterfowl or wading habitat within the site. A copy of the MDIFW response will be forwarded to the City upon receipt.

- Aquifers on Casco Bay Islands

  (iv) Not applicable.

- Waterbodies (including wetlands, watercourses, significant vernal pools and floodplains)

  (v) No waterbodies are located on the proposed project site.

  Per review of the City of Portland GIS Map Viewer-Flood Map (1986 FEMA flood boundaries), the project is not located in a flood plain.

- Proposed preservation areas and protection measures

  No dedicated preservation areas or protection measures are proposed as part of the Pine State Family Mart project.

- Documentation from environmental consultants determinations from applicable state agencies

  Reference is made to the aforementioned correspondence regarding natural features.

STATE OF MAINE
DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY
93 STATE HOUSE STATION
AUGUSTA, MAINE 04333

PAUL R. LEPAGE
GOVERNOR

WALTER E. WHITCOMB
COMMISSIONER

September 4, 2018

Stefanie Nichols
Sebago Technics
75 John Roberts Road, Suite 4A
South Portland, ME 04106

Via email: snichols@sebagotechnics.com

Re: Rare and exemplary botanical features in proximity to: #11142, Chau Property, 1884 Forest Ave, Portland, Maine

Dear Ms. Nichols:

I have searched the Natural Areas Program's Biological and Conservation Data System files in response to your request received August 28, 2018 for information on the presence of rare or unique botanical features documented from the vicinity of the project in Portland, Maine. Rare and unique botanical features include the habitat of rare, threatened, or endangered plant species and unique or exemplary natural communities. Our review involves examining maps, manual and computerized records, other sources of information such as scientific articles or published references, and the personal knowledge of staff or cooperating experts.

Our official response covers only botanical features. For authoritative information and official response for zoological features you must make a similar request to the Maine Department of Inland Fisheries and Wildlife, 284 State Street, Augusta, Maine 04333.

According to the information currently in our Biological and Conservation Data System files, there are no rare botanical features documented specifically within the project area. This lack of data may indicate minimal survey efforts rather than confirm the absence of rare botanical features. You may want to have the site inventoried by a qualified field biologist to ensure that no undocumented rare features are inadvertently harmed.

If a field survey of the project area is conducted, please refer to the enclosed supplemental information regarding rare and exemplary botanical features documented to occur in the vicinity of the project site. The list may include information on features that have been known to occur historically in the area as well as recently field-verified information. While historic records have not been documented in several years, they may persist in the area if suitable habitat exists. The enclosed list identifies features with potential to occur in the area, and it should be considered if you choose to conduct field surveys.

This finding is available and appropriate for preparation and review of environmental assessments, but it is not a substitute for on-site surveys. Comprehensive field surveys do not exist for all natural areas in Maine, and in the absence of a specific field investigation, the Maine Natural Areas Program cannot provide a definitive statement on the presence or absence of unusual natural features at this site.

MOLLY DOCHERTY, DIRECTOR
MAINE NATURAL AREAS PROGRAM

DEPARTMENT OF Agriculture Conservation & Forestry

PHONE: (207) 287-8044
FAX: (207) 287-8040
WWW.MAINE.GOV/DACF/MNAP

The Natural Areas Program is continuously working to achieve a more comprehensive database of exemplary natural features in Maine. We would appreciate the contribution of any information obtained should you decide to do field work. The Natural Areas Program welcomes coordination with individuals or organizations proposing environmental alteration, or conducting environmental assessments. If, however, data provided by the Natural Areas Program are to be published in any form, the Program should be informed at the outset and credited as the source.

The Natural Areas Program has instituted a fee structure of $75.00 an hour to recover the actual cost of processing your request for information. You will receive an invoice for $150.00 for two hours of our services.

Thank you for using the Natural Areas Program in the environmental review process. Please do not hesitate to contact me if you have further questions about the Natural Areas Program or about rare or unique botanical features on this site.

Sincerely,

Kristen Puryear | Ecologist | Maine Natural Areas Program
207-287-8043 | kristen.puryear@maine.gov

Rare and Exemplary Botanical Features within 4 miles of
Project: 11142, Chau Property, 1884 Forest Ave, Portland, Maine

Common Name	State Status	State Rank	Global Rank	Date Last Observed	Occurrence Number	Habitat
Allegheny Vine						
	E	S1	G4	1860-10	9	Rocky summits and outcrops (non-forested, upland),Dry barrens (partly forested, upland)
American Sea-blite						
	T	S2	G5	1932-09-12	5	Tidal wetland (non-forested, wetland)
	T	S2	G5	2011-08-15	17	Tidal wetland (non-forested, wetland)
Bottlebrush Grass						
	SC	S3	G5	1905-09-13	10	Hardwood to mixed forest (forest, upland)
Broad Beech Fern						
	SC	S2	G5	1872-08	15	Hardwood to mixed forest (forest, upland)
Clothed Sedge						
	E	S1	G5	2000-06-06	5	Dry barrens (partly forested, upland)
Ebony Spleenwort						
	SC	S2	G5	1910-06-06	10	Rocky summits and outcrops (non-forested, upland),Hardwood to mixed forest (forest, upland)
Engelmann's Spikerush						
	PE	SH	G4G5	1916-08-31	2	Open wetland, not coastal nor rivershore (non-forested, wetland)
Fern-leaved False Foxglove						
	SC	S3	G5	1902-09-02	13	Dry barrens (partly forested, upland),Hardwood to mixed forest (forest, upland)
Great Blue Lobelia						
	PE	SX	G5	1905-09	3	Forested wetland,Non-tidal rivershore (non-forested, seasonally wet)
Hollow Joe-pye Weed						
	SC	S2	G5?	2014-06-18	24	Open wetland, not coastal nor rivershore (non-forested, wetland),Old field/roadside (non-forested, wetland or upland)
	SC	S2	G5?	2007-10-22	18	Open wetland, not coastal nor rivershore (non-forested, wetland),Old

Rare and Exemplary Botanical Features within 4 miles of
Project: 11142, Chau Property, 1884 Forest Ave, Portland, Maine

Common Name	State Status	State Rank	Global Rank	Date Last Observed	Occurrence Number	Habitat
						field/roadside (non-forested, wetland or upland)
	SC	S2	G5?	2011-08-04	19	Open wetland, not coastal nor rivershore (non-forested, wetland),Old field/roadside (non-forested, wetland or upland)
Horned Pondweed						
	SC	S2	G5	1913-09-13	9	Tidal wetland (non-forested, wetland)
Marsh Milkwort						
	PE	SH	G5T4	1903-08-18	1	Dry barrens (partly forested, upland),Open wetland, not coastal nor rivershore (non-forested, wetland)
Missouri Rockcress						
	T	S1	G5	1905-06-11	5	Rocky summits and outcrops (non-forested, upland),Hardwood to mixed forest (forest, upland)
Mountain Honeysuckle						
	E	S2	G5	2014-08-03	14	Dry barrens (partly forested, upland),Hardwood to mixed forest (forest, upland)
	E	S2	G5	2007-10-05	11	Dry barrens (partly forested, upland),Hardwood to mixed forest (forest, upland)
	E	S2	G5	2015-07-07	17	Dry barrens (partly forested, upland),Hardwood to mixed forest (forest, upland)
Pitch Pine Woodland						
	<null>	S3	G2	2005-12-08	28	Rocky summits and outcrops (non-forested, upland)
Small Reed Grass						
	SC	S3	G5	2011-08-28	18	Old field/roadside (non-forested, wetland or upland)
Spotted Pondweed						
	T	S1	G5	1995-10-01	3	Open water (non-forested, wetland)
Tidal Marsh Estuary Ecosystem						
	<null>	S3	GNR	2011-08-25	8	Tidal wetland (non-forested, wetland)
Upright Bindweed						

Rare and Exemplary Botanical Features within 4 miles of
Project: 11142, Chau Property, 1884 Forest Ave, Portland, Maine

Common Name	State Status	State Rank	Global Rank	Date Last Observed	Occurrence Number	Habitat
	T	S2	G4G5	2007-06-28	5	Dry barrens (partly forested, upland),Old field/roadside (non-forested, wetland or upland)
Variable Sedge						
	E	S1	G3	1911	8	Dry barrens (partly forested, upland),Hardwood to mixed forest (forest, upland)
	E	S1	G3	1911-06-29	9	Dry barrens (partly forested, upland),Hardwood to mixed forest (forest, upland)
Vasey's Pondweed						
	SC	S2	G4	1901-08-04	7	Open water (non-forested, wetland)
Wild Garlic						
	SC	S2	G5	1918-07-16	6	Forested wetland,Hardwood to mixed forest (forest, upland)

STATE RARITY RANKS

S1 Critically imperiled in Maine because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the State of Maine.

S2 Imperiled in Maine because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.

S3 Rare in Maine (20-100 occurrences).

S4 Apparently secure in Maine.

S5 Demonstrably secure in Maine.

SU Under consideration for assigning rarity status; more information needed on threats or distribution.

SNR Not yet ranked.

SNA Rank not applicable.

S#? Current occurrence data suggests assigned rank, but lack of survey effort along with amount of potential habitat create uncertainty (e.g. S3?).

Note: **State Rarity Ranks** are determined by the Maine Natural Areas Program for rare plants and rare and exemplary natural communities and ecosystems. The Maine Department of Inland Fisheries and Wildlife determines State Rarity Ranks for animals.

GLOBAL RARITY RANKS

G1 Critically imperiled globally because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extinction.

G2 Globally imperiled because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.

G3 Globally rare (20-100 occurrences).

G4 Apparently secure globally.

G5 Demonstrably secure globally.

GNR Not yet ranked.

Note: **Global Ranks** are determined by NatureServe.

STATE LEGAL STATUS

Note: State legal status is according to 5 M.R.S.A. § 13076-13079, which mandates the Department of Conservation to produce and biennially update the official list of Maine's **Endangered** and **Threatened** plants. The list is derived by a technical advisory committee of botanists who use data in the Natural Areas Program's database to recommend status changes to the Department of Conservation.

E ENDANGERED; Rare and in danger of being lost from the state in the foreseeable future; or federally listed as Endangered.

T THREATENED; Rare and, with further decline, could become endangered; or federally listed as Threatened.

NON-LEGAL STATUS

SC SPECIAL CONCERN; Rare in Maine, based on available information, but not sufficiently rare to be considered Threatened or Endangered.

PE Potentially Extirpated; Species has not been documented in Maine in past 20 years or loss of last known occurrence has been documented.

ELEMENT OCCURRENCE RANKS - EO RANKS

Element Occurrence ranks are used to describe the quality of a rare plant population or natural community based on three factors:

- **Size**: Size of community or population relative to other known examples in Maine. Community or population's viability, capability to maintain itself.
- **Condition**: For communities, condition includes presence of representative species, maturity of species, and evidence of human-caused disturbance. For plants, factors include species vigor and evidence of human-caused disturbance.
- **Landscape context**: Land uses and/or condition of natural communities surrounding the observed area. Ability of the observed community or population to be protected from effects of adjacent land uses.

These three factors are combined into an overall ranking of the feature of **A**, **B**, **C**, or **D**, where **A** indicates an **excellent** example of the community or population and **D** indicates a **poor** example of the community or population. A rank of **E** indicates that the community or population is **extant** but there is not enough data to assign a quality rank. The Maine Natural Areas Program tracks all occurrences of rare (S1-S3) plants and natural communities as well as A and B ranked common (S4-S5) natural communities.

Note: **Element Occurrence Ranks** are determined by the Maine Natural Areas Program for rare plants and rare and exemplary natural communities and ecosystems. The Maine Department of Inland Fisheries and Wildlife determines Element Occurrence ranks for animals.

Visit our website for more information on rare, threatened, and endangered species!
http://www.maine.gov/dacf/mnap

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Maine Ecological Services Field Office
P. O. Box A
East Orland, ME 04431
Phone: (207) 469-7300 Fax: (207) 902-1588
http://www.fws.gov/mainefieldoffice/index.html

In Reply Refer To:
Consultation Code: 05E1ME00-2018-SLI-1029
Event Code: 05E1ME00-2018-E-02121
Project Name: Pine State Family Mart

August 28, 2018

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies the threatened, endangered, candidate, and proposed species and designated or proposed critical habitat that may occur within the boundary of your proposed project or may be affected by your proposed project. This species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC Web site at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the Endangered Species Consultation Handbook at: http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

This species list also identifies candidate species under review for listing and those species that the Service considers species of concern. Candidate species have no protection under the Act but are included for consideration because they could be listed prior to completion of your project. Species of concern are those taxa whose conservation status is of concern to the Service (i.e., species previously known as Category 2 candidates), but for which further information is needed.

If a proposed project may affect only candidate species or species of concern, you are not required to prepare a Biological Assessment or biological evaluation or to consult with the Service. However, the Service recommends minimizing effects to these species to prevent future conflicts. Therefore, if early evaluation indicates that a project will affect a candidate species or species of concern, you may wish to request technical assistance from this office to identify appropriate minimization measures.

Please be aware that bald and golden eagles are not protected under the Endangered Species Act but are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.). Projects affecting these species may require development of an eagle conservation plan: http://www.fws.gov/windenergy/eagle_guidance.html Information on the location of bald eagle nests in Maine can be found on the Maine Field Office Web site: http://www.fws.gov/mainefieldoffice/Project%20review4.html

Additionally, wind energy projects should follow the wind energy guidelines: http://www.fws.gov/windenergy/ for minimizing impacts to migratory birds and bats. Projects may require development of an avian and bat protection plan.

Migratory birds are also a Service trust resource. Under the Migratory Bird Treaty Act, construction activities in grassland, wetland, stream, woodland, and other habitats that would result in the take of migratory birds, eggs, young, or active nests should be avoided. Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g.,

cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm and at: http://www.towerkill.com; and at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Maine Ecological Services Field Office
P. O. Box A
East Orland, ME 04431
(207) 469-7300

Project Summary

Consultation Code: 05E1ME00-2018-SLI-1029

Event Code: 05E1ME00-2018-E-02121

Project Name: Pine State Family Mart

Project Type: DEVELOPMENT

Project Description: Scope: Development of mixed use retail building and a convenience store/ gas Station

+/- 1.61 Acre lot

Timing: 2018-2019

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/43.69991417790426N70.3196235655184W



Counties: Cumberland, ME

Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

August 28, 2018
11142

Mr. John Perry
Environmental Coordinator
Maine Department of Inland Fisheries
41 State House Station
Augusta, Maine 04333

Maine Department of Inland Fisheries & Wildlife Project Review
Pine State Family Mart - 1884 Forest Avenue, Portland
Record Owner: John Chau, Phuong Neang (JT)

Dear John:

Sebago Technics, Inc. respectfully requests a project review of a 1.61 ± acre wooded property located at 1884 Forest Avenue in the City of Portland. The site is identified by the assessor as 327-B-3 and is currently unimproved. The site design consists of a 7,800 square foot ± mixed-use retail building and a 5,000 square foot convenience store with four fueling islands. Sebago Technics is preparing a City of Portland Planning Board Site Plan Review Application. Review of the *Beginning with Habitat, Map 2 – High Value Plant & Animal Habitats* did not identify habitat area within the project bounds.

The property is surrounded by existing development including three residential apartment complexes (Riverton Park, Wellesley Estates, and Terrace Pond) and it is opposite from Tortilla Flats restaurant. A dance club/event center is located immediately to the east.

For your reference, I have enclosed a USGS Site Location Map and an aerial photograph for your reference and record. If you have any questions about the proposed development, please do not hesitate to contact me at snichols@sebagotechnics.com or on my direct line at (207) 200-2120. I look forward to hearing from you.

Sincerely,
SEBAGO TECHNICS, INC.

Stefanie Nichols
Permitting Specialist/Project Coordinator

enc.

20: Landscaping and Landscape Preservation (14-526 (b) 2a)

Att. T

- Preservation of trees and preservation within required zoning setbacks (Technical Manual, Section 4)

  The design and allowed lot coverage by zone prevents preservation of trees. The proposed landscaping will restablish vegetation on the site in a manner that compliments the development and surrounding area.

- Protection measures of existing vegetation during construction

  All existing vegetation will be removed from the site during construction.

- Protection measures within Shoreland Zone, if applicable

  The proposed project is not located within the Shoreland Zone.

Att. U

21: Site Landscaping (14-526(b)2b)

- Screening and buffering of service areas and between non-residential and residential uses

  The Pine State Family Mart will be buffered from residential uses by the placement of plantings along the south and southeast property lines. Areas that are not screened have been allocated as the snow storage area.

- Planting plans with plant schedule and sizes (Technical Manual, Section 4)

  Please see the Landscape Plan the plant schedule and sizes.

22: Parking Lot Landscaping (14-526(b) 2 b ii), if applicable

Att. V

- Landscaped islands within parking areas (Technical Manual, Section 4)

  Landscaping hs been incorporated into the development, as required. Parking is screened from Forest Avenue by urban wall building placement required by the zoning. Plant materials have been selected for aesthetics and durability and are protected from snow plowing with curbing and boulder placement.

23: Street Trees (14-526(b) 2 B iii)

Att. W

- Existing Heritage or Feature Trees on site and measures to preserve

  No existing Heritage or Feature Trees have been located on the site.

- Identify street trees on the plan meeting the site plan and Technical Manual standards (Section 4) or identify alternative measures, if applicable

  The project site requires a 10' minimum setback and is further constrained by existing overhead electrical lines. No street trees will be placed within the public right-of-way. The applicant proposes to plant five trees where appropriate within the property bounds adjacent to the right-of-way along Forest Avenue and two trees adjacent to the Riverton Drive right-of-way as shown on the enclosed Landscape Plan. Foundation plantings along the face of the retail building have been included in the landscape design where the installation of trees would cause a conflict with existing overhead electrical lines. Please see the Landscape Plan for proposed planting information.

24: Water Quality, Stormwater Management and Erosion Control (14-526(b) 3 a)

Att. X

The proposed site development has been designed in accordance with the City and Maine DEP Chapter 500 Stormwater standards. Please refer to the revised Stormwater Management Plan, this section. See the site plans for erosion control features, details and the written ESC plan.

SEBAGO TECHNICS

CIVIL ENGINEERING ▪ SURVEYING ▪ LANDSCAPE ARCHITECTURE

Pine State Family Mart
1884 Forest Avenue
Portland ME, 04103

Prepared for

John Chau
75 Arcadia Street
Portland, ME 04103

April 2019

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STORMWATER MANAGEMENT PLAN
Pine State Family Mart
Portland, Maine

I. Introduction

This Stormwater Management Plan has been prepared to address the potential impacts associated with this project due to the proposed modification in stormwater runoff characteristics and land cover changes. The stormwater management controls that are outlined in this plan have been designed to suit the proposed development and to comply with applicable regulatory requirements.

Project Scope

The proposed development will consist of an 8-bay gas station and related convenience store with a 5,000 square-foot footprint, and a mixed-use retail building with a total footprint of 7,800 square-feet. Additionally, the site will include 48 parking spaces, 4 of which are handicap accessible. The project will result in the creation of 1.1 acres of impervious area and 1.6 acres of developed area.

Project Watershed

The proposed development is tributary to the Presumpscot River watershed, ultimately draining to the Atlantic Ocean.

Regulatory Requirements

Regulatory requirements for this project consist of the basic, general and flooding standards, each described individually below.

Basic Standard - Chapter 500, Section 4(B)

Since the project will disturb more than one (1) acre of land area, MDEP Basic Standards apply, requiring that grading or other construction activities on the site do not impede or otherwise alter drainage ways to have an unreasonable adverse impact. As such, an Erosion & Sedimentation Control Plan and an Inspection, Maintenance and Housekeeping Plan (Appendix E) will be implemented during construction and post-construction to stabilize the site. These construction requirements have been developed following Best Management Practice guidelines.

General Standard - Chapter 500, Section 4(C)

Since the project will create more than one (1) acre of impervious surface, MDEP General Standards apply, which require a project's stormwater management system to include treatment measures that will mitigate for the increased frequency and duration of channel erosive flows due to runoff from smaller storms, provide for effective treatment of pollutants in stormwater, and mitigate potential temperature impacts. The General Standards require treatment of no less than 95% of the site's created impervious area and no less than 80% of the site's created developed area (landscaped area and impervious area

combined). To mitigate the changes in hydrologic patterns due to the development of this project, a subsurface underdrained soil filter has been implemented into the stormwater management infrastructure.

Flooding Standard - Chapter 500, Section 4(F)

Since the planned project will not create more than three (3) acres of impervious surface, MDEP Flooding Standards are not required to be met. However, through the City of Portland delegated review there are flooding standards that need to be met. The Flooding Standard requires a project's stormwater management system detain, retain, or result in the infiltration of stormwater from 24-hour storms of the 2, 10, and 25-year frequencies such that the peak flows of stormwater from the project site do not exceed the peak flows of stormwater prior to undertaking the project.

Urban Impaired Stream Standard – Chapter 500, Section 4(E)

The proposed development is not tributary to an Urban Impaired Stream as defined by the Maine Department of Environmental Protection in Chapter 502. Therefore, the project will not be required to meet or exceed the requirements of the Urban Impaired Stream Standard as listed in Section 4(E) of Chapter 500.

II. Existing Conditions

The project site is located in the City of Portland's Riverton section and is bounded by Forest Avenue to the north, Riverton Drive to the west and residential developments to the south and east. The project frontage is on Forest Avenue (Route 302) and will be accessed by drives on Forest Avenue and Riverton Drive. The project site is approximately 1.61 acres in size. The site is partially wooded with slopes generally between 0-3%. There are no wetlands or other waterbodies within this property.

Soils

Soil characteristics were obtained from the USDA National Resources Conservation Service - Web Soil Survey. The Hydrologic Groups (HSG) of the soils is classified as follows:

Soil Map Symbol	Soil Name	Slope (%)	HSG
WmB	Windsor Loamy Sand	0-8	A

A copy of the hydrologic soil group designation is included in Appendix B.

Flood Zone

The proposed development area of the site is not located in an identified flood zone per the FEMA Flood Insurance Rate Map for the City of Portland, Community Panel 230051 0006 C. A flood insurance rate map is included in Appendix B.

III. Proposed Conditions

Project Scope

The proposed development will consist of an 8-bay gas station and related convenience store with a 5,000 square-foot footprint, and a mixed used retail building with a total footprint of 7,800 square-feet. Additionally, the site will include 48 parking spaces, 4 of which are handicap accessible. The project will result in the creation of 1.1 acres of impervious area and 1.6 acres of developed area.

Surface Cover

The project development will require removal of most of the vegetation on the site. The site will be revegetated in accordance with the City regulations. Neighboring residential uses are buffered and all landscaping plant locations, types and sizes are shown on the enclosed Landscape Plan.

Best Management Practices

The project will utilize a Subsurface Underdrained Soil Filter for stormwater treatment and detention.

IV. Methodology

In order to evaluate drainage characteristics as a result of the proposed development, a quantitative analysis was performed to determine peak runoff rates in the pre-development and post-development conditions. The evaluation was performed using the methodology outlined in the USDA Soil Conservation Service's "Urban Hydrology for Small Watersheds - Technical Release #55 (TR-55)". HydroCAD computer software was utilized to perform the calculations.

The peak runoff rates were calculated using a 24-hour duration storm event with a Type-III rainfall distribution. The rainfall amounts for Cumberland County (SE) were obtained from Appendix H of MDEP's Chapter 500: Stormwater Management (effective date August 2015). Rainfall values for Cumberland County SE are listed in the table below.

Storm Frequency Precipitation (in./24 hr) Cumberland County SE	
2-year	3.1
10-year	4.6
25-year	5.8

Runoff curve numbers were determined for each of the watersheds by measuring the area of each hydrologic soil group within each type of land cover. The type of land cover was determined based on survey data, field reconnaissance and aerial photography. Times of concentration were determined from site topographic maps in accordance with SCS procedures.

The hydrologic model incorporates the following design assumptions:

- The minimum time of concentration (Tc) is six minutes, based upon limitations of the TR-55 model.

V. Pre-Development Watershed Model

The pre-development watershed plan consists of two subcatchments labeled 1S and 2S in the HydroCAD model. Two locations were identified as Study Points (SP's) for comparing peak runoff rates, and are described below:

SP-1 is located in the south-westerly corner of the lot where runoff leaves the site via closed drainage system located in Riverton Drive. Watershed 1S contributes runoff to this study point with an overall runoff area of approximately 0.93 acres. SP-1 and the associated drainage area are tributary to the Presumpscot River Watershed.

SP-2 is located in the south-easterly corner of the lot where runoff leaves the site via overland flow to the adjacent residential property complex. Watershed 2S contributes runoff to this study point with an overall runoff area of approximately 0.07 acres. SP-2 and the associated drainage area are also tributary to Presumpscot River Watershed.

VI. Post-Development Watershed Model

The post-development watershed area consists of the same overall area as the pre-development plan.

Post-development subcatchments 10S and 11S represent the area tributary to SP-1. Subcatchment 20S represents the area tributary to SP-2. The majority of the proposed development area is included within 10S and 11s. Watersheds 10S and 11S include the buildings, access drives, parking areas, landscaped areas, and the subsurface underdrained soil filter (10P). The overall tributary area associated with SP-1 is 1.5 acres. Watershed 20S includes a small portion of proposed sidewalk, and landscaped areas. The overall tributary area associated with SP-2 is 0.14 acres.

The Best Management Practices have been designed and sized in accordance with DEP BMP standards contained within Chapter 500 and the BMP Manual. Sizing calculations can be found in Appendix A.

VII. Water Quality

A subsurface geotechnical investigation to determine the seasonal high-water table will be performed and test pits will be done in the proposed building areas and stormwater treatment filtration area. Upon completion, the geotechnical investigation report can be provided upon request.

The General Standards are met by routing stormwater runoff to a subsurface underdrained soil filter. BMP sizing and treatment calculations of this system are provided in Appendix A.

Through the use of the aforementioned BMP 99.69% of new impervious area and 95.70% of new developed area will be receiving treatment. This meets the requirements for the Maine DEP General Standards.

VIII. Water Quantity

The subcatchment areas and times of concentration of the post-development conditions vary from the pre-development conditions based on the proposed site development and grading. The following table summarizes the results of the hydrological analysis of the project during pre-development and post development conditions:

Stormwater Peak Runoff Summary Table			
Study Point	**Storm Event**	**Pre-Development (cfs)**	**Post-Development (cfs)**
SP-1	2-year	0.00	0.00
	10-year	0.00	0.01
	25-year	0.02	0.03
SP-2	2-year	0.00	0.00
	10-year	0.00	0.00
	25-year	0.01	0.00

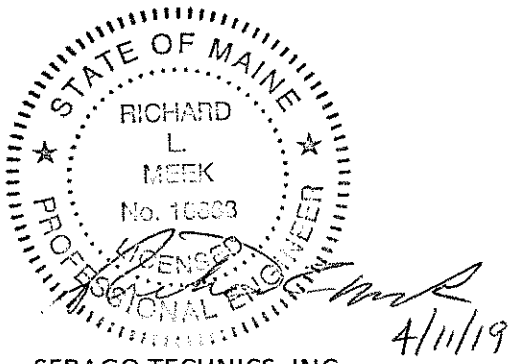
Although a concerted effort has been made to maintain post-development peak rates at pre-development levels, the model indicates an insignificant increase (0.01 cfs) at SP-1 during the 10-year and 25-year storm events. As such, a waiver of the flooding standard is requested in accordance with Chapter 500, 4.F.3.a. The requested waiver applies to projects located in the watershed of a major river segment in which stormwater is conveyed to this resource via a piped system.

IX. Conclusion

Erosion and sedimentation controls, inspection and maintenance procedures and general housekeeping requirements have been outlined to prevent unreasonable impacts on the site and to the surrounding environment. By utilizing Best Management Practices (subsurface

underdrained soil filter), stormwater quality treatment has been provided for at least 95% of the total site impervious area and at least 80% of the total site developed area. Based on modeling data, an insignificant increase (0.01 cfs) at SP-1 during the 10-year and 25-year storm events. As such, a waiver of the flooding standard is requested in accordance with Chapter 500, 4.F.3.a. The requested waiver applies to projects located in the watershed of a major river segment in which stormwater is conveyed to this resource via a piped system. It is anticipated that stormwater runoff from the proposed site development will not cause a significant adverse effect to off-site receiving channels or downstream properties.

Prepared by:



SEBAGO TECHNICS, INC.

Richard L. Meek, P.E

Senior Project Engineer

SAH

Appendix A

Regulatory Standards Calculations

Table 1: MDEP GENERAL STANDARD CALCULATIONS

Job # 11142 Pine State Family Mart

AREA ID	WATERSHED SIZE (S.F.)	EXISTING ONSITE IMPERVIOUS AREA TO REMAIN (S.F.)	NEW ONSITE IMPERVIOUS AREA (S.F.)	EXISTING ONSITE LANDSCAPED AREA TO REMAIN (S.F.)	NEW ONSITE LANDSCAPED AREA (S.F.)	NET NEW DEVELOPED AREA (S.F.)	NET EXISTING DEVELOPED AREAS (S.F.)	TREATMENT PROVIDED?	IMPERVIOUS AREA TREATED (S.F.)	LANDSCAPED AREA TREATED* (S.F.)	DEVELOPED AREA TREATED (S.F.)	TREATMENT BMP
10 &11	66,349	147	48,403	2,101	15,698	64,101		YES	48,550	17,799	66,349	SSSF1
20	7,500	296	300	475	4,930	5,230		NO	0	0	0	
TOTAL (S.F.)	**73,849**	**443**	**48,703**	**2,576**	**20,628**	**69,331**	**0**		**48,550**	**17,799**	**66,349**	

TOTAL NEW IMPERVIOUS AREA (S.F.)	**48,703**	**TOTAL DEVELOPED AREA (S.F.)**	**69,331**
TOTAL IMPERVIOUS AREA RECEIVING TREATMENT (S.F.)	**48,550**	**TOTAL DEV. AREA RECEIVING TREATMENT (S.F.)**	**66,349**
% OF IMPERVIOUS AREA RECEIVING TREATMENT	**99.69%**	**% OF DEV. AREA RECEIVING TREATMENT**	**95.70%**

SEBAGO TECHNICS, INC.
75 John Roberts Road Suite 4A
South Portland, Maine 04106
Tel. (207) 200-2100

JOB	11142				
SHEET NO.	1	OF	1		
CALCULATED BY	SAH	DATE	9/4/2018		
FILE NAME	11142WQC.xls	PRNT DATE	4/8/2019		

UNDERDRAINED SUBSURFACE SAND FILTER

Task: Calculate water quality volume per MDEP chapter 500 regulations

References
1. Maine DEP Chapter 500, Section 4.C.(3)(b)
"must detain a runoff volume equal to 1.0 inch times the subcatchment's impervious area plus 0.4 inch times the subcatchment's landscaped area"

2. Maine DEP Best Management Practices Stormwater Manual, Section 7.3.2
a. "detain runoff volume equal to 1.0 inch times the subcatchment's impervious area plus 0.4 inch times the subcatchment's landscaped area"
b. "surface area of the sand filter bed and chamber system must be at least equal to 5% of the impervious area draining to it and 2% of the landscaped area."
c. "treatment flow rate for the Stormtech Isolator Row is the projected one year peak flow rate for the drainage area feeding the Isolator Row"

Flow rates:

SC-310	0.10	cfs/chamber
SC-740	0.20	cfs/chamber
DC-780	0.20	cfs/chamber
MC-3500	0.30	cfs/chamber

Tributary to Subsurface Sand Filter: SSSF1

Landscaped Area	17,799.00	SF
Impervious Area	48,550.00	SF

Minimum Surface Area for sand filter and chamber system

Required (2% X Landscaped + 5%" X Impervious)

Total Landscaped Area	17,799.00	SF	Area	356	SF
Total Impervious Area	48,550.00	SF	Area	2428	SF
Required Minimum Surface Area				2783	SF
Provided Surface Area				5768	SF

Treatment Volume

Required (0.4" X Landscaped + 1.0" X Impervious)

Landscaped Area	17,799.00	SF	Volume	593	
Impervious Area	48,550.00	SF	Volume	4046	
Treatment Volume Required				4639	CF 0.106 AF
Provided Treatment Volume				6605	CF At Elev = 75.12

Sediment Pre-Treatment

Per Reference 2.c above

One year flow rate out put from Hydrocad:		1.60	cfs
ISO Row sizing for:	**DC-780**	**0.2**	cfs
Total number of Isolator Row Chambers required:		8	Provided one row of 20

Appendix B

Subsurface Investigations



Map Scale: 1:1,170 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 15 30 60 90

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Soil Rating Lines

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Soil Rating Points

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Water Features

Streams and Canals

Transportation

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cumberland County and Part of Oxford County, Maine
Survey Area Data: Version 13, Sep 11, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Data not available.

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
WmB	Windsor loamy sand, 0 to 8 percent slopes	A	4.0	100.0%
Totals for Area of Interest			**4.0**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

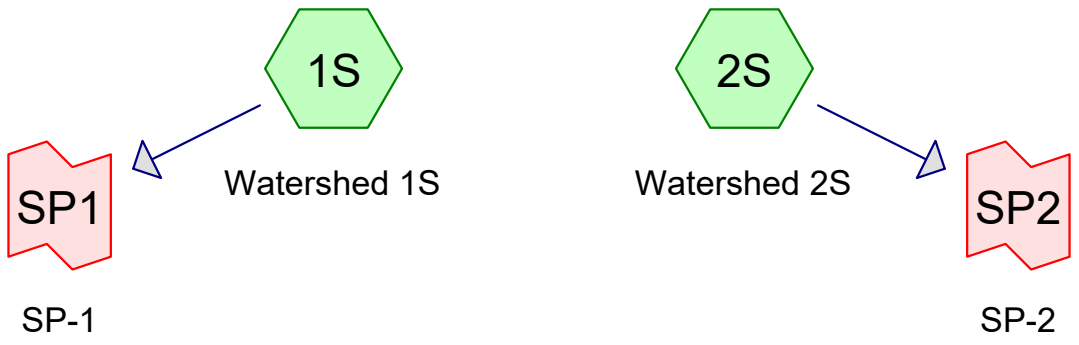
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix C

Pre-Development Calculations



Subcat Reach Pond Link

Routing Diagram for Pre-Development
Prepared by Sebago Technics, Inc, Printed 4/8/2019
HydroCAD® 10.00-24 s/n 01856 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
20,032	39	>75% Grass cover, Good, HSG A (1S, 2S)
443	98	Impervious (1S, 2S)
49,918	30	Woods, Good, HSG A (1S, 2S)

Summary for Subcatchment 1S: Watershed 1S

Runoff = 0.02 cfs @ 15.04 hrs, Volume= 462 cf, Depth= 0.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
	29,205	30	Woods, Good, HSG A
	11,058	39	>75% Grass cover, Good, HSG A
*	147	98	Impervious
	40,410	33	Weighted Average
	40,263		99.64% Pervious Area
	147		0.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.4	75	0.0230	0.08		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.10"
7.4	222	0.0100	0.50		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
0.5	37	0.0540	1.16		**Shallow Concentrated Flow, C to D** Woodland Kv= 5.0 fps
24.3	334	Total			

Summary for Subcatchment 2S: Watershed 2S

Runoff = 0.01 cfs @ 15.15 hrs, Volume= 343 cf, Depth= 0.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
	20,713	30	Woods, Good, HSG A
	8,974	39	>75% Grass cover, Good, HSG A
*	296	98	Impervious
	29,983	33	Weighted Average
	29,687		99.01% Pervious Area
	296		0.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	75	0.0270	0.08		**Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.10"
18.6	394	0.0050	0.35		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
34.0	469	Total			

Summary for Link SP1: SP-1

Inflow Area = 40,410 sf, 0.36% Impervious, Inflow Depth = 0.14" for 25-year event
Inflow = 0.02 cfs @ 15.04 hrs, Volume= 462 cf
Primary = 0.02 cfs @ 15.04 hrs, Volume= 462 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Link SP2: SP-2

Inflow Area = 29,983 sf, 0.99% Impervious, Inflow Depth = 0.14" for 25-year event
Inflow = 0.01 cfs @ 15.15 hrs, Volume= 343 cf
Primary = 0.01 cfs @ 15.15 hrs, Volume= 343 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Watershed 1S Runoff Area=40,410 sf 0.36% Impervious Runoff Depth=0.00"
Flow Length=334' Tc=24.3 min CN=33 Runoff=0.00 cfs 0 cf

Subcatchment2S: Watershed 2S Runoff Area=29,983 sf 0.99% Impervious Runoff Depth=0.00"
Flow Length=469' Tc=34.0 min CN=33 Runoff=0.00 cfs 0 cf

Link SP1: SP-1 Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Link SP2: SP-2 Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 70,393 sf Runoff Volume = 0 cf Average Runoff Depth = 0.00"
99.37% Pervious = 69,950 sf 0.63% Impervious = 443 sf

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Watershed 1S Runoff Area=40,410 sf 0.36% Impervious Runoff Depth=0.01"
Flow Length=334' Tc=24.3 min CN=33 Runoff=0.00 cfs 47 cf

Subcatchment2S: Watershed 2S Runoff Area=29,983 sf 0.99% Impervious Runoff Depth=0.01"
Flow Length=469' Tc=34.0 min CN=33 Runoff=0.00 cfs 35 cf

Link SP1: SP-1 Inflow=0.00 cfs 47 cf
Primary=0.00 cfs 47 cf

Link SP2: SP-2 Inflow=0.00 cfs 35 cf
Primary=0.00 cfs 35 cf

Total Runoff Area = 70,393 sf Runoff Volume = 82 cf Average Runoff Depth = 0.01"
99.37% Pervious = 69,950 sf 0.63% Impervious = 443 sf

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Watershed 1S Runoff Area=40,410 sf 0.36% Impervious Runoff Depth=0.14"
Flow Length=334' Tc=24.3 min CN=33 Runoff=0.02 cfs 462 cf

Subcatchment2S: Watershed 2S Runoff Area=29,983 sf 0.99% Impervious Runoff Depth=0.14"
Flow Length=469' Tc=34.0 min CN=33 Runoff=0.01 cfs 343 cf

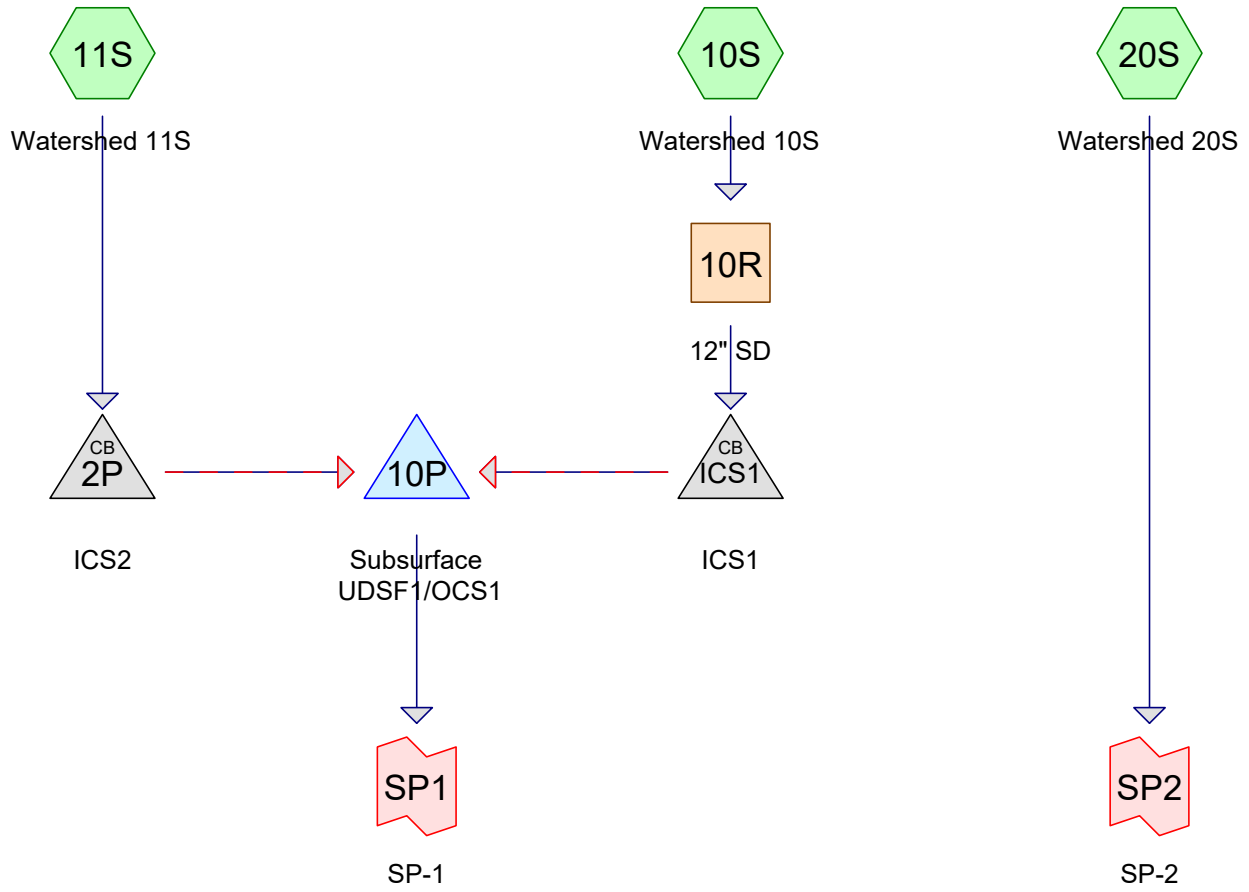
Link SP1: SP-1 Inflow=0.02 cfs 462 cf
Primary=0.02 cfs 462 cf

Link SP2: SP-2 Inflow=0.01 cfs 343 cf
Primary=0.01 cfs 343 cf

Total Runoff Area = 70,393 sf Runoff Volume = 805 cf Average Runoff Depth = 0.14"
99.37% Pervious = 69,950 sf 0.63% Impervious = 443 sf

Appendix D

Post-Development Calculations



Subcat Reach Pond Link

Routing Diagram for Post-Development
Prepared by Sebago Technics, Inc, Printed 4/8/2019
HydroCAD® 10.00-24 s/n 01856 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
20,628	39	>75% Grass cover, Good, HSG A (10S, 11S, 20S)
49,146	98	Impervious (10S, 11S, 20S)
2,576	30	Woods, Good, HSG A (10S, 11S, 20S)

Summary for Subcatchment 10S: Watershed 10S

Runoff = 3.3 cfs @ 12.15 hrs, Volume= 12,251 cf, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
	708	30	Woods, Good, HSG A
	8,667	39	>75% Grass cover, Good, HSG A
*	28,262	98	Impervious
	37,637	83	Weighted Average
	9,375		24.91% Pervious Area
	28,262		75.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	55	0.0180	0.10		**Sheet Flow, A to B** Grass: Dense n= 0.240 P2= 3.10"
1.5	296	0.0050	3.21	2.52	**Pipe Channel, B to C** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
10.9	351	Total			

Summary for Subcatchment 11S: Watershed 11S

Runoff = 2.8 cfs @ 12.09 hrs, Volume= 8,617 cf, Depth= 3.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
	1,393	30	Woods, Good, HSG A
	7,031	39	>75% Grass cover, Good, HSG A
*	20,288	98	Impervious
	28,712	80	Weighted Average
	8,424		29.34% Pervious Area
	20,288		70.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	125	0.0136	1.21		**Sheet Flow, A to B** Smooth surfaces n= 0.011 P2= 3.10"
1.1	200	0.0240	3.14		**Shallow Concentrated Flow, B to C** Paved Kv= 20.3 fps
3.2					**Direct Entry, Min Tc=6.0 mins**
6.0	325	Total			

Summary for Subcatchment 20S: Watershed 20S

Runoff = 0.0 cfs @ 12.27 hrs, Volume= 331 cf, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.80"

	Area (sf)	CN	Description
	475	30	Woods, Good, HSG A
	4,930	39	>75% Grass cover, Good, HSG A
*	596	98	Impervious
	6,001	44	Weighted Average
	5,405		90.07% Pervious Area
	596		9.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	75	0.0220	0.11		**Sheet Flow, A to B** Grass: Dense n= 0.240 P2= 3.10"

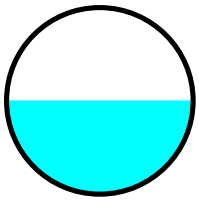
Summary for Reach 10R: 12" SD

Inflow Area = 37,637 sf, 75.09% Impervious, Inflow Depth = 3.91" for 25-year event
Inflow = 3.3 cfs @ 12.15 hrs, Volume= 12,251 cf
Outflow = 3.3 cfs @ 12.15 hrs, Volume= 12,251 cf, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 4
Max. Velocity= 8.41 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.03 fps, Avg. Travel Time= 0.5 min

Peak Storage= 38 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.50'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 6.6 cfs

12.0" Round Pipe
n= 0.005
Length= 95.0' Slope= 0.0051 '/'
Inlet Invert= 76.66', Outlet Invert= 76.18'



Summary for Pond 2P: ICS2

Inflow Area = 28,712 sf, 70.66% Impervious, Inflow Depth = 3.60" for 25-year event
Inflow = 2.8 cfs @ 12.09 hrs, Volume= 8,617 cf
Outflow = 2.8 cfs @ 12.09 hrs, Volume= 8,617 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.7 cfs @ 12.08 hrs, Volume= 6,192 cf
Secondary = 0.3 cfs @ 12.42 hrs, Volume= 2,425 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 4
Peak Elev= 77.07' @ 15.42 hrs
Flood Elev= 83.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.68'	**12.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 73.68' / 73.68' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	75.12'	**12.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 75.12' / 74.82' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.7 cfs @ 12.08 hrs HW=75.26' TW=74.46' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 2.7 cfs @ 3.39 fps)

Secondary OutFlow Max=0.3 cfs @ 12.42 hrs HW=75.70' TW=75.67' (Dynamic Tailwater)
↑—**2=Culvert** (Outlet Controls 0.3 cfs @ 0.99 fps)

Summary for Pond 10P: Subsurface UDSF1/OCS1

Inflow Area = 66,349 sf, 73.17% Impervious, Inflow Depth = 3.77" for 25-year event
Inflow = 5.8 cfs @ 12.12 hrs, Volume= 20,868 cf
Outflow = 0.3 cfs @ 15.42 hrs, Volume= 13,176 cf, Atten= 95%, Lag= 198.2 min
Primary = 0.3 cfs @ 15.42 hrs, Volume= 13,176 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 4
Peak Elev= 77.07' @ 15.42 hrs Surf.Area= 5,768 sf Storage= 14,001 cf
Flood Elev= 78.24' Surf.Area= 5,768 sf Storage= 14,244 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 561.8 min (1,375.6 - 813.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	72.93'	6,846 cf	**39.50'W x 146.02'L x 4.25'H Field A** 24,513 cf Overall - 7,398 cf Embedded = 17,114 cf x 40.0% Voids
#2A	73.68'	7,398 cf	**ADS_StormTech DC-780 +Cap** x 160 Inside #1 Effective Size= 45.4"W x 30.0"H => 6.49 sf x 7.12'L = 46.2 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 160 Chambers in 8 Rows
		14,244 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	70.00'	**12.0" Round Culvert** L= 61.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 70.00' / 69.20' S= 0.0131 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	70.10'	**6.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 70.10' / 70.10' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	70.10'	**0.8" Vert. Orifice 1** C= 0.600
#4	Device 1	75.12'	**1.0" Vert. Orifice 2** C= 0.600
#5	Device 1	76.16'	**2.0" Vert. Orifice 3 X 2.00** C= 0.600
#6	Device 1	77.18'	**6.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Primary OutFlow Max=0.3 cfs @ 15.42 hrs HW=77.07' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.3 cfs of 8.9 cfs potential flow)
  - **2=Culvert** (Passes 0.0 cfs of 2.4 cfs potential flow)
    - **3=Orifice 1** (Orifice Controls 0.0 cfs @ 12.69 fps)
  - **4=Orifice 2** (Orifice Controls 0.0 cfs @ 6.66 fps)
  - **5=Orifice 3** (Orifice Controls 0.2 cfs @ 4.39 fps)
  - **6=Sharp-Crested Vee/Trap Weir** (Controls 0.0 cfs)

Summary for Pond ICS1: ICS1

Inflow Area =	37,637 sf,	75.09% Impervious,	Inflow Depth =	3.91" for 25-year event
Inflow =	3.3 cfs @	12.15 hrs, Volume=	12,251 cf	
Outflow =	3.3 cfs @	12.15 hrs, Volume=	12,251 cf,	Atten= 0%, Lag= 0.0 min
Primary =	2.7 cfs @	12.11 hrs, Volume=	8,257 cf	
Secondary =	0.8 cfs @	12.18 hrs, Volume=	3,995 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 4
Peak Elev= 77.08' @ 15.42 hrs
Flood Elev= 83.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.68'	**12.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 73.68' / 73.68' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	75.12'	**12.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 75.12' / 74.82' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.7 cfs @ 12.11 hrs HW=75.44' TW=74.62' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 2.7 cfs @ 3.44 fps)

Secondary OutFlow Max=0.8 cfs @ 12.18 hrs HW=75.58' TW=74.94' (Dynamic Tailwater)
└**2=Culvert** (Inlet Controls 0.8 cfs @ 2.30 fps)

Summary for Link SP1: SP-1

Inflow Area = 66,349 sf, 73.17% Impervious, Inflow Depth > 2.38" for 25-year event
Inflow = 0.3 cfs @ 15.42 hrs, Volume= 13,176 cf
Primary = 0.3 cfs @ 15.42 hrs, Volume= 13,176 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Link SP2: SP-2

Inflow Area = 6,001 sf, 9.93% Impervious, Inflow Depth = 0.66" for 25-year event
Inflow = 0.0 cfs @ 12.27 hrs, Volume= 331 cf
Primary = 0.0 cfs @ 12.27 hrs, Volume= 331 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 4
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 10S: Watershed 10S Runoff Area=37,637 sf 75.09% Impervious Runoff Depth=1.53"
Flow Length=351' Tc=10.9 min CN=83 Runoff=1.3 cfs 4,791 cf

Subcatchment 11S: Watershed 11S Runoff Area=28,712 sf 70.66% Impervious Runoff Depth=1.33"
Flow Length=325' Tc=6.0 min CN=80 Runoff=1.0 cfs 3,171 cf

Subcatchment 20S: Watershed 20S Runoff Area=6,001 sf 9.93% Impervious Runoff Depth=0.02"
Flow Length=75' Slope=0.0220 '/' Tc=11.1 min CN=44 Runoff=0.0 cfs 12 cf

Reach 10R: 12" SD Avg. Flow Depth=0.30' Max Vel=6.53 fps Inflow=1.3 cfs 4,791 cf
12.0" Round Pipe n=0.005 L=95.0' S=0.0051 '/' Capacity=6.6 cfs Outflow=1.3 cfs 4,791 cf

Pond 2P: ICS2 Peak Elev=74.62' Inflow=1.0 cfs 3,171 cf
Primary=1.0 cfs 3,171 cf Secondary=0.0 cfs 0 cf Outflow=1.0 cfs 3,171 cf

Pond 10P: Subsurface UDSF1/OCS1 Peak Elev=74.62' Storage=6,194 cf Inflow=2.2 cfs 7,962 cf
Outflow=0.0 cfs 4,719 cf

Pond ICS1: ICS1 Peak Elev=74.62' Inflow=1.3 cfs 4,791 cf
Primary=1.3 cfs 4,791 cf Secondary=0.0 cfs 0 cf Outflow=1.3 cfs 4,791 cf

Link SP1: SP-1 Inflow=0.0 cfs 4,719 cf
Primary=0.0 cfs 4,719 cf

Link SP2: SP-2 Inflow=0.0 cfs 12 cf
Primary=0.0 cfs 12 cf

Total Runoff Area = 72,350 sf Runoff Volume = 7,974 cf Average Runoff Depth = 1.32"
32.07% Pervious = 23,204 sf 67.93% Impervious = 49,146 sf

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 4
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 10S: Watershed 10S Runoff Area=37,637 sf 75.09% Impervious Runoff Depth=2.81"
Flow Length=351' Tc=10.9 min CN=83 Runoff=2.4 cfs 8,828 cf

Subcatchment 11S: Watershed 11S Runoff Area=28,712 sf 70.66% Impervious Runoff Depth=2.55"
Flow Length=325' Tc=6.0 min CN=80 Runoff=2.0 cfs 6,094 cf

Subcatchment 20S: Watershed 20S Runoff Area=6,001 sf 9.93% Impervious Runoff Depth=0.29"
Flow Length=75' Slope=0.0220 '/' Tc=11.1 min CN=44 Runoff=0.0 cfs 143 cf

Reach 10R: 12" SD Avg. Flow Depth=0.42' Max Vel=7.74 fps Inflow=2.4 cfs 8,828 cf
12.0" Round Pipe n=0.005 L=95.0' S=0.0051 '/' Capacity=6.6 cfs Outflow=2.4 cfs 8,828 cf

Pond 2P: ICS2 Peak Elev=76.16' Inflow=2.0 cfs 6,094 cf
Primary=2.0 cfs 5,165 cf Secondary=0.0 cfs 929 cf Outflow=2.0 cfs 6,094 cf

Pond 10P: Subsurface UDSF1/OCS1 Peak Elev=76.16' Storage=11,884 cf Inflow=4.1 cfs 14,922 cf
Outflow=0.1 cfs 7,353 cf

Pond ICS1: ICS1 Peak Elev=76.16' Inflow=2.4 cfs 8,828 cf
Primary=2.4 cfs 7,519 cf Secondary=0.1 cfs 1,309 cf Outflow=2.4 cfs 8,828 cf

Link SP1: SP-1 Inflow=0.1 cfs 7,353 cf
Primary=0.1 cfs 7,353 cf

Link SP2: SP-2 Inflow=0.0 cfs 143 cf
Primary=0.0 cfs 143 cf

Total Runoff Area = 72,350 sf Runoff Volume = 15,065 cf Average Runoff Depth = 2.50"
32.07% Pervious = 23,204 sf 67.93% Impervious = 49,146 sf

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 4
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment10S: Watershed 10S Runoff Area=37,637 sf 75.09% Impervious Runoff Depth=3.91"
Flow Length=351' Tc=10.9 min CN=83 Runoff=3.3 cfs 12,251 cf

Subcatchment11S: Watershed 11S Runoff Area=28,712 sf 70.66% Impervious Runoff Depth=3.60"
Flow Length=325' Tc=6.0 min CN=80 Runoff=2.8 cfs 8,617 cf

Subcatchment20S: Watershed 20S Runoff Area=6,001 sf 9.93% Impervious Runoff Depth=0.66"
Flow Length=75' Slope=0.0220 '/' Tc=11.1 min CN=44 Runoff=0.0 cfs 331 cf

Reach 10R: 12" SD Avg. Flow Depth=0.50' Max Vel=8.41 fps Inflow=3.3 cfs 12,251 cf
12.0" Round Pipe n=0.005 L=95.0' S=0.0051 '/' Capacity=6.6 cfs Outflow=3.3 cfs 12,251 cf

Pond 2P: ICS2 Peak Elev=77.07' Inflow=2.8 cfs 8,617 cf
Primary=2.7 cfs 6,192 cf Secondary=0.3 cfs 2,425 cf Outflow=2.8 cfs 8,617 cf

Pond 10P: Subsurface UDSF1/OCS1 Peak Elev=77.07' Storage=14,001 cf Inflow=5.8 cfs 20,868 cf
Outflow=0.3 cfs 13,176 cf

Pond ICS1: ICS1 Peak Elev=77.08' Inflow=3.3 cfs 12,251 cf
Primary=2.7 cfs 8,257 cf Secondary=0.8 cfs 3,995 cf Outflow=3.3 cfs 12,251 cf

Link SP1: SP-1 Inflow=0.3 cfs 13,176 cf
Primary=0.3 cfs 13,176 cf

Link SP2: SP-2 Inflow=0.0 cfs 331 cf
Primary=0.0 cfs 331 cf

Total Runoff Area = 72,350 sf Runoff Volume = 21,199 cf Average Runoff Depth = 3.52"
32.07% Pervious = 23,204 sf 67.93% Impervious = 49,146 sf

Appendix E

Inspection, Maintenance and Housekeeping Plan

INSPECTION, MAINTENANCE, AND HOUSEKEEPING PLAN
Pine State Family Mart
1883 Forest Avenue
Portland, Maine 04103

Introduction

The responsible party for maintenance of the stormwater management facility following construction will be the City of Portland.

The Contract Documents will require the contractor to designate of person responsible for maintenance of the sedimentation control features during construction as required by the Erosion & Sedimentation Control Report.

The following plan outlines the anticipated inspection and maintenance procedures for the erosion and sedimentation control measures as well as stormwater management facilities for the project. This plan also outlines several housekeeping requirements that shall be followed during and after construction. These procedures shall be followed in order to ensure the intended function of the designed measures and to prevent unreasonably adverse impacts to the surrounding environment.

The procedures outlined in this Inspection, Maintenance and Housekeeping Plan are provided as an overview of the anticipated practices to be used on this site. In some instances, additional measures may be required due to unexpected conditions. For additional detail on any of the erosion and sedimentation control measures or stormwater management devices to be utilized on this project, refer to the most recently revised edition of the "Maine Erosion and Sedimentation Control BMP" manual and/or the "Stormwater Management for Maine: Best Management Practices" manual as published by the Maine Department of Environmental Protection (MDEP).

During Construction

1. **Inspection:** During the construction process, it is the Contractor's responsibility to comply with the inspection and maintenance procedures outlined in this section and the erosion and sedimentation control plan for the project. These responsibilities include inspecting disturbed and impervious areas, erosion control measures, materials storage areas that are exposed to precipitation, and locations where vehicles enter or exit the site. These areas shall be inspected at least once a week as well as before and after a storm event, and prior to completing permanent stabilization measures. A person with knowledge of erosion and stormwater control, including the standards and conditions in any applicable permits, shall conduct the inspections.

2. **Maintenance:** All measures shall be maintained in an effective operating condition until areas are permanently stabilized. If Best Management Practices (BMPs) need to be maintained or modified, additional BMPs are necessary, or other corrective action is needed, implementation must be completed within 7 calendar days and prior to any storm event (rainfall).

3. **Documentation:** A log summarizing the inspections and any corrective action taken must be maintained on-site. Correction action shall be performed in general conformance with the Maine Construction General Permit and Maine DEP Chapter 500 Stormwater standards. The log must

include the name(s) and qualifications of the person making the inspections, the date(s) of the inspections, and major observations about the operation and maintenance of erosion and sedimentation controls, material storage areas, and vehicle access points to the site. Major observations must include BMPs that need maintenance, BMPs that failed to operate as designed or proved inadequate for a particular location, and locations where additional BMPs are needed. For each BMP requiring maintenance, BMP needing replacement, and location needing additional BMPs, note in the log the corrective action taken and when it was taken. The log must be made accessible to the appropriate regulatory agency upon request. The permittee shall retain a copy of the log for a period of at least three years from the completion of permanent stabilization.

4. **Specific Inspection and Maintenance Tasks:** The following is a list of erosion control and stormwater management measures and the specific inspection and maintenance tasks to be performed during construction.

A. Filter Berms:

- Hay bale barriers, silt fences, and filter berms shall be inspected immediately after each rainfall and at least daily during prolonged rainfall.
- If the fabric on a silt fence or filter barrier should decompose or become ineffective prior to the end of the expected usable life and the barrier is still necessary, it shall be replaced.
- Sediment deposits should be removed after each storm event. They must be removed before deposits reach approximately one-half the height of the barrier.
- Filter berms shall be reshaped as needed.
- Any sediment deposits remaining in place after the silt fence or filter barrier is no longer required should be dressed to conform to the existing grade, prepared, and seeded.

B. Stone Check Dams:

- Inspect the center of the dam to make sure it is lower than the edges. Erosion caused by high flows around the edges of the dam must be corrected.
- Sediment accumulation shall be removed prior to reaching half of the original design height.
- Areas beneath stone check dams must be seeded and mulched upon removal.

C. Riprap Materials:

- Once a riprap installation has been completed, it should require very little maintenance. It shall, however, be inspected periodically to determine if high flows have caused scour beneath the riprap or dislodged any of the stone.

D. Erosion Control Blankets:

- Inspect these reinforced areas semi-annually and after significant rainfall events for slumping, sliding, seepage, and scour. Pay close attention to unreinforced areas adjacent to the erosion control blankets, which may experience accelerated erosion.
- Review all applicable inspection and maintenance procedures recommended by the

specific blanket manufacturer. These tasks shall be included in addition to the requirements of this plan.

E. Stabilized Construction Entrances/Exits:

- The exit shall be maintained in a condition that will prevent tracking of sediment onto public rights-of-way.
- When the control pad becomes ineffective, the stone shall be removed along with the collected soil material. The entrance should then be reconstructed.
- Areas that have received mud-tracking or sediment deposits shall be swept or washed. Washing shall be done on an area stabilized with aggregate, which drains into an approved sediment-trapping device (not into storm drains, ditches, or waterways).

F. Temporary Seed and Mulch:

- Mulched areas should be inspected after rain events to check for rill erosion.
- If less than 90% of the soil surface is covered by mulch, additional mulch shall be applied in bare areas.
- In applications where seeding and mulch have been applied in conjunction with erosion control blankets, the blankets must be inspected after rain events for dislocation or undercutting.
- Mulch shall continue to be reapplied until 95% of the soil surface has established temporary vegetative cover.

G. Stabilized Temporary Drainage Swales:

- Sediment accumulation in the swale shall be removed once the cross section of the swale is reduced by 25%.
- The swales shall be inspected after rainfall events. Any evidence of sloughing of the side slopes or channel erosion shall be repaired and corrective action should be taken to prevent reoccurrence of the problem.
- In addition to the stabilized lining of the channel (i.e. erosion control blankets), stone check dams may be needed to further reduce channel velocity.

5. **Housekeeping:** The following general performance standards apply to the proposed project.

A. Spill prevention: Controls must be used to prevent pollutants from being discharged from materials on-site, including storage practices to minimize exposure of the materials to stormwater, and appropriate spill prevention, containment, and response planning and implementation. A Spill, Prevention, Control and Countermeasures Plan is created for the project and is to be kept onsite at all times.

B. Groundwater protection: During construction, liquid petroleum products and other hazardous materials with the potential to contaminate groundwater may not be stored or handled in areas of the site draining to an infiltration area. An "infiltration area" is any area of the site that by design or as a result of soils, topography and other relevant factors, accumulates runoff that infiltrates into the soil. Dikes, berms, sumps, and other forms of secondary containment that prevent discharge to groundwater may be used to

isolate portions of the site for the purposes of storage and handling of these materials.

C. Fugitive sediment and dust: Actions must be taken to ensure that activities do not result in noticeable erosion of soils or fugitive dust emissions during or after construction. Oil may not be used for dust control.

D. Debris and other materials: Litter, construction debris, and chemicals exposed to stormwater must be prevented from becoming a pollutant source.

E. Trench or foundation dewatering: Trench dewatering is the removal of water from trenches, foundations, cofferdams, ponds, and other areas within the construction area that retain water after excavation. In most cases, the collected water is heavily silted and hinders correct and safe construction practices. The collected water must be removed from the ponded area, either through gravity or pumping, and must be spread through natural wooded buffers or removed to areas that are specifically designed to collect the maximum amount of sediment possible, like a cofferdam sedimentation basin. Avoid allowing the water to flow over disturbed areas of the site. Equivalent measures may be taken if approved.

Post-Construction

1. **Inspection:** After construction, it is the responsibility of the City of Portland to comply with the inspection and maintenance procedures outlined in this section. All measures must be maintained in effective operating condition. A person with knowledge of erosion and stormwater control, including the standards and conditions in all applicable permits, shall conduct the inspections.

2. **Specific Inspection and Maintenance Tasks:** The following is a list of permanent erosion control and stormwater management measures and the inspection and maintenance tasks to be performed after construction.

   A. Vegetated Areas:

   - Inspect vegetated areas, particularly slopes and embankments, early in the growing season or after heavy rains to identify active or potential erosion problems.
   - Replant bare areas or areas with sparse growth. Where rill erosion is evident, armor the area with an appropriate lining or divert the erosive flows to on-site areas able to withstand the concentrated flows.

   B. Ditches, Swales and Other Open Channels:

   - Inspect ditches, swales, level spreaders and other open stormwater channels in the spring, in the late fall, and after heavy rains to remove any obstructions to flow. Remove accumulated sediments and debris, remove woody vegetative growth that could obstruct flow, and repair any erosion of the ditch lining.
   - Vegetated ditches must be mowed at least annually or otherwise maintained to control the growth of woody vegetation and maintain flow capacity.
   - Any woody vegetation growing through riprap linings must also be removed.

Repair any slumping side slopes as soon as practicable.

- If the ditch has a riprap lining, replace riprap in areas where any underlying filter fabric or underdrain gravel is showing through the stone or where stones have dislodged.

C. Winter Sanding:

- Clear accumulations of winter sand along access road at least once a year, preferably in the spring.
- Accumulations of sand along road shoulders may be removed by grading excess sand to the pavement edge and removing it manually or by a front-end loader or other acceptable method.

D. Culverts:

- Inspect culverts in the spring, in the late fall, and after heavy rains to remove any obstructions to flow.
- Remove accumulated sediments and debris at the inlet, at the outlet, and within the conduit.
- Inspect and repair any erosion damage at the culvert's inlet and outlet.

E. Subsurface Sand Filter

- Inspect the site monthly for the first few months after construction. Then inspections can occur on an annual basis, preferably after rain events when clogging will be obvious.
- Make any repairs necessary to ensure the measure is operating properly.
- Regular maintenance is necessary to remove surface sediment, trash, debris, and leaf litter.
- Outlets and chambers need to be cleaned/repaired when drawdown times in the filter exceeds 36 hours.
- In certain cases, layers of sand may need to be replaced every 3 to 5 years.

J. Level Spreader:

- The level spreader pool should be inspected after rainfall events for sediment accumulation and debris that may reduce its capacity. Sediment and debris buildup should be removed once the volume of the pool has been reduced by 25%. The level berm must be constructed so that flows slowly seep across the berm as sheet flow to the receiving downstream drainage way. Repair or reconstruction of the berm is required when flow from the spreader becomes channelized.

3. **Documentation:**

A. The owner or operator of a BMP or a qualified post-construction stormwater inspector hired by that person, shall, on or by June 30 of each year, provide a completed and signed certification to DPS in a form provided by DPS, certifying that the person has inspected the BMP(s) and that they are adequately maintained and functioning as intended by the approved post-construction stormwater management plan, or that they required

maintenance or repair, including the record of the deficiency and corrective action(s) taken.

B. A log summarizing the inspections and any corrective action taken must be maintained. The log must include the name(s) and qualifications of the person making the inspections, the date(s) of the inspections, and major observations about the operation and maintenance of controls. Major observations must include BMPs that need maintenance, BMPs that failed to operate as designed or proved inadequate for a particular location, and locations where additional BMPs are needed. For each BMP requiring maintenance, BMP needing replacement, and location needing additional BMPs, note in the log the corrective action taken and when it was taken. The log must be made accessible to the appropriate regulatory agency upon request. A sample "Stormwater Inspection and Maintenance Form" has been included as Attachment 2 of this Inspection, Maintenance, and Housekeeping Plan.

4. Maine DEP Recertification: A certification of the following shall be submitted to the MDEP within three months of the expiration of each five-year interval from the date of issuance of MDEP permits.

A. Identification and repair of erosion problems. All areas of the project site have been inspected for areas of erosion, and appropriate steps have been taken to permanently stabilize these areas.

B. Inspection and repair of stormwater control system. All aspects of the stormwater control system have been inspected for damage, wear, and malfunction, and appropriate steps have been taken to repair or replace the system, or portions of the system.

C. The Inspection, Maintenance, and Housekeeping Plan for the site is being implemented as written, or modifications to the plan have been submitted to and approved by the MDEP, and the maintenance log is being maintained.

5. Duration of Maintenance: Perform maintenance as described and required for any associated permits unless and until the system is formally accepted by a municipality or quasi-municipal district or is placed under the jurisdiction of a legally created association that will be responsible for the maintenance of the system. If a municipality or quasi-municipal district chooses to accept a stormwater management system, or a component of a stormwater system, it must provide a letter to the MDEP stating that it assumes responsibility for the system. The letter must specify the components of the system for which the municipality or district will assume responsibility, and that the municipality or district agrees to maintain those components of the system in compliance with MDEP standards. Upon such assumption of responsibility, and approval by the MDEP, the municipality, quasi-municipal district, or association becomes a co-permittee for this purpose only and must comply with all terms and conditions of the permit.

Attachments

Attachment 1 – Stormwater Inspection and Maintenance Log Form

ATTACHMENT 1 – STORMWATER INSPECTION AND MAINTENANCE LOG

Pine State Family Mart
1883 Forest Avenue
Portland, Maine 04103

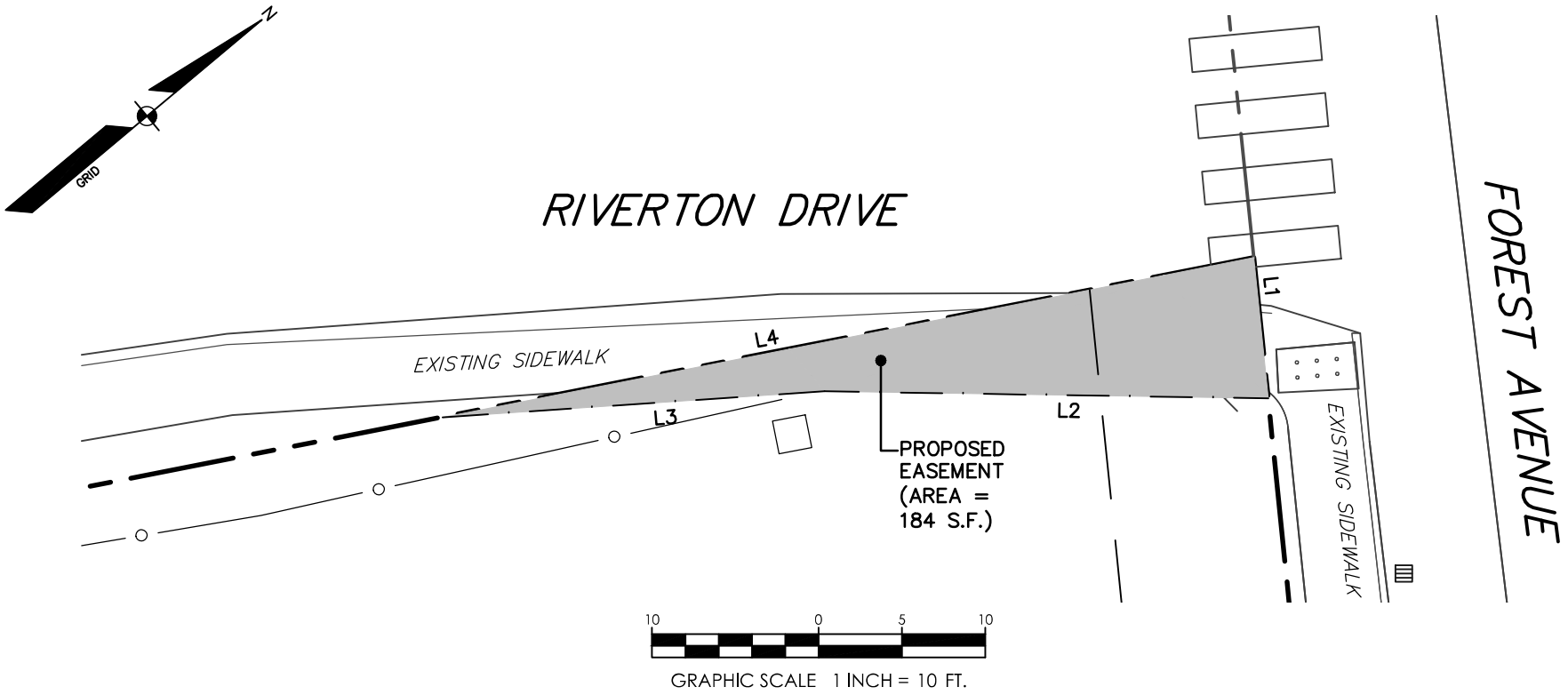
This log is intended to accompany the Inspection, Maintenance and Housekeeping Plan for the proposed Pine State Family Mart in Portland, Maine. The following items shall be checked, cleaned and maintained on a regular basis as specified in the Maintenance Plan and as described in the table below. This log shall be kept on file for a minimum of five (5) years and shall be available for review by the municipality. Qualified personnel familiar with drainage systems and soils shall perform all inspections. Attached is a copy of the construction and post-construction maintenance logs.

	INSPECTOR NAME	DATE PERFORMED	SUGGESTED INTERVAL
Vegetated Areas			
Inspect all slopes and embankments			Annually
Replant bare areas or areas with sparse growth			Annually
Paved Surfaces			
Clear accumulated winter sand			Annually
Remove sediment along edges and in pockets			Annually
Ditches & Swales			
Remove any obstructions and accumulated sediments and debris			Monthly
Repair any erosion of ditch lining			Annually
Mow vegetated ditches			Annually
Remove woody vegetation growing through riprap			Annually
Repair any slumping side slopes			Annually
Replace riprap where stones have dislodged			Annually
Catch Basins			
Remove accumulated sediments and debris in the sump and at grate			Annually
Culverts			
Remove accumulated sediments and debris at the inlet, outlet, within conduit			Annually
Repair any erosion at inlet and outlet			Annually
Sump Depth			Annually

Level Spreader				
	Remove sediment			Monthly
	Check for evidence of channelized flow over berm			Monthly
	Erosion (side slopes, embankment)			Monthly
	Mowed			Semi-Annually
Subsurface Sand Filter				
	Inspection of subsurface structure following major storm events			Semi-Annually (during first year)
	Inspection after major storm to ensure proper function			Bi-Annually
	Remove sediment and debris			Annually
	Clean/repair outlets and chambers			When drawdown times in filter exceed 36 hrs

Appendix F

Easements/Deed Restrictions



GENERAL NOTES:

1. THE RECORD OWNER OF THE LOCUS PARCEL IS JOHN CHAU AND PHUONG NEANG BY WARRANTY DEED DATED JUNE 20, 2008 AND RECORDED AT THE CUMBERLAND COUNTY REGISTRY OF DEEDS (CCRD) ON JUNE 23, 2008 IN BOOK 26148, PAGE 266.

2. THE PROPERTY IS SHOWN AS LOT 3, BLOCK B, ON THE CITY OF PORTLAND ASSESSORS MAP 327 AND IS LOCATED IN THE B-2 ZONE.

3. REFERENCE IS MADE TO PLANS ENTITLED "EXISTING CONDITIONS AND SITE PLAN OF PINE STATE FAMILY MART, 1884 FOREST AVE., PORTLAND, MAINE FOR JOHN CHAU" DATED SEPTEMBER 10, 2018, BY SEBAGO TECHNICS, INC.

EASEMENT LINE TABLE

LINE	DIRECTION	DISTANCE
L1	S 55°50'32" E	8.50'
L2	S 40°54'47" W	26.63'
L3	S 36°05'00" W	23.00'
L4	N 28°50'58" E	49.65'

SEBAGO TECHNICS
WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
Tel. 207-200-2100

EXHIBIT 'A' SKETCH
OF PROPOSED SIDEWALK EASEMENT

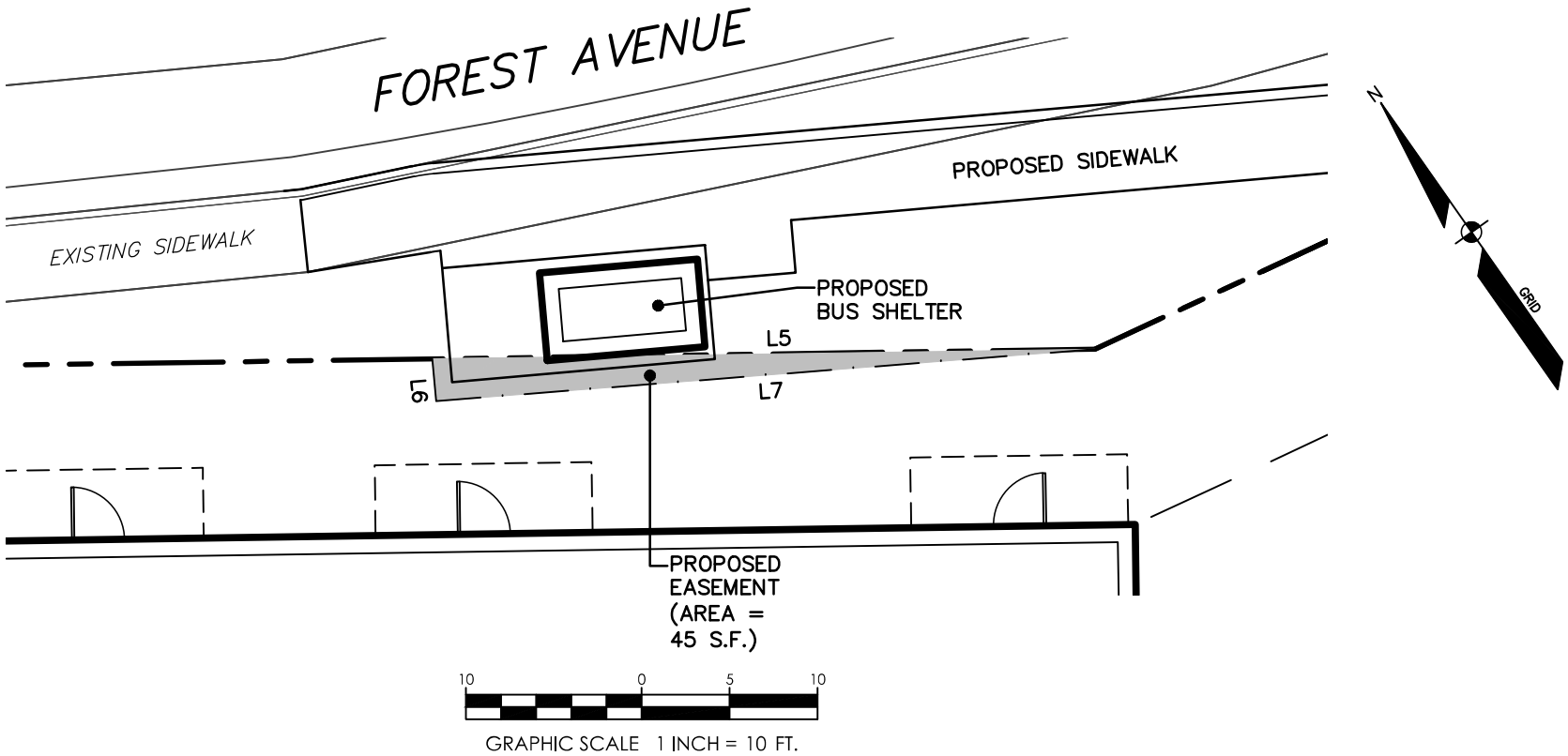
SCALE: 1" = 10'
DATE: 09-11-18

LOCATION:
RIVERTON DRIVE/FOREST AVENUE
PORTLAND, MAINE

FOR:
PINE STATE FAMILY MART
1884 FOREST AVE., PORTLAND, MAINE

SHEET:
1 OF 3

11142S.dwg, TAB: EX1



GENERAL NOTES:

1. THE RECORD OWNER OF THE LOCUS PARCEL IS JOHN CHAU AND PHUONG NEANG BY WARRANTY DEED DATED JUNE 20, 2008 AND RECORDED AT THE CUMBERLAND COUNTY REGISTRY OF DEEDS (CCRD) ON JUNE 23, 2008 IN BOOK 26148, PAGE 266.

2. THE PROPERTY IS SHOWN AS LOT 3, BLOCK B, ON THE CITY OF PORTLAND ASSESSORS MAP 327 AND IS LOCATED IN THE B-2 ZONE.

3. REFERENCE IS MADE TO PLANS ENTITLED "EXISTING CONDITIONS AND SITE PLAN OF PINE STATE FAMILY MART, 1884 FOREST AVE., PORTLAND, MAINE FOR JOHN CHAU" DATED SEPTEMBER 10, 2018, BY SEBAGO TECHNICS, INC.

EASEMENT LINE TABLE

LINE	DIRECTION	DISTANCE
L5	N 55°50'32" W	37.68'
L6	S 30°00'00" W	2.41'
L7	S 59°30'29" E	37.58'

SEBAGO TECHNICS
WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
Tel. 207-200-2100

EXHIBIT 'B' SKETCH
OF PROPOSED SIDEWALK EASEMENT

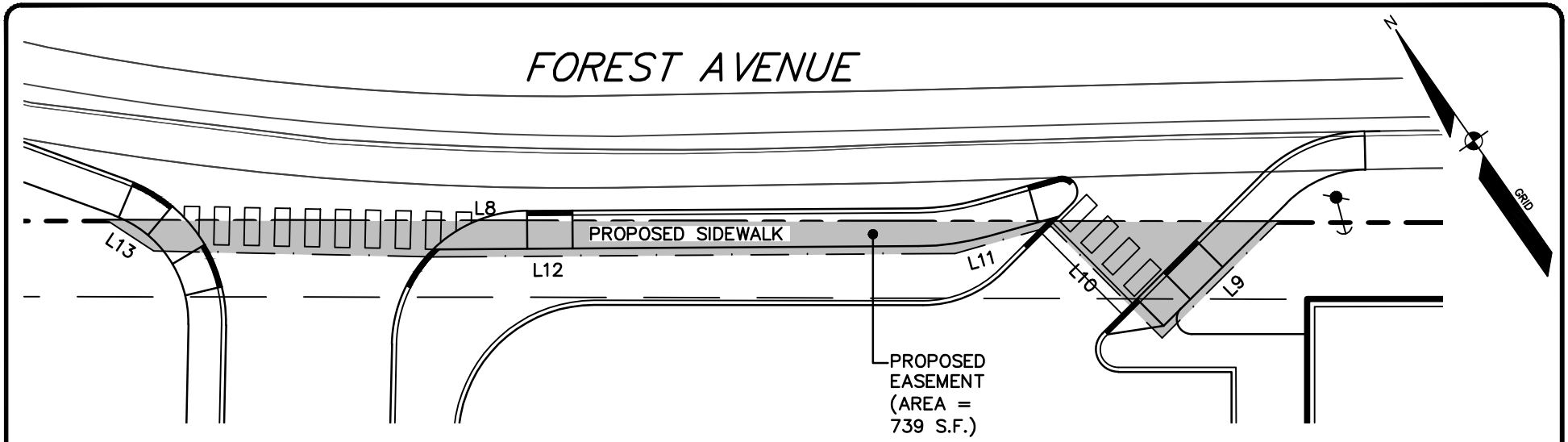
SCALE: 1" = 10'
DATE: 09-11-18

LOCATION:
RIVERTON DRIVE/FOREST AVENUE
PORTLAND, MAINE

FOR:
PINE STATE FAMILY MART
1884 FOREST AVE., PORTLAND, MAINE

SHEET:
2 OF 3

11142S.dwg, TAB: EX2



GENERAL NOTES:

1. THE RECORD OWNER OF THE LOCUS PARCEL IS JOHN CHAU AND PHUONG NEANG BY WARRANTY DEED DATED JUNE 20, 2008 AND RECORDED AT THE CUMBERLAND COUNTY REGISTRY OF DEEDS (CCRD) ON JUNE 23, 2008 IN BOOK 26148, PAGE 266.
2. THE PROPERTY IS SHOWN AS LOT 3, BLOCK B, ON THE CITY OF PORTLAND ASSESSORS MAP 327 AND IS LOCATED IN THE B-2 ZONE.
3. REFERENCE IS MADE TO PLANS ENTITLED "EXISTING CONDITIONS AND SITE PLAN OF PINE STATE FAMILY MART, 1884 FOREST AVE., PORTLAND, MAINE FOR JOHN CHAU" DATED SEPTEMBER 10, 2018, BY SEBAGO TECHNICS, INC.

EASEMENT LINE TABLE

LINE	DIRECTION	DISTANCE
L8	S 79°56'02" E	154.87'
L9	S 55°08'13" W	21.63'
L10	N 34°51'47" W	20.80'
L11	S 84°17'55" W	13.22'
L12	N 80°22'32" W	69.08'
L13	N 46°57'50" W	7.23'

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75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
Tel. 207-200-2100

EXHIBIT 'C' SKETCH
OF PROPOSED SIDEWALK EASEMENT

SCALE: 1" = 20'
DATE: 09-11-18

LOCATION:
RIVERTON DRIVE/FOREST AVENUE
PORTLAND, MAINE

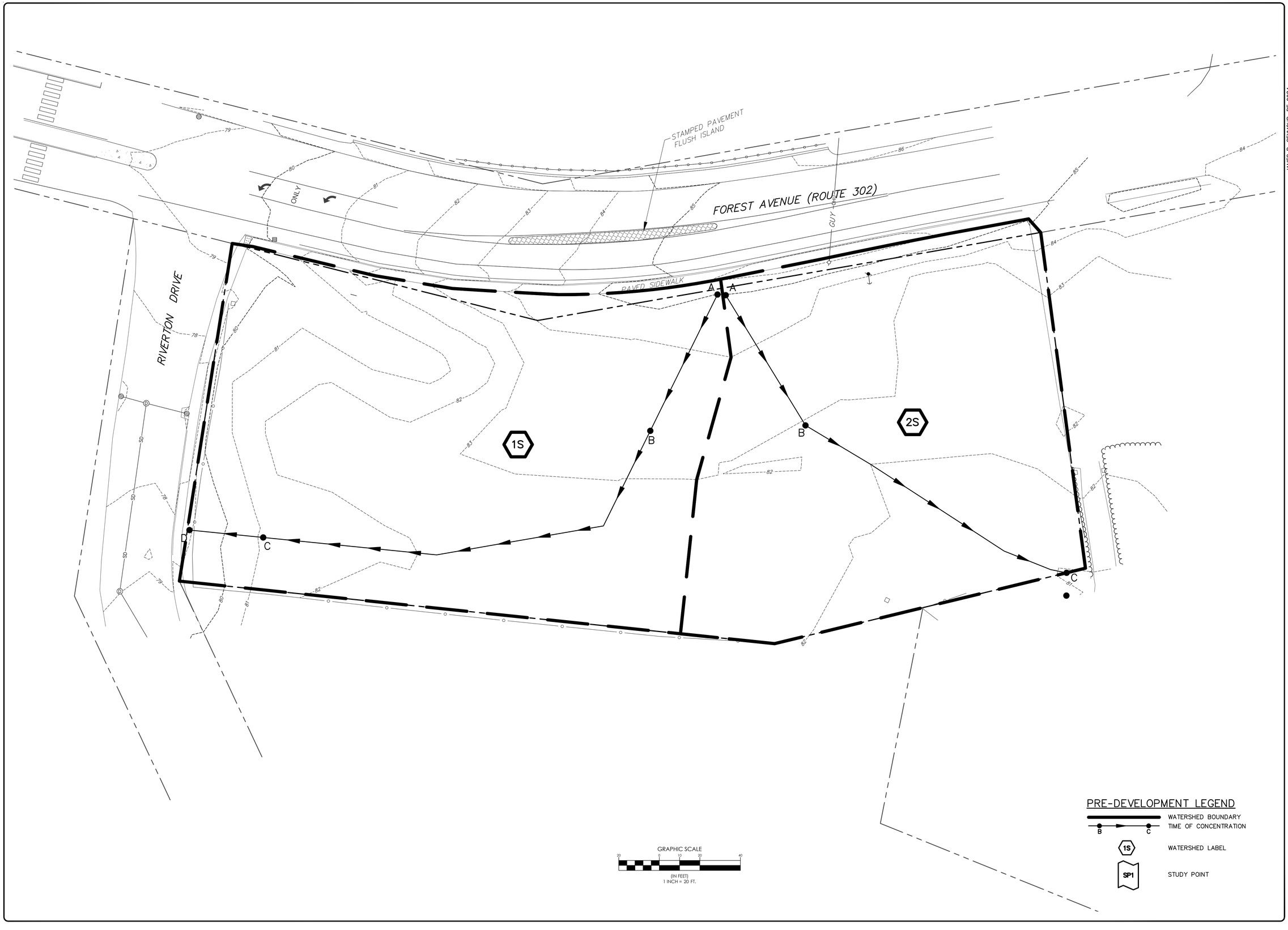
FOR:
PINE STATE FAMILY MART
1884 FOREST AVE., PORTLAND, MAINE

SHEET:
3 OF 3

11142S.dwg, TAB: EX3

Appendix G

Stormwater Management Plans



JAMES R. SEYMOUR, PE 9984

STATE OF MAINE
JAMES R. SEYMOUR
No. 9984
REGISTERED PROFESSIONAL ENGINEER
04-18-19

DESIGNED	CHECKED
SAH	RLM

REV.	BY:	DATE:	STATUS
B	JRS	04-18-19	RESPONSE TO CITY COMMENTS
A	RLM	9-10-18	SUBMIT TO CITY OF PORTLAND

THESE PLANS ARE NOT TO BE USED OR ALTERED WITHOUT WRITTEN PERMISSION FROM SEBAGO TECHNICS, INC. ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO SEBAGO TECHNICS, INC.

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75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
Tel. 207-200-2100

PRE-DEVELOPMENT WATERSHED PLAN

OF:
PINE STATE FAMILY MART
1884 FOREST AVENUE
PORTLAND, MAINE 04103

FOR:
JOHN CHAU
75 ARCADIA ST.
PORTLAND, MAINE 04103

PROJECT NO.	SCALE
11142	1" =20'

SHEET 11 OF 12

11142SWP.dwg, TAB: PRE

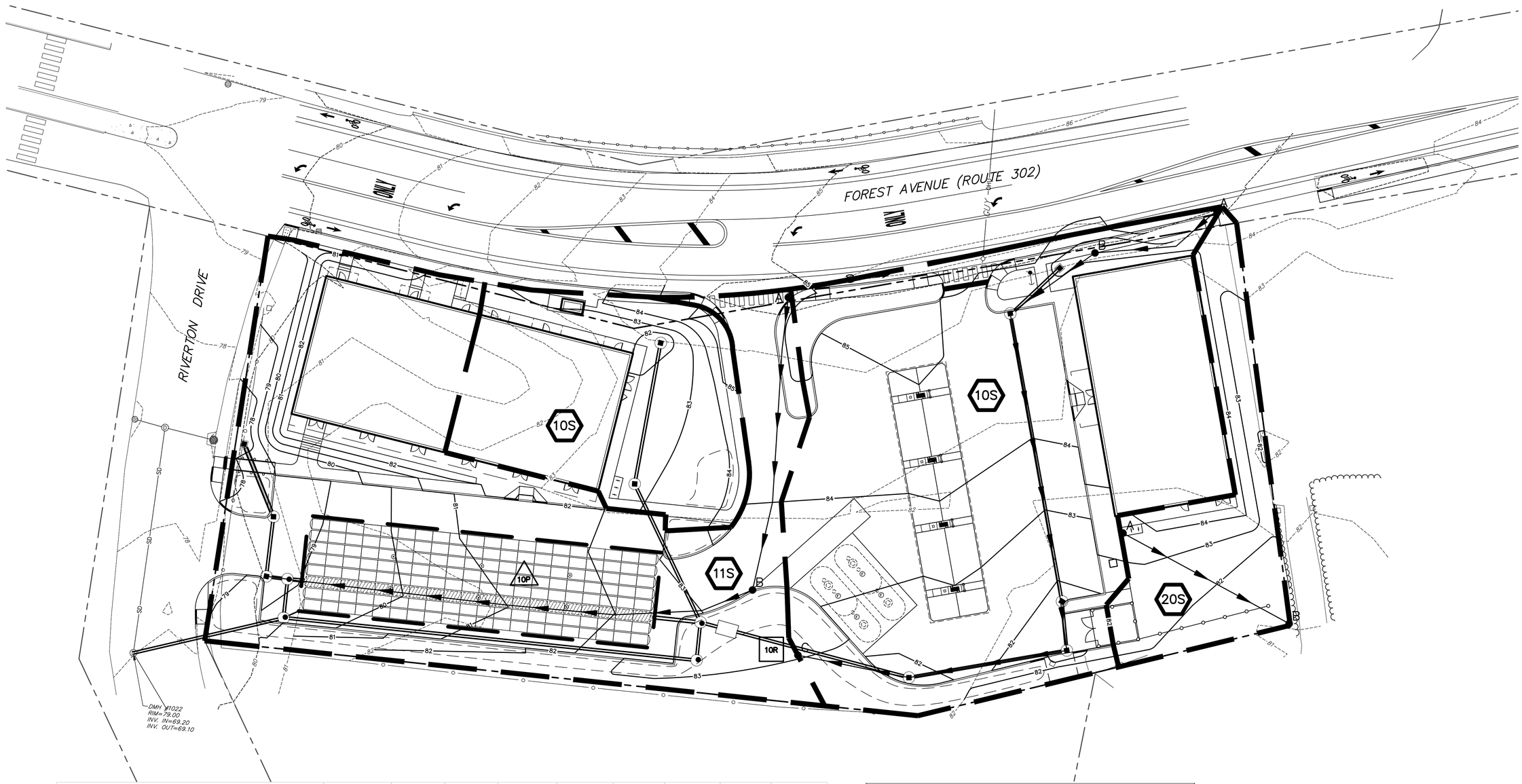


Table 1: MDEP GENERAL STANDARD CALCULATIONS

Job # 11142 Pine State Family Mart

AREA ID	WATERSHED SIZE (S.F.)	EXISTING ONSITE IMPERVIOUS AREA TO REMAIN (S.F.)	NEW ONSITE IMPERVIOUS AREA (S.F.)	EXISTING ONSITE LANDSCAPED AREA TO REMAIN (S.F.)	NEW ONSITE LANDSCAPED AREA (S.F.)	NET NEW DEVELOPED AREA (S.F.)	NET EXISTING DEVELOPED AREAS (S.F.)	TREATMENT PROVIDED?	IMPERVIOUS AREA TREATED (S.F.)	LANDSCAPED AREA TREATED* (S.F.)	DEVELOPED AREA TREATED (S.F.)	TREATMENT BMP
10 &11	66,349	147	48,403	2,101	15,698	64,101		YES	48,550	17,799	66,349	SSSF1
20	7,500	296	300	475	4,930	5,230		NO	0	0	0	
TOTAL (S.F.)	**73,849**	**443**	**48,703**	**2,576**	**20,628**	**69,331**	**0**		**48,550**	**17,799**	**66,349**	

TOTAL NEW IMPERVIOUS AREA (S.F.)	**48,703**	**TOTAL DEVELOPED AREA (S.F.)**	**69,331**
TOTAL IMPERVIOUS AREA RECEIVING TREATMENT (S.F.)	**48,550**	**TOTAL DEV. AREA RECEIVING TREATMENT (S.F.)**	**66,349**
% OF IMPERVIOUS AREA RECEIVING TREATMENT	**99.69%**	**% OF DEV. AREA RECEIVING TREATMENT**	**95.70%**

Stormwater Peak Runoff Summary Table			
Study Point	**Storm Event**	**Pre-Development (cfs)**	**Post-Development (cfs)**
SP-1	2-year	0.00	0.00
	10-year	0.00	0.01
	25-year	0.02	0.03
SP-2	2-year	0.00	0.00
	10-year	0.00	0.00
	25-year	0.01	0.00

POST-DEVELOPMENT LEGEND

- WATERSHED BOUNDARY
- TIME OF CONCENTRATION (B — C)
- 10S — WATERSHED LABEL
- SP1 — STUDY POINT
- 10P — STORMWATER TREATMENT/DETENTION POND
- 10R — REACH

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 INCH = 20 FT.

JAMES R. SEYMOUR, PE 9984

STATE OF MAINE — JAMES R. SEYMOUR No. 9984 — REGISTERED PROFESSIONAL ENGINEER — 04-18-19

DESIGNED	CHECKED
SAH	RLM

REV.	BY:	DATE:	STATUS
B	JRS	04-18-19	RESPONSE TO CITY COMMENTS
A	RLM	9-10-18	SUBMIT TO CITY OF PORTLAND

THIS PLAN MAY NOT BE USED OR ALTERED WITHOUT WRITTEN PERMISSION FROM SEBAGO TECHNICS, INC. ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO SEBAGO TECHNICS, INC.

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75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
Tel: 207-200-2100

POST-DEVELOPMENT WATERSHED PLAN
OF:
PINE STATE FAMILY MART
1884 FOREST AVENUE
PORTLAND, MAINE 04103
FOR:
JOHN CHAU
75 ARCADIA ST.
PORTLAND, MAINE 04103

PROJECT NO.	SCALE
11142	1" =20'

SHEET 12 OF 12

11142SWP.dwg, TAB:POST1

25: Consistency with City Master Plans (14-526 (c) 1)

Att. Y

- Identify consistency with master plans

    a. A formal Master Plan for the Riverton area of the City is not available. The proposed development is consistent with the adjacent uses and will not create an eyesore or diminish the neighborhood characteristics nor with the proposed site development include features that will burden the City's resources.

- Proposed easements, rights and improvements to connect or continue off-premises public infrastructure, as applicable

    b. Internal walks will be connected to the existing walks at Forest Avenue and Riverton Drive to provide continuous pedestrian access to the proposed development. Three sidewalk easements are proposed as part of the site development. One of the easements is prepared to allow for the installation/access to a new transit shelter adjacent to the proposed mixed-use retail building at the existing Greater Portland METRO bus stop. Coordination of the transit shelter design is underway between Gorrill-Palmer Consulting Engineers, Sebago Technics and Greater Portland METRO. Reference is made to the enclosed easement sketches and information in #6: Existing and/or Proposed Easements and Covenants and #14: Public Transit and on the enclosed site plans and details.

Att. Z

26: Public Safety and Fire Prevention (14-526(c))

- Address Crime Prevention through Environmental Design (CPTED) (Technical Manual, Section 3)

  Natural Surveillance: The site design allows formal and non-formal natural surveillance increasing safety of users and deterring possible offenders. The physical features of the project design maximize visibility to allow for surveillance opportunities to and from the site.

  The lighting of the site enables users to observe movement and activities on the site during the day and at night. The lighting plan addresses nighttime illumination of pedestrian ways. Reference is made to the Exterior Lighting (#33) containing site photometrics and light cut sheets. Mechanical surveillance systems may be installed as the discretion of the applicant and/or tenants.

  Access Management: Site plans have been designed to provide visible pathways and the layout, features and signage will clearly guide pedestrians and vehicular traffic along safe paths.

  Mechanical Access Control: Mechanical site access control systems are not proposed as part of the site development.

- Emergency vehicle access

  2.b. There is adequate access to the site for emergency vehicles. Please see the plan set.

- Address consistency with public safety standards (Technical Manual, Section 3)

  The site design complies with the applicable sections of the Technical Design Manual in the following manner:

  Fire Hydrant Standard: There is an existing fire hydrant at the northeasterly corner of the lot at Forest Avenue.

  Site Access Standards: Fire Department vehicles can access two sides of each building as required and there are no dead end roads associated with the project. The lot is directly connected to Forest Avenue and Riverton Drive allowing multiple emergency vehicle access points.

  Street Numbers: The assigned street numbers will be visible from the project signage on Forest Avenue and will also be placed on the building façades as required by the City of Portland.

- Submit a code summary referring NFPA 1 and all Fire Department standards (Technical Manual, Section 3)-Fire Checklist

  Please see the attached Fire Department Checklist, this section.

PORTLAND FIRE DEPARTMENT
SITE REVIEW
FIRE DEPARTMENT CHECKLIST

A separate drawing[s] shall be provided as part of the site plan application for the Portland Fire Department's review.

1. Name, address, telephone number of applicant John Chau, 75 Arcadia St., Portland, ME 04103
2.
3. Name address, telephone number of architect Ryan Senatore Architecture, 207-747-5159, ryan@senatorearchitecture.com
   565 Congress Street, Suite 304, Portland, ME 04101
4. Proposed uses of any structures [NFPA and IBC classification]
5. Retail IBC2015: M-Mercantile, NFPA101-Mercantile Class C (ea. space)
   Convenience Store IBC2015=M-Mercantile, NFPA101-Mercantile Class B
6. Square footage of all structures [total and per story] (2) One-story buildings:
   7,800 SF +/- Mixed retail and 5,000 SF +/- Convenience Store with 4 Fueling Islands
7. Elevation of all structures Retail: 25'-8" Convenience Store: 25'-6"

8. Proposed fire protection of all structures
   - ***As of September 16, 2010 all new construction of one and two family homes are required to be sprinkled in compliance with NFPA 13D. This is required by City Code. (NFPA 101 2009 ed.)***

9. Hydrant locations A hydrant is located at the northeasterly corner of the property at the Forest Avenue R.O.W.
10. Water main[s] size and location A 12" Water Main exists on the southerly side of Forest Avenue. Domestic and fire protection service will extend from the main as shown on the enclosed Grading and Utility Plan.
11. Access to all structures [min. 2 sides] Yes. See Site Plan.

12. A code summary shall be included referencing NFPA 1 and all fire department. Technical standards. To be provided by the project architect under separate cover.

Some structures may require Fire flows using annex H of NFPA 1

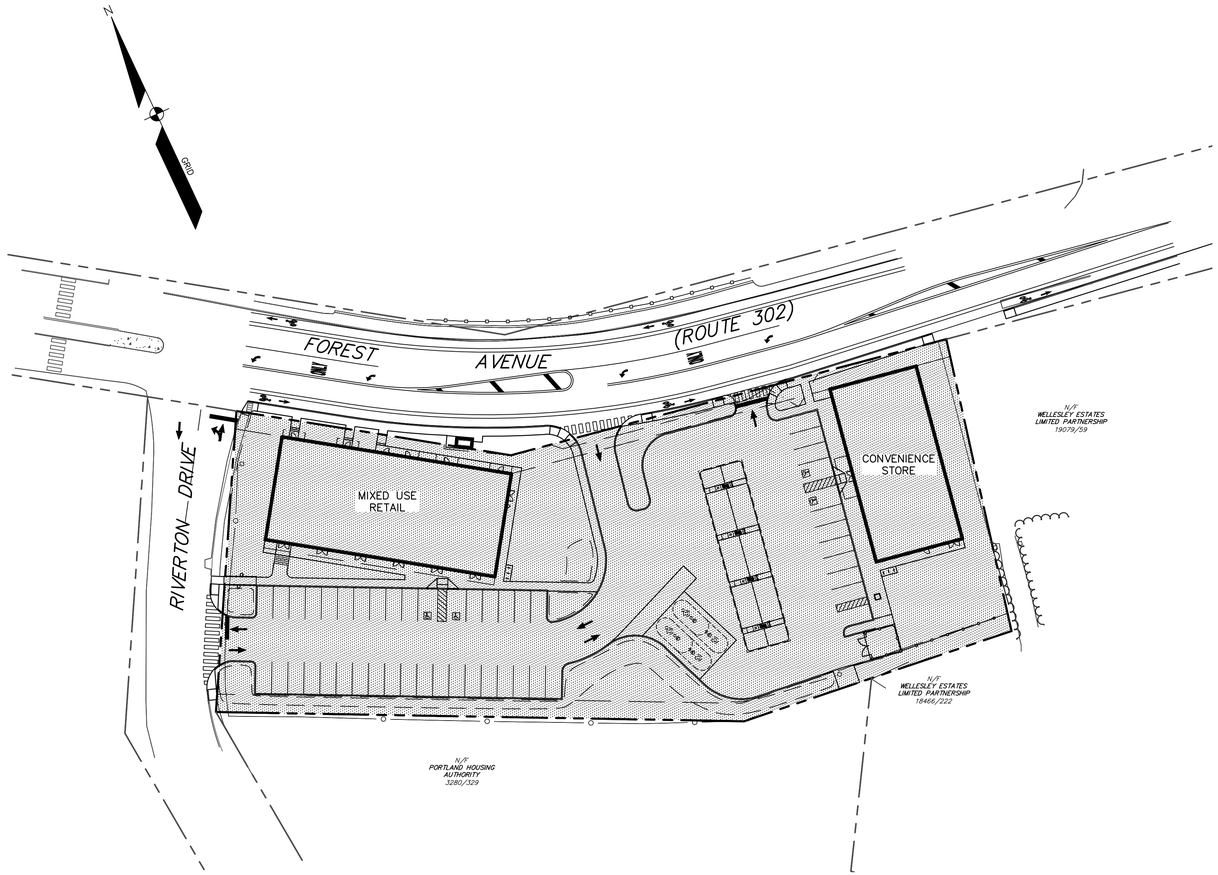
PINE STATE FAMILY MART

1884 FOREST AVENUE
PORTLAND, MAINE 04103

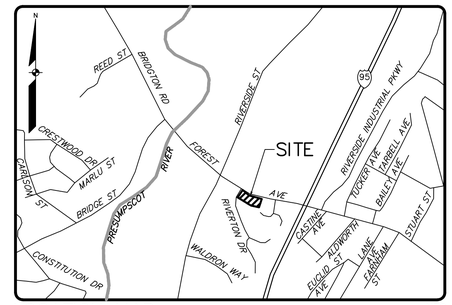
APPLICANT:
JOHN CHAU
75 ARCADIA ST.
PORTLAND, MAINE 04103

ENGINEER/SURVEYOR/
LANDSCAPE ARCHITECT:

SEBAGO TECHNICS
WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
Tel. 207-200-2100



SCALE: 1" = 40'



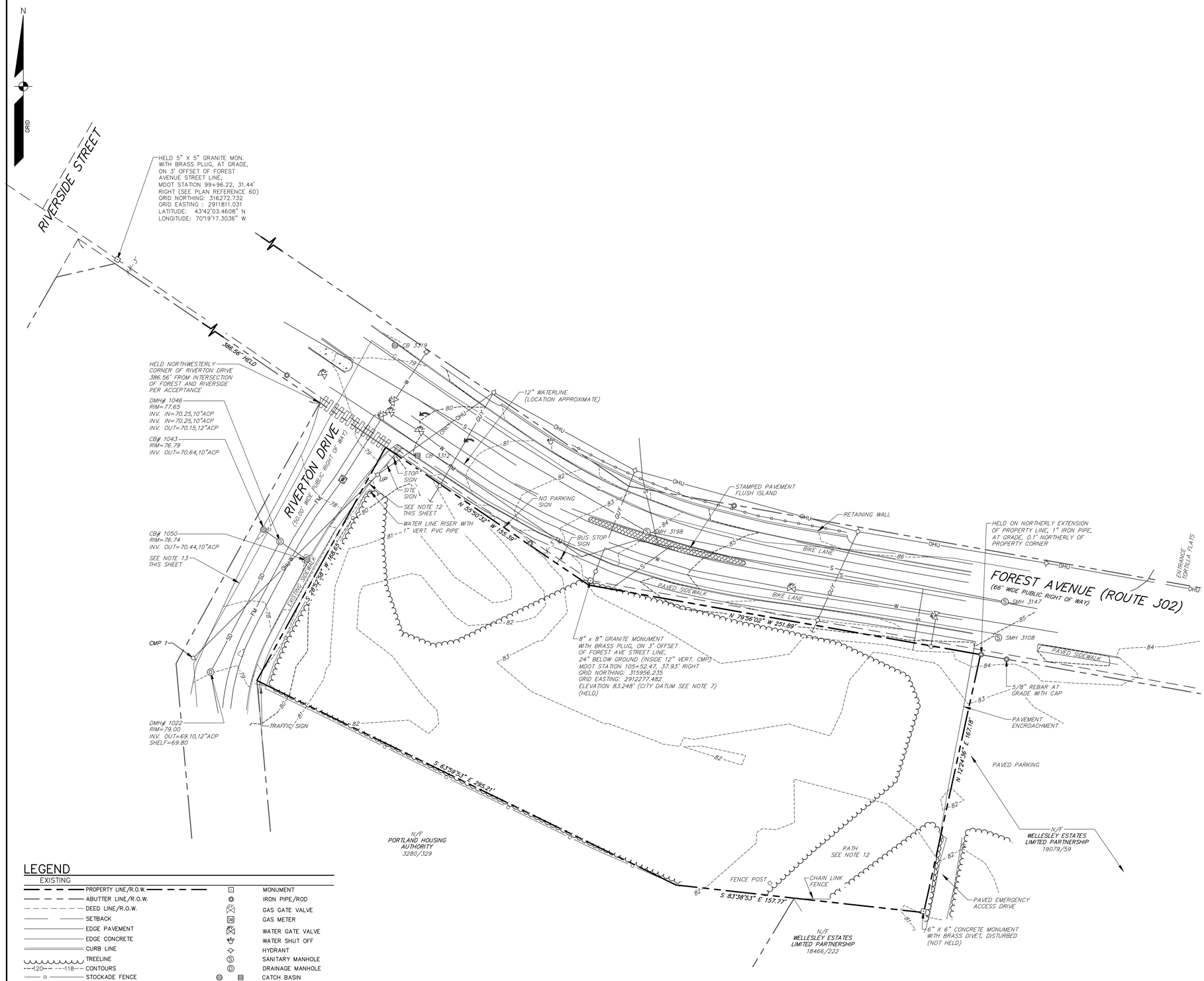
LOCATION MAP NTS

SHEET LIST TABLE

SHEET NUMBER	SHEET TITLE
1	COVER SHEET
2	EXISTING CONDITIONS PLAN
3	SITE PLAN
4A	SIGNAGE & WAYFINDING PLAN
4	GRADING & UTILITY PLAN
5	LANDSCAPE PLAN & DETAILS
6	EROSION CONTROL NOTES & DETAILS
7	DETAILS
8	DETAILS
9	DETAILS
1 OF 2	PRE-DEVELOPMENT WATERSHED PLAN
2 OF 2	POST-DEVELOPMENT WATERSHED PLAN
1 OF 1	OFFSITE IMPROVEMENT PLAN

REVISED THROUGH 04-18-19

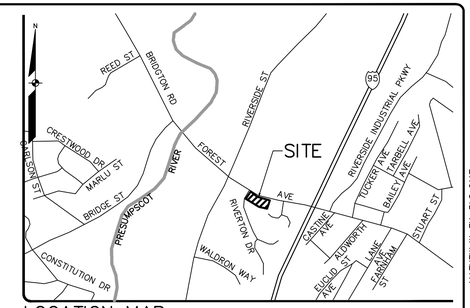
11142c.dwg, TAB:C



LEGEND

EXISTING

PROPERTY LINE/R.O.W.	MONUMENT
ABUTTER LINE/R.O.W.	IRON PIPE/ROD
DEED LINE/R.O.W.	GAS GATE VALVE
SETBACK	GAS METER
EDGE PAVEMENT	WATER GATE VALVE
EDGE CONCRETE	WATER SHUT OFF
CURB LINE	HYDRANT
TREELINE	SANITARY MANHOLE
CONTOURS	DRAINAGE MANHOLE
STOCKADE FENCE	CATCH BASIN
GAS	UTILITY POLE
WATER	GUY WIRE
SANITARY SEWER	SIGN
FORCE MAIN	
STORM DRAIN	
UNDER DRAIN	
OVERHEAD UTILITY	



LOCATION MAP N.T.S.

GENERAL NOTES:

1. THE RECORD OWNER OF THE LOCUS PARCEL IS JOHN CHAU AND PHUONG NEANG BY WARRANTY DEED DATED JUNE 20, 2008 AND RECORDED AT THE CUMBERLAND COUNTY REGISTRY OF DEEDS (CCRD) ON JUNE 23, 2008 IN BOOK 26148, PAGE 266.

2. THE PROPERTY IS SHOWN AS LOT 3, BLOCK B, ON THE CITY OF PORTLAND ASSESSORS MAP 327 AND IS LOCATED IN THE B-2 ZONE.

3. SPACE AND BULK CRITERIA:

   B-2 ZONE
   BUSINESS AND NON-RESIDENTIAL USES

MIN. LOT SIZE:	NONE
MIN. STREET FRONTAGE:	20 FEET
MIN. FRONT YARD:	NONE
MAX. FRONT YARD:	NO MORE THAN 10 FEET *
MIN. SIDE YARD:	NONE *
MIN. REAR YARD:	10 FEET *
MAX. BUILDING HEIGHT:	45 FEET *
MAX. IMPERVIOUS SURFACE RATIO:	80% *

   * SEE ORDINANCE FOR MORE PARTICULAR INFORMATION.

4. TOTAL AREA OF PARCEL IS APPROXIMATELY 1.61 ACRES.

5. BOUNDARY AND TOPOGRAPHIC INFORMATION SHOWN HEREON IS BASED UPON A FIELD SURVEY BY SEBAGO TECHNICS DURING JULY AND AUGUST OF 2011, JANUARY OF 2012, AND APRIL OF 2018.

6. PLAN REFERENCES:
   A. BLUE SHEETS 34 AND 35 OF FOREST AVENUE AND ON FILE WITH THE PORTLAND DEPARTMENT OF PUBLIC WORKS.
   B. AMENDED SUBDIVISION PLAN ON FOREST AVENUE, PORTLAND, MAINE MADE FOR OWNER: WESLLESEY ESTATES, LLC DATED OCTOBER 8, 2002 AND REVISED THROUGH 12-18-02 BY OWEN HASKELL, INC. AND RECORDED IN PLAN BOOK 202 PAGE 744 CCRD.
   C. PLAN OF RIVERTON DRIVE, BY THE CITY OF PORTLAND PUBLIC WORKS DEPARTMENT, AND ON FILE AS 493/5 WITH THE SAME.
   D. MAINE DEPARTMENT OF TRANSPORTATION(MDOT), RIGHT OF WAY MAP FOR STATE HIGHWAY "14", US ROUTE 302 – FOREST AVENUE, DATED MAY 2011, AND ON FILE WITH THE SAME AS D.O.T. FILE NO. 3-572.
   E. TURNKEY FAMILY HOUSING, FOREST AVENUE, PORTLAND, MAINE, BY OWEN HASKELL, INC. REVISED THROUGH JUNE 8, 1971.

7. PROJECT ELEVATIONS SHOWN HEREON ARE BASED ON THE TOP OF THE BRASS PLUG IN A GRANITE MON. LOCATED GENERALLY AT THE NORTHERLY MIDDLE OF THE LOCUS PROPERTY. THE CITY OF PORTLAND PUBLISHED ELEVATION OF 83.248 IS HELD (SEE LEVEL BOOK 316 PAGE 106) AS THE DATUM AS SHOWN HEREON. THE ELEVATION OF THIS BENCHMARK WAS CHECKED AGAINST PRE-EXISTING MDOT CONTROL FROM A SURVEY PERFORMED IN 2006. THE CORRELATION OF 88 DATUM TO CITY DATUM OF THESES CONTROL POINTS MEETS THE EXPECTATION OF THIS SURVEYOR.

8. PLAN ORIENTATION IS GRID NORTH, MAINE STATE PLANE COORDINATE SYSTEM, WEST ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83).

9. THE STREET LINE OF FOREST AVENUE IS BASED ON HOLDING THE THREE FOOT OFFSET MONUMENT NEAR THE INTERSECTION OF FOREST AND RIVERSIDE STREETS, THE THREE FOOT OFFSET MONUMENT GENERALLY AT THE NORTHERLY MIDDLE OF THE LOCUS PROPERTY AND AN EASTERLY PROJECTED ANGLE OF 155° 54' 30" PER PLAN REFERENCE 6A

10. THE 16 FOOT WIDE EMERGENCY ACCESS EASEMENT SHOWN ON PLAN REFERENCE 6B HAS BEEN CONVEYED IN FEE TO WELLESLEY ESTATES LIMITED PARTNERSHIP PER WARRANTY DEED DATED MARCH 21, 2003 AND RECORDED AT CCRD ON MARCH 26, 2003 IN BOOK 19078, PAGE 59.

11. THE 1 INCH IRON PIPE FOUND AT THE NORTHEASTERLY CORNER OF THE LOCUS PROPERTY WAS HELD ON THE NORTHERLY EXTENSION OF THE EASTERLY PROPERTY LINE AS CALLED FOR IN THE LOCUS DEED. THE STREET LINE ACCEPTANCE FOR RIVERTON DRIVE WAS HELD FOR THE WESTERLY PROPERTY LINE AND RECORD ANGLES AND DISTANCES PER THE LOCUS DEED ARE HELD IN RELATION TO IT FOR THE SOUTHERLY PROPERTY LINE. THE RIVERTON DRIVE ACCEPTANCE DOES NOT CALL FOR AN ABUTTER AS IT RUNS ALONG THE LOCUS PARCEL.

12. STREET IMPROVEMENTS (EG. PAVEMENT AND CURBING) EXIST OVER THE NORTHWESTERLY CORNER OF THE LOCUS PROPERTY AND ARE SHOWN HEREON. THE SOUTHEASTERLY PORTION OF THE LOCUS PROPERTY IS CURRENTLY USED AS AN ACCESS TO AND FROM FOREST AVENUE BY THE TENANTS OF THE PORTLAND HOUSING. RECORD EASEMENT FOR THIS ACCESS OVER THE LOCUS PROPERTY WAS NOT FOUND.

13. UTILITIES SHOWN IN FOREST AVENEUE ARE DERIVED FROM FIELD LOCATIONS AND PLAN REFERENCE 6D. UTILITIES SHOWN IN RIVERTON DRIVE ARE DERIVED FROM FIELD LOCATIONS AND PLAN REFERENCE 6E. PHYSICAL LOCATIONS SHOULD BE FIELD VERIFIED BEFORE DIGGING.

14. ALL SUBSURFACE UTILITY LINES SHOWN HEREON ARE BASED SOLELY ON THE FIELD LOCATION OF VISIBLE STRUCTURES, SMH'S, CB'S, HYDRANTS, ETC.. IN CONJUNCTION WITH DESIGN AND OR AS-BUILT PLANS SUPPLIED TO SEBAGO TECHNICS INC. BY OTHERS. PRIOR TO ANY CONSTRUCTION, EXCAVATION, TEST BORINGS, DRILLING, ETC.. DIG SAFE MUST BE NOTIFIED AND A SITE IDENTIFICATION NUMBER ALONG WITH A SAFE TO DIG DATE OBTAINED. THE SITE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING THE LOCATION, DEPTH AND MATERIAL OF ALL SUBSURFACE UTILITY LINES SHOWN HEREON AND ANY AND ALL OTHERS LOCATED ON SITE WITHIN THE CONSTRUCTION AREA.

MATHEW W. EK, PLS 2117

STATE OF MAINE · MATTHEW W. EK · 2117 · PROFESSIONAL LAND SURVEYOR

DRAWN	CHECKED
MAC	MWE

REV.	BY:	DATE:	STATUS:
A	MWE	8-07-18	SUBMIT TO CITY OF PORTLAND

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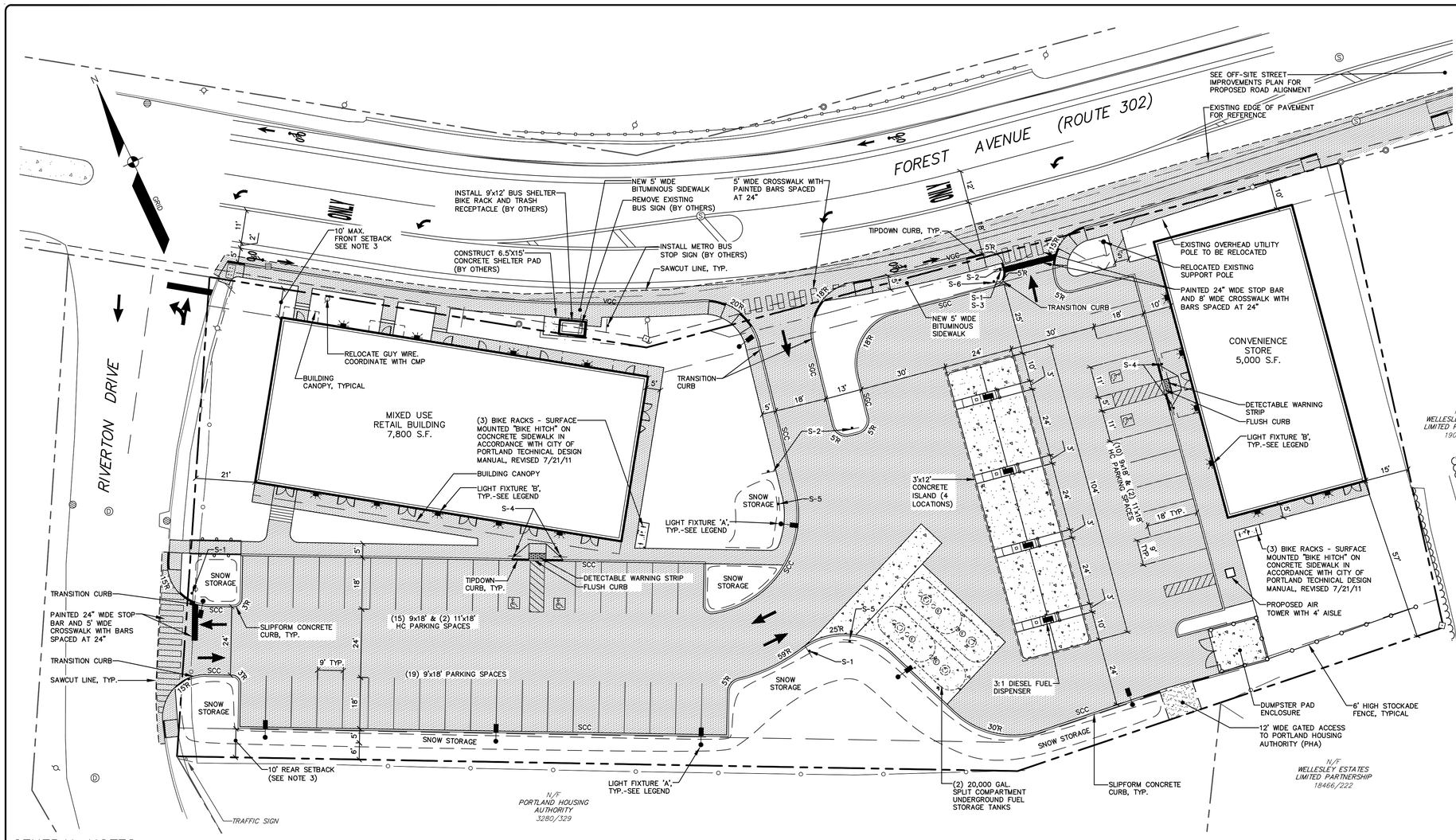
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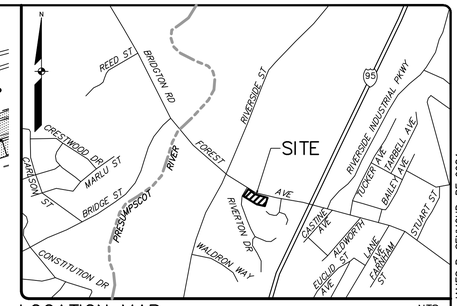
EXISTING CONDITIONS PLAN
OF:
PINE STATE FAMILY MART
1884 FOREST AVENUE
PORTLAND, MAINE 04103
FOR:
JOHN CHAU
75 ACADIA ST.
PORTLAND, MAINE 04103

PROJECT NO.	SCALE
11142	1" = 30'

SHEET 2 OF 9

11142 ec.dwg, TAB: ec





LOCATION MAP NTS

SIGN LEGEND

KEY	QTY.	COMMENTS
S-1	4	STOP SIGN
S-2	4	DO NOT EXIT
S-3	2	RIGHT TURN ONLY
S-4	5	VAN ACCESSIBLE HANDICAP PARKING
S-5	2	EXIT TO RT. 302 NORTH (WESTBROOK) (RIVERSIDE ST.)
S-6	1	EXIT TO RT. 302 SOUTH FOREST AVE./DOWNTOWN PORTLAND

LIGHT FIXTURE LEGEND

KEY	COMMENTS
A	SPAULDING CIMMARON 90 LED, 20 FT. POLE, COLOR BLACK
B	SPAULDING GEOPAK QUARTERSPHERE LED WALL PACK, 14 FT. MOUNTING HEIGHT, COLOR BLACK

CURB ABBREVIATIONS

SCC	SLIPFORM CONCRETE CURB
SGC	SLOPE GRANITE CURB
VGC	VERTICAL GRANITE CURB

PARKING SUMMARY

PARKING REQUIRED: 1 SPACE PER 200SF IN EXCESS OF 2000SF NOT USED FOR BULK STORAGE

CONVENIENCE STORE: 5,000SF -2,000SF = 3,000 / 200SF
15 SPACES REQUIRED

RETAIL STORES: 6,274SF -2,000SF = 4,274 / 200SF
22 SPACES REQUIRED

TOTAL REQUIRED PARKING: 37 SPACES

TOTAL PROVIDED PARKING: 44 STANDARD SPACES
4 ACCESSIBLE SPACES
48 TOTAL PARKING SPACES

LEGEND

EXISTING	DESCRIPTION	PROPOSED
	PROPERTY LINE/R.O.W.	
	ABUTTER LINE/R.O.W.	
	TIE LINE	
	SETBACK	
⊡	MONUMENT	
⊙	IRON PIPE/ROD	
	DEED CALL	
	BUILDING	
	EDGE PAVEMENT	
	PAVEMENT SAWCUT	
	EDGE CONCRETE	
	PAVEMENT PAINT	
	CURB LINE	
	TREELINE	
	CHAIN LINK FENCE	
	STOCKADE FENCE	
	SIGN	
Ⓢ	SANITARY MANHOLE	
Ⓓ	DRAINAGE MANHOLE	
	CATCH BASIN	
	LIGHT POLE	
	UTILITY POLE	
	GUY WIRE	
	HYDRANT	

APPROVAL- CITY OF PORTLAND PLANNING BOARD

_____ DATE

_____ CHAIRPERSON

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2. THE PROPERTY IS SHOWN AS LOT 3, BLOCK B, ON THE CITY OF PORTLAND ASSESSORS MAP 327 AND IS LOCATED IN THE B-2 ZONE.
3. SPACE AND BULK CRITERIA:

B-2 ZONE BUSINESS AND NON-RESIDENTIAL USES	REQUIRED	PROVIDED
MIN. LOT SIZE:	NONE	70,132 S.F.
MIN. STREET FRONTAGE:	20 FEET	573.93 FEET
MAX. FRONT YARD:	NO MORE THAN 10 FEET*	10 FEET
MIN. SIDE YARD:	NONE*	15 FEET
MIN. REAR YARD:	10 FEET*	57 FEET
MAX. BUILDING HEIGHT:	45 FEET*	25'-8"
MAX. IMPERVIOUS SURFACE RATIO:	80%	70.01%

* SEE ORDINACE FOR MORE PARTICULAR INFORMATION

4. TOTAL AREA OF PARCEL IS APPROXIMATELY 1.61 ACRES.
5. BOUNDARY AND TOPOGRAPHIC INFORMATION SHOWN HEREON IS BASED UPON A FIELD SURVEY BY SEBAGO TECHNICS DURING JULY AND AUGUST OF 2011, JANUARY OF 2012, AND APRIL OF 2018.
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GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 INCH = 20 FT.

JAMES R. SEYMOUR, PE 9984
STATE OF MAINE — JAMES R. SEYMOUR — No. 9984 — REGISTERED PROFESSIONAL ENGINEER — 04-18-19

DESIGNED	CHECKED
SAH	RLM

REV.	BY:	DATE:	STATUS
B	JRS	04-18-19	RESPONSE TO CITY COMMENTS
A	RLM	09-10-18	SUBMIT TO CITY OF PORTLAND

ANY ALTERATIONS, AMENDMENTS OR REUSE OF THIS PLAN WITHOUT WRITTEN PERMISSION FROM SEBAGO TECHNICS, INC. ANY ALTERATIONS, AMENDMENTS OR REUSE WITHOUT WRITTEN PERMISSION FROM SEBAGO TECHNICS, INC. AUTHORIZES SEBAGO TECHNICS, INC. TO MAKE ANY CHANGES NECESSARY FOR ITS USE ON ANY OTHER PROJECT AND AUTHORIZES SEBAGO TECHNICS, INC. TO USE THIS PLAN FOR ANY PURPOSE IT DEEMS APPROPRIATE, UNLESS OTHERWISE AGREED TO IN WRITING BY SEBAGO TECHNICS, INC. ANY USE OF THIS PLAN BY ANY PERSON OR ENTITY FOR ANY PURPOSE OTHER THAN THAT ORIGINALLY INTENDED BY SEBAGO TECHNICS, INC. SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO SEBAGO TECHNICS, INC.

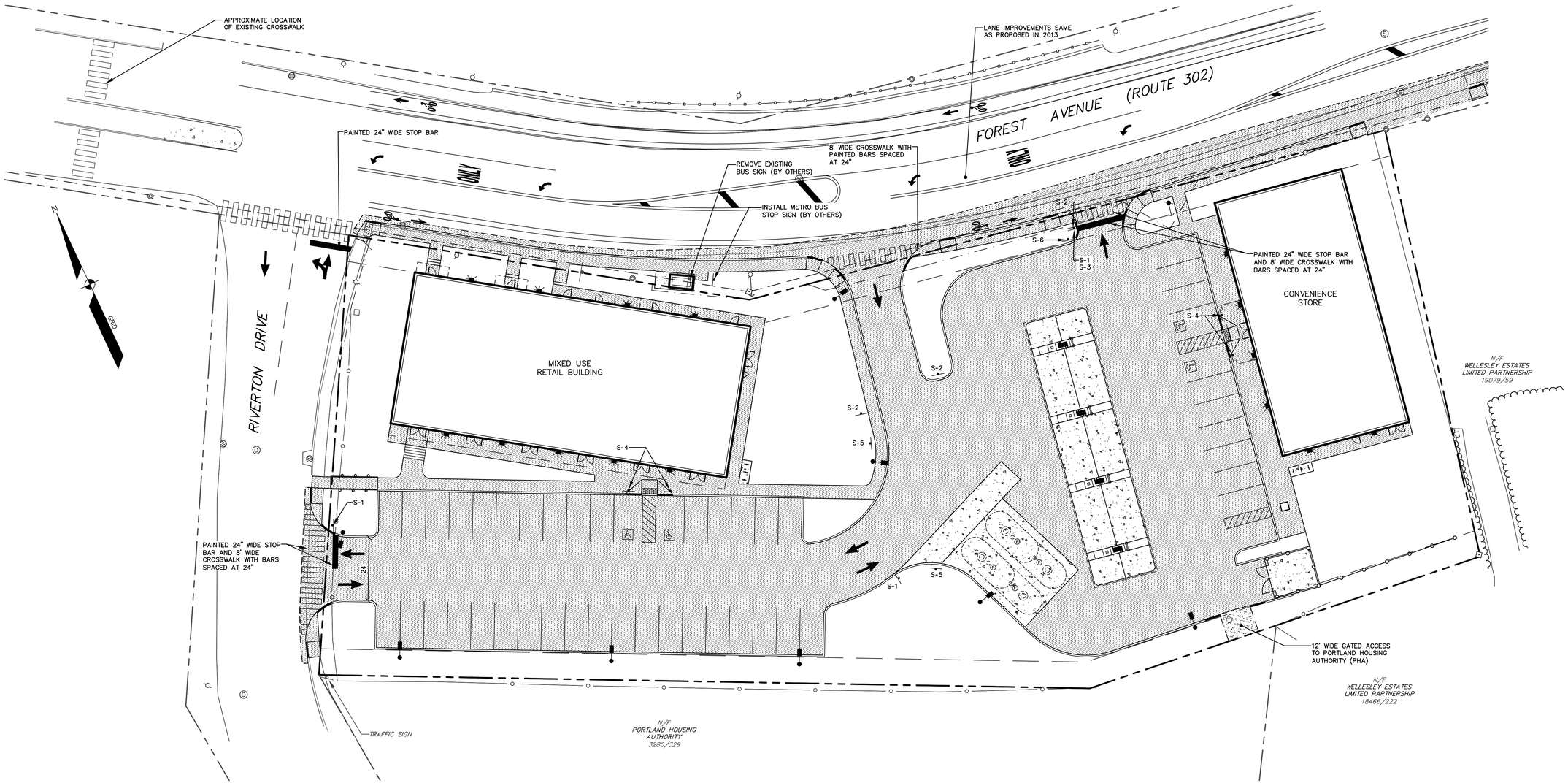
SEBAGO TECHNICS
WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
Tel: 207-200-2100

SITE PLAN
OF:
PINE STATE FAMILY MART
1884 FOREST AVENUE
PORTLAND, MAINE 04103
FOR:
JOHN CHAU
75 ARCADIA ST.
PORTLAND, MAINE 04103

PROJECT NO.	SCALE
11142	1"=20'

SHEET 3 OF 9

11425.dwg, TAB: S



SIGN LEGEND

KEY	QTY.	COMMENTS
S-1	4	STOP SIGN
S-2	4	DO NOT EXIT
S-3	2	RIGHT TURN ONLY
S-4	5	VAN ACCESSIBLE HANDICAP PARKING
S-5	2	EXIT TO RT. 302 NORTH (WESTBROOK) (RIVERSIDE ST.)
S-6	1	EXIT TO RT. 302 SOUTH FOREST AVE./DOWNTOWN PORTLAND

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 INCH = 20 FT.

JAMES R. SEYMOUR, PE 9984

STATE OF MAINE — JAMES R. SEYMOUR — No. 9984 — REGISTERED PROFESSIONAL ENGINEER — 04-18-19

DESIGNED	CHECKED
SAH	RLM

REV.	BY:	DATE:	STATUS
B	JRS	04-18-19	RESPONSE TO CITY COMMENTS
A	RLM	09-10-18	SUBMIT TO CITY OF PORTLAND

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SEBAGO TECHNICS
WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
Tel: 207-200-2100

SIGNAGE & WAYFINDING PLAN

OF:
PINE STATE FAMILY MART
1884 FOREST AVENUE
PORTLAND, MAINE 04103

FOR:
JOHN CHAU
75 ARCADIA ST.
PORTLAND, MAINE 04103

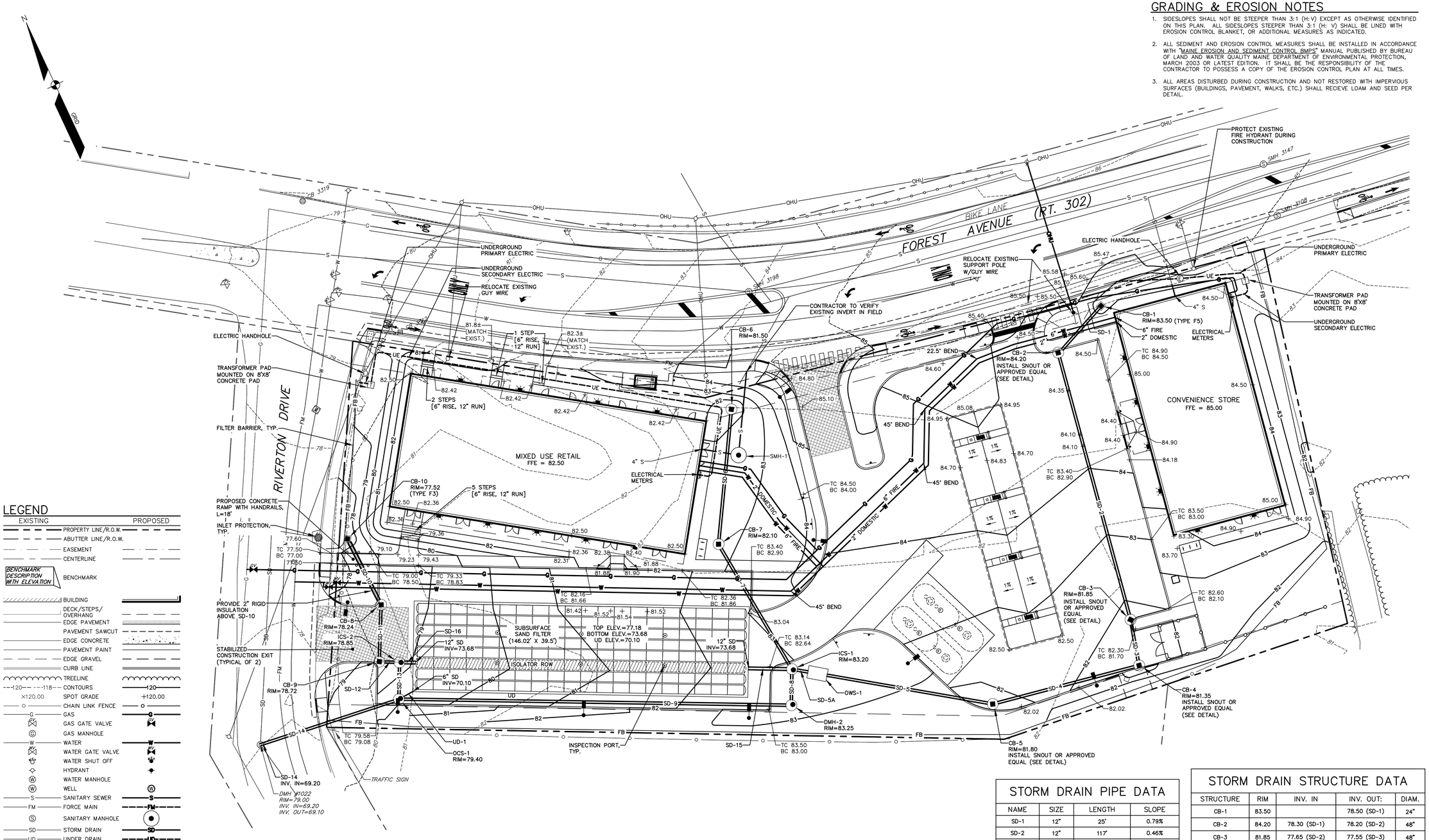
PROJECT NO.	SCALE
11142	1"=20'

SHEET 4A OF 9

11142S2.dwg, TAB: S2

GRADING & EROSION NOTES

1. SIDESLOPES SHALL NOT BE STEEPER THAN 3:1 (H:V) EXCEPT AS OTHERWISE IDENTIFIED ON THIS PLAN. ALL SIDESLOPES STEEPER THAN 3:1 (H: V) SHALL BE LINED WITH EROSION CONTROL BLANKET, OR ADDITIONAL MEASURES AS INDICATED.
2. ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH "MAINE EROSION AND SEDIMENT CONTROL BMPS" MANUAL PUBLISHED BY BUREAU OF LAND AND WATER QUALITY MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION, MARCH 2003 OR LATEST EDITION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO POSSESS A COPY OF THE EROSION CONTROL PLAN AT ALL TIMES.
3. ALL AREAS DISTURBED DURING CONSTRUCTION AND NOT RESTORED WITH IMPERVIOUS SURFACES (BUILDINGS, PAVEMENT, WALKS, ETC.) SHALL RECIEVE LOAM AND SEED PER DETAIL.



LEGEND

EXISTING		PROPOSED
	PROPERTY LINE/R.O.W.	
	ABUTTER LINE/R.O.W.	
	EASEMENT	
	CENTERLINE	
BENCHMARK DESCRIPTION WITH ELEVATION	BENCHMARK	
	BUILDING	
	DECK/STEPS/ OVERHANG	
	EDGE PAVEMENT	
	PAVEMENT SAWCUT	
	EDGE CONCRETE	
	PAVEMENT PAINT	
	EDGE GRAVEL	
	CURB LINE	
	TREELINE	
120 118	CONTOURS	120
×120.00	SPOT GRADE	+120.00
CHAIN LINK FENCE		
G	GAS	G
GV	GAS GATE VALVE	
G	GAS MANHOLE	
W	WATER	W
WV	WATER GATE VALVE	
WSO	WATER SHUT OFF	
	HYDRANT	
W	WATER MANHOLE	
W	WELL	W
S	SANITARY SEWER	S
FM	FORCE MAIN	FM
S	SANITARY MANHOLE	
SD	STORM DRAIN	SD
UD	UNDER DRAIN	UD
D	DRAINAGE MANHOLE	
	CATCH BASIN	
OHU	OVERHEAD UTILITY	OHU
UGU	UNDERGROUND UTILITY	UGU
T	TRANSFORMER PAD	T
E	ELECTRICAL MANHOLE	
EM	ELECTRIC METER	
T	TELEPHONE MANHOLE	
	LIGHT POLE	
	UTILITY POLE	
	GUY WIRE	
	EROSION CONTROL BLANKET	
FB	FILTER BARRIER	FB
	RIPRAP	
	CHECK DAM	
	INLET PROTECTION	

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 INCH = 20 FT.

STORM DRAIN PIPE DATA

NAME	SIZE	LENGTH	SLOPE
SD-1	12"	25'	0.79%
SD-2	12"	117'	0.46%
SD-3	12"	16'	0.55%
SD-4	12"	62'	0.57%
SD-5	12"	71'	0.94%
SD-5A	12"	5'	0.09%
SD-6	12"	55'	0.55%
SD-7	12"	59'	0.67%
SD-8	12"	12'	0.76%
SD-9	12"	167'	0.36%
SD-10	12"	29'	0.46%
SD-11	12"	21'	0.73%
SD-12	12"	5'	1.14%
SD-13	12"	12'	1.00%
SD-14	12"	61'	1.31%
SD-15	12"	17'	0.00%
SD-16	12"	5'	0.00%
UD-1	6"	5'	0.00%

STORM DRAIN STRUCTURE DATA

STRUCTURE	RIM	INV. IN	INV. OUT:	DIAM.
CB-1	83.50		78.50 (SD-1)	24"
CB-2	84.20	78.30 (SD-1)	78.20 (SD-2)	48"
CB-3	81.85	77.65 (SD-2)	77.55 (SD-3)	48"
CB-4	81.35	77.45 (SD-3)	77.35 (SD-4)	48"
CB-5	81.80	77.00 (SD-4)	76.90 (SD-5)	48"
CB-6	81.50		77.00 (SD-6)	48"
CB-7	82.10	76.70 (SD-6)	76.60 (SD-7)	48"
CB-8	78.24	74.35 (SD-10)	74.25 (SD-11)	48"
CB-9	78.72	74.10 (SD-11)	74.00 (SD-12)	48"
CB-10	77.52		74.50 (SD-10)	24"
DMH-2	83.25	75.00 (SD-8)	74.90 (SD-9)	48"
ICS-1	83.20	76.18 (SD-5A) 76.18 (SD-7)	73.68 (SD-15) 75.12 (SD-8)	48"
ICS-2	78.85	73.95 (SD-12)	75.12 (SD-13) 73.68 (SD-16)	48"
OCS-1	79.40	74.30 (SD-9) 75.00 (SD-13) 70.10 (UD-1)	70.00 (SD-14)	48"
OWS-1	83.40	76.19 (SD-5)	76.19 (SD-5A)	6'x13'

JAMES R. SEYMOUR, PE 9984

STATE OF MAINE — JAMES R. SEYMOUR No. 9984 — REGISTERED PROFESSIONAL ENGINEER — 04-09-19

DESIGNED	CHECKED
SAH	RLM

REV.	BY:	DATE:	STATUS
B.	RLM	04-09-19	RESPONSE TO CITY COMMENTS
A.	RLM	09-10-18	SUBMIT TO CITY OF PORTLAND

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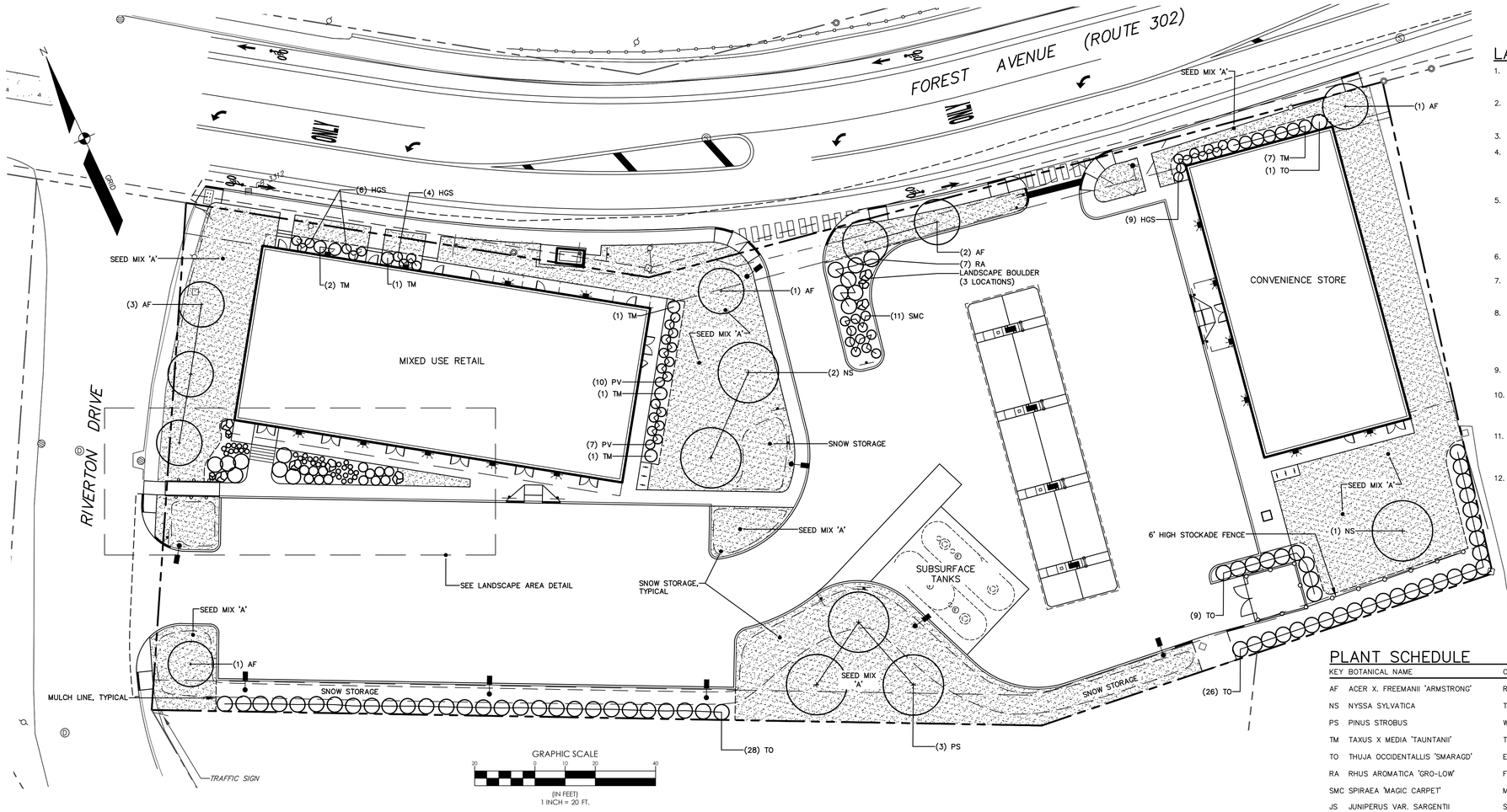
SEBAGO TECHNICS
WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
Tel: 207-200-2100

GRADING & UTILITY PLAN
OF:
PINE STATE FAMILY MART
1884 FOREST AVENUE
PORTLAND, MAINE 04103
FOR:
JOHN CHAU
75 ARCADIA ST.
PORTLAND, MAINE 04103

PROJECT NO.	SCALE
11142	1" = 20'

SHEET 4 OF 9

11142GU.dwg, TAB: GU



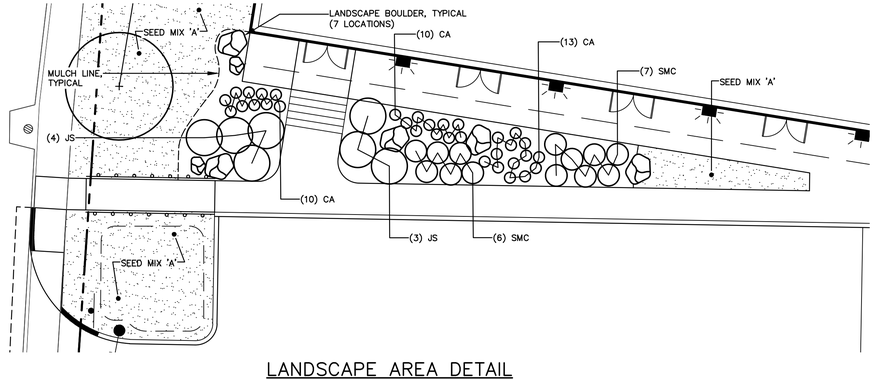
LANDSCAPE NOTES

1. PLANT QUANTITIES SHOWN ON PLANT LISTS ARE FOR CONVENIENCE TO THE CONTRACTOR ONLY. THE CONTRACTOR IS RESPONSIBLE FOR ALL PLANT MATERIAL INSTALLATION AS SHOWN ON PLANS.
2. SIZE AND GRADING STANDARDS OF PLANT MATERIALS SHALL CONFORM TO THE LATEST EDITION OF "U.S.A. STANDARD FOR NURSERY STOCK," BY THE AMERICAN ASSOCIATION OF NURSERYMEN, INC.
3. ALL PLANT MATERIAL SHALL BE FREE FROM INSECTS AND DISEASE.
4. ALL PLANTING SHALL BE DONE IN ACCORDANCE WITH ACCEPTABLE HORTICULTURAL PRACTICES. THIS IS TO INCLUDE PROPER PLANTING MIX, PLANT BED AND TREE PIT PREPARATION, PRUNING, STAKING OR GUYING, WRAPPING, SPRAYING, FERTILIZATION, PLANTING AND ADEQUATE MAINTENANCE UNTIL ACCEPTANCE BY THE OWNER.
5. PLANT MATERIAL SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR BY THE CONTRACTOR AND A PERIOD OF TWO YEARS THEREAFTER BY THE OWNER FROM DATE OF INSTALLATION. DURING THE ONE YEAR GUARANTEE PERIOD, DEAD PLANT MATERIAL SHALL BE REPLACED AT NO COST TO THE OWNER. AT THE END OF THE ONE YEAR PERIOD, THE CONTRACTOR SHALL OBTAIN FINAL ACCEPTANCE FROM THE OWNER.
6. ALL GRASS, OTHER VEGETATION AND DEBRIS SHALL BE REMOVED FROM ALL PLANTING AREAS PRIOR TO PLANTING.
7. EXISTING TREES TO BE PRESERVED WILL BE PROTECTED DURING CONSTRUCTION AND SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR.
8. THE LANDSCAPE CONTRACTOR IS ADVISED OF THE PRESENCE OF THE UNDERGROUND UTILITIES AND SHALL VERIFY THE EXISTENCE AND LOCATION OF SAME BEFORE COMMENCING AND DIGGING OPERATIONS. THE LANDSCAPE CONTRACTOR SHALL REPLACE OR REPAIR UTILITIES, PAVING, WALKS, CURBING, ETC. DAMAGED IN PERFORMANCE OF THIS JOB AT NO ADDITIONAL COST TO THE OWNER.
9. ALL SHRUB BEDS SHALL BE MULCHED WITH 3" CLEAN SHREDDED DARK BROWN BARK MULCH.
10. THE CONTRACTOR SHALL PROVIDE 4" LOAM FOR ALL AREAS TO BE SODDED OR SEEDED. PLANTING AREAS SHALL RECEIVE 12" ROLLED THICKNESS OF LOAM. THE LANDSCAPE CONTRACTOR SHALL COORDINATE SUBGRADE PREPARATION WITH THE GENERAL CONTRACTOR PRIOR TO PLACING LOAM.
11. ANY DEVIATION FROM THE LANDSCAPE PLAN, INCLUDING PLANT LOCATION, SELECTION, SIZE, QUANTITY OR CONDITION SHALL BE REVIEWED AND APPROVED BY THE OWNER AND LANDSCAPE ARCHITECT (AND MUNICIPAL AUTHORITY, IF APPLICABLE) PRIOR TO INSTALLATION ON SITE.
12. WHERE INDICATED ON PLAN, PLANTING SOIL MIXTURE FOR PERENNIAL AND ANNUAL FLOWER BED AREAS SHALL CONSIST OF FOUR PARTS TOPSOIL, TWO PARTS SPHAGNUM PEAT MOSS, AND ONE PART HORTICULTURAL PERLITE BY VOLUME. PEAT MOSS MAY BE SUBSTITUTED WITH WELL-ROTTED OR DEHYDRATED MANURE OR COMPOST. ROTOTILL BEDS TO A DEPTH OF 8 INCHES.

PLANT SCHEDULE

KEY	BOTANICAL NAME	COMMON NAME	SIZE / NOTES
AF	ACER X. FREEMANII 'ARMSTRONG'	RED MAPLE	3" CAL.
NS	NYSSA SYLVATICA	TUPELO	3" CAL.
PS	PINUS STROBUS	WHITE PINE	10'-12' HGT
TM	TAXUS X MEDIA 'TAUNTANII'	TAUNTANI YEW	18"-24"
TO	THUJA OCCIDENTALLIS 'SMARAGD'	EMERALD GREEN ARBORVITAE	3 IN. CAL.
RA	RHUS AROMATICA 'GRO-LOW'	FRAGRENT SUMAC	#3 CONTAINER
SMC	SPIRAEA 'MAGIC CARPET'	MAGIC CARPET SPIREA	#3 CONTAINER
JS	JUNIPERUS VAR. SARGENTII	SARGENTII JUNIPER	#3 CONTAINER
CA	CALAMAGROSTIS ACUTIFLORA 'OVERDAM'	DWARF FEATHER REED GRASS	#2 CONTAINER
HGS	HOSTA 'GOLD STANDARD'	GOLD STANDARD HOSTA	#1 CONTAINER
PV	PANICUM VIRGATUM 'CHEYENNE SKY'	CHEYENNE SKY SWITCHGRASS	#1 CONTAINER

SEED MIX A - MEDOT PARK MIX



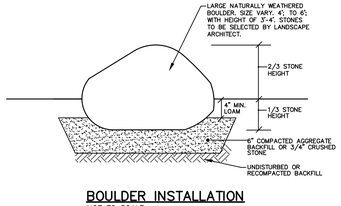
LANDSCAPE AREA DETAIL

1" = 10'

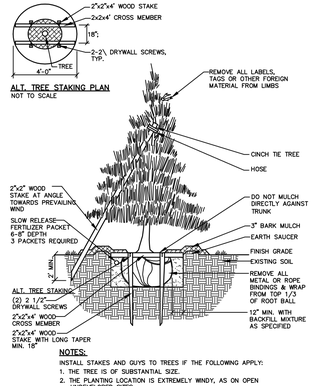
GRAPHIC SCALE
10 0 5 10 20
(IN FEET)
1 INCH = 10 FT.

LEGEND

EXISTING	PROPOSED
PROPERTY LINE/R.O.W.	
ABUTTER LINE/R.O.W.	
SETBACK	
EASEMENT	
BUILDING	
EDGE PAVEMENT	
CURB LINE	
EDGE OF WATER	
TREELINE	
MULCH LINE	
DECIDUOUS TREE	
CONIFEROUS TREE	
LIGHT POLE	
SIGN	



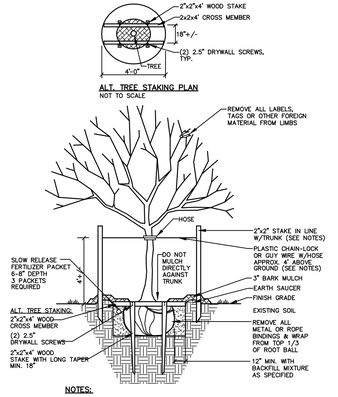
BOULDER INSTALLATION
NOT TO SCALE



ALT. TREE STAKING PLAN
NOT TO SCALE

NOTES:
INSTALL STAKES AND GUYS TO TREES IF THE FOLLOWING APPLY:
1. THE TREE IS OF SUBSTANTIAL SIZE.
2. THE PLANTING LOCATION IS EXTREMELY WINDY, AS ON OPEN UNDEVELOPED SITES.
3. THE PLANTING LOCATION IS COMPRISED OF SAND OR OTHER LOOSE TEXTURED SOILS.
4. IF STAKES AND GUYS ARE REQUIRED, REMOVE AFTER ONE YEAR TIME.

EVERGREEN TREES
NOT TO SCALE



ALT TREE STAKING PLAN
NOT TO SCALE

NOTES:
INSTALL STAKES AND GUYS TO TREES IF THE FOLLOWING APPLY:
1. THE TREE IS OF SUBSTANTIAL SIZE.
2. THE PLANTING LOCATION IS EXTREMELY WINDY, AS ON OPEN UNDEVELOPED SITES.
3. THE PLANTING LOCATION IS COMPRISED OF SAND OR OTHER LOOSE TEXTURED SOILS.
4. IF STAKES AND GUYS ARE REQUIRED, REMOVE AFTER ONE YEAR TIME.

DECIDUOUS TREES
NOT TO SCALE

STEPHEN G. DOE, RLA 131
REGISTERED LANDSCAPE ARCHITECT
STEPHEN G. DOE
No. 131
STATE OF MAINE
04-18-19

DESIGNED	CHECKED
DMD	SGD

REV.	BY:	DATE:	STATUS
B	SGD	4-18-19	RESPONSE TO CITY COMMENTS
A	SGD	9-10-18	SUBMIT TO CITY OF PORTLAND

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PROJECT NO.	SCALE
11142	1" = 20'

SHEET 5 OF 9

11142L.dwg, TAB:L

EROSION CONTROL MEASURES:

PRE-CONSTRUCTION PHASE

PRIOR TO THE BEGINNING OF ANY CONSTRUCTION, SEDIMENT BARRIERS (SILT FENCE) WILL BE STAKED/INSTALLED ACROSS THE SLOPE(S), ON THE CONTOUR AT OR JUST BELOW THE LIMITS OF CLEARING OR GRUBBING, AND/OR JUST ABOVE ANY ADJACENT PROPERTY LINE OR WATERCOURSE TO PROTECT AGAINST CONSTRUCTION RELATED EROSION. THE PLACEMENT OF SEDIMENT BARRIERS SHALL BE COMPLETED IN ACCORDANCE WITH GUIDELINES ESTABLISHED IN BEST MANAGEMENT PRACTICES AND IN ACCORDANCE WITH THIS EROSION CONTROL PLAN AND DETAILS IN THIS PLAN SET. THIS NETWORK IS TO BE MAINTAINED BY THE CONTRACTOR UNTIL ALL EXPOSED SLOPES HAVE AT LEAST 85%-90% VIGOROUS PERENNIAL VEGETATIVE COVER TO PREVENT EROSION. TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER PERMANENT STABILIZATION IS ATTAINED.

PRIOR TO ANY CLEARING OR GRUBBING, A CONSTRUCTION ENTRANCE/EXIT SHALL BE CONSTRUCTED AT THE INTERSECTION OF THE PROPOSED ENTRANCES AND EXISTING ROADWAY TO AVOID TRACKING OF MUD, DUST AND DEBRIS FROM THE SITE.

PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL PREPARE A DETAILED SCHEDULE AND MARKED UP PLAN INDICATING AREAS AND COMPONENTS OF THE WORK AND KEY DATES SHOWING DATE OF DISTURBANCE AND COMPLETION OF THE WORK. THE CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH THE MUNICIPAL STAFF. THREE COPIES OF THE SCHEDULE AND MARKED UP PLAN SHALL BE PROVIDED TO THE MUNICIPALITY THREE DAYS PRIOR TO THE SCHEDULED PRE-CONSTRUCTION MEETING. SPECIAL ATTENTION SHALL BE GIVEN TO THE 14 DAY LIMIT OF DISTURBANCE IN THE SCHEDULE ADDRESSING TEMPORARY AND PERMANENT VEGETATION MEASURES.

CONSTRUCTION AND POST-CONSTRUCTION PHASE

AREAS UNDERGOING ACTUAL CONSTRUCTION SHALL ONLY EXPOSE THAT AMOUNT OF MINERAL SOIL NECESSARY FOR PROGRESSIVE AND EFFICIENT CONSTRUCTION . AN AREA CONSIDERED OPEN IS ANY AREA NOT STABILIZED WITH PAVEMENT, VEGETATION, MULCHING, EROSION CONTROL MATS, RIPRAP OR GRAVEL BASE ON A ROAD . OPEN AREAS SHALL BE ANCHORED WITH TEMPORARY EROSION CONTROL AS SHOWN ON THE DESIGN PLANS AND AS DESCRIBED WITHIN THIS EROSION CONTROL PLAN WITHIN 14-DAYS OF DISTURBANCE. AREAS LOCATED WITHIN 100' OF STREAMS SHALL BE ANCHORED WITH TEMPORARY EROSION CONTROL WITHIN SEVEN (7) DAYS. REFER TO WINTER EROSION CONTROL NOTES FOR THE TREATMENT OF OPEN AREAS AFTER OCTOBER 1ST OF THE CONSTRUCTION YEAR.

THE CONTRACTOR MUST INSTALL ANY ADDED MEASURES WHICH MAY BE NECESSARY TO CONTROL EROSION/SEDIMENTATION FROM THE SITE DEPENDENT UPON THE ACTUAL SITE AND WEATHER CONDITIONS. CONTINUATION OF EARTHWORK OPERATIONS ON ADDITIONAL AREAS SHALL NOT BEGIN UNTIL THE EXPOSED SOIL SURFACE ON THE AREA BEING WORKED HAS BEEN STABILIZED, IN ORDER TO MINIMIZE AREAS WITHOUT EROSION CONTROL PROTECTION.

EROSION CONTROL APPLICATIONS & MEASURES

THE PLACEMENT OF EROSION CONTROL MEASURES SHALL BE COMPLETED IN ACCORDANCE WITH GUIDELINES ESTABLISHED IN BEST MANAGEMENT PRACTICES AND IN ACCORDANCE WITH THE EROSION CONTROL PLAN AND DETAILS IN THE PLAN SET.

1. TEMPORARY MULCHING:

   ALL DISTURBED AREAS SHALL BE MULCHED WITH MATERIALS SPECIFIED BELOW PRIOR TO ANY STORM EVENT. ALL DISTURBED AREAS NOT FINAL GRADED WITHIN 14 DAYS SHALL BE MULCHED, ALSO, AREAS WHICH HAVE BEEN TEMPORARILY OR PERMANENTLY SEEDED SHALL BE MULCHED IMMEDIATELY FOLLOWING SEEDING. EROSION CONTROL BLANKETS ARE RECOMMENDED TO BE USED AT THE BASE OF GRASSED WATERWAYS AND ON SLOPES GREATER THAN 15%. MULCH ANCHORING SHOULD BE USED ON SLOPES GREATER THAN 5% AFTER SEPTEMBER 15TH OF THE CONSTRUCTION YEAR (SEE WINTER EROSION CONTROL NOTES).
   TYPES OF MULCH:
   HAY OR STRAW: SHALL BE APPLIED AT A RATE OF 75 LBS/1,000 S.F. (1.5 TONS PER ACRE).
   EROSION CONTROL MIX: SHALL BE PLACED EVENLY AND MUST PROVIDE 100% SOIL COVERAGE. EROSION CONTROL MIX SHALL BE APPLIED SUCH THAT THE THICKNESS ON SLOPES 3:1 OR LESS IS 2 INCHES PLUS 1/2 INCH PER 20 FEET OF SLOPE UP TO 100 FEET. THE THICKNESS ON SLOPES BETWEEN 3:1 AND 2:1 SHALL BE 4 INCHES PLUS 1/2 INCH PER 20 FEET OF SLOPE UP TO 100 FEET. THIS SHALL NOT BE USED ON SLOPES GREATER THAN 2:1.
   EROSION CONTROL BLANKET: SHALL BE INSTALLED SUCH THAT CONTINUOUS CONTACT BETWEEN THE MAT AND THE SOIL IS OBTAINED. INSTALL BLANKETS AND STAPLE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

2. SOIL STOCKPILES:

   STOCKPILES OF SOIL OR SUBSOIL SHALL BE MULCHED WITH HAY OR STRAW AT A RATE OF 75 LBS/1,000 S.F. (1.5 TONS PER ACRE) OR WITH A FOUR-INCH LAYER OF WOOD WASTE EROSION CONTROL MIX. THIS WILL BE DONE WITHIN 24 HOURS OF STOCKING AND RE-ESTABLISHED PRIOR TO ANY RAINFALL. ANY SOIL STOCKPILE WILL NOT BE PLACED (EVEN COVERED WITH HAY OR STRAW) WITHIN 100 FEET FROM ANY NATURAL RESOURCES.

3. NATURAL RESOURCES PROTECTION:

   ANY AREAS WITHIN 100 FEET FROM ANY NATURAL RESOURCES, IF NOT STABILIZED WITH A MINIMUM OF 75% MATURE VEGETATION CATCH, SHALL BE MULCHED USING TEMPORARY MULCHING (AS DESCRIBED IN PART 1. OF THIS SECTION) WITHIN 7 DAYS OF EXPOSURE OR PRIOR TO ANY STORM EVENT. SEDIMENT BARRIERS (AS DESCRIBED IN PART 4. OF THIS SECTION) SHALL BE PLACED BETWEEN ANY NATURAL RESOURCE AND THE DISTURBED AREA.
   PROJECTS CROSSING THE NATURAL RESOURCE SHALL BE PROTECTED A MINIMUM DISTANCE OF 100 FEET ON EITHER SIDE FROM THE RESOURCE.

4. SEDIMENT BARRIERS:

   PRIOR TO THE BEGINNING OF ANY CONSTRUCTION, SEDIMENT BARRIERS SHALL BE STAKED ACROSS THE SLOPE(S), ON THE CONTOUR AT OR JUST BELOW THE LIMITS OF CLEARING OR GRUBBING, AND/OR JUST ABOVE ANY ADJACENT PROPERTY LINE OR WATERCOURSE TO PROTECT AGAINST CONSTRUCTION RELATED EROSION. SEDIMENT BARRIERS SHALL BE MAINTAINED BY THE CONTRACTOR UNTIL ALL EXPOSED SLOPES HAVE AT LEAST 85%-90% VIGOROUS PERENNIAL VEGETATIVE COVER TO PREVENT EROSION.

   SILT FENCE: SHALL BE INSTALLED PER THE DETAIL ON THE PLANS. THE EFFECTIVE HEIGHT OF THE FENCE SHALL NOT EXCEED 36 INCHES. IT IS RECOMMENDED THAT SILT FENCE BE REMOVED BY CUTTING THE FENCE MATERIALS AT GROUND LEVEL SO AS TO AVOID ADDITIONAL SOIL DISTURBANCE.

   HAY BALES: SHALL BE INSTALLED PER THE DETAIL ON THE PLANS. BALES SHALL BE WIRE-BOUND OR STRING-TIED AND THESE BINDINGS MUST REMAIN PARALLEL WITH THE GROUND SURFACE DURING INSTALLATION TO PREVENT DETERIORATION OF THE BINDINGS. BALES SHALL BE INSTALLED WITHIN A MINIMUM 4 INCH DEEP TRENCH LINE WITH ENDS OF ADJACENT BALES TIGHTLY ABUTTING ONE ANOTHER.

   EROSION CONTROL MIX: SHALL BE INSTALLED PER THE DETAIL ON THE PLANS. THE MIX SHALL CONSIST PRIMARILY OF ORGANIC MATERIAL AND CONTAIN A WELL-GRADED MIXTURE OF PARTICLE SIZES AND MAY CONTAIN ROCKS LESS THAN 4 INCHES IN DIAMETER. THE MIX COMPOSITION SHALL MEET THE STANDARDS DESCRIBED WITHIN THE MDEP BEST MANAGEMENT PRACTICES. NO TRENCHING IS REQUIRED FOR INSTALLATION OF THIS BARRIER.

   CONTINUOUS CONTAINED BERM: SHALL BE INSTALLED PER THE DETAIL ON THE PLANS. THIS SEDIMENT BARRIER IS EROSION CONTROL MIX PLACED WITHIN A SYNTHETIC TUBULAR NETTING AND PERFORMS AS A STURDY SEDIMENT BARRIER THAT WORKS WELL ON HARD GROUND SUCH AS FROZEN CONDITIONS, TRAVELED AREAS OR PAVEMENT. NO TRENCHING IS REQUIRED FOR INSTALLATION OF THIS BARRIER.

5. TEMPORARY CHECK DAMS:

   SHALL BE INSTALLED PER THE DETAIL ON THE PLANS. CHECK DAMS ARE TO BE PLACED WITHIN DITCHES/ SWALES AS SPECIFIED ON THE DESIGN PLANS IMMEDIATELY AFTER FINAL GRADING. CHECK DAMS SHALL BE 2 FEET HIGH. TEMPORARY CHECK DAMS MAY BE REMOVED ONLY AFTER THE ROADWAYS ARE PAVED AND THE VEGETATED SWALE ARE ESTABLISHED WITH AT LEAST 85%-90% OF VIGOROUS PERENNIAL GROWTH. THE AREA BENEATH THE CHECK DAM MUST BE SEEDED AND MULCHED IMMEDIATELY AFTER REMOVAL OF THE CHECK DAM.

   STONE CHECK DAMS: SHOULD BE CONSTRUCTED OF 2 TO 3 INCH STONE AND PLACED SUCH THAT COMPLETE COVERAGE OF THE SWALE IS OBTAINED AND THAT THE CENTER OF THE DAM IS 6 INCHES LOWER THAT THE OUTER EDGES.

   HAY BALE CHECK DAMS: WE DO NOT RECOMMEND THE USE OF HAY BALES AS CHECK DAMS.

   MANUFACTURED CHECK DAMS: MANUFACTURED CHECK DAMS, AS SPECIFIED IN THE DETAIL ON THE PLANS, MAY BE USED IF AUTHORIZED BY THE PROPER LOCAL, STATE OR FEDERAL REGULATING AGENCIES. THESE UNITS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURE'S RECOMMENDATIONS.

6. STORMDRAIN INLET PROTECTION:

   INLET PROTECTION SHALL BE PLACED AROUND A STORMDRAIN DROP INLETOR CURB INLET PRIOR TO PERMANENT STABILIZATION OF THE IMMEDIATE AND UPSTREAM DISTURBED AREAS. THEY SHALL BE CONSTRUCTED IN A MANNER THAT WILL FACILITATE CLEAN-OUT AND DISPOSAL OF TRAPPED SEDIMENTS AND MINIMIZE INTERFERENCE WITH CONSTRUCTION ACTIVITIES. ANY RESULTANT PONDING OF WATER FROM THE PROTECTION METHOD MUST NOT CAUSE EXCESSIVE INCONVENIENCE OR DAMAGE TO ADJACENT AREAS OR STRUCTURES.

   HAY BALE DROP INLET PROTECTION: WE DO NOT RECOMMEND THE USE OF HAY BALES AS INLET PROTECTION.

   CONCRETE BLOCK AND STONE INLET SEDIMENT FILTER (DROP OR CURB INLET): SHALL BE INSTALLED PER THE DETAIL ON THE PLANS. THE HEIGHT OF THE CONCRETE BLOCK BARRIER CAN VARY BUT MUST BE BETWEEN 12 AND 24 INCHES TALL. A MINIMUM OF 1 INCH CRUSHED STONE SHALL BE USED.

   MANUFACTURED SEDIMENT BARRIERS AND FILTER (DROP OR CURB INLET): MANUFACTURED FILTERS, AS SPECIFIED IN THE DETAIL ON THE PLANS, MAY BE USED IF INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

7. STABILIZED CONSTRUCTION ENTRANCE/EXIT:

   PRIOR TO CLEARING AND/OR GRUBBING THE SITE A STABILIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE CONSTRUCTED WHEREVER TRAFFIC WILL EXIT THE CONSTRUCTION SITE ONTO A PAVED ROADWAY IN ORDER TO MINIMIZE THE TRACKING OF SEDIMENT AND DEBRIS FROM THE CONSTRUCTION SITE ONTO PUBLIC ROADWAYS. THE ENTRANCES AND ADJACENT ROADWAY AREAS SHALL BE PERIODICALLY SWEPT OR WASHED TO FURTHER MINIMIZE THE TRACKING OF MUD, DUST OR DEBRIS FROM THE CONSTRUCTION AREA. STABILIZED CONSTRUCTION EXITS SHALL BE CONSTRUCTED IN AREAS SPECIFIED ON THE PLANS AND AS DETAILED ON THE PLANS.

8. DUST CONTROL:

   DUST CONTROL DURING CONSTRUCTION SHALL BE ACHIEVED BY THE USE OF A WATERING TRUCK TO PERIODICALLY SPRINKLE THE EXPOSED ROADWAY AREAS AS NECESSARY TO REDUCE DUST DURING THE DRY MONTHS. APPLYING OTHER DUST CONTROL PRODUCTS SUCH AS CALCIUM CHLORIDE OR OTHER MANUFACTURED PRODUCTS ARE ALLOWED IF AUTHORIZED BY THE PROPER LOCAL, STATE AND/OR FEDERAL REGULATING AGENCIES. HOWEVER, IT IS THE CONTRACTOR'S ULTIMATE RESPONSIBILITY TO MITIGATE DUST AND SOIL LOSS FROM THE SITE.

9. TEMPORARY VEGETATION:

   TEMPORARY VEGETATION SHALL BE APPLIED TO DISTURBED AREAS THAT WILL NOT RECEIVE FINAL GRADING FOR PERIODS UP TO 12 MONTHS. THIS PROCEDURE SHOULD BE USED EXTENSIVELY IN AREAS ADJACENT TO NATURAL RESOURCES. SEEDBED PREPARATION AND APPLICATION OF SEED SHALL BE CONDUCTED AS INDICATED IN THE PERMANENT VEGETATION SECTION OF THIS NARRATIVE. SPECIFIC SEEDS (FAST GROWING AND SHORT LIVING) SHALL BE SELECTED FROM THE MAINE EROSION AND SEDIMENT CONTROL BMP MANUAL DATED 3/2003 OR LATER. ALTERNATIVE EROSION CONTROL MEASURES SHOULD BE USED IF SEEDING CAN NOT BE DONE BEFORE SEPTEMBER 15TH OF THE CONSTRUCTION YEAR.

10. PERMANENT VEGETATION:

    REVEGETATION MEASURES SHALL COMMENCE IMMEDIATELY UPON COMPLETION OF FINAL GRADING OF AREAS TO BE LOAMED AND SEEDED. THE APPLICATION OF SEED SHALL BE CONDUCTED BETWEEN APRIL 1ST AND OCTOBER 1ST OF THE CONSTRUCTION YEAR, PLEASE REFER TO THE WINTER EROSION CONTROL NOTES FOR MORE DETAIL. REVEGETATION MEASURES SHALL CONSIST OF THE FOLLOWING:

SEEDBED PREPARATION:

A. FOUR (4) INCHES OF LOAM SHALL BE SPREAD OVER DISTURBED AREAS AND SMOOTHED TO A UNIFORM SURFACE. LOAM SHALL BE FREE OF SUBSOIL, CLAY LUMPS, STONES AND OTHER OBJECTS OVER 2 INCHES OR LARGER IN ANY DIMENSION, AND WITHOUT WEEDS, ROOTS OR OTHER OBJECTIONABLE MATERIAL.

B. SOILS TESTS SHALL BE TAKEN AT THE TIME OF SOIL STRIPPING TO DETERMINE FERTILIZATION REQUIREMENTS. SOILS TESTS SHALL BE TAKEN PROMPTLY AS TO NOT INTERFERE WITH THE 14-DAY LIMIT ON SOIL EXPOSURE. BASED UPON TEST RESULTS, SOIL AMENDMENTS SHALL BE INCORPORATED INTO THE SOIL PRIOR TO FINAL SEEDING. IN LIEU OF SOIL TESTS, SOIL AMENDMENTS MAY BE APPLIED AS FOLLOWS:

ITEM	APPLICATION RATE
10-20-20 FERTILIZER (N-P205-K20 OR EQUAL)	18.4 LBS./1,000 S.F.
GROUND LIMESTONE (50% CALCIUM & MAGNESIUM OXIDE)	138 LBS./1,000 S.F.

C. WORK LIME AND FERTILIZER INTO THE SOIL AS NEARLY AS PRACTICAL TO A DEPTH OF 4 INCHES WITH PROPER EQUIPMENT. ROLL THE AREA TO FIRM THE SEEDBED EXCEPT ON CLAY OR SILTY SOILS OR COARSE SAND.

APPLICATION OF SEED:

A. SEEDING: SHALL BE CONDUCTED BETWEEN APRIL 1ST AND OCTOBER 1ST OF THE CONSTRUCTION YEAR. GENERALLY A SEED MIXTURE MAY BE APPLIED AS FOLLOWS:

   MDOT SEEDING METHOD NO.1- PARK MIXTURE
   MDOT SEEDING METHOD NO.3- ROADSIDE MIXTURE NO.3

   NOTE: A SPECIFIC SEED MIXTURE SHOULD BE CHOSEN TO MATCH THE SOILS CONDITION OF THE SITE. VARIOUS AGENCIES CAN RECOMMEND SEED MIXTURES. MDEP RECOMMENDED SEED MIXTURES ARE IN THE EROSION AND SEDIMENT CONTROL BMP MANUAL DATED 3/2003 OR LATER.

B. HYDROSEEDING: SHALL BE CONDUCTED ON PREPARED AREAS WITH SLOPES LESS THAN 2:1. LIME AND FERTILIZER MAY BE APPLIED SIMULTANEOUSLY WITH THE SEED. RECOMMENDED SEEDING RATES MUST BE INCREASED BY 10% WHEN HYDROSEEDING.

C. MULCHING: SHALL COMMENCE IMMEDIATELY AFTER SEED IS APPLIED. REFER TO THE TEMPORARY MULCHING SECTION OF THIS NARRATIVE FOR DETAILS.

SODDING:

FOLLOWING SEEDBED PREPARATION, SOD CAN BE APPLIED IN LIEU OF SEEDING IN AREAS WHERE IMMEDIATE VEGETATION IS MOST BENEFICIAL SUCH AS DITCHES, AROUND STORMWATER DROP INLETS AND AREAS OF AESTHETIC VALUE. SOD SHOULD BE LAID AT RIGHT ANGLES TO THE DIRECTION OF FLOW, STARTING AT THE LOWEST ELEVATION. SOD SHOULD BE ROLLED OR TAMPED DOWN TO EVEN OUT THE JOINTS ONCE LAID DOWN. WHERE FLOW IS PREVALENT THE SOD MUST BE PROPERLY ANCHORED DOWN. IRRIGATE THE SOD IMMEDIATELY AFTER INSTALLATION. IN MOST CASES, SOD CAN BE ESTABLISHED BETWEEN APRIL 1ST AND NOVEMBER 15TH OF THE CONSTRUCTION YEAR, HOWEVER, REFER TO THE WINTER EROSION CONTROL NOTES FOR ANY ACTIVITIES AFTER OCTOBER 1ST.

TRENCH DEWATERING AND TEMPORARY STREAM DIVERSION:

WATER FROM CONSTRUCTION TRENCH DEWATERING OR TEMPORARY STREAM DIVERSION WILL PASS FIRST THROUGH A FILTER BAG OR SECONDARY CONTAINMENT STRUCTURE (E.G. HAY BALE LINED POOL) PRIOR TO DISCHARGE. THE DISCHARGE SITE SHALL BE SELECTED TO AVOID FLOODING AND SEDIMENT DISCHARGES TO A PROTECTED RESOURCE. IN NO CASE SHALL THE FILTER BAG OR CONTAINMENT STRUCTURE BE LOCATED WITHIN 100 FEET OF A PROTECTED NATURAL RESOURCE.

STANDARDS FOR TIMELY STABILIZATION:

STANDARD FOR THE TIMELY STABILIZATION OF DISTURBED SLOPES -- THE CONTRACTOR WILL CONSTRUCT AND STABILIZE STONE-COVERED SLOPES BY NOVEMBER 15. THE CONTRACTOR WILL SEED AND MULCH ALL SLOPES TO BE VEGETATED BY SEPTEMBER 15. THE MDEP WILL CONSIDER ANY AREA HAVING A GRADE GREATER THAN 15% (10H:1V) TO BE A SLOPE. IF THE CONTRACTOR FAILS TO STABILIZE ANY SLOPE TO BE VEGETATED BY SEPTEMBER 15, THEN THE CONTRACTOR WILL TAKE ONE OF THE FOLLOWING ACTIONS TO STABILIZE THE SLOPE FOR LATE FALL AND WINTER.

A. STABILIZE THE SOIL WITH TEMPORARY VEGETATION AND EROSION CONTROL MATS -- BY OCTOBER 1 THE CONTRACTOR WILL SEED THE DISTURBED SLOPE WITH WINTER RYE AT A SEEDING RATE OF 3 POUNDS PER 1,000 SQUARE FEET AND APPLY EROSION CONTROL MATS OVER THE MULCHED SLOPE. THE CONTRACTOR WILL MONITOR GROWTH OF THE RYE OVER THE NEXT 30 DAYS. IF THE RYE FAILS TO GROW AT LEAST THREE INCHES OR COVER AT LEAST 75% OF THE DISTURBED SLOPE BY NOVEMBER 1, THEN THE APPLICANT WILL COVER THE SLOPE WITH A LAYER OF WOOD WASTE COMPOST AS DESCRIBED IN ITEM 2(C.) OF THIS STANDARD OR WITH STONE RIPRAP AS DESCRIBED IN ITEM 2(D.) OF THIS STANDARD.
B. STABILIZE THE SLOPE WITH SOD -- THE CONTRACTOR WILL STABILIZE THE DISTURBED SLOPE WITH PROPERLY INSTALLED SOD BY OCTOBER 1. PROPER INSTALLATION INCLUDES THE APPLICANT PINNING THE SOD ONTO THE SLOPE WITH WIRE PINS, ROLLING THE SOD TO GUARANTEE CONTACT BETWEEN THE SOD AND UNDERLYING SOIL, AND WATERING THE SOD TO PROMOTE ROOT GROWTH INTO THE DISTURBED SOIL. THE APPLICANT WILL NOT USE LATE-SEASON SOD INSTALLATION TO STABILIZE SLOPES HAVING A GRADE GREATER THAN 33% (3H:1V).
C. STABILIZE THE SLOPE WITH WOOD WASTE COMPOST -- THE CONTRACTOR WILL PLACE A SIX-INCH LAYER OF WOOD WASTE COMPOST ON THE SLOPE BY NOVEMBER 15. PRIOR TO PLACING THE WOOD WASTE COMPOST, THE APPLICANT WILL REMOVE ANY SNOW ACCUMULATION ON THE DISTURBED SLOPE. THE APPLICANT WILL NOT USE WOOD WASTE COMPOST TO STABILIZE SLOPES HAVING GRADES GREATER THAN 50% (2H:1V) OR HAVING GROUNDWATER SEEPS ON THE SLOPE FACE.
D. STABILIZE THE SLOPE WITH STONE RIPRAP -- THE CONTRACTOR WILL PLACE A LAYER OF STONE RIPRAP ON THE SLOPE BY NOVEMBER 15. THE APPLICANT WILL HIRE A REGISTERED PROFESSIONAL ENGINEER TO DETERMINE THE STONE SIZE NEEDED FOR STABILITY AND TO DESIGN A FILTER LAYER FOR UNDERNEATH THE RIPRAP.

STANDARD FOR THE TIMELY STABILIZATION OF DISTURBED SOILS -- BY SEPTEMBER 15 THE CONTRACTOR WILL SEED AND MULCH ALL DISTURBED SOILS ON AREAS HAVING A SLOPE LESS THAN 15%. IF THE CONTRACTOR FAILS TO STABILIZE THESE SOILS BY THIS DATE, THEN THE CONTRACTOR WILL TAKE ONE OF THE FOLLOWING ACTIONS TO STABILIZE THE SOIL FOR LATE FALL AND WINTER.

A. STABILIZE THE SOIL WITH TEMPORARY VEGETATION -- BY OCTOBER 1 THE CONTRACTOR WILL SEED THE DISTURBED SOIL WITH WINTER RYE AT A SEEDING RATE OF 3 POUNDS PER 1000 SQUARE FEET, LIGHTLY MULCH THE SEEDED SOIL WITH HAY OR STRAW AT 75 POUNDS PER 1000 SQUARE FEET, AND ANCHOR THE MULCH WITH PLASTIC NETTING. THE APPLICANT WILL MONITOR GROWTH OF THE RYE OVER THE NEXT 30 DAYS. IF THE RYE FAILS TO GROW AT LEAST THREE INCHES OR COVER AT LEAST 75% OF THE DISTURBED SOIL BEFORE NOVEMBER 15, THEN THE APPLICANT WILL MULCH THE AREA FOR OVER-WINTER PROTECTION AS DESCRIBED IN ITEM 3(C.) OF THIS STANDARD.
B. STABILIZE THE SOIL WITH SOD -- THE APPLICANT WILL STABILIZE THE DISTURBED SOIL WITH PROPERLY INSTALLED SOD BY OCTOBER 1. PROPER INSTALLATION INCLUDES THE APPLICANT PINNING THE SOD ONTO THE SOIL WITH WIRE PINS, ROLLING THE SOD TO GUARANTEE CONTACT BETWEEN THE SOD AND UNDERLYING SOIL, AND WATERING THE SOD TO PROMOTE ROOT GROWTH INTO THE DISTURBED SOIL.
C. STABILIZE THE SOIL WITH MULCH -- BY NOVEMBER 15 THE APPLICANT WILL MULCH THE DISTURBED SOIL BY SPREADING HAY OR STRAW AT A RATE OF AT LEAST 150 POUNDS PER 1000 SQUARE FEET ON THE AREA SO THAT NO SOIL IS VISIBLE THROUGH THE MULCH. PRIOR TO APPLYING THE MULCH, THE APPLICANT WILL REMOVE ANY SNOW ACCUMULATION ON THE DISTURBED AREA. IMMEDIATELY AFTER APPLYING THE MULCH, THE APPLICANT WILL ANCHOR THE MULCH WITH PLASTIC NETTING TO PREVENT WIND FROM MOVING THE MULCH OFF THE DISTURBED SOIL.

CONSTRUCTION SCHEDULE

SITE IMPROVEMENTS WILL MOST LIKELY BEGIN IN FALL 2018 DEPENDING UPON FINAL PROJECT APPROVAL. THE FOLLOWING SCHEDULE IS ANTICIPATED FOR THE CONSTRUCTION OF THE SITE IMPROVEMENTS.

SCHEDULE

1.	ESTIMATED CONSTRUCTION TIME:	8 MONTHS
2.	EROSION CONTROL MEASURES PLACED.	MONTH 1
3.	SITE CLEARING AND GRUBBING.	MONTH 1
4.	PLACEMENT & GRADING OF FILL	MONTH 1-3
5.	BUILDING CONSTRUCTION	MONTH 1-3
6.	STORMWATER MANAGEMENT AREA CONSTRUCTION.	MONTH 1-3
7.	UTILITY IMPROVEMENTS	MONTH 2-5
8.	PARKING BASE AND BINDER PAVEMENT	MONTH 2-5
9.	STABILIZE FOR WINTER	OCTOBER 15
10.	LANDSCAPING AND SEEDING	SPRING 2019
11.	CONSTRUCTION OF FINISH PAVEMENT	SPRING 2019
12.	FINAL SEEDING ON PREPARED AREAS. (DURING GROWING SEASON.)	MONTH 6 - MONTH 7
13.	BIWEEKLY MONITORING OF VEGETATIVE GROWTH.	MONTH 7 - MONTH 8
**	14. RE-SEEDING OF AREAS, IF NEEDED.	MONTH 8
**	15. REMOVAL OF EROSION CONTROL DEVICES.	UPON FINAL PROJECT COMPLETION AND STABILIZATION

** DATES ARE SUBJECT TO CHANGE, DEPENDING ON CONSTRUCTION PROGRESS.

HOUSEKEEPING: (CONT.)

C. FUGITIVE SEDIMENT AND DUST: ACTIONS MUST BE TAKEN TO INSURE THAT ACTIVITIES DO NOT RESULT IN NOTICEABLE EROSION OF SOILS OR FUGITIVE DUST EMISSIONS DURING OR AFTER CONSTRUCTION. OIL MAY NOT BE USED FOR DUST CONTROL.

D. DEBRIS AND OTHER MATERIALS: LITTER, CONSTRUCTION DEBRIS, AND CHEMICALS EXPOSED TO STORMWATER MUST BE PREVENTED FROM BECOMING A POLLUTANT SOURCE.

E. TRENCH DEWATERING: TRENCH DEWATERING IS THE REMOVAL OF WATER FROM TRENCHES, FOUNDATIONS, COFFERDAMS, PONDS, AND OTHER AREAS WITHIN THE CONSTRUCTION AREA THAT RETAIN WATER AFTER EXCAVATION. IN MOST CASES, THE COLLECTED WATER IS HEAVILY SILTED AND HINDERS CORRECT AND SAFE CONSTRUCTION PRACTICES. THE COLLECTED WATER MUST BE REMOVED FROM THE PONDED AREA, EITHER THROUGH GRAVITY OR PUMPING, AND MUST BE SPREAD THROUGH NATURAL WOODED BUFFERS OR REMOVED TO AREAS THAT ARE SPECIFICALLY DESIGNED TO COLLECT THE MAXIMUM AMOUNT OF SEDIMENT POSSIBLE, LIKE A COFFERDAM SEDIMENTATION BASIN. AVOID ALLOWING THE WATER TO FLOW OVER DISTURBED AREAS OF THE SITE. EQUIVALENT MEASURES MAY BE TAKEN IF APPROVED.

F. STORMWATER MANAGEMENT: THE CONTRACTOR IS RESPONSIBLE FOR MAINTENANCE AND INSPECTION OF ALL STORMWATER MANAGEMENT INFRASTRUCTURE DURING CONSTRUCTION. REFER TO THE INSPECTION, MAINTENANCE AND HOUSEKEEPING PLAN IN THE STORMWATER MANAGEMENT REPORT FOR SPECIFIC INSTRUCTIONS.

INSPECTIONS/MONITORING:

1. MAINTENANCE MEASURES SHALL BE APPLIED AS NEEDED DURING THE ENTIRE CONSTRUCTION CYCLE. AFTER EACH RAINFALL, SNOW STORM OR PERIOD OF THAWING AND RUNOFF, OR AT LEAST EVERY SEVEN (7) DAYS, THE CONTRACTOR SHALL PERFORM A VISUAL INSPECTION OF ALL INSTALLED EROSION CONTROL MEASURES. THE CONTRACTOR SHALL PERFORM REPAIRS AS NEEDED TO ALLOW CONTINUED PROPER FUNCTIONING OF THE EROSION CONTROL MEASURE. THE CONTRACTOR SHALL PROVIDE THE NECESSARY REGULATING AGENCIES WITH WRITTEN DOCUMENTATION DESCRIBING DATES OF INSPECTIONS AND NECESSARY FOLLOW-UP WORK TO MAINTAIN EROSION CONTROL MEASURES MEETING THE REQUIREMENTS OF THIS PLAN.

2. FOLLOWING THE TEMPORARY AND/OR FINAL SEEDINGS, THE CONTRACTOR SHALL INSPECT THE WORK AREA SEMIMONTHLY UNTIL THE SEEDINGS HAVE BEEN ESTABLISHED. ESTABLISHED MEANS A MINIMUM OF 85%-90% OF AREAS VEGETATED WITH VIGOROUS GROWTH. RESEEDING SHALL BE CARRIED OUT BY THE CONTRACTOR WITH FOLLOW-UP INSPECTIONS IN THE EVENT OF ANY FAILURES UNTIL VEGETATION IS ADEQUATELY ESTABLISHED.

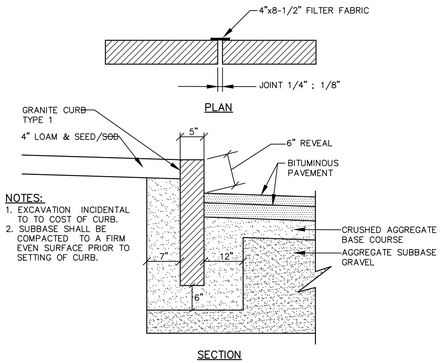
HOUSEKEEPING:

A. SPILL PREVENTION: CONTROLS MUST BE USED TO PREVENT POLLUTANTS FROM BEING DISCHARGED FROM MATERIALS ON-SITE, INCLUDING STORAGE PRACTICES TO MINIMIZE EXPOSURE OF THE MATERIALS TO STORMWATER, AND APPROPRIATE SPILL PREVENTION, CONTAINMENT, AND RESPONSE PLANNING AND IMPLEMENTATION.

B. GROUNDWATER PROTECTION: DURING CONSTRUCTION, LIQUID PETROLEUM PRODUCTS AND OTHER HAZARDOUS MATERIALS WITH THE POTENTIAL TO CONTAMINATE GROUNDWATER MAY NOT BE STORED OR HANDLED IN AREAS OF THE SITE DRAINING TO AN INFILTRATION AREA. AN "INFILTRATION AREA" IS ANY AREA OF THE SITE THAT BY DESIGN OR AS A RESULT OF SOILS, TOPOGRAPHY AND OTHER RELEVANT FACTORS, ACCUMULATES RUNOFF THAT INFILTRATES INTO THE SOIL. DIKES, BERMS, SUMPS, AND OTHER FORMS OF SECONDARY CONTAINMENT THAT PREVENT DISCHARGE TO GROUNDWATER MAY BE USED TO ISOLATE PORTIONS OF THE SITE FOR THE PURPOSES OF STORAGE AND HANDLING OF THESE MATERIALS.

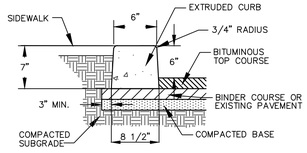
WINTER EROSION CONTROL MEASURES:

THE WINTER CONSTRUCTION PERIOD IS FROM OCTOBER 1 THROUGH APRIL 15. IF THE CONSTRUCTION SITE IS NOT STABILIZED WITH PAVEMENT, A ROAD GRAVEL BASE, 75% MATURE VEGETATION COVER OR RIPRAP BY NOVEMBER 15 THEN THE SITE NEEDS TO BE PROTECTED WITH OVER-WINTER STABILIZATION. AN AREA CONSIDERED OPEN IS ANY AREA NOT STABILIZED WITH PAVEMENT, VEGETATION, MULCHING, EROSION CONTROL MATS, RIPRAP OR GRAVEL BASE ON A ROAD.
WINTER EXCAVATION AND EARTHWORK SHALL BE COMPLETED SUCH THAT NO MORE THAN 1 ACRE OF THE SITE IS WITHOUT STABILIZATION AT ANY ONE TIME. LIMIT THE EXPOSED AREA TO THOSE AREAS IN WHICH WORK IS EXPECTED TO BE UNDER TAKEN DURING THE PROCEEDING 15 DAYS AND THAT CAN BE MULCHED IN ONE DAY PRIOR TO ANY SNOW EVENT. ALL AREAS CONSIDERED TO BE DENUDED UNTIL THE SUBBASE GRAVEL IS INSTALLED IN ROADWAY AREAS OR THE AREAS OF FUTURE LOAM AND SEED HAVE BEEN LOAMED, SEEDED AND MULCHED. HAY AND STRAW MULCH RATE SHALL BE A MINIMUM OF 150 LBS./1,000 S.F. (3 TONS/ACRE) AND SHALL BE PROPERLY ANCHORED.
THE CONTRACTOR MUST INSTALL ANY ADDED MEASURES WHICH MAY BE NECESSARY TO CONTROL EROSION/SEDIMENTATION FROM THE SITE DEPENDENT UPON THE ACTUAL SITE AND WEATHER CONDITIONS.
CONTINUATION OF EARTHWORK OPERATIONS ON ADDITIONAL AREAS SHALL NOT BEGIN UNTIL THE EXPOSED SOIL SURFACE ON THE AREA BEING WORKED HAS BEEN STABILIZED, IN OR



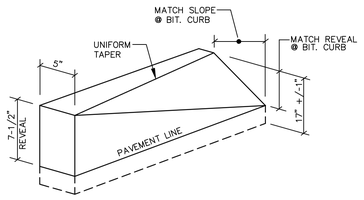
NOTES:
1. EXCAVATION INCIDENTAL TO TO COST OF CURB.
2. SUBBASE SHALL BE COMPACTED TO A FIRM EVEN SURFACE PRIOR TO SETTING OF CURB.

VERTICAL GRANITE CURB
(BID ALTERNATE NO.2)

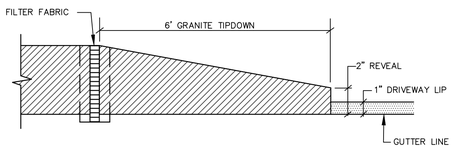


NOTE:
USE SLOPED MOLD WHEREVER CURB ABUTS LANDSCAPE AREAS.

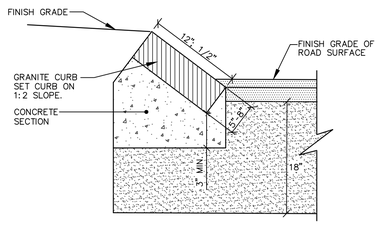
SLIPFORM CONCRETE CURB
NOT TO SCALE



VERTICAL TO SLOPED CURB TRANSITION STONES
NOT TO SCALE

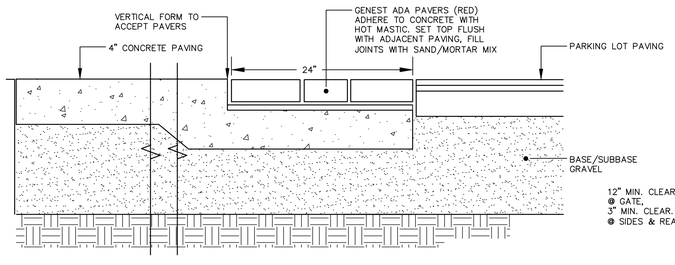


TYPICAL TIPDOWN CURB INSTALLATION
NOT TO SCALE

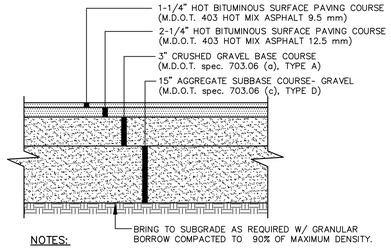


NOTE: REUSE EXISTING GRANITE CURB WHEN POSSIBLE

SLOPED GRANITE CURB (6x12)
NOT TO SCALE

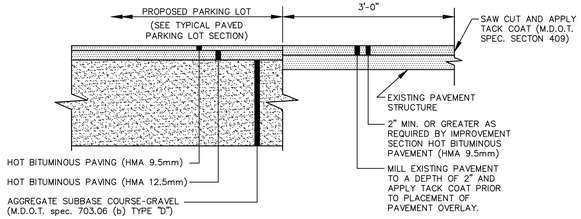


TRUNCATED DOMES AT CROSSWALKS
NOT TO SCALE

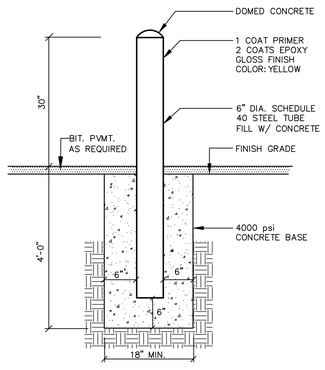


NOTES:
1. COMPACT GRAVEL SUBBASE, BASE COURSE TO 92% OF MAXIMUM DENSITY USING HEAVY ROLLER COMPACTION.
2. CONTRACTOR SHALL SET GRADE STAKES MARKING SUBBASE AND FINISH GRADE ELEVATIONS FOR CONSTRUCTION REFERENCE.

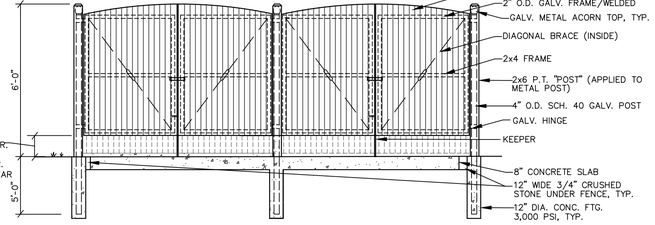
TYP. PAVED PARKING LOT/DRIVEWAY SECTION
NOT TO SCALE

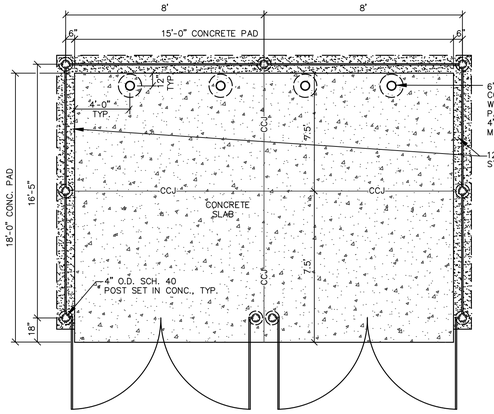


TYPICAL PAVEMENT JOINT
NOT TO SCALE

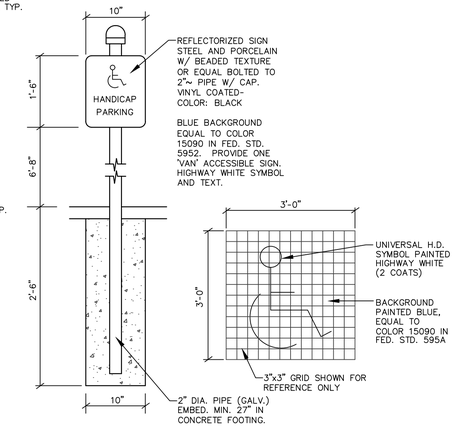


METAL BOLLARD
NOT TO SCALE

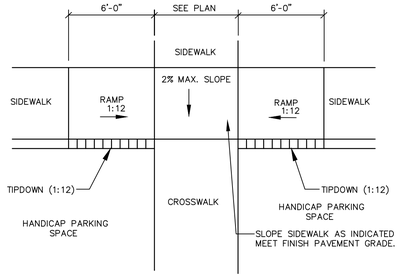




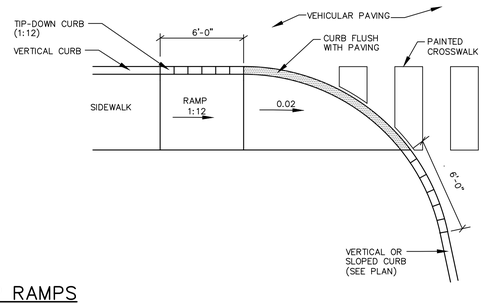
TYPICAL DUMPSTER ENCLOSURE
NOT TO SCALE

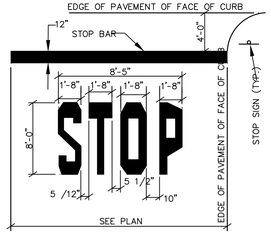


HANDICAP SIGNS
NOT TO SCALE



HANDICAP RAMPS
NOT TO SCALE

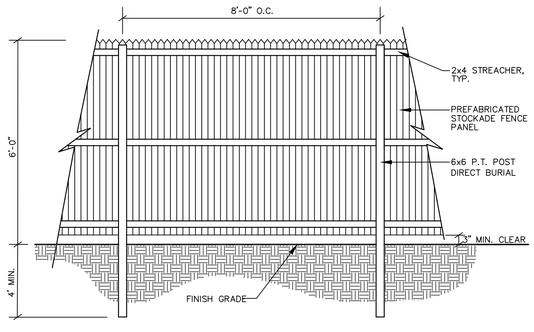




NOTE:
1. WORDS AND ARROWS FOR DRIVEWAYS SHALL BE APPLIED ACCORDING TO REQUIREMENTS AS OUTLINED IN SECTION 3B OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS.

2. THESE WORDS AND BAR ARE TO BE PAINTED REFLECTIVE WHITE.

STOP BAR
NOT TO SCALE



STOCKADE FENCE
NOT TO SCALE

JAMES R. SEYMOUR, PE 9984

STATE OF MAINE — JAMES R. SEYMOUR — No. 9984 — REGISTERED PROFESSIONAL ENGINEER — 04-18-19

DESIGNED	CHECKED
SAH	RLM

REV.	BY:	DATE:	STATUS
A.	RLM	09-10-18	SUMBIT TO CITY OF PORTLAND
B.	JRS	04-18-19	RESPONSE TO CITY COMMENTS

ANY ALTERATIONS, WITHOUT WRITTEN PERMISSION FROM SEBAGO TECHNICS, INC., SHALL RENDER THE ENGINEER OF RECORD RELEASED FROM ALL RESPONSIBILITY AND SHALL INDEMNIFY AND HOLD HARMLESS SEBAGO TECHNICS, INC. AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO SEBAGO TECHNICS, INC.

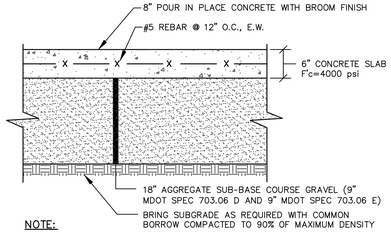
SEBAGO TECHNICS
WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
Tel: 207-200-2100

DETAILS
OF:
PINE STATE FAMILY MART
1884 FOREST AVENUE
PORTLAND, MAINE 04103
FOR:
JOHN CHAU
75 ARCADIA ST.
PORTLAND, MAINE 04103

PROJECT NO.	SCALE
11142	NTS

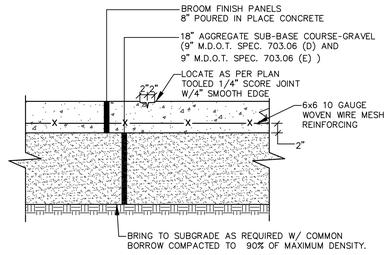
SHEET 7 OF 9

11142D.dwg, TAB:02



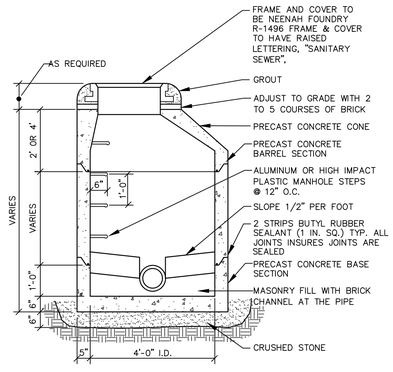
NOTE:
1. PROVIDE CONTRACTION CONTROL JOINTS EVERY 6' IN EACH DIRECTION

TYPICAL CONCRETE SLAB
NOT TO SCALE



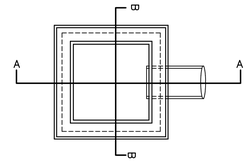
NOTES:
1. COMPACT GRAVEL SUB-BASE, BASE COURSE TO 92% OF MAXIMUM DENSITY USING HEAVY ROLLER COMPACTION.
2. CONTRACTOR SHALL SET GRADE STAKES MARKING SUBBASE AND FINISH GRADE ELEVATIONS FOR CONSTRUCTION REFERENCE.

HEAVY DUTY CONCRETE PAVEMENT
NOT TO SCALE

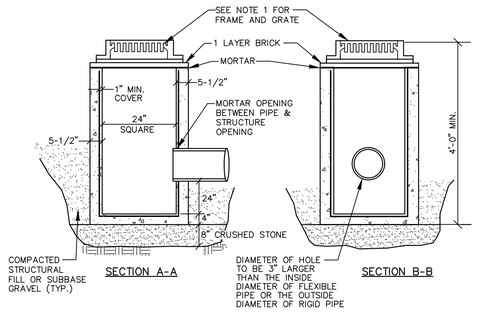


NOTE: PIPE CONNECTIONS SHALL BE WATERTIGHT FLEXIBLE BOOT CONNECTORS PROVIDES LEAKPROOF CONNECTION

PRECAST SEWER MANHOLE
NOT TO SCALE

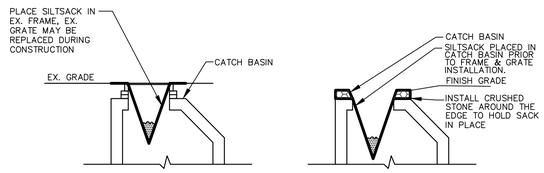


PLAN VIEW

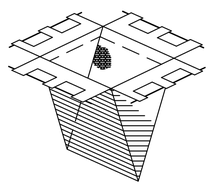


NOTES:
1. FRAME SHALL BE FOR 24" SQUARE GRATE, EAST JORDAN FOUNDRY 5250, OR APPROVED EQUAL.
2. ENTIRE CATCH BASIN WITH EXCEPTION OF LEVELING BRICK FRAME AND GRATE TO BE PRECAST AS SINGLE PORTLAND CEMENT CONCRETE UNIT.

"TYPE F" CATCH BASIN
NOT TO SCALE



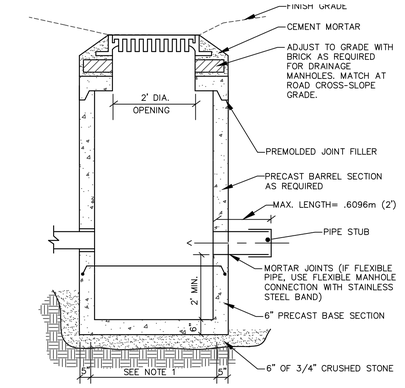
EXISTING BASIN NEW INSTALLATION



SILT SACK PROTECTION

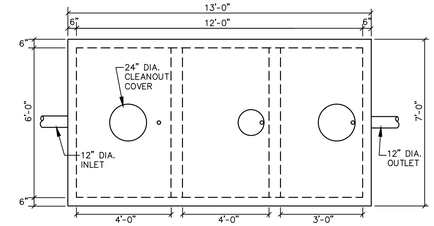
NOTES:
PRIOR TO FINAL GRADING AND PAVING OPERATIONS BEGIN A CATCH BASIN INSERT (SUCH AS A SILT SACK OR A DANDY BAG II) MUST BE INSTALLED IN EACH BASIN PER MANUFACTURES INSTRUCTIONS. HAY BALES SHOULD BE REMOVED ONCE INSERTS ARE INSTALLED.

CATCH BASIN PROTECTION DETAIL (FOR PAVED AREAS)
NOT TO SCALE



NOTES:
1. 4'-0" I.D. TYPICAL. SOME STRUCTURES MAY REQUIRE LARGER I.D. PROVIDE SHOP DRAWINGS.
2. DRAINAGE STRUCTURES TO BE DESIGNED FOR H-20 LOADING.
3. PIPE SIZES AND INVERTS AS NOTED ON PLANS.
4. CATCH BASIN FRAME AND GRATE TO BE ETHERIDGE FOUNDRY E245G AND/OR DR5A (WITH GRANITE STONE) APPROVED EQUAL. LOW PROFILE FRAMES AND COVERS MAY BE USED AS A SUBSTITUTE.
5. DRAINAGE MANHOLE FRAME AND COVER TO BE ETHERIDGE FOUNDRY E245S OR APPROVED EQUAL.

TYP. DRAINAGE STRUCTURE & CATCH BASIN
NOT TO SCALE

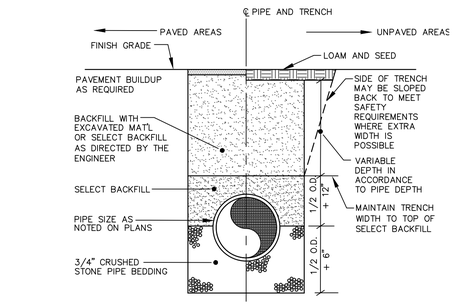


PLAN VIEW

SECTION VIEW

CONSTRUCTION NOTES:
CONCRETE: 5,000 PSI @ 28 DAYS.
CEMENT: TYPE III PER ASTM C150-81.
DESIGN LOADING: ASHTO HS20-44
JOINTS: TO BE SEALED WATERTIGHT WITH ASPHALTIC BUTYL SEALANT.
TEES: PROVIDED & INSTALLED BY CONTRACTOR. PROVIDE RISERS & MANHOLE COVERS TO GRADE.

PRE-CAST OIL & WATER SEPARATOR DETAIL
NOT TO SCALE



TYPICAL TRENCH SECTION
NOT TO SCALE

JAMES R. SEYMOUR, PE 9984

STATE OF MAINE — JAMES R. SEYMOUR No. 9984 — REGISTERED PROFESSIONAL ENGINEER — 04-18-19

DESIGNED	CHECKED
SAH	RLM

REV.	BY	DATE:	STATUS
B	JRS	04-18-19	RESPONSE TO CITY COMMENTS
A	RLM	09-10-18	SUBMIT TO CITY OF PORTLAND

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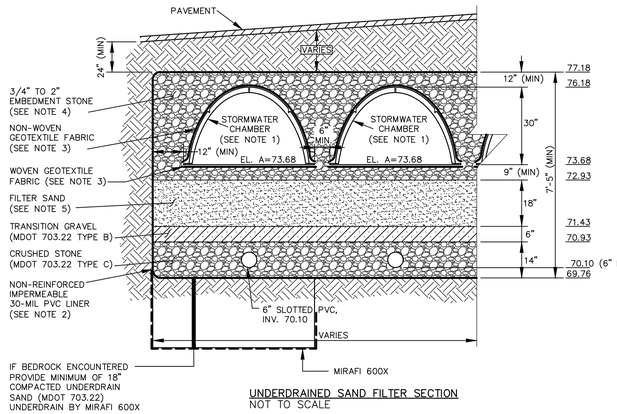
DETAILS
OF:
PINE STATE FAMILY MART
1884 FOREST AVENUE
PORTLAND, MAINE 04103
FOR:
JOHN CHAU
75 ARCADIA ST.
PORTLAND, MAINE 04103

PROJECT NO.	SCALE
11142	NTS

SHEET 8 OF 9

111420.dwg, TAB:D3

SUBSURFACE SAND FILTER SECTION TABLE					
NAME	CHAMBER	CHAMBER BOTTOM ELEV.=A	UNDERDRAIN OUTLET ELEV.=B	ISOLATOR ROW(S) INLET PIPE ELEV.=C	OVERFLOW OUTLET PIPE ELEV.=D
SSSF #1	DC-780	73.68	70.10	73.68	75.12



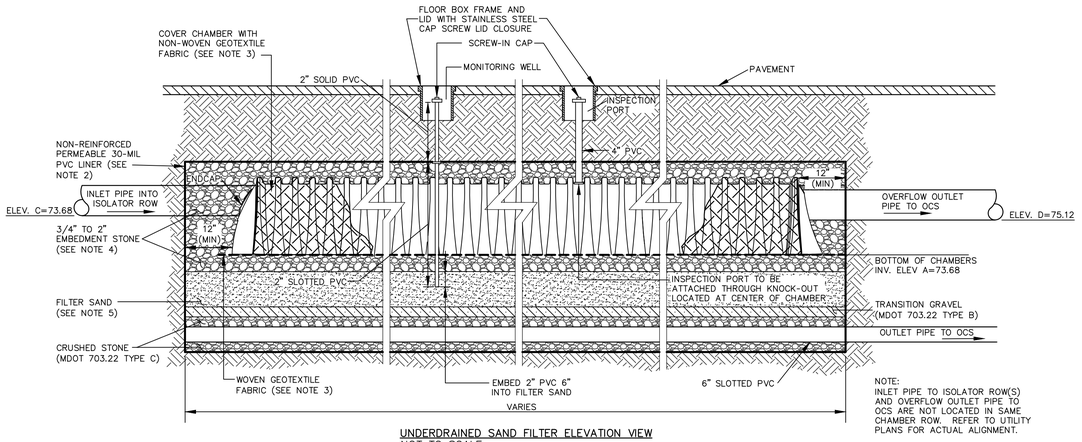
UNDERDRAINED SAND FILTER SECTION
NOT TO SCALE

SUBSURFACE UNDERDRAINED SAND FILTER NOTES:

1. THE STORMWATER CHAMBER SHALL BE A STORMTECH DC-780 OR EQUIVALENT SUBSURFACE STORAGE CHAMBER APPROVED BY THE ENGINEER.
2. THE ENTIRE SUBSURFACE SYSTEM, INCLUDING THE CRUSHED STONE STORAGE VOLUME, THE FILTER MEDIA, AND UNDERDRAIN MATERIALS, SHALL BE WRAPPED IN AN NON-REIFORCED IMPERMEABLE 30-MIL PVC LINER.
3. A STRIP OF WOVEN GEOTEXTILE THAT MEETS AASHTO M288 CLASS ONE REQUIREMENTS (MIRAFI FW404 OR EQUIVALENT) MUST BE PLACED BETWEEN THE BOTTOM OF THE CHAMBER AND ITS STONE FOUNDATION. THIS FABRIC TRAPS SEDIMENTS AND PROTECTS THE UNDERLYING CRUSHED STONE. A SECOND STRIP OF NON-WOVEN AASHTO M288 CLASS 2 GEOTEXTILE (MIRAFI 160N OR EQUIVALENT) SHALL BE DRAPED OVER THE ENTIRE LENGTH OF THE CHAMBERS. THIS FABRIC WILL ALSO TRAP SEDIMENTS AND PROVIDE SEPARATION BETWEEN THE CHAMBERS AND SURROUNDING STONE.
4. THE EMBEDMENT STONE SURROUNDING THE CHAMBERS SHALL BE A WASHED, ANGULAR STONE WITH THE MAJORITY OF PARTICLES BETWEEN 3/4 INCH AND 2 INCH. THE BOTTOM 6 INCH LAYER OF STONE THAT ACTS AS THE FOUNDATION BELOW THE CHAMBERS SHALL BE COMPACTED TO ACHIEVE A 95% STANDARD PROCTOR DENSITY.
5. THE SAND FILTER MATERIAL SHALL BE A UNIFORM MIX, FREE OF STONES LARGER THAN 2 INCHES, STUMPS, ROOTS, OR OTHER SIMILAR OBJECTS. THE MATERIAL SHALL MEET THE SPECIFICATIONS FOR MDOT AGGREGATE SAND (MDOT #703.01). HOWEVER, THIS AGGREGATE SAND SHALL BE MIXED WITH LOAM TO ACHIEVE A MATERIAL WITH BETWEEN 8% AND 10% PASSING THE #200 SIEVE. THE LOAM USED IN THIS MIXTURE SHALL HAVE A MINIMAL CLAY CONTENT. THIS 18 INCH LAYER OF SAND FILTRATION MEDIA SHALL BE PLACED TO ACHIEVE A LEVEL OF COMPACTION BETWEEN 92% AND 95% STANDARD PROCTOR DENSITY.

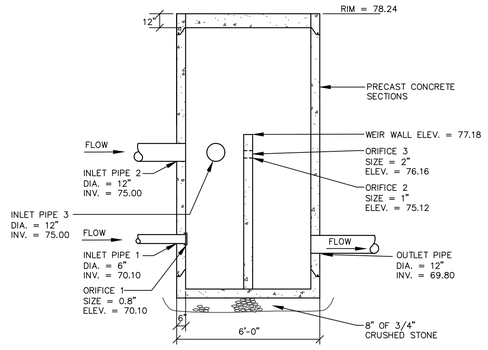
CONSTRUCTION OVERSIGHT NOTES FOR SUBSURFACE SAND FILER:

1. INSPECTIONS BY A PROFESSIONAL ENGINEER SHALL CONSIST OF WEEKLY VISITS TO THE SITE TO INSPECT THE CONSTRUCTION AND STABILIZATION OF THE PROPOSED SUBSURFACE CHAMBERS AND ITS FILTER COURSE MATERIAL TO BE BUILT ON THE SITE. INSPECTIONS SHALL CONSIST OF AN APPROPRIATE NUMBER OF VISITS TO THE SITE TO INSPECT THE INSTALLATION OF THE SUBGRADE, FILTER BED MATERIAL PLACEMENT, INSTALLATION OF STONE, ISOLATOR ROW AND CHAMBER, SURROUNDING STONE, FABRIC LAYMENT AND STORMWATER OVERFLOW BYPASS CONSTRUCTION FROM INITIAL GROUND DISTURBANCE TO FINAL PAVER PLACEMENT.



NOTE:
INLET PIPE TO ISOLATOR ROW(S) AND OVERFLOW OUTLET PIPE TO OCS ARE NOT LOCATED IN SAME CHAMBER ROW. REFER TO UTILITY PLANS FOR ACTUAL ALIGNMENT.

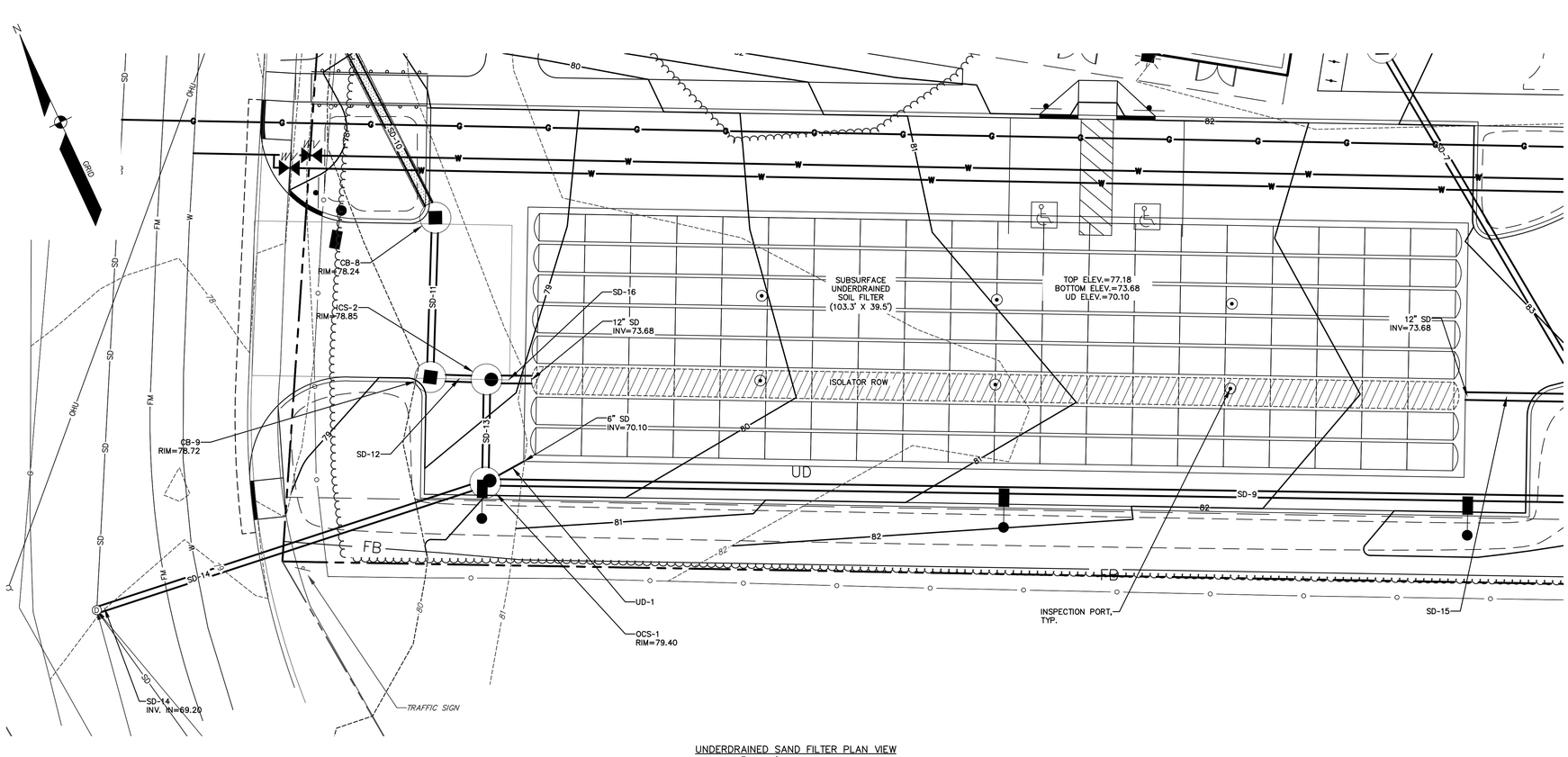
UNDERDRAINED SAND FILTER ELEVATION VIEW
NOT TO SCALE



	OCS-1
OUTLET PIPE	
DIA=A	12"
ELEV.=B	70.00
INLET PIPE 1	
DIA=C	6"
ELEV.=D	70.10
INLET PIPE 2	
DIA=E	12"
ELEV.=F	75.00
INLET PIPE 3	
DIA=E	12"
ELEV.=F	75.00
WEIR WALL	
ELEV.=K	76.65
RIM	
ELEV.=L	78.24

OUTLET CONTROL ELEVATION SCHEDULE

6'ø OUTLET CONTROL STRUCTURE/VAULT
NOT TO SCALE



UNDERDRAINED SAND FILTER PLAN VIEW
SCALE: 1" = 10'

JAMES R. SEYMOUR, PE 9984

DESIGNED	CHECKED
SAH	RLM

REV.	BY:	DATE:	DESCRIPTION:
B	JRS	04-18-19	RESPONSE TO CITY COMMENTS
A	RLM	09-10-18	SUBMIT TO CITY OF PORTLAND

DATE: 04-18-19
STATUS:
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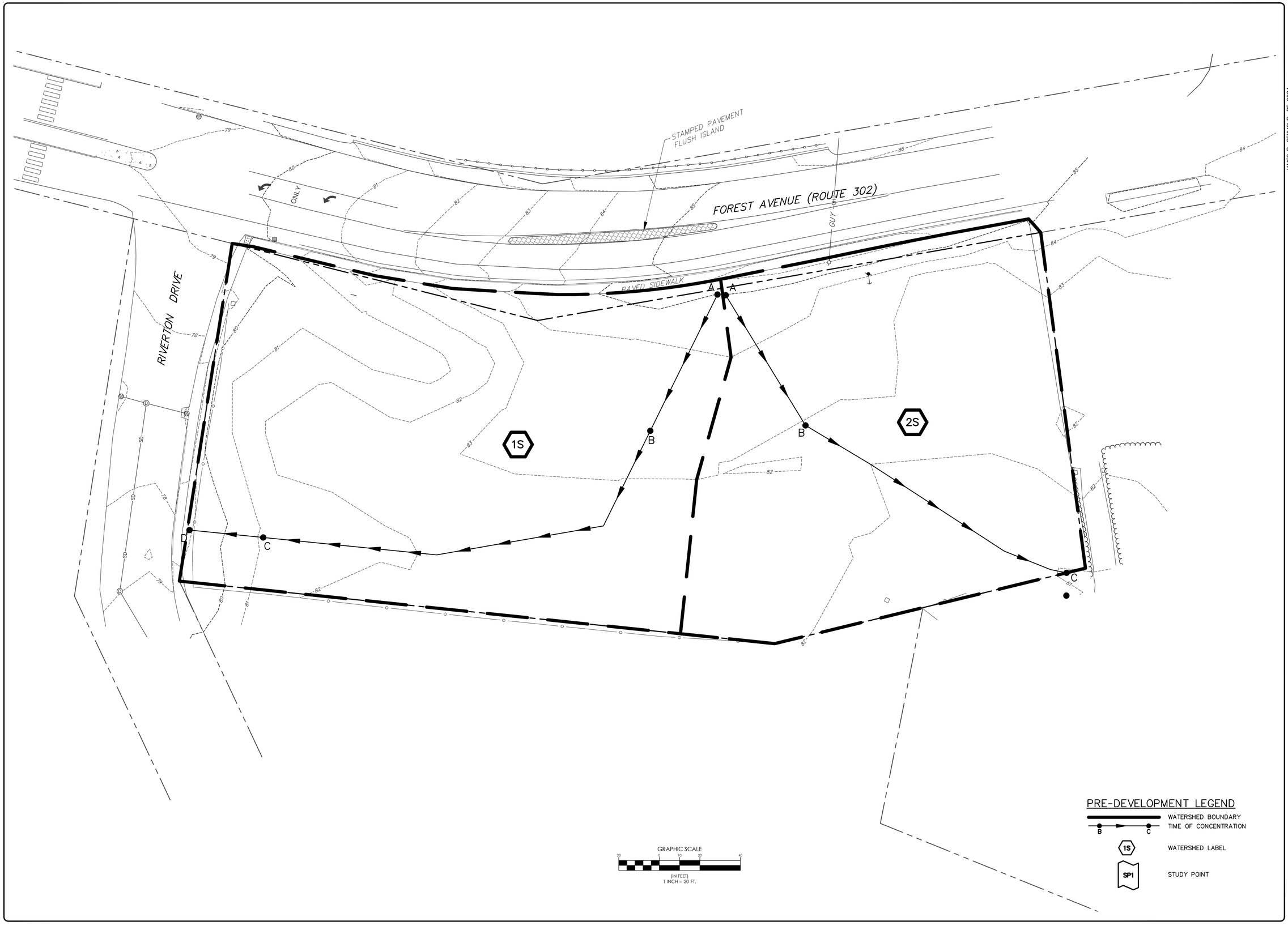
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DETAILS
OF:
PINE STATE FAMILY MART
1884 FOREST AVENUE
PORTLAND, MAINE 04103
FOR:
JOHN CHAU
75 ARCADIA ST.
PORTLAND, MAINE 04103

PROJECT NO.	SCALE
11142	NTS

SHEET 9 OF 9

111420.dwg, TAB:D4



JAMES R. SEYMOUR, PE 9984

STATE OF MAINE
JAMES R. SEYMOUR
No. 9984
REGISTERED PROFESSIONAL ENGINEER
04-18-19

DESIGNED	CHECKED
SAH	RLM

REV.	BY:	DATE:	STATUS
B	JRS	04-18-19	RESPONSE TO CITY COMMENTS
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PRE-DEVELOPMENT WATERSHED PLAN

OF:
PINE STATE FAMILY MART
1884 FOREST AVENUE
PORTLAND, MAINE 04103

FOR:
JOHN CHAU
75 ARCADIA ST.
PORTLAND, MAINE 04103

PROJECT NO.	SCALE
11142	1" =20'

SHEET 1 OF 2

11142SWP.dwg, TAB: PRE

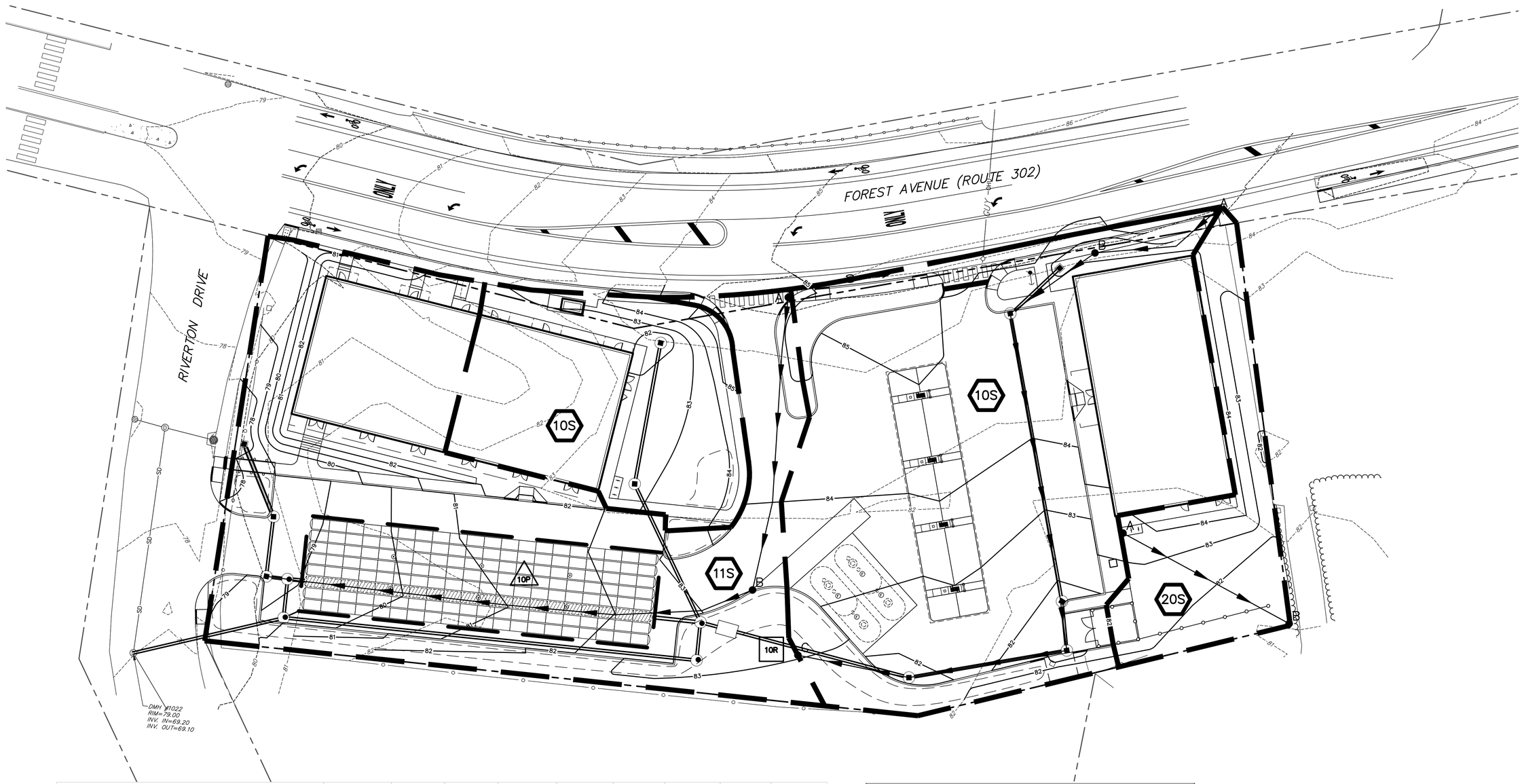


Table 1: MDEP GENERAL STANDARD CALCULATIONS

Job # 11142 Pine State Family Mart

AREA ID	WATERSHED SIZE (S.F.)	EXISTING ONSITE IMPERVIOUS AREA TO REMAIN (S.F.)	NEW ONSITE IMPERVIOUS AREA (S.F.)	EXISTING ONSITE LANDSCAPED AREA TO REMAIN (S.F.)	NEW ONSITE LANDSCAPED AREA (S.F.)	NET NEW DEVELOPED AREA (S.F.)	NET EXISTING DEVELOPED AREAS (S.F.)	TREATMENT PROVIDED?	IMPERVIOUS AREA TREATED (S.F.)	LANDSCAPED AREA TREATED* (S.F.)	DEVELOPED AREA TREATED (S.F.)	TREATMENT BMP
10 &11	66,349	147	48,403	2,101	15,698	64,101		YES	48,550	17,799	66,349	SSSF1
20	7,500	296	300	475	4,930	5,230		NO	0	0	0	
TOTAL (S.F.)	**73,849**	**443**	**48,703**	**2,576**	**20,628**	**69,331**	**0**		**48,550**	**17,799**	**66,349**	

TOTAL NEW IMPERVIOUS AREA (S.F.)	**48,703**	**TOTAL DEVELOPED AREA (S.F.)**	**69,331**
TOTAL IMPERVIOUS AREA RECEIVING TREATMENT (S.F.)	**48,550**	**TOTAL DEV. AREA RECEIVING TREATMENT (S.F.)**	**66,349**
% OF IMPERVIOUS AREA RECEIVING TREATMENT	**99.69%**	**% OF DEV. AREA RECEIVING TREATMENT**	**95.70%**

Stormwater Peak Runoff Summary Table			
Study Point	**Storm Event**	**Pre-Development (cfs)**	**Post-Development (cfs)**
SP-1	2-year	0.00	0.00
	10-year	0.00	0.01
	25-year	0.02	0.03
SP-2	2-year	0.00	0.00
	10-year	0.00	0.00
	25-year	0.01	0.00

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 INCH = 20 FT.

POST-DEVELOPMENT LEGEND

- WATERSHED BOUNDARY
- TIME OF CONCENTRATION (B — C)
- 10S — WATERSHED LABEL
- SP1 — STUDY POINT
- 10P — STORMWATER TREATMENT/DETENTION POND
- 10R — REACH

JAMES R. SEYMOUR, PE 9984

STATE OF MAINE — JAMES R. SEYMOUR No. 9984 — REGISTERED PROFESSIONAL ENGINEER — 04-18-19

DESIGNED	CHECKED
SAH	RLM

REV.	BY:	DATE:	STATUS
B	JRS	04-18-19	RESPONSE TO CITY COMMENTS
A	RLM	9-10-18	SUBMIT TO CITY OF PORTLAND

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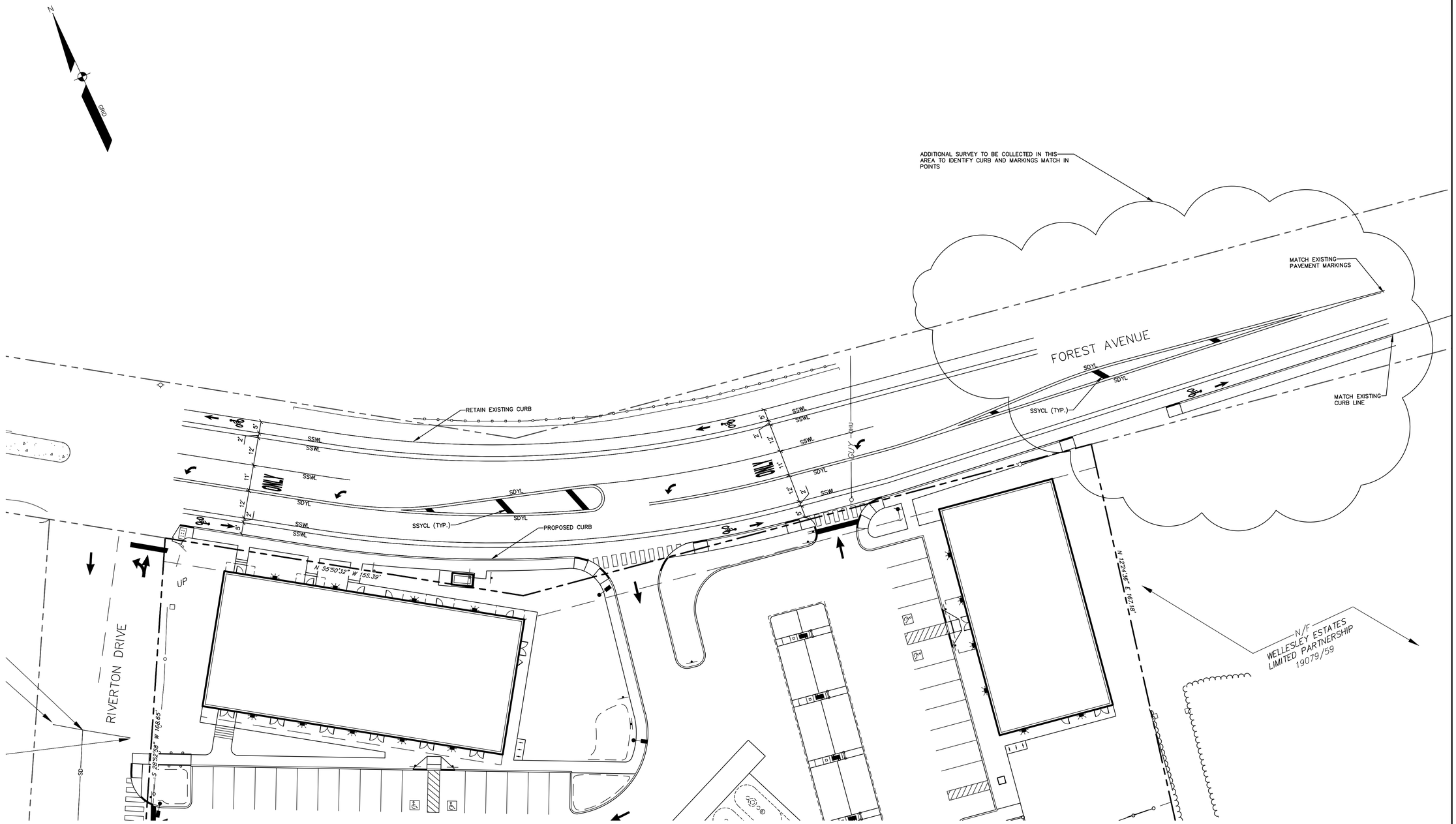
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POST-DEVELOPMENT WATERSHED PLAN
OF:
PINE STATE FAMILY MART
1884 FOREST AVENUE
PORTLAND, MAINE 04103
FOR:
JOHN CHAU
75 ARCADIA ST.
PORTLAND, MAINE 04103

PROJECT NO.	SCALE
11142	1" =20'

SHEET 2 OF 2

11142SWP.dwg, TAB:POST1



PAVEMENT MARKINGS LEGEND:

SDYL - SOLID DOUBLE YELLOW LINE
SSWL - SOLID SINGLE WHITE LINE
SSYCL - SOLID SINGLE YELLOW CHEVRON LINE

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 INCH = 20 FT.

NOT FOR CONSTRUCTION

DESIGNED	CHECKED
CMT	DHC

REV: | BY: | DATE: | STATUS:

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OFFSITE IMPROVEMENT PLAN

OF:
PINE STATE FAMILY MART
1884 FOREST AVENUE
PORTLAND, MAINE 04103

FOR:
JOHN CHAU
75 ARCADIA ST.
PORTLAND, MAINE 04103

PROJECT NO.	SCALE
11142	1"=20'

SHEET 1 OF 1

11142offsite5.dwg, TAB: S

MIXED-USE DEVELOPMENT

1884 FOREST AVENUE, PORTLAND, MAINE

PROGRESS PRINT ONLY
Not for Construction

JANUARY 14, 2019



1 VIEW OF CONVENIENCE STORE FROM FOREST AVENUE
N.T.S.



2 VIEW OF CONVENIENCE STORE FROM PARKING LOT
N.T.S.

RYAN SENATORE ARCHITECTURE

MIXED-USE DEVELOPMENT

1884 FOREST AVENUE, PORTLAND, MAINE

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JANUARY 14, 2019



1 VIEW OF RETAIL BUILDING FROM FOREST AVENUE
N.T.S.



2 VIEW OF RETAIL BUILDING FROM PARKING LOT
N.T.S.

RYAN SENATORE ARCHITECTURE

MIXED-USE DEVELOPMENT

1884 FOREST AVENUE, PORTLAND, MAINE

PROGRESS PRINT ONLY
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JANUARY 14, 2019

CONVENIENCE STORE AVERAGE GRADE CALCULATION

GRADE ELEVATION AT BUILDING CORNERS
85' , 83.3' , 85' , 84.5' = 337.8 / 4 = 84.45' AVERAGE GRADE

FINISHED FLOOR ELEVATION = 85', RIDGE OF HIGH ROOF IS 25' - 4 ⅛" ABOVE FINISHED FLOOR

THUS RIDGE OF HIGH ROOF IS 25.89' ABOVE AVERAGE GRADE (HEIGHT LIMIT IS 45' MAXIMUM)

HVAC NOTE

ALL HVAC EQUIPMENT TO MEET APPLICABLE STATE AND FEDERAL EMISSIONS REQUIREMENTS

MATERIAL FINISH SCHEDULE

#	COLOR / FINISH	PRODUCT	MANUFACTURER	FINISH / SIZE	MATERIAL TYPE
1	EVENING BLUE	HARDIE-PLANK	JAMES HARDIE	4" EXPOSURE - CEDAR MILL	FIBER CEMENT LAP SIDING
2				n/a	CULTURED STONE VENEER
3	ARCTIC WHITE	HARDIE-BOARD	JAMES HARDIE	PRE-FINISHED	FIBER-CEMENT TRIM
4	NAVAJO BEIGE	HARDIE-PLANK	JAMES HARDIE	4" EXPOSURE - CEDAR MILL	FIBER CEMENT LAP SIDING
5	GRAY SLATE	HARDIE-BOARD	JAMES HARDIE	PRE-FINISHED	FIBER-CEMENT TRIM
6					
7				PAINTED	ALUMINUM STOREFRONT



2 CONVENIENCE STORE - WEST ELEVATION
3/16" = 1'-0"



1 CONVENIENCE STORE - EAST ELEVATION
3/16" = 1'-0"

RYAN SENATORE ARCHITECTURE

MIXED-USE DEVELOPMENT

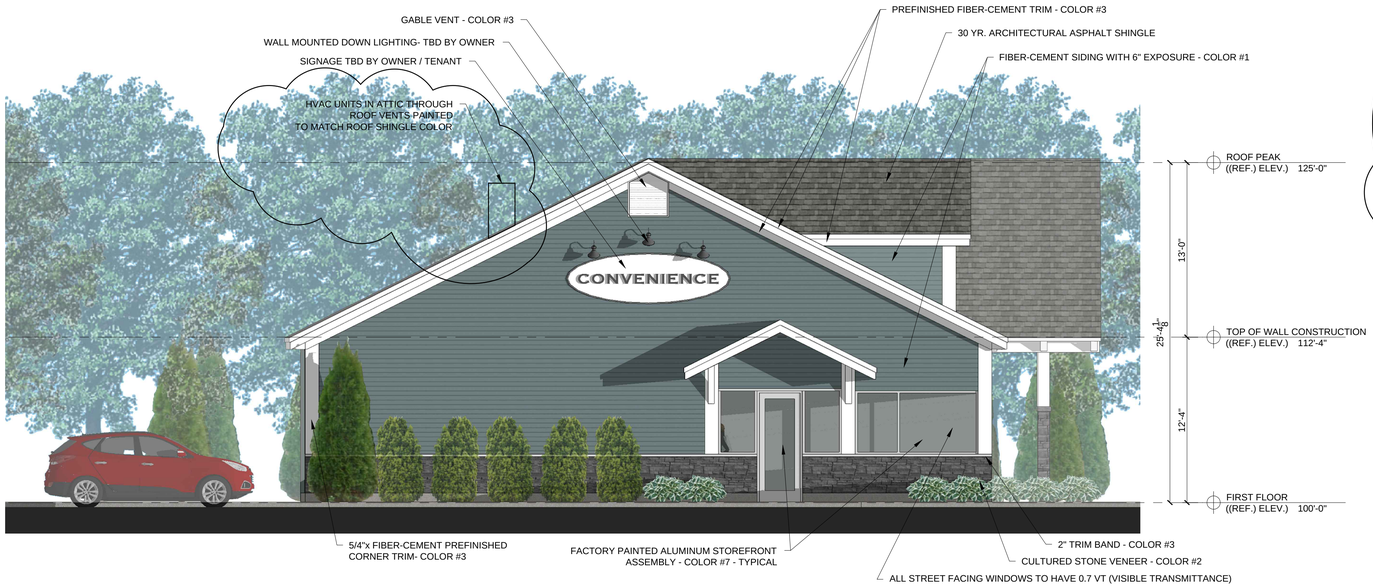
1884 FOREST AVENUE, PORTLAND, MAINE

PROGRESS PRINT ONLY
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JANUARY 14, 2019

MATERIAL FINISH SCHEDULE

#	COLOR / FINISH	PRODUCT	MANUFACTURER	FINISH / SIZE	MATERIAL TYPE
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2				n/a	CULTURED STONE VENEER
3	ARCTIC WHITE	HARDIE-BOARD	JAMES HARDIE	PRE-FINISHED	FIBER-CEMENT TRIM
4	NAVAJO BEIGE	HARDIE-PLANK	JAMES HARDIE	4" EXPOSURE - CEDAR MILL	FIBER CEMENT LAP SIDING
5	GRAY SLATE	HARDIE-BOARD	JAMES HARDIE	PRE-FINISHED	FIBER-CEMENT TRIM
6					
7				PAINTED	ALUMINUM STOREFRONT



2 CONVENIENCE STORE - NORTH ELEVATION (FACING FOREST AVENUE)
3/16" = 1'-0"

CONVENIENCE STORE AVERAGE GRADE CALCULATION

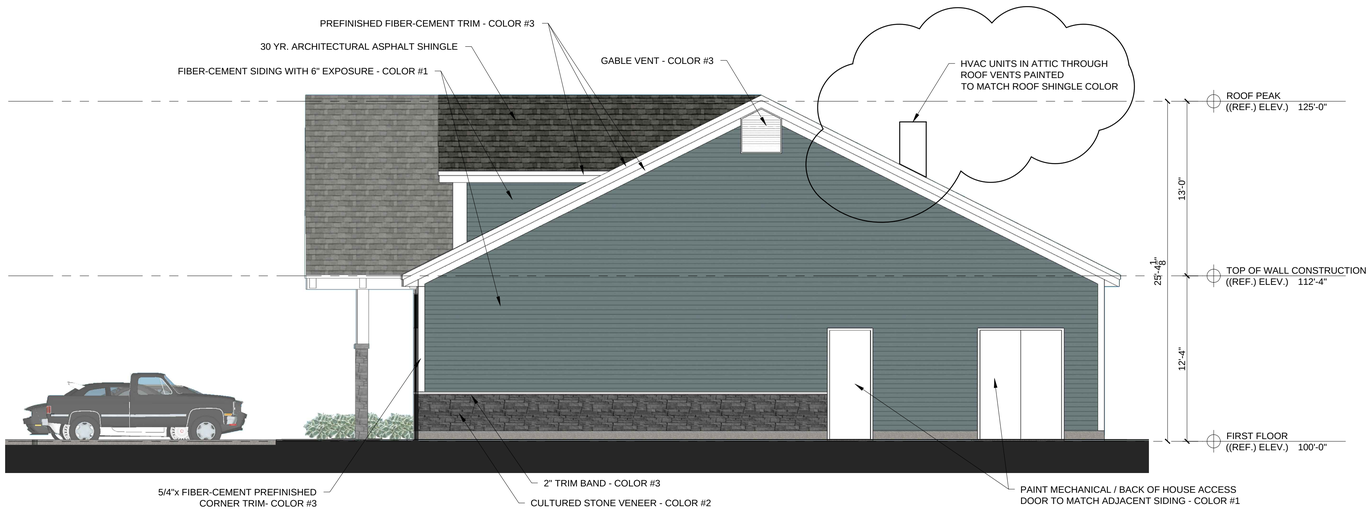
GRADE ELEVATION AT BUILDING CORNERS
85' , 83.3' , 85' , 84.5' = 337.8 / 4 = 84.45' AVERAGE GRADE

FINISHED FLOOR ELEVATION = 85', RIDGE OF HIGH ROOF IS 25' - 4 ⅛" ABOVE FINISHED FLOOR

THUS RIDGE OF HIGH ROOF IS 25.89' ABOVE AVERAGE GRADE (HEIGHT LIMIT IS 45' MAXIMUM)

HVAC NOTE

ALL HVAC EQUIPMENT TO MEET APPLICABLE STATE AND FEDERAL EMISSIONS REQUIREMENTS



1 CONVENIENCE STORE - SOUTH ELEVATION
3/16" = 1'-0"

RYAN SENATORE ARCHITECTURE

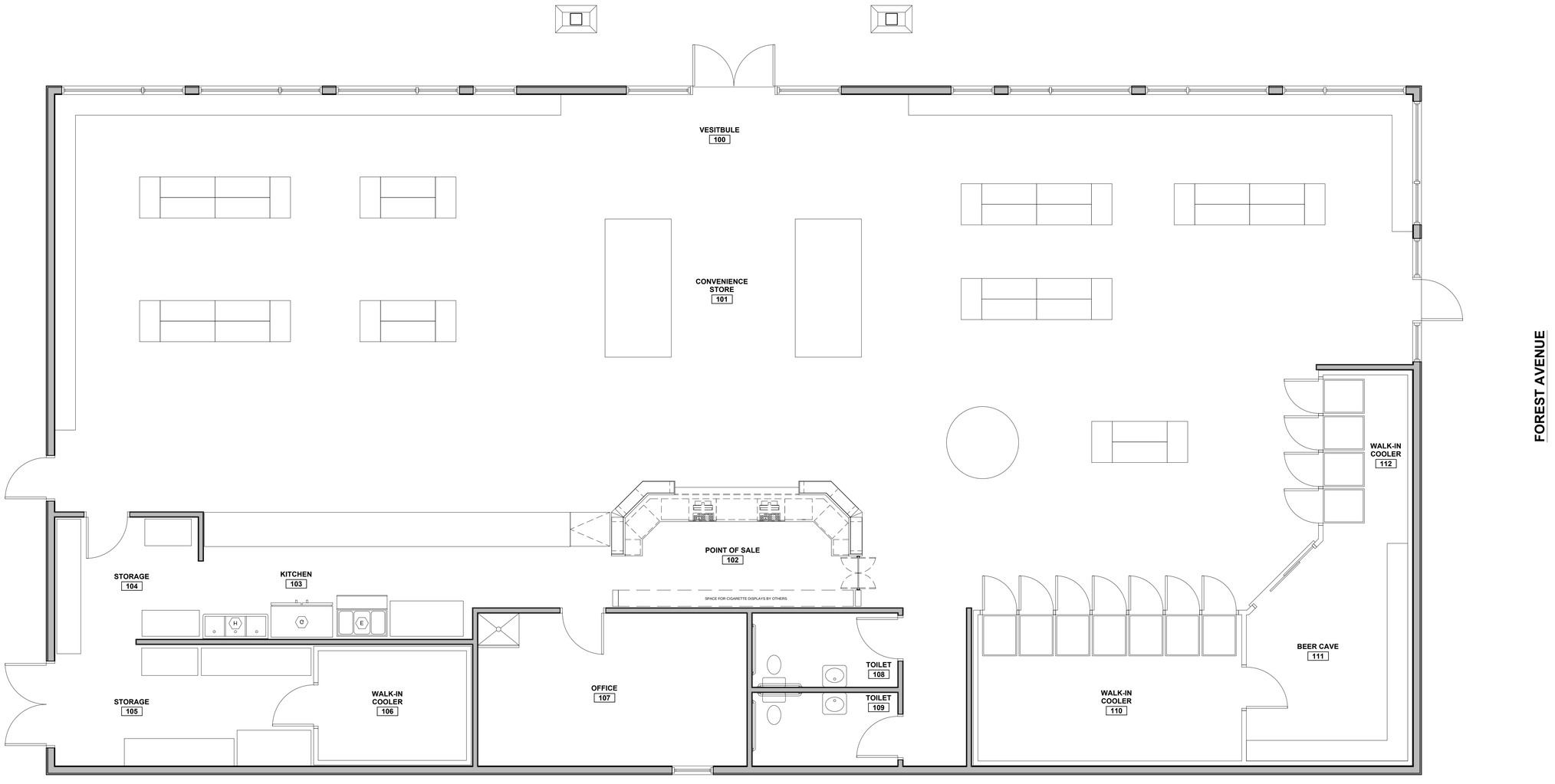
MIXED-USE DEVELOPMENT

1884 FOREST AVENUE, PORTLAND, MAINE

PROGRESS PRINT ONLY
Not for Construction

SQUARE FOOTAGES SHOWN ARE MEASURED TO OUTSIDE FACE OF EXTERIOR WALLS AND CENTERLINE OF SHARED WALLS

JANUARY 14, 2019



PROJECT NORTH

0 4' 8' 16' 32'

1 CONVENIENCE STORE - FIRST FLOOR PLAN
1/4" = 1'-0"

RYAN SENATORE ARCHITECTURE

MIXED-USE DEVELOPMENT

1884 FOREST AVENUE, PORTLAND, MAINE

PROGRESS PRINT ONLY
Not for Construction

JANUARY 14, 2019

RETAIL BUILDING AVERAGE GRADE CALCULATION

GRADE ELEVATION AT BUILDING CORNERS
82.5' , 82' , 82.5' , 82.5' = 329.5 / 4 = 82.375' AVERAGE GRADE

FINISHED FLOOR ELEVATION = 82.5', RIDGE OF HIGH ROOF IS 25' - 8" ABOVE FINISHED FLOOR

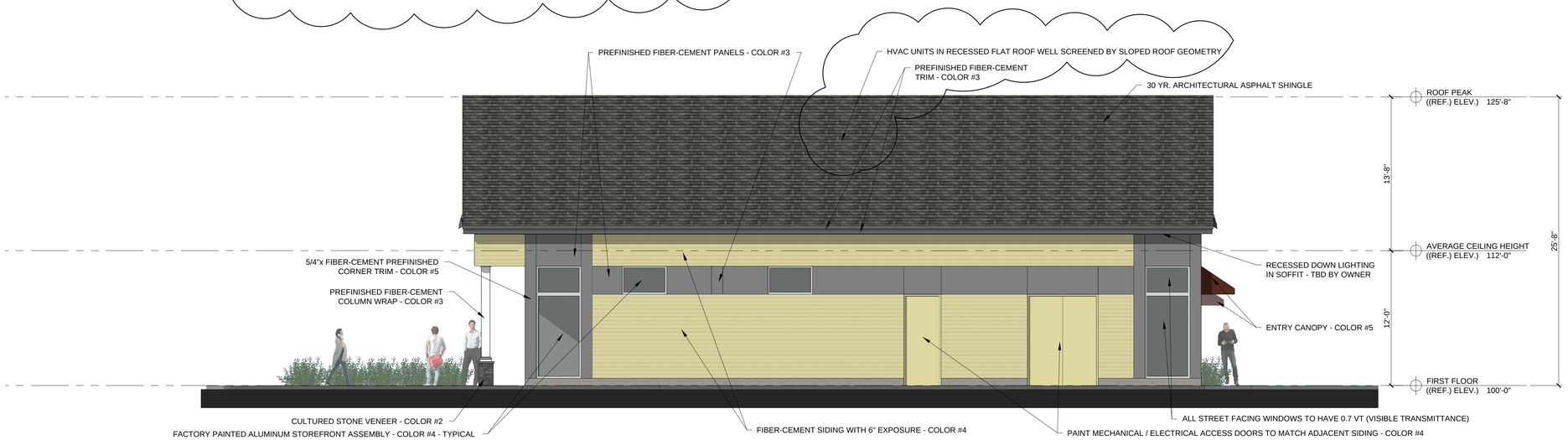
THUS RIDGE OF HIGH ROOF IS 25.79' ABOVE AVERAGE GRADE (HEIGHT LIMIT IS 45' MAXIMUM)

HVAC NOTE

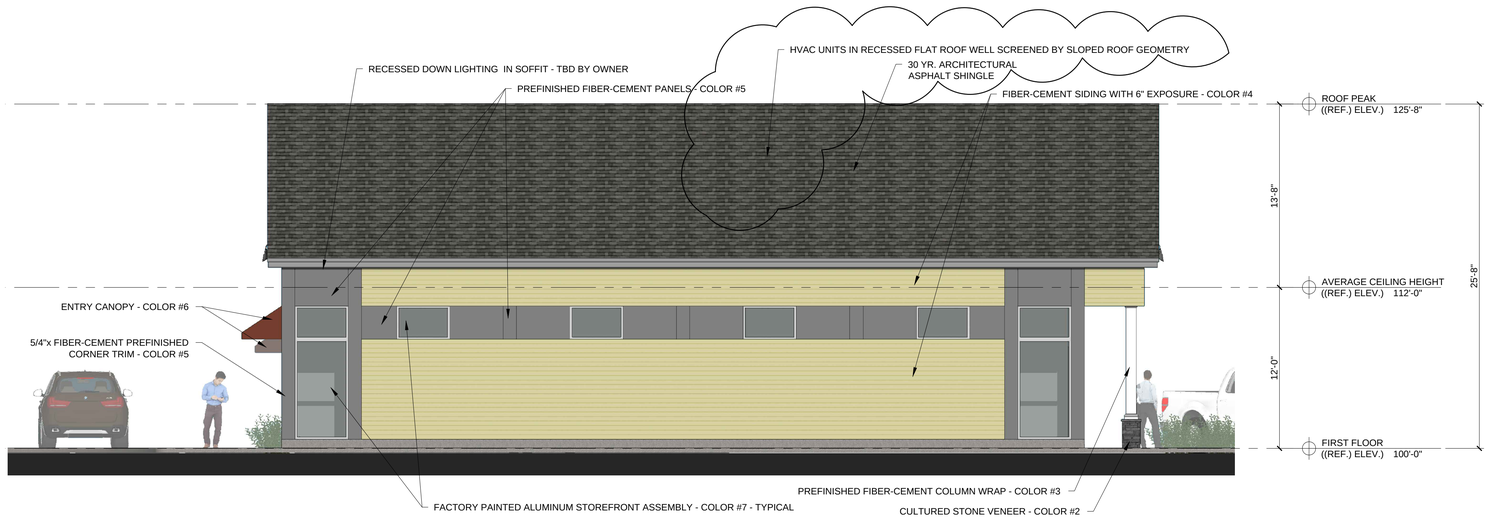
ALL HVAC EQUIPMENT TO MEET APPLICABLE STATE AND FEDERAL EMISSIONS REQUIREMENTS

MATERIAL FINISH SCHEDULE

#	COLOR / FINISH	PRODUCT	MANUFACTURER	FINISH / SIZE	MATERIAL TYPE
1	EVENING BLUE	HARDIE-PLANK	JAMES HARDIE	4" EXPOSURE - CEDAR MILL	FIBER CEMENT LAP SIDING
2				n/a	CULTURED STONE VENEER
3	ARCTIC WHITE	HARDIE-BOARD	JAMES HARDIE	PRE-FINISHED	FIBER-CEMENT TRIM
4	NAVAJO BEIGE	HARDIE-PLANK	JAMES HARDIE	4" EXPOSURE - CEDAR MILL	FIBER CEMENT LAP SIDING
5	GRAY SLATE	HARDIE-BOARD	JAMES HARDIE	PRE-FINISHED	FIBER-CEMENT TRIM
6					
7				PAINTED	ALUMINUM STOREFRONT



2 RETAIL BUILDING (PLAN B) - EAST ELEVATION
3/16" = 1'-0"



1 RETAIL BUILDING (PLAN B) - WEST ELEVATION
3/16" = 1'-0"

RYAN SENATORE ARCHITECTURE

MIXED-USE DEVELOPMENT

1884 FOREST AVENUE, PORTLAND, MAINE

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JANUARY 14, 2019

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THUS RIDGE OF HIGH ROOF IS 25.79' ABOVE AVERAGE GRADE (HEIGHT LIMIT IS 45' MAXIMUM)

HVAC NOTE

ALL HVAC EQUIPMENT TO MEET APPLICABLE STATE AND FEDERAL EMISSIONS REQUIREMENTS

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3	ARCTIC WHITE	HARDIE-BOARD	JAMES HARDIE	PRE-FINISHED	FIBER-CEMENT TRIM
4	NAVAJO BEIGE	HARDIE-PLANK	JAMES HARDIE	4" EXPOSURE - CEDAR MILL	FIBER CEMENT LAP SIDING
5	GRAY SLATE	HARDIE-BOARD	JAMES HARDIE	PRE-FINISHED	FIBER-CEMENT TRIM
6					
7				PAINTED	ALUMINUM STOREFRONT



2 RETAIL BUILDING - SOUTH ELEVATION (FACING PARKING AREA)
3/16" = 1'-0"



1 RETAIL BUILDING - NORTH ELEVATION (FACING FOREST AVENUE)
3/16" = 1'-0"

RYAN SENATORE ARCHITECTURE

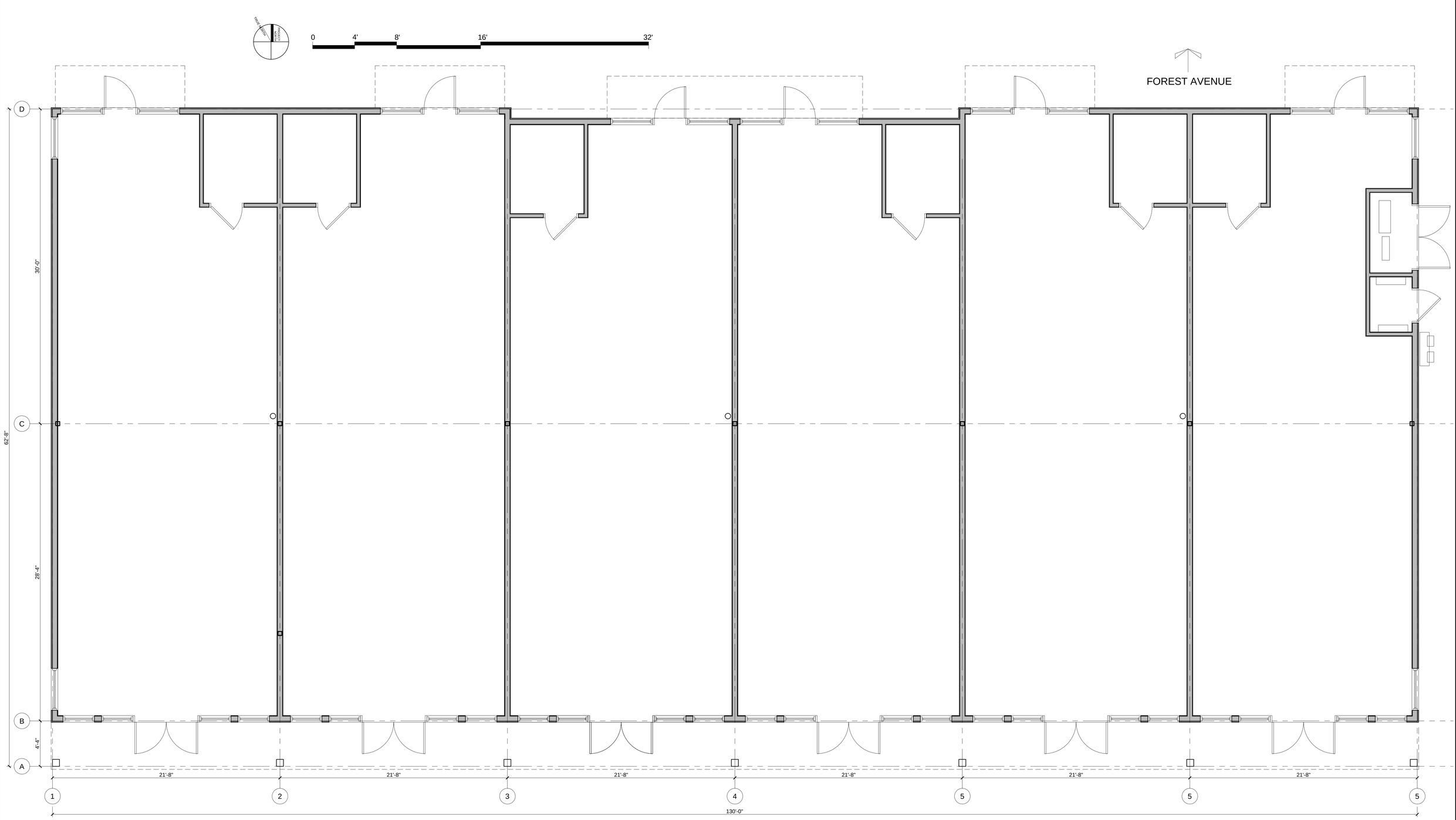
MIXED-USE DEVELOPMENT

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JANUARY 14, 2019



1 RETAIL BUILDING - FIRST FLOOR PLAN
3/16" = 1'-0"

RYAN SENATORE ARCHITECTURE

PLANNING BOARD REPORT
PORTLAND, MAINE

Portland International Jetport Expansion:
Deicing Pad; Long-Term Hold Area and Terminal Apron Expansion
Vicinity of 1001 Westbrook Street
Level III Site Plan Review
City of Portland and Portland International Jetport, Applicant
PL-000591-2019

Submitted to: Portland Planning Board Public Hearing Date: May 28, 2019	Prepared by: Jean Fraser Planner Date: May 24, 2019

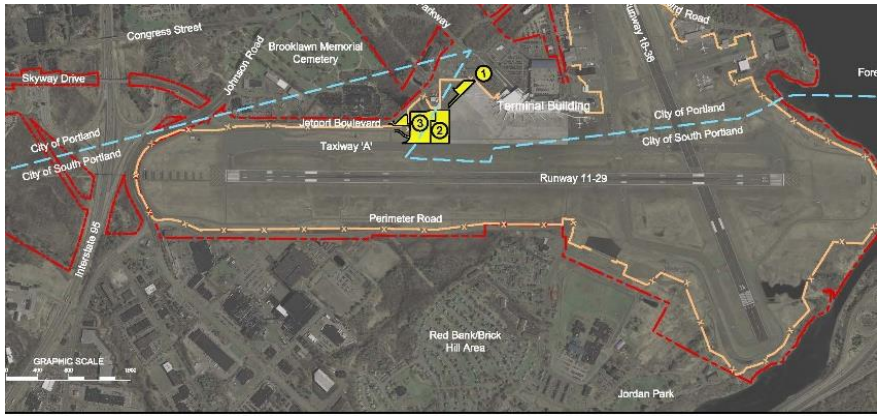
I. INTRODUCTION

Stantec Consulting Services Inc, on behalf of the Portland International Jetport, has submitted a Level III Site Plan application for several projects that form part of an ongoing program of improvements identified in the Jetports *Sustainable Airport Master Plan* that was approved by the City Council in November 2016. The Jetport is currently progressing a number of improvement projects for the 5-7 year period, which include expansion of the Deicing Pad/Long Term Hold Area and Terminal Apron (NW End) which are scheduled for construction within the next year.

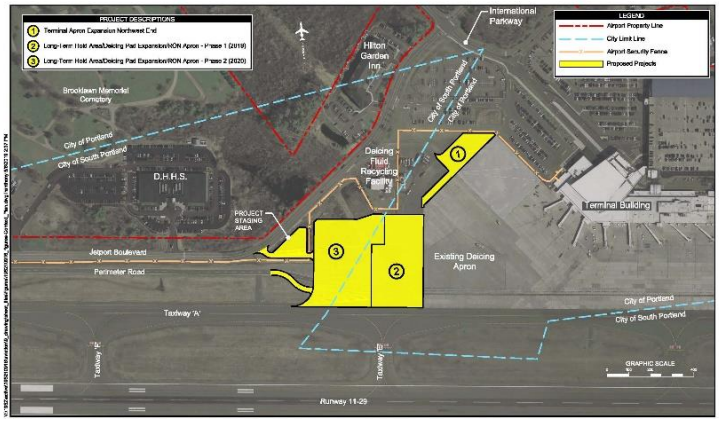
The current projects before the Board total about 5 acres within the City of Portland and are located in the AB-Airport Business Zone. These developments would result in about 2.4 acres of new impervious surface within a fenced part of the Jetport; they would not include any above-ground structures except revised lighting, access and fencing. Most of the deicing expansion and part of the long term hold apron expansion are located within South Portland (boundary shown as dashed blue line below), and the South Portland Planning Board approved these projects on May 8, 2019 without any substantive conditions (as part of a larger number of phased projects that are within South Portland) (*Attachment 5*).

The specific projects currently before the Board have been approved by the MDEP as a SLODA amendment (*Attachment E.*). This is associated with NRPA and US Army Corps of Engineers Permits for the Jetport high priority projects in both municipalities (wetlands are in South Portland). The proposals are being brought direct to a Planning Board Hearing as the development has few site plan impacts other than technical ones associated with stormwater management, and traffic implications associated with the scale of material removal and delivery.

Context Plan *(also included in Plan P1)*



Projects being Reviewed *(also included in Plan P1)*



Applicant: City of Portland and Portland International Jetport (Paul Bradbury, P.E., Airport Director)
Consultants: Stantec Consulting Services Inc (Dwight D Anderson, P.E.)

II. REQUIRED REVIEWS: Site Plan Review with the applicable standards in Section 14-526. No waivers have been requested.

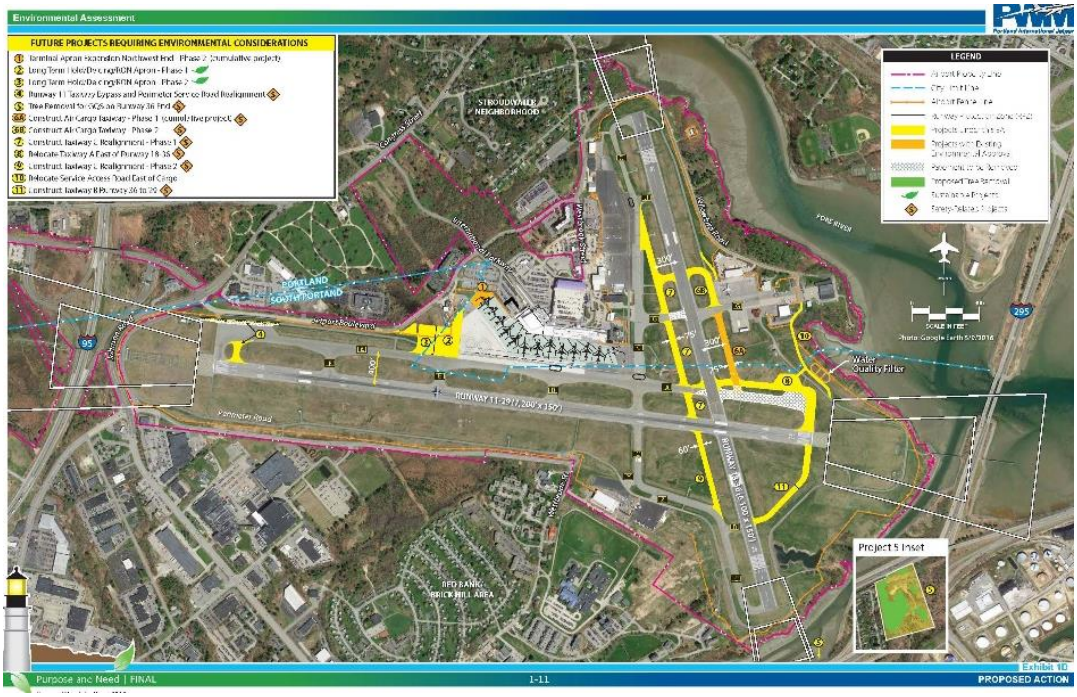
III. PROJECT DATA

Existing Zoning	AB-Airport Business Zone
Existing Use	Vacant grassed areas with some paved areas
Proposed Use	Upgrade of stormwater system and new paved areas
Parcel Size	226 acres in City of Portland (overall Jetport)
New impervious surface in City of Portland	2.4 acres

IV. BACKGROUND & EXISTING CONDITIONS

The Jetport 's approved *Sustainable Airport Master Plan* (Summary sheet included in *Plan P1*) includes short, intermediate and long term improvement projects for the terminal, the terminal aprons and runways, and for the supporting infrastructure such as for deicing, snow removal, and servicing.

The short term priorities are identified on the plan below (taken from the *Master Plan; also in Plan P1*):



Birdseye view looking east; existing deicing facility in left foreground; South Portland parcel in foreground:



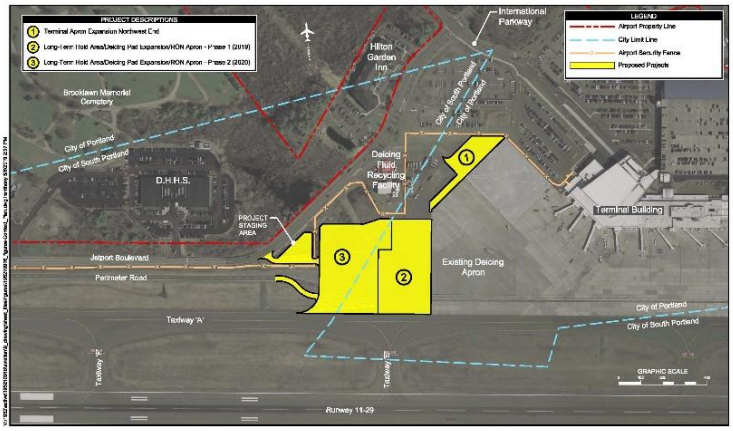
The existing site comprises vacant and partially paved land around the existing deicing facility just west of the terminal. The deicing facility includes two existing deicing plane positions, a collection pad, deicing fluid recycling building, and 500,000 gallon underground storage tank constructed in 2009/2010. The deicing facility is managed by Inland Technologies and allows for the recycling of the deicing fluid (propylene glycol) so that it does not enter the sewer system or the Fore River.

There are no wetland areas within the Portland part of the project. The site access for construction is from Jetport Boulevard, within the City of South Portland, though the construction routes to this access are largely within the City of Portland.

V. PROPOSED PROJECT DESCRIPTION

The proposed project is for essentially for two of the short term improvement projects identified on the *Sustainable Airport Master Plan:*

- Terminal Apron Expansion Northwest End (Area 1) *(Plans P2., P4., P5., P6., and P7)*
- Deicing Pad Expansion/Long-Term Hold/Overnight Airplane parking area expansion to allow for 2 additional airplane positions (Two phases: areas 2 and 3) *(Plans P2., P3., P6., P7., and P8.)*



These projects do not involve any above-ground structures or buildings and are supported by:

- Stormwater upgrades to address the additional impervious area (*Attachments E and J*)
- Valve controls and automated sampling system for the six additional fluid collection zones (*Attachment Q and Plan P6.*)
- Construction access/staging area (just west of Area 3), which after completion of the projects will be used for a utility lot to support airport maintenance/emergency access (*Plan P3*)
- Construction Management Plan and Addendums to manage access for construction materials removal and delivery (estimated to be about 7000 truck trips spread over 256 construction days in 2019/2020.) (*Attachment O*)

The proposals will result in greater ground support capacity but would not generate any additional traffic other than during the construction period.

VI. PUBLIC COMMENT (A Planning Board Workshop has not been held regarding this project)

A total of 124 notices were sent to property owners within 500 feet of the site and to interested parties. A Neighborhood Meeting was held on May 7, 2019 at the Jetport Terminal and no members of the public attended (Certificate in *Attachment P.*). As at the time of preparing this report no public comments have been received by the Planning office.

VII. RIGHT, TITLE, AND INTEREST and FINANCIAL CAPACITY

The Jetport is owned by the City of Portland and made up of some 93 parcels and associated deeds, as documented in *Attachment C.* The total cost of these improvements is $10,300,000 and would be funded through FAA Airport Improvement Program grants, State of Maine bond funding, and City of Portland as outlined in a letter from the Airport Director dated March 12, 2019 (*Attachment D*).

VIII. ZONING ANALYSIS

The project is located within the A-B Airport Business Zone where airport carrier operations, including ground support and fueling are permitted uses. The development meets the dimensional standards of this zone.

IX. DEVELOPMENT REVIEW

The proposed development has been reviewed by staff for conformance with the relevant review standards of Portland's site plan ordinance and applicable regulations. Staff comments are listed below.

1. *Transportation Standards*

   a. Impact on Surrounding Street Systems and Access and Circulation: The proposed development will have minimal traffic impacts after it is constructed. The truck traffic generated during construction is substantial at over 7000 truck trips over the 256 days of construction, averaging approximately 3 trucks/hour.

   b. Construction Management Plan: The proposed truck routes are shown in *Attachment O.* and are from Route 22/Exit 46 on I95 via Skyway Drive, across Congress to Jetport Boulevard. This choice of routes keeps construction traffic away from the terminal area. Staff requested further information in order to assess the potential impacts on the surrounding street systems and intersections, and the Traffic Engineer reviewer concluded (*Attachment 2*):

   > *The applicant has provided an estimate of construction vehicles and anticipated routings. According to the information provided, 3 to 12 trucks will be generated during the weekday morning peak period (7-9AM) and 3 to 6 trucks during the weekday afternoon peak period (4-6PM). The routing to the construction site will be via Jetport Boulevard to/from either the Maine Turnpike or Route 22 to the west. This level of truck traffic (1 truck every 10 minutes under the heaviest noted time) is not expected to create noticeable traffic congestion issues. Given the length of the project and*

possible platooning of trucks, I would suggest that conditions be monitored and if problems are identified, restrictions on truck travel during peak time periods may be a consideration.

c. Sidewalks: The project site does not abut any Portland streets; there is a sidewalk along Jetport Boulevard at the construction entrance in South Portland.

d. Public Transit Access, e. Parking and f. Bicycle parking: these standards do not apply to this project.

2. Environmental Quality Standards

a. Preservation of Significant Natural Features; b. Landscaping and Landscape Preservation: There are no known significant natural features on the site, and the proposals do not impact the limited low level landscape along the parking area to the north (near the Terminal apron expansion).

b. Water Quality, Storm Water Management and Erosion Control:

- *Water Quality :* The airplane deicing facility is doubling in size in terms of the number of planes that can be deiced at one time, and the proposals include valve controls and automated sampling system for the six additional fluid collection zones. The valve system directs glycol laden runoff to an underground tank that gets treated at the Inland Technologies deicing facility. While this run off eventually is discharged to the Portland sewer, but this is not a concern as the facility removes the glycol and then sends it to the sewer after getting approval from the PWD.

  The primary concern, as identified by the DPW Water Resources Compliance Coordinator, is to ensure that the fluids containing glycol do not reach natural waters because they are high in biological oxygen demand and would create conditions harmful to aquatic life and the environment. Therefore, the Compliance Coordinator requested further information regarding the deicing valve control and how they would function to prevent glycol-contaminated runoff from entering the Fore River. (*Attachment 4.)*

  The applicant has provided a satisfactory detailed explanation of the valve system and automated sampling system that allow for the glycol levels to be monitored by Inland Technologies (contracted to operate the deicing recycling system) *(Attachment O: also see Plan P6.)*. The submissions do not include documentation that Portland Water District (PWD) has reviewed and approved the details and capacity implications, and a suggested condition of approval is included to cover that question.

- *Stormwater Management and Erosion Control:* The stormwater management system is designed to treat the quality and quantity of stormwater run off from the additional 2.4 acres of impervious surface, prior to discharge to the Fore River. Separate from the deicing recycling process, the proposals include reshaping of an existing Water Quality Filter and installation of an additional Water Quality filter to achieve treatment. The post-development flows are reduced in the post-development condition.

  The project has been reviewed by the Maine DEP as part of a SLODA application, and that permit has been issued *(Attachment E.).* The City's Peer Engineer has reviewed the project for compliance with the City of Portland Technical Manual Section 5 stormwater standards, which include the Basic, General, Flooding, and Urban Impaired Stream standards. The Peer Engineer has confirmed that the submitted stormwater management report documents that the proposals meet the City's standards, and notes that in respect of the Urban Impaired Stream Standard: "*While portions of the Jetport property is located within the Long Creek watershed, the proposed project will not impact this watershed, and the standard does not apply to this project. Outfalls #3 and #5 both discharge to the Fore River." (Attachment 3)*

3. Public Infrastructure and Community Safety Standards

a. Consistency with City Master Plans: The proposals are consistent with the Jetports *Sustainable Airport Master Plan* that was approved by the City Council in November 2016 (see plan above and in *Plan P1).*

b. Public Safety and Fire Prevention: The Fire Department does not have any comments on this project *(Attachment 1).*

c. Availability of Public Utilities: The submissions (*Attachment M*) have not addressed this question. As noted above the proposed expansion of the deicing facility has implication for the Portland Water District and a suggested condition includes the question of water capacity.

4. Site Design Standards

a. Massing, Ventilation and wind Impact; Shadows; Snow and ice Loading; View corridors; Historic Resources; Noise and Vibration; signage and Wayfinding: These standards do not apply to the project under review.

b. Exterior Lighting: The plane positions within the expanded deicing and long term hold areas are lit by four new exterior lighting fixtures (50ft high poles with LED lighting) and the associated photometric plan is included at *Plan P8*. This proposal is stated to meet FAA requirements (*Attachment N*) and also meets the City's Technical Standards.

X. STAFF RECOMMENDATION

Subject to the proposed motions and conditions of approval listed below, Planning Division staff recommend that the Planning Board approve the Portland International Jetport proposals for expansion of the deicing pad, long term/overnight hold areas, and the terminal apron (NW end).

XI. PROPOSED MOTIONS FOR THE PLANNING BOARD'S CONSIDERATION

SITE PLAN REVIEW

On the basis of the application, plans, reports and other information submitted by the applicant; findings and recommendations contained in the Planning Board Report for the public hearing on May 28, 2019 for application # PL-000591-2019 (1001 Westbrook Street- Portland International Jetport) relevant to the site plan regulations; and the testimony presented at the Planning Board hearing:

The Planning Board [**finds/does not find**] that the plan is in conformance with the site plan standards of the land use code subject to the following conditions of approval:

PRIOR TO THE START OF CONSTRUCTION

1. That the applicant shall submit documentation that the Portland Water District (DPW) has reviewed the proposals, including the water demand and the submitted details of the deicing recycling, valve controls and sampling system.

ONGOING

2. That the applicant shall monitor the traffic conditions along the construction truck routes, and if problems are identified by either the applicant or the City of Portland, the applicant shall consider - in discussion with the City of Portland Department of Public Works - introducing restrictions on truck travel during peak time periods.

XII. ATTACHMENTS

Report Attachments

1. Fire Department confirmation (no comments)
2. Traffic Engineer Final comments 5.17.19
3. Peer Engineer Final comments 5.22.19
4. DPW Water Resources Final comments 5.23.19

Public Comments (none received at time this Report was prepared)

Applicants submittal

A. Cover Letter ltr_barhydt_level3_20190403.pdf
B. Level III Checklist.pdf
C. right_title_interest.pdf
D. financial_capacity.pdf
E. evidence_state_federal_approvals.pdf
F. existing_proposed_easements_covenants.pdf
G. waiver_requests.pdf
H. zoning_assessment.pdf
I. technical_capability.pdf
J. environmental_and_stormwater.pdf
K. environmental_landscape_features.pdf
L. transportation.pdf
M. public_infrastructure_safety.pdf
N. site_design.pdf
O. Updated CMP and info.pdf
P. 2019_05_07_Neighborhood Mtg Certification.pdf
Q. Deicing Valve Detail_2019_05_22_DA_Email.pdf

Plans

P1. Context Plans.pdf
P2. Civil Cover Sheet & Notes.pdf
P3. Deicing-Long Term Hold Civil, Phases & Details.pdf
P4. NW Terminal Apron Site Plans.pdf
P5. Apron Markings.pdf
P6. Details re Site, Drainage, WQF, Valves, Elec.pdf
P7. Erosion Control Details.pdf
P8. Deicing & Long Term Hold Photometrics.pdf

PLAN CORRECTIONS REPORT PL-000591-2019
FOR CITY OF PORTLAND

PLAN ADDRESS: 1001 Westbrook St
Portland, ME 04102

PARCEL: PORTLAND INTERNATIONAL JETPORT

APPLICATION DATE: 04/03/2019

SQUARE FEET: 0.00

DESCRIPTION: Proposed Long-Term Hold Area, Deicing Pad Expansion and RON Apron Construction including Terminal Apron Expansion Northwest End at the Portland International Jetport

EXPIRATION DATE:

VALUATION: $0.00

CONTACTS	Name	Company	Address
Agent/Representative	Dwight Anderson	Stantec	482 Payne Road Scarborough, ME 04074
	Amie Gray	Stantec	482 Payne Road Scarborough, ME 04074

Comments & Corrections Required

Civil Engineering - Third Party Reviewer — Lauren Swett

DPW Engineering — Caitlyn Abbott

DPW Water Resources Compliance — Benjamin Pearson

DPW Water Resources Engineering — Brad Roland

Fire — Robert Thompson

Comment(s)/ Recommendation(s):
The Fire Department has no concerns on this proposed project.

Planning — Jean Fraser

Traffic - Third Party Reviewer — Tom Errico

Zoning — Jean Fraser

Conditions Required

Portland Maine | Yes. Google's good here.

Jean Fraser <jf@portlandmaine.gov>

FW: Jetport Deicing and Apron Improvement Project - Construction Management Plan

1 message

Tom Errico <thomas.errico@tylin.com> Fri, May 17, 2019 at 5:07 PM
To: Jean Fraser <jf@portlandmaine.gov>

This was meant for you. Thanks

Thomas A. Errico, PE
Senior Associate
Traffic Engineering Director
TY LIN INTERNATIONAL
12 Northbrook Drive
Falmouth, ME 04105
+1.207.781.4721 main
+1.207.347.4354 direct
+1.207.400.0719 mobile
thomas.errico@tylin.com
Visit us online at www.tylin.com
Twitter | Facebook | LinkedIn | Instagram

From: Tom Errico
Sent: Friday, May 17, 2019 4:49 PM
To: Jesse Fraser <jfraser@carmanah.com>
Cc: Jeremiah Bartlett <JBartlett@portlandmaine.gov>; Michael Tremblay <mtremblay@portlandmaine.gov>; Bruce Hyman <bhyman@portlandmaine.gov>
Subject: Jetport Deicing and Apron Improvement Project - Construction Management Plan

Hi Jean – the applicant has provided an estimate of construction vehicles and anticipated routings. According to the information provided, 3 to 12 trucks will be generated during the weekday morning peak period (7-9AM) and 3 to 6 trucks during the weekday afternoon peak period (4-6PM). The routing to the construction site will be via Jetport Boulevard to/from either the Maine Turnpike or Route 22 to the west. This level of truck traffic (1 truck every 10 minutes under the heaviest noted time) is not expected to create noticeable traffic congestion issues. Given the length of the project and possible platooning of trucks, I would suggest that conditions be monitored and if problems are identified, restrictions on truck travel during peak time periods may be a consideration.

If you have any questions, please contact me.

Best regards,

Thomas A. Errico, PE
Senior Associate
Traffic Engineering Director
TY LIN INTERNATIONAL
12 Northbrook Drive

Att. 3

Portland Maine | Yes. Google's good here.

Jean Fraser <jf@portlandmaine.gov>

1001 Westbrook Street Jetport Deicing

1 message

Lauren Swett <lswett@woodardcurran.com> Wed, May 22, 2019 at 5:42 PM
To: Jean Fraser <jf@portlandmaine.gov>
Cc: "bnpearson@gmail.com" <bnp@portlandmaine.gov>

Hi Jean,

I've reviewed the application materials for the 1001 Westbrook Street, Jetport Deicing project. I don't have any specific comments, but have outlined their compliance with the stormwater standards below:

- The project is required to comply with the Maine DEP Chapter 500 and City of Portland Section 5 stormwater standards, which include the Basic, General, Flooding, and Urban Impaired Stream standards. The Applicant is proposing to modify an existing water quality filter located northwest of the proposed improvements. The project has been reviewed by the Maine DEP as part of a SLODA application, and that permit has been issued. The submitted stormwater management report includes improvements beyond what is being considered as part of this application. Review was focused on the Jetport Deicing work.
  - Basic Standard: A detailed soil erosion and sediment control plan has been provided.
  - General Standard: Treatment has been provided by the modified water quality filter WQF #1.
  - Flooding Standard: The site's stormwater management systems maintain post-development flows at levels less than pre-development flows for the proposed work. The Jetport Deicing work will include improvements to WQF #1, which appears to impact Outfalls #3 and #5, both of which have reduced flows in the post-development condition.
  - Urban Impaired Stream Standard: While portions of the Jetport property is located within the Long Creek watershed, the proposed project will not impact this watershed, and the standard does not apply to this project. Outfalls #3 and #5 both discharge to the Fore River.

If you have any questions, please let me know.

Thanks,

Lauren

Lauren Swett, P.E.*

Technical Manager

Woodard & Curran

41 Hutchins Drive

Portland, Maine 04102

Phone: (207)558-3763 (direct)

(207)219-3591 (cell)

Portland Maine Yes. Google's good here.

Jean Fraser <jf@portlandmaine.gov>

Fwd: Written explanation of the deicing valve control system for Spent Aircraft Deicing Fluid at the Jetport

1 message

Jean Fraser <jf@portlandmaine.gov> Thu, May 23, 2019 at 5:10 PM
To: "Fraser, Jean" <jf@portlandmaine.gov>

Department of Public Works - Water Resources- Comments

---------- Forwarded message ---------
From: **Benjamin Pearson** <bnp@portlandmaine.gov>
Date: Thu, May 23, 2019 at 3:16 PM
Subject: Re: Written explanation of the deicing valve control system for Spent Aircraft Deicing Fluid at the Jetport
To: Jean Fraser <jf@portlandmaine.gov>

Hi Jean,

The main concern is the stormwater impact. The valve system directs glycol laden runoff to an underground tank that gets treated at the Inland Technologies deicing facility. This facility does eventually get discharged to the portland sewer but isn't as much of an issue. The facility removes the glycol and then sends it to the sewer after getting approval from the PWD. It is a pretty neat system. Just don't want any of it ending up in the storm sewer.

> The stormwater runoff goes to the Fore River but when they are deicing, the deicing runoff is controlled by the valves and goes into the storage tank for treatment. Deicing solution has glycol in it which is high in BOD which can use up all the oxygen in the natural water way and create poor water quality.
>
> I assume you would like me to provide the comment that states the concern so here it goes.
>
> Deicing operations contain glycol, a chemical high in biochemical oxygen demand (BOD). If runoff high in BOD enters into natural waters, it could create conditions harmful to aquatic life and environmental conditions by utilizing the available oxygen. Please provide additional information about the deicing valve controls and how it will function to prevent glycol contaminated runoff from entering into the Fore River.

To applicant:

> On Thu, May 23, 2019 at 7:46 AM Benjamin Pearson <bnp@portlandmaine.gov> wrote:
>
> > Thank you for sending this over. My only request for revision is to include this language in the project summary.
> >
> > Ben
> >
> > On Wed, May 22, 2019 at 3:48 PM Anderson, Dwight <Dwight.Anderson@stantec.com> wrote:
> >
> > > Mr. Pearson,
> > >
> > > The existing aircraft deicing apron is separated into 3 fluid collection zones (2 for deicing aircraft and 1 for containment of snow mixed with spent aircraft deicing fluid). The expanded aircraft deicing apron will include the 2 existing aircraft deicing positions, 2 additional aircraft deicing positions and 2 zones for containment of snow mixed with spent aircraft deicing fluid. The 6 zones will be controlled by 12 butterfly valves with electric actuators and an automated sampling system capable of directing flow to the existing 500,000 gallon underground storage tank or drainage system discharging to the Fore River from any number of the 6 zones at one time depending upon the concentration of propylene glycol present in the stormwater. The system will be equipped for automated

operation with a manual override for each zone. The manual override is needed during maintenance and in the event an electrical failure occurs. During non-deicing periods the valve control system will be set to discharge to DMH DI-8 and the storm drain system which discharges easterly to the Fore River. Spent aircraft deicing fluid collected in the 500,000 gallon underground storage tank will continue to be recycled by Inland Technologies under contract with the City of Portland and in accordance with the site's Industrial Discharge Permit issued by the Portland Water District. More specific detail on the sampling system is provided below.

The sampling system will be able to monitor glycol concentrations at all six (6) inlet pipes from the deicing area trench drains to ensure optimum conformance to meet MeDEP guidelines. The system is to monitor concentrations in flow using a set of fittings as depicted in Detail A on Sheet 6.11 included with the project drawings. The system will be capable of sampling each pipe individually on a maximum setting of 6-minutes per pipe. If no flow is detected, signaled by the float switch going off before the 6-minute sampling rotation is finished, then that pipe is skipped, and the system moves onto the next pipe. The one required sampling pump shall be peristaltic type, have low flow capabilities, be able to run dry without damage and be self-priming up to 8'. The refractometer to be installed will be able to be programmed for variable concentrations of propylene glycol. The control system will be capable of controlling the sampling system automatically. Control features are to be installed in the control room at Inland Technologies approximately 200 feet north of the sampling points.

Sincerely,

Dwight Anderson, PE

Senior Associate

Dwight.Anderson@stantec.com

Stantec
482 Payne Road Scarborough Court
Scarborough ME 04074-8929

Stantec

From: Benjamin Pearson <bnp@portlandmaine.gov>
Sent: Wednesday, May 22, 2019 10:16 AM
To: Jean Fraser <jf@portlandmaine.gov>
Cc: Gray, Amie <Amie.Gray@stantec.com>; Anderson, Dwight <Dwight.Anderson@stantec.com>
Subject: Re: Urgent - need revised plans and comment response

Jean,

I will not be requesting any revisions, just a written explanation of the valve system. In talking with Adam from Inland Technologies and Dwight from Stantec, the current plans are satisfactory to prevent any glycol contaminated water from entering into the storm drainage system but I would like to have the system explained including an explanation of the manual override. The comment will be

"Please provide a written explanation of the deicing manhole valve control system. The explanation should include how the valves will function when deicing is occurring. Additional information about automation and manual control of the system must be included. Please also provide information regarding how the system will function and where flows are diverted to during non-deicing periods."

Thanks,

Ben

Benjamin Pearson, PE
Compliance Coordinator
Water Resources, Public Works
bnp@portlandmaine.gov
207-874-8843

CITY OF SOUTH PORTLAND
PLANNING BOARD FINDINGS OF FACT AND DECISION

Date: 5/8/2019

RE: Amended Site Plan Review – Proposed Aircraft Apron, Taxiway, Service Road, Tree Removal, and Water Quality Projects at the Portland International Jetport – the City of Portland and Portland International Jetport – 777 Westbrook Street

The South Portland Planning Board issues the following findings of fact and decision based upon the application, all plans and submissions, and public hearing as of this date:

1. The City of Portland and the Portland International Jetport have requested an amended site plan to implement a number of capital improvement projects on the Jetport's property located at 777 Westbrook Street. The applicant proposes to phase the improvements relative to priorities established in the Jetport's Sustainable Airport Master Plan. The improvements relate to aircraft deicing apron expansion, taxiway, service road, tree removal, and water quality projects. There are eight related projects: 1) Improvements for more and long-term aircraft parking for de-icing procedures, 2) Runway 11, Taxiway Bypass, 3) tree removal for Runway 36, 4) air cargo taxiway, 5) Taxiway C realignment, 6) Taxiway A relocation east of Runway 18-36, 7) service access road relocation east of Cargo Area, and 8) Taxiway B construction from Runway 36 end to Runway 29 end. The applicant will request a waiver of Section 24-26 (a) for a phased development approval to allow the construction of the above projects as funding is available to the site plan to be valid until 2026. The property is further identified as Assessor's Maps 44 and 46, Lots 16 and 3F, in the Light Industrial (IL) District.

   Public hearing notices were mailed on April 29, 2019, to the 16 property owners within 500 feet of the proposed project and the applicant and were sent via email to the Conservation Commission, Planning Board, and City Council.

   This site plan submission was reviewed under Chapter 27, Article XIV Site Plan Review and in compliance with Article XXIV Light Industrial (IL) District.

2. This submission is for a permitted use. The site appears to meet space and bulk requirements and satisfies the performance standards for the Light Industrial (IL) District.

3. Pursuant to Section 27-1426 (g), the proposed improvement projects will not involve any additional traffic generation to the Jetport.

   Access to the project sites will be from Jetport Boulevard, west of the de-icing facility. The applicant will provide traffic control when project construction occurs. The projects do not require permeant parking areas; 20 "utility" parking spaces will be created for the construction workers on-site and after completion of the projects 2/3, the utility parking will be used by Airport Maintenance.

4. No additional utilities will be required for the different improvement projects proposed for the Jetport.

5. Pursuant to Section 27-1426 (v), the applicant has provided adequate provisions for the management of the quality and quantity of all stormwater generated by the proposed construction of the Aviation Facility's Master Plan Improvement projects. The applicant has proposed a stormwater management system meeting the City's Post-Construction Stormwater Management Plan standards, per Section 27-1536 (c)(1)(a) by providing MeDEP Site Location of Development Act permits # L-13760-18-AZ-A and # L-13760 TG-BG-N.

   The stormwater management system is designed to treat the quality and quantity of stormwater runoff prior to discharge to the Fore River. In addition to airfield improvement, an existing Water Quality Filter, located in Portland, will be reshaped to allow for project areas 2 and 3 for the construction of the second Water Quality Filter in South Portland. The post-development conditions will redevelop approximately 70.3 acres of which 27.04 acres of new impervious surfaces will be created. The applicant submitted a stormwater management plan based on the Basic, General, and Flooding Standards contained in Chapter 500 Stormwater Management. The management system for each proposed project will consist of catch basins, a surface drainage system, grassed swales and two vegetated under drained soil filters and an existing

Pursuant to Section 27-1426 (f), a satisfactory erosion and sedimentation control program proposal has been submitted.

The applicant proposes to fill 54,886 SF (or 1.26 acres) of freshwater wetland at two locations to allow for the construction the Hold/Deicing Apron and Taxiway A as well as ground disturbance within 75 feet of a coastal wetland. Off the Jetport, the applicant proposes to selective cut trees in a forested freshwater wetland identified as obstructions in the approach of Runway 39 without stump grubbing. The area is found on the east side of Instate 295 located on the Calvary Cemetery land.

The applicant has provided the U. S. Army Corps of Engineers Permit No. NAE-2008-00053, in which a mitigation payment of $236,009.80 for the compensation for filling, dredging, vegetation conversion (e. forested to shrub/scrub), and others. MeDEP has issued a Natural Resource Protection Act Permit-by-Rule for disturbance within 75-feet of coastal wetlands.

Any upland vegetative buffer impacts will be restored to its original state.

6. The applicant does not propose any new landscaping with the Master Improvement Plan. Any new lighting will meet FAA standards and match the existing lighting at the facility.

7. No potential nuisances are anticipated. The project is not anticipated to generate noise impacts above those permitted by Chapter 30, Control of Noise from New Development.

8. Per Section 27-1426 (r), the applicant is the City of Portland. As evidence of the applicant's right, title or interest in the Property, the applicant has submitted a plan entitled "Exhibit A" that shows all of the numerous parcels that make up the Property and lists the various land acquisition deeds and easements on the exhibit.

   The City of Portland is a Maine municipal corporation organized and existing under Maine law, per Section 27-1426 (s).

   Per Section 27-1426 (t), the estimated project cost is $8.52 million. The applicant has submitted a letter from the Airport Director to Dwight Anderson, P.E. of Stantec explaining how it intends to finance the project through a combination of federal Airport Improvement Program funds, State of Maine transportation bond funds, and airport operating budget funds. The Planning Board should require as a condition of approval that one of the first six methods set forth in Section 3(B) of the Site Plan application be provided to the Planning Department before a building permit may be issued for the project as follows: "Prior to the issuance of a building permit, the applicant shall provide the Planning and Development Director with satisfactory evidence that one of the first six methods set forth in Section 3(B) of the City's Site Plan application form relating to the applicant's financial capacity is in place."

9. The applicant is also requesting the modification of the City's Post-construction Stormwater Management System Plan, per Section 27-1536 (H)(1) by allowing the waivers of Drainage Maintenance Agreement and a perpetual easement to the City for access to the Stormwater facilities. The Jetport contract with certification stormwater inspection and maintenance contractors and will maintain the facilities per their MeDEP permits and believes that meeting a separate local requirement is overburdensome

CITY OF SOUTH PORTLAND
PLANNING BOARD FINDINGS OF FACT AND DECISION

5/8/2019

777 Westbrook Street
The City of Portland and Portland International Jetport
Amended Site Plan Review

With the inclusion of the condition of approval, all-applicable site plan standards are met by this submission.

WAIVERS:
The approval for the waiver of Section 24-26(a), to allow a phased development of the projects as funding is available, expiring ~~May 8,~~ 2026.
December 31, 2026
The approval for the waiver of 27-1536 (H) (1) to modify the City's Post-construction Stormwater Management Plan to waive the drainage maintenance agreement, per Section 27-1536(c)(2)(b), and to waive the requirement for the applicant to provide a perpetual easements be provided to the city allowing access for maintenance, repair, replacement and improvement of the stormwater management facilities in accordance with the approved drainage maintenance agreement, per Section 27-1536(c)(2)(c).

DECISION:
The approved the site plan application of the City of Portland and Portland International Jetport dated March 14, 2019, through May 1, 2019, and drawings dated October 12, 2018, through May 1, 2019, for Proposed Aircraft Apron, Taxiway, Service Road, Tree Removal, and Water Quality Projects at the Portland International Jetport located at 777 Westbrook Street, is hereby

DENIED APPROVED WITH CONDITION (4-0 (Saidley, Mullin absent; District #2 vacant)
as follows:

CONDITIONS
1 Planning Board Regulation #5, standard condition of approval: This approval is dependent upon and limited to the proposals and plans contained in the application and supporting documents submitted and affirmed to by the applicant. No project, plan or development previously approved by the Planning Board may be altered or modified without securing prior approval of the Planning Board in the form of an amended approval; provided, however, that, if at any time it becomes necessary or desirable to make modifications to the project, plan or development, the Planning Director may approve modifications determined by the Planning Director to be de minimis in that they (i) do not amount to a waiver or substantial alteration of any condition or requirement set by the Planning Board; (ii) do not affect any approval standard; (iii) meet all applicable ordinances and laws; (iv) are reviewed and approved by all appropriate City staff and consultants; and (v) do not involve any change to lot lines. De minimis changes include only the modifications listed in Section 24-27 of the Subdivision Ordinance and Section 27-140 of the Zoning Ordinance.
2. Prior to the scheduling of scheduling a pre-construction meeting, the applicant shall pay all outstanding review escrow account fees, post the necessary performance guarantee(s) in such amount(s) as established by the City, post and sedimentation control inspection escrow, and pay all compensation and/or impact fees as determined by the Planning Board.
3. Prior to the issuance of a building permit, the applicant shall provide the planning and development director with satisfactory evidence that one of the first six methods set forth in Section 3(B) of the City's site plan application form related to the Applicant's financial capacity is in place.

Stantec Consulting Services Inc.
482 Payne Road Scarborough Court, Scarborough ME 04074-8929

April 3, 2019

Ms. Barbara Barhydt
Planning and Development Department
City of Portland, Maine
389 Congress Street
Portland, Maine 04101-3509

Subject: Application for Level III Site Plan Application
Proposed Long-Term Hold Area, Deicing Pad Expansion and RON Apron Construction Including Terminal Apron Expansion Northwest End at the Portland International Jetport, 1001 Westbrook Street, Portland, Maine
Tax Maps 209/Lot A001

Dear Barbara:

On behalf of the City of Portland and the Portland International Jetport (Applicant), our office is pleased to provide the accompanying package of submission materials for a Level III Site Plan Application for the proposed Long-Term Hold Area, Deicing Pad Expansion and RON Apron Construction including Terminal Apron Expansion Northwest End at the Portland International Jetport. This submission package is intended to meet the City's Level III Site Plan Submission requirements as outlined in the Level III Site Plan Checklist as well as Section 14-526 of the Code of Ordinances. On behalf of the City of Portland and the Portland International Jetport, we look forward to your continued assistance in review of the proposed project.

If you have any questions regarding the materials being submitted, please contact this office.

Sincerely,

STANTEC CONSULTING SERVICES INC.

Dwight D. Anderson, P.E.
Project Manager
Phone: (207) 887-3438
Fax: (207) 879-0896
Dwight.Anderson@stantec.com

c: Chuck Norton, P.E., City of Portland (with attachments)
Paul Bradbury, P.E., Airport Director (with attachments)
Amie Gray, P.E., Stantec

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Portland International Jetport

You're on your way.

Paul H. Bradbury, P.E.
Airport Director

Zachary R. Sundquist, A.A.E.
Assistant Airport Director

October 10, 2018

Dwight Anderson, P.E.
Project Manager
Stantec
482 Payne Road
Scarborough, ME 04074

Subject: Aircraft Apron, Taxiway, Service Road, Tree Removal, and Water Quality Projects at the Portland International Jetport
Portland and South Portland, Maine
Agent Authorization Letter

Dear Mr. Anderson:

Please accept this letter as confirmation the City of Portland – Portland International Jetport has retained your firm, Stantec Consulting Services Inc. (Stantec), to prepare Local, State and Federal Permit Applications for the above referenced project. As part of these services, Stantec and their subconsultants are authorized to act as an agent for matters related to these permits.

Sincerely,

Paul Bradbury, P.E.
Airport Director

Portland, Maine — Yes. Life's good here.

Planning & Urban Development Department

LEVEL II and LEVEL III APPLICATION SUBMISSION CHECKLIST

Please submit each document as a separate PDF file.
Please confirm by electronically checking the boxes to the left

General Application Documents

Checklist	Items to be Provided
Yes NA Plan ✔	PROJECT DESCRIPTION • Cover Letter with detailed project description
Yes NA Plan ✔	COMPLETED CHECKLIST – LEVEL III APPLICATION
Yes NA Plan ✔	RIGHT, TITLE AND INTEREST • Deeds, leases, or purchase and sales agreements
Yes NA Plan ✔	EVIDENCE OF STATE OR FEDERAL APPROVALS, if applicable • Permits or letters of non-jurisdiction, if applicable
Yes NA Plan ✔	ZONING ASSESSMENT • Table listing required and proposed uses and dimensional standards Zoning Assessment Table
Yes NA Plan ✔	EXISTING &/OR PROPOSED EASEMENTS OR COVENANTS, if applicable • Evidence of existing easements and any proposed easements
Yes NA Plan ✔	WAIVER REQUESTS • Written request for waiver describing request and reason. Waiver Table
Yes NA Plan ✔	FINANCIAL CAPABILITY • Letter or evidence from a financial institution or third party verifying financial capacity to undertake project
Yes NA Plan ✔	TECHNICAL CAPABILITY • Evidence of technical capability of applicant and consultants – resumes and/or examples of past projects

LEVEL II AND LEVEL III SITE PLAN STANDARDS AND SUBMISSION CHECKLIST

Provide assessment of compliance with standards and include supplemental documentation, as applicable.

Please submit each document as a separate PDF file.

TRANSPORTATION

Check list	Assess/Provide/Document:
Yes NA Plan ☐ ✔ ☐	**Transportation Analysis- Traffic Impact (14-526 (a) 1)** • Provisions for pedestrian, bicycle, vehicle, and loading circulation and incremental volume of traffic impacts • Traffic Impact Study (Technical Manual, Section 1) if applicable
Yes NA Plan ✔ ☐ ☐	**Access and Circulation (14-526 (a) 2 a)** • Access and internal circulation, addressing ADA access • Access and egress impacts on traffic flows • Description and use of drive-up features, if applicable
Yes NA Plan ✔ ☐ ☐	**Loading and Servicing (14-526 (a) 2 b)** • Loading and servicing needs, route and travel way geometrics for deliveries • Turning templates for delivery vehicles, if applicable
Yes NA Plan ☐ ✔ ☐	**Sidewalks (14-526 (a) 2 c)** • Sidewalks and condition along street frontages and internal walkways • Engineered details for ADA ramps and public sidewalk details meeting sidewalk materials policy and ADA ramp construction details as applicable (Technical Manual, Section 1)
Yes NA Plan ☐ ✔ ☐	**Public Transit (14-526 (a) 3), if applicable** • Existing available transit services • Proposed site plan design details, such as easement, pad base, and shelter
Yes NA Plan ☐ ✔ ☐	**Off-Street Parking: Vehicle & Motorcycle/Scooter) (14-526 (a) 4 a and c)** • Expected parking demand, proposed parking supply, ADA parking, and applicable Zoning Requirements • Address Technical Manual standards (Section 1) for curb cut separation and parking lot layout and locate on site plan
Yes NA Plan ☐ ✔ ☐	**Bicycle Parking (14-526 (a) 4 b)** • Address bicycle parking requirements and identify locations on-site • Construction details for bike racks (Technical Manual, Section 1)
Yes NA Plan ✔ ☐ ✔	**Snow Storage (14-526 (a) 4 d)** • Management plan for snow removal and locate snow storage areas on plan
Yes NA Plan ☐ ✔ ☐	**Traffic Demand Management (TDM) (14-526 (a) 5), if applicable** • Develop TDM with Trip Reduction Targets and Strategies

ENVIRONMENTAL AND LANDSCAPE FEATURES	
Check list	Assess/Provide/Document:
Yes NA Plan ☐ ✔ ☐	**Preservation of Significant Natural Features (14-526 (b) 1), if applicable** • Trees, plants, habitats listed on State or Federal list of endangered or threatened • High and moderate value waterfowl and wading habitat • Aquifers on Casco Bay Islands • Waterbodies (including wetlands, watercourses, significant vernal pools and floodplains) • Proposed preservation areas and protection measures • Documentation from environmental consultants, determinations from applicable state agencies
Yes NA Plan ☐ ✔ ☐	**Landscaping and Landscape Preservation (14-526 (b) 2 a)** • Preservation of trees and preservation within required zoning setbacks (Technical Manual, Section 4) • Protection measures of existing vegetation during construction • Protection measures within Shoreland Zone, if applicable
Yes NA Plan ☐ ✔ ☐	**Site Landscaping (14-526 (b) 2 b)** • Screening and buffering of service areas and between non-residential and residential uses • Planting plans with plant schedule and sizes (Technical Manual, Section 4)
Yes NA Plan ☐ ✔ ☐	**Parking Lot Landscaping (14-526 (b) 2 b ii), if applicable** • Landscaped islands within parking areas (Technical Manual, Section 4)
Yes NA Plan ☐ ✔ ☐	**Street Trees (14-526 (b) 2 b iii)** • Existing Heritage or Feature Trees on site and measures to preserve • Identify street trees on the plan meeting the site plan and Technical Manual standards (Section 4) or identify alternative measures, if applicable

ENVIRONMENTAL AND STORMWATER	
Check list	Assess/Provide/Document:
Yes NA Plan ✔ ☐ ☐	**Water Quality, Stormwater Management and Erosion Control (14-526 (b) 3 a)** • Stormwater report in compliance with Section 5 of Technical Manual and DEP Chapter 500 stormwater for basic, general and flooding standards, as applicable • Erosion control plan and measures • Evidence of compliance with Urban Impaired Stream Standards pursuant to DEP Chapter 500 stormwater, as applicable • Subsurface sanitary sewage disposal and groundwater protection

PUBLIC INFRASTRUCTURE AND SAFETY	
Check list	Assess/Provide/Document:
Yes NA Plan ✔	**Consistency with City Master Plans (14-526 (c) 1)** • Identify consistency with master plans • Proposed easements, rights and improvements to connect or continue off-premises public infrastructure, as applicable
Yes NA Plan ✔	**Public Safety and Fire Prevention (14-526 (c))** • Address Crime Prevention through Environmental Design (CPTED) (Technical Manual, Section 3) • Emergency vehicle access • Address consistency with public safety standards (Technical Manual, Section 3) • Submit a code summary referring NFPA 1 and all Fire Department standards (Technical Manual, Section 3) – Fire Checklist
Yes NA Plan ✔	**Availability and Adequacy of Public Utilities (14-526 (c) 3) (Technical Manual, Sections 2 & 9)** • Electrical services, including providing underground services • Identify existing and proposed connections for public utilities and required public utility upgrades • Sewer line connections are required, if there is a main within 200 feet • Proposed solid waste management facilities on-site and management for the site • Written evidence of the ability to serve from utility companies, as applicable

SITE DESIGN	
Check list	Assess/Provide/Document:
Yes NA Plan ✔	**Massing, Ventilations and Wind Impact (14-526 (d) 1)** • Wind and ventilation impacts on adjoining structures and/or adjacent public spaces. Wind study, if applicable • Bulk, location or height impacts on adjoining structures • Identify and locate HVAC equipment and venting away from public spaces and residential properties • Identify screening and manufacturing specifications for noise, if applicable
Yes NA Plan ✔	**Shadows (14-526 (d) 2), if applicable** • Shadow analysis of impacts on publicly accessible open space (Technical Manual, Section 11)
Yes NA Plan ✔	**Snow and Ice Loading (14-526 (d) 3)** • Building design to prevent snow and ice from loading or falling onto adjacent properties or public ways
Yes NA Plan ✔	**View Corridors (14-526 (d) 4), if applicable** • Protection of designated view corridors (Portland Design Manual, Appendix 1)

Yes NA Plan ✔	**Historic Resources (14-526 (d) 5), if applicable** • Identify developments within Historic Districts or affecting Designated Landmarks • Certificate of Appropriateness or other evidence • Identify Developments within 100 feet of Historic Districts or affecting Designated Landmarks. Advisory HP review may be required • Address preservation and documentation of Archaeological Resources
Yes NA Plan ✔	**Exterior Lighting (14-526 (d) 6)** • Cut sheets of on-site light fixtures and any architectural or specialty lights (Technical Manual, Section 12) • Engineered details for any lights proposed in street right-of-way (Technical Manual, Section 10)
Yes NA Plan ✔	**Noise and Vibration (14-526 (d) 7)** • Evidence of noise levels for equipment, such as equipment specifications, to demonstrate consistency with zoning requirements
Yes NA Plan ✔	**Signage and Wayfinding (14-526 (d) 8), if applicable** • Signage plan showing the location, dimensions, height and setback of all existing and proposed signs. Signs in Historic Districts are reviewed by Historic Preservation staff • Proposed commercial and directional signage on site
Yes NA Plan ✔	**Zone Related Design Standards (14-526 (d) 5)** • Address Historic Preservation Design Review, if applicable • Address any applicable design review standards by zone • Address submission requirements from Design Manual, page 1, addressing neighborhood context • Description of exterior materials, color, finish, and samples
Construction Management Plan	
Check list	
Yes NA Plan ✔	**Construction Management Plan** • Construction Management Document and Plan

Level II and Level III Site Plan Checklist

Please upload the following drawings with the listed details into e-Plan as separate pdfs.

☑ **RECENT BOUNDARY SURVEY** (stamped by Maine Licensed Surveyor)

Must be in compliance with Technical Manual, Section 13

SITE PLAN(s) (stamped by Maine Licensed Engineer) including:

☑ **Existing Conditions**

- Approximate location of structures on abutting property
- Topography
- Locate water courses
- Delineate wetlands
- Zone lines

☑ **Proposed Site Plan**

- Ground floor area, and grade elevations for all buildings

☑ **Access, Circulation, and Parking**

- Streets and intersections adjacent to site , any proposed geometric modifications
- Location, dimensions and materials of all existing and proposed driveways, vehicle, bicycle, & pedestrian access ways with corresponding curb lines
- Engineered specifications/ cross-sections for proposed driveways, sidewalks & paved areas
- Location and dimensions of proposed loading areas
- Existing and proposed transit infrastructure with dimensions/ engineering specifications
- Location of vehicle and bicycle parking with dimensions and engineering specifications

☑ **Site Considerations**

- Identify snow storage areas
- Location of fire hydrants
- Location of solid waste management facilities

☑ **UTILITY PLAN** including:

- Existing utilities on site and within public streets
- Location, sizing, and directional flows of all existing and proposed utilities
- Location and dimensions of off-premises public or publicly accessible infrastructure adjacent to site
- Electric utility infrastructure

☑ **GRADING and DRAINAGE PLAN** including:

- Existing grades and drainage
- Proposed grades
- Proposed stormwater management meeting Technical Manual (Section 5) standards
- Location and proposed alteration of a water course
- Preservation or alteration of wetlands

☑ **EROSION CONTROL**

- Must be in compliance with Technical Manual, Section 5

☑ **LANDSCAPE PLAN** including:

- Existing vegetation to be preserved and preservation measures
- Proposed landscaping and buffers
- Planting schedule

☐ **RECORDING PLAT**, if applicable

- IF SUBDIVISION: Must be in compliance with requirements of Section 14-496 (b)

☐ **ARCHITECTURAL PLANS & RENDERINGS** including:

- Exterior building elevations, color renderings, illustrations of all sides
- Location and dimensions of all existing & proposed HVAC & mechanical equipment, all proposed screening
- Provide context drawings, if applicable (Design Manual, page 1)
- Floor plans

GENERAL APPLICATION DOCUMENTS

RIGHT, TITLE & INTEREST

No new land is being acquired by the Applicant for this project. A current print of Exhibit 'A' dated September 27, 2018 showing the parcels which make up the Portland International Jetport property is included with this section. Land acquisition deeds and easement are shown on this plan.

A copy of the Boundary Survey of the entire Jetport property dated September 27, 2018 was prepared by Plisga & Day (dba Good Deeds) are also provided with this section.

Attachments

Attachment A – Exhibit 'A' dated September 27, 2018
Attachment B – Boundary Survey

ATTACHMENT A

Exhibit 'A' dated September 27, 2018

Stantec

EASEMENTS ON AIRPORT PROPERTY

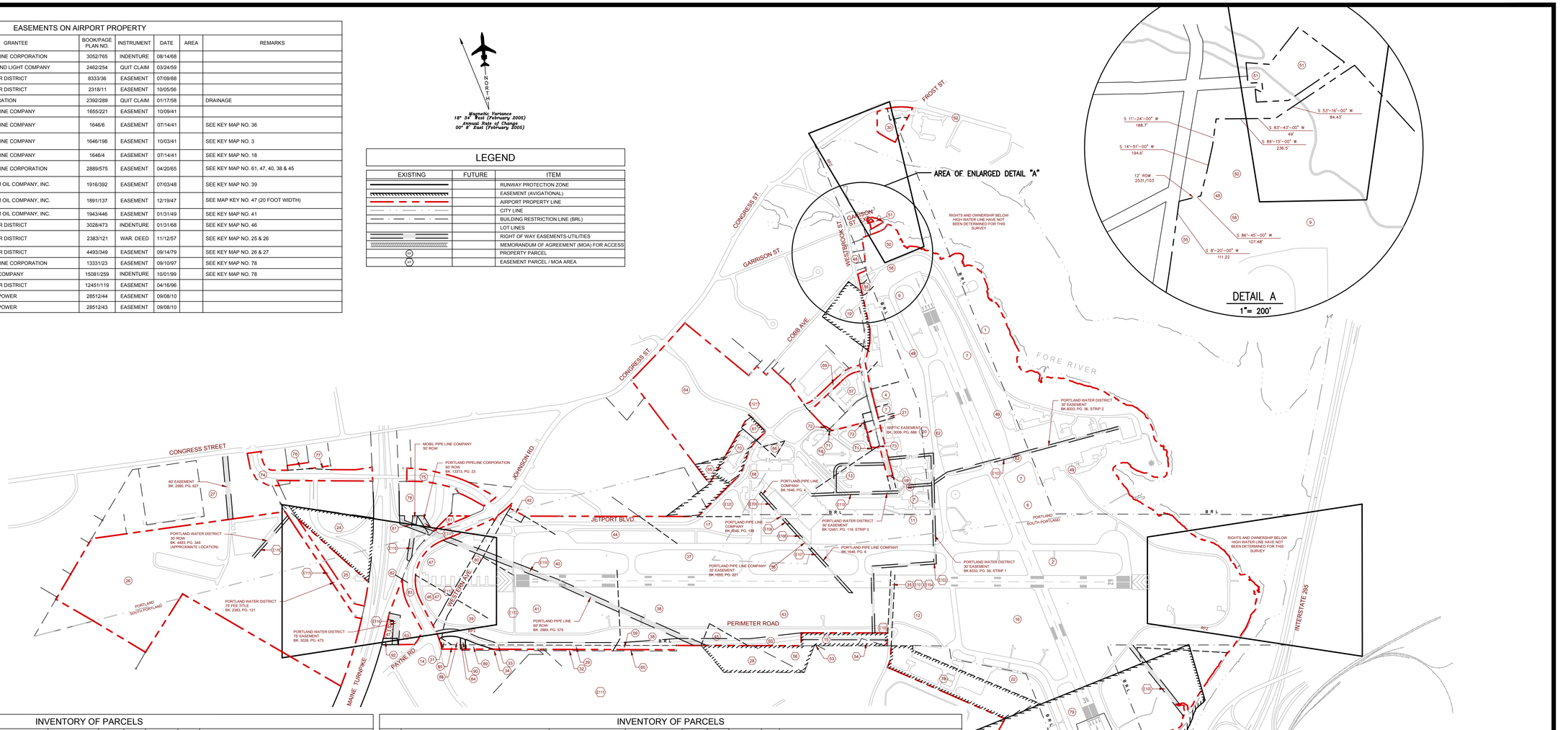
MAP KEY	GRANTOR	GRANTEE	BOOK/PAGE PLAN NO.	INSTRUMENT	DATE	AREA	REMARKS
E100	STATE OF MAINE	PORTLAND PIPE LINE CORPORATION	3052/765	INDENTURE	08/14/68		
E101	CITY OF PORTLAND	PORTLAND GAS AND LIGHT COMPANY	2462/254	QUIT CLAIM	03/24/59		
E103	CITY OF PORTLAND	PORTLAND WATER DISTRICT	8333/36	EASEMENT	07/09/88		
E104	CITY OF PORTLAND	PORTLAND WATER DISTRICT	2318/11	EASEMENT	10/05/56		
E105	CITY OF PORTLAND	CHAPLIN CORPORATION	2392/289	QUIT CLAIM	01/17/58		DRAINAGE
E106	CITY OF PORTLAND	PORTLAND PIPE LINE COMPANY	1655/221	EASEMENT	10/09/41		
E107	BURTON DENSMORE & GERTRUDE L. DENSMORE	PORTLAND PIPE LINE COMPANY	1646/6	EASEMENT	07/14/41		SEE KEY MAP NO. 36
E108	WALTER C. & ELEANOR JOHNSON NIELSEN, NELLIE R. JOHNSON	PORTLAND PIPE LINE COMPANY	1646/198	EASEMENT	10/03/41		SEE KEY MAP NO. 3
E109	ISSAC FAIRWEATHER	PORTLAND PIPE LINE COMPANY	1646/4	EASEMENT	07/14/41		SEE KEY MAP NO. 18
E110	CITY OF PORTLAND	PORTLAND PIPE LINE CORPORATION	2889/575	EASEMENT	04/20/65		SEE KEY MAP NO. 61, 47, 40, 38 & 45
E111	WILFRED A. HAY, TRUSTEE OF CLINTON C. PHINNEY	SOCONY-VACUUM OIL COMPANY, INC.	1916/392	EASEMENT	07/03/48		SEE KEY MAP NO. 39
E112	FRANK P. CUMMINGS, TRUSTEE OF LEON F. CUMMINGS	SOCONY-VACUUM OIL COMPANY, INC.	1891/137	EASEMENT	12/19/47		SEE MAP KEY NO. 47 (20 FOOT WIDTH)
E113	FRNCIS B. EVANS	SOCONY-VACUUM OIL COMPANY, INC.	1943/446	EASEMENT	01/31/49		SEE KEY MAP NO. 41
E114	CITY OF PORTLAND	PORTLAND WATER DISTRICT	3028/473	INDENTURE	01/31/68		SEE KEY MAP NO. 46
E115	EDWARD S. FINKS AND DOROTHY L. FINKS	PORTLAND WATER DISTRICT	2383/121	WAR. DEED	11/12/57		SEE KEY MAP NO. 25 & 26
E116	CITY OF PORTLAND	PORTLAND WATER DISTRICT	4493/349	EASEMENT	09/14/79		SEE KEY MAP NO. 26 & 27
E117	CITY OF PORTLAND	PORTLAND PIPE LINE CORPORATION	13331/23	EASEMENT	09/10/97		SEE KEY MAP NO. 78
E118	CITY OF PORTLAND	MOBIL PIPE LINE COMPANY	15081/259	INDENTURE	10/01/99		SEE KEY MAP NO. 78
E119	CITY OF PORTLAND	PORTLAND WATER DISTRICT	12451/119	EASEMENT	04/16/96		
E120	CITY OF PORTLAND	CENTRAL MAINE POWER	28512/44	EASEMENT	09/08/10		
E121	CITY OF PORTLAND	CENTRAL MAINE POWER	28512/43	EASEMENT	09/08/10		

NORTH

Magnetic Variance
18° 34' West (February 2006)
Annual Rate of Change
00° 8' East (February 2006)

LEGEND

EXISTING	FUTURE	ITEM
		RUNWAY PROTECTION ZONE
		EASEMENT (AVIGATIONAL)
		AIRPORT PROPERTY LINE
		CITY LINE
		BUILDING RESTRICTION LINE (BRL)
		LOT LINES
		RIGHT OF WAY EASEMENTS-UTILITIES
		MEMORANDUM OF AGREEMENT (MOA) FOR ACCESS
64		PROPERTY PARCEL
64		EASEMENT PARCEL / MOA AREA



INVENTORY OF PARCELS

MAP KEY	GRANTOR	GRANTEE	INST.	BOOK	PAGE	DATE	Ac.	REMARKS
1 ●	HAROLD SEIDERS	CITY OF PORTLAND	WAR. DEED	1548	80	4/23/38	1.15	PART OF 1 ALSO TAKEN BY CONDEMN. 1532/305
2 ●	HERBERT JACKSON	CITY OF PORTLAND	CONDEMNATION	1634	492	5/2/41	124.4	PARCEL 1 IN 1634/492
3 ●	FAIRWEATHER, NEILSON & LARRABEE	CITY OF PORTLAND	CONDEMNATION	1634	492	5/2/41	28.1	PARCEL 2 IN 1634/492
4 ●	GEORGE W. MILLS	CITY OF PORTLAND	WAR. DEED	1639	63	5/6/41	2.29	PART OF 4 ALSO TAKEN BY CONDEMN. 1532/305
5 ●	STATE OF MAINE	CITY OF PORTLAND	Q.C. DEED	1647	460	7/30/41	4.59	
6 ●	CLIFFORD STRANGE	CITY OF PORTLAND	WAR. DEED	1543	276	3/1/38	15.3	
6 ●	CLIFFORD STRANGE	CITY OF PORTLAND	CONDEMNATION	1532	305	6/30/37	-	
7 ●	PORTLAND CITY AIRPORT	CITY OF PORTLAND	WAR. DEED	1543	277	3/1/38	139.2	
7 ●	PORTLAND CITY AIRPORT	CITY OF PORTLAND	CONDEMNATION	1532	305	6/30/37	-	
8 ●	FLOELLA A. MAXWELL	CITY OF PORTLAND	WAR. DEED	1504	410	9/23/36	2.06	ROAD R.O.W. B 1504 P 409, POLE LINE R.O.W. B 1507, P275
9 ●	MILLIKEN HEIRS & CUMMINGS ESTATE	CITY OF PORTLAND	CONDEMNATION	1634	492	5/2/41	24.05	PARCEL 3 IN 1634/492
10 ●	ROBERT D. JACKSON	CITY OF PORTLAND	EASEMENT	1532	301	6/30/37	-	CONDEMNATION OF AIR RIGHTS
11	CLIFFORD STRANGE	CITY OF PORTLAND	WAR. DEED	1897	140	9/25/47	1.6	FEDERAL PROJECT NO. 9-17-001-702
11	CLIFFORD STRANGE	CITY OF PORTLAND	CONDEMNATION	1880	157	8/5/47	1.6	FEDERAL PROJECT NO. 9-17-001-702
12	STATE OF MAINE	CITY OF PORTLAND	CONDEMNATION	2238	63	7/22/55	8.61	FEDERAL PROJECT NO. 9-17-001-508
13	ELEANOR J. NIELSON	CITY OF PORTLAND	WAR. DEED	2361	436	7/9/57	9.60	FEDERAL PROJECT NO. 9-17-001-5811
14	EDNA MAXFIELD	CITY OF PORTLAND	EASEMENT	72	256	6/17/55	-	CONDEMNATION OF AIR RIGHTS, 9-17-001-508
15	MERLE P. CHAPLIN	CITY OF PORTLAND	EASEMENT	72	256	6/17/55	-	CONDEMNATION OF AIR RIGHTS, 9-17-001-508
16	STATE OF MAINE	CITY OF PORTLAND	Q.C. DEED	3028	471	1/24/68	16.5	FEDERAL PROJECT NO. 9-17-001-C916
17	BROOKLAWN MEM. PARK	CITY OF PORTLAND	CONDEMNATION	3007	617	6/19/67	6.3	PARCEL B-3 IN 3007/617, 9-17-001-C916
18	BERTRAM J. FAIRWEATHER	CITY OF PORTLAND	WAR. DEED	3009	666	8/30/67	12.6	FEDERAL PROJECT NO. 9-17-001-C916
18	BERTRAM J. FAIRWEATHER	CITY OF PORTLAND	CONDEMNATION	3007	617	6/19/67	-	SEE PARCEL B-4 IN 3007/617, 9-17-001-C916
19	CUMBERLAND COUNTY COMMISSIONERS	CITY OF PORTLAND	DISCONTINUED	DOCKET	1175	JAN.1957	1.18	CUMBERLAND CO. COMM. RECORDS, 9-17-001-508
20	LLEWELLYN PRESSLEY	CITY OF PORTLAND	EASEMENT	2365	139	7/18/57	792SF	GROWTH RESTRICTION, 9-17-001-5811
21 ●	PORTLAND CITY AIRPORT	CITY OF PORTLAND	Q.C. DEED	1503	216	7/13/36	1.30	
22	STATE OF MAINE	CITY OF PORTLAND	Q.C. DEED	3028	471	1/24/68	24.5	FEDERAL PROJECT NO. 9-17-001-C916
23	STATE OF MAINE	CITY OF PORTLAND	EASEMENT	3028	469	1/24/68	96	EASEMENT FOR UNOBSTRUCTED AIR SPACE 9-17-001-C916
24	HARRY HARMON & GEORGE HUTCHINS	CITY OF PORTLAND	EASEMENT	3010	683	8/31/67	9.2	EASEMENT FOR UNOBSTRUCTED AIR SPACE 9-17-001-C916
24	HARRY HARMON & GEORGE HUTCHINS	CITY OF PORTLAND	EASEMENT	3007	617	6/19/67	9.2	PARCEL D-1 IN 3007/617, 9-17-001-C916
25	EDWARD S. & DOROTHY L. FINKS	CITY OF PORTLAND	WAR. DEED	2457	262	2/13/59	4.30	FEDERAL PROJECT NO. 9-17-001-5912
26	EDWARD S. & DOROTHY L. FINKS	CITY OF PORTLAND	WAR. DEED	2457	262	2/13/59	86.09	FEDERAL PROJECT NO. 9-17-001-5912
27	CITY OF PORTLAND	W.H. NICHOLS CO.	WAR. DEED	2990	627	4/4/67	28.77	PARCEL SOLD-FAA RELEASE 2/27/67 AVIG. ESMT. RETAINED
28	BERGEN ASSOCIATES INC.	CITY OF PORTLAND	EASEMENT	3007	617	6/19/67	5.62	PARCEL D-1 IN 3007/617, 9-17-001-C916
29	ADC BUILDING FUND INC. et. als.	CITY OF PORTLAND	CONDEMNATION	3007	617	6/19/67	1.01	PARCEL B-2 IN 3007/617, 9-17-001-C916
30	OTIS J. & DOROTHY J. AUGUST	CITY OF PORTLAND	WAR. DEED	3909	306	9/17/76	2.25	6-23-0038-10
31	ADC BUILDING FUND INC.	CITY OF PORTLAND	CONDEMNATION	3007	617	6/17/67	0.11	PARCEL B-6 IN 3007/617, 9-17-001-C916
32	ADC BUILDING FUND INC.	CITY OF PORTLAND	EASEMENT	3007	617	6/17/67	0.28	PARCEL E-2 IN 3007/617, 9-17-001-C916
33	ADC BUILDING FUND INC.	CITY OF PORTLAND	CONDEMNATION	3007	617	6/17/67	1.31	PARCEL B-1 IN 3007/617, 9-17-001-C916
34	ADC BUILDING FUND INC.	CITY OF PORTLAND	EASEMENT	3007	617	6/17/67	0.32	PARCEL E-1 IN 3007/617, 9-17-001-C916
35	CUMBERLAND COUNTY COMMISSIONERS	CITY OF PORTLAND	DISCONTINUED	21	226	1955	2.30	FEDERAL PROJECT NO. 9-17-001-508
36	BURTON DENSMORE	CITY OF PORTLAND	WAR. DEED	2236	399	7/12/55	20	FEDERAL PROJECT NO. 9-17-001-508
36	BURTON DENSMORE	CITY OF PORTLAND	CONDEMNATION	72	256	6/17/55	-	FEDERAL PROJECT NO. 9-17-001-508
37	BROOKLAWN MEM. PARK	CITY OF PORTLAND	WAR. DEED	2257	189	9/13/55	5.22	FEDERAL PROJECT NO. 9-17-001-508
37	BROOKLAWN MEM. PARK	CITY OF PORTLAND	CONDEMNATION	72	256	6/17/55	-	FEDERAL PROJECT NO. 9-17-001-508
38	CLINTON C. PHINNEY & ROBERT D. SCHWARTZ	CITY OF PORTLAND	Q.C. DEED	2255	428/9	11/28/55	15.2	FEDERAL PROJECT NO. 9-17-001-508
38	CLINTON C. PHINNEY & ROBERT D. SCHWARTZ	CITY OF PORTLAND	CONDEMNATION	72	256	6/17/55	-	FEDERAL PROJECT NO. 9-17-001-508
39	CLINTON C. PHINNEY & ROBERT D. SCHWARTZ	CITY OF PORTLAND	Q.C. DEED	2255	428/9	11/28/55	8.03	FEDERAL PROJECT NO. 9-17-001-508
39	CLINTON C. PHINNEY & ROBERT D. SCHWARTZ	CITY OF PORTLAND	CONDEMNATION	72	256	6/17/55	-	FEDERAL PROJECT NO. 9-17-001-508
40	JOHN M. DENSMORE	CITY OF PORTLAND	WAR. DEED	2257	271	10/27/55	49	FEDERAL PROJECT NO. 9-17-001-508
40	JOHN M. DENSMORE	CITY OF PORTLAND	CONDEMNATION	72	256	6/17/55	-	FEDERAL PROJECT NO. 9-17-001-508
41	JOHN M. DENSMORE	CITY OF PORTLAND	WAR. DEED	2257	271	10/27/55	49	FEDERAL PROJECT NO. 9-17-001-508
41	MOBIL PIPE LINE CO.	CITY OF PORTLAND	Q.C. DEED	3051	721	8/1/68	21.8	
41	FRANCIS B. EVANS	CITY OF PORTLAND	CONDEMNATION	72	256	6/17/55	-	FEDERAL PROJECT NO. 9-17-001-508
42	JOHN E. DENSMORE	CITY OF PORTLAND	WAR. DEED	2241	473	8/8/55	0.50	FEDERAL PROJECT NO. 9-17-001-508
42	JOHN E. DENSMORE	CITY OF PORTLAND	CONDEMNATION	72	256	6/17/55	0.50	FEDERAL PROJECT NO. 9-17-001-508
43	MERLE P. CHAPLIN	CITY OF PORTLAND	CONDEMNATION	72	256	6/17/55	24.1	FEDERAL PROJECT NO. 9-17-001-508
44	CHRISTIAN KRAGELUND	CITY OF PORTLAND	CONDEMNATION	72	256	6/17/55	22.9	FEDERAL PROJECT NO. 9-17-001-508

INVENTORY OF PARCELS

MAP KEY	GRANTOR	GRANTEE	INST.	BOOK	PAGE	DATE	Ac.	REMARKS
45	SOUTH PORTLAND GARDENS	CITY OF PORTLAND	CONDEMNATION	72	256	6/17/55	1.72	FEDERAL PROJECT NO. 9-17-001-508
46	WALTER & STELLA KORZENIEWSKI	CITY OF PORTLAND	WAR. DEED	2279	228	3/5/55	6.80	FEDERAL PROJECT NO. 9-17-001-508
46	WALTER & STELLA KORZENIEWSKI	CITY OF PORTLAND	CONDEMNATION	72	256	6/17/55	-	FEDERAL PROJECT NO. 9-17-001-508
47	FRANK P. CUMMINGS ESTATE	CITY OF PORTLAND	CONDEMNATION	72	256	6/17/55	10.9	FEDERAL PROJECT NO. 9-17-001-508
48	THOMAS J. JR. & PAT A. FOLEY	CITY OF PORTLAND	WAR. DEED	4040	177	6/22/77	0.23	SEE ACTUAL DESCRIPTION IN 2531/103, 6-23-0038-11
49 ●	PORTLAND CITY AIRPORT	CITY OF PORTLAND	Q.C. DEED	1503	217	10/24/35	19.62	
50	JAMES C. MORRIS (TRUSTEE)	CITY OF PORTLAND	WAR. DEED	3420	256	6/18/73	4.65	
51	KENNETH I. PARKER (PER REP)	CITY OF PORTLAND	WAR. DEED	7715	172	4/7/87	0.5	3-23-0038-19
52	ROBERT D. SCHWARTZ et. al.(TRUSTEE)	CITY OF PORTLAND	EASEMENT	2453	324	1/15/59	-	RIGHT TO ENTER 10' STRIP
53	EDWARD F. GALLAGHER	CITY OF PORTLAND	EASEMENT	72	256	6/17/55	-	FEDERAL PROJECT NO. 9-17-001-508
54	CHAPLIN CORP.	CITY OF PORTLAND	EASEMENT	72	256	6/17/55	-	FEDERAL PROJECT NO. 9-17-001-508
55	RAY L. LITTLEFIELD III	CITY OF PORTLAND	WAR. DEED	3894	331	3/14/77	1.0	6-23-0038-11
56	DIAMOND GARDNER CORP	CITY OF PORTLAND	EASEMENT	3007	617	6/19/67	2.6	PARCEL D-18 -3007/617 9-17-001-C916
57	NEVER OWNED BY CITY, PARCEL B-4 IN CONDEMNATION DEED WITH ERROR SEE AFFIDAVIT 3458/116							
58	RAY L. & JOLAN L. LITTLEFIELD	CITY OF PORTLAND	WAR. DEED	3550	07	5/24/74	0.60	
59	AIRPORT REALITY CORP.	CITY OF PORTLAND	CONDEMNATION	3007	617	6/19/67	0.82	PARCEL B-8 IN 3007/617, 9-17-001-C916
60	AIRPORT REALITY CORP.	CITY OF PORTLAND	EASEMENT	3007	617	6/19/67	0.25	PARCEL E-3 IN 3007/617, 9-17-001-C916
61	FRANK P. CUMMINGS ESTATE	CITY OF PORTLAND	CONDEMNATION	72	256	6/17/55	3.79	FEDERAL PROJECT NO. 9-17-001-508
62 ●	PORTLAND CITY AIRPORT	CITY OF PORTLAND	WAR. DEED	1465	141	1/23/35	12.8	
63	CITY OF PORTLAND	STATE OF MAINE	CONDEMNATION	11456	276	5/31/94	0.13	
64	BCD AIRPORT PARTNERS	CITY OF PORTLAND	CONDEMNATION	9492	231	3/4/91	45.5	
65	APEX INC.	CITY OF PORTLAND	QUITCLAIM	10203	192	7/8/92	1.06	
65	CITY OF PORTLAND	BROOKLAWN MEM. PARK	Q.C. W/COVEN	13400	006	10/23/97	1.06	PART OF 64
65	BROOKLAWN MEMORIAL PARK	CITY OF PORTLAND	AVIG. ESMT.	13395	309	10/24/97	1.06	
66	APEX INC.	CITY OF PORTLAND	QUITCLAIM	10203	192	7/8/92	0.32	
67	CITY OF PORTLAND	BROOKLAWN MEM. PARK	Q.C. W/COVEN	13400	006	10/23/97	0.94	PART OF 64
67	BROOKLAWN MEMORIAL PARK	CITY OF PORTLAND	AVIG. ESMT.	13395	309	10/16/97	0.94	
68	BROOKLAWN MEMORIAL PARK	CITY OF PORTLAND	Q.C. W/COVEN	13395	305	10/16/97	7.48	3-23-0038-36 SUBJ. TO DRAINAGE ESMT BK. 8272, PG. 208
69	THOMAS A. TOYE , III	CITY OF PORTLAND	Q.C. W/COVEN	13434	266	10/16/97	1.28	
70	BROOKLAWN MEMORIAL PARK	CITY OF PORTLAND	AVIG. ESMT.	13395	309	10/24/97	6.23	
71	TOYE AIRPORT PARK LLC	CITY OF PORTLAND	WAR. DEED	16971	184	11/19/01	0.06	
72	TOYE REALTY HOLDINGS LLC	CITY OF PORTLAND	Q.C. W/COVEN	16971	190	11/19/01	0.03	
73	CITY OF PORTLAND	TOYE AIRPORT PARK LLC	QUITCLAIM	16971	193	11/19/01	0.02	
74	MAINE TURNPIKE AUTHORITY	CITY OF PORTLAND	Q.C. W/COVEN	21040	64	3/31/04	5.14	SUBJECT TO ALL EASEMENTS OF RECORD
75	MAINE TURNPIKE AUTHORITY	CITY OF PORTLAND	Q.C. W/COVEN	21040	64	3/31/04	3.47	SUBJECT TO ALL EASEMENTS OF RECORD
76	MAINE TURNPIKE AUTHORITY	CITY OF PORTLAND	Q.C. W/COVEN	21040	74	3/31/04	0.37	
77	MAINE TURNPIKE AUTHORITY	CITY OF PORTLAND	Q.C. W/COVEN	21040	74	3/31/04	0.13	
78	CITY OF PORTLAND	MAINE TURNPIKE AUTHORITY	Q.C. W/COVEN	21040	60	3/31/04	4.95	ACQUIRED UNDER FAAP 508, FAA APPROVED RELEASE ON 3-26-02
79	STATE OF MAINE	CITY OF PORTLAND	RELEASE DEED	17126	328	12/26/01	70.4	ACQUIRED AIP 3-23-0038-54
79	STATE OF MAINE	CITY OF PORTLAND	AVIG. ESMT.	17126	332	12/26/01		ACQUIRED AIP 3-23-0038-54
80	STATE OF MAINE	CITY OF PORTLAND	VACATION	19510	56	6/06/03	-	VACATION OF JOHNSON ROAD/WESTERN AVENUE, LAND SWAP
81	PORTLAND PIPE LINE CORPORATION	CITY OF PORTLAND	RELEASE	14138	238	9/10/98	-	RELEASE OF EASEMENT WITH COVENANT
82	MOBIL PIPE LINE COMPANY	CITY OF PORTLAND	RELEASE	15081	274	10/01/99		RELEASE OF EASEMENT WITH COVENANT
83	CITY OF PORTLAND	STATE OF MAINE	CONDEMNATION	15801	296	10/24/00	5.91	JOHNSON ROAD/WESTERN AVENUE RELOCATION, LAND SWAP
84	CITY OF SOUTH PORTLAND	CITY OF PORTLAND	RELEASE	23141	42	8/01/05	2.32	ORIGINAL DEED 4940/8, FAA RELEASE 4-23-82 BK 4947 PG.32
85	CITY OF SOUTH PORTLAND		CITY COUNCIL ORDER	23154	238	9/15/05	-	DISCONTINUANCE OF A PORTION OF JETPORT PLAZA ROAD (290')
86	CITY OF PORTLAND	STATE OF MAINE	CONDEMNATION	24337	300	9/05/06	1.44	LAND SWAP RUNWAY 36 APPROACH / FAA APPROVAL 3-1-07
87	STATE OF MAINE	CITY OF PORTLAND	CONDEMNATION	24337	303	9/05/06	1.44	LAND SWAP RUNWAY 36 APPROACH
88	JETPORT PROPERTIES, LLC	CITY OF PORTLAND	LEASE	25698	194	12/07/07	0.77	LEASE / FAA APPROVAL 6-11-08
89	JETPORT PROPERTIES, LLC	CITY OF PORTLAND	LEASE	25698	194	12/07/07	0.40	LEASE / FAA APPROVAL 6-11-08
90	CITY OF PORTLAND	CITY OF PORTLAND	EASEMENT	25698	194	12/07/07	0.16	RIGHT-OF-WAY
91	STATE OF MAINE	CITY OF PORTLAND	MOA	-	-	7/01/11	0.44	OBSTRUCTION REMOVAL MEMORANDUM OF AGREEMENT FOR ACCESS
92	CITY OF PORTLAND	DULUTH HOLDINGS, INC.	LEASE	-	-	7/16/18	0.30	
93	CITY OF PORTLAND	CITY OF SOUTH PROTLAND	EASEMENT	23141	44	12/12/05	8.70	SUBJECT TO ALL EASEMENTS OF RECORD

GRAPHIC SCALE
600 0 300 600 1200
1 inch = 600 feet

NOTES:
1. THIS IS AN EXHIBIT A PROPERTY MAP, PART OF THE AIRPORT IMPROVEMENT PROGRAM FEDERAL GRANT APPLICATION. IT IS NOT A BOUNDARY SURVEY. THE PRIMARY INTENT IS TO IDENTIFY ALL LAND WHICH IS DESIGNATED AIRPORT PROPERTY AND TO PROVIDE AN INVENTORY OF ALL PARCELS WHICH MAKE UP THE AIRPORT. PHYSICAL SURVEY OF BOUNDARIES IS GENERALLY NOT REQUIRED. REFER TO AC 150/5100-17.
2. THE DESCRIPTION OF PARCEL NO. 10 INCLUDES OTHER AVIGATIONAL EASEMENTS WHICH WERE LATER EXTINGUISHED WHEN THE PARCELS WERE ACQUIRED BY THE CITY OF PORTLAND.
3. PARCEL NO. 49 INCLUDES PORTIONS OF PARCEL NO. 82 WHICH HAD BEEN PREVIOUSLY CONVEYED.
4. "●" INDICATES PARCELS THAT COMPRISE LIMITS OF AP-4 AFFECTED LAND (C.A.A. DOCKET NO. S-904-17-19).
5. FOR PARCELS ACQUIRED UNDER CITY COUNCIL ORDER, DATED JUNE 20, 1955, RECORDED IN THE PORTLAND CITY CLERKS RECORDS IN VOLUME 72, PAGE 256, SEE AFFIDAVIT OF ELIZABETH L. BOYNTON, DATED AUGUST 4, 1997, RECORDED IN THE CUMBERLAND COUNTY REGISTRY OF DEEDS IN BOOK 13265, PAGE 102.
6. REFERENCE IS MADE TO THE EXHIBIT "A" DOCUMENT FOR THE PORTLAND INTERNATIONAL JETPORT ON FILE IN THE TERMINAL AT THE AIRPORT MANAGER'S OFFICE, 1001 WESTBROOK STREET, PORTLAND.

REV	DESCRIPTION	DATE	BY	APP'D
6	ADDED ILS CRITICAL AREAS TO ALP AND RE-POSTED WITH EXHIBIT A TO FAA OEAAA	09.27.18	LA	DDA
5	SUBMITTED TO CITY WITH FINAL MASTER PLAN DOCUMENT	07.09.18	LA	DDA
4	POSTED ALP SET TO FAA OEAAA STUDY #2018-ANE-22-NRA	01.12.18	LA	DDA
3	SUBMITTED TO FAA FOR APPROVAL	11.29.17	LA	DDA
2	ISSUED DRAFT ALP TO CITY AND FAA	11.17.16	LA	DDA
1	SUBMITTED TO CLIENT FOR REVIEW	07.26.16	LA	DDA

REVISIONS

THE CONTENTS OF THIS PLAN DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THIS DOCUMENT BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

PORTLAND INTERNATIONAL JETPORT
EXHIBIT 'A'
PORTLAND, MAINE

Stantec Consulting Services Inc.
482 Payne Road
Scarborough, ME
Tel. 207.883.3355
WWW.STANTEC.COM

PLANNED BY: Dwight Anderson / Amie Gray / Steve Benson
DETAILED BY: Lori Anthony / Diana Przybycien
APPROVED BY: Dwight Anderson / Mike Dmyterko
FILE NAME: STANTEC-EXHIBIT_A
September 2018 | SHEET EXHIBIT 'A'

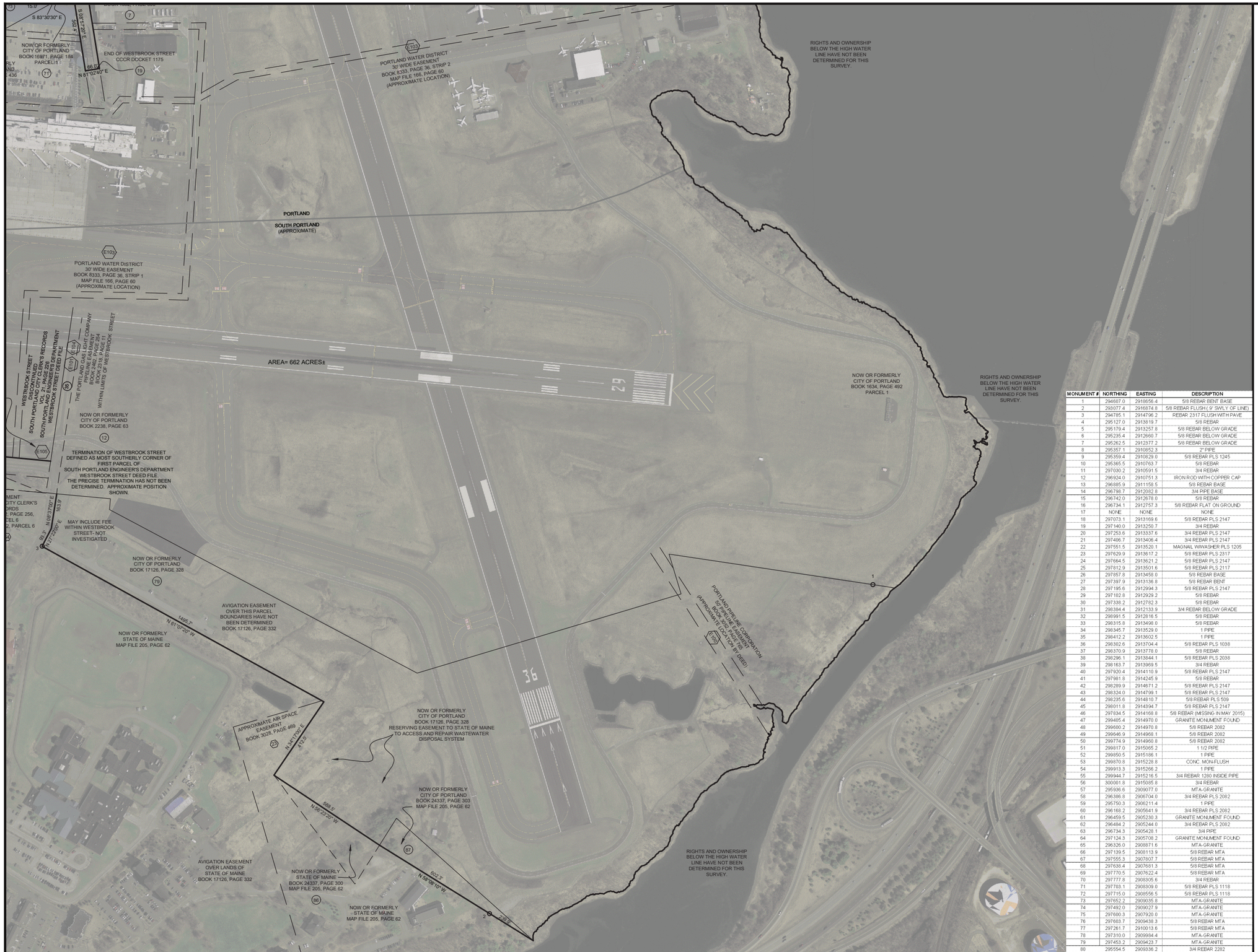
Coffman Associates Airport Consultants

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ATTACHMENT B

Boundary Survey

Stantec



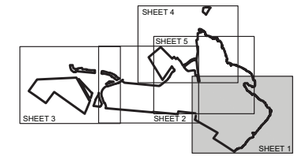
MONUMENT #	NORTHING	EASTING	DESCRIPTION
1	294607.0	2918656.4	5/8 REBAR BENT BASE
2	293077.4	2916874.8	5/8 REBAR FLUSH (.9' SWLY OF LINE)
3	294785.1	2914796.2	REBAR 2317 FLUSH WITH PAVE
4	295127.0	2913819.7	5/8 REBAR
5	295179.4	2913257.8	5/8 REBAR BELOW GRADE
6	295235.4	2912660.7	5/8 REBAR BELOW GRADE
7	295262.5	2912377.2	5/8 REBAR BELOW GRADE
8	295357.1	2910852.3	2" PIPE
9	295359.4	2910829.0	5/8 REBAR PLS 1245
10	295365.5	2910763.7	5/8 REBAR
11	297030.2	2910591.5	3/4 REBAR
12	296924.0	2910751.3	IRON ROD WITH COPPER CAP
13	296885.9	2911158.5	5/8 REBAR BASE
14	296786.7	2912082.8	3/4 PIPE BASE
15	296742.0	2912678.0	5/8 REBAR
16	296734.1	2912757.3	5/8 REBAR FLAT ON GROUND
17	NONE	NONE	NONE
18	297073.1	2913169.6	5/8 REBAR PLS 2147
19	297140.0	2913250.7	3/4 REBAR
20	297253.6	2913337.6	3/4 REBAR PLS 2147
21	297406.7	2913406.4	3/4 REBAR PLS 2147
22	297551.5	2913520.1	MAGNAIL W/WASHER PLS 1205
23	297629.9	2913617.2	5/8 REBAR PLS 2317
24	297664.5	2913621.2	5/8 REBAR PLS 2147
25	297812.9	2913501.6	5/8 REBAR PLS 2117
26	297857.8	2913458.0	5/8 REBAR BASE
27	297397.9	2913136.8	5/8 REBAR BENT
28	297195.6	2912994.3	5/8 REBAR PLS 2147
29	297102.8	2912929.2	5/8 REBAR
30	297338.2	2912782.3	5/8 REBAR
31	298384.4	2912133.9	3/4 REBAR BELOW GRADE
32	298991.5	2912616.5	5/8 REBAR
33	298315.6	2913498.0	5/8 REBAR
34	298345.7	2913529.0	1 PIPE
35	298412.2	2913602.5	1 PIPE
36	298302.6	2913704.4	5/8 REBAR PLS 1038
37	298370.9	2913778.0	5/8 REBAR
38	298296.1	2913844.1	5/8 REBAR PLS 2038
39	298163.7	2913969.5	3/4 REBAR
40	297920.4	2914110.9	5/8 REBAR PLS 2147
41	297981.8	2914245.9	5/8 REBAR
42	298289.9	2914671.2	5/8 REBAR PLS 2147
43	298334.0	2914799.1	5/8 REBAR PLS 2147
44	298235.6	2914810.7	5/8 REBAR PLS 509
45	298011.8	2914394.7	5/8 REBAR PLS 2147
46	297834.5	2914168.8	5/8 REBAR (MISSING IN MAY 2015)
47	299405.4	2914970.0	GRANITE MONUMENT FOUND
48	299600.2	2914970.8	5/8 REBAR 2082
49	299646.9	2914968.1	5/8 REBAR 2082
50	299774.9	2914960.8	5/8 REBAR 2082
51	299817.0	2915065.2	1 1/2 PIPE
52	299850.5	2915186.1	1 PIPE
53	299870.8	2915228.8	CONC MON-FLUSH
54	299913.3	2915266.2	1 PIPE
55	299944.7	2915216.5	3/4 REBAR 1280 INSIDE PIPE
56	300001.8	2915085.8	3/4 REBAR
57	295936.6	2909077.0	MTA-GRANITE
58	296386.8	2906704.0	3/4 REBAR PLS 2082
59	296750.3	2906211.4	1 PIPE
60	296168.2	2905641.9	3/4 REBAR PLS 2082
61	296459.5	2905230.3	GRANITE MONUMENT FOUND
62	296484.2	2905244.0	3/4 REBAR PLS 2082
63	296734.3	2905428.1	3/4 PIPE
64	297124.3	2905708.2	GRANITE MONUMENT FOUND
65	296326.0	2908871.6	MTA-GRANITE
66	297139.5	2908113.9	5/8 REBAR MTA
67	297555.3	2907807.7	5/8 REBAR MTA
68	297638.4	2907681.3	5/8 REBAR MTA
69	297770.5	2907622.4	5/8 REBAR MTA
70	297777.8	2908305.6	3/4 REBAR
71	297703.1	2908309.0	5/8 REBAR PLS 1118
72	297715.0	2908556.5	5/8 REBAR PLS 1118
73	297652.2	2909035.8	MTA-GRANITE
74	297492.0	2909027.9	MTA-GRANITE
75	297600.3	2907920.0	MTA-GRANITE
76	297603.7	2909438.3	5/8 REBAR MTA
77	297261.7	2910013.6	5/8 REBAR MTA
78	297310.0	2909964.4	MTA-GRANITE
79	297453.2	2909423.7	MTA-GRANITE
80	295554.5	2909336.2	3/4 REBAR 2282
81	295584.6	2908958.4	1" PIPE

NOTES

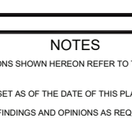
1. BOOK AND PAGE CITATIONS SHOWN HEREON REFER TO THE CUMBERLAND COUNTY REGISTRY OF DEEDS.
2. NO MONUMENTS WERE SET AS OF THE DATE OF THIS PLAN.
3. A WRITTEN REPORT OF FINDINGS AND OPINIONS AS REQUIRED BY SECTION 10.A.3.D OF THE TECHNICAL STANDARDS OF PRACTICE OF THE STATE OF MAINE BOARD OF LICENSURE FOR PROFESSIONAL LAND SURVEYORS WAS NOT PREPARED.
4. THE PURPOSE OF THIS SURVEY WAS TO DEFINE THE PERIMETER BOUNDARY OF THE PORTLAND INTERNATIONAL JETPORT PARCEL AND ACCESSORY PARCELS IN THE VICINITY OF THE JETPORT. INTERIOR PARCEL BOUNDARIES WERE NOT RESEARCHED OR DEFINED EXCEPT WHERE REQUIRED TO DEFINE THE PERIMETER BOUNDARY. EASEMENTS DEPICTED ON THIS PLAN WERE NOT COMPLETELY RESEARCHED OR LOCATED IN THE FIELD BUT SHOW THEIR GENERAL LOCATION RELATIVE TO THE PERIMETER BOUNDARY.
5. AERIAL PHOTOGRAPHY SHOWN WAS TAKEN IN 2015.
6. CURRENT OWNER: CITY OF PORTLAND
389 CONGRESS ST.
PORTLAND, MAINE 04101

LEGEND

- 1 — MONUMENT FOUND WITH REFERENCE NUMBER
- 79 — HIGHWAY MONUMENT FOUND WITH REFERENCE NUMBER
- 64 — STONE/GRANITE FOUND WITH REFERENCE NUMBER
- EASEMENT BOUNDARY
- PROPERTY LINE
- INTERIOR PARCEL BOUNDARY
- APPROXIMATE ABUTTER BOUNDARY
- E105 / 12 — PARCEL NUMBERING CORRESPONDS WITH DRAWING "PORTLAND INTERNATIONAL JETPORT EXHIBIT 'A'" DATED SEPTEMBER 27, 2018, BY COFFMAN ASSOCIATES



SHEET INDEX
NOT TO SCALE



GRID NORTH
MAINE COORDINATE SYSTEM OF 1983 (2011)
WEST ZONE

SCALE: 1"= 200'

200' 0 200' 400' 600' 800'

SURVEY STANDARD

THIS PLAN WAS PREPARED FROM INFORMATION OBTAINED BY A SURVEY CONFORMING SUBSTANTIALLY TO THE REQUIREMENTS OF TECHNICAL STANDARDS CONTAINED IN CHAPTER 90, PART 2, OF THE RULES OF THE BOARD OF LICENSURE FOR PROFESSIONAL LAND SURVEYORS, EFFECTIVE APRIL 1, 2001.

CLARK G. STAPLES, MAINE LICENSED
PROFESSIONAL LAND SURVEYOR No. 2332

STATE OF MAINE
CLARK G. STAPLES
NO. 2332
PROFESSIONAL LAND SURVEYOR

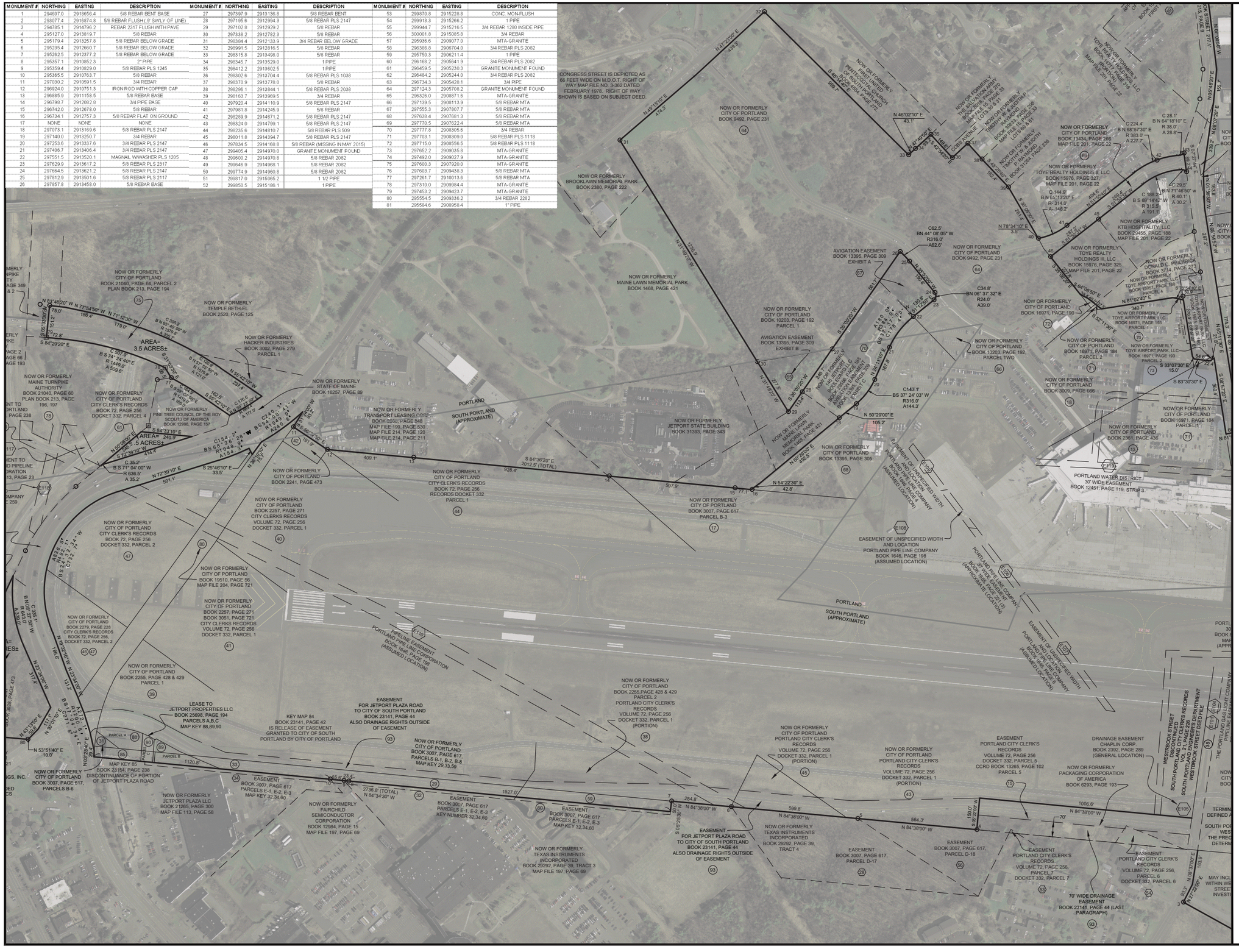
BOUNDARY SURVEY

OF LANDS OF
THE CITY OF PORTLAND
IN THE VICINITY OF
THE PORTLAND INTERNATIONAL JETPORT
-PORTLAND & SOUTH PORTLAND-
CUMBERLAND COUNTY, MAINE
FOR
Stantec

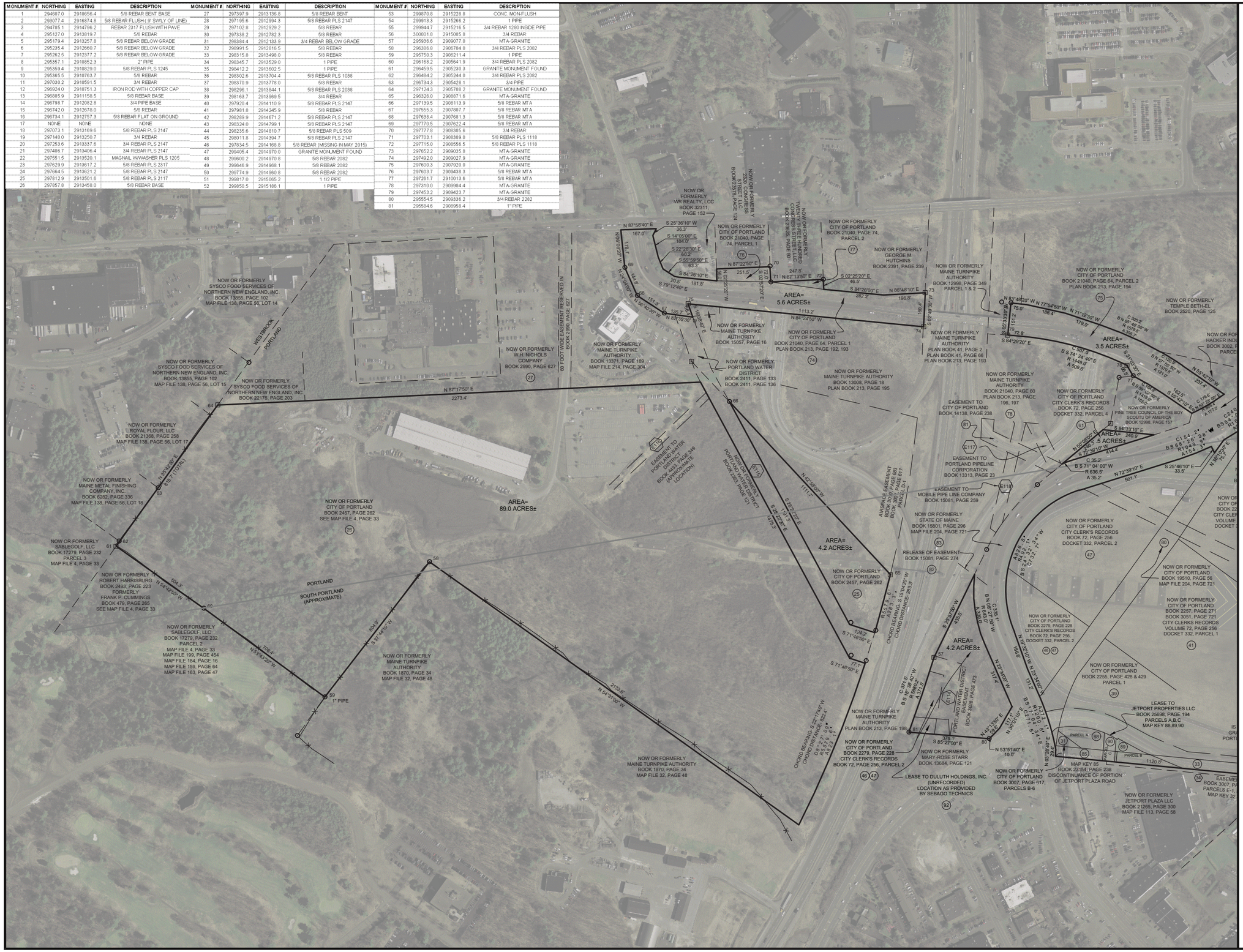
GOOD DEEDS
LAND SURVEYING • DEED RESEARCH
109 MAIN STREET
BELFAST, ME 04915
(207) 338-5743

DWG: 14078 MASTER PLAN 20180927.DWG
DATE: SEPTEMBER 27, 2018
SCALE: 1"=200'
SHEET: 1 OF 5

MONUMENT #	NORTHING	EASTING	DESCRIPTION
1	294607.0	2918656.4	5/8 REBAR BENT BASE
2	293077.4	2916874.8	5/8 REBAR FLUSH.(9' SWLY OF LINE)
3	294785.1	2914796.2	REBAR 2317 FLUSH WITH PAVE
4	295127.0	2913819.7	5/8 REBAR
5	295179.4	2913257.8	5/8 REBAR BELOW GRADE
6	295235.4	2912660.7	5/8 REBAR BELOW GRADE
7	295262.5	2912377.2	5/8 REBAR BELOW GRADE
8	295357.1	2910852.3	2" PIPE
9	295359.4	2910829.0	5/8 REBAR PLS 1245
10	295365.5	2910763.7	5/8 REBAR
11	297030.2	2910591.5	3/4 REBAR
12	296924.0	2910751.3	IRON ROD WITH COPPER CAP
13	296885.9	2911158.5	5/8 REBAR BASE
14	296798.7	2912082.8	3/4 PIPE BASE
15	296742.0	2912678.0	5/8 REBAR
16	296734.1	2912757.3	5/8 REBAR FLAT ON GROUND
17	NONE	NONE	NONE
18	297073.1	2913169.6	5/8 REBAR PLS 2147
19	297140.0	2913250.7	3/4 REBAR
20	297253.6	2913337.6	3/4 REBAR PLS 2147
21	297406.7	2913406.4	3/4 REBAR PLS 2147
22	297551.5	2913520.1	MAGNAIL WWASHER PLS 1205
23	297629.9	2913617.2	5/8 REBAR PLS 2317
24	297664.5	2913621.2	5/8 REBAR PLS 2147
25	297812.9	2913501.6	5/8 REBAR PLS 2117
26	297857.8	2913458.0	5/8 REBAR BASE
27	297397.9	2913136.8	5/8 REBAR BENT
28	297195.6	2912994.3	5/8 REBAR PLS 2147
29	297102.8	2912929.2	5/8 REBAR
30	297338.2	2912782.3	5/8 REBAR
31	298384.4	2912133.9	3/4 REBAR BEL OW GRADE
32	298991.5	2912816.5	5/8 REBAR
33	298315.8	2913498.0	5/8 REBAR
34	298345.7	2913529.0	1 PIPE
35	298412.2	2913602.5	1 PIPE
36	298302.6	2913704.4	5/8 REBAR PLS 1038
37	298370.9	2913778.0	5/8 REBAR
38	298296.1	2913844.1	5/8 REBAR PLS 2038
39	298163.7	2913969.5	3/4 REBAR
40	297920.4	2914110.9	5/8 REBAR PLS 2147
41	297981.8	2914245.9	5/8 REBAR
42	298289.9	2914671.2	5/8 REBAR PLS 2147
43	298324.0	2914799.1	5/8 REBAR PLS 2147
44	298235.6	2914810.7	5/8 REBAR PLS 509
45	298011.8	2914394.7	5/8 REBAR PLS 2147
46	297834.5	2914168.8	5/8 REBAR (MISSING IN MAY 2015)
47	297406.7	2914046.4	GRANITE MONUMENT FOUND
48	299600.2	2914970.8	5/8 REBAR 2082
49	299646.9	2914968.1	5/8 REBAR 2082
50	299774.9	2914960.8	5/8 REBAR 2082
51	299817.0	2915065.2	1 1/2 PIPE
52	299650.5	2915186.1	1 PIPE
53	299870.8	2915228.8	CONC. MON-FLUSH
54	299913.3	2915266.2	1 PIPE
55	299944.7	2915216.5	3/4 REBAR 1280 INSIDE PIPE
56	300001.8	2915085.8	3/4 REBAR
57	295936.6	2906077.0	MTA-GRANITE
58	296386.8	2906704.0	3/4 REBAR PLS 2082
59	295750.3	2906211.4	1 PIPE
60	296168.2	2905641.9	3/4 REBAR PLS 2082
61	296459.5	2905230.3	GRANITE MONUMENT FOUND
62	296484.2	2905344.0	3/4 REBAR PLS 2082
63	296734.3	2905428.1	3/4 PIPE
64	297124.3	2905708.2	GRANITE MONUMENT FOUND
65	296326.0	2906871.6	MTA-GRANITE
66	297139.5	2908113.9	5/8 REBAR MTA
67	297555.3	2907807.7	5/8 REBAR MTA
68	297638.4	2907681.3	5/8 REBAR MTA
69	297770.5	2907622.4	5/8 REBAR MTA
70	297777.8	2908305.6	3/4 REBAR
71	297703.1	2908309.0	5/8 REBAR PLS 1118
72	297715.0	2908556.5	5/8 REBAR PLS 1118
73	297652.2	2909035.8	MTA-GRANITE
74	297492.0	2909027.9	MTA-GRANITE
75	297600.3	2907920.0	MTA-GRANITE
76	297603.7	2909458.3	5/8 REBAR MTA
77	297261.7	2910013.6	5/8 REBAR MTA
78	297310.0	2909984.4	MTA-GRANITE
79	297453.2	2909423.7	MTA-GRANITE
80	295554.5	2909336.2	3/4 REBAR 2282
81	295584.6	2908958.4	1" PIPE

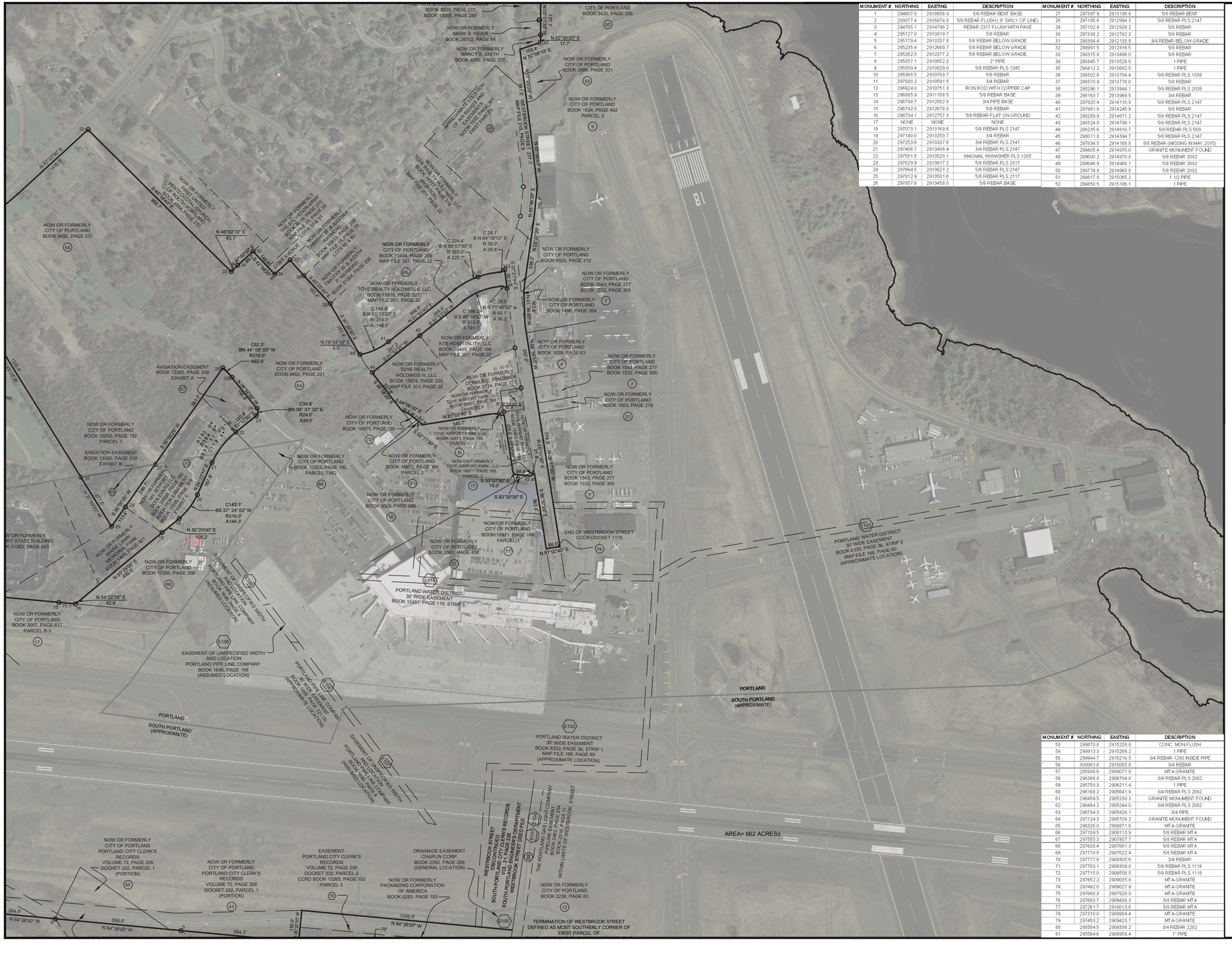

CONGRESS STREET IS DEPICTED AS 66 FEET WIDE ON M.D.O.T. RIGHT OF WAY MAP FILE NO. 3-362 DATED FEBRUARY 1978. RIGHT OF WAY SHOWN IS BASED ON SUBJECT DEED.
NOW OR FORMERLY CITY OF PORTLAND BOOK 9492, PAGE 231
NOW OR FORMERLY BROOKLAWN MEMORIAL PARK BOOK 2380, PAGE 222
NOW OR FORMERLY MAINE LAWN MEMORIAL PARK BOOK 1468, PAGE 421
NOW OR FORMERLY CITY OF PORTLAND BOOK 10203, PAGE 192 PARCEL 1
NOW OR FORMERLY CITY OF PORTLAND BOOK 10203, PAGE 192, PARCEL TWO
NOW OR FORMERLY CITY OF PORTLAND BOOK 3009, PAGE 686
NOW OR FORMERLY CITY OF PORTLAND BOOK 2361, PAGE 436
NOW OR FORMERLY CITY OF PORTLAND BOOK 16971, PAGE 184 PARCEL 1
NOW OR FORMERLY CITY OF PORTLAND BOOK 16971, PAGE 184 PARCEL 2
NOW OR FORMERLY TOYE REALTY HOLDINGS II, LLC BOOK 15976, PAGE 327, MAP FILE 201, PAGE 22
NOW OR FORMERLY TOYE REALTY HOLDINGS III, LLC BOOK 15976, PAGE 325, MAP FILE 201, PAGE 22
NOW OR FORMERLY KTB HOSPITALITY, LLC BOOK 29455, PAGE 188 MAP FILE 201, PAGE 22
NOW OR FORMERLY DONALD C. PROBSTEIN BOOK 3714, PAGE 273
NOW OR FORMERLY TOYE AIRPORT PARK, LLC BOOK 16971, PAGE 193 PARCEL 1
NOW OR FORMERLY TOYE AIRPORT PARK, LLC BOOK 16971, PAGE 193 PARCEL 2
NOW OR FORMERLY TOYE AIRPORT PARK, LLC BOOK 16971, PAGE 193 PARCEL 4
NOW OR FORMERLY CITY OF PORTLAND BOOK 13434, PAGE 286 MAP FILE 201, PAGE 22
NOW OR FORMERLY TOYE REALTY HOLDINGS II, LLC BOOK 15976, PAGE 327, MAP FILE 201, PAGE 22
NOW OR FORMERLY TIMOTHY W. & JUDITH P. RAYMOND BOOK 31294, PAGE 288
NOW OR FORMERLY TIMOTHY W. & JUDITH P. RAYMOND BOOK 29233, PAGE 236 MAP FILE 201, PAGE 22 LOT 6 & 6-1
NOW OR FORMERLY THE SALVATION ARMY BOOK 4615, PAGE 270 MAP FILE 201, PAGE 22 LOTS 3 & 5
NOW OR FORMERLY CITY OF PORTLAND BOOK 2255, PAGE 428 & 429 PARCEL 2 PORTLAND CITY CLERK'S RECORDS VOLUME 72, PAGE 256 DOCKET 332, PARCEL 1 (PORTION)
NOW OR FORMERLY CITY OF PORTLAND BOOK 2255, PAGE 428 & 429 PARCEL 1
NOW OR FORMERLY CITY OF PORTLAND BOOK 2257, PAGE 271 CITY CLERKS RECORDS VOLUME 72, PAGE 256 DOCKET 332, PARCEL 1
NOW OR FORMERLY CITY OF PORTLAND BOOK 2241, PAGE 473
NOW OR FORMERLY CITY OF PORTLAND BOOK 2279, PAGE 228 CITY CLERKS RECORDS BOOK 72, PAGE 256, DOCKET 332, PARCEL 2
NOW OR FORMERLY CITY OF PORTLAND BOOK 10510, PAGE 56 MAP FILE 204, PAGE 721
NOW OR FORMERLY CITY OF PORTLAND BOOK 2257, PAGE 271 BOOK 3051, PAGE 721 CITY CLERKS RECORDS VOLUME 72, PAGE 256 DOCKET 332, PARCEL 1
NOW OR FORMERLY CITY OF PORTLAND BOOK 2257, PAGE 271 CITY CLERKS RECORDS BOOK 72, PAGE 256 DOCKET 332, PARCEL 2
NOW OR FORMERLY CITY OF PORTLAND BOOK 21040, PAGE 64, PARCEL 2 PLAN BOOK 213, PAGE 194
NOW OR FORMERLY TEMPLE BETH-EL BOOK 2520, PAGE 125
NOW OR FORMERLY HACKER INDUSTRIES BOOK 3002, PAGE 279 PARCEL 1
NOW OR FORMERLY MAINE TURNPIKE AUTHORITY BOOK 21040, PAGE 60 PLAN BOOK 213, PAGE 196, 197
NOW OR FORMERLY CITY OF PORTLAND CITY CLERK'S RECORDS BOOK 72, PAGE 256 DOCKET 332, PARCEL 4
NOW OR FORMERLY PINE TREE COUNCIL OF THE BOY SCOUTS OF AMERICA BOOK 12998, PAGE 197
NOW OR FORMERLY STATE OF MAINE BOOK 16257, PAGE 89
NOW OR FORMERLY TRANSPORT LEASING CO/32 BOOK 2880, PAGE 848 MAP FILE 199, PAGE 530 MAP FILE 214, PAGE 120 MAP FILE 214, PAGE 211
NOW OR FORMERLY JETPORT STATE BUILDING BOOK 31393, PAGE 343
NOW OR FORMERLY CITY OF PORTLAND BOOK 13395, PAGE 305
NOW OR FORMERLY CITY OF PORTLAND BOOK 3007, PAGE 617, PARCEL B-3
NOW OR FORMERLY CITY OF PORTLAND CITY CLERK'S RECORDS BOOK 72, PAGE 256 RECORDS DOCKET 332 PARCEL 1
NOW OR FORMERLY JETPORT PLAZA LLC BOOK 21265, PAGE 300 MAP FILE 113, PAGE 58
NOW OR FORMERLY FAIRCHILD SEMICONDUCTOR CORPORATION BOOK 12984, PAGE 15 MAP FILE 197, PAGE 69
NOW OR FORMERLY TEXAS INSTRUMENTS INCORPORATED BOOK 29292, PAGE 39, TRACT 3 MAP FILE 197, PAGE 69
NOW OR FORMERLY TEXAS INSTRUMENTS INCORPORATED BOOK 29292, PAGE 39, TRACT 4
NOW OR FORMERLY MAINE TURNPIKE AUTHORITY BOOK 3028, PAGE 273
NOW OR FORMERLY CITY OF PORTLAND BOOK 3007, PAGE 617, PARCELS B-6
NOW OR FORMERLY CITY OF PORTLAND BOOK 3007, PAGE 617, PARCELS B-1, B-2, B-8
NOW OR FORMERLY CITY OF PORTLAND BOOK 3007, PAGE 617, PARCELS E-1, E-2, E-3
AVIGATION EASEMENT BOOK 13395, PAGE 309 EXHIBIT A
AVIGATION EASEMENT BOOK 13395, PAGE 309 EXHIBIT B
EASEMENT FOR JETPORT PLAZA ROAD TO CITY OF SOUTH PORTLAND BOOK 23141, PAGE 44 ALSO DRAINAGE RIGHTS OUTSIDE OF EASEMENT
EASEMENT FOR JETPORT PLAZA ROAD TO CITY OF SOUTH PORTLAND BOOK 23141, PAGE 44 ALSO DRAINAGE RIGHTS OUTSIDE OF EASEMENT
KEY MAP 84 BOOK 23141, PAGE 42 IS RELEASE OF EASEMENT GRANTED TO CITY OF SOUTH PORTLAND BY CITY OF PORTLAND
LEASE TO JETPORT PROPERTIES LLC BOOK 25698, PAGE 194 PARCELS A,B,C MAP KEY 88,89,90
MAP KEY 85 BOOK 23154, PAGE 238 DISCONTINUANCE OF PORTION OF JETPORT PLAZA ROAD
EASEMENT BOOK 3007, PAGE 617 PARCELS E-1, E-2, E-3 MAP KEY 32,34,60
EASEMENT BOOK 3007, PAGE 617 PARCELS E-1, E-2, E-3 KEY NUMBER 32,34,60
EASEMENT BOOK 3007, PAGE 617 PARCELS E-1, E-2, E-3 MAP KEY 32,34,60
EASEMENT BOOK 3007, PAGE 617, PARCEL D-17
EASEMENT BOOK 3007, PAGE 617, PARCEL D-18
EASEMENT PORTLAND CITY CLERK'S RECORDS VOLUME 72, PAGE 256, PARCEL 7 DOCKET 332, PARCEL 7
EASEMENT PORTLAND CITY CLERK'S RECORDS VOLUME 72, PAGE 256, PARCEL 6 DOCKET 332, PARCEL 6
EASEMENT PORTLAND CITY CLERK'S RECORDS VOLUME 72, PAGE 256, PARCEL 5 DOCKET 332, PARCEL 5 CCRD BOOK 13265, PAGE 102
DRAINAGE EASEMENT CHAPLIN CORP. BOOK 2392, PAGE 289 (GENERAL LOCATION)
70' WIDE DRAINAGE EASEMENT BOOK 23141, PAGE 44 (LAST PARAGRAPH)
NOW OR FORMERLY PACKAGING CORPORATION OF AMERICA BOOK 6293, PAGE 193
WESTBROOK STREET SOUTH PORTLAND CONTINUED NO. 21, PAGE 23 CITY ENGINEERS DEPARTMENT WESTBROOK STREET DEED FILE
SOUTH PORTLAND
PORTLAND
EASEMENT OF UNSPECIFIED WIDTH AND LOCATION PORTLAND PIPE LINE COMPANY BOOK 1646, PAGE 198 (ASSUMED LOCATION)
PORTLAND WATER DISTRICT 30' WIDE EASEMENT BOOK 12451, PAGE 119, STRIP 3
PIPELINE EASEMENT PORTLAND PIPE LINE CORPORATION BOOK 1646, PAGE 198 (ASSUMED LOCATION)
EASEMENT OF UNSPECIFIED WIDTH AND LOCATION PORTLAND PIPE LINE COMPANY 30' WIDE EASEMENT (APPROXIMATE LOCATION)
EASEMENT OF UNSPECIFIED WIDTH AND LOCATION PORTLAND PIPE LINE COMPANY BOOK 1646, PAGE 198 (ASSUMED LOCATION)
EASEMENT OF UNSPECIFIED WIDTH AND LOCATION PORTLAND PIPE LINE COMPANY BOOK 1646, PAGE 198 (ASSUMED LOCATION)
PORTLAND WATER DISTRICT 30' WIDE EASEMENT BOOK 12451, PAGE 119, STRIP 3
THE PORTLAND GAS LIGHT COMPANY PIPELINE EASEMENT
MAY INCLUDE WITHIN WE STREE INVESTI
TERMIN DEFINED A
SOUTH POR WES THE PREC DETERM
N 53°51'40" E 10.0'
N 50°29'00" E 105.2'
N 54°22'30" E 42.8'
S 84°36'20" E 2012.5' (TOTAL)
S 84°38'00" W 1527.0'
N 84°38'00" W 1008.8'
N 84°38'00" W 599.8'
N 84°38'00" W 564.3'
N 84°38'00" W 284.8'
S 84°33'10" E
S 84°29'20" E
S 84°34'30" W 2736.8' (TOTAL)
N 72°39'10" E 501.1'
S 25°46'10" E 33.5'
N 77°54'50" W 186.4'
N 71°12'30" W 178.0'
N 55°32'10" W 257.8'
N 43°14'20" W 1736.8'
N 43°14'20" W 1713.4'
N 43°13'50" E 374.4'
N 43°13'50" E 374.4'
N 43°13'50" E 374

MONUMENT #	NORTHING	EASTING	DESCRIPTION
1	294607.0	2918656.4	5/8 REBAR BENT BASE
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58	296386.8	2906704.0	3/4 REBAR PLS 2082
59	295750.3	2906211.4	1 PIPE
60	296168.2	2905641.9	3/4 REBAR PLS 2082
61	296459.5	2905230.3	GRANITE MONUMENT FOUND
62	296484.2	2905344.0	3/4 REBAR PLS 2082
63	296734.3	2905428.1	3/4 PIPE
64	297124.3	2905708.2	GRANITE MONUMENT FOUND
65	296326.0	2908871.6	MT.A-GRANITE
66	297139.5	2908113.9	5/8 REBAR MT.A
67	297555.3	2907807.7	5/8 REBAR MT.A
68	297638.4	2907681.3	5/8 REBAR MT.A
69	297770.5	2907622.4	5/8 REBAR MT.A
70	297777.8	2908305.6	3/4 REBAR
71	297703.1	2908309.0	5/8 REBAR PLS 1118
72	297715.0	2908556.5	5/8 REBAR PLS 1118
73	297652.2	2909035.8	MT.A-GRANITE
74	297492.0	2909027.9	MT.A-GRANITE
75	297600.3	2907920.0	MT.A-GRANITE
76	297603.7	2909438.3	5/8 REBAR MT.A
77	297261.7	2910013.6	5/8 REBAR MT.A
78	297310.0	2909984.4	MT.A-GRANITE
79	297453.2	2909423.7	MT.A-GRANITE
80	295554.5	2909336.2	3/4 REBAR 2282
81	295584.6	2908958.4	1" PIPE


NOW OR FORMERLY SYSCO FOOD SERVICES OF NORTHERN NEW ENGLAND, INC. BOOK 13855, PAGE 102 MAP FILE 138, PAGE 56, LOT 14
NOW OR FORMERLY SYSCO FOOD SERVICES OF NORTHERN NEW ENGLAND, INC. BOOK 13855, PAGE 102 MAP FILE 138, PAGE 56, LOT 15
NOW OR FORMERLY SYSCO FOOD SERVICES OF NORTHERN NEW ENGLAND, INC. BOOK 22175, PAGE 203
NOW OR FORMERLY ROYAL FLOUR, LLC BOOK 21368, PAGE 258 MAP FILE 138, PAGE 56, LOT 17
NOW OR FORMERLY MAINE METAL FINISHING COMPANY, INC. BOOK 6282, PAGE 336 MAP FILE 138, PAGE 56, LOT 18
NOW OR FORMERLY SABLEGOLF, LLC BOOK 17279, PAGE 232 PARCEL 3 MAP FILE 4, PAGE 33
NOW OR FORMERLY ROBERT HARRISBURG BOOK 2493, PAGE 223 FORMERLY FRANK P. CUMMINGS BOOK 479, PAGE 265 SEE MAP FILE 4, PAGE 33
NOW OR FORMERLY SABLEGOLF, LLC BOOK 17279, PAGE 232 PARCEL 2 MAP FILE 4, PAGE 33 MAP FILE 199, PAGE 454 MAP FILE 184, PAGE 16 MAP FILE 159, PAGE 64 MAP FILE 163, PAGE 47
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60 FOOT WIDE EASEMENT RESERVED IN BOOK 2990, PAGE 627
NOW OR FORMERLY MAINE TURNPIKE AUTHORITY BOOK 13371, PAGE 189 MAP FILE 214, PAGE 304
NOW OR FORMERLY MAINE TURNPIKE AUTHORITY BOOK 15057, PAGE 16
NOW OR FORMERLY PORTLAND WATER DISTRICT BOOK 2411, PAGE 133 BOOK 2411, PAGE 136
NOW OR FORMERLY MAINE TURNPIKE AUTHORITY BOOK 1308, PAGE 18 PLAN BOOK 213, PAGE 195
NOW OR FORMERLY CITY OF PORTLAND BOOK 21040, PAGE 64, PARCEL 1 PLAN BOOK 213, PAGE 192, 193
NOW OR FORMERLY MAINE TURNPIKE AUTHORITY PLAN BOOK 41, PAGE 2 PLAN BOOK 41, PAGE 66 PLAN BOOK 213, PAGE 193
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NOW OR FORMERLY CITY OF PORTLAND BOOK 21040, PAGE 74, PARCEL 2
NOW OR FORMERLY GEORGE M. HUTCHINS BOOK 2391, PAGE 239
NOW OR FORMERLY MAINE TURNPIKE AUTHORITY BOOK 12998, PAGE 349 PARCEL 1 & 2
NOW OR FORMERLY CITY OF PORTLAND BOOK 21040, PAGE 64, PARCEL 2 PLAN BOOK 213, PAGE 194
NOW OR FORMERLY TEMPLE BETH-EL BOOK 2520, PAGE 125
NOW OR FORMERLY CITY OF PORTLAND CITY CLERK'S RECORDS BOOK 72, PAGE 256 DOCKET 332, PARCEL 4
NOW OR FORMERLY PINE TREE COUNCIL OF THE BOY SCOUTS OF AMERICA BOOK 12998, PAGE 157
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NOW OR FORMERLY CITY OF PORTLAND BOOK 19510, PAGE 56 MAP FILE 204, PAGE 721
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NOW OR FORMERLY CITY OF PORTLAND BOOK 2279, PAGE 228 CITY CLERKS RECORDS BOOK 72, PAGE 256, DOCKET 332, PARCEL 2
NOW OR FORMERLY CITY OF PORTLAND BOOK 2255, PAGE 428 & 429 PARCEL 1
NOW OR FORMERLY HACKER IND... BOOK 3002, P... PARCE...
NOW OR FORMERLY WR REALTY, LCC BOOK 32311, PAGE 152
NOW OR FORMERLY 2320 CONGRESS BOOK 21357, PAGE 124
NOW OR FORMERLY TWENTY-THREE CONGRESS STREET, LLC BOOK 23925, PAGE 86
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NOW OR FORMERLY CITY OF PORTLAND BOOK 2457, PAGE 262
NOW OR FORMERLY MAINE TURNPIKE AUTHORITY BOOK 1870, PAGE 34 MAP FILE 32, PAGE 48
NOW OR FORMERLY MAINE TURNPIKE AUTHORITY BOOK 1870, PAGE 34 MAP FILE 32, PAGE 48
NOW OR FORMERLY MARY-ROSE STARR BOOK 13684, PAGE 121
NOW OR FORMERLY CITY OF PORTLAND BOOK 3007, PAGE 617, PARCELS B-6
NOW OR FORMERLY JETPORT PLAZA LLC BOOK 21265, PAGE 300 MAP FILE 113, PAGE 58
EASEMENT TO PORTLAND WATER DISTRICT BOOK 2493, PAGE 349 (APPROXIMATE LOCATION)
EASEMENT TO CITY OF PORTLAND BOOK 14138, PAGE 238
EASEMENT TO PORTLAND PIPELINE CORPORATION BOOK 13313, PAGE 23
EASEMENT TO MOBILE PIPE LINE COMPANY BOOK 15081, PAGE 259
RELEASE OF EASEMENT BOOK 15081, PAGE 274
LEASE TO JETPORT PROPERTIES LLC BOOK 25698, PAGE 194 PARCELS A,B,C MAP KEY 88,89,90
MAP KEY 85 BOOK 23154 | PAGE 238 DISCONTINUANCE OF PORTION OF JETPORT PLAZA ROAD
LEASE TO DULUTH HOLDINGS, INC. (UNRECORDED) LOCATION AS PROVIDED BY SEBAGO TECHNICS
AIRSPACE EASEMENT BOOK 3007, PAGE 617 PARCEL E-1
EASEMENT BOOK 3007, PAGE 617 PARCEL E-1
PORTLAND
SOUTH PORTLAND (APPROXIMATE)
WESTBROOK
AREA= 89.0 ACRES±
AREA= 4.2 ACRES±
AREA= 5.6 ACRES±
AREA= 4.2 ACRES±
AREA= 3.5 ACRES±
AREA= 0.5 ACRES±
N 87°17'50" E 2273.4'
N 87°58'40" E 167.0'
S 25°36'10" W 36.3'
S 14°05'00" E 104.0'
S 22°28'30" E 60.2'
S 55°59'50" E 93.3'
S 84°26'10" E 181.8'
N 87°22'50" E 251.5'
S 02°25'20" E 46.5'
N 87°13'50" E 247.8'
S 84°28'00" E 282.2'
N 86°48'10" E 196.8'
N 84°24'50" W 1113.2'
S 79°12'40" E 20.5'
N 83°35'30" W 138.4'
N 56°40'30" W 151.3'
N 30°09'20" W 178.1'
S 84°29'20" E 72.8'
N 77°54'50" W 179.6'
N 71°12'30" W 179.6'
N 83°48'20" W 75.0'
N 80°33'00" E 151.0'
N 54°45'20" W 524.3'
N 53°43'20" W 708.4'
S 37°34'10" W 804.9'
N 54°31'06" W 2133.6'
S 71°46'50" E 124.5'
S 71°46'50" E 77.1'
S 25°27'40" W 435.9'
N 27°34'00" W 317.4'
N 53°51'40" E 10.0'
S 85°27'00" E 379.1'
N 03°39'40" E 29.8'
N 72°38'10" E 501.1'
S 25°46'10" E 33.5'
N 38°10'50" E 75.7'
S 84°33'10" E 240.9'
N 50°08'00" E 236.1'
S 72°39'10" W 414.4'
N 72°38'10" E 501.1'
S 84°29'20" E 72.8'
N 83°48'20" W 75.0'
N 77°54'50" W 179.6'
N 71°12'30" W 179.6'
N 53°43'20" W 237.4'
S 25°24'00" E 182.5'
N 38°10'50" E 75.7'
N 87°58'40" E 167.0'
N 30°09'20" W 178.1'
N 56°40'30" W 151.3'
S 84°26'10" E 181.8'
S 79°12'40" E 20.5'
N 87°17'50" E 2273.4'
N 87°22'50" E 251.5'
S 02°25'20" E 46.5'
N 87°13'50" E 247.8'
S 84°28'00" E 282.2'
N 86°48'10" E 196.8'
N 84°24'50" W 1113.2'
S 71°46'50" E 124.5'
S 71°46'50" E 77.1'
S 25°27'40" W 435.9'
N 27°34'00" W 317.4'
N 53°51'40" E 10.0'
S 85°27'00" E 379.1'
N 03°39'40" E 29.8'
N 72°38'10" E 501.1'
S 25°46'10" E 33.5'
N 38°10'50" E 75.7'
S 84°33'10" E 240.9'
N 50°08'00" E 236.1'
S 72°39'10" W 414.4'
N 53°43'20" W 237.4'
S 25°24'00" E 182.5'
N 54°45'20" W 524.3'
N 53°43'20" W 708.4'
S 37°34'10" W 804.9'
N 54°31'06" W 2133.6'
N 43°58'00" W 1111.1'
S 43°58'00" E 1111.1'
S 37°22'00" E 475.3'
N 43°58'00" W 1111.1'
S 43°58'00" E 1111.1'
S 37°22'00" E 475.3'
CHORD BEARING S 22°17'00" W CHORD DISTANCE 922.4'
CHORD BEARING S 15°10'00" W CHORD DISTANCE 269.3'
CHORD BEARING S 22°17'00" W CHORD DISTANCE 922.4'
C 35.2' Δ 71° 04' 00" W R 636.5' A 35.2'
C 35.1' Δ 89° 46' 40" R 6440.0' A 35.1'
C 35.1' Δ 89° 46' 38" R 6440.0' A 35.1'
C 50.9' Δ 74° 24' 40" R 1440.0' A 50.9

MONUMENT #	NORTHING	EASTING	DESCRIPTION
1	294607.0	2918656.4	5/8 REBAR BENT BASE
2	293077.4	2916874.8	5/8 REBAR FLUSH (9' SWLY OF LINE)
3	294785.1	2914796.2	REBAR 2317 FLUSH WITH PAVE
4	295127.0	2913819.7	5/8 REBAR
5	295179.4	2913257.8	5/8 REBAR BELOW GRADE
6	295235.4	2912660.7	5/8 REBAR BELOW GRADE
7	295262.5	2912377.2	5/8 REBAR BELOW GRADE
8	295357.1	2910852.3	2" PIPE
9	295359.4	2910829.0	5/8 REBAR PLS 1245
10	295365.5	2910763.7	5/8 REBAR
11	297030.2	2910591.5	3/4 REBAR
12	296924.0	2910751.3	IRON ROD WITH COPPER CAP
13	296885.9	2911158.5	5/8 REBAR BASE
14	296798.7	2912082.8	3/4 PIPE BASE
15	296742.0	2912678.0	5/8 REBAR
16	296734.1	2912757.3	5/8 REBAR FLAT ON GROUND
17	NONE	NONE	NONE
18	297073.1	2913169.6	5/8 REBAR PLS 2147
19	297140.0	2913250.7	3/4 REBAR
20	297253.6	2913337.6	3/4 REBAR PLS 2147
21	297406.7	2913406.4	3/4 REBAR PLS 2147
22	297551.5	2913520.1	MAGNAIL WWASHER PLS 1205
23	297629.9	2913617.2	5/8 REBAR PLS 2317
24	297664.5	2913621.2	5/8 REBAR PLS 2147
25	297812.9	2913501.6	5/8 REBAR PLS 2117
26	297857.8	2913458.0	5/8 REBAR BASE
27	297397.9	2913136.8	5/8 REBAR BENT
28	297195.6	2912994.3	5/8 REBAR PLS 2147
29	297102.8	2912929.2	5/8 REBAR
30	297339.2	2912782.3	5/8 REBAR
31	298384.4	2912133.9	3/4 REBAR BELOW GRADE
32	298991.5	2912816.5	5/8 REBAR
33	298315.8	2913498.0	5/8 REBAR
34	298345.7	2913529.0	1 PIPE
35	298412.2	2913602.5	1 PIPE
36	298302.6	2913704.4	5/8 REBAR PLS 1038
37	298370.9	2913778.0	5/8 REBAR
38	298296.1	2913844.1	5/8 REBAR PLS 2038
39	298163.7	2913969.5	3/4 REBAR
40	297920.4	2914110.9	5/8 REBAR PLS 2147
41	297981.8	2914245.9	5/8 REBAR
42	298289.9	2914671.2	5/8 REBAR PLS 2147
43	298324.0	2914799.1	5/8 REBAR PLS 2147
44	298235.6	2914810.7	5/8 REBAR PLS 509
45	298011.8	2914394.7	5/8 REBAR PLS 2147
46	297834.5	2914168.8	5/8 REBAR (MISSING IN MAY 2015)
47	299405.4	2914970.0	GRANITE MONUMENT FOUND
48	299600.2	2914970.8	5/8 REBAR 2082
49	299646.9	2914968.1	5/8 REBAR 2082
50	299774.9	2914960.8	5/8 REBAR 2082
51	299817.0	2915065.2	1 1/2 PIPE
52	299850.5	2915186.1	1 PIPE
53	299870.8	2915228.8	CONC. MON-FLUSH
54	299913.3	2915266.2	1 PIPE
55	299944.7	2915216.5	3/4 REBAR 1280 INSIDE PIPE
56	3000001.8	2915085.8	3/4 REBAR
57	295936.6	2909077.0	MT A-GRANITE
58	296386.8	2906704.0	3/4 REBAR PLS 2082
59	295750.3	2906211.4	1 PIPE
60	296168.2	2905641.9	3/4 REBAR PLS 2082
61	296459.5	2905230.3	GRANITE MONUMENT FOUND
62	296484.2	2905244.0	3/4 REBAR PLS 2082
63	296734.3	2905428.1	3/4 PIPE
64	297124.3	2905708.2	GRANITE MONUMENT FOUND
65	296326.0	2908871.6	MT A-GRANITE
66	297139.5	2908113.9	5/8 REBAR MTA
67	297555.3	2907807.7	5/8 REBAR MTA
68	297638.4	2907681.3	5/8 REBAR MTA
69	297770.5	2907622.4	5/8 REBAR MTA
70	297777.8	2908305.6	3/4 REBAR
71	297703.1	2908309.0	5/8 REBAR PLS 1118
72	297715.0	2908556.5	5/8 REBAR PLS 1118
73	297652.2	2909035.8	MT A-GRANITE
74	297492.0	2909027.9	MT A-GRANITE
75	297600.3	2907920.0	MT A-GRANITE
76	297603.7	2909438.3	5/8 REBAR MTA
77	297261.7	2910013.6	5/8 REBAR MTA
78	297310.0	2909984.4	MT A-GRANITE
79	297453.2	2909423.7	MT A-GRANITE
80	295554.5	2909336.2	3/4 REBAR 2282
81	295584.6	2908958.4	1" PIPE


STATE OF MAINE
MAP FILE 194/405
MAP FILE 194/406
LEASE TO
164 REALTY, INC
BOOK 14715, PAGE 1
NOW OR FORMERLY
NORTHERN NEW ENGLAND
TELEPHONE OPERATIONS LLC
BOOK 25946, PAGE 126
NOW OR FORMERLY
CITY OF PORTLAND
BOOK 3909, PAGE 306
NOW OR FORMERLY
164 REALTY, INC.
BOOK 11022, PAGE 141
AREA= 2.6 ACRES±
CUMBERLAND AND
OXFORD CANAL
NOW OR FORMERLY
CITY OF PORTLAND
BOOK 7715, PAGE 172
NOW OR FORMERLY
PORTLAND WATER DISTRICT
BOOK 4802, PAGE 288
NOW OR FORMERLY
KENNETH I. & KAREN C. PARKER
BOOK 6147, PAGE 294
PARCEL 2
NOW OR FORMERLY
JAMES E. & DEBRA W.
ROBBINS
BOOK 13170, PAGE 121
AREA= .3 ACRES±
NOW OR FORMERLY
KENNETH I. & KAREN C. PARKER
BOOK 6147, PAGE 294
PARCEL 1
NOW OR FORMERLY
DAVID P. SILK &
LYNNE A. CRANDALL
BOOK 12849, PAGE 307
N 41°18'50" E
56.7'
N 64°37'20" E
47.3'
N 74°29'30" E
125.4'
N 75°45'00" E
108.7'
N 03°22'20" W
46.9'
NOW OR FORMERLY
ANDREA C. & DONALD A. HAWKES
BOOK 25474, PAGE 139
NOW OR FORMERLY
KEITH R. & ROSEMARY B. MASON
BOOK 3839, PAGE 277
BOOK 13005, PAGE 288
NOW OR FORMERLY
CITY OF PORTLAND
BOOK 3420, PAGE 256
NOW OR FORMERLY
MARK S. HIDER
BOOK 28702, PAGE 84
N 02°50'20" E
17.7'
NOW OR FORMERLY
NANCY S. SMITH
BOOK 4586, PAGE 277
N 72°08'10" E
103.4'
NOW OR FORMERLY
CITY OF PORTLAND
BOOK 3984, PAGE 331
N 17°20'20" W
381.5' WESTBROOK STREET
MAP FILE 41, PAGE 5
APPROXIMATE LOCATION
OF RIGHTS AND
EASEMENTS
BOOK 1532, PAGE 301
FIRST PARCEL
NOW OR FORMERLY
CITY OF PORTLAND
BOOK 1634, PAGE 492
PARCEL 3
N 10°09'40" W
155.7'
N 19°49'20" E
N 00°07'20" E
382.2'
NOW OR FORMERLY
TOYE REALTY HOLDINGS II, LLC
BOOK 15976, PAGE 327
MAP FILE 201, PAGE 22
NOW OR FORMERLY
CITY OF PORTLAND
BOOK 13434, PAGE 266
MAP FILE 201, PAGE 22
C 224.4'
B N 68°57'30" E
R 383.0'
A 227.7'
C 28.1'
B N 64°18'10" E
R 38.0'
A 28.8'
NOW OR FORMERLY
CITY OF PORTLAND
BOOK 1503, PAGE 212
NOW OR FORMERLY
CITY OF PORTLAND
BOOK 1543, PAGE 277
BOOK 1532, PAGE 305
NOW OR FORMERLY
CITY OF PORTLAND
BOOK 1496, PAGE 354
N 71°58'00" W
653.8'
S 17°27'14" E
N 18°58'50" W
297.2'
NOW OR FORMERLY
CITY OF PORTLAND
BOOK 1639, PAGE 63
NOW OR FORMERLY
KTB HOSPITALITY, LLC
BOOK 23455, PAGE 188
MAP FILE 201, PAGE 22
NOW OR FORMERLY
TOYE REALTY
HOLDINGS III, LLC
BOOK 15976, PAGE 325
MAP FILE 201, PAGE 22
NOW OR FORMERLY
DONALD C. PRENDERGAST
BOOK 3714, PAGE 273
NOW OR FORMERLY
TOYE AIRPORT PARK, LLC
BOOK 15951, PAGE 195
PARCEL 4
NOW OR FORMERLY
CITY OF PORTLAND
BOOK 1543, PAGE 277
BOOK 1532, PAGE 305
NOW OR FORMERLY
CITY OF PORTLAND
BOOK 1503, PAGE 216
NOW OR FORMERLY
CITY OF PORTLAND
BOOK 16971, PAGE 190
NOW OR FORMERLY
TOYE AIRPORT PARK, LLC
BOOK 16971, PAGE 193
PARCEL 1
N 81°02'40" E
340.7'
S 32°11'00" E
S 83°07'30" E
15.0'
S 83°30'30" E
54.6'
N 06°17'00" E
21.8'
N 08°57'30" W
714.3'
S 06°57'20" E
363.5'
NOW OR FORMERLY
CITY OF PORTLAND
BOOK 16971, PAGE 184
PARCEL 2
NOW OR FORMERLY
TOYE AIRPORT PARK, LLC
BOOK 16971, PAGE 193
PARCEL 2
NOW OR FORMERLY
CITY OF PORTLAND
BOOK 3009, PAGE 666
NOW OR FORMERLY
CITY OF PORTLAND
BOOK 16971, PAGE 184
PARCEL 1
NOW OR FORMERLY
CITY OF PORTLAND
BOOK 2301, PAGE 436
END OF WESTBROOK STREET
CCCR DOCKET 1175
N 81°02'40" E
86.0'
PORTLAND WATER DISTRICT
30' WIDE EASEMENT
BOOK 5333, PAGE 36, STRIP 2
MAP FILE 166, PAGE 60
(APPROXIMATE LOCATION)
NOW OR FORMERLY
TOYE REALTY HOLDINGS II, LLC
BOOK 15976, PAGE 327
MAP FILE 201, PAGE 22
NOW OR FORMERLY
TOYE REALTY HOLDINGS III, LLC
BOOK 15976, PAGE 325
MAP FILE 201, PAGE 22
NOW OR FORMERLY
CITY OF PORTLAND
BOOK 9492, PAGE 231
AVIGATION EASEMENT
BOOK 13395, PAGE 309
EXHIBIT A
AVIGATION EASEMENT
BOOK 13395, PAGE 309
EXHIBIT B
NOW OR FORMERLY
CITY OF PORTLAND
BOOK 10203, PAGE 192
PARCEL 1
NOW OR FORMERLY
CITY OF PORTLAND
BOOK 10203, PAGE 192,
PARCEL TWO
NOW OR FORMERLY
BROOKLAWN MEMORIAL PARK
BOOK 2380, PAGE 222
NOW OR FORMERLY
MAINE LAWN MEMORIAL PARK
BOOK 1468, PAGE 421
NOW OR FORMERLY
JETPORT STATE BUILDING
BOOK 31393, PAGE 343
NOW OR FORMERLY
MAINE LAWN
MEMORIAL PARK
BOOK 1468, PAGE 421
NOW OR FORMERLY
FIRST UNITED
PENTECOSTAL CHURCH
OF SOUTH PORTLAND
BOOK 4340, PAGE 272
NOW OR FORMERLY
THOMAS ATTERBURY
MAP FILE 41, PAGE 5
LOTS 30 & 31
NOW OR FORMERLY
TIMOTHY W. & JUDITH P. RAYMOND
BOOK 3603, PAGE 236
MAP FILE 201, PAGE 33
LOTS 60 & 61
NOW OR FORMERLY
TIMOTHY W. & JUDITH
P. RAYMOND
BOOK 31264, PAGE 236
COREY AVENUE
CONGRESS STREET IS DEPICTED AS
66 FEET WIDE ON M.D.O.T. RIGHT OF
WAY MAP FILE NO. 3-362 DATED
FEBRUARY 1978. RIGHT OF WAY
SHOWN IS BASED ON SUBJECT DEED
N 43°23'00" E
459.9'
N 49°10'10" E
474.3'
N 31°40'20" W
1239.9'
S 47°49'50" E
S 42°10'10" W
N 46°02'10" E
43.1'
S 45°49'50" E
S 42°10'10" W
102.4'
S 30°00'00" E
281.2'
N 78°34'10" E
3.5'
S 30°00'00" E
269.6'
S 30°00'00" W
269.6'
S 30°00'00" E
S 64°06'50" E
N 81°02'40" E
S 30°30'20" W
S 59°29'40" W
S 30°30'20" W
S 59°29'40" W
S 30°30'20" W
N 31°40'20" W
N 50°29'00" E
105.2'
C62.5'
BN 44° 08' 05" W
R316.0'
A62.6'
C34.8'
BN 06° 37' 32" E
R24.0'
A39.0'
C143.1'
BS 37° 24' 03" W
R316.0'
A144.3
A180.0m
R24.3m
CH 47.8m
CB N 13°18'20" W
A184.1'
R24.0'
CH 47.8'
CB N 13°18'20" W
S 24°11'00" E
80.8'
N 13°18'20" W
80.8'
N 24°11'00" W
S 65°49'00" W
130.3'
S 51°17'40" W
199.6'
S 38°30'00" W
114.4'
S 38°30'00" W
247.7'
S 38°30'00" W
227.8'
S 38°30'00" W
S 51°29'00" E
S 38°30'00" W
S 51°29'00" E
N 38°30'00" E
S 51°29'00" E
N 38°30'00" E
S 51°29'00" E
N 38°30'00" E


CITY OF PORTLAND BOOK 3420, PAGE 256
NOW OR FORMERLY MARK S. HIDER BOOK 28702, PAGE 84
NOW OR FORMERLY NANCY S. SMITH BOOK 4586, PAGE 277
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C 188.2' BS 69°14'42" W R 315.5' A 191.0'
C 144.9' BN 55°13'20" E R 314.0' A 148.2'
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GENERAL APPLICATON DOCUMENT

FINANCIAL CAPACITY

The Airport Improvement Program (AIP) is authorized by the Airport and Airway Improvement Act of 1982. Under the AIP, the Portland International Jetport receives annual entitlement grants based upon numbers of enplaned passengers and cargo tonnage and is eligible to receive discretionary grants. The proposed improvements will be funded by the FAA at 90% through their AIP grants, by the State of Maine at 5% through a general obligation bond, and by the City of Portland at 5% through operating expenses.

Construction Cost Estimate

See below list for the estimated construction cost of each project (Project Items 1 & 2 are based on bid pricing and Project Item 3 is based on the attached CIP):

- Project Item 1 – Terminal Apron Expansion Northwest End – Phase 2: $900,000 (Bid Price)
- Project Item 2 – Long-term hold/deicing/remain overnight apron – 2019: $6,800,000 (Bid Price)
- Project Item 3 – Long-term hold/deicing/remain overnight apron – 2020: $2,600,000 (CIP)

Total Cost: $10,300,000

Attachments:

Attachment A – Portland International Jetport Federal Fiscal Year 2019 Airport Improvement Program Funding Letter, dated March 12, 2019 and written by Paul H. Bradbury, P.E., Airport Director

Attachment B – Portland International Jetport: AIP/CIP Project Summary Dated October 9, 2018

ATTACHMENT A

Portland International Jetport Federal Fiscal Year 2019 Airport Improvement Program Funding Letter, dated March 12, 2019 and written by Paul H. Bradbury, P.E., Airport Director

Stantec

Portland International Jetport

You're on your way.

March 12, 2019

Paul H. Bradbury, P.E.
Airport Director

Zachary R. Sundquist, A.A.E.
Assistant Airport Director

Mr. Dwight D. Anderson, P.E.
Stantec
482 Payne Road Scarborough Court
Scarborough ME 04074-8929

RE: Portland International Jetport Federal Fiscal Year 2019 Airport Improvement Program Funding

Dear Mr. Anderson:

The Airport Capital Improvement Program (ACIP) for airfield improvements at the Portland International Jetport is largely funded through Federal Aviation Administration grants for eligible safety and capacity projects. These grants are issued to airports nationwide through the Airport Improvement Program (AIP). This program is funded through federal taxes on commercial air fares and on aviation fuel taxes. The amount of entitlement funding allocated to each airport is based on the annual number of enplaned commercial passengers the airport handled in the prior calendar year. This year the Portland International Jetport has AIP entitlement funding totaling $3.93 million based upon 925,903 enplaned passengers in 2017. In addition to entitlement funding the Jetport is also seeking AIP discretionary funding of $3.74 million in federal FY 2019. Two projects have been planned this year which include: the construction of Taxiway B to connect Runway 36 to 29; and the first phase expansion of the terminal aircraft apron to provide an additional aircraft deicing pad, aircraft hold area, and aircraft overnight parking. These projects will be procured through two construction contracts with a total engineer estimated cost for both projects of $8.52 million.

The AIP funding amount for these projects of $7.67 million is 90% of the total cost. The balance of $850,000 is covered locally through the Jetport's operating budget and through state of Maine transportation bond funding of up to 5% of project costs. Future year projects for which we are filing permits will be funded similarly.

The FAA funding for Jetport FFY19 and future year projects has been planned, but the grants will not be issued until we have submitted grant applications based on bid pricing and all necessary local, state, and federal permits have been issued.

Please feel free to contact me if you have any questions.

Sincerely,

Paul H. Bradbury, P.E.
Airport Director

ATTACHMENT B

Portland International Jetport: AIP/CIP Project Summary Dated October 9, 2018

Stantec

Portland International Jetport - AIP / CIP PROJECT SUMMARY

Updated 10/9/18

Federal Fiscal Year	Project	Total Cost	FAA Entitlement	FAA Discretionary	PFC	Emergency Ops. Center	State	Airport	Total
F.Y. 2016									
AIP080	Environmental Assessment and Permitting for Airport Improvements, Phase 1	$243,000	$218,700	$0	$0	$0	$0	$24,300	$243,000
AIP081	Terminal Apron Expansion Northwest End, Phase 1, Snow Shoulders East Apron, Gate 5 Relocation, Paving Final 200 Feet of North GA Ramp and Drainage at Cargo Ramp	$3,996,384	$3,596,746	$0	$0	$0	$199,819	$199,819	$3,996,384
Subtotal 2016		**$4,239,384**	**$3,815,446**	**$0**	**$0**	**$0**	**$199,819**	**$224,119**	**$4,239,384**
F.Y. 2017									
AIP083	Environmental Assessment and Permitting for Airport Improvements, Phase 2	$531,204	$478,084	$0	$0	$0	$0	$53,120	$531,204
AIP082	Gate 1 Apron Reconstruction and Snow Shoulders for Taxiway C North, Phase 1 & Pilot Controlled Ltg	$3,131,991	$2,818,792	$0	$0	$0	$156,600	$156,600	$3,131,991
2017	Runway Incursion Warning System	$132,000	$0	$0	$0	$0	$0	$132,000	$132,000
2017	Gates 1 - 6 Rehabilitation & Arriving Passenger Vertical Circulation Improvements	$2,925,000	$0	$0	$0	$0	$0	$2,925,000	$2,925,000
2017	Gate 2 Loading Bridge Rehabilitation	$1,050,000	$0	$0	$0	$0	$0	$1,050,000	$1,050,000
AIP084	Purchase of an ARFF Fire Truck	$609,025	$548,123	$0	$0	$0	$30,451	$30,451	$609,025
AIP085	Solar Photovoltaic Installation on Parking Garage Roof	$1,450,398	$0	$1,305,358	$0	$0	$72,520	$72,520	$1,450,398
Subtotal 2017		**$9,829,618**	**$3,844,999**	**$1,305,358**	**$0**	**$0**	**$259,571**	**$4,419,691**	**$9,829,618**
F.Y. 2018									
AIP086	Gate 1 Apron Reconstruction & Taxiway C North Snow Shoulder Phase 2, & Apron Expansion Northwest End Phase 2	$3,869,184	$3,482,266	$0	$0	$0	$193,459	$193,459	$3,869,184
Subtotal 2018		**$3,869,184**	**$3,482,266**	**$0**	**$0**	**$0**	**$193,459**	**$193,459**	**$3,869,184**
F.Y. 2019									
2019	Construct Air Cargo Taxiway, Phase 1 - Taxiway G to Taxiway A	$4,200,000	$3,780,000		$0	$0	$210,000	$210,000	$4,200,000
2019	Construct Taxiway B Runway 36 to 29	$3,284,000	$0	$2,955,600	$0	$0	$164,200	$164,200	$3,284,000
2019	Long-Term Hold Area, Deicing Pad Expansion & RON Apron Construction - Phase 1	$4,220,000	$0	$3,798,000	$0	$0	$211,000	$211,000	$4,220,000
2019	Environmental Assessment Mitigation Measures	$600,000	$540,000	$0	$0	$0	$30,000	$30,000	$600,000
2019	Relocate Administration Offices to East End of Terminal Building	$1,625,000	$0	$0	$0	$244,000	$0	$1,381,000	$1,625,000
2019	Preconditioned Air & Lifts for All Loading Bridges	$949,000	$0	$0	$854,100	$0	$0	$94,900	$949,000
2019	FIS Facility	$7,787,000	$0	$0	$7,398,000	$0	$0	$389,000	$7,787,000
Subtotal 2019		**$22,665,000**	**$4,320,000**	**$6,753,600**	**$8,252,100**	**$244,000**	**$615,200**	**$2,480,100**	**$22,665,000**
F.Y. 2020									
2020	Long-Term Hold Area, Deicing Pad Expansion & RON Apron Construction - Phase 2	$2,600,000	$2,340,000	$0	$0	$0	$130,000	$130,000	$2,600,000
2020	Snow Melt Equipment for Contaminated Snow	$675,000	$607,500	$0	$0	$0	$33,750	$33,750	$675,000
2020	Runway 11 Taxiway Bypass & Perimeter Service Road Realignment	$1,100,000	$990,000	$0	$0	$0	$55,000	$55,000	$1,100,000
2020	Expand Baggage Claim	$11,425,000	$0	$0	$10,854,000	$0	$0	$571,000	$11,425,000
2020	Purchase of Loading Bridge	$588,000	$0	$0	$588,000	$0	$0	$0	$588,000
Subtotal 2020		**$16,388,000**	**$3,937,500**	**$0**	**$11,442,000**	**$0**	**$218,750**	**$789,750**	**$16,388,000**
F.Y. 2021									
2021	Rehabilitate Cargo Apron	$2,863,000	$2,576,700	$0	$0	$0	$143,150	$143,150	$2,863,000
2021	Displacement Plows	$880,000	$792,000	$0	$0	$0	$44,000	$44,000	$880,000
2021	Airport Security Fence and Gate Upgrades in Northeast Area	$288,000	$259,200	$0	$0	$0	$14,400	$14,400	$288,000
Subtotal 2021		**$4,031,000**	**$3,627,900**	**$0**	**$0**	**$0**	**$201,550**	**$201,550**	**$4,031,000**
F.Y. 2022									
2022	Construct Air Cargo Taxiway, Phase 2	$3,050,000	$2,745,000	$0	$0	$0	$152,500	$152,500	$3,050,000
2022	Land Acquisition	$2,476,000	$2,228,400	$0	$0	$0	$123,800	$123,800	$2,476,000
Subtotal 2022		**$5,526,000**	**$4,973,400**	**$0**	**$0**	**$0**	**$276,300**	**$276,300**	**$5,526,000**
F.Y. 2023									
2023	Relocate Taxiway A East of Runway 18-36	$6,788,000	$4,089,200	$2,020,000	$0	$0	$339,400	$339,400	$6,788,000
2023	Relocate Service Access Road East of Cargo	$804,000	$723,600				$40,200	$40,200	$804,000
Subtotal 2023		**$6,788,000**	**$4,089,200**	**$2,020,000**	**$0**	**$0**	**$339,400**	**$339,400**	**$6,788,000**
	TOTAL SHORT TERM PLANNING HORIZON	**$73,336,187**	**$32,090,711**	**$10,078,958**	**$19,694,100**	**$244,000**	**$2,304,049**	**$8,924,370**	**$73,336,187**

GENERAL APPLICATON DOCUMENT

EVIDENCE OF STATE OR FEDERAL APPROVALS

The applicant has applied for and received the following permits for the project:

- MaineDEP Site Location of Development Major Amendment
- MaineDEP Natural Resource Protection Act Permit
- U.S. Army Corps of Engineers Permit

A copy of these permits are attached to this section.

For project elements in the City of South Portland, a Site Plan Application has been submitted to the City of South Portland concurrently with this application to the City of Portland.

Attachments:

Attachment A – MeDEP Permit
Attachment B – U.S. Army Corps of Engineers Permit

ATTACHMENT A

MeDEP Permit

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
17 STATE HOUSE STATION AUGUSTA, MAINE 04333-0017

DEPARTMENT ORDER

IN THE MATTER OF

CITY OF PORTLAND	) SITE LOCATION OF DEVELOPMENT ACT
Portland and South Portland,	) NATURAL RESOURCES PROTECTION ACT
Cumberland County	) FRESHWATER WETLAND ALTERATION
MASTER PLAN IMPROVEMENTS	) WATER QUALITY CERTIFICATION
L-13760-18-AZ-A (approval)	) AMENDMENT
L-13760-TG-BA-N (approval)	) FINDINGS OF FACT AND ORDER

Pursuant to the provisions of 38 M.R.S. §§ 481–489-E and §§ 480-A–480-JJ, Section 401 of the Federal Water Pollution Control Act (33 U. S. C. § 1341), and Chapters 310, 315, 335, 372, 375, and 500 of Department rules, the Department of Environmental Protection has considered the application of the CITY OF PORTLAND with the supportive data, agency review comments, and other related materials on file and FINDS THE FOLLOWING FACTS:

1. PROJECT DESCRIPTION:

A. History of Project: The Portland International Jetport (Jetport) is a small hub, commercial service airport owned and operated by the applicant. In Department Order #L-13760-18-A-N, dated October 9, 1987, the Department approved, in part, existing post-1970 improvements at the Jetport. The Department has approved a number of amendments and modifications to the Jetport in subsequent Orders, including multi-year improvement programs described in Department Order #L-13760-18-R-A, dated February 16, 2001 and Department Order #L-13760-18-AN-A/L-13760-TG-AO-N, dated January 27, 2010. The Jetport is situated partially within the Cities of Portland and South Portland.

B. Summary: The applicant proposes to implement capital improvements and safety-related projects outlined in its Sustainability Airport Master Plan, which was updated in 2018. High priority projects include the modification of taxiways, expansion of the Long-Term Hold/Deicing apron, and improvements to the runway safety area for Runway 18-36. Two projects approved by the Department in the 2010 Department Order, that have not been completed are included for reexamination by the Department. The proposed project will result in redevelopment of approximately 70.3 acres, of which 27.04 acres are new impervious area. Details of the proposal include:

- Terminal Apron Expansion, Northeast end

Previously permitted but not completed, this project will result in the creation of approximately 0.6 acres of new impervious area.

- Long-Term Hold/Deicing/Remain Overnight Night Apron, Phases 1 and 2

This project will disturb approximately 7.3 acres, including 1.16 acres of freshwater wetlands for the construction of an approximately 3.5-acre concrete and asphalt apron for expanded deicing operations and aircraft parking. This project also includes the construction of a 0.44-acre access and laydown area and stormwater treatment unit.

- Runway 11 End, Taxiway Bypass/Perimeter Service Road Realignment

This project will improve safety by allowing aircraft to bypass each other and to separate ground vehicles from aircraft. This project will disturb approximately 4.3 acres for the construction of a 245-foot long bypass, providing a second point of connection of Taxiway A to the end of Runway 11 and realignment of approximately 930 linear of the perimeter service road. This project will result in the creation of 1.2 acres of new impervious area.

- Tree Removal to Clear Glideslope Qualification Surface, Runway 36 End

This project will result in the removal of vegetation within ten feet of the approach surface to address the safety issues and reduce the frequency for returning to remove airspace obstructions in the future. The applicant proposes to cut and remove trees from several locations that collectively total 31.6 acres, including 0.5 acres of freshwater wetlands.

- Air Cargo Taxiway (Phases 1 and 2)

The previously approved portion of this project will construct the new taxiway east of, and parallel to, Runway 18-36 between Taxiways A and G. When built, Phase 1 of this project will result in the creation of 3.25 acres of new impervious area, which includes an additional 0.24 acres of new impervious area not previously approved. Phase 2 of the project includes extending the taxiway an additional 663 linear feet north of Taxiway G. Phase 2 includes the realignment of approximately 375 feet of the perimeter service road. This project will result in the creation of 1.1 acres of new impervious area.

- Taxiway C (Phases 1 and 2)

The 3,363 feet of Taxiway C will be located west of, and parallel to, Runway 18-36. Phase 1 of the project includes that portion of Taxiway C north of Runway 11-29. Taxiway C includes a cross-connection to the Air Cargo Taxiway at the northern terminus of the Air Cargo Taxiway. Phase 2 of this project will construct the reminder or Taxiway C from the intersection of Runway 11-29 to the Runway 36 end. In its entirety, this project will result in the creation of 8.8 acres of new impervious area, 1.48 acres of reconstructed impervious area, removal of 0.77 acres of impervious area, and 12 acres of redeveloped grass area associated with utility installation.

- Taxiway A Relocation

The eastern end of Taxiway A lies within the glideslope critical area of Runway 11-29, and must be relocated. This project will shift this portion of Taxiway A 180 feet north of Runway 11-29 and create a new 1,776-foot long taxiway. This project will result in the creation of 4.7 acres of new impervious area (taxiway and snow shoulder apron), the removal of approximately 2.9 acres of impervious area, redevelopment of eight acres of grassed infield, and the filling of 0.1 acres of freshwater wetlands.

- Service Road Relocation

This project is located east of the new Air Cargo Taxiway and north of the relocated end of Taxiway A. The project includes the relocation of approximately 1,300 feet of the perimeter service road, relocation of approximately 350 feet of perimeter fencing and the construction of elements of the stormwater management system. This project, in addition to the Taxiway A Relocation and Air Cargo Taxiway, will disturb approximately 27.3 acres, in total. The service road relocation will result in the creation of approximately 0.5 acres of impervious area, as well as the removal of an equivalent amount of impervious area.

- Taxiway B, New Construction

This project includes the construction of Taxiway B, a new 1,226-foot long taxiway that connects the end of Runway 29 to Runway 36. This project will result in the creation of 5.2 acres of redeveloped area, of which 2.3 acres are new impervious area.

The proposed project is shown on a set of plans, the first of which is titled "Portland International Jetport," prepared by Stantec Consulting Services, Inc., and dated October 12, 2018, with a last revision date on any of the sheets of December 31, 2018. Construction of the multiple projects is projected to be completed in phases over the next five years, as the funds for each project become available.

The applicant is also seeking approval under the Natural Resources Protection Act (NRPA) to alter approximately 1.26 acres of freshwater wetlands and selective tree removal within a forested freshwater wetland, as described in Finding 11, and for ground disturbance activities within 75 feet of a coastal wetland.

C. Current Use of Site: The site of the proposed projects is currently developed with the existing Jetport, that includes runways and taxiways. terminal buildings, parking areas, and supporting facilities. With exception of the obstruction clearing project, all of the proposed projects are located on existing developed area. The area proposed for obstruction clearing is located within the grounds of the Calvary Cemetery, an adjacent property owned by the Diocese of Portland, Maine.

D. Title, Right, or Interest: The application included documentation from Diocese of Portland, Maine granting the application rights to enter onto the cemetery for the purpose of removing hazard trees. The Diocese noted that they and the applicant had worked collaboratively in the past to perform selective tree cutting.

2. FINANCIAL CAPACITY:

The total cost of the project is estimated to be $73,336,200. The proposed project will be funded using the existing Airport Improvement Program, authorized by the Airport and Airway Improvement Act of 1982. Under this program the Jetport receives annual entitlement grants and is eligible for additional discretionary grants. Funding sources include the Federal Aviation Administration (FAA), providing 90% through the Airport

Improvement Program grant process; the State of Maine, providing 5% through a general obligation bond; and the applicant, providing 5% through operating expenses.

The Department finds that the applicant has demonstrated adequate financial capacity to comply with Department standards.

3. TECHNICAL ABILITY:

The applicant provided resume information for key persons involved with the project and provided a list of projects successfully constructed by the applicant. The applicant also retained the services of Stantec Consulting Services, Inc., Coffman Associates, and Haley & Aldrich, Inc., professional engineering and environmental consulting firms, to assist in the design and engineering of the project.

The Department finds that the applicant has demonstrated adequate technical ability to comply with Department standards.

4. NOISE:

The primary sound emissions from the proposed project relate to aircraft operations at the airport. Noise from aircraft operations is subject to federal noise regulations and as such is exempt from regulation under Chapter 375(10)(5). The applicant completed a its Final Environmental Assessment for Proposed Airfield and Terminal Area Improvements in 2009, which included the airport improvements authorized in the 2010 Department Order. This study concluded that implementation of the proposed improvements would not result in a significant noise impact as defined by the FAA.

The applicant asserts that the proposed project does not alter the current runway configuration or permit changes in the design category of aircraft serving the Jetport. The applicant notes that forecast operations projected to the year 2035 are lower than previously forecasted, such that calculation of new noise contours are not warranted. The application included a map of the Jetport and surrounding parcels. The map identified nearby noise-sensitive sites and their distance outside of the 60-, 70-, and 75-decibel contours around the Jetport.

Based on the evidence in the record, the Department finds that no regulated sources of noise have been identified and that the proposed project will not have a significant impact under the applicable federal regulations.

5. SCENIC CHARACTER:

The proposed project is located within the footprint of the Jetport development, consisting of taxiways, airport aprons, service roads, and redeveloped grassed areas. the project elements are consistent with the existing use of the Jetport. No changes to the airport or terminal lighting systems are proposed.

Based on the project's location and design, the Department finds that the proposed project will not have an unreasonable adverse effect on the scenic character of the surrounding area.

6. WILDLIFE AND FISHERIES:

The Maine Department of Inland Fisheries and Wildlife (MDIFW) reviewed the proposed project. In its comments, dated October 13, 2017, MDIFW stated that it found no records of any Essential or Significant Wildlife Habitats, or other wildlife habitats of special concern within the sites of the proposed project. No fisheries concerns were identified.

The Department finds that the applicant has made adequate provision for the protection of wildlife and fisheries.

7. SOILS:

The applicant submitted a soil survey map and report based on the soils found at the project site and a geotechnical report. The geotechnical report was prepared by a registered professional engineer and reviewed by staff from the Division of Environmental Assessment (DEA) of the Bureau of Water Quality.

The applicant indicated blasting associated with construction of the project is likely and submitted a site-specific blasting plan in the application for blasting that occurs within 500 feet of non-owned off-site structures such as buildings and wells. A site-specific blasting plan for the Jetport, authorized in Department Order #L-13760-18-AR-C, dated September 27, 2010, was determined to meet the blasting standards contained in 38 M.R.S. § 490-Z(14).

The Department finds that, based on the geotechnical report, the Blasting Plan, and DEA's review, the soils on the project site present no limitations to the proposed project that cannot be overcome through standard engineering practices.

8. STORMWATER MANAGEMENT:

The proposed project will result in the redevelopment of approximately 70.3 acres, of which 27.04 acres are new impervious area. The Jetport lies within the watershed of the Fore River. The applicant submitted a stormwater management plan based on the Basic, General, and Flooding Standards contained in Chapter 500 Stormwater Management rules (06-096 C.M.R. ch. 500, effective August 12, 2015). The stormwater management system for the proposed project consists of catch basins, a subsurface drainage system, grassed swales, and two vegetated underdrained soil filters, and an existing wet pond.

A. Basic Standards:

(1) Erosion and Sedimentation Control: The applicant submitted an Erosion and Sedimentation Control Plan (Section 14 of the application) that is based on the performance standards contained in Appendix A of Chapter 500 and the Best Management Practices outlined in the Maine Erosion and Sediment Control BMPs, which were developed by the Department. This plan and plan sheets containing erosion control details were reviewed by, and revised in response to the comments of, the Bureau of Land Resources (BLR).

Erosion control details will be included on the final construction plans and the erosion control narrative will be included in the project specifications to be provided to the construction contractor.

(2) Inspection and Maintenance: The applicant submitted a maintenance plan that addresses both short and long-term maintenance requirements. The maintenance plan is based on the standards contained in Appendix B of Chapter 500. This plan was reviewed by, and revised in response to the comments of, BLR. The applicant will be responsible for the maintenance of all common facilities including the stormwater management system.

Storm sewer grit and sediment materials removed from stormwater control structures during maintenance activities must be disposed of in compliance with the Maine Solid Waste Management Rules.

(3) Housekeeping: The proposed project will comply with the performance standards outlined in Appendix C of Chapter 500.

Based on BLR's review of the erosion and sedimentation control plan and the maintenance plan, the Department finds that the proposed project meets the Basic Standards contained in Chapter 500(4)(B).

B. General Standards:

Pursuant to Department Rules, Chapter 500(4)(C)(2)(d), the treatment requirement for a redevelopment project is scaled based on the change of use of existing developed area to the proposed developed area. Mitigation for the proposed project requires control of runoff from no less than 60% of the new developed area. The applicant's stormwater management plan includes general treatment measures that will mitigate for no less than 81% of the developed area, including 32% of the impervious area.

The stormwater management system proposed by the applicant was reviewed by, and revised in response to comments from, BLR. After a final review, BLR commented that the proposed stormwater management system is designed in accordance with the General Standards contained in Chapter 500(4)(C) and recommended that the applicant’s design engineer or another qualified engineer oversee the construction of the stormwater management structures to ensure that they are installed in accordance with the details and notes specified on the approved plans. Within 30 days from completion of the entire

system, or if the project takes more than one year to complete, at least once per year, the applicant must submit a log of inspection reports detailing the items inspected, photographs taken, and the dates of each inspection to the BLR for review.

Based on the stormwater system's design and BLR's review, the Department finds that the applicant has made adequate provision to ensure that the proposed project will meet the General Standards contained in Chapter 500(4)(C) provided that the applicant retains a professional engineer to inspect and document construction of the stormwater management system as outlined above.

C. Flooding Standard:

The applicant is not proposing a formal stormwater management system to detain stormwater from 24-hour storms of 2-, 10-, and 25-year frequency. Instead, since the project site is located adjacent to the lower portion of the Fore River which empties into Portland Harbor, the applicant requested a waiver from the flooding standard pursuant to Department Rules, Chapter 500(4)(F)(3)(b).

BLR commented that the proposed system is designed in accordance with the Flooding Standard contained in Chapter 500(4)(F).

Based on the system's design and BLR's review, the Department finds that the applicant has made adequate provision to ensure that the proposed project will meet the Flooding Standard contained in Chapter 500(4)(F) for peak flow from the project site, and channel limits and runoff areas.

The Department further finds that the proposed project will meet the Chapter 500 standards for the discharge to coastal wetlands.

9. WASTEWATER DISPOSAL:

The proposed project includes expansion of the deicing apron allowing for additional aircraft to undergo deicing simultaneously during significant winter weather and thereby reducing aircraft wait times. Authorized in the 2010 Department Order, the deicing operation includes deicing fluid storage tanks, a collection system, and recycling facilities. The spent deicing fluid is recycled and wastewater generated by this operation is collected and discharged to the City of Portland's East End Wastewater Treatment Facility. The application included the latest City permit that authorizes the discharge of this wastewater into the municipal sanitary sewer system. Discharge records, included with the City's wastewater permit, indicate flow from the recycling facility is well below its permitted limit. Following expansion of the deicing apron, the volume of wastewater generated from recycling of deicing fluid is expected remain unchanged from what is currently generated.

Based on information included in the record, the Department finds that the applicant has made adequate provision for wastewater disposal at a facility that has the capacity to ensure satisfactory treatment.

10. SOLID WASTE:

The proposed project will generate approximately 300 cubic yards of stumps and grubbings. All stumps and grubbings generated will be ground on site and the resulting material utilized for erosion control, in compliance with Maine Solid Waste Management Rules.

Based on the above information, the Department finds that the applicant has made adequate provision for solid waste disposal.

11. WETLAND IMPACTS:

On the Jetport, the applicant proposes to directly alter 54,886 square feet (1.26 acres) of freshwater wetlands at two locations to construct the Long-term Hold/Deicing Apron and Taxiway A. In addition, ground disturbance activities related to the new perimeter service road are proposed within the 75-foot setback to a coastal wetland. Off the Jetport, the applicant proposes to selective cut trees in a forested freshwater wetland that are identified as obstructions in the approach surface of Runway 39.

The Wetland and Waterbodies Protection Rules, 06-096 C.M.R. ch. 310 (effective January 26, 2009), interpret and elaborate on the Natural Resources Protection Act (NRPA) criteria for obtaining a permit. The rules guide the Department in its determination of whether a project's impacts would be unreasonable. A proposed project would generally be found to be unreasonable if it would cause a loss in wetland area, functions and values and there is a practicable alternative to the project that would be less damaging to the environment. Each application for a NRPA permit that involves a freshwater wetland alteration must provide an analysis of alternatives in order to demonstrate that a practicable alternative does not exist.

A. Avoidance. No activity may be permitted if there is a practicable alternative to the project that would be less damaging to the environment. The applicant submitted an alternative analysis for the proposed project completed by Stantec and dated October 2018. The purpose of the proposed project is to improve the operational efficiency and safety of the airfield system, consistent with FAA design and safety standards, which includes protection of the instrument approaches to the runway system and to implement the Jetport's sustainability goals and objectives.

The applicant examined several locations near the terminal building to meets its long-term aircraft parking needs. Because expansion of the deicing operation is also proposed, apron expansion around the deicing facilities was determined to be the most practicable alternative for this portion of the proposed project, as it would have the additional benefit of improved access to Taxiway A from the deicing operations. The isolated, 1.16-acre

scrub-shrub wetland proposed for alteration is located between the existing deicing apron, Taxiway A, and Jetport Boulevard. Given the location of this wetland and the size requirements of the project, the applicant stated that there was no other practicable alternative to the project that would otherwise avoid impacts.

Three isolated wet meadow wetlands are located where Taxiway A (at the Runway 29 end) is proposed to be relocated. These wetlands are routinely mowed as part of the grass infield maintenance program. The applicant determined that the relocated portion of Taxiway A is the best fit for the multiple space demands required for infrastructure required for instrument landings and for snow removal.

The removal of trees in the off-site forested wetland was determined to be the only alternative for meeting the runway safety requirements established by the FAA. As discussed below the applicant proposes to minimize disturbance of this wetland.

Encroachment within the 75-foot setback to a coastal wetland was determined to be unavoidable given the location of existing buildings and the service road in relation to the coastal wetland. As discussed below the applicant proposes to minimize disturbance of the setback.

B. Minimal Alteration. The amount of freshwater wetlands to be altered must be kept to the minimum amount necessary for meeting the overall purpose of the project. Impacts to the scrub-shrub wetland near the deicing facilities have been minimized by locating the apron, stormwater treatment unit, and laydown area along the wetland edge to the greatest extent practicable. Given the space required to safely move aircraft through this area, encroachment into the wetland was unavoidable. The applicant stated that as it is currently designed, the proposed project minimizes impacts to freshwater wetlands at this location to the maximum extent practicable. The applicant also stated that for the Taxiway A relocation project, the proposed project minimizes impacts to freshwater wetlands to the maximum extent practicable.

For the off-site wetland alteration, the applicant proposes to selectively cut only those trees that are at, or near, the height in which they present as obstructions to the approach surface of Runway 36. the applicant proposes to leave the cut trees in place or remove the trees by winch. Stumps will be treated, but remain in place. To further limit wetland disturbance, no mats or other fill will be placed in the wetlands and no machinery will be operated within the wetland.

To minimize encroachment in the 75-foot setback to the coastal wetland by the perimeter service road, the applicant proposes to use riprap to steepen sideslopes and limit disturbance.

C. Compensation. In accordance with Chapter 310, Section 5(C)(6)(a), compensation is required for the proposed project to achieve the goal of no net loss of freshwater wetland functions and values. The applicant submitted a functional assessment, dated August 30, 2018, that described the 54,886 square feet of freshwater wetlands to be altered by the proposed project. The functional assessment documented

that the primary functions and values of these wetlands would include floodwater alteration and sediment toxicant retention.

The applicant proposes to make a contribution into the In-Lieu Fee program of the Maine Natural Resource Conservation Program in the amount of $236,009.80. Prior to the start of construction, the applicant must submit a payment in the amount of $236,009.80, payable to "Treasurer, State of Maine", and directed to the attention of the In-Lieu Fee Program Administrator at 17 State House Station, Augusta, Maine 04333.

The Department finds that the applicant has avoided and minimized freshwater wetland impacts to the greatest extent practicable, and that the proposed project represents the least environmentally damaging alternative that meets the overall purpose of the project provided that the applicant submits the In-Lieu Fee payment as described above.

12. ALL OTHER:

All other Findings of Fact, Conclusions and Conditions remain as approved in Department Order #L-13760-18-A-N, and subsequent Orders.

BASED on the above findings of fact, and subject to the conditions listed below, the Department makes the following conclusions pursuant to 38 M.R.S. §§ 480-A–480-JJ and Section 401 of the Federal Water Pollution Control Act:

A. The proposed activity will not unreasonably interfere with existing scenic, aesthetic, recreational, or navigational uses.

B. The proposed activity will not cause unreasonable erosion of soil or sediment.

C. The proposed activity will not unreasonably inhibit the natural transfer of soil from the terrestrial to the marine or freshwater environment.

D. The proposed activity will not unreasonably harm any significant wildlife habitat, freshwater wetland plant habitat, threatened or endangered plant habitat, aquatic habitat, travel corridor, freshwater, estuarine, or marine fisheries or other aquatic life provided that prior to the start of project construction, the applicant makes a contribution to the In-Lieu Fee program as described in Finding 11.

E. The proposed activity will not unreasonably interfere with the natural flow of any surface or subsurface waters.

F. The proposed activity will not violate any state water quality law including those governing the classifications of the State's waters.

G. The proposed activity will not unreasonably cause or increase the flooding of the alteration area or adjacent properties.

H. The proposed activity is not on or adjacent to a sand dune.

I. The proposed activity is not on an outstanding river segment as noted in 38 M.R.S. § 480-P.

BASED on the above findings of fact, and subject to the conditions listed below, the Department makes the following conclusions pursuant to 38 M.R.S. §§ 481–489-E:

A. The applicant has provided adequate evidence of financial capacity and technical ability to develop the project in a manner consistent with state environmental standards.

B. The applicant has made adequate provision for fitting the development harmoniously into the existing natural environment and the development will not adversely affect existing uses, scenic character, air quality, water quality or other natural resources in the municipality or in neighboring municipalities.

C. The proposed development will be built on soil types which are suitable to the nature of the undertaking and will not cause unreasonable erosion of soil or sediment nor inhibit the natural transfer of soil.

D. The proposed development meets the standards for storm water management in 38 M.R.S. § 420-D and the standard for erosion and sedimentation control in 38 M.R.S. § 420-C provided that sewer grit and sediment are disposed of properly and that the installation of stormwater components is overseen and documented as described in Finding 8.

E. The proposed development will not pose an unreasonable risk that a discharge to a significant groundwater aquifer will occur.

F. The applicant has made adequate provision of utilities, including water supplies, sewerage facilities and solid waste disposal required for the development and the development will not have an unreasonable adverse effect on the existing or proposed utilities in the municipality or area served by those services.

G. The activity will not unreasonably cause or increase the flooding of the alteration area or adjacent properties nor create an unreasonable flood hazard to any structure.

THEREFORE, the Department APPROVES the application of the CITY OF PORTLAND to construct runway and terminal area improvements as described in Finding 1, SUBJECT TO THE FOLLOWING CONDITIONS and all applicable standards and regulations:

1. The Standard Conditions of Approval, a copy attached.

2. In addition to any specific erosion control measures described in this or previous orders, the applicant shall take all necessary actions to ensure that its activities or those of its agents do not result in noticeable erosion of soils or fugitive dust emissions on the site during the construction and operation of the project covered by this approval.

3. Severability. The invalidity or unenforceability of any provision, or part thereof, of this License shall not affect the remainder of the provision or any other provisions. This License shall be construed and enforced in all respects as if such invalid or unenforceable provision or part thereof had been omitted.

4. Prior to the start of construction, the applicant shall submit a payment in the amount of $236,009.80, payable to "Treasurer, State of Maine", to the attention of the In-Lieu Fee Program Administrator at 17 State House Station, Augusta, Maine 04333.

5. The applicant shall retain its design engineer or another qualified engineer to oversee the construction of the stormwater management system according to the details and notes specified on the approved plans. Within 30 days of completion of the entire system or at least once per year, the applicant shall submit a log of inspection reports detailing the items inspected, photographs taken, and dates of each inspection to the BLR for review.

6. Storm sewer grit and sediment materials removed from stormwater control structures shall be disposed of in compliance with the Maine Solid Waste Management Rules.

7. All other Findings of Fact, Conclusions and Conditions remain as approved in Department Order #L-13760-18-A-N, and subsequent Orders, and are incorporated herein.

THIS APPROVAL DOES NOT CONSTITUTE OR SUBSTITUTE FOR ANY OTHER REQUIRED STATE, FEDERAL OR LOCAL APPROVALS NOR DOES IT VERIFY COMPLIANCE WITH ANY APPLICABLE SHORELAND ZONING ORDINANCES.

DONE AND DATED IN AUGUSTA, MAINE, THIS 21st DAY OF February, 2019.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Filed
FEB 21 2019
State of Maine
Board of Environmental Protection

BY: Melanie Loyzim
For: Gerald D. Reid, Commissioner

PLEASE NOTE THE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES.

RLG/L13760AZABAN/ATS#83692 & 83696

Department of Environmental Protection

SITE LOCATION OF DEVELOPMENT (SITE)
STANDARD CONDITIONS

A. Approval of Variations from Plans. The granting of this approval is dependent upon and limited to the proposals and plans contained in the application and supporting documents submitted and affirmed to by the applicant. Any variation from these plans, proposals, and supporting documents is subject to review and approval prior to implementation. Further subdivision of proposed lots by the applicant or future owners is specifically prohibited without prior approval of the Board, and the applicant shall include deed restrictions to that effect.

B. Compliance with All Applicable Laws. The applicant shall secure and comply with all applicable federal, state, and local licenses, permits, authorizations, conditions, agreements, and orders prior to or during construction and operation, as appropriate.

C. Compliance with All Terms and Conditions of Approval. The applicant shall submit all reports and information requested by the Board or the Department demonstrating that the applicant has complied or will comply with all preconstruction terms and conditions of this approval. All preconstruction terms and conditions must be met before construction begins.

D. Advertising. Advertising relating to matters included in this application shall refer to this approval only if it notes that the approval has been granted WITH CONDITIONS, and indicates where copies of those conditions may be obtained.

E. Transfer of Development. Unless otherwise provided in this approval, the applicant shall not sell, lease, assign or otherwise transfer the development or any portion thereof without prior written approval of the Board where the purpose or consequence of the transfer is to transfer any of the obligations of the developer as incorporated in this approval. Such approval shall be granted only if the applicant or transferee demonstrates to the Board that the transferee has the technical capacity and financial ability to comply with conditions of this approval and the proposals and plans contained in the application and supporting documents submitted by the applicant.

F. Time frame for approvals. If the construction or operation of the activity is not begun within four years, this approval shall lapse and the applicant shall reapply to the Board for a new approval. The applicant may not begin construction or operation of the development until a new approval is granted. A reapplication for approval may include information submitted in the initial application by reference. This approval, if construction is begun within the four-year time frame, is valid for seven years. If construction is not completed within the seven-year time frame, the applicant must reapply for, and receive, approval prior to continuing construction.

G. Approval Included in Contract Bids. A copy of this approval must be included in or attached to all contract bid specifications for the development.

H. Approval Shown to Contractors. Work done by a contractor pursuant to this approval shall not begin before the contractor has been shown by the developer a copy of this approval.

(2/81)/Revised December 27, 2011

Natural Resources Protection Act (NRPA)
Standard Conditions

THE FOLLOWING STANDARD CONDITIONS SHALL APPLY TO ALL PERMITS GRANTED UNDER THE NATURAL RESOURCES PROTECTION ACT, 38 M.R.S. § 480-A ET SEQ., UNLESS OTHERWISE SPECIFICALLY STATED IN THE PERMIT.

A. Approval of Variations From Plans. The granting of this permit is dependent upon and limited to the proposals and plans contained in the application and supporting documents submitted and affirmed to by the applicant. Any variation from these plans, proposals, and supporting documents is subject to review and approval prior to implementation.

B. Compliance With All Applicable Laws. The applicant shall secure and comply with all applicable federal, state, and local licenses, permits, authorizations, conditions, agreements, and orders prior to or during construction and operation, as appropriate.

C. Erosion Control. The applicant shall take all necessary measures to ensure that his activities or those of his agents do not result in measurable erosion of soils on the site during the construction and operation of the project covered by this Approval.

D. Compliance With Conditions. Should the project be found, at any time, not to be in compliance with any of the Conditions of this Approval, or should the applicant construct or operate this development in any way other the specified in the Application or Supporting Documents, as modified by the Conditions of this Approval, then the terms of this Approval shall be considered to have been violated.

E. Time frame for approvals. If construction or operation of the activity is not begun within four years, this permit shall lapse and the applicant shall reapply to the Board for a new permit. The applicant may not begin construction or operation of the activity until a new permit is granted. Reapplications for permits may include information submitted in the initial application by reference. This approval, if construction is begun within the four-year time frame, is valid for seven years. If construction is not completed within the seven-year time frame, the applicant must reapply for, and receive, approval prior to continuing construction.

F. No Construction Equipment Below High Water. No construction equipment used in the undertaking of an approved activity is allowed below the mean high water line unless otherwise specified by this permit.

G. Permit Included In Contract Bids. A copy of this permit must be included in or attached to all contract bid specifications for the approved activity.

H. Permit Shown To Contractor. Work done by a contractor pursuant to this permit shall not begin before the contractor has been shown by the applicant a copy of this permit.

Revised September 2016

STORMWATER STANDARD CONDITIONS

STRICT CONFORMANCE WITH THE STANDARD AND SPECIAL CONDITIONS OF THIS APPROVAL IS NECESSARY FOR THE PROJECT TO MEET THE STATUTORY CRITERIA FOR APPROVAL

Standard conditions of approval. Unless otherwise specifically stated in the approval, a department approval is subject to the following standard conditions pursuant to Chapter 500 Stormwater Management Law.

(1) Approval of variations from plans. The granting of this approval is dependent upon and limited to the proposals and plans contained in the application and supporting documents submitted and affirmed to by the permittee. Any variation from these plans, proposals, and supporting documents must be reviewed and approved by the department prior to implementation. Any variation undertaken without approval of the department is in violation of 38 M.R.S. §420-D(8) and is subject to penalties under 38 M.R.S.. §349.

(2) Compliance with all terms and conditions of approval. The applicant shall submit all reports and information requested by the department demonstrating that the applicant has complied or will comply with all terms and conditions of this approval. All preconstruction terms and conditions must be met before construction begins.

(3) Advertising. Advertising relating to matters included in this application may not refer to this approval unless it notes that the approval has been granted WITH CONDITIONS, and indicates where copies of those conditions may be obtained.

(4) Transfer of project. Unless otherwise provided in this approval, the applicant may not sell, lease, assign, or otherwise transfer the project or any portion thereof without written approval by the department where the purpose or consequence of the transfer is to transfer any of the obligations of the developer as incorporated in this approval. Such approval may only be granted if the applicant or transferee demonstrates to the department that the transferee agrees to comply with conditions of this approval and the proposals and plans contained in the application and supporting documents submitted by the applicant. Approval of a transfer of the permit must be applied for no later than two weeks after any transfer of property subject to the license.

(5) Time frame for approvals. If the construction or operation of the activity is not begun within four years, this approval shall lapse and the applicant shall reapply to the department for a new approval. The applicant may not begin construction or operation of the project until a new approval is granted. A reapplication for approval may include information submitted in the initial application by reference. This approval, if construction is begun within the four-year time frame, is valid for seven years. If construction is not completed within the seven-year time frame, the applicant must reapply for, and receive, approval prior to continuing construction.

(6) Certification. Contracts must specify that "all work is to comply with the conditions of the Stormwater Permit." Work done by a contractor or subcontractor pursuant to this approval may not begin before the contractor and any subcontractors have been shown a copy of this approval with the conditions by the permittee, and the permittee and each contractor and subcontractor has certified, on a form provided by the department, that the approval and conditions have been received and read, and that the work will be carried out in accordance with the approval and conditions. Completed certification forms must be forwarded to the department.

(7) Maintenance. The components of the stormwater management system must be adequately maintained to ensure that the system operates as designed, and as approved by the Department. If maintenance responsibility is to be transferred from the permittee to another entity, a transfer request must be filed with the Department which includes the name and contact information for the person or entity responsible for this maintenance. The form must be signed by the responsible person or agent of the responsible entity.

(8) Recertification requirement. Within three months of the expiration of each five-year interval from the date of issuance of the permit, the permittee shall certify the following to the department.

(a) All areas of the project site have been inspected for areas of erosion, and appropriate steps have been taken to permanently stabilize these areas.

(b) All aspects of the stormwater control system are operating as approved, have been inspected for damage, wear, and malfunction, and appropriate steps have been taken to repair or replace the system, or portions of the system, as necessary.

(c) The stormwater maintenance plan for the site is being implemented as approved by the Department, and the maintenance log is being maintained.

(d) All proprietary systems have been maintained according to the manufacturer's recommendations. Where required by the Department, the permittee shall execute a 5-year maintenance contract with a qualified professional for the coming 5-year interval. The maintenance contract must include provisions for routine inspections, cleaning and general maintenance.

(e) The Department may waive some or all of these recertification requirements on a case-by-case basis for permittees subject to the Department's Multi-Sector General Permit ("MSGP") and/or Maine Pollutant Discharge Elimination System ("MEPDES") programs where it is demonstrated that these programs are providing stormwater control that is at least as effective as required pursuant to this Chapter.

(9) Transfer of property subject to the license. If any portion of the property subject to the license containing areas of flow or areas that are flooded are transferred to a new property owner, restrictive covenants protecting these areas must be included in any deeds or leases, and recorded at the appropriate county registry of deeds. Also, in all transfers of such areas and areas containing parts of the stormwater management system, deed restrictions must be included making the property transfer subject to all applicable terms and conditions of the permit. These terms and conditions must be incorporated by specific and prominent reference to the permit in the deed. All transfers must include in the restrictions the requirement that any subsequent transfer must specifically include the same restrictions unless their removal or modification is approved by the Department. These restrictions must be written to be enforceable by the Department, and must reference the permit number.

(10) Severability. The invalidity or unenforceability of any provision, or part thereof, of this permit shall not affect the remainder of the provision or any other provisions. This permit shall be construed and enforced in all respects as if such invalid or unenforceable provision or part thereof had been omitted.

DEP INFORMATION SHEET

Appealing a Department Licensing Decision

Dated: November 2018 **Contact: (207) 287-2452**

SUMMARY

There are two methods available to an aggrieved person seeking to appeal a licensing decision made by the Department of Environmental Protection's (DEP) Commissioner: (1) an administrative process before the Board of Environmental Protection (Board); or (2) a judicial process before Maine's Superior Court. An aggrieved person seeking review of a licensing decision over which the Board had original jurisdiction may seek judicial review in Maine's Superior Court.

A judicial appeal of final action by the Commissioner or the Board regarding an application for an expedited wind energy development (35-A M.R.S. § 3451(4)) or a general permit for an offshore wind energy demonstration project (38 M.R.S. § 480-HH(1)) or a general permit for a tidal energy demonstration project (38 M.R.S. § 636-A) must be taken to the Supreme Judicial Court sitting as the Law Court.

This information sheet, in conjunction with a review of the statutory and regulatory provisions referred to herein, can help a person to understand his or her rights and obligations in filing an administrative or judicial appeal.

I. ADMINISTRATIVE APPEALS TO THE BOARD

LEGAL REFERENCES

The laws concerning the DEP's *Organization and Powers*, 38 M.R.S. §§ 341-D(4) & 346; the *Maine Administrative Procedure Act*, 5 M.R.S. § 11001; and the DEP's *Rules Concerning the Processing of Applications and Other Administrative Matters* ("Chapter 2"), 06-096 C.M.R. ch. 2.

DEADLINE TO SUBMIT AN APPEAL TO THE BOARD

The Board must receive a written appeal within 30 days of the date on which the Commissioner's decision was filed with the Board. Appeals filed more than 30 calendar days after the date on which the Commissioner's decision was filed with the Board will be dismissed unless notice of the Commissioner's license decision was required to be given to the person filing an appeal (appellant) and the notice was not given as required.

HOW TO SUBMIT AN APPEAL TO THE BOARD

Signed original appeal documents must be sent to: Chair, Board of Environmental Protection, 17 State House Station, Augusta, ME 04333-0017. An appeal may be submitted by fax or e-mail if it contains a scanned original signature. It is recommended that a faxed or e-mailed appeal be followed by the submittal of mailed original paper documents. The complete appeal, including any attachments, must be received at DEP's offices in Augusta on or before 5:00 PM on the due date; materials received after 5:00 pm are not considered received until the following day. The risk of material not being received in a timely manner is on the sender, regardless of the method used. The appellant must also send a copy of the appeal documents to the Commissioner of the DEP; the applicant (if the appellant is not the applicant in the license proceeding at issue); and if a hearing was held on the application, any intervenor in that hearing process. All of the information listed in the next section of this information sheet must be submitted at the time the appeal is filed.

INFORMATION APPEAL PAPERWORK MUST CONTAIN

Appeal materials must contain the following information at the time the appeal is submitted:

1. *Aggrieved Status*. The appeal must explain how the appellant has standing to maintain an appeal. This requires an explanation of how the appellant may suffer a particularized injury as a result of the Commissioner's decision.
2. *The findings, conclusions, or conditions objected to or believed to be in error.* The appeal must identify the specific findings of fact, conclusions regarding compliance with the law, license conditions, or other aspects of the written license decision or of the license review process that the appellant objects to or believes to be in error.
3. *The basis of the objections or challenge.* For the objections identified in Item #2, the appeal must state why the appellant believes that the license decision is incorrect and should be modified or reversed. If possible, the appeal should cite specific evidence in the record or specific licensing requirements that the appellant believes were not properly considered or fully addressed.
4. *The remedy sought.* This can range from reversal of the Commissioner's decision on the license or permit to changes in specific permit conditions.
5. *All the matters to be contested*. The Board will limit its consideration to those matters specifically raised in the written notice of appeal.
6. *Request for hearing.* If the appellant wishes the Board to hold a public hearing on the appeal, a request for public hearing must be filed as part of the notice of appeal, and must include an offer of proof in accordance with Chapter 2. The Board will hear the arguments in favor of and in opposition to a hearing on the appeal and the presentations on the merits of an appeal at a regularly scheduled meeting. If the Board decides to hold a public hearing on an appeal, that hearing will then be scheduled for a later date.
7. *New or additional evidence to be offered.* If an appellant wants to provide evidence not previously provided to DEP staff during the DEP's review of the application, the request and the proposed evidence must be submitted with the appeal. The Board may allow new or additional evidence, referred to as supplemental evidence, to be considered in an appeal only under very limited circumstances. The proposed evidence must be relevant and material, and (a) the person seeking to add information to the record must show due diligence in bringing the evidence to the DEP's attention at the earliest possible time in the licensing process; or (b) the evidence itself must be newly discovered and therefore unable to have been presented earlier in the process. Specific requirements for supplemental evidence are found in Chapter 2 § 24.

OTHER CONSIDERATIONS IN APPEALING A DECISION TO THE BOARD

1. *Be familiar with all relevant material in the DEP record.* A license application file is public information, subject to any applicable statutory exceptions, and is made easily accessible by the DEP. Upon request, the DEP will make application materials available during normal working hours, provide space to review the file, and provide an opportunity for photocopying materials. There is a charge for copies or copying services.
2. *Be familiar with the regulations and laws under which the application was processed, and the procedural rules governing your appeal.* DEP staff will provide this information on request and answer general questions regarding the appeal process.
3. *The filing of an appeal does not operate as a stay to any decision.* If a license has been granted and it has been appealed, the license normally remains in effect pending the processing of the appeal. Unless a stay of the decision is requested and granted, a license holder may proceed with a project pending the outcome of an appeal, but the license holder runs the risk of the decision being reversed or modified as a result of the appeal.

WHAT TO EXPECT ONCE YOU FILE A TIMELY APPEAL WITH THE BOARD

The Board will formally acknowledge receipt of an appeal, and will provide the name of the DEP project manager assigned to the specific appeal. The notice of appeal, any materials accepted by the Board Chair as supplementary evidence, any materials submitted in response to the appeal, and relevant excerpts from the DEP's application review file will be sent to Board members with a recommended decision from DEP staff. The appellant, the license holder if different from the appellant, and any interested persons are notified in advance of the date set for Board consideration of an appeal or request for public hearing. The appellant and the license holder will have an opportunity to address the Board at the Board meeting. With or without holding a public hearing, the Board may affirm, amend, or reverse a Commissioner decision or remand the matter to the Commissioner for further proceedings. The Board will notify the appellant, the license holder, and interested persons of its decision.

II. JUDICIAL APPEALS

Maine law generally allows aggrieved persons to appeal final Commissioner or Board licensing decisions to Maine's Superior Court (see 38 M.R.S. § 346(1); 06-096 C.M.R. ch. 2; 5 M.R.S. § 11001; and M.R. Civ. P. 80C). A party's appeal must be filed with the Superior Court within 30 days of receipt of notice of the Board's or the Commissioner's decision. For any other person, an appeal must be filed within 40 days of the date the decision was rendered. An appeal to court of a license decision regarding an expedited wind energy development, a general permit for an offshore wind energy demonstration project, or a general permit for a tidal energy demonstration project may only be taken directly to the Maine Supreme Judicial Court. See 38 M.R.S. § 346(4).

Maine's Administrative Procedure Act, DEP statutes governing a particular matter, and the Maine Rules of Civil Procedure must be consulted for the substantive and procedural details applicable to judicial appeals.

ADDITIONAL INFORMATION

If you have questions or need additional information on the appeal process, for administrative appeals contact the Board's Executive Analyst at (207) 287-2452, or for judicial appeals contact the court clerk's office in which your appeal will be filed.

Note: The DEP provides this INFORMATION SHEET for general guidance only; it is not intended for use as a legal reference. Maine law governs an appellant's rights.

ATTACHMENT B

U.S. Army Corps of Engineers Permit

Stantec

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
696 VIRGINIA ROAD
CONCORD MA 01742-2751

Regulatory Division
File No. NAE-2008-00053

FEBRUARY 26, 2019

Paul Bradbury
City of Portland
Portland International Jetport
1001 Westbrook Street
Portland, Maine 04102

Dear Mr. Bradbury:

Enclosed are two copies of a Department of the Army permit authorizing your project. **Please sign both copies of the permit and return one signed copy to this office at the address above.** No fee is required. The authorized work cannot start until we receive a complete, signed copy of the permit.

You are required to complete and return the enclosed forms to this office:

1. Preliminary Jurisdictional Determination Form to be submitted along with your signed copy of the permit
2. Work Start Notification Form at least two weeks before the anticipated work start date.
3. Compliance Certification Form within one month following the completion of the authorized work.

This permit is a limited authorization containing a specific set of conditions. Please read the permit thoroughly to familiarize yourself with those conditions, **including any conditions contained on the enclosed state water quality certification.** If a contractor does the work for you, both you and the contractor are responsible for ensuring that the work is done in compliance with the permit's terms and conditions, as any violations could result in civil or criminal penalties.

Our verification of this project's wetland delineation under the Corps of Engineers Wetlands Delineation Manual, and its applicable supplement, is valid for a period of five years from the date of this letter unless new information warrants revision of the determination before the expiration date.

A combined Notification of Administrative Appeal Options and Process (NAP) and Request for Appeal (RFA) form, and flow chart explaining the appeals process and your options, are enclosed. If you desire to appeal this proffered permit, you must submit a completed RFA form along with any supporting or clarifying information to James W. Haggerty; Administrative Appeals Review Officer; North Atlantic Division, Corps of Engineers; North Atlantic Fort Hamilton Military Community, Bldg. 301; General Lee Avenue; Brooklyn, NY 11252-6700.

Contact info: (347) 370-4650 or james.w.haggerty@usace.army.mil.

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP.

You may not appeal conditions contained in the State water quality certification or the CZM consistency determination under this program as they are automatically included in the Federal permit. This authorization does not obviate the need to obtain other Federal, state, or local authorizations required by law.

We continually strive to improve our customer service. In order for us to better serve you, we would appreciate your completing our Customer Service Survey located at http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey.

If you have any questions regarding this correspondence, please contact Jay Clement at 207-623-8367 at our Augusta, Maine Project Office.

Sincerely,

Frank J. Del Giudice
Chief, Permits and Enforcement Branch
Regulatory Division

Enclosures

cc:
Laura Teracino, U.S. Environmental Protection Agency Region 1,Teracino.Laura@epa.gov

DEPARTMENT OF THE ARMY PERMIT

Permittee **City of Portland/Portland International Jetport; 1001 Westbrook Street; Portland, Maine 04102**

Permit No. **NAE-2008-00053**

Issuing Office **New England District**

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description:

Fill approximately 1.26 acres and selectively clear another 0.5 acres of freshwater wetlands in order to implement a number of improvements at the Portland International Jetport. Regulated activities on site include the construction of a long-term airplane holding, de-icing, and overnight storage apron west of the current de-icing pad and de-icing fluid recovery area; and

Project Description Continued on Page 3

This work is shown on the attached plans entitled, "Portland International Jetport, Proposed Capital Improvements" in two sheets dated "2018-11-30" and "PORTLAND INTERNATIONAL JETPORT" in three sheets dated "10-12-18".

Project Location:

In freshwater wetlands adjacent to Long Creek and the Fore River at Portland and South Portland, Maine

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on December 31, 2024. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

1. The permittee shall ensure that a copy of this permit is at the work site whenever work is being performed and that all personnel performing work at the site of the work authorized by this permit are fully aware of the terms and conditions of the permit. This permit, including its drawings and any appendices and other attachments, shall be made a part of any and all contracts and sub-contracts for work which affects areas of Corps of Engineers jurisdiction at the site of the work authorized by this permit. This shall be done by including the entire permit in the specifications for work.

Special Conditions continued on Page 4

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

( ) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

3.1.2019

(PERMITTEE) *(DATE)*

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

2-26-2019

(DATE)

Frank J. Del Giudice
Chief, Permits & Enforcement Branch
For District Engineer

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE) *(DATE)*

☆U.S. GOVERNMENT PRINTING OFFICE: 1986 — 717-425

Project Description Continued from Page 1

the relocation of the eastern end of Taxiway A. These improvements are intended to enhance safety and operational efficiency at the Jetport. They are included in a list of improvements that will occur as part of a 2018 Sustainable Airport Master Plan that do not otherwise affect jurisdictional waters. The selective clearing of forested wetlands will occur on Jetport property located off site, off Dawson Street and I-295, at South Portland and is intended to clear potential obstructions to approaching or departing aircraft. Potential hazard trees will be cut and removed without removing the stumps or otherwise disturbing soils.

Special Conditions continued from Page 2

If the permit is issued after the construction specifications but before receipt of bids or quotes, the entire permit shall be included as an addendum to the specifications. If the permit is issued after receipt of bids or quotes, the entire permit shall be included in the contract or sub-contract as a change order. The term "entire permit" includes permit amendments. Although the permittee may assign various aspects of the work to different contractors or sub-contractors, all contractors and sub-contractors shall be obligated by contract to comply with all environmental protection provisions of the entire permit, and no contract or sub-contract shall require or allow unauthorized work in areas of Corps jurisdiction.

2. This authorization requires you to 1) notify us before beginning work so we may inspect the project, and 2) submit a Compliance Certification Form. You must complete and return the enclosed Work Start Notification Form(s) to this office at least two weeks before the anticipated starting date. The permittee shall complete and return the enclosed Compliance Certification Form within one month following the completion of the authorized work.

3. Adequate sedimentation and erosion control devices, such as geo-textile silt fences or other devices capable of filtering the fines involved, shall be installed and properly maintained to minimize impacts during construction. These devices must be removed upon completion of work and stabilization of disturbed areas. The sediment collected by these devices must also be removed and placed upland, in a manner that will prevent its later erosion and transport to a waterway or wetland.

4. No temporary fill (e.g., access roads, cofferdams) may be placed in waters or wetlands unless specifically authorized by this permit. If temporary fill is used, it shall be disposed of at an upland site and suitably contained to prevent its subsequent erosion into a water of the U.S., and the area shall be restored to its original contours (but not higher) and character upon completion of the project. During use, such temporary fill must be stabilized to prevent erosion or, in the case fill placed in flowing water (rivers or streams), clean washed stone should be used.

5. Except where stated otherwise, reports, drawings, correspondence and any other submittals required by this permit shall be marked with the words "Permit No. NAE-2008-00053" and shall be addressed to "Inspection Section, CENAE-R, U.S. Army Corps of Engineers, 696 Virginia

Permit Conditions Continued on Page 5

Road, Concord, MA 01742-2751." Documents which are not marked and addressed in this manner may not reach their intended destination and do not comply with the requirements of this permit.

6. Mitigation shall consist of payment of $236,009.80 to the Natural Resource Mitigation Fund. The completed ILF Project Data Worksheet which must be mailed with a cashiers check or bank draft, made out to "Treasurer, State of Maine", with the permit number noted on the check. The check and worksheet should be mailed to: ME DEP, Attn: ILF Program Administrator, State House Station 17, Augusta, ME 04333. **This authorization is not valid until the permittee provides the Corps with a copy of the check, with the permit number noted on the check.** The ILF amount is only valid for a period of one year from the date on the authorization letter. After that time, the project would need to be reevaluated and a new amount determined.

7. All tree cutting at the off-site clearing area shall occur between October 16 and April 19 of any year to the maximum extent practicable and no tree cutting shall occur between June 1 and July 31 of any year. Potential hazard trees will be cut and removed without removing the stumps or otherwise disturbing soils. These measures are intended to minimize potential impacts to federally-threatened northern long-eared bats and to minimize the risk of soil erosion.

IN-LIEU-FEE (ILF) PROJECT DATA WORKSHEET

DEP Invoice # _____

[Note: Will be filled in by ILF Administrator at DEP]

Project name: Portland International Jetport; 2019 Improvements

Applicant (s): City of Portland/Portland International Jetport

DEP Permit #: L-13760-TG-BA-N

Corps Permit #: NAE-2008-00053

ILF Contribution Amount $236,009.80

[Note: Please attach a copy of the check]

Project address: 1001 Westbrook Street; Portland, Maine

Biophysical region: Southern Maine

Sub-region: Gulf of Maine Coastal Lowland

Size of total impact subject to compensation: 1.26 acres

Resources Impacted: Refer to attached table

DEP Project manager: Green

Corps Project manager: Clement

Corps ILF Processing Procedure:

Within 3 days of final permit approval the Corps project manager MUST send via e-mail to the ILF Administrator at DEP with the following attachments:

1. **A Microsoft word version of this completed ILF project worksheet including the resource impact table. Please make sure that you double check the information to make sure that the worksheet is accurate and reflects the actual impacts that are stated in the permit and the correct biophysical region.**

   [Note: The DEP Invoice # section of the worksheet should be left blank and will be filled in by the ILF Program Administrator.]

2. **A copy of a location map for the project site. The map MUST be made in GIS and saved as a pdf and MUST include a call out box to physically locate the project site and enough reference information so that project site can be geo-located on the MNRCP GIS data layer.**
3. **A pdf copy of the Corps permit for the project.**

Corps permitees MUST be instructed to send all required ILF payments to the attention of the ILF Administrator Maine Department of Environmental Protection, State House Station 17, Augusta, Maine 04333. All checks must have the ILF program routing # 014.06A.1776.14 on the memo line.

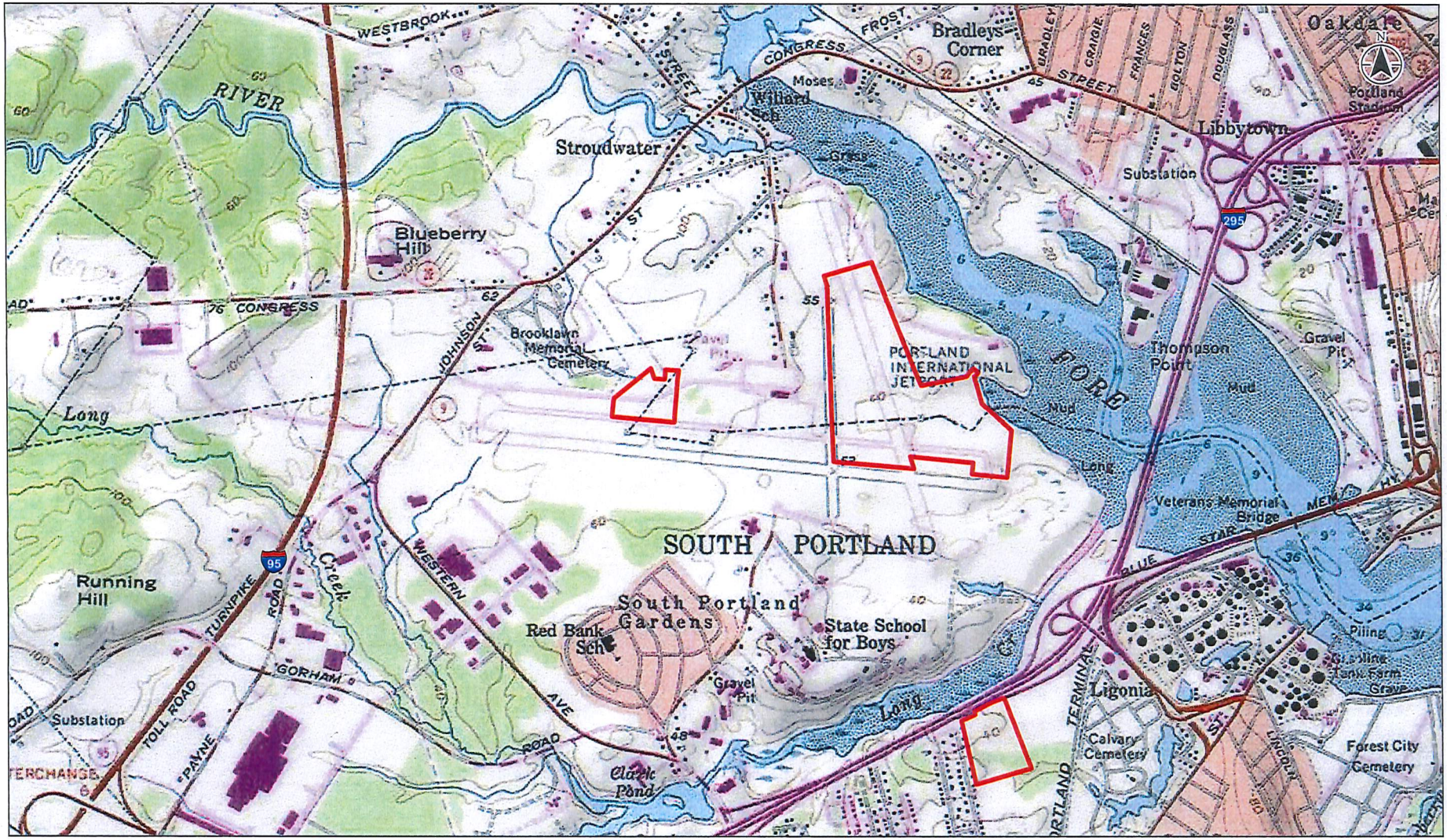
Resource(s) Impacted:

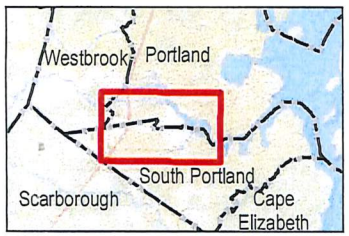
Resource Type: (Wetlands by NWI Type (PFO, PSS, M1, M2, E1, E2, etc), significant vernal pool (SVP), shorebird feeding & staging habitat (Shorebird), inland waterfowl & wading bird habitat (IWWH), tidal waterfowl & wading habitat (TWWH), and river, stream, or brook (RSB).

Wetland Functions & Values: Groundwater recharge/discharge (GWR); floodflow alterations(FF); fish & shellfish habitat(FSH); sediment toxicant retention (STR); nutrient removal (NR); production export (PE); sediment/shoreline stabilization (SS); wildlife habitat (WH); recreation (R); education/scientific value (ESV); uniqueness/heritage (UH); and visual quality/aesthetics (VQ).

Types of impacts: may include filling, dredging, vegetation conversion (e.g. forested to shrub/scrub), others.

Resource type (list all that apply)	**Functions (for wetland impacts)** (list all that apply, by resource type)	**Type of Impact** (by resource type)	**Sq Feet Impacted** (by resource type)
PFO	GWR, FF, SS, WH	Filling	34,970
PSS	GWR, FF, SS, WH	Filling	14,679
PEM	FF, GWR, WH	Filling	3,250
		Total square feet impacted	52,899





Legend

Project Area

0 2,000 Feet

1:24,000 (At original document size of 8.5x11)

Notes
1. Coordinate System: NAD 1983 StatePlane Maine West FIPS 1802 Feet
2. USGS Imagery/Topo provided by The National Map Mapping Service (http://basemap.nationalmap.gov/arcgis/services/USGSImageryTopo).

Stantec

Project Location
Portland & South Portland, ME

195210916

Prepared by REM on 2018-11-30
Technical Review by KWH on 2018-11-30
Independent Review by AG on 2018-11-30

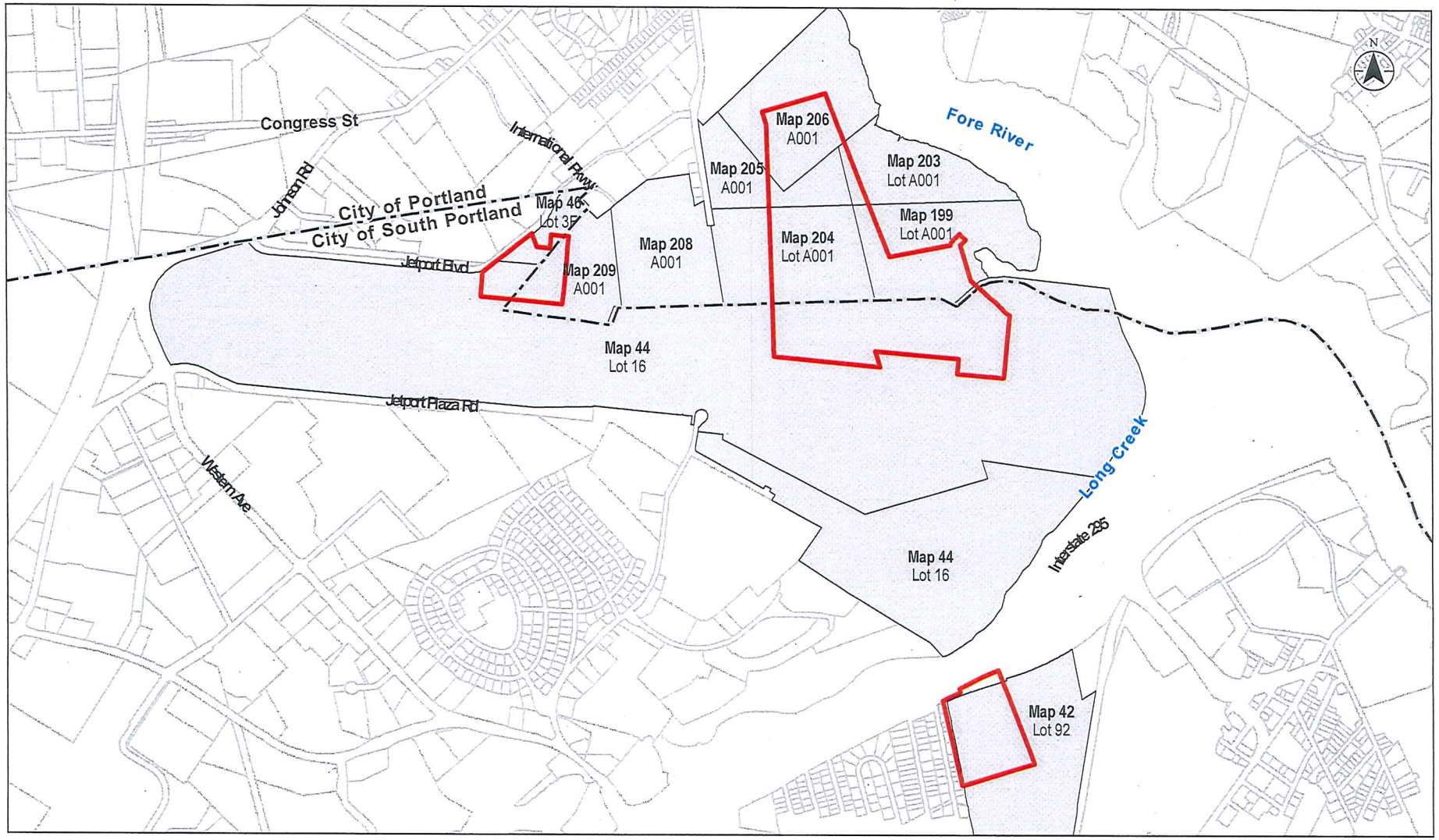
Client/Project
Portland International Jetport
Proposed Capital Improvements

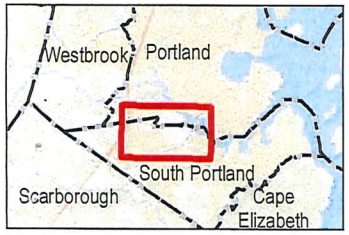
Figure No.
1

Title
Site Location

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

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Legend

- Tax Parcel
- Project Area
- Municipal Boundary

0 1,500 Feet

1:18,000 (At original document size of 8.5x11)

Notes

1. Coordinate System: NAD 1983 StatePlane Maine West FIPS 1802 Feet
2. Tax parcels obtained from the Maine Office of GIS (MEGIS) with Map Book - Lot numbers.

Stantec

Project Location
Portland & South Portland, ME

195210916

Prepared by REM on 2018-11-30
Technical Review by KWH on 2018-11-30
Independent Review by AG on 2018-11-30

Client/Project
Portland International Jetport
Proposed Capital Improvements

Figure No.
2

Title
Property Tax Map

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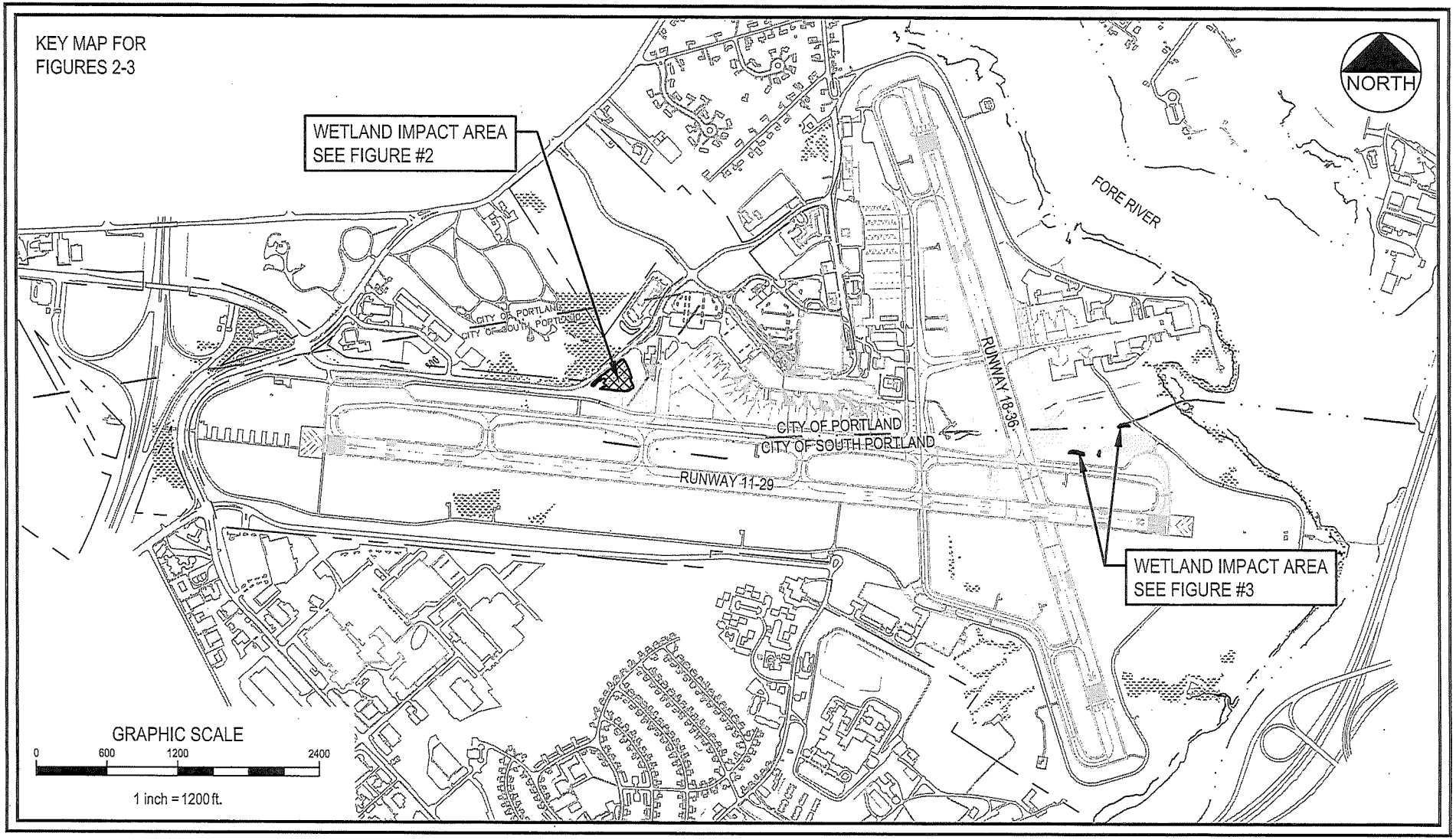


FIGURE:	BOOK: PAGE:	LOCATION:	PROPOSED ACTIVITY:	PROJECT APPLICANT:	
1	REFER TO EXHIBIT A IN SLDA APPLICATION, SECTION 2	CITY OF PORTLAND AND SOUTH PORTLAND, MAINE	PROPOSED AIRCRAFT APRON, TAXIWAY SERVICE ROAD, TREE REMOVAL AND WATER QUALITY PROJECTS	PORTLAND INTERNATIONAL JETPORT	
	LEGAL DESCRIPTION: REFER TO BOUNDARY SURVEY IN SLDA APPLICATION, SEC. 2	WATER BODY: UNNAMED WETLANDS	ABUTTERS: SEE EXHIBIT 25 OF SLDA APPLICATION	SCALE: 1"=1200' DATUM: NAD83 DATE: 10-12-18	STANTEC CONSULTING SERVICES INC.

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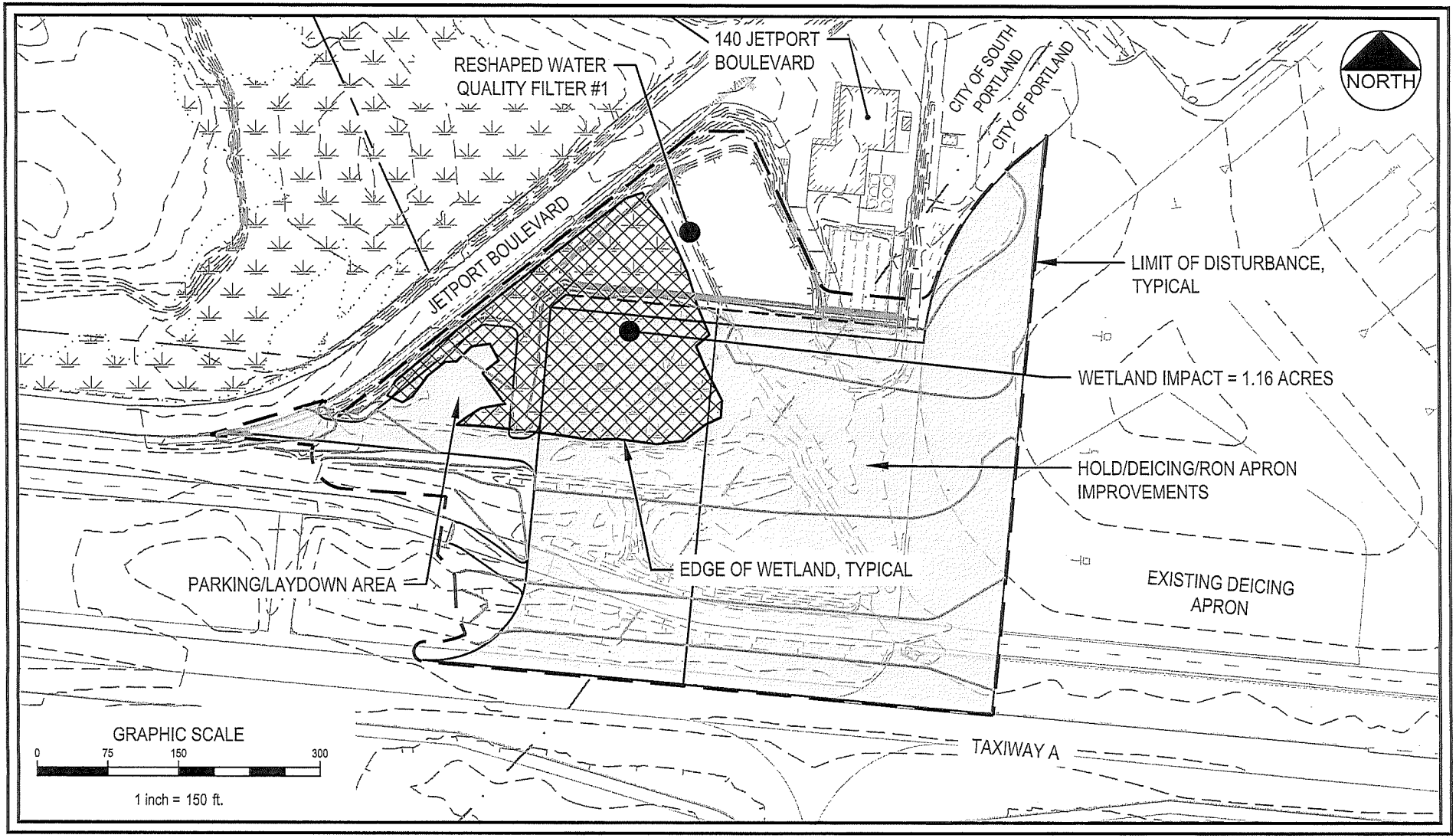


FIGURE: 2	BOOK: PAGE: REFER TO EXHIBIT A IN SLDA APPLICATION, SECTION 2	LOCATION: CITY OF PORTLAND AND SOUTH PORTLAND, MAINE	PROPOSED ACTIVITY: PROPOSED AIRCRAFT APRON, TAXIWAY SERVICE ROAD, TREE REMOVAL AND WATER QUALITY PROJECTS	PROJECT APPLICANT: PORTLAND INTERNATIONAL JETPORT	
	LEGAL DESCRIPTION: REFER TO BOUNDARY SURVEY IN SLDA APPLICATION, SEC. 2	WATER BODY: UNNAMED WETLANDS	ABUTTERS: SEE EXHIBIT 25 OF SLDA APPLICATION	SCALE: 1"=150' DATUM: NAD83 DATE: 10-12-18	STANTEC CONSULTING SERVICES INC.

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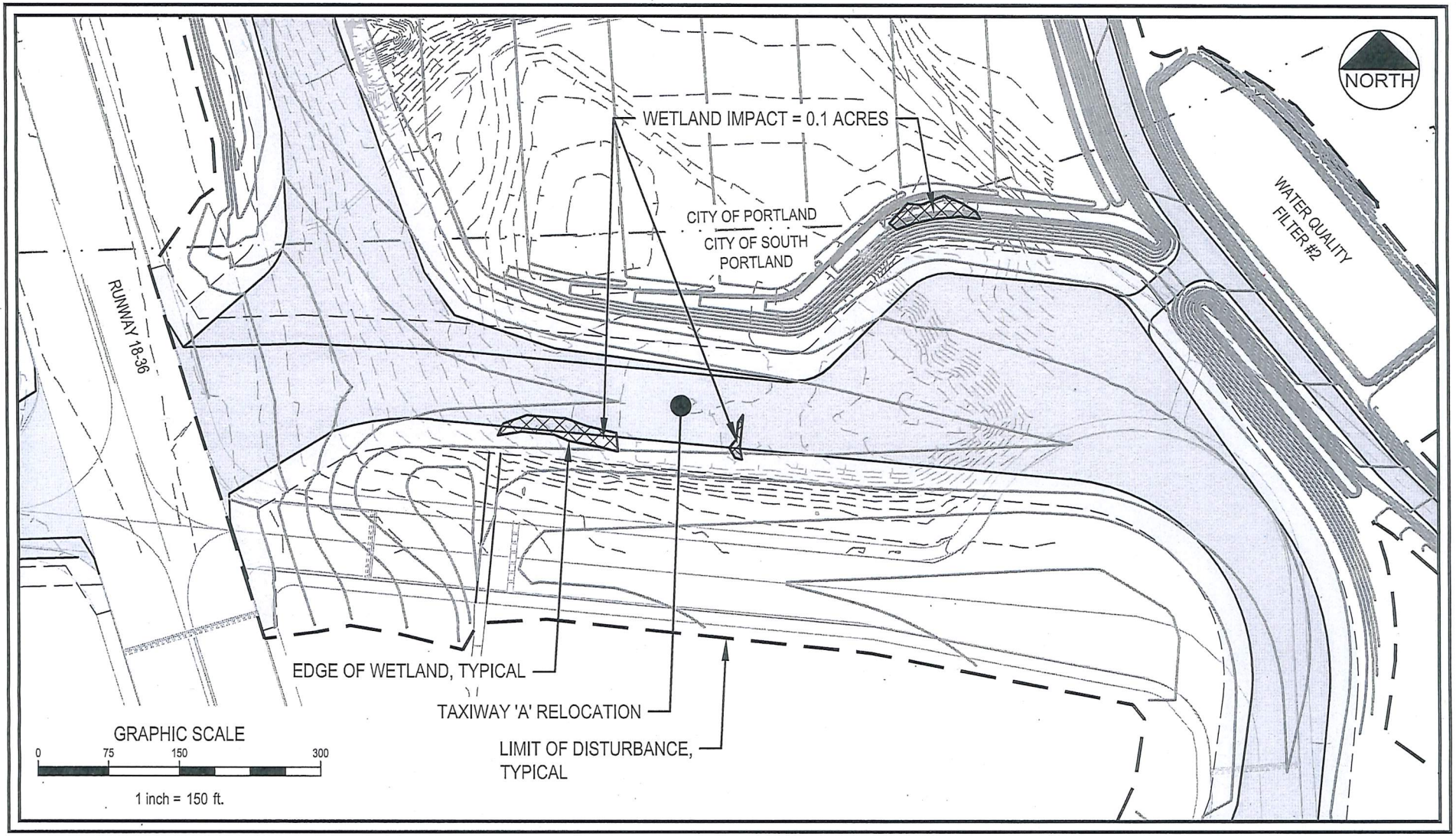


FIGURE: 3	BOOK: PAGE: REFER TO EXHIBIT A IN SLDA APPLICATION, SECTION 2	LOCATION: CITY OF PORTLAND AND SOUTH PORTLAND, MAINE	PROPOSED ACTIVITY: PROPOSED AIRCRAFT APRON, TAXIWAY SERVICE ROAD, TREE REMOVAL AND WATER QUALITY PROJECTS	PROJECT APPLICANT: PORTLAND INTERNATIONAL JETPORT
	LEGAL DESCRIPTION: REFER TO BOUNDARY SURVEY IN SLDA APPLICATION, SEC. 2	WATER BODY: UNNAMED WETLAND	ABUTTERS: SEE EXHIBIT 25 OF SLDA APPLICATION	SCALE: 1"=150' DATUM: NAD83 DATE: 10-12-18 STANTEC CONSULTING SERVICES INC.

GENERAL APPLICATON DOCUMENT

EXISTING AND/OR PROPOSED EASEMENTS OR COVENANTS

There are no proposed easements or covenants for the proposed project.

Refer to Exhibit 'A' and Boundary Survey included as attachments to the Right, Title, and Interest section for existing easement locations within the Jetport property.

GENERAL APPLICATION DOCUMENT

WAIVER REQUESTS

There are no waivers being requested as part of this application.

GENERAL APPLICATION DOCUMENT

ZONING ASSESSMENT

The project area is located in the AB-Airport Business Zone. The proposed use will not change and the use is allowed within the AB Zone.

See the Zoning Assessment Table in Attachment A for more information.

Attachment

Attachment A – Zoning Assessment Table

ATTACHMENT A

Zoning Assessment Table

Stantec

ZONING ANALYSIS Relevant Zone(s) A-B Airport Business Zone / Shoreland Overlay Zone

All Projects:

	Required	Proposed
Lot Size	20,000 Sq. Ft.	769 Acres
Area Per Dwelling Unit	-	
Minimum Street Frontage	50 Ft.	>50 Ft.
Front Yard Minimum	None*	NA
Front Yard Maximum		
Rear Yard	None**	NA
Yard Right	None***	NA
Yard Left	None***	NA
Side Street Setback		
Step Back		
Maximum Lot Coverage		
Minimum Lot Coverage		
Maximum Height	75 Ft.****	53 Ft.
Open Space		
Maximum Impervious Area	NA (14-201)	NA
Pavement Setback		
Floor Area Ratio		
Off Street Parking Spaces		
Loading Bays		
Other 1		
Other 2		
Other 3		

*None, except that every property having frontage on Westbrook Street shall have a minimum front yard of twenty (20) feet.
**None, except where a rear yard abuts a residence zone or use, in which case it must be fifty (50) feet.
***None, except where a side yard abuts a residential zone or use, in which case it must be twenty-five (25) feet in width.
****Seventy-five (75) feet, except within one hundred (100) feet of the private property line on Westbrook Street or within one hundred (100) feet of the boundary of the A-B airport business zone in which the height limit shall be forty-five (45) feet. No structure or tree, however, shall be erected, altered, allowed to grow or maintained to a height in excess of that allowed by applicable FAA regulation.

Planned Residential Unit Developments (PRUD) Requirements

	Required	Proposed
Minimum Lot Size		
Minimum Lot Area per Dwelling		
Maximum # Units per Building		
Maximum Building Length		
Maximum Accessory Building Length		
Minimum Setbacks		
Minimum Building Separation		
Minimum Open Space		

Affordable Housing Density Bonuses (if applicable)

	Bonus Increase or Decrease	Maximum Allowable With Bonus	Proposed
Density			
Height			
Setback Reduction			
Recreation Space			
Maximum Accessory Building Length			
Minimum Setbacks			
Minimum Building Separation			
Minimum Open Space			
Explanatory Text 1 (optional):			
Explanatory Text 2 (optional):			
Explanatory Text 3 (optional):			

GENERAL APPLICATION DOCUMENT

TECHNICAL CAPABILITY

The design and permitting of the project is being completed under the direction of Dwight D. Anderson, P.E., of Stantec serving as the Project Manager.

Stantec Consulting Services, Inc. is the prime consultant for the Civil/Site design and site permitting assistance of the project. The following firms are acting as consultants to the City of Portland or as subconsultants to Stantec Consulting Services, Inc. for the project:

Firm	Services	Contact
Stantec Consulting Services, Inc. 482 Payne Road, Scarborough Court Scarborough, ME 04074	Project Manager	Dwight D. Anderson, P.E.
Stantec Consulting Services, Inc. 30 Park Drive Topsham, ME 04086	Wetland Delineation	Brooke Barnes, Principal
Coffman Associates 237 NW Blue Parkway, Ste. 100 Lee's Summit, MO 64043	Environmental Assessment	Judi Krauss
Haley & Aldrich, Inc. 75 Washington Avenue, Ste. 1A Portland, ME 04101	Geotechnical Investigations	Wayne Chadbourne, P.E.
Plisga & Day (dba Good Deeds) PO Box 587 Belfast, ME 04915	Boundary and Existing Conditions Survey	Jonathan Stewart
Independent Archaeological Consulting, LLC (IAC) 801 Islington Street-Suite 31 Portsmouth, NH 03801	Archaeological Survey	Jacob Tumelaire, MA
Diana's CADD Service, LLC PO Box 372 Jackman, ME 04945	CADD-WBE	Diana Burgess

The Portland International Jetport has a full contingent of staff to manage and operate the facilities after construction.

The team of consultants retained by the City of Portland has expertise and experience in the design and permitting of airport facilities.

Resumes of Key Personnel are available upon request.

ENVIRONMENTAL AND STORMWATER

The following statements are provided in accordance with the submission checklist and Section 14-526 of the ordinance.

(b) Environmental Quality Standards

Water Quality, Stormwater Management and Erosion Control (14-526 (b) 3 a)

- *Stormwater report in compliance with Section 5 of Technical Manual and DEP Chapter 500 stormwater for basic, general and flooding standards, as applicable*
- *Erosion control plan and measures*
- *Evidence of compliance with Urban Impaired Stream Standards pursuant to DEP Chapter 500 stormwater, as applicable*
- *Subsurface sanitary sewage disposal and groundwater protection*

Project Statement addressing 14-526 (b) 3 a)

3. *Water Quality, Stormwater Management and Erosion Control:*
   a. *Stormwater:*

      Stormwater management water quality treatment measure includes the reshaping of the existing water quality filter, constructed in 2010, northwest of the deicing apron (WQF #1). WQF #1 is located wholly within the City of South Portland. Section 12 of the MeDEP SLODA application is included as Attachment A for reference. The MeDEP has completed their review and issued the permit for the project. A copy of the permit is provided as an attachment to the State or Federal Approvals section.

   b. *Flooding Standards:*

      See Attachment A, Stormwater Management Report.

   c. *Urban Impaired Stream:*

      No applicable.

   d. *Basic Erosion Control Standards:*

      A detailed soil erosion and sediment control plan has been prepared for the MeDEP application (Section 14 of the SLODA) and is included as Attachment B. Additionally, an erosion control narrative is included on Sheet 6.0 of the plan set.

   e. The project boundaries are shown on the Maine Geological Survey (MGS) Sand and Gravel Aquifer Maps; Surficial Geology Map and Bedrock Geological Map included as Attachment C. There will be no groundwater used, discharged, or extracted, and no sand and gravel aquifers exist in the project area. Additionally, construction at the site will be required to follow Local, State and Federal regulations and will be undertaken under the supervision of a suitably

qualified environmental professional. Post-construction activities at the site do not pose a risk of groundwater contamination.

f. The sanitary sewer systems outside of the Jetport will not be affected by the proposed development and will not need to be upsized.

   Presently, aircraft deicing takes place on the west portion of the terminal apron near Taxiway A. An aircraft deicing collection pad, deicing fluid recycling building, and 500,000-gallon underground storage tank were designed and constructed from 2009 to 2010. The deicing facility is managed by Inland Technologies, who is required to ensure that non-permitted levels of glycol do not enter the sanitary sewer via the Jetport wastewater flow. Most of the propylene glycol sprayed on aircraft is removed from the facility's stormwater and recycled, helping to maintain dissolved oxygen levels in receiving waters otherwise reduced by degrading glycol. U.S. EPA effluent guidelines related to deicing fluid application apply to the Jetport and are regulated by MeDEP under the industrial activity program.

   The existing deicing apron is being expanded as part of this project. Deicing fluid will continue to be collected and recycled, and Inland Technologies will continue to manage the glycol recovery system. The locations of the proposed deicing fluid storage, collection and recycling facilities are shown on the project drawings.

Attachments:

Attachment A – Stormwater Management Report
Attachment B – Erosion and Sediment Control Report
Attachment C – Figures

ATTACHMENT A

Stormwater Management Report

Stantec

SECTION 12

STORMWATER MANAGEMENT REPORT

PORTLAND INTERNATIONAL JETPORT
ENVIRONMENTAL ASSESSMENT AND
ENVIRONMENTAL PERMITTING
PORTLAND AND SOUTH PORTLAND, MAINE

Prepared for:

Portland International Jetport
1001 Westbrook Street
Portland and South Portland, Maine

Prepared by:

Stantec Consulting Services Inc.
482 Payne Road, Scarborough Court
Scarborough, ME 04074
(207) 883-3434

October 2018



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Attachments

A – Pre-Development Computations

B – Post-Development Computations

C – Pond Sizing Computations

D – Water Quality Filter Computations

E – Stormwater Management Systems Inspection & Maintenance Manual

F – Figures:

- Figures 1-3 – Offsite Development
- Figure 4 – Existing Pond Alterations
- Figure 5 – Overall Facility Water Quality Treatment Summary
- Figure 6 – Existing Redevelopment
- Figure 7 – Proposed Redevelopment

SECTION 12

STORMWATER MANAGEMENT REPORT

12.0 Overview

Projects addressed in this permit application are primarily related to enhancing safety, efficiency, and sustainability at the Jetport.

The following report is a review of the proposed stormwater conveyance and quality measures associated with proposed improvements at the Portland International Jetport (Jetport). These improvements consist of the following:

Project Area	Description
Area 1	Terminal Apron Expansion Northwest End – Phase 2 (Previously Permitted)
Area 2 & 3	Long-Term Hold/Deicing/RON Apron – Phases 1 & 2 (includes Previously Permitted Impervious Area)
Area 4	Runway 11 Taxiway Bypass and Perimeter Service Road Realignment
Area 5	Tree Removal for GQS on Runway 36 End
Area 6A	Construct Air Cargo Taxiway – Phase 1 (Previously Permitted but never fully constructed; only partially filled)
Area 6B	Construct Air Cargo Taxiway – Phase 2
Area 7	Construct Taxiway C Realignment – Phase 1
Area 8	Relocated Taxiway A East of Runway 18-36
Area 9	Construct Taxiway C Realignment – Phase 2
Area 10	Relocate Service Access Road East of Cargo
Area 11	Construct Taxiway B Runway 36 to 29

Refer to Section 1 for the purpose, need and description of each project area.

This narrative contains the stormwater management systems designed and required for the project to meet the latest MeDEP Chapter 500 Stormwater Regulations.

12.1 Existing Site Conditions

Existing site conditions in the areas of the proposed development include mainly developed, grassed infield. There are also existing paved areas that are being converted to grass. For an overview of the impacts of each project area including proposed wetland impact, existing pavement to be removed and not replaced, existing pavement to be removed and reconstructed, proposed new impervious area, and area of disturbance, see the impact area summary sheets within the plan set.

Pre-development conditions were modeled and analyzed to establish a baseline for the existing drainage system. The models are part of the Jetport's overall HydroCAD files. The pre-development model used is very similar to the post-development model in the prior 2008 MeDEP permit application submission. Updates have been made based on projects that have been constructed since.

12.2 Proposed Project

As described in Section 1, the proposed projects generally consist of airfield improvements including Apron, Taxiway, and Perimeter Road improvements.

In addition to the airfield improvements, an existing Water Quality Filter #1 (WQF #1) will be reshaped to allow for Project Area 2/3 construction, and a new Water Quality Filter #2 (WQF#2) is proposed north of the Runway 29 end. Modifications to the existing pond east of the Runway 36 end are also proposed to allow for additional treatment of proposed and existing airfield pavement and grassed in field areas. This is a redevelopment project and redevelopment standards are discussed in this report. The overall limit of disturbance (excluding Project Area 1 of 1.4 acres previously permitted) is 68.9 acres. The net new impervious (excluding Project Area 1 of 0.6 acres) is 21.79 acres. The limit of disturbance including Project Area 1 is 70.3 acres and the net new impervious including project area 1 is 22.39 acres. The proposed projects are generally located within developed areas.

The study area consists of portions of the Jetport as depicted on Exhibit 1D, Section 1. The Jetport is bounded by the Fore River to the east, Johnson Road/Western Avenue to the north, the Maine Turnpike to the west, and Brick Hill and the tidal portion of Long Creek to the south.

See below for an explanation of areas that were previously permitted, and how they are included within the redevelopment and treatment summary:

- Project Area 1 – This project is already permitted and has not been built yet due to funding. Water quality treatment for this area (WQF #1) has already been constructed. This area has been excluded from redevelopment and treatment calculations.

- Project Area 6A – This entire project area has been included in redevelopment and treatment calculations. This project is included within the water quality treatment calculations because although it was previously permitted, it's impervious area improvements and treatment (WQF #2) were never constructed, and treatment does not currently exist.

12.3 Watershed Delineation Method

See below for an overview of the watershed delineation methods used.

Mix of grass (infield), woodland, gravel (existing road), existing terminal structures, existing pavement, and existing pond and wetlands. There are several areas of improved hydrologic condition based on prior drainage projects, and these areas are identified on the watershed maps. The RCN varies from 39 to 98.

Watershed analysis (Onsite):

The pre- and post-development HydroCAD files are separated by outfall:

- Pre-Development Outfall 1, 3, 5 (includes existing WQF#1)
- Pre-Development Outfall 6 and 7
- Pre-Development Outfall 8 (existing Pond)
- Post-Development Outfall 1, 3, 5 (includes existing WQF#1)
- Post-Development WQF 2
- Post-Development Outfall 6 and 7
- Post-Development Outfall 8 (existing Pond with modifications)

- Discharge Location for Watershed:

  There are six discharge locations for the watersheds. See watershed maps WS-1 to WS-14 for the locations of the outfalls:

Outfalls					
Outfall	**Description**	**Project ID's**	**Ultimate Discharge**	**Impervious Area (acres)**	**Total Area (acres)**
Outfall 1	30-Inch Existing	6B, 7	Fore River	19.58	26.1
WQF #2	24-Inch Proposed	6A, 8	Fore River	9.94	23.19
Outfall 3	60-Inch Existing	1, 2, 3, 4, 7, 8, 10	Fore River	107.63	227.9
Outfall 5	42-Inch Existing	7, 8	Fore River	20.71	39.88
Outfall 6	36-Inch Existing	8, 10	Fore River	3.19	30.5
Outfall 8	Water Quality Pond	9, 11	Tidal Long Creek	56.63	159

- Ground Survey by Plisga and Day Land Surveyors and 2-foot aerial topography

- Field Reconnaissance

  Dwight Anderson, P.E., and Amie Gray, P.E., Stantec

- Site Topographic Survey

  Plisga and Day Land Surveyors, survey completed July 25th through August 4, 2017, on datum NGVD 29, As-Built information from past projects, and USGS contours

- Hydrologic Soil Group Information

  SCS Medium Intensity

12.4 References

- Maine Stormwater Management Design Manual, Technical Design Manual (Best Management Practices), Volume III, published by the MeDEP in May 2016.

- Urban Hydrology for Small Watersheds from the USDA SCC *Technical Release SS, dated 1986*

- Maine Erosion and Sediment Control BMPs", published by the MeDEP in October 2016 http://www.maine.gov/dep/land/erosion/escbmps/esc_bmp_engineers.pdf

- Chapter 500 DEP Rules, latest revision August 12, 2015.

12.5 Modeling Software:

- HydroCAD Stormwater Modeling System, version 10.0, Applied Microcomputer Systems – used for modeling watersheds for pre and post development conditions;

- Microsoft Excel, version Microsoft Office 365 ProPlus, Microsoft Corporation – used for spreadsheet computations.

12.6 Design Storms

Stormwater Quantity

MeDEP requires that the design of piped or open channel drainage systems be based on a 10-year, 24-hour storm without overloading or flooding beyond channel limits. In addition, the areas expected to be flooded by runoff from a 10-year or 25-year, 24-hour storm must be designated in the application, and no buildings or other similar facilities may be planned within such areas.

The 2006 edition of the Unified Facilities Criteria for Surface Drainage Design issued by the U.S. Department of Transportation Federal Aviation Administration (FAA), and referenced in the FAA Advisory Circular 150/5320-5D, Airport Drainage Design recommends that the 5-year storm event be used for design with no encroachment of runoff on taxiway and runway pavements (including paved shoulders). The calculation of and provision for the storage of water or ponding between runways, taxiways, and aprons should usually be considered as a safety factor for temporary accommodation of runoff from storm return periods longer than 5 years. An additional design consideration is the ponding of water around an inlet structure on an apron during a rain event, which should be limited to 4 inches or less.

Considering both MeDEP and FAA design criteria, the 25-year, 24-hour storm has been selected as the design storm for the terminal area of this project and the 10-year, 24-hour storm has been selected for all other areas. The improvements necessary to bring the existing terminal area storm drainage up to the 25-year design level are not warranted due to a history of no flooding problems.

Per MeDEP Chapter 500, Stormwater Management, (F) 3(a), a waiver is requested to the flooding standard. The project areas discharge to tidal areas. A comparison of pre-development to post-development flow is provided.

Hydrologic Parameters: Cumberland County SE Type III Distribution, data extracted by the Maine DEP from the Northeast Regional Climate Center website Extreme Precipitation Tables (June 2014) and published in the current MeDEP Chapter 500 Standards.

Rainfall Amount (inches)	
2-Year Storm	3.1
10-Year Storm	4.6
25-Year Storm	5.8
100-Year Storm	8.1

Antecedent Moisture Content: 2.

12.7 Land Use Cover

Land use cover affects the volume of runoff as well as the peak stormwater discharges from a watershed. The land use cover on the watershed varies from that shown on the existing conditions plan to that shown on the proposed site plan.

In the post-development condition, the number of watersheds was increased to permit the analysis of the individual storm water inlets. The land cover for each of these post-development conditions is shown in the HydroCAD output.

12.8 Existing and Proposed Drainage Features

An elaborate on-site drainage system exists, which will be expanded to accommodate the proposed development.

The proposed storm drain improvements include the following:

1. The reshaping of WQF #1 in the area of the terminal apron;
2. The construction of WQF #2 south of the cargo apron;
3. The existing wet pond will also be upgraded by adding two baffles and a sheet wall in order to meet MeDEP Chapter 500 Standards for water volume; and
4. A significant amount of drainage will be installed as needed to accommodate runoff from the impervious areas added as part of the proposed improvements.

12.9 Modeling Assumptions:

- Most inlets have been modeled as ponds with insignificant storage and it is assumed that all storm water can enter at these inlets.
- The Maine Youth Center model composite CN values have been used, not individual land cover areas (i.e., impervious, lawn, wooded).
- Links were used for the following areas:
  - OEST Terminal Area from 2008 (1R, 5R and 37L)
- Figures 1, 2 and 3 from the prior 2008 permit application (also included with this submission) depict the following:
  - Figure 1 – Area A on watershed maps: Southern Maine Juvenile Detention Facility
  - Figure 2 – Area B on watershed maps: South GA
  - Figure 3 – Area C on watershed maps: Brickhill Development

12.10 Pre-Development Analysis

The RCN and hydrologic time of concentration for the catchments are provided in the attached HydroCAD computations.

Peak Predevelopment Flows are shown within the next section.

12.11 Post-Development Analysis

The post-development model employs several sub-catchments to model the post-development conditions.

The following is a list of the general post-development watershed areas, the discharge locations, and the water quality pretreatment provided before the discharge:

Project ID	Tributary to Outfall	Water Quality Treatment
2/3	Outfall 3	WQF #1
4	Outfalls 3 & 10	None Proposed
6A	WQF #2	WQF #2
6B	Outfall 1	None Proposed
7	Outfalls 1, 3 & 5	None Proposed
8	Outfalls 5 & 6	WQF #2 (partial treatment)
9	Outfall 8	Existing Wet Pond
10	Outfalls 3 & 6	WQF #2
11	Outfall 8	Existing Wet Pond

The breakdown into smaller subcatchments permits accurate modeling of the proposed conditions and provides the information for pipe sizing, ditch design, and inlet capacity review. The RCN and hydrologic time of concentration are provided in the attached computations. The watersheds range in size, with RCNs varying from 98 to 39 and times of concentration varying from extremely short duration to 60.8 minutes. The short times of concentration occur in small watersheds with nearly 100% impermeable surfaces, where direct (5 minutes) was input for the time of concentration.

The post-development conditions with stormwater management are compared with the predevelopment condition at the POIs are as follows:

Storm Frequency	25 Year	
Outfall	Pre	Post
1	47.34	47.09
WQF #2	--	6.30
3	250.60	145.06
5	204.67	203.33
6	67.60	58.57
7	101.06	15.58
8	222.74	239.87

The applicant is also proposing that the bar rack be removed in two locations at the existing 60” pipe (at pond P-4 located within the center of the infield and at Outfall #3) to increase capacity and reduce the risk of flooding during a large storm event due to blockage from debris.

Additionally, the applicant is proposing to disconnect outfalls 3 and 5, by removing the connection to the 42” pipe (Outfall 5) at existing structure RWE DMH 104, and routing a portion of project ID #7 via a 30” storm drain under Runway 18-36.

Pre-development and post-development HydroCAD analysis are included in Attachments A and B.

12.12 Stormwater Management Objectives

The goal of the Stormwater Management Plan is to design, operate, and maintain the development to avoid downstream erosion, flooding, or significant water quality impairment.

This goal will be achieved by:

1. Designing water quality measures to provide long-term removal of non-point contaminants.

2. Implementing a plan to control erosion, sedimentation, or fugitive dust emissions during construction.

3. Maintenance of the Stormwater Management System.

The plan has been designed in accordance with the August 2015 Chapter 500 Stormwater Rules of the MeDEP.

12.13 Water Quality

Pursuant to MeDEP Stormwater Regulations, the General Stormwater Standards must be met. The applicant is proposing modifications to the existing wet pond and WQF #1, and a new WQF #2 to meet this requirement on the site.

Existing Wet Pond

The applicant is proposing to treat a portion of Project IDs 9 (Construct Taxiway C) and 11 (Construct Taxiway B Runway 36 to 29) with the existing wet pond. Additionally, the applicant is proposing to treat an existing portion of the southeast end of Runway 18-36 and Runway 11-29, and the grassed in-field within this area, that was not previously treated with the existing wet pond.

Existing Wet Pond Permanent Pool Volume:

The applicant reviewed the water quality volume of the existing pond located east of Runway 18-36 to treat proposed project areas.

In order to meet current MeDEP Chapter 500 Standards, the applicant is proposing two baffles and one sheet pile be installed, to create three ponds in series with L:W ratios of >3:1. See Figure 4 for modifications to the pond. For the existing and proposed development, the existing wet pond with the proposed alterations meets the following standard: The permanent pool must have a storage volume at least equal to 2.0 inches times the subcatchment's impervious are plus 0.8 inch times the subcatchment's non-impervious developed area. A 40% decrease in permanent pool volume required can be applied if the volume is relatively evenly distributed within 3 ponds in series (within 25% of each other). See Attachment C, Pond Calculations for permanent pool calculations.

Existing Wet Pond Mean Pond Depth:

The mean pond depth is required to be at least 3 feet. All three of the ponds in series meet this requirement. See Attachment C for mean pond depth calculations.

Existing Wet Pond Length to Width Ratio:

The length to width ratio is required to be 3:1 or greater. All three of the ponds in series meet this requirement. See Attachment C for L:W ratio calculations.

Existing Wet Pond Channel Protection Volume & Underdrained Gravel Trench

The existing wet pond discharges to a tidal portion of Long Creek, and therefore channel protection volume and an underdrained gravel trench are not required.

More comprehensive calculations for the wet pond, as well as other pond design criteria, are included in Attachment C.

Water Quality Filters (Onsite):

The applicant is proposing to reshape the existing water quality filter (WQF #1) located at the Terminal Apron to treat portions of Project ID's 2 and 3, Long Term Hold/Deicing/RON Apron Phases 1 and 2. Note that this filter was previously designed, and the overall design will not change as a result of the re-shaping. The sizing of the reshaped filter has been checked for volume (as discussed below) to include the additional area that will drain to it.

The applicant is also proposing a new water quality filter (WQF #2) with 12 compartments to treat portions of Project ID's 6A (Construct Air Cargo Taxiway – Phase 1), 8 (Relocate Taxiway A East of Runway 18-36), and 10 (Relocate Service Access Road East of Cargo Apron). WQF #2 will also treat an existing potion of Runway 18-36, a portion of the Cargo Apron, and grassed in-field adjacent to Runway 18-36.

The detention volume must have storage volume at least equal to 1.0 inch times the subcatchment's impervious are plus 0.4 inch times the subcatchment's non-impervious developed area. The surface area of the water quality filter must be no less than the sum of 5% of the impervious area and 2% of the landscaped area draining to the filter. The proposed filters meet both of these requirements.

The filters are designed in accordance with the MeDEP Chapter 500 rules and follow the Chapter 7.1, Grassed Underdrain Soil Filter BMP's as practicable.

- **Water Quality Filter (WQF) #1:**

  WQF #1 Volume:
  The underdrained vegetated water quality filter has been reshaped to allow for the construction of Long Term Hold/Deicing/RON Apron project, and meets the volume requirements as stated above.

  WQF #1 Surface Area
  Per the Chapter 7.1 – Grassed Underdrained Soil Filter BMP's the filter are recommended not to exceed 3,000 square feet or have more than 2.5 acres of

subwatershed draining to the structure. Although the applicant considered this when designing the expansion to the filter, the existing filter area is 22,877 square feet. The filter has been maintained adequately and is functioning sufficiently, and therefore the applicant sees no need to separate the existing expanded filter into compartments to adhere to the best management practices.

Other Standards:
The discharge must pass through a gravel filter, the maximum underdrain pipe shall be 6", and the storage depth cannot exceed 18".

Drain Time:
The detention zone 1 (first 12" up to elevation 60.50) of the filter is controlled by a 2-inch orifice in the outlet control structure. This orifice slows the release rate such that the pond is within the 24 to 48 hours to draw down (per MeDEP criteria). The computed drawdown time for the pond is 35.635 hours.

The volume above detention zone 1 is discharged through two catch basins for longer storms.

Water Quality Filter #1 meets the General Storm Water standards of the August 2015 Chapter 500 Rules of MeDEP. See Attachment D for Water Quality Filter Computations.

- **Water Quality Filter (WQF) #2:**

WQF #2 Volume:
The underdrained gravel filter has been designed to treat the area of the proposed Air Cargo Taxiway and Taxiway A Relocation East of RW 18-36, and meets the volume requirements as stated above.

WQF #2 Surface Area:
Water quality filter #2 meets the requirements for surface area and is broken in to 12 compartments fed by pipes and separated by stone block walls in order to have compartments less than 3,000 square feet.

Other Standards:
The discharge must pass through a gravel filter, the maximum underdrain pipe shall be 6", and the storage depth cannot exceed 18".

Drain Time:
The filter is permeable enough to insure the drainage within 24 to 48 hours, and will have sufficient fines to insure the filtration of fine particles and the removal of dissolved pollutants.

The volume above detention zone 1 is discharged through two overflow structures located adjacent to the two ditches.

The berm of the filter to the wetland side is set at 33.50.

An impermeable liner is proposed due to the depth of seasonal groundwater at 5.5 to 11.5 feet below existing ground surface, per observation well HA 18-8, within 18" of the bottom of the filter.

Water Quality Filter #2 meets the General Storm Water standards of the August 2015 Chapter 500 Rules of MeDEP. See Attachment D for Water Quality Filter Computations.

Redevelopment Calculations:

The existing wet pond, expanded Water Quality Filter #1 and new Water Quality Filter #2 will treat the redeveloped and impervious areas for this project to meet MaineDEP requirements under Chapter 500. See Figures 6 and 7 for Redevelopment Calculations. The required redevelopment treatment level for this project is 60% based on the ranked impact change due to redevelopment = 0.29. The new resultant treatment for the project was calculated to be 81%. The method used to determine the treatment requirement for redevelopment projects follows steps a.-e. under Chapter 500 Section (d) Redevelopment project. Although the priority for treatment was given to the highest pollutant ranking to the maximum extent practicable, the 81% includes some non-impervious grassed in-field (ranked as pollutant impact ranking 2). The 81% also includes existing impervious and non-impervious areas that will be treated as a result of the improvements and were not previously treated (equivalent treatment).

The following assumptions were made:

- All wetlands – Pollutant Impact Ranking 0 (Meadow mowed no more than twice per year)
- Stormwater Quality Features – Pollutant Impact Ranking 1 (Stormwater treatment/storage systems)
- All grassed infield – Pollutant Impact Ranking 2 (Grassed areas mowed more than twice per year)
- All Aprons/Taxiways – Pollutant Impact Ranking 3 (Other parking lots and driveways)
- All Perimeter Roads – Pollutant Impact Ranking 4 (Other roads, medium use parking lots)

Apron and taxiways are classified as pollutant impact ranking 3 – other parking lots and driveways, due to their limited use and low instances of fuel spillage/hydrocarbon runoff.

Figures 5, 6 and 7 summarize the redevelopment and treatment calculations.

12.14 Erosion Control

An Erosion Control Narrative, Plan, and Details have been prepared for the project and accompany this application as Section 14.

12.15 Storm Drain Sizing

The storm drain sizing was computed by using the HydroCAD model. The sizing calculations are included in Attachment B of this section.

12.16 Operations and Maintenance

An Operations & Maintenance Manual has been prepared and accompanies this application as Attachment E.

12.17 Permit Requirements

Maine Department of Environmental Protection review and permitting of the Stormwater Management Plan is required and will be completed with the review of the Site Location of Development Permit Amendment Application.

A NRPA permit is being submitted also for wetland impacts associated with the overall project.

Five years from the date the permit is received, the applicant will submit a “five-year recertification for long term maintenance of stormwater management systems” which will include the form and all supporting documentation.

Attachments

A – Pre-Development Computations

B – Post-Development Computations

C – Pond Sizing Computations

D – Water Quality Filter Computations

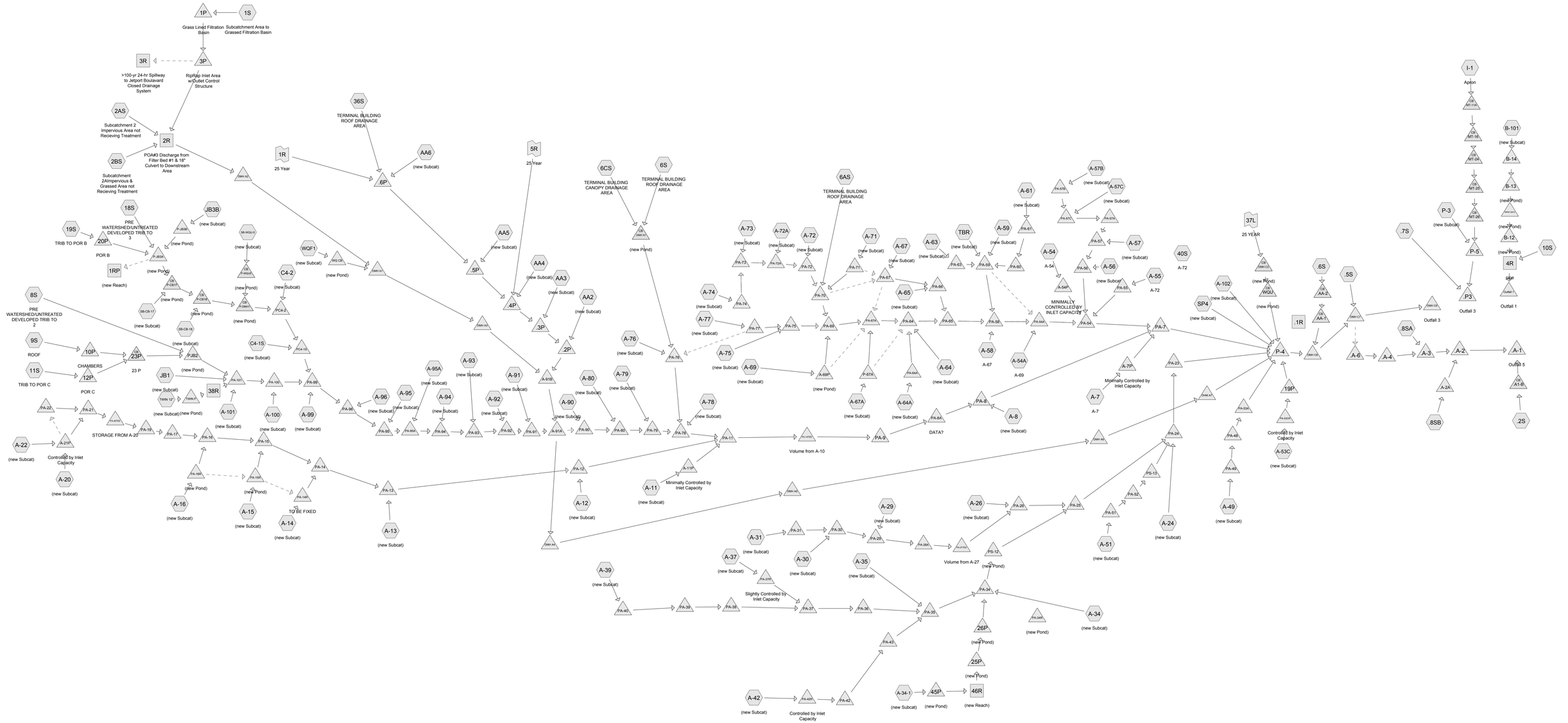
E – Stormwater Management Systems Inspection & Maintenance Manual

F – Figures:

Figures 1-3 – Offsite Development
Figure 4 – Existing Pond Alterations
Figure 5 – Overall Facility Water Quality Treatment Summary
Figure 6 – Existing Redevelopment
Figure 7 – Proposed Redevelopment

ATTACHMENT A

Pre-Development Computations

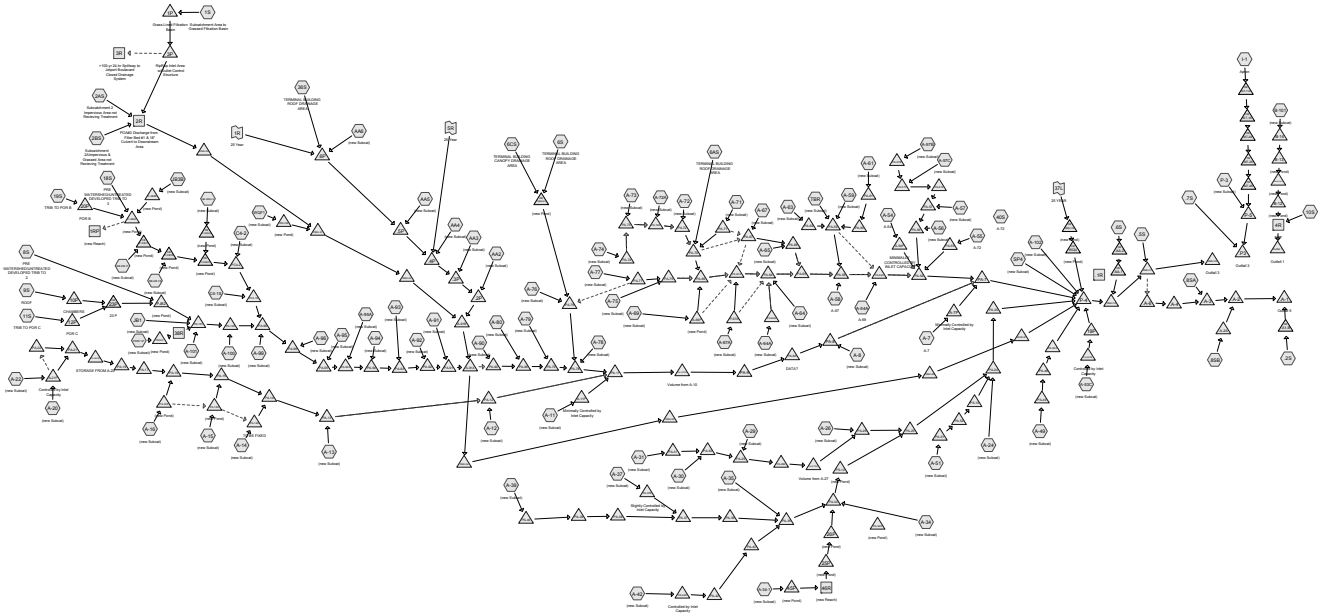


Subcat | Reach | Pond | Link

Routing Diagram for Predevelopment Terminal Area - Outfalls 1-3-5

Prepared by Stantec Consulting Ltd., Printed 10/19/2018

HydroCAD® 10.00-13 s/n 00734 © 2014 HydroCAD Software Solutions LLC



Subcat Reach Pond Link

Routing Diagram for Predevelopment Terminal Area - Outfalls 1-3-5

Prepared by Stantec Consulting Ltd., Printed 10/19/2018

HydroCAD® 10.00-13 s/n 00734 © 2014 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
75.749	98	(.8SB, 40S, A-100, A-102, A-11, A-12, A-13, A-14, A-15, A-16, A-20, A-22, A-24, A-26, A-29, A-30, A-31, A-34-1, A-53C, A-55, A-56, A-57, A-57B, A-57C, A-59, A-61, A-63, A-64, A-64A, A-65, A-67, A-67A, A-69, A-7, A-71, A-72, A-72A, A-73, A-74, A-75, A-76, A-77, A-78, A-79, A-8, A-80, A-90, A-91, A-92, A-93, A-94, A-95, A-95A, A-96, A-99, AA2, AA3, AA4, AA5, AA6, JB1, JB3B, SB-CB-17, SB-CB-18, SB-WQU-5, TWIN 12", WQF1)
0.800	84	(A-100)
5.440	83	(A-101)
13.130	80	(A-16, A-20, A-22, JB3B, SP4, TWIN 12")
1.160	64	(A-34)
1.400	65	(A-35)
1.250	68	(A-37)
2.150	72	(A-39)
2.710	82	(A-42, C4-1S)
1.767	86	(A-49)
1.564	56	(A-51)
0.810	74	(JB1)
4.921	39	>75% Grass cover, Good, HSG A (A-102, A-34-1)
2.300	64	>75% Grass cover, Good, HSG A (A-34)
2.100	65	>75% Grass cover, Good, HSG A (A-35)
2.200	68	>75% Grass cover, Good, HSG A (A-37)
1.960	72	>75% Grass cover, Good, HSG A (A-39)
5.000	56	>75% Grass cover, Good, HSG A (A-51)
0.242	61	>75% Grass cover, Good, HSG B (A-34-1)
11.471	74	>75% Grass cover, Good, HSG C (.2S, .5S, .7S, .8SA, .8SB, 11S, 19S, A-53C, P-3)
5.568	80	>75% Grass cover, Good, HSG C (SP4)
52.212	80	>75% Grass cover, Good, HSG D (.2S, .5S, .6S, .8SA, .8SB, 10S, 18S, A-102, A-11, A-12, A-13, A-14, A-15, A-24, A-26, A-29, A-30, A-31, A-34-1, A-53C, A-56, A-57, A-57B, A-57C, A-61, A-7, A-8, A-96, A-99, B-101, C4-2, P-3, SB-WQU-5, SP4, WQF1)
0.539	74	>75% Grass cover, Good, HSG D (8S)
2.700	64	>75% Grass cover, Good, HSG D (A-34)
2.550	65	>75% Grass cover, Good, HSG D (A-35)
3.800	68	>75% Grass cover, Good, HSG D (A-37)
7.040	72	>75% Grass cover, Good, HSG D (A-39)
11.750	82	>75% Grass cover, Good, HSG D (A-42, C4-1S)
2.250	56	>75% Grass cover, Good, HSG D (A-51)
0.100	98	CANOPY (6CS)
0.680	74	Grass HSG C (1S, 2BS)
1.685	98	Impervious (1S, 2AS, 2BS)
0.127	98	JetPort Road (18S)
0.289	98	Parking LOT (8S)

Area Listing (all nodes) (continued)

Area (acres)	CN	Description (subcatchment-numbers)
22.025	98	Paved parking & roofs (.2S, .5S, .6S, .7S, .8SA, 9S, 10S, A-53C, A-54, A-54A, A-58, SP4)
0.163	86	Paved parking & roofs (A-49)
0.186	56	Paved parking & roofs (A-51)
9.938	98	Paved parking, HSG D (B-101)
1.230	98	Pavement (I-1)
1.320	98	Porous Pavement (11S, 19S)
1.000	98	ROADWAY (36S)
0.800	98	ROOF (6AS, 6S)
0.122	98	Sidewalk Curbs (11S)
0.021	98	Sidewalks/Curb (19S)
1.680	98	Water Surface, 0% imp (C4-2)
0.101	83	Woods, Poor, HSG D (8S)
0.250	82	Woods/grass comb., Poor, HSG C (18S)
1.958	82	Woods/grass comb., Poor, HSG D (8S)
4.660	86	Woods/grass comb., Poor, HSG D (18S)
2.400	98	roof (TBR)
277.268	**85**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
18.481	HSG A	A-102, A-34, A-34-1, A-35, A-37, A-39, A-51
0.242	HSG B	A-34-1
17.969	HSG C	.2S, .5S, .7S, .8SA, .8SB, 1S, 2BS, 11S, 18S, 19S, A-53C, P-3, SP4
99.498	HSG D	.2S, .5S, .6S, .8SA, .8SB, 8S, 10S, 18S, A-102, A-11, A-12, A-13, A-14, A-15, A-24, A-26, A-29, A-30, A-31, A-34, A-34-1, A-35, A-37, A-39, A-42, A-51, A-53C, A-56, A-57, A-57B, A-57C, A-61, A-7, A-8, A-96, A-99, B-101, C4-1S, C4-2, P-3, SB-WQU-5, SP4, WQF1
141.078	Other	.2S, .5S, .6S, .7S, .8SA, .8SB, 1S, 2AS, 2BS, 6AS, 6CS, 6S, 8S, 9S, 10S, 11S, 18S, 19S, 36S, 40S, A-100, A-101, A-102, A-11, A-12, A-13, A-14, A-15, A-16, A-20, A-22, A-24, A-26, A-29, A-30, A-31, A-34, A-34-1, A-35, A-37, A-39, A-42, A-49, A-51, A-53C, A-54, A-54A, A-55, A-56, A-57, A-57B, A-57C, A-58, A-59, A-61, A-63, A-64, A-64A, A-65, A-67, A-67A, A-69, A-7, A-71, A-72, A-72A, A-73, A-74, A-75, A-76, A-77, A-78, A-79, A-8, A-80, A-90, A-91, A-92, A-93, A-94, A-95, A-95A, A-96, A-99, AA2, AA3, AA4, AA5, AA6, C4-1S, C4-2, I-1, JB1, JB3B, SB-CB-17, SB-CB-18, SB-WQU-5, SP4, TBR, TWIN 12", WQF1
277.268		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	107.930	107.930		.8SB, 40S, A-100, A-101, A-102, A-11, A-12, A-13, A-14, A-15, A-16, A-20, A-22, A-24, A-26, A-29, A-30, A-31, A-34, A-34-1, A-35, A-37, A-39, A-42, A-49, A-51, A-53C, A-55, A-56, A-57, A-57B, A-57C, A-59, A-61, A-63, A-64, A-64A, A-65, A-67, A-67A, A-69, A-7, A-71, A-72, A-72A, A-73,

Ground Covers (all nodes) (continued)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
18.481	0.242	17.039	82.841	0.000	118.604	>75% Grass cover, Good	.2S, .5S, .6S, .7S, .8SA, .8SB, 8S, 10S, 11S, 18S, 19S, A-102, A-11, A-12, A-13, A-14, A-15, A-24, A-26, A-29, A-30, A-31, A-34, A-34-1, A-35, A-37, A-39, A-42, A-51, A-53C, A-56, A-57, A-57B, A-57C, A-61, A-7, A-8, A-96, A-99, B-101, C4-1S, C4-2, P-3, SB-WQU -5, SP4, WQF1

Ground Covers (all nodes) (continued)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	0.100	0.100	CANOPY	6CS
0.000	0.000	0.680	0.000	0.000	0.680	Grass	1S, 2BS
0.000	0.000	0.000	0.000	1.685	1.685	Impervious	1S, 2AS, 2BS
0.000	0.000	0.000	0.000	0.127	0.127	JetPort Road	18S
0.000	0.000	0.000	0.000	0.289	0.289	Parking LOT	8S
0.000	0.000	0.000	9.938	0.000	9.938	Paved parking	B-101
0.000	0.000	0.000	0.000	22.374	22.374	Paved parking & roofs	.2S, .5S, .6S, .7S, .8SA, 9S, 10S, A-49, A-51, A-53C, A-54, A-54A, A-58, SP4
0.000	0.000	0.000	0.000	1.230	1.230	Pavement	I-1
0.000	0.000	0.000	0.000	1.320	1.320	Porous Pavement	11S, 19S
0.000	0.000	0.000	0.000	1.000	1.000	ROADWAY	36S
0.000	0.000	0.000	0.000	0.800	0.800	ROOF	6AS, 6S
0.000	0.000	0.000	0.000	0.122	0.122	Sidewalk Curbs	11S
0.000	0.000	0.000	0.000	0.021	0.021	Sidewalks/Curb	19S
0.000	0.000	0.000	0.000	1.680	1.680	Water Surface, 0% imp	C4-2
0.000	0.000	0.000	0.101	0.000	0.101	Woods, Poor	8S
0.000	0.000	0.250	6.617	0.000	6.868	Woods/grass comb., Poor	8S, 18S
0.000	0.000	0.000	0.000	2.400	2.400	roof	TBR
18.481	**0.242**	**17.969**	**99.498**	**141.078**	**277.268**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	.2S	0.00	0.00	348.0	0.0060	0.013	15.0	0.0	0.0
2	.2S	0.00	0.00	262.0	0.0069	0.013	15.0	0.0	0.0
3	A-102	0.00	0.00	390.0	0.0020	0.013	15.0	0.0	0.0
4	A-102	0.00	0.00	400.0	0.0020	0.013	18.0	0.0	0.0
5	A-102	0.00	0.00	690.0	0.0020	0.013	24.0	0.0	0.0
6	A-39	0.00	0.00	400.0	0.0050	0.013	15.0	0.0	0.0
7	A-53C	0.00	0.00	330.0	0.0100	0.013	15.0	0.0	0.0
8	I-1	0.00	0.00	183.0	0.0040	0.015	12.0	0.0	0.0
9	JB1	0.00	0.00	480.0	0.0050	0.015	12.0	0.0	0.0
10	JB1	0.00	0.00	60.0	0.0040	0.015	15.0	0.0	0.0
11	JB3B	0.00	0.00	510.0	0.0100	0.011	15.0	0.0	0.0
12	SB-WQU-5	0.00	0.00	477.0	0.0150	0.013	12.0	0.0	0.0
13	SB-WQU-5	0.00	0.00	105.0	0.0030	0.013	15.0	0.0	0.0
14	SB-WQU-5	0.00	0.00	670.0	0.0038	0.013	18.0	0.0	0.0
15	4R	36.00	24.53	1,000.0	0.0115	0.013	30.0	0.0	0.0
16	.2P	49.71	49.05	95.0	0.0069	0.013	54.0	0.0	0.0
17	.3P	50.17	49.98	95.0	0.0020	0.013	54.0	0.0	0.0
18	.4P	50.47	50.28	95.0	0.0020	0.013	54.0	0.0	0.0
19	.5P	50.83	50.64	95.0	0.0020	0.013	48.0	0.0	0.0
20	.6P	51.01	50.93	40.0	0.0020	0.013	48.0	0.0	0.0
21	.A-1	17.06	15.50	520.0	0.0030	0.013	42.0	0.0	0.0
22	.A-2	17.80	17.17	168.0	0.0037	0.013	42.0	0.0	0.0
23	.A-2A	29.50	29.00	12.0	0.0417	0.011	15.0	0.0	0.0
24	.A-3	18.41	17.80	235.0	0.0026	0.013	42.0	0.0	0.0
25	.A-4	19.18	18.46	233.0	0.0031	0.013	42.0	0.0	0.0
26	.A-6	19.67	19.20	172.0	0.0027	0.013	42.0	0.0	0.0
27	.A1-B	23.26	17.17	181.0	0.0336	0.013	24.0	0.0	0.0
28	.AA-1	35.31	33.09	292.0	0.0076	0.013	12.0	0.0	0.0
29	.AA-2	37.97	35.34	348.3	0.0076	0.013	12.0	0.0	0.0
30	.DMH A1	51.27	50.88	55.0	0.0071	0.013	24.0	0.0	0.0
31	.P3	30.25	28.54	111.0	0.0154	0.013	24.0	0.0	0.0
32	.P3	29.61	29.01	116.0	0.0052	0.013	36.0	0.0	0.0
33	3P	72.57	72.00	50.0	0.0114	0.013	18.0	0.0	0.0
34	12P	67.58	67.00	20.0	0.0290	0.013	4.0	0.0	0.0
35	19P	37.26	35.85	210.0	0.0067	0.013	15.0	0.0	0.0
36	20P	67.55	67.00	20.0	0.0275	0.013	4.0	0.0	0.0
37	23P	63.48	63.00	40.0	0.0120	0.013	15.0	0.0	0.0
38	25P	70.00	55.00	560.0	0.0268	0.013	15.0	0.0	0.0
39	26P	55.00	47.42	340.0	0.0223	0.013	24.0	0.0	0.0
40	45P	45.00	44.40	30.0	0.0200	0.015	12.0	0.0	0.0
41	A-91A	43.14	41.73	353.0	0.0040	0.013	54.0	0.0	0.0
42	A-91A	51.23	51.14	15.0	0.0060	0.013	24.0	0.0	0.0

Pipe Listing (all nodes) (continued)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
43	A-91B	43.48	43.24	47.0	0.0051	0.013	54.0	0.0	0.0
44	B-12	36.33	35.50	137.0	0.0061	0.013	30.0	0.0	0.0
45	B-13	41.14	40.89	25.0	0.0100	0.013	30.0	0.0	0.0
46	B-14	42.81	41.24	224.0	0.0070	0.013	24.0	0.0	0.0
47	DHM A7	33.25	30.00	300.0	0.0108	0.013	54.0	0.0	0.0
48	DMH A1	52.20	51.88	40.0	0.0080	0.013	24.0	0.0	0.0
49	DMH A2	58.00	52.30	666.0	0.0086	0.013	18.0	0.0	0.0
50	DMH A3	51.78	50.13	550.0	0.0030	0.013	24.0	0.0	0.0
51	DMH A4	41.63	39.87	309.0	0.0057	0.013	54.0	0.0	0.0
52	DMH A5	39.77	34.94	1,012.0	0.0048	0.013	54.0	0.0	0.0
53	DMH A6	34.84	33.35	312.0	0.0048	0.013	54.0	0.0	0.0
54	DMH C2	36.00	33.72	370.0	0.0062	0.013	24.0	0.0	0.0
55	DMH C6	15.71	15.00	141.0	0.0050	0.013	60.0	0.0	0.0
56	DMH C7	18.80	15.81	598.0	0.0050	0.013	60.0	0.0	0.0
57	DMH C7	19.79	19.67	45.0	0.0027	0.013	42.0	0.0	0.0
58	DMH C8	20.32	18.90	284.0	0.0050	0.013	60.0	0.0	0.0
59	MT-11A	33.75	33.47	104.0	0.0027	0.011	18.0	0.0	0.0
60	MT-16	33.42	32.87	74.0	0.0074	0.010	24.0	0.0	0.0
61	MT-24	32.61	32.10	145.0	0.0035	0.010	24.0	0.0	0.0
62	MT-25	31.95	31.80	74.0	0.0020	0.011	24.0	0.0	0.0
63	MT-26	31.00	30.50	20.0	0.0250	0.010	24.0	0.0	0.0
64	P-4	25.73	21.14	500.0	0.0092	0.013	60.0	0.0	0.0
65	P-5	28.10	28.00	7.0	0.0143	0.011	6.0	0.0	0.0
66	P-CB17	61.53	61.19	30.0	0.0113	0.013	18.0	0.0	0.0
67	P-CB18	61.14	60.57	40.0	0.0143	0.013	18.0	0.0	0.0
68	P-DMH1	60.57	59.84	305.0	0.0024	0.013	24.0	0.0	0.0
69	P-JB3A	61.75	61.09	40.0	0.0165	0.013	18.0	0.0	0.0
70	P-JB3B	70.40	70.00	40.0	0.0100	0.013	15.0	0.0	0.0
71	P-WQU5	61.60	60.57	24.0	0.0429	0.013	18.0	0.0	0.0
72	PA-100	55.77	53.59	403.0	0.0054	0.013	18.0	0.0	0.0
73	PA-101	58.10	55.94	386.0	0.0056	0.013	15.0	0.0	0.0
74	PA-10TEE	45.83	45.47	62.0	0.0058	0.013	42.0	0.0	0.0
75	PA-11	46.72	45.83	154.0	0.0058	0.013	42.0	0.0	0.0
76	PA-12	48.91	47.02	394.0	0.0048	0.013	30.0	0.0	0.0
77	PA-13	51.21	49.12	297.0	0.0070	0.013	30.0	0.0	0.0
78	PA-14	53.09	51.24	515.0	0.0036	0.013	30.0	0.0	0.0
79	PA-15	53.99	53.09	330.0	0.0027	0.013	30.0	0.0	0.0
80	PA-16	55.77	54.29	290.0	0.0051	0.013	24.0	0.0	0.0
81	PA-17	57.01	55.92	297.0	0.0037	0.013	24.0	0.0	0.0
82	PA-19	58.90	57.16	295.0	0.0059	0.013	24.0	0.0	0.0
83	PA-20TEE	59.46	59.00	110.0	0.0042	0.013	18.0	0.0	0.0
84	PA-21	60.39	59.46	182.0	0.0051	0.013	18.0	0.0	0.0

Pipe Listing (all nodes) (continued)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
85	PA-22	62.26	60.51	295.0	0.0059	0.013	18.0	0.0	0.0
86	PA-23	40.90	20.40	440.0	0.0466	0.013	30.0	0.0	0.0
87	PA-24	41.37	40.90	74.0	0.0064	0.013	36.0	0.0	0.0
88	PA-25	42.91	41.57	333.0	0.0040	0.013	36.0	0.0	0.0
89	PA-26	44.50	43.11	198.0	0.0070	0.013	30.0	0.0	0.0
90	PA-27TEE	46.03	44.70	240.0	0.0055	0.013	30.0	0.0	0.0
91	PA-28A	46.79	46.13	153.0	0.0043	0.013	30.0	0.0	0.0
92	PA-29	47.34	46.89	90.0	0.0050	0.010	24.0	0.0	0.0
93	PA-30	48.74	47.41	300.0	0.0044	0.010	24.0	0.0	0.0
94	PA-31	50.99	48.99	396.0	0.0051	0.013	24.0	0.0	0.0
95	PA-34	45.07	43.25	105.0	0.0173	0.013	30.0	0.0	0.0
96	PA-35	45.85	45.12	230.0	0.0032	0.013	24.0	0.0	0.0
97	PA-36	47.16	45.85	161.0	0.0081	0.013	24.0	0.0	0.0
98	PA-37	49.28	47.51	396.0	0.0045	0.013	24.0	0.0	0.0
99	PA-38	51.18	49.44	396.0	0.0044	0.013	18.0	0.0	0.0
100	PA-39	51.81	51.20	200.0	0.0030	0.013	18.0	0.0	0.0
101	PA-40	54.16	52.11	400.0	0.0051	0.013	15.0	0.0	0.0
102	PA-42	48.75	47.06	378.0	0.0045	0.013	30.0	0.0	0.0
103	PA-43	47.04	45.85	128.0	0.0093	0.013	30.0	0.0	0.0
104	PA-48	46.32	46.50	423.0	-0.0004	0.012	12.0	0.0	0.0
105	PA-49	47.00	46.32	141.0	0.0048	0.012	10.0	0.0	0.0
106	PA-51	44.75	44.87	59.0	-0.0020	0.012	15.0	0.0	0.0
107	PA-52	44.87	44.65	4.0	0.0550	0.010	15.0	0.0	0.0
108	PA-53A	44.20	20.40	370.0	0.0643	0.012	12.0	0.0	0.0
109	PA-54	44.13	42.10	236.0	0.0086	0.013	36.0	0.0	0.0
110	PA-54A	44.98	44.13	194.0	0.0044	0.013	36.0	0.0	0.0
111	PA-55	45.33	44.83	69.0	0.0072	0.013	24.0	0.0	0.0
112	PA-56	46.09	45.27	130.0	0.0063	0.013	18.0	0.0	0.0
113	PA-57	46.11	45.69	239.0	0.0018	0.013	18.0	0.0	0.0
114	PA-57A	46.75	46.51	10.0	0.0240	0.013	15.0	0.0	0.0
115	PA-57B	49.75	48.00	175.0	0.0100	0.025	8.0	0.0	0.0
116	PA-57C	48.00	46.80	45.0	0.0267	0.013	15.0	0.0	0.0
117	PA-58	46.23	45.29	184.0	0.0051	0.013	36.0	0.0	0.0
118	PA-59	50.10	47.77	250.0	0.0093	0.013	24.0	0.0	0.0
119	PA-60	50.30	50.05	91.0	0.0027	0.012	18.0	0.0	0.0
120	PA-61	50.61	50.50	47.0	0.0023	0.012	12.0	0.0	0.0
121	PA-63	50.23	50.12	78.0	0.0014	0.013	12.0	0.0	0.0
122	PA-64	48.08	47.61	25.0	0.0188	0.013	30.0	0.0	0.0
123	PA-64A	48.68	49.18	25.0	-0.0200	0.013	24.0	0.0	0.0
124	PA-65	47.41	46.68	156.0	0.0047	0.013	30.0	0.0	0.0
125	PA-66	47.84	47.46	28.0	0.0136	0.013	30.0	0.0	0.0
126	PA-67	48.67	48.24	185.0	0.0023	0.013	24.0	0.0	0.0

Pipe Listing (all nodes) (continued)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
127	PA-67A	49.11	48.18	183.0	0.0051	0.013	30.0	0.0	0.0
128	PA-69	49.74	49.06	180.0	0.0038	0.013	24.0	0.0	0.0
129	PA-7	41.52	37.45	498.0	0.0082	0.013	42.0	0.0	0.0
130	PA-70	50.68	49.74	195.0	0.0048	0.013	18.0	0.0	0.0
131	PA-71	51.80	51.48	41.0	0.0078	0.013	15.0	0.0	0.0
132	PA-72	51.01	51.08	28.0	-0.0025	0.011	18.0	0.0	0.0
133	PA-72A	51.16	51.01	27.0	0.0056	0.013	15.0	0.0	0.0
134	PA-73	51.29	51.11	45.0	0.0040	0.013	15.0	0.0	0.0
135	PA-74	51.48	51.16	45.0	0.0071	0.013	15.0	0.0	0.0
136	PA-75	51.44	49.74	173.0	0.0098	0.013	24.0	0.0	0.0
137	PA-76	50.78	50.16	90.0	0.0069	0.013	24.0	0.0	0.0
138	PA-77	55.58	51.48	197.0	0.0208	0.013	18.0	0.0	0.0
139	PA-78	49.38	47.02	213.0	0.0111	0.013	36.0	0.0	0.0
140	PA-79	49.94	49.43	108.0	0.0047	0.013	30.0	0.0	0.0
141	PA-8	42.20	41.93	363.0	0.0007	0.013	42.0	0.0	0.0
142	PA-80	50.97	50.02	88.0	0.0108	0.013	24.0	0.0	0.0
143	PA-8A	44.16	42.40	396.0	0.0044	0.013	42.0	0.0	0.0
144	PA-9	45.27	44.26	175.0	0.0058	0.013	42.0	0.0	0.0
145	PA-90	51.25	51.03	93.0	0.0024	0.013	24.0	0.0	0.0
146	PA-91	51.67	51.27	71.0	0.0056	0.013	24.0	0.0	0.0
147	PA-92	51.89	51.68	93.0	0.0023	0.013	24.0	0.0	0.0
148	PA-93	52.45	52.22	96.0	0.0024	0.013	24.0	0.0	0.0
149	PA-94	52.83	52.47	93.0	0.0039	0.013	24.0	0.0	0.0
150	PA-95	52.95	52.59	93.0	0.0039	0.013	24.0	0.0	0.0
151	PA-95A	52.59	52.80	51.0	-0.0041	0.013	24.0	0.0	0.0
152	PA-96	52.83	52.92	93.0	-0.0010	0.013	24.0	0.0	0.0
153	PA-99	53.49	52.88	296.0	0.0021	0.013	24.0	0.0	0.0
154	PC4-1S	57.51	56.19	106.0	0.0125	0.013	18.0	0.0	0.0
155	PC4-2	59.37	59.23	65.0	0.0022	0.013	18.0	0.0	0.0
156	PJB2	62.30	61.55	75.0	0.0100	0.013	18.0	0.0	0.0
157	PS-12	43.15	42.91	190.0	0.0013	0.013	30.0	0.0	0.0
158	PS-13	44.55	44.37	315.0	0.0006	0.010	15.0	0.0	0.0
159	RWW CB10	44.50	38.26	200.0	0.0312	0.013	30.0	0.0	0.0
160	TWIN P	65.85	65.53	75.0	0.0043	0.013	12.0	0.0	0.0
161	WQU	33.72	33.53	80.0	0.0024	0.011	24.0	0.0	0.0

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points x 2
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 2S: Runoff Area=421,213 sf 42.73% Impervious Runoff Depth=4.33"
Flow Length=885' Tc=16.0 min CN=78/98 Runoff=33.84 cfs 3.486 af

Subcatchment 5S: Runoff Area=312,199 sf 26.88% Impervious Runoff Depth=3.77"
Flow Length=440' Tc=4.3 min CN=75/98 Runoff=31.95 cfs 2.252 af

Subcatchment 6S: Runoff Area=45,057 sf 41.68% Impervious Runoff Depth=4.42"
Flow Length=194' Slope=0.0172 '/' Tc=12.4 min CN=80/98 Runoff=4.07 cfs 0.381 af

Subcatchment 7S: Runoff Area=92,086 sf 21.08% Impervious Runoff Depth=3.55"
Flow Length=692' Tc=9.6 min CN=74/98 Runoff=7.47 cfs 0.626 af

Subcatchment 8SA: Runoff Area=360,005 sf 15.19% Impervious Runoff Depth=3.73"
Flow Length=378' Tc=18.8 min CN=78/98 Runoff=24.35 cfs 2.569 af

Subcatchment 8SB: Runoff Area=2.270 ac 26.43% Impervious Runoff Depth=3.90"
Flow Length=365' Tc=9.4 min CN=77/98 Runoff=8.81 cfs 0.738 af

Subcatchment 1S: Subcatchment Area to Runoff Area=2.150 ac 73.02% Impervious Runoff Depth=4.88"
Tc=5.0 min CN=74/98 Runoff=11.36 cfs 0.874 af

Subcatchment 2AS: Subcatchment 2 Runoff Area=0.100 ac 100.00% Impervious Runoff Depth=5.56"
Tc=1.0 min CN=0/98 Runoff=0.68 cfs 0.046 af

Subcatchment 2BS: Subcatchment Runoff Area=0.115 ac 13.04% Impervious Runoff Depth=3.35"
Tc=1.0 min CN=74/98 Runoff=0.52 cfs 0.032 af

Subcatchment 6AS: TERMINAL BUILDING Runoff Area=0.200 ac 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=0/98 Runoff=1.18 cfs 0.093 af

Subcatchment 6CS: TERMINAL BUILDING Runoff Area=0.100 ac 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=0/98 Runoff=0.59 cfs 0.046 af

Subcatchment 6S: TERMINAL BUILDING Runoff Area=0.600 ac 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=0/98 Runoff=3.53 cfs 0.278 af

Subcatchment 8S: PRE Runoff Area=125,708 sf 10.00% Impervious Runoff Depth=3.80"
Flow Length=590' Slope=0.0200 '/' Tc=26.2 min CN=80/98 Runoff=7.58 cfs 0.913 af

Subcatchment 9S: ROOF Runoff Area=38,594 sf 100.00% Impervious Runoff Depth=5.56"
Tc=0.0 min CN=0/98 Runoff=6.14 cfs 0.411 af

Subcatchment 10S: Runoff Area=600,571 sf 66.69% Impervious Runoff Depth=4.91"
Tc=0.0 min CN=80/98 Runoff=87.39 cfs 5.640 af

Subcatchment 11S: TRIB TO POR C Runoff Area=1.109 ac 88.55% Impervious Runoff Depth=5.27"
Tc=6.0 min CN=74/98 Runoff=6.03 cfs 0.487 af

Subcatchment 18S: PRE Runoff Area=223,356 sf 2.48% Impervious Runoff Depth=4.25"
Flow Length=665' Slope=0.0100 '/' Tc=48.1 min CN=86/98 Runoff=11.23 cfs 1.817 af

Subcatchment 19S: TRIB TO POR B Runoff Area=0.518 ac 92.86% Impervious Runoff Depth=5.38"
Tc=6.0 min CN=74/98 Runoff=2.86 cfs 0.232 af

Subcatchment 36S: TERMINAL BUILDING Runoff Area=1.000 ac 100.00% Impervious Runoff Depth=5.56"
Tc=10.0 min CN=0/98 Runoff=4.99 cfs 0.464 af

Subcatchment 40S: A-72 Runoff Area=1.890 ac 100.00% Impervious Runoff Depth=5.56"
Flow Length=500' Slope=0.0100 '/' Tc=5.6 min CN=0/98 Runoff=10.89 cfs 0.876 af

Subcatchment A-100: (new Subcat) Runoff Area=1.300 ac 38.46% Impervious Runoff Depth=4.61"
Flow Length=218' Slope=0.0100 '/' Tc=9.6 min CN=84/98 Runoff=5.82 cfs 0.499 af

Subcatchment A-101: (new Subcat) Runoff Area=5.440 ac 0.00% Impervious Runoff Depth=3.91"
Flow Length=1,095' Tc=40.6 min CN=83/0 Runoff=12.09 cfs 1.771 af

Subcatchment A-102: (new Subcat) Runoff Area=18.960 ac 54.48% Impervious Runoff Depth=4.03"
Flow Length=1,810' Tc=44.2 min CN=65/98 Runoff=37.93 cfs 6.375 af

Subcatchment A-11: (new Subcat) Runoff Area=2.740 ac 36.50% Impervious Runoff Depth=4.32"
Flow Length=370' Tc=28.5 min CN=80/98 Runoff=7.59 cfs 0.986 af

Subcatchment A-12: (new Subcat) Runoff Area=1.180 ac 38.98% Impervious Runoff Depth=4.37"
Flow Length=280' Tc=18.9 min CN=80/98 Runoff=3.92 cfs 0.429 af

Subcatchment A-13: (new Subcat) Runoff Area=1.520 ac 57.89% Impervious Runoff Depth=4.74"
Flow Length=318' Tc=37.9 min CN=80/98 Runoff=3.94 cfs 0.600 af

Subcatchment A-14: (new Subcat) Runoff Area=4.530 ac 49.67% Impervious Runoff Depth=4.58"
Flow Length=450' Tc=44.2 min CN=80/98 Runoff=10.57 cfs 1.727 af

Subcatchment A-15: (new Subcat) Runoff Area=2.900 ac 31.03% Impervious Runoff Depth=4.21"
Flow Length=470' Tc=38.1 min CN=80/98 Runoff=6.88 cfs 1.017 af

Subcatchment A-16: (new Subcat) Runoff Area=5.240 ac 50.00% Impervious Runoff Depth=4.58"
Flow Length=499' Tc=38.8 min CN=80/98 Runoff=13.07 cfs 2.001 af

Subcatchment A-20: (new Subcat) Runoff Area=5.500 ac 36.36% Impervious Runoff Depth=4.31"
Flow Length=420' Tc=33.1 min CN=80/98 Runoff=14.19 cfs 1.977 af

Subcatchment A-22: (new Subcat) Runoff Area=3.800 ac 39.47% Impervious Runoff Depth=4.38"
Flow Length=580' Tc=49.7 min CN=80/98 Runoff=8.09 cfs 1.386 af

Subcatchment A-24: (new Subcat) Runoff Area=3.600 ac 50.00% Impervious Runoff Depth=4.58"
Flow Length=520' Tc=44.7 min CN=80/98 Runoff=8.37 cfs 1.375 af

Subcatchment A-26: (new Subcat) Runoff Area=1.950 ac 64.10% Impervious Runoff Depth=4.86"
Flow Length=270' Tc=25.1 min CN=80/98 Runoff=6.21 cfs 0.789 af

Subcatchment A-29: (new Subcat) Runoff Area=1.760 ac 43.18% Impervious Runoff Depth=4.45"
Flow Length=300' Tc=26.1 min CN=80/98 Runoff=5.16 cfs 0.652 af

Subcatchment A-30: (new Subcat) Runoff Area=1.950 ac 42.05% Impervious Runoff Depth=4.43"
Flow Length=400' Tc=29.5 min CN=80/98 Runoff=5.40 cfs 0.719 af

Subcatchment A-31: (new Subcat) Runoff Area=2.650 ac 56.60% Impervious Runoff Depth=4.71"
Flow Length=520' Slope=0.0050 '/' Tc=62.5 min CN=80/98 Runoff=5.23 cfs 1.040 af

Subcatchment A-34: (new Subcat) Runoff Area=6.160 ac 0.00% Impervious Runoff Depth=2.12"
Flow Length=750' Slope=0.0050 '/' Tc=77.0 min CN=64/0 Runoff=4.96 cfs 1.089 af

Subcatchment A-34-1: (new Subcat) Runoff Area=203,148 sf 43.76% Impervious Runoff Depth=3.02"
Flow Length=700' Slope=0.0100 '/' Tc=27.7 min CN=50/98 Runoff=8.22 cfs 1.175 af

Subcatchment A-35: (new Subcat) Runoff Area=6.050 ac 0.00% Impervious Runoff Depth=2.21"
Flow Length=880' Slope=0.0050 '/' Tc=81.3 min CN=65/0 Runoff=4.91 cfs 1.113 af

Subcatchment A-37: (new Subcat) Runoff Area=7.250 ac 0.00% Impervious Runoff Depth=2.47"
Flow Length=900' Slope=0.0050 '/' Tc=82.0 min CN=68/0 Runoff=6.61 cfs 1.491 af

Subcatchment A-39: (new Subcat) Runoff Area=11.150 ac 0.00% Impervious Runoff Depth=2.83"
Flow Length=720' Tc=44.7 min CN=72/0 Runoff=17.08 cfs 2.630 af

Subcatchment A-42: (new Subcat) Runoff Area=12.260 ac 0.00% Impervious Runoff Depth=3.80"
Flow Length=760' Tc=47.4 min CN=82/0 Runoff=24.51 cfs 3.886 af

Subcatchment A-49: (new Subcat) Runoff Area=1.930 ac 0.00% Impervious Runoff Depth=4.22"
Flow Length=167' Tc=19.4 min CN=86/0 Runoff=6.42 cfs 0.679 af

Subcatchment A-51: (new Subcat) Runoff Area=9.000 ac 0.00% Impervious Runoff Depth=1.48"
Flow Length=505' Tc=53.7 min CN=56/0 Runoff=5.81 cfs 1.110 af

Subcatchment A-53C: (new Subcat) Runoff Area=8.720 ac 48.08% Impervious Runoff Depth=4.54"
Flow Length=575' Slope=0.0100 '/' Tc=40.8 min CN=80/98 Runoff=21.13 cfs 3.302 af

Subcatchment A-54: A-54 Runoff Area=1.820 ac 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=0/98 Runoff=10.71 cfs 0.844 af

Subcatchment A-54A: A-69 Runoff Area=1.130 ac 100.00% Impervious Runoff Depth=5.56"
Tc=4.0 min CN=0/98 Runoff=6.89 cfs 0.524 af

Subcatchment A-55: A-72 Runoff Area=1.890 ac 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=0/98 Runoff=11.13 cfs 0.876 af

Subcatchment A-56: (new Subcat) Runoff Area=0.980 ac 94.90% Impervious Runoff Depth=5.46"
Tc=4.0 min CN=80/98 Runoff=5.90 cfs 0.446 af

Subcatchment A-57: (new Subcat) Runoff Area=0.760 ac 46.05% Impervious Runoff Depth=4.50"
Flow Length=230' Slope=0.0100 '/' Tc=14.8 min CN=80/98 Runoff=2.84 cfs 0.285 af

Subcatchment A-57B: (new Subcat) Runoff Area=0.330 ac 45.45% Impervious Runoff Depth=4.49"
Flow Length=130' Slope=0.0100 '/' Tc=11.8 min CN=80/98 Runoff=1.34 cfs 0.124 af

Subcatchment A-57C: (new Subcat) Runoff Area=1.070 ac 62.62% Impervious Runoff Depth=4.83"
Tc=5.0 min CN=80/98 Runoff=5.69 cfs 0.431 af

Subcatchment A-58: A-67 Runoff Area=0.450 ac 100.00% Impervious Runoff Depth=5.56"
Tc=4.0 min CN=0/98 Runoff=2.74 cfs 0.209 af

Subcatchment A-59: (new Subcat) Runoff Area=0.020 ac 100.00% Impervious Runoff Depth=5.56"
Tc=1.0 min CN=0/98 Runoff=0.14 cfs 0.009 af

Subcatchment A-61: (new Subcat) Runoff Area=0.470 ac 31.91% Impervious Runoff Depth=4.23"
Tc=10.0 min CN=80/98 Runoff=1.93 cfs 0.166 af

Subcatchment A-63: (new Subcat) Runoff Area=0.020 ac 100.00% Impervious Runoff Depth=5.56"
Tc=1.0 min CN=0/98 Runoff=0.14 cfs 0.009 af

Subcatchment A-64: (new Subcat) Runoff Area=1.130 ac 100.00% Impervious Runoff Depth=5.56"
Tc=4.0 min CN=0/98 Runoff=6.89 cfs 0.524 af

Subcatchment A-64A: (new Subcat) Runoff Area=0.340 ac 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=2.15 cfs 0.158 af

Subcatchment A-65: (new Subcat) Runoff Area=0.450 ac 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=2.85 cfs 0.209 af

Subcatchment A-67: (new Subcat) Runoff Area=0.140 ac 100.00% Impervious Runoff Depth=5.56"
Tc=2.0 min CN=0/98 Runoff=0.92 cfs 0.065 af

Subcatchment A-67A: (new Subcat) Runoff Area=2.950 ac 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=0/98 Runoff=17.37 cfs 1.367 af

Subcatchment A-69: (new Subcat) Runoff Area=65,410 sf 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=0/98 Runoff=8.84 cfs 0.696 af

Subcatchment A-7: A-7 Runoff Area=1.860 ac 35.48% Impervious Runoff Depth=4.30"
Flow Length=450' Tc=42.3 min CN=80/98 Runoff=4.25 cfs 0.666 af

Subcatchment A-71: (new Subcat) Runoff Area=0.060 ac 100.00% Impervious Runoff Depth=5.56"
Tc=1.0 min CN=0/98 Runoff=0.41 cfs 0.028 af

Subcatchment A-72: (new Subcat) Runoff Area=0.050 ac 100.00% Impervious Runoff Depth=5.56"
Tc=1.0 min CN=0/98 Runoff=0.34 cfs 0.023 af

Subcatchment A-72A: (new Subcat) Runoff Area=0.040 ac 100.00% Impervious Runoff Depth=5.56"
Tc=1.0 min CN=0/98 Runoff=0.27 cfs 0.019 af

Subcatchment A-73: (new Subcat) Runoff Area=0.060 ac 100.00% Impervious Runoff Depth=5.56"
Tc=1.0 min CN=0/98 Runoff=0.41 cfs 0.028 af

Subcatchment A-74: (new Subcat) Runoff Area=0.150 ac 100.00% Impervious Runoff Depth=5.56"
Tc=2.0 min CN=0/98 Runoff=0.98 cfs 0.070 af

Subcatchment A-75: (new Subcat) Runoff Area=41,230 sf 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=5.99 cfs 0.439 af

Subcatchment A-76: (new Subcat) Runoff Area=31,000 sf 100.00% Impervious Runoff Depth=5.56"
Tc=4.0 min CN=0/98 Runoff=4.34 cfs 0.330 af

Subcatchment A-77: (new Subcat) Runoff Area=52,235 sf 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=0/98 Runoff=7.06 cfs 0.556 af

Subcatchment A-78: (new Subcat) Runoff Area=0.050 ac 100.00% Impervious Runoff Depth=5.56"
Tc=2.0 min CN=0/98 Runoff=0.33 cfs 0.023 af

Subcatchment A-79: (new Subcat) Runoff Area=0.090 ac 100.00% Impervious Runoff Depth=5.56"
Tc=2.0 min CN=0/98 Runoff=0.59 cfs 0.042 af

Subcatchment A-8: (new Subcat) Runoff Area=2.600 ac 50.00% Impervious Runoff Depth=4.58"
Flow Length=479' Tc=47.6 min CN=80/98 Runoff=5.86 cfs 0.993 af

Subcatchment A-80: (new Subcat) Runoff Area=0.100 ac 100.00% Impervious Runoff Depth=5.56"
Tc=2.0 min CN=0/98 Runoff=0.66 cfs 0.046 af

Subcatchment A-90: (new Subcat) Runoff Area=13,480 sf 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=1.96 cfs 0.143 af

Subcatchment A-91: (new Subcat) Runoff Area=25,265 sf 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=3.67 cfs 0.269 af

Subcatchment A-92: (new Subcat) Runoff Area=35,650 sf 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=5.18 cfs 0.379 af

Subcatchment A-93: (new Subcat) Runoff Area=33,790 sf 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=4.91 cfs 0.360 af

Subcatchment A-94: (new Subcat) Runoff Area=21,855 sf 100.00% Impervious Runoff Depth=5.56"
Tc=4.0 min CN=0/98 Runoff=3.06 cfs 0.233 af

Subcatchment A-95: (new Subcat) Runoff Area=12,400 sf 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=1.80 cfs 0.132 af

Subcatchment A-95A: (new Subcat) Runoff Area=15,300 sf 100.00% Impervious Runoff Depth=5.56"
Tc=4.0 min CN=0/98 Runoff=2.14 cfs 0.163 af

Subcatchment A-96: (new Subcat) Runoff Area=47,500 sf 87.37% Impervious Runoff Depth=5.31"
Tc=4.0 min CN=80/98 Runoff=6.43 cfs 0.483 af

Subcatchment A-99: (new Subcat) Runoff Area=1.770 ac 34.46% Impervious Runoff Depth=4.28"
Flow Length=350' Tc=45.6 min CN=80/98 Runoff=3.88 cfs 0.631 af

Subcatchment AA2: (new Subcat) Runoff Area=15,190 sf 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=2.21 cfs 0.162 af

Subcatchment AA3: (new Subcat) Runoff Area=26,970 sf 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=3.92 cfs 0.287 af

Subcatchment AA4: (new Subcat) Runoff Area=38,130 sf 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=5.54 cfs 0.406 af

Subcatchment AA5: (new Subcat) Runoff Area=36,735 sf 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=5.34 cfs 0.391 af

Subcatchment AA6: (new Subcat) Runoff Area=118,885 sf 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=0/98 Runoff=16.07 cfs 1.265 af

Subcatchment B-101: (new Subcat) Runoff Area=481,018 sf 90.00% Impervious Runoff Depth=5.37"
Tc=5.0 min CN=80/98 Runoff=63.32 cfs 4.938 af

Subcatchment C4-1S: (new Subcat) Runoff Area=2.200 ac 0.00% Impervious Runoff Depth=3.80"
Flow Length=500' Slope=0.0100 '/' Tc=17.8 min CN=82/0 Runoff=6.92 cfs 0.697 af

Subcatchment C4-2: (new Subcat) Runoff Area=1.880 ac 0.00% Impervious Runoff Depth=5.33"
Flow Length=30' Slope=0.0100 '/' Tc=7.4 min CN=96/0 Runoff=10.06 cfs 0.835 af

Subcatchment I-1: Apron Runoff Area=1.230 ac 100.00% Impervious Runoff Depth=5.56"
Flow Length=475' Tc=4.1 min CN=0/98 Runoff=7.48 cfs 0.570 af

Subcatchment JB1: (new Subcat) Runoff Area=2.810 ac 71.17% Impervious Runoff Depth=4.83"
Flow Length=680' Tc=5.0 min CN=74/98 Runoff=14.74 cfs 1.131 af

Subcatchment JB3B: (new Subcat) Runoff Area=2.750 ac 81.82% Impervious Runoff Depth=5.21"
Flow Length=660' Slope=0.0100 '/' Tc=3.1 min CN=80/98 Runoff=16.52 cfs 1.193 af

Subcatchment P-3: (new Subcat) Runoff Area=26,830 sf 0.00% Impervious Runoff Depth=3.21"
Flow Length=50' Slope=0.2000 '/' Tc=2.3 min CN=76/0 Runoff=2.65 cfs 0.165 af

Subcatchment SB-CB-17: (new Subcat) Runoff Area=0.070 ac 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=0.44 cfs 0.032 af

Subcatchment SB-CB-18: (new Subcat) Runoff Area=0.080 ac 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=0.51 cfs 0.037 af

Subcatchment SB-WQU-5: (new Subcat) Runoff Area=1.360 ac 89.71% Impervious Runoff Depth=5.36"
Flow Length=1,407' Tc=7.0 min CN=80/98 Runoff=7.27 cfs 0.607 af

Subcatchment SP4: (new Subcat) Runoff Area=14.751 ac 1.77% Impervious Runoff Depth=3.64"
Flow Length=735' Tc=49.4 min CN=80/98 Runoff=27.65 cfs 4.470 af

Subcatchment TBR: (new Subcat) Runoff Area=2.400 ac 100.00% Impervious Runoff Depth=5.56"
Tc=8.0 min CN=0/98 Runoff=12.75 cfs 1.112 af

Subcatchment TWIN 12": (new Subcat) Runoff Area=1.030 ac 75.73% Impervious Runoff Depth=5.09"
Flow Length=840' Tc=12.7 min CN=80/98 Runoff=4.44 cfs 0.437 af

Subcatchment WQF1: (new Subcat) Runoff Area=6.590 ac 82.55% Impervious Runoff Depth=5.22"
Flow Length=480' Tc=6.0 min CN=80/98 Runoff=35.75 cfs 2.867 af

Reach .1R: Avg. Flow Depth=0.00' Max Vel=0.00 fps
n=0.022 L=44.0' S=0.0045 '/' Capacity=1,125.06 cfs Outflow=0.00 cfs 0.000 af

Reach 1RP: (new Reach) Inflow=8.20 cfs 1.798 af
Outflow=8.20 cfs 1.798 af

Reach 2R: POA#3 Discharge from Filter Bed #1 & 18" Culvert to Downstream Inflow=8.31 cfs 0.736 af
Outflow=8.31 cfs 0.736 af

Reach 3R: >100-yr 24-hr Spillway to Jetport Boulavard Closed Drainage Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 4R: pipe Avg. Flow Depth=2.50' Max Vel=10.20 fps Inflow=130.30 cfs 10.575 af
30.0" Round Pipe n=0.013 L=1,000.0' S=0.0115 '/' Capacity=43.93 cfs Outflow=47.34 cfs 10.575 af

Reach 38R: Avg. Flow Depth=0.23' Max Vel=1.21 fps Inflow=4.00 cfs 0.437 af
n=0.022 L=990.0' S=0.0046 '/' Capacity=112.70 cfs Outflow=3.16 cfs 0.437 af

Reach 46R: (new Reach) Avg. Flow Depth=0.59' Max Vel=0.87 fps Inflow=2.45 cfs 0.716 af
n=0.030 L=291.0' S=0.0010 '/' Capacity=78.23 cfs Outflow=2.44 cfs 0.716 af

Pond .2P: Peak Elev=54.86' Storage=130 cf Inflow=82.80 cfs 6.760 af
54.0" Round Culvert n=0.013 L=95.0' S=0.0069 '/' Outflow=82.74 cfs 6.759 af

Pond .3P: Peak Elev=55.75' Storage=136 cf Inflow=80.66 cfs 6.600 af
54.0" Round Culvert n=0.013 L=95.0' S=0.0020 '/' Outflow=80.63 cfs 6.599 af

Pond .4P: Peak Elev=56.05' Storage=135 cf Inflow=76.83 cfs 6.315 af
54.0" Round Culvert n=0.013 L=95.0' S=0.0020 '/' Outflow=76.81 cfs 6.313 af

Pond .5P: Peak Elev=56.93' Storage=141 cf Inflow=61.38 cfs 5.177 af
48.0" Round Culvert n=0.013 L=95.0' S=0.0020 '/' Outflow=61.40 cfs 5.175 af

Pond .6P: Peak Elev=57.19' Storage=142 cf Inflow=56.34 cfs 4.788 af
48.0" Round Culvert n=0.013 L=40.0' S=0.0020 '/' Outflow=56.33 cfs 4.786 af

Pond .A-1: Outfall 5 Peak Elev=49.93' Storage=299 cf Inflow=192.62 cfs 32.889 af
42.0" Round Culvert n=0.013 L=520.0' S=0.0030 '/' Outflow=204.67 cfs 32.889 af

Pond .A-2: Peak Elev=32.61' Storage=3,977 cf Inflow=158.04 cfs 19.835 af
42.0" Round Culvert n=0.013 L=168.0' S=0.0037 '/' Outflow=166.99 cfs 19.890 af

Pond .A-2A: Peak Elev=31.85' Storage=5,827 cf Inflow=8.81 cfs 0.738 af
15.0" Round Culvert n=0.011 L=12.0' S=0.0417 '/' Outflow=6.88 cfs 0.738 af

Pond .A-3: Peak Elev=32.69' Storage=5,667 cf Inflow=160.61 cfs 18.783 af
42.0" Round Culvert n=0.013 L=235.0' S=0.0026 '/' Outflow=152.31 cfs 18.783 af

Pond .A-4: Peak Elev=33.80' Storage=69,865 cf Inflow=105.80 cfs 15.856 af
42.0" Round Culvert n=0.013 L=233.0' S=0.0031 '/' Outflow=149.83 cfs 15.889 af

Pond .A-6: Peak Elev=36.68' Storage=195 cf Inflow=146.39 cfs 15.856 af
42.0" Round Culvert n=0.013 L=172.0' S=0.0027 '/' Outflow=105.80 cfs 15.856 af

Pond .A1-B: Peak Elev=52.76' Inflow=33.84 cfs 3.486 af
24.0" Round Culvert n=0.013 L=181.0' S=0.0336 '/' Outflow=33.84 cfs 3.486 af

Pond .AA-1: Peak Elev=38.54' Inflow=4.07 cfs 0.381 af
12.0" Round Culvert n=0.013 L=292.0' S=0.0076 '/' Outflow=4.07 cfs 0.381 af

Pond .AA-2: Peak Elev=43.73' Inflow=4.07 cfs 0.381 af
12.0" Round Culvert n=0.013 L=348.3' S=0.0076 '/' Outflow=4.07 cfs 0.381 af

Pond .DMH A1: (new Pond) Peak Elev=65.46' Inflow=4.12 cfs 0.324 af
24.0" Round Culvert n=0.013 L=55.0' S=0.0071 '/' Outflow=4.12 cfs 0.324 af

Pond .P3: Outfall 3 Peak Elev=31.01' Storage=2,219 cf Inflow=19.83 cfs 1.264 af
Outflow=13.77 cfs 1.264 af

Pond 1P: Grass Lined Filtration Basin Peak Elev=76.45' Storage=14,473 cf Inflow=11.36 cfs 0.874 af
Outflow=7.84 cfs 0.658 af

Pond 3P: RipRap Inlet Area w/Outlet Control Peak Elev=75.95' Storage=98 cf Inflow=7.84 cfs 0.658 af
Primary=7.84 cfs 0.657 af Secondary=0.00 cfs 0.000 af Outflow=7.84 cfs 0.657 af

Pond 10P: CHAMBERS Peak Elev=65.65' Storage=5,057 cf Inflow=6.14 cfs 0.411 af
Outflow=6.29 cfs 0.343 af

Pond 12P: POR C Peak Elev=68.00' Storage=10,067 cf Inflow=6.03 cfs 0.487 af
Outflow=1.10 cfs 0.429 af

Pond 19P: Peak Elev=47.14' Storage=82 cf Inflow=9.92 cfs 3.302 af
15.0" Round Culvert n=0.013 L=210.0' S=0.0067 '/' Outflow=9.94 cfs 3.302 af

Pond 20P: POR B Peak Elev=67.82' Storage=3,916 cf Inflow=2.86 cfs 0.232 af
Outflow=1.10 cfs 0.213 af

Pond 23P: 23 P Peak Elev=66.01' Inflow=6.44 cfs 0.777 af
15.0" Round Culvert n=0.013 L=40.0' S=0.0120 '/' Outflow=6.44 cfs 0.777 af

Pond 25P: (new Pond) Peak Elev=76.75' Storage=38 cf Inflow=2.44 cfs 0.716 af
15.0" Round Culvert n=0.013 L=560.0' S=0.0268 '/' Outflow=5.11 cfs 0.716 af

Pond 26P: (new Pond) Peak Elev=82.84' Storage=38 cf Inflow=5.11 cfs 0.717 af
24.0" Round Culvert n=0.013 L=340.0' S=0.0223 '/' Outflow=5.35 cfs 0.718 af

Pond 45P: (new Pond) Peak Elev=45.91' Storage=28,152 cf Inflow=8.22 cfs 1.175 af
12.0" Round Culvert n=0.015 L=30.0' S=0.0200 '/' Outflow=2.45 cfs 0.716 af

Pond A-11P: Minimally Controlled by Inlet Peak Elev=56.14' Storage=4,438 cf Inflow=7.59 cfs 0.986 af
Outflow=8.39 cfs 0.986 af

Pond A-21P: Controlled by Inlet Capacity Peak Elev=82.73' Storage=34,355 cf Inflow=21.31 cfs 3.363 af
Primary=11.37 cfs 3.401 af Secondary=11.31 cfs 0.587 af Outflow=14.74 cfs 3.363 af

Pond A-54P: MINIMALLY CONTROLLED BY Peak Elev=68.52' Storage=1,650 cf Inflow=10.71 cfs 0.844 af
Primary=6.49 cfs 0.793 af Secondary=17.78 cfs 0.082 af Outflow=18.23 cfs 0.843 af

Pond A-69P: (new Pond) Peak Elev=57.51' Storage=607 cf Inflow=8.84 cfs 0.696 af
Primary=4.33 cfs 0.410 af Secondary=6.00 cfs 0.304 af Outflow=8.80 cfs 0.696 af

Pond A-7P: Minimally Controlled by Inlet Peak Elev=50.92' Storage=2,065 cf Inflow=4.25 cfs 0.666 af
Outflow=4.56 cfs 0.666 af

Pond A-91A: Peak Elev=52.78' Storage=0.003 af Inflow=140.03 cfs 23.129 af
Primary=139.51 cfs 23.129 af Secondary=7.32 cfs 0.006 af Outflow=139.51 cfs 23.129 af

Pond A-91B: Peak Elev=54.44' Storage=0.003 af Inflow=105.12 cfs 10.063 af
54.0" Round Culvert n=0.013 L=47.0' S=0.0051 '/' Outflow=104.91 cfs 10.063 af

Pond B-12: (new Pond) Peak Elev=45.04' Storage=0.004 af Inflow=63.79 cfs 4.935 af
30.0" Round Culvert n=0.013 L=137.0' S=0.0061 '/' Outflow=64.15 cfs 4.935 af

Pond B-13: (new Pond) Peak Elev=57.29' Storage=0.004 af Inflow=63.30 cfs 4.937 af
30.0" Round Culvert n=0.013 L=25.0' S=0.0100 '/' Outflow=63.29 cfs 4.935 af

Pond B-14: Peak Elev=82.50' Storage=0.002 af Inflow=63.32 cfs 4.938 af
24.0" Round Culvert n=0.013 L=224.0' S=0.0070 '/' Outflow=63.30 cfs 4.937 af

Pond DHM A7: Peak Elev=41.12' Storage=0.002 af Inflow=138.07 cfs 23.129 af
54.0" Round Culvert n=0.013 L=300.0' S=0.0108 '/' Outflow=138.09 cfs 23.128 af

Pond DMH A1: Peak Elev=73.54' Storage=104 cf Inflow=37.01 cfs 3.305 af
24.0" Round Culvert n=0.013 L=40.0' S=0.0080 '/' Outflow=36.71 cfs 3.305 af

Pond DMH A2: Peak Elev=71.91' Storage=163 cf Inflow=8.31 cfs 0.736 af
18.0" Round Culvert n=0.013 L=666.0' S=0.0086 '/' Outflow=12.33 cfs 0.736 af

Pond DMH A3: Peak Elev=72.91' Storage=110 cf Inflow=36.71 cfs 3.305 af
24.0" Round Culvert n=0.013 L=550.0' S=0.0030 '/' Outflow=39.76 cfs 3.305 af

Pond DMH A4: Peak Elev=49.74' Storage=102 cf Inflow=139.51 cfs 23.129 af
54.0" Round Culvert n=0.013 L=309.0' S=0.0057 '/' Outflow=138.83 cfs 23.129 af

Pond DMH A5: Peak Elev=46.88' Storage=89 cf Inflow=138.83 cfs 23.129 af
54.0" Round Culvert n=0.013 L=1,012.0' S=0.0048 '/' Outflow=137.93 cfs 23.129 af

Pond DMH A6: Peak Elev=41.46' Storage=83 cf Inflow=137.93 cfs 23.129 af
54.0" Round Culvert n=0.013 L=312.0' S=0.0048 '/' Outflow=138.07 cfs 23.129 af

Pond DMH C2: (new Pond) Peak Elev=68.86' Inflow=48.22 cfs 4.589 af
24.0" Round Culvert n=0.013 L=370.0' S=0.0062 '/' Outflow=48.22 cfs 4.589 af

Pond DMH C6: Outfall 3 Peak Elev=24.34' Storage=108 cf Inflow=270.70 cfs 73.884 af
60.0" Round Culvert n=0.013 L=141.0' S=0.0050 '/' Outflow=250.60 cfs 73.884 af

Pond DMH C7: Peak Elev=31.28' Storage=157 cf Inflow=302.32 cfs 88.960 af
Primary=270.70 cfs 73.884 af Secondary=146.39 cfs 15.856 af Outflow=309.59 cfs 88.960 af

Pond DMH C8: Peak Elev=37.15' Storage=211 cf Inflow=292.07 cfs 86.708 af
60.0" Round Culvert n=0.013 L=284.0' S=0.0050 '/' Outflow=298.43 cfs 86.708 af

Pond MT-11A: Peak Elev=388.26' Inflow=7.48 cfs 0.570 af
18.0" Round Culvert n=0.011 L=104.0' S=0.0027 '/' Outflow=7.48 cfs 0.570 af

Pond MT-16: Peak Elev=387.68' Inflow=7.48 cfs 0.570 af
24.0" Round Culvert n=0.010 L=74.0' S=0.0074 '/' Outflow=7.48 cfs 0.570 af

Pond MT-24: Peak Elev=387.42' Inflow=7.48 cfs 0.570 af
24.0" Round Culvert n=0.010 L=145.0' S=0.0035 '/' Outflow=7.48 cfs 0.570 af

Pond MT-25: Peak Elev=387.34' Inflow=7.48 cfs 0.570 af
24.0" Round Culvert n=0.011 L=74.0' S=0.0020 '/' Outflow=7.48 cfs 0.570 af

Pond MT-26: Peak Elev=387.06' Inflow=7.48 cfs 0.570 af
24.0" Round Culvert n=0.010 L=20.0' S=0.0250 '/' Outflow=7.48 cfs 0.570 af

Pond Outfall 1: Outfall 1 Inflow=47.34 cfs 10.575 af
Primary=47.34 cfs 10.575 af

Pond P-4: Peak Elev=40.81' Storage=299,877 cf Inflow=419.36 cfs 86.327 af
60.0" Round Culvert n=0.013 L=500.0' S=0.0092 '/' Outflow=291.40 cfs 86.327 af

Pond P-5: Peak Elev=387.02' Storage=9,952 cf Inflow=10.01 cfs 0.735 af
Outflow=14.09 cfs 0.638 af

Pond P-67A: Peak Elev=57.37' Storage=2,951 cf Inflow=17.37 cfs 1.367 af
Primary=9.17 cfs 1.128 af Secondary=21.08 cfs 0.250 af Outflow=23.62 cfs 1.367 af

Pond P-CB17: (new Pond) Peak Elev=62.37' Inflow=1.01 cfs 0.995 af
18.0" Round Culvert n=0.013 L=30.0' S=0.0113 '/' Outflow=1.01 cfs 0.995 af

Pond P-CB18: (new Pond) Peak Elev=62.36' Inflow=1.07 cfs 1.032 af
18.0" Round Culvert n=0.013 L=40.0' S=0.0143 '/' Outflow=1.07 cfs 1.032 af

Pond P-DMH1: (new Pond) Peak Elev=62.36' Inflow=8.02 cfs 1.639 af
24.0" Round Culvert n=0.013 L=305.0' S=0.0024 '/' Outflow=8.02 cfs 1.639 af

Pond P-JB3A: (new Pond) Peak Elev=62.51' Storage=60,677 cf Inflow=17.52 cfs 3.224 af
Primary=0.98 cfs 0.962 af Secondary=8.20 cfs 1.798 af Outflow=9.18 cfs 2.761 af

Pond P-JB3B: (new Pond) Peak Elev=72.30' Storage=10,022 cf Inflow=16.52 cfs 1.193 af
15.0" Round Culvert n=0.013 L=40.0' S=0.0100 '/' Outflow=6.47 cfs 1.193 af

Pond P-WQU5: (new Pond) Peak Elev=63.10' Inflow=7.27 cfs 0.607 af
18.0" Round Culvert n=0.013 L=24.0' S=0.0429 '/' Outflow=7.27 cfs 0.607 af

Pond PA-100: Peak Elev=64.52' Storage=31,264 cf Inflow=24.88 cfs 6.267 af
18.0" Round Culvert n=0.013 L=403.0' S=0.0054 '/' Outflow=9.85 cfs 6.267 af

Pond PA-101: Peak Elev=124.55' Storage=52,286 cf Inflow=23.58 cfs 5.768 af
15.0" Round Culvert n=0.013 L=386.0' S=0.0056 '/' Outflow=23.95 cfs 5.768 af

Pond PA-10TEE: Volume from A-10 Peak Elev=65.44' Storage=121 cf Inflow=71.69 cfs 12.489 af
42.0" Round Culvert n=0.013 L=62.0' S=0.0058 '/' Outflow=67.35 cfs 12.489 af

Pond PA-11: Peak Elev=90.46' Storage=153 cf Inflow=75.78 cfs 12.489 af
42.0" Round Culvert n=0.013 L=154.0' S=0.0058 '/' Outflow=71.69 cfs 12.489 af

Pond PA-12: Peak Elev=58.13' Storage=1,383 cf Inflow=53.69 cfs 10.494 af
Primary=50.15 cfs 10.492 af Secondary=2.17 cfs 0.003 af Outflow=50.15 cfs 10.494 af

Pond PA-13: Peak Elev=59.97' Storage=466 cf Inflow=63.61 cfs 10.064 af
Primary=53.03 cfs 10.033 af Secondary=8.14 cfs 0.031 af Outflow=53.03 cfs 10.064 af

Pond PA-14: Peak Elev=74.65' Storage=73 cf Inflow=62.18 cfs 9.464 af
30.0" Round Culvert n=0.013 L=515.0' S=0.0036 '/' Outflow=62.10 cfs 9.464 af

Pond PA-14R: TO BE FIXED Peak Elev=60.59' Storage=17,912 cf Inflow=18.78 cfs 2.202 af
Outflow=20.05 cfs 2.202 af

Pond PA-15: Peak Elev=72.06' Storage=72 cf Inflow=44.98 cfs 6.938 af
30.0" Round Culvert n=0.013 L=330.0' S=0.0027 '/' Outflow=44.46 cfs 6.938 af

Pond PA-15R: (new Pond) Peak Elev=61.23' Storage=12,254 cf Inflow=13.54 cfs 1.393 af
Primary=9.76 cfs 1.239 af Secondary=9.29 cfs 0.475 af Outflow=18.57 cfs 1.393 af

Pond PA-16: Peak Elev=75.04' Storage=74 cf Inflow=32.78 cfs 5.699 af
24.0" Round Culvert n=0.013 L=290.0' S=0.0051 '/' Outflow=36.07 cfs 5.699 af

Pond PA-16R: (new Pond) Peak Elev=62.60' Storage=8,463 cf Inflow=13.07 cfs 2.001 af
Primary=7.76 cfs 1.697 af Secondary=7.66 cfs 0.376 af Outflow=15.38 cfs 2.001 af

Pond PA-17: Peak Elev=73.37' Storage=94 cf Inflow=26.64 cfs 4.001 af
24.0" Round Culvert n=0.013 L=297.0' S=0.0037 '/' Outflow=26.61 cfs 4.001 af

Pond PA-19: Peak Elev=81.43' Storage=104 cf Inflow=21.78 cfs 3.994 af
24.0" Round Culvert n=0.013 L=295.0' S=0.0059 '/' Outflow=26.64 cfs 3.996 af

Pond PA-20TEE: STORAGE FROM A-20 Peak Elev=81.40' Storage=73 cf Inflow=20.16 cfs 3.994 af
18.0" Round Culvert n=0.013 L=110.0' S=0.0042 '/' Outflow=21.78 cfs 3.994 af

Pond PA-21: Peak Elev=95.30' Storage=63 cf Inflow=26.69 cfs 3.994 af
18.0" Round Culvert n=0.013 L=182.0' S=0.0051 '/' Outflow=20.16 cfs 3.994 af

Pond PA-22: Peak Elev=87.06' Storage=55 cf Inflow=11.31 cfs 0.587 af
18.0" Round Culvert n=0.013 L=295.0' S=0.0059 '/' Outflow=15.38 cfs 0.588 af

Pond PA-23: Peak Elev=84.87' Storage=127 cf Inflow=109.29 cfs 18.902 af
30.0" Round Culvert n=0.013 L=440.0' S=0.0466 '/' Outflow=111.72 cfs 18.904 af

Pond PA-24: Peak Elev=73.67' Storage=2,795 cf Inflow=90.43 cfs 17.504 af
36.0" Round Culvert n=0.013 L=74.0' S=0.0064 '/' Outflow=109.29 cfs 17.504 af

Pond PA-25: Peak Elev=74.06' Storage=136 cf Inflow=70.01 cfs 14.761 af
36.0" Round Culvert n=0.013 L=333.0' S=0.0040 '/' Outflow=75.04 cfs 14.761 af

Pond PA-26: Peak Elev=75.64' Storage=114 cf Inflow=27.02 cfs 3.227 af
30.0" Round Culvert n=0.013 L=198.0' S=0.0070 '/' Outflow=21.30 cfs 3.227 af

Pond PA-27TEE: Volume from A-27 Peak Elev=74.62' Storage=107 cf Inflow=21.02 cfs 2.431 af
30.0" Round Culvert n=0.013 L=240.0' S=0.0055 '/' Outflow=24.14 cfs 2.431 af

Pond PA-28A: Peak Elev=72.22' Storage=109 cf Inflow=22.59 cfs 2.424 af
30.0" Round Culvert n=0.013 L=153.0' S=0.0043 '/' Outflow=21.02 cfs 2.424 af

Pond PA-29: Peak Elev=74.97' Storage=111 cf Inflow=19.47 cfs 2.418 af
24.0" Round Culvert n=0.010 L=90.0' S=0.0050 '/' Outflow=22.61 cfs 2.418 af

Pond PA-30: Peak Elev=72.83' Storage=107 cf Inflow=13.68 cfs 1.764 af
24.0" Round Culvert n=0.010 L=300.0' S=0.0044 '/' Outflow=17.39 cfs 1.764 af

Pond PA-31: Peak Elev=76.24' Storage=103 cf Inflow=5.23 cfs 1.040 af
24.0" Round Culvert n=0.013 L=396.0' S=0.0051 '/' Outflow=10.68 cfs 1.041 af

Pond PA-34: Peak Elev=76.56' Storage=1,422 cf Inflow=59.81 cfs 11.380 af
30.0" Round Culvert n=0.013 L=105.0' S=0.0173 '/' Outflow=63.82 cfs 11.380 af

Pond PA-34R: (new Pond) Peak Elev=0.00' Storage=0 cf
Primary=0.00 cfs 0.000 af

Pond PA-35: Peak Elev=94.19' Storage=381 cf Inflow=47.69 cfs 9.572 af
24.0" Round Culvert n=0.013 L=230.0' S=0.0032 '/' Outflow=51.64 cfs 9.572 af

Pond PA-36: Peak Elev=83.84' Storage=92 cf Inflow=24.00 cfs 4.403 af
24.0" Round Culvert n=0.013 L=161.0' S=0.0081 '/' Outflow=23.56 cfs 4.403 af

Pond PA-37: Peak Elev=95.23' Storage=87 cf Inflow=22.46 cfs 4.403 af
24.0" Round Culvert n=0.013 L=396.0' S=0.0045 '/' Outflow=24.00 cfs 4.403 af

Pond PA-37R: Slightly Controlled by Inlet Peak Elev=57.77' Storage=13,303 cf Inflow=6.61 cfs 1.491 af
Outflow=16.30 cfs 1.491 af

Pond PA-38: Peak Elev=84.74' Storage=87 cf Inflow=13.27 cfs 2.745 af
18.0" Round Culvert n=0.013 L=396.0' S=0.0044 '/' Outflow=10.23 cfs 2.745 af

Pond PA-39: Peak Elev=96.31' Storage=90 cf Inflow=8.79 cfs 2.743 af
18.0" Round Culvert n=0.013 L=200.0' S=0.0030 '/' Outflow=13.27 cfs 2.743 af

Pond PA-40: Peak Elev=61.96' Storage=32,873 cf Inflow=17.08 cfs 2.630 af
15.0" Round Culvert n=0.013 L=400.0' S=0.0051 '/' Outflow=8.79 cfs 2.630 af

Pond PA-42: Peak Elev=94.24' Storage=101 cf Inflow=22.06 cfs 4.050 af
30.0" Round Culvert n=0.013 L=378.0' S=0.0045 '/' Outflow=27.41 cfs 4.050 af

Pond PA-42R: Controlled by Inlet Capacity Peak Elev=88.83' Storage=36,250 cf Inflow=24.51 cfs 3.886 af
Outflow=23.23 cfs 3.886 af

Pond PA-43: Peak Elev=81.19' Storage=78 cf Inflow=27.41 cfs 4.057 af
30.0" Round Culvert n=0.013 L=128.0' S=0.0093 '/' Outflow=27.17 cfs 4.057 af

Pond PA-48: Peak Elev=50.80' Storage=54 cf Inflow=3.23 cfs 0.679 af
12.0" Round Culvert n=0.012 L=423.0' S=-0.0004 '/' Outflow=3.23 cfs 0.679 af

Pond PA-49: Peak Elev=54.47' Storage=3,596 cf Inflow=6.42 cfs 0.679 af
10.0" Round Culvert n=0.012 L=141.0' S=0.0048 '/' Outflow=3.23 cfs 0.679 af

Pond PA-51: Peak Elev=51.95' Storage=9,541 cf Inflow=5.81 cfs 1.110 af
15.0" Round Culvert n=0.012 L=59.0' S=-0.0020 '/' Outflow=11.75 cfs 1.110 af

Pond PA-52: Peak Elev=76.51' Storage=90 cf Inflow=11.87 cfs 1.331 af
15.0" Round Culvert n=0.010 L=4.0' S=0.0550 '/' Outflow=11.96 cfs 1.331 af

Pond PA-53A: Peak Elev=45.87' Storage=21 cf Inflow=3.23 cfs 0.679 af
12.0" Round Culvert n=0.012 L=370.0' S=0.0643 '/' Outflow=3.23 cfs 0.679 af

Pond PA-53CR: Controlled by Inlet Capacity Peak Elev=45.33' Storage=27,517 cf Inflow=21.13 cfs 3.302 af
Outflow=9.92 cfs 3.302 af

Pond PA-54: Peak Elev=102.68' Storage=3,964 cf Inflow=116.98 cfs 9.766 af
36.0" Round Culvert n=0.013 L=236.0' S=0.0086 '/' Outflow=131.10 cfs 9.766 af

Pond PA-54A: Peak Elev=68.47' Storage=128 cf Inflow=89.08 cfs 6.674 af
Primary=58.73 cfs 6.183 af Secondary=71.90 cfs 0.542 af Outflow=82.98 cfs 6.674 af

Pond PA-55: Peak Elev=69.06' Storage=77 cf Inflow=11.13 cfs 0.876 af
24.0" Round Culvert n=0.013 L=69.0' S=0.0072 '/' Outflow=11.18 cfs 0.877 af

Pond PA-56: Peak Elev=72.44' Storage=83 cf Inflow=14.31 cfs 1.287 af
18.0" Round Culvert n=0.013 L=130.0' S=0.0063 '/' Outflow=14.50 cfs 1.288 af

Pond PA-57: Peak Elev=105.49' Storage=98 cf Inflow=8.90 cfs 0.841 af
18.0" Round Culvert n=0.013 L=239.0' S=0.0018 '/' Outflow=8.70 cfs 0.841 af

Pond PA-57A: Peak Elev=75.95' Storage=64 cf Inflow=6.74 cfs 0.555 af
15.0" Round Culvert n=0.013 L=10.0' S=0.0240 '/' Outflow=6.92 cfs 0.555 af

Pond PA-57B: Peak Elev=83.67' Storage=63 cf Inflow=1.34 cfs 0.124 af
8.0" Round Culvert n=0.025 L=175.0' S=0.0100 '/' Outflow=1.37 cfs 0.124 af

Pond PA-57C: Peak Elev=106.24' Storage=69 cf Inflow=6.73 cfs 0.554 af
15.0" Round Culvert n=0.013 L=45.0' S=0.0267 '/' Outflow=6.74 cfs 0.555 af

Pond PA-58: Peak Elev=102.38' Storage=127 cf Inflow=63.66 cfs 5.967 af
Primary=63.75 cfs 5.728 af Secondary=44.07 cfs 0.360 af Outflow=66.35 cfs 5.966 af

Pond PA-59: Peak Elev=67.45' Storage=100 cf Inflow=16.81 cfs 1.301 af
Primary=17.03 cfs 1.291 af Secondary=16.64 cfs 0.062 af Outflow=16.64 cfs 1.302 af

Pond PA-60: Peak Elev=64.01' Storage=84 cf Inflow=2.99 cfs 0.166 af
18.0" Round Culvert n=0.012 L=91.0' S=0.0027 '/' Outflow=4.47 cfs 0.166 af

Pond PA-61: Peak Elev=67.77' Storage=81 cf Inflow=1.93 cfs 0.166 af
12.0" Round Culvert n=0.012 L=47.0' S=0.0023 '/' Outflow=2.99 cfs 0.166 af

Pond PA-63: Peak Elev=55.94' Storage=72 cf Inflow=0.14 cfs 0.009 af
12.0" Round Culvert n=0.013 L=78.0' S=0.0014 '/' Outflow=0.91 cfs 0.009 af

Pond PA-64: Peak Elev=57.42' Storage=103 cf Inflow=49.26 cfs 4.052 af
Primary=39.79 cfs 3.150 af Secondary=43.55 cfs 0.911 af Outflow=49.73 cfs 4.052 af

Pond PA-64A: Peak Elev=57.36' Storage=91 cf Inflow=2.15 cfs 0.158 af
Primary=1.85 cfs 0.123 af Secondary=2.46 cfs 0.036 af Outflow=2.78 cfs 0.158 af

Pond PA-65: Peak Elev=57.37' Storage=10,890 cf Inflow=52.42 cfs 4.338 af
Primary=45.65 cfs 4.467 af Secondary=0.00 cfs 0.000 af Outflow=45.65 cfs 4.338 af

Pond PA-66: Peak Elev=57.42' Storage=112 cf Inflow=4.42 cfs 0.275 af
Primary=4.55 cfs 0.233 af Secondary=2.67 cfs 0.044 af Outflow=4.55 cfs 0.276 af

Pond PA-67: Peak Elev=57.35' Storage=104 cf Inflow=1.33 cfs 0.067 af
Primary=2.86 cfs 0.067 af Secondary=0.77 cfs 0.004 af Outflow=2.86 cfs 0.067 af

Pond PA-67A: Peak Elev=57.40' Storage=5,530 cf Inflow=28.18 cfs 3.119 af
Primary=33.13 cfs 2.855 af Secondary=24.42 cfs 0.264 af Outflow=35.70 cfs 3.119 af

Pond PA-69: Peak Elev=57.51' Storage=105 cf Inflow=19.08 cfs 1.667 af
Primary=14.08 cfs 1.591 af Secondary=6.04 cfs 0.092 af Outflow=18.96 cfs 1.667 af

Pond PA-7: Peak Elev=79.13' Storage=121 cf Inflow=229.57 cfs 24.835 af
42.0" Round Culvert n=0.013 L=498.0' S=0.0082 '/' Outflow=226.42 cfs 24.835 af

Pond PA-70: Peak Elev=57.68' Storage=88 cf Inflow=4.24 cfs 0.260 af
Primary=5.27 cfs 0.261 af Secondary=0.00 cfs 0.000 af Outflow=5.27 cfs 0.261 af

Pond PA-71: Peak Elev=57.63' Storage=75 cf Inflow=0.41 cfs 0.028 af
Primary=1.12 cfs 0.026 af Secondary=0.43 cfs 0.002 af Outflow=1.12 cfs 0.028 af

Pond PA-72: Peak Elev=57.77' Storage=84 cf Inflow=3.76 cfs 0.141 af
Primary=3.01 cfs 0.141 af Secondary=0.00 cfs 0.000 af Outflow=3.01 cfs 0.141 af

Pond PA-72A: Peak Elev=57.82' Storage=84 cf Inflow=2.34 cfs 0.117 af
Primary=3.73 cfs 0.118 af Secondary=0.00 cfs 0.000 af Outflow=3.73 cfs 0.117 af

Pond PA-73: Peak Elev=57.90' Storage=83 cf Inflow=1.68 cfs 0.098 af
Primary=2.32 cfs 0.099 af Secondary=0.00 cfs 0.000 af Outflow=2.32 cfs 0.098 af

Pond PA-74: Peak Elev=57.91' Storage=81 cf Inflow=0.98 cfs 0.070 af
Primary=1.64 cfs 0.070 af Secondary=0.00 cfs 0.000 af Outflow=1.64 cfs 0.070 af

Pond PA-75: Peak Elev=58.40' Storage=87 cf Inflow=12.78 cfs 0.995 af
Primary=12.77 cfs 0.995 af Secondary=0.00 cfs 0.000 af Outflow=12.77 cfs 0.995 af

Pond PA-76: Peak Elev=65.06' Storage=109 cf Inflow=8.42 cfs 0.654 af
24.0" Round Culvert n=0.013 L=90.0' S=0.0069 '/' Outflow=11.04 cfs 0.656 af

Pond PA-77: Peak Elev=59.66' Storage=51 cf Inflow=7.06 cfs 0.556 af
Primary=7.08 cfs 0.556 af Secondary=0.00 cfs 0.000 af Outflow=7.08 cfs 0.556 af

Pond PA-78: Peak Elev=65.26' Storage=139 cf Inflow=17.15 cfs 0.943 af
36.0" Round Culvert n=0.013 L=213.0' S=0.0111 '/' Outflow=24.34 cfs 0.945 af

Pond PA-79: Peak Elev=57.00' Storage=89 cf Inflow=8.98 cfs 0.249 af
30.0" Round Culvert n=0.013 L=108.0' S=0.0047 '/' Outflow=8.66 cfs 0.250 af

Pond PA-8: Peak Elev=86.88' Storage=1,374 cf Inflow=72.34 cfs 13.506 af
Primary=101.97 cfs 13.475 af Secondary=79.97 cfs 0.458 af Outflow=101.16 cfs 13.522 af

Pond PA-80: Peak Elev=55.66' Storage=59 cf Inflow=8.99 cfs 0.201 af
24.0" Round Culvert n=0.013 L=88.0' S=0.0108 '/' Outflow=8.50 cfs 0.204 af

Pond PA-8A: DATA? Peak Elev=64.69' Storage=9 cf Inflow=71.90 cfs 12.513 af
42.0" Round Culvert n=0.013 L=396.0' S=0.0044 '/' Outflow=67.37 cfs 12.513 af

Pond PA-9: Peak Elev=89.71' Storage=157 cf Inflow=67.35 cfs 12.489 af
42.0" Round Culvert n=0.013 L=175.0' S=0.0058 '/' Outflow=71.90 cfs 12.489 af

Pond PA-90: Peak Elev=55.06' Storage=48 cf Inflow=9.12 cfs 0.149 af
24.0" Round Culvert n=0.013 L=93.0' S=0.0024 '/' Outflow=8.45 cfs 0.150 af

Pond PA-91: Peak Elev=58.84' Storage=180 cf Inflow=39.06 cfs 13.068 af
24.0" Round Culvert n=0.013 L=71.0' S=0.0056 '/' Outflow=37.77 cfs 13.066 af

Pond PA-92: Peak Elev=64.35' Storage=122 cf Inflow=36.73 cfs 12.799 af
24.0" Round Culvert n=0.013 L=93.0' S=0.0023 '/' Outflow=35.55 cfs 12.799 af

Pond PA-93: Peak Elev=66.19' Storage=115 cf Inflow=32.32 cfs 12.420 af
24.0" Round Culvert n=0.013 L=96.0' S=0.0024 '/' Outflow=31.76 cfs 12.420 af

Pond PA-94: Peak Elev=67.88' Storage=109 cf Inflow=28.58 cfs 12.060 af
24.0" Round Culvert n=0.013 L=93.0' S=0.0039 '/' Outflow=27.61 cfs 12.060 af

Pond PA-95: Peak Elev=69.99' Storage=105 cf Inflow=26.50 cfs 11.665 af
24.0" Round Culvert n=0.013 L=93.0' S=0.0039 '/' Outflow=23.44 cfs 11.665 af

Pond PA-95A: Peak Elev=68.07' Storage=7 cf Inflow=25.58 cfs 11.828 af
24.0" Round Culvert n=0.013 L=51.0' S=-0.0041 '/' Outflow=25.52 cfs 11.828 af

Pond PA-96: Peak Elev=69.73' Storage=89 cf Inflow=27.07 cfs 11.533 af
24.0" Round Culvert n=0.013 L=93.0' S=-0.0010 '/' Outflow=26.26 cfs 11.533 af

Pond PA-99: Peak Elev=70.49' Storage=8,628 cf Inflow=25.82 cfs 11.043 af
24.0" Round Culvert n=0.013 L=296.0' S=0.0021 '/' Outflow=26.10 cfs 11.043 af

Pond PC4-1S: Peak Elev=70.00' Storage=1,676 cf Inflow=12.73 cfs 4.022 af
18.0" Round Culvert n=0.013 L=106.0' S=0.0125 '/' Outflow=14.85 cfs 4.022 af

Pond PC4-2: Peak Elev=61.86' Storage=25,302 cf Inflow=18.04 cfs 2.474 af
18.0" Round Culvert n=0.013 L=65.0' S=0.0022 '/' Outflow=10.02 cfs 2.474 af

Pond PJB2: (new Pond) Peak Elev=64.76' Storage=19,078 cf Inflow=10.50 cfs 1.690 af
Outflow=4.37 cfs 1.690 af

Pond PS-12: (new Pond) Peak Elev=82.40' Storage=135 cf Inflow=63.82 cfs 11.513 af
30.0" Round Culvert n=0.013 L=190.0' S=0.0013 '/' Outflow=67.24 cfs 11.513 af

Pond PS-13: Peak Elev=73.15' Storage=98 cf Inflow=11.96 cfs 1.353 af
15.0" Round Culvert n=0.010 L=315.0' S=0.0006 '/' Outflow=10.74 cfs 1.353 af

Pond RWW CB10: (new Pond) Peak Elev=53.05' Storage=0.004 af Inflow=63.29 cfs 4.935 af
30.0" Round Culvert n=0.013 L=200.0' S=0.0312 '/' Outflow=63.79 cfs 4.935 af

Pond TWIN P: (new Pond) Peak Elev=66.82' Storage=944 cf Inflow=4.44 cfs 0.437 af
12.0" Round Culvert x 2.00 n=0.013 L=75.0' S=0.0043 '/' Outflow=4.00 cfs 0.437 af

Pond WQ CB: (new Pond) Peak Elev=63.30' Storage=49,154 cf Inflow=35.75 cfs 2.867 af
Outflow=28.41 cfs 2.222 af

Pond WQU: (new Pond) Peak Elev=45.27' Inflow=48.22 cfs 4.589 af
24.0" Round Culvert n=0.011 L=80.0' S=0.0024 '/' Outflow=48.22 cfs 4.589 af

Link 1R: 25 Year Manual Hydrograph Inflow=36.91 cfs 3.059 af
Area= 8.518 ac 70.03% Imperv. Primary=36.91 cfs 3.059 af

Link 5R: 25 Year Manual Hydrograph Inflow=10.01 cfs 0.733 af
Area= 1.754 ac 90.88% Imperv. Primary=10.01 cfs 0.733 af

Link 37L: 25 YEAR Manual Hydrograph Inflow=48.22 cfs 4.589 af
Area= 23.400 ac 61.69% Imperv. Primary=48.22 cfs 4.589 af

Total Runoff Area = 277.268 ac Runoff Volume = 96.673 af Average Runoff Depth = 4.18"
57.87% Pervious = 160.462 ac 42.13% Impervious = 116.806 ac

Summary for Subcatchment .2S:

Runoff = 33.84 cfs @ 12.21 hrs, Volume= 3.486 af, Depth= 4.33"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (sf)	CN	Description
65,277	74	>75% Grass cover, Good, HSG C
175,948	80	>75% Grass cover, Good, HSG D
179,988	98	Paved parking & roofs
421,213	87	Weighted Average
241,225		57.27% Pervious Area
179,988		42.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	100	0.0198	0.16		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
3.4	175	0.0150	0.86		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
1.4	348	0.0060	4.08	5.00	**Pipe Channel, C-D** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Concrete pipe, straight & clean
1.0	262	0.0069	4.37	5.37	**Pipe Channel, D-E** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Concrete pipe, straight & clean
16.0	885	Total			

Summary for Subcatchment .5S:

Runoff = 31.95 cfs @ 12.06 hrs, Volume= 2.252 af, Depth= 3.77"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (sf)	CN	Description
83,928	98	Paved parking & roofs
193,199	74	>75% Grass cover, Good, HSG C
35,072	80	>75% Grass cover, Good, HSG D
312,199	81	Weighted Average
228,271		73.12% Pervious Area
83,928		26.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0169	1.25		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.00"
0.7	115	0.0169	2.64		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
2.3	225	0.0533	1.62		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
4.3	440	Total			

Summary for Subcatchment .6S:

Runoff = 4.07 cfs @ 12.17 hrs, Volume= 0.381 af, Depth= 4.42"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (sf)	CN	Description
18,779	98	Paved parking & roofs
26,278	80	>75% Grass cover, Good, HSG D
45,057	88	Weighted Average
26,278		58.32% Pervious Area
18,779		41.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.0172	0.16		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
1.7	94	0.0172	0.92		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
12.4	194	Total			

Summary for Subcatchment .7S:

Runoff = 7.47 cfs @ 12.13 hrs, Volume= 0.626 af, Depth= 3.55"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (sf)	CN	Description
19,410	98	Paved parking & roofs
72,676	74	>75% Grass cover, Good, HSG C
92,086	79	Weighted Average
72,676		78.92% Pervious Area
19,410		21.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	50	0.0059	0.71		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.00"
3.0	211	0.0033	1.17		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
1.8	188	0.0638	1.77		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
3.6	243	0.0057	1.13		**Shallow Concentrated Flow, D-E** Grassed Waterway Kv= 15.0 fps
9.6	692	Total			

Summary for Subcatchment .8SA:

Runoff = 24.35 cfs @ 12.26 hrs, Volume= 2.569 af, Depth= 3.73"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (sf)	CN	Description
104,423	74	>75% Grass cover, Good, HSG C
200,913	80	>75% Grass cover, Good, HSG D
54,669	98	Paved parking & roofs
360,005	81	Weighted Average
305,336		84.81% Pervious Area
54,669		15.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0230	0.12		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
4.9	278	0.0182	0.94		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
18.8	378	Total			

Summary for Subcatchment .8SB:

Runoff = 8.81 cfs @ 12.13 hrs, Volume= 0.738 af, Depth= 3.90"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.600	98	
	0.800	74	>75% Grass cover, Good, HSG C
	0.870	80	>75% Grass cover, Good, HSG D
	2.270	83	Weighted Average
	1.670		73.57% Pervious Area
	0.600		26.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	40	0.0600	0.15		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
1.8	25	0.2500	0.24		**Sheet Flow, B-C** Grass: Dense n= 0.240 P2= 3.00"
3.0	300	0.0120	1.64		**Shallow Concentrated Flow, C-D** Grassed Waterway Kv= 15.0 fps
9.4	365	Total			

Summary for Subcatchment 1S: Subcatchment Area to Grassed Filtration Basin

Runoff = 11.36 cfs @ 12.07 hrs, Volume= 0.874 af, Depth= 4.88"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.570	98	Impervious
*	0.580	74	Grass HSG C
	2.150	92	Weighted Average
	0.580		26.98% Pervious Area
	1.570		73.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Summary for Subcatchment 2AS: Subcatchment 2 Impervious Area not Recieving Treatment

Runoff = 0.68 cfs @ 12.01 hrs, Volume= 0.046 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.100	98	Impervious
	0.100		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry, Direct**

Summary for Subcatchment 2BS: Subcatchment 2AImpervious & Grassed Area not Recieving Treatme

Runoff = 0.52 cfs @ 12.02 hrs, Volume= 0.032 af, Depth= 3.35"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.015	98	Impervious
*	0.100	74	Grass HSG C
	0.115	77	Weighted Average
	0.100		86.96% Pervious Area
	0.015		13.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry, Direct**

Summary for Subcatchment 6AS: TERMINAL BUILDING ROOF DRAINAGE AREA

Runoff = 1.18 cfs @ 12.07 hrs, Volume= 0.093 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.200	98	ROOF
	0.200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 6CS: TERMINAL BUILDING CANOPY DRAINAGE AREA

Runoff = 0.59 cfs @ 12.07 hrs, Volume= 0.046 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.100	98	CANOPY
	0.100		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 6S: TERMINAL BUILDING ROOF DRAINAGE AREA

Runoff = 3.53 cfs @ 12.07 hrs, Volume= 0.278 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.600	98	ROOF
	0.600		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8S: PRE WATERSHED/UNTREATED DEVELOPED TRIB TO 2

Runoff = 7.58 cfs @ 12.37 hrs, Volume= 0.913 af, Depth= 3.80"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
	4,394	83	Woods, Poor, HSG D
*	85,274	82	Woods/grass comb., Poor, HSG D
*	12,571	98	Parking LOT
*	23,469	74	>75% Grass cover, Good, HSG D
	125,708	82	Weighted Average
	113,137		90.00% Pervious Area
	12,571		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0200	0.11		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.00"
11.5	490	0.0200	0.71		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
26.2	590	Total			

Summary for Subcatchment 9S: ROOF

Runoff = 6.14 cfs @ 12.00 hrs, Volume= 0.411 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (sf)	CN	Description
38,594	98	Paved parking & roofs
38,594		100.00% Impervious Area

Summary for Subcatchment 10S:

Runoff = 87.39 cfs @ 12.00 hrs, Volume= 5.640 af, Depth= 4.91"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (sf)	CN	Description
400,500	98	Paved parking & roofs
200,071	80	>75% Grass cover, Good, HSG D
600,571	92	Weighted Average
200,071		33.31% Pervious Area
400,500		66.69% Impervious Area

Summary for Subcatchment 11S: TRIB TO POR C

Runoff = 6.03 cfs @ 12.08 hrs, Volume= 0.487 af, Depth= 5.27"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.860	98	Porous Pavement
*	0.122	98	Sidewalk Curbs
	0.127	74	>75% Grass cover, Good, HSG C
	1.109	95	Weighted Average
	0.127		11.45% Pervious Area
	0.982		88.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 18S: PRE WATERSHED/UNTREATED DEVELOPED TRIB TO 3

Runoff = 11.23 cfs @ 12.66 hrs, Volume= 1.817 af, Depth= 4.25"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
	10,897	82	Woods/grass comb., Poor, HSG C
	202,979	86	Woods/grass comb., Poor, HSG D
*	5,533	98	JetPort Road
	3,947	80	>75% Grass cover, Good, HSG D
	223,356	86	Weighted Average
	217,823		97.52% Pervious Area
	5,533		2.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.3	100	0.0100	0.06		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
18.8	565	0.0100	0.50		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
48.1	665	Total			

Summary for Subcatchment 19S: TRIB TO POR B

Runoff = 2.86 cfs @ 12.08 hrs, Volume= 0.232 af, Depth= 5.38"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.460	98	Porous Pavement
*	0.021	98	Sidewalks/Curb
	0.037	74	>75% Grass cover, Good, HSG C
	0.518	96	Weighted Average
	0.037		7.14% Pervious Area
	0.481		92.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 36S: TERMINAL BUILDING ROOF DRAINAGE AREA

Runoff = 4.99 cfs @ 12.13 hrs, Volume= 0.464 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.000	98	ROADWAY
	1.000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 40S: A-72

Runoff = 10.89 cfs @ 12.08 hrs, Volume= 0.876 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.890	98	
	1.890		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	300	0.0100	1.26		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00"
1.6	200	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.6	500	Total			

Summary for Subcatchment A-100: (new Subcat)

Runoff = 5.82 cfs @ 12.13 hrs, Volume= 0.499 af, Depth= 4.61"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.800	84	
*	0.500	98	
	1.300	89	Weighted Average
	0.800		61.54% Pervious Area
	0.500		38.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0100	0.11		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
1.9	168	0.0100	1.50		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
9.6	218	Total			

Summary for Subcatchment A-101: (new Subcat)

Runoff = 12.09 cfs @ 12.54 hrs, Volume= 1.771 af, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	5.440	83	
	5.440		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.7	200	0.0050	0.11		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
9.9	895	0.0100	1.50		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
40.6	1,095	Total			

Summary for Subcatchment A-102: (new Subcat)

Runoff = 37.93 cfs @ 12.62 hrs, Volume= 6.375 af, Depth= 4.03"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	10.330	98	
	5.500	80	>75% Grass cover, Good, HSG D
	3.130	39	>75% Grass cover, Good, HSG A
	18.960	83	Weighted Average
	8.630		45.52% Pervious Area
	10.330		54.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.9	200	0.0100	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
1.4	130	0.0100	1.50		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
2.8	390	0.0020	2.35	2.89	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
2.5	400	0.0020	2.66	4.70	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
3.6	690	0.0020	3.22	10.12	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
44.2	1,810	Total			

Summary for Subcatchment A-11: (new Subcat)

Runoff = 7.59 cfs @ 12.38 hrs, Volume= 0.986 af, Depth= 4.32"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.000	98	
	1.740	80	>75% Grass cover, Good, HSG D
	2.740	87	Weighted Average
	1.740		63.50% Pervious Area
	1.000		36.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.4	100	0.0100	0.09		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
9.1	270	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
28.5	370	Total			

Summary for Subcatchment A-12: (new Subcat)

Runoff = 3.92 cfs @ 12.25 hrs, Volume= 0.429 af, Depth= 4.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
	0.720	80	>75% Grass cover, Good, HSG D
*	0.460	98	
	1.180	87	Weighted Average
	0.720		61.02% Pervious Area
	0.460		38.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	50	0.0100	0.07		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
7.7	230	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
18.9	280	Total			

Summary for Subcatchment A-13: (new Subcat)

Runoff = 3.94 cfs @ 12.51 hrs, Volume= 0.600 af, Depth= 4.74"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.880	98	
	0.640	80	>75% Grass cover, Good, HSG D
	1.520	90	Weighted Average
	0.640		42.11% Pervious Area
	0.880		57.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.9	200	0.0100	0.10		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
4.0	118	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
37.9	318	Total			

Summary for Subcatchment A-14: (new Subcat)

Runoff = 10.57 cfs @ 12.58 hrs, Volume= 1.727 af, Depth= 4.58"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	2.250	98	
	2.280	80	>75% Grass cover, Good, HSG D
	4.530	89	Weighted Average
	2.280		50.33% Pervious Area
	2.250		49.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.5	220	0.0100	0.10		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
7.7	230	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
44.2	450	Total			

Summary for Subcatchment A-15: (new Subcat)

Runoff = 6.88 cfs @ 12.49 hrs, Volume= 1.017 af, Depth= 4.21"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.900	98	
	2.000	80	>75% Grass cover, Good, HSG D
	2.900	86	Weighted Average
	2.000		68.97% Pervious Area
	0.900		31.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.7	250	0.0200	0.14		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
7.4	220	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
38.1	470	Total			

Summary for Subcatchment A-16: (new Subcat)

Runoff = 13.07 cfs @ 12.54 hrs, Volume= 2.001 af, Depth= 4.58"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	2.620	80	
*	2.620	98	
	5.240	89	Weighted Average
	2.620		50.00% Pervious Area
	2.620		50.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.2	245	0.0200	0.14		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
8.6	254	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
38.8	499	Total			

Summary for Subcatchment A-20: (new Subcat)

Runoff = 14.19 cfs @ 12.46 hrs, Volume= 1.977 af, Depth= 4.31"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	2.000	98	
*	3.500	80	
	5.500	87	Weighted Average
	3.500		63.64% Pervious Area
	2.000		36.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.7	200	0.0200	0.13		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
7.4	220	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
33.1	420	Total			

Summary for Subcatchment A-22: (new Subcat)

Runoff = 8.09 cfs @ 12.65 hrs, Volume= 1.386 af, Depth= 4.38"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.500	98	
*	2.300	80	
	3.800	87	Weighted Average
	2.300		60.53% Pervious Area
	1.500		39.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.9	230	0.0100	0.10		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
11.8	350	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
49.7	580	Total			

Summary for Subcatchment A-24: (new Subcat)

Runoff = 8.37 cfs @ 12.57 hrs, Volume= 1.375 af, Depth= 4.58"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
	1.800	80	>75% Grass cover, Good, HSG D
*	1.800	98	
	3.600	89	Weighted Average
	1.800		50.00% Pervious Area
	1.800		50.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.9	200	0.0100	0.10		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
10.8	320	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
44.7	520	Total			

Summary for Subcatchment A-26: (new Subcat)

Runoff = 6.21 cfs @ 12.33 hrs, Volume= 0.789 af, Depth= 4.86"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.250	98	
	0.700	80	>75% Grass cover, Good, HSG D
	1.950	92	Weighted Average
	0.700		35.90% Pervious Area
	1.250		64.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.4	100	0.0100	0.09		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
5.7	170	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
25.1	270	Total			

Summary for Subcatchment A-29: (new Subcat)

Runoff = 5.16 cfs @ 12.35 hrs, Volume= 0.652 af, Depth= 4.45"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.760	98	
	1.000	80	>75% Grass cover, Good, HSG D
	1.760	88	Weighted Average
	1.000		56.82% Pervious Area
	0.760		43.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.4	100	0.0100	0.09		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
6.7	200	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
26.1	300	Total			

Summary for Subcatchment A-30: (new Subcat)

Runoff = 5.40 cfs @ 12.39 hrs, Volume= 0.719 af, Depth= 4.43"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
	1.130	80	>75% Grass cover, Good, HSG D
*	0.820	98	
	1.950	88	Weighted Average
	1.130		57.95% Pervious Area
	0.820		42.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.4	100	0.0100	0.09		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
10.1	300	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
29.5	400	Total			

Summary for Subcatchment A-31: (new Subcat)

Runoff = 5.23 cfs @ 12.84 hrs, Volume= 1.040 af, Depth= 4.71"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.500	98	
	1.150	80	>75% Grass cover, Good, HSG D
	2.650	90	Weighted Average
	1.150		43.40% Pervious Area
	1.500		56.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
53.4	250	0.0050	0.08		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
9.1	270	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
62.5	520	Total			

Summary for Subcatchment A-34: (new Subcat)

Runoff = 4.96 cfs @ 13.09 hrs, Volume= 1.089 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	2.700	64	>75% Grass cover, Good, HSG D
*	1.160	64	
*	2.300	64	>75% Grass cover, Good, HSG A
	6.160	64	Weighted Average
	6.160		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
61.8	300	0.0050	0.08		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
15.2	450	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
77.0	750	Total			

Summary for Subcatchment A-34-1: (new Subcat)

Runoff = 8.22 cfs @ 12.39 hrs, Volume= 1.175 af, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	88,898	98	
	78,024	39	>75% Grass cover, Good, HSG A
	10,549	61	>75% Grass cover, Good, HSG B
	25,677	80	>75% Grass cover, Good, HSG D
	203,148	71	Weighted Average
	114,250		56.24% Pervious Area
	88,898		43.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	100	0.0100	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
14.3	600	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
27.7	700	Total			

Summary for Subcatchment A-35: (new Subcat)

Runoff = 4.91 cfs @ 13.10 hrs, Volume= 1.113 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	2.550	65	>75% Grass cover, Good, HSG D
*	2.100	65	>75% Grass cover, Good, HSG A
*	1.400	65	
	6.050	65	Weighted Average
	6.050		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
61.8	300	0.0050	0.08		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
19.5	580	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
81.3	880	Total			

Summary for Subcatchment A-37: (new Subcat)

Runoff = 6.61 cfs @ 13.12 hrs, Volume= 1.491 af, Depth= 2.47"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	3.800	68	>75% Grass cover, Good, HSG D
*	1.250	68	
*	2.200	68	>75% Grass cover, Good, HSG A
	7.250	68	Weighted Average
	7.250		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
61.8	300	0.0050	0.08		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
20.2	600	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
82.0	900	Total			

Summary for Subcatchment A-39: (new Subcat)

Runoff = 17.08 cfs @ 12.62 hrs, Volume= 2.630 af, Depth= 2.83"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	2.150	72	
*	7.040	72	>75% Grass cover, Good, HSG D
*	1.960	72	>75% Grass cover, Good, HSG A
	11.150	72	Weighted Average
	11.150		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
42.2	300	0.0130	0.12		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
0.7	20	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
1.8	400	0.0050	3.72	4.57	**Pipe Channel, C-D** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
44.7	720	Total			

Summary for Subcatchment A-42: (new Subcat)

Runoff = 24.51 cfs @ 12.64 hrs, Volume= 3.886 af, Depth= 3.80"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	10.000	82	>75% Grass cover, Good, HSG D
*	2.260	82	
	12.260	82	Weighted Average
	12.260		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.9	150	0.0100	0.09		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
20.5	610	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
47.4	760	Total			

Summary for Subcatchment A-49: (new Subcat)

Runoff = 6.42 cfs @ 12.26 hrs, Volume= 0.679 af, Depth= 4.22"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.337	86	
*	0.430	86	
*	0.163	86	Paved parking & roofs
	1.930	86	Weighted Average
	1.930		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	79	0.0050	0.73		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.00"
17.6	88	0.0100	0.08		**Sheet Flow, B-C** Grass: Dense n= 0.240 P2= 3.00"
19.4	167	Total			

Summary for Subcatchment A-51: (new Subcat)

Runoff = 5.81 cfs @ 12.83 hrs, Volume= 1.110 af, Depth= 1.48"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	2.250	56	>75% Grass cover, Good, HSG D
*	1.564	56	
*	5.000	56	>75% Grass cover, Good, HSG A
*	0.186	56	Paved parking & roofs
	9.000	56	Weighted Average
	9.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
46.8	300	0.0100	0.11		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
6.9	205	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
53.7	505	Total			

Summary for Subcatchment A-53C: (new Subcat)

Runoff = 21.13 cfs @ 12.55 hrs, Volume= 3.302 af, Depth= 4.54"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	4.100	98	
	0.100	74	>75% Grass cover, Good, HSG C
	4.427	80	>75% Grass cover, Good, HSG D
	0.093	98	Paved parking & roofs
	8.720	89	Weighted Average
	4.527		51.92% Pervious Area
	4.193		48.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
39.8	245	0.0100	0.10		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
1.0	330	0.0100	5.26	6.46	**Pipe Channel, B-C** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
40.8	575	Total			

Summary for Subcatchment A-54: A-54

Runoff = 10.71 cfs @ 12.07 hrs, Volume= 0.844 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (ac)	CN	Description
1.820	98	Paved parking & roofs
1.820		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment A-54A: A-69

Runoff = 6.89 cfs @ 12.06 hrs, Volume= 0.524 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (ac)	CN	Description
1.130	98	Paved parking & roofs
1.130		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0					**Direct Entry,**

Summary for Subcatchment A-55: A-72

Runoff = 11.13 cfs @ 12.07 hrs, Volume= 0.876 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.890	98	
	1.890		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment A-56: (new Subcat)

Runoff = 5.90 cfs @ 12.06 hrs, Volume= 0.446 af, Depth= 5.46"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.930	98	
	0.050	80	>75% Grass cover, Good, HSG D
	0.980	97	Weighted Average
	0.050		5.10% Pervious Area
	0.930		94.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0					**Direct Entry,**

Summary for Subcatchment A-57: (new Subcat)

Runoff = 2.84 cfs @ 12.19 hrs, Volume= 0.285 af, Depth= 4.50"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
	0.410	80	>75% Grass cover, Good, HSG D
*	0.350	98	
	0.760	88	Weighted Average
	0.410		53.95% Pervious Area
	0.350		46.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	100	0.0100	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.00"
1.4	130	0.0100	1.50		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
14.8	230	Total			

Summary for Subcatchment A-57B: (new Subcat)

Runoff = 1.34 cfs @ 12.16 hrs, Volume= 0.124 af, Depth= 4.49"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.150	98	
	0.180	80	>75% Grass cover, Good, HSG D
	0.330	88	Weighted Average
	0.180		54.55% Pervious Area
	0.150		45.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	80	0.0100	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.00"
0.6	50	0.0100	1.50		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
11.8	130	Total			

Summary for Subcatchment A-57C: (new Subcat)

Runoff = 5.69 cfs @ 12.07 hrs, Volume= 0.431 af, Depth= 4.83"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.670	98	
	0.400	80	>75% Grass cover, Good, HSG D
	1.070	91	Weighted Average
	0.400		37.38% Pervious Area
	0.670		62.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment A-58: A-67

Runoff = 2.74 cfs @ 12.06 hrs, Volume= 0.209 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (ac)	CN	Description
0.450	98	Paved parking & roofs
0.450		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0					**Direct Entry,**

Summary for Subcatchment A-59: (new Subcat)

Runoff = 0.14 cfs @ 12.01 hrs, Volume= 0.009 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.020	98	
	0.020		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry,**

Summary for Subcatchment A-61: (new Subcat)

Runoff = 1.93 cfs @ 12.14 hrs, Volume= 0.166 af, Depth= 4.23"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.150	98	
	0.320	80	>75% Grass cover, Good, HSG D
	0.470	86	Weighted Average
	0.320		68.09% Pervious Area
	0.150		31.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Summary for Subcatchment A-63: (new Subcat)

Runoff = 0.14 cfs @ 12.01 hrs, Volume= 0.009 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.020	98	
	0.020		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry,**

Summary for Subcatchment A-64: (new Subcat)

Runoff = 6.89 cfs @ 12.06 hrs, Volume= 0.524 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.130	98	
	1.130		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0					**Direct Entry,**

Summary for Subcatchment A-64A: (new Subcat)

Runoff = 2.15 cfs @ 12.04 hrs, Volume= 0.158 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.340	98	
	0.340		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment A-65: (new Subcat)

Runoff = 2.85 cfs @ 12.04 hrs, Volume= 0.209 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.450	98	
	0.450		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment A-67: (new Subcat)

Runoff = 0.92 cfs @ 12.03 hrs, Volume= 0.065 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.140	98	
	0.140		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					**Direct Entry,**

Summary for Subcatchment A-67A: (new Subcat)

Runoff = 17.37 cfs @ 12.07 hrs, Volume= 1.367 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	2.950	98	
	2.950		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment A-69: (new Subcat)

Runoff = 8.84 cfs @ 12.07 hrs, Volume= 0.696 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	65,410	98	
	65,410		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment A-7: A-7

Runoff = 4.25 cfs @ 12.55 hrs, Volume= 0.666 af, Depth= 4.30"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
	1.200	80	>75% Grass cover, Good, HSG D
*	0.660	98	
	1.860	86	Weighted Average
	1.200		64.52% Pervious Area
	0.660		35.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.9	200	0.0100	0.10		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
8.4	250	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
42.3	450	Total			

Summary for Subcatchment A-71: (new Subcat)

Runoff = 0.41 cfs @ 12.01 hrs, Volume= 0.028 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.060	98	
	0.060		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry,**

Summary for Subcatchment A-72: (new Subcat)

Runoff = 0.34 cfs @ 12.01 hrs, Volume= 0.023 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.050	98	
	0.050		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry,**

Summary for Subcatchment A-72A: (new Subcat)

Runoff = 0.27 cfs @ 12.01 hrs, Volume= 0.019 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.040	98	
	0.040		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry,**

Summary for Subcatchment A-73: (new Subcat)

Runoff = 0.41 cfs @ 12.01 hrs, Volume= 0.028 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.060	98	
	0.060		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry,**

Summary for Subcatchment A-74: (new Subcat)

Runoff = 0.98 cfs @ 12.03 hrs, Volume= 0.070 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.150	98	
	0.150		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					**Direct Entry,**

Summary for Subcatchment A-75: (new Subcat)

Runoff = 5.99 cfs @ 12.04 hrs, Volume= 0.439 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	41,230	98	
	41,230		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment A-76: (new Subcat)

Runoff = 4.34 cfs @ 12.06 hrs, Volume= 0.330 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	31,000	98	
	31,000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0					**Direct Entry,**

Summary for Subcatchment A-77: (new Subcat)

Runoff = 7.06 cfs @ 12.07 hrs, Volume= 0.556 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	52,235	98	
	52,235		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment A-78: (new Subcat)

Runoff = 0.33 cfs @ 12.03 hrs, Volume= 0.023 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.050	98	
	0.050		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					**Direct Entry,**

Summary for Subcatchment A-79: (new Subcat)

Runoff = 0.59 cfs @ 12.03 hrs, Volume= 0.042 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.090	98	
	0.090		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					**Direct Entry,**

Summary for Subcatchment A-8: (new Subcat)

Runoff = 5.86 cfs @ 12.64 hrs, Volume= 0.993 af, Depth= 4.58"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.300	98	
	1.300	80	>75% Grass cover, Good, HSG D
	2.600	89	Weighted Average
	1.300		50.00% Pervious Area
	1.300		50.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
39.7	244	0.0100	0.10		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
7.9	235	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
47.6	479	Total			

Summary for Subcatchment A-80: (new Subcat)

Runoff = 0.66 cfs @ 12.03 hrs, Volume= 0.046 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.100	98	
	0.100		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					**Direct Entry,**

Summary for Subcatchment A-90: (new Subcat)

Runoff = 1.96 cfs @ 12.04 hrs, Volume= 0.143 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	13,480	98	
	13,480		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment A-91: (new Subcat)

Runoff = 3.67 cfs @ 12.04 hrs, Volume= 0.269 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	25,265	98	
	25,265		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment A-92: (new Subcat)

Runoff = 5.18 cfs @ 12.04 hrs, Volume= 0.379 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	35,650	98	
	35,650		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment A-93: (new Subcat)

Runoff = 4.91 cfs @ 12.04 hrs, Volume= 0.360 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	33,790	98	
	33,790		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment A-94: (new Subcat)

Runoff = 3.06 cfs @ 12.06 hrs, Volume= 0.233 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	21,855	98	
	21,855		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0					**Direct Entry,**

Summary for Subcatchment A-95: (new Subcat)

Runoff = 1.80 cfs @ 12.04 hrs, Volume= 0.132 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	12,400	98	
	12,400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment A-95A: (new Subcat)

Runoff = 2.14 cfs @ 12.06 hrs, Volume= 0.163 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	15,300	98	
	15,300		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0					**Direct Entry,**

Summary for Subcatchment A-96: (new Subcat)

Runoff = 6.43 cfs @ 12.06 hrs, Volume= 0.483 af, Depth= 5.31"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	41,500	98	
	6,000	80	>75% Grass cover, Good, HSG D
	47,500	96	Weighted Average
	6,000		12.63% Pervious Area
	41,500		87.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0					**Direct Entry,**

Summary for Subcatchment A-99: (new Subcat)

Runoff = 3.88 cfs @ 12.61 hrs, Volume= 0.631 af, Depth= 4.28"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.610	98	
	1.160	80	>75% Grass cover, Good, HSG D
	1.770	86	Weighted Average
	1.160		65.54% Pervious Area
	0.610		34.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	50	0.0050	0.08		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
35.5	300	0.0200	0.14		**Sheet Flow, B-C** Grass: Dense n= 0.240 P2= 3.00"
45.6	350	Total			

Summary for Subcatchment AA2: (new Subcat)

Runoff = 2.21 cfs @ 12.04 hrs, Volume= 0.162 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	15,190	98	
	15,190		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment AA3: (new Subcat)

Runoff = 3.92 cfs @ 12.04 hrs, Volume= 0.287 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	26,970	98	
	26,970		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment AA4: (new Subcat)

Runoff = 5.54 cfs @ 12.04 hrs, Volume= 0.406 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	38,130	98	
	38,130		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment AA5: (new Subcat)

Runoff = 5.34 cfs @ 12.04 hrs, Volume= 0.391 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	36,735	98	
	36,735		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment AA6: (new Subcat)

Runoff = 16.07 cfs @ 12.07 hrs, Volume= 1.265 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	118,885	98	
	118,885		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment B-101: (new Subcat)

Runoff = 63.32 cfs @ 12.07 hrs, Volume= 4.938 af, Depth= 5.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (sf)	CN	Description
432,916	98	Paved parking, HSG D
48,102	80	>75% Grass cover, Good, HSG D
481,018	96	Weighted Average
48,102		10.00% Pervious Area
432,916		90.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Summary for Subcatchment C4-1S: (new Subcat)

Runoff = 6.92 cfs @ 12.24 hrs, Volume= 0.697 af, Depth= 3.80"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.750	82	>75% Grass cover, Good, HSG D
*	0.450	82	
	2.200	82	Weighted Average
	2.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	100	0.0100	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
4.4	400	0.0100	1.50		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
17.8	500	Total			

Summary for Subcatchment C4-2: (new Subcat)

Runoff = 10.06 cfs @ 12.10 hrs, Volume= 0.835 af, Depth= 5.33"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (ac)	CN	Description
0.200	80	>75% Grass cover, Good, HSG D
0.000	77	Woods, Good, HSG D
1.680	98	Water Surface, 0% imp
0.000	98	Paved parking & roofs
1.880	96	Weighted Average
1.880		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	30	0.0100	0.07		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"

Summary for Subcatchment I-1: Apron

Runoff = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.230	98	Pavement
	1.230		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0130	1.12		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.00"
1.4	192	0.0130	2.31		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
1.2	183	0.0040	2.49	1.95	**Pipe Channel, C-D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.015 Concrete sewer w/manholes & inlets
4.1	475	Total			

Summary for Subcatchment JB1: (new Subcat)

Runoff = 14.74 cfs @ 12.07 hrs, Volume= 1.131 af, Depth= 4.83"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	2.000	98	
*	0.810	74	
	2.810	91	Weighted Average
	0.810		28.83% Pervious Area
	2.000		71.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	80	0.0100	0.97		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.00"
2.9	480	0.0050	2.78	2.18	**Pipe Channel, B-C** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.015 Corrugated PE, smooth interior
0.3	60	0.0040	2.89	3.54	**Pipe Channel, C-D** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.015 Corrugated PE, smooth interior
0.4	60	0.0300	2.60		**Shallow Concentrated Flow, D-E** Grassed Waterway Kv= 15.0 fps
5.0	680	Total			

Summary for Subcatchment JB3B: (new Subcat)

Runoff = 16.52 cfs @ 12.04 hrs, Volume= 1.193 af, Depth= 5.21"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.500	80	
*	2.250	98	
	2.750	95	Weighted Average
	0.500		18.18% Pervious Area
	2.250		81.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	50	0.0100	0.88		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.00"
0.8	100	0.0100	2.03		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
1.4	510	0.0100	6.22	7.63	**Pipe Channel, C-D** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
3.1	660	Total			

Summary for Subcatchment P-3: (new Subcat)

Runoff = 2.65 cfs @ 12.04 hrs, Volume= 0.165 af, Depth= 3.21"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (sf)	CN	Description
9,065	80	>75% Grass cover, Good, HSG D
17,765	74	>75% Grass cover, Good, HSG C
26,830	76	Weighted Average
26,830		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	50	0.2000	0.36		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"

Summary for Subcatchment SB-CB-17: (new Subcat)

Runoff = 0.44 cfs @ 12.04 hrs, Volume= 0.032 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.070	98	
	0.070		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment SB-CB-18: (new Subcat)

Runoff = 0.51 cfs @ 12.04 hrs, Volume= 0.037 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.080	98	
	0.080		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment SB-WQU-5: (new Subcat)

Runoff = 7.27 cfs @ 12.10 hrs, Volume= 0.607 af, Depth= 5.36"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.220	98	
	0.140	80	>75% Grass cover, Good, HSG D
	1.360	96	Weighted Average
	0.140		10.29% Pervious Area
	1.220		89.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	80	0.0100	0.97		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.00"
0.6	75	0.0100	2.03		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
1.4	477	0.0150	5.56	4.36	**Pipe Channel, C-D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
0.6	105	0.0030	2.88	3.54	**Pipe Channel, D-E** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
3.0	670	0.0038	3.66	6.48	**Pipe Channel, E-F** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
7.0	1,407	Total			

Summary for Subcatchment SP4: (new Subcat)

Runoff = 27.65 cfs @ 12.68 hrs, Volume= 4.470 af, Depth= 3.64"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	3.960	80	
*	5.568	80	>75% Grass cover, Good, HSG C
*	4.962	80	>75% Grass cover, Good, HSG D
	0.261	98	Paved parking & roofs
	14.751	80	Weighted Average
	14.490		98.23% Pervious Area
	0.261		1.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
46.8	300	0.0100	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
0.8	96	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.8	128	0.0300	2.60		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.0	211	0.0500	3.35		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
49.4	735	Total			

Summary for Subcatchment TBR: (new Subcat)

Runoff = 12.75 cfs @ 12.11 hrs, Volume= 1.112 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	2.400	98	roof
	2.400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0					**Direct Entry,**

Summary for Subcatchment TWIN 12": (new Subcat)

Runoff = 4.44 cfs @ 12.17 hrs, Volume= 0.437 af, Depth= 5.09"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.780	98	
*	0.250	80	
	1.030	94	Weighted Average
	0.250		24.27% Pervious Area
	0.780		75.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	240	0.0100	1.20		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.00"
9.4	600	0.0050	1.06		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
12.7	840	Total			

Summary for Subcatchment WQF1: (new Subcat)

Runoff = 35.75 cfs @ 12.08 hrs, Volume= 2.867 af, Depth= 5.22"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	5.440	98	
	1.150	80	>75% Grass cover, Good, HSG D
	6.590	95	Weighted Average
	1.150		17.45% Pervious Area
	5.440		82.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	100	0.0100	1.01		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00"
1.9	230	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.4	150	0.0050	1.06		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
6.0	480	Total			

Summary for Reach .1R:

Bank-Full Depth= 5.00' Flow Area= 120.0 sf, Capacity= 1,125.06 cfs

9.00' x 5.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 39.00'
Length= 44.0' Slope= 0.0045 '/'
Inlet Invert= 31.20', Outlet Invert= 31.00'



‡

Summary for Reach 1RP: (new Reach)

Inflow = 8.20 cfs @ 13.12 hrs, Volume= 1.798 af
Outflow = 8.20 cfs @ 13.12 hrs, Volume= 1.798 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Summary for Reach 2R: POA#3 Discharge from Filter Bed #1 & 18" Culvert to Downstream Area

Inflow Area = 2.365 ac, 71.25% Impervious, Inflow Depth > 3.73" for 25 yr event
Inflow = 8.31 cfs @ 12.15 hrs, Volume= 0.736 af
Outflow = 8.31 cfs @ 12.15 hrs, Volume= 0.736 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Summary for Reach 3R: >100-yr 24-hr Spillway to Jetport Boulavard Closed Drainage System

Inflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af
Outflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

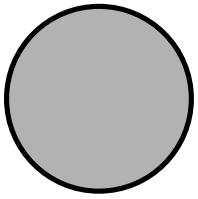
Summary for Reach 4R: pipe

Inflow Area = 24.830 ac, 77.05% Impervious, Inflow Depth = 5.11" for 25 yr event
Inflow = 130.30 cfs @ 12.00 hrs, Volume= 10.575 af
Outflow = 47.34 cfs @ 11.84 hrs, Volume= 10.575 af, Atten= 64%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 10.20 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 4.68 fps, Avg. Travel Time= 3.6 min

Peak Storage= 4,909 cf @ 11.85 hrs
Average Depth at Peak Storage= 2.50'
Bank-Full Depth= 2.50' Flow Area= 4.9 sf, Capacity= 43.93 cfs

30.0" Round Pipe
n= 0.013
Length= 1,000.0' Slope= 0.0115 '/'
Inlet Invert= 36.00', Outlet Invert= 24.53'



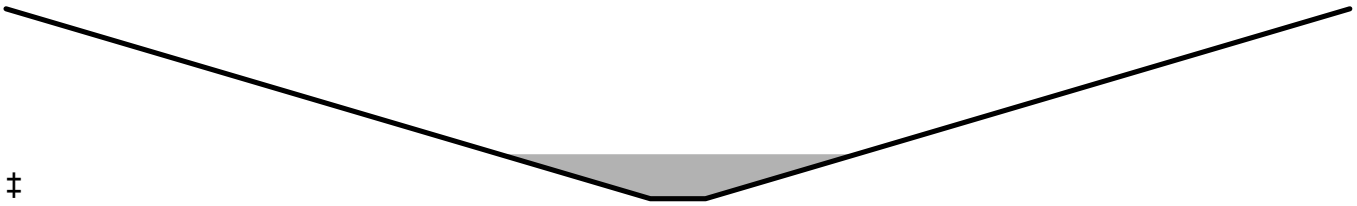
Summary for Reach 38R:

Inflow Area = 1.030 ac, 75.73% Impervious, Inflow Depth = 5.09" for 25 yr event
Inflow = 4.00 cfs @ 12.23 hrs, Volume= 0.437 af
Outflow = 3.16 cfs @ 12.37 hrs, Volume= 0.437 af, Atten= 21%, Lag= 8.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 1.21 fps, Min. Travel Time= 13.7 min
Avg. Velocity = 0.45 fps, Avg. Travel Time= 36.8 min

Peak Storage= 2,590 cf @ 12.37 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 1.00' Flow Area= 38.0 sf, Capacity= 112.70 cfs

3.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 35.0 '/' Top Width= 73.00'
Length= 990.0' Slope= 0.0046 '/'
Inlet Invert= 65.53', Outlet Invert= 60.97'



‡

Summary for Reach 46R: (new Reach)

Inflow Area = 4.664 ac, 43.76% Impervious, Inflow Depth > 1.84" for 25 yr event
Inflow = 2.45 cfs @ 13.02 hrs, Volume= 0.716 af
Outflow = 2.44 cfs @ 13.10 hrs, Volume= 0.716 af, Atten= 1%, Lag= 5.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 0.87 fps, Min. Travel Time= 5.6 min
Avg. Velocity = 0.46 fps, Avg. Travel Time= 10.5 min

Peak Storage= 813 cf @ 13.10 hrs
Average Depth at Peak Storage= 0.59'
Bank-Full Depth= 3.00' Flow Area= 36.0 sf, Capacity= 78.23 cfs

3.00' x 3.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 21.00'
Length= 291.0' Slope= 0.0010 '/'
Inlet Invert= 44.50', Outlet Invert= 44.21'



Summary for Pond .2P:

Inflow Area = 16.688 ac, 83.74% Impervious, Inflow Depth = 4.86" for 25 yr event
Inflow = 82.80 cfs @ 12.05 hrs, Volume= 6.760 af
Outflow = 82.74 cfs @ 12.05 hrs, Volume= 6.759 af, Atten= 0%, Lag= 0.0 min
Primary = 82.74 cfs @ 12.05 hrs, Volume= 6.759 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 54.86' @ 12.08 hrs Surf.Area= 13 sf Storage= 130 cf
Flood Elev= 60.88' Surf.Area= 21 sf Storage= 206 cf

Plug-Flow detention time= 0.4 min calculated for 6.759 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (761.8 - 761.6)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	206 cf	**4.00'D x 16.38'H Vertical Cone/Cylinder**
#2	60.88'	36 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		242 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
60.88	8	0	0
61.00	596	36	36

Device	Routing	Invert	Outlet Devices
#1	Primary	49.71'	**54.0" Round Culvert** L= 95.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 49.71' / 49.05' S= 0.0069 '/' Cc= 0.900 n= 0.013, Flow Area= 15.90 sf

Primary OutFlow Max=67.67 cfs @ 12.05 hrs HW=53.48' TW=52.49' (Dynamic Tailwater)
1=Culvert (Outlet Controls 67.67 cfs @ 6.43 fps)

Summary for Pond .3P:

Inflow Area = 16.339 ac, 83.40% Impervious, Inflow Depth = 4.85" for 25 yr event
Inflow = 80.66 cfs @ 12.05 hrs, Volume= 6.600 af
Outflow = 80.63 cfs @ 12.05 hrs, Volume= 6.599 af, Atten= 0%, Lag= 0.0 min
Primary = 80.63 cfs @ 12.05 hrs, Volume= 6.599 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 55.75' @ 12.08 hrs Surf.Area= 13 sf Storage= 136 cf
Flood Elev= 60.88' Surf.Area= 21 sf Storage= 201 cf

Plug-Flow detention time= 0.3 min calculated for 6.596 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (762.1 - 761.9)

Volume	Invert	Avail.Storage	Storage Description
#1	44.89'	201 cf	**4.00'D x 15.99'H Vertical Cone/Cylinder**
#2	60.88'	36 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		237 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
60.88	8	0	0
61.00	596	36	36

Device	Routing	Invert	Outlet Devices
#1	Primary	50.17'	**54.0" Round Culvert** L= 95.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 50.17' / 49.98' S= 0.0020 '/' Cc= 0.900 n= 0.013, Flow Area= 15.90 sf

Primary OutFlow Max=78.48 cfs @ 12.05 hrs HW=54.47' TW=53.49' (Dynamic Tailwater)
1=Culvert (Outlet Controls 78.48 cfs @ 6.44 fps)

Summary for Pond .4P:

Inflow Area = 15.720 ac, 82.74% Impervious, Inflow Depth = 4.82" for 25 yr event
Inflow = 76.83 cfs @ 12.05 hrs, Volume= 6.315 af
Outflow = 76.81 cfs @ 12.05 hrs, Volume= 6.313 af, Atten= 0%, Lag= 0.0 min
Primary = 76.81 cfs @ 12.05 hrs, Volume= 6.313 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 56.05' @ 12.09 hrs Surf.Area= 13 sf Storage= 135 cf
Flood Elev= 60.88' Surf.Area= 21 sf Storage= 196 cf

Plug-Flow detention time= 0.4 min calculated for 6.313 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (762.7 - 762.5)

Volume	Invert	Avail.Storage	Storage Description
#1	45.28'	196 cf	**4.00'D x 15.60'H Vertical Cone/Cylinder**
#2	60.88'	36 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		232 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
60.88	8	0	0
61.00	596	36	36

Device	Routing	Invert	Outlet Devices
#1	Primary	50.47'	**54.0" Round Culvert** L= 95.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 50.47' / 50.28' S= 0.0020 '/' Cc= 0.900 n= 0.013, Flow Area= 15.90 sf

Primary OutFlow Max=72.79 cfs @ 12.05 hrs HW=55.17' TW=54.47' (Dynamic Tailwater)
1=Culvert (Outlet Controls 72.79 cfs @ 5.45 fps)

Summary for Pond .5P:

Inflow Area = 13.091 ac, 80.50% Impervious, Inflow Depth = 4.75" for 25 yr event
Inflow = 61.38 cfs @ 12.06 hrs, Volume= 5.177 af
Outflow = 61.40 cfs @ 12.06 hrs, Volume= 5.175 af, Atten= 0%, Lag= 0.0 min
Primary = 61.40 cfs @ 12.06 hrs, Volume= 5.175 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 56.93' @ 12.09 hrs Surf.Area= 13 sf Storage= 141 cf
Flood Elev= 60.88' Surf.Area= 21 sf Storage= 191 cf

Plug-Flow detention time= 0.5 min calculated for 5.175 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (765.1 - 764.8)

Volume	Invert	Avail.Storage	Storage Description
#1	45.67'	191 cf	**4.00'D x 15.21'H Vertical Cone/Cylinder**
#2	60.88'	36 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		227 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
60.88	8	0	0
61.00	596	36	36

Device	Routing	Invert	Outlet Devices
#1	Primary	50.83'	**48.0" Round Culvert** L= 95.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 50.83' / 50.64' S= 0.0020 '/' Cc= 0.900 n= 0.013, Flow Area= 12.57 sf

Primary OutFlow Max=61.07 cfs @ 12.06 hrs HW=55.85' TW=55.20' (Dynamic Tailwater)
1=Culvert (Inlet Controls 61.07 cfs @ 4.86 fps)

Summary for Pond .6P:

Inflow Area = 12.247 ac, 79.16% Impervious, Inflow Depth = 4.69" for 25 yr event
Inflow = 56.34 cfs @ 12.07 hrs, Volume= 4.788 af
Outflow = 56.33 cfs @ 12.07 hrs, Volume= 4.786 af, Atten= 0%, Lag= 0.0 min
Primary = 56.33 cfs @ 12.07 hrs, Volume= 4.786 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.19' @ 12.10 hrs Surf.Area= 13 sf Storage= 142 cf
Flood Elev= 60.88' Surf.Area= 21 sf Storage= 188 cf

Plug-Flow detention time= 0.5 min calculated for 4.784 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (766.6 - 766.4)

Volume	Invert	Avail.Storage	Storage Description
#1	45.89'	188 cf	**4.00'D x 14.99'H Vertical Cone/Cylinder**
#2	60.88'	36 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		225 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
60.88	8	0	0
61.00	596	36	36

Device	Routing	Invert	Outlet Devices
#1	Primary	51.01'	**48.0" Round Culvert** L= 40.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 51.01' / 50.93' S= 0.0020 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf

Primary OutFlow Max=53.68 cfs @ 12.07 hrs HW=56.39' TW=55.88' (Dynamic Tailwater)
1=Culvert (Inlet Controls 53.68 cfs @ 4.27 fps)

Summary for Pond .A-1: Outfall 5

Estimated Slope and Calcutated Invert Out.

Inflow Area = 20.204 ac, 29.63% Impervious, Inflow Depth = 19.53" for 25 yr event
Inflow = 192.62 cfs @ 12.16 hrs, Volume= 32.889 af
Outflow = 204.67 cfs @ 12.23 hrs, Volume= 32.889 af, Atten= 0%, Lag= 4.0 min
Primary = 204.67 cfs @ 12.23 hrs, Volume= 32.889 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 49.93' @ 12.23 hrs Surf.Area= 13 sf Storage= 299 cf
Flood Elev= 40.89' Surf.Area= 13 sf Storage= 299 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (813.4 - 813.4)

Volume	Invert	Avail.Storage	Storage Description
#1	17.06'	299 cf	**4.00'D x 23.83'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	17.06'	**42.0" Round Culvert** L= 520.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 17.06' / 15.50' S= 0.0030 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 9.62 sf

Primary OutFlow Max=187.30 cfs @ 12.23 hrs HW=45.91' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 187.30 cfs @ 19.47 fps)

Summary for Pond .A-2:

Storage at elevation 32.34 taken from contour 32 this is conservative.
Storage at elevation 33 has been split evenly between A-2 and A-3.
Storage at elevation 34 has been split evenly between A-2 and A-3 and A-4.

Inflow Area = 10.535 ac, 17.61% Impervious, Inflow Depth = 22.59" for 25 yr event
Inflow = 158.04 cfs @ 12.39 hrs, Volume= 19.835 af
Outflow = 166.99 cfs @ 12.81 hrs, Volume= 19.890 af, Atten= 0%, Lag= 25.2 min
Primary = 183.57 cfs @ 12.81 hrs, Volume= 29.404 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 32.61' @ 12.54 hrs Surf.Area= 15,086 sf Storage= 3,977 cf
Flood Elev= 32.34' Surf.Area= 12,836 sf Storage= 183 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	17.80'	183 cf	**4.00'D x 14.54'H Vertical Cone/Cylinder**
#2	32.34'	39,443 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		39,626 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
32.34	12,823	0	0
33.00	18,283	10,265	10,265
34.00	40,073	29,178	39,443

Device	Routing	Invert	Outlet Devices
#1	Primary	17.80'	**42.0" Round Culvert** L= 168.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 17.80' / 17.17' S= 0.0037 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 9.62 sf

Primary OutFlow Max=0.00 cfs @ 12.81 hrs HW=32.57' TW=41.90' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond .A-2A:

Inflow Area = 2.270 ac, 26.43% Impervious, Inflow Depth = 3.90" for 25 yr event
Inflow = 8.81 cfs @ 12.13 hrs, Volume= 0.738 af
Outflow = 6.88 cfs @ 12.45 hrs, Volume= 0.738 af, Atten= 22%, Lag= 19.5 min
Primary = 6.88 cfs @ 12.45 hrs, Volume= 0.915 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 31.85' @ 12.48 hrs Surf.Area= 9,446 sf Storage= 5,827 cf

Plug-Flow detention time= 9.4 min calculated for 0.738 af (100% of inflow)
Center-of-Mass det. time= 9.4 min (806.5 - 797.1)

Volume	Invert	Avail.Storage	Storage Description
#1	29.50'	13,050 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
29.50	0	0	0
30.00	200	50	50
31.00	1,800	1,000	1,050
32.00	10,800	6,300	7,350
32.50	12,000	5,700	13,050

Device	Routing	Invert	Outlet Devices
#1	Primary	29.50'	**15.0" Round Culvert** L= 12.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 29.50' / 29.00' S= 0.0417 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=6.11 cfs @ 12.45 hrs HW=31.84' TW=26.97' (Dynamic Tailwater)
1=Culvert (Inlet Controls 6.11 cfs @ 4.98 fps)

Summary for Pond .A-3:

Storage at elevation 33 has been split evenly between A-2 and A-3.
Storage at elevation 34 has been split evenly between A-2 and A-3 and A-4.

Inflow Area = 8.265 ac, 15.19% Impervious, Inflow Depth = 27.27" for 25 yr event
Inflow = 160.61 cfs @ 12.31 hrs, Volume= 18.783 af
Outflow = 152.31 cfs @ 13.43 hrs, Volume= 18.783 af, Atten= 5%, Lag= 67.2 min
Primary = 152.31 cfs @ 13.43 hrs, Volume= 18.920 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 32.69' @ 12.38 hrs Surf.Area= 13,206 sf Storage= 5,667 cf
Flood Elev= 31.61' Surf.Area= 17 sf Storage= 166 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.6 min (822.3 - 821.7)

Volume	Invert	Avail.Storage	Storage Description
#1	18.41'	166 cf	**4.00'D x 13.20'H Vertical Cone/Cylinder**
#2	31.61'	39,515 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		39,681 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
31.61	4	0	0
32.00	1,719	336	336
33.00	18,283	10,001	10,337
34.00	40,073	29,178	39,515

Device	Routing	Invert	Outlet Devices
#1	Primary	18.41'	**42.0" Round Culvert** L= 235.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.41' / 17.80' S= 0.0026 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 9.62 sf

Primary OutFlow Max=152.26 cfs @ 13.43 hrs HW=32.53' TW=19.97' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 152.26 cfs @ 15.83 fps)

Summary for Pond .A-4:

Storage at elevation 34 has been split evenly between A-2 and A-3 and A-4.

Inflow	=	105.80 cfs @	12.53 hrs, Volume=	15.856 af
Outflow	=	149.83 cfs @	12.94 hrs, Volume=	15.889 af, Atten= 0%, Lag= 24.6 min
Primary	=	149.83 cfs @	12.94 hrs, Volume=	16.214 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 33.80' @ 13.97 hrs Surf.Area= 39,680 sf Storage= 69,865 cf
Flood Elev= 30.18' Surf.Area= 17 sf Storage= 138 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 8.5 min (822.7 - 814.2)

Volume	Invert	Avail.Storage	Storage Description
#1	19.18'	138 cf	**4.00'D x 11.00'H Vertical Cone/Cylinder**
#2	30.18'	77,808 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		77,947 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
30.18	4	0	0
31.00	3,265	1,340	1,340
32.00	16,728	9,997	11,337
33.00	38,071	27,400	38,736
34.00	40,073	39,072	77,808

Device	Routing	Invert	Outlet Devices
#1	Primary	19.18'	**42.0" Round Culvert** L= 233.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.18' / 18.46' S= 0.0031 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 9.62 sf

Primary OutFlow Max=35.63 cfs @ 12.94 hrs HW=32.79' TW=32.18' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 35.63 cfs @ 3.70 fps)

Summary for Pond .A-6:

Inflow = 146.39 cfs @ 12.81 hrs, Volume= 15.856 af
Outflow = 105.80 cfs @ 12.53 hrs, Volume= 15.856 af, Atten= 28%, Lag= 0.0 min
Primary = 105.80 cfs @ 12.53 hrs, Volume= 15.856 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 36.68' @ 12.53 hrs Surf.Area= 13 sf Storage= 195 cf
Flood Elev= 35.17' Surf.Area= 13 sf Storage= 195 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (814.2 - 814.1)

Volume	Invert	Avail.Storage	Storage Description
#1	19.67'	195 cf	**4.00'D x 15.50'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	19.67'	**42.0" Round Culvert** L= 172.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.67' / 19.20' S= 0.0027 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 9.62 sf

Primary OutFlow Max=103.32 cfs @ 12.53 hrs HW=36.61' TW=31.64' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 103.32 cfs @ 10.74 fps)

Summary for Pond .A1-B:

Inflow Area = 9.670 ac, 42.73% Impervious, Inflow Depth = 4.33" for 25 yr event
Inflow = 33.84 cfs @ 12.21 hrs, Volume= 3.486 af
Outflow = 33.84 cfs @ 12.21 hrs, Volume= 3.486 af, Atten= 0%, Lag= 0.0 min
Primary = 33.84 cfs @ 12.21 hrs, Volume= 3.486 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 52.76' @ 12.16 hrs
Flood Elev= 40.86'

Device	Routing	Invert	Outlet Devices
#1	Primary	23.26'	**24.0" Round Culvert** L= 181.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 23.26' / 17.17' S= 0.0336 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=48.17 cfs @ 12.21 hrs HW=38.29' TW=24.58' (Dynamic Tailwater)
1=Culvert (Outlet Controls 48.17 cfs @ 15.33 fps)

Summary for Pond .AA-1:

Assumed 15" pipe (Utility Study shows 15" or 18" Pipe)

Inflow Area = 1.034 ac, 41.68% Impervious, Inflow Depth = 4.42" for 25 yr event
Inflow = 4.07 cfs @ 12.17 hrs, Volume= 0.381 af
Outflow = 4.07 cfs @ 12.17 hrs, Volume= 0.381 af, Atten= 0%, Lag= 0.0 min
Primary = 4.07 cfs @ 12.17 hrs, Volume= 0.381 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 38.54' @ 12.17 hrs
Flood Elev= 43.29'

Device	Routing	Invert	Outlet Devices
#1	Primary	35.31'	**12.0" Round Culvert** L= 292.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 35.31' / 33.09' S= 0.0076 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=4.07 cfs @ 12.17 hrs HW=38.53' TW=31.72' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 4.07 cfs @ 5.18 fps)

Summary for Pond .AA-2:

Assumed 15" pipe (Utility Study shows 15" or 18" Pipe)
Assumed slope is taken from downstream structure AA-1.
Inlet - RCP, square edge headwall is assumed. Taken from downstream structure AA-1.
Outlet Invert assumed 0.1' added to downstream structure AA-1 invert out.
Inlet Invert calculated from assumed slope and assumed outlet invert.

Inflow Area = 1.034 ac, 41.68% Impervious, Inflow Depth = 4.42" for 25 yr event
Inflow = 4.07 cfs @ 12.17 hrs, Volume= 0.381 af
Outflow = 4.07 cfs @ 12.17 hrs, Volume= 0.381 af, Atten= 0%, Lag= 0.0 min
Primary = 4.07 cfs @ 12.17 hrs, Volume= 0.381 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 43.73' @ 12.17 hrs
Flood Elev= 44.67'

Device	Routing	Invert	Outlet Devices
#1	Primary	37.97'	**12.0" Round Culvert** L= 348.3' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 37.97' / 35.34' S= 0.0076 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=4.07 cfs @ 12.17 hrs HW=43.71' TW=38.53' (Dynamic Tailwater)
1=Culvert (Outlet Controls 4.07 cfs @ 5.18 fps)

Summary for Pond .DMH A1: (new Pond)

Inflow Area = 0.700 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 4.12 cfs @ 12.07 hrs, Volume= 0.324 af
Outflow = 4.12 cfs @ 12.07 hrs, Volume= 0.324 af, Atten= 0%, Lag= 0.0 min
Primary = 4.12 cfs @ 12.07 hrs, Volume= 0.324 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 65.46' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	51.27'	**24.0" Round Culvert** L= 55.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 51.27' / 50.88' S= 0.0071 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.07 hrs HW=52.51' TW=52.73' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond .P3: Outfall 3

Inflow Area = 3.960 ac, 42.31% Impervious, Inflow Depth > 3.83" for 25 yr event
Inflow = 19.83 cfs @ 12.07 hrs, Volume= 1.264 af
Outflow = 13.77 cfs @ 12.13 hrs, Volume= 1.264 af, Atten= 31%, Lag= 3.8 min
Primary = 13.77 cfs @ 12.13 hrs, Volume= 1.264 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 31.01' @ 12.13 hrs Surf.Area= 3,166 sf Storage= 2,219 cf
Flood Elev= 36.00' Surf.Area= 11,164 sf Storage= 38,305 cf

Plug-Flow detention time= 3.1 min calculated for 1.264 af (100% of inflow)
Center-of-Mass det. time= 2.9 min (833.4 - 830.5)

Volume	Invert	Avail.Storage	Storage Description
#1	29.61'	38,305 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
29.61	0	0	0
31.00	3,148	2,188	2,188
32.00	4,954	4,051	6,239
33.00	6,456	5,705	11,944
34.00	7,997	7,227	19,170
35.00	9,554	8,776	27,946
36.00	11,164	10,359	38,305

Device	Routing	Invert	Outlet Devices
#1	Primary	30.25'	**24.0" Round Culvert** L= 111.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 30.25' / 28.54' S= 0.0154 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Primary	29.61'	**36.0" Round Culvert** L= 116.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 29.61' / 29.01' S= 0.0052 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 7.07 sf

Primary OutFlow Max=13.76 cfs @ 12.13 hrs HW=31.01' (Free Discharge)
1=Culvert (Inlet Controls 3.25 cfs @ 2.97 fps)
2=Culvert (Barrel Controls 10.51 cfs @ 4.77 fps)

Summary for Pond 1P: Grass Lined Filtration Basin

Inflow Area = 2.150 ac, 73.02% Impervious, Inflow Depth = 4.88" for 25 yr event
Inflow = 11.36 cfs @ 12.07 hrs, Volume= 0.874 af
Outflow = 7.84 cfs @ 12.15 hrs, Volume= 0.658 af, Atten= 31%, Lag= 4.5 min
Primary = 7.84 cfs @ 12.15 hrs, Volume= 0.658 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 76.45' @ 12.15 hrs Surf.Area= 11,933 sf Storage= 14,473 cf
Flood Elev= 78.00' Surf.Area= 16,416 sf Storage= 36,387 cf

Plug-Flow detention time= 179.9 min calculated for 0.658 af (75% of inflow)
Center-of-Mass det. time= 92.4 min (851.3 - 758.9)

Volume	Invert	Avail.Storage	Storage Description
#1	75.00'	36,387 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
75.00	8,073	0	0
76.00	10,688	9,381	9,381
77.00	13,454	12,071	21,452
78.00	16,416	14,935	36,387

Device	Routing	Invert	Outlet Devices
#1	Primary	76.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=7.83 cfs @ 12.15 hrs HW=76.45' TW=75.95' (Dynamic Tailwater)
↳**1=Broad-Crested Rectangular Weir** (Weir Controls 7.83 cfs @ 1.74 fps)

Summary for Pond 3P: RipRap Inlet Area w/Outlet Control Structure

Inflow Area = 2.150 ac, 73.02% Impervious, Inflow Depth > 3.67" for 25 yr event
Inflow = 7.84 cfs @ 12.15 hrs, Volume= 0.658 af
Outflow = 7.84 cfs @ 12.15 hrs, Volume= 0.657 af, Atten= 0%, Lag= 0.1 min
Primary = 7.84 cfs @ 12.15 hrs, Volume= 0.657 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 75.95' @ 12.15 hrs Surf.Area= 180 sf Storage= 98 cf
Flood Elev= 78.00' Surf.Area= 796 sf Storage= 999 cf

Plug-Flow detention time= 1.3 min calculated for 0.657 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (851.7 - 851.3)

Volume	Invert	Avail.Storage	Storage Description
#1	75.00'	999 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
75.00	27	0	0
76.00	188	108	108
77.00	399	294	401
78.00	796	598	999

Device	Routing	Invert	Outlet Devices
#1	Primary	72.57'	**18.0" Round 18-inch Culvert** L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 72.57' / 72.00' S= 0.0114 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	75.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	77.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=7.84 cfs @ 12.15 hrs HW=75.95' TW=0.00' (Dynamic Tailwater)
↑—**1=18-inch Culvert** (Passes 7.84 cfs of 13.79 cfs potential flow)
↑—**2=Orifice/Grate** (Weir Controls 7.84 cfs @ 2.19 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=75.00' TW=0.00' (Dynamic Tailwater)
↑—**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 10P: CHAMBERS

Inflow Area = 0.886 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 6.14 cfs @ 12.00 hrs, Volume= 0.411 af
Outflow = 6.29 cfs @ 12.11 hrs, Volume= 0.343 af, Atten= 0%, Lag= 6.8 min
Primary = 5.75 cfs @ 12.11 hrs, Volume= 0.348 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 65.65' @ 12.10 hrs Surf.Area= 3,168 sf Storage= 5,057 cf

Plug-Flow detention time= 149.9 min calculated for 0.343 af (84% of inflow)
Center-of-Mass det. time= 80.9 min (821.0 - 740.1)

Volume	Invert	Avail.Storage	Storage Description
#1	64.00'	6,146 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) 6,336 cf Overall x 97.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
64.00	3,168	0	0
65.00	3,168	3,168	3,168
66.00	3,168	3,168	6,336

Device	Routing	Invert	Outlet Devices
#1	Primary	63.58'	**0.6" Vert. Orifice/Grate** C= 0.600
#2	Primary	65.02'	**4.0' long x 0.7' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32 3.31 3.32

Primary OutFlow Max=0.00 cfs @ 12.11 hrs HW=65.64' TW=65.99' (Dynamic Tailwater)
1=Orifice/Grate (Controls 0.00 cfs)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 12P: POR C

Inflow Area = 1.109 ac, 88.55% Impervious, Inflow Depth = 5.27" for 25 yr event
Inflow = 6.03 cfs @ 12.08 hrs, Volume= 0.487 af
Outflow = 1.10 cfs @ 12.53 hrs, Volume= 0.429 af, Atten= 82%, Lag= 26.8 min
Primary = 1.10 cfs @ 12.53 hrs, Volume= 0.429 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 68.00' @ 12.53 hrs Surf.Area= 37,448 sf Storage= 10,067 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 169.4 min (920.6 - 751.2)

Volume	Invert	Avail.Storage	Storage Description
#1	67.33'	14,979 cf	**12' Reservoir (Prismatic)**Listed below (Recalc) 37,448 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
67.33	37,448	0	0
68.33	37,448	37,448	37,448

Device	Routing	Invert	Outlet Devices
#1	Primary	66.17'	**1.6" Vert. Orifice/Grate** C= 0.600
#2	Primary	67.58'	**4.0" Round Culvert X 6.00** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.58' / 67.00' S= 0.0290 '/' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf

Primary OutFlow Max=1.10 cfs @ 12.53 hrs HW=68.00' TW=64.64' (Dynamic Tailwater)
1=Orifice/Grate (Orifice Controls 0.09 cfs @ 6.40 fps)
2=Culvert (Inlet Controls 1.01 cfs @ 1.92 fps)

Summary for Pond 19P:

Inflow Area = 8.720 ac, 48.08% Impervious, Inflow Depth = 4.54" for 25 yr event
Inflow = 9.92 cfs @ 13.07 hrs, Volume= 3.302 af
Outflow = 9.94 cfs @ 13.07 hrs, Volume= 3.302 af, Atten= 0%, Lag= 0.0 min
Primary = 9.94 cfs @ 13.07 hrs, Volume= 3.302 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 47.14' @ 12.97 hrs Surf.Area= 13 sf Storage= 82 cf
Flood Elev= 43.81' Surf.Area= 13 sf Storage= 82 cf

Plug-Flow detention time= 0.1 min calculated for 3.301 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (824.2 - 824.1)

Volume	Invert	Avail.Storage	Storage Description
#1	37.26'	82 cf	**4.00'D x 6.55'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	37.26'	**15.0" Round Culvert** L= 210.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 37.26' / 35.85' S= 0.0067 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=9.95 cfs @ 13.07 hrs HW=47.00' TW=40.47' (Dynamic Tailwater)
1=Culvert (Outlet Controls 9.95 cfs @ 8.11 fps)

Summary for Pond 20P: POR B

Inflow Area = 0.518 ac, 92.86% Impervious, Inflow Depth = 5.38" for 25 yr event
Inflow = 2.86 cfs @ 12.08 hrs, Volume= 0.232 af
Outflow = 1.10 cfs @ 12.31 hrs, Volume= 0.213 af, Atten= 62%, Lag= 13.7 min
Primary = 1.10 cfs @ 12.31 hrs, Volume= 0.213 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 67.82' @ 12.31 hrs Surf.Area= 20,045 sf Storage= 3,916 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 146.7 min (895.7 - 749.0)

Volume	Invert	Avail.Storage	Storage Description
#1	67.33'	8,018 cf	**12" Reservoir (Prismatic)**Listed below (Recalc) 20,045 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
67.33	20,045	0	0
68.33	20,045	20,045	20,045

Device	Routing	Invert	Outlet Devices
#1	Primary	66.17'	**1.2" Vert. Orifice/Grate** C= 0.600
#2	Primary	67.55'	**4.0" Round Culvert X 10.00** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.55' / 67.00' S= 0.0275 '/' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf

Primary OutFlow Max=1.10 cfs @ 12.31 hrs HW=67.82' TW=62.27' (Dynamic Tailwater)
1=Orifice/Grate (Orifice Controls 0.05 cfs @ 6.09 fps)
2=Culvert (Inlet Controls 1.05 cfs @ 1.39 fps)

Summary for Pond 23P: 23 P

Inflow Area = 1.995 ac, 93.63% Impervious, Inflow Depth > 4.67" for 25 yr event
Inflow = 6.44 cfs @ 12.11 hrs, Volume= 0.777 af
Outflow = 6.44 cfs @ 12.11 hrs, Volume= 0.777 af, Atten= 0%, Lag= 0.0 min
Primary = 6.44 cfs @ 12.11 hrs, Volume= 0.777 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 66.01' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	63.48'	**15.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 63.48' / 63.00' S= 0.0120 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=6.43 cfs @ 12.11 hrs HW=66.00' TW=63.73' (Dynamic Tailwater)
1=Culvert (Inlet Controls 6.43 cfs @ 5.24 fps)

Summary for Pond 25P: (new Pond)

Inflow Area = 4.664 ac, 43.76% Impervious, Inflow Depth > 1.84" for 25 yr event
Inflow = 2.44 cfs @ 13.10 hrs, Volume= 0.716 af
Outflow = 5.11 cfs @ 13.02 hrs, Volume= 0.716 af, Atten= 0%, Lag= 0.0 min
Primary = 5.11 cfs @ 13.02 hrs, Volume= 0.717 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 76.75' @ 13.01 hrs Surf.Area= 13 sf Storage= 38 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (983.6 - 983.6)

Volume	Invert	Avail.Storage	Storage Description
#1	70.00'	38 cf	**4.00'D x 3.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	70.00'	**15.0" Round Culvert** L= 560.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 70.00' / 55.00' S= 0.0268 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=5.12 cfs @ 13.02 hrs HW=71.49' TW=67.91' (Dynamic Tailwater)
1=Culvert (Outlet Controls 5.12 cfs @ 4.42 fps)

Summary for Pond 26P: (new Pond)

Inflow Area = 4.664 ac, 43.76% Impervious, Inflow Depth > 1.84" for 25 yr event
Inflow = 5.11 cfs @ 13.02 hrs, Volume= 0.717 af
Outflow = 5.35 cfs @ 12.95 hrs, Volume= 0.718 af, Atten= 0%, Lag= 0.0 min
Primary = 5.35 cfs @ 12.95 hrs, Volume= 0.718 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 82.84' @ 13.89 hrs Surf.Area= 13 sf Storage= 38 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	55.00'	38 cf	**4.00'D x 3.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	55.00'	**24.0" Round Culvert** L= 340.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 55.00' / 47.42' S= 0.0223 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.95 hrs HW=56.63' TW=59.38' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond 45P: (new Pond)

Inflow Area = 4.664 ac, 43.76% Impervious, Inflow Depth = 3.02" for 25 yr event
Inflow = 8.22 cfs @ 12.39 hrs, Volume= 1.175 af
Outflow = 2.45 cfs @ 13.02 hrs, Volume= 0.716 af, Atten= 70%, Lag= 37.8 min
Primary = 2.45 cfs @ 13.02 hrs, Volume= 0.716 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 45.91' @ 13.02 hrs Surf.Area= 10,404 sf Storage= 28,152 cf

Plug-Flow detention time= 301.0 min calculated for 0.716 af (61% of inflow)
Center-of-Mass det. time= 181.1 min (976.5 - 795.4)

Volume	Invert	Avail.Storage	Storage Description
#1	42.00'	72,211 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	3,043	0	0
43.00	5,955	4,499	4,499
44.00	7,426	6,691	11,190
45.00	8,867	8,147	19,336
46.00	10,547	9,707	29,043
47.00	12,182	11,365	40,408
48.00	16,412	14,297	54,705
49.00	18,601	17,507	72,211

Device	Routing	Invert	Outlet Devices
#1	Primary	45.00'	**12.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.00' / 44.40' S= 0.0200 '/' Cc= 0.900 n= 0.015 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.45 cfs @ 13.02 hrs HW=45.91' TW=45.08' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.45 cfs @ 3.26 fps)

Summary for Pond A-11P: Minimally Controlled by Inlet Capacity

Inflow Area = 2.740 ac, 36.50% Impervious, Inflow Depth = 4.32" for 25 yr event
Inflow = 7.59 cfs @ 12.38 hrs, Volume= 0.986 af
Outflow = 8.39 cfs @ 12.60 hrs, Volume= 0.986 af, Atten= 0%, Lag= 13.4 min
Primary = 8.39 cfs @ 12.60 hrs, Volume= 1.040 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 56.14' @ 12.60 hrs Surf.Area= 10,902 sf Storage= 4,438 cf

Plug-Flow detention time= 3.4 min calculated for 0.985 af (100% of inflow)
Center-of-Mass det. time= 3.4 min (807.0 - 803.5)

Volume	Invert	Avail.Storage	Storage Description
#1	55.28'	12,750 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.28	0	0	0
56.00	8,500	3,060	3,060
56.68	20,000	9,690	12,750

Device	Routing	Invert	Outlet Devices
#1	Primary	55.28'	**1.4" x 3.5" Horiz. Orifice/Grate X 48.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=7.45 cfs @ 12.60 hrs HW=56.14' TW=51.40' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 7.45 cfs @ 4.46 fps)

Summary for Pond A-21P: Controlled by Inlet Capacity

Inflow Area = 9.300 ac, 37.63% Impervious, Inflow Depth = 4.34" for 25 yr event
Inflow = 21.31 cfs @ 12.50 hrs, Volume= 3.363 af
Outflow = 14.74 cfs @ 13.54 hrs, Volume= 3.363 af, Atten= 31%, Lag= 62.2 min
Primary = 11.37 cfs @ 13.11 hrs, Volume= 3.401 af
Secondary = 11.31 cfs @ 13.11 hrs, Volume= 0.587 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 82.73' @ 13.33 hrs Surf.Area= 44,000 sf Storage= 34,355 cf

Plug-Flow detention time= 28.7 min calculated for 3.362 af (100% of inflow)
Center-of-Mass det. time= 28.6 min (841.9 - 813.3)

Volume	Invert	Avail.Storage	Storage Description
#1	65.39'	34,355 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
65.39	0	0	0
66.00	13,000	3,965	3,965
66.62	36,000	15,190	19,155
67.00	44,000	15,200	34,355

Device	Routing	Invert	Outlet Devices
#1	Primary	65.39'	**1.4" x 3.5" Horiz. Orifice/Grate X 48.00** C= 0.600 Limited to weir flow at low heads
#2	Secondary	66.66'	**1.4" x 3.5" Horiz. Orifice/Grate X 8.00 columns** X 6 rows C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 13.11 hrs HW=70.87' TW=76.01' (Dynamic Tailwater)
1=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 13.11 hrs HW=71.51' TW=77.64' (Dynamic Tailwater)
2=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond A-54P: MINIMALLY CONTROLLED BY INLET CAPACITY

Inflow Area = 1.820 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 10.71 cfs @ 12.07 hrs, Volume= 0.844 af
Outflow = 18.23 cfs @ 12.09 hrs, Volume= 0.843 af, Atten= 0%, Lag= 1.3 min
Primary = 6.49 cfs @ 12.10 hrs, Volume= 0.793 af
Secondary = 17.78 cfs @ 12.09 hrs, Volume= 0.082 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 68.52' @ 12.09 hrs Surf.Area= 10,000 sf Storage= 1,650 cf

Plug-Flow detention time= 1.7 min calculated for 0.843 af (100% of inflow)
Center-of-Mass det. time= 1.0 min (745.8 - 744.7)

Volume	Invert	Avail.Storage	Storage Description
#1	52.45'	1,650 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.45	0	0	0
52.78	10,000	1,650	1,650

Device	Routing	Invert	Outlet Devices
#1	Primary	52.45'	**1.8" x 9.6" Horiz. Orifice/Grate X 20.00** C= 0.600 Limited to weir flow at low heads
#2	Secondary	52.61'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 12.10 hrs HW=52.78' TW=57.89' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=3,874.54 cfs @ 12.09 hrs HW=67.75' TW=52.23' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 3,874.54 cfs @ 10.23 fps)

Summary for Pond A-69P: (new Pond)

Inflow Area = 1.502 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 8.84 cfs @ 12.07 hrs, Volume= 0.696 af
Outflow = 8.80 cfs @ 12.09 hrs, Volume= 0.696 af, Atten= 0%, Lag= 1.3 min
Primary = 4.33 cfs @ 12.03 hrs, Volume= 0.410 af
Secondary = 6.00 cfs @ 12.09 hrs, Volume= 0.304 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.51' @ 12.09 hrs Surf.Area= 6,063 sf Storage= 607 cf

Plug-Flow detention time= 0.4 min calculated for 0.696 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (745.1 - 744.7)

Volume	Invert	Avail.Storage	Storage Description
#1	57.31'	1,650 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
57.31	0	0	0
57.64	10,000	1,650	1,650

Device	Routing	Invert	Outlet Devices
#1	Primary	57.31'	**1.8" x 9.6" Horiz. Orifice/Grate X 20.00** C= 0.600 Limited to weir flow at low heads
#2	Secondary	57.31'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.58 cfs @ 12.03 hrs HW=57.48' TW=57.47' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.58 cfs @ 0.24 fps)

Secondary OutFlow Max=5.99 cfs @ 12.09 hrs HW=57.51' TW=56.61' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 5.99 cfs @ 1.20 fps)

Summary for Pond A-7P: Minimally Controlled by Inlet Capacity

Inflow Area = 1.860 ac, 35.48% Impervious, Inflow Depth = 4.30" for 25 yr event
Inflow = 4.25 cfs @ 12.55 hrs, Volume= 0.666 af
Outflow = 4.56 cfs @ 12.64 hrs, Volume= 0.666 af, Atten= 0%, Lag= 5.2 min
Primary = 4.56 cfs @ 12.64 hrs, Volume= 0.712 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 50.92' @ 12.64 hrs Surf.Area= 12,852 sf Storage= 2,065 cf

Plug-Flow detention time= 2.5 min calculated for 0.666 af (100% of inflow)
Center-of-Mass det. time= 2.5 min (819.6 - 817.1)

Volume	Invert	Avail.Storage	Storage Description
#1	50.60'	5,751 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
50.60	4	0	0
51.00	16,000	3,201	3,201
51.15	18,000	2,550	5,751

Device	Routing	Invert	Outlet Devices
#1	Primary	50.60'	**1.4" x 3.5" Horiz. Orifice/Grate X 8.00 columns** X 6 rows C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 12.64 hrs HW=50.92' TW=56.46' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond A-91A:

Inflow Area = 61.261 ac, 58.18% Impervious, Inflow Depth > 4.53" for 25 yr event
Inflow = 140.03 cfs @ 12.06 hrs, Volume= 23.129 af
Outflow = 139.51 cfs @ 12.06 hrs, Volume= 23.129 af, Atten= 0%, Lag= 0.0 min
Primary = 139.51 cfs @ 12.06 hrs, Volume= 23.129 af
Secondary = 7.32 cfs @ 12.07 hrs, Volume= 0.006 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 52.78' @ 12.07 hrs Surf.Area= 0.000 ac Storage= 0.003 af
Flood Elev= 61.60' Surf.Area= 0.000 ac Storage= 0.005 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (852.0 - 852.0)

Volume	Invert	Avail.Storage	Storage Description
#1	43.74'	0.005 af	**4.00'D x 17.86'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	43.14'	**54.0" Round Culvert** L= 353.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.14' / 41.73' S= 0.0040 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 15.90 sf
#2	Secondary	51.23'	**24.0" Round Culvert** L= 15.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.23' / 51.14' S= 0.0060 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf

Primary OutFlow Max=116.70 cfs @ 12.06 hrs HW=52.03' TW=49.52' (Dynamic Tailwater)
1=Culvert (Outlet Controls 116.70 cfs @ 7.34 fps)

Secondary OutFlow Max=0.00 cfs @ 12.07 hrs HW=52.77' TW=53.07' (Dynamic Tailwater)
2=Culvert (Controls 0.00 cfs)

Summary for Pond A-91B:

Inflow Area = 25.643 ac, 82.28% Impervious, Inflow Depth = 4.71" for 25 yr event
Inflow = 105.12 cfs @ 12.10 hrs, Volume= 10.063 af
Outflow = 104.91 cfs @ 12.10 hrs, Volume= 10.063 af, Atten= 0%, Lag= 0.1 min
Primary = 104.91 cfs @ 12.10 hrs, Volume= 10.063 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 54.44' @ 12.07 hrs Surf.Area= 0.000 ac Storage= 0.003 af
Flood Elev= 61.60' Surf.Area= 0.000 ac Storage= 0.005 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (783.9 - 783.9)

Volume	Invert	Avail.Storage	Storage Description
#1	44.11'	0.005 af	**4.00'D x 17.49'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	43.48'	**54.0" Round Culvert** L= 47.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.48' / 43.24' S= 0.0051 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 15.90 sf

Primary OutFlow Max=93.80 cfs @ 12.10 hrs HW=52.73' TW=51.23' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 93.80 cfs @ 5.90 fps)

Summary for Pond B-12: (new Pond)

Inflow Area = 11.043 ac, 90.00% Impervious, Inflow Depth = 5.36" for 25 yr event
Inflow = 63.79 cfs @ 12.07 hrs, Volume= 4.935 af
Outflow = 64.15 cfs @ 12.07 hrs, Volume= 4.935 af, Atten= 0%, Lag= 0.0 min
Primary = 64.15 cfs @ 12.07 hrs, Volume= 4.935 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 45.04' @ 12.07 hrs Surf.Area= 0.001 ac Storage= 0.004 af

Plug-Flow detention time= 0.2 min calculated for 4.935 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (750.1 - 750.0)

Volume	Invert	Avail.Storage	Storage Description
#1	36.33'	0.004 af	**6.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	36.33'	**30.0" Round Culvert** L= 137.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 36.33' / 35.50' S= 0.0061 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=64.13 cfs @ 12.07 hrs HW=45.04' TW=38.50' (Dynamic Tailwater)
1=Culvert (Outlet Controls 64.13 cfs @ 13.06 fps)

Summary for Pond B-13: (new Pond)

Inflow Area = 11.043 ac, 90.00% Impervious, Inflow Depth = 5.37" for 25 yr event
Inflow = 63.30 cfs @ 12.07 hrs, Volume= 4.937 af
Outflow = 63.29 cfs @ 12.07 hrs, Volume= 4.935 af, Atten= 0%, Lag= 0.0 min
Primary = 63.29 cfs @ 12.07 hrs, Volume= 4.935 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.29' @ 12.08 hrs Surf.Area= 0.001 ac Storage= 0.004 af

Plug-Flow detention time= 0.7 min calculated for 4.934 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (749.9 - 749.5)

Volume	Invert	Avail.Storage	Storage Description
#1	41.14'	0.004 af	**6.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	41.14'	**30.0" Round RCP_Round 30"** L= 25.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 41.14' / 40.89' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=60.25 cfs @ 12.07 hrs HW=57.18' TW=53.02' (Dynamic Tailwater)
↑**1=RCP_Round 30"** (Inlet Controls 60.25 cfs @ 12.27 fps)

Summary for Pond B-14:

Inflow Area = 11.043 ac, 90.00% Impervious, Inflow Depth = 5.37" for 25 yr event
Inflow = 63.32 cfs @ 12.07 hrs, Volume= 4.938 af
Outflow = 63.30 cfs @ 12.07 hrs, Volume= 4.937 af, Atten= 0%, Lag= 0.0 min
Primary = 63.30 cfs @ 12.07 hrs, Volume= 4.937 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 82.50' @ 12.08 hrs Surf.Area= 0.000 ac Storage= 0.002 af

Plug-Flow detention time= 0.2 min calculated for 4.936 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (749.5 - 749.4)

Volume	Invert	Avail.Storage	Storage Description
#1	42.81'	0.002 af	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	42.81'	**24.0" Round Culvert** L= 224.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 42.81' / 41.24' S= 0.0070 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=62.83 cfs @ 12.07 hrs HW=81.97' TW=57.18' (Dynamic Tailwater)
1=Culvert (Outlet Controls 62.83 cfs @ 20.00 fps)

Summary for Pond DHM A7:

Inflow Area = 61.261 ac, 58.18% Impervious, Inflow Depth > 4.53" for 25 yr event
Inflow = 138.07 cfs @ 12.07 hrs, Volume= 23.129 af
Outflow = 138.09 cfs @ 12.07 hrs, Volume= 23.128 af, Atten= 0%, Lag= 0.0 min
Primary = 138.09 cfs @ 12.07 hrs, Volume= 23.128 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 41.12' @ 12.79 hrs Surf.Area= 0.000 ac Storage= 0.002 af
Flood Elev= 48.00' Surf.Area= 0.000 ac Storage= 0.004 af

Plug-Flow detention time= 0.0 min calculated for 23.121 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (852.1 - 852.1)

Volume	Invert	Avail.Storage	Storage Description
#1	33.25'	0.004 af	**4.00'D x 14.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	33.25'	**54.0" Round Culvert** L= 300.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 33.25' / 30.00' S= 0.0108 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf

Primary OutFlow Max=138.29 cfs @ 12.07 hrs HW=37.93' TW=34.28' (Dynamic Tailwater)
1=Culvert (Outlet Controls 138.29 cfs @ 10.38 fps)

Summary for Pond DMH A1:

Inflow Area = 8.955 ac, 79.56% Impervious, Inflow Depth = 4.43" for 25 yr event
Inflow = 37.01 cfs @ 12.31 hrs, Volume= 3.305 af
Outflow = 36.71 cfs @ 12.18 hrs, Volume= 3.305 af, Atten= 1%, Lag= 0.0 min
Primary = 36.71 cfs @ 12.18 hrs, Volume= 3.305 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 73.54' @ 12.18 hrs Surf.Area= 13 sf Storage= 104 cf
Flood Elev= 60.50' Surf.Area= 13 sf Storage= 104 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (829.1 - 829.0)

Volume	Invert	Avail.Storage	Storage Description
#1	52.20'	104 cf	**4.00'D x 8.30'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	52.20'	**24.0" Round Culvert** L= 40.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 52.20' / 51.88' S= 0.0080 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=37.16 cfs @ 12.18 hrs HW=71.64' TW=65.61' (Dynamic Tailwater)
1=Culvert (Inlet Controls 37.16 cfs @ 11.83 fps)

Summary for Pond DMH A2:

Inflow Area = 2.365 ac, 71.25% Impervious, Inflow Depth > 3.73" for 25 yr event
Inflow = 8.31 cfs @ 12.15 hrs, Volume= 0.736 af
Outflow = 12.33 cfs @ 12.23 hrs, Volume= 0.736 af, Atten= 0%, Lag= 5.0 min
Primary = 12.33 cfs @ 12.23 hrs, Volume= 0.739 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 71.91' @ 12.25 hrs Surf.Area= 13 sf Storage= 163 cf
Flood Elev= 71.00' Surf.Area= 13 sf Storage= 163 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (842.9 - 842.8)

Volume	Invert	Avail.Storage	Storage Description
#1	58.00'	163 cf	**4.00'D x 13.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	58.00'	**18.0" Round Culvert** L= 666.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 58.00' / 52.30' S= 0.0086 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=12.47 cfs @ 12.23 hrs HW=70.21' TW=59.63' (Dynamic Tailwater)
1=Culvert (Outlet Controls 12.47 cfs @ 7.06 fps)

Summary for Pond DMH A3:

Inflow Area = 8.955 ac, 79.56% Impervious, Inflow Depth = 4.43" for 25 yr event
Inflow = 36.71 cfs @ 12.18 hrs, Volume= 3.305 af
Outflow = 39.76 cfs @ 12.32 hrs, Volume= 3.305 af, Atten= 0%, Lag= 8.3 min
Primary = 39.76 cfs @ 12.32 hrs, Volume= 3.305 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 72.91' @ 12.32 hrs Surf.Area= 13 sf Storage= 110 cf
Flood Elev= 60.50' Surf.Area= 13 sf Storage= 110 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (829.2 - 829.1)

Volume	Invert	Avail.Storage	Storage Description
#1	51.78'	110 cf	**4.00'D x 8.72'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	51.78'	**24.0" Round Culvert** L= 550.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.78' / 50.13' S= 0.0030 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=39.72 cfs @ 12.32 hrs HW=72.86' TW=47.99' (Dynamic Tailwater)
1=Culvert (Barrel Controls 39.72 cfs @ 12.64 fps)

Summary for Pond DMH A4:

Inflow Area = 61.261 ac, 58.18% Impervious, Inflow Depth > 4.53" for 25 yr event
Inflow = 139.51 cfs @ 12.06 hrs, Volume= 23.129 af
Outflow = 138.83 cfs @ 12.06 hrs, Volume= 23.129 af, Atten= 0%, Lag= 0.1 min
Primary = 138.83 cfs @ 12.06 hrs, Volume= 23.129 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 49.74' @ 12.06 hrs Surf.Area= 13 sf Storage= 102 cf
Flood Elev= 60.10' Surf.Area= 13 sf Storage= 232 cf

Plug-Flow detention time= 0.0 min calculated for 23.129 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (852.0 - 852.0)

Volume	Invert	Avail.Storage	Storage Description
#1	41.63'	232 cf	**4.00'D x 18.47'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	41.63'	**54.0" Round Culvert** L= 309.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 41.63' / 39.87' S= 0.0057 '/' Cc= 0.900 n= 0.013, Flow Area= 15.90 sf

Primary OutFlow Max=132.37 cfs @ 12.06 hrs HW=49.48' TW=46.79' (Dynamic Tailwater)
1=Culvert (Outlet Controls 132.37 cfs @ 8.32 fps)

Summary for Pond DMH A5:

Inflow Area = 61.261 ac, 58.18% Impervious, Inflow Depth > 4.53" for 25 yr event
Inflow = 138.83 cfs @ 12.06 hrs, Volume= 23.129 af
Outflow = 137.93 cfs @ 12.07 hrs, Volume= 23.129 af, Atten= 1%, Lag= 0.1 min
Primary = 137.93 cfs @ 12.07 hrs, Volume= 23.129 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 46.88' @ 12.07 hrs Surf.Area= 13 sf Storage= 89 cf
Flood Elev= 57.00' Surf.Area= 13 sf Storage= 217 cf

Plug-Flow detention time= 0.0 min calculated for 23.129 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (852.0 - 852.0)

Volume	Invert	Avail.Storage	Storage Description
#1	39.77'	217 cf	**4.00'D x 17.23'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	39.77'	**54.0" Round Culvert** L= 1,012.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 39.77' / 34.94' S= 0.0048 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf

Primary OutFlow Max=136.32 cfs @ 12.07 hrs HW=46.79' TW=40.54' (Dynamic Tailwater)
1=Culvert (Outlet Controls 136.32 cfs @ 8.57 fps)

Summary for Pond DMH A6:

Inflow Area = 61.261 ac, 58.18% Impervious, Inflow Depth > 4.53" for 25 yr event
Inflow = 137.93 cfs @ 12.07 hrs, Volume= 23.129 af
Outflow = 138.07 cfs @ 12.07 hrs, Volume= 23.129 af, Atten= 0%, Lag= 0.0 min
Primary = 138.07 cfs @ 12.07 hrs, Volume= 23.129 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 41.46' @ 12.75 hrs Surf.Area= 13 sf Storage= 83 cf
Flood Elev= 49.50' Surf.Area= 13 sf Storage= 184 cf

Plug-Flow detention time= 0.0 min calculated for 23.121 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (852.1 - 852.0)

Volume	Invert	Avail.Storage	Storage Description
#1	34.84'	184 cf	**4.00'D x 14.66'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	34.84'	**54.0" Round Culvert** L= 312.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 34.84' / 33.35' S= 0.0048 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf

Primary OutFlow Max=133.42 cfs @ 12.07 hrs HW=40.54' TW=37.93' (Dynamic Tailwater)
1=Culvert (Outlet Controls 133.42 cfs @ 8.55 fps)

Summary for Pond DMH C2: (new Pond)

Inflow Area = 23.400 ac, 61.69% Impervious, Inflow Depth = 2.35" for 25 yr event
Inflow = 48.22 cfs @ 12.10 hrs, Volume= 4.589 af
Outflow = 48.22 cfs @ 12.10 hrs, Volume= 4.589 af, Atten= 0%, Lag= 0.0 min
Primary = 48.22 cfs @ 12.10 hrs, Volume= 4.589 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 68.86' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	36.00'	**24.0" Round Culvert** L= 370.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 36.00' / 33.72' S= 0.0062 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=47.91 cfs @ 12.10 hrs HW=68.70' TW=45.18' (Dynamic Tailwater)
1=Culvert (Outlet Controls 47.91 cfs @ 15.25 fps)

Summary for Pond DMH C6: Outfall 3

Inflow Area = 260.056 ac, 42.34% Impervious, Inflow Depth > 3.41" for 25 yr event
Inflow = 270.70 cfs @ 12.54 hrs, Volume= 73.884 af
Outflow = 250.60 cfs @ 12.54 hrs, Volume= 73.884 af, Atten= 7%, Lag= 0.0 min
Primary = 250.60 cfs @ 12.54 hrs, Volume= 73.884 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 24.34' @ 12.54 hrs Surf.Area= 13 sf Storage= 108 cf
Flood Elev= 27.00' Surf.Area= 13 sf Storage= 142 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (837.5 - 837.5)

Volume	Invert	Avail.Storage	Storage Description
#1	15.71'	142 cf	**4.00'D x 11.29'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	15.71'	**60.0" Round Culvert** L= 141.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 15.71' / 15.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 19.63 sf

Primary OutFlow Max=243.12 cfs @ 12.54 hrs HW=24.09' (Free Discharge)
1=Culvert (Barrel Controls 243.12 cfs @ 12.38 fps)

Summary for Pond DMH C7:

Inflow Area = 260.056 ac, 42.34% Impervious, Inflow Depth > 4.10" for 25 yr event
Inflow = 302.32 cfs @ 12.64 hrs, Volume= 88.960 af
Outflow = 309.59 cfs @ 12.77 hrs, Volume= 88.960 af, Atten= 0%, Lag= 7.8 min
Primary = 270.70 cfs @ 12.54 hrs, Volume= 73.884 af
Secondary = 146.39 cfs @ 12.81 hrs, Volume= 15.856 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 31.28' @ 12.56 hrs Surf.Area= 13 sf Storage= 157 cf
Flood Elev= 32.00' Surf.Area= 13 sf Storage= 166 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (833.7 - 833.6)

Volume	Invert	Avail.Storage	Storage Description
#1	18.80'	166 cf	**4.00'D x 13.20'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	18.80'	**60.0" Round Culvert** L= 598.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 18.80' / 15.81' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 19.63 sf
#2	Secondary	19.79'	**42.0" Round Culvert** L= 45.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 19.79' / 19.67' S= 0.0027 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 9.62 sf

Primary OutFlow Max=217.89 cfs @ 12.54 hrs HW=30.62' TW=24.12' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 217.89 cfs @ 11.10 fps)

Secondary OutFlow Max=0.00 cfs @ 12.81 hrs HW=28.44' TW=35.79' (Dynamic Tailwater)
↑—**2=Culvert** (Controls 0.00 cfs)

Summary for Pond DMH C8:

Inflow Area = 252.889 ac, 42.78% Impervious, Inflow Depth > 4.11" for 25 yr event
Inflow = 292.07 cfs @ 12.77 hrs, Volume= 86.708 af
Outflow = 298.43 cfs @ 12.64 hrs, Volume= 86.708 af, Atten= 0%, Lag= 0.0 min
Primary = 298.43 cfs @ 12.64 hrs, Volume= 86.708 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 37.15' @ 12.53 hrs Surf.Area= 13 sf Storage= 211 cf
Flood Elev= 43.00' Surf.Area= 13 sf Storage= 285 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (834.7 - 834.7)

Volume	Invert	Avail.Storage	Storage Description
#1	20.32'	285 cf	**4.00'D x 22.68'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	20.32'	**60.0" Round Culvert** L= 284.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 20.32' / 18.90' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 19.63 sf

Primary OutFlow Max=189.17 cfs @ 12.64 hrs HW=32.78' TW=29.55' (Dynamic Tailwater)
1=Culvert (Outlet Controls 189.17 cfs @ 9.63 fps)

Summary for Pond MT-11A:

Inflow Area = 1.230 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af
Outflow = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af, Atten= 0%, Lag= 0.0 min
Primary = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 388.26' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	33.75'	**18.0" Round RCP_Round 18"** L= 104.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 33.75' / 33.47' S= 0.0027 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=7.46 cfs @ 12.06 hrs HW=35.51' TW=34.74' (Dynamic Tailwater)
1=RCP_Round 18" (Barrel Controls 7.46 cfs @ 4.53 fps)

Summary for Pond MT-16:

Inflow Area = 1.230 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af
Outflow = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af, Atten= 0%, Lag= 0.0 min
Primary = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 387.68' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	33.42'	**24.0" Round RCP_Round 24"** L= 74.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 33.42' / 32.87' S= 0.0074 '/' Cc= 0.900 n= 0.010 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.06 hrs HW=34.74' TW=311.61' (Dynamic Tailwater)
1=RCP_Round 24" (Controls 0.00 cfs)

Summary for Pond MT-24:

Inflow Area = 1.230 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af
Outflow = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af, Atten= 0%, Lag= 0.0 min
Primary = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 387.42' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	32.61'	**24.0" Round RCP_Round 24"** L= 145.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 32.61' / 32.10' S= 0.0035 '/' Cc= 0.900 n= 0.010 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=7.19 cfs @ 12.06 hrs HW=311.61' TW=311.43' (Dynamic Tailwater)
1=RCP_Round 24" (Outlet Controls 7.19 cfs @ 2.29 fps)

Summary for Pond MT-25:

Inflow Area = 1.230 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af
Outflow = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af, Atten= 0%, Lag= 0.0 min
Primary = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 387.34' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	31.95'	**24.0" Round CMP_Round 24"** L= 74.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 31.95' / 31.80' S= 0.0020 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=230.78 cfs @ 12.06 hrs HW=311.43' TW=155.55' (Dynamic Tailwater)
1=CMP_Round 24" (Outlet Controls 230.78 cfs @ 73.46 fps)

Summary for Pond MT-26:

Inflow Area = 1.230 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af
Outflow = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af, Atten= 0%, Lag= 0.0 min
Primary = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 387.06' @ 12.05 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	31.00'	**24.0" Round CMP_Round 24"** L= 20.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 31.00' / 30.50' S= 0.0250 '/' Cc= 0.900 n= 0.010 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=3.67 cfs @ 12.06 hrs HW=155.55' TW=155.51' (Dynamic Tailwater)
↑**1=CMP_Round 24"** (Inlet Controls 3.67 cfs @ 1.17 fps)

Summary for Pond Outfall 1: Outfall 1

Inflow Area = 24.830 ac, 77.05% Impervious, Inflow Depth = 5.11" for 25 yr event
Inflow = 47.34 cfs @ 11.84 hrs, Volume= 10.575 af
Primary = 47.34 cfs @ 11.84 hrs, Volume= 10.575 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Summary for Pond P-4:

Inflow Area = 251.854 ac, 42.79% Impervious, Inflow Depth > 4.11" for 25 yr event
Inflow = 419.36 cfs @ 12.08 hrs, Volume= 86.327 af
Outflow = 291.40 cfs @ 12.77 hrs, Volume= 86.327 af, Atten= 31%, Lag= 41.5 min
Primary = 291.40 cfs @ 12.77 hrs, Volume= 86.327 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 40.81' @ 12.79 hrs Surf.Area= 57,550 sf Storage= 299,877 cf

Plug-Flow detention time= 6.6 min calculated for 86.298 af (100% of inflow)
Center-of-Mass det. time= 6.6 min (834.9 - 828.3)

Volume	Invert	Avail.Storage	Storage Description
#1	25.73'	533,906 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
25.73	100	0	0
28.00	317	473	473
30.00	2,959	3,276	3,749
32.00	9,123	12,082	15,831
34.00	19,699	28,822	44,653
36.00	29,551	49,250	93,903
38.00	40,123	69,674	163,577
40.00	51,963	92,086	255,663
42.00	65,802	117,765	373,428
44.00	94,676	160,478	533,906

Device	Routing	Invert	Outlet Devices
#1	Primary	25.73'	**60.0" Round Culvert** L= 500.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 25.73' / 21.14' S= 0.0092 '/' Cc= 0.900 n= 0.013, Flow Area= 19.63 sf

Primary OutFlow Max=238.76 cfs @ 12.77 hrs HW=40.79' TW=33.81' (Dynamic Tailwater)
1=Culvert (Outlet Controls 238.76 cfs @ 12.16 fps)

Summary for Pond P-5:

Inflow Area = 1.846 ac, 66.63% Impervious, Inflow Depth = 4.78" for 25 yr event
Inflow = 10.01 cfs @ 12.05 hrs, Volume= 0.735 af
Outflow = 14.09 cfs @ 12.05 hrs, Volume= 0.638 af, Atten= 0%, Lag= 0.0 min
Primary = 14.09 cfs @ 12.05 hrs, Volume= 0.638 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 387.02' @ 12.05 hrs Surf.Area= 5,500 sf Storage= 9,952 cf

Plug-Flow detention time= 153.8 min calculated for 0.638 af (87% of inflow)
Center-of-Mass det. time= 93.2 min (854.7 - 761.6)

Volume	Invert	Avail.Storage	Storage Description
#1	30.50'	9,952 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
30.50	2,833	314.0	0	0	2,833
31.00	3,240	326.0	1,517	1,517	3,465
31.50	3,680	334.0	1,729	3,246	3,916
32.00	4,073	343.0	1,937	5,183	4,430
33.00	5,500	450.0	4,769	9,952	11,194

Device	Routing	Invert	Outlet Devices
#1	Primary	28.10'	**6.0" Round Culvert** L= 7.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 28.10' / 28.00' S= 0.0143 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#2	Device 1	32.00'	**2.3" x 2.3" Horiz. Orifice/Grate X 6.00 columns** X 6 rows C= 0.600 in 24.0" x 24.0" Grate (33% open area) Limited to weir flow at low heads
#3	Device 1	30.50'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=14.09 cfs @ 12.05 hrs HW=387.02' TW=30.61' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 14.09 cfs @ 71.76 fps)
↑**2=Orifice/Grate** (Passes < 119.98 cfs potential flow)
3=Exfiltration (Passes < 0.06 cfs potential flow)

Summary for Pond P-67A:

Inflow Area = 2.950 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 17.37 cfs @ 12.07 hrs, Volume= 1.367 af
Outflow = 23.62 cfs @ 12.06 hrs, Volume= 1.367 af, Atten= 0%, Lag= 0.0 min
Primary = 9.17 cfs @ 12.26 hrs, Volume= 1.128 af
Secondary = 21.08 cfs @ 12.10 hrs, Volume= 0.250 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.37' @ 12.26 hrs Surf.Area= 10,000 sf Storage= 2,951 cf

Plug-Flow detention time= 2.2 min calculated for 1.367 af (100% of inflow)
Center-of-Mass det. time= 2.2 min (746.9 - 744.7)

Volume	Invert	Avail.Storage	Storage Description
#1	56.01'	2,951 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
56.01	4	0	0
56.50	10,000	2,451	2,451
56.55	10,000	500	2,951

Device	Routing	Invert	Outlet Devices
#1	Primary	56.01'	**1.8" x 9.6" Horiz. Orifice/Grate X 20.00** C= 0.600 Limited to weir flow at low heads
#2	Secondary	56.50'	**110.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 12.26 hrs HW=57.37' TW=57.38' (Dynamic Tailwater)
1=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=20.62 cfs @ 12.10 hrs HW=56.67' TW=56.51' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 20.62 cfs @ 1.10 fps)

Summary for Pond P-CB17: (new Pond)

Inflow Area = 8.466 ac, 34.59% Impervious, Inflow Depth > 1.41" for 25 yr event
Inflow = 1.01 cfs @ 13.33 hrs, Volume= 0.995 af
Outflow = 1.01 cfs @ 13.33 hrs, Volume= 0.995 af, Atten= 0%, Lag= 0.0 min
Primary = 1.01 cfs @ 13.33 hrs, Volume= 0.995 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 62.37' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	61.53'	**18.0" Round Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 61.53' / 61.19' S= 0.0113 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.01 cfs @ 13.33 hrs HW=62.15' TW=61.98' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.01 cfs @ 2.14 fps)

Summary for Pond P-CB18: (new Pond)

Inflow Area = 8.546 ac, 35.20% Impervious, Inflow Depth > 1.45" for 25 yr event
Inflow = 1.07 cfs @ 12.03 hrs, Volume= 1.032 af
Outflow = 1.07 cfs @ 12.03 hrs, Volume= 1.032 af, Atten= 0%, Lag= 0.0 min
Primary = 1.07 cfs @ 12.03 hrs, Volume= 1.032 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 62.36' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	61.14'	**18.0" Round Culvert** L= 40.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 61.14' / 60.57' S= 0.0143 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.94 cfs @ 12.03 hrs HW=62.19' TW=62.15' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.94 cfs @ 1.00 fps)

Summary for Pond P-DMH1: (new Pond)

Inflow Area = 9.906 ac, 42.68% Impervious, Inflow Depth > 1.99" for 25 yr event
Inflow = 8.02 cfs @ 12.09 hrs, Volume= 1.639 af
Outflow = 8.02 cfs @ 12.09 hrs, Volume= 1.639 af, Atten= 0%, Lag= 0.0 min
Primary = 8.02 cfs @ 12.09 hrs, Volume= 1.639 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 62.36' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	60.57'	**24.0" Round Culvert** L= 305.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 60.57' / 59.84' S= 0.0024 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=8.01 cfs @ 12.09 hrs HW=62.35' TW=61.43' (Dynamic Tailwater)
1=Culvert (Outlet Controls 8.01 cfs @ 3.59 fps)

Summary for Pond P-JB3A: (new Pond)

Inflow Area = 8.396 ac, 34.04% Impervious, Inflow Depth > 4.61" for 25 yr event
Inflow = 17.52 cfs @ 12.56 hrs, Volume= 3.224 af
Outflow = 9.18 cfs @ 13.13 hrs, Volume= 2.761 af, Atten= 48%, Lag= 34.0 min
Primary = 0.98 cfs @ 13.33 hrs, Volume= 0.962 af
Secondary = 8.20 cfs @ 13.12 hrs, Volume= 1.798 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 62.51' @ 13.12 hrs Surf.Area= 102,108 sf Storage= 60,677 cf

Plug-Flow detention time= 222.1 min calculated for 2.760 af (86% of inflow)
Center-of-Mass det. time= 155.0 min (971.4 - 816.3)

Volume	Invert	Avail.Storage	Storage Description
#1	61.75'	113,625 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
61.75	1,000	0	0
62.00	92,000	11,625	11,625
63.00	112,000	102,000	113,625

Device	Routing	Invert	Outlet Devices
#1	Primary	61.75'	**18.0" Round Culvert** L= 40.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 61.75' / 61.09' S= 0.0165 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Secondary	62.16'	**15.0' long x 50.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Device 1	61.75'	**8.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.98 cfs @ 13.33 hrs HW=62.50' TW=62.15' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.98 cfs of 1.80 cfs potential flow)
↑—**3=Orifice/Grate** (Orifice Controls 0.98 cfs @ 2.82 fps)

Secondary OutFlow Max=8.20 cfs @ 13.12 hrs HW=62.51' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 8.20 cfs @ 1.58 fps)

Summary for Pond P-JB3B: (new Pond)

Inflow Area = 2.750 ac, 81.82% Impervious, Inflow Depth = 5.21" for 25 yr event
Inflow = 16.52 cfs @ 12.04 hrs, Volume= 1.193 af
Outflow = 6.47 cfs @ 12.21 hrs, Volume= 1.193 af, Atten= 61%, Lag= 9.9 min
Primary = 6.47 cfs @ 12.21 hrs, Volume= 1.193 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 72.30' @ 12.21 hrs Surf.Area= 7,150 sf Storage= 10,022 cf

Plug-Flow detention time= 20.0 min calculated for 1.193 af (100% of inflow)
Center-of-Mass det. time= 20.0 min (771.8 - 751.8)

Volume	Invert	Avail.Storage	Storage Description
#1	70.40'	15,150 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
70.40	0	0	0
71.00	5,500	1,650	1,650
72.00	7,000	6,250	7,900
73.00	7,500	7,250	15,150

Device	Routing	Invert	Outlet Devices
#1	Primary	70.40'	**15.0" Round Culvert** L= 40.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 70.40' / 70.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=6.47 cfs @ 12.21 hrs HW=72.30' TW=62.22' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 6.47 cfs @ 5.27 fps)

Summary for Pond P-WQU5: (new Pond)

Inflow Area = 1.360 ac, 89.71% Impervious, Inflow Depth = 5.36" for 25 yr event
Inflow = 7.27 cfs @ 12.10 hrs, Volume= 0.607 af
Outflow = 7.27 cfs @ 12.10 hrs, Volume= 0.607 af, Atten= 0%, Lag= 0.0 min
Primary = 7.27 cfs @ 12.10 hrs, Volume= 0.607 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 63.10' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	61.60'	**18.0" Round Culvert** L= 24.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 61.60' / 60.57' S= 0.0429 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=7.21 cfs @ 12.10 hrs HW=63.09' TW=62.35' (Dynamic Tailwater)
1=Culvert (Outlet Controls 7.21 cfs @ 5.09 fps)

Summary for Pond PA-100:

Inflow Area = 15.461 ac, 35.16% Impervious, Inflow Depth > 4.86" for 25 yr event
Inflow = 24.88 cfs @ 12.67 hrs, Volume= 6.267 af
Outflow = 9.85 cfs @ 17.40 hrs, Volume= 6.267 af, Atten= 60%, Lag= 283.8 min
Primary = 9.85 cfs @ 17.40 hrs, Volume= 6.390 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 64.52' @ 14.03 hrs Surf.Area= 30,013 sf Storage= 31,264 cf
Flood Elev= 60.84' Surf.Area= 13 sf Storage= 64 cf

Plug-Flow detention time= 27.5 min calculated for 6.265 af (100% of inflow)
Center-of-Mass det. time= 27.5 min (956.9 - 929.4)

Volume	Invert	Avail.Storage	Storage Description
#1	55.77'	64 cf	**4.00'D x 5.07'H Vertical Cone/Cylinder**
#2	60.84'	31,200 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		31,264 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
60.84	0	0	0
61.34	1,600	400	400
62.34	15,000	8,300	8,700
63.34	30,000	22,500	31,200

Device	Routing	Invert	Outlet Devices
#1	Primary	55.77'	**18.0" Round Culvert** L= 403.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 55.77' / 53.59' S= 0.0054 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=9.75 cfs @ 17.40 hrs HW=62.30' TW=58.11' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 9.75 cfs @ 5.52 fps)

Summary for Pond PA-101:

Inflow Area = 14.161 ac, 34.86% Impervious, Inflow Depth > 4.89" for 25 yr event
Inflow = 23.58 cfs @ 12.08 hrs, Volume= 5.768 af
Outflow = 23.95 cfs @ 12.67 hrs, Volume= 5.768 af, Atten= 0%, Lag= 35.4 min
Primary = 23.95 cfs @ 12.67 hrs, Volume= 5.768 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 124.55' @ 12.67 hrs Surf.Area= 40,013 sf Storage= 52,286 cf
Flood Elev= 60.97' Surf.Area= 13 sf Storage= 36 cf

Plug-Flow detention time= 89.6 min calculated for 5.766 af (100% of inflow)
Center-of-Mass det. time= 89.6 min (942.3 - 852.7)

Volume	Invert	Avail.Storage	Storage Description
#1	58.10'	36 cf	**4.00'D x 2.87'H Vertical Cone/Cylinder**
#2	60.97'	52,250 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		52,286 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
60.97	0	0	0
61.47	3,000	750	750
62.47	30,000	16,500	17,250
63.47	40,000	35,000	52,250

Device	Routing	Invert	Outlet Devices
#1	Primary	58.10'	**15.0" Round Culvert** L= 386.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 58.10' / 55.94' S= 0.0056 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=23.95 cfs @ 12.67 hrs HW=124.55' TW=62.47' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 23.95 cfs @ 19.51 fps)

Summary for Pond PA-10TEE: Volume from A-10

Inflow Area = 29.371 ac, 46.21% Impervious, Inflow Depth = 5.10" for 25 yr event
Inflow = 71.69 cfs @ 12.15 hrs, Volume= 12.489 af
Outflow = 67.35 cfs @ 12.34 hrs, Volume= 12.489 af, Atten= 6%, Lag= 11.4 min
Primary = 67.35 cfs @ 12.34 hrs, Volume= 12.489 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 65.44' @ 12.13 hrs Surf.Area= 13 sf Storage= 121 cf
Flood Elev= 55.47' Surf.Area= 13 sf Storage= 121 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (814.2 - 814.2)

Volume	Invert	Avail.Storage	Storage Description
#1	45.83'	121 cf	**4.00'D x 9.64'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	45.83'	**42.0" Round Culvert** L= 62.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.83' / 45.47' S= 0.0058 '/' Cc= 0.900 n= 0.013, Flow Area= 9.62 sf

Primary OutFlow Max=0.00 cfs @ 12.34 hrs HW=53.43' TW=56.38' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-11:

Inflow Area = 29.371 ac, 46.21% Impervious, Inflow Depth = 5.10" for 25 yr event
Inflow = 75.78 cfs @ 12.15 hrs, Volume= 12.489 af
Outflow = 71.69 cfs @ 12.15 hrs, Volume= 12.489 af, Atten= 5%, Lag= 0.0 min
Primary = 71.69 cfs @ 12.15 hrs, Volume= 12.489 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 90.46' @ 12.23 hrs Surf.Area= 13 sf Storage= 153 cf
Flood Elev= 58.92' Surf.Area= 13 sf Storage= 153 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (814.2 - 814.2)

Volume	Invert	Avail.Storage	Storage Description
#1	46.72'	153 cf	**4.00'D x 12.20'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	46.72'	**42.0" Round Culvert** L= 154.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 46.72' / 45.83' S= 0.0058 '/' Cc= 0.900 n= 0.013, Flow Area= 9.62 sf

Primary OutFlow Max=42.07 cfs @ 12.15 hrs HW=51.93' TW=51.11' (Dynamic Tailwater)
1=Culvert (Inlet Controls 42.07 cfs @ 4.37 fps)

Summary for Pond PA-12:

Inflow Area = 24.670 ac, 43.01% Impervious, Inflow Depth = 5.10" for 25 yr event
Inflow = 53.69 cfs @ 13.01 hrs, Volume= 10.494 af
Outflow = 50.15 cfs @ 12.66 hrs, Volume= 10.494 af, Atten= 7%, Lag= 0.0 min
Primary = 50.15 cfs @ 12.66 hrs, Volume= 10.492 af
Secondary = 2.17 cfs @ 12.60 hrs, Volume= 0.003 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 58.13' @ 12.32 hrs Surf.Area= 5,013 sf Storage= 1,383 cf
Flood Elev= 57.49' Surf.Area= 13 sf Storage= 108 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (821.6 - 821.5)

Volume	Invert	Avail.Storage	Storage Description
#1	48.91'	108 cf	**4.00'D x 8.58'H Vertical Cone/Cylinder**
#2	57.49'	1,275 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		1,383 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
57.49	0	0	0
58.00	5,000	1,275	1,275

Device	Routing	Invert	Outlet Devices
#1	Primary	48.91'	**30.0" Round Culvert** L= 394.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 48.91' / 47.02' S= 0.0048 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Secondary	58.00'	**10.0' long x 50.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=36.53 cfs @ 12.66 hrs HW=57.66' TW=53.23' (Dynamic Tailwater)
1=Culvert (Outlet Controls 36.53 cfs @ 7.44 fps)

Secondary OutFlow Max=0.00 cfs @ 12.60 hrs HW=57.99' TW=49.41' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond PA-13:

Inflow Area = 23.490 ac, 43.21% Impervious, Inflow Depth = 5.14" for 25 yr event
Inflow = 63.61 cfs @ 13.11 hrs, Volume= 10.064 af
Outflow = 53.03 cfs @ 13.01 hrs, Volume= 10.064 af, Atten= 17%, Lag= 0.0 min
Primary = 53.03 cfs @ 13.01 hrs, Volume= 10.033 af
Secondary = 8.14 cfs @ 12.58 hrs, Volume= 0.031 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 59.97' @ 12.58 hrs Surf.Area= 1,513 sf Storage= 466 cf
Flood Elev= 59.01' Surf.Area= 13 sf Storage= 98 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (822.8 - 822.7)

Volume	Invert	Avail.Storage	Storage Description
#1	51.21'	98 cf	**4.00'D x 7.80'H Vertical Cone/Cylinder**
#2	59.01'	368 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		466 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
59.01	0	0	0
59.50	1,500	368	368

Device	Routing	Invert	Outlet Devices
#1	Primary	51.21'	**30.0" Round Culvert** L= 297.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.21' / 49.12' S= 0.0070 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#2	Secondary	59.50'	**10.0' long x 50.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=32.07 cfs @ 13.01 hrs HW=58.75' TW=55.93' (Dynamic Tailwater)
1=Culvert (Outlet Controls 32.07 cfs @ 6.53 fps)

Secondary OutFlow Max=7.11 cfs @ 12.58 hrs HW=59.91' TW=57.95' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 7.11 cfs @ 1.73 fps)

Summary for Pond PA-14:

Inflow Area = 21.970 ac, 42.19% Impervious, Inflow Depth = 5.17" for 25 yr event
Inflow = 62.18 cfs @ 13.11 hrs, Volume= 9.464 af
Outflow = 62.10 cfs @ 13.11 hrs, Volume= 9.464 af, Atten= 0%, Lag= 0.0 min
Primary = 62.10 cfs @ 13.11 hrs, Volume= 9.464 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 74.65' @ 13.11 hrs Surf.Area= 13 sf Storage= 73 cf
Flood Elev= 58.86' Surf.Area= 13 sf Storage= 73 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (824.3 - 824.3)

Volume	Invert	Avail.Storage	Storage Description
#1	53.09'	73 cf	**4.00'D x 5.77'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	53.09'	**30.0" Round Culvert** L= 515.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 53.09' / 51.24' S= 0.0036 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=61.55 cfs @ 13.11 hrs HW=74.55' TW=59.25' (Dynamic Tailwater)
1=Culvert (Outlet Controls 61.55 cfs @ 12.54 fps)

Summary for Pond PA-14R: TO BE FIXED

Inflow Area = 4.530 ac, 49.67% Impervious, Inflow Depth = 5.83" for 25 yr event
Inflow = 18.78 cfs @ 12.76 hrs, Volume= 2.202 af
Outflow = 20.05 cfs @ 12.97 hrs, Volume= 2.202 af, Atten= 0%, Lag= 12.9 min
Primary = 20.05 cfs @ 12.97 hrs, Volume= 2.526 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 60.59' @ 12.97 hrs Surf.Area= 26,708 sf Storage= 17,912 cf

Plug-Flow detention time= 11.2 min calculated for 2.201 af (100% of inflow)
Center-of-Mass det. time= 11.2 min (813.3 - 802.2)

Volume	Invert	Avail.Storage	Storage Description
#1	58.86'	21,761 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
58.86	4	0	0
59.00	300	21	21
60.00	12,300	6,300	6,321
60.73	30,000	15,439	21,761

Device	Routing	Invert	Outlet Devices
#1	Primary	58.86'	**1.4" x 3.5" Horiz. Orifice/Grate X 8.00 columns** X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Primary	59.74'	**1.4" x 3.5" Horiz. Orifice/Grate X 8.00 columns** X 6 rows C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 12.97 hrs HW=60.59' TW=63.06' (Dynamic Tailwater)
1=Orifice/Grate (Controls 0.00 cfs)
2=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond PA-15:

Inflow Area = 17.440 ac, 40.25% Impervious, Inflow Depth = 4.77" for 25 yr event
Inflow = 44.98 cfs @ 13.11 hrs, Volume= 6.938 af
Outflow = 44.46 cfs @ 13.11 hrs, Volume= 6.938 af, Atten= 1%, Lag= 0.0 min
Primary = 44.46 cfs @ 13.11 hrs, Volume= 6.938 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 72.06' @ 13.30 hrs Surf.Area= 13 sf Storage= 72 cf
Flood Elev= 59.74' Surf.Area= 13 sf Storage= 72 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (829.6 - 829.5)

Volume	Invert	Avail.Storage	Storage Description
#1	53.99'	72 cf	**4.00'D x 5.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	53.99'	**30.0" Round Culvert** L= 330.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 53.99' / 53.09' S= 0.0027 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=0.00 cfs @ 13.11 hrs HW=70.46' TW=74.44' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-15R: (new Pond)

Inflow Area = 2.900 ac, 31.03% Impervious, Inflow Depth = 5.76" for 25 yr event
Inflow = 13.54 cfs @ 12.70 hrs, Volume= 1.393 af
Outflow = 18.57 cfs @ 12.87 hrs, Volume= 1.393 af, Atten= 0%, Lag= 10.1 min
Primary = 9.76 cfs @ 12.87 hrs, Volume= 1.239 af
Secondary = 9.29 cfs @ 12.76 hrs, Volume= 0.475 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 61.23' @ 12.76 hrs Surf.Area= 13,473 sf Storage= 12,254 cf

Plug-Flow detention time= 13.5 min calculated for 1.393 af (100% of inflow)
Center-of-Mass det. time= 13.5 min (817.3 - 803.8)

Volume	Invert	Avail.Storage	Storage Description
#1	59.74'	19,500 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
59.74	0	0	0
60.74	12,000	6,000	6,000
61.74	15,000	13,500	19,500

Device	Routing	Invert	Outlet Devices
#1	Secondary	60.74'	**10.0' long x 50.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	59.74'	**1.4" x 3.5" Horiz. Orifice/Grate X 8.00 columns** X 6 rows C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=9.31 cfs @ 12.87 hrs HW=61.21' TW=59.87' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Orifice Controls 9.31 cfs @ 5.57 fps)

Secondary OutFlow Max=9.26 cfs @ 12.76 hrs HW=61.23' TW=60.41' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 9.26 cfs @ 1.89 fps)

Summary for Pond PA-16:

Inflow Area = 14.540 ac, 42.09% Impervious, Inflow Depth = 4.70" for 25 yr event
Inflow = 32.78 cfs @ 13.32 hrs, Volume= 5.699 af
Outflow = 36.07 cfs @ 13.15 hrs, Volume= 5.699 af, Atten= 0%, Lag= 0.0 min
Primary = 36.07 cfs @ 13.15 hrs, Volume= 5.699 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 75.04' @ 13.12 hrs Surf.Area= 13 sf Storage= 74 cf
Flood Elev= 61.67' Surf.Area= 13 sf Storage= 74 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (831.0 - 830.9)

Volume	Invert	Avail.Storage	Storage Description
#1	55.77'	74 cf	**4.00'D x 5.90'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	55.77'	**24.0" Round Culvert** L= 290.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 55.77' / 54.29' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=24.28 cfs @ 13.15 hrs HW=71.39' TW=66.65' (Dynamic Tailwater)
1=Culvert (Outlet Controls 24.28 cfs @ 7.73 fps)

Summary for Pond PA-16R: (new Pond)

Inflow Area = 5.240 ac, 50.00% Impervious, Inflow Depth = 4.58" for 25 yr event
Inflow = 13.07 cfs @ 12.54 hrs, Volume= 2.001 af
Outflow = 15.38 cfs @ 12.71 hrs, Volume= 2.001 af, Atten= 0%, Lag= 10.2 min
Primary = 7.76 cfs @ 12.71 hrs, Volume= 1.697 af
Secondary = 7.66 cfs @ 12.70 hrs, Volume= 0.376 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 62.60' @ 12.70 hrs Surf.Area= 13,296 sf Storage= 8,463 cf

Plug-Flow detention time= 6.2 min calculated for 2.000 af (100% of inflow)
Center-of-Mass det. time= 6.2 min (809.8 - 803.5)

Volume	Invert	Avail.Storage	Storage Description
#1	61.67'	16,500 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
61.67	0	0	0
62.17	12,000	3,000	3,000
63.17	15,000	13,500	16,500

Device	Routing	Invert	Outlet Devices
#1	Secondary	62.17'	**10.0' long x 50.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	61.67'	**1.4" x 3.5" Horiz. Orifice/Grate X 8.00 columns** X 6 rows C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 12.71 hrs HW=62.60' TW=66.88' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=7.63 cfs @ 12.70 hrs HW=62.60' TW=61.19' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 7.63 cfs @ 1.77 fps)

Summary for Pond PA-17:

Inflow Area = 9.300 ac, 37.63% Impervious, Inflow Depth = 5.16" for 25 yr event
Inflow = 26.64 cfs @ 13.61 hrs, Volume= 4.001 af
Outflow = 26.61 cfs @ 13.11 hrs, Volume= 4.001 af, Atten= 0%, Lag= 0.0 min
Primary = 26.61 cfs @ 13.11 hrs, Volume= 4.002 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 73.37' @ 13.29 hrs Surf.Area= 13 sf Storage= 94 cf
Flood Elev= 64.46' Surf.Area= 13 sf Storage= 94 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (836.6 - 836.5)

Volume	Invert	Avail.Storage	Storage Description
#1	57.01'	94 cf	**4.00'D x 7.45'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	57.01'	**24.0" Round Culvert** L= 297.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 57.01' / 55.92' S= 0.0037 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 13.11 hrs HW=67.85' TW=71.44' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-19:

Inflow Area = 9.300 ac, 37.63% Impervious, Inflow Depth = 5.15" for 25 yr event
Inflow = 21.78 cfs @ 13.46 hrs, Volume= 3.994 af
Outflow = 26.64 cfs @ 13.61 hrs, Volume= 3.996 af, Atten= 0%, Lag= 9.1 min
Primary = 26.64 cfs @ 13.61 hrs, Volume= 4.001 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 81.43' @ 13.13 hrs Surf.Area= 13 sf Storage= 104 cf
Flood Elev= 67.20' Surf.Area= 13 sf Storage= 104 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (836.6 - 836.5)

Volume	Invert	Avail.Storage	Storage Description
#1	58.90'	104 cf	**4.00'D x 8.30'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	58.90'	**24.0" Round Culvert** L= 295.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 58.90' / 57.16' S= 0.0059 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 13.61 hrs HW=64.94' TW=66.15' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-20TEE: STORAGE FROM A-20

Inflow Area = 9.300 ac, 37.63% Impervious, Inflow Depth = 5.15" for 25 yr event
Inflow = 20.16 cfs @ 13.87 hrs, Volume= 3.994 af
Outflow = 21.78 cfs @ 13.46 hrs, Volume= 3.994 af, Atten= 0%, Lag= 0.0 min
Primary = 21.78 cfs @ 13.46 hrs, Volume= 3.994 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 81.40' @ 13.32 hrs Surf.Area= 13 sf Storage= 73 cf
Flood Elev= 65.25' Surf.Area= 13 sf Storage= 73 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (836.5 - 836.4)

Volume	Invert	Avail.Storage	Storage Description
#1	59.46'	73 cf	**4.00'D x 5.79'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	59.46'	**18.0" Round Culvert** L= 110.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 59.46' / 59.00' S= 0.0042 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=11.98 cfs @ 13.46 hrs HW=68.77' TW=66.26' (Dynamic Tailwater)
1=Culvert (Outlet Controls 11.98 cfs @ 6.78 fps)

Summary for Pond PA-21:

Inflow Area = 9.300 ac, 37.63% Impervious, Inflow Depth = 5.15" for 25 yr event
Inflow = 26.69 cfs @ 13.11 hrs, Volume= 3.994 af
Outflow = 20.16 cfs @ 13.87 hrs, Volume= 3.994 af, Atten= 24%, Lag= 45.6 min
Primary = 20.16 cfs @ 13.87 hrs, Volume= 3.994 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 95.30' @ 13.14 hrs Surf.Area= 13 sf Storage= 63 cf
Flood Elev= 65.39' Surf.Area= 13 sf Storage= 63 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (836.4 - 836.3)

Volume	Invert	Avail.Storage	Storage Description
#1	60.39'	63 cf	**4.00'D x 5.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	60.39'	**18.0" Round Culvert** L= 182.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 60.39' / 59.46' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=16.24 cfs @ 13.87 hrs HW=70.83' TW=64.50' (Dynamic Tailwater)
1=Culvert (Outlet Controls 16.24 cfs @ 9.19 fps)

Summary for Pond PA-22:

Inflow = 11.31 cfs @ 13.11 hrs, Volume= 0.587 af
Outflow = 15.38 cfs @ 13.11 hrs, Volume= 0.588 af, Atten= 0%, Lag= 0.0 min
Primary = 15.38 cfs @ 13.11 hrs, Volume= 0.594 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 87.06' @ 13.33 hrs Surf.Area= 13 sf Storage= 55 cf
Flood Elev= 66.66' Surf.Area= 13 sf Storage= 55 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (805.9 - 805.8)

Volume	Invert	Avail.Storage	Storage Description
#1	62.26'	55 cf	**4.00'D x 4.40'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	62.26'	**18.0" Round Culvert** L= 295.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 62.26' / 60.51' S= 0.0059 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=9.31 cfs @ 13.11 hrs HW=77.64' TW=74.67' (Dynamic Tailwater)
1=Culvert (Outlet Controls 9.31 cfs @ 5.27 fps)

Summary for Pond PA-23:

Inflow Area = 68.444 ac, 11.94% Impervious, Inflow Depth > 3.31" for 25 yr event
Inflow = 109.29 cfs @ 13.88 hrs, Volume= 18.902 af
Outflow = 111.72 cfs @ 12.66 hrs, Volume= 18.904 af, Atten= 0%, Lag= 0.0 min
Primary = 111.72 cfs @ 12.66 hrs, Volume= 18.949 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 84.87' @ 12.66 hrs Surf.Area= 13 sf Storage= 127 cf
Flood Elev= 51.00' Surf.Area= 13 sf Storage= 127 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (870.1 - 870.1)

Volume	Invert	Avail.Storage	Storage Description
#1	40.90'	127 cf	**4.00'D x 10.10'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	40.90'	**30.0" Round Culvert** L= 440.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 40.90' / 20.40' S= 0.0466 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=106.08 cfs @ 12.66 hrs HW=81.03' TW=40.61' (Dynamic Tailwater)
1=Culvert (Outlet Controls 106.08 cfs @ 21.61 fps)

Summary for Pond PA-24:

Inflow Area = 68.444 ac, 11.94% Impervious, Inflow Depth > 3.07" for 25 yr event
Inflow = 90.43 cfs @ 12.78 hrs, Volume= 17.504 af
Outflow = 109.29 cfs @ 13.88 hrs, Volume= 17.504 af, Atten= 0%, Lag= 66.2 min
Primary = 109.29 cfs @ 13.88 hrs, Volume= 18.902 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 73.67' @ 13.87 hrs Surf.Area= 6,890 sf Storage= 2,795 cf
Flood Elev= 49.47' Surf.Area= 13 sf Storage= 102 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (876.1 - 876.0)

Volume	Invert	Avail.Storage	Storage Description
#1	41.37'	102 cf	**4.00'D x 8.10'H Vertical Cone/Cylinder**
#2	49.47'	2,694 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		2,795 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
49.47	0	0	0
50.00	1,116	296	296
50.60	6,877	2,398	2,694

Device	Routing	Invert	Outlet Devices
#1	Primary	41.37'	**36.0" Round Culvert** L= 74.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 41.37' / 40.90' S= 0.0064 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf

Primary OutFlow Max=0.00 cfs @ 13.88 hrs HW=58.02' TW=67.72' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond PA-25:

Inflow Area = 55.844 ac, 11.41% Impervious, Inflow Depth > 3.17" for 25 yr event
Inflow = 70.01 cfs @ 14.26 hrs, Volume= 14.761 af
Outflow = 75.04 cfs @ 12.78 hrs, Volume= 14.761 af, Atten= 0%, Lag= 0.0 min
Primary = 75.04 cfs @ 12.78 hrs, Volume= 14.761 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 74.06' @ 12.65 hrs Surf.Area= 13 sf Storage= 136 cf
Flood Elev= 53.71' Surf.Area= 13 sf Storage= 136 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (879.0 - 878.9)

Volume	Invert	Avail.Storage	Storage Description
#1	42.91'	136 cf	**4.00'D x 10.80'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	42.91'	**36.0" Round Culvert** L= 333.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 42.91' / 41.57' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf

Primary OutFlow Max=83.85 cfs @ 12.78 hrs HW=57.16' TW=48.60' (Dynamic Tailwater)
1=Culvert (Outlet Controls 83.85 cfs @ 11.86 fps)

Summary for Pond PA-26:

Inflow Area = 8.310 ac, 52.11% Impervious, Inflow Depth = 4.66" for 25 yr event
Inflow = 27.02 cfs @ 12.73 hrs, Volume= 3.227 af
Outflow = 21.30 cfs @ 12.82 hrs, Volume= 3.227 af, Atten= 21%, Lag= 5.4 min
Primary = 21.30 cfs @ 12.82 hrs, Volume= 3.233 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 75.64' @ 13.88 hrs Surf.Area= 13 sf Storage= 114 cf
Flood Elev= 53.60' Surf.Area= 13 sf Storage= 114 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (802.5 - 802.3)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	114 cf	**4.00'D x 9.10'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	44.50'	**30.0" Round Culvert** L= 198.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.50' / 43.11' S= 0.0070 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=10.33 cfs @ 12.82 hrs HW=55.89' TW=55.67' (Dynamic Tailwater)
1=Culvert (Outlet Controls 10.33 cfs @ 2.10 fps)

Summary for Pond PA-27TEE: Volume from A-27

Inflow Area = 6.360 ac, 48.43% Impervious, Inflow Depth = 4.59" for 25 yr event
Inflow = 21.02 cfs @ 12.73 hrs, Volume= 2.431 af
Outflow = 24.14 cfs @ 12.73 hrs, Volume= 2.431 af, Atten= 0%, Lag= 0.0 min
Primary = 24.14 cfs @ 12.73 hrs, Volume= 2.438 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 74.62' @ 12.66 hrs Surf.Area= 13 sf Storage= 107 cf
Flood Elev= 54.57' Surf.Area= 13 sf Storage= 107 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (808.9 - 808.8)

Volume	Invert	Avail.Storage	Storage Description
#1	46.03'	107 cf	**4.00'D x 8.54'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	46.03'	**30.0" Round Culvert** L= 240.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 46.03' / 44.70' S= 0.0055 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=0.00 cfs @ 12.73 hrs HW=51.83' TW=52.80' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-28A:

Inflow Area = 6.360 ac, 48.43% Impervious, Inflow Depth = 4.57" for 25 yr event
Inflow = 22.59 cfs @ 12.81 hrs, Volume= 2.424 af
Outflow = 21.02 cfs @ 12.73 hrs, Volume= 2.424 af, Atten= 7%, Lag= 0.0 min
Primary = 21.02 cfs @ 12.73 hrs, Volume= 2.431 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 72.22' @ 13.40 hrs Surf.Area= 13 sf Storage= 109 cf
Flood Elev= 55.49' Surf.Area= 13 sf Storage= 109 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (808.8 - 808.6)

Volume	Invert	Avail.Storage	Storage Description
#1	46.79'	109 cf	**4.00'D x 8.70'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	46.79'	**30.0" Round Culvert** L= 153.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 46.79' / 46.13' S= 0.0043 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=0.00 cfs @ 12.73 hrs HW=49.55' TW=51.83' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-29:

Inflow Area = 6.360 ac, 48.43% Impervious, Inflow Depth = 4.56" for 25 yr event
Inflow = 19.47 cfs @ 12.81 hrs, Volume= 2.418 af
Outflow = 22.61 cfs @ 12.81 hrs, Volume= 2.418 af, Atten= 0%, Lag= 0.0 min
Primary = 22.59 cfs @ 12.81 hrs, Volume= 2.424 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 74.97' @ 12.67 hrs Surf.Area= 13 sf Storage= 111 cf
Flood Elev= 56.14' Surf.Area= 13 sf Storage= 111 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (808.6 - 808.5)

Volume	Invert	Avail.Storage	Storage Description
#1	47.34'	111 cf	**4.00'D x 8.80'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	47.34'	**24.0" Round Culvert** L= 90.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 47.34' / 46.89' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=23.85 cfs @ 12.81 hrs HW=55.65' TW=51.66' (Dynamic Tailwater)
1=Culvert (Inlet Controls 23.85 cfs @ 7.59 fps)

Summary for Pond PA-30:

Inflow Area = 4.600 ac, 50.43% Impervious, Inflow Depth = 4.60" for 25 yr event
Inflow = 13.68 cfs @ 12.56 hrs, Volume= 1.764 af
Outflow = 17.39 cfs @ 12.81 hrs, Volume= 1.764 af, Atten= 0%, Lag= 15.0 min
Primary = 17.39 cfs @ 12.81 hrs, Volume= 1.766 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 72.83' @ 12.59 hrs Surf.Area= 13 sf Storage= 107 cf
Flood Elev= 57.24' Surf.Area= 13 sf Storage= 107 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (812.9 - 812.8)

Volume	Invert	Avail.Storage	Storage Description
#1	48.74'	107 cf	**4.00'D x 8.50'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	48.74'	**24.0" Round Culvert** L= 300.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 48.74' / 47.41' S= 0.0044 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.81 hrs HW=55.07' TW=55.62' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-31:

Inflow Area = 2.650 ac, 56.60% Impervious, Inflow Depth = 4.71" for 25 yr event
Inflow = 5.23 cfs @ 12.84 hrs, Volume= 1.040 af
Outflow = 10.68 cfs @ 12.78 hrs, Volume= 1.041 af, Atten= 0%, Lag= 0.0 min
Primary = 10.68 cfs @ 12.78 hrs, Volume= 1.045 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 76.24' @ 12.68 hrs Surf.Area= 13 sf Storage= 103 cf
Flood Elev= 59.19' Surf.Area= 13 sf Storage= 103 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (821.4 - 821.2)

Volume	Invert	Avail.Storage	Storage Description
#1	50.99'	103 cf	**4.00'D x 8.20'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	50.99'	**24.0" Round Culvert** L= 396.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 50.99' / 48.99' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=17.39 cfs @ 12.78 hrs HW=55.78' TW=52.72' (Dynamic Tailwater)
1=Culvert (Outlet Controls 17.39 cfs @ 5.54 fps)

Summary for Pond PA-34:

Inflow Area = 47.534 ac, 4.29% Impervious, Inflow Depth > 2.87" for 25 yr event
Inflow = 59.81 cfs @ 13.04 hrs, Volume= 11.380 af
Outflow = 63.82 cfs @ 14.26 hrs, Volume= 11.380 af, Atten= 0%, Lag= 73.3 min
Primary = 63.82 cfs @ 14.26 hrs, Volume= 11.513 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 76.56' @ 13.00 hrs Surf.Area= 2,513 sf Storage= 1,422 cf
Flood Elev= 52.02' Surf.Area= 13 sf Storage= 87 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.3 min (901.3 - 901.0)

Volume	Invert	Avail.Storage	Storage Description
#1	45.07'	87 cf	**4.00'D x 6.95'H Vertical Cone/Cylinder**
#2	52.02'	1,335 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		1,422 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.02	0	0	0
52.52	1,500	375	375
53.00	2,500	960	1,335

Device	Routing	Invert	Outlet Devices
#1	Primary	45.07'	**30.0" Round Culvert** L= 105.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.07' / 43.25' S= 0.0173 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=45.97 cfs @ 14.26 hrs HW=63.96' TW=60.18' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 45.97 cfs @ 9.37 fps)

Summary for Pond PA-34R: (new Pond)

Volume	Invert	Avail.Storage	Storage Description
#1	52.02'	19,800 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.02	0	0	0
54.00	20,000	19,800	19,800

Device	Routing	Invert	Outlet Devices
#1	Primary	52.02'	**1.4" x 10.0" Horiz. Orifice/Grate X 78.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond PA-35:

Inflow Area = 36.710 ac, 0.00% Impervious, Inflow Depth = 3.13" for 25 yr event
Inflow = 47.69 cfs @ 13.34 hrs, Volume= 9.572 af
Outflow = 51.64 cfs @ 13.04 hrs, Volume= 9.572 af, Atten= 0%, Lag= 0.0 min
Primary = 51.64 cfs @ 13.04 hrs, Volume= 9.572 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 94.19' @ 13.89 hrs Surf.Area= 1,501 sf Storage= 381 cf
Flood Elev= 54.01' Surf.Area= 1 sf Storage= 6 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (892.7 - 892.5)

Volume	Invert	Avail.Storage	Storage Description
#1	45.85'	6 cf	**1.00'D x 8.16'H Vertical Cone/Cylinder**
#2	54.01'	375 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		381 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
54.01	0	0	0
54.51	1,500	375	375

Device	Routing	Invert	Outlet Devices
#1	Primary	45.85'	**24.0" Round Culvert** L= 230.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.85' / 45.12' S= 0.0032 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=45.84 cfs @ 13.04 hrs HW=80.65' TW=66.22' (Dynamic Tailwater)
1=Culvert (Outlet Controls 45.84 cfs @ 14.59 fps)

Summary for Pond PA-36:

Inflow Area = 18.400 ac, 0.00% Impervious, Inflow Depth = 2.87" for 25 yr event
Inflow = 24.00 cfs @ 13.58 hrs, Volume= 4.403 af
Outflow = 23.56 cfs @ 13.58 hrs, Volume= 4.403 af, Atten= 2%, Lag= 0.0 min
Primary = 23.56 cfs @ 13.58 hrs, Volume= 4.403 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 83.84' @ 13.01 hrs Surf.Area= 13 sf Storage= 92 cf
Flood Elev= 54.51' Surf.Area= 13 sf Storage= 92 cf

Plug-Flow detention time= 0.1 min calculated for 4.401 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (909.1 - 909.0)

Volume	Invert	Avail.Storage	Storage Description
#1	47.16'	92 cf	**4.00'D x 7.35'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	47.16'	**24.0" Round Culvert** L= 161.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.16' / 45.85' S= 0.0081 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 13.58 hrs HW=59.51' TW=66.26' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-37:

Inflow Area = 18.400 ac, 0.00% Impervious, Inflow Depth = 2.87" for 25 yr event
Inflow = 22.46 cfs @ 13.67 hrs, Volume= 4.403 af
Outflow = 24.00 cfs @ 13.58 hrs, Volume= 4.403 af, Atten= 0%, Lag= 0.0 min
Primary = 24.00 cfs @ 13.58 hrs, Volume= 4.403 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 95.23' @ 13.90 hrs Surf.Area= 13 sf Storage= 87 cf
Flood Elev= 56.24' Surf.Area= 13 sf Storage= 87 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (909.0 - 908.9)

Volume	Invert	Avail.Storage	Storage Description
#1	49.28'	87 cf	**4.00'D x 6.96'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	49.28'	**24.0" Round Culvert** L= 396.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 49.28' / 47.51' S= 0.0045 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=23.65 cfs @ 13.58 hrs HW=65.18' TW=59.52' (Dynamic Tailwater)
1=Culvert (Outlet Controls 23.65 cfs @ 7.53 fps)

Summary for Pond PA-37R: Slightly Controlled by Inlet Capacity

Inflow Area = 7.250 ac, 0.00% Impervious, Inflow Depth = 2.47" for 25 yr event
Inflow = 6.61 cfs @ 13.12 hrs, Volume= 1.491 af
Outflow = 16.30 cfs @ 13.55 hrs, Volume= 1.491 af, Atten= 0%, Lag= 25.8 min
Primary = 16.30 cfs @ 13.55 hrs, Volume= 1.655 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.77' @ 13.54 hrs Surf.Area= 17,388 sf Storage= 13,303 cf

Plug-Flow detention time= 12.6 min calculated for 1.491 af (100% of inflow)
Center-of-Mass det. time= 12.6 min (927.7 - 915.1)

Volume	Invert	Avail.Storage	Storage Description
#1	56.24'	17,600 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
56.24	0	0	0
58.00	20,000	17,600	17,600

Device	Routing	Invert	Outlet Devices
#1	Primary	56.24'	**1.4" x 10.0" Horiz. Orifice/Grate X 26.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 13.55 hrs HW=57.76' TW=59.49' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond PA-38:

Inflow Area = 11.150 ac, 0.00% Impervious, Inflow Depth = 2.95" for 25 yr event
Inflow = 13.27 cfs @ 13.17 hrs, Volume= 2.745 af
Outflow = 10.23 cfs @ 12.80 hrs, Volume= 2.745 af, Atten= 23%, Lag= 0.0 min
Primary = 10.23 cfs @ 12.80 hrs, Volume= 2.748 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 84.74' @ 13.02 hrs Surf.Area= 13 sf Storage= 87 cf
Flood Elev= 58.14' Surf.Area= 13 sf Storage= 87 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (904.7 - 904.6)

Volume	Invert	Avail.Storage	Storage Description
#1	51.18'	87 cf	**4.00'D x 6.96'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	51.18'	**18.0" Round Culvert** L= 396.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.18' / 49.44' S= 0.0044 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=14.57 cfs @ 12.80 hrs HW=72.79' TW=63.56' (Dynamic Tailwater)
1=Culvert (Outlet Controls 14.57 cfs @ 8.25 fps)

Summary for Pond PA-39:

Inflow Area = 11.150 ac, 0.00% Impervious, Inflow Depth = 2.95" for 25 yr event
Inflow = 8.79 cfs @ 13.40 hrs, Volume= 2.743 af
Outflow = 13.27 cfs @ 13.17 hrs, Volume= 2.743 af, Atten= 0%, Lag= 0.0 min
Primary = 13.27 cfs @ 13.17 hrs, Volume= 2.745 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 96.31' @ 13.91 hrs Surf.Area= 13 sf Storage= 90 cf
Flood Elev= 58.96' Surf.Area= 13 sf Storage= 90 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (904.6 - 904.5)

Volume	Invert	Avail.Storage	Storage Description
#1	51.81'	90 cf	**4.00'D x 7.15'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	51.81'	**18.0" Round Culvert** L= 200.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 51.81' / 51.20' S= 0.0030 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 13.17 hrs HW=65.26' TW=74.70' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-40:

Inflow Area = 11.150 ac, 0.00% Impervious, Inflow Depth = 2.83" for 25 yr event
Inflow = 17.08 cfs @ 12.62 hrs, Volume= 2.630 af
Outflow = 8.79 cfs @ 13.40 hrs, Volume= 2.630 af, Atten= 49%, Lag= 46.7 min
Primary = 8.79 cfs @ 13.40 hrs, Volume= 2.743 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 61.96' @ 13.40 hrs Surf.Area= 52,408 sf Storage= 32,873 cf
Flood Elev= 60.71' Surf.Area= 13 sf Storage= 82 cf

Plug-Flow detention time= 38.6 min calculated for 2.630 af (100% of inflow)
Center-of-Mass det. time= 38.6 min (909.6 - 871.0)

Volume	Invert	Avail.Storage	Storage Description
#1	54.16'	82 cf	**4.00'D x 6.55'H Vertical Cone/Cylinder**
#2	60.71'	34,830 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		34,912 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
60.71	0	0	0
62.00	54,000	34,830	34,830

Device	Routing	Invert	Outlet Devices
#1	Primary	54.16'	**15.0" Round Culvert** L= 400.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 54.16' / 52.11' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 13.40 hrs HW=61.96' TW=63.48' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-42:

Inflow Area = 12.260 ac, 0.00% Impervious, Inflow Depth = 3.96" for 25 yr event
Inflow = 22.06 cfs @ 12.92 hrs, Volume= 4.050 af
Outflow = 27.41 cfs @ 12.92 hrs, Volume= 4.050 af, Atten= 0%, Lag= 0.0 min
Primary = 27.41 cfs @ 12.92 hrs, Volume= 4.057 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 94.24' @ 13.90 hrs Surf.Area= 13 sf Storage= 101 cf
Flood Elev= 56.75' Surf.Area= 13 sf Storage= 101 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (866.4 - 866.3)

Volume	Invert	Avail.Storage	Storage Description
#1	48.75'	101 cf	**4.00'D x 8.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	48.75'	**30.0" Round Culvert** L= 378.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 48.75' / 47.06' S= 0.0045 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=0.00 cfs @ 12.92 hrs HW=62.49' TW=74.51' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-42R: Controlled by Inlet Capacity

Inflow Area = 12.260 ac, 0.00% Impervious, Inflow Depth = 3.80" for 25 yr event
Inflow = 24.51 cfs @ 12.64 hrs, Volume= 3.886 af
Outflow = 23.23 cfs @ 12.92 hrs, Volume= 3.886 af, Atten= 5%, Lag= 17.0 min
Primary = 22.06 cfs @ 12.92 hrs, Volume= 4.050 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 88.83' @ 13.02 hrs Surf.Area= 20,000 sf Storage= 36,250 cf

Plug-Flow detention time= 21.5 min calculated for 3.885 af (100% of inflow)
Center-of-Mass det. time= 21.5 min (870.2 - 848.7)

Volume	Invert	Avail.Storage	Storage Description
#1	56.75'	36,250 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
56.75	0	0	0
58.00	10,000	6,250	6,250
60.00	20,000	30,000	36,250

Device	Routing	Invert	Outlet Devices
#1	Primary	56.75'	**1.4" x 7.0" Horiz. Orifice/Grate X 24.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=21.15 cfs @ 12.92 hrs HW=69.83' TW=62.91' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 21.15 cfs @ 12.66 fps)

Summary for Pond PA-43:

Inflow Area = 12.260 ac, 0.00% Impervious, Inflow Depth = 3.97" for 25 yr event
Inflow = 27.41 cfs @ 12.92 hrs, Volume= 4.057 af
Outflow = 27.17 cfs @ 12.92 hrs, Volume= 4.057 af, Atten= 1%, Lag= 0.0 min
Primary = 27.17 cfs @ 12.92 hrs, Volume= 4.057 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 81.19' @ 13.01 hrs Surf.Area= 13 sf Storage= 78 cf
Flood Elev= 53.21' Surf.Area= 13 sf Storage= 78 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (866.5 - 866.4)

Volume	Invert	Avail.Storage	Storage Description
#1	47.04'	78 cf	**4.00'D x 6.17'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	47.04'	**30.0" Round Culvert** L= 128.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.04' / 45.85' S= 0.0093 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=46.73 cfs @ 12.92 hrs HW=74.51' TW=70.60' (Dynamic Tailwater)
1=Culvert (Inlet Controls 46.73 cfs @ 9.52 fps)

Summary for Pond PA-48:

Inflow Area = 1.930 ac, 0.00% Impervious, Inflow Depth = 4.22" for 25 yr event
Inflow = 3.23 cfs @ 12.58 hrs, Volume= 0.679 af
Outflow = 3.23 cfs @ 12.59 hrs, Volume= 0.679 af, Atten= 0%, Lag= 0.5 min
Primary = 3.23 cfs @ 12.59 hrs, Volume= 0.679 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 50.80' @ 12.59 hrs Surf.Area= 13 sf Storage= 54 cf
Flood Elev= 52.15' Surf.Area= 13 sf Storage= 71 cf

Plug-Flow detention time= 0.3 min calculated for 0.679 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (816.7 - 816.5)

Volume	Invert	Avail.Storage	Storage Description
#1	46.50'	71 cf	**4.00'D x 5.65'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	46.50'	**12.0" Round Culvert** L= 423.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 46.32' / 46.50' S= -0.0004 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=3.23 cfs @ 12.59 hrs HW=50.80' TW=45.87' (Dynamic Tailwater)
1=Culvert (Barrel Controls 3.23 cfs @ 4.12 fps)

Summary for Pond PA-49:

Inflow Area = 1.930 ac, 0.00% Impervious, Inflow Depth = 4.22" for 25 yr event
Inflow = 6.42 cfs @ 12.26 hrs, Volume= 0.679 af
Outflow = 3.23 cfs @ 12.58 hrs, Volume= 0.679 af, Atten= 50%, Lag= 19.4 min
Primary = 3.23 cfs @ 12.58 hrs, Volume= 0.679 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 54.47' @ 12.58 hrs Surf.Area= 10,663 sf Storage= 3,596 cf
Flood Elev= 53.64' Surf.Area= 13 sf Storage= 83 cf

Plug-Flow detention time= 5.2 min calculated for 0.679 af (100% of inflow)
Center-of-Mass det. time= 5.1 min (816.5 - 811.4)

Volume	Invert	Avail.Storage	Storage Description
#1	47.00'	83 cf	**4.00'D x 6.64'H Vertical Cone/Cylinder**
#2	53.64'	11,700 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		11,783 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
53.64	0	0	0
54.00	2,500	450	450
55.00	20,000	11,250	11,700

Device	Routing	Invert	Outlet Devices
#1	Primary	47.00'	**10.0" Round Culvert** L= 141.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 47.00' / 46.32' S= 0.0048 '/' Cc= 0.900 n= 0.012, Flow Area= 0.55 sf

Primary OutFlow Max=3.23 cfs @ 12.58 hrs HW=54.47' TW=50.80' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 3.23 cfs @ 5.93 fps)

Summary for Pond PA-51:

Rim (Flood Elevation) set per CB A-46

Inflow Area = 9.000 ac, 0.00% Impervious, Inflow Depth = 1.48" for 25 yr event
Inflow = 5.81 cfs @ 12.83 hrs, Volume= 1.110 af
Outflow = 11.75 cfs @ 13.52 hrs, Volume= 1.110 af, Atten= 0%, Lag= 41.6 min
Primary = 11.87 cfs @ 13.52 hrs, Volume= 1.331 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 51.95' @ 13.36 hrs Surf.Area= 17,066 sf Storage= 9,541 cf
Flood Elev= 50.83' Surf.Area= 13 sf Storage= 75 cf

Plug-Flow detention time= 15.7 min calculated for 1.109 af (100% of inflow)
Center-of-Mass det. time= 15.7 min (936.5 - 920.8)

Volume	Invert	Avail.Storage	Storage Description
#1	44.87'	75 cf	**4.00'D x 5.96'H Vertical Cone/Cylinder**
#2	50.83'	17,577 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		17,652 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
50.83	0	0	0
51.00	2,500	213	213
52.00	17,875	10,188	10,400
52.36	22,000	7,177	17,577

Device	Routing	Invert	Outlet Devices
#1	Primary	44.87'	**15.0" Round Culvert** L= 59.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 44.75' / 44.87' S= -0.0020 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 13.52 hrs HW=51.92' TW=53.49' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-52:

Inflow Area = 9.000 ac, 0.00% Impervious, Inflow Depth = 1.77" for 25 yr event
Inflow = 11.87 cfs @ 13.52 hrs, Volume= 1.331 af
Outflow = 11.96 cfs @ 13.80 hrs, Volume= 1.331 af, Atten= 0%, Lag= 17.0 min
Primary = 11.96 cfs @ 13.80 hrs, Volume= 1.353 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 76.51' @ 13.88 hrs Surf.Area= 13 sf Storage= 90 cf
Flood Elev= 52.07' Surf.Area= 13 sf Storage= 90 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (913.1 - 912.8)

Volume	Invert	Avail.Storage	Storage Description
#1	44.87'	90 cf	**4.00'D x 7.20'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	44.87'	**15.0" Round Culvert** L= 4.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 44.87' / 44.65' S= 0.0550 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=8.96 cfs @ 13.80 hrs HW=59.56' TW=55.87' (Dynamic Tailwater)
1=Culvert (Inlet Controls 8.96 cfs @ 7.30 fps)

Summary for Pond PA-53A:

Inflow Area = 1.930 ac, 0.00% Impervious, Inflow Depth = 4.22" for 25 yr event
Inflow = 3.23 cfs @ 12.59 hrs, Volume= 0.679 af
Outflow = 3.23 cfs @ 12.59 hrs, Volume= 0.679 af, Atten= 0%, Lag= 0.2 min
Primary = 3.23 cfs @ 12.59 hrs, Volume= 0.679 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 45.87' @ 12.59 hrs Surf.Area= 13 sf Storage= 21 cf
Flood Elev= 50.80' Surf.Area= 13 sf Storage= 83 cf

Plug-Flow detention time= 0.2 min calculated for 0.679 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (816.9 - 816.7)

Volume	Invert	Avail.Storage	Storage Description
#1	44.20'	83 cf	**4.00'D x 6.60'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	44.20'	**12.0" Round Culvert** L= 370.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 44.20' / 20.40' S= 0.0643 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=3.23 cfs @ 12.59 hrs HW=45.87' TW=40.33' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.23 cfs @ 4.12 fps)

Summary for Pond PA-53CR: Controlled by Inlet Capacity

Inflow Area = 8.720 ac, 48.08% Impervious, Inflow Depth = 4.54" for 25 yr event
Inflow = 21.13 cfs @ 12.55 hrs, Volume= 3.302 af
Outflow = 9.92 cfs @ 13.07 hrs, Volume= 3.302 af, Atten= 53%, Lag= 31.1 min
Primary = 9.92 cfs @ 13.07 hrs, Volume= 3.302 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 45.33' @ 13.07 hrs Surf.Area= 40,236 sf Storage= 27,517 cf

Plug-Flow detention time= 17.4 min calculated for 3.301 af (100% of inflow)
Center-of-Mass det. time= 17.4 min (824.1 - 806.7)

Volume	Invert	Avail.Storage	Storage Description
#1	43.81'	61,095 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.81	0	0	0
44.00	1,000	95	95
46.00	60,000	61,000	61,095

Device	Routing	Invert	Outlet Devices
#1	Primary	43.81'	**1.4" x 3.5" Horiz. Orifice/Grate X 6.00 columns** X 8 rows C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 13.07 hrs HW=45.33' TW=46.97' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond PA-54:

Storage being modeled is from CB PA-55. Due to problems running Simultaneous Routing the site conditions have been modeled this way.

Inflow Area = 20.557 ac, 93.38% Impervious, Inflow Depth = 5.70" for 25 yr event
Inflow = 116.98 cfs @ 12.10 hrs, Volume= 9.766 af
Outflow = 131.10 cfs @ 12.21 hrs, Volume= 9.766 af, Atten= 0%, Lag= 6.8 min
Primary = 126.24 cfs @ 12.21 hrs, Volume= 10.191 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 102.68' @ 12.21 hrs Surf.Area= 18,162 sf Storage= 3,964 cf
Flood Elev= 52.45' Surf.Area= 17,916 sf Storage= 3,954 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (749.6 - 749.4)

Volume	Invert	Avail.Storage	Storage Description
#1	44.13'	105 cf	**4.00'D x 8.32'H Vertical Cone/Cylinder**
#2	51.57'	3,849 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
#3	52.45'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		3,964 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
51.57	4	0	0
52.00	17,899	3,849	3,849

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.45	4	0	0
52.53	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	44.13'	**36.0" Round Culvert** L= 236.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.13' / 42.10' S= 0.0086 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf

Primary OutFlow Max=168.34 cfs @ 12.21 hrs HW=99.37' TW=71.07' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 168.34 cfs @ 23.82 fps)

Summary for Pond PA-54A:

Inflow Area = 13.707 ac, 97.67% Impervious, Inflow Depth = 5.84" for 25 yr event
Inflow = 89.08 cfs @ 12.51 hrs, Volume= 6.674 af
Outflow = 82.98 cfs @ 12.10 hrs, Volume= 6.674 af, Atten= 7%, Lag= 0.0 min
Primary = 58.73 cfs @ 12.51 hrs, Volume= 6.183 af
Secondary = 71.90 cfs @ 12.23 hrs, Volume= 0.542 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 68.47' @ 12.09 hrs Surf.Area= 263 sf Storage= 128 cf
Flood Elev= 54.34' Surf.Area= 17 sf Storage= 118 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (747.6 - 747.6)

Volume	Invert	Avail.Storage	Storage Description
#1	44.98'	118 cf	**4.00'D x 9.36'H Vertical Cone/Cylinder**
#2	54.34'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		128 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
54.34	4	0	0
54.42	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	44.98'	**36.0" Round Culvert** L= 194.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 44.98' / 44.13' S= 0.0044 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf
#2	Secondary	54.34'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=52.73 cfs @ 12.51 hrs HW=54.43' TW=51.92' (Dynamic Tailwater)
1=Culvert (Outlet Controls 52.73 cfs @ 7.46 fps)

Secondary OutFlow Max=672.68 cfs @ 12.23 hrs HW=59.05' TW=51.99' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 672.68 cfs @ 5.71 fps)

Summary for Pond PA-55:

Inflow Area = 1.890 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 11.13 cfs @ 12.07 hrs, Volume= 0.876 af
Outflow = 11.18 cfs @ 12.07 hrs, Volume= 0.877 af, Atten= 0%, Lag= 0.0 min
Primary = 11.18 cfs @ 12.07 hrs, Volume= 0.877 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 69.06' @ 12.09 hrs Surf.Area= 13 sf Storage= 77 cf
Flood Elev= 51.48' Surf.Area= 13 sf Storage= 77 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (744.9 - 744.7)

Volume	Invert	Avail.Storage	Storage Description
#1	45.33'	77 cf	**4.00'D x 6.15'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	45.33'	**24.0" Round Culvert** L= 69.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 45.33' / 44.83' S= 0.0072 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.07 hrs HW=55.90' TW=62.51' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-56:

Inflow Area = 3.140 ac, 66.88% Impervious, Inflow Depth = 4.92" for 25 yr event
Inflow = 14.31 cfs @ 12.07 hrs, Volume= 1.287 af
Outflow = 14.50 cfs @ 12.07 hrs, Volume= 1.288 af, Atten= 0%, Lag= 0.0 min
Primary = 14.50 cfs @ 12.07 hrs, Volume= 1.289 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 72.44' @ 12.09 hrs Surf.Area= 13 sf Storage= 83 cf
Flood Elev= 52.69' Surf.Area= 13 sf Storage= 83 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (764.6 - 764.5)

Volume	Invert	Avail.Storage	Storage Description
#1	46.09'	83 cf	**4.00'D x 6.60'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	46.09'	**18.0" Round Culvert** L= 130.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 46.09' / 45.27' S= 0.0063 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 12.07 hrs HW=59.44' TW=62.23' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-57:

Inflow Area = 2.160 ac, 54.17% Impervious, Inflow Depth = 4.67" for 25 yr event
Inflow = 8.90 cfs @ 12.10 hrs, Volume= 0.841 af
Outflow = 8.70 cfs @ 12.10 hrs, Volume= 0.841 af, Atten= 2%, Lag= 0.0 min
Primary = 8.70 cfs @ 12.10 hrs, Volume= 0.841 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 105.49' @ 12.22 hrs Surf.Area= 13 sf Storage= 98 cf
Flood Elev= 53.91' Surf.Area= 13 sf Storage= 98 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.3 min (774.2 - 773.9)

Volume	Invert	Avail.Storage	Storage Description
#1	46.11'	98 cf	**4.00'D x 7.80'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	46.11'	**18.0" Round Culvert** L= 239.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 46.11' / 45.69' S= 0.0018 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=8.66 cfs @ 12.10 hrs HW=57.69' TW=55.50' (Dynamic Tailwater)
1=Culvert (Outlet Controls 8.66 cfs @ 4.90 fps)

Summary for Pond PA-57A:

Inflow Area = 1.400 ac, 58.57% Impervious, Inflow Depth = 4.76" for 25 yr event
Inflow = 6.74 cfs @ 12.07 hrs, Volume= 0.555 af
Outflow = 6.92 cfs @ 12.08 hrs, Volume= 0.555 af, Atten= 0%, Lag= 0.4 min
Primary = 6.92 cfs @ 12.08 hrs, Volume= 0.555 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 75.95' @ 12.10 hrs Surf.Area= 13 sf Storage= 64 cf
Flood Elev= 51.85' Surf.Area= 13 sf Storage= 64 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (768.7 - 768.5)

Volume	Invert	Avail.Storage	Storage Description
#1	46.75'	64 cf	**4.00'D x 5.10'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	46.75'	**15.0" Round Culvert** L= 10.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 46.75' / 46.51' S= 0.0240 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=62.89' TW=68.33' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-57B:

Inflow Area = 0.330 ac, 45.45% Impervious, Inflow Depth = 4.49" for 25 yr event
Inflow = 1.34 cfs @ 12.16 hrs, Volume= 0.124 af
Outflow = 1.37 cfs @ 12.16 hrs, Volume= 0.124 af, Atten= 0%, Lag= 0.1 min
Primary = 1.37 cfs @ 12.16 hrs, Volume= 0.124 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 83.67' @ 12.11 hrs Surf.Area= 13 sf Storage= 63 cf
Flood Elev= 54.74' Surf.Area= 13 sf Storage= 63 cf

Plug-Flow detention time= 0.9 min calculated for 0.124 af (100% of inflow)
Center-of-Mass det. time= 0.9 min (782.4 - 781.6)

Volume	Invert	Avail.Storage	Storage Description
#1	49.75'	63 cf	**4.00'D x 4.99'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	49.75'	**8.0" Round Culvert** L= 175.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 49.75' / 48.00' S= 0.0100 '/' Cc= 0.900 n= 0.025, Flow Area= 0.35 sf

Primary OutFlow Max=1.37 cfs @ 12.16 hrs HW=66.31' TW=57.53' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.37 cfs @ 3.92 fps)

Summary for Pond PA-57C:

FLOOD ELEVATION/RIM ESTIMATED

Inflow Area = 1.400 ac, 58.57% Impervious, Inflow Depth = 4.75" for 25 yr event
Inflow = 6.73 cfs @ 12.08 hrs, Volume= 0.554 af
Outflow = 6.74 cfs @ 12.07 hrs, Volume= 0.555 af, Atten= 0%, Lag= 0.0 min
Primary = 6.74 cfs @ 12.07 hrs, Volume= 0.555 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 106.24' @ 12.23 hrs Surf.Area= 13 sf Storage= 69 cf
Flood Elev= 53.50' Surf.Area= 13 sf Storage= 69 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (768.5 - 768.3)

Volume	Invert	Avail.Storage	Storage Description
#1	48.00'	69 cf	**4.00'D x 5.50'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	48.00'	**15.0" Round Culvert** L= 45.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 48.00' / 46.80' S= 0.0267 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=4.60 cfs @ 12.07 hrs HW=60.67' TW=60.06' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 4.60 cfs @ 3.75 fps)

Summary for Pond PA-58:

Inflow Area = 12.577 ac, 97.46% Impervious, Inflow Depth = 5.69" for 25 yr event
Inflow = 63.66 cfs @ 12.10 hrs, Volume= 5.967 af
Outflow = 66.35 cfs @ 12.23 hrs, Volume= 5.966 af, Atten= 0%, Lag= 7.7 min
Primary = 63.75 cfs @ 12.23 hrs, Volume= 5.728 af
Secondary = 44.07 cfs @ 12.25 hrs, Volume= 0.360 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 102.38' @ 12.22 hrs Surf.Area= 263 sf Storage= 127 cf
Flood Elev= 55.55' Surf.Area= 17 sf Storage= 117 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (748.2 - 748.1)

Volume	Invert	Avail.Storage	Storage Description
#1	46.23'	117 cf	**4.00'D x 9.32'H Vertical Cone/Cylinder**
#2	55.55'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		127 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.55	4	0	0
55.63	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	46.23'	**36.0" Round Culvert** L= 184.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 46.23' / 45.29' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf
#2	Secondary	55.55'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 12.23 hrs HW=55.47' TW=59.05' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 12.25 hrs HW=58.38' TW=61.58' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond PA-59:

Inflow Area = 2.910 ac, 89.00% Impervious, Inflow Depth = 5.36" for 25 yr event
Inflow = 16.81 cfs @ 12.14 hrs, Volume= 1.301 af
Outflow = 16.64 cfs @ 12.10 hrs, Volume= 1.302 af, Atten= 1%, Lag= 0.0 min
Primary = 17.03 cfs @ 12.10 hrs, Volume= 1.291 af
Secondary = 16.64 cfs @ 12.10 hrs, Volume= 0.062 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 67.45' @ 12.12 hrs Surf.Area= 263 sf Storage= 100 cf
Flood Elev= 57.25' Surf.Area= 17 sf Storage= 90 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (753.2 - 753.0)

Volume	Invert	Avail.Storage	Storage Description
#1	50.10'	90 cf	**4.00'D x 7.15'H Vertical Cone/Cylinder**
#2	57.25'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		100 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
57.25	4	0	0
57.33	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	50.10'	**24.0" Round Culvert** L= 250.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 50.10' / 47.77' S= 0.0093 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Secondary	57.25'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=14.04 cfs @ 12.10 hrs HW=57.59' TW=56.16' (Dynamic Tailwater)
1=Culvert (Outlet Controls 14.04 cfs @ 4.47 fps)

Secondary OutFlow Max=15.99 cfs @ 12.10 hrs HW=57.63' TW=55.34' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 15.99 cfs @ 1.67 fps)

Summary for Pond PA-60:

Inflow Area = 0.470 ac, 31.91% Impervious, Inflow Depth = 4.24" for 25 yr event
Inflow = 2.99 cfs @ 12.17 hrs, Volume= 0.166 af
Outflow = 4.47 cfs @ 12.14 hrs, Volume= 0.166 af, Atten= 0%, Lag= 0.0 min
Primary = 4.47 cfs @ 12.14 hrs, Volume= 0.170 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 64.01' @ 12.13 hrs Surf.Area= 13 sf Storage= 84 cf
Flood Elev= 57.00' Surf.Area= 13 sf Storage= 84 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.6 min (791.0 - 790.4)

Volume	Invert	Avail.Storage	Storage Description
#1	50.30'	84 cf	**4.00'D x 6.70'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	50.30'	**18.0" Round Culvert** L= 91.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 50.30' / 50.05' S= 0.0027 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 12.14 hrs HW=55.42' TW=57.32' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-61:

Inflow Area = 0.470 ac, 31.91% Impervious, Inflow Depth = 4.23" for 25 yr event
Inflow = 1.93 cfs @ 12.14 hrs, Volume= 0.166 af
Outflow = 2.99 cfs @ 12.17 hrs, Volume= 0.166 af, Atten= 0%, Lag= 2.0 min
Primary = 2.99 cfs @ 12.17 hrs, Volume= 0.166 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 67.77' @ 12.13 hrs Surf.Area= 13 sf Storage= 81 cf
Flood Elev= 57.06' Surf.Area= 13 sf Storage= 81 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.6 min (790.5 - 789.9)

Volume	Invert	Avail.Storage	Storage Description
#1	50.61'	81 cf	**4.00'D x 6.45'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	50.61'	**12.0" Round Culvert** L= 47.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 50.61' / 50.50' S= 0.0023 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=3.56 cfs @ 12.17 hrs HW=57.49' TW=56.07' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.56 cfs @ 4.53 fps)

Summary for Pond PA-63:

Inflow Area = 0.020 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 0.14 cfs @ 12.01 hrs, Volume= 0.009 af
Outflow = 0.91 cfs @ 12.33 hrs, Volume= 0.009 af, Atten= 0%, Lag= 18.9 min
Primary = 0.91 cfs @ 12.33 hrs, Volume= 0.010 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 55.94' @ 12.26 hrs Surf.Area= 13 sf Storage= 72 cf
Flood Elev= 57.28' Surf.Area= 13 sf Storage= 89 cf

Plug-Flow detention time= 8.8 min calculated for 0.009 af (100% of inflow)
Center-of-Mass det. time= 8.8 min (749.8 - 741.0)

Volume	Invert	Avail.Storage	Storage Description
#1	50.23'	89 cf	**4.00'D x 7.05'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	50.23'	**12.0" Round Culvert** L= 78.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 50.23' / 50.12' S= 0.0014 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.33 hrs HW=53.02' TW=56.14' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-64:

Inflow Area = 8.627 ac,100.00% Impervious, Inflow Depth = 5.64" for 25 yr event
Inflow = 49.26 cfs @ 12.13 hrs, Volume= 4.052 af
Outflow = 49.73 cfs @ 12.13 hrs, Volume= 4.052 af, Atten= 0%, Lag= 0.0 min
Primary = 39.79 cfs @ 12.61 hrs, Volume= 3.150 af
Secondary = 43.55 cfs @ 12.13 hrs, Volume= 0.911 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.42' @ 12.26 hrs Surf.Area= 263 sf Storage= 103 cf
Flood Elev= 55.48' Surf.Area= 17 sf Storage= 93 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (746.2 - 746.1)

Volume	Invert	Avail.Storage	Storage Description
#1	48.08'	93 cf	**4.00'D x 7.40'H Vertical Cone/Cylinder**
#2	55.48'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		103 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.48	4	0	0
55.56	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	48.08'	**30.0" Round Culvert** L= 25.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 48.08' / 47.61' S= 0.0188 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#2	Secondary	55.48'	**25.0' long x 28.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 12.61 hrs HW=53.74' TW=54.13' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Secondary OutFlow Max=40.04 cfs @ 12.13 hrs HW=56.99' TW=56.94' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 40.04 cfs @ 1.06 fps)

Summary for Pond PA-64A:

Inflow Area = 0.340 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 2.15 cfs @ 12.04 hrs, Volume= 0.158 af
Outflow = 2.78 cfs @ 12.05 hrs, Volume= 0.158 af, Atten= 0%, Lag= 0.4 min
Primary = 1.85 cfs @ 12.01 hrs, Volume= 0.123 af
Secondary = 2.46 cfs @ 12.29 hrs, Volume= 0.036 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.36' @ 12.27 hrs Surf.Area= 263 sf Storage= 91 cf
Flood Elev= 55.63' Surf.Area= 17 sf Storage= 81 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.8 min (743.6 - 742.9)

Volume	Invert	Avail.Storage	Storage Description
#1	49.18'	81 cf	**4.00'D x 6.45'H Vertical Cone/Cylinder**
#2	55.63'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		91 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.63	4	0	0
55.71	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	49.18'	**24.0" Round Culvert** L= 25.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 48.68' / 49.18' S= -0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Secondary	55.63'	**25.0' long x 28.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 12.01 hrs HW=55.62' TW=55.72' (Dynamic Tailwater)
↑**1=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=40.98 cfs @ 12.29 hrs HW=57.27' TW=57.23' (Dynamic Tailwater)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 40.98 cfs @ 1.00 fps)

Summary for Pond PA-65:

Inflow Area = 9.217 ac,100.00% Impervious, Inflow Depth = 5.65" for 25 yr event
Inflow = 52.42 cfs @ 12.13 hrs, Volume= 4.338 af
Outflow = 45.65 cfs @ 12.45 hrs, Volume= 4.338 af, Atten= 13%, Lag= 19.2 min
Primary = 45.65 cfs @ 12.45 hrs, Volume= 4.467 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.37' @ 12.25 hrs Surf.Area= 7,564 sf Storage= 10,890 cf
Flood Elev= 55.86' Surf.Area= 17 sf Storage= 106 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.1 min (747.1 - 746.0)

Volume	Invert	Avail.Storage	Storage Description
#1	47.41'	106 cf	**4.00'D x 8.45'H Vertical Cone/Cylinder**
#2	55.86'	166,955 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		167,061 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.86	4	0	0
56.00	7,446	522	522
76.24	9,000	166,434	166,955

Device	Routing	Invert	Outlet Devices
#1	Primary	47.41'	**30.0" Round Culvert** L= 156.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.41' / 46.68' S= 0.0047 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#2	Secondary	76.16'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=19.38 cfs @ 12.45 hrs HW=56.38' TW=55.67' (Dynamic Tailwater)
1=Culvert (Outlet Controls 19.38 cfs @ 3.95 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=47.41' TW=46.23' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond PA-66:

Inflow Area = 0.590 ac,100.00% Impervious, Inflow Depth = 5.60" for 25 yr event
Inflow = 4.42 cfs @ 12.05 hrs, Volume= 0.275 af
Outflow = 4.55 cfs @ 12.03 hrs, Volume= 0.276 af, Atten= 0%, Lag= 0.0 min
Primary = 4.55 cfs @ 12.03 hrs, Volume= 0.233 af
Secondary = 2.67 cfs @ 12.11 hrs, Volume= 0.044 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.42' @ 12.26 hrs Surf.Area= 263 sf Storage= 112 cf
Flood Elev= 55.94' Surf.Area= 17 sf Storage= 102 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.6 min (743.6 - 743.0)

Volume	Invert	Avail.Storage	Storage Description
#1	47.84'	102 cf	**4.00'D x 8.10'H Vertical Cone/Cylinder**
#2	55.94'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		112 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.94	4	0	0
56.02	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	47.84'	**30.0" Round Culvert** L= 28.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.84' / 47.46' S= 0.0136 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#2	Secondary	55.94'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1.11 cfs @ 12.03 hrs HW=55.91' TW=55.91' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.11 cfs @ 0.23 fps)

Secondary OutFlow Max=3.29 cfs @ 12.11 hrs HW=56.63' TW=56.63' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 3.29 cfs @ 0.19 fps)

Summary for Pond PA-67:

Inflow Area = 0.140 ac,100.00% Impervious, Inflow Depth = 5.73" for 25 yr event
Inflow = 1.33 cfs @ 12.04 hrs, Volume= 0.067 af
Outflow = 2.86 cfs @ 12.58 hrs, Volume= 0.067 af, Atten= 0%, Lag= 32.4 min
Primary = 2.86 cfs @ 12.58 hrs, Volume= 0.067 af
Secondary = 0.77 cfs @ 12.13 hrs, Volume= 0.004 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.35' @ 12.27 hrs Surf.Area= 263 sf Storage= 104 cf
Flood Elev= 56.17' Surf.Area= 17 sf Storage= 94 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.8 min (743.2 - 741.4)

Volume	Invert	Avail.Storage	Storage Description
#1	48.67'	94 cf	**4.00'D x 7.50'H Vertical Cone/Cylinder**
#2	56.17'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		104 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
56.17	4	0	0
56.25	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	48.67'	**24.0" Round Culvert** L= 185.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 48.67' / 48.24' S= 0.0023 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Secondary	56.17'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=10.96 cfs @ 12.58 hrs HW=52.07' TW=51.35' (Dynamic Tailwater)
1=Culvert (Outlet Controls 10.96 cfs @ 3.49 fps)

Secondary OutFlow Max=0.00 cfs @ 12.13 hrs HW=56.74' TW=57.16' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond PA-67A:

Inflow Area = 7.157 ac,100.00% Impervious, Inflow Depth = 5.23" for 25 yr event
Inflow = 28.18 cfs @ 12.06 hrs, Volume= 3.119 af
Outflow = 35.70 cfs @ 12.13 hrs, Volume= 3.119 af, Atten= 0%, Lag= 4.3 min
Primary = 33.13 cfs @ 12.61 hrs, Volume= 2.855 af
Secondary = 24.42 cfs @ 12.15 hrs, Volume= 0.264 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.40' @ 12.27 hrs Surf.Area= 12,513 sf Storage= 5,530 cf
Flood Elev= 56.01' Surf.Area= 17 sf Storage= 87 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.2 min (747.7 - 746.5)

Volume	Invert	Avail.Storage	Storage Description
#1	49.11'	87 cf	**4.00'D x 6.90'H Vertical Cone/Cylinder**
#2	56.01'	5,443 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		5,530 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
56.01	4	0	0
56.50	10,801	2,647	2,647
56.74	12,500	2,796	5,443

Device	Routing	Invert	Outlet Devices
#1	Primary	49.11'	**30.0" Round Culvert** L= 183.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 49.11' / 48.18' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#2	Secondary	56.66'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=25.01 cfs @ 12.61 hrs HW=55.18' TW=53.89' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 25.01 cfs @ 5.09 fps)

Secondary OutFlow Max=21.57 cfs @ 12.15 hrs HW=57.29' TW=57.15' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 21.57 cfs @ 1.36 fps)

Summary for Pond PA-69:

Inflow Area = 4.207 ac,100.00% Impervious, Inflow Depth = 4.75" for 25 yr event
Inflow = 19.08 cfs @ 12.03 hrs, Volume= 1.667 af
Outflow = 18.96 cfs @ 12.03 hrs, Volume= 1.667 af, Atten= 1%, Lag= 0.0 min
Primary = 14.08 cfs @ 12.03 hrs, Volume= 1.591 af
Secondary = 6.04 cfs @ 12.13 hrs, Volume= 0.092 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.51' @ 12.13 hrs Surf.Area= 263 sf Storage= 105 cf
Flood Elev= 57.31' Surf.Area= 17 sf Storage= 95 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (745.2 - 745.0)

Volume	Invert	Avail.Storage	Storage Description
#1	49.74'	95 cf	**4.00'D x 7.57'H Vertical Cone/Cylinder**
#2	57.31'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		105 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
57.31	4	0	0
57.39	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	49.74'	**24.0" Round Culvert** L= 180.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 49.74' / 49.06' S= 0.0038 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Secondary	57.31'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=14.09 cfs @ 12.03 hrs HW=57.47' TW=56.30' (Dynamic Tailwater)
1=Culvert (Outlet Controls 14.09 cfs @ 4.49 fps)

Secondary OutFlow Max=5.99 cfs @ 12.13 hrs HW=57.51' TW=57.16' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 5.99 cfs @ 1.20 fps)

Summary for Pond PA-7:

Storage maximum elevation set at runway flood elevation (Same elevation used as maximum for Pond A-7P)

Inflow Area = 54.388 ac, 63.85% Impervious, Inflow Depth = 5.48" for 25 yr event
Inflow = 229.57 cfs @ 12.34 hrs, Volume= 24.835 af
Outflow = 226.42 cfs @ 12.34 hrs, Volume= 24.835 af, Atten= 1%, Lag= 0.0 min
Primary = 226.42 cfs @ 12.34 hrs, Volume= 24.835 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 79.13' @ 12.34 hrs Surf.Area= 13 sf Storage= 121 cf
Flood Elev= 50.60' Surf.Area= 13 sf Storage= 114 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (786.3 - 786.3)

Volume	Invert	Avail.Storage	Storage Description
#1	41.52'	121 cf	**4.00'D x 9.63'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	41.52'	**42.0" Round Culvert** L= 498.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 41.52' / 37.45' S= 0.0082 '/' Cc= 0.900 n= 0.013, Flow Area= 9.62 sf

Primary OutFlow Max=223.21 cfs @ 12.34 hrs HW=78.09' TW=38.53' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 223.21 cfs @ 23.20 fps)

Summary for Pond PA-70:

Inflow Area = 0.560 ac,100.00% Impervious, Inflow Depth = 5.58" for 25 yr event
Inflow = 4.24 cfs @ 12.63 hrs, Volume= 0.260 af
Outflow = 5.27 cfs @ 12.63 hrs, Volume= 0.261 af, Atten= 0%, Lag= 0.0 min
Primary = 5.27 cfs @ 12.63 hrs, Volume= 0.261 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.68' @ 12.06 hrs Surf.Area= 13 sf Storage= 88 cf
Flood Elev= 58.53' Surf.Area= 17 sf Storage= 99 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.6 min (745.2 - 744.6)

Volume	Invert	Avail.Storage	Storage Description
#1	50.68'	99 cf	**4.00'D x 7.85'H Vertical Cone/Cylinder**
#2	58.53'	137 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		236 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
58.53	4	0	0
59.61	250	137	137

Device	Routing	Invert	Outlet Devices
#1	Primary	50.68'	**18.0" Round Culvert** L= 195.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 50.68' / 49.74' S= 0.0048 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Secondary	58.53'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=3.03 cfs @ 12.63 hrs HW=52.08' TW=51.73' (Dynamic Tailwater)
1=Culvert (Outlet Controls 3.03 cfs @ 2.28 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=50.68' TW=48.67' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond PA-71:

Inflow Area = 0.060 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 0.41 cfs @ 12.01 hrs, Volume= 0.028 af
Outflow = 1.12 cfs @ 12.63 hrs, Volume= 0.028 af, Atten= 0%, Lag= 36.9 min
Primary = 1.12 cfs @ 12.63 hrs, Volume= 0.026 af
Secondary = 0.43 cfs @ 12.04 hrs, Volume= 0.002 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.63' @ 12.04 hrs Surf.Area= 123 sf Storage= 75 cf
Flood Elev= 57.60' Surf.Area= 17 sf Storage= 73 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 2.7 min (743.7 - 741.0)

Volume	Invert	Avail.Storage	Storage Description
#1	51.80'	73 cf	**4.00'D x 5.80'H Vertical Cone/Cylinder**
#2	57.60'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		83 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
57.60	4	0	0
57.68	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	51.80'	**15.0" Round Culvert** L= 41.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 51.80' / 51.48' S= 0.0078 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Secondary	57.60'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.99 cfs @ 12.63 hrs HW=52.35' TW=51.99' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.99 cfs @ 2.81 fps)

Secondary OutFlow Max=0.42 cfs @ 12.04 hrs HW=57.63' TW=55.93' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 0.42 cfs @ 0.49 fps)

Summary for Pond PA-72:

Inflow Area = 0.300 ac,100.00% Impervious, Inflow Depth = 5.65" for 25 yr event
Inflow = 3.76 cfs @ 12.64 hrs, Volume= 0.141 af
Outflow = 3.01 cfs @ 12.63 hrs, Volume= 0.141 af, Atten= 20%, Lag= 0.0 min
Primary = 3.01 cfs @ 12.63 hrs, Volume= 0.141 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.77' @ 12.04 hrs Surf.Area= 13 sf Storage= 84 cf
Flood Elev= 58.08' Surf.Area= 17 sf Storage= 88 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.7 min (744.5 - 743.8)

Volume	Invert	Avail.Storage	Storage Description
#1	51.08'	88 cf	**4.00'D x 7.00'H Vertical Cone/Cylinder**
#2	58.08'	468 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		556 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
58.08	4	0	0
58.50	908	192	192
58.74	1,396	276	468

Device	Routing	Invert	Outlet Devices
#1	Primary	51.08'	**18.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 51.01' / 51.08' S= -0.0025 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf
#2	Secondary	58.66'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.99 cfs @ 12.63 hrs HW=52.08' TW=52.04' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.99 cfs @ 0.79 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=51.08' TW=50.68' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond PA-72A:

Inflow Area = 0.250 ac,100.00% Impervious, Inflow Depth = 5.64" for 25 yr event
Inflow = 2.34 cfs @ 12.64 hrs, Volume= 0.117 af
Outflow = 3.73 cfs @ 12.64 hrs, Volume= 0.117 af, Atten= 0%, Lag= 0.0 min
Primary = 3.73 cfs @ 12.64 hrs, Volume= 0.118 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.82' @ 12.04 hrs Surf.Area= 13 sf Storage= 84 cf
Flood Elev= 58.19' Surf.Area= 17 sf Storage= 88 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.9 min (744.3 - 743.4)

Volume	Invert	Avail.Storage	Storage Description
#1	51.16'	88 cf	**4.00'D x 7.03'H Vertical Cone/Cylinder**
#2	58.19'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		99 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
58.19	4	0	0
58.27	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	51.16'	**15.0" Round Culvert** L= 27.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 51.16' / 51.01' S= 0.0056 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Secondary	58.19'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=4.02 cfs @ 12.64 hrs HW=52.46' TW=51.81' (Dynamic Tailwater)
1=Culvert (Barrel Controls 4.02 cfs @ 3.92 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=51.16' TW=51.08' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond PA-73:

Inflow Area = 0.210 ac,100.00% Impervious, Inflow Depth = 5.61" for 25 yr event
Inflow = 1.68 cfs @ 12.65 hrs, Volume= 0.098 af
Outflow = 2.32 cfs @ 12.64 hrs, Volume= 0.098 af, Atten= 0%, Lag= 0.0 min
Primary = 2.32 cfs @ 12.64 hrs, Volume= 0.099 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.90' @ 12.05 hrs Surf.Area= 13 sf Storage= 83 cf
Flood Elev= 58.16' Surf.Area= 17 sf Storage= 86 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.0 min (743.7 - 742.7)

Volume	Invert	Avail.Storage	Storage Description
#1	51.29'	86 cf	**4.00'D x 6.87'H Vertical Cone/Cylinder**
#2	58.16'	191 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		277 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
58.16	4	0	0
58.50	368	63	63
58.74	698	128	191

Device	Routing	Invert	Outlet Devices
#1	Primary	51.29'	**15.0" Round Culvert** L= 45.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 51.29' / 51.11' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Secondary	58.66'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1.72 cfs @ 12.64 hrs HW=52.48' TW=52.35' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 1.72 cfs @ 1.84 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=51.29' TW=51.16' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond PA-74:

Inflow Area = 0.150 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 0.98 cfs @ 12.03 hrs, Volume= 0.070 af
Outflow = 1.64 cfs @ 12.65 hrs, Volume= 0.070 af, Atten= 0%, Lag= 37.2 min
Primary = 1.64 cfs @ 12.65 hrs, Volume= 0.070 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.91' @ 12.05 hrs Surf.Area= 13 sf Storage= 81 cf
Flood Elev= 58.13' Surf.Area= 17 sf Storage= 84 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.4 min (743.3 - 741.9)

Volume	Invert	Avail.Storage	Storage Description
#1	51.48'	84 cf	**4.00'D x 6.65'H Vertical Cone/Cylinder**
#2	58.13'	135 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		219 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
58.13	4	0	0
58.50	270	51	51
58.74	436	85	135

Device	Routing	Invert	Outlet Devices
#1	Primary	51.48'	**15.0" Round Culvert** L= 45.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 51.48' / 51.16' S= 0.0071 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Secondary	58.66'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=2.36 cfs @ 12.65 hrs HW=52.34' TW=51.68' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 2.36 cfs @ 3.70 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=51.48' TW=51.29' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond PA-75:

Inflow Area = 2.146 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 12.78 cfs @ 12.06 hrs, Volume= 0.995 af
Outflow = 12.77 cfs @ 12.05 hrs, Volume= 0.995 af, Atten= 0%, Lag= 0.0 min
Primary = 12.77 cfs @ 12.05 hrs, Volume= 0.995 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 58.40' @ 12.06 hrs Surf.Area= 13 sf Storage= 87 cf
Flood Elev= 58.76' Surf.Area= 17 sf Storage= 92 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (744.2 - 744.0)

Volume	Invert	Avail.Storage	Storage Description
#1	51.44'	92 cf	**4.00'D x 7.32'H Vertical Cone/Cylinder**
#2	58.76'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		102 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
58.76	4	0	0
58.84	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	51.44'	**24.0" Round Culvert** L= 173.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.44' / 49.74' S= 0.0098 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Secondary	58.76'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=12.63 cfs @ 12.05 hrs HW=58.39' TW=57.47' (Dynamic Tailwater)
1=Culvert (Outlet Controls 12.63 cfs @ 4.02 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=51.44' TW=49.74' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond PA-76:

Inflow Area = 1.412 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 8.42 cfs @ 12.06 hrs, Volume= 0.654 af
Outflow = 11.04 cfs @ 12.15 hrs, Volume= 0.656 af, Atten= 0%, Lag= 5.2 min
Primary = 11.04 cfs @ 12.15 hrs, Volume= 0.664 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 65.06' @ 12.14 hrs Surf.Area= 13 sf Storage= 109 cf
Flood Elev= 59.48' Surf.Area= 13 sf Storage= 109 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (744.4 - 744.3)

Volume	Invert	Avail.Storage	Storage Description
#1	50.78'	109 cf	**4.00'D x 8.70'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	50.78'	**24.0" Round Culvert** L= 90.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 50.78' / 50.16' S= 0.0069 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=12.17 cfs @ 12.15 hrs HW=54.24' TW=53.59' (Dynamic Tailwater)
1=Culvert (Inlet Controls 12.17 cfs @ 3.88 fps)

Summary for Pond PA-77:

Inflow Area = 1.199 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 7.06 cfs @ 12.07 hrs, Volume= 0.556 af
Outflow = 7.08 cfs @ 12.08 hrs, Volume= 0.556 af, Atten= 0%, Lag= 0.4 min
Primary = 7.08 cfs @ 12.08 hrs, Volume= 0.556 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 59.66' @ 12.07 hrs Surf.Area= 13 sf Storage= 51 cf
Flood Elev= 59.93' Surf.Area= 17 sf Storage= 55 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (744.9 - 744.7)

Volume	Invert	Avail.Storage	Storage Description
#1	55.58'	55 cf	**4.00'D x 4.35'H Vertical Cone/Cylinder**
#2	59.93'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		65 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
59.93	4	0	0
60.01	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	55.58'	**18.0" Round Culvert** L= 197.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 55.58' / 51.48' S= 0.0208 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Secondary	59.93'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=7.08 cfs @ 12.08 hrs HW=59.62' TW=58.35' (Dynamic Tailwater)
1=Culvert (Outlet Controls 7.08 cfs @ 4.00 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=55.58' TW=50.78' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond PA-78:

Inflow Area = 1.961 ac,100.00% Impervious, Inflow Depth = 5.77" for 25 yr event
Inflow = 17.15 cfs @ 12.07 hrs, Volume= 0.943 af
Outflow = 24.34 cfs @ 12.15 hrs, Volume= 0.945 af, Atten= 0%, Lag= 4.7 min
Primary = 24.34 cfs @ 12.15 hrs, Volume= 0.954 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 65.26' @ 12.14 hrs Surf.Area= 13 sf Storage= 139 cf
Flood Elev= 60.43' Surf.Area= 13 sf Storage= 139 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (744.1 - 744.0)

Volume	Invert	Avail.Storage	Storage Description
#1	49.38'	139 cf	**4.00'D x 11.05'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	49.38'	**36.0" Round Culvert** L= 213.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 49.38' / 47.02' S= 0.0111 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf

Primary OutFlow Max=15.84 cfs @ 12.15 hrs HW=52.19' TW=51.81' (Dynamic Tailwater)
1=Culvert (Outlet Controls 15.84 cfs @ 2.99 fps)

Summary for Pond PA-79:

Inflow Area = 0.499 ac,100.00% Impervious, Inflow Depth = 5.98" for 25 yr event
Inflow = 8.98 cfs @ 12.07 hrs, Volume= 0.249 af
Outflow = 8.66 cfs @ 12.07 hrs, Volume= 0.250 af, Atten= 4%, Lag= 0.0 min
Primary = 8.66 cfs @ 12.07 hrs, Volume= 0.256 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.00' @ 12.14 hrs Surf.Area= 13 sf Storage= 89 cf
Flood Elev= 60.94' Surf.Area= 13 sf Storage= 138 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.3 min (742.6 - 742.3)

Volume	Invert	Avail.Storage	Storage Description
#1	49.94'	138 cf	**4.00'D x 11.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	49.94'	**30.0" Round Culvert** L= 108.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 49.94' / 49.43' S= 0.0047 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=23.20 cfs @ 12.07 hrs HW=52.51' TW=51.30' (Dynamic Tailwater)
1=Culvert (Barrel Controls 23.20 cfs @ 5.71 fps)

Summary for Pond PA-8:

Inflow Area = 31.971 ac, 46.51% Impervious, Inflow Depth = 5.07" for 25 yr event
Inflow = 72.34 cfs @ 12.86 hrs, Volume= 13.506 af
Outflow = 101.16 cfs @ 12.18 hrs, Volume= 13.522 af, Atten= 0%, Lag= 0.0 min
Primary = 101.97 cfs @ 12.18 hrs, Volume= 13.475 af
Secondary = 79.97 cfs @ 12.48 hrs, Volume= 0.458 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 86.88' @ 12.21 hrs Surf.Area= 5,013 sf Storage= 1,374 cf
Flood Elev= 52.10' Surf.Area= 13 sf Storage= 124 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	42.20'	124 cf	**4.00'D x 9.90'H Vertical Cone/Cylinder**
#2	52.10'	1,250 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		1,374 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.10	0	0	0
52.60	5,000	1,250	1,250

Device	Routing	Invert	Outlet Devices
#1	Primary	42.20'	**42.0" Round Culvert** L= 363.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 42.20' / 41.93' S= 0.0007 '/' Cc= 0.900 n= 0.013, Flow Area= 9.62 sf
#2	Secondary	52.60'	**10.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 12.18 hrs HW=52.20' TW=66.80' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=1,409.89 cfs @ 12.48 hrs HW=66.82' TW=51.28' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 1,409.89 cfs @ 9.92 fps)

Summary for Pond PA-80:

Inflow Area = 0.409 ac,100.00% Impervious, Inflow Depth = 5.90" for 25 yr event
Inflow = 8.99 cfs @ 12.07 hrs, Volume= 0.201 af
Outflow = 8.50 cfs @ 12.07 hrs, Volume= 0.204 af, Atten= 5%, Lag= 0.0 min
Primary = 8.50 cfs @ 12.07 hrs, Volume= 0.207 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 55.66' @ 12.15 hrs Surf.Area= 13 sf Storage= 59 cf
Flood Elev= 61.47' Surf.Area= 13 sf Storage= 132 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (742.3 - 742.1)

Volume	Invert	Avail.Storage	Storage Description
#1	50.97'	132 cf	**4.00'D x 10.50'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	50.97'	**24.0" Round Culvert** L= 88.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 50.97' / 50.02' S= 0.0108 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.07 hrs HW=52.42' TW=52.51' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-8A: DATA?

Inflow Area = 29.371 ac, 46.21% Impervious, Inflow Depth = 5.11" for 25 yr event
Inflow = 71.90 cfs @ 12.86 hrs, Volume= 12.513 af
Outflow = 67.37 cfs @ 12.86 hrs, Volume= 12.513 af, Atten= 6%, Lag= 0.0 min
Primary = 67.37 cfs @ 12.86 hrs, Volume= 12.513 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 64.69' @ 12.12 hrs Surf.Area= 1 sf Storage= 9 cf
Flood Elev= 56.00' Surf.Area= 1 sf Storage= 9 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (814.1 - 814.1)

Volume	Invert	Avail.Storage	Storage Description
#1	44.16'	9 cf	**1.00'D x 11.84'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	44.16'	**42.0" Round Culvert** L= 396.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 44.16' / 42.40' S= 0.0044 '/' Cc= 0.900 n= 0.013, Flow Area= 9.62 sf

Primary OutFlow Max=57.00 cfs @ 12.86 hrs HW=50.55' TW=48.46' (Dynamic Tailwater)
1=Culvert (Outlet Controls 57.00 cfs @ 5.92 fps)

Summary for Pond PA-9:

Inflow Area = 29.371 ac, 46.21% Impervious, Inflow Depth = 5.10" for 25 yr event
Inflow = 67.35 cfs @ 12.34 hrs, Volume= 12.489 af
Outflow = 71.90 cfs @ 12.86 hrs, Volume= 12.489 af, Atten= 0%, Lag= 31.1 min
Primary = 71.90 cfs @ 12.86 hrs, Volume= 12.513 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 89.71' @ 12.22 hrs Surf.Area= 13 sf Storage= 157 cf
Flood Elev= 57.77' Surf.Area= 13 sf Storage= 157 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (814.3 - 814.2)

Volume	Invert	Avail.Storage	Storage Description
#1	45.27'	157 cf	**4.00'D x 12.50'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	45.27'	**42.0" Round Culvert** L= 175.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 45.27' / 44.26' S= 0.0058 '/' Cc= 0.900 n= 0.013, Flow Area= 9.62 sf

Primary OutFlow Max=0.00 cfs @ 12.86 hrs HW=50.14' TW=50.57' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-90:

Inflow Area = 0.309 ac,100.00% Impervious, Inflow Depth = 5.80" for 25 yr event
Inflow = 9.12 cfs @ 12.07 hrs, Volume= 0.149 af
Outflow = 8.45 cfs @ 12.07 hrs, Volume= 0.150 af, Atten= 7%, Lag= 0.0 min
Primary = 8.45 cfs @ 12.07 hrs, Volume= 0.155 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 55.06' @ 12.15 hrs Surf.Area= 13 sf Storage= 48 cf
Flood Elev= 61.71' Surf.Area= 13 sf Storage= 131 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.3 min (742.5 - 742.1)

Volume	Invert	Avail.Storage	Storage Description
#1	51.25'	131 cf	**4.00'D x 10.46'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	51.25'	**24.0" Round Culvert** L= 93.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 51.25' / 51.03' S= 0.0024 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=9.29 cfs @ 12.07 hrs HW=53.06' TW=52.43' (Dynamic Tailwater)
1=Culvert (Outlet Controls 9.29 cfs @ 4.08 fps)

Summary for Pond PA-91:

Inflow Area = 35.619 ac, 40.82% Impervious, Inflow Depth > 4.40" for 25 yr event
Inflow = 39.06 cfs @ 12.06 hrs, Volume= 13.068 af
Outflow = 37.77 cfs @ 12.06 hrs, Volume= 13.066 af, Atten= 3%, Lag= 0.1 min
Primary = 37.77 cfs @ 12.06 hrs, Volume= 13.066 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 58.84' @ 12.06 hrs Surf.Area= 13 sf Storage= 180 cf
Flood Elev= 61.60' Surf.Area= 13 sf Storage= 215 cf

Plug-Flow detention time= 0.3 min calculated for 13.061 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (904.4 - 904.3)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	215 cf	**4.00'D x 17.10'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	51.67'	**24.0" Round Culvert** L= 71.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.67' / 51.27' S= 0.0056 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=36.40 cfs @ 12.06 hrs HW=58.46' TW=52.10' (Dynamic Tailwater)
1=Culvert (Inlet Controls 36.40 cfs @ 11.59 fps)

Summary for Pond PA-92:

Inflow Area = 35.039 ac, 39.84% Impervious, Inflow Depth > 4.38" for 25 yr event
Inflow = 36.73 cfs @ 12.06 hrs, Volume= 12.799 af
Outflow = 35.55 cfs @ 12.06 hrs, Volume= 12.799 af, Atten= 3%, Lag= 0.0 min
Primary = 35.55 cfs @ 12.06 hrs, Volume= 12.799 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 64.35' @ 12.06 hrs Surf.Area= 13 sf Storage= 122 cf
Flood Elev= 61.62' Surf.Area= 13 sf Storage= 122 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (907.7 - 907.6)

Volume	Invert	Avail.Storage	Storage Description
#1	51.89'	122 cf	**4.00'D x 9.73'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	51.89'	**24.0" Round Culvert** L= 93.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 51.89' / 51.68' S= 0.0023 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=34.49 cfs @ 12.06 hrs HW=63.78' TW=58.58' (Dynamic Tailwater)
1=Culvert (Inlet Controls 34.49 cfs @ 10.98 fps)

Summary for Pond PA-93:

Inflow Area = 34.220 ac, 38.40% Impervious, Inflow Depth > 4.36" for 25 yr event
Inflow = 32.32 cfs @ 12.06 hrs, Volume= 12.420 af
Outflow = 31.76 cfs @ 12.06 hrs, Volume= 12.420 af, Atten= 2%, Lag= 0.0 min
Primary = 31.76 cfs @ 12.06 hrs, Volume= 12.420 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 66.19' @ 12.06 hrs Surf.Area= 13 sf Storage= 115 cf
Flood Elev= 61.60' Surf.Area= 13 sf Storage= 115 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (912.6 - 912.6)

Volume	Invert	Avail.Storage	Storage Description
#1	52.45'	115 cf	**4.00'D x 9.15'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	52.45'	**24.0" Round Culvert** L= 96.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 52.45' / 52.22' S= 0.0024 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=19.90 cfs @ 12.06 hrs HW=65.68' TW=63.95' (Dynamic Tailwater)
1=Culvert (Inlet Controls 19.90 cfs @ 6.33 fps)

Summary for Pond PA-94:

Inflow Area = 33.444 ac, 36.97% Impervious, Inflow Depth > 4.33" for 25 yr event
Inflow = 28.58 cfs @ 12.06 hrs, Volume= 12.060 af
Outflow = 27.61 cfs @ 12.06 hrs, Volume= 12.060 af, Atten= 3%, Lag= 0.0 min
Primary = 27.61 cfs @ 12.06 hrs, Volume= 12.060 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 67.88' @ 12.07 hrs Surf.Area= 13 sf Storage= 109 cf
Flood Elev= 61.48' Surf.Area= 13 sf Storage= 109 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (917.7 - 917.6)

Volume	Invert	Avail.Storage	Storage Description
#1	52.83'	109 cf	**4.00'D x 8.65'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	52.83'	**24.0" Round Culvert** L= 93.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 52.83' / 52.47' S= 0.0039 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=10.01 cfs @ 12.06 hrs HW=66.15' TW=65.71' (Dynamic Tailwater)
1=Culvert (Inlet Controls 10.01 cfs @ 3.19 fps)

Summary for Pond PA-95:

Inflow Area = 32.592 ac, 35.32% Impervious, Inflow Depth > 4.30" for 25 yr event
Inflow = 26.50 cfs @ 12.52 hrs, Volume= 11.665 af
Outflow = 23.44 cfs @ 12.06 hrs, Volume= 11.665 af, Atten= 12%, Lag= 0.0 min
Primary = 23.44 cfs @ 12.06 hrs, Volume= 11.665 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 69.99' @ 12.08 hrs Surf.Area= 13 sf Storage= 105 cf
Flood Elev= 61.27' Surf.Area= 13 sf Storage= 105 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (923.5 - 923.4)

Volume	Invert	Avail.Storage	Storage Description
#1	52.95'	105 cf	**4.00'D x 8.32'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	52.95'	**24.0" Round Culvert** L= 93.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 52.95' / 52.59' S= 0.0039 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.06 hrs HW=65.89' TW=66.11' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-95A:

Flood Elevation Estimated

Inflow Area = 32.943 ac, 36.01% Impervious, Inflow Depth > 4.31" for 25 yr event
Inflow = 25.58 cfs @ 12.06 hrs, Volume= 11.828 af
Outflow = 25.52 cfs @ 12.06 hrs, Volume= 11.828 af, Atten= 0%, Lag= 0.0 min
Primary = 25.52 cfs @ 12.06 hrs, Volume= 11.828 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 68.07' @ 12.07 hrs Surf.Area= 1 sf Storage= 7 cf
Flood Elev= 61.38' Surf.Area= 1 sf Storage= 7 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (921.0 - 921.0)

Volume	Invert	Avail.Storage	Storage Description
#1	52.80'	7 cf	**1.00'D x 8.58'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	52.80'	**24.0" Round Culvert** L= 51.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 52.59' / 52.80' S= -0.0041 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=0.97 cfs @ 12.06 hrs HW=66.12' TW=66.11' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.97 cfs @ 0.31 fps)

Summary for Pond PA-96:

Inflow Area = 32.307 ac, 34.75% Impervious, Inflow Depth > 4.28" for 25 yr event
Inflow = 27.07 cfs @ 12.52 hrs, Volume= 11.533 af
Outflow = 26.26 cfs @ 12.52 hrs, Volume= 11.533 af, Atten= 3%, Lag= 0.0 min
Primary = 26.26 cfs @ 12.52 hrs, Volume= 11.533 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 69.73' @ 12.08 hrs Surf.Area= 13 sf Storage= 89 cf
Flood Elev= 59.98' Surf.Area= 13 sf Storage= 89 cf

Plug-Flow detention time= 0.1 min calculated for 11.529 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (925.5 - 925.4)

Volume	Invert	Avail.Storage	Storage Description
#1	52.92'	89 cf	**4.00'D x 7.06'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	52.92'	**24.0" Round Culvert** L= 93.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 52.83' / 52.92' S= -0.0010 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=21.40 cfs @ 12.52 hrs HW=63.15' TW=61.15' (Dynamic Tailwater)
1=Culvert (Inlet Controls 21.40 cfs @ 6.81 fps)

Summary for Pond PA-99:

Inflow Area = 31.216 ac, 32.91% Impervious, Inflow Depth > 4.25" for 25 yr event
Inflow = 25.82 cfs @ 12.52 hrs, Volume= 11.043 af
Outflow = 26.10 cfs @ 12.52 hrs, Volume= 11.043 af, Atten= 0%, Lag= 0.0 min
Primary = 26.10 cfs @ 12.52 hrs, Volume= 11.050 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 70.49' @ 12.09 hrs Surf.Area= 15,013 sf Storage= 8,628 cf
Flood Elev= 58.94' Surf.Area= 13 sf Storage= 68 cf

Plug-Flow detention time= 5.1 min calculated for 11.039 af (100% of inflow)
Center-of-Mass det. time= 5.1 min (933.2 - 928.1)

Volume	Invert	Avail.Storage	Storage Description
#1	53.49'	68 cf	**4.00'D x 5.45'H Vertical Cone/Cylinder**
#2	58.94'	8,560 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		8,628 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
58.94	0	0	0
59.00	2,000	60	60
60.00	15,000	8,500	8,560

Device	Routing	Invert	Outlet Devices
#1	Primary	53.49'	**24.0" Round Culvert** L= 296.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 53.49' / 52.88' S= 0.0021 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=21.60 cfs @ 12.52 hrs HW=66.99' TW=63.18' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 21.60 cfs @ 6.87 fps)

Summary for Pond PC4-1S:

Inflow Area = 13.986 ac, 30.23% Impervious, Inflow Depth > 3.45" for 25 yr event
Inflow = 12.73 cfs @ 12.52 hrs, Volume= 4.022 af
Outflow = 14.85 cfs @ 12.52 hrs, Volume= 4.022 af, Atten= 0%, Lag= 0.0 min
Primary = 14.85 cfs @ 12.52 hrs, Volume= 4.022 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 70.00' @ 12.09 hrs Surf.Area= 2,371 sf Storage= 1,676 cf

Plug-Flow detention time= 3.0 min calculated for 4.022 af (100% of inflow)
Center-of-Mass det. time= 3.0 min (905.4 - 902.4)

Volume	Invert	Avail.Storage	Storage Description
#1	57.51'	1,676 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
57.51	2	0	0
58.00	54	14	14
59.00	450	252	266
60.00	2,371	1,411	1,676

Device	Routing	Invert	Outlet Devices
#1	Primary	57.51'	**18.0" Round Culvert** L= 106.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 57.51' / 56.19' S= 0.0125 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=9.15 cfs @ 12.52 hrs HW=69.08' TW=67.65' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 9.15 cfs @ 5.18 fps)

Summary for Pond PC4-2:

Inflow Area = 11.786 ac, 35.87% Impervious, Inflow Depth > 2.52" for 25 yr event
Inflow = 18.04 cfs @ 12.10 hrs, Volume= 2.474 af
Outflow = 10.02 cfs @ 13.11 hrs, Volume= 2.474 af, Atten= 44%, Lag= 60.6 min
Primary = 9.19 cfs @ 13.07 hrs, Volume= 3.325 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 61.86' @ 13.09 hrs Surf.Area= 57,493 sf Storage= 25,302 cf

Plug-Flow detention time= 32.6 min calculated for 2.474 af (100% of inflow)
Center-of-Mass det. time= 32.6 min (936.8 - 904.3)

Volume	Invert	Avail.Storage	Storage Description
#1	59.37'	33,721 cf	**Wetland Storage (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
59.37	2	0	0
60.00	54	18	18
61.00	446	250	268
62.00	66,460	33,453	33,721

Device	Routing	Invert	Outlet Devices
#1	Primary	59.37'	**18.0" Round Culvert** L= 65.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 59.37' / 59.23' S= 0.0022 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 13.07 hrs HW=61.86' TW=63.59' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond PJB2: (new Pond)

Inflow Area = 4.881 ac, 44.18% Impervious, Inflow Depth > 4.16" for 25 yr event
Inflow = 10.50 cfs @ 12.31 hrs, Volume= 1.690 af
Outflow = 4.37 cfs @ 12.30 hrs, Volume= 1.690 af, Atten= 58%, Lag= 0.0 min
Primary = 4.37 cfs @ 12.30 hrs, Volume= 2.430 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 64.76' @ 13.65 hrs Surf.Area= 24,861 sf Storage= 19,078 cf

Plug-Flow detention time= 69.3 min calculated for 1.690 af (100% of inflow)
Center-of-Mass det. time= 69.2 min (916.9 - 847.7)

Volume	Invert	Avail.Storage	Storage Description
#1	62.30'	20,624 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
62.30	0	0	0
62.82	323	84	84
63.82	7,382	3,853	3,936
64.82	25,993	16,687	20,624

Device	Routing	Invert	Outlet Devices
#1	Primary	62.30'	**18.0" Round Culvert** L= 75.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.30' / 61.55' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	62.30'	**12.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=4.37 cfs @ 12.30 hrs HW=64.14' TW=62.81' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 4.37 cfs of 7.02 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 4.37 cfs @ 5.56 fps)

Summary for Pond PS-12: (new Pond)

Inflow Area = 47.534 ac, 4.29% Impervious, Inflow Depth > 2.91" for 25 yr event
Inflow = 63.82 cfs @ 14.26 hrs, Volume= 11.513 af
Outflow = 67.24 cfs @ 14.26 hrs, Volume= 11.513 af, Atten= 0%, Lag= 0.0 min
Primary = 65.83 cfs @ 14.26 hrs, Volume= 11.528 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 82.40' @ 13.88 hrs Surf.Area= 13 sf Storage= 135 cf
Flood Elev= 53.90' Surf.Area= 13 sf Storage= 135 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (900.4 - 900.4)

Volume	Invert	Avail.Storage	Storage Description
#1	43.15'	135 cf	**4.00'D x 10.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	43.15'	**30.0" Round Culvert** L= 190.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.15' / 42.91' S= 0.0013 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=57.57 cfs @ 14.26 hrs HW=60.96' TW=54.00' (Dynamic Tailwater)
1=Culvert (Outlet Controls 57.57 cfs @ 11.73 fps)

Summary for Pond PS-13:

Inflow Area = 9.000 ac, 0.00% Impervious, Inflow Depth = 1.80" for 25 yr event
Inflow = 11.96 cfs @ 13.80 hrs, Volume= 1.353 af
Outflow = 10.74 cfs @ 13.81 hrs, Volume= 1.353 af, Atten= 10%, Lag= 0.3 min
Primary = 10.74 cfs @ 13.81 hrs, Volume= 1.369 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 73.15' @ 12.65 hrs Surf.Area= 13 sf Storage= 98 cf
Flood Elev= 52.36' Surf.Area= 13 sf Storage= 98 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.3 min (911.8 - 911.5)

Volume	Invert	Avail.Storage	Storage Description
#1	44.55'	98 cf	**4.00'D x 7.81'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	44.55'	**15.0" Round Culvert** L= 315.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 44.55' / 44.37' S= 0.0006 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=14.29 cfs @ 13.81 hrs HW=63.59' TW=50.44' (Dynamic Tailwater)
1=Culvert (Outlet Controls 14.29 cfs @ 11.65 fps)

Summary for Pond RWW CB10: (new Pond)

Inflow Area = 11.043 ac, 90.00% Impervious, Inflow Depth = 5.36" for 25 yr event
Inflow = 63.29 cfs @ 12.07 hrs, Volume= 4.935 af
Outflow = 63.79 cfs @ 12.07 hrs, Volume= 4.935 af, Atten= 0%, Lag= 0.0 min
Primary = 63.79 cfs @ 12.07 hrs, Volume= 4.935 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 53.05' @ 12.07 hrs Surf.Area= 0.001 ac Storage= 0.004 af

Plug-Flow detention time= 0.1 min calculated for 4.935 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (750.0 - 749.9)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	0.004 af	**6.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	44.50'	**30.0" Round Culvert** L= 200.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 44.50' / 38.26' S= 0.0312 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=63.78 cfs @ 12.07 hrs HW=53.04' TW=45.04' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 63.78 cfs @ 12.99 fps)

Summary for Pond TWIN P: (new Pond)

Inflow Area = 1.030 ac, 75.73% Impervious, Inflow Depth = 5.09" for 25 yr event
Inflow = 4.44 cfs @ 12.17 hrs, Volume= 0.437 af
Outflow = 4.00 cfs @ 12.23 hrs, Volume= 0.437 af, Atten= 10%, Lag= 3.7 min
Primary = 4.00 cfs @ 12.23 hrs, Volume= 0.437 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 66.82' @ 12.23 hrs Surf.Area= 1,723 sf Storage= 944 cf

Plug-Flow detention time= 4.3 min calculated for 0.436 af (100% of inflow)
Center-of-Mass det. time= 4.3 min (768.2 - 763.9)

Volume	Invert	Avail.Storage	Storage Description
#1	65.85'	2,413 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
65.85	0	0	0
66.00	500	38	38
67.00	2,000	1,250	1,288
67.50	2,500	1,125	2,413

Device	Routing	Invert	Outlet Devices
#1	Primary	65.85'	**12.0" Round Culvert X 2.00** L= 75.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 65.85' / 65.53' S= 0.0043 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=4.00 cfs @ 12.23 hrs HW=66.82' TW=65.74' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 4.00 cfs @ 3.28 fps)

Summary for Pond WQ CB: (new Pond)

Inflow Area = 6.590 ac, 82.55% Impervious, Inflow Depth = 5.22" for 25 yr event
Inflow = 35.75 cfs @ 12.08 hrs, Volume= 2.867 af
Outflow = 28.41 cfs @ 12.31 hrs, Volume= 2.222 af, Atten= 21%, Lag= 13.8 min
Primary = 28.41 cfs @ 12.31 hrs, Volume= 2.566 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 63.30' @ 12.26 hrs Surf.Area= 50,985 sf Storage= 49,154 cf

Plug-Flow detention time= 166.4 min calculated for 2.221 af (77% of inflow)
Center-of-Mass det. time= 83.8 min (837.9 - 754.1)

Volume	Invert	Avail.Storage	Storage Description
#1	59.50'	49,154 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
59.50	22,877	0	0
60.00	28,030	12,727	12,727
60.50	33,346	15,344	28,071
61.00	50,985	21,083	49,154

Device	Routing	Invert	Outlet Devices
#1	Primary	60.50'	**3.0" x 3.0" Horiz. Orifice/Grate X 100.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 12.31 hrs HW=61.19' TW=62.36' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond WQU: (new Pond)

Inflow Area = 23.400 ac, 61.69% Impervious, Inflow Depth = 2.35" for 25 yr event
Inflow = 48.22 cfs @ 12.10 hrs, Volume= 4.589 af
Outflow = 48.22 cfs @ 12.10 hrs, Volume= 4.589 af, Atten= 0%, Lag= 0.0 min
Primary = 48.22 cfs @ 12.10 hrs, Volume= 4.589 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 45.27' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	33.72'	**24.0" Round Culvert** L= 80.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 33.72' / 33.53' S= 0.0024 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=47.98 cfs @ 12.10 hrs HW=45.18' TW=35.12' (Dynamic Tailwater)
1=Culvert (Inlet Controls 47.98 cfs @ 15.27 fps)

Summary for Link 1R: 25 Year

Inflow Area = 8.518 ac, 70.03% Impervious, Inflow Depth = 4.31" for 25 yr event
Inflow = 36.91 cfs @ 12.05 hrs, Volume= 3.059 af
Primary = 36.91 cfs @ 12.05 hrs, Volume= 3.059 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

479 Point manual hydrograph, To= 0.10 hrs, dt= 0.05 hrs, Area= 8.518 ac, 70.03% Imp., cfs =

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.04
0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06
0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.07	0.08	0.08
0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.10	0.10
0.10	0.10	0.11	0.11	0.12	0.16	0.16	0.16	0.16	0.17
0.17	0.18	0.18	0.19	0.19	0.19	0.20	0.20	0.20	0.20
0.21	0.21	0.21	0.22	0.22	0.22	0.22	0.23	0.23	0.23
0.23	0.24	0.24	0.24	0.25	0.25	0.26	0.26	0.26	0.27
0.27	0.27	0.27	0.28	0.28	0.29	0.29	0.29	0.30	0.30
0.30	0.30	0.31	0.31	0.31	0.32	0.32	0.32	0.32	0.33
0.33	0.34	0.34	0.35	0.36	0.36	0.37	0.38	0.38	0.39
0.40	0.41	0.41	0.42	0.43	0.44	0.44	0.45	0.46	0.47
0.47	0.48	0.49	0.50	0.51	0.51	0.52	0.53	0.54	0.55
0.55	0.56	0.57	0.58	0.59	0.60	0.60	0.61	0.62	0.63
0.64	0.66	0.67	0.69	0.71	0.72	0.74	0.76	0.78	0.80
0.82	0.83	0.85	0.87	0.89	0.91	0.93	0.95	0.97	0.99
1.01	1.03	1.05	1.07	1.09	1.11	1.13	1.15	1.18	1.20
1.22	1.24	1.26	1.28	1.31	1.33	1.35	1.37	1.39	1.42
1.45	1.49	1.53	1.57	1.61	1.65	1.70	1.74	1.78	1.83
1.87	1.91	1.96	2.00	2.05	2.09	2.14	2.19	2.23	2.29
2.40	2.54	2.68	2.84	3.00	3.16	3.32	3.49	3.66	4.01
4.94	6.21	7.64	9.16	10.73	12.35	14.38	18.39	27.88	36.78
35.16	28.15	22.97	19.53	16.95	14.73	12.69	10.72	8.77	7.08
6.09	5.50	5.11	4.80	4.53	4.30	4.07	3.86	3.65	3.46
3.33	3.24	3.17	3.11	3.05	2.99	2.93	2.88	2.82	2.77
2.72	2.66	2.61	2.56	2.50	2.45	2.40	2.34	2.29	2.24
2.20	2.17	2.14	2.12	2.09	2.06	2.04	2.01	1.98	1.96
1.93	1.91	1.88	1.86	1.83	1.81	1.78	1.76	1.73	1.71
1.68	1.66	1.63	1.61	1.58	1.56	1.53	1.50	1.48	1.45
1.43	1.40	1.38	1.35	1.33	1.30	1.27	1.25	1.22	1.20
1.18	1.17	1.15	1.14	1.13	1.12	1.10	1.09	1.08	1.07
1.06	1.05	1.04	1.02	1.01	1.00	0.99	0.98	0.97	0.96
0.95	0.94	0.92	0.91	0.90	0.89	0.88	0.87	0.86	0.85
0.83	0.82	0.81	0.80	0.79	0.78	0.77	0.76	0.75	0.73
0.73	0.72	0.72	0.71	0.71	0.71	0.70	0.70	0.70	0.69
0.69	0.69	0.68	0.68	0.68	0.67	0.67	0.67	0.66	0.66
0.66	0.65	0.65	0.65	0.64	0.64	0.64	0.63	0.63	0.63
0.62	0.62	0.62	0.61	0.61	0.61	0.60	0.60	0.60	0.59
0.59	0.59	0.58	0.58	0.58	0.58	0.57	0.57	0.57	0.57
0.56	0.56	0.56	0.56	0.55	0.55	0.55	0.55	0.54	0.54
0.54	0.54	0.53	0.53	0.53	0.53	0.52	0.52	0.52	0.52

0.51	0.51	0.51	0.51	0.50	0.50	0.50	0.50	0.49	0.49
0.49	0.49	0.48	0.48	0.48	0.48	0.47	0.47	0.47	0.47
0.46	0.46	0.46	0.45	0.45	0.45	0.45	0.44	0.44	0.44
0.44	0.43	0.43	0.43	0.43	0.42	0.42	0.42	0.42	0.41
0.41	0.41	0.41	0.40	0.40	0.40	0.40	0.39	0.39	

Summary for Link 5R: 25 Year

Inflow Area = 1.754 ac, 90.88% Impervious, Inflow Depth = 5.02" for 25 yr event
Inflow = 10.01 cfs @ 12.05 hrs, Volume= 0.733 af
Primary = 10.01 cfs @ 12.05 hrs, Volume= 0.733 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

479 Point manual hydrograph, To= 0.10 hrs, dt= 0.05 hrs, Area= 1.754 ac, 90.88% Imp., cfs =

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03
0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.09
0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.10
0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.11	0.11
0.11	0.11	0.11	0.12	0.12	0.12	0.12	0.12	0.13	0.13
0.13	0.13	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.15
0.16	0.16	0.16	0.16	0.17	0.17	0.17	0.17	0.18	0.18
0.18	0.18	0.19	0.19	0.19	0.19	0.20	0.20	0.20	0.20
0.21	0.21	0.22	0.23	0.23	0.24	0.24	0.25	0.25	0.26
0.26	0.27	0.27	0.28	0.28	0.29	0.30	0.30	0.31	0.31
0.32	0.32	0.33	0.34	0.34	0.35	0.35	0.36	0.36	0.37
0.38	0.38	0.39	0.39	0.40	0.40	0.41	0.42	0.42	0.43
0.44	0.45	0.46	0.47	0.49	0.50	0.51	0.52	0.53	0.54
0.56	0.57	0.58	0.59	0.60	0.61	0.63	0.64	0.65	0.67
0.71	0.75	0.79	0.84	0.88	0.92	0.97	1.01	1.06	1.19
1.54	1.94	2.36	2.77	3.19	3.62	4.05	5.23	8.23	10.01
7.66	5.00	4.09	3.64	3.22	2.80	2.38	1.95	1.53	1.20
1.10	1.05	1.01	0.96	0.92	0.87	0.83	0.79	0.74	0.71
0.69	0.68	0.67	0.65	0.64	0.63	0.62	0.61	0.60	0.59
0.57	0.56	0.55	0.54	0.53	0.52	0.51	0.49	0.48	0.47
0.47	0.46	0.45	0.45	0.44	0.44	0.43	0.43	0.42	0.42
0.41	0.41	0.40	0.39	0.39	0.38	0.38	0.37	0.37	0.36
0.36	0.35	0.34	0.34	0.33	0.33	0.32	0.32	0.31	0.31
0.30	0.29	0.29	0.28	0.28	0.27	0.27	0.26	0.26	0.25
0.25	0.25	0.24	0.24	0.24	0.24	0.23	0.23	0.23	0.23
0.22	0.22	0.22	0.22	0.21	0.21	0.21	0.21	0.20	0.20
0.20	0.20	0.20	0.19	0.19	0.19	0.19	0.18	0.18	0.18
0.18	0.17	0.17	0.17	0.17	0.16	0.16	0.16	0.16	0.15
0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
0.15	0.15	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
0.14	0.14	0.14	0.14	0.14	0.14	0.13	0.13	0.13	0.13
0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.11
0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11

0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.10	0.10	0.10
0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.09	0.09	0.09
0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	

Summary for Link 37L: 25 YEAR

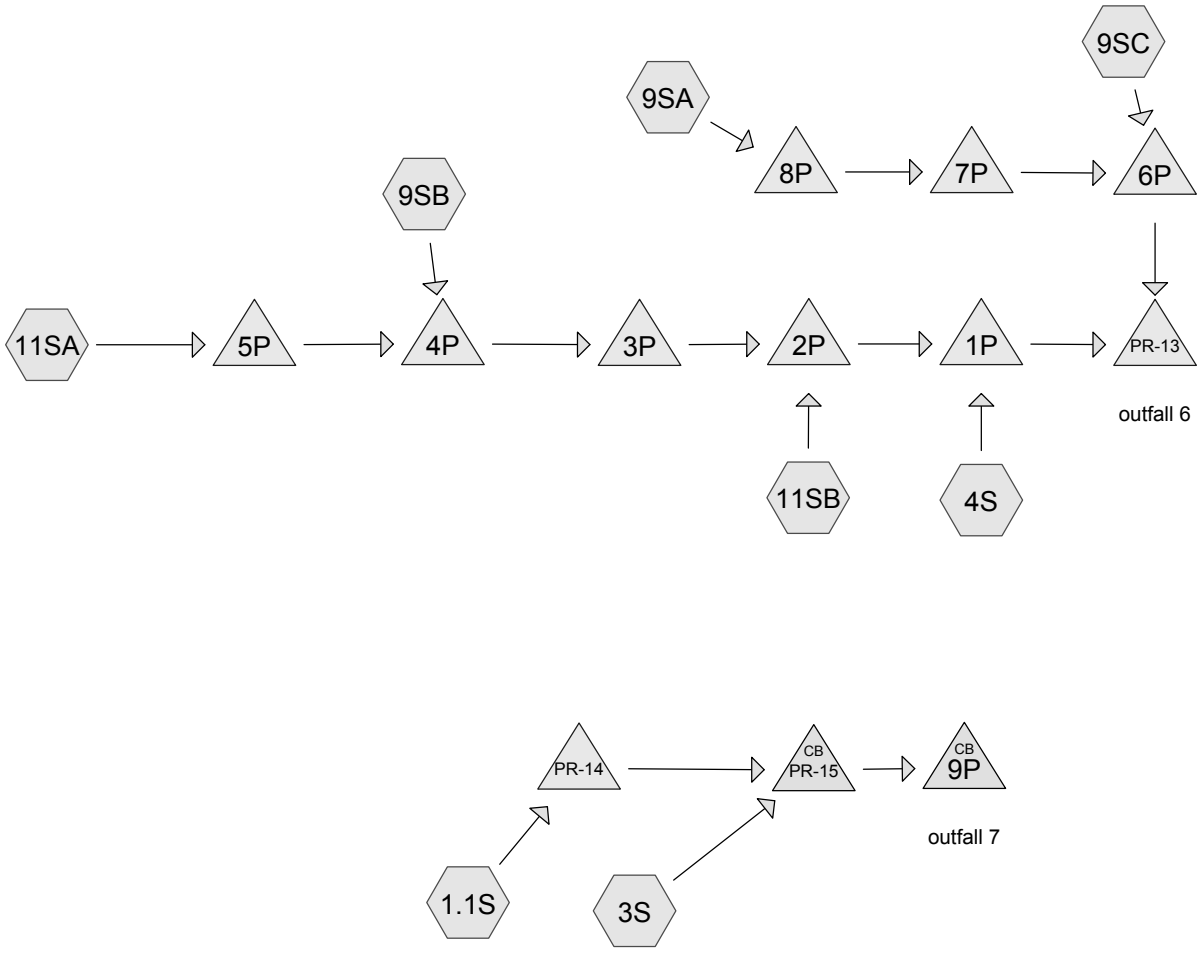
Inflow Area = 23.400 ac, 61.69% Impervious, Inflow Depth = 2.35" for 25 yr event
Inflow = 48.22 cfs @ 12.10 hrs, Volume= 4.589 af
Primary = 48.22 cfs @ 12.10 hrs, Volume= 4.589 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

25 yr 479 Point manual hydrograph, To= 0.10 hrs, dt= 0.05 hrs, Area= 23.400 ac, 61.69% Imp., cfs =

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.07
0.07	0.08	0.08	0.15	0.17	0.17	0.18	0.18	0.18	0.19
0.19	0.20	0.21	0.21	0.21	0.22	0.22	0.23	0.23	0.24
0.24	0.25	0.25	0.26	0.26	0.26	0.27	0.27	0.28	0.28
0.28	0.29	0.29	0.29	0.30	0.30	0.30	0.31	0.31	0.32
0.32	0.32	0.33	0.33	0.33	0.34	0.34	0.35	0.35	0.36
0.36	0.37	0.38	0.38	0.38	0.39	0.39	0.41	0.42	0.42
0.43	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.50	0.51
0.52	0.53	0.54	0.55	0.56	0.57	0.59	0.60	0.61	0.62
0.63	0.64	0.65	0.67	0.68	0.69	0.70	0.71	0.73	0.74
0.75	0.77	0.78	0.80	0.81	0.82	0.84	0.87	0.88	0.89
0.91	0.94	0.97	1.00	1.03	1.06	1.08	1.11	1.14	1.17
1.20	1.23	1.26	1.29	1.33	1.37	1.40	1.44	1.47	1.52
1.55	1.59	1.62	1.66	1.69	1.73	1.77	1.81	1.84	1.88
1.92	1.95	1.99	2.02	2.06	2.10	2.14	2.18	2.22	2.26
2.31	2.37	2.44	2.51	2.58	2.65	2.72	2.79	2.87	2.94
3.01	3.09	3.17	3.25	3.33	3.41	3.50	3.58	3.67	3.76
3.92	4.13	4.37	4.62	4.88	5.14	5.41	5.68	5.96	6.39
7.56	9.40	11.53	13.73	15.96	18.27	20.70	24.21	32.65	44.17
48.20	41.54	33.82	28.47	24.94	22.30	20.04	17.91	15.79	14.04
12.42	11.70	11.17	10.60	10.10	9.63	9.12	8.62	8.13	7.66
7.25	6.89	6.57	6.28	6.00	5.75	5.52	5.31	5.11	4.92
4.75	4.59	4.44	4.30	4.16	4.03	3.91	3.80	3.69	3.58
3.49	3.42	3.35	3.29	3.22	3.17	3.11	3.06	3.00	2.95
2.90	2.85	2.80	2.76	2.71	2.67	2.62	2.58	2.53	2.49
2.45	2.41	2.37	2.33	2.29	2.25	2.21	2.17	2.13	2.09
2.05	2.01	1.97	1.93	1.89	1.85	1.81	1.77	1.74	1.70
1.66	1.64	1.62	1.59	1.57	1.55	1.53	1.51	1.49	1.47
1.45	1.43	1.41	1.39	1.38	1.36	1.34	1.32	1.30	1.29
1.27	1.25	1.24	1.22	1.20	1.18	1.17	1.15	1.13	1.12
1.10	1.08	1.07	1.05	1.03	1.02	1.00	0.99	0.97	0.95
0.94	0.93	0.92	0.91	0.91	0.90	0.89	0.89	0.88	0.87
0.87	0.86	0.86	0.85	0.84	0.84	0.83	0.83	0.82	0.82
0.81	0.81	0.80	0.80	0.79	0.79	0.78	0.78	0.77	0.77
0.76	0.76	0.75	0.75	0.74	0.74	0.73	0.73	0.72	0.72
0.71	0.71	0.71	0.70	0.70	0.69	0.69	0.69	0.68	0.68
0.68	0.67	0.67	0.66	0.66	0.66	0.65	0.65	0.65	0.64
0.64	0.63	0.63	0.63	0.62	0.62	0.62	0.61	0.61	0.61

0.60	0.60	0.60	0.59	0.59	0.59	0.58	0.58	0.58	0.57
0.57	0.57	0.56	0.56	0.56	0.55	0.55	0.55	0.54	0.54
0.54	0.53	0.53	0.53	0.52	0.52	0.52	0.51	0.51	0.51
0.50	0.50	0.50	0.49	0.49	0.49	0.48	0.48	0.47	0.47
0.47	0.46	0.46	0.46	0.45	0.45	0.45	0.44	0.44	



Subcat Reach Pond Link

Routing Diagram for Predevelopment Runway 11-29 - Outfall 6 and 7

Prepared by Stantec Consulting Ltd., Printed 10/19/2018

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
137,612	61	>75% Grass cover, Good, HSG B (11SA, 11SB)
1,381,893	74	>75% Grass cover, Good, HSG C (1.1S, 3S, 4S, 9SA, 9SB, 9SC, 11SA, 11SB)
577,863	80	>75% Grass cover, Good, HSG D (1.1S, 9SA)
403,884	98	Paved parking & roofs (1.1S, 3S, 4S, 9SA, 9SB, 9SC)
2,501,252	**79**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
137,612	HSG B	11SA, 11SB
1,381,893	HSG C	1.1S, 3S, 4S, 9SA, 9SB, 9SC, 11SA, 11SB
577,863	HSG D	1.1S, 9SA
403,884	Other	1.1S, 3S, 4S, 9SA, 9SB, 9SC
2,501,252		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Sub Num
0	137,612	1,381,893	577,863	0	2,097,368	>75% Grass cover, Good	
0	0	0	0	403,884	403,884	Paved parking & roofs	
0	**137,612**	**1,381,893**	**577,863**	**403,884**	**2,501,252**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	9SA	0.00	0.00	31.0	0.0001	0.010	12.0	0.0	0.0
2	9SB	0.00	0.00	50.0	0.0200	0.013	18.0	0.0	0.0
3	1P	12.40	12.21	96.0	0.0020	0.013	36.0	0.0	0.0
4	2P	12.72	12.50	75.0	0.0029	0.013	36.0	0.0	0.0
5	3P	13.03	12.82	70.0	0.0030	0.013	36.0	0.0	0.0
6	4P	13.50	13.13	183.0	0.0020	0.013	36.0	0.0	0.0
7	5P	23.00	15.00	385.0	0.0208	0.013	15.0	0.0	0.0
8	6P	15.09	14.94	51.0	0.0029	0.013	30.0	0.0	0.0
9	7P	15.61	15.19	141.0	0.0030	0.013	30.0	0.0	0.0
10	8P	18.00	15.71	636.0	0.0036	0.013	30.0	0.0	0.0
11	9P	28.01	26.50	846.0	0.0018	0.013	30.0	0.0	0.0
12	PR-13	12.11	11.10	60.0	0.0168	0.011	36.0	0.0	0.0
13	PR-14	28.65	28.14	103.0	0.0050	0.013	30.0	0.0	0.0
14	PR-15	28.08	28.01	39.0	0.0018	0.013	30.0	0.0	0.0

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1.1S: Runoff Area=945,764 sf 20.69% Impervious Runoff Depth=3.80"
Flow Length=1,246' Tc=36.8 min CN=82 Runoff=49.43 cfs 299,772 cf

Subcatchment3S: Runoff Area=60,945 sf 8.14% Impervious Runoff Depth=3.21"
Flow Length=415' Tc=24.7 min CN=76 Runoff=3.24 cfs 16,294 cf

Subcatchment4S: Runoff Area=13,992 sf 9.90% Impervious Runoff Depth=3.21"
Flow Length=80' Slope=0.0437 '/' Tc=6.2 min CN=76 Runoff=1.20 cfs 3,741 cf

Subcatchment9SA: Runoff Area=394,839 sf 33.46% Impervious Runoff Depth=3.91"
Flow Length=991' Tc=25.7 min CN=83 Runoff=24.97 cfs 128,525 cf

Subcatchment9SB: Runoff Area=488,878 sf 10.68% Impervious Runoff Depth=3.31"
Flow Length=1,270' Tc=34.0 min CN=77 Runoff=23.17 cfs 134,647 cf

Subcatchment9SC: Runoff Area=224,500 sf 7.80% Impervious Runoff Depth=3.21"
Flow Length=950' Slope=0.0220 '/' Tc=23.3 min CN=76 Runoff=12.24 cfs 60,020 cf

Subcatchment11SA: Runoff Area=285,288 sf 0.00% Impervious Runoff Depth=2.56"
Flow Length=700' Tc=16.5 min CN=69 Runoff=14.13 cfs 60,798 cf

Subcatchment11SB: Runoff Area=87,046 sf 0.00% Impervious Runoff Depth=2.56"
Flow Length=540' Tc=17.8 min CN=69 Runoff=4.18 cfs 18,551 cf

Pond 1P: Peak Elev=18.50' Storage=118 cf Inflow=33.16 cfs 217,736 cf
36.0" Round Culvert n=0.013 L=96.0' S=0.0020 '/' Outflow=33.18 cfs 217,737 cf

Pond 2P: Peak Elev=20.00' Storage=0 cf Inflow=32.80 cfs 213,996 cf
36.0" Round Culvert n=0.013 L=75.0' S=0.0029 '/' Outflow=32.80 cfs 213,996 cf

Pond 3P: Peak Elev=21.00' Storage=0 cf Inflow=29.88 cfs 195,445 cf
36.0" Round Culvert n=0.013 L=70.0' S=0.0030 '/' Outflow=29.88 cfs 195,445 cf

Pond 4P: Peak Elev=21.79' Storage=156 cf Inflow=29.89 cfs 195,445 cf
36.0" Round Culvert n=0.013 L=183.0' S=0.0020 '/' Outflow=29.88 cfs 195,445 cf

Pond 5P: Peak Elev=26.70' Storage=8,294 cf Inflow=14.13 cfs 60,798 cf
15.0" Round Culvert n=0.013 L=385.0' S=0.0208 '/' Outflow=6.88 cfs 60,798 cf

Pond 6P: Peak Elev=21.00' Storage=0 cf Inflow=36.75 cfs 188,559 cf
30.0" Round Culvert n=0.013 L=51.0' S=0.0029 '/' Outflow=36.75 cfs 188,559 cf

Pond 7P: Peak Elev=22.11' Storage=42 cf Inflow=24.73 cfs 128,532 cf
30.0" Round Culvert n=0.013 L=141.0' S=0.0030 '/' Outflow=24.72 cfs 128,539 cf

Pond 8P: Peak Elev=25.01' Storage=141 cf Inflow=24.97 cfs 128,525 cf
30.0" Round Culvert n=0.013 L=636.0' S=0.0036 '/' Outflow=24.73 cfs 128,532 cf

Pond 9P: outfall 7 Peak Elev=90.41' Inflow=101.06 cfs 319,442 cf
30.0" Round Culvert n=0.013 L=846.0' S=0.0018 '/' Outflow=101.06 cfs 319,443 cf

Pond PR-13: outfall 6 Peak Elev=17.55' Storage=1,050 cf Inflow=68.82 cfs 406,296 cf
Discarded=0.00 cfs 0 cf Primary=67.60 cfs 406,305 cf Outflow=67.60 cfs 406,305 cf

Pond PR-14: Peak Elev=107.69' Storage=29,227 cf Inflow=49.43 cfs 299,772 cf
30.0" Round Culvert n=0.013 L=103.0' S=0.0050 '/' Outflow=98.42 cfs 303,142 cf

Pond PR-15: Peak Elev=90.43' Inflow=101.06 cfs 319,435 cf
30.0" Round Culvert n=0.013 L=39.0' S=0.0018 '/' Outflow=101.06 cfs 319,442 cf

Total Runoff Area = 2,501,252 sf Runoff Volume = 722,347 cf Average Runoff Depth = 3.47"
83.85% Pervious = 2,097,368 sf 16.15% Impervious = 403,884 sf

Summary for Subcatchment 1.1S:

Runoff = 49.43 cfs @ 12.50 hrs, Volume= 299,772 cf, Depth= 3.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
267,120	74	>75% Grass cover, Good, HSG C
482,946	80	>75% Grass cover, Good, HSG D
3,506	98	Paved parking & roofs
192,192	98	Paved parking & roofs
945,764	82	Weighted Average
750,066		79.31% Pervious Area
195,698		20.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0145	0.14		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
25.3	1,146	0.0116	0.75		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
36.8	1,246	Total			

Summary for Subcatchment 3S:

Runoff = 3.24 cfs @ 12.34 hrs, Volume= 16,294 cf, Depth= 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
4,962	98	Paved parking & roofs
55,983	74	>75% Grass cover, Good, HSG C
60,945	76	Weighted Average
55,983		91.86% Pervious Area
4,962		8.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	100	0.0050	0.09		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
7.1	315	0.0111	0.74		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
24.7	415	Total			

Summary for Subcatchment 4S:

Runoff = 1.20 cfs @ 12.09 hrs, Volume= 3,741 cf, Depth= 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
12,607	74	>75% Grass cover, Good, HSG C
1,385	98	Paved parking & roofs
13,992	76	Weighted Average
12,607		90.10% Pervious Area
1,385		9.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	80	0.0437	0.22		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"

Summary for Subcatchment 9SA:

Runoff = 24.97 cfs @ 12.35 hrs, Volume= 128,525 cf, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
167,810	74	>75% Grass cover, Good, HSG C
58,465	98	Paved parking & roofs
41,367	80	>75% Grass cover, Good, HSG D
51,243	98	Paved parking & roofs
22,404	98	Paved parking & roofs
53,550	80	>75% Grass cover, Good, HSG D
394,839	83	Weighted Average
262,727		66.54% Pervious Area
132,112		33.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	60	0.0243	0.16		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
1.3	117	0.0427	1.45		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
3.1	138	0.0113	0.74		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
0.9	31	0.0001	0.59	0.46	**Pipe Channel, D-E** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
11.4	480	0.0100	0.70		**Shallow Concentrated Flow, E-F** Short Grass Pasture Kv= 7.0 fps
2.8	165	0.0200	0.99		**Shallow Concentrated Flow, F-G** Short Grass Pasture Kv= 7.0 fps
25.7	991	Total			

Summary for Subcatchment 9SB:

Runoff = 23.17 cfs @ 12.46 hrs, Volume= 134,647 cf, Depth= 3.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
436,651	74	>75% Grass cover, Good, HSG C
52,227	98	Paved parking & roofs
488,878	77	Weighted Average
436,651		89.32% Pervious Area
52,227		10.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	100	0.0165	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
7.1	420	0.0200	0.99		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.1	50	0.0200	8.41	14.86	**Pipe Channel, C-D** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, bends & connections
15.9	700	0.0110	0.73		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
34.0	1,270	Total			

Summary for Subcatchment 9SC:

Runoff = 12.24 cfs @ 12.32 hrs, Volume= 60,020 cf, Depth= 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
207,000	74	>75% Grass cover, Good, HSG C
17,500	98	Paved parking & roofs
224,500	76	Weighted Average
207,000		92.20% Pervious Area
17,500		7.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	100	0.0220	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
13.6	850	0.0220	1.04		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
23.3	950	Total			

Summary for Subcatchment 11SA:

Runoff = 14.13 cfs @ 12.23 hrs, Volume= 60,798 cf, Depth= 2.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
102,868	61	>75% Grass cover, Good, HSG B
182,420	74	>75% Grass cover, Good, HSG C
285,288	69	Weighted Average
285,288		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	100	0.0500	0.24		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
5.3	275	0.0150	0.86		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
1.4	150	0.0690	1.84		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
2.8	175	0.0220	1.04		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
16.5	700	Total			

Summary for Subcatchment 11SB:

Runoff = 4.18 cfs @ 12.24 hrs, Volume= 18,551 cf, Depth= 2.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
52,302	74	>75% Grass cover, Good, HSG C
34,744	61	>75% Grass cover, Good, HSG B
87,046	69	Weighted Average
87,046		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	100	0.0450	0.23		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
10.5	440	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
17.8	540	Total			

Summary for Pond 1P:

Inflow Area = 875,204 sf, 6.13% Impervious, Inflow Depth = 2.99" for 25 Year Storm event
Inflow = 33.16 cfs @ 12.43 hrs, Volume= 217,736 cf
Outflow = 33.18 cfs @ 12.49 hrs, Volume= 217,737 cf, Atten= 0%, Lag= 3.1 min
Primary = 33.18 cfs @ 12.49 hrs, Volume= 217,737 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 18.50' @ 12.46 hrs Surf.Area= 470 sf Storage= 118 cf
Flood Elev= 19.50' Surf.Area= 1,460 sf Storage= 1,071 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (851.3 - 851.3)

Volume	Invert	Avail.Storage	Storage Description
#1	18.00'	4,979 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
18.00	4	0	0
19.00	938	471	471
20.00	1,982	1,460	1,931
21.00	4,113	3,048	4,979

Device	Routing	Invert	Outlet Devices
#1	Primary	12.40'	**36.0" Round Culvert** L= 96.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.40' / 12.21' S= 0.0020 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=33.59 cfs @ 12.49 hrs HW=18.47' TW=17.50' (Dynamic Tailwater)
1=Culvert (Inlet Controls 33.59 cfs @ 4.75 fps)

Summary for Pond 2P:

Inflow Area = 861,212 sf, 6.06% Impervious, Inflow Depth = 2.98" for 25 Year Storm event
Inflow = 32.80 cfs @ 12.44 hrs, Volume= 213,996 cf
Outflow = 32.80 cfs @ 12.44 hrs, Volume= 213,996 cf, Atten= 0%, Lag= 0.0 min
Primary = 32.80 cfs @ 12.44 hrs, Volume= 213,996 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 20.00' @ 12.46 hrs Surf.Area= 4 sf Storage= 0 cf
Flood Elev= 20.00' Surf.Area= 4 sf Storage= 0 cf

Plug-Flow detention time= 0.2 min calculated for 213,996 cf (100% of inflow)
Center-of-Mass det. time= 0.0 min (851.7 - 851.7)

Volume	Invert	Avail.Storage	Storage Description
#1	20.00'	2,670 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
20.00	4	0	0
21.00	5,336	2,670	2,670

Device	Routing	Invert	Outlet Devices
#1	Primary	12.72'	**36.0" Round Culvert** L= 75.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.72' / 12.50' S= 0.0029 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=41.85 cfs @ 12.44 hrs HW=20.00' TW=18.49' (Dynamic Tailwater)
1=Culvert (Inlet Controls 41.85 cfs @ 5.92 fps)

Summary for Pond 3P:

Inflow Area = 774,166 sf, 6.75% Impervious, Inflow Depth = 3.03" for 25 Year Storm event
Inflow = 29.88 cfs @ 12.47 hrs, Volume= 195,445 cf
Outflow = 29.88 cfs @ 12.47 hrs, Volume= 195,445 cf, Atten= 0%, Lag= 0.0 min
Primary = 29.88 cfs @ 12.47 hrs, Volume= 195,445 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 21.00' @ 12.47 hrs Surf.Area= 4 sf Storage= 0 cf
Flood Elev= 21.00' Surf.Area= 4 sf Storage= 0 cf

Plug-Flow detention time= 0.2 min calculated for 195,445 cf (100% of inflow)
Center-of-Mass det. time= 0.0 min (851.6 - 851.6)

Volume	Invert	Avail.Storage	Storage Description
#1	21.00'	1,090 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
21.00	4	0	0
22.00	500	252	252
22.50	2,850	838	1,090

Device	Routing	Invert	Outlet Devices
#1	Primary	13.03'	**36.0" Round Culvert** L= 70.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 13.03' / 12.82' S= 0.0030 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=34.04 cfs @ 12.47 hrs HW=21.00' TW=20.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 34.04 cfs @ 4.82 fps)

Summary for Pond 4P:

Inflow Area = 774,166 sf, 6.75% Impervious, Inflow Depth = 3.03" for 25 Year Storm event
Inflow = 29.89 cfs @ 12.46 hrs, Volume= 195,445 cf
Outflow = 29.88 cfs @ 12.47 hrs, Volume= 195,445 cf, Atten= 0%, Lag= 0.5 min
Primary = 29.88 cfs @ 12.47 hrs, Volume= 195,445 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 21.79' @ 12.47 hrs Surf.Area= 393 sf Storage= 156 cf
Flood Elev= 21.00' Surf.Area= 4 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (851.6 - 851.6)

Volume	Invert	Avail.Storage	Storage Description
#1	21.00'	1,090 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
21.00	4	0	0
22.00	500	252	252
22.50	2,850	838	1,090

Device	Routing	Invert	Outlet Devices
#1	Primary	13.50'	**36.0" Round Culvert** L= 183.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 13.50' / 13.13' S= 0.0020 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=29.88 cfs @ 12.47 hrs HW=21.79' TW=21.00' (Dynamic Tailwater)
1=Culvert (Outlet Controls 29.88 cfs @ 4.23 fps)

Summary for Pond 5P:

Inflow Area = 285,288 sf, 0.00% Impervious, Inflow Depth = 2.56" for 25 Year Storm event
Inflow = 14.13 cfs @ 12.23 hrs, Volume= 60,798 cf
Outflow = 6.88 cfs @ 12.79 hrs, Volume= 60,798 cf, Atten= 51%, Lag= 33.8 min
Primary = 6.88 cfs @ 12.79 hrs, Volume= 60,798 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 26.70' @ 12.57 hrs Surf.Area= 11,312 sf Storage= 8,294 cf

Plug-Flow detention time= 6.1 min calculated for 60,788 cf (100% of inflow)
Center-of-Mass det. time= 6.1 min (857.9 - 851.8)

Volume	Invert	Avail.Storage	Storage Description
#1	23.00'	12,212 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
23.00	4	0	0
25.00	465	469	469
26.00	4,320	2,393	2,862
27.00	14,380	9,350	12,212

Device	Routing	Invert	Outlet Devices
#1	Primary	23.00'	**15.0" Round Culvert** L= 385.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 23.00' / 15.00' S= 0.0208 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=6.88 cfs @ 12.79 hrs HW=26.55' TW=21.43' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 6.88 cfs @ 5.61 fps)

Summary for Pond 6P:

Inflow Area = 619,339 sf, 24.16% Impervious, Inflow Depth = 3.65" for 25 Year Storm event
Inflow = 36.75 cfs @ 12.35 hrs, Volume= 188,559 cf
Outflow = 36.75 cfs @ 12.35 hrs, Volume= 188,559 cf, Atten= 0%, Lag= 0.0 min
Primary = 36.75 cfs @ 12.35 hrs, Volume= 188,559 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 21.00' @ 12.38 hrs Surf.Area= 4 sf Storage= 0 cf
Flood Elev= 21.00' Surf.Area= 4 sf Storage= 0 cf

Plug-Flow detention time= 0.0 min calculated for 188,528 cf (100% of inflow)
Center-of-Mass det. time= 0.0 min (830.6 - 830.6)

Volume	Invert	Avail.Storage	Storage Description
#1	21.00'	1,697 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
21.00	4	0	0
22.00	500	252	252
22.50	5,279	1,445	1,697

Device	Routing	Invert	Outlet Devices
#1	Primary	15.09'	**30.0" Round Culvert** L= 51.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 15.09' / 14.94' S= 0.0029 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=44.90 cfs @ 12.35 hrs HW=21.00' TW=17.39' (Dynamic Tailwater)
1=Culvert (Inlet Controls 44.90 cfs @ 9.15 fps)

Summary for Pond 7P:

Inflow Area = 394,839 sf, 33.46% Impervious, Inflow Depth = 3.91" for 25 Year Storm event
Inflow = 24.73 cfs @ 12.37 hrs, Volume= 128,532 cf
Outflow = 24.72 cfs @ 12.38 hrs, Volume= 128,539 cf, Atten= 0%, Lag= 0.3 min
Primary = 24.72 cfs @ 12.38 hrs, Volume= 128,539 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 22.11' @ 12.38 hrs Surf.Area= 205 sf Storage= 42 cf
Flood Elev= 21.70' Surf.Area= 4 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (825.6 - 825.6)

Volume	Invert	Avail.Storage	Storage Description
#1	21.70'	1,334 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
21.70	4	0	0
22.70	500	252	252
23.50	2,206	1,082	1,334

Device	Routing	Invert	Outlet Devices
#1	Primary	15.61'	**30.0" Round Culvert** L= 141.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 15.61' / 15.19' S= 0.0030 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=24.72 cfs @ 12.38 hrs HW=22.10' TW=21.00' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 24.72 cfs @ 5.04 fps)

Summary for Pond 8P:

Inflow Area = 394,839 sf, 33.46% Impervious, Inflow Depth = 3.91" for 25 Year Storm event
Inflow = 24.97 cfs @ 12.35 hrs, Volume= 128,525 cf
Outflow = 24.73 cfs @ 12.37 hrs, Volume= 128,532 cf, Atten= 1%, Lag= 1.3 min
Primary = 24.73 cfs @ 12.37 hrs, Volume= 128,532 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 25.01' @ 12.38 hrs Surf.Area= 562 sf Storage= 141 cf
Flood Elev= 24.50' Surf.Area= 4 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (825.6 - 825.5)

Volume	Invert	Avail.Storage	Storage Description
#1	24.50'	1,838 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
24.50	4	0	0
25.00	530	134	134
26.00	2,879	1,705	1,838

Device	Routing	Invert	Outlet Devices
#1	Primary	18.00'	**30.0" Round Culvert** L= 636.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.00' / 15.71' S= 0.0036 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=24.71 cfs @ 12.37 hrs HW=25.01' TW=22.10' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 24.71 cfs @ 5.03 fps)

Summary for Pond 9P: outfall 7

Lenght Assumed
Invert Out Assumed

Inflow Area = 1,006,709 sf, 19.93% Impervious, Inflow Depth = 3.81" for 25 Year Storm event
Inflow = 101.06 cfs @ 12.51 hrs, Volume= 319,442 cf
Outflow = 101.06 cfs @ 12.51 hrs, Volume= 319,443 cf, Atten= 0%, Lag= 0.0 min
Primary = 101.06 cfs @ 12.51 hrs, Volume= 319,443 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 90.41' @ 12.51 hrs
Flood Elev= 34.49'

Device	Routing	Invert	Outlet Devices
#1	Primary	28.01'	**30.0" Round Culvert** L= 846.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 28.01' / 26.50' S= 0.0018 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=101.06 cfs @ 12.51 hrs HW=90.41' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 101.06 cfs @ 20.59 fps)

Summary for Pond PR-13: outfall 6

Slope ASSUMED to be minimum (S=0.002) for conservative estimate.
Outlet elevation caculated with assumed slope.
Storage at elevation 22 has been split evenly between PR-13 and P2.

Inflow Area = 1,494,543 sf, 13.60% Impervious, Inflow Depth = 3.26" for 25 Year Storm event
Inflow = 68.82 cfs @ 12.39 hrs, Volume= 406,296 cf
Outflow = 67.60 cfs @ 12.45 hrs, Volume= 406,305 cf, Atten= 2%, Lag= 3.5 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 67.60 cfs @ 12.45 hrs, Volume= 406,305 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 17.55' @ 12.45 hrs Surf.Area= 3,675 sf Storage= 1,050 cf
Flood Elev= 22.00' Surf.Area= 129,946 sf Storage= 241,100 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (841.7 - 841.7)

Volume	Invert	Avail.Storage	Storage Description
#1	16.95'	241,100 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
16.95	4	0	0
17.00	103	3	3
18.00	6,546	3,325	3,327
19.00	30,981	18,764	22,091
20.00	61,120	46,051	68,141
21.00	77,426	69,273	137,414
22.00	129,946	103,686	241,100

Device	Routing	Invert	Outlet Devices
#1	Primary	12.11'	**36.0" Round Culvert** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.11' / 11.10' S= 0.0168 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 7.07 sf
#2	Discarded	21.26'	**93.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=16.95' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Primary OutFlow Max=67.59 cfs @ 12.45 hrs HW=17.55' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 67.59 cfs @ 9.56 fps)

Summary for Pond PR-14:

Inflow Area = 945,764 sf, 20.69% Impervious, Inflow Depth = 3.80" for 25 Year Storm event
Inflow = 49.43 cfs @ 12.50 hrs, Volume= 299,772 cf
Outflow = 98.42 cfs @ 12.51 hrs, Volume= 303,142 cf, Atten= 0%, Lag= 0.8 min
Primary = 98.42 cfs @ 12.51 hrs, Volume= 303,142 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 107.69' @ 12.53 hrs Surf.Area= 29,972 sf Storage= 29,227 cf
Flood Elev= 32.05' Surf.Area= 4 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 8.1 min (846.6 - 838.5)

Volume	Invert	Avail.Storage	Storage Description
#1	32.05'	29,227 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
32.05	4	0	0
34.00	29,972	29,227	29,227

Device	Routing	Invert	Outlet Devices
#1	Primary	28.65'	**30.0" Round Culvert** L= 103.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 28.65' / 28.14' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=75.51 cfs @ 12.51 hrs HW=57.82' TW=47.61' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 75.51 cfs @ 15.38 fps)

Summary for Pond PR-15:

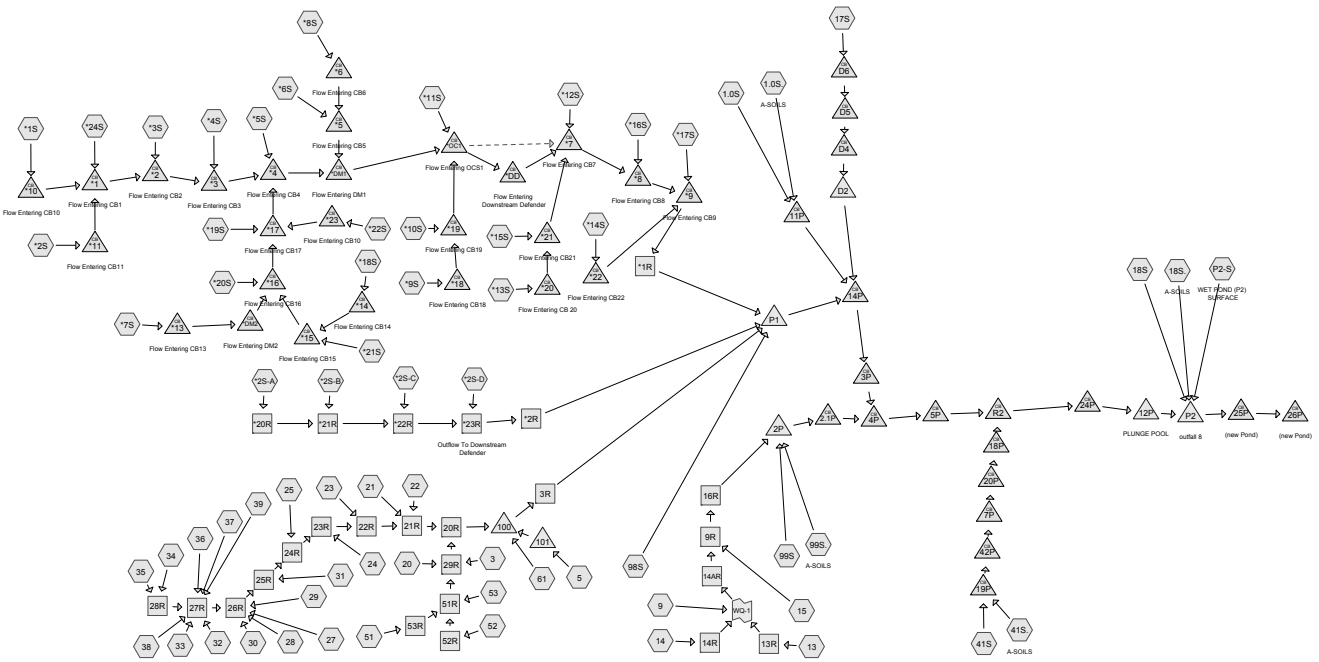
Lenght Assumed
Invert Out Assumed

Inflow Area = 1,006,709 sf, 19.93% Impervious, Inflow Depth = 3.81" for 25 Year Storm event
Inflow = 101.06 cfs @ 12.51 hrs, Volume= 319,435 cf
Outflow = 101.06 cfs @ 12.51 hrs, Volume= 319,442 cf, Atten= 0%, Lag= 0.0 min
Primary = 101.06 cfs @ 12.51 hrs, Volume= 319,442 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 90.43' @ 12.52 hrs
Flood Elev= 34.49'

Device	Routing	Invert	Outlet Devices
#1	Primary	28.08'	**30.0" Round Culvert** L= 39.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 28.08' / 28.01' S= 0.0018 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=0.00 cfs @ 12.51 hrs HW=47.61' TW=90.41' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)



Subcat Reach Pond Link

Routing Diagram for Predevelopment Runway 18-36 - Outfall 8

Prepared by Stantec Consulting Ltd., Printed 10/19/2018

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
735,295	39	>75% Grass cover, Good, HSG A (*1S, *2S-A, 1.0S., 3, 13, 14, 18S., 23, 24, 27, 28, 30, 31, 33, 34, 35, 36, 39, 41S., 99S.)
617,773	61	>75% Grass cover, Good, HSG B (*10S, *11S, *12S, *1S, *21S, *24S, *2S, *2S-C, *3S, *4S, *5S, *6S, *7S, *8S, 1.0S, 3, 5, 18S, 20, 21, 22, 23, 51, 52, 53, 61, 98S)
86,684	61	>75% Grass cover, Good, HSG B - LOT 4 (15)
1,465,921	74	>75% Grass cover, Good, HSG C (*10S, *12S, *16S, *17S, *18S, *2S-D, *9S, 1.0S, 5, 9, 17S, 18S, 98S, 99S)
1,098,569	80	>75% Grass cover, Good, HSG D (*1S, *2S-B, 1.0S, 3, 5, 17S, 18S, 98S, 99S)
29,839	67	ADJUSTMENT (3)
29,839	68	ADJUSTMENT (5)
7,884	98	ADJUSTMENT (5)
102,082	98	ADJUSTMENT 2018 (1.0S, 5, 15)
40,423	98	ADUSTMENT 2018 (*1S)
140,220	98	Impervious (9, 14)
1,049,550	98	Paved parking & roofs (*10S, *11S, *12S, *13S, *14S, *15S, *16S, *17S, *18S, *19S, *1S, *20S, *21S, *22S, *24S, *2S, *2S-A, *2S-B, *2S-C, *2S-D, *3S, *4S, *5S, *6S, *7S, *8S, *9S, 3, 5, 13, 17S, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 41S, 51, 52, 53, 99S)
181,645	98	Paved parking & roofs - LOT 4 (15)
471,325	98	Paved parking, HSG D (1.0S)
13,068	100	Water Surface (61)
79,989	98	Water Surface, HSG A (P2-S)
6,150,106	**77**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
815,284	HSG A	*1S, *2S-A, 1.0S., 3, 13, 14, 18S., 23, 24, 27, 28, 30, 31, 33, 34, 35, 36, 39, 41S., 99S., P2-S
704,457	HSG B	*10S, *11S, *12S, *1S, *21S, *24S, *2S, *2S-C, *3S, *4S, *5S, *6S, *7S, *8S, 1.0S, 3, 5, 15, 18S, 20, 21, 22, 23, 51, 52, 53, 61, 98S
1,465,921	HSG C	*10S, *12S, *16S, *17S, *18S, *2S-D, *9S, 1.0S, 5, 9, 17S, 18S, 98S, 99S
1,569,894	HSG D	*1S, *2S-B, 1.0S, 3, 5, 17S, 18S, 98S, 99S
1,594,550	Other	*10S, *11S, *12S, *13S, *14S, *15S, *16S, *17S, *18S, *19S, *1S, *20S, *21S, *22S, *24S, *2S, *2S-A, *2S-B, *2S-C, *2S-D, *3S, *4S, *5S, *6S, *7S, *8S, *9S, 1.0S, 3, 5, 9, 13, 14, 15, 17S, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 41S, 51, 52, 53, 61, 99S
6,150,106		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
735,295	704,457	1,465,921	1,098,569	0	4,004,242	>75% Grass cover, Good
0	0	0	0	67,562	67,562	ADJUSTMENT
0	0	0	0	102,082	102,082	ADJUSTMENT 2018
0	0	0	0	40,423	40,423	ADUSTMENT 2018
0	0	0	0	140,220	140,220	Impervious
0	0	0	471,325	0	471,325	Paved parking
0	0	0	0	1,049,550	1,049,550	Paved parking & roofs
0	0	0	0	181,645	181,645	Paved parking & roofs - LOT 4
79,989	0	0	0	13,068	93,057	Water Surface
815,284	**704,457**	**1,465,921**	**1,569,894**	**1,594,550**	**6,150,106**	**TOTAL AREA**

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	*20R	58.89	54.41	315.0	0.0142	0.013	12.0	0.0	0.0
2	*21R	54.31	52.34	270.0	0.0073	0.013	12.0	0.0	0.0
3	*22R	52.24	51.20	110.0	0.0095	0.013	15.0	0.0	0.0
4	*23R	51.10	50.00	80.0	0.0138	0.013	15.0	0.0	0.0
5	13R	0.00	-3.30	330.0	0.0100	0.011	12.0	0.0	0.0
6	14AR	0.00	-5.95	170.0	0.0350	0.011	18.0	0.0	0.0
7	14R	0.00	-9.20	230.0	0.0400	0.011	18.0	0.0	0.0
8	20R	0.00	-8.67	289.0	0.0300	0.013	24.0	0.0	0.0
9	21R	0.00	-3.60	180.0	0.0200	0.013	24.0	0.0	0.0
10	22R	0.00	-2.90	290.0	0.0100	0.013	24.0	0.0	0.0
11	23R	0.00	-2.10	103.0	0.0204	0.013	24.0	0.0	0.0
12	24R	0.00	-5.00	75.0	0.0667	0.013	18.0	0.0	0.0
13	25R	0.00	-2.60	124.0	0.0210	0.013	18.0	0.0	0.0
14	26R	0.00	-3.84	192.0	0.0200	0.013	18.0	0.0	0.0
15	27R	0.00	-2.00	192.0	0.0104	0.013	18.0	0.0	0.0
16	28R	0.00	-0.60	107.0	0.0056	0.013	12.0	0.0	0.0
17	29R	0.00	-1.15	115.0	0.0100	0.013	24.0	0.0	0.0
18	51R	0.00	-9.75	325.0	0.0300	0.013	15.0	0.0	0.0
19	52R	0.00	-0.50	25.0	0.0200	0.013	15.0	0.0	0.0
20	53R	0.00	-0.66	66.0	0.0100	0.013	12.0	0.0	0.0
21	*1	52.70	51.83	145.0	0.0060	0.011	18.0	0.0	0.0
22	*10	53.25	52.80	30.0	0.0150	0.011	18.0	0.0	0.0
23	*11	53.40	52.80	85.0	0.0071	0.011	15.0	0.0	0.0
24	*13	54.45	53.10	135.0	0.0100	0.013	12.0	0.0	0.0
25	*14	52.75	52.45	58.0	0.0052	0.013	12.0	0.0	0.0
26	*15	52.35	51.80	88.0	0.0063	0.013	12.0	0.0	0.0
27	*16	51.70	51.15	78.0	0.0071	0.013	18.0	0.0	0.0
28	*17	51.05	50.10	135.0	0.0070	0.011	18.0	0.0	0.0
29	*18	47.40	46.80	118.0	0.0051	0.011	15.0	0.0	0.0
30	*19	46.70	46.05	130.0	0.0050	0.011	15.0	0.0	0.0
31	*2	51.73	50.98	125.0	0.0060	0.011	24.0	0.0	0.0
32	*20	47.25	46.40	122.0	0.0070	0.011	15.0	0.0	0.0
33	*21	46.30	45.23	155.0	0.0069	0.011	15.0	0.0	0.0
34	*22	45.80	41.60	222.0	0.0189	0.011	15.0	0.0	0.0
35	*23	52.75	51.15	86.0	0.0186	0.011	15.0	0.0	0.0
36	*3	50.88	50.10	130.0	0.0060	0.011	24.0	0.0	0.0
37	*4	50.00	48.85	105.0	0.0110	0.011	30.0	0.0	0.0
38	*5	48.05	47.69	45.0	0.0080	0.011	18.0	0.0	0.0
39	*6	48.60	48.15	45.0	0.0100	0.011	18.0	0.0	0.0
40	*7	45.13	43.45	120.0	0.0140	0.011	30.0	0.0	0.0
41	*8	43.35	41.60	125.0	0.0140	0.011	36.0	0.0	0.0
42	*9	41.50	40.00	100.0	0.0150	0.011	36.0	0.0	0.0

Pipe Listing (all nodes) (continued)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
43	*DD	45.75	45.23	50.0	0.0104	0.011	30.0	0.0	0.0
44	*DM1	47.59	46.05	140.0	0.0110	0.011	30.0	0.0	0.0
45	*DM2	53.00	51.80	50.0	0.0240	0.013	12.0	0.0	0.0
46	*OC1	45.30	43.50	54.0	0.0333	0.011	30.0	0.0	0.0
47	*OC1	45.95	45.23	65.0	0.0111	0.011	24.0	0.0	0.0
48	2.1P	32.50	32.14	70.0	0.0051	0.013	36.0	0.0	0.0
49	2P	36.00	32.64	112.0	0.0300	0.013	36.0	0.0	0.0
50	3P	29.99	29.62	250.0	0.0015	0.013	48.0	0.0	0.0
51	4P	29.39	29.29	196.0	0.0005	0.013	60.0	0.0	0.0
52	5P	28.97	28.38	371.0	0.0016	0.013	60.0	0.0	0.0
53	7P	33.75	33.40	160.0	0.0022	0.013	30.0	0.0	0.0
54	11P	35.75	34.50	161.0	0.0078	0.013	18.0	0.0	0.0
55	14P	30.44	30.09	238.0	0.0015	0.013	30.0	0.0	0.0
56	18P	32.50	31.88	184.0	0.0034	0.013	36.0	0.0	0.0
57	19P	36.40	36.00	62.0	0.0065	0.013	12.0	0.0	0.0
58	20P	33.30	32.62	181.0	0.0038	0.013	36.0	0.0	0.0
59	24P	21.63	21.50	30.0	0.0043	0.013	60.0	0.0	0.0
60	25P	17.40	15.14	113.0	0.0200	0.013	12.0	0.0	0.0
61	26P	16.40	16.00	20.0	0.0200	0.013	12.0	0.0	0.0
62	42P	35.00	34.25	338.0	0.0022	0.013	30.0	0.0	0.0
63	100	45.50	45.10	40.0	0.0100	0.013	18.0	0.0	0.0
64	101	51.50	47.98	75.0	0.0469	0.013	15.0	0.0	0.0
65	D2	33.33	31.80	277.0	0.0055	0.012	24.0	0.0	0.0
66	D4	34.54	33.33	249.0	0.0049	0.012	24.0	0.0	0.0
67	D5	35.13	34.64	71.3	0.0069	0.012	24.0	0.0	0.0
68	D6	40.87	36.88	337.5	0.0118	0.010	15.0	0.0	0.0
69	P1	33.00	30.54	126.0	0.0195	0.013	36.0	0.0	0.0
70	P2	18.35	17.50	42.6	0.0200	0.012	12.0	0.0	0.0
71	R2	28.33	28.25	44.0	0.0018	0.013	60.0	0.0	0.0

Time span=0.00-50.00 hrs, dt=0.01 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment*10S: Runoff Area=24,132 sf 65.52% Impervious Runoff Depth=4.22"
Tc=6.0 min CN=86 Runoff=2.68 cfs 8,486 cf

Subcatchment*11S: Runoff Area=17,817 sf 34.72% Impervious Runoff Depth=3.02"
Tc=6.0 min CN=74 Runoff=1.45 cfs 4,480 cf

Subcatchment*12S: Runoff Area=11,369 sf 57.86% Impervious Runoff Depth=4.33"
Tc=6.0 min CN=87 Runoff=1.29 cfs 4,099 cf

Subcatchment*13S: Runoff Area=17,511 sf 100.00% Impervious Runoff Depth=5.56"
Tc=6.0 min CN=98 Runoff=2.29 cfs 8,116 cf

Subcatchment*14S: Runoff Area=13,896 sf 100.00% Impervious Runoff Depth=5.56"
Tc=6.0 min CN=98 Runoff=1.81 cfs 6,441 cf

Subcatchment*15S: Runoff Area=17,555 sf 100.00% Impervious Runoff Depth=5.56"
Tc=6.0 min CN=98 Runoff=2.29 cfs 8,137 cf

Subcatchment*16S: Runoff Area=17,119 sf 92.11% Impervious Runoff Depth=5.33"
Tc=6.0 min CN=96 Runoff=2.21 cfs 7,601 cf

Subcatchment*17S: Runoff Area=26,267 sf 90.22% Impervious Runoff Depth=5.33"
Tc=6.0 min CN=96 Runoff=3.39 cfs 11,663 cf

Subcatchment*18S: Runoff Area=7,536 sf 84.39% Impervious Runoff Depth=5.10"
Tc=0.0 min CN=94 Runoff=1.15 cfs 3,202 cf

Subcatchment*19S: Runoff Area=11,064 sf 100.00% Impervious Runoff Depth=5.56"
Tc=0.0 min CN=98 Runoff=1.75 cfs 5,128 cf

Subcatchment*1S: Runoff Area=75,881 sf 84.16% Impervious Runoff Depth=4.87"
Tc=6.0 min CN=92 Runoff=9.36 cfs 30,814 cf

Subcatchment*20S: Runoff Area=20,865 sf 100.00% Impervious Runoff Depth=5.56"
Tc=0.0 min CN=98 Runoff=3.29 cfs 9,671 cf

Subcatchment*21S: Runoff Area=7,753 sf 91.58% Impervious Runoff Depth=5.21"
Tc=0.0 min CN=95 Runoff=1.20 cfs 3,368 cf

Subcatchment*22S: Runoff Area=10,716 sf 100.00% Impervious Runoff Depth=5.56"
Tc=0.0 min CN=98 Runoff=1.69 cfs 4,967 cf

Subcatchment*24S: Runoff Area=12,371 sf 80.28% Impervious Runoff Depth=4.76"
Tc=0.0 min CN=91 Runoff=1.82 cfs 4,909 cf

Subcatchment*2S: Runoff Area=42,558 sf 84.75% Impervious Runoff Depth=4.87"
Tc=6.0 min CN=92 Runoff=5.25 cfs 17,282 cf

Subcatchment*2S-A: Runoff Area=27,182 sf 25.16% Impervious Runoff Depth=1.33"
Flow Length=210' Tc=15.2 min CN=54 Runoff=0.62 cfs 3,013 cf

Subcatchment*2S-B: Runoff Area=32,713 sf 30.23% Impervious Runoff Depth=4.11"
Flow Length=325' Tc=7.3 min CN=85 Runoff=3.40 cfs 11,216 cf

Subcatchment*2S-C: Runoff Area=34,674 sf 19.22% Impervious Runoff Depth=2.47"
Flow Length=275' Tc=9.7 min CN=68 Runoff=2.00 cfs 7,132 cf

Subcatchment*2S-D: Runoff Area=10,193 sf 32.90% Impervious Runoff Depth=3.80"
Tc=5.0 min CN=82 Runoff=1.07 cfs 3,231 cf

Subcatchment*3S: Runoff Area=23,479 sf 96.10% Impervious Runoff Depth=5.44"
Tc=6.0 min CN=97 Runoff=3.05 cfs 10,653 cf

Subcatchment*4S: Runoff Area=23,696 sf 92.65% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=95 Runoff=3.03 cfs 10,294 cf

Subcatchment*5S: Runoff Area=29,272 sf 94.05% Impervious Runoff Depth=5.33"
Tc=6.0 min CN=96 Runoff=3.77 cfs 12,998 cf

Subcatchment*6S: Runoff Area=29,708 sf 77.71% Impervious Runoff Depth=4.65"
Tc=6.0 min CN=90 Runoff=3.55 cfs 11,515 cf

Subcatchment*7S: Runoff Area=17,207 sf 10.64% Impervious Runoff Depth=2.21"
Tc=6.0 min CN=65 Runoff=1.00 cfs 3,165 cf

Subcatchment*8S: Runoff Area=17,468 sf 92.02% Impervious Runoff Depth=5.21"
Tc=0.0 min CN=95 Runoff=2.70 cfs 7,588 cf

Subcatchment*9S: Runoff Area=17,075 sf 83.93% Impervious Runoff Depth=5.10"
Tc=6.0 min CN=94 Runoff=2.16 cfs 7,255 cf

Subcatchment1.0S: Runoff Area=887,207 sf 59.16% Impervious Runoff Depth=4.54"
Flow Length=237' Tc=12.8 min CN=89 Runoff=84.20 cfs 335,798 cf

Subcatchment1.0S.: A-SOILS Runoff Area=163,301 sf 0.00% Impervious Runoff Depth=0.39"
Flow Length=237' Tc=12.8 min CN=39 Runoff=0.50 cfs 5,305 cf

Subcatchment3: Runoff Area=271,597 sf 20.05% Impervious Runoff Depth=2.38"
Tc=19.3 min CN=67 Runoff=11.65 cfs 53,870 cf

Subcatchment5: Runoff Area=383,659 sf 9.34% Impervious Runoff Depth=2.56"
Tc=28.0 min CN=69 Runoff=15.21 cfs 81,762 cf

Subcatchment9: Runoff Area=23,174 sf 75.19% Impervious Runoff Depth=4.87"
Tc=5.0 min CN=92 Runoff=2.96 cfs 9,410 cf

Subcatchment13: Runoff Area=289,064 sf 12.81% Impervious Runoff Depth=0.85"
Flow Length=600' Tc=21.0 min CN=47 Runoff=2.97 cfs 20,421 cf

Subcatchment14: Runoff Area=178,553 sf 68.77% Impervious Runoff Depth=3.60"
Tc=10.0 min CN=80 Runoff=15.08 cfs 53,585 cf

Subcatchment15: Runoff Area=306,371 sf 71.71% Impervious Runoff Depth=4.43"
Tc=10.0 min CN=88 Runoff=30.99 cfs 113,191 cf

Subcatchment17S: Runoff Area=983,366 sf 19.67% Impervious Runoff Depth=3.80"
Flow Length=893' Slope=0.0090 '/' Tc=33.8 min CN=82 Runoff=53.55 cfs 311,691 cf

Subcatchment18S: Runoff Area=355,602 sf 0.00% Impervious Runoff Depth=3.11"
Flow Length=455' Tc=22.9 min CN=75 Runoff=18.94 cfs 92,229 cf

Subcatchment18S.: A-SOILS Runoff Area=2,239 sf 0.00% Impervious Runoff Depth=0.39"
Tc=0.0 min CN=39 Runoff=0.01 cfs 73 cf

Subcatchment20: Runoff Area=16,553 sf 13.16% Impervious Runoff Depth=2.29"
Tc=11.5 min CN=66 Runoff=0.83 cfs 3,163 cf

Subcatchment21: Runoff Area=24,829 sf 85.96% Impervious Runoff Depth=4.99"
Tc=3.3 min CN=93 Runoff=3.42 cfs 10,315 cf

Subcatchment22: Runoff Area=30,927 sf 54.93% Impervious Runoff Depth=3.70"
Tc=4.3 min CN=81 Runoff=3.26 cfs 9,541 cf

Subcatchment23: Runoff Area=18,295 sf 78.57% Impervious Runoff Depth=4.33"
Tc=4.9 min CN=87 Runoff=2.16 cfs 6,595 cf

Subcatchment24: Runoff Area=39,204 sf 47.78% Impervious Runoff Depth=2.38"
Tc=10.6 min CN=67 Runoff=2.11 cfs 7,776 cf

Subcatchment25: Runoff Area=3,920 sf 100.00% Impervious Runoff Depth=5.56"
Tc=2.1 min CN=98 Runoff=0.59 cfs 1,817 cf

Subcatchment27: Runoff Area=6,099 sf 92.85% Impervious Runoff Depth=5.10"
Tc=3.9 min CN=94 Runoff=0.83 cfs 2,591 cf

Subcatchment28: Runoff Area=26,572 sf 75.41% Impervious Runoff Depth=3.91"
Tc=3.6 min CN=83 Runoff=3.02 cfs 8,649 cf

Subcatchment29: Runoff Area=7,405 sf 100.00% Impervious Runoff Depth=5.56"
Tc=1.3 min CN=98 Runoff=1.14 cfs 3,432 cf

Subcatchment30: Runoff Area=24,830 sf 71.93% Impervious Runoff Depth=3.70"
Tc=12.3 min CN=81 Runoff=2.01 cfs 7,660 cf

Subcatchment31: Runoff Area=9,148 sf 76.19% Impervious Runoff Depth=4.01"
Tc=1.1 min CN=84 Runoff=1.16 cfs 3,057 cf

Subcatchment32: Runoff Area=3,485 sf 100.00% Impervious Runoff Depth=5.56"
Tc=1.2 min CN=98 Runoff=0.54 cfs 1,615 cf

Subcatchment33: Runoff Area=21,344 sf 81.63% Impervious Runoff Depth=4.33"
Tc=3.6 min CN=87 Runoff=2.64 cfs 7,695 cf

Subcatchment 34: Runoff Area=7,405 sf 82.35% Impervious Runoff Depth=4.43"
Tc=1.5 min CN=88 Runoff=1.00 cfs 2,736 cf

Subcatchment 35: Runoff Area=13,940 sf 96.87% Impervious Runoff Depth=5.33"
Tc=5.3 min CN=96 Runoff=1.84 cfs 6,190 cf

Subcatchment 36: Runoff Area=7,405 sf 82.35% Impervious Runoff Depth=4.43"
Tc=2.8 min CN=88 Runoff=0.96 cfs 2,736 cf

Subcatchment 37: Runoff Area=2,614 sf 100.00% Impervious Runoff Depth=5.56"
Tc=1.0 min CN=98 Runoff=0.41 cfs 1,212 cf

Subcatchment 38: Runoff Area=10,454 sf 100.00% Impervious Runoff Depth=5.56"
Tc=1.4 min CN=98 Runoff=1.60 cfs 4,846 cf

Subcatchment 39: Runoff Area=15,682 sf 50.00% Impervious Runoff Depth=2.56"
Tc=17.0 min CN=69 Runoff=0.77 cfs 3,342 cf

Subcatchment 41S: Runoff Area=38,337 sf 100.00% Impervious Runoff Depth=5.56"
Flow Length=848' Tc=27.5 min CN=98 Runoff=2.98 cfs 17,769 cf

Subcatchment 41S.: A-SOILS Runoff Area=115,425 sf 0.00% Impervious Runoff Depth=0.39"
Tc=0.0 min CN=39 Runoff=0.39 cfs 3,749 cf

Subcatchment 51: Runoff Area=14,375 sf 78.79% Impervious Runoff Depth=4.65"
Tc=2.6 min CN=90 Runoff=1.94 cfs 5,572 cf

Subcatchment 52: Runoff Area=77,537 sf 58.99% Impervious Runoff Depth=3.91"
Tc=6.6 min CN=83 Runoff=7.91 cfs 25,239 cf

Subcatchment 53: Runoff Area=18,731 sf 46.51% Impervious Runoff Depth=3.40"
Tc=1.9 min CN=78 Runoff=1.99 cfs 5,312 cf

Subcatchment 61: Runoff Area=58,370 sf 22.39% Impervious Runoff Depth=2.65"
Tc=16.5 min CN=70 Runoff=3.00 cfs 12,877 cf

Subcatchment 98S: Runoff Area=440,083 sf 0.00% Impervious Runoff Depth=3.02"
Tc=30.2 min CN=74 Runoff=20.08 cfs 110,660 cf

Subcatchment 99S: Runoff Area=552,985 sf 7.86% Impervious Runoff Depth=3.31"
Flow Length=1,629' Tc=30.2 min CN=77 Runoff=27.70 cfs 152,303 cf

Subcatchment 99S.: A-SOILS Runoff Area=22,953 sf 0.00% Impervious Runoff Depth=0.39"
Tc=0.0 min CN=39 Runoff=0.08 cfs 746 cf

Subcatchment P2-S: WET POND (P2) Runoff Area=79,989 sf 100.00% Impervious Runoff Depth=5.56"
Flow Length=635' Tc=1.1 min CN=98 Runoff=12.42 cfs 37,075 cf

Reach *1R: Avg. Flow Depth=0.59' Max Vel=2.97 fps Inflow=55.83 cfs 201,831 cf
n=0.035 L=400.0' S=0.0125 '/' Capacity=529.57 cfs Outflow=53.96 cfs 201,831 cf

Reach *20R: Avg. Flow Depth=0.26' Max Vel=3.85 fps Inflow=0.62 cfs 3,013 cf
12.0" Round Pipe n=0.013 L=315.0' S=0.0142 '/' Capacity=4.25 cfs Outflow=0.62 cfs 3,013 cf

Reach *21R: Avg. Flow Depth=1.00' Max Vel=4.42 fps Inflow=3.71 cfs 14,229 cf
12.0" Round Pipe n=0.013 L=270.0' S=0.0073 '/' Capacity=3.04 cfs Outflow=3.27 cfs 14,229 cf

Reach *22R: Avg. Flow Depth=0.85' Max Vel=5.69 fps Inflow=5.04 cfs 21,361 cf
15.0" Round Pipe n=0.013 L=110.0' S=0.0095 '/' Capacity=6.28 cfs Outflow=5.04 cfs 21,361 cf

Reach *23R: Outflow To Downstream Avg. Flow Depth=0.84' Max Vel=6.84 fps Inflow=5.97 cfs 24,591 cf
15.0" Round Pipe n=0.013 L=80.0' S=0.0138 '/' Capacity=7.57 cfs Outflow=5.96 cfs 24,591 cf

Reach *2R: Avg. Flow Depth=0.25' Max Vel=1.74 fps Inflow=5.96 cfs 24,591 cf
n=0.035 L=800.0' S=0.0125 '/' Capacity=260.28 cfs Outflow=5.17 cfs 24,591 cf

Reach 3R: Avg. Flow Depth=0.53' Max Vel=2.77 fps Inflow=38.39 cfs 221,101 cf
n=0.035 L=596.0' S=0.0151 '/' Capacity=602.80 cfs Outflow=37.58 cfs 221,101 cf

Reach 9R: Avg. Flow Depth=1.14' Max Vel=7.95 fps Inflow=48.88 cfs 196,608 cf
n=0.035 L=100.0' S=0.0600 '/' Capacity=176.48 cfs Outflow=48.88 cfs 196,608 cf

Reach 13R: Avg. Flow Depth=0.62' Max Vel=5.81 fps Inflow=2.97 cfs 20,421 cf
12.0" Round Pipe n=0.011 L=330.0' S=0.0100 '/' Capacity=4.21 cfs Outflow=2.97 cfs 20,421 cf

Reach 14AR: Avg. Flow Depth=0.99' Max Vel=14.50 fps Inflow=17.90 cfs 83,417 cf
18.0" Round Pipe n=0.011 L=170.0' S=0.0350 '/' Capacity=23.22 cfs Outflow=17.89 cfs 83,417 cf

Reach 14R: Avg. Flow Depth=0.84' Max Vel=14.73 fps Inflow=15.08 cfs 53,585 cf
18.0" Round Pipe n=0.011 L=230.0' S=0.0400 '/' Capacity=24.83 cfs Outflow=15.08 cfs 53,585 cf

Reach 16R: Avg. Flow Depth=0.14' Max Vel=2.81 fps Inflow=48.88 cfs 196,608 cf
n=0.025 L=1,400.0' S=0.0309 '/' Capacity=15,061.85 cfs Outflow=40.95 cfs 196,608 cf

Reach 20R: Avg. Flow Depth=2.00' Max Vel=14.22 fps Inflow=43.22 cfs 184,960 cf
24.0" Round Pipe n=0.013 L=289.0' S=0.0300 '/' Capacity=39.18 cfs Outflow=42.35 cfs 184,960 cf

Reach 21R: Avg. Flow Depth=1.37' Max Vel=11.35 fps Inflow=26.17 cfs 91,804 cf
24.0" Round Pipe n=0.013 L=180.0' S=0.0200 '/' Capacity=31.99 cfs Outflow=26.14 cfs 91,804 cf

Reach 22R: Avg. Flow Depth=1.44' Max Vel=8.11 fps Inflow=19.79 cfs 71,949 cf
24.0" Round Pipe n=0.013 L=290.0' S=0.0100 '/' Capacity=22.62 cfs Outflow=19.71 cfs 71,949 cf

Reach 23R: Avg. Flow Depth=1.05' Max Vel=10.51 fps Inflow=17.65 cfs 65,353 cf
24.0" Round Pipe n=0.013 L=103.0' S=0.0204 '/' Capacity=32.30 cfs Outflow=17.64 cfs 65,353 cf

Reach 24R: Avg. Flow Depth=0.84' Max Vel=16.03 fps Inflow=16.24 cfs 57,577 cf
18.0" Round Pipe n=0.013 L=75.0' S=0.0667 '/' Capacity=27.12 cfs Outflow=16.24 cfs 57,577 cf

Reach 25R: Avg. Flow Depth=1.28' Max Vel=9.81 fps Inflow=15.73 cfs 55,760 cf
18.0" Round Pipe n=0.013 L=124.0' S=0.0210 '/' Capacity=15.21 cfs Outflow=15.71 cfs 55,760 cf

Reach 26R: Avg. Flow Depth=1.22' Max Vel=9.58 fps Inflow=14.81 cfs 52,704 cf
18.0" Round Pipe n=0.013 L=192.0' S=0.0200 '/' Capacity=14.86 cfs Outflow=14.78 cfs 52,704 cf

Reach 27R: Avg. Flow Depth=1.03' Max Vel=6.76 fps Inflow=8.78 cfs 30,370 cf
18.0" Round Pipe n=0.013 L=192.0' S=0.0104 '/' Capacity=10.72 cfs Outflow=8.75 cfs 30,370 cf

Reach 28R: Avg. Flow Depth=0.81' Max Vel=3.87 fps Inflow=2.65 cfs 8,926 cf
12.0" Round Pipe n=0.013 L=107.0' S=0.0056 '/' Capacity=2.67 cfs Outflow=2.64 cfs 8,926 cf

Reach 29R: Avg. Flow Depth=1.36' Max Vel=8.01 fps Inflow=18.24 cfs 93,156 cf
24.0" Round Pipe n=0.013 L=115.0' S=0.0100 '/' Capacity=22.62 cfs Outflow=18.23 cfs 93,156 cf

Reach 51R: Avg. Flow Depth=1.00' Max Vel=10.39 fps Inflow=10.98 cfs 36,122 cf
15.0" Round Pipe n=0.013 L=325.0' S=0.0300 '/' Capacity=11.19 cfs Outflow=10.93 cfs 36,122 cf

Reach 52R: Avg. Flow Depth=0.90' Max Vel=8.38 fps Inflow=7.91 cfs 25,239 cf
15.0" Round Pipe n=0.013 L=25.0' S=0.0200 '/' Capacity=9.14 cfs Outflow=7.90 cfs 25,239 cf

Reach 53R: Avg. Flow Depth=0.53' Max Vel=4.63 fps Inflow=1.94 cfs 5,572 cf
12.0" Round Pipe n=0.013 L=66.0' S=0.0100 '/' Capacity=3.56 cfs Outflow=1.94 cfs 5,572 cf

Pond *1: Flow Entering CB1 Peak Elev=59.42' Inflow=15.55 cfs 53,004 cf
18.0" Round Culvert n=0.011 L=145.0' S=0.0060 '/' Outflow=15.55 cfs 53,004 cf

Pond *10: Flow Entering CB10 Peak Elev=60.14' Inflow=9.36 cfs 30,814 cf
18.0" Round Culvert n=0.011 L=30.0' S=0.0150 '/' Outflow=9.36 cfs 30,814 cf

Pond *11: Flow Entering CB11 Peak Elev=60.11' Inflow=5.25 cfs 17,282 cf
15.0" Round Culvert n=0.011 L=85.0' S=0.0071 '/' Outflow=5.25 cfs 17,282 cf

Pond *13: Flow Entering CB13 Peak Elev=55.04' Inflow=1.00 cfs 3,165 cf
12.0" Round Culvert n=0.013 L=135.0' S=0.0100 '/' Outflow=1.00 cfs 3,165 cf

Pond *14: Flow Entering CB14 Peak Elev=54.89' Inflow=1.15 cfs 3,202 cf
12.0" Round Culvert n=0.013 L=58.0' S=0.0052 '/' Outflow=1.15 cfs 3,202 cf

Pond *15: Flow Entering CB15 Peak Elev=54.79' Inflow=2.35 cfs 6,570 cf
12.0" Round Culvert n=0.013 L=88.0' S=0.0063 '/' Outflow=2.35 cfs 6,570 cf

Pond *16: Flow Entering CB16 Peak Elev=54.26' Inflow=6.18 cfs 19,406 cf
18.0" Round Culvert n=0.013 L=78.0' S=0.0071 '/' Outflow=6.18 cfs 19,406 cf

Pond *17: Flow Entering CB17 Peak Elev=53.67' Inflow=9.62 cfs 29,501 cf
18.0" Round Culvert n=0.011 L=135.0' S=0.0070 '/' Outflow=9.62 cfs 29,501 cf

Pond *18: Flow Entering CB18 Peak Elev=51.58' Inflow=2.16 cfs 7,255 cf
15.0" Round Culvert n=0.011 L=118.0' S=0.0051 '/' Outflow=2.16 cfs 7,255 cf

Pond *19: Flow Entering CB19 Peak Elev=51.44' Inflow=4.84 cfs 15,741 cf
15.0" Round Culvert n=0.011 L=130.0' S=0.0050 '/' Outflow=4.84 cfs 15,741 cf

Pond *2: Flow Entering CB2 Peak Elev=56.07' Inflow=18.60 cfs 63,657 cf
24.0" Round Culvert n=0.011 L=125.0' S=0.0060 '/' Outflow=18.60 cfs 63,657 cf

Pond *20: Flow Entering CB 20 Peak Elev=50.52' Inflow=2.29 cfs 8,116 cf
15.0" Round Culvert n=0.011 L=122.0' S=0.0070 '/' Outflow=2.29 cfs 8,116 cf

Pond *21: Flow Entering CB21 Peak Elev=50.35' Inflow=4.58 cfs 16,253 cf
15.0" Round Culvert n=0.011 L=155.0' S=0.0069 '/' Outflow=4.58 cfs 16,253 cf

Pond *22: Flow Entering CB22 Peak Elev=46.43' Inflow=1.81 cfs 6,441 cf
15.0" Round Culvert n=0.011 L=222.0' S=0.0189 '/' Outflow=1.81 cfs 6,441 cf

Pond *23: Flow Entering CB10 Peak Elev=53.70' Inflow=1.69 cfs 4,967 cf
15.0" Round Culvert n=0.011 L=86.0' S=0.0186 '/' Outflow=1.69 cfs 4,967 cf

Pond *3: Flow Entering CB3 Peak Elev=54.97' Inflow=21.62 cfs 73,951 cf
24.0" Round Culvert n=0.011 L=130.0' S=0.0060 '/' Outflow=21.62 cfs 73,951 cf

Pond *4: Flow Entering CB4 Peak Elev=53.36' Inflow=31.47 cfs 116,449 cf
30.0" Round Culvert n=0.011 L=105.0' S=0.0110 '/' Outflow=31.47 cfs 116,449 cf

Pond *5: Flow Entering CB5 Peak Elev=52.48' Inflow=5.16 cfs 19,103 cf
18.0" Round Culvert n=0.011 L=45.0' S=0.0080 '/' Outflow=5.16 cfs 19,103 cf

Pond *6: Flow Entering CB6 Peak Elev=52.49' Inflow=2.70 cfs 7,588 cf
18.0" Round Culvert n=0.011 L=45.0' S=0.0100 '/' Outflow=2.70 cfs 7,588 cf

Pond *7: Flow Entering CB7 Peak Elev=49.54' Inflow=48.49 cfs 176,125 cf
30.0" Round Culvert n=0.011 L=120.0' S=0.0140 '/' Outflow=48.49 cfs 176,125 cf

Pond *8: Flow Entering CB8 Peak Elev=46.55' Inflow=50.68 cfs 183,726 cf
36.0" Round Culvert n=0.011 L=125.0' S=0.0140 '/' Outflow=50.68 cfs 183,726 cf

Pond *9: Flow Entering CB9 Peak Elev=44.72' Inflow=55.83 cfs 201,831 cf
36.0" Round Culvert n=0.011 L=100.0' S=0.0150 '/' Outflow=55.83 cfs 201,831 cf

Pond *DD: Flow Entering Downstream Defender Peak Elev=50.10' Inflow=23.71 cfs 102,011 cf
30.0" Round Culvert n=0.011 L=50.0' S=0.0104 '/' Outflow=23.71 cfs 102,011 cf

Pond *DM1: Flow Entering DM1 Peak Elev=52.29' Inflow=36.58 cfs 135,553 cf
30.0" Round Culvert n=0.011 L=140.0' S=0.0110 '/' Outflow=36.58 cfs 135,553 cf

Pond *DM2: Flow Entering DM2 Peak Elev=54.31' Inflow=1.00 cfs 3,165 cf
12.0" Round Culvert n=0.013 L=50.0' S=0.0240 '/' Outflow=1.00 cfs 3,165 cf

Pond *OC1: Flow Entering OCS1 Peak Elev=50.64' Inflow=42.70 cfs 155,773 cf
Primary=23.71 cfs 102,011 cf Secondary=19.93 cfs 53,762 cf Outflow=42.70 cfs 155,773 cf

Pond 2.1P: Peak Elev=57.05' Inflow=93.29 cfs 349,656 cf
36.0" Round Culvert n=0.013 L=70.0' S=0.0051 '/' Outflow=93.29 cfs 349,656 cf

Pond 2P: Peak Elev=58.68' Storage=14,921 cf Inflow=62.23 cfs 349,656 cf
36.0" Round Culvert n=0.013 L=112.0' S=0.0300 '/' Outflow=93.29 cfs 349,656 cf

Pond 3P: Peak Elev=61.16' Inflow=195.36 cfs 1,211,291 cf
48.0" Round Culvert n=0.013 L=250.0' S=0.0015 '/' Outflow=195.36 cfs 1,211,291 cf

Pond 4P: Peak Elev=50.73' Inflow=249.42 cfs 1,560,948 cf
60.0" Round Culvert n=0.013 L=196.0' S=0.0005 '/' Outflow=249.42 cfs 1,560,948 cf

Pond 5P: Peak Elev=44.24' Inflow=249.42 cfs 1,560,948 cf
60.0" Round Culvert n=0.013 L=371.0' S=0.0016 '/' Outflow=249.42 cfs 1,560,948 cf

Pond 7P: Peak Elev=38.02' Inflow=3.34 cfs 21,519 cf
30.0" Round Culvert n=0.013 L=160.0' S=0.0022 '/' Outflow=3.34 cfs 21,519 cf

Pond 11P: Peak Elev=282.31' Inflow=84.26 cfs 341,103 cf
18.0" Round Culvert n=0.013 L=161.0' S=0.0078 '/' Outflow=84.26 cfs 341,103 cf

Pond 12P: PLUNGE POOL Peak Elev=24.07' Storage=10,538 cf Inflow=252.76 cfs 1,582,466 cf
Outflow=254.53 cfs 1,571,928 cf

Pond 14P: Peak Elev=147.68' Inflow=195.36 cfs 1,211,290 cf
30.0" Round Culvert n=0.013 L=238.0' S=0.0015 '/' Outflow=195.36 cfs 1,211,291 cf

Pond 18P: Peak Elev=37.99' Inflow=3.34 cfs 21,519 cf
36.0" Round Culvert n=0.013 L=184.0' S=0.0034 '/' Outflow=3.34 cfs 21,519 cf

Pond 19P: Peak Elev=39.00' Inflow=3.34 cfs 21,519 cf
12.0" Round Culvert n=0.013 L=62.0' S=0.0065 '/' Outflow=3.34 cfs 21,519 cf

Pond 20P: Peak Elev=38.00' Inflow=3.34 cfs 21,519 cf
36.0" Round Culvert n=0.013 L=181.0' S=0.0038 '/' Outflow=3.34 cfs 21,519 cf

Pond 24P: Peak Elev=31.28' Inflow=252.76 cfs 1,582,467 cf
60.0" Round Culvert n=0.013 L=30.0' S=0.0043 '/' Outflow=252.76 cfs 1,582,466 cf

Pond 25P: (new Pond) Peak Elev=22.00' Inflow=5.10 cfs 224,619 cf
12.0" Round Culvert n=0.013 L=113.0' S=0.0200 '/' Outflow=5.10 cfs 224,619 cf

Pond 26P: (new Pond) Peak Elev=18.72' Inflow=5.10 cfs 224,619 cf
12.0" Round Culvert n=0.013 L=20.0' S=0.0200 '/' Outflow=5.10 cfs 224,619 cf

Pond 42P: Peak Elev=38.05' Inflow=3.34 cfs 21,519 cf
30.0" Round Culvert n=0.013 L=338.0' S=0.0022 '/' Outflow=3.34 cfs 21,519 cf

Pond 100: Peak Elev=49.68' Storage=89,755 cf Inflow=52.24 cfs 279,600 cf
Outflow=38.39 cfs 221,101 cf

Pond 101: Peak Elev=53.84' Storage=1,832 cf Inflow=15.21 cfs 81,762 cf
15.0" Round Culvert x 2.00 n=0.013 L=75.0' S=0.0469 '/' Outflow=14.50 cfs 81,762 cf

Pond D2: Peak Elev=180.37' Storage=15,827 cf Inflow=53.61 cfs 311,691 cf
24.0" Round Culvert n=0.012 L=277.0' S=0.0055 '/' Outflow=70.19 cfs 312,004 cf

Pond D4: Peak Elev=198.69' Inflow=53.61 cfs 311,691 cf
24.0" Round Culvert n=0.012 L=249.0' S=0.0049 '/' Outflow=53.61 cfs 311,691 cf

Pond D5: Peak Elev=211.07' Inflow=53.55 cfs 311,691 cf
24.0" Round Culvert n=0.012 L=71.3' S=0.0069 '/' Outflow=53.61 cfs 311,691 cf

Pond D6: Peak Elev=392.79' Inflow=53.55 cfs 311,691 cf
15.0" Round Culvert n=0.010 L=337.5' S=0.0118 '/' Outflow=53.55 cfs 311,691 cf

Pond P1: Peak Elev=149.15' Storage=40,422 cf Inflow=77.82 cfs 558,182 cf
36.0" Round Culvert n=0.013 L=126.0' S=0.0195 '/' Outflow=113.07 cfs 558,183 cf

Pond P2: outfall 8 Peak Elev=23.80' Storage=201,517 cf Inflow=276.37 cfs 1,701,306 cf
Primary=5.10 cfs 224,619 cf Secondary=217.64 cfs 1,476,230 cf Outflow=222.74 cfs 1,700,849 cf

Pond R2: Peak Elev=37.98' Inflow=252.76 cfs 1,582,467 cf
60.0" Round Culvert n=0.013 L=44.0' S=0.0018 '/' Outflow=252.76 cfs 1,582,467 cf

Link WQ-1: Inflow=17.90 cfs 83,417 cf
Primary=17.90 cfs 83,417 cf

Total Runoff Area = 6,150,106 sf Runoff Volume = 1,770,029 cf Average Runoff Depth = 3.45"
66.08% Pervious = 4,063,920 sf 33.92% Impervious = 2,086,186 sf

Summary for Subcatchment *10S:

Runoff = 2.68 cfs @ 12.08 hrs, Volume= 8,486 cf, Depth= 4.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
15,812	98	Paved parking & roofs
2,134	74	>75% Grass cover, Good, HSG C
6,186	61	>75% Grass cover, Good, HSG B
24,132	86	Weighted Average
8,320		34.48% Pervious Area
15,812		65.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *11S:

Runoff = 1.45 cfs @ 12.08 hrs, Volume= 4,480 cf, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
11,631	61	>75% Grass cover, Good, HSG B
6,186	98	Paved parking & roofs
17,817	74	Weighted Average
11,631		65.28% Pervious Area
6,186		34.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *12S:

Runoff = 1.29 cfs @ 12.08 hrs, Volume= 4,099 cf, Depth= 4.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
6,578	98	Paved parking & roofs
566	61	>75% Grass cover, Good, HSG B
4,225	74	>75% Grass cover, Good, HSG C
11,369	87	Weighted Average
4,791		42.14% Pervious Area
6,578		57.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *13S:

Runoff = 2.29 cfs @ 12.08 hrs, Volume= 8,116 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
17,511	98	Paved parking & roofs
17,511		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *14S:

Runoff = 1.81 cfs @ 12.08 hrs, Volume= 6,441 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
13,896	98	Paved parking & roofs
13,896		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *15S:

Runoff = 2.29 cfs @ 12.08 hrs, Volume= 8,137 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
17,555	98	Paved parking & roofs
17,555		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *16S:

Runoff = 2.21 cfs @ 12.08 hrs, Volume= 7,601 cf, Depth= 5.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
1,350	74	>75% Grass cover, Good, HSG C
15,769	98	Paved parking & roofs
17,119	96	Weighted Average
1,350		7.89% Pervious Area
15,769		92.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *17S:

Runoff = 3.39 cfs @ 12.08 hrs, Volume= 11,663 cf, Depth= 5.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
2,570	74	>75% Grass cover, Good, HSG C
23,697	98	Paved parking & roofs
26,267	96	Weighted Average
2,570		9.78% Pervious Area
23,697		90.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *18S:

Runoff = 1.15 cfs @ 12.00 hrs, Volume= 3,202 cf, Depth= 5.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
6,360	98	Paved parking & roofs
1,176	74	>75% Grass cover, Good, HSG C
7,536	94	Weighted Average
1,176		15.61% Pervious Area
6,360		84.39% Impervious Area

Summary for Subcatchment *19S:

Runoff = 1.75 cfs @ 12.00 hrs, Volume= 5,128 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
11,064	98	Paved parking & roofs
11,064		100.00% Impervious Area

Summary for Subcatchment *1S:

Runoff = 9.36 cfs @ 12.08 hrs, Volume= 30,814 cf, Depth= 4.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
	23,435	98	Paved parking & roofs
	4,792	39	>75% Grass cover, Good, HSG A
	5,271	80	>75% Grass cover, Good, HSG D
	1,960	61	>75% Grass cover, Good, HSG B
*	40,423	98	ADUSTMENT 2018
	75,881	92	Weighted Average
	12,023		15.84% Pervious Area
	63,858		84.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *20S:

Runoff = 3.29 cfs @ 12.00 hrs, Volume= 9,671 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
20,865	98	Paved parking & roofs
20,865		100.00% Impervious Area

Summary for Subcatchment *21S:

Runoff = 1.20 cfs @ 12.00 hrs, Volume= 3,368 cf, Depth= 5.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
7,100	98	Paved parking & roofs
653	61	>75% Grass cover, Good, HSG B
7,753	95	Weighted Average
653		8.42% Pervious Area
7,100		91.58% Impervious Area

Summary for Subcatchment *22S:

Runoff = 1.69 cfs @ 12.00 hrs, Volume= 4,967 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
10,716	98	Paved parking & roofs
10,716		100.00% Impervious Area

Summary for Subcatchment *24S:

Runoff = 1.82 cfs @ 12.00 hrs, Volume= 4,909 cf, Depth= 4.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
9,932	98	Paved parking & roofs
2,439	61	>75% Grass cover, Good, HSG B
12,371	91	Weighted Average
2,439		19.72% Pervious Area
9,932		80.28% Impervious Area

Summary for Subcatchment *2S:

Runoff = 5.25 cfs @ 12.08 hrs, Volume= 17,282 cf, Depth= 4.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
36,068	98	Paved parking & roofs
6,490	61	>75% Grass cover, Good, HSG B
42,558	92	Weighted Average
6,490		15.25% Pervious Area
36,068		84.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *2S-A:

Runoff = 0.62 cfs @ 12.24 hrs, Volume= 3,013 cf, Depth= 1.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
6,839	98	Paved parking & roofs
20,343	39	>75% Grass cover, Good, HSG A
27,182	54	Weighted Average
20,343		74.84% Pervious Area
6,839		25.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0080	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.00"
0.6	110	0.0410	3.04		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
15.2	210	Total			

Summary for Subcatchment *2S-B:

Runoff = 3.40 cfs @ 12.10 hrs, Volume= 11,216 cf, Depth= 4.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
9,888	98	Paved parking & roofs
22,825	80	>75% Grass cover, Good, HSG D
32,713	85	Weighted Average
22,825		69.77% Pervious Area
9,888		30.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	100	0.1100	0.33		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.00"
2.2	225	0.0133	1.73		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.3	325	Total			

Summary for Subcatchment *2S-C:

Runoff = 2.00 cfs @ 12.14 hrs, Volume= 7,132 cf, Depth= 2.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
6,665	98	Paved parking & roofs
28,009	61	>75% Grass cover, Good, HSG B
34,674	68	Weighted Average
28,009		80.78% Pervious Area
6,665		19.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	100	0.0400	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.00"
0.4	50	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.6	125	0.0080	1.34		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
9.7	275	Total			

Summary for Subcatchment *2S-D:

Runoff = 1.07 cfs @ 12.07 hrs, Volume= 3,231 cf, Depth= 3.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
3,354	98	Paved parking & roofs
6,839	74	>75% Grass cover, Good, HSG C
10,193	82	Weighted Average
6,839		67.10% Pervious Area
3,354		32.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment *3S:

Runoff = 3.05 cfs @ 12.08 hrs, Volume= 10,653 cf, Depth= 5.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
22,564	98	Paved parking & roofs
915	61	>75% Grass cover, Good, HSG B
23,479	97	Weighted Average
915		3.90% Pervious Area
22,564		96.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *4S:

Runoff = 3.03 cfs @ 12.08 hrs, Volume= 10,294 cf, Depth= 5.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
21,954	98	Paved parking & roofs
1,742	61	>75% Grass cover, Good, HSG B
23,696	95	Weighted Average
1,742		7.35% Pervious Area
21,954		92.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *5S:

Runoff = 3.77 cfs @ 12.08 hrs, Volume= 12,998 cf, Depth= 5.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
27,530	98	Paved parking & roofs
1,742	61	>75% Grass cover, Good, HSG B
29,272	96	Weighted Average
1,742		5.95% Pervious Area
27,530		94.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *6S:

Runoff = 3.55 cfs @ 12.08 hrs, Volume= 11,515 cf, Depth= 4.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
23,087	98	Paved parking & roofs
6,621	61	>75% Grass cover, Good, HSG B
29,708	90	Weighted Average
6,621		22.29% Pervious Area
23,087		77.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *7S:

Runoff = 1.00 cfs @ 12.09 hrs, Volume= 3,165 cf, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
1,830	98	Paved parking & roofs
15,377	61	>75% Grass cover, Good, HSG B
17,207	65	Weighted Average
15,377		89.36% Pervious Area
1,830		10.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *8S:

Runoff = 2.70 cfs @ 12.00 hrs, Volume= 7,588 cf, Depth= 5.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
16,074	98	Paved parking & roofs
1,394	61	>75% Grass cover, Good, HSG B
17,468	95	Weighted Average
1,394		7.98% Pervious Area
16,074		92.02% Impervious Area

Summary for Subcatchment *9S:

Runoff = 2.16 cfs @ 12.08 hrs, Volume= 7,255 cf, Depth= 5.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
2,744	74	>75% Grass cover, Good, HSG C
14,331	98	Paved parking & roofs
17,075	94	Weighted Average
2,744		16.07% Pervious Area
14,331		83.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 1.0S:

Runoff = 84.20 cfs @ 12.16 hrs, Volume= 335,798 cf, Depth= 4.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
	471,325	98	Paved parking, HSG D
	137,123	74	>75% Grass cover, Good, HSG C
	213,334	80	>75% Grass cover, Good, HSG D
	11,909	61	>75% Grass cover, Good, HSG B
*	53,516	98	ADJUSTMENT 2018
	887,207	89	Weighted Average
	362,366		40.84% Pervious Area
	524,841		59.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0200	0.16		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
2.7	137	0.0146	0.85		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
12.8	237	Total			

Summary for Subcatchment 1.0S.: A-SOILS

Runoff = 0.50 cfs @ 12.47 hrs, Volume= 5,305 cf, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
163,301	39	>75% Grass cover, Good, HSG A
163,301		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0200	0.16		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
2.7	137	0.0146	0.85		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
12.8	237	Total			

Summary for Subcatchment 3:

Runoff = 11.65 cfs @ 12.28 hrs, Volume= 53,870 cf, Depth= 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
	54,450	98	Paved parking & roofs
	44,867	39	>75% Grass cover, Good, HSG A
	125,888	61	>75% Grass cover, Good, HSG B
	16,553	80	>75% Grass cover, Good, HSG D
*	29,839	67	ADJUSTMENT
	271,597	67	Weighted Average
	217,147		79.95% Pervious Area
	54,450		20.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.3					**Direct Entry,**

Summary for Subcatchment 5:

Runoff = 15.21 cfs @ 12.41 hrs, Volume= 81,762 cf, Depth= 2.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
*	29,839	68	ADJUSTMENT
	17,424	98	Paved parking & roofs
*	0	100	Water Surface
	224,334	61	>75% Grass cover, Good, HSG B
	9,148	74	>75% Grass cover, Good, HSG C
	84,506	80	>75% Grass cover, Good, HSG D
*	7,884	98	ADJUSTMENT
*	10,524	98	ADJUSTMENT 2018
	383,659	69	Weighted Average
	347,827		90.66% Pervious Area
	35,832		9.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.0					**Direct Entry,**

Summary for Subcatchment 9:

Runoff = 2.96 cfs @ 12.07 hrs, Volume= 9,410 cf, Depth= 4.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
*	17,424	98	Impervious
	5,750	74	>75% Grass cover, Good, HSG C
	23,174	92	Weighted Average
	5,750		24.81% Pervious Area
	17,424		75.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment 13:

Runoff = 2.97 cfs @ 12.39 hrs, Volume= 20,421 cf, Depth= 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
252,038	39	>75% Grass cover, Good, HSG A
37,026	98	Paved parking & roofs
289,064	47	Weighted Average
252,038		87.19% Pervious Area
37,026		12.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	100	0.0330	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
8.9	500	0.0180	0.94		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
21.0	600	Total			

Summary for Subcatchment 14:

Runoff = 15.08 cfs @ 12.13 hrs, Volume= 53,585 cf, Depth= 3.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
122,796	98	Impervious
55,757	39	>75% Grass cover, Good, HSG A
178,553	80	Weighted Average
55,757		31.23% Pervious Area
122,796		68.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Summary for Subcatchment 15:

Runoff = 30.99 cfs @ 12.13 hrs, Volume= 113,191 cf, Depth= 4.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
	181,645	98	Paved parking & roofs - LOT 4
	86,684	61	>75% Grass cover, Good, HSG B - LOT 4
*	38,042	98	ADJUSTMENT 2018
	306,371	88	Weighted Average
	86,684		28.29% Pervious Area
	219,687		71.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Summary for Subcatchment 17S:

Runoff = 53.55 cfs @ 12.46 hrs, Volume= 311,691 cf, Depth= 3.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
472,701	80	>75% Grass cover, Good, HSG D
317,229	74	>75% Grass cover, Good, HSG C
193,436	98	Paved parking & roofs
983,366	82	Weighted Average
789,930		80.33% Pervious Area
193,436		19.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0090	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
19.9	793	0.0090	0.66		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
33.8	893	Total			

Summary for Subcatchment 18S:

Runoff = 18.94 cfs @ 12.31 hrs, Volume= 92,229 cf, Depth= 3.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
6,303	61	>75% Grass cover, Good, HSG B
254,763	74	>75% Grass cover, Good, HSG C
94,536	80	>75% Grass cover, Good, HSG D
355,602	75	Weighted Average
355,602		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0150	0.10		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
5.9	263	0.0114	0.75		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.5	92	0.1665	2.86		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
22.9	455	Total			

Summary for Subcatchment 18S.: A-SOILS

Runoff = 0.01 cfs @ 12.26 hrs, Volume= 73 cf, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
2,239	39	>75% Grass cover, Good, HSG A
2,239		100.00% Pervious Area

Summary for Subcatchment 20:

Runoff = 0.83 cfs @ 12.16 hrs, Volume= 3,163 cf, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
2,178	98	Paved parking & roofs
14,375	61	>75% Grass cover, Good, HSG B
16,553	66	Weighted Average
14,375		86.84% Pervious Area
2,178		13.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5					**Direct Entry,**

Summary for Subcatchment 21:

Runoff = 3.42 cfs @ 12.04 hrs, Volume= 10,315 cf, Depth= 4.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
21,344	98	Paved parking & roofs
3,485	61	>75% Grass cover, Good, HSG B
24,829	93	Weighted Average
3,485		14.04% Pervious Area
21,344		85.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3					**Direct Entry,**

Summary for Subcatchment 22:

Runoff = 3.26 cfs @ 12.06 hrs, Volume= 9,541 cf, Depth= 3.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
16,988	98	Paved parking & roofs
13,939	61	>75% Grass cover, Good, HSG B
30,927	81	Weighted Average
13,939		45.07% Pervious Area
16,988		54.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3					**Direct Entry,**

Summary for Subcatchment 23:

Runoff = 2.16 cfs @ 12.07 hrs, Volume= 6,595 cf, Depth= 4.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
14,375	98	Paved parking & roofs
2,178	39	>75% Grass cover, Good, HSG A
1,742	61	>75% Grass cover, Good, HSG B
18,295	87	Weighted Average
3,920		21.43% Pervious Area
14,375		78.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9					**Direct Entry,**

Summary for Subcatchment 24:

Runoff = 2.11 cfs @ 12.15 hrs, Volume= 7,776 cf, Depth= 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
18,731	98	Paved parking & roofs
20,473	39	>75% Grass cover, Good, HSG A
39,204	67	Weighted Average
20,473		52.22% Pervious Area
18,731		47.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6					**Direct Entry,**

Summary for Subcatchment 25:

Runoff = 0.59 cfs @ 12.02 hrs, Volume= 1,817 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
3,920	98	Paved parking & roofs
3,920		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1					**Direct Entry,**

Summary for Subcatchment 27:

Runoff = 0.83 cfs @ 12.05 hrs, Volume= 2,591 cf, Depth= 5.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
5,663	98	Paved parking & roofs
436	39	>75% Grass cover, Good, HSG A
6,099	94	Weighted Average
436		7.15% Pervious Area
5,663		92.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9					**Direct Entry,**

Summary for Subcatchment 28:

Runoff = 3.02 cfs @ 12.05 hrs, Volume= 8,649 cf, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
20,038	98	Paved parking & roofs
6,534	39	>75% Grass cover, Good, HSG A
26,572	83	Weighted Average
6,534		24.59% Pervious Area
20,038		75.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6					**Direct Entry,**

Summary for Subcatchment 29:

Runoff = 1.14 cfs @ 12.01 hrs, Volume= 3,432 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
7,405	98	Paved parking & roofs
7,405		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3					**Direct Entry,**

Summary for Subcatchment 30:

Runoff = 2.01 cfs @ 12.16 hrs, Volume= 7,660 cf, Depth= 3.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
17,860	98	Paved parking & roofs
6,970	39	>75% Grass cover, Good, HSG A
24,830	81	Weighted Average
6,970		28.07% Pervious Area
17,860		71.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3					**Direct Entry,**

Summary for Subcatchment 31:

Runoff = 1.16 cfs @ 12.01 hrs, Volume= 3,057 cf, Depth= 4.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
6,970	98	Paved parking & roofs
2,178	39	>75% Grass cover, Good, HSG A
9,148	84	Weighted Average
2,178		23.81% Pervious Area
6,970		76.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1					**Direct Entry,**

Summary for Subcatchment 32:

Runoff = 0.54 cfs @ 12.01 hrs, Volume= 1,615 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
3,485	98	Paved parking & roofs
3,485		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2					**Direct Entry,**

Summary for Subcatchment 33:

Runoff = 2.64 cfs @ 12.05 hrs, Volume= 7,695 cf, Depth= 4.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
17,424	98	Paved parking & roofs
3,920	39	>75% Grass cover, Good, HSG A
21,344	87	Weighted Average
3,920		18.37% Pervious Area
17,424		81.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6					**Direct Entry,**

Summary for Subcatchment 34:

Runoff = 1.00 cfs @ 12.02 hrs, Volume= 2,736 cf, Depth= 4.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
6,098	98	Paved parking & roofs
1,307	39	>75% Grass cover, Good, HSG A
7,405	88	Weighted Average
1,307		17.65% Pervious Area
6,098		82.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5					**Direct Entry,**

Summary for Subcatchment 35:

Runoff = 1.84 cfs @ 12.07 hrs, Volume= 6,190 cf, Depth= 5.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
13,504	98	Paved parking & roofs
436	39	>75% Grass cover, Good, HSG A
13,940	96	Weighted Average
436		3.13% Pervious Area
13,504		96.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3					**Direct Entry,**

Summary for Subcatchment 36:

Runoff = 0.96 cfs @ 12.04 hrs, Volume= 2,736 cf, Depth= 4.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
6,098	98	Paved parking & roofs
1,307	39	>75% Grass cover, Good, HSG A
7,405	88	Weighted Average
1,307		17.65% Pervious Area
6,098		82.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8					**Direct Entry,**

Summary for Subcatchment 37:

Runoff = 0.41 cfs @ 12.01 hrs, Volume= 1,212 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
2,614	98	Paved parking & roofs
2,614		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry,**

Summary for Subcatchment 38:

Runoff = 1.60 cfs @ 12.02 hrs, Volume= 4,846 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
10,454	98	Paved parking & roofs
10,454		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4					**Direct Entry,**

Summary for Subcatchment 39:

Runoff = 0.77 cfs @ 12.24 hrs, Volume= 3,342 cf, Depth= 2.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
7,841	98	Paved parking & roofs
7,841	39	>75% Grass cover, Good, HSG A
15,682	69	Weighted Average
7,841		50.00% Pervious Area
7,841		50.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0					**Direct Entry,**

Summary for Subcatchment 41S:

Runoff = 2.98 cfs @ 12.36 hrs, Volume= 17,769 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
20,925	98	Paved parking & roofs
17,412	98	Paved parking & roofs
38,337	98	Weighted Average
38,337		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.0600	0.26		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
1.5	112	0.0300	1.21		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
3.8	308	0.0381	1.37		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
0.1	50	0.5000	14.35		**Shallow Concentrated Flow, D-E** Paved Kv= 20.3 fps
15.6	278	0.0018	0.30		**Shallow Concentrated Flow, E-F** Short Grass Pasture Kv= 7.0 fps
27.5	848	Total			

Summary for Subcatchment 41S.: A-SOILS

Runoff = 0.39 cfs @ 12.26 hrs, Volume= 3,749 cf, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
81,220	39	>75% Grass cover, Good, HSG A
34,205	39	>75% Grass cover, Good, HSG A
115,425	39	Weighted Average
115,425		100.00% Pervious Area

Summary for Subcatchment 51:

Runoff = 1.94 cfs @ 12.03 hrs, Volume= 5,572 cf, Depth= 4.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
11,326	98	Paved parking & roofs
3,049	61	>75% Grass cover, Good, HSG B
14,375	90	Weighted Average
3,049		21.21% Pervious Area
11,326		78.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6					**Direct Entry,**

Summary for Subcatchment 52:

Runoff = 7.91 cfs @ 12.09 hrs, Volume= 25,239 cf, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
45,738	98	Paved parking & roofs
0	39	>75% Grass cover, Good, HSG A
31,799	61	>75% Grass cover, Good, HSG B
77,537	83	Weighted Average
31,799		41.01% Pervious Area
45,738		58.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6					**Direct Entry,**

Summary for Subcatchment 53:

Runoff = 1.99 cfs @ 12.02 hrs, Volume= 5,312 cf, Depth= 3.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
8,712	98	Paved parking & roofs
10,019	61	>75% Grass cover, Good, HSG B
18,731	78	Weighted Average
10,019		53.49% Pervious Area
8,712		46.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9					**Direct Entry,**

Summary for Subcatchment 61:

Runoff = 3.00 cfs @ 12.23 hrs, Volume= 12,877 cf, Depth= 2.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
*	13,068	100	Water Surface
	45,302	61	>75% Grass cover, Good, HSG B
	0	74	>75% Grass cover, Good, HSG C
	58,370	70	Weighted Average
	45,302		77.61% Pervious Area
	13,068		22.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5					**Direct Entry,**

Summary for Subcatchment 98S:

Runoff = 20.08 cfs @ 12.42 hrs, Volume= 110,660 cf, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
39,904	61	>75% Grass cover, Good, HSG B
105,781	80	>75% Grass cover, Good, HSG D
294,398	74	>75% Grass cover, Good, HSG C
440,083	74	Weighted Average
440,083		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.2					**Direct Entry, Tc From 99S**

Summary for Subcatchment 99S:

Runoff = 27.70 cfs @ 12.41 hrs, Volume= 152,303 cf, Depth= 3.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
14,673	98	Paved parking & roofs
16,843	98	Paved parking & roofs
248,035	74	>75% Grass cover, Good, HSG C
7,750	98	Paved parking & roofs
178,437	74	>75% Grass cover, Good, HSG C
4,185	98	Paved parking & roofs
83,062	80	>75% Grass cover, Good, HSG D
552,985	77	Weighted Average
509,534		92.14% Pervious Area
43,451		7.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	100	0.0400	0.22		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
1.2	150	0.0933	2.14		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
1.0	69	0.0290	1.19		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
20.3	1,310	0.0237	1.08		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
30.2	1,629	Total			

Summary for Subcatchment 99S.: A-SOILS

Runoff = 0.08 cfs @ 12.26 hrs, Volume= 746 cf, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
22,953	39	>75% Grass cover, Good, HSG A
22,953		100.00% Pervious Area

Summary for Subcatchment P2-S: WET POND (P2) SURFACE

Runoff = 12.42 cfs @ 12.01 hrs, Volume= 37,075 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
79,989	98	Water Surface, HSG A
79,989		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	635		9.93		**Lake or Reservoir, WET POND** Mean Depth= 3.06'

Summary for Reach *1R:

Inflow Area = 492,315 sf, 83.35% Impervious, Inflow Depth = 4.92" for 25 Year Storm event
Inflow = 55.83 cfs @ 12.07 hrs, Volume= 201,831 cf
Outflow = 53.96 cfs @ 12.09 hrs, Volume= 201,831 cf, Atten= 3%, Lag= 1.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.97 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 0.73 fps, Avg. Travel Time= 9.1 min

Peak Storage= 7,278 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.59'
Bank-Full Depth= 2.00' Flow Area= 90.0 sf, Capacity= 529.57 cfs

25.00' x 2.00' deep channel, n= 0.035
Side Slope Z-value= 12.5 7.5 '/' Top Width= 65.00'
Length= 400.0' Slope= 0.0125 '/'
Inlet Invert= 35.00', Outlet Invert= 30.00'



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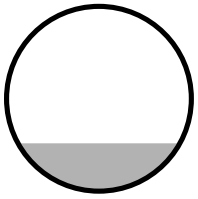
Summary for Reach *20R:

Inflow Area = 27,182 sf, 25.16% Impervious, Inflow Depth = 1.33" for 25 Year Storm event
Inflow = 0.62 cfs @ 12.24 hrs, Volume= 3,013 cf
Outflow = 0.62 cfs @ 12.25 hrs, Volume= 3,013 cf, Atten= 1%, Lag= 0.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.85 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 1.70 fps, Avg. Travel Time= 3.1 min

Peak Storage= 50 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.25 cfs

12.0" Round Pipe
n= 0.013
Length= 315.0' Slope= 0.0142 '/'
Inlet Invert= 58.89', Outlet Invert= 54.41'



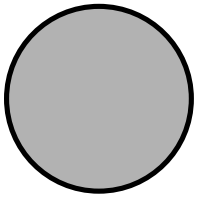
Summary for Reach *21R:

Inflow Area = 59,895 sf, 27.93% Impervious, Inflow Depth = 2.85" for 25 Year Storm event
Inflow = 3.71 cfs @ 12.10 hrs, Volume= 14,229 cf
Outflow = 3.27 cfs @ 12.27 hrs, Volume= 14,229 cf, Atten= 12%, Lag= 9.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.42 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.75 fps, Avg. Travel Time= 2.6 min

Peak Storage= 212 cf @ 12.09 hrs
Average Depth at Peak Storage= 1.00'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.04 cfs

12.0" Round Pipe
n= 0.013
Length= 270.0' Slope= 0.0073 '/'
Inlet Invert= 54.31', Outlet Invert= 52.34'



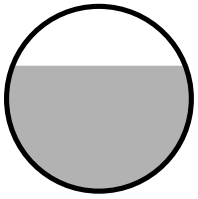
Summary for Reach *22R:

Inflow Area = 94,569 sf, 24.74% Impervious, Inflow Depth = 2.71" for 25 Year Storm event
Inflow = 5.04 cfs @ 12.14 hrs, Volume= 21,361 cf
Outflow = 5.04 cfs @ 12.14 hrs, Volume= 21,361 cf, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.69 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.08 fps, Avg. Travel Time= 0.9 min

Peak Storage= 97 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.85'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 6.28 cfs

15.0" Round Pipe
n= 0.013
Length= 110.0' Slope= 0.0095 '/'
Inlet Invert= 52.24', Outlet Invert= 51.20'



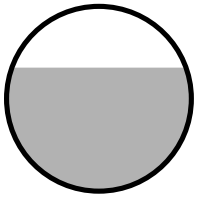
Summary for Reach *23R: Outflow To Downstream Defender

Inflow Area = 104,762 sf, 25.53% Impervious, Inflow Depth = 2.82" for 25 Year Storm event
Inflow = 5.97 cfs @ 12.08 hrs, Volume= 24,591 cf
Outflow = 5.96 cfs @ 12.09 hrs, Volume= 24,591 cf, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.84 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.48 fps, Avg. Travel Time= 0.5 min

Peak Storage= 70 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.84'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.57 cfs

15.0" Round Pipe
n= 0.013
Length= 80.0' Slope= 0.0138 '/'
Inlet Invert= 51.10', Outlet Invert= 50.00'



Summary for Reach *2R:

Inflow Area = 104,762 sf, 25.53% Impervious, Inflow Depth = 2.82" for 25 Year Storm event
Inflow = 5.96 cfs @ 12.09 hrs, Volume= 24,591 cf
Outflow = 5.17 cfs @ 12.22 hrs, Volume= 24,591 cf, Atten= 13%, Lag= 8.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.74 fps, Min. Travel Time= 7.7 min
Avg. Velocity = 0.52 fps, Avg. Travel Time= 25.8 min

Peak Storage= 2,383 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 2.00' Flow Area= 47.0 sf, Capacity= 260.28 cfs

10.00' x 2.00' deep channel, n= 0.035
Side Slope Z-value= 6.0 7.5 '/' Top Width= 37.00'
Length= 800.0' Slope= 0.0125 '/'
Inlet Invert= 50.00', Outlet Invert= 40.00'



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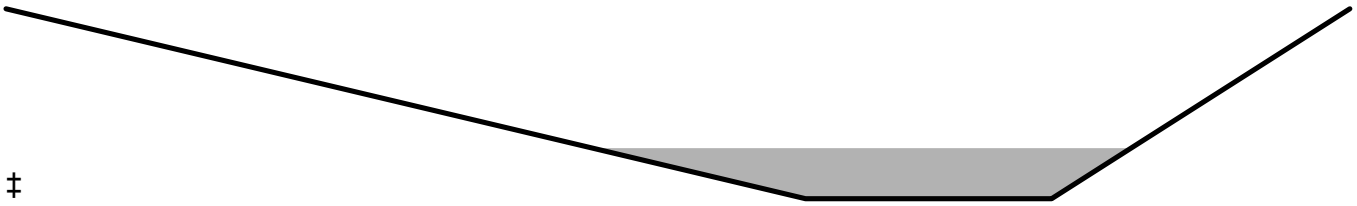
Summary for Reach 3R:

Inflow Area = 1,114,380 sf, 33.39% Impervious, Inflow Depth = 2.38" for 25 Year Storm event
Inflow = 38.39 cfs @ 12.43 hrs, Volume= 221,101 cf
Outflow = 37.58 cfs @ 12.48 hrs, Volume= 221,101 cf, Atten= 2%, Lag= 3.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.77 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 0.88 fps, Avg. Travel Time= 11.3 min

Peak Storage= 8,081 cf @ 12.48 hrs
Average Depth at Peak Storage= 0.53'
Bank-Full Depth= 2.00' Flow Area= 103.4 sf, Capacity= 602.80 cfs

16.00' x 2.00' deep channel, n= 0.035 High grass
Side Slope Z-value= 26.0 9.7 '/' Top Width= 87.40'
Length= 596.0' Slope= 0.0151 '/'
Inlet Invert= 48.00', Outlet Invert= 39.00'



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Summary for Reach 9R:

Inflow Area = 797,162 sf, 49.79% Impervious, Inflow Depth = 2.96" for 25 Year Storm event
Inflow = 48.88 cfs @ 12.13 hrs, Volume= 196,608 cf
Outflow = 48.88 cfs @ 12.13 hrs, Volume= 196,608 cf, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.95 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.69 fps, Avg. Travel Time= 0.6 min

Peak Storage= 614 cf @ 12.13 hrs
Average Depth at Peak Storage= 1.14'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 176.48 cfs

2.00' x 2.00' deep channel, n= 0.035
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 100.0' Slope= 0.0600 '/'
Inlet Invert= 0.00', Outlet Invert= -6.00'



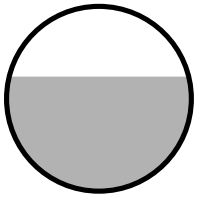
Summary for Reach 13R:

Inflow Area = 289,064 sf, 12.81% Impervious, Inflow Depth = 0.85" for 25 Year Storm event
Inflow = 2.97 cfs @ 12.39 hrs, Volume= 20,421 cf
Outflow = 2.97 cfs @ 12.41 hrs, Volume= 20,421 cf, Atten= 0%, Lag= 1.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.81 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 3.01 fps, Avg. Travel Time= 1.8 min

Peak Storage= 168 cf @ 12.41 hrs
Average Depth at Peak Storage= 0.62'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.21 cfs

12.0" Round Pipe
n= 0.011
Length= 330.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -3.30'



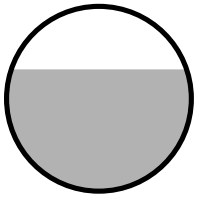
Summary for Reach 14AR:

Inflow Area = 490,791 sf, 36.11% Impervious, Inflow Depth = 2.04" for 25 Year Storm event
Inflow = 17.90 cfs @ 12.13 hrs, Volume= 83,417 cf
Outflow = 17.89 cfs @ 12.14 hrs, Volume= 83,417 cf, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 14.50 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 5.12 fps, Avg. Travel Time= 0.6 min

Peak Storage= 210 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.99'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 23.22 cfs

18.0" Round Pipe
n= 0.011
Length= 170.0' Slope= 0.0350 '/'
Inlet Invert= 0.00', Outlet Invert= -5.95'



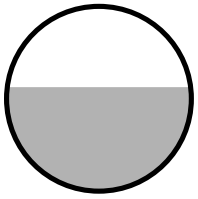
Summary for Reach 14R:

Inflow Area = 178,553 sf, 68.77% Impervious, Inflow Depth = 3.60" for 25 Year Storm event
Inflow = 15.08 cfs @ 12.13 hrs, Volume= 53,585 cf
Outflow = 15.08 cfs @ 12.14 hrs, Volume= 53,585 cf, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 14.73 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 5.39 fps, Avg. Travel Time= 0.7 min

Peak Storage= 235 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.84'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 24.83 cfs

18.0" Round Pipe
n= 0.011
Length= 230.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -9.20'



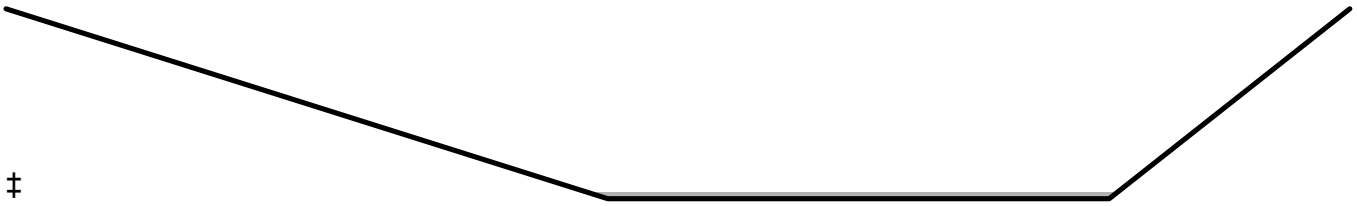
Summary for Reach 16R:

Inflow Area = 797,162 sf, 49.79% Impervious, Inflow Depth = 2.96" for 25 Year Storm event
Inflow = 48.88 cfs @ 12.13 hrs, Volume= 196,608 cf
Outflow = 40.95 cfs @ 12.21 hrs, Volume= 196,608 cf, Atten= 16%, Lag= 4.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.81 fps, Min. Travel Time= 8.3 min
Avg. Velocity = 1.26 fps, Avg. Travel Time= 18.5 min

Peak Storage= 20,397 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 4.00' Flow Area= 736.0 sf, Capacity= 15,061.85 cfs

100.00' x 4.00' deep channel, n= 0.025 Earth, grassed & winding
Side Slope Z-value= 30.0 12.0 '/' Top Width= 268.00'
Length= 1,400.0' Slope= 0.0309 '/'
Inlet Invert= 64.00', Outlet Invert= 20.80'



‡

Summary for Reach 20R:

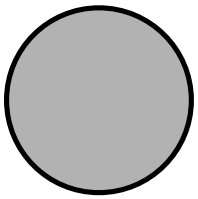
SMJDF 02.26.99

Inflow Area = 672,351 sf, 48.07% Impervious, Inflow Depth = 3.30" for 25 Year Storm event
Inflow = 43.22 cfs @ 12.08 hrs, Volume= 184,960 cf
Outflow = 42.35 cfs @ 12.07 hrs, Volume= 184,960 cf, Atten= 2%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 14.22 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 5.02 fps, Avg. Travel Time= 1.0 min

Peak Storage= 908 cf @ 12.08 hrs
Average Depth at Peak Storage= 2.00'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 39.18 cfs

24.0" Round Pipe
n= 0.013
Length= 289.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -8.67'



Summary for Reach 21R:

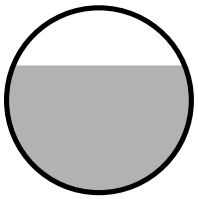
SMJDF 02.26.99

Inflow Area = 273,558 sf, 73.41% Impervious, Inflow Depth = 4.03" for 25 Year Storm event
Inflow = 26.17 cfs @ 12.06 hrs, Volume= 91,804 cf
Outflow = 26.14 cfs @ 12.07 hrs, Volume= 91,804 cf, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 11.35 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 3.63 fps, Avg. Travel Time= 0.8 min

Peak Storage= 414 cf @ 12.07 hrs
Average Depth at Peak Storage= 1.37'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 31.99 cfs

24.0" Round Pipe
n= 0.013
Length= 180.0' Slope= 0.0200 '/'
Inlet Invert= 0.00', Outlet Invert= -3.60'



Summary for Reach 22R:

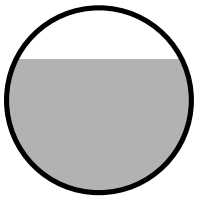
SMJDF 02.26.99

Inflow Area = 217,802 sf, 74.60% Impervious, Inflow Depth = 3.96" for 25 Year Storm event
Inflow = 19.79 cfs @ 12.06 hrs, Volume= 71,949 cf
Outflow = 19.71 cfs @ 12.07 hrs, Volume= 71,949 cf, Atten= 0%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.11 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 2.66 fps, Avg. Travel Time= 1.8 min

Peak Storage= 704 cf @ 12.07 hrs
Average Depth at Peak Storage= 1.44'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 22.62 cfs

24.0" Round Pipe
n= 0.013
Length= 290.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -2.90'



Summary for Reach 23R:

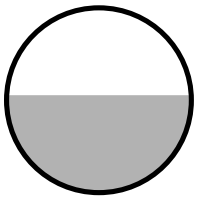
SMJDF 02.26.99

Inflow Area = 199,507 sf, 74.24% Impervious, Inflow Depth = 3.93" for 25 Year Storm event
Inflow = 17.65 cfs @ 12.06 hrs, Volume= 65,353 cf
Outflow = 17.64 cfs @ 12.06 hrs, Volume= 65,353 cf, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.51 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.36 fps, Avg. Travel Time= 0.5 min

Peak Storage= 173 cf @ 12.06 hrs
Average Depth at Peak Storage= 1.05'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 32.30 cfs

24.0" Round Pipe
n= 0.013
Length= 103.0' Slope= 0.0204 '/'
Inlet Invert= 0.00', Outlet Invert= -2.10'



Summary for Reach 24R:

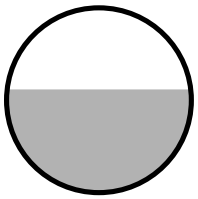
SMJDF 02.26.99

Inflow Area = 160,303 sf, 80.71% Impervious, Inflow Depth = 4.31" for 25 Year Storm event
Inflow = 16.24 cfs @ 12.05 hrs, Volume= 57,577 cf
Outflow = 16.24 cfs @ 12.05 hrs, Volume= 57,577 cf, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 16.03 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.12 fps, Avg. Travel Time= 0.2 min

Peak Storage= 76 cf @ 12.05 hrs
Average Depth at Peak Storage= 0.84'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 27.12 cfs

18.0" Round Pipe
n= 0.013
Length= 75.0' Slope= 0.0667 '/'
Inlet Invert= 0.00', Outlet Invert= -5.00'



Summary for Reach 25R:

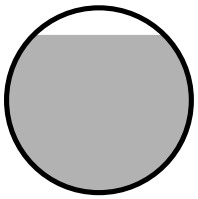
SMJDF 02.26.99

Inflow Area = 156,383 sf, 80.22% Impervious, Inflow Depth = 4.28" for 25 Year Storm event
Inflow = 15.73 cfs @ 12.05 hrs, Volume= 55,760 cf
Outflow = 15.71 cfs @ 12.05 hrs, Volume= 55,760 cf, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.81 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.35 fps, Avg. Travel Time= 0.6 min

Peak Storage= 199 cf @ 12.05 hrs
Average Depth at Peak Storage= 1.28'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 15.21 cfs

18.0" Round Pipe
n= 0.013
Length= 124.0' Slope= 0.0210 '/'
Inlet Invert= 0.00', Outlet Invert= -2.60'



Summary for Reach 26R:

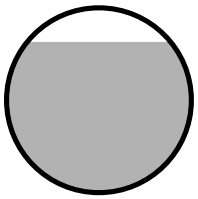
SMJDF 02.26.99

Inflow Area = 147,235 sf, 80.47% Impervious, Inflow Depth = 4.30" for 25 Year Storm event
Inflow = 14.81 cfs @ 12.05 hrs, Volume= 52,704 cf
Outflow = 14.78 cfs @ 12.05 hrs, Volume= 52,704 cf, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.58 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 3.25 fps, Avg. Travel Time= 1.0 min

Peak Storage= 296 cf @ 12.05 hrs
Average Depth at Peak Storage= 1.22'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 14.86 cfs

18.0" Round Pipe
n= 0.013
Length= 192.0' Slope= 0.0200 '/'
Inlet Invert= 0.00', Outlet Invert= -3.84'



Summary for Reach 27R:

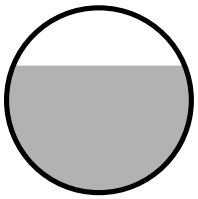
SMJDF 02.26.99

Inflow Area = 82,329 sf, 82.01% Impervious, Inflow Depth = 4.43" for 25 Year Storm event
Inflow = 8.78 cfs @ 12.04 hrs, Volume= 30,370 cf
Outflow = 8.75 cfs @ 12.04 hrs, Volume= 30,370 cf, Atten= 0%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.76 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 2.23 fps, Avg. Travel Time= 1.4 min

Peak Storage= 248 cf @ 12.04 hrs
Average Depth at Peak Storage= 1.03'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 10.72 cfs

18.0" Round Pipe
n= 0.013
Length= 192.0' Slope= 0.0104 '/'
Inlet Invert= 0.00', Outlet Invert= -2.00'



Summary for Reach 28R:

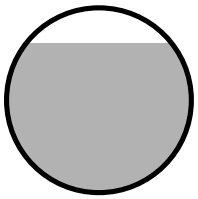
SMJDF 02.26.99

Inflow Area = 21,345 sf, 91.83% Impervious, Inflow Depth = 5.02" for 25 Year Storm event
Inflow = 2.65 cfs @ 12.05 hrs, Volume= 8,926 cf
Outflow = 2.64 cfs @ 12.06 hrs, Volume= 8,926 cf, Atten= 0%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.87 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.36 fps, Avg. Travel Time= 1.3 min

Peak Storage= 73 cf @ 12.06 hrs
Average Depth at Peak Storage= 0.81'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.67 cfs

12.0" Round Pipe
n= 0.013
Length= 107.0' Slope= 0.0056 '/'
Inlet Invert= 0.00', Outlet Invert= -0.60'



Summary for Reach 29R:

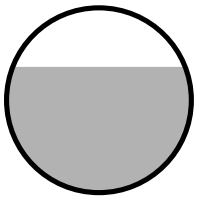
SMJDF 02.26.99

Inflow Area = 398,793 sf, 30.69% Impervious, Inflow Depth = 2.80" for 25 Year Storm event
Inflow = 18.24 cfs @ 12.12 hrs, Volume= 93,156 cf
Outflow = 18.23 cfs @ 12.13 hrs, Volume= 93,156 cf, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.01 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.93 fps, Avg. Travel Time= 0.7 min

Peak Storage= 262 cf @ 12.13 hrs
Average Depth at Peak Storage= 1.36'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 22.62 cfs

24.0" Round Pipe
n= 0.013
Length= 115.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -1.15'



Summary for Reach 51R:

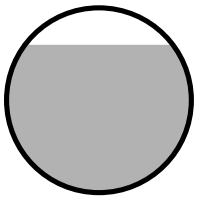
SMJDF 02.26.99

Inflow Area = 110,643 sf, 59.45% Impervious, Inflow Depth = 3.92" for 25 Year Storm event
Inflow = 10.98 cfs @ 12.07 hrs, Volume= 36,122 cf
Outflow = 10.93 cfs @ 12.08 hrs, Volume= 36,122 cf, Atten= 0%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.39 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 3.57 fps, Avg. Travel Time= 1.5 min

Peak Storage= 342 cf @ 12.08 hrs
Average Depth at Peak Storage= 1.00'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 11.19 cfs

15.0" Round Pipe
n= 0.013
Length= 325.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -9.75'



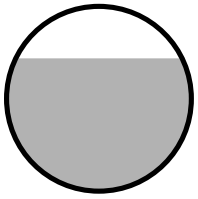
Summary for Reach 52R:

Inflow Area = 77,537 sf, 58.99% Impervious, Inflow Depth = 3.91" for 25 Year Storm event
Inflow = 7.91 cfs @ 12.09 hrs, Volume= 25,239 cf
Outflow = 7.90 cfs @ 12.09 hrs, Volume= 25,239 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.38 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 3.04 fps, Avg. Travel Time= 0.1 min

Peak Storage= 24 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.90'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 9.14 cfs

15.0" Round Pipe
n= 0.013
Length= 25.0' Slope= 0.0200 '/'
Inlet Invert= 0.00', Outlet Invert= -0.50'



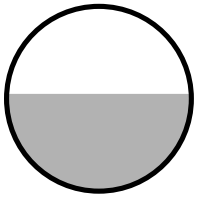
Summary for Reach 53R:

Inflow Area = 14,375 sf, 78.79% Impervious, Inflow Depth = 4.65" for 25 Year Storm event
Inflow = 1.94 cfs @ 12.03 hrs, Volume= 5,572 cf
Outflow = 1.94 cfs @ 12.04 hrs, Volume= 5,572 cf, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.63 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.51 fps, Avg. Travel Time= 0.7 min

Peak Storage= 28 cf @ 12.04 hrs
Average Depth at Peak Storage= 0.53'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.56 cfs

12.0" Round Pipe
n= 0.013
Length= 66.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.66'



Summary for Pond *1: Flow Entering CB1

Inflow Area = 130,810 sf, 83.98% Impervious, Inflow Depth = 4.86" for 25 Year Storm event
Inflow = 15.55 cfs @ 12.07 hrs, Volume= 53,004 cf
Outflow = 15.55 cfs @ 12.07 hrs, Volume= 53,004 cf, Atten= 0%, Lag= 0.0 min
Primary = 15.55 cfs @ 12.07 hrs, Volume= 53,004 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 59.42' @ 12.09 hrs
Flood Elev= 59.65'

Device	Routing	Invert	Outlet Devices
#1	Primary	52.70'	**18.0" Round Culvert** L= 145.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 52.70' / 51.83' S= 0.0060 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=14.92 cfs @ 12.07 hrs HW=59.12' TW=55.69' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 14.92 cfs @ 8.44 fps)

Summary for Pond *10: Flow Entering CB10

Inflow Area = 75,881 sf, 84.16% Impervious, Inflow Depth = 4.87" for 25 Year Storm event
Inflow = 9.36 cfs @ 12.08 hrs, Volume= 30,814 cf
Outflow = 9.36 cfs @ 12.08 hrs, Volume= 30,814 cf, Atten= 0%, Lag= 0.0 min
Primary = 9.36 cfs @ 12.08 hrs, Volume= 30,814 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 60.14' @ 12.10 hrs
Flood Elev= 59.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	53.25'	**18.0" Round Culvert** L= 30.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 53.25' / 52.80' S= 0.0150 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=7.13 cfs @ 12.08 hrs HW=59.72' TW=59.27' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 7.13 cfs @ 4.03 fps)

Summary for Pond *11: Flow Entering CB11

Inflow Area = 42,558 sf, 84.75% Impervious, Inflow Depth = 4.87" for 25 Year Storm event
Inflow = 5.25 cfs @ 12.08 hrs, Volume= 17,282 cf
Outflow = 5.25 cfs @ 12.08 hrs, Volume= 17,282 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.25 cfs @ 12.08 hrs, Volume= 17,282 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 60.11' @ 12.10 hrs
Flood Elev= 58.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	53.40'	**15.0" Round Culvert** L= 85.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 53.40' / 52.80' S= 0.0071 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=3.94 cfs @ 12.08 hrs HW=59.69' TW=59.27' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 3.94 cfs @ 3.21 fps)

Summary for Pond *13: Flow Entering CB13

Inflow Area = 17,207 sf, 10.64% Impervious, Inflow Depth = 2.21" for 25 Year Storm event
Inflow = 1.00 cfs @ 12.09 hrs, Volume= 3,165 cf
Outflow = 1.00 cfs @ 12.09 hrs, Volume= 3,165 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.00 cfs @ 12.09 hrs, Volume= 3,165 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 55.04' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	54.45'	**12.0" Round Culvert** L= 135.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 54.45' / 53.10' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.99 cfs @ 12.09 hrs HW=55.04' TW=53.86' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.99 cfs @ 2.06 fps)

Summary for Pond *14: Flow Entering CB14

Inflow Area = 7,536 sf, 84.39% Impervious, Inflow Depth = 5.10" for 25 Year Storm event
Inflow = 1.15 cfs @ 12.00 hrs, Volume= 3,202 cf
Outflow = 1.15 cfs @ 12.00 hrs, Volume= 3,202 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.15 cfs @ 12.00 hrs, Volume= 3,202 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 54.89' @ 12.02 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	52.75'	**12.0" Round Culvert** L= 58.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 52.75' / 52.45' S= 0.0052 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.00 hrs HW=54.20' TW=54.39' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond *15: Flow Entering CB15

Inflow Area = 15,289 sf, 88.04% Impervious, Inflow Depth = 5.16" for 25 Year Storm event
Inflow = 2.35 cfs @ 12.00 hrs, Volume= 6,570 cf
Outflow = 2.35 cfs @ 12.00 hrs, Volume= 6,570 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.35 cfs @ 12.00 hrs, Volume= 6,570 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 54.79' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	52.35'	**12.0" Round Culvert** L= 88.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 52.35' / 51.80' S= 0.0063 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.64 cfs @ 12.00 hrs HW=54.39' TW=54.07' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.64 cfs @ 2.09 fps)

Summary for Pond *16: Flow Entering CB16

Inflow Area = 53,361 sf, 67.76% Impervious, Inflow Depth = 4.36" for 25 Year Storm event
Inflow = 6.18 cfs @ 12.00 hrs, Volume= 19,406 cf
Outflow = 6.18 cfs @ 12.00 hrs, Volume= 19,406 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.18 cfs @ 12.00 hrs, Volume= 19,406 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 54.26' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	51.70'	**18.0" Round Culvert** L= 78.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 51.70' / 51.15' S= 0.0071 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=5.47 cfs @ 12.00 hrs HW=54.11' TW=53.45' (Dynamic Tailwater)
1=Culvert (Inlet Controls 5.47 cfs @ 3.10 fps)

Summary for Pond *17: Flow Entering CB17

Inflow Area = 75,141 sf, 77.10% Impervious, Inflow Depth = 4.71" for 25 Year Storm event
Inflow = 9.62 cfs @ 12.00 hrs, Volume= 29,501 cf
Outflow = 9.62 cfs @ 12.00 hrs, Volume= 29,501 cf, Atten= 0%, Lag= 0.0 min
Primary = 9.62 cfs @ 12.00 hrs, Volume= 29,501 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 53.67' @ 12.10 hrs
Flood Elev= 57.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	51.05'	**18.0" Round Culvert** L= 135.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 51.05' / 50.10' S= 0.0070 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=9.22 cfs @ 12.00 hrs HW=53.44' TW=52.18' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 9.22 cfs @ 5.22 fps)

Summary for Pond *18: Flow Entering CB18

Inflow Area = 17,075 sf, 83.93% Impervious, Inflow Depth = 5.10" for 25 Year Storm event
Inflow = 2.16 cfs @ 12.08 hrs, Volume= 7,255 cf
Outflow = 2.16 cfs @ 12.08 hrs, Volume= 7,255 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.16 cfs @ 12.08 hrs, Volume= 7,255 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 51.58' @ 12.10 hrs
Flood Elev= 52.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	47.40'	**15.0" Round Culvert** L= 118.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 47.40' / 46.80' S= 0.0051 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=51.20' TW=51.30' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond *19: Flow Entering CB19

Inflow Area = 41,207 sf, 73.15% Impervious, Inflow Depth = 4.58" for 25 Year Storm event
Inflow = 4.84 cfs @ 12.08 hrs, Volume= 15,741 cf
Outflow = 4.84 cfs @ 12.08 hrs, Volume= 15,741 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.84 cfs @ 12.08 hrs, Volume= 15,741 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 51.44' @ 12.09 hrs
Flood Elev= 52.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	46.70'	**15.0" Round Culvert** L= 130.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 46.70' / 46.05' S= 0.0050 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=4.47 cfs @ 12.08 hrs HW=51.32' TW=50.63' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 4.47 cfs @ 3.64 fps)

Summary for Pond *2: Flow Entering CB2

Inflow Area = 154,289 sf, 85.83% Impervious, Inflow Depth = 4.95" for 25 Year Storm event
Inflow = 18.60 cfs @ 12.07 hrs, Volume= 63,657 cf
Outflow = 18.60 cfs @ 12.07 hrs, Volume= 63,657 cf, Atten= 0%, Lag= 0.0 min
Primary = 18.60 cfs @ 12.07 hrs, Volume= 63,657 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 56.07' @ 12.10 hrs
Flood Elev= 58.75'

Device	Routing	Invert	Outlet Devices
#1	Primary	51.73'	**24.0" Round Culvert** L= 125.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 51.73' / 50.98' S= 0.0060 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=16.92 cfs @ 12.07 hrs HW=55.70' TW=54.66' (Dynamic Tailwater)
1=Culvert (Outlet Controls 16.92 cfs @ 5.39 fps)

Summary for Pond *20: Flow Entering CB 20

Inflow Area = 17,511 sf,100.00% Impervious, Inflow Depth = 5.56" for 25 Year Storm event
Inflow = 2.29 cfs @ 12.08 hrs, Volume= 8,116 cf
Outflow = 2.29 cfs @ 12.08 hrs, Volume= 8,116 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.29 cfs @ 12.08 hrs, Volume= 8,116 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 50.52' @ 12.09 hrs
Flood Elev= 52.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	47.25'	**15.0" Round Culvert** L= 122.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 47.25' / 46.40' S= 0.0070 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=1.35 cfs @ 12.08 hrs HW=50.40' TW=50.34' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.35 cfs @ 1.10 fps)

Summary for Pond *21: Flow Entering CB21

Inflow Area = 35,066 sf,100.00% Impervious, Inflow Depth = 5.56" for 25 Year Storm event
Inflow = 4.58 cfs @ 12.08 hrs, Volume= 16,253 cf
Outflow = 4.58 cfs @ 12.08 hrs, Volume= 16,253 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.58 cfs @ 12.08 hrs, Volume= 16,253 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 50.35' @ 12.08 hrs
Flood Elev= 52.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	46.30'	**15.0" Round Culvert** L= 155.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 46.30' / 45.23' S= 0.0069 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=4.62 cfs @ 12.08 hrs HW=50.34' TW=49.50' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 4.62 cfs @ 3.76 fps)

Summary for Pond *22: Flow Entering CB22

Inflow Area = 13,896 sf,100.00% Impervious, Inflow Depth = 5.56" for 25 Year Storm event
Inflow = 1.81 cfs @ 12.08 hrs, Volume= 6,441 cf
Outflow = 1.81 cfs @ 12.08 hrs, Volume= 6,441 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.81 cfs @ 12.08 hrs, Volume= 6,441 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 46.43' @ 12.08 hrs
Flood Elev= 51.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	45.80'	**15.0" Round Culvert** L= 222.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 45.80' / 41.60' S= 0.0189 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=1.82 cfs @ 12.08 hrs HW=46.43' TW=44.69' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.82 cfs @ 4.30 fps)

Summary for Pond *23: Flow Entering CB10

Inflow Area = 10,716 sf,100.00% Impervious, Inflow Depth = 5.56" for 25 Year Storm event
Inflow = 1.69 cfs @ 12.00 hrs, Volume= 4,967 cf
Outflow = 1.69 cfs @ 12.00 hrs, Volume= 4,967 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.69 cfs @ 12.00 hrs, Volume= 4,967 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 53.70' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	52.75'	**15.0" Round Culvert** L= 86.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 52.75' / 51.15' S= 0.0186 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=1.11 cfs @ 12.00 hrs HW=53.57' TW=53.43' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.11 cfs @ 1.85 fps)

Summary for Pond *3: Flow Entering CB3

Inflow Area = 177,985 sf, 86.74% Impervious, Inflow Depth = 4.99" for 25 Year Storm event
Inflow = 21.62 cfs @ 12.08 hrs, Volume= 73,951 cf
Outflow = 21.62 cfs @ 12.08 hrs, Volume= 73,951 cf, Atten= 0%, Lag= 0.0 min
Primary = 21.62 cfs @ 12.08 hrs, Volume= 73,951 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 54.97' @ 12.10 hrs
Flood Elev= 57.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	50.88'	**24.0" Round Culvert** L= 130.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 50.88' / 50.10' S= 0.0060 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=20.31 cfs @ 12.08 hrs HW=54.67' TW=53.14' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 20.31 cfs @ 6.46 fps)

Summary for Pond *4: Flow Entering CB4

Inflow Area = 282,398 sf, 84.93% Impervious, Inflow Depth = 4.95" for 25 Year Storm event
Inflow = 31.47 cfs @ 12.06 hrs, Volume= 116,449 cf
Outflow = 31.47 cfs @ 12.06 hrs, Volume= 116,449 cf, Atten= 0%, Lag= 0.0 min
Primary = 31.47 cfs @ 12.06 hrs, Volume= 116,449 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 53.36' @ 12.09 hrs
Flood Elev= 57.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	50.00'	**30.0" Round Culvert** L= 105.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 50.00' / 48.85' S= 0.0110 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=27.45 cfs @ 12.06 hrs HW=52.88' TW=51.88' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 27.45 cfs @ 6.09 fps)

Summary for Pond *5: Flow Entering CB5

Inflow Area = 47,176 sf, 83.01% Impervious, Inflow Depth = 4.86" for 25 Year Storm event
Inflow = 5.16 cfs @ 12.05 hrs, Volume= 19,103 cf
Outflow = 5.16 cfs @ 12.05 hrs, Volume= 19,103 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.16 cfs @ 12.05 hrs, Volume= 19,103 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 52.48' @ 12.09 hrs
Flood Elev= 53.82'

Device	Routing	Invert	Outlet Devices
#1	Primary	48.05'	**18.0" Round Culvert** L= 45.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 48.05' / 47.69' S= 0.0080 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 12.05 hrs HW=51.32' TW=51.40' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond *6: Flow Entering CB6

Inflow Area = 17,468 sf, 92.02% Impervious, Inflow Depth = 5.21" for 25 Year Storm event
Inflow = 2.70 cfs @ 12.00 hrs, Volume= 7,588 cf
Outflow = 2.70 cfs @ 12.00 hrs, Volume= 7,588 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.70 cfs @ 12.00 hrs, Volume= 7,588 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 52.49' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	48.60'	**18.0" Round Culvert** L= 45.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 48.60' / 48.15' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 12.00 hrs HW=50.14' TW=50.21' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond *7: Flow Entering CB7

Inflow Area = 435,033 sf, 82.06% Impervious, Inflow Depth = 4.86" for 25 Year Storm event
Inflow = 48.49 cfs @ 12.07 hrs, Volume= 176,125 cf
Outflow = 48.49 cfs @ 12.07 hrs, Volume= 176,125 cf, Atten= 0%, Lag= 0.0 min
Primary = 48.49 cfs @ 12.07 hrs, Volume= 176,125 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 49.54' @ 12.07 hrs
Flood Elev= 51.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	45.13'	**30.0" Round Culvert** L= 120.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 45.13' / 43.45' S= 0.0140 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=48.05 cfs @ 12.07 hrs HW=49.51' TW=46.54' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 48.05 cfs @ 9.79 fps)

Summary for Pond *8: Flow Entering CB8

Inflow Area = 452,152 sf, 82.44% Impervious, Inflow Depth = 4.88" for 25 Year Storm event
Inflow = 50.68 cfs @ 12.07 hrs, Volume= 183,726 cf
Outflow = 50.68 cfs @ 12.07 hrs, Volume= 183,726 cf, Atten= 0%, Lag= 0.0 min
Primary = 50.68 cfs @ 12.07 hrs, Volume= 183,726 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 46.55' @ 12.07 hrs
Flood Elev= 50.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	43.35'	**36.0" Round Culvert** L= 125.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 43.35' / 41.60' S= 0.0140 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 7.07 sf

Primary OutFlow Max=50.22 cfs @ 12.07 hrs HW=46.54' TW=44.72' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 50.22 cfs @ 8.31 fps)

Summary for Pond *9: Flow Entering CB9

Inflow Area = 492,315 sf, 83.35% Impervious, Inflow Depth = 4.92" for 25 Year Storm event
Inflow = 55.83 cfs @ 12.07 hrs, Volume= 201,831 cf
Outflow = 55.83 cfs @ 12.07 hrs, Volume= 201,831 cf, Atten= 0%, Lag= 0.0 min
Primary = 55.83 cfs @ 12.07 hrs, Volume= 201,831 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 44.72' @ 12.07 hrs
Flood Elev= 49.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	41.50'	**36.0" Round Culvert** L= 100.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 41.50' / 40.00' S= 0.0150 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 7.07 sf

Primary OutFlow Max=55.77 cfs @ 12.07 hrs HW=44.72' TW=35.58' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 55.77 cfs @ 7.89 fps)

Summary for Pond *DD: Flow Entering Downstream Defender

Inflow Area = 388,598 sf, 81.15% Impervious, Inflow Depth = 3.15" for 25 Year Storm event
Inflow = 23.71 cfs @ 12.05 hrs, Volume= 102,011 cf
Outflow = 23.71 cfs @ 12.05 hrs, Volume= 102,011 cf, Atten= 0%, Lag= 0.0 min
Primary = 23.71 cfs @ 12.05 hrs, Volume= 102,011 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 50.10' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	45.75'	**30.0" Round Culvert** L= 50.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 45.75' / 45.23' S= 0.0104 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=18.94 cfs @ 12.05 hrs HW=49.75' TW=49.33' (Dynamic Tailwater)
1=Culvert (Inlet Controls 18.94 cfs @ 3.86 fps)

Summary for Pond *DM1: Flow Entering DM1

Inflow Area = 329,574 sf, 84.66% Impervious, Inflow Depth = 4.94" for 25 Year Storm event
Inflow = 36.58 cfs @ 12.06 hrs, Volume= 135,553 cf
Outflow = 36.58 cfs @ 12.06 hrs, Volume= 135,553 cf, Atten= 0%, Lag= 0.0 min
Primary = 36.58 cfs @ 12.06 hrs, Volume= 135,553 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 52.29' @ 12.09 hrs
Flood Elev= 55.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	47.59'	**30.0" Round Culvert** L= 140.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 47.59' / 46.05' S= 0.0110 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=33.34 cfs @ 12.06 hrs HW=51.83' TW=50.30' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 33.34 cfs @ 6.79 fps)

Summary for Pond *DM2: Flow Entering DM2

Inflow Area = 17,207 sf, 10.64% Impervious, Inflow Depth = 2.21" for 25 Year Storm event
Inflow = 1.00 cfs @ 12.09 hrs, Volume= 3,165 cf
Outflow = 1.00 cfs @ 12.09 hrs, Volume= 3,165 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.00 cfs @ 12.09 hrs, Volume= 3,165 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 54.31' @ 12.02 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	53.00'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 53.00' / 51.80' S= 0.0240 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.87 cfs @ 12.09 hrs HW=53.86' TW=53.73' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.87 cfs @ 1.62 fps)

Summary for Pond *OC1: Flow Entering OCS1

Inflow Area = 388,598 sf, 81.15% Impervious, Inflow Depth = 4.81" for 25 Year Storm event
Inflow = 42.70 cfs @ 12.06 hrs, Volume= 155,773 cf
Outflow = 42.70 cfs @ 12.06 hrs, Volume= 155,773 cf, Atten= 0%, Lag= 0.0 min
Primary = 23.71 cfs @ 12.05 hrs, Volume= 102,011 cf
Secondary = 19.93 cfs @ 12.10 hrs, Volume= 53,762 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 50.64' @ 12.08 hrs
Flood Elev= 52.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	45.30'	**30.0" Round Culvert** L= 54.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 45.30' / 43.50' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Secondary	45.95'	**24.0" Round Culvert** L= 65.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 45.95' / 45.23' S= 0.0111 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=17.35 cfs @ 12.05 hrs HW=50.09' TW=49.75' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 17.35 cfs @ 3.53 fps)

Secondary OutFlow Max=21.56 cfs @ 12.10 hrs HW=50.52' TW=49.22' (Dynamic Tailwater)
↑—**2=Culvert** (Outlet Controls 21.56 cfs @ 6.86 fps)

Summary for Pond 2.1P:

Inflow Area = 1,373,100 sf, 32.07% Impervious, Inflow Depth = 3.06" for 25 Year Storm event
Inflow = 93.29 cfs @ 12.26 hrs, Volume= 349,656 cf
Outflow = 93.29 cfs @ 12.26 hrs, Volume= 349,656 cf, Atten= 0%, Lag= 0.0 min
Primary = 93.29 cfs @ 12.26 hrs, Volume= 349,656 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 57.05' @ 12.34 hrs
Flood Elev= 43.12'

Device	Routing	Invert	Outlet Devices
#1	Primary	32.50'	**36.0" Round Culvert** L= 70.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 32.50' / 32.14' S= 0.0051 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=86.12 cfs @ 12.26 hrs HW=56.59' TW=50.18' (Dynamic Tailwater)
1=Culvert (Inlet Controls 86.12 cfs @ 12.18 fps)

Summary for Pond 2P:

Inflow Area = 1,373,100 sf, 32.07% Impervious, Inflow Depth = 3.06" for 25 Year Storm event
Inflow = 62.23 cfs @ 12.27 hrs, Volume= 349,656 cf
Outflow = 93.29 cfs @ 12.26 hrs, Volume= 349,656 cf, Atten= 0%, Lag= 0.0 min
Primary = 93.29 cfs @ 12.26 hrs, Volume= 349,656 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 58.68' @ 12.34 hrs Surf.Area= 21,218 sf Storage= 14,921 cf

Plug-Flow detention time= 2.0 min calculated for 349,587 cf (100% of inflow)
Center-of-Mass det. time= 2.0 min (839.3 - 837.2)

Volume	Invert	Avail.Storage	Storage Description
#1	36.00'	14,921 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
36.00	4	0	0
37.00	59	32	32
38.00	1,012	536	567
39.00	3,239	2,126	2,693
40.00	21,218	12,229	14,921

Device	Routing	Invert	Outlet Devices
#1	Primary	36.00'	**36.0" Round Culvert** L= 112.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 36.00' / 32.64' S= 0.0300 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=46.65 cfs @ 12.26 hrs HW=58.46' TW=56.59' (Dynamic Tailwater)
1=Culvert (Inlet Controls 46.65 cfs @ 6.60 fps)

Summary for Pond 3P:

Inflow Area = 4,185,414 sf, 36.50% Impervious, Inflow Depth = 3.47" for 25 Year Storm event
Inflow = 195.36 cfs @ 12.35 hrs, Volume= 1,211,291 cf
Outflow = 195.36 cfs @ 12.35 hrs, Volume= 1,211,291 cf, Atten= 0%, Lag= 0.0 min
Primary = 195.36 cfs @ 12.35 hrs, Volume= 1,211,291 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 61.16' @ 12.35 hrs
Flood Elev= 43.12'

Device	Routing	Invert	Outlet Devices
#1	Primary	29.99'	**48.0" Round Culvert** L= 250.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 29.99' / 29.62' S= 0.0015 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf

Primary OutFlow Max=203.11 cfs @ 12.35 hrs HW=61.15' TW=49.88' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 203.11 cfs @ 16.16 fps)

Summary for Pond 4P:

Inflow Area = 5,558,514 sf, 35.40% Impervious, Inflow Depth = 3.37" for 25 Year Storm event
Inflow = 249.42 cfs @ 12.34 hrs, Volume= 1,560,948 cf
Outflow = 249.42 cfs @ 12.34 hrs, Volume= 1,560,948 cf, Atten= 0%, Lag= 0.0 min
Primary = 249.42 cfs @ 12.34 hrs, Volume= 1,560,948 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 50.73' @ 12.34 hrs
Flood Elev= 42.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	29.39'	**60.0" Round Culvert** L= 196.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 29.39' / 29.29' S= 0.0005 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 19.63 sf

Primary OutFlow Max=240.85 cfs @ 12.34 hrs HW=50.73' TW=44.24' (Dynamic Tailwater)
1=Culvert (Inlet Controls 240.85 cfs @ 12.27 fps)

Summary for Pond 5P:

Inflow Area = 5,558,514 sf, 35.40% Impervious, Inflow Depth = 3.37" for 25 Year Storm event
Inflow = 249.42 cfs @ 12.34 hrs, Volume= 1,560,948 cf
Outflow = 249.42 cfs @ 12.34 hrs, Volume= 1,560,948 cf, Atten= 0%, Lag= 0.0 min
Primary = 249.42 cfs @ 12.34 hrs, Volume= 1,560,948 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 44.24' @ 12.34 hrs
Flood Elev= 40.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	28.97'	**60.0" Round Culvert** L= 371.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 28.97' / 28.38' S= 0.0016 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 19.63 sf

Primary OutFlow Max=233.08 cfs @ 12.34 hrs HW=44.24' TW=37.98' (Dynamic Tailwater)
1=Culvert (Outlet Controls 233.08 cfs @ 11.87 fps)

Summary for Pond 7P:

Inflow Area = 153,762 sf, 24.93% Impervious, Inflow Depth = 1.68" for 25 Year Storm event
Inflow = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf
Outflow = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 38.02' @ 12.37 hrs
Flood Elev= 39.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	33.75'	**30.0" Round Culvert** L= 160.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 33.75' / 33.40' S= 0.0022 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=0.00 cfs @ 12.34 hrs HW=37.11' TW=37.93' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond 11P:

Inflow Area = 1,050,508 sf, 49.96% Impervious, Inflow Depth = 3.90" for 25 Year Storm event
Inflow = 84.26 cfs @ 12.16 hrs, Volume= 341,103 cf
Outflow = 84.26 cfs @ 12.16 hrs, Volume= 341,103 cf, Atten= 0%, Lag= 0.0 min
Primary = 84.26 cfs @ 12.16 hrs, Volume= 341,103 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 282.31' @ 12.16 hrs
Flood Elev= 44.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	35.75'	**18.0" Round Culvert** L= 161.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 35.75' / 34.50' S= 0.0078 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=85.63 cfs @ 12.16 hrs HW=261.11' TW=99.07' (Dynamic Tailwater)
1=Culvert (Outlet Controls 85.63 cfs @ 48.46 fps)

Summary for Pond 12P: PLUNGE POOL

Inflow Area = 5,712,276 sf, 35.12% Impervious, Inflow Depth = 3.32" for 25 Year Storm event
Inflow = 252.76 cfs @ 12.34 hrs, Volume= 1,582,466 cf
Outflow = 254.53 cfs @ 12.34 hrs, Volume= 1,571,928 cf, Atten= 0%, Lag= 0.0 min
Primary = 254.53 cfs @ 12.34 hrs, Volume= 1,571,928 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 24.07' @ 12.46 hrs Surf.Area= 4,083 sf Storage= 10,538 cf

Plug-Flow detention time= 7.6 min calculated for 1,571,614 cf (99% of inflow)
Center-of-Mass det. time= 3.4 min (838.4 - 835.0)

Volume	Invert	Avail.Storage	Storage Description
#1	19.00'	10,538 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
19.00	1,349	0	0
20.00	1,930	1,640	1,640
21.00	2,582	2,256	3,896
22.00	3,310	2,946	6,842
23.00	4,083	3,697	10,538

Device	Routing	Invert	Outlet Devices
#1	Primary	23.00'	**116.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=249.18 cfs @ 12.34 hrs HW=23.99' TW=23.54' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 249.18 cfs @ 2.17 fps)

Summary for Pond 14P:

Inflow Area = 4,185,414 sf, 36.50% Impervious, Inflow Depth = 3.47" for 25 Year Storm event
Inflow = 195.36 cfs @ 12.35 hrs, Volume= 1,211,290 cf
Outflow = 195.36 cfs @ 12.35 hrs, Volume= 1,211,291 cf, Atten= 0%, Lag= 0.0 min
Primary = 195.36 cfs @ 12.35 hrs, Volume= 1,211,291 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 147.68' @ 12.35 hrs
Flood Elev= 43.12'

Device	Routing	Invert	Outlet Devices
#1	Primary	30.44'	**30.0" Round Culvert** L= 238.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 30.44' / 30.09' S= 0.0015 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=190.35 cfs @ 12.35 hrs HW=147.61' TW=61.15' (Dynamic Tailwater)
1=Culvert (Outlet Controls 190.35 cfs @ 38.78 fps)

Summary for Pond 18P:

Inflow Area = 153,762 sf, 24.93% Impervious, Inflow Depth = 1.68" for 25 Year Storm event
Inflow = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf
Outflow = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 37.99' @ 12.35 hrs
Flood Elev= 40.03'

Device	Routing	Invert	Outlet Devices
#1	Primary	32.50'	**36.0" Round Culvert** L= 184.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 32.50' / 31.88' S= 0.0034 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=0.00 cfs @ 12.34 hrs HW=37.14' TW=37.92' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond 19P:

Inflow Area = 153,762 sf, 24.93% Impervious, Inflow Depth = 1.68" for 25 Year Storm event
Inflow = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf
Outflow = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 39.00' @ 12.37 hrs
Flood Elev= 42.93'

Device	Routing	Invert	Outlet Devices
#1	Primary	36.40'	**12.0" Round Culvert** L= 62.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 36.40' / 36.00' S= 0.0065 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.04 cfs @ 12.34 hrs HW=38.03' TW=37.94' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 1.04 cfs @ 1.33 fps)

Summary for Pond 20P:

Inflow Area = 153,762 sf, 24.93% Impervious, Inflow Depth = 1.68" for 25 Year Storm event
Inflow = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf
Outflow = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 38.00' @ 12.36 hrs
Flood Elev= 39.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	33.30'	**36.0" Round Culvert** L= 181.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 33.30' / 32.62' S= 0.0038 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=30.11 cfs @ 12.34 hrs HW=37.93' TW=37.14' (Dynamic Tailwater)
1=Culvert (Outlet Controls 30.11 cfs @ 4.26 fps)

Summary for Pond 24P:

Inflow Area = 5,712,276 sf, 35.12% Impervious, Inflow Depth = 3.32" for 25 Year Storm event
Inflow = 252.76 cfs @ 12.34 hrs, Volume= 1,582,467 cf
Outflow = 252.76 cfs @ 12.34 hrs, Volume= 1,582,466 cf, Atten= 0%, Lag= 0.0 min
Primary = 252.76 cfs @ 12.34 hrs, Volume= 1,582,466 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 31.28' @ 12.34 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	21.63'	**60.0" Round Culvert** L= 30.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 21.63' / 21.50' S= 0.0043 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 19.63 sf

Primary OutFlow Max=252.75 cfs @ 12.34 hrs HW=31.28' TW=23.99' (Dynamic Tailwater)
1=Culvert (Inlet Controls 252.75 cfs @ 12.87 fps)

Summary for Pond 25P: (new Pond)

Inflow Area = 6,150,106 sf, 33.92% Impervious, Inflow Depth > 0.44" for 25 Year Storm event
Inflow = 5.10 cfs @ 12.52 hrs, Volume= 224,619 cf
Outflow = 5.10 cfs @ 12.52 hrs, Volume= 224,619 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.10 cfs @ 12.52 hrs, Volume= 224,619 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 22.00' @ 12.50 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	17.40'	**12.0" Round Culvert** L= 113.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 17.40' / 15.14' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf

Primary OutFlow Max=5.08 cfs @ 12.52 hrs HW=22.00' TW=18.72' (Dynamic Tailwater)
1=Culvert (Outlet Controls 5.08 cfs @ 6.47 fps)

Summary for Pond 26P: (new Pond)

Inflow Area = 6,150,106 sf, 33.92% Impervious, Inflow Depth > 0.44" for 25 Year Storm event
Inflow = 5.10 cfs @ 12.52 hrs, Volume= 224,619 cf
Outflow = 5.10 cfs @ 12.52 hrs, Volume= 224,619 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.10 cfs @ 12.52 hrs, Volume= 224,619 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 18.72' @ 12.52 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	16.40'	**12.0" Round Culvert** L= 20.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 16.40' / 16.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf

Primary OutFlow Max=5.10 cfs @ 12.52 hrs HW=18.72' (Free Discharge)
1=Culvert (Inlet Controls 5.10 cfs @ 6.49 fps)

Summary for Pond 42P:

Inflow Area = 153,762 sf, 24.93% Impervious, Inflow Depth = 1.68" for 25 Year Storm event
Inflow = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf
Outflow = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 38.05' @ 12.38 hrs
Flood Elev= 40.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	35.00'	**30.0" Round Culvert** L= 338.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 35.00' / 34.25' S= 0.0022 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=16.88 cfs @ 12.34 hrs HW=37.94' TW=37.11' (Dynamic Tailwater)
1=Culvert (Outlet Controls 16.88 cfs @ 3.69 fps)

Summary for Pond 100:

Inflow Area = 1,114,380 sf, 33.39% Impervious, Inflow Depth = 3.01" for 25 Year Storm event
Inflow = 52.24 cfs @ 12.19 hrs, Volume= 279,600 cf
Outflow = 38.39 cfs @ 12.43 hrs, Volume= 221,101 cf, Atten= 27%, Lag= 14.3 min
Primary = 38.39 cfs @ 12.43 hrs, Volume= 221,101 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 49.68' @ 12.43 hrs Surf.Area= 20,164 sf Storage= 89,755 cf

Plug-Flow detention time= 151.5 min calculated for 221,056 cf (79% of inflow)
Center-of-Mass det. time= 70.0 min (902.6 - 832.6)

Volume	Invert	Avail.Storage	Storage Description
#1	42.00'	96,101 cf	**Custom Stage Data (Pyramidal)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
42.00	3,172	0	0	3,172
43.00	6,650	4,805	4,805	6,661
44.00	8,133	7,379	12,184	8,183
47.00	13,011	31,431	43,615	13,213
48.00	16,841	14,885	58,500	17,074
49.00	18,793	17,808	76,308	19,097
50.00	20,811	19,793	96,101	21,192

Device	Routing	Invert	Outlet Devices
#1	Primary	45.50'	**18.0" Round Culvert** L= 40.0' Ke= 0.600 Inlet / Outlet Invert= 45.50' / 45.10' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	48.00'	**11.5' long Sharp-Crested Rectangular Weir** 0 End Contraction(s) 6.0' Crest Height
#3	Device 1	47.00'	**3.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 5.0' Crest Height
#4	Primary	49.00'	**20.0' long (Profile 20) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 1.97 Coef. (English) 2.68 2.63 2.61 2.61

Primary OutFlow Max=38.37 cfs @ 12.43 hrs HW=49.68' TW=48.52' (Dynamic Tailwater)
- **1=Culvert** (Inlet Controls 8.58 cfs @ 4.85 fps)
  - **2=Sharp-Crested Rectangular Weir** (Passes < 78.63 cfs potential flow)
  - **3=Sharp-Crested Rectangular Weir** (Passes < 30.35 cfs potential flow)
- **4=Broad-Crested Rectangular Weir** (Weir Controls 29.79 cfs @ 2.19 fps)

Summary for Pond 101:

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Inflow Area = 383,659 sf, 9.34% Impervious, Inflow Depth = 2.56" for 25 Year Storm event
Inflow = 15.21 cfs @ 12.41 hrs, Volume= 81,762 cf
Outflow = 14.50 cfs @ 12.48 hrs, Volume= 81,762 cf, Atten= 5%, Lag= 4.6 min
Primary = 14.50 cfs @ 12.48 hrs, Volume= 81,762 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 53.84' @ 12.48 hrs Surf.Area= 0 sf Storage= 1,832 cf
Flood Elev= 55.00' Surf.Area= 0 sf Storage= 5,143 cf

Plug-Flow detention time= 1.0 min calculated for 81,762 cf (100% of inflow)
Center-of-Mass det. time= 0.9 min (863.3 - 862.4)

Volume	Invert	Avail.Storage	Storage Description
#1	51.50'	5,143 cf	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
51.50	0
52.00	35
53.00	566
54.00	2,077
55.00	5,143

Device	Routing	Invert	Outlet Devices
#1	Primary	51.50'	**15.0" Round Culvert X 2.00** L= 75.0' Ke= 0.600 Inlet / Outlet Invert= 51.50' / 47.98' S= 0.0469 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=14.50 cfs @ 12.48 hrs HW=53.84' TW=49.67' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 14.50 cfs @ 5.91 fps)

Summary for Pond D2:

Inflow Area = 983,366 sf, 19.67% Impervious, Inflow Depth = 3.80" for 25 Year Storm event
Inflow = 53.61 cfs @ 12.45 hrs, Volume= 311,691 cf
Outflow = 70.19 cfs @ 12.46 hrs, Volume= 312,004 cf, Atten= 0%, Lag= 0.6 min
Primary = 70.19 cfs @ 12.46 hrs, Volume= 312,004 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 180.37' @ 12.40 hrs Surf.Area= 30,265 sf Storage= 15,827 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 4.7 min (840.5 - 835.8)

Volume	Invert	Avail.Storage	Storage Description
#1	42.68'	15,827 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.68	4	0	0
43.00	1,052	169	169
44.00	30,265	15,659	15,827

Device	Routing	Invert	Outlet Devices
#1	Primary	33.33'	**24.0" Round Culvert** L= 277.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 33.33' / 31.80' S= 0.0055 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Primary OutFlow Max=93.87 cfs @ 12.46 hrs HW=173.62' TW=112.05' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 93.87 cfs @ 29.88 fps)

Summary for Pond D4:

Inflow Area = 983,366 sf, 19.67% Impervious, Inflow Depth = 3.80" for 25 Year Storm event
Inflow = 53.61 cfs @ 12.45 hrs, Volume= 311,691 cf
Outflow = 53.61 cfs @ 12.45 hrs, Volume= 311,691 cf, Atten= 0%, Lag= 0.0 min
Primary = 53.61 cfs @ 12.45 hrs, Volume= 311,691 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 198.69' @ 12.41 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	34.54'	**24.0" Round Culvert** L= 249.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 34.54' / 33.33' S= 0.0049 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Primary OutFlow Max=100.58 cfs @ 12.45 hrs HW=193.15' TW=127.19' (Dynamic Tailwater)
1=Culvert (Outlet Controls 100.58 cfs @ 32.02 fps)

Summary for Pond D5:

Inflow Area = 983,366 sf, 19.67% Impervious, Inflow Depth = 3.80" for 25 Year Storm event
Inflow = 53.55 cfs @ 12.46 hrs, Volume= 311,691 cf
Outflow = 53.61 cfs @ 12.45 hrs, Volume= 311,691 cf, Atten= 0%, Lag= 0.0 min
Primary = 53.61 cfs @ 12.45 hrs, Volume= 311,691 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 211.07' @ 12.42 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	35.13'	**24.0" Round Culvert** L= 71.3' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 35.13' / 34.64' S= 0.0069 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.45 hrs HW=160.89' TW=193.15' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond D6:

Inflow Area = 983,366 sf, 19.67% Impervious, Inflow Depth = 3.80" for 25 Year Storm event
Inflow = 53.55 cfs @ 12.46 hrs, Volume= 311,691 cf
Outflow = 53.55 cfs @ 12.46 hrs, Volume= 311,691 cf, Atten= 0%, Lag= 0.0 min
Primary = 53.55 cfs @ 12.46 hrs, Volume= 311,691 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 392.79' @ 12.43 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	40.87'	**15.0" Round Culvert** L= 337.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 40.87' / 36.88' S= 0.0118 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=52.37 cfs @ 12.46 hrs HW=361.84' TW=187.71' (Dynamic Tailwater)
1=Culvert (Outlet Controls 52.37 cfs @ 42.68 fps)

Summary for Pond P1:

Inflow Area = 2,151,540 sf, 37.61% Impervious, Inflow Depth = 3.11" for 25 Year Storm event
Inflow = 77.82 cfs @ 12.41 hrs, Volume= 558,182 cf
Outflow = 113.07 cfs @ 12.41 hrs, Volume= 558,183 cf, Atten= 0%, Lag= 0.0 min
Primary = 113.07 cfs @ 12.41 hrs, Volume= 558,183 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 149.15' @ 12.38 hrs Surf.Area= 52,049 sf Storage= 40,422 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 7.4 min (853.2 - 845.8)

Volume	Invert	Avail.Storage	Storage Description
#1	33.00'	40,422 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
33.00	4	0	0
34.00	4	4	4
35.00	174	89	93
36.00	986	580	673
37.00	2,234	1,610	2,283
38.00	3,914	3,074	5,357
39.00	7,083	5,499	10,856
40.00	52,049	29,566	40,422

Device	Routing	Invert	Outlet Devices
#1	Primary	33.00'	**36.0" Round Culvert** L= 126.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 33.00' / 30.54' S= 0.0195 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=0.00 cfs @ 12.41 hrs HW=130.43' TW=145.17' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond P2: outfall 8

Inflow Area = 6,150,106 sf, 33.92% Impervious, Inflow Depth = 3.32" for 25 Year Storm event
Inflow = 276.37 cfs @ 12.32 hrs, Volume= 1,701,306 cf
Outflow = 222.74 cfs @ 12.52 hrs, Volume= 1,700,849 cf, Atten= 19%, Lag= 12.0 min
Primary = 5.10 cfs @ 12.52 hrs, Volume= 224,619 cf
Secondary = 217.64 cfs @ 12.52 hrs, Volume= 1,476,230 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 23.80' @ 12.52 hrs Surf.Area= 96,776 sf Storage= 201,517 cf

Plug-Flow detention time= 26.9 min calculated for 1,700,509 cf (100% of inflow)
Center-of-Mass det. time= 26.9 min (863.5 - 836.5)

Volume	Invert	Avail.Storage	Storage Description
#1	21.50'	321,382 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
21.50	80,991	0	0
22.00	83,450	41,110	41,110
23.00	87,750	85,600	126,710
24.00	99,017	93,384	220,094
25.00	103,559	101,288	321,382

Device	Routing	Invert	Outlet Devices
#1	Primary	18.35'	**12.0" Round Culvert** L= 42.6' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.35' / 17.50' S= 0.0200 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf
#2	Device 1	21.50'	**36.7" W x 7.1" H Vert. Orifice/Grate X 2.00** C= 0.600
#3	Secondary	21.58'	**25.0' long x 52.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=5.07 cfs @ 12.52 hrs HW=23.80' TW=22.00' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 5.07 cfs @ 6.46 fps)
└**2=Orifice/Grate** (Passes 5.07 cfs of 23.28 cfs potential flow)

Secondary OutFlow Max=217.63 cfs @ 12.52 hrs HW=23.80' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 217.63 cfs @ 3.92 fps)

Summary for Pond R2:

Inflow Area = 5,712,276 sf, 35.12% Impervious, Inflow Depth = 3.32" for 25 Year Storm event
Inflow = 252.76 cfs @ 12.34 hrs, Volume= 1,582,467 cf
Outflow = 252.76 cfs @ 12.34 hrs, Volume= 1,582,467 cf, Atten= 0%, Lag= 0.0 min
Primary = 252.76 cfs @ 12.34 hrs, Volume= 1,582,467 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 37.98' @ 12.34 hrs
Flood Elev= 41.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	28.33'	**60.0" Round Culvert** L= 44.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 28.33' / 28.25' S= 0.0018 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 19.63 sf

Primary OutFlow Max=244.72 cfs @ 12.34 hrs HW=37.98' TW=31.28' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 244.72 cfs @ 12.46 fps)

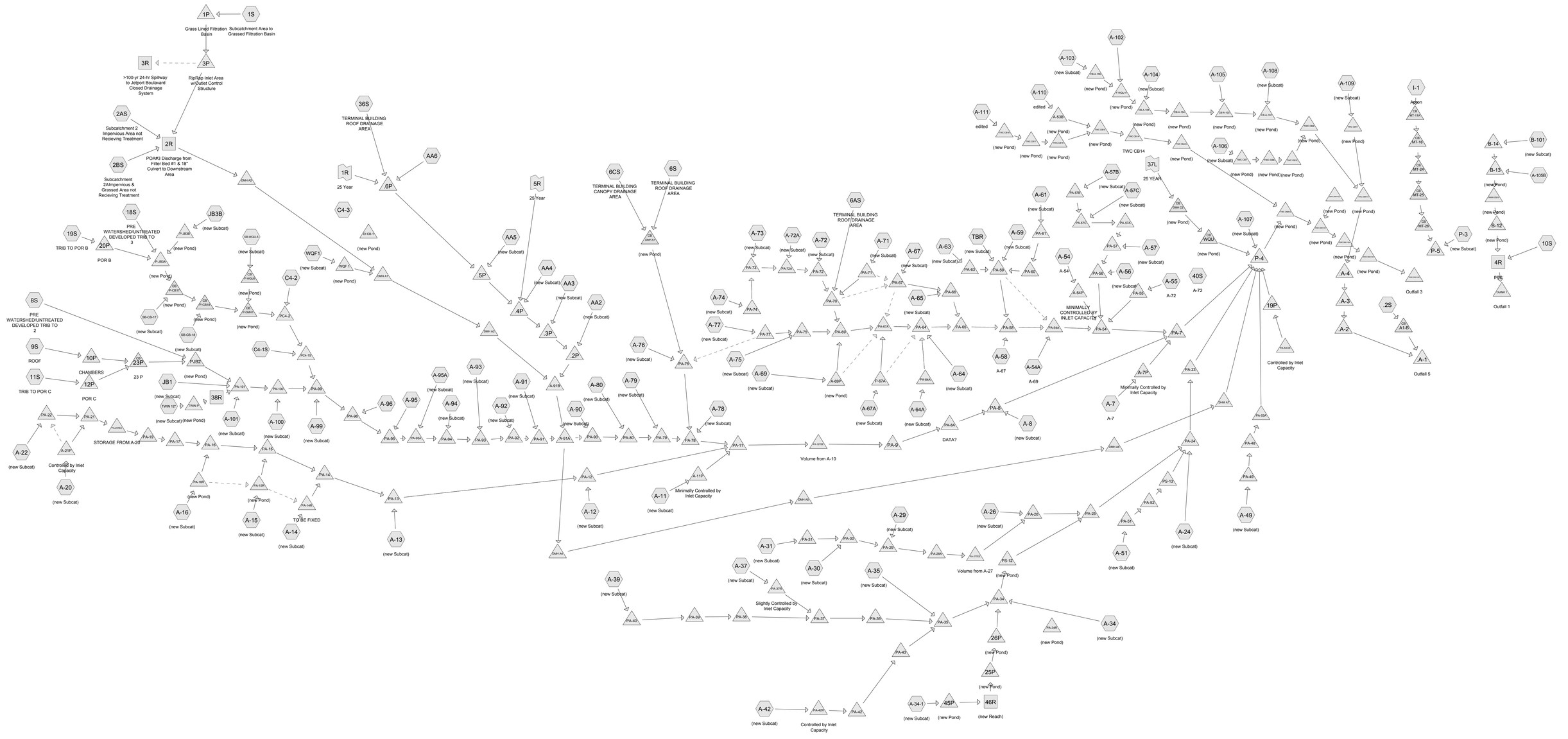
Summary for Link WQ-1:

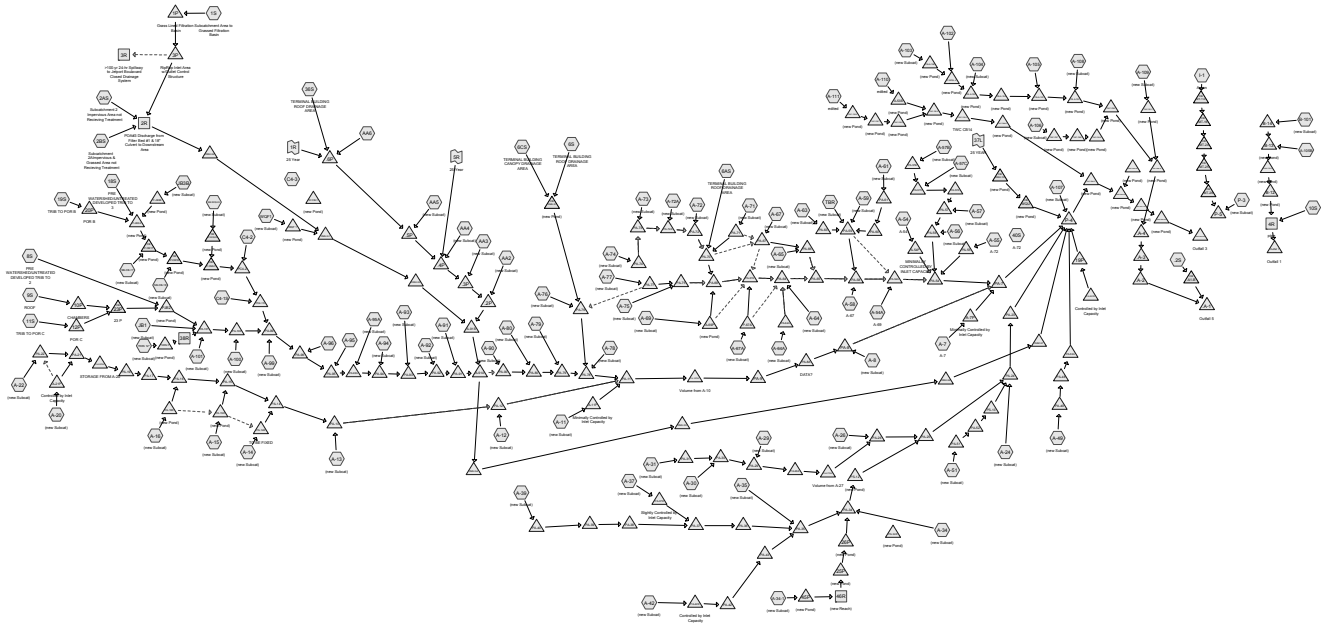
Inflow Area = 490,791 sf, 36.11% Impervious, Inflow Depth = 2.04" for 25 Year Storm event
Inflow = 17.90 cfs @ 12.13 hrs, Volume= 83,417 cf
Primary = 17.90 cfs @ 12.13 hrs, Volume= 83,417 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs

ATTACHMENT B

Post-Development Computations


1P
1S
Grass Lined Filtration Basin
Subcatchment Area to Grassed Filtration Basin
3R
3P
>100-yr 24-hr Spillway to Jetport Boulevard Closed Drainage System
RipRap Inlet Area w/Outlet Control Structure
2AS
Subcatchment 2 Impervious Area not Recieving Treatment
2R
2BS
Subcatchment 2Aimpervious & Grassed Area not Recieving Treatment
POA#3 Discharge from Filter Bed #1 & 18" Culvert to Downstream Area
DMH A2
36S
TERMINAL BUILDING ROOF DRAINAGE AREA
1R
25 Year
.6P
AA6
C4-3
CI CB-1
(new Pond)
6CS
TERMINAL BUILDING CANOPY DRAINAGE AREA
6S
TERMINAL BUILDING ROOF DRAINAGE AREA
CB DMH A1
(new Pond)
5R
25 Year
AA5
(new Subcat)
5P
AA4
(new Subcat)
AA3
(new Subcat)
AA2
(new Subcat)
4P
3P
2P
18S
PRE WATERSHED/UNTREATED DEVELOPED TRIB TO 3
JB3B
(new Subcat)
19S
TRIB TO POR B
20P
POR B
JB3A
(new Pond)
GB-WQU-1
(new Subcat)
CB A-CB17
(new Pond)
CB A-CB18
(new Pond)
SB-CB-17
(new Subcat)
SB-CB-18
(new Subcat)
WQF1
(new Subcat)
WQF
(new Pond)
DMH A1
C4-2
PC4-2
C4-1S
PC4-1S
8S
PRE WATERSHED/UNTREATED DEVELOPED TRIB TO 2
9S
ROOF
10P
CHAMBERS
23P
23 P
11S
TRIB TO POR C
12P
POR C
PJB2
JB1
(new Subcat)
TWIN 12"
TWIN P
(new Pond)
38R
PA-101
PA-100
PA-99
A-101
(new Subcat)
A-100
(new Subcat)
A-99
(new Subcat)
PA-22
PA-21
PA-20SS1
PA-19
PA-17
PA-16
PA-15
PA-14
PA-13
A-22
(new Subcat)
A-21P
Controlled by Inlet Capacity
A-20
(new Subcat)
PA-16P
(new Pond)
PA-15P
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PA-14P
TO BE FIXED
A-16
(new Subcat)
A-15
(new Subcat)
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PA-96
A-96
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A-95A
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PA-95
PA-95A
PA-94
PA-93
PA-92
PA-91
A-91A
PA-90
PA-80
PA-79
PA-78
PA-11
PA-12
A-12
(new Subcat)
A-11P
A-11
(new Subcat)
Minimally Controlled by Inlet Capacity
PA-11SS1
Volume from A-10
PA-9
A-91B
A-76
(new Subcat)
PA-76
A-77
(new Subcat)
A-75
(new Subcat)
A-69P
(new Pond)
A-73
(new Subcat)
A-72A
(new Subcat)
A-72
(new Subcat)
PA-73
PA-72A
PA-72
PA-70
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(new Subcat)
PA-74
6AS
TERMINAL BUILDING ROOF DRAINAGE AREA
A-71
(new Subcat)
A-67
(new Subcat)
PA-71
PA-67
A-65
(new Subcat)
PA-66
A-63
(new Subcat)
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(new Subcat)
A-59
(new Subcat)
PA-63
PA-59
PA-61
PA-60
A-61
(new Subcat)
A-54
A-54
A-54P
MINIMALLY CONTROLLED BY INLET CAPACITY
PA-54
A-58
A-67
A-54A
A-69
PA-57
A-57
(new Subcat)
A-56
(new Subcat)
PA-56
PA-55
A-55
A-72
40S
A-72
A-57B
(new Subcat)
PA-57B
A-57C
(new Subcat)
PA-57C
PA-57A
37L
25 YEAR
CB DMH C2
(new Pond)
GB WQU
(new Pond)
A-107
(new Subcat)
P-4
PA-7
19P
PA-100P
Controlled by Inlet Capacity
A-7P
Minimally Controlled by Inlet Capacity
A-7
(new Subcat)
PA-8
A-8
(new Subcat)
DATA?
A-64
(new Subcat)
A-64A
(new Subcat)
A-64P
(new Pond)
A-67A
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A-67P
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A-105
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Subcat Reach Pond Link

Routing Diagram for Postdevelopment Terminal Area - Outfalls 1-3-5 - new WQF info

Prepared by Stantec Consulting Ltd., Printed 10/19/2018

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
70.547	98	(40S, A-100, A-102, A-106, A-11, A-12, A-13, A-14, A-15, A-16, A-20, A-22, A-24, A-26, A-29, A-30, A-31, A-34-1, A-55, A-56, A-57, A-57B, A-57C, A-59, A-61, A-63, A-64, A-64A, A-65, A-67, A-67A, A-69, A-7, A-71, A-72, A-72A, A-73, A-74, A-75, A-76, A-77, A-78, A-79, A-8, A-80, A-90, A-91, A-92, A-93, A-94, A-95, A-95A, A-96, A-99, AA2, AA3, AA4, AA5, AA6, JB1, JB3B, SB-CB-17, SB-CB-18, SB-WQU-5, TWIN 12", WQF1)
0.800	84	(A-100)
5.440	83	(A-101)
8.709	80	(A-16, A-20, A-22, JB3B, TWIN 12")
1.160	64	(A-34)
1.400	65	(A-35)
1.250	68	(A-37)
2.150	72	(A-39)
2.260	82	(A-42)
1.767	86	(A-49)
1.564	56	(A-51)
0.810	74	(JB1)
6.678	39	>75% Grass cover, Good, HSG A (.2S, A-103, A-104, A-105, A-34-1)
2.300	64	>75% Grass cover, Good, HSG A (A-34)
2.100	65	>75% Grass cover, Good, HSG A (A-35)
2.200	68	>75% Grass cover, Good, HSG A (A-37)
1.960	72	>75% Grass cover, Good, HSG A (A-39)
5.000	56	>75% Grass cover, Good, HSG A (A-51)
4.040	61	>75% Grass cover, Good, HSG B (A-107, A-108, A-109, A-34-1)
4.032	74	>75% Grass cover, Good, HSG C (.2S, 10S, 11S, 19S, P-3)
41.706	80	>75% Grass cover, Good, HSG D (.2S, 10S, 18S, A-103, A-104, A-105, A-105B, A-106, A-107, A-108, A-11, A-110, A-111, A-12, A-13, A-14, A-15, A-24, A-26, A-29, A-30, A-31, A-34-1, A-56, A-57, A-57B, A-57C, A-61, A-7, A-8, A-99, B-101, P-3, SB-WQU-5, WQF1)
0.539	74	>75% Grass cover, Good, HSG D (8S)
2.700	64	>75% Grass cover, Good, HSG D (A-34)
2.550	65	>75% Grass cover, Good, HSG D (A-35)
3.800	68	>75% Grass cover, Good, HSG D (A-37)
7.040	72	>75% Grass cover, Good, HSG D (A-39)
10.701	82	>75% Grass cover, Good, HSG D (A-42, C4-1S)
2.250	56	>75% Grass cover, Good, HSG D (A-51)
0.100	98	CANOPY (6CS)
0.680	74	Grass HSG C (1S, 2BS)
1.685	98	Impervious (1S, 2AS, 2BS)
0.127	98	JetPort Road (18S)
0.289	98	Parking LOT (8S)
8.704	98	Paved parking (A-105, A-105B, A-107, A-108, A-109)

Area Listing (all nodes) (continued)

Area (acres)	CN	Description (subcatchment-numbers)
18.321	98	Paved parking & roofs (.2S, 9S, 10S, A-54, A-54A, A-58)
0.163	86	Paved parking & roofs (A-49)
0.186	56	Paved parking & roofs (A-51)
3.728	98	Paved parking, HSG A (C4-1S, C4-2, C4-3)
14.421	98	Paved parking, HSG D (A-103, A-104, B-101)
1.230	98	Pavement (I-1)
1.320	98	Porous Pavement (11S, 19S)
1.000	98	ROADWAY (36S)
0.800	98	ROOF (6AS, 6S)
0.122	98	Sidewalk Curbs (11S)
0.021	98	Sidewalks/Curb (19S)
0.101	83	Woods, Poor, HSG D (8S)
0.250	82	Woods/grass comb., Poor, HSG C (18S)
1.958	82	Woods/grass comb., Poor, HSG D (8S)
4.660	86	Woods/grass comb., Poor, HSG D (18S)
5.932	98	paved (A-110, A-111)
2.400	98	roof (TBR)
265.650	**86**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
23.966	HSG A	.2S, A-103, A-104, A-105, A-34, A-34-1, A-35, A-37, A-39, A-51, C4-1S, C4-2, C4-3
4.040	HSG B	A-107, A-108, A-109, A-34-1
4.962	HSG C	.2S, 1S, 2BS, 10S, 11S, 18S, 19S, P-3
92.425	HSG D	.2S, 8S, 10S, 18S, A-103, A-104, A-105, A-105B, A-106, A-107, A-108, A-11, A-110, A-111, A-12, A-13, A-14, A-15, A-24, A-26, A-29, A-30, A-31, A-34, A-34-1, A-35, A-37, A-39, A-42, A-51, A-56, A-57, A-57B, A-57C, A-61, A-7, A-8, A-99, B-101, C4-1S, P-3, SB-WQU-5, WQF1
140.257	Other	.2S, 1S, 2AS, 2BS, 6AS, 6CS, 6S, 8S, 9S, 10S, 11S, 18S, 19S, 36S, 40S, A-100, A-101, A-102, A-105, A-105B, A-106, A-107, A-108, A-109, A-11, A-110, A-111, A-12, A-13, A-14, A-15, A-16, A-20, A-22, A-24, A-26, A-29, A-30, A-31, A-34, A-34-1, A-35, A-37, A-39, A-42, A-49, A-51, A-54, A-54A, A-55, A-56, A-57, A-57B, A-57C, A-58, A-59, A-61, A-63, A-64, A-64A, A-65, A-67, A-67A, A-69, A-7, A-71, A-72, A-72A, A-73, A-74, A-75, A-76, A-77, A-78, A-79, A-8, A-80, A-90, A-91, A-92, A-93, A-94, A-95, A-95A, A-96, A-99, AA2, AA3, AA4, AA5, AA6, I-1, JB1, JB3B, SB-CB-17, SB-CB-18, SB-WQU-5, TBR, TWIN 12", WQF1
265.650		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	97.857	97.857		40S, A-100, A-101, A-102, A-106, A-11, A-12, A-13, A-14, A-15, A-16, A-20, A-22, A-24, A-26, A-29, A-30, A-31, A-34, A-34-1, A-35, A-37, A-39, A-42, A-49, A-51, A-55, A-56, A-57, A-57B, A-57C, A-59, A-61, A-63, A-64, A-64A, A-65, A-67, A-67A, A-69, A-7, A-71, A-72, A-72A, A-73, A-74,

Ground Covers (all nodes) (continued)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
20.238	4.040	4.032	71.286	0.000	99.595	>75% Grass cover, Good	.2S, 8S, 10S, 11S, 18S, 19S, A-103, A-104, A-105, A-105B, A-106, A-107, A-108, A-109, A-11, A-110, A-111, A-12, A-13, A-14, A-15, A-24, A-26, A-29, A-30, A-31, A-34, A-34-1, A-35, A-37, A-39, A-42, A-51, A-56, A-57, A-57B, A-57C, A-61, A-7, A-8, A-99, B-101, C4-1S, P-3, SB-WQU -5, WQF1

Ground Covers (all nodes) (continued)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	0.100	0.100	CANOPY	6CS
0.000	0.000	0.680	0.000	0.000	0.680	Grass	1S, 2BS
0.000	0.000	0.000	0.000	1.685	1.685	Impervious	1S, 2AS, 2BS
0.000	0.000	0.000	0.000	0.127	0.127	JetPort Road	18S
0.000	0.000	0.000	0.000	0.289	0.289	Parking LOT	8S
3.728	0.000	0.000	14.421	8.704	26.853	Paved parking	A-103, A-104, A-105, A-105B, A-107, A-108, A-109, B-101, C4-1S, C4-2, C4-3
0.000	0.000	0.000	0.000	18.670	18.670	Paved parking & roofs	.2S, 9S, 10S, A-49, A-51, A-54, A-54A, A-58
0.000	0.000	0.000	0.000	1.230	1.230	Pavement	I-1
0.000	0.000	0.000	0.000	1.320	1.320	Porous Pavement	11S, 19S
0.000	0.000	0.000	0.000	1.000	1.000	ROADWAY	36S
0.000	0.000	0.000	0.000	0.800	0.800	ROOF	6AS, 6S
0.000	0.000	0.000	0.000	0.122	0.122	Sidewalk Curbs	11S
0.000	0.000	0.000	0.000	0.021	0.021	Sidewalks/Curb	19S
0.000	0.000	0.000	0.101	0.000	0.101	Woods, Poor	8S
0.000	0.000	0.250	6.617	0.000	6.868	Woods/grass comb., Poor	8S, 18S
0.000	0.000	0.000	0.000	5.932	5.932	paved	A-110, A-111
0.000	0.000	0.000	0.000	2.400	2.400	roof	TBR
23.966	**4.040**	**4.962**	**92.425**	**140.257**	**265.650**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	.2S	0.00	0.00	8.0	0.2850	0.011	12.0	0.0	0.0
2	.2S	0.00	0.00	348.0	0.0060	0.013	15.0	0.0	0.0
3	.2S	0.00	0.00	262.0	0.0069	0.013	15.0	0.0	0.0
4	A-39	0.00	0.00	400.0	0.0050	0.013	15.0	0.0	0.0
5	I-1	0.00	0.00	183.0	0.0040	0.015	12.0	0.0	0.0
6	JB1	0.00	0.00	480.0	0.0050	0.015	12.0	0.0	0.0
7	JB1	0.00	0.00	60.0	0.0040	0.015	15.0	0.0	0.0
8	JB3B	0.00	0.00	510.0	0.0100	0.011	15.0	0.0	0.0
9	SB-WQU-5	0.00	0.00	477.0	0.0150	0.013	12.0	0.0	0.0
10	SB-WQU-5	0.00	0.00	105.0	0.0030	0.013	15.0	0.0	0.0
11	SB-WQU-5	0.00	0.00	670.0	0.0038	0.013	18.0	0.0	0.0
12	4R	36.00	24.53	1,000.0	0.0115	0.013	30.0	0.0	0.0
13	.2P	49.71	49.05	95.0	0.0069	0.013	54.0	0.0	0.0
14	.3P	50.17	49.98	95.0	0.0020	0.013	54.0	0.0	0.0
15	.4P	50.47	50.28	95.0	0.0020	0.013	54.0	0.0	0.0
16	.5P	50.83	50.64	95.0	0.0020	0.013	48.0	0.0	0.0
17	.6P	51.01	50.93	40.0	0.0020	0.013	48.0	0.0	0.0
18	.A-1	17.06	15.50	520.0	0.0030	0.013	42.0	0.0	0.0
19	.A-2	17.80	17.17	168.0	0.0037	0.013	42.0	0.0	0.0
20	.A-3	18.41	17.80	235.0	0.0026	0.013	42.0	0.0	0.0
21	.A-4	19.18	18.46	233.0	0.0031	0.013	42.0	0.0	0.0
22	.A1-B	23.26	17.17	181.0	0.0336	0.013	24.0	0.0	0.0
23	.DMH A1	51.27	50.88	55.0	0.0071	0.013	24.0	0.0	0.0
24	3P	72.57	72.00	50.0	0.0114	0.013	18.0	0.0	0.0
25	12P	67.58	67.00	20.0	0.0290	0.013	4.0	0.0	0.0
26	19P	37.26	35.85	210.0	0.0067	0.013	15.0	0.0	0.0
27	20P	67.55	67.00	20.0	0.0275	0.013	4.0	0.0	0.0
28	23P	63.48	63.00	40.0	0.0120	0.013	15.0	0.0	0.0
29	25P	70.00	55.00	560.0	0.0268	0.013	15.0	0.0	0.0
30	26P	55.00	47.42	340.0	0.0223	0.013	24.0	0.0	0.0
31	45P	45.00	44.40	30.0	0.0200	0.015	12.0	0.0	0.0
32	A-53B	37.36	37.00	160.0	0.0022	0.013	15.0	0.0	0.0
33	A-91A	43.14	41.73	353.0	0.0040	0.013	54.0	0.0	0.0
34	A-91A	51.23	51.14	15.0	0.0060	0.013	24.0	0.0	0.0
35	A-91B	43.48	43.24	47.0	0.0051	0.013	54.0	0.0	0.0
36	B-12	36.33	35.50	137.0	0.0061	0.013	30.0	0.0	0.0
37	B-13	41.14	40.89	25.0	0.0100	0.013	30.0	0.0	0.0
38	B-14	42.81	41.24	224.0	0.0070	0.013	24.0	0.0	0.0
39	CB-A-102	37.70	37.21	198.0	0.0025	0.013	24.0	0.0	0.0
40	CB-A-103	37.86	37.73	200.0	0.0007	0.013	24.0	0.0	0.0
41	CB-A-104	38.70	37.96	183.0	0.0040	0.013	24.0	0.0	0.0
42	CB-A-105	39.58	38.75	393.0	0.0021	0.013	18.0	0.0	0.0

Pipe Listing (all nodes) (continued)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
43	CB-A-106	40.72	40.61	57.0	0.0019	0.011	15.0	0.0	0.0
44	DHM A7	33.25	30.00	300.0	0.0108	0.013	54.0	0.0	0.0
45	DMH A1	52.20	51.88	40.0	0.0080	0.013	24.0	0.0	0.0
46	DMH A2	58.00	52.30	666.0	0.0086	0.013	18.0	0.0	0.0
47	DMH A3	51.78	50.13	550.0	0.0030	0.013	24.0	0.0	0.0
48	DMH A4	41.63	39.87	309.0	0.0057	0.013	54.0	0.0	0.0
49	DMH A5	39.77	34.94	1,012.0	0.0048	0.013	54.0	0.0	0.0
50	DMH A6	34.84	33.35	312.0	0.0048	0.013	54.0	0.0	0.0
51	DMH C2	36.00	33.72	370.0	0.0062	0.013	24.0	0.0	0.0
52	F-WQU-4	40.51	39.83	335.0	0.0020	0.011	15.0	0.0	0.0
53	MT-11A	33.75	33.47	104.0	0.0027	0.011	18.0	0.0	0.0
54	MT-16	33.42	32.87	74.0	0.0074	0.010	24.0	0.0	0.0
55	MT-24	32.61	32.10	145.0	0.0035	0.010	24.0	0.0	0.0
56	MT-25	31.95	31.80	74.0	0.0020	0.011	24.0	0.0	0.0
57	MT-26	31.00	30.50	20.0	0.0250	0.010	24.0	0.0	0.0
58	P-4	26.00	25.10	200.0	0.0045	0.013	60.0	0.0	0.0
59	P-5	28.10	28.00	7.0	0.0143	0.011	6.0	0.0	0.0
60	P-CB17	61.53	61.19	30.0	0.0113	0.013	18.0	0.0	0.0
61	P-CB18	61.14	60.57	40.0	0.0143	0.013	18.0	0.0	0.0
62	P-DMH1	60.57	59.84	305.0	0.0024	0.013	24.0	0.0	0.0
63	P-JB3A	61.75	61.09	40.0	0.0165	0.013	18.0	0.0	0.0
64	P-JB3B	70.40	70.00	40.0	0.0100	0.013	15.0	0.0	0.0
65	P-WQU5	61.60	60.57	24.0	0.0429	0.013	18.0	0.0	0.0
66	PA-100	55.77	53.59	403.0	0.0054	0.013	18.0	0.0	0.0
67	PA-101	58.10	55.94	386.0	0.0056	0.013	15.0	0.0	0.0
68	PA-10TEE	45.83	45.47	62.0	0.0058	0.013	42.0	0.0	0.0
69	PA-11	46.72	45.83	154.0	0.0058	0.013	42.0	0.0	0.0
70	PA-12	48.91	47.02	394.0	0.0048	0.013	30.0	0.0	0.0
71	PA-13	51.21	49.12	297.0	0.0070	0.013	30.0	0.0	0.0
72	PA-14	53.09	51.24	515.0	0.0036	0.013	30.0	0.0	0.0
73	PA-15	53.99	53.09	330.0	0.0027	0.013	30.0	0.0	0.0
74	PA-16	55.77	54.29	290.0	0.0051	0.013	24.0	0.0	0.0
75	PA-17	57.01	55.92	297.0	0.0037	0.013	24.0	0.0	0.0
76	PA-19	58.90	57.16	295.0	0.0059	0.013	24.0	0.0	0.0
77	PA-20TEE	59.46	59.00	110.0	0.0042	0.013	18.0	0.0	0.0
78	PA-21	60.39	59.46	182.0	0.0051	0.013	18.0	0.0	0.0
79	PA-22	62.26	60.51	295.0	0.0059	0.013	18.0	0.0	0.0
80	PA-23	40.90	20.40	440.0	0.0466	0.013	30.0	0.0	0.0
81	PA-24	41.37	40.90	74.0	0.0064	0.013	36.0	0.0	0.0
82	PA-25	42.91	41.57	333.0	0.0040	0.013	36.0	0.0	0.0
83	PA-26	44.50	43.11	198.0	0.0070	0.013	30.0	0.0	0.0
84	PA-27TEE	46.03	44.70	240.0	0.0055	0.013	30.0	0.0	0.0

Pipe Listing (all nodes) (continued)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
85	PA-28A	46.79	46.13	153.0	0.0043	0.013	30.0	0.0	0.0
86	PA-29	47.34	46.89	90.0	0.0050	0.010	24.0	0.0	0.0
87	PA-30	48.74	47.41	300.0	0.0044	0.010	24.0	0.0	0.0
88	PA-31	50.99	48.99	396.0	0.0051	0.013	24.0	0.0	0.0
89	PA-34	45.07	43.25	105.0	0.0173	0.013	30.0	0.0	0.0
90	PA-35	45.85	45.12	230.0	0.0032	0.013	24.0	0.0	0.0
91	PA-36	47.16	45.85	161.0	0.0081	0.013	24.0	0.0	0.0
92	PA-37	49.28	47.51	396.0	0.0045	0.013	24.0	0.0	0.0
93	PA-38	51.18	49.44	396.0	0.0044	0.013	18.0	0.0	0.0
94	PA-39	51.81	51.20	200.0	0.0030	0.013	18.0	0.0	0.0
95	PA-40	54.16	52.11	400.0	0.0051	0.013	15.0	0.0	0.0
96	PA-42	48.75	47.06	378.0	0.0045	0.013	30.0	0.0	0.0
97	PA-43	47.04	45.85	128.0	0.0093	0.013	30.0	0.0	0.0
98	PA-48	46.32	46.50	423.0	-0.0004	0.012	12.0	0.0	0.0
99	PA-49	47.00	46.32	141.0	0.0048	0.012	10.0	0.0	0.0
100	PA-51	44.75	44.87	59.0	-0.0020	0.012	15.0	0.0	0.0
101	PA-52	44.87	44.65	4.0	0.0550	0.010	15.0	0.0	0.0
102	PA-53A	44.20	20.40	370.0	0.0643	0.012	12.0	0.0	0.0
103	PA-54	44.13	42.10	236.0	0.0086	0.013	36.0	0.0	0.0
104	PA-54A	44.98	44.13	194.0	0.0044	0.013	36.0	0.0	0.0
105	PA-55	45.33	44.83	69.0	0.0072	0.013	24.0	0.0	0.0
106	PA-56	46.09	45.27	130.0	0.0063	0.013	18.0	0.0	0.0
107	PA-57	46.11	45.69	239.0	0.0018	0.013	18.0	0.0	0.0
108	PA-57A	46.75	46.51	10.0	0.0240	0.013	15.0	0.0	0.0
109	PA-57B	49.75	48.00	175.0	0.0100	0.025	8.0	0.0	0.0
110	PA-57C	48.00	46.80	45.0	0.0267	0.013	15.0	0.0	0.0
111	PA-58	46.23	45.29	184.0	0.0051	0.013	36.0	0.0	0.0
112	PA-59	50.10	47.77	250.0	0.0093	0.013	24.0	0.0	0.0
113	PA-60	50.30	50.05	91.0	0.0027	0.012	18.0	0.0	0.0
114	PA-61	50.61	50.50	47.0	0.0023	0.012	12.0	0.0	0.0
115	PA-63	50.23	50.12	78.0	0.0014	0.013	12.0	0.0	0.0
116	PA-64	48.08	47.61	25.0	0.0188	0.013	30.0	0.0	0.0
117	PA-64A	48.68	49.18	25.0	-0.0200	0.013	24.0	0.0	0.0
118	PA-65	47.41	46.68	156.0	0.0047	0.013	30.0	0.0	0.0
119	PA-66	47.84	47.46	28.0	0.0136	0.013	30.0	0.0	0.0
120	PA-67	48.67	48.24	185.0	0.0023	0.013	24.0	0.0	0.0
121	PA-67A	49.11	48.18	183.0	0.0051	0.013	30.0	0.0	0.0
122	PA-69	49.74	49.06	180.0	0.0038	0.013	24.0	0.0	0.0
123	PA-7	41.52	37.45	498.0	0.0082	0.013	42.0	0.0	0.0
124	PA-70	50.68	49.74	195.0	0.0048	0.013	18.0	0.0	0.0
125	PA-71	51.80	51.48	41.0	0.0078	0.013	15.0	0.0	0.0
126	PA-72	51.01	51.08	28.0	-0.0025	0.011	18.0	0.0	0.0

Pipe Listing (all nodes) (continued)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
127	PA-72A	51.16	51.01	27.0	0.0056	0.013	15.0	0.0	0.0
128	PA-73	51.29	51.11	45.0	0.0040	0.013	15.0	0.0	0.0
129	PA-74	51.48	51.16	45.0	0.0071	0.013	15.0	0.0	0.0
130	PA-75	51.44	49.74	173.0	0.0098	0.013	24.0	0.0	0.0
131	PA-76	50.78	50.16	90.0	0.0069	0.013	24.0	0.0	0.0
132	PA-77	55.58	51.48	197.0	0.0208	0.013	18.0	0.0	0.0
133	PA-78	49.38	47.02	213.0	0.0111	0.013	36.0	0.0	0.0
134	PA-79	49.94	49.43	108.0	0.0047	0.013	30.0	0.0	0.0
135	PA-8	42.20	41.93	363.0	0.0007	0.013	42.0	0.0	0.0
136	PA-80	50.97	50.02	88.0	0.0108	0.013	24.0	0.0	0.0
137	PA-8A	44.16	42.40	396.0	0.0044	0.013	42.0	0.0	0.0
138	PA-9	45.27	44.26	175.0	0.0058	0.013	42.0	0.0	0.0
139	PA-90	51.25	51.03	93.0	0.0024	0.013	24.0	0.0	0.0
140	PA-91	51.67	51.27	71.0	0.0056	0.013	24.0	0.0	0.0
141	PA-92	51.89	51.68	93.0	0.0023	0.013	24.0	0.0	0.0
142	PA-93	52.45	52.22	96.0	0.0024	0.013	24.0	0.0	0.0
143	PA-94	52.83	52.47	93.0	0.0039	0.013	24.0	0.0	0.0
144	PA-95	52.95	52.59	93.0	0.0039	0.013	24.0	0.0	0.0
145	PA-95A	52.59	52.80	51.0	-0.0041	0.013	24.0	0.0	0.0
146	PA-96	52.83	52.92	93.0	-0.0010	0.013	24.0	0.0	0.0
147	PA-99	53.49	52.88	296.0	0.0021	0.013	24.0	0.0	0.0
148	PC4-1S	57.51	56.19	106.0	0.0125	0.013	18.0	0.0	0.0
149	PC4-2	59.37	59.23	65.0	0.0022	0.013	18.0	0.0	0.0
150	PJB2	62.30	61.55	75.0	0.0100	0.013	18.0	0.0	0.0
151	PS-12	43.15	42.91	190.0	0.0013	0.013	30.0	0.0	0.0
152	PS-13	44.55	44.37	315.0	0.0006	0.010	15.0	0.0	0.0
153	RWE DMH 104	18.67	18.50	52.0	0.0033	0.013	60.0	0.0	0.0
154	RWE DMH 104	19.79	19.67	45.0	0.0027	0.013	42.0	0.0	0.0
155	RWE DMH102	21.02	19.47	170.0	0.0091	0.013	60.0	0.0	0.0
156	RWE DMH103	19.42	18.77	130.0	0.0050	0.013	60.0	0.0	0.0
157	RWE DMH105	18.54	15.54	529.0	0.0057	0.013	60.0	0.0	0.0
158	RWE DMH106	15.54	15.00	283.0	0.0019	0.013	60.0	0.0	0.0
159	RWW CB10	44.50	38.26	200.0	0.0312	0.013	30.0	0.0	0.0
160	TWC CB10	38.90	37.00	46.0	0.0413	0.011	15.0	0.0	0.0
161	TWC CB11	38.30	38.00	35.0	0.0086	0.010	12.0	0.0	0.0
162	TWC CB14	36.06	35.50	110.0	0.0051	0.013	12.0	0.0	0.0
163	TWC CB15	36.96	36.16	181.0	0.0044	0.013	12.0	0.0	0.0
164	TWC CB17	38.65	37.50	229.0	0.0050	0.013	12.0	0.0	0.0
165	TWC CB18	39.00	38.75	16.0	0.0156	0.013	12.0	0.0	0.0
166	TWC CB7	40.52	40.25	48.0	0.0056	0.011	12.0	0.0	0.0
167	TWC CB8	40.15	39.00	46.0	0.0250	0.011	15.0	0.0	0.0
168	TWC CB9	36.50	35.00	405.0	0.0037	0.011	30.0	0.0	0.0

Pipe Listing (all nodes) (continued)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
169	TWC DMH10	34.90	24.00	715.0	0.0152	0.011	30.0	0.0	0.0
170	TWC DMH3	25.08	21.02	423.0	0.0096	0.011	60.0	0.0	0.0
171	TWC DMH5	35.40	35.14	46.0	0.0057	0.013	12.0	0.0	0.0
172	TWIN P	65.85	65.53	75.0	0.0043	0.013	12.0	0.0	0.0
173	WQU	33.72	33.53	80.0	0.0024	0.011	24.0	0.0	0.0

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points x 2
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 2S: Runoff Area=691,221 sf 35.37% Impervious Runoff Depth=3.62"
Flow Length=918' Tc=16.5 min CN=69/98 Runoff=45.58 cfs 4.787 af

Subcatchment 1S: Subcatchment Area to Runoff Area=2.150 ac 73.02% Impervious Runoff Depth=4.88"
Tc=5.0 min CN=74/98 Runoff=11.36 cfs 0.874 af

Subcatchment 2AS: Subcatchment 2 Runoff Area=0.100 ac 100.00% Impervious Runoff Depth=5.56"
Tc=1.0 min CN=0/98 Runoff=0.68 cfs 0.046 af

Subcatchment 2BS: Subcatchment Runoff Area=0.115 ac 13.04% Impervious Runoff Depth=3.35"
Tc=1.0 min CN=74/98 Runoff=0.52 cfs 0.032 af

Subcatchment 6AS: TERMINAL BUILDING Runoff Area=0.200 ac 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=0/98 Runoff=1.18 cfs 0.093 af

Subcatchment 6CS: TERMINAL BUILDING Runoff Area=0.100 ac 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=0/98 Runoff=0.59 cfs 0.046 af

Subcatchment 6S: TERMINAL BUILDING Runoff Area=0.600 ac 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=0/98 Runoff=3.53 cfs 0.278 af

Subcatchment 8S: PRE Runoff Area=125,708 sf 10.00% Impervious Runoff Depth=3.80"
Flow Length=590' Slope=0.0200 '/' Tc=26.2 min CN=80/98 Runoff=7.58 cfs 0.913 af

Subcatchment 9S: ROOF Runoff Area=38,594 sf 100.00% Impervious Runoff Depth=5.56"
Tc=0.0 min CN=0/98 Runoff=6.14 cfs 0.411 af

Subcatchment 10S: Runoff Area=586,801 sf 62.52% Impervious Runoff Depth=4.83"
Tc=5.0 min CN=80/98 Runoff=71.59 cfs 5.419 af

Subcatchment 11S: TRIB TO POR C Runoff Area=1.109 ac 88.55% Impervious Runoff Depth=5.27"
Tc=6.0 min CN=74/98 Runoff=6.03 cfs 0.487 af

Subcatchment 18S: PRE Runoff Area=223,356 sf 2.48% Impervious Runoff Depth=4.25"
Flow Length=665' Slope=0.0100 '/' Tc=48.1 min CN=86/98 Runoff=11.23 cfs 1.817 af

Subcatchment 19S: TRIB TO POR B Runoff Area=0.518 ac 92.86% Impervious Runoff Depth=5.38"
Tc=6.0 min CN=74/98 Runoff=2.86 cfs 0.232 af

Subcatchment 36S: TERMINAL BUILDING Runoff Area=1.000 ac 100.00% Impervious Runoff Depth=5.56"
Tc=10.0 min CN=0/98 Runoff=4.99 cfs 0.464 af

Subcatchment 40S: A-72 Runoff Area=1.890 ac 100.00% Impervious Runoff Depth=5.56"
Flow Length=500' Slope=0.0100 '/' Tc=5.6 min CN=0/98 Runoff=10.89 cfs 0.876 af

Subcatchment A-100: (new Subcat) Runoff Area=1.300 ac 38.46% Impervious Runoff Depth=4.61"
Flow Length=218' Slope=0.0100 '/' Tc=9.6 min CN=84/98 Runoff=5.82 cfs 0.499 af

Subcatchment A-101: (new Subcat) Runoff Area=5.440 ac 0.00% Impervious Runoff Depth=3.91"
Flow Length=1,095' Tc=40.6 min CN=83/0 Runoff=12.09 cfs 1.771 af

Subcatchment A-102: Runoff Area=174,763 sf 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=0/98 Runoff=23.62 cfs 1.860 af

Subcatchment A-103: (new Subcat) Runoff Area=134,780 sf 63.32% Impervious Runoff Depth=4.21"
Flow Length=330' Slope=0.0100 '/' Tc=7.9 min CN=61/98 Runoff=12.63 cfs 1.085 af

Subcatchment A-104: (new Subcat) Runoff Area=194,930 sf 56.40% Impervious Runoff Depth=3.51"
Flow Length=320' Tc=2.6 min CN=47/98 Runoff=17.51 cfs 1.308 af

Subcatchment A-105: Runoff Area=86,999 sf 49.83% Impervious Runoff Depth=3.59"
Flow Length=90' Slope=0.0150 '/' Tc=10.4 min CN=58/98 Runoff=6.39 cfs 0.598 af

Subcatchment A-105B: Runoff Area=68,846 sf 76.93% Impervious Runoff Depth=5.11"
Flow Length=190' Tc=1.7 min CN=80/98 Runoff=9.85 cfs 0.673 af

Subcatchment A-106: (new Subcat) Runoff Area=186,154 sf 54.68% Impervious Runoff Depth=4.67"
Flow Length=605' Tc=5.9 min CN=80/98 Runoff=21.51 cfs 1.664 af

Subcatchment A-107: (new Subcat) Runoff Area=356,383 sf 39.42% Impervious Runoff Depth=4.02"
Flow Length=650' Tc=17.2 min CN=74/98 Runoff=25.79 cfs 2.741 af

Subcatchment A-108: (new Subcat) Runoff Area=98,096 sf 47.49% Impervious Runoff Depth=4.18"
Flow Length=85' Slope=0.0100 '/' Tc=11.7 min CN=73/98 Runoff=8.42 cfs 0.784 af

Subcatchment A-109: (new Subcat) Runoff Area=170,336 sf 56.21% Impervious Runoff Depth=3.95"
Flow Length=162' Tc=10.4 min CN=61/98 Runoff=13.86 cfs 1.286 af

Subcatchment A-11: (new Subcat) Runoff Area=2.740 ac 36.50% Impervious Runoff Depth=4.32"
Flow Length=370' Tc=28.5 min CN=80/98 Runoff=7.59 cfs 0.986 af

Subcatchment A-110: edited Runoff Area=224,687 sf 52.55% Impervious Runoff Depth=4.63"
Flow Length=235' Tc=11.7 min CN=80/98 Runoff=21.41 cfs 1.991 af

Subcatchment A-111: edited Runoff Area=167,759 sf 83.66% Impervious Runoff Depth=5.24"
Tc=5.0 min CN=80/98 Runoff=21.71 cfs 1.682 af

Subcatchment A-12: (new Subcat) Runoff Area=1.180 ac 38.98% Impervious Runoff Depth=4.37"
Flow Length=280' Tc=18.9 min CN=80/98 Runoff=3.92 cfs 0.429 af

Subcatchment A-13: (new Subcat) Runoff Area=1.520 ac 57.89% Impervious Runoff Depth=4.74"
Flow Length=318' Tc=37.9 min CN=80/98 Runoff=3.94 cfs 0.600 af

Subcatchment A-14: (new Subcat) Runoff Area=4.530 ac 49.67% Impervious Runoff Depth=4.58"
Flow Length=450' Tc=44.2 min CN=80/98 Runoff=10.57 cfs 1.727 af

Subcatchment A-15: (new Subcat) Runoff Area=2.900 ac 31.03% Impervious Runoff Depth=4.21"
Flow Length=470' Tc=38.1 min CN=80/98 Runoff=6.88 cfs 1.017 af

Subcatchment A-16: (new Subcat) Runoff Area=5.240 ac 50.00% Impervious Runoff Depth=4.58"
Flow Length=499' Tc=38.8 min CN=80/98 Runoff=13.07 cfs 2.001 af

Subcatchment A-20: (new Subcat) Runoff Area=5.500 ac 36.36% Impervious Runoff Depth=4.31"
Flow Length=420' Tc=33.1 min CN=80/98 Runoff=14.19 cfs 1.977 af

Subcatchment A-22: (new Subcat) Runoff Area=242,899 sf 67.02% Impervious Runoff Depth=4.92"
Flow Length=580' Tc=26.2 min CN=80/98 Runoff=17.57 cfs 2.284 af

Subcatchment A-24: (new Subcat) Runoff Area=3.600 ac 50.00% Impervious Runoff Depth=4.58"
Flow Length=520' Tc=44.7 min CN=80/98 Runoff=8.37 cfs 1.375 af

Subcatchment A-26: (new Subcat) Runoff Area=1.950 ac 64.10% Impervious Runoff Depth=4.86"
Flow Length=270' Tc=25.1 min CN=80/98 Runoff=6.21 cfs 0.789 af

Subcatchment A-29: (new Subcat) Runoff Area=1.760 ac 43.18% Impervious Runoff Depth=4.45"
Flow Length=300' Tc=26.1 min CN=80/98 Runoff=5.16 cfs 0.652 af

Subcatchment A-30: (new Subcat) Runoff Area=1.950 ac 42.05% Impervious Runoff Depth=4.43"
Flow Length=400' Tc=29.5 min CN=80/98 Runoff=5.40 cfs 0.719 af

Subcatchment A-31: (new Subcat) Runoff Area=2.650 ac 56.60% Impervious Runoff Depth=4.71"
Flow Length=520' Slope=0.0050 '/' Tc=62.5 min CN=80/98 Runoff=5.23 cfs 1.040 af

Subcatchment A-34: (new Subcat) Runoff Area=6.160 ac 0.00% Impervious Runoff Depth=2.12"
Flow Length=750' Slope=0.0050 '/' Tc=77.0 min CN=64/0 Runoff=4.96 cfs 1.089 af

Subcatchment A-34-1: (new Subcat) Runoff Area=203,148 sf 43.76% Impervious Runoff Depth=3.02"
Flow Length=700' Slope=0.0100 '/' Tc=27.7 min CN=50/98 Runoff=8.22 cfs 1.175 af

Subcatchment A-35: (new Subcat) Runoff Area=6.050 ac 0.00% Impervious Runoff Depth=2.21"
Flow Length=880' Slope=0.0050 '/' Tc=81.3 min CN=65/0 Runoff=4.91 cfs 1.113 af

Subcatchment A-37: (new Subcat) Runoff Area=7.250 ac 0.00% Impervious Runoff Depth=2.47"
Flow Length=900' Slope=0.0050 '/' Tc=82.0 min CN=68/0 Runoff=6.61 cfs 1.491 af

Subcatchment A-39: (new Subcat) Runoff Area=11.150 ac 0.00% Impervious Runoff Depth=2.83"
Flow Length=720' Tc=44.7 min CN=72/0 Runoff=17.08 cfs 2.630 af

Subcatchment A-42: (new Subcat) Runoff Area=12.260 ac 0.00% Impervious Runoff Depth=3.80"
Flow Length=760' Tc=47.4 min CN=82/0 Runoff=24.51 cfs 3.886 af

Subcatchment A-49: (new Subcat) Runoff Area=1.930 ac 0.00% Impervious Runoff Depth=4.22"
Flow Length=167' Tc=19.4 min CN=86/0 Runoff=6.42 cfs 0.679 af

Subcatchment A-51: (new Subcat) Runoff Area=9.000 ac 0.00% Impervious Runoff Depth=1.48"
Flow Length=505' Tc=53.7 min CN=56/0 Runoff=5.81 cfs 1.110 af

Subcatchment A-54: A-54 Runoff Area=1.820 ac 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=0/98 Runoff=10.71 cfs 0.844 af

Subcatchment A-54A: A-69 Runoff Area=1.130 ac 100.00% Impervious Runoff Depth=5.56"
Tc=4.0 min CN=0/98 Runoff=6.89 cfs 0.524 af

Subcatchment A-55: A-72 Runoff Area=1.890 ac 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=0/98 Runoff=11.13 cfs 0.876 af

Subcatchment A-56: (new Subcat) Runoff Area=0.980 ac 94.90% Impervious Runoff Depth=5.46"
Tc=4.0 min CN=80/98 Runoff=5.90 cfs 0.446 af

Subcatchment A-57: (new Subcat) Runoff Area=0.760 ac 46.05% Impervious Runoff Depth=4.50"
Flow Length=230' Slope=0.0100 '/' Tc=14.8 min CN=80/98 Runoff=2.84 cfs 0.285 af

Subcatchment A-57B: (new Subcat) Runoff Area=0.330 ac 45.45% Impervious Runoff Depth=4.49"
Flow Length=130' Slope=0.0100 '/' Tc=11.8 min CN=80/98 Runoff=1.34 cfs 0.124 af

Subcatchment A-57C: (new Subcat) Runoff Area=1.070 ac 62.62% Impervious Runoff Depth=4.83"
Tc=5.0 min CN=80/98 Runoff=5.69 cfs 0.431 af

Subcatchment A-58: A-67 Runoff Area=0.450 ac 100.00% Impervious Runoff Depth=5.56"
Tc=4.0 min CN=0/98 Runoff=2.74 cfs 0.209 af

Subcatchment A-59: (new Subcat) Runoff Area=0.020 ac 100.00% Impervious Runoff Depth=5.56"
Tc=1.0 min CN=0/98 Runoff=0.14 cfs 0.009 af

Subcatchment A-61: (new Subcat) Runoff Area=0.470 ac 31.91% Impervious Runoff Depth=4.23"
Tc=10.0 min CN=80/98 Runoff=1.93 cfs 0.166 af

Subcatchment A-63: (new Subcat) Runoff Area=0.020 ac 100.00% Impervious Runoff Depth=5.56"
Tc=1.0 min CN=0/98 Runoff=0.14 cfs 0.009 af

Subcatchment A-64: (new Subcat) Runoff Area=1.130 ac 100.00% Impervious Runoff Depth=5.56"
Tc=4.0 min CN=0/98 Runoff=6.89 cfs 0.524 af

Subcatchment A-64A: (new Subcat) Runoff Area=0.340 ac 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=2.15 cfs 0.158 af

Subcatchment A-65: (new Subcat) Runoff Area=0.450 ac 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=2.85 cfs 0.209 af

Subcatchment A-67: (new Subcat) Runoff Area=0.140 ac 100.00% Impervious Runoff Depth=5.56"
Tc=2.0 min CN=0/98 Runoff=0.92 cfs 0.065 af

Subcatchment A-67A: (new Subcat) Runoff Area=2.950 ac 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=0/98 Runoff=17.37 cfs 1.367 af

Subcatchment A-69: (new Subcat) Runoff Area=65,410 sf 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=0/98 Runoff=8.84 cfs 0.696 af

Subcatchment A-7: A-7 Runoff Area=1.860 ac 35.48% Impervious Runoff Depth=4.30"
Flow Length=450' Tc=42.3 min CN=80/98 Runoff=4.25 cfs 0.666 af

Subcatchment A-71: (new Subcat) Runoff Area=0.060 ac 100.00% Impervious Runoff Depth=5.56"
Tc=1.0 min CN=0/98 Runoff=0.41 cfs 0.028 af

Subcatchment A-72: (new Subcat) Runoff Area=0.050 ac 100.00% Impervious Runoff Depth=5.56"
Tc=1.0 min CN=0/98 Runoff=0.34 cfs 0.023 af

Subcatchment A-72A: (new Subcat) Runoff Area=0.040 ac 100.00% Impervious Runoff Depth=5.56"
Tc=1.0 min CN=0/98 Runoff=0.27 cfs 0.019 af

Subcatchment A-73: (new Subcat) Runoff Area=0.060 ac 100.00% Impervious Runoff Depth=5.56"
Tc=1.0 min CN=0/98 Runoff=0.41 cfs 0.028 af

Subcatchment A-74: (new Subcat) Runoff Area=0.150 ac 100.00% Impervious Runoff Depth=5.56"
Tc=2.0 min CN=0/98 Runoff=0.98 cfs 0.070 af

Subcatchment A-75: (new Subcat) Runoff Area=41,230 sf 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=5.99 cfs 0.439 af

Subcatchment A-76: (new Subcat) Runoff Area=31,000 sf 100.00% Impervious Runoff Depth=5.56"
Tc=4.0 min CN=0/98 Runoff=4.34 cfs 0.330 af

Subcatchment A-77: (new Subcat) Runoff Area=52,235 sf 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=0/98 Runoff=7.06 cfs 0.556 af

Subcatchment A-78: (new Subcat) Runoff Area=0.050 ac 100.00% Impervious Runoff Depth=5.56"
Tc=2.0 min CN=0/98 Runoff=0.33 cfs 0.023 af

Subcatchment A-79: (new Subcat) Runoff Area=0.090 ac 100.00% Impervious Runoff Depth=5.56"
Tc=2.0 min CN=0/98 Runoff=0.59 cfs 0.042 af

Subcatchment A-8: (new Subcat) Runoff Area=2.600 ac 50.00% Impervious Runoff Depth=4.58"
Flow Length=479' Tc=47.6 min CN=80/98 Runoff=5.86 cfs 0.993 af

Subcatchment A-80: (new Subcat) Runoff Area=0.100 ac 100.00% Impervious Runoff Depth=5.56"
Tc=2.0 min CN=0/98 Runoff=0.66 cfs 0.046 af

Subcatchment A-90: (new Subcat) Runoff Area=13,480 sf 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=1.96 cfs 0.143 af

Subcatchment A-91: (new Subcat) Runoff Area=25,265 sf 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=3.67 cfs 0.269 af

Subcatchment A-92: (new Subcat) Runoff Area=35,650 sf 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=5.18 cfs 0.379 af

Subcatchment A-93: (new Subcat) Runoff Area=33,790 sf 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=4.91 cfs 0.360 af

Subcatchment A-94: (new Subcat) Runoff Area=21,855 sf 100.00% Impervious Runoff Depth=5.56"
Tc=4.0 min CN=0/98 Runoff=3.06 cfs 0.233 af

Subcatchment A-95: Runoff Area=14,166 sf 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=2.06 cfs 0.151 af

Subcatchment A-95A: (new Subcat) Runoff Area=15,300 sf 100.00% Impervious Runoff Depth=5.56"
Tc=4.0 min CN=0/98 Runoff=2.14 cfs 0.163 af

Subcatchment A-96: Runoff Area=30,353 sf 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=0/98 Runoff=4.10 cfs 0.323 af

Subcatchment A-99: (new Subcat) Runoff Area=108,001 sf 76.56% Impervious Runoff Depth=5.10"
Flow Length=351' Tc=35.7 min CN=80/98 Runoff=6.98 cfs 1.054 af

Subcatchment AA2: (new Subcat) Runoff Area=15,190 sf 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=2.21 cfs 0.162 af

Subcatchment AA3: (new Subcat) Runoff Area=26,970 sf 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=3.92 cfs 0.287 af

Subcatchment AA4: (new Subcat) Runoff Area=38,130 sf 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=5.54 cfs 0.406 af

Subcatchment AA5: (new Subcat) Runoff Area=36,735 sf 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=5.34 cfs 0.391 af

Subcatchment AA6: Runoff Area=122,464 sf 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=0/98 Runoff=16.55 cfs 1.303 af

Subcatchment B-101: (new Subcat) Runoff Area=481,018 sf 90.00% Impervious Runoff Depth=5.37"
Tc=5.0 min CN=80/98 Runoff=63.32 cfs 4.938 af

Subcatchment C4-1S: Runoff Area=43,850 sf 30.39% Impervious Runoff Depth=4.34"
Flow Length=360' Slope=0.0100 '/' Tc=16.3 min CN=82/98 Runoff=3.57 cfs 0.364 af

Subcatchment C4-2: Runoff Area=74,534 sf 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=0/98 Runoff=10.07 cfs 0.793 af

Subcatchment C4-3: Runoff Area=74,534 sf 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=0/98 Runoff=10.07 cfs 0.793 af

Subcatchment I-1: Apron Runoff Area=1.230 ac 100.00% Impervious Runoff Depth=5.56"
Flow Length=475' Tc=4.1 min CN=0/98 Runoff=7.48 cfs 0.570 af

Subcatchment JB1: (new Subcat) Runoff Area=2.810 ac 71.17% Impervious Runoff Depth=4.83"
Flow Length=680' Tc=5.0 min CN=74/98 Runoff=14.74 cfs 1.131 af

Subcatchment JB3B: (new Subcat) Runoff Area=2.750 ac 81.82% Impervious Runoff Depth=5.21"
Flow Length=660' Slope=0.0100 '/' Tc=3.1 min CN=80/98 Runoff=16.52 cfs 1.193 af

Subcatchment P-3: (new Subcat) Runoff Area=26,830 sf 0.00% Impervious Runoff Depth=3.21"
Flow Length=50' Slope=0.2000 '/' Tc=2.3 min CN=76/0 Runoff=2.65 cfs 0.165 af

Subcatchment SB-CB-17: (new Subcat) Runoff Area=0.070 ac 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=0.44 cfs 0.032 af

Subcatchment SB-CB-18: (new Subcat) Runoff Area=0.080 ac 100.00% Impervious Runoff Depth=5.56"
Tc=3.0 min CN=0/98 Runoff=0.51 cfs 0.037 af

Subcatchment SB-WQU-5: (new Subcat) Runoff Area=1.360 ac 89.71% Impervious Runoff Depth=5.36"
Flow Length=1,407' Tc=7.0 min CN=80/98 Runoff=7.27 cfs 0.607 af

Subcatchment TBR: (new Subcat) Runoff Area=2.400 ac 100.00% Impervious Runoff Depth=5.56"
Tc=8.0 min CN=0/98 Runoff=12.75 cfs 1.112 af

Subcatchment TWIN 12": (new Subcat) Runoff Area=1.030 ac 75.73% Impervious Runoff Depth=5.09"
Flow Length=840' Tc=12.7 min CN=80/98 Runoff=4.44 cfs 0.437 af

Subcatchment WQF1: (new Subcat) Runoff Area=305,885 sf 78.71% Impervious Runoff Depth=5.14"
Flow Length=500' Tc=6.2 min CN=80/98 Runoff=37.45 cfs 3.010 af

Reach 2R: POA#3 Discharge from Filter Bed #1 & 18" Culvert to Downstream Inflow=8.31 cfs 0.736 af
Outflow=8.31 cfs 0.736 af

Reach 3R: >100-yr 24-hr Spillway to Jetport Boulavard Closed Drainage Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 4R: pipe Avg. Flow Depth=2.50' Max Vel=10.20 fps Inflow=143.84 cfs 11.027 af
30.0" Round Pipe n=0.013 L=1,000.0' S=0.0115 '/' Capacity=43.93 cfs Outflow=47.09 cfs 11.027 af

Reach 38R: Avg. Flow Depth=0.23' Max Vel=1.21 fps Inflow=4.00 cfs 0.437 af
n=0.022 L=990.0' S=0.0046 '/' Capacity=112.70 cfs Outflow=3.16 cfs 0.437 af

Reach 46R: (new Reach) Avg. Flow Depth=0.59' Max Vel=0.87 fps Inflow=2.45 cfs 0.716 af
n=0.030 L=291.0' S=0.0010 '/' Capacity=78.23 cfs Outflow=2.44 cfs 0.716 af

Pond .2P: Peak Elev=53.98' Storage=119 cf Inflow=83.26 cfs 6.798 af
54.0" Round Culvert n=0.013 L=95.0' S=0.0069 '/' Outflow=83.14 cfs 6.797 af

Pond .3P: Peak Elev=54.83' Storage=125 cf Inflow=81.13 cfs 6.638 af
54.0" Round Culvert n=0.013 L=95.0' S=0.0020 '/' Outflow=81.08 cfs 6.637 af

Pond .4P: Peak Elev=55.44' Storage=128 cf Inflow=77.30 cfs 6.353 af
54.0" Round Culvert n=0.013 L=95.0' S=0.0020 '/' Outflow=77.28 cfs 6.351 af

Pond .5P: Peak Elev=56.13' Storage=131 cf Inflow=61.86 cfs 5.215 af
48.0" Round Culvert n=0.013 L=95.0' S=0.0020 '/' Outflow=61.87 cfs 5.214 af

Pond .6P: Peak Elev=56.65' Storage=135 cf Inflow=56.82 cfs 4.826 af
48.0" Round Culvert n=0.013 L=40.0' S=0.0020 '/' Outflow=56.81 cfs 4.824 af

Pond .A-1: Outfall 5 Peak Elev=50.26' Storage=299 cf Inflow=197.57 cfs 15.100 af
42.0" Round Culvert n=0.013 L=520.0' S=0.0030 '/' Outflow=203.33 cfs 15.100 af

Pond .A-2: Peak Elev=34.13' Storage=39,626 cf Inflow=154.12 cfs 8.982 af
42.0" Round Culvert n=0.013 L=168.0' S=0.0037 '/' Outflow=161.06 cfs 9.048 af

Pond .A-3: Peak Elev=32.58' Storage=4,316 cf Inflow=148.41 cfs 8.971 af
42.0" Round Culvert n=0.013 L=235.0' S=0.0026 '/' Outflow=154.12 cfs 8.981 af

Pond .A-4: Peak Elev=32.58' Storage=24,888 cf Inflow=98.05 cfs 8.584 af
42.0" Round Culvert n=0.013 L=233.0' S=0.0031 '/' Outflow=148.41 cfs 8.601 af

Pond .A1-B: Peak Elev=48.76' Inflow=45.58 cfs 4.787 af
24.0" Round Culvert n=0.013 L=181.0' S=0.0336 '/' Outflow=45.58 cfs 4.787 af

Pond .DMH A1: (new Pond) Peak Elev=61.76' Inflow=4.12 cfs 0.324 af
24.0" Round Culvert n=0.013 L=55.0' S=0.0071 '/' Outflow=4.12 cfs 0.324 af

Pond 1P: Grass Lined Filtration Basin Peak Elev=76.45' Storage=14,473 cf Inflow=11.36 cfs 0.874 af
Outflow=7.84 cfs 0.658 af

Pond 3P: RipRap Inlet Area w/Outlet Control Peak Elev=75.95' Storage=98 cf Inflow=7.84 cfs 0.658 af
Primary=7.84 cfs 0.657 af Secondary=0.00 cfs 0.000 af Outflow=7.84 cfs 0.657 af

Pond 10P: CHAMBERS Peak Elev=65.65' Storage=5,057 cf Inflow=6.14 cfs 0.411 af
Outflow=6.29 cfs 0.343 af

Pond 12P: POR C Peak Elev=68.00' Storage=10,067 cf Inflow=6.03 cfs 0.487 af
Outflow=1.10 cfs 0.429 af

Pond 19P: Peak Elev=37.26' Storage=0 cf Inflow=0.00 cfs 0.000 af
15.0" Round Culvert n=0.013 L=210.0' S=0.0067 '/' Outflow=0.00 cfs 0.000 af

Pond 20P: POR B Peak Elev=67.82' Storage=3,916 cf Inflow=2.86 cfs 0.232 af
Outflow=1.10 cfs 0.213 af

Pond 23P: 23 P Peak Elev=66.01' Inflow=6.44 cfs 0.777 af
15.0" Round Culvert n=0.013 L=40.0' S=0.0120 '/' Outflow=6.44 cfs 0.777 af

Pond 25P: (new Pond) Peak Elev=78.00' Storage=38 cf Inflow=2.44 cfs 0.716 af
15.0" Round Culvert n=0.013 L=560.0' S=0.0268 '/' Outflow=4.95 cfs 0.716 af

Pond 26P: (new Pond) Peak Elev=65.01' Storage=38 cf Inflow=4.95 cfs 0.716 af
24.0" Round Culvert n=0.013 L=340.0' S=0.0223 '/' Outflow=5.90 cfs 0.716 af

Pond 45P: (new Pond) Peak Elev=45.91' Storage=28,152 cf Inflow=8.22 cfs 1.175 af
12.0" Round Culvert n=0.015 L=30.0' S=0.0200 '/' Outflow=2.45 cfs 0.716 af

Pond A-11P: Minimally Controlled by Inlet Peak Elev=56.14' Storage=4,448 cf Inflow=7.59 cfs 0.986 af
Outflow=7.47 cfs 0.986 af

Pond A-21P: Controlled by Inlet Capacity Peak Elev=66.97' Storage=33,079 cf Inflow=14.19 cfs 1.977 af
Primary=10.11 cfs 2.003 af Secondary=4.47 cfs 0.178 af Outflow=14.58 cfs 1.977 af

Pond A-53B: (new Pond) Peak Elev=598.54' Storage=75 cf Inflow=21.41 cfs 1.991 af
15.0" Round Culvert n=0.013 L=160.0' S=0.0022 '/' Outflow=21.45 cfs 1.991 af

Pond A-54P: MINIMALLY CONTROLLED BY Peak Elev=76.40' Storage=1,650 cf Inflow=10.71 cfs 0.844 af
Primary=6.96 cfs 0.771 af Secondary=15.10 cfs 0.099 af Outflow=15.40 cfs 0.844 af

Pond A-69P: (new Pond) Peak Elev=57.52' Storage=660 cf Inflow=8.84 cfs 0.696 af
Primary=4.81 cfs 0.407 af Secondary=6.38 cfs 0.323 af Outflow=8.67 cfs 0.696 af

Pond A-7P: Minimally Controlled by Inlet Peak Elev=50.89' Storage=1,717 cf Inflow=4.25 cfs 0.666 af
Outflow=4.35 cfs 0.666 af

Pond A-91A: Peak Elev=51.53' Storage=0.002 af Inflow=132.46 cfs 23.007 af
Primary=132.38 cfs 23.006 af Secondary=0.00 cfs 0.000 af Outflow=132.38 cfs 23.006 af

Pond A-91B: Peak Elev=53.19' Storage=0.003 af Inflow=107.60 cfs 10.308 af
54.0" Round Culvert n=0.013 L=47.0' S=0.0051 '/' Outflow=107.87 cfs 10.308 af

Pond B-12: (new Pond) Peak Elev=46.81' Storage=0.004 af Inflow=72.08 cfs 5.608 af
30.0" Round Culvert n=0.013 L=137.0' S=0.0061 '/' Outflow=72.28 cfs 5.608 af

Pond B-13: (new Pond) Peak Elev=62.25' Storage=0.004 af Inflow=71.21 cfs 5.610 af
30.0" Round Culvert n=0.013 L=25.0' S=0.0100 '/' Outflow=71.19 cfs 5.608 af

Pond B-14: Peak Elev=87.57' Storage=0.002 af Inflow=63.32 cfs 4.938 af
24.0" Round Culvert n=0.013 L=224.0' S=0.0070 '/' Outflow=63.37 cfs 4.937 af

Pond CB-A-102: (new Pond) Peak Elev=107.63' Storage=75 cf Inflow=62.15 cfs 5.634 af
24.0" Round Culvert n=0.013 L=198.0' S=0.0025 '/' Outflow=62.11 cfs 5.634 af

Pond CB-A-103: (new Pond) Peak Elev=125.47' Storage=75 cf Inflow=55.69 cfs 4.850 af
24.0" Round Culvert n=0.013 L=200.0' S=0.0007 '/' Outflow=55.66 cfs 4.850 af

Pond CB-A-104: (new Pond) Peak Elev=137.76' Storage=75 cf Inflow=50.95 cfs 4.252 af
24.0" Round Culvert n=0.013 L=183.0' S=0.0040 '/' Outflow=50.91 cfs 4.252 af

Pond CB-A-105: (new Pond) Peak Elev=241.80' Storage=75 cf Inflow=50.86 cfs 4.252 af
18.0" Round Culvert n=0.013 L=393.0' S=0.0021 '/' Outflow=50.95 cfs 4.252 af

Pond CB-A-106: (new Pond) Peak Elev=332.40' Storage=75 cf Inflow=12.63 cfs 1.085 af
15.0" Round Culvert n=0.011 L=57.0' S=0.0019 '/' Outflow=12.74 cfs 1.085 af

Pond DHM A7: Peak Elev=40.09' Storage=0.002 af Inflow=131.93 cfs 23.006 af
54.0" Round Culvert n=0.013 L=300.0' S=0.0108 '/' Outflow=133.44 cfs 23.006 af

Pond DI CB-1: (new Pond)
Primary=0.00 cfs 0.000 af

Pond DMH A1: Peak Elev=72.99' Storage=104 cf Inflow=37.78 cfs 3.511 af
24.0" Round Culvert n=0.013 L=40.0' S=0.0080 '/' Outflow=38.05 cfs 3.511 af

Pond DMH A2: Peak Elev=71.64' Storage=163 cf Inflow=8.31 cfs 0.736 af
18.0" Round Culvert n=0.013 L=666.0' S=0.0086 '/' Outflow=13.01 cfs 0.736 af

Pond DMH A3: Peak Elev=77.51' Storage=110 cf Inflow=38.05 cfs 3.511 af
24.0" Round Culvert n=0.013 L=550.0' S=0.0030 '/' Outflow=43.95 cfs 3.511 af

Pond DMH A4: Peak Elev=49.08' Storage=94 cf Inflow=132.38 cfs 23.006 af
54.0" Round Culvert n=0.013 L=309.0' S=0.0057 '/' Outflow=132.05 cfs 23.006 af

Pond DMH A5: Peak Elev=46.51' Storage=85 cf Inflow=132.05 cfs 23.006 af
54.0" Round Culvert n=0.013 L=1,012.0' S=0.0048 '/' Outflow=131.94 cfs 23.006 af

Pond DMH A6: Peak Elev=40.87' Storage=76 cf Inflow=131.94 cfs 23.006 af
54.0" Round Culvert n=0.013 L=312.0' S=0.0048 '/' Outflow=131.93 cfs 23.006 af

Pond DMH C2: (new Pond) Peak Elev=69.47' Inflow=48.22 cfs 4.589 af
24.0" Round Culvert n=0.013 L=370.0' S=0.0062 '/' Outflow=48.22 cfs 4.589 af

Pond F-WQU-4: (new Pond) Peak Elev=325.73' Storage=75 cf Inflow=35.36 cfs 2.945 af
15.0" Round Culvert n=0.011 L=335.0' S=0.0020 '/' Outflow=35.33 cfs 2.945 af

Pond MT-11A: Peak Elev=416.62' Inflow=7.48 cfs 0.570 af
18.0" Round Culvert n=0.011 L=104.0' S=0.0027 '/' Outflow=7.48 cfs 0.570 af

Pond MT-16: Peak Elev=416.01' Inflow=7.48 cfs 0.570 af
24.0" Round Culvert n=0.010 L=74.0' S=0.0074 '/' Outflow=7.48 cfs 0.570 af

Pond MT-24: Peak Elev=415.91' Inflow=7.48 cfs 0.570 af
24.0" Round Culvert n=0.010 L=145.0' S=0.0035 '/' Outflow=7.48 cfs 0.570 af

Pond MT-25: Peak Elev=415.72' Inflow=7.48 cfs 0.570 af
24.0" Round Culvert n=0.011 L=74.0' S=0.0020 '/' Outflow=7.48 cfs 0.570 af

Pond MT-26: Peak Elev=415.59' Inflow=7.48 cfs 0.570 af
24.0" Round Culvert n=0.010 L=20.0' S=0.0250 '/' Outflow=7.48 cfs 0.570 af

Pond Outfall 1: Outfall 1 Inflow=47.09 cfs 11.027 af
Primary=47.09 cfs 11.027 af

Pond P-4: Peak Elev=39.61' Storage=235,932 cf Inflow=480.60 cfs 76.088 af
60.0" Round Culvert n=0.013 L=200.0' S=0.0045 '/' Outflow=236.89 cfs 76.086 af

Pond P-5: Peak Elev=415.43' Storage=9,952 cf Inflow=10.01 cfs 0.735 af
Outflow=14.72 cfs 0.637 af

Pond P-67A: Peak Elev=57.56' Storage=2,951 cf Inflow=17.37 cfs 1.367 af
Primary=9.68 cfs 1.116 af Secondary=20.28 cfs 0.304 af Outflow=22.77 cfs 1.367 af

Pond P-CB17: (new Pond) Peak Elev=62.36' Inflow=1.04 cfs 0.999 af
18.0" Round Culvert n=0.013 L=30.0' S=0.0113 '/' Outflow=1.04 cfs 0.999 af

Pond P-CB18: (new Pond) Peak Elev=62.35' Inflow=1.09 cfs 1.036 af
18.0" Round Culvert n=0.013 L=40.0' S=0.0143 '/' Outflow=1.09 cfs 1.036 af

Pond P-DMH1: (new Pond) Peak Elev=62.35' Inflow=8.02 cfs 1.644 af
24.0" Round Culvert n=0.013 L=305.0' S=0.0024 '/' Outflow=8.02 cfs 1.644 af

Pond P-JB3A: (new Pond) Peak Elev=62.50' Storage=60,630 cf Inflow=17.52 cfs 3.224 af
Primary=1.01 cfs 0.967 af Secondary=8.19 cfs 1.794 af Outflow=9.20 cfs 2.761 af

Pond P-JB3B: (new Pond) Peak Elev=72.30' Storage=10,022 cf Inflow=16.52 cfs 1.193 af
15.0" Round Culvert n=0.013 L=40.0' S=0.0100 '/' Outflow=6.47 cfs 1.193 af

Pond P-WQU5: (new Pond) Peak Elev=63.09' Inflow=7.27 cfs 0.607 af
18.0" Round Culvert n=0.013 L=24.0' S=0.0429 '/' Outflow=7.27 cfs 0.607 af

Pond PA-100: Peak Elev=66.97' Storage=31,264 cf Inflow=30.82 cfs 6.241 af
18.0" Round Culvert n=0.013 L=403.0' S=0.0054 '/' Outflow=10.99 cfs 6.241 af

Pond PA-101: Peak Elev=159.01' Storage=52,286 cf Inflow=23.58 cfs 5.742 af
15.0" Round Culvert n=0.013 L=386.0' S=0.0056 '/' Outflow=29.89 cfs 5.742 af

Pond PA-10TEE: Volume from A-10 Peak Elev=90.84' Storage=121 cf Inflow=77.40 cfs 13.284 af
42.0" Round Culvert n=0.013 L=62.0' S=0.0058 '/' Outflow=69.48 cfs 13.284 af

Pond PA-11: Peak Elev=86.18' Storage=153 cf Inflow=77.33 cfs 13.284 af
42.0" Round Culvert n=0.013 L=154.0' S=0.0058 '/' Outflow=77.40 cfs 13.284 af

Pond PA-12: Peak Elev=60.73' Storage=1,383 cf Inflow=76.17 cfs 11.255 af
Primary=48.67 cfs 11.274 af Secondary=23.38 cfs 0.022 af Outflow=48.67 cfs 11.255 af

Pond PA-13: Peak Elev=60.82' Storage=466 cf Inflow=76.22 cfs 10.812 af
Primary=49.66 cfs 10.412 af Secondary=39.78 cfs 0.414 af Outflow=75.17 cfs 10.812 af

Pond PA-14: Peak Elev=82.08' Storage=73 cf Inflow=71.57 cfs 10.212 af
30.0" Round Culvert n=0.013 L=515.0' S=0.0036 '/' Outflow=73.58 cfs 10.212 af

Pond PA-14R: TO BE FIXED Peak Elev=81.12' Storage=21,761 cf Inflow=31.66 cfs 2.870 af
Outflow=38.66 cfs 2.870 af

Pond PA-15: Peak Elev=78.43' Storage=72 cf Inflow=34.82 cfs 7.279 af
30.0" Round Culvert n=0.013 L=330.0' S=0.0027 '/' Outflow=35.68 cfs 7.279 af

Pond PA-15R: (new Pond) Peak Elev=61.71' Storage=19,048 cf Inflow=17.75 cfs 1.599 af
Primary=12.16 cfs 1.339 af Secondary=24.85 cfs 1.143 af Outflow=32.66 cfs 1.599 af

Pond PA-16: Peak Elev=82.31' Storage=74 cf Inflow=25.29 cfs 5.941 af
24.0" Round Culvert n=0.013 L=290.0' S=0.0051 '/' Outflow=25.99 cfs 5.941 af

Pond PA-16R: (new Pond) Peak Elev=62.74' Storage=10,284 cf Inflow=13.07 cfs 2.001 af
Primary=8.09 cfs 1.472 af Secondary=11.52 cfs 0.582 af Outflow=18.50 cfs 2.001 af

Pond PA-17: Peak Elev=77.29' Storage=94 cf Inflow=23.33 cfs 4.468 af
24.0" Round Culvert n=0.013 L=297.0' S=0.0037 '/' Outflow=19.23 cfs 4.468 af

Pond PA-19: Peak Elev=83.07' Storage=104 cf Inflow=27.38 cfs 4.465 af
24.0" Round Culvert n=0.013 L=295.0' S=0.0059 '/' Outflow=23.30 cfs 4.465 af

Pond PA-20TEE: STORAGE FROM A-20 Peak Elev=80.36' Storage=73 cf Inflow=20.27 cfs 4.465 af
18.0" Round Culvert n=0.013 L=110.0' S=0.0042 '/' Outflow=27.38 cfs 4.465 af

Pond PA-21: Peak Elev=96.26' Storage=63 cf Inflow=22.61 cfs 4.465 af
18.0" Round Culvert n=0.013 L=182.0' S=0.0051 '/' Outflow=20.27 cfs 4.465 af

Pond PA-22: Peak Elev=95.52' Storage=55 cf Inflow=17.57 cfs 2.462 af
18.0" Round Culvert n=0.013 L=295.0' S=0.0059 '/' Outflow=17.71 cfs 2.462 af

Pond PA-23: Peak Elev=76.10' Storage=127 cf Inflow=95.56 cfs 19.384 af
30.0" Round Culvert n=0.013 L=440.0' S=0.0466 '/' Outflow=103.56 cfs 19.384 af

Pond PA-24: Peak Elev=74.16' Storage=2,795 cf Inflow=81.78 cfs 17.759 af
36.0" Round Culvert n=0.013 L=74.0' S=0.0064 '/' Outflow=104.21 cfs 17.769 af

Pond PA-25: Peak Elev=78.36' Storage=136 cf Inflow=77.16 cfs 14.954 af
36.0" Round Culvert n=0.013 L=333.0' S=0.0040 '/' Outflow=72.39 cfs 14.954 af

Pond PA-26: Peak Elev=75.10' Storage=114 cf Inflow=24.77 cfs 3.236 af
30.0" Round Culvert n=0.013 L=198.0' S=0.0070 '/' Outflow=22.82 cfs 3.237 af

Pond PA-27TEE: Volume from A-27 Peak Elev=79.22' Storage=107 cf Inflow=19.65 cfs 2.434 af
30.0" Round Culvert n=0.013 L=240.0' S=0.0055 '/' Outflow=20.42 cfs 2.435 af

Pond PA-28A: Peak Elev=70.45' Storage=109 cf Inflow=21.24 cfs 2.421 af
30.0" Round Culvert n=0.013 L=153.0' S=0.0043 '/' Outflow=19.65 cfs 2.421 af

Pond PA-29: Peak Elev=80.14' Storage=111 cf Inflow=17.76 cfs 2.416 af
24.0" Round Culvert n=0.010 L=90.0' S=0.0050 '/' Outflow=21.24 cfs 2.416 af

Pond PA-30: Peak Elev=71.25' Storage=107 cf Inflow=13.87 cfs 1.761 af
24.0" Round Culvert n=0.010 L=300.0' S=0.0044 '/' Outflow=14.83 cfs 1.761 af

Pond PA-31: Peak Elev=71.65' Storage=103 cf Inflow=5.23 cfs 1.040 af
24.0" Round Culvert n=0.013 L=396.0' S=0.0051 '/' Outflow=11.74 cfs 1.040 af

Pond PA-34: Peak Elev=78.73' Storage=1,422 cf Inflow=51.63 cfs 11.425 af
30.0" Round Culvert n=0.013 L=105.0' S=0.0173 '/' Outflow=69.18 cfs 11.425 af

Pond PA-34R: (new Pond) Peak Elev=0.00' Storage=0 cf
Primary=0.00 cfs 0.000 af

Pond PA-35: Peak Elev=82.15' Storage=381 cf Inflow=43.07 cfs 9.613 af
24.0" Round Culvert n=0.013 L=230.0' S=0.0032 '/' Outflow=45.87 cfs 9.613 af

Pond PA-36: Peak Elev=80.04' Storage=92 cf Inflow=23.06 cfs 4.395 af
24.0" Round Culvert n=0.013 L=161.0' S=0.0081 '/' Outflow=23.15 cfs 4.395 af

Pond PA-37: Peak Elev=82.44' Storage=87 cf Inflow=22.74 cfs 4.395 af
24.0" Round Culvert n=0.013 L=396.0' S=0.0045 '/' Outflow=23.06 cfs 4.395 af

Pond PA-37R: Slightly Controlled by Inlet Peak Elev=57.68' Storage=11,830 cf Inflow=6.61 cfs 1.491 af
Outflow=14.95 cfs 1.491 af

Pond PA-38: Peak Elev=80.38' Storage=87 cf Inflow=12.23 cfs 2.775 af
18.0" Round Culvert n=0.013 L=396.0' S=0.0044 '/' Outflow=10.46 cfs 2.775 af

Pond PA-39: Peak Elev=83.23' Storage=90 cf Inflow=8.78 cfs 2.768 af
18.0" Round Culvert n=0.013 L=200.0' S=0.0030 '/' Outflow=12.28 cfs 2.768 af

Pond PA-40: Peak Elev=61.99' Storage=34,473 cf Inflow=17.08 cfs 2.630 af
15.0" Round Culvert n=0.013 L=400.0' S=0.0051 '/' Outflow=8.78 cfs 2.630 af

Pond PA-42: Peak Elev=83.20' Storage=101 cf Inflow=16.93 cfs 4.093 af
30.0" Round Culvert n=0.013 L=378.0' S=0.0045 '/' Outflow=20.45 cfs 4.093 af

Pond PA-42R: Controlled by Inlet Capacity Peak Elev=81.33' Storage=36,250 cf Inflow=24.51 cfs 3.886 af
Outflow=16.93 cfs 3.886 af

Pond PA-43: Peak Elev=79.77' Storage=78 cf Inflow=20.45 cfs 4.105 af
30.0" Round Culvert n=0.013 L=128.0' S=0.0093 '/' Outflow=20.19 cfs 4.105 af

Pond PA-48: Peak Elev=50.80' Storage=54 cf Inflow=3.23 cfs 0.679 af
12.0" Round Culvert n=0.012 L=423.0' S=-0.0004 '/' Outflow=3.23 cfs 0.679 af

Pond PA-49: Peak Elev=54.47' Storage=3,596 cf Inflow=6.42 cfs 0.679 af
10.0" Round Culvert n=0.012 L=141.0' S=0.0048 '/' Outflow=3.23 cfs 0.679 af

Pond PA-51: Peak Elev=51.89' Storage=8,586 cf Inflow=5.81 cfs 1.110 af
15.0" Round Culvert n=0.012 L=59.0' S=-0.0020 '/' Outflow=11.62 cfs 1.110 af

Pond PA-52: Peak Elev=69.88' Storage=90 cf Inflow=11.73 cfs 1.401 af
15.0" Round Culvert n=0.010 L=4.0' S=0.0550 '/' Outflow=12.04 cfs 1.402 af

Pond PA-53A: Peak Elev=45.87' Storage=21 cf Inflow=3.23 cfs 0.679 af
12.0" Round Culvert n=0.012 L=370.0' S=0.0643 '/' Outflow=3.23 cfs 0.679 af

Pond PA-53CR: Controlled by Inlet Capacity Peak Elev=0.00' Storage=0 cf
Primary=0.00 cfs 0.000 af

Pond PA-54: Peak Elev=109.10' Storage=3,964 cf Inflow=128.93 cfs 9.945 af
36.0" Round Culvert n=0.013 L=236.0' S=0.0086 '/' Outflow=161.46 cfs 9.945 af

Pond PA-54A: Peak Elev=76.56' Storage=128 cf Inflow=99.85 cfs 6.857 af
Primary=59.76 cfs 6.112 af Secondary=84.97 cfs 0.800 af Outflow=95.18 cfs 6.857 af

Pond PA-55: Peak Elev=77.21' Storage=77 cf Inflow=11.13 cfs 0.876 af
24.0" Round Culvert n=0.013 L=69.0' S=0.0072 '/' Outflow=11.21 cfs 0.876 af

Pond PA-56: Peak Elev=80.94' Storage=83 cf Inflow=15.00 cfs 1.287 af
18.0" Round Culvert n=0.013 L=130.0' S=0.0063 '/' Outflow=14.87 cfs 1.287 af

Pond PA-57: Peak Elev=114.31' Storage=98 cf Inflow=8.83 cfs 0.841 af
18.0" Round Culvert n=0.013 L=239.0' S=0.0018 '/' Outflow=9.38 cfs 0.841 af

Pond PA-57A: Peak Elev=84.05' Storage=64 cf Inflow=6.80 cfs 0.555 af
15.0" Round Culvert n=0.013 L=10.0' S=0.0240 '/' Outflow=6.80 cfs 0.555 af

Pond PA-57B: Peak Elev=88.67' Storage=63 cf Inflow=1.34 cfs 0.124 af
8.0" Round Culvert n=0.025 L=175.0' S=0.0100 '/' Outflow=1.60 cfs 0.124 af

Pond PA-57C: Peak Elev=116.66' Storage=69 cf Inflow=6.97 cfs 0.554 af
15.0" Round Culvert n=0.013 L=45.0' S=0.0267 '/' Outflow=6.80 cfs 0.554 af

Pond PA-58: Peak Elev=108.68' Storage=127 cf Inflow=83.07 cfs 6.093 af
Primary=66.52 cfs 5.702 af Secondary=55.91 cfs 0.507 af Outflow=77.42 cfs 6.093 af

Pond PA-59: Peak Elev=75.55' Storage=100 cf Inflow=17.01 cfs 1.306 af
Primary=19.58 cfs 1.282 af Secondary=17.49 cfs 0.124 af Outflow=19.58 cfs 1.306 af

Pond PA-60: Peak Elev=60.11' Storage=84 cf Inflow=3.51 cfs 0.169 af
18.0" Round Culvert n=0.012 L=91.0' S=0.0027 '/' Outflow=4.78 cfs 0.169 af

Pond PA-61: Peak Elev=76.79' Storage=81 cf Inflow=1.93 cfs 0.166 af
12.0" Round Culvert n=0.012 L=47.0' S=0.0023 '/' Outflow=3.51 cfs 0.166 af

Pond PA-63: Peak Elev=56.09' Storage=74 cf Inflow=0.14 cfs 0.009 af
12.0" Round Culvert n=0.013 L=78.0' S=0.0014 '/' Outflow=2.84 cfs 0.010 af

Pond PA-64: Peak Elev=57.65' Storage=103 cf Inflow=67.99 cfs 4.124 af
Primary=27.99 cfs 3.135 af Secondary=58.36 cfs 0.999 af Outflow=67.96 cfs 4.124 af

Pond PA-64A: Peak Elev=57.56' Storage=91 cf Inflow=2.15 cfs 0.158 af
Primary=2.62 cfs 0.125 af Secondary=1.84 cfs 0.036 af Outflow=2.21 cfs 0.158 af

Pond PA-65: Peak Elev=57.56' Storage=12,323 cf Inflow=70.14 cfs 4.410 af
Primary=65.37 cfs 4.602 af Secondary=0.00 cfs 0.000 af Outflow=66.10 cfs 4.410 af

Pond PA-66: Peak Elev=57.63' Storage=112 cf Inflow=4.15 cfs 0.275 af
Primary=4.61 cfs 0.230 af Secondary=2.79 cfs 0.046 af Outflow=4.74 cfs 0.275 af

Pond PA-67: Peak Elev=57.52' Storage=104 cf Inflow=1.38 cfs 0.067 af
Primary=2.73 cfs 0.067 af Secondary=0.83 cfs 0.008 af Outflow=2.73 cfs 0.068 af

Pond PA-67A: Peak Elev=57.61' Storage=5,530 cf Inflow=28.58 cfs 3.135 af
Primary=28.41 cfs 2.810 af Secondary=28.28 cfs 0.326 af Outflow=41.82 cfs 3.135 af

Pond PA-69: Peak Elev=57.61' Storage=105 cf Inflow=19.26 cfs 1.665 af
Primary=14.14 cfs 1.581 af Secondary=7.66 cfs 0.107 af Outflow=19.22 cfs 1.665 af

Pond PA-7: Peak Elev=89.63' Storage=121 cf Inflow=256.68 cfs 25.689 af
42.0" Round Culvert n=0.013 L=498.0' S=0.0082 '/' Outflow=256.75 cfs 25.689 af

Pond PA-70: Peak Elev=57.74' Storage=89 cf Inflow=3.26 cfs 0.261 af
Primary=3.17 cfs 0.261 af Secondary=0.00 cfs 0.000 af Outflow=3.17 cfs 0.261 af

Pond PA-71: Peak Elev=57.64' Storage=75 cf Inflow=0.41 cfs 0.028 af
Primary=1.22 cfs 0.027 af Secondary=0.49 cfs 0.002 af Outflow=1.22 cfs 0.028 af

Pond PA-72: Peak Elev=57.78' Storage=84 cf Inflow=2.07 cfs 0.142 af
Primary=2.59 cfs 0.142 af Secondary=0.00 cfs 0.000 af Outflow=2.59 cfs 0.142 af

Pond PA-72A: Peak Elev=57.89' Storage=85 cf Inflow=1.87 cfs 0.118 af
Primary=2.03 cfs 0.118 af Secondary=0.00 cfs 0.000 af Outflow=2.03 cfs 0.118 af

Pond PA-73: Peak Elev=57.88' Storage=83 cf Inflow=1.59 cfs 0.098 af
Primary=1.80 cfs 0.099 af Secondary=0.00 cfs 0.000 af Outflow=1.80 cfs 0.098 af

Pond PA-74: Peak Elev=57.98' Storage=82 cf Inflow=0.98 cfs 0.070 af
Primary=1.54 cfs 0.070 af Secondary=0.00 cfs 0.000 af Outflow=1.54 cfs 0.070 af

Pond PA-75: Peak Elev=58.41' Storage=88 cf Inflow=12.82 cfs 0.995 af
Primary=12.83 cfs 0.996 af Secondary=0.00 cfs 0.000 af Outflow=12.83 cfs 0.995 af

Pond PA-76: Peak Elev=84.16' Storage=109 cf Inflow=8.42 cfs 0.654 af
24.0" Round Culvert n=0.013 L=90.0' S=0.0069 '/' Outflow=10.19 cfs 0.657 af

Pond PA-77: Peak Elev=59.66' Storage=51 cf Inflow=7.06 cfs 0.556 af
Primary=7.09 cfs 0.557 af Secondary=0.00 cfs 0.000 af Outflow=7.09 cfs 0.556 af

Pond PA-78: Peak Elev=61.58' Storage=139 cf Inflow=17.25 cfs 0.943 af
36.0" Round Culvert n=0.013 L=213.0' S=0.0111 '/' Outflow=24.67 cfs 0.948 af

Pond PA-79: Peak Elev=58.15' Storage=103 cf Inflow=6.17 cfs 0.245 af
30.0" Round Culvert n=0.013 L=108.0' S=0.0047 '/' Outflow=7.60 cfs 0.246 af

Pond PA-8: Peak Elev=83.45' Storage=1,374 cf Inflow=70.23 cfs 14.276 af
Primary=105.26 cfs 14.189 af Secondary=91.89 cfs 0.507 af Outflow=107.03 cfs 14.292 af

Pond PA-80: Peak Elev=56.19' Storage=66 cf Inflow=4.61 cfs 0.196 af
24.0" Round Culvert n=0.013 L=88.0' S=0.0108 '/' Outflow=5.92 cfs 0.198 af

Pond PA-8A: DATA? Peak Elev=90.50' Storage=9 cf Inflow=65.48 cfs 13.284 af
42.0" Round Culvert n=0.013 L=396.0' S=0.0044 '/' Outflow=65.46 cfs 13.284 af

Pond PA-9: Peak Elev=85.51' Storage=157 cf Inflow=69.48 cfs 13.284 af
42.0" Round Culvert n=0.013 L=175.0' S=0.0058 '/' Outflow=65.48 cfs 13.284 af

Pond PA-90: Peak Elev=57.41' Storage=77 cf Inflow=1.96 cfs 0.143 af
24.0" Round Culvert n=0.013 L=93.0' S=0.0024 '/' Outflow=4.34 cfs 0.146 af

Pond PA-91: Peak Elev=57.26' Storage=160 cf Inflow=32.67 cfs 12.701 af
24.0" Round Culvert n=0.013 L=71.0' S=0.0056 '/' Outflow=32.47 cfs 12.699 af

Pond PA-92: Peak Elev=61.23' Storage=117 cf Inflow=31.01 cfs 12.432 af
24.0" Round Culvert n=0.013 L=93.0' S=0.0023 '/' Outflow=29.67 cfs 12.432 af

Pond PA-93: Peak Elev=63.32' Storage=115 cf Inflow=27.23 cfs 12.053 af
24.0" Round Culvert n=0.013 L=96.0' S=0.0024 '/' Outflow=26.76 cfs 12.053 af

Pond PA-94: Peak Elev=64.30' Storage=109 cf Inflow=24.45 cfs 11.694 af
24.0" Round Culvert n=0.013 L=93.0' S=0.0039 '/' Outflow=23.19 cfs 11.694 af

Pond PA-95: Peak Elev=65.14' Storage=105 cf Inflow=28.39 cfs 11.299 af
24.0" Round Culvert n=0.013 L=93.0' S=0.0039 '/' Outflow=22.56 cfs 11.298 af

Pond PA-95A: Peak Elev=64.27' Storage=7 cf Inflow=23.30 cfs 11.461 af
24.0" Round Culvert n=0.013 L=51.0' S=-0.0041 '/' Outflow=22.95 cfs 11.461 af

Pond PA-96: Peak Elev=66.03' Storage=89 cf Inflow=27.33 cfs 11.148 af
24.0" Round Culvert n=0.013 L=93.0' S=-0.0010 '/' Outflow=27.64 cfs 11.148 af

Pond PA-99: Peak Elev=68.25' Storage=8,628 cf Inflow=25.40 cfs 10.818 af
24.0" Round Culvert n=0.013 L=296.0' S=0.0021 '/' Outflow=25.53 cfs 10.818 af

Pond PC4-1S: Peak Elev=68.11' Storage=1,676 cf Inflow=11.48 cfs 3.362 af
18.0" Round Culvert n=0.013 L=106.0' S=0.0125 '/' Outflow=12.68 cfs 3.362 af

Pond PC4-2: Peak Elev=61.78' Storage=20,649 cf Inflow=17.95 cfs 2.437 af
18.0" Round Culvert n=0.013 L=65.0' S=0.0022 '/' Outflow=9.46 cfs 2.437 af

Pond PJB2: (new Pond) Peak Elev=64.72' Storage=18,223 cf Inflow=10.50 cfs 1.690 af
Outflow=4.37 cfs 1.690 af

Pond PS-12: (new Pond) Peak Elev=76.63' Storage=135 cf Inflow=64.32 cfs 11.711 af
30.0" Round Culvert n=0.013 L=190.0' S=0.0013 '/' Outflow=70.80 cfs 11.711 af

Pond PS-13: Peak Elev=70.13' Storage=98 cf Inflow=12.04 cfs 1.417 af
15.0" Round Culvert n=0.010 L=315.0' S=0.0006 '/' Outflow=11.22 cfs 1.417 af

Pond RWE DMH 104: (new Pond) Peak Elev=25.60' Storage=170 cf Inflow=244.27 cfs 79.758 af
Primary=145.13 cfs 56.429 af Secondary=99.50 cfs 23.329 af Outflow=244.29 cfs 79.758 af

Pond RWE DMH102: (new Pond) Peak Elev=0.00' Storage=0 cf
60.0" Round Culvert n=0.013 L=170.0' S=0.0091 '/' Primary=0.00 cfs 0.000 af

Pond RWE DMH103: (new Pond) Peak Elev=29.84' Storage=170 cf Inflow=244.29 cfs 79.758 af
60.0" Round Culvert n=0.013 L=130.0' S=0.0050 '/' Outflow=244.27 cfs 79.758 af

Pond RWE DMH105: (new Pond) Peak Elev=24.12' Storage=158 cf Inflow=145.13 cfs 56.429 af
60.0" Round Culvert n=0.013 L=529.0' S=0.0057 '/' Outflow=145.04 cfs 56.429 af

Pond RWE DMH106: Outfall 3 Peak Elev=21.35' Storage=164 cf Inflow=145.04 cfs 56.429 af
60.0" Round Culvert n=0.013 L=283.0' S=0.0019 '/' Outflow=145.06 cfs 56.428 af

Pond RWW CB10: (new Pond) Peak Elev=57.02' Storage=0.004 af Inflow=71.19 cfs 5.608 af
30.0" Round Culvert n=0.013 L=200.0' S=0.0312 '/' Outflow=72.08 cfs 5.608 af

Pond TWC CB10: (new Pond) Peak Elev=94.43' Storage=0.002 af Inflow=21.73 cfs 1.664 af
15.0" Round Culvert n=0.011 L=46.0' S=0.0413 '/' Outflow=22.00 cfs 1.664 af

Pond TWC CB11: (new Pond) Peak Elev=78.72' Storage=170 cf Inflow=13.86 cfs 1.286 af
12.0" Round Culvert n=0.010 L=35.0' S=0.0086 '/' Outflow=16.23 cfs 1.286 af

Pond TWC CB14: TWC CB14 Peak Elev=316.10' Storage=75 cf Inflow=39.07 cfs 3.673 af
12.0" Round Culvert n=0.013 L=110.0' S=0.0051 '/' Outflow=39.02 cfs 3.673 af

Pond TWC CB15: (new Pond) Peak Elev=578.71' Storage=75 cf Inflow=39.08 cfs 3.673 af
12.0" Round Culvert n=0.013 L=181.0' S=0.0044 '/' Outflow=39.07 cfs 3.673 af

Pond TWC CB16: (new Pond) Inflow=21.73 cfs 1.682 af
Primary=21.73 cfs 1.682 af

Pond TWC CB17: (new Pond) Peak Elev=138.19' Storage=75 cf Inflow=21.68 cfs 1.682 af
12.0" Round Culvert n=0.013 L=229.0' S=0.0050 '/' Outflow=21.73 cfs 1.682 af

Pond TWC CB18: (new Pond) Peak Elev=159.24' Storage=0.002 af Inflow=21.71 cfs 1.682 af
12.0" Round Culvert n=0.013 L=16.0' S=0.0156 '/' Outflow=21.68 cfs 1.682 af

Pond TWC CB7: (new Pond) Peak Elev=130.52' Storage=0.002 af Inflow=21.51 cfs 1.664 af
12.0" Round Culvert n=0.011 L=48.0' S=0.0056 '/' Outflow=21.57 cfs 1.664 af

Pond TWC CB8: (new Pond) Peak Elev=103.41' Storage=0.002 af Inflow=21.57 cfs 1.664 af
15.0" Round Culvert n=0.011 L=46.0' S=0.0250 '/' Outflow=21.73 cfs 1.664 af

Pond TWC CB9: (new Pond) Peak Elev=86.09' Storage=170 cf Inflow=83.90 cfs 7.298 af
30.0" Round Culvert n=0.011 L=405.0' S=0.0037 '/' Outflow=83.65 cfs 7.298 af

Pond TWC DMH10: (new Pond) Peak Elev=68.83' Storage=170 cf Inflow=97.79 cfs 8.584 af
30.0" Round Culvert n=0.011 L=715.0' S=0.0152 '/' Outflow=98.05 cfs 8.584 af

Pond TWC DMH3: (new Pond) Peak Elev=35.32' Storage=75 cf Inflow=244.28 cfs 79.759 af
60.0" Round Culvert n=0.011 L=423.0' S=0.0096 '/' Outflow=244.29 cfs 79.758 af

Pond TWC DMH5: (new Pond) Peak Elev=137.71' Storage=75 cf Inflow=39.02 cfs 3.673 af
12.0" Round Culvert n=0.013 L=46.0' S=0.0057 '/' Outflow=39.06 cfs 3.673 af

Pond TWIN P: (new Pond) Peak Elev=66.82' Storage=944 cf Inflow=4.44 cfs 0.437 af
12.0" Round Culvert x 2.00 n=0.013 L=75.0' S=0.0043 '/' Outflow=4.00 cfs 0.437 af

Pond WQF 1: (new Pond) Peak Elev=61.20' Storage=46,596 cf Inflow=37.45 cfs 3.010 af
Outflow=24.23 cfs 2.406 af

Pond WQU: (new Pond) Peak Elev=45.90' Inflow=48.22 cfs 4.589 af
24.0" Round Culvert n=0.011 L=80.0' S=0.0024 '/' Outflow=48.22 cfs 4.589 af

Link 1R: 25 Year Manual Hydrograph Inflow=36.91 cfs 3.059 af
Area= 8.518 ac 70.03% Imperv. Primary=36.91 cfs 3.059 af

Link 5R: 25 Year Manual Hydrograph Inflow=10.01 cfs 0.733 af
Area= 1.754 ac 90.88% Imperv. Primary=10.01 cfs 0.733 af

Link 37L: 25 YEAR Manual Hydrograph Inflow=48.22 cfs 4.589 af
Area= 23.400 ac 61.69% Imperv. Primary=48.22 cfs 4.589 af

Total Runoff Area = 265.650 ac Runoff Volume = 94.493 af Average Runoff Depth = 4.27"
50.78% Pervious = 134.903 ac 49.22% Impervious = 130.747 ac

Summary for Subcatchment .2S:

Runoff = 45.58 cfs @ 12.23 hrs, Volume= 4.787 af, Depth= 3.62"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (sf)	CN	Description
147,712	74	>75% Grass cover, Good, HSG C
199,000	80	>75% Grass cover, Good, HSG D
244,509	98	Paved parking & roofs
100,000	39	>75% Grass cover, Good, HSG A
691,221	79	Weighted Average
446,712		64.63% Pervious Area
244,509		35.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	100	0.0198	0.16		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
3.9	200	0.0150	0.86		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.0	8	0.2850	28.62	22.48	**Pipe Channel, C-D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 PVC, smooth interior
1.4	348	0.0060	4.08	5.00	**Pipe Channel, D-E** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Concrete pipe, straight & clean
1.0	262	0.0069	4.37	5.37	**Pipe Channel, E-F** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Concrete pipe, straight & clean
16.5	918	Total			

Summary for Subcatchment 1S: Subcatchment Area to Grassed Filtration Basin

Runoff = 11.36 cfs @ 12.07 hrs, Volume= 0.874 af, Depth= 4.88"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.570	98	Impervious
*	0.580	74	Grass HSG C
	2.150	92	Weighted Average
	0.580		26.98% Pervious Area
	1.570		73.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Summary for Subcatchment 2AS: Subcatchment 2 Impervious Area not Recieving Treatment

Runoff = 0.68 cfs @ 12.01 hrs, Volume= 0.046 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.100	98	Impervious
	0.100		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry, Direct**

Summary for Subcatchment 2BS: Subcatchment 2AImpervious & Grassed Area not Recieving Treatme

Runoff = 0.52 cfs @ 12.02 hrs, Volume= 0.032 af, Depth= 3.35"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.015	98	Impervious
*	0.100	74	Grass HSG C
	0.115	77	Weighted Average
	0.100		86.96% Pervious Area
	0.015		13.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry, Direct**

Summary for Subcatchment 6AS: TERMINAL BUILDING ROOF DRAINAGE AREA

Runoff = 1.18 cfs @ 12.07 hrs, Volume= 0.093 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.200	98	ROOF
	0.200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 6CS: TERMINAL BUILDING CANOPY DRAINAGE AREA

Runoff = 0.59 cfs @ 12.07 hrs, Volume= 0.046 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.100	98	CANOPY
	0.100		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 6S: TERMINAL BUILDING ROOF DRAINAGE AREA

Runoff = 3.53 cfs @ 12.07 hrs, Volume= 0.278 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.600	98	ROOF
	0.600		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8S: PRE WATERSHED/UNTREATED DEVELOPED TRIB TO 2

Runoff = 7.58 cfs @ 12.37 hrs, Volume= 0.913 af, Depth= 3.80"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
	4,394	83	Woods, Poor, HSG D
*	85,274	82	Woods/grass comb., Poor, HSG D
*	12,571	98	Parking LOT
*	23,469	74	>75% Grass cover, Good, HSG D
	125,708	82	Weighted Average
	113,137		90.00% Pervious Area
	12,571		10.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0200	0.11		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.00"
11.5	490	0.0200	0.71		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
26.2	590	Total			

Summary for Subcatchment 9S: ROOF

Runoff = 6.14 cfs @ 12.00 hrs, Volume= 0.411 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (sf)	CN	Description
38,594	98	Paved parking & roofs
38,594		100.00% Impervious Area

Summary for Subcatchment 10S:

Runoff = 71.59 cfs @ 12.07 hrs, Volume= 5.419 af, Depth= 4.83"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (sf)	CN	Description
366,868	98	Paved parking & roofs
216,933	80	>75% Grass cover, Good, HSG D
3,000	74	>75% Grass cover, Good, HSG C
586,801	91	Weighted Average
219,933		37.48% Pervious Area
366,868		62.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, DIRECT**

Summary for Subcatchment 11S: TRIB TO POR C

Runoff = 6.03 cfs @ 12.08 hrs, Volume= 0.487 af, Depth= 5.27"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.860	98	Porous Pavement
*	0.122	98	Sidewalk Curbs
	0.127	74	>75% Grass cover, Good, HSG C
	1.109	95	Weighted Average
	0.127		11.45% Pervious Area
	0.982		88.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 18S: PRE WATERSHED/UNTREATED DEVELOPED TRIB TO 3

Runoff = 11.23 cfs @ 12.66 hrs, Volume= 1.817 af, Depth= 4.25"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
	10,897	82	Woods/grass comb., Poor, HSG C
	202,979	86	Woods/grass comb., Poor, HSG D
*	5,533	98	JetPort Road
	3,947	80	>75% Grass cover, Good, HSG D
	223,356	86	Weighted Average
	217,823		97.52% Pervious Area
	5,533		2.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.3	100	0.0100	0.06		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
18.8	565	0.0100	0.50		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
48.1	665	Total			

Summary for Subcatchment 19S: TRIB TO POR B

Runoff = 2.86 cfs @ 12.08 hrs, Volume= 0.232 af, Depth= 5.38"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.460	98	Porous Pavement
*	0.021	98	Sidewalks/Curb
	0.037	74	>75% Grass cover, Good, HSG C
	0.518	96	Weighted Average
	0.037		7.14% Pervious Area
	0.481		92.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 36S: TERMINAL BUILDING ROOF DRAINAGE AREA

Runoff = 4.99 cfs @ 12.13 hrs, Volume= 0.464 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.000	98	ROADWAY
	1.000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 40S: A-72

Runoff = 10.89 cfs @ 12.08 hrs, Volume= 0.876 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.890	98	
	1.890		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	300	0.0100	1.26		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00"
1.6	200	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.6	500	Total			

Summary for Subcatchment A-100: (new Subcat)

Runoff = 5.82 cfs @ 12.13 hrs, Volume= 0.499 af, Depth= 4.61"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.800	84	
*	0.500	98	
	1.300	89	Weighted Average
	0.800		61.54% Pervious Area
	0.500		38.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0100	0.11		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
1.9	168	0.0100	1.50		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
9.6	218	Total			

Summary for Subcatchment A-101: (new Subcat)

Runoff = 12.09 cfs @ 12.54 hrs, Volume= 1.771 af, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	5.440	83	
	5.440		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.7	200	0.0050	0.11		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
9.9	895	0.0100	1.50		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
40.6	1,095	Total			

Summary for Subcatchment A-102:

Runoff = 23.62 cfs @ 12.07 hrs, Volume= 1.860 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	174,763	98	
	174,763		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Summary for Subcatchment A-103: (new Subcat)

Runoff = 12.63 cfs @ 12.11 hrs, Volume= 1.085 af, Depth= 4.21"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (sf)	CN	Description
27,105	80	>75% Grass cover, Good, HSG D
85,342	98	Paved parking, HSG D
22,333	39	>75% Grass cover, Good, HSG A
134,780	85	Weighted Average
49,438		36.68% Pervious Area
85,342		63.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	150	0.0100	0.70		**Shallow Concentrated Flow, A-B** Short Grass Pasture Kv= 7.0 fps
4.3	180	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
7.9	330	Total			

Summary for Subcatchment A-104: (new Subcat)

Runoff = 17.51 cfs @ 12.04 hrs, Volume= 1.308 af, Depth= 3.51"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (sf)	CN	Description
109,938	98	Paved parking, HSG D
17,349	80	>75% Grass cover, Good, HSG D
67,643	39	>75% Grass cover, Good, HSG A
194,930	76	Weighted Average
84,992		43.60% Pervious Area
109,938		56.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	150	0.0170	1.35		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.00"
0.8	170	0.0300	3.52		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
2.6	320	Total			

Summary for Subcatchment A-105:

Runoff = 6.39 cfs @ 12.14 hrs, Volume= 0.598 af, Depth= 3.59"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	43,349	98	Paved parking
	20,745	80	>75% Grass cover, Good, HSG D
	22,905	39	>75% Grass cover, Good, HSG A
	86,999	78	Weighted Average
	43,650		50.17% Pervious Area
	43,349		49.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	90	0.0150	0.14		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"

Summary for Subcatchment A-105B:

Runoff = 9.85 cfs @ 12.02 hrs, Volume= 0.673 af, Depth= 5.11"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	52,965	98	Paved parking
	15,881	80	>75% Grass cover, Good, HSG D
	68,846	94	Weighted Average
	15,881		23.07% Pervious Area
	52,965		76.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	70	0.0200	1.24		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.00"
0.8	120	0.0300	2.60		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
1.7	190	Total			

Summary for Subcatchment A-106: (new Subcat)

Runoff = 21.51 cfs @ 12.08 hrs, Volume= 1.664 af, Depth= 4.67"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	101,792	98	
	84,362	80	>75% Grass cover, Good, HSG D
	186,154	90	Weighted Average
	84,362		45.32% Pervious Area
	101,792		54.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	70	0.0150	1.11		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.00"
1.1	95	0.0100	1.50		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
3.7	440	0.0050	1.97	14.47	**Trap/Vee/Rect Channel Flow, C-D** Bot.W=36.00' D=0.20' Z= 4.0 '/' Top.W=37.60' n= 0.018 Earth, clean & straight
5.9	605	Total			

Summary for Subcatchment A-107: (new Subcat)

Runoff = 25.79 cfs @ 12.23 hrs, Volume= 2.741 af, Depth= 4.02"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	140,480	98	Paved parking
	143,647	80	>75% Grass cover, Good, HSG D
	72,256	61	>75% Grass cover, Good, HSG B
	356,383	83	Weighted Average
	215,903		60.58% Pervious Area
	140,480		39.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	100	0.0100	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
1.0	130	0.0200	2.12		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
2.8	420	0.0050	2.54	14.29	**Trap/Vee/Rect Channel Flow, C-D** Bot.W=3.00' D=0.50' Z= 3.0 & 30.0 '/' Top.W=19.50' n= 0.018 Earth, clean & straight
17.2	650	Total			

Summary for Subcatchment A-108: (new Subcat)

Runoff = 8.42 cfs @ 12.16 hrs, Volume= 0.784 af, Depth= 4.18"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	46,587	98	Paved parking
	32,940	80	>75% Grass cover, Good, HSG D
	18,569	61	>75% Grass cover, Good, HSG B
	98,096	85	Weighted Average
	51,509		52.51% Pervious Area
	46,587		47.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	85	0.0100	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"

Summary for Subcatchment A-109: (new Subcat)

Runoff = 13.86 cfs @ 12.14 hrs, Volume= 1.286 af, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	95,744	98	Paved parking
	74,592	61	>75% Grass cover, Good, HSG B
	170,336	82	Weighted Average
	74,592		43.79% Pervious Area
	95,744		56.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	85	0.0170	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
0.9	77	0.0100	1.50		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
10.4	162	Total			

Summary for Subcatchment A-11: (new Subcat)

Runoff = 7.59 cfs @ 12.38 hrs, Volume= 0.986 af, Depth= 4.32"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.000	98	
	1.740	80	>75% Grass cover, Good, HSG D
	2.740	87	Weighted Average
	1.740		63.50% Pervious Area
	1.000		36.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.4	100	0.0100	0.09		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
9.1	270	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
28.5	370	Total			

Summary for Subcatchment A-110: edited

Runoff = 21.41 cfs @ 12.16 hrs, Volume= 1.991 af, Depth= 4.63"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	118,063	98	paved
	106,624	80	>75% Grass cover, Good, HSG D
	224,687	89	Weighted Average
	106,624		47.45% Pervious Area
	118,063		52.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0200	0.16		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
1.6	135	0.0090	1.42		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
11.7	235	Total			

Summary for Subcatchment A-111: edited

Runoff = 21.71 cfs @ 12.07 hrs, Volume= 1.682 af, Depth= 5.24"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	140,349	98	paved
	27,410	80	>75% Grass cover, Good, HSG D
	167,759	95	Weighted Average
	27,410		16.34% Pervious Area
	140,349		83.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment A-12: (new Subcat)

Runoff = 3.92 cfs @ 12.25 hrs, Volume= 0.429 af, Depth= 4.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
	0.720	80	>75% Grass cover, Good, HSG D
*	0.460	98	
	1.180	87	Weighted Average
	0.720		61.02% Pervious Area
	0.460		38.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	50	0.0100	0.07		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
7.7	230	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
18.9	280	Total			

Summary for Subcatchment A-13: (new Subcat)

Runoff = 3.94 cfs @ 12.51 hrs, Volume= 0.600 af, Depth= 4.74"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.880	98	
	0.640	80	>75% Grass cover, Good, HSG D
	1.520	90	Weighted Average
	0.640		42.11% Pervious Area
	0.880		57.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.9	200	0.0100	0.10		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
4.0	118	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
37.9	318	Total			

Summary for Subcatchment A-14: (new Subcat)

Runoff = 10.57 cfs @ 12.58 hrs, Volume= 1.727 af, Depth= 4.58"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	2.250	98	
	2.280	80	>75% Grass cover, Good, HSG D
	4.530	89	Weighted Average
	2.280		50.33% Pervious Area
	2.250		49.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.5	220	0.0100	0.10		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
7.7	230	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
44.2	450	Total			

Summary for Subcatchment A-15: (new Subcat)

Runoff = 6.88 cfs @ 12.49 hrs, Volume= 1.017 af, Depth= 4.21"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.900	98	
	2.000	80	>75% Grass cover, Good, HSG D
	2.900	86	Weighted Average
	2.000		68.97% Pervious Area
	0.900		31.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.7	250	0.0200	0.14		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
7.4	220	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
38.1	470	Total			

Summary for Subcatchment A-16: (new Subcat)

Runoff = 13.07 cfs @ 12.54 hrs, Volume= 2.001 af, Depth= 4.58"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	2.620	80	
*	2.620	98	
	5.240	89	Weighted Average
	2.620		50.00% Pervious Area
	2.620		50.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.2	245	0.0200	0.14		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
8.6	254	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
38.8	499	Total			

Summary for Subcatchment A-20: (new Subcat)

Runoff = 14.19 cfs @ 12.46 hrs, Volume= 1.977 af, Depth= 4.31"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	2.000	98	
*	3.500	80	
	5.500	87	Weighted Average
	3.500		63.64% Pervious Area
	2.000		36.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.7	200	0.0200	0.13		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
7.4	220	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
33.1	420	Total			

Summary for Subcatchment A-22: (new Subcat)

Runoff = 17.57 cfs @ 12.34 hrs, Volume= 2.284 af, Depth= 4.92"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	162,792	98	
*	80,107	80	
	242,899	92	Weighted Average
	80,107		32.98% Pervious Area
	162,792		67.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	100	0.0300	0.13		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
13.7	480	0.0070	0.59		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
26.2	580	Total			

Summary for Subcatchment A-24: (new Subcat)

Runoff = 8.37 cfs @ 12.57 hrs, Volume= 1.375 af, Depth= 4.58"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
	1.800	80	>75% Grass cover, Good, HSG D
*	1.800	98	
	3.600	89	Weighted Average
	1.800		50.00% Pervious Area
	1.800		50.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.9	200	0.0100	0.10		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
10.8	320	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
44.7	520	Total			

Summary for Subcatchment A-26: (new Subcat)

Runoff = 6.21 cfs @ 12.33 hrs, Volume= 0.789 af, Depth= 4.86"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.250	98	
	0.700	80	>75% Grass cover, Good, HSG D
	1.950	92	Weighted Average
	0.700		35.90% Pervious Area
	1.250		64.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.4	100	0.0100	0.09		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
5.7	170	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
25.1	270	Total			

Summary for Subcatchment A-29: (new Subcat)

Runoff = 5.16 cfs @ 12.35 hrs, Volume= 0.652 af, Depth= 4.45"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.760	98	
	1.000	80	>75% Grass cover, Good, HSG D
	1.760	88	Weighted Average
	1.000		56.82% Pervious Area
	0.760		43.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.4	100	0.0100	0.09		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
6.7	200	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
26.1	300	Total			

Summary for Subcatchment A-30: (new Subcat)

Runoff = 5.40 cfs @ 12.39 hrs, Volume= 0.719 af, Depth= 4.43"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
	1.130	80	>75% Grass cover, Good, HSG D
*	0.820	98	
	1.950	88	Weighted Average
	1.130		57.95% Pervious Area
	0.820		42.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.4	100	0.0100	0.09		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
10.1	300	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
29.5	400	Total			

Summary for Subcatchment A-31: (new Subcat)

Runoff = 5.23 cfs @ 12.84 hrs, Volume= 1.040 af, Depth= 4.71"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.500	98	
	1.150	80	>75% Grass cover, Good, HSG D
	2.650	90	Weighted Average
	1.150		43.40% Pervious Area
	1.500		56.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
53.4	250	0.0050	0.08		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
9.1	270	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
62.5	520	Total			

Summary for Subcatchment A-34: (new Subcat)

Runoff = 4.96 cfs @ 13.09 hrs, Volume= 1.089 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	2.700	64	>75% Grass cover, Good, HSG D
*	1.160	64	
*	2.300	64	>75% Grass cover, Good, HSG A
	6.160	64	Weighted Average
	6.160		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
61.8	300	0.0050	0.08		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
15.2	450	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
77.0	750	Total			

Summary for Subcatchment A-34-1: (new Subcat)

Runoff = 8.22 cfs @ 12.39 hrs, Volume= 1.175 af, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	88,898	98	
	78,024	39	>75% Grass cover, Good, HSG A
	10,549	61	>75% Grass cover, Good, HSG B
	25,677	80	>75% Grass cover, Good, HSG D
	203,148	71	Weighted Average
	114,250		56.24% Pervious Area
	88,898		43.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	100	0.0100	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
14.3	600	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
27.7	700	Total			

Summary for Subcatchment A-35: (new Subcat)

Runoff = 4.91 cfs @ 13.10 hrs, Volume= 1.113 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	2.550	65	>75% Grass cover, Good, HSG D
*	2.100	65	>75% Grass cover, Good, HSG A
*	1.400	65	
	6.050	65	Weighted Average
	6.050		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
61.8	300	0.0050	0.08		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
19.5	580	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
81.3	880	Total			

Summary for Subcatchment A-37: (new Subcat)

Runoff = 6.61 cfs @ 13.12 hrs, Volume= 1.491 af, Depth= 2.47"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	3.800	68	>75% Grass cover, Good, HSG D
*	1.250	68	
*	2.200	68	>75% Grass cover, Good, HSG A
	7.250	68	Weighted Average
	7.250		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
61.8	300	0.0050	0.08		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
20.2	600	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
82.0	900	Total			

Summary for Subcatchment A-39: (new Subcat)

Runoff = 17.08 cfs @ 12.62 hrs, Volume= 2.630 af, Depth= 2.83"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	2.150	72	
*	7.040	72	>75% Grass cover, Good, HSG D
*	1.960	72	>75% Grass cover, Good, HSG A
	11.150	72	Weighted Average
	11.150		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
42.2	300	0.0130	0.12		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
0.7	20	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
1.8	400	0.0050	3.72	4.57	**Pipe Channel, C-D** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
44.7	720	Total			

Summary for Subcatchment A-42: (new Subcat)

Runoff = 24.51 cfs @ 12.64 hrs, Volume= 3.886 af, Depth= 3.80"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	10.000	82	>75% Grass cover, Good, HSG D
*	2.260	82	
	12.260	82	Weighted Average
	12.260		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.9	150	0.0100	0.09		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
20.5	610	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
47.4	760	Total			

Summary for Subcatchment A-49: (new Subcat)

Runoff = 6.42 cfs @ 12.26 hrs, Volume= 0.679 af, Depth= 4.22"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.337	86	
*	0.430	86	
*	0.163	86	Paved parking & roofs
	1.930	86	Weighted Average
	1.930		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	79	0.0050	0.73		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.00"
17.6	88	0.0100	0.08		**Sheet Flow, B-C** Grass: Dense n= 0.240 P2= 3.00"
19.4	167	Total			

Summary for Subcatchment A-51: (new Subcat)

Runoff = 5.81 cfs @ 12.83 hrs, Volume= 1.110 af, Depth= 1.48"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	2.250	56	>75% Grass cover, Good, HSG D
*	1.564	56	
*	5.000	56	>75% Grass cover, Good, HSG A
*	0.186	56	Paved parking & roofs
	9.000	56	Weighted Average
	9.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
46.8	300	0.0100	0.11		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
6.9	205	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
53.7	505	Total			

Summary for Subcatchment A-54: A-54

Runoff = 10.71 cfs @ 12.07 hrs, Volume= 0.844 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (ac)	CN	Description
1.820	98	Paved parking & roofs
1.820		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment A-54A: A-69

Runoff = 6.89 cfs @ 12.06 hrs, Volume= 0.524 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (ac)	CN	Description
1.130	98	Paved parking & roofs
1.130		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0					**Direct Entry,**

Summary for Subcatchment A-55: A-72

Runoff = 11.13 cfs @ 12.07 hrs, Volume= 0.876 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.890	98	
	1.890		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment A-56: (new Subcat)

Runoff = 5.90 cfs @ 12.06 hrs, Volume= 0.446 af, Depth= 5.46"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.930	98	
	0.050	80	>75% Grass cover, Good, HSG D
	0.980	97	Weighted Average
	0.050		5.10% Pervious Area
	0.930		94.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0					**Direct Entry,**

Summary for Subcatchment A-57: (new Subcat)

Runoff = 2.84 cfs @ 12.19 hrs, Volume= 0.285 af, Depth= 4.50"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
	0.410	80	>75% Grass cover, Good, HSG D
*	0.350	98	
	0.760	88	Weighted Average
	0.410		53.95% Pervious Area
	0.350		46.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	100	0.0100	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.00"
1.4	130	0.0100	1.50		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
14.8	230	Total			

Summary for Subcatchment A-57B: (new Subcat)

Runoff = 1.34 cfs @ 12.16 hrs, Volume= 0.124 af, Depth= 4.49"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.150	98	
	0.180	80	>75% Grass cover, Good, HSG D
	0.330	88	Weighted Average
	0.180		54.55% Pervious Area
	0.150		45.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	80	0.0100	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.00"
0.6	50	0.0100	1.50		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
11.8	130	Total			

Summary for Subcatchment A-57C: (new Subcat)

Runoff = 5.69 cfs @ 12.07 hrs, Volume= 0.431 af, Depth= 4.83"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.670	98	
	0.400	80	>75% Grass cover, Good, HSG D
	1.070	91	Weighted Average
	0.400		37.38% Pervious Area
	0.670		62.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment A-58: A-67

Runoff = 2.74 cfs @ 12.06 hrs, Volume= 0.209 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (ac)	CN	Description
0.450	98	Paved parking & roofs
0.450		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0					**Direct Entry,**

Summary for Subcatchment A-59: (new Subcat)

Runoff = 0.14 cfs @ 12.01 hrs, Volume= 0.009 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.020	98	
	0.020		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry,**

Summary for Subcatchment A-61: (new Subcat)

Runoff = 1.93 cfs @ 12.14 hrs, Volume= 0.166 af, Depth= 4.23"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.150	98	
	0.320	80	>75% Grass cover, Good, HSG D
	0.470	86	Weighted Average
	0.320		68.09% Pervious Area
	0.150		31.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Summary for Subcatchment A-63: (new Subcat)

Runoff = 0.14 cfs @ 12.01 hrs, Volume= 0.009 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.020	98	
	0.020		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry,**

Summary for Subcatchment A-64: (new Subcat)

Runoff = 6.89 cfs @ 12.06 hrs, Volume= 0.524 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.130	98	
	1.130		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0					**Direct Entry,**

Summary for Subcatchment A-64A: (new Subcat)

Runoff = 2.15 cfs @ 12.04 hrs, Volume= 0.158 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.340	98	
	0.340		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment A-65: (new Subcat)

Runoff = 2.85 cfs @ 12.04 hrs, Volume= 0.209 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.450	98	
	0.450		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment A-67: (new Subcat)

Runoff = 0.92 cfs @ 12.03 hrs, Volume= 0.065 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.140	98	
	0.140		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					**Direct Entry,**

Summary for Subcatchment A-67A: (new Subcat)

Runoff = 17.37 cfs @ 12.07 hrs, Volume= 1.367 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	2.950	98	
	2.950		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment A-69: (new Subcat)

Runoff = 8.84 cfs @ 12.07 hrs, Volume= 0.696 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	65,410	98	
	65,410		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment A-7: A-7

Runoff = 4.25 cfs @ 12.55 hrs, Volume= 0.666 af, Depth= 4.30"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
	1.200	80	>75% Grass cover, Good, HSG D
*	0.660	98	
	1.860	86	Weighted Average
	1.200		64.52% Pervious Area
	0.660		35.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.9	200	0.0100	0.10		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
8.4	250	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
42.3	450	Total			

Summary for Subcatchment A-71: (new Subcat)

Runoff = 0.41 cfs @ 12.01 hrs, Volume= 0.028 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.060	98	
	0.060		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry,**

Summary for Subcatchment A-72: (new Subcat)

Runoff = 0.34 cfs @ 12.01 hrs, Volume= 0.023 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.050	98	
	0.050		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry,**

Summary for Subcatchment A-72A: (new Subcat)

Runoff = 0.27 cfs @ 12.01 hrs, Volume= 0.019 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.040	98	
	0.040		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry,**

Summary for Subcatchment A-73: (new Subcat)

Runoff = 0.41 cfs @ 12.01 hrs, Volume= 0.028 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.060	98	
	0.060		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry,**

Summary for Subcatchment A-74: (new Subcat)

Runoff = 0.98 cfs @ 12.03 hrs, Volume= 0.070 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.150	98	
	0.150		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					**Direct Entry,**

Summary for Subcatchment A-75: (new Subcat)

Runoff = 5.99 cfs @ 12.04 hrs, Volume= 0.439 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	41,230	98	
	41,230		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment A-76: (new Subcat)

Runoff = 4.34 cfs @ 12.06 hrs, Volume= 0.330 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	31,000	98	
	31,000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0					**Direct Entry,**

Summary for Subcatchment A-77: (new Subcat)

Runoff = 7.06 cfs @ 12.07 hrs, Volume= 0.556 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	52,235	98	
	52,235		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment A-78: (new Subcat)

Runoff = 0.33 cfs @ 12.03 hrs, Volume= 0.023 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.050	98	
	0.050		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					**Direct Entry,**

Summary for Subcatchment A-79: (new Subcat)

Runoff = 0.59 cfs @ 12.03 hrs, Volume= 0.042 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.090	98	
	0.090		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					**Direct Entry,**

Summary for Subcatchment A-8: (new Subcat)

Runoff = 5.86 cfs @ 12.64 hrs, Volume= 0.993 af, Depth= 4.58"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.300	98	
	1.300	80	>75% Grass cover, Good, HSG D
	2.600	89	Weighted Average
	1.300		50.00% Pervious Area
	1.300		50.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
39.7	244	0.0100	0.10		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
7.9	235	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
47.6	479	Total			

Summary for Subcatchment A-80: (new Subcat)

Runoff = 0.66 cfs @ 12.03 hrs, Volume= 0.046 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.100	98	
	0.100		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					**Direct Entry,**

Summary for Subcatchment A-90: (new Subcat)

Runoff = 1.96 cfs @ 12.04 hrs, Volume= 0.143 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	13,480	98	
	13,480		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment A-91: (new Subcat)

Runoff = 3.67 cfs @ 12.04 hrs, Volume= 0.269 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	25,265	98	
	25,265		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment A-92: (new Subcat)

Runoff = 5.18 cfs @ 12.04 hrs, Volume= 0.379 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	35,650	98	
	35,650		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment A-93: (new Subcat)

Runoff = 4.91 cfs @ 12.04 hrs, Volume= 0.360 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	33,790	98	
	33,790		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment A-94: (new Subcat)

Runoff = 3.06 cfs @ 12.06 hrs, Volume= 0.233 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	21,855	98	
	21,855		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0					**Direct Entry,**

Summary for Subcatchment A-95:

Runoff = 2.06 cfs @ 12.04 hrs, Volume= 0.151 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	14,166	98	
	14,166		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment A-95A: (new Subcat)

Runoff = 2.14 cfs @ 12.06 hrs, Volume= 0.163 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	15,300	98	
	15,300		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0					**Direct Entry,**

Summary for Subcatchment A-96:

Runoff = 4.10 cfs @ 12.07 hrs, Volume= 0.323 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	30,353	98	
	30,353		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment A-99: (new Subcat)

Runoff = 6.98 cfs @ 12.49 hrs, Volume= 1.054 af, Depth= 5.10"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	82,685	98	
	25,316	80	>75% Grass cover, Good, HSG D
	108,001	94	Weighted Average
	25,316		23.44% Pervious Area
	82,685		76.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	50	0.0050	0.08		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
23.7	181	0.0200	0.13		**Sheet Flow, B-C** Grass: Dense n= 0.240 P2= 3.00"
1.9	120	0.0100	1.05		**Sheet Flow, C-D** Smooth surfaces n= 0.011 P2= 3.00"
35.7	351	Total			

Summary for Subcatchment AA2: (new Subcat)

Runoff = 2.21 cfs @ 12.04 hrs, Volume= 0.162 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	15,190	98	
	15,190		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment AA3: (new Subcat)

Runoff = 3.92 cfs @ 12.04 hrs, Volume= 0.287 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	26,970	98	
	26,970		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment AA4: (new Subcat)

Runoff = 5.54 cfs @ 12.04 hrs, Volume= 0.406 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	38,130	98	
	38,130		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment AA5: (new Subcat)

Runoff = 5.34 cfs @ 12.04 hrs, Volume= 0.391 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	36,735	98	
	36,735		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment AA6:

Runoff = 16.55 cfs @ 12.07 hrs, Volume= 1.303 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	122,464	98	
	122,464		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment B-101: (new Subcat)

Runoff = 63.32 cfs @ 12.07 hrs, Volume= 4.938 af, Depth= 5.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (sf)	CN	Description
432,916	98	Paved parking, HSG D
48,102	80	>75% Grass cover, Good, HSG D
481,018	96	Weighted Average
48,102		10.00% Pervious Area
432,916		90.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Summary for Subcatchment C4-1S:

Runoff = 3.57 cfs @ 12.22 hrs, Volume= 0.364 af, Depth= 4.34"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	30,523	82	>75% Grass cover, Good, HSG D
	13,327	98	Paved parking, HSG A
	43,850	87	Weighted Average
	30,523		69.61% Pervious Area
	13,327		30.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	100	0.0100	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
2.9	260	0.0100	1.50		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
16.3	360	Total			

Summary for Subcatchment C4-2:

Runoff = 10.07 cfs @ 12.07 hrs, Volume= 0.793 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (sf)	CN	Description
74,534	98	Paved parking, HSG A
74,534		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct**

Summary for Subcatchment C4-3:

Runoff = 10.07 cfs @ 12.07 hrs, Volume= 0.793 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (sf)	CN	Description
74,534	98	Paved parking, HSG A
74,534		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct**

Summary for Subcatchment I-1: Apron

Runoff = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.230	98	Pavement
	1.230		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0130	1.12		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.00"
1.4	192	0.0130	2.31		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
1.2	183	0.0040	2.49	1.95	**Pipe Channel, C-D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.015 Concrete sewer w/manholes & inlets
4.1	475	Total			

Summary for Subcatchment JB1: (new Subcat)

Runoff = 14.74 cfs @ 12.07 hrs, Volume= 1.131 af, Depth= 4.83"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	2.000	98	
*	0.810	74	
	2.810	91	Weighted Average
	0.810		28.83% Pervious Area
	2.000		71.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	80	0.0100	0.97		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.00"
2.9	480	0.0050	2.78	2.18	**Pipe Channel, B-C** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.015 Corrugated PE, smooth interior
0.3	60	0.0040	2.89	3.54	**Pipe Channel, C-D** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.015 Corrugated PE, smooth interior
0.4	60	0.0300	2.60		**Shallow Concentrated Flow, D-E** Grassed Waterway Kv= 15.0 fps
5.0	680	Total			

Summary for Subcatchment JB3B: (new Subcat)

Runoff = 16.52 cfs @ 12.04 hrs, Volume= 1.193 af, Depth= 5.21"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.500	80	
*	2.250	98	
	2.750	95	Weighted Average
	0.500		18.18% Pervious Area
	2.250		81.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	50	0.0100	0.88		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.00"
0.8	100	0.0100	2.03		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
1.4	510	0.0100	6.22	7.63	**Pipe Channel, C-D** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
3.1	660	Total			

Summary for Subcatchment P-3: (new Subcat)

Runoff = 2.65 cfs @ 12.04 hrs, Volume= 0.165 af, Depth= 3.21"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (sf)	CN	Description
9,065	80	>75% Grass cover, Good, HSG D
17,765	74	>75% Grass cover, Good, HSG C
26,830	76	Weighted Average
26,830		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	50	0.2000	0.36		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"

Summary for Subcatchment SB-CB-17: (new Subcat)

Runoff = 0.44 cfs @ 12.04 hrs, Volume= 0.032 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.070	98	
	0.070		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment SB-CB-18: (new Subcat)

Runoff = 0.51 cfs @ 12.04 hrs, Volume= 0.037 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.080	98	
	0.080		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry,**

Summary for Subcatchment SB-WQU-5: (new Subcat)

Runoff = 7.27 cfs @ 12.10 hrs, Volume= 0.607 af, Depth= 5.36"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	1.220	98	
	0.140	80	>75% Grass cover, Good, HSG D
	1.360	96	Weighted Average
	0.140		10.29% Pervious Area
	1.220		89.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	80	0.0100	0.97		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.00"
0.6	75	0.0100	2.03		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
1.4	477	0.0150	5.56	4.36	**Pipe Channel, C-D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, straight & clean
0.6	105	0.0030	2.88	3.54	**Pipe Channel, D-E** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
3.0	670	0.0038	3.66	6.48	**Pipe Channel, E-F** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
7.0	1,407	Total			

Summary for Subcatchment TBR: (new Subcat)

Runoff = 12.75 cfs @ 12.11 hrs, Volume= 1.112 af, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	2.400	98	roof
	2.400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0					**Direct Entry,**

Summary for Subcatchment TWIN 12": (new Subcat)

Runoff = 4.44 cfs @ 12.17 hrs, Volume= 0.437 af, Depth= 5.09"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (ac)	CN	Description
*	0.780	98	
*	0.250	80	
	1.030	94	Weighted Average
	0.250		24.27% Pervious Area
	0.780		75.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	240	0.0100	1.20		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.00"
9.4	600	0.0050	1.06		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
12.7	840	Total			

Summary for Subcatchment WQF1: (new Subcat)

Runoff = 37.45 cfs @ 12.09 hrs, Volume= 3.010 af, Depth= 5.14"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

	Area (sf)	CN	Description
*	240,749	98	
	65,136	80	>75% Grass cover, Good, HSG D
	305,885	94	Weighted Average
	65,136		21.29% Pervious Area
	240,749		78.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	100	0.0100	1.01		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.00"
2.1	250	0.0100	2.03		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
2.4	150	0.0050	1.06		**Shallow Concentrated Flow, C-D** Grassed Waterway Kv= 15.0 fps
6.2	500	Total			

Summary for Reach 2R: POA#3 Discharge from Filter Bed #1 & 18" Culvert to Downstream Area

Inflow Area = 2.365 ac, 71.25% Impervious, Inflow Depth > 3.73" for 25 yr event
Inflow = 8.31 cfs @ 12.15 hrs, Volume= 0.736 af
Outflow = 8.31 cfs @ 12.15 hrs, Volume= 0.736 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Summary for Reach 3R: >100-yr 24-hr Spillway to Jetport Boulavard Closed Drainage System

Inflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af
Outflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

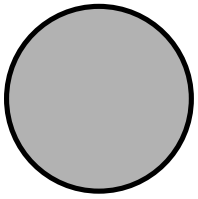
Summary for Reach 4R: pipe

Inflow Area = 26.094 ac, 75.02% Impervious, Inflow Depth = 5.07" for 25 yr event
Inflow = 143.84 cfs @ 12.07 hrs, Volume= 11.027 af
Outflow = 47.09 cfs @ 11.86 hrs, Volume= 11.027 af, Atten= 67%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 10.20 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 4.74 fps, Avg. Travel Time= 3.5 min

Peak Storage= 4,909 cf @ 11.88 hrs
Average Depth at Peak Storage= 2.50'
Bank-Full Depth= 2.50' Flow Area= 4.9 sf, Capacity= 43.93 cfs

30.0" Round Pipe
n= 0.013
Length= 1,000.0' Slope= 0.0115 '/'
Inlet Invert= 36.00', Outlet Invert= 24.53'



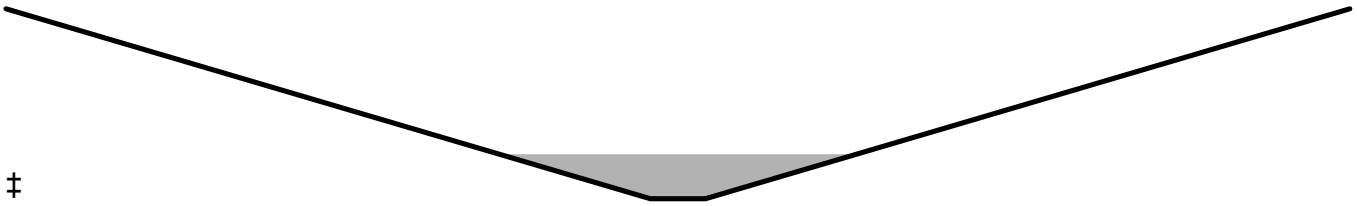
Summary for Reach 38R:

Inflow Area = 1.030 ac, 75.73% Impervious, Inflow Depth = 5.09" for 25 yr event
Inflow = 4.00 cfs @ 12.23 hrs, Volume= 0.437 af
Outflow = 3.16 cfs @ 12.37 hrs, Volume= 0.437 af, Atten= 21%, Lag= 8.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 1.21 fps, Min. Travel Time= 13.7 min
Avg. Velocity = 0.45 fps, Avg. Travel Time= 36.8 min

Peak Storage= 2,590 cf @ 12.37 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 1.00' Flow Area= 38.0 sf, Capacity= 112.70 cfs

3.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 35.0 '/' Top Width= 73.00'
Length= 990.0' Slope= 0.0046 '/'
Inlet Invert= 65.53', Outlet Invert= 60.97'



‡

Summary for Reach 46R: (new Reach)

Inflow Area = 4.664 ac, 43.76% Impervious, Inflow Depth > 1.84" for 25 yr event
Inflow = 2.45 cfs @ 13.02 hrs, Volume= 0.716 af
Outflow = 2.44 cfs @ 13.10 hrs, Volume= 0.716 af, Atten= 1%, Lag= 5.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 0.87 fps, Min. Travel Time= 5.6 min
Avg. Velocity = 0.46 fps, Avg. Travel Time= 10.5 min

Peak Storage= 813 cf @ 13.10 hrs
Average Depth at Peak Storage= 0.59'
Bank-Full Depth= 3.00' Flow Area= 36.0 sf, Capacity= 78.23 cfs

3.00' x 3.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 21.00'
Length= 291.0' Slope= 0.0010 '/'
Inlet Invert= 44.50', Outlet Invert= 44.21'



Summary for Pond .2P:

Inflow Area = 16.770 ac, 83.82% Impervious, Inflow Depth = 4.86" for 25 yr event
Inflow = 83.26 cfs @ 12.05 hrs, Volume= 6.798 af
Outflow = 83.14 cfs @ 12.05 hrs, Volume= 6.797 af, Atten= 0%, Lag= 0.0 min
Primary = 83.14 cfs @ 12.05 hrs, Volume= 6.797 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 53.98' @ 12.11 hrs Surf.Area= 13 sf Storage= 119 cf
Flood Elev= 60.88' Surf.Area= 21 sf Storage= 206 cf

Plug-Flow detention time= 0.3 min calculated for 6.795 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (761.7 - 761.5)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	206 cf	**4.00'D x 16.38'H Vertical Cone/Cylinder**
#2	60.88'	36 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		242 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
60.88	8	0	0
61.00	596	36	36

Device	Routing	Invert	Outlet Devices
#1	Primary	49.71'	**54.0" Round Culvert** L= 95.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 49.71' / 49.05' S= 0.0069 '/' Cc= 0.900 n= 0.013, Flow Area= 15.90 sf

Primary OutFlow Max=72.34 cfs @ 12.05 hrs HW=53.60' TW=52.55' (Dynamic Tailwater)
1=Culvert (Outlet Controls 72.34 cfs @ 6.63 fps)

Summary for Pond .3P:

Inflow Area = 16.421 ac, 83.48% Impervious, Inflow Depth = 4.85" for 25 yr event
Inflow = 81.13 cfs @ 12.05 hrs, Volume= 6.638 af
Outflow = 81.08 cfs @ 12.05 hrs, Volume= 6.637 af, Atten= 0%, Lag= 0.0 min
Primary = 81.08 cfs @ 12.05 hrs, Volume= 6.637 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 54.83' @ 12.07 hrs Surf.Area= 13 sf Storage= 125 cf
Flood Elev= 60.88' Surf.Area= 21 sf Storage= 201 cf

Plug-Flow detention time= 0.4 min calculated for 6.637 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (762.0 - 761.8)

Volume	Invert	Avail.Storage	Storage Description
#1	44.89'	201 cf	**4.00'D x 15.99'H Vertical Cone/Cylinder**
#2	60.88'	36 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		237 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
60.88	8	0	0
61.00	596	36	36

Device	Routing	Invert	Outlet Devices
#1	Primary	50.17'	**54.0" Round Culvert** L= 95.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 50.17' / 49.98' S= 0.0020 '/' Cc= 0.900 n= 0.013, Flow Area= 15.90 sf

Primary OutFlow Max=75.77 cfs @ 12.05 hrs HW=54.51' TW=53.62' (Dynamic Tailwater)
1=Culvert (Outlet Controls 75.77 cfs @ 6.15 fps)

Summary for Pond .4P:

Inflow Area = 15.802 ac, 82.83% Impervious, Inflow Depth = 4.82" for 25 yr event
Inflow = 77.30 cfs @ 12.05 hrs, Volume= 6.353 af
Outflow = 77.28 cfs @ 12.05 hrs, Volume= 6.351 af, Atten= 0%, Lag= 0.0 min
Primary = 77.28 cfs @ 12.05 hrs, Volume= 6.351 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 55.44' @ 12.07 hrs Surf.Area= 13 sf Storage= 128 cf
Flood Elev= 60.88' Surf.Area= 21 sf Storage= 196 cf

Plug-Flow detention time= 0.4 min calculated for 6.351 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (762.6 - 762.4)

Volume	Invert	Avail.Storage	Storage Description
#1	45.28'	196 cf	**4.00'D x 15.60'H Vertical Cone/Cylinder**
#2	60.88'	36 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		232 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
60.88	8	0	0
61.00	596	36	36

Device	Routing	Invert	Outlet Devices
#1	Primary	50.47'	**54.0" Round Culvert** L= 95.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 50.47' / 50.28' S= 0.0020 '/' Cc= 0.900 n= 0.013, Flow Area= 15.90 sf

Primary OutFlow Max=72.10 cfs @ 12.05 hrs HW=55.20' TW=54.52' (Dynamic Tailwater)
1=Culvert (Outlet Controls 72.10 cfs @ 5.37 fps)

Summary for Pond .5P:

Inflow Area = 13.173 ac, 80.62% Impervious, Inflow Depth = 4.75" for 25 yr event
Inflow = 61.86 cfs @ 12.06 hrs, Volume= 5.215 af
Outflow = 61.87 cfs @ 12.06 hrs, Volume= 5.214 af, Atten= 0%, Lag= 0.0 min
Primary = 61.87 cfs @ 12.06 hrs, Volume= 5.214 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 56.13' @ 12.08 hrs Surf.Area= 13 sf Storage= 131 cf
Flood Elev= 60.88' Surf.Area= 21 sf Storage= 191 cf

Plug-Flow detention time= 0.4 min calculated for 5.212 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (764.9 - 764.7)

Volume	Invert	Avail.Storage	Storage Description
#1	45.67'	191 cf	**4.00'D x 15.21'H Vertical Cone/Cylinder**
#2	60.88'	36 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		227 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
60.88	8	0	0
61.00	596	36	36

Device	Routing	Invert	Outlet Devices
#1	Primary	50.83'	**48.0" Round Culvert** L= 95.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 50.83' / 50.64' S= 0.0020 '/' Cc= 0.900 n= 0.013, Flow Area= 12.57 sf

Primary OutFlow Max=60.34 cfs @ 12.06 hrs HW=55.88' TW=55.25' (Dynamic Tailwater)
1=Culvert (Inlet Controls 60.34 cfs @ 4.80 fps)

Summary for Pond .6P:

Inflow Area = 12.329 ac, 79.29% Impervious, Inflow Depth = 4.70" for 25 yr event
Inflow = 56.82 cfs @ 12.07 hrs, Volume= 4.826 af
Outflow = 56.81 cfs @ 12.07 hrs, Volume= 4.824 af, Atten= 0%, Lag= 0.0 min
Primary = 56.81 cfs @ 12.07 hrs, Volume= 4.824 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 56.65' @ 12.08 hrs Surf.Area= 13 sf Storage= 135 cf
Flood Elev= 60.88' Surf.Area= 21 sf Storage= 188 cf

Plug-Flow detention time= 0.5 min calculated for 4.823 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (766.5 - 766.2)

Volume	Invert	Avail.Storage	Storage Description
#1	45.89'	188 cf	**4.00'D x 14.99'H Vertical Cone/Cylinder**
#2	60.88'	36 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		225 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
60.88	8	0	0
61.00	596	36	36

Device	Routing	Invert	Outlet Devices
#1	Primary	51.01'	**48.0" Round Culvert** L= 40.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 51.01' / 50.93' S= 0.0020 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf

Primary OutFlow Max=52.87 cfs @ 12.07 hrs HW=56.44' TW=55.95' (Dynamic Tailwater)
1=Culvert (Inlet Controls 52.87 cfs @ 4.21 fps)

Summary for Pond .A-1: Outfall 5

Estimated Slope and Calcutated Invert Out.

Inflow Area = 39.882 ac, 51.92% Impervious, Inflow Depth = 4.54" for 25 yr event
Inflow = 197.57 cfs @ 12.32 hrs, Volume= 15.100 af
Outflow = 203.33 cfs @ 12.17 hrs, Volume= 15.100 af, Atten= 0%, Lag= 0.0 min
Primary = 203.33 cfs @ 12.17 hrs, Volume= 15.100 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 50.26' @ 12.17 hrs Surf.Area= 13 sf Storage= 299 cf
Flood Elev= 40.89' Surf.Area= 13 sf Storage= 299 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (774.5 - 774.4)

Volume	Invert	Avail.Storage	Storage Description
#1	17.06'	299 cf	**4.00'D x 23.83'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	17.06'	**42.0" Round Culvert** L= 520.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 17.06' / 15.50' S= 0.0030 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 9.62 sf

Primary OutFlow Max=192.22 cfs @ 12.17 hrs HW=47.35' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 192.22 cfs @ 19.98 fps)

Summary for Pond .A-2:

Storage at elevation 32.34 taken from contour 32 this is conservative.
Storage at elevation 33 has been split evenly between A-2 and A-3.
Storage at elevation 34 has been split evenly between A-2 and A-3 and A-4.

Inflow Area = 24.014 ac, 62.86% Impervious, Inflow Depth = 4.49" for 25 yr event
Inflow = 154.12 cfs @ 12.30 hrs, Volume= 8.982 af
Outflow = 161.06 cfs @ 12.60 hrs, Volume= 9.048 af, Atten= 0%, Lag= 18.0 min
Primary = 168.21 cfs @ 12.60 hrs, Volume= 10.313 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 34.13' @ 12.59 hrs Surf.Area= 40,086 sf Storage= 39,626 cf
Flood Elev= 32.34' Surf.Area= 12,836 sf Storage= 183 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	17.80'	183 cf	**4.00'D x 14.54'H Vertical Cone/Cylinder**
#2	32.34'	39,443 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		39,626 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
32.34	12,823	0	0
33.00	18,283	10,265	10,265
34.00	40,073	29,178	39,443

Device	Routing	Invert	Outlet Devices
#1	Primary	17.80'	**42.0" Round Culvert** L= 168.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 17.80' / 17.17' S= 0.0037 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 9.62 sf

Primary OutFlow Max=0.00 cfs @ 12.60 hrs HW=32.46' TW=42.90' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond .A-3:

Storage at elevation 33 has been split evenly between A-2 and A-3.
Storage at elevation 34 has been split evenly between A-2 and A-3 and A-4.

Inflow Area = 24.014 ac, 62.86% Impervious, Inflow Depth = 4.48" for 25 yr event
Inflow = 148.41 cfs @ 12.25 hrs, Volume= 8.971 af
Outflow = 154.12 cfs @ 12.30 hrs, Volume= 8.981 af, Atten= 0%, Lag= 3.1 min
Primary = 154.12 cfs @ 12.30 hrs, Volume= 8.982 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 32.58' @ 12.50 hrs Surf.Area= 11,384 sf Storage= 4,316 cf
Flood Elev= 31.61' Surf.Area= 17 sf Storage= 166 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (765.9 - 765.8)

Volume	Invert	Avail.Storage	Storage Description
#1	18.41'	166 cf	**4.00'D x 13.20'H Vertical Cone/Cylinder**
#2	31.61'	39,515 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		39,681 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
31.61	4	0	0
32.00	1,719	336	336
33.00	18,283	10,001	10,337
34.00	40,073	29,178	39,515

Device	Routing	Invert	Outlet Devices
#1	Primary	18.41'	**42.0" Round Culvert** L= 235.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.41' / 17.80' S= 0.0026 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 9.62 sf

Primary OutFlow Max=138.05 cfs @ 12.30 hrs HW=32.36' TW=23.12' (Dynamic Tailwater)
1=Culvert (Outlet Controls 138.05 cfs @ 14.35 fps)

Summary for Pond .A-4:

Storage at elevation 34 has been split evenly between A-2 and A-3 and A-4.

Inflow Area = 24.014 ac, 62.86% Impervious, Inflow Depth = 4.29" for 25 yr event
Inflow = 98.05 cfs @ 12.09 hrs, Volume= 8.584 af
Outflow = 148.41 cfs @ 12.25 hrs, Volume= 8.601 af, Atten= 0%, Lag= 9.6 min
Primary = 148.41 cfs @ 12.25 hrs, Volume= 8.971 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 32.58' @ 12.24 hrs Surf.Area= 29,208 sf Storage= 24,888 cf
Flood Elev= 30.18' Surf.Area= 17 sf Storage= 138 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.6 min (766.9 - 765.4)

Volume	Invert	Avail.Storage	Storage Description
#1	19.18'	138 cf	**4.00'D x 11.00'H Vertical Cone/Cylinder**
#2	30.18'	77,808 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		77,947 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
30.18	4	0	0
31.00	3,265	1,340	1,340
32.00	16,728	9,997	11,337
33.00	38,071	27,400	38,736
34.00	40,073	39,072	77,808

Device	Routing	Invert	Outlet Devices
#1	Primary	19.18'	**42.0" Round Culvert** L= 233.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.18' / 18.46' S= 0.0031 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 9.62 sf

Primary OutFlow Max=80.31 cfs @ 12.25 hrs HW=32.54' TW=29.43' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 80.31 cfs @ 8.35 fps)

Summary for Pond .A1-B:

Inflow Area = 15.868 ac, 35.37% Impervious, Inflow Depth = 3.62" for 25 yr event
Inflow = 45.58 cfs @ 12.23 hrs, Volume= 4.787 af
Outflow = 45.58 cfs @ 12.23 hrs, Volume= 4.787 af, Atten= 0%, Lag= 0.0 min
Primary = 45.58 cfs @ 12.23 hrs, Volume= 4.787 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 48.76' @ 12.22 hrs
Flood Elev= 40.86'

Device	Routing	Invert	Outlet Devices
#1	Primary	23.26'	**24.0" Round Culvert** L= 181.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 23.26' / 17.17' S= 0.0336 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=11.91 cfs @ 12.23 hrs HW=40.02' TW=39.19' (Dynamic Tailwater)
1=Culvert (Outlet Controls 11.91 cfs @ 3.79 fps)

Summary for Pond .DMH A1: (new Pond)

Inflow Area = 0.700 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 4.12 cfs @ 12.07 hrs, Volume= 0.324 af
Outflow = 4.12 cfs @ 12.07 hrs, Volume= 0.324 af, Atten= 0%, Lag= 0.0 min
Primary = 4.12 cfs @ 12.07 hrs, Volume= 0.324 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 61.76' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	51.27'	**24.0" Round Culvert** L= 55.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 51.27' / 50.88' S= 0.0071 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.07 hrs HW=52.60' TW=55.21' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond 1P: Grass Lined Filtration Basin

Inflow Area = 2.150 ac, 73.02% Impervious, Inflow Depth = 4.88" for 25 yr event
Inflow = 11.36 cfs @ 12.07 hrs, Volume= 0.874 af
Outflow = 7.84 cfs @ 12.15 hrs, Volume= 0.658 af, Atten= 31%, Lag= 4.5 min
Primary = 7.84 cfs @ 12.15 hrs, Volume= 0.658 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 76.45' @ 12.15 hrs Surf.Area= 11,933 sf Storage= 14,473 cf
Flood Elev= 78.00' Surf.Area= 16,416 sf Storage= 36,387 cf

Plug-Flow detention time= 179.9 min calculated for 0.658 af (75% of inflow)
Center-of-Mass det. time= 92.4 min (851.3 - 758.9)

Volume	Invert	Avail.Storage	Storage Description
#1	75.00'	36,387 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
75.00	8,073	0	0
76.00	10,688	9,381	9,381
77.00	13,454	12,071	21,452
78.00	16,416	14,935	36,387

Device	Routing	Invert	Outlet Devices
#1	Primary	76.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=7.83 cfs @ 12.15 hrs HW=76.45' TW=75.95' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 7.83 cfs @ 1.74 fps)

Summary for Pond 3P: RipRap Inlet Area w/Outlet Control Structure

Inflow Area = 2.150 ac, 73.02% Impervious, Inflow Depth > 3.67" for 25 yr event
Inflow = 7.84 cfs @ 12.15 hrs, Volume= 0.658 af
Outflow = 7.84 cfs @ 12.15 hrs, Volume= 0.657 af, Atten= 0%, Lag= 0.1 min
Primary = 7.84 cfs @ 12.15 hrs, Volume= 0.657 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 75.95' @ 12.15 hrs Surf.Area= 180 sf Storage= 98 cf
Flood Elev= 78.00' Surf.Area= 796 sf Storage= 999 cf

Plug-Flow detention time= 1.3 min calculated for 0.657 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (851.7 - 851.3)

Volume	Invert	Avail.Storage	Storage Description
#1	75.00'	999 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
75.00	27	0	0
76.00	188	108	108
77.00	399	294	401
78.00	796	598	999

Device	Routing	Invert	Outlet Devices
#1	Primary	72.57'	**18.0" Round 18-inch Culvert** L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 72.57' / 72.00' S= 0.0114 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	75.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	77.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=7.84 cfs @ 12.15 hrs HW=75.95' TW=0.00' (Dynamic Tailwater)
└**1=18-inch Culvert** (Passes 7.84 cfs of 13.79 cfs potential flow)
└**2=Orifice/Grate** (Weir Controls 7.84 cfs @ 2.19 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=75.00' TW=0.00' (Dynamic Tailwater)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 10P: CHAMBERS

Inflow Area = 0.886 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 6.14 cfs @ 12.00 hrs, Volume= 0.411 af
Outflow = 6.29 cfs @ 12.11 hrs, Volume= 0.343 af, Atten= 0%, Lag= 6.8 min
Primary = 5.75 cfs @ 12.11 hrs, Volume= 0.348 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 65.65' @ 12.10 hrs Surf.Area= 3,168 sf Storage= 5,057 cf

Plug-Flow detention time= 149.9 min calculated for 0.343 af (84% of inflow)
Center-of-Mass det. time= 80.9 min (821.0 - 740.1)

Volume	Invert	Avail.Storage	Storage Description
#1	64.00'	6,146 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) 6,336 cf Overall x 97.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
64.00	3,168	0	0
65.00	3,168	3,168	3,168
66.00	3,168	3,168	6,336

Device	Routing	Invert	Outlet Devices
#1	Primary	63.58'	**0.6" Vert. Orifice/Grate** C= 0.600
#2	Primary	65.02'	**4.0' long x 0.7' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32 3.31 3.32

Primary OutFlow Max=0.00 cfs @ 12.11 hrs HW=65.64' TW=65.99' (Dynamic Tailwater)
1=Orifice/Grate (Controls 0.00 cfs)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 12P: POR C

Inflow Area = 1.109 ac, 88.55% Impervious, Inflow Depth = 5.27" for 25 yr event
Inflow = 6.03 cfs @ 12.08 hrs, Volume= 0.487 af
Outflow = 1.10 cfs @ 12.53 hrs, Volume= 0.429 af, Atten= 82%, Lag= 26.8 min
Primary = 1.10 cfs @ 12.53 hrs, Volume= 0.429 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 68.00' @ 12.53 hrs Surf.Area= 37,448 sf Storage= 10,067 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 169.4 min (920.6 - 751.2)

Volume	Invert	Avail.Storage	Storage Description
#1	67.33'	14,979 cf	**12' Reservoir (Prismatic)**Listed below (Recalc) 37,448 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
67.33	37,448	0	0
68.33	37,448	37,448	37,448

Device	Routing	Invert	Outlet Devices
#1	Primary	66.17'	**1.6" Vert. Orifice/Grate** C= 0.600
#2	Primary	67.58'	**4.0" Round Culvert X 6.00** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.58' / 67.00' S= 0.0290 '/' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf

Primary OutFlow Max=1.10 cfs @ 12.53 hrs HW=68.00' TW=64.64' (Dynamic Tailwater)
1=Orifice/Grate (Orifice Controls 0.09 cfs @ 6.40 fps)
2=Culvert (Inlet Controls 1.01 cfs @ 1.92 fps)

Summary for Pond 19P:

Inflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af
Outflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af, Atten= 0%, Lag= 0.0 min
Primary	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 37.26' @ 0.00 hrs Surf.Area= 13 sf Storage= 0 cf
Flood Elev= 43.81' Surf.Area= 13 sf Storage= 82 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	37.26'	82 cf	**4.00'D x 6.55'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	37.26'	**15.0" Round Culvert** L= 210.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 37.26' / 35.85' S= 0.0067 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=37.26' TW=25.73' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond 20P: POR B

Inflow Area = 0.518 ac, 92.86% Impervious, Inflow Depth = 5.38" for 25 yr event
Inflow = 2.86 cfs @ 12.08 hrs, Volume= 0.232 af
Outflow = 1.10 cfs @ 12.31 hrs, Volume= 0.213 af, Atten= 62%, Lag= 13.7 min
Primary = 1.10 cfs @ 12.31 hrs, Volume= 0.213 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 67.82' @ 12.31 hrs Surf.Area= 20,045 sf Storage= 3,916 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 146.7 min (895.7 - 749.0)

Volume	Invert	Avail.Storage	Storage Description
#1	67.33'	8,018 cf	**12" Reservoir (Prismatic)**Listed below (Recalc) 20,045 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
67.33	20,045	0	0
68.33	20,045	20,045	20,045

Device	Routing	Invert	Outlet Devices
#1	Primary	66.17'	**1.2" Vert. Orifice/Grate** C= 0.600
#2	Primary	67.55'	**4.0" Round Culvert X 10.00** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.55' / 67.00' S= 0.0275 '/' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf

Primary OutFlow Max=1.10 cfs @ 12.31 hrs HW=67.82' TW=62.27' (Dynamic Tailwater)
1=Orifice/Grate (Orifice Controls 0.05 cfs @ 6.09 fps)
2=Culvert (Inlet Controls 1.05 cfs @ 1.39 fps)

Summary for Pond 23P: 23 P

Inflow Area = 1.995 ac, 93.63% Impervious, Inflow Depth > 4.67" for 25 yr event
Inflow = 6.44 cfs @ 12.11 hrs, Volume= 0.777 af
Outflow = 6.44 cfs @ 12.11 hrs, Volume= 0.777 af, Atten= 0%, Lag= 0.0 min
Primary = 6.44 cfs @ 12.11 hrs, Volume= 0.777 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 66.01' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	63.48'	**15.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 63.48' / 63.00' S= 0.0120 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=6.43 cfs @ 12.11 hrs HW=66.00' TW=63.73' (Dynamic Tailwater)
1=Culvert (Inlet Controls 6.43 cfs @ 5.24 fps)

Summary for Pond 25P: (new Pond)

Inflow Area = 4.664 ac, 43.76% Impervious, Inflow Depth > 1.84" for 25 yr event
Inflow = 2.44 cfs @ 13.10 hrs, Volume= 0.716 af
Outflow = 4.95 cfs @ 12.89 hrs, Volume= 0.716 af, Atten= 0%, Lag= 0.0 min
Primary = 4.95 cfs @ 12.89 hrs, Volume= 0.716 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 78.00' @ 12.71 hrs Surf.Area= 13 sf Storage= 38 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (983.7 - 983.6)

Volume	Invert	Avail.Storage	Storage Description
#1	70.00'	38 cf	**4.00'D x 3.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	70.00'	**15.0" Round Culvert** L= 560.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 70.00' / 55.00' S= 0.0268 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=5.07 cfs @ 12.89 hrs HW=71.36' TW=57.47' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 5.07 cfs @ 4.13 fps)

Summary for Pond 26P: (new Pond)

Inflow Area = 4.664 ac, 43.76% Impervious, Inflow Depth > 1.84" for 25 yr event
Inflow = 4.95 cfs @ 12.89 hrs, Volume= 0.716 af
Outflow = 5.90 cfs @ 13.18 hrs, Volume= 0.716 af, Atten= 0%, Lag= 17.4 min
Primary = 5.90 cfs @ 13.18 hrs, Volume= 0.723 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 65.01' @ 12.64 hrs Surf.Area= 13 sf Storage= 38 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	55.00'	38 cf	**4.00'D x 3.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	55.00'	**24.0" Round Culvert** L= 340.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 55.00' / 47.42' S= 0.0223 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=5.67 cfs @ 13.18 hrs HW=56.67' TW=56.07' (Dynamic Tailwater)
1=Culvert (Outlet Controls 5.67 cfs @ 2.75 fps)

Summary for Pond 45P: (new Pond)

Inflow Area = 4.664 ac, 43.76% Impervious, Inflow Depth = 3.02" for 25 yr event
Inflow = 8.22 cfs @ 12.39 hrs, Volume= 1.175 af
Outflow = 2.45 cfs @ 13.02 hrs, Volume= 0.716 af, Atten= 70%, Lag= 37.8 min
Primary = 2.45 cfs @ 13.02 hrs, Volume= 0.716 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 45.91' @ 13.02 hrs Surf.Area= 10,404 sf Storage= 28,152 cf

Plug-Flow detention time= 301.0 min calculated for 0.716 af (61% of inflow)
Center-of-Mass det. time= 181.1 min (976.5 - 795.4)

Volume	Invert	Avail.Storage	Storage Description
#1	42.00'	72,211 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	3,043	0	0
43.00	5,955	4,499	4,499
44.00	7,426	6,691	11,190
45.00	8,867	8,147	19,336
46.00	10,547	9,707	29,043
47.00	12,182	11,365	40,408
48.00	16,412	14,297	54,705
49.00	18,601	17,507	72,211

Device	Routing	Invert	Outlet Devices
#1	Primary	45.00'	**12.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.00' / 44.40' S= 0.0200 '/' Cc= 0.900 n= 0.015 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.45 cfs @ 13.02 hrs HW=45.91' TW=45.08' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 2.45 cfs @ 3.26 fps)

Summary for Pond A-11P: Minimally Controlled by Inlet Capacity

Inflow Area = 2.740 ac, 36.50% Impervious, Inflow Depth = 4.32" for 25 yr event
Inflow = 7.59 cfs @ 12.38 hrs, Volume= 0.986 af
Outflow = 7.47 cfs @ 12.64 hrs, Volume= 0.986 af, Atten= 2%, Lag= 15.5 min
Primary = 7.47 cfs @ 12.64 hrs, Volume= 1.033 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 56.14' @ 12.64 hrs Surf.Area= 10,917 sf Storage= 4,448 cf

Plug-Flow detention time= 3.2 min calculated for 0.985 af (100% of inflow)
Center-of-Mass det. time= 3.2 min (806.8 - 803.5)

Volume	Invert	Avail.Storage	Storage Description
#1	55.28'	12,750 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.28	0	0	0
56.00	8,500	3,060	3,060
56.68	20,000	9,690	12,750

Device	Routing	Invert	Outlet Devices
#1	Primary	55.28'	**1.4" x 3.5" Horiz. Orifice/Grate X 48.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=7.47 cfs @ 12.64 hrs HW=56.14' TW=52.87' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 7.47 cfs @ 4.47 fps)

Summary for Pond A-21P: Controlled by Inlet Capacity

Inflow Area = 5.500 ac, 36.36% Impervious, Inflow Depth = 4.31" for 25 yr event
Inflow = 14.19 cfs @ 12.46 hrs, Volume= 1.977 af
Outflow = 14.58 cfs @ 13.05 hrs, Volume= 1.977 af, Atten= 0%, Lag= 35.6 min
Primary = 10.11 cfs @ 13.05 hrs, Volume= 2.003 af
Secondary = 4.47 cfs @ 13.05 hrs, Volume= 0.178 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 66.97' @ 13.04 hrs Surf.Area= 43,385 sf Storage= 33,079 cf

Plug-Flow detention time= 36.6 min calculated for 1.977 af (100% of inflow)
Center-of-Mass det. time= 36.6 min (844.5 - 807.9)

Volume	Invert	Avail.Storage	Storage Description
#1	65.39'	34,355 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
65.39	0	0	0
66.00	13,000	3,965	3,965
66.62	36,000	15,190	19,155
67.00	44,000	15,200	34,355

Device	Routing	Invert	Outlet Devices
#1	Primary	65.39'	**1.4" x 3.5" Horiz. Orifice/Grate X 48.00** C= 0.600 Limited to weir flow at low heads
#2	Secondary	66.66'	**1.4" x 3.5" Horiz. Orifice/Grate X 8.00 columns** X 6 rows C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 13.05 hrs HW=66.97' TW=86.16' (Dynamic Tailwater)
1=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=4.47 cfs @ 13.05 hrs HW=66.97' TW=65.88' (Dynamic Tailwater)
2=Orifice/Grate (Orifice Controls 4.47 cfs @ 2.68 fps)

Summary for Pond A-53B: (new Pond)

Inflow Area = 5.158 ac, 52.55% Impervious, Inflow Depth = 4.63" for 25 yr event
Inflow = 21.41 cfs @ 12.16 hrs, Volume= 1.991 af
Outflow = 21.45 cfs @ 12.15 hrs, Volume= 1.991 af, Atten= 0%, Lag= 0.0 min
Primary = 21.45 cfs @ 12.15 hrs, Volume= 1.991 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 598.54' @ 12.11 hrs Surf.Area= 13 sf Storage= 75 cf

Plug-Flow detention time= 0.3 min calculated for 1.991 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (776.9 - 776.7)

Volume	Invert	Avail.Storage	Storage Description
#1	37.36'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	37.36'	**15.0" Round RCP_Round 15"** L= 160.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 37.36' / 37.00' S= 0.0022 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=24.79 cfs @ 12.15 hrs HW=524.28' TW=493.03' (Dynamic Tailwater)
1=RCP_Round 15" (Outlet Controls 24.79 cfs @ 20.20 fps)

Summary for Pond A-54P: MINIMALLY CONTROLLED BY INLET CAPACITY

Inflow Area = 1.820 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 10.71 cfs @ 12.07 hrs, Volume= 0.844 af
Outflow = 15.40 cfs @ 12.14 hrs, Volume= 0.844 af, Atten= 0%, Lag= 4.2 min
Primary = 6.96 cfs @ 12.16 hrs, Volume= 0.771 af
Secondary = 15.10 cfs @ 12.14 hrs, Volume= 0.099 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 76.40' @ 12.07 hrs Surf.Area= 10,000 sf Storage= 1,650 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.2 min (745.9 - 744.7)

Volume	Invert	Avail.Storage	Storage Description
#1	52.45'	1,650 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.45	0	0	0
52.78	10,000	1,650	1,650

Device	Routing	Invert	Outlet Devices
#1	Primary	52.45'	**1.8" x 9.6" Horiz. Orifice/Grate X 20.00** C= 0.600 Limited to weir flow at low heads
#2	Secondary	52.61'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 12.16 hrs HW=52.81' TW=57.09' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=267.09 cfs @ 12.14 hrs HW=55.53' TW=54.22' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 267.09 cfs @ 3.66 fps)

Summary for Pond A-69P: (new Pond)

Inflow Area = 1.502 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 8.84 cfs @ 12.07 hrs, Volume= 0.696 af
Outflow = 8.67 cfs @ 12.09 hrs, Volume= 0.696 af, Atten= 2%, Lag= 1.4 min
Primary = 4.81 cfs @ 12.26 hrs, Volume= 0.407 af
Secondary = 6.38 cfs @ 12.21 hrs, Volume= 0.323 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.52' @ 12.21 hrs Surf.Area= 6,326 sf Storage= 660 cf

Plug-Flow detention time= 0.5 min calculated for 0.696 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (745.2 - 744.7)

Volume	Invert	Avail.Storage	Storage Description
#1	57.31'	1,650 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
57.31	0	0	0
57.64	10,000	1,650	1,650

Device	Routing	Invert	Outlet Devices
#1	Primary	57.31'	**1.8" x 9.6" Horiz. Orifice/Grate X 20.00** C= 0.600 Limited to weir flow at low heads
#2	Secondary	57.31'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 12.26 hrs HW=57.51' TW=57.57' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=6.12 cfs @ 12.21 hrs HW=57.52' TW=57.35' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 6.12 cfs @ 1.18 fps)

Summary for Pond A-7P: Minimally Controlled by Inlet Capacity

Inflow Area = 1.860 ac, 35.48% Impervious, Inflow Depth = 4.30" for 25 yr event
Inflow = 4.25 cfs @ 12.55 hrs, Volume= 0.666 af
Outflow = 4.35 cfs @ 12.62 hrs, Volume= 0.666 af, Atten= 0%, Lag= 4.0 min
Primary = 4.35 cfs @ 12.62 hrs, Volume= 0.704 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 50.89' @ 12.62 hrs Surf.Area= 11,718 sf Storage= 1,717 cf

Plug-Flow detention time= 2.2 min calculated for 0.666 af (100% of inflow)
Center-of-Mass det. time= 2.2 min (819.3 - 817.1)

Volume	Invert	Avail.Storage	Storage Description
#1	50.60'	5,751 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
50.60	4	0	0
51.00	16,000	3,201	3,201
51.15	18,000	2,550	5,751

Device	Routing	Invert	Outlet Devices
#1	Primary	50.60'	**1.4" x 3.5" Horiz. Orifice/Grate X 8.00 columns** X 6 rows C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 12.62 hrs HW=50.89' TW=61.27' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond A-91A:

Inflow Area = 60.770 ac, 64.01% Impervious, Inflow Depth > 4.54" for 25 yr event
Inflow = 132.46 cfs @ 12.09 hrs, Volume= 23.007 af
Outflow = 132.38 cfs @ 12.09 hrs, Volume= 23.006 af, Atten= 0%, Lag= 0.0 min
Primary = 132.38 cfs @ 12.09 hrs, Volume= 23.006 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 51.53' @ 12.09 hrs Surf.Area= 0.000 ac Storage= 0.002 af
Flood Elev= 61.60' Surf.Area= 0.000 ac Storage= 0.005 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (845.9 - 845.8)

Volume	Invert	Avail.Storage	Storage Description
#1	43.74'	0.005 af	**4.00'D x 17.86'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	43.14'	**54.0" Round Culvert** L= 353.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.14' / 41.73' S= 0.0040 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 15.90 sf
#2	Secondary	51.23'	**24.0" Round Culvert** L= 15.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.23' / 51.14' S= 0.0060 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf

Primary OutFlow Max=115.31 cfs @ 12.09 hrs HW=51.47' TW=49.03' (Dynamic Tailwater)
1=Culvert (Outlet Controls 115.31 cfs @ 7.25 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=43.74' TW=51.25' (Dynamic Tailwater)
2=Culvert (Controls 0.00 cfs)

Summary for Pond A-91B:

Inflow Area = 26.157 ac, 81.31% Impervious, Inflow Depth = 4.73" for 25 yr event
Inflow = 107.60 cfs @ 12.07 hrs, Volume= 10.308 af
Outflow = 107.87 cfs @ 12.07 hrs, Volume= 10.308 af, Atten= 0%, Lag= 0.0 min
Primary = 107.87 cfs @ 12.07 hrs, Volume= 10.308 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 53.19' @ 12.10 hrs Surf.Area= 0.000 ac Storage= 0.003 af
Flood Elev= 61.60' Surf.Area= 0.000 ac Storage= 0.005 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (783.6 - 783.6)

Volume	Invert	Avail.Storage	Storage Description
#1	44.11'	0.005 af	**4.00'D x 17.49'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	43.48'	**54.0" Round Culvert** L= 47.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.48' / 43.24' S= 0.0051 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 15.90 sf

Primary OutFlow Max=104.49 cfs @ 12.07 hrs HW=52.59' TW=50.73' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 104.49 cfs @ 6.57 fps)

Summary for Pond B-12: (new Pond)

Inflow Area = 12.623 ac, 88.36% Impervious, Inflow Depth = 5.33" for 25 yr event
Inflow = 72.08 cfs @ 12.07 hrs, Volume= 5.608 af
Outflow = 72.28 cfs @ 12.07 hrs, Volume= 5.608 af, Atten= 0%, Lag= 0.0 min
Primary = 72.28 cfs @ 12.07 hrs, Volume= 5.608 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 46.81' @ 12.07 hrs Surf.Area= 0.001 ac Storage= 0.004 af

Plug-Flow detention time= 0.2 min calculated for 5.608 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (750.5 - 750.4)

Volume	Invert	Avail.Storage	Storage Description
#1	36.33'	0.004 af	**6.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	36.33'	**30.0" Round Culvert** L= 137.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 36.33' / 35.50' S= 0.0061 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=72.01 cfs @ 12.07 hrs HW=46.75' TW=38.50' (Dynamic Tailwater)
1=Culvert (Outlet Controls 72.01 cfs @ 14.67 fps)

Summary for Pond B-13: (new Pond)

Inflow Area = 12.623 ac, 88.36% Impervious, Inflow Depth = 5.33" for 25 yr event
Inflow = 71.21 cfs @ 12.07 hrs, Volume= 5.610 af
Outflow = 71.19 cfs @ 12.06 hrs, Volume= 5.608 af, Atten= 0%, Lag= 0.0 min
Primary = 71.19 cfs @ 12.06 hrs, Volume= 5.608 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 62.25' @ 12.07 hrs Surf.Area= 0.001 ac Storage= 0.004 af

Plug-Flow detention time= 0.6 min calculated for 5.608 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (750.3 - 750.0)

Volume	Invert	Avail.Storage	Storage Description
#1	41.14'	0.004 af	**6.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	41.14'	**30.0" Round RCP_Round 30"** L= 25.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 41.14' / 40.89' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=70.31 cfs @ 12.06 hrs HW=62.09' TW=56.43' (Dynamic Tailwater)
↑**1=RCP_Round 30"** (Inlet Controls 70.31 cfs @ 14.32 fps)

Summary for Pond B-14:

Inflow Area = 11.043 ac, 90.00% Impervious, Inflow Depth = 5.37" for 25 yr event
Inflow = 63.32 cfs @ 12.07 hrs, Volume= 4.938 af
Outflow = 63.37 cfs @ 12.07 hrs, Volume= 4.937 af, Atten= 0%, Lag= 0.0 min
Primary = 63.37 cfs @ 12.07 hrs, Volume= 4.937 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 87.57' @ 12.08 hrs Surf.Area= 0.000 ac Storage= 0.002 af

Plug-Flow detention time= 0.2 min calculated for 4.937 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (749.5 - 749.4)

Volume	Invert	Avail.Storage	Storage Description
#1	42.81'	0.002 af	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	42.81'	**24.0" Round Culvert** L= 224.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 42.81' / 41.24' S= 0.0070 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=62.68 cfs @ 12.07 hrs HW=86.90' TW=62.23' (Dynamic Tailwater)
1=Culvert (Outlet Controls 62.68 cfs @ 19.95 fps)

Summary for Pond CB-A-102: (new Pond)

Inflow Area = 15.830 ac, 66.71% Impervious, Inflow Depth = 4.27" for 25 yr event
Inflow = 62.15 cfs @ 12.08 hrs, Volume= 5.634 af
Outflow = 62.11 cfs @ 12.07 hrs, Volume= 5.634 af, Atten= 0%, Lag= 0.0 min
Primary = 62.11 cfs @ 12.07 hrs, Volume= 5.634 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 107.63' @ 12.08 hrs Surf.Area= 13 sf Storage= 75 cf

Plug-Flow detention time= 0.1 min calculated for 5.634 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (761.7 - 761.6)

Volume	Invert	Avail.Storage	Storage Description
#1	37.70'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	37.70'	**24.0" Round RCP_Round 24"** L= 198.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 37.70' / 37.21' S= 0.0025 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=59.12 cfs @ 12.07 hrs HW=104.11' TW=83.95' (Dynamic Tailwater)
↑**1=RCP_Round 24"** (Outlet Controls 59.12 cfs @ 18.82 fps)

Summary for Pond CB-A-103: (new Pond)

Inflow Area = 13.578 ac, 69.89% Impervious, Inflow Depth = 4.29" for 25 yr event
Inflow = 55.69 cfs @ 12.07 hrs, Volume= 4.850 af
Outflow = 55.66 cfs @ 12.07 hrs, Volume= 4.850 af, Atten= 0%, Lag= 0.0 min
Primary = 55.66 cfs @ 12.07 hrs, Volume= 4.850 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 125.47' @ 12.08 hrs Surf.Area= 13 sf Storage= 75 cf

Plug-Flow detention time= 0.1 min calculated for 4.849 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (758.2 - 758.1)

Volume	Invert	Avail.Storage	Storage Description
#1	37.86'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	37.86'	**24.0" Round RCP_Round 24"** L= 200.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 37.86' / 37.73' S= 0.0007 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=54.19 cfs @ 12.07 hrs HW=118.93' TW=101.87' (Dynamic Tailwater)
↑**1=RCP_Round 24"** (Outlet Controls 54.19 cfs @ 17.25 fps)

Summary for Pond CB-A-104: (new Pond)

Inflow Area = 11.581 ac, 73.35% Impervious, Inflow Depth = 4.41" for 25 yr event
Inflow = 50.95 cfs @ 12.07 hrs, Volume= 4.252 af
Outflow = 50.91 cfs @ 12.06 hrs, Volume= 4.252 af, Atten= 0%, Lag= 0.0 min
Primary = 50.91 cfs @ 12.06 hrs, Volume= 4.252 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 137.76' @ 12.09 hrs Surf.Area= 13 sf Storage= 75 cf

Plug-Flow detention time= 0.1 min calculated for 4.251 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (755.3 - 755.2)

Volume	Invert	Avail.Storage	Storage Description
#1	38.70'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	38.70'	**24.0" Round RCP_Round 24"** L= 183.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 38.70' / 37.96' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=41.68 cfs @ 12.06 hrs HW=128.70' TW=119.19' (Dynamic Tailwater)
1=RCP_Round 24" (Outlet Controls 41.68 cfs @ 13.27 fps)

Summary for Pond CB-A-105: (new Pond)

Inflow Area = 11.581 ac, 73.35% Impervious, Inflow Depth = 4.41" for 25 yr event
Inflow = 50.86 cfs @ 12.07 hrs, Volume= 4.252 af
Outflow = 50.95 cfs @ 12.07 hrs, Volume= 4.252 af, Atten= 0%, Lag= 0.1 min
Primary = 50.95 cfs @ 12.07 hrs, Volume= 4.252 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 241.80' @ 12.07 hrs Surf.Area= 13 sf Storage= 75 cf

Plug-Flow detention time= 0.1 min calculated for 4.252 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (755.2 - 755.1)

Volume	Invert	Avail.Storage	Storage Description
#1	39.58'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	39.58'	**18.0" Round RCP_Round 18"** L= 393.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 39.58' / 38.75' S= 0.0021 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=50.52 cfs @ 12.07 hrs HW=238.34' TW=131.88' (Dynamic Tailwater)
↑**1=RCP_Round 18"** (Outlet Controls 50.52 cfs @ 28.59 fps)

Summary for Pond CB-A-106: (new Pond)

Inflow Area = 3.094 ac, 63.32% Impervious, Inflow Depth = 4.21" for 25 yr event
Inflow = 12.63 cfs @ 12.11 hrs, Volume= 1.085 af
Outflow = 12.74 cfs @ 12.11 hrs, Volume= 1.085 af, Atten= 0%, Lag= 0.0 min
Primary = 12.74 cfs @ 12.11 hrs, Volume= 1.085 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 332.40' @ 12.08 hrs Surf.Area= 13 sf Storage= 75 cf

Plug-Flow detention time= 0.3 min calculated for 1.085 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (766.7 - 766.5)

Volume	Invert	Avail.Storage	Storage Description
#1	40.72'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	40.72'	**15.0" Round RCP_Round 15"** L= 57.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 40.72' / 40.61' S= 0.0019 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf

Primary OutFlow Max=22.81 cfs @ 12.11 hrs HW=306.80' TW=295.26' (Dynamic Tailwater)
1=RCP_Round 15" (Outlet Controls 22.81 cfs @ 18.59 fps)

Summary for Pond DHM A7:

Inflow Area = 60.770 ac, 64.01% Impervious, Inflow Depth > 4.54" for 25 yr event
Inflow = 131.93 cfs @ 12.07 hrs, Volume= 23.006 af
Outflow = 133.44 cfs @ 12.10 hrs, Volume= 23.006 af, Atten= 0%, Lag= 1.6 min
Primary = 133.44 cfs @ 12.10 hrs, Volume= 23.006 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 40.09' @ 12.57 hrs Surf.Area= 0.000 ac Storage= 0.002 af
Flood Elev= 48.00' Surf.Area= 0.000 ac Storage= 0.004 af

Plug-Flow detention time= 0.0 min calculated for 22.999 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (845.9 - 845.9)

Volume	Invert	Avail.Storage	Storage Description
#1	33.25'	0.004 af	**4.00'D x 14.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	33.25'	**54.0" Round Culvert** L= 300.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 33.25' / 30.00' S= 0.0108 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf

Primary OutFlow Max=129.80 cfs @ 12.10 hrs HW=38.40' TW=35.70' (Dynamic Tailwater)
1=Culvert (Outlet Controls 129.80 cfs @ 8.93 fps)

Summary for Pond DI CB-1: (new Pond)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=0.00' (Dynamic Tailwater)

Summary for Pond DMH A1:

Inflow Area = 9.387 ac, 76.83% Impervious, Inflow Depth = 4.49" for 25 yr event
Inflow = 37.78 cfs @ 12.16 hrs, Volume= 3.511 af
Outflow = 38.05 cfs @ 12.17 hrs, Volume= 3.511 af, Atten= 0%, Lag= 0.4 min
Primary = 38.05 cfs @ 12.17 hrs, Volume= 3.511 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 72.99' @ 12.19 hrs Surf.Area= 13 sf Storage= 104 cf
Flood Elev= 60.50' Surf.Area= 13 sf Storage= 104 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (826.0 - 825.9)

Volume	Invert	Avail.Storage	Storage Description
#1	52.20'	104 cf	**4.00'D x 8.30'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	52.20'	**24.0" Round Culvert** L= 40.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 52.20' / 51.88' S= 0.0080 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.17 hrs HW=65.00' TW=76.90' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond DMH A2:

Inflow Area = 2.365 ac, 71.25% Impervious, Inflow Depth > 3.73" for 25 yr event
Inflow = 8.31 cfs @ 12.15 hrs, Volume= 0.736 af
Outflow = 13.01 cfs @ 12.14 hrs, Volume= 0.736 af, Atten= 0%, Lag= 0.0 min
Primary = 13.01 cfs @ 12.14 hrs, Volume= 0.748 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 71.64' @ 12.14 hrs Surf.Area= 13 sf Storage= 163 cf
Flood Elev= 71.00' Surf.Area= 13 sf Storage= 163 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (842.9 - 842.8)

Volume	Invert	Avail.Storage	Storage Description
#1	58.00'	163 cf	**4.00'D x 13.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	58.00'	**18.0" Round Culvert** L= 666.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 58.00' / 52.30' S= 0.0086 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=12.08 cfs @ 12.14 hrs HW=71.52' TW=61.60' (Dynamic Tailwater)
1=Culvert (Outlet Controls 12.08 cfs @ 6.83 fps)

Summary for Pond DMH A3:

Inflow Area = 9.387 ac, 76.83% Impervious, Inflow Depth = 4.49" for 25 yr event
Inflow = 38.05 cfs @ 12.17 hrs, Volume= 3.511 af
Outflow = 43.95 cfs @ 12.17 hrs, Volume= 3.511 af, Atten= 0%, Lag= 0.0 min
Primary = 43.95 cfs @ 12.17 hrs, Volume= 3.511 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 77.51' @ 12.17 hrs Surf.Area= 13 sf Storage= 110 cf
Flood Elev= 60.50' Surf.Area= 13 sf Storage= 110 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (826.1 - 826.0)

Volume	Invert	Avail.Storage	Storage Description
#1	51.78'	110 cf	**4.00'D x 8.72'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	51.78'	**24.0" Round Culvert** L= 550.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.78' / 50.13' S= 0.0030 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=43.54 cfs @ 12.17 hrs HW=77.05' TW=49.63' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 43.54 cfs @ 13.86 fps)

Summary for Pond DMH A4:

Inflow Area = 60.770 ac, 64.01% Impervious, Inflow Depth > 4.54" for 25 yr event
Inflow = 132.38 cfs @ 12.09 hrs, Volume= 23.006 af
Outflow = 132.05 cfs @ 12.09 hrs, Volume= 23.006 af, Atten= 0%, Lag= 0.0 min
Primary = 132.05 cfs @ 12.09 hrs, Volume= 23.006 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 49.08' @ 12.09 hrs Surf.Area= 13 sf Storage= 94 cf
Flood Elev= 60.10' Surf.Area= 13 sf Storage= 232 cf

Plug-Flow detention time= 0.0 min calculated for 22.999 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (845.9 - 845.9)

Volume	Invert	Avail.Storage	Storage Description
#1	41.63'	232 cf	**4.00'D x 18.47'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	41.63'	**54.0" Round Culvert** L= 309.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 41.63' / 39.87' S= 0.0057 '/' Cc= 0.900 n= 0.013, Flow Area= 15.90 sf

Primary OutFlow Max=128.84 cfs @ 12.09 hrs HW=49.07' TW=46.51' (Dynamic Tailwater)
1=Culvert (Outlet Controls 128.84 cfs @ 8.10 fps)

Summary for Pond DMH A5:

Inflow Area = 60.770 ac, 64.01% Impervious, Inflow Depth > 4.54" for 25 yr event
Inflow = 132.05 cfs @ 12.09 hrs, Volume= 23.006 af
Outflow = 131.94 cfs @ 12.07 hrs, Volume= 23.006 af, Atten= 0%, Lag= 0.0 min
Primary = 131.94 cfs @ 12.07 hrs, Volume= 23.006 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 46.51' @ 12.09 hrs Surf.Area= 13 sf Storage= 85 cf
Flood Elev= 57.00' Surf.Area= 13 sf Storage= 217 cf

Plug-Flow detention time= 0.0 min calculated for 22.999 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (845.9 - 845.9)

Volume	Invert	Avail.Storage	Storage Description
#1	39.77'	217 cf	**4.00'D x 17.23'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	39.77'	**54.0" Round Culvert** L= 1,012.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 39.77' / 34.94' S= 0.0048 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf

Primary OutFlow Max=129.20 cfs @ 12.07 hrs HW=45.39' TW=40.31' (Dynamic Tailwater)
1=Culvert (Outlet Controls 129.20 cfs @ 8.34 fps)

Summary for Pond DMH A6:

Inflow Area = 60.770 ac, 64.01% Impervious, Inflow Depth > 4.54" for 25 yr event
Inflow = 131.94 cfs @ 12.07 hrs, Volume= 23.006 af
Outflow = 131.93 cfs @ 12.07 hrs, Volume= 23.006 af, Atten= 0%, Lag= 0.0 min
Primary = 131.93 cfs @ 12.07 hrs, Volume= 23.006 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 40.87' @ 12.09 hrs Surf.Area= 13 sf Storage= 76 cf
Flood Elev= 49.50' Surf.Area= 13 sf Storage= 184 cf

Plug-Flow detention time= 0.0 min calculated for 22.999 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (845.9 - 845.9)

Volume	Invert	Avail.Storage	Storage Description
#1	34.84'	184 cf	**4.00'D x 14.66'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	34.84'	**54.0" Round Culvert** L= 312.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 34.84' / 33.35' S= 0.0048 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf

Primary OutFlow Max=122.63 cfs @ 12.07 hrs HW=40.31' TW=38.04' (Dynamic Tailwater)
1=Culvert (Outlet Controls 122.63 cfs @ 8.06 fps)

Summary for Pond DMH C2: (new Pond)

Inflow Area = 23.400 ac, 61.69% Impervious, Inflow Depth = 2.35" for 25 yr event
Inflow = 48.22 cfs @ 12.10 hrs, Volume= 4.589 af
Outflow = 48.22 cfs @ 12.10 hrs, Volume= 4.589 af, Atten= 0%, Lag= 0.0 min
Primary = 48.22 cfs @ 12.10 hrs, Volume= 4.589 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 69.47' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	36.00'	**24.0" Round Culvert** L= 370.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 36.00' / 33.72' S= 0.0062 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=47.87 cfs @ 12.10 hrs HW=69.29' TW=45.82' (Dynamic Tailwater)
1=Culvert (Outlet Controls 47.87 cfs @ 15.24 fps)

Summary for Pond F-WQU-4: (new Pond)

Inflow Area = 7.106 ac, 84.03% Impervious, Inflow Depth = 4.97" for 25 yr event
Inflow = 35.36 cfs @ 12.09 hrs, Volume= 2.945 af
Outflow = 35.33 cfs @ 12.08 hrs, Volume= 2.945 af, Atten= 0%, Lag= 0.0 min
Primary = 35.33 cfs @ 12.08 hrs, Volume= 2.945 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 325.73' @ 12.08 hrs Surf.Area= 13 sf Storage= 75 cf

Plug-Flow detention time= 0.1 min calculated for 2.945 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (752.9 - 752.8)

Volume	Invert	Avail.Storage	Storage Description
#1	40.51'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	40.51'	**15.0" Round RCP_Round 15"** L= 335.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 40.51' / 39.83' S= 0.0020 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf

Primary OutFlow Max=35.52 cfs @ 12.08 hrs HW=325.17' TW=236.80' (Dynamic Tailwater)
↑**1=RCP_Round 15"** (Outlet Controls 35.52 cfs @ 28.94 fps)

Summary for Pond MT-11A:

Inflow Area = 1.230 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af
Outflow = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af, Atten= 0%, Lag= 0.0 min
Primary = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 416.62' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	33.75'	**18.0" Round RCP_Round 18"** L= 104.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 33.75' / 33.47' S= 0.0027 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=7.46 cfs @ 12.06 hrs HW=35.51' TW=34.73' (Dynamic Tailwater)
1=RCP_Round 18" (Barrel Controls 7.46 cfs @ 4.53 fps)

Summary for Pond MT-16:

Inflow Area = 1.230 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af
Outflow = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af, Atten= 0%, Lag= 0.0 min
Primary = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 416.01' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	33.42'	**24.0" Round RCP_Round 24"** L= 74.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 33.42' / 32.87' S= 0.0074 '/' Cc= 0.900 n= 0.010 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=7.37 cfs @ 12.06 hrs HW=34.73' TW=34.09' (Dynamic Tailwater)
1=RCP_Round 24" (Outlet Controls 7.37 cfs @ 4.82 fps)

Summary for Pond MT-24:

Inflow Area = 1.230 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af
Outflow = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af, Atten= 0%, Lag= 0.0 min
Primary = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 415.91' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	32.61'	**24.0" Round RCP_Round 24"** L= 145.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 32.61' / 32.10' S= 0.0035 '/' Cc= 0.900 n= 0.010 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=7.45 cfs @ 12.06 hrs HW=34.09' TW=33.51' (Dynamic Tailwater)
1=RCP_Round 24" (Outlet Controls 7.45 cfs @ 4.15 fps)

Summary for Pond MT-25:

Inflow Area = 1.230 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af
Outflow = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af, Atten= 0%, Lag= 0.0 min
Primary = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 415.72' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	31.95'	**24.0" Round CMP_Round 24"** L= 74.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 31.95' / 31.80' S= 0.0020 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=7.02 cfs @ 12.06 hrs HW=33.51' TW=33.13' (Dynamic Tailwater)
1=CMP_Round 24" (Outlet Controls 7.02 cfs @ 3.68 fps)

Summary for Pond MT-26:

Inflow Area = 1.230 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af
Outflow = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af, Atten= 0%, Lag= 0.0 min
Primary = 7.48 cfs @ 12.06 hrs, Volume= 0.570 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 415.59' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	31.00'	**24.0" Round CMP_Round 24"** L= 20.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 31.00' / 30.50' S= 0.0250 '/' Cc= 0.900 n= 0.010 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=7.48 cfs @ 12.06 hrs HW=33.13' TW=32.98' (Dynamic Tailwater)
1=CMP_Round 24" (Outlet Controls 7.48 cfs @ 2.78 fps)

Summary for Pond Outfall 1: Outfall 1

Inflow Area = 26.094 ac, 75.02% Impervious, Inflow Depth = 5.07" for 25 yr event
Inflow = 47.09 cfs @ 11.86 hrs, Volume= 11.027 af
Primary = 47.09 cfs @ 11.86 hrs, Volume= 11.027 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Summary for Pond P-4:

Inflow Area = 218.889 ac, 46.46% Impervious, Inflow Depth > 4.17" for 25 yr event
Inflow = 480.60 cfs @ 12.09 hrs, Volume= 76.088 af
Outflow = 236.89 cfs @ 12.70 hrs, Volume= 76.086 af, Atten= 51%, Lag= 36.4 min
Primary = 236.89 cfs @ 12.70 hrs, Volume= 76.086 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 39.61' @ 12.65 hrs Surf.Area= 49,664 sf Storage= 235,932 cf

Plug-Flow detention time= 5.0 min calculated for 76.061 af (100% of inflow)
Center-of-Mass det. time= 5.0 min (829.7 - 824.7)

Volume	Invert	Avail.Storage	Storage Description
#1	25.73'	533,906 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
25.73	100	0	0
28.00	317	473	473
30.00	2,959	3,276	3,749
32.00	9,123	12,082	15,831
34.00	19,699	28,822	44,653
36.00	29,551	49,250	93,903
38.00	40,123	69,674	163,577
40.00	51,963	92,086	255,663
42.00	65,802	117,765	373,428
44.00	94,676	160,478	533,906

Device	Routing	Invert	Outlet Devices
#1	Primary	26.00'	**60.0" Round Culvert** L= 200.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 26.00' / 25.10' S= 0.0045 '/' Cc= 0.900 n= 0.013, Flow Area= 19.63 sf

Primary OutFlow Max=235.46 cfs @ 12.70 hrs HW=39.55' TW=35.22' (Dynamic Tailwater)
1=Culvert (Outlet Controls 235.46 cfs @ 11.99 fps)

Summary for Pond P-5:

Inflow Area = 1.846 ac, 66.63% Impervious, Inflow Depth = 4.78" for 25 yr event
Inflow = 10.01 cfs @ 12.05 hrs, Volume= 0.735 af
Outflow = 14.72 cfs @ 12.07 hrs, Volume= 0.637 af, Atten= 0%, Lag= 1.1 min
Primary = 14.72 cfs @ 12.07 hrs, Volume= 0.637 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 415.43' @ 12.07 hrs Surf.Area= 5,500 sf Storage= 9,952 cf

Plug-Flow detention time= 148.9 min calculated for 0.637 af (87% of inflow)
Center-of-Mass det. time= 88.0 min (849.6 - 761.5)

Volume	Invert	Avail.Storage	Storage Description
#1	30.50'	9,952 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
30.50	2,833	314.0	0	0	2,833
31.00	3,240	326.0	1,517	1,517	3,465
31.50	3,680	334.0	1,729	3,246	3,916
32.00	4,073	343.0	1,937	5,183	4,430
33.00	5,500	450.0	4,769	9,952	11,194

Device	Routing	Invert	Outlet Devices
#1	Primary	28.10'	**6.0" Round Culvert** L= 7.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 28.10' / 28.00' S= 0.0143 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#2	Device 1	32.00'	**2.3" x 2.3" Horiz. Orifice/Grate X 6.00 columns** X 6 rows C= 0.600 in 24.0" x 24.0" Grate (33% open area) Limited to weir flow at low heads
#3	Device 1	30.50'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=14.29 cfs @ 12.07 hrs HW=394.87' (Free Discharge)
↑**1=Culvert** (Inlet Controls 14.29 cfs @ 72.78 fps)
↑**2=Orifice/Grate** (Passes < 121.30 cfs potential flow)
3=Exfiltration (Passes < 0.06 cfs potential flow)

Summary for Pond P-67A:

Inflow Area = 2.950 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 17.37 cfs @ 12.07 hrs, Volume= 1.367 af
Outflow = 22.77 cfs @ 12.06 hrs, Volume= 1.367 af, Atten= 0%, Lag= 0.0 min
Primary = 9.68 cfs @ 12.34 hrs, Volume= 1.116 af
Secondary = 20.28 cfs @ 12.10 hrs, Volume= 0.304 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.56' @ 12.24 hrs Surf.Area= 10,000 sf Storage= 2,951 cf

Plug-Flow detention time= 2.2 min calculated for 1.367 af (100% of inflow)
Center-of-Mass det. time= 2.2 min (747.0 - 744.7)

Volume	Invert	Avail.Storage	Storage Description
#1	56.01'	2,951 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
56.01	4	0	0
56.50	10,000	2,451	2,451
56.55	10,000	500	2,951

Device	Routing	Invert	Outlet Devices
#1	Primary	56.01'	**1.8" x 9.6" Horiz. Orifice/Grate X 20.00** C= 0.600 Limited to weir flow at low heads
#2	Secondary	56.50'	**110.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 12.34 hrs HW=57.45' TW=57.53' (Dynamic Tailwater)
1=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 12.10 hrs HW=56.70' TW=56.73' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond P-CB17: (new Pond)

Inflow Area = 8.466 ac, 34.59% Impervious, Inflow Depth > 1.42" for 25 yr event
Inflow = 1.04 cfs @ 13.26 hrs, Volume= 0.999 af
Outflow = 1.04 cfs @ 13.26 hrs, Volume= 0.999 af, Atten= 0%, Lag= 0.0 min
Primary = 1.04 cfs @ 13.26 hrs, Volume= 0.999 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 62.36' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	61.53'	**18.0" Round Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 61.53' / 61.19' S= 0.0113 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.04 cfs @ 13.26 hrs HW=62.14' TW=61.94' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.04 cfs @ 2.30 fps)

Summary for Pond P-CB18: (new Pond)

Inflow Area = 8.546 ac, 35.20% Impervious, Inflow Depth > 1.46" for 25 yr event
Inflow = 1.09 cfs @ 12.03 hrs, Volume= 1.036 af
Outflow = 1.09 cfs @ 12.03 hrs, Volume= 1.036 af, Atten= 0%, Lag= 0.0 min
Primary = 1.09 cfs @ 12.03 hrs, Volume= 1.036 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 62.35' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	61.14'	**18.0" Round Culvert** L= 40.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 61.14' / 60.57' S= 0.0143 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.00 cfs @ 12.03 hrs HW=62.18' TW=62.14' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.00 cfs @ 1.08 fps)

Summary for Pond P-DMH1: (new Pond)

Inflow Area = 9.906 ac, 42.68% Impervious, Inflow Depth > 1.99" for 25 yr event
Inflow = 8.02 cfs @ 12.09 hrs, Volume= 1.644 af
Outflow = 8.02 cfs @ 12.09 hrs, Volume= 1.644 af, Atten= 0%, Lag= 0.0 min
Primary = 8.02 cfs @ 12.09 hrs, Volume= 1.644 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 62.35' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	60.57'	**24.0" Round Culvert** L= 305.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 60.57' / 59.84' S= 0.0024 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=8.01 cfs @ 12.09 hrs HW=62.34' TW=61.40' (Dynamic Tailwater)
1=Culvert (Outlet Controls 8.01 cfs @ 3.62 fps)

Summary for Pond P-JB3A: (new Pond)

Inflow Area = 8.396 ac, 34.04% Impervious, Inflow Depth > 4.61" for 25 yr event
Inflow = 17.52 cfs @ 12.56 hrs, Volume= 3.224 af
Outflow = 9.20 cfs @ 13.13 hrs, Volume= 2.761 af, Atten= 48%, Lag= 33.9 min
Primary = 1.01 cfs @ 13.26 hrs, Volume= 0.967 af
Secondary = 8.19 cfs @ 13.12 hrs, Volume= 1.794 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 62.50' @ 13.12 hrs Surf.Area= 102,099 sf Storage= 60,630 cf

Plug-Flow detention time= 222.0 min calculated for 2.760 af (86% of inflow)
Center-of-Mass det. time= 154.9 min (971.3 - 816.3)

Volume	Invert	Avail.Storage	Storage Description
#1	61.75'	113,625 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
61.75	1,000	0	0
62.00	92,000	11,625	11,625
63.00	112,000	102,000	113,625

Device	Routing	Invert	Outlet Devices
#1	Primary	61.75'	**18.0" Round Culvert** L= 40.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 61.75' / 61.09' S= 0.0165 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Secondary	62.16'	**15.0' long x 50.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Device 1	61.75'	**8.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=1.01 cfs @ 13.26 hrs HW=62.50' TW=62.14' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 1.01 cfs of 1.87 cfs potential flow)
↑—**3=Orifice/Grate** (Orifice Controls 1.01 cfs @ 2.90 fps)

Secondary OutFlow Max=8.19 cfs @ 13.12 hrs HW=62.50' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 8.19 cfs @ 1.58 fps)

Summary for Pond P-JB3B: (new Pond)

Inflow Area = 2.750 ac, 81.82% Impervious, Inflow Depth = 5.21" for 25 yr event
Inflow = 16.52 cfs @ 12.04 hrs, Volume= 1.193 af
Outflow = 6.47 cfs @ 12.21 hrs, Volume= 1.193 af, Atten= 61%, Lag= 9.9 min
Primary = 6.47 cfs @ 12.21 hrs, Volume= 1.193 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 72.30' @ 12.21 hrs Surf.Area= 7,150 sf Storage= 10,022 cf

Plug-Flow detention time= 20.0 min calculated for 1.193 af (100% of inflow)
Center-of-Mass det. time= 20.0 min (771.8 - 751.8)

Volume	Invert	Avail.Storage	Storage Description
#1	70.40'	15,150 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
70.40	0	0	0
71.00	5,500	1,650	1,650
72.00	7,000	6,250	7,900
73.00	7,500	7,250	15,150

Device	Routing	Invert	Outlet Devices
#1	Primary	70.40'	**15.0" Round Culvert** L= 40.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 70.40' / 70.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=6.47 cfs @ 12.21 hrs HW=72.30' TW=62.22' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 6.47 cfs @ 5.27 fps)

Summary for Pond P-WQU5: (new Pond)

Inflow Area = 1.360 ac, 89.71% Impervious, Inflow Depth = 5.36" for 25 yr event
Inflow = 7.27 cfs @ 12.10 hrs, Volume= 0.607 af
Outflow = 7.27 cfs @ 12.10 hrs, Volume= 0.607 af, Atten= 0%, Lag= 0.0 min
Primary = 7.27 cfs @ 12.10 hrs, Volume= 0.607 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 63.09' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	61.60'	**18.0" Round Culvert** L= 24.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 61.60' / 60.57' S= 0.0429 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=7.21 cfs @ 12.10 hrs HW=63.09' TW=62.34' (Dynamic Tailwater)
1=Culvert (Outlet Controls 7.21 cfs @ 5.11 fps)

Summary for Pond PA-100:

Inflow Area = 15.461 ac, 35.16% Impervious, Inflow Depth > 4.84" for 25 yr event
Inflow = 30.82 cfs @ 12.67 hrs, Volume= 6.241 af
Outflow = 10.99 cfs @ 13.50 hrs, Volume= 6.241 af, Atten= 64%, Lag= 49.8 min
Primary = 10.99 cfs @ 13.50 hrs, Volume= 6.402 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 66.97' @ 13.57 hrs Surf.Area= 30,013 sf Storage= 31,264 cf
Flood Elev= 60.84' Surf.Area= 13 sf Storage= 64 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 25.9 min (950.4 - 924.6)

Volume	Invert	Avail.Storage	Storage Description
#1	55.77'	64 cf	**4.00'D x 5.07'H Vertical Cone/Cylinder**
#2	60.84'	31,200 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		31,264 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
60.84	0	0	0
61.34	1,600	400	400
62.34	15,000	8,300	8,700
63.34	30,000	22,500	31,200

Device	Routing	Invert	Outlet Devices
#1	Primary	55.77'	**18.0" Round Culvert** L= 403.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 55.77' / 53.59' S= 0.0054 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=8.11 cfs @ 13.50 hrs HW=66.83' TW=63.93' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 8.11 cfs @ 4.59 fps)

Summary for Pond PA-101:

Inflow Area = 14.161 ac, 34.86% Impervious, Inflow Depth > 4.87" for 25 yr event
Inflow = 23.58 cfs @ 12.08 hrs, Volume= 5.742 af
Outflow = 29.89 cfs @ 12.67 hrs, Volume= 5.742 af, Atten= 0%, Lag= 35.4 min
Primary = 29.89 cfs @ 12.67 hrs, Volume= 5.742 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 159.01' @ 12.67 hrs Surf.Area= 40,013 sf Storage= 52,286 cf
Flood Elev= 60.97' Surf.Area= 13 sf Storage= 36 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 87.1 min (937.1 - 850.0)

Volume	Invert	Avail.Storage	Storage Description
#1	58.10'	36 cf	**4.00'D x 2.87'H Vertical Cone/Cylinder**
#2	60.97'	52,250 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		52,286 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
60.97	0	0	0
61.47	3,000	750	750
62.47	30,000	16,500	17,250
63.47	40,000	35,000	52,250

Device	Routing	Invert	Outlet Devices
#1	Primary	58.10'	**15.0" Round Culvert** L= 386.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 58.10' / 55.94' S= 0.0056 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=29.46 cfs @ 12.67 hrs HW=156.41' TW=62.42' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 29.46 cfs @ 24.01 fps)

Summary for Pond PA-10TEE: Volume from A-10

Inflow Area = 31.147 ac, 50.75% Impervious, Inflow Depth = 5.12" for 25 yr event
Inflow = 77.40 cfs @ 12.40 hrs, Volume= 13.284 af
Outflow = 69.48 cfs @ 12.40 hrs, Volume= 13.284 af, Atten= 10%, Lag= 0.1 min
Primary = 69.48 cfs @ 12.40 hrs, Volume= 13.284 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 90.84' @ 12.11 hrs Surf.Area= 13 sf Storage= 121 cf
Flood Elev= 55.47' Surf.Area= 13 sf Storage= 121 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (807.5 - 807.4)

Volume	Invert	Avail.Storage	Storage Description
#1	45.83'	121 cf	**4.00'D x 9.64'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	45.83'	**42.0" Round Culvert** L= 62.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.83' / 45.47' S= 0.0058 '/' Cc= 0.900 n= 0.013, Flow Area= 9.62 sf

Primary OutFlow Max=0.00 cfs @ 12.40 hrs HW=52.03' TW=52.85' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-11:

Inflow Area = 31.147 ac, 50.75% Impervious, Inflow Depth = 5.12" for 25 yr event
Inflow = 77.33 cfs @ 12.40 hrs, Volume= 13.284 af
Outflow = 77.40 cfs @ 12.40 hrs, Volume= 13.284 af, Atten= 0%, Lag= 0.0 min
Primary = 77.40 cfs @ 12.40 hrs, Volume= 13.284 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 86.18' @ 12.11 hrs Surf.Area= 13 sf Storage= 153 cf
Flood Elev= 58.92' Surf.Area= 13 sf Storage= 153 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (807.4 - 807.4)

Volume	Invert	Avail.Storage	Storage Description
#1	46.72'	153 cf	**4.00'D x 12.20'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	46.72'	**42.0" Round Culvert** L= 154.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 46.72' / 45.83' S= 0.0058 '/' Cc= 0.900 n= 0.013, Flow Area= 9.62 sf

Primary OutFlow Max=40.27 cfs @ 12.40 hrs HW=52.55' TW=51.79' (Dynamic Tailwater)
1=Culvert (Inlet Controls 40.27 cfs @ 4.19 fps)

Summary for Pond PA-12:

Inflow Area = 26.446 ac, 48.58% Impervious, Inflow Depth = 5.11" for 25 yr event
Inflow = 76.17 cfs @ 13.07 hrs, Volume= 11.255 af
Outflow = 48.67 cfs @ 13.55 hrs, Volume= 11.255 af, Atten= 36%, Lag= 28.9 min
Primary = 48.67 cfs @ 13.55 hrs, Volume= 11.274 af
Secondary = 23.38 cfs @ 12.59 hrs, Volume= 0.022 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 60.73' @ 12.59 hrs Surf.Area= 5,013 sf Storage= 1,383 cf
Flood Elev= 57.49' Surf.Area= 13 sf Storage= 108 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (813.3 - 813.2)

Volume	Invert	Avail.Storage	Storage Description
#1	48.91'	108 cf	**4.00'D x 8.58'H Vertical Cone/Cylinder**
#2	57.49'	1,275 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		1,383 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
57.49	0	0	0
58.00	5,000	1,275	1,275

Device	Routing	Invert	Outlet Devices
#1	Primary	48.91'	**30.0" Round Culvert** L= 394.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 48.91' / 47.02' S= 0.0048 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Secondary	58.00'	**10.0' long x 50.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=46.16 cfs @ 13.55 hrs HW=57.30' TW=50.24' (Dynamic Tailwater)
1=Culvert (Outlet Controls 46.16 cfs @ 9.40 fps)

Secondary OutFlow Max=118.44 cfs @ 12.59 hrs HW=60.73' TW=50.81' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 118.44 cfs @ 4.34 fps)

Summary for Pond PA-13:

Inflow Area = 25.266 ac, 49.03% Impervious, Inflow Depth = 5.13" for 25 yr event
Inflow = 76.22 cfs @ 12.83 hrs, Volume= 10.812 af
Outflow = 75.17 cfs @ 13.07 hrs, Volume= 10.812 af, Atten= 1%, Lag= 14.4 min
Primary = 49.66 cfs @ 13.48 hrs, Volume= 10.412 af
Secondary = 39.78 cfs @ 13.17 hrs, Volume= 0.414 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 60.82' @ 13.17 hrs Surf.Area= 1,513 sf Storage= 466 cf
Flood Elev= 59.01' Surf.Area= 13 sf Storage= 98 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (814.1 - 814.0)

Volume	Invert	Avail.Storage	Storage Description
#1	51.21'	98 cf	**4.00'D x 7.80'H Vertical Cone/Cylinder**
#2	59.01'	368 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		466 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
59.01	0	0	0
59.50	1,500	368	368

Device	Routing	Invert	Outlet Devices
#1	Primary	51.21'	**30.0" Round Culvert** L= 297.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.21' / 49.12' S= 0.0070 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#2	Secondary	59.50'	**10.0' long x 50.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=25.34 cfs @ 13.48 hrs HW=59.12' TW=57.37' (Dynamic Tailwater)
1=Culvert (Outlet Controls 25.34 cfs @ 5.16 fps)

Secondary OutFlow Max=38.40 cfs @ 13.17 hrs HW=60.78' TW=57.89' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 38.40 cfs @ 2.99 fps)

Summary for Pond PA-14:

Inflow Area = 23.746 ac, 48.46% Impervious, Inflow Depth = 5.16" for 25 yr event
Inflow = 71.57 cfs @ 12.83 hrs, Volume= 10.212 af
Outflow = 73.58 cfs @ 12.83 hrs, Volume= 10.212 af, Atten= 0%, Lag= 0.0 min
Primary = 73.58 cfs @ 12.83 hrs, Volume= 10.212 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 82.08' @ 12.83 hrs Surf.Area= 13 sf Storage= 73 cf
Flood Elev= 58.86' Surf.Area= 13 sf Storage= 73 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (815.0 - 814.9)

Volume	Invert	Avail.Storage	Storage Description
#1	53.09'	73 cf	**4.00'D x 5.77'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	53.09'	**30.0" Round Culvert** L= 515.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 53.09' / 51.24' S= 0.0036 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=72.69 cfs @ 12.83 hrs HW=81.94' TW=60.60' (Dynamic Tailwater)
1=Culvert (Outlet Controls 72.69 cfs @ 14.81 fps)

Summary for Pond PA-14R: TO BE FIXED

Inflow Area = 4.530 ac, 49.67% Impervious, Inflow Depth = 7.60" for 25 yr event
Inflow = 31.66 cfs @ 12.97 hrs, Volume= 2.870 af
Outflow = 38.66 cfs @ 13.23 hrs, Volume= 2.870 af, Atten= 0%, Lag= 15.6 min
Primary = 38.66 cfs @ 13.23 hrs, Volume= 2.932 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 81.12' @ 13.06 hrs Surf.Area= 30,000 sf Storage= 21,761 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 12.4 min (810.9 - 798.5)

Volume	Invert	Avail.Storage	Storage Description
#1	58.86'	21,761 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
58.86	4	0	0
59.00	300	21	21
60.00	12,300	6,300	6,321
60.73	30,000	15,439	21,761

Device	Routing	Invert	Outlet Devices
#1	Primary	58.86'	**1.4" x 3.5" Horiz. Orifice/Grate X 8.00 columns** X 6 rows C= 0.600 Limited to weir flow at low heads
#2	Primary	59.74'	**1.4" x 3.5" Horiz. Orifice/Grate X 8.00 columns** X 6 rows C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 13.23 hrs HW=73.82' TW=75.14' (Dynamic Tailwater)
1=Orifice/Grate (Controls 0.00 cfs)
2=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond PA-15:

Inflow Area = 19.216 ac, 48.17% Impervious, Inflow Depth = 4.55" for 25 yr event
Inflow = 34.82 cfs @ 12.48 hrs, Volume= 7.279 af
Outflow = 35.68 cfs @ 12.83 hrs, Volume= 7.279 af, Atten= 0%, Lag= 21.0 min
Primary = 35.68 cfs @ 12.83 hrs, Volume= 7.279 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 78.43' @ 13.06 hrs Surf.Area= 13 sf Storage= 72 cf
Flood Elev= 59.74' Surf.Area= 13 sf Storage= 72 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (816.9 - 816.9)

Volume	Invert	Avail.Storage	Storage Description
#1	53.99'	72 cf	**4.00'D x 5.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	53.99'	**30.0" Round Culvert** L= 330.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 53.99' / 53.09' S= 0.0027 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=0.00 cfs @ 12.83 hrs HW=76.55' TW=81.78' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-15R: (new Pond)

Inflow Area = 2.900 ac, 31.03% Impervious, Inflow Depth = 6.62" for 25 yr event
Inflow = 17.75 cfs @ 12.64 hrs, Volume= 1.599 af
Outflow = 32.66 cfs @ 13.07 hrs, Volume= 1.599 af, Atten= 0%, Lag= 25.5 min
Primary = 12.16 cfs @ 13.07 hrs, Volume= 1.339 af
Secondary = 24.85 cfs @ 12.97 hrs, Volume= 1.143 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 61.71' @ 12.96 hrs Surf.Area= 14,909 sf Storage= 19,048 cf

Plug-Flow detention time= 17.9 min calculated for 1.599 af (100% of inflow)
Center-of-Mass det. time= 17.9 min (816.0 - 798.1)

Volume	Invert	Avail.Storage	Storage Description
#1	59.74'	19,500 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
59.74	0	0	0
60.74	12,000	6,000	6,000
61.74	15,000	13,500	19,500

Device	Routing	Invert	Outlet Devices
#1	Secondary	60.74'	**10.0' long x 50.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	59.74'	**1.4" x 3.5" Horiz. Orifice/Grate X 8.00 columns** X 6 rows C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 13.07 hrs HW=61.63' TW=69.87' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 12.97 hrs HW=61.70' TW=61.85' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond PA-16:

Inflow Area = 16.316 ac, 51.22% Impervious, Inflow Depth = 4.37" for 25 yr event
Inflow = 25.29 cfs @ 12.33 hrs, Volume= 5.941 af
Outflow = 25.99 cfs @ 12.48 hrs, Volume= 5.941 af, Atten= 0%, Lag= 9.0 min
Primary = 25.99 cfs @ 12.48 hrs, Volume= 5.941 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 82.31' @ 12.84 hrs Surf.Area= 13 sf Storage= 74 cf
Flood Elev= 61.67' Surf.Area= 13 sf Storage= 74 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (814.3 - 814.3)

Volume	Invert	Avail.Storage	Storage Description
#1	55.77'	74 cf	**4.00'D x 5.90'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	55.77'	**24.0" Round Culvert** L= 290.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 55.77' / 54.29' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=22.18 cfs @ 12.48 hrs HW=67.52' TW=63.56' (Dynamic Tailwater)
1=Culvert (Outlet Controls 22.18 cfs @ 7.06 fps)

Summary for Pond PA-16R: (new Pond)

Inflow Area = 5.240 ac, 50.00% Impervious, Inflow Depth = 4.58" for 25 yr event
Inflow = 13.07 cfs @ 12.54 hrs, Volume= 2.001 af
Outflow = 18.50 cfs @ 12.68 hrs, Volume= 2.001 af, Atten= 0%, Lag= 8.4 min
Primary = 8.09 cfs @ 12.74 hrs, Volume= 1.472 af
Secondary = 11.52 cfs @ 12.67 hrs, Volume= 0.582 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 62.74' @ 12.67 hrs Surf.Area= 13,701 sf Storage= 10,284 cf

Plug-Flow detention time= 7.0 min calculated for 2.000 af (100% of inflow)
Center-of-Mass det. time= 7.0 min (810.5 - 803.5)

Volume	Invert	Avail.Storage	Storage Description
#1	61.67'	16,500 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
61.67	0	0	0
62.17	12,000	3,000	3,000
63.17	15,000	13,500	16,500

Device	Routing	Invert	Outlet Devices
#1	Secondary	62.17'	**10.0' long x 50.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	61.67'	**1.4" x 3.5" Horiz. Orifice/Grate X 8.00 columns** X 6 rows C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 12.74 hrs HW=62.68' TW=64.37' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=11.49 cfs @ 12.67 hrs HW=62.74' TW=61.38' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 11.49 cfs @ 2.03 fps)

Summary for Pond PA-17:

Inflow Area = 11.076 ac, 51.80% Impervious, Inflow Depth = 4.84" for 25 yr event
Inflow = 23.33 cfs @ 12.96 hrs, Volume= 4.468 af
Outflow = 19.23 cfs @ 12.28 hrs, Volume= 4.468 af, Atten= 18%, Lag= 0.0 min
Primary = 19.23 cfs @ 12.28 hrs, Volume= 4.468 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 77.29' @ 12.84 hrs Surf.Area= 13 sf Storage= 94 cf
Flood Elev= 64.46' Surf.Area= 13 sf Storage= 94 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (810.3 - 810.2)

Volume	Invert	Avail.Storage	Storage Description
#1	57.01'	94 cf	**4.00'D x 7.45'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	57.01'	**24.0" Round Culvert** L= 297.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 57.01' / 55.92' S= 0.0037 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=20.56 cfs @ 12.28 hrs HW=66.44' TW=62.98' (Dynamic Tailwater)
1=Culvert (Outlet Controls 20.56 cfs @ 6.54 fps)

Summary for Pond PA-19:

Inflow Area = 11.076 ac, 51.80% Impervious, Inflow Depth = 4.84" for 25 yr event
Inflow = 27.38 cfs @ 13.03 hrs, Volume= 4.465 af
Outflow = 23.30 cfs @ 12.96 hrs, Volume= 4.465 af, Atten= 15%, Lag= 0.0 min
Primary = 23.33 cfs @ 12.96 hrs, Volume= 4.468 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 83.07' @ 12.85 hrs Surf.Area= 13 sf Storage= 104 cf
Flood Elev= 67.20' Surf.Area= 13 sf Storage= 104 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (810.2 - 810.1)

Volume	Invert	Avail.Storage	Storage Description
#1	58.90'	104 cf	**4.00'D x 8.30'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	58.90'	**24.0" Round Culvert** L= 295.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 58.90' / 57.16' S= 0.0059 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=18.75 cfs @ 12.96 hrs HW=71.08' TW=68.22' (Dynamic Tailwater)
1=Culvert (Outlet Controls 18.75 cfs @ 5.97 fps)

Summary for Pond PA-20TEE: STORAGE FROM A-20

Inflow Area = 11.076 ac, 51.80% Impervious, Inflow Depth = 4.84" for 25 yr event
Inflow = 20.27 cfs @ 13.00 hrs, Volume= 4.465 af
Outflow = 27.38 cfs @ 13.03 hrs, Volume= 4.465 af, Atten= 0%, Lag= 1.8 min
Primary = 27.38 cfs @ 13.03 hrs, Volume= 4.465 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 80.36' @ 13.25 hrs Surf.Area= 13 sf Storage= 73 cf
Flood Elev= 65.25' Surf.Area= 13 sf Storage= 73 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (810.1 - 810.1)

Volume	Invert	Avail.Storage	Storage Description
#1	59.46'	73 cf	**4.00'D x 5.79'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	59.46'	**18.0" Round Culvert** L= 110.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 59.46' / 59.00' S= 0.0042 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=16.85 cfs @ 13.03 hrs HW=76.60' TW=71.65' (Dynamic Tailwater)
1=Culvert (Outlet Controls 16.85 cfs @ 9.53 fps)

Summary for Pond PA-21:

Inflow Area = 11.076 ac, 51.80% Impervious, Inflow Depth = 4.84" for 25 yr event
Inflow = 22.61 cfs @ 13.00 hrs, Volume= 4.465 af
Outflow = 20.27 cfs @ 13.00 hrs, Volume= 4.465 af, Atten= 10%, Lag= 0.0 min
Primary = 20.27 cfs @ 13.00 hrs, Volume= 4.465 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 96.26' @ 13.03 hrs Surf.Area= 13 sf Storage= 63 cf
Flood Elev= 65.39' Surf.Area= 13 sf Storage= 63 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (810.1 - 810.0)

Volume	Invert	Avail.Storage	Storage Description
#1	60.39'	63 cf	**4.00'D x 5.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	60.39'	**18.0" Round Culvert** L= 182.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 60.39' / 59.46' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=16.20 cfs @ 13.00 hrs HW=75.60' TW=69.29' (Dynamic Tailwater)
1=Culvert (Outlet Controls 16.20 cfs @ 9.17 fps)

Summary for Pond PA-22:

Inflow Area = 5.576 ac, 67.02% Impervious, Inflow Depth = 5.30" for 25 yr event
Inflow = 17.57 cfs @ 12.34 hrs, Volume= 2.462 af
Outflow = 17.71 cfs @ 12.34 hrs, Volume= 2.462 af, Atten= 0%, Lag= 0.0 min
Primary = 17.71 cfs @ 12.34 hrs, Volume= 2.462 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 95.52' @ 12.32 hrs Surf.Area= 13 sf Storage= 55 cf
Flood Elev= 66.66' Surf.Area= 13 sf Storage= 55 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (783.0 - 782.9)

Volume	Invert	Avail.Storage	Storage Description
#1	62.26'	55 cf	**4.00'D x 4.40'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	62.26'	**18.0" Round Culvert** L= 295.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 62.26' / 60.51' S= 0.0059 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=18.16 cfs @ 12.34 hrs HW=92.56' TW=81.26' (Dynamic Tailwater)
1=Culvert (Outlet Controls 18.16 cfs @ 10.28 fps)

Summary for Pond PA-23:

Inflow Area = 68.444 ac, 11.94% Impervious, Inflow Depth > 3.40" for 25 yr event
Inflow = 95.56 cfs @ 13.96 hrs, Volume= 19.384 af
Outflow = 103.56 cfs @ 13.48 hrs, Volume= 19.384 af, Atten= 0%, Lag= 0.0 min
Primary = 103.56 cfs @ 13.48 hrs, Volume= 19.384 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 76.10' @ 13.17 hrs Surf.Area= 13 sf Storage= 127 cf
Flood Elev= 51.00' Surf.Area= 13 sf Storage= 127 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (871.0 - 871.0)

Volume	Invert	Avail.Storage	Storage Description
#1	40.90'	127 cf	**4.00'D x 10.10'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	40.90'	**30.0" Round Culvert** L= 440.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 40.90' / 20.40' S= 0.0466 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=102.48 cfs @ 13.48 hrs HW=73.08' TW=35.36' (Dynamic Tailwater)
1=Culvert (Outlet Controls 102.48 cfs @ 20.88 fps)

Summary for Pond PA-24:

Inflow Area = 68.444 ac, 11.94% Impervious, Inflow Depth > 3.11" for 25 yr event
Inflow = 81.78 cfs @ 13.80 hrs, Volume= 17.759 af
Outflow = 104.21 cfs @ 13.96 hrs, Volume= 17.769 af, Atten= 0%, Lag= 10.1 min
Primary = 95.56 cfs @ 13.96 hrs, Volume= 19.384 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 74.16' @ 13.09 hrs Surf.Area= 6,890 sf Storage= 2,795 cf
Flood Elev= 49.47' Surf.Area= 13 sf Storage= 102 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (877.2 - 877.0)

Volume	Invert	Avail.Storage	Storage Description
#1	41.37'	102 cf	**4.00'D x 8.10'H Vertical Cone/Cylinder**
#2	49.47'	2,694 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		2,795 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
49.47	0	0	0
50.00	1,116	296	296
50.60	6,877	2,398	2,694

Device	Routing	Invert	Outlet Devices
#1	Primary	41.37'	**36.0" Round Culvert** L= 74.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 41.37' / 40.90' S= 0.0064 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf

Primary OutFlow Max=0.00 cfs @ 13.96 hrs HW=50.26' TW=60.58' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond PA-25:

Inflow Area = 55.844 ac, 11.41% Impervious, Inflow Depth > 3.21" for 25 yr event
Inflow = 77.16 cfs @ 13.79 hrs, Volume= 14.954 af
Outflow = 72.39 cfs @ 13.80 hrs, Volume= 14.954 af, Atten= 6%, Lag= 0.2 min
Primary = 72.39 cfs @ 13.80 hrs, Volume= 14.954 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 78.36' @ 12.69 hrs Surf.Area= 13 sf Storage= 136 cf
Flood Elev= 53.71' Surf.Area= 13 sf Storage= 136 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (880.4 - 880.4)

Volume	Invert	Avail.Storage	Storage Description
#1	42.91'	136 cf	**4.00'D x 10.80'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	42.91'	**36.0" Round Culvert** L= 333.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 42.91' / 41.57' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf

Primary OutFlow Max=60.16 cfs @ 13.80 hrs HW=54.79' TW=50.39' (Dynamic Tailwater)
1=Culvert (Outlet Controls 60.16 cfs @ 8.51 fps)

Summary for Pond PA-26:

Inflow Area = 8.310 ac, 52.11% Impervious, Inflow Depth = 4.67" for 25 yr event
Inflow = 24.77 cfs @ 12.57 hrs, Volume= 3.236 af
Outflow = 22.82 cfs @ 12.56 hrs, Volume= 3.237 af, Atten= 8%, Lag= 0.0 min
Primary = 22.82 cfs @ 12.56 hrs, Volume= 3.243 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 75.10' @ 13.10 hrs Surf.Area= 13 sf Storage= 114 cf
Flood Elev= 53.60' Surf.Area= 13 sf Storage= 114 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (802.6 - 802.5)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	114 cf	**4.00'D x 9.10'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	44.50'	**30.0" Round Culvert** L= 198.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.50' / 43.11' S= 0.0070 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=0.00 cfs @ 12.56 hrs HW=48.02' TW=51.48' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-27TEE: Volume from A-27

Inflow Area = 6.360 ac, 48.43% Impervious, Inflow Depth = 4.59" for 25 yr event
Inflow = 19.65 cfs @ 12.72 hrs, Volume= 2.434 af
Outflow = 20.42 cfs @ 12.57 hrs, Volume= 2.435 af, Atten= 0%, Lag= 0.0 min
Primary = 20.42 cfs @ 12.57 hrs, Volume= 2.446 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 79.22' @ 12.70 hrs Surf.Area= 13 sf Storage= 107 cf
Flood Elev= 54.57' Surf.Area= 13 sf Storage= 107 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (809.0 - 808.9)

Volume	Invert	Avail.Storage	Storage Description
#1	46.03'	107 cf	**4.00'D x 8.54'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	46.03'	**30.0" Round Culvert** L= 240.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 46.03' / 44.70' S= 0.0055 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=34.66 cfs @ 12.57 hrs HW=53.03' TW=50.15' (Dynamic Tailwater)
1=Culvert (Outlet Controls 34.66 cfs @ 7.06 fps)

Summary for Pond PA-28A:

Inflow Area = 6.360 ac, 48.43% Impervious, Inflow Depth = 4.57" for 25 yr event
Inflow = 21.24 cfs @ 12.67 hrs, Volume= 2.421 af
Outflow = 19.65 cfs @ 12.72 hrs, Volume= 2.421 af, Atten= 7%, Lag= 3.0 min
Primary = 19.65 cfs @ 12.72 hrs, Volume= 2.434 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 70.45' @ 12.71 hrs Surf.Area= 13 sf Storage= 109 cf
Flood Elev= 55.49' Surf.Area= 13 sf Storage= 109 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (808.8 - 808.7)

Volume	Invert	Avail.Storage	Storage Description
#1	46.79'	109 cf	**4.00'D x 8.70'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	46.79'	**30.0" Round Culvert** L= 153.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 46.79' / 46.13' S= 0.0043 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=8.94 cfs @ 12.72 hrs HW=53.64' TW=53.49' (Dynamic Tailwater)
1=Culvert (Outlet Controls 8.94 cfs @ 1.82 fps)

Summary for Pond PA-29:

Inflow Area = 6.360 ac, 48.43% Impervious, Inflow Depth = 4.56" for 25 yr event
Inflow = 17.76 cfs @ 12.56 hrs, Volume= 2.416 af
Outflow = 21.24 cfs @ 12.67 hrs, Volume= 2.416 af, Atten= 0%, Lag= 6.6 min
Primary = 21.24 cfs @ 12.67 hrs, Volume= 2.421 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 80.14' @ 12.71 hrs Surf.Area= 13 sf Storage= 111 cf
Flood Elev= 56.14' Surf.Area= 13 sf Storage= 111 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (808.6 - 808.4)

Volume	Invert	Avail.Storage	Storage Description
#1	47.34'	111 cf	**4.00'D x 8.80'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	47.34'	**24.0" Round Culvert** L= 90.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 47.34' / 46.89' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=33.10 cfs @ 12.67 hrs HW=58.63' TW=50.94' (Dynamic Tailwater)
1=Culvert (Inlet Controls 33.10 cfs @ 10.54 fps)

Summary for Pond PA-30:

Inflow Area = 4.600 ac, 50.43% Impervious, Inflow Depth = 4.59" for 25 yr event
Inflow = 13.87 cfs @ 12.90 hrs, Volume= 1.761 af
Outflow = 14.83 cfs @ 12.73 hrs, Volume= 1.761 af, Atten= 0%, Lag= 0.0 min
Primary = 14.83 cfs @ 12.73 hrs, Volume= 1.763 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 71.25' @ 12.72 hrs Surf.Area= 13 sf Storage= 107 cf
Flood Elev= 57.24' Surf.Area= 13 sf Storage= 107 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (812.9 - 812.8)

Volume	Invert	Avail.Storage	Storage Description
#1	48.74'	107 cf	**4.00'D x 8.50'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	48.74'	**24.0" Round Culvert** L= 300.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 48.74' / 47.41' S= 0.0044 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=11.63 cfs @ 12.73 hrs HW=55.86' TW=54.91' (Dynamic Tailwater)
1=Culvert (Inlet Controls 11.63 cfs @ 3.70 fps)

Summary for Pond PA-31:

Inflow Area = 2.650 ac, 56.60% Impervious, Inflow Depth = 4.71" for 25 yr event
Inflow = 5.23 cfs @ 12.84 hrs, Volume= 1.040 af
Outflow = 11.74 cfs @ 12.90 hrs, Volume= 1.040 af, Atten= 0%, Lag= 3.6 min
Primary = 11.74 cfs @ 12.90 hrs, Volume= 1.042 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 71.65' @ 12.73 hrs Surf.Area= 13 sf Storage= 103 cf
Flood Elev= 59.19' Surf.Area= 13 sf Storage= 103 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (821.4 - 821.2)

Volume	Invert	Avail.Storage	Storage Description
#1	50.99'	103 cf	**4.00'D x 8.20'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	50.99'	**24.0" Round Culvert** L= 396.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 50.99' / 48.99' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=12.30 cfs @ 12.90 hrs HW=56.58' TW=55.05' (Dynamic Tailwater)
1=Culvert (Outlet Controls 12.30 cfs @ 3.91 fps)

Summary for Pond PA-34:

Inflow Area = 47.534 ac, 4.29% Impervious, Inflow Depth > 2.88" for 25 yr event
Inflow = 51.63 cfs @ 13.04 hrs, Volume= 11.425 af
Outflow = 69.18 cfs @ 13.79 hrs, Volume= 11.425 af, Atten= 0%, Lag= 45.1 min
Primary = 64.32 cfs @ 13.79 hrs, Volume= 11.711 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 78.73' @ 12.70 hrs Surf.Area= 2,513 sf Storage= 1,422 cf
Flood Elev= 52.02' Surf.Area= 13 sf Storage= 87 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.3 min (903.5 - 903.2)

Volume	Invert	Avail.Storage	Storage Description
#1	45.07'	87 cf	**4.00'D x 6.95'H Vertical Cone/Cylinder**
#2	52.02'	1,335 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		1,422 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.02	0	0	0
52.52	1,500	375	375
53.00	2,500	960	1,335

Device	Routing	Invert	Outlet Devices
#1	Primary	45.07'	**30.0" Round Culvert** L= 105.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.07' / 43.25' S= 0.0173 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=21.31 cfs @ 13.79 hrs HW=59.30' TW=58.49' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 21.31 cfs @ 4.34 fps)

Summary for Pond PA-34R: (new Pond)

Volume	Invert	Avail.Storage	Storage Description
#1	52.02'	19,800 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.02	0	0	0
54.00	20,000	19,800	19,800

Device	Routing	Invert	Outlet Devices
#1	Primary	52.02'	**1.4" x 10.0" Horiz. Orifice/Grate X 78.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond PA-35:

Inflow Area = 36.710 ac, 0.00% Impervious, Inflow Depth = 3.14" for 25 yr event
Inflow = 43.07 cfs @ 13.58 hrs, Volume= 9.613 af
Outflow = 45.87 cfs @ 13.49 hrs, Volume= 9.613 af, Atten= 0%, Lag= 0.0 min
Primary = 45.87 cfs @ 13.49 hrs, Volume= 9.613 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 82.15' @ 13.11 hrs Surf.Area= 1,501 sf Storage= 381 cf
Flood Elev= 54.01' Surf.Area= 1 sf Storage= 6 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (895.3 - 895.2)

Volume	Invert	Avail.Storage	Storage Description
#1	45.85'	6 cf	**1.00'D x 8.16'H Vertical Cone/Cylinder**
#2	54.01'	375 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		381 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
54.01	0	0	0
54.51	1,500	375	375

Device	Routing	Invert	Outlet Devices
#1	Primary	45.85'	**24.0" Round Culvert** L= 230.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.85' / 45.12' S= 0.0032 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=38.27 cfs @ 13.49 hrs HW=66.42' TW=56.36' (Dynamic Tailwater)
1=Culvert (Outlet Controls 38.27 cfs @ 12.18 fps)

Summary for Pond PA-36:

Inflow Area = 18.400 ac, 0.00% Impervious, Inflow Depth = 2.87" for 25 yr event
Inflow = 23.06 cfs @ 13.58 hrs, Volume= 4.395 af
Outflow = 23.15 cfs @ 13.58 hrs, Volume= 4.395 af, Atten= 0%, Lag= 0.0 min
Primary = 23.15 cfs @ 13.58 hrs, Volume= 4.395 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 80.04' @ 12.88 hrs Surf.Area= 13 sf Storage= 92 cf
Flood Elev= 54.51' Surf.Area= 13 sf Storage= 92 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (912.7 - 912.6)

Volume	Invert	Avail.Storage	Storage Description
#1	47.16'	92 cf	**4.00'D x 7.35'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	47.16'	**24.0" Round Culvert** L= 161.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.16' / 45.85' S= 0.0081 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 13.58 hrs HW=58.90' TW=63.39' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-37:

Inflow Area = 18.400 ac, 0.00% Impervious, Inflow Depth = 2.87" for 25 yr event
Inflow = 22.74 cfs @ 13.58 hrs, Volume= 4.395 af
Outflow = 23.06 cfs @ 13.58 hrs, Volume= 4.395 af, Atten= 0%, Lag= 0.0 min
Primary = 23.06 cfs @ 13.58 hrs, Volume= 4.395 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 82.44' @ 13.12 hrs Surf.Area= 13 sf Storage= 87 cf
Flood Elev= 56.24' Surf.Area= 13 sf Storage= 87 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (912.6 - 912.5)

Volume	Invert	Avail.Storage	Storage Description
#1	49.28'	87 cf	**4.00'D x 6.96'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	49.28'	**24.0" Round Culvert** L= 396.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 49.28' / 47.51' S= 0.0045 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=22.56 cfs @ 13.58 hrs HW=64.08' TW=58.92' (Dynamic Tailwater)
1=Culvert (Outlet Controls 22.56 cfs @ 7.18 fps)

Summary for Pond PA-37R: Slightly Controlled by Inlet Capacity

Inflow Area = 7.250 ac, 0.00% Impervious, Inflow Depth = 2.47" for 25 yr event
Inflow = 6.61 cfs @ 13.12 hrs, Volume= 1.491 af
Outflow = 14.95 cfs @ 13.53 hrs, Volume= 1.491 af, Atten= 0%, Lag= 24.4 min
Primary = 14.95 cfs @ 13.53 hrs, Volume= 1.619 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.68' @ 13.52 hrs Surf.Area= 16,397 sf Storage= 11,830 cf

Plug-Flow detention time= 11.4 min calculated for 1.491 af (100% of inflow)
Center-of-Mass det. time= 11.4 min (926.5 - 915.1)

Volume	Invert	Avail.Storage	Storage Description
#1	56.24'	17,600 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
56.24	0	0	0
58.00	20,000	17,600	17,600

Device	Routing	Invert	Outlet Devices
#1	Primary	56.24'	**1.4" x 10.0" Horiz. Orifice/Grate X 26.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 13.53 hrs HW=57.68' TW=59.82' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond PA-38:

Inflow Area = 11.150 ac, 0.00% Impervious, Inflow Depth = 2.99" for 25 yr event
Inflow = 12.23 cfs @ 14.31 hrs, Volume= 2.775 af
Outflow = 10.46 cfs @ 14.28 hrs, Volume= 2.775 af, Atten= 14%, Lag= 0.0 min
Primary = 10.46 cfs @ 14.28 hrs, Volume= 2.776 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 80.38' @ 12.89 hrs Surf.Area= 13 sf Storage= 87 cf
Flood Elev= 58.14' Surf.Area= 13 sf Storage= 87 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (909.5 - 909.3)

Volume	Invert	Avail.Storage	Storage Description
#1	51.18'	87 cf	**4.00'D x 6.96'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	51.18'	**18.0" Round Culvert** L= 396.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.18' / 49.44' S= 0.0044 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=11.59 cfs @ 14.28 hrs HW=61.97' TW=56.14' (Dynamic Tailwater)
1=Culvert (Outlet Controls 11.59 cfs @ 6.56 fps)

Summary for Pond PA-39:

Inflow Area = 11.150 ac, 0.00% Impervious, Inflow Depth = 2.98" for 25 yr event
Inflow = 8.78 cfs @ 14.10 hrs, Volume= 2.768 af
Outflow = 12.28 cfs @ 14.31 hrs, Volume= 2.768 af, Atten= 0%, Lag= 12.7 min
Primary = 12.23 cfs @ 14.31 hrs, Volume= 2.775 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 83.23' @ 13.13 hrs Surf.Area= 13 sf Storage= 90 cf
Flood Elev= 58.96' Surf.Area= 13 sf Storage= 90 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (909.5 - 909.3)

Volume	Invert	Avail.Storage	Storage Description
#1	51.81'	90 cf	**4.00'D x 7.15'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	51.81'	**18.0" Round Culvert** L= 200.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 51.81' / 51.20' S= 0.0030 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=13.62 cfs @ 14.31 hrs HW=64.85' TW=60.09' (Dynamic Tailwater)
1=Culvert (Outlet Controls 13.62 cfs @ 7.71 fps)

Summary for Pond PA-40:

Inflow Area = 11.150 ac, 0.00% Impervious, Inflow Depth = 2.83" for 25 yr event
Inflow = 17.08 cfs @ 12.62 hrs, Volume= 2.630 af
Outflow = 8.78 cfs @ 14.10 hrs, Volume= 2.630 af, Atten= 49%, Lag= 88.7 min
Primary = 8.78 cfs @ 14.10 hrs, Volume= 2.768 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 61.99' @ 13.68 hrs Surf.Area= 53,671 sf Storage= 34,473 cf
Flood Elev= 60.71' Surf.Area= 13 sf Storage= 82 cf

Plug-Flow detention time= 43.8 min calculated for 2.629 af (100% of inflow)
Center-of-Mass det. time= 43.8 min (914.8 - 871.0)

Volume	Invert	Avail.Storage	Storage Description
#1	54.16'	82 cf	**4.00'D x 6.55'H Vertical Cone/Cylinder**
#2	60.71'	34,830 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		34,912 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
60.71	0	0	0
62.00	54,000	34,830	34,830

Device	Routing	Invert	Outlet Devices
#1	Primary	54.16'	**15.0" Round Culvert** L= 400.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 54.16' / 52.11' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 14.10 hrs HW=61.95' TW=65.42' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-42:

Inflow Area = 12.260 ac, 0.00% Impervious, Inflow Depth = 4.01" for 25 yr event
Inflow = 16.93 cfs @ 13.40 hrs, Volume= 4.093 af
Outflow = 20.45 cfs @ 13.86 hrs, Volume= 4.093 af, Atten= 0%, Lag= 27.6 min
Primary = 20.45 cfs @ 13.86 hrs, Volume= 4.105 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 83.20' @ 13.12 hrs Surf.Area= 13 sf Storage= 101 cf
Flood Elev= 56.75' Surf.Area= 13 sf Storage= 101 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (869.1 - 869.0)

Volume	Invert	Avail.Storage	Storage Description
#1	48.75'	101 cf	**4.00'D x 8.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	48.75'	**30.0" Round Culvert** L= 378.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 48.75' / 47.06' S= 0.0045 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=16.87 cfs @ 13.86 hrs HW=55.94' TW=55.03' (Dynamic Tailwater)
1=Culvert (Outlet Controls 16.87 cfs @ 3.44 fps)

Summary for Pond PA-42R: Controlled by Inlet Capacity

Inflow Area = 12.260 ac, 0.00% Impervious, Inflow Depth = 3.80" for 25 yr event
Inflow = 24.51 cfs @ 12.64 hrs, Volume= 3.886 af
Outflow = 16.93 cfs @ 13.40 hrs, Volume= 3.886 af, Atten= 31%, Lag= 45.6 min
Primary = 16.93 cfs @ 13.40 hrs, Volume= 4.093 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 81.33' @ 13.13 hrs Surf.Area= 20,000 sf Storage= 36,250 cf

Plug-Flow detention time= 23.6 min calculated for 3.885 af (100% of inflow)
Center-of-Mass det. time= 23.6 min (872.2 - 848.7)

Volume	Invert	Avail.Storage	Storage Description
#1	56.75'	36,250 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
56.75	0	0	0
58.00	10,000	6,250	6,250
60.00	20,000	30,000	36,250

Device	Routing	Invert	Outlet Devices
#1	Primary	56.75'	**1.4" x 7.0" Horiz. Orifice/Grate X 24.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=34.37 cfs @ 13.40 hrs HW=78.02' TW=59.76' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 34.37 cfs @ 20.57 fps)

Summary for Pond PA-43:

Inflow Area = 12.260 ac, 0.00% Impervious, Inflow Depth = 4.02" for 25 yr event
Inflow = 20.45 cfs @ 13.86 hrs, Volume= 4.105 af
Outflow = 20.19 cfs @ 13.86 hrs, Volume= 4.105 af, Atten= 1%, Lag= 0.0 min
Primary = 20.19 cfs @ 13.86 hrs, Volume= 4.106 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 79.77' @ 12.88 hrs Surf.Area= 13 sf Storage= 78 cf
Flood Elev= 53.21' Surf.Area= 13 sf Storage= 78 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (869.2 - 869.1)

Volume	Invert	Avail.Storage	Storage Description
#1	47.04'	78 cf	**4.00'D x 6.17'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	47.04'	**30.0" Round Culvert** L= 128.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.04' / 45.85' S= 0.0093 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=0.00 cfs @ 13.86 hrs HW=55.03' TW=59.58' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-48:

Inflow Area = 1.930 ac, 0.00% Impervious, Inflow Depth = 4.22" for 25 yr event
Inflow = 3.23 cfs @ 12.58 hrs, Volume= 0.679 af
Outflow = 3.23 cfs @ 12.59 hrs, Volume= 0.679 af, Atten= 0%, Lag= 0.5 min
Primary = 3.23 cfs @ 12.59 hrs, Volume= 0.679 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 50.80' @ 12.59 hrs Surf.Area= 13 sf Storage= 54 cf
Flood Elev= 52.15' Surf.Area= 13 sf Storage= 71 cf

Plug-Flow detention time= 0.3 min calculated for 0.679 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (816.7 - 816.5)

Volume	Invert	Avail.Storage	Storage Description
#1	46.50'	71 cf	**4.00'D x 5.65'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	46.50'	**12.0" Round Culvert** L= 423.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 46.32' / 46.50' S= -0.0004 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=3.23 cfs @ 12.59 hrs HW=50.80' TW=45.87' (Dynamic Tailwater)
1=Culvert (Barrel Controls 3.23 cfs @ 4.12 fps)

Summary for Pond PA-49:

Inflow Area = 1.930 ac, 0.00% Impervious, Inflow Depth = 4.22" for 25 yr event
Inflow = 6.42 cfs @ 12.26 hrs, Volume= 0.679 af
Outflow = 3.23 cfs @ 12.58 hrs, Volume= 0.679 af, Atten= 50%, Lag= 19.4 min
Primary = 3.23 cfs @ 12.58 hrs, Volume= 0.679 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 54.47' @ 12.58 hrs Surf.Area= 10,663 sf Storage= 3,596 cf
Flood Elev= 53.64' Surf.Area= 13 sf Storage= 83 cf

Plug-Flow detention time= 5.2 min calculated for 0.679 af (100% of inflow)
Center-of-Mass det. time= 5.1 min (816.5 - 811.4)

Volume	Invert	Avail.Storage	Storage Description
#1	47.00'	83 cf	**4.00'D x 6.64'H Vertical Cone/Cylinder**
#2	53.64'	11,700 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		11,783 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
53.64	0	0	0
54.00	2,500	450	450
55.00	20,000	11,250	11,700

Device	Routing	Invert	Outlet Devices
#1	Primary	47.00'	**10.0" Round Culvert** L= 141.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 47.00' / 46.32' S= 0.0048 '/' Cc= 0.900 n= 0.012, Flow Area= 0.55 sf

Primary OutFlow Max=3.23 cfs @ 12.58 hrs HW=54.47' TW=50.80' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 3.23 cfs @ 5.93 fps)

Summary for Pond PA-51:

Rim (Flood Elevation) set per CB A-46

Inflow Area = 9.000 ac, 0.00% Impervious, Inflow Depth = 1.48" for 25 yr event
Inflow = 5.81 cfs @ 12.83 hrs, Volume= 1.110 af
Outflow = 11.62 cfs @ 14.06 hrs, Volume= 1.110 af, Atten= 0%, Lag= 74.0 min
Primary = 11.73 cfs @ 14.06 hrs, Volume= 1.401 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 51.89' @ 13.46 hrs Surf.Area= 16,182 sf Storage= 8,586 cf
Flood Elev= 50.83' Surf.Area= 13 sf Storage= 75 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 14.5 min (935.4 - 920.8)

Volume	Invert	Avail.Storage	Storage Description
#1	44.87'	75 cf	**4.00'D x 5.96'H Vertical Cone/Cylinder**
#2	50.83'	17,577 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		17,652 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
50.83	0	0	0
51.00	2,500	213	213
52.00	17,875	10,188	10,400
52.36	22,000	7,177	17,577

Device	Routing	Invert	Outlet Devices
#1	Primary	44.87'	**15.0" Round Culvert** L= 59.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 44.75' / 44.87' S= -0.0020 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 14.06 hrs HW=51.70' TW=53.41' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-52:

Inflow Area = 9.000 ac, 0.00% Impervious, Inflow Depth = 1.87" for 25 yr event
Inflow = 11.73 cfs @ 14.06 hrs, Volume= 1.401 af
Outflow = 12.04 cfs @ 13.26 hrs, Volume= 1.402 af, Atten= 0%, Lag= 0.0 min
Primary = 12.04 cfs @ 13.26 hrs, Volume= 1.417 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 69.88' @ 12.70 hrs Surf.Area= 13 sf Storage= 90 cf
Flood Elev= 52.07' Surf.Area= 13 sf Storage= 90 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (908.3 - 908.1)

Volume	Invert	Avail.Storage	Storage Description
#1	44.87'	90 cf	**4.00'D x 7.20'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	44.87'	**15.0" Round Culvert** L= 4.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 44.87' / 44.65' S= 0.0550 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=9.35 cfs @ 13.26 hrs HW=56.47' TW=52.45' (Dynamic Tailwater)
1=Culvert (Inlet Controls 9.35 cfs @ 7.62 fps)

Summary for Pond PA-53A:

Inflow Area = 1.930 ac, 0.00% Impervious, Inflow Depth = 4.22" for 25 yr event
Inflow = 3.23 cfs @ 12.59 hrs, Volume= 0.679 af
Outflow = 3.23 cfs @ 12.59 hrs, Volume= 0.679 af, Atten= 0%, Lag= 0.2 min
Primary = 3.23 cfs @ 12.59 hrs, Volume= 0.679 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 45.87' @ 12.59 hrs Surf.Area= 13 sf Storage= 21 cf
Flood Elev= 50.80' Surf.Area= 13 sf Storage= 83 cf

Plug-Flow detention time= 0.2 min calculated for 0.679 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (816.9 - 816.7)

Volume	Invert	Avail.Storage	Storage Description
#1	44.20'	83 cf	**4.00'D x 6.60'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	44.20'	**12.0" Round Culvert** L= 370.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 44.20' / 20.40' S= 0.0643 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=3.23 cfs @ 12.59 hrs HW=45.87' TW=39.53' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.23 cfs @ 4.12 fps)

Summary for Pond PA-53CR: Controlled by Inlet Capacity

Volume	Invert	Avail.Storage	Storage Description
#1	43.81'	61,095 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.81	0	0	0
44.00	1,000	95	95
46.00	60,000	61,000	61,095

Device	Routing	Invert	Outlet Devices
#1	Primary	43.81'	**1.4" x 3.5" Horiz. Orifice/Grate X 6.00 columns** X 8 rows C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=37.26' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond PA-54:

Storage being modeled is from CB PA-55. Due to problems running Simultaneous Routing the site conditions have been modeled this way.

Inflow Area = 20.557 ac, 93.38% Impervious, Inflow Depth = 5.81" for 25 yr event
Inflow = 128.93 cfs @ 12.11 hrs, Volume= 9.945 af
Outflow = 161.46 cfs @ 12.09 hrs, Volume= 9.945 af, Atten= 0%, Lag= 0.0 min
Primary = 161.46 cfs @ 12.09 hrs, Volume= 10.289 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 109.10' @ 12.09 hrs Surf.Area= 18,162 sf Storage= 3,964 cf
Flood Elev= 52.45' Surf.Area= 17,916 sf Storage= 3,954 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (749.3 - 749.1)

Volume	Invert	Avail.Storage	Storage Description
#1	44.13'	105 cf	**4.00'D x 8.32'H Vertical Cone/Cylinder**
#2	51.57'	3,849 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
#3	52.45'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		3,964 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
51.57	4	0	0
52.00	17,899	3,849	3,849

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.45	4	0	0
52.53	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	44.13'	**36.0" Round Culvert** L= 236.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.13' / 42.10' S= 0.0086 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf

Primary OutFlow Max=128.20 cfs @ 12.09 hrs HW=102.80' TW=86.39' (Dynamic Tailwater)
1=Culvert (Outlet Controls 128.20 cfs @ 18.14 fps)

Summary for Pond PA-54A:

Inflow Area = 13.707 ac, 97.67% Impervious, Inflow Depth = 6.00" for 25 yr event
Inflow = 99.85 cfs @ 12.11 hrs, Volume= 6.857 af
Outflow = 95.18 cfs @ 12.11 hrs, Volume= 6.857 af, Atten= 5%, Lag= 0.0 min
Primary = 59.76 cfs @ 12.11 hrs, Volume= 6.112 af
Secondary = 84.97 cfs @ 12.28 hrs, Volume= 0.800 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 76.56' @ 12.07 hrs Surf.Area= 263 sf Storage= 128 cf
Flood Elev= 54.34' Surf.Area= 17 sf Storage= 118 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (747.3 - 747.2)

Volume	Invert	Avail.Storage	Storage Description
#1	44.98'	118 cf	**4.00'D x 9.36'H Vertical Cone/Cylinder**
#2	54.34'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		128 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
54.34	4	0	0
54.42	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	44.98'	**36.0" Round Culvert** L= 194.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 44.98' / 44.13' S= 0.0044 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf
#2	Secondary	54.34'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=52.07 cfs @ 12.11 hrs HW=54.69' TW=52.24' (Dynamic Tailwater)
1=Culvert (Outlet Controls 52.07 cfs @ 7.37 fps)

Secondary OutFlow Max=309.58 cfs @ 12.28 hrs HW=57.15' TW=53.37' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 309.58 cfs @ 4.41 fps)

Summary for Pond PA-55:

Inflow Area = 1.890 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 11.13 cfs @ 12.07 hrs, Volume= 0.876 af
Outflow = 11.21 cfs @ 12.06 hrs, Volume= 0.876 af, Atten= 0%, Lag= 0.0 min
Primary = 11.21 cfs @ 12.06 hrs, Volume= 0.876 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 77.21' @ 12.07 hrs Surf.Area= 13 sf Storage= 77 cf
Flood Elev= 51.48' Surf.Area= 13 sf Storage= 77 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (744.9 - 744.7)

Volume	Invert	Avail.Storage	Storage Description
#1	45.33'	77 cf	**4.00'D x 6.15'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	45.33'	**24.0" Round Culvert** L= 69.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 45.33' / 44.83' S= 0.0072 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=44.54 cfs @ 12.06 hrs HW=60.63' TW=51.96' (Dynamic Tailwater)
1=Culvert (Inlet Controls 44.54 cfs @ 14.18 fps)

Summary for Pond PA-56:

Inflow Area = 3.140 ac, 66.88% Impervious, Inflow Depth = 4.92" for 25 yr event
Inflow = 15.00 cfs @ 12.07 hrs, Volume= 1.287 af
Outflow = 14.87 cfs @ 12.07 hrs, Volume= 1.287 af, Atten= 1%, Lag= 0.0 min
Primary = 14.87 cfs @ 12.07 hrs, Volume= 1.287 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 80.94' @ 12.07 hrs Surf.Area= 13 sf Storage= 83 cf
Flood Elev= 52.69' Surf.Area= 13 sf Storage= 83 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (764.6 - 764.5)

Volume	Invert	Avail.Storage	Storage Description
#1	46.09'	83 cf	**4.00'D x 6.60'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	46.09'	**18.0" Round Culvert** L= 130.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 46.09' / 45.27' S= 0.0063 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=38.44 cfs @ 12.07 hrs HW=80.48' TW=51.99' (Dynamic Tailwater)
1=Culvert (Outlet Controls 38.44 cfs @ 21.75 fps)

Summary for Pond PA-57:

Inflow Area = 2.160 ac, 54.17% Impervious, Inflow Depth = 4.67" for 25 yr event
Inflow = 8.83 cfs @ 12.09 hrs, Volume= 0.841 af
Outflow = 9.38 cfs @ 12.09 hrs, Volume= 0.841 af, Atten= 0%, Lag= 0.0 min
Primary = 9.38 cfs @ 12.09 hrs, Volume= 0.841 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 114.31' @ 12.10 hrs Surf.Area= 13 sf Storage= 98 cf
Flood Elev= 53.91' Surf.Area= 13 sf Storage= 98 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.3 min (774.2 - 773.9)

Volume	Invert	Avail.Storage	Storage Description
#1	46.11'	98 cf	**4.00'D x 7.80'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	46.11'	**18.0" Round Culvert** L= 239.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 46.11' / 45.69' S= 0.0018 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=64.05' TW=78.68' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-57A:

Inflow Area = 1.400 ac, 58.57% Impervious, Inflow Depth = 4.76" for 25 yr event
Inflow = 6.80 cfs @ 12.07 hrs, Volume= 0.555 af
Outflow = 6.80 cfs @ 12.07 hrs, Volume= 0.555 af, Atten= 0%, Lag= 0.0 min
Primary = 6.80 cfs @ 12.07 hrs, Volume= 0.556 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 84.05' @ 12.08 hrs Surf.Area= 13 sf Storage= 64 cf
Flood Elev= 51.85' Surf.Area= 13 sf Storage= 64 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (768.7 - 768.5)

Volume	Invert	Avail.Storage	Storage Description
#1	46.75'	64 cf	**4.00'D x 5.10'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	46.75'	**15.0" Round Culvert** L= 10.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 46.75' / 46.51' S= 0.0240 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=19.56 cfs @ 12.07 hrs HW=69.50' TW=58.54' (Dynamic Tailwater)
1=Culvert (Inlet Controls 19.56 cfs @ 15.94 fps)

Summary for Pond PA-57B:

Inflow Area = 0.330 ac, 45.45% Impervious, Inflow Depth = 4.49" for 25 yr event
Inflow = 1.34 cfs @ 12.16 hrs, Volume= 0.124 af
Outflow = 1.60 cfs @ 12.16 hrs, Volume= 0.124 af, Atten= 0%, Lag= 0.1 min
Primary = 1.60 cfs @ 12.16 hrs, Volume= 0.124 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 88.67' @ 12.09 hrs Surf.Area= 13 sf Storage= 63 cf
Flood Elev= 54.74' Surf.Area= 13 sf Storage= 63 cf

Plug-Flow detention time= 0.9 min calculated for 0.124 af (100% of inflow)
Center-of-Mass det. time= 0.9 min (782.4 - 781.6)

Volume	Invert	Avail.Storage	Storage Description
#1	49.75'	63 cf	**4.00'D x 4.99'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	49.75'	**8.0" Round Culvert** L= 175.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 49.75' / 48.00' S= 0.0100 '/' Cc= 0.900 n= 0.025, Flow Area= 0.35 sf

Primary OutFlow Max=1.68 cfs @ 12.16 hrs HW=73.53' TW=60.27' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.68 cfs @ 4.82 fps)

Summary for Pond PA-57C:

FLOOD ELEVATION/RIM ESTIMATED

Inflow Area = 1.400 ac, 58.57% Impervious, Inflow Depth = 4.75" for 25 yr event
Inflow = 6.97 cfs @ 12.08 hrs, Volume= 0.554 af
Outflow = 6.80 cfs @ 12.07 hrs, Volume= 0.554 af, Atten= 2%, Lag= 0.0 min
Primary = 6.80 cfs @ 12.07 hrs, Volume= 0.555 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 116.66' @ 12.11 hrs Surf.Area= 13 sf Storage= 69 cf
Flood Elev= 53.50' Surf.Area= 13 sf Storage= 69 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (768.5 - 768.3)

Volume	Invert	Avail.Storage	Storage Description
#1	48.00'	69 cf	**4.00'D x 5.50'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	48.00'	**15.0" Round Culvert** L= 45.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 48.00' / 46.80' S= 0.0267 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=16.91 cfs @ 12.07 hrs HW=77.78' TW=69.59' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 16.91 cfs @ 13.78 fps)

Summary for Pond PA-58:

Inflow Area = 12.577 ac, 97.46% Impervious, Inflow Depth = 5.81" for 25 yr event
Inflow = 83.07 cfs @ 12.28 hrs, Volume= 6.093 af
Outflow = 77.42 cfs @ 12.28 hrs, Volume= 6.093 af, Atten= 7%, Lag= 0.0 min
Primary = 66.52 cfs @ 12.38 hrs, Volume= 5.702 af
Secondary = 55.91 cfs @ 12.19 hrs, Volume= 0.507 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 108.68' @ 12.10 hrs Surf.Area= 263 sf Storage= 127 cf
Flood Elev= 55.55' Surf.Area= 17 sf Storage= 117 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (748.0 - 748.0)

Volume	Invert	Avail.Storage	Storage Description
#1	46.23'	117 cf	**4.00'D x 9.32'H Vertical Cone/Cylinder**
#2	55.55'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		127 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.55	4	0	0
55.63	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	46.23'	**36.0" Round Culvert** L= 184.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 46.23' / 45.29' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf
#2	Secondary	55.55'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=31.62 cfs @ 12.38 hrs HW=55.50' TW=54.62' (Dynamic Tailwater)
1=Culvert (Outlet Controls 31.62 cfs @ 4.47 fps)

Secondary OutFlow Max=1,399.44 cfs @ 12.19 hrs HW=63.23' TW=55.01' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 1,399.44 cfs @ 7.29 fps)

Summary for Pond PA-59:

Inflow Area = 2.910 ac, 89.00% Impervious, Inflow Depth = 5.38" for 25 yr event
Inflow = 17.01 cfs @ 12.08 hrs, Volume= 1.306 af
Outflow = 19.58 cfs @ 12.11 hrs, Volume= 1.306 af, Atten= 0%, Lag= 1.8 min
Primary = 19.58 cfs @ 12.11 hrs, Volume= 1.282 af
Secondary = 17.49 cfs @ 12.11 hrs, Volume= 0.124 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 75.55' @ 12.10 hrs Surf.Area= 263 sf Storage= 100 cf
Flood Elev= 57.25' Surf.Area= 17 sf Storage= 90 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (753.1 - 753.0)

Volume	Invert	Avail.Storage	Storage Description
#1	50.10'	90 cf	**4.00'D x 7.15'H Vertical Cone/Cylinder**
#2	57.25'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		100 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
57.25	4	0	0
57.33	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	50.10'	**24.0" Round Culvert** L= 250.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 50.10' / 47.77' S= 0.0093 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Secondary	57.25'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 12.11 hrs HW=56.10' TW=58.52' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 12.11 hrs HW=55.11' TW=55.01' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond PA-60:

Inflow Area = 0.470 ac, 31.91% Impervious, Inflow Depth = 4.31" for 25 yr event
Inflow = 3.51 cfs @ 12.29 hrs, Volume= 0.169 af
Outflow = 4.78 cfs @ 12.39 hrs, Volume= 0.169 af, Atten= 0%, Lag= 6.0 min
Primary = 4.79 cfs @ 12.39 hrs, Volume= 0.172 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 60.11' @ 12.07 hrs Surf.Area= 13 sf Storage= 84 cf
Flood Elev= 57.00' Surf.Area= 13 sf Storage= 84 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.6 min (790.3 - 789.7)

Volume	Invert	Avail.Storage	Storage Description
#1	50.30'	84 cf	**4.00'D x 6.70'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	50.30'	**18.0" Round Culvert** L= 91.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 50.30' / 50.05' S= 0.0027 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 12.39 hrs HW=53.50' TW=54.25' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-61:

Inflow Area = 0.470 ac, 31.91% Impervious, Inflow Depth = 4.23" for 25 yr event
Inflow = 1.93 cfs @ 12.14 hrs, Volume= 0.166 af
Outflow = 3.51 cfs @ 12.29 hrs, Volume= 0.166 af, Atten= 0%, Lag= 9.1 min
Primary = 3.51 cfs @ 12.29 hrs, Volume= 0.169 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 76.79' @ 12.11 hrs Surf.Area= 13 sf Storage= 81 cf
Flood Elev= 57.06' Surf.Area= 13 sf Storage= 81 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.6 min (790.5 - 789.9)

Volume	Invert	Avail.Storage	Storage Description
#1	50.61'	81 cf	**4.00'D x 6.45'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	50.61'	**12.0" Round Culvert** L= 47.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 50.61' / 50.50' S= 0.0023 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.29 hrs HW=54.95' TW=56.35' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-63:

Inflow Area = 0.020 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 0.14 cfs @ 12.01 hrs, Volume= 0.009 af
Outflow = 2.84 cfs @ 12.31 hrs, Volume= 0.010 af, Atten= 0%, Lag= 17.7 min
Primary = 2.84 cfs @ 12.31 hrs, Volume= 0.012 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 56.09' @ 12.24 hrs Surf.Area= 13 sf Storage= 74 cf
Flood Elev= 57.28' Surf.Area= 13 sf Storage= 89 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 7.9 min (748.9 - 741.0)

Volume	Invert	Avail.Storage	Storage Description
#1	50.23'	89 cf	**4.00'D x 7.05'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	50.23'	**12.0" Round Culvert** L= 78.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 50.23' / 50.12' S= 0.0014 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.31 hrs HW=51.92' TW=57.29' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-64:

Inflow Area = 8.627 ac,100.00% Impervious, Inflow Depth = 5.74" for 25 yr event
Inflow = 67.99 cfs @ 12.12 hrs, Volume= 4.124 af
Outflow = 67.96 cfs @ 12.12 hrs, Volume= 4.124 af, Atten= 0%, Lag= 0.0 min
Primary = 27.99 cfs @ 12.60 hrs, Volume= 3.135 af
Secondary = 58.36 cfs @ 12.12 hrs, Volume= 0.999 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.65' @ 12.24 hrs Surf.Area= 263 sf Storage= 103 cf
Flood Elev= 55.48' Surf.Area= 17 sf Storage= 93 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (746.1 - 746.0)

Volume	Invert	Avail.Storage	Storage Description
#1	48.08'	93 cf	**4.00'D x 7.40'H Vertical Cone/Cylinder**
#2	55.48'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		103 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.48	4	0	0
55.56	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	48.08'	**30.0" Round Culvert** L= 25.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 48.08' / 47.61' S= 0.0188 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#2	Secondary	55.48'	**25.0' long x 28.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 12.60 hrs HW=52.13' TW=52.79' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Secondary OutFlow Max=57.58 cfs @ 12.12 hrs HW=56.94' TW=56.78' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 57.58 cfs @ 1.58 fps)

Summary for Pond PA-64A:

Inflow Area = 0.340 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 2.15 cfs @ 12.04 hrs, Volume= 0.158 af
Outflow = 2.21 cfs @ 12.05 hrs, Volume= 0.158 af, Atten= 0%, Lag= 0.4 min
Primary = 2.62 cfs @ 12.61 hrs, Volume= 0.125 af
Secondary = 1.84 cfs @ 12.05 hrs, Volume= 0.036 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.56' @ 12.25 hrs Surf.Area= 263 sf Storage= 91 cf
Flood Elev= 55.63' Surf.Area= 17 sf Storage= 81 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.8 min (743.7 - 742.9)

Volume	Invert	Avail.Storage	Storage Description
#1	49.18'	81 cf	**4.00'D x 6.45'H Vertical Cone/Cylinder**
#2	55.63'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		91 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.63	4	0	0
55.71	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	49.18'	**24.0" Round Culvert** L= 25.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 48.68' / 49.18' S= -0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Secondary	55.63'	**25.0' long x 28.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 12.61 hrs HW=55.48' TW=55.90' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 12.05 hrs HW=56.09' TW=56.13' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond PA-65:

Inflow Area = 9.217 ac,100.00% Impervious, Inflow Depth = 5.74" for 25 yr event
Inflow = 70.14 cfs @ 12.12 hrs, Volume= 4.410 af
Outflow = 66.10 cfs @ 12.38 hrs, Volume= 4.410 af, Atten= 6%, Lag= 15.7 min
Primary = 65.37 cfs @ 12.38 hrs, Volume= 4.602 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.56' @ 12.24 hrs Surf.Area= 7,578 sf Storage= 12,323 cf
Flood Elev= 55.86' Surf.Area= 17 sf Storage= 106 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.3 min (747.3 - 746.0)

Volume	Invert	Avail.Storage	Storage Description
#1	47.41'	106 cf	**4.00'D x 8.45'H Vertical Cone/Cylinder**
#2	55.86'	166,955 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		167,061 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.86	4	0	0
56.00	7,446	522	522
76.24	9,000	166,434	166,955

Device	Routing	Invert	Outlet Devices
#1	Primary	47.41'	**30.0" Round Culvert** L= 156.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.41' / 46.68' S= 0.0047 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#2	Secondary	76.16'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=17.13 cfs @ 12.38 hrs HW=57.25' TW=56.69' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 17.13 cfs @ 3.49 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=47.41' TW=46.23' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond PA-66:

Inflow Area = 0.590 ac,100.00% Impervious, Inflow Depth = 5.60" for 25 yr event
Inflow = 4.15 cfs @ 12.04 hrs, Volume= 0.275 af
Outflow = 4.74 cfs @ 12.04 hrs, Volume= 0.275 af, Atten= 0%, Lag= 0.0 min
Primary = 4.61 cfs @ 12.04 hrs, Volume= 0.230 af
Secondary = 2.79 cfs @ 12.09 hrs, Volume= 0.046 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.63' @ 12.24 hrs Surf.Area= 263 sf Storage= 112 cf
Flood Elev= 55.94' Surf.Area= 17 sf Storage= 102 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.6 min (743.7 - 743.0)

Volume	Invert	Avail.Storage	Storage Description
#1	47.84'	102 cf	**4.00'D x 8.10'H Vertical Cone/Cylinder**
#2	55.94'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		112 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.94	4	0	0
56.02	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	47.84'	**30.0" Round Culvert** L= 28.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.84' / 47.46' S= 0.0136 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#2	Secondary	55.94'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=4.30 cfs @ 12.04 hrs HW=55.95' TW=55.92' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 4.30 cfs @ 0.88 fps)

Secondary OutFlow Max=5.36 cfs @ 12.09 hrs HW=56.59' TW=56.59' (Dynamic Tailwater)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 5.36 cfs @ 0.33 fps)

Summary for Pond PA-67:

Inflow Area = 0.140 ac,100.00% Impervious, Inflow Depth = 5.75" for 25 yr event
Inflow = 1.38 cfs @ 12.04 hrs, Volume= 0.067 af
Outflow = 2.73 cfs @ 12.61 hrs, Volume= 0.068 af, Atten= 0%, Lag= 34.2 min
Primary = 2.73 cfs @ 12.61 hrs, Volume= 0.067 af
Secondary = 0.83 cfs @ 12.13 hrs, Volume= 0.008 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.52' @ 12.24 hrs Surf.Area= 263 sf Storage= 104 cf
Flood Elev= 56.17' Surf.Area= 17 sf Storage= 94 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.9 min (743.3 - 741.4)

Volume	Invert	Avail.Storage	Storage Description
#1	48.67'	94 cf	**4.00'D x 7.50'H Vertical Cone/Cylinder**
#2	56.17'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		104 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
56.17	4	0	0
56.25	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	48.67'	**24.0" Round Culvert** L= 185.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 48.67' / 48.24' S= 0.0023 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Secondary	56.17'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=2.33 cfs @ 12.61 hrs HW=50.38' TW=50.31' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.33 cfs @ 1.10 fps)

Secondary OutFlow Max=0.00 cfs @ 12.13 hrs HW=56.74' TW=56.81' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond PA-67A:

Inflow Area = 7.157 ac,100.00% Impervious, Inflow Depth = 5.26" for 25 yr event
Inflow = 28.58 cfs @ 12.03 hrs, Volume= 3.135 af
Outflow = 41.82 cfs @ 12.12 hrs, Volume= 3.135 af, Atten= 0%, Lag= 5.2 min
Primary = 28.41 cfs @ 12.63 hrs, Volume= 2.810 af
Secondary = 28.28 cfs @ 12.12 hrs, Volume= 0.326 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.61' @ 12.24 hrs Surf.Area= 12,513 sf Storage= 5,530 cf
Flood Elev= 56.01' Surf.Area= 17 sf Storage= 87 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.3 min (747.7 - 746.4)

Volume	Invert	Avail.Storage	Storage Description
#1	49.11'	87 cf	**4.00'D x 6.90'H Vertical Cone/Cylinder**
#2	56.01'	5,443 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		5,530 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
56.01	4	0	0
56.50	10,801	2,647	2,647
56.74	12,500	2,796	5,443

Device	Routing	Invert	Outlet Devices
#1	Primary	49.11'	**30.0" Round Culvert** L= 183.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 49.11' / 48.18' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#2	Secondary	56.66'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=29.25 cfs @ 12.63 hrs HW=56.14' TW=54.38' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 29.25 cfs @ 5.96 fps)

Secondary OutFlow Max=26.66 cfs @ 12.12 hrs HW=57.26' TW=56.95' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 26.66 cfs @ 1.79 fps)

Summary for Pond PA-69:

Inflow Area = 4.207 ac,100.00% Impervious, Inflow Depth = 4.75" for 25 yr event
Inflow = 19.26 cfs @ 12.03 hrs, Volume= 1.665 af
Outflow = 19.22 cfs @ 12.03 hrs, Volume= 1.665 af, Atten= 0%, Lag= 0.0 min
Primary = 14.14 cfs @ 12.03 hrs, Volume= 1.581 af
Secondary = 7.66 cfs @ 12.12 hrs, Volume= 0.107 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.61' @ 12.24 hrs Surf.Area= 263 sf Storage= 105 cf
Flood Elev= 57.31' Surf.Area= 17 sf Storage= 95 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (745.2 - 745.0)

Volume	Invert	Avail.Storage	Storage Description
#1	49.74'	95 cf	**4.00'D x 7.57'H Vertical Cone/Cylinder**
#2	57.31'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		105 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
57.31	4	0	0
57.39	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	49.74'	**24.0" Round Culvert** L= 180.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 49.74' / 49.06' S= 0.0038 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Secondary	57.31'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=14.12 cfs @ 12.03 hrs HW=57.48' TW=56.31' (Dynamic Tailwater)
1=Culvert (Outlet Controls 14.12 cfs @ 4.49 fps)

Secondary OutFlow Max=7.02 cfs @ 12.12 hrs HW=57.53' TW=57.18' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 7.02 cfs @ 1.26 fps)

Summary for Pond PA-7:

Storage maximum elevation set at runway flood elevation (Same elevation used as maximum for Pond A-7P)

Inflow Area = 56.165 ac, 65.82% Impervious, Inflow Depth = 5.49" for 25 yr event
Inflow = 256.68 cfs @ 12.09 hrs, Volume= 25.689 af
Outflow = 256.75 cfs @ 12.09 hrs, Volume= 25.689 af, Atten= 0%, Lag= 0.0 min
Primary = 256.75 cfs @ 12.09 hrs, Volume= 25.689 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 89.63' @ 12.09 hrs Surf.Area= 13 sf Storage= 121 cf
Flood Elev= 50.60' Surf.Area= 13 sf Storage= 114 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (783.5 - 783.5)

Volume	Invert	Avail.Storage	Storage Description
#1	41.52'	121 cf	**4.00'D x 9.63'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	41.52'	**42.0" Round Culvert** L= 498.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 41.52' / 37.45' S= 0.0082 '/' Cc= 0.900 n= 0.013, Flow Area= 9.62 sf

Primary OutFlow Max=245.27 cfs @ 12.09 hrs HW=85.79' TW=35.56' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 245.27 cfs @ 25.49 fps)

Summary for Pond PA-70:

Inflow Area = 0.560 ac,100.00% Impervious, Inflow Depth = 5.60" for 25 yr event
Inflow = 3.26 cfs @ 12.65 hrs, Volume= 0.261 af
Outflow = 3.17 cfs @ 12.03 hrs, Volume= 0.261 af, Atten= 3%, Lag= 0.0 min
Primary = 3.17 cfs @ 12.03 hrs, Volume= 0.261 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.74' @ 12.03 hrs Surf.Area= 13 sf Storage= 89 cf
Flood Elev= 58.53' Surf.Area= 17 sf Storage= 99 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.5 min (745.1 - 744.6)

Volume	Invert	Avail.Storage	Storage Description
#1	50.68'	99 cf	**4.00'D x 7.85'H Vertical Cone/Cylinder**
#2	58.53'	137 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		236 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
58.53	4	0	0
59.61	250	137	137

Device	Routing	Invert	Outlet Devices
#1	Primary	50.68'	**18.0" Round Culvert** L= 195.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 50.68' / 49.74' S= 0.0048 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Secondary	58.53'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=3.18 cfs @ 12.03 hrs HW=57.74' TW=57.48' (Dynamic Tailwater)
1=Culvert (Outlet Controls 3.18 cfs @ 1.80 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=50.68' TW=48.67' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond PA-71:

Inflow Area = 0.060 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 0.41 cfs @ 12.01 hrs, Volume= 0.028 af
Outflow = 1.22 cfs @ 12.55 hrs, Volume= 0.028 af, Atten= 0%, Lag= 32.1 min
Primary = 1.22 cfs @ 12.55 hrs, Volume= 0.027 af
Secondary = 0.49 cfs @ 12.04 hrs, Volume= 0.002 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.64' @ 12.04 hrs Surf.Area= 132 sf Storage= 75 cf
Flood Elev= 57.60' Surf.Area= 17 sf Storage= 73 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 2.6 min (743.6 - 741.0)

Volume	Invert	Avail.Storage	Storage Description
#1	51.80'	73 cf	**4.00'D x 5.80'H Vertical Cone/Cylinder**
#2	57.60'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		83 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
57.60	4	0	0
57.68	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	51.80'	**15.0" Round Culvert** L= 41.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 51.80' / 51.48' S= 0.0078 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Secondary	57.60'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 12.55 hrs HW=53.57' TW=55.27' (Dynamic Tailwater)
↑**1=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.46 cfs @ 12.04 hrs HW=57.64' TW=55.94' (Dynamic Tailwater)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 0.46 cfs @ 0.51 fps)

Summary for Pond PA-72:

Inflow Area = 0.300 ac,100.00% Impervious, Inflow Depth = 5.66" for 25 yr event
Inflow = 2.07 cfs @ 12.52 hrs, Volume= 0.142 af
Outflow = 2.59 cfs @ 12.65 hrs, Volume= 0.142 af, Atten= 0%, Lag= 7.8 min
Primary = 2.59 cfs @ 12.65 hrs, Volume= 0.142 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.78' @ 12.05 hrs Surf.Area= 13 sf Storage= 84 cf
Flood Elev= 58.08' Surf.Area= 17 sf Storage= 88 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.7 min (744.5 - 743.7)

Volume	Invert	Avail.Storage	Storage Description
#1	51.08'	88 cf	**4.00'D x 7.00'H Vertical Cone/Cylinder**
#2	58.08'	468 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		556 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
58.08	4	0	0
58.50	908	192	192
58.74	1,396	276	468

Device	Routing	Invert	Outlet Devices
#1	Primary	51.08'	**18.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 51.01' / 51.08' S= -0.0025 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf
#2	Secondary	58.66'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 12.65 hrs HW=52.06' TW=54.07' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=51.08' TW=50.68' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond PA-72A:

Inflow Area = 0.250 ac,100.00% Impervious, Inflow Depth = 5.65" for 25 yr event
Inflow = 1.87 cfs @ 12.03 hrs, Volume= 0.118 af
Outflow = 2.03 cfs @ 12.52 hrs, Volume= 0.118 af, Atten= 0%, Lag= 29.3 min
Primary = 2.03 cfs @ 12.52 hrs, Volume= 0.118 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.89' @ 12.04 hrs Surf.Area= 13 sf Storage= 85 cf
Flood Elev= 58.19' Surf.Area= 17 sf Storage= 88 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.9 min (744.2 - 743.3)

Volume	Invert	Avail.Storage	Storage Description
#1	51.16'	88 cf	**4.00'D x 7.03'H Vertical Cone/Cylinder**
#2	58.19'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		99 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
58.19	4	0	0
58.27	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	51.16'	**15.0" Round Culvert** L= 27.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 51.16' / 51.01' S= 0.0056 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Secondary	58.19'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 12.52 hrs HW=53.69' TW=55.45' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=51.16' TW=51.08' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond PA-73:

Inflow Area = 0.210 ac,100.00% Impervious, Inflow Depth = 5.61" for 25 yr event
Inflow = 1.59 cfs @ 12.50 hrs, Volume= 0.098 af
Outflow = 1.80 cfs @ 12.49 hrs, Volume= 0.098 af, Atten= 0%, Lag= 0.0 min
Primary = 1.80 cfs @ 12.49 hrs, Volume= 0.099 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.88' @ 12.05 hrs Surf.Area= 13 sf Storage= 83 cf
Flood Elev= 58.16' Surf.Area= 17 sf Storage= 86 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.0 min (743.7 - 742.7)

Volume	Invert	Avail.Storage	Storage Description
#1	51.29'	86 cf	**4.00'D x 6.87'H Vertical Cone/Cylinder**
#2	58.16'	191 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		277 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
58.16	4	0	0
58.50	368	63	63
58.74	698	128	191

Device	Routing	Invert	Outlet Devices
#1	Primary	51.29'	**15.0" Round Culvert** L= 45.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 51.29' / 51.11' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Secondary	58.66'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 12.49 hrs HW=52.37' TW=54.78' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=51.29' TW=51.16' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond PA-74:

Inflow Area = 0.150 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 0.98 cfs @ 12.03 hrs, Volume= 0.070 af
Outflow = 1.54 cfs @ 12.50 hrs, Volume= 0.070 af, Atten= 0%, Lag= 28.3 min
Primary = 1.54 cfs @ 12.50 hrs, Volume= 0.070 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.98' @ 12.05 hrs Surf.Area= 13 sf Storage= 82 cf
Flood Elev= 58.13' Surf.Area= 17 sf Storage= 84 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.3 min (743.3 - 741.9)

Volume	Invert	Avail.Storage	Storage Description
#1	51.48'	84 cf	**4.00'D x 6.65'H Vertical Cone/Cylinder**
#2	58.13'	135 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		219 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
58.13	4	0	0
58.50	270	51	51
58.74	436	85	135

Device	Routing	Invert	Outlet Devices
#1	Primary	51.48'	**15.0" Round Culvert** L= 45.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 51.48' / 51.16' S= 0.0071 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Secondary	58.66'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.78 cfs @ 12.50 hrs HW=52.22' TW=52.13' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.78 cfs @ 1.49 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=51.48' TW=51.29' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond PA-75:

Inflow Area = 2.146 ac,100.00% Impervious, Inflow Depth = 5.57" for 25 yr event
Inflow = 12.82 cfs @ 12.06 hrs, Volume= 0.995 af
Outflow = 12.83 cfs @ 12.05 hrs, Volume= 0.995 af, Atten= 0%, Lag= 0.0 min
Primary = 12.83 cfs @ 12.05 hrs, Volume= 0.996 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 58.41' @ 12.05 hrs Surf.Area= 13 sf Storage= 88 cf
Flood Elev= 58.76' Surf.Area= 17 sf Storage= 92 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (744.2 - 744.0)

Volume	Invert	Avail.Storage	Storage Description
#1	51.44'	92 cf	**4.00'D x 7.32'H Vertical Cone/Cylinder**
#2	58.76'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		102 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
58.76	4	0	0
58.84	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	51.44'	**24.0" Round Culvert** L= 173.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.44' / 49.74' S= 0.0098 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Secondary	58.76'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=12.65 cfs @ 12.05 hrs HW=58.40' TW=57.48' (Dynamic Tailwater)
1=Culvert (Outlet Controls 12.65 cfs @ 4.03 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=51.44' TW=49.74' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond PA-76:

Inflow Area = 1.412 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 8.42 cfs @ 12.06 hrs, Volume= 0.654 af
Outflow = 10.19 cfs @ 12.12 hrs, Volume= 0.657 af, Atten= 0%, Lag= 3.5 min
Primary = 10.19 cfs @ 12.12 hrs, Volume= 0.663 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 84.16' @ 12.29 hrs Surf.Area= 13 sf Storage= 109 cf
Flood Elev= 59.48' Surf.Area= 13 sf Storage= 109 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (744.4 - 744.3)

Volume	Invert	Avail.Storage	Storage Description
#1	50.78'	109 cf	**4.00'D x 8.70'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	50.78'	**24.0" Round Culvert** L= 90.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 50.78' / 50.16' S= 0.0069 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=20.67 cfs @ 12.12 hrs HW=56.49' TW=54.63' (Dynamic Tailwater)
1=Culvert (Inlet Controls 20.67 cfs @ 6.58 fps)

Summary for Pond PA-77:

Inflow Area = 1.199 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 7.06 cfs @ 12.07 hrs, Volume= 0.556 af
Outflow = 7.09 cfs @ 12.08 hrs, Volume= 0.556 af, Atten= 0%, Lag= 0.4 min
Primary = 7.09 cfs @ 12.08 hrs, Volume= 0.557 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 59.66' @ 12.06 hrs Surf.Area= 13 sf Storage= 51 cf
Flood Elev= 59.93' Surf.Area= 17 sf Storage= 55 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (744.9 - 744.7)

Volume	Invert	Avail.Storage	Storage Description
#1	55.58'	55 cf	**4.00'D x 4.35'H Vertical Cone/Cylinder**
#2	59.93'	10 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		65 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
59.93	4	0	0
60.01	250	10	10

Device	Routing	Invert	Outlet Devices
#1	Primary	55.58'	**18.0" Round Culvert** L= 197.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 55.58' / 51.48' S= 0.0208 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Secondary	59.93'	**25.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=7.09 cfs @ 12.08 hrs HW=59.61' TW=58.33' (Dynamic Tailwater)
1=Culvert (Outlet Controls 7.09 cfs @ 4.01 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=55.58' TW=50.78' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond PA-78:

Inflow Area = 1.961 ac,100.00% Impervious, Inflow Depth = 5.77" for 25 yr event
Inflow = 17.25 cfs @ 12.10 hrs, Volume= 0.943 af
Outflow = 24.67 cfs @ 12.13 hrs, Volume= 0.948 af, Atten= 0%, Lag= 1.9 min
Primary = 24.67 cfs @ 12.13 hrs, Volume= 0.955 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 61.58' @ 12.08 hrs Surf.Area= 13 sf Storage= 139 cf
Flood Elev= 60.43' Surf.Area= 13 sf Storage= 139 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (744.2 - 744.0)

Volume	Invert	Avail.Storage	Storage Description
#1	49.38'	139 cf	**4.00'D x 11.05'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	49.38'	**36.0" Round Culvert** L= 213.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 49.38' / 47.02' S= 0.0111 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf

Primary OutFlow Max=22.95 cfs @ 12.13 hrs HW=51.83' TW=50.72' (Dynamic Tailwater)
1=Culvert (Outlet Controls 22.95 cfs @ 5.05 fps)

Summary for Pond PA-79:

Inflow Area = 0.499 ac,100.00% Impervious, Inflow Depth = 5.89" for 25 yr event
Inflow = 6.17 cfs @ 12.14 hrs, Volume= 0.245 af
Outflow = 7.60 cfs @ 12.10 hrs, Volume= 0.246 af, Atten= 0%, Lag= 0.0 min
Primary = 7.60 cfs @ 12.10 hrs, Volume= 0.256 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 58.15' @ 12.21 hrs Surf.Area= 13 sf Storage= 103 cf
Flood Elev= 60.94' Surf.Area= 13 sf Storage= 138 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.4 min (743.2 - 742.7)

Volume	Invert	Avail.Storage	Storage Description
#1	49.94'	138 cf	**4.00'D x 11.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	49.94'	**30.0" Round Culvert** L= 108.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 49.94' / 49.43' S= 0.0047 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=0.00 cfs @ 12.10 hrs HW=52.10' TW=53.54' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-8:

Inflow Area = 33.747 ac, 50.70% Impervious, Inflow Depth = 5.08" for 25 yr event
Inflow = 70.23 cfs @ 12.41 hrs, Volume= 14.276 af
Outflow = 107.03 cfs @ 12.37 hrs, Volume= 14.292 af, Atten= 0%, Lag= 0.0 min
Primary = 105.26 cfs @ 12.37 hrs, Volume= 14.189 af
Secondary = 91.89 cfs @ 12.26 hrs, Volume= 0.507 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 83.45' @ 12.09 hrs Surf.Area= 5,013 sf Storage= 1,374 cf
Flood Elev= 52.10' Surf.Area= 13 sf Storage= 124 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	42.20'	124 cf	**4.00'D x 9.90'H Vertical Cone/Cylinder**
#2	52.10'	1,250 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		1,374 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
52.10	0	0	0
52.60	5,000	1,250	1,250

Device	Routing	Invert	Outlet Devices
#1	Primary	42.20'	**42.0" Round Culvert** L= 363.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 42.20' / 41.93' S= 0.0007 '/' Cc= 0.900 n= 0.013, Flow Area= 9.62 sf
#2	Secondary	52.60'	**10.0' long x 100.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 12.37 hrs HW=52.28' TW=76.54' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Secondary OutFlow Max=2,388.99 cfs @ 12.26 hrs HW=81.91' TW=77.13' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 2,388.99 cfs @ 8.15 fps)

Summary for Pond PA-80:

Inflow Area = 0.409 ac,100.00% Impervious, Inflow Depth = 5.76" for 25 yr event
Inflow = 4.61 cfs @ 12.23 hrs, Volume= 0.196 af
Outflow = 5.92 cfs @ 12.14 hrs, Volume= 0.198 af, Atten= 0%, Lag= 0.0 min
Primary = 5.92 cfs @ 12.14 hrs, Volume= 0.203 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 56.19' @ 12.18 hrs Surf.Area= 13 sf Storage= 66 cf
Flood Elev= 61.47' Surf.Area= 13 sf Storage= 132 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (743.0 - 742.8)

Volume	Invert	Avail.Storage	Storage Description
#1	50.97'	132 cf	**4.00'D x 10.50'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	50.97'	**24.0" Round Culvert** L= 88.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 50.97' / 50.02' S= 0.0108 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=6.81 cfs @ 12.14 hrs HW=52.12' TW=50.47' (Dynamic Tailwater)
1=Culvert (Inlet Controls 6.81 cfs @ 3.65 fps)

Summary for Pond PA-8A: DATA?

Inflow Area = 31.147 ac, 50.75% Impervious, Inflow Depth = 5.12" for 25 yr event
Inflow = 65.48 cfs @ 12.41 hrs, Volume= 13.284 af
Outflow = 65.46 cfs @ 12.41 hrs, Volume= 13.284 af, Atten= 0%, Lag= 0.0 min
Primary = 65.46 cfs @ 12.41 hrs, Volume= 13.284 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 90.50' @ 12.10 hrs Surf.Area= 1 sf Storage= 9 cf
Flood Elev= 56.00' Surf.Area= 1 sf Storage= 9 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (807.5 - 807.5)

Volume	Invert	Avail.Storage	Storage Description
#1	44.16'	9 cf	**1.00'D x 11.84'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	44.16'	**42.0" Round Culvert** L= 396.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 44.16' / 42.40' S= 0.0044 '/' Cc= 0.900 n= 0.013, Flow Area= 9.62 sf

Primary OutFlow Max=57.80 cfs @ 12.41 hrs HW=53.35' TW=51.20' (Dynamic Tailwater)
1=Culvert (Outlet Controls 57.80 cfs @ 6.01 fps)

Summary for Pond PA-9:

Inflow Area = 31.147 ac, 50.75% Impervious, Inflow Depth = 5.12" for 25 yr event
Inflow = 69.48 cfs @ 12.40 hrs, Volume= 13.284 af
Outflow = 65.48 cfs @ 12.41 hrs, Volume= 13.284 af, Atten= 6%, Lag= 0.2 min
Primary = 65.48 cfs @ 12.41 hrs, Volume= 13.284 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 85.51' @ 12.10 hrs Surf.Area= 13 sf Storage= 157 cf
Flood Elev= 57.77' Surf.Area= 13 sf Storage= 157 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (807.5 - 807.5)

Volume	Invert	Avail.Storage	Storage Description
#1	45.27'	157 cf	**4.00'D x 12.50'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	45.27'	**42.0" Round Culvert** L= 175.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 45.27' / 44.26' S= 0.0058 '/' Cc= 0.900 n= 0.013, Flow Area= 9.62 sf

Primary OutFlow Max=0.00 cfs @ 12.41 hrs HW=53.25' TW=53.32' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond PA-90:

Inflow Area = 0.309 ac,100.00% Impervious, Inflow Depth = 5.56" for 25 yr event
Inflow = 1.96 cfs @ 12.04 hrs, Volume= 0.143 af
Outflow = 4.34 cfs @ 12.23 hrs, Volume= 0.146 af, Atten= 0%, Lag= 11.2 min
Primary = 4.38 cfs @ 12.23 hrs, Volume= 0.150 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.41' @ 12.22 hrs Surf.Area= 13 sf Storage= 77 cf
Flood Elev= 61.71' Surf.Area= 13 sf Storage= 131 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.3 min (743.2 - 742.9)

Volume	Invert	Avail.Storage	Storage Description
#1	51.25'	131 cf	**4.00'D x 10.46'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	51.25'	**24.0" Round Culvert** L= 93.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 51.25' / 51.03' S= 0.0024 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=14.01 cfs @ 12.23 hrs HW=53.67' TW=52.29' (Dynamic Tailwater)
1=Culvert (Barrel Controls 14.01 cfs @ 4.68 fps)

Summary for Pond PA-91:

Inflow Area = 34.613 ac, 50.93% Impervious, Inflow Depth > 4.40" for 25 yr event
Inflow = 32.67 cfs @ 12.09 hrs, Volume= 12.701 af
Outflow = 32.47 cfs @ 12.09 hrs, Volume= 12.699 af, Atten= 1%, Lag= 0.0 min
Primary = 32.47 cfs @ 12.09 hrs, Volume= 12.699 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.26' @ 12.09 hrs Surf.Area= 13 sf Storage= 160 cf
Flood Elev= 61.60' Surf.Area= 13 sf Storage= 215 cf

Plug-Flow detention time= 0.3 min calculated for 12.695 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (896.4 - 896.2)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	215 cf	**4.00'D x 17.10'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	51.67'	**24.0" Round Culvert** L= 71.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.67' / 51.27' S= 0.0056 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=31.82 cfs @ 12.09 hrs HW=57.10' TW=51.41' (Dynamic Tailwater)
1=Culvert (Inlet Controls 31.82 cfs @ 10.13 fps)

Summary for Pond PA-92:

Inflow Area = 34.033 ac, 50.10% Impervious, Inflow Depth > 4.38" for 25 yr event
Inflow = 31.01 cfs @ 12.09 hrs, Volume= 12.432 af
Outflow = 29.67 cfs @ 12.09 hrs, Volume= 12.432 af, Atten= 4%, Lag= 0.0 min
Primary = 29.67 cfs @ 12.09 hrs, Volume= 12.432 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 61.23' @ 12.09 hrs Surf.Area= 13 sf Storage= 117 cf
Flood Elev= 61.62' Surf.Area= 13 sf Storage= 122 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (899.5 - 899.5)

Volume	Invert	Avail.Storage	Storage Description
#1	51.89'	122 cf	**4.00'D x 9.73'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	51.89'	**24.0" Round Culvert** L= 93.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 51.89' / 51.68' S= 0.0023 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=28.92 cfs @ 12.09 hrs HW=60.71' TW=57.06' (Dynamic Tailwater)
1=Culvert (Inlet Controls 28.92 cfs @ 9.21 fps)

Summary for Pond PA-93:

Inflow Area = 33.214 ac, 48.87% Impervious, Inflow Depth > 4.35" for 25 yr event
Inflow = 27.23 cfs @ 12.09 hrs, Volume= 12.053 af
Outflow = 26.76 cfs @ 12.09 hrs, Volume= 12.053 af, Atten= 2%, Lag= 0.0 min
Primary = 26.76 cfs @ 12.09 hrs, Volume= 12.053 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 63.32' @ 12.09 hrs Surf.Area= 13 sf Storage= 115 cf
Flood Elev= 61.60' Surf.Area= 13 sf Storage= 115 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (904.4 - 904.3)

Volume	Invert	Avail.Storage	Storage Description
#1	52.45'	115 cf	**4.00'D x 9.15'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	52.45'	**24.0" Round Culvert** L= 96.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 52.45' / 52.22' S= 0.0024 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=20.85 cfs @ 12.09 hrs HW=62.52' TW=60.62' (Dynamic Tailwater)
1=Culvert (Inlet Controls 20.85 cfs @ 6.64 fps)

Summary for Pond PA-94:

Inflow Area = 32.438 ac, 47.64% Impervious, Inflow Depth > 4.33" for 25 yr event
Inflow = 24.45 cfs @ 12.17 hrs, Volume= 11.694 af
Outflow = 23.19 cfs @ 12.09 hrs, Volume= 11.694 af, Atten= 5%, Lag= 0.0 min
Primary = 23.19 cfs @ 12.09 hrs, Volume= 11.694 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 64.30' @ 12.09 hrs Surf.Area= 13 sf Storage= 109 cf
Flood Elev= 61.48' Surf.Area= 13 sf Storage= 109 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (909.3 - 909.2)

Volume	Invert	Avail.Storage	Storage Description
#1	52.83'	109 cf	**4.00'D x 8.65'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	52.83'	**24.0" Round Culvert** L= 93.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 52.83' / 52.47' S= 0.0039 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=13.07 cfs @ 12.09 hrs HW=63.16' TW=62.41' (Dynamic Tailwater)
1=Culvert (Inlet Controls 13.07 cfs @ 4.16 fps)

Summary for Pond PA-95:

Inflow Area = 31.586 ac, 46.23% Impervious, Inflow Depth > 4.29" for 25 yr event
Inflow = 28.39 cfs @ 12.23 hrs, Volume= 11.299 af
Outflow = 22.56 cfs @ 13.50 hrs, Volume= 11.298 af, Atten= 21%, Lag= 76.2 min
Primary = 22.56 cfs @ 13.50 hrs, Volume= 11.298 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 65.14' @ 12.11 hrs Surf.Area= 13 sf Storage= 105 cf
Flood Elev= 61.27' Surf.Area= 13 sf Storage= 105 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (915.0 - 915.0)

Volume	Invert	Avail.Storage	Storage Description
#1	52.95'	105 cf	**4.00'D x 8.32'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	52.95'	**24.0" Round Culvert** L= 93.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 52.95' / 52.59' S= 0.0039 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=12.10 cfs @ 13.50 hrs HW=60.19' TW=59.55' (Dynamic Tailwater)
1=Culvert (Inlet Controls 12.10 cfs @ 3.85 fps)

Summary for Pond PA-95A:

Flood Elevation Estimated

Inflow Area = 31.937 ac, 46.82% Impervious, Inflow Depth > 4.31" for 25 yr event
Inflow = 23.30 cfs @ 12.17 hrs, Volume= 11.461 af
Outflow = 22.95 cfs @ 12.17 hrs, Volume= 11.461 af, Atten= 2%, Lag= 0.0 min
Primary = 22.95 cfs @ 12.17 hrs, Volume= 11.461 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 64.27' @ 12.09 hrs Surf.Area= 1 sf Storage= 7 cf
Flood Elev= 61.38' Surf.Area= 1 sf Storage= 7 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (912.6 - 912.6)

Volume	Invert	Avail.Storage	Storage Description
#1	52.80'	7 cf	**1.00'D x 8.58'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	52.80'	**24.0" Round Culvert** L= 51.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 52.59' / 52.80' S= -0.0041 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=21.37 cfs @ 12.17 hrs HW=61.68' TW=59.69' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 21.37 cfs @ 6.80 fps)

Summary for Pond PA-96:

Inflow Area = 31.260 ac, 45.67% Impervious, Inflow Depth > 4.28" for 25 yr event
Inflow = 27.33 cfs @ 12.23 hrs, Volume= 11.148 af
Outflow = 27.64 cfs @ 12.23 hrs, Volume= 11.148 af, Atten= 0%, Lag= 0.0 min
Primary = 27.64 cfs @ 12.23 hrs, Volume= 11.148 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 66.03' @ 12.11 hrs Surf.Area= 13 sf Storage= 89 cf
Flood Elev= 59.98' Surf.Area= 13 sf Storage= 89 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (917.3 - 917.2)

Volume	Invert	Avail.Storage	Storage Description
#1	52.92'	89 cf	**4.00'D x 7.06'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	52.92'	**24.0" Round Culvert** L= 93.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 52.83' / 52.92' S= -0.0010 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=17.17 cfs @ 12.23 hrs HW=64.88' TW=63.59' (Dynamic Tailwater)
1=Culvert (Inlet Controls 17.17 cfs @ 5.46 fps)

Summary for Pond PA-99:

Inflow Area = 30.563 ac, 44.43% Impervious, Inflow Depth > 4.25" for 25 yr event
Inflow = 25.40 cfs @ 12.29 hrs, Volume= 10.818 af
Outflow = 25.53 cfs @ 12.23 hrs, Volume= 10.818 af, Atten= 0%, Lag= 0.0 min
Primary = 25.53 cfs @ 12.23 hrs, Volume= 10.825 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 68.25' @ 12.23 hrs Surf.Area= 15,013 sf Storage= 8,628 cf
Flood Elev= 58.94' Surf.Area= 13 sf Storage= 68 cf

Plug-Flow detention time= 4.8 min calculated for 10.814 af (100% of inflow)
Center-of-Mass det. time= 4.7 min (922.5 - 917.7)

Volume	Invert	Avail.Storage	Storage Description
#1	53.49'	68 cf	**4.00'D x 5.45'H Vertical Cone/Cylinder**
#2	58.94'	8,560 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		8,628 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
58.94	0	0	0
59.00	2,000	60	60
60.00	15,000	8,500	8,560

Device	Routing	Invert	Outlet Devices
#1	Primary	53.49'	**24.0" Round Culvert** L= 296.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 53.49' / 52.88' S= 0.0021 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=18.47 cfs @ 12.23 hrs HW=67.66' TW=64.88' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 18.47 cfs @ 5.88 fps)

Summary for Pond PC4-1S:

Inflow Area = 12.623 ac, 49.47% Impervious, Inflow Depth > 3.20" for 25 yr event
Inflow = 11.48 cfs @ 12.29 hrs, Volume= 3.362 af
Outflow = 12.68 cfs @ 12.29 hrs, Volume= 3.362 af, Atten= 0%, Lag= 0.0 min
Primary = 12.68 cfs @ 12.29 hrs, Volume= 3.362 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 68.11' @ 12.23 hrs Surf.Area= 2,371 sf Storage= 1,676 cf

Plug-Flow detention time= 3.3 min calculated for 3.360 af (100% of inflow)
Center-of-Mass det. time= 3.2 min (906.1 - 902.9)

Volume	Invert	Avail.Storage	Storage Description
#1	57.51'	1,676 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
57.51	2	0	0
58.00	54	14	14
59.00	450	252	266
60.00	2,371	1,411	1,676

Device	Routing	Invert	Outlet Devices
#1	Primary	57.51'	**18.0" Round Culvert** L= 106.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 57.51' / 56.19' S= 0.0125 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 12.29 hrs HW=66.48' TW=66.49' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond PC4-2:

Inflow Area = 11.617 ac, 51.13% Impervious, Inflow Depth > 2.52" for 25 yr event
Inflow = 17.95 cfs @ 12.08 hrs, Volume= 2.437 af
Outflow = 9.46 cfs @ 13.07 hrs, Volume= 2.437 af, Atten= 47%, Lag= 59.8 min
Primary = 9.46 cfs @ 13.07 hrs, Volume= 2.998 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 61.78' @ 13.06 hrs Surf.Area= 51,875 sf Storage= 20,649 cf

Plug-Flow detention time= 24.8 min calculated for 2.437 af (100% of inflow)
Center-of-Mass det. time= 24.7 min (926.2 - 901.5)

Volume	Invert	Avail.Storage	Storage Description
#1	59.37'	33,721 cf	**Wetland Storage (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
59.37	2	0	0
60.00	54	18	18
61.00	446	250	268
62.00	66,460	33,453	33,721

Device	Routing	Invert	Outlet Devices
#1	Primary	59.37'	**18.0" Round Culvert** L= 65.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 59.37' / 59.23' S= 0.0022 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 13.07 hrs HW=61.77' TW=62.14' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond PJB2: (new Pond)

Inflow Area = 4.881 ac, 44.18% Impervious, Inflow Depth > 4.16" for 25 yr event
Inflow = 10.50 cfs @ 12.31 hrs, Volume= 1.690 af
Outflow = 4.37 cfs @ 12.30 hrs, Volume= 1.690 af, Atten= 58%, Lag= 0.0 min
Primary = 4.37 cfs @ 12.30 hrs, Volume= 2.404 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 64.72' @ 13.68 hrs Surf.Area= 24,213 sf Storage= 18,223 cf

Plug-Flow detention time= 65.3 min calculated for 1.689 af (100% of inflow)
Center-of-Mass det. time= 65.2 min (912.9 - 847.7)

Volume	Invert	Avail.Storage	Storage Description
#1	62.30'	20,624 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
62.30	0	0	0
62.82	323	84	84
63.82	7,382	3,853	3,936
64.82	25,993	16,687	20,624

Device	Routing	Invert	Outlet Devices
#1	Primary	62.30'	**18.0" Round Culvert** L= 75.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.30' / 61.55' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	62.30'	**12.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=4.37 cfs @ 12.30 hrs HW=64.15' TW=62.81' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 4.37 cfs of 7.04 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 4.37 cfs @ 5.57 fps)

Summary for Pond PS-12: (new Pond)

Inflow Area = 47.534 ac, 4.29% Impervious, Inflow Depth > 2.96" for 25 yr event
Inflow = 64.32 cfs @ 13.79 hrs, Volume= 11.711 af
Outflow = 70.80 cfs @ 13.79 hrs, Volume= 11.711 af, Atten= 0%, Lag= 0.0 min
Primary = 70.80 cfs @ 13.79 hrs, Volume= 11.711 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 76.63' @ 13.10 hrs Surf.Area= 13 sf Storage= 135 cf
Flood Elev= 53.90' Surf.Area= 13 sf Storage= 135 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (901.9 - 901.9)

Volume	Invert	Avail.Storage	Storage Description
#1	43.15'	135 cf	**4.00'D x 10.75'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	43.15'	**30.0" Round Culvert** L= 190.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.15' / 42.91' S= 0.0013 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=46.56 cfs @ 13.79 hrs HW=59.18' TW=54.63' (Dynamic Tailwater)
1=Culvert (Outlet Controls 46.56 cfs @ 9.49 fps)

Summary for Pond PS-13:

Inflow Area = 9.000 ac, 0.00% Impervious, Inflow Depth = 1.89" for 25 yr event
Inflow = 12.04 cfs @ 13.26 hrs, Volume= 1.417 af
Outflow = 11.22 cfs @ 13.27 hrs, Volume= 1.417 af, Atten= 7%, Lag= 0.4 min
Primary = 11.22 cfs @ 13.27 hrs, Volume= 1.430 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 70.13' @ 12.98 hrs Surf.Area= 13 sf Storage= 98 cf
Flood Elev= 52.36' Surf.Area= 13 sf Storage= 98 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (907.7 - 907.4)

Volume	Invert	Avail.Storage	Storage Description
#1	44.55'	98 cf	**4.00'D x 7.81'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	44.55'	**15.0" Round Culvert** L= 315.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 44.55' / 44.37' S= 0.0006 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=8.84 cfs @ 13.27 hrs HW=55.28' TW=50.25' (Dynamic Tailwater)
1=Culvert (Outlet Controls 8.84 cfs @ 7.20 fps)

Summary for Pond RWE DMH 104: (new Pond)

Inflow Area = 227.899 ac, 47.23% Impervious, Inflow Depth > 4.20" for 25 yr event
Inflow = 244.27 cfs @ 12.57 hrs, Volume= 79.758 af
Outflow = 244.29 cfs @ 12.62 hrs, Volume= 79.758 af, Atten= 0%, Lag= 2.8 min
Primary = 145.13 cfs @ 12.48 hrs, Volume= 56.429 af
Secondary = 99.50 cfs @ 12.58 hrs, Volume= 23.329 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 25.60' @ 12.58 hrs Surf.Area= 28 sf Storage= 170 cf

Plug-Flow detention time= 0.0 min calculated for 79.758 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (826.8 - 826.8)

Volume	Invert	Avail.Storage	Storage Description
#1	18.67'	170 cf	**6.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	18.67'	**60.0" Round RCP_Round 60"** L= 52.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 18.67' / 18.50' S= 0.0033 '/' Cc= 0.900 n= 0.013, Flow Area= 19.63 sf
#2	Secondary	19.79'	**42.0" Round Culvert** L= 45.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 19.79' / 19.67' S= 0.0027 '/' Cc= 0.900 n= 0.013, Flow Area= 9.62 sf

Primary OutFlow Max=143.35 cfs @ 12.48 hrs HW=25.57' TW=24.10' (Dynamic Tailwater)
↑—**1=RCP_Round 60"** (Inlet Controls 143.35 cfs @ 7.30 fps)

Secondary OutFlow Max=99.45 cfs @ 12.58 hrs HW=25.60' (Free Discharge)
↑—**2=Culvert** (Barrel Controls 99.45 cfs @ 10.34 fps)

Summary for Pond RWE DMH102: (new Pond)

Volume	Invert	Avail.Storage	Storage Description
#1	21.02'	170 cf	**6.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	21.02'	**60.0" Round RCP_Round 60"** L= 170.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 21.02' / 19.47' S= 0.0091 '/' Cc= 0.900 n= 0.013, Flow Area= 19.63 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=19.42' (Dynamic Tailwater)
↑—**1=RCP_Round 60"** (Controls 0.00 cfs)

Summary for Pond RWE DMH103: (new Pond)

Inflow Area = 227.899 ac, 47.23% Impervious, Inflow Depth > 4.20" for 25 yr event
Inflow = 244.29 cfs @ 12.57 hrs, Volume= 79.758 af
Outflow = 244.27 cfs @ 12.57 hrs, Volume= 79.758 af, Atten= 0%, Lag= 0.0 min
Primary = 244.27 cfs @ 12.57 hrs, Volume= 79.758 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 29.84' @ 12.58 hrs Surf.Area= 28 sf Storage= 170 cf

Plug-Flow detention time= 0.0 min calculated for 79.732 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (826.8 - 826.8)

Volume	Invert	Avail.Storage	Storage Description
#1	19.42'	170 cf	**6.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	19.42'	**60.0" Round RCP_Round 60"** L= 130.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 19.42' / 18.77' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 19.63 sf

Primary OutFlow Max=243.12 cfs @ 12.57 hrs HW=29.83' TW=25.60' (Dynamic Tailwater)
↑**1=RCP_Round 60"** (Inlet Controls 243.12 cfs @ 12.38 fps)

Summary for Pond RWE DMH105: (new Pond)

Inflow Area = 227.899 ac, 47.23% Impervious, Inflow Depth > 2.97" for 25 yr event
Inflow = 145.13 cfs @ 12.48 hrs, Volume= 56.429 af
Outflow = 145.04 cfs @ 12.48 hrs, Volume= 56.429 af, Atten= 0%, Lag= 0.0 min
Primary = 145.04 cfs @ 12.48 hrs, Volume= 56.429 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 24.12' @ 12.51 hrs Surf.Area= 28 sf Storage= 158 cf

Plug-Flow detention time= 0.0 min calculated for 56.429 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (836.3 - 836.2)

Volume	Invert	Avail.Storage	Storage Description
#1	18.54'	170 cf	**6.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	18.54'	**60.0" Round RCP_Round 60"** L= 529.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 18.54' / 15.54' S= 0.0057 '/' Cc= 0.900 n= 0.013, Flow Area= 19.63 sf

Primary OutFlow Max=142.00 cfs @ 12.48 hrs HW=24.10' TW=21.34' (Dynamic Tailwater)
↑**1=RCP_Round 60"** (Outlet Controls 142.00 cfs @ 8.12 fps)

Summary for Pond RWE DMH106: Outfall 3

Inflow Area = 227.899 ac, 47.23% Impervious, Inflow Depth > 2.97" for 25 yr event
Inflow = 145.04 cfs @ 12.48 hrs, Volume= 56.429 af
Outflow = 145.06 cfs @ 12.48 hrs, Volume= 56.428 af, Atten= 0%, Lag= 0.0 min
Primary = 145.06 cfs @ 12.48 hrs, Volume= 56.428 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 21.35' @ 12.48 hrs Surf.Area= 28 sf Storage= 164 cf

Plug-Flow detention time= 0.0 min calculated for 56.428 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (836.3 - 836.3)

Volume	Invert	Avail.Storage	Storage Description
#1	15.54'	170 cf	**6.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	15.54'	**60.0" Round RCP_Round 60"** L= 283.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 15.54' / 15.00' S= 0.0019 '/' Cc= 0.900 n= 0.013, Flow Area= 19.63 sf

Primary OutFlow Max=144.84 cfs @ 12.48 hrs HW=21.34' (Free Discharge)
↑**1=RCP_Round 60"** (Barrel Controls 144.84 cfs @ 7.99 fps)

Summary for Pond RWW CB10: (new Pond)

Inflow Area = 12.623 ac, 88.36% Impervious, Inflow Depth = 5.33" for 25 yr event
Inflow = 71.19 cfs @ 12.06 hrs, Volume= 5.608 af
Outflow = 72.08 cfs @ 12.07 hrs, Volume= 5.608 af, Atten= 0%, Lag= 0.2 min
Primary = 72.08 cfs @ 12.07 hrs, Volume= 5.608 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.02' @ 12.07 hrs Surf.Area= 0.001 ac Storage= 0.004 af

Plug-Flow detention time= 0.1 min calculated for 5.607 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (750.4 - 750.3)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	0.004 af	**6.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	44.50'	**30.0" Round Culvert** L= 200.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 44.50' / 38.26' S= 0.0312 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=71.82 cfs @ 12.07 hrs HW=56.88' TW=46.74' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 71.82 cfs @ 14.63 fps)

Summary for Pond TWC CB10: (new Pond)

Inflow Area = 4.274 ac, 54.68% Impervious, Inflow Depth = 4.67" for 25 yr event
Inflow = 21.73 cfs @ 12.09 hrs, Volume= 1.664 af
Outflow = 22.00 cfs @ 12.09 hrs, Volume= 1.664 af, Atten= 0%, Lag= 0.0 min
Primary = 22.00 cfs @ 12.09 hrs, Volume= 1.664 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 94.43' @ 12.08 hrs Surf.Area= 0.000 ac Storage= 0.002 af

Plug-Flow detention time= 0.1 min calculated for 1.664 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (770.3 - 770.2)

Volume	Invert	Avail.Storage	Storage Description
#1	38.90'	0.002 af	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	38.90'	**15.0" Round Culvert** L= 46.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 38.90' / 37.00' S= 0.0413 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf

Primary OutFlow Max=17.47 cfs @ 12.09 hrs HW=91.89' TW=85.70' (Dynamic Tailwater)
1=Culvert (Outlet Controls 17.47 cfs @ 14.24 fps)

Summary for Pond TWC CB11: (new Pond)

Inflow Area = 3.910 ac, 56.21% Impervious, Inflow Depth = 3.95" for 25 yr event
Inflow = 13.86 cfs @ 12.14 hrs, Volume= 1.286 af
Outflow = 16.23 cfs @ 12.15 hrs, Volume= 1.286 af, Atten= 0%, Lag= 0.5 min
Primary = 16.23 cfs @ 12.15 hrs, Volume= 1.286 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 78.72' @ 12.09 hrs Surf.Area= 28 sf Storage= 170 cf

Plug-Flow detention time= 0.3 min calculated for 1.286 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (774.3 - 774.0)

Volume	Invert	Avail.Storage	Storage Description
#1	38.30'	170 cf	**6.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	38.30'	**12.0" Round RCP_Round 12"** L= 35.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 38.30' / 38.00' S= 0.0086 '/' Cc= 0.900 n= 0.010 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=16.12 cfs @ 12.15 hrs HW=71.14' TW=59.03' (Dynamic Tailwater)
↑**1=RCP_Round 12"** (Outlet Controls 16.12 cfs @ 20.53 fps)

Summary for Pond TWC CB14: TWC CB14

Inflow Area = 9.009 ac, 65.85% Impervious, Inflow Depth = 4.89" for 25 yr event
Inflow = 39.07 cfs @ 12.09 hrs, Volume= 3.673 af
Outflow = 39.02 cfs @ 12.10 hrs, Volume= 3.673 af, Atten= 0%, Lag= 0.1 min
Primary = 39.02 cfs @ 12.10 hrs, Volume= 3.673 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 316.10' @ 12.10 hrs Surf.Area= 13 sf Storage= 75 cf

Plug-Flow detention time= 0.1 min calculated for 3.673 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (766.1 - 766.0)

Volume	Invert	Avail.Storage	Storage Description
#1	36.06'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	36.06'	**12.0" Round RCP_Round 12"** L= 110.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 36.06' / 35.50' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=39.00 cfs @ 12.10 hrs HW=315.71' TW=137.50' (Dynamic Tailwater)
1=RCP_Round 12" (Outlet Controls 39.00 cfs @ 49.66 fps)

Summary for Pond TWC CB15: (new Pond)

Inflow Area = 9.009 ac, 65.85% Impervious, Inflow Depth = 4.89" for 25 yr event
Inflow = 39.08 cfs @ 12.09 hrs, Volume= 3.673 af
Outflow = 39.07 cfs @ 12.09 hrs, Volume= 3.673 af, Atten= 0%, Lag= 0.0 min
Primary = 39.07 cfs @ 12.09 hrs, Volume= 3.673 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 578.71' @ 12.10 hrs Surf.Area= 13 sf Storage= 75 cf

Plug-Flow detention time= 0.1 min calculated for 3.673 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (766.0 - 765.9)

Volume	Invert	Avail.Storage	Storage Description
#1	36.96'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	36.96'	**12.0" Round RCP_Round 12"** L= 181.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 36.96' / 36.16' S= 0.0044 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=38.89 cfs @ 12.09 hrs HW=577.56' TW=315.48' (Dynamic Tailwater)
1=RCP_Round 12" (Outlet Controls 38.89 cfs @ 49.52 fps)

Summary for Pond TWC CB16: (new Pond)

Inflow Area = 3.851 ac, 83.66% Impervious, Inflow Depth = 5.24" for 25 yr event
Inflow = 21.73 cfs @ 12.07 hrs, Volume= 1.682 af
Primary = 21.73 cfs @ 12.07 hrs, Volume= 1.682 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Summary for Pond TWC CB17: (new Pond)

Inflow Area = 3.851 ac, 83.66% Impervious, Inflow Depth = 5.24" for 25 yr event
Inflow = 21.68 cfs @ 12.07 hrs, Volume= 1.682 af
Outflow = 21.73 cfs @ 12.07 hrs, Volume= 1.682 af, Atten= 0%, Lag= 0.0 min
Primary = 21.73 cfs @ 12.07 hrs, Volume= 1.682 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 138.19' @ 12.07 hrs Surf.Area= 13 sf Storage= 75 cf

Plug-Flow detention time= 0.2 min calculated for 1.682 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (752.8 - 752.7)

Volume	Invert	Avail.Storage	Storage Description
#1	38.65'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	38.65'	**12.0" Round RCP_Round 12"** L= 229.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 38.65' / 37.50' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=21.72 cfs @ 12.07 hrs HW=138.12' TW=0.00' (Dynamic Tailwater)
↑**1=RCP_Round 12"** (Barrel Controls 21.72 cfs @ 27.65 fps)

Summary for Pond TWC CB18: (new Pond)

Inflow Area = 3.851 ac, 83.66% Impervious, Inflow Depth = 5.24" for 25 yr event
Inflow = 21.71 cfs @ 12.07 hrs, Volume= 1.682 af
Outflow = 21.68 cfs @ 12.07 hrs, Volume= 1.682 af, Atten= 0%, Lag= 0.0 min
Primary = 21.68 cfs @ 12.07 hrs, Volume= 1.682 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 159.24' @ 12.07 hrs Surf.Area= 0.000 ac Storage= 0.002 af

Plug-Flow detention time= 0.2 min calculated for 1.682 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (752.7 - 752.6)

Volume	Invert	Avail.Storage	Storage Description
#1	39.00'	0.002 af	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	39.00'	**12.0" Round RCP_Round 12"** L= 16.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 39.00' / 38.75' S= 0.0156 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=21.68 cfs @ 12.07 hrs HW=159.10' TW=138.07' (Dynamic Tailwater)
↑**1=RCP_Round 12"** (Inlet Controls 21.68 cfs @ 27.60 fps)

Summary for Pond TWC CB7: (new Pond)

Inflow Area = 4.274 ac, 54.68% Impervious, Inflow Depth = 4.67" for 25 yr event
Inflow = 21.51 cfs @ 12.08 hrs, Volume= 1.664 af
Outflow = 21.57 cfs @ 12.09 hrs, Volume= 1.664 af, Atten= 0%, Lag= 0.2 min
Primary = 21.57 cfs @ 12.09 hrs, Volume= 1.664 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 130.52' @ 12.09 hrs Surf.Area= 0.000 ac Storage= 0.002 af

Plug-Flow detention time= 0.2 min calculated for 1.664 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (770.1 - 770.0)

Volume	Invert	Avail.Storage	Storage Description
#1	40.52'	0.002 af	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	40.52'	**12.0" Round RCP_Round 12"** L= 48.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 40.52' / 40.25' S= 0.0056 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=21.70 cfs @ 12.09 hrs HW=128.80' TW=101.79' (Dynamic Tailwater)
1=RCP_Round 12" (Outlet Controls 21.70 cfs @ 27.63 fps)

Summary for Pond TWC CB8: (new Pond)

Inflow Area = 4.274 ac, 54.68% Impervious, Inflow Depth = 4.67" for 25 yr event
Inflow = 21.57 cfs @ 12.09 hrs, Volume= 1.664 af
Outflow = 21.73 cfs @ 12.09 hrs, Volume= 1.664 af, Atten= 0%, Lag= 0.1 min
Primary = 21.73 cfs @ 12.09 hrs, Volume= 1.664 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 103.41' @ 12.08 hrs Surf.Area= 0.000 ac Storage= 0.002 af

Plug-Flow detention time= 0.1 min calculated for 1.664 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (770.2 - 770.1)

Volume	Invert	Avail.Storage	Storage Description
#1	40.15'	0.002 af	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	40.15'	**15.0" Round Culvert** L= 46.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 40.15' / 39.00' S= 0.0250 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf

Primary OutFlow Max=21.54 cfs @ 12.09 hrs HW=101.48' TW=92.06' (Dynamic Tailwater)
1=Culvert (Outlet Controls 21.54 cfs @ 17.55 fps)

Summary for Pond TWC CB9: (new Pond)

Inflow Area = 20.104 ac, 64.15% Impervious, Inflow Depth = 4.36" for 25 yr event
Inflow = 83.90 cfs @ 12.07 hrs, Volume= 7.298 af
Outflow = 83.65 cfs @ 12.07 hrs, Volume= 7.298 af, Atten= 0%, Lag= 0.1 min
Primary = 83.65 cfs @ 12.07 hrs, Volume= 7.298 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 86.09' @ 12.09 hrs Surf.Area= 28 sf Storage= 170 cf

Plug-Flow detention time= 0.1 min calculated for 7.298 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (763.7 - 763.6)

Volume	Invert	Avail.Storage	Storage Description
#1	36.50'	170 cf	**6.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	36.50'	**30.0" Round Culvert** L= 405.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 36.50' / 35.00' S= 0.0037 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=83.02 cfs @ 12.07 hrs HW=84.11' TW=66.86' (Dynamic Tailwater)
1=Culvert (Outlet Controls 83.02 cfs @ 16.91 fps)

Summary for Pond TWC DMH10: (new Pond)

Inflow Area = 24.014 ac, 62.86% Impervious, Inflow Depth = 4.29" for 25 yr event
Inflow = 97.79 cfs @ 12.09 hrs, Volume= 8.584 af
Outflow = 98.05 cfs @ 12.09 hrs, Volume= 8.584 af, Atten= 0%, Lag= 0.0 min
Primary = 98.05 cfs @ 12.09 hrs, Volume= 8.584 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 68.83' @ 12.09 hrs Surf.Area= 28 sf Storage= 170 cf

Plug-Flow detention time= 0.1 min calculated for 8.584 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (765.4 - 765.3)

Volume	Invert	Avail.Storage	Storage Description
#1	34.90'	170 cf	**6.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	34.90'	**30.0" Round Culvert** L= 715.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 34.90' / 24.00' S= 0.0152 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=97.91 cfs @ 12.09 hrs HW=68.66' TW=31.97' (Dynamic Tailwater)
1=Culvert (Outlet Controls 97.91 cfs @ 19.95 fps)

Summary for Pond TWC DMH3: (new Pond)

Inflow Area = 227.899 ac, 47.23% Impervious, Inflow Depth > 4.20" for 25 yr event
Inflow = 244.28 cfs @ 12.57 hrs, Volume= 79.759 af
Outflow = 244.29 cfs @ 12.57 hrs, Volume= 79.758 af, Atten= 0%, Lag= 0.0 min
Primary = 244.29 cfs @ 12.57 hrs, Volume= 79.758 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 35.32' @ 12.57 hrs Surf.Area= 13 sf Storage= 75 cf

Plug-Flow detention time= 0.0 min calculated for 79.758 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (826.8 - 826.8)

Volume	Invert	Avail.Storage	Storage Description
#1	22.30'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	25.08'	**60.0" Round Culvert** L= 423.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 25.08' / 21.02' S= 0.0096 '/' Cc= 0.900 n= 0.011, Flow Area= 19.63 sf

Primary OutFlow Max=242.60 cfs @ 12.57 hrs HW=35.31' TW=29.83' (Dynamic Tailwater)
1=Culvert (Outlet Controls 242.60 cfs @ 12.36 fps)

Summary for Pond TWC DMH5: (new Pond)

Inflow Area = 9.009 ac, 65.85% Impervious, Inflow Depth = 4.89" for 25 yr event
Inflow = 39.02 cfs @ 12.10 hrs, Volume= 3.673 af
Outflow = 39.06 cfs @ 12.10 hrs, Volume= 3.673 af, Atten= 0%, Lag= 0.1 min
Primary = 39.06 cfs @ 12.10 hrs, Volume= 3.673 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 137.71' @ 12.10 hrs Surf.Area= 13 sf Storage= 75 cf

Plug-Flow detention time= 0.1 min calculated for 3.673 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (766.2 - 766.1)

Volume	Invert	Avail.Storage	Storage Description
#1	35.40'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	35.40'	**12.0" Round RCP_Round 12"** L= 46.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 35.40' / 35.14' S= 0.0057 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=39.04 cfs @ 12.10 hrs HW=137.59' TW=33.39' (Dynamic Tailwater)
↑**1=RCP_Round 12"** (Barrel Controls 39.04 cfs @ 49.71 fps)

Summary for Pond TWIN P: (new Pond)

Inflow Area = 1.030 ac, 75.73% Impervious, Inflow Depth = 5.09" for 25 yr event
Inflow = 4.44 cfs @ 12.17 hrs, Volume= 0.437 af
Outflow = 4.00 cfs @ 12.23 hrs, Volume= 0.437 af, Atten= 10%, Lag= 3.7 min
Primary = 4.00 cfs @ 12.23 hrs, Volume= 0.437 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 66.82' @ 12.23 hrs Surf.Area= 1,723 sf Storage= 944 cf

Plug-Flow detention time= 4.3 min calculated for 0.436 af (100% of inflow)
Center-of-Mass det. time= 4.3 min (768.2 - 763.9)

Volume	Invert	Avail.Storage	Storage Description
#1	65.85'	2,413 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
65.85	0	0	0
66.00	500	38	38
67.00	2,000	1,250	1,288
67.50	2,500	1,125	2,413

Device	Routing	Invert	Outlet Devices
#1	Primary	65.85'	**12.0" Round Culvert X 2.00** L= 75.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 65.85' / 65.53' S= 0.0043 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=4.00 cfs @ 12.23 hrs HW=66.82' TW=65.74' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 4.00 cfs @ 3.28 fps)

Summary for Pond WQF 1: (new Pond)

Inflow Area = 7.022 ac, 78.71% Impervious, Inflow Depth = 5.14" for 25 yr event
Inflow = 37.45 cfs @ 12.09 hrs, Volume= 3.010 af
Outflow = 24.23 cfs @ 12.31 hrs, Volume= 2.406 af, Atten= 35%, Lag= 13.4 min
Primary = 27.19 cfs @ 12.31 hrs, Volume= 2.763 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 61.20' @ 12.31 hrs Surf.Area= 31,004 sf Storage= 46,596 cf

Plug-Flow detention time= 154.2 min calculated for 2.405 af (80% of inflow)
Center-of-Mass det. time= 76.6 min (832.8 - 756.3)

Volume	Invert	Avail.Storage	Storage Description
#1	59.50'	73,209 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
59.50	25,194	0	0
60.00	26,257	12,863	12,863
60.50	27,630	13,472	26,335
61.00	28,938	14,142	40,477
61.50	33,997	15,734	56,210
62.00	33,997	16,999	73,209

Device	Routing	Invert	Outlet Devices
#1	Primary	60.50'	**3.0" x 3.0" Horiz. Orifice/Grate X 48.00 columns** X 2 rows C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 12.31 hrs HW=61.20' TW=62.18' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond WQU: (new Pond)

Inflow Area = 23.400 ac, 61.69% Impervious, Inflow Depth = 2.35" for 25 yr event
Inflow = 48.22 cfs @ 12.10 hrs, Volume= 4.589 af
Outflow = 48.22 cfs @ 12.10 hrs, Volume= 4.589 af, Atten= 0%, Lag= 0.0 min
Primary = 48.22 cfs @ 12.10 hrs, Volume= 4.589 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 45.90' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	33.72'	**24.0" Round Culvert** L= 80.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 33.72' / 33.53' S= 0.0024 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=47.85 cfs @ 12.10 hrs HW=45.82' TW=35.81' (Dynamic Tailwater)
1=Culvert (Inlet Controls 47.85 cfs @ 15.23 fps)

Summary for Link 1R: 25 Year

Inflow Area = 8.518 ac, 70.03% Impervious, Inflow Depth = 4.31" for 25 yr event
Inflow = 36.91 cfs @ 12.05 hrs, Volume= 3.059 af
Primary = 36.91 cfs @ 12.05 hrs, Volume= 3.059 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

479 Point manual hydrograph, To= 0.10 hrs, dt= 0.05 hrs, Area= 8.518 ac, 70.03% Imp., cfs =

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.04
0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06
0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.07	0.08	0.08
0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.10	0.10
0.10	0.10	0.11	0.11	0.12	0.16	0.16	0.16	0.16	0.17
0.17	0.18	0.18	0.19	0.19	0.19	0.20	0.20	0.20	0.20
0.21	0.21	0.21	0.22	0.22	0.22	0.22	0.23	0.23	0.23
0.23	0.24	0.24	0.24	0.25	0.25	0.26	0.26	0.26	0.27
0.27	0.27	0.27	0.28	0.28	0.29	0.29	0.29	0.30	0.30
0.30	0.30	0.31	0.31	0.31	0.32	0.32	0.32	0.32	0.33
0.33	0.34	0.34	0.35	0.36	0.36	0.37	0.38	0.38	0.39
0.40	0.41	0.41	0.42	0.43	0.44	0.44	0.45	0.46	0.47
0.47	0.48	0.49	0.50	0.51	0.51	0.52	0.53	0.54	0.55
0.55	0.56	0.57	0.58	0.59	0.60	0.60	0.61	0.62	0.63
0.64	0.66	0.67	0.69	0.71	0.72	0.74	0.76	0.78	0.80
0.82	0.83	0.85	0.87	0.89	0.91	0.93	0.95	0.97	0.99
1.01	1.03	1.05	1.07	1.09	1.11	1.13	1.15	1.18	1.20
1.22	1.24	1.26	1.28	1.31	1.33	1.35	1.37	1.39	1.42
1.45	1.49	1.53	1.57	1.61	1.65	1.70	1.74	1.78	1.83
1.87	1.91	1.96	2.00	2.05	2.09	2.14	2.19	2.23	2.29
2.40	2.54	2.68	2.84	3.00	3.16	3.32	3.49	3.66	4.01
4.94	6.21	7.64	9.16	10.73	12.35	14.38	18.39	27.88	36.78
35.16	28.15	22.97	19.53	16.95	14.73	12.69	10.72	8.77	7.08
6.09	5.50	5.11	4.80	4.53	4.30	4.07	3.86	3.65	3.46
3.33	3.24	3.17	3.11	3.05	2.99	2.93	2.88	2.82	2.77
2.72	2.66	2.61	2.56	2.50	2.45	2.40	2.34	2.29	2.24
2.20	2.17	2.14	2.12	2.09	2.06	2.04	2.01	1.98	1.96
1.93	1.91	1.88	1.86	1.83	1.81	1.78	1.76	1.73	1.71
1.68	1.66	1.63	1.61	1.58	1.56	1.53	1.50	1.48	1.45
1.43	1.40	1.38	1.35	1.33	1.30	1.27	1.25	1.22	1.20
1.18	1.17	1.15	1.14	1.13	1.12	1.10	1.09	1.08	1.07
1.06	1.05	1.04	1.02	1.01	1.00	0.99	0.98	0.97	0.96
0.95	0.94	0.92	0.91	0.90	0.89	0.88	0.87	0.86	0.85
0.83	0.82	0.81	0.80	0.79	0.78	0.77	0.76	0.75	0.73
0.73	0.72	0.72	0.71	0.71	0.71	0.70	0.70	0.70	0.69
0.69	0.69	0.68	0.68	0.68	0.67	0.67	0.67	0.66	0.66
0.66	0.65	0.65	0.65	0.64	0.64	0.64	0.63	0.63	0.63
0.62	0.62	0.62	0.61	0.61	0.61	0.60	0.60	0.60	0.59
0.59	0.59	0.58	0.58	0.58	0.58	0.57	0.57	0.57	0.57
0.56	0.56	0.56	0.56	0.55	0.55	0.55	0.55	0.54	0.54
0.54	0.54	0.53	0.53	0.53	0.53	0.52	0.52	0.52	0.52

0.51	0.51	0.51	0.51	0.50	0.50	0.50	0.50	0.49	0.49
0.49	0.49	0.48	0.48	0.48	0.48	0.47	0.47	0.47	0.47
0.46	0.46	0.46	0.45	0.45	0.45	0.45	0.44	0.44	0.44
0.44	0.43	0.43	0.43	0.43	0.42	0.42	0.42	0.42	0.41
0.41	0.41	0.41	0.40	0.40	0.40	0.40	0.39	0.39	

Summary for Link 5R: 25 Year

Inflow Area = 1.754 ac, 90.88% Impervious, Inflow Depth = 5.02" for 25 yr event
Inflow = 10.01 cfs @ 12.05 hrs, Volume= 0.733 af
Primary = 10.01 cfs @ 12.05 hrs, Volume= 0.733 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

479 Point manual hydrograph, To= 0.10 hrs, dt= 0.05 hrs, Area= 1.754 ac, 90.88% Imp., cfs =

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03
0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.09
0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.10
0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.11	0.11
0.11	0.11	0.11	0.12	0.12	0.12	0.12	0.12	0.13	0.13
0.13	0.13	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.15
0.16	0.16	0.16	0.16	0.17	0.17	0.17	0.17	0.18	0.18
0.18	0.18	0.19	0.19	0.19	0.19	0.20	0.20	0.20	0.20
0.21	0.21	0.22	0.23	0.23	0.24	0.24	0.25	0.25	0.26
0.26	0.27	0.27	0.28	0.28	0.29	0.30	0.30	0.31	0.31
0.32	0.32	0.33	0.34	0.34	0.35	0.35	0.36	0.36	0.37
0.38	0.38	0.39	0.39	0.40	0.40	0.41	0.42	0.42	0.43
0.44	0.45	0.46	0.47	0.49	0.50	0.51	0.52	0.53	0.54
0.56	0.57	0.58	0.59	0.60	0.61	0.63	0.64	0.65	0.67
0.71	0.75	0.79	0.84	0.88	0.92	0.97	1.01	1.06	1.19
1.54	1.94	2.36	2.77	3.19	3.62	4.05	5.23	8.23	10.01
7.66	5.00	4.09	3.64	3.22	2.80	2.38	1.95	1.53	1.20
1.10	1.05	1.01	0.96	0.92	0.87	0.83	0.79	0.74	0.71
0.69	0.68	0.67	0.65	0.64	0.63	0.62	0.61	0.60	0.59
0.57	0.56	0.55	0.54	0.53	0.52	0.51	0.49	0.48	0.47
0.47	0.46	0.45	0.45	0.44	0.44	0.43	0.43	0.42	0.42
0.41	0.41	0.40	0.39	0.39	0.38	0.38	0.37	0.37	0.36
0.36	0.35	0.34	0.34	0.33	0.33	0.32	0.32	0.31	0.31
0.30	0.29	0.29	0.28	0.28	0.27	0.27	0.26	0.26	0.25
0.25	0.25	0.24	0.24	0.24	0.24	0.23	0.23	0.23	0.23
0.22	0.22	0.22	0.22	0.21	0.21	0.21	0.21	0.20	0.20
0.20	0.20	0.20	0.19	0.19	0.19	0.19	0.18	0.18	0.18
0.18	0.17	0.17	0.17	0.17	0.16	0.16	0.16	0.16	0.15
0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
0.15	0.15	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
0.14	0.14	0.14	0.14	0.14	0.14	0.13	0.13	0.13	0.13
0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.11
0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11

0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.10	0.10	0.10
0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.09	0.09	0.09
0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	

Summary for Link 37L: 25 YEAR

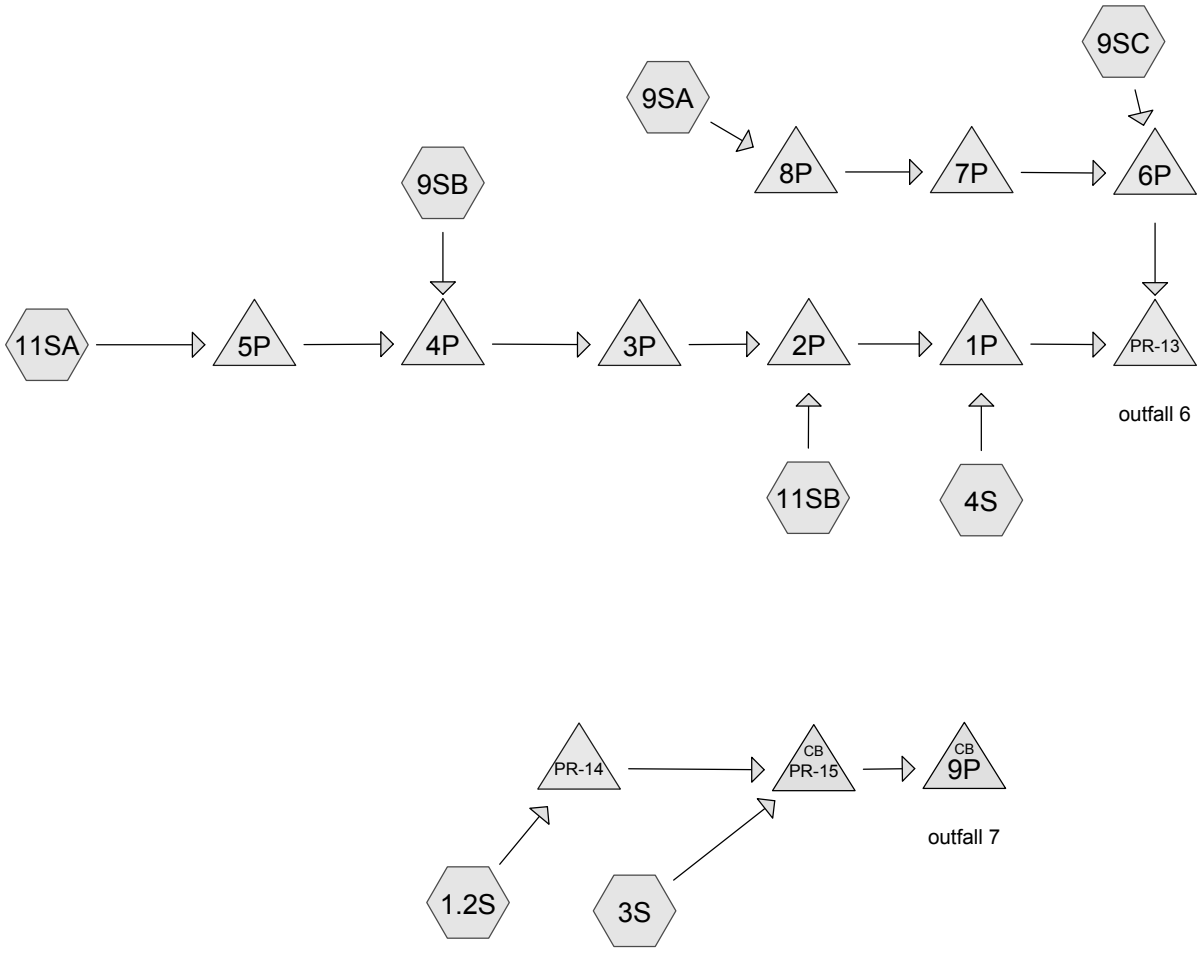
Inflow Area = 23.400 ac, 61.69% Impervious, Inflow Depth = 2.35" for 25 yr event
Inflow = 48.22 cfs @ 12.10 hrs, Volume= 4.589 af
Primary = 48.22 cfs @ 12.10 hrs, Volume= 4.589 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

479 Point manual hydrograph, To= 0.10 hrs, dt= 0.05 hrs, Area= 23.400 ac, 61.69% Imp., cfs =

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.07
0.07	0.08	0.08	0.15	0.17	0.17	0.18	0.18	0.18	0.19
0.19	0.20	0.21	0.21	0.21	0.22	0.22	0.23	0.23	0.24
0.24	0.25	0.25	0.26	0.26	0.26	0.27	0.27	0.28	0.28
0.28	0.29	0.29	0.29	0.30	0.30	0.30	0.31	0.31	0.32
0.32	0.32	0.33	0.33	0.33	0.34	0.34	0.35	0.35	0.36
0.36	0.37	0.38	0.38	0.38	0.39	0.39	0.41	0.42	0.42
0.43	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.50	0.51
0.52	0.53	0.54	0.55	0.56	0.57	0.59	0.60	0.61	0.62
0.63	0.64	0.65	0.67	0.68	0.69	0.70	0.71	0.73	0.74
0.75	0.77	0.78	0.80	0.81	0.82	0.84	0.87	0.88	0.89
0.91	0.94	0.97	1.00	1.03	1.06	1.08	1.11	1.14	1.17
1.20	1.23	1.26	1.29	1.33	1.37	1.40	1.44	1.47	1.52
1.55	1.59	1.62	1.66	1.69	1.73	1.77	1.81	1.84	1.88
1.92	1.95	1.99	2.02	2.06	2.10	2.14	2.18	2.22	2.26
2.31	2.37	2.44	2.51	2.58	2.65	2.72	2.79	2.87	2.94
3.01	3.09	3.17	3.25	3.33	3.41	3.50	3.58	3.67	3.76
3.92	4.13	4.37	4.62	4.88	5.14	5.41	5.68	5.96	6.39
7.56	9.40	11.53	13.73	15.96	18.27	20.70	24.21	32.65	44.17
48.20	41.54	33.82	28.47	24.94	22.30	20.04	17.91	15.79	14.04
12.42	11.70	11.17	10.60	10.10	9.63	9.12	8.62	8.13	7.66
7.25	6.89	6.57	6.28	6.00	5.75	5.52	5.31	5.11	4.92
4.75	4.59	4.44	4.30	4.16	4.03	3.91	3.80	3.69	3.58
3.49	3.42	3.35	3.29	3.22	3.17	3.11	3.06	3.00	2.95
2.90	2.85	2.80	2.76	2.71	2.67	2.62	2.58	2.53	2.49
2.45	2.41	2.37	2.33	2.29	2.25	2.21	2.17	2.13	2.09
2.05	2.01	1.97	1.93	1.89	1.85	1.81	1.77	1.74	1.70
1.66	1.64	1.62	1.59	1.57	1.55	1.53	1.51	1.49	1.47
1.45	1.43	1.41	1.39	1.38	1.36	1.34	1.32	1.30	1.29
1.27	1.25	1.24	1.22	1.20	1.18	1.17	1.15	1.13	1.12
1.10	1.08	1.07	1.05	1.03	1.02	1.00	0.99	0.97	0.95
0.94	0.93	0.92	0.91	0.91	0.90	0.89	0.89	0.88	0.87
0.87	0.86	0.86	0.85	0.84	0.84	0.83	0.83	0.82	0.82
0.81	0.81	0.80	0.80	0.79	0.79	0.78	0.78	0.77	0.77
0.76	0.76	0.75	0.75	0.74	0.74	0.73	0.73	0.72	0.72
0.71	0.71	0.71	0.70	0.70	0.69	0.69	0.69	0.68	0.68
0.68	0.67	0.67	0.66	0.66	0.66	0.65	0.65	0.65	0.64
0.64	0.63	0.63	0.63	0.62	0.62	0.62	0.61	0.61	0.61

0.60	0.60	0.60	0.59	0.59	0.59	0.58	0.58	0.58	0.57
0.57	0.57	0.56	0.56	0.56	0.55	0.55	0.55	0.54	0.54
0.54	0.53	0.53	0.53	0.52	0.52	0.52	0.51	0.51	0.51
0.50	0.50	0.50	0.49	0.49	0.49	0.48	0.48	0.47	0.47
0.47	0.46	0.46	0.46	0.45	0.45	0.45	0.44	0.44	



Subcat Reach Pond Link

Routing Diagram for Postdevelopment Runway 11-29 - Outfall 6 and 7

Prepared by Stantec Consulting Ltd., Printed 10/19/2018

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
137,612	61	>75% Grass cover, Good, HSG B (11SA, 11SB)
1,158,321	74	>75% Grass cover, Good, HSG C (1.2S, 3S, 4S, 9SA, 9SB, 9SC, 11SA, 11SB)
61,127	80	>75% Grass cover, Good, HSG D (1.2S, 9SA)
206,248	98	Paved parking & roofs (1.2S, 3S, 4S, 9SA, 9SB, 9SC)
1,563,308	**76**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
137,612	HSG B	11SA, 11SB
1,158,321	HSG C	1.2S, 3S, 4S, 9SA, 9SB, 9SC, 11SA, 11SB
61,127	HSG D	1.2S, 9SA
206,248	Other	1.2S, 3S, 4S, 9SA, 9SB, 9SC
1,563,308		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Sub Num
0	137,612	1,158,321	61,127	0	1,357,060	>75% Grass cover, Good	
0	0	0	0	206,248	206,248	Paved parking & roofs	
0	**137,612**	**1,158,321**	**61,127**	**206,248**	**1,563,308**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	9SB	0.00	0.00	50.0	0.0200	0.013	18.0	0.0	0.0
2	1P	12.40	12.21	96.0	0.0020	0.013	36.0	0.0	0.0
3	2P	12.72	12.50	75.0	0.0029	0.013	36.0	0.0	0.0
4	3P	13.03	12.82	70.0	0.0030	0.013	36.0	0.0	0.0
5	4P	13.50	13.13	183.0	0.0020	0.013	36.0	0.0	0.0
6	5P	23.00	15.00	385.0	0.0208	0.013	15.0	0.0	0.0
7	6P	15.09	14.94	51.0	0.0029	0.013	30.0	0.0	0.0
8	7P	15.61	15.19	141.0	0.0030	0.013	30.0	0.0	0.0
9	8P	18.00	15.71	636.0	0.0036	0.013	30.0	0.0	0.0
10	9P	28.01	26.50	846.0	0.0018	0.013	30.0	0.0	0.0
11	PR-13	12.11	11.10	60.0	0.0168	0.011	36.0	0.0	0.0
12	PR-14	28.65	28.14	103.0	0.0050	0.013	30.0	0.0	0.0
13	PR-15	28.08	28.01	39.0	0.0018	0.013	30.0	0.0	0.0

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1.2S: Runoff Area=181,553 sf 34.50% Impervious Runoff Depth=4.01"
Flow Length=384' Tc=21.1 min CN=84 Runoff=12.79 cfs 60,664 cf

Subcatchment3S: Runoff Area=54,112 sf 9.17% Impervious Runoff Depth=3.21"
Flow Length=415' Tc=24.7 min CN=76 Runoff=2.88 cfs 14,467 cf

Subcatchment4S: Runoff Area=13,992 sf 9.90% Impervious Runoff Depth=3.21"
Flow Length=80' Slope=0.0437 '/' Tc=6.2 min CN=76 Runoff=1.20 cfs 3,741 cf

Subcatchment9SA: Runoff Area=227,939 sf 29.63% Impervious Runoff Depth=3.80"
Flow Length=605' Tc=20.6 min CN=82 Runoff=15.47 cfs 72,248 cf

Subcatchment9SB: Runoff Area=488,878 sf 10.68% Impervious Runoff Depth=3.31"
Flow Length=1,270' Tc=34.0 min CN=77 Runoff=23.17 cfs 134,647 cf

Subcatchment9SC: Runoff Area=224,500 sf 7.80% Impervious Runoff Depth=3.21"
Flow Length=950' Slope=0.0220 '/' Tc=23.3 min CN=76 Runoff=12.24 cfs 60,020 cf

Subcatchment11SA: Runoff Area=285,288 sf 0.00% Impervious Runoff Depth=2.56"
Flow Length=700' Tc=16.5 min CN=69 Runoff=14.13 cfs 60,798 cf

Subcatchment11SB: Runoff Area=87,046 sf 0.00% Impervious Runoff Depth=2.56"
Flow Length=540' Tc=17.8 min CN=69 Runoff=4.18 cfs 18,551 cf

Pond 1P: Peak Elev=18.01' Storage=0 cf Inflow=33.16 cfs 217,736 cf
36.0" Round Culvert n=0.013 L=96.0' S=0.0020 '/' Outflow=33.16 cfs 217,735 cf

Pond 2P: Peak Elev=20.00' Storage=0 cf Inflow=32.80 cfs 213,996 cf
36.0" Round Culvert n=0.013 L=75.0' S=0.0029 '/' Outflow=32.80 cfs 213,996 cf

Pond 3P: Peak Elev=21.00' Storage=0 cf Inflow=29.88 cfs 195,445 cf
36.0" Round Culvert n=0.013 L=70.0' S=0.0030 '/' Outflow=29.88 cfs 195,445 cf

Pond 4P: Peak Elev=21.79' Storage=156 cf Inflow=29.89 cfs 195,445 cf
36.0" Round Culvert n=0.013 L=183.0' S=0.0020 '/' Outflow=29.88 cfs 195,445 cf

Pond 5P: Peak Elev=26.70' Storage=8,294 cf Inflow=14.13 cfs 60,798 cf
15.0" Round Culvert n=0.013 L=385.0' S=0.0208 '/' Outflow=6.88 cfs 60,798 cf

Pond 6P: Peak Elev=21.00' Storage=0 cf Inflow=27.60 cfs 132,269 cf
30.0" Round Culvert n=0.013 L=51.0' S=0.0029 '/' Outflow=27.60 cfs 132,269 cf

Pond 7P: Peak Elev=21.70' Storage=0 cf Inflow=15.47 cfs 72,248 cf
30.0" Round Culvert n=0.013 L=141.0' S=0.0030 '/' Outflow=15.47 cfs 72,248 cf

Pond 8P: Peak Elev=24.50' Storage=0 cf Inflow=15.47 cfs 72,248 cf
30.0" Round Culvert n=0.013 L=636.0' S=0.0036 '/' Outflow=15.47 cfs 72,248 cf

Pond 9P: outfall 7 Peak Elev=30.37' Inflow=15.58 cfs 75,131 cf
30.0" Round Culvert n=0.013 L=846.0' S=0.0018 '/' Outflow=15.58 cfs 75,131 cf

Pond PR-13: outfall 6 Peak Elev=16.96' Storage=0 cf Inflow=58.57 cfs 350,003 cf
Discarded=0.00 cfs 0 cf Primary=58.57 cfs 350,002 cf Outflow=58.57 cfs 350,002 cf

Pond PR-14: Peak Elev=32.05' Storage=0 cf Inflow=12.79 cfs 60,664 cf
30.0" Round Culvert n=0.013 L=103.0' S=0.0050 '/' Outflow=12.79 cfs 60,664 cf

Pond PR-15: Peak Elev=30.81' Inflow=15.58 cfs 75,131 cf
30.0" Round Culvert n=0.013 L=39.0' S=0.0018 '/' Outflow=15.58 cfs 75,131 cf

Total Runoff Area = 1,563,308 sf Runoff Volume = 425,136 cf Average Runoff Depth = 3.26"
86.81% Pervious = 1,357,060 sf 13.19% Impervious = 206,248 sf

Summary for Subcatchment 1.2S:

Runoff = 12.79 cfs @ 12.28 hrs, Volume= 60,664 cf, Depth= 4.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
77,333	74	>75% Grass cover, Good, HSG C
41,582	80	>75% Grass cover, Good, HSG D
62,638	98	Paved parking & roofs
181,553	84	Weighted Average
118,915		65.50% Pervious Area
62,638		34.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	150	0.0145	0.16		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
5.2	234	0.0116	0.75		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
21.1	384	Total			

Summary for Subcatchment 3S:

Runoff = 2.88 cfs @ 12.34 hrs, Volume= 14,467 cf, Depth= 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
4,962	98	Paved parking & roofs
49,150	74	>75% Grass cover, Good, HSG C
54,112	76	Weighted Average
49,150		90.83% Pervious Area
4,962		9.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	100	0.0050	0.09		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
7.1	315	0.0111	0.74		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
24.7	415	Total			

Summary for Subcatchment 4S:

Runoff = 1.20 cfs @ 12.09 hrs, Volume= 3,741 cf, Depth= 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
12,607	74	>75% Grass cover, Good, HSG C
1,385	98	Paved parking & roofs
13,992	76	Weighted Average
12,607		90.10% Pervious Area
1,385		9.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	80	0.0437	0.22		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"

Summary for Subcatchment 9SA:

Runoff = 15.47 cfs @ 12.28 hrs, Volume= 72,248 cf, Depth= 3.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
67,536	98	Paved parking & roofs
140,858	74	>75% Grass cover, Good, HSG C
19,545	80	>75% Grass cover, Good, HSG D
227,939	82	Weighted Average
160,403		70.37% Pervious Area
67,536		29.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	150	0.0200	0.18		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
2.3	220	0.0500	1.57		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
4.3	235	0.0170	0.91		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
20.6	605	Total			

Summary for Subcatchment 9SB:

Runoff = 23.17 cfs @ 12.46 hrs, Volume= 134,647 cf, Depth= 3.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
436,651	74	>75% Grass cover, Good, HSG C
52,227	98	Paved parking & roofs
488,878	77	Weighted Average
436,651		89.32% Pervious Area
52,227		10.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	100	0.0165	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
7.1	420	0.0200	0.99		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.1	50	0.0200	8.41	14.86	**Pipe Channel, C-D** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, bends & connections
15.9	700	0.0110	0.73		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
34.0	1,270	Total			

Summary for Subcatchment 9SC:

Runoff = 12.24 cfs @ 12.32 hrs, Volume= 60,020 cf, Depth= 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
207,000	74	>75% Grass cover, Good, HSG C
17,500	98	Paved parking & roofs
224,500	76	Weighted Average
207,000		92.20% Pervious Area
17,500		7.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	100	0.0220	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
13.6	850	0.0220	1.04		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
23.3	950	Total			

Summary for Subcatchment 11SA:

Runoff = 14.13 cfs @ 12.23 hrs, Volume= 60,798 cf, Depth= 2.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
102,868	61	>75% Grass cover, Good, HSG B
182,420	74	>75% Grass cover, Good, HSG C
285,288	69	Weighted Average
285,288		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	100	0.0500	0.24		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
5.3	275	0.0150	0.86		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
1.4	150	0.0690	1.84		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
2.8	175	0.0220	1.04		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
16.5	700	Total			

Summary for Subcatchment 11SB:

Runoff = 4.18 cfs @ 12.24 hrs, Volume= 18,551 cf, Depth= 2.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
52,302	74	>75% Grass cover, Good, HSG C
34,744	61	>75% Grass cover, Good, HSG B
87,046	69	Weighted Average
87,046		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	100	0.0450	0.23		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
10.5	440	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
17.8	540	Total			

Summary for Pond 1P:

Inflow Area = 875,204 sf, 6.13% Impervious, Inflow Depth = 2.99" for 25 Year Storm event
Inflow = 33.16 cfs @ 12.43 hrs, Volume= 217,736 cf
Outflow = 33.16 cfs @ 12.43 hrs, Volume= 217,735 cf, Atten= 0%, Lag= 0.0 min
Primary = 33.16 cfs @ 12.43 hrs, Volume= 217,735 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 18.01' @ 12.43 hrs Surf.Area= 9 sf Storage= 0 cf
Flood Elev= 19.50' Surf.Area= 1,460 sf Storage= 1,071 cf

Plug-Flow detention time= 0.0 min calculated for 217,699 cf (100% of inflow)
Center-of-Mass det. time= 0.0 min (851.3 - 851.3)

Volume	Invert	Avail.Storage	Storage Description
#1	18.00'	4,979 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
18.00	4	0	0
19.00	938	471	471
20.00	1,982	1,460	1,931
21.00	4,113	3,048	4,979

Device	Routing	Invert	Outlet Devices
#1	Primary	12.40'	**36.0" Round Culvert** L= 96.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.40' / 12.21' S= 0.0020 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=34.93 cfs @ 12.43 hrs HW=18.00' TW=16.95' (Dynamic Tailwater)
1=Culvert (Inlet Controls 34.93 cfs @ 4.94 fps)

Summary for Pond 2P:

Inflow Area = 861,212 sf, 6.06% Impervious, Inflow Depth = 2.98" for 25 Year Storm event
Inflow = 32.80 cfs @ 12.44 hrs, Volume= 213,996 cf
Outflow = 32.80 cfs @ 12.44 hrs, Volume= 213,996 cf, Atten= 0%, Lag= 0.0 min
Primary = 32.80 cfs @ 12.44 hrs, Volume= 213,996 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 20.00' @ 12.44 hrs Surf.Area= 4 sf Storage= 0 cf
Flood Elev= 20.00' Surf.Area= 4 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (851.7 - 851.7)

Volume	Invert	Avail.Storage	Storage Description
#1	20.00'	2,670 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
20.00	4	0	0
21.00	5,336	2,670	2,670

Device	Routing	Invert	Outlet Devices
#1	Primary	12.72'	**36.0" Round Culvert** L= 75.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.72' / 12.50' S= 0.0029 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=48.07 cfs @ 12.44 hrs HW=20.00' TW=18.00' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 48.07 cfs @ 6.80 fps)

Summary for Pond 3P:

Inflow Area = 774,166 sf, 6.75% Impervious, Inflow Depth = 3.03" for 25 Year Storm event
Inflow = 29.88 cfs @ 12.47 hrs, Volume= 195,445 cf
Outflow = 29.88 cfs @ 12.47 hrs, Volume= 195,445 cf, Atten= 0%, Lag= 0.0 min
Primary = 29.88 cfs @ 12.47 hrs, Volume= 195,445 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 21.00' @ 12.47 hrs Surf.Area= 4 sf Storage= 0 cf
Flood Elev= 21.00' Surf.Area= 4 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (851.6 - 851.6)

Volume	Invert	Avail.Storage	Storage Description
#1	21.00'	1,090 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
21.00	4	0	0
22.00	500	252	252
22.50	2,850	838	1,090

Device	Routing	Invert	Outlet Devices
#1	Primary	13.03'	**36.0" Round Culvert** L= 70.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 13.03' / 12.82' S= 0.0030 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=34.04 cfs @ 12.47 hrs HW=21.00' TW=20.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 34.04 cfs @ 4.82 fps)

Summary for Pond 4P:

[58] Hint: Peaked 0.79' above defined flood level

Inflow Area = 774,166 sf, 6.75% Impervious, Inflow Depth = 3.03" for 25 Year Storm event
Inflow = 29.89 cfs @ 12.46 hrs, Volume= 195,445 cf
Outflow = 29.88 cfs @ 12.47 hrs, Volume= 195,445 cf, Atten= 0%, Lag= 0.5 min
Primary = 29.88 cfs @ 12.47 hrs, Volume= 195,445 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 21.79' @ 12.47 hrs Surf.Area= 393 sf Storage= 156 cf
Flood Elev= 21.00' Surf.Area= 4 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (851.6 - 851.6)

Volume	Invert	Avail.Storage	Storage Description
#1	21.00'	1,090 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
21.00	4	0	0
22.00	500	252	252
22.50	2,850	838	1,090

Device	Routing	Invert	Outlet Devices
#1	Primary	13.50'	**36.0" Round Culvert** L= 183.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 13.50' / 13.13' S= 0.0020 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=29.88 cfs @ 12.47 hrs HW=21.79' TW=21.00' (Dynamic Tailwater)
1=Culvert (Outlet Controls 29.88 cfs @ 4.23 fps)

Summary for Pond 5P:

Inflow Area = 285,288 sf, 0.00% Impervious, Inflow Depth = 2.56" for 25 Year Storm event
Inflow = 14.13 cfs @ 12.23 hrs, Volume= 60,798 cf
Outflow = 6.88 cfs @ 12.79 hrs, Volume= 60,798 cf, Atten= 51%, Lag= 33.8 min
Primary = 6.88 cfs @ 12.79 hrs, Volume= 60,798 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 26.70' @ 12.57 hrs Surf.Area= 11,312 sf Storage= 8,294 cf

Plug-Flow detention time= 6.1 min calculated for 60,788 cf (100% of inflow)
Center-of-Mass det. time= 6.1 min (857.9 - 851.8)

Volume	Invert	Avail.Storage	Storage Description
#1	23.00'	12,212 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
23.00	4	0	0
25.00	465	469	469
26.00	4,320	2,393	2,862
27.00	14,380	9,350	12,212

Device	Routing	Invert	Outlet Devices
#1	Primary	23.00'	**15.0" Round Culvert** L= 385.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 23.00' / 15.00' S= 0.0208 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=6.88 cfs @ 12.79 hrs HW=26.55' TW=21.43' (Dynamic Tailwater)
1=Culvert (Outlet Controls 6.88 cfs @ 5.61 fps)

Summary for Pond 6P:

Inflow Area = 452,439 sf, 18.80% Impervious, Inflow Depth = 3.51" for 25 Year Storm event
Inflow = 27.60 cfs @ 12.29 hrs, Volume= 132,269 cf
Outflow = 27.60 cfs @ 12.29 hrs, Volume= 132,269 cf, Atten= 0%, Lag= 0.0 min
Primary = 27.60 cfs @ 12.29 hrs, Volume= 132,269 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 21.00' @ 12.29 hrs Surf.Area= 4 sf Storage= 0 cf
Flood Elev= 21.00' Surf.Area= 4 sf Storage= 0 cf

Plug-Flow detention time= 0.0 min calculated for 132,247 cf (100% of inflow)
Center-of-Mass det. time= 0.0 min (831.6 - 831.6)

Volume	Invert	Avail.Storage	Storage Description
#1	21.00'	1,697 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
21.00	4	0	0
22.00	500	252	252
22.50	5,279	1,445	1,697

Device	Routing	Invert	Outlet Devices
#1	Primary	15.09'	**30.0" Round Culvert** L= 51.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 15.09' / 14.94' S= 0.0029 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=47.54 cfs @ 12.29 hrs HW=21.00' TW=16.95' (Dynamic Tailwater)
1=Culvert (Inlet Controls 47.54 cfs @ 9.69 fps)

Summary for Pond 7P:

Inflow Area = 227,939 sf, 29.63% Impervious, Inflow Depth = 3.80" for 25 Year Storm event
Inflow = 15.47 cfs @ 12.28 hrs, Volume= 72,248 cf
Outflow = 15.47 cfs @ 12.28 hrs, Volume= 72,248 cf, Atten= 0%, Lag= 0.0 min
Primary = 15.47 cfs @ 12.28 hrs, Volume= 72,248 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 21.70' @ 12.28 hrs Surf.Area= 4 sf Storage= 0 cf
Flood Elev= 21.70' Surf.Area= 4 sf Storage= 0 cf

Plug-Flow detention time= 0.0 min calculated for 72,236 cf (100% of inflow)
Center-of-Mass det. time= 0.0 min (823.5 - 823.5)

Volume	Invert	Avail.Storage	Storage Description
#1	21.70'	1,334 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
21.70	4	0	0
22.70	500	252	252
23.50	2,206	1,082	1,334

Device	Routing	Invert	Outlet Devices
#1	Primary	15.61'	**30.0" Round Culvert** L= 141.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 15.61' / 15.19' S= 0.0030 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=19.68 cfs @ 12.28 hrs HW=21.70' TW=21.00' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 19.68 cfs @ 4.01 fps)

Summary for Pond 8P:

Inflow Area = 227,939 sf, 29.63% Impervious, Inflow Depth = 3.80" for 25 Year Storm event
Inflow = 15.47 cfs @ 12.28 hrs, Volume= 72,248 cf
Outflow = 15.47 cfs @ 12.28 hrs, Volume= 72,248 cf, Atten= 0%, Lag= 0.0 min
Primary = 15.47 cfs @ 12.28 hrs, Volume= 72,248 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 24.50' @ 12.28 hrs Surf.Area= 4 sf Storage= 0 cf
Flood Elev= 24.50' Surf.Area= 4 sf Storage= 0 cf

Plug-Flow detention time= 0.0 min calculated for 72,236 cf (100% of inflow)
Center-of-Mass det. time= 0.0 min (823.5 - 823.5)

Volume	Invert	Avail.Storage	Storage Description
#1	24.50'	1,838 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
24.50	4	0	0
25.00	530	134	134
26.00	2,879	1,705	1,838

Device	Routing	Invert	Outlet Devices
#1	Primary	18.00'	**30.0" Round Culvert** L= 636.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.00' / 15.71' S= 0.0036 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=24.25 cfs @ 12.28 hrs HW=24.50' TW=21.70' (Dynamic Tailwater)
1=Culvert (Outlet Controls 24.25 cfs @ 4.94 fps)

Summary for Pond 9P: outfall 7

Lenght Assumed
Invert Out Assumed

Inflow Area = 235,665 sf, 28.68% Impervious, Inflow Depth = 3.83" for 25 Year Storm event
Inflow = 15.58 cfs @ 12.29 hrs, Volume= 75,131 cf
Outflow = 15.58 cfs @ 12.29 hrs, Volume= 75,131 cf, Atten= 0%, Lag= 0.0 min
Primary = 15.58 cfs @ 12.29 hrs, Volume= 75,131 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 30.37' @ 12.29 hrs
Flood Elev= 34.49'

Device	Routing	Invert	Outlet Devices
#1	Primary	28.01'	**30.0" Round Culvert** L= 846.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 28.01' / 26.50' S= 0.0018 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=15.58 cfs @ 12.29 hrs HW=30.37' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 15.58 cfs @ 4.19 fps)

Summary for Pond PR-13: outfall 6

Slope ASSUMED to be minimum (S=0.002) for conservative estimate.
Outlet elevation caculated with assumed slope.
Storage at elevation 22 has been split evenly between PR-13 and P2.

Inflow Area = 1,327,643 sf, 10.44% Impervious, Inflow Depth = 3.16" for 25 Year Storm event
Inflow = 58.57 cfs @ 12.34 hrs, Volume= 350,003 cf
Outflow = 58.57 cfs @ 12.34 hrs, Volume= 350,002 cf, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 58.57 cfs @ 12.34 hrs, Volume= 350,002 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 16.96' @ 12.34 hrs Surf.Area= 17 sf Storage= 0 cf
Flood Elev= 22.00' Surf.Area= 129,946 sf Storage= 241,100 cf

Plug-Flow detention time= 0.2 min calculated for 350,002 cf (100% of inflow)
Center-of-Mass det. time= 0.0 min (843.8 - 843.8)

Volume	Invert	Avail.Storage	Storage Description
#1	16.95'	241,100 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
16.95	4	0	0
17.00	103	3	3
18.00	6,546	3,325	3,327
19.00	30,981	18,764	22,091
20.00	61,120	46,051	68,141
21.00	77,426	69,273	137,414
22.00	129,946	103,686	241,100

Device	Routing	Invert	Outlet Devices
#1	Primary	12.11'	**36.0" Round Culvert** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 12.11' / 11.10' S= 0.0168 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 7.07 sf
#2	Discarded	21.26'	**93.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=16.95' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Primary OutFlow Max=62.26 cfs @ 12.34 hrs HW=16.96' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 62.26 cfs @ 8.81 fps)

Summary for Pond PR-14:

Inflow Area = 181,553 sf, 34.50% Impervious, Inflow Depth = 4.01" for 25 Year Storm event
Inflow = 12.79 cfs @ 12.28 hrs, Volume= 60,664 cf
Outflow = 12.79 cfs @ 12.28 hrs, Volume= 60,664 cf, Atten= 0%, Lag= 0.0 min
Primary = 12.79 cfs @ 12.28 hrs, Volume= 60,664 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 32.05' @ 12.29 hrs Surf.Area= 4 sf Storage= 0 cf
Flood Elev= 32.05' Surf.Area= 4 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	32.05'	29,227 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
32.05	4	0	0
34.00	29,972	29,227	29,227

Device	Routing	Invert	Outlet Devices
#1	Primary	28.65'	**30.0" Round Culvert** L= 103.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 28.65' / 28.14' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=26.43 cfs @ 12.28 hrs HW=32.05' TW=30.80' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 26.43 cfs @ 5.39 fps)

Summary for Pond PR-15:

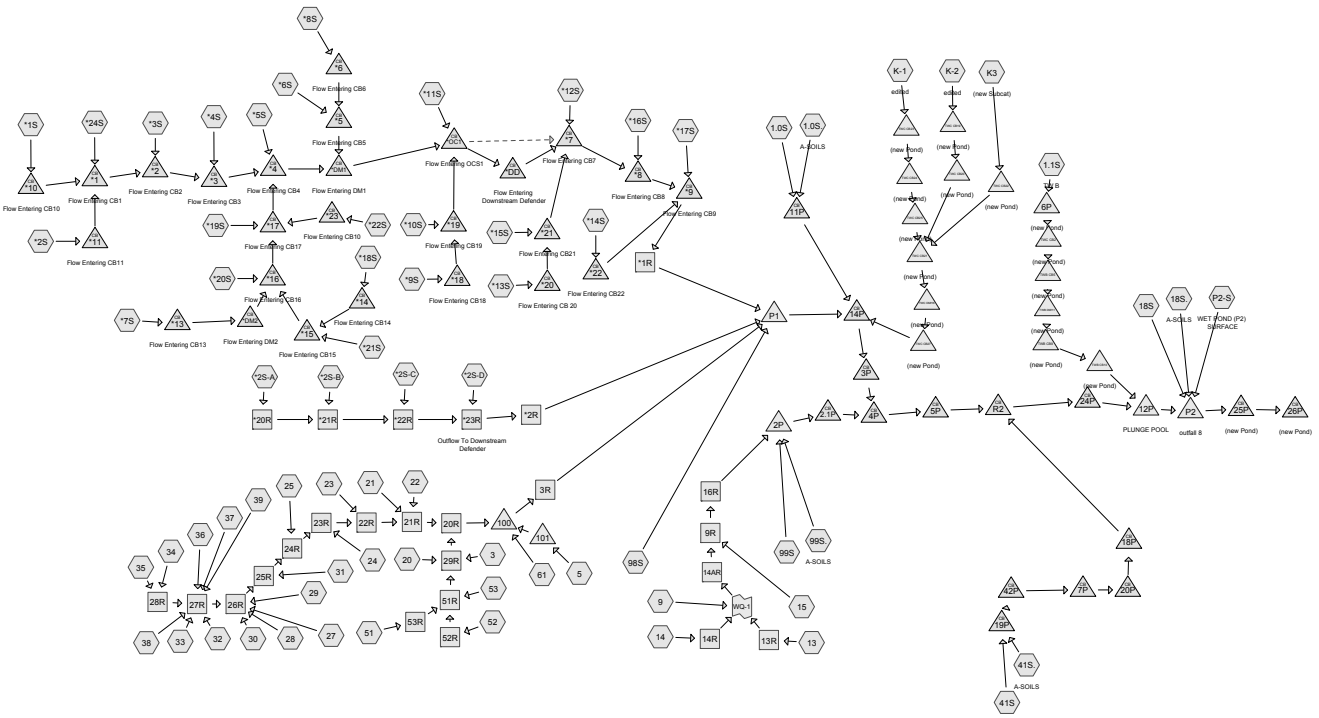
Lenght Assumed
Invert Out Assumed

Inflow Area = 235,665 sf, 28.68% Impervious, Inflow Depth = 3.83" for 25 Year Storm event
Inflow = 15.58 cfs @ 12.29 hrs, Volume= 75,131 cf
Outflow = 15.58 cfs @ 12.29 hrs, Volume= 75,131 cf, Atten= 0%, Lag= 0.0 min
Primary = 15.58 cfs @ 12.29 hrs, Volume= 75,131 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 30.81' @ 12.30 hrs
Flood Elev= 34.49'

Device	Routing	Invert	Outlet Devices
#1	Primary	28.08'	**30.0" Round Culvert** L= 39.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 28.08' / 28.01' S= 0.0018 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=15.57 cfs @ 12.29 hrs HW=30.81' TW=30.37' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 15.57 cfs @ 3.17 fps)



Subcat Reach Pond Link

Routing Diagram for Postdevelopment Runway 18-36 - Outfall 8
Prepared by Stantec Consulting Ltd., Printed 10/19/2018
HydroCAD® 10.00-13 s/n 00734 © 2014 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
735,295	39	>75% Grass cover, Good, HSG A (*1S, *2S-A, 1.0S., 3, 13, 14, 18S., 23, 24, 27, 28, 30, 31, 33, 34, 35, 36, 39, 41S., 99S.)
617,773	61	>75% Grass cover, Good, HSG B (*10S, *11S, *12S, *1S, *21S, *24S, *2S, *2S-C, *3S, *4S, *5S, *6S, *7S, *8S, 1.0S, 3, 5, 18S, 20, 21, 22, 23, 51, 52, 53, 61, 98S)
86,684	61	>75% Grass cover, Good, HSG B - LOT 4 (15)
1,462,211	74	>75% Grass cover, Good, HSG C (*10S, *12S, *16S, *17S, *18S, *2S-D, *9S, 1.0S, 1.1S, 5, 9, 18S, 98S, 99S, K-1, K3)
1,517,729	80	>75% Grass cover, Good, HSG D (*1S, *2S-B, 1.0S, 1.1S, 3, 5, 18S, 98S, 99S, K-1, K-2, K3)
29,839	67	ADJUSTMENT (3)
29,839	68	ADJUSTMENT (5)
7,884	98	ADJUSTMENT (5)
102,082	98	ADJUSTMENT 2018 (1.0S, 5, 15)
40,423	98	ADUSTMENT 2018 (*1S)
140,220	98	Impervious (9, 14)
1,029,858	98	Paved parking & roofs (*10S, *11S, *12S, *13S, *14S, *15S, *16S, *17S, *18S, *19S, *1S, *20S, *21S, *22S, *24S, *2S, *2S-A, *2S-B, *2S-C, *2S-D, *3S, *4S, *5S, *6S, *7S, *8S, *9S, 3, 5, 13, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 41S, 51, 52, 53, 99S, K-1)
181,645	98	Paved parking & roofs - LOT 4 (15)
165,492	98	Paved parking, HSG A (K-2, K3)
706,258	98	Paved parking, HSG D (1.0S, 1.1S)
13,068	100	Water Surface (61)
79,989	98	Water Surface, HSG A (P2-S)
6,946,289	**79**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
980,776	HSG A	*1S, *2S-A, 1.0S., 3, 13, 14, 18S., 23, 24, 27, 28, 30, 31, 33, 34, 35, 36, 39, 41S., 99S., K-2, K3, P2-S
704,457	HSG B	*10S, *11S, *12S, *1S, *21S, *24S, *2S, *2S-C, *3S, *4S, *5S, *6S, *7S, *8S, 1.0S, 3, 5, 15, 18S, 20, 21, 22, 23, 51, 52, 53, 61, 98S
1,462,211	HSG C	*10S, *12S, *16S, *17S, *18S, *2S-D, *9S, 1.0S, 1.1S, 5, 9, 18S, 98S, 99S, K-1, K3
2,223,987	HSG D	*1S, *2S-B, 1.0S, 1.1S, 3, 5, 18S, 98S, 99S, K-1, K-2, K3
1,574,858	Other	*10S, *11S, *12S, *13S, *14S, *15S, *16S, *17S, *18S, *19S, *1S, *20S, *21S, *22S, *24S, *2S, *2S-A, *2S-B, *2S-C, *2S-D, *3S, *4S, *5S, *6S, *7S, *8S, *9S, 1.0S, 3, 5, 9, 13, 14, 15, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 41S, 51, 52, 53, 61, 99S, K-1
6,946,289		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
735,295	704,457	1,462,211	1,517,729	0	4,419,692	>75% Grass cover, Good
0	0	0	0	67,562	67,562	ADJUSTMENT
0	0	0	0	102,082	102,082	ADJUSTMENT 2018
0	0	0	0	40,423	40,423	ADUSTMENT 2018
0	0	0	0	140,220	140,220	Impervious
165,492	0	0	706,258	0	871,750	Paved parking
0	0	0	0	1,029,858	1,029,858	Paved parking & roofs
0	0	0	0	181,645	181,645	Paved parking & roofs - LOT 4
79,989	0	0	0	13,068	93,057	Water Surface
980,776	**704,457**	**1,462,211**	**2,223,987**	**1,574,858**	**6,946,289**	**TOTAL AREA**

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	*20R	58.89	54.41	315.0	0.0142	0.013	12.0	0.0	0.0
2	*21R	54.31	52.34	270.0	0.0073	0.013	12.0	0.0	0.0
3	*22R	52.24	51.20	110.0	0.0095	0.013	15.0	0.0	0.0
4	*23R	51.10	50.00	80.0	0.0138	0.013	15.0	0.0	0.0
5	13R	0.00	-3.30	330.0	0.0100	0.011	12.0	0.0	0.0
6	14AR	0.00	-5.95	170.0	0.0350	0.011	18.0	0.0	0.0
7	14R	0.00	-9.20	230.0	0.0400	0.011	18.0	0.0	0.0
8	20R	0.00	-8.67	289.0	0.0300	0.013	24.0	0.0	0.0
9	21R	0.00	-3.60	180.0	0.0200	0.013	24.0	0.0	0.0
10	22R	0.00	-2.90	290.0	0.0100	0.013	24.0	0.0	0.0
11	23R	0.00	-2.10	103.0	0.0204	0.013	24.0	0.0	0.0
12	24R	0.00	-5.00	75.0	0.0667	0.013	18.0	0.0	0.0
13	25R	0.00	-2.60	124.0	0.0210	0.013	18.0	0.0	0.0
14	26R	0.00	-3.84	192.0	0.0200	0.013	18.0	0.0	0.0
15	27R	0.00	-2.00	192.0	0.0104	0.013	18.0	0.0	0.0
16	28R	0.00	-0.60	107.0	0.0056	0.013	12.0	0.0	0.0
17	29R	0.00	-1.15	115.0	0.0100	0.013	24.0	0.0	0.0
18	51R	0.00	-9.75	325.0	0.0300	0.013	15.0	0.0	0.0
19	52R	0.00	-0.50	25.0	0.0200	0.013	15.0	0.0	0.0
20	53R	0.00	-0.66	66.0	0.0100	0.013	12.0	0.0	0.0
21	*1	52.70	51.83	145.0	0.0060	0.011	18.0	0.0	0.0
22	*10	53.25	52.80	30.0	0.0150	0.011	18.0	0.0	0.0
23	*11	53.40	52.80	85.0	0.0071	0.011	15.0	0.0	0.0
24	*13	54.45	53.10	135.0	0.0100	0.013	12.0	0.0	0.0
25	*14	52.75	52.45	58.0	0.0052	0.013	12.0	0.0	0.0
26	*15	52.35	51.80	88.0	0.0063	0.013	12.0	0.0	0.0
27	*16	51.70	51.15	78.0	0.0071	0.013	18.0	0.0	0.0
28	*17	51.05	50.10	135.0	0.0070	0.011	18.0	0.0	0.0
29	*18	47.40	46.80	118.0	0.0051	0.011	15.0	0.0	0.0
30	*19	46.70	46.05	130.0	0.0050	0.011	15.0	0.0	0.0
31	*2	51.73	50.98	125.0	0.0060	0.011	24.0	0.0	0.0
32	*20	47.25	46.40	122.0	0.0070	0.011	15.0	0.0	0.0
33	*21	46.30	45.23	155.0	0.0069	0.011	15.0	0.0	0.0
34	*22	45.80	41.60	222.0	0.0189	0.011	15.0	0.0	0.0
35	*23	52.75	51.15	86.0	0.0186	0.011	15.0	0.0	0.0
36	*3	50.88	50.10	130.0	0.0060	0.011	24.0	0.0	0.0
37	*4	50.00	48.85	105.0	0.0110	0.011	30.0	0.0	0.0
38	*5	48.05	47.69	45.0	0.0080	0.011	18.0	0.0	0.0
39	*6	48.60	48.15	45.0	0.0100	0.011	18.0	0.0	0.0
40	*7	45.13	43.45	120.0	0.0140	0.011	30.0	0.0	0.0
41	*8	43.35	41.60	125.0	0.0140	0.011	36.0	0.0	0.0
42	*9	41.50	40.00	100.0	0.0150	0.011	36.0	0.0	0.0

Pipe Listing (all nodes) (continued)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
43	*DD	45.75	45.23	50.0	0.0104	0.011	30.0	0.0	0.0
44	*DM1	47.59	46.05	140.0	0.0110	0.011	30.0	0.0	0.0
45	*DM2	53.00	51.80	50.0	0.0240	0.013	12.0	0.0	0.0
46	*OC1	45.30	43.50	54.0	0.0333	0.011	30.0	0.0	0.0
47	*OC1	45.95	45.23	65.0	0.0111	0.011	24.0	0.0	0.0
48	2.1P	32.50	32.14	70.0	0.0051	0.013	36.0	0.0	0.0
49	2P	36.00	32.64	112.0	0.0300	0.013	36.0	0.0	0.0
50	3P	30.09	29.62	250.0	0.0019	0.013	48.0	0.0	0.0
51	4P	29.39	29.29	196.0	0.0005	0.013	60.0	0.0	0.0
52	5P	28.97	28.38	371.0	0.0016	0.013	60.0	0.0	0.0
53	7P	33.75	33.40	160.0	0.0022	0.013	30.0	0.0	0.0
54	11P	35.75	34.50	161.0	0.0078	0.013	18.0	0.0	0.0
55	14P	30.44	30.09	238.0	0.0015	0.013	30.0	0.0	0.0
56	18P	32.50	31.88	184.0	0.0034	0.013	36.0	0.0	0.0
57	19P	36.40	36.00	62.0	0.0065	0.013	12.0	0.0	0.0
58	20P	33.30	32.62	181.0	0.0038	0.013	36.0	0.0	0.0
59	24P	21.63	21.50	30.0	0.0043	0.013	60.0	0.0	0.0
60	25P	17.40	15.14	113.0	0.0200	0.013	12.0	0.0	0.0
61	26P	16.40	16.00	20.0	0.0200	0.013	12.0	0.0	0.0
62	42P	35.00	34.25	338.0	0.0022	0.013	30.0	0.0	0.0
63	100	45.50	45.10	40.0	0.0100	0.013	18.0	0.0	0.0
64	101	51.50	47.98	75.0	0.0469	0.013	15.0	0.0	0.0
65	P1	33.00	30.54	126.0	0.0195	0.013	36.0	0.0	0.0
66	P2	18.35	17.50	42.6	0.0200	0.012	12.0	0.0	0.0
67	R2	28.33	28.25	44.0	0.0018	0.013	60.0	0.0	0.0
68	TWB CB10	25.30	24.80	157.0	0.0032	0.013	30.0	0.0	0.0
69	TWB CB5	27.30	26.64	204.0	0.0032	0.013	30.0	0.0	0.0
70	TWB CB9	25.50	25.40	31.0	0.0032	0.013	30.0	0.0	0.0
71	TWB DMH1	26.54	25.60	303.0	0.0031	0.013	30.0	0.0	0.0
72	TWC CB19	41.25	40.80	88.0	0.0051	0.013	15.0	0.0	0.0
73	TWC CB2	29.50	28.84	218.0	0.0030	0.013	18.0	0.0	0.0
74	TWC CB20	38.00	36.00	336.0	0.0060	0.013	24.0	0.0	0.0
75	TWC CB21	34.40	33.43	167.0	0.0058	0.013	24.0	0.0	0.0
76	TWC CB22	38.61	38.00	93.0	0.0066	0.013	15.0	0.0	0.0
77	TWC CB23	38.00	37.80	40.0	0.0050	0.013	12.0	0.0	0.0
78	TWC CB24	37.60	36.00	340.0	0.0047	0.013	12.0	0.0	0.0
79	TWC CB25	35.90	35.40	96.0	0.0052	0.013	12.0	0.0	0.0
80	TWC CB27	33.33	32.00	278.0	0.0048	0.013	27.0	0.0	0.0
81	TWC DMH6	33.70	33.43	77.0	0.0035	0.013	24.0	0.0	0.0

Time span=0.00-50.00 hrs, dt=0.01 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment*10S: Runoff Area=24,132 sf 65.52% Impervious Runoff Depth=4.22"
Tc=6.0 min CN=86 Runoff=2.68 cfs 8,486 cf

Subcatchment*11S: Runoff Area=17,817 sf 34.72% Impervious Runoff Depth=3.02"
Tc=6.0 min CN=74 Runoff=1.45 cfs 4,480 cf

Subcatchment*12S: Runoff Area=11,369 sf 57.86% Impervious Runoff Depth=4.33"
Tc=6.0 min CN=87 Runoff=1.29 cfs 4,099 cf

Subcatchment*13S: Runoff Area=17,511 sf 100.00% Impervious Runoff Depth=5.56"
Tc=6.0 min CN=98 Runoff=2.29 cfs 8,116 cf

Subcatchment*14S: Runoff Area=13,896 sf 100.00% Impervious Runoff Depth=5.56"
Tc=6.0 min CN=98 Runoff=1.81 cfs 6,441 cf

Subcatchment*15S: Runoff Area=17,555 sf 100.00% Impervious Runoff Depth=5.56"
Tc=6.0 min CN=98 Runoff=2.29 cfs 8,137 cf

Subcatchment*16S: Runoff Area=17,119 sf 92.11% Impervious Runoff Depth=5.33"
Tc=6.0 min CN=96 Runoff=2.21 cfs 7,601 cf

Subcatchment*17S: Runoff Area=26,267 sf 90.22% Impervious Runoff Depth=5.33"
Tc=6.0 min CN=96 Runoff=3.39 cfs 11,663 cf

Subcatchment*18S: Runoff Area=7,536 sf 84.39% Impervious Runoff Depth=5.10"
Tc=0.0 min CN=94 Runoff=1.15 cfs 3,202 cf

Subcatchment*19S: Runoff Area=11,064 sf 100.00% Impervious Runoff Depth=5.56"
Tc=0.0 min CN=98 Runoff=1.75 cfs 5,128 cf

Subcatchment*1S: Runoff Area=75,881 sf 84.16% Impervious Runoff Depth=4.87"
Tc=6.0 min CN=92 Runoff=9.36 cfs 30,814 cf

Subcatchment*20S: Runoff Area=20,865 sf 100.00% Impervious Runoff Depth=5.56"
Tc=0.0 min CN=98 Runoff=3.29 cfs 9,671 cf

Subcatchment*21S: Runoff Area=7,753 sf 91.58% Impervious Runoff Depth=5.21"
Tc=0.0 min CN=95 Runoff=1.20 cfs 3,368 cf

Subcatchment*22S: Runoff Area=10,716 sf 100.00% Impervious Runoff Depth=5.56"
Tc=0.0 min CN=98 Runoff=1.69 cfs 4,967 cf

Subcatchment*24S: Runoff Area=12,371 sf 80.28% Impervious Runoff Depth=4.76"
Tc=0.0 min CN=91 Runoff=1.82 cfs 4,909 cf

Subcatchment*2S: Runoff Area=42,558 sf 84.75% Impervious Runoff Depth=4.87"
Tc=6.0 min CN=92 Runoff=5.25 cfs 17,282 cf

Subcatchment*2S-A: Runoff Area=27,182 sf 25.16% Impervious Runoff Depth=1.33"
Flow Length=210' Tc=15.2 min CN=54 Runoff=0.62 cfs 3,013 cf

Subcatchment*2S-B: Runoff Area=32,713 sf 30.23% Impervious Runoff Depth=4.11"
Flow Length=325' Tc=7.3 min CN=85 Runoff=3.40 cfs 11,216 cf

Subcatchment*2S-C: Runoff Area=34,674 sf 19.22% Impervious Runoff Depth=2.47"
Flow Length=275' Tc=9.7 min CN=68 Runoff=2.00 cfs 7,132 cf

Subcatchment*2S-D: Runoff Area=10,193 sf 32.90% Impervious Runoff Depth=3.80"
Tc=5.0 min CN=82 Runoff=1.07 cfs 3,231 cf

Subcatchment*3S: Runoff Area=23,479 sf 96.10% Impervious Runoff Depth=5.44"
Tc=6.0 min CN=97 Runoff=3.05 cfs 10,653 cf

Subcatchment*4S: Runoff Area=23,696 sf 92.65% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=95 Runoff=3.03 cfs 10,294 cf

Subcatchment*5S: Runoff Area=29,272 sf 94.05% Impervious Runoff Depth=5.33"
Tc=6.0 min CN=96 Runoff=3.77 cfs 12,998 cf

Subcatchment*6S: Runoff Area=29,708 sf 77.71% Impervious Runoff Depth=4.65"
Tc=6.0 min CN=90 Runoff=3.55 cfs 11,515 cf

Subcatchment*7S: Runoff Area=17,207 sf 10.64% Impervious Runoff Depth=2.21"
Tc=6.0 min CN=65 Runoff=1.00 cfs 3,165 cf

Subcatchment*8S: Runoff Area=17,468 sf 92.02% Impervious Runoff Depth=5.21"
Tc=0.0 min CN=95 Runoff=2.70 cfs 7,588 cf

Subcatchment*9S: Runoff Area=17,075 sf 83.93% Impervious Runoff Depth=5.10"
Tc=6.0 min CN=94 Runoff=2.16 cfs 7,255 cf

Subcatchment1.0S: Runoff Area=887,207 sf 59.16% Impervious Runoff Depth=4.54"
Flow Length=237' Tc=12.8 min CN=89 Runoff=84.20 cfs 335,798 cf

Subcatchment1.0S.: A-SOILS Runoff Area=163,301 sf 0.00% Impervious Runoff Depth=0.39"
Flow Length=237' Tc=12.8 min CN=39 Runoff=0.50 cfs 5,305 cf

Subcatchment1.1S: TW B Runoff Area=761,059 sf 30.87% Impervious Runoff Depth=4.11"
Flow Length=900' Tc=18.2 min CN=85 Runoff=58.37 cfs 260,927 cf

Subcatchment3: Runoff Area=271,597 sf 20.05% Impervious Runoff Depth=2.38"
Tc=19.3 min CN=67 Runoff=11.65 cfs 53,870 cf

Subcatchment5: Runoff Area=383,659 sf 9.34% Impervious Runoff Depth=2.56"
Tc=28.0 min CN=69 Runoff=15.21 cfs 81,762 cf

Subcatchment9: Runoff Area=23,174 sf 75.19% Impervious Runoff Depth=4.87"
Tc=5.0 min CN=92 Runoff=2.96 cfs 9,410 cf

Subcatchment13: Runoff Area=289,064 sf 12.81% Impervious Runoff Depth=0.85"
Flow Length=600' Tc=21.0 min CN=47 Runoff=2.97 cfs 20,421 cf

Subcatchment 14: Runoff Area=178,553 sf 68.77% Impervious Runoff Depth=3.60"
Tc=10.0 min CN=80 Runoff=15.08 cfs 53,585 cf

Subcatchment 15: Runoff Area=306,371 sf 71.71% Impervious Runoff Depth=4.43"
Tc=10.0 min CN=88 Runoff=30.99 cfs 113,191 cf

Subcatchment 18S: Runoff Area=355,602 sf 0.00% Impervious Runoff Depth=3.11"
Flow Length=455' Tc=22.9 min CN=75 Runoff=18.94 cfs 92,229 cf

Subcatchment 18S.: A-SOILS Runoff Area=2,239 sf 0.00% Impervious Runoff Depth=0.39"
Tc=0.0 min CN=39 Runoff=0.01 cfs 73 cf

Subcatchment 20: Runoff Area=16,553 sf 13.16% Impervious Runoff Depth=2.29"
Tc=11.5 min CN=66 Runoff=0.83 cfs 3,163 cf

Subcatchment 21: Runoff Area=24,829 sf 85.96% Impervious Runoff Depth=4.99"
Tc=3.3 min CN=93 Runoff=3.42 cfs 10,315 cf

Subcatchment 22: Runoff Area=30,927 sf 54.93% Impervious Runoff Depth=3.70"
Tc=4.3 min CN=81 Runoff=3.26 cfs 9,541 cf

Subcatchment 23: Runoff Area=18,295 sf 78.57% Impervious Runoff Depth=4.33"
Tc=4.9 min CN=87 Runoff=2.16 cfs 6,595 cf

Subcatchment 24: Runoff Area=39,204 sf 47.78% Impervious Runoff Depth=2.38"
Tc=10.6 min CN=67 Runoff=2.11 cfs 7,776 cf

Subcatchment 25: Runoff Area=3,920 sf 100.00% Impervious Runoff Depth=5.56"
Tc=2.1 min CN=98 Runoff=0.59 cfs 1,817 cf

Subcatchment 27: Runoff Area=6,099 sf 92.85% Impervious Runoff Depth=5.10"
Tc=3.9 min CN=94 Runoff=0.83 cfs 2,591 cf

Subcatchment 28: Runoff Area=26,572 sf 75.41% Impervious Runoff Depth=3.91"
Tc=3.6 min CN=83 Runoff=3.02 cfs 8,649 cf

Subcatchment 29: Runoff Area=7,405 sf 100.00% Impervious Runoff Depth=5.56"
Tc=1.3 min CN=98 Runoff=1.14 cfs 3,432 cf

Subcatchment 30: Runoff Area=24,830 sf 71.93% Impervious Runoff Depth=3.70"
Tc=12.3 min CN=81 Runoff=2.01 cfs 7,660 cf

Subcatchment 31: Runoff Area=9,148 sf 76.19% Impervious Runoff Depth=4.01"
Tc=1.1 min CN=84 Runoff=1.16 cfs 3,057 cf

Subcatchment 32: Runoff Area=3,485 sf 100.00% Impervious Runoff Depth=5.56"
Tc=1.2 min CN=98 Runoff=0.54 cfs 1,615 cf

Subcatchment 33: Runoff Area=21,344 sf 81.63% Impervious Runoff Depth=4.33"
Tc=3.6 min CN=87 Runoff=2.64 cfs 7,695 cf

Subcatchment 34: Runoff Area=7,405 sf 82.35% Impervious Runoff Depth=4.43"
Tc=1.5 min CN=88 Runoff=1.00 cfs 2,736 cf

Subcatchment 35: Runoff Area=13,940 sf 96.87% Impervious Runoff Depth=5.33"
Tc=5.3 min CN=96 Runoff=1.84 cfs 6,190 cf

Subcatchment 36: Runoff Area=7,405 sf 82.35% Impervious Runoff Depth=4.43"
Tc=2.8 min CN=88 Runoff=0.96 cfs 2,736 cf

Subcatchment 37: Runoff Area=2,614 sf 100.00% Impervious Runoff Depth=5.56"
Tc=1.0 min CN=98 Runoff=0.41 cfs 1,212 cf

Subcatchment 38: Runoff Area=10,454 sf 100.00% Impervious Runoff Depth=5.56"
Tc=1.4 min CN=98 Runoff=1.60 cfs 4,846 cf

Subcatchment 39: Runoff Area=15,682 sf 50.00% Impervious Runoff Depth=2.56"
Tc=17.0 min CN=69 Runoff=0.77 cfs 3,342 cf

Subcatchment 41S: Runoff Area=38,337 sf 100.00% Impervious Runoff Depth=5.56"
Flow Length=848' Tc=27.5 min CN=98 Runoff=2.98 cfs 17,769 cf

Subcatchment 41S.: A-SOILS Runoff Area=115,425 sf 0.00% Impervious Runoff Depth=0.39"
Tc=0.0 min CN=39 Runoff=0.39 cfs 3,749 cf

Subcatchment 51: Runoff Area=14,375 sf 78.79% Impervious Runoff Depth=4.65"
Tc=2.6 min CN=90 Runoff=1.94 cfs 5,572 cf

Subcatchment 52: Runoff Area=77,537 sf 58.99% Impervious Runoff Depth=3.91"
Tc=6.6 min CN=83 Runoff=7.91 cfs 25,239 cf

Subcatchment 53: Runoff Area=18,731 sf 46.51% Impervious Runoff Depth=3.40"
Tc=1.9 min CN=78 Runoff=1.99 cfs 5,312 cf

Subcatchment 61: Runoff Area=58,370 sf 22.39% Impervious Runoff Depth=2.65"
Tc=16.5 min CN=70 Runoff=3.00 cfs 12,877 cf

Subcatchment 98S: Runoff Area=440,083 sf 0.00% Impervious Runoff Depth=3.02"
Tc=30.2 min CN=74 Runoff=20.08 cfs 110,660 cf

Subcatchment 99S: Runoff Area=552,985 sf 7.86% Impervious Runoff Depth=3.31"
Flow Length=1,629' Tc=30.2 min CN=77 Runoff=27.70 cfs 152,303 cf

Subcatchment 99S.: A-SOILS Runoff Area=22,953 sf 0.00% Impervious Runoff Depth=0.39"
Tc=0.0 min CN=39 Runoff=0.08 cfs 746 cf

Subcatchment K-1: edited Runoff Area=695,432 sf 24.98% Impervious Runoff Depth=3.91"
Flow Length=821' Tc=18.9 min CN=83 Runoff=50.16 cfs 226,371 cf

Subcatchment K-2: edited Runoff Area=108,136 sf 60.78% Impervious Runoff Depth=4.76"
Tc=5.0 min CN=91 Runoff=13.61 cfs 42,908 cf

Subcatchment K3: (new Subcat) Runoff Area=214,922 sf 46.42% Impervious Runoff Depth=4.33"
Tc=5.0 min CN=87 Runoff=25.25 cfs 77,481 cf

Subcatchment P2-S: WET POND (P2) Runoff Area=79,989 sf 100.00% Impervious Runoff Depth=5.56"
Flow Length=635' Tc=1.1 min CN=98 Runoff=12.42 cfs 37,075 cf

Reach *1R: Avg. Flow Depth=0.59' Max Vel=2.97 fps Inflow=55.83 cfs 201,831 cf
n=0.035 L=400.0' S=0.0125 '/' Capacity=529.57 cfs Outflow=53.96 cfs 201,831 cf

Reach *20R: Avg. Flow Depth=0.26' Max Vel=3.85 fps Inflow=0.62 cfs 3,013 cf
12.0" Round Pipe n=0.013 L=315.0' S=0.0142 '/' Capacity=4.25 cfs Outflow=0.62 cfs 3,013 cf

Reach *21R: Avg. Flow Depth=1.00' Max Vel=4.42 fps Inflow=3.71 cfs 14,229 cf
12.0" Round Pipe n=0.013 L=270.0' S=0.0073 '/' Capacity=3.04 cfs Outflow=3.27 cfs 14,229 cf

Reach *22R: Avg. Flow Depth=0.85' Max Vel=5.69 fps Inflow=5.04 cfs 21,361 cf
15.0" Round Pipe n=0.013 L=110.0' S=0.0095 '/' Capacity=6.28 cfs Outflow=5.04 cfs 21,361 cf

Reach *23R: Outflow To Downstream Avg. Flow Depth=0.84' Max Vel=6.84 fps Inflow=5.97 cfs 24,591 cf
15.0" Round Pipe n=0.013 L=80.0' S=0.0138 '/' Capacity=7.57 cfs Outflow=5.96 cfs 24,591 cf

Reach *2R: Avg. Flow Depth=0.25' Max Vel=1.74 fps Inflow=5.96 cfs 24,591 cf
n=0.035 L=800.0' S=0.0125 '/' Capacity=260.28 cfs Outflow=5.17 cfs 24,591 cf

Reach 3R: Avg. Flow Depth=0.53' Max Vel=2.77 fps Inflow=38.39 cfs 221,101 cf
n=0.035 L=596.0' S=0.0151 '/' Capacity=602.80 cfs Outflow=37.58 cfs 221,101 cf

Reach 9R: Avg. Flow Depth=1.14' Max Vel=7.95 fps Inflow=48.88 cfs 196,608 cf
n=0.035 L=100.0' S=0.0600 '/' Capacity=176.48 cfs Outflow=48.88 cfs 196,608 cf

Reach 13R: Avg. Flow Depth=0.62' Max Vel=5.81 fps Inflow=2.97 cfs 20,421 cf
12.0" Round Pipe n=0.011 L=330.0' S=0.0100 '/' Capacity=4.21 cfs Outflow=2.97 cfs 20,421 cf

Reach 14AR: Avg. Flow Depth=0.99' Max Vel=14.50 fps Inflow=17.90 cfs 83,417 cf
18.0" Round Pipe n=0.011 L=170.0' S=0.0350 '/' Capacity=23.22 cfs Outflow=17.89 cfs 83,417 cf

Reach 14R: Avg. Flow Depth=0.84' Max Vel=14.73 fps Inflow=15.08 cfs 53,585 cf
18.0" Round Pipe n=0.011 L=230.0' S=0.0400 '/' Capacity=24.83 cfs Outflow=15.08 cfs 53,585 cf

Reach 16R: Avg. Flow Depth=0.14' Max Vel=2.81 fps Inflow=48.88 cfs 196,608 cf
n=0.025 L=1,400.0' S=0.0309 '/' Capacity=15,061.85 cfs Outflow=40.95 cfs 196,608 cf

Reach 20R: Avg. Flow Depth=2.00' Max Vel=14.22 fps Inflow=43.22 cfs 184,960 cf
24.0" Round Pipe n=0.013 L=289.0' S=0.0300 '/' Capacity=39.18 cfs Outflow=42.35 cfs 184,960 cf

Reach 21R: Avg. Flow Depth=1.37' Max Vel=11.35 fps Inflow=26.17 cfs 91,804 cf
24.0" Round Pipe n=0.013 L=180.0' S=0.0200 '/' Capacity=31.99 cfs Outflow=26.14 cfs 91,804 cf

Reach 22R: Avg. Flow Depth=1.44' Max Vel=8.11 fps Inflow=19.79 cfs 71,949 cf
24.0" Round Pipe n=0.013 L=290.0' S=0.0100 '/' Capacity=22.62 cfs Outflow=19.71 cfs 71,949 cf

Reach 23R: Avg. Flow Depth=1.05' Max Vel=10.51 fps Inflow=17.65 cfs 65,353 cf
24.0" Round Pipe n=0.013 L=103.0' S=0.0204 '/' Capacity=32.30 cfs Outflow=17.64 cfs 65,353 cf

Reach 24R: Avg. Flow Depth=0.84' Max Vel=16.03 fps Inflow=16.24 cfs 57,577 cf
18.0" Round Pipe n=0.013 L=75.0' S=0.0667 '/' Capacity=27.12 cfs Outflow=16.24 cfs 57,577 cf

Reach 25R: Avg. Flow Depth=1.28' Max Vel=9.81 fps Inflow=15.73 cfs 55,760 cf
18.0" Round Pipe n=0.013 L=124.0' S=0.0210 '/' Capacity=15.21 cfs Outflow=15.71 cfs 55,760 cf

Reach 26R: Avg. Flow Depth=1.22' Max Vel=9.58 fps Inflow=14.81 cfs 52,704 cf
18.0" Round Pipe n=0.013 L=192.0' S=0.0200 '/' Capacity=14.86 cfs Outflow=14.78 cfs 52,704 cf

Reach 27R: Avg. Flow Depth=1.03' Max Vel=6.76 fps Inflow=8.78 cfs 30,370 cf
18.0" Round Pipe n=0.013 L=192.0' S=0.0104 '/' Capacity=10.72 cfs Outflow=8.75 cfs 30,370 cf

Reach 28R: Avg. Flow Depth=0.81' Max Vel=3.87 fps Inflow=2.65 cfs 8,926 cf
12.0" Round Pipe n=0.013 L=107.0' S=0.0056 '/' Capacity=2.67 cfs Outflow=2.64 cfs 8,926 cf

Reach 29R: Avg. Flow Depth=1.36' Max Vel=8.01 fps Inflow=18.24 cfs 93,156 cf
24.0" Round Pipe n=0.013 L=115.0' S=0.0100 '/' Capacity=22.62 cfs Outflow=18.23 cfs 93,156 cf

Reach 51R: Avg. Flow Depth=1.00' Max Vel=10.39 fps Inflow=10.98 cfs 36,122 cf
15.0" Round Pipe n=0.013 L=325.0' S=0.0300 '/' Capacity=11.19 cfs Outflow=10.93 cfs 36,122 cf

Reach 52R: Avg. Flow Depth=0.90' Max Vel=8.38 fps Inflow=7.91 cfs 25,239 cf
15.0" Round Pipe n=0.013 L=25.0' S=0.0200 '/' Capacity=9.14 cfs Outflow=7.90 cfs 25,239 cf

Reach 53R: Avg. Flow Depth=0.53' Max Vel=4.63 fps Inflow=1.94 cfs 5,572 cf
12.0" Round Pipe n=0.013 L=66.0' S=0.0100 '/' Capacity=3.56 cfs Outflow=1.94 cfs 5,572 cf

Pond *1: Flow Entering CB1 Peak Elev=59.42' Inflow=15.55 cfs 53,004 cf
18.0" Round Culvert n=0.011 L=145.0' S=0.0060 '/' Outflow=15.55 cfs 53,004 cf

Pond *10: Flow Entering CB10 Peak Elev=60.14' Inflow=9.36 cfs 30,814 cf
18.0" Round Culvert n=0.011 L=30.0' S=0.0150 '/' Outflow=9.36 cfs 30,814 cf

Pond *11: Flow Entering CB11 Peak Elev=60.11' Inflow=5.25 cfs 17,282 cf
15.0" Round Culvert n=0.011 L=85.0' S=0.0071 '/' Outflow=5.25 cfs 17,282 cf

Pond *13: Flow Entering CB13 Peak Elev=55.04' Inflow=1.00 cfs 3,165 cf
12.0" Round Culvert n=0.013 L=135.0' S=0.0100 '/' Outflow=1.00 cfs 3,165 cf

Pond *14: Flow Entering CB14 Peak Elev=54.89' Inflow=1.15 cfs 3,202 cf
12.0" Round Culvert n=0.013 L=58.0' S=0.0052 '/' Outflow=1.15 cfs 3,202 cf

Pond *15: Flow Entering CB15 Peak Elev=54.79' Inflow=2.35 cfs 6,570 cf
12.0" Round Culvert n=0.013 L=88.0' S=0.0063 '/' Outflow=2.35 cfs 6,570 cf

Pond *16: Flow Entering CB16 Peak Elev=54.26' Inflow=6.18 cfs 19,406 cf
18.0" Round Culvert n=0.013 L=78.0' S=0.0071 '/' Outflow=6.18 cfs 19,406 cf

Pond *17: Flow Entering CB17 Peak Elev=53.67' Inflow=9.62 cfs 29,501 cf
18.0" Round Culvert n=0.011 L=135.0' S=0.0070 '/' Outflow=9.62 cfs 29,501 cf

Pond *18: Flow Entering CB18 Peak Elev=51.58' Inflow=2.16 cfs 7,255 cf
15.0" Round Culvert n=0.011 L=118.0' S=0.0051 '/' Outflow=2.16 cfs 7,255 cf

Pond *19: Flow Entering CB19 Peak Elev=51.44' Inflow=4.84 cfs 15,741 cf
15.0" Round Culvert n=0.011 L=130.0' S=0.0050 '/' Outflow=4.84 cfs 15,741 cf

Pond *2: Flow Entering CB2 Peak Elev=56.07' Inflow=18.60 cfs 63,657 cf
24.0" Round Culvert n=0.011 L=125.0' S=0.0060 '/' Outflow=18.60 cfs 63,657 cf

Pond *20: Flow Entering CB 20 Peak Elev=50.52' Inflow=2.29 cfs 8,116 cf
15.0" Round Culvert n=0.011 L=122.0' S=0.0070 '/' Outflow=2.29 cfs 8,116 cf

Pond *21: Flow Entering CB21 Peak Elev=50.35' Inflow=4.58 cfs 16,253 cf
15.0" Round Culvert n=0.011 L=155.0' S=0.0069 '/' Outflow=4.58 cfs 16,253 cf

Pond *22: Flow Entering CB22 Peak Elev=46.43' Inflow=1.81 cfs 6,441 cf
15.0" Round Culvert n=0.011 L=222.0' S=0.0189 '/' Outflow=1.81 cfs 6,441 cf

Pond *23: Flow Entering CB10 Peak Elev=53.70' Inflow=1.69 cfs 4,967 cf
15.0" Round Culvert n=0.011 L=86.0' S=0.0186 '/' Outflow=1.69 cfs 4,967 cf

Pond *3: Flow Entering CB3 Peak Elev=54.97' Inflow=21.62 cfs 73,951 cf
24.0" Round Culvert n=0.011 L=130.0' S=0.0060 '/' Outflow=21.62 cfs 73,951 cf

Pond *4: Flow Entering CB4 Peak Elev=53.36' Inflow=31.47 cfs 116,449 cf
30.0" Round Culvert n=0.011 L=105.0' S=0.0110 '/' Outflow=31.47 cfs 116,449 cf

Pond *5: Flow Entering CB5 Peak Elev=52.48' Inflow=5.16 cfs 19,103 cf
18.0" Round Culvert n=0.011 L=45.0' S=0.0080 '/' Outflow=5.16 cfs 19,103 cf

Pond *6: Flow Entering CB6 Peak Elev=52.49' Inflow=2.70 cfs 7,588 cf
18.0" Round Culvert n=0.011 L=45.0' S=0.0100 '/' Outflow=2.70 cfs 7,588 cf

Pond *7: Flow Entering CB7 Peak Elev=49.54' Inflow=48.49 cfs 176,125 cf
30.0" Round Culvert n=0.011 L=120.0' S=0.0140 '/' Outflow=48.49 cfs 176,125 cf

Pond *8: Flow Entering CB8 Peak Elev=46.55' Inflow=50.68 cfs 183,726 cf
36.0" Round Culvert n=0.011 L=125.0' S=0.0140 '/' Outflow=50.68 cfs 183,726 cf

Pond *9: Flow Entering CB9 Peak Elev=44.72' Inflow=55.83 cfs 201,831 cf
36.0" Round Culvert n=0.011 L=100.0' S=0.0150 '/' Outflow=55.83 cfs 201,831 cf

Pond *DD: Flow Entering Downstream Defender Peak Elev=50.10' Inflow=23.71 cfs 102,011 cf
30.0" Round Culvert n=0.011 L=50.0' S=0.0104 '/' Outflow=23.71 cfs 102,011 cf

Pond *DM1: Flow Entering DM1 Peak Elev=52.29' Inflow=36.58 cfs 135,553 cf
30.0" Round Culvert n=0.011 L=140.0' S=0.0110 '/' Outflow=36.58 cfs 135,553 cf

Pond *DM2: Flow Entering DM2 Peak Elev=54.31' Inflow=1.00 cfs 3,165 cf
12.0" Round Culvert n=0.013 L=50.0' S=0.0240 '/' Outflow=1.00 cfs 3,165 cf

Pond *OC1: Flow Entering OCS1 Peak Elev=50.64' Inflow=42.70 cfs 155,773 cf
Primary=23.71 cfs 102,011 cf Secondary=19.93 cfs 53,762 cf Outflow=42.70 cfs 155,773 cf

Pond 2.1P: Peak Elev=67.18' Inflow=111.49 cfs 349,656 cf
36.0" Round Culvert n=0.013 L=70.0' S=0.0051 '/' Outflow=111.49 cfs 349,656 cf

Pond 2P: Peak Elev=67.37' Storage=14,921 cf Inflow=62.23 cfs 349,656 cf
36.0" Round Culvert n=0.013 L=112.0' S=0.0300 '/' Outflow=111.49 cfs 349,656 cf

Pond 3P: Peak Elev=74.58' Inflow=264.14 cfs 1,246,312 cf
48.0" Round Culvert n=0.013 L=250.0' S=0.0019 '/' Outflow=264.14 cfs 1,246,313 cf

Pond 4P: Peak Elev=56.79' Inflow=268.82 cfs 1,595,969 cf
60.0" Round Culvert n=0.013 L=196.0' S=0.0005 '/' Outflow=268.82 cfs 1,595,969 cf

Pond 5P: Peak Elev=48.82' Inflow=268.82 cfs 1,595,969 cf
60.0" Round Culvert n=0.013 L=371.0' S=0.0016 '/' Outflow=268.82 cfs 1,595,969 cf

Pond 6P: (new Pond) Peak Elev=38.56' Storage=260,927 cf Inflow=58.37 cfs 260,927 cf
Outflow=0.00 cfs 0 cf

Pond 7P: Peak Elev=40.62' Inflow=3.34 cfs 21,519 cf
30.0" Round Culvert n=0.013 L=160.0' S=0.0022 '/' Outflow=3.34 cfs 21,519 cf

Pond 11P: Peak Elev=378.98' Inflow=84.26 cfs 341,103 cf
18.0" Round Culvert n=0.013 L=161.0' S=0.0078 '/' Outflow=84.26 cfs 341,103 cf

Pond 12P: PLUNGE POOL Peak Elev=24.24' Storage=10,538 cf Inflow=271.39 cfs 1,617,484 cf
Outflow=271.54 cfs 1,606,946 cf

Pond 14P: Peak Elev=222.93' Inflow=264.14 cfs 1,246,312 cf
30.0" Round Culvert n=0.013 L=238.0' S=0.0015 '/' Outflow=264.14 cfs 1,246,312 cf

Pond 18P: Peak Elev=40.60' Inflow=3.34 cfs 21,519 cf
36.0" Round Culvert n=0.013 L=184.0' S=0.0034 '/' Outflow=3.34 cfs 21,519 cf

Pond 19P: Peak Elev=41.39' Inflow=3.34 cfs 21,519 cf
12.0" Round Culvert n=0.013 L=62.0' S=0.0065 '/' Outflow=3.34 cfs 21,519 cf

Pond 20P: Peak Elev=40.60' Inflow=3.34 cfs 21,519 cf
36.0" Round Culvert n=0.013 L=181.0' S=0.0038 '/' Outflow=3.34 cfs 21,519 cf

Pond 24P: Peak Elev=32.37' Inflow=271.39 cfs 1,617,488 cf
60.0" Round Culvert n=0.013 L=30.0' S=0.0043 '/' Outflow=271.39 cfs 1,617,484 cf

Pond 25P: (new Pond) Peak Elev=22.22' Inflow=5.22 cfs 229,154 cf
12.0" Round Culvert n=0.013 L=113.0' S=0.0200 '/' Outflow=5.22 cfs 229,154 cf

Pond 26P: (new Pond) Peak Elev=18.80' Inflow=5.22 cfs 229,154 cf
12.0" Round Culvert n=0.013 L=20.0' S=0.0200 '/' Outflow=5.22 cfs 229,154 cf

Pond 42P: Peak Elev=40.64' Inflow=3.34 cfs 21,519 cf
30.0" Round Culvert n=0.013 L=338.0' S=0.0022 '/' Outflow=3.34 cfs 21,519 cf

Pond 100: Peak Elev=49.68' Storage=89,755 cf Inflow=52.24 cfs 279,600 cf
Outflow=38.39 cfs 221,101 cf

Pond 101: Peak Elev=53.84' Storage=1,832 cf Inflow=15.21 cfs 81,762 cf
15.0" Round Culvert x 2.00 n=0.013 L=75.0' S=0.0469 '/' Outflow=14.50 cfs 81,762 cf

Pond P1: Peak Elev=223.61' Storage=40,422 cf Inflow=77.82 cfs 558,182 cf
36.0" Round Culvert n=0.013 L=126.0' S=0.0195 '/' Outflow=113.52 cfs 558,183 cf

Pond P2: outfall 8 Peak Elev=24.09' Storage=210,849 cf Inflow=290.88 cfs 1,736,324 cf
Primary=5.22 cfs 229,154 cf Secondary=234.69 cfs 1,506,697 cf Outflow=239.87 cfs 1,735,852 cf

Pond R2: Peak Elev=40.59' Inflow=271.39 cfs 1,617,488 cf
60.0" Round Culvert n=0.013 L=44.0' S=0.0018 '/' Outflow=271.39 cfs 1,617,488 cf

Pond TWB CB10: (new Pond) Peak Elev=25.30' Storage=0 cf Inflow=0.00 cfs 0 cf
30.0" Round Culvert n=0.013 L=157.0' S=0.0032 '/' Outflow=0.00 cfs 0 cf

Pond TWB CB5: (new Pond) Peak Elev=27.30' Storage=0 cf Inflow=0.00 cfs 0 cf
30.0" Round Culvert n=0.013 L=204.0' S=0.0032 '/' Outflow=0.00 cfs 0 cf

Pond TWB CB9: (new Pond) Peak Elev=25.50' Storage=0 cf Inflow=0.00 cfs 0 cf
30.0" Round Culvert n=0.013 L=31.0' S=0.0032 '/' Outflow=0.00 cfs 0 cf

Pond TWB DMH1: (new Pond) Peak Elev=26.54' Storage=0 cf Inflow=0.00 cfs 0 cf
30.0" Round Culvert n=0.013 L=303.0' S=0.0031 '/' Outflow=0.00 cfs 0 cf

Pond TWC CB19: (new Pond) Peak Elev=266.79' Storage=75 cf Inflow=13.61 cfs 42,908 cf
15.0" Round Culvert n=0.013 L=88.0' S=0.0051 '/' Outflow=17.44 cfs 43,119 cf

Pond TWC CB2: (new Pond) Peak Elev=29.50' Storage=0 cf Inflow=0.00 cfs 0 cf
18.0" Round Culvert n=0.013 L=218.0' S=0.0030 '/' Outflow=0.00 cfs 0 cf

Pond TWC CB20: (new Pond) Peak Elev=266.48' Storage=75 cf Inflow=17.44 cfs 43,119 cf
24.0" Round Culvert n=0.013 L=336.0' S=0.0060 '/' Outflow=14.48 cfs 43,127 cf

Pond TWC CB21: (new Pond) Peak Elev=266.14' Storage=75 cf Inflow=73.45 cfs 346,986 cf
24.0" Round Culvert n=0.013 L=167.0' S=0.0058 '/' Outflow=71.92 cfs 346,986 cf

Pond TWC CB22: (new Pond) Peak Elev=270.00' Storage=75 cf Inflow=25.25 cfs 77,481 cf
15.0" Round Culvert n=0.013 L=93.0' S=0.0066 '/' Outflow=28.31 cfs 77,488 cf

Pond TWC CB23: (new Pond) Peak Elev=1,425.09' Storage=75 cf Inflow=50.16 cfs 226,371 cf
12.0" Round Culvert n=0.013 L=40.0' S=0.0050 '/' Outflow=50.13 cfs 226,371 cf

Pond TWC CB24: (new Pond) Peak Elev=1,270.66' Storage=75 cf Inflow=50.13 cfs 226,371 cf
12.0" Round Culvert n=0.013 L=340.0' S=0.0047 '/' Outflow=50.19 cfs 226,371 cf

Pond TWC CB25: (new Pond) Peak Elev=521.70' Storage=75 cf Inflow=50.19 cfs 226,371 cf
12.0" Round Culvert n=0.013 L=96.0' S=0.0052 '/' Outflow=50.86 cfs 226,371 cf

Pond TWC CB27: (new Pond) Peak Elev=234.44' Storage=75 cf Inflow=79.01 cfs 346,986 cf
27.0" Round Culvert n=0.013 L=278.0' S=0.0048 '/' Outflow=82.69 cfs 347,025 cf

Pond TWC DMH6: (new Pond) Peak Elev=245.26' Storage=75 cf Inflow=71.92 cfs 346,986 cf
24.0" Round Culvert n=0.013 L=77.0' S=0.0035 '/' Outflow=79.01 cfs 346,986 cf

Link WQ-1: Inflow=17.90 cfs 83,417 cf
Primary=17.90 cfs 83,417 cf

Total Runoff Area = 6,946,289 sf Runoff Volume = 2,066,025 cf Average Runoff Depth = 3.57"
64.49% Pervious = 4,479,370 sf 35.51% Impervious = 2,466,919 sf

Summary for Subcatchment *10S:

Runoff = 2.68 cfs @ 12.08 hrs, Volume= 8,486 cf, Depth= 4.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
15,812	98	Paved parking & roofs
2,134	74	>75% Grass cover, Good, HSG C
6,186	61	>75% Grass cover, Good, HSG B
24,132	86	Weighted Average
8,320		34.48% Pervious Area
15,812		65.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *11S:

Runoff = 1.45 cfs @ 12.08 hrs, Volume= 4,480 cf, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
11,631	61	>75% Grass cover, Good, HSG B
6,186	98	Paved parking & roofs
17,817	74	Weighted Average
11,631		65.28% Pervious Area
6,186		34.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *12S:

Runoff = 1.29 cfs @ 12.08 hrs, Volume= 4,099 cf, Depth= 4.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
6,578	98	Paved parking & roofs
566	61	>75% Grass cover, Good, HSG B
4,225	74	>75% Grass cover, Good, HSG C
11,369	87	Weighted Average
4,791		42.14% Pervious Area
6,578		57.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *13S:

Runoff = 2.29 cfs @ 12.08 hrs, Volume= 8,116 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
17,511	98	Paved parking & roofs
17,511		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *14S:

Runoff = 1.81 cfs @ 12.08 hrs, Volume= 6,441 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
13,896	98	Paved parking & roofs
13,896		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *15S:

Runoff = 2.29 cfs @ 12.08 hrs, Volume= 8,137 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
17,555	98	Paved parking & roofs
17,555		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *16S:

Runoff = 2.21 cfs @ 12.08 hrs, Volume= 7,601 cf, Depth= 5.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
1,350	74	>75% Grass cover, Good, HSG C
15,769	98	Paved parking & roofs
17,119	96	Weighted Average
1,350		7.89% Pervious Area
15,769		92.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *17S:

Runoff = 3.39 cfs @ 12.08 hrs, Volume= 11,663 cf, Depth= 5.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
2,570	74	>75% Grass cover, Good, HSG C
23,697	98	Paved parking & roofs
26,267	96	Weighted Average
2,570		9.78% Pervious Area
23,697		90.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *18S:

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.15 cfs @ 12.00 hrs, Volume= 3,202 cf, Depth= 5.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
6,360	98	Paved parking & roofs
1,176	74	>75% Grass cover, Good, HSG C
7,536	94	Weighted Average
1,176		15.61% Pervious Area
6,360		84.39% Impervious Area

Summary for Subcatchment *19S:

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.75 cfs @ 12.00 hrs, Volume= 5,128 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
11,064	98	Paved parking & roofs
11,064		100.00% Impervious Area

Summary for Subcatchment *1S:

Runoff = 9.36 cfs @ 12.08 hrs, Volume= 30,814 cf, Depth= 4.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
	23,435	98	Paved parking & roofs
	4,792	39	>75% Grass cover, Good, HSG A
	5,271	80	>75% Grass cover, Good, HSG D
	1,960	61	>75% Grass cover, Good, HSG B
*	40,423	98	ADUSTMENT 2018
	75,881	92	Weighted Average
	12,023		15.84% Pervious Area
	63,858		84.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *20S:

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 3.29 cfs @ 12.00 hrs, Volume= 9,671 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
20,865	98	Paved parking & roofs
20,865		100.00% Impervious Area

Summary for Subcatchment *21S:

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.20 cfs @ 12.00 hrs, Volume= 3,368 cf, Depth= 5.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
7,100	98	Paved parking & roofs
653	61	>75% Grass cover, Good, HSG B
7,753	95	Weighted Average
653		8.42% Pervious Area
7,100		91.58% Impervious Area

Summary for Subcatchment *22S:

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.69 cfs @ 12.00 hrs, Volume= 4,967 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
10,716	98	Paved parking & roofs
10,716		100.00% Impervious Area

Summary for Subcatchment *24S:

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.82 cfs @ 12.00 hrs, Volume= 4,909 cf, Depth= 4.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
9,932	98	Paved parking & roofs
2,439	61	>75% Grass cover, Good, HSG B
12,371	91	Weighted Average
2,439		19.72% Pervious Area
9,932		80.28% Impervious Area

Summary for Subcatchment *2S:

Runoff = 5.25 cfs @ 12.08 hrs, Volume= 17,282 cf, Depth= 4.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
36,068	98	Paved parking & roofs
6,490	61	>75% Grass cover, Good, HSG B
42,558	92	Weighted Average
6,490		15.25% Pervious Area
36,068		84.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *2S-A:

Runoff = 0.62 cfs @ 12.24 hrs, Volume= 3,013 cf, Depth= 1.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
6,839	98	Paved parking & roofs
20,343	39	>75% Grass cover, Good, HSG A
27,182	54	Weighted Average
20,343		74.84% Pervious Area
6,839		25.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0080	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.00"
0.6	110	0.0410	3.04		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
15.2	210	Total			

Summary for Subcatchment *2S-B:

Runoff = 3.40 cfs @ 12.10 hrs, Volume= 11,216 cf, Depth= 4.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
9,888	98	Paved parking & roofs
22,825	80	>75% Grass cover, Good, HSG D
32,713	85	Weighted Average
22,825		69.77% Pervious Area
9,888		30.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	100	0.1100	0.33		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.00"
2.2	225	0.0133	1.73		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.3	325	Total			

Summary for Subcatchment *2S-C:

Runoff = 2.00 cfs @ 12.14 hrs, Volume= 7,132 cf, Depth= 2.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
6,665	98	Paved parking & roofs
28,009	61	>75% Grass cover, Good, HSG B
34,674	68	Weighted Average
28,009		80.78% Pervious Area
6,665		19.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	100	0.0400	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.00"
0.4	50	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.6	125	0.0080	1.34		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
9.7	275	Total			

Summary for Subcatchment *2S-D:

Runoff = 1.07 cfs @ 12.07 hrs, Volume= 3,231 cf, Depth= 3.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
3,354	98	Paved parking & roofs
6,839	74	>75% Grass cover, Good, HSG C
10,193	82	Weighted Average
6,839		67.10% Pervious Area
3,354		32.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment *3S:

Runoff = 3.05 cfs @ 12.08 hrs, Volume= 10,653 cf, Depth= 5.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
22,564	98	Paved parking & roofs
915	61	>75% Grass cover, Good, HSG B
23,479	97	Weighted Average
915		3.90% Pervious Area
22,564		96.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *4S:

Runoff = 3.03 cfs @ 12.08 hrs, Volume= 10,294 cf, Depth= 5.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
21,954	98	Paved parking & roofs
1,742	61	>75% Grass cover, Good, HSG B
23,696	95	Weighted Average
1,742		7.35% Pervious Area
21,954		92.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *5S:

Runoff = 3.77 cfs @ 12.08 hrs, Volume= 12,998 cf, Depth= 5.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
27,530	98	Paved parking & roofs
1,742	61	>75% Grass cover, Good, HSG B
29,272	96	Weighted Average
1,742		5.95% Pervious Area
27,530		94.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *6S:

Runoff = 3.55 cfs @ 12.08 hrs, Volume= 11,515 cf, Depth= 4.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
23,087	98	Paved parking & roofs
6,621	61	>75% Grass cover, Good, HSG B
29,708	90	Weighted Average
6,621		22.29% Pervious Area
23,087		77.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *7S:

Runoff = 1.00 cfs @ 12.09 hrs, Volume= 3,165 cf, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
1,830	98	Paved parking & roofs
15,377	61	>75% Grass cover, Good, HSG B
17,207	65	Weighted Average
15,377		89.36% Pervious Area
1,830		10.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment *8S:

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 2.70 cfs @ 12.00 hrs, Volume= 7,588 cf, Depth= 5.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
16,074	98	Paved parking & roofs
1,394	61	>75% Grass cover, Good, HSG B
17,468	95	Weighted Average
1,394		7.98% Pervious Area
16,074		92.02% Impervious Area

Summary for Subcatchment *9S:

Runoff = 2.16 cfs @ 12.08 hrs, Volume= 7,255 cf, Depth= 5.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
2,744	74	>75% Grass cover, Good, HSG C
14,331	98	Paved parking & roofs
17,075	94	Weighted Average
2,744		16.07% Pervious Area
14,331		83.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment 1.0S:

Runoff = 84.20 cfs @ 12.16 hrs, Volume= 335,798 cf, Depth= 4.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
	471,325	98	Paved parking, HSG D
	137,123	74	>75% Grass cover, Good, HSG C
	213,334	80	>75% Grass cover, Good, HSG D
	11,909	61	>75% Grass cover, Good, HSG B
*	53,516	98	ADJUSTMENT 2018
	887,207	89	Weighted Average
	362,366		40.84% Pervious Area
	524,841		59.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0200	0.16		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
2.7	137	0.0146	0.85		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
12.8	237	Total			

Summary for Subcatchment 1.0S.: A-SOILS

Runoff = 0.50 cfs @ 12.47 hrs, Volume= 5,305 cf, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
163,301	39	>75% Grass cover, Good, HSG A
163,301		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0200	0.16		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
2.7	137	0.0146	0.85		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
12.8	237	Total			

Summary for Subcatchment 1.1S: TW B

Runoff = 58.37 cfs @ 12.23 hrs, Volume= 260,927 cf, Depth= 4.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
467,821	80	>75% Grass cover, Good, HSG D
58,305	74	>75% Grass cover, Good, HSG C
234,933	98	Paved parking, HSG D
761,059	85	Weighted Average
526,126		69.13% Pervious Area
234,933		30.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0200	0.16		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
8.1	800	0.0120	1.64		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
18.2	900	Total			

Summary for Subcatchment 3:

Runoff = 11.65 cfs @ 12.28 hrs, Volume= 53,870 cf, Depth= 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
	54,450	98	Paved parking & roofs
	44,867	39	>75% Grass cover, Good, HSG A
	125,888	61	>75% Grass cover, Good, HSG B
	16,553	80	>75% Grass cover, Good, HSG D
*	29,839	67	ADJUSTMENT
	271,597	67	Weighted Average
	217,147		79.95% Pervious Area
	54,450		20.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.3					**Direct Entry,**

Summary for Subcatchment 5:

Runoff = 15.21 cfs @ 12.41 hrs, Volume= 81,762 cf, Depth= 2.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
*	29,839	68	ADJUSTMENT
	17,424	98	Paved parking & roofs
*	0	100	Water Surface
	224,334	61	>75% Grass cover, Good, HSG B
	9,148	74	>75% Grass cover, Good, HSG C
	84,506	80	>75% Grass cover, Good, HSG D
*	7,884	98	ADJUSTMENT
*	10,524	98	ADJUSTMENT 2018
	383,659	69	Weighted Average
	347,827		90.66% Pervious Area
	35,832		9.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.0					**Direct Entry,**

Summary for Subcatchment 9:

Runoff = 2.96 cfs @ 12.07 hrs, Volume= 9,410 cf, Depth= 4.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
*	17,424	98	Impervious
	5,750	74	>75% Grass cover, Good, HSG C
	23,174	92	Weighted Average
	5,750		24.81% Pervious Area
	17,424		75.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment 13:

Runoff = 2.97 cfs @ 12.39 hrs, Volume= 20,421 cf, Depth= 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
252,038	39	>75% Grass cover, Good, HSG A
37,026	98	Paved parking & roofs
289,064	47	Weighted Average
252,038		87.19% Pervious Area
37,026		12.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	100	0.0330	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.00"
8.9	500	0.0180	0.94		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
21.0	600	Total			

Summary for Subcatchment 14:

Runoff = 15.08 cfs @ 12.13 hrs, Volume= 53,585 cf, Depth= 3.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
122,796	98	Impervious
55,757	39	>75% Grass cover, Good, HSG A
178,553	80	Weighted Average
55,757		31.23% Pervious Area
122,796		68.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Summary for Subcatchment 15:

Runoff = 30.99 cfs @ 12.13 hrs, Volume= 113,191 cf, Depth= 4.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
	181,645	98	Paved parking & roofs - LOT 4
	86,684	61	>75% Grass cover, Good, HSG B - LOT 4
*	38,042	98	ADJUSTMENT 2018
	306,371	88	Weighted Average
	86,684		28.29% Pervious Area
	219,687		71.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Summary for Subcatchment 18S:

Runoff = 18.94 cfs @ 12.31 hrs, Volume= 92,229 cf, Depth= 3.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
6,303	61	>75% Grass cover, Good, HSG B
254,763	74	>75% Grass cover, Good, HSG C
94,536	80	>75% Grass cover, Good, HSG D
355,602	75	Weighted Average
355,602		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0150	0.10		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.00"
5.9	263	0.0114	0.75		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.5	92	0.1665	2.86		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
22.9	455	Total			

Summary for Subcatchment 18S.: A-SOILS

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.01 cfs @ 12.26 hrs, Volume= 73 cf, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
2,239	39	>75% Grass cover, Good, HSG A
2,239		100.00% Pervious Area

Summary for Subcatchment 20:

Runoff = 0.83 cfs @ 12.16 hrs, Volume= 3,163 cf, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
2,178	98	Paved parking & roofs
14,375	61	>75% Grass cover, Good, HSG B
16,553	66	Weighted Average
14,375		86.84% Pervious Area
2,178		13.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5					**Direct Entry,**

Summary for Subcatchment 21:

Runoff = 3.42 cfs @ 12.04 hrs, Volume= 10,315 cf, Depth= 4.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
21,344	98	Paved parking & roofs
3,485	61	>75% Grass cover, Good, HSG B
24,829	93	Weighted Average
3,485		14.04% Pervious Area
21,344		85.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3					**Direct Entry,**

Summary for Subcatchment 22:

Runoff = 3.26 cfs @ 12.06 hrs, Volume= 9,541 cf, Depth= 3.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
16,988	98	Paved parking & roofs
13,939	61	>75% Grass cover, Good, HSG B
30,927	81	Weighted Average
13,939		45.07% Pervious Area
16,988		54.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3					**Direct Entry,**

Summary for Subcatchment 23:

Runoff = 2.16 cfs @ 12.07 hrs, Volume= 6,595 cf, Depth= 4.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
14,375	98	Paved parking & roofs
2,178	39	>75% Grass cover, Good, HSG A
1,742	61	>75% Grass cover, Good, HSG B
18,295	87	Weighted Average
3,920		21.43% Pervious Area
14,375		78.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9					**Direct Entry,**

Summary for Subcatchment 24:

Runoff = 2.11 cfs @ 12.15 hrs, Volume= 7,776 cf, Depth= 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
18,731	98	Paved parking & roofs
20,473	39	>75% Grass cover, Good, HSG A
39,204	67	Weighted Average
20,473		52.22% Pervious Area
18,731		47.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6					**Direct Entry,**

Summary for Subcatchment 25:

Runoff = 0.59 cfs @ 12.02 hrs, Volume= 1,817 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
3,920	98	Paved parking & roofs
3,920		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1					**Direct Entry,**

Summary for Subcatchment 27:

Runoff = 0.83 cfs @ 12.05 hrs, Volume= 2,591 cf, Depth= 5.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
5,663	98	Paved parking & roofs
436	39	>75% Grass cover, Good, HSG A
6,099	94	Weighted Average
436		7.15% Pervious Area
5,663		92.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9					**Direct Entry,**

Summary for Subcatchment 28:

Runoff = 3.02 cfs @ 12.05 hrs, Volume= 8,649 cf, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
20,038	98	Paved parking & roofs
6,534	39	>75% Grass cover, Good, HSG A
26,572	83	Weighted Average
6,534		24.59% Pervious Area
20,038		75.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6					**Direct Entry,**

Summary for Subcatchment 29:

Runoff = 1.14 cfs @ 12.01 hrs, Volume= 3,432 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
7,405	98	Paved parking & roofs
7,405		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3					**Direct Entry,**

Summary for Subcatchment 30:

Runoff = 2.01 cfs @ 12.16 hrs, Volume= 7,660 cf, Depth= 3.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
17,860	98	Paved parking & roofs
6,970	39	>75% Grass cover, Good, HSG A
24,830	81	Weighted Average
6,970		28.07% Pervious Area
17,860		71.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3					**Direct Entry,**

Summary for Subcatchment 31:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.16 cfs @ 12.01 hrs, Volume= 3,057 cf, Depth= 4.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
6,970	98	Paved parking & roofs
2,178	39	>75% Grass cover, Good, HSG A
9,148	84	Weighted Average
2,178		23.81% Pervious Area
6,970		76.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1					**Direct Entry,**

Summary for Subcatchment 32:

Runoff = 0.54 cfs @ 12.01 hrs, Volume= 1,615 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
3,485	98	Paved parking & roofs
3,485		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2					**Direct Entry,**

Summary for Subcatchment 33:

Runoff = 2.64 cfs @ 12.05 hrs, Volume= 7,695 cf, Depth= 4.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
17,424	98	Paved parking & roofs
3,920	39	>75% Grass cover, Good, HSG A
21,344	87	Weighted Average
3,920		18.37% Pervious Area
17,424		81.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6					**Direct Entry,**

Summary for Subcatchment 34:

Runoff = 1.00 cfs @ 12.02 hrs, Volume= 2,736 cf, Depth= 4.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
6,098	98	Paved parking & roofs
1,307	39	>75% Grass cover, Good, HSG A
7,405	88	Weighted Average
1,307		17.65% Pervious Area
6,098		82.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5					**Direct Entry,**

Summary for Subcatchment 35:

Runoff = 1.84 cfs @ 12.07 hrs, Volume= 6,190 cf, Depth= 5.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
13,504	98	Paved parking & roofs
436	39	>75% Grass cover, Good, HSG A
13,940	96	Weighted Average
436		3.13% Pervious Area
13,504		96.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3					**Direct Entry,**

Summary for Subcatchment 36:

Runoff = 0.96 cfs @ 12.04 hrs, Volume= 2,736 cf, Depth= 4.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
6,098	98	Paved parking & roofs
1,307	39	>75% Grass cover, Good, HSG A
7,405	88	Weighted Average
1,307		17.65% Pervious Area
6,098		82.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8					**Direct Entry,**

Summary for Subcatchment 37:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.41 cfs @ 12.01 hrs, Volume= 1,212 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
2,614	98	Paved parking & roofs
2,614		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry,**

Summary for Subcatchment 38:

Runoff = 1.60 cfs @ 12.02 hrs, Volume= 4,846 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
10,454	98	Paved parking & roofs
10,454		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4					**Direct Entry,**

Summary for Subcatchment 39:

Runoff = 0.77 cfs @ 12.24 hrs, Volume= 3,342 cf, Depth= 2.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
7,841	98	Paved parking & roofs
7,841	39	>75% Grass cover, Good, HSG A
15,682	69	Weighted Average
7,841		50.00% Pervious Area
7,841		50.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0					**Direct Entry,**

Summary for Subcatchment 41S:

Runoff = 2.98 cfs @ 12.36 hrs, Volume= 17,769 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
20,925	98	Paved parking & roofs
17,412	98	Paved parking & roofs
38,337	98	Weighted Average
38,337		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.0600	0.26		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
1.5	112	0.0300	1.21		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
3.8	308	0.0381	1.37		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
0.1	50	0.5000	14.35		**Shallow Concentrated Flow, D-E** Paved Kv= 20.3 fps
15.6	278	0.0018	0.30		**Shallow Concentrated Flow, E-F** Short Grass Pasture Kv= 7.0 fps
27.5	848	Total			

Summary for Subcatchment 41S.: A-SOILS

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.39 cfs @ 12.26 hrs, Volume= 3,749 cf, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
81,220	39	>75% Grass cover, Good, HSG A
34,205	39	>75% Grass cover, Good, HSG A
115,425	39	Weighted Average
115,425		100.00% Pervious Area

Summary for Subcatchment 51:

Runoff = 1.94 cfs @ 12.03 hrs, Volume= 5,572 cf, Depth= 4.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
11,326	98	Paved parking & roofs
3,049	61	>75% Grass cover, Good, HSG B
14,375	90	Weighted Average
3,049		21.21% Pervious Area
11,326		78.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6					**Direct Entry,**

Summary for Subcatchment 52:

Runoff = 7.91 cfs @ 12.09 hrs, Volume= 25,239 cf, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
45,738	98	Paved parking & roofs
0	39	>75% Grass cover, Good, HSG A
31,799	61	>75% Grass cover, Good, HSG B
77,537	83	Weighted Average
31,799		41.01% Pervious Area
45,738		58.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6					**Direct Entry,**

Summary for Subcatchment 53:

Runoff = 1.99 cfs @ 12.02 hrs, Volume= 5,312 cf, Depth= 3.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
8,712	98	Paved parking & roofs
10,019	61	>75% Grass cover, Good, HSG B
18,731	78	Weighted Average
10,019		53.49% Pervious Area
8,712		46.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9					**Direct Entry,**

Summary for Subcatchment 61:

Runoff = 3.00 cfs @ 12.23 hrs, Volume= 12,877 cf, Depth= 2.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

	Area (sf)	CN	Description
*	13,068	100	Water Surface
	45,302	61	>75% Grass cover, Good, HSG B
	0	74	>75% Grass cover, Good, HSG C
	58,370	70	Weighted Average
	45,302		77.61% Pervious Area
	13,068		22.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5					**Direct Entry,**

Summary for Subcatchment 98S:

Runoff = 20.08 cfs @ 12.42 hrs, Volume= 110,660 cf, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
39,904	61	>75% Grass cover, Good, HSG B
105,781	80	>75% Grass cover, Good, HSG D
294,398	74	>75% Grass cover, Good, HSG C
440,083	74	Weighted Average
440,083		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.2					**Direct Entry, Tc From 99S**

Summary for Subcatchment 99S:

Runoff = 27.70 cfs @ 12.41 hrs, Volume= 152,303 cf, Depth= 3.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
14,673	98	Paved parking & roofs
16,843	98	Paved parking & roofs
248,035	74	>75% Grass cover, Good, HSG C
7,750	98	Paved parking & roofs
178,437	74	>75% Grass cover, Good, HSG C
4,185	98	Paved parking & roofs
83,062	80	>75% Grass cover, Good, HSG D
552,985	77	Weighted Average
509,534		92.14% Pervious Area
43,451		7.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	100	0.0400	0.22		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
1.2	150	0.0933	2.14		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
1.0	69	0.0290	1.19		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
20.3	1,310	0.0237	1.08		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
30.2	1,629	Total			

Summary for Subcatchment 99S.: A-SOILS

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.08 cfs @ 12.26 hrs, Volume= 746 cf, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
22,953	39	>75% Grass cover, Good, HSG A
22,953		100.00% Pervious Area

Summary for Subcatchment K-1: edited

Runoff = 50.16 cfs @ 12.24 hrs, Volume= 226,371 cf, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
320,226	80	>75% Grass cover, Good, HSG D
201,462	74	>75% Grass cover, Good, HSG C
173,744	98	Paved parking & roofs
695,432	83	Weighted Average
521,688		75.02% Pervious Area
173,744		24.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.0120	0.13		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
6.5	721	0.0150	1.84		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
18.9	821	Total			

Summary for Subcatchment K-2: edited

Runoff = 13.61 cfs @ 12.07 hrs, Volume= 42,908 cf, Depth= 4.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
65,726	98	Paved parking, HSG A
42,410	80	>75% Grass cover, Good, HSG D
108,136	91	Weighted Average
42,410		39.22% Pervious Area
65,726		60.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment K3: (new Subcat)

Runoff = 25.25 cfs @ 12.07 hrs, Volume= 77,481 cf, Depth= 4.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
99,766	98	Paved parking, HSG A
61,404	80	>75% Grass cover, Good, HSG D
53,752	74	>75% Grass cover, Good, HSG C
214,922	87	Weighted Average
115,156		53.58% Pervious Area
99,766		46.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2-S: WET POND (P2) SURFACE

[49] Hint: Tc<2dt may require smaller dt

Runoff = 12.42 cfs @ 12.01 hrs, Volume= 37,075 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Storm Rainfall=5.80"

Area (sf)	CN	Description
79,989	98	Water Surface, HSG A
79,989		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	635		9.93		**Lake or Reservoir, WET POND** Mean Depth= 3.06'

Summary for Reach *1R:

Inflow Area = 492,315 sf, 83.35% Impervious, Inflow Depth = 4.92" for 25 Year Storm event
Inflow = 55.83 cfs @ 12.07 hrs, Volume= 201,831 cf
Outflow = 53.96 cfs @ 12.09 hrs, Volume= 201,831 cf, Atten= 3%, Lag= 1.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.97 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 0.73 fps, Avg. Travel Time= 9.1 min

Peak Storage= 7,278 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.59'
Bank-Full Depth= 2.00' Flow Area= 90.0 sf, Capacity= 529.57 cfs

25.00' x 2.00' deep channel, n= 0.035
Side Slope Z-value= 12.5 7.5 '/' Top Width= 65.00'
Length= 400.0' Slope= 0.0125 '/'
Inlet Invert= 35.00', Outlet Invert= 30.00'



‡

Summary for Reach *20R:

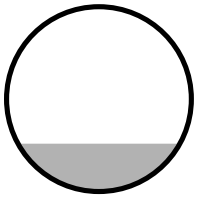
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 27,182 sf, 25.16% Impervious, Inflow Depth = 1.33" for 25 Year Storm event
Inflow = 0.62 cfs @ 12.24 hrs, Volume= 3,013 cf
Outflow = 0.62 cfs @ 12.25 hrs, Volume= 3,013 cf, Atten= 1%, Lag= 0.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.85 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 1.70 fps, Avg. Travel Time= 3.1 min

Peak Storage= 50 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.25 cfs

12.0" Round Pipe
n= 0.013
Length= 315.0' Slope= 0.0142 '/'
Inlet Invert= 58.89', Outlet Invert= 54.41'



Summary for Reach *21R:

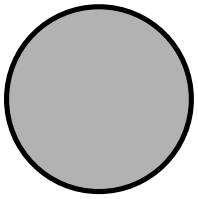
[52] Hint: Inlet/Outlet conditions not evaluated
[55] Hint: Peak inflow is 122% of Manning's capacity
[76] Warning: Detained 151 cf (Pond w/culvert advised)
[62] Hint: Exceeded Reach *20R OUTLET depth by 0.73' @ 12.09 hrs

Inflow Area = 59,895 sf, 27.93% Impervious, Inflow Depth = 2.85" for 25 Year Storm event
Inflow = 3.71 cfs @ 12.10 hrs, Volume= 14,229 cf
Outflow = 3.27 cfs @ 12.27 hrs, Volume= 14,229 cf, Atten= 12%, Lag= 9.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.42 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.75 fps, Avg. Travel Time= 2.6 min

Peak Storage= 212 cf @ 12.09 hrs
Average Depth at Peak Storage= 1.00'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.04 cfs

12.0" Round Pipe
n= 0.013
Length= 270.0' Slope= 0.0073 '/'
Inlet Invert= 54.31', Outlet Invert= 52.34'



Summary for Reach *22R:

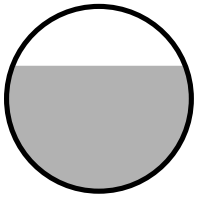
[52] Hint: Inlet/Outlet conditions not evaluated
[61] Hint: Exceeded Reach *21R outlet invert by 0.75' @ 12.14 hrs

Inflow Area = 94,569 sf, 24.74% Impervious, Inflow Depth = 2.71" for 25 Year Storm event
Inflow = 5.04 cfs @ 12.14 hrs, Volume= 21,361 cf
Outflow = 5.04 cfs @ 12.14 hrs, Volume= 21,361 cf, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.69 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.08 fps, Avg. Travel Time= 0.9 min

Peak Storage= 97 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.85'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 6.28 cfs

15.0" Round Pipe
n= 0.013
Length= 110.0' Slope= 0.0095 '/'
Inlet Invert= 52.24', Outlet Invert= 51.20'



Summary for Reach *23R: Outflow To Downstream Defender

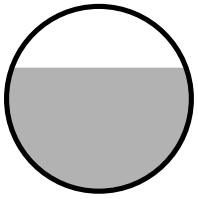
[52] Hint: Inlet/Outlet conditions not evaluated
[61] Hint: Exceeded Reach *22R outlet invert by 0.74' @ 12.09 hrs

Inflow Area = 104,762 sf, 25.53% Impervious, Inflow Depth = 2.82" for 25 Year Storm event
Inflow = 5.97 cfs @ 12.08 hrs, Volume= 24,591 cf
Outflow = 5.96 cfs @ 12.09 hrs, Volume= 24,591 cf, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.84 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.48 fps, Avg. Travel Time= 0.5 min

Peak Storage= 70 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.84'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.57 cfs

15.0" Round Pipe
n= 0.013
Length= 80.0' Slope= 0.0138 '/'
Inlet Invert= 51.10', Outlet Invert= 50.00'



Summary for Reach *2R:

[61] Hint: Exceeded Reach *23R outlet invert by 0.25' @ 12.22 hrs

Inflow Area = 104,762 sf, 25.53% Impervious, Inflow Depth = 2.82" for 25 Year Storm event
Inflow = 5.96 cfs @ 12.09 hrs, Volume= 24,591 cf
Outflow = 5.17 cfs @ 12.22 hrs, Volume= 24,591 cf, Atten= 13%, Lag= 8.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.74 fps, Min. Travel Time= 7.7 min
Avg. Velocity = 0.52 fps, Avg. Travel Time= 25.8 min

Peak Storage= 2,383 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 2.00' Flow Area= 47.0 sf, Capacity= 260.28 cfs

10.00' x 2.00' deep channel, n= 0.035
Side Slope Z-value= 6.0 7.5 '/' Top Width= 37.00'
Length= 800.0' Slope= 0.0125 '/'
Inlet Invert= 50.00', Outlet Invert= 40.00'



Summary for Reach 3R:

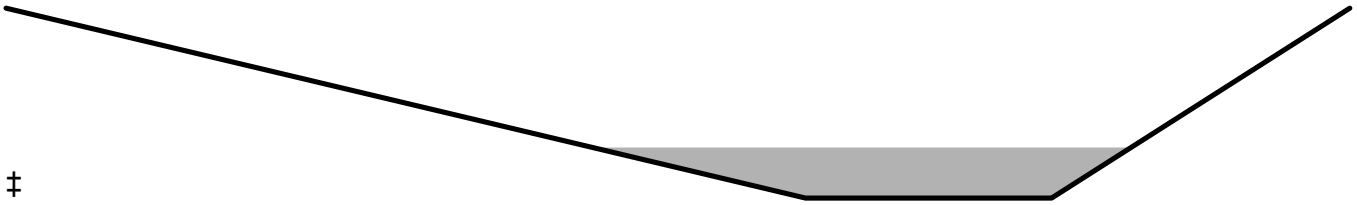
[80] Warning: Exceeded Pond 100 by 6.00' @ 0.00 hrs (9.38 cfs 406,675 cf)

Inflow Area = 1,114,380 sf, 33.39% Impervious, Inflow Depth = 2.38" for 25 Year Storm event
Inflow = 38.39 cfs @ 12.43 hrs, Volume= 221,101 cf
Outflow = 37.58 cfs @ 12.48 hrs, Volume= 221,101 cf, Atten= 2%, Lag= 3.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.77 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 0.88 fps, Avg. Travel Time= 11.3 min

Peak Storage= 8,081 cf @ 12.48 hrs
Average Depth at Peak Storage= 0.53'
Bank-Full Depth= 2.00' Flow Area= 103.4 sf, Capacity= 602.80 cfs

16.00' x 2.00' deep channel, n= 0.035 High grass
Side Slope Z-value= 26.0 9.7 '/' Top Width= 87.40'
Length= 596.0' Slope= 0.0151 '/'
Inlet Invert= 48.00', Outlet Invert= 39.00'



‡

Summary for Reach 9R:

[65] Warning: Inlet elevation not specified

Inflow Area = 797,162 sf, 49.79% Impervious, Inflow Depth = 2.96" for 25 Year Storm event
Inflow = 48.88 cfs @ 12.13 hrs, Volume= 196,608 cf
Outflow = 48.88 cfs @ 12.13 hrs, Volume= 196,608 cf, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.95 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.69 fps, Avg. Travel Time= 0.6 min

Peak Storage= 614 cf @ 12.13 hrs
Average Depth at Peak Storage= 1.14'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 176.48 cfs

2.00' x 2.00' deep channel, n= 0.035
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 100.0' Slope= 0.0600 '/'
Inlet Invert= 0.00', Outlet Invert= -6.00'



Summary for Reach 13R:

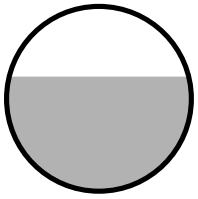
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 289,064 sf, 12.81% Impervious, Inflow Depth = 0.85" for 25 Year Storm event
Inflow = 2.97 cfs @ 12.39 hrs, Volume= 20,421 cf
Outflow = 2.97 cfs @ 12.41 hrs, Volume= 20,421 cf, Atten= 0%, Lag= 1.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.81 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 3.01 fps, Avg. Travel Time= 1.8 min

Peak Storage= 168 cf @ 12.41 hrs
Average Depth at Peak Storage= 0.62'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.21 cfs

12.0" Round Pipe
n= 0.011
Length= 330.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -3.30'



Summary for Reach 14AR:

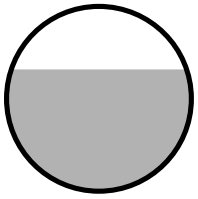
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 490,791 sf, 36.11% Impervious, Inflow Depth = 2.04" for 25 Year Storm event
Inflow = 17.90 cfs @ 12.13 hrs, Volume= 83,417 cf
Outflow = 17.89 cfs @ 12.14 hrs, Volume= 83,417 cf, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 14.50 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 5.12 fps, Avg. Travel Time= 0.6 min

Peak Storage= 210 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.99'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 23.22 cfs

18.0" Round Pipe
n= 0.011
Length= 170.0' Slope= 0.0350 '/'
Inlet Invert= 0.00', Outlet Invert= -5.95'



Summary for Reach 14R:

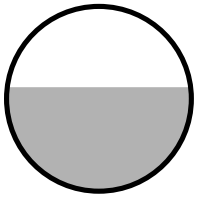
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 178,553 sf, 68.77% Impervious, Inflow Depth = 3.60" for 25 Year Storm event
Inflow = 15.08 cfs @ 12.13 hrs, Volume= 53,585 cf
Outflow = 15.08 cfs @ 12.14 hrs, Volume= 53,585 cf, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 14.73 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 5.39 fps, Avg. Travel Time= 0.7 min

Peak Storage= 235 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.84'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 24.83 cfs

18.0" Round Pipe
n= 0.011
Length= 230.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -9.20'



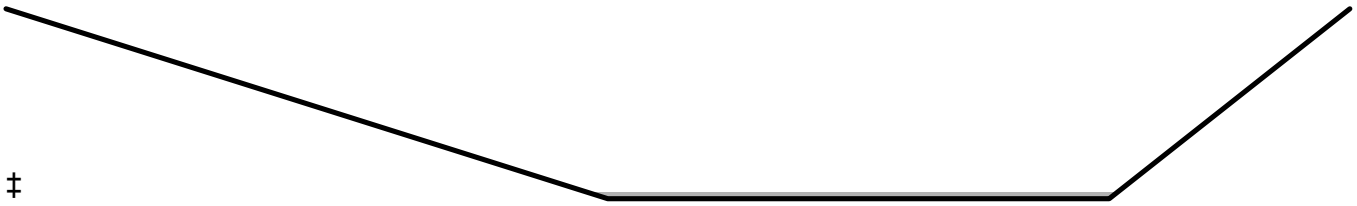
Summary for Reach 16R:

Inflow Area = 797,162 sf, 49.79% Impervious, Inflow Depth = 2.96" for 25 Year Storm event
Inflow = 48.88 cfs @ 12.13 hrs, Volume= 196,608 cf
Outflow = 40.95 cfs @ 12.21 hrs, Volume= 196,608 cf, Atten= 16%, Lag= 4.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.81 fps, Min. Travel Time= 8.3 min
Avg. Velocity = 1.26 fps, Avg. Travel Time= 18.5 min

Peak Storage= 20,397 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 4.00' Flow Area= 736.0 sf, Capacity= 15,061.85 cfs

100.00' x 4.00' deep channel, n= 0.025 Earth, grassed & winding
Side Slope Z-value= 30.0 12.0 '/' Top Width= 268.00'
Length= 1,400.0' Slope= 0.0309 '/'
Inlet Invert= 64.00', Outlet Invert= 20.80'



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Summary for Reach 20R:

SMJDF 02.26.99

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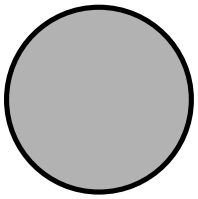
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified
[55] Hint: Peak inflow is 110% of Manning's capacity
[76] Warning: Detained 529 cf (Pond w/culvert advised)

Inflow Area = 672,351 sf, 48.07% Impervious, Inflow Depth = 3.30" for 25 Year Storm event
Inflow = 43.22 cfs @ 12.08 hrs, Volume= 184,960 cf
Outflow = 42.35 cfs @ 12.07 hrs, Volume= 184,960 cf, Atten= 2%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 14.22 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 5.02 fps, Avg. Travel Time= 1.0 min

Peak Storage= 908 cf @ 12.08 hrs
Average Depth at Peak Storage= 2.00'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 39.18 cfs

24.0" Round Pipe
n= 0.013
Length= 289.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -8.67'



Summary for Reach 21R:

SMJDF 02.26.99

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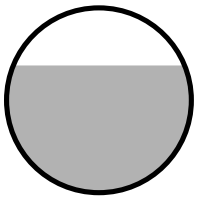
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 273,558 sf, 73.41% Impervious, Inflow Depth = 4.03" for 25 Year Storm event
Inflow = 26.17 cfs @ 12.06 hrs, Volume= 91,804 cf
Outflow = 26.14 cfs @ 12.07 hrs, Volume= 91,804 cf, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 11.35 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 3.63 fps, Avg. Travel Time= 0.8 min

Peak Storage= 414 cf @ 12.07 hrs
Average Depth at Peak Storage= 1.37'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 31.99 cfs

24.0" Round Pipe
n= 0.013
Length= 180.0' Slope= 0.0200 '/'
Inlet Invert= 0.00', Outlet Invert= -3.60'



Summary for Reach 22R:

SMJDF 02.26.99

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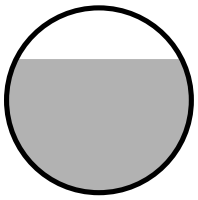
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 217,802 sf, 74.60% Impervious, Inflow Depth = 3.96" for 25 Year Storm event
Inflow = 19.79 cfs @ 12.06 hrs, Volume= 71,949 cf
Outflow = 19.71 cfs @ 12.07 hrs, Volume= 71,949 cf, Atten= 0%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.11 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 2.66 fps, Avg. Travel Time= 1.8 min

Peak Storage= 704 cf @ 12.07 hrs
Average Depth at Peak Storage= 1.44'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 22.62 cfs

24.0" Round Pipe
n= 0.013
Length= 290.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -2.90'



Summary for Reach 23R:

SMJDF 02.26.99

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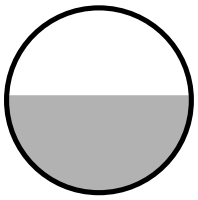
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 199,507 sf, 74.24% Impervious, Inflow Depth = 3.93" for 25 Year Storm event
Inflow = 17.65 cfs @ 12.06 hrs, Volume= 65,353 cf
Outflow = 17.64 cfs @ 12.06 hrs, Volume= 65,353 cf, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.51 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.36 fps, Avg. Travel Time= 0.5 min

Peak Storage= 173 cf @ 12.06 hrs
Average Depth at Peak Storage= 1.05'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 32.30 cfs

24.0" Round Pipe
n= 0.013
Length= 103.0' Slope= 0.0204 '/'
Inlet Invert= 0.00', Outlet Invert= -2.10'



Summary for Reach 24R:

SMJDF 02.26.99

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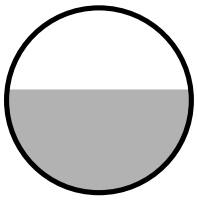
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 160,303 sf, 80.71% Impervious, Inflow Depth = 4.31" for 25 Year Storm event
Inflow = 16.24 cfs @ 12.05 hrs, Volume= 57,577 cf
Outflow = 16.24 cfs @ 12.05 hrs, Volume= 57,577 cf, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 16.03 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.12 fps, Avg. Travel Time= 0.2 min

Peak Storage= 76 cf @ 12.05 hrs
Average Depth at Peak Storage= 0.84'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 27.12 cfs

18.0" Round Pipe
n= 0.013
Length= 75.0' Slope= 0.0667 '/'
Inlet Invert= 0.00', Outlet Invert= -5.00'



Summary for Reach 25R:

SMJDF 02.26.99

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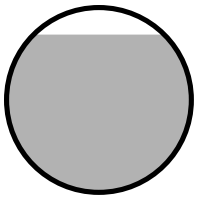
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified
[55] Hint: Peak inflow is 103% of Manning's capacity

Inflow Area = 156,383 sf, 80.22% Impervious, Inflow Depth = 4.28" for 25 Year Storm event
Inflow = 15.73 cfs @ 12.05 hrs, Volume= 55,760 cf
Outflow = 15.71 cfs @ 12.05 hrs, Volume= 55,760 cf, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.81 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.35 fps, Avg. Travel Time= 0.6 min

Peak Storage= 199 cf @ 12.05 hrs
Average Depth at Peak Storage= 1.28'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 15.21 cfs

18.0" Round Pipe
n= 0.013
Length= 124.0' Slope= 0.0210 '/'
Inlet Invert= 0.00', Outlet Invert= -2.60'



Summary for Reach 26R:

SMJDF 02.26.99

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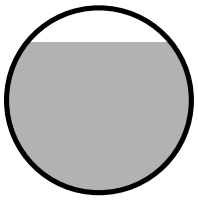
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 147,235 sf, 80.47% Impervious, Inflow Depth = 4.30" for 25 Year Storm event
Inflow = 14.81 cfs @ 12.05 hrs, Volume= 52,704 cf
Outflow = 14.78 cfs @ 12.05 hrs, Volume= 52,704 cf, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.58 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 3.25 fps, Avg. Travel Time= 1.0 min

Peak Storage= 296 cf @ 12.05 hrs
Average Depth at Peak Storage= 1.22'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 14.86 cfs

18.0" Round Pipe
n= 0.013
Length= 192.0' Slope= 0.0200 '/'
Inlet Invert= 0.00', Outlet Invert= -3.84'



Summary for Reach 27R:

SMJDF 02.26.99

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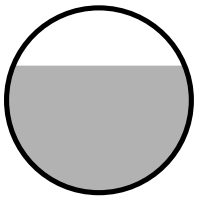
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 82,329 sf, 82.01% Impervious, Inflow Depth = 4.43" for 25 Year Storm event
Inflow = 8.78 cfs @ 12.04 hrs, Volume= 30,370 cf
Outflow = 8.75 cfs @ 12.04 hrs, Volume= 30,370 cf, Atten= 0%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.76 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 2.23 fps, Avg. Travel Time= 1.4 min

Peak Storage= 248 cf @ 12.04 hrs
Average Depth at Peak Storage= 1.03'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 10.72 cfs

18.0" Round Pipe
n= 0.013
Length= 192.0' Slope= 0.0104 '/'
Inlet Invert= 0.00', Outlet Invert= -2.00'



Summary for Reach 28R:

SMJDF 02.26.99

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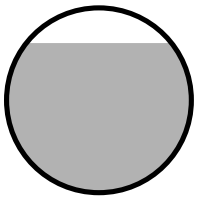
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 21,345 sf, 91.83% Impervious, Inflow Depth = 5.02" for 25 Year Storm event
Inflow = 2.65 cfs @ 12.05 hrs, Volume= 8,926 cf
Outflow = 2.64 cfs @ 12.06 hrs, Volume= 8,926 cf, Atten= 0%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.87 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.36 fps, Avg. Travel Time= 1.3 min

Peak Storage= 73 cf @ 12.06 hrs
Average Depth at Peak Storage= 0.81'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.67 cfs

12.0" Round Pipe
n= 0.013
Length= 107.0' Slope= 0.0056 '/'
Inlet Invert= 0.00', Outlet Invert= -0.60'



Summary for Reach 29R:

SMJDF 02.26.99

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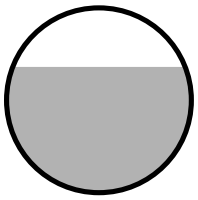
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 398,793 sf, 30.69% Impervious, Inflow Depth = 2.80" for 25 Year Storm event
Inflow = 18.24 cfs @ 12.12 hrs, Volume= 93,156 cf
Outflow = 18.23 cfs @ 12.13 hrs, Volume= 93,156 cf, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.01 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.93 fps, Avg. Travel Time= 0.7 min

Peak Storage= 262 cf @ 12.13 hrs
Average Depth at Peak Storage= 1.36'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 22.62 cfs

24.0" Round Pipe
n= 0.013
Length= 115.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -1.15'



Summary for Reach 51R:

SMJDF 02.26.99

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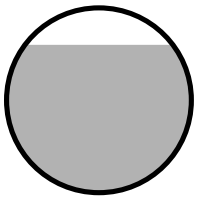
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 110,643 sf, 59.45% Impervious, Inflow Depth = 3.92" for 25 Year Storm event
Inflow = 10.98 cfs @ 12.07 hrs, Volume= 36,122 cf
Outflow = 10.93 cfs @ 12.08 hrs, Volume= 36,122 cf, Atten= 0%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.39 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 3.57 fps, Avg. Travel Time= 1.5 min

Peak Storage= 342 cf @ 12.08 hrs
Average Depth at Peak Storage= 1.00'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 11.19 cfs

15.0" Round Pipe
n= 0.013
Length= 325.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -9.75'



Summary for Reach 52R:

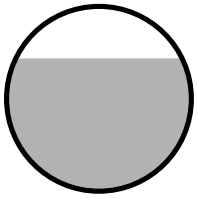
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 77,537 sf, 58.99% Impervious, Inflow Depth = 3.91" for 25 Year Storm event
Inflow = 7.91 cfs @ 12.09 hrs, Volume= 25,239 cf
Outflow = 7.90 cfs @ 12.09 hrs, Volume= 25,239 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.38 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 3.04 fps, Avg. Travel Time= 0.1 min

Peak Storage= 24 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.90'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 9.14 cfs

15.0" Round Pipe
n= 0.013
Length= 25.0' Slope= 0.0200 '/'
Inlet Invert= 0.00', Outlet Invert= -0.50'



Summary for Reach 53R:

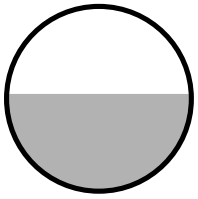
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 14,375 sf, 78.79% Impervious, Inflow Depth = 4.65" for 25 Year Storm event
Inflow = 1.94 cfs @ 12.03 hrs, Volume= 5,572 cf
Outflow = 1.94 cfs @ 12.04 hrs, Volume= 5,572 cf, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.63 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.51 fps, Avg. Travel Time= 0.7 min

Peak Storage= 28 cf @ 12.04 hrs
Average Depth at Peak Storage= 0.53'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.56 cfs

12.0" Round Pipe
n= 0.013
Length= 66.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.66'



Summary for Pond *1: Flow Entering CB1

[80] Warning: Exceeded Pond *10 by 0.07' @ 11.98 hrs (2.75 cfs 316 cf)
[80] Warning: Exceeded Pond *11 by 0.10' @ 11.98 hrs (1.97 cfs 258 cf)

Inflow Area = 130,810 sf, 83.98% Impervious, Inflow Depth = 4.86" for 25 Year Storm event
Inflow = 15.55 cfs @ 12.07 hrs, Volume= 53,004 cf
Outflow = 15.55 cfs @ 12.07 hrs, Volume= 53,004 cf, Atten= 0%, Lag= 0.0 min
Primary = 15.55 cfs @ 12.07 hrs, Volume= 53,004 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 59.42' @ 12.09 hrs
Flood Elev= 59.65'

Device	Routing	Invert	Outlet Devices
#1	Primary	52.70'	**18.0" Round Culvert** L= 145.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 52.70' / 51.83' S= 0.0060 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=14.92 cfs @ 12.07 hrs HW=59.12' TW=55.69' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 14.92 cfs @ 8.44 fps)

Summary for Pond *10: Flow Entering CB10

[58] Hint: Peaked 0.34' above defined flood level

Inflow Area = 75,881 sf, 84.16% Impervious, Inflow Depth = 4.87" for 25 Year Storm event
Inflow = 9.36 cfs @ 12.08 hrs, Volume= 30,814 cf
Outflow = 9.36 cfs @ 12.08 hrs, Volume= 30,814 cf, Atten= 0%, Lag= 0.0 min
Primary = 9.36 cfs @ 12.08 hrs, Volume= 30,814 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 60.14' @ 12.10 hrs
Flood Elev= 59.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	53.25'	**18.0" Round Culvert** L= 30.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 53.25' / 52.80' S= 0.0150 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=7.13 cfs @ 12.08 hrs HW=59.72' TW=59.27' (Dynamic Tailwater)
1=Culvert (Inlet Controls 7.13 cfs @ 4.03 fps)

Summary for Pond *11: Flow Entering CB11

[58] Hint: Peaked 1.61' above defined flood level

Inflow Area = 42,558 sf, 84.75% Impervious, Inflow Depth = 4.87" for 25 Year Storm event
Inflow = 5.25 cfs @ 12.08 hrs, Volume= 17,282 cf
Outflow = 5.25 cfs @ 12.08 hrs, Volume= 17,282 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.25 cfs @ 12.08 hrs, Volume= 17,282 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 60.11' @ 12.10 hrs
Flood Elev= 58.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	53.40'	**15.0" Round Culvert** L= 85.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 53.40' / 52.80' S= 0.0071 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=3.94 cfs @ 12.08 hrs HW=59.69' TW=59.27' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 3.94 cfs @ 3.21 fps)

Summary for Pond *13: Flow Entering CB13

[57] Hint: Peaked at 55.04' (Flood elevation advised)

Inflow Area =	17,207 sf,	10.64% Impervious,	Inflow Depth =	2.21"	for 25 Year Storm event
Inflow =	1.00 cfs @	12.09 hrs, Volume=	3,165 cf		
Outflow =	1.00 cfs @	12.09 hrs, Volume=	3,165 cf,	Atten= 0%,	Lag= 0.0 min
Primary =	1.00 cfs @	12.09 hrs, Volume=	3,165 cf		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 55.04' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	54.45'	**12.0" Round Culvert** L= 135.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 54.45' / 53.10' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.99 cfs @ 12.09 hrs HW=55.04' TW=53.86' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 0.99 cfs @ 2.06 fps)

Summary for Pond *14: Flow Entering CB14

[57] Hint: Peaked at 54.89' (Flood elevation advised)

Inflow Area = 7,536 sf, 84.39% Impervious, Inflow Depth = 5.10" for 25 Year Storm event
Inflow = 1.15 cfs @ 12.00 hrs, Volume= 3,202 cf
Outflow = 1.15 cfs @ 12.00 hrs, Volume= 3,202 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.15 cfs @ 12.00 hrs, Volume= 3,202 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 54.89' @ 12.02 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	52.75'	**12.0" Round Culvert** L= 58.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 52.75' / 52.45' S= 0.0052 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.00 hrs HW=54.20' TW=54.39' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond *15: Flow Entering CB15

[57] Hint: Peaked at 54.79' (Flood elevation advised)
[80] Warning: Exceeded Pond *14 by 0.22' @ 12.00 hrs (1.40 cfs 213 cf)

Inflow Area = 15,289 sf, 88.04% Impervious, Inflow Depth = 5.16" for 25 Year Storm event
Inflow = 2.35 cfs @ 12.00 hrs, Volume= 6,570 cf
Outflow = 2.35 cfs @ 12.00 hrs, Volume= 6,570 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.35 cfs @ 12.00 hrs, Volume= 6,570 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 54.79' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	52.35'	**12.0" Round Culvert** L= 88.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 52.35' / 51.80' S= 0.0063 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.64 cfs @ 12.00 hrs HW=54.39' TW=54.07' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.64 cfs @ 2.09 fps)

Summary for Pond *16: Flow Entering CB16

[57] Hint: Peaked at 54.26' (Flood elevation advised)
[80] Warning: Exceeded Pond *DM2 by 0.27' @ 11.99 hrs (1.37 cfs 120 cf)

Inflow Area = 53,361 sf, 67.76% Impervious, Inflow Depth = 4.36" for 25 Year Storm event
Inflow = 6.18 cfs @ 12.00 hrs, Volume= 19,406 cf
Outflow = 6.18 cfs @ 12.00 hrs, Volume= 19,406 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.18 cfs @ 12.00 hrs, Volume= 19,406 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 54.26' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	51.70'	**18.0" Round Culvert** L= 78.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 51.70' / 51.15' S= 0.0071 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=5.47 cfs @ 12.00 hrs HW=54.11' TW=53.45' (Dynamic Tailwater)
1=Culvert (Inlet Controls 5.47 cfs @ 3.10 fps)

Summary for Pond *17: Flow Entering CB17

[80] Warning: Exceeded Pond *23 by 0.05' @ 12.09 hrs (0.67 cfs 49 cf)

Inflow Area = 75,141 sf, 77.10% Impervious, Inflow Depth = 4.71" for 25 Year Storm event
Inflow = 9.62 cfs @ 12.00 hrs, Volume= 29,501 cf
Outflow = 9.62 cfs @ 12.00 hrs, Volume= 29,501 cf, Atten= 0%, Lag= 0.0 min
Primary = 9.62 cfs @ 12.00 hrs, Volume= 29,501 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 53.67' @ 12.10 hrs
Flood Elev= 57.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	51.05'	**18.0" Round Culvert** L= 135.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 51.05' / 50.10' S= 0.0070 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=9.22 cfs @ 12.00 hrs HW=53.44' TW=52.18' (Dynamic Tailwater)
1=Culvert (Outlet Controls 9.22 cfs @ 5.22 fps)

Summary for Pond *18: Flow Entering CB18

Inflow Area = 17,075 sf, 83.93% Impervious, Inflow Depth = 5.10" for 25 Year Storm event
Inflow = 2.16 cfs @ 12.08 hrs, Volume= 7,255 cf
Outflow = 2.16 cfs @ 12.08 hrs, Volume= 7,255 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.16 cfs @ 12.08 hrs, Volume= 7,255 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 51.58' @ 12.10 hrs
Flood Elev= 52.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	47.40'	**15.0" Round Culvert** L= 118.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 47.40' / 46.80' S= 0.0051 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=51.20' TW=51.30' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond *19: Flow Entering CB19

[80] Warning: Exceeded Pond *18 by 0.26' @ 12.01 hrs (2.79 cfs 831 cf)

Inflow Area = 41,207 sf, 73.15% Impervious, Inflow Depth = 4.58" for 25 Year Storm event
Inflow = 4.84 cfs @ 12.08 hrs, Volume= 15,741 cf
Outflow = 4.84 cfs @ 12.08 hrs, Volume= 15,741 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.84 cfs @ 12.08 hrs, Volume= 15,741 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 51.44' @ 12.09 hrs
Flood Elev= 52.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	46.70'	**15.0" Round Culvert** L= 130.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 46.70' / 46.05' S= 0.0050 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=4.47 cfs @ 12.08 hrs HW=51.32' TW=50.63' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 4.47 cfs @ 3.64 fps)

Summary for Pond *2: Flow Entering CB2

Inflow Area = 154,289 sf, 85.83% Impervious, Inflow Depth = 4.95" for 25 Year Storm event
Inflow = 18.60 cfs @ 12.07 hrs, Volume= 63,657 cf
Outflow = 18.60 cfs @ 12.07 hrs, Volume= 63,657 cf, Atten= 0%, Lag= 0.0 min
Primary = 18.60 cfs @ 12.07 hrs, Volume= 63,657 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 56.07' @ 12.10 hrs
Flood Elev= 58.75'

Device	Routing	Invert	Outlet Devices
#1	Primary	51.73'	**24.0" Round Culvert** L= 125.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 51.73' / 50.98' S= 0.0060 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=16.92 cfs @ 12.07 hrs HW=55.70' TW=54.66' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 16.92 cfs @ 5.39 fps)

Summary for Pond *20: Flow Entering CB 20

Inflow Area = 17,511 sf,100.00% Impervious, Inflow Depth = 5.56" for 25 Year Storm event
Inflow = 2.29 cfs @ 12.08 hrs, Volume= 8,116 cf
Outflow = 2.29 cfs @ 12.08 hrs, Volume= 8,116 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.29 cfs @ 12.08 hrs, Volume= 8,116 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 50.52' @ 12.09 hrs
Flood Elev= 52.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	47.25'	**15.0" Round Culvert** L= 122.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 47.25' / 46.40' S= 0.0070 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=1.35 cfs @ 12.08 hrs HW=50.40' TW=50.34' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.35 cfs @ 1.10 fps)

Summary for Pond *21: Flow Entering CB21

[80] Warning: Exceeded Pond *20 by 0.20' @ 12.05 hrs (2.45 cfs 551 cf)

Inflow Area = 35,066 sf,100.00% Impervious, Inflow Depth = 5.56" for 25 Year Storm event
Inflow = 4.58 cfs @ 12.08 hrs, Volume= 16,253 cf
Outflow = 4.58 cfs @ 12.08 hrs, Volume= 16,253 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.58 cfs @ 12.08 hrs, Volume= 16,253 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 50.35' @ 12.08 hrs
Flood Elev= 52.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	46.30'	**15.0" Round Culvert** L= 155.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 46.30' / 45.23' S= 0.0069 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=4.62 cfs @ 12.08 hrs HW=50.34' TW=49.50' (Dynamic Tailwater)
1=Culvert (Outlet Controls 4.62 cfs @ 3.76 fps)

Summary for Pond *22: Flow Entering CB22

Inflow Area = 13,896 sf,100.00% Impervious, Inflow Depth = 5.56" for 25 Year Storm event
Inflow = 1.81 cfs @ 12.08 hrs, Volume= 6,441 cf
Outflow = 1.81 cfs @ 12.08 hrs, Volume= 6,441 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.81 cfs @ 12.08 hrs, Volume= 6,441 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 46.43' @ 12.08 hrs
Flood Elev= 51.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	45.80'	**15.0" Round Culvert** L= 222.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 45.80' / 41.60' S= 0.0189 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=1.82 cfs @ 12.08 hrs HW=46.43' TW=44.69' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.82 cfs @ 4.30 fps)

Summary for Pond *23: Flow Entering CB10

[57] Hint: Peaked at 53.70' (Flood elevation advised)

Inflow Area = 10,716 sf,100.00% Impervious, Inflow Depth = 5.56" for 25 Year Storm event
Inflow = 1.69 cfs @ 12.00 hrs, Volume= 4,967 cf
Outflow = 1.69 cfs @ 12.00 hrs, Volume= 4,967 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.69 cfs @ 12.00 hrs, Volume= 4,967 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 53.70' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	52.75'	**15.0" Round Culvert** L= 86.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 52.75' / 51.15' S= 0.0186 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=1.11 cfs @ 12.00 hrs HW=53.57' TW=53.43' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.11 cfs @ 1.85 fps)

Summary for Pond *3: Flow Entering CB3

Inflow Area = 177,985 sf, 86.74% Impervious, Inflow Depth = 4.99" for 25 Year Storm event
Inflow = 21.62 cfs @ 12.08 hrs, Volume= 73,951 cf
Outflow = 21.62 cfs @ 12.08 hrs, Volume= 73,951 cf, Atten= 0%, Lag= 0.0 min
Primary = 21.62 cfs @ 12.08 hrs, Volume= 73,951 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 54.97' @ 12.10 hrs
Flood Elev= 57.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	50.88'	**24.0" Round Culvert** L= 130.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 50.88' / 50.10' S= 0.0060 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=20.31 cfs @ 12.08 hrs HW=54.67' TW=53.14' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 20.31 cfs @ 6.46 fps)

Summary for Pond *4: Flow Entering CB4

Inflow Area = 282,398 sf, 84.93% Impervious, Inflow Depth = 4.95" for 25 Year Storm event
Inflow = 31.47 cfs @ 12.06 hrs, Volume= 116,449 cf
Outflow = 31.47 cfs @ 12.06 hrs, Volume= 116,449 cf, Atten= 0%, Lag= 0.0 min
Primary = 31.47 cfs @ 12.06 hrs, Volume= 116,449 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 53.36' @ 12.09 hrs
Flood Elev= 57.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	50.00'	**30.0" Round Culvert** L= 105.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 50.00' / 48.85' S= 0.0110 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=27.45 cfs @ 12.06 hrs HW=52.88' TW=51.88' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 27.45 cfs @ 6.09 fps)

Summary for Pond *5: Flow Entering CB5

[80] Warning: Exceeded Pond *6 by 0.33' @ 12.05 hrs (6.10 cfs 1,773 cf)

Inflow Area = 47,176 sf, 83.01% Impervious, Inflow Depth = 4.86" for 25 Year Storm event
Inflow = 5.16 cfs @ 12.05 hrs, Volume= 19,103 cf
Outflow = 5.16 cfs @ 12.05 hrs, Volume= 19,103 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.16 cfs @ 12.05 hrs, Volume= 19,103 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 52.48' @ 12.09 hrs
Flood Elev= 53.82'

Device	Routing	Invert	Outlet Devices
#1	Primary	48.05'	**18.0" Round Culvert** L= 45.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 48.05' / 47.69' S= 0.0080 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 12.05 hrs HW=51.32' TW=51.40' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond *6: Flow Entering CB6

[57] Hint: Peaked at 52.49' (Flood elevation advised)

Inflow Area = 17,468 sf, 92.02% Impervious, Inflow Depth = 5.21" for 25 Year Storm event
Inflow = 2.70 cfs @ 12.00 hrs, Volume= 7,588 cf
Outflow = 2.70 cfs @ 12.00 hrs, Volume= 7,588 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.70 cfs @ 12.00 hrs, Volume= 7,588 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 52.49' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	48.60'	**18.0" Round Culvert** L= 45.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 48.60' / 48.15' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 12.00 hrs HW=50.14' TW=50.21' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond *7: Flow Entering CB7

Inflow Area = 435,033 sf, 82.06% Impervious, Inflow Depth = 4.86" for 25 Year Storm event
Inflow = 48.49 cfs @ 12.07 hrs, Volume= 176,125 cf
Outflow = 48.49 cfs @ 12.07 hrs, Volume= 176,125 cf, Atten= 0%, Lag= 0.0 min
Primary = 48.49 cfs @ 12.07 hrs, Volume= 176,125 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 49.54' @ 12.07 hrs
Flood Elev= 51.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	45.13'	**30.0" Round Culvert** L= 120.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 45.13' / 43.45' S= 0.0140 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=48.05 cfs @ 12.07 hrs HW=49.51' TW=46.54' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 48.05 cfs @ 9.79 fps)

Summary for Pond *8: Flow Entering CB8

Inflow Area = 452,152 sf, 82.44% Impervious, Inflow Depth = 4.88" for 25 Year Storm event
Inflow = 50.68 cfs @ 12.07 hrs, Volume= 183,726 cf
Outflow = 50.68 cfs @ 12.07 hrs, Volume= 183,726 cf, Atten= 0%, Lag= 0.0 min
Primary = 50.68 cfs @ 12.07 hrs, Volume= 183,726 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 46.55' @ 12.07 hrs
Flood Elev= 50.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	43.35'	**36.0" Round Culvert** L= 125.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 43.35' / 41.60' S= 0.0140 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 7.07 sf

Primary OutFlow Max=50.22 cfs @ 12.07 hrs HW=46.54' TW=44.72' (Dynamic Tailwater)
1=Culvert (Outlet Controls 50.22 cfs @ 8.31 fps)

Summary for Pond *9: Flow Entering CB9

Inflow Area = 492,315 sf, 83.35% Impervious, Inflow Depth = 4.92" for 25 Year Storm event
Inflow = 55.83 cfs @ 12.07 hrs, Volume= 201,831 cf
Outflow = 55.83 cfs @ 12.07 hrs, Volume= 201,831 cf, Atten= 0%, Lag= 0.0 min
Primary = 55.83 cfs @ 12.07 hrs, Volume= 201,831 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 44.72' @ 12.07 hrs
Flood Elev= 49.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	41.50'	**36.0" Round Culvert** L= 100.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 41.50' / 40.00' S= 0.0150 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 7.07 sf

Primary OutFlow Max=55.77 cfs @ 12.07 hrs HW=44.72' TW=35.58' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 55.77 cfs @ 7.89 fps)

Summary for Pond *DD: Flow Entering Downstream Defender

[57] Hint: Peaked at 50.10' (Flood elevation advised)
[80] Warning: Exceeded Pond *OC1 by 0.45' @ 0.00 hrs (1.29 cfs 38,275 cf)

Inflow Area = 388,598 sf, 81.15% Impervious, Inflow Depth = 3.15" for 25 Year Storm event
Inflow = 23.71 cfs @ 12.05 hrs, Volume= 102,011 cf
Outflow = 23.71 cfs @ 12.05 hrs, Volume= 102,011 cf, Atten= 0%, Lag= 0.0 min
Primary = 23.71 cfs @ 12.05 hrs, Volume= 102,011 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 50.10' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	45.75'	**30.0" Round Culvert** L= 50.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 45.75' / 45.23' S= 0.0104 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=18.94 cfs @ 12.05 hrs HW=49.75' TW=49.33' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 18.94 cfs @ 3.86 fps)

Summary for Pond *DM1: Flow Entering DM1

[80] Warning: Exceeded Pond *5 by 0.12' @ 12.04 hrs (3.74 cfs 451 cf)

Inflow Area = 329,574 sf, 84.66% Impervious, Inflow Depth = 4.94" for 25 Year Storm event
Inflow = 36.58 cfs @ 12.06 hrs, Volume= 135,553 cf
Outflow = 36.58 cfs @ 12.06 hrs, Volume= 135,553 cf, Atten= 0%, Lag= 0.0 min
Primary = 36.58 cfs @ 12.06 hrs, Volume= 135,553 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 52.29' @ 12.09 hrs
Flood Elev= 55.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	47.59'	**30.0" Round Culvert** L= 140.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 47.59' / 46.05' S= 0.0110 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=33.34 cfs @ 12.06 hrs HW=51.83' TW=50.30' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 33.34 cfs @ 6.79 fps)

Summary for Pond *DM2: Flow Entering DM2

[57] Hint: Peaked at 54.31' (Flood elevation advised)

Inflow Area =	17,207 sf,	10.64% Impervious,	Inflow Depth =	2.21"	for 25 Year Storm event
Inflow =	1.00 cfs @	12.09 hrs, Volume=	3,165 cf		
Outflow =	1.00 cfs @	12.09 hrs, Volume=	3,165 cf,	Atten= 0%,	Lag= 0.0 min
Primary =	1.00 cfs @	12.09 hrs, Volume=	3,165 cf		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 54.31' @ 12.02 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	53.00'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 53.00' / 51.80' S= 0.0240 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.87 cfs @ 12.09 hrs HW=53.86' TW=53.73' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.87 cfs @ 1.62 fps)

Summary for Pond *OC1: Flow Entering OCS1

Inflow Area = 388,598 sf, 81.15% Impervious, Inflow Depth = 4.81" for 25 Year Storm event
Inflow = 42.70 cfs @ 12.06 hrs, Volume= 155,773 cf
Outflow = 42.70 cfs @ 12.06 hrs, Volume= 155,773 cf, Atten= 0%, Lag= 0.0 min
Primary = 23.71 cfs @ 12.05 hrs, Volume= 102,011 cf
Secondary = 19.93 cfs @ 12.10 hrs, Volume= 53,762 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 50.64' @ 12.08 hrs
Flood Elev= 52.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	45.30'	**30.0" Round Culvert** L= 54.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 45.30' / 43.50' S= 0.0333 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Secondary	45.95'	**24.0" Round Culvert** L= 65.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 45.95' / 45.23' S= 0.0111 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=17.35 cfs @ 12.05 hrs HW=50.09' TW=49.75' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 17.35 cfs @ 3.53 fps)

Secondary OutFlow Max=21.56 cfs @ 12.10 hrs HW=50.52' TW=49.22' (Dynamic Tailwater)
↑—**2=Culvert** (Outlet Controls 21.56 cfs @ 6.86 fps)

Summary for Pond 2.1P:

[58] Hint: Peaked 24.06' above defined flood level
[80] Warning: Exceeded Pond 2P by 8.23' @ 12.17 hrs (97.65 cfs 34,047 cf)

Inflow Area = 1,373,100 sf, 32.07% Impervious, Inflow Depth = 3.06" for 25 Year Storm event
Inflow = 111.49 cfs @ 12.27 hrs, Volume= 349,656 cf
Outflow = 111.49 cfs @ 12.27 hrs, Volume= 349,656 cf, Atten= 0%, Lag= 0.0 min
Primary = 111.49 cfs @ 12.27 hrs, Volume= 349,656 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 67.18' @ 12.21 hrs
Flood Elev= 43.12'

Device	Routing	Invert	Outlet Devices
#1	Primary	32.50'	**36.0" Round Culvert** L= 70.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 32.50' / 32.14' S= 0.0051 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=113.12 cfs @ 12.27 hrs HW=65.90' TW=54.86' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 113.12 cfs @ 16.00 fps)

Summary for Pond 2P:

[93] Warning: Storage range exceeded by 27.37'
[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=45)
[63] Warning: Exceeded Reach 16R INLET depth by 3.22' @ 12.23 hrs

Inflow Area = 1,373,100 sf, 32.07% Impervious, Inflow Depth = 3.06" for 25 Year Storm event
Inflow = 62.23 cfs @ 12.27 hrs, Volume= 349,656 cf
Outflow = 111.49 cfs @ 12.27 hrs, Volume= 349,656 cf, Atten= 0%, Lag= 0.1 min
Primary = 111.49 cfs @ 12.27 hrs, Volume= 349,656 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 67.37' @ 12.23 hrs Surf.Area= 21,218 sf Storage= 14,921 cf

Plug-Flow detention time= 2.1 min calculated for 349,587 cf (100% of inflow)
Center-of-Mass det. time= 2.1 min (839.4 - 837.2)

Volume	Invert	Avail.Storage	Storage Description
#1	36.00'	14,921 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
36.00	4	0	0
37.00	59	32	32
38.00	1,012	536	567
39.00	3,239	2,126	2,693
40.00	21,218	12,229	14,921

Device	Routing	Invert	Outlet Devices
#1	Primary	36.00'	**36.0" Round Culvert** L= 112.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 36.00' / 32.64' S= 0.0300 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=23.34 cfs @ 12.27 hrs HW=66.37' TW=65.90' (Dynamic Tailwater)
1=Culvert (Inlet Controls 23.34 cfs @ 3.30 fps)

Summary for Pond 3P:

[58] Hint: Peaked 31.46' above defined flood level

Inflow Area = 4,220,538 sf, 39.65% Impervious, Inflow Depth = 3.54" for 25 Year Storm event
Inflow = 264.14 cfs @ 12.14 hrs, Volume= 1,246,312 cf
Outflow = 264.14 cfs @ 12.14 hrs, Volume= 1,246,313 cf, Atten= 0%, Lag= 0.0 min
Primary = 264.14 cfs @ 12.14 hrs, Volume= 1,246,313 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 74.58' @ 12.20 hrs
Flood Elev= 43.12'

Device	Routing	Invert	Outlet Devices
#1	Primary	30.09'	**48.0" Round Culvert** L= 250.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 30.09' / 29.62' S= 0.0019 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf

Primary OutFlow Max=237.97 cfs @ 12.14 hrs HW=65.05' TW=49.58' (Dynamic Tailwater)
1=Culvert (Inlet Controls 237.97 cfs @ 18.94 fps)

Summary for Pond 4P:

[58] Hint: Peaked 14.29' above defined flood level
[80] Warning: Exceeded Pond 2.1P by 8.38' @ 12.14 hrs (98.52 cfs 55,890 cf)

Inflow Area = 5,593,638 sf, 37.79% Impervious, Inflow Depth = 3.42" for 25 Year Storm event
Inflow = 268.82 cfs @ 12.18 hrs, Volume= 1,595,969 cf
Outflow = 268.82 cfs @ 12.18 hrs, Volume= 1,595,969 cf, Atten= 0%, Lag= 0.0 min
Primary = 268.82 cfs @ 12.18 hrs, Volume= 1,595,969 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 56.79' @ 12.20 hrs
Flood Elev= 42.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	29.39'	**60.0" Round Culvert** L= 196.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 29.39' / 29.29' S= 0.0005 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 19.63 sf

Primary OutFlow Max=236.39 cfs @ 12.18 hrs HW=54.60' TW=48.35' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 236.39 cfs @ 12.04 fps)

Summary for Pond 5P:

[58] Hint: Peaked 7.97' above defined flood level

Inflow Area = 5,593,638 sf, 37.79% Impervious, Inflow Depth = 3.42" for 25 Year Storm event
Inflow = 268.82 cfs @ 12.18 hrs, Volume= 1,595,969 cf
Outflow = 268.82 cfs @ 12.18 hrs, Volume= 1,595,969 cf, Atten= 0%, Lag= 0.0 min
Primary = 268.82 cfs @ 12.18 hrs, Volume= 1,595,969 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 48.82' @ 12.19 hrs
Flood Elev= 40.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	28.97'	**60.0" Round Culvert** L= 371.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 28.97' / 28.38' S= 0.0016 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 19.63 sf

Primary OutFlow Max=260.74 cfs @ 12.18 hrs HW=48.35' TW=40.51' (Dynamic Tailwater)
1=Culvert (Outlet Controls 260.74 cfs @ 13.28 fps)

Summary for Pond 6P: (new Pond)

Inflow Area = 761,059 sf, 30.87% Impervious, Inflow Depth = 4.11" for 25 Year Storm event
Inflow = 58.37 cfs @ 12.23 hrs, Volume= 260,927 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 38.56' @ 25.04 hrs Surf.Area= 162,633 sf Storage= 260,927 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	35.00'	336,534 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
35.00	2,207	270.0	0	0	2,207
36.00	32,106	804.0	14,244	14,244	47,849
37.00	79,773	1,200.0	54,162	68,406	111,008
38.00	138,838	1,557.0	107,950	176,356	189,345
39.00	182,512	1,716.0	160,178	336,534	230,790

Summary for Pond 7P:

[58] Hint: Peaked 1.22' above defined flood level
[80] Warning: Exceeded Pond 42P by 2.91' @ 12.17 hrs (26.16 cfs 4,862 cf)

Inflow Area = 153,762 sf, 24.93% Impervious, Inflow Depth = 1.68" for 25 Year Storm event
Inflow = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf
Outflow = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 40.62' @ 12.21 hrs
Flood Elev= 39.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	33.75'	**30.0" Round Culvert** L= 160.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 33.75' / 33.40' S= 0.0022 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=10.15 cfs @ 12.34 hrs HW=38.81' TW=38.61' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 10.15 cfs @ 2.07 fps)

Summary for Pond 11P:

[58] Hint: Peaked 334.98' above defined flood level

Inflow Area = 1,050,508 sf, 49.96% Impervious, Inflow Depth = 3.90" for 25 Year Storm event
Inflow = 84.26 cfs @ 12.16 hrs, Volume= 341,103 cf
Outflow = 84.26 cfs @ 12.16 hrs, Volume= 341,103 cf, Atten= 0%, Lag= 0.0 min
Primary = 84.26 cfs @ 12.16 hrs, Volume= 341,103 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 378.98' @ 12.17 hrs
Flood Elev= 44.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	35.75'	**18.0" Round Culvert** L= 161.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 35.75' / 34.50' S= 0.0078 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=81.77 cfs @ 12.16 hrs HW=327.95' TW=180.20' (Dynamic Tailwater)
1=Culvert (Outlet Controls 81.77 cfs @ 46.27 fps)

Summary for Pond 12P: PLUNGE POOL

[93] Warning: Storage range exceeded by 1.24'
[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[80] Warning: Exceeded Pond 24P by 1.37' @ 26.24 hrs (12.06 cfs 642,340 cf)

Inflow Area = 6,508,459 sf, 36.67% Impervious, Inflow Depth = 2.98" for 25 Year Storm event
Inflow = 271.39 cfs @ 12.18 hrs, Volume= 1,617,484 cf
Outflow = 271.54 cfs @ 12.18 hrs, Volume= 1,606,946 cf, Atten= 0%, Lag= 0.0 min
Primary = 271.54 cfs @ 12.18 hrs, Volume= 1,606,946 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 24.24' @ 12.40 hrs Surf.Area= 4,083 sf Storage= 10,538 cf

Plug-Flow detention time= 7.4 min calculated for 1,606,625 cf (99% of inflow)
Center-of-Mass det. time= 3.3 min (831.6 - 828.3)

Volume	Invert	Avail.Storage	Storage Description
#1	19.00'	10,538 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
19.00	1,349	0	0
20.00	1,930	1,640	1,640
21.00	2,582	2,256	3,896
22.00	3,310	2,946	6,842
23.00	4,083	3,697	10,538

Device	Routing	Invert	Outlet Devices
#1	Primary	23.00'	**116.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=263.26 cfs @ 12.18 hrs HW=23.99' TW=23.46' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 263.26 cfs @ 2.30 fps)

Summary for Pond 14P:

[58] Hint: Peaked 179.81' above defined flood level
[80] Warning: Exceeded Pond 11P by 37.51' @ 12.56 hrs (41.20 cfs 94,504 cf)
[80] Warning: Exceeded Pond P1 by 93.43' @ 12.10 hrs (328.99 cfs 839,786 cf)
[80] Warning: Exceeded Pond TWC CB27 by 74.52' @ 12.10 hrs (135.02 cfs 341,215 cf)

Inflow Area = 4,220,538 sf, 39.65% Impervious, Inflow Depth = 3.54" for 25 Year Storm event
Inflow = 264.14 cfs @ 12.14 hrs, Volume= 1,246,312 cf
Outflow = 264.14 cfs @ 12.14 hrs, Volume= 1,246,312 cf, Atten= 0%, Lag= 0.0 min
Primary = 264.14 cfs @ 12.14 hrs, Volume= 1,246,312 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 222.93' @ 12.14 hrs
Flood Elev= 43.12'

Device	Routing	Invert	Outlet Devices
#1	Primary	30.44'	**30.0" Round Culvert** L= 238.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 30.44' / 30.09' S= 0.0015 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=257.17 cfs @ 12.14 hrs HW=222.87' TW=65.05' (Dynamic Tailwater)
1=Culvert (Outlet Controls 257.17 cfs @ 52.39 fps)

Summary for Pond 18P:

[58] Hint: Peaked 0.57' above defined flood level
[80] Warning: Exceeded Pond 20P by 3.63' @ 12.15 hrs (60.05 cfs 14,517 cf)

Inflow Area = 153,762 sf, 24.93% Impervious, Inflow Depth = 1.68" for 25 Year Storm event
Inflow = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf
Outflow = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 40.60' @ 12.19 hrs
Flood Elev= 40.03'

Device	Routing	Invert	Outlet Devices
#1	Primary	32.50'	**36.0" Round Culvert** L= 184.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 32.50' / 31.88' S= 0.0034 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=15.98 cfs @ 12.34 hrs HW=38.40' TW=38.18' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 15.98 cfs @ 2.26 fps)

Summary for Pond 19P:

Inflow Area = 153,762 sf, 24.93% Impervious, Inflow Depth = 1.68" for 25 Year Storm event
Inflow = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf
Outflow = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 41.39' @ 12.24 hrs
Flood Elev= 42.93'

Device	Routing	Invert	Outlet Devices
#1	Primary	36.40'	**12.0" Round Culvert** L= 62.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 36.40' / 36.00' S= 0.0065 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.60 cfs @ 12.34 hrs HW=40.13' TW=39.01' (Dynamic Tailwater)
1=Culvert (Outlet Controls 3.60 cfs @ 4.58 fps)

Summary for Pond 20P:

[58] Hint: Peaked 1.15' above defined flood level
[80] Warning: Exceeded Pond 7P by 3.57' @ 12.16 hrs (38.71 cfs 8,262 cf)

Inflow Area = 153,762 sf, 24.93% Impervious, Inflow Depth = 1.68" for 25 Year Storm event
Inflow = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf
Outflow = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 40.60' @ 12.20 hrs
Flood Elev= 39.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	33.30'	**36.0" Round Culvert** L= 181.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 33.30' / 32.62' S= 0.0038 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=15.52 cfs @ 12.34 hrs HW=38.61' TW=38.40' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 15.52 cfs @ 2.19 fps)

Summary for Pond 24P:

[57] Hint: Peaked at 32.37' (Flood elevation advised)

Inflow Area = 5,747,400 sf, 37.44% Impervious, Inflow Depth = 3.38" for 25 Year Storm event
Inflow = 271.39 cfs @ 12.18 hrs, Volume= 1,617,488 cf
Outflow = 271.39 cfs @ 12.18 hrs, Volume= 1,617,484 cf, Atten= 0%, Lag= 0.0 min
Primary = 271.39 cfs @ 12.18 hrs, Volume= 1,617,484 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 32.37' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	21.63'	**60.0" Round Culvert** L= 30.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 21.63' / 21.50' S= 0.0043 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 19.63 sf

Primary OutFlow Max=271.30 cfs @ 12.18 hrs HW=32.37' TW=23.99' (Dynamic Tailwater)
1=Culvert (Inlet Controls 271.30 cfs @ 13.82 fps)

Summary for Pond 25P: (new Pond)

[57] Hint: Peaked at 22.22' (Flood elevation advised)

Inflow Area = 6,946,289 sf, 35.51% Impervious, Inflow Depth > 0.40" for 25 Year Storm event
Inflow = 5.22 cfs @ 12.40 hrs, Volume= 229,154 cf
Outflow = 5.22 cfs @ 12.40 hrs, Volume= 229,154 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.22 cfs @ 12.40 hrs, Volume= 229,154 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 22.22' @ 12.45 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	17.40'	**12.0" Round Culvert** L= 113.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 17.40' / 15.14' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf

Primary OutFlow Max=5.18 cfs @ 12.40 hrs HW=22.22' TW=18.80' (Dynamic Tailwater)
1=Culvert (Outlet Controls 5.18 cfs @ 6.60 fps)

Summary for Pond 26P: (new Pond)

[57] Hint: Peaked at 18.80' (Flood elevation advised)

Inflow Area = 6,946,289 sf, 35.51% Impervious, Inflow Depth > 0.40" for 25 Year Storm event
Inflow = 5.22 cfs @ 12.40 hrs, Volume= 229,154 cf
Outflow = 5.22 cfs @ 12.40 hrs, Volume= 229,154 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.22 cfs @ 12.40 hrs, Volume= 229,154 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 18.80' @ 12.40 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	16.40'	**12.0" Round Culvert** L= 20.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 16.40' / 16.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf

Primary OutFlow Max=5.21 cfs @ 12.40 hrs HW=18.80' (Free Discharge)
1=Culvert (Inlet Controls 5.21 cfs @ 6.64 fps)

Summary for Pond 42P:

[58] Hint: Peaked 0.14' above defined flood level
[80] Warning: Exceeded Pond 19P by 1.33' @ 12.18 hrs (3.92 cfs 648 cf)

Inflow Area = 153,762 sf, 24.93% Impervious, Inflow Depth = 1.68" for 25 Year Storm event
Inflow = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf
Outflow = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.34 cfs @ 12.34 hrs, Volume= 21,519 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 40.64' @ 12.22 hrs
Flood Elev= 40.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	35.00'	**30.0" Round Culvert** L= 338.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 35.00' / 34.25' S= 0.0022 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=8.11 cfs @ 12.34 hrs HW=39.01' TW=38.81' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 8.11 cfs @ 1.65 fps)

Summary for Pond 100:

Inflow Area = 1,114,380 sf, 33.39% Impervious, Inflow Depth = 3.01" for 25 Year Storm event
Inflow = 52.24 cfs @ 12.19 hrs, Volume= 279,600 cf
Outflow = 38.39 cfs @ 12.43 hrs, Volume= 221,101 cf, Atten= 27%, Lag= 14.3 min
Primary = 38.39 cfs @ 12.43 hrs, Volume= 221,101 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 49.68' @ 12.43 hrs Surf.Area= 20,164 sf Storage= 89,755 cf

Plug-Flow detention time= 151.5 min calculated for 221,056 cf (79% of inflow)
Center-of-Mass det. time= 70.0 min (902.6 - 832.6)

Volume	Invert	Avail.Storage	Storage Description
#1	42.00'	96,101 cf	**Custom Stage Data (Pyramidal)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
42.00	3,172	0	0	3,172
43.00	6,650	4,805	4,805	6,661
44.00	8,133	7,379	12,184	8,183
47.00	13,011	31,431	43,615	13,213
48.00	16,841	14,885	58,500	17,074
49.00	18,793	17,808	76,308	19,097
50.00	20,811	19,793	96,101	21,192

Device	Routing	Invert	Outlet Devices
#1	Primary	45.50'	**18.0" Round Culvert** L= 40.0' Ke= 0.600 Inlet / Outlet Invert= 45.50' / 45.10' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	48.00'	**11.5' long Sharp-Crested Rectangular Weir** 0 End Contraction(s) 6.0' Crest Height
#3	Device 1	47.00'	**3.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 5.0' Crest Height
#4	Primary	49.00'	**20.0' long (Profile 20) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 1.97 Coef. (English) 2.68 2.63 2.61 2.61

Primary OutFlow Max=38.37 cfs @ 12.43 hrs HW=49.68' TW=48.52' (Dynamic Tailwater)
- **1=Culvert** (Inlet Controls 8.58 cfs @ 4.85 fps)
  - **2=Sharp-Crested Rectangular Weir** (Passes < 78.63 cfs potential flow)
  - **3=Sharp-Crested Rectangular Weir** (Passes < 30.35 cfs potential flow)
- **4=Broad-Crested Rectangular Weir** (Weir Controls 29.79 cfs @ 2.19 fps)

Summary for Pond 101:

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Inflow Area = 383,659 sf, 9.34% Impervious, Inflow Depth = 2.56" for 25 Year Storm event
Inflow = 15.21 cfs @ 12.41 hrs, Volume= 81,762 cf
Outflow = 14.50 cfs @ 12.48 hrs, Volume= 81,762 cf, Atten= 5%, Lag= 4.6 min
Primary = 14.50 cfs @ 12.48 hrs, Volume= 81,762 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 53.84' @ 12.48 hrs Surf.Area= 0 sf Storage= 1,832 cf
Flood Elev= 55.00' Surf.Area= 0 sf Storage= 5,143 cf

Plug-Flow detention time= 1.0 min calculated for 81,762 cf (100% of inflow)
Center-of-Mass det. time= 0.9 min (863.3 - 862.4)

Volume	Invert	Avail.Storage	Storage Description
#1	51.50'	5,143 cf	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
51.50	0
52.00	35
53.00	566
54.00	2,077
55.00	5,143

Device	Routing	Invert	Outlet Devices
#1	Primary	51.50'	**15.0" Round Culvert X 2.00** L= 75.0' Ke= 0.600 Inlet / Outlet Invert= 51.50' / 47.98' S= 0.0469 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=14.50 cfs @ 12.48 hrs HW=53.84' TW=49.67' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 14.50 cfs @ 5.91 fps)

Summary for Pond P1:

[93] Warning: Storage range exceeded by 183.61'
[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=211)
[63] Warning: Exceeded Reach *1R INLET depth by 188.07' @ 12.15 hrs
[63] Warning: Exceeded Reach *2R INLET depth by 173.36' @ 12.15 hrs
[63] Warning: Exceeded Reach 3R INLET depth by 175.51' @ 12.15 hrs

Inflow Area = 2,151,540 sf, 37.61% Impervious, Inflow Depth = 3.11" for 25 Year Storm event
Inflow = 77.82 cfs @ 12.41 hrs, Volume= 558,182 cf
Outflow = 113.52 cfs @ 12.42 hrs, Volume= 558,183 cf, Atten= 0%, Lag= 0.6 min
Primary = 113.52 cfs @ 12.42 hrs, Volume= 558,183 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 223.61' @ 12.15 hrs Surf.Area= 52,049 sf Storage= 40,422 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 7.0 min (852.8 - 845.8)

Volume	Invert	Avail.Storage	Storage Description
#1	33.00'	40,422 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
33.00	4	0	0
34.00	4	4	4
35.00	174	89	93
36.00	986	580	673
37.00	2,234	1,610	2,283
38.00	3,914	3,074	5,357
39.00	7,083	5,499	10,856
40.00	52,049	29,566	40,422

Device	Routing	Invert	Outlet Devices
#1	Primary	33.00'	**36.0" Round Culvert** L= 126.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 33.00' / 30.54' S= 0.0195 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=0.00 cfs @ 12.42 hrs HW=109.66' TW=165.89' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond P2: outfall 8

Inflow Area = 6,946,289 sf, 35.51% Impervious, Inflow Depth = 3.00" for 25 Year Storm event
Inflow = 290.88 cfs @ 12.18 hrs, Volume= 1,736,324 cf
Outflow = 239.87 cfs @ 12.44 hrs, Volume= 1,735,852 cf, Atten= 18%, Lag= 15.6 min
Primary = 5.22 cfs @ 12.40 hrs, Volume= 229,154 cf
Secondary = 234.69 cfs @ 12.44 hrs, Volume= 1,506,697 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 24.09' @ 12.44 hrs Surf.Area= 95,827 sf Storage= 210,849 cf

Plug-Flow detention time= 27.1 min calculated for 1,735,852 cf (100% of inflow)
Center-of-Mass det. time= 26.9 min (857.2 - 830.3)

Volume	Invert	Avail.Storage	Storage Description
#1	21.67'	300,577 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
21.67	81,950	0	0
22.00	84,672	27,493	27,493
23.00	84,942	84,807	112,300
24.00	95,351	90,147	202,446
25.00	100,911	98,131	300,577

Device	Routing	Invert	Outlet Devices
#1	Primary	18.35'	**12.0" Round Culvert** L= 42.6' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.35' / 17.50' S= 0.0200 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf
#2	Device 1	21.67'	**36.7" W x 7.1" H Vert. Orifice/Grate X 2.00** C= 0.600
#3	Secondary	21.75'	**25.0' long x 52.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=5.16 cfs @ 12.40 hrs HW=24.07' TW=22.22' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 5.16 cfs @ 6.57 fps)
└**2=Orifice/Grate** (Passes 5.16 cfs of 23.75 cfs potential flow)

Secondary OutFlow Max=234.69 cfs @ 12.44 hrs HW=24.09' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 234.69 cfs @ 4.02 fps)

Summary for Pond R2:

[80] Warning: Exceeded Pond 18P by 3.65' @ 12.14 hrs (64.38 cfs 24,100 cf)

Inflow Area = 5,747,400 sf, 37.44% Impervious, Inflow Depth = 3.38" for 25 Year Storm event
Inflow = 271.39 cfs @ 12.18 hrs, Volume= 1,617,488 cf
Outflow = 271.39 cfs @ 12.18 hrs, Volume= 1,617,488 cf, Atten= 0%, Lag= 0.0 min
Primary = 271.39 cfs @ 12.18 hrs, Volume= 1,617,488 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 40.59' @ 12.18 hrs
Flood Elev= 41.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	28.33'	**60.0" Round Culvert** L= 44.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 28.33' / 28.25' S= 0.0018 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 19.63 sf

Primary OutFlow Max=270.04 cfs @ 12.18 hrs HW=40.52' TW=32.37' (Dynamic Tailwater)
1=Culvert (Inlet Controls 270.04 cfs @ 13.75 fps)

Summary for Pond TWB CB10: (new Pond)

Inflow Area = 761,059 sf, 30.87% Impervious, Inflow Depth = 0.00" for 25 Year Storm event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 25.30' @ 0.00 hrs Surf.Area= 28 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	25.30'	170 cf	**6.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	25.30'	**30.0" Round Culvert** L= 157.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 25.30' / 24.80' S= 0.0032 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=25.30' TW=19.00' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond TWB CB5: (new Pond)

Inflow Area = 761,059 sf, 30.87% Impervious, Inflow Depth = 0.00" for 25 Year Storm event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 27.30' @ 0.00 hrs Surf.Area= 13 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	27.30'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	27.30'	**30.0" Round Culvert** L= 204.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 27.30' / 26.64' S= 0.0032 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=27.30' TW=26.54' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond TWB CB9: (new Pond)

Inflow Area = 761,059 sf, 30.87% Impervious, Inflow Depth = 0.00" for 25 Year Storm event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 25.50' @ 0.00 hrs Surf.Area= 28 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	25.50'	170 cf	**6.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	25.50'	**30.0" Round Culvert** L= 31.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 25.50' / 25.40' S= 0.0032 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=25.50' TW=25.30' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond TWB DMH1: (new Pond)

Inflow Area = 761,059 sf, 30.87% Impervious, Inflow Depth = 0.00" for 25 Year Storm event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 26.54' @ 0.00 hrs Surf.Area= 13 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	26.54'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	26.54'	**30.0" Round Culvert** L= 303.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 26.54' / 25.60' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=26.54' TW=25.50' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond TWC CB19: (new Pond)

[93] Warning: Storage range exceeded by 219.54'
[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=55)

Inflow Area = 108,136 sf, 60.78% Impervious, Inflow Depth = 4.76" for 25 Year Storm event
Inflow = 13.61 cfs @ 12.07 hrs, Volume= 42,908 cf
Outflow = 17.44 cfs @ 12.06 hrs, Volume= 43,119 cf, Atten= 0%, Lag= 0.0 min
Primary = 17.44 cfs @ 12.06 hrs, Volume= 43,119 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 266.79' @ 12.19 hrs Surf.Area= 13 sf Storage= 75 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (781.0 - 780.9)

Volume	Invert	Avail.Storage	Storage Description
#1	41.25'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	41.25'	**15.0" Round Culvert** L= 88.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 41.25' / 40.80' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=21.32 cfs @ 12.06 hrs HW=121.82' TW=106.58' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 21.32 cfs @ 17.37 fps)

Summary for Pond TWC CB2: (new Pond)

Inflow Area = 761,059 sf, 30.87% Impervious, Inflow Depth = 0.00" for 25 Year Storm event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 29.50' @ 0.00 hrs Surf.Area= 13 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	29.50'	126 cf	**4.00'D x 10.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	29.50'	**18.0" Round Culvert** L= 218.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 29.50' / 28.84' S= 0.0030 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=29.50' TW=27.30' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond TWC CB20: (new Pond)

[93] Warning: Storage range exceeded by 222.48'
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=42)
[80] Warning: Exceeded Pond TWC CB19 by 113.46' @ 12.39 hrs (58.17 cfs 80,617 cf)

Inflow Area = 108,136 sf, 60.78% Impervious, Inflow Depth = 4.78" for 25 Year Storm event
Inflow = 17.44 cfs @ 12.06 hrs, Volume= 43,119 cf
Outflow = 14.48 cfs @ 12.07 hrs, Volume= 43,127 cf, Atten= 17%, Lag= 0.6 min
Primary = 14.48 cfs @ 12.07 hrs, Volume= 43,127 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 266.48' @ 12.18 hrs Surf.Area= 13 sf Storage= 75 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (781.2 - 781.0)

Volume	Invert	Avail.Storage	Storage Description
#1	38.00'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	38.00'	**24.0" Round Culvert** L= 336.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 38.00' / 36.00' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=30.10 cfs @ 12.07 hrs HW=127.46' TW=119.78' (Dynamic Tailwater)
1=Culvert (Outlet Controls 30.10 cfs @ 9.58 fps)

Summary for Pond TWC CB21: (new Pond)

[93] Warning: Storage range exceeded by 225.74'
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=31)
[80] Warning: Exceeded Pond TWC CB20 by 93.19' @ 12.57 hrs (104.86 cfs 160,245 cf)
[80] Warning: Exceeded Pond TWC CB22 by 55.10' @ 12.13 hrs (39.83 cfs 69,047 cf)
[80] Warning: Exceeded Pond TWC CB25 by 10.76' @ 12.91 hrs (10.07 cfs 4,831 cf)

Inflow Area = 1,018,490 sf, 33.31% Impervious, Inflow Depth = 4.09" for 25 Year Storm event
Inflow = 73.45 cfs @ 12.09 hrs, Volume= 346,986 cf
Outflow = 71.92 cfs @ 12.10 hrs, Volume= 346,986 cf, Atten= 2%, Lag= 0.6 min
Primary = 71.92 cfs @ 12.10 hrs, Volume= 346,986 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 266.14' @ 12.17 hrs Surf.Area= 13 sf Storage= 75 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (809.3 - 809.2)

Volume	Invert	Avail.Storage	Storage Description
#1	34.40'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	34.40'	**24.0" Round Culvert** L= 167.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 34.40' / 33.43' S= 0.0058 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=79.05 cfs @ 12.10 hrs HW=150.26' TW=118.00' (Dynamic Tailwater)
1=Culvert (Outlet Controls 79.05 cfs @ 25.16 fps)

Summary for Pond TWC CB22: (new Pond)

[93] Warning: Storage range exceeded by 225.39'
[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=79)

Inflow Area = 214,922 sf, 46.42% Impervious, Inflow Depth = 4.33" for 25 Year Storm event
Inflow = 25.25 cfs @ 12.07 hrs, Volume= 77,481 cf
Outflow = 28.31 cfs @ 12.07 hrs, Volume= 77,488 cf, Atten= 0%, Lag= 0.2 min
Primary = 28.31 cfs @ 12.07 hrs, Volume= 77,488 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 270.00' @ 12.18 hrs Surf.Area= 13 sf Storage= 75 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (794.8 - 794.6)

Volume	Invert	Avail.Storage	Storage Description
#1	38.61'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	38.61'	**15.0" Round Culvert** L= 93.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 38.61' / 38.00' S= 0.0066 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=31.30 cfs @ 12.07 hrs HW=153.71' TW=119.68' (Dynamic Tailwater)
1=Culvert (Outlet Controls 31.30 cfs @ 25.50 fps)

Summary for Pond TWC CB23: (new Pond)

[93] Warning: Storage range exceeded by 1,381.09'

Inflow Area = 695,432 sf, 24.98% Impervious, Inflow Depth = 3.91" for 25 Year Storm event
Inflow = 50.16 cfs @ 12.24 hrs, Volume= 226,371 cf
Outflow = 50.13 cfs @ 12.25 hrs, Volume= 226,371 cf, Atten= 0%, Lag= 0.1 min
Primary = 50.13 cfs @ 12.25 hrs, Volume= 226,371 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 1,425.09' @ 12.26 hrs Surf.Area= 13 sf Storage= 75 cf

Plug-Flow detention time= 0.1 min calculated for 226,326 cf (100% of inflow)
Center-of-Mass det. time= 0.1 min (819.3 - 819.2)

Volume	Invert	Avail.Storage	Storage Description
#1	38.00'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	38.00'	**12.0" Round Culvert** L= 40.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 38.00' / 37.80' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=48.55 cfs @ 12.25 hrs HW=1,395.40' TW=1,249.65' (Dynamic Tailwater)
1=Culvert (Outlet Controls 48.55 cfs @ 61.82 fps)

Summary for Pond TWC CB24: (new Pond)

[93] Warning: Storage range exceeded by 1,227.06'
[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[80] Warning: Exceeded Pond TWC CB23 by 12.30' @ 12.93 hrs (14.10 cfs 12,529 cf)

Inflow Area = 695,432 sf, 24.98% Impervious, Inflow Depth = 3.91" for 25 Year Storm event
Inflow = 50.13 cfs @ 12.25 hrs, Volume= 226,371 cf
Outflow = 50.19 cfs @ 12.24 hrs, Volume= 226,371 cf, Atten= 0%, Lag= 0.0 min
Primary = 50.19 cfs @ 12.24 hrs, Volume= 226,371 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 1,270.66' @ 12.25 hrs Surf.Area= 13 sf Storage= 75 cf

Plug-Flow detention time= 0.1 min calculated for 226,326 cf (100% of inflow)
Center-of-Mass det. time= 0.1 min (819.4 - 819.3)

Volume	Invert	Avail.Storage	Storage Description
#1	37.60'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	37.60'	**12.0" Round Culvert** L= 340.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 37.60' / 36.00' S= 0.0047 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=49.39 cfs @ 12.24 hrs HW=1,239.09' TW=510.02' (Dynamic Tailwater)
1=Culvert (Outlet Controls 49.39 cfs @ 62.88 fps)

Summary for Pond TWC CB25: (new Pond)

[93] Warning: Storage range exceeded by 479.80'
[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=88)

Inflow Area = 695,432 sf, 24.98% Impervious, Inflow Depth = 3.91" for 25 Year Storm event
Inflow = 50.19 cfs @ 12.24 hrs, Volume= 226,371 cf
Outflow = 50.86 cfs @ 12.25 hrs, Volume= 226,371 cf, Atten= 0%, Lag= 0.4 min
Primary = 50.86 cfs @ 12.25 hrs, Volume= 226,371 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 521.70' @ 12.24 hrs Surf.Area= 13 sf Storage= 75 cf

Plug-Flow detention time= 0.1 min calculated for 226,326 cf (100% of inflow)
Center-of-Mass det. time= 0.1 min (819.5 - 819.4)

Volume	Invert	Avail.Storage	Storage Description
#1	35.90'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	35.90'	**12.0" Round Culvert** L= 96.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 35.90' / 35.40' S= 0.0052 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=45.76 cfs @ 12.25 hrs HW=480.20' TW=258.05' (Dynamic Tailwater)
1=Culvert (Outlet Controls 45.76 cfs @ 58.27 fps)

Summary for Pond TWC CB27: (new Pond)

[93] Warning: Storage range exceeded by 195.11'
[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=71)
[80] Warning: Exceeded Pond TWC DMH6 by 65.59' @ 12.11 hrs (138.93 cfs 202,284 cf)

Inflow Area = 1,018,490 sf, 33.31% Impervious, Inflow Depth = 4.09" for 25 Year Storm event
Inflow = 79.01 cfs @ 12.09 hrs, Volume= 346,986 cf
Outflow = 82.69 cfs @ 12.10 hrs, Volume= 347,025 cf, Atten= 0%, Lag= 0.6 min
Primary = 82.69 cfs @ 12.10 hrs, Volume= 347,025 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 234.44' @ 12.15 hrs Surf.Area= 13 sf Storage= 75 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (809.4 - 809.3)

Volume	Invert	Avail.Storage	Storage Description
#1	33.33'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	33.33'	**27.0" Round Culvert** L= 278.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 33.33' / 32.00' S= 0.0048 '/' Cc= 0.900 n= 0.013, Flow Area= 3.98 sf

Primary OutFlow Max=0.00 cfs @ 12.10 hrs HW=129.11' TW=203.55' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond TWC DMH6: (new Pond)

[93] Warning: Storage range exceeded by 205.56'
[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=15)
[80] Warning: Exceeded Pond TWC CB21 by 50.71' @ 12.12 hrs (99.10 cfs 147,115 cf)

Inflow Area = 1,018,490 sf, 33.31% Impervious, Inflow Depth = 4.09" for 25 Year Storm event
Inflow = 71.92 cfs @ 12.10 hrs, Volume= 346,986 cf
Outflow = 79.01 cfs @ 12.09 hrs, Volume= 346,986 cf, Atten= 0%, Lag= 0.0 min
Primary = 79.01 cfs @ 12.09 hrs, Volume= 346,986 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 245.26' @ 12.16 hrs Surf.Area= 13 sf Storage= 75 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (809.3 - 809.3)

Volume	Invert	Avail.Storage	Storage Description
#1	33.70'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**

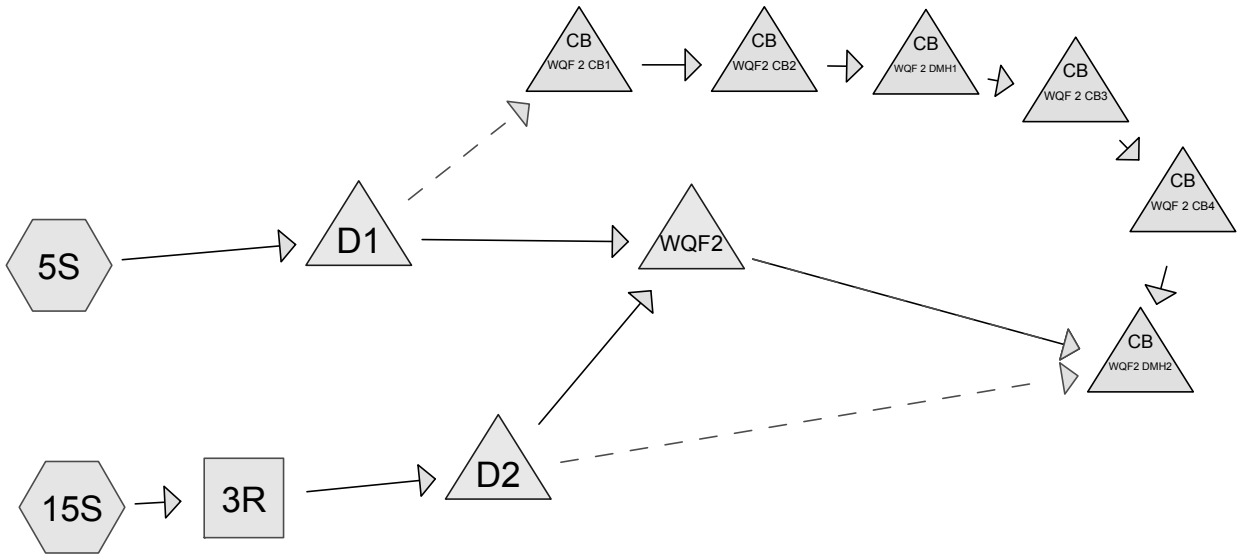
Device	Routing	Invert	Outlet Devices
#1	Primary	33.70'	**24.0" Round Culvert** L= 77.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 33.70' / 33.43' S= 0.0035 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=70.96 cfs @ 12.09 hrs HW=123.60' TW=106.49' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 70.96 cfs @ 22.59 fps)

Summary for Link WQ-1:

Inflow Area = 490,791 sf, 36.11% Impervious, Inflow Depth = 2.04" for 25 Year Storm event
Inflow = 17.90 cfs @ 12.13 hrs, Volume= 83,417 cf
Primary = 17.90 cfs @ 12.13 hrs, Volume= 83,417 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs



Subcat Reach Pond Link

Routing Diagram for Postdevelopment Cargo Area - WQF2
Prepared by Stantec Consulting Ltd., Printed 10/19/2018
HydroCAD® 10.00-13 s/n 00734 © 2014 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
7.511	74	>75% Grass cover, Good, HSG C (5S, 15S)
5.737	80	>75% Grass cover, Good, HSG D (5S, 15S)
9.941	98	Paved parking, HSG A (5S, 15S)
23.189	**86**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
9.941	HSG A	5S, 15S
0.000	HSG B	
7.511	HSG C	5S, 15S
5.737	HSG D	5S, 15S
0.000	Other	
23.189		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	7.511	5.737	0.000	13.248	>75% Grass cover, Good	5S, 15S
9.941	0.000	0.000	0.000	0.000	9.941	Paved parking	5S, 15S
9.941	**0.000**	**7.511**	**5.737**	**0.000**	**23.189**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	15S	0.00	0.00	110.0	0.0050	0.009	12.0	0.0	0.0
2	3R	32.00	31.50	80.0	0.0063	0.010	12.0	0.0	0.0
3	D1	31.50	31.00	77.0	0.0065	0.010	15.0	0.0	0.0
4	D1	31.50	31.00	82.0	0.0061	0.010	15.0	0.0	0.0
5	D1	31.50	31.00	90.0	0.0056	0.010	15.0	0.0	0.0
6	D1	31.50	31.00	95.0	0.0053	0.011	15.0	0.0	0.0
7	D1	31.50	31.00	105.0	0.0048	0.011	15.0	0.0	0.0
8	D1	31.50	31.00	109.0	0.0046	0.010	15.0	0.0	0.0
9	D2	31.50	31.00	158.0	0.0032	0.010	15.0	0.0	0.0
10	D2	31.50	31.00	146.0	0.0034	0.010	15.0	0.0	0.0
11	D2	31.50	31.00	127.0	0.0039	0.010	15.0	0.0	0.0
12	D2	31.50	31.00	120.0	0.0042	0.010	15.0	0.0	0.0
13	D2	31.50	31.00	112.0	0.0045	0.010	15.0	0.0	0.0
14	D2	31.50	31.00	117.0	0.0043	0.010	15.0	0.0	0.0
15	WQF 2 CB1	26.00	25.20	160.0	0.0050	0.010	15.0	0.0	0.0
16	WQF 2 CB3	23.72	23.02	180.0	0.0039	0.010	24.0	0.0	0.0
17	WQF 2 CB4	22.90	22.30	150.0	0.0040	0.010	24.0	0.0	0.0
18	WQF 2 DMH1	24.58	23.82	200.0	0.0038	0.010	18.0	0.0	0.0
19	WQF2	25.30	24.00	410.0	0.0032	0.010	12.0	0.0	0.0
20	WQF2 CB2	25.10	24.68	150.0	0.0028	0.010	18.0	0.0	0.0
21	WQF2 DMH2	22.20	22.00	140.0	0.0014	0.010	24.0	0.0	0.0

Time span=0.00-50.00 hrs, dt=0.01 hrs, 5001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 5S: (new Subcat) Runoff Area=716,141 sf 38.60% Impervious Runoff Depth=4.01"
Flow Length=800' Tc=25.0 min CN=84 Runoff=46.89 cfs 5.493 af

Subcatchment 15S: (new Subcat) Runoff Area=293,978 sf 53.27% Impervious Runoff Depth=4.54"
Flow Length=1,223' Tc=5.5 min CN=89 Runoff=35.19 cfs 2.554 af

Reach 3R: (new Reach) Avg. Flow Depth=1.00' Max Vel=5.31 fps Inflow=35.19 cfs 2.554 af
12.0" Round Pipe n=0.010 L=80.0' S=0.0063 '/' Capacity=3.66 cfs Outflow=3.94 cfs 2.554 af

Pond D1: (new Pond) Peak Elev=33.49' Storage=11,088 cf Inflow=46.89 cfs 5.493 af
Primary=37.94 cfs 4.497 af Secondary=5.88 cfs 0.968 af Outflow=43.73 cfs 5.464 af

Pond D2: (new Pond) Peak Elev=32.93' Storage=7,538 cf Inflow=3.94 cfs 2.554 af
Primary=3.66 cfs 1.837 af Secondary=3.66 cfs 0.686 af Outflow=4.34 cfs 2.523 af

Pond WQF 2 CB1: (new Pond) Peak Elev=28.00' Inflow=5.88 cfs 0.968 af
15.0" Round Culvert n=0.010 L=160.0' S=0.0050 '/' Outflow=5.88 cfs 0.968 af

Pond WQF 2 CB3: (new Pond) Peak Elev=25.16' Inflow=5.88 cfs 0.968 af
24.0" Round Culvert n=0.010 L=180.0' S=0.0039 '/' Outflow=5.88 cfs 0.968 af

Pond WQF 2 CB4: (new Pond) Peak Elev=24.84' Inflow=5.88 cfs 0.968 af
24.0" Round Culvert n=0.010 L=150.0' S=0.0040 '/' Outflow=5.88 cfs 0.968 af

Pond WQF 2 DMH1: (new Pond) Peak Elev=26.03' Inflow=5.88 cfs 0.968 af
18.0" Round Culvert n=0.010 L=200.0' S=0.0038 '/' Outflow=5.88 cfs 0.968 af

Pond WQF2: (new Pond) Peak Elev=33.09' Storage=81,489 cf Inflow=38.44 cfs 6.334 af
Primary=0.49 cfs 0.486 af Secondary=5.81 cfs 5.848 af Outflow=6.30 cfs 6.335 af

Pond WQF2 CB2: (new Pond) Peak Elev=26.68' Inflow=5.88 cfs 0.968 af
18.0" Round Culvert n=0.010 L=150.0' S=0.0028 '/' Outflow=5.88 cfs 0.968 af

Pond WQF2 DMH2: (new Pond) Peak Elev=24.70' Inflow=14.57 cfs 7.988 af
24.0" Round Culvert n=0.010 L=140.0' S=0.0014 '/' Outflow=14.57 cfs 7.988 af

Total Runoff Area = 23.189 ac Runoff Volume = 8.048 af Average Runoff Depth = 4.16"
57.13% Pervious = 13.248 ac 42.87% Impervious = 9.941 ac

Summary for Subcatchment 5S: (new Subcat)

Runoff = 46.89 cfs @ 12.34 hrs, Volume= 5.493 af, Depth= 4.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (sf)	CN	Description
276,412	98	Paved parking, HSG A
300,000	74	>75% Grass cover, Good, HSG C
139,729	80	>75% Grass cover, Good, HSG D
716,141	84	Weighted Average
439,729		61.40% Pervious Area
276,412		38.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	150	0.0533	0.26		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.00"
15.5	650	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
25.0	800	Total			

Summary for Subcatchment 15S: (new Subcat)

Runoff = 35.19 cfs @ 12.08 hrs, Volume= 2.554 af, Depth= 4.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.80"

Area (sf)	CN	Description
156,612	98	Paved parking, HSG A
110,177	80	>75% Grass cover, Good, HSG D
27,189	74	>75% Grass cover, Good, HSG C
293,978	89	Weighted Average
137,366		46.73% Pervious Area
156,612		53.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	100	0.0200	1.33		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.00"
1.7	293	0.0200	2.87		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
2.1	720	0.0150	5.82	33.47	**Trap/Vee/Rect Channel Flow, C-D** Bot.W=10.00' D=0.50' Z= 3.0 '/' Top.W=13.00' n= 0.018 Earth, clean & straight
0.4	110	0.0050	4.63	3.64	**Pipe Channel, CMP_Round 12"** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.009 PVC, smooth interior
5.5	1,223	Total			

Summary for Reach 3R: (new Reach)

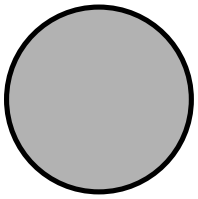
[52] Hint: Inlet/Outlet conditions not evaluated
[55] Hint: Peak inflow is 961% of Manning's capacity
[76] Warning: Detained 0.875 af (Pond w/culvert advised)

Inflow Area = 6.749 ac, 53.27% Impervious, Inflow Depth = 4.54" for 25 yr event
Inflow = 35.19 cfs @ 12.08 hrs, Volume= 2.554 af
Outflow = 3.94 cfs @ 11.58 hrs, Volume= 2.554 af, Atten= 89%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.31 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 3.56 fps, Avg. Travel Time= 0.4 min

Peak Storage= 63 cf @ 11.59 hrs
Average Depth at Peak Storage= 1.00'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.66 cfs

12.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 80.0' Slope= 0.0063 '/'
Inlet Invert= 32.00', Outlet Invert= 31.50'



Summary for Pond D1: (new Pond)

Inflow Area = 16.440 ac, 38.60% Impervious, Inflow Depth = 4.01" for 25 yr event
Inflow = 46.89 cfs @ 12.34 hrs, Volume= 5.493 af
Outflow = 43.73 cfs @ 12.40 hrs, Volume= 5.464 af, Atten= 7%, Lag= 3.5 min
Primary = 37.94 cfs @ 12.39 hrs, Volume= 4.497 af
Secondary = 5.88 cfs @ 12.47 hrs, Volume= 0.968 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 33.49' @ 12.47 hrs Surf.Area= 6,564 sf Storage= 11,088 cf

Plug-Flow detention time= 16.7 min calculated for 5.463 af (99% of inflow)
Center-of-Mass det. time= 13.4 min (835.8 - 822.4)

Volume	Invert	Avail.Storage	Storage Description
#1	31.00'	22,434 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
31.00	2,082	0	0
32.00	3,835	2,959	2,959
33.00	6,184	5,010	7,968
33.50	6,572	3,189	11,157
34.00	7,512	3,521	14,678
35.00	8,000	7,756	22,434

Device	Routing	Invert	Outlet Devices
#1	Primary	31.50'	**15.0" Round Culvert** L= 77.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 31.50' / 31.00' S= 0.0065 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf
#2	Primary	31.50'	**15.0" Round Culvert** L= 82.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 31.50' / 31.00' S= 0.0061 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf
#3	Primary	31.50'	**15.0" Round Culvert** L= 90.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 31.50' / 31.00' S= 0.0056 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf
#4	Primary	31.50'	**15.0" Round Culvert** L= 95.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 31.50' / 31.00' S= 0.0053 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#5	Primary	31.50'	**15.0" Round Culvert** L= 105.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 31.50' / 31.00' S= 0.0048 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#6	Primary	31.50'	**15.0" Round Culvert** L= 109.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 31.50' / 31.00' S= 0.0046 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf
#7	Secondary	32.50'	**15.0" Horiz. Orifice/Grate** C= 0.600 in 24.0" Grate (39% open area)

Limited to weir flow at low heads

Primary OutFlow Max=37.74 cfs @ 12.39 hrs HW=33.45' TW=32.25' (Dynamic Tailwater)
- **1=Culvert** (Inlet Controls 6.47 cfs @ 5.27 fps)
- **2=Culvert** (Inlet Controls 6.47 cfs @ 5.27 fps)
- **3=Culvert** (Inlet Controls 6.47 cfs @ 5.27 fps)
- **4=Culvert** (Outlet Controls 6.14 cfs @ 5.00 fps)
- **5=Culvert** (Outlet Controls 5.98 cfs @ 4.87 fps)
- **6=Culvert** (Outlet Controls 6.22 cfs @ 5.07 fps)

Secondary OutFlow Max=5.88 cfs @ 12.47 hrs HW=33.49' TW=28.00' (Dynamic Tailwater)
- **7=Orifice/Grate** (Orifice Controls 5.88 cfs @ 4.79 fps)

Summary for Pond D2: (new Pond)

[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=1)
[63] Warning: Exceeded Reach 3R INLET depth by 0.23' @ 17.73 hrs

Inflow Area = 6.749 ac, 53.27% Impervious, Inflow Depth = 4.54" for 25 yr event
Inflow = 3.94 cfs @ 11.58 hrs, Volume= 2.554 af
Outflow = 4.34 cfs @ 13.74 hrs, Volume= 2.523 af, Atten= 0%, Lag= 129.8 min
Primary = 3.66 cfs @ 11.97 hrs, Volume= 1.837 af
Secondary = 3.66 cfs @ 13.72 hrs, Volume= 0.686 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 32.93' @ 13.72 hrs Surf.Area= 5,543 sf Storage= 7,538 cf

Plug-Flow detention time= 34.4 min calculated for 2.523 af (99% of inflow)
Center-of-Mass det. time= 27.7 min (890.6 - 862.9)

Volume	Invert	Avail.Storage	Storage Description
#1	31.00'	14,525 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
31.00	2,313	0	0
32.00	3,926	3,120	3,120
33.00	5,659	4,793	7,912
33.50	6,530	3,047	10,959
34.00	7,734	3,566	14,525

Device	Routing	Invert	Outlet Devices
#1	Primary	31.50'	**15.0" Round Culvert** L= 158.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 31.50' / 31.00' S= 0.0032 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf
#2	Primary	31.50'	**15.0" Round Culvert** L= 146.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 31.50' / 31.00' S= 0.0034 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf
#3	Primary	31.50'	**15.0" Round Culvert** L= 127.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 31.50' / 31.00' S= 0.0039 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf
#4	Primary	31.50'	**15.0" Round Culvert** L= 120.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 31.50' / 31.00' S= 0.0042 '/' Cc= 0.900 n= 0.010 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#5	Primary	31.50'	**15.0" Round Culvert** L= 112.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 31.50' / 31.00' S= 0.0045 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf
#6	Primary	31.50'	**15.0" Round Culvert** L= 117.0' CMP, end-section conforming to fill, Ke= 0.500

			Inlet / Outlet Invert= 31.50' / 31.00' S= 0.0043 '/' Cc= 0.900
			n= 0.010, Flow Area= 1.23 sf
#7	Secondary	32.50'	**15.0" Horiz. Orifice/Grate** C= 0.600 in 24.0" Grate (39% open area)
			Limited to weir flow at low heads

Primary OutFlow Max=3.66 cfs @ 11.97 hrs HW=31.90' TW=31.30' (Dynamic Tailwater)
- **1=Culvert** (Barrel Controls 0.57 cfs @ 2.50 fps)
- **2=Culvert** (Barrel Controls 0.58 cfs @ 2.58 fps)
- **3=Culvert** (Barrel Controls 0.61 cfs @ 2.71 fps)
- **4=Culvert** (Barrel Controls 0.63 cfs @ 2.77 fps)
- **5=Culvert** (Barrel Controls 0.64 cfs @ 2.84 fps)
- **6=Culvert** (Barrel Controls 0.63 cfs @ 2.79 fps)

Secondary OutFlow Max=3.66 cfs @ 13.72 hrs HW=32.93' TW=24.54' (Dynamic Tailwater)
- **7=Orifice/Grate** (Weir Controls 3.66 cfs @ 2.15 fps)

Summary for Pond WQF 2 CB1: (new Pond)

[57] Hint: Peaked at 28.00' (Flood elevation advised)

Inflow	=	5.88 cfs @	12.47 hrs, Volume=	0.968 af
Outflow	=	5.88 cfs @	12.47 hrs, Volume=	0.968 af, Atten= 0%, Lag= 0.0 min
Primary	=	5.88 cfs @	12.47 hrs, Volume=	0.968 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 28.00' @ 12.47 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	26.00'	**15.0" Round Culvert** L= 160.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 26.00' / 25.20' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=5.87 cfs @ 12.47 hrs HW=28.00' TW=26.68' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 5.87 cfs @ 4.79 fps)

Summary for Pond WQF 2 CB3: (new Pond)

[57] Hint: Peaked at 25.16' (Flood elevation advised)

Inflow	=	5.88 cfs @	12.47 hrs, Volume=	0.968 af
Outflow	=	5.88 cfs @	12.47 hrs, Volume=	0.968 af, Atten= 0%, Lag= 0.0 min
Primary	=	5.88 cfs @	12.47 hrs, Volume=	0.968 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 25.16' @ 12.74 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	23.72'	**24.0" Round Culvert** L= 180.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 23.72' / 23.02' S= 0.0039 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=5.87 cfs @ 12.47 hrs HW=25.12' TW=24.59' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 5.87 cfs @ 3.51 fps)

Summary for Pond WQF 2 CB4: (new Pond)

[57] Hint: Peaked at 24.84' (Flood elevation advised)

Inflow	=	5.88 cfs @	12.47 hrs, Volume=	0.968 af
Outflow	=	5.88 cfs @	12.47 hrs, Volume=	0.968 af, Atten= 0%, Lag= 0.0 min
Primary	=	5.88 cfs @	12.47 hrs, Volume=	0.968 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 24.84' @ 13.03 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	22.90'	**24.0" Round Culvert** L= 150.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 22.90' / 22.30' S= 0.0040 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=5.86 cfs @ 12.47 hrs HW=24.59' TW=24.29' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 5.86 cfs @ 2.79 fps)

Summary for Pond WQF 2 DMH1: (new Pond)

[57] Hint: Peaked at 26.03' (Flood elevation advised)

Inflow	=	5.88 cfs @	12.47 hrs, Volume=	0.968 af
Outflow	=	5.88 cfs @	12.47 hrs, Volume=	0.968 af, Atten= 0%, Lag= 0.0 min
Primary	=	5.88 cfs @	12.47 hrs, Volume=	0.968 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 26.03' @ 12.47 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	24.58'	**18.0" Round Culvert** L= 200.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 24.58' / 23.82' S= 0.0038 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=5.87 cfs @ 12.47 hrs HW=26.03' TW=25.12' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 5.87 cfs @ 4.28 fps)

Summary for Pond WQF2: (new Pond)

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=191)
[80] Warning: Exceeded Pond D2 by 0.17' @ 13.01 hrs (13.72 cfs 1.037 af)

Inflow Area = 23.189 ac, 42.87% Impervious, Inflow Depth = 3.28" for 25 yr event
Inflow = 38.44 cfs @ 12.36 hrs, Volume= 6.334 af
Outflow = 6.30 cfs @ 13.05 hrs, Volume= 6.335 af, Atten= 84%, Lag= 41.4 min
Primary = 0.49 cfs @ 13.05 hrs, Volume= 0.486 af
Secondary = 5.81 cfs @ 13.05 hrs, Volume= 5.848 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 33.09' @ 13.05 hrs Surf.Area= 42,188 sf Storage= 81,489 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 109.5 min (969.4 - 859.9)

Volume	Invert	Avail.Storage	Storage Description
#1	31.00'	120,648 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
31.00	35,926	0	0
32.00	38,692	37,309	37,309
32.50	40,082	19,694	57,003
33.00	42,000	20,521	77,523
33.50	43,000	21,250	98,773
34.00	44,500	21,875	120,648

Device	Routing	Invert	Outlet Devices
#1	Primary	31.00'	**0.500 in/hr Exfiltration over Surface area**
#2	Secondary	25.30'	**12.0" Round Culvert** L= 410.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 25.30' / 24.00' S= 0.0032 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.49 cfs @ 13.05 hrs HW=33.09' TW=24.70' (Dynamic Tailwater)
1=Exfiltration (Exfiltration Controls 0.49 cfs)

Secondary OutFlow Max=5.81 cfs @ 13.05 hrs HW=33.09' TW=24.70' (Dynamic Tailwater)
2=Culvert (Barrel Controls 5.81 cfs @ 7.40 fps)

Summary for Pond WQF2 CB2: (new Pond)

[57] Hint: Peaked at 26.68' (Flood elevation advised)

Inflow	=	5.88 cfs @	12.47 hrs, Volume=	0.968 af
Outflow	=	5.88 cfs @	12.47 hrs, Volume=	0.968 af, Atten= 0%, Lag= 0.0 min
Primary	=	5.88 cfs @	12.47 hrs, Volume=	0.968 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 26.68' @ 12.47 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	25.10'	**18.0" Round Culvert** L= 150.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 25.10' / 24.68' S= 0.0028 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=5.87 cfs @ 12.47 hrs HW=26.68' TW=26.03' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 5.87 cfs @ 3.91 fps)

Summary for Pond WQF2 DMH2: (new Pond)

[57] Hint: Peaked at 24.70' (Flood elevation advised)
[80] Warning: Exceeded Pond WQF 2 CB4 by 0.67' @ 17.81 hrs (2.09 cfs 0.144 af)

Inflow Area = 23.189 ac, 42.87% Impervious, Inflow Depth = 4.13" for 25 yr event
Inflow = 14.57 cfs @ 13.04 hrs, Volume= 7.988 af
Outflow = 14.57 cfs @ 13.04 hrs, Volume= 7.988 af, Atten= 0%, Lag= 0.0 min
Primary = 14.57 cfs @ 13.04 hrs, Volume= 7.988 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Peak Elev= 24.70' @ 13.04 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	22.20'	**24.0" Round Culvert** L= 140.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 22.20' / 22.00' S= 0.0014 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=14.57 cfs @ 13.04 hrs HW=24.70' (Free Discharge)
1=Culvert (Barrel Controls 14.57 cfs @ 4.76 fps)

ATTACHMENT C

Pond Sizing Computations

Portland International Jetport - Environmental Assessment
Existing Pond East of RW 18-36
Design Summary

Proposed New Area:	**WET POND**
WQ Impervious Factor (inches):	2
WQ Landscape Factor (inches):	0.8

Ex. Water Quality Volume Required

Subcatchment	Total Area	Impervious Area	Impervious Area	WQ Impervious Factor	WQ Impervious Volume	WQ Landscape Area	Landscape Area	WQ Landscape Factor	WQ Landscape Volume	Total WQ Volume
Area Tributary to Treatment Pond	6,130,106 ft²	2,086,344 ft²	47.90 Acres	2	347,724 ft³	4,043,762 ft²	92.83 Acres	0.8	269,584 ft³	617,308 ft³
TOTAL	6,130,106 ft²	2,086,344 ft²	47.90 Acres	2	347,724 ft³	4,043,762 ft²	92.83 Acres	0.8	269,584 ft³	617,308 ft³

*Project ID Area 9 included as impervious below and is therefore not included in total and landscaped area within the above table

Existing WQV Required

WQ Volume Due to Impervious Surface:	347,724 ft³	Volume for Existing Area Required with 40% Decrease Due to Use of 3 Ponds	**A**
WQ Volume Due to Landscape Surface:	269,584 ft³		
Total existing:	617,308 ft³	370,385 ft³	

Proposed Water Quality Volume Required

Project ID	Total Area	Impervious Area	Impervious Area	WQ Impervious Factor	WQ Impervious Volume	WQ Landscape Area	Landscape Area	WQ Landscape Factor	WQ Landscape Volume	Total WQ Volume
9 (Prop.)	114,422 ft²	114,422 ft²	2.63 Acres	2	19,070 ft³	0 ft²	0.00 Acres	0.8	000 ft³	19,070 ft³
11 (Prop.)	163,150 ft²	126,856 ft²	2.91 Acres	2	21,143 ft³	36,294 ft²	0.83 Acres	0.8	2,420 ft³	23,562 ft³
11 (Ex.)	776,908 ft²	189,830 ft²	4.36 Acres	2	31,638 ft³	587,078 ft²	13.48 Acres	0.8	39,139 ft³	70,777 ft³
TOTAL	7,200,044 ft²	431,108 ft²	9.90 Acres	2	71,851 ft³	623,372 ft²	14.31 Acres	0.8	41,558 ft³	113,409 ft³

Proposed WQV Required

WQ Volume Due to Impervious Surface:	71,851 ft³	Volume Required for New Development with 40% Decrease Due to Use of 3 Ponds	**B**
WQ Volume Due to Landscape Surface:	41,558 ft³		
Total Proposed:	113,409 ft³	68,046 ft³	

Total Water Quality Volume Required / Provided

Total WQV Required

WQ Volume Due to Impervious Surface:	419,575 ft³
WQ Volume Due to Landscape Surface:	311,142 ft³
Total:	730,718 ft³
40% reduction for existing (water flows through 3 ponds in series):	-246,923 ft³
40% reduction for proposed (water flows through 3 ponds in series):	-45,364 ft³
Total Required with Reduction (A+B):	438,431 ft³
Provided Permanent Pool Volume at Elevation 21.67:	442,515 ft³

Western 1/3 Portion of Pond (Compartment A)

Elevation	Surface Area	Average Stage Area	Stage Volume	Cumulative Volume
11	452 ft²			000 ft³
		573 ft²	573 ft³	
12	694 ft²			573 ft³
		857 ft²	857 ft³	
13	1,019 ft²			000 ft³
		3,493 ft²	3,493 ft³	
14	5,967 ft²			000 ft³
		6,593 ft²	6,593 ft³	
15	7,219 ft²			6,593 ft³
		7,869 ft²	7,869 ft³	
16	8,518 ft²			14,462 ft³
		9,190 ft²	9,190 ft³	
17	9,862 ft²			23,652 ft³
		11,416 ft²	11,416 ft³	
18	12,970 ft²			35,068 ft³
		18,137 ft²	18,137 ft³	
19	23,304 ft²			53,205 ft³
		24,323 ft²	24,323 ft³	
20	25,342 ft²			77,528 ft³
		25,876 ft²	12,938 ft³	
20.5	26,411 ft²			90,466 ft³
		26,945 ft²	13,472 ft³	
21	27,479 ft²			103,938 ft³
		28,297 ft²	18,959 ft³	
21.67	29,114 ft²			122,897 ft³
		29,424 ft²	9,710 ft³	
22	29,734 ft²			132,607 ft³

Permanent Pool Volume Provided (at Elevation 21.67): 122,897 ft³

Computed Mean Depth (at Elevation 20.50): 3.43 feet

Length to Width Ratio: >3:1

Emergency Spillway Elevation: 21.75

Middle 1/3 of Pond (Compartment B)

Elevation	Surface Area	Average Stage Area	Stage Volume	Cumulative Volume
11	7297			000 ft³
		7,929 ft²	7,929 ft³	
12	8561			7,929 ft³
		9,415 ft²	9,415 ft³	
13	10,268 ft²			17,344 ft³
		10,948 ft²	10,948 ft³	
14	11,628 ft²			28,292 ft³
		12,307 ft²	12,307 ft³	
15	12,986 ft²			40,599 ft³
		13,647 ft²	13,647 ft³	
16	14,307 ft²			54,245 ft³
		14,982 ft²	14,982 ft³	
17	15,656 ft²			69,227 ft³
		16,327 ft²	16,327 ft³	
18	16,998 ft²			85,554 ft³
		17,663 ft²	17,663 ft³	
19	18,327 ft²			103,216 ft³
		19,027 ft²	19,027 ft³	
20	19,726 ft²			122,243 ft³
		20,075 ft²	10,038 ft³	
20.5	20,425 ft²			132,280 ft³
		20,774 ft²	10,387 ft³	
21	21,123 ft²			142,667 ft³
		21,613 ft²	14,480 ft³	
21.67	22,102 ft²			157,147 ft³
		22,157 ft²	7,312 ft³	
22	22,211 ft²			164,459 ft³

Permanent Pool Volume Provided (at Elevation 21.67):	157,147 ft³
Computed Mean Depth (at Elevation 20.50):	6.48 feet
Length to Width Ratio:	>3:1
Emergency Spillway Elevation:	21.75

Eastern 1/3 Portion of Pond (Compartment C)

Elevation	Surface Area	Average Stage Area	Stage Volume	Cumulative Volume
13	3,613 ft²			000 ft³
		6,548 ft²	6,548 ft³	
14	9,482 ft²			6,548 ft³
		11,099 ft²	11,099 ft³	
15	12,716 ft²			17,647 ft³
		14,007 ft²	14,007 ft³	
16	15,298 ft²			31,654 ft³
		16,606 ft²	16,606 ft³	
17	17,913 ft²			48,259 ft³
		19,284 ft²	19,284 ft³	
18	20,655 ft²			67,543 ft³
		22,039 ft²	22,039 ft³	
19	23,422 ft²			89,582 ft³
		24,806 ft²	24,806 ft³	
20	26,189 ft²			114,387 ft³
		27,035 ft²	13,518 ft³	
20.5	27,881 ft²			127,905 ft³
		28,727 ft²	14,364 ft³	
21	29,573 ft²			142,268 ft³
		30,154 ft²	20,203 ft³	
21.67	30,734 ft²			162,471 ft³
		31,731 ft²	10,471 ft³	
22	32,727 ft²			172,942 ft³

Permanent Pool Volume Provided (at Elevation 21.67):	162,471 ft³
Computed Mean Depth (at Elevation 20.5):	4.59 feet
Length to Width Ratio:	>3:1
Emergency Spillway Elevation:	21.75

ATTACHMENT D

Water Quality Filter Computations

Drawdown Calculation - Water Quality Filter #1 (Existing Reshaped WQF)

Orifice Diameter =2 in

Elev. (ft)	Depth (ft)	Surface Area (sq.ft)	Ave. End Area (sq.ft)	End Area Depth (ft)	Incremental Volume (cf)	Head, h (ft)	Orifice Flow (cfs)	Drawdown Time (secs)	Drawdown Time (hours)
60.50	1.00	27,630	26,944	0.50	13,472	4.50	0.2227	60,480	16.800
60.00	0.50	26,257	25,726	0.50	12,863	4.00	0.2100	61,249	17.014
59.50	0.00	25,194	0.00	0.00	0.00	3.50	0.1964	0.00	0.000
								TOTAL	***33.814***

Orifice Formula $CA\ (2gh)^{1/2}$
Orifice Diameter: 2 inch
A: 0.021817 sq.ft
Filter Thickness: 3.5 feet
g: 32.174 ft/s^2
C: 0.6 Orifice/Grate Discharge Coefficient

Drawdown Calculation - Water Quality Filter #2 (Proposed WQF)

Orifice Diameter =3 in

Elev. (ft)	Depth (ft)	Surface Area (sq.ft)	Ave. End Area (sq.ft)	End Area Depth (ft)	Incremental Volume (cf)	Head, h (ft)	Orifice Flow (cfs)	Drawdown Time (secs)	Drawdown Time (hours)
32.50	1.50	40,082	39,387	0.50	19,694	4.67	0.5106	38,572	10.715
32.00	1.00	38,692	38,001	0.50	19,000	4.17	0.4825	39,382	10.940
31.50	0.50	37,309	36,618	0.50	18,309	3.67	0.4526	40,452	11.237
31.00	0.00	35,926	0.00	0.00	0.00	3.17	0.4206	0.00	0.000
								TOTAL	***32.891***

Orifice Formula $CA\ (2gh)^{1/2}$
Orifice Diameter: 3 inch
A: 0.049087 sq.ft
Filter Thickness: 3.17 feet
g: 32.174 ft/s^2
C: 0.6 Orifice/Grate Discharge Coefficient

Portland International Jetport
Environmental Assessment and Environmental Permitting
WQF #1 - Treatment for Terminal/RON/Deicing Apron
Design Summary

WQ Impervious Factor (inches): 1
WQ Landscape Factor (inches): 0.4

Water Quality Volume Required

Subcatchment	Total Area	Impervious Area	Impervious Area	WQ Impervious Factor	WQ Impervious Volume	WQ Landscape Area	Landscape Area	WQ Landscape Factor	WQ Landscape Volume	Total WQ Volume
WQF 1	305,885 ft²	240,749 ft²	5.53 Acres	1	20,062 ft³	65,136 ft²	1.50 Acres	0.4	2,171 ft³	22,234 ft³
TOTAL	305,885 ft²	240,749 ft²	5.53 Acres	1	20,062 ft³	65,136 ft²	1.50 Acres	0.4	2,171 ft³	22,234 ft³

Total WQ Volume Due to Impervious Surface:	20,062 ft³	
Total WQ Volume Due to Landscape Surface:	2,171 ft³	
Required Treatment Volume:	22,234 ft³	
Bottom of Basin	59.50	Overflow rim set at 60.50
Max WQ Dept	1.00	
Water Quality Volume Provided	26,335 ft³	
5% of tributary Impervious Area	12,037 ft²	
2% of tributary landscape Area	1,303 ft²	
Filter Area Required (per 7.1)	13,340 ft²	
Bottom Surface Area Provided	25,194 ft²	

Portland International Jetport
Environmental Assessment and Environmental Permitting
Vegetated Underdrained Filter #1

Elevation	Surface Area	Average Stage Area	Stage Volume	Cumulative Volume
59.50	25,194 ft²			000 ft³
		25,726 ft²	12,863 ft³	
60.00	26,257 ft²			12,863 ft³
		26,944 ft²	13,472 ft³	
60.50	27,630 ft²			26,335 ft³

Water Quality Volume Provided (at Elevation 60.5): 26,335 ft³

Portland International Jetport
Environmental Assessment and Environmental Permitting

WQF #2 - Treatment for Taxiway A East of RW 18-36 and Air Cargo Taxiway
Design Summary

Proposed BMP:	**VUF**
WQ Impervious Factor (inches):	1
WQ Landscape Factor (inches):	0.4

Water Quality Volume Required

Subcatchment	Total Area	Impervious Area	Impervious Area	WQ Impervious Factor	WQ Impervious Volume	WQ Landscape Area	Landscape Area	WQ Landscape Factor	WQ Landscape Volume	Total WQ Volume
15S (Filter Area 2.1-2.6)	293,978 ft²	156,612 ft²	3.60 Acres	1	13,051 ft³	137,366 ft²	3.15 Acres	0.4	4,579 ft³	17,630 ft³
5S (Filter Area 2.7-2.12)	716,141 ft²	276,412 ft²	6.35 Acres	1	23,034 ft³	439,729 ft²	10.09 Acres	0.4	14,658 ft³	37,692 ft³
TOTAL	1,010,119 ft²	433,024 ft²	9.94 Acres	1	36,085 ft³	577,095 ft²	13.25 Acres	0.4	19,237 ft³	55,322 ft³

Sizing Summary Filter	
Total Water Quality Volume Provided	57,003 ft³
Total Water Quality Volume Required	55,322 ft³
Total Surface Area Provided Filter	35,926 ft³
5% of tributary Impervious Area	21,651 ft²
2% of tributary landscape Area	11,542 ft²
Total Filter Area Required	33,193 ft²

Portland International Jetport
Environmental Assessment and Environmental Permitting

Vegetated Underdrained Filter #2.1				
Elevation	Surface Area	Average Stage Area	Stage Volume	Cumulative Volume
31	3,042 ft²			000 ft³
		3,283 ft²	3,283 ft³	
32	3,524 ft²			3,283 ft³
		3,651 ft²	1,825 ft³	
32.5	3,777 ft²			5,108 ft³
Water Quality Volume Provided Area 2.1 (at Elevation 32.50):				5,108 ft³

Vegetated Underdrained Filter #2.2				
Elevation	Surface Area	Average Stage Area	Stage Volume	Cumulative Volume
31	3,060 ft²			000 ft³
		3,151 ft²	3,151 ft³	
32	3,242 ft²			3,151 ft³
		3,286 ft²	1,643 ft³	
32.5	3,330 ft²			4,794 ft³
Water Quality Volume Provided Area 2.2 (at Elevation 32.50):				4,794 ft³

Vegetated Underdrained Filter #2.3				
Elevation	Surface Area	Average Stage Area	Stage Volume	Cumulative Volume
31	3,060 ft²			000 ft³
		3,151 ft²	3,151 ft³	
32	3,242 ft²			3,151 ft³
		3,286 ft²	1,643 ft³	
32.5	3,330 ft²			4,794 ft³
Water Quality Volume Provided Area 2.3 (at Elevation 32.50):				4,794 ft³

Vegetated Underdrained Filter #2.4				
Elevation	Surface Area	Average Stage Area	Stage Volume	Cumulative Volume
31	3,060 ft²			000 ft³
		3,151 ft²	3,151 ft³	
32	3,242 ft²			3,151 ft³
		3,286 ft²	1,643 ft³	
32.5	3,330 ft²			4,794 ft³
Water Quality Volume Provided Area 2.4 (at Elevation 32.50):				4,794 ft³

Vegetated Underdrained Filter #2.5				
Elevation	Surface Area	Average Stage Area	Stage Volume	Cumulative Volume
31	3,060 ft²			000 ft³
		3,151 ft²	3,151 ft³	
32	3,242 ft²			3,151 ft³
		3,286 ft²	1,643 ft³	
32.5	3,330 ft²			4,794 ft³
Water Quality Volume Provided Area 2.5 (at Elevation 32.50):				4,794 ft³

Vegetated Underdrained Filter #2.6				
Elevation	Surface Area	Average Stage Area	Stage Volume	Cumulative Volume
31	3,060 ft²			000 ft³
		3,151 ft²	3,151 ft³	
32	3,242 ft²			3,151 ft³
		3,286 ft²	1,643 ft³	
32.5	3,330 ft²			4,794 ft³
Water Quality Volume Provided Area 2.6 (at Elevation 32.50):				4,794 ft³

Vegetated Underdrained Filter #2.7				
Elevation	Surface Area	Average Stage Area	Stage Volume	Cumulative Volume
31	3,060 ft²			000 ft³
		3,151 ft²	3,151 ft³	
32	3,242 ft²			3,151 ft³
		3,286 ft²	1,643 ft³	
32.5	3,330 ft²			4,794 ft³
Water Quality Volume Provided Area 2.7 (at Elevation 32.50):				4,794 ft³

Vegetated Underdrained Filter #2.8				
Elevation	Surface Area	Average Stage Area	Stage Volume	Cumulative Volume
31	3,060 ft²			000 ft³
		3,151 ft²	3,151 ft³	
32	3,242 ft²			3,151 ft³
		3,286 ft²	1,643 ft³	
32.5	3,330 ft²			4,794 ft³
Water Quality Volume Provided Area 2.8 (at Elevation 32.50):				4,794 ft³

Vegetated Underdrained Filter #2.9				
Elevation	Surface Area	Average Stage Area	Stage Volume	Cumulative Volume
31	2,991 ft²			000 ft³
		3,083 ft²	3,083 ft³	
32	3,175 ft²			3,083 ft³
		3,219 ft²	1,610 ft³	
32.5	3,263 ft²			4,693 ft³
Water Quality Volume Provided Area 2.9 (at Elevation 32.50):				4,693 ft³

Vegetated Underdrained Filter #2.10				
Elevation	Surface Area	Average Stage Area	Stage Volume	Cumulative Volume
31	2,753 ft²			000 ft³
		2,845 ft²	2,845 ft³	
32	2,936 ft²			2,845 ft³
		2,987 ft²	1,493 ft³	
32.5	3,037 ft²			4,338 ft³
Water Quality Volume Provided Area 2.10 (at Elevation 32.50):				4,338 ft³

Vegetated Underdrained Filter #2.11				
Elevation	Surface Area	Average Stage Area	Stage Volume	Cumulative Volume
31	2,509 ft²			000 ft³
		2,605 ft²	2,605 ft³	
32	2,701 ft²			2,605 ft³
		2,749 ft²	1,375 ft³	
32.5	2,797 ft²			3,980 ft³
Water Quality Volume Provided Area 2.11 (at Elevation 32.50):				3,980 ft³

Vegetated Underdrained Filter #2.12				
Elevation	Surface Area	Average Stage Area	Stage Volume	Cumulative Volume
31	3,211 ft²			000 ft³
		3,437 ft²	3,437 ft³	
32	3,662 ft²			3,437 ft³
		3,780 ft²	1,890 ft³	
32.5	3,898 ft²			5,327 ft³
Water Quality Volume Provided Area 2.12 (at Elevation 32.50):				5,327 ft³

Total Volume All Compartments: 57,003 ft³

ATTACHMENT E

Stormwater Management Systems
Inspection & Maintenance Manual

INSPECTION AND MAINTENANCE MANUAL FOR STORMWATER MANAGEMENT AND RELATED STORMWATER FACILITIES SUPPLEMENT TO EXISTING SWPP PLAN

FOR THE

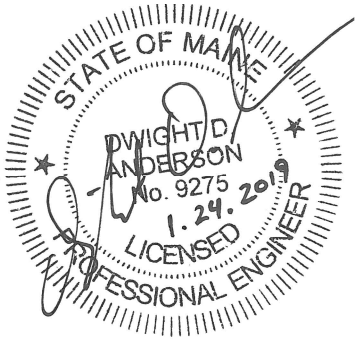
PORTLAND INTERNATIONAL JETPORT ENVIRONMENTAL ASSESSMENT AND ENVIRONMENTAL PERMITTING PORTLAND AND SOUTH PORTLAND, MAINE

Prepared for

City of Portland
Portland International Jetport
1001 Westbrook Street
Portland, Maine 04102

Prepared by

Stantec Consulting Services Inc.
482 Payne Road
Scarborough, Maine 04074
(207) 883-3355



October 2018
Revised January 2019

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ATTACHMENTS

Appendix A – Summary Checklist
Appendix B – Inspection Logs
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I. INTRODUCTION

Relatively complex stormwater management facilities are commonly installed in development projects including airport facilities. The complexity and goals of these systems vary with the nature of the receiving water, as well as the type of development. Runoff from developed areas of the project contains a number of contaminants, especially those emanating from rooftops, paved or lawn areas. This runoff can contain a significant amount of non-point contaminants which can have an adverse impact on the receiving waters. Source control and the installation of wet ponds, vegetated water quality filters, and water quality units, many times combined with vegetated buffer strips and other best management practices, can significantly reduce the non-point pollution discharge from the developed area. These measures are particularly important to projects in sensitive water bodies and of concern if impacts for groundwater are proposed.

The effectiveness of water quality management provisions and other components of the stormwater management system are dependent on their design, upkeep, and maintenance to assure they meet their intended function over an extended period of years. It is critical that the stormwater management facilities are inspected on a regularly scheduled basis, and that maintenance is performed on an as-needed basis. It must also be recognized that the effectiveness of these facilities, and their maintenance requirements, are related to the stormwater drainage facilities which collect and transport the flow to the pond or other treatment measures. Thus, maintenance should be directed to the total system, not just the pond.

The purpose of this document is to define in detail the inspection and maintenance requirements deemed necessary to assure that the stormwater management facilities function as intended on a long-term basis. Subsequent sections identify individual maintenance items, give a brief commentary of the function and need of the item, a description of the work required, and a suggested frequency of accomplishment. While the suggested programs and schedules must be adapted to specific projects, the material presented should provide guidance for a successful long-term program.

A. GUIDELINES OVERVIEW

A summary of the individual components of stormwater management facilities has been prepared. The format used in the summary is as follows:

Preface: A general description of what function/benefit the element is intended to provide. This is a short summary and not intended to provide the design basis which can be found in other sources.

Inspection: This section provides the inspection requirements for the individual component.

Maintenance: The section provides general information on the routine maintenance requirements of this element.

Frequency: This section outlines the best judgment of the designer of the system to the frequency of maintenance.

Comments: This section provides any particular comment on the site-specific features of this element. This is a summary only. The staff of the City of Portland at the Portland International Jetport should review the design drawings and documents carefully to understand the particular elements of the project. The end of this section should allow for the City of Portland to make notes on the specific program. This may include the selected maintenance procedure, cross-references to applicable design drawings, etc.

A list of the individual inspection/maintenance elements is provided in the table of contents. The guidelines are proposed for initial use with adjustments made as appropriate based upon specific project experience.

II. PROJECT OVERVIEW

Key permits issued on the project include:

- MeDEP Site Location of Development Major Amendment
- MeDEP Natural Resources Permit
- US Army Corps of Engineers Permit

The permit applications for the project will include the design information for the stormwater system.

A copy of the permits and Stormwater Management Report should be appended to this manual as Appendix B and all of this information shall be appended to the existing SWPPP for the Portland International Jetport. The City of Portland, owner of the stormwater management system at the Portland International Jetport should review these permits for a general description and background of the project, as well as any specific permit conditions or requirements of the project.

The City of Portland has retained Stantec Consulting Services Inc. (Stantec) for civil engineering for the Portland International Jetport in Portland and South Portland, Maine. Stantec has prepared the design for the stormwater management facilities on the airfield portion of the site and may be contacted at:

Stantec Consulting Services Inc.
482 Payne Road
Scarborough, Maine 04074
(207) 883-3355

It is recommended the preparer of the plan be contacted with any particular questions on the design intent or similar issues.

The applicable plans/design documents which apply to the project are:

1. Civil Site Plans/Permit Applications

   Portland International Jetport – Environmental Assessment and Environmental Permitting, Portland and South Portland, Maine
   - Prepared by Stantec Consulting Services Inc.

2. Erosion Control/Sedimentation Control Plan for Portland International Jetport – Environmental Assessment and Environmental Permitting, Portland and South Portland, Maine

3. Stormwater Management Report for Portland International Jetport – Environmental Assessment and Environmental Permitting, Maine

4. O&M Stormwater Maintenance Drawing for Portland International Jetport – Environmental Assessment and Environmental Permitting, Portland and South Portland, Maine

A copy of these documents should be retained with the manual.

Stantec has been retained as a consultant to the City of Portland for the preparation of site designs and assistance in site permitting for Portland International Jetport – Environmental Assessment and Environmental Permitting, in Portland and South Portland, Maine.

III. STANDARD INSPECTION/MAINTENANCE DESCRIPTIONS

The following narratives describe the inspection/maintenance required for each Stormwater Management area. All post-construction inspections shall be conducted by someone with "knowledge of erosion and stormwater control, including the standards and conditions in the permit."

A. POND OVERFLOW CHANNEL/EMERGENCY SPILLWAY

Preface: The enhancement of the existing wet stormwater pond proposed for the area of the prior 18-36 Runway Extension and new Taxiway B connector from Runway 36 to 29 provides water quality treatment. When storm events occur, the water in the pond is displaced by the entering flow with peak inflows attenuated by pond storage above the normal pond stage. The pond includes an outlet control structure at the discharge which has been designed to attenuate peak flows that enter the pond and release them at a slower rate. If the pond surcharges beyond the design stage, excess flow is discharged to an emergency overflow spillway channel. This channel has been stabilized with additional stone armor.

Inspection: The outlet control structure has been designed to regulate the discharge from storm events. Therefore, flow is anticipated to be released during and after each storm event except for minor events when the pond level has dropped due to evaporation. The control structure has been designed to be

inspected by removing the cover. Debris should be removed whenever observed. Entry may require CONFINED SPACE ENTRY procedures and appropriately trained personnel.

The overflow channel (emergency spillway) has been designed to operate infrequently but it is important to assure that it is operable as intended. The channel will need to be inspected to assure the surface is stable and has not been eroded or damaged. The area should be inspected to note any larger brush or trees which could become established in the spillway channel and outlet pad.

Maintenance: Requirements for the spillway should be limited. Any brush or trees which become established near the spillway should be cut and kept in a cropped condition. Any debris which may accumulate in the channel should be removed.

Frequency: The spillway should be inspected on an annual basis, and after a high intensity rainfall event (in excess of 3 inches in a 24-hour period). Maintenance should be conducted on an as-needed basis.

The outlet control structure should be inspected quarterly or if any unusual increase in the elevation of the permanent pool is observed.

Maintenance/Inspection Responsibility: Staff of the City of Portland at the Portland International Jetport will have the primary responsibility for ensuring that inspections are performed per the frequency shown on the Summary Checklist in Appendix A and that proper maintenance is performed.

Inspection Personnel: The inspection is anticipated to be performed by maintenance personnel who will perform the minor maintenance/inspection. Although the inspection will be recorded as made, any observations made/concerns, observations should be entered in the records maintained by the Owner. The spillways should be observed and debris removed during the annual inspection.

Special Services: Major repairs would need to be addressed on a case-by-case basis by contracted personnel.



EMERGENCY OVERFLOW CHANNEL – FLOWS ARE CONVEYED VIA RIPRAP CHANNEL TO STABILIZED AREA OR CREEK/RIVER

Replacement Parts/Repairs: Material for repairs would be loam and seed or riprap as appropriate for channels. No unusual parts are anticipated for the outlet manholes.

Comments: None.

B. CONTROL STRUCTURES

Preface: The pond also serves to attenuate peak flows which are controlled by the outlet controls. This attenuation is only moderate as the discharge from the pond is to tidal waters and does not require flood control.

Inspection: The outlet control structure must be inspected to assure it maintains its intended hydraulic characteristics. The inspection should note any debris or sediment which may accumulate in the structure and in the inlet and outlet pipes. It is noted that it does not take much debris or silt to alter the hydraulic characteristics of the discharge. The inlet should be inspected to assure it is not blocked or restricted or there is sediment to the extent that its flow characteristics may be altered.

Maintenance: Maintenance of the control structure will consist primarily of removing debris which may accumulate.

Frequency: The control structure should be inspected quarterly, and after a high intensity rainfall event (in excess of 3 inches in a 24-hour period). Debris and silt should be removed during each inspection.

Maintenance/Inspection Responsibility: Staff of the City of Portland at the Portland International Jetport will have the primary responsibility for ensuring that inspections are performed per the frequency shown on the Summary Checklist in Appendix A and that proper maintenance is performed.

Inspection Personnel: The Maintenance Personnel of the Portland International Jetport will perform the scheduled maintenance/inspection.

Dates of inspections, maintenance performed, and any observed problems should be noted in the logs/records maintained by the Portland International Jetport.

Outside Contract Services: The outlet structure should be opened/inspected by the Maintenance Personnel of the Portland International Jetport on a quarterly basis. The logs and records of inspections and maintenance of the control structures should also be reviewed by the contract agent if the City elects to retain an outside agent for assistance.

Replacement Parts/Repairs: No normal replacement parts are required. Inspection personnel should have a bucket to remove debris.



OUTLET CONTROL STRUCTURE – NOTE STRUCTURE (ABOVE CULVERT) HAS BEEN BACKFILLED TO ALLOW ACCESS, HOWEVER DOES NOT CREATE AN EYESORE OF A RAISED STRUCTURE.

The outlet control structure will be designed with a surface inlet or beehive grate. A sustained rise in water level would likely be attributed to clogging of the control structure.

C. POND BERMS

Preface: Many times pond construction will include installation of an earthen berm or dike to contain the water. The water quality pond is formed with both excavated slopes and a constructed berm. The maintenance and monitoring discussed here applies to both the side slopes of excavated pond areas and the

constructed pond berm. All excavated slopes and the constructed berm must maintain their integrity to contain water without catastrophic leakage. Erosion or piping could cause pond failure. It is critical that the integrity of the berm be maintained.

Inspection: The berm must be periodically inspected to note any sags, slope sloughing, erosion, cracking, or undesirable tree growth. Inspection can best be accomplished at low pond level in the late summer to allow observation of normally submerged slopes. Any defects in the berm must be noted and documented. It is noted that on larger ponds muskrats can burrow into the sidewall to the extent that the wall's structural integrity can be diminished. Dry ponds may have occasional problems with burrowing animals.

Any noted sags or slope sloughing should be corrected after the contributing factor has been identified and mitigated. If muskrat burrows become a problem, the muskrats should be trapped and removed from the site. This should be accomplished in cooperation with wildlife officials. Some situations have occurred where burrowing animals cause a significant problem with pond integrity. While this situation is generally rare, in certain instances it may warrant placement of a barrier. Chain link fence with shallow cover has been a successful deterrent in some cases.

Frequency: Berm inspections should be done semiannually. Grassed areas along the top of the berm should be mowed monthly during the growing season. Repair of any berm defects should be accomplished in a timely manner to limit further deterioration.

Maintenance/Inspection Responsibility: Staff of the City of Portland at the Portland International Jetport will have the primary responsibility for ensuring that inspections are performed per the frequency shown on the Summary Checklist in Appendix A and that proper maintenance is performed.

Maintenance Personnel: The Maintenance Personnel of the Portland International Jetport will perform the mowing/brush removal as part of the grounds maintenance. Minor slumping or washouts will also be repaired by maintenance personnel, but should be noted in the records to determine if the problem is recurring. The maintenance staff should perform the annual inspection and carefully walk/inspect all fill berms.

Repairs: Minor repairs will be performed by maintenance personnel. More significant problems would require outside services on an as-needed basis. If burrowing animals were to become a problem, the Owner should consult with knowledgeable professionals on remedial actions.



POND BERM – NOTE STABILIZATION HAS OCCURRED, VEGETATION HAS CAUGHT, SLOPES AND TOP HAVE BEEN MAINTAINED. PROPER MAINTENANCE HAS LED TO A STABILIZED FACILITY

D. VEGETATION IN POND

Preface: Typically, ponds constructed for stormwater management will have an earthen bottom. Aquatic vegetation will often become established in such ponds. It will be more prevalent in ponds with silty soils and ponds with relatively impermeable liners and less prevalent in granular soils. This vegetation is beneficial as it assists in nutrient removal, provides wildlife habitat, and assists in side slope stability through its root structure.

Proper maintenance is important because, if the vegetation proliferates beyond acceptable levels, it can become a detriment to the pond function. Dying vegetation may also accumulate on the pond bottom where it will release nutrients back in the water, and may lower oxygen levels. If allowed to accumulate it will lessen pond volumes over time.

Inspection/Monitoring: The extent of aquatic vegetation associated with the retention pond should be monitored. A photographic record of growth may be useful.

Maintenance: Judgment must be used to determine a proper balance between desirable growth levels and excessive growth. This will be gained by experience. If excessive growth is observed it should be cut back and removed on an annual basis.

Removal of excessive growth should be accomplished in the late fall or early winter. When ice forms sufficiently to walk on, the vegetation extending above the ice level should be cut and removed from the pond. The material should be disposed of in accordance with applicable ordinances. The material can sometimes be composted particularly if the municipality operates such a facility.

Frequency: Inspect and document aquatic vegetation growth and wildlife use annually in late summer or early fall at the end of the growing season. Cutting and removal of growth will depend on its density. Removal on a 1-to-3 year frequency will be typical.

Maintenance/Inspection Responsibility: Staff of the City of Portland at the Portland International Jetport will have the primary responsibility for ensuring that inspections are performed per the frequency shown on the Summary Checklist in Appendix A and that proper maintenance is performed.

Removal of Cutting: Cuttings of undesirable excessive vegetation should be removed from the pond areas and composted or otherwise disposed of.



AQUATIC VEGETATION HAS BEEN PLANTED IN THE PERMANENT POOL OF THE POND



VEGETATION PROVIDES WATER QUALITY TREATMENT AND AESTHETIC ENHANCEMENT OF THE POND

E. POND DEWATERING

Preface: Dewatering the water quality pond periodically is desirable in order to check sediment accumulations, side slope conditions and debris accumulation. Dewatering of the water quality pond at the Portland International Jetport can be accomplished using pumps. Sheet pile walls separate the pond compartments and only one section of the pond is to be dewatered at any time. Water is to be pumped from one compartment of the pond into another to maintain fish habitat.

Inspection: The purpose of pond dewatering is to allow observation of sediment buildup and the accumulation of debris on the pond bottom. It also allows inspection of the lower slopes of the sidewalls for stability. Pond dewatering is a preferred method of inspection and cleaning. A separate section discusses large wet pond inspections.

Dewatering of the water quality pond should be accomplished only in the summer months when normal pond level is minimal. Pump suction should be kept above the sediment level to minimize silt transfer. Filter fabric over the suction may be required to prevent excessive silt from being discharged. The pumping rate should be designed by a professional engineer if over 300 gallons per minute, and the effluent should be transferred to the other pond sections. When the

downgradient pond section is dewatered into the inlet end, a surface draw-off of the inlet side will need to be provided and discharged to the overflow spillway.

Upon draining the pond the sediment level should be measured at multiple locations in the pond to determine a representative depth.

Maintenance: If the volume of sediment recorded exceeds 15% of the normal operating volume of the wetpond (i.e., for retention), the sediment should be removed. Prior to removal the material should be sampled and analyzed in accordance with current practice as promulgated by appropriate regulatory agencies. Upon documentation of its chemical characteristics, the material should be removed by appropriate means for trucking from the site. Disposal of removed material must be in compliance with all regulatory requirements which will vary with the documented characteristics with material. Guidance should be sought from appropriate regulatory agencies.

Frequency: An initial retention/detention pond draining and inspection should be made after the first 5 years of operation. The rate of recorded sediment buildup will then be utilized to schedule subsequent drainings. Sediment removal will be accomplished when the sediment occupies 15% of the normal pond operating volume. Sediment removal once every 50 years may be expected in most instances where good source control practices are in place. Upon completion of sediment removal a topographic survey should be accomplished to document pond shape and elevation.

Maintenance/Inspection Responsibility: Staff of the City of Portland at the Portland International Jetport will have the primary responsibility for ensuring that inspections are performed per the frequency shown on the Summary Checklist in Appendix A and that proper maintenance is performed.



POND HAS BEEN DRAINED TO ALLOW REMOVAL OF SEDIMENTS ACCUMULATED DURING CONSTRUCTION

Comments: The pond has an earthen bottom.

F. SEDIMENT MONITORING/WET PONDS

Preface: Some large ponds or ponds integrated with wetlands may have a permanent pool which could support various fish and wildlife species where full dewatering may be difficult and undesirable except in critical circumstances. It is, however, still important to monitor sediment buildup in such ponds to assure that capacity remains to accomplish its intended water quality function.

Inspection: Measuring sediment buildup in a pond with a permanent pool which cannot be readily dewatered must rely on recorded differential elevation. In such an installation, it is important to have accurate "As Built" elevations on the pond bottom prior to its being placed in operation. This should be a requirement of the construction contract.

The buildup of sediment requires establishing the elevation of the top of the sediment layer for comparison with original bottom elevations. To accomplish this, a permanent benchmark should be established at the site that is not subject to frost action. The elevation of the water surface at the time of survey can thus be established. Measurement should then be taken from the water surface to the top of the sediment layer. This should be done at sufficient locations to cover the total pond area. It is noted that sediment buildup will be more rapid near the inlet of the pond where a sediment forebay has been provided.

The depth measurements can be taken in the summer utilizing a small boat, or in the winter through the ice. The depth measuring staff should have a flat plate attached to the bottom so it will not sink substantially into the sediment layer.

By comparing the measured elevations with the as-built elevations of the pond bottom it will be possible to compute sediment buildup levels.

Maintenance: If sediment buildup in the pond becomes sufficient to diminish its treatment function it will have to be removed. This may be accomplished in a similar manner to that described previously for smaller ponds by dewatering and removal. If the pond cannot be dewatered, hydraulic dredging should be utilized. When pond sediment removal is planned, record drawings should be reviewed for special linings or other special features which may influence removal techniques, or may have to be concurrently maintained.

Frequency: The sediment buildup measurements should be accomplished at 5-year intervals. Removal of sediment should be accomplished when it occupies 15% of the effective pond volume.

Options to sediment removal will vary on each project, but could include enlargement of the pond, or qualitative sampling to examine pond performance. If such options are considered, existing permit conditions, as well as current regulations, should be examined where necessary, and permit amendments should be obtained.

Maintenance/Inspection Responsibility: Staff of the City of Portland at the Portland International Jetport will have the primary responsibility for ensuring that inspections are performed per the frequency shown on the Summary Checklist in Appendix A and that proper maintenance is performed.

Outside Services: The pond sediment level monitoring is recommended to be performed by outside services if necessary. The owner will evaluate this and may contract with an independent surveyor.

Comments: A key to reducing sediment in the pond is to perform the upstream maintenance and source control.



WET POND AFTER INITIAL CONSTRUCTION

NOTE: PERMANENT POOL ELEVATION IS MAINTAINED TO ALLOW SETTLEMENT OF SUSPENDED SOLIDS



THIS CONNECTING CHANNEL IS RIPRAP-LINED AND CONVEYS FLOWS FROM A WETPOND TO DOWNSTREAM RESOURCE AREA

G. SEDIMENT IN FOREBAY

Preface: The wet pond has been constructed with a forebay sump constructed by installing a stone barrier to separate the inlet from most of the pond. The purpose of this sump is to collect and detain sediment before it is transported to the wet pond.

Inspection: During dry periods it should be possible to inspect the forebay sump and to measure the sediment accumulation.

Maintenance: If a significant accumulation of sediment is recorded in the sump it should be removed. The material removed from the sump should be disposed of in accordance with local practice for disposing of catch basin cleanings.

Frequency: The forebay sump should be inspected three times a year, or quarterly, if possible, preferably in the early summer after spring runoff, during late summer, and in the fall. The frequency of sump cleaning will depend on the rate of sediment buildup. Cleaning on a 1-to-2-year basis is likely. It is noted that cleaning of the forebay sump will lengthen the time between pond cleanings.

The rate of sediment buildup will depend on the tributary drainage facilities, i.e., faster buildup with open ditch transport systems than buildup from pipe systems with sumped catch basins. Maintenance practiced for the tributary drainage system will also impact sediment buildups.

Maintenance/Inspection Responsibility: Staff of the City of Portland at the Portland International Jetport will have the primary responsibility for ensuring

that inspections are performed per the frequency shown on the Summary Checklist in Appendix A and that proper maintenance is performed.

Comments: None.



THIS SEDIMENT SUMP ALSO FUNCTIONS AS AN OUTLET PLUNGE POOL TO PROVIDE PROTECTION AND REDUCE VELOCITIES PRIOR TO DISCHARGE TO WETPOND AREAS

H. STORMWATER INLETS

Preface: The success of any stormwater facility relies on the ability to intercept stormwater runoff at the design locations. Stormwater inlets may include catch basins, open culverts, culverts with bar screens, and field inlets. Inlets exist throughout the system at the points of collection as well as at the outlet of many ponds. Bar racks are common on inlet locations which intercept an open channel. This section is directed at maintenance of the actual inlet point. A later section addresses more substantive maintenance of the structures and conveyance facilities.

Inspection: The inspection of inlet points will need to be coordinated with other maintenance items. These include:

- roadway/parking lot maintenance areas
- building maintenance areas
- grounds maintenance
- runway and taxiway maintenance

The key elements of the inspection are to assure the inlet entry point is clear of debris and will allow the intended water entry.

Maintenance: The key maintenance is the removal of any blockage which restricts the entry of stormwater to the inlet. The removed material should be

taken out of the area of the inlet and placed where it will not reenter the runoff collection system. Snow should be removed from inlets in parking lots/roadway areas. Leaves should be bagged and removed, particularly near the yard inlets near buildings.

Frequency: All inlets should be inspected on a monthly basis, and after/during significant storm events. A windshield survey is suitable for most inlets but off-road inlets and pond structures require more rigorous inspection.

Maintenance/Inspection Responsibility: Staff of the City of Portland at the Portland International Jetport will have the primary responsibility for ensuring that inspections are performed per the frequency shown on the Summary Checklist in Appendix A and that proper maintenance is performed.

Maintenance Personnel: The maintenance personnel will perform the normal maintenance/inspections of the inlets and culvert crossings.

Comments: Maintenance of inlets is critical on this project.



POORLY STABILIZED INLET ALLOWS ENTRANCE OF DEBRIS AND REDUCED CAPACITY



STABILIZED INLETS REDUCE DEBRIS ACCUMULATION AND MAINTAIN DESIGN CAPACITY

I. TRIBUTARY DRAINAGE SYSTEM

Preface: Stormwater from most of the project will be directed to a conveyance system which transports the flow to the water quality pond or water quality filters. This conveyance system will be principally a piped drain system. Sediment which accumulates in the pond is carried by the drainage system. Maintenance of this system can play a major role in the long-term maintenance costs and the effectiveness of the pond system and water quality filters.

Inspection: The tributary drainage system should be periodically inspected to assure that it is operating as intended, and that its carrying capacity has not been diminished by accumulations of debris and sediment or other hydraulic impediments. On piped systems the inlets must be inspected to ensure the rims are set at the proper elevation to optimize flow entry and are not clogged with leaves or other debris. (See prior section for inlet location data.) The inlet basins are normally equipped with sumps which will remove large sediment particles from the flow stream.

The level of sediment in the sumps should be checked to assure their effectiveness. Pipelines connecting the inlets should be checked to determine if siltation is occurring. This will be most critical on drain lines laid at minimal slopes. This can usually be accomplished by a light and mirror procedure.

In some areas the stormwater is carried in open swales, channels, or ditches. These conveyance channels may be riprapped or vegetated, depending on the gradient and expected flow velocities. These facilities must be inspected to insure debris or sedimentation does not reduce their carrying capacity. Excess

vegetative growth must also be noted. The surface protection for the channels, either stone or vegetation, must be inspected to insure its integrity. Any areas subject to erosion should be noted.

Maintenance: Maintenance of the storm drainage system must assure that it continues to serve its design function on a long-term basis, and that its operation does not transport excessive sedimentation to any downstream pond, water quality filter, or the receiving waters. Elevations on the rim of catch basins should be adjusted as needed to assure optimal water entry. Depending on the frost susceptibility of the soil, the rims may become elevated over time causing flow to circumvent the inlet. When the sediment in an inlet reaches 12" of the normal two-foot depth, the sediment should be removed. This will typically be every 1 to 3 years, depending on the tributary drainage area and the amount of sand utilized for winter ice control. Catch basin cleaning would normally be accomplished with vacuum trucks. The removed material must be disposed of at an approved site for such materials.

If sediment in the pipeline exceeds 20% of the diameter of the pipe, it should be removed. This may be accomplished by hydraulic flushing, or by mechanical means. If hydraulic flushing is used, the downstream conditions should be analyzed. In general a sump or sediment trap should be used where it can be flushed into the water quality pond, since it will reduce pond volume and hasten the time when it must be cleaned.

Vegetated ditches or swales should be mowed at least monthly during the growing season. Larger brush or trees must not be allowed to become established in the channel. Any vegetation cut in the ditch area should be removed from the site. Any areas where the vegetation fails will be subject to erosion and should be repaired and revegetated. Any riprap that becomes displaced should be replaced and chinked to assure its stability.

Frequency: The piped drainage system should be inspected on an annual basis. Adjustment of inlet rim elevations should be on an as-needed basis. Cleaning catch basin sumps and pipelines will depend on the rate of accumulation. Typically, catch basin sumps should be cleaned on a 1-to-3-year cycle. Pipeline cleaning schedules will be more variable. Open, vegetated swales should be mowed at least monthly during the growing season. Debris should be removed as required to maintain hydraulic capacity.

Maintenance/Inspection Responsibility: Staff of the City of Portland at the Portland International Jetport will have the primary responsibility for ensuring that inspections are performed per the frequency shown on the Summary Checklist in Appendix A and that proper maintenance is performed.

Maintenance Personnel: Portland International Jetport Maintenance Personnel.

Special Services: The owner may elect to contract with an independent agent for cleaning of catch basins, sumps, and pipelines. Remedial source control measures may be performed by the owner or an outside service depending upon the nature of the particular situation.

Comments: Maintenance of inlets is critical on this project.

J. VEGETATED SWALES

Preface: Vegetated swales are often used to convey stormwater. Swales can be intended to be:

1. Mowed and maintained
2. Naturalized

Inspection: Swales should be inspected for erosion and sedimentation.

Maintenance: Eroded or silted channels need to be repaired when discovered. If erosion is a problem, the swale design should be examined. Likewise, if the situation is a continuing problem, the upgradient conditions should be assumed.

Frequency: It is recommended vegetated swales be inspected quarterly until vegetation is established and a year after installation. Thereafter, if no problems have been noticed, the frequency can be decreased to once yearly.

Maintenance/Inspection Responsibility: Staff of the City of Portland at the Portland International Jetport will have the primary responsibility for ensuring that inspections are performed per the frequency shown on the Summary Checklist in Appendix A and that proper maintenance is performed.

Design Guidelines: The vegetated swale should consider channel cover at the time of concentration as well as several years after construction.

Design computations should state the assumed channel of vegetation and provide the basis for the Manning's or other roughness coefficient and for design.

Applicability: The Portland International Jetport has several vegetated swales as well as open armored channel systems.



VEGETATED SWALE UNDER CONSTRUCTION WITH HAY BALE CHECK DAM TO REDUCE VELOCITIES



A WELL STABILIZED VEGETATED SWALE SHOWS LITTLE SIGNS OF EROSIVE VELOCITIES OR FLOWS. THIS SWALE ALSO FUNCTIONS AS A POND SPILLWAY

K. POND LINING

Preface: The pond is constructed of natural clay.

Inspection: Observations of substantial water level variations could indicate pond leakage. Repairs could be made using a material called ESS 13 which is a vegetable emulsion that expands during degradation and acts similar to a radiator sealant.

Maintenance: Avoid excavation of sidewall areas or pond bottom, except as provided by the project drawings.

Maintenance/Inspection Responsibility: Staff of the City of Portland at the Portland International Jetport will have the primary responsibility for ensuring that inspections are performed per the frequency shown on the Summary Checklist in Appendix A and that proper maintenance is performed.

L. SORBENT BOOMS

Preface: During construction, sorbent booms will be installed in the catch basins which have pavement areas. The intent of these is to absorb oil and runoff from new pavement surfaces. These will be removed when construction of the project is complete.

Inspection: The sorbent boom should be raised out of the inlet, the boom absorbent fabric inspected, and replaced if necessary. Inspection should occur on a quarterly basis.

Maintenance/Inspection Responsibility: Staff of the City of Portland at the Portland International Jetport will have the primary responsibility for ensuring that inspections are performed per the frequency shown on the Summary Checklist in Appendix A and that proper maintenance is performed.

Recommendation: The Portland International Jetport has sorbent booms and pillows on site in the event of an unexpected spill or if oil sheens are observed at any inlet.

M. UNDERDRAINED WATER QUALITY FILTERS

Underdrain: The underdrain water quality filters are intended to capture and filter the runoff from most storm events. Historic rainfall events (generally over 2"/24 hours) will flood the filter and flow through the overflow. After a hard rain, the biofilter will be surcharged and take 24 to 36 hours to drain.

Potential Signs of Failure or Restricted Performance: The evidence of failure or restricted performance would be stressed vegetation and extended drawdown periods for the filter.

Inspection: The water quality filters should be inspected when normal landscape maintenance is performed and formally twice a year. Formal inspection should include checking the underdrain connection and orifice at the outlet manhole of Water Quality Filter #1 near the deicing pads, the underdrain connection at the outlet manhole of Water Quality Filter #2 north east of Taxiway A, inspecting the ground surface near the pipe or inlets to both filters to check for evidence of sediment, and inspection of the bottom area of both filters for matting and unwanted vegetative litter.

- The inspector shall confirm that no snow is being stored in these water quality filters.

- The inspector shall confirm that no vehicles or heavy equipment are being operated on the water quality filters.

Maintenance: Any sediment near the inlet pipes and undesirable leaf or vegetative litter should be removed from the filter. The vegetation should be maintained similar to other landscaping on the site and needed to remove invasive plants. Fertilization is not recommended.

The mulch and surface of the filter should be raked with a deep tine twice a year. If discharge through the filter is slow, the filter media and plants may need to be replaced and aeration is recommended. if either Water Quality Filter #1 or #2 contain ponded water after 72 hours after a wet weather event, the filter media should be replaced.

Maintenance/Inspection Responsibility: Staff of the City of Portland at the Portland International Jetport will have the primary responsibility for ensuring that inspections are performed per the frequency shown on the Summary Checklist in Appendix A and that proper maintenance is performed.

Pretreatment:

- Water Quality Filter #1: There is no formal sediment forebay for the existing or proposed "reshaped" Water Quality Filter #1, however it receives pre-treatment by a vegetated swale located at the western corner of the filter and a riprap channel east of the water quality filter. Additionally, the Jetport staff routinely inspect the vegetated swale and riprap for grit and will continue to after the filter is modified. The sand that is used on the airfield is specifically designed for use around Jet-engines is costly and used very little.

- Water Quality Filter #2: WQF #2 receives pretreatment by vegetated swales and by two sediment forebays (located on the opposite side of the Perimeter Access Road).

Groundwater Protection Note: Inland deicing facility provides containment for glycol and other liquid pollutants, reducing the potential that they would be discharged to Water Quality Filter #1. During the facility's operational season, the facility is staffed 24 hours a day and 7 days a week. Some of the fluid storage tanks are double walled and others have audible high level alarms. There is a Stormwater Pollution Prevention Plan (SWPPP) for the deicing facility, which notes that any fluid chemicals stored within buildings or sheds in 55-gallon drums are stored on top of secondary containment tubs. A ditch to the east of the site leading to an 18-inch stormdrain, leading to Water Quality Filter #1 would

receive fluids from tanks in the event of a spill. The 18-inch storm drain will be blocked with a plug at the end of the inlet or outlet in the event of a tank spill, as noted in the SWPPP.

N. SUMMARY CHECKLIST

The above described inspection and maintenance items have been summarized on a checklist in Attachment A.

IV. PROGRAM ADMINISTRATION

A. GENERAL

A reliable administrative structure must be established to assure implementation of the maintenance programs described in the foregoing section. Key factors that must be considered in establishing a responsive administrative structure include:

1. Administrative body must be responsible for long-term operation and maintenance of the facilities.

2. Administrative body must have the financial resources to accomplish the inspection and maintenance program over the life of the facility.

3. The administrative body must have a responsible administrator to manage the inspection and maintenance programs.

4. The administrative body must have the staff to accomplish the inspection and maintenance programs, or must have authority to contract for the required services.

5. The administrative body must have a management information system sufficient to file, retain, and retrieve all inspection and maintenance records associated with the inspection and maintenance programs.

Staff of the City of Portland at the Portland International Jetport will perform the administrative duties described above.

B. RECORD KEEPING

Records of all inspections and maintenance work accomplished must be kept and maintained to document facility operations. These records should be filed and retained for a minimum 5-year time span. The filing system should be capable of ready retrieval of data for periodic reviews by appropriate regulatory bodies. Where possible, copies of such records should also be filed with the designated primary regulatory agency for their review for compliance with permit conditions.

Typical inspection and maintenance record forms are attached hereto as Attachment B.

C. CONTRACT SERVICES

In some instances or at specific times, City of Portland Maintenance Personnel may not have the staff to conduct the required inspection and/or maintenance programs as outlined in this document. In such cases the work should be accomplished on a contractual basis with a firm or organization that has the staff and equipment to accomplish the required work.

The service contract for inspection and maintenance should be a formal, well written legal document which clearly defines the services to be provided, the contractual conditions that will apply, and detailed payment schedules. Liability insurance should be required in all contracts.

City of Portland staff at the Portland International Jetport and City counsel will prepare the actual service contract and procurement procedures to fit the needs for the project.

City of Portland staff at the Portland International Jetport are responsible for managing the overall inspection and maintenance program and has authority to engage third parties, if needed.

D. RECERTIFICATION REQUIREMENTS

Within three months of the expiration of each five-year interval from the date of issuance of the permit, the City of Portland shall certify the following to the Department.

(1) All areas of the project site have been inspected for areas of erosion, and appropriate steps have been taken to permanently stabilize these areas.

(2) All aspects of the stormwater control system have been inspected for damage, wear, and malfunction, and appropriate steps have been taken to repair or replace the system, or portions of the system.

(3) The erosion and stormwater maintenance plan for the site is being implemented as written, or modifications to the plan have been submitted to and approved by the Department, and the maintenance log is being maintained.

(4) All proprietary systems have been maintained according to the manufacturer's recommendations. Where required by the Department, the permittee shall execute a 5-year maintenance contract with a qualified professional for the coming 5-year interval. The maintenance contract must include provisions for routine inspections, cleaning and general maintenance.

(5) The Department may waive some or all of these recertification requirements on a case-by-case basis for permittees subject to the Department's Multi-Sector General Permit ("MSGP") and/or Maine Pollutant Discharge Elimination System ("MEPDES") programs where it is demonstrated that these programs are providing stormwater control that is at least as effective as required pursuant to this Chapter.

APPENDIX A

Summary Checklist
Inspection and Maintenance

Stormwater Management System Maintenance Program Summary Checklist						
Item	**Commentary**	**Frequency**				
		Monthly	**Quarterly**	**Semi-Annual**	**Annual**	**Long Term**
Stormwater Inlets	Stormwater inlets allow flow entry from a surface swale to a piped system. Entry may or may not be equipped with a bar rack. Inspect entry for debris accumulation. Remove debris to allow unimpeded entry. Lawn clippings and leaves should be removed from yard areas.	X			X Clearing	
Sorbent Booms	Sorbent boom should be raised out of the inlet, inspected, and replaced if necessary.	X				
Tributary Drainage System	Inspect to assure that the carrying capacity has not been diminished by debris, sediment or other hydraulic impediments.				X	
Control Structures	Inspect outlet control to assure it maintains its hydraulic characteristics. Inspect inlets for blockage.		X			
Water Quality Filters	Filters should be inspected semi-annually and maintained as needed. **Snow storage within either underdrained water quality filter (WQF #1 or WQF #2) should be prohibited by Maintenance Personnel.** **Vehicles or heavy equipment should not be used on either WQF #1 or WQF #2.**			X		
Pond Overflow Channel/ Emergency Spillway	The spillways should be observed and debris removed during the annual inspection.				X	
Pond Berms	The berm must be periodically inspected to note any sags, slope sloughing, erosion, cracking, or undesirable tree growth.			X		
Vegetation Pond	Removal of excessive growth should be accomplished in the late fall or early winter.				X	
Pond Dewatering	If the volume of sediment recorded exceeds 15% of the normal operating volume of the wetpond, the sediment should be removed.					X After first 5 years
Sediment Monitoring/ Wet Ponds	It is important to monitor sediment buildup in such ponds to assure that capacity remains to accomplish its intended water quality function.					X 5-year intervals
Sediment in Forebay	If a significant accumulation of sediment is recorded in the sump it should be removed.		X			
Vegetated Swales	Eroded or silted channels need to be repaired when discovered.		X			
Litter	Litter should be removed daily.					
Pond Lining	Observations of substantial water level variations could indicate pond leakage.			X		

APPENDIX B

Inspection Logs

Owner Should Prepare Logs for All Various Stormwater Management Items in a Format Convenient for Use and Review

PORTLAND INTERNATIONAL JETPORT
PORTLAND AND SOUTH PORTLAND, MAINE

STORMWATER MANAGEMENT
WATER QUALITY FILTER #1
ANNUAL INSPECTION & MAINTENANCE LOG

FACILITY: Water Quality Filter #1		**YEAR:**	
LOCATION: Southwest of Deicing Facility		**CONTRACTOR:**	
FUNCTION: Treatment of Deicing Facility and Apron Area		**INSPECTOR:**	
DATE OF INSPECTION:			
ITEM IDENTIFICATION	**DESCRIPTION OF CONDITIONS**	**MAINTENANCE ACCOMPLISHED**	**DATE OF MAINTENANCE**
VEGETATION			
BERMS			
PIPING INLETS AND OUTLETS			
OUTLET CONTROL STRUCTURE			
GENERAL COMMENTS:			

PORTLAND INTERNATIONAL JETPORT
PORTLAND AND SOUTH PORTLAND, MAINE

STORMWATER MANAGEMENT
WATER QUALITY FILTER #1
MONTHLY INSPECTION & MAINTENANCE LOG

FACILITY: Water Quality Filter #1			YEAR:			
LOCATION: Southwest of Deicing Facility			CONTRACTOR:			
FUNCTION: Treatment of Deicing Facility and Apron Area						
				OVERFLOW STRUCTURE		
MONTH	DAY	INSPECTOR	WATER DEPTH	CLEAR	DEBRIS	BERM COMMENTS
JANUARY						
FEBRUARY						
MARCH						
APRIL						
MAY						
JUNE						
JULY						
AUGUST						
SEPTEMBER						
OCTOBER						
NOVEMBER						
DECEMBER						
LIST SPECIAL MAINTENANCE UNDERTAKEN:						

PORTLAND INTERNATIONAL JETPORT
PORTLAND AND SOUTH PORTLAND, MAINE

STORMWATER MANAGEMENT
WATER QUALITY FILTER #2
ANNUAL INSPECTION & MAINTENANCE LOG

FACILITY: Water Quality Filter #2		**YEAR:**	
LOCATION: Northeast of Taxiway A		**CONTRACTOR:**	
FUNCTION: Treatment of Airfield Pavement		**INSPECTOR:**	
DATE OF INSPECTION:			
ITEM IDENTIFICATION	**DESCRIPTION OF CONDITIONS**	**MAINTENANCE ACCOMPLISHED**	**DATE OF MAINTENANCE**
VEGETATION			
BERMS			
PIPING INLETS AND OUTLETS			
OUTLET CONTROL STRUCTURE			
GENERAL COMMENTS:			

PORTLAND INTERNATIONAL JETPORT
PORTLAND AND SOUTH PORTLAND, MAINE

STORMWATER MANAGEMENT
WATER QUALITY FILTER #2
MONTHLY INSPECTION & MAINTENANCE LOG

FACILITY: Water Quality Filter #2			YEAR:			
LOCATION**:** Northeast of Taxiway A			CONTRACTOR:			
FUNCTION: Treatment of Airfield Pavement						
				OVERFLOW STRUCTURE		
MONTH	DAY	INSPECTOR	WATER DEPTH	CLEAR	DEBRIS	BERM COMMENTS
JANUARY						
FEBRUARY						
MARCH						
APRIL						
MAY						
JUNE						
JULY						
AUGUST						
SEPTEMBER						
OCTOBER						
NOVEMBER						
DECEMBER						
LIST SPECIAL MAINTENANCE UNDERTAKEN:						

PORTLAND INTERNATIONAL JETPORT
PORTLAND AND SOUTH PORTLAND, MAINE

STORMWATER MANAGEMENT
WET POND EAST OF RUNWAY 18-36
ANNUAL INSPECTION & MAINTENANCE LOG

FACILITY: Wet Pond East of Runway 18-36		**YEAR:**	
LOCATION: East of Runway 36 End		**CONTRACTOR:**	
FUNCTION: Water Quality Treatment of Airfield		**INSPECTOR:**	
DATE OF INSPECTION:			
ITEM IDENTIFICATION	**DESCRIPTION OF CONDITIONS**	**MAINTENANCE ACCOMPLISHED**	**DATE OF MAINTENANCE**
VEGETATION			
BERMS			
EMERGENCY OVERFLOW SPILLWAY			
OUTLET CONTROL STRUCTURE			
GENERAL COMMENTS:			

PORTLAND INTERNATIONAL JETPORT
PORTLAND AND SOUTH PORTLAND, MAINE

STORMWATER MANAGEMENT
WET POND EAST OF RUNWAY 18-36
MONTHLY INSPECTION & MAINTENANCE LOG

FACILITY: Wet Pond East of Runway 18-36			YEAR:			
LOCATION: East of Runway 36 End			CONTRACTOR:			
FUNCTION: Water Quality Treatment of Airfield						
				OVERFLOW STRUCTURE		
MONTH	DAY	INSPECTOR	WATER DEPTH	CLEAR	DEBRIS	BERM COMMENTS
JANUARY						
FEBRUARY						
MARCH						
APRIL						
MAY						
JUNE						
JULY						
AUGUST						
SEPTEMBER						
OCTOBER						
NOVEMBER						
DECEMBER						
LIST SPECIAL MAINTENANCE UNDERTAKEN:						

PORTLAND INTERNATIONAL JETPORT
PORTLAND AND SOUTH PORTLAND, MAINE

STORMWATER MANAGEMENT
WET POND EAST OF RUNWAY 18-36
SEMI-ANNUAL INSPECTION & MAINTENANCE LOG

SEMI-ANNUAL INSPECT	FACILITY: Wet Pond East of Runway 18-36
DATE:	LOCATION: East of Runway 36 End
INSPECTOR:	FUNCTION: Water Quality Treatment of Airfield
SPILLWAY CONDITION:	
OUTLET CONDITION	

FORE BAY SUMP	EST. DEPTH SED.	REMOVED? Y/N	EST. VOL. CY	WHERE DISPOSED OF	STRUCTURAL CONDITION

CONTROL STRUCTURE:
DESCRIBE CONDITIONS FOUND & MAINTENANCE ACCOMPLISHED:

APPENDIX C

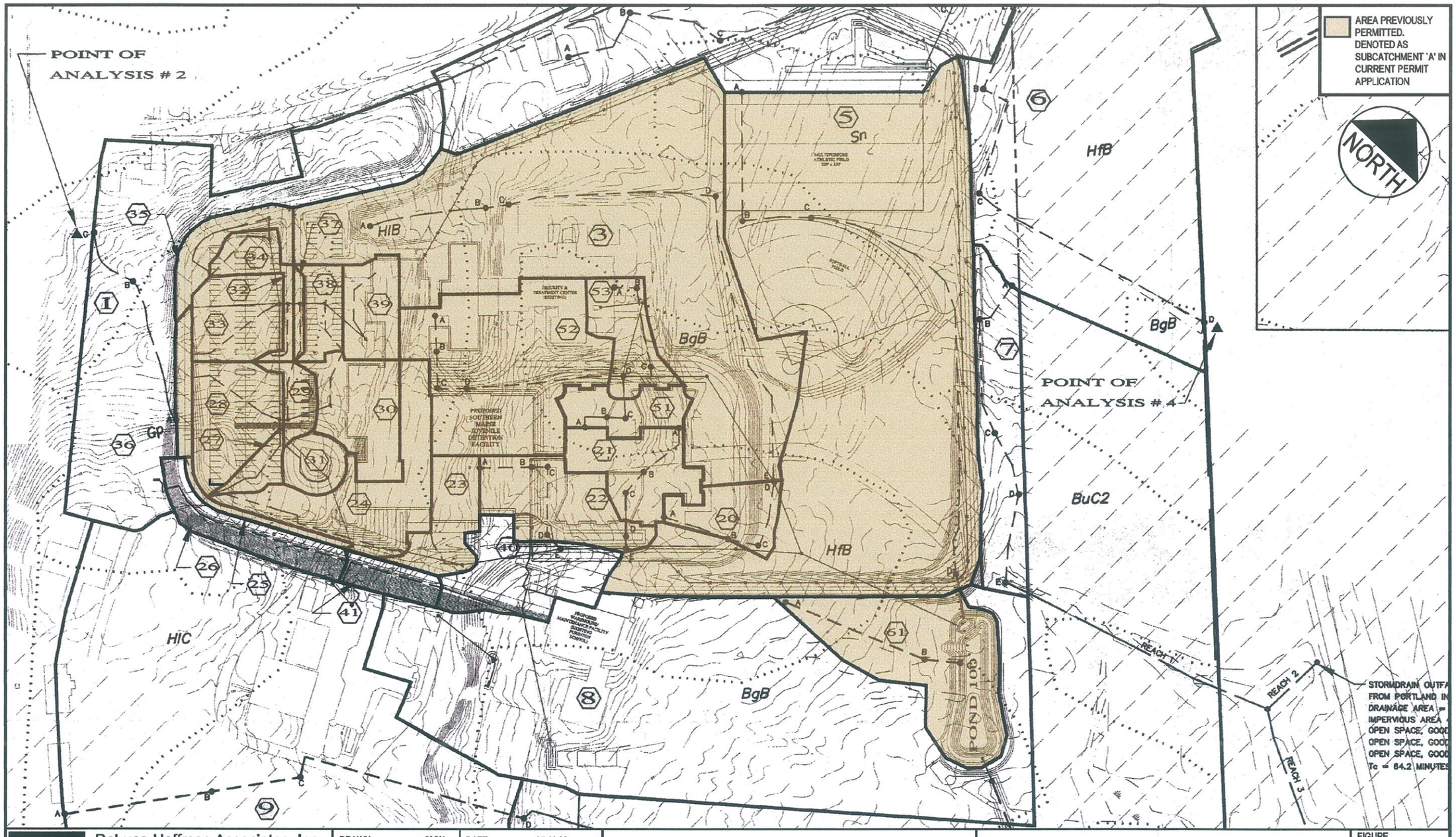
Permits for Project

To be Added at a Subsequent Time

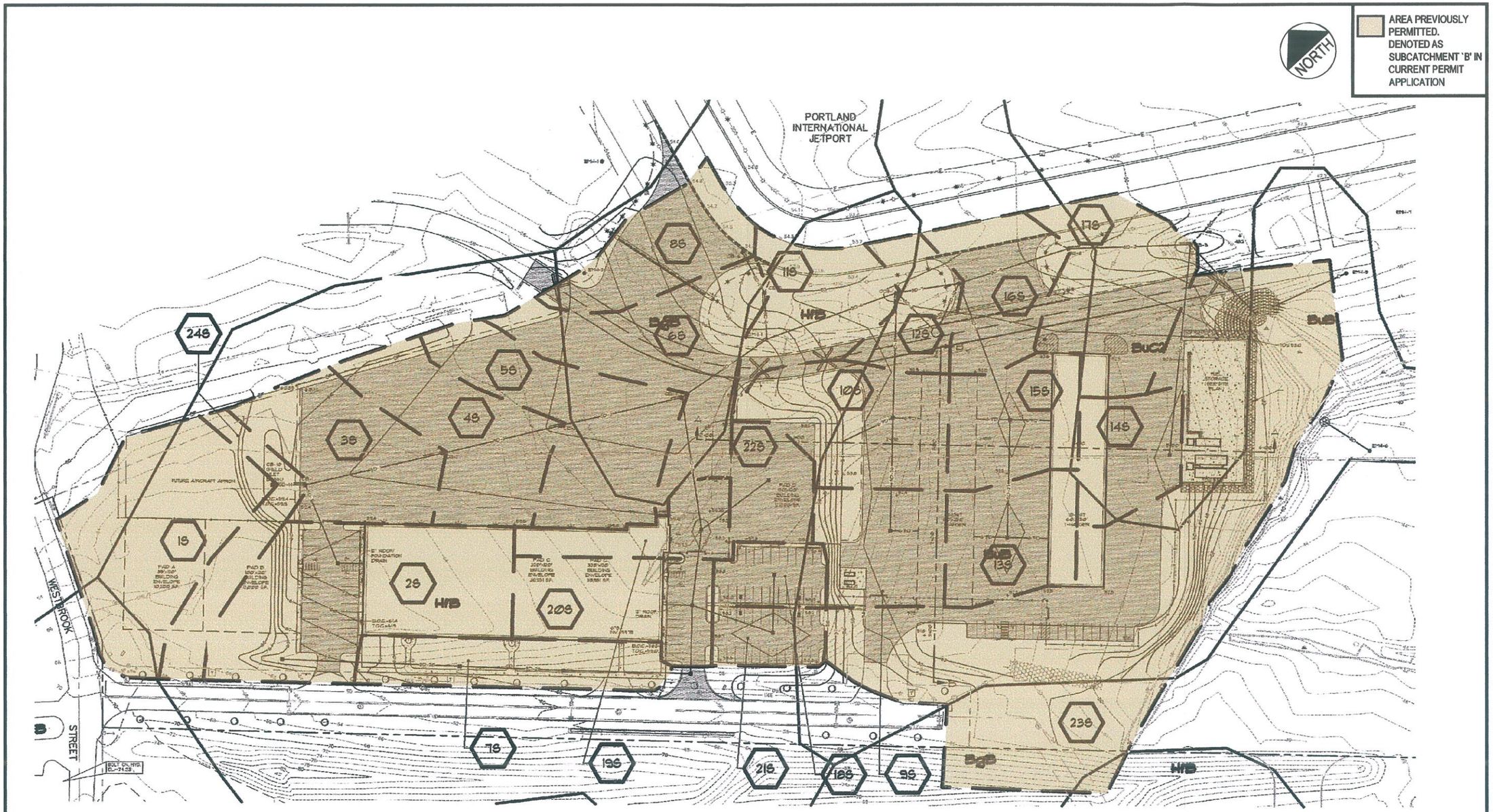
ATTACHMENT F

Figures

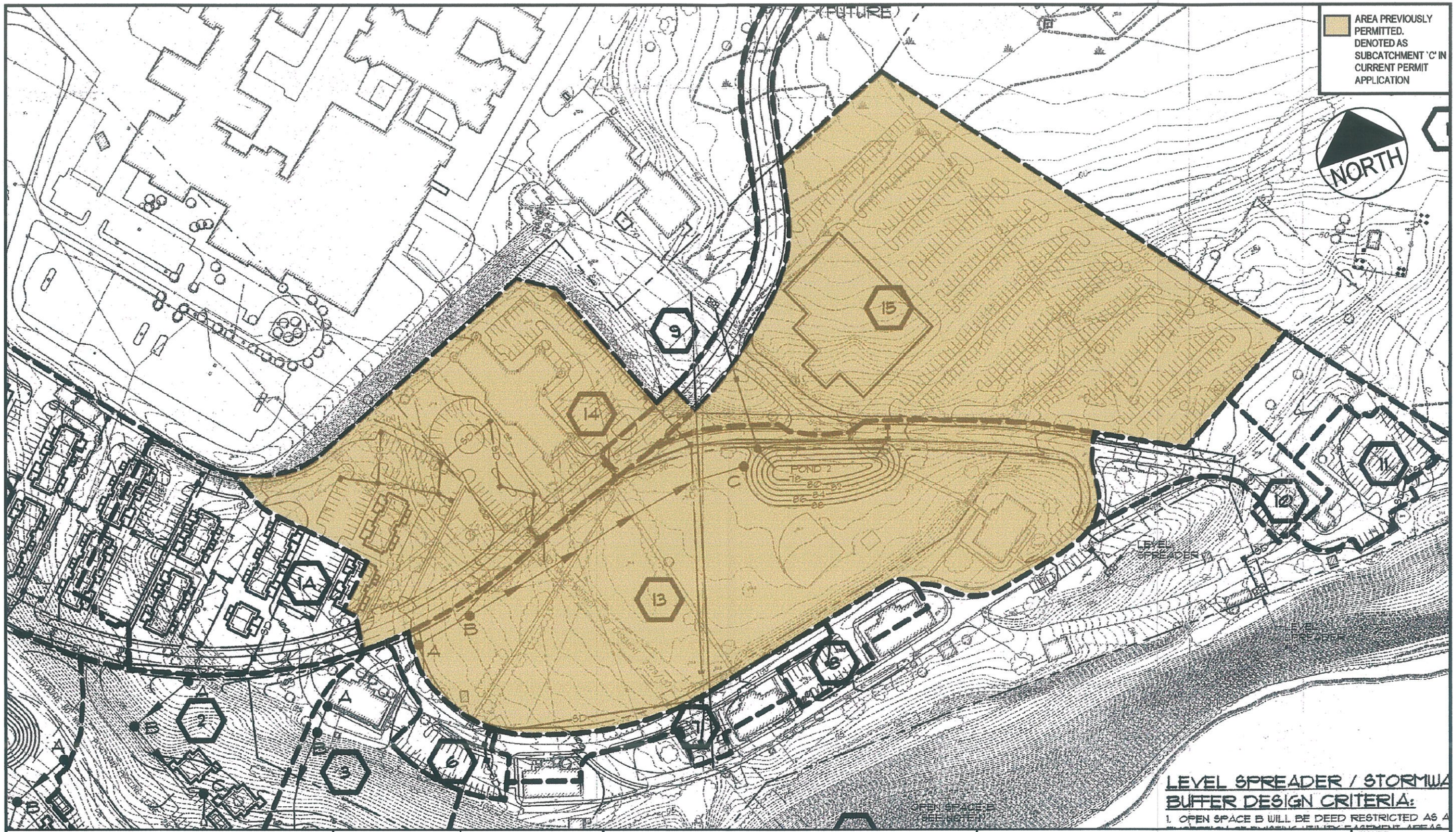
Figures 1-3 – Offsite Development
Figure 4 – Existing Pond Alterations
Figure 5 – Overall Facility Water Quality Treatment Summary
Figure 6 – Existing Redevelopment
Figure 7 – Proposed Redevelopment



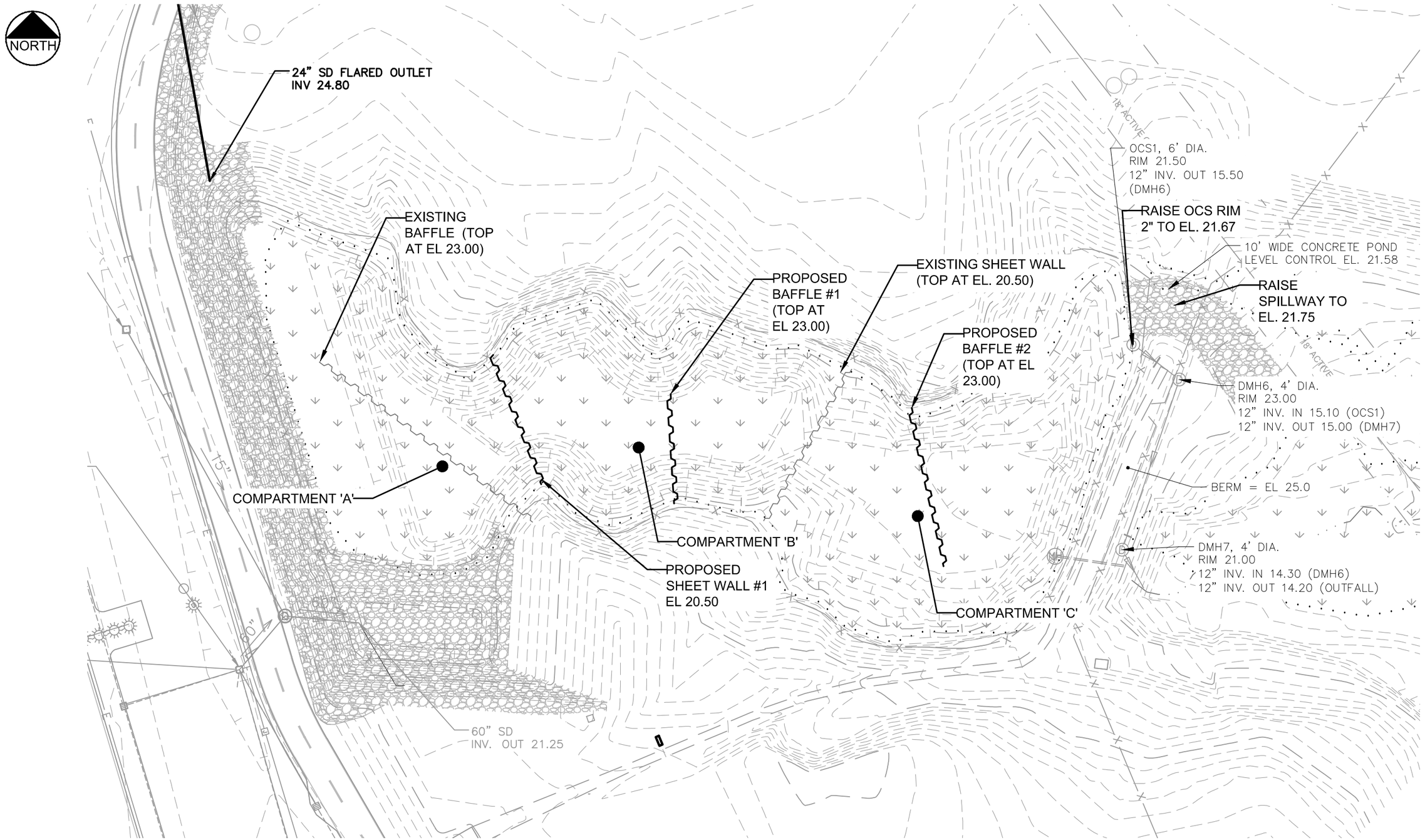
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		DESIGNED: PFG	SCALE: N.T.S.		FIGURE 1
		CHECKED: DDA	JOB NO. 2743		
		FILE NAME: 2743-FIGURE 1			



DH	DeLuca-Hoffman Associates, Inc. 778 MAIN STREET, SUITE 8 SOUTH PORTLAND, ME 04106 207.775.1121 WWW.DELUCAHOFFMAN.COM	DRAWN:	CMW	DATE:	07.16.08	ENVIRONMENTAL ASSESSMENT AND ENVIRONMENTAL PERMITTING	SOUTH GA PROJECT MeDEP PERMIT # L-13760-18-A-N L-13760-18-AA-M	FIGURE 2
		DESIGNED:	PFG	SCALE:	N.T.S.			
		CHECKED:	DDA	JOB NO.	2743			
		FILE NAME:	2743-FIGURE 2					



DH	DeLuca-Hoffman Associates, Inc. 778 MAIN STREET, SUITE 8 SOUTH PORTLAND, ME 04106 207.775.1121 WWW.DELUCAHOFFMAN.COM	DRAWN: CMW	DATE: 09.30.08	ENVIRONMENTAL ASSESSMENT AND ENVIRONMENTAL PERMITTING	BRICKHILL REDEVELOPMENT MeDEP PERMIT # L-21554-39-AN	FIGURE 3
		DESIGNED: PFG	SCALE: N.T.S.			
		CHECKED: DDA	JOB NO. 2743			
		FILE NAME: 2743-FIGURE 1				



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www.stantec.com

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Client/Project
PORTLAND INTERNATIONAL JTEPORT
ENVIRONMENTAL ASSESSMENT AND ENVIRONMENTAL PERMITTING
PORTLAND AND SOUTH PORTLAND, MAINE

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	DWN.	CHKD.	DSGN.	DATE

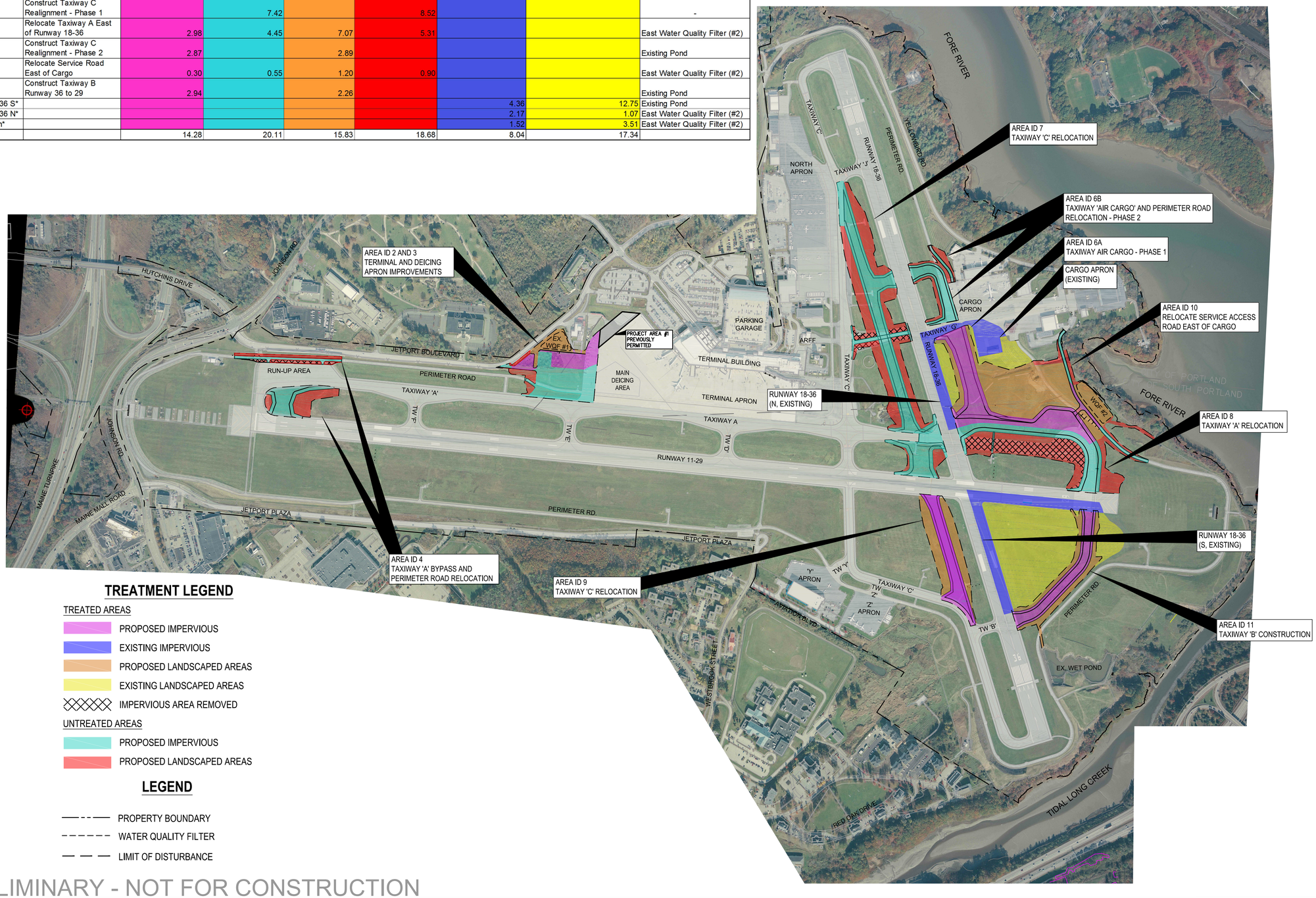
Title
EXISTING POND ALTERATIONS

Figure No.
FIGURE 4

Treatment Table

Area ID	Area Description	Proposed Impervious (New/Reconstructed) Area Treated (ac)	Proposed Impervious (New/Reconstructed) Area Not Treated (ac)	Proposed Non-Impervious Area Treated (ac)	Proposed Non-Impervious Area Untreated (ac)	Existing Impervious Area Now Treated by proposed treatment (ac)	Existing Non-Impervious Area Now Treated by proposed treatment* (ac)	Treatment ID
2, 3	Long Term Hold/Deicing/RON Apron - Phase 1 and 2	1.94	3.67	1.11	0.67	Already taken credit for		Apron Water Quality Filter (#1)
4	Runway 11 Taxiway Bypass and Perimeter Road Realignment		2.02		2.28			-
6A	Construct Air Carge Taxiway - Phase 1	3.25		1.30				East Water Quality Filter (#2)
6B	Construct Air Cargo Taxiway - Phase 2		2.00		1.00			-
7	Construct Taxiway C Realignment - Phase 1		7.42		8.52			-
8	Relocate Taxiway A East of Runway 18-36	2.98	4.45	7.07	5.31			East Water Quality Filter (#2)
9	Construct Taxiway C Realignment - Phase 2	2.87		2.89				Existing Pond
10	Relocate Service Road East of Cargo	0.30	0.55	1.20	0.90			East Water Quality Filter (#2)
11	Construct Taxiway B Runway 36 to 29	2.94		2.26				Existing Pond
Runway 18-36 S*						4.36	12.75	Existing Pond
Runway 18-36 N*						2.17	1.07	East Water Quality Filter (#2)
Cargo Apron*						1.52	3.51	East Water Quality Filter (#2)
Total		14.28	20.11	15.83	18.68	8.04	17.34	

Proposed Treatment %	
Total Redevelopment Area	68.9 ac
Impervious Area Treated - Ex and Prop	22.3 ac
Non-Impervious Area Treated - Ex and Prop	33.2 ac
Treated Area - Impervious and Non-Impervious	55.5 ac
Required Treatment - 60% of Redev Area	41.3 ac
Equivalent Treated % (Impervious and Non Impervious)	81%
Equivalent Treated % (Impervious Only)	32%



TREATMENT LEGEND

TREATED AREAS

- PROPOSED IMPERVIOUS
- EXISTING IMPERVIOUS
- PROPOSED LANDSCAPED AREAS
- EXISTING LANDSCAPED AREAS
- IMPERVIOUS AREA REMOVED

UNTREATED AREAS

- PROPOSED IMPERVIOUS
- PROPOSED LANDSCAPED AREAS

LEGEND

- PROPERTY BOUNDARY
- WATER QUALITY FILTER
- LIMIT OF DISTURBANCE

PRELIMINARY - NOT FOR CONSTRUCTION

NORTH

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P. O. Box 372
Jackman, Maine 04945

Notes

No.	Revision	By	Appd.	YY.MM.DD
1	SUBMITTED TO MACRP FOR PERMITTING	LA	DDA	18.10.12

File Name: 195210916_wshd | DWN. LA | CHKD. | DSGN. DDA | DATE APR 2018

Permit-Seal

STATE OF MAINE
DWIGHT D. ANDERSON
No. 9276
10-12-18
LICENSED PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

ENVIRONMENTAL ASSESSMENT AND PERMITTING PLANS

PORTLAND and SOUTH PORTLAND, MAINE

Title

OVERALL FACILITY WATER QUALITY TREATMENT SUMMARY

Project No. 195210916 | Scale 1" = 400'

Sheet

WQT - FIGURE 5

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		Existing Impact															
		Forest and Meadow mowed 2x or less per yr			Non-grass LS areas & SW systems			Other Roof Tops and grass mowed > 2X per yr			Other P-lots and flat asphalt roofs			Other Roads and Medium use P-lots			High use Roads and P-lots			
		Wetland			Water Quality Filter			Grassed Infield			Paved Apron/Taxiway/Shoulder/Runway			Perimeter Road			None			
		Pollutant Impact Ranking 0			Pollutant Impact Ranking 1			Pollutant Impact Ranking 2			Pollutant Impact Ranking 3			Pollutant Impact Ranking 4			Pollutant Impact Ranking 5			
Area ID	Total Area (AC)	Pollutant Ranking	Area (SF)	Impact	Pollutant Ranking	Area (SF)	Impact	Pollutant Ranking	Area (SF)	Impact	Pollutant Ranking	Area (SF)	Impact	Pollutant Ranking	Area (SF)	Impact	Pollutant Ranking	Area (SF)	Impact	Area Impact Subtotal (SF)
Area 2 + 3: Long Term Hold/Deicing/ROM Apron Phase 1 and 2																				
2 + 3	7.4	0	50,481	0	1	22,877	22,877	2	164,870	329,740	3	66,229	198,687	4	17,887	71,548	5	0	0	622,852
Area 4: Runway 11 Taxiway Bypass and Perimeter Service Road Realignment																				
4	4.3	0	0	0	1	0	0	2	148,753	297,506	3	17,890	53,670	4	20,665	82,660	5	0	0	433,836
Area 6A/8/10: Construct Air Cargo Taxiway - Phase 1/ Relocate Taxiway A East of Runway 18-36/ Relocate Service Road East of Cargo																				
6A/8/10	27.3	0	4,170	0	1	0	0	2	931,447	1,862,894	3	219,827	659,481	4	33,744	134,976	5	0	0	2,657,351
Area 6B: Construct Air Cargo Taxiway - Phase 2																				
6B	3.0	0	0	0	1	0	0	2	82,361	164,722	3	43,624	130,872	4	4,695	18,780	5	0	0	314,374
Area 7: Construct Taxiway C Realignment - Phase 1																				
7	15.9	0	0	0	1	0	0	2	549,522	1,099,044	3	143,082	429,246	4	0	0	5	0	0	1,528,290
Area 9: Construct Taxiway C Realignment - Phase 2																				
9	5.8	0	0	0	1	0	0	2	232,856	465,712	3	19,792	59,376	4	0	0	5	0	0	525,088
Area 11: Construct Taxiway B Runway 36 to 29																				
11	5.2	0	0	0	1	0	0	2	221,164	442,328	3	5,348	16,044	4	0	0	5	0	0	458,372
Total	**68.9**																			**6,540,163**

LEGEND

POLLUTANT IMPACT RANKING

0	WETLAND
1	WQF / POND
2	GRASSED SHOULDER / INFIELD
3	PAVED APRON / TAXIWAY / SHOULDER
4	PERIMETER ROAD

GRAPHIC SCALE

400 0 200 400 800

(IN FEET)

1 inch = 400 ft.

PRELIMINARY - NOT FOR CONSTRUCTION

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P. O. Box 372
Jackman, Maine 04945

Notes

No.	Revision	By	Appd.	YY.MM.DD
1	SUBMITTED TO MaDEP FOR PERMITTING	LA	DDA	18.10.12

File Name: 195210916-redev | DS DWN. | EMS CHKD. | EMS DSGN. | APR 2018 DATE

Permit-Seal

STATE OF MAINE
DWIGHT D. ANDERSON
No. 9676
LICENSED
PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

ENVIRONMENTAL ASSESSMENT AND PERMITTING PLANS

PORTLAND and SOUTH PORTLAND, MAINE

Title

EXISTING REDEVELOPMENT TREATMENT SUMMARY

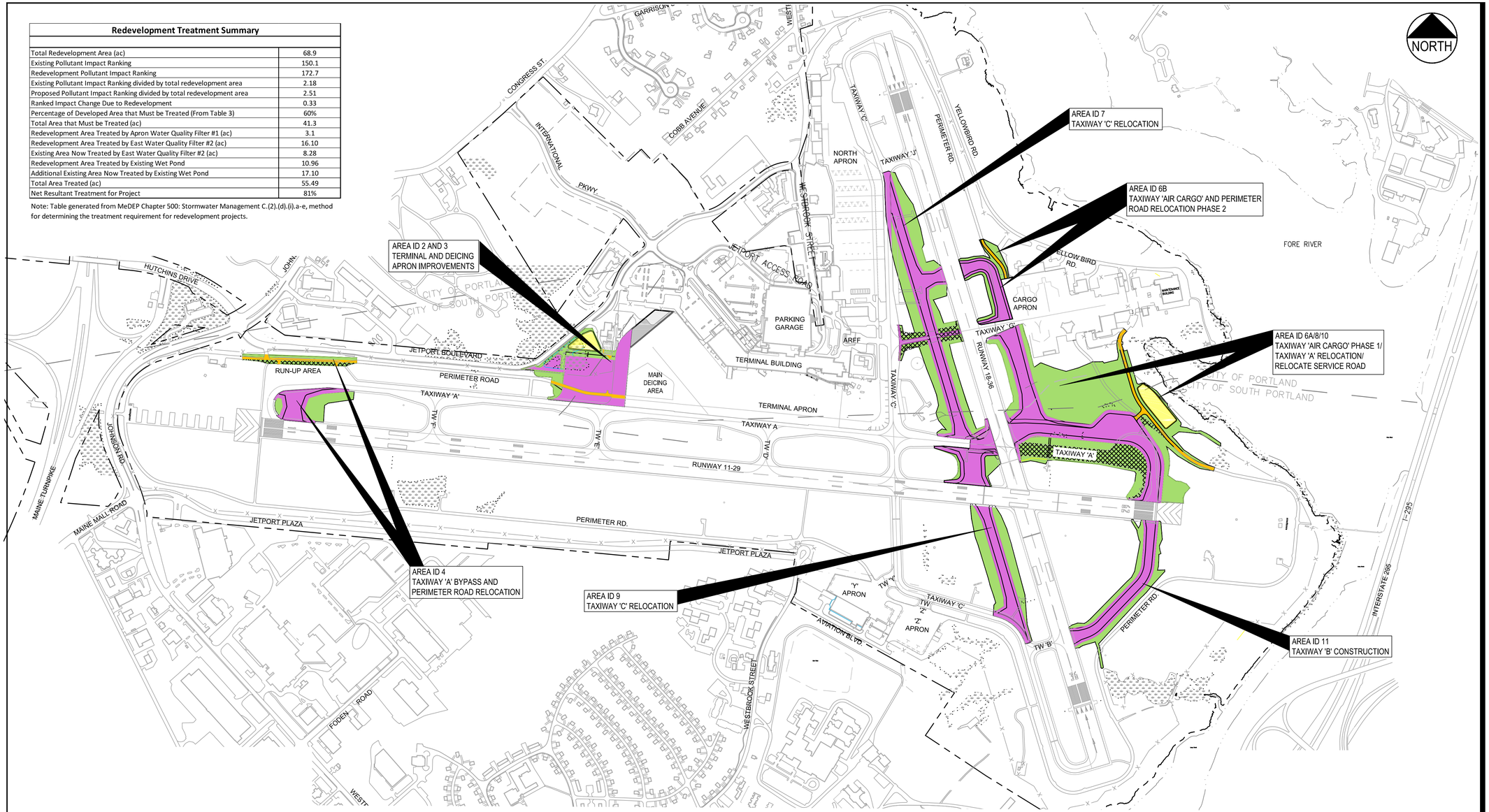
Project No. 195210916

Scale 1" = 400'

Sheet EX. REDEV FIGURE 6

Redevelopment Treatment Summary	
Total Redevelopment Area (ac)	68.9
Existing Pollutant Impact Ranking	150.1
Redevelopment Pollutant Impact Ranking	172.7
Existing Pollutant Impact Ranking divided by total redevelopment area	2.18
Proposed Pollutant Impact Ranking divided by total redevelopment area	2.51
Ranked Impact Change Due to Redevelopment	0.33
Percentage of Developed Area that Must be Treated (From Table 3)	60%
Total Area that Must be Treated (ac)	41.3
Redevelopment Area Treated by Apron Water Quality Filter #1 (ac)	3.1
Redevelopment Area Treated by East Water Quality Filter #2 (ac)	16.10
Existing Area Now Treated by East Water Quality Filter #2 (ac)	8.28
Redevelopment Area Treated by Existing Wet Pond	10.96
Additional Existing Area Now Treated by Existing Wet Pond	17.10
Total Area Treated (ac)	55.49
Net Resultant Treatment for Project	81%

Note: Table generated from MeDEP Chapter 500: Stormwater Management C.(2).(d).(i).a-e, method for determining the treatment requirement for redevelopment projects.



		Proposed Impact														
		Forest and Meadow mowed 2x or less per yr			Non-grass LS areas & SW systems			Other Roof Tops and grass mowed > 2X per yr			Other P-lots and flat asphalt roofs			Other Roads and Medium use P-lots			High use Roads and P-lots			
		Wetland			Water Quality Filter			Grassed Infield			Paved Apron/Taxiway/Shoulder/Runway			Perimeter Road			None			
		Pollutant Impact Ranking 0			Pollutant Impact Ranking 1			Pollutant Impact Ranking 2			Pollutant Impact Ranking 3			Pollutant Impact Ranking 4			Pollutant Impact Ranking 5			
Area ID	Total Area (AC)	Ranking	Area (SF)	Impact	Ranking	Area (SF)	Impact	Pollutant Ranking	Area (SF)	Impact	Ranking	Area (SF)	Impact	Ranking	Area (SF)	Impact	Ranking	Area (SF)	Impact	Subtotal
Area 2 + 3: Long Term Hold/Deicing/ROM Apron Phase 1 and 2																				
2 + 3	7.4	0	0	0	1	25,227	25,227	2	52,745	105,491	3	226,398	679,193	4	17,974	71,896	5	0	0	881,807
Area 4: Runway 11 Taxiway Bypass and Perimeter Service Road Realignment																				
4	4.3	0	0	0	1	0	0	2	99,317	198,634	3	63,267	189,802	4	24,724	98,896	5	0	0	487,331
Area 6A/8/10: Construct Air Cargo Taxiway - Phase 1/ Relocate Taxiway A East of Runway 18-36/ Relocate Service Road East of Cargo																				
6A/8/10	27.3	0	0	0	1	42,500	42,500	2	644,441	1,288,882	3	464,666	1,393,997	4	37,581	150,324	5	0	0	2,875,704
Area 6B: Construct Air Cargo Taxiway - Phase 2																				
6B	3.0	0	0	0	1	0	0	2	43,560	87,120	3	78,168	234,504	4	8,952	35,808	5	0	0	357,432
Area 7: Construct Taxiway C Realignment - Phase 1																				
7	15.9	0	0	0	1	0	0	2	369,389	738,778	3	323,215	969,646	4	0	0	5	0	0	1,708,423
Area 9: Construct Taxiway C Realignment - Phase 2																				
9	5.8	0	0	0	1	0	0	2	127,631	255,262	3	125,017	375,052	4	0	0	5	0	0	630,313
Area 11: Construct Taxiway B Runway 36 to 29																				
11	5.2	0	0	0	1	0	0	2	98,446	196,891	3	128,066	384,199	4	0	0	5	0	0	581,090
Total	**68.9**																			**7,522,100**

LEGEND

POLLUTANT IMPACT RANKING

0	WETLAND
1	WQF / POND
2	GRASSED SHOULDER / INFIELD
3	PAVED APRON / TAXIWAY / SHOULDER
4	PERIMETER ROAD

GRAPHIC SCALE

400 0 200 400 800

(IN FEET)

1 inch = 400 ft.

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P. O. Box 372
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Notes

Revision	By	DDA	Appd.	YY.MM.DD
1 SUBMITTED TO MAOEP FOR PERMITTING	LA	DDA		18.10.12

File Name: 195210916-redev	DB	ΔΔ/MM	ΔΔ/MM	APR 2018
	DWN.	CHKD.	DSGN.	DATE

Permit-Seal

STATE OF MAINE
DWIGHT D. ANDERSON
No. 9875
12-12-18
LICENSED
PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

ENVIRONMENTAL ASSESSMENT AND PERMITTING PLANS

PORTLAND and SOUTH PORTLAND, MAINE

Title

PROPOSED REDEVELOPMENT TREATMENT SUMMARY

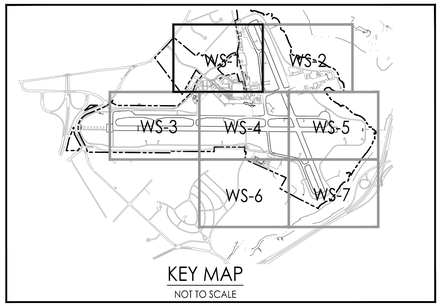
Project No.	Scale
195210916	1" = 400'

Sheet

PROP REDEV
FIGURE 7

LEGEND AND AREA SUMMARY

- WATERSHED BOUNDARY
- HYDROLOGICAL SOIL GROUP BOUNDARY (FROM SCS MEDIUM INTENSITY SOIL SURVEY)
- A — HYDROLOGICAL SOIL GROUP TYPE
- A — B — WATERSHED FLOW PATH
- 1 — SUBCATCHMENT
- 1 — REACH
- SHT — SHEET FLOW
- SHL — SHALLOW CONCENTRATED FLOW
- CF — CHANNEL FLOW
- CC — CIRCULAR CHANNEL
- 1 — POND
- ONSITE IMPERVIOUS AREAS
- PROPERTY BOUNDARY
- WETLAND AREAS
- 70 — CONTOUR
- 12" — 12" — DRAINAGE INFRASTRUCTURE
- FLOW DIRECTION ARROW



KEY MAP
NOT TO SCALE

NORTH

MATCH LINE - SEE SHEET WS-2

MATCH LINE - SEE SHEET WS-4

JETPORT BOULEVARD

Taxiway 'C'

Taxiway 'J'

General Aviation Hangar

North Apron

Rental Car Facility

General Aviation Terminal

General Aviation Hangar/Offices

Fuel Farm

Parking Garage

A-102

B-101

JB3B

5R

1R

37L

W-C8-18 SUBCATCHMENT INCLUDED IN STUDY BY OEST

SUBCATCHMENT BY OEST. INCLUDED AS A LINK IN MODEL

SUBCATCHMENT INCLUDED IN STUDY BY OEST

AREA PERMITTED TO BE IMPERVIOUS IN PRIOR PERMIT

SHL L=100'

SHT L=50'

SHL L=510'

SHT L=100'

SH1 L=100'

SHT L=212'

2R FROM OEST

15" RCP CULVERT

2 6' CU. CULVERTS INV. 74.74

GRAPHIC SCALE
10 0 50 100 200
(IN FEET)
1 inch = 100 ft.

PERMITTING DRAWINGS

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Jackman, Maine 04945

Notes

No.	Revision	By	Appd.	YY.MM.DD
2	CITY OF PORTLAND AND SOUTH PORTLAND PERMIT SET	LA	DDA	19.03.08
1	SUBMITTED TO MaDEP FOR PERMITTING	LA	DDA	18.10.12

File Name: 195210916_pre_wshed	LA DWN.	AMG CHKD.	DDA DSGN.	OCT 2018 DATE

Permit-Seal

STATE OF MAINE — DWIGHT D. ANDERSON — No. 9275 — LICENSED — PROFESSIONAL ENGINEER — 3-22-2019

Client/Project

PORTLAND INTERNATIONAL JETPORT

ENVIRONMENTAL ASSESSMENT AND PERMITTING PLANS

PORTLAND and SOUTH PORTLAND, MAINE

Title

PRE-DEVELOPMENET WATERSHED

Project No. 195210916

Scale 1" = 100'

Sheet

WS-1

NORTH

MATCH LINE - SEE SHEET WS-1

MATCH LINE - SEE SHEET WS-5

RUNWAY 18-36

Perimeter Road

Yellow Bird Road

YELLOW BIRD ROAD

FORE RIVER

OUTFALL #1

OUTFALL #4

AREAS OF IMPROVED HYDROLOGIC SOIL CONDITION RESULTING FROM PAST DRAINAGE IMPROVEMENT WORK

FAA Tech. Ops. Facility

Fixed Base Operation Hangar

Fuel Dispensing Station

Lighting Vault

Airport Maintenance Building

Customs Office

Cargo Apron

Vehicle Fuel

Sand Salt Storage Facility

Hexagonal Hangar

FSDO Apron

General Aviation Hangar/Office

Flight Standards District Office

Maintenance/ Equipment Storage

Taxiway 'G'

A-102

A-103

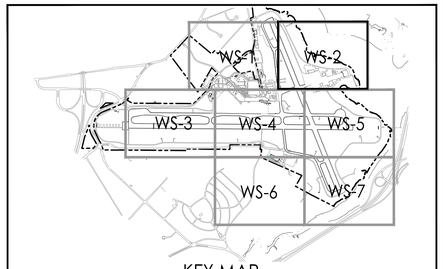
A-104

A-105

A-106

LEGEND AND AREA SUMMARY

- WATERSHED BOUNDARY
- HYDROLOGICAL SOIL GROUP BOUNDARY (FROM SCS MEDIUM INTENSITY SOIL SURVEY)
- A — HYDROLOGICAL SOIL GROUP TYPE
- A–B — WATERSHED FLOW PATH
- 1 — SUBCATCHMENT
- 1 — REACH
- SHT — SHEET FLOW
- SHL — SHALLOW CONCENTRATED FLOW
- CF — CHANNEL FLOW
- CC — CIRCULAR CHANNEL
- 1 — POND
- ONSITE IMPERVIOUS AREAS
- PROPERTY BOUNDARY
- WETLAND AREAS
- 70 — CONTOUR
- 12" — 12" — DRAINAGE INFRASTRUCTURE
- FLOW DIRECTION ARROW



KEY MAP
NOT TO SCALE

GRAPHIC SCALE
10 0 50 100 200
(IN FEET)
1 inch = 100 ft.

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Notes

Revision	By	Appd.	YY.MM.DD
1 SUBMITTED TO MaDEP FOR PERMITTING	LA	DDA	18.10.12
2 CITY OF PORTLAND AND SOUTH PORTLAND PERMIT SET	LA	DDA	19.03.08

File Name: 195210916_pre_wshed	LA DWN.	AMG CHKD.	DDA DSGN.	OCT 2018 DATE

Permit-Seal

STATE OF MAINE — DWIGHT D. ANDERSON No. 9275 — 3-8-2019 — LICENSED PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

ENVIRONMENTAL ASSESSMENT AND PERMITTING PLANS

PORTLAND and SOUTH PORTLAND, MAINE

Title

PRE-DEVELOPMENET WATERSHED

Project No.	Scale
195210916	1" = 100'

Sheet

WS-2

PERMITTING DRAWINGS

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NORTH

JETPORT BOULEVARD

Taxiway 'A'

Perimeter Road

RUNWAY 11-29

PERIMETER ROAD

JETPORT PLAZA

Taxiway 'F'

Taxiway 'E'

INLAND DEICING FACILITY

MATCH LINE - SEE SHEET WS-4

AREAS OF IMPROVED HYDROLOGIC SOIL CONDITION RESULTING FROM PAST DRAINAGE IMPROVEMENT WORK

LEGEND AND AREA SUMMARY

- WATERSHED BOUNDARY
- HYDROLOGICAL SOIL GROUP BOUNDARY (FROM SCS MEDIUM INTENSITY SOIL SURVEY)
- A — HYDROLOGICAL SOIL GROUP TYPE
- A to B — WATERSHED FLOW PATH
- 1 — SUBCATCHMENT
- 1 — REACH
- SHT — SHEET FLOW
- SHL — SHALLOW CONCENTRATED FLOW
- CF — CHANNEL FLOW
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- ONSITE IMPERVIOUS AREAS
- PROPERTY BOUNDARY
- WETLAND AREAS
- 70 — CONTOUR
- 12" to 12" — DRAINAGE INFRASTRUCTURE
- FLOW DIRECTION ARROW

KEY MAP
NOT TO SCALE

GRAPHIC SCALE
10 0 50 100 200
(IN FEET)
1 inch = 100 ft.

PERMITTING DRAWINGS

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Notes

No.	Revision	By	Appd.	YY/MM/DD
2	CITY OF PORTLAND AND SOUTH PORTLAND PERMIT SET	JA	JDA	2018.10.12
1	SUBMITTED TO MaineDEP FOR PERMITTING	JA	JDA	2018.09.28

File Name: 195210916_pre_wshed	LA	AMG	DDA	OCT 2018
	DWN.	CHKD.	DSGN.	DATE

Permit-Seal

STATE OF MAINE — DWIGHT C. ANDERSON No. 9275 — 3-2-2019 — LICENSED PROFESSIONAL ENGINEER

Client/Project
PORTLAND INTERNATIONAL JETPORT

ENVIRONMENTAL ASSESSMENT AND PERMITTING PLANS

PORTLAND and SOUTH PORTLAND, MAINE

Title
PRE-DEVELOPMENET WATERSHED

Project No. 195210916
Scale 1" = 100'

Sheet
WS-3

MATCH LINE - SEE SHEET WS-1

MATCH LINE - SEE SHEET WS-3

MATCH LINE - SEE SHEET WS-5

MATCH LINE - SEE SHEET WS-6

SEE LEGEND ON SHEET WS-1

SEE KEY MAP ON SHEET WS-1

PERMITTING DRAWINGS

AREAS PERMITTED TO BE IMPERVIOUS IN PRIOR PERMIT

NORTH

SUBCATCHMENT BY OEST, INCLUDED AS A LINK IN MODEL

Airport Rescue and Fire Fighting

Administration/Terminal Building

Terminal Apron

Taxiway 'A'

Taxiway 'C'

Taxiway 'D'

Taxiway 'Y'

'Y' Apron

Taxiway 'Z'

Pinkham Road

RUNWAY 11-29

RUNWAY 18-36

TO EXISTING POND

GRAPHIC SCALE

10 0 50 100 200

(IN FEET)

1 inch = 100 ft.

V:\195\2active\195210916\aviation\9_drawings\sheet_files\195210916_pre_wshed.dwg rbpruger 3/8/2019 1:35 PM

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Independent Archaeological Consulting, LLC (Archaeologist)
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Diana's CADD Serivice, LLC (Drafting)
P. O. Box 372
Jackman, Maine 04945

Notes

Revision	By	Appd.	YY.MM.DD
2 CITY OF PORTLAND AND SOUTH PORTLAND PERMIT SET	LA	DDA	19.03.08
1 SUBMITTED TO MaDEP FOR PERMITTING	LA	DDA	18.10.12

File Name: 195210916_pre_wshed	LA	AMG	DDA	OCT 2018
	DWN.	CHKD.	DSGN.	DATE

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STATE OF MAINE
DWIGHT D. ANDERSON
No. 9275
3-8-2019
LICENSED PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

ENVIRONMENTAL ASSESSMENT AND PERMITTING PLANS

PORTLAND and SOUTH PORTLAND, MAINE

Title

PRE-DEVELOPMENET WATERSHED

Project No.	Scale
195210916	1" = 100'

Sheet

WS-4

MATCH LINE - SEE SHEET WS-2

MATCH LINE - SEE SHEET WS-4

MATCH LINE - SEE SHEET WS-7

AREAS OF IMPROVED HYDROLOGIC SOIL CONDITION RESULTING FROM PAST DRAINAGE IMPROVEMENT WORK

RUNWAY 11-29

RUNWAY 18-36

EX. Taxiway 'A'

Perimeter Road

FORE RIVER

TIDAL LONG CREEK

OUTFALL #3

OUTFALL #5

OUTFALL #6

FAA Electrical Vault

Runway 14 Localizer Building

Maintenance/ Equipment Storage

NORTH

KEY MAP

NOT TO SCALE

WS-1 WS-2 WS-3 WS-4 WS-5 WS-6 WS-7

LEGEND AND AREA SUMMARY

- WATERSHED BOUNDARY
- HYDROLOGICAL SOIL GROUP BOUNDARY (FROM SCS MEDIUM INTENSITY SOIL SURVEY)
- A — HYDROLOGICAL SOIL GROUP TYPE
- A–B — WATERSHED FLOW PATH
- 1 — SUBCATCHMENT
- 1 — REACH
- SHT — SHEET FLOW
- SHL — SHALLOW CONCENTRATED FLOW
- CF — CHANNEL FLOW
- CC — CIRCULAR CHANNEL
- 1 — POND
- ONSITE IMPERVIOUS AREAS
- PROPERTY BOUNDARY
- WETLAND AREAS
- 70 — CONTOUR
- 12" — 12" — DRAINAGE INFRASTRUCTURE
- FLOW DIRECTION ARROW

GRAPHIC SCALE

10 0 50 100 200

(IN FEET)

1 inch = 100 ft.

PERMITTING DRAWINGS

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STATE OF MAINE
DWIGHT J. MORRISON
No. 9275
3-2-2019
LICENSED
PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

ENVIRONMENTAL ASSESSMENT AND PERMITTING PLANS

PORTLAND and SOUTH PORTLAND, MAINE

Title

PRE-DEVELOPMENET WATERSHED

Project No. 195210916

Scale 1" = 100'

Sheet

WS-5

NORTH

MATCH LINE - SEE SHEET WS-4

MATCH LINE - SEE SHEET WS-7

South Aviation Hangar

'Z' Apron

SOUTH GA PROJECT (REFER TO FIGURE 2 IN STORMWATER REPORT)

SOUTH GA PROJECT (REFER TO FIGURE 2 IN STORMWATER REPORT)

SOUTHERN MAINE JUVENILE DETENTION FACILITY (REFER TO FIGURE 1 IN STORMWATER REPORT)

SOUTHERN MAINE JUVENILE DETENTION FACILITY (REFER TO FIGURE 1 IN STORMWATER REPORT)

BRICKHILL DEVELOPEMENT (REFER TO FIGURE 3 IN STORMWATER REPORT)

BRICKHILL DEVELOPEMENT (REFER TO FIGURE 3 IN STORMWATER REPORT)

CB1 CB2 CB3 CB4 CB5 CB6 CB7 CB8 CB30

A-34-1

SHL L=720'

SHT L=100'

SHL L=1310'

SHL L=150'

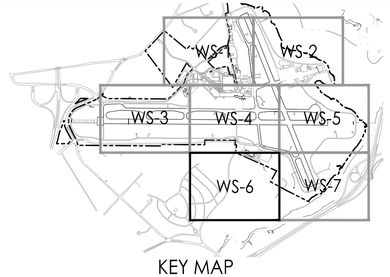
SHT L=100'

SHL L=69'

98S *2R 3R

LEGEND AND AREA SUMMARY

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- PROPERTY BOUNDARY
- WETLAND AREAS
- 70 — CONTOUR
- 12" — DRAINAGE INFRASTRUCTURE
- FLOW DIRECTION ARROW



KEY MAP
NOT TO SCALE

GRAPHIC SCALE
10 0 50 100 200
(IN FEET)
1 inch = 100 ft.

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DWIGHT D. ANDERSON
No. 9275
3-8-2019
LICENSED PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

ENVIRONMENTAL ASSESSMENT AND PERMITTING PLANS

PORTLAND and SOUTH PORTLAND, MAINE

Title

PRE-DEVELOPMENET WATERSHED

Project No. 195210916

Scale 1" = 100'

Sheet

WS-6

MATCH LINE - SEE SHEET WS-5

MATCH LINE - SEE SHEET WS-6

OUTFALL #7

OUTLET CONTROL STRUCTURE

OVERFLOW SPILLWAY

OUTFALL #8

Taxiway 'B'

Taxiway 'C'

Perimeter Road

Perimeter Road

RUNWAY 18-36

Remote Transmitter/Receiver Building

TIDAL LONG CREEK

SHL L=137'

SHL L=263'

SHL L=92'

SHT L=100'

SHL L=112'

SHL L=308'

SHL L=50'

SHL L=278'

1.0S

99S

18S

16R

16L

P1

P2

P2-S

6S

41S

CB1 CB2 CB3 CB4 CB R17

DMH1 DMH2 DMH3 DMH6 DMHZ

OCS1

NORTH

GRAPHIC SCALE

10 0 50 100 200

(IN FEET)

1 inch = 100 ft.

KEY MAP

NOT TO SCALE

WS-1 WS-2 WS-3 WS-4 WS-5 WS-6 WS-7

LEGEND AND AREA SUMMARY

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- PROPERTY BOUNDARY
- WETLAND AREAS
- 70 — CONTOUR
- 12" — 12" — DRAINAGE INFRASTRUCTURE
- FLOW DIRECTION ARROW

PERMITTING DRAWINGS

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File Name: 195210916_pre_wshed	LA DWN.	AMG CHKD.	DDA DSGN.	OCT 2018 DATE

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STATE OF MAINE — DWIGHT D. ANDERSON — No. 9275 — 3-8-2019 — LICENSED PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

ENVIRONMENTAL ASSESSMENT AND PERMITTING PLANS

PORTLAND and SOUTH PORTLAND, MAINE

Title

PRE-DEVELOPMENET WATERSHED

Project No. 195210916

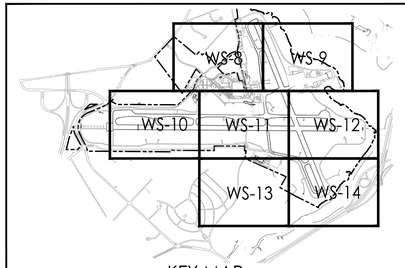
Scale 1" = 100'

Sheet

WS-7

LEGEND AND AREA SUMMARY

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- 12" — 12" — DRAINAGE INFRASTRUCTURE
- FLOW DIRECTION ARROW



KEY MAP
NOT TO SCALE

PERMITTING DRAWINGS

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2	CITY OF PORTLAND AND SOUTH PORTLAND PERMIT SET	LA	DDA	19.03.08
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File Name: 195210916-wshed	LA DWN.	AMG CHKD.	DDA DSGN.	OCT 2018 DATE

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Client/Project

PORTLAND INTERNATIONAL JETPORT

ENVIRONMENTAL ASSESSMENT AND PERMITTING PLANS

PORTLAND and SOUTH PORTLAND, MAINE

Title

POST-DEVELOPMENET WATERSHED

Project No.	Scale
195210916	1" = 100'

Sheet

WS-8

MATCH LINE - SEE SHEET WS-8

MATCH LINE - SEE SHEET WS-12

NORTH

Perimeter Road

Yellow Bird Road

RUNWAY 18-36

YELLOW BIRD ROAD

FORE RIVER

OUTFALL #1

OUTFALL #4

AREAS OF IMPROVED HYDROLOGIC SOIL CONDITION RESULTING FROM PAST DRAINAGE IMPROVEMENT WORK

FAA Tech. Ops. Facility

Fixed Base Operation Hangar

Fuel Dispensing Station

Lighting Vault

Airport Maintenance Building

Fuel Dispensing Station

Vehicle Fuel

Customs Office

Cargo Apron

DIRECT

Sand Salt Storage Facility

Hexagonal Hangar

FSDO Apron

General Aviation Hangar/Office

Flight Standards District Office

Maintenance/ Equipment Storage

Taxiway 'G'

TRAP L=561'

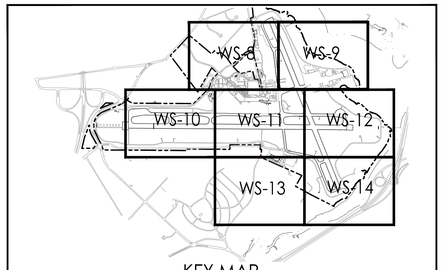
TRAP L=350'

TRAP L=300'

CC L=400'

LEGEND AND AREA SUMMARY

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- 1 — POND
- ONSITE IMPERVIOUS AREAS
- PROPERTY BOUNDARY
- WETLAND AREAS
- 70 — CONTOUR
- 12" → 12" — DRAINAGE INFRASTRUCTURE
- FLOW DIRECTION ARROW



KEY MAP
NOT TO SCALE

GRAPHIC SCALE
10 0 50 100 200
(IN FEET)
1 inch = 100 ft.

PERMITTING DRAWINGS

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Client/Project

PORTLAND INTERNATIONAL JETPORT

ENVIRONMENTAL ASSESSMENT AND PERMITTING PLANS

PORTLAND and SOUTH PORTLAND, MAINE

Title

POST-DEVELOPMENET WATERSHED

Project No.	Scale
195210916	1" = 100'

Sheet

WS-9

NORTH

JETPORT BOULEVARD

Taxiway 'A'

RUNWAY 11-29

PERIMETER ROAD

JETPORT PLAZA

Taxiway 'F'

Taxiway 'E'

TRENCH DRAIN (TYP. OF 10)

INLAND DEICING FACILITY

MATCH LINE - SEE SHEET WS-11

AREAS OF IMPROVED HYDROLOGIC SOIL CONDITION RESULTING FROM PAST DRAINAGE IMPROVEMENT WORK

LEGEND AND AREA SUMMARY

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- FLOW DIRECTION ARROW

KEY MAP
NOT TO SCALE

GRAPHIC SCALE
10 0 50 100 200
(IN FEET)
1 inch = 100 ft.

PERMITTING DRAWINGS

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PORTLAND and SOUTH PORTLAND, MAINE

Title
POST-DEVELOPMENET WATERSHED

Project No. 195210916
Scale 1" = 100'

Sheet
WS-10

MATCH LINE - SEE SHEET WS-8

MATCH LINE - SEE SHEET WS-10

MATCH LINE - SEE SHEET WS-12

MATCH LINE - SEE SHEET WS-13

AREAS PERMITTED TO BE IMPERVIOUS IN PRIOR PERMIT

Airport Rescue and Fire Fighting

Administration/Terminal Building

Terminal Apron

Taxiway 'A'

Taxiway 'D'

Taxiway 'C'

Taxiway 'Y'

'Y' Apron

Taxiway 'Z'

RUNWAY 11-29

RUNWAY 18-36

Pinkham Road

SEE LEGEND ON SHEET WS-1

SEE KEY MAP ON SHEET WS-1

PERMITTING DRAWINGS

GRAPHIC SCALE
10 0 50 100 200
(IN FEET)
1 inch = 100 ft.

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Title
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Project No.	Scale
195210916	1" = 100'

Sheet
WS-11

MATCH LINE - SEE SHEET WS-2

MATCH LINE - SEE SHEET WS-11

MATCH LINE - SEE SHEET WS-14

RUNWAY 11-29

RUNWAY 18-36

FORE RIVER

TIDAL LONG CREEK

Perimeter Road

EX. Taxiway 'A'

Maintenance/ Equipment Storage

FAA Electrical Vault

Runway 14 Localizer Building

AREAS OF IMPROVED HYDROLOGIC SOIL CONDITION RESULTING FROM PAST DRAINAGE IMPROVEMENT WORK

LIMIT OF DISTURBANCE

OUTFALL #3

OUTFALL #5

OUTFALL #6

NORTH

KEY MAP

NOT TO SCALE

WS-8 WS-9 WS-10 WS-11 WS-12 WS-13 WS-14

LEGEND AND AREA SUMMARY

- WATERSHED BOUNDARY
- HYDROLOGICAL SOIL GROUP BOUNDARY (FROM SCS MEDIUM INTENSITY SOIL SURVEY)
- A — HYDROLOGICAL SOIL GROUP TYPE
- A–B — WATERSHED FLOW PATH
- 1 — SUBCATCHMENT
- 1 — REACH
- SHT — SHEET FLOW
- SHL — SHALLOW CONCENTRATED FLOW
- CF — CHANNEL FLOW
- CC — CIRCULAR CHANNEL
- 1 — POND
- ONSITE IMPERVIOUS AREAS
- PROPERTY BOUNDARY
- WETLAND AREAS
- 70 — CONTOUR
- 12" — 12" — DRAINAGE INFRASTRUCTURE
- FLOW DIRECTION ARROW

GRAPHIC SCALE

10 0 50 100 200

(IN FEET)

1 inch = 100 ft.

PERMITTING DRAWINGS

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Notes

No.	Revision	By	Appd.	YY.MM.DD
1	SUBMITTED TO MaDEP FOR PERMITTING	LA	JDA	19.03.08
2	CITY OF PORTLAND AND SOUTH PORTLAND PERMIT SET	LA	JDA	19.10.12

File Name: 195210916-wshed	LA DWN.	AMG CHK'D.	DDA DSGN.	OCT 2018 DATE

Permit-Seal

STATE OF MAINE — DWIGHT D. ANDERSON — No. 9275 — 3-8-2019 — LICENSED PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

ENVIRONMENTAL ASSESSMENT AND PERMITTING PLANS

PORTLAND and SOUTH PORTLAND, MAINE

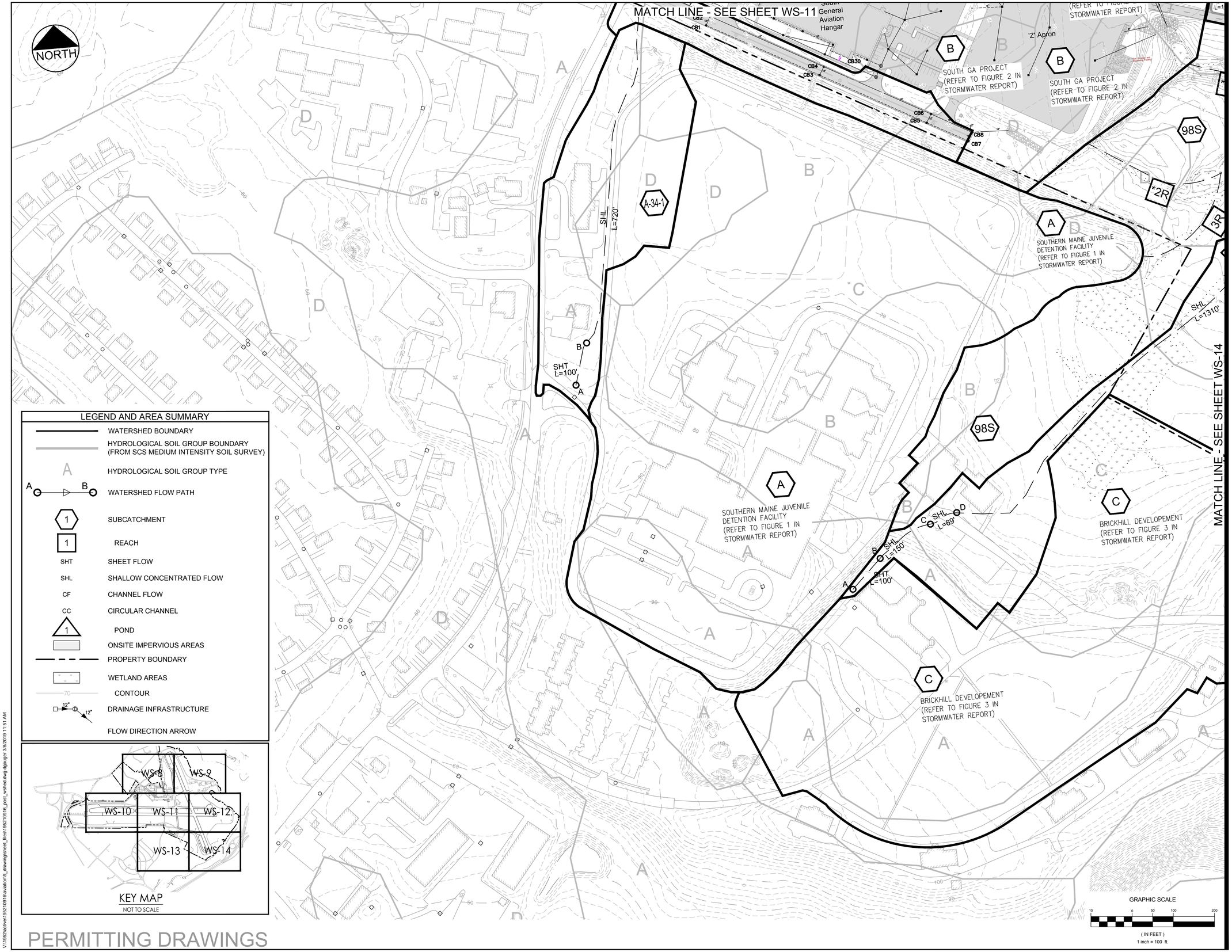
Title

POST-DEVELOPMENET WATERSHED

Project No.	Scale
195210916	1" = 100'

Sheet

WS-12



PERMITTING DRAWINGS

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File Name: 195210916-wshed	LA	AMG	DDA	OCT 2018
	DWN.	CHKD.	DSGN.	DATE

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ENVIRONMENTAL ASSESSMENT AND PERMITTING PLANS

PORTLAND and SOUTH PORTLAND, MAINE

Title

POST-DEVELOPMENET WATERSHED

Project No.	Scale
195210916	1" = 100'

Sheet

WS-13

MATCH LINE - SEE SHEET WS-12

MATCH LINE - SEE SHEET WS-13

OUTFALL #7

OUTFALL #8

Perimeter Road

Taxiway 'B'

Taxiway 'C'

RUNWAY 18-36

Remote Transmitter/Receiver Building

TIDAL LONG CREEK

NORTH

GRAPHIC SCALE

10 0 50 100 200

(IN FEET)

1 inch = 100 ft.

KEY MAP

NOT TO SCALE

WS-8 WS-9 WS-10 WS-11 WS-12 WS-13 WS-14

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	PROPERTY BOUNDARY
	WETLAND AREAS
70	CONTOUR
12" 12"	DRAINAGE INFRASTRUCTURE
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Revision	By	Appd.	YY.MM.DD
1 SUBMITTED TO MaDEP FOR PERMITTING	LA	DDA	18.10.12
2 CITY OF PORTLAND AND SOUTH PORTLAND PERMIT SET	LA	DDA	19.03.08

File Name: 19521091 6-wshed	DWN. LA	CHKD. AMG	DSGN. DDA	DATE OCT 2018

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ENVIRONMENTAL ASSESSMENT AND PERMITTING PLANS

PORTLAND and SOUTH PORTLAND, MAINE

Title

POST-DEVELOPMENET WATERSHED

Project No.	Scale
195210916	1" = 100'

Sheet

WS-14

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ATTACHMENT B

Erosion and Sediment Control Report

Stantec

SECTION 14

BASIC STANDARDS
EROSION AND SEDIMENTATION CONTROL REPORT

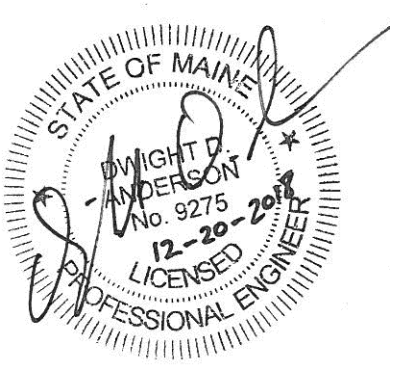
PORTLAND INTERNATIONAL JETPORT
ENVIRONMENTAL ASSESSMENT AND
ENVIRONMENTAL PERMITTING
PORTLAND AND SOUTH PORTLAND, MAINE

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Revised December 2018

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B – Sample Certification and Inspection Forms

C – MeDEP Chapter 500 Appendix C – Housekeeping Notes

D – Previously Permitted Project 1 (Erosion and Sediment Control Plan dated 3-12-2018)

SECTION 14

BASIC STANDARDS
EROSION AND SEDIMENTATION CONTROL REPORT

Introduction

The following report summarizes erosion and sedimentation control measures to be implemented for the proposed improvements at the Portland International Jetport (Jetport). The proposed improvements consist of the following:

Project Item	Description
Item 1	Terminal Apron Expansion Northwest End – Phase 2 (Previously Permitted)
Items 2 & 3	Long-Term Hold/Deicing/RON Apron – Phase 1 & 2
Item 4	Runway 11 Taxiway Bypass and Perimeter Service Road Realignment
Item 5	Tree Removal for GQS on Runway 36 End
Item 6A	Construct Air Cargo Taxiway – Phase 1 (Previously Permitted)
Item 6B	Construct Air Cargo Taxiway – Phase 2
Item 7	Construct Taxiway C Realignment – Phase 1
Item 8	Relocated Taxiway A East of Runway 18-36
Item 9	Construct Taxiway C Realignment – Phase 2
Item 10	Relocate Service Access Road East of Cargo and Water Quality Filter
Item 11	Construct Taxiway B Runway 36 to 29

Note that for each individual project area, no more than one acre shall be disturbed at one time, or no larger area than can be mulched in one day. This note shall apply to all construction, including during winter. The following erosion and sedimentation control measures are in accordance with the 2016 Revision to the 2003 Maine Erosion and Sediment Control Best Management Practices (BMPs) Manual for Designers and Engineers. The construction of erosion and sedimentation control measures shall be in accordance with the 2014 Revision to the 2003 Maine Erosion and Sediment Control Field Guide for Contractors.

A detailed description of each of these improvements is provided below.

A. Terminal Apron Expansion Northwest End (Phase 2) (Project Item 1) (Previously Permitted)

This project component was previously permitted as impervious area with the MeDEP and has already been partially constructed as bituminous pavement snow shoulder and graded to become gently sloping grass and drainage areas adjacent to the existing terminal apron. As part of this project the previously constructed bituminous pavement would be converted to concrete, 0.6 acres of grass and gravel area would be paved or become concrete impervious area, and 1.4 acres would be disturbed. A portion of this area will be directed to Water Quality Filter #1 (WQF #1). An Erosion and Sediment Control Plan dated March 12, 2018 for this project is provided as Attachment D.

B. Long-term Hold/Deicing/Remain Overnight Apron (Phases 1 and 2) (Project Items 2 and 3)

This project component would include construction of 3.47 acres of new concrete and bituminous aircraft and snow storage apron, a transition of 1.7 acres of existing bituminous snow shoulder to concrete aircraft apron, 0.44 acre of access and project laydown area, 1.7 acres of grassed side slope and vegetated water quality filter areas, and 1.16 acres of wetland impact. The overall work limit associated with this project component, including project staging, would be approximately 7.3 acres, with maximum earthwork cuts of six feet and maximum earthwork fills of three feet.

The water quality filter (WQF #1) in this area would help the overall project meet the Maine Department of Environmental Protection (MeDEP) Chapter 500 Stormwater Management Rules and would utilize MeDEP Best Management Practices (BMPs) Volume III, BMP Technical Design for Grassed Underdrained Soil Filter for its design guidelines. Vegetated underdrained soil filters (or water quality filters) capture and retain runoff and pass it through a soil filter media consisting of a silty sand and organic matter mixture to remove pollutants. The runoff is collected below the soil filter media in underdrain pipe and discharged to a formal piped drainage system leading to the Fore River.

The existing 500,000-gallon underground spent deicing fluid storage tank along the northern limits of this project component would remain and be protected during construction of this project component.

C. Runway 11 End Taxiway Bypass and Realignment of Perimeter Service Road (Project Item 4)

This project component would include construction of 245 linear feet (lf) of new taxiway comprised of 1.2 acres of new bituminous aircraft taxiway and snow shoulder pavement, and 2.2 acres of grassed side slope area associated with site fills and additional disturbance associated with storm drain installation. This project component would also include realignment of 928 lf of perimeter service road. Due to the proposed location of the road, only 0.08 acre of new bituminous pavement would be required to realign the road and 0.38 acre of bituminous pavement would be eliminated. The overall disturbance associated with this project component would be approximately 4.30 acres, with maximum earthwork cuts of three feet and maximum earthwork fills of three feet.

D. Tree Removal to Clear the Glideslope Qualification Surface (GQS) for the Runway 36 End (Project Item 5)

This project component would include select tree removal within approximately six acres of off-Jetport property. Only those trees that are obstructions to or within 10 vertical feet of the 30 horizontal to 1 vertical GQS would be removed. Tree removal would be performed on a tree-by-tree basis and would treat and leave all stumps in place. Approximately 0.5 acre of this select tree removal would be within areas delineated as wetlands.

E. Air Cargo Taxiway (Phase 1) (Project Item 6A) (Previously Permitted)

This project component was previously permitted as impervious area with the MeDEP and has not yet been constructed. The geometry of this project has been adjusted to match into the Relocation of Taxiway A East of Runway 18-36 (Project Item 8), which resulted in a 0.24 acre increase in impervious area for Project Item 6A.

F. Air Cargo Taxiway (Phase 2) (Project Item 6B)

This project component would include construction of 663 lf of taxiway comprised of 1.1 acres of new bituminous aircraft taxiway and snow shoulder pavement and 1.0 acre of grassed side slope area associated with site fills and additional disturbance associated with utility installation. Approximately 0.9 acre of existing aircraft apron pavement would be replaced to become part of the new taxiway. This project component would also include realignment of 373 lf of perimeter service road. The overall disturbance area associated with this project component would be approximately 3.0 acres with maximum earthwork cuts of four feet and maximum earthwork fills of two feet.

G. Construct Taxiway C Realignment – Phase 1 (Project Item 7)

This project component would include construction of 3,363 lf of new taxiway comprised of 8.8 acres of new bituminous aircraft taxiway and snow shoulder pavement and 12.0 acres of grassed side slope area associated with site fills and additional disturbance associated with utility installation. The overall disturbance associated with this project component would be approximately 22 acres with maximum earthwork cuts of eight feet and maximum earthwork fills of 20 feet.

H. Relocate Taxiway A East of Runway 18-36 (Project Item 8)

The eastern end of Taxiway A currently encroaches within the glideslope critical area located east of Runway 18-36. Therefore, a 1,776-lf section of Taxiway A would be relocated approximately 180 feet to the north to remove Taxiway A from the glideslope critical area. This project component would include construction of 1,776 lf of relocated taxiway comprised of 4.7 acres of new bituminous aircraft taxiway and snow shoulder pavement, 8.0 acres of grassed side slope area associated with site fills and disturbance associated with utility installation, and 0.1 acre of wetland impact. Approximately 2.9 acres of existing taxiway pavement would be removed to become a grassed infield area. The overall disturbance associated with this project component would be approximately 13 acres with maximum earthwork cuts of four feet and maximum earthwork fills of 14 feet.

I. Construct Taxiway C Realignment – Phase 2 (Project Item 9)

This project component would include construction of 3,363 lf of new taxiway comprised of 8.8 acres of new bituminous aircraft taxiway and snow shoulder pavement and 5.1 acres of grassed side slope area associated with site fills and additional disturbance associated with utility installation. The overall work limit associated with this project component, including project staging, would be approximately 22 acres with maximum earthwork cuts of eight feet and maximum earthwork fills of 20 feet.

J. Relocate Service Access Road East of Cargo and Water Quality Filter #2 (Project Item 10)

This project component would include realignment of 1,300 lf of perimeter service road comprised of 0.5 acre of new bituminous service access road and 6.0 acres of grassed side slope area associated with site fills and additional disturbance associated with storm drain installation and a water quality filter adjacent to the service road. Approximately 350 lf of perimeter fence in this area would also be relocated to accommodate the realigned road. The overall disturbance area associated with this project component would blend into the Cargo Taxiway and

Taxiway A project areas and have maximum earthwork cuts of six feet and maximum earthwork fills of six feet.

This project component also includes a water quality filter (WQF #2), which would be required to meet MeDEP Chapter 500 rules for water quality treatment of a redevelopment project. WQF #2 would be located east of Project Item 10. This location would allow for future expansion of the cargo apron and would allow the filter to be located topographically downgradient of existing and proposed development to capture runoff in order to meet MeDEP redevelopment standards. The water quality filter would follow guidelines for MeDEP Best Management Practices for a Grassed Underdrained Soil Filter.

K. Construct Taxiway B Runway 36 to 29 (Project Item 11)

This project component would include construction of 1,226 lf of new taxiway comprised of 2.9 acres of new bituminous aircraft taxiway and snow shoulder pavement and 2.3 acres of grassed side slope area associated with site fills and additional disturbance associated with storm drain installation to discharge stormwater to the existing water quality pond to the south. The overall disturbance associated with this project component would be approximately 5.2 acres with maximum earthwork cuts of four feet and maximum earthwork fills of four feet.

Existing Site Conditions

Existing site conditions have been provided by project area below and soil types for these areas are depicted on Figure 6 included at the end of Section 1.

- Terminal Apron Expansion Northwest End

  Grades in this area range from elevation 70 at the top of the riprap slope tie in point to elevation 59 at the lowest catch basin in this area. Construction has occurred previously in this area as it has been partially paved and graded for proper drainage relief adjacent to the apron. Drainage is directed to the Fore River through a formal drainage system with a portion of it being routed through WQF #1.

- Long-term Hold/Deicing/Remain Overnight Apron

  Grades in this area range from elevation 65 at the tie in point to Jetport Boulevard and above the existing 500,000 gallon UST to elevation 59.50 at the bottom of Water Quality Filter #1. Construction has occurred previously in this area as WQF #1 was constructed in 2010 along with the bituminous pavement snow shoulder. Drainage is directed to the Fore River through a formal drainage system with a portion of it being routed through WQF #1.

- Runway 11 End Taxiway Bypass and Realignment of Perimeter Service Road

  Grades in this area for the taxiway range from elevation 74 at the new bypass taxiway connection point to Runway 11 to elevation 68 near catch basin A22 where drainage is collected and flows to the Fore River.

  Grades in this area for the service road range from elevation 71 at the high point of the road to elevation 68 near the east connection point the existing service road

where drainage is collected and flows to the Fore River. A portion of the road to the west drains southwesterly to Long Creek and will continue to do so.

- Tree Removal to Clear the Glideslope Qualification Surface (GQS) for the Runway 36 End

  This is a forested area with an existing access road which will be utilized to access the trees to be selectively cut. Wetlands of approximately ½ acre exist in this area and will not be entered by wheeled or tracked tree removal equipment.

- Air Cargo Taxiway

  Grades in this area for the taxiway range from elevation 49 at the taxiway connection point to Runway 18-36 to elevation 33 in the drainage swale to be filled where drainage is currently collected and flows to the Fore River. All this area is grassed airfield infield or pavement.

- Construct Taxiway C Realignment

  Grades in this area for the taxiway range from elevation 55 at the taxiway connection point to Taxiway C near Taxiway J to elevation 26 at the invert to the 60-inch stormdrain to be extended. All this area is grassed airfield infield or pavement and drains to the Fore River.

- Relocate Taxiway A East of Runway 18-36

  Grades in this area for the taxiway range from elevation 47 at the taxiway connection point to Runway 18-36 to elevation 32 at the grading tie in point adjacent to the service road. All this area is grassed airfield infield or pavement and drains to the Fore River.

- Relocate Service Access Road East of Cargo and Water Quality Filter #2

  Grades in this area for the service road range from elevation 43 at the berm south of the Flight Standards District Office to elevation 21 at the tie in point for the drainage swale from Water Quality Filter #2. All this area is grassed airfield area inside the perimeter security fence expect a small portion on the north end where the service road connects to an existing roadway. This entire area drains to the Fore River.

- Construct Taxiway B Runway 36 to 29

  Grades in this area for the taxiway range from elevation 46 at the taxiway connection point to Runway 18-36 to elevation 25 at the invert of the 30-inch stormdrain to be installed draining to the existing 2 acre water quality pond east of Runway 36. All this area is grassed airfield infield or pavement and drains to the Fore River.

Some erosion has occurred in the area of the proposed Water Quality Filter #2 outfall which will be repaired and stabilized with riprap as part of this project.

Overview of Soil Erosion and Sedimentation Concerns

The susceptibility of soils to erosion is indicated on a relative “K” scale of values over a range of 0.02 to 0.69. The “K” value is frequently used with the universal soil loss equation. The higher values are indicative of the more erodible soils. The project area is proposed on the following soils, which contain these “K” values:

Soil Description	K Value
Buxton	0.49
Biddeford	0.49
Belgrade	0.49-0.64
Scantic	0.49
Suffield	0.49

Based on a review of the K values, the onsite soils in the area where construction is focused are slightly to very susceptible to erosion after the cover material is stripped depending upon location.

The primary emphasis of the erosion and sedimentation control plan to be implemented for this project is as follows:

1. Planning the project to intercept and convey runoff as the construction of the project occurs.

2. Planning for early shaping of water quality filter (WQF #2) area to be used as a sedimentation basin.

3. Development of a careful construction sequence which includes restrictions for construction of certain elements of the project and prohibits opening excessive areas of the site at one time.

4. Rapid stabilization of areas denuded to underlying parent material to minimize the period of soil exposure.

5. Rapid stabilization of drainage paths to avoid rill and gully erosion.

6. The use of on-site measures to capture sediment (hay bales/silt fence/stone check dams, etc.).

7. The implementation of long-term measures for erosion/sediment and pollutant treatment through the construction of permanent water quality measures.

Existing and Proposed Drainage Features

The existing site has an extensive formal drainage system which will be expanded as part of these projects.

Additional stormwater outfall location information is contained within the project's Stormwater Management Report, Section 12.

14.0 Critical Areas

The critical areas of the site include the freshwater wetlands within the project areas and the coastal wetland along the shore line of Fore River and Long Creek.

14.1 Erosion/Sedimentation Control Devices

As part of the site development, the contractor will be obligated to implement the following erosion and sediment control devices. These devices shall be installed as indicated on the plans or as described within this report. For further reference on these devices, see the Maine Erosion and Sediment Control Handbook for Construction: Best Management Practices.

1. Siltation fence shall be installed down slope of any disturbed areas to trap runoff-borne sediments until the site is revegetated. The silt fence shall be installed per the detail provided in the plan set and inspected immediately after each rainfall and at least daily during prolonged rainfall. The Contractor shall make repairs immediately if there are any signs of erosion or sedimentation below the fence line. If such erosion is observed, the contractor shall take proactive action to identify the cause of the erosion and take action to avoid its reoccurrence. Typically this requires stabilization methods be taken. Proper placement of stakes and keying the bottom of the fabric into the ground is critical to the fence's effectiveness. If there are signs of undercutting at the center or the edges, or impounding of large volumes of water behind the fence, the barrier shall be replaced with a stone check dam and measures taken to avoid the concentration of flows not intended to be directed to the silt fence.

2. Erosion control mix berms are intended to trap runoff-borne sediments until the site is revegetated, and is required to be used in lieu of siltation fence during winter months (refer to Section 14.7 (3)). Erosion control mix should contain a well-graded mixture of particle sizes and may contain rocks less than 4" in diameter. Erosion control mix should be free of refuse, physical contaminants, and material toxic to plant growth such as fly ash or yard scraping. Large portions of silts, clays or fine sands are not acceptable in the mix. The mix composition should meet the following standards:

    - The organic matter content should be between 80% and 100%, dry weight basis.
    - Particle size by weight should be 100% passing a 6" screen and 70% to 85% passing a 0.75" screen.
    - The organic portion needs to be fibrous and elongated.
    - Soluble salts content shall be < 4.0 mmhos/cm.
    - The pH should be between 5.0 and 8.0.
    - The use of soley an erosion control mix berm at the base of a slope steeper than 8% or where there is flowing water is prohibited.

3. Straw or hay mulch including hydroseeding is intended to provide cover for denuded or seeded areas until revegetation is established. Mulching should be occurring several times per week when the site construction activity is high and at sufficient intervals to reduce the period of exposure of bare soils to the time limits set forth in this plan. Mulch placed on slopes of less than 8 percent shall be anchored by applying water; mulch placed on slopes steeper than 8 percent, 3:1 max shall be covered with fabric netting immediately after mulching as practicable and anchored with staples in accordance with the manufacturer's recommendations. Slopes steeper than 3:1 shall be riprapped. Proposed drainage channels which are to be

revegetated shall receive Curlex or approved equal blankets selected for the slope, velocity, and whether the measure is temporary or intended to be in place for a sustained period. Mulch application rates are provided in Attachment A of this section. Hay mulch shall be available on site at all times in order to provide immediate temporary stabilization when necessary. Where necessary, a windrow of crushed stone and/or gravel shall be placed at the top of the slope and directed to a temporary stone channel or pipe sluice to convey runoff down slopes. A dissipation device such as stone or a plunge pool should be installed at the base of the slope and sluice outlet to dissipate the energy of the water from the sluice or channel.

4. A water quality pond will be enhanced to provide sedimentation control for stormwater runoff from the Taxiway B project area east of Runway 18-36 during and after construction. Refer to Section 14.7 for specific timing and sequence of construction requirements for the stormwater quality pond.

5. Riprap slopes, ditch linings, stone check dams, hay bale barriers, and culvert outlet aprons are intended to stabilize and protect denuded soil surfaces or dissipate the energy and erosive forces from concentrated flows. Installation details and stone sizes are provided in the construction plan set on the erosion control detail sheets.

6. Construction entrances will be constructed at access points onto the site to prevent tracking of soil onto adjacent local roads.

7. Stone sediment traps or hay bales and a premanufactured SiltSack® or approved equal will be installed at catch basin inlets to prevent silt from entering the storm drain system. Installation details are provided in the plan set on the erosion control detail sheets.

8. Riprap will be used on slopes greater than 3:1 in areas designated on the drawings.

9. Dirtbags™ or approved equal will be required to be on site and available for construction dewatering. The Contractor will be required to provide four Dirtbags™ with one prepared for operation prior to commencing any trenching operations.

10. Loam and seed is intended to serve as the primary permanent revegetative measure for all denuded areas not provided with other erosion control measures, such as riprap. Application rates are provided in Attachment A of this section for temporary and permanent seeding in non-wetland areas.

11. Silt logs are an option for stone check dams and may be substituted provided the devices are well anchored.

12. Sorbent booms are intended to capture oils and the asphalt sheen from paved surfaces and shall be installed in all catch basins before pavement is installed.

14.2 Temporary Erosion/Sedimentation Control Measures

The following are planned as temporary erosion/sedimentation control measures during construction:

1. A crushed stone-stabilized construction entrance shall be placed at any construction access points. The locations of the construction entrances shown on the drawings should be considered illustrative and adjusted as appropriate and located at any

area where tracking of mud and debris onto existing roads, previously paved areas within the project, or streets is a potential. Stone-stabilized construction entrances will require the stone to be removed and replaced as they become covered or filled with mud and material tracked by vehicles exiting the site.

2. Siltation fence shall be installed along the downgradient side of the proposed improvement areas. The siltation fence will remain in place and properly maintained until the site is acceptably revegetated. Siltation fence is to be used along the contour of significant fill slopes as illustrated on the erosion control plan site drawings. Siltation fence needs to be checked to insure the bottom is properly keyed in and inspected after significant rains. Wood chips from clearing are often used on the construction side of the silt fence to provide an extra margin of safety and security for the silt fence. This practice is encouraged provided the chips are removed or dispersed into forested areas when the fence is removed.

3. Dirtbags™ or approved equal shall be installed in accordance with the details in the plan set. The Dirtbags'™ function on the project is to receive any water pumped from excavations during construction. A Dirtbag™ shall be installed and prepared for operation prior to any trenching on site. When Dirtbags™ are observed to be at 50% capacity, they shall be cleaned or replaced. Stone under the Dirtbag™ shall be removed and replaced concurrently.

4. Temporary stockpiles of common excavation will be protected as follows:

   a) Temporary stockpiles shall not be located within 100 feet of the wetlands and at least 50 feet upgradient of the perimeter silt fence.

   b) Inactive stockpiles shall be stabilized within 5 days by either temporarily seeding the stockpile with a hydroseed method containing an emulsified mulch tackifier or by covering the stockpile with mulch. If necessary, mesh shall be installed to prevent wind from removing the mulch.

   c) Sediment barriers should be installed downgradient of stockpiles.

   d) Stormwater should be prevented from running onto stockpiles.

5. All denuded areas which have been rough graded shall receive mulch or erosion control mesh fabric within 7 days of initial disturbance of soil.

6. All soils disturbed between November 1 and April 1 will be covered with mulch within 5 days of disturbance, prior to any predicted storm event of the equivalent of ½" of equivalent rainfall in a 24-hour period, or prior to any work shutdown lasting more than 35 hours (including weekends and holidays). The mulch rate shall be double the normal rate.

   For work that is conducted between November 1 and April 15 of any calendar year, all denuded areas will be covered with hay mulch, applied at twice the normal application rate, and (in areas over 10% grade) anchored with a fabric netting. The time period for applying mulch shall be limited to 5 days for all areas or immediately in advance of a predicted rainfall event.

7. The paved access roads shall be swept to control mud and dust as necessary. A street sweeper shall be available from the Contractor on immediate notice or request from the Owner, Town, or regulatory agency. Any off-site tracking of mud or

sediment shall be vacuumed immediately and prior to the next significant storm event.

8. Stone check dams, silt logs, or hay bale barriers will be installed at any evident concentrated flow discharge points during construction and earthwork operations.

9. Silt fencing with a maximum stake spacing of 6 feet should be used, unless the fence is supported by wire fence reinforcement of minimum 14 gauge and with a maximum mesh spacing of 6 inches, in which case stakes may be spaced a maximum of 10 feet apart. The bottom of the fence should be properly anchored a minimum of 6" per the plan detail and backfilled. Any silt fence identified by the Owner or reviewing agencies as not being properly installed during construction shall be immediately repaired in accordance with the installation details.

10. Storm drain catch basin inlet protection shall be provided through the use of stone sediment barriers or a premanufactured SiltSack® or approved equal. Stone sediment barrier installation details are provided in the plan set. The barriers or SiltSacks® shall be inspected after each rainfall and repairs made as necessary, including the removal of sediment. Sediment shall be removed and the barrier or SiltSack® restored to its original dimensions when the sediment has accumulated to ½ the design depth of the barrier. Sediment shall be removed from SiltSacks® as necessary. Inlet protection shall be removed when the tributary drainage area has been stabilized.

11. All slopes over 8%, and 3:1 max shall receive erosion control mesh. Slopes steeper than 3:1 shall be riprapped. Slopes shall not exceed 1.5:1 Slopes shall only be 1.5:1 in the vicinity of the natural resource (coastal wetland associated with the Fore River).

12. Slopes steeper than 3:1 shall receive riprap.

13. Additional silt fences shall be installed as construction progresses.

14. Areas of visible erosion shall be stabilized with crushed stone. The size of the stone shall be determined by the Owner in consultation with the design engineer.

15. New catch basins shall all be installed with an opening 2'-6" below finished grade to receive a 4" underdrain with an end cap. A 3'-0" stub of underdrain surrounded by 6" of ¾" crushed stone and filter fabric shall be installed. The purpose of this measure is to provide drainage relief until site grades are at finish levels.

16. All catch basins which receive runoff from paved areas being constructed as part of this project shall have a sorbent boom installed in the catch basin sump prior to installing binder pavement or overlays.

17. Storm drain catch basin inlet protection shall be provided through the use of stone sediment barriers (paved areas) or hay bales (lawn areas) and a pre-manufactured SiltSack® or approved equal. Stone sediment barrier installation details are provided in the plan set. The barriers or SiltSacks® shall be inspected after each rainfall and repairs made as necessary, including the removal of sediment. Sediment shall be removed in a timely manner.

18. No disturbance shall take place within 50-feet of a protected natural resource. This includes the coastal wetlands associated with the Fore River in the area of the perimeter road relocation (Project Area 10) and Water Quality Filter #2.

19. All areas within 75-feet of a protected natural resource must be protected with a double row of sediment barriers during winter construction.

14.3 Standards for Stabilizing Sites for the Winter

The construction of the projects will occur over multiple years and multiple seasons. The contractor shall schedule the work to avoid construction of the water quality filters during the winter months. For permitted winter construction, the erosion control measures are substantially more stringent due to the cold temperatures and lack of weather which aids in drying the subgrade soils through evaporation. During the periods of November 1st through April 1st, the Contractor shall install erosion control mix berms in lieu of silt fence. The minimum inspection requirement for winter construction is after each rainfall, snowstorm, or thawing and at least once a week. Refer to 14.13 for inspector qualifications and responsibilities.

1. Standard for the timely stabilization of ditches and channels: The contractor shall construct and stabilize all stone-lined ditches and channels on the site by November 15. The contractor shall construct and stabilize all grass-lined ditches and channels on the site by September 15. If the contractor fails to stabilize a ditch or channel to be grass-lined by September 15, then the contractor shall take one of the following actions to stabilize the ditch for late fall and winter.

    i. Install a sod lining in the ditch. The contractor shall line the ditch with properly installed sod by October 1. Proper installation includes the contractor pinning the sod onto the soil with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, watering the sod to promote root growth into the disturbed soil, and anchoring the sod with jute or plastic mesh to prevent the sod strips from sloughing during flow conditions.

    ii. Install a stone lining in the ditch. The contractor shall line the ditch with stone riprap by November 15. The contractor shall hire a registered professional engineer to determine the stone size and lining thickness needed to withstand the anticipated flow velocities and flow depths within the ditch. If necessary, the contractor shall regrade the ditch prior to placing the stone lining so as to prevent the stone lining from reducing the ditch's cross-sectional area.

2. Standard for the timely stabilization of disturbed slopes: The contractor shall construct and stabilize stone-covered slopes by November 15. The contractor shall seed and mulch all slopes to be vegetated by September 15. The department will consider any area having a grade greater than 15% (10H:1V) to be a slope. If the Contractor fails to stabilize any slope to be vegetated by September 15, then the Contractor shall take one of the following actions to stabilize the slope for late fall and winter.

    i. Stabilize the soil with temporary vegetation and erosion control mesh. By October 1 the contractor shall seed the disturbed slope with winter rye at a seeding rate of 3 pounds per 1000 square feet and apply erosion control mats over the mulched slope. The Contractor shall monitor growth of the rye over the next 45 days. If the rye fails to grow at least three inches or fails to cover at least 90% of the disturbed slope by November 15, then the contractor shall cover the slope with a layer of wood waste compost as described in item iii of this standard or with stone rip rap as described in item iv of this standard.

ii. Stabilize the slope with sod. The contractor shall stabilize the disturbed slope with properly installed sod by October 1. Proper installation includes the contractor pinning the sod onto the slope with wire pins, rolling the sod to guarantee contract between the sod and underlying soil, and watering the sod to promote root growth into the disturbed soil. The contractor shall not use late-season sod installation to stabilize slopes having a grade greater than 33% (3H: 1V) or having groundwater seeps on the slope face.

iii. Stabilize the slope with wood waste compost. The contractor shall place a six-inch layer of wood waste compost on the slope by November 15. Prior to placing the wood waste compost, the contractor shall remove any snow accumulation on the disturbed slope. The contractor shall not use wood waste compost to stabilize slopes having grades greater than 50% (2H:1V) or having groundwater seeps on the slope face.

iv. Stabilize the slope with stone rip rap. The contractor shall place a layer of stone riprap on the slope by November 15. The contractor shall hire a registered professional engineer to determine the stone size needed for stability and to design a filter layer for underneath the riprap.

3. Standard for the timely stabilization of disturbed soil: By September 15, the contractor shall seed and mulch all disturbed soils on areas having a slope less than 15%. If the contractor fails to stabilize these soils by this date, then the contractor shall take one of the following actions to stabilize the soil for late fall and winter.

   i. Stabilize the soil with temporary vegetation. By October 1, the contractor shall seed the disturbed soil with winter rye at a seeding rate of 3 pounds per 1000 square feet, lightly mulch the seeded soil with hay or straw at 75 pounds per 1000 square feet, and anchor the mulch with plastic netting. The contractor shall monitor the growth of the rye over the next 45 days. If the rye fails to grow at least three inches or fails to cover at least 90% of the disturbed soil before November 15, then the contractor shall mulch the area for over-winter protection as described in item iii of this standard.

   ii. Stabilize the soil with sod. The contractor shall stabilize the disturbed soil with properly installed sod by October 1. Proper installation includes the contractor pinning the sod onto the soil with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, and watering the sod to promote root growth into the disturbed soil.

   iii. Stabilize the soil with mulch. By November 15, the contractor shall mulch the disturbed soil by spreading hay or straw at a rate of at least 150 pounds per 1000 square feet on the area so that no soil is visible through the mulch. Prior to applying the mulch, the contractor shall remove any snow accumulation on the disturbed area. Immediately after applying the mulch, the contractor shall anchor the mulch with plastic netting to prevent wind from moving the mulch off the disturbed soil.

14.4 Special Measures for Summer Construction

The summer period is generally optimum for construction in Maine, but it is also the period where intense, short-duration storms are most common, making denuded areas very susceptible to erosion, where dust control needs to be the most stringent, and

where the potential to establish vegetation is often restricted by moisture deficit. During these periods the contractor must:

1. Implement a program to apply dust control measures on a daily basis except those days where the precipitation exceeds 0.25 inches;
2. Spray the mulch after anchoring with water to dampen the soil and encourage early growth. Temporary seed may be required until the late summer seeding season.
3. Mulch, cover, and moisten stockpiles of fine-grained materials which are susceptible to erosion.
4. Take additional steps needed to control fugitive dust emissions to minimize reductions in visibility and the airborne dispersing of fine-grained soils.
5. Any off-site tracking of mud or sediment shall be vacuumed immediately and prior to the next storm.

These measures may also be required in the spring and fall during the drier periods of these seasons.

14.5 Sedimentation Sumps

The use of shallow sediment sumps on the downgradient side of erodible stockpiles and areas where denuded conditions will be prolonged is encouraged. The sediment sumps may be installed and used in conjunction with the underdrain inlets at catch basins. The water quality filter areas may be used as temporary sediment sumps if the gravel filter and underdrain are not installed until the up-gradient area is stabilized or unless a sacrificial filter fabric is placed above the filter to protect the area until the site has been stabilized.

14.6 Permanent Erosion Control Measures

The following permanent erosion control measures have been designed as part of the Erosion/Sedimentation Control Plan:

1. The drainage conveyance systems have been designed to intercept and convey the 10-year or the 25-year storm, depending upon the location on site. In the case of open channels or swales, this includes the design of measures to resist scour of the channel.

2. All storm drain pipes shall have riprap aprons at their outlet to protect the outlet and receiving channel of the culverts from scour and deterioration. Installation details are provided in the plan set. The aprons shall be installed and stabilized prior to directing runoff to the tributary pipe or culvert. It is noted that all inlets and outlets 12” or over in diameter are to have flared concrete inlet and outlet ends or HDPE flares.

3. All areas disturbed during construction, but not subject to other restoration (paving, riprap, etc.) will be loamed, limed, fertilized, mulched, and seeded. Fabric netting, anchored with staples, shall be placed over the mulch in areas where the finish grade slope is greater than 8 percent. Native topsoil shall be stockpiled and temporarily stabilized with seed and mulch and reused for final restoration when it is of sufficient quality.

4. Catch basins shall be provided with sediment sumps for all outlet pipes that are 12" in diameter or greater.

5. A permanent water quality filter will be installed. An existing filter will be reshaped and a water quality pond will be modified. The filters and pond will collect and treat stormwater from the site and discharge to the Fore River.

14.7 Timing and Sequence of Erosion/Sedimentation Control Measures

The following construction sequence shall be required to insure the effectiveness of the erosion and sedimentation control measures is optimized.

Note: For all grading activities, the Contractor shall exercise extreme caution not to overexpose the site by limiting the disturbed area and shall stabilize any steep slopes within 24 hours if final slope grading and stabilization will not be completed within 7 days. Any final slopes shall have the specified erosion control measures installed within 7 days of final stabilization.

1. Install crushed-stone stabilized construction entrances where shown on the project drawings.
2. Mark the grading and clearing limits and initiate clearing that will permit the contractor to access the site and install silt fence.
3. Install siltation fence where shown on the contract drawings. During the periods of November 1st through April 1st, the Contractor shall install erosion control mix berms in lieu of silt fence.
4. Establish and prepare Dirtbag™ area.
5. Add sheet baffle walls to the wet pond at the beginning of the construction sequence to provide maximum treatment during construction.
6. Construct diversion and drainage channels to direct flow to the sediment basins.
7. Clear and grub the project area.
8. Prepare area to receive excavated material recognizing the need to limit the denuded area of the site.
9. Construct the perimeter road and install gravels, and restore the slopes.
10. Grub and conduct rock removal.
11. Install stone and hay bale check dams at any concentrated flow discharge points.
12. Install storm drain, underground electric, collection system, and other utility work. Install inlet and outlet protection immediately after the installation of any culverts. Pump any accumulated water to the Dirtbag™.
13. Install erosion control measures and construct the improvement area subgrade including extension of embankments and temporary slope stabilization.
14. Construct other site improvements and utilities. Place gravels in the apron, taxiway, and service road areas as soon as subgrade is prepared to minimize the period that the unprotected subgrade is exposed and vulnerable to erosion from runoff events.

15. Raise catch basins to grade and install inlet protection devices, the SiltSack® inside the basin and the external hay bales or stone filter.

16. Install binder pavement as detailed on the site plans.

17. Loam, lime, fertilize, seed and mulch all disturbed and denuded areas.

18. Remove all accumulated sediment from silt barriers.

19. Review stability of the site. If a 90% catch of grass is achieved, remove all other temporary erosion control devices, the fabric over sediment forebays, and removal of the temporary sedimentation sumps.

Soil will be considered disturbed if it does not have an established stand of vegetation covering at least 90% of the soil surface or have not been mulched with hay applied at a rate of 230-lb. /1000 sq. ft.

It is anticipated that site work may be suspended prior to winter. If so, the General Contractor shall schedule a meeting with the MeDEP, Owner, and Owner's representatives to review the site for conformance with the plan. This meeting shall be scheduled at least 10 days prior to winter shutdown. The Owner may elect to provide the Contractor with a punch list for measures to be complete before the interim shutdown. The Owner's punch list shall not obviate the Contractor's responsibility for compliance with the erosion control requirements of the project or permits.

14.8 Contracting Procedure

The project will be constructed by a General Contractor or Site Contractor under contract to the City of Portland. The Contractor involved in site construction shall submit a schedule for the completion of the work which will satisfy the following criteria:

1. The above construction sequence should generally be completed in the specified order; however, several separate items may be constructed simultaneously. Work must also be scheduled or phased to prevent the extent of the exposed areas as specified within this narrative. The intent of this sequence is to provide for erosion control and to have structural measures such as silt fence and construction entrances in place before construction begins as well as to limit the exposed area to one that can be prepared in anticipation of predicted and non-predicted storm events except for the shorter period required for winter construction.

2. The work shall be conducted in sections which will:

   a) Limit the amount of exposed area to those areas in which work is expected to be undertaken during the proceeding 30 days. Areas shall not be worked until the appropriate erosion control materials have been installed or are on the site to install as required by this narrative.

   b) Re-vegetate disturbed areas as rapidly as possible. All areas shall be permanently stabilized within 14 days of final grading or before a predicted storm event.

   c) Incorporate planned inlets and drainage system as early as possible into the construction phase. The ditches shall be immediately lined or revegetated as soon as their installation is complete.

3. Once final grade has been established, the Contractor may choose to dormant seed the disturbed areas prior to placement of mulch and placement of fabric netting anchored with staples.

    a. If dormant seeding is used for the site, all disturbed areas shall receive 4" of loam and seed at an application rate of 5#/1000 s.f.

    b. All areas seeded during the winter months will be inspected in the Spring for adequate catch. All areas insufficiently vegetated (less than 90% catch) shall be revegetated by replacing loam, seed and mulch.

    c. If dormant seeding is not used for the site, all disturbed areas shall be revegetated in the spring.

4. The area of denuded non-stabilized construction shall be limited to the minimum area practicable. An area shall be considered to be denuded until the subbase gravel is installed in taxiway, apron and snow shoulder areas, or the areas of future loam and seed have been loamed, seeded, and mulched. The mulch rate shall be twice the rate specified in the seeding plan. [For example, 115#/1,000 s.f. x 2 = 230#/1,000 s.f.]

5. Within the exposed work area, temporary sedimentation sumps shall be provided at the interface between proposed paved areas and graded slopes (refer to paragraph 14.7). This shall be accomplished by creating an area 18" below adjacent temporary grades. The sedimentation area shall have a bottom width of 3' and 3:1 side slopes. Culverts to allow access shall be installed by the Contractor. Along the sedimentation sumps, barriers shall be provided at sufficient intervals to permit runoff to be accumulated to a minimum depth of 12" before overflowing. The sediment forebay within sediment basins may be used as a sediment sump if the filter elements are delayed until up-gradient areas have been stabilized or if covered with a sacrificial filter fabric that will protect the underlying areas.

6. The schedule shall be subject to the approval of the Owner and must comply with the requirements of this erosion control report. The sequence and limitations of the erosion control report shall be contractual and failure shall be deemed a violation of the contract.

7. The contractor must maintain an accurate set of record drawings indicating the date when an area is first denuded, the date of temporary stabilization, and the date of final stabilization. On October 1 of any calendar year, the contractor shall submit a detailed plan for stabilizing the site for the winter and a description of what activities are planned during the winter.

8. The Contractor must install any added measures which may be necessary to control erosion/sedimentation and fugitive dust emissions from the site with adjustments made dependent upon forecasted and actual site and weather conditions.

The Owner may be required to retain a third party inspector. The Contractor shall cooperate with the third party inspector and permit access to the site by the inspector at all times.

The Contractor shall note that no area within 50 feet of a slope with a vertical drop of more than 3' in 50 feet shall remain denuded for a period of over 5 days before it is

temporarily stabilized. Temporary stabilization shall be the installation of mulching. All other areas shall be stabilized within 14 days. For construction between November 1 and April 15 of any calendar year, all areas shall be temporarily stabilized at the earlier time frames specified above.

It is anticipated that site work may be suspended prior winter seasons. If so, the General Contractor shall schedule a meeting with the Owner, a representative of MeDEP, and Owner's representatives to review the site for conformance with the plan and to check for conformance of the project with Section 14.8 of this plan. This meeting shall be scheduled at least 10 days prior to winter shutdown. The Owner may elect to provide the Contractor with a punch list for measures to be completed to satisfy this erosion control plan before the interim shutdown. The Owner's punch list shall not obviate the Contractor's responsibility for compliance with the erosion control requirements of the project or permits.

14.9 Provisions for Maintenance of the Erosion/Sedimentation Control Features During Construction

The project is subject to the requirement of a MeDEP Site Location of Development Permit, MeDEP Natural Resources Protection Act permits, Federal 404 wetland permits, and a MeDEP General Permit for Stormwater Pollution Prevention. This project requires the Contractor to prepare a list and designate by name, address and telephone number all individuals who will be responsible for implementation, inspection and maintenance of all erosion control measures identified within this section and as contained in the Erosion and Sedimentation Control Plan of the contract drawings. Specific responsibilities of the inspector(s) will include:

1. Execution of the Contractor/Subcontractor Certification contained in Attachment B by any and all parties responsible for erosion control measures on the site as required by the forms. This task is the responsibility of the inspector.
2. Assuring and certifying the Owner's construction sequence and all subcontractors are in conformance with the specified schedule of this section. A weekly certification stating compliance, any deviations, and corrective measures necessary to comply with the erosion control requirements of this section shall be prepared and signed by the inspector(s). In the event that the site work is subcontracted, this certification shall be signed by both the General and Site Work contractors. This task is the responsibility of the inspector.
3. In addition to the weekly certifications, the inspector(s) shall maintain written reports recording construction activities on site which include:
    - Dates when major grading activities occur in a particular area.
    - Dates when major construction activities cease in a particular area, either temporarily or permanently.
    - Dates when an area is stabilized.
4. Inspection of this project work site on a weekly basis, and before and after each significant rainfall event (0.5 inch or more within any consecutive 24-hour period) during construction until permanent erosion control measures have been properly installed and the site has been stabilized. Inspection of the project work site shall include:

- Identification of proper erosion control measure installation in accordance with the erosion control detail sheet or as specified in this section.
- Determine whether each erosion control measure is properly operating. If not, identify damage to the control device and determine remedial measures.
- Identify areas which appear vulnerable to erosion and determine additional erosion control measures which should be used to improve conditions.
- Inspect areas of recent seeding to determine percent catch of grass. A minimum catch of 90% is required prior to removal of erosion control measures.
- The scope of the inspection includes disturbed and impervious areas, material storage areas, and vehicle access points in addition to erosion control measures.

Accumulated silt/sediment should be removed when the depth of sediment reaches 50% of the barrier height. Accumulated silt/sediment should be removed from behind silt fencing when the depth of the sediment reaches 6 inches.

SiltSacks® should be removed and replaced at least every three months and at any time when the weekly inspection reveals that siltation has significantly retarded the rate of flow through the SiltSack®.

5. If inspection of the site indicates a change should be made to the erosion control plan, either to improve effectiveness or correct a site-specific deficiency, the inspector shall immediately implement the corrective measure and notify the owner of the change.

6. If an inspection determines that a corrective action is required, the action or repair shall be started by the end of the next workday and completed within seven days, or before the next storm event. Documentation of these corrective actions shall be maintained with the inspection forms.

7. Inspection requirements/frequency also applies to winter work.

8. All construction inspections shall be conducted by someone with knowledge of erosion and stormwater control, including the standards and conditions in the permit.

Once construction has been completed, long-term maintenance of the detention pond and water quality filters will be the responsibility of the Owner. The catch basin sumps shall be inspected each year. Sediment shall be removed when the depth of sediment reaches one half the depth of the sump.

All certifications, inspection forms, and written reports prepared by the inspector(s) shall be filed with the Owner, and the Permit File contained on the project site. All written certifications, inspection forms, and written reports must be filed within one (1) week of the inspection date. The inspection forms and documentation of corrective actions during construction shall be maintained for at least three (3) years.

The Contractor has sole responsibility for complying with the erosion/sediment control report and shall be responsible for any monetary penalties resulting from failure to comply with these standards.

14.10 Preconstruction Conference

Prior to any construction at the site, representatives of the Contractor, MeDEP and City of Portland and City of South Portland officials when applicable and the site design engineer shall arrange for and meet with the Owner to discuss the scheduling of the site construction and the designation of the responsible parties for implementing the plan. This meeting shall be scheduled by the Contractor with reasonable advance notice for all attendees. Prior to the meeting the Contractor shall prepare a detailed schedule and a marked-up site plan indicating areas and components of the work and key dates showing date of disturbance and completion of the work. If bid through a general contractor, the general contractor's superintendent shall provide a written acknowledgement that the erosion control plan has definitive dates for implementation. The contractor shall conduct a meeting with employees and subcontractors to review the erosion control plan, the construction techniques which will be employed to implement the plan, and provide a list of attendees and items discussed at the meeting to the Owner. Three copies of the schedule, the contractor's meeting minutes, and marked-up site plan shall be provided to the Owner at the preconstruction meeting.

14.11 Attachments

Attachment A – Seeding Plan
Attachment B – Sample Certification and Inspection Forms
Attachment C – MeDEP Chapter 500 Appendix C – Housekeeping Notes
Attachment D – Previously Permitted Project 1 (Erosion and Sediment Control Plan dated 3-12-2018)

14.12 References

Project Drawings 1 through 45 and WS-1 through WS-14 dated October 12, 2018

2016 Revision to the 2003 Maine Erosion and Sediment Control Best Management Practices (BMPs) Manual for Designers and Engineers

2014 Revision to the 2003 Maine Erosion and Sediment Control Field Guide for Contractors

ATTACHMENT A

Seeding Plan

SEEDING PLAN: Lawn or Infield Turf

Project Portland International Jetport

Site Location 1001 Westbrook Street, Portland, Maine

X Permanent Seeding _____ Temporary Seeding

1. Area to be seeded: TBD acre, OR _____ M Sq. Ft.
2. Instructions on preparation of soil: Prepare a good seed bed for planting method used.
3. Apply lime as follows: _____ #/acres, OR 115 #/M Sq. Ft.
4. Fertilize with phosphorus-free fertilizer supplying 1 lb. active N / M Sq. Ft.
5. Method of applying lime and fertilizer: Spread and work into the soil before seeding.
6. Seed with the following mixture:

   35% Perennial Rye
   25% Kentucky Bluegrass
   40% Penn Lawn Tall Fescue

When using small grain as nurse crop seed it at one-half the normal seeding rate.

7. Mulching instructions: Apply at the rate of _____ tons per acre. OR 115 pounds per M. Sq. Ft.

	Amount	Unit #, Tons, Etc.
8. TOTAL LIME	115	#/1000 sq. ft.
9. TOTAL FERTILIZER	1 active N	#/1000 sq. ft.
10. TOTAL SEED	8.0	#/1000 sq. ft.
11. TOTAL MULCH	115	#/1000 sq. ft.
12. TOTAL other materials, seeds, etc.		

13. REMARKS

- Spring seeding is recommended; however, late summer (prior to September 1) seeding can be made. Permanent seeding should be made prior to October 15 or as a dormant seeding after the first killing frost and before the first snowfall. If seeding cannot be done within these seeding dates, temporary seeding and mulching shall be used to protect the site. Permanent seeding shall be delayed until the next recommended seeding period.

- Fertilizer requirements shall be subject to actual test results of the topsoil used for the project. The Contractor shall be responsible for providing topsoil test results for pH and recommended fertilizer application rates to the Owner. The pH should be between 6.0 and 8.0.

- Seed mixture shall be fresh, clean, new crop seed. Seed may be mixed by an appropriate method on the site or may be mixed by the dealer. If the seed is mixed on the site, each variety shall be delivered in the original containers bearing the dealer's guaranteed analysis. If seed is mixed by the dealer, the Seeding Contractor shall furnish to the Owner the dealer's guaranteed statement of the composition of the mixture and the percentage of purity and germination of each variety.

- Seed shall be purchased from a recognized distributor and shall test to a minimum percentage of 95% for purity and 85% for germination.

- All loam shall have compost or peat admixtures to raise the organic content to 8%.

- Recommended fertilizer shall contain zero phosphorus with a nutrient analysis most suitable for supplying test indicated amounts of Nitrogen and Potassium (Potash). Organic and/or slow release forms of Nitrogen are preferred.

SEEDING PLAN: EROSION CONTROL MIX

Project Portland International Jetport

Site Location 1001 Westbrook Street, Portland, Maine

X Permanent Seeding _____ Temporary Seeding

1. Area to be seeded: TBD acres, OR _____ M Sq. Ft.
2. Instructions on preparation of soil: Prepare a good seed bed for planting method used.
3. Apply lime as follows: _____ #/acres, OR 115#/M Sq. Ft.
4. Fertilize with phosphorus-free fertilizer supplying 1 lb. active N / M Sq. Ft.
5. Method of applying lime and fertilizer: Spread and work into the soil before seeding.
6. Seed with the following mixture:

   New England Erosion Control Seed Mix as manufactured by *"New England Wetland Plants, Inc. – Amherst, MA" consisting of the following species:*

Creeping Red Fescue	Annual Rye-grass
Timothy	White Clover
Red Top	Little Bluestem
Indian Grass	

When using small grain as nurse crop seed it at one-half the normal seeding rate.

7. Mulching instructions: Apply at the rate of _____ tons per acre. OR 230 pounds per M. Sq. Ft.

	Amount	Unit #, Tons, Etc.
8. TOTAL LIME……..	115	#/1000 sq. ft.
9. TOTAL FERTILIZER…….	1 active N	#/1000 sq. ft.
10. TOTAL SEED…….	1	#/1000 sq. ft.
11. TOTAL MULCH…….	230	#/1000 sq. ft.
12. TOTAL other materials, seeds, etc.……..……		

13. REMARKS

- For areas with slopes >10% and fall and winter erosion control areas, mulch netting shall be used per manufacturer's specifications.
- Spring seeding is recommended; however, late summer (prior to September 1) seeding can be made. Permanent seeding should be made prior to October 15 or as a dormant seeding after the first killing frost and before the first snowfall. If seeding cannot be done within these seeding dates, temporary seeding and mulching shall be used to protect the site. Permanent seeding shall be delayed until the next recommended seeding period.
- Fertilizer requirements shall be subject to actual test results of the topsoil used for the project. The Contractor shall be responsible for providing topsoil test results for pH and recommended fertilizer application rates to the Owner. The pH should between 5.5 and 7.5.
- All loam shall have compost or peat admixtures to raise the organic content to 8%.
- Seed mixture shall be fresh, clean, new crop seed. Seed may be mixed by an appropriate method on the site or may be mixed by the dealer. If the seed is mixed on the site, each variety shall be delivered in the original containers bearing the dealer's guaranteed analysis. If seed is mixed by the dealer, the Seeding Contractor shall furnish

to the Owner the dealer's guaranteed statement of the composition of the mixture and the percentage of purity and germination of each variety.

- Seed shall be purchased from a recognized distributor and shall test to a minimum percentage of 95% for purity and 85% for germination.

- Recommended fertilizer shall contain zero phosphorus with a nutrient analysis most suitable for supplying test indicated amounts of Nitrogen and Potassium (Potash). Organic and/or slow release forms of Nitrogen are preferred.

SEEDING PLAN: LOW MAINTENANCE AREAS

Project Portland International Jetport

Site Location 1001 Westbrook Street, Portland, Maine

X Permanent Seeding _____ Temporary Seeding

1. Area to be seeded: TBD acres, OR _____ M Sq. Ft.
2. Instructions on preparation of soil: Prepare a good seed bed for planting method used.
3. Apply lime as follows: _____ #/acres, OR 115 #/M Sq. Ft.
4. Fertilize with phosphorus-free fertilizer supplying 1 lb. active N / M Sq. Ft.
5. Method of applying lime and fertilizer: Spread and work into the soil before seeding.
6. Seed with the following mixture:

   New England Conservation/Wildlife Mix as manufactured by *"New England Wetland Plants, Inc. – Amherst, MA" consisting of the following species:*

Big Bluestem	Switchgrass
Little Bluestem	Canada Wild Rye
Fox Sedge	Partridge Pea
Fringed Bromegrass	Pennsylvania Smartweed
Common Milkweed	Showy Tick-Trefoil
New England Aster	Flat-Top Aster
Nodding Bur-Marigold	

   When using small grain as nurse crop seed it at one-half the normal seeding rate.

7. Mulching instructions: Apply at the rate of _____ tons per acre. OR 180 pounds per M. Sq. Ft.

	Amount	Unit # Tons, Etc.
8. TOTAL LIME……..	115	#/1000 sq. ft.
9. TOTAL FERTILIZER……	1 active N	#/1000 sq. ft.
10. TOTAL SEED……..	0.75	#/1000 sq. ft.
11. TOTAL MULCH…….	115	#/1000 sq. ft.
12. TOTAL other materials, seeds, etc.……		

13. REMARKS

- Spring seeding is recommended; however, late summer (prior to September 1) seeding can be made. Permanent seeding should be made prior to October 15 or as a dormant seeding after the first killing frost and before the first snowfall. If seeding cannot be done within these seeding dates, temporary seeding and mulching shall be used to protect the site. Permanent seeding shall be delayed until the next recommended seeding period.

- Fertilizer requirements shall be subject to actual test results of the topsoil used for the project. The Contractor shall be responsible for providing topsoil test results for pH and recommended fertilizer application rates to the Owner. The pH should be between 6.0 and 8.0.

- Seed mixture shall be fresh, clean, new crop seed. Seed may be mixed by an appropriate method on the site or may be mixed by the dealer. If the seed is mixed on the site, each variety shall be delivered in the original containers bearing the

dealer's guaranteed analysis. If seed is mixed by the dealer, the Seeding Contractor shall furnish to the Owner the dealer's guaranteed statement of the composition of the mixture and the percentage of purity and germination of each variety.

- Seed shall be purchased from a recognized distributor and shall test to a minimum percentage of 95% for purity and 85% for germination.

- All loam shall have compost or peat admixtures to raise the organic content to 8%.

- Recommended fertilizer shall contain zero phosphorus with a nutrient analysis most suitable for supplying test indicated amounts of Nitrogen and Potassium (Potash). Organic and/or slow release forms of Nitrogen are preferred.

SEEDING PLAN: GRASS UNDERDRAINED SOIL FILTER BEDS

Project Portland International Jetport

Site Location 1001 Westbrook Street, Portland, Maine

X Permanent Seeding _____ Temporary Seeding

1. Area to be seeded: TBD acres, OR _____ M Sq. Ft.
2. Instructions on preparation of soil: Prepare a good seed bed for planting method used.
3. Apply lime as follows: _____ #/acres, OR 115 #/M Sq. Ft.
4. Fertilize with phosphorus-free fertilizer supplying 1 lb. active N / M Sq. Ft.
5. Method of applying lime and fertilizer: Spread and work into the soil before seeding.
6. Seed with the following mixture:

   New England Erosion Control/Restoration Mix as manufactured by "New England Wetland Plants, Inc. – Amherst, MA" consisting of the following species:

Switchgrass	N. England Aster
Va. Wild Rye	Grass-leaved Goldenrod
Creeping Red Fescue	Nodding Bur Marigold
Fox Sedge	Green Bulrush
Creeping Bentgrass	Joe-Pye Weed
Soft Rush	Boneset
Blue Vervain	

   When using small grain as nurse crop seed it at one-half the normal seeding rate.

7. Mulching instructions: Apply at the rate of _____ tons per acre. OR 180 pounds per M. Sq. Ft.

	Amount	Unit # Tons, Etc.
8. TOTAL LIME……..	115	#/1000 sq. ft.
9. TOTAL FERTILIZER……	1 active N	#/1000 sq. ft.
10. TOTAL SEED……..1		#/1000 sq. ft.
11. TOTAL MULCH……	115	#/1000 sq. ft.
12. TOTAL other materials, seeds, etc.…….		

13. REMARKS

- Spring seeding is recommended; however, late summer (prior to September 1) seeding can be made. Permanent seeding should be made prior to October 15 or as a dormant seeding after the first killing frost and before the first snowfall. If seeding cannot be done within these seeding dates, temporary seeding and mulching shall be used to protect the site. Permanent seeding shall be delayed until the next recommended seeding period.

- Fertilizer requirements shall be subject to actual test results of the topsoil used for the project. The Contractor shall be responsible for providing topsoil test results for pH and recommended fertilizer application rates to the Owner. The pH should be between 6.0 and 8.0.

- Seed mixture shall be fresh, clean, new crop seed. Seed may be mixed by an appropriate method on the site or may be mixed by the dealer. If the seed is mixed on the site, each variety shall be delivered in the original containers bearing the dealer's guaranteed analysis. If seed is mixed by the dealer, the Seeding Contractor

shall furnish to the Owner the dealer's guaranteed statement of the composition of the mixture and the percentage of purity and germination of each variety.

- Seed shall be purchased from a recognized distributor and shall test to a minimum percentage of 95% for purity and 85% for germination.

- All loam shall have compost or peat admixtures to raise the organic content to 8%.

- Recommended fertilizer shall contain zero phosphorus with a nutrient analysis most suitable for supplying test indicated amounts of Nitrogen and Potassium (Potash). Organic and/or slow release forms of Nitrogen are preferred.

TEMPORARY SEEDING PLAN

Project Portland International Jetport

Site Location 1001 Westbrook Street, Portland, Maine

_____ Permanent Seeding X Temporary Seeding

1. Area to be seeded: TBD acres, OR _____ M Sq. Ft.
2. Instructions on preparation of soil: Prepare a good seed bed for planting method used.
3. Apply lime as follows: _____ #/acres, OR 115#/M Sq. Ft.
4. Fertilize with phosphorus-free fertilizer supplying 1 lb. active N / M Sq. Ft.
5. Method of applying lime and fertilizer: Spread and work into the soil before seeding.
6. Seed with the following mixture:

   50% Perennial Ryegrass
   50% Annual Ryegrass

   When using small grain as nurse crop seed it at one-half the normal seeding rate.

7. Mulching instructions: Apply at the rate of _____ tons per acre. OR 180 pounds per M. Sq. Ft.

		Amount	Unit #,Tons, Etc.
8.	TOTAL LIME……..	115	#/1000 sq. ft.
9.	TOTAL FERTILIZER…….	1 active N	#/1000 sq. ft.
10.	TOTAL SEED…….	4	#/1000 sq. ft.
11.	TOTAL MULCH…….	180	#/1000 sq. ft.
12.	TOTAL other materials, seeds, etc.…….		

13. REMARKS

- The above seed mix is required in all disturbed areas that cannot be permanently seeded within allowable timeframe.
- Recommended fertilizer shall contain zero phosphorus with a nutrient analysis most suitable for supplying test indicated amounts of Nitrogen and Potassium (Potash). Organic and/or slow release forms of Nitrogen are preferred.

ATTACHMENT B

Sample Certification and Inspection Forms

STORMWATER POLLUTION PREVENTION PLAN

CONTRACTOR/SUBCONTRACTOR CERTIFICATION

PROJECT INFORMATION

Project Portland International Jetport

Site Location 1001 Westbrook Street, Portland, Maine

CONTRACTOR/SUBCONTRACTOR INFORMATION

Firm Name:

Address:

Telephone:

Type of Firm:

CERTIFICATION STATEMENT

"I certify under penalty of law that I understand the terms and conditions of the Maine General Permit for Pollutant Discharge Elimination System (MGDES) permit that authorizes the stormwater discharges associated with construction activity from the project site identified as part of this certification."

_____
Signature

_____
Typed Name

_____
Title

_____
Date

STORMWATER POLLUTION PREVENTION PLAN

INSPECTION REPORT

PROJECT INFORMATION

Project Portland International Jetport

Site Location 1001 Westbrook Street, Portland, Maine

INSPECTOR INFORMATION

Inspector Name: _____

Firm: _____

Title: _____

Qualifications: _____

INSPECTION SUMMARY

Date of Inspection: _____

Major Observations: _____

_____

_____

_____

THE FACILITY IS IN COMPLIANCE WITH THE STORMWATER POLLUTION PREVENTION PLAN WITH THE FOLLOWING EXCEPTIONS:

_____

_____

_____

_____

ACTIONS NECESSARY TO BRING FACILITY INTO COMPLIANCE:

_____

_____

REQUIRED MODIFICATIONS TO STORMWATER POLLUTION PREVENTION PLAN (MUST BE IMPLEMENTED WITHIN 7 DAYS OF INSPECTION):

_____

_____

_____

_____

CERTIFICATION STATEMENT:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the systems, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of find and imprisonment for knowing violations."

_____
Signature

_____
Typed Name

_____
Title

_____
Date

ATTACHMENT C

MeDEP Chapter 500 Appendix C – Housekeeping Notes

MaineDEP CHAPTER 500 APPENDIX C – HOUSEKEEPING NOTES

These performance standards apply to all projects except for stormwater PBR projects.

1. **Spill prevention.** Controls must be used to prevent pollutants from construction and waste materials stored on site to enter stormwater, which includes storage practices to minimize exposure of the materials to stormwater. The site contractor or operator must develop, and implement as necessary, appropriate spill prevention, containment, and response planning measures.

   NOTE: Any spill or release of toxic or hazardous substances must be reported to the Department. For oil spills, call 1-800-482-0777 which is available 24 hours a day. For spills of toxic or hazardous material, call 1-800-452-4664 which is available 24 hours a day. For more information, visit the Department's website at: http://www.maine.gov/dep/spills/emergspillresp/

2. **Groundwater protection.** During construction, liquid petroleum products and other hazardous materials with the potential to contaminate groundwater may not be stored or handled in areas of the site draining to an infiltration area. An "infiltration area" is any area of the site that by design or as a result of soils, topography and other relevant factors accumulates runoff that infiltrates into the soil. Dikes, berms, sumps, and other forms of secondary containment that prevent discharge to groundwater may be used to isolate portions of the site for the purposes of storage and handling of these materials. Any project proposing infiltration of stormwater must provide adequate pre-treatment of stormwater prior to discharge of stormwater to the infiltration area, or provide for treatment within the infiltration area, in order to prevent the accumulation of fines, reduction in infiltration rate, and consequent flooding and destabilization.

   See Appendix D for license by rule standards for infiltration of stormwater.

   NOTE: Lack of appropriate pollutant removal best management practices (BMPs) may result in violations of the groundwater quality standard established by 38 M.R.S.A. §465-C(1).

3. **Fugitive sediment and dust.** Actions must be taken to ensure that activities do not result in noticeable erosion of soils or fugitive dust emissions during or after construction. Oil may not be used for dust control, but other water additives may be considered as needed. A stabilized construction entrance (SCE) should be included to minimize tracking of mud and sediment. If off-site tracking occurs, public roads should be swept immediately and no less than once a week and prior to significant storm events. Operations during dry months, that experience fugitive dust problems, should wet down unpaved access roads once a week or more frequently as needed with a water additive to suppress fugitive sediment and dust.

   NOTE: Dewatering a stream without a permit from the Department may violate state water quality standards and the *Natural Resources Protection Act*.

4. **Debris and other materials.** Minimize the exposure of construction debris, building and landscaping materials, trash, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials to precipitation and stormwater runoff. These materials must be prevented from becoming a pollutant source.

   NOTE: To prevent these materials from becoming a source of pollutants, construction and post-construction activities related to a project may be required to comply with applicable provision of rules related to solid, universal, and hazardous waste, including, but not limited to, the Maine solid waste and hazardous waste management rules; Maine hazardous waste management rules; Maine oil conveyance and storage rules; and Maine pesticide requirements.

5. **Excavation de-watering.** Excavation de-watering is the removal of water from trenches, foundations, coffer dams, ponds, and other areas within the construction area that retain water after excavation. In most cases the collected water is heavily silted and hinders correct and safe construction practices. The collected water removed from the ponded area, either through gravity or pumping, must be spread through natural wooded buffers or removed to areas that are specifically designed to collect the maximum amount of sediment possible, like a cofferdam sedimentation basin. Avoid allowing the water to flow over disturbed areas of the site. Equivalent measures may be taken if approved by the Department.

   NOTE: Dewatering controls are discussed in the "Maine Erosion and Sediment Control BMPs, Maine Department of Environmental Protection."

6. **Authorized Non-stormwater discharges.** Identify and prevent contamination by non-stormwater discharges. Where allowed non-stormwater discharges exist, they must be identified and steps should be taken to ensure the implementation of appropriate pollution prevention measures for the non-stormwater component(s) of the discharge. Authorized non-stormwater discharges are:

   (a) Discharges from firefighting activity;

   (b) Fire hydrant flushings;

   (c) Vehicle washwater if detergents are not used and washing is limited to the exterior of vehicles (engine, undercarriage and transmission washing is prohibited);

   (d) Dust control runoff in accordance with permit conditions and Appendix (C)(3);

   (e) Routine external building washdown, not including surface paint removal, that does not involve detergents;

   (f) Pavement washwater (where spills/leaks of toxic or hazardous materials have not occurred, unless all spilled material had been removed) if detergents are not used;

(g) Uncontaminated air conditioning or compressor condensate;

(h) Uncontaminated groundwater or spring water;

(i) Foundation or footer drain-water where flows are not contaminated;

(j) Uncontaminated excavation dewatering (see requirements in Appendix C(5));

(k) Potable water sources including waterline flushings; and

(l) Landscape irrigation.

7. Unauthorized non-stormwater discharges. The Department's approval under this Chapter does not authorize a discharge that is mixed with a source of non-stormwater, other than those discharges in compliance with Appendix C (6). Specifically, the Department's approval does not authorize discharges of the following:

(a) Wastewater from the washout or cleanout of concrete, stucco, paint, form release oils, curing compounds or other construction materials;

(b) Fuels, oils or other pollutants used in vehicle and equipment operation and maintenance;

(c) Soaps, solvents, or detergents used in vehicle and equipment washing; and

(d) Toxic or hazardous substances from a spill or other release.

(8) Additional requirements. Additional requirements may be applied on a site-specific basis.

ATTACHMENT D

Previously Permitted Project 1
(Erosion and Sediment Control Plan dated 3-12-2018)

NORTH

PERMANENT SECURITY FENCE

CATCH BASIN SEDIMENT PROTECTION, TYP.

RIPRAP SLOPE AND DRAINAGE EDGE

CATCH BASIN SEDIMENT PROTECTION, TYP.

HAYBALE INLET BARRIER, TYP.

EROSION CONTROL MESH FABRIC, TYP.

INSTALL SILT FENCE

STABILIZED CONSTRUCTION ENTRANCE

INSTALL ONE 20'x30' SEDIMENT FILTRATION BED, 18" DEEP WITH P-154 SUBBASE COURSE AND 6" UD (TO BE PAID FOR AS P-154-5.1 PER C.Y.) AND D-705-5.1 PER L.F., REMOVE TOP 12 INCHES PRIOR TO INSTALLATION OF CONCRETE APRON (TO BE PAID FOR AS EXCAVATION ITEM P-152 -4.1)

STABILIZED CONSTRUCTION ENTRANCE

DEWATERING SEDIMENT FILTERS SHALL BE INSTALLED AS NEEDED IN ACCORDANCE WITH THE DETAILS IN THE PLAN SET. THE DEWATERING SEDIMENT FILTERS FUNCTION ON THE PROJECT IS TO RECEIVE ANY WATER PUMPED FROM EXCAVATIONS DURING CONSTRUCTION. A DEWATERING SEDIMENT FILTER SHALL BE INSTALLED AND PREPARED FOR OPERATION PRIOR TO ANY TRENCHING ON SITE. WHEN DEWATERING SEDIMENT FILTERS ARE OBSERVED TO BE AT 50% CAPACITY, THEY SHALL BE CLEANED OR REPLACED. STONE UNDER THE SEDIMENT FILTERS SHALL BE REMOVED AND REPLACED CONCURRENTLY.

TEMPORARY SECURITY FENCE

TRENCH DRAIN

1+00 1+50 2+00 2+50 3+00 3+50 4+00 4+50 5+00

UD #1 UD #2 6"UD 18" RCP SD #1

EROSION AND SEDIMENT CONTROL LEGEND

SILT FENCE	SF
CONSTRUCTION ENTRANCE	
EROSION CONTROL MESH BLANKET	
RIPRAP DRAINAGE EDGE OR SLOPE PROTECTION	
HAY BALE INLET BARRIER	
CATCH BASIN SEDIMENT PROTECTOR	

GRAPHIC SCALE

20 0 10 20 40

(IN FEET)
1 inch = 20 ft.

PRELIMINARY - NOT FOR CONSTRUCTION

V:\195\Active\195211072\aviation\9_drawing\sheet_files\195211072_eros_terminal.dwg agray 3/9/2018 12:47 PM

Stantec
482 Payne Road Scarborough Court
Scarborough, Maine 04074-8929
Tel. 207.883.3355
www.stantec.com

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The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.
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Consultants

Notes

Revision	By	Appd.	YY.MM.DD
2 ISSUED FOR BIDDING	AMG	DDA	18.03.12
1 ISSUED TO CITY, MDOT AND FAA FOR REVIEW	AMG	DDA	18.02.23

File Name:195211072_eros_terminal	LA	DDA	AMG	18.01.06
	DWN.	CHKD.	DSGN.	DATE

Permit-Seal

STATE OF MAINE
DWIGHT D. ANDERSON
No. 9275
3-12-2018
LICENSED
PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

PHASE 2 GATE 1 APRON RECONSTRUCTION, APRON EXPANSION NORTHWEST END AND TAXIWAY 'C' NORTH SNOW SHOULDERS

PORTLAND, MAINE

Title

TERMINAL APRON EXPANSION NORTHWEST END - EROSION AND SEDIMENT CONTROL PLAN

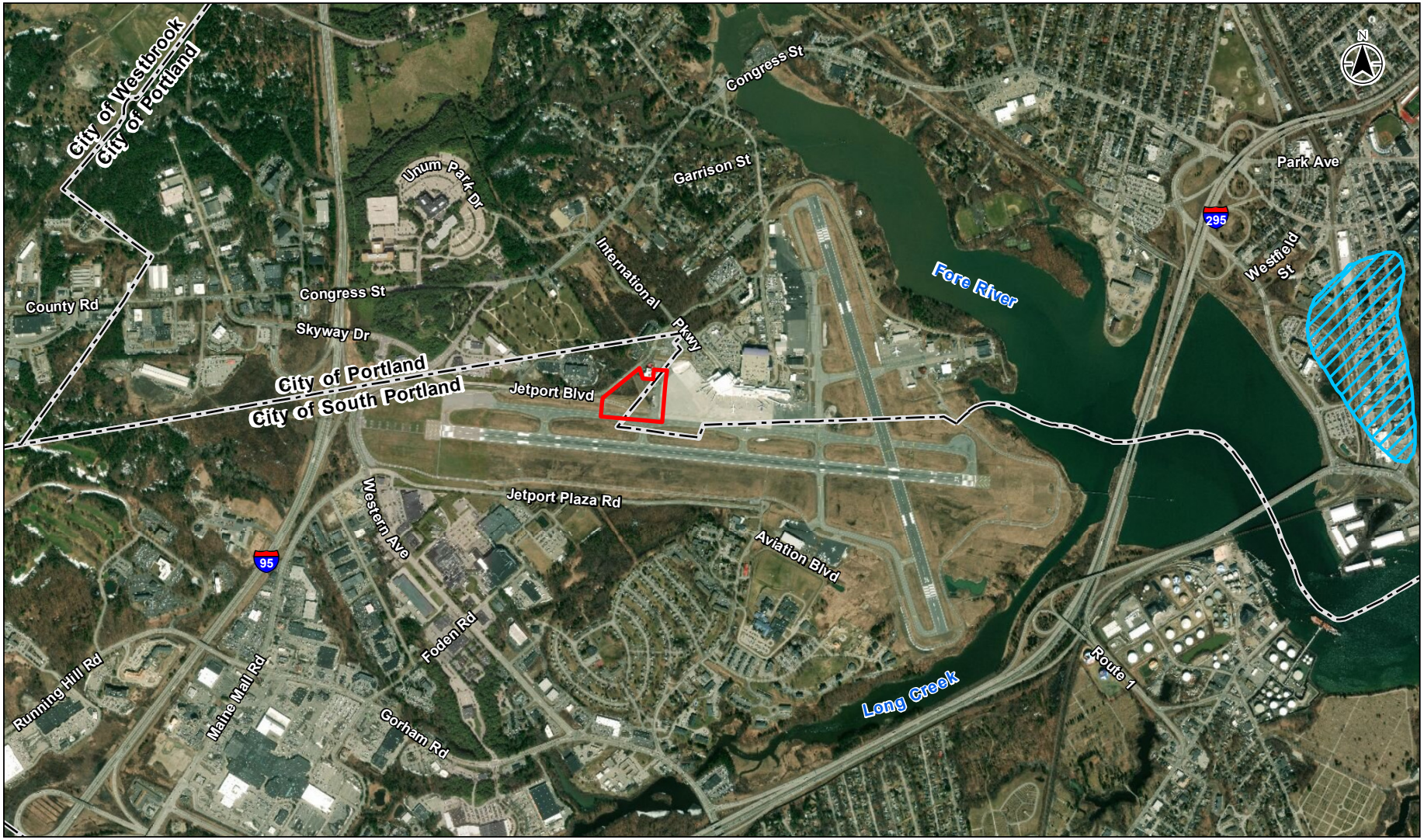
Project No.	Scale
195211072	1" = 20'

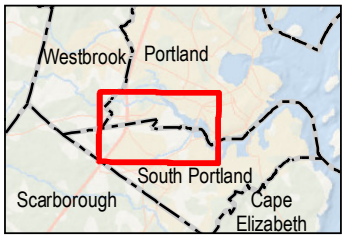
Sheet

5.5

ATTACHMENT C

Figure 7 – Sand and Gravel Aquifer Map
Figure 8 – Surficial Geology Map





Legend

- Sand & Gravel Aquifer (10-50 gpm)
- Project Area
- Municipal Boundary

0 2,000 Feet

1:24,031 (At original document size of 8.5x11)

Notes

1. Coordinate System: NAD 1983 StatePlane Maine West FIPS 1802 Feet
2. Maine Aquifers layer obtained from Maine Office of GIS (MEGIS)
3. Aerial imagery provided by ArcGIS Online World Imagery Mapping Service (http://server.arcgisonline.com/arcgis/services/World_Imagery/MapServer).

Stantec

Project Location: Portland & South Portland, ME — 195210916

Prepared by REM on 2018-08-28
Technical Review by KWH on 2018-08-29
Independent Review by AG on 2018-09-05

Client/Project
Portland International Jetport
Proposed Capital Improvements

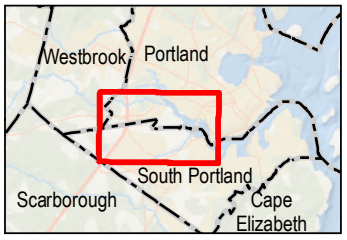
Figure No.
7

Title
Sand and Gravel Aquifer Map

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

V:\195\active_Tax Owner and other Non-RC\195210916.003_data\gis_cad\GIS\mxd\Site Location Application\0916_07_Aquifer.mxd Revised: 2018-10-09 By: rmack





Legend

- Ha - Stream alluvium
- Hwsm - Salt marsh deposits
- Pmf - Marine fan deposit
- Pmrs - Marine regressive sand deposits
- Pp - Presumpscot Formation
- Pt - Till
- af - Artificial fill
- Project Area
- Municipal Boundary

0 2,000 Feet

1:24,000 (At original document size of 8.5x11)

Notes

1. Coordinate System: NAD 1983 StatePlane Maine West FIPS 1802 Feet
2. Maine surficial geology data obtained from Maine Office of GIS (MEGIS)
3. Aerial imagery provided by ArcGIS Online World Imagery Mapping Service (http://server.arcgisonline.com/arcgis/services/World_Imagery/MapServer).

Stantec

Project Location: Portland & South Portland, ME — 195210916

Prepared by REM on 2018-08-28
Technical Review by KWH on 2018-08-29
Independent Review by AG on 2018-09-05

Client/Project: Portland International Jetport Proposed Capital Improvements

Figure No. 8

Title: **Surficial Geology Map**

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

V:\195\active_Tax Owner and other Non-RC\195210916.03_data\gis_cad\GIS\mxd\SiteLocationApplication\09.14_08_SurficialGeology.mxd Revised: 2018.10.09 By: mrack

ENVIRONMENTAL AND LANDSCAPE FEATURES

The following statements to address City Standards are provided in accordance with the Section 14-526 of the ordinance.

(b) Environmental Quality Standards

Preservation of Significant Natural Features (14-526 (b) 1), if applicable

- *Trees, plants, habitats listed on State or Federal list of endangered or threatened*
- *High and moderate value waterfowl and wading habitat*
- *Aquifers on Casco Bay Islands*
- *Waterbodies (including wetlands, watercourses, significant vernal pools and floodplains)*
- *Proposed preservation areas and protection measures*
- *Documentation from environmental consultants, determinations from applicable state agencies*

Project Statement addressing 14-526 (b) 1 a)

1. *Preservation of Significant Natural Features:*

   (i – iv) There are no significant natural features within the project area within the City of Portland, as the project areas are either existing pavement or grassed in-field areas. Wetland impacts are located within the City of South Portland and have been permitted with the MeDEP and Army Corps of Engineers(copies of permits are attached to Evidence of State of Federal Approvals sections).

Landscaping and Landscape Preservation (14-526 (b) 2 a)

- *Preservation of trees and preservation within required zoning setbacks (Technical Manual, Section 4)*
- *Protection measures of existing vegetation during construction*
- *Protection measures within Shoreland Zone, if applicable*

Project Statement addressing 14-526 (b) 2 a)

2. *Landscaping and Landscape Prevention:*

   a. *Landscape Preservation.*

      (i) For the project areas within the City of Portland, there will be no tree or landscaping removal.

      (ii) Not applicable.

      (iii) There is no specific vegetation protection required on the site.

      (iv) Not applicable.

      (v) Not applicable.

Landscaping and Landscape Preservation (14-526 (b) 2 b i)

- *Screening and buffering of service areas and between non-residential and residential uses*
- *Planting plans with plant schedule and sizes*

Project Statement addressing 14-526 (b) 2 b)

2. *Landscaping and Landscape Prevention:*
   b. *Site Landscaping:*
      (i) Landscaped Buffers:
         (a) Screening: Not applicable.
         (b) The development is not subject to zoning setbacks or buffering requirements.
         (c) Not applicable.
         (d) Not applicable.

Landscaping and Landscape Preservation (14-526 (b) 2 b ii)

Parking Lot Landscaping, if applicable

- *Landscaped islands within parking areas (Technical Manual, Section 4)*

2. *Landscaping and Landscape Preservation:*
   a. *Site Landscaping.*
      (ii) Parking Lot Landscaping:

         a) thru d) Not applicable, there are no parking lots proposed within the City of Portland as part of the development.

Street Trees (14-526 (b) 2 b iii)

- *Existing Heritage or Feature Trees on site and measures to preserve*
- *Identify street trees on the plan meeting the site plan and Technical Manual standards (Section 4) or identify alternative measures, if applicable*

2. *Landscaping and Landscape Preservation:*
   b. *Site Landscaping.*
      (iii) Street Trees:

         (a) Not applicable.

         (b) Not applicable.

TRANSPORTATION

The following statements to address City Standards are provided in accordance with the Section 14-526 of the ordinance.

TRANSPORTATION

(a) Transportation Standards

Transportation Analysis – Traffic Impact (14-526 (a) 1)

- *Provisions for pedestrian, bicycle, vehicle, and loading circulation and incremental volume of traffic impacts*
- *Traffic Impact Study (Technical Manual, Section 1) if applicable*

Project Statement addressing 14-526 (a) 1

1. *Impact on Surrounding Street Systems:*

   Not Applicable. There will be a stop sign at the new access connection to Jetport Boulevard (located in South Portland).

Access and Circulation (14-526 (a) 2 a)

- *Access and internal circulation, addressing ADA access*
- *Access and egress impacts on traffic flows*
- *Description and use of drive-up features, if applicable*

Project Statement addressing 14-526 (a) 2 a)

2. *Access and Circulation:*
   a. Site Access and Circulation.

   (i) The majority of the proposed projects are located in a secure area and unauthorized access is not allowed; therefore, this section is not applicable. A Traffic Plan with haul routes and traffic control for temporary construction access (for construction access only) and airport traffic diverted around the construction areas are included with the plan set as sheets 2.0 through 2.7.

   (ii) The traffic will be limited to construction, and existing traffic flows will remain the same for the airport perimeter road within the secure area of the airport.

   (iii) Not applicable as there are no drive through features proposed.

Loading and Servicing (14-526 (a) 2 b)

- *Loading and servicing needs, route and travel way geometrics for deliveries*
- *Turning templates for delivery vehicles, if applicable*

Project Statement addressing 14-526 (a) 2 b)

2. *Access and Circulation:*
   b. Loading and Servicing:

      (i) Aircraft will use the deicing apron and terminal apron, and the aprons comply with the FAA Advisory Circular guidelines.

Sidewalks (14-526 (a) 2 c)

- *Sidewalks and condition along street frontages and internal walkways*
- *Engineered details for ADA ramps and public sidewalk details meeting sidewalk materials policy and ADA ramp construction details as applicable (Technical Manual, Section 1)*

Project Statement addressing 14-526 (a) 2 c)

2. *Access and Circulation:*
   c. Sidewalks:

      (i) None of the project areas are anticipated to impact existing sidewalks within the City of Portland at the Jetport. Public sidewalk impacts are limited to City of South Portland along Jetport Boulevard, and the impacted sidewalk shall be maintained with a crosswalk across the proposed connection to Jetport Boulevard.

Public Transit (14-526 (a) 3), if applicable

- *Existing available transit services*
- *Proposed site plan design details, such as easement, pad base, and shelter*

Project Statement addressing 14-526 (a) 3 a)

3. *Public Transit Access.*

   a. Not Applicable.

Off-Street Parking: Vehicle & Motorcycle/Scooter (14-526 (a) 4 a)

- *Expected parking demand, proposed parking supply, ADA parking, and applicable Zoning Requirements*
- *Address Technical Manual standards (Section 1) for curb cut separation and parking lot layout and locate on site plan*

Project Statement addressing 14-526 (a) 4 a)

4. *Parking.*
   a. Location and Required Number of Vehicle Parking Spaces.

There are no parking lots proposed within the City of Portland, this section is not applicable.

i. Not Applicable.
ii. Not Applicable.
iii. Not Applicable.
iv. Not Applicable.
v. Not Applicable.

Bicycle Parking (14-526 (a) 4 b)

- *Address bicycle parking requirements and identify locations on-site*
- *Construction details for bike racks (Technical Manual, Section 1)*

Project Statement addressing 14-526 (a) 4 b)

4. *Parking.*
   b. Location and Required Number of Bicycle Parking Spaces.

   The project areas cannot be accessed by bicycle; therefore this section is not applicable.

4. *Parking.*
   c. Motorcycle and Scooter Parking.

   The project areas cannot be accessed by motorcycle or scooter; therefore this section is not applicable.

Snow Storage (14-526 (a) 4 d)

- *Management plan for snow removal and locate snow storage areas on plans*

Project Statement addressing 14-526 (a) 4 d)

4. *Parking.*
   d. Snow Storage.

   i. During storm events, snow is plowed/blown off of the aprons and onto the snow storage areas and shoulders adjacent to the aprons. This will continue in the area of the proposed improvements.
   ii. Not applicable, there are no pedestrian walkways that snow storage will impede in the project areas.

Traffic Demand Management (TDM) (14-526 (a) 5), if applicable

- *Develop TDM with Trip Reduction Targets and Strategies*

Project Statement addressing 14-526 (a) 5 a)

5. Transportation Demand Management (TDM).

a. Not Applicable.

PUBLIC INFRASTRUCTURE AND SAFETY

The following statements are provided in accordance with the submission and Section 14-526 of the ordinance.

(c) Public Infrastructure and Community Safety Standards.

Consistency with City Master Plans (14-526 (c) 1)

- *Identify consistency with master plans*
- *Proposed easements, rights and improvements to connect or continue off-premises public infrastructure, as applicable*

Project Statement addressing 14-526 (c) 1

1. *Consistency with City Master Plans:*

    a. The project has been designed to be consistent with the City's Zoning Ordinance and PWM's Sustainable Airport Master Plan (SAMP) reviewed by City staff members, the FAA, the MaineDOT and Planning Advisory Committee members. PWM's SAMP was previously approved by the Portland City Council in 2016.

    b. Not applicable.

Public Safety and Fire Prevention (14-526 (c) 2)

- *Address Crime Prevention through Environmental Design (CPTED) (Technical Manual, Section 3)*
- *Emergency vehicle access*
- *Address consistency with public safety standards (Technical Manual, Section 3)*
- *Submit a code summary referring NFPA 1 and all Fire Department standards (Technical Manual, Section 3) – Fire Checklist*

Project Statement addressing 14-526 (c) 2

2. *Public Safety and Fire Prevention:*

    a. The site is under surveillance, is in a fenced in secure area and therefore no unauthorized access is granted.

    b. The site is accessible from Air Rescue Fire Fighting, located at the airport, or at any security gate for emergency vehicles.

    c. Fire hydrants are located throughout the Jetport. There are 4 existing fire hydrants throughout the airport and several hydrants along International Boulevard, Jetport Boulevard and Westbrook Street.

    d. A letter is being sent to the fire department summarizing all NFPA 1/Fire Department Standards. A copy of the letter follows this section.

Availability and Adequacy of Public Utilities (14-526 (c) 3) (Technical Manual, Sections 2 & 9)

- *Electrical services, including providing underground services*
- *Identify existing and proposed connections for public utilities and required public utility upgrades*
- *Sewer line connections are required, if there is a main within 200 feet*
- *Proposed solid waste management facilities on-site and management for the site*
- *Written evidence of the ability to serve from utility companies, as applicable*

Project Statement addressing 14-526 (c) 3

a. There are no connections proposed for sewers or water lines. The existing stormdrain system will be expanded and upgraded in several areas, and the capacity/sizing of the existing system has been evaluated as part of the hydroCAD models evaluated within the stormwater report.

b. No electrical services are proposed.

c. All new utility infrastructures will meet the provisions of the Technical Manual, as outlined in Sections 2 and 9, where not in direct conflict with FAA Advisory Circulars and federal procurement policies.

d. Not applicable.

e. All new stormwater infrastructure will meet City standards as specified in Section 2 and Section 4, Chapter 500 Stormwater Management Standards, of the Technical Manual, where not in direct conflict with FAA Advisory Circulars and federal procurement policies.

f. Not applicable, development will not require any changes to existing waste removal.

Stantec Consulting Services Inc.
482 Payne Road, Scarborough Court, Scarborough, ME 04074

April 11, 2019

Division Chief Mike Thompson
City of Portland Fire Department
380 Congress Street
Portland, Maine 04101

Subject: Proposed Long-Term Hold Area, Deicing Pad Expansion and RON Apron Construction Including Terminal Apron Expansion Northwest End at the Portland International Jetport, 1001 Westbrook Street, Portland, Maine
Fire Safety Checklist

Dear Chief Thompson:

In accordance with instructions in the City's Level III Site Plan and Subdivision Review packet, please find enclosed the drawings necessary for your review of the subject project at the Portland International Jetport. We have listed each item in your checklist below, followed by our response.

1. *Name, address, telephone number of applicant.*

   Portland International Jetport
   Attn: Charles Norton, P.E.
   1001 Westbrook Street
   Portland, Maine 04102
   207.756.8026

2. *Name, address, telephone number of architect.*

   Not Applicable.

3. *Proposed uses of any structures (NFPA and IBC classification).*

   Not Applicable.

4. *Square footage of all structures (total and per story).*

   Not Applicable.

5. *Elevation of all structures.*

   Not Applicable.

6. *Proposed fire protection of all structures.*

   Not Applicable.

7. *Hydrant locations.*

   There are 4 existing fire hydrants throughout the airport and hydrants along International Parkway, Jetport Boulevard and Westbrook Street. See the attached

Portland Water District's GIS showing the hydrants in the vicinity of and on the airport property. There is a hydrant on Jetport boulevard located approximately 800-feet from the site entrance.

8. *Water main(s) size and location.*

   There is an 8" ductile iron water main running under Runway 18-36, and a 12" cast/ductile iron water main on Westbrook Street and Jetport Boulevard.

9. *Access to all structures (min. 2 sides).*

   Not Applicable.

10. *A code summary shall be included referencing NFPA 1 and all fire department technical standards.*

NFPA 1 – Chapter 18 Fire Department Access and Water Supply

18.2 Fire Department Access:

The project site is accessed from Air Rescue Fire Fighting (ARFF) from within the Secure area of the airport and emergency access routes are kept clear at all times per the Airport's standard operating procedure.

If fire department access beyond ARFF is required, the access would be through the construction access gates, or other existing access gates/fire gates.

*Note that within Chapter 5 "Aircraft Fueling Ramp Drainage" of NFPA 415 "Standard on Airport Terminal Buildings, Fueling Ramp Drainage, and Loading Walkways", paragraph 5.1.7 designates that if open-grate drainage trenches are used as a collection means, such open trenches, shall not be over 125-feet in length with a minimum interval of 6-feet between open-trench sections to act as fire stops. The proposed trench drains meet this standard.

City of Portland Technical Manual – Section 3 Public Safety

3.4.1 Every dead-end roadway more than one hundred fifty (150') feet in length shall provide a turnaround at the closed end. Turnarounds shall be designed to facilitate future street connectivity and shall always be designed to the right (refer to Figure I-5).

Supporting Evidence: Not applicable. There are no dead-end roadways proposed. The project is located within a secure area of the airport and turnarounds are not needed.

3.4.2 through 3.4.7 are not applicable (no proposed buildings).

If you need any further information regarding this review, please contact our office.

Regards,

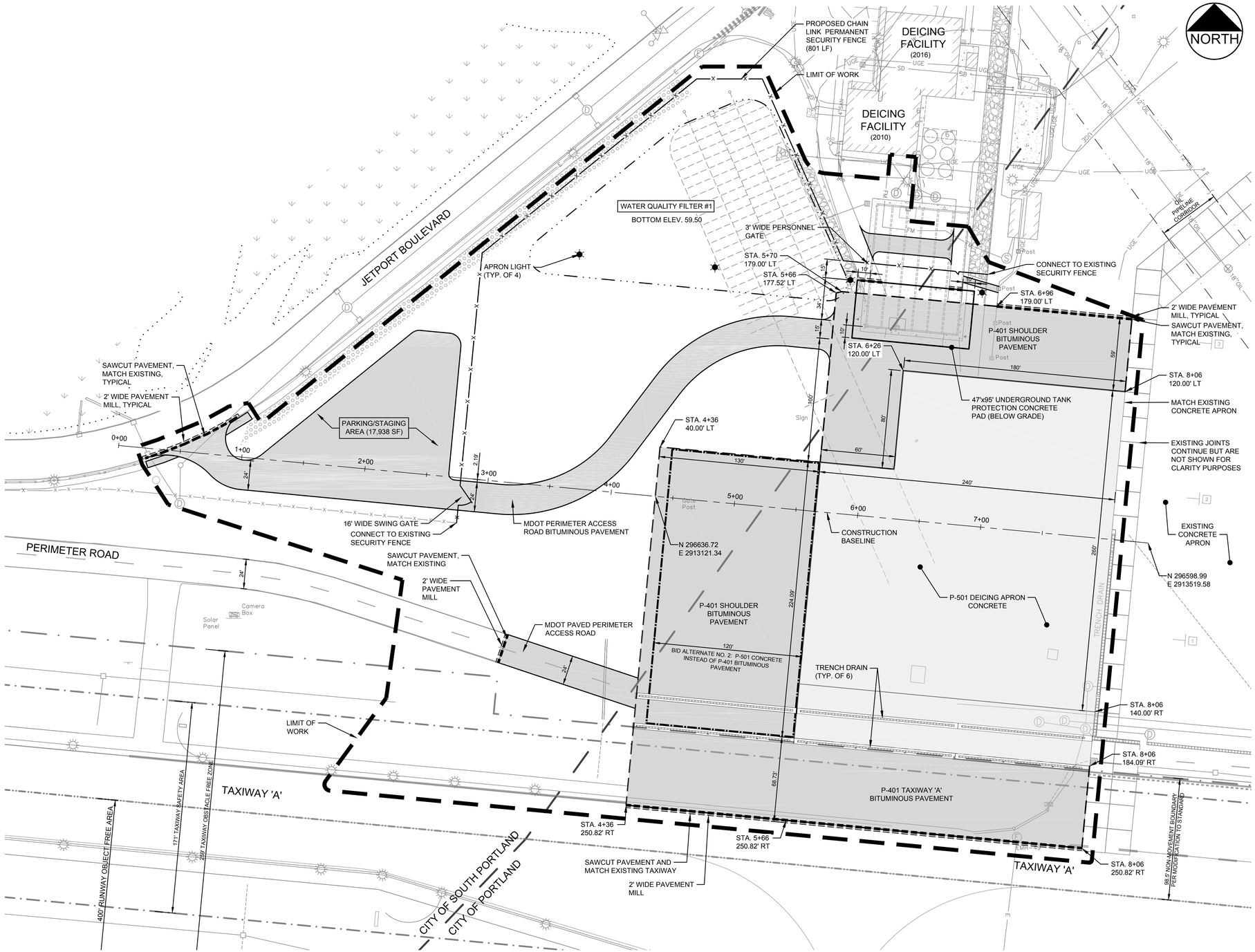
STANTEC CONSULTING SERVICES INC.

Dwight Anderson, P.E.
Project Manager
Tel: 207-887-3438
Dwight.Anderson@stantec.com

Attachment: Sheet 3.1A – Site Layout Plan – 2019 Construction Only
Sheet 3.1B – Site Layout Plan with 2020 Construction
Portland Water District GIS

c: Fire Chief Jonathan Hendricks – ARFF
Chuck Norton, P.E. – PWM

V:\1952\active\195210916\aviation\4_environmental\42_report\env_assmnt\Portland_Permitting\ltr_thompson_fire_2019.04.11.docx



SITE LAYOUT LEGEND

- BITUMINOUS PAVEMENT (MDOT)
- BITUMINOUS PAVEMENT (P-401)
- PORTLAND CEMENT CONCRETE (P-501)
- LIMIT OF WORK
- LIMIT OF PAVEMENT SAWCUT
- PAVEMENT MILL

GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

PERMITTING DRAWINGS

V:\1952\active\195211590\aviation\9_drawing\sheet_files-portland\195211590_site_deicing.dwg agray, 4/10/2019 2:39 PM

Stantec

Stantec
482 Payne Road Scarborough Court
Scarborough, Maine 04074-8929
Tel. 207.883.3355
www.stantec.com

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Consultants

Haley & Aldrich (Geotechnical)
75 Washington Avenue, Suite 1A
Portland, Maine 04101

Plisga & Day Land Surveyors (Surveyor)
72 Main Street
Bangor, Maine 04401

Independent Archaeological Consulting, LLC (Archaeologist)
801 Islington Street, Suite 31
Portsmouth, New Hampshire 03801

Diana's CADD Serivice, LLC (Drafting)
P. O. Box 372
Jackman, Maine 04945

Notes

By	Appd.	Date	Revision
DDA	DDA	19.04.08	3 ISSUED TO CITY OF PORTLAND FOR APPROVAL
DDA	DDA	19.03.08	2 RELEASED FOR BID
DDA	DDA	19.02.28	1 ISSUED FOR CITY, MeDOT AND FAA REVIEW
DDA	DDA	YY.MM.DD	Revision

File Name: 195211590_site_deicing	LA	DDA	AMG	JAN 2018
	DWN.	CHKD.	DSGN.	DATE

Permit-Seal



Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

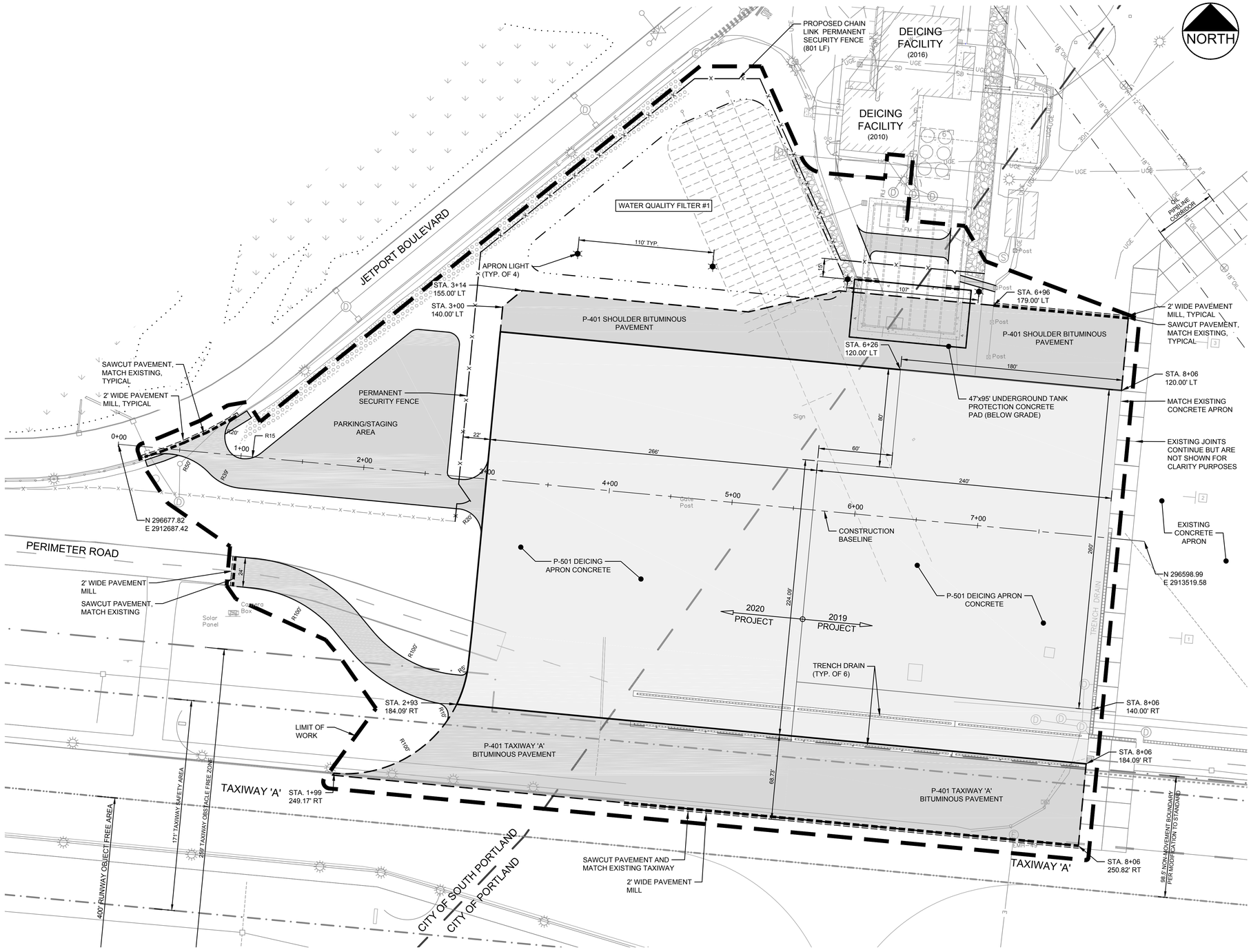
Title

HOLD/DEICING/RON APRON SITE LAYOUT PLAN - 2019 CONSTRUCTION ONLY

Project No.	Scale
195211590	1" = 40'

Sheet

3.1A



GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

SITE LAYOUT LEGEND

- BITUMINOUS PAVEMENT (MDOT)
- BITUMINOUS PAVEMENT (P-401)
- PORTLAND CEMENT CONCRETE (P-501)
- LIMIT OF WORK
- LIMIT OF PAVEMENT SAWCUT
- PAVEMENT MILL

PERMITTING DRAWINGS

V:\195211590\active\195211590\aviation\9_drawings\sheet_files-portland\195211590_site_deicing.dwg agray 4/10/2019 2:30 PM

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Consultants

Haley & Aldrich (Geotechnical)
75 Washington Avenue, Suite 1A
Portland, Maine 04101

Plisga & Day Land Surveyors (Surveyor)
72 Main Street
Bangor, Maine 04401

Independent Archaeological Consulting, LLC (Archaeologist)
801 Islington Street, Suite 31
Portsmouth, New Hampshire 03801

Diana's CADD Serivice, LLC (Drafting)
P. O. Box 372
Jackman, Maine 04945

Notes

No.	Revision	By	Appd.	YY.MM.DD
3	ISSUED TO CITY OF PORTLAND FOR APPROVAL	DDA	DDA	19.04.08
2	RELEASED FOR BID	DDA	DDA	19.03.08
1	ISSUED FOR CITY, MaDOT AND FAA REVIEW	DDA	DDA	19.02.28

File Name: 195211590_site_deicing	- DWN:	DDA CHKD.	AMG DSGN.	JAN 2018 DATE

Permit-Seal

STATE OF MAINE — DWIGHT D. ANDERSON No. 9272 — LICENSED PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

Title

HOLD/DEICING/RON APRON SITE LAYOUT PLAN WITH 2020 CONSTRUCTION

Project No.	Scale
195211590	1" = 40'

Sheet

3.1B



0 200 400 800 1,200 1,600 Feet

1 inch = 200 feet

PORTLAND WATER DISTRICT
225 Douglass Street
Portland, ME 04104

Legend

- Air Valve
- Blow Off
- By Pass
- Distribution
- Transmission
- Connection
- Attribute Change
- Reducer
- Hydrant
- Hydrant Control
- Combined Service
- Domestic Service
- Fire Service
- Private Hydrants
- Meter Pits
- Manhole
- CSO
- Gravity
- Force

Portland Jetport

Portland

N

Disclaimer: This map is suitable for preliminary study and analysis and is based on PWD record information. PWD is not liable for any damages whatsoever resulting from inaccurate data or from errors made in the location and marking of its infrastructure.

Drawn By: BSJ

Scale: As Noted

Date: March 18, 2015

SITE DESIGN

The following statements are made in accordance with the City of Portland Code of Ordinances, Chapter 14 Land Use, Article V Section 14-526.

(d) Site Design Standards.

Massing, Ventilations and Wind Impact (14-526 (d) 1)

- *Wind and ventilation impacts on adjoining structures and/or adjacent public spaces. Wind study, if applicable.*
- *Bulk, location or height impacts on adjoining structures*
- *Identify and locate HVAC equipment and venting away from public spaces and residential properties*
- *Identify screening and manufacturing specifications for noise, if applicable*

Project Statement addressing 14-526 (d) 1

1. *Massing, Ventilation and Wind Impact:*

    a-c. Not applicable, there are no proposed buildings.

Shadows (14-526 (d) 2), if applicable

- Shadow analysis of impacts on publicly accessible open space (Technical Manual, Section 11)

Project Statement addressing 14-526 (d) 2

2. *Shadows:*
    a. The proposed projects will not cast significant shadows onto neighboring properties, or block access to direct sunlight for structures utilizing solar energy.

Snow and Ice Loading (14-526 (d) 3)

- *Building design to prevent snow and ice from loading or falling onto adjacent properties or public ways.*

Project Statement addressing 14-526 (d) 3

3. *Snow and Ice Loading:*
    a. Not applicable.

View Corridors (14-526 (d) 4), if applicable

- *Protection of designated view corridors (Portland Design Manual, Appendix 1)*

Project Statement addressing 14-526 (d) 4

4. *View Corridors:*
    a. Not applicable.

Historic Resources (14-526 (d) 5), if applicable

- *Identify developments within Historic Districts or affecting Designated Landmarks*
- *Certificate of Appropriateness or other evidence*
- *Identify Developments within 100 feet of Historic Districts or affecting Designated Landmarks. Advisory HP review may be required*
- *Address preservation and documentation of Archaeological Resources*

Project Statement addressing 14-526 (d) 5

5. *Historic Resources:*
    a. The development is not located in a historic district, historic landscape district or City designated landmark.
    b. The project is not located adjacent to, or within 100 ft. of, the Stroudwater historic district.

Exterior Lighting (14-526 (d) 6)

- *Cut sheets of on-site light fixtures and any architectural or specialty lights (Technical Manual, Section 12)*
- *Engineered details for any lights proposed in street right-of-way (Technical Manual, Section 10)*

Project Statement addressing 14-526 (d) 6

6. *Exterior Lighting:*
    a. Site Lighting
        (i) New exterior lighting at the site will include Apron lighting, as required by FAA Advisory Circulars (FAA AC). Apron lighting will include 4 approximately 50' high mast poles (one in Portland), with LED lighting for the deice apron. A photometrics plan is included as Sheet 6.15 of the plan set.

    b. Architectural and Specialty Lighting
        (i) Not applicable to the project.

    c. Street Lighting
        (i) Not applicable.

Noise and Vibration (14-526 (d) 7)

- *Evidence of noise levels for equipment, such as equipment specifications, to demonstrate consistency with zoning requirements*

Project Statement addressing 14-526 (d) 7

7. Noise and Vibration:

a. There are no HVAC equipment, air handling units, emergency generators, or similar equipment proposed with this project.

Signage and Wayfinding (14-526 (d) 8), if applicable

- *Signage plan showing the location, dimensions, height and setback of all existing and proposed signs. Signs in Historic Districts are reviewed by Historic Preservation staff*
- *Proposed commercial and directional signage on site*

Project Statement addressing 14-526 (d) 8

8. Signage and Wayfinding:

a. All street and wayfinding signage shall meet the requirements of the Manual on Uniform Traffic Devices (MUTCD) and Division 22 of the City Code.

(i) The project is not located in a historic district or subject to Article IX.

(ii) There is no proposed commercial signage for roadways. All signage will be limited to signage throughout the airfield, as required by FAA ACs, or temporary construction signage.

(iii) Not applicable.

Zone Related Design Standards (14-526 (d) 9)

- Address Historic Preservation Design Review, if applicable
- Address any applicable design review standards by zone
- Address submission requirements from Design Manual, page 1, addressing neighborhood context
- Description of exterior materials, color, finish, and samples

Project Statement addressing 14-526 (d) 9

9. Zoning Related Design Standards:

a. The project is in accordance with the existing Airport Business zone. See zoning assessment for further discussion.

Portland Maine | Yes. Google's good here.

Jean Fraser <jf@portlandmaine.gov>

Fwd: Portland Jetport proposals PL-000591-2019

1 message

Jean Fraser <jf@portlandmaine.gov> Fri, May 10, 2019 at 11:22 AM
To: "Fraser, Jean" <jf@portlandmaine.gov>

Additional Information regarding CMP 5.9.19

---------- Forwarded message ---------
From: **Gray, Amie** <Amie.Gray@stantec.com>
Date: Thu, May 9, 2019 at 1:34 PM
Subject: RE: Portland Jetport proposals PL-000591-2019
To: Jean Fraser <jf@portlandmaine.gov>
Cc: Charles Norton <cnorton@portlandmaine.gov>, Paul Bradbury <PHB@portlandmaine.gov> (PHB@portlandmaine.gov) <PHB@portlandmaine.gov>, Keef, Sandi <Sandi.Keef@stantec.com>, Anderson, Dwight <Dwight.Anderson@stantec.com>

Jean,

See below for our responses and please reach out to us with any further questions.

-Amie

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From: Jean Fraser <jf@portlandmaine.gov>
Sent: Wednesday, May 08, 2019 4:04 PM
To: Gray, Amie <Amie.Gray@stantec.com>
Cc: Charles Norton <cnorton@portlandmaine.gov>; Paul Bradbury <PHB@portlandmaine.gov> (PHB@portlandmaine.gov) <PHB@portlandmaine.gov>; Keef, Sandi <Sandi.Keef@stantec.com>; Anderson, Dwight <Dwight.Anderson@stantec.com>; Anthony, Lori <Lori.Anthony@stantec.com>
Subject: Re: Portland Jetport proposals PL-000591-2019

Amie

We reviewed this additional information at this morning's Dev Rev meeting, with particular emphasis on the Addendum to the CMP given the number of truck trips that was noted in the Addendum. Reviewers have several questions, as below:

1. The original submitted CMP (Section E. *Construction Schedule,* pg 3) referred to a total of 390 construction days - while we presume some may overlap, that seems a much larger number than included in the Addendum for calculating the number of trucks per day (128 days was used there). Could you please clarify the period (which months of the year) over which the 128 days of construction will take place, and clarify how this relates to the 390 days. (I attach both the original CMP and the Addendum for reference) For clarification, there will be a 180 calendar day contract in 2019 and a 180 calendar day contract in 2020 (totaling 360 calendar days). There will be limited Saturday work and no Sunday work, therefore the construction days are equivalent to approximately 128 construction days (180* 5/7) each year. The months the work will take place are from mid-May to mid-November. In the original submitted CMP, it was noted that the availability of funds may affect the actual year of construction. The City has received bids for the 2019 project and it is likely that the Terminal Apron Northwest End component which was bid as an alternate will take place in 2020 and not 2019. There will be overlap between the two 2020 projects to fit the 180 calendar day construction schedule.

2. We note the reference to a 10 hour work day - could you clarify the start and finish times, and also estimate how many truck trips you would expect between 7AM and 9AM (morning peak on the truck routes) and between 4PM to 6PM (evening peak on those routes). We may be advising the use of different inbound and outbound routes to minimize pressure on congested routes and intersections. The work day hours will generally be from 6:30am – 5:00pm. There will be mornings where work starts earlier for concrete placements and days when work stops later. The number of trucks anticipated between 7:00am and 9:00am will vary by operation

and is estimated to range from 3-12 trucks. In general, the work requiring more hauling will slow down by the 4-6:00pm evening peak, with an estimated range of 3-6 trucks. Note that as in the past years, the contractor will be required to obtain a waiver for working beyond the City's 7pm-7am time restriction.

3. Will the construction access off of Jetport Boulevard be temporary- ie will it be closed when the construction is complete and not used for future airport operational traffic? The construction access/staging area will become a utility lot utilized for airport maintenance/emergency access after the projects are completed.

Also I was wondering if you could give me an idea of the current status of the South Portland Review of these proposals, and give me the South Portland Planner's contact details so I can coordinate with them (when projects cross municipality boundary lines there is sometimes a requirement for a joint meeting - in this case that was not required, but the Planning Board would expect the reviews to be coordinated, especially re the traffic impacts). The City of Portland received South Portland Planning Board approval of PWM's overall 5-7 year capital improvement projects, including the Proposed Long-Term Hold Area, Deicing Pad Expansion and RON Apron and Terminal Apron Expansion Northwest End project, at last night's 5/8/2019 South Portland Planning Board meeting. The contact information for the planner is as follows:

Steve Puleo

Community Planner

City of South Portland

496 Ocean Street

South Portland, ME 04106

Tel: 207-767-7648

thank you

Jean

Addendum to

Construction Management Plan
Proposed Long-Term Hold Area, Deicing Pad Expansion and RON Apron Construction Including Terminal Apron Expansion Northwest End at the Portland International Jetport

---

For supplemental information to the Construction Management Plan for the project, see below:

Haul Routes and # of Truck Trips:

See below for a breakdown of the number of truck trips based on estimated material quantities:

Material	Quantity 2019 Deice	Quantity 2020 Deice	Quantity 2019 NW Apron	Truck Capacity	Unit	# of Truck Trips
Unclassified Excavation	16,000	20,314	3,000	15	CY	2,621
Unclassified Ex Incidentals	5,000			15	CY	333
Embankment	2,000	2,539		15	CY	303
Subbase Course	7,500	9,522	1,500	15	CY	1,235
Base Course	4,200	5,332	1,300	15	CY	722
Hot Mix Asphalt	4,050	5,142	820	17	TON	589
Portland Cement Concrete	3,600	4,733	550	10	CY	888
Riprap	60		150	15	CY	14
3/4" stone	1,000	1,000	300	15	CY	153
Equipment Delivery	10	10	10	--	EA	30
Miscellaneous	90	90	20	--	EA	200
				Total Trucks		**7,088**
				Total 2019		3,544
				Total 2020		3,544

The total estimated truck trips is 7,088, with approximately half in 2019 and half in 2020. The total truck trip numbers are conservative as some days trucks will be able to haul gravels to the site and leave loaded with unclassified excavation thereby reducing required truck trips. The truck trips will be spread out throughout the day, with slightly more in the morning hours on concrete placement and paving days. Additionally, the trips will be somewhat spread out over the 180 calendar day (6 month, 128 work days)

construction period each year. See below for an estimated breakdown of vehicles per week, and day and hour over the 2 years:

3,544 trucks / 26 weeks = 136 trucks / week
3,544 trucks / 128 construction days = 28 trucks / day
28 trucks / day / approx. 10 hour days = 3 trucks / hour*

*Note that the number of truck trips by hour will vary based upon onsite activities and weather conditions.

The haul routes will generally be a combination of the following:

- Exit 46 from I-95 to Skyway Drive to Jetport Boulevard (Figure 1)
- Congress Street to Skyway Drive to Jetport Boulevard (Figure 2)

The gravel will be hauled from either Shaw Brothers' pits or the Sargent New Gloucester Pit, pavement will be hauled from the Shaw Brother's Gorham plant, and concrete will be hauled from Auburn Concrete's Westbrook plant.

Routes for vehicles involved in construction are shown on the below Figures 1 and 2 (snapshots from googlemaps).

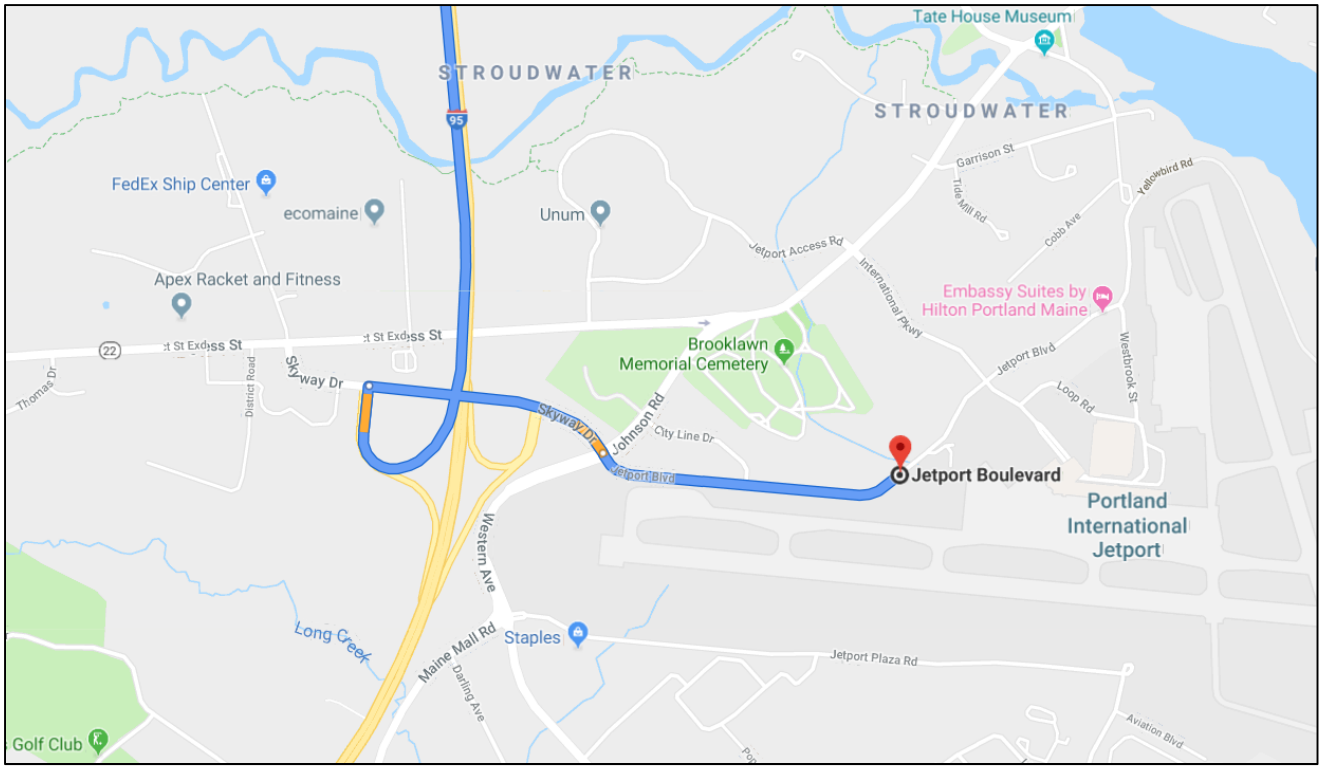


Figure 1 - Exit 46 from I-95 to Skyway Drive to Jetport Boulevard

Stantec

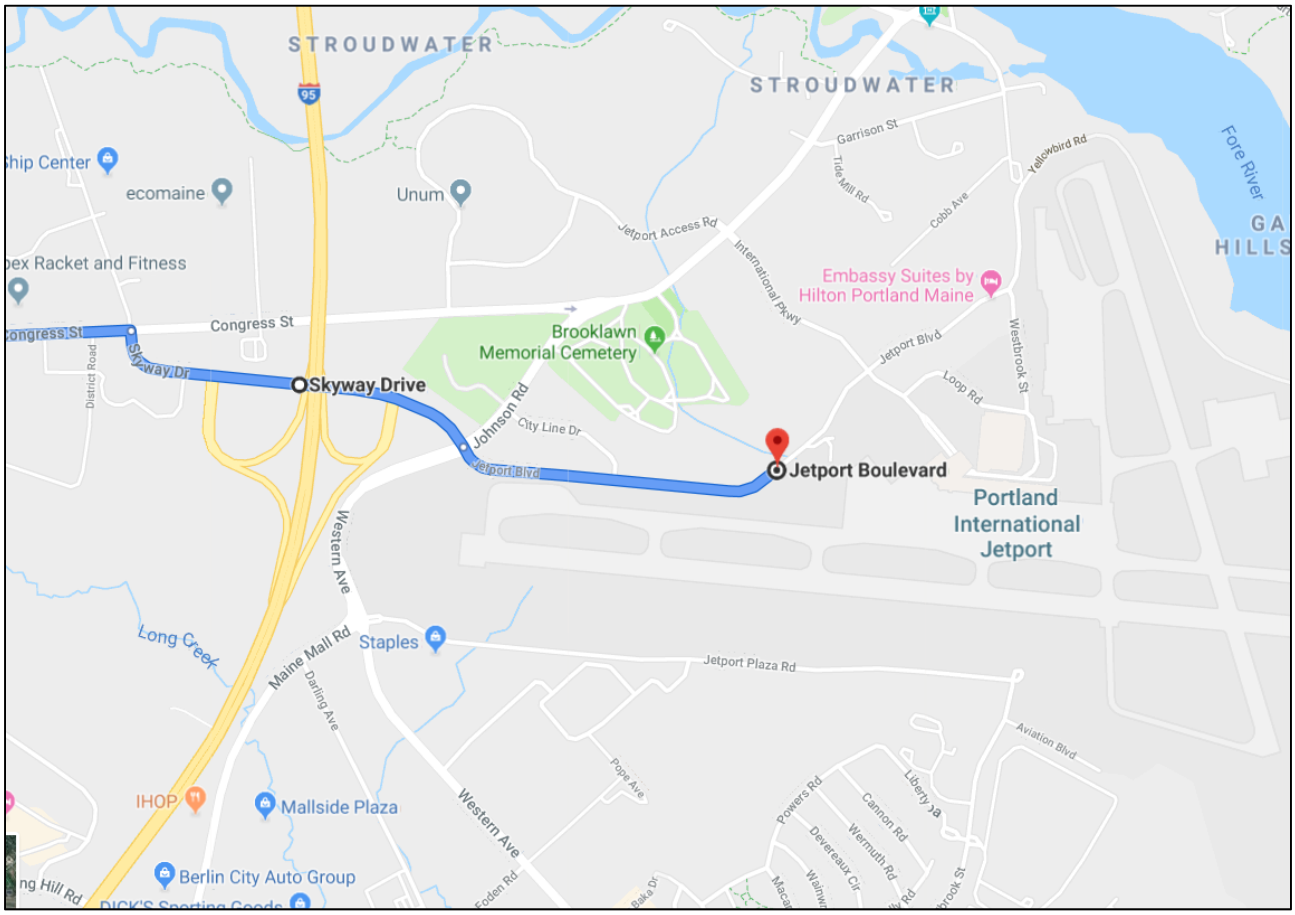


Figure 2 - Congress Street to Skyway Drive to Jetport Boulevard

Similar scale aircraft apron projects have been completed during each of the past 4 years in the vicinity of the Terminal and North Apron and have not resulted in significant impact to vehicular access to the Jetport or surrounding area.

Stantec

Construction Management Plan
Proposed Long-Term Hold Area, Deicing Pad Expansion and RON Apron Construction Including Terminal Apron Expansion Northwest End at the Portland International Jetport

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This document and its subsequent attachments comprise The Construction Management Plan being submitted to the City of Portland for the proposed development at the Portland Jetport. The Construction Management Plan contains information pertaining to the overall planning and coordination of the project.

CONSTRUCTION APPROACH NARRATIVE:

The core element of the plan is to have the General Contractor (TBD) and the Resident Engineer (Stantec) working together out of an onsite construction office. The goal of this arrangement is to ensure clear and timely communication and seamless coordination of project activities with City of Portland officials and other users of the airport. Detailed Construction Safety and Phasing Plans following the FAA Advisory Circular Construction for Safety & Phasing have been completed and are included within the plan set. A Construction Safety & Phasing Narrative has also been completed and submitted to the FAA and is included as Attachment A. The CSPP plans/narrative include access, barricade/fence location, flagger location, sign locations, etc. and a narrative outline safety protocols which follow FAA guidance.

Key issues include:

- Airport Safety
- Uninterrupted traffic flow throughout airport (both landside and airside);
- Communication with airport users;
- Parking for airport users;
- Laydown and material storage areas;
- Waste management;
- Designated areas for stockpiled materials; and
- Airport utilities.

A. Construction Management Principles

The impact of this project on the public will be minimized via the following construction management principles:

- The construction will mostly be located within the secure area, and unauthorized civilians are not allowed to enter the secure area.
- The construction within the airfield will have very specific access points, haul routes, and designated construction area. The construction are will be

barricaded or fenced in to prevent construction traffic from inadvertently entering the active airfield, or from aircraft from entering the construction site.

- Construction haul routes on public airport roads will have signs and flaggers as necessary and will have little impact to traffic flow to the extent practicable.
- There will be onsite staging and unloading areas for all deliveries which will prevent any impacts caused by offsite staging of trucks.
- All construction activities will occur within normal daytime working hours to the extent practicable to minimize sound impacts to the surrounding area. When nighttime work is required, the Contractor will be required to request a waiver from the City of Portland as applicable.

B. Development Review of Construction Management Plan

The contractor is required to follow the Construction Safety and Phasing Plan (CSPP) and is required to submit their own Safety Plan Compliance Document (SPCD) per FAA ACs. The public will not be put at risk during this project, as most work will be completed within the secure area of the Airport. The work at the Jetport Boulevard access will be located within the City of South Portland, and traffic control/flaggers will be utilized. Minimizing impacts to areas surrounding the building/construction site will be a primary consideration in the process.

The Planning Authority and the Department of Public Works have the right to seek revisions to an approved Construction Management Plan or require a condition of approval that states an applicant shall coordinate a project's construction schedule with the timing of nearby construction activity, in order to avoid cumulative impacts on a neighborhood. Such a condition may involve a delay in commencement of construction, if necessary.

C. Performance Guarantees, Inspection Fees, Preconstruction Meeting, and Permits

All fees, permits, and guarantees will be paid/issued prior to construction commencing.

D. Construction Administration and Communication

The contact person for all construction activities for the project will be:

Dwight Anderson, P.E.
207-887-3438
dwight.anderson@stantec.com

An emergency contact list for each specific project will be included within the CSPP and will be posted onsite.

E. Construction Schedule

The Proposed Action components would be constructed in phases according to the Jetport's airport capital improvement program (ACIP) and the availability of federal funds as follows (availability of funds vary therefore the actual year of construction may vary):

- Long-term hold/deicing/remain overnight apron - Phase 1 - 2019 (anticipated duration of construction - 180 days); Phase 2 - 2020 (anticipated duration of construction - 120 days);
- Terminal Apron Expansion Northwest End – Phase 2 – 2019 (anticipated duration of construction – 90 days).

F. Security & Public Safety

The site areas are located within the secure, fenced in, airfield, which is monitored by Transportation Security Administration (TSA).

The fire safety program onsite will consist of the following:

- Fire extinguishers placed throughout the construction site for the duration of the project. This includes contractor vehicles and the office trailer.
- All team members will be briefed on the emergency evacuation plan for the project site prior to starting work.

G. Construction Permitting and Traffic Control Plans

1. Construction Activity in Public Streets: Not applicable. The proposed access to Jetport Boulevard is located within the City of South Portland.

2. Sewer: Not applicable.

3. Traffic Control Plans: See Attachment A, Construction Safety and Phasing Narrative (CSPP), for on-site traffic control plans.

H. Site Management and Controls

The following actions will be taken by the Owner as regular site management and control activities:

- Construction site signage will be provided, installed, and maintained by the Contractor throughout the duration of the project.
- Access to the site will be controlled.
- Trash and debris will be removed from site via a construction dumpster which will be changed out as needed on a regular basis.

- Street cleaning will not be required on a regular basis, but if it is deemed necessary the Owner will coordinate the cleaning of any excess dirt that has resulted from construction activities.
- Onsite snow removal will be the Owner's responsibility. Projects are anticipated to be constructed in the spring-fall and snow removal is not anticipated to be an issue.

I. Erosion Control and Preservation of Trees

Erosion control measures will be installed onsite prior to any work commencing. Erosion control plans for each project area are included within the plan set. The control measures will be maintained daily and inspected weekly or after any major rain event. The inspections will be completed by a third party erosion control inspector and will be documented for review by the City of Portland, Maine Department of Environmental Protection, or the U.S. Environmental Protection Agency.

All stored materials onsite will be located away from any trees or vegetation.

J. Construction Staging Area

All trucks will be unloaded within the construction site's footprint to avoid impacts on public traffic. An offsite marshalling area will not be required for this project. All materials will be stored onsite and in a manner to avoid impacts to emergency vehicle access to the property.

K. Parking During Construction

Construction parking will be provided onsite.

L. Special Measures as Necessary

The special measures are described in the CSPP included as Attachment A.

ATTACHMENTS:

Attachment A – Construction Safety and Phasing Narrative

ATTACHMENT A

Construction Safety and Phasing Narrative

CONSTRUCTION SAFETY AND PHASING PLAN – PORTLAND INTERNATIONAL JETPORT

Long-Term Hold Area, Deicing Pad Expansion and RON Apron Construction Including Terminal Apron Expansion Northwest End

Prepared for:
City of Portland
Portland International Jetport
1001 Westbrook Street
Portland, Maine 04102
AIP No. 3-23-0038-###-2019

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March 22, 2019

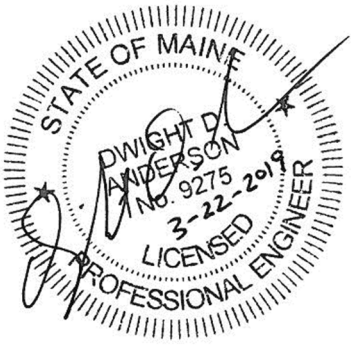


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1 Relevant Partial List of Definitions

AIR OPERATIONS AREA (AOA). Any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operations area includes such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runways, taxiways, or aprons.

AIRPORT AUTHORITY/AIRPORT OPERATOR. The airport authority/airport operator shall mean the personnel responsible for the managing and operating the Portland International Jetport to include but not limited to the Airport Director, Deputy Airport Director – Operations (DADO) or designee, Facilities Manager or designees appointed by the Airport Operator.

CONSTRUCTION. The presence and movement of construction-related personnel, equipment, and materials in any location that could infringe upon the movement of aircraft.

CERTIFICATED AIRPORT. An airport that has been issued an Airport Operating Certificate by the FAA under the authority of 14 CFR part 139, Certification and Operation: Land Airports Serving Certain Air Carriers, or its subsequent revisions.

ENGINEER. The design engineer and/or resident engineer/inspector assigned to the project by the Airport Operator.

MOVEMENT AREA. The runways, taxiways, and other areas of an airport that are used for taxiing or hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading aprons and aircraft parking areas (reference 14 CFR part 139).

OBSTRUCTION. Any object/obstacle exceeding the obstruction standards specified by 14 CFR part 77, subpart C.

OBJECT-FREE AREA (OFA). An area on the ground centered on the runway, taxiway, or taxilane centerline provided to enhance safety of aircraft operations by having the area free of objects except for those objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes (see AC 150/5300-13, Airport Design, for additional guidance on OFA standards and wingtip clearance criteria).

OBSTACLE FREE ZONE (OFZ). The airspace below 150 feet (45m) above the established airport elevation and along the runway and extended runway centerline that is required to be clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance protection for aircraft landing or taking off from the runway and for missed approaches (refer to AC 150/5300-13 for guidance on OFZs).

RUNWAY SAFETY AREA (RSA). A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway, in accordance with AC 150/5300-13.

TAXIWAY SAFETY AREA. A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway, in accordance with AC 150/5300-13.

THRESHOLD. The beginning of that portion of the runway available for landing. In some instances, the landing threshold may be displaced.

VISUAL GLIDE SLOPE INDICATOR (VGSI). This device provides a visual glide slope indicator to landing pilots. These systems include precision approach path indicators (PAPIs), visual approach slope indicators (VASIs), and pulse light approach slope indicators (PLASIs)

*For additional definitions not listed here, refer to www.faa.gov/

2 Construction Safety and Phasing Plan Narrative

2.1 Scope of Work and Duration of Work

The Long-Term Hold Area, Deicing Pad Expansion and RON Apron Construction including Terminal Apron Expansion Northwest End includes multiple sub-phases. The Long-Term Hold Area, Deicing Pad Expansion and RON Apron Construction portion of the project includes an approximately 15,700 square yard full depth construction of a proposed rigid P-501 Portland Cement Concrete Deicing Apron including bituminous snow shoulders and bituminous paving as needed to match into Taxiway A, new High Mast Apron lighting, security fence installation, apron and taxiway markings, and reshaping of an existing water quality filter. The Northwest Terminal Apron Expansion portion of the project includes a new concrete apron encompassing approximately 4,200 square yards. Construction activities will include pavement removal, placement of subbase and base gravels, saw cutting and milling of existing pavement, installation of new pavement (Portland Cement Concrete and Hot Mix Asphalt), and Apron markings.

For safety and security procedures, the work will be broken into the following areas:

- Phase 1A: Construction of the Contractor staging area and Contractor access route, outside of the security fence
- Phase 1B: Construction of the temporary Contractor access route, installation of permanent security fence and gate, and removal of existing security fence
- Phase 2: Long-Term Hold Area, Deicing Pad and RON Apron Construction impacting Taxiway 'A' and Taxiway 'E'
- Phase 3: Long-Term Hold Area, Deicing Pad and RON Apron Construction
- Phase 4: Long-Term Hold Area, Deicing Pad and RON Apron Construction impacting RON positions 1 and 2
- Phase 5: Long-Term Hold Area, Deicing Pad and RON Apron Construction impacting RON positions 2 and 3
- Phase 6: Terminal Apron NW End impacting Gate 14
- Phase 7: Terminal Apron NW End impacting Gate 14

See Section 206 for details and sub phases and Appendix C for Safety and Phasing Drawings.

Phasing Schedule:

See below for approximate months that the work is expected to be completed for the project phases:

- Phase 1A: June 2019
- Phase 1B: June 2019
- Phase 2: July - August 2019
- Phase 3: July – September 2019
- Phase 4: September – October 2019
- Phase 5: September – October 2019
- Phase 6: October 2019
- Phase 7: October 2019

Phases 1-7 of the project are expected to be completed during one construction season beginning in June of 2019 and to be completed and ready for owner acceptance in October of 2019.

Some general points that will be more fully described and discussed in future paragraphs are as follows:

- Work in Phase 1B requiring the removal and installation of permanent security fence shall be carefully coordinated with the airport. The installation of the new security fence and permanent gate shall take place before the removal of the existing fence.
- Work in Phase 2 involving the partial closure of Taxiway A and the closure of Taxiway E must be carefully coordinated with the Deputy Airport Director – Operations (DADO) or designee and the Air Traffic Control (ATC) Tower. Closed taxiways will be marked with interlocking low profile portable barricades at all times. A construction schedule with actual closing and opening dates will be formulated and updated as required. Safety Plans which accompany this narrative depict access routes and traffic control personnel positions. Work in this phase shall be completed as day and night work in order to complete this phase as expeditiously as possible. Affected existing taxiway lights in the area of these phases will not be illuminated during construction and guidance signs will be covered.
- A radio control person must be on-site full time during Phase 2 and during barricade set up of all other phases.
- Access gates shall be guarded during construction by authorized security personnel badged by the Portland International Jetport. The access gates shall be locked during all non-attended times.
- Key personnel (site supervision, equipment operators, etc.) working within the secure area shall complete an FAA security screening and be badged by the airport. All other personnel must be escorted at all times. Note that obtaining security clearance will require that special procedures be completed well in advance of construction in coordination with the Airport Operator. When multiple aspects of the project are completed simultaneously, the Contractor is responsible for having badged personnel on-site at all locations.

- Any driving within an active apron will require Radio Control personnel with Security Identification Display Area (SIDA) Badge driver endorsements as escort.
- There are 7 total numbered phases (Phases 1-7) for this project. The following shall apply:
    - No phases or sub-phases can be worked together with the exception of Phase 2 may be worked with Phase 3, but Phase 2 must be completed within the timeframe as outlined in the special provisions.
- Liquidated damages shall apply to work not completed within the time indicated in the Special Provisions.

2.2 Contractor Responsibilities

Hazardous practices and marginal conditions created by construction activities can decrease or jeopardize operational safety on airports. To minimize disruption of normal aircraft operations and to avoid situations that compromise the airport's operational safety, the Contractor shall carefully plan, schedule, and coordinate construction activities with the Airport Operator.

The Airport Operator has overall authority and responsibility for construction activities on the airport. This includes the predesign, design, preconstruction, construction, and inspection phases. It shall be the Contractor's responsibility to carry out construction in accordance with this Safety and Phasing Plan in coordination with the DADO or designee and as required by the contract documents. Working in and around airports requires special provisions and attention to the manner in which the work is completed. **As a result, the requirements of this Safety Plan and contract documents are not all inclusive. The Contractor shall remain flexible and adaptive to changing conditions and shall carry out requirements imposed by the DADO or Designee and Engineer.**

Throughout construction the Engineer and DADO or designee will conduct frequent inspections to ensure construction Contractors comply with the Safety and Phasing Plan and that construction activities do not create potential safety hazards. Any and all safety issues shall be resolved immediately to the satisfaction of the Engineer and DADO or designee.

The Contractor responsibilities shall include but not be limited to:

1. Communication and coordination with the Engineer and DADO or designee throughout project activities.
2. Comply with all requirements of this Safety and Phasing Plan and contract documents.
3. Prior to construction, provide plans indicating how the Contractor intends to comply with the safety requirements of the project.
4. Convene a meeting with the Engineer and DADO or designee to review and discuss project safety before beginning construction activity.

5. Ensure contact information is accurate for each representative/point of contact identified in the Safety Plan.
6. Hold daily safety meetings prior to the start of work each day.
7. Through the DADO or designee notify users, especially the ATC and aircraft rescue and firefighting (ARFF) personnel, of construction activity and conditions that may adversely affect the operational safety of the airport via Notices to Airmen (NOTAMs) or other methods, as appropriate. Convene a meeting for review and discussion if necessary.
8. Ensure that construction personnel know of any applicable airport procedures and of changes to those procedures that may affect their work. This shall be done in coordination with the Airport Operator.
9. Ensure that construction Contractors and subcontractors undergo training required by the Safety and Phasing Plan and Airport Operator.
10. Obtain security clearance and proper badging for key personnel (site supervisor, equipment operators, etc.) that will access the secure area of the airport. All other personnel must be escorted at all times. This badging may take up to four weeks to complete.
11. Maintain a Construction Vehicle Plan showing access routes, parking areas and requiring flags or flashing beacons on equipment and construction vehicles as approved by the DADO or designee and contained in this Safety Plan and contract documents.
12. Comply with standards and procedures for vehicle lighting, marking, access, operation, and communication. Requirements for marking and identifying vehicles in accordance with AC 150/5210-5D, Painting, Marking, and Lighting of Vehicles Used on an Airport.
13. Construction access shall comply with the security requirements of 49 CFR Part 1542, Airport Security. The project includes special provisions for use of a secure locking temporary access gate. The Contractor will be required to post an airport-approved, badged security officer at the gate established for access to respective phases of this project. The security officer shall be versed in proper marking of construction equipment and shall inspect all vehicles and insure that all parties entering the secure area are properly badged.
14. Under certain conditions, upon notification by the DADO or designee or Engineer, operations shall be suspended and the site stabilized. Such conditions will include airport emergencies, low-visibility conditions as determined by the DADO or designee, unsafe site conditions, inclement weather conditions as deemed unsafe by the Engineer, DADO or designee, failure to comply with the Safety and Phasing Plan or potential aircraft hazards.
15. Provide a 24-hour point of contact that will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport. Contractor shall also provide a secondary 24-hour point of contact in the event the primary point of contact cannot be reached.

16. Provide a safety officer/construction inspector familiar with airport safety to monitor construction activities.
17. Restrict movement of construction vehicles to construction areas by flagging and barricading, signage, erecting temporary fencing, or providing escorts, as appropriate and as required by the engineer.
18. The Contractor shall receive prior written approval from the Engineer and DADO or designee prior to proceeding with any changes that deviate from the approved Construction Plan or Safety and Phasing Plan.
19. The Contractor shall be responsible for maintaining a clean site and insuring that no extraneous debris or materials are placed within any Runway or Taxiway safety areas. The Contractor shall implement a routine cleaning program to include mechanical pickup sweeper, visual inspections and hand clean-up to insure no Foreign Object Debris (FOD) are deposited with the safety areas.

The above general responsibilities shall be in addition to any specific responsibilities identified in the Safety Plan.

Required Compliance of Contractor Personnel with Airport Safety & Security Requirements

The Contractor shall comply with all FAA and Portland International Jetport (PWM) specific safety and security requirements. This shall include but not be limited to requirements of this Safety and Phasing Plan, contract documents, federal law and specific requirements of PWM. Prior to construction, the Contractor will be required to attend a pre-construction safety meeting to review key elements of Airport Safety and Security. All key Contractor and subcontractor personnel (operators, site supervisor, managers) working within the secure areas (within the airport perimeter fence) shall be required to obtain a PWM Security Identification Display Area badge. All other personnel shall be escorted in accordance with PWM and FAA security requirements. This process will require that the Contractor and Contractor's personnel complete an application form, fingerprinting, submit to a background check, and pass the PWM security training and exam. In some cases the airport will allow for Contractors and Contractor subcontractors to access the secure area with an escort in accordance with PWM regulations. All vehicle operators shall be trained specific to the worksite location and associated access.

Construction access shall comply with the security requirements of 49 CFR Part 1542, Airport Security. The project includes special provisions for use of a secure locking access gate. The Contractor will be required to post an airport-approved badged security officer at the gate during all operating times. The security officer shall be properly trained and versed in proper marking of construction equipment and shall inspect all vehicles and insure that parties entering the secure area are properly badged. The security officer (gate guard) shall log personnel and vehicles that enter and depart from the site.

Safety Plan Compliance Document

The Contractor is responsible for submitting a Safety Plan Compliance Document (SPCD), detailing how the Contractor will follow the Construction Safety and Phasing Plan (CSPP). The SPCD will be reviewed prior to issuance of a Notice-to-Proceed. It will not be possible to determine all safety plan details during the development of this CSPP. The SPCD shall cover any additional specific details that the Contractor deems necessary to comply with this Construction Safety and Phasing Plan but shall not be repetitive of the CSPP. This will include but not be limited to the Contractor's contact information, construction equipment heights (i.e. cranes, etc.), a description of possible ignition sources and a safety protocol for any activities involving flames, names of employees to be badged, etc. The contactor shall also include any specific safety protocol that their company establishes and a statement about the safety culture of the company. The SPCD must also include a certification statement by the Contractor that indicates it understands the operational safety requirements of the CSPP and it asserts it will not deviate from the approved CSPP and SPCD unless written approval is granted by the Airport Operator. The Contractor statement shall include the name of the Contractor, the title of the project CSPP, the approval date of the CSPP, and a reference to any supplemental information. The supplemental information in the SPCD should be written to match the format of the CSPP indicating each subject by corresponding CSPP subject name and title. The SPCD shall include, as a minimum:

- Coordination
- Phasing
- Duration of each phase
- Contractor Access
- Details on how the Contractor will maintain the integrity of the airport security fence
- Listing of badged personnel
- Radio Communications
- Details on how the Contractor will escort materials delivery vehicles
- Foreign Object Debris Management (FOD)
- Hazardous Material Management
- Notification of Construction Activities
- Discuss proposed actions for each safety and phasing plan related special condition listed in the Special Conditions
- Marking and Signs for Access Routes
- Management of Sub contractors (escorting, meetings, etc.)

3 Construction Safety and Phasing Plan Narrative

Section 205 – Coordination

A project predesign meeting was held on January 11th, 2019. An airfield impact coordination meeting with ATCT (Air Traffic Control Tower) personnel (Mark Collins) was held on February 5, 2019. User coordination has been completed. A pre-bid meeting is scheduled for March 19, 2019. A pre-construction conference will be held after the contract has been awarded. Additionally, the following will be required:

- Contractor Progress Meetings: Operational safety will be a standing agenda item for discussion during progress meetings throughout the project.
- Scope or Schedule Changes: Changes in scope or duration of the project may necessitate revisions to the CSPP and SPCD.
- FAA ATCT Coordination: Early coordination with FAA ATCT is required to schedule Taxiway and Apron facility shutdowns and restarts. No Runway shutdowns are proposed with this project.

Section 206 – Phasing

For safety and security procedures, the work will be broken into the following areas (refer to Appendix C for Safety and Phasing Drawings):

Note that all phases with the exception of Phase 1A are within the Airport Operation Area (AOA)/Secure Information Display Area (SIDA).

All of the following phases will be accessed through a new permanent gate (installed with Phase 1B) as shown in the safety and phasing plans. The new permanent gate will remain open during construction hours with a badged gate guard monitoring access and will be locked after work hours.

- Phase 1A will include the construction of the Contractor staging area and access route in. This work will be located outside of the AOA/SIDA. Special care is required when working adjacent to the existing security fence. Equipment shall not be stockpiled within 10-feet of the fence.
- Phase 1B will include the construction of the Contractor access route for Phase 2, and the removal of existing fence and installation of the permanent security fence and gate. This work abuts the perimeter road. The perimeter road shall remain open to airport traffic throughout the construction of the access route. Phase 1B is not located within the Runway Safety Area (RSA) or Runway Object Free Area (ROFA) and is not located within any Taxiway Safety Area or Taxiway Object Free Area.
- Phase 2 will include the construction of approximately 33,000 square feet of the concrete apron, and will require that Taxiway E and a portion of Taxiway A be closed throughout the duration of the work. It will also include the relocation of the perimeter road onto the centerline of Taxiway A. This work is located outside of the Runway 11-29 Safety Area, and abuts the Runway 11-29 Object Free Area

and the perimeter road will be temporary relocated to within the Runway 11-29 OFA.

- Phase 3 will have minimal impacts to airport operations. It will consist of the construction of 89,600 square feet of the concrete apron and will also include the water quality filter installation. This phase abuts the perimeter road and the RON positions, but will not impact either. Phase 3 is not located within the Runway Safety Area (RSA) or Runway Object Free Area (ROFA) and is not located within any Taxiway Safety Area or Taxiway Object Free Area.
- Phase 4 will include the installation of concrete that affects the RON positions 1 and 2. A new, temporary RON position will be marked within the Phase 3 area, to allow for the airport to have at least 2 RON positions. Phase 4 is not located within the Runway Safety Area (RSA) or Runway Object Free Area (ROFA) and is not located within any Taxiway Safety Area or Taxiway Object Free Area.
- Phase 5 will include the installation of concrete that affects the RON positions 2 and 3. The temporary RON position marked on Phase 3 will be utilized throughout the duration of this phase also. Phase 5 is not located within the Runway Safety Area (RSA) or Runway Object Free Area (ROFA) and is not located within any Taxiway Safety Area or Taxiway Object Free Area.
- Phases 6 and 7 will include the Northwest Terminal Apron Expansion portion of the project encompassing approximately 35,000 square feet. These phases will require the temporary closure of Terminal Apron Gate 14. Phases 5 and 6 are not located within the Runway Safety Area (RSA) or Runway Object Free Area (ROFA), Taxiway Safety Area or Taxiway Object Free Areas.

Section 207 – Areas and Operations Affected by Construction Activity

The project has many different aspects and all aspects of the project vary for safety operations. Taxiways A and E will be affected and Taxiway A will be partially closed at times. Taxiway E will be closed at times. The Safety and Phasing Plans show the locations of work Phases 1-7 and sub phases. Prior to beginning work, the Contractor shall provide a detailed schedule to complete the work of this project.

Existing underground utilities to be protected are shown on the construction plans.

Section 208 – NAVAIDS

The work is not expected to interfere with any NAVAIDS, however, the Contractor shall be aware that construction activities, materials/equipment storage, and vehicle parking near electronic NAVAIDs require special consideration since they may interfere with signals essential to air navigation. In the event that any of the Contractor's equipment affects NAVAIDS, the Contractor will be required to immediately stop use of the equipment and seek alternate means and methods. The Contractor shall pay particular attention to stockpiling material, as well as to movement and parking of equipment that may interfere with line of sight from the ATCT or with electronic emissions. Interference from construction may require NAVAID shutdown or adjustment of instrument approach minimums for IFR. This condition requires that a NOTAM be filed in coordination with the DADO or designee.

Section 209 – Construction Access

The Contractor parking will be located within the Contractor staging area, constructed with Phase 1A, as shown on the Safety and Phasing Plans.

Access for all phases will be from Jetport Boulevard. A Contractor access route will be installed with Phase 1A. A permanent gate will be installed as part of Phase 1B. From that point on, the site will be accessed through the new permanent gate (for Phases 1B-7). All traffic control measures, access routes, and other information listed on the Safety Plans shall be incidental to the Safety and Security Bid Items. Traffic control gate guards, and radio control personnel shall be at locations as designated on the plans.

All areas except Phase 1A require secure access and will be within the SIDA. Contractor employees will be escorted by Contractor representatives within the SIDA at all times.

Construction equipment parking locations shall be coordinated with the Engineer and DADO or designee.

Construction access shall comply with the security requirements of 49 CFR Part 1542, Airport Security. The project includes special provisions for use of a secure locking temporary access gate. The Contractor will be required to post an airport-approved, badged security officer at the gate established for access to respective phases of this project. The security officer will need to be versed in proper marking of construction equipment and shall inspect all vehicles and insure that parties entering the secure area are properly badged. Many of the phases of the project will be completed inside the perimeter fence of the Airport within the SIDA.

Haul roads are designated on the Safety and Phasing Plans and shall not be deviated from without prior authorization from the Engineer, DADO or designee. It shall be the Contractor's responsibly to remove any materials deposited on haul roads during construction. This shall include mechanical and hand sweeping and as directed by the Engineer.

The construction material stockpile locations, sizes and heights shall be approved by the Engineer and DADO or designee. The locations must be approved by the DADO or designee. Material stockpiles shall be limited to temporary stockpiles as needed for construction staging. All stockpiles shall be located within the designated limits and shall be outside of the taxiway safety areas and shall not exceed heights in accordance with FAA Part 77 requirements and shall not obscure ATCT line of sight. All excess materials shall be removed from the site at project completion. All materials stored onsite shall be located at an approved location by the Engineer and DADO or designee to prevent foreign object damage and attraction of wildlife.

All pedestrians and vehicle operators inside the AOA will be appropriately trained per the Airport Driver Training Program by Airport Operations prior to access to the AOA. Otherwise, they must be under a full-time escort.

Radio Communications:

The Contractor shall furnish a full-time communications person to be on site to assist with opening and closing of Taxiway 'A' and Taxiway 'E' and for barricade set up, adjustment and takedown of other phases. The communications person needs to complete airport operations driving training and related communications training requirements. Radio control personnel will need to be on-site full time during all phases.

The communications person will constantly monitor ATC on ground frequency 121.9 and 120.9 (CTAF after hours) and be in constant contact with construction vehicles on a designated frequency. Airport Operations will coordinate movement area crossings and radio protocols between ATC and the Contractor for runway and taxiway closure work prior to the start of construction.

The Contractor must have adequate back-up radio equipment as approved by Airport Operations. In the event of radio failure tower light gun signals and/or cell phones will be used. Cell phone numbers are provided in Section 213.

Methods of Separating Vehicle and Pedestrian Construction Traffic from Airport Movement Areas:

The project will not have construction traffic inside active Airport Movement Areas except in the cases where the Taxiways and Aprons are partially closed and enclosed with barricades. There will be no construction traffic on Runways or Runway Safety Areas.

Construction vehicles shall be separated from movement areas by project perimeter barricades or safety fence. Construction vehicles shall not interfere with emergency ingress/egress routes. Additionally, they must not obstruct the clear line of sign by the ATCT to any taxiways or runways, nor obstruct any runway visual aid, signs, lights or navigation aids. Low profile barricades (or safety fence in some instances) will be provided to keep construction vehicles within the designated work areas.

No vehicles will be allowed within active movement areas (Runway and Runway Safety Areas, Taxiway and Taxiway Safety Areas) unless authorized by the DADO or designee.

Any unauthorized access shall not be permitted. Unauthorized vehicles or pedestrians accessing movement areas shall be escorted immediately off the project site and shall be subject to potential fines and arrest in accordance with Federal law. Prior to leaving the site, the vehicle license plate and driver name shall be documented.

Vehicle Identification:

Vehicles are expected to be inside the fence as part of this project. All construction vehicles within the secure perimeter fence must be clearly identified in accordance with AC 150/5210-5D as follows:

1. Vehicles operating within the AOA during the day must be provided with a flag on a staff attached to the vehicle so that the flag will be readily visible or with an amber beacon. When any vehicle, other than one that has prior approval from the airport

operator, must travel over any portion of an aircraft movement area, it shall be escorted and properly identified. To operate in those areas during daylight hours, the vehicle must have a flag or beacon attached to it.

2. Flags or approved amber beacons must be provided on all vehicles.
3. The flag must be at least a 3-foot-by-3-foot square having a checkered pattern of international orange and white squares at least 1 foot on each side meeting the color requirements of Table A-1.

COLOR SPECIFICATIONS

A-1. SPECIFICATIONS. Colors specified in Table A-1 are per the Commission Internationale de l'Eclairage (CIE) L*a*b* system of color specification. For a description of this system, refer to American Society for Testing & Materials (ASTM) D 2244, *Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.*

Table A-1. Specification for Vehicle and Flag Colors

Standard Illuminant D65 Usage	Chrome Yellow			Yellowish-Green			International Orange		
	Vehicle Paint			Vehicle Paint			Flag Fabric		
CIELAB DATA	L*	a*	b*	L*	a*	b*	L*	a*	b*
Centroid Color	72.8	24.4	77.6	79.3	-10.2	80.4	45.0	53.5	52.0
Point 1	72.8	31.8	82.9	78.3	-9.0	92.0	45.0	61.4	47.8
Point 2	72.8	25.5	66.7	78.3	-7.6	73.2	45.0	53.9	41.4
Point 3	72.8	18.0	69.3	78.3	-11.0	69.3	45.0	53.5	53.4
Point 4	72.8	22.4	86.0	78.3	-13.4	86.2	45.0	49.7	60.4
Light Limit	77.8			83.3			49.9		
Dark Limit	67.8			73.3			41.6		
Max ΔE	11.1			11.7			10.7		

A-2. COLOR TESTS. Acceptable colors are those that meet the gloss rating test and either a visual or an instrumental color test as follows:

NOTE: *Flag fabric colors must meet either the instrumental tests in Table A-1 or the visual method described in paragraph A-2b(1).*

a. Gloss Rating Test. This test is performed per ASTM D 523, *Standard Test Method for Specular Gloss,* on a paint sample of the color to be applied on the vehicle. An acceptable color sample is high gloss with a minimum gloss rating of 70 units, for 60° geometry.

b. Color Test Methods:

(1) Visual. Prepare a master specimen of the color (per Table A-1) and gloss (per paragraph A-2a). This specimen will be the master color and be used as the basis of comparison per ASTM D 5531-05, *Standard Guide for the Preparation, Maintenance, and Distribution of Physical Product Standards for Color and Geometric Appearance of Coatings.* To verify the paint color of a vehicle visually, vehicle paint samples must be prepared and viewed per ASTM D 1729-96 (Reapproved 2003), *Standard Practice for Visual Appraisal of Colors and Color Differences of Diffusely-Illuminated Opaque Materials.*

Section 210 – Wildlife Management

The Portland International Jetport has developed a Wildlife Hazard Management Plan. The Contractor shall minimize attraction of wildlife during project construction. The Contractor shall ensure that the site is maintained daily and that construction trash such as food scraps not collected from construction personnel activity, grass seed, or ponded water does not occur. In the event Wildlife Hazards are observed, the DADO or designee and the Operations Center shall be contacted immediately. Telephone numbers are provided in Section 213.

Section 211 – Foreign Object Debris Management

Construction Contractors must not leave or place FOD on or near active aircraft movement areas. Materials tracked onto these areas must be continuously removed during the construction project. The construction Contractors shall also carefully control and continuously remove waste or loose materials that might attract wildlife.

Prior to opening any portion of the apron or taxiway, the apron and taxiway will be swept to a "broom clean" condition. Additionally, the tracking of material onto Jetport Boulevard shall be minimized to the extent practicable and any material tracked onto Jetport Boulevard shall be swept expeditiously.

Removal of FOD shall be a continuous activity that is the Contractor's responsibility using all means as necessary to insure aircraft safety. This may include but not be limited to physical inspections and hand-picking materials within the aircraft apron, implementing provisions to prevent blown FOD such as temporary barrier fencing, limiting size and locations of material storage areas, educating and instructing contractor employees on trash/debris control, and use of mechanical sweepers and/or water trucks.

The guidance provided in the FAA Advisory Circular 150/5210-24, "Airport Foreign Object Debris (FOD) Management" included in Appendix B shall be followed. The project requires that a dedicated sweeper be available at all times for haul routes, and sweeping as required.

Section 212 – Hazardous Materials Management

The Contractor shall be responsible for disclosing to the airport all hazardous materials as defined under State and Federal laws that may be utilized during construction. The airport shall have the authority to restrict any such materials from being used on the project site. The Contractor shall:

1. Provide a complete listing at the pre-construction conference for the Airport's review.

2. The Contractor shall provide MSDS on all hazardous materials.

3. The Contractor shall have in place an emergency plan for handling and the cleanup of any potential hazardous waste spills such as fuels from construction equipment.

4. The Contractor shall maintain contact numbers for all emergency response agencies to include but not be limited to the Portland Fire Department, DADO or designee, and Maine Department of Environmental Protection (MeDEP).

5. Any vehicles transporting fuel or other harmful substance shall be appropriately identified using DOT placards.

Section 213 – Notification of Construction Activities

A. In order to allow for immediate notification of airport users and the FAA of any conditions adversely affecting the operational safety of the airport, see list of responsible representatives below:

1. **Portland Police, Fire Department & Rescue**
   Tel.: 911

2. **Deputy Airport Director – Operations – Barry Brown**
   Cell: 207-653-0835

3. **Air Traffic Control Tower**
   Mark Collins, Manager
   Tel.: 207-775-0602

4. **Air Rescue Fire Fighting (ARFF)**
   Tel.: 207-874-8492

5. **Jetport Operations Center (formerly the Jetport "Comm Center")**
   Tel.: 207-756-8310

   Jetport Operations Supervisor
   Tel.: 207-747-8041

6. **FAA – Technical Operations, Portland**
   Bob Durocher, Manager
   Tel: 207-780-3739
   OR
   James Mello, Coordinator
   Tel: 207-780-3319
   Cell: 207-318-2830

7. **Project Engineer/Manager – Stantec**
   Dwight Anderson, P.E.
   Cell: 207-329-7644
   Tel.: 207-887-3438

8. **Resident Engineers – Stantec**
   Amie Gray, P.E.
   Cell: 207-740-2520

   Joseph Newton
   Cell: 207-420-6162

   Chris Sawyer, P.E.
   Cell: 207-841-3082

B. NOTAMS

Before beginning any construction activity requiring a NOTAM and after receiving information from the Contractor, the Airport Operator will give notice [using the Notice to Airmen (NOTAM) System] of proposed location, time, and date of commencement of construction. Upon completion of work and return of all such areas to standard conditions, the Contractor must, through the airport operator, verify the cancellation of all notices issued via the NOTAM System. Throughout the duration of the construction project, the Contractor must:

- Be aware of and understand the safety problems and hazards described in AC 150/5370-2G, Operational Safety on Airports During Construction.

- Conduct activities so as not to violate any safety standards contained in AC 150/5370-2G or any of the references therein.

The airport operator must also provide information on closed or hazardous conditions on airport movement areas to the Flight Service Station (FSS) so it can issue a NOTAM. The airport operator must coordinate the issuance, maintenance, and cancellation of NOTAMs about airport conditions resulting from construction activities with tenants and the local air traffic facility (control tower, approach control, or air traffic control center). Refer to AC 150/5200-28, current version Notices to Airmen (NOTAMs) for Airport Operators. Only the FAA may issue or cancel NOTAMs on shutdown or irregular operation of FAA-owned facilities. Only the airport operator or an authorized representative may issue or cancel NOTAMs on airport conditions. (The airport owner/operator is the only entity that can close or open a runway/taxiway.) The airport operator must file and maintain this list of

authorized representatives with the FSS. Any person having reason to believe that a NOTAM is missing, incomplete, or inaccurate must notify the airport operator. **The Contractor shall coordinate all work with the Engineer and Deputy Airport Director - Operations (DADO) or Designee for the issuance of NOTAMs in a timely manner (several days in advance of the work being initiated).**

C. Emergency Notification Procedures for Medical and Police Response

In the event of a medical, fire or other emergency the Contractor shall immediately call **911**. In addition, ARFF and the Resident Engineer on site shall be notified at the same time, who will in turn notify the Operations Center and DADO or designee. If the resident Engineer/Inspector is not available, the Contractor shall notify the Airport Operations Center and DADO or designee of any emergency. The Contractor shall secure the work area by moving all personnel and equipment away from the emergency to a safe distance.

D. Coordination with ARFF

There will be no deactivated water lines or blocked fire hydrants associated with this project. Prior to the start of construction the Contractor will provide the schedule to the DADO or designee, who will supply it to ARFF, together with a copy of this Safety and Phasing Plan and contact information.

DADO or designee will notify ARFF immediately of any blocked emergency access routes.

Airport contact numbers are provided in Section 213.

E. Notification to the FAA

As described in Part 77, the FAA shall be notified of the proposed construction or alteration of objects that affect navigable airspace. The work in this project is not anticipated to affect the navigable airspace. The work is not expected to interfere with any NAVAIDS.

Additional Notification of Construction Activities Requirements:

1. The Contractor shall coordinate all day-to-day work through the resident Engineer/Inspector assigned to the project by the airport.

2. The resident Engineer/Inspector will contact the DADO or designee as required during construction. If the resident Engineer/Inspector is not available, the contactor may contact the DADO or designee when needed.

4. The DADO or designee will be responsible for issuing NOTAMs and be the liaison with ATCT along with the FAA, when necessary.

5. At the preconstruction conference, a more detailed contact list will be developed and distributed to all parties.

The DADO or designee, in coordination with the Engineer and Contractor, shall notify users, especially aircraft rescue and firefighting (ARFF) personnel, of construction activity and conditions that may adversely affect the operational safety of the airport via Notices to Airmen (NOTAMs) or other methods, as appropriate. Meetings shall be convened, if required, and airport users will be notified that there will be weekly meetings that they may attend.

The DADO or designee will follow established procedures for the immediate notification of all airport users and the FAA of any conditions adversely affecting the operational safety of an airport as defined in this Safety and Phasing Plan and established by the Airport Operator.

Airport contact numbers are provided above.

Section 214 – Inspection Requirements

The Resident Engineer, Contractor and Airport Operator must perform onsite inspections throughout the project and at the end of each work day, with immediate remedy of any deficiencies, whether caused by negligence, oversight, or project scope change. The Contractor's onsite superintendent shall be responsible for coordinating with the Airport Resident Engineer/Inspector and the DADO or designee throughout construction. The Engineer and the Contractor shall at a minimum, inspect the work area and verify that all cones, barricades and lights are placed in a working order. Inspections must be performed by Airport Operations prior to reopening a closed aircraft operations area. Inspections must meet all FAA Part 139 regulatory requirements.

Section 215 – Underground Utilities

There are the following utilities located in the proximity of the work area:

Unitil – Natural Gas
Oil Pipeline – Portland Pipeline
Portland Water District – Water
FairPoint Communications – Telephone
Central Maine Power – Electrical
Time Warner – Television and High Speed Internet Access
City of Portland – Sewer
FAA – Cables
Airport – Cables
Airport – Storm Drainage

Prior to any site construction the Contractor shall undertake the following:

1. Under Title 23 Section 3360-A, Protection of Underground Utilities, the Contractor shall notify "Dig Safe" System, Inc. (1-800-dig-safe) in accordance with the applicable rules and laws. The Contractor shall also coordinate with the Engineer and DADO or designee to field mark and review airport utilities that Dig Safe does not delineate.

2. The Contractor shall contact, schedule and coordinate work with the DADO or designee for Airport owned utilities and may need to utilize DIGSMART to locate Airport owned utilities.

Section 216 – Penalties

Noncompliance with this Safety and Phasing Plan, airport and/or FAA regulations may result in monetary penalties as allowed by Federal law and as stipulated in the contract documents. The Contractor shall also be responsible for immediately fixing, repairing or reconstructing any damages resulting from noncompliance. The airport also reserves the right to restrict future access to the project site, impose additional requirements, or terminate the Contactor's contract at the Airport at its sole discretion for noncompliance.

Section 217 – Special Conditions

Care and coordination with DADO, or designee, and ATCT are required for any work areas when placing barricades on Taxiway 'A' or Taxiway 'E'. Special conditions that may trigger specific safety mitigation actions outlined in this safety plan include low visibility operations, snow removal, aircraft in distress, aircraft accident, security breach and vehicle pedestrian deviations. For aircraft in distress, an aircraft accident, a security breach, or vehicle pedestrian deviations construction work shall suspend and all personnel shall report to the field office for information.

Refer to Section 209 for radio communications as required. Refer to Section 213 for police and medical emergency notification procedures as required. Refer to Section 213 for emergency procedures for contacting all involved parties as required.

In addition, the Contractor must take special notice to the following:

- Heavy equipment (stationary or mobile) operating or idle near Taxiway Safety Areas and Taxiway Object Free Areas.

- Equipment or material near NAVAIDS that may degrade or impair radiated signals and/or the monitoring of navigational and visual aids. Unauthorized or improper vehicle operations in localizer or glide slope critical areas, resulting in electronic interference and/or facility shutdown.

- Tall and especially relatively low-visibility units (i.e., equipment with slim profiles) – cranes, drills, and similar objects – located in critical areas, such as the TSA or Part 77 surfaces.

- Improperly positioned or malfunctioning lights or unlighted airport hazards, such as holes or excavations, on any apron, open taxiway, or open taxilane or in a related safety area.

- Obstacles, loose pavement, trash, and other debris on or near the Air Operations Area (AOA). Construction debris (gravel, sand, mud, paving materials, etc.) on airport pavements may result in aircraft propeller, turbine engine, or tire

damage. Also, loose materials may blow about, potentially causing personal injury or equipment damage.

- Inappropriate or poorly maintained fencing during construction intended to deter human and animal intrusions into the AOA. Fencing and other markings that are inadequate to separate construction areas from open AOAs create aviation hazards.

- Misleading or malfunctioning obstruction lights. Unlighted or unmarked obstructions pose aviation hazards. Flashing red obstruction lights will be placed at a minimum 10 foot spacing along the top of the low profile barricades. The lights are to be Airfield Solutions Model AS4000 Solar Barricade Light or equal.

- Failure to mark and identify utilities or power cables. Damage to utilities and power cables during construction activity can result in the loss of runway/taxiway lighting; loss of navigational, visual, or approach aids; disruption of weather reporting services; and/or loss of communications.

- Restrictions on ARFF access from fire stations to the runway-taxiway system or airport buildings or access to aircraft parking positions or hydrants.

- Lack of radio communications with construction vehicles in airport movement areas.

- Objects, regardless of whether they are marked or flagged, or activities anywhere on or near an airport that could be distracting, confusing, or alarming to pilots during aircraft operations.

- Water, snow, dirt, debris, or other contaminants that temporarily obscure or derogate the visibility of taxiway marking, lighting, and pavement edges. Any condition or factor that obscures or diminishes the visibility of areas under construction.

- Spillage from vehicles (gasoline, diesel fuel, oil, etc.) on active pavement areas, such as taxiways, aprons, and airport roadways.

- Failure to maintain drainage system integrity during construction (e.g., no temporary drainage provided when working on a drainage system).

- Failure to control dust. Consider limiting the amount of area from which the Contractor is allowed to strip turf. Water or other dust control measures will also be used when required. The Contractor shall use care not to cause debris onto the taxiway or active aircraft apron. Any debris on the taxiway will be removed immediately. The Contractor shall have expeditious access to a properly functioning vacuum sweeper at all times during construction.

- Exposed wiring that creates an electrocution or fire ignition hazard. Identify and secure wiring, and place it in conduit or bury it.

- Site burning is not allowed.

Section 218 – Runway and Taxiway Visual Aids – Markings, Lighting, Signs, and Visual Aids

The use of temporary visual aids beyond typical construction signage and the items listed below is not anticipated to be required.

Runway lighting will not be affected.

During Phase 2, Taxiway signs in or adjacent to closed areas shall be disabled or covered. The taxiway edge lights should either be disconnected or covered while Taxiway's are closed during the nights. When a Taxiway is partially closed, the Contractor must ensure that the lights on the open portion of the Taxiway remain connected and lit.

The following Advisory Circulars, most recent version shall be followed:

- Standards for Airport Markings - AC 150/5340-1
- Design and Installation Details for Airport Visual Aids - AC 150/5430-30
- Specification for Portable Runway and Taxiway Lights– AC 150/5345-50
- Airport Lighting Certification Program – AC 150/5345-53
- Specification for Runway and Taxiway Signs – AC 150/5345-44
- Standards for Airport Sign Systems – AC 150/5340-18
- Airport Lighting Certification Program – AC 150-5345-53

Section 219 – Markings and Signs for Access Routes

Pavement markings and signs for construction personnel will conform to AC 150/5340-18 and, to the extent practicable, with the Federal Highway Administration Manual on Uniform Control Devices (MUTCD) and/or State highway specifications. Signs adjacent to areas used by aircraft will be moved to provide wingtip clearance during non-work hours.

Section 220 – Hazard Marking, Lighting and Signage

Areas affected by construction located on the airfield that may abut aircraft traffic include the Phase 2 Taxiway A concrete/pavement installation. Phases 1B, 3, 4, and 5 will be located adjacent to the existing RON/deice apron, but construction traffic will be separated from aircraft and airport traffic. Phases 6 and 7 will require the closure of Gate 14.

In order to prevent pilots from entering areas closed to aircraft, and for construction vehicles from entering areas with active aircraft, the following precautions will be taken:

- Phase 1A: This phase will be located outside of the AOA/SIDA. The existing perimeter fence will remain installed to keep construction traffic separate from airport/aircraft traffic.

- Phase 1B: Interlocking barricades will be installed at the perimeter road where the temporary access road ties in, to keep construction vehicles from accessing the perimeter road, and from airport traffic from accessing the construction site. This will also keep construction traffic from inadvertently entering the Taxiway Object Free Area. Safety fence will be installed in grass areas to keep construction traffic within the work areas.

- Phase 2: Construction barrels will be installed to the south of the work area to keep construction traffic separate from the temporarily relocated perimeter road. Interlocking barricades will be installed to the south of the temporary perimeter road. Barricades will also be placed on either side of the work area on Taxiway 'A' and on the existing perimeter road on either side of the work area to keep construction traffic confined to the work site. Barricades will also be installed on Taxiway 'A', east of Taxiway 'F' and on Taxiway 'E' to prevent aircraft from entering the worksite.

- Phases 3-7: Barricades will be installed around the work site on paved areas and safety fence will be installed in grass areas to keep construction traffic within the work area.

For all phases, several Traffic control people and 1 radio control person will also be at various locations as shown on the plans to ensure construction vehicles remain on the haul routes and within the work area.

"Construction Traffic Only" signs will also be installed in areas where airport vehicular traffic may be located. Additionally, "Stop, No Construction Vehicles Beyond This Point" signs will be installed in areas where construction traffic may not pass beyond.

Manholes shall not be left open during non-work hours. Each phase will be surrounded by barricades or cones and if any trenches are required to be left open within the work area, they will be lined with caution tape. There will be no open trenches beyond the project work areas.

Section 221 – Protection of Runway and Taxiway Safety Areas

Runway Safety Areas, Object Free Zones and Object Free Areas:

There will not be work completed within the Runway 11-29 Runway Safety Areas (RSA) or Object Free Zones (ROFZ)

During work in Phase 2, the perimeter road will be temporarily relocated to be within the Runway Object Free Area (ROFA). Barricades will be placed around the work area to prevent inadvertent access to open portions of the Runway 11-29 RSA.

Taxiway Safety Areas, Object Free Areas:

There will be work completed within the Taxiway 'A' Object Free Area (TOFA) and Safety Area (TSA). The Taxiway will be partially closed at the time of construction. Barricades will be placed around the work areas to protect the open portion of Taxiway 'A'.

Appropriate NOTAMs will be issued when personnel and equipment need to be within Safety Areas, OFZs and OFAs and the work will be coordinated with Air Traffic and the ATO. No stockpile locations will be located within Safety Areas, OFZs or OFAs.

Trenches and Excavations and Cover Requirements:

All trenches and excavations shall be in accordance with the contract documents and drawings. All excavation and trenches shall meet all applicable OSHA, state and federal requirements. Safeguards shall be taken during construction to insure worker safety in accordance with all local, state and federal laws and regulations governing excavations. The Contractor shall demonstrate compliance with regulations through providing a written safety plan.

At the close of work each day construction areas shall be properly barricaded and lighted.

As identified in the sediment and erosion control narrative, plans and details, erosion control measures within the TSA and TOFA shall be extremely important. The site shall be stabilized in order to eliminate the possibility of rain washing FOD into critical areas.

Section 222 – Limitations on Construction

Construction activities shall be limited by the requirements of this safety plan, contract documents and plans. Construction days for most phases will include Monday through Friday, only during daylight hours. During Phase 4 Monday through Saturday work is anticipated. See Section 3.1 above for limitations on what phases can be completed concurrently.

If the Contractor construction methods require a 7460, it shall be submitted by the Contractor and approved by the FAA. The Contractor is responsible for submitting the 7460 to the FAA in a timely manner (within 45 days of the specific project element) to allow for approval.

As an active airport, the Contractor will be required to adhere to any and all requirements imposed by the Airport Operator, Engineer, DADO or designee, TSA or ATCT. The Contractor may be required to suspend construction or modify the work approach to accommodate aircraft movements, safety alerts or concerns, weather conditions or hazards/emergencies that may arise at the airport.

Contractors may not use open-flame welding or torches unless adequate fire safety precautions are provided and the airport operator has approved their use.

The situations identified above are potentially hazardous conditions that could occur during airport construction projects. Safety area encroachments, unauthorized and improper ground vehicle operations, and unmarked or uncovered holes and trenches near aircraft operating surfaces pose the most prevalent threats to airport operational safety during airport construction projects.

4 References

Obtain the latest version of the following free publications from the FAA on its Web site at http://www.faa.gov/arp/. In addition, these ACs are available by contacting the U.S. Department of Transportation, Subsequent Distribution Office, SVC-121.23, Ardmore East Business Center, 3341 Q 75th Avenue, Landover, MD 20785.

AC 150/5200-28, Notices to Airmen (NOTAM) for Airport Operators. Provides guidance for the use of the NOTAM System in airport reporting.

AC 150/5200-30, Airport Winter Safety and Operations. Provides guidance to airport owners/operators on the development of an acceptable airport snow and ice control program and on appropriate field condition reporting procedures.

AC 150/5200-33, Hazardous Wildlife Attractants On or Near Airports. Provides guidance on locating certain land uses having the potential to attract hazardous wildlife to public-use airports.

AC 150/5210-5, Painting, Marking, and Lighting of Vehicles Used on an Airport. Provides guidance, specifications, and standards for painting, marking, and lighting vehicles operating in the airport air operations areas.

AC 150/5210-24, Airport Foreign Object Debris (FOD) Management. Provides guidance for developing and managing an airport foreign object debris (FOD) program.

AC 150/5340-1, Standards for Airport Markings. Contains FAA standards for markings used on airport runways, taxiways, and aprons.

AC 150/5340-18, Standards for Airport Sign Systems. Contains FAA standards for the siting and installation of signs on airport runways and taxiways.

AC 150/5345-28, Precision Approach Path Indicator (PAPI) Systems. Contains the FAA standards for PAPI systems, which provides pilots with visual glide slope guidance during approach for landing.

AC 70/7460-1, Obstruction Marking and Lighting. Sets forth standards for marking and lighting obstructions that have been deemed to be a hazard to navigable airspace

5 Appendices

Appendix A – AC 150/5370-2G Operational Safety on Airports During Construction

Appendix B – AC 150/5210-24 Airport Foreign Object Debris Management

Appendix C – Construction Safety and Phasing Plans

Appendix A

AC 150/5370-2G Operational Safety on Airports During Construction

U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Operational Safety on Airports During Construction	**Date:** 12/13/2017 **Initiated By:** AAS-100	**AC No:** 150/5370-2G **Change:**

1 **Purpose.**

This AC sets forth guidelines for operational safety on airports during construction.

2 **Cancellation.**

This AC cancels AC 150/5370-2F, *Operational Safety on Airports during Construction*, dated September 29, 2011.

3 **Application.**

This AC assists airport operators in complying with Title 14 Code of Federal Regulations (CFR) Part 139, *Certification of Airports*. For those certificated airports, this AC provides one way, but not the only way, of meeting those requirements. The use of this AC is mandatory for those airport construction projects receiving funds under the Airport Improvement Program (AIP). See Grant Assurance No. 34, *Policies, Standards, and Specifications*. While we do not require non-certificated airports without grant agreements or airports using Passenger Facility Charge (PFC) Program funds for construction projects to adhere to these guidelines, we recommend that they do so to help these airports maintain operational safety during construction.

4 **Related Documents.**

ACs and Orders referenced in the text of this AC do not include a revision letter, as they refer to the latest version. Appendix A contains a list of reading material on airport construction, design, and potential safety hazards during construction, as well as instructions for obtaining these documents.

5 **Principal Changes.**

The AC incorporates the following principal changes:

1. Notification about impacts to both airport owned and FAA-owned NAVAIDs was added. See paragraph 2.13.5.3, NAVAIDs.

2. Guidance for the use of orange construction signs was added. See paragraph 2.18.4.2, Temporary Signs.
3. Open trenches or excavations may be permitted in the taxiway safety area while the taxiway is open to aircraft operations, subject to restrictions. See paragraph 2.22.3.4, Excavations.
4. Guidance for temporary shortened runways and displaced thresholds has been enhanced. See Figure 2-1 and Figure 2-2.
5. Figures have been improved and a new Appendix F on the placement of orange construction signs has been added.

Hyperlinks (allowing the reader to access documents located on the internet and to maneuver within this document) are provided throughout this document and are identified with underlined text. When navigating within this document, return to the previously viewed page by pressing the "ALT" and " ←" keys simultaneously.

Figures in this document are schematic representations and are not to scale.

6 **Use of Metrics.**

Throughout this AC, U.S. customary units are used followed with "soft" (rounded) conversion to metric units. The U.S. customary units govern.

7 **Where to Find this AC.**

You can view a list of all ACs at http://www.faa.gov/regulations_policies/advisory_circulars/. You can view the Federal Aviation Regulations at http://www.faa.gov/regulations_policies/faa_regulations/.

8 **Feedback on this AC.**

If you have suggestions for improving this AC, you may use the Advisory Circular Feedback form at the end of this AC.

John R. Dermody
Director of Airport Safety and Standards

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CHAPTER 1. PLANNING AN AIRFIELD CONSTRUCTION PROJECT

1.1 Overview.

Airports are complex environments, and procedures and conditions associated with construction activities often affect aircraft operations and can jeopardize operational safety. Safety considerations are paramount and may make operational impacts unavoidable. However, careful planning, scheduling, and coordination of construction activities can minimize disruption of normal aircraft operations and avoid situations that compromise the airport's operational safety. The airport operator must understand how construction activities and aircraft operations affect one another to be able to develop an effective plan to complete the project. While the guidance in this AC is primarily used for construction operations, the concepts, methods and procedures described may also enhance the day-to-day airport maintenance operations, such as lighting maintenance and snow removal operations.

1.2 Plan for Safety.

Safety, maintaining aircraft operations, and construction costs are all interrelated. Since safety must not be compromised, the airport operator must strike a balance between maintaining aircraft operations and construction costs. This balance will vary widely depending on the operational needs and resources of the airport and will require early coordination with airport users and the FAA. As the project design progresses, the necessary construction locations, activities, and associated costs will be identified and their impact to airport operations must be assessed. Adjustments are made to the proposed construction activities, often by phasing the project, and/or to airport operations to maintain operational safety. This planning effort will ultimately result in a project Construction Safety and Phasing Plan (CSPP). The development of the CSPP takes place through the following five steps:

1.2.1 Identify Affected Areas.

The airport operator must determine the geographic areas on the airport affected by the construction project. Some, such as a runway extension, will be defined by the project. Others may be variable, such as the location of haul routes and material stockpiles.

1.2.2 Describe Current Operations.

Identify the normal airport operations in each affected area for each phase of the project. This becomes the baseline from which the impact on operations by construction activities can be measured. This should include a narrative of the typical users and aircraft operating within the affected areas. It should also include information related to airport operations: the Aircraft Approach Category (AAC) and Airplane Design Group (ADG) of the airplanes that operate on each runway; the ADG and Taxiway Design Group (TDG)[1] for each affected taxiway; designated approach visibility minimums;

[1] Find Taxiway Design Group information in AC 150/5300-13, *Airport Design.*

available approach and departure procedures; most demanding aircraft; declared distances; available air traffic control services; airport Surface Movement Guidance and Control System (SMGCS) plan; and others. The applicable seasons, days and times for certain operations should also be identified as applicable.

1.2.3 Allow for Temporary Changes to Operations.

To the extent practical, current airport operations should be maintained during the construction. In consultation with airport users, Aircraft Rescue and Fire Fighting (ARFF) personnel, and FAA Air Traffic Organization (ATO) personnel, the airport operator should identify and prioritize the airport's most important operations. The construction activities should be planned, through project phasing if necessary, to safely accommodate these operations. When the construction activities cannot be adjusted to safely maintain current operations, regardless of their importance, then the operations must be revised accordingly. Allowable changes include temporary revisions to approach procedures, restricting certain aircraft to specific runways and taxiways, suspension of certain operations, decreased weights for some aircraft due to shortened runways, and other changes. An example of a table showing temporary operations versus current operations is shown in Appendix E.

1.2.4 Take Required Measures to Revise Operations.

Once the level and type of aircraft operations to be maintained are identified, the airport operator must determine the measures required to safely conduct the planned operations during the construction. These measures will result in associated costs, which can be broadly interpreted to include not only direct construction costs, but also loss of revenue from impacted operations. Analysis of costs may indicate a need to reevaluate allowable changes to operations. As aircraft operations and allowable changes will vary widely among airports, this AC presents general guidance on those subjects.

1.2.5 Manage Safety Risk.

The FAA is committed to incorporating proactive safety risk management (SRM) tools into its decision-making processes. FAA Order 5200.11, *FAA Airports (ARP) Safety Management System (SMS)*, requires the FAA to conduct a Safety Assessment for certain triggering actions. Certain airport projects may require the airport operator to provide a Project Proposal Summary to help the FAA determine whether a Safety Assessment is required prior to FAA approval of the CSPP. The airport operator must coordinate with the appropriate FAA Airports Regional or District Office early in the development of the CSPP to determine the need for a Safety Risk Assessment. If the FAA requires an assessment, the airport operator must at a minimum:

1. Notify the appropriate FAA Airports Regional or District Office during the project "scope development" phase of any project requiring a CSPP.
2. Provide documents identified by the FAA as necessary to conduct SRM.
3. Participate in the SRM process for airport projects.
4. Provide a representative to participate on the SRM panel.

5. Ensure that all applicable SRM identified risks elements are recorded and mitigated within the CSPP.

1.3 **Develop a Construction Safety and Phasing Plan (CSPP).**

Development of an effective CSPP will require familiarity with many other documents referenced throughout this AC. See Appendix A for a list of related reading material.

1.3.1 List Requirements.

A CSPP must be developed for each on-airfield construction project funded by the Airport Improvement Program (AIP) or located on an airport certificated under Part 139. For on-airfield construction projects at Part 139 airports funded without AIP funds, the preparation of a CSPP represents an acceptable method the certificate holder may use to meet Part 139 requirements during airfield construction activity. As per FAA Order 5200.11, projects that require Safety Assessments do not include construction, rehabilitation, or change of any facility that is entirely outside the air operations area, does not involve any expansion of the facility envelope and does not involve construction equipment, haul routes or placement of material in locations that require access to the air operations area, increase the facility envelope, or impact line-of-sight. Such facilities may include passenger terminals and parking or other structures. However, extraordinary circumstances may trigger the need for a Safety Assessment and a CSPP. The CSPP is subject to subsequent review and approval under the FAA's Safety Risk Management procedures (see paragraph 1.2.5).

1.3.2 Prepare a Safety Plan Compliance Document (SPCD).

The Safety Plan Compliance Document (SPCD) details how the contractor will comply with the CSPP. Also, it will not be possible to determine all safety plan details (for example specific hazard equipment and lighting, contractor's points of contact, construction equipment heights) during the development of the CSPP. The successful contractor must define such details by preparing an SPCD that the airport operator reviews for approval prior to issuance of a notice-to-proceed. The SPCD is a subset of the CSPP, similar to how a shop drawing review is a subset to the technical specifications.

1.3.3 Assume Responsibility for the CSPP.

The airport operator is responsible for establishing and enforcing the CSPP. The airport operator may use the services of an engineering consultant to help develop the CSPP. However, writing the CSPP cannot be delegated to the construction contractor. Only those details the airport operator determines cannot be addressed before contract award are developed by the contractor and submitted for approval as the SPCD. The SPCD does not restate nor propose differences to provisions already addressed in the CSPP.

1.4 Who Is Responsible for Safety During Construction?

1.4.1 Establish a Safety Culture.

Everyone has a role in operational safety on airports during construction: the airport operator, the airport's consultants, the construction contractor and subcontractors, airport users, airport tenants, ARFF personnel, Air Traffic personnel, including Technical Operations personnel, FAA Airports Division personnel, and others, such as military personnel at any airport supporting military operations (e.g. national guard or a joint use facility). Close communication and coordination between all affected parties is the key to maintaining safe operations. Such communication and coordination should start at the project scoping meeting and continue through the completion of the project. The airport operator and contractor should conduct onsite safety inspections throughout the project and immediately remedy any deficiencies, whether caused by negligence, oversight, or project scope change.

1.4.2 Assess Airport Operator's Responsibilities.

An airport operator has overall responsibility for all activities on an airport, including construction. This includes the predesign, design, preconstruction, construction, and inspection phases. Additional information on the responsibilities listed below can be found throughout this AC. The airport operator must:

1.4.2.1 Develop a CSPP that complies with the safety guidelines of Chapter 2, Construction Safety and Phasing Plans, and Chapter 3, Guidelines for Writing a CSPP. The airport operator may develop the CSPP internally or have a consultant develop the CSPP for approval by the airport operator. For tenant sponsored projects, approve a CSPP developed by the tenant or its consultant.

1.4.2.2 Require, review and approve the SPCD by the contractor that indicates how it will comply with the CSPP and provides details that cannot be determined before contract award.

1.4.2.3 Convene a preconstruction meeting with the construction contractor, consultant, airport employees and, if appropriate, tenant sponsor and other tenants to review and discuss project safety before beginning construction activity. The appropriate FAA representatives should be invited to attend the meeting. See AC 150/5370-12, *Quality Management for Federally Funded Airport Construction Projects.* (Note "FAA" refers to the Airports Regional or District Office, the Air Traffic Organization, Flight Standards Service, and other offices that support airport operations, flight regulations, and construction/environmental policies.)

1.4.2.4 Ensure contact information is accurate for each representative/point of contact identified in the CSPP and SPCD.

1.4.2.5 Hold weekly or, if necessary, daily safety meetings with all affected parties to coordinate activities.

1.4.2.6 Notify users, ARFF personnel, and FAA ATO personnel of construction and conditions that may adversely affect the operational safety of the airport via Notices to Airmen (NOTAM) and other methods, as appropriate. Convene a meeting for review and discussion if necessary.

1.4.2.7 Ensure construction personnel know applicable airport procedures and changes to those procedures that may affect their work.

1.4.2.8 Ensure that all temporary construction signs are located per the scheduled list for each phase of the project.

1.4.2.9 Ensure construction contractors and subcontractors undergo training required by the CSPP and SPCD.

1.4.2.10 Ensure vehicle and pedestrian operations addressed in the CSPP and SPCD are coordinated with airport tenants, the airport traffic control tower (ATCT), and construction contractors.

1.4.2.11 At certificated airports, ensure each CSPP and SPCD is consistent with Part 139.

1.4.2.12 Conduct inspections sufficiently frequently to ensure construction contractors and tenants comply with the CSPP and SPCD and that there are no altered construction activities that could create potential safety hazards.

1.4.2.13 Take immediate action to resolve safety deficiencies.

1.4.2.14 At airports subject to 49 CFR Part 1542, *Airport Security*, ensure construction access complies with the security requirements of that regulation.

1.4.2.15 Notify appropriate parties when conditions exist that invoke provisions of the CSPP and SPCD (for example, implementation of low-visibility operations).

1.4.2.16 Ensure prompt submittal of a Notice of Proposed Construction or Alteration (Form 7460-1) for conducting an aeronautical study of potential obstructions such as tall equipment (cranes, concrete pumps, other), stock piles, and haul routes. A separate form may be filed for each potential obstruction, or one form may be filed describing the entire construction area and maximum equipment height. In the latter case, a separate form must be filed for any object beyond or higher than the originally evaluated area/height. The FAA encourages online submittal of forms for expediency at https://oeaaa.faa.gov/oeaaa/external/portal.jsp. The appropriate FAA Airports Regional or District Office can provide assistance in determining which objects require an aeronautical study.

1.4.2.17 Ensure prompt transmission of the Airport Sponsor Strategic Event Submission, FAA Form 6000-26, located at https://oeaaa.faa.gov/oeaaa/external/content/AIRPORT_SPONSOR_STRATEGIC_EVENT_SUBMISSION_FORM.pdf, to assure proper coordination for NAS Strategic Interruption per Service Level Agreement with ATO.

1.4.2.18 Promptly notify the FAA Airports Regional or District Office of any proposed changes to the CSPP prior to implementation of the change. Changes to the CSPP require review and approval by the airport operator and the FAA. The FAA Airports Regional or District office will determine if further coordination within the FAA is needed. Coordinate with appropriate local and other federal government agencies, such as Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), Transportation Security Administration (TSA), and the state environmental agency.

1.4.3 Define Construction Contractor's Responsibilities.

The contractor is responsible for complying with the CSPP and SPCD. The contractor must:

1.4.3.1 Submit a Safety Plan Compliance Document (SPCD) to the airport operator describing how it will comply with the requirements of the CSPP and supply any details that could not be determined before contract award. The SPCD must include a certification statement by the contractor, indicating an understanding of the operational safety requirements of the CSPP and the assertion of compliance with the approved CSPP and SPCD unless written approval is granted by the airport operator. Any construction practice proposed by the contractor that does not conform to the CSPP and SPCD may impact the airport's operational safety and will require a revision to the CSPP and SPCD and re-coordination with the airport operator and the FAA in advance.

1.4.3.2 Have available at all times copies of the CSPP and SPCD for reference by the airport operator and its representatives, and by subcontractors and contractor employees.

1.4.3.3 Ensure that construction personnel are familiar with safety procedures and regulations on the airport. Provide a point of contact who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport. Many projects will require 24-hour coverage.

1.4.3.4 Identify in the SPCD the contractor's on-site employees responsible for monitoring compliance with the CSPP and SPCD during construction. At least one of these employees must be on-site when active construction is taking place.

1.4.3.5 Conduct sufficient inspections to ensure construction personnel comply with the CSPP and SPCD and that there are no altered construction activities that could create potential safety hazards.

1.4.3.6 Restrict movement of construction vehicles and personnel to permitted construction areas by flagging, barricading, erecting temporary fencing, or providing escorts, as appropriate, and as specified in the CSPP and SPCD.

1.4.3.7 Ensure that no contractor employees, employees of subcontractors or suppliers, or other persons enter any part of the air operations area (AOA) from the construction site unless authorized.

1.4.3.8 Ensure prompt submittal through the airport operator of Form 7460-1 for the purpose of conducting an aeronautical study of contractor equipment such as tall equipment (cranes, concrete pumps, and other equipment), stock piles, and haul routes when different from cases previously filed by the airport operator. The FAA encourages online submittal of forms for expediency at https://oeaaa.faa.gov/oeaaa/external/portal.jsp.

1.4.3.9 Ensure that all necessary safety mitigations are understood by all parties involved, and any special requirements of each construction phase will be fulfilled per the approved timeframe.

1.4.3.10 Participate in pre-construction meetings to review construction limits, safety mitigations, NOTAMs, and understand all special airport operational needs during each phase of the project.

1.4.4 Define Tenant's Responsibilities.

If planning construction activities on leased property, Airport tenants, such as airline operators, fixed base operators, and FAA ATO/Technical Operations sponsoring construction are strongly encouraged to:

1. Develop, or have a consultant develop, a project specific CSPP and submit it to the airport operator. The airport operator may forgo a complete CSPP submittal and instead incorporate appropriate operational safety principles and measures addressed in the advisory circular within their tenant lease agreements.
2. In coordination with its contractor, develop an SPCD and submit it to the airport operator for approval issued prior to issuance of a Notice to Proceed.
3. Ensure that construction personnel are familiar with safety procedures and regulations on the airport during all phases of the construction.
4. Provide a point of contact of who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport.
5. Identify in the SPCD the contractor's on-site employees responsible for monitoring compliance with the CSPP and SPCD during construction. At least one of these employees must be on-site when active construction is taking place.
6. Ensure that no tenant or contractor employees, employees of subcontractors or suppliers, or any other persons enter any part of the AOA from the construction site unless authorized.
7. Restrict movement of construction vehicles to construction areas by flagging and barricading, erecting temporary fencing, or providing escorts, as appropriate, as specified in the CSPP and SPCD.
8. Ensure prompt submittal through the airport operator of Form 7460-1 for conducting an aeronautical study of contractor equipment such as tall equipment (cranes, concrete pumps, other), stock piles, and haul routes. The FAA encourages online submittal of forms for expediency at https://oeaaa.faa.gov/oeaaa/external/portal.jsp.
9. Participate in pre-construction meetings to review construction limits, safety mitigations, NOTAMs, and understand all special airport operational needs during each phase of the project.

CHAPTER 2. CONSTRUCTION SAFETY AND PHASING PLANS

2.1 Overview.

Aviation safety is the primary consideration at airports, especially during construction. The airport operator's CSPP and the contractor's Safety Plan Compliance Document (SPCD) are the primary tools to ensure safety compliance when coordinating construction activities with airport operations. These documents identify all aspects of the construction project that pose a potential safety hazard to airport operations and outline respective mitigation procedures for each hazard. They must provide information necessary for the Airport Operations department to conduct airfield inspections and expeditiously identify and correct unsafe conditions during construction. All aviation safety provisions included within the project drawings, contract specifications, and other related documents must also be reflected in the CSPP and SPCD.

2.2 Assume Responsibility.

Operational safety on the airport remains the airport operator's responsibility at all times. The airport operator must develop, certify, and submit for FAA approval each CSPP. It is the airport operator's responsibility to apply the requirements of the FAA approved CSPP. The airport operator must revise the CSPP when conditions warrant changes and must submit the revised CSPP to the FAA for approval. The airport operator must also require and approve a SPCD from the project contractor.

2.3 Submit the CSPP.

Construction Safety and Phasing Plans should be developed concurrently with the project design. Milestone versions of the CSPP should be submitted for review and approval as follows. While these milestones are not mandatory, early submission will help to avoid delays. Submittals are preferred in 8.5 × 11 inch or 11 × 17 inch format for compatibility with the FAA's Obstruction Evaluation / Airport Airspace Analysis (OE / AAA) process.

2.3.1 Submit an Outline/Draft.

By the time approximately 25% to 30% of the project design is completed, the principal elements of the CSPP should be established. Airport operators are encouraged to submit an outline or draft, detailing all CSPP provisions developed to date, to the FAA for review at this stage of the project design.

2.3.2 Submit a CSPP.

The CSPP should be formally submitted for FAA approval when the project design is 80 percent to 90 percent complete. Since provisions in the CSPP will influence contract costs, it is important to obtain FAA approval in time to include all such provisions in the procurement contract.

2.3.3 Submit an SPCD.

The contractor should submit the SPCD to the airport operator for approval to be issued prior to the Notice to Proceed.

2.3.4 Submit CSPP Revisions.

All revisions to a previously approved CSPP must be re-submitted to the FAA for review and approval/disapproval action.

2.4 Meet CSPP Requirements.

2.4.1 To the extent possible, the CSPP should address the following as outlined in Chapter 3, Guidelines for Writing a CSPP. Details that cannot be determined at this stage are to be included in the SPCD.

1. Coordination.
    a. Contractor progress meetings.
    b. Scope or schedule changes.
    c. FAA ATO coordination.
2. Phasing.
    a. Phase elements.
    b. Construction safety drawings.
3. Areas and operations affected by the construction activity.
    a. Identification of affected areas.
    b. Mitigation of effects.
4. Protection of navigation aids (NAVAIDs).
5. Contractor access.
    a. Location of stockpiled construction materials.
    b. Vehicle and pedestrian operations.
6. Wildlife management.
    a. Trash.
    b. Standing water.
    c. Tall grass and seeds.
    d. Poorly maintained fencing and gates.
    e. Disruption of existing wildlife habitat.
7. Foreign Object Debris (FOD) management.
8. Hazardous materials (HAZMAT) management.
9. Notification of construction activities.

a. Maintenance of a list of responsible representatives/ points of contact.

b. NOTAM.

c. Emergency notification procedures.

d. Coordination with ARFF Personnel.

e. Notification to the FAA.

10. Inspection requirements.

a. Daily (or more frequent) inspections.

b. Final inspections.

11. Underground utilities.

12. Penalties.

13. Special conditions.

14. Runway and taxiway visual aids. Marking, lighting, signs, and visual NAVAIDs.

a. General.

b. Markings.

c. Lighting and visual NAVAIDs.

d. Signs, temporary, including orange construction signs, and permanent signs.

15. Marking and signs for access routes.

16. Hazard marking and lighting.

a. Purpose.

b. Equipment.

17. Work zone lighting for nighttime construction (if applicable).

18. Protection of runway and taxiway safety areas, object free areas, obstacle free zones, and approach/departure surfaces.

a. Runway Safety Area (RSA).

b. Runway Object Free Area (ROFA).

c. Taxiway Safety Area (TSA). Provide details for any adjustments to Taxiway Safety Area width to allow continued operation of smaller aircraft. See paragraph 2.22.3.

d. Taxiway Object Free Area (TOFA). Provide details for any continued aircraft operations while construction occurs within the TOFA. See paragraph 2.22.4.

e. Obstacle Free Zone (OFZ).

f. Runway approach/departure surfaces.

19. Other limitations on construction.

a. Prohibitions.

b. Restrictions.

2.4.2 The Safety Plan Compliance Document (SPCD) should include a general statement by the construction contractor that he/she has read and will abide by the CSPP. In addition, the SPCD must include all supplemental information that could not be included in the CSPP prior to the contract award. The contractor statement should include the name of the contractor, the title of the project CSPP, the approval date of the CSPP, and a reference to any supplemental information (that is, "I, (Name of Contractor), have read the (Title of Project) CSPP, approved on (Date), and will abide by it as written and with the following additions as noted:"). The supplemental information in the SPCD should be written to match the format of the CSPP indicating each subject by corresponding CSPP subject number and title. If no supplemental information is necessary for any specific subject, the statement, "No supplemental information," should be written after the corresponding subject title. The SPCD should not duplicate information in the CSPP:

1. Coordination. Discuss details of proposed safety meetings with the airport operator and with contractor employees and subcontractors.
2. Phasing. Discuss proposed construction schedule elements, including:
   a. Duration of each phase.
   b. Daily start and finish of construction, including "night only" construction.
   c. Duration of construction activities during:
      i. Normal runway operations.
      ii. Closed runway operations.
      iii. Modified runway "Aircraft Reference Code" usage.
3. Areas and operations affected by the construction activity. These areas and operations should be identified in the CSPP and should not require an entry in the SPCD.
4. Protection of NAVAIDs. Discuss specific methods proposed to protect operating NAVAIDs.
5. Contractor access. Provide the following:
   a. Details on how the contractor will maintain the integrity of the airport security fence (gate guards, daily log of construction personnel, and other).
   b. Listing of individuals requiring driver training (for certificated airports and as requested).
   c. Radio communications.
      i. Types of radios and backup capabilities.
      ii. Who will be monitoring radios.
      iii. Who to contact if the ATCT cannot reach the contractor's designated person by radio.

d. Details on how the contractor will escort material delivery vehicles.

6. Wildlife management. Discuss the following:
   a. Methods and procedures to prevent wildlife attraction.
   b. Wildlife reporting procedures.
7. Foreign Object Debris (FOD) management. Discuss equipment and methods for control of FOD, including construction debris and dust.
8. Hazardous Materials (HAZMAT) management. Discuss equipment and methods for responding to hazardous spills.
9. Notification of construction activities. Provide the following:
   a. Contractor points of contact.
   b. Contractor emergency contact.
   c. Listing of tall or other requested equipment proposed for use on the airport and the timeframe for submitting 7460-1 forms not previously submitted by the airport operator.
   d. Batch plant details, including 7460-1 submittal.
10. Inspection requirements. Discuss daily (or more frequent) inspections and special inspection procedures.
11. Underground utilities. Discuss proposed methods of identifying and protecting underground utilities.
12. Penalties. Penalties should be identified in the CSPP and should not require an entry in the SPCD.
13. Special conditions. Discuss proposed actions for each special condition identified in the CSPP.
14. Runway and taxiway visual aids. Including marking, lighting, signs, and visual NAVAIDs. Discuss proposed visual aids including the following:
   a. Equipment and methods for covering signage and airfield lights.
   b. Equipment and methods for temporary closure markings (paint, fabric, other).
   c. Temporary orange construction signs.
   d. Types of temporary Visual Guidance Slope Indicators (VGSI).
15. Marking and signs for access routes. Discuss proposed methods of demarcating access routes for vehicle drivers.
16. Hazard marking and lighting. Discuss proposed equipment and methods for identifying excavation areas.
17. Work zone lighting for nighttime construction (if applicable). Discuss proposed equipment, locations, aiming, and shielding to prevent interference with air traffic control and aircraft operations.

18. Protection of runway and taxiway safety areas, object free areas, obstacle free zones, and approach/departure surfaces. Discuss proposed methods of identifying, demarcating, and protecting airport surfaces including:
    a. Equipment and methods for maintaining Taxiway Safety Area standards.
    b. Equipment and methods to ensure the safe passage of aircraft where Taxiway Safety Area or Taxiway Object Free Area standards cannot be maintained.
    c. Equipment and methods for separation of construction operations from aircraft operations, including details of barricades.
19. Other limitations on construction should be identified in the CSPP and should not require an entry in the SPCD.

2.5 **Coordination.**

Airport operators, or tenants responsible for design, bidding and conducting construction on their leased properties, should ensure at all project developmental stages, such as predesign, prebid, and preconstruction conferences, they capture the subject of airport operational safety during construction (see AC 150/5370-12, *Quality Management for Federally Funded Airport Construction Projects*). In addition, the following should be coordinated as required:

2.5.1 Progress Meetings.

Operational safety should be a standing agenda item for discussion during progress meetings throughout the project developmental stages.

2.5.2 Scope or Schedule Changes.

Changes in the scope or duration at any of the project stages may require revisions to the CSPP and review and approval by the airport operator and the FAA (see paragraph 1.4.2.17).

2.5.3 FAA ATO Coordination.

Early coordination with FAA ATO is highly recommended during the design phase and is required for scheduling Technical Operations shutdowns prior to construction. Coordination is critical to restarts of NAVAID services and to the establishment of any special procedures for the movement of aircraft. Formal agreements between the airport operator and appropriate FAA offices are recommended. All relocation or adjustments to NAVAIDs, or changes to final grades in critical areas, should be coordinated with FAA ATO and may require an FAA flight inspection prior to restarting the facility. Flight inspections must be coordinated and scheduled well in advance of the intended facility restart. Flight inspections may require a reimbursable agreement between the airport operator and FAA ATO. Reimbursable agreements should be coordinated a minimum of 12 months prior to the start of construction. (See paragraph 2.13.5.3.2 for required FAA notification regarding FAA-owned NAVAIDs.)

2.6 **Phasing.**

Once it has been determined what types and levels of airport operations will be maintained, the most efficient sequence of construction may not be feasible. In this case, the sequence of construction may be phased to gain maximum efficiency while allowing for the required operations. The development of the resulting construction phases should be coordinated with local Air Traffic personnel and airport users. The sequenced construction phases established in the CSPP must be incorporated into the project design and must be reflected in the contract drawings and specifications.

2.6.1 Phase Elements.

For each phase the CSPP should detail:

- Areas closed to aircraft operations.
- Duration of closures.
- Taxi routes and/or areas of reduced TSA and TOFA to reflect reduced ADG use.
- ARFF access routes.
- Construction staging, disposal, and cleanout areas.
- Construction access and haul routes.
- Impacts to NAVAIDs.
- Lighting, marking, and signing changes.
- Available runway length and/or reduced RSA and ROFA to reflect reduced ADG use.
- Declared distances (if applicable).
- Required hazard marking, lighting, and signing.
- Work zone lighting for nighttime construction (if applicable).
- Lead times for required notifications.

2.6.2 Construction Safety Drawings.

Drawings specifically indicating operational safety procedures and methods in affected areas (i.e., construction safety drawings) should be developed for each construction phase. Such drawings should be included in the CSPP as referenced attachments and should also be included in the contract drawing package.

2.7 **Areas and Operations Affected by Construction Activity.**

Runways and taxiways should remain in use by aircraft to the maximum extent possible without compromising safety. Pre-meetings with the FAA ATO will support operational simulations. See Appendix E for an example of a table showing temporary operations versus current operations. The tables in Appendix E can be useful for coordination among all interested parties, including FAA Lines of Business.

2.7.1 Identification of Affected Areas.

Identifying areas and operations affected by the construction helps to determine possible safety problems. The affected areas should be identified in the construction safety drawings for each construction phase. (See paragraph 2.6.2.) Of particular concern are:

2.7.1.1 **Closing, or Partial Closing, of Runways, Taxiways and Aprons, and Displaced Thresholds.**

When a runway is partially closed, a portion of the pavement is unavailable for any aircraft operation, meaning taxiing, landing, or takeoff in either direction on that pavement is prohibited. A displaced threshold, by contrast, is established to ensure obstacle clearance and adequate safety area for landing aircraft. The pavement prior to the displaced threshold is normally available for take-off in the direction of the displacement and for landing and takeoff in the opposite direction. Misunderstanding this difference, may result in issuance of an inaccurate NOTAM, and can lead to a hazardous condition.

2.7.1.1.1 Partially Closed Runways.

The temporarily closed portion of a partially closed runway will generally extend from the threshold to a taxiway that may be used for entering and exiting the runway. If the closed portion extends to a point between taxiways, pilots will have to back-taxi on the runway, which is an undesirable operation. See Figure 2-1 for a desirable configuration.

2.7.1.1.2 Displaced Thresholds.

Since the portion of the runway pavement between the permanent threshold and a standard displaced threshold is available for takeoff and for landing in the opposite direction, the temporary displaced threshold need not be located at an entrance/exit taxiway. See Figure 2-2.

2.7.1.2 Closing of aircraft rescue and fire fighting access routes.

2.7.1.3 Closing of access routes used by airport and airline support vehicles.

2.7.1.4 Interruption of utilities, including water supplies for fire fighting.

2.7.1.5 Approach/departure surfaces affected by heights of objects.

2.7.1.6 Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads.

Figure 2-1. Temporary Partially Closed Runway

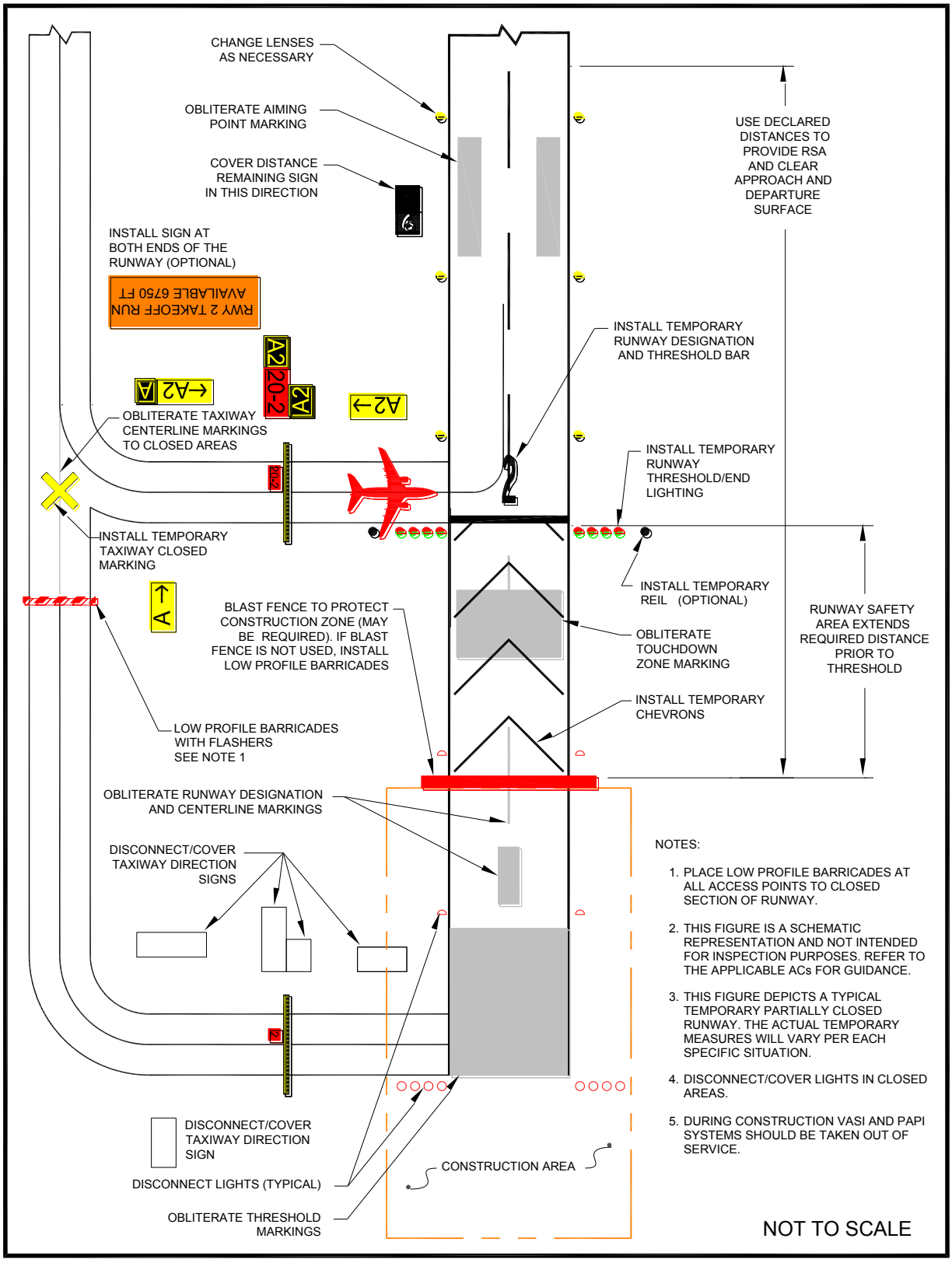
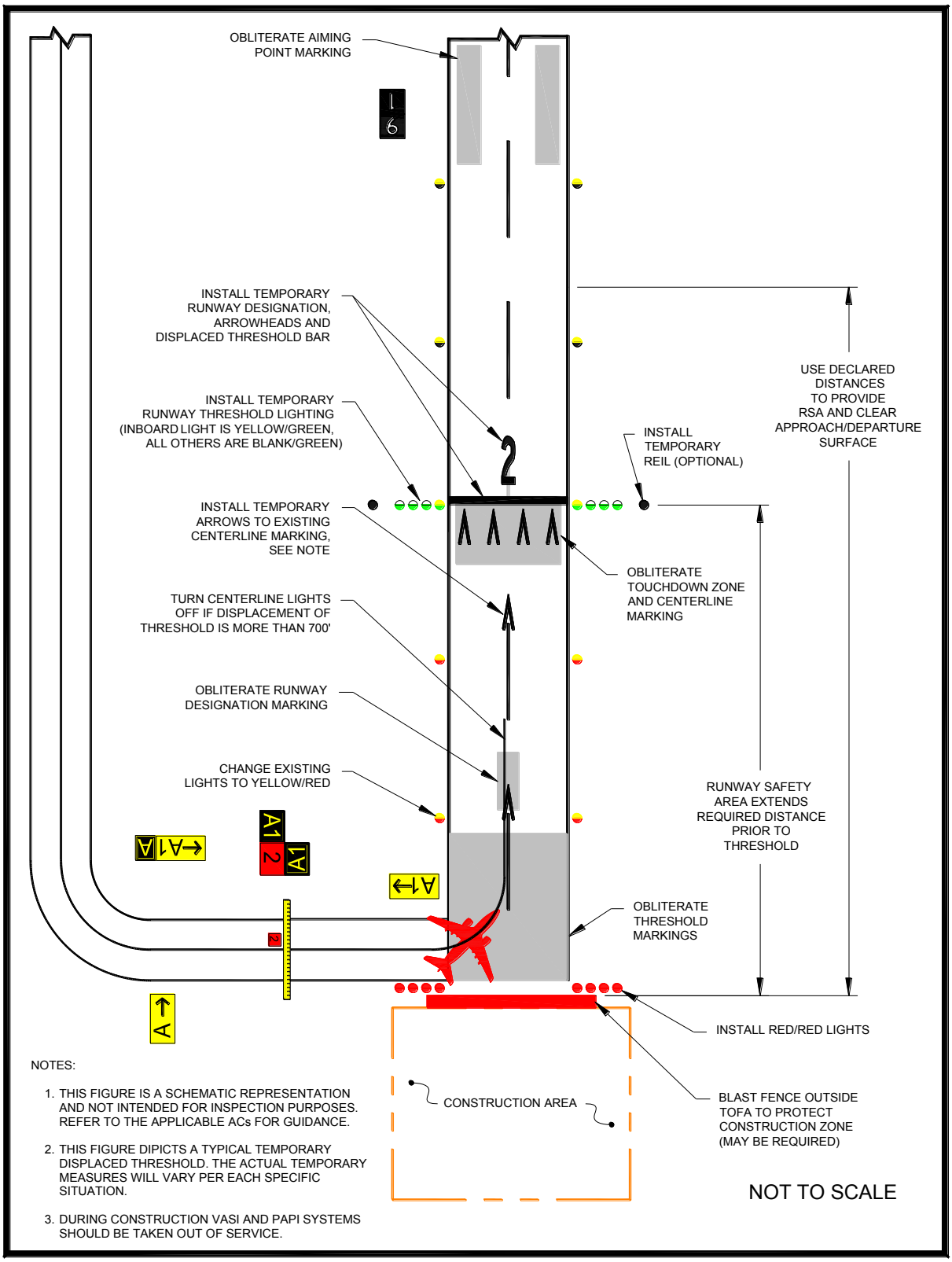


Figure 2-2. Temporary Displaced Threshold



Note: See paragraph 2.18.2.5.

2.7.2 Mitigation of Effects.

Establishment of specific procedures is necessary to maintain the safety and efficiency of airport operations. The CSPP must address:

2.7.2.1 Temporary changes to runway and/or taxi operations.

2.7.2.2 Detours for ARFF and other airport vehicles.

2.7.2.3 Maintenance of essential utilities.

2.7.2.4 Temporary changes to air traffic control procedures. Such changes must be coordinated with the ATO.

2.8 Navigation Aid (NAVAID) Protection.

Before commencing construction activity, parking vehicles, or storing construction equipment and materials near a NAVAID, coordinate with the appropriate FAA ATO/Technical Operations office to evaluate the effect of construction activity and the required distance and direction from the NAVAID. (See paragraph 2.13.5.3.) Construction activities, materials/equipment storage, and vehicle parking near electronic NAVAIDs require special consideration since they may interfere with signals essential to air navigation. If any NAVAID may be affected, the CSPP and SPCD must show an understanding of the "critical area" associated with each NAVAID and describe how it will be protected. Where applicable, the operational critical areas of NAVAIDs should be graphically delineated on the project drawings. Pay particular attention to stockpiling material, as well as to movement and parking of equipment that may interfere with line of sight from the ATCT or with electronic emissions. Interference from construction equipment and activities may require NAVAID shutdown or adjustment of instrument approach minimums for low visibility operations. This condition requires that a NOTAM be filed (see paragraph 2.13.2). Construction activities and materials/equipment storage near a NAVAID must not obstruct access to the equipment and instruments for maintenance. Submittal of a 7460-1 form is required for construction vehicles operating near FAA NAVAIDs. (See paragraph 2.13.5.3.)

2.9 Contractor Access.

The CSPP must detail the areas to which the contractor must have access, and explain how contractor personnel will access those areas. Specifically address:

2.9.1 Location of Stockpiled Construction Materials.

Stockpiled materials and equipment storage are not permitted within the RSA and OFZ, and if possible should not be permitted within the Object Free Area (OFA) of an operational runway. Stockpiling material in the OFA requires submittal of a 7460-1 form and justification provided to the appropriate FAA Airports Regional or District Office for approval. The airport operator must ensure that stockpiled materials and equipment adjacent to these areas are prominently marked and lighted during hours of restricted visibility or darkness. (See paragraph 2.18.2.) This includes determining and

verifying that materials are stabilized and stored at an approved location so as not to be a hazard to aircraft operations and to prevent attraction of wildlife and foreign object damage from blowing or tracked material. See paragraphs 2.10 and 2.11.

2.9.2 Vehicle and Pedestrian Operations.

The CSPP should include specific vehicle and pedestrian requirements. Vehicle and pedestrian access routes for airport construction projects must be controlled to prevent inadvertent or unauthorized entry of persons, vehicles, or animals onto the AOA. The airport operator should coordinate requirements for vehicle operations with airport tenants, contractors, and the FAA air traffic manager. In regard to vehicle and pedestrian operations, the CSPP should include the following, with associated training requirements:

2.9.2.1 **Construction Site Parking.**

Designate in advance vehicle parking areas for contractor employees to prevent any unauthorized entry of persons or vehicles onto the AOA. These areas should provide reasonable contractor employee access to the job site.

2.9.2.2 **Construction Equipment Parking.**

Contractor employees must park and service all construction vehicles in an area designated by the airport operator outside the OFZ and never in the safety area of an active runway or taxiway. Unless a complex setup procedure makes movement of specialized equipment infeasible, inactive equipment must not be parked on a closed taxiway or runway. If it is necessary to leave specialized equipment on a closed taxiway or runway at night, the equipment must be well lighted. Employees should also park construction vehicles outside the OFA when not in use by construction personnel (for example, overnight, on weekends, or during other periods when construction is not active). Parking areas must not obstruct the clear line of sight by the ATCT to any taxiways or runways under air traffic control nor obstruct any runway visual aids, signs, or navigation aids. The FAA must also study those areas to determine effects on airport design criteria, surfaces established by 14 CFR Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace (Part 77), and on NAVAIDs and Instrument Approach Procedures (IAP). See paragraph 2.13.1 for further information.

2.9.2.3 **Access and Haul Roads.**

Determine the construction contractor’s access to the construction sites and haul roads. Do not permit the construction contractor to use any access or haul roads other than those approved. Access routes used by contractor vehicles must be clearly marked to prevent inadvertent entry to areas open to airport operations. Pay special attention to ensure that if construction traffic is to share or cross any ARFF routes that ARFF right of way is not impeded at any time, and that construction traffic on haul

roads does not interfere with NAVAIDs or approach surfaces of operational runways. Address whether access gates will be blocked or inoperative or if a rally point will be blocked or inaccessible.

2.9.2.4 Marking and lighting of vehicles in accordance with AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport.*

2.9.2.5 Description of proper vehicle operations on various areas under normal, lost communications, and emergency conditions.

2.9.2.6 Required escorts.

2.9.2.7 **Training Requirements for Vehicle Drivers to Ensure Compliance with the Airport Operator's Vehicle Rules and Regulations.**

Specific training should be provided to vehicle operators, including those providing escorts. See AC 150/5210-20, *Ground Vehicle Operations on Airports*, for information on training and records maintenance requirements.

2.9.2.8 **Situational Awareness.**

Vehicle drivers must confirm by personal observation that no aircraft is approaching their position (either in the air or on the ground) when given clearance to cross a runway, taxiway, or any other area open to airport operations. In addition, it is the responsibility of the escort vehicle driver to verify the movement/position of all escorted vehicles at any given time. At non-towered airports, all aircraft movements and flight operations rely on aircraft operators to self-report their positions and intentions. However, there is no requirement for an aircraft to have radio communications. Because aircraft do not always broadcast their positions or intentions, visual checking, radio monitoring, and situational awareness of the surroundings is critical to safety.

2.9.2.9 **Two-Way Radio Communication Procedures.**

2.9.2.9.1 General.

The airport operator must ensure that tenant and construction contractor personnel engaged in activities involving unescorted operation on aircraft movement areas observe the proper procedures for communications, including using appropriate radio frequencies at airports with and without ATCT. When operating vehicles on or near open runways or taxiways, construction personnel must understand the critical importance of maintaining radio contact, as directed by the airport operator, with:

1. Airport operations
2. ATCT

3. Common Traffic Advisory Frequency (CTAF), which may include UNICOM, MULTICOM.
4. Automatic Terminal Information Service (ATIS). This frequency is useful for monitoring conditions on the airport. Local air traffic will broadcast information regarding construction related runway closures and "shortened" runways on the ATIS frequency.

2.9.2.9.2 Areas Requiring Two-Way Radio Communication with the ATCT.

Vehicular traffic crossing active movement areas must be controlled either by two-way radio with the ATCT, escort, flagman, signal light, or other means appropriate for the particular airport.

2.9.2.9.3 Frequencies to be Used.

The airport operator will specify the frequencies to be used by the contractor, which may include the CTAF for monitoring of aircraft operations. Frequencies may also be assigned by the airport operator for other communications, including any radio frequency in compliance with Federal Communications Commission requirements. At airports with an ATCT, the airport operator will specify the frequency assigned by the ATCT to be used between contractor vehicles and the ATCT.

2.9.2.9.4 Proper radio usage, including read back requirements.

2.9.2.9.5 Proper phraseology, including the International Phonetic Alphabet.

2.9.2.9.6 Light Gun Signals.

Even though radio communication is maintained, escort vehicle drivers must also familiarize themselves with ATCT light gun signals in the event of radio failure. See the FAA safety placard "Ground Vehicle Guide to Airport Signs and Markings." This safety placard may be downloaded through the Runway Safety Program Web site at http://www.faa.gov/airports/runway_safety/publications/ (see "Signs & Markings Vehicle Dashboard Sticker") or obtained from the FAA Airports Regional Office.

2.9.2.10 **Maintenance of the secured area of the airport, including:**

2.9.2.10.1 Fencing and Gates.

Airport operators and contractors must take care to maintain security during construction when access points are created in the security fencing to permit the passage of construction vehicles or personnel. Temporary gates should be equipped so they can be securely closed and locked to prevent access by animals and unauthorized people. Procedures should be in place to ensure that only authorized persons and vehicles have access to the AOA and to prohibit "piggybacking" behind another person or vehicle. The Department of Transportation (DOT) document DOT/FAA/AR-

00/52, *Recommended Security Guidelines for Airport Planning and Construction*, provides more specific information on fencing. A copy of this document can be obtained from the Airport Consultants Council, Airports Council International, or American Association of Airport Executives.

2.9.2.10.2 Badging Requirements.

Airports subject to 49 CFR Part 1542, *Airport Security*, must meet standards for access control, movement of ground vehicles, and identification of construction contractor and tenant personnel.

2.10 Wildlife Management.

The CSPP and SPCD must be in accordance with the airport operator's wildlife hazard management plan, if applicable. See AC 150/5200-33, *Hazardous Wildlife Attractants On or Near Airports,* and CertAlert 98-05, *Grasses Attractive to Hazardous Wildlife.* Construction contractors must carefully control and continuously remove waste or loose materials that might attract wildlife. Contractor personnel must be aware of and avoid construction activities that can create wildlife hazards on airports, such as:

2.10.1 Trash.

Food scraps must be collected from construction personnel activity.

2.10.2 Standing Water.

2.10.3 Tall Grass and Seeds.

Requirements for turf establishment can be at odds with requirements for wildlife control. Grass seed is attractive to birds. Lower quality seed mixtures can contain seeds of plants (such as clover) that attract larger wildlife. Seeding should comply with the guidance in AC 150/5370-10, *Standards for Specifying Construction of Airports,* Item T-901, Seeding. Contact the local office of the United Sates Department of Agriculture Soil Conservation Service or the State University Agricultural Extension Service (County Agent or equivalent) for assistance and recommendations. These agencies can also provide liming and fertilizer recommendations.

2.10.4 Poorly Maintained Fencing and Gates.

See paragraph 2.9.2.10.1.

2.10.5 Disruption of Existing Wildlife Habitat.

While this will frequently be unavoidable due to the nature of the project, the CSPP should specify under what circumstances (location, wildlife type) contractor personnel should immediately notify the airport operator of wildlife sightings.

2.11 Foreign Object Debris (FOD) Management.

Waste and loose materials, commonly referred to as FOD, are capable of causing damage to aircraft landing gears, propellers, and jet engines. Construction contractors must not leave or place FOD on or near active aircraft movement areas. Materials capable of creating FOD must be continuously removed during the construction project. Fencing (other than security fencing) or covers may be necessary to contain material that can be carried by wind into areas where aircraft operate. See AC 150/5210-24, *Foreign Object Debris (FOD) Management.*

2.12 Hazardous Materials (HAZMAT) Management.

Contractors operating construction vehicles and equipment on the airport must be prepared to expeditiously contain and clean-up spills resulting from fuel or hydraulic fluid leaks. Transport and handling of other hazardous materials on an airport also requires special procedures. See AC 150/5320-15, *Management of Airport Industrial Waste.*

2.13 Notification of Construction Activities.

The CSPP and SPCD must detail procedures for the immediate notification of airport users and the FAA of any conditions adversely affecting the operational safety of the airport. It must address the notification actions described below, as applicable.

2.13.1 List of Responsible Representatives/points of contact for all involved parties, and procedures for contacting each of them, including after hours.

2.13.2 NOTAMs.

Only the airport operator may initiate or cancel NOTAMs on airport conditions, and is the only entity that can close or open a runway. The airport operator must coordinate the issuance, maintenance, and cancellation of NOTAMs about airport conditions resulting from construction activities with tenants and the local air traffic facility (control tower, approach control, or air traffic control center), and must either enter the NOTAM into NOTAM Manager, or provide information on closed or hazardous conditions on airport movement areas to the FAA Flight Service Station (FSS) so it can issue a NOTAM. The airport operator must file and maintain a list of authorized representatives with the FSS. Refer to AC 150/5200-28, *Notices to Airmen (NOTAMs) for Airport Operators,* for a sample NOTAM form. Only the FAA may issue or cancel NOTAMs on shutdown or irregular operation of FAA owned facilities. Any person having reason to believe that a NOTAM is missing, incomplete, or inaccurate must notify the airport operator. See paragraph 2.7.1.1 about issuing NOTAMs for partially closed runways versus runways with displaced thresholds.

2.13.3 Emergency notification procedures for medical, fire fighting, and police response.

2.13.4 Coordination with ARFF.

The CSPP must detail procedures for coordinating through the airport sponsor with ARFF personnel, mutual aid providers, and other emergency services if construction requires:

1. The deactivation and subsequent reactivation of water lines or fire hydrants, or
2. The rerouting, blocking and restoration of emergency access routes, or
3. The use of hazardous materials on the airfield.

2.13.5 Notification to the FAA.

2.13.5.1 **Part 77.**

Any person proposing construction or alteration of objects that affect navigable airspace, as defined in Part 77, must notify the FAA. This includes construction equipment and proposed parking areas for this equipment (i.e., cranes, graders, other equipment) on airports. FAA Form 7460-1, *Notice of Proposed Construction or Alteration*, can be used for this purpose and submitted to the appropriate FAA Airports Regional or District Office. See Appendix A to download the form. Further guidance is available on the FAA web site at oeaaa.faa.gov.

2.13.5.2 **Part 157.**

With some exceptions, Title 14 CFR Part 157, *Notice of Construction, Alteration, Activation, and Deactivation of Airports*, requires that the airport operator notify the FAA in writing whenever a non-Federally funded project involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport. Notification involves submitting FAA Form 7480-1, *Notice of Landing Area Proposal*, to the nearest FAA Airports Regional or District Office. See Appendix A to download the form.

2.13.5.3 **NAVAIDs.**

For emergency (short-notice) notification about impacts to both airport owned and FAA owned NAVAIDs, contact: 866-432-2622.

2.13.5.3.1 Airport Owned/FAA Maintained.

If construction operations require a shutdown of 24 hours or greater in duration, or more than 4 hours daily on consecutive days, of a NAVAID owned by the airport but maintained by the FAA, provide a 45-day minimum notice to FAA ATO/Technical Operations prior to facility shutdown, using Strategic Event Coordination (SEC) Form 6000.26 contained within FAA Order 6000.15, *General Maintenance Handbook for National Airspace System (NAS) Facilities*.

2.13.5.3.2 FAA Owned.

1. The airport operator must notify the appropriate FAA ATO Service Area Planning and Requirements (P&R) Group a minimum of 45 days prior to implementing an event that causes impacts to NAVAIDs, using SEC Form 6000.26.
2. Coordinate work for an FAA owned NAVAID shutdown with the local FAA ATO/Technical Operations office, including any necessary reimbursable agreements and flight checks. Detail procedures that address unanticipated utility outages and cable cuts that could impact FAA NAVAIDs. Refer to active Service Level Agreement with ATO for specifics.

2.14 **Inspection Requirements.**

2.14.1 Daily Inspections.

Inspections should be conducted at least daily, but more frequently if necessary to ensure conformance with the CSPP. A sample checklist is provided in Appendix D, Construction Project Daily Safety Inspection Checklist. See also AC 150/5200-18, *Airport Safety Self-Inspection.* Airport operators holding a Part 139 certificate are required to conduct self-inspections during unusual conditions, such as construction activities, that may affect safe air carrier operations.

2.14.2 Interim Inspections.

Inspections should be conducted of all areas to be (re)opened to aircraft traffic to ensure the proper operation of lights and signs, for correct markings, and absence of FOD. The contractor should conduct an inspection of the work area with airport operations personnel. The contractor should ensure that all construction materials have been secured, all pavement surfaces have been swept clean, all transition ramps have been properly constructed, and that surfaces have been appropriately marked for aircraft to operate safely. Only if all items on the list meet with the airport operator's approval should the air traffic control tower be notified to open the area to aircraft operations. The contractor should be required to retain a suitable workforce and the necessary equipment at the work area for any last minute cleanup that may be requested by the airport operator prior to opening the area.

2.14.3 Final Inspections.

New runways and extended runway closures may require safety inspections at certificated airports prior to allowing air carrier service. Coordinate with the FAA Airport Certification Safety Inspector (ACSI) to determine if a final inspection will be necessary.

2.15 **Underground Utilities.**

The CSPP and/or SPCD must include procedures for locating and protecting existing underground utilities, cables, wires, pipelines, and other underground facilities in excavation areas. This may involve coordinating with public utilities and FAA ATO/Technical Operations. Note that "One Call" or "Miss Utility" services do not include FAA ATO/Technical Operations.

2.16 **Penalties.**

The CSPP should detail penalty provisions for noncompliance with airport rules and regulations and the safety plans (for example, if a vehicle is involved in a runway incursion). Such penalties typically include rescission of driving privileges or access to the AOA.

2.17 **Special Conditions.**

The CSPP must detail any special conditions that affect the operation of the airport and will require the activation of any special procedures (for example, low-visibility operations, snow removal, aircraft in distress, aircraft accident, security breach, Vehicle / Pedestrian Deviation (VPD) and other activities requiring construction suspension/resumption).

2.18 **Runway and Taxiway Visual Aids.**

This includes marking, lighting, signs, and visual NAVAIDs. The CSPP must ensure that areas where aircraft will be operating are clearly and visibly separated from construction areas, including closed runways. Throughout the duration of the construction project, verify that these areas remain clearly marked and visible at all times and that marking, lighting, signs, and visual NAVAIDs that are to continue to perform their functions during construction remain in place and operational. Visual NAVAIDs that are not serving their intended function during construction must be temporarily disabled, covered, or modified as necessary. The CSPP must address the following, as appropriate:

2.18.1 General.

Airport markings, lighting, signs, and visual NAVAIDs must be clearly visible to pilots, not misleading, confusing, or deceptive. All must be secured in place to prevent movement by prop wash, jet blast, wing vortices, and other wind currents and constructed of materials that will minimize damage to an aircraft in the event of inadvertent contact. Items used to secure such markings must be of a color similar to the marking.

2.18.2 Markings.

During the course of construction projects, temporary pavement markings are often required to allow for aircraft operations during or between work periods. During the design phase of the project, the designer should coordinate with the project manager,

airport operations, airport users, the FAA Airports project manager, and Airport Certification Safety Inspector for Part 139 airports to determine minimum temporary markings. The FAA Airports project manager will, wherever a runway is closed, coordinate with the appropriate FAA Flight Standards Office and disseminate findings to all parties. Where possible, the temporary markings on finish grade pavements should be placed to mirror the dimensions of the final markings. Markings must be in compliance with the standards of AC 150/5340-1, *Standards for Airport Markings*, except as noted herein. Runways and runway exit taxiways closed to aircraft operations are marked with a yellow X. The preferred visual aid to depict temporary runway closure is the lighted X signal placed on or near the runway designation numbers. (See paragraph 2.18.2.1.2.)

2.18.2.1 **Closed Runways and Taxiways.**

2.18.2.1.1 Permanently Closed Runways.

For runways, obliterate the threshold marking, runway designation marking, and touchdown zone markings, and place an X at each end and at 1,000-foot (300 m) intervals. For a multiple runway environment, if the lighted X on a designated number will be located in the RSA of an adjacent active runway, locate the lighted X farther down the closed runway to clear the RSA of the active runway. In addition, the closed runway numbers located in the RSA of an active runway must be marked with a flat yellow X.

2.18.2.1.2 Temporarily Closed Runways.

For runways that have been temporarily closed, place an X at each end of the runway directly on or as near as practicable to the runway designation numbers. For a multiple runway environment, if the lighted X on a designated number will be located in the RSA of an adjacent active runway, locate the lighted X farther down the closed runway to clear the RSA of the active runway. In addition, the closed runway numbers located in the RSA of an active runway must be marked with a flat yellow X. See Figure 2-3. See also paragraph 2.18.3.3.

2.18.2.1.3 Partially Closed Runways and Displaced Thresholds.

When threshold markings are needed to identify the temporary beginning of the runway that is available for landing, the markings must comply with AC 150/5340-1. An X is not used on a partially closed runway or a runway with a displaced threshold. See paragraph 2.7.1.1 for the difference between partially closed runways and runways with displaced thresholds. Because of the temporary nature of threshold displacement due to construction, it is not necessary to re-adjust the existing runway centerline markings to meet standard spacing for a runway with a visual approach. Some of the requirements below may be waived in the cases of low-activity airports and/or short duration changes that are measured in days rather than weeks. Consider whether the presence of an airport traffic

control tower allows for the development of special procedures. Contact the appropriate FAA Airports Regional or District Office for assistance.

Figure 2-3. Markings for a Temporarily Closed Runway

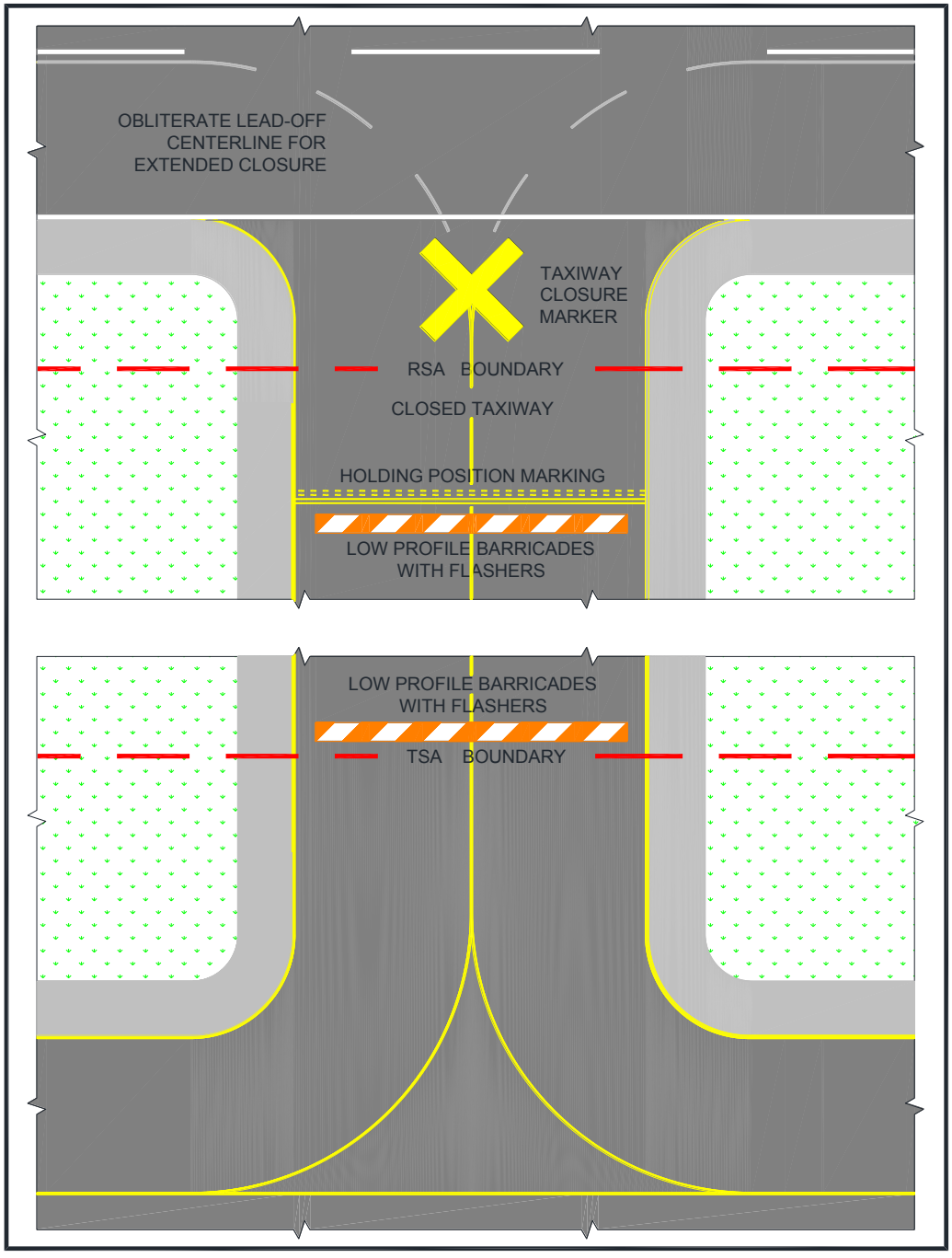


1. **Partially Closed Runways.** Pavement markings for temporary closed portions of the runway consist of a runway threshold bar, runway designation, and yellow chevrons to identify pavement areas that are unsuitable for takeoff or landing (see AC 150/5340-1). Obliterate or cover markings prior to the moved threshold. Existing touchdown zone markings beyond the moved threshold may remain in place. Obliterate aiming point markings. Issue appropriate NOTAMs regarding any nonstandard markings. See Figure 2-4.
2. **Displaced Thresholds.** Pavement markings for a displaced threshold consist of a runway threshold bar, runway designation, and white arrowheads with and without arrow shafts. These markings are required to identify the portion of the runway before the displaced threshold to provide centerline guidance for pilots during approaches, takeoffs, and landing rollouts from the opposite direction. See AC 150/5340-1. Obliterate markings prior to the displaced threshold. Existing touchdown zone markings beyond the displaced threshold may remain in place. Obliterate aiming point markings. Issue appropriate NOTAMs regarding any nonstandard markings. See Figure 2-2.

2.18.2.1.4 Taxiways.

1. **Permanently Closed Taxiways.** AC 150/5300-13 *Airport Design*, notes that it is preferable to remove the pavement, but for pavement that is to remain, place an X at the entrance to both ends of the closed section. Obliterate taxiway centerline markings, including runway leadoff lines, leading to the closed taxiway. See Figure 2-4.

Figure 2-4. Temporary Taxiway Closure



2. **Temporarily Closed Taxiways.** Place barricades outside the safety area of intersecting taxiways. For runway/taxiway intersections, place an X at the entrance to the closed taxiway from the runway. If the taxiway will be closed for an extended period, obliterate taxiway centerline markings, including runway leadoff lines and taxiway to taxiway turns, leading to the closed section. Always obliterate runway lead-off lines for high speed exits, regardless of the duration of the closure. If the centerline markings will be reused upon reopening the taxiway, it is preferable to paint over the marking. This will result in less damage to the pavement when the upper layer of paint is ultimately removed. See Figure 2-4.

2.18.2.1.5 Temporarily Closed Airport.

When the airport is closed temporarily, mark all the runways as closed.

2.18.2.2 If unable to paint temporary markings on the pavement, construct them from any of the following materials: fabric, colored plastic, painted sheets of plywood, or similar materials. They must be properly configured and appropriately secured to prevent movement by prop wash, jet blast, or other wind currents. Items used to secure such markings must be of a color similar to the marking.

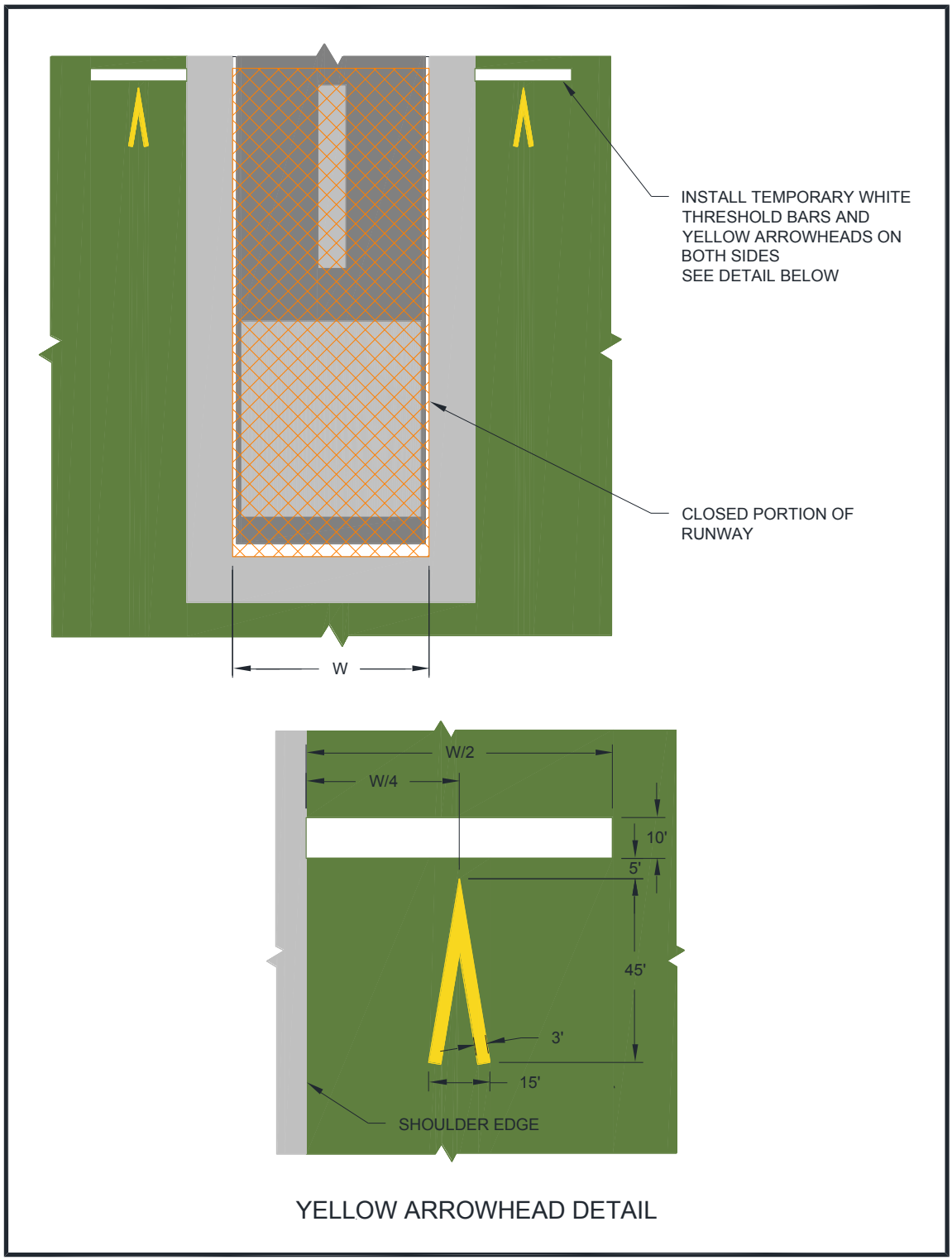
2.18.2.3 It may be necessary to remove or cover runway markings, including but not limited to, runway designation markings, threshold markings, centerline markings, edge stripes, touchdown zone markings and aiming point markings, depending on the length of construction and type of activity at the airport. When removing runway markings, apply the same treatment to areas between stripes or numbers, as the cleaned area will appear to pilots as a marking in the shape of the treated area.

2.18.2.4 If it is not possible to install threshold bars, chevrons, and arrows on the pavement, "temporary outboard white threshold bars and yellow arrowheads", see Figure 2-5, may be used. Locate them outside of the runway pavement surface on both sides of the runway. The dimensions must be as shown in Figure 2-5. If the markings are not discernible on grass or snow, apply a black background with appropriate material over the ground to ensure they are clearly visible.

2.18.2.5 The application rate of paint to mark a short-term temporary runway and taxiway markings may deviate from the standard (see Item P-620, "Runway and Taxiway Painting," in AC 150/5370-10), but the dimensions must meet the existing standards. When applying temporary markings at night, it is recommended that the fast curing, Type II paint be used to help offset the higher humidity and cooler temperatures often experienced at night. Diluting the paint will substantially increase cure time and is not recommended. Glass beads are not recommended for temporary markings. Striated markings may also be used for certain temporary markings. AC

150/5340-1, *Standards for Airport Markings*, has additional guidance on temporary markings.

Figure 2-5. Temporary Outboard White Threshold Bars and Yellow Arrowheads



2.18.3 Lighting and Visual NAVAIDs.

This paragraph refers to standard runway and taxiway lighting systems. See below for hazard lighting. Lighting installation must be in conformance with AC 150/5340-30, *Design and Installation Details for Airport Visual Aids,* and fixture design in conformance with AC 150/5345-50, *Specification for Portable Runway and Taxiway Lights.* When disconnecting runway and taxiway lighting fixtures, disconnect the associated isolation transformers. See AC 150/5340-26, *Maintenance of Airport Visual Aid Facilities*, for disconnect procedures and safety precautions. Alternately, cover the light fixture in such a way as to prevent light leakage. Avoid removing the lamp from energized fixtures because an excessive number of isolation transformers with open secondaries may damage the regulators and/or increase the current above its normal value. Secure, identify, and place any above ground temporary wiring in conduit to prevent electrocution and fire ignition sources. Maintain mandatory hold signs to operate normally in any situation where pilots or vehicle drivers could mistakenly be in that location. At towered airports certificated under Part 139, holding position signs are required to be illuminated on open taxiways crossing to closed or inactive runways. If the holding position sign is installed on the runway circuit for the closed runway, install a jumper to the taxiway circuit to provide power to the holding position sign for nighttime operations. Where it is not possible to maintain power to signs that would normally be operational, install barricades to exclude aircraft. Figure 2-1, Figure 2-2, Figure 2-3, and Figure 2-4 illustrate temporary changes to lighting and visual NAVAIDs.

2.18.3.1 **Permanently Closed Runways and Taxiways.**

For runways and taxiways that have been permanently closed, disconnect the lighting circuits.

2.18.3.2 **Temporarily Closed Runways and New Runways Not Yet Open to Air Traffic.**

If available, use a lighted X, both at night and during the day, placed at each end of the runway on or near the runway designation numbers facing the approach. (Note that the lighted X must be illuminated at all times that it is on a runway.) The use of a lighted X is required if night work requires runway lighting to be on. See AC 150/5345-55, *Specification for L-893, Lighted Visual Aid to Indicate Temporary Runway Closure.* For runways that have been temporarily closed, but for an extended period, and for those with pilot controlled lighting, disconnect the lighting circuits or secure switches to prevent inadvertent activation. For runways that will be opened periodically, coordinate procedures with the FAA air traffic manager or, at airports without an ATCT, the airport operator. Activate stop bars if available. Figure 2-6 shows a lighted X by day. Figure 2-7 shows a lighted X at night.

Figure 2-6. Lighted X in Daytime



Figure 2-7. Lighted X at Night



2.18.3.3 **Partially Closed Runways and Displaced Thresholds.**

When a runway is partially closed, a portion of the pavement is unavailable for any aircraft operation, meaning taxiing and landing or taking off in either direction. A displaced threshold, by contrast, is put in place to ensure obstacle clearance by landing aircraft. The pavement prior to the displaced threshold is available for takeoff in the direction of the displacement, and for landing and takeoff in the opposite direction. Misunderstanding this difference and issuance of a subsequently inaccurate NOTAM can result in a hazardous situation. For both partially

closed runways and displaced thresholds, approach lighting systems at the affected end must be placed out of service.

2.18.3.3.1 Partially Closed Runways.

Disconnect edge and threshold lights on that part of the runway at and behind the threshold (that is, the portion of the runway that is closed). Alternately, cover the light fixtures in such a way as to prevent light leakage. See Figure 2-1.

2.18.3.3.2 Temporary Displaced Thresholds.

Edge lighting in the area of the displacement emits red light in the direction of approach and yellow light (white for visual runways) in the opposite direction. If the displacement is 700 feet or less, blank out centerline lights in the direction of approach or place the centerline lights out of service. If the displacement is over 700 feet, place the centerline lights out of service. See AC 150/5340-30 for details on lighting displaced thresholds. See Figure 2-2.

2.18.3.3.3 Temporary runway thresholds and runway ends must be lighted if the runway is lighted and it is the intended threshold for night landings or instrument meteorological conditions.

2.18.3.3.4 A temporary threshold on an unlighted runway may be marked by retroreflective, elevated markers in addition to markings noted in paragraph 2.18.2.1.3. Markers seen by aircraft on approach are green. Markers at the rollout end of the runway are red. At certificated airports, temporary elevated threshold markers must be mounted with a frangible fitting (see 14 CFR Part 139.309). At non-certificated airports, the temporary elevated threshold markings may either be mounted with a frangible fitting or be flexible. See AC 150/5345-39, *Specification for L-853, Runway and Taxiway Retroreflective Markers.*

2.18.3.3.5 Temporary threshold lights and runway end lights and related visual NAVAIDs are installed outboard of the edges of the full-strength pavement only when they cannot be installed on the pavement. They are installed with bases at grade level or as low as possible, but not more than 3 inch (7.6 cm) above ground. (The standard above ground height for airport lighting fixtures is 14 inches (35 cm)). When any portion of a base is above grade, place properly compacted fill around the base to minimize the rate of gradient change so aircraft can, in an emergency, cross at normal landing or takeoff speeds without incurring significant damage. See AC 150/5370-10.

2.18.3.3.6 Maintain threshold and edge lighting color and spacing standards as described in AC 150/5340-30. Battery powered, solar, or portable lights that meet the criteria in AC 150/5345-50 may be used. These systems are intended primarily for visual flight rules (VFR) aircraft operations but may

be used for instrument flight rules (IFR) aircraft operations, upon individual approval from the Flight Standards Division of the applicable FAA Regional Office.

2.18.3.3.7 When runway thresholds are temporarily displaced, reconfigure yellow lenses (caution zone), as necessary, and place the centerline lights out of service.

2.18.3.3.8 Relocate the Visual Glide Slope Indicator (VGSI), such as Visual Approach Slope Indicator (VASI) and Precision Approach Path Indicator (PAPI); other airport lights, such as Runway End Identifier Lights (REIL); and approach lights to identify the temporary threshold. Another option is to disable the VGSI or any equipment that would give misleading indications to pilots as to the new threshold location. Installation of temporary visual aids may be necessary to provide adequate guidance to pilots on approach to the affected runway. If the FAA owns and operates the VGSI, coordinate its installation or disabling with the local ATO/Technical Operations Office. Relocation of such visual aids will depend on the duration of the project and the benefits gained from the relocation, as this can result in great expense. See FAA JO 6850.2, *Visual Guidance Lighting Systems,* for installation criteria for FAA owned and operated NAVAIDs.

2.18.3.3.9 Issue a NOTAM to inform pilots of temporary lighting conditions.

2.18.3.4 **Temporarily Closed Taxiways.**

If possible, deactivate the taxiway lighting circuits. When deactivation is not possible (for example other taxiways on the same circuit are to remain open), cover the light fixture in a way as to prevent light leakage.

2.18.4 Signs.

To the extent possible, signs must be in conformance with AC 150/5345-44, *Specification for Runway and Taxiway Signs*, and AC 150/5340-18, *Standard for Airport Sign Systems.*

2.18.4.1 **Existing Signs.**

Runway exit signs are to be covered for closed runway exits. Outbound destination signs are to be covered for closed runways. Any time a sign does not serve its normal function or would provide conflicting information, it must be covered or removed to prevent misdirecting pilots. Note that information signs identifying a crossing taxiway continue to perform their normal function even if the crossing taxiway is closed. For long term construction projects, consider relocating signs, especially runway distance remaining signs.

2.18.4.2 **Temporary Signs.**

Orange construction signs comprise a message in black on an orange background. Orange construction signs may help pilots be aware of changed conditions. The airport operator may choose to introduce these signs as part of a movement area construction project to increase situational awareness when needed. Locate signs outside the taxiway safety limits and ahead of construction areas so pilots can take timely action. Use temporary signs judiciously, striking a balance between the need for information and the increase in pilot workload. When there is a concern of pilot "information overload," the applicability of mandatory hold signs must take precedence over orange construction signs recommended during construction. Temporary signs must meet the standards for such signs in Engineering Brief 93, *Guidance for the Assembly and Installation of Temporary Orange Construction Signs.* Many criteria in AC 150/5345-44, *Specification for Runway and Taxiway Signs,* are referenced in the Engineering Brief. Permissible sign legends are:

1. CONSTRUCTION AHEAD,
2. CONSTRUCTION ON RAMP, and
3. RWY XX TAKEOFF RUN AVAILABLE XXX FT.

Phasing, supported by drawings and sign schedule, for the installation of orange construction signs must be included in the CSPP or SPCD.

2.18.4.2.1 Takeoff Run Available (TORA) signs.

Recommended: Where a runway has been shortened for takeoff, install orange TORA signs well before the hold lines, such as on a parallel taxiway prior to a turn to a runway hold position. See EB 93 for sign size and location.

2.18.4.2.2 Sign legends are shown in Figure F-1.

Note: See Figure E-1, Figure E-2, Figure E-3, Figure F-2, and Figure F-3 for examples of orange construction sign locations.

2.19 **Marking and Signs for Access Routes.**

The CSPP should indicate that pavement markings and signs for construction personnel will conform to AC 150/5340-18 and, to the extent practicable, with the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD) and/or State highway specifications. Signs adjacent to areas used by aircraft must comply with the frangibility requirements of AC 150/5220-23, *Frangible Connections,* which may require modification to size and height guidance in the MUTCD.

2.20 **Hazard Marking, Lighting and Signing.**

2.20.1 Hazard marking, lighting, and signing prevent pilots from entering areas closed to aircraft, and prevent construction personnel from entering areas open to aircraft. The CSPP must specify prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles. Hazard marking and lighting must also be specified to identify open manholes, small areas under repair, stockpiled material, waste areas, and areas subject to jet blast. Also consider less obvious construction-related hazards and include markings to identify FAA, airport, and National Weather Service facilities cables and power lines; instrument landing system (ILS) critical areas; airport surfaces, such as RSA, OFA, and OFZ; and other sensitive areas to make it easier for contractor personnel to avoid these areas.

2.20.2 Equipment.

2.20.2.1 **Barricades.**

Low profile barricades, including traffic cones, (weighted or sturdily attached to the surface) are acceptable methods used to identify and define the limits of construction and hazardous areas on airports. Careful consideration must be given to selecting equipment that poses the least danger to aircraft but is sturdy enough to remain in place when subjected to typical winds, prop wash and jet blast. The spacing of barricades must be such that a breach is physically prevented barring a deliberate act. For example, if barricades are intended to exclude aircraft, gaps between barricades must be smaller than the wingspan of the smallest aircraft to be excluded; if barricades are intended to exclude vehicles, gaps between barricades must be smaller than the width of the excluded vehicles, generally 4 feet (1.2 meters). Provision must be made for ARFF access if necessary. If barricades are intended to exclude pedestrians, they must be continuously linked. Continuous linking may be accomplished through the use of ropes, securely attached to prevent FOD.

2.20.2.2 **Lights.**

Lights must be red, either steady burning or flashing, and must meet the luminance requirements of the State Highway Department. Batteries powering lights will last longer if lights flash. Lights must be mounted on barricades and spaced at no more than 10 feet (3 meters). Lights must be operated between sunset and sunrise and during periods of low visibility whenever the airport is open for operations. They may be operated by photocell, but this may require that the contractor turn them on manually during periods of low visibility during daytime hours.

2.20.2.3 **Supplement Barricades with Signs (for example) As Necessary.**

Examples are “No Entry” and “No Vehicles.” Be aware of the increased effects of wind and jet blast on barricades with attached signs.

2.20.2.4 **Air Operations Area – General.**

Barricades are not permitted in any active safety area or on the runway side of a runway hold line. Within a runway or taxiway object free area, and on aprons, use orange traffic cones, flashing or steady burning red lights as noted above, highly reflective collapsible barricades marked with diagonal, alternating orange and white stripes; and/or signs to separate all construction/maintenance areas from the movement area. Barricades may be supplemented with alternating orange and white flags at least 20 by 20 inch (50 by 50 cm) square and securely fastened to eliminate FOD. All barricades adjacent to any open runway or taxiway / taxilane safety area, or apron must be as low as possible to the ground, and no more than 18 inches high, exclusive of supplementary lights and flags. Barricades must be of low mass; easily collapsible upon contact with an aircraft or any of its components; and weighted or sturdily attached to the surface to prevent displacement from prop wash, jet blast, wing vortex, and other surface wind currents. If affixed to the surface, they must be frangible at grade level or as low as possible, but not to exceed 3 inch (7.6 cm) above the ground. Figure 2-8 and Figure 2-9 show sample barricades with proper coloring and flags.

Figure 2-8. Interlocking Barricades



Figure 2-9. Low Profile Barricades



2.20.2.5 **Air Operations Area – Runway/Taxiway Intersections.**

Use highly reflective barricades with lights to close taxiways leading to closed runways. Evaluate all operating factors when determining how to mark temporary closures that can last from 10 to 15 minutes to a much longer period of time. However, even for closures of relatively short duration, close all taxiway/runway intersections with barricades. The use of traffic cones is appropriate for short duration closures.

2.20.2.6 **Air Operations Area – Other.**

Beyond runway and taxiway object free areas and aprons, barricades intended for construction vehicles and personnel may be many different shapes and made from various materials, including railroad ties, sawhorses, jersey barriers, or barrels.

2.20.2.7 **Maintenance.**

The construction specifications must include a provision requiring the contractor to have a person on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades. The contractor must file the contact person's information with the airport operator. Lighting should be checked for proper operation at least once per day, preferably at dusk.

2.21 Work Zone Lighting for Nighttime Construction.

Lighting equipment must adequately illuminate the work area if the construction is to be performed during nighttime hours. Refer to AC 150/5370-10 for minimum illumination levels for nighttime paving projects. Additionally, it is recommended that all support equipment, except haul trucks, be equipped with artificial illumination to safely

illuminate the area immediately surrounding their work areas. The lights should be positioned to provide the most natural color illumination and contrast with a minimum of shadows. The spacing must be determined by trial. Light towers should be positioned and adjusted to aim away from ATCT cabs and active runways to prevent blinding effects. Shielding may be necessary. Light towers should be removed from the construction site when the area is reopened to aircraft operations. Construction lighting units should be identified and generally located on the construction phasing plans in relationship to the ATCT and active runways and taxiways.

2.22 **Protection of Runway and Taxiway Safety Areas.**

Runway and taxiway safety areas, OFZs, OFAs, and approach surfaces are described in AC 150/5300-13. Protection of these areas includes limitations on the location and height of equipment and stockpiled material. An FAA airspace study may be required. Coordinate with the appropriate FAA Airports Regional or District Office if there is any doubt as to requirements or dimensions (see paragraph 2.13.5) as soon as the location and height of materials or equipment are known. The CSPP should include drawings showing all safety areas, object free areas, obstacle free zones and approach departure surfaces affected by construction.

2.22.1 Runway Safety Area (RSA).

A runway safety area is the defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway (see AC 150/5300-13). Construction activities within the existing RSA are subject to the following conditions:

2.22.1.1 No construction may occur within the existing RSA while the runway is open for aircraft operations. The RSA dimensions may be temporarily adjusted if the runway is restricted to aircraft operations requiring an RSA that is equal to the RSA width and length beyond the runway ends available during construction. (See AC 150/5300-13). The temporary use of declared distances and/or partial runway closures may provide the necessary RSA under certain circumstances. Coordinate with the appropriate FAA Airports Regional or District Office to have declared distances information published, and appropriate NOTAMs issued. See AC 150/5300-13 for guidance on the use of declared distances.

2.22.1.2 The airport operator must coordinate the adjustment of RSA dimensions as permitted above with the appropriate FAA Airports Regional or District Office and the local FAA air traffic manager and issue a NOTAM.

2.22.1.3 The CSPP and SPCD must provide procedures for ensuring adequate distance for protection from blasting operations, if required by operational considerations.

2.22.1.4 **Excavations.**

2.22.1.4.1 Open trenches or excavations are not permitted within the RSA while the runway is open. Backfill trenches before the runway is opened. If backfilling excavations before the runway must be opened is impracticable, cover the excavations appropriately. Covering for open trenches must be designed to allow the safe operation of the heaviest aircraft operating on the runway across the trench without damage to the aircraft.

2.22.1.4.2 Construction contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness.

2.22.1.5 **Erosion Control.**

Soil erosion must be controlled to maintain RSA standards, that is, the RSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and fire fighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

2.22.2 Runway Object Free Area (ROFA).

Construction, including excavations, may be permitted in the ROFA. However, equipment must be removed from the ROFA when not in use, and material should not be stockpiled in the ROFA if not necessary. Stockpiling material in the OFA requires submittal of a 7460-1 form and justification provided to the appropriate FAA Airports Regional or District Office for approval.

2.22.3 Taxiway Safety Area (TSA).

2.22.3.1 A taxiway safety area is a defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway. (See AC 150/5300-13.) Since the width of the TSA is equal to the wingspan of the design aircraft, no construction may occur within the TSA while the taxiway is open for aircraft operations. The TSA dimensions may be temporarily adjusted if the taxiway is restricted to aircraft operations requiring a TSA that is equal to the TSA width available during construction. Give special consideration to TSA dimensions at taxiway turns and intersections. (see AC 150/5300-13).

2.22.3.2 The airport operator must coordinate the adjustment of the TSA width as permitted above with the appropriate FAA Airports Regional or District Office and the FAA air traffic manager and issue a NOTAM.

2.22.3.3 The CSPP and SPCD must provide procedures for ensuring adequate distance for protection from blasting operations.

2.22.3.4 **Excavations.**

1. Curves. Open trenches or excavations are not permitted within the TSA while the taxiway is open. Trenches should be backfilled before the taxiway is opened. If backfilling excavations before the taxiway must be opened is impracticable, cover the excavations appropriately. Covering for open trenches must be designed to allow the safe operation of the heaviest aircraft operating on the taxiway across the trench without damage to the aircraft.
2. Straight Sections. Open trenches or excavations are not permitted within the TSA while the taxiway is open for unrestricted aircraft operations. Trenches should be backfilled before the taxiway is opened. If backfilling excavations before the taxiway must be opened is impracticable, cover the excavations to allow the safe passage of ARFF equipment and of the heaviest aircraft operating on the taxiway across the trench without causing damage to the equipment or aircraft. In rare circumstances where the section of taxiway is indispensable for aircraft movement, open trenches or excavations may be permitted in the TSA while the taxiway is open to aircraft operations, subject to the following restrictions:
    a. Taxiing speed is limited to 10 mph.
    b. Appropriate NOTAMs are issued.
    c. Marking and lighting meeting the provisions of paragraphs 2.18 and 2.20 are implemented.
    d. Low mass, low-profile lighted barricades are installed.
    e. Appropriate temporary orange construction signs are installed.
3. Construction contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness.

2.22.3.5 **Erosion control.**

Soil erosion must be controlled to maintain TSA standards, that is, the TSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

2.22.4 Taxiway Object Free Area (TOFA).

Unlike the Runway Object Free Area, aircraft wings regularly penetrate the taxiway object free area during normal operations. Thus, the restrictions are more stringent. Except as provided below, no construction may occur within the taxiway object free area while the taxiway is open for aircraft operations.

2.22.4.1 The taxiway object free area dimensions may be temporarily adjusted if the taxiway is restricted to aircraft operations requiring a taxiway object free area that is equal to the taxiway object free area width available. Give special consideration to TOFA dimensions at taxiway turns and intersections.

2.22.4.2 Offset taxiway centerline and edge pavement markings (do not use glass beads) may be used as a temporary measure to provide the required taxiway object free area. Where offset taxiway pavement markings are provided, centerline lighting, centerline reflectors, or taxiway edge reflectors are required. Existing lighting that does not coincide with the temporary markings must be taken out of service.

2.22.4.3 Construction activity, including open excavations, may be accomplished without adjusting the width of the taxiway object free area, subject to the following restrictions:

2.22.4.3.1 Taxiing speed is limited to 10 mph.

2.22.4.3.2 NOTAMs issued advising taxiing pilots of hazard and recommending reduced taxiing speeds on the taxiway.

2.22.4.3.3 Marking and lighting meeting the provisions of paragraphs 2.18 and 2.20 are implemented.

2.22.4.3.4 If desired, appropriate orange construction signs are installed. See paragraph 2.18.4.2 and Appendix F.

2.22.4.3.5 Five-foot clearance is maintained between equipment and materials and any part of an aircraft (includes wingtip overhang). If such clearance can only be maintained if an aircraft does not have full use of the entire taxiway width (with its main landing gear at the edge of the usable pavement), then it will be necessary to move personnel and equipment for the passage of that aircraft.

2.22.4.3.6 Flaggers furnished by the contractor must be used to direct and control construction equipment and personnel to a pre-established setback distance for safe passage of aircraft, and airline and/or airport personnel. Flaggers must also be used to direct taxiing aircraft. Due to liability issues, the airport operator should require airlines to provide flaggers for directing taxiing aircraft.

2.22.5 Obstacle Free Zone (OFZ).

In general, personnel, material, and/or equipment may not penetrate the OFZ while the runway is open for aircraft operations. If a penetration to the OFZ is necessary, it may be possible to continue aircraft operations through operational restrictions. Coordinate with the FAA through the appropriate FAA Airports Regional or District Office.

2.22.6 Runway Approach/Departure Areas and Clearways.

All personnel, materials, and/or equipment must remain clear of the applicable threshold siting surfaces, as defined in AC 150/5300-13. Objects that do not penetrate these surfaces may still be obstructions to air navigation and may affect standard instrument approach procedures. Coordinate with the FAA through the appropriate FAA Airports Regional or District Office.

2.22.6.1 Construction activity in a runway approach/departure area may result in the need to partially close a runway or displace the existing runway threshold. Partial runway closure, displacement of the runway threshold, as well as closure of the complete runway and other portions of the movement area also require coordination through the airport operator with the appropriate FAA air traffic manager (FSS if non-towered) and ATO/Technical Operations (for affected NAVAIDS) and airport users.

2.22.6.2 **Caution About Partial Runway Closures.**

When filing a NOTAM for a partial runway closure, clearly state that the portion of pavement located prior to the threshold is not available for landing and departing traffic. In this case, the threshold has been moved for both landing and takeoff purposes (this is different than a displaced threshold). There may be situations where the portion of closed runway is available for taxiing only. If so, the NOTAM must reflect this condition).

2.22.6.3 **Caution About Displaced Thresholds.**

Implementation of a displaced threshold affects runway length available for aircraft landing over the displacement. Depending on the reason for the displacement (to provide obstruction clearance or RSA), such a displacement may also require an adjustment in the landing distance available and accelerate-stop distance available in the opposite direction. If project scope includes personnel, equipment, excavation, or other work within the existing RSA of any usable runway end, do not implement a displaced threshold unless arrivals and departures toward the construction activity are prohibited. Instead, implement a partial closure.

2.23 **Other Limitations on Construction.**

The CSPP must specify any other limitations on construction, including but not limited to:

2.23.1 Prohibitions.

2.23.1.1 No use of tall equipment (cranes, concrete pumps, and so on) unless a 7460-1 determination letter is issued for such equipment.

2.23.1.2 No use of open flame welding or torches unless fire safety precautions are provided and the airport operator has approved their use.

2.23.1.3 No use of electrical blasting caps on or within 1,000 feet (300 meters) of the airport property. See AC 150/5370-10.

2.23.2 Restrictions.

2.23.2.1 Construction suspension required during specific airport operations.

2.23.2.2 Areas that cannot be worked on simultaneously.

2.23.2.3 Day or night construction restrictions.

2.23.2.4 Seasonal construction restrictions.

2.23.2.5 Temporary signs not approved by the airport operator.

2.23.2.6 Grades changes that could result in unplanned effects on NAVAIDs.

CHAPTER 3. GUIDELINES FOR WRITING A CSPP

3.1 General Requirements.

The CSPP is a standalone document written to correspond with the subjects outlined in paragraph 2.4. The CSPP is organized by numbered sections corresponding to each subject listed in paragraph 2.4, and described in detail in paragraphs 2.5 - 2.23. Each section number and title in the CSPP matches the corresponding subject outlined in paragraph 2.4 (for example, 1. Coordination, 2. Phasing, 3. Areas and Operations Affected by the Construction Activity, and so on). With the exception of the project scope of work outlined in Section 2. Phasing, only subjects specific to operational safety during construction should be addressed.

3.2 Applicability of Subjects.

Each section should, to the extent practical, focus on the specific subject. Where an overlapping requirement spans several sections, the requirement should be explained in detail in the most applicable section. A reference to that section should be included in all other sections where the requirement may apply. For example, the requirement to protect existing underground FAA ILS cables during trenching operations could be considered FAA ATO coordination (Coordination, paragraph 2.5.3), an area and operation affected by the construction activity (Areas and Operations Affected by the Construction Activity, paragraph 2.7.1.4), a protection of a NAVAID (Protection of Navigational Aids (NAVAIDs), paragraph 2.8), or a notification to the FAA of construction activities (Notification of Construction Activities, paragraph 2.13.5.3.2). However, it is more specifically an underground utility requirement (Underground Utilities, paragraph 2.15). The procedure for protecting underground ILS cables during trenching operations should therefore be described in 2.4.2.11: "The contractor must coordinate with the local FAA System Support Center (SSC) to mark existing ILS cable routes along Runway 17-35. The ILS cables will be located by hand digging whenever the trenching operation moves within 10 feet of the cable markings." All other applicable sections should include a reference to 2.4.2.11: "ILS cables shall be identified and protected as described in 2.4.2.11" or "See 2.4.2.11 for ILS cable identification and protection requirements." Thus, the CSPP should be considered as a whole, with no need to duplicate responses to related issues.

3.3 Graphical Representations.

Construction safety drawings should be included in the CSPP as attachments. When other graphical representations will aid in supporting written statements, the drawings, diagrams, and/or photographs should also be attached to the CSPP. References should be made in the CSPP to each graphical attachment and may be made in multiple sections.

3.4 **Reference Documents.**

The CSPP must not incorporate a document by reference unless reproduction of the material in that document is prohibited. In that case, either copies of or a source for the referenced document must be provided to the contractor. Where this AC recommends references (e.g. as in paragraph 3.9) the intent is to include a reference to the corresponding section in the CSPP, not to this Advisory Circular.

3.5 **Restrictions.**

The CSPP should not be considered as a project design review document. The CSPP should also avoid mention of permanent ("as-built") features such as pavements, markings, signs, and lighting, except when such features are intended to aid in maintaining operational safety during the construction.

3.6 **Coordination.**

Include in this section a detailed description of conferences and meetings to be held both before and during the project. Include appropriate information from AC 150/5370-12. Discuss coordination procedures and schedules for each required FAA ATO Technical Operations shutdown and restart and all required flight inspections.

3.7 **Phasing.**

Include in this section a detailed scope of work description for the project as a whole and each phase of work covered by the CSPP. This includes all locations and durations of the work proposed. Attach drawings to graphically support the written scope of work. Detail in this section the sequenced phases of the proposed construction. Include a reference to paragraph 3.8, as appropriate.

3.8 **Areas and Operations Affected by Construction.**

Focus in this section on identifying the areas and operations affected by the construction. Describe corresponding mitigation that is not covered in detail elsewhere in the CSPP. Include references to paragraphs below as appropriate. Attach drawings as necessary to graphically describe affected areas and mechanisms proposed. See Appendix F for sample operational effects tables and figures.

3.9 **NAVAID Protection.**

List in this section all NAVAID facilities that will be affected by the construction. Identify NAVAID facilities that will be placed out of service at any time prior to or during construction activities. Identify individuals responsible for coordinating each shutdown and when each facility will be out of service. Include a reference to paragraph 3.6 for FAA ATO NAVAID shutdown, restart, and flight inspection coordination. Outline in detail procedures to protect each NAVAID facility remaining in service from interference by construction activities. Include a reference to paragraph 3.14 for the

issuance of NOTAMs as required. Include a reference to paragraph 3.16 for the protection of underground cables and piping serving NAVAIDs. If temporary visual aids are proposed to replace or supplement existing facilities, include a reference to paragraph 3.19. Attach drawings to graphically indicate the affected NAVAIDS and the corresponding critical areas.

3.10 **Contractor Access.**

This will necessarily be the most extensive section of the CSPP. Provide sufficient detail so that a contractor not experienced in working on airports will understand the unique restrictions such work will require. Due to this extent, it should be broken down into subsections as described below:

3.10.1 Location of Stockpiled Construction Materials.

Describe in this section specific locations for stockpiling material. Note any height restrictions on stockpiles. Include a reference to paragraph 3.21 for hazard marking and lighting devices used to identify stockpiles. Include a reference to paragraph 3.11 for provisions to prevent stockpile material from becoming wildlife attractants. Include a reference to paragraph 3.12 for provisions to prevent stockpile material from becoming FOD. Attach drawings to graphically indicate the stockpile locations.

3.10.2 Vehicle and Pedestrian Operations.

While there are many items to be addressed in this major subsection of the CSPP, all are concerned with one main issue: keeping people and vehicles from areas of the airport where they don't belong. This includes preventing unauthorized entry to the AOA and preventing the improper movement of pedestrians or vehicles on the airport. In this section, focus on mechanisms to prevent construction vehicles and workers traveling to and from the worksite from unauthorized entry into movement areas. Specify locations of parking for both employee vehicles and construction equipment, and routes for access and haul roads. In most cases, this will best be accomplished by attaching a drawing. Quote from AC 150/5210-5 specific requirements for contractor vehicles rather than referring to the AC as a whole, and include special requirements for identifying HAZMAT vehicles. Quote from, rather than incorporate by reference, AC 150/5210-20 as appropriate to address the airport's rules for ground vehicle operations, including its training program. Discuss the airport's recordkeeping system listing authorized vehicle operators.

3.10.3 Two-Way Radio Communications.

Include a special section to identify all individuals who are required to maintain communications with Air Traffic (AT) at airports with active towers, or monitor CTAF at airports without or with closed ATCT. Include training requirements for all individuals required to communicate with AT. Individuals required to monitor AT frequencies should also be identified. If construction employees are also required to communicate by radio with Airport Operations, this procedure should be described in detail. Usage of vehicle mounted radios and/or portable radios should be addressed. Communication procedures for the event of disabled radio communication (that is, light

signals, telephone numbers, others) must be included. All radio frequencies should by identified (Tower, Ground Control, CTAF, UNICOM, ATIS, and so on).

3.10.4 Airport Security.

Address security as it applies to vehicle and pedestrian operations. Discuss TSA requirements, security badging requirements, perimeter fence integrity, gate security, and other needs. Attach drawings to graphically indicate secured and/or Security Identification Display Areas (SIDA), perimeter fencing, and available access points.

3.11 Wildlife Management.

Discuss in this section wildlife management procedures. Describe the maintenance of existing wildlife mitigation devices, such as perimeter fences, and procedures to limit wildlife attractants. Include procedures to notify Airport Operations of wildlife encounters. Include a reference to paragraph 3.10 for security (wildlife) fence integrity maintenance as required.

3.12 FOD Management.

In this section, discuss methods to control and monitor FOD: worksite housekeeping, ground vehicle tire inspections, runway sweeps, and so on. Include a reference to paragraph 3.15 for inspection requirements as required.

3.13 HAZMAT Management.

Describe in this section HAZMAT management procedures: fuel deliveries, spill recovery procedures, Safety Data Sheet (SDS), Material Safety Data Sheet (MSDS) or Product Safety Data Sheet (PSDS) availability, and other considerations. Any specific airport HAZMAT restrictions should also be identified. Include a reference to paragraph 3.10 for HAZMAT vehicle identification requirements. Quote from, rather than incorporate by reference, AC 150/5320-15.

3.14 Notification of Construction Activities.

List in this section the names and telephone numbers of points of contact for all parties affected by the construction project. We recommend a single list that includes all telephone numbers required under this section. Include emergency notification procedures for all representatives of all parties potentially impacted by the construction. Identify individual representatives – and at least one alternate – for each party. List both on-duty and off-duty contact information for each individual, including individuals responsible for emergency maintenance of airport construction hazard lighting and barricades. Describe procedures to coordinate immediate response to events that might adversely affect the operational safety of the airport (such as interrupted NAVAID service). Explain requirements for and the procedures for the issuance of Notices to Airmen (NOTAMs), notification to FAA required by 14 CFR Part 77 and Part 157 and in the event of affected NAVAIDs. For NOTAMs, identify an individual, and at least one alternate, responsible for issuing and cancelling each specific type of Notice to

Airmen (NOTAM) required. Detail notification methods for police, fire fighting, and medical emergencies. This may include 911, but should also include direct phone numbers of local police departments and nearby hospitals. Identify the E911 address of the airport and the emergency access route via haul roads to the construction site. Require the contractor to have this information available to all workers. The local Poison Control number should be listed. Procedures regarding notification of Airport Operations and/or the ARFF Department of such emergencies should be identified, as applicable. If airport radio communications are identified as a means of emergency notification, include a reference to paragraph 3.10. Differentiate between emergency and nonemergency notification of ARFF personnel, the latter including activities that affect ARFF water supplies and access roads. Identify the primary ARFF contact person and at least one alternate. If notification is to be made through Airport Operations, then detail this procedure. Include a method of confirmation from the ARFF department.

3.15 **Inspection Requirements.**

Describe in this section inspection requirements to ensure airfield safety compliance. Include a requirement for routine inspections by the resident engineer (RE) or other airport operator's representative and the construction contractors. If the engineering consultants and/or contractors have a Safety Officer who will conduct such inspections, identify this individual. Describe procedures for special inspections, such as those required to reopen areas for aircraft operations. Part 139 requires daily airfield inspections at certificated airports, but these may need to be more frequent when construction is in progress. Discuss the role of such inspections on areas under construction. Include a requirement to immediately remedy any deficiencies, whether caused by negligence, oversight, or project scope change.

3.16 **Underground Utilities.**

Explain how existing underground utilities will be located and protected. Identify each utility owner and include contact information for each company/agency in the master list. Address emergency response procedures for damaged or disrupted utilities. Include a reference to paragraph 3.14 for notification of utility owners of accidental utility disruption as required.

3.17 **Penalties.**

Describe in this section specific penalties imposed for noncompliance with airport rules and regulations, including the CSPP: SIDA violations, VPD, and others.

3.18 **Special Conditions.**

Identify any special conditions that may trigger specific safety mitigation actions outlined in this CSPP: low visibility operations, snow removal, aircraft in distress, aircraft accident, security breach, VPD, and other activities requiring construction suspension/resumption. Include a reference to paragraph 3.10 for compliance with airport safety and security measures and for radio communications as required. Include

a reference to paragraph 3.14 for emergency notification of all involved parties, including police/security, ARFF, and medical services.

3.19 **Runway and Taxiway Visual Aids.**

Include marking, lighting, signs, and visual NAVAIDS. Detail temporary runway and taxiway marking, lighting, signs, and visual NAVAIDs required for the construction. Discuss existing marking, lighting, signs, and visual NAVAIDs that are temporarily, altered, obliterated, or shut down. Consider non-federal facilities and address requirements for reimbursable agreements necessary for alteration of FAA facilities and for necessary flight checks. Identify temporary TORA signs or runway distance remaining signs if appropriate. Identify required temporary visual NAVAIDs such as REIL or PAPI. Quote from, rather than incorporate by reference, AC 150/5340-1, *Standards for Airport Markings;* AC 150/5340-18, *Standards for Airport Sign Systems;* and AC 150/5340-30, as required. Attach drawings to graphically indicate proposed marking, lighting, signs, and visual NAVAIDs.

3.20 **Marking and Signs for Access Routes.**

Detail plans for marking and signs for vehicle access routes. To the extent possible, signs should be in conformance with the Federal Highway Administration MUTCD and/or State highway specifications, not hand lettered. Detail any modifications to the guidance in the MUTCD necessary to meet frangibility/height requirements.

3.21 **Hazard Marking and Lighting.**

Specify all marking and lighting equipment, including when and where each type of device is to be used. Specify maximum gaps between barricades and the maximum spacing of hazard lighting. Identify one individual and at least one alternate responsible for maintenance of hazard marking and lighting equipment in the master telephone list. Include a reference to paragraph 3.14. Attach drawings to graphically indicate the placement of hazard marking and lighting equipment.

3.22 **Work Zone Lighting for Nighttime Construction.**

If work is to be conducted at night, specify all lighting equipment, including when and where each type of device is to be used. Indicate the direction lights are to be aimed and any directions that aiming of lights is prohibited. Specify any shielding necessary in instances where aiming is not sufficient to prevent interference with air traffic control and aircraft operations. Attach drawings to graphically indicate the placement and aiming of lighting equipment. Where the plan only indicates directions that aiming of lights is prohibited, the placement and positioning of portable lights must be proposed by the Contractor and approved by the airport operator’s representative each time lights are relocated or repositioned.

3.23 **Protection of Runway and Taxiway Safety Areas.**

This section should focus exclusively on procedures for protecting all safety areas, including those altered by the construction: methods of demarcation, limit of access, movement within safety areas, stockpiling and trenching restrictions, and so on. Reference AC 150/5300-13, as required. Include a reference to paragraph 3.10 for procedures regarding vehicle and personnel movement within safety areas. Include a reference to paragraph 3.10 for material stockpile restrictions as required. Detail requirements for trenching, excavations, and backfill. Include a reference to paragraph 3.21 for hazard marking and lighting devices used to identify open excavations as required. If runway and taxiway closures are proposed to protect safety areas, or if temporary displaced thresholds and/or revised declared distances are used to provide the required Runway Safety Area, include a reference to paragraphs 3.14 and 3.19. Detail procedures for protecting the runway OFZ, runway OFA, taxiway OFA and runway approach surfaces including those altered by the construction: methods of demarcation, limit of cranes, storage of equipment, and so on. Quote from, rather than incorporate by reference, AC 150/5300-13, as required. Include a reference to paragraph 3.24 for height (i.e., crane) restrictions as required. One way to address the height of equipment that will move during the project is to establish a three-dimensional "box" within which equipment will be confined that can be studied as a single object. Attach drawings to graphically indicate the safety area, OFZ, and OFA boundaries.

3.24 **Other Limitations on Construction.**

This section should describe what limitations must be applied to each area of work and when each limitation will be applied: limitations due to airport operations, height (i.e., crane) restrictions, areas which cannot be worked at simultaneously, day/night work restrictions, winter construction, and other limitations. Include a reference to paragraph 3.7 for project phasing requirements based on construction limitations as required.

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APPENDIX A. RELATED READING MATERIAL

Obtain the latest version of the following free publications from the FAA on its Web site at http://www.faa.gov/airports/.

Table A-1. FAA Publications

Number	Title and Description
AC 150/5200-28	*Notices to Airmen (NOTAMs) for Airport Operators* Guidance for using the NOTAM System in airport reporting.
AC 150/5200-30	*Airport Field Condition Assessments and Winter Operations Safety* Guidance for airport owners/operators on the development of an acceptable airport snow and ice control program and on appropriate field condition reporting procedures.
AC 150/5200-33	*Hazardous Wildlife Attractants On or Near Airports* Guidance on locating certain land uses that might attract hazardous wildlife to public-use airports.
AC 150/5210-5	*Painting, Marking, and Lighting of Vehicles Used on an Airport* Guidance, specifications, and standards for painting, marking, and lighting vehicles operating in the airport air operations areas.
AC 150/5210-20	*Ground Vehicle Operations to include Taxiing or Towing an Aircraft on Airports* Guidance to airport operators on developing ground vehicle operation training programs.
AC 150/5300-13	*Airport Design* FAA standards and recommendations for airport design. Establishes approach visibility minimums as an airport design parameter, and contains the Object Free area and the obstacle free-zone criteria.
AC 150/5210-24	*Airport Foreign Object Debris (FOD) Management* Guidance for developing and managing an airport foreign object debris (FOD) program

Number	Title and Description
AC 150/5320-15	*Management of Airport Industrial Waste* Basic information on the characteristics, management, and regulations of industrial wastes generated at airports. Guidance for developing a Storm Water Pollution Prevention Plan (SWPPP) that applies best management practices to eliminate, prevent, or reduce pollutants in storm water runoff with particular airport industrial activities.
AC 150/5340-1	*Standards for Airport Markings* FAA standards for the siting and installation of signs on airport runways and taxiways.
AC 150/5340-18	*Standards for Airport Sign Systems* FAA standards for the siting and installation of signs on airport runways and taxiways.
AC 150/5345-28	*Precision Approach Path Indicator (PAPI) Systems* FAA standards for PAPI systems, which provide pilots with visual glide slope guidance during approach for landing.
AC 150/5340-30	*Design and Installation Details for Airport Visual Aids* Guidance and recommendations on the installation of airport visual aids.
AC 150/5345-39	*Specification for L-853, Runway and Taxiway Retroreflective Markers*
AC 150/5345-44	*Specification for Runway and Taxiway Signs* FAA specifications for unlighted and lighted signs for taxiways and runways.
AC 150/5345-53	*Airport Lighting Equipment Certification Program* Details on the Airport Lighting Equipment Certification Program (ALECP).
AC 150/5345-50	*Specification for Portable Runway and Taxiway Lights* FAA standards for portable runway and taxiway lights and runway end identifier lights for temporary use to permit continued aircraft operations while all or part of a runway lighting system is inoperative.
AC 150/5345-55	*Specification for L-893, Lighted Visual Aid to Indicate Temporary Runway Closure*

Number	Title and Description
AC 150/5370-10	*Standards for Specifying Construction of Airports* Standards for construction of airports, including earthwork, drainage, paving, turfing, lighting, and incidental construction.
AC 150/5370-12	*Quality Management for Federally Funded Airport Construction Projects*
EB 93	*Guidance for the Assembly and Installation of Temporary Orange Construction Signs*
FAA Order 5200.11	FAA Airports (ARP) Safety Management System (SMS) Basics for implementing SMS within ARP. Includes roles and responsibilities of ARP management and staff as well as other FAA lines of business that contribute to the ARP SMS.
FAA Certalert 98-05	*Grasses Attractive to Hazardous Wildlife* Guidance on grass management and seed selection.
FAA Form 7460-1	Notice of Proposed Construction or Alteration
FAA Form 7480-1	Notice of Landing Area Proposal
FAA Form 6000.26	National NAS Strategic Interruption Service Level Agreement, Strategic Events Coordination, Airport Sponsor Form

Obtain the latest version of the following free publications from the Electronic Code of Federal Regulations at http://www.ecfr.gov/.

Table A-2. Code of Federal Regulation

Number	Title
Title 14 CFR Part 77	Safe, Efficient Use and Preservation of the Navigable Airspace
Title 14 CFR Part 139	Certification of Airports
Title 49 CFR Part 1542	Airport Security

Obtain the latest version of the Manual on Uniform Traffic Control Devices from the Federal Highway Administration at http://mutcd.fhwa.dot.gov/.

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APPENDIX B. TERMS AND ACRONYMS

Table B-1. Terms and Acronyms

Term	Definition
Form 7460-1	Notice of Proposed Construction or Alteration. For on-airport projects, the form submitted to the FAA regional or airports division office as formal written notification of any kind of construction or alteration of objects that affect navigable airspace, as defined in 14 CFR Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*. (See guidance available on the FAA web site at https://oeaaa.faa.gov.) The form may be downloaded at http://www.faa.gov/airports/resources/forms/, or filed electronically at: https://oeaaa.faa.gov.
Form 7480-1	Notice of Landing Area Proposal. Form submitted to the FAA Airports Regional Division Office or Airports District Office as formal written notification whenever a project without an airport layout plan on file with the FAA involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport The form may be downloaded at http://www.faa.gov/airports/resources/forms/.
Form 6000-26	Airport Sponsor Strategic Event Submission Form
AC	Advisory Circular
ACSI	Airport Certification Safety Inspector
ADG	Airplane Design Group
AIP	Airport Improvement Program
ALECP	Airport Lighting Equipment Certification Program
ANG	Air National Guard
AOA	Air Operations Area, as defined in 14 CFR Part 107. Means a portion of an airport, specified in the airport security program, in which security measures are carried out. This area includes aircraft movement areas, aircraft parking areas, loading ramps, and safety areas, and any adjacent areas (such as general aviation areas) that are not separated by adequate security systems, measures, or procedures. This area does not include the secured area of the airport terminal building.
ARFF	Aircraft Rescue and Fire Fighting
ARP	FAA Office of Airports
ASDA	Accelerate-Stop Distance Available
AT	Air Traffic
ATCT	Airport Traffic Control Tower
ATIS	Automatic Terminal Information Service
ATO	Air Traffic Organization
Certificated Airport	An airport that has been issued an Airport Operating Certificate by the FAA under

Term	Definition
	the authority of 14 CFR Part 139, *Certification of Airports*.
CFR	Code of Federal Regulations
Construction	The presence of construction-related personnel, equipment, and materials in any location that could infringe upon the movement of aircraft.
CSPP	Construction Safety and Phasing Plan. The overall plan for safety and phasing of a construction project developed by the airport operator, or developed by the airport operator's consultant and approved by the airport operator. It is included in the invitation for bids and becomes part of the project specifications.
CTAF	Common Traffic Advisory Frequency
Displaced Threshold	A threshold that is located at a point on the runway other than the designated beginning of the runway. The portion of pavement behind a displaced threshold is available for takeoffs in either direction or landing from the opposite direction.
DOT	Department of Transportation
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FOD	Foreign Object Debris/Damage
FSS	Flight Service Station
GA	General Aviation
HAZMAT	Hazardous Materials
HMA	Hot Mix Asphalt
IAP	Instrument Approach Procedures
IFR	Instrument Flight Rules
ILS	Instrument Landing System
LDA	Landing Distance Available
LOC	Localizer antenna array
Movement Area	The runways, taxiways, and other areas of an airport that are used for taxiing or hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading aprons and aircraft parking areas (reference 14 CFR Part 139).
MSDS	Material Safety Data Sheet
MUTCD	Manual on Uniform Traffic Control Devices
NAVAID	Navigation Aid
NAVAID Critical Area	An area of defined shape and size associated with a NAVAID that must remain clear and graded to avoid interference with the electronic signal.
Non-Movement Area	The area inside the airport security fence exclusive of the Movement Area. It is important to note that the non-movement area includes pavement traversed by aircraft.

Term	Definition
NOTAM	Notices to Airmen
Obstruction	Any object/obstacle exceeding the obstruction standards specified by 14 CFR Part 77, subpart C.
OCC	Operations Control Center
OE / AAA	Obstruction Evaluation / Airport Airspace Analysis
OFA	Object Free Area. An area on the ground centered on the runway, taxiway, or taxi lane centerline provided to enhance safety of aircraft operations by having the area free of objects except for those objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes. (See AC 150/5300-13 for additional guidance on OFA standards and wingtip clearance criteria.)
OFZ	Obstacle Free Zone. The airspace below 150 ft (45 m) above the established airport elevation and along the runway and extended runway centerline that is required to be clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance protection for aircraft landing or taking off from the runway and for missed approaches. The OFZ is subdivided as follows: Runway OFZ, Inner Approach OFZ, Inner Transitional OFZ, and Precision OFZ. Refer to AC 150/5300-13 for guidance on OFZ.
OSHA	Occupational Safety and Health Administration
OTS	Out of Service
P&R	Planning and Requirements Group
NPI	NAS Planning & Integration
PAPI	Precision Approach Path Indicator
PFC	Passenger Facility Charge
PLASI	Pulse Light Approach Slope Indicator
Project Proposal Summary	A clear and concise description of the proposed project or change that is the object of Safety Risk Management.
RA	Reimbursable Agreement
RE	Resident Engineer
REIL	Runway End Identifier Lights
RNAV	Area Navigation
ROFA	Runway Object Free Area
RSA	Runway Safety Area. A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway, in accordance with AC 150/5300-13.
SDS	Safety Data Sheet
SIDA	Security Identification Display Area
SMS	Safety Management System

Term	Definition
SPCD	Safety Plan Compliance Document. Details developed and submitted by a contractor to the airport operator for approval providing details on how the performance of a construction project will comply with the CSPP.
SRM	Safety Risk Management
SSC	System Support Center
Taxiway Safety Area	A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway, in accordance with AC 150/5300-13.
TDG	Taxiway Design Group
Temporary	Any condition that is not intended to be permanent.
Temporary Runway End	The beginning of that portion of the runway available for landing and taking off in one direction, and for landing in the other direction. Note the difference from a displaced threshold.
Threshold	The beginning of that portion of the runway available for landing. In some instances, the landing threshold may be displaced.
TODA	Takeoff Distance Available
TOFA	Taxiway Object Free Area
TORA	Takeoff Run Available. The length of the runway less any length of runway unavailable and/or unsuitable for takeoff run computations. See AC 150/5300-13 for guidance on declared distances.
TSA	Taxiway Safety Area, or Transportation Security Administration
UNICOM	A radio communications system of a type used at small airports.
VASI	Visual Approach Slope Indicator
VGSI	Visual Glide Slope Indicator. A device that provides a visual glide slope indicator to landing pilots. These systems include precision approach path indicator (PAPI), visual approach slope indicator (VASI), and pulse light approach slope indicator (PLASI).
VFR	Visual Flight Rules
VOR	Very High Frequency Omnidirectional Radio Range
VPD	Vehicle / Pedestrian Deviation

APPENDIX C. SAFETY AND PHASING PLAN CHECKLIST

This appendix is keyed to Chapter 2. In the electronic version of this AC, clicking on the paragraph designation in the Reference column will access the applicable paragraph. There may be instances where the CSPP requires provisions that are not covered by the list in this appendix.

This checklist is intended as an aid, not a required submittal.

Table C-1. CSPP Checklist

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
General Considerations					
Requirements for predesign, prebid, and preconstruction conferences to introduce the subject of airport operational safety during construction are specified.	2.5				
Operational safety is a standing agenda item for construction progress meetings.	2.5				
Scheduling of the construction phases is properly addressed.	2.6				
Any formal agreements are established.	2.5.3				
Areas and Operations Affected by Construction Activity					
Drawings showing affected areas are included.	2.7.1				
Closed or partially closed runways, taxiways, and aprons are depicted on drawings.	2.7.1.1				
Access routes used by ARFF vehicles affected by the project are addressed.	2.7.1.2				
Access routes used by airport and airline support vehicles affected by the project are addressed.	2.7.1.3				
Underground utilities, including water supplies for firefighting and drainage.	2.7.1.4				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Approach/departure surfaces affected by heights of temporary objects are addressed.	2.7.1.5				
Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads are properly depicted on drawings.	2.7.1				
Temporary changes to taxi operations are addressed.	2.7.2.1				
Detours for ARFF and other airport vehicles are identified.	2.7.2.2				
Maintenance of essential utilities and underground infrastructure is addressed.	2.7.2.3				
Temporary changes to air traffic control procedures are addressed.	2.7.2.4				
NAVAIDs					
Critical areas for NAVAIDs are depicted on drawings.	2.8				
Effects of construction activity on the performance of NAVAIDS, including unanticipated power outages, are addressed.	2.8				
Protection of NAVAID facilities is addressed.	2.8				
The required distance and direction from each NAVAID to any construction activity is depicted on drawings.	2.8				
Procedures for coordination with FAA ATO/Technical Operations, including identification of points of contact, are included.	2.8, 2.13.1, 2.13.5.3.1, 2.18.1				
Contractor Access					
The CSPP addresses areas to which contractor will have access and how	2.9				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
the areas will be accessed.					
The application of 49 CFR Part 1542 Airport Security, where appropriate, is addressed.	2.9				
The location of stockpiled construction materials is depicted on drawings.	2.9.1				
The requirement for stockpiles in the ROFA to be approved by FAA is included.	2.9.1				
Requirements for proper stockpiling of materials are included.	2.9.1				
Construction site parking is addressed.	2.9.2.1				
Construction equipment parking is addressed.	2.9.2.2				
Access and haul roads are addressed.	2.9.2.3				
A requirement for marking and lighting of vehicles to comply with AC 150/5210-5, *Painting, Marking and Lighting of Vehicles Used on an Airport,* is included.	2.9.2.4				
Proper vehicle operations, including requirements for escorts, are described.	2.9.2.5, 2.9.2.6				
Training requirements for vehicle drivers are addressed.	2.9.2.7				
Two-way radio communications procedures are described.	2.9.2.9				
Maintenance of the secured area of the airport is addressed.	2.9.2.10				
Wildlife Management					
The airport operator’s wildlife management procedures are addressed.	2.10				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Foreign Object Debris Management					
The airport operator's FOD management procedures are addressed.	2.11				
Hazardous Materials Management					
The airport operator's hazardous materials management procedures are addressed.	2.12				
Notification of Construction Activities					
Procedures for the immediate notification of airport user and local FAA of any conditions adversely affecting the operational safety of the airport are detailed.	2.13				
Maintenance of a list by the airport operator of the responsible representatives/points of contact for all involved parties and procedures for contacting them 24 hours a day, seven days a week is specified.	2.13.1				
A list of local ATO/Technical Operations personnel is included.	2.13.1				
A list of ATCT managers on duty is included.	2.13.1				
A list of authorized representatives to the OCC is included.	2.13.2				
Procedures for coordinating, issuing, maintaining and cancelling by the airport operator of NOTAMS about airport conditions resulting from construction are included.	2.8, 2.13.2, 2.18.3.3.9				
Provision of information on closed or hazardous conditions on airport movement areas by the airport operator to the OCC is specified.	2.13.2				
Emergency notification procedures for medical, fire fighting, and police	2.13.3				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
response are addressed.					
Coordination with ARFF personnel for non-emergency issues is addressed.	2.13.4				
Notification to the FAA under 14 CFR parts 77 and 157 is addressed.	2.13.5				
Reimbursable agreements for flight checks and/or design and construction for FAA owned NAVAIDs are addressed.	2.13.5.3.2				
Inspection Requirements					
Daily and interim inspections by both the airport operator and contractor are specified.	2.14.1, 2.14.2				
Final inspections at certificated airports are specified when required.	2.14.3				
Underground Utilities					
Procedures for protecting existing underground facilities in excavation areas are described.	2.15				
Penalties					
Penalty provisions for noncompliance with airport rules and regulations and the safety plans are detailed.	2.16				
Special Conditions					
Any special conditions that affect the operation of the airport or require the activation of any special procedures are addressed.	2.17				
Runway and Taxiway Visual Aids - Marking, Lighting, Signs, and Visual NAVAIDs					
The proper securing of temporary airport markings, lighting, signs, and visual NAVAIDs is addressed.	2.18.1				
Frangibility of airport markings, lighting, signs, and visual NAVAIDs is specified.	2.18.1, 2.18.3, 2.18.4.2, 2.20.2.4				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
The requirement for markings to be in compliance with AC 150/5340-1, *Standards for Airport Markings*, is specified.	2.18.2				
Detailed specifications for materials and methods for temporary markings are provided.	2.18.2				
The requirement for lighting to conform to AC 150/5340-30, *Design and Installation Details for Airport Visual Aids;* AC 150/5345-50, *Specification for Portable Runway and Taxiway Lights;* and AC 150/5345-53, *Airport Lighting Certification Program*, is specified.	2.18.3				
The use of a lighted X is specified where appropriate.	2.18.2.1.2, 2.18.3.2				
The requirement for signs to conform to AC 150/5345-44, *Specification for Runway and Taxiway Signs;* AC 50/5340-18, *Standards for Airport Sign Systems;* and AC 150/5345-53, *Airport Lighting Certification Program*, is specified.	2.18.4				
Marking and Signs For Access Routes					
The CSPP specifies that pavement markings and signs intended for construction personnel should conform to AC 150/5340-18 and, to the extent practicable, with the MUTCD and/or State highway specifications.	2.18.4.2				
Hazard Marking and Lighting					
Prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles are specified.	2.20.1				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Hazard marking and lighting are specified to identify open manholes, small areas under repair, stockpiled material, and waste areas.	2.20.1				
The CSPP considers less obvious construction-related hazards.	2.20.1				
Equipment that poses the least danger to aircraft but is sturdy enough to remain in place when subjected to typical winds, prop wash and jet blast is specified.	2.20.2.1				
The spacing of barricades is specified such that a breach is physically prevented barring a deliberate act.	2.20.2.1				
Red lights meeting the luminance requirements of the State Highway Department are specified.	2.20.2.2				
Barricades, temporary markers, and other objects placed and left in areas adjacent to any open runway, taxiway, taxi lane, or apron are specified to be as low as possible to the ground, and no more than 18 inch high.	2.20.2.3				
Barricades are specified to indicate construction locations in which no part of an aircraft may enter.	2.20.2.3				
Highly reflective barriers with lights are specified to barricade taxiways leading to closed runways.	2.20.2.5				
Markings for temporary closures are specified.	2.20.2.5				
The provision of a contractor's representative on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades is specified.	2.20.2.7				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Work Zone Lighting for Nighttime Construction					
If work is to be conducted at night, the CSPP identifies construction lighting units and their general locations and aiming in relationship to the ATCT and active runways and taxiways.	2.21				
Protection of Runway and Taxiway Safety Areas					
The CSPP clearly states that no construction may occur within a safety area while the associated runway or taxiway is open for aircraft operations.	2.22.1.1, 2.22.3.1				
The CSPP specifies that the airport operator coordinates the adjustment of RSA or TSA dimensions with the ATCT and the appropriate FAA Airports Regional or District Office and issues a local NOTAM.	2.22.1.2, 2.22.3.2				
Procedures for ensuring adequate distance for protection from blasting operations, if required by operational considerations, are detailed.	2.22.3.3				
The CSPP specifies that open trenches or excavations are not permitted within a safety area while the associated runway or taxiway is open, subject to approved exceptions.	2.22.1.4				
Appropriate covering of excavations in the RSA or TSA that cannot be backfilled before the associated runway or taxiway is open is detailed.	2.22.1.4				
The CSPP includes provisions for prominent marking of open trenches and excavations at the construction site.	2.22.1.4				
Grading and soil erosion control to maintain RSA/TSA standards are	2.22.3.5				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
addressed.					
The CSPP specifies that equipment is to be removed from the ROFA when not in use.	2.22.2				
The CSPP clearly states that no construction may occur within a taxiway safety area while the taxiway is open for aircraft operations.	2.22.3				
Appropriate details are specified for any construction work to be accomplished in a taxiway object free area.	2.22.4				
Measures to ensure that personnel, material, and/or equipment do not penetrate the OFZ or threshold siting surfaces while the runway is open for aircraft operations are included.	2.22.4.3.6				
Provisions for protection of runway approach/departure areas and clearways are included.	2.22.6				
Other Limitations on Construction					
The CSPP prohibits the use of open flame welding or torches unless adequate fire safety precautions are provided and the airport operator has approved their use.	2.23.1.2				
The CSPP prohibits the use of electrical blasting caps on or within 1,000 ft (300 m) of the airport property.	2.23.1.3				

APPENDIX D. CONSTRUCTION PROJECT DAILY SAFETY INSPECTION CHECKLIST

The situations identified below are potentially hazardous conditions that may occur during airport construction projects. Safety area encroachments, unauthorized and improper ground vehicle operations, and unmarked or uncovered holes and trenches near aircraft operating surfaces pose the most prevalent threats to airport operational safety during airport construction projects. The list below is one tool that the airport operator or contractor may use to aid in identifying and correcting potentially hazardous conditions. It should be customized as appropriate for each project including information such as the date, time and name of the person conducting the inspection.

Table D-1. Potentially Hazardous Conditions

Item	Action Required (Describe)	No Action Required (Check)
Excavation adjacent to runways, taxiways, and aprons improperly backfilled.		
Mounds of earth, construction materials, temporary structures, and other obstacles near any open runway, taxiway, or taxi lane; in the related Object Free area and aircraft approach or departure areas/zones; or obstructing any sign or marking.		
Runway resurfacing projects resulting in lips exceeding 3 inch (7.6 cm) from pavement edges and ends.		
Heavy equipment (stationary or mobile) operating or idle near AOA, in runway approaches and departures areas, or in OFZ.		
Equipment or material near NAVAIDs that may degrade or impair radiated signals and/or the monitoring of navigation and visual aids. Unauthorized or improper vehicle operations in localizer or glide slope critical areas, resulting in electronic interference and/or facility shutdown.		
Tall and especially relatively low visibility units (that is, equipment with slim profiles) — cranes, drills, and similar objects — located in critical areas, such as OFZ and		

Item	Action Required (Describe)	No Action Required (Check)
approach zones.		
Improperly positioned or malfunctioning lights or unlighted airport hazards, such as holes or excavations, on any apron, open taxiway, or open taxi lane or in a related safety, approach, or departure area.		
Obstacles, loose pavement, trash, and other debris on or near AOA. Construction debris (gravel, sand, mud, paving materials) on airport pavements may result in aircraft propeller, turbine engine, or tire damage. Also, loose materials may blow about, potentially causing personal injury or equipment damage.		
Inappropriate or poorly maintained fencing during construction intended to deter human and animal intrusions into the AOA. Fencing and other markings that are inadequate to separate construction areas from open AOA create aviation hazards.		
Improper or inadequate marking or lighting of runways (especially thresholds that have been displaced or runways that have been closed) and taxiways that could cause pilot confusion and provide a potential for a runway incursion. Inadequate or improper methods of marking, barricading, and lighting of temporarily closed portions of AOA create aviation hazards.		
Wildlife attractants — such as trash (food scraps not collected from construction personnel activity), grass seeds, tall grass, or standing water — on or near airports.		
Obliterated or faded temporary markings on active operational areas.		
Misleading or malfunctioning obstruction lights. Unlighted or unmarked obstructions in the approach to any open runway pose aviation hazards.		

Item	Action Required (Describe)	No Action Required (Check)
Failure to issue, update, or cancel NOTAMs about airport or runway closures or other construction related airport conditions.		
Failure to mark and identify utilities or power cables. Damage to utilities and power cables during construction activity can result in the loss of runway / taxiway lighting; loss of navigation, visual, or approach aids; disruption of weather reporting services; and/or loss of communications.		
Restrictions on ARFF access from fire stations to the runway / taxiway system or airport buildings.		
Lack of radio communications with construction vehicles in airport movement areas.		
Objects, regardless of whether they are marked or flagged, or activities anywhere on or near an airport that could be distracting, confusing, or alarming to pilots during aircraft operations.		
Water, snow, dirt, debris, or other contaminants that temporarily obscure or derogate the visibility of runway/taxiway marking, lighting, and pavement edges. Any condition or factor that obscures or diminishes the visibility of areas under construction.		
Spillage from vehicles (gasoline, diesel fuel, oil) on active pavement areas, such as runways, taxiways, aprons, and airport roadways.		
Failure to maintain drainage system integrity during construction (for example, no temporary drainage provided when working on a drainage system).		

Item	Action Required (Describe)	No Action Required (Check)
Failure to provide for proper electrical lockout and tagging procedures. At larger airports with multiple maintenance shifts/workers, construction contractors should make provisions for coordinating work on circuits.		
Failure to control dust. Consider limiting the amount of area from which the contractor is allowed to strip turf.		
Exposed wiring that creates an electrocution or fire ignition hazard. Identify and secure wiring, and place it in conduit or bury it.		
Site burning, which can cause possible obscuration.		
Construction work taking place outside of designated work areas and out of phase.		

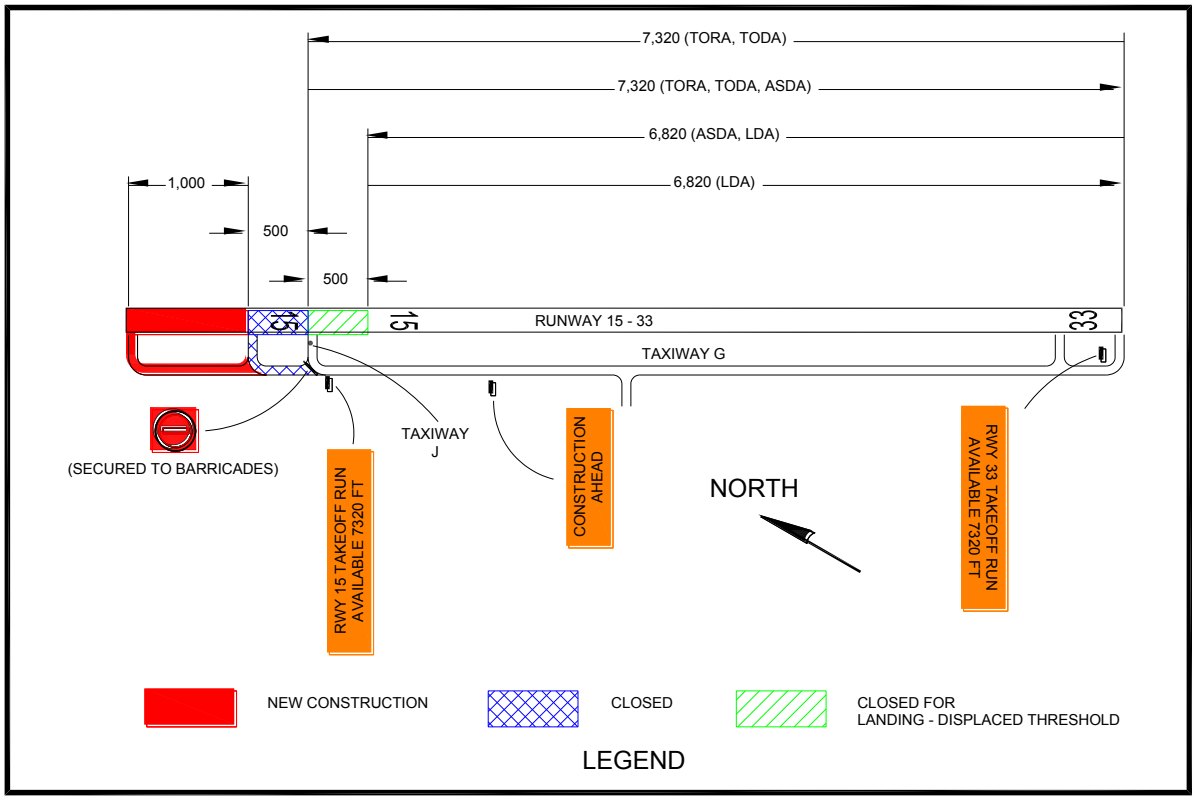
APPENDIX E. SAMPLE OPERATIONAL EFFECTS TABLE

E.1 **Project Description.**

Runway 15-33 is currently 7820 feet long, with a 500 foot stopway on the north end. This project will remove the stopway and extend the runway 1000 feet to the north and 500 feet to the south. Finally, the existing portion of the runway will be repaved. The runway 33 glide slope will be relocated. The new runway 33 localizer has already been installed by FAA Technical Operations and only needs to be switched on. Runway 15 is currently served only by a localizer, which will remain in operation as it will be beyond the future RSA. Appropriate NOTAMS will be issued throughout the project.

E.1.1 During Phase I, the runway 15 threshold will be displaced 1000 feet to keep construction equipment below the approach surface. The start of runway 15 takeoff and the departure end of runway 33 will also be moved 500 feet to protect workers from jet blast. Declared distances for runway 33 will be adjusted to provide the required RSA and applicable departure surface. Excavation near Taxiway G will require its ADG to be reduced from IV to III. See Figure E-1.

Figure E-1. Phase I Example

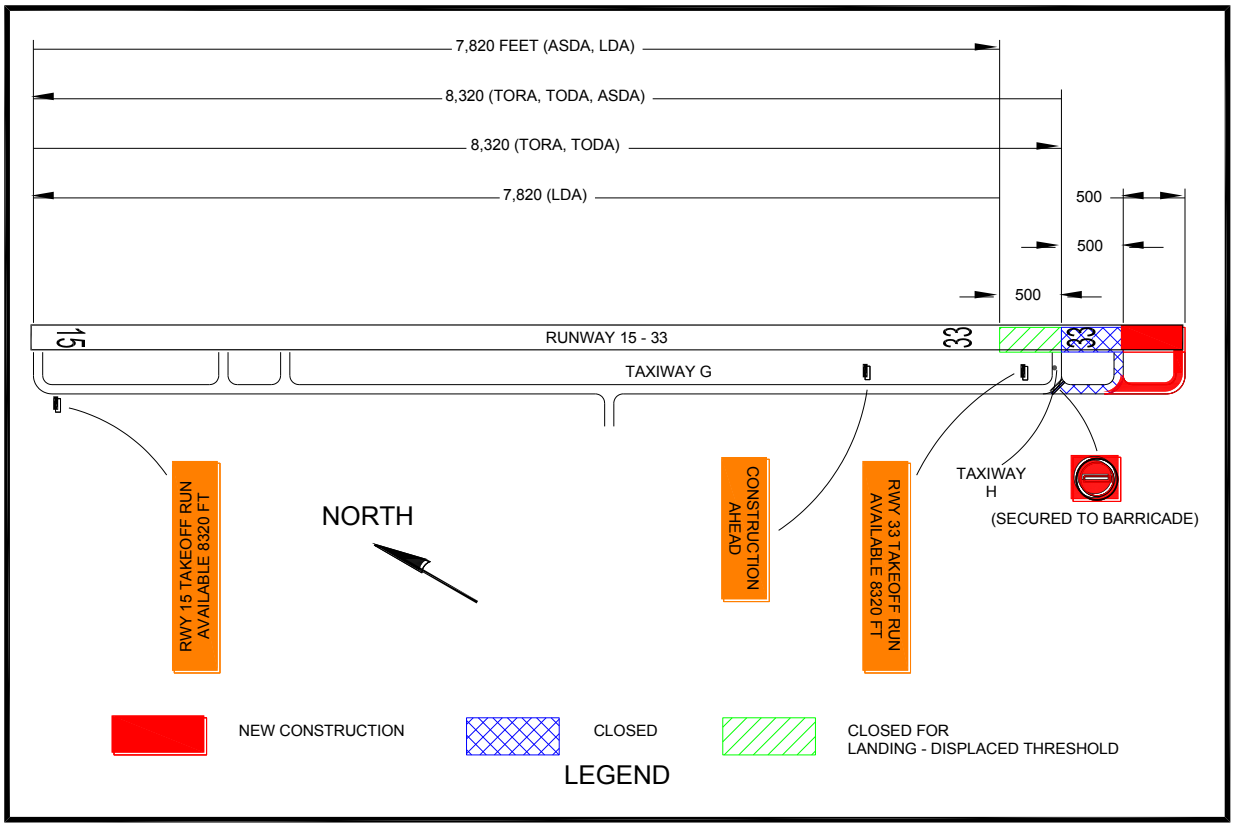


Note 1: Where hold signs are installed on both sides of a taxiway, install the TORA sign on the left side of the taxiway before the final turn to the runway intersection.

Note 2: Based on the declared distances for Runway 33 departures, the maximum equipment height in the construction area is 12.5 feet (500/40 = 12.5).

E.2 During Phase II, the runway 33 threshold will be displaced 1000 feet to keep construction equipment below the approach surface. The start of runway 33 takeoff and the departure end of runway 15 will also be moved 500 feet to protect workers from jet blast. Declared distances for runway 15 will be adjusted to provide the required RSA and applicable departure surface. See Figure E-2.

Figure E-2. Phase II Example



Note 1: Where hold signs are installed on both sides of a taxiway, install the TORA sign on the left side of the taxiway before the final turn to the runway intersection.

Note 2: Based on the declared distances for Runway 15 departures, the maximum equipment height in the construction area is 12.5 feet (500/40 = 12.5).

E.3 During Phase III, the existing portion of the runway will be repaved with Hot Mix Asphalt (HMA) and the runway 33 glide slope will be relocated. Construction will be accomplished between the hours of 8:00 pm and 5:00 am, during which the runway will be closed to operations.

Figure E-3. Phase III Example

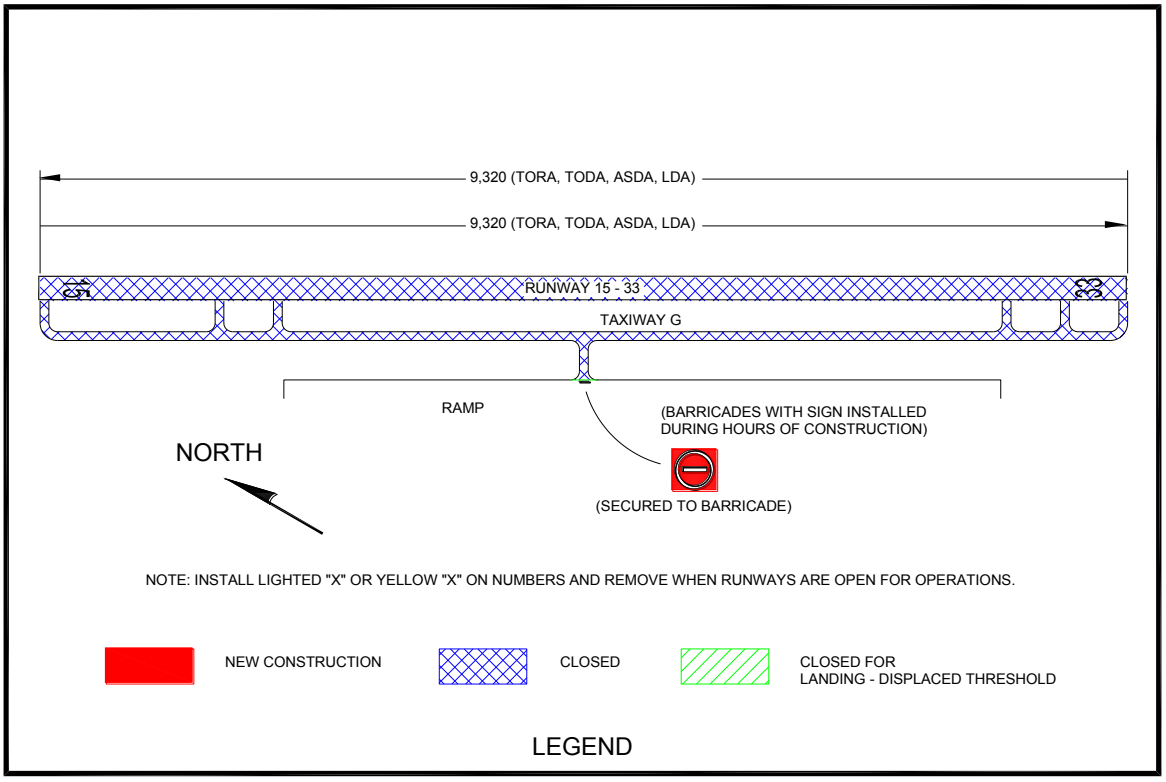


Table E-1. Operational Effects Table

Project	**Runway 15-33 Extension and Repaving**			
Phase	**Normal (Existing)**	**Phase I: Extend Runway 15 End**	**Phase II: Extend Runway 33 End**	**Phase III: Repave Runway**
Scope of Work	N/A	Extend Runway 15-33 1,000 ft on north end with Hot Mix Asphaltic Concrete (HMA).	Extend Runway 15-33 500 ft on south end with Hot Mix Asphaltic Concrete (HMA).	Repave existing runway with HMA Relocate Runway 33 Glide Slope
Effects of Construction Operations	N/A	Existing North 500 ft closed	Existing South 500 ft closed	Runway closed between 8:00 pm and 5:00 am Edge lighting out of service
Construction Phase	N/A	Phase I (Anticipated)	Phase II (Anticipated)	Phase III (Anticipated)
Runway 15 Average Aircraft Operations	Carrier: 52 /day GA: 26 /day Military: 11 /day	Carrier: 40 /day GA: 26 /day Military: 0 /day	Carrier: 45 /day GA: 26 /day Military: 5 /day	Carrier: 45 / day GA: 20 / day Military: 0 /day
Runway 33 Average Aircraft Operations	Carrier: 40 /day GA: 18 /day Military: 10 /day	Carrier: 30 /day GA: 18 /day Military: 0 /day	Carrier: 25 /day GA: 18 /day Military: 5 /day	Carrier: 20 /day GA: 5 /day Military: 0 /day
Runway 15-33 Aircraft Category	C-IV	C-IV	C-IV	C-IV
Runway 15 Approach Visibility Minimums	1 mile	1 mile	1 mile	1 mile
Runway 33 Approach Visibility Minimums	¾ mile	¾ mile	¾ mile	1 mile

Note: Proper coordination with Flight Procedures group is necessary to maintain instrument approach procedures during construction.

Project		Runway 15-33 Extension and Repaving			
Phase		Normal (Existing)	Phase I: Extend Runway 15 End	Phase II: Extend Runway 33 End	Phase III: Repave Runway
Runway 15 Declared Distances	TORA	7,820	7,320	8,320	9,320
	TODA	7,820	7,320	8,320	9,320
	ASDA	7,820	7,320	7,820	9,320
	LDA	7,820	6,820	7,820	9,320
Runway 33 Declared Distances	TORA	7,820	7,320	8,320	9,320
	TODA	7,820	7,320	8,320	9,320
	ASDA	8,320	6,820	8,320	9,320
	LDA	7,820	6,820	7,820	9,320
Runway 15 Approach Procedures		LOC only	LOC only	LOC only	LOC only
		RNAV	RNAV	RNAV	RNAV
		VOR	VOR	VOR	VOR
Runway 33 Approach Procedures		ILS	ILS	ILS	LOC only
		RNAV	RNAV	RNAV	RNAV
		VOR	VOR	VOR	VOR
Runway 15 NAVAIDs		LOC	LOC	LOC	LOC
Runway 33 NAVAIDs		ILS, MALSR	ILS, MALSR	ILS, MALSR	LOC, MALSR
Taxiway G ADG		IV	III	IV	IV
Taxiway G TDG		4	4	4	4
ATCT (hours open)		24 hours	24 hours	24 hours	0500 - 2000
ARFF Index		D	D	D	D

Project	Runway 15-33 Extension and Repaving			
Phase	**Normal (Existing)**	**Phase I: Extend Runway 15 End**	**Phase II: Extend Runway 33 End**	**Phase III: Repave Runway**
Special Conditions	Air National Guard (ANG) military operations	All military aircraft relocated to alternate ANG Base	Some large military aircraft relocated to alternate ANG Base	All military aircraft relocated to alternate ANG Base
Information for NOTAMs		Refer above for applicable declared distances. Taxiway G limited to 118 ft wingspan	Refer above for applicable declared distances.	Refer above for applicable declared distances. Airport closed 2000 – 0500. Runway 15 glide slope OTS.

Note: This table is one example. It may be advantageous to develop a separate table for each project phase and/or to address the operational status of the associated NAVAIDs per construction phase.

Complete the following chart for each phase to determine the area that must be protected along the runway and taxiway edges:

Table E-2. Runway and Taxiway Edge Protection

Runway/Taxiway	Aircraft Approach Category* A, B, C, or D	Airplane Design Group* I, II, III, or IV	Safety Area Width in Feet Divided by 2*

*See AC 150/5300-13 to complete the chart for a specific runway/taxiway.

Complete the following chart for each phase to determine the area that must be protected before the runway threshold:

Table E-3. Protection Prior to Runway Threshold

Runway End Number	Airplane Design Group* I, II, III, or IV	Aircraft Approach Category* A, B, C, or D	Minimum Safety Area Prior to the Threshold*	Minimum Distance to Threshold Based on Required Approach Slope*	
			ft	ft	: 1
			ft	ft	: 1
			ft	ft	: 1
			ft	ft	: 1

*See AC 150/5300-13 to complete the chart for a specific runway.

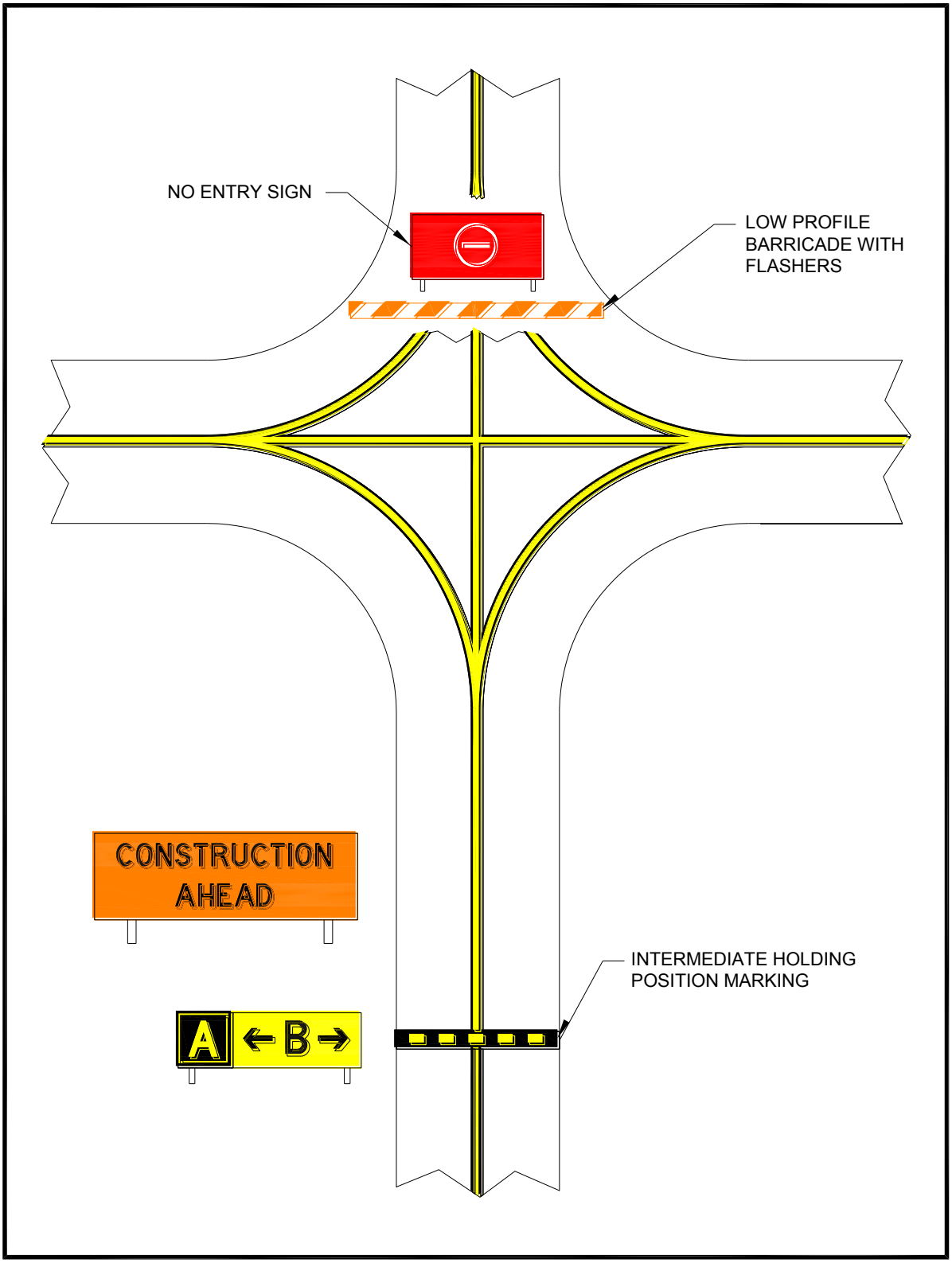
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APPENDIX F. ORANGE CONSTRUCTION SIGNS

Figure F-1. Approved Sign Legends

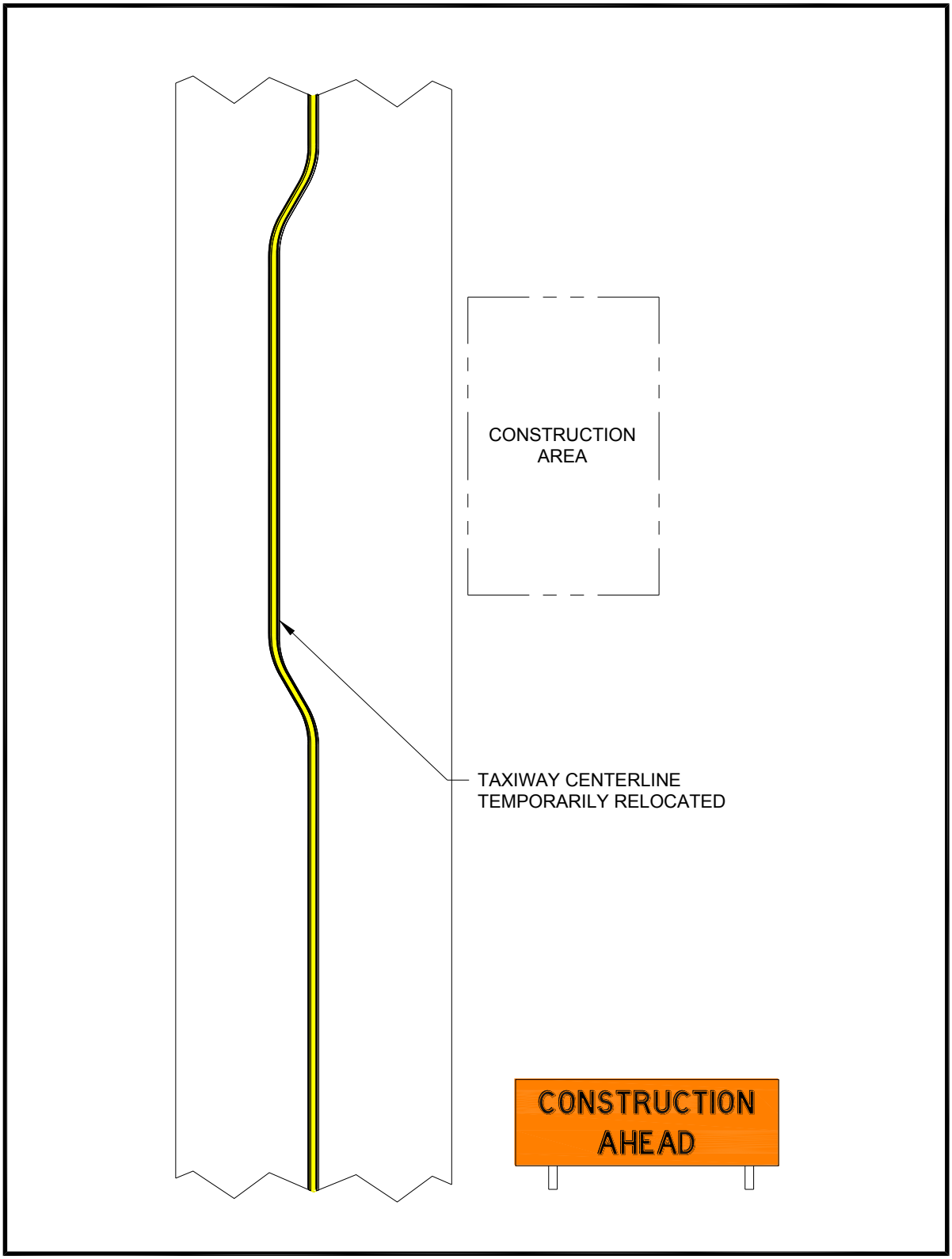


Figure F-2. Orange Construction Sign Example 1



Note: For proper placement of signs, refer to EB 93.

Figure F-3. Orange Construction Sign Example 2



Note: For proper placement of signs, refer to EB 93.

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Advisory Circular Feedback

If you find an error in this AC, have recommendations for improving it, or have suggestions for new items/subjects to be added, you may let us know by (1) mailing this form to Manager, Airport Engineering Division, Federal Aviation Administration ATTN: AAS-100, 800 Independence Avenue SW, Washington DC 20591 or (2) faxing it to the attention of the Office of Airport Safety and Standards at (202) 267-5383.

Subject: AC 150/5370-2G Date: _____

Please check all appropriate line items:

☐ An error (procedural or typographical) has been noted in paragraph _____ on page _____.

☐ Recommend paragraph _____ on page _____ be changed as follows:

_____
_____
_____

☐ In a future change to this AC, please cover the following subject:
(Briefly describe what you want added.)

_____
_____
_____

☐ Other comments:

_____
_____
_____

☐ I would like to discuss the above. Please contact me at (phone number, email address).

_____

Submitted by: _____ Date: _____

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Appendix B

AC 150/5210-24 Airport Foreign Object Debris Management

U.S. Department of Transportation

Federal Aviation Administration

Advisory Circular

Subject: Airport Foreign Object Debris (FOD) Management	**Date:** 9/30/2010 **Initiated by:** AAS-100	**AC No:** 150/5210-24 **Change:**

1. PURPOSE. This advisory circular (AC) provides guidance for developing and managing an airport foreign object debris (FOD) program. In addition, this AC provides specifications for the equipment used in FOD removal operations.

2. SCOPE. The program described herein is composed of four main areas: prevention; detection; removal; and evaluation. Each of the four areas (corresponding to a dedicated chapter in this AC) contains strategies and practices that can help reduce FOD at airports.

The guidance in this AC is particularly applicable to airport owners and operators, air carrier station managers, and general aviation operators. Individuals in these positions may then be able to communicate to apron crews, maintenance technicians, and aircraft servicing personnel the safety hazards posed by FOD.

The FOD management guidelines presented in this AC are advisory and can be implemented at the discretion of the airport operator in accordance with the airport operator's approved Airport Certification Manual.

3. CANCELLATION. AC 150/5380-5B, Debris Hazards at Civil Airports, dated 7/5/96, is canceled.

4. APPLICATION. The Federal Aviation Administration (FAA) recommends the guidance and specifications in this Advisory Circular for developing and managing an airport FOD management program. In general, use of this AC is not mandatory. However, use of this AC is mandatory for the acquisition of FOD removal equipment through the Airport Improvement Program (AIP) or the Passenger Facility Charge (PFC) Program. See Grant Assurance No. 34, Policies, Standards, and Specifications, and PFC Assurance No.9, Standards and Specifications.

5. COMMENTS OR SUGGESTIONS for improvements to this AC should be sent to:

Manager, Airport Engineering Division (AAS-100)
ATTN: FOD MANAGEMENT
Federal Aviation Administration
800 Independence Avenue SW
Washington DC 20591



Michael J. O'Donnell
Director of Airport Safety and Standards

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CHAPTER 1. TERMINOLOGY AND REFERENCES

1.1. DEFINITIONS.

a. Air Operations Area (AOA). All airport areas where aircraft can operate, either under their own power or while in tow. The AOA includes runways, taxiways, apron areas, and all unpaved surfaces within the airport's perimeter fence.

b. Airport Apron (or Ramp). A surface in the AOA where aircraft park and are serviced (refueled, loaded with cargo, and/or boarded by passengers).

c. Clean-as-you-go. The practice of cleaning one's surroundings before, during, and after a shift, especially when working with items that may become FOD.

d. Foreign Object Debris (FOD). Any object, live or not, located in an inappropriate location in the airport environment that has the capacity to injure airport or air carrier personnel and damage aircraft. **NOTE:** *The FAA is cooperating with international aviation organizations in an effort to develop a standard, international definition of FOD. If, and when, such a definition is developed and adopted by the International Civil Aviation Organization (ICAO), that definition will take precedence over the one provided in this AC.*

e. Foreign Object Debris (FOD) Damage. Any damage attributed to a foreign object that can be expressed in physical or economic terms which may or may not downgrade the product's safety or performance characteristics. **NOTE:** *For the purposes of this AC, and to reduce confusion and ensure consistency in language and terminology, "FOD" will only refer to the phrase "foreign object debris."*

f. Hazard. A condition, object or activity with the potential for causing damage, loss, or injury.

g. Manufacturer. The distributor, lessor, or supplier of automated FOD detection equipment. This includes any operator of a FOD removal program that incorporates FOD detection equipment and removal equipment.

1.2. ACRONYMS AND TERMS.

ACM	Airport Certification Manual
AOA	Air Operations Area
FAA	Federal Aviation Administration
FOD	Foreign Object Debris
GSE	Ground Support Equipment
ICAO	International Civil Aviation Organization

NHTSA	National Highway Traffic Safety Administration
SAE	Society of Automotive Engineers
USAF	United States Air Force

1.3. APPLICABLE DOCUMENTS.

The following documents form part of this specification and are applicable to the extent specified.

a. DOT Standards / FAA Orders, Specifications, Drawings, and Advisory Circulars (ACs).

AC 150/5200-5	Wildlife Attractants On or Near Airports
AC 150/5210-5	Painting, Marking, and Lighting of Vehicles Used on an Airport
AC 150/5200-18	Airport Safety Self-Inspection
AC 150/5200-30	Airport Winter Safety and Operations
AC 150/5220-24	Airport Foreign Object Debris (FOD) Detection Equipment
AC 150/5300-13	Airport Design
AC 150/5370-2	Operational Safety on Airports During Construction
AC 150/5380-6	Guidelines and Procedures for Maintenance of Airport Pavements
NHTSA FMVSS 103	Windshield Defrosting and Defogging Systems

b. Industry Publications.

Chaplin, G.	Make it FOD Free: The Ultimate FOD Prevention Program Manual
NAFPI	Foreign Object Debris (FOD) Prevention Guidelines
NAS 412	Foreign Object Damage/Foreign Object Debris (FOD) Prevention
San Antonio International Airport	FOD Prevention Program Manual
SAE 1247	Aircraft Ground Support Equipment — General Requirements
SAE J1503	Performance Test for Air-Conditioned, Heated, and Ventilated Off-Road Self-Propelled Work Machines

c. Sources.

(1) FAA ACs may be obtained from the FAA website at: http://www.faa.gov/regulations_policies/advisory_circulars/

(2) FAA Orders, Specifications, and Drawings may be obtained from: Federal Aviation Administration, ATO-W CM-NAS Documentation, Control Center, 800 Independence Avenue, SW, Washington, DC 20591. Telephone: (202) 548-5256, FAX: (202) 548-5501 and website: http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/atc_facilities/cm/cm_documentation/

(3) NHTSA Standards may be obtained from: NHTSA HQ, 1200 New Jersey Avenue, SE, West Building Washington, DC 20590. Website: www.nhtsa.dot.gov

(4) Industry publications may be obtained from:

(a) National Aerospace FOD Prevention, Inc., Telephone: (800) 363-1121 and website: www.nafpi.com

(b) The FOD Control Corporation, 8987 East Tanque Verde Road, Building 309 - Mail Stop #360, Tucson, Arizona USA, 85749-9399 and website: www.makeitfodfree.com

(c) National Aerospace Standards (NAS), from the Aerospace Industries Association of America, Inc., 15 Inverness Way East, Inglewood, CO 80112 and website: global.ihs.com/?RID=AIA

(d) San Antonio International Airport, 9800 Airport Blvd., San Antonio, TX 78216, Telephone: (210) 207-3475 and website: www.sanantonio.gov

(e) Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096-0001

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CHAPTER 2. INTRODUCTION

2.1. GENERAL.

The presence of FOD on an airport's air operations area (AOA) poses a significant threat to the safety of air travel. FOD has the potential to damage aircraft during critical phases of flight, which can lead to catastrophic loss of life and airframe, and at the very least increased maintenance and operating costs. FOD hazards can be reduced, however, through the implementation of a FOD management program and the effective use of FOD detection and removal equipment.

2.2. FOD FUNDAMENTALS.

a. FOD Hazards. FOD can severely injure airport or air carrier personnel or damage equipment. Types of potential damage include: cutting aircraft tires; being ingested into engines; or becoming lodged in mechanisms affecting flight operations. Personnel injuries or even death can occur when jet blast propels FOD through the airport environment at high velocities.

b. Sources of FOD.

(1) FOD comes from many sources, which complicates efforts to maintain safe airfield operations. FOD can be generated from personnel, airport infrastructure (pavements, lights, and signs), the environment (wildlife, snow, ice) and the equipment operating on the airfield (aircraft, airport operations vehicles, maintenance equipment, fueling trucks, other aircraft servicing equipment, and construction equipment).

(2) FOD can collect both on and below ground support equipment stored or staged on the airport apron, particularly in apron areas. Jet blast can then blow FOD onto personnel or an aircraft. Jet blasts can also create runway FOD when an aircraft transitions from a relatively large-width runway onto a smaller-width taxiway. Outboard engines blow any loose dirt and materials from the shoulder and infield areas onto the runway. Also, the outboard engines of four-engine aircraft can move debris from the runway edge and shoulder areas, where it tends to accumulate, back toward the center of the runway or taxiway.

(3) Helicopters that maneuver over freshly mowed or loose-dirt infield areas can also move FOD onto runways, taxiways, and ramps. In addition, the rotor wash from a helicopter can propel lightweight ground support equipment (GSE) or materials staged nearby.

(4) FOD is often more common when airports begin construction activities. FOD may also be more prevalent in winter conditions, as aging pavement infrastructure may be influenced by weathering (freeze and thaw cycles) and begin to crack or break apart.

(5) Advisory Circular 150/5200-30, Airport Winter Safety and Operations, contains specific guidance on using and removing sand to minimize its chances of becoming FOD in winter weather conditions.

(6) Weather can also be the cause of FOD due to movement. For example, wind can blow dry debris, such as sand or plastic bags, from relatively non-critical areas onto the flight area. Rain water and drainage can stream mud, pebbles and other small items along the path of least resistance. Awareness of weather-related sources of FOD movement helps civil engineers to design barriers and other structures properly.

c. FOD Taxonomy. The exact nature of FOD is also varied. FOD can be composed of any material and can be of any color and size. In a one year airport study (Information Paper on French Study on Automatic FOD Detection Systems – Workshop EUROCONTROL, 9-10 June 2008), over 60% of the collected, known FOD items were made of metal, followed by 18% of the items being made of rubber. Dark-colored items made up nearly 50% of the FOD collected. Typical FOD includes the following:

- aircraft and engine fasteners (nuts, bolts, washers, safety wire, etc.);
- aircraft parts (fuel caps, landing gear fragments, oil sticks, metal sheets, trapdoors, and tire fragments);
- mechanics' tools;
- catering supplies;
- flight line items (nails, personnel badges, pens, pencils, luggage tags, soda cans, etc.);
- apron items (paper and plastic debris from catering and freight pallets, luggage parts, and debris from ramp equipment);
- runway and taxiway materials (concrete and asphalt chunks, rubber joint materials, and paint chips);
- construction debris (pieces of wood, stones, fasteners and miscellaneous metal objects);
- plastic and/or polyethylene materials;
- natural materials (plant fragments, wildlife and volcanic ash); and
- contaminants from winter conditions (snow, ice).

FOD removal operations are not meant to occur when a given area is contaminated with snow or ice. In such winter conditions, the procedures listed in AC 150/5200-30, Airport Winter Safety and Operations, are used to clear the AOA surfaces.

2.3 AN AIRPORT FOD MANAGEMENT PROGRAM

a. Airport Regulatory Requirements.

(1) The need for an airport to manage FOD is based on the requirements outlined in 14 CFR Part 139, Certification of Airports. The presence of FOD in the airport environment is discussed in §139.305.(a).(4), Paved Areas, which states: “Except as provided in paragraph (b) of this section, mud, dirt, sand, loose aggregate, debris, foreign objects, rubber deposits, and other contaminants must be removed promptly and as completely as practicable.” In addition, daily inspections performed at certificated airports (which form the primary means of FOD detection and removal at some airports) are required under §139.327, Self-Inspection Program. Inspections are a key component in airport operations, and an effective self-inspection program enables an airport operator to identify and eliminate unsafe conditions.

(2) Other FAA guidance documents, such as AC 150/5200-18, Airport Safety Self-Inspection, contain detailed information on the Part 139 inspection process, stating that "The inspector should continuously check for, and remove any FOD in movement areas, aircraft parking areas and loading ramps" (reference paragraph 11.g). It should be noted that while Part 139 requirements are mandatory for a holder of a Part 139 Airport Operating Certificate, the regulation contains many safety practices the FAA recommends for use at all airports.

(3) International standards and practices also discuss the issue of FOD in airports. ICAO Annex 14, Aerodrome Design and Operations, Chapter 10.2.1 states, "The surfaces of all movement areas including pavements (runways, taxiways and aprons) and adjacent areas shall be inspected and their conditions monitored regularly as part of an aerodrome preventive and corrective maintenance programme with the objective of avoiding and eliminating any loose objects/debris that might cause damage to aircraft or impair the operation of aircraft systems."

b. Program Areas.

(1) A successful FOD management programs typically contain four main areas, each containing significant elements, as outlined below and in Figure 2-1:

- Prevention
  - Awareness (existence of the FOD program and management support)
  - Training and education (implementation of the FOD program)
  - Maintenance
- Detection
  - Operations (manual inspections and use of detection equipment)
  - Equipment
- Removal
  - Equipment
  - Operations
- Evaluation
  - Data collection and analysis
  - Continuous improvement (trending, feedback, incident investigation)

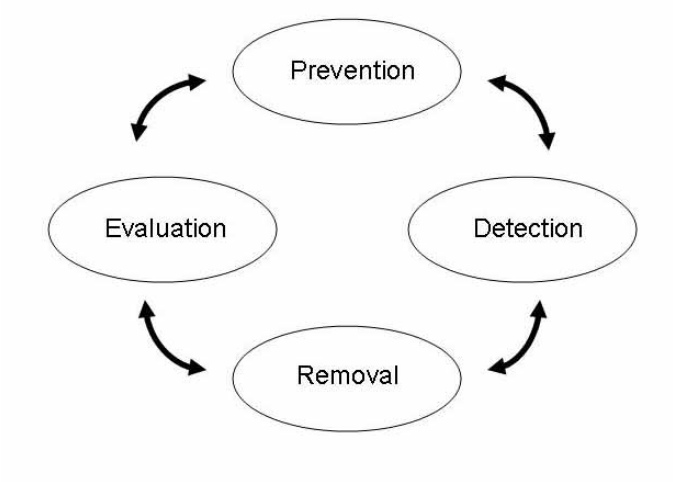


Figure 2-1. Relationship between the four main areas in a FOD program

(2) Practical guidance for FOD managers. FOD managers are encouraged to build upon the guidance provided in this AC when implementing or improving their own programs.

CHAPTER 3. FOD PREVENTION

3.1. AWARENESS.

a. Program Existence and Status.

(1) A first step in implementing a successful FOD management program is making sure that applicable personnel are aware of the program's existence. An airport's FOD management system should be visible in all aspects of the airport operation. Improvements in FOD safety will occur most efficiently if all airport personnel are actively encouraged to identify potential FOD hazards, act to remove observed FOD, and propose solutions to mitigate those hazards. Some examples of organizational communication are:

(a) FOD seminars;

(b) FOD letters, notices and bulletins;

(c) FOD lessons-learned;

(d) FOD bulletin boards, safety reporting drop boxes, and electronic reporting through web sites or email; and

(e) A method to exchange safety-related information with other airport operators through regional offices or professional organizations.

(f) Airport FOD program promotional materials, such as t-shirts, stickers, FOD disposal cans, and smaller give-away items.

(g) FOD discussion at employee staff meetings.

b. FOD Policy and Management Support.

(1) An effective FOD program must also have the full support of management. Management's commitment to FOD prevention should be formally expressed in a statement of the organization's FOD policy. The statement will serve to formally establish the FOD management program. Posting this policy statement in conspicuous locations will help reinforce the organization's commitment to FOD prevention and help remind employees of their FOD management duties. Some key elements of an airport's FOD policy are:

(a) An outline of the methods and processes that the organization will use to achieve desired safety outcomes.

(b) The organization's policy concerning responsibility and accountability.

(2) The FOD Program Manager.

(a) Airport operators should designate an accountable staff member to manage the airport's FOD programs and issues. This designated individual can be a dedicated FOD manager or can have other duties (e.g., operations manger, safety manager, etc.).

(b) The responsibilities of the FOD Manager should be clearly defined along the identified lines of communication within the organization. Additionally, the FOD manager should be allowed to report to the highest levels of management (e.g. airport president, chief executive officer (CEO), etc.) to assure appropriate consideration of all reports, recommendations, and issues.

(c) The FOD manager should regularly communicate the status of the FOD program to airport staff and ensure that lessons learned from hazardous occurrence investigations and case history or experiences, both internally and from other organizations, are distributed widely. An open line of communication should always be available between the FOD Manager and the airport/air carrier staff.

(d) An expanded discussion of the suggested duties and responsibilities of a FOD manager are provided in Appendix A.

(3) The FOD Committee.

(a) A number of airports of varying sizes and complexities have found it helpful to establish a FOD committee. Note: The level of authority or power of the FOD committee will be different for each airport, as it is set by the airport's executive management.

(b) The composition of the committee is under the airport's discretion, but typical committee members include those stakeholders with a direct relationship to FOD (such as those in a position to produce or remove FOD), including: tenant representatives, air carriers, airport operations and public safety staff, and contractor representatives, etc. The FOD manager would typically chair the committee.

(c) One of the most important functions of the FOD committee is to serve as a resource for the FOD manager. In addition, the determination of potentially hazardous FOD situations can be performed by the FOD committee, as well as performing an evaluation of collected FOD data.

c. Safety Culture. An effective FOD management program requires more than the implementation of rules and procedures to be followed. It requires the support of management to establish the attitude, decisions, and methods of operation at the policy-making level that demonstrate the organizations priority to safety. In effective safety cultures, there are clear reporting lines, clearly defined duties and well understood procedures. Personnel fully understand their responsibilities and know what to report, to whom and when. Though it is an intangible aspect of a safety program, proper personal attitudes and corporate commitment enable or facilitate the elimination of unsafe acts and conditions that are the precursors to accidents and incidents.

3.2. TRAINING AND EDUCATION.

a. Audience. Each individual with access to the AOA should understand their role in the prevention of FOD. These personnel include: airport operations; construction; aircraft maintenance and permanent/seasonal servicing staff (e.g. catering, fuel, cabin cleaning, baggage and cargo handling, waste disposal, etc.), and any other contractors. A formal orientation/indoctrination program familiarizing new employees with safety, security, communications, and vehicle operations should include FOD management training. This training can supplement the general FOD awareness incorporated into the driver training curriculum (or training for apron walking privileges) already in place at many airports.

b. Features. The FOD manager provides current information and continual training relating to FOD issues relevant to the specific operation of the airport. The provision of appropriate training to all staff, regardless of their level in the organization, is an indication of management's commitment to an effective FOD management program. FOD training and education programs typically contain the following features:

(1) A documented process to identify training requirements;

(2) A validation process that measures the effectiveness of training;

(3) Recurrent training and education (to help maintain awareness);

(4) Human (and organizational) factors.

c. Training Objectives. The primary objectives of the FOD training program will be to increase employee awareness of the causes and effects of FOD damage and to promote active employee participation in eliminating FOD during performance of daily work routines. The FOD manager should emphasize FOD management through employee motivational programs as well as by conducting training courses to emphasize FOD prevention through efficient design, product discipline, maintenance, and flight line activities. The following subject matter should be included, as applicable, in the FOD manager's FOD prevention program:

(1) Overview of the FOD management program in place at the airport;

(2) Safety of personnel and air carrier passengers;

(3) Causes and principal contributing factors of FOD;

(4) The consequences of ignoring FOD, and/or, the incentives of preventing FOD;

(5) Practicing clean-as-you-go work habits, and the general cleanliness and inspection standards of work areas (including the apron and AOA);

(6) Proper care, use, and stowage of material and component or equipment items used around aircraft while in maintenance or on airport surfaces;

(7) Control of debris in the performance of work assignments (e.g. loose items associated with luggage, ramp equipment, and construction materials);

(8) Control over personal items and equipment;

(9) Proper control/accountability and care of tools and hardware;

(10) Requirements and procedures for regular inspection and cleaning of aircraft and apron areas;

(11) How to report FOD incidents or potential incidents;

(12) Continual vigilance for potential sources of hazardous foreign objects;

(13) FOD Detection procedures, including the proper use of detection technologies (if applicable); and

(14) FOD Removal procedures.

d. Training Documentation. Training requirements and activities should be documented for each area of activity within the organization. To the extent possible, a training file should be developed for each employee, including management, to assist in identifying and tracking employee training, training requirements, and verifying that the personnel have received the planned training. Any training program should be adapted to fit the needs and complexity of the airport in question. At certificated airports, this is already being done for training required by 14 CFR Part 139, Certification of Airports.

3.3. MAINTENANCE PROGRAMS.

a. An airport's FOD prevention program should be tailored to mitigate the particular actions and activities that generate FOD. A few examples of these activities include:

(1) Aircraft Servicing. Air carriers and airport tenants generate much of the FOD found in the airport apron, service roads, baggage makeup areas, and areas near flight kitchens. Agreements between air carriers and their support organizations should specify which of the parties are responsible for cleaning various areas. In addition, the airport can help these organizations to establish procedures to inspect GSE for signs of wear and tear that can lead to FOD hazards. Procedures to inspect the baggage loading and unloading areas every time an aircraft is serviced can also be helpful, as luggage items (such as baggage wheels, zippers, and accessories) are common FOD items found in the airport apron.

(2) Aircraft Maintenance. Account for and dispose of nuts, bolts, washers, safety wire, etc. Account for hand tools used in repair jobs. Aids in the control of these items include checklists, shadow boards, and cut out tool tray liners. All items should be contained in a spill proof tote bag, tray or toolbox.

(3) Air Cargo. In an air cargo area, there is a high potential for blowing debris such as cargo strapping and plastic. Establish procedures to contain such debris, possibly by installing

(and monitoring) fencing where appropriate. Of course, FOD trapped by such fences should be removed regularly.

(4) Construction.

(a) Both airside and landside construction activities, as well as scheduled maintenance, should be communicated to airports users as early as possible. Specific FOD prevention procedures should be established and employed for each construction project. These procedures should be based on the proximity of construction activities to operational areas but in general should stress containment and regular cleanup of construction debris. Airport preconstruction planning should include a means for controlling and containing FOD generated by the construction. This is especially true in high-wind environments where debris is more likely to become airborne. For additional guidance on airport actions during construction activities, please reference AC 150/5370-2, Operational Safety on Airports During Construction.

(b) The designated routes of construction vehicles on the AOA should be examined, so as to avoid or minimize crossings of critical areas of aircraft operations. If high-risk crossings cannot be avoided, subsequent provisions such as an increased frequency of FOD inspections could be implemented. Airport operators should ensure that these provisions are incorporated into their FAA-approved Safety During Construction Plan.

(c) Contractors must fully understand the requirements and penalties incorporated in their contracts regarding the control and removal of FOD. To help ensure this occurs, airport operators may consider drafting standard "FOD Control and Clean-up" related language for all construction projects taking place within the AOA. The standard and project-specific FOD provisions could then be included into the contract documents for AOA construction projects. These items may include:

- Requiring contractors to cover all loads;
- Requiring contractor to secure any lose items that could easily be blown;
- Specifying whether any mechanical FOD removal devices will be required;
- Specifying how monitoring for FOD hazards will be done; and
- Requirements for inspecting tires prior to traversing areas where aircraft are located.

(5) Airfield Maintenance Operations.

(a) Mowing and other maintenance operations routinely disturb the vegetation and soil in areas adjacent to areas traveled by aircraft. Establish procedures to remove debris such as the use of an assigned airfield sweeper or personnel on foot using shovels to repair vegetation and soil.

(b) Airfield lighting, pavement, and marking maintenance operations generate concrete/asphalt debris as well as increase the potential for dropped repair parts, tools, and other items stored on the maintenance vehicles. Corrective procedures should include the use of airfield sweepers and inspection of the work site after the procedures are completed.

(6) Pavements. Asphalt and concrete pavements may be the most common source of FOD on an airport. Therefore, effective pavement maintenance practices are critical to the mitigation of FOD. The FAA has developed extensive resources for pavement maintenance. For further information on this topic, please refer to AC 150/5380-6, Guidelines and Procedures for Maintenance of Airport Pavements, or visit http://www.faa.gov.

CHAPTER 4. FOD DETECTION

4.1. GENERAL.

a. While proper FOD awareness is fundamental for any successful FOD program, the act of detecting FOD is one of the critical FOD operations that occur at an airport. This process involves not only the identification of potential FOD causes and locations, but also the timely detection of any FOD on airport surfaces. Whether detection occurs manually, through regular inspections, as a result of pilot reports, or through the use of advanced detection technologies, the outcome is equally important.

b. Runway Closures.

(1) A highly sensitive question involved in the use of continuously operating FOD detection technologies arises once an object is detected. If the location or characteristics of the FOD present no immediate safety hazard the object should be removed as soon as the operational schedule permits. If the location or characteristics of the FOD present an immediate safety hazard, provisions in the FOD management program should clearly indicate that a hazard exists and allow for an airport supervisor to take action and temporarily cease operations and, in the case of aircraft or airport equipment source of the FOD, notify the equipment operator. This is an appropriate issue, for example, for an airport's FOD committee to study and provide further guidance to airport management and operations staff.

(2) On March 17, 2009, the FAA issued CertAlert 09-06, Closing active runway for FOD checks increases safe operations. In this advisory notice, the FAA stated that although not all types of FOD will necessitate an immediate runway closure, quick and decisive action should be taken, in all cases, to assess the threat posed by reported FOD. The FAA recommends that airports work closely with their Airport Traffic Control facilities in establishing procedures for handling such matters. For those interested, local FAA Airport District or Regional Offices can provide sample Letters of Agreement that address these types of situations and that have been successfully implemented at high activity air carrier airports.

4.2. FOD RISK ASSESSMENT.

A FOD risk assessment enables an airport to determine where unsafe FOD conditions exist. However, since the risk assessment process is an integral part of an airport's Safety Management System (SMS) program, and the FAA does not require airports to have an SMS program, the risk assessment process will not be discussed at this time. If, or when, airports are required to have an SMS program in the future, this AC will be updated to reflect the appropriate risk assessment procedures.

4.3. FOD DETECTION OPERATIONS

a. Inspection Areas. While detailed inspection guidance is provided in AC 150/5200-18, Airport Safety Self-Inspection, additional information can be helpful for airport personnel conducting FOD inspections. The following areas and operations are typically prone to having FOD:

(1) Movement Areas (runways and taxiways).

(a) The portion of the runway used by aircraft to take off is where departing aircraft are most susceptible to FOD damage.

(b) Deteriorating or neglected pavement can exhibit spalling or cracks. For example, pieces of concrete can break loose from pavements or FOD can develop from fatigue corner cracks and airfield markings. FOD associated with building materials, debris falling from construction vehicles or blown from the airport apron onto aircraft maneuvering areas. Broken pieces of pavement can collect at the edge of the airport apron and be carried onto the aircraft maneuvering area by the tires of vehicular GSE.

(c) Service roads that cross taxiways should be monitored closely to prevent the vehicles using these roads from moving FOD onto the taxiways (especially in the case of construction operations, as addressed in the airport's Safety During Construction Plan).

(d) Shoulders. Unpaved areas adjacent to pavement should be stabilized to prevent FOD. (AC 150/5300-13, Airport Design, provides further guidance in the construction of stabilized shoulders.)

(e) Pavement Joints. Special attention should be paid to the cleaning of cracks and pavement joints as tests have shown that these are the main sources of foreign objects which are ingested.

(f) Turf Areas. Turf grass and ditches collect and hold large amounts of light debris such as paper, cardboard, plastic, and various containers that trash often originate in terminal aprons, cargo ramps, and hangar ramps. This trash can blow back into areas traveled by aircraft unless collected in a timely manner.

(g) Fence-lines. Fences can collect trash on windy days. This FOD should be collected before the wind increases or shifts direction and the trash blows back on to areas traveled by aircraft.

(2) Airport Apron. Anywhere on the aircraft apron where ground vehicles operate.

(3) Aircraft Servicing Operations.

(a) Refueling, catering, cabin cleaning, and baggage and cargo handling can produce broken materials.

(b) Baggage pieces, including bag tags and wheels, can break off luggage and either fall onto the apron or collect in the door sill. Items collected in the door sill can damage the door or prevent it from properly closing. They can also be knocked out of the sills and onto the apron at the next station.

(c) Other areas where FOD is likely to collect include the ground at both ends of the conveyor, and the area between the baggage cart and the conveyor belt.

(4) Air Cargo Operations.

(a) High potential for blowing debris such as plastic cargo wrappers.

(b) Fencing used to contain debris should be cleaned regularly.

(5) Construction Operations.

(a) The proximity of construction activities to operational areas presents a risk of debris.

(b) Regular and thorough cleaning of the construction site, including the construction haul routes, is expected. These provisions are typically outlined in local rules and pre-existing agreements, such as the construction safety plan. Particular attention should be paid to construction vehicle routes that cross or are adjacent to active pavements.

(6) Aircraft Maintenance Activities.

(a) These activities, which may be performed on the apron, require a variety of small objects, such as rivets, safety wire, and bolts that become FOD when they are inadvertently left behind.

(b) All tools should be accounted for as a matter of practice. Aids in the control of these items include checklists, shadow boards, and cut out tool tray liners. For more information on an effective tool control program, please see NAS 412, Tool Accountability.

(7) Other activities. All vehicles should be driven on clean, paved surfaces when possible. If a vehicle must be driven on unpaved surfaces, the operator should check the vehicle tires for foreign objects immediately after returning to the pavement.

b. Methods and Techniques.

(1) The FAA and ICAO require a daily, daylight inspection of aircraft operating areas. Operational areas must be inspected at least once each day, with additional inspections being made in construction areas and immediately after any aircraft or ground vehicle accident or incident or any spill of material which may cause slippery conditions. In addition to performing these inspections at the beginning of the day or shift, personnel in the AOA should practice a clean-as-you-go technique of looking for FOD during their normal shifts in the course of their regular duties. Inspections occurring at night, taking place after the runway is closed or before the runway is opened, also occur frequently. During night time inspections, personnel and vehicles should be equipped with additional lights/lighting systems to better detect FOD.

(2) Detection Technologies.

(a) Recent technological developments have greatly expanded the capabilities of FOD detection through automation. Advanced technologies are now available for improved FOD detection, including capabilities for continuous detection on runways and other aircraft movement areas and mobile detection devices to supplement the capabilities of airport personnel.

If an airport chooses to implement these new FOD detection technologies, they should ensure that the personnel monitoring these systems either have the authority (or the ability to quickly contact those in authority) to take appropriate and timely action if FOD is detected. Please see AC 150/5220-24, Airport FOD Detection Equipment, for more detailed information on the performance capabilities of advanced FOD detection technologies.

(b) FOD Detection Notification. The airport operator and air carriers have considerable flexibility in terms of how to implement continuous detection systems at the airport. The user interface may be located in the airport's operation or maintenance center, or it may be located in the airport traffic control (ATC) tower. Regardless of the configuration, an airport will determine the most efficient way to notify airport/air carrier personnel to remove the detected FOD, as well as the ATC staff to divert aircraft if a significant risk is presented.

(c) Wildlife. There are currently no uniform standards or procedures for the detection of wildlife on an airport. However, anecdotal evidence suggest that dead wildlife are more appropriately handled as a component of a FOD management program, while live wildlife are a component of a wildlife hazard management program. An overlap of these two programs therefore occurs whenever wildlife are struck by aircraft and/or their remains serve as an attractant to other wildlife. In addition, elements of certain wildlife programs can create FOD, e.g. the introduction of cracker shell casings. Certificated airports (under 14 CFR Part 139) and airports that have a Wildlife Hazard Assessment Plan may therefore need to review their plan as it relates to the airport's FOD program.

(3) Manual Detection.

(a) When conducting an inspection on a runway, inspection techniques will be determined by runway availability and type of operation. Ongoing construction requires more frequent inspections. It may even be necessary to assign dedicated personnel to continually inspect for FOD during major construction activities. As part of the FOD management program, the FOD manager may find it appropriate to reach out to air carriers and flight crews to leverage the airport's current FOD management efforts. For example, flight crews could be asked to report to ATC and station operations any FOD they observe on runways and taxiways. Air carrier and aircraft handling agents may also be asked to designate individuals to inspect apron areas prior to aircraft movement to and from the gate.

(b) A runway inspection will involve passage along the length of the runway to observe and remove FOD. The most effective method involves two or more passages to reduce the width of the inspection zone. When there is time to do only one pass on the runway, inspection personnel, whenever practical, should drive in the opposite direction that aircraft are landing on the runway with high intensity flashing beacon and headlights on at all times. This practice will enable self-inspection personnel to see approaching aircraft and improve visibility of the vehicle to pilots. Inspection personnel should also drive the stub taxiways between the runway and parallel taxiway because these areas are commonly overlooked.

(c) Encouraging the participation of airport tenants in inspections will reinforce the concept that FOD prevention is a team effort and demonstrate the airport operator's commitment to a debris-free environment. As such, air carrier personnel, when feasible, should join the

airport staff in daily movement area inspections. This practice helps increase familiarity with local airfield conditions, and promotes effective communication between the airport and air carriers. The placement of convenient and conspicuous FOD containers (as described in Paragraph 5.2 of this AC) is a helpful reminder of the need to be vigilant in preventing the occurrence of FOD.

(i) An effective and clever operation currently in place at airports is the promotion of all-hands "FOD walks." These walks are typically conducted as part of an airport's FOD management campaign. Walks involve the coordination and invitation of airport and air carrier staff (e.g. ground handling agents, air carriers, Aircraft Rescue and Fire Fighting (ARFF) and apron personnel), external partners, and other community volunteers to participate in manually collecting airport FOD. These events can be promoted with offering food and water to participants, and various prizes (i.e. airport clothing) to those who collect the most FOD. Of note, during this type of event, identifying the location and origin of FOD (for data analysis and evaluation) is not always possible.

(d) For further guidance on the performance of airport inspections, please see AC 150/5200-18, Airport Safety Self-Inspection.

4.4. FOD DETECTION EQUIPMENT.

The standards and specifications found in AC 150/5220 24, Airport Foreign Object Debris (FOD) Detection Equipment, represent the FAA guidance for the evaluation and procurement of FOD detection systems.

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CHAPTER 5. FOD REMOVAL

5.1. BACKGROUND.

Once FOD is detected, the next major operation of a FOD management program will occur: removing FOD from the airport environment. The most effective resource for FOD removal is the use of FOD removal equipment, especially in areas where FOD can be expected, such as near areas of construction. For removal of an isolated FOD object detected on a runway, manual removal will be the most efficient. Although specialized equipment is available and highly suited to some airport operations, FOD removal methodologies and technologies are available for all airports.

5.2. EQUIPMENT CHARACTERISTICS.

This AC does not limit the equipment that airports may use for FOD removal. Currently available removal equipment can be categorized into two types: mechanical and non-mechanical. Additionally, the category of storage systems (FOD containers) is also of fundamental importance.

a. Mechanical Systems. These technologies use powered devices in mechanical systems that remove or retrieve FOD items and contain retrieved FOD for proper disposition. Equipment in this category varies in size, and is found in sizes from small push units to large area systems that are truck mounted. Types of mechanical removal systems include:

(1) Power Sweepers, including tow-behind bristle trailers. The sweeper removes debris from cracks and pavement joints, and is typically used in all areas of the AOA including areas where GSE are staged. **NOTE:** *For all brush systems, operators are cautioned that bristles can detach from brooms and produce a FOD source. Brushes made with metal bristles or spines are not recommended to be used for FOD removal purposes. Plastic or combination plastic/metal bristles may be appropriate, but the user should consult the equipment manufacturer for specific recommendations. Regardless of the equipment used, a thorough check of the pavement should be conducted at the conclusion of the sweeping procedure.*

(2) Vacuum Systems. These systems perform FOD removal functions similar to the power sweepers described above, but use air flow as the primary means of object retrieval. The systems may also perform in conjunction with mechanical brooms or other recirculating air units.

(3) Jet Air Blowers. These systems move FOD and other debris by directing a stream of high velocity air towards the pavement surface. When used in the airport environment, it is recommended that these systems incorporate a debris collection mechanism so that FOD will not simply be relocated to another area in the AOA.

b. Non-Mechanical Systems.

(1) Friction Mat Sweepers. A rectangular assembly towed behind a vehicle that employs a series of bristle brushes and friction to sweep FOD into sets of capture scoops, which are covered by a retaining mesh to hold collected debris.

(2) Magnetic Bars (attached to vehicles). These bars can be suspended beneath tugs and trucks to pick up metallic material. However, the bars should be cleaned regularly to prevent them from dropping the collected debris. Vehicles operation in the AOA should be inspected periodically to ensure that they have no loose items that can fall off. Common magnetic materials include ceramic, rare earth, and alnico metals. Conversely, magnetic bars are not able to pick up the following types of common FOD materials: titanium and aluminum alloys, some stainless steels, and plastics.

(3) Rumble strips (also "FOD Shakers"). Long devices, which are 10 to 15 ft (3 to 4.60 m) long, that are positioned on the pavement to dislodge FOD from vehicles that drive over them. While these devices may have been used in the past, they are no longer a widely accepted FOD removal system. Their effectiveness at removing debris from tires or vehicle undercarriages is negligible, and the equipment can generate its own FOD if not cleaned out regularly. The current best practice for removing FOD from tires is to stop a vehicle at a designated checkpoint, perform a visual inspection, and then use a hand tool to manually remove detected debris.

c. Storage Systems (FOD Containers).

(1) Designated FOD containers should be conspicuously placed at all gates for the collection of debris. The containers should be well marked, properly secured, and emptied frequently to prevent them from overflowing and becoming a source of FOD themselves. In addition, airport personnel can wear waist pouches to collect debris.

(2) "Closed-type" containers are preferable, given the opportunity for wind to dislodge the container contents. Consequently, "open-type" containers are not advised. Airport operators should ensure that FOD containers do not blow over during periods of high winds. This can be accomplished by using heavy trash cans or securing the containers to the ground with a tether or a weight. FOD containers should also have placards stating that hazardous materials may not be deposited in them.

(3) Locations. Suggested locations include: near all entry points to the AOA, in hangars, in aircraft tie-down and aircraft maintenance areas, and at each aircraft gate or baggage area. Central or well-known storage locations increase the likelihood that collected debris will be deposited by personnel.

(4) Other means for containing FOD include: wind barriers and netting to restrict movement of airborne FOD; fencing to prevent animals from entering the airfield; and well-maintained paved surfaces. If damaged pavement cannot be repaired immediately, airport operators should make arrangements for aircraft to take an alternate route.

(5) Evaluating the debris collected in containers and pouches can reveal its sources and indicate where personnel and equipment should be deployed for more effective control. Chapter six of this AC will provide more information on this practice.

5.3. PERFORMANCE.

a. Operational Standards. Unless otherwise specified, the following standards apply only to "mechanical" FOD removal systems.

(1) Operational Speeds. The minimum speeds that FOD removal equipment should operate and collect 90% of FOD (based on the "test/validation objects described in paragraph 5.3.b) is 15 mph (25 km/h). Maximum speeds are limited by airport operations regulations. (Mechanical and non-mechanical systems)

(2) Collection Path.

(a) The minimum path for a removal system used during airport operations is 60 in (150 cm) wide.

(b) Systems that are used on the airport apron or designed to be mounted on existing airport operations vehicles must have a minimum path 40 in (100 cm) wide.

(c) Magnets must be at least 36 in (90 cm) long and 4 in (10 cm) wide. (Mechanical and non-mechanical systems)

(3) Retention / Hopper Capacity.

(a) The minimum usable capacity of a power sweeper used during airport operations is 40 cu ft (1 cu m).

(b) For systems mounted on airport operations vehicles, the volume of the truck bed will represent the retention capacity.

b. Testing / Validation.

(1) All FOD removal equipment must be able to demonstrate the ability to collect 90 percent of the items listed in paragraph below, when they are placed in a 10 ft x 10 ft (3 m x 3 m) square on the pavement surface, on one pass of the equipment at a minimum speed of 15 mph (25 km/h). Where specific dimensions and weights are not provided, the purchaser will determine the object properties most characteristic of those found on their airport.

(2) Test / Validation Objects.

- A metal cylinder measuring 1.2 in (3.1 cm) high and 1.5 in (3.8 cm) in diameter (both ferrous (i.e., magnetic) or non-ferrous metals are acceptable),
- A sphere, measuring 1.7 in (4.3 cm) in diameter (i.e., a standard size golf ball),
- A "chunk" of asphalt or concrete,
- Any portion of a runway light fixture (in-pavement or edge light),
- A wrench (up to 8 in. (20 cm) in length),
- A socket (at least 2 in. (5 cm) in length),
- A piece of rubber from an aircraft tire,

- A distorted metal strip (up to 8 in. (20 cm) in length),
- Fuel cap (aircraft or automotive),
- Lug nut,
- Hydraulic line (from aircraft or GSE, up to 8 in. (20 cm) in length), and
- Aircraft fasteners and safety wire.

(3) Further testing requirements are contained in Appendix B, Section B.3, of this document.

c. Additional Standards. Additional FOD removal system standards are located in Appendix C.

5.4. REMOVAL OPERATIONS.

a. Individuals responsible for FOD removal operations should have direct responsibility for the safety of those operations and should be given the resources to implement the necessary controls.

b. The majority of FOD removal operations are performed in conjunction with the detection operations described in paragraph 4.2 of this AC. While the exact actions are specific to each airport, the following two examples of FOD removal operations from a high activity air carrier airport in the U.S. represent the successful implementation of FOD removal equipment:

(1) Assigning an airfield sweeper(s) to work with maintenance crews and/or respond as required to reports of FOD.

(2) Deploying a maintenance employee on a small all-terrain vehicle with a litter stick and garbage bags to pick up trash in grassy areas and fence-lines. This operation is intended to pick up debris before it returns to the pavement areas. In one year, over 2,898 bags of trash were collected using this method.

c. The equipment described in this chapter may be used singularly or in combination. In either case, FOD managers are cautioned that personnel using particular FOD removal equipment may become complacent and completely rely on the equipment to remove all pieces of FOD in their area of operation. Personnel must be constantly aware of the performance of their equipment, and should regularly check to make sure visually detected FOD is in fact collected by their equipment during FOD removal operations.

CHAPTER 6. FOD EVALUATION

6.1. DATA COLLECTION AND ANALYSIS.

a. A critical part of any FOD management system is the information available for problem assessment and management program design. Although anecdotal information on FOD collected at airports is available, no comprehensive assessment of FOD types and sources is possible unless a comprehensive data collection and analysis scheme is in place.

b. Documentation. The FOD manager will ultimately determine the documentation guidelines in a FOD management program. Certain small items, such as plastic wrappers or baggage tags, may simply warrant efficient collection and disposal. A consistent trend of small items, such as those coming from a particular entity or operation, or particularly large or hazardous FOD, may require detailed documentation for effective analysis and prevention efforts. It is recommended that airport personnel collect the following information, to the extent practicable, whenever FOD is collected:

(1) How the FOD object was detected

(2) Date and time of FOD detection and retrieval

(3) Description of FOD retrieved (category, size, color), and/or image (if available)

(4) Location of FOD object (coordinates and reference to the AOA location)

(5) Possible source

(6) Name of personnel detecting / investigating FOD item

(7) Airport operations and weather data during the FOD detection event

c. Reporting.

(1) Depending on the volume or significance of collected FOD, the FOD manager may decide that it is necessary to designate and train certain personnel to collect, tag, store, and report on the collected FOD for future data analysis efforts. An additional communication procedure may also need to be established, so that the person who first collects the FOD will notify the person responsible for reporting the FOD. In any case, a well-defined reporting procedure is an important aspect of any FOD management program.

(2) The FOD management program should include a visible FOD reporting system supported by management. The reporting system should permit feedback from personnel regarding FOD hazards and other safety-related concerns. The FOD management system should use this information to identify and address operational or administrative deficiencies.

(3) Depending on the potential hazard of FOD collected, a reoccurrence of FOD from the same source, and the personnel available at an airport, the FOD management program may

contain provisions to notify the FOD source of a FOD occurrence. Operational experience from at least one airport has shown that notifying the source of FOD helped to correct the underlying safety deficiencies that caused multiple FOD events.

d. Investigation. It is recommended that major FOD incidents (as determined or classified by the airport operator) are investigated by the FOD manager or other appropriate airport personnel. An investigation should try to determine the source of FOD and damage caused. When the investigation is completed and necessary corrective action has been implemented in accordance with the FOD management plan, final disposition of the incident should be entered into the airport's FOD reporting system.

e. Database. It is important that the organization maintain a record of the measures taken to fulfill the objectives of the FOD management system. These records may be required in the event of a formal investigation of an accident or serious incident, and can also be used to identify any trends, repeats, unusual conditions, etc., in order for corrective action to be initiated. Records can also provide quantitative data for future risk assessments, support the assessment of system operational history and assure operational capabilities. The disposition of reported information will be based on the airport's FOD management program specifications and support §139.327 certification. All records should be maintained in sufficient detail for a period of at least 2 years to ensure traceability of all significant safety-related decisions. The FAA is currently developing the framework for a national FOD database. Airport's collecting high-quality FOD data (showing at least the type, location, and source), are encouraged to submit their data to FAA once the national database is in operation.

6.2. CONTINUOUS PROGRAM IMPROVEMENT.

a. Safety performance monitoring validates the FOD management program, confirming the organization's safety objectives. Through regular review and evaluation, management can pursue continuous improvements in FOD management and may revise safety objectives, policies, procedures, and training programs to ensure that the FOD management program remains effective and relevant to the organization's operation.

b. The FOD Manager, in assessing the effectiveness of the FOD management program, should work with the persons that have direct responsibility for analyzing hazards, identifying control measures derived from that analysis, and ensuring those measures are effective.

c. Program Evaluation. These evaluations provide a means for systematically assessing how well the organization is meeting its FOD management objectives. The evaluation provides a review of existing conditions and results in recommendations for enhanced debris control. Management may choose to have an external organization evaluate the system (e.g., by a consultant or another airport operator), or choose to perform the evaluation using airport/air carrier staff. In addition to supporting the airport operator's existing responsibilities for self-inspection and correction of discrepancies under 14 CFR Part 139, an effective airport FOD management program evaluation should:

(1) Systematically review the effectiveness of existing FOD-management procedures used by airport and air carrier personnel, including all available feedback from daily self-inspections, assessments, reports, and other safety audits:

(2) Verify that the airport is meeting identified performance indicators and targets;

(3) Solicit input through a FOD system;

(4) Communicate findings to staff and implement agreed-upon corrective procedures, mitigation strategies, and enhanced training programs; and

(5) Promote safety in the overall operation of the airport by improving coordination between airport staff, air carrier personnel, and airport tenants.

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APPENDIX A: SUGGESTED DUTIES AND RESPONSIBILITIES OF THE FOD MANAGER

The information presented in this section represents only one of many potential approaches to designating the duties and responsibilities of a FOD Manager. Airports should select/modify any items that would be most appropriate for their situation when developing their FOD program.

A.1. GENERAL. Where appropriate, the airport operator should designate a FOD Manager(s) that will develop and implement plans and programs to prevent, detect, and remove FOD on an airport. The FOD Program Manager may be a dedicated position, but will more likely than not be an additional role assigned to someone currently serving in the airport operations staff. The FOD Manager(s) should be appointed by an Airport executive, or executive of the commercial business operating at the airport, and should have sufficient authority and organizational freedom to identify and implement FOD preventive measures whenever and wherever required.

A.2. THE FOD MANAGER should:

a. Review and assess the airport's FOD management program and make necessary revisions.

b. Conduct scheduled and unscheduled evaluations/inspections of work areas to assess the effectiveness of the FOD management program.

c. Assure implementation of corrective actions for FOD prevention.

d. Assure that FOD incidents are thoroughly investigated and that incident reports are accomplished as specified in paragraph 6.1 of this AC.

e. Assure that causes of FOD incidents are thoroughly analyzed to identify corrective measures.

f. Notify affected contractor/tenant organizations and personnel of unique FOD prevention requirements.

g. Develop techniques and assign responsibilities for publication of special FOD prevention instructions.

h. Review results of the FOD incident investigations and evaluate the adequacy of corrective actions.

i. Evaluate the amount and kind of foreign objects found and how they were found (e.g. during daily inspections, by pilots, airport operations staff, etc.).

j. Review and approve FOD prevention training curricula, designate training personnel, and assure that airport/contractor/tenant personnel receive required training.

k. Assure that written procedures provide for adequate records attesting to the current status and adequacy of the FOD management program.

l. Manage any additional program activities, including the scheduling of the FOD committee meetings, as required.

APPENDIX B: FOD REMOVAL EQUIPMENT: ADDITIONAL STANDARDS

B.1 DESIGN STANDARDS.

a. General.

(1) Total Life. FOD removal systems must be designed to perform their intended function for their "total life" period, when maintained according to the manufacturer's instructions. The "total life" for which the equipment is designed, assuming it is used and maintained in accordance with the manufacturer's recommendations, must be a minimum of:

(a) 20 years, or 200,000 miles (322,000 km), for mechanical systems, excluding consumable parts (e.g. bristles, brooms, and other portions of the collection mechanism)

(b) 10 years, or 10,000 miles (16,000 km), for friction mat sweeper equipment and towing hardware. The consumable portions of the system (e.g. friction mat), must be capable of operating for at least 2,000 miles (3,000 km) before replacement is needed.

(c) 30 years for all other non-mechanical systems.

(2) Environmental. FOD removal equipment, including all associated outdoor mounted equipment, must be designed to withstand the following climatic conditions and operate without damage or failure:

(a) Weather

(i) Ambient temperature range: 32 degrees F (0 degrees C) to 123 degrees F (52 degrees C) ambient outdoor air temperature (may be modified by the purchaser if the device is to be used in extreme climates)

(ii) Relative Humidity: 5% to 90% (may be modified by the purchaser if the device is to be used in extreme climates)

(iii) General Environment: Dust and airborne hydrocarbons resulting from jet fuel fumes.

(b) Components must be protected from mechanical, electrical, and corrosion damage causing impairment of operation due to rain, snow, ice, sand, grit, and deicing fluids.

(c) All electric motors, controls, and electrical wiring / equipment placed outdoors must be weatherproof in order to protect the equipment and connections from the elements.

(d) All non-moving structural components and materials must be individually and collectively designed and selected to serve the total life requirement under such conditions. Moving or working components, such as tires, motors, brakes, etc. are exempt from this provision.

b. Safety.

The device must meet the requirements of SAE ARP1247, paragraph 3.8.

(1) Personnel Safety. The device must meet the requirements of SAE ARP1247, paragraph 3.9, except as provided below.

(a) If highway transportability, defined as the capability (of a self-propelled device) to be licensed for operation on public highways, is not specified by the purchaser, the provisions of SAE ARP1247, paragraph 3.9.1 do not apply.

(b) If the device is not self-propelled, the provisions of SAE ARP1247, paragraphs 3.9.2 through 3.9.4 do not apply.

(c) Noise and Vibration. The device must meet the requirements of FAA HF-STD-001, paragraph 13.5 (Noise) and MIL-STD-1472F, paragraph 5.8.4 (Vibration). The unit must be designed and constructed to prevent parts from working loose in service. It must be built to withstand the stresses, jars, vibrations, and other conditions incident to shipping, storage, installation, and service. Suitable and durable vibration isolators must be used between the engine and structural mounts and to include all other structural mountings to protect the operator, instruments, components, hydraulics, and structure from vibration transmission.

(2) Equipment Safety. The device must meet the requirements of SAE ARP1247, paragraph 3.10. For any device not completely manually operated, a 5 lb (2 kg) BC-rated fire extinguisher must be mounted on the device at a location easily accessible to the operator.

(3) Emergency Operations. The device must meet the requirements of 49 CFR §38.23(b)(3)) and SAE ARP1247, paragraph 3.9.11. Where there is a conflict with the two documents, the DOT regulations take precedence.

(a) Power or Equipment Failure. The device must meet the requirements of 49 CFR §38.23(b)(4)).

(4) Storage / Security. All requirements needed to properly store and secure the device must be supplied by the manufacturer.

c. Engines and Related Equipment.

(1) General. The vehicle must have a commercially-produced engine that is certified to comply with the Environmental Protection Agency (EPA) and state laws for off-highway emission requirements at the time of manufacture. The engine and transmission must operate efficiently and without detrimental effect to any drive train components when lubricated with standard, commercially available lubricants in keeping with the recommendations of the engine and transmission manufacturers.

(2) Acceleration. The fully loaded vehicle will accelerate from 0 to 50 miles per hour (mph) on a level paved road within 30 seconds.

(3) Altitude. Where justified, the vehicle will be designed for operation at 2,000 feet above sea level.

(4) Indicators. Engines used to drive systems, other than the vehicle propulsion system, must be equipped with a tachometer (green-lined within the correct operating RPM range and red-lined above this range) or automatically governed to prevent over-revving.

(5) Engine Cooling System. Liquid coolant systems must be rated for the maximum engine loads under the environmental conditions specified by the airport, or at the conditions of maximum intermittent output approved by the engine manufacturer, whichever criterion results in the largest heat transfer capacity. A label will be installed near the engine coolant reservoir reading "Engine Coolant Fill."

(6) Fuel System.

(a) Gasoline powered engines must meet all performance requirements without requiring premium grades of fuel. Diesel powered engines must be certified for aviation turbine fuel. LPG engines must be certified for (Natural Gas Producers Association) HD-5 motor fuel.

(b) Alternative fuels, such as bio-diesel, clean diesel, gaseous fuels (natural gas and liquid petroleum gas), alcohols (methanol and ethanol), Jet A, and reformulated gasoline may also be used. Equipment modifications to allow the use of such fuels must conform to manufacturer specifications.

(c) Fuel filters. Primary and secondary fuel filters will be provided. Fuel filter elements will be easily replaceable by a mechanic without loss of engine prime.

(d) Fuel tank. The fuel tank will have a fill opening readily accessible to personnel standing on the ground and designed to prevent fuel splash while refueling. Each tank will be located and mounted so as to provide maximum protection from damage, exhaust heat, and ground fires. If more than one tank is furnished, means will be provided to assure equalized fuel level in both tanks. An overturn fuel valve will be provided for each tank to prevent spillage in the event of a rollover. Each fuel tank must be prominently labeled with the type of fuel used in the engine.

(7) Exhaust System. The exhaust system will be constructed of high grade rust resistant materials and protected from damage resulting from FOD impact. Exhaust system outlet(s) will be directed upward or to the rear, away from personnel accessing equipment compartments and the engine air intake, and will not be directed toward the ground. Engine exhaust systems must be provided with flame and spark arrestors.

d. Chassis and Vehicle Components

(1) Transmission. A fully automatic transmission will be provided.

(2) Driveline. If the driveline is equipped with a differential locking control, a warning/caution label will be placed in view of the driver indicating the proper differential locking/un-locking procedures. The operator's manual will also include a similar warning/caution. All moving parts requiring routine lubrication must have a means of providing for such lubrication. There must be no pressure lubrication fittings where their normal use would damage grease seals or other parts.

(3) Axle Capacity. Each axle will have a rated capacity, as established by the axle manufacturer.

(4) Tires and Wheels. Tires and wheels will be certified by the manufacturer for not less than 25 miles of continuous operation at 60 mph at the normal operational inflation pressure. A spare tire and wheel assembly will be provided; however, the spare tire and wheel assembly are not required to be mounted on the vehicle. Tires will be new. Retreads, recaps, or re-grooved tires are not permitted.

(5) Towing Connections. The vehicle will be equipped with towing connections allowing for the vehicle to be towed fore and aft.

(6) Brake System.

(a) The vehicle will be equipped with a braking system in accordance with Federal Motor Vehicle Safety Standard (FMVSS) standards. Vehicles with a Gross Vehicle Weight Ratio (GVWR) above 26,000 lbs will be equipped with air brakes. All components of the braking system will be installed in such a manner as to provide protection from objects liable to strike and cause damage to the brake system components. No part of the braking system will extend below the bottom of wheel rims, to ensure, in case of a flat tire, that the weight of the vehicle will be supported by the rim and the flat tire and not be imposed on any component of the braking system.

(b) Braking systems for vehicles with a maximum speed of less than 20 mph (32 km/h) must meet the requirements of Title 49 CFR Part 393, §393.41 and 393.52. The maximum stopping distance in feet must be equal to the design speed in mph.

(7) Steering. The vehicle will be equipped with power steering. The fully loaded vehicle will have a wall to wall turning diameter of less than three times the overall length of the vehicle in both directions.

e. Cab. The vehicle will have a fully enclosed door cab of materials which are corrosion resistant, such as aluminum, stainless steel, or glass reinforced polyester construction. Steps and handrails will be provided for all doors. The lowermost step(s) will be no more than 20 inches above level ground when the vehicle is fully loaded. A tilt steering column will be provided.

(1) Windshield and Windows. The windshield and windows will be of tinted safety glass. Each door window will be capable of being opened far enough to facilitate emergency occupant escape in the event of a vehicle accident.

(2) Instruments and Controls. All instruments and controls will be illuminated and designed to prevent or produce windshield glare. Gauges will be provided for oil pressure, coolant temperature, and automatic transmission temperature. All device instruments and controls must be located within convenient reach of the seated driver.

(3) HVAC System. If an HVAC system is specified by the purchaser, enclosed lift systems must meet the requirements of SAE J1503 and FMVSS No. 103. In sections where the two documents may conflict, FMVSS No. 103 takes precedence.

(4) Seats. The driver seat will be adjustable fore and aft. Each seat will be provided with a Type 2 seat belt assembly (i.e., 3-point retractable restraint) in accordance with Code of Federal Regulations (CFR) 49 CFR Part 571, §571.209.

(5) Windshield wipers and washer. The vehicle will be equipped with electrically powered windshield wiper(s). The wiper arm(s) and blade(s) will be of sufficient length to clear the windshield area described by Society of Automotive Engineers (SAE) J198, Windshield Wiper Systems - Trucks, Buses, and Multipurpose Vehicles. Individual wiper controls will include a minimum of two speed settings and an intermittent setting. The wiper blades will automatically return to a park position, out of the line of vision. The vehicle will be equipped with a powered windshield washer system, including an electric fluid pump, a minimum one gallon fluid container, washer nozzles mounted to the wiper arms (wet arms), and a momentary switch.

(6) Warning Signs. Signs that state "Occupants must be seated and wearing a seat belt when apparatus is in motion" will be provided in locations that are visible from each seated position.

f. Electrical / Lighting.

(1) General.

(a) Lighting must in all cases meet the requirements of AC 150/5210-5, Painting, Marking, and Lighting of Vehicles Used on an Airport, using the standards for airfield service vehicles.

(b) Unless otherwise specified, electrical systems incorporating a storage battery must have a nominal rating of 12 or 24V DC.

(c) If highway transportability is specified, or otherwise specified by the purchaser, the vehicle lighting must comply with the appropriate provisions of the Uniform Vehicle Code and Federal Motor Vehicle Safety Standards (i.e. FMVSS Title 23, Chapter 2, Standard No. 108 "Lamps, Reflective Devices, and Associated Equipment"). The following lighting equipment must also be provided:

(i) Two sealed-beam headlamps with high and low beams and a beam indicator.

(ii) Two red combination tail and stop lamps, visible from the rear of the vehicle.

(iii) Directional turn signals.

(iv) Dual backup lights controlled by the transmission shift lever.

(d) When possible, headlights must be located on the vehicle so that they are 22 in (559 mm) below the operator's eye level.

(2) Battery Powered Devices.

(a) Batteries must be designed to have a minimum life of 3 years when maintained according to the manufacturer's instructions. For design purposes, a frequency of use of 1000 cycles per year must be assumed.

(b) A self-contained battery charger with automatic voltage control must be provided. The charging process will require the operator to connect a readily-accessible plug to a standard 110 or 220-volt receptacle, as specified by the purchaser.

(c) The battery system must incorporate a battery condition gauge. If a low voltage condition could result in higher amperage flow and motor burnout, then the status-monitoring device must provide a time warning to the operator.

(3) Electromagnetic Interference. The equipment must meet the current issues of radio suppression specification MIL-STD-461, Class 3D, Requirements for the Control of Electromagnetic Interference Emissions and Susceptibility. It must be capable of operating through the entire amplitude modulated aircraft radio frequency range of 75 MHz – 136 MHz.

g. Hydraulic and Pneumatic. The following requirements apply to hydraulic systems other than the chassis brake system.

(1) Raising and lowering of the system hopper must be accomplished by one person and through two or more hydraulic cylinders, powered by an electric or engine driven pump.

(2) Hydraulic fluid must be as recommended by the manufacturers of the hydraulic system components.

(3) The materials used for each hydraulic line must be consistent with its application. Fixed lines must be made of high quality steel or stainless steel. Flexible lines must be used only where necessary.

h. IDENTIFICATION AND MARKING.

(1) The device must meet the requirements of SAE ARP1247, paragraph 3.13.9 and AC 150/5220-5, Painting, Marking, and Lighting of Vehicles Used on an Airport, using the standards for airfield service vehicles. The shifting diagram placard specified in SAE ARP1247, paragraph 3.13.9.6 may be provided in a medium other than metal if designated to last for the total life of the equipment. In the event that identification and marking guidance differs between SAE ARP1247 and AC 150/5210-5, AC 150/5210-5 takes precedence.

(2) Painting and Marking. The device must meet the requirements of SAE ARP1247, paragraph 3.13.11.

(a) The system must be primed in accordance with accepted industry standards for heavy-duty industrial equipment intended for outdoor use.

(b) The system must be furnished as specified by the purchaser, in accordance with AC 150/5210-5, using the standards for airfield service vehicles.

i. Optional Equipment.

(1) The following options are not allowed unless specific justification is provided:

(a) Turbocharged engine;

(b) Auxiliary hand hose, and hand hose hydraulic assist;

(c) Gutter-broom attachments**.**

(2) Vehicle undercarriage coatings are not allowed.

B.2 CONSTRUCTION STANDARDS.

a. General Requirements.

(1) All equipment and material must be new, undamaged, and of the best grade.

(2) Where items exceed one in number, the manufacturer must provide products from the same component manufacturer with identical construction, model numbers, and appearance.

(3) Insofar as possible, products must be the standard and proven design of the manufacturer.

(4) The manufacturer must install electrical connections for power, controls, and devices in accordance with NEMA and NEC recommendations and requirements. Transmitting equipment must be installed and adjusted in accordance with manufacturer's published instructions and the requirements specified herein.

b. Workmanship. The device must meet the requirements of SAE ARP1247, paragraph 3.13.7.

c. Materials. The device must meet the requirements of SAE ARP1247, paragraph 3.13.2.

(1) Moisture and Fungus Resistance. The device must meet the requirements of SAE ARP1247, paragraph 3.13.4.

(2) Corrosion of Metal Parts. The device must meet the requirements of SAE ARP1247, paragraph 3.13.5.

d. Parts.

(1) Standard and Commercial Parts. The device must meet the requirements of SAE ARP1247, paragraph 3.13.3.

(2) Interchangeability and Replaceability. The device must meet the requirements of SAE ARP1247, paragraph 3.13.6.

(3) Spare / Replacement of Parts. The manufacturer must develop and provide to the purchaser a parts list, including associated replacement/repair costs.

(4) Substitutions. The purchaser must approve any material or equipment designated as an "or equal" product, but these items must be clearly distinguished and noted in the technical manuals as substitutions.

e. Codes, Standards, Regulations, and References. The manufacturer must recognize and comply with all codes and standards applicable to the design and construction of this type of equipment which are generally accepted and used as good practice in the industry.

B.3 DELIVERY AND ACCEPTANCE STANDARDS.

a. For self-propelled, mechanical FOD removal equipment, the manufacturer must provide trained personnel at the time of delivery to place the device into operation.

b. Transportability. If highway transportability is specified by the purchaser, the device must meet the requirements of SAE ARP1247, paragraph 3.7.

c. Quality Assurance. The manufacturer must test all of the equipment installed under this specification and demonstrate its proper operation to the purchaser. The manufacturer must furnish all required labor, testing, instruments and devices required for the conduct of such tests.

(1) The manufacturer must install all electrical, instrumentation, and mechanical works to the satisfaction of the purchaser, with inspecting authorities having jurisdiction.

(2) The manufacturer must notify the purchaser in writing of any instances in the specifications that are in conflict with applicable codes. The manufacturer must perform all work in accordance with applicable laws, rules, or regulations.

(3) Deviations from the specifications required for conformance with the applicable codes and/or laws must be corrected immediately, but not until such deviations have been brought to the attention of the purchaser.

(4) For applicable codes and/or laws that govern the minimum design requirements; where this AC calls for materials, vents, ductwork, sizes, design details, etc., in excess of the code requirements, the AC takes precedence.

d. Inspection. Inspections must meet the provisions of SAE ARP1247, paragraph 4.3.

e. Testing. After the equipment has been inspected, adjusted, and placed in correct operating condition, the equipment must be field tested in accordance with the purchasers testing procedures and requirements. The field tests must demonstrate that the equipment functions are in compliance with the specifications over the entire range of operation. The manufacturer must report any unusual conditions and correct deficiencies of any of the units.

(1) Preliminary Qualification Tests. Preliminary qualification tests may be specified by the purchaser.

(2) Formal Qualification Tests. Formal qualification tests may be specified by the purchaser.

(3) Specification Conformance Tests. The manufacturer must perform any tests referred to in SAE ARP1247, paragraph 4.6, if specified by the purchaser. The purchaser may elect to accept documentation of previously run tests.

(4) Reliability Test and Analysis. A reliability test and analysis may be specified by the purchaser.

f. Data and Analyses. If requested by the purchaser, the requirements of SAE ARP1247, paragraph 4.4, must be met by the manufacturer.

g. Manuals and Publications. The following operation and maintenance manuals must accompany the delivered equipment. The quantity of items is specified by the purchaser. No special format is required.

(1) Operator's handbook.

(2) Illustrated parts breakdown and list.

(3) Preventive maintenance schedule.

B.4 POST-DELIVERY STANDARDS.

a. Training. For self-propelled, mechanical FOD removal equipment, the manufacturer must provide trained personnel at the time of delivery to adequately train airport/air carrier staff in the operation and maintenance of the equipment.

(1) Training must include written operating instructions that depict the step by step operational use of the device. Written instructions must include, or be supplemented by, materials which can be used to train subsequent new operators.

(2) Training topics must include trouble shooting and problem solving, in the form of theory and hands-on training, for personnel designated by the purchaser.

(3) A minimum of 4 hours of training for every airport/air carrier personnel and technician on the purchaser's maintenance staff must be provided by the manufacturer. Training selected personnel as part of a "Train the Trainer" program will also satisfy this requirement.

(4) Training time per day must not exceed 8-hour shifts, unless otherwise specified by the purchaser.

(5) Upon the completion of training, the manufacturer must issue each participant a certificate of completion.

b. Maintenance / Reliability. The equipment and its accessories must be designed and constructed with reliability of operation as a primary consideration. The minimum reliability design requirement is that the equipment be designed to operate between periodic preventive maintenance activities of 4 months. The above interval does not apply in cases where the component manufacturer recommends more frequent maintenance intervals.

(1) Preventive. The manufacturer must develop and provide to the purchaser written documentation on recommended preventive maintenance actions. For the purpose of this specification, normal servicing of fuel, oil, tire pressure, battery, and water are not considered preventive maintenance.

(2) Cleaning. The manufacturer must develop and provide to the purchaser written documentation on recommended cleaning procedures, including solvent types and tools.

(3) Inspection. The manufacturer must develop and provide to the purchaser written documentation on regularly scheduled maintenance inspection procedures. A focus on sensitive equipment and schedule timelines must be included in the documentation.

(4) Spare / Replacement of Parts. The manufacturer must develop and provide to the purchaser a parts list, including associated replacement/repair costs.

(5) Tools and Test Equipment. The device must meet the requirements of SAE ARP1247, paragraph 3.12.4.

Appendix C

Construction Safety and Phasing Plans

(Refer to Sheets 2.0 through 2.8 of the project drawings)

Neighborhood Meeting Certification

For the

Proposed Long-Term Hold Area, Deicing Pad Expansion and RON Apron Construction Including Terminal Apron Expansion Northwest End at the Portland International Jetport

I, Dwight D. Anderson, P.E., of Stantec hereby certify that a neighborhood meeting was held on Tuesday, May 7, 2019 at Portland International Jetport, 1001 Westbrook Street, Portland, Maine at 5:30 P.M.

I also certify that on April 26, 2019, invitations were mailed to the following:

1. All addresses on the mailing list provided by the Planning Division which includes property owners within 500 feet of the proposed development or within 1000 feet of a subdivision within an industrial zone or industrial zone change.

2. Residents on the "interested parties" list.

Signed,

Applicant's Signature

May 7, 2019
(date)

Attached to this certification are:

1. Copy of invitation sent
2. Sign-in sheet
3. Meeting minutes

PWM
Portland International Jetport

You're on your way.

April 26, 2019

Dear Neighbor:

Please join us for a Neighborhood Meeting to discuss the City of Portland's submission of a Level III Site Plan Application for proposed work within the City of Portland municipal boundaries at the Portland International Jetport, 1001 Westbrook Street. The proposed site improvements will be located within the perimeter security fence or areas of authorized airport operations personnel only. The project includes the proposed expansion of the terminal apron at the northwest end of the building near gates 12 and 14 and expansion of the long-term hold/deicing/overnight apron west of the existing deicing apron to serve two additional aircraft deicing positions. Improvements to the Airport's stormwater management system are also proposed.

Meeting Location:	**Portland International Jetport** **(lower level concourse of passenger terminal building between ticketing and baggage)** **1001 Westbrook Street** **Portland, Maine**
Meeting Date:	**Tuesday, May 7, 2019**
Meeting Time:	**5:30 PM – 7:00 PM**

(The City Code requires that property owners within 500 feet (1,000 feet for industrial subdivisions and industrial zone changes) of the proposed development and residents on an "interested parties list", be invited to participate in a neighborhood meeting. A sign-in sheet will be circulated and minutes of the meeting will be taken. Both the sign-in sheet and minutes will be submitted to the Planning Board.)

If you have any questions, please feel free to contact Dwight Anderson, P.E. of Stantec at 207-887-3438 or Charles Norton, P.E. of the City of Portland at 207-756-8026.

Sincerely,

Charles Norton, P.E.
Deputy Director Facilities & Engineering

Note: Under Section 14-32(C) and 14-524(a)d of the City Code of Ordinances, an applicant for a Level III development, subdivision of over five lots/units, or zone change is required to hold a neighborhood meeting within 30 days of submitting a preliminary application or 21 days of submitting a final site plan application, if a preliminary plan was not submitted. The neighborhood meeting must be held at least seven days prior to the Planning Board public hearing on the proposal. Should you wish to offer additional comments on this proposed development, you may contact the Planning Division at 874-8721 or send written correspondence to the Planning and Urban Development Department, Planning Division, 4th Floor, 389 Congress Street, Portland, ME 04101 or by email to: bab@portlandmaine.gov

Neighborhood Meeting Sign-In Sheet
Proposed Long-Term Hold Area, Deicing Pad Expansion and RON Apron Construction Including Terminal Apron Expansion Northwest End at the Portland International Jetport

Date: Tuesday, May 7, 2019
Time: 5:30 PM – 7:00 PM
Location: Portland International Jetport, 1001 Westbrook Street, Portland, Maine
(lower level concourse of passenger terminal building between ticketing and luggage)

Members of Public in Attendance:

Name	Address	Telephone No.	Email Address
NONE			

Neighborhood Meeting Sign-In Sheet
Proposed Long-Term Hold Area, Deicing Pad Expansion and RON Apron Construction Including Terminal Apron Expansion Northwest End at the Portland International Jetport

Date: Tuesday, May 7, 2019
Time: 5:30 PM – 7:00 PM
Location: Portland International Jetport, 1001 Westbrook Street, Portland, Maine
(lower level concourse of passenger terminal building between ticketing and luggage)

Applicant and Consultant Team in Attendance:

Name	Address	Telephone No.	Email Address
Dwight Anderson / Stantec	Scarborough, ME	207-329-7644	Dwight.Anderson@Stantec.com
Amie Gray / Stantec	Scarborough, ME	207-740-2520	Amie.Gray@stantec.com
Charles Norton / PWM	Portland, ME	207-756-8026	Cnorton@portlandmaine.gov

Stantec

Meeting Minutes

City of Portland Neighborhood Meeting – Level III Site Plan Application

Proposed Long-Term Hold Area, Deicing Pad Expansion and RON Apron Construction Including Terminal Apron Expansion Northwest End at the Portland International Jetport

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Date/Time:	May 7, 2019 / 5:30-7:00 pm
Place:	Portland International Jetport, between ticketing and baggage claim
Attendees:	Dwight Anderson, P.E., Stantec Amie Gray, P.E., Stantec Chuck Norton, P.E., Portland International Jetport

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In order to comply with the City of Portland's Level III Site Plan Application Guidelines, a Neighborhood Meeting was held on May 7th, 2019 from 5:30-7:00pm for the subject project.

Dwight Anderson, Chuck Norton and Amie Gray set up boards for the public to view between ticketing and baggage claim at the Portland International Jetport. As shown on the attendance list, no members of the public were in attendance to discuss the proposed projects. The group left at 7:00 pm.

Stantec Consulting Services Inc.

Dwight Anderson, PE
Senior Associate

Phone: 207 887 3438
Fax: 207 879 0896
Dwight.Anderson@stantec.com

Anderson, Dwight

From: Anderson, Dwight
Sent: Wednesday, May 22, 2019 3:49 PM
To: Benjamin Pearson; Jean Fraser
Cc: Gray, Amie; Charles Norton; athurlow@inlandgroup.ca
Subject: Written explanation of the deicing valve control system for Spent Aircraft Deicing Fluid at the Jetport

Mr. Pearson,
The existing aircraft deicing apron is separated into 3 fluid collection zones (2 for deicing aircraft and 1 for containment of snow mixed with spent aircraft deicing fluid). The expanded aircraft deicing apron will include the 2 existing aircraft deicing positions, 2 additional aircraft deicing positions and 2 zones for containment of snow mixed with spent aircraft deicing fluid. The 6 zones will be controlled by 12 butterfly valves with electric actuators and an automated sampling system capable of directing flow to the existing 500,000 gallon underground storage tank or drainage system discharging to the Fore River from any number of the 6 zones at one time depending upon the concentration of propylene glycol present in the stormwater. The system will be equipped for automated operation with a manual override for each zone. The manual override is needed during maintenance and in the event an electrical failure occurs. During non-deicing periods the valve control system will be set to discharge to DMH DI-8 and the storm drain system which discharges easterly to the Fore River. Spent aircraft deicing fluid collected in the 500,000 gallon underground storage tank will continue to be recycled by Inland Technologies under contract with the City of Portland and in accordance with the site's Industrial Discharge Permit issued by the Portland Water District. More specific detail on the sampling system is provided below.

The sampling system will be able to monitor glycol concentrations at all six (6) inlet pipes from the deicing area trench drains to ensure optimum conformance to meet MeDEP guidelines. The system is to monitor concentrations in flow using a set of fittings as depicted in Detail A on Sheet 6.11 included with the project drawings. The system will be capable of sampling each pipe individually on a maximum setting of 6-minutes per pipe. If no flow is detected, signaled by the float switch going off before the 6-minute sampling rotation is finished, then that pipe is skipped, and the system moves onto the next pipe. The one required sampling pump shall be peristaltic type, have low flow capabilities, be able to run dry without damage and be self-priming up to 8'. The refractometer to be installed will be able to be programmed for variable concentrations of propylene glycol. The control system will be capable of controlling the sampling system automatically. Control features are to be installed in the control room at Inland Technologies approximately 200 feet north of the sampling points.

Sincerely,

Dwight Anderson, PE
Senior Associate

Dwight.Anderson@stantec.com

Stantec
482 Payne Road Scarborough Court
Scarborough ME 04074-8929



From: Benjamin Pearson <bnp@portlandmaine.gov>
Sent: Wednesday, May 22, 2019 10:16 AM
To: Jean Fraser <jf@portlandmaine.gov>
Cc: Gray, Amie <Amie.Gray@stantec.com>; Anderson, Dwight <Dwight.Anderson@stantec.com>
Subject: Re: Urgent - need revised plans and comment response

Jean,

I will not be requesting any revisions, just a written explanation of the valve system. In talking with Adam from Inland Technologies and Dwight from Stantec, the current plans are satisfactory to prevent any glycol contaminated water from entering into the storm drainage system but I would like to have the system explained including an explanation of the manual override. The comment will be

"Please provide a written explanation of the deicing manhole valve control system. The explanation should include how the valves will function when deicing is occurring. Additional information about automation and manual control of the system must be included. Please also provide information regarding how the system will function and where flows are diverted to during non-deicing periods."

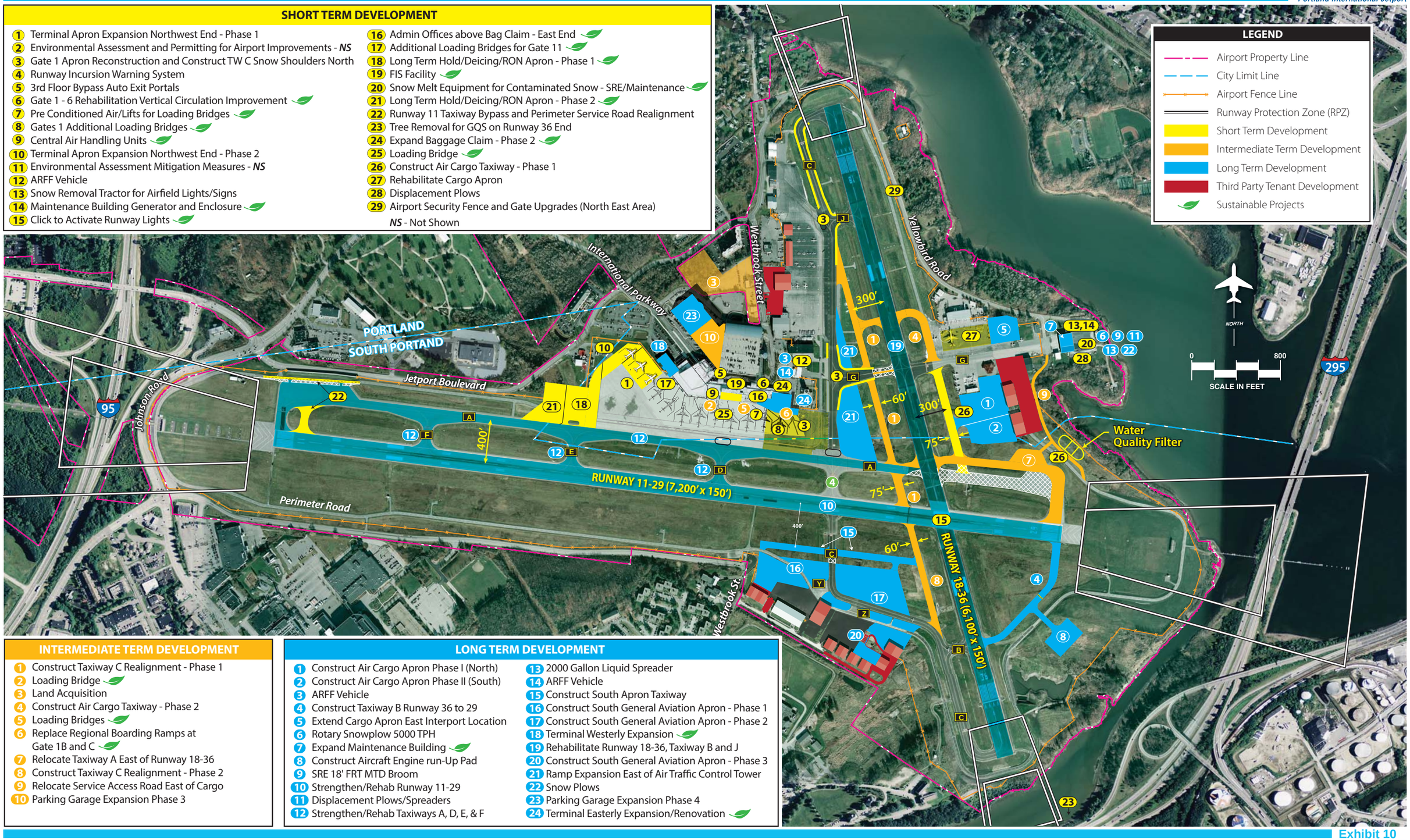
Thanks,
Ben

PWM Portland International Jetport

SHORT TERM DEVELOPMENT

1. Terminal Apron Expansion Northwest End - Phase 1
2. Environmental Assessment and Permitting for Airport Improvements - ***NS***
3. Gate 1 Apron Reconstruction and Construct TW C Snow Shoulders North
4. Runway Incursion Warning System
5. 3rd Floor Bypass Auto Exit Portals
6. Gate 1 - 6 Rehabilitation Vertical Circulation Improvement
7. Pre Conditioned Air/Lifts for Loading Bridges
8. Gates 1 Additional Loading Bridges
9. Central Air Handling Units
10. Terminal Apron Expansion Northwest End - Phase 2
11. Environmental Assessment Mitigation Measures - ***NS***
12. ARFF Vehicle
13. Snow Removal Tractor for Airfield Lights/Signs
14. Maintenance Building Generator and Enclosure
15. Click to Activate Runway Lights
16. Admin Offices above Bag Claim - East End
17. Additional Loading Bridges for Gate 11
18. Long Term Hold/Deicing/RON Apron - Phase 1
19. FIS Facility
20. Snow Melt Equipment for Contaminated Snow - SRE/Maintenance
21. Long Term Hold/Deicing/RON Apron - Phase 2
22. Runway 11 Taxiway Bypass and Perimeter Service Road Realignment
23. Tree Removal for GQS on Runway 36 End
24. Expand Baggage Claim - Phase 2
25. Loading Bridge
26. Construct Air Cargo Taxiway - Phase 1
27. Rehabilitate Cargo Apron
28. Displacement Plows
29. Airport Security Fence and Gate Upgrades (North East Area)

NS - Not Shown



INTERMEDIATE TERM DEVELOPMENT

1. Construct Taxiway C Realignment - Phase 1
2. Loading Bridge
3. Land Acquisition
4. Construct Air Cargo Taxiway - Phase 2
5. Loading Bridges
6. Replace Regional Boarding Ramps at Gate 1B and C
7. Relocate Taxiway A East of Runway 18-36
8. Construct Taxiway C Realignment - Phase 2
9. Relocate Service Access Road East of Cargo
10. Parking Garage Expansion Phase 3

LONG TERM DEVELOPMENT

1. Construct Air Cargo Apron Phase I (North)
2. Construct Air Cargo Apron Phase II (South)
3. ARFF Vehicle
4. Construct Taxiway B Runway 36 to 29
5. Extend Cargo Apron East Interport Location
6. Rotary Snowplow 5000 TPH
7. Expand Maintenance Building
8. Construct Aircraft Engine run-Up Pad
9. SRE 18' FRT MTD Broom
10. Strengthen/Rehab Runway 11-29
11. Displacement Plows/Spreaders
12. Strengthen/Rehab Taxiways A, D, E, & F
13. 2000 Gallon Liquid Spreader
14. ARFF Vehicle
15. Construct South Apron Taxiway
16. Construct South General Aviation Apron - Phase 1
17. Construct South General Aviation Apron - Phase 2
18. Terminal Westerly Expansion
19. Rehabilitate Runway 18-36, Taxiway B and J
20. Construct South General Aviation Apron - Phase 3
21. Ramp Expansion East of Air Traffic Control Tower
22. Snow Plows
23. Parking Garage Expansion Phase 4
24. Terminal Easterly Expansion/Renovation

Exhibit 10

FUTURE PROJECTS REQUIRING ENVIRONMENTAL CONSIDERATIONS

1. Terminal Apron Expansion Northwest End - Phase 2 (cumulative project)
2. Long Term Hold/Deicing/RON Apron - Phase 1
3. Long Term Hold/Deicing/RON Apron - Phase 2
4. Runway 11 Taxiway Bypass and Perimeter Service Road Realignment (S)
5. Tree Removal for GQS on Runway 36 End (S)
6A. Construct Air Cargo Taxiway - Phase 1 (cumulative project) (S)
6B. Construct Air Cargo Taxiway - Phase 2 (S)
7. Construct Taxiway C Realignment - Phase 1 (S)
8. Relocate Taxiway A East of Runway 18-36 (S)
9. Construct Taxiway C Realignment - Phase 2 (S)
10. Relocate Service Access Road East of Cargo
11. Construct Taxiway B Runway 36 to 29 (S)

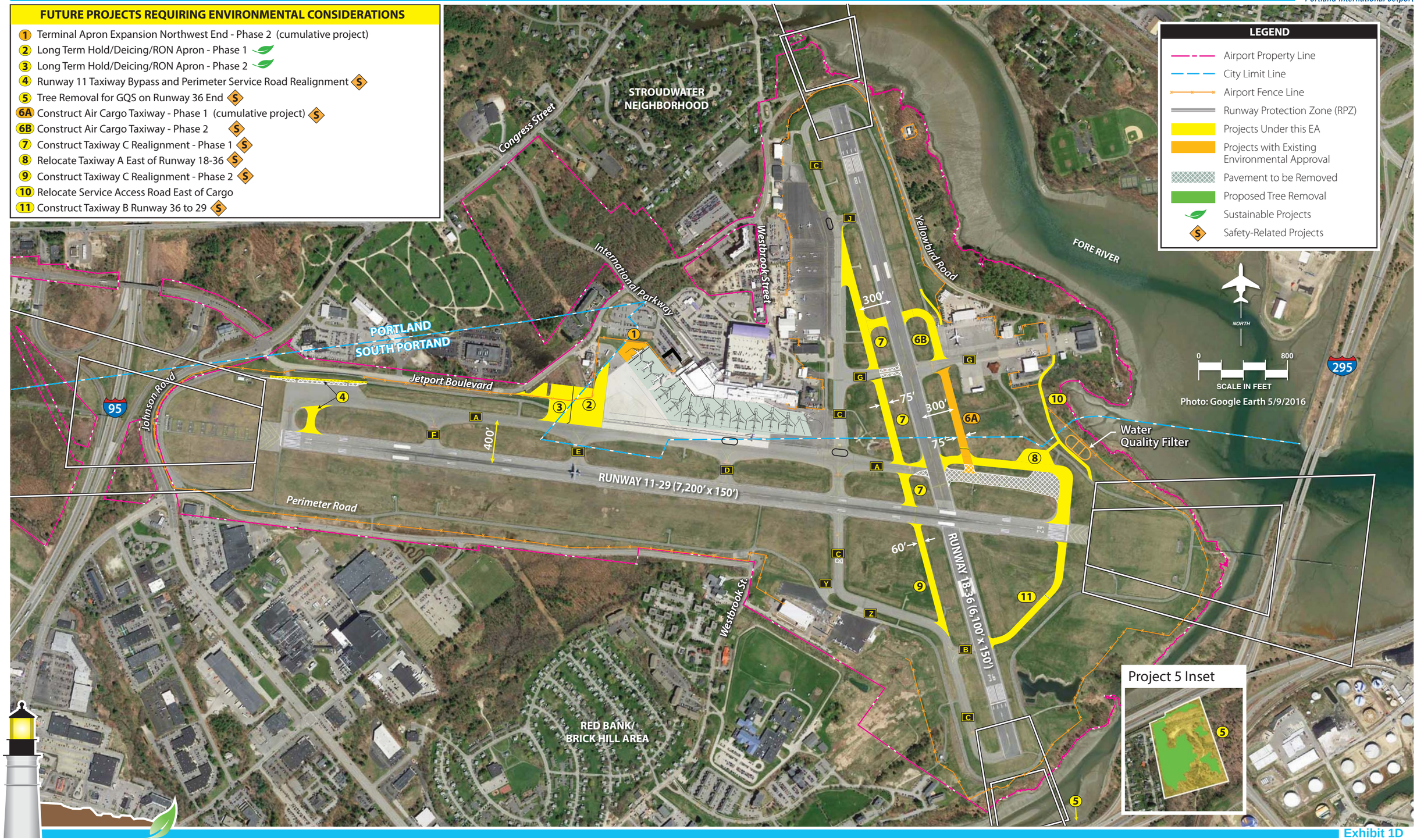
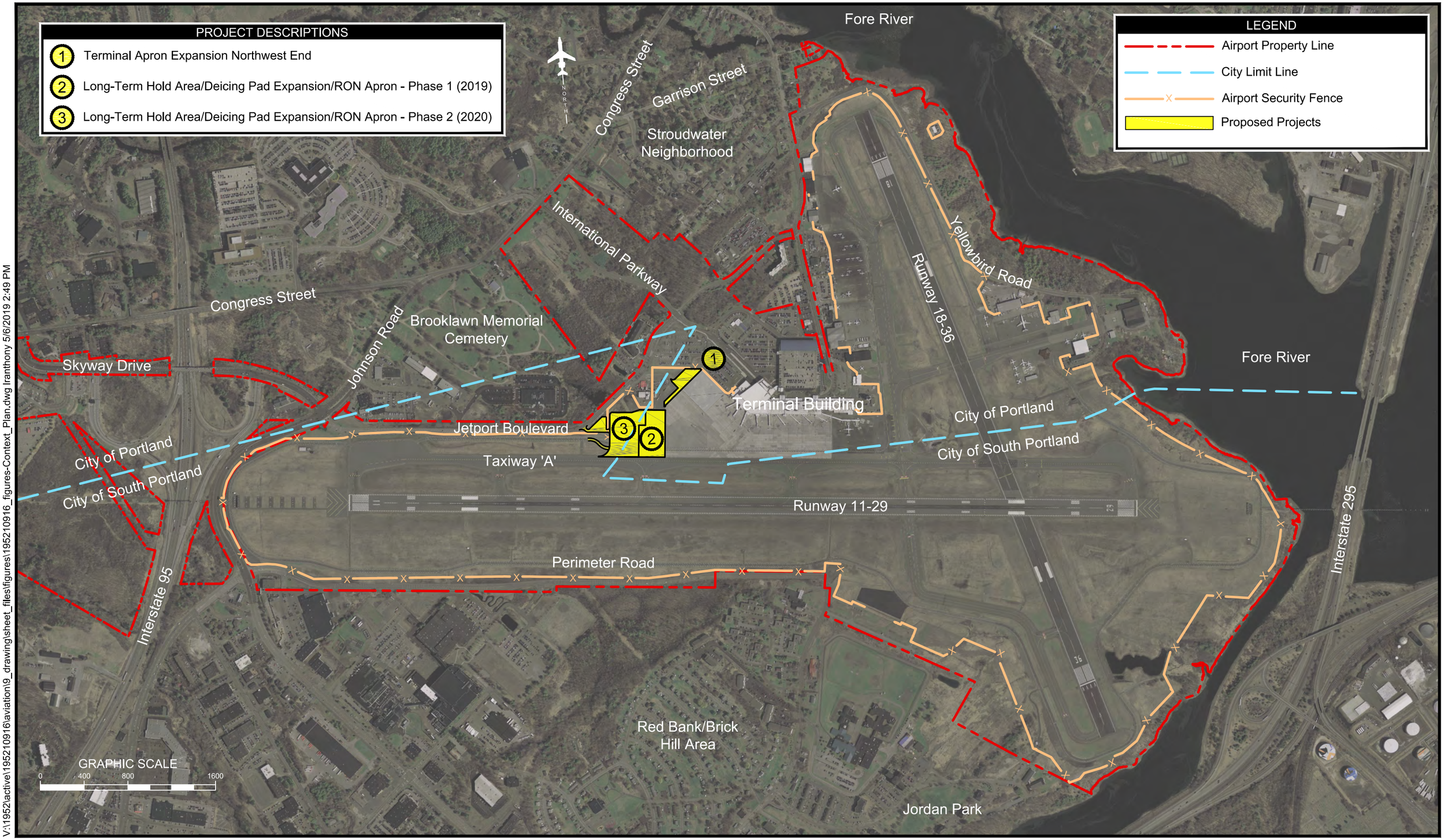


Exhibit 1D

Source: City of Portland 2018.



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482 Payne Road Scarborough Court
Scarborough, Maine 04074-8929
Tel. 207.883.3355
www.stantec.com

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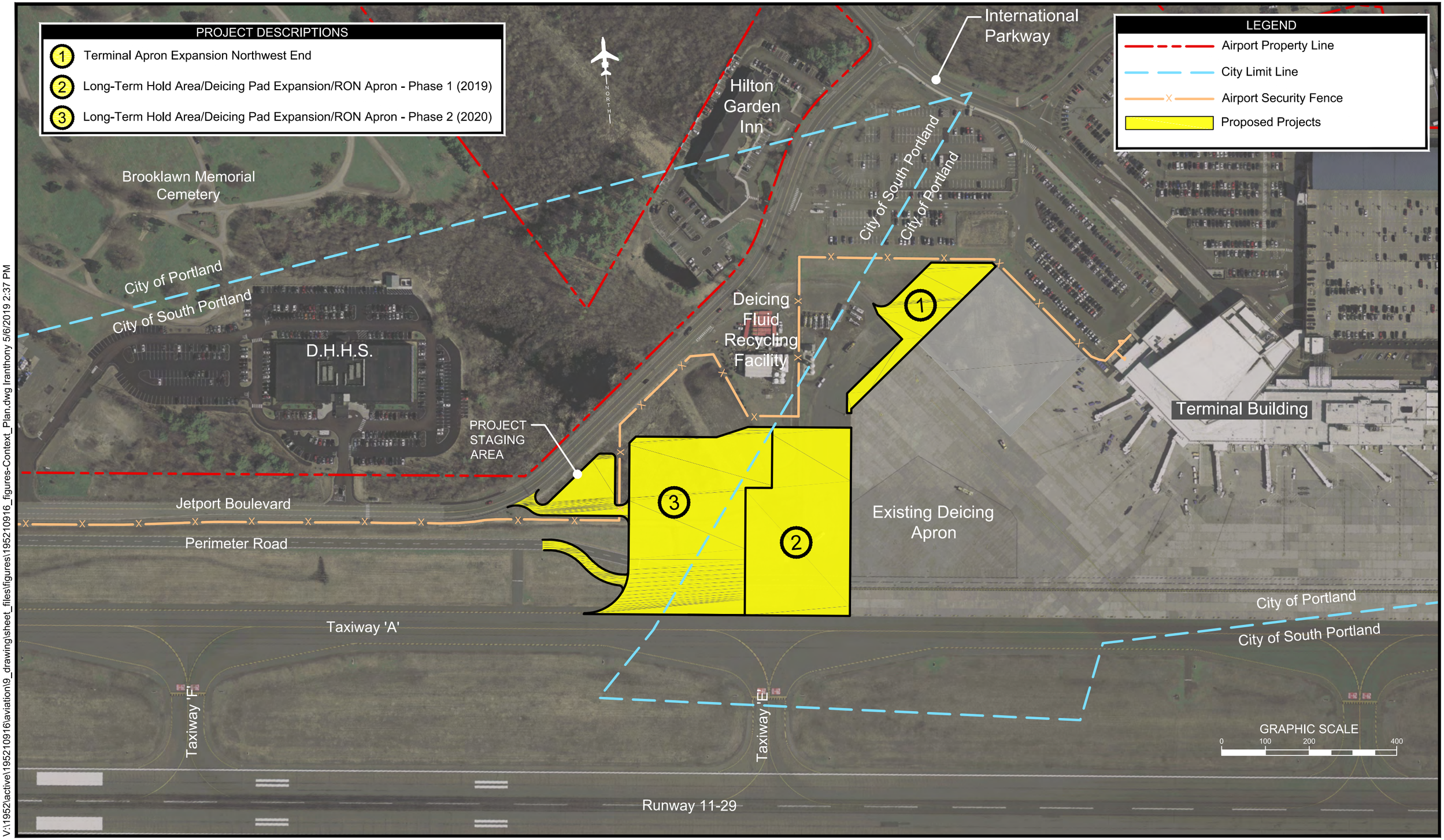
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Client/Project
PORTLAND INTERNATIONAL JETPORT
CITY OF PORTLAND PERMITTING
PORTLAND AND SOUTH PORTLAND, MAINE

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Title
OVERALL CONTEXT PLAN

Figure No.
1



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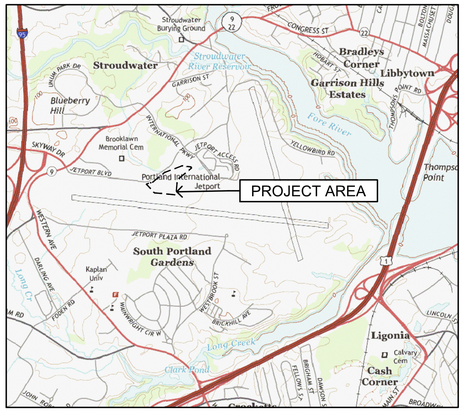
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Client/Project
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CITY OF PORTLAND PERMITTING
PORTLAND AND SOUTH PORTLAND, MAINE

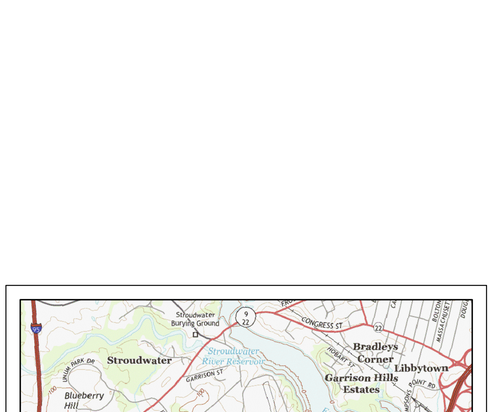
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Title
HOLD/DEICING/RON APRON AND NW TERMINAL APRON CONTEXT PLAN

Figure No.
2



VICINITY MAP



LOCATION MAP

OWNER / APPLICANT:
City of Portland / Portland International Jetport
1001 WESTBROOK STREET
PORTLAND, ME 04102

STANTEC CERTIFIES THAT THE PLANS AND SPECIFICATIONS FOR THE PROJECT WERE PREPARED IN ACCORDANCE WITH CRITERIA CONTAINED IN THE CURRENT EDITION OF F.A.A. ADVISORY CIRCULARS

Dwight D. Anderson, P.E.
Project Manager

PERMITTING DRAWINGS

Base Bid			
Item #	Item Description	Estimated Qty	Unit
C-100-5.1	Contractor Quality Control Program (CQCP)	1	LS
C-102-5.1	Temporary Seeding and Mulching	4,000	SY
C-102-5.2	Hay Bales	20	EA
C-102-5.3	Installation and Removal of Silt Fence	500	LF
C-102-5.4	Stabilized Construction Entrance	1	EA
C-102-5.5	Dewatering Sediment Filter	1	EA
C-102-5.6	Stone Check Dams	16	EA
C-102-5.7	Erosion Control Mesh Fabric	1,000	SY
C-105-3.1	Mobilization	1	LS
C-105-3.2	Field Office - Engineer	1	LS
P-101-5.1	Pavement Removal	6,700	SY
P-101-5.2	Concrete Removal	50	SY
P-101-5.3	Paint and Rubber Removal	5,000	SF
P-101-5.4	Cold Milling	120	SY
P-101-5.5	Saw Cutting	500	LF
P-101-5.6	Saw and Seal Asphalt Pavement	1,500	LF
P-101-5.7	Conduit Removal	100	LF
P-151-4.1	Clearing and Grubbing	1.5	AC
P-152-4.1	Unclassified Excavation	16,000	CY
P-152-4.2	Rock Excavation	10	CY
P-152-4.3	Test Pit Excavation	50	CY
P-152-4.4	Embankment	2,000	CY
P-154-5.1	Subbase Course	7,500	CY
P-154-5.2	Geotextile Fabric for Undercut Areas	2,000	SY
P-209-5.1	Crushed Aggregate Base Course	4,200	CY
P-209-5.2	Grade Existing Gravel	720	SY
P-401-8.1	HMA Bituminous Course (Binder and Surface)	2,000	TON
P-401-8.2	HMA Bituminous Course (Surface Pavement Only)	1,250	TON
P-501-8.1	Portland Cement Concrete (PCC) Pavement	3,600	CY
P-501-8.2	Portland Cement Concrete (PCC) Pavement Panel Replacement (Not AIP Funded)	105	CY
P-603-5.1	Emulsified Asphalt Tack Coat	500	GAL
P-608-8.1	Asphalt Surface Treatment	2,200	SY
P-610-5.1	Structural Concrete	170	CY
P-620-5.1	Taxiway and Apron Markings	25,000	SF
P-620-5.2	Reflective Media (Type I)	1,500	LB
P-621-5.1	Sawcut Grooves at Deice Apron	5,000	SY
P-701-5.1	8" Diameter Storm Drain - PVC	350	LF
P-701-5.2	12" Diameter Storm Drain - PVC	1,800	LF
P-701-5.2A	15" Diameter Storm Drain - PVC	500	LF
P-701-5.3	18" Diameter Storm Drain - PVC	150	LF
D-701-5.4	12" Diameter Storm Drain - RCP - Class V	10	LF
D-701-5.5	18" Diameter Storm Drain - RCP - Class V	35	LF
D-701-5.6	24" Diameter Storm Drain - RCP - Class V	1,150	LF
D-701-5.7	Remove and Backfill Underdrain Trench	800	LF
D-701-5.8	Remove and Backfill Stormdrain Trench	2,260	LF
D-701-5.9	Remove Drainage Structure	15	EA
D-705-5.1	6" Vent Pipe	50	LF
D-705-5.2	6" Diameter Underdrain Pipe - PVC	1,200	LF
D-705-5.3	12" Diameter Underdrain Pipe - PVC	100	LF
D-751-5.1	Alter Drainage Structure	1	EA
D-751-5.2	Adjust Rim to Grade	4	EA
D-751-5.3	Alter UGST Riser Structure	1	LS
D-751-5.4	Coring for 6-inch Pipe	4	EA
D-751-5.5	Coring for 8 to 18-inch Pipe	3	EA
D-751-5.6	Type F Field Inlet (2' x 2')	1	EA
D-751-5.7	Precast SD Manhole - 4' Diameter (Heavy Duty)	13	EA
D-751-5.8	Precast SD Catch Basin - 4' Diameter (Heavy Duty)	3	EA
D-751-5.9	Precast SD Catch Basin - 6' Diameter (Heavy Duty)	1	EA
D-751-5.10	Precast SD Catch Basin - 4' Diameter (Light Duty)	2	EA
D-751-5.11	Outlet Control Structure	1	EA
D-751-5.12	Precast SD Manhole - 6' Diameter (Heavy Duty)	5	EA
F-162-5.1	8' Security Fence	760	LF
F-162-5.2	16' Swing Gate	1	EA
F-162-5.3	Pedestrian Gate	1	EA
F-162-5.4	Remove Existing Security Fence	588	LF
T-901-5.1	Seeding (1,000 square feet)	40	UNIT
T-905-5.1	Topsoiling	300	CY
T-908-5.1	Mulching (1,000 square feet)	40	UNIT
100-3.1	Trench Drain	742	LF
200-4.1	Traffic Control, Safety and Security Measures - Airport - Phase 1	1	LS
200-4.2	Traffic Control, Safety and Security Measures - Airport - Phase 2	1	LS
200-4.3	Traffic Control, Safety and Security Measures - Airport - Phase 3	1	LS
200-4.4	Traffic Control, Safety and Security Measures - Airport - Phase 4	1	LS
200-4.5	Traffic Control, Safety and Security Measures - Airport - Phase 5	1	LS
300-5.1	Valve Pit with Two Each 12" Valves	6	EA
300-5.2	Valve Pit with One 18" Valve	2	EA
400-5.1	3/4" Crushed Stone for Over Excavation Backfill	1,000	CY
400-5.2	Filter Fabric Other Areas	100	SY
400-5.3	Riprap D50 = 6"	60	CY
400-5.4	Riprap Removal	25	CY
500-4.1	Water Quality Filter	1	LS
600-5.1	12.5 mm MDOT Pavement	300	TON
600-5.2	19 mm MDOT Pavement	500	TON
700-5.1	Access Drive Connection to Jetport Boulevard	1	LS
800-5.1	12" Sleeve for Future Utility	50	LF
900-5.1	Plate Load Testing	3	EA
L-160-5.1	Light Fixtures Type A	4	EA
L-160-5.2	Underground Cable, #6	2,600	LF
L-160-5.3	Underground 2" PVC Conduit	450	LF
L-160-5.4	Spent Deicing Fluid Control System	1	LS

Bid Alternate 1 - Terminal Apron Expansion Northwest End (Phases 6 & 7)			
C-100-5.1	Contractor Quality Control Program (CQCP)	1	LS
C-102-5.1	Temporary Seeding and Mulching	100	SY
C-102-5.2	Hay Bales	10	EA
C-102-5.3	Installation and Removal of Silt Fence	50	LF
C-102-5.4	Stabilized Construction Entrance	1	EA
C-102-5.5	Dewatering Sediment Filter	1	EA
C-102-5.6	Stone Check Dams	3	EA
C-102-5.7	Erosion Control Mesh Fabric	70	SY
C-105-3.1	Mobilization	1	LS
P-101-5.1	Pavement Removal	1,900	SY
P-101-5.3	Paint and Rubber Removal	6,500	SF
P-101-5.4	Cold Milling	80	SY
P-101-5.5	Saw Cutting	330	LF
P-101-5.6	Saw and Seal Asphalt Pavement	1,000	LF
P-152-4.1	Unclassified Excavation	3,000	CY
P-152-4.3	Test Pit Excavation	10	CY
P-154-5.1	Subbase Course	1,500	CY
P-154-5.2	Geotextile Fabric for Undercut Areas	700	SY
P-209-5.1	Crushed Aggregate Base Course	1,300	CY
P-209-5.2	Grade Existing Gravel	280	SY
P-401-8.1	HMA Bituminous Course (Binder and Surface)	500	TON
P-401-8.2	HMA Bituminous Course (Surface Pavement Only)	320	TON
P-501-8.1	Portland Cement Concrete (PCC) Pavement	550	CY
P-603-5.1	Emulsified Asphalt Tack Coat	90	GAL
P-608-8.1	Asphalt Surface Treatment	5,000	SY
D-701-5.5	18" Diameter Storm Drain - RCP - Class V	85	LF
D-701-5.7	Remove and Backfill Underdrain Trench	550	LF
D-701-5.8	Remove and Backfill Storm Drain Trench	150	LF
D-701-5.9	Remove Drainage Structure	7	EA
D-705-5.2	6" Diameter Underdrain Pipe - PVC	340	LF
D-705-5.3	12" Diameter Underdrain Pipe - PVC	310	LF
D-751-5.2	Adjust Rim to Grade	1	EA
D-751-5.6	Type F Field Inlet (2' x 2')	1	EA
D-751-5.7	Precast SD Catch Basin - 4' Diameter (Heavy Duty)	1	EA
F-162-5.1	8' Security Fence	150	LF
F-162-5.2	Remove Existing Security Fence	170	LF
T-901-5.1	Seeding (1,000 square feet)	6	UNIT
T-905-5.1	Topsoiling	50	CY
T-908-5.1	Mulching (1,000 square feet)	6	UNIT
200-4.6	Traffic Control, Safety and Security Measures - Airport - Phase 6	1	LS
200-4.7	Traffic Control, Safety and Security Measures - Airport - Phase 7	1	LS
400-5.1	3/4" Crushed Stone for Over Excavation Backfill	300	CY
400-5.2	Filter Fabric Other Areas	500	SY
400-5.3	Riprap D50 = 6"	150	CY
400-5.4	Riprap Removal	190	CY

Bid Alternate 2			
This alternate is for the installation of P-501 instead of P-401 within 2,933 square yards of Phase 2 and Phase 3 where identified on Sheet 3.1. If this alternate is selected, the unit price below for supplying and placing P-501 shall apply in this area.			
P-501-8.1	Portland Cement Concrete (PCC) Pavement (Bid Alternate 2)	1,390	CY

PLANS FOR
PORTLAND INTERNATIONAL JETPORT
PORTLAND AND SOUTH PORTLAND, MAINE
LONG TERM HOLD AREA, DEICING PAD EXPANSION AND RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NORTHWEST END
AIP-3-23-0038-XX-2019

COVER, GENERAL NOTES, SAFETY AND PHASING PLANS
1.0 COVER SHEET
1.1 GENERAL NOTES AND LEGEND
2.0 DEICING PAD EXPANSION SAFETY AND PHASING PLAN PHASE 1A
2.1 DEICING PAD EXPANSION SAFETY AND PHASING PLAN PHASE 1B
2.2 DEICING PAD EXPANSION SAFETY AND PHASING PLAN PHASE 2
2.3 DEICING PAD EXPANSION SAFETY AND PHASING PLAN PHASE 3
2.4 DEICING PAD EXPANSION SAFETY AND PHASING PLAN PHASE 4
2.5 DEICING PAD EXPANSION SAFETY AND PHASING PLAN PHASE 5
2.6 DEICING PAD EXPANSION SAFETY AND PHASING PLAN PHASE 6
2.7 DEICING PAD EXPANSION SAFETY AND PHASING PLAN PHASE 7
2.8 SAFETY DETAILS

LONG TERM HOLD/DEICING/RON APRON
3.0 HOLD/DEICING/RON APRON EXISTING CONDITIONS AND DEMOLITIONS PLAN
3.1A HOLD/DEICING/RON APRON SITE LAYOUT PLAN - 2019 CONSTRUCTION ONLY
3.1B HOLD/DEICING/RON APRON SITE LAYOUT PLAN WITH 2020 CONSTRUCTION
3.1C HOLD/DEICING/RON APRON IMPACT AREA SUMMARY
3.2 HOLD/DEICING/RON APRON JOINTING PLAN
3.3 HOLD/DEICING/RON APRON UTILITY PLAN
3.4A HOLD/DEICING/RON APRON GRADING AND DRAINAGE PLAN - 2019 CONSTRUCTION ONLY
3.4B HOLD/DEICING/RON APRON GRADING AND DRAINAGE PLAN WITH 2020 CONSTRUCTION
3.5 HOLD/DEICING/RON APRON SPOT GRADE PLAN
3.6 EXPANDED PLAN FOR WATER QUALITY FILTER 1 AND DEICING VALVE PITS
3.7 HOLD/DEICING/RON APRON EROSION AND SEDIMENT CONTROL PLAN

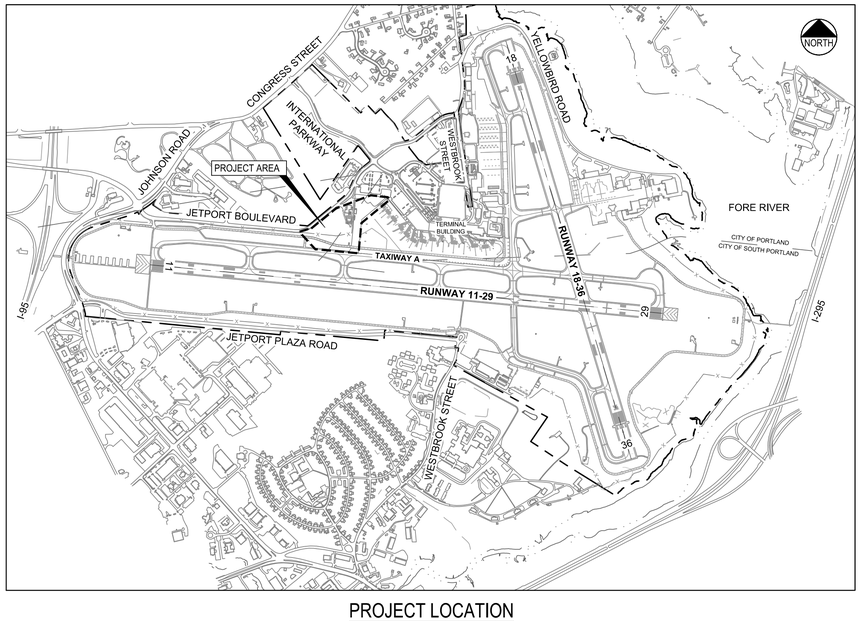
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INDEX OF SHEETS



PROJECT LOCATION
SCALE: 1" = 1000'

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Notes

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File Name: 195211590_cover	LA	DDA	AMG	JAN 2018
	DWN.	CHKD.	DSGN.	DATE

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Client/Project
PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

Title
COVER SHEET

Project No. 195211590
Scale AS NOTED

Sheet
1.0

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GENERAL NOTES:

1. ALL WORK SHALL BE COORDINATED AND PERFORMED UNDER THE DIRECTION OF THE CITY OF PORTLAND'S AUTHORIZED REPRESENTATIVE. ALL MATERIALS AND INSTALLATION SHALL MEET MDOT, FAA AND/OR THE CITY OF PORTLAND SPECIFICATIONS, AS SPECIFIED.

2. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR THE ELEVATION OF THE EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES AND WHERE POSSIBLE MEASUREMENTS TAKEN IN THE FIELD. THIS INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANY AND DIG SAFE (1-888-DIG-SAFE) AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS. ANY UTILITIES DAMAGED BY THE CONTRACTOR DURING CONSTRUCTION OPERATIONS SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR AT NO ADDITIONAL EXPENSE TO THE OWNER.

3. ALL MATERIAL SCHEDULES SHOWN ON THE PLANS ARE FOR GENERAL INFORMATION ONLY. THE CONTRACTOR SHALL PREPARE THE CONTRACTOR'S OWN MATERIAL SCHEDULES BASED UPON REVIEW OF THE PLANS. ALL SCHEDULES SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO ORDERING MATERIALS OR PERFORMING WORK.

4. THE FOLLOWING BENCHMARKS HAVE BEEN ESTABLISHED FOR THE PROJECT.

   A1/DISK ELEVATION OF 66.04 (NGVD 29) AND A2/DISK ELEVATION OF 64.32 (NGVD 29) WERE INSTALLED ON THE RISERS OF THE UNDERGROUND SPENT DEICING FLUID STORAGE TANK FOR THIS PROJECT BY PLISGA AND DAY. REFER TO SHEET 3.0 FOR LOCATIONS OF THE BENCHMARKS. NOTE THAT DISK A2 WILL BE REMOVED AS A RESULT OF THIS PROJECT.

5. THE CONTRACTOR SHALL COORDINATE AND COOPERATE WITH THE OWNERS OF ANY UTILITY (UNDERGROUND OR OVERHEAD) IN THEIR REMOVAL, REARRANGEMENT, OR REPAIR.

   THE FOLLOWING UTILITY COORDINATION REQUIREMENTS APPLY TO THE PROJECT:

   PORTLAND WATER DISTRICT
   THE CONTRACTOR SHALL PROTECT ALL WATER MAINS AND SERVICES THROUGHOUT THE CONSTRUCTION PROCESS. REPAIR AND RELOCATIONS TO SERVICES OR TO WATER MAINS SHALL BE INCIDENTAL TO THE WORK. THERE ARE NO KNOWN WATER MAINS WITHIN THE PROJECT AREA.

   FAIRPOINT COMMUNICATIONS
   FAIRPOINT COMMUNICATIONS MAINTAINS UNDERGROUND UTILITY IN THE VICINITY (AIRPORT PROPERTY) HOWEVER THERE ARE NO KNOWN FAIRPOINT UTILITY LINES WITHIN THE PROJECT AREA. THE CONTRACTOR MUST CONFIRM NO UTILITY LINES EXIST WITHIN THE PROJECT WORK LIMITS PRIOR TO CONSTRUCTION. IF UTILITY LINES ARE FOUND TO EXIST THEN THE CONTRACTOR SHALL PROTECT THE UNDERGROUND LINES THROUGHOUT THE CONSTRUCTION PROCESS AND COORDINATE WITH FAIRPOINT COMMUNICATIONS FOR PROTECTION OF WIRES AND SERVICES.

   CENTRAL MAINE POWER
   CENTRAL MAINE POWER MAINTAINS UNDERGROUND PRIMARY UTILITY LINES AND SERVICE LINES IN THE VICINITY (AIRPORT PROPERTY) HOWEVER THERE ARE NO KNOWN UTILITY LINES WITHIN THE PROJECT AREA. THE CONTRACTOR MUST CONFIRM NO UTILITY LINES EXIST WITHIN THE PROJECT WORK LIMITS PRIOR TO CONSTRUCTION. IF UTILITY LINES ARE FOUND TO EXIST THEN THE CONTRACTOR SHALL PROTECT THE UNDERGROUND LINES THROUGHOUT THE CONSTRUCTION PROCESS AND COORDINATE WITH CENTRAL MAINE POWER FOR PROTECTION OF WIRES AND SERVICES.

   CITY OF PORTLAND PUBLIC WORKS DEPARTMENT
   THE CITY OF PORTLAND PUBLIC WORKS DEPARTMENT MAINTAINS GRAVITY SEWER MAINS IN THE VICINITY (AIRPORT PROPERTY). EXISTING FACILITIES ARE IDENTIFIED ON THE DRAWINGS PER RECORD DRAWING INFORMATION AND SHALL BE RELIED UPON AS APPROXIMATE ONLY.

   AIRPORT CABLES
   AIRPORT CABLES AND UGE EXIST IN MANY LOCATIONS WITHIN THE PROJECT AREA, AND SHALL BE PROTECTED OR RELOCATED AS IDENTIFIED ON THE PROJECT DRAWINGS. EXISTING FACILITIES ARE IDENTIFIED ON THE DRAWINGS PER RECORD DRAWING INFORMATION AND SHALL BE RELIED UPON AS APPROXIMATE ONLY. THE CONTACT IN CASE AIRPORT CABLES ARE ENCOUNTERED IS:

CONTACT	PHONE
FAA - BOB DUROCHER	207-780-3739
FAA - JAMES MELLO	207-780-3839 (OFFICE) AND 207-318-2830 (CELL)

   PORTLAND PIPE LINE
   AN 18-NCH OIL PIPELINE EXISTS IN THE PROJECT AREA. THE CONTRACTOR WILL BE REQUIRED TO FOLLOW THE GUIDELINES AND CONSTRUCTION PRACTICES LISTED ON THIS SHEET FOR WORK PERFORMED IN THE PORTLAND PIPELINE RIGHT OF WAY.

6. THE CONTRACTOR WILL BE RESPONSIBLE TO PROVIDE THEIR OWN STAGING AND MATERIALS STORAGE IN A MANNER THAT DOES NOT IMPACT TRAFFIC FLOW OR NEIGHBORING PROPERTIES OR VIOLATE ANY FAA REGULATIONS.

7. ALL AREAS OUTSIDE THE WORK AREA, DAMAGED BY THE CONTRACTOR, SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL EXPENSE TO THE OWNER.

8. PROPERTY MARKERS AND STREET LINE MONUMENTS SHALL BE PROPERLY PROTECTED AND, IF DISTURBED, SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE BY A LICENSED SURVEYOR.

9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ALL DAMAGES TO WORK AREAS DISTURBED DURING CONSTRUCTION.

10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PRESERVATION OF ALL TREES AND SHRUBS ON THE PROJECT. DAMAGED TREES OR SHRUBS ON PRIVATE PROPERTY SHALL BE REPLACED AS DETERMINED BY DISCUSSIONS WITH THE PROPERTY OWNER.

11. EXISTING PAVEMENT SHALL BE SAW CUT PRIOR TO PLACEMENT OF NEW PAVEMENT OR CONCRETE, THE EXISTING PAVEMENT SURFACE SHALL BE PREPARED BY GRINDING A MINIMUM OF A 2" DEEP, 2 FOOT WIDE SECTION OR MORE AS DETAILED ON THE PROJECT DRAWINGS TO ALLOW OVERLAP OF THE NEW PAVEMENT OVER EXISTING BASE ASPHALT.

12. EXISTING DRAINAGE STRUCTURES SHALL NOT BE DISTURBED UNLESS OTHERWISE NOTED.

13. THE CONTRACTOR SHALL BE RESPONSIBLE AT HIS OWN EXPENSE FOR REPAIRING TO SATISFACTORY CONDITION ANY PAVEMENT OR CONCRETE APRON THAT HAS EXPERIENCED EXCESSIVE SETTLEMENT, CRACKING, OR OPENING OF JOINTS PER THE DISCRETION OF THE THE RESIDENT ENGINEER OR THE CITY OF PORTLAND'S REPRESENTATIVE AIRPORT PERSONNEL.

14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UTILITIES PRIOR TO THE START OF WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING DAMAGED UTILITIES RESULTING FROM THE PROGRESS OF WORK AT NO ADDITIONAL EXPENSE TO THE OWNER.

15. ALL WORK SHALL BE CONFINED TO THE AREAS SHOWN ON THE PLANS.

16. LONG TERM (>24 HRS) CLOSING OF ROADWAYS OR ANY AIRPORT FACILITIES SHALL NOT BE PERMITTED UNLESS APPROVED BY THE DEPUTY AIRPORT DIRECTOR- OPERATIONS.

17. ALL DISTURBED SLOPE AREAS SHALL BE LOAMED AND SEEDED PER THE PROJECT PLANS AND SPECIFICATIONS.

18. ALL DISTURBED AREAS TO REMAIN GRASSED ARE TO RECEIVE A MINIMUM OF 2" OF TOPSOIL PRIOR TO PERMANENT SEEDING UNLESS OTHERWISE NOTED.

19. DISPOSAL OF SURPLUS MATERIAL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. SURPLUS MATERIAL SHALL NOT BE DISPOSED OF ON THE PROJECT SITE. DISPOSAL SHALL BE MADE ONLY AT WASTE AREAS WHICH ARE LICENSED TO ACCEPT SUCH MATERIALS, UNLESS THE MATERIALS CAN BE PROPERLY AND LEGALLY INCORPORATED IN FILLS IN OTHER PROJECTS OF THE CONTRACTOR. DISPOSAL OF STUMPS AND GRUBBINGS MUST BE IN ACCORDANCE WITH THE MEDEP PERMIT FOR THIS PROJECT ATTACHED TO THE PROJECT SPECIFICATIONS.

20. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL REQUIRED CONSTRUCTION PERMITS.

21. MAINTENANCE OF TRAFFIC SHALL BE PER THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" AND ALL OTHER FAA REGULATIONS THAT APPLY TO THIS SITE.

22. THE CONTRACTOR SHALL SUBMIT A PLAN TO CONTROL ALL TRAFFIC DURING THE PERIOD OF CONSTRUCTING THE IMPROVEMENTS TO THE JETPORT.

23. THE CONTRACTOR SHALL PROVIDE THE CITY OF PORTLAND WITH A SCHEDULE OF WORK FOR CONSTRUCTING THE IMPROVEMENTS AND A 24-HOUR EMERGENCY CONTACT LIST PRIOR TO COMMENCEMENT OF CONSTRUCTION.

24. THE CONTRACTOR SHALL PROVIDE ONE FULL-TIME, ON-SITE MECHANICAL PICKUP SWEEPER FOR THE EXCLUSIVE USE OF SWEEPING AND COLLECTING/REMOVING DUST AND DEBRIS (FOD) FROM AIRFIELD PAVEMENTS AS WELL AS HAUL ROUTES BOTH ON THE AIRPORT PROPERTY AND ADJACENT TO PUBLIC ROADWAYS.

LAYOUT NOTES:

1. ALL DIMENSIONING, UNLESS NOTED OTHERWISE, IS TO THE EDGE OF PAVEMENT, EDGE OF CONCRETE, FACE OF CURB OR BUILDING.

2. ALL SIGNS INDICATED ON THE LAYOUT PLANS ARE TO MEET ALL REQUIREMENTS AND STANDARDS OF THE MAINE DEPARTMENT OF TRANSPORTATION AND THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AS WELL AS CURRENT FAA ADVISORY CIRCULARS.

3. COORDINATES FOR ALL IMPROVEMENTS SHALL BE PROVIDED TO THE CONTRACTOR IN ELECTRONIC FORMAT PRIOR TO THE START OF WORK.

4. PIPE LENGTH EQUALS THE CENTER TO CENTER DISTANCES BETWEEN CATCH BASINS AND/OR MANHOLES MINUS ONE-HALF OF THE INSIDE DIAMETER OF EACH CATCH BASIN OR MANHOLE.

GRADING AND DRAINAGE NOTES:

1. UNLESS OTHERWISE NOTED, ALL STORM DRAIN PIPE SHALL BE IN ACCORDANCE WITH FAA SPECIFICATIONS SECTION 701 - PIPE FOR STORM DRAINS AND CULVERTS, WITH THE EXCEPTION THAT THE ONLY ACCEPTABLE TYPES OF PIPE ARE AS FOLLOWS:

   CLASS V REINFORCED CONCRETE PIPE (RCP)
   POLYVINYL CHLORIDE PIPE (PVC)

2. TOPSOIL STRIPPED IN AREAS OF CONSTRUCTION THAT IS SUITABLE FOR REUSE AS LOAM AS DETERMINED BY THE ENGINEER SHALL BE STOCKPILED ON SITE AT A LOCATION TO BE DESIGNATED BY THE OWNER. UNSUITABLE SOIL AS DETERMINED BY THE ENGINEER AND EXCESS TOPSOIL SHALL BE SEPARATED, REMOVED AND DISPOSED OF AT AN APPROVED DISPOSAL LOCATION OFF SITE. ALL DISPOSED MATERIALS SHALL BE DISCARDED IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL ENVIRONMENTAL REGULATIONS.

3. THE CONTRACTOR SHALL ANTICIPATE THAT GROUNDWATER WILL BE ENCOUNTERED DURING CONSTRUCTION AND SHALL INCLUDE SUFFICIENT COSTS WITHIN THEIR BID TO PROVIDE DEWATERING AS NECESSARY TO ALLOW FOR WORK TO BE COMPLETED IN-THE-DRY. NO SEPARATE PAYMENT SHALL BE MADE TO THE CONTRACTOR FOR DEWATERING.

4. THE CONTRACTOR WILL BE REQUIRED TO PROTECT OPEN TRENCHES AND BOX CUTS FROM FILLING WITH RAIN WATER.

UTILITY NOTES:

1. PRIOR TO BEGINNING UTILITY WORK OR DRAINAGE IMPROVEMENTS, THE CONTRACTOR SHALL EXCAVATE TEST PITS TO DETERMINE LOCATION AND ELEVATION OF EXISTING UTILITIES. EXCAVATION WITHIN 12-INCHES OF EXISTING UTILITIES SHALL BE BY HAND. ALL FINDINGS SHALL BE REPORTED TO THE OWNER OR THEIR REPRESENTATIVE PRIOR TO THE START OF FURTHER WORK SO THE ENGINEER MAY REVIEW AND MAKE DESIGN ADJUSTMENTS AS NECESSARY.

EROSION CONTROL NOTES:

1. LAND DISTURBING ACTIVITIES SHALL BE ACCOMPLISHED IN A MANNER AND SEQUENCE THAT RESULTS IN THE LEAST DISTURBANCE TO THE SITE.

2. PRIOR TO BEGINNING ANY CLEARING/LAND DISTURBING ACTIVITIES, THE CONTRACTOR SHALL INSTALL THE PERIMETER SILT FENCE(S) OR EROSION CONTROL MIX BERM(S) AND THE CONSTRUCTION ENTRANCE(S) AND ALL OTHER EROSION CONTROL MEASURES AS SPECIFIED WITHIN THE PROJECT SPECIFICATIONS AND WITHIN THIS PLAN SET.

3. ALL GROUND AREAS GRADED FOR CONSTRUCTION WILL BE GRADED, LOAMED AND SEEDED AS SOON AS POSSIBLE. PERMANENT SEED MIXTURE SHALL CONFORM TO THE SEEDING PLAN CONTAINED IN SPECIFICATIONS PREPARED FOR THIS PROJECT.

4. PRIOR TO PAVING OR INSTALLATION OF THE CONCRETE APRON, THE CONTRACTOR SHALL FLUSH SILT FROM ALL STORM DRAIN LINES AND REMOVE ACCUMULATED SEDIMENT FROM ALL SUMPS AND MANHOLE INVERTS. SILT SHALL NOT BE FLUSHED OR DISPOSED INTO THE ADJACENT WETLANDS OR WATER COURSES.

5. SILT FENCES AND/OR SEDIMENT BARRIERS SHALL BE INSPECTED, REPAIRED AND CLEANED ON A REGULAR BASIS AND ALWAYS AFTER A SIGNIFICANT RAIN EVENT.

6. THE CONTRACTOR SHALL REPAIR AND ADD STONE TO THE CONSTRUCTION ENTRANCE(S) AS IT BECOMES SATURATED WITH SEDIMENT TO ENSURE THAT IT WORKS AS PLANNED DURING CONSTRUCTION. THE CONTRACTOR SHALL SWEEP ACCESS ROADWAYS AND THE WORK AREA TO REMOVE ANY SEDIMENT.

7. SILT REMOVED FROM AROUND INLETS AND BEHIND THE SILT FENCES SHALL BE PLACED ON A TOPSOIL STOCKPILE AND MIXED INTO IT FOR LATER USE IN LANDSCAPING OPERATIONS.

8. THE CONTRACTOR IS CAUTIONED THAT FAILURE TO COMPLY WITH THE SEQUENCE OF CONSTRUCTION AND OTHER PERMIT REQUIREMENTS MAY RESULT IN MONETARY PENALTIES. THE CONTRACTOR SHALL BE ASSESSED ALL SUCH PENALTIES AT NO COST TO THE OWNER OR PERMITTEE.

9. ALL NON-PAVED AREAS DISTURBED DURING CONSTRUCTION SHALL BE LOAMED AND SEEDED, UNLESS OTHERWISE DIRECTED BY THE OWNER.

10. THE CONTRACTOR SHALL TAKE ALL NECESSARY ACTIONS TO ENSURE THAT ITS ACTIVITIES OR THOSE OF ITS AGENTS DO NOT RESULT IN NOTICEABLE EROSION OF SORTS OR NEGATIVE DUST EMISSIONS ON THE SITE DURING CONSTRUCTION AND OPERATION OF THE PROJECT.

PORTLAND PIPE LINE (PPLC) CONSTRUCTION PRACTICES:

THE GUIDELINES AND CONSTRUCTION PRACTICES LISTED BELOW SHALL BE FOLLOWED BY OTHER PIPELINE, UTILITY, CONSTRUCTION ORGANIZATIONS, AND OTHERS PERFORMING WORK IN THE PORTLAND PIPE LINE CORPORATION RIGHT-OF-WAY.

1. A MINIMUM DISTANCE OF 50 FEET SHALL BE MAINTAINED BETWEEN NEW STRUCTURES AND NEAREST PIPELINE (49 CFR 195.210).
2. CROSSINGS OF THE PIPELINES SHOULD IDEALLY BE 90°, BUT IN NO CASE LESS THAN 45°.
3. A MINIMUM VERTICAL DISTANCE BETWEEN LINES CROSSING BENEATH THE PIPELINES SHALL BE 18 INCHES. COMPACTION NEAR THE PIPELINES SHALL BE EQUAL TO ORIGINAL SOIL COMPACTION. CERTAIN SOIL CONDITIONS MAY DICTATE ADDITIONAL VERTICAL CLEARANCE.
4. LINES CROSSING OVER THE PIPELINES SHALL HAVE AN 18 INCH MINIMUM VERTICAL CLEARANCE WITH 90% OR GREATER PROCTOR COMPACTION DENSITY OR PIPELINE APPROVED SUPPORTS ON BOTH SIDES OF THE PIPELINE CROSSED.
5. EXCAVATION IN QUESTIONABLE SOILS CONDITIONS, WHERE SHEAR FAILURE OR TRENCH COLLAPSE MIGHT OCCUR, MUST BE INVESTIGATED BY A SOILS ENGINEERING CONSULTANT AND WHERE CONDITIONS WARRANT IT, SUITABLE PLANS FOR SOILS STABILIZATION SHALL BE DESIGNED AND CARRIED OUT BY A QUALIFIED ENGINEER.
6. NO EXCAVATION IN THE VICINITY OF PIPELINES IS TO BE MADE WITHOUT A PIPELINE REPRESENTATION BEING PRESENT. EXCAVATION WITHIN FIVE (5) FEET OF A PIPELINE SHALL BE DONE WITH EXTREME CAUTION AND ONLY BY HAND DIGGING UNDER A PIPE LINE REPRESENTATIVE'S DIRECTION.
7. WHERE HEAVY CONSTRUCTION VEHICLES MUST CROSS A PIPELINE, SUITABLE COMPACTED COVER AND PADDING SHALL BE PLACED OVER THE PIPELINE TO PROVIDE GENERALLY NOT LESS THAN FOUR (4) FEET OF SUITABLE PROTECTIVE MATERIAL OVER THE PIPELINE. PIPE LINE REPRESENTATIVE WILL LOCATE PIPELINES FOR LANDOWNER OR CONTRACTOR UPON REQUEST.
8. IN NO CASE SHALL COVER BE LESS THAN THAT REQUIRED BY THE DEPARTMENT OF TRANSPORTATION, CODE OF FEDERAL REGULATION FOR TRANSPORTATION OF HAZARDOUS LIQUIDS BY PIPELINE (49 CFR 195.248).
9. BLASTING IS PROHIBITED IN ASSOCIATION WITH THIS PROJECT WITHOUT WRITTEN PERMISSION FROM THE PORTLAND PIPELINE.
10. BE AWARE OF POTENTIAL INTERFERENCE BETWEEN PORTLAND PIPE LINE'S DC ELECTRIC RECTIFIER SYSTEMS AND AC POWER LINE OR POWER CABLE NETWORKS. IF A POLE LINE ANCHOR IS PLACED NEAR A GROUND BED, CONTACT A CORROSION DEPARTMENT REPRESENTATIVE FOR ASSISTANCE.
11. PORTLAND PIPE LINE IS TO BE NOTIFIED AT LEAST 48 HOURS BEFORE WORK IS PERFORMED IN THE VICINITY OF ITS PIPELINES. IN EXTREME EMERGENCIES, WHEN THIS IS NOT POSSIBLE, NOTIFICATION SHOULD BE GIVEN AT THE EARLIEST POSSIBLE TIME.
12. NO SPOIL, EITHER OF A PERMANENT OR TEMPORARY NATURE, IS TO BE DEPOSITED ON THE PIPELINES.
13. PORTLAND PIPE LINE SHOULD BE NOTIFIED DURING INITIAL PLANNING STAGES FOR FUTURE INSTALLATIONS LOCATED NEAR PIPELINES SO THAT THE BEST MUTUALLY ACCEPTABLE DESIGN PRACTICES ARE ADOPTED.
14. PROJECTS INVOLVING GRADING OF ACCESS OR UTILITY CROSSINGS OF PORTLAND PIPE LINE CORPORATION PIPELINES OR RIGHTS OF WAY MUST BE SUBMITTED TO PPLC FOR REVIEW AND WRITTEN APPROVAL PRIOR TO CONSTRUCTION, WITH SUPPORTING DOCUMENTATION TO DEMONSTRATE THAT THE WORK WILL COMPLY WITH THE ABOVE REQUIREMENTS.
15. CONTACT INFORMATION FOR PPLC: THOMAS A. HARDINSON, CEO, (207) 767-0440, KEN BROWN, ENGINEER - MAINE (207) 767-0449.

EROSION AND SEDIMENT CONTROL LEGEND

- SILT FENCE/SEDIMENT BARRIER — SF
- CONSTRUCTION ENTRANCE
- EROSION CONTROL MESH BLANKET
- RIPRAP PROTECTION
- STONE CHECK DAM
- HAY BALE INLET BARRIER
- CATCH BASIN SEDIMENT PROTECTOR

GENERAL LEGEND

	EXISTING	PROPOSED
CONTOUR	100	47
FENCE	X X	X X
CONSTRUCTION BASELINE		
EDGE OF PAVEMENT		
PROPERTY LINE		
LIMIT OF DISTURBANCE		
STORM DRAIN LINE	24"	
WATER LINE	6"W	
SPRING HIGH TIDE		
TREELINE		
LIGHTS		
MANHOLE		
CATCH BASIN		
SPOT GRADE	×47.98	×4[illegible].98
WETLANDS		
PAVEMENT	PAVED	
BUILDING		
CONCRETE		
CURBING		
UNDERGROUND ELECTRIC	UGE	UGE
SEWER LINE	S	
GAS LINE	G	
WATER GATE VALVE		
TREES/LANDSCAPING		
RIPRAP		

500,000 GALLON UNDERGROUND STORAGE TANK:

AN UNDERGROUND STORAGE TANK FOR THE PURPOSES OF STORING SPENT PROPYLENE GLYCOL (AIRCRAFT DEICING FLUID) IS LOCATED WITHIN THE PROJECT AREA AND THE WORK ASSOCIATED WITH THIS PROJECT WILL INVOLVE PLACEMENT OF A CONCRETE TANK PROTECTION SLAB, GRAVELS, AND PAVEMENT OVER THE SOUTHERN PORTION OF THE EXISTING UNDERGROUND TANK. THE CONTRACTOR MUST PROVIDE ADEQUATE DEWATERING SYSTEMS AT ALL TIMES SUCH THAT ALL EXCAVATIONS NEAR TO AND ABOVE THE UNDERGROUND STORAGE TANK REMAIN DRY TO PREVENT WATER FROM ENTERING THE TANK AND TO PREVENT FLOTATION OF THE TANK. THE CONTRACTOR SHALL BE REQUIRED TO SUBMIT AN UNDERGROUND STORAGE TANK PROTECTION DEWATERING PLAN PREPARED BY AND STAMPED BY A MAINE PROFESSIONAL ENGINEER FOR REVIEW AND APPROVAL BY THE OWNER OR RESIDENT ENGINEER PRIOR TO ANY WORK WITHIN 30-FEET OF THE EXISTING UNDERGROUND STORAGE TANK.

PERMITTING DRAWINGS

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	DWN.	CHKD.	DSGN.	DATE

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STATE OF MAINE — DWIGHT D. ANDERSON — No. 9275 — LICENSED PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

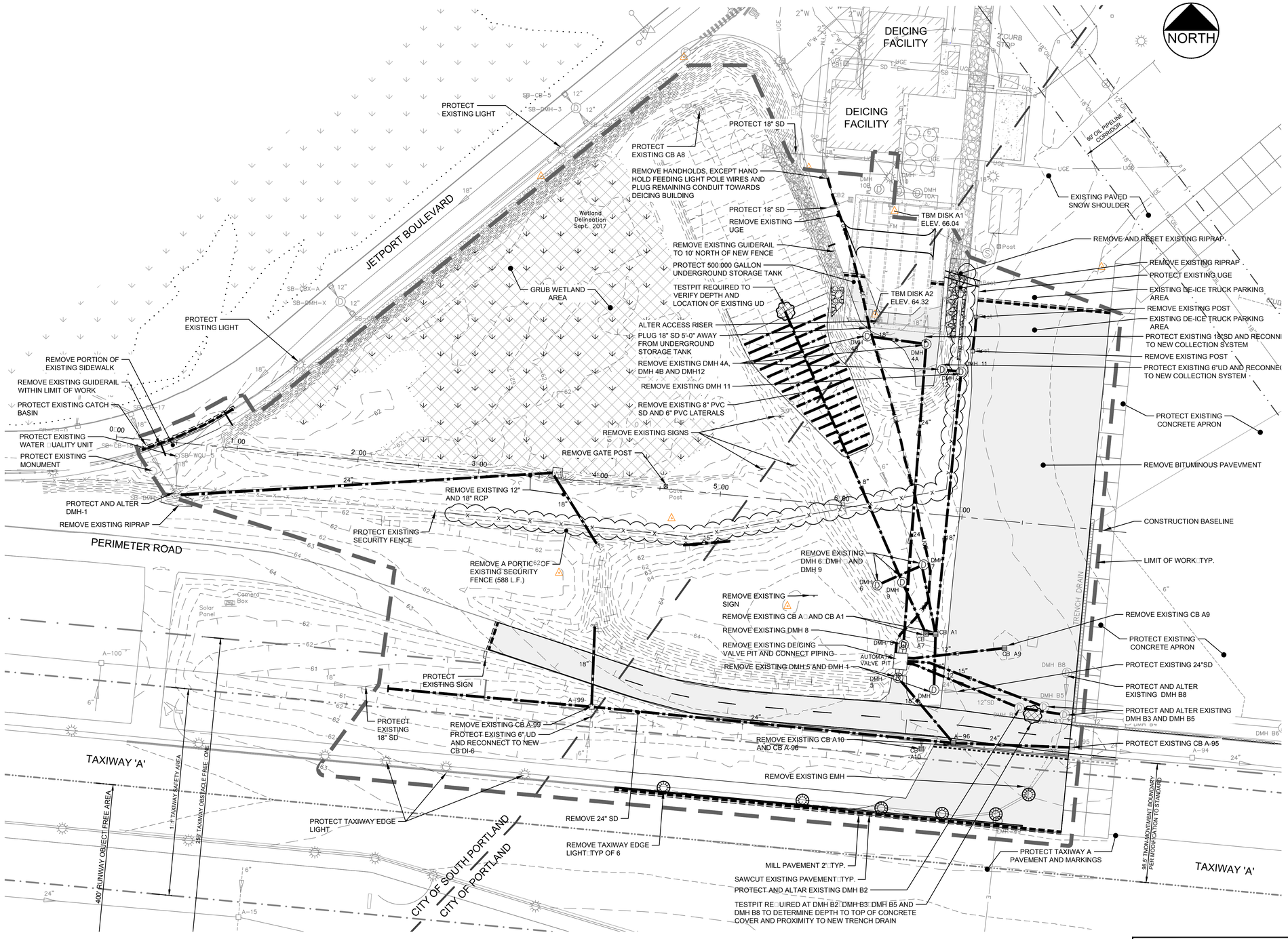
Title

GENERAL NOTES AND LEGEND

Project No.	Scale
195211590	AS NOTED

Sheet

1.1



REMOVAL LEGEND

- BITUMINOUS PAVEMENT TO BE REMOVED
- PAVEMENT SAWCUT
- PAVEMENT MILL
- LIMIT OF WORK
- EXISTING UGE TO BE REMOVED
- STORMDRAIN/UNDERDRAIN TO BE REMOVED

GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

PERMITTING DRAWINGS

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Jackman, Maine 04945

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By	Appd.	YY.MM.DD	Revision
DDA	DDA	19.04.08	3 ISSUED TO CITY OF PORTLAND FOR APPROVAL
DDA	DDA	19.03.08	2 RELEASED FOR BID
DDA	DDA	19.02.28	1 ISSUED FOR CITY / MaDOT AND FAA REVIEW

File Name: 195211590_demo_deicing	LA DWN.	DDA CHKD.	AMG DSGN.	JAN 2018 DATE

Permit-Seal

STATE OF MAINE
DWIGHT D. ANDERSON
No. 5272
LICENSED
PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

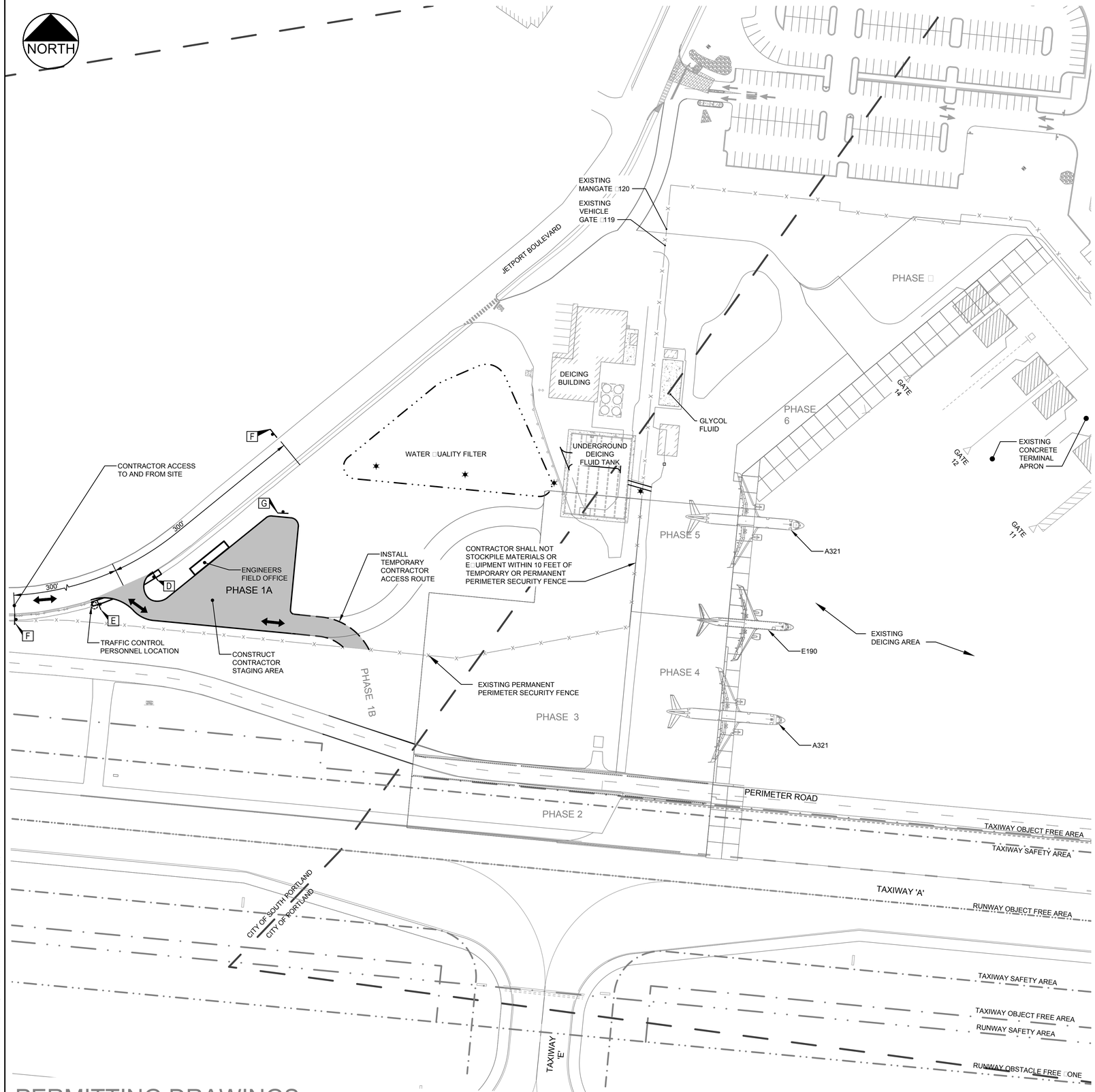
Title

HOLD/DEICING/RON APRON EXISTING CONDITIONS AND DEMOLITION PLAN

Project No.	Scale
195211590	1" = 40'

Sheet

3.0



LEGEND

- CONSTRUCTION BARRELS
- SIGN (LEGEND BELOW)
- GATE GUARD/TRAFFIC CONTROL PERSONNEL
- HAUL ROUTE

NOTE: REFER TO SHEET 2.8 FOR DETAILS OF THE LOW PROFILE BARRICADES

SIGN LEGEND

STOP CHECK IN WITH GATE GUARD	STOP NO CONSTRUCTION TRAFFIC BEYOND THIS POINT	CONSTRUCTION PERSONNEL AND VEHICLES SHALL NOT PASS BEYOND THE PERIMETER BARRICADES	CONSTRUCTION TRAFFIC ONLY	CONSTRUCTION TRAFFIC ONLY
A	B	C	D	E
CONSTRUCTION VEHICLES ENTERING	CONTRACTOR EMPLOYEE PARKING		AUTHORI ED PERSONNEL AND VEHICLES ONLY	
F	G	H	I	

PHASE 1A NOTES:

1. PHASE 1A WORK SHALL BE COMPLETED OUTSIDE OF THE SIDA/SECURE AREA. THE EXISTING FENCE SHALL REMAIN INTACT DURING THIS PHASE.
2. ALL SIGNS ARE TO BE MOUNTED ON TEMPORARY TRIPODS WITH APPROPRIATE BALLASTS.
3. ALL CONSTRUCTION SAFETY SIGNS ARE TO BE RED WITH WHITE LETTERING MEETING MUTCD STANDARDS.
4. A SEPARATE SAFETY AND SECURITY MEETING WITH THE CONTRACTOR IS RE UIRED PRIOR TO THE START OF EACH WORK PHASE AND SUB-PHASE.
5. CONTRACTOR ACCESS FOR ALL PHASE 1A WORK SHALL BE FROM JETPORT BOULEVARD.
6. THE CONTRACTOR'S ATTENTION IS CALLED TO THE SPECIAL PROVISIONS SECTION IN THE CONTRACT DOCUMENTS.
7. CONTRACTOR SHALL NOT STOCKPILE MATERIALS OR E UIPMENT WITHIN 10' OF EXISTING PERIMETER SECURITY FENCE OR BARRICADES.
8. THE CONTRACTOR PARKING FOR THIS PHASE IS LOCATED WITHIN THE STAGING AREA AS DIRECTED BY THE ON-SITE ENGINEER.
9. LI UIDATED DAMAGES SHALL APPLY TO PHASE 1A WORK NOT COMPLETED WITHIN THE TIME FRAME SPECIFIED IN THE SPECIAL PROVISIONS.

GRAPHIC SCALE

60 0 30 60 120

(IN FEET)
1 inch = 60 ft.

PERMITTING DRAWINGS

V:\1952\active\195211590\aviation\9_drawing\sheet_files-portland\195211590_safety_deicing.dwg agray 4/10/2019 2:23 PM

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Consultants

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75 Washington Avenue, Suite 1A
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Plisga & Day Land Surveyors (Surveyor)
72 Main Street
Bangor, Maine 04401

Independent Archaeological Consulting, LLC (Archaeologist)
801 Islington Street, Suite 31
Portsmouth, New Hampshire 03801

Diana's CADD Serivice, LLC (Drafting)
P. O. Box 372
Jackman, Maine 04945

Notes

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4 ISSUED TO CITY OF PORTLAND FOR APPROVAL	DDA	DDA	19.04.08
3 RELEASED FOR BID	AMG	DDA	19.03.08
2 ISSUED TO CITY, FAA AND MDOT FOR REVIEW	AMG	DDA	19.02.28
1 ISSUED TO CITY, FAA AND MDOT FOR REVIEW	AMG	DDA	YY.MM.DD

File Name: 195211590_safety_deicing	-	DDA	AMG	JAN 2018
	DWN.	CHKD.	DSGN.	DATE

Permit-Seal

STATE OF MAINE
DWIGHT D. ANDERSON
No. 9275
4-3-19
LICENSED
PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

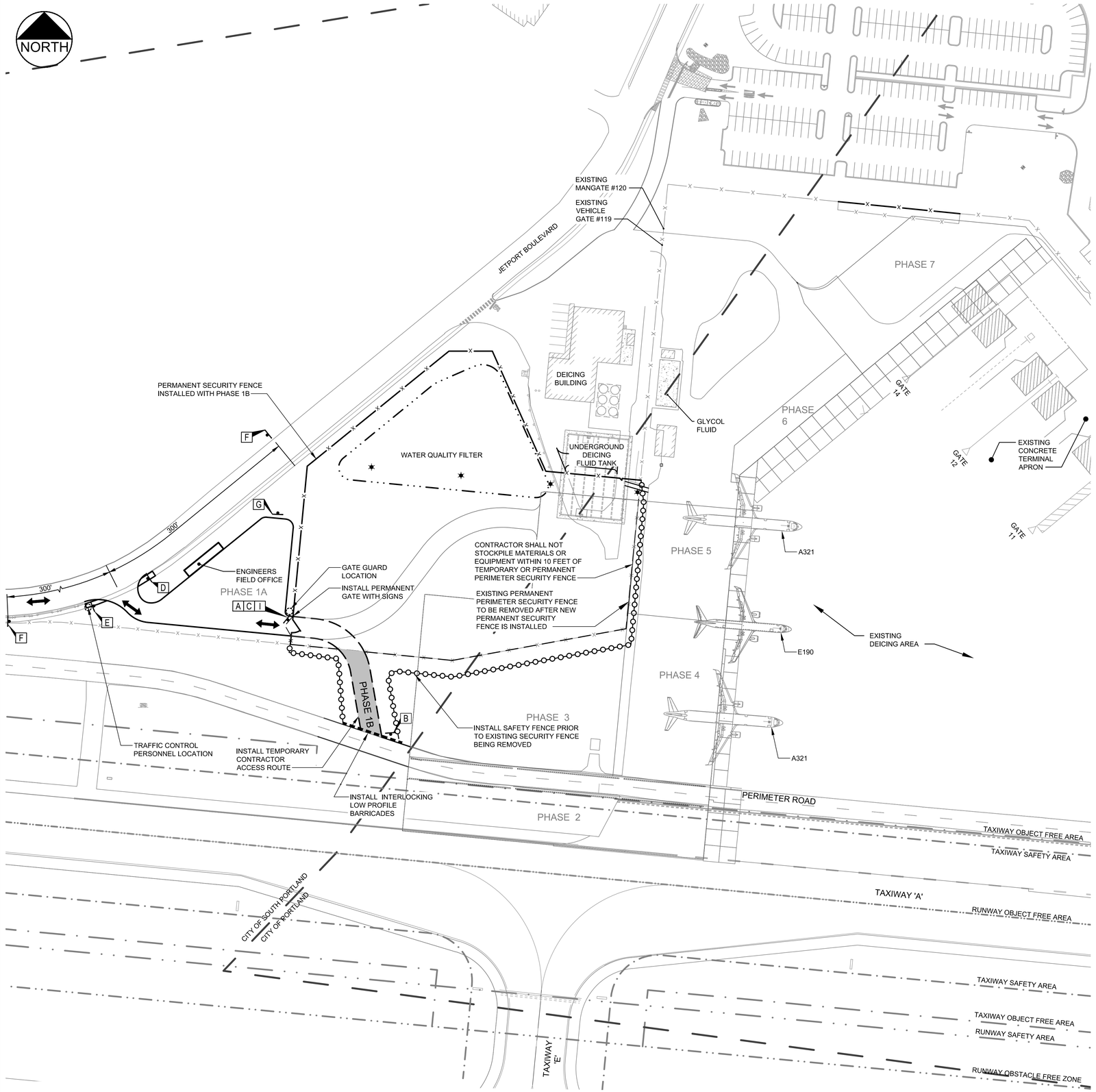
Title

DEICING PAD EXPANSION SAFETY AND PHASING PLAN PHASE 1A

Project No.	Scale
195211590	1" = 60'

Sheet

2.0



LEGEND

- INTERLOCKING LOW PROFILE BARRICADES
- SAFETY FENCE
- CONSTRUCTION BARRELS
- SIGN (LEGEND BELOW)
- GATE GUARD/TRAFFIC CONTROL PERSONNEL
- HAUL ROUTE

NOTE: REFER TO SHEET 2.8 FOR DETAILS OF THE LOW PROFILE BARRICADES

SIGN LEGEND

STOP CHECK IN WITH GATE GUARD	STOP NO CONSTRUCTION TRAFFIC BEYOND THIS POINT	CONSTRUCTION PERSONNEL AND VEHICLES SHALL NOT PASS BEYOND THE PERIMETER BARRICADES	CONSTRUCTION TRAFFIC ONLY	CONSTRUCTION TRAFFIC ONLY
A	B	C	D	E
CONSTRUCTION VEHICLES ENTERING	CONTRACTOR EMPLOYEE PARKING		AUTHORIZED PERSONNEL AND VEHICLES ONLY	
F	G	H	I	

PHASE 1B NOTES:

1. THE CONTRACTOR SHALL PROVIDE A GATE GUARD/SECURITY OFFICER ACCEPTABLE TO THE JETPORT AT ANY ACCESS GATE TO CONTROL ACCESS TO THE AIRFIELD WHEN THE GATE IS NOT LOCKED. THEY WILL ALLOW AUTHORIZED CONSTRUCTION VEHICLES ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING ALL FAA SECURITY REQUIREMENTS.
2. THE PERMANENT SECURITY FENCE AND GATE SHALL BE INSTALLED WITH THIS PHASE. BEFORE THE EXISTING FENCE IS REMOVED, THE AIRPORT WILL INSTALL A PERMANENT LOCK ON THE NEW GATE. ONCE THE PERMANENT GATE IS INSTALLED, A GATE GUARD WILL BE REQUIRED DURING CONSTRUCTION ACCESS TO SIDA/AOA.
3. SIGNS ARE TO BE MOUNTED ON TEMPORARY TRIPODS WITH APPROPRIATE BALLASTS. SIGNS A, C AND I ARE TO BE MOUNTED ON THE SECURITY FENCE AT THE NEW GATE.
4. ALL CONSTRUCTION SAFETY SIGNS ARE TO BE RED WITH WHITE LETTERING MEETING MUTCD STANDARDS.
5. A SEPARATE SAFETY AND SECURITY MEETING WITH THE CONTRACTOR IS REQUIRED PRIOR TO THE START OF EACH WORK PHASE AND SUB-PHASE.
6. CONTRACTOR ACCESS FOR ALL PHASE 1B WORK SHALL BE FROM JETPORT BOULEVARD.
7. THE CONTRACTOR'S ATTENTION IS CALLED TO THE SPECIAL PROVISIONS SECTION IN THE CONTRACT DOCUMENTS.
8. CONTRACTOR SHALL NOT STOCKPILE MATERIALS OR EQUIPMENT WITHIN 10' OF EXISTING OR PERMANENT PERIMETER SECURITY FENCE OR BARRICADES.
9. THE CONTRACTOR PARKING FOR THIS PHASE IS LOCATED WITHIN THE STAGING AREA AS DIRECTED BY THE ON-SITE ENGINEER.
10. LIQUIDATED DAMAGES SHALL APPLY TO PHASE 1B WORK NOT COMPLETED WITHIN THE TIME FRAME SPECIFIED IN THE SPECIAL PROVISIONS.
11. A RADIO CONTROL PERSON SHALL BE ON-SITE FULL TIME DURING PHASE 2 AND DURING BARRICADE SETUP OF ALL OTHER PHASES.
12. UNDERGROUND CONDUIT AND 12" UTILITY SLEEVE THAT WILL BE REQUIRED TO BE INSTALLED WITHIN 10' EITHER SIDE OF THE NEW SECURITY FENCE SHALL BE INSTALLED PRIOR TO THE INSTALLATION OF THE NEW FENCE.

GRAPHIC SCALE

60 0 30 60 120

(IN FEET)

1 inch = 60 ft.

PERMITTING DRAWINGS

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DDA	DDA	YY.MM.DD	

File Name: 195211590_safety_deicing	DWN.	CHKD.	DSGN.	DATE
	-	DDA	AMG	JAN 2018

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STATE OF MAINE — DWIGHT D. ANDERSON No. 9275 — LICENSED PROFESSIONAL ENGINEER — 4-3-2019

Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

Title

DEICING PAD EXPANSION
SAFETY AND PHASING PLAN
PHASE 1B

Project No.	Scale
195211590	1" = 60'

Sheet

2.1

LEGEND

- INTERLOCKING LOW PROFILE BARRICADES
- SAFETY FENCE
- (B) CONSTRUCTION BARRELS
- SIGN (LEGEND BELOW)
- GATE GUARD/TRAFFIC CONTROL PERSONNEL
- CONTRACTOR HAUL ROUTE
- AIRPORT TRAFFIC

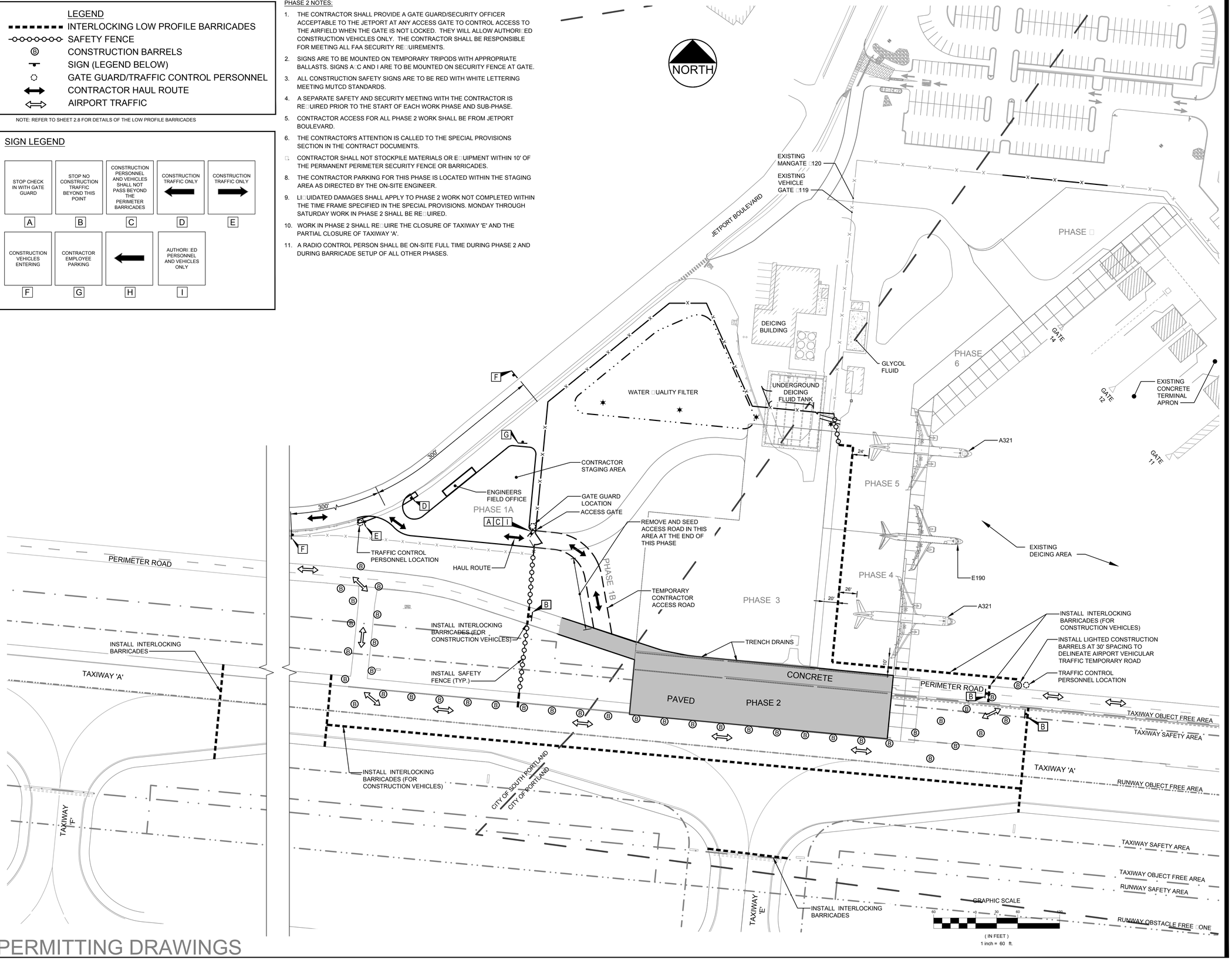
NOTE: REFER TO SHEET 2.8 FOR DETAILS OF THE LOW PROFILE BARRICADES

SIGN LEGEND

STOP CHECK IN WITH GATE GUARD	STOP NO CONSTRUCTION TRAFFIC BEYOND THIS POINT	CONSTRUCTION PERSONNEL AND VEHICLES SHALL NOT PASS BEYOND THE PERIMETER BARRICADES	CONSTRUCTION TRAFFIC ONLY ←	CONSTRUCTION TRAFFIC ONLY →
A	B	C	D	E
CONSTRUCTION VEHICLES ENTERING	CONTRACTOR EMPLOYEE PARKING	←	AUTHORIZED PERSONNEL AND VEHICLES ONLY	
F	G	H	I	

PHASE 2 NOTES:

1. THE CONTRACTOR SHALL PROVIDE A GATE GUARD/SECURITY OFFICER ACCEPTABLE TO THE JETPORT AT ANY ACCESS GATE TO CONTROL ACCESS TO THE AIRFIELD WHEN THE GATE IS NOT LOCKED. THEY WILL ALLOW AUTHORIZED CONSTRUCTION VEHICLES ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING ALL FAA SECURITY REQUIREMENTS.
2. SIGNS ARE TO BE MOUNTED ON TEMPORARY TRIPODS WITH APPROPRIATE BALLASTS. SIGNS A, C AND I ARE TO BE MOUNTED ON SECURITY FENCE AT GATE.
3. ALL CONSTRUCTION SAFETY SIGNS ARE TO BE RED WITH WHITE LETTERING MEETING MUTCD STANDARDS.
4. A SEPARATE SAFETY AND SECURITY MEETING WITH THE CONTRACTOR IS REQUIRED PRIOR TO THE START OF EACH WORK PHASE AND SUB-PHASE.
5. CONTRACTOR ACCESS FOR ALL PHASE 2 WORK SHALL BE FROM JETPORT BOULEVARD.
6. THE CONTRACTOR'S ATTENTION IS CALLED TO THE SPECIAL PROVISIONS SECTION IN THE CONTRACT DOCUMENTS.
7. CONTRACTOR SHALL NOT STOCKPILE MATERIALS OR EQUIPMENT WITHIN 10' OF THE PERMANENT PERIMETER SECURITY FENCE OR BARRICADES.
8. THE CONTRACTOR PARKING FOR THIS PHASE IS LOCATED WITHIN THE STAGING AREA AS DIRECTED BY THE ON-SITE ENGINEER.
9. LIQUIDATED DAMAGES SHALL APPLY TO PHASE 2 WORK NOT COMPLETED WITHIN THE TIME FRAME SPECIFIED IN THE SPECIAL PROVISIONS. MONDAY THROUGH SATURDAY WORK IN PHASE 2 SHALL BE REQUIRED.
10. WORK IN PHASE 2 SHALL REQUIRE THE CLOSURE OF TAXIWAY 'E' AND THE PARTIAL CLOSURE OF TAXIWAY 'A'.
11. A RADIO CONTROL PERSON SHALL BE ON-SITE FULL TIME DURING PHASE 2 AND DURING BARRICADE SETUP OF ALL OTHER PHASES.



PERMITTING DRAWINGS

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Revision	By	Appd.	YY.MM.DD

File Name: 195211590_safety_deicing	-	DDA	AMG	JAN 2018
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Permit-Seal

STATE OF MAINE
DWIGHT D. ANDERSON
No. 9275
LICENSED PROFESSIONAL ENGINEER
2019

Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

Title

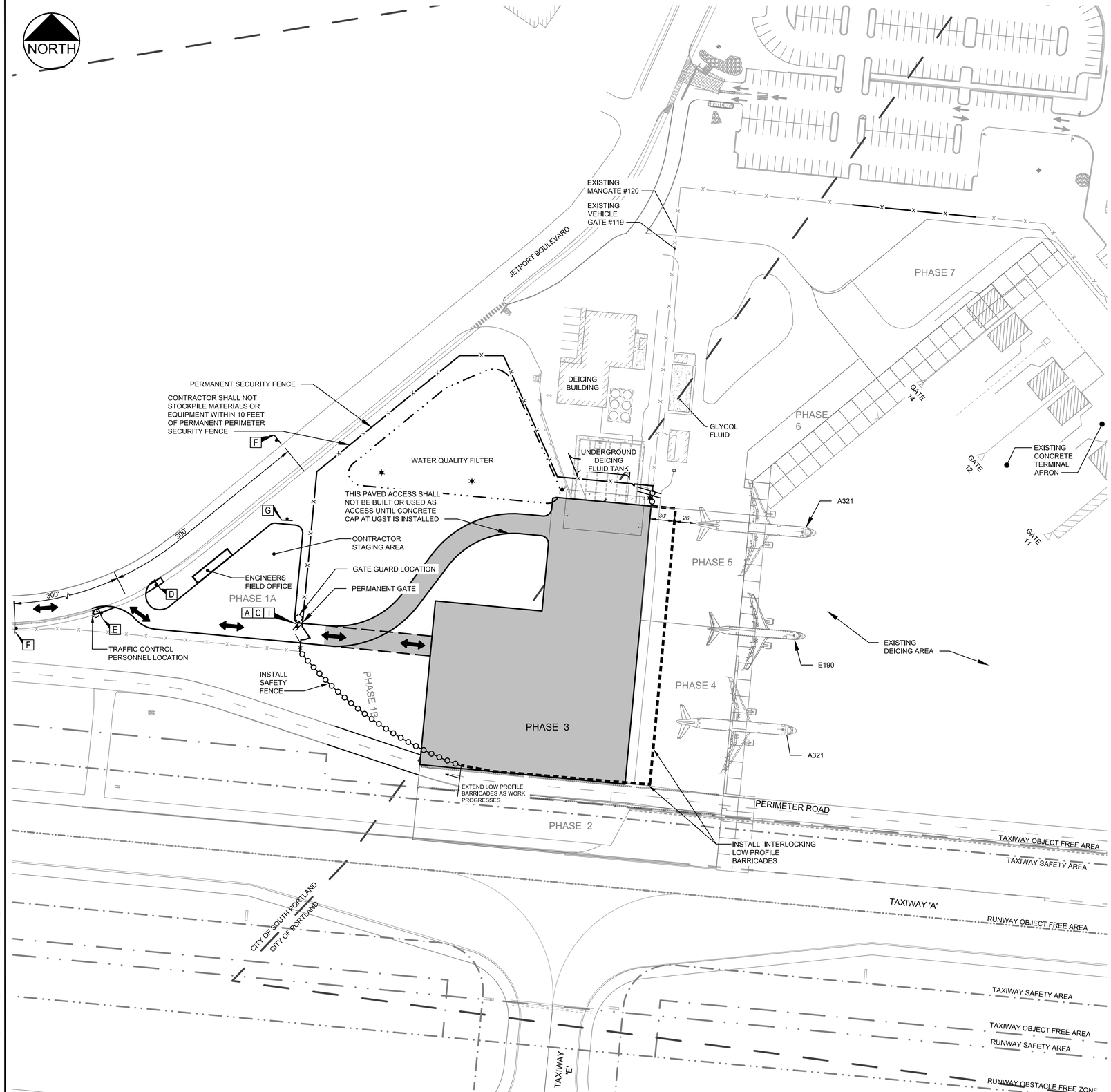
DEICING PAD EXPANSION
SAFETY AND PHASING PLAN
PHASE 2

Project No.	Scale
195211590	1" = 60'

Sheet

2.2

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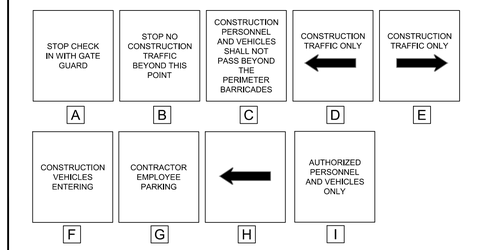


LEGEND

- INTERLOCKING LOW PROFILE BARRICADES
- SAFETY FENCE
- Ⓑ CONSTRUCTION BARRELS
- SIGN (LEGEND BELOW)
- GATE GUARD/TRAFFIC CONTROL PERSONNEL
- HAUL ROUTE

NOTE: REFER TO SHEET 2.8 FOR DETAILS OF THE LOW PROFILE BARRICADES

SIGN LEGEND



PHASE 3 NOTES:

1. THE CONTRACTOR SHALL PROVIDE A GATE GUARD/SECURITY OFFICER ACCEPTABLE TO THE JETPORT AT ANY ACCESS GATE TO CONTROL ACCESS TO THE AIRFIELD WHEN THE GATE IS NOT LOCKED. THEY WILL ALLOW AUTHORIZED CONSTRUCTION VEHICLES ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING ALL FAA SECURITY REQUIREMENTS.
2. ALL SIGNS ARE TO BE MOUNTED ON TEMPORARY TRIPODS WITH APPROPRIATE BALLASTS. SIGNS A, C AND I ARE TO BE MOUNTED ON SECURITY FENCE AT GATE.
3. ALL CONSTRUCTION SAFETY SIGNS ARE TO BE RED WITH WHITE LETTERING MEETING MUTCD STANDARDS.
4. A SEPARATE SAFETY AND SECURITY MEETING WITH THE CONTRACTOR IS REQUIRED PRIOR TO THE START OF EACH WORK PHASE AND SUB-PHASE.
5. CONTRACTOR ACCESS FOR ALL PHASE 3 WORK SHALL BE FROM JETPORT BOULEVARD.
6. THE CONTRACTOR'S ATTENTION IS CALLED TO THE SPECIAL PROVISIONS SECTION IN THE CONTRACT DOCUMENTS.
7. CONTRACTOR SHALL NOT STOCKPILE MATERIALS OR EQUIPMENT WITHIN 10' OF THE PERMANENT PERIMETER SECURITY FENCE OR BARRICADES.
8. THE CONTRACTOR PARKING FOR THIS PHASE IS LOCATED WITHIN THE STAGING AREA AS DIRECTED BY THE ON-SITE ENGINEER.
9. TEMPORARY CONTRACTOR ACCESS ROUTE IN PHASE 3 WILL NEED TO BE SHIFTED WITHIN THE WORK AREA THROUGHOUT THE PROJECT AS WORK PROGRESSES.
10. LIQUIDATED DAMAGES SHALL APPLY TO PHASE 3 WORK NOT COMPLETED WITHIN THE TIME FRAME SPECIFIED IN THE SPECIAL PROVISIONS.
11. A RADIO CONTROL PERSON SHALL BE ON-SITE FULL TIME DURING PHASE 2 AND DURING BARRICADE SETUP OF ALL OTHER PHASES.

GRAPHIC SCALE

60 0 30 60 120

(IN FEET)

1 inch = 60 ft.

PERMITTING DRAWINGS

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Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

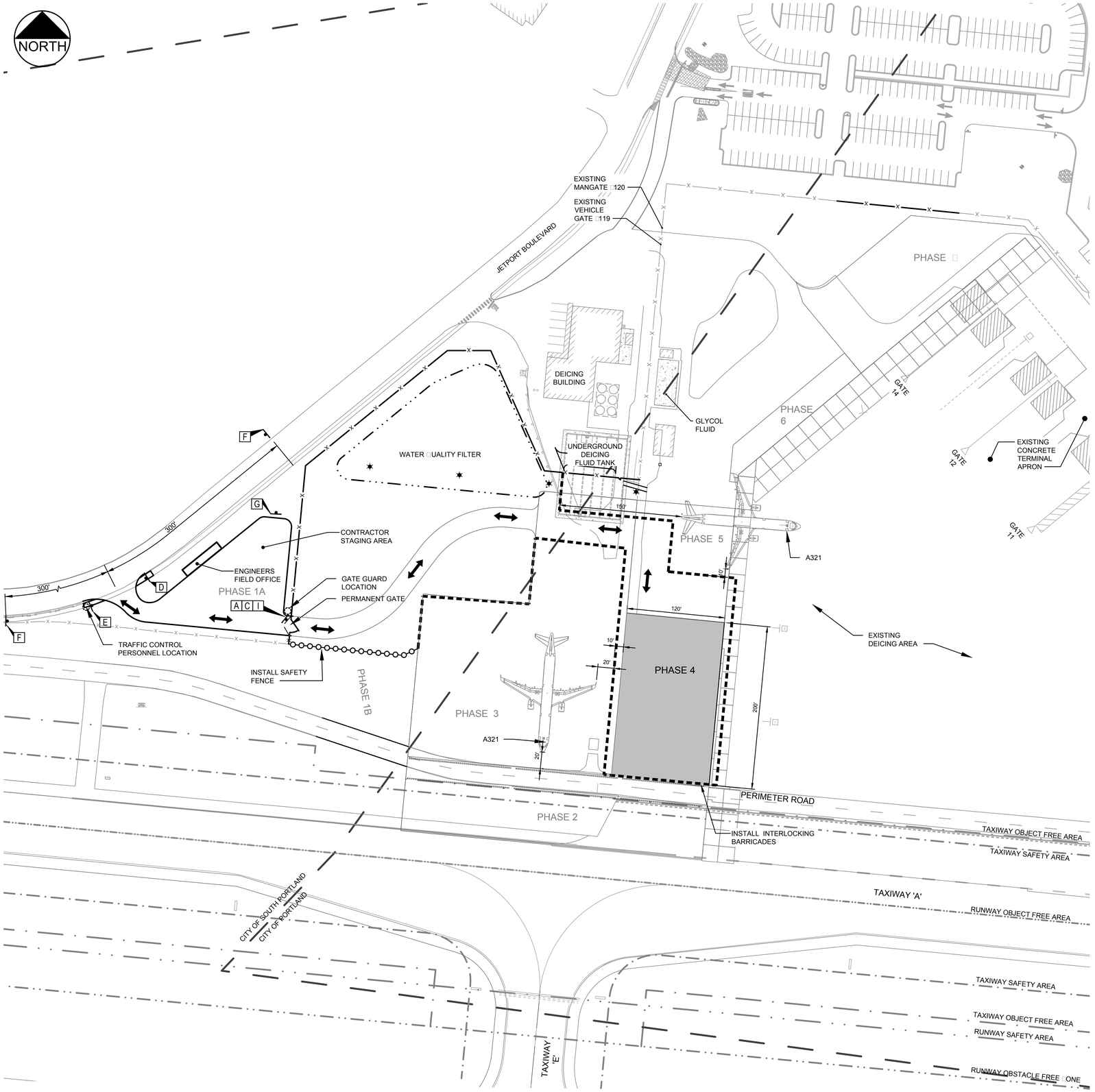
Title

DEICING PAD EXPANSION SAFETY AND PHASING PLAN PHASE 3

Project No.	Scale
195211590	1" = 60'

Sheet

2.3



LEGEND

- INTERLOCKING LOW PROFILE BARRICADES
- SAFETY FENCE
- Ⓑ CONSTRUCTION BARRELS
- SIGN (LEGEND BELOW)
- GATE GUARD/TRAFFIC CONTROL PERSONNEL
- HAUL ROUTE

NOTE: REFER TO SHEET 2.8 FOR DETAILS OF THE LOW PROFILE BARRICADES

SIGN LEGEND

STOP CHECK IN WITH GATE GUARD	STOP NO CONSTRUCTION TRAFFIC BEYOND THIS POINT	CONSTRUCTION PERSONNEL AND VEHICLES SHALL NOT PASS BEYOND THE PERIMETER BARRICADES	CONSTRUCTION TRAFFIC ONLY ←	CONSTRUCTION TRAFFIC ONLY →
A	B	C	D	E
CONSTRUCTION VEHICLES ENTERING	CONTRACTOR EMPLOYEE PARKING	←	AUTHORI□ED PERSONNEL AND VEHICLES ONLY	
F	G	H	I	

PHASE 4 NOTES:

1. THE CONTRACTOR SHALL PROVIDE A GATE GUARD/SECURITY OFFICER ACCEPTABLE TO THE JETPORT AT ANY ACCESS GATE TO CONTROL ACCESS TO THE AIRFIELD WHEN THE GATE IS NOT LOCKED. THEY WILL ALLOW AUTHORI□ED CONSTRUCTION VEHICLES ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING ALL FAA SECURITY RE□UIREMENTS.
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3. ALL CONSTRUCTION SAFETY SIGNS ARE TO BE RED WITH WHITE LETTERING MEETING MUTCD STANDARDS.
4. A SEPARATE SAFETY AND SECURITY MEETING WITH THE CONTRACTOR IS RE□UIRED PRIOR TO THE START OF EACH WORK PHASE AND SUB-PHASE.
5. CONTRACTOR ACCESS FOR ALL PHASE 4 WORK SHALL BE FROM JETPORT BOULEVARD.
6. THE CONTRACTOR'S ATTENTION IS CALLED TO THE SPECIAL CONDITIONS SECTION IN THE CONTRACT DOCUMENTS.
7. CONTRACTOR SHALL NOT STOCKPILE MATERIALS OR E□UIPMENT WITHIN 10' OF THE PERMANENT PERIMETER SECURITY FENCE OR BARRICADES.
8. THE CONTRACTOR PARKING FOR THIS PHASE IS LOCATED WITHIN THE STAGING AREA AS DIRECTED BY THE ON-SITE ENGINEER.
9. LI□UIDATED DAMAGES SHALL APPLY TO PHASE 4 WORK NOT COMPLETED WITHIN THE TIME FRAME SPECIFIED IN THE SPECIAL PROVISIONS.
11. A RADIO CONTROL PERSON SHALL BE ON-SITE FULL TIME DURING PHASE 2 AND DURING BARRICADE SETUP OF ALL OTHER PHASES.

GRAPHIC SCALE

60 0 30 60 120

(IN FEET)

1 inch = 60 ft.

PERMITTING DRAWINGS

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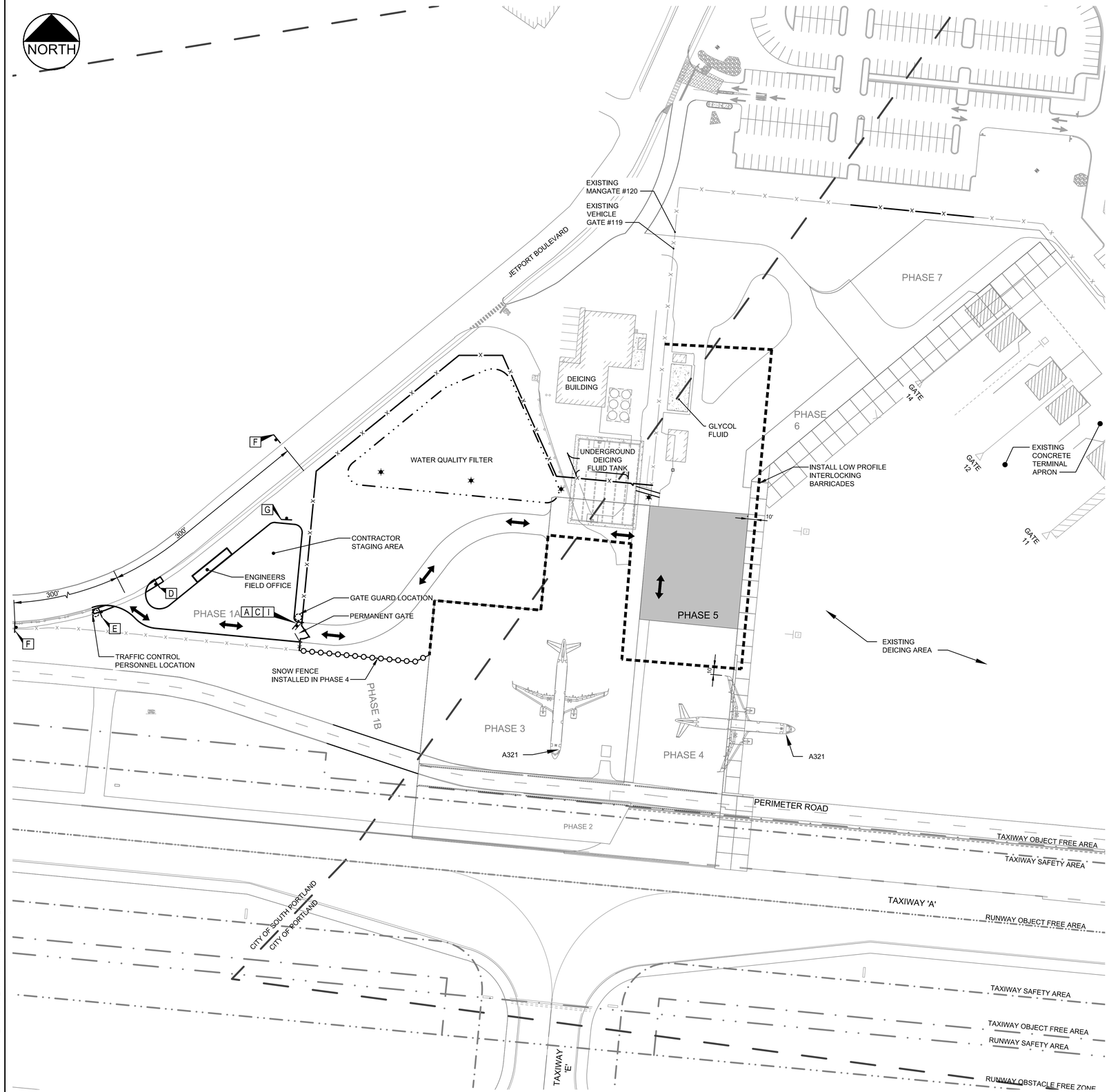
Title

DEICING PAD EXPANSION
SAFETY AND PHASING PLAN
PHASE 4

Project No.	Scale
195211590	1" = 60'

Sheet

2.4

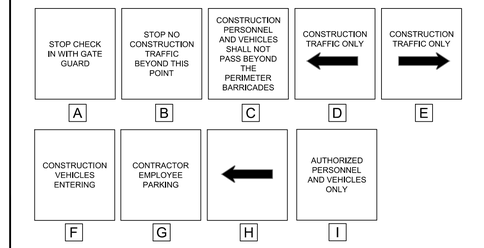


LEGEND

- INTERLOCKING LOW PROFILE BARRICADES
- SAFETY FENCE
- CONSTRUCTION BARRELS
- SIGN (LEGEND BELOW)
- GATE GUARD/TRAFFIC CONTROL PERSONNEL
- HAUL ROUTE

NOTE: REFER TO SHEET 2.8 FOR DETAILS OF THE LOW PROFILE BARRICADES

SIGN LEGEND



PHASE 5 NOTES:

1. THE CONTRACTOR SHALL PROVIDE A GATE GUARD/SECURITY OFFICER ACCEPTABLE TO THE JETPORT AT ANY ACCESS GATE TO CONTROL ACCESS TO THE AIRFIELD WHEN THE GATE IS NOT LOCKED. THEY WILL ALLOW AUTHORIZED CONSTRUCTION VEHICLES ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING ALL FAA SECURITY REQUIREMENTS.
2. ALL SIGNS ARE TO BE MOUNTED ON TEMPORARY TRIPODS WITH APPROPRIATE BALLASTS. SIGNS A, C AND I ARE TO BE MOUNTED ON SECURITY FENCE AT GATE.
3. ALL CONSTRUCTION SAFETY SIGNS ARE TO BE RED WITH WHITE LETTERING MEETING MUTCD STANDARDS.
4. A SEPARATE SAFETY AND SECURITY MEETING WITH THE CONTRACTOR IS REQUIRED PRIOR TO THE START OF EACH WORK PHASE AND SUB-PHASE.
5. CONTRACTOR ACCESS FOR ALL PHASE 5 WORK SHALL BE FROM JETPORT BOULEVARD.
6. THE CONTRACTOR'S ATTENTION IS CALLED TO THE SPECIAL PROVISIONS SECTION IN THE CONTRACT DOCUMENTS.
7. CONTRACTOR SHALL NOT STOCKPILE MATERIALS OR EQUIPMENT WITHIN 10' OF THE PERMANENT PERIMETER SECURITY FENCE OR BARRICADES.
8. THE CONTRACTOR PARKING FOR THIS PHASE IS LOCATED WITHIN THE STAGING AREA AS DIRECTED BY THE ON-SITE ENGINEER.
9. LIQUIDATED DAMAGES SHALL APPLY TO PHASE 5 WORK NOT COMPLETED WITHIN THE TIME FRAME SPECIFIED IN THE SPECIAL PROVISIONS.
11. A RADIO CONTROL PERSON SHALL BE ON-SITE FULL TIME DURING PHASE 2 AND DURING BARRICADE SETUP OF ALL OTHER PHASES.

GRAPHIC SCALE

60 0 30 60 120

(IN FEET)

1 inch = 60 ft.

PERMITTING DRAWINGS

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Diana's CADD Serivice, LLC (Drafting)
P. O. Box 372
Jackman, Maine 04945

Notes

Revision	By	Appd.	YY.MM.DD
4 ISSUED TO CITY OF PORTLAND FOR APPROVAL	AMG	DDA	19.04.08
3 RELEASED FOR BID	AMG	DDA	19.03.08
2 ISSUED TO CITY, FAA AND MDOT FOR REVIEW	AMG	DDA	19.02.28
1 ISSUED TO CITY, FAA AND MDOT FOR REVIEW	AMG	DDA	19.02.13

File Name: 195211590_safety_deicing	-	DDA	AMG	JAN 2018
	DWN.	CHKD.	DSGN.	DATE

Permit-Seal



Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

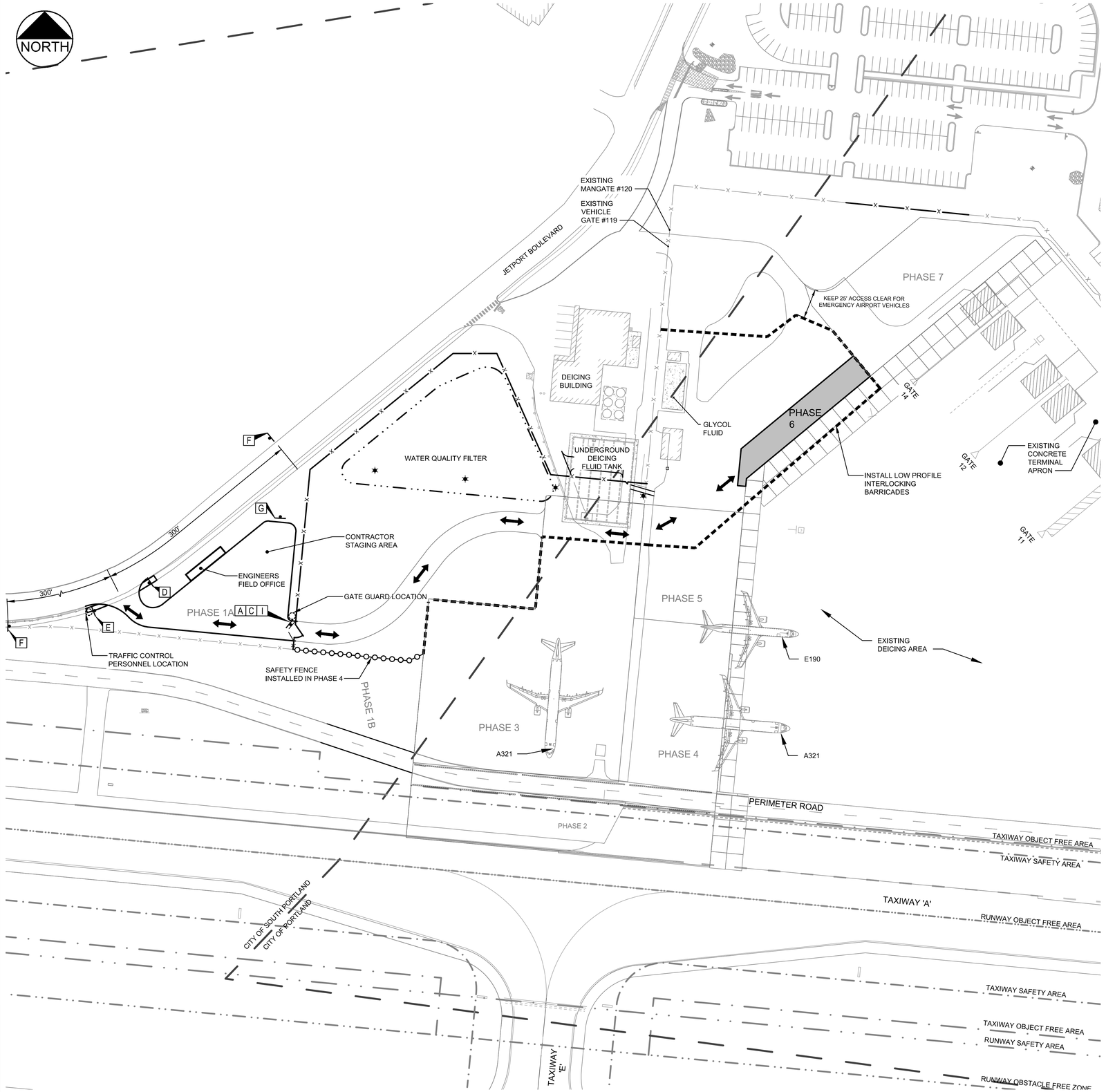
Title

DEICING PAD EXPANSION
SAFETY AND PHASING PLAN
PHASE 5

Project No.	Scale
195211590	1" = 60'

Sheet

2.5



LEGEND

- INTERLOCKING LOW PROFILE BARRICADES
- SAFETY FENCE
- CONSTRUCTION BARRELS
- SIGN (LEGEND BELOW)
- GATE GUARD/TRAFFIC CONTROL PERSONNEL
- HAUL ROUTE

NOTE: REFER TO SHEET 2.8 FOR DETAILS OF THE LOW PROFILE BARRICADES

SIGN LEGEND

STOP CHECK IN WITH GATE GUARD	STOP NO CONSTRUCTION TRAFFIC BEYOND THIS POINT	CONSTRUCTION PERSONNEL AND VEHICLES SHALL NOT PASS BEYOND THE PERIMETER BARRICADES	CONSTRUCTION TRAFFIC ONLY	CONSTRUCTION TRAFFIC ONLY
A	B	C	D	E
CONSTRUCTION VEHICLES ENTERING	CONTRACTOR EMPLOYEE PARKING		AUTHORIZED PERSONNEL AND VEHICLES ONLY	
F	G	H	I	

PHASE 6 NOTES:

1. THE CONTRACTOR SHALL PROVIDE A GATE GUARD/SECURITY OFFICER ACCEPTABLE TO THE JETPORT AT ANY ACCESS GATE TO CONTROL ACCESS TO THE AIRFIELD WHEN THE GATE IS NOT LOCKED. THEY WILL ALLOW AUTHORIZED CONSTRUCTION VEHICLES ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING ALL FAA SECURITY REQUIREMENTS.
2. SIGNS ARE TO BE MOUNTED ON TEMPORARY TRIPODS WITH APPROPRIATE BALLASTS. SIGNS A, C AND I ARE TO BE MOUNTED ON SECURITY FENCE AT GATE.
3. ALL CONSTRUCTION SAFETY SIGNS ARE TO BE RED WITH WHITE LETTERING MEETING MUTCD STANDARDS.
4. A SEPARATE SAFETY AND SECURITY MEETING WITH THE CONTRACTOR IS REQUIRED PRIOR TO THE START OF EACH WORK PHASE AND SUB-PHASE.
5. CONTRACTOR ACCESS FOR ALL PHASE 6 WORK SHALL BE FROM JETPORT BOULEVARD.
6. THE CONTRACTOR'S ATTENTION IS CALLED TO THE SPECIAL PROVISIONS SECTION IN THE CONTRACT DOCUMENTS.
7. CONTRACTOR SHALL NOT STOCKPILE MATERIALS OR EQUIPMENT WITHIN 10' OF THE PERMANENT PERIMETER SECURITY FENCE OR BARRICADES.
8. THE CONTRACTOR PARKING FOR THIS PHASE IS LOCATED WITHIN THE STAGING AREA AS DIRECTED BY THE ON-SITE ENGINEER.
9. PHASE 6 REQUIRES THE CLOSURE OF TERMINAL APRON GATE 14.
10. LIQUIDATED DAMAGES SHALL APPLY TO PHASE 6 WORK NOT COMPLETED WITHIN THE TIME FRAME SPECIFIED IN THE SPECIAL PROVISIONS.
11. A RADIO CONTROL PERSON SHALL BE ON-SITE FULL TIME DURING PHASE 2 AND DURING BARRICADE SETUP OF ALL OTHER PHASES.

GRAPHIC SCALE

60 0 30 60 120

(IN FEET)

1 inch = 60 ft.

PERMITTING DRAWINGS

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Notes

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4	ISSUED TO CITY OF PORTLAND FOR APPROVAL	DDA	DDA	19.04.08
3	RELEASED FOR BID	AMG	DDA	19.03.08
2	ISSUED TO CITY- FAA AND MDOT FOR REVIEW	AMG	DDA	19.02.28
1	ISSUED TO CITY- FAA AND MDOT FOR REVIEW	AMG	DDA	19.02.13

File Name: 195211590_safety_deicing	-	DDA	AMG	JAN 2018
	DWN.	CHKD.	DSGN.	DATE

Permit-Seal

STATE OF MAINE
DWIGHT D. ANDERSON
No. 9272
LICENSED
PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

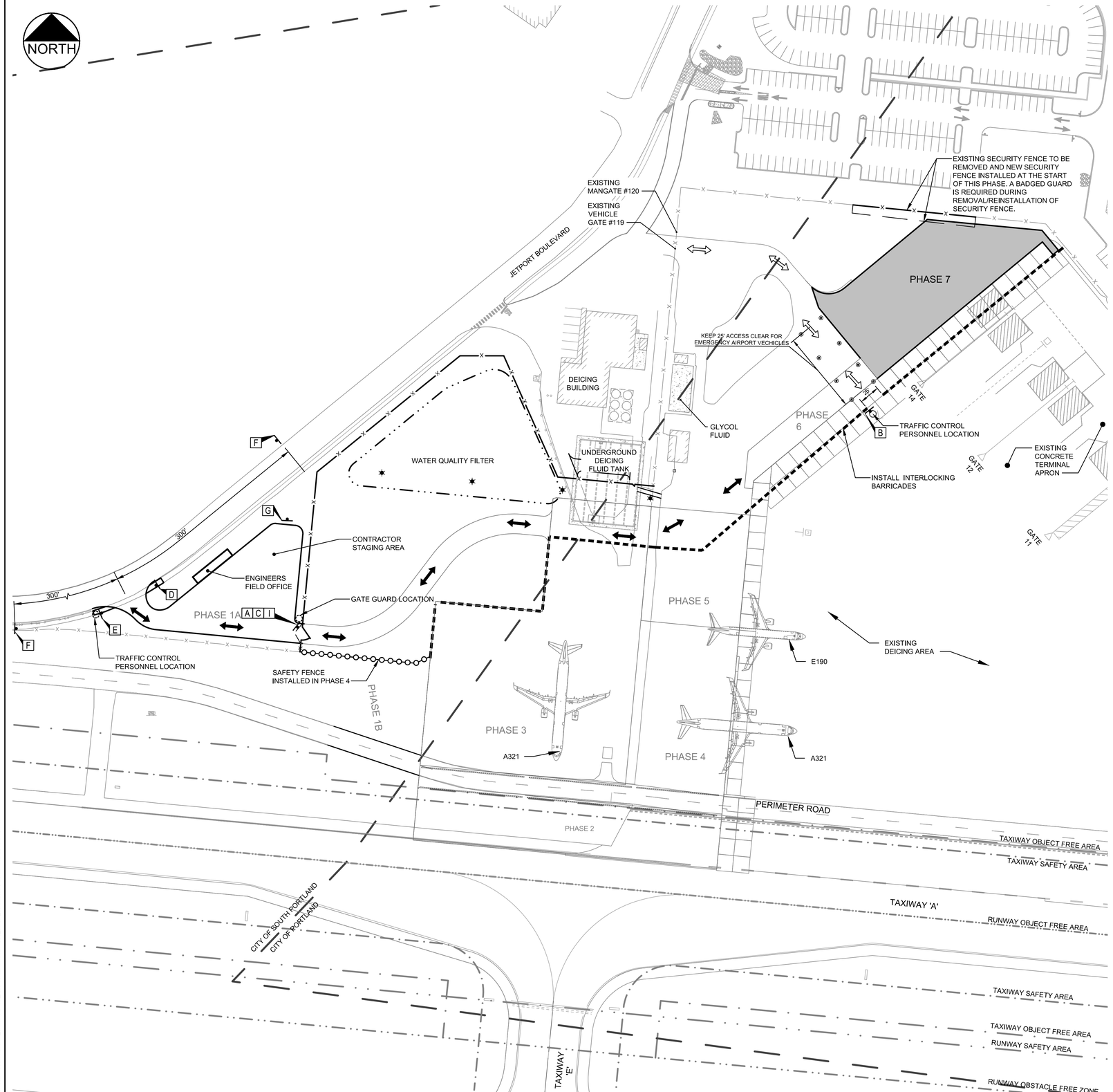
Title

DEICING PAD EXPANSION
SAFETY AND PHASING PLAN
PHASE 6

Project No.
195211590

Scale
1" = 60'

Sheet
2.6



LEGEND

- INTERLOCKING LOW PROFILE BARRICADES
- SAFETY FENCE
- SAFETY CONES
- CONSTRUCTION BARRELS
- SIGN (LEGEND BELOW)
- GATE GUARD/TRAFFIC CONTROL PERSONNEL
- CONTRACTOR HAUL ROUTE
- AIRPORT TRAFFIC

NOTE: REFER TO SHEET 2.8 FOR DETAILS OF THE LOW PROFILE BARRICADES

SIGN LEGEND

A	B	C	D	E
STOP CHECK IN WITH GATE GUARD	STOP NO CONSTRUCTION TRAFFIC BEYOND THIS POINT	CONSTRUCTION PERSONNEL AND VEHICLES SHALL NOT PASS BEYOND THE PERIMETER BARRICADES	CONSTRUCTION TRAFFIC ONLY ←	CONSTRUCTION TRAFFIC ONLY →

F	G	H	I
CONSTRUCTION VEHICLES ENTERING	CONTRACTOR EMPLOYEE PARKING	←	AUTHORIZED PERSONNEL AND VEHICLES ONLY

PHASE 7 NOTES:

1. THE CONTRACTOR SHALL PROVIDE A GATE GUARD/SECURITY OFFICER ACCEPTABLE TO THE JETPORT AT ANY ACCESS GATE TO CONTROL ACCESS TO THE AIRFIELD WHEN THE GATE IS NOT LOCKED. THEY WILL ALLOW AUTHORIZED CONSTRUCTION VEHICLES ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING ALL FAA SECURITY REQUIREMENTS.
2. SIGNS ARE TO BE MOUNTED ON TEMPORARY TRIPODS WITH APPROPRIATE BALLASTS. SIGNS A, C AND I ARE TO BE MOUNTED ON SECURITY FENCE AT GATE.
3. CONSTRUCTION SAFETY SIGNS ARE TO BE RED WITH WHITE LETTERING MEETING MUTCD STANDARDS.
4. A SEPARATE SAFETY AND SECURITY MEETING WITH THE CONTRACTOR IS REQUIRED PRIOR TO THE START OF EACH WORK PHASE AND SUB-PHASE.
5. CONTRACTOR ACCESS FOR ALL PHASE 7 WORK SHALL BE FROM JETPORT BOULEVARD.
6. THE CONTRACTOR'S ATTENTION IS CALLED TO THE SPECIAL PROVISIONS SECTION IN THE CONTRACT DOCUMENTS.
7. CONTRACTOR SHALL NOT STOCKPILE MATERIALS OR EQUIPMENT WITHIN 10' OF THE PERMANENT PERIMETER SECURITY FENCE OR BARRICADES.
8. THE CONTRACTOR PARKING FOR THIS PHASE IS LOCATED WITHIN THE STAGING AREA AS DIRECTED BY THE ON-SITE ENGINEER.
9. PHASE 7 REQUIRES THE CLOSURE OF TERMINAL APRON GATE 14.
10. THE CONTRACTOR SHALL KEEP A 25' CLEAR ROUTE FOR EMERGENCY AIRPORT VEHICLES AT ALL TIMES.
11. LIQUIDATED DAMAGES SHALL APPLY TO PHASE 7 WORK NOT COMPLETED WITHIN THE TIME FRAME SPECIFIED IN THE SPECIAL PROVISIONS.
11. A RADIO CONTROL PERSON SHALL BE ON-SITE FULL TIME DURING PHASE 2 AND DURING BARRICADE SETUP OF ALL OTHER PHASES.

GRAPHIC SCALE

60 0 30 60 120

(IN FEET)
1 inch = 60 ft.

PERMITTING DRAWINGS

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Portsmouth, New Hampshire 03801

Diana's CADD Serivice, LLC (Drafting)
P. O. Box 372
Jackman, Maine 04945

Notes

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4 ISSUED TO CITY OF PORTLAND FOR APPROVAL	DDA	AMG	19.04.08
3 RELEASED FOR BID	DDA	AMG	19.03.08
2 ISSUED TO CITY- FAA AND MDOT FOR REVIEW	DDA	AMG	19.02.28
1 ISSUED TO CITY- FAA AND MDOT FOR REVIEW	DDA	AMG	19.02.13

File Name: 195211590_safety_deicing	-	DDA	AMG	JAN 2018
	DWN.	CHKD.	DSGN.	DATE

Permit-Seal



Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

Title

DEICING PAD EXPANSION
SAFETY AND PHASING PLAN
PHASE 7

Project No.	Scale
195211590	1" = 60'

Sheet

2.7

SIGN LEGEND

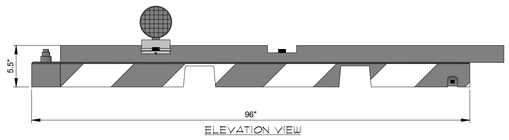
STOP CHECK IN WITH GATE GUARD	STOP NO CONSTRUCTION TRAFFIC BEYOND THIS POINT	CONSTRUCTION PERSONNEL AND VEHICLES SHALL NOT PASS BEYOND THE PERIMETER BARRICADES	CONSTRUCTION TRAFFIC ONLY ←	CONSTRUCTION TRAFFIC ONLY →
SIGN A QUANTITY = 1 — A	SIGN B QUANTITY = 3 — B	SIGN C QUANTITY = 1 — C	SIGN D QUANTITY = 1 — D	SIGN E QUANTITY = 2 — E

CONSTRUCTION VEHICLES ENTERING	CONTRACTOR EMPLOYEE PARKING	←	AUTHORIZED PERSONNEL AND VEHICLES ONLY
SIGN F QUANTITY = 2 — F	SIGN G QUANTITY = 1 — G	SIGN H QUANTITY = 1 — H	SIGN I QUANTITY = 1 — I

NOTES:

1. TO BE PAID FOR UNDER SAFETY AND SECURITY ITEM 200
2. ALL SIGNS RED BACKGROUND AND WHITE LETTERS
3. THE SIGNS SHALL BECOME THE PROPERTY OF THE AIRPORT AT PROJECT COMPLETION
4. ALL SIGNS SHALL BE 48" X 48" UNLESS OTHERWISE NOTED

(A) CONSTRUCTION SIGN DETAILS
N.T.S.



ELEVATION VIEW

PRODUCT SPECIFICATIONS

COMPOSITION: UV-RESISTANT POLYETHYLENE

SIZE:
HEIGHT: 5.5"
LENGTH: 96"
WIDTH: 8.5"
WALL: 0.25" (AVG.)

TO BE FILLED WITH WATER THROUGHOUT DURATION OF PROJECT

NOTES:

1. COLORS OF BARRICADES TO BE SAFETY ORANGE AND WHITE
2. FAA/FHWA CLASS 4 STRIPING TAPE ON 3 SIDES, 4 INCHES TALL TOTAL 2.75 INCHES ON SIDE AND 1.25 INCHES ON TOP, TYP.
3. BARRICADES SHALL BE AIRFIELD SOLUTIONS MODEL AS-3000
4. RED STROBE LIGHTS SHALL BE AIRFIELD SOLUTIONS MODEL AS4000 SOLAR BARRICADE LIGHT (RED) OR EQUAL.

(B) LOW PROFILE BARRIER AND LIGHT
N.T.S.

PERMITTING DRAWINGS

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DDA	DDA	19.03.08	2 RELEASED FOR BID
DDA	DDA	19.02.28	1 ISSUED FOR CITY, MaDOT AND FAA REVIEW

File Name: 195211072_details	DWN: -	CHKD.: DDA	DSGN: -	DATE: JAN 2018

Permit-Seal



Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

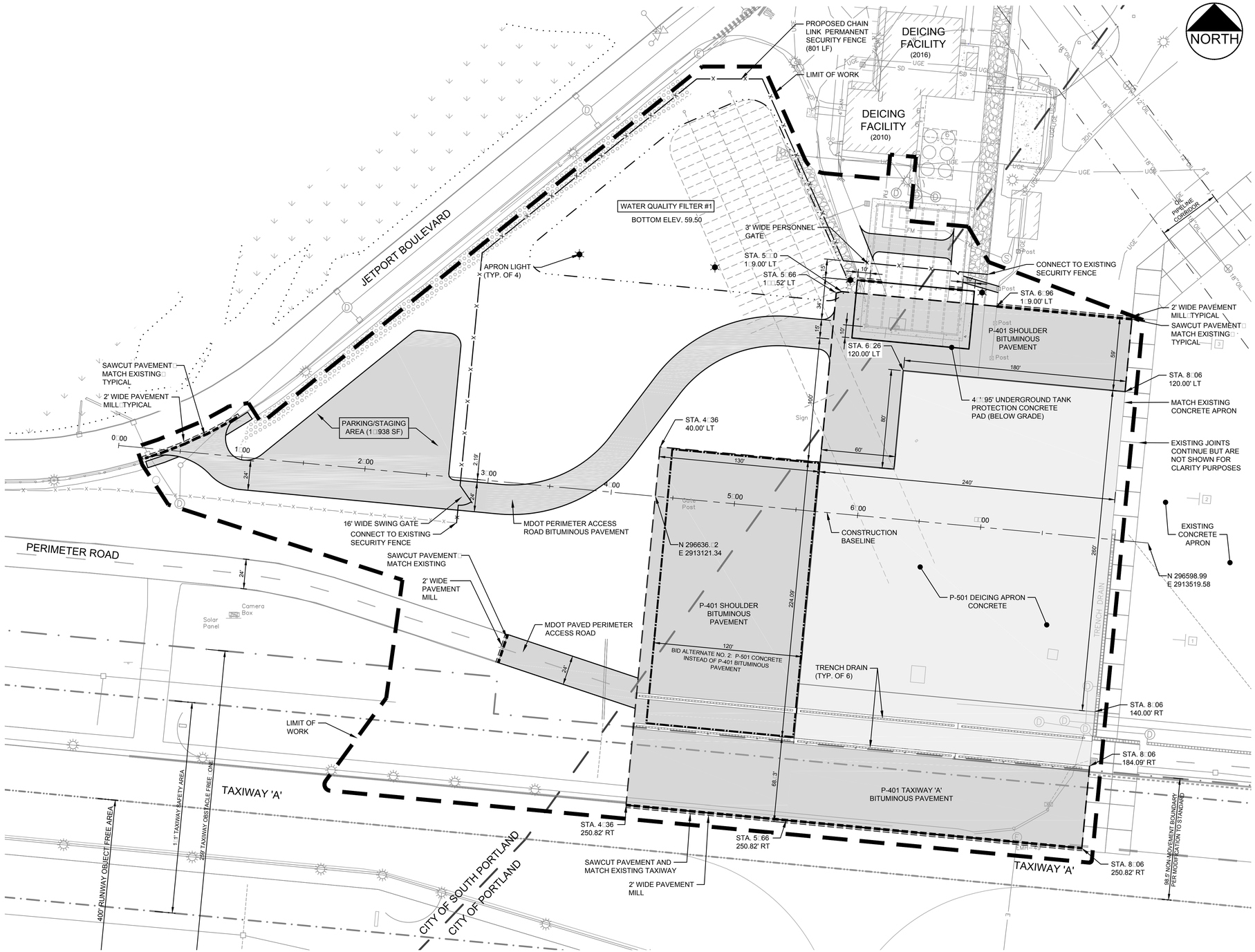
Title

SAFETY DETAILS

Project No.	Scale
195211590	AS NOTED

Sheet

2.8



SITE LAYOUT LEGEND

- BITUMINOUS PAVEMENT (MDOT)
- BITUMINOUS PAVEMENT (P-401)
- PORTLAND CEMENT CONCRETE (P-501)
- LIMIT OF WORK
- LIMIT OF PAVEMENT SAWCUT
- PAVEMENT MILL

GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

PERMITTING DRAWINGS

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File Name: 195211590_site_deicing	LA	DDA	AMG	JAN 2018
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STATE OF MAINE
DWIGHT D. ANDERSON
No. 12275
4-2-2019
LICENSED PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

Title

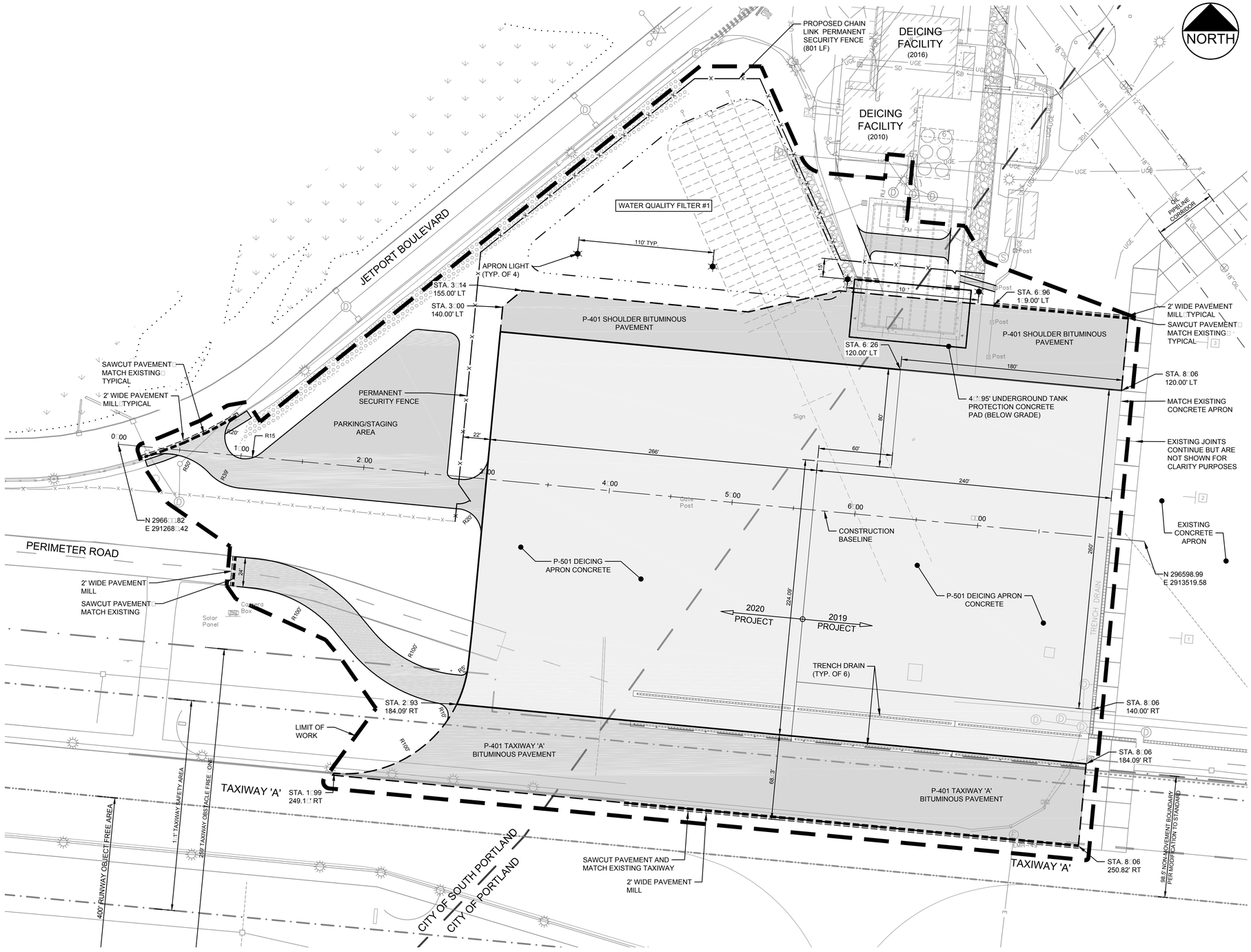
HOLD/DEICING/RON APRON SITE LAYOUT PLAN - 2019 CONSTRUCTION ONLY

Project No. 195211590

Scale 1" = 40'

Sheet

3.1A



GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

SITE LAYOUT LEGEND

- BITUMINOUS PAVEMENT (MDOT)
- BITUMINOUS PAVEMENT (P-401)
- PORTLAND CEMENT CONCRETE (P-501)
- LIMIT OF WORK
- LIMIT OF PAVEMENT SAWCUT
- PAVEMENT MILL

PERMITTING DRAWINGS

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By	Appd.	YY.MM.DD	Revision

File Name: 195211590_site_deicing	-	DDA	AMG	JAN 2018
	DWN:	CHKD.	DSGN.	DATE

Permit-Seal

STATE OF MAINE
DWIGHT D. ANDERSON
No. 9272
LICENSED
PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

Title

HOLD/DEICING/RON APRON SITE LAYOUT PLAN WITH 2020 CONSTRUCTION

Project No.	Scale
195211590	1" = 40'

Sheet

3.1B

NOTES:

1. REINFORCED STEEL SHALL BE USED IN ODD-SHAPED (PARTIAL) SLABS AND WHERE LENGTH TO WIDTH RATIO EXCEEDS 1.25 TO 1.
2. AN ISOLATION JOINT (TYPE A) SHALL BE INSTALLED AROUND ALL STRUCTURES WITHIN THE CONCRETE APRON.
3. ALL CONCRETE WITHIN THE NEW APRON IS TO BE BROOM FINISHED. (SEE PROJECT SPECIFICATIONS FOR MORE INFORMATION).
4. ALL EXISTING CONCRETE EDGES MUST HAVE DOWELS CORED AND EPOXIED INTO PLACE PRIOR TO PLACING ADJACENT CONCRETE.

JOINTING LEGEND

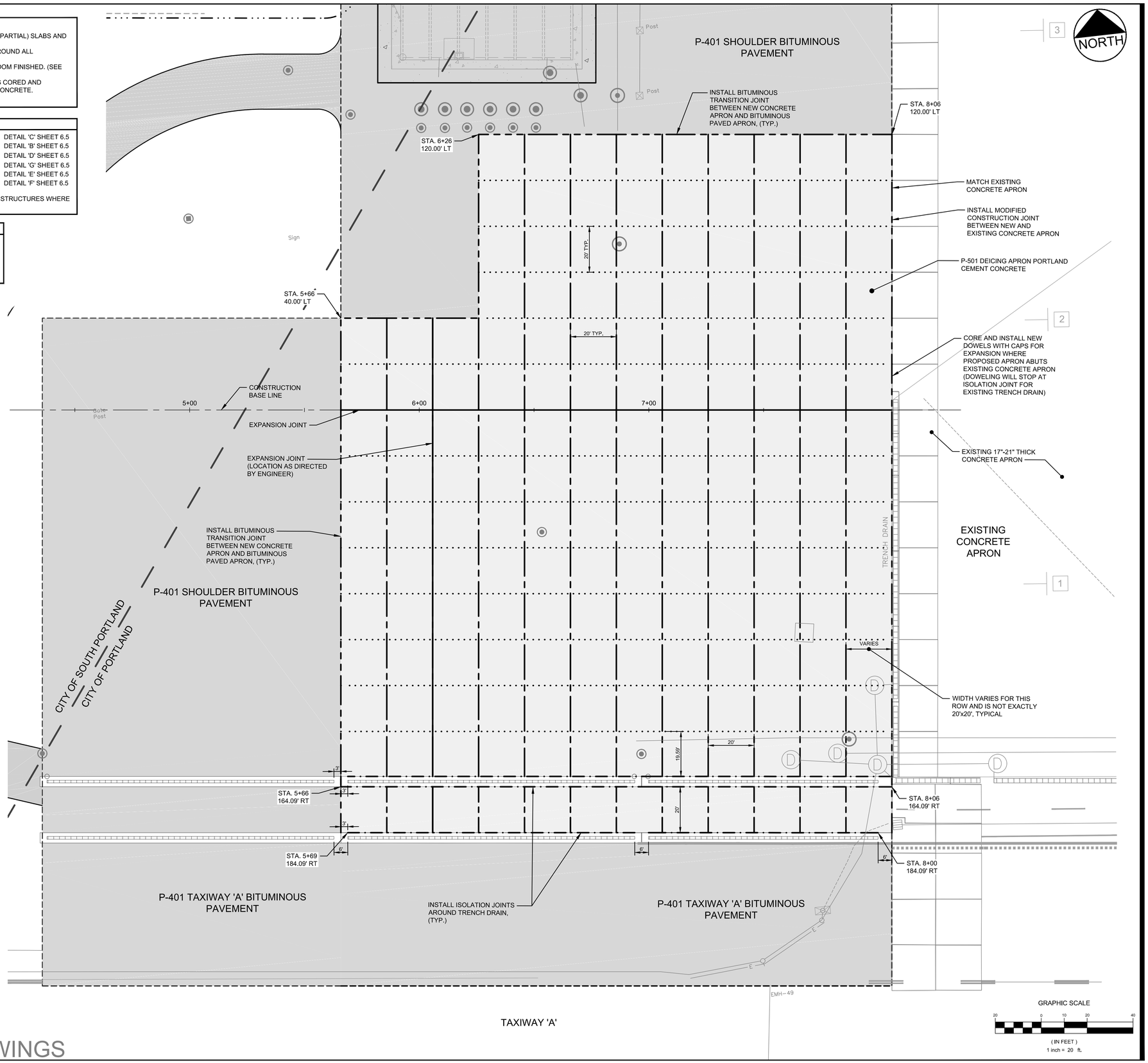
ISOLATION JOINT (TYPE A-1)*	DETAIL 'C' SHEET 6.5
CONTRACTION JOINT (TYPE C)	DETAIL 'B' SHEET 6.5
CONSTRUCTION JOINT (TYPE E)	DETAIL 'D' SHEET 6.5
MODIFIED CONSTRUCTION JOINT	DETAIL 'G' SHEET 6.5
EXPANSION JOINT	DETAIL 'E' SHEET 6.5
BITUMINOUS TRANSITION JOINT	DETAIL 'F' SHEET 6.5

*ISOLATION JOINT (TYPE A-1) TO BE INSTALLED AROUND ALL STRUCTURES WHERE ENCOUNTERED WITHIN CONCRETE APRON

SITE LAYOUT LEGEND

BITUMINOUS PAVEMENT

PORTLAND CEMENT CONCRETE



PERMITTING DRAWINGS

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Plisga & Day Land Surveyors (Surveyor)
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801 Islington Street, Suite 31
Portsmouth, New Hampshire 03801

Diana's CADD Serivice, LLC (Drafting)
P. O. Box 372
Jackman, Maine 04945

Notes

By	Appd.	Revision
DDA	DDA	3 ISSUED TO CITY OF PORTLAND FOR APPROVAL 19.04.08
DDA	DDA	2 RELEASED FOR BID 19.03.08
DDA	DDA	1 ISSUED FOR CITY, MaDOT, AND FAA REVIEW 19.02.28

File Name: 195211590_site_deicing	LA	DDA	AMG	JAN 2018
	DWN.	CHKD.	DSGN.	DATE

Permit-Seal

STATE OF MAINE
DWIGHT D. ALDERSON
No. 13275
4-8-2019
LICENSED PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

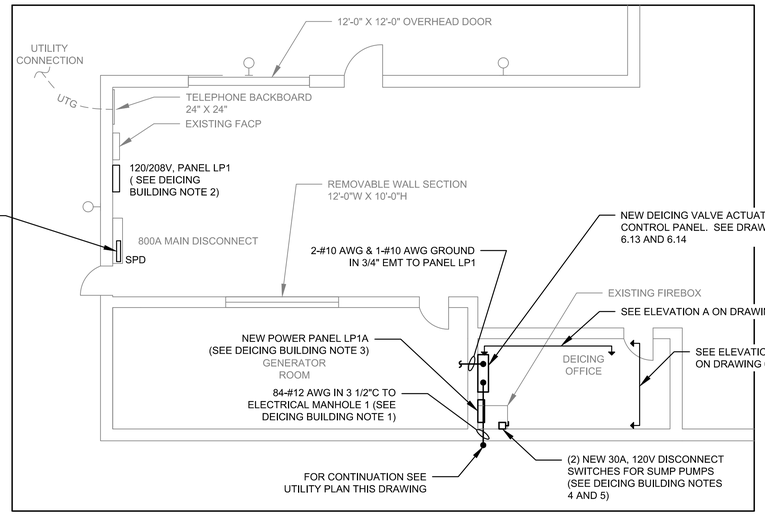
Title

HOLD/DEICING/RON APRON JOINTING PLAN - 2019 CONSTRUCTION

Project No.	Scale
195211590	1" = 20'

Sheet

3.2



DEICING FLUID TREATMENT BUILDING ENLARGED PLAN

N.T.S.

FIXTURE NOTES:

1. MANUFACTURER SHALL PROVIDE FIXTURES AND BRACKETS PRE–AIMED. COORDINATE INSTALLATION OF STANDARD BRACKETS ON BULLHORNS PROVIDED WITH POLES, WITH CONTRACTOR TO ACHIEVE X–Y ORIENTATION IN AGREEMENT WITH PHOTOMETRIC CALCULATIONS.
2. SEE POLE FOUNDATION ON ELECTRICAL DETAIL DRAWING 6.12
3. PROVIDE 2–#10 AWG + #10 GND PHASE CONDUCTORS, COLORED CODED BY PHASE, FOR 480 VOLT CIRCUITS FROM EACH FIXTURE LED DRIVER COMPARTMENT TO THE HAND HOLE IN THE POLE BASE. MAKE SPLICES USING TERMINAL BLOCKS OR AS SPECIFIED. BOND #6 AWG GROUND TO POLE BASE WITH GROUND LUG. COAT LUG WITH 3M SKOTCH KOTE.
4. PROVIDE FIXTURE TYPE A AND WIRING AS INDICATED ON DRAWINGS.

DEICING BUILDING NOTE:

1. EXTEND CONDUIT UP SURFACE OF BUILDING EXTERIOR IN 3 1/2" RGS CONDUIT AND TO NEW CONTROL PANEL.
2. PANEL LP1: REMOVE SUMP PUMP 20A, SINGLE POLE BREAKER, VALVE PIT 20A SINGLE POLE BREAKER AND FIRE ALARM 20A SINGLE POLE BREAKER AND REARRANGE CIRCUITS TO INSTALL A 3 POLE, 30A CIRCUIT BREAKER TO FEED SUB–PANEL LP1A IN THE DEICING OFFICE. INSTALL A FEEDER FROM LP1 TO LP1A: 3–#10 AWG & 1–#10 GROUND IN 3/4" EMT. RELOCATE FIRE ALARM 20A CIRCUIT (2–#12 & 1–#12 GROUND IN 1/2"C) TO PANEL LP1A.
3. NEW PANEL LP1A: 12 CKT, 100A, 120/208V, 3PH, 4W BOLT ON MAIN LUGS ONLY, WITH 10kAIC RATED CIRCUIT BREAKERS. BALANCE PHASE LEGS AS FOLLOWS: 2–20A SUMP PUMP SINGLE POLE GFIC CIRCUIT BREAKERS ON PHASE A (CKT 1, CKT 2), 1–2 POLE 208V VALVE ACTUATOR CIRCUIT BREAKER ON PHASES B & C (CKT 3,5), 1–20A SINGLE POLE BREAKER FOR 120V CONTROL POWER ON PHASE B (CKT 4), AND FIRE ALARM PANEL 20A CB WITH LOCKOUT (CKT 6).
4. INSTALL 2–30A, NEMA 1, HEAVY DUTY, FUSIBLE, 120V DISCONNECTS WITH LOCK ON/OFF FEATURE FOR SUMP PUMPS. PROVIDE 20A DUAL ELEMENT TIME DELAY FUSES. PROVIDE NEMA 4X BOX AND SEALTITE CONDUIT PIT TO CONNECT TO SUMP PUMPS. LABEL PUMPS BY PIT DESIGNATION.
5. PROVIDE 1 1/2" GALVANIZED RIGID CONDUIT FROM DEICING OFFICE, MOUNTED ON BUILDING EXTERIOR FROM DISCONNECTS TO 24" BELOW GRADE AND CONVERT TO SCHEDULE 40 PVC TO ENTER EMH1.

GENERAL NOTES:

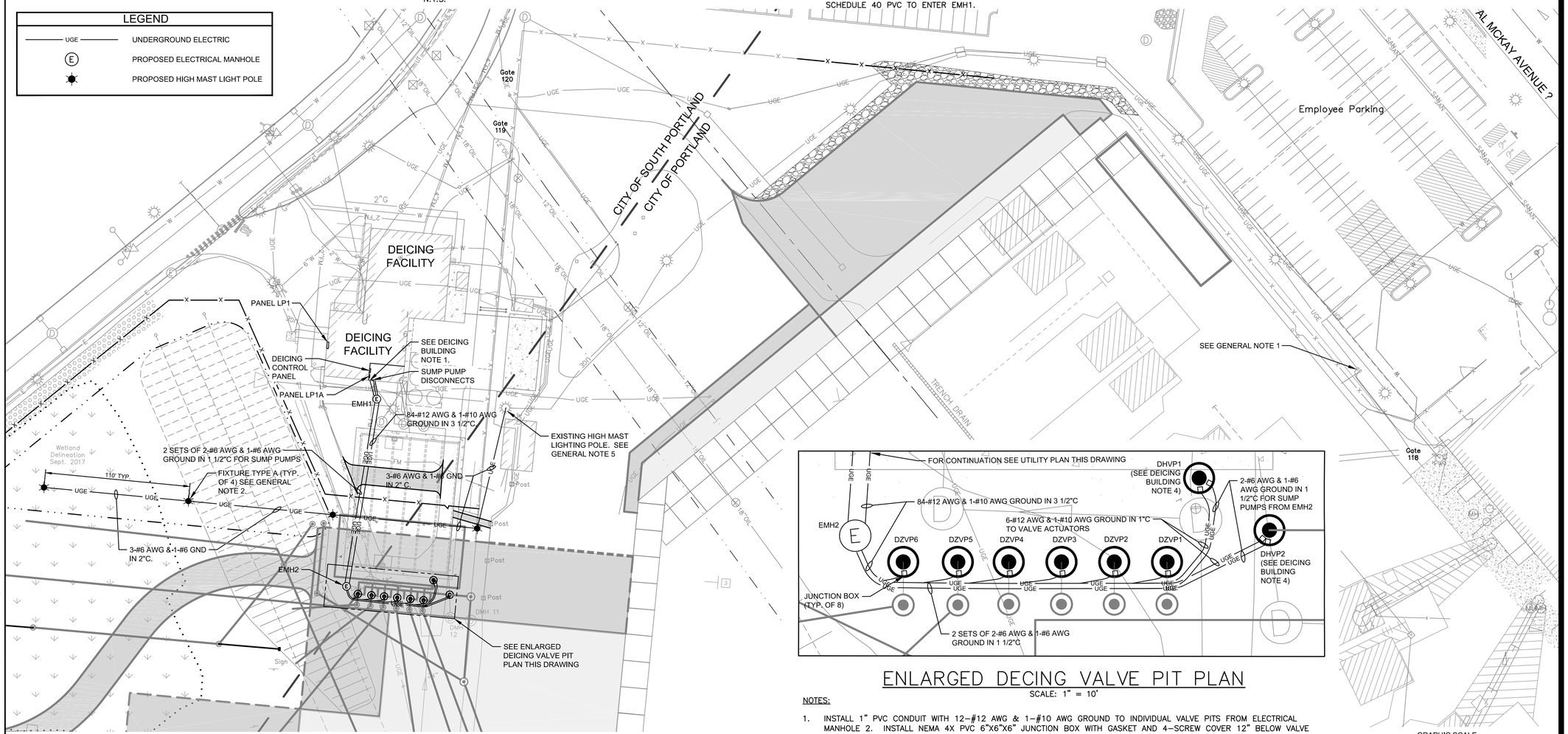
1. REMOVE EXISTING #6 AWG CONDUCTORS FROM HAND HOLE TO PANEL IN TERMINAL FOR APRON LIGHTING FEEDER (2000') IN 2" C. INSTALL 3–#2 AWG & 1–#2 AWG GROUND IN EXISTING 2" CONDUIT FROM PANEL LP–X TO HAND HOLE HAND SPLICE TO EXISTING #6 PHASE CONDUCTORS AND GROUND. IDENTIFY PHASE CONDUCTORS AT PANEL AND HAND HOLE.

   REPLACE EXISTING 30 AMPERE, 480V, GE SPECTRA SRPE, THREE PHASE CIRCUIT BREAKER WITH 40 AMPERE BREAKER OR RATING PLUG. CONFIRM THE CIRCUIT BREAKER WILL ACCEPT #2 AWG CONDUCTORS.
2. CONNECT NEW FIXTURES – 7 PHASE A, 7 PHASE B AND 6 ON PHASE C TO EXISTING 480 VOLT 3 PHASE CIRCUIT. IDENTIFY CONDUCTORS TO EACH FIXTURE PAIRING ORANGE/BROWN/YELLOW CONDUCTORS AND GROUND FOR IDENTIFICATION AT EACH POLE,
3. ALL EXISTING UTILITIES SHOWN ON THESE CONTRACT DRAWINGS ARE SHOWN IN THEIR APPROXIMATE LOCATIONS ONLY. ADDITIONAL UTILITIES OTHER THAN THOSE SHOWN ON THESE DRAWINGS MAY EXIST (INCLUDING UNDERGROUND). THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND MARKING THE EXACT LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES PRIOR TO ANY EXCAVATION. HAND DIGGING SHALL BE PERFORMED AS NECESSARY TO AVOID DAMAGE TO UTILITIES. THE CONTRACTOR SHALL CONTACT DIGSAFE TEL. 888–DIGSAFE (344–7233), FOR ASSISTANCE IN LOCATING UTILITIES PRIOR TO THE COMMENCEMENT OF ANY DIGGING. THE CONTRACTOR SHALL BE RESPONSIBLE TO REPAIR DAMAGED UTILITIES IMMEDIATELY AT NO ADDITIONAL COST TO THE OWNER.
4. SPLICE CONDUCTORS IN EXISTING POLE FOUNDATION. INSTALL 1 1/2" RGS CONDUIT TO POLE BASE AND INSTALL NIPPLE TO HANDHOLE.

NORTH

LEGEND

- UGE — UNDERGROUND ELECTRIC
- (E) — PROPOSED ELECTRICAL MANHOLE
- PROPOSED HIGH MAST LIGHT POLE



ENLARGED DECING VALVE PIT PLAN

SCALE: 1" = 10'

NOTES:

1. INSTALL 1" PVC CONDUIT WITH 12–#12 AWG & 1–#10 AWG GROUND TO INDIVIDUAL VALVE PITS FROM ELECTRICAL MANHOLE 2. INSTALL NEMA 4X PVC 6"X6"X6" JUNCTION BOX WITH GASKET AND 4–SCREW COVER 12" BELOW VALVE PIT SIDE WALL. EXTEND TWO 3/4" SEALTITE CONDUITS TO EACH VALVE ACTUATOR WITH 6–#12 AWG & 1–#10 AWG GROUND. SPLICES ARE NOT PERMITTED IN VALVE PIT JUNCTION BOXES. SEE CABLE DESIGNATIONS FOR DHVP1 AND DHVP2.
2. PROVIDE WATERPROOF SPLICE KITS IN EMH1 AND EMH2.

GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

PERMITTING DRAWINGS

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P. O. Box 372
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1	ISSUED FOR CITY / MaDOT AND FAA REVIEW	DDA	DDA	19.02.28

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	DWN.	CHKD.	DSGN.	DATE

Permit-Seal

STATE OF MAINE — MICHAEL L CLAYPOOLE No. 7824 LICENSED PROFESSIONAL ENGINEER — 04.08.2019

Client/Project

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PORTLAND AND SOUTH PORTLAND, MAINE

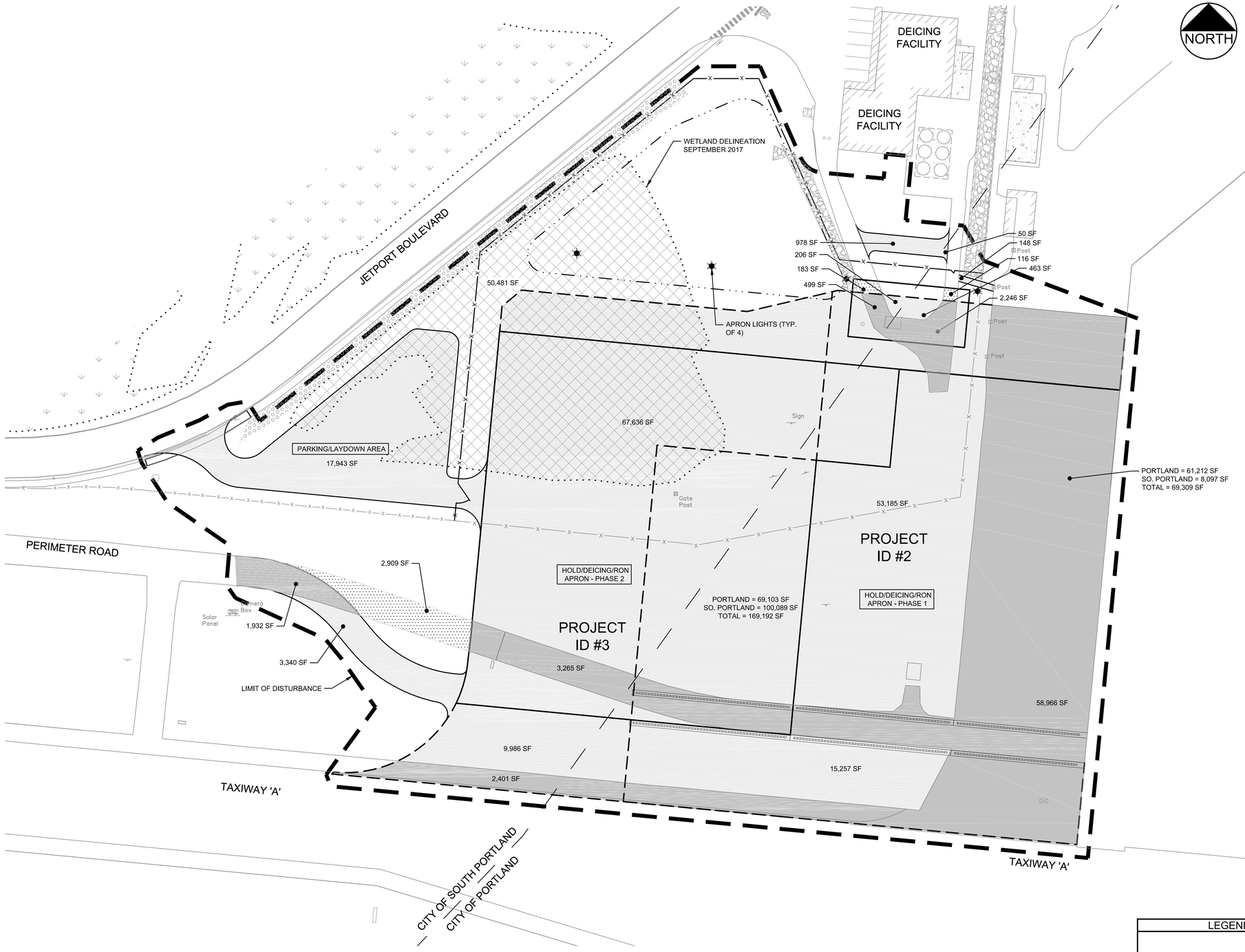
Title

HOLD/DEICING/RON APRON UTILITY PLAN - 2019 CONSTRUCTION

Project No.	Scale
195211590	1" = 40'

Sheet

3.3



LEGEND AND AREA SUMMARY

	PORTLAND (AC)	SO. PORTLAND (AC)	TOTAL AREA (AC)
PROPOSED WETLAND IMPACT AREA	-	1.16	1.16
EXISTING PAVEMENT TO BE REMOVED AND NOT REPLACED	0.003	0.07	0.073
EXISTING PAVEMENT TO BE REMOVED AND RECONSTRUCTED	1.41	0.19	1.60
PROPOSED NEW IMPERVIOUS AREA	1.59	2.30	3.89
AREA OF DISTURBANCE	3.05	4.39	7.44

GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

PERMITTING DRAWINGS

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	LA	DDA	LA	JAN 2018

Permit-Seal

STATE OF MAINE
DWIGHT D. ANDERSON
No. 9275
LICENSED
PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

Title

HOLD/DEICING/RON APRON IMPACT AREA SUMMARY

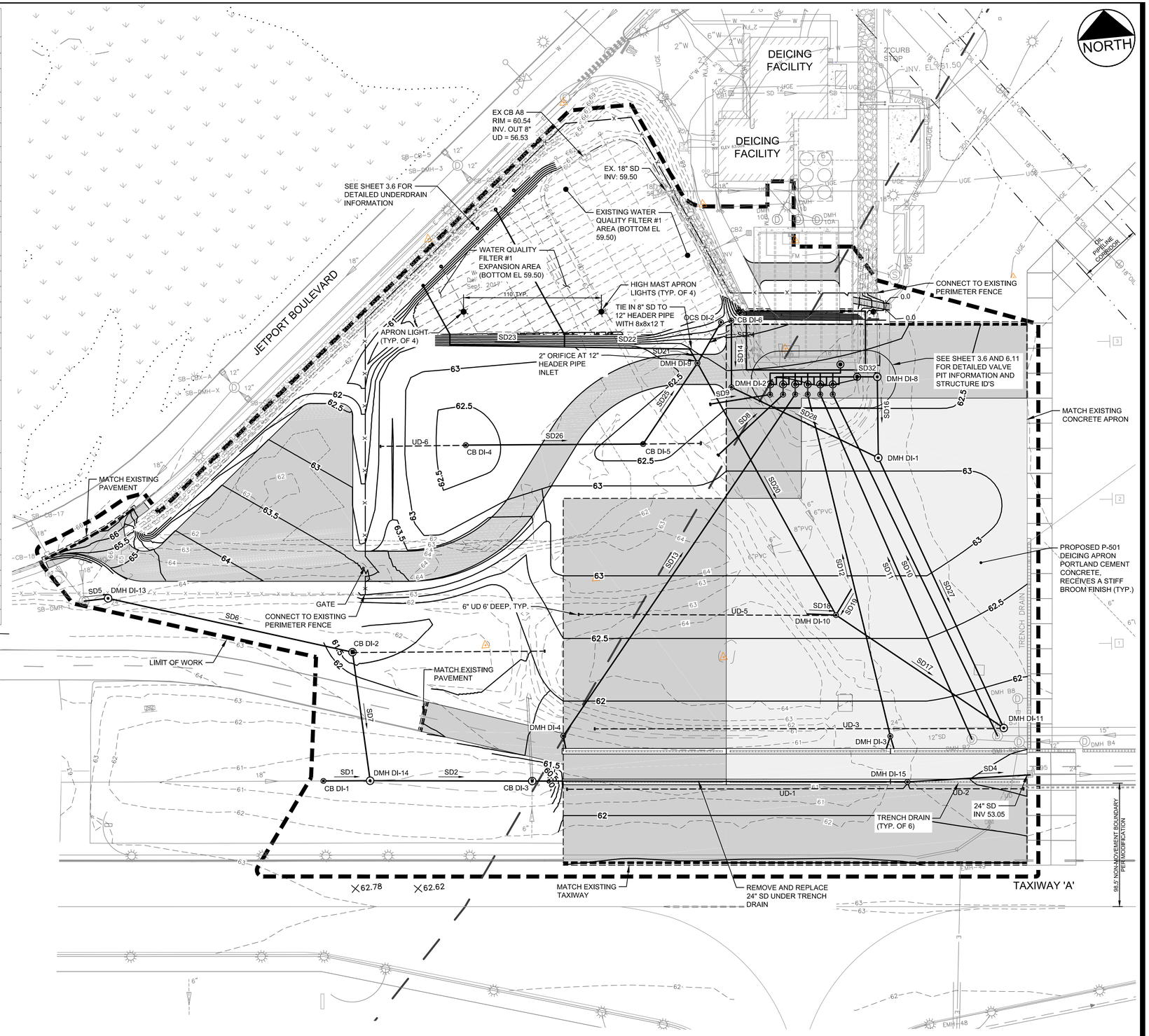
Project No.	Scale
195211590	1" = 40'

Sheet

3.1C

STORM DRAIN APPURTENANCE SCHEDULE
NETWORK - DEICING APRON

ID	RIM	SIZE	INV. IN / SIZE / FROM	INV. OUT / SIZE / TO	TYPE
CB DI-1	60.33	4 ft Ø	54.48 / 18" / EX. A-100	54.41 / 18" / DMH DI-14	HD
CB DI-2	61.37	4 ft Ø	54.66 / 18" / DMH DI-13 57.18 / 6" / UD-4	54.56 / 18" / DMH DI-14	HD
CB DI-3	59.50	6 ft Ø	53.98 / 24" / DMH DI-14	53.88 / 24" / DMH DI-15	HD
CB DI-4	62.00	4 ft Ø	58.45 / 6" / UD-6	55.62 / 12" / CB DI-5	HD
CB DI-5	62.00	4 ft Ø	55.00 / 12" / CB DI-4 58.11 / 6" / UD-7	54.90 / 12" / DMH DI-9	LD
CB DI-6	60.50	4 ft Ø		53.15 / 15" / DMH DI-2	LD
DMH DI-1	62.88	6 ft Ø	52.25 / 24" / DMH DI-8 52.25 / 15" / DMH DI-2	52.20 / 24" / DMH DI-11	HD
DMH DI-1A	62.35	4 ft Ø	53.52 / 12" / EX. DMH B5	53.48 / 12" / DZVP1	HD
DMH DI-2	62.26	4 ft Ø	52.65 / 15" / CB DI-6	52.55 / 15" / DMH DI-1	HD
DMH DI-2A	62.35	4 ft Ø	53.62 / 12" / EX. DMH B2	53.58 / 12" / DZVP2	HD
DMH DI-3	61.77	4 ft Ø	55.72 / 12" / TD 55.72 / 12" / TD	55.62 / 12" / DMH DI-3A	HD
DMH DI-3A	62.35	4 ft Ø	53.72 / 12" / DMH DI-3	53.68 / 12" / DZVP3	HD
DMH DI-4	61.77	4 ft Ø	55.72 / 12" / TD	55.72 / 12" / DMH DI-4A	HD
DMH DI-4A	62.35	4 ft Ø	53.82 / 12" / DMH DI-4	53.78 / 12" / DZVP4	HD
DMH DI-5A	62.35	4 ft Ø	53.92 / 12" / CAP	53.88 / 12" / DZVP5	HD
DMH DI-6A	62.35	4 ft Ø	54.02 / 12" /	53.98 / 12" / DZVP6	HD
DMH DI-8	62.27	6 ft Ø	52.90 / 12" / DHVP-2	52.52 / 24" / DMH DI-1	HD
DMH DI-9	62.20	4 ft Ø	54.00 / 12" / TEE C2 54.00 / 12" / OCS DI-2 54.60 / 12" / CB DI-5	52.77 / 15" / DMH DI-10	HD
DMH DI-10	62.68	4 ft Ø	52.70 / 6" / BEND B3 52.70 / 6" / BEND B4 52.19 / 15" / DMH DI-9 57.44 / 6" / UD-5	52.17 / 12" / DMH DI-11	HD
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EX. DMH B2	61.69	4 ft Ø	55.62 / 15" / EX. DMH B3	54.40 / 12" / DMH DI-2A	HD
EX. DMH B3	61.57	4 ft Ø	56.51 / 12" / EX. DMH B8	55.79 / 15" / EX. DMH B2	HD
EX. DMH B5	61.66	4 ft Ø	54.57 / 15" / EX DMH B6	54.51 / 12" / DMH DI-1A	HD
EX. DMH B8	61.87	4 ft Ø	57.25 / 12" / EX. TD	56.82 / 12" / EX. DMH B3	HD
EX. SB-DMH-1	65.62	4 ft Ø	60.57 / 18" / SB-WQU-5 60.57 / 18" / SB-CB-18	55.20 / 18" / DMH DI-13	HD
OCS DI-2	60.50	4 ft Ø		54.50 / 12" / DMH DI-9	LD



PERMITTING DRAWINGS

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STATE OF MAINE
DWIGHT D. ANDERSON
No. 12275
4-2-19
LICENSED
PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

Title

HOLD/DEICING/RON APRON GRADING AND DRAINAGE PLAN - 2019 CONSTRUCTION ONLY

Project No.
195211590

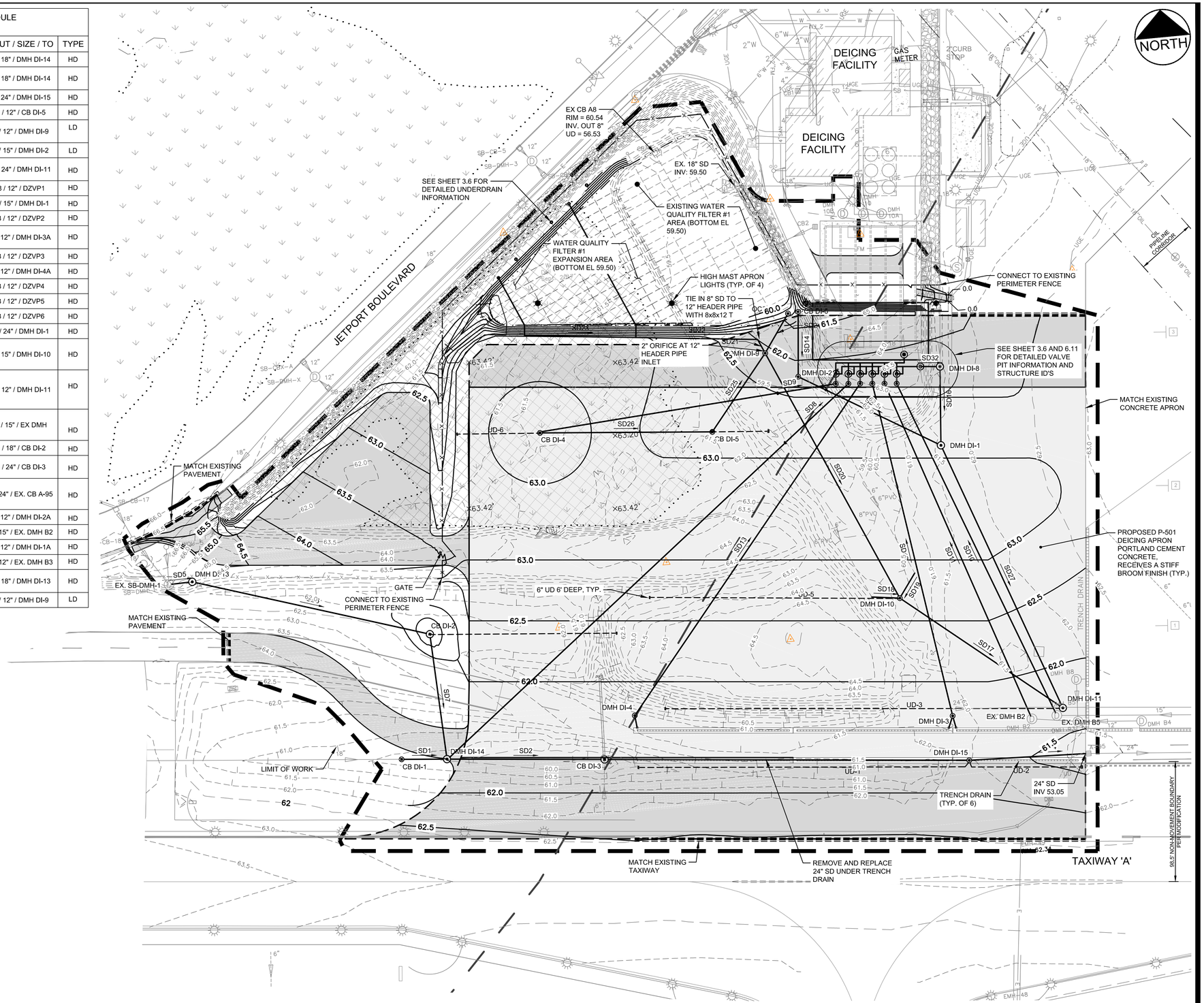
Scale
1" = 40'

Sheet

3.4A

STORM DRAIN APPURTENANCE SCHEDULE
NETWORK - DEICING APRON

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OCS DI-2	60.50	4 ft Ø		54.50 / 12" / DMH DI-9	LD



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PORTLAND AND SOUTH PORTLAND, MAINE

Title

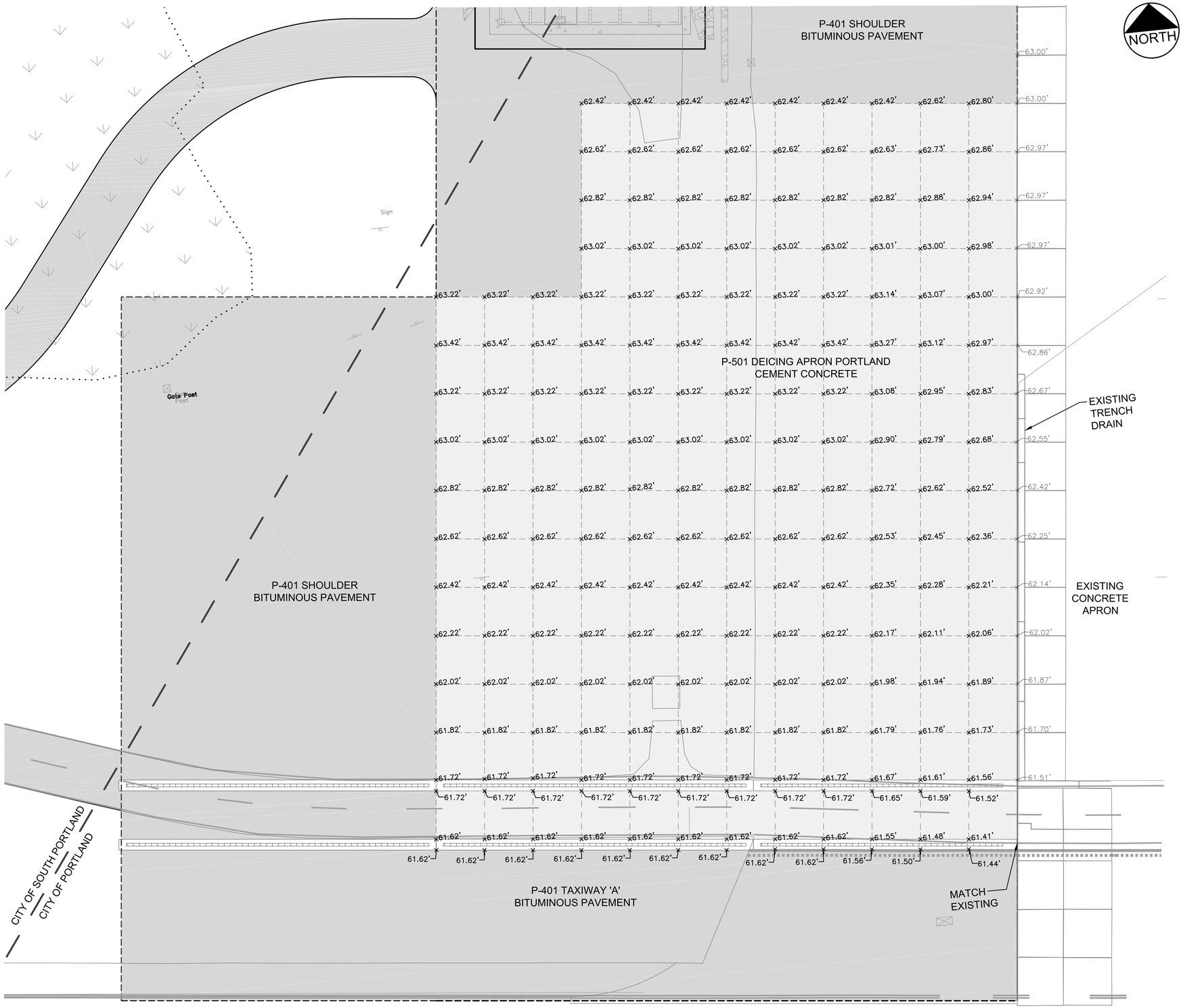
HOLD/DEICING/RON APRON GRADING AND DRAINAGE PLAN - 2020 CONSTRUCTION

Project No.	Scale
195211590	1" = 40'

Sheet

3.4B

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NORTH

SITE LAYOUT LEGEND

- BITUMINOUS PAVEMENT
- PORTLAND CEMENT CONCRETE

GRAPHIC SCALE

20 0 10 20 40

(IN FEET)

1 inch = 20 ft.

PERMITTING DRAWINGS

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Diana's CADD Serivice, LLC (Drafting)
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Notes

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3	ISSUED TO CITY OF PORTLAND FOR APPROVAL	DDA	DDA	19.04.08
2	RELEASED FOR BID	DDA	DDA	19.03.08
1	ISSUED FOR CITY, MeDOT AND FAA REVIEW	DDA	DDA	19.02.28

File Name: 195211590_spot_deicing	LA	DDA	AMG	JAN 2018
	DWN.	CHKD.	DSGN.	DATE

Permit-Seal



Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

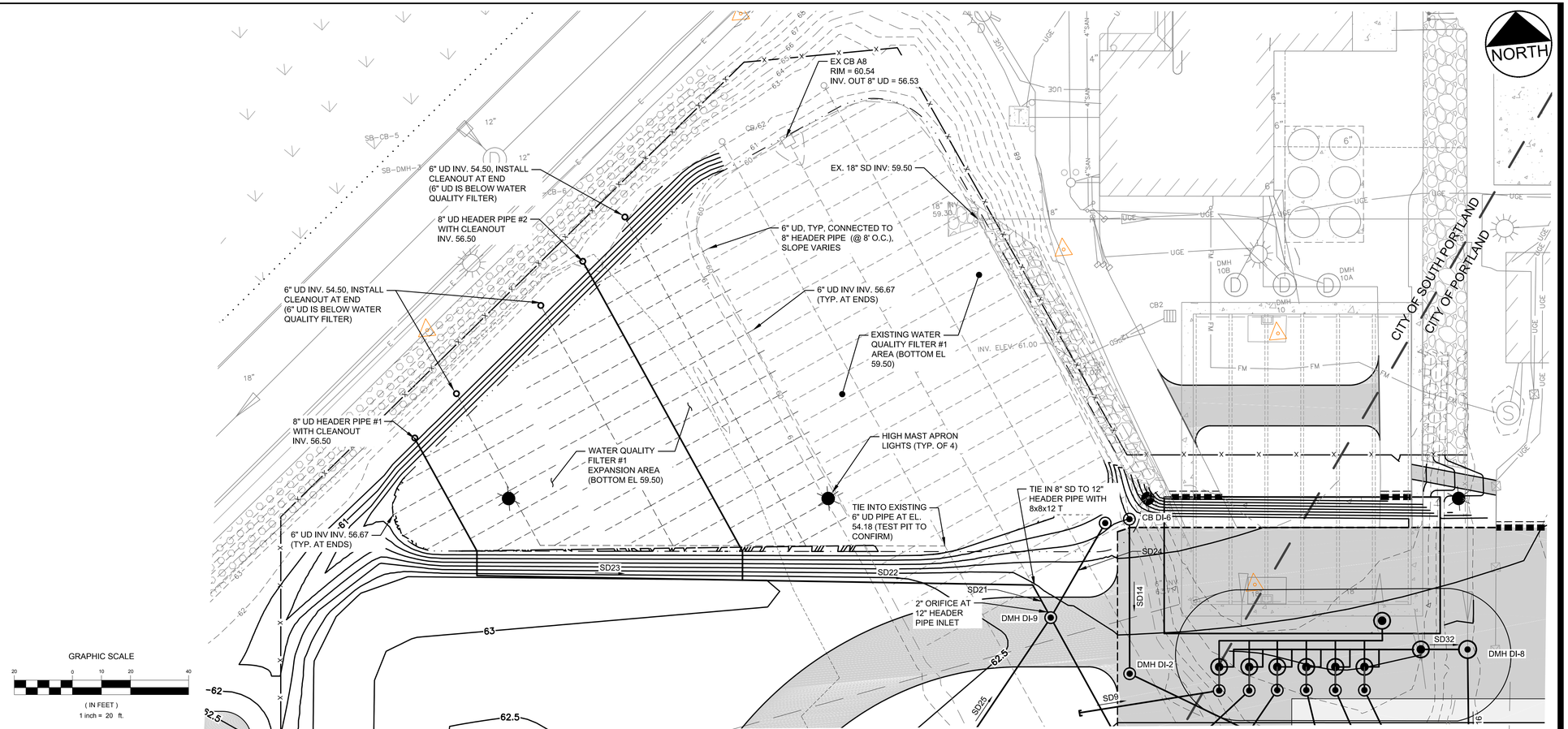
Title

HOLD/DEICING/RON APRON SPOT GRADE PLAN

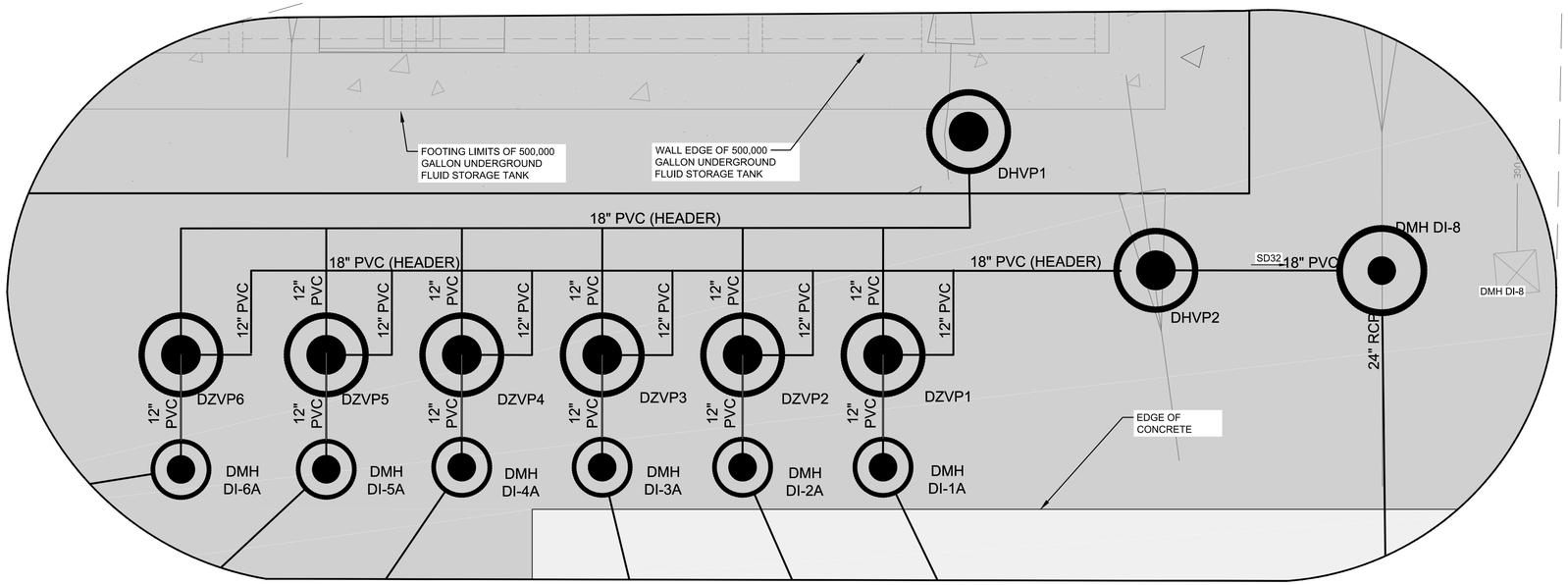
Project No.
195211590

Scale
1" = 20'

Sheet
3.5



PLANVIEW
SCALE 1" = 20'



DEICING VALVE PIT
SCALE 1" = 5'

PERMITTING DRAWINGS

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STATE OF MAINE
DWIGHT D. ANDERSON
No. 9275
LICENSED
PROFESSIONAL ENGINEER

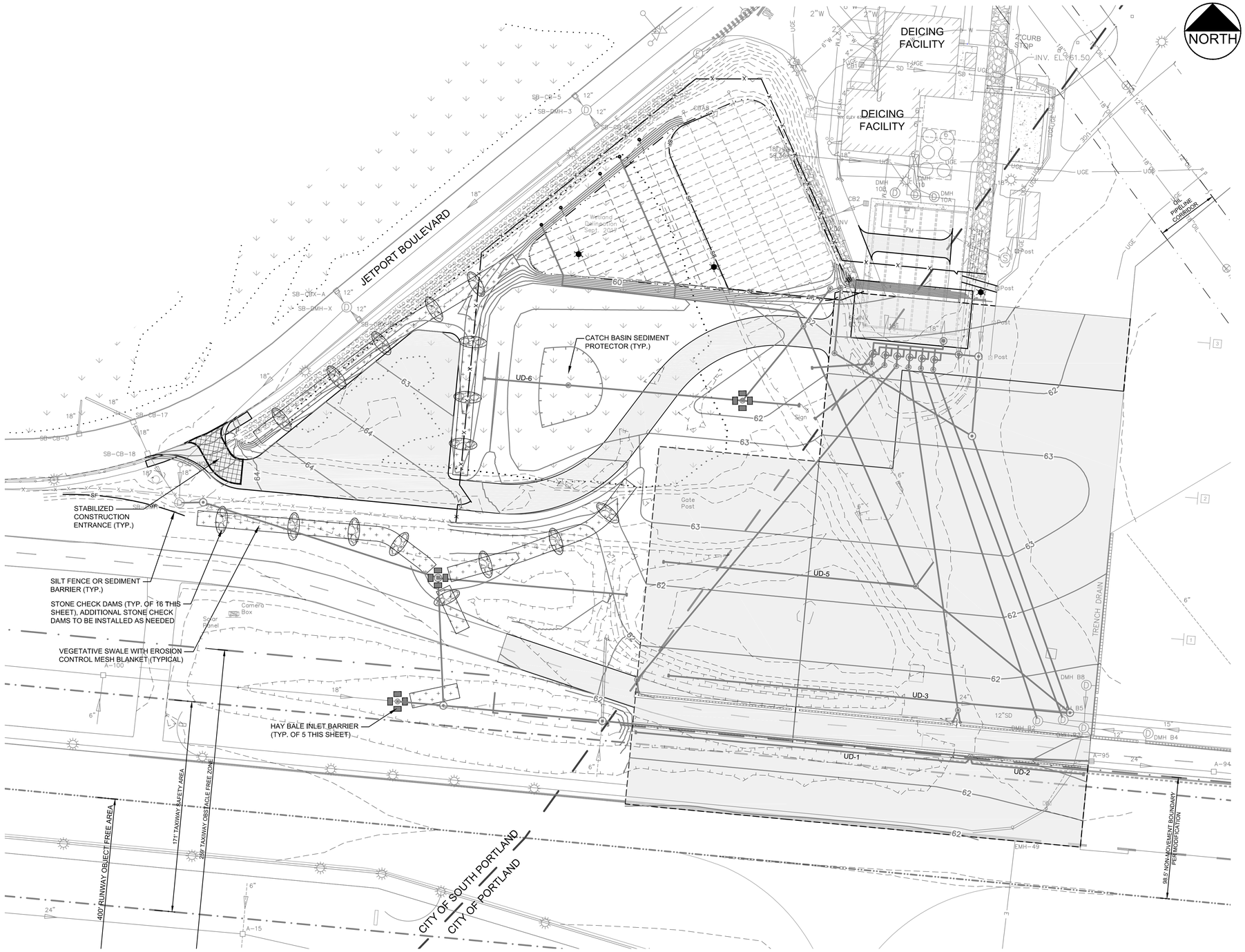
Client/Project
PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END
PORTLAND AND SOUTH PORTLAND, MAINE

Title
EXPANDED PLAN FOR WATER QUALITY FILTER 1 AND DEICING VALVE PITS

Project No. 195211590
Scale AS SHOWN

Sheet
3.6



EROSION AND SEDIMENT CONTROL LEGEND

- SILT FENCE/SEDIMENT BARRIER — SF
- CONSTRUCTION ENTRANCE
- EROSION CONTROL MESH BLANKET
- RIPRAP PROTECTION
- STONE CHECK DAM
- HAY BALE INLET BARRIER
- CATCH BASIN SEDIMENT PROTECTOR

GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

PERMITTING DRAWINGS

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DDA	DDA	YY.MM.DD	

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	DWN.	CHKD.	DSGN.	DATE

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STATE OF MAINE
DWIGHT D. ANDERSON
No. 12275
4-2-19
LICENSED
PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

Title

HOLD/DEICING/RON APRON EROSION AND SEDIMENT CONTROL PLAN

Project No.	Scale
195211590	1" = 40'

Sheet

3.7

NORTH

JETPORT BOULEVARD

CITY OF SOUTH PORTLAND
CITY OF PORTLAND

Gate 120

Gate 119

PROTECT EXISTING SECURITY FENCE

PROTECT EXISTING UGE

PROTECT EXISTING SECURITY FENCE

ADJUST FIELD INLET #5 CASTING TO GRADE

PROTECT EXISTING LIGHT POLE BASE AND UGE

EXISTING FENCE TO BE REMOVED

PROTECT EXISTING LIGHT POLE BASE AND UGE

EXISTING RIPRAP TO BE REMOVED (INCIDENTAL TO UNCLASSIFIED EXCAVATION BID ITEM)

REMOVE 12" SD

UNCLASSIFIED EXCAVATION BOX CUT WITHIN PROPOSED CONCRETE AND PAVEMENT LIMITS

6" AND 12" UNDERDRAIN WITHIN RIPRAP AREA TO BE REMOVED

MILL PAVEMENT 2' TYP.

SAWCUT EXISTING PAVEMENT TYP.

REMOVE CB A-13 AND CB A-138

REMOVE FIELD INLET #1 AND 2

REMOVE FIELD INLET #3 AND #4

EXISTING 18" RCP STORMDRAIN TO BE EXTENDED

REMOVE CB A-137

PROTECT EXISTING UGE

PROTECT EXISTING LIGHT POLE BASE AND UGE

EXISTING BITUMINOUS PAVEMENT AND BASE GRAVEL TO BE REMOVED AND REPLACED WITH 6" P-209 BASE GRAVEL AND 1 -21" OF P-501 PORTLAND CEMENT CONCRETE OR 4" OF P-401 AND 14" OF P-209 (SEE SHEET 4.1 FOR LIMITS OF NEW SECTIONS)

EXISTING RIPRAP TO BE REMOVED

PROTECT EXISTING OIL PIPELINE MONITORING ACCESS, TYP.

LIMIT OF WORK TYP.

EXISTING CONCRETE APRON

GLYCOL FLUID (TO BE PROTECTED)

PROTECT EXISTING CONCRETE APRON

EXISTING PAVED SNOW SHOULDER

EXISTING CONCRETE APRON

REMOVE UGE WHERE ENCOUNTERED WITHIN BOX CUT FOR PAVEMENT CONCRETE AND GRAVELS (INCIDENTAL TO UNCLASSIFIED EXCAVATION BID ITEM TYP.)

PROTECT EXISTING 18" PORTLAND OIL PIPELINE (PMPL) COORDINATE EXCAVATION IN THIS AREA WITH PMPL

50' OIL PIPELINE CORRIDOR

TBM DISK A1
ELEV. 66.04

TBM DISK A2
ELEV. 64.32

PROJECT BENCHMARKS TBM DISK A1 AND A2

EXISTING DE-ICE TRUCK PARKING AREA

DEICING FACILITY

GAS METER

GATE 14

GATE 12

TRENCH DRAIN

Paved

REMOVAL LEGEND

- BITUMINOUS PAVEMENT TO BE REMOVED
- PAVEMENT SAWCUT
- PAVEMENT MILL
- LIMIT OF WORK
- EXISTING UGE TO BE REMOVED
- STORMDRAIN/UNDERDRAIN TO BE REMOVED

GRAPHIC SCALE

20 0 10 20 40

(IN FEET)
1 inch = 20 ft.

PERMITTING DRAWINGS

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	DWN.	CHKD.	DSGN.	DATE

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STATE OF MAINE
DWIGHT D. ANDERSON
No. 9275
LICENSED
PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

Title

TERMINAL APRON EXISTING CONDITIONS AND DEMOLITION PLAN

Project No.	Scale
195211590	1" = 20'

Sheet

4.0

NORTH

PERMANENT PERIMETER SECURITY FENCE

RIPRAP SLOPE AND DRAINAGE EDGE

STA. 23+74
248.75' LT

STA. 23+88
248.79' LT

STA. 22+75
149.94' LT

EXISTING PERSONNEL GATE #120

EXISTING VEHICLE GATE #119

CONSTRUCTION BASELINE

6" D_{50} RIPRAP, 14" THICK TO BE INSTALLED 10' WIDE AT APRON SHOULDERS

SAWCUT EXISTING BITUMINOUS APRON, TYP.

MILL PAVEMENT 2', TYP.

P-401 SHOULDER BITUMINOUS PAVEMENT

P-501 APRON PORTLAND CEMENT CONCRETE TO RECEIVE A STIFF BROOM FINISH (TYP.)

EXISTING EDGE OF PAVEMENT

FULL DEPTH P-401 PAVEMENT SECTION

FULL DEPTH P-501 PCC APRON CONSTRUCTION WITHIN PHASE 7 LIMITS

CITY OF SOUTH PORTLAND

CITY OF PORTLAND

EXISTING GRAVEL - TEMPORARY STAGING AND CONTRACTOR PARKING AREA

GATE 14

REMOVE EXISTING P-401 PAVEMENT, RESHAPE EXISTING P-209 BASE COURSE AND PAVE WITH 6 INCHES OF P-401 HMA PAVEMENT

PHASE 6

PHASE 7

17-21" OF P-501 PCC AND 6" OF P-209 WITHIN PHASE 6 LIMITS

EXISTING CONCRETE APRON

GATE 12

STA. 23+85
0.00' T

TRENCH DRAIN

N 296884.97
E 2913737.39

EXISTING JOINTS CONTINUE BUT ARE NOT SHOWN FOR CLARITY PURPOSES

STA. 23+53
196.57' RT

SAWCUT EXISTING PAVED APRON, TYP.

MILL PAVEMENT 2', TYP.

SAW AND SEAL ALL PAVEMENT JOINTS WHERE NEW PAVEMENT MEETS EXISTING PAVEMENT

STA. 23+85
231.09' RT

PROTECT ACTIVE OIL LINE

EXISTING CONCRETE APRON

OIL PIPELINE CORRIDOR

EXISTING CONCRETE APRON

3

SITE LAYOUT LEGEND

- BITUMINOUS PAVEMENT (MDOT)
- BITUMINOUS PAVEMENT (P-401)
- PORTLAND CEMENT CONCRETE
- LIMIT OF WORK
- LIMIT OF PAVEMENT SAWCUT
- PAVEMENT MILL

GRAPHIC SCALE

20 0 10 20 40

(IN FEET)
1 inch = 20 ft.

PERMITTING DRAWINGS

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STATE OF MAINE
DWIGHT D. ANDERSON
No. 12275
4-2-2019
LICENSED PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

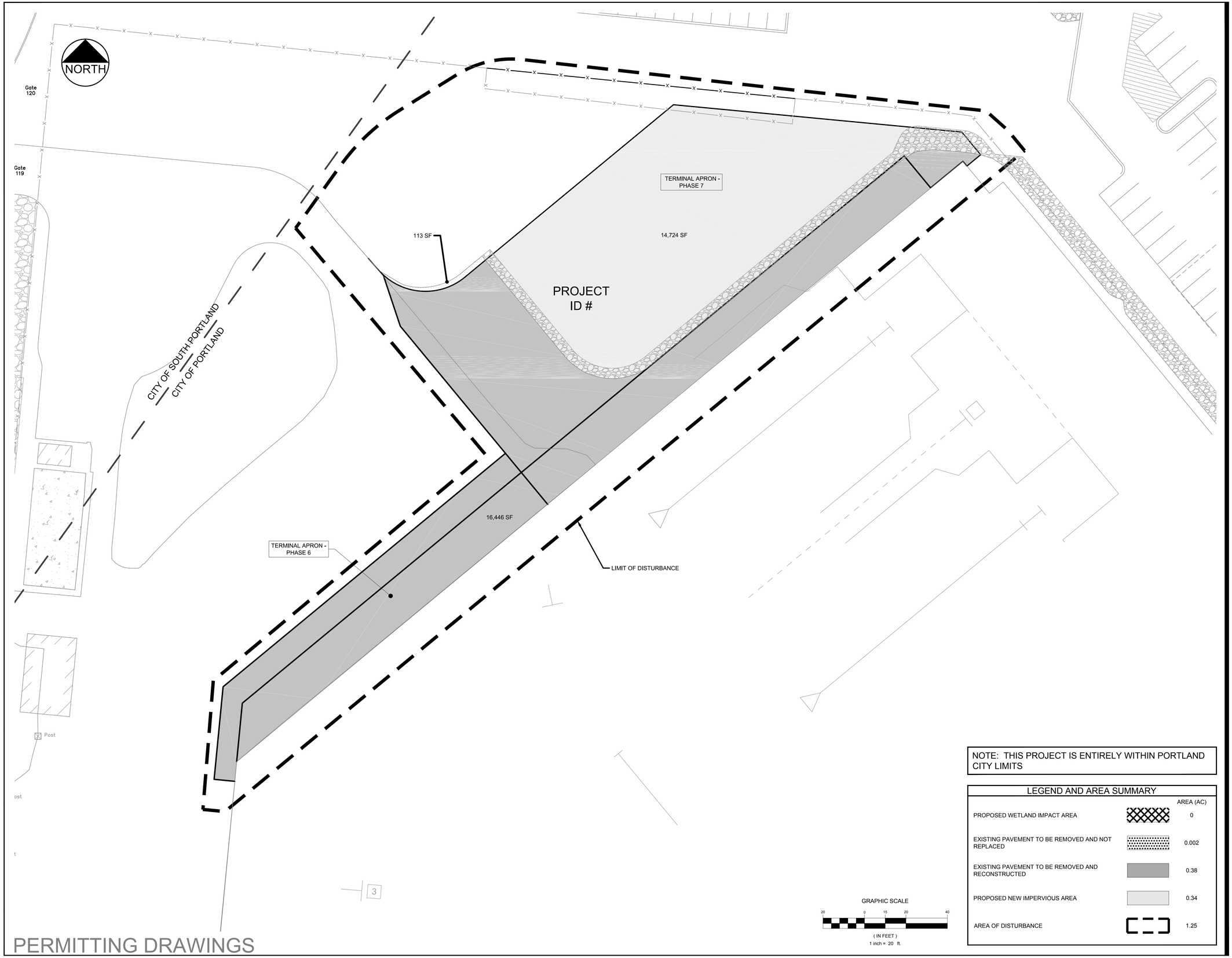
Title

TERMINAL APRON SITE LAYOUT PLAN

Project No.	Scale
195211590	1" = 20'

Sheet

4.1A



NOTE: THIS PROJECT IS ENTIRELY WITHIN PORTLAND CITY LIMITS

LEGEND AND AREA SUMMARY		AREA (AC)
PROPOSED WETLAND IMPACT AREA		0
EXISTING PAVEMENT TO BE REMOVED AND NOT REPLACED		0.002
EXISTING PAVEMENT TO BE REMOVED AND RECONSTRUCTED		0.38
PROPOSED NEW IMPERVIOUS AREA		0.34
AREA OF DISTURBANCE		1.25

GRAPHIC SCALE

20 0 15 20 40

(IN FEET)

1 inch = 20 ft.

PERMITTING DRAWINGS

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4-8-2019
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PORTLAND AND SOUTH PORTLAND, MAINE

Title

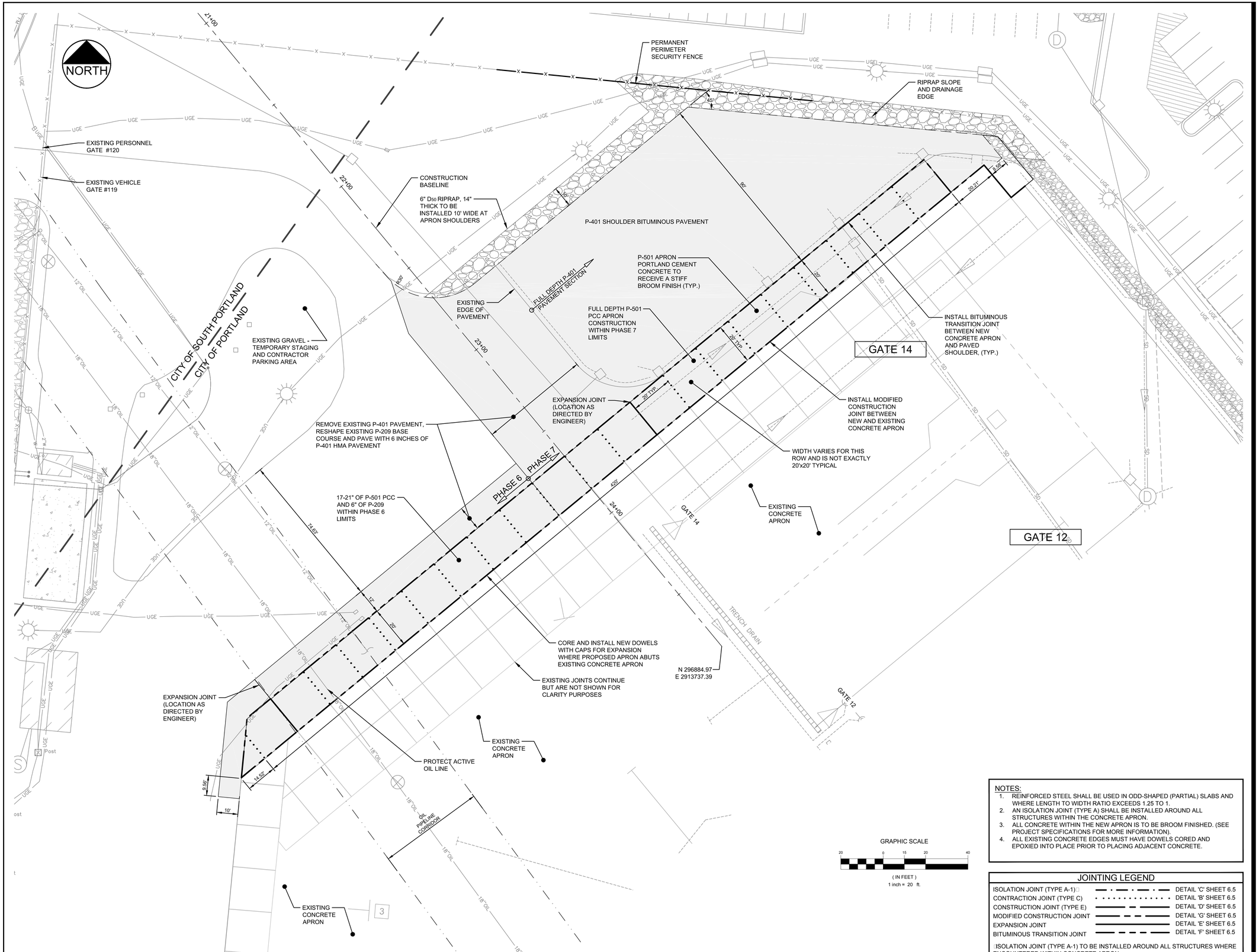
TERMINAL APRON
IMPACT AREA SUMMARY

Project No. 195211590

Scale 1" = 20'

Sheet

4.1B



NOTES:

1. REINFORCED STEEL SHALL BE USED IN ODD-SHAPED (PARTIAL) SLABS AND WHERE LENGTH TO WIDTH RATIO EXCEEDS 1.25 TO 1.
2. AN ISOLATION JOINT (TYPE A) SHALL BE INSTALLED AROUND ALL STRUCTURES WITHIN THE CONCRETE APRON.
3. ALL CONCRETE WITHIN THE NEW APRON IS TO BE BROOM FINISHED. (SEE PROJECT SPECIFICATIONS FOR MORE INFORMATION).
4. ALL EXISTING CONCRETE EDGES MUST HAVE DOWELS CORED AND EPOXIED INTO PLACE PRIOR TO PLACING ADJACENT CONCRETE.

JOINTING LEGEND

ISOLATION JOINT (TYPE A-1)□	DETAIL 'C' SHEET 6.5
CONTRACTION JOINT (TYPE C)	DETAIL 'B' SHEET 6.5
CONSTRUCTION JOINT (TYPE E)	DETAIL 'D' SHEET 6.5
MODIFIED CONSTRUCTION JOINT	DETAIL 'G' SHEET 6.5
EXPANSION JOINT	DETAIL 'E' SHEET 6.5
BITUMINOUS TRANSITION JOINT	DETAIL 'F' SHEET 6.5

□ISOLATION JOINT (TYPE A-1) TO BE INSTALLED AROUND ALL STRUCTURES WHERE ENCOUNTERED WITHIN CONCRETE APRON

PERMITTING DRAWINGS

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Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

Title

TERMINAL APRON JOINTING PLAN

Project No.	Scale
195211590	1" = 20'

Sheet

4.2

NORTH

Gate 120

Gate 119

PERMANENT SECURITY FENCE

SLOPE TRANSITION

1.5H:1V SLOPE

3H:1V SLOPE

CB A-137 4' HEAVY DUTY
RIM = 61.50
12" UD #1 INV. IN = 55.00
12" UD #2 INV. IN = 56.00
6" UD #3 INV. IN = 56.5
18" RCP SD #1 INV. OUT = 53.51

RIPRAP SLOPE AND DRAINAGE EDGE

INV. = 54.85

ADJUST FL#5 TO GRADE

INV. ELEV. 56.00

INV. ELEV. 57.5

INV. ELEV. 58.00

APPROXIMATE ELEV. EX 18" SD = 52.93 (CONNECT NEW 18" SD TO EXISTING 18" SD)

MATCH EXISTING PAVEMENT GRADE (TYP.)

PROPOSED P-501 TERMINAL APRON PORTLAND CEMENT CONCRETE, RECEIVES A STIFF BROOM FINISH (TYP.)

EXISTING JOINTS CONTINUE BUT ARE NOT SHOWN FOR CLARITY PURPOSES

INV. ELEV. 58.5

EXISTING CONCRETE APRON

MATCH EXISTING CONCRETE APRON GRADES

TRENCH DRAIN

CITY OF SOUTH PORTLAND

CITY OF PORTLAND

INV. EL. 61.50

GRAPHIC SCALE

20 0 10 20 40

(IN FEET)
1 inch = 20 ft.

SITE LAYOUT LEGEND

- BITUMINOUS PAVEMENT (MDOT)
- BITUMINOUS PAVEMENT (P-401)
- PORTLAND CEMENT CONCRETE
- LIMIT OF WORK
- LIMIT OF PAVEMENT SAWCUT
- PAVEMENT MILL

PERMITTING DRAWINGS

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Jackman, Maine 04945

Notes

Revision	By	Appd.	YY.MM.DD
3 ISSUED TO CITY OF PORTLAND FOR APPROVAL	DDA	DDA	19.04.08
2 RELEASED FOR BID	DDA	DDA	19.03.08
1 ISSUED FOR CITY, MaDOT AND FAA REVIEW	DDA	DDA	19.02.28

File Name: 195211590_grading_nw_term	-	DDA	AMG	JAN 2018
	DWN.	CHKD.	DSGN.	DATE

Permit-Seal

STATE OF MAINE
DWIGHT D. ANDERSON
No. 12275
4-2-19
LICENSED PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

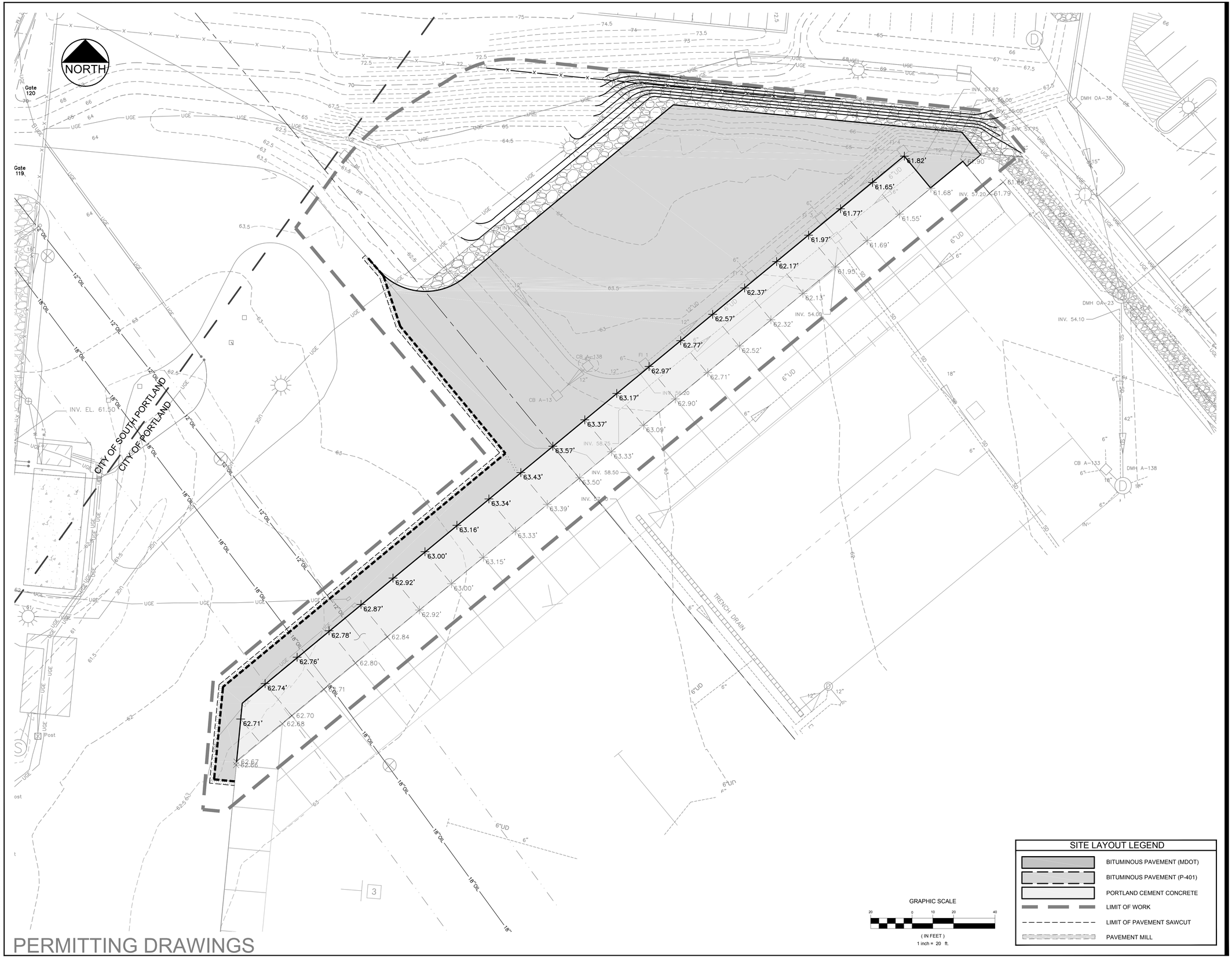
Title

TERMINAL APRON GRADING AND DRAINAGE PLAN

Project No.	Scale
195211590	1" = 20'

Sheet

4.3



PERMITTING DRAWINGS

V:\1952\active\195211590\aviation\9_drawingsheet_files:portland\195211590_grading_nw_term.dwg apray 4/10/2019 2:26 PM

SITE LAYOUT LEGEND

- BITUMINOUS PAVEMENT (MDOT)
- BITUMINOUS PAVEMENT (P-401)
- PORTLAND CEMENT CONCRETE
- LIMIT OF WORK
- LIMIT OF PAVEMENT SAWCUT
- PAVEMENT MILL

Stantec

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Plisga & Day Land Surveyors (Surveyor)
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Independent Archaeological Consulting, LLC (Archaeologist)
801 Islington Street, Suite 31
Portsmouth, New Hampshire 03801

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DDA	DDA	19.04.08	3 ISSUED TO CITY OF PORTLAND FOR APPROVAL
DDA	DDA	19.03.08	2 RELEASED FOR BID
DDA	DDA	19.02.28	1 ISSUED FOR CITY, MeDOT AND FAA REVIEW

File Name: 195211590_grade_nw_term	-	DDA	AMG	JAN 2018
	DWN.	CHKD.	DSGN.	DATE

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STATE OF MAINE
DWIGHT D. ANDERSON
No. 12275
4-2-19
LICENSED
PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

Title

TERMINAL APRON SPOT GRADE PLAN

Project No.	Scale
195211590	1" = 20'

Sheet

4.4

PERMANENT SECURITY FENCE

CATCH BASIN SEDIMENT PROTECTION, TYP.

RIPRAP SLOPE AND DRAINAGE EDGE

CATCH BASIN SEDIMENT PROTECTION, TYP.

HAYBALE INLET BARRIER, TYP.

EROSION CONTROL MESH FABRIC, TYP.

INSTALL SILT FENCE

STONE CHECK DAM, TYP.

STABILIZED CONSTRUCTION ENTRANCE.

P-401 SHOULDER BITUMINOUS PAVEMENT

INSTALL ONE 20'x30' SEDIMENT FILTRATION BED, 18" DEEP WITH P-154 SUBBASE COURSE AND 6" UD (TO BE PAID FOR AS P-154-5.1 PER C.Y.) AND D-705-5.1 PER L.F., REMOVE TOP 12 INCHES PRIOR TO INSTALLATION OF CONCRETE APRON (TO BE PAID FOR AS EXCAVATION ITEM P-152 -4.1)

P-501 TERMINAL APRON PORTLAND CEMENT CONCRETE

DEWATERING SEDIMENT FILTERS SHALL BE INSTALLED AS NEEDED IN ACCORDANCE WITH THE DETAILS IN THE PLAN SET. THE DEWATERING SEDIMENT FILTERS FUNCTION ON THE PROJECT IS TO RECEIVE ANY WATER PUMPED FROM EXCAVATIONS DURING CONSTRUCTION. A DEWATERING SEDIMENT FILTER SHALL BE INSTALLED AND PREPARED FOR OPERATION PRIOR TO ANY TRENCHING ON SITE. WHEN DEWATERING SEDIMENT FILTERS ARE OBSERVED TO BE AT 50% CAPACITY, THEY SHALL BE CLEANED OR REPLACED. STONE UNDER THE SEDIMENT FILTERS SHALL BE REMOVED AND REPLACED CONCURRENTLY.

CITY OF SOUTH PORTLAND / CITY OF PORTLAND

Gate 120

Gate 119

GATE 14

GATE 12

TRENCH DRAIN

Paved

Post

DMH OA-38

DMH OA-23

CB A-133

DMH A-138

CB A-138

CB A-13

PI 1

EROSION AND SEDIMENT CONTROL LEGEND

- SILT FENCE/SEDIMENT BARRIER — SF
- CONSTRUCTION ENTRANCE
- EROSION CONTROL MESH BLANKET
- RIPRAP PROTECTION
- STONE CHECK DAM
- HAY BALE INLET BARRIER
- CATCH BASIN SEDIMENT PROTECTOR

GRAPHIC SCALE

20 0 10 20 40

(IN FEET)

1 inch = 20 ft.

PERMITTING DRAWINGS

V:\1952\active\195211590\layout\cad\0_drawingsheet_files:portland\195211590_eros_nw_term.dwg agray 4/10/2019 2:21 PM

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2 RELEASED FOR BID	DDA	DDA	19.03.08
1 ISSUED FOR CITY, MeDOT AND FAA REVIEW	DDA	DDA	19.02.28

File Name: 195211590_eros_nw_term	LA	DDA	AMG	JAN 2018
	DWN.	CHKD.	DSGN.	DATE

Permit-Seal

STATE OF MAINE
DWIGHT D. ANDERSON
No. 10275
4-3-19
LICENSED PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

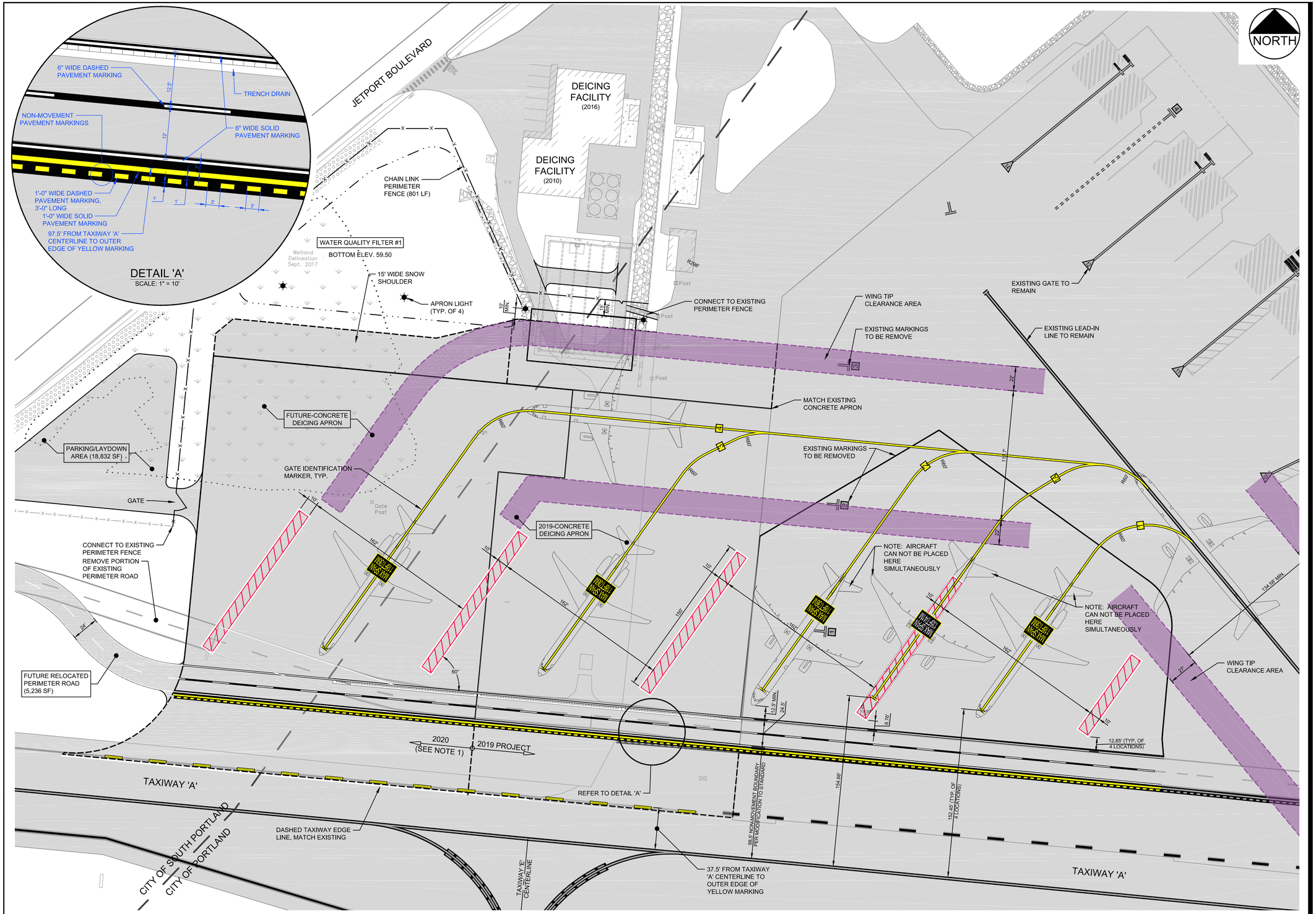
Title

TERMINAL APRON EROSION AND SEDIMENT CONTROL PLAN

Project No.	Scale
195211590	1" = 20'

Sheet

4.5



NOTES:
THE PURPOSE OF THIS PLAN IS TO SHOW PROPOSED MARKINGS AS PART OF THE 2019 PROJECT WITH THE 2020 PROJECT LOCATED TO THE WEST.

GRAPHIC SCALE
40 0 20 40 80
(IN FEET)
1 inch = 40 ft.

PERMITTING DRAWINGS

V:\19522\active\195211590\aviation\9_drawingsheet_files-portland\195211590_markings_deicing.dwg agray 4/11/2019 12:02 PM

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Jackman, Maine 04945

Notes

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DDA	DDA	19.04.08	3 ISSUED TO CITY OF PORTLAND FOR APPROVAL
DDA	DDA	19.03.08	2 RELEASED FOR BID
DDA	DDA	19.02.28	1 ISSUED FOR CITY, MeDOT AND FAA REVIEW

File Name: 195211590_markings_deicing	LA	DDA	AMG	JAN 2018
	DWN.	CHKD.	DSGN.	DATE

Permit-Seal



Client/Project
PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

Title
HOLD/DEICING/RON APRON MARKING PLAN

Project No.	Scale
195211590	1" = 40'

Sheet
5.0

NORTH

CITY OF SOUTH PORTLAND
CITY OF PORTLAND

P-401
SNOW SHOULDER

36'x43'INGESTION ZONE

36.19'

46.91'

EXISTING PAVED SHOULDER

P-501 TERMINAL APRON EXPANSION

EXISTING CONCRETE TERMINAL APRON

Employee

EXISTING MARKINGS AT GATE 12 AND GATE 14 ARE TO BE ERADICATED PRIOR TO STRIPING OF GATE 12 AND GATE 14

36'x41.5' INGESTION ZONE

14

12

120'

20'

35'

41'

25'

16.47'

18.92'

12.95'

53.96'

EXISTING MARKINGS, TYP.

GATE IDENTIFICATION MARKING, TYP.

GSE FREE ZONE, TYP.

AIRCRAFT SAFETY ENVELOPES, TYPICAL

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

PERMITTING DRAWINGS

GATE 14
1" = 10'

GATE 12
1" = 10'

32.91'

7'

5'

3'

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1	ISSUED FOR CITY, MaDOT AND FAA REVIEW	DDA	DDA	19.02.28

File Name: 195211590_markings	LA	DDA	AMG	JAN 2018
	DWN.	CHKD.	DSGN.	DATE

Permit-Seal

STATE OF MAINE
DWIGHT D. ANDERSON
No. 9273
4-8-2019
LICENSED PROFESSIONAL ENGINEER

Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

Title

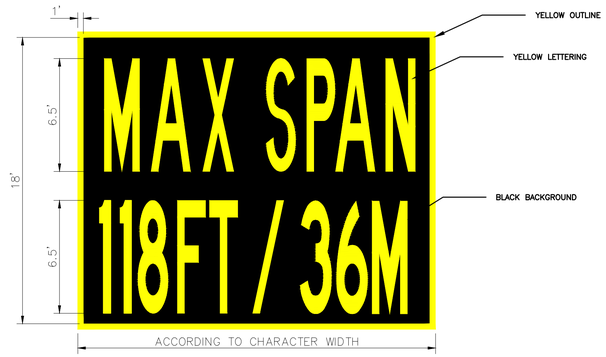
TERMINAL APRON NORTHWEST END MARKING PLAN

Project No.	Scale
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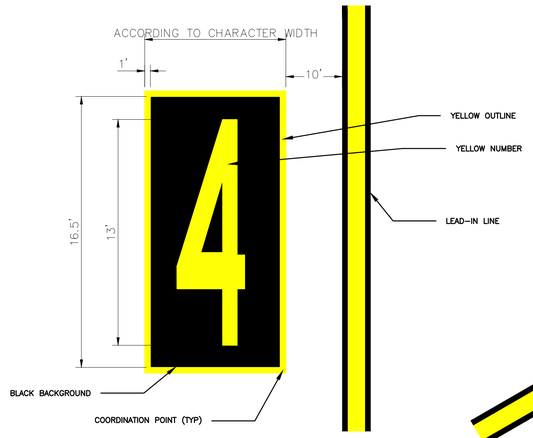
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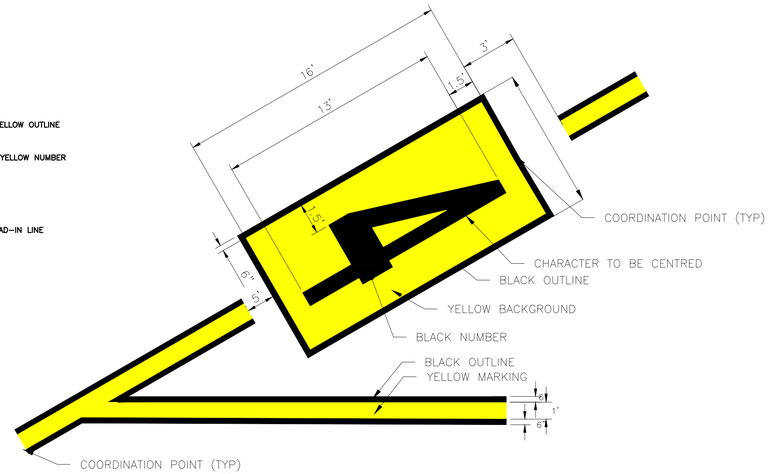
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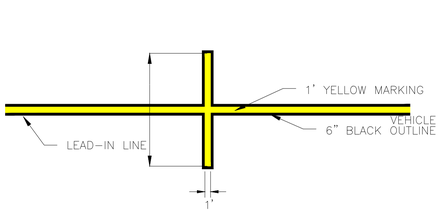
1 MAXIMUM WING SPAN MARKING DETAILS
NOT TO SCALE

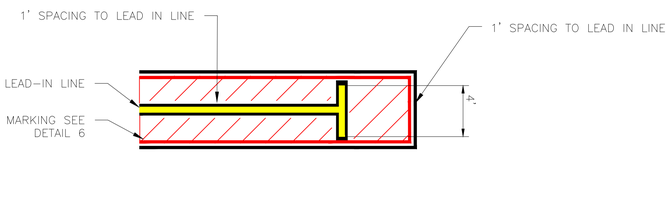


2 DEICING BAY IDENTIFICATION MARKING DETAILS
NOT TO SCALE



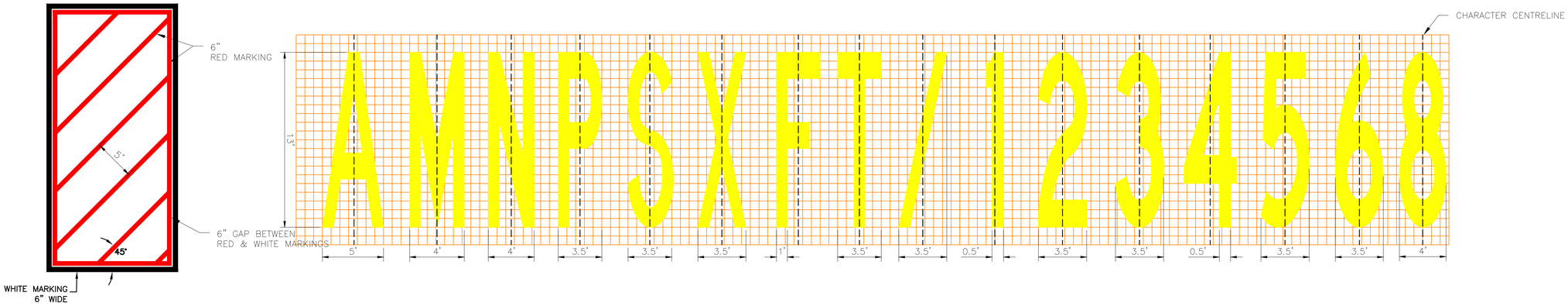
3 LEAD–IN LINE AND DIRECTION TO DEICING BAY MARKING DETAILS
NOT TO SCALE





4 STOP BAR AND PILOT REFERENCE BAR MARKING DETAILS
NOT TO SCALE

5 STOP BAR AND PILOT REFERENCE BAR MARKING DETAIL
NOT TO SCALE



6 VEHICLE SAFETY ZONE MARKING DETAILS
NOT TO SCALE

7 TAXIWAY/APRON IDENTIFICATION NUMBERS/LETTERS DETAILS
NOT TO SCALE

PERMITTING DRAWINGS

V:\195\active\195211590\aviation\0_drawing\sheet_files-portland\195211590_marking_detail.dwg ag/ray 4/10/2019 2:27 PM

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1	ISSUED FOR CITY / MaDOT AND FAA REVIEW	DDA	DDA	19.02.28

File Name: | DWN. | CHKD. | DSGN. | JAN 2018 DATE

Permit-Seal



Client/Project
PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

Title
APRON MARKING DETAILS

Project No. 195211590
Scale AS NOTED

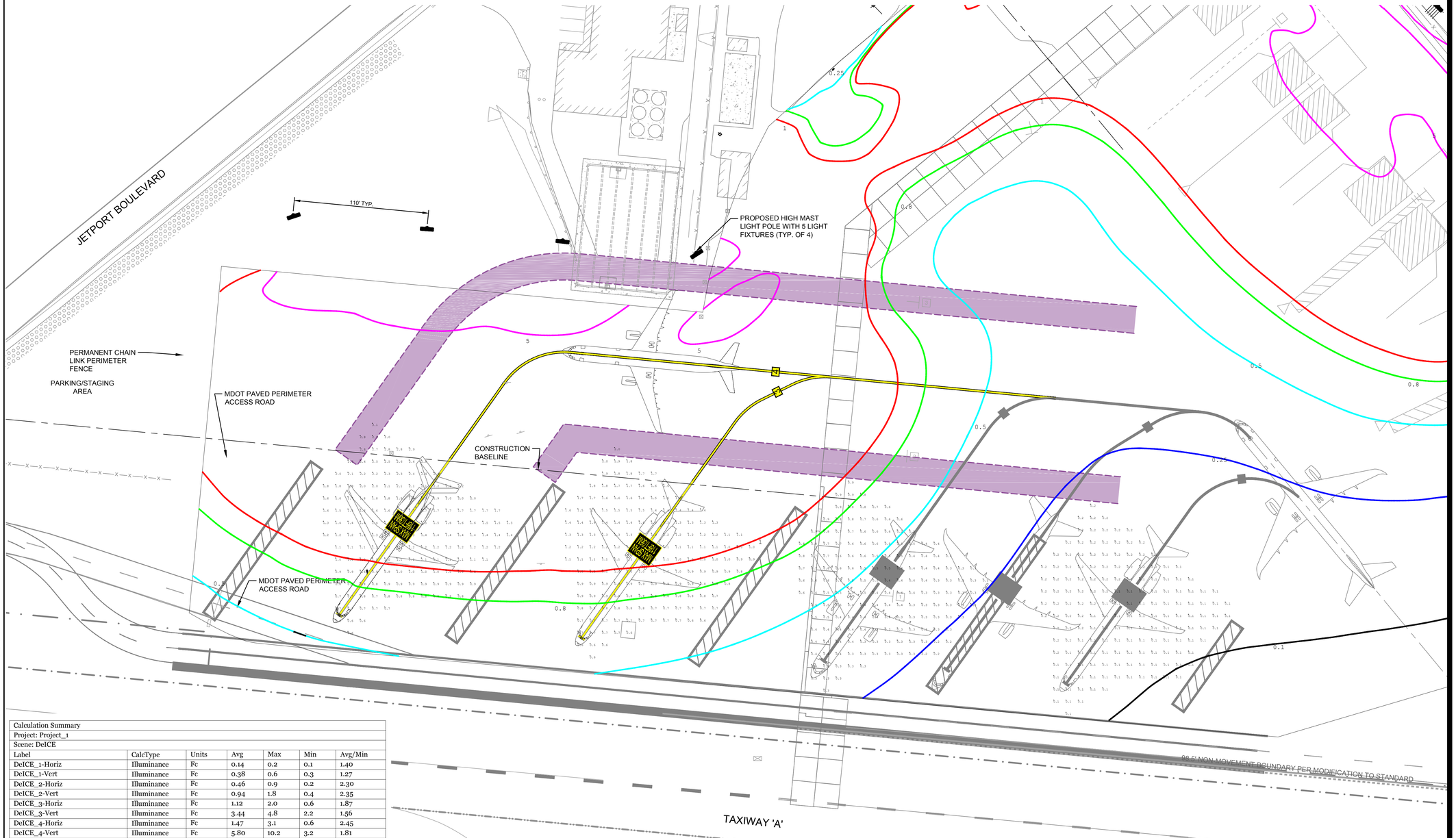
Sheet
5.2

GENERAL NOTE:
1. DRAWING TO BE PLOTTED IN COLOR.

NORTH

PHOTOMETRIC LEGEND

	5 fc
	1 fc
	.8 fc
	.5 fc
	.25 fc
	.1 fc



Calculation Summary						
Project: Project_1						
Scene: DeICE						
Label	CalcType	Units	Avg	Max	Min	Avg/Min
DeICE_1-Horiz	Illuminance	Fc	0.14	0.2	0.1	1.40
DeICE_1-Vert	Illuminance	Fc	0.38	0.6	0.3	1.27
DeICE_2-Horiz	Illuminance	Fc	0.46	0.9	0.2	2.30
DeICE_2-Vert	Illuminance	Fc	0.94	1.8	0.4	2.35
DeICE_3-Horiz	Illuminance	Fc	1.12	2.0	0.6	1.87
DeICE_3-Vert	Illuminance	Fc	3.44	4.8	2.2	1.56
DeICE_4-Horiz	Illuminance	Fc	1.47	3.1	0.6	2.45
DeICE_4-Vert	Illuminance	Fc	5.80	10.2	3.2	1.81

GRAPHIC SCALE
40 0 20 40 80
(IN FEET)
1 inch = 40 ft.

PERMITTING DRAWINGS

V:\195\active\195211590\aviation\8_drawingsheet_files-portland\195211590_apron_photometrics.dwg agray 4/10/2019 2:16 PM

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File Name: 195211590_site_deicing	MC	DDA	MLC	JAN 2018
	DWN.	CHKD.	DSGN.	DATE

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STATE OF MAINE
MICHAEL L CLAYPOOLE
No. 7824
LICENSED
PROFESSIONAL ENGINEER
04.08.2019

Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

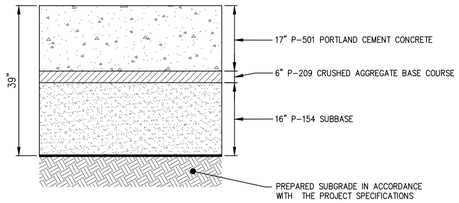
Title

HOLD/DEICING/RON APRON PHOTOMETRICS PLAN

Project No.	Scale
195211590	1" = 40'

Sheet

6.16

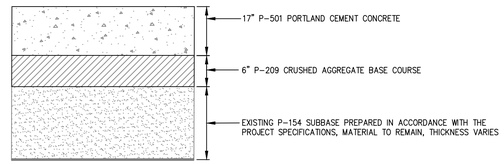


NOTES:

1. ALL MATERIALS SHALL CONFORM TO FAA SPECIFICATIONS, LATEST REVISION. COMPACTION OF ALL MATERIALS TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

(A) P-501 PORTLAND CEMENT CONCRETE APRON SECTION (EXISTING GRASS AREAS)

N.T.S.

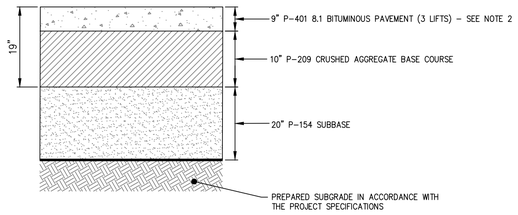


NOTES:

1. ALL MATERIALS SHALL CONFORM TO MAINEDOT AND FAA SPECIFICATIONS, LATEST REVISION. COMPACTION OF ALL MATERIALS TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

(D) P-501 PORTLAND CEMENT CONCRETE RECONSTRUCTION APRON SECTION (EXISTING PAVED SHOULDER AREAS)

NTS

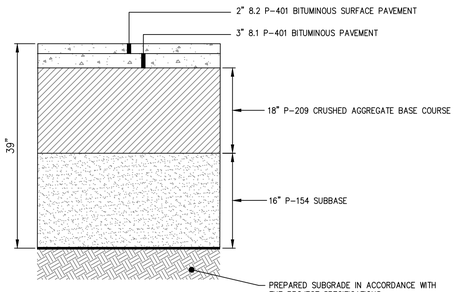


NOTES:

1. ALL MATERIALS SHALL CONFORM TO MAINEDOT AND FAA SPECIFICATIONS, LATEST REVISION. COMPACTION OF ALL MATERIALS TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
2. IF EXISTING TAXIWAY IS 10–INCHES, THICKEN BOTTOM LIFT TO 4–INCHES.

(G) P-401 TAXIWAY 'A' BITUMINOUS PAVEMENT SECTION

NTS

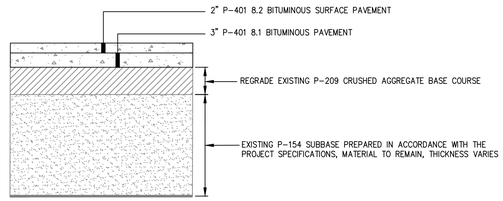


NOTES:

1. ALL MATERIALS SHALL CONFORM TO MAINEDOT AND FAA SPECIFICATIONS, LATEST REVISION. COMPACTION OF ALL MATERIALS TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

(B) P-401 SHOULDER BITUMINOUS PAVEMENT SECTION (EXISTING GRASS AREAS)

NTS

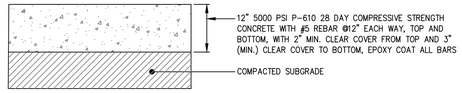


NOTES:

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(E) P-401 SHOULDER BITUMINOUS PAVEMENT SECTION (EXISTING PAVED SHOULDER AREAS)

NTS

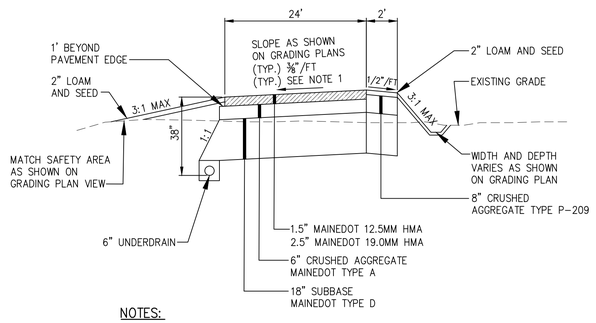


NOTES:

1. ALL MATERIALS SHALL CONFORM TO MAINEDOT AND FAA SPECIFICATIONS, LATEST REVISION.
2. COMPACTION OF ALL MATERIALS TO BE IN ACCORDANCE WITH THE LATEST FAA SPECIFICATIONS.
3. UNIFORMLY SPACE JOINTS FOR PAD AT 10' ON CENTER TRANSVERSE AND 10' ON CENTER LONGITUDINALLY.

(E) UNDERGROUND TANK PROTECTION CONCRETE PAD SECTION

NTS

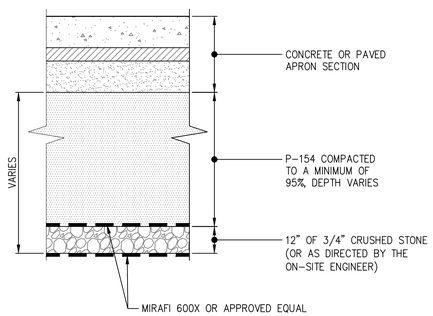


NOTES:

1. ACCESS ROAD IS CROWNED IN SELECT AREAS. SEE GRADING PLANS FOR DIRECTION OF SLOPE.

(C) PERIMETER ACCESS ROAD/STAGING AREA TYPICAL SECTION

N.T.S.



NOTE:
THIS DETAIL IS TO BE USED WHERE DIRECTED BY ENGINEER.

(F) MODIFIED OVER EXCAVATION SECTION

N.T.S.

PERMITTING DRAWINGS

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Jackman, Maine 04945

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1 ISSUED FOR CITY, MaDOT AND FAA REVIEW	DDA	DDA	19.02.28

File Name: 195211590_details | - DWN. | DDA CHKD. | AMG DSGN. | JAN 2018 DATE

Permit-Seal



Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

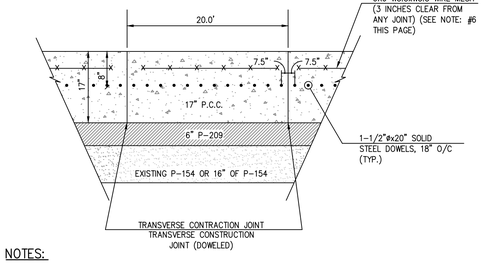
Title

SITE DETAILS

Project No. 195211590 | Scale AS NOTED

Sheet

6.4

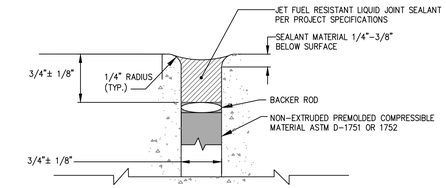


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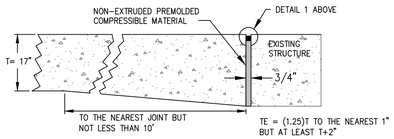
1. AT LEAST ONE HALF OF THE 1 1/2" DOWELS SHALL BE PAINTED AND OILED PER PROJECT SPECIFICATIONS.

A LONGITUDINAL AND TRANSVERSE DOWELED JOINT DETAIL IN HEAVY DUTY PCC PAVEMENT

N.T.S.



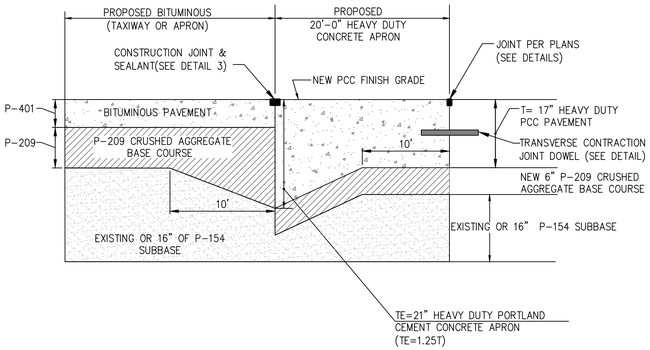
ISOLATION JOINT (DETAIL 1)



ISOLATION JOINT- TYPE A THICKENED EDGE

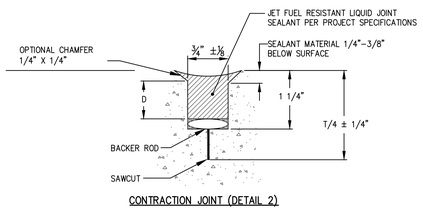
C HEAVY DUTY PORTLAND CEMENT CONCRETE PAVEMENT ISOLATION JOINT DETAILS

N.T.S.

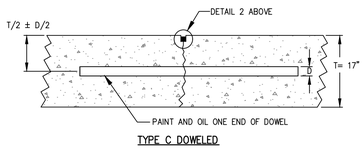


F CONCRETE APRON TO BITUMINOUS APRON OR TAXIWAY TRANSITION DETAIL

N.T.S.



CONTRACTION JOINT (DETAIL 2)



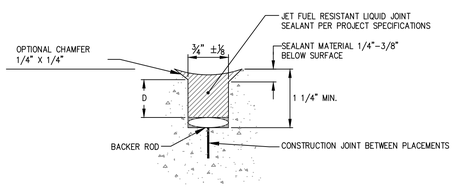
TYPE C DOWELED

B HEAVY DUTY PORTLAND CEMENT CONCRETE PAVEMENT TRANSVERSE CONTRACTION JOINT DETAILS

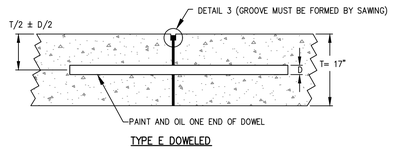
N.T.S.

JOINTING NOTES:

1. SEALANT RESERVOIR SI□ED TO PROVIDE PROPER SHAPE FACTOR□W/D. FIELD POURED AND PERFORMED SEALANTS RE□UIRE DIFFERENT SHAPE FACTORS FOR OPTIMUM PERFORMANCE.
2. BACKER ROD MATERIAL MUST BE COMPATIBLE WITH THE TYPE OF SEALANT USED AND SI□ED TO PROVIDE THE DESIRED SHAPE FACTOR.
3. CHAMFERED EDGES ARE RECOMMENDED FOR DETAILS 2 AND 3 WHEN PAVEMENTS ARE SUBJECT TO SNOW REMOVAL E□UIPMENT OR HIGH TRAFFIC VOLUMES.
4. AN ISOLATION JOINT SHALL BE INSTALLED AROUND ALL STRUCTURES WHERE ENCOUNTERED WITHIN THE CONCRETE APRON.
5. GROOVES CONSISTING OF DETAILS 1 THROUGH 3 ON THIS PAGE MUST BE FORMED BY SAWCUTTING CONCRETE APRON PER PROJECT SPECIFICATIONS. ALL SAWCUTTING SHALL BE COMPLETED WITHIN 4 HOURS OF PROPER CURING OF CONCRETE. A LACK OF MEETING THIS RE□UIREMENT COULD RESULT IN LATERAL CRACKING OF THE CONCRETE PADS IN UNACCEPTABLE LOCATIONS. THUS RE□UIRING THE CONTRACTOR TO REMOVE AND RECONSTRUCT THE PAD AT THE CONTRACTOR'S EXPENSE.
6. REINFORCING STEEL SHALL BE USED IN ODD-SHAPED SLABS AND WHERE LENGTH TO WIDTH RATIO EXCEEDS 1.25 TO 1. REINFORCING STEEL SHOULD ALSO BE USED IN SLABS WHICH ARE PENETRATED BY ACCESS COVERS OR CATCH BASIN CASTINGS. SEE DETAIL C ON SHEET 6.8.
- □. REFER TO AIRCRAFT APRON JOINTING PLAN OF THIS PLAN SET FOR LOCATIONS OF WHERE THESE SPECIFIC JOINTS ARE UTILI□ED FOR THIS PROJECT.



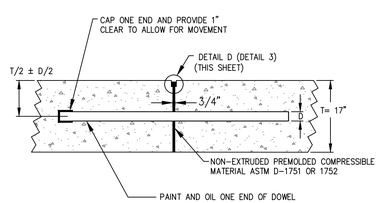
CONSTRUCTION JOINT (DETAIL 3)



TYPE E DOWELED

D HEAVY DUTY PORTLAND CEMENT CONCRETE PAVEMENT CONSTRUCTION JOINT DETAILS

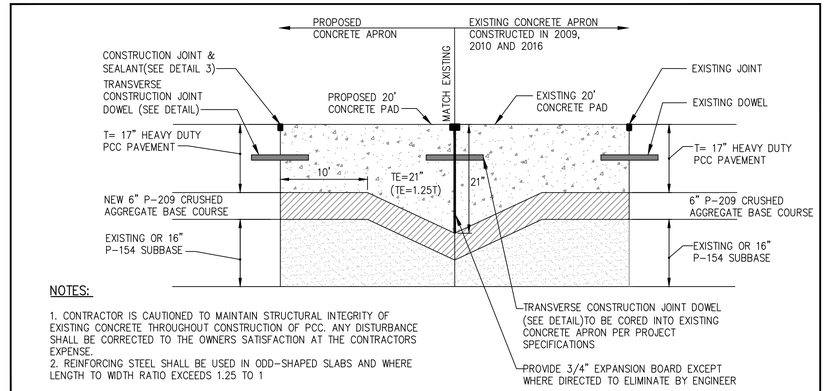
N.T.S.



TYPE F DOWELED

E EXPANSION JOINT DETAIL

N.T.S.

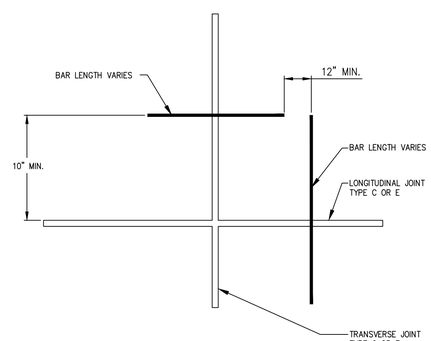


NOTES:

1. CONTRACTOR IS CAUTIONED TO MAINTAIN STRUCTURAL INTEGRITY OF EXISTING CONCRETE THROUGHOUT CONSTRUCTION OF PCC. ANY DISTURBANCE SHALL BE CORRECTED TO THE OWNERS SATISFACTION AT THE CONTRACTORS EXPENSE.
2. REINFORCING STEEL SHALL BE USED IN ODD-SHAPED SLABS AND WHERE LENGTH TO WIDTH RATIO EXCEEDS 1.25 TO 1

G MODIFIED CONSTRUCTION JOINT CONNECTION DETAIL BETWEEN EXISTING AND PROPOSED CONCRETE APRONS

N.T.S.



H POSITION OF DOWELS AT EDGE OF JOINT (TYPE C, E AND F)

N.T.S.

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PORTLAND AND SOUTH PORTLAND, MAINE

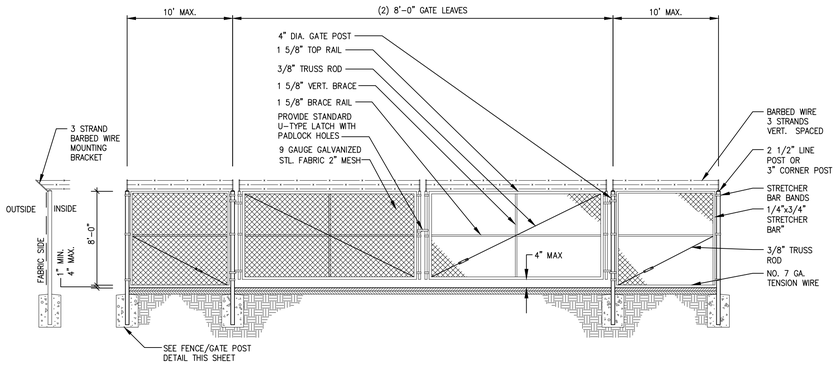
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Project No. 195211590
Scale AS NOTED

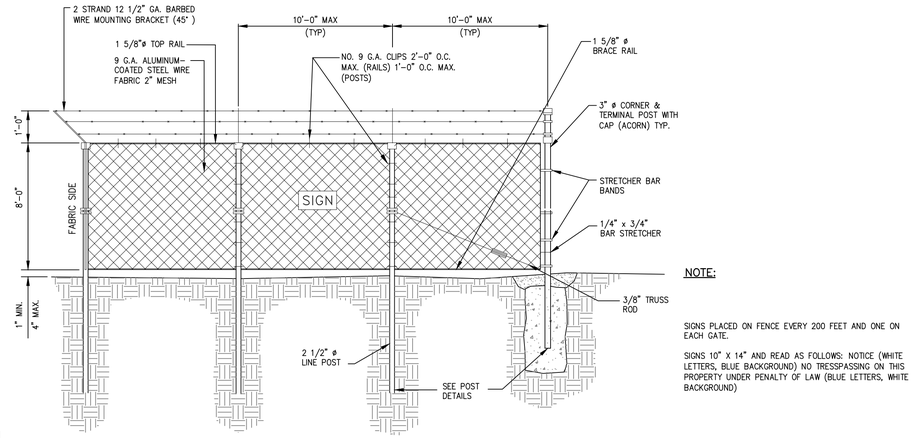
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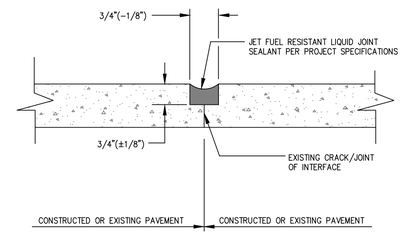
PERMITTING DRAWINGS



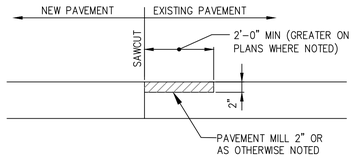
A 16' DUAL LEAF SWINGING GATE DETAIL
N.T.S.



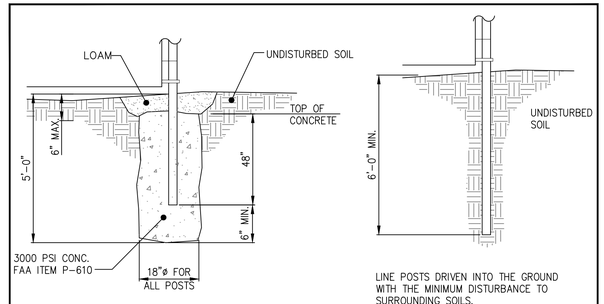
D SECURITY FENCE DETAIL
N.T.S.



B BITUMINOUS SAWCUT CONTROL JOINT DETAIL
N.T.S.



C GRIND AT PAVEMENT MATCH
N.T.S



F POST DETAIL
N.T.S

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LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

Title
SITE DETAILS

Project No. 195211590
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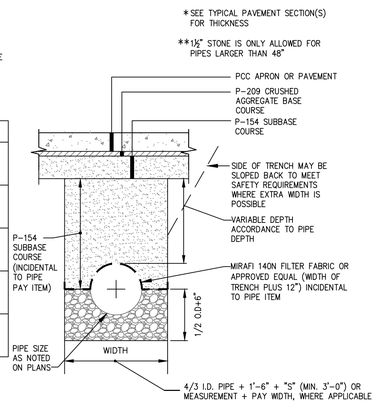
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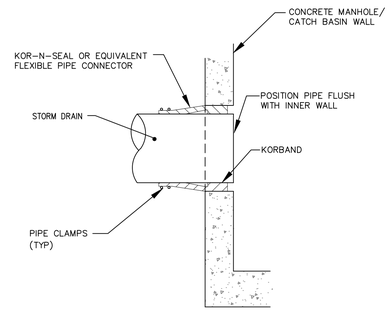
NOTES:

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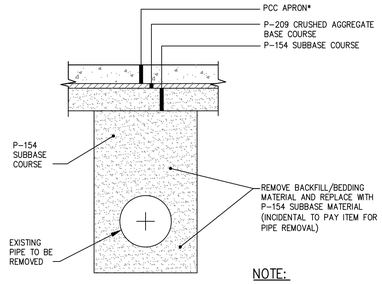
SCHEDULE OF BASE BACKFILL				
TYPE OF PIPE	BEDDING MATERIAL	SPECIAL BACKFILL	SPECIAL BACKFILL COVER "A" (IN)	SELECT BACKFILL
CONC.	¾" OR 1½" CRUSHED STONE**	CLEAN SAND	12	CLEAN SAND
PVC	¾" CRUSHED STONE	CLEAN SAND	6	CLEAN SAND
cmP	¾" CRUSHED STONE	CLEAN SAND	6	CLEAN SAND
DUCTILE IRON	CLEAN SAND	CLEAN SAND	6	CLEAN SAND



A TYPICAL STORM DRAIN TRENCH SECTION (CONCRETE AND PAVEMENT AREAS)
N.T.S.



B PIPE CONNECTION TO PRECAST CONCRETE STORM DRAINAGE STRUCTURES
N.T.S.



NOTE:

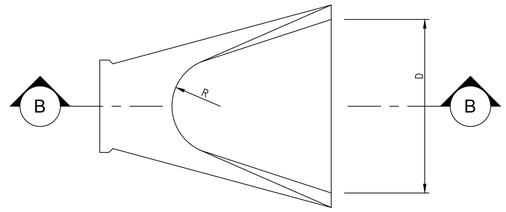
COMPACT REPLACEMENT MATERIAL TO DENSITY IN SPECIFICATIONS

NOTE:

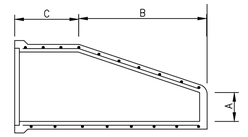
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*SEE TYPICAL PAVEMENT SECTION(S) FOR THICKNESS

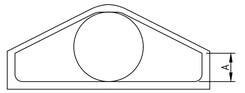
E TYPICAL PIPE REMOVAL TRENCH SECTION
N.T.S.



PLAN VIEW - TYP EACH PIPE



SECTION B-B



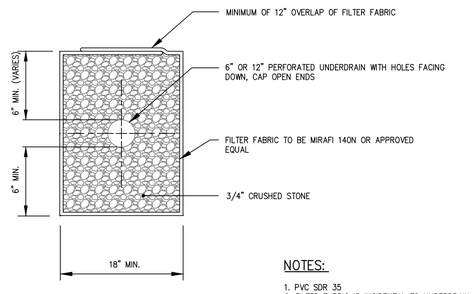
END VIEW

DIA.	A	B	C	D	E	R
18"	9"	2'-3"	3'-10"	3'-0"	2½"	12"
24"	9½"	3'-7½"	2'-6"	4'-0"	3"	14"
30"	12"	4'-6"	1'-7¾"	5'-0"	3½"	15"
36"	15"	5'-3"	2'-10¾"	6'-0"	4"	20"
42"	21"	5'-3"	2'-11"	6'-6"	4½"	22"
48"	24"	6'-0"	2'-2"	7'-0"	5"	22"
54"	27"	5'-5"	2'-11"	7'-6"	5½"	24"
60"	30"	5'-0"	3'-3"	8'-0"	6"	24"

NOTES:

JOINTS MAY BE FURNISHED WITH EITHER BELL & SPIGOT OR TONGUE & GROOVE ENDS. CULVERT END SECTIONS SHALL CONFORM TO MAINE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS.

G RCP FLARED END DETAIL
N.T.S.



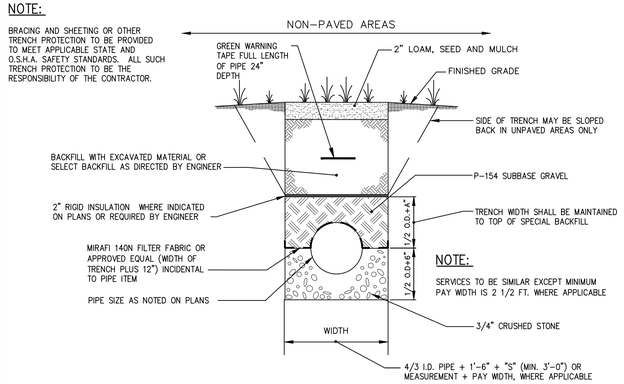
NOTES:

1. PVC SDR 35
2. FILTER FABRIC IS INCIDENTAL TO UNDERDRAIN

C TYPICAL UNDERDRAIN
N.T.S.

NOTE:

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NOTE:

SERVICES TO BE SIMILAR EXCEPT MINIMUM PAY WIDTH IS 2 1/2 FT. WHERE APPLICABLE

F TYPICAL STORM DRAIN TRENCH SECTION (NON-PAVED AREAS)
N.T.S.

PERMITTING DRAWINGS

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PORTLAND AND SOUTH PORTLAND, MAINE

Title

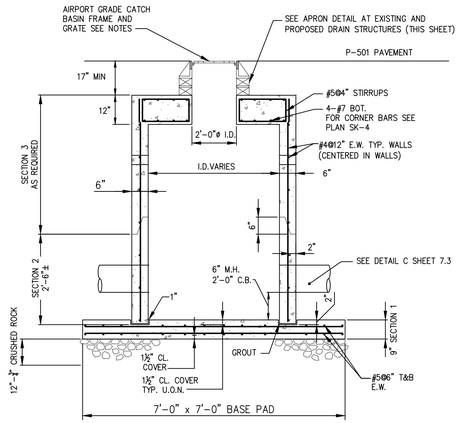
DRAINAGE DETAILS

Project No. 195211590

Scale AS NOTED

Sheet

6.7

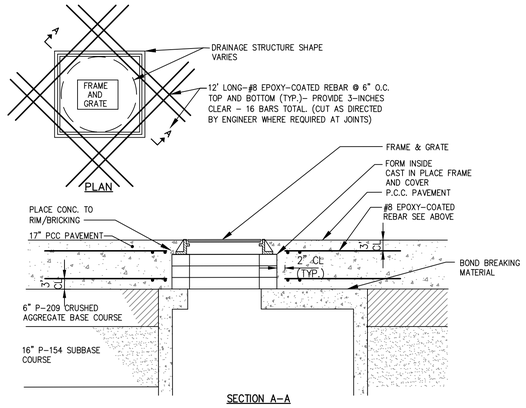


SECTION

NOTE:

1. CONCRETE TO HAVE 5000 PSI COMPRESSIVE STRENGTH (f'c) AT 28 DAYS.
2. REINFORCEMENT TO CONFORM TO ASTM A615 GRADE 60, EPOXY COATED.
3. PRECAST SECTION, 2 ADJUST FOR OPENINGS AND HEIGHT BASED ON INVERT ELEVATIONS.
4. PRECAST SECTIONS TO BE PROVIDED WITH LIFTING HOLES/PINS.
5. SHIPLAP JOINTS TO BE SEALED WITH BUTYL RUBBER SEALANT.
6. CAST IN FLEXIBLE PIPE SLEEVES AT PIPE OPENINGS.
7. NET ALLOWABLE SOIL BEARING PRESSURE USED FOR DESIGN IS 2000 PSF.
8. REMOVABLE BOLTS TO BE PROVIDED TO SECURE COVER TO FRAME.
9. THE CATCH BASIN FRAME AND GRATE ARE DUCTILE IRON CASTING ABLE TO SUPPORT 100,000 LBS WHEEL LOAD.
10. DOUBLE CATCH BASIN CASTINGS SHALL BE EAST JORDAN IRON WORKS, INC. PRODUCT NUMBER 00544004 OR APPROVED EQUAL.
12. MANUFACTURERS CERTIFICATION FOR AIRCRAFT RATING (100,000 LB WHEEL LOAD) REQUIRED FOR ENTIRE STRUCTURE

(A) 4', 5', AND 6 'Ø HEAVY DUTY CATCH BASIN AND MANHOLE DETAIL
N.T.S.

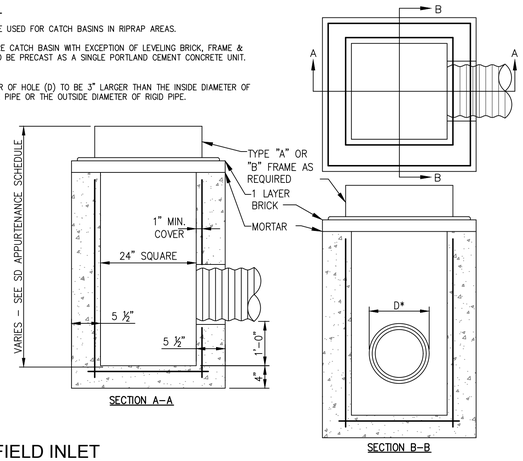


(C) APRON DETAIL AT EXISTING AND PROPOSED DRAINAGE STRUCTURES
N.T.S.

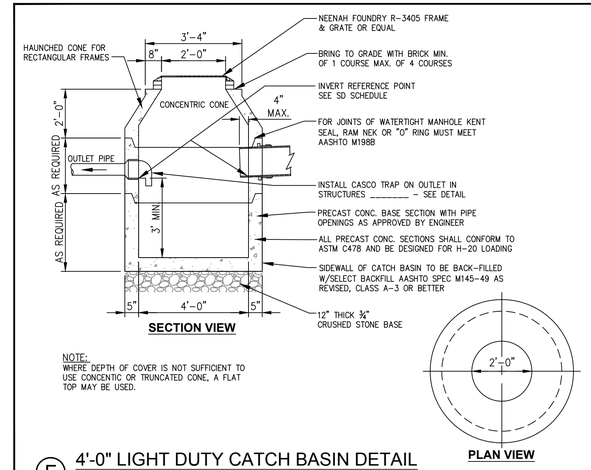
NOTE:

1. TO BE USED FOR CATCH BASINS IN RIPRAP AREAS.
2. ENTIRE CATCH BASIN WITH EXCEPTION OF LEVELING BRICK, FRAME & GRATE TO BE PRECAST AS A SINGLE PORTLAND CEMENT CONCRETE UNIT.

* DIAMETER OF HOLE (D) TO BE 3" LARGER THAN THE INSIDE DIAMETER OF FLEXIBLE PIPE OR THE OUTSIDE DIAMETER OF RIGID PIPE.

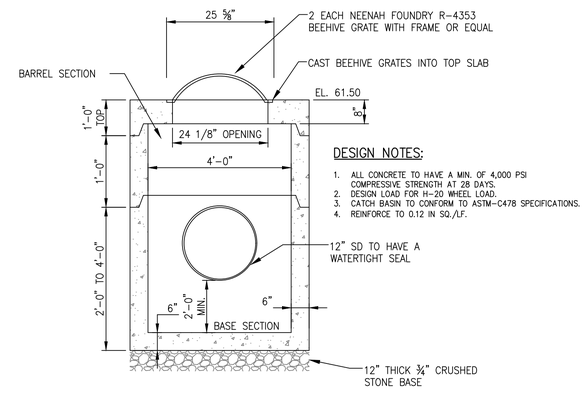


(D) FIELD INLET
N.T.S.



NOTE:
WHERE DEPTH OF COVER IS NOT SUFFICIENT TO USE CONCENTRIC OR TRUNCATED CONE, A FLAT TOP MAY BE USED.

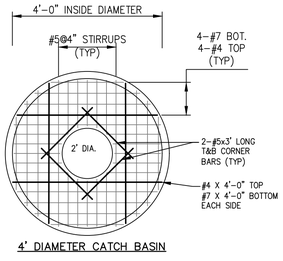
(F) 4'-0" LIGHT DUTY CATCH BASIN DETAIL
N.T.S.



DESIGN NOTES:

1. ALL CONCRETE TO HAVE A MIN. OF 4,000 PSI COMPRESSIVE STRENGTH AT 28 DAYS.
2. DESIGN LOAD FOR H-20 WHEEL LOAD.
3. CATCH BASIN TO CONFORM TO ASTM-C478 SPECIFICATIONS.
4. REINFORCE TO 0.12 IN SQ./LF.

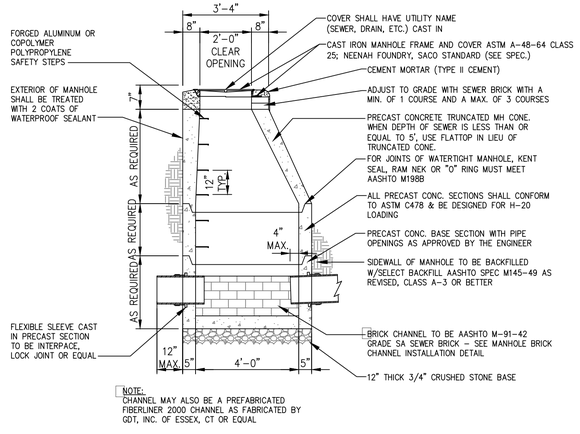
(G) 4'-0" PRECAST OUTLET CONTROL STRUCTURE
N.T.S.



4' DIAMETER CATCH BASIN

4'Ø HEAVY DUTY CATCH BASIN
TOP SLAB REINFORCING PLAN DETAIL

(B)
N.T.S.



NOTE:
CHANNEL MAY ALSO BE A PREFABRICATED FIBERLINER 2000 CHANNEL AS FABRICATED BY ODT, INC. OF ESSEX, CT OR EQUAL

(E) 4' DIA. LIGHT DUTY STORM DRAIN MANHOLE DETAIL
N.T.S.

PERMITTING DRAWINGS

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Stantec

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Notes

No.	Revision	By	Appd.	YY.MM.DD
3	ISSUED TO CITY OF PORTLAND FOR APPROVAL	DDA	DDA	19.04.08
2	RELEASED FOR BID	DDA	DDA	19.03.08
1	ISSUED FOR CITY, MaDOT AND FAA REVIEW	DDA	DDA	19.02.28

File Name: 195211590_details	-	DDA	AMG	JAN 2018
	DWN.	CHK'D.	DSGN.	DATE

Permit-Seal

STATE OF MAINE
DWIGHT D. ANDERSON
No. 9273
LICENSED
PROFESSIONAL ENGINEER

Client/Project
PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

Title
DRAINAGE DETAILS

Project No. 195211590
Scale AS NOTED

Sheet
6.8

UNDERDRAIN SOIL FILTER CONSTRUCTION NOTES

1. SPECIFIC DESIGN CRITERIA

A. UNDERDRAIN PIPE:- PROPER LAYOUT OF THE PIPE UNDERDRAIN SYSTEM IS NECESSARY TO EFFECTIVELY DRAIN THE ENTIRE FILTER AREA. THERE MUST BE AT LEAST ONE LINE OF UNDERDRAIN PIPE FOR EVERY FIFTEEN FEET OF FILTER AREA'S WIDTH. THE SLOPE OF THE INSTALLED UNDERDRAIN PIPE MUST BE POSITIVE. THE UNDERDRAIN PIPING SHOULD BE 6" SLOTTED, RIGID SCHEDULE 40 PVC OR SDR35. STRUCTURE JOINTS SHALL BE SEALED SO THAT THEY ARE WATERTIGHT.

B. PIPE BEDDING AND TRANSITION ZONE: THE 6 INCH DIAMETER PERFORATED UNDERDRAIN PIPE(S) MUST BE BEDDED IN 14 INCHES OF UNDERDRAIN MATERIAL WITH AT LEAST 4 INCHES OF MATERIAL BENEATH THE PIPE AND 4 INCHES ABOVE.:

THE UNDERDRAIN MATERIAL CONSISTS OF 14" OF CRUSHED STONE MEETING THE MAINE DOT SPECIFICATION 703.22 UNDERDRAIN BACKFILL FOR TYPE C UNDERDRAIN. AS A TRANSITION ZONE, A 6-INCH LAYER OF WELL GRADED, CLEAN, COARSE GRAVEL MEETING THE MAINE DOT SPECIFICATION 703.22 UNDERDRAIN BACKFILL FOR TYPE B UNDERDRAIN IS NEEDED ABOVE THE BEDDING SEE TABLE BELOW.

UNDERDRAIN - TYPE B (MAINE DOT)	
SIEVE □	□ PASSING BY WEIGHT
1"	95–100
¼"	75–100
No. 4	50–100
No. 20	15–80
No. 50	0–15
No. 200	0–5.0

UNDERDRAIN - TYPE C (MAINE DOT)	
SIEVE □	□ PASSING BY WEIGHT
1"	100
½"	90–100
⅜"	0–75
No. 4	0–25
No. 10	0–5

C. SOIL FILTER BED: THE SOIL FILTER MUST BE AT LEAST 18 INCHES DEEP ON TOP OF THE GRAVEL UNDERDRAIN PIPE BEDDING AND MUST EXTEND ACROSS THE BOTTOM OF THE ENTIRE FILTER AREA. THIS SOIL MIXTURE SHALL BE A UNIFORM MIX, FREE OF STONES, STUMPS, ROOTS, OR OTHER SIMILAR OBJECTS LARGER THAN TWO INCHES. NO OTHER MATERIALS OR SUBSTANCES THAT MAY BE HARMFUL TO PLANT GROWTH, OR PROVE A HINDRANCE TO THE PLANTING OR MAINTENANCE OPERATIONS CAN BE MIXED WITHIN THE FILTER.

D. SOIL FILTER MEDIA: SOIL MEDIA MUST CONSIST OF SILTY SAND OR SOIL MIXTURE COMBINED WITH A MATURE, MODERATELY FINE SHREDDED BARK OR WOOD FIBER MULCH 20% OR 25% BY VOLUME (NO LESS THAN 10% BY DRY WEIGHT). THE RESULTING MIXTURE SHOULD HAVE 8% TO 12% PASSING THE NO. 200 SIEVE AND A CLAY CONTENT OF LESS THAN 2%. THE PROPORTIONS OF THE MIXTURE CAN BE ADJUSTED SO IT WILL CONTAIN SUFFICIENT FINES AND ORGANIC MATTER.

THE SYSTEM MUST BE DESIGNED TO DRAIN THE SURFACE STORAGE VOLUME IN NO LESS THAN 24 HOURS AND NO MORE THAN 48 HOURS.

AS AN EXAMPLE, THE MIXTURE MAY CONTAIN BY VOLUME THE FOLLOWING:
50% OF SAND (MAINEDOT #703.01 CONTAINS INSUFFICIENT FINE FOR THE MEDIA)
20% OF LOAMY TOPSOIL (SEE TABLE BELOW)
30% OF COMPOSTED WOODY FIBERS AND SHREDDED BARK MULCH

SIEVE □	□ PASSING BY WEIGHT
4	75 – 95
10	60 – 90
40	35 – 85
200	20 – 70
200 CLAY SIZE	2.00

E. CLAY CONTENT: USE OF SOILS WITH MORE THAN 2 % CLAY CONTENT COULD CAUSE FAILURE OF THE SYSTEM AND CARE SHOULD BE TAKEN, ESPECIALLY IN AREAS WHERE THE PREDOMINANT SOIL CONTAINS MARINE CLAY, THAT THE SAND AND TOPSOIL USED IN THE MIXTURE HAVE VERY LITTLE OR NO CLAY CONTENT.

FILTER PERMEABILITY: THE FILTER MUST BE PERMEABLE ENOUGH TO INSURE DRAINAGE WITHIN 24 TO 48 HOURS, YET HAVE SUFFICIENT FINES TO INSURE FILTRATION OF FINE PARTICLES AND REMOVAL OF DISSOLVED POLLUTANTS.

F. GRADATION TESTING: GRADATION TESTS, INCLUDING HYDROMETER TESTING FOR CLAY CONTENT, AND PERMEABILITY TESTING OF THE SOIL FILTER MATERIAL, SHALL BE PERFORMED BY A QUALIFIED SOIL TESTING LABORATORY AND SUBMITTED TO THE PROJECT ENGINEER FOR REVIEW BEFORE PLACEMENT AND COMPACTION.

G. IMPERMEALE LINER: A 30 MIL PVC IMPERMEABLE LINER IS REQUIRED AS SHOWN.

H. VEGETATION: THE SOIL FILTER SURFACE MUST BE PLANTED WITH A CONSERVATION MIX OF GRASS SPECIES THAT IS TOLERANT OF FREQUENT INUNDATION AND WELL DRAINED SOILS. UPON SEEDING, THE SOIL FILTER SHALL BE MULCHED WITH HAY OR AN EROSION CONTROL BLANKET. AN APPROPRIATE SEED MIXTURE SHOULD CONTAIN THE FOLLOWING OR BE AN APPROVED EQUIVALENT CONSERVATION TYPE MIXTURE:

TALL FESCUE	0.46	LBS/M. SQ. FT.
CREEPING RED FESCUE	0.46	LBS/M. SQ. FT
BIRDSFOOT TREFOIL	0.18	LBS/M. SQ. FT.
TOTAL	1.1	LBS/M. SQ. FT.

I. ROCK FOREBAY: A ROCK FOREBAY IS RECOMMENDED TO REDUCE FLOW VELOCITY INTO THE GRASSED FILTER BASIN. IT SHALL REMAIN CLEAR OF SEDIMENT UNTIL THE UPGRADIENT TRIBUTARY AREA IS FULLY VEGETATED.

2. CONSTRUCTION CRITERIA

A. BASIN EXCAVATION: THE AREA OF THE BASIN MAY BE EXCAVATED IN PREPARATION OF THE INSTALLATION OF THE UNDERDRAIN AND CAN BE USED FOR A SEDIMENT TRAP FROM THE SITE DURING CONSTRUCTION. AFTER EXCAVATION OF THE BASIN, THE OUTLET STRUCTURE AND PIPING SYSTEM MUST BE INSTALLED AT THE APPROPRIATE ELEVATION AND PROTECTED WITH A SEDIMENT BARRIER. IF THE BASIN IS TO BE USED AS A SEDIMENT TRAP, THE SIDES OF THE EMBANKMENTS MUST BE MULCHED AND MAINTAINED TO PREVENT EROSION.

B. COMPACTION OF SOIL FILTER: FILTER SOIL MEDIA AND UNDERDRAIN BEDDING MATERIAL MUST BE COMPACTED TO BETWEEN 90 AND 92% STANDARD PROCTOR. THE BED SHOULD BE INSTALLED IN AT LEAST 2 LIFTS OF 9 INCHES TO PREVENT POCKETS OF LOOSE MEDIA.

C. OUTLET DISCHARGE: OUTFLOW OF THE FILTER BASIN UNDERDRAIN WILL BE CONTROLLED BY THE SOIL FILTER PERMEABILITY.

D. CONSTRUCTION SEQUENCE: EROSION AND SEDIMENTATION FROM UNSTABLE SUBCATCHMENTS IS THE MOST COMMON REASON FOR FILTER FAILURE. NOT HEEDING THE CONSTRUCTION SEQUENCING CRITERIA IS LIKELY TO RESULT IN THE NEED TO REPLACE THE SOIL FILTER. THE SOIL FILTER MEDIA AND VEGETATION MUST NOT BE INSTALLED UNTIL THE AREA THAT DRAINS TO THE FILTER HAS BEEN PERMANENTLY STABILIZED WITH PAVEMENT OR OTHER STRUCTURE, 90% VEGETATION COVER, OR OTHER PERMANENT STABILIZATION. OTHERWISE, THE RUNOFF FROM THE CONTRIBUITNG DRAINAGE AREA MUST BE DIVERTED AROUND THE FILTER UNTIL STABILIZATION IS COMPLETED UNLESS THE DEPARTMENT HAS DETERMINED, ON A CASE-BY-CASE BASIS, THAT SUFFICIENT MEASURES ARE BEING TAKEN TO PREVENT EROSION OF MATERIAL FROM THE UNSTABLE CATCHMENT AREA AND DEPOSITION ON THE FILTER.

E. REMEDIAL LOAM COVER: TO RAPIDLY ESTABLISH VEGETATION IN THE FILTER AREA, THE CONTRACTOR WILL INSTALL A 2–3 INCH LAYER OF SANDY LOAM TOPSOIL (WITH LESS THAN 2% CLAY AS TESTED VIA HYDROMETER TEST) ABOVE THE GRASS FILTER PRIOR TO SEEDING, MULCHING,AND ANCHORING EROSION CONTROL MESH.

F. CONSTRUCTION OVERSIGHT: INSPECTION OF THE FILTER BASIN SHALL BE PROVIDED FOR EACH PHASE OF CONSTRUCTION BY THE DESIGN ENGINEER WITH REQUIRED REPORTING TO THE OWNER AND THE MeDEP. AT A MINIMUM, INSPECTIONS WILL OCCUR:
- AFTER PRELIMINARY CONSTRUCTION OF THE FILTER GRADES AND ONCE THE UNDERDRAIN PIPES ARE INSTALLED BUT NOT BACKFILLED;
- AFTER THE DRAINAGE LAYER IS CONSTRUCTED AND PRIOR TO THE INSTALLATION OF THE FILTER MEDIA;
- AFTER THE FILTER MEDIA HAS BEEN INSTALLED AND SEEDED;
- AFTER 1 YEAR, TO INSPECT VEGETATION AND MAKE CORRECTIONS.

G. TESTING AND SUBMITTALS: THE CONTRACTOR SHALL IDENTIFY THE LOCATION OF THE SOURCE OF EACH COMPONENT OF THE FILTER MEDIA. ALL RESULTS OF FIELD AND LABORATORY TESTING SHALL BE SUBMITTED TO THE PROJECT ENGINEER FOR CONFIRMATION. THE CONTRACTOR SHALL:
SUBMIT SAMPLES OF EACH TYPE OF MATERIAL TO BE BLENDED FOR THE MIXED FILTER MEDIA AND SAMPLES OF THE UNDERDRAIN BEDDING MATERIAL. SAMPLES MUST BE A COMPOSITE OF THREE DIFFERENT LOCATIONS (GRABS) FROM THE STOCKPILE OR PIT FACE. SAMPLE SIZE REQUIRED WILL BE DETERMINED BY THE TESTING LABORATORY. PERFORM A SIEVE ANALYSIS CONFORMING TO ASTM C136 (STANDARD TEST METHOD FOR SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES; 1996A) ON EACH TYPE OF THE SAMPLE MATERIAL. THE RESULTING SOIL FILTER MEDIA MIXTURE MUST HAVE NO MORE THAN 8% BY WEIGHT PASSING THE #200 SIEVE, A CLAY CONTENT OF LESS THAN 2% (DETERMINED HYDROMETER GRAIN SIZE ANALYSIS) AND HAVE 10% DRY WEIGHT OF ORGANIC MATTER.
PERFORM A PERMEABILITY TEST ON THE SOIL FILTER MEDIA MIXTURE CONFORMING TO ASTM D2434 WITH THE MIXTURE COMPACTED TO 90–92% OF MAXIMUM DRY DENSITY BASED ON ASTM D698.

3. MAINTENANCE CRITERIA

DURING THE FIRST YEAR, THE BASIN WILL BE INSPECTED SEMI-ANNUALLY AND FOLLOWING MAJOR STORM EVENTS.

DEBRIS AND SEDIMENT BUILDUP SHALL BE REMOVED FROM THE FOREBAY AND BASIN AS NEEDED.

MOWING OF A GRASSED BASIN CAN OCCUR SEMIANNUALLY TO A HEIGHT NO LESS THAN 6 INCHES.

ANY BARE AREA OR EROSION RILLS SHALL BE REPAIRED WITH NEW FILTER MEDIA OR SANDY LOAM THEN SEEDED AND MULCHED.

MAINTAINING GOOD GRASS COVER WILL MINIMIZE CLOGGING WITH FINE SEDIMENTS AND IF PONDING EXCEEDS 48 HOURS, THE TOP OF THE FILTER BED MUST BE ROTOTILLED TO REESTABLISH THE SOIL'S FILTRATION CAPACITY IF EXTENDED PONDING IS OBSERVED.

A. MAINTENANCE AGREEMENT: AN AGENT OF THE OWNER IS RESPONSIBLE FOR INSPECTING AND MAINTAINING ANY UNDERDRAINED FILTER. OTHER STORMWATER O&M REQUIREMENTS ARE INCLUDED WITH THE EXISTING DEP PERMIT.

B. SOIL FILTER INSPECTION: THE SOIL FILTER SHOULD BE INSPECTED AFTER EVERY MAJOR STORM IN THE FIRST YEAR TO BE SURE IT IS FUNCTIONING PROPERLY. THEREAFTER, THE FILTER SHOULD BE INSPECTED AT LEAST ONCE EVERY SIX MONTHS TO ENSURE THAT IT IS DRAINING WITHIN 48 HOURS FOLLOWING A ONE INCH STORM OR GREATER.

C. DRAINAGE: THE FILTER SHOULD DRAIN WITHIN 24 TO 48 HOURS FOLLOWING A ONE-INCH STORM OR GREATER. IF THE SYSTEM DRAINS TO FAST, AN ORIFICE MAY NEED TO BE ADDED ON THE UNDERDRAIN OUTLET OR MAY NEED TO BE MODIFIED IF ALREADY PRESENT.

D. SOIL FILTER REPLACEMENT: THE TOP SEVERAL INCHES OF THE FILTER SHALL BE REPLACED WITH FRESH MATERIAL WHEN WATER PONDS ON THE SURFACE OF THE BED FOR MORE THAN 72 HOURS. THE REMOVED SEDIMENTS SHOULD BE DISPOSED OF IN AN ACCEPTABLE MANNER.

E. SEDIMENT REMOVAL: SEDIMENT AND PLANT DEBRIS SHOULD BE REMOVED FROM THE PRETREATMENT STRUCTURE AT LEAST ANNUALLY.

F. MOWING: IF MOWING IS DESIRED, ONLY HANDHELD STRING TRIMMERS OR PUSH-MOWERS ARE ALLOWED ON THE FILTER (NO TRACTOR) AND THE GRASS BED SHOULD BE MOWED NO MORE THAN 2 TIMES PER GROWING SEASON TO MAINTAIN GRASS HEIGHTS OF NO LESS THAN 6 INCHES.

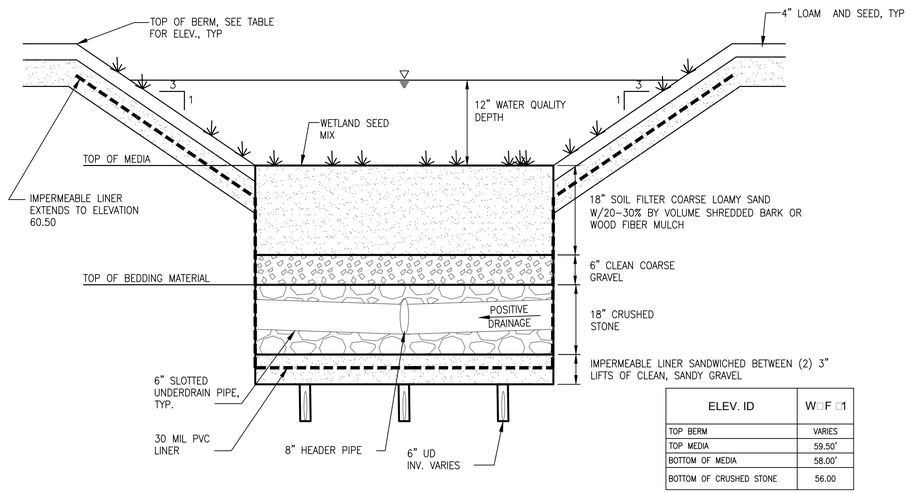
G. FERTILIZATION: FERTILIZATION OF THE UNDERDRAINED FILTER AREA SHOULD BE AVOIDED UNLESS ABSOLUTELY NECESSARY TO ESTABLISH VEGETATION.

H. HARVESTING AND WEEDING: HARVESTING AND PRUNING OF EXCESSIVE GROWTH WILL NEED TO BE DONE OCCASIONALLY. WEEDING TO CONTROL UNWANTED OR INVASIVE PLANTS MAY ALSO BE NECESSARY. ADD NEW MULCH ONLY AS NECESSARY FOR BIORETENTION CELL.

I. GRASS COVER: MAINTAINING A HEALTHY COVER OF GRASS WILL MINIMIZE CLOGGING WITH FINE AND SEDIMENTS. IF PONDING EXCEEDS 48 HOURS, THE TOP OF THE FILTER BED SHOULD BE ROTOTILLED TO REESTABLISH THE SOIL'S FILTRATION CAPACITY.

J. VEHICULAR TRAFFIC: VEHICLES AND OTHER HEAVY EQUIPMENT ARE PROHIBITED FROM DRIVING ON WATER QUALITY FILTER #1.

K. SNOW STORAGE: STORAGE OF SNOW IS PROHIBITED WITHIN WATER QUALITY FILTER #1.



ELEV. ID	W□F □1
TOP BERM	VARIES
TOP MEDIA	59.50'
BOTTOM OF MEDIA	58.00'
BOTTOM OF CRUSHED STONE	56.00

(A) TYPICAL CROSS SECTION THROUGH EXPANSION AREA OF GRASSED UNDERDRAINED SOIL FILTER (W□F □1)
N.T.S.

BMP CONSTRUCTION OVERSIGHT NOTES

WETLAND SEED MIX	
Scientific Name	Common Name
Carex vulpinoidea	Fox Sedge
Carex comosa	Bearded Sedge
Carex lurida	Lurid Sedge
Juncus effusus	Soft Rush
Euthamia graminifolia	Grass-leaved Goldenrod
Eupatorium perfoliatum	Boneset
Carex lupulina	Hop Sedge
Verbena hastata	Blue Vervain
Carex gynandra	Nodding Sedge
Scirpus atrovirens	Green Bulrush
Onoclea sensibilis	Sensitive Fern
Iris versicolor	Blue Flag Iris
Scirpub cypernius	Woolgrass
Eupatorium maculatum	Spotted Joe Pye Weed
Asclepias incarnata	Swamp Milkweed
Mimulus ringens	Monkey Flower
Schoenoplectus tabernaemontani (ex. – S. validus)	Soft-Stem Bulrush
Schoenoplectus acutus (ex. – Scirpus acutus)	Hard-Stem Bulrush
Bidens cernua	Nodding Bur Marigold
Aster umbellatus	Flat-top Aster

COARSE LOAMY SAND SIEVE ANALYSIS SPECIFICATION

Sieve #	% Passing by Weight
10	85–100
20	70–100
60	15–40
200	8–15

PERMITTING DRAWINGS

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Notes

By	Revision
DDA	3 ISSUED TO CITY OF PORTLAND FOR APPROVAL
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File Name: 195211590_details	-	DDA	AMG	JAN 2018
	DWN.	CHKD.	DSGN.	DATE

Permit-Seal



Client/Project
PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

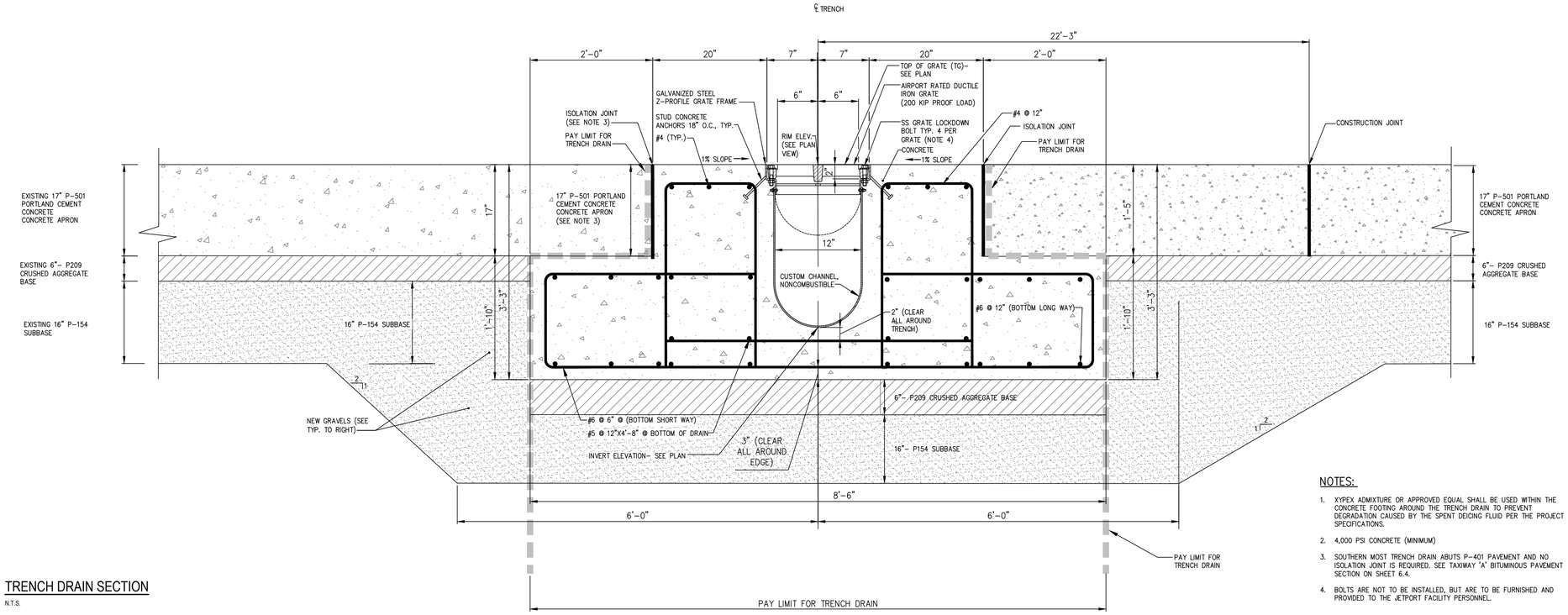
PORTLAND AND SOUTH PORTLAND, MAINE

Title
WATER QUALITY FILTER EXPANSION SECTIONS AND DETAILS

Project No.	Scale
195211590	AS NOTED

Sheet
6.9

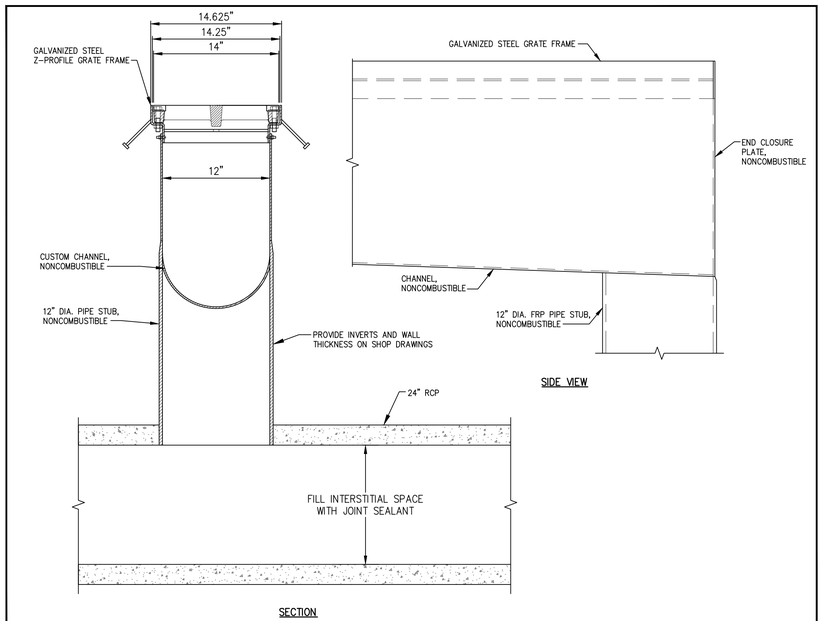
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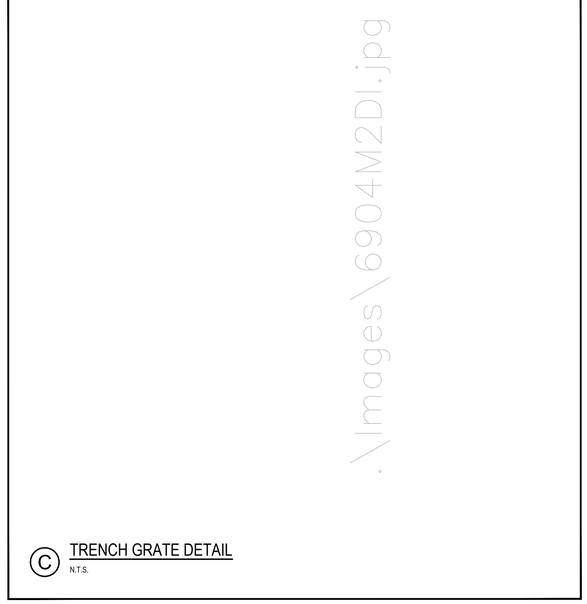
A TRENCH DRAIN SECTION
N.T.S.

NOTES:

1. XYPEX ADMIXTURE OR APPROVED EQUAL SHALL BE USED WITHIN THE CONCRETE FOOTING AROUND THE TRENCH DRAIN TO PREVENT DEGRADATION CAUSED BY THE SPENT DEICING FLUID PER THE PROJECT SPECIFICATIONS.
2. 4,000 PSI CONCRETE (MINIMUM)
3. SOUTHERN MOST TRENCH DRAIN ABUTS P-401 PAVEMENT AND NO ISOLATION JOINT IS REQUIRED. SEE TAXIWAY 'A' BITUMINOUS PAVEMENT SECTION ON SHEET 6.4.
4. BOLTS ARE NOT TO BE INSTALLED, BUT ARE TO BE FURNISHED AND PROVIDED TO THE JETPORT FACILITY PERSONNEL.



B CHANNEL CONNECTION TO 24" RCP
N.T.S.



C TRENCH GRATE DETAIL
N.T.S.

PERMITTING DRAWINGS

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Jackman, Maine 04945

Notes

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3	ISSUED TO CITY OF PORTLAND FOR APPROVAL	DDA	DDA	19.04.08
2	RELEASED FOR BID	DDA	DDA	19.03.08
1	ISSUED FOR CITY, MaDOT AND FAA REVIEW	DDA	DDA	19.02.28

File Name: 195211590_details	-	DDA	AMG	JAN 2018
	DWN.	CHKD.	DSGN.	DATE

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PORTLAND INTERNATIONAL JETPORT

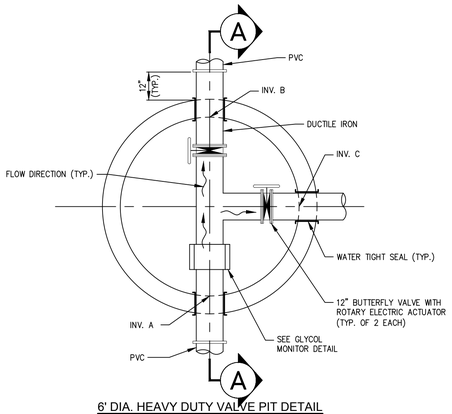
LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END
PORTLAND AND SOUTH PORTLAND, MAINE

Title
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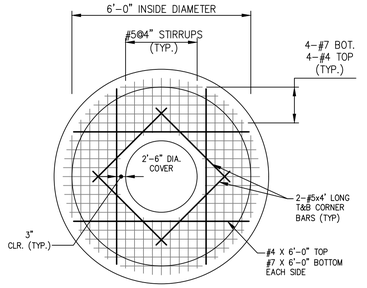
Project No.
195211590

Scale
AS NOTED

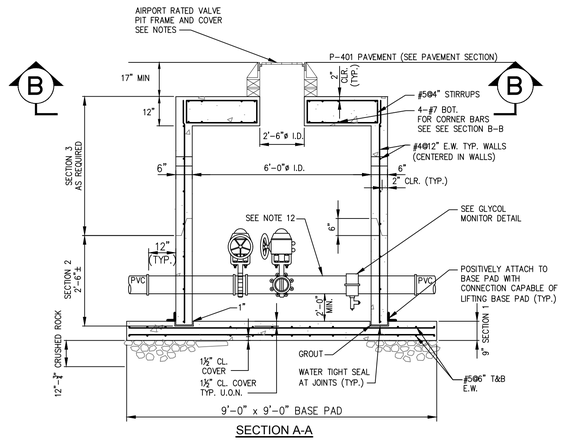
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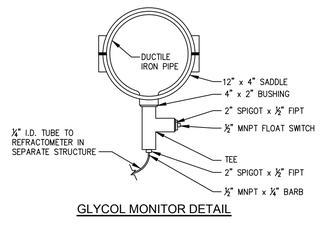


6' DIA. HEAVY DUTY VALVE PIT DETAIL
PLAN VIEW



TOP SLAB REINFORCING DETAIL
SECTION B-B



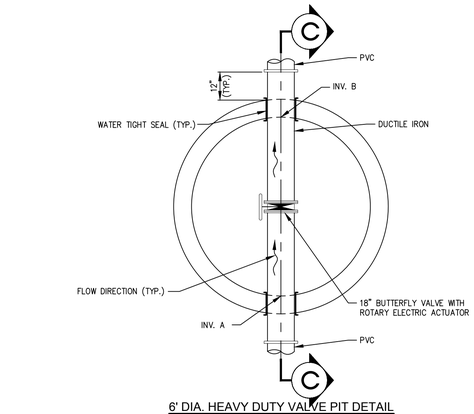


GLYCOL MONITOR DETAIL

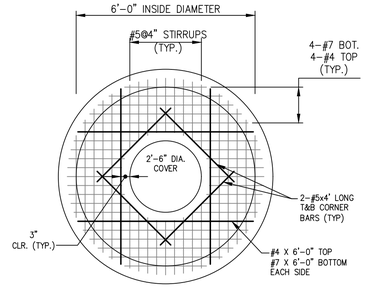
NOTE:

1. CONCRETE TO HAVE 5000 PSI COMPRESSIVE STRENGTH (fc') AT 28 DAYS.
2. REINFORCEMENT TO CONFORM TO ASTM A615 GRADE 60, EPOXY COATED.
3. PRECAST SECTION, 2 ADJUST FOR OPENINGS AND HEIGHT BASED ON INVERT ELEVATIONS.
4. PRECAST SECTIONS TO BE PROVIDED WITH LIFTING HOLES/PINS.
5. SHIPLAP JOINTS TO BE SEALED WITH BUTYL RUBBER SEALANT.
6. CAST IN FLEXIBLE PIPE SLEEVES AT PIPE OPENINGS.
7. NET ALLOWABLE SOIL BEARING PRESSURE USED FOR DESIGN IS 2000 PSF.
8. REMOVABLE BOLTS TO BE PROVIDED TO SECURE COVER TO FRAME.
9. THE VALVE PIT COVER AND FRAME ARE TO BE DUCTILE IRON CASTING ABLE TO SUPPORT 100,000 LBS WHEEL LOAD.
11. MANUFACTURERS CERTIFICATION FOR AIRCRAFT RATING (100,000 LB WHEEL LOAD) REQUIRED FOR ENTIRE STRUCTURE.
12. ALL PIPES INSIDE THE VALVE PIT AND TO 1'-0" OUTSIDE THE VALVE PIT ARE TO BE DUCTILE IRON.

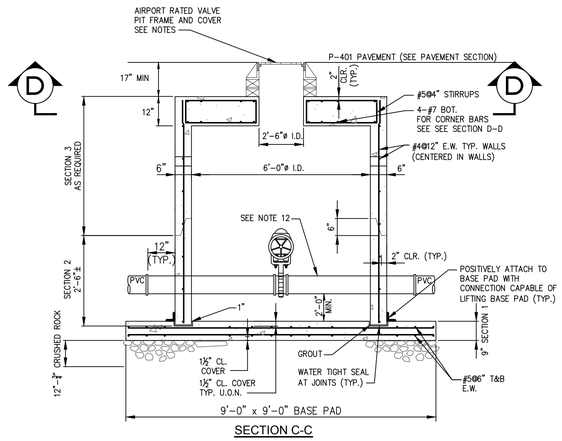
A 6' DIA. DEICING ZONE AUTOMATIC VALVE PIT DETAIL (REV. PER ADD#2)
SCALE: 1" = 3' (APPLIES TO DZVP 1, 2, 3, 4, 5 AND 6)



6' DIA. HEAVY DUTY VALVE PIT DETAIL
PLAN VIEW



TOP SLAB REINFORCING DETAIL
SECTION D-D



NOTE:

1. CONCRETE TO HAVE 5000 PSI COMPRESSIVE STRENGTH (fc') AT 28 DAYS.
2. REINFORCEMENT TO CONFORM TO ASTM A615 GRADE 60, EPOXY COATED.
3. PRECAST SECTION, 2 ADJUST FOR OPENINGS AND HEIGHT BASED ON INVERT ELEVATIONS.
4. PRECAST SECTIONS TO BE PROVIDED WITH LIFTING HOLES/PINS.
5. SHIPLAP JOINTS TO BE SEALED WITH BUTYL RUBBER SEALANT.
6. CAST IN FLEXIBLE PIPE SLEEVES AT PIPE OPENINGS.
7. NET ALLOWABLE SOIL BEARING PRESSURE USED FOR DESIGN IS 2000 PSF.
8. REMOVABLE BOLTS TO BE PROVIDED TO SECURE COVER TO FRAME.
9. THE VALVE PIT COVER AND FRAME ARE TO BE DUCTILE IRON CASTING ABLE TO SUPPORT 100,000 LBS WHEEL LOAD.
11. MANUFACTURERS CERTIFICATION FOR AIRCRAFT RATING (100,000 LB WHEEL LOAD) REQUIRED FOR ENTIRE STRUCTURE.
12. ALL PIPES INSIDE THE VALVE PIT AND TO 1'-0" OUTSIDE THE VALVE PIT ARE TO BE DUCTILE IRON.

B 6' DIA. DEICING HEADER AUTOMATIC VALVE PIT DETAIL (REV. PER ADD#2)
SCALE: 1" = 3' (APPLIES TO DHVP 1, AND 2)

AUTOMATIC VALVE PIT INVERT SCHEDULE			
VALVE PIT ID	INV. A	INV. B	INV. C
DZVP 1	53.46	53.40	53.40
DZVP 2	53.56	53.50	53.50
DZVP 3	53.66	53.60	53.60
DZVP 4	53.76	53.70	53.70
DZVP 5	53.86	53.80	53.80
DZVP 6	53.96	53.90	53.90
DHVP 1	50.60	50.54	N.A.
DHVP 2	53.20	53.14	N.A.

C AUTOMATIC VALVE PIT INVERT SCHEDULE
SCALE: NONE

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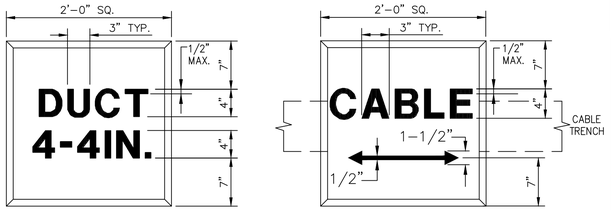
PORTLAND AND SOUTH PORTLAND, MAINE

Title
DEICING VALVE PIT DETAILS

Project No. 195211590
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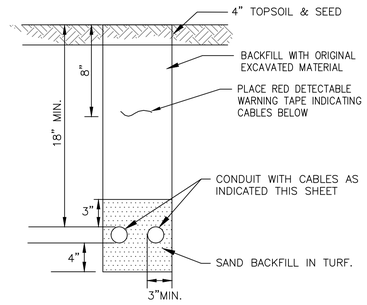
DUCTBANK MARKER NOTES:

1. DUCT MARKER SHALL INDICATE NUMBER AND SIZE OF DUCT.
2. DIMENSIONS OF 2-WAY DUCT (NOT SHOWN) SHALL HAVE SIMILAR LATERAL DIMENSIONS AND SHALL HAVE 10" LONGITUDINAL DIMENSIONS WITH 3" OF CONCRETE ABOVE AND BELOW 4" DUCT.

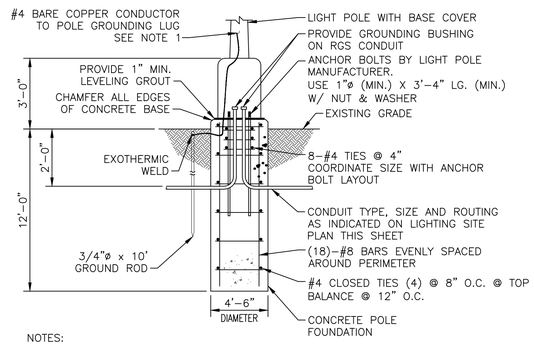
CABLE MARKER NOTES:

1. HAND LETTERING NOT ALLOWED ON MARKERS. LETTERING IS TO BE IMPRESSED.
2. ARROW ON CABLE MARKER TO INDICATE DIRECTION OF CABLES. (WHERE APPLICABLE).
3. NO SEPARATE PAYMENT WILL BE MADE FOR ANY TYPE OF MARKER.
4. ALL CONCRETE MARKERS WILL BE AT LEAST 4" IN THICKNESS.
5. CABLE MARKERS WILL BE PLACED AT CHANGE OF DIRECTION AND AS REQUIRED BY ENGINEER.

(A) 4-WAY ELECTRICAL DUCTBANK MARKER AND CABLE MARKER
N.T.S.

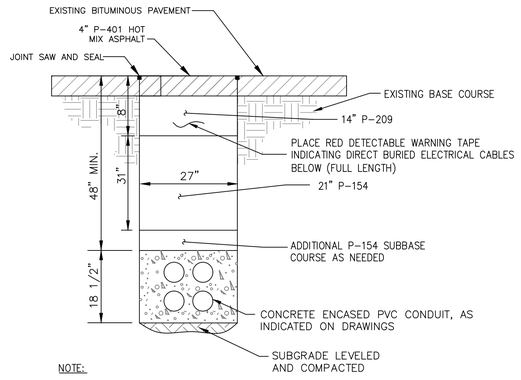


(D) CONDUIT TRENCH
N.T.S.



NOTES:
1. GROUND LUMINAIRE, POLE (VIA INTERNAL GROUND LUG), BASE REINFORCING STEEL AND ANCHOR BOLTS WITH COPPER GROUND WIRE TO GROUND ROD AT EACH POLE.
2. COORDINATE BASE DIMENSION WITH MANUFACTURER.

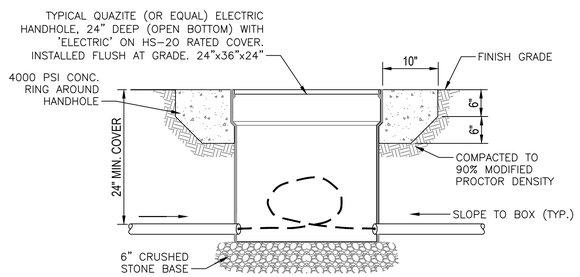
(B) LIGHTING POLE FOUNDATION
NTS



NOTE:

DUCT BANK SHALL BE INSTALLED 48-INCHES MIN. BELOW GRADE UNLESS OTHERWISE INDICATED. DUCTS SHALL BE PVC, AS INDICATED ON THE DRAWINGS.

(E) DUCT UNDER PAVEMENT
NTS



NOTES:
1. INSTALL BELL ENDS ON ALL CONDUIT PENETRATING INSIDE HANDHOLE.
2. INSTALL CONDUCTORS IN HANDHOLE. LOOP AND RACK CONDUCTORS 360° IN HANDHOLE.
3. ARRANGE CONDUIT TO DRAIN TOWARD HANDHOLES.
4. CONTINUOUS PULL CABLE ENTIRE LENGTH.

(C) TYPICAL POLYMER HANDHOLE
NTS

PERMITTING DRAWINGS

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PORTLAND AND SOUTH PORTLAND, MAINE

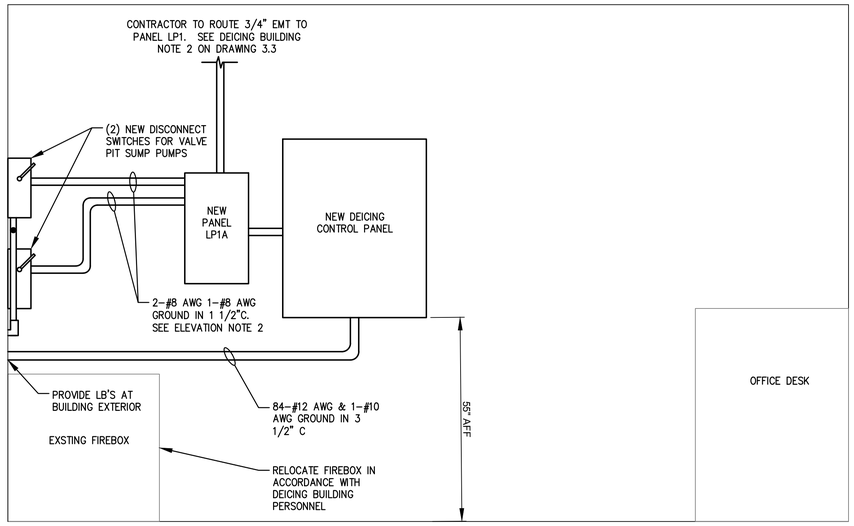
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ELECTRICAL DETAILS

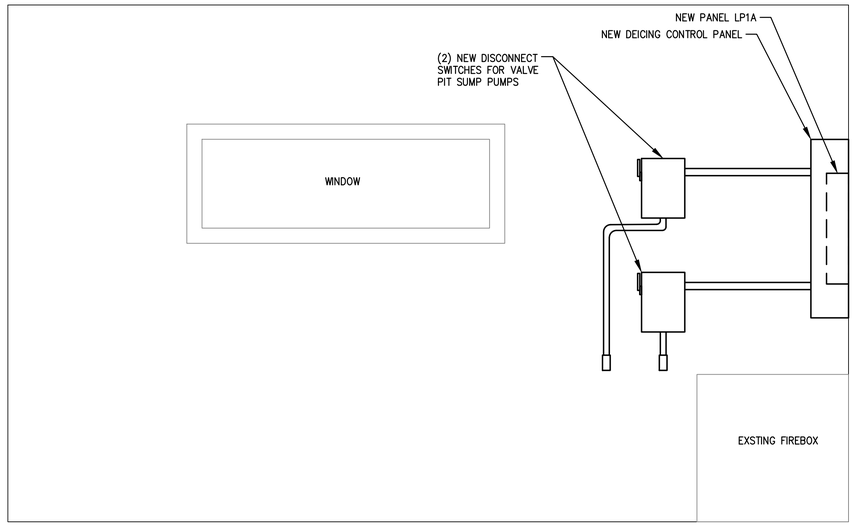
Project No.	Scale
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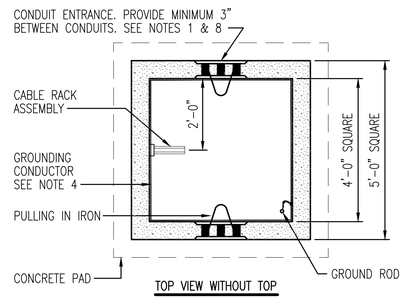
A ELEVATION
SCALE: N.T.S.



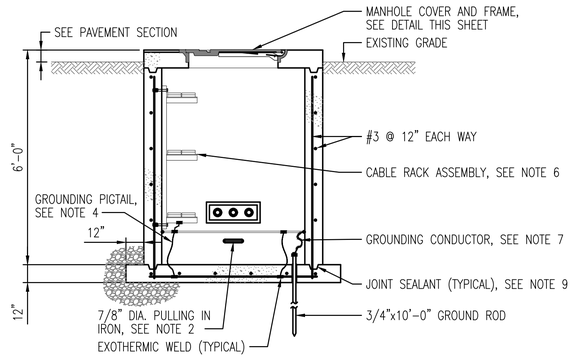
B ELEVATION
SCALE: N.T.S.

ELEVATION NOTES:

1. SEE UTILITY PLAN 3.3
2. CONVERT TO 2-#6 AWG AND 1-#6 AWG GROUND ON LOAD SIDE OF DISCONNECTS.



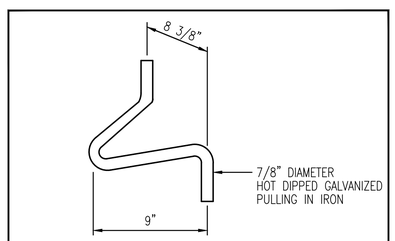
MANHOLE DETAILS
1/2" = 1'-0"



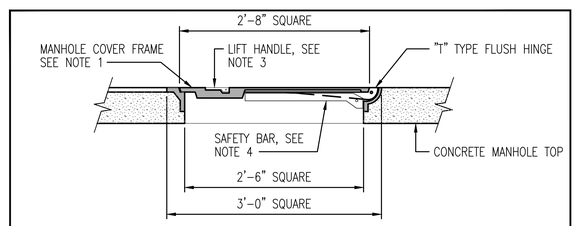
C ELEVATION
SCALE: 1/2"=1'-0"

MANHOLE NOTES:

1. TYPICAL MANHOLE DETAIL, SEE SITE PLAN FOR CONDUIT ENTRANCE LOCATIONS, SIZE AND NUMBER OF CONDUITS.
2. PROVIDE PULLING IRONS IN WALLS OPPOSITE CONDUIT ENTRANCES. WELD PULLING IRONS TO CONCRETE REINFORCING STEEL.
3. STRENGTH OF CONCRETE SHALL BE 5,000 PSI @28 DAYS. WALLS SHALL BE A MINIMUM OF 6" THICK, BASE AND TOP SHALL BE A MINIMUM OF 12" THICK. MANUFACTURERS CERTIFICATION FOR AIRCRAFT RATING (1000,000lb WHEEL LOAD) REQUIRED FOR ENTIRE STRUCTURE.
4. PROVIDE #2 AWG BARE COPPER GROUNDING PIGTAIL EXOTHERMICALLY WELDED TO REBAR. EXOTHERMICALLY WELD PIGTAIL TO GROUNDING CONDUCTOR. (TYPICAL 2 PLACES)
5. PROVIDE GROUNDING BUSHINGS TO RIDGID GALVANIZED STEEL CONDUITS ENTERING MANHOLE. PROVIDE #6 AWG BONDING JUMPER BETWEEN GROUNDING BUSHING AND GROUND CONDUCTOR. EXOTHERMICALLY WELD TO GROUND CONDUCTOR.
6. PROVIDE GALVANIZED STEEL CABLE RACK ASSEMBLY WITH INSULATORS AS INDICATED. PROVIDE 5/8"x4-1/2" STAINLESS STEEL EXPANSION ANCHORS TO ATTACH CABLE RACK CHANNEL TO CONCRETE (TYPICAL OF 2). GROUND CABLE RACK ASSEMBLY TO GROUNDING CONDUCTOR USING #2 AWG BOND WIRE EXOTHERMICALLY WELDED TO RACK ASSEMBLY AND GROUNDING CONDUCTOR.
7. PROVIDE #4/0 BARE COPPER GROUND CONDUCTOR. ATTACH TO WALLS USING STAINLESS STEEL CLIPS 16" ON CENTER. EXOTHERMICALLY WELD GROUND CONDUCTOR TO GROUND ROD.
8. PROVIDE DUCT ENTRANCE KNOCKOUT, SEE NOTE 1. PROVIDE MINIMUM 1", 45° CHAMFER AROUND CONDUIT ENTRANCES ON THE INTERIOR OF MANHOLE.
9. PROVIDE JOINT SEALANT WHICH SHALL BE PACKAGED IN EXTRUDED PREFORMED ROPE-LIKE SHAPE HAVING A CROSS SECTIONAL AREA OF APPROXIMATELY 1 1/2" PROTECTED BY A SUITABLE REMOVABLE WRAPPER.
10. RACK CABLES BY VALVE ACTUATOR USING NYLON TIE WRAPS AROUND PERIMETER OF MANHOLE. RACK SUMP PUMP CABLES TOGETHER. SPLICES SHALL BE WATERPROOF.



PULLING IN IRON DETAIL
N.T.S.



MANHOLE COVER DETAIL
1" = 1'-0"

MANHOLE COVER NOTES:

1. COVER ATTACHMENT FRAME IN MANHOLE TOP SECTION SHALL BE CAST IN PLACE.
2. COVER ASSEMBLY SHALL BE HINGED TO OPEN WITHOUT SPRING ASSIST AS SHOWN ON MANHOLE DETAILS OR WITHOUT HINGE AND SHALL BE DESIGNED FOR AIRCRAFT RATED (100,000lb WHEEL LOAD) TRAFFIC AND FABRICATED FROM CARBON STEEL (GALVANIZED TO RESIST CORROSION) CHECKERED FLOOR PLATE.
3. COVER SHALL INCORPORATE A LIFT HANDLE WHICH WHEN NOT IN USE WILL BE FLUSH WITH SURFACE OF COVER.
4. COVER SHALL INCORPORATE AN ASSEMBLY TO SECURE THE COVER IN THE OPEN POSITION.

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MICHAEL L CLAYPOOLE
No. 7824
LICENSED PROFESSIONAL ENGINEER
APR 08 2019

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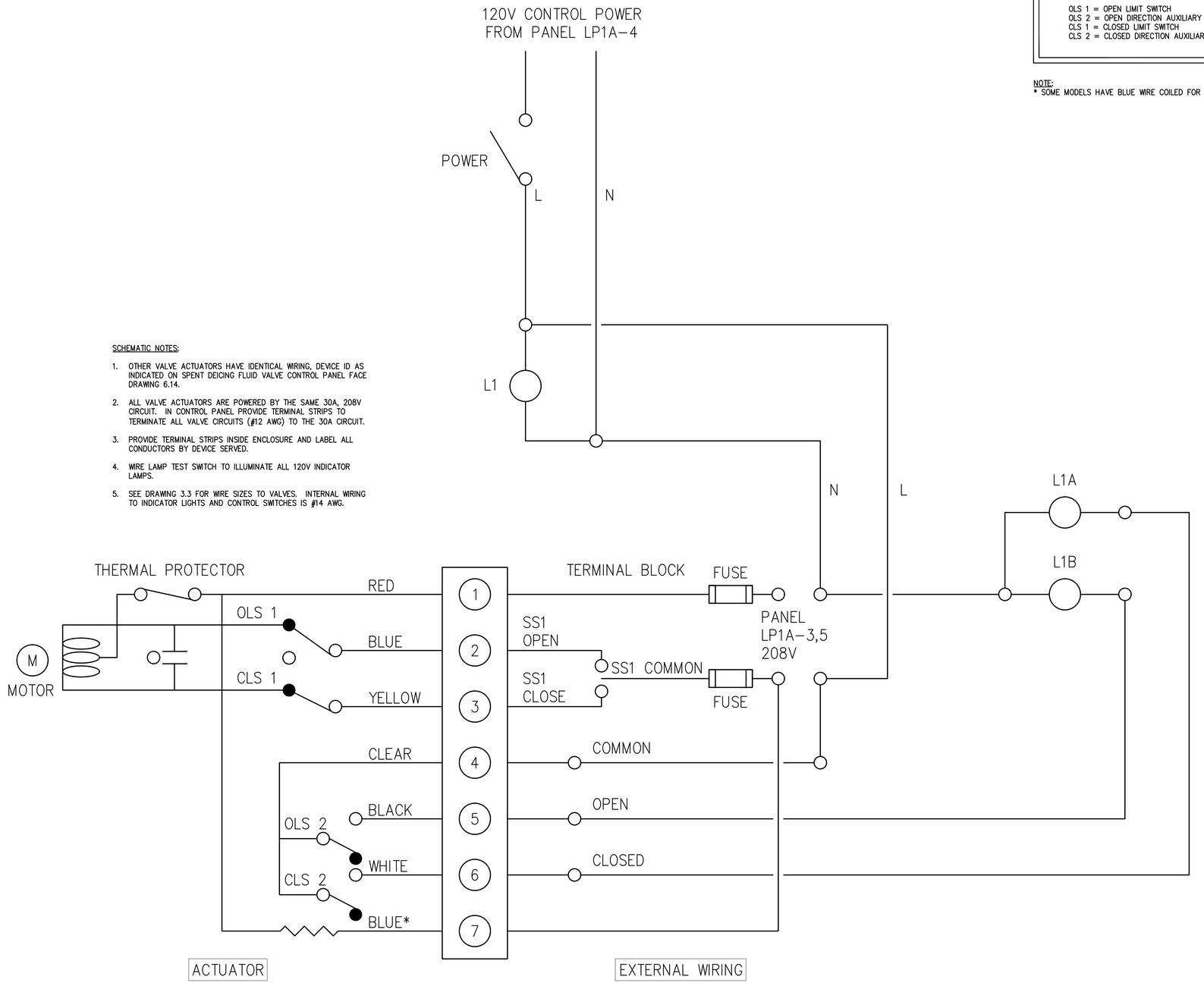
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Project No. 195211590
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PERMITTING DRAWINGS



WIRING SCHEMATIC VALVE 1 (TYPICAL FOR VALVES 1–14)

N.T.S.

SCHEMATIC NOTES:

1. OTHER VALVE ACTUATORS HAVE IDENTICAL WIRING, DEVICE ID AS INDICATED ON SPENT DEICING FLUID VALVE CONTROL PANEL FACE DRAWING 6.14.
2. ALL VALVE ACTUATORS ARE POWERED BY THE SAME 30A, 208V CIRCUIT. IN CONTROL PANEL PROVIDE TERMINAL STRIPS TO TERMINATE ALL VALVE CIRCUITS (#12 AWG) TO THE 30A CIRCUIT.
3. PROVIDE TERMINAL STRIPS INSIDE ENCLOSURE AND LABEL ALL CONDUCTORS BY DEVICE SERVED.
4. WIRE LAMP TEST SWITCH TO ILLUMINATE ALL 120V INDICATOR LAMPS.
5. SEE DRAWING 3.3 FOR WIRE SIZES TO VALVES. INTERNAL WIRING TO INDICATOR LIGHTS AND CONTROL SWITCHES IS #14 AWG.

LEGEND

OLS 1 = OPEN LIMIT SWITCH
OLS 2 = OPEN DIRECTION AUXILIARY SWITCH
CLS 1 = CLOSED LIMIT SWITCH
CLS 2 = CLOSED DIRECTION AUXILIARY SWITCH

NOTE:
* SOME MODELS HAVE BLUE WIRE COILED FOR HEATER CONNECTION.

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3	ISSUED TO CITY OF PORTLAND FOR APPROVAL	DDA	DDA	19.04.08
2	RELEASED FOR BID	DDA	DDA	19.03.08
1	ISSUED FOR CITY, MaDOT AND FAA REVIEW	DDA	DDA	19.02.28

File Name: 195211590_details	HAB DWN.	MLC CHKD.	MLC DSGN.	JAN 2018 DATE

Permit-Seal

STATE OF MAINE
MICHAEL L CLAYPOOLE
No. 7824
LICENSED PROFESSIONAL ENGINEER
04-08-2019

Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

Title

SPENT DEICING FLUID VALVE CONTROL PANEL SCHEMATIC

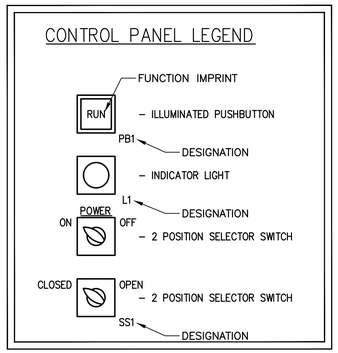
Project No.	Scale
195211590	AS NOTED

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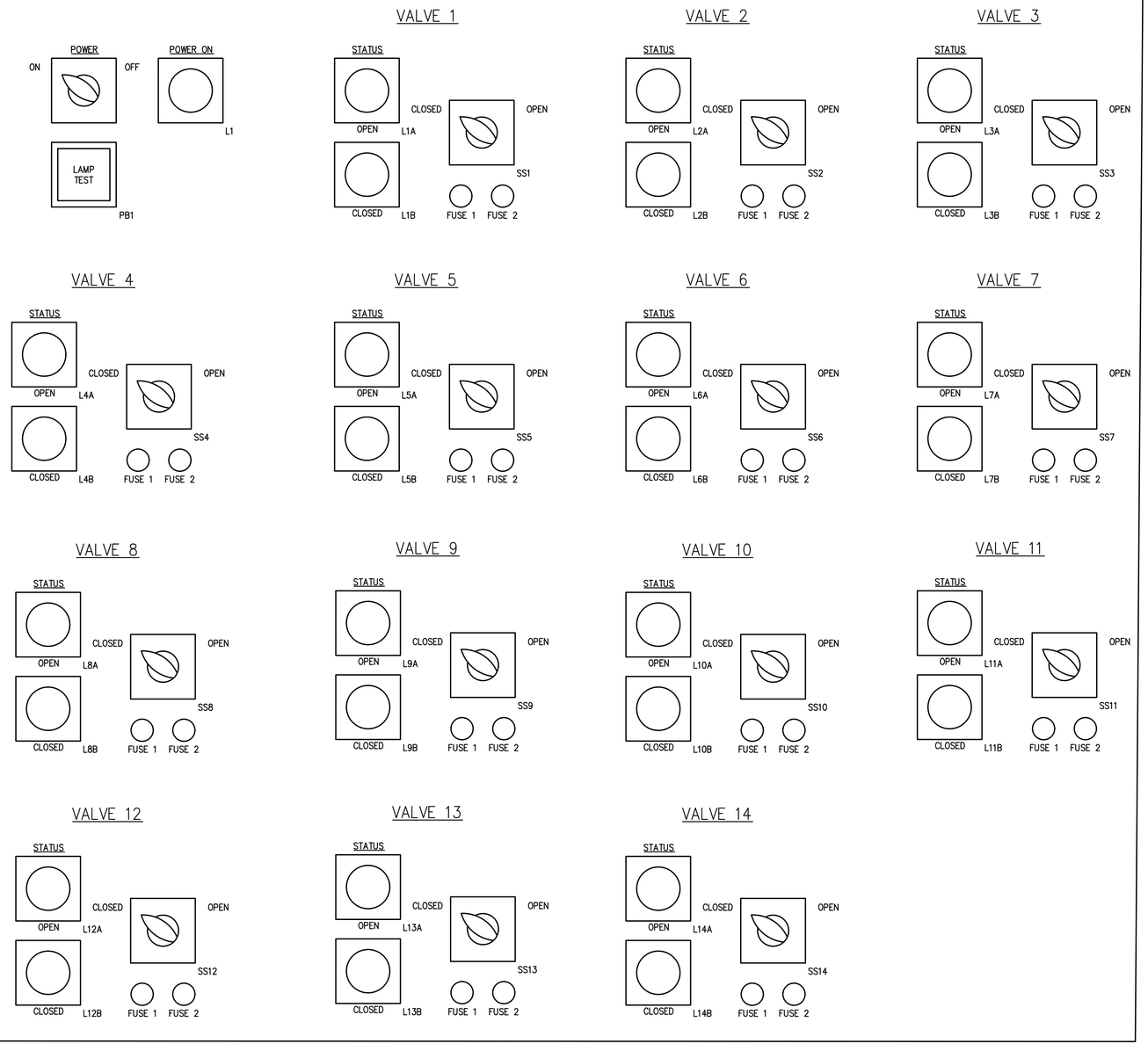
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CONTROL PANEL LEGEND



DEICING CONTROL PANEL



PERMITTING DRAWINGS

Stantec
482 Payne Road Scarborough Court
Scarborough, Maine 04074-8929
Tel. 207.883.3355
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LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

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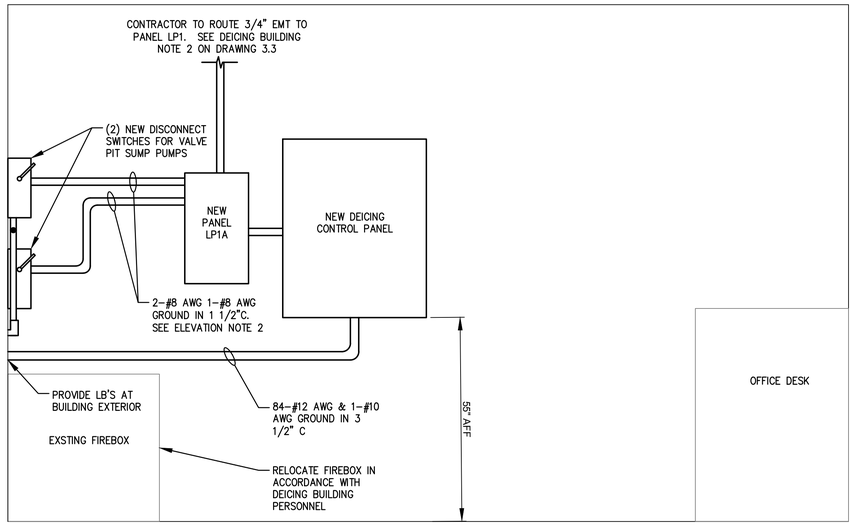
SPENT DEICING FLUID VALVES CONTROL PANEL FACE

Project No.	Scale
195211590	AS NOTED

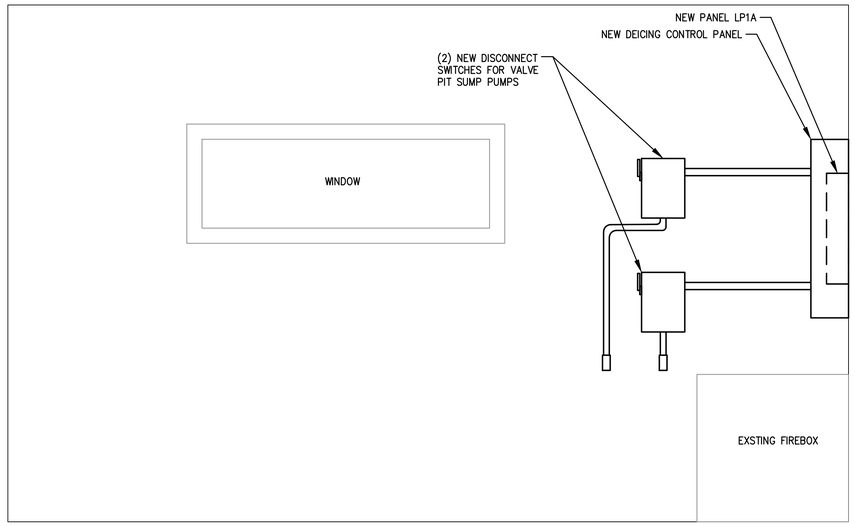
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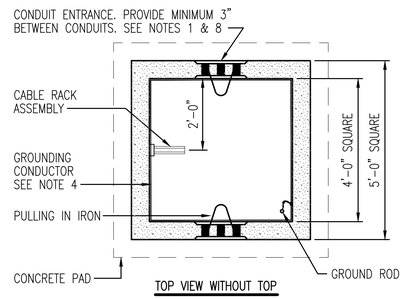
A ELEVATION
SCALE: N.T.S.



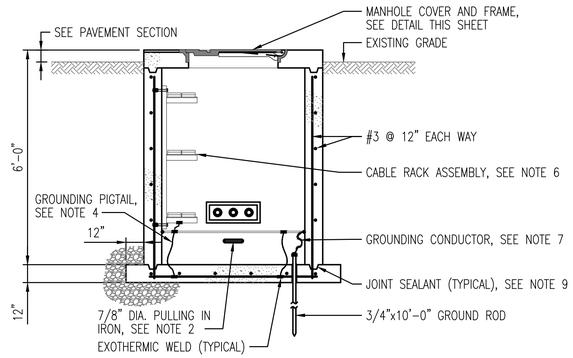
B ELEVATION
SCALE: N.T.S.

ELEVATION NOTES:

1. SEE UTILITY PLAN 3.3
2. CONVERT TO 2-#6 AWG AND 1-#6 AWG GROUND ON LOAD SIDE OF DISCONNECTS.



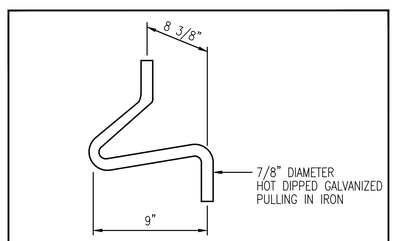
MANHOLE DETAILS
1/2" = 1'-0"



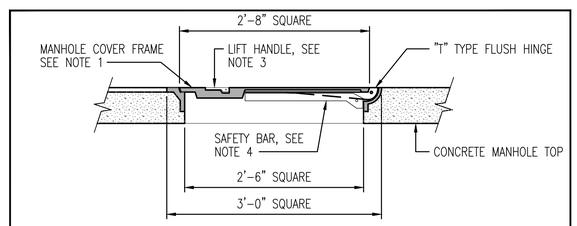
C ELEVATION
SCALE: 1/2"=1'-0"

MANHOLE NOTES:

1. TYPICAL MANHOLE DETAIL, SEE SITE PLAN FOR CONDUIT ENTRANCE LOCATIONS, SIZE AND NUMBER OF CONDUITS.
2. PROVIDE PULLING IRONS IN WALLS OPPOSITE CONDUIT ENTRANCES. WELD PULLING IRONS TO CONCRETE REINFORCING STEEL.
3. STRENGTH OF CONCRETE SHALL BE 5,000 PSI @28 DAYS. WALLS SHALL BE A MINIMUM OF 6" THICK, BASE AND TOP SHALL BE A MINIMUM OF 12" THICK. MANUFACTURERS CERTIFICATION FOR AIRCRAFT RATING (1000,000lb WHEEL LOAD) REQUIRED FOR ENTIRE STRUCTURE.
4. PROVIDE #2 AWG BARE COPPER GROUNDING PIGTAIL EXOTHERMICALLY WELDED TO REBAR. EXOTHERMICALLY WELD PIGTAIL TO GROUNDING CONDUCTOR. (TYPICAL 2 PLACES)
5. PROVIDE GROUNDING BUSHINGS TO RIDGID GALVANIZED STEEL CONDUITS ENTERING MANHOLE. PROVIDE #6 AWG BONDING JUMPER BETWEEN GROUNDING BUSHING AND GROUND CONDUCTOR. EXOTHERMICALLY WELD TO GROUND CONDUCTOR.
6. PROVIDE GALVANIZED STEEL CABLE RACK ASSEMBLY WITH INSULATORS AS INDICATED. PROVIDE 5/8"x4-1/2" STAINLESS STEEL EXPANSION ANCHORS TO ATTACH CABLE RACK CHANNEL TO CONCRETE (TYPICAL OF 2). GROUND CABLE RACK ASSEMBLY TO GROUNDING CONDUCTOR USING #2 AWG BOND WIRE EXOTHERMICALLY WELDED TO RACK ASSEMBLY AND GROUNDING CONDUCTOR.
7. PROVIDE #4/0 BARE COPPER GROUND CONDUCTOR. ATTACH TO WALLS USING STAINLESS STEEL CLIPS 16" ON CENTER. EXOTHERMICALLY WELD GROUND CONDUCTOR TO GROUND ROD.
8. PROVIDE DUCT ENTRANCE KNOCKOUT, SEE NOTE 1. PROVIDE MINIMUM 1", 45° CHAMFER AROUND CONDUIT ENTRANCES ON THE INTERIOR OF MANHOLE.
9. PROVIDE JOINT SEALANT WHICH SHALL BE PACKAGED IN EXTRUDED PREFORMED ROPE-LIKE SHAPE HAVING A CROSS SECTIONAL AREA OF APPROXIMATELY 1 1/2" PROTECTED BY A SUITABLE REMOVABLE WRAPPER.
10. RACK CABLES BY VALVE ACTUATOR USING NYLON TIE WRAPS AROUND PERIMETER OF MANHOLE. RACK SUMP PUMP CABLES TOGETHER. SPLICES SHALL BE WATERPROOF.



PULLING IN IRON DETAIL
N.T.S.



MANHOLE COVER DETAIL
1" = 1'-0"

MANHOLE COVER NOTES:

1. COVER ATTACHMENT FRAME IN MANHOLE TOP SECTION SHALL BE CAST IN PLACE.
2. COVER ASSEMBLY SHALL BE HINGED TO OPEN WITHOUT SPRING ASSIST AS SHOWN ON MANHOLE DETAILS OR WITHOUT HINGE AND SHALL BE DESIGNED FOR AIRCRAFT RATED (100,000lb WHEEL LOAD) TRAFFIC AND FABRICATED FROM CARBON STEEL (GALVANIZED TO RESIST CORROSION) CHECKERED FLOOR PLATE.
3. COVER SHALL INCORPORATE A LIFT HANDLE WHICH WHEN NOT IN USE WILL BE FLUSH WITH SURFACE OF COVER.
4. COVER SHALL INCORPORATE AN ASSEMBLY TO SECURE THE COVER IN THE OPEN POSITION.

Stantec
482 Payne Road Scarborough Court
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STATE OF MAINE
MICHAEL L CLAYPOOLE
No. 7824
LICENSED PROFESSIONAL ENGINEER
APR 08 2019

Client/Project
PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

Title
MISCELLANEOUS ELECTRICAL DETAILS

Project No. 195211590
Scale AS NOTED

Sheet
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PERMITTING DRAWINGS

EROSION AND SEDIMENT CONTROL NARRATIVE

The primary emphasis of the erosion and sedimentation control plan to be implemented for this project is as follows:

1. Planning the project to intercept and convey runoff as the construction of the project occurs.
2. Planning for early reshaping of water quality filter (WQF-1) for expanded area to be used as a sedimentation basin.
3. Development of a careful construction sequence which includes restrictions for construction of certain elements of the project and prohibits opening excessive areas of the site at one time.
4. Rapid stabilization of areas denuded to underlying parent material to minimize the period of soil exposure.
5. Rapid stabilization of drainage paths to avoid rill and gully erosion.
6. The use of on-site measures to capture sediment (hay bales/silt fence/stone check dams, etc.).
7. The implementation of long-term measures for erosion/sediment and pollutant treatment through the construction of permanent water quality measures.

Introduction

Note that for this project, no more than one acre shall be disturbed at one time or no larger area than can be mulched in one day. This note shall apply to all construction including drilling winter. The following erosion and sedimentation control measures are in accordance with the 2016 Revision to the 2003 Maine Erosion and Sediment Control Best Management Practices (BMPs) Manual for Designers and Engineers. The construction of erosion and sedimentation control measures shall be in accordance with the 2014 Revision to the 2003 Maine Erosion and Sediment Control Field Guide for Contractors.

14.0 Critical Areas

The critical areas of the site include the freshwater wetlands within the project areas and the coastal wetland along the shore line of Fore River and Long Creek. For this project the wetlands within the limits of disturbance are being filled.

14.1 Erosion/Sedimentation Control Devices

As part of the site development, the contractor will be obligated to implement the following erosion and sediment control devices. These devices shall be installed as indicated on the plans or as described in this report. For further reference on these devices see the Maine Erosion and Sediment Control Handbook for Construction: Best Management Practices.

1. Siltation fence shall be installed down slope of any disturbed areas to trap sediment borne sediments until the site is revegetated. The silt fence shall be installed per the detail provided in the plan set and inspected immediately after each rainfall and at least daily during prolonged rainfall. The Contractor shall make repairs immediately if there are any signs of erosion or sedimentation below the fence line. If such erosion is observed, the contractor shall take proactive action to identify the cause of the erosion and take action to avoid its reoccurrence. Typically this requires stabilization methods be taken. Proper placement of stakes and keying the bottom of the fabric into the ground is critical to the fence's effectiveness. If there are signs of undercutting at the center or the edges or impounding of large volumes of water behind the fence the barrier shall be replaced with a stone check dam and measures taken to avoid the concentration of flows not intended to be directed to the silt fence.
2. Erosion control mix berms are intended to trap runoff-borne sediments until the site is revegetated and is removed to be used in lieu of siltation fence during winter months (refer to Section 14.0 (3)). Erosion control mix should contain a well-graded mixture of particle sizes and may contain rock as large as 4" in diameter. Erosion control mix should be free of refuse, physical contaminants and material toxic to plant growth such as fly ash or yard scraping. Large portions of silts, clays or fine sands are not acceptable in the mix. The mix composition should meet the following standards:
   - The organic matter content should be between 80% and 100% dry weight basis.
   - Particle size by weight should be 100% passing a 6" screen and 70% to 85% passing a 0.75" screen.
   - The organic portion needs to be fibrous and elongated.
   - Soluble salts content shall be < 4.0 mmhos/cm.
   - The pH should be between 5.0 and 8.0.
   - The use of soley an erosion control mix berm at the base of a slope steeper than 8% or where there is flowing water is prohibited.
3. Straw or hay mulch including hydroseeding is intended to provide cover for denuded or seeded areas until revegetation is established. Mulching should occur within several times per week when the site construction activity is high and at sufficient intervals to reduce the period of exposure of areas soils to the time limits set forth in this plan. Mulch placed on slopes of less than 8 percent (3H:1V max) shall be anchored by applying water; mulch placed on slopes steeper than 8 percent shall be covered with fabric netting as immediately after mulching as practical and anchored with staples in accordance with the manufacturer's recommendations. Slopes steeper than 3H:1V shall be riprapped. Proposed drainage channels which are to be revegetated shall receive Curlex or approved equal all plantings selected for the slope, velocity, and whether the measures is temporary or intended to be in place for a stained period. Mulch application rates are provided in the project specifications. Hay mulch shall be available on site at all times in order to provide immediate temporary stabilization when necessary. Where necessary a windrow of screened stone and/or gravel shall be placed at the top of the slope and directed to a temporary stone channel or pipe slice to convey runoff down slopes. A dissipation device such as stone or a plunge pool should be installed at the base of the slope and slice to direct to dissipate the energy of the water from the slice or channel.
4. Riprap slopes, ditch linings, stone checkdams, hay bales, arriers, and culvert outlet aprons are intended to stabilize and protect denuded soil surfaces or dissipate the energy and erosive forces from concentrated flows. Installation details and stone sizes are provided in the construction plan set on the erosion control detail sheets.
5. Construction entrances will be constructed at access points onto the site to prevent tracking of soil onto adacent local roads.
6. Stone sediment traps or hay bales and a premanufactured SiltSack® or approved equal will be installed at catch basin inlets to prevent silt from entering the storm drain system. Installation details are provided in the plan set on the erosion control detail sheets.
7. Riprap will be used on slopes greater than 3H:1V in areas designated on the drawings.
8. Dirt bags or approved equal will be required to be on site and available for construction dewatering. The Contractor will be required to provide for Dirt bags with one prepared for operation prior to commencing any trenching operations.
9. Loam and seed is intended to serve as the primary permanent revegetative measure for all denuded areas not provided with other erosion control measures such as riprap. Application rates are provided in the project specifications for temporary and permanent seeding in non-wetland areas.
10. Silt logs are an option for stone checkdams and may be substituted provided the devices are well anchored.
11. Sorbent booms are intended to capture oils and the asphalt sheen from paved surfaces and shall be installed in all catch basins before pavement is installed.

14.2 Temporary Erosion/Sedimentation Control Measures

The following are planned as temporary erosion/sedimentation control measures during construction:

1. A crushed stone-stabilized construction entrance shall be placed at any construction access points. The locations of the construction entrances shown on the drawings should be considered illustrative and adjusted as appropriate and located at any area where tracking of mud and debris onto existing roads, previously paved areas within the project, or streets is a potential. Stone-stabilized construction entrances will require the stone to be removed and replaced as they become covered or filled with mud and material tracked by vehicles exiting the site.
2. Siltation fence shall be installed along the downgradient side of the proposed improvement areas. The siltation fence will remain in place and properly maintained until the site is acceptably revegetated. Siltation fence is to be used along the contour of significant fill slopes as illustrated on the erosion control plan site drawings. Siltation fence needs to be checked to insure the bottom is properly keyed in and inspected after significant rains. Wood chips from clearing are often used on the construction side of the silt fence to provide an extra margin of safety and security for the silt fence. The practice is encouraged provided the chips are removed or dispersed into forested areas when the fence is removed.
3. Dirt bags or approved equal will be installed in accordance with the details in the plan set. The Dirt bags' function on the project is to receive any water pumped from excavations during construction. A Dirt bag shall be installed and prepared for operation prior to any trenching on site. When Dirt bags are observed to be at 50% capacity they shall be cleaned or replaced. Stone under the Dirt bag shall be removed and replaced concurrently.
4. Temporary stockpiles of common excavation will be protected as follows:
   a) Temporary stockpiles shall not be located within 100 feet of the wetlands and at least 50 feet upgradient of the perimeter silt fence.
   b) Inactive stockpiles shall be stabilized within 5 days by either temporarily seeding the stockpile with a hydroseed method containing an emulsified mulch tackifier or covering the stockpile with mulch. If necessary, mesh shall be installed to prevent wind from removing the mulch.
   c) Sediment barriers shall be installed downgradient of stockpiles
   d) Stormwater shall be prevented from running onto stockpiles.
5. All denuded areas which have been rough graded shall receive mulch or erosion control mesh fabric within 7 days of initial distrance of soil.
6. All soils distrbed between November 1 and April 1 will be covered with mulch within 5 days of distrance; prior to any predicted storm event of the equivalent of ½" of equivalent rainfall in a 24-hour period; or prior to any weekend shutdown lasting more than 35 hours (including weekends and holidays). The mulch rate shall be double the normal rate.

   For work that is conducted between November 1 and April 15 of any calendar year, all denuded areas will be covered with hay mulch, applied at twice the normal application rate, and (in areas over 10% grade) anchored with a fabric netting. The time period for applying mulch shall be limited to 5 days for all areas or immediately in advance of a predicted rainfall event.
7. The paved access roads shall be swept to control mud and dust as necessary. A street sweeper shall be available from the Contractor on immediate notice or request from the Owner, Town or regulatory agency. Any off-site tracking of mud or sediment shall be vacuumed immediately and prior to the next significant storm event.
8. Stone checkdams, silt logs, or hay bale barriers will be installed at any evident concentrated flow discharge points during construction and earthwork operations.
9. Silt fencing with a maximum stated spacing of 6 feet shoulder used, unless the fence is supported by wire fence reinforcement of minimum 14 gauge and with a maximum mesh spacing of 6 inches, in which case stakes may be spaced a maximum of 10 feet apart. The bottom of the fence should be properly anchored a minimum of 6" per the plan detail and backfilled. Any silt fence identified by the Owner or reviewing agencies as not being properly installed during construction shall be immediately repaired in accordance with the installation details.
10. Storm drain catch basin inlet protection shall be provided through the use of stone sediment barriers or a premanufactured catch basin sediment bag. Stone sediment barrier installation details are provided in the plan set. The barriers or catch basin sediment bag shall be inspected after each rainfall and repairs made as necessary, including the removal of sediment. Sediment shall be removed and the barrier or catch basin sediment bag restored to its original dimensions when the sediment has accumulated to ½ the design depth of the barrier. Sediment shall be removed from catch basin sediment bag as necessary. Inlet protection shall be removed when the tributary drainage area has been stabilized.
11. All slopes over 8% and 3H:1V may shall receive erosion control mesh. Slopes steeper than 3H:1V shall be riprapped. Slopes shall not exceed 1.5H:1V Slopes shall only be 1.5H:1V in the vicinity of the natural resource (coastal wetland associated with the Fore River).
12. Slopes steeper than 3H:1V shall receive riprap.
13. Additional silt fences shall be installed as construction progresses.
14. Areas of visible erosion shall be stabilized with crushed stone. The size of the stone shall be determined by the Owner in consultation with the design engineer.
15. New catch basins shall all be installed with an opening 2'-6" below finished grade to receive a 4" underdrain with an end cap. A 3'-0" sump of underdrain stone, rounded 2" to 6" of ¾" crushed stone and filter fabric shall be installed. The purpose of this measure is to provide drainage relief until site grades are at finish levels.
16. All catch basins which receive runoff from paved areas being constructed as part of this project shall have a sorbent boom installed in the catch basin sump prior to installing binder pavement or overlays.
17. Storm drain catch basin inlet protection shall be provided through the use of stone sediment barriers (paved areas) or hay bales (lawn areas) and a pre-manufactured catch basin sediment bag. Stone sediment barrier installation details are provided in the plan set. The barriers or catch basin sediment bag shall be inspected after each rainfall and repairs made as necessary, including the removal of sediment. Sediment shall be removed in a timely manner.
18. No distrance shall take place within 50-feet of a protected natural resource.
19. All areas within 75-feet of a protected natural resource must be protected with a double row of sediment barriers during winter construction.

14.3 Standards for Stabilizing Sites for the Winter

In the event winter construction is required the following is provided. The contractor shall schedule the work to avoid construction of the water quality filter during the winter months. For permitted winter construction the erosion control measures are substantially more stringent and lack of weather which aids in drying the sediments grade soils through evaporation. During the periods of November 1st through April 1st the Contractor shall install erosion berms in lieu of silt fence. The minimum inspection requirement for winter construction is after each rainfall/snowstorm or thawing and at least once a week. Refer to 14.9 for inspector qualifications and responsibilities.

1. Standard for the timely stabilization of ditches and channels: The contractor shall construct and stabilize all stone-lined ditches and channels on the site by November 15. The contractor shall construct and stabilize all grass-lined ditches and channels on the site by September 15. If the contractor fails to stabilize a ditch or channel to be grass-lined by September 15, then the contractor shall take one of the following actions to stabilize the ditch for late fall and winter.

   i. Install a sod lining in the ditch. The contractor shall line the ditch with propery installed sod by October 1. Proper installation includes the contractor pinning the sod onto the soil with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, watering the sod to promote root growth into the distrbed soil, and anchoring the sod with stake or plastic mesh to prevent the sod strips from sloughing during flow conditions.

   ii. Install a stone lining in the ditch. The contractor shall line the ditch with stone riprap by November 15. The contractor shall hire a registered professional engineer to determine the stone size and lining thickness needed to withstand the anticipated flow velocities and flow depths within the ditch. If necessary, the contractor shall regrade the ditch prior to placing the stone lining so as to prevent the stone lining from reducing the ditch's cross-sectional area.

2. Standard for the timely stabilization of distrbed slopes: The contractor shall construct and stabilize stone-covered slopes by November 15. The contractor shall seed and mulch all slopes to be vegetated by September 15. The department will consider any area having a grade greater than 15% (10H:1V) to be a slope. If the Contractor fails to stabilize any slope to be vegetated by September 15, then the Contractor shall take one of the following actions to stabilize the slope for late fall and winter.

   i. Stabilize the soil with temporary vegetation and erosion control mesh. By October 1 the contractor shall seed the distrbed slope with winter rye at a seeding rate of 3 pounds per 1000 sq feet and apply erosion control mats over the mulched slope. The Contractor shall monitor growth of the rye over the next 45 days. If the rye fails to grow at least three inches or fails to cover at least 90% of the distrbed slope by November 15, then the contractor shall cover the slope with a layer of wood waste compost as described in item iii of this standard or with stone rip rap as described in item iv of this standard.

   ii. Stabilize the slope with sod. The contractor shall stabilize the distrbed slope with properly installed sod by October 1. Proper installation includes the contractor pinning the sod onto the slope with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, and watering the sod to promote root growth into the distrbed soil. The contractor shall not use late-season sod installation to stabilize slopes having a grade greater than 33% (3H:1V) or having groundwater seeps on the slope face.

   iii. Stabilize the slope with wood waste compost. The contractor shall place a silt-inch layer of wood waste compost on the slope by November 15. Prior to placing the wood waste compost, the contractor shall remove any snow accumulation on the distrbed slope. The contractor shall not use wood waste compost to stabilize slopes having grades greater than 50% (2H:1V) or having groundwater seeps on the slope face.

   iv. Stabilize the slope with stone rip rap. The contractor shall place a layer of stone riprap on the slope by November 15. The contractor shall hire a registered professional engineer to determine the stone size needed for stability and to design a filter layer for underneath the riprap.

3. Standard for the timely stabilization of distrbed soil: By September 15 the contractor shall seed and mulch all distrbed soils on areas having a slope less than 15%. If the contractor fails to stabilize these soils by this date then the contractor shall take one of the following actions to stabilize the soil for late fall and winter.

   i. Stabilize the soil with temporary vegetation. By October 1 the contractor shall seed the distrbed soil with winter rye at a seeding rate of 3 pounds per 1000 sq feet, lightly mulch the seeded soil with hay or straw at 150 pounds per 1000 sq feet and anchor the mulch with plastic netting. The contractor shall monitor the growth of the rye over the next 45 days. If the rye fails to grow at least three inches or fails to cover at least 90% of the distrbed soil before November 15 then the contractor shall mulch the area for over-winter protection as described in item iii of this standard.

   ii. Stabilize the soil with sod. The contractor shall stabilize the distrbed soil with properly installed sod by October 1. Proper installation includes the contractor pinning the sod onto the soil with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, and watering the sod to promote root growth into the distrbed soil.

   iii. Stabilize the soil with mulch. By November 15 the contractor shall mulch the distrbed soil by spreading hay or straw at a rate of at least 150 pounds per 1000 sq feet on the area so that no soil is visible through the mulch. Prior to applying the mulch the contractor shall remove any snow accumulation on the distrbed area. Immediately after applying the mulch the contractor shall anchor the mulch with plastic netting to prevent wind from moving the mulch off the distrbed soil.

14.4 Special Measures for Summer Construction

The summer period is generally optimum for construction in Maine but it is also the period where intense short-duration storms are most common, making dendrites areas very susceptible to erosion, where distrbed soil control needs to be the most stringent, and where the potential to establish vegetation is often restricted by moisture deficit. During these periods the contractor must:

1. Implement a program to apply dust control measures on a daily basis except those days where the precipitation exceeds 0.25 inches.
2. Spray the mulch after anchoring with water to dampen the soil and encourage early growth. Temporary seed may be required until the late summer season.
3. Mulch cover and moisten stockpiles of fine-grained materials which are susceptible to erosion.
4. Take additional steps needed to control fugitive dust emissions to minimize reductions in visibility and the airborne dispersing of fine-grained soils.
5. Any off-site trucking of mud or sediment shall be vacuumed immediately and prior to the next storm.

These measures may also be required in the spring and fall during the drier periods of these seasons.

14.5 Sedimentation Sumps

The use of shallow sediment sumps on the downgradient side of erodible stockpiles and areas where denuded conditions will be prolonged is encouraged. The sediment sumps may be installed and used in conjuction with the underdrain inlets at catch basins. The expanded water quality filter area may be used as temporary sediment sump if the gravel filter and underdrain are not installed until the riprap-gradient area is stabilized or unless a sacrificial filter fabric is placed above the filter to protect the area until the site has been stabilized.

14.6 Permanent Erosion Control Measures

The following permanent erosion control measures have been designed as part of the Erosion/Sedimentation Control Plan:

1. The drainage conveyance systems have been designed to intercept and convey the 10-year or the 25-year storm depending upon the location on site. In the case of open channels or swales this includes the design of measures to resist scour of the channel.
2. All storm drain pipes shall have riprap aprons at their outlet to protect the outlet and receiving channel of the culverts from scour and deterioration. Installation details are provided in the plan set. The aprons shall be installed and stabilized prior to directing runoff to the tributary pipe or culvert. It is noted that all inlets and outlets 12" or over in diameter are to have flared concrete inlet and outlet ends or HDPE flares.
3. All areas distrbed during construction that not subject to restoration (paving, riprap, etc.) will be loamed limed, fertilized, mulched, and seeded. Fabric netting, anchored with staples, shall be placed over the mulch in areas where the finish grade slope is greater than 8 percent. Native topsoil shall be stockpiled and temporarily stabilized with seed and mulch and reseded for final restoration when it is of sufficient quality.
4. Catch basins shall be provided with sediment sumps for all outlet pipes that are 12" in diameter or greater.
5. A permanent water quality filter will be reshaped and will collect and treat stormwater from the site and discharge to the Fore River.

14.7 Timing and Sequence of Erosion/Sedimentation Control Measures

The following construction sequence shall be exercised to the extreme caution not to overexpose the site by limiting the distrbed areas and shall stabilize any steep slopes within 24 hours final slope grading and stabilization will not be completed within 7 days. Any final slopes shall have the specified erosion control measures installed within 7 days of final stabilization.

Note: For all grading activities the Contractor shall exercise extreme caution not to overexpose the site by limiting the distrbed areas and shall stabilize any steep slopes within 24 hours final slope grading and stabilization will not be completed within 7 days. Any final slopes shall have the specified erosion control measures installed within 7 days of final stabilization.

1. Install construction-stabilized construction entrances where shown on the project drawings.
2. Mark the grading and clearing limits and initiate clearing that will permit the contractor to access the site and install silt fence.
3. Install siltation fence where shown on the contract drawings. During the periods of November 1st through April 1st the Contractor shall install erosion berms in lieu of silt fence.
4. Establish and prepare Dirt bag area.
5. Construct diversion and drainage channels to direct flow to the sediment basins.
6. Clear and grub the project area.
7. Prepare area to receive excavated material recognizing the need to limit the denuded area of the site.
8. Construct the perimeter road and install gravels and restore the slopes.
9. Grub and construct road removal.
10. Install stone and hay bale checkdams at any concentrated flow discharge points.
11. Install storm drain undergrond electric collection system and other utility work. Install inlet and outlet protection immediately after the installation of any culverts. Pump any accumulated water to the Dirt bag.
12. Install erosion control measures and construct the improvement area subgrade including extension of embankments and temporary slope stabilization.
13. Construct other site improvements and utilities. Place gravels in the apron, taliway shoulder, and service road areas as soon as subgrade is prepared to minimize the period that the unprotected subgrade is exposed and vulnerable to erosion from runoff events.
14. Raise catch basins to grade and install inlet protection devices the SiltSack® inside the basin and the external hay bales or stone filter.
15. Install binder pavement as detailed on the site plans.
16. Loam, limefertilize, seed and mulch all distrbed and denuded areas.
17. Remove all accumulated sediment from silt barriers.
18. Review stability of the site. If a 90% catch of grass is achieved, remove all other temporary erosion control devices the fabric over sediment forebays and removal of the temporary sedimentation sumps.

Soil will be considered distrbed if it does not have an established stand of vegetation covering at least 90% of the soil surface or have not been mulched with hay applied at a rate of 230-lb./1000 sq. ft.

In the event that site is being suspended prior to winter, the General Contractor shall schedule a meeting with the MeDEP, Owner, and Owner's representatives to review the site for conformance with the plan. This meeting shall be scheduled at least 10 days prior to winter shutdown. The Owner may elect to provide the Contractor with a punch list for measures to be completed before the interim shutdown. The Owner's punch list shall not deviate the Contractor's responsibility for compliance with the erosion control requirements of the project or permits.

14.8 Contracting Procedure

The project will be constructed by a General Contractor or Site Contractor under contract to the City of Portland. The Contractor involved in site construction shall submit a schedule for the completion of the work which will satisfy the following criteria:

1. The above construction sequence shall generally be completed in the specified order, however several separate items may be constructed simultaneously. Work must also be scheduled or phased to prevent the extent of the exposed areas as specified within this narrative. The intent of this sequence is to provide for erosion control and to have structural measures such as silt fence and construction entrances in place before construction begins as well as to limit the exposed area to one that can be prepared in anticipation of predicted and non-predicted storm events except for the shorter period required for winter construction.
2. The work shall be conducted in sections which will:
   a) Limit the amount of exposed area to those areas in which work is expected to be underlain during the proceeding 30 days. Areas shall not be worked until the appropriate erosion control materials have been installed or are on the site to install as required by this narrative.
   b) Re-vegetate distrbed areas as rapidly as possible. All areas shall be permanently stabilized within 14 days of final grading or before a predicted storm event.
   c) Incorporate planned inlets and drainage system as early as possible into the construction phase. The ditches shall be immediately lined or revegetated as soon as their installation is complete.
3. Once final grade has been established the Contractor may choose to dormant seed the distrbed areas prior to placement of mulch and placement of fabric netting anchored with staples.
   a. If dormant seeding is used for the site, all distrbed areas shall receive 4" of loam and seed at an application rate of 5/1000 s.f.
   b. All areas seeded during the winter months will be inspected in the Spring for adequate catch. All areas insufficiently vegetated (less than 90% catch) shall be revegetated by replacing loam, seed and mulch.
   c. If dormant seeding is not used for the site all distrbed areas shall be revegetated in the spring.
4. The area of denuded non-stabilized construction shall be limited to the minimum area practical. An area shall be considered to be denuded until the subbase gravel is installed in taliway, apron and snow shoulder areas, or the areas of fine loam and seed have been loamed, seeded, and mulched. The mulch rate shall be twice the rate specified in the seeding plan. For example: 115 /1 000 s.f. 2 = 230 /1 000 s.f.
5. Within the proposed work area, temporary sedimentation sumps shall be provided at the interface between proposed paved areas and graded slopes (refer to paragraph 14.). This shall be accomplished during creating an area 18" below adjacent temporary grades. The sedimentation area shall have a bottom width of 3' and 3:1 side slopes. Culverts to allow access shall be installed by the Contractor. Along the sedimentation sumps, barriers shall be provided at sufficient intervals to permit runoff to be accumulated to a minimum depth of 12" before overflowing. The sediment forebay within sediment basins may be used as a sediment sump if the filter elements are delayed until pre-gradient areas have been stabilized or if covered with a sacrificial filter fabric that will protect the underlying areas.
6. The schedule shall be subject to the approval of the Owner and must comply with the requirements of this erosion control report. The sequence and limitations of the erosion control report shall be contractual and failure shall be deemed a violation of the contract.
7. The contractor must maintain an accurate set of record drawings indicating the date when an area is first denuded the date of temporary stabilization and the date of final stabilization. On October 1 of any calendar year the contractor shall submit a detailed plan for stabilizing the site for the winter and a description of what activities are planned during the winter.
8. The Contractor must install any added measures which may be necessary to control erosion/sedimentation and fugitive dust emissions from the site with additoments made dependent upon forecasted and actual site and weather conditions.

The Owner may be required to retain a third party inspector. The Contractor shall cooperate with the third party inspector and permit access to the site by the inspector at all times.

The Contractor shall note that no area within 50 feet of a slope with a vertical drop of more than 3' in 50 feet shall remain denuded for a period of over 5 days before it is temporarily stabilized. Temporary stabilization shall be the installation of mulching. All other areas shall be stabilized within 14 days. For construction between November 1 and April 15 of any calendar year, all areas shall be temporarily stabilized at the earlier time frames specified above.

It is anticipated that site work may be suspended prior winter seasons. If so the General Contractor shall schedule a meeting with the Owner, a representative of MeDEP, and Owner's representatives to review the site for conformance with the plan and to check for conformance of the project with Section 14.8 of this plan. This meeting shall be scheduled at least 10 days prior to winter shutdown. The Owner may elect to provide the Contractor with a punch list for measures to be completed to satisfy this erosion control plan before the interim shutdown. The Owner's punch list shall not violate the Contractor's responsibility for compliance with the erosion control requirements of the project or permits.

14.9 Provisions for Maintenance of the Erosion/Sedimentation Control Features During Construction

The project is subject to the requirement of a MeDEP Site Location of Development Permit, MeDEP Natural Resources Protection Act permits, Federal 404 wetland permits, and a MeDEP General Permit for Stormwater Pollution Prevention. This project requires the Contractor to prepare a list and designate by name, address and telephone number, for all individuals who will be responsible for implementation, inspection and maintenance of all erosion control measures identified within this section and as contained in the Erosion and Sedimentation Control Plan of the contract drawings. Specific responsibilities of the inspector(s) will include:

1. Election of a Contractor/Subcontractor Certification form by any and all parties responsible for erosion control measures on the site as required by the forms. This task is the responsibility of the inspector.
2. Assuring and certifying the Owner's construction sequence and all subcontractors are in conformance with the specified schedule of this section. A weekly certification stating compliance, any deviations, and corrective measures necessary to comply with the erosion control requirements of this section shall be prepared and signed by the inspector(s). In the event that the site work is subcontracted this certification shall be signed by both the General and Site Work Contractors. This task is the responsibility of the inspector.
3. In addition to the weekly certifications the inspector(s) shall maintain written reports recording construction activities on site which include:
   - Dates when major grading activities occur in a particular area.
   - Dates when material or construction activities cease in a particular area either temporarily or permanently.
   - Dates when an area is stabilized.
4. Inspection of this project work site on a weekly basis and before and after each significant rainfall event (0.5 inch or more within any consecutive 24-hour period) during construction until permanent erosion control measures have been properly installed and the site has been stabilized. Inspection of the project work site shall include:
   - Identification of proper erosion control measure installation in accordance with the erosion control detail sheet or as specified in this section.
   - Determine whether each erosion control measure is properly operating. If not identify damage to the control device and determine remedial measures.
   - Identify areas which appear vulnerable to erosion and determine additional erosion control measures which should be used to improve conditions.
   - Inspect areas of recent seeding to determine percent catch of grass. A minimum catch of 90% is required prior to removal of erosion control measures.
   - The scope of the inspection includes distrbed and impervious areas, material storage areas and vehicle access points in addition to erosion control measures.

   Accumulated silt/sediment should be removed when the depth of sediment reaches 50% of the barrier height. Accumulated silt/sediment should be removed from behind silt fencing when the depth of the sediment reaches 6 inches.

   Catch basin sediment bags should be removed and replaced at least every three months and at any time when the weekly inspection reveals that siltation has significantly retarded the rate of flow through the catch basin sediment bag.
5. If inspection of the site indicates a change should be made to the erosion control plan either to improve effectiveness or correct a site-specific deficiency the inspector shall immediately implement the corrective measure and notify the owner of the change.
6. If an inspection determines that a corrective action is required the action or repair shall be started by the end of the next work day and completed within seven days or before the next storm event. Documentation of these corrective actions shall be maintained with the inspection forms.
7. Inspection requirements/frequency also applies to winter work.
8. All construction inspections shall be conducted by someone with knowledge of erosion and stormwater control including the standards and conditions in the permit.

Once construction has been completed long-term maintenance of the water quality filter will be the responsibility of the Owner. The catch basin sumps shall be inspected each year. Sediment shall be removed when the depth of sediment reaches one half the depth of the sump.

All certifications inspection forms and written reports prepared by the inspector(s) shall be filed with the Owner and the Permit File contained on the project site. All written certifications inspection forms and written reports must be filed within one (1) week of the inspection date. The inspection forms and documentation of corrective actions during construction shall be maintained for at least three (3) years.

The Contractor has sole responsibility for complying with the erosion/sediment control report and shall be responsible for any monetary penalties resulting from failure to comply with these standards.

14.10 Preconstruction Conference

Prior to any construction at the site representatives of the Contractor, MeDEP and City of Portland and City of Southern Portland officials when applicable and the site design engineer shall arrange for and meet with the Owner to discuss the scheduling of the site construction and the designation of the responsible parties for implementing the plan. This meeting shall be scheduled by the Contractor with reasonable advance notice for all attendees. Prior to the meeting the Contractor shall prepare a detailed schedule and a marked-up site plan indicating areas and components of the work and they dates showing date of distrbance and completion of the work. If did through the general contractor's superintendent shall provide a written acknowledgement that the erosion control plan has definitive dates for implementation. The contractor shall conduct a meeting with employees and subcontractors to review the erosion control plan, the construction techniques which will be employed to implement the plan, and provide a list of attendees and items discussed at the meeting to the Owner. Three copies of the schedule, the contractor's meeting minutes and marked-up site plan shall be provided to the Owner at the preconstruction meeting.

MAINE DEP CHAPTER 500 APPENDIX C. HOUSEKEEPING NOTES

See sheet 6.2.

PERMITTING DRAWINGS

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Stantec

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Notes

By	Appd.	Revision
DDA	AMG	3 ISSUED TO CITY OF PORTLAND FOR APPROVAL 19.04.08
DDA	AMG	2 RELEASED FOR BID 19.03.08
DDA	AMG	1 ISSUED FOR CITY, MaDOT AND TAA REVIEW 19.02.28
DDA	AMG	YY.MM.DD

File Name: 195211590_details	-	DDA	AMG	JAN 2018
	DWN.	CHKD.	DSGN.	DATE

Permit-Seal



Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

Title

EROSION AND SEDIMENT CONTROL NARRATIVE

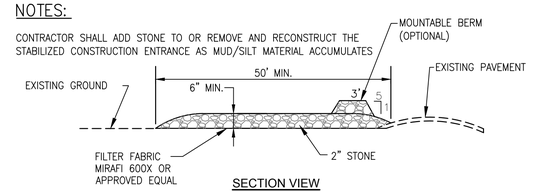
Project No.	Scale
195211590	AS NOTED

Sheet

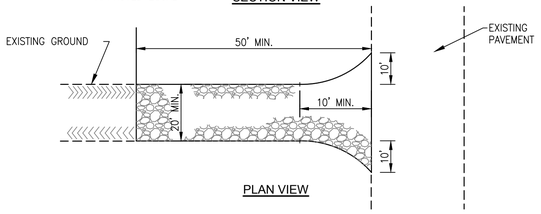
6.0

NOTES:

CONTRACTOR SHALL ADD STONE TO OR REMOVE AND RECONSTRUCT THE STABILIZED CONSTRUCTION ENTRANCE AS MUD/SILT MATERIAL ACCUMULATES



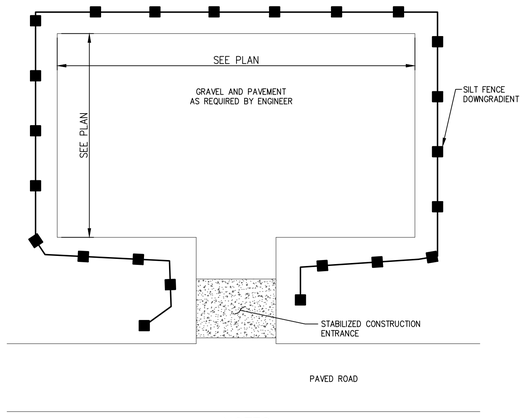
SECTION VIEW



PLAN VIEW

(A) STABILI□ED CONSTRUCTION ENTRANCE DETAIL

N.T.S.

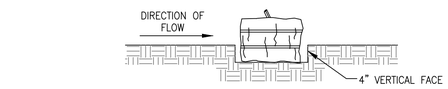


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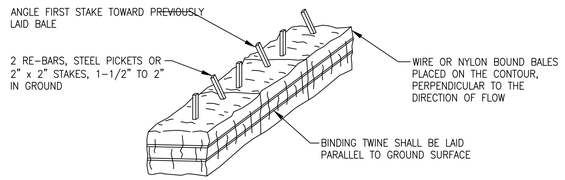
THE CONTRACTOR STAGING AREA IS NOT A SEPARATE BID ITEM AND WILL BE PAID FOR BY QUANTITIES OF PAVEMENT, EARTHWORK, GRAVEL AND EROSION CONTROL BID ITEMS.

(B) CONTRACTOR STAGING AREA

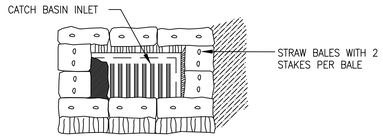
N.T.S.



EMBEDDING DETAIL



ANCHORING DETAIL



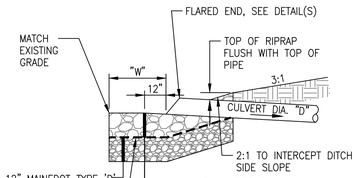
AT CATCH BASIN INLET

CONSTRUCTION SPECIFICATIONS

1. BALES SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF 4".
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY STAKES OR RE-BARS DRIVEN THROUGH THE BALES. THE FIRST STAKE IN EACH BALE WAS ANGLED TOWARD PREVIOUSLY LAID BALE TO FORCE BALES TOGETHER.
4. INSPECTION WILL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MAKE PROMPTLY AS NEEDED.
5. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

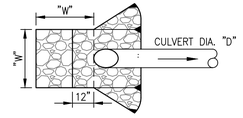
(D) STRAW OR HAY BALE BARRIER

N.T.S.



SECTION VIEW

SCHEDULE			
CULVERT DIAMETER (D)	WIDTH (W)	STONE d_{50}	RIPRAP THICKNESS
12"	2'	6"	14"
15"	4'	6"	14"
18"	4'	6"	14"
24"	6'	6"	14"
30"	8'	12"	2'-"
36"	8'	12"	2'-"
42"	10'	12"	2'-"
48"	12'	12"	2'-"



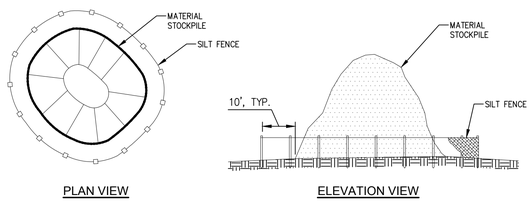
PLAN VIEW

NOTE:

RIPRAP GRADATION AND PLACEMENT – THE RIPRAP GRADATION SHALL BE A WELL-GRADED MIX FROM ABOUT 1.5 TIMES THE D SIZE TO ABOUT 25 PERCENT OF THE D SIZE. THE RIPRAP STONES SHALL BE CAREFULLY PLACED WORKING FROM THE TOE OF THE SLOPE UPWARD. THE STONES SHOULD BE LOWERED TO THE SLOPE AND NOT BE ALLOWED TO DROP MORE THAN 12 INCHES ONTO THE GEOTEXTILE. THE FINISHED SURFACE SHALL BE A RELATIVELY SMOOTH UNIFORMLY SLOPED SURFACE.

(G) RIPRAP INLET APRON DETAIL

N.T.S.



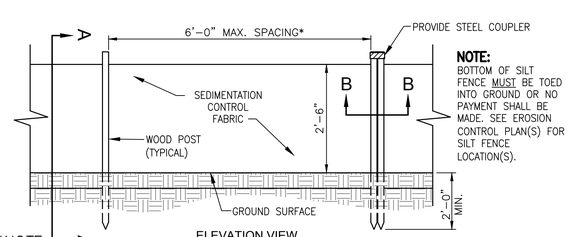
PLAN VIEW ELEVATION VIEW

NOTES:

1. SEE EROSION AND SEDIMENTATION CONTROL PLAN FOR STOCKPILE LOCATIONS. STOCKPILES SHALL NOT BE LOCATED WITHIN 100' OF WETLANDS, STREAMS OR RIVERS.
2. SILTATION FENCE SHALL BE INSTALLED AROUND THE PERIMETER OF STOCKPILES AND SHALL BE INSTALLED, INSPECTED, AND MAINTAINED IN ACCORDANCE WITH THE SILTATION FENCE DETAIL PROVIDED AND THE EROSION AND SEDIMENTATION CONTROL NARRATIVE.
3. INACTIVE STOCKPILES SHALL BE STABILIZED WITHIN 5 DAYS BY EITHER TEMPORARILY SEEDING THE STOCKPILE WITH A HYDROSEED MIXTURE CONTAINING AN EMULSIFIED MULCH TACKIFIER OR BY COVERING THE STOCKPILE WITH MULCH. IF NECESSARY, MULCH SHALL BE ANCHORED TO PREVENT IT FROM BLOWING AWAY.

(C) EROSION CONTROL FOR TEMPORARY STOCKPILES

N.T.S.

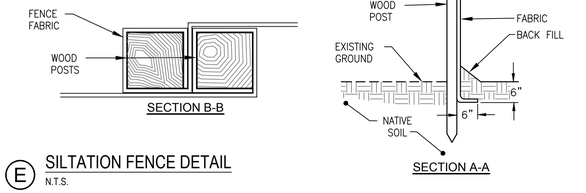


ELEVATION VIEW

NOTE: BOTTOM OF SILT FENCE MUST BE TOED INTO GROUND OR NO PAYMENT SHALL BE MADE. SEE EROSION CONTROL PLAN(S) FOR SILT FENCE LOCATION(S).

*NOTE:

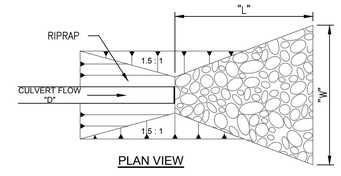
THE SILT FENCE SHOULD HAVE A MAXIMUM STAKING DISTANCE OF 6', UNLESS THE FENCE IS SUPPORTED BY WIRE FENCE REINFORCEMENT, A MAXIMUM 14 GAUGE AND WITH A MINIMUM MESH SPACING OF 6".



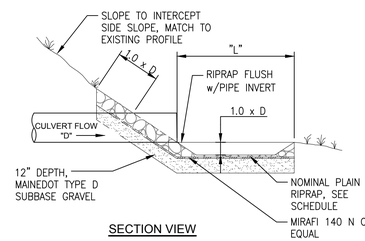
SECTION B-B SECTION A-A

(E) SILTATION FENCE DETAIL

N.T.S.



PLAN VIEW



SECTION VIEW

SCHEDULE				
CULVERT DIAMETER (D)	LENGTH (L)	WIDTH (W)	STONE d_{50}	RIPRAP THICKNESS
12"	8'	12'	6"	14"
15"	8'	12'	6"	14"
18"	10'	12'	6"	14"
24"	12'	14'	6"	14"
30"	20'	23'	12"	2'-"
36"	20'	23'	12"	2'-"
42"	24'	28'	12"	2'-"
48"	28'	32'	12"	2'-"
60"	35'	40'	12"	2'-"

NOTE:

RIPRAP GRADATION AND PLACEMENT – THE RIPRAP GRADATION IS TO BE A WELL-GRADED MIX FROM ABOUT 1.5 TIMES THE D SIZE TO ABOUT 25 PERCENT OF THE D SIZE. THE RIPRAP STONES SHALL BE CAREFULLY PLACED WORKING FROM THE TOE OF THE SLOPE UPWARD. THE STONES SHOULD BE LOWERED TO THE SLOPE AND NOT BE ALLOWED TO DROP MORE THAN 12 INCHES ONTO THE GEOTEXTILE. THE FINISHED SURFACE SHALL BE A RELATIVELY SMOOTH UNIFORMLY SLOPED SURFACE.

(H) RIPRAP OUTLET APRON DETAIL

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www.stantec.com

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Notes

By	Appd.	YY.MM.DD	Revision
DDA	DDA	19.04.08	3 ISSUED TO CITY OF PORTLAND FOR APPROVAL
DDA	DDA	19.03.08	2 RELEASED FOR BID
DDA	DDA	19.02.28	1 ISSUED FOR CITY, MaDOT AND FAA REVIEW

File Name: 195211590_details	-	DDA	AMC	JAN 2018
	DWN.	CHKD.	DSGN.	DATE

Permit-Seal



Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

Title

EROSION AND SEDIMENT CONTROL DETAILS

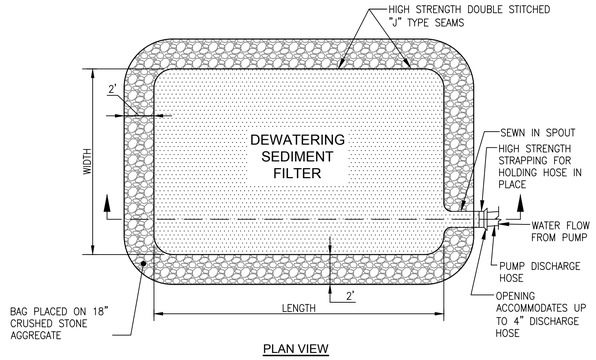
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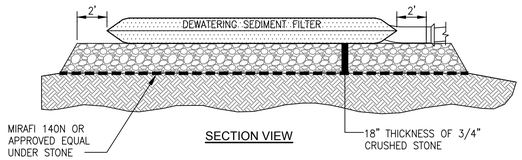
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PERMITTING DRAWINGS



PLAN VIEW



SECTION VIEW

NOTES:
LOCATION OF DEWATERING SEDIMENT FILTERS TO BE SELECTED BY THE CONTRACTOR AND APPROVED BY ENGINEER BUT SHALL NOT BE SITED IN THE CRITICAL AREAS.

SPECIFICATIONS AND REQUIREMENTS FOR DEWATERING

THIS PROJECT WILL RE□UIRE THE DISCHARGE OF CONSTRUCTION DEWATERING AND TURBID LADEN RUNOFF FROM THE SITE TO BE DIRECTED AND DISCHARGED THROUGH A DEWATERING SEDIMENT FILTER. THIS DESCRIPTION ALSO CONTAINS APPENDED MATERIALS DESCRIBING THE DEWATERING SEDIMENT FILTERS REFERRED TO IN THIS NARRATIVE.

OVERVIEW:

THE PROJECT WILL BENEFIT FROM THE EXISTING WATER□UALITY FILTER DESIGNED NOT ONLY FOR DETENTION BUT ALSO FOR USE AS SEDIMENTATION BASINS DURING CONSTRUCTION. HOWEVER,IT IS RECOGNI□ED THAT WEATHER CONDITIONS ARE NOT ALWAYS PREDICTABLE□THERE MAY BE EXCEPTIONAL PERIODS WHEN CONSTRUCTION ACTIVITY RESULTS IN HIGHLY TURBID WATER WHICH IS NOT CONSIDERED DESIRABLE TO DISCHARGE TO THE WATER □UALITY FILTER□OR LIMITED ACTIVITY,IS RE□UIRED THAT MAY NOT BE EASILY ACCOMMODATED BY THE FILTER. TRADITIONALLY□MEDEP PERMITS HAVE HAD A STANDARD CONDITION WHICH STATES:

"THE APPLICANT SHALL TAKE ALL NECESSARY ACTIONS TO ENSURE THAT ITS ACTIVITIES OR THOSE OF ITS AGENTS DO NOT RESULT IN NOTICEABLE EROSION OF SOILS OR FUGITIVE DUST EMISSIONS ON THE SITE DURING THE CONSTRUCTION AND OPERATION OF THE PROJECT COVERED BY THIS APPROVAL."

THESE SPECIFICATIONS HAVE BEEN DEVELOPED FOR THE PURPOSE OF ADDRESSING CONSTRUCTION-DEWATERING ACTIVITIES WITH THE CONTINGENCY THAT UNPREDICTABLE WEATHER CAN CREATE. THE SPECIFICATION IS INTENDED TO "SHARE THE RISK" BETWEEN THE CONTRACTOR AND OWNER. IT IS ANTICIPATED THAT THIS METHOD WILL ALLOW THE BASE BID FOR THE PROJECT TO HAVE A REDUCED BUILT-IN CONTINGENCY COST FOR CERTAIN WEATHER-RELATED FACTORS.

THIS SPECIFICATION IS NOT INTENDED TO DIMINISH THE RECOGNI□ED AND POTENTIAL AID OF THE PROPOSED FILTERS TO ACT AS DEVICES TO CAPTURE AND RETAIN SUSPENDED SEDIMENT.

ACCEPTABLE METHODS OF DISCHARGING CONSTRUCTION SITE RUNOFF:

DEWATERING OF THE CONSTRUCTION SITE SHALL BE ACCOMPLISHED USING ONE OF THE FOLLOWING MEASURES:

□ THE DIRECTION OF THE RUNOFF TO THE SEDIMENTATION FILTERS BY GRAVITY FLOW.

□ THE PUMPING OF DEWATERING SEDIMENT FILTERS WITH A DISCHARGE TO THE FILTERS.

□ THE PUMPING OF CONSTRUCTION SITE WATER AND COLLECTED RUNOFF TO A DEWATERING SEDIMENT FILTER WITH RELEASE THROUGH A VEGETATED BUFFER AT LEAST 100 FEET UPGRADIENT OF ANY WETLAND OR OTHER RESOURCE.

REQUIREMENTS FOR DEWATERING SEDIMENT FILTERS:

THE SITE CONTRACTOR SHALL INCLUDE THE PRICE OF INSTALLING□OPERATING□AND REMOVAL AND DISPOSAL OF THE SPECIFIED NUMBER OF DEWATERING SEDIMENT FILTERS AS PART OF THE PROJECT.

AT ALL TIMES THERE MUST BE AN UNUSED DEWATERING SEDIMENT FILTER AVAILABLE FOR EMERGENCY USE.

AT ALL TIMES (AFTER INITIAL SITE PREPARATION)□THE CONTRACTOR SHALL HAVE ONE DEWATERING SEDIMENT FILTERS ACTIVE OR READY FOR USE. THE DEWATERING SEDIMENT FILTERS SHALL BE FIELD LOCATED BY THE CONTRACTOR BUT ARE NOT TO BE INSTALLED IN ANY **"CRITICAL"** AREA. (THE SITE CRITICAL AREAS ARE SHOWN ON THE EROSION-SEDIMENT CONTROL PLANS.) THE DEWATERING SEDIMENT FILTERS SHALL BE INSTALLED ON A PREPARED SUBGRADE. THIS SUBGRADE SHALL CONSIST OF THE INSTALLATION OF A LAYER OF MIRAFI 140N OR APPROVED E□UAL AND 18 INCHES OF ¾ INCH CRUSHED STONE. THE PLAN DIMENSION OF THE CRUSHED STONE PAD SHALL EXCEED THE PLAN AREA OF THE DEWATERING SEDIMENT FILTERS BY AT LEAST TWO FEET IN ALL DIRECTIONS. THE DEWATERING SEDIMENT FILTERS SHALL NOT BE INSTALLED ON AN UNDERLYING SLOPE OF GREATER THAN 15 PERCENT.

CONSTRUCTION DEWATERING OPERATIONS:

ALL CONSTRUCTION-DEWATERING OPERATIONS ARE THE RESPONSIBILITY OF THE SITE CONTRACTOR. IT SHALL BE THE SITE CONTRACTOR WHO IS RESPONSIBLE FOR SELECTING THE SITE FOR THE DEWATERING SEDIMENT FILTERS□ THE SELECTION OF THE USE OF THE DEWATERING SEDIMENT FILTERS OR THE SEDIMENTATION BASIN FOR DIRECTING DEWATERING□EXCEPT THAT THE OWNER OR ENGINEER MAY DIRECT THE SITE CONTRACTOR TO ALTER THE SELECTED OPERATION IF TURBID DISCHARGE IS OBSERVED.

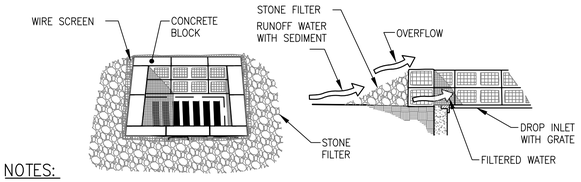
WINTER OPERATIONS:

IN THE EVENT THAT WINTER OPERATIONS ARE RE□UIRED□THE CONTRACTOR SHALL "POLY" ENCLOSE□AND PROVIDE TEMPORARY HEAT TO PREVENT THE DEWATERING SEDIMENT FILTERS FROM SUBSTANTIAL FREE□ING.

RECORD KEEPING

THE WEEKLY EROSION-SEDIMENT CONTROL REPORTS PREPARED IN ACCORDANCE WITH THE NPDES PERMIT SHALL MAINTAIN A LOG OF THE LOCATION□USE□AND REMOVAL OF DEWATERING SEDIMENT FILTERS. IN THE EVENT THAT THE STONE UNDER THE DEWATERING SEDIMENT FILTER BECOMES HIGHLY CONTAMINATED WITH FINES□THE NEXT DEWATERING SEDIMENT FILTER SHALL BE INSTALLED IN A DIFFERENT LOCATION.

Ⓐ DEWATERING SEDIMENT FILTER DETAILS AND SPECIFICATIONS
N.T.S.



NOTES:

1. THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE HEAVY FLOWS ARE EXPECTED AND WHERE AN OVERFLOW CAPACITY IS NECESSARY TO PREVENT EXCESSIVE PONDING AROUND THE STRUCTURE.
2. PLACE CONCRETE BLOCKS LENGTHWISE ON THEIR SIDES IN A SINGLE ROW AROUND THE PERIMETER OF THE INLET, WITH THE ENDS OF ADJACENT BLOCKS ABUTTING. THE HEIGHT OF THE BARRIER CAN BE VARIED, DEPENDING ON DESIGN NEEDS, BY STACKING COMBINATIONS OF 4", 8" AND 12" WIDE BLOCKS. THE BARRIER OF BLOCKS SHALL BE AT LEAST 12 INCHES HIGH, AND NO GREATER THAN 24" HIGH.
3. WIRE MESH SHALL BE PLACED OVER THE OUTSIDE VERTICAL FACE (WEBBING) OF THE CONCRETE BLOCKS TO PREVENT STONE FROM BEING WASHED THROUGH THE HOLES IN THE BLOCKS. HARDWARE CLOTH OR COMPARABLE WIRE MESH WITH ½" OPENINGS SHALL BE USED.
4. STONE SHALL BE PILED AGAINST THE WIRE TO THE TOP OF THE BLOCK BARRIER, AS SHOWN IN DETAIL. THE STONE FILTER SHALL BE 3/4" CRUSHED STONE.
5. IF THE STONE FILTER BECOMES CLOGGED WITH SEDIMENT SO THAT IT NO LONGER ADEQUATELY PERFORMS ITS FUNCTION, THE STONE MUST BE PULLED AWAY FROM THE BLOCKS, CLEANED AND REPLACED.
6. ALL INLETS ALSO REQUIRE SEDIMENT BAG INSERTS AS SHOWN ON DETAIL C.

Ⓑ CATCH BASIN STONE SEDIMENT BARRIER DETAIL
N.T.S.

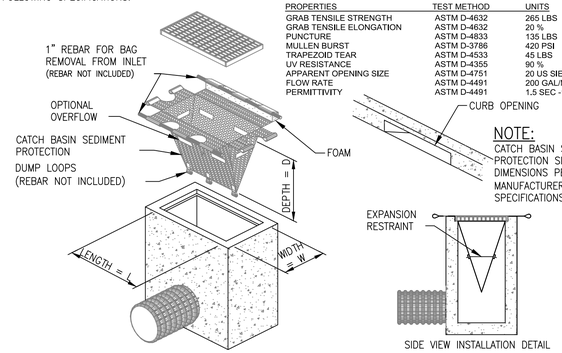
NOTE: THE CATCH BASIN SEDIMENT PROTECTION WILL BE MANUFACTURED FROM A WOVEN POLYPROPYLENE FABRIC THAT MEETS OR EXCEEDS THE FOLLOWING SPECIFICATIONS:

HIGH–FLOW CATCH BASIN SEDIMENT PROTECTION

(FOR USE IN LOW POINTS/SAGS)

(FOR AREAS OF MODERATE TO HEAVY PRECIPITATION AND RUN-OFF)

PROPERTIES	TEST METHOD	UNITS
GRAB TENSILE STRENGTH	ASTM D-4632	265 LBS
GRAB TENSILE ELONGATION	ASTM D-4632	20 %
PUNCTURE	ASTM D-4833	135 LBS
MULLEN BURST	ASTM D-3786	420 PSI
TRAPEZOID TEAR	ASTM D-4533	45 LBS
UV RESISTANCE	ASTM D-4355	90 %
APPARENT OPENING SIZE	ASTM D-4751	20 US SIEVE
FLOW RATE	ASTM D-4491	200 GAL/MIN/SQ.FT
PERMITTIVITY	ASTM D-4491	1.5 SEC -1



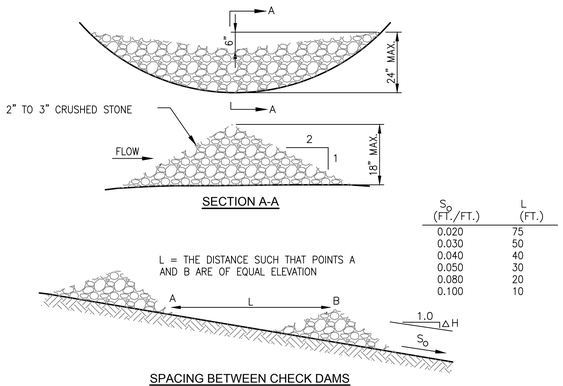
NOTE:
CATCH BASIN SEDIMENT PROTECTION SIZE & DIMENSIONS PER MANUFACTURER'S SPECIFICATIONS.

SIDE VIEW INSTALLATION DETAIL

Ⓒ CATCH BASIN SEDIMENT BAG
N.T.S.

MAINE DEP CHAPTER 500 APPENDIX C. HOUSEKEEPING NOTES

1. **SPILL PREVENTION.** CONTROLS MUST BE USED TO PREVENT POLLUTANTS FROM CONSTRUCTION AND WASTE MATERIALS STORED ON SITE TO ENTER STORMWATER□WHICH INCLUDES STORAGE PRACTICES TO MINIMI□E EXPOSURE OF THE MATERIALS TO STORMWATER, THE SITE CONTRACTOR OR OPERATOR MUST DEVELOP□AND IMPLEMENT AS NECESSARY□APPROPRIATE SPILL PREVENTION□CONTAINMENT□AND RESPONSE PLANNING MEASURES.
   NOTE: ANY SPILL OR RELEASE OF TOXIC OR HA□ARDOUS SUBSTANCES MUST BE REPORTED TO THE DEPARTMENT, FOR OIL SPILLS□CALL 1-800-482-0□□□WHICH IS AVAILABLE 24 HOURS A DAY. FOR SPILLS OF TOXIC OR HA□ARDOUS MATERIAL□CALL 1-800-452-4664 WHICH IS AVAILABLE 24 HOURS A DAY.
2. **GROUNDWATER PROTECTION.** DURING CONSTRUCTION□LI□UID PETROLEUM PRODUCTS AND OTHER HA□ARDOUS MATERIALS WITH THE POTENTIAL TO CONTAMINATE GROUNDWATER MAY NOT BE STORED OR HANDLED IN AREAS OF THE SITE DRAINING TO AN INFILTRATION AREA. AN "INFILTRATION AREA" IS ANY AREA OF THE SITE THAT BY DESIGN OR AS A RESULT OF SOILS□ TOPOGRAPHY AND OTHER RELEVANT FACTORS ACCUMULATES RUNOFF THAT INFILTRATES INTO THE SOIL. DIKES□BERMS□SUMPS□ AND OTHER FORMS OF SECONDARY CONTAINMENT THAT PREVENT DISCHARGE TO GROUNDWATER MAY BE USED TO ISOLATE PORTIONS OF THE SITE FOR THE PURPOSES OF STORAGE AND HANDLING OF THESE MATERIALS. ANY PROJECT PROPOSING INFILTRATION OF STORMWATER MUST PROVIDE ADE□UATE PRE-TREATMENT OF STORMWATER PRIOR TO DISCHARGE OF STORMWATER TO THE INFILTRATION AREA□OR PROVIDE FOR TREATMENT WITHIN THE INFILTRATION AREA□IN ORDER TO PREVENT THE ACCUMULATION OF FINES□REDUCTION IN INFILTRATION RATE□AND CONSE□UENT FLOODING AND DESTABILI□ATION.
   NOTE: LACK OF APPROPRIATE POLLUTANT REMOVAL BEST MANAGEMENT PRACTICES (BMPS) MAY RESULT IN VIOLATIONS OF THE GROUNDWATER QUALITY STANDARD ESTABLISHED BY 38 M.R.S.A. §465-C(1).
3. **FUGITIVE SEDIMENT AND DUST.** ACTIONS MUST BE TAKEN TO ENSURE THAT ACTIVITIES DO NOT RESULT IN NOTICEABLE EROSION OF SOILS OR FUGITIVE DUST EMISSIONS DURING OR AFTER CONSTRUCTION□OIL MAY NOT BE USED FOR DUST CONTROL□BUT OTHER WATER ADDITIVES MAY BE CONSIDERED AS NEEDED. A STABILI□ED CONSTRUCTION ENTRANCE (SCE) SHOULD BE INCLUDED TO MINIMI□E TRACKING OF MUD AND SEDIMENT. IF OFF-SITE TRACKING OCCURS□PUBLIC ROADS SHOULD BE SWEPT IMMEDIATELY AND NO LESS THAN ONCE A WEEK AND PRIOR TO SIGNIFICANT STORM EVENTS. OPERATIONS DURING DRY MONTHS□ THAT EXPERIENCE FUGITIVE DUST PROBLEMS□SHOULD WET DOWN UNPAVED ACCESS ROADS ONCE A WEEK OR MORE FRE□UENTLY AS NEEDED WITH A WATER ADDITIVE TO SUPPRESS FUGITIVE SEDIMENT AND DUST.
   NOTE: DEWATERING A STREAM WITHOUT A PERMIT FROM THE DEPARTMENT MAY VIOLATE STATE WATER □UALITY STANDARDS AND THE *NATURAL RESOURCES PROTECTION ACT*.
4. **DEBRIS AND OTHER MATERIALS.** MINIMI□E THE EXPOSURE OF CONSTRUCTION DEBRIS□BUILDING AND LANDSCAPING MATERIALS□ TRASH□FERTILI□ERS□PESTICIDES□HERBICIDES□DETERGENTS□SANITARY WASTE AND OTHER MATERIALS TO PRECIPITATION AND STORMWATER RUNOFF. THESE MATERIALS MUST BE PREVENTED FROM BECOMING A POLLUTANT SOURCE.
   NOTE: TO PREVENT THESE MATERIALS FROM BECOMING A SOURCE OF POLLUTANTS□CONSTRUCTION AND POST-CONSTRUCTION ACTIVITIES RELATED TO A PROJECT MAY BE RE□UIRED TO COMPLY WITH APPLICABLE PROVISION OF RULES RELATED TO SOLID□UNIVERSAL□AND HA□ARDOUS WASTE□INCLUDING□BUT NOT LIMITED TO□THE MAINE SOLID WASTE AND HA□ARDOUS WASTE MANAGEMENT RULES□MAINE HA□ARDOUS WASTE MANAGEMENT RULES□MAINE OIL CONVEYANCE AND STORAGE RULES□AND MAINE PESTICIDE RE□UIREMENTS.
5. **EXCAVATION DE-WATERING.** EXCAVATION DE-WATERING IS THE REMOVAL OF WATER FROM TRENCHES□FOUNDATIONS□COFFER DAMS□PONDS□AND OTHER AREAS WITHIN THE CONSTRUCTION AREA THAT RETAIN WATER AFTER EXCAVATION. IN MOST CASES THE COLLECTED WATER IS HEAVILY SILTED AND HINDERS CORRECT AND SAFE CONSTRUCTION PRACTICES. THE COLLECTED WATER REMOVED FROM THE PONDED AREA□EITHER THROUGH GRAVITY OR PUMPING□MUST BE SPREAD THROUGH NATURAL WOODED BUFFERS OR REMOVED TO AREAS THAT ARE SPECIFICALLY DESIGNED TO COLLECT THE MAXIMUM AMOUNT OF SEDIMENT POSSIBLE□LIKE A COFFERDAM SEDIMENTATION BASIN. AVOID ALLOWING THE WATER TO FLOW OVER DISTURBED AREAS OF THE SITE. E□UIVALENT MEASURES MAY BE TAKEN IF APPROVED BY THE DEPARTMENT.
6. **AUTHORIZED NON-STORMWATER DISCHARGES.** IDENTIFY AND PREVENT CONTAMINATION BY NON-STORMWATER DISCHARGES. WHERE ALLOWED NON-STORMWATER DISCHARGES EXIST□THEY MUST BE IDENTIFIED AND STEPS SHOULD BE TAKEN TO ENSURE THE IMPLEMENTATION OF APPROPRIATE POLLUTION PREVENTION MEASURES FOR THE NON-STORMWATER COMPONENT(S) OF THE DISCHARGE. AUTHORI□ED NON-STORMWATER DISCHARGES ARE:
   (a) DISCHARGES FROM FIREFIGHTING ACTIVITY□
   (□) FIRE HYDRANT FLUSHINGS□
   (c) VEHICLE WASHWATER IF DETERGENTS ARE NOT USED AND WASHING IS LIMITED TO THE EXTERIOR OF VEHICLES (ENGINE□ UNDERCARRIAGE AND TRANSMISSION WASHING IS PROHIBITED)□
   (d) DUST CONTROL RUNOFF IN ACCORDANCE WITH PERMIT CONDITIONS AND APPENDIX (C)(3)□
   (e) ROUTINE EXTERNAL BUILDING WASHDOWN□NOT INCLUDING SURFACE PAINT REMOVAL□ THAT DOES NOT INVOLVE DETERGENTS□
   (f) PAVEMENT WASHWATER (WHERE SPILLS□LEAKS OF TOXIC OR HA□ARDOUS MATERIALS HAVE NOT OCCURRED□UNLESS ALL SPILLED MATERIAL HAD BEEN REMOVED)□IF DETERGENTS ARE NOT USED□
   (g) UNCONTAMINATED AIR CONDITIONING OR COMPRESSOR CONDENSATE□
   (h) UNCONTAMINATED GROUNDWATER OR SPRING WATER□
   (i) FOUNDATION OR FOOTER DRAIN-WATER WHERE FLOWS ARE NOT CONTAMINATED□
   (□) UNCONTAMINATED EXCAVATION DEWATERING (SEE RE□UIREMENTS IN APPENDIX C(5))□
   (□) POTABLE WATER SOURCES INCLUDING WATERLINE FLUSHINGS□AND
   (l) LANDSCAPE IRRIGATION.
7. **UNAUTHORIZED NON-STORMWATER DISCHARGES.** THE DEPARTMENT'S APPROVAL UNDER THIS CHAPTER DOES NOT AUTHORI□E A DISCHARGE THAT IS MIXED WITH A SOURCE OF NON□STORMWATER□OTHER THAN THOSE DISCHARGES IN COMPLIANCE WITH APPENDIX C (6). SPECIFICALLY□THE DEPARTMENT'S APPROVAL DOES NOT AUTHORI□E DISCHARGES OF THE FOLLOWING:
   (a) WASTEWATER FROM THE WASHOUT OR CLEANOUT OF CONCRETE□ STUCCO□ PAINT□ FORM RELEASE OILS□ CURING COMPOUNDS OR OTHER CONSTRUCTION MATERIALS□
   (□) FUELS□OILS OR OTHER POLLUTANTS USED IN VEHICLE AND E□UIPMENT OPERATION AND MAINTENANCE□
   (c) SOAPS□SOLVENTS□OR DETERGENTS USED IN VEHICLE AND E□UIPMENT WASHING□AND
   (d) TOXIC OR HA□ARDOUS SUBSTANCES FROM A SPILL OR OTHER RELEASE.



SECTION A-A

S_o (FT./FT.)	L (FT.)
0.020	75
0.030	50
0.040	40
0.050	30
0.080	20
0.100	10

SPACING BETWEEN CHECK DAMS

Ⓓ STONE CHECK DAM DETAIL
N.T.S.

PERMITTING DRAWINGS

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Notes

Revision	By	Appd.	YY.MM.DD
3 ISSUED TO CITY OF PORTLAND FOR APPROVAL	DDA	DDA	19.04.08
2 RELEASED FOR BID	DDA	DDA	19.03.08
1 ISSUED FOR CITY□MaDOT AND FAA REVIEW	DDA	DDA	19.02.28

File Name: 195211590_details	-	DDA	AMG	JAN 2018
	DWN.	CHKD.	DSGN.	DATE

Permit-Seal



Client/Project
PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

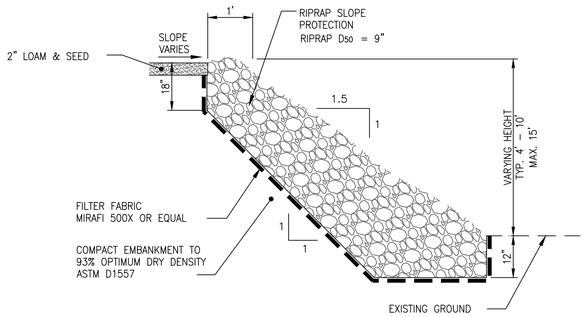
PORTLAND AND SOUTH PORTLAND, MAINE

Title
EROSION AND SEDIMENT CONTROL DETAILS

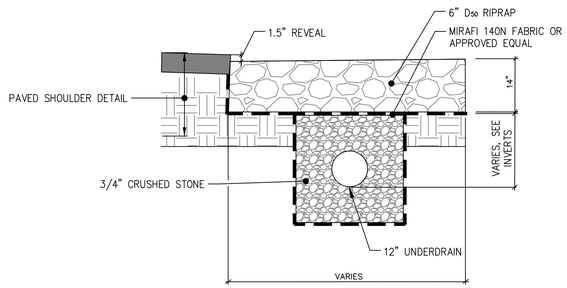
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A 1.5H:1V RIPRAP SLOPE DETAIL
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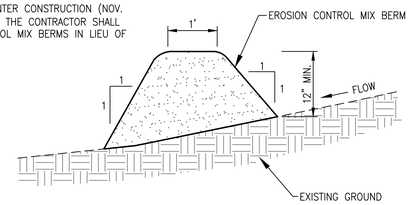
NOTES:

1. FILTER FABRIC AROUND 3/4" UNDERDRAIN STONE SHALL BE INCIDENTAL TO UNDERDRAIN PIPE.
2. FILTER FABRIC UNDER RIPRAP SHALL BE PAID FOR UNDER ITEM 400-5.2

D RIPRAP AT TERMINAL APRON SHOULDER
N.T.S.

NOTE:

DURING PERIODS OF WINTER CONSTRUCTION (NOV. 15 THROUGH APRIL 15), THE CONTRACTOR SHALL INSTALL EROSION CONTROL MIX BERMS IN LIEU OF SILT FENCE.



EROSION CONTROL MIX:

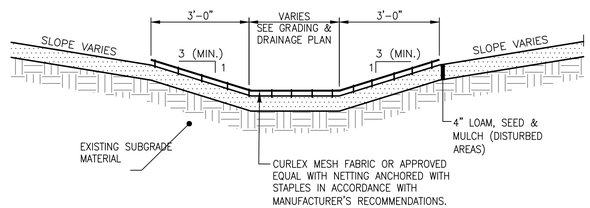
EROSION CONTROL MIX SHALL CONTAIN A WELL-GRADED MIXTURE OF PARTICLE SIZES & MAY CONTAIN ROCKS LESS THAN 4" IN DIAMETER. EROSION CONTROL MIX MUST BE FREE OF REFUSE, PHYSICAL CONTAMINANTS, AND MATERIAL TOXIC TO PLANT GROWTH. THE MIX COMPOSITION SHALL MEET THE FOLLOWING STANDARDS:

- THE ORGANIC MATTER CONTENT SHALL BE BETWEEN 80 AND 100%, DRY WEIGHT BASIS.
- PARTICLE SIZE BY WEIGHT SHALL BE 100% PASSING A 6" SCREEN AND A MINIMUM OF 70%, MAXIMUM OF 85%, PASSING A 0.75" SCREEN.
- THE ORGANIC PORTION NEEDS TO BE FIBROUS AND ELONGATED.
- LARGE PORTIONS OF SILTS, CLAYS OR FINE SANDS ARE NOT ACCEPTABLE IN THE MIX.
- SOLUBLE SALTS CONTENT SHALL BE < 4.0 mmhos/cm.
- PH SHALL FALL BETWEEN 5.0 AND 8.0.
- THE USE OF SOLELY AN EROSION CONTROL MIX BERM AT THE BASE OF A SLOPE STEEPER THAN 8% OR WHERE THERE IS FLOWING WATER IS PROHIBITED.

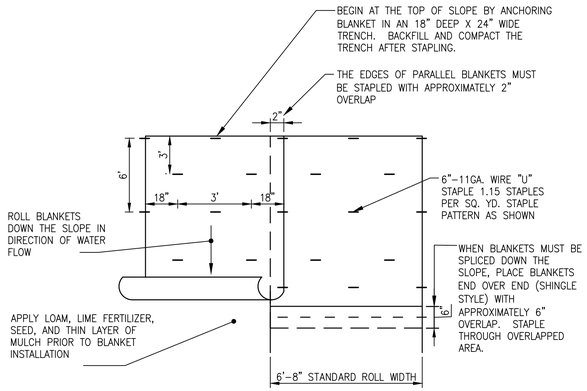
G EROSION CONTROL MIX BERM DETAIL
N.T.S.

NOTES:

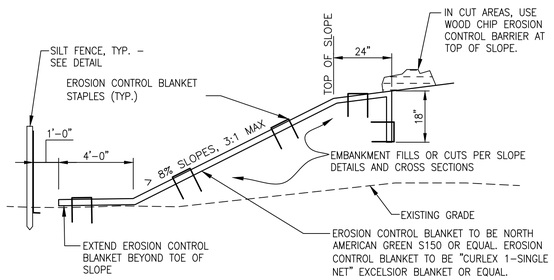
1. ALL MATERIALS SHALL CONFORM TO THE CURRENT EDITION OF THE MAINEDOT STANDARD SPECIFICATIONS.
2. SEE PLANS FOR LOCATION(S).



E VEGETATED DRAINAGE SWALE DETAIL
N.T.S.



PLAN VIEW



SECTION VIEW

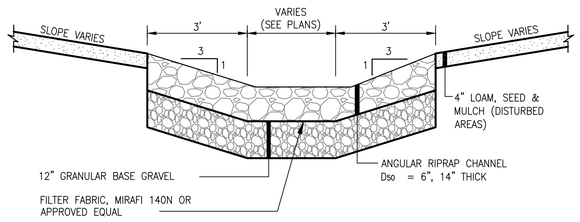
NOTE:

EROSION CONTROL BLANKET STAPLE SIZE AND DISTRIBUTION PER MANUFACTURER'S SPECIFICATIONS.

NOTES:

1. IF GRASS CATCH IS NOT 90% BY SEPTEMBER 1, ADD #4 REBARS AT 3'-0" ROWS AT 3' CENTERS. REMOVE OR DRIVE REBARS 3" BELOW GRADE IN SPRING FOLLOWING TURF ESTABLISHMENT.
2. MULCH RATE TO BE 1/2 THE RATE OTHERWISE SPECIFIED.

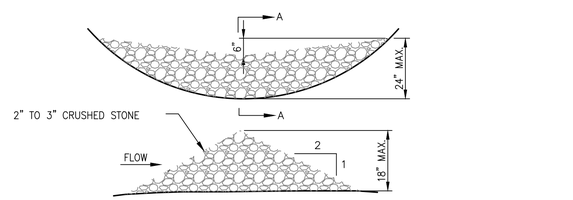
H EROSION CONTROL BLANKET SLOPE STABILIZATION DETAIL
N.T.S.



NOTES:

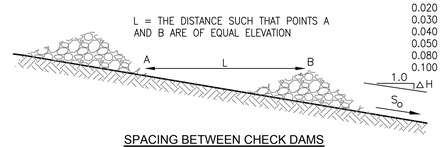
1. ALL MATERIALS SHALL CONFORM TO THE CURRENT EDITION OF THE MeDOT STANDARD SPECIFICATIONS.
2. SEE PLAN(S) FOR LOCATION(S).

C RIPRAP CHANNEL DETAIL
N.T.S.



SECTION A-A

So (FT./FT.)	L (FT.)
0.010	150
0.020	75
0.030	50
0.040	40
0.050	30
0.080	20
0.100	10



SPACING BETWEEN CHECK DAMS

F STONE CHECK DAM DETAIL
N.T.S.

PERMITTING DRAWINGS

V:\195Zactive\195211590\aviation\0_drawingsheet_files-portland\195211590_details.dwg agray 4/10/2019 2:19 PM

Stantec
482 Payne Road Scarborough Court
Scarborough, Maine 04074-8929
Tel. 207.883.3355
www.stantec.com

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Consultants

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75 Washington Avenue, Suite 1A
Portland, Maine 04101

Pliska & Day Land Surveyors (Surveyor)
72 Main Street
Bangor, Maine 04401

Independent Archaeological Consulting, LLC (Archaeologist)
801 Islington Street, Suite 31
Portsmouth, New Hampshire 03801

Diana's CADD Serivice, LLC (Drafting)
P. O. Box 372
Jackman, Maine 04945

Notes

No.	Revision	By	Appd.	YY.MM.DD
3	ISSUED TO CITY OF PORTLAND FOR APPROVAL	DDA	DDA	19.04.08
2	RELEASED FOR BID	DDA	DDA	19.03.08
1	ISSUED FOR CITY, MeDOT AND FAA REVIEW	DDA	DDA	19.02.28

File Name: 195211590_details	-	DDA	AMG	JAN 2018
	DWN.	CHKD.	DSGN.	DATE

Permit-Seal



Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

Title

EROSION AND SEDIMENT CONTROL DETAILS

Project No. 195211590

Scale AS NOTED

Sheet

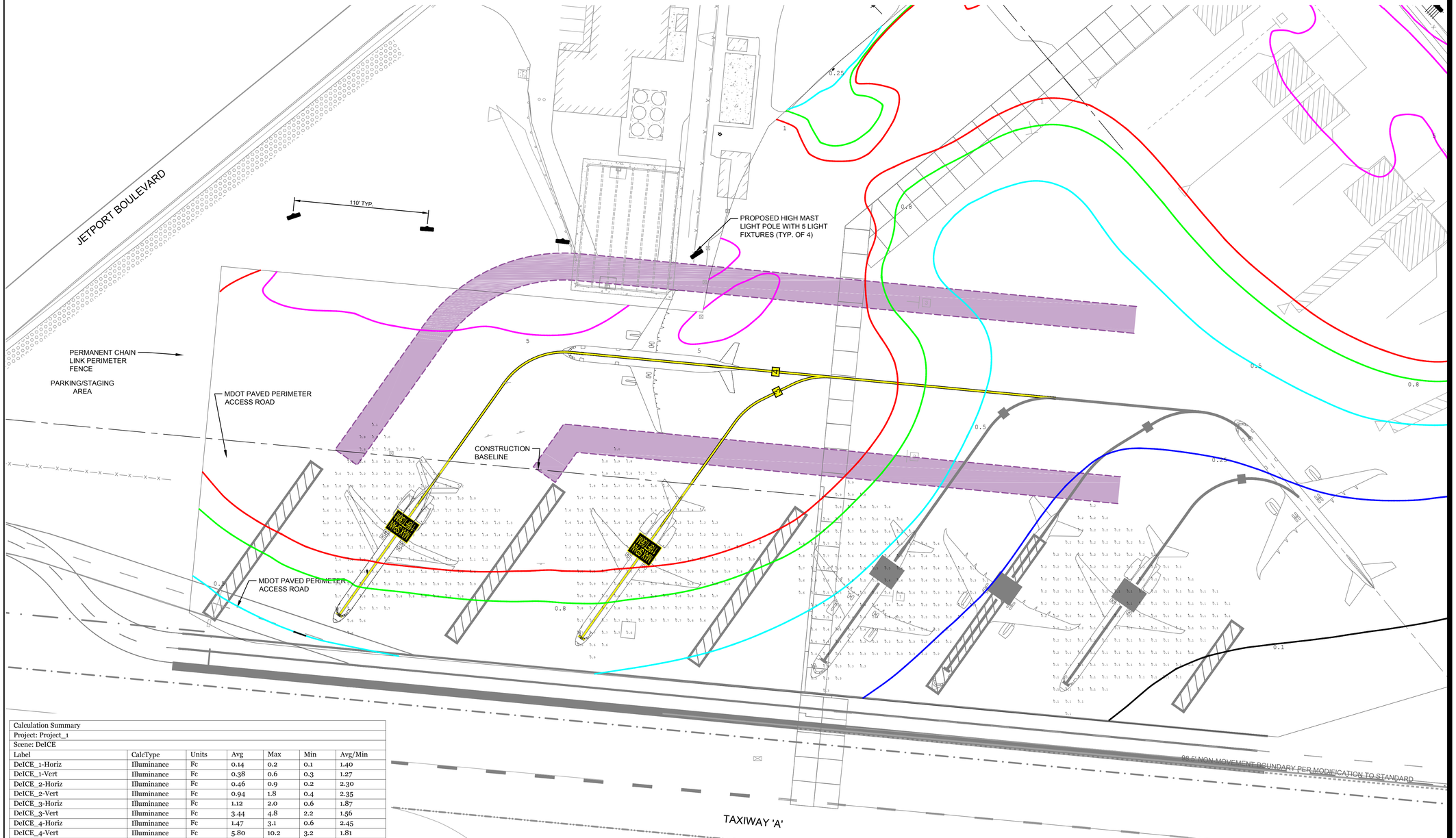
6.3

GENERAL NOTE:
1. DRAWING TO BE PLOTTED IN COLOR.

NORTH

PHOTOMETRIC LEGEND

	5 fc
	1 fc
	.8 fc
	.5 fc
	.25 fc
	.1 fc



Calculation Summary						
Project: Project_1						
Scene: DeICE						
Label	CalcType	Units	Avg	Max	Min	Avg/Min
DeICE_1-Horiz	Illuminance	Fc	0.14	0.2	0.1	1.40
DeICE_1-Vert	Illuminance	Fc	0.38	0.6	0.3	1.27
DeICE_2-Horiz	Illuminance	Fc	0.46	0.9	0.2	2.30
DeICE_2-Vert	Illuminance	Fc	0.94	1.8	0.4	2.35
DeICE_3-Horiz	Illuminance	Fc	1.12	2.0	0.6	1.87
DeICE_3-Vert	Illuminance	Fc	3.44	4.8	2.2	1.56
DeICE_4-Horiz	Illuminance	Fc	1.47	3.1	0.6	2.45
DeICE_4-Vert	Illuminance	Fc	5.80	10.2	3.2	1.81

GRAPHIC SCALE
40 0 20 40 80
(IN FEET)
1 inch = 40 ft.

PERMITTING DRAWINGS

V:\195\active\195211590\aviation\8_drawingsheet_files-portland\195211590_apron_photometrics.dwg agray 4/10/2019 2:16 PM

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1	ISSUED FOR CITY, MaDOT AND FAA REVIEW	DDA	DDA	19.02.28

File Name: 195211590_site_deicing	MC	DDA	MLC	JAN 2018
	DWN.	CHKD.	DSGN.	DATE

Permit-Seal

STATE OF MAINE
MICHAEL L CLAYPOOLE
No. 7824
LICENSED
PROFESSIONAL ENGINEER
04.08.2019

Client/Project

PORTLAND INTERNATIONAL JETPORT

LONG TERM HOLD AREA, DEICING PAD EXPANSION & RON APRON CONSTRUCTION INCLUDING TERMINAL APRON NW END

PORTLAND AND SOUTH PORTLAND, MAINE

Title

HOLD/DEICING/RON APRON PHOTOMETRICS PLAN

Project No.	Scale
195211590	1" = 40'

Sheet

6.16

PLANNING BOARD REPORT
PORTLAND, MAINE

Parris Terraces, 60 Parris Street
Design Amendment to Approved Level III Site Plan
665-2019
Horton LLC

Submitted to: Portland Planning Board Date: May 24, 2019 Public Hearing Date: May 28, 2018	Prepared by: Nell Donaldson, Planner CBL: 33-A-13 Project #: 655-2019

I. INTRODUCTION

Horton LLC appears before the Planning Board for an after-the-fact review of changes in the design of their approved 23-unit condominium building at 60 Parris Street, Parris Terraces. Notice of this hearing appeared in the *Portland Press Herald on* May 17 and 18, 2019. Notices were also sent to 106 property owners within 500 feet and to the interested citizens list.

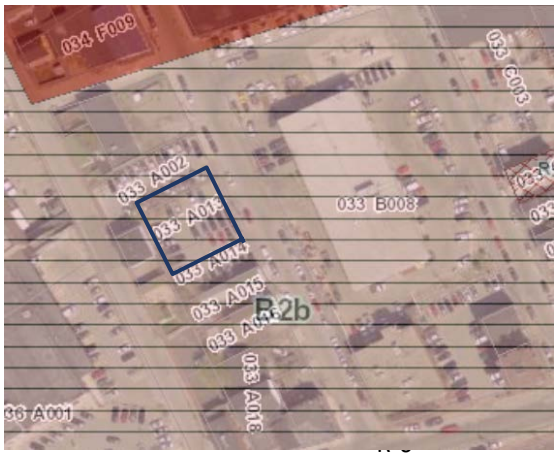
Applicant: Jack Soley, Horton LLC
Consultants: Kaplan Thompson Architects

II. REQUIRED REVIEWS

Review	*Applicable Statute*
Site Plan/B-2b & multi-family design review	*Article V/City of Portland Design Manual*

III. PROJECT DATA

Existing Zoning	B-2b & Bayside Height Overlay
Development Program	23-Unit Condominium
Parcel Size	10,302 SF
Original Date of Approval	3/27/18





Figures 1 and 2: 60 Parris Street context and 60 Parris from above prior to construction.

IV. CONTEXT

60 Parris Street is located on the west side of Parris Street between Portland Street and Kennebec Street in West Bayside. The site is zoned B-2b within the Bayside Height Overlay. The Planning Board approved a 23-unit condominium project, Parris Terraces, for the site on May 27, 2018 *(Attachment A)*. Construction began on the site in June. In the time since, the Department of Planning & Urban Development's Development Review Services Coordinator has made multiple visits to the site to ensure that construction is being completed according to plan as required under the site plan ordinance. On the last visit, in late April, the Development Review Services Coordinator identified several divergences from the approved building elevations. The building as constructed also diverged from the stamped building permit plans. These design changes had been completed in the field without approval by the Planning or Building Authority.

Following discussion with the Planning staff who jointly conducted the design review for the project, it was decided that the changes merited an after-the-fact design review by the Planning Board. The purpose of this hearing is to consider the design changes in the context of the city's site plan ordinance and *Design Manual* and determine what, if any, changes are necessary to bring the design into compliance with the B-2b and multi-family design standards.

V. SUMMARY OF AMENDMENTS & REVIEW COMMENTS

The applicant has submitted an amendment application identifying changes to the building design *(Attachments B and C, with photographs in Attachment D)*. Planning staff met to review the design modifications in the context of the design standards of the site plan ordinance, which in this case reference the B-2b and multi-family design standards of the city's *Design Manual (Attachment 1).* Significant design changes, along with relevant design review comments, are summarized here.

1. ***Modifications to the Parris Street balcony railing design.*** The Planning Board-approved elevations showed a consistent railing treatment for all balconies proposed on the building, including the Juliet balconies on the Parris Street façade *(Attachment A and Figure 3)*. This treatment, a solid railing of horizontal cedar planks, had both practical and aesthetic dimensions; it provided privacy at lower floors, created continuity with the cedar siding on the base of the building, and, when taken in total, added visual interest and a sense of rhythm to the front facade. Following the stamping of elevations by the Planning Division, however, the Juliet balcony railing design was modified such that the four balconies most visible on Parris Street façade would be constructed of aluminum as opposed to cedar. In their narrative, the applicant explains this change as the result of a constructability issue, necessary to "insure structural integrity of all balconies for the long term" *(Attachment B)*. The metal railings have been installed on the upper floor Juliet balconies *(Attachment D and Figure 4)*.

   The design review considered the railing change and finds,

   > *B-2b Design Standards: Standard (1)a Urban Street Wall - Building placement does not change. However, the visual privacy for the ground floor unit is altered by the railing design. Staff discussed with applicant keeping the ground floor balcony as approved with solid cedar in horizontal orientation.*
   >
   > *B-2b Design Standards: Standard (1)g Building Materials - The material palette has been altered to include a second type of balcony railing. Staff find that the new railing has minimal visual impact – however, staff raised concern about consistency of design with the introduction of a second balcony railing. Buildings in this context typically have simple forms and material palettes. The suggested approach is to keep the ground floor balcony as approved with cedar to address the concerns about consistency and visual privacy.*





Figures 3 and 4: Approved east elevation; east façade as constructed.

Two-Family/Multi-Family Design Standards: Standard (2). Relationship to Street – The placement in relationship with the street did not change. The visual privacy of the ground floor tenant must be addressed by the material change.

In the interest of privacy and continuity, a condition of approval is suggested to require the use of horizontal cedar railing, consistent with the original design, on the ground floor balcony at the least.

2. ***Modifications to the roofline and window composition on the Parris Street façade.*** The original elevations showed two "pop-up" elements on the east façade, aligned with columns of mulled windows running vertically from the base to the building top *(Attachment A and Figure 3)*. These two "pop-ups" extended 4 1/2 feet above the roofline and served to break what would otherwise have been a continuous horizontal building element. In the revised design, the northernmost of these pop-ups has been eliminated, and the other has been further "popped-up," raised in height by 5 additional feet. The additional height allows for a 60 SF storage area, accessible by ladder, within the pop-up *(Attachment C)*. Simultaneously, the mulled windows on the fourth floor have been disaggregated, such that what read from the exterior as a composite window on a vaulted fourth floor space now reads as two separate floors. The architect writes that the change in roofline "better balanced the building from all viewing perspective[s] and increased the architectural presence of the building" *(Attachment B)*.

   Regarding this change, the design review finds,

   Two-Family/Multi-Family Design Standards: Standard 1. Exterior Design - Th[e east façade] design was revised by moving some of the roof forms, raising them, and changing the window pattern. Staff finds these changes do not significantly alter the overall form or design concept from the approved version – in other words, in concept and form, the building design is similar to the approved design.

   Staff also considered whether the changes to the roof forms had an impact to the views and integration of rooftop mechanicals. The rooftop systems are not visible from the public right-of-way immediately adjacent to the project. These systems become somewhat visible from longer views uphill – staff discussed whether a screen would better meet the standards around complementary roof forms and building design. Though there might be some benefit to a screen in some directions, the impact would appear to be minimal and staff do not recommend pursuing a screen system.

   Staff suggest no further changes with respect to the roofline or window composition.

3. ***Minor modifications in building material at base.*** Last, the applicant has substituted vertical cedar for painted panel surrounding the front door at the building base on the Parris Street façade. The applicant writes, "[t]he team considered this an upgrade at the front door for both residents and the general public" *(Attachment B)*. Because this change provides continuity of materials around the first floor of the building, staff suggest no further modification to the entryway materials.

It should be noted that the amendment application identifies other minor changes to the site, utility, and landscaping plans *(Attachment B)*. These have been reviewed by staff in the field and are deemed de minimis in nature. No action by the Planning Board is required.





Figures 5 and 6: Rendering as presented to Planning Board in May 2018; constructed building as of May 2019

VI. STAFF RECOMMENDATION

The Planning Division staff recommends that the Planning Board approve the after-the-fact design amendments to Parris Terraces at 60 Parris Street subject to the condition presented below.

VII. PROPOSED MOTION

On the basis of the application, drawings, and other information submitted by the applicant; findings and recommendations contained in the Planning Board Report for the public hearing on May 28, 2019 for application 655-2019 relevant to the site plan regulations; and the testimony presented at the Planning Board hearing, the Planning Board finds that the amended elevations **[are/are not]** in conformance with the site plan standards of the land use code, subject to the following condition of approval that must be met prior to the release of the performance guarantee:

1. The applicant shall install a horizontal cedar railing on the first floor Juliet balcony on the east façade as shown in the approved plans for review and approval by the Planning Authority.

VIII. ATTACHMENTS

PLANNING BOARD REPORT ATTACHMENTS

1. Design review (memo from Caitlin Cameron, 5/19/19)

APPLICANT'S SUBMITTALS

A. Approved Drawing Set
B. Plan Amendments Narrative
C. Amended Drawing Set
D. Photographs

Planning and Urban Development Department
Planning Division

Subject: B-2b Design Review – 56 Parris Street

Written by: Caitlin Cameron, Urban Designer

Date of Review: Monday, May 20 2019

The revisions to the project at 56 Parris Street was reviewed according to the *City of Portland Design Manual* standards by Caitlin Cameron, Urban Designer, and Nell Donaldson, Senior Planner, against *the B2b Commercial Business Zones Standards* (Section (d) of the Design Manual) and *Multiple-Family Standards*.

Design Review Comments*:* (new comments in bold)
Revisions include:

- Front balcony treatment changed from cedar to black metal
- Roofline – height, proportion, and window placement of "popups" revised
- Roofline – placement of "popups" and overall formal composition revised

(d) B-2b Commercial Business Zones

Standard (1) a. Urban Street Wall – **Building placement does not change. However, the visual privacy for the ground floor unit is altered by the railing design. Staff discussed with applicant keeping the ground floor balcony as approved with solid cedar in horizontal orientation.**

Standard (1) b. Mixed Uses – Not applicable

Standard (1) c. Building Entrances – Building entrances not impacted – continues to meet the standard.

Standard (1) d. Windows –Windows not impacted – continues to meet the standard.

Standard (1) e. Façade Character – Not applicable

Standard (1) f. Building Design – See multi-family comments below.

Standard (1) g. Building Materials – **The material palette has been altered to include a second type of balcony railing. Staff find that the new railing has minimal visual impact – however, staff raised concern about consistency of design with the introduction of a second balcony railing. Buildings in this context typically have simple forms and material palettes. The suggested approach is to keep the ground floor balcony as approved with cedar to address the concerns about consistency and visual privacy.**

Standard (1) h. Building Scale – Not applicable

Standard (1) i. Landscaping and Buffers – Not applicable

(i) Two-Family, . . . Multiple-Family . . . :

Standard (1) . Exterior Design – Context currently does not include multi-family buildings of this scale. The project successfully incorporates industrial and residential references. This context is appropriate for more contemporary design and more flexibility of forms, scale, and patterns. The project includes interesting forms and massing as well as articulation elements such as balconies to provide a visually interesting, contemporary design. Staff observe that though building type, scale, and placement vary throughout the neighborhood, there is a consistent use of material, trim, roof overhangs, and other articulation elements to add texture, fine-grain scale, and visual interest to the buildings, even if in a vernacular way. **The new railing does introduce another material.**

This design was revised by moving some of the roof forms, raising them, and changing the window pattern. Staff finds these changes do not significantly alter the overall form or design concept from the approved version – in other words, in concept and form, the building design is similar to the approved design.

Staff also considered whether the changes to the roof forms had an impact to the views and integration of rooftop mechanicals. The rooftop systems are not visible from the public right-of-way immediately adjacent to the project. These systems become somewhat visible from longer views uphill – staff discussed whether a screen would better meet the standards around complementary roof forms and building design. Though there might be some benefit to a screen in some directions, the impact would appear to be minimal and staff do not recommend pursuing a screen system.

Standard (2). Relationship to Street – **The placement in relationship with the street did not change. The visual privacy of the ground floor tenant must be addressed by the material change.**

Standard (3). Open Space – **Balconies were altered in style but not number or size. Standard states, "Such open space . . . shall be designed to complement and enhance the building form and development proposed on the site." Because the placement and form of these balconies were not revised, staff find the standard to be met.**

Standard (4). Light and Air – Window placement altered in top units - continues to meet the standard.

Standard (5). Parking – Parking not altered – continues to meet the standard.

Standard (6). Not applicable

Code Summary	Parris St Lofts
Project address:	56 Parris St, Portland, ME
Project type:	23 Unit Multifamily Building
Square Foot	13,707 SF total, 3,852 SF typical
Building code:	MUBEC 2018
	NFPA 101 2015
	IBC 2015
	Maine Human Rights Commission

NFPA 101 2015	ALLOWED BY CODE	CODE REF.	PAGE	AS DRAWN
Occupancy	Apartment Building (3 or more dwelling units)	3.3.36.3, 6.1.8.1.5 & Ch 30	101-28	
Exit Access Corridor	Area w Occupant load > 30 = 1 Hour exit access corridors	7.1.3.1	101-48	
Exits	1 Hour Fire Resistance for 3 Stories or less	7.1.3.2.1 (1)	101-48	
	2 Hour Fire Resistance for 4 Stories or more	7.1.3.2.1 (3)	101-48	**2 HOUR**
	Structural elements that support exit components & penetrate or are installed within a rated wall assembly protected per 7.1.3.2.1 (1) & (2)	7.1.3.2.1 (5)		
Headroom	Headroom in means of egress = 7'-6" min	7.1.5.1	101-49	**8'-0" min.**
	Headroom in spaces = 7'-6" min (1/3 max may be 6'-8")	7.1.5.2		**8'-0" min.**
	Headroom in stairs = 6'-8" min	7.1.5.3		**6'-8" min.**
Door Openings	Door leaf in means of egress min width = 32" minimum	7.2.1.2.3.2	101-51	**32" min.**
Stairs	Min Width = 36" Clear (<50 occupants per story)	7.2.2.2.1.2 (A)	101-59	**44" provided**
	Min Width = 44" Clear (>50 occupants per story)			
	Max height of risers = 7"			
	Min tread depth = 11"			
	Min headroom = 6'-8"			**6'-8" min.**
	Max Height Between Landings = 12'-0"			
Landings	Landing dimension = not less than width of stair	7.2.2.3.2.3	101-60	**44" provided**
Guards & Handrails	Stairs & ramps handrails both sides	7.2.2.4.1.1	101-61	**Handrails on both sides**
	Handrail within 30" of all portions of egress width	7.2.2.4.1.2 (1)		
	Handrails continue full length of stairs, continuous on inside face	7.2.2.4.2	101-61	**Continuous on both sides**
	Handrail continue 12" horz beyond top riser & slope 1 tread beyond bottom riser	7.2.2.4.5.10	101-61	**Extensions included**
	Guards = 42" min (within dwelling units = 36")	7.2.2.4.6.2	101-62	**42"**
Fire Barriers	FB in horz exit on 1 story only if separated from other stories by equal rating & discharge directly to outside	7.2.4.3.3	101-67	
	Outside walls <180 degrees @ horz exit = 1 HR outside wall FRR & 3/4 HR opening protection for 10'-0" on each side of horz exit.	7.2.4.3.4		
Ramps	Ramps in means of egress = 44" W, 1:12 slope, 30" max rise	Table 7.2.5.3 (a)	101-69	
Occupant Load	Residential Apartment Buildings (200 SF / person)	Table 7.3.1.2	101-76	**3,852 SF / 200 = 20 Occupants/Floor**
				13,707 Total SF = 69 Occupants Total
Egress Capacity	Width of any means of Egress = 36" min.	7.3.4.1 (2)	101-77	**36" Min**
# Means of Egress	2 means of egress from any story except as under Chapter 11 -> 43	7.4.1	101-77	**2 Means of Egress Provided**
	Residential			
	Electrical Room # of means of egress per NFPA 70 (600V +/)	7.4.2.1	101-72	**1 Means of Egress Provided**
Arrangement of Means of Egress	Automatic sprinkler system per Sec 9.7 min separation distance between 2 exits = 1/3 diagonal distance	7.5.1.3.3	101-78	
Opening Protectives	Elevator Hoistways. Walls & Partitions: 2 HR, Fire Door Assemblies: 1 1/2 HR	Table 8.3.4.2	101-92	
	Vertical Shafts. Walls & Partitions: 2 HR, Fire Door Assemblies: 1 1/2 HR			
	Vertical Shafts. Walls & Partitions: 1 HR, Fire Door Assemblies: 1 HR			
	Fire Barriers. Walls & Partitions: 2 HR, Fire Door Assemblies: 1 1/2 HR			
	Fire Barriers. Walls & Partitions: 1 HR, Fire Door Assemblies: 3/4 HR			
	Fire Barriers. Walls & Partitions: 1/2 HR, Fire Door Assemblies: 1/3 HR			
	Horz Exits. Walls & Partitions: 2 HR, Fire Door Assemblies: 1 1/2 HR			
	Exit Access Corridors. Walls & Partitions: 1 HR, Fire Door Assemblies: 1/3 HR			
	Exit Access Corridors. Walls & Partitions: 1/2 HR, Fire Door Assemblies: 1/3 HR			
	Smoke Barriers. Walls & Partitions: 1 HR, Fire Door Assemblies: 1/3 HR			
	Smoke Partitions. Walls & Partitions: 1/2 HR, Fire Door Assemblies: 1/3 HR			
Concealed Spaces & Draftstopping	Concealed combustible spaces w Flame Spread > Class A shall be draftstopped. (2) Unoccipied shall be subdivided into spaces < 3,000 SF	8.6.11.1 (2)	101-99	
	New Apartment Buildings	**CHAPTER 30**		
Number of Exits	Access to 2 Separated Exit per Dwelling Unit	30.2.4.3	101-282	**Access Provided**
Arrangement of Means of Egress	Common path of travel not greater than 50' protected with sprinkler system	30.2.5.3.2	101-283	**None**
	Dead-end corridors not greater than 50' protected with sprinkler system	30.2.5.4.2	101-283	**10'-0" max**
Travel Distance to Exits	Within dwelling unit no greater than 125' with sprinkler system	30.2.6.2	101-283	**40'-0" max**
	Entrance door to unit to nearest exit not greater than 200' with sprinkler	30.2.6.3.2	101-283	**25'-0" max**
Protection of Vertical Openings	Sprinklers per 30.3.5, Vertical openings = 1 HR, Doors = 1 HR	30.3.1.1.4	101-283	
Hazardous Area Protection	Sprinklered: Boiler rooms = 1 HR, Laundry <100 SF = None, Laundry >100 SF = 1 HR, Maint Rm = 1 HR, Storage = None, Trash RM = 1 HR	Table 30.3.2.1.1	101-284	
Detection & Alarm	Four or more stories or > 11 units = Alarm per Section 9.6	30.3.4.1.1	101-284	**Detection, Alarm and Comm System Provided**
Extinguishment Requirements	4 stories or fewer & Single Occupancy = NFPA 13R per Sect 9.7	30.3.5.2	101-285	**NFPA 13 sprinkler system**
Corridors	Sprinklers per 30.3.5.2 = Corridor 1/2 HR FRR	30.3.6.1.2	101-285	
Doors	Doors that open into Exit Access Corridors = 20 minute FRR	30.3.6.2.1	101-285	

Zoning Summary — Kaplan Thompson Architects

Chapter 14

Project address	56 Parris St, Portland, ME, 04101
Tax ID	033 A014
Project type	Multi-family Housing 20 - 23 Units
City Zone	B2b Business Zone
Lot Area	10,213 SF / 0.2345 Acre / 110' x 95'
Permitted Uses	Multifamily Housing
	Site Plan review by Planning Board
Existing Uses	Vacant Land, Car Parking
Proposed Use	Multifamily Housing
Guidelines	

B2b

Dimensional Requirements	Required / Allowed	Provided
Min Lot Size:	None	10,173 SF
Min Land Area per Dwelling Unit:	435 SF per unit w Active Street Frontage	510.65 SF / unit
Min Street Frontage:	20'-0"	75'-0"
Min Front Yard	None, Max 10'-0"	
Min Rear Yard:	10'-0", Above 35' setback 15' from side	
Min Side Yard:	None, Above 35' setback 5' from side	
Max Structure Height:	85'-0" Bayside Height Overlay, 45'-0" B2b	
Max Impervious Area:	Residential, None. 90% other.	

Other Requirements		
Off-street Auto Parking	Per Div 20: 1 space for each dwelling unit	
Front Yard Parking	None allowed except driveway	none
Bicycle Parking Spaces	Per: 14-526.(a).4.b.(i).(a). Two for every 5 units (23 units x 0.4) = 9.2	10

IBC 2015	ALLOWED BY CODE	CODE REF.	PAGE	AS DRAWN
Occupancy Type	Residential R-2 (> 2 Dwelling Units)	Section 310	50	**R-2**
Detailed Requirements	Dwelling Units shall be separated by Fire Partitions per 708	420.2	92	**In Compliance**
	Floor Assemblies separating Dwelling Units shall be constructed as Horizontal Assemblies per Section 711	420.3	92	**In Compliance**
Fire Alarm Systems & Smoke Alarms	Group R-2 per 907.2.9 & 907.2.11	420.6	93	
Allowable Building Height	Type VA or VB: 60-0 max height w Type 13 or 13R sprinkler	Table 504.3	98	**49'-9"**
Allowable Number of Stories	R-2: Type VA Max Stories: 4 w Type 13 or 13R sprinkler	Table 504.4	100	**Type VA: 4 Stories & 3,852 SF / floor**
Allowable Area Factor	R-2: Type VA w Type 13 = 36,000 SF, Type 13R = 12,000	Table 506.2	103	**3,850 SF/Floor**
Incedental Accessory Occupancies	Incidental Accessory Occupancies: 1 Hour OR Automatic SPrinkler System: Furnace Rm over 400Kbtu/hr, **Laundry Rm** >100 SF, Waste Rm >100 SF	Table 509	109	**Type 13 Automatic sprinkler system provided**
Construction Type 601	**Type VA**	Table 601	113	
	Primary Structural Frame: 1 Hour			**1 Hour Fire Resistance Rating (FRR)**
	Bearing Walls, Exterior & Interior: 1 Hour			**1 Hour FRR**
	Non-bearing exterior walls & partitions: per Table 602			
	Non-bearing interior walls & partitions: 0 Hour			**0 Hour FRR**
	Floor Construction & Secondary Members: 1 Hour			**1 Hour FRR**
	Roof Construction & Secondary Members: 1 Hour			**1 Hour FRR**
Fire Separation Distance 602	Occupancy R Type VA:	Table 602	114	
	X < 5 = 1 Hour	Interior Lot Line		**NA**
	5 < X < 10 = 1 Hour	or Centerline of Street		**1 Hour FRR**
	10 < X < 30 = 1 Hour			**1 Hour FRR**
Fire Protection: Exterior Walls 705	Cornices, eave overhangs: FSD > 3' - 30" = 24" + 8" for every foot of FSD beyond 3'	705.2.2	120	**NA**
	Type V: Projections shall be of any Approved material	705.2.2	120	**In Compliance**
	Exterior Walls: Fire separation > 10-0 rated from inside. Fire separation < 10-0 rated from both sides.	705.5	97	**9'-6" segment rated from both sides**
Max Area of Exterior Openings 705	3-0 to <5-0: Unprotected & NFPA 13 = 15%, UP & no NFPA13 = NP	Table 705.8	123	
	5-0 to <10-0: Unprotected & NFPA 13 = 25%, UP & no NFPA13 = 10%			
	10-0 to <15-0: Unprotected & NFPA 13 = 45%, UP & no NFPA13 = 15%			
	15-0 to <20-0: Unprotected & NFPA 13 = 75%, UP & no NFPA13 = 25%			
	20-0 to <25-0: Unprotected & NFPA 13 = No Limit, UP & no NFPA13 = 45%			
Fire Walls 706	R-2 Fire Wall = 3 Hour FRR	Table 706.4	125	**NA**
Fire Barriers 707	R-2 Fire Barrier or Horz Assembly between Fire Areas = 2 Hour FRR	Table 707.3.10	127	
	Exterior Walls as part of rated shaft or exit per 705 only (see Section 1023.7 Exit Enclosures)	707.4	127	
Fire Partitions 708	Separation Walls: Fire Rating not less than 1 Hour (exception Corridor walls 1/2 Hour per 1020.1)	708.1.1	107	**1 HR FRR Unit Demising walls** **1/2 HR FRR Corridor walls**
Horizontal Assemblies 711	Separating Dwelling Units horizontally = 1 Hour	711.2.4.3	131	**1 HR FRR**
Shaft Enclosures (Fire Barriers)	Fire Rating: Connecting 4 stories + = 2 Hours, <4 stories = 1 Hour	713.4	133	**4 Stories = 2 HR Shaft FRR**
	Shaft FR = FR of floor being penetrated minimum, 2 hr max	713.4	133	**Shaft FRR = 1 HR**
	Openings protected per Section 715, doors self-closing.	713.7	133	**No openings**
Penetrations 714	Penetrations through Fire Walls, Fire Barriers, Smoke Barriers & Fire Partitions firestopped ASTM E 814 / UL 1479	714.3	135	
	Membrane penetrations, max 2 HR: max 16 in2 steel elect box	714.3.2 Ex 1	135	
	Horz Assemblies: max 6" diameter metal duct, max 144 in2 / 100 SF	714.4.1 Ex 1	135	
Fire Door Ratings 716	Fire Wall & Fire Barrier: 2 HR wall = 1 1/2 HR door	Table 716.5	140	
	Fire Wall & Fire Barrier: 1 1/2 HR wall = 1 1/2 HR door			
	Shaft enclosures, interior exit stairs: 2 HR wall = 1 1/2 HR door			
	Fire Barrier: 1 HR wall = 1 HR door			
	Other fire partitions: 1 HR wall = 3/4 HR door			
	Other fire partitions: 1/2 HR corridor wall = 1/3 HR door			
	Exterior Walls: 1 HR wall = 3/4 HR door			
Ducts & Air Transfer Openings 717	Fire Partitions may be penetrated by ducted HVAC systems if under 1 HR FRR without Fire Damper	717.5.4 Exception 4	146	**No Fire Dampers @ corridor walls**
	Horizontal Assemblies: protected by shaft enclosure per 708 unless 4" or less, direct to outside, open to only 1 dwelling unit (kitchen exhaust)	717.6 Exception 1-5	147	**Ducts and Openings to comply with 708**
	Membrane penetrations protected w Shaft Enclosure or Ceiling Radiation Damper	717.6.2	147	
Concealed Spaces 718	Groups R-2: Draftstopping req'd above & in line w dwelling & sleeping unit separations	718.3.2	149	**Sprinkler per 903.3.1.1 provided (Type 13)**
	Draftstopping not req'd w NFPA 13 or NFPA 13R if sprinklered in concealed spaces	718.3.2. Exception 1 & 2	149	
	Draftstopping in Attics: openings in partitions protected by self-closing latches	718.4.1.1	150	
	Draftstopping in Attics not req'd in Groups R-2 <4 stories = <3,000 SF	718.4.3	150	
Interior Finishes 803	R-2: Wall, Ceiling, Exit Enclosures/Passageway Finishes: Class C throughout	Table 803.11	205	**Class C Finishes Throughout**
Fire Protection Systems 901	All Group R buildings to be sprinklered	903.2.8	212	**Sprinkler per 903.3.1.x provided**
	Group R - up to & including 4 stories in height = NFPA-13R permitted	903.3.1.2	215	
	Balconies & Decks: sprinkler provided Type V if roof or deck above.	903.3.1.2.1	215	
	Quick-response & residential sprinklers: Dwelling & sleeping Units Group R	903.3.2	215	**Sprinklered Dwelling Units**
Standpipes 905	Height: Class 3 required for Group R if highest story > 30' above lowest level of fire dept vehicle access	905.3.1	190	**Class 1 Standpipe, See exception**
	Class 1 allowed if Sprinklered per NFPA 13 or 13R	905.3.1.1	190	**Class 1 Standpipe**
Fire Alarms & Detection Systems	Manual fire alarm box not required for R-2 unless required by fire code official	907.2 (Ex 2)	195	**None**
	Group R-2: Manual fire alarm req'd if any dwelling unit 3+ stories above level of	907.2.9.1	197	**NA, 2 Stories only**
	Manual fire alarm not req'd with automatic sprinklers & occupant notification upon a sprinkler waterflow	907.2.9.1 (Ex 2)	198	
	Group R-2: Smoke alarms outside of sleeping area, in bedrooms.	907.2.11.2	199	
	Interconnection required for Group R	907.2.11.3	199	
	Visible Alarm in all Group R-2 req'd to have a fire alarm system	907.5.2.3.4	203	
Occupant Load				
Group R-2	Floor 1: 200 SF / Occupant @ 2,150 SF	Table 1004.1.1		**11 Occupants**
	Floor 2: 200 SF / Occupant @ 3,852 SF			**20 Occupants Each**
	Floor 3: 200 SF / Occupant @ 3,852 SF			
	Floor 4: 200 SF / Occupant @ 3,852 SF			
	Total Occupancy:			**71 Total Occupants**
Egress Width	Stairways: Occ Load / 2 * 0.3" = 10"	1005.1	221	**44" Minimum (per 1009.1)**
	Other egress: Occ Load / 2 * 0.2" = 7"	1005.1	221	**44" Minimum**
Means of Egress Illumination	Illuminated at all times except dwelling units in Group R-2	1006.1 (Ex 3)	221	
Accessible Means of Egress	Elevator not accessible means of egress if <4 stories above discharge	1007.2.1	221	
	Clear width of 48" stairway not req'd if NFPA 13 or 13R & 1016.1	1007.3 (Ex 2)	222	**44" Minimum**
	Area of Refuge not req'd in Group R-2	1007.3 (Ex 7)	222	**No Area of Refuge**
Door Width	Minimum 32" Clear	1008.1.1	224	**36" Egress Doors**
	Exception: Group R-2 doors not part of Means of Egress	1008.1.1 (Ex 1)	224	
Stairways	Stairway Width: Minimum 44" (36" < 50 occupant load)	1009.1 (Ex 1)	230	**44" Minimum**
	Headroom stair & landing: 80" clear	1009.2	230	**80" Clear maintained**
	Max. stair riser = 7", min. stair tread = 11"	1009.4.2	231	**Risers = 7" Max, Treads = 11"**
	R-2 Inside Units: 7 3/4" rise, 10" tread	1009.4.2.5	231	**No Treads inside units**
	Landings top & bottom, min depth = stair width	1009.5	231	**44" Minimum**
	Max Stair Flight Vertical Rise = 12'-0"	1009.7	232	**10'6" Maximum Rise**
	Stairway to Roof: 4 Story + required. Roof hatch OK	1009.13	233	**NA**
	Guard req. if hatch <10' of roof edge, 21"o min.opening	1013.6	237	**NA**
Exit & Exit Access Doorways	R: Spaces w occupancy >10 = 2 exits	Table 1015.1	239	**No spaces > 10 occupancy**
	Exit Separation shall be > 1/3 maximum diagonal distance	1015.2.1 (Ex 2)	239	**1/3 Max Diagonal Distance = 30'-0"** **Exit Separation Dist = 33'-0"**
Exit Access Travel Distance	Occupancy R = 250' max w NFPA 13 or 13R sprinklers	Table 1016.1	240	
Corridors	Fire Resistance Rating: Occ R NFPA 13 or 13R sprinklered = 1/2 HR	Table 1018.1	241	**1/2 HR**
	Width 44" min, width 36" if occupancy < 50	1018.2	242	**52"**
	Width 36" min within a dwelling unit	1018.2.3	242	**36" MIN.**
	Dead End in Corridor: R-2: Max 20'-0", 50' if NFPA 13 sprinklered	1018.4	242	**48'-6"**
Number of Exits & Continuity	Group R-2: Single exit in dwelling units occupancy < 20	1021.1 Ex 4	243	**1 Exit per unit**
	Min. # of exits per story: Occupant Load 1 - 500 = 2 Exits	Table 1021.1	243	**2 Exits per story, Min.**
Exit Enclosures	Min Fire Rating = 1 HR if connecting < 4 storys	1022.1	244	**1 HR**
	Exterior walls: Non-rated walls exposed <180 degrees 1 Hour rating within 10-	1022.6	245	**NA**
Exit Passageways	Width: 44" minimum. Occupancy Load <50 = 36" minimum.	1023.2	246	**44" Minimum**
	Construction: 1 Hour minimum or not less than Exit Enclosure	1023.3	246	**1 HR**
Emergency Escape & Rescue	Emergency Egress Opening not required with NFPA 13 or 13R sprinkler	1029.1 Ex 1		**None**

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PROJECT:
PARRIS TERRACES
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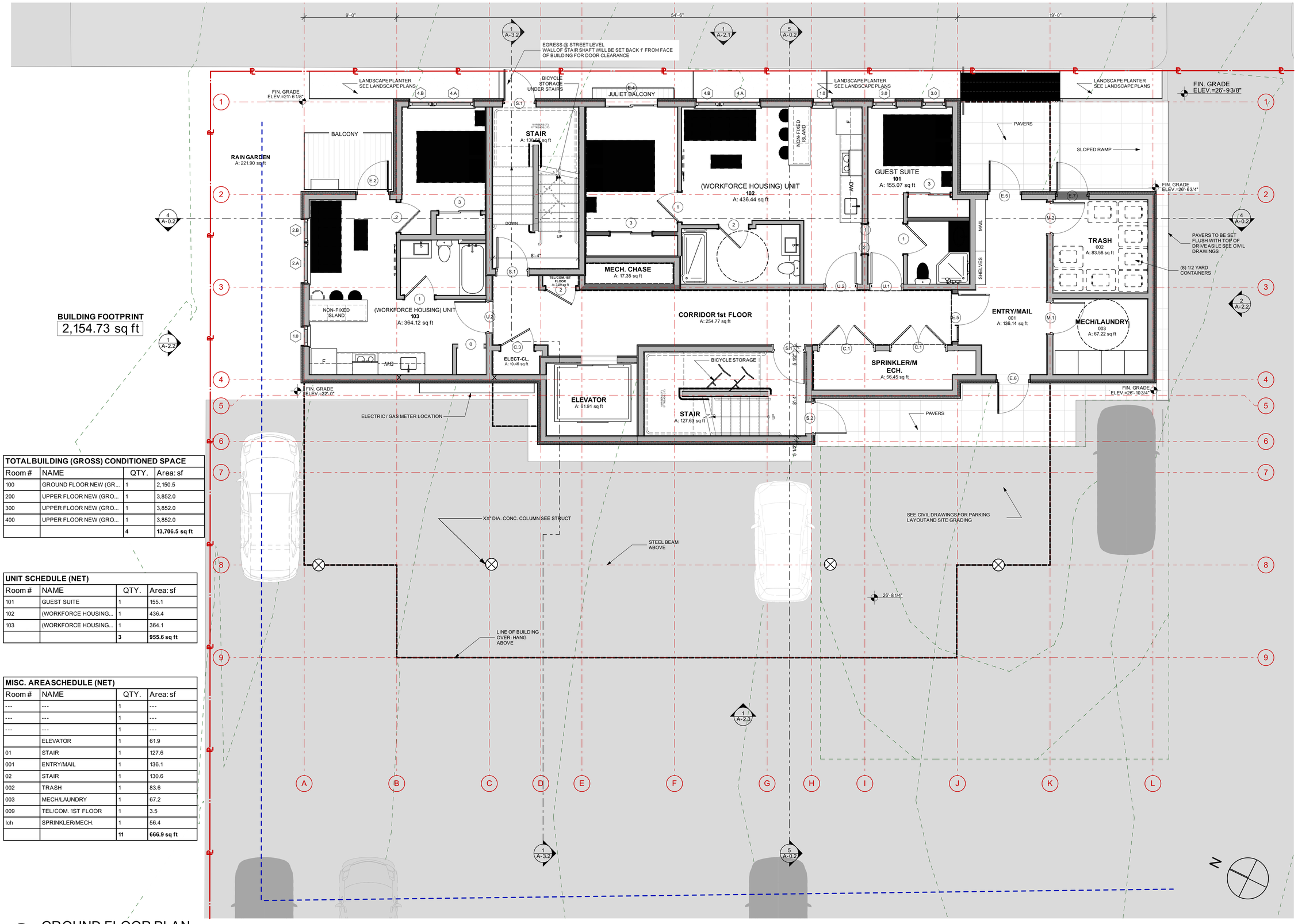
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PROJECT NO:	PRS
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REVISED 2:	
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PHASE:	DESIGN DEVELOPMENT

CODE SUMMARY

CITY OF PORTLAND
APPROVED SITE PLAN
Subject to Conditions of Approval
and Notes Noted Thereon
Date of Approval: 3/27/18
Planner: Nell Donaldson
PROJECT NO. 2017-287

A-1



BUILDING FOOTPRINT
2,154.73 sq ft

TOTAL BUILDING (GROSS) CONDITIONED SPACE			
Room #	NAME	QTY.	Area: sf
100	GROUND FLOOR NEW (GR...	1	2,150.5
200	UPPER FLOOR NEW (GRO...	1	3,852.0
300	UPPER FLOOR NEW (GRO...	1	3,852.0
400	UPPER FLOOR NEW (GRO...	1	3,852.0
		4	**13,706.5 sq ft**

UNIT SCHEDULE (NET)			
Room #	NAME	QTY.	Area: sf
101	GUEST SUITE	1	155.1
102	(WORKFORCE HOUSING...	1	436.4
103	(WORKFORCE HOUSING...	1	364.1
		3	**955.6 sq ft**

MISC. AREAS SCHEDULE (NET)			
Room #	NAME	QTY.	Area: sf
---	---	1	---
---	---	1	---
---	---	1	---
	ELEVATOR	1	61.9
01	STAIR	1	127.6
001	ENTRY/MAIL	1	136.1
02	STAIR	1	130.6
002	TRASH	1	83.6
003	MECH/LAUNDRY	1	67.2
009	TEL/COM. 1ST FLOOR	1	3.5
lch	SPRINKLER/MECH.	1	56.4
		11	**666.9 sq ft**

1 GROUND FLOOR PLAN
SCALE: 1/4" = 1'- 0"

0 2' 4' 8'

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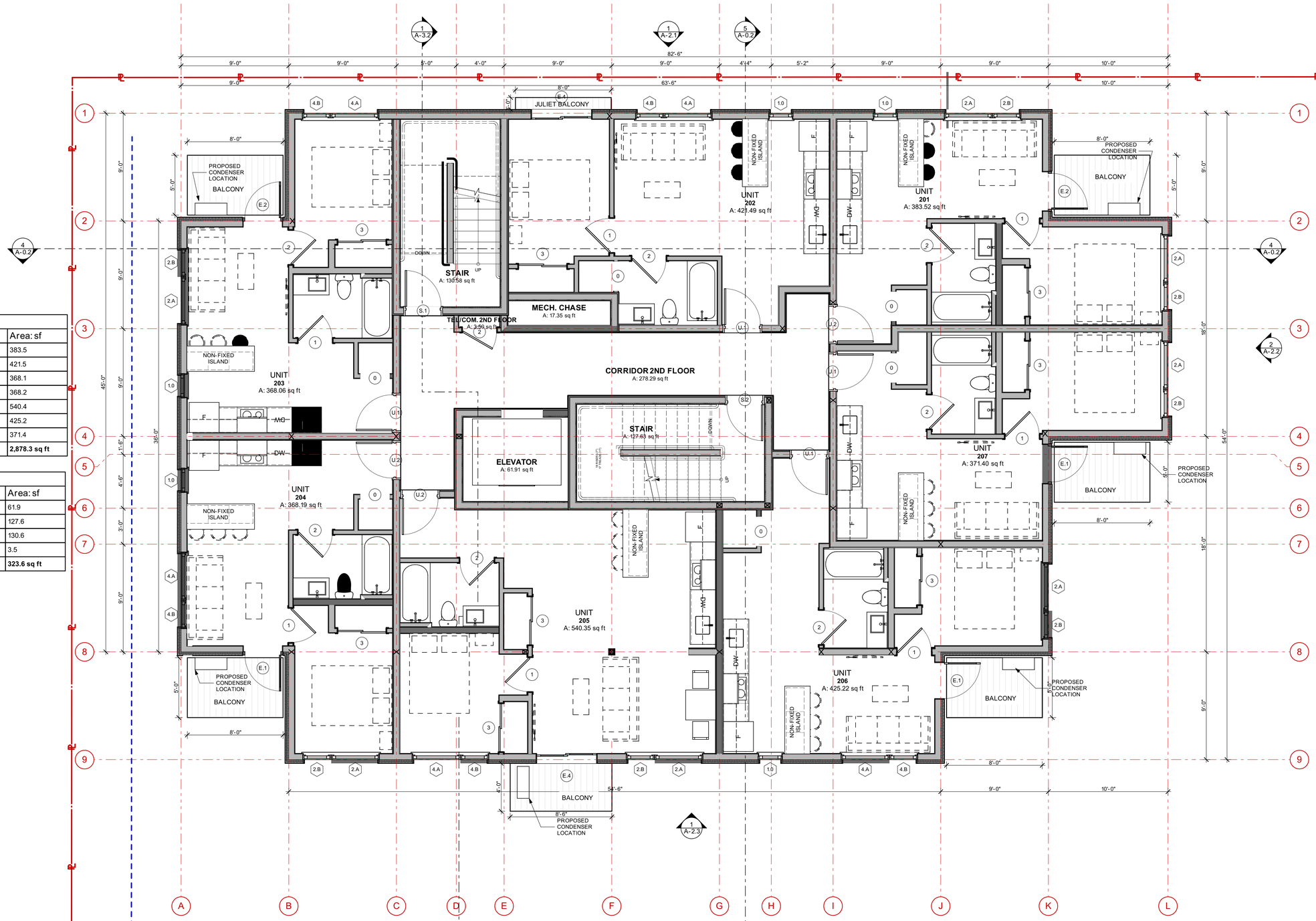
GROUND FLOOR PLAN

A-1.1

NOT REVIEWED AND APPROVED SITE PLAN
Subject to Planning Board approval and attached conditions
DATE of APPROVAL: 3/27/18
PLANNER: Nell Donaldson
PROJECT NO. 2017-287

UNIT SCHEDULE (NET)			
Room #	NAME	QTY.	Area: sf
201	UNIT	1	383.5
202	UNIT	1	421.5
203	UNIT	1	368.1
204	UNIT	1	368.2
205	UNIT	1	540.4
206	UNIT	1	425.2
207	UNIT	1	371.4
		7	**2,878.3 sq ft**

MISC. AREASCHEDULE (NET)			
Room #	NAME	QTY.	Area: sf
	ELEVATOR	1	61.9
01	STAIR	1	127.6
02	STAIR	1	130.6
009	TEL/COM. 2ND FLOOR	1	3.5
		4	**323.6 sq ft**



1 SECOND FLOOR PLAN
SCALE: 1/4" = 1'-0"

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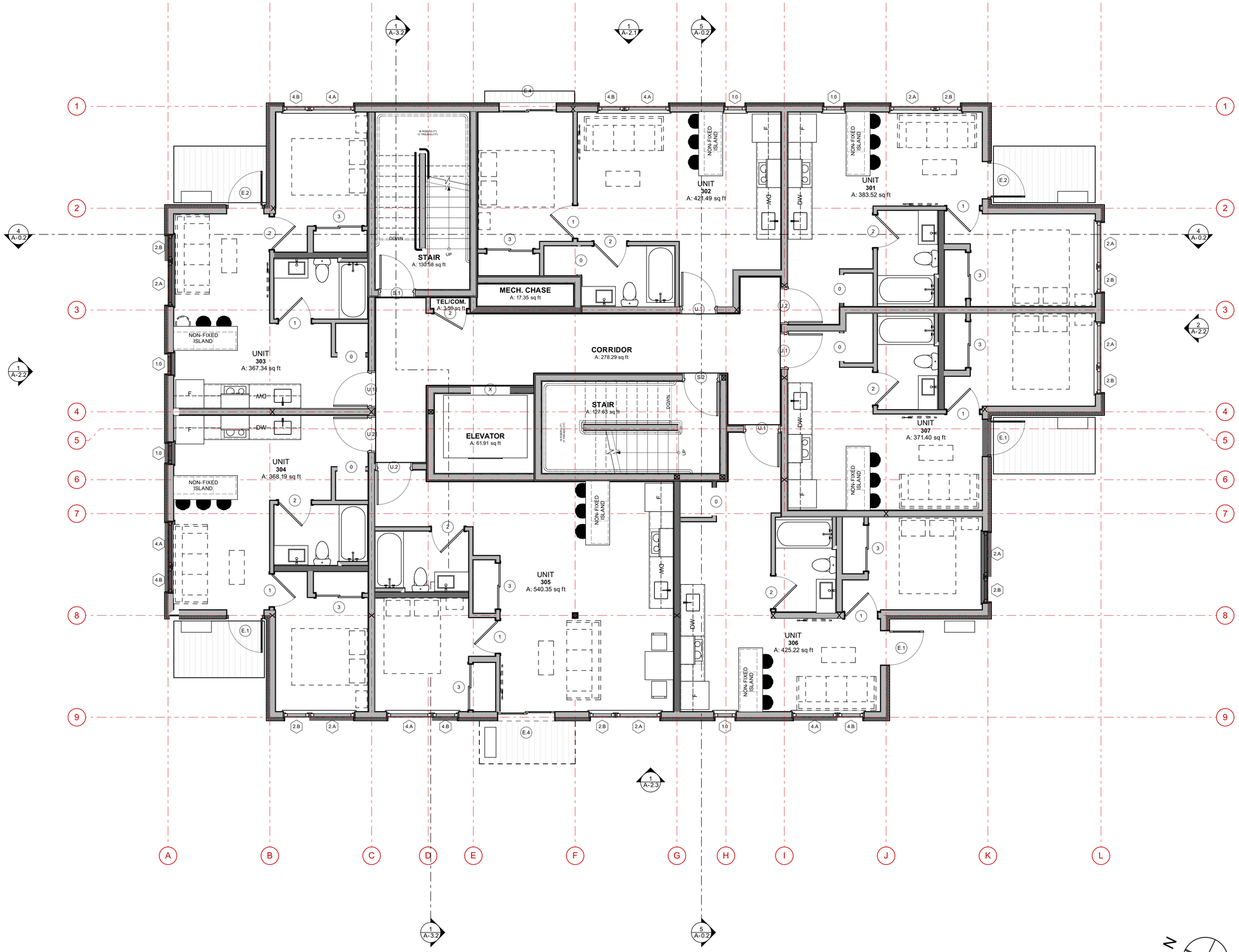
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SECOND FLOOR PLAN

CITY OF PORTLAND
APPROVED SITE PLAN
Subject to conditions of approval
and building permit issuance

Date of Approval: 3/27/18
Approved: Nell Donaldson
PROJECT NO. 2017-287

A-1.2



1 THIRD FLOOR PLAN
SCALE: 1/4" = 1'-0"

0 2' 4' 8'

KAPLAN THOMPSON ARCHITECTS
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PROJECT NO:	PRS
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THIRD FLOOR PLAN

A-1.3

CITY OF PORTLAND
APPROVED SITE PLAN
Subject to Conditions of Approval
and Limitations of Approval

Date of APPROVAL: 3/27/18
Reviewer: Nell Donaldson

PROJECT NO. 2017-287



1 FOURTH FLOOR PLAN
SCALE: 1/4" = 1'-0"

0 2' 4' 8'

KAPLAN THOMPSON ARCHITECTS
102 EXCHANGE STREET
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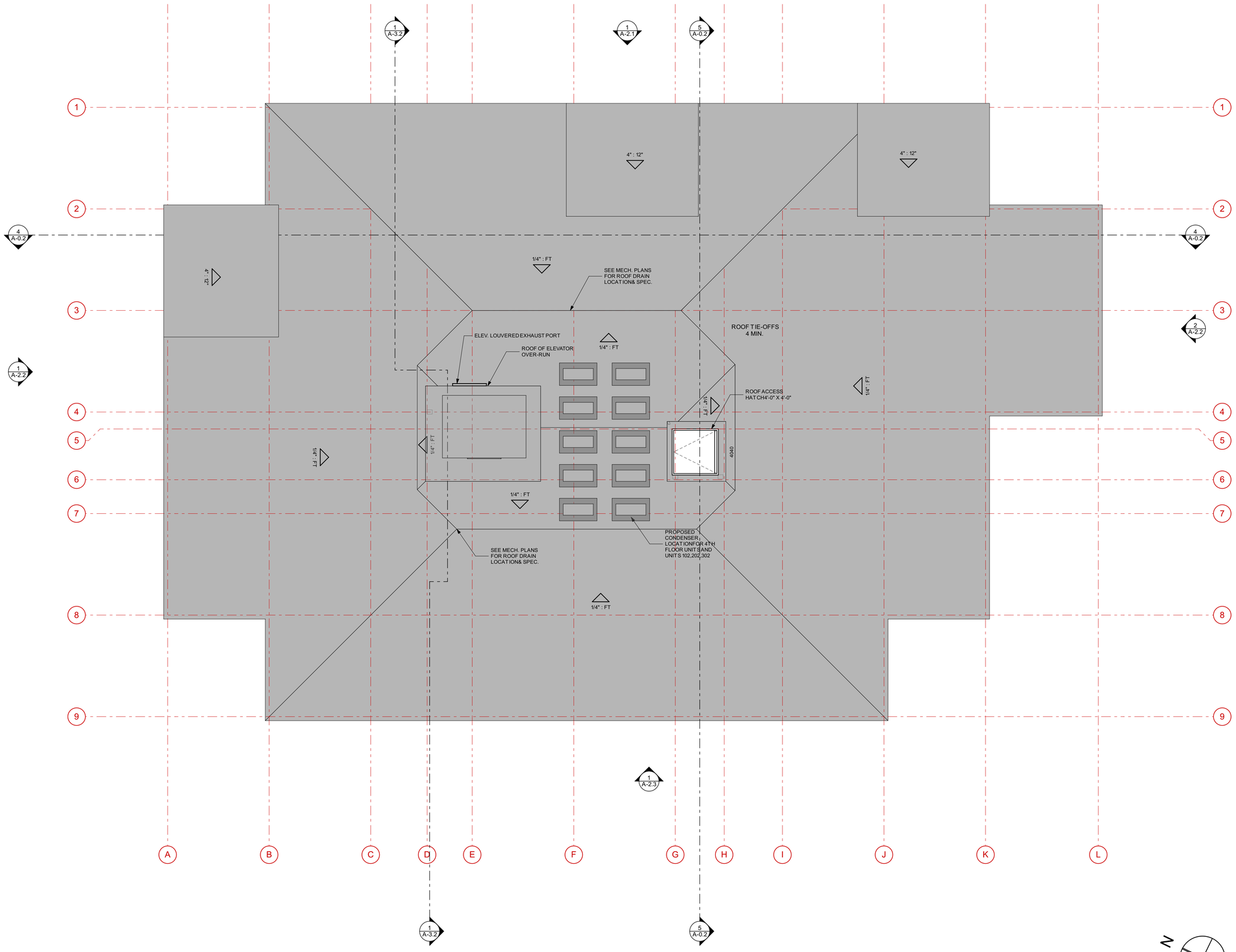
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PHASE:	DESIGN DEVELOPMENT

FOURTH FLOOR PLAN

CITY OF PORTLAND
APPROVED SITE PLAN
Subject to Conditions of Approval
Not Valid Without Signature

Date of APPROVAL: 3/27/18
Reviewer: Nell Donaldson
PROJECT NO. 2017-287

A-1.4



KAPLAN THOMPSON ARCHITECTS
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NOT FOR CONSTRUCTION

PROJECT NO:	PRS
DATE:	03/13/2018
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PHASE:	DESIGN DEVELOPMENT

ROOF PLAN

CITY OF PORTLAND
APPROVED BUILDING PLANS
Subject to Conditions of Approval
and Compliance with Codes
Date of Approval: 3/27/18
Signature: Nell Donaldson
PROJECT NO. 2017-287



EXTERIOR CLADDING SCHEME

SIDING KEY	
TYPE - 1	FIBER CEMENT LAP SIDING, PTD
TYPE - 2	VERT. EASTERN WHITE CEDAR, BLEACHING OIL
TYPE - 3	HORIZ. EASTERN WHITE CEDAR w/ SPACING PER: A-5.4
TYPE - 4	MDO PANEL, PTD.

AVERAGE GRADE CALCULATIONS (SEE A-1.1 FOR LOCATIONS)	
SOUTHEAST	26.782'
SOUTHWEST	26.901'
NORTHWEST	22'
NORTHEAST	21.509'
TOTAL	97.192' / 4
	= 24.298' AV. GRADE ELEV.



1 EAST ELEVATION

SCALE: 1/4" = 1'-0"

0 2' 4' 8'

KAPLAN THOMPSON ARCHITECTS
102 EXCHANGE STREET
PORTLAND, ME 04101
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PARRIS TERRACES

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LICENSED ARCHITECT JAMES JESSE THOMPSON No. 3275 STATE OF MAINE

ISSUE NO.	DESCRIPTION	CHKD	CHANGE NAME	DATE
A	FOR CONSTRUCTION			4/27/18

PROJECT NO:	PRS
DATE:	05/07/2018
REVISED 1:	
REVISED 2:	
DRAWN BY:	JT/AW
PHASE:	FOR CONSTRUCTION

EAST ELEVATION

A-2.1

CITY OF PORTLAND
APPROVED SITE PLAN
Subject to Conditions of Approval
Date of Approval: 5/24/18
Reviewer: Nell Donaldson
PROJECT NO. 2017-287

SIDING KEY

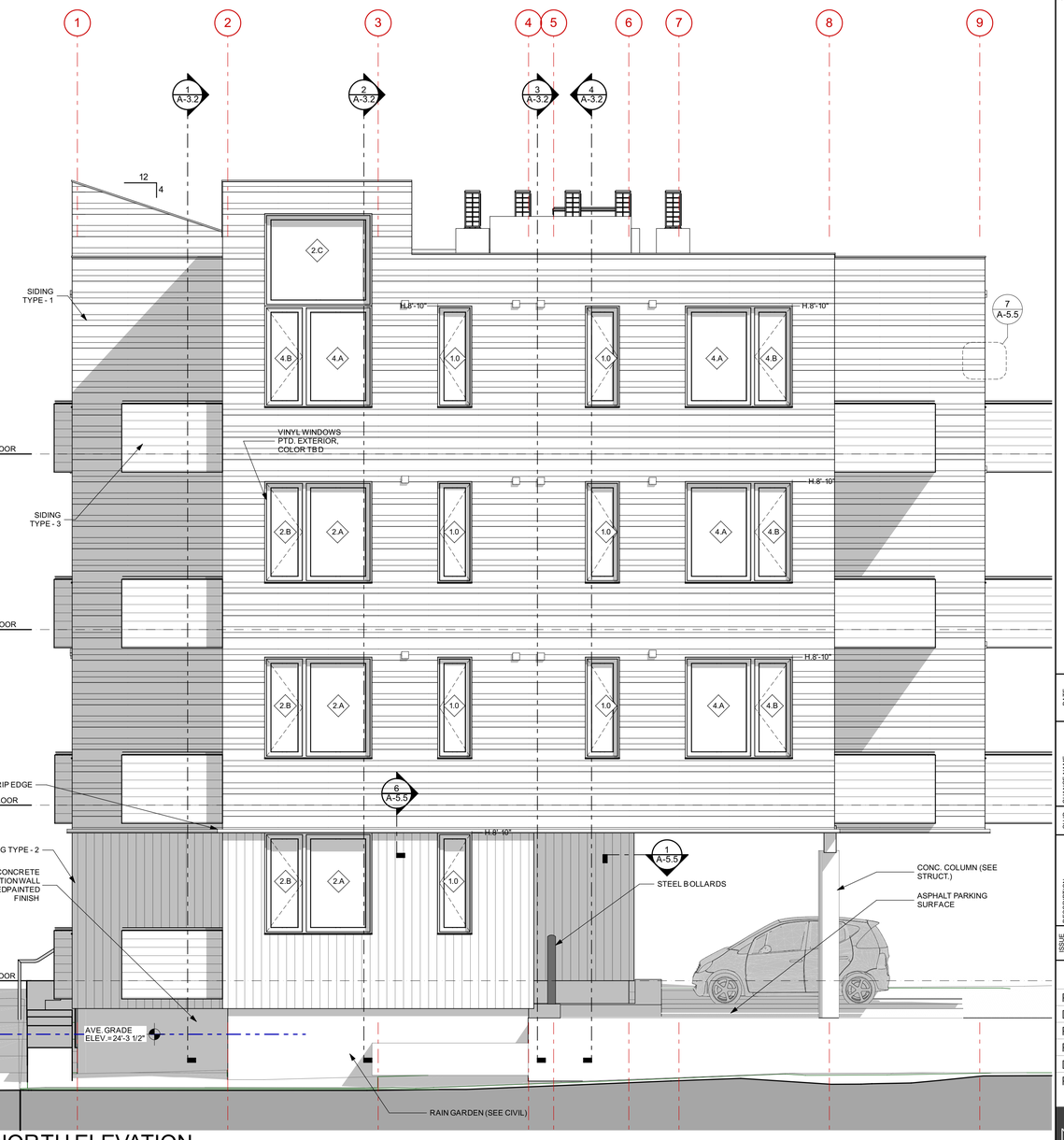
TYPE - 1	FIBER CEMENT LAP SIDING, PTD
TYPE - 2	VERT. EASTERN WHITE CEDAR, BLEACHING OIL
TYPE - 3	HORIZ. EASTERN WHITE CEDAR w/ SPACING PER: A-5.4
TYPE - 4	MDO PANEL, PTD.



2 SOUTH ELEVATION

SCALE: 1/4" = 1'-0"

0 2' 4' 8'



1 NORTH ELEVATION

SCALE: 1/4" = 1'-0"

0 2' 4' 8'

KAPLAN THOMPSON ARCHITECTS
102 EXCHANGE STREET
PORTLAND, ME 04101
207-842-2888
KAPLANTHOMPSON.COM

PROJECT:
PARRIS TERRACES

60 PARRIS ST.
PORTLAND, ME 04101

OWNER REP :
Donald M Peterson, Inc.
1 Avon Road
Cape Elizabeth, ME 04107
p: 207-415-0707

STRUCTURAL :
Structural Integrity
46 Forrest Avenue
Portland, ME 04101
p: 207-774-4614
f: 866-793-7835

CIVIL :
Ransom Consulting Engineers and Scientists
400 Commercial Street, Suite 404
Portland, ME 04101
p: 207 772-2891

LANDSCAPE :
MRLD Landscape Architecture + Urbanism
87 Main Street
Yarmouth, ME 04096
p: 207 846-4966

MECHANICAL :
Ripcord Engineering
PO Box 4175
Portland, ME 04101
p: 207 835-4060

ELECTRICAL :
Swiftcurrent Engineering
10 Forest Falls Drive, Unit 4B
Yarmouth, ME 04096
p: 207 847-9280

LICENSED ARCHITECT * JAMES JESSE THOMPSON NO. 3275 * STATE OF MAINE

ISSUE NO.	DESCRIPTION	CH'D	CHANGE NAME	DATE
A	FOR CONSTRUCTION			4/27/18

PROJECT NO:	PRS
DATE:	05/07/2018
REVISED 1:	
REVISED 2:	
DRAWN BY:	JT/AW
PHASE:	FOR CONSTRUCTION

NORTH & SOUTH ELEVATIONS

CITY OF PORTLAND
APPROVED - FIRE PLAN
Subject to inspection by City personnel
Date of Approval: 5/22/2018
Approved: Neil Donaldson

A-2.2

PROJECT NO. 2017-287

AVERAGE GRADE CALCULATIONS	
SEE A-1.1 FOR LOCATIONS	
SOUTHEAST	26.782'
SOUTHWEST	26.901'
NORTHWEST	22'
NORTHEAST	21.509'
TOTAL	97.192' / 4
	= 24.298' AV. GRADE ELEV.

SIDING KEY	
TYPE - 1	FIBERCEMENT LAP SIDING, PTD
TYPE - 2	VERT. EASTERN WHITE CEDAR, BLEACHING OIL
TYPE - 3	HORIZ. EASTERN WHITE CEDAR w/ SPACING PER: A-5.4
TYPE - 4	MDO PANEL, PTD.



1 WEST ELEVATION

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LICENSED ARCHITECT JAMES JESSE THOMPSON NO. 3275 STATE OF MAINE

ISSUE NO.	DESCRIPTION	CHANGE NAME	CH ID	DATE
A	FOR CONSTRUCTION			4/27/18

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REVISED 2:	
DRAWN BY:	JT/AW
PHASE:	FOR CONSTRUCTION

WEST ELEVATION

CITY OF PORTLAND APPROVED SITE PLAN
Subject to conditions of approval and permitted notations.
DATE OF APPROVAL: 5/27/18
REVIEWER: Nell Donaldson
PROJECT NO. 2017-287

A-2.3

CITY OF PORTLAND
Planning & Urban Development Department

PLAN AMENDMENT FOR SITE PLAN
GENERAL DOCUMENT AND DRAWINGS CHECKLIST
Please submit each document as a separate PDF file
Please confirm by electronically checking the boxes to the left

GENERAL APPLICATION DOCUMENTS	
Yes ☑ NA ☐	Written Statement of the Proposed Amendment(s) (Identify any conditions of approval being met and any changes to waivers)
Yes ☑ NA ☐	Any supporting documents of the original application that are being revised. (Revisions should be clearly identified)
DRAWINGS	
Yes ☑ NA ☐	All amended plans affected by the proposed revisions. The plans shall clearly depict proposed modifications.

Parris Terraces
60 Parris Street / CBL 33-A-13
Project ID 2017-287 and 2017-297 (IZ)
Approved Plan Amendments / Narrative
Original Approval Date / March 29, 2108

Overall, changes made to the project were based on four basic factors; aesthetic improvements, product availability, performance upgrades and code requirements. Taken together the changes resulted a direct net added cost to the developer, in some cases quite sizable. No changes were made based strictly on "value engineering".

Roof “Pops-ups” / Location and Size Revisions

Sheets A1.4, A1.4a, A1.5, A2.1, A2.2, A2.3

The development team relocated one pop-up from Unit 402 to Unit 405. This change better balanced the building from all viewing perspective and increased the architectural presence of the building. The height increase in each pop-up was the same and provides for a dramatic two-story space in Unit 405 as well as a useable storage loft in both Units 401+403.

Juliette Balconies

Sheet A2.1

The development team wanted to insure structural integrity of all balconies for the long term. Because of structural complications with PT wood, prefinished 42” high aluminum guards were designed for use at the Juliette locations. At all other balconies steel tie rods were incorporated for additional structural support at an increase in cost to the developer.

Doors Type Changed from Sliders to Swing doors at Units 205+305

Sheet A2.3

Team preference was for more interior wall space in these two units.

Change in Front Entry Wall Material+Finish

Sheets A2.1, A2.2

Painted MDO in this location was deleted in favor of a continuation of adjacent vertical cedar siding. The team considered this an upgrade at the front door for both residents and the general public.

Project Signage Revision

Sheet A2.1, A2.2 North

The schematic design originally proposed had the project name “Parris Terraces” on two lines. The design team preferred smaller letters and numbers on a single line. Neither font nor sign locations changed.

Wall Siding Under the Parking Overhang

Sheet A2.3 West

Cedar siding planned for this partial wall (ie: adjacent to private resident parking) was relocated to the front entrance for an upgraded appearance. Typical with upper levels, horizontal lap fiber cement was substituted here.

Exterior Mechanical Vent Hoods

Sheets A2.1, A2.2, A2.3

These through the wall units originally shown schematically as square were changed to spherical units for both aesthetic reasons and increased energy efficiency as this unit model has a superior back draft preventer.

Roof Mounted Mini Split Condenser Locations

Sheet A1.5

Rooftop unit locations originally approved were schematic. Final locations resulted from completion of the HVAC design build process. Condenser locations changed slightly for this reason and are not visible from nearby streets.

Gas Meter Location Change

Sheets A2.2 North, A2.3

The original location of both gas meter and related protective bollards was changed by direction and as required of Unitil.

Driveway Guardrail

Sheet L-1

Originally approved the existing guardrail was to remain and be reused. Due to deterioration and aesthetics, the team opted to upgrade this safety feature with 3x10" PT wood rail mounted on the original steel posts.

Additional Pavers

Sheet L-1

Originally approved as crushed stone, this area between parking curb and rear foundation wall was upgraded to pavers to match the walkway.

Landscaping Revisions

Sheet L-1

Due to product unavailability and restricted onsite conditions some plantings needed to be changed. Attached is an email from the Landscape Architect dated 5/9/19 documenting these revisions generated from multiple conversations, meetings and ultimate approval by Jeff Tarling, City Arborist.

Utility As-Built Site Plan

Sheet C-1

Attached is the revised utility plan noting actual sewer, water and power locations. This accurate but "raw" document was received 5/8/19 from Hebert Construction. This information will be transcribed by the Civil Engineer as part of the final as built document submission for the Certificate of Occupancy.

To Whom It May Concern,

On Wednesday May 1, 2019 I met with Jeff Tarling and Jodie Keene from The City of Portland at Parris Terraces to receive input on substitutions for plants that are more appropriate for the site conditions.

At this meeting Jeff Tarling provided specific recommendations for plant substitutions. The recommendations maintain the agreed tree count.

The attached email from Jodie Keene summarizes the changes to the landscape plan as approved by Jeff Tarling.

If you have any questions please feel free to contact me.

Thanks

M

Mitchell Rasor
ME and MA Licensed Landscape Architect
CLARB

MRLD Landscape Architecture + Urbanism
87 Main Street
T 207 831 9096
@mitchellrasor

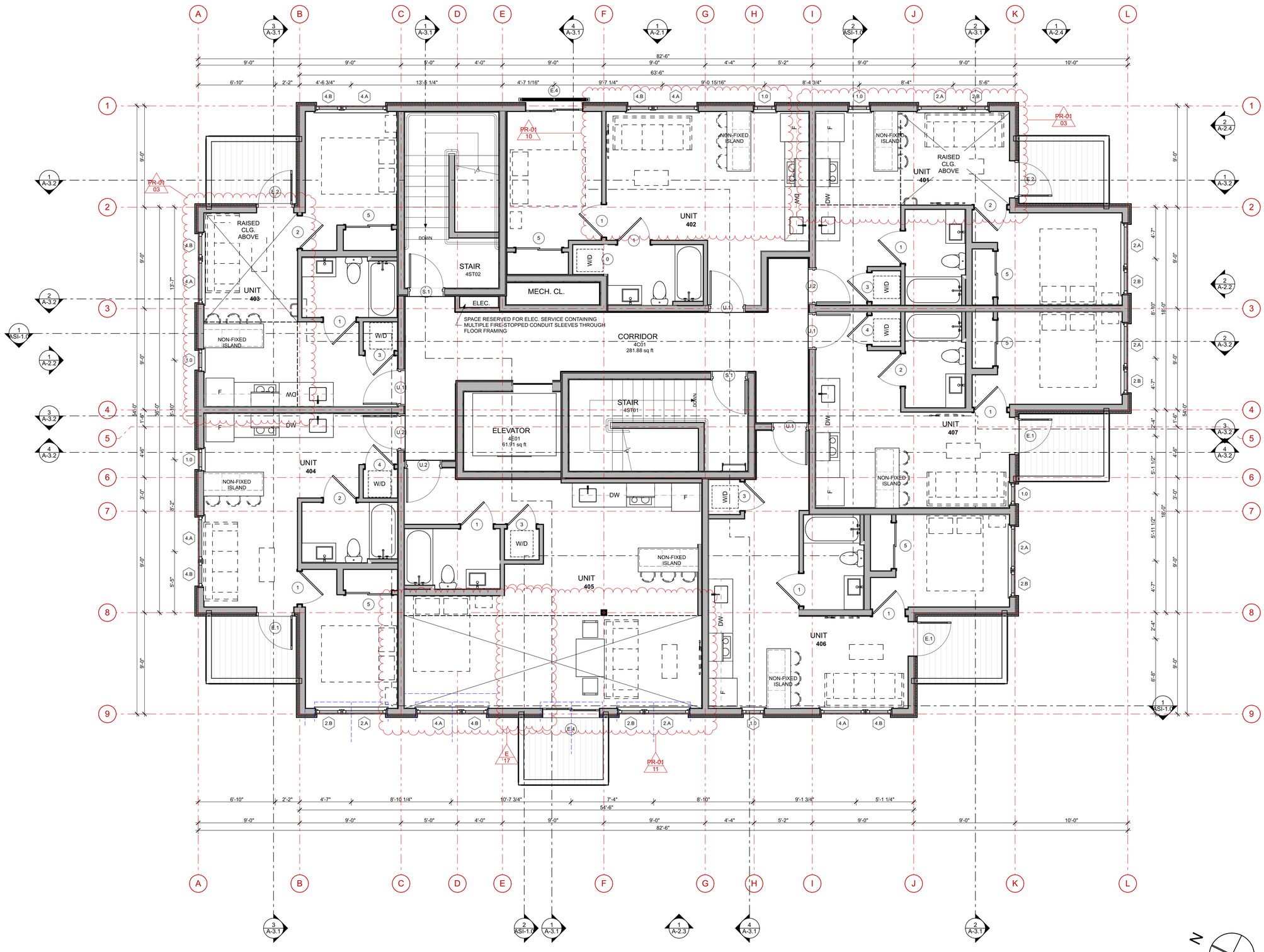
mrasor@mrld.net
www.mrld.net

From: **Jodie Keene** JKEENE@portlandmaine.gov
Subject: Re: Request for Parris Terraces Site Meeting
Date: May 6, 2019 at 2:25 PM
To: Tim Hebert thebert@hebertconstruction.com
Cc: Mitchell Rasor mrasor@mrld.net, Jeff Tarling jst@portlandmaine.gov, Jack Soley jsoley@eastbrowncow.com, Todd Sharp tsharplandscape@gmail.com, dmpetersoninc@gmail.com

JK

- Two European Hornbeam - Frans Fontane, will be planted in place of the "columnar red maple" shown in the upper terraces of the rain garden at the northern corner of the property.
- One shrub form serviceberry will replace the red maple at the lower rain garden terrace.
- A single-stem Serviceberry will replace the eastern redbud in the planter in the eastern corner of the property near the front entrance to the building.
- Three European Hornbeam - Frans Fontane - will be planted in place of the two "columnar red maple" and the tree that was planned to be saved at the southwestern property boundary at the rear of the parking area.

Jodie W. Keene, Development Review Coordinator
Office: 207.874.8632 | Mobile: 207.317.1956
City of Portland Planning and Urban Development Department
389 Congress Street, 4th Floor, Portland, Maine 04101



1 FOURTH FLOOR PLAN
SCALE: 1/4" = 1'-0"

0 2' 4' 8"

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KAPLANTHOMPSON.COM

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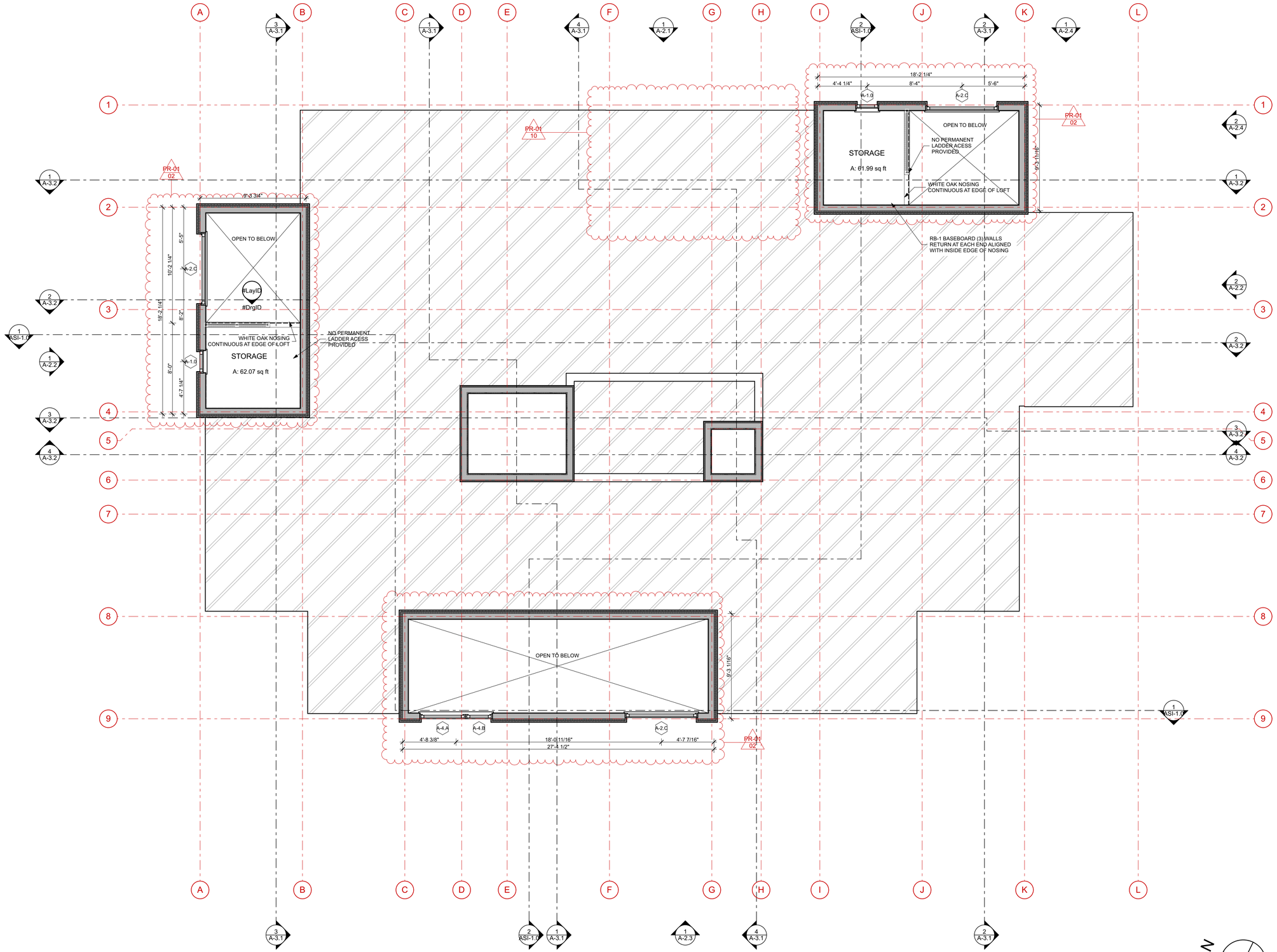
ELECTRICAL :
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Yarmouth, ME 04096
p: 207 847-9280

LICENSED ARCHITECT JAMES JESSE THOMPSON No. 3275 STATE OF MAINE

ISSUE NO	DESCRIPTION	CH ID	CHANGE NAME	DATE
A	FOR CONSTRUCTION			4/27/18
B	ADDENDUM 01			5/7/18
PR-01	4TH FLOOR ALTERNATE	03	WIDTH OF UPPER ROOF INCREASED	5/23/18
		10	UPPER ROOF REMOVED	
		11	UPPER ROOF ADDED TO WEST	
E	AMMENDMENT SET	17	BEDROOM WALLS REMOVED	5/8/19

PROJECT NO: PRS
DATE: 05/07/2018
REVISED 1:
REVISED 2:
DRAWN BY: JT/AW
PHASE: FOR CONSTRUCTION

FOURTH FLOOR PLAN
A-1.4



1 FOURTH FLOOR PLAN
SCALE: 1/4" = 1'-0"

0 2' 4' 8'

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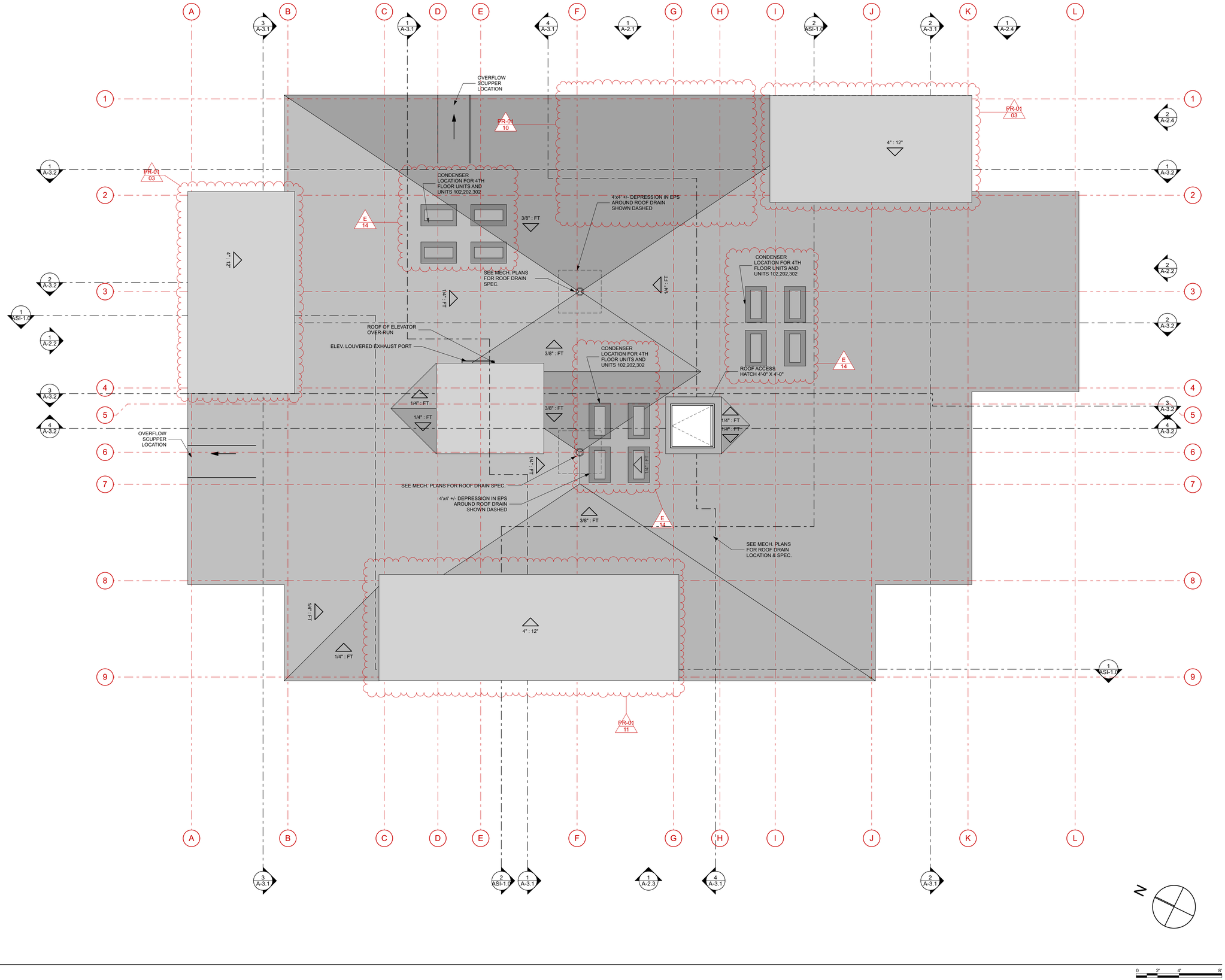
LICENSED ARCHITECT JAMES JESSE THOMPSON NO. 3275 STATE OF MAINE

ISSUE NO.	DESCRIPTION	CHANGE NAME	CH ID	DATE
PR-01	4TH FLOOR ALTERNATE	EXTENT OF ALTERNATE	02	5/23/18
E	AMMENDMENT SET	UPPER ROOF REMOVED	10	5/8/19

PROJECT NO:	PRS
DATE:	05/07/2018
REVISED 1:	
REVISED 2:	
DRAWN BY:	JT/AW
PHASE:	FOR CONSTRUCTION

STORAGE LOFT PLANS

A-1.4a



1 ROOF PLAN
SCALE: 1/4" = 1'-0"

0 2' 4' 8'

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LICENSED ARCHITECT JAMES JESSE THOMPSON NO. 3275 STATE OF MAINE

ISSUE NO.	DESCRIPTION	CH ID	CHANGE NAME	DATE
A	FOR CONSTRUCTION			4/27/18
PR-01	4TH FLOOR ALTERNATE	03	WIDTH OF UPPER ROOF INCREASED	5/23/18
		10	UPPER ROOF REMOVED	
		11	LOWER ROOF ADDED TO UNIT	
D	ROOF REVISION	04	DOOR CHANGE	8/5/18
		05	ALU. 42" GUARD	
E	AMENDMENT SET	14	CONDENSER LOCATION	5/8/19

PROJECT NO: PRS
DATE: 05/07/2018
REVISED 1:
REVISED 2:
DRAWN BY: JT/AW
PHASE: FOR CONSTRUCTION

ROOF PLAN

A-1.5



EXTERIOR CLADDING SCHEME

SIDING KEY

TYPE - 1	FIBER CEMENT LAP SIDING, PTD
TYPE - 2	VERT. EASTERN WHITE CEDAR, BLEACHING OIL
TYPE - 3	HORIZ. EASTERN WHITE CEDAR w/ SPACING PER: A-5.4
TYPE - 4	MDO PANEL, PTD.

E 19

AVERAGE GRADE CALCULATIONS

SEE A-1.1 FOR LOCATIONS

SOUTHEAST	26.782'
SOUTHWEST	26.901'
NORTHWEST	22'
NORTHEAST	21.509'
TOTAL	97.192' / 4
	= 24.298' AV. GRADE ELEV.



1 EAST ELEVATION

SCALE: 1/4" = 1'-0"

0 2' 4' 8'

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ISSUE NO.	DESCRIPTION	CH ID	CHANGE NAME	DATE
A	FOR CONSTRUCTION			4/27/18
PR-01	4TH FLOOR ALTERNATE	02	EXTENT OF ALTERNATE P.R.	5/23/18
D	ROOF REVISION	05	ALU. 42" GUARD	9/5/18
		11	UNIT ROOF ADDED TO UNIT	
		12	ROOF MODIFICATION	
E	AMMENDMENT SET	19	MDO CLADDING CHANGED TO TYPE 2, CEDAR	5/8/19
		20	BUILDING SIGNAGE SIZE REDUCED	

PROJECT NO:	PRS
DATE:	05/07/2018
REVISED 1:	
REVISED 2:	
DRAWN BY:	JT/AW
PHASE:	FOR CONSTRUCTION

EAST ELEVATION

A-2.1

SIDING KEY

TYPE - 1	FIBER CEMENT LAP SIDING, PTD
TYPE - 2	VERT. EASTERN WHITE CEDAR, BLEACHING OIL
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TYPE - 4	MDO PANEL, PTD.

E 19



2 SOUTH ELEVATION

SCALE: 1/4" = 1'-0"

0 2' 4' 8'



1 NORTH ELEVATION

SCALE: 1/4" = 1'-0"

0 2' 4' 8'

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LICENSED ARCHITECT JAMES JESSE THOMPSON NO. 3275 STATE OF MAINE

ISSUE NO.	DESCRIPTION	DATE
A	FOR CONSTRUCTION	4/27/18
PR-01	4TH FLOOR ALTERNATE	5/23/18
D	ROOF REVISION	9/5/18
E	AMMENDMENT SET	5/8/19

CHANGE NAME	CH ID
EXTENT OF ALTERNATE P.R.	02
ROOF MODIFICATION FROM TYPE 2 TO TYPE 1	12
GAS METER LOCATION	13
MDO CLADDING CHANGED TO TYPE 2, CEMENT BOARD	18
BUILDING SIGNAGE SIZE REDUCED	19
	20

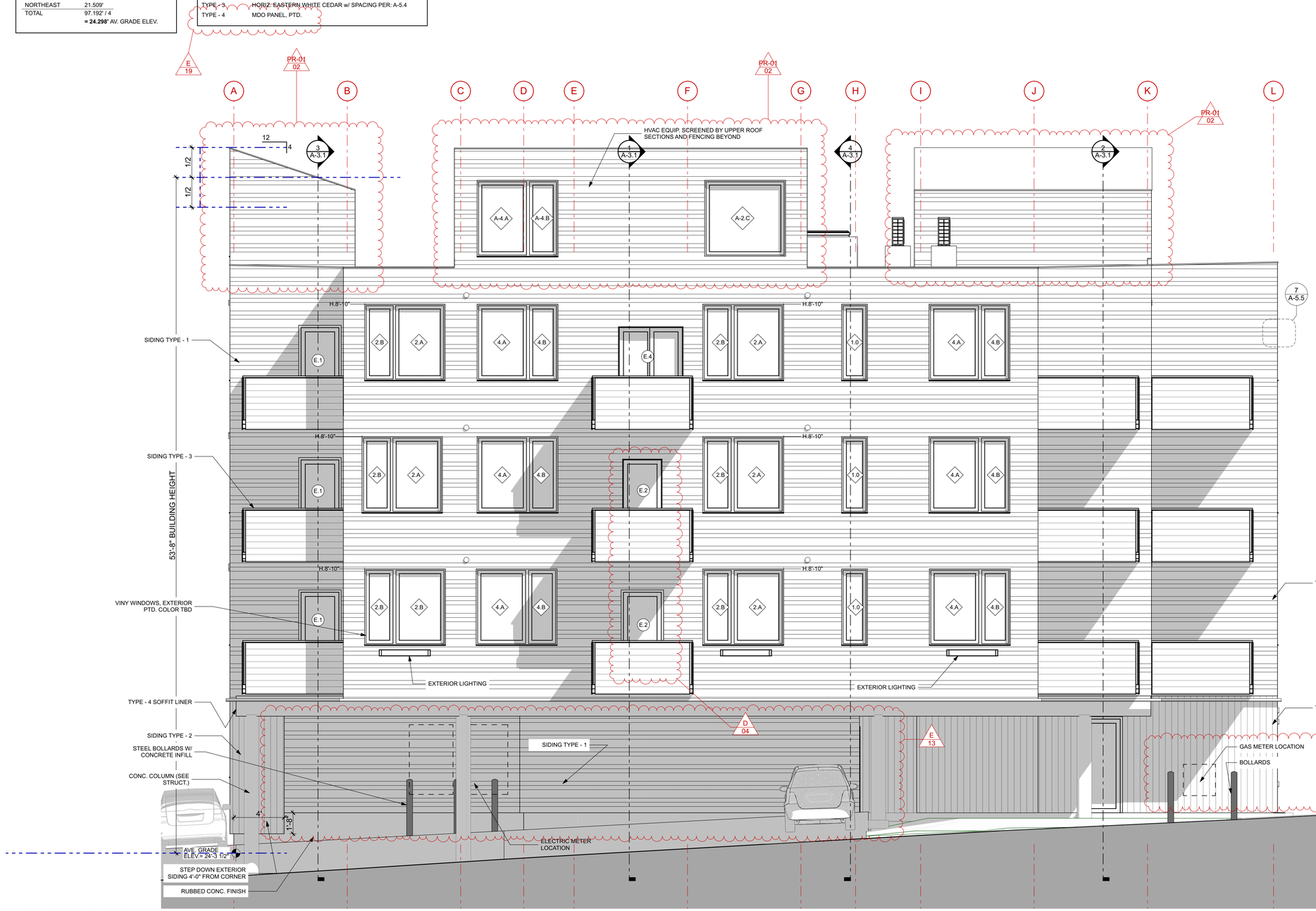
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REVISED 2:	
DRAWN BY:	JT/AW
PHASE:	FOR CONSTRUCTION

NORTH & SOUTH ELEVATIONS

A-2.2

AVERAGE GRADE CALCULATIONS	
SEE A-1.1 FOR LOCATIONS	
SOUTHEAST	26.782'
SOUTHWEST	26.901'
NORTHWEST	22'
NORTHEAST	21.509'
TOTAL	97.192' / 4
	= 24.298' AV. GRADE ELEV.

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TYPE - 4	MDO PANEL, PTD.



1 WEST ELEVATION

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PR-01	4TH FLOOR ALTERNATE	02	EXTENT OF ALTERNATE PR.	5/23/18
D	ROOF REVISION	04	DOOR CHANGE	9/5/18
		12	ROOF MODIFICATION	
		13	SIDING CHANGE FROM TYPE 2 TO TYPE 1	
E	AMMENDMENT SET	18	GAS METER LOCATION	5/8/19
		19	MDO CLADDING CHANGED TO TYPE 2. CEDAR	

PROJECT NO:	PRS
DATE:	05/07/2018
REVISED 1:	
REVISED 2:	
DRAWN BY:	JT/AW
PHASE:	FOR CONSTRUCTION

WEST ELEVATION

A-2.3

PLANT LIST: TREES, SHRUBS, GRASSES

QUANTITY	BOTANICAL NAME	COMMON NAME	SIZE	REMARKS
5	Acer rubrum "Columnare"	Red Maple "Columnar"	4" Calp.	BB
34	Aster novae angliae	New England Aster	1GL	CONTAINER/1' O.C.
74	Akebia quinata	Chocolate Vine	2GL	CONTAINER/2' O.C.
24	Boltonia asteroides	Boltonia	1GL	CONTAINER/1' O.C.
34	Calamagrostis arundinacea	Reed Grass	2GL	CONTAINER/1' O.C.
1	Cercis canadensis "Ace of Hearts"	Eastern Redbud "Ace of Hearts"	4'	CONTAINER
10	Cornus sericea "Arctic Fire"	Red Twig Dogwood "Arctic Fire"	5'	CONTAINER/3' O.C/MULTI-STEM
69	Dennstaedtia punctilbula	Hayscented Ferm	1GL	CONTAINER/1' O.C.
25	Elymus virginicus	Virginia Wild Rye	1GL	CONTAINER/1' O.C.
3	Malus "Adirondak"	Adirondak Crabapple	6' - 8'	CONTAINER OR BB

underground storm water detention vault

10"ø sdr. 14.74 in

PARRIS STREET

TBM: spike in utility pole #24 elevation=18.55

concrete monument per plan reference 1 not found

bituminous sidewalk

CBT 16.39
TRHOAT 21.02
INV OUT 17.18

3 ADIRONDAK CRABAPPLE W/ 23 HAY SCENTED FERN PER TREE PIT

34 REED GRASS

1 EASTERN REDBUD "ACE OF HEARTS"

208.08' by Parris Street to the no

34 NEW ENGLAND ASTER
5 RED TWIG DOGWOOD
1 COLUMNAR RED MAPLE
(PLANT MAPLE OUTSIDE RAIN GARDEN)

RAIN GARDEN COORDINATE WITH CIVIL DRAWINGS

12" ø HDPE SDR 35 inv. out

24 BOLTONIA
3 RED TWIG DOGWOOD
1 COLUMNAR RED MAPLE

25 VIRGINIA WILD RYE
2 RED TWIG DOGWOOD
1 COLUMNAR RED MAPLE

74 CHOCOLATE VINE ALONG LIVING FENCE. COORDINATE FENCE LOCATION AND DESIGN WITH CIVIL AND STRUCTURAL DRAWINGS PROVIDE STAKING TO TRAIN VINES TO FENCE

SEE EMAIL CORRESPONDENCE FROM LANDSCAPE ARCHITECT AND CITY OF PORTLAND PLANNING AND URBAN DEVELOPMENT DEPT. WITH PLANTING SUBSTITUTIONS, INCLUDED IN WRITTEN STATEMENT

#27
Brattle Street

Second Parcel
Tax Map 33, Lot A-13
5,151 Sq. Ft.

First Parcel
Tax Map 33, Lot A-14
5,5 square feet

PAVERS CONTINUE TO EXTENT WHERE DARK HATCH IS SHOWN

6' TALL WHITE CEDAR FENCE. TYP. ATTACH TO GUARDRAIL. AND THEN CONTINUE ALONG PROPERTY LINE TO CROCKER PARCEL. FIELD VERIFY LOCATION AND COORDINATE WITH OWNER SEE SHEET L2 FOR DETAIL

EXISTING GALV. GUARDRAIL REPLACED w/ 3"X10" P.T.

apparent encroachment of a concrete stair well leading to a basement door of the abutting building

3 EXISTING TREES. PROTECT AND PRESERVE DURING CONSTRUCTION. FIELD VERIFY LOCATION AND COORDINATE WITH OWNER

2 COLUMNAR RED MAPLE

EXISTING TREE. PROTECT AND PRESERVE DURING CONSTRUCTION. FIELD VERIFY LOCATION AND COORDINATE WITH OWNER

N/F
Christine M. Arsenal
22447/341

#56
Parris Street

N/F
Paul Waring
Christine Waring
32106/90

#25
Brattle Street

N/F
Robert Crocker
31539/187

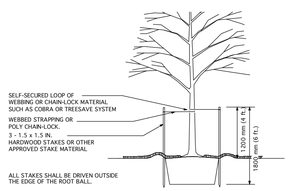
#19
Brattle Street

BRATTLE STREET
30 feet wide

TREE KEY:

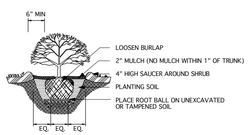
EXISTING TREE TO BE PRESERVED:

PROPOSED TREE:



TYPICAL TREE PLANTING DETAIL

N.T.S.



TYPICAL SHRUB PLANTING DETAIL

N.T.S.

PLANTING SPECIFICATION

A. Call Dig Safe prior to any excavation work. The location and maintenance of trees and landscaping cannot conflict with site utilities. Coordinate with other project drawings.

B. In any case where drawings or specifications vary from the City of Portland Technical Manual Landscaping and Landscape Preservation Standards, City regulations take precedent. Report any discrepancies to Owner and Landscape Architect

C.The location of all trees and shrubs shall be staked and approved by the Landscape Architect prior to planting.

D.Flag the northern side of trees in the nursery and install trees oriented to the north. Landscape Architect to select plant material with contractor.

E. All plant material shall be healthy and full-branching, true to form and specified size, free of disease, pests and physical damage.

F. Employ only experienced personnel familiar with required work.

G. If deciduous trees are planted in - leaf, they shall be sprayed with an anti-desiccant prior to digging operation.

H. Landscape installation timeframe:

Balled and Burlapped:
Spring 4/1 to 7/15, and Fall 8/15 to 10/15

I. Specified plant material may be substituted by the use of alternate, similar plant material, with approval from the Landscape Architect.

J. All plant material and lawn shall be guaranteed for a period for two years from date of occupancy. All dead and non-vigorous material shall be replaced, without cost to the Owner, with a similar species, and these replacement plants shall be guaranteed for one year from the date of acceptance by the Owner.

K. Planting soil shall be 2/3 topsoil, free of debris and stones over 1" in diameter, and 1/3 peat moss. The pH shall be between 5. 5 - 7.0. Ground limestone shall be added to the planting soil to achieve specified pH.

L. Add compost in planting beds at a 1 part compost to 4 part existing soil ratio,tilled to a 12" depth per industry standards.

M. Fertilizer shall be applied when planting pits are 2/3 full of planting soil with a 5-10-10 fertilizer. After planting, slow release fertilizer, minimum 5 year, shall be applied using a 4 oz. packet system at rates recommended by the manufacturer.

N. Mulch shall be 100% fine shredded pine bark, 2" deep. Planting beds adjacent to buildings shall use 3/4" aggregate or less. Landscape and Owner to approve color.

O. Tree wrap shall be Osnaburg Cloth, 4 7/8" wide, unbleached, or approved equal. Cloth should only be used for material transport and installation and removed immediately following installation.

P. Loam and seed disturbed lawn areas per civil engineering plans.

Q. Trees normally do not need to be staked and staking can be harmful to the tree and a hazard in pedestrian locations. Staking should only be done with the approval of the Landscape Architect and the Portland City Arborist if it is expected that the tree will not be able to support itself. The following are reasons why trees do not remain straight:

Root balls placed on soft soil: Tamp soils under root ball prior to planting
Root balls with very sandy soil or very wet clay soil: Staking advisable
Trees located in a place of extremely windy conditions: Staking advisable
Trees located in a place where vandalism may impact tree: Staking advisable

R. If tree stakes are required they shall be placed parallel to the curb. Trees will be secured with web strapping or polyester chain-lock. No wire or hose will be used. Assure that the bearing surface of the webbed strapping or poly chain lock against the trunk is a minimum of 12 MM (0.5 inches). Remove all staking as soon as the tree has grown sufficient roots to overcome the problem that required the tree to be staked. Stakes shall be in place no longer than one year or at least until the end of the growing season after planting.

S. Install black, molded, modular panels manufactured with 50 percent recycled polyethylene plastic with ultraviolet inhibitors, 85 mils (2.2 mm) thick, with vertical root deflecting ribs protruding _ inch (12 mm) to 3/4 inch (19 mm) out from panel, and each panel 24 inches (610 mm) wide by 18 inches in depth. Integrated zipper joining system for panel-to-panel connection.

T. Planting Pits and Trenches: Excavate circular planting pits with tapered sides. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit sheared or smoothed during excavation. Excavate two times as wide as ball diameter. Excavate at least 12 inches (300 mm) wider than root spread and deep enough to accommodate vertical roots for bare-root stock. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball. Subsoil and topsoil removed from excavations may not be used as planting media

U. Maintenance shall begin immediately after each plant is planted and shall continue until
Maintenance required:
1. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring water saucers, resetting to proper grade or vertical position, and performing other operations as required to establish healthy, viable plantings.
2. Planting areas shall be kept free of weeds, grass, and other undesired vegetative growth.
3. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of settling. Do not place mulch within 3 inches (75 mm) of trunks or stems. A continuous, linear mulched area shall be maintained between closely spaced plants to avoid grassed strips less than 2 feet (600 mm) wide or scallops of grass that are difficult to maintain.
4. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use practices to minimize the use of chemicals and pesticides and reduce hazards.
5. Apply pesticides and other chemical products and biological control agents in accordance with authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
6. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings without additional cost to the Owner.
7. Prune, thin, and shape woody materials according to standard professional horticultural and arboricultural practices and in accordance with ANSI A300 (Part 3) Pruning Standards. Unless otherwise indicated by Landscape Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs. Prune to retain natural character.
8. Pruning shall be done with clean, sharp tools. Cuts shall be made at branch collars, leaving no stubs. No tree paint shall be used.

0 5 10 20
SCALE in FEET
1"=10'

Parris Terraces Development

60 Parris Street
Portland , Maine

Applicant:

Jack Soley; Horton, LLC
Box 411
100 Commercial Street, Suite 306
Portland, Maine
207-808-4714
jsoley@eastbrowncow.com

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102 EXCHANGE STREET
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MRLD
Landscape Architecture + Urbanism

RANSOM
Consulting, Inc.
Civil Engineer
Ransom Consulting, Inc.
400 Commercial Street, Suite 404
Portland, Maine 04101
207-772-2891

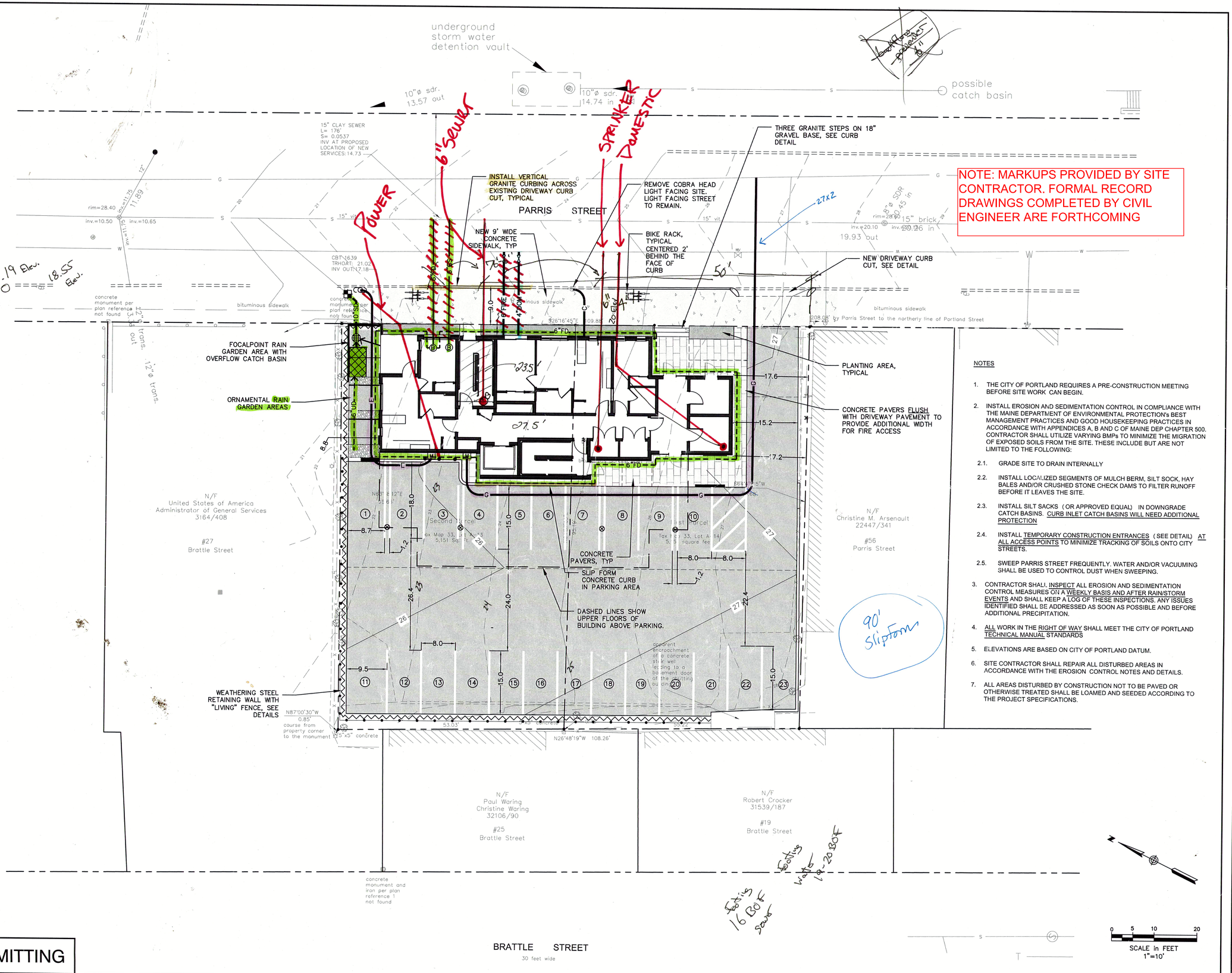
LANDSCAPE PLAN

No.	Revision/Issue	Date
3	ADDED PLANTER/CHANGED GRASS	7.25.18
2	ADJUSTED HEIGHT OF CEDAR FENCE	5.8.18
1		5.1.18

Design by: MHR
Drawn by: MHR
Checked by: MHR
Approved by: MHR

Project: 2017.35

Sheet No: L-1



NOTES

1. THE CITY OF PORTLAND REQUIRES A PRE-CONSTRUCTION MEETING BEFORE SITE WORK CAN BEGIN.
2. INSTALL EROSION AND SEDIMENTATION CONTROL IN COMPLIANCE WITH THE MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION'S BEST MANAGEMENT PRACTICES AND GOOD HOUSEKEEPING PRACTICES IN ACCORDANCE WITH APPENDICES A, B AND C OF MAINE DEP CHAPTER 500. CONTRACTOR SHALL UTILIZE VARYING BMPs TO MINIMIZE THE MIGRATION OF EXPOSED SOILS FROM THE SITE. THESE INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING:
   - 2.1. GRADE SITE TO DRAIN INTERNALLY
   - 2.2. INSTALL LOCALIZED SEGMENTS OF MULCH BERM, SILT SOCK, HAY BALES AND/OR CRUSHED STONE CHECK DAMS TO FILTER RUNOFF BEFORE IT LEAVES THE SITE.
   - 2.3. INSTALL SILT SACKS (OR APPROVED EQUAL) IN DOWNGRADE CATCH BASINS. CURB INLET CATCH BASINS WILL NEED ADDITIONAL PROTECTION
   - 2.4. INSTALL TEMPORARY CONSTRUCTION ENTRANCES (SEE DETAIL) AT ALL ACCESS POINTS TO MINIMIZE TRACKING OF SOILS ONTO CITY STREETS.
   - 2.5. SWEEP PARRIS STREET FREQUENTLY. WATER AND/OR VACUUMING SHALL BE USED TO CONTROL DUST WHEN SWEEPING.
3. CONTRACTOR SHALL INSPECT ALL EROSION AND SEDIMENTATION CONTROL MEASURES ON A WEEKLY BASIS AND AFTER RAIN/STORM EVENTS AND SHALL KEEP A LOG OF THESE INSPECTIONS. ANY ISSUES IDENTIFIED SHALL BE ADDRESSED AS SOON AS POSSIBLE AND BEFORE ADDITIONAL PRECIPITATION.
4. ALL WORK IN THE RIGHT OF WAY SHALL MEET THE CITY OF PORTLAND TECHNICAL MANUAL STANDARDS
5. ELEVATIONS ARE BASED ON CITY OF PORTLAND DATUM.
6. SITE CONTRACTOR SHALL REPAIR ALL DISTURBED AREAS IN ACCORDANCE WITH THE EROSION CONTROL NOTES AND DETAILS.
7. ALL AREAS DISTURBED BY CONSTRUCTION NOT TO BE PAVED OR OTHERWISE TREATED SHALL BE LOAMED AND SEEDED ACCORDING TO THE PROJECT SPECIFICATIONS.

FOR PERMITTING

Parris Terraces Development

60 Parris Street
Portland , Maine

Applicant:

Jack Soley; Horton, LLC
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Tim Hebert - 212-2176
Roger 212-9543

KAPLAN THOMPSON ARCHITECTS
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MRLD
Landscape Architecture + Urbanism

RANSOM
Consulting, Inc.
Civil Engineer
Ransom Consulting, Inc.
400 Commercial Street, Suite 404
Portland, Maine 04101
207-772-2891

STATE OF MAINE — John I. Mahoney #12340 — LICENSED PROFESSIONAL ENGINEER

SITE PLAN

No.	Revision/Issue	Date
B	PERMITTING/PRICING	2/8/18
A	PERMITTING	12/13/17

Design by: JIM	Checked by: SJB
Drawn by: TGN	Approved by: SJB
Project: 171.06098	2017-11-17

Sheet No: C-1

P:\2017\171.06098\06_Parris St\Drawings\Working Drawings\Parris St-Ransom-Working.dwg C-1 Feb 08,2018- 4:49pm






HomeWrap
Tyvek
HomeWrap


HomeWrap
DUPONT


HomeWrap
DUPONT
Tyvek
HomeWrap


HEBERT
HEBERT
HEBERT
CONSTRUCTION
Tyvek
Tyvek


COMMERCIAL
SPACE
AVAILABLE
773-7000
LEANERS
PARKING
LOT
FOR LEASE
773-7000
PARKING












15 MINUTE
PARKING
LIMITED TO
POSTAL
CUSTOMERS
ONLY


NO
PARKING
ANY
TIME
15
126·174


BLIND
PEDESTRIAN

Memorandum
Planning and Urban Development Department
Planning Division

To:	Sean Dundon, Chair and Members of the Portland Planning Board
From:	Matthew Grooms, Planner
Date:	May 23, 2019
Re:	Level III Master Development Plan, Portland Square, North River IV, LLC
Project #:	PL-000599-2019
Meeting Date:	May 28, 2019

I. INTRODUCTION

North River IV, LLC has submitted a Level III Master Development Plan (MDP) application for a phased mixed-use redevelopment of a two-block area (existing surface parking tied to Portland Square One and Two) in Portland's Downtown and Old Port district. As proposed, the project includes five (5) separate phases, six new buildings (two of which are proposed over the parking garage) and a development scheme consisting of 135-room hotels, 548,127 square feet of office space, 48,153 square feet of retail space, 76 apartments (one- and two- bedroom) and 1,336 structured parking spaces.



Figure 1: Development Site in context

Two Level III site plan applications, directly tied to the Portland Square MDP have been submitted for review, and are pending Planning Board approval. The first is a proposal by Fathom Company to construct a new 135-room hotel at 1 Center Street (PL-000448-2018), and was considered by the Planning Board at a workshop held on February 12, 2019. The second application (PL-000606-2019), is a proposal by Portland Square One and Two to reduce their overall parking requirement by 90 spaces so as to sell off a portion of the lower site for the hotel at 1 Center Street. This proposal is undergoing a Planning Board workshop on May 28, 2019, following discussion of the Portland Square MDP.

The project will require advisory review by the Historic Preservation Board, given that portions of the plan area are either within a designated district, or within 100 feet of either a district or landmark. As of the writing of this memorandum, that meeting has not yet been scheduled.

Review of the Portland Square MDP is anticipated to require multiple Planning Board Workshops (at a minimum two). The intent of this first workshop is to introduce the Planning Board to the overall project and provide initial feedback on site and building design, area-wide utilities and stormwater concepts. A

second workshop, focused specifically on traffic-related impacts and mitigation schemes, will occur at a later date.

This development is being referred to the planning board for compliance with the MDP standards of the land use code. A total of 213 notices were sent to property owners within 500 feet of the site and a legal ad ran in the *Portland Press Herald* on May 17th and May 18th. A Neighborhood Meeting was held on May 22, 2019. The meeting notes are not yet received, and shall be made available prior to the workshop.

Applicant: North River IV, LLC, Christopher Flagg

Consultants: Stephen Weatherhead, Winton Scott Architects; Patrick Carroll, Carroll Associates; Barry Sheff, Woodard and Curran; John Swan, Owen Haskell, Jacques Dan, North River Company/Waterfront Maine

II. REQUIRED REVIEWS

Review	Applicable Standards
Master Development Plan (MDP)	Section 14-527.a.c.3
Waivers	**Applicable Standards**
Sec. 14-352 – Loading Bays – to permit loading bays measuring 12 feet in width. **Staff Recommendation:** Staff have not yet formalized a recommendation on this waiver request.	Sec. 14-352 requires that each loading bay be at a minimum, 14 feet wide by 50 feet deep.

A Master Development Plan is a regulatory option for sites with one acre or more in cumulative lot area that is designed as a cohesive and integral development program consisting of multiple buildings and associated site improvements, built in phases over an extended timeframe (Sec. 14-522). An approved MDP establishes parameters to be adhered to for the full development, including the total number of residential units, types of uses, lot coverage, open space, stormwater management, infrastructure, traffic, parking, site layout and circulation. This is a regulatory option, at the discretion of the applicant, with the intent of establishing a cohesive program for a site, while allowing a site to be built out over an extended time-frame. MDPs may be developed concurrently with site plans and/or subdivisions, or independently. Approval of an MDP does not constitute an authorization for development, but it does maintain the applicability of regulations in effect at the time of the approval for as long as the MDP approval remains valid (six years, with possible extensions).

Master Development Plan submission requirements are purposefully not as detailed as Site Plan and (when applicable) Subdivision requirements, which will be required before any development on the site can proceed. When reviewing and making the eventual decision of this application under the review standards of Section 14-524.a.3.ciii, Section 14-524.f.iv (*Planning Board Master Development Plan Decisions*) states:

The Planning Board shall approve, approve with conditions, or deny a Master Development Plan application based upon the applicable review standards. An approval, including an approval of waivers, establishes the general parameters to be adhered to for the development, including the supporting documentation for floor area ratio and/or residential density, general types of uses, building coverage, generalized open space plans and infrastructure systems.

A Master Development Plan approval shall not be construed as final authorization of the development. Approval shall confer pending proceeding status upon the development with the effect of maintaining the applicability of regulations in effect at the time of approval for as long as the master Development Plan approval remains valid, including permissible extensions if granted.

III. PROJECT DATA

Existing Zoning	B-3 Downtown Business, DE Overlay, PAD, Old Port Historic District		
Existing Use	Surface Parking Lot (542 spaces)		
Proposed Use	Office Space	548,127 SF	
	Retail Space	48,153 SF	
	Apartments	76 (1- and 2- bedroom units)	
	Hotel	135 Rooms	
	Structured Parking	1,336 spaces	
Property Size	6.45 acres		
	Existing	*Proposed*	*Net Change*
Building Footprint	42,643 SF	187,833 SF	145,190 SF
Building Floor Area	273,191 SF	1,047,859 SF	774,668 SF
Impervious Surface Area	225,000 SF	300,000 SF	50,000 SF
Parking Spaces	584 spaces	1,336	752
Bicycle Parking Spaces	10	98	88

IV. EXISTING CONDITIONS AND SITE CONTEXT



Figure 2: Project site is split by Fore Street, and includes surface parking on both sides of the street.

The project site occupies 6.45 acres, on two separate city blocks (split by Fore Street) located adjacent to Portland's downtown and Old Port District. The upper block, bounded by Spring, Fore, Cotton and Union Streets, as well as a discontinued portion of Cross Street, is occupied by two existing office buildings with ground floor retail uses (One and Two Portland Square), with 236 surface parking spaces, and 42 structured parking spaces. The lower block, bounded by Commercial, Fore, Center and Cross Streets, includes the Richardson Wharf Building (under separate ownership) and 306 surface parking spaces. All parking on both blocks is nominally provided to serve Portland Square One and Two, though both lots provide public parking that is available to both daily and monthly parkers.

The development site is located entirely within the B-3 Downtown Business district, with portions of the site located in the Old Port Historic District, the Pedestrian Activities District (PAD), and within the Downtown Entertainment District. For a more detailed discussion of zoning, please see the zoning analysis discussion below under Section X of this memorandum.

The surrounding context consists largely of high intensity commercial development, given the site's location within Portland's central business district. To the south, water-dependent, marine-related and compatible non-marine development characterize Portland's working waterfront. To the north and east (and west along Commercial Street), there are a wide variety of commercial uses, notably retail and restaurant uses associated with the Old Port, prominent hotels such as the Courtyard Marriott (321 Commercial Street) and Hyatt Place (433 Fore Street), several large office buildings such as the MEMIC building (261 Commercial Street) and development at Canal Plaza. Development intensity declines as one moves west, transitioning from predominantly commercial to predominantly residential, over the course of four blocks.

V. MASTER DEVELOPMENT PLAN PROGRAM

The proposal now under consideration is a mixed-use development, with retail, office, hotel and residential uses, served by substantial structured parking. The development would occur over five separate phases.

A. Phase Components



Figure 3: Phasing Plan

Phase 1: 135-room hotel with ground floor 4,192 square feet of retail/restaurant space along Commercial Street or within proposed rooftop bar. Proposed at corner of Commercial and Center Street.



Figure 4: Proposed hotel and associated restaurants shown in white, at corner of Center and Commercial Street.

Phase 2: Seven-story parking garage with 1,100 parking spaces and retail/residential wrap, with eighteen (18) residential units and 5,964 square feet of retail space. Proposed on remainder portion of upper block with frontage on Spring, Cotton, Cross and Fore Streets.



Figure 5: Note, phase 2 does not include two towers, shown in white/grey.

Phase 3: Four-story office building with 82,700 square feet of office space, 7,177 square feet of ground floor retail space and 194 structured parking spaces, with garage entrance/exit accessible off of Cross

Street. This phase includes development of the proposed mid-block permeability, with landscaped courtyard providing access between Fore and Commercial Street. A series of commercial vestibules are proposed to create a pedestrian mall feel. At this time, the last remaining surface parking would be converted to lawn or landscaped space in anticipation of the next phase. Proposed at corner of Cross and Fore Streets.



Figure 6: View of Phase 3 Office Building in foreground, from Cross and Fore Street intersection.



Figure 7: View of pedestrian courtyard, mid-block permeability between Fore and Commercial Street, proposed as part of Phase 3.

Phase 4: Five-story residential building with 58 residential units and 22,472 square feet of ground floor retail. Proposed at corner of Center and Fore Streets.



Figure 8: View of Phase 4 residential building from corner of Fore and Center Street.

Phase 5: 205,06 square feet of office space, constructed atop parking structure in two separate towers.



Figure 9: Phase 5 office towers, to be constructed over garage, are shown in white/grey.

B. Stormwater and Utilities:

The proposed Portland Square redevelopment will be serviced by public water, sanitary sewer, electric, natural gas and telecommunications. As indicated in the material submitted by the applicant, the project

team will coordinate utility design at time of individual site plan review, with much of the utility work occurring early in the overall development scheme, so as to support later phases (for example, phase 2 utility work will be sized to service phase 5). A plan of proposed utilities and relevant timing is provided below.

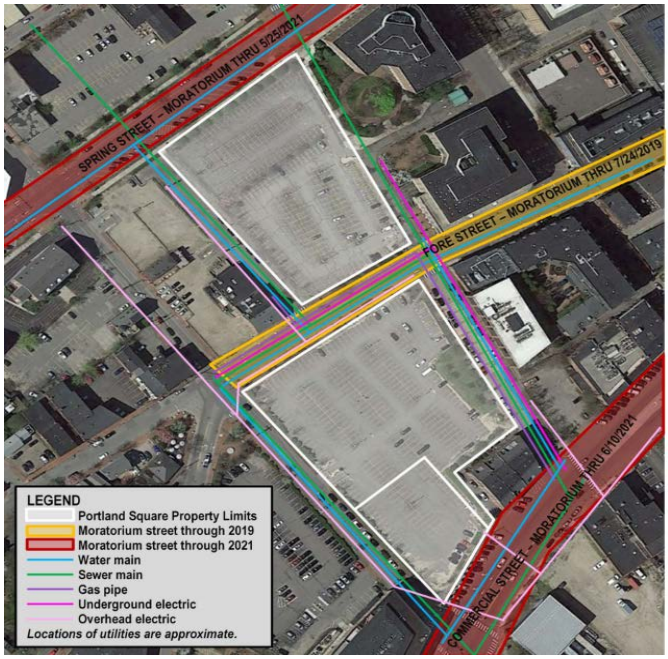


Figure 10: Utility scheme for Portland Square MDP

	Spring Street	Cotton Street	Fore Street	Center Street	Commercial Street	Lower Cross Street	Upper Cross Street
Water (Domestic)	No Utility Connections Proposed Moratorium until 6/10/2021	No Utility Connections Proposed	Phase 2(x2) Phases 3/4	Phase 1 Phase 4	No Utility Connections Proposed Moratorium until 5/25/2021	Phase 3	
Water (Fire Control)			Phase 2 Phases 3/4	Phase 1 Phase 4		Phase 3	
Sanitary Sewer			Phase 2 Phases 3/4	Phase 1 Phase 4		Phase 3	Phase 2(x2)
Electric				Phase 1 Phase 4		Phase 3	Phase 2
Gas			Phase 2 Phases 3/4	Phase 1			
Telecommunications				Phase 1		Phase 3	

Figure 11: Phasing scheme for utilities

Regarding stormwater improvements, the applicant has developed a general concept plan to service the overall development. This concept is to be refined and designed with more detail as part of each individual phase. The proposal qualifies as a redevelopment under Maine DEP, and is required to treat 50% of impervious surface. Jellyfish Filters for treatment and R-Tank subsurface systems for pre-treatment channel protection volume storage were evaluated for the preliminary stormwater design. This system is approved as a Maine DEP stormwater best management practice. Additional stormwater treatment may be provided by a series of green roofs, though for the purposes of the MDP, these are not being considered for a stormwater function.

VI. ZONING ANALYSIS

As shown, the Master Development Plan complies with the zoning requirements of the B-3 zone, which encourages a near maximum buildout of lots, particularly at ground level. For example, the B-3 permits up to 100% lot coverage and by extension, 100% impervious surface, and requires that building facades be located no further than five (5) feet from the street right-of-way. Regarding building height, no portion of a building located within 50 feet of a right-of-way may be less than 35' feet tall, and maximum height depends upon location, illustrated by the downtown height overlay map. The majority of the upper block is permitted a maximum height of up to 125' feet above average grade, with only a narrow strip along Fore Street being restricted to a height of 85' feet. This block is also subject to a series of stepback requirements, particularly along Spring Street. The maximum height for the lower block is 65' feet.

The list of proposed uses, while still preliminary, are all considered permitted uses within the zone, namely; multi-family residential, pedestrian oriented retail establishments, restaurants, hotels, and general office uses. Similarly, structured parking is favored over surface parking, es evidenced by the fact that it is a permitted use. Surface parking meanwhile is a conditional use within the zone.

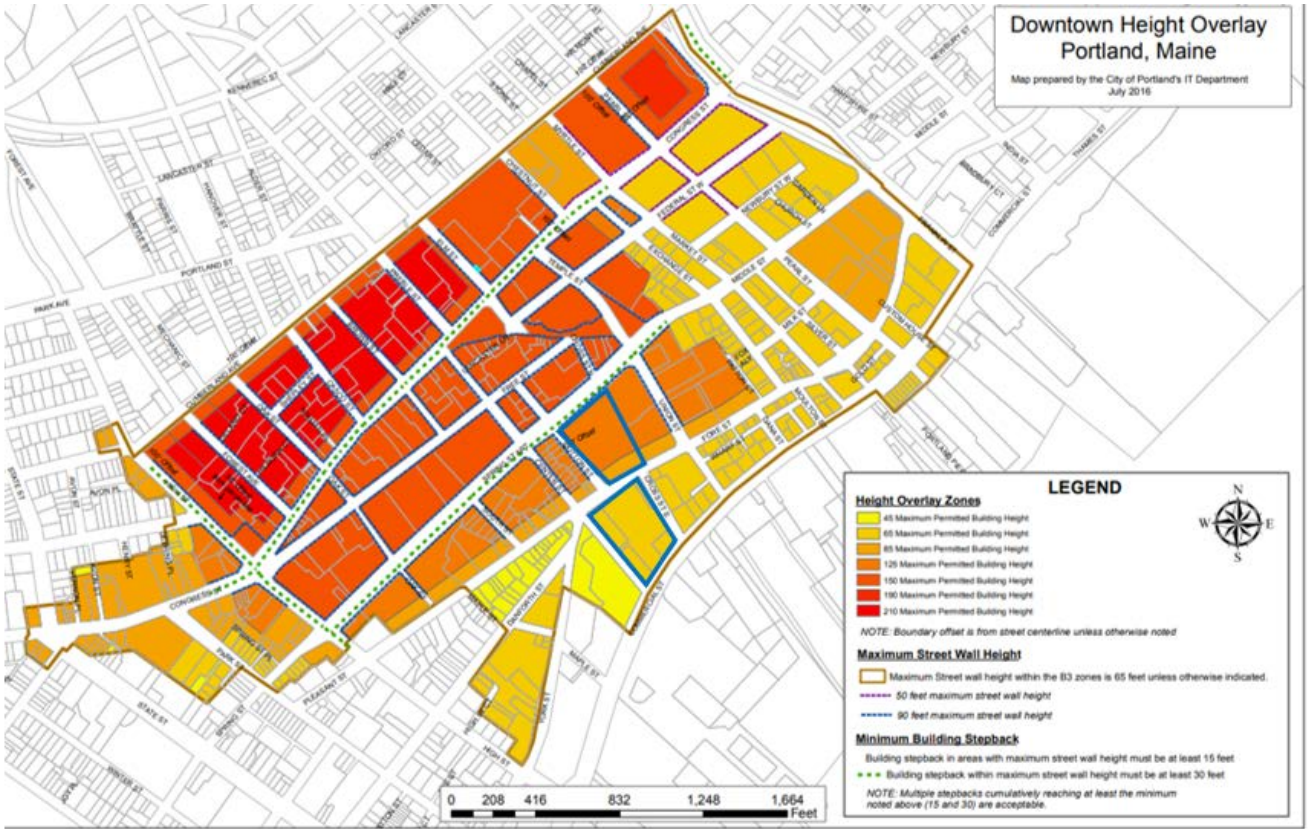


Figure 12: Downtown height overlay map. Project site is outlined in blue.

Pedestrian Activities District (PAD):

The majority of the development frontage falls within the Pedestrian Activities District (PAD), including all frontage along Commercial, Center and Fore Streets. The Spring Street frontage is identified as a PAD encouragement area. This overlay zone, as its name would suggest, is intended to ensure that ground floor uses activate pedestrian spaces, creating a safe and vibrant pedestrian environment in Portland's

downtown. Buildings located within this overlay zone are required to activate a minimum of 75% of their frontage, to a minimum depth of 20 feet. This activation is achieved through a requirement that only certain uses be permitted, particularly uses accessible and open to the public such as retail establishments, restaurants, museums and galleries to name a few. These requirements still apply where a building has more than one such frontage. The only exception provided by the overlay zone is for scenarios where one such frontage measures less than 40 feet, and must also accommodate a service entrance.

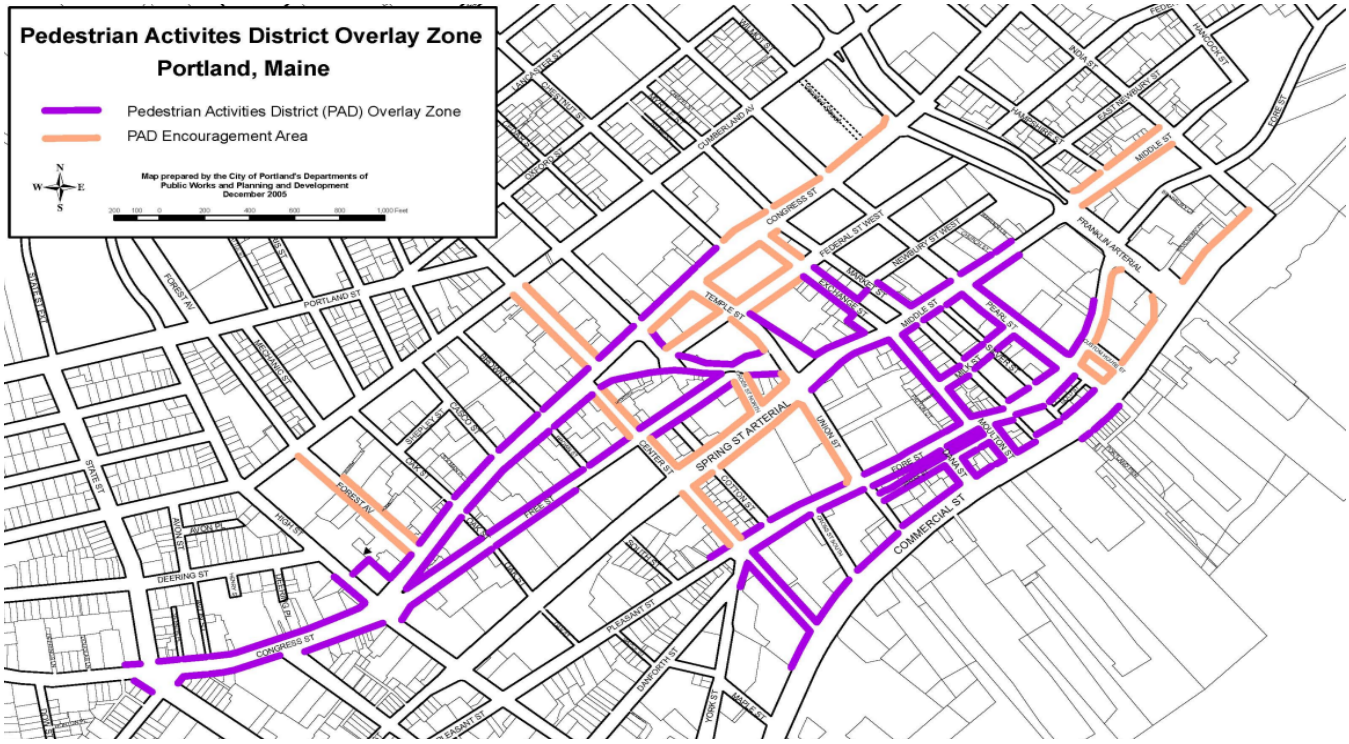


Figure 13: Pedestrian Activities District Map

Downtown Entertainment Overlay Zone (DEOZ):

The Downtown Entertainment Overlay Zone encompasses all property located within the B-3 zone, and states that properties seeking an entertainment license shall be located no closer than 100 feet from the nearest license holder. For more information, such licenses and activity are further regulated by Chapter 4 of the City's Code. While no information has been provided in regards to this requirement, the development shall be required to comply with the provisions of this overlay zone.

VII. STAFF REVIEW

A. Master Development Plan Submission Requirements (14-527(e))

The material provided by the applicant generally fulfills the submission requirements for a Master Development Plan, though some of the submission materials would benefit from further elaboration as stated below:

- **Design Narrative –** The cover letter includes a section titled, 'Primary Design Considerations' which discusses the surrounding context and loosely links that context to the proposed site and

building design. In staff's initial design review, it was noted that a more substantive review of the context should be undertaken, and that such review should more transparently inform the proposed design.

- **Easements –** The submission materials list all existing and proposed easements. When available, all such easements should be illustrated on a plan to better understand encumbrances being placed on the site.

- **Traffic –** A Traffic Movement Permit (TMP) application has been received by the City, and has undergone an initial scoping meeting. Staff have provided feedback on that application, and are requesting additional information, described in greater detail below under review of the standards.

- **Consistency with Comprehensive/City Master Plans** – Application does not include a discussion of the project's consistency with the City's guiding policy documents, and should include such analysis as part of a follow-up submission. As part of staff's initial review, we find the project to be generally consistent with the intent of Portland's Plan 2030, which is discussed in greater detail under the Consistency with the Comprehensive Plan section of this memorandum.

- **Impact on City Services** – MDP submission requirements state that an application shall include information on projected impact to city services, including those forecasted for the public-school system and public infrastructure. Such information should be included as part of any follow-up submission. Utility capacity letters, when available, shall also be provided.

B. Master Development Plan Standards (14-524(a)3.c(iii))

Section 14-524 of the city's land use code establishes standards under which Master Development Plan applications must be reviewed. Per this section, Master Development Plans shall adhere to the following requirements:

a. *A designated tract of land consisting of a parcel or parcels of contiguous land or land on both sides of a street, totaling one (1) acre or more;*

   Staff Comment: The project area totals 6.45 acres spread across multiple contiguous parcels and separated by Fore Street. The property meets this requirement.

b. *Developed in a comprehensive, design-integrated manner, according to an overall master development plan;*

   Staff Comment: Staff have provided initial comments on site and building design, and have raised concerns regarding integration of the upper block into the surrounding context given its scale and proposed level of connectivity. The lower block appears more successful in its compliance with this requirement.

c. *Consistent with the City's Comprehensive Plan and consistent with City Council approved master plans and facility plans for off-premise infrastructure, including but not limited to, trails, pedestrian*

and bicycle network, view corridors, environmental management, sewer and stormwater, streets, or other facilities (see Section 15 of the Technical Manual);

Staff Comment: Staff are asking that the applicant provide a written narrative describing the project's consistency with the Comprehensive Plan and city approved master plans. The development program appears to be generally consistent in terms of its proposed uses, its improvements to the existing street grid and area-wide connectivity, and its proposed reconfiguration of Spring Street, however more analysis is required.

d. *Developed so as to locate buildings and improvements in a manner that provides usable open space, preserves significant natural features, as defined by the site plan ordinance standards, and preserves existing trees to the maximum extent possible;*

Staff Comment: The property is almost entirely developed, with minimal landscaping around the perimeter, and more substantially behind the Richardson Wharf building and where the discontinued portion of Cross Street meets Spring Street. The MDP eliminates much of the existing landscaping in order to meet the 5-foot build-to-line requirement of the B-3 zone, and instead, proposes street trees in accordance with City standards and a series of roof gardens on both the upper and lower site. These green spaces would be accessible to either building tenants (upper site) or to the general public (lower site) and serve as usable open space, and in the case of the lower site, a vital pedestrian connection between Fore and Commercial Street. The site does not contain significant natural features.

Jeff Tarling, City Arborist, has reviewed the application, and provides the following comment (Attachment 2):

- One opportunity to consider would be continuation of the greenery that the One Portland Square project created and expand that element throughout the project edges and Cross Street. Cross Street could become an important pedestrian walkway connecting Commercial Street to the Downtown / One City Center & Monument Square. The existing link between the 2 Portland Square buildings already connects to Canal Plaza.

  With Portland becoming more of a tourist destination, and with hotel uses in particular being less car centric and more pedestrian focused, greenery and plaza nodes should be integrated as a theme in these new concept plans. One can look to the much larger, urban Boston Seaport to see great examples of creating public spaces for visitors along with the buffering provided by street trees, plazas and landscaping.



Figure 14: Concept outlined by City Arborist of pedestrian connection between Commercial Street and Monument Square via Cross Street.

e. *Ordinance standards for designated landmarks or for properties within designated historic districts or designated historic landscapes, if applicable. When proposed adjacent to or within one hundred (100) feet of designated landmarks, historic districts or historic landscapes, the Master Plan shall be developed so as to be generally compatible with the major character-defining elements of the landmark or portion of the district in the immediate vicinity of the proposed development;*

Staff Comment: The applicant is aware that the MDP will need to be reviewed by the Historic Preservation Board against these standards. As of the writing of this memorandum, no meeting with the HP Board has occurred, though the Historic Preservation Program Manager, Deb Andrews, did participate in and inform the initial design review. Staff has provided initial design comments, and will seek feedback from the Planning Board before bringing this item to the HP Board. Following that meeting, staff are looking to schedule a comprehensive design meeting with the applicant to consolidate feedback and provide more formal recommendations.

f. *An efficient use of land which properly considers topography and protects significant natural features including, but not limited to, waterways, wetlands, floodplains and wildlife;*

Staff Comment: As mentioned above, the site does not contain significant natural features, and the proposed design thoughtfully incorporates the grade change into its development program. For example, at the corner of Cross and Spring Street, a view easement is proposed to be enhanced. Within the lower block, a monumental external stairway is proposed, to bridge the grade change between Fore and Commercial Street, and bridge that gap, providing valuable outdoor space available to the general public.

g. *An efficient use of land demonstrating full coordination of its own site development and surrounding context including, but not limited to, the land uses and functions contemplated, architecture, open space and pedestrian networks, vehicular access and circulation, and all other infrastructure.*

Staff Comment: While still in the initial review stage, the proposal generally demonstrates coordination of its site elements as related to use, site integration and open-space. Regarding design, more analysis is still required as was indicated above, and there are concerns that the upper block's monolithic parking structure may overwhelm the block and surrounding context.

The proposed project generates traffic volumes that require a Traffic Movement Permit. The Applicant has submitted a Traffic Movement Permit application and the Scoping Meeting was held on May 15, 2019. It is anticipated that the next workshop will focus on traffic, and provide opportunity for the applicant to address staff comments related to traffic. A summary of the items discussed at the TMP Scoping Meeting is included as Attachment 3.

h. Linked and coordinated with surrounding land uses, infrastructure and off-site public facilities, including but not limited to the public-school system, where appropriate, in a manner that is safe, efficient, non-injurious to the public, and an improvement or benefit to the public where possible; and

Staff Comment: As mentioned above, more information is required regarding the anticipated impacts of this development on public services.

i. Designed with sizing of street and other infrastructure systems to accommodate the overall service demand of the Master Plan;

Staff Comment: Applicant has provided a preliminary utility plan, and has indicated that capacity verification is being requested from utility providers. Such verification should be provided when available.

Wright-Pierce has provided preliminary review comments regarding concept stormwater and utility systems, which are outlined below (Attachment 5):

- Stormwater Drainage Requirement:
    - The applicant has indicated that future development proposals will fall under the combined requirements of the Site Location of Development Act (SLODA), as the site is currently under SLODA permit, as well as Level III Site Plan requirements within the City of Portland (City).
    - Flooding Standard: The applicant has indicated that as the project is subject to a SLODA permit modification, adherence to the Flooding Standard is required. Confirmation of pre-development and post-development flow rates is also requested to confirm flows to the combined storm system, as referenced in Land Use Code Chapter 14-526(b)3.a. The applicant anticipated providing calculations in future Level III Site Plan applications for the pre-development and post-development stormwater flow rates for the 24-hour, 2-year, 10-year, and 25-year rain events. Other calculations may be required based on the final design requirements for the proposed stormwater treatment systems. Associated design may require additional best practices for runoff rate reduction in interval storm rates, such as outlet control structures or additional concrete chamber construction.

- Grading and Drainage:

  - Connection to Existing Stormdrain Systems: Connections to combined sewer systems are currently proposed. The existing systems will require confirmation of combined sewer connection and pipe capacity. As part of future applications, the Department of Public Works will be required to confirm that these connections are appropriate under Land Use section 14-526(b)3.a.(iv); and 14-526(c)3.a. The applicant has begun initial conversations with the City on these items, and has indicated that they will pursue further conversations as final design develops.

  - Contour information should be added to the Utility and Grading Plan at not less than 2' intervals.

- Site Utilities Requirement:

  - Storm drain and sewer infrastructure between 1 Portland Square and 2 Portland Square is anticipated to remain. Opportunities to provide sewer separation should be evaluated for these items, and may be required if proposed conditions convey additional surface flows to this infrastructure.

  - Site Lighting: Site lighting is an important aspect of pedestrian safety and access through the facility. Lighting is indicated on the Utility Plans but is not described in the utility memorandum. Proposed lighting is not a required portion of the Master Development Plan process, but will need to be evaluated as a critical piece of future Level III Site Plan applications.

j. Designed to create a street grid pattern that reflects average city block sizes of the neighborhood for street connectivity;

Staff Comment: The MDP illustrates a strengthening of the city's street grid, with Cotton Street being reconnected to Spring Street, as likely a new two-way street. In accordance with the Spring Street Master Plan, on-street parking along Spring Street would be converted from front-in angled parking to parallel, which would make available additional space for sidewalks. The lower block under this proposal is bifurcated by a shared-access pedestrian corridor providing mid-block permeability, and sidewalks generally are being widened.

k. Designed as to create a cohesive identity through building scale, massing, and articulation; use of quality exterior materials, architectural detailing at pedestrian scale; consistency of design and materials for streetscape and pedestrian amenities; framing of outdoor open space and linkages; a clear conveyance of the function and significance of various buildings, entrances, and features; and to generally comply with design and development standards of the zone in which it is located;

Staff Comment: An initial design review was completed on May 16, 2019, conducted by Caitlin Cameron, Urban Designer, Deb Andrews, Historic Preservation Program Manager and Matthew Grooms, Planner. The City's Urban Designer produced a memo to articulate the findings of that review, which are as follows (Attachment 1):

- Relationship with Context: Though these buildings are not expected to replicate the scales and forms of the traditional fabric, there are ways the new buildings can mitigate and transition scale, create a backdrop to the historic buildings, or maintain a continuity of street wall and pedestrian-scale activity and building integration. The residential building especially seems to be lacking a contextual relationship. The "B streets", given the grade change will also need to be considered for appropriate interface with the street while not expected to maintain the level of activity and pedestrian amenity found on Spring, Fore, and Commercial streets.

- Circulation: The Lower Block is designed to mediate the grade change, break up the block with multiple buildings, be of a scale that transitions between the taller downtown buildings, Commercial Street warehouses, and historic residential buildings. The buildings are oriented appropriately towards Commercial and Fore streets treating Center, Cotton, and Cross streets appropriately as "B streets." The mid-block permeability mitigates the scale, mediates the grades and also creates pedestrian connection and amenity. The mid-block circulation should be designed as to not rely on active retail uses to be functional, comfortable, or approachable. Consider CPTED concepts, solar exposure, legibility for these mid-block spaces.

  The Upper Block lacks many of these characteristics found in the Lower Block. The block is almost entirely filled with one building (parking garage). The Fore Street façade will include liner buildings to continue the commercial/mixed uses already happening on that street. The Spring Street façade is less active with one corner activated by an office use and arcade. The concern is whether this is an adequate "face" to Spring Street, whether Cotton and Cross streets are appropriately addressed when it comes to circulation through the block and relationship to the street grid and pedestrian networks as the standard calls for.



Figure 15: Spring Street elevation of garage/office building.

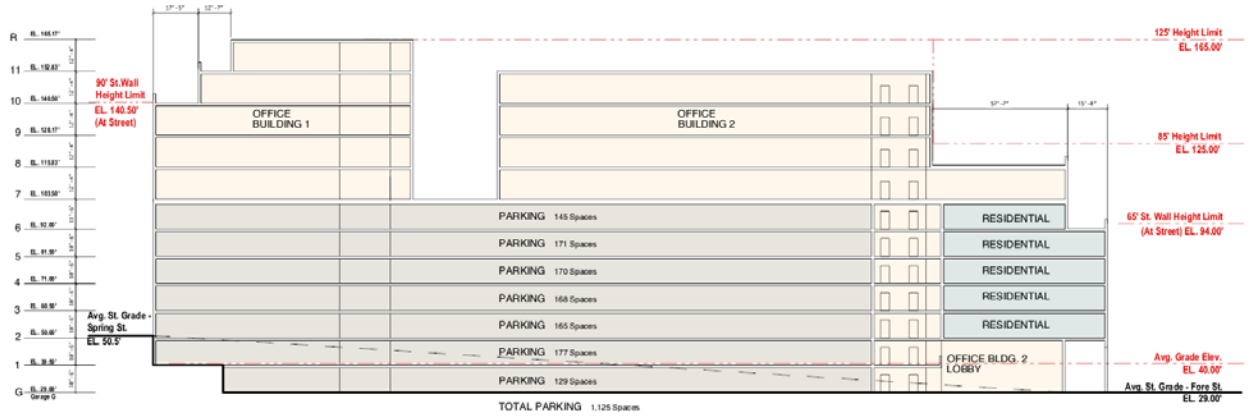


Figure 16: Section view of garage/office building, illustrating length of building along Cotton Street, and lack of pedestrian connectivity across block.

- Architectural Design: The Lower Block has already received design review and approval of the hotel facing Commercial Street. Therefore, the two remaining buildings – office and residential are the focus of review. Staff found the residential building to be out of character with the context and the identity of the MDP. The materials, façade composition, proportions do not emphasize or reference characteristics of the surrounding context or even within the proposed development. The office building has a good direction for massing and composition that transition between the buildings in context. The fenestration and proportions on the side streets require further iteration and review.

  The Upper Block tries to mitigate the scale of the garage and footprint of the building by varying the massing of the upper floors. The result, however, are forms and rooflines that are complex and anachronistic with the character of buildings in Portland and the immediate context. These forms should be reconsidered, simplified, with forms and massing that relate to the context. The treatment of the building as it steps down the grade on the "B streets" also need further consideration. Generally, design review should focus on how the building relate to the streetscape/human scale and also from the long-views.

  Overall, there are some elements that create cohesive identity – material palette being one. Staff caution against the buildings being too similar as to create an artificial character. The character of these new buildings should draw from the characteristics found nearby (simplicity, regularity) but also creating new identity as appropriate for new, contemporary buildings – most of the proposed buildings seem headed in this direction.



Figure 17: View of garage/office building looking up Cotton Street, illustrating building articulation elements.

- Staff's Recommendation:
  - Historic Preservation Board should review the MDP and provide comment regarding compatibility prior to further staff/Planning Board review.

  - Design guidelines should be developed for this Master Plan that would apply to future site plan application to guide on relationship to context within the complex.

l. Inclusive of provisions for the ownership and maintenance of usable open space as appropriate;

Staff Comment: The applicant has indicated that roof gardens proposed for the upper block may be accessible to building tenants, and that the lower block pedestrian corridor shall be made accessible by public access easement. At this point, maintenance mechanisms, such as easements and or/written agreements have not been provided. Staff is requesting that these be provided for review.

m. For areas proposed as future development phase(s), the proposed interim conditions shall be managed and maintained to ensure stable, safe and attractive site conditions.

Staff Comment: The proposed phasing plan addresses the interim conditions of the site, replacing existing surface parking with either building or landscaped area at the earliest practicable point in the process.

The one concern raised by staff is in regards to Phase 1 of the development, which involves development of a new 135-room hotel and removal of ninety (90) surface parking spaces. The applicant's parking study, completed under separate application for the Level III amendment (PL-000606-2019), identifies that the parking lot may be over capacity once the hotel comes online. Parking demand is alleviated once Phase 2 (1,100 space parking garage) of the MDP is completed. We

are requesting that the hotel proposal (PL-000448-2018) account for its parking requirement in the interim between phases.

VIII. NEXT STEPS

Staff is looking for initial feedback on the overall concept as it relates site and building design, utility layout and stormwater management. Following the Planning Board workshop, staff will coordinate with the applicant to schedule a meeting with the Historic Preservation Board to discuss design. Feedback from staff, the Planning Board and Historic Preservation Board should be utilized to develop general design guidelines that apply to the entire project, and that govern future phases.

Based upon feedback from the TMP Scoping Meeting, the applicant should compile data as requested and resubmit an updated application. Once that information is available, staff will coordinate with the applicant and Planning Board to schedule a second workshop, that will focus explicitly on traffic.

IX. ATTACHMENTS

Staff Attachments

1. Preliminary Design Review Comments
2. Preliminary Landscape Comments
3. Traffic Recommendations Regarding TMP Scope
4. TMP Scoping Meeting Notes
5. Preliminary Stormwater and Utility Comments
6. Public Comment
    a. PC1: Elizabeth Parsons
    b. PC2: Lauren Reiter

Applicant's Documents

A. Cover Letter
B. Authorization Letter
C. Master Development Plan Checklist
D. Evidence of State/Federal Approvals
E. Major Landscaping
F. Easements and Covenants
G. Natural Features
H. Financial Capacity
I. North River Deed
J. Technical Capacity
K. Stormwater Memo
L. TMP Applications
M. Views and Historic Features
N. Waiver Table
O. Zoning Analysis (Upper Site)
P. Zoning Analysis (Lower Site)

Plans

P1. Lower Lot Survey
P2. Upper Lot Survey
P3. Utility Master Plan
P4. MDP Site Plan
P5. Phasing Plan
P6. Pedestrian Diagram
P7. Neighborhood Context Map
P8. Landscape Plan
P9. Lower Level Floor Plan Level 1
P10. Lower Level Floor Plan Level 2
P11. Lower Level Floor Plan Level 3
P12. Lower Level Floor Plan Level 4
P13. Lower Level Floor Plan Level 5
P14. Lower Level Floor Plan Level 6
P15. Lower Level Floor Plan Level 7
P16. Lower Level Sections A & B
P17. Lower Level Sections C & Average Grade
P18. Upper Level Floor Plan Level G
P19. Upper Level Floor Plan Level 1
P20. Upper Level Floor Plan Level 2
P21. Upper Level Floor Plan Level 3
P22. Upper Level Floor Plan Level 4
P23. Upper Level Floor Plan Level 5
P24. Upper Level Floor Plan Level 6
P25. Upper Level Floor Plan Level 7
P26. Upper Level Floor Plan Level 8
P27. Upper Level Floor Plan Level 9
P28. Upper Level Floor Plan Level 10
P29. Upper Level Floor Plan Level 11
P30. Upper Level Floor Plan Level 12
P31. Upper Level Sections
P32. Center Street Elevation
P33. Cotton Street Elevation
P34. Cross Street Elevation
P35. Fore Street North Elevation
P36. Fore Street South Elevation
P37. Spring Street Elevation
P38. Upper Cross Street Elevation
P39. Overhead View NE
P40. Overhead View NW
P41. Overhead View Plaza
P42. Overhead View SE

P43. Corner of Fore and Center
P44. Corner of Fore and Cotton
P45. Corner of Fore and Cross
P46. Corner of Spring and Cotton
P47. Cross Street Views
P48. Plaza View from Fore
P49. Plaza View
P50. Spring Street Entrance
P51. Stair and Ramp Views

Planning and Urban Development Department
Planning Division

Subject: Design Review – 1 Portland Square Master Plan
Written by: Caitlin Cameron, Urban Designer
Date of Review: Thursday, May 16, 2019

The proposed master plan for Portland Square will be reviewed according to the Master Plan criteria but must also generally comply with the B3 design standards. In future Site Plan design reviews, individual building projects will be subject to the B-3 and possibly Multi-family design standards. The preliminary review was conducted by Caitlin Cameron, Matt Grooms, and Deb Andrews.

In the Master Plan level review, the design considerations include:

- Developed in a comprehensive, design-integrated manner
- Designed to be in conformance with Portland's Historic Preservation Ordinance standards . . . the Master Plan shall be developed so as to be generally compatible with the major character-defining elements of the portion of the district in the immediate vicinity
- Coordination with surround context including open space and pedestrian networks
- Designed to create a street grid pattern that reflects average city block sizes of the neighborhood for street connectivity
- Designed so as to create a cohesive identity through building scale, massing, and articulation . . . to generally comply with the design and development standards of the zone (B3)

In this case, the immediate context includes the taller, more contemporary buildings to the west, surface parking lots, and smaller scale, historic buildings both commercial and residential. Though the design and placement of buildings should be sensitive to neighboring residential and park contexts, the zoning and block size allow for considerable scale of building on these two blocks. There is considerable grade change throughout these two blocks contributing to some of the design decisions.

Staff Comment – Preliminary
In the preliminary review, staff focused on general, big-picture responses to the block layout, forms and massing, and character of architecture depicted. The following comments are meant to bring to the Board's attention the topics discussed and areas of concern.

Relationship with Context: Though these buildings are not expected to replicate the scales and forms of the traditional fabric, there are ways the new buildings can mitigate and transition scale, create a backdrop to the historic buildings, or maintain a continuity of street wall and pedestrian-scale activity and building integration. The residential building especially seems to be lacking a contextual relationship. The "B streets", given the grade change will also need to be

considered for appropriate interface with the street while not expected to maintain the level of activity and pedestrian amenity found on Spring, Fore, and Commercial streets.

Circulation: The Lower Block is designed to mediate the grade change, break up the block with multiple buildings, be of a scale that transitions between the taller downtown buildings, Commercial Street warehouses, and historic residential buildings. The buildings are oriented appropriately towards Commercial and Fore streets treating Center, Cotton, and Cross streets appropriately as "B streets." The mid-block permeability mitigates the scale, mediates the grades and also creates pedestrian connection and amenity. The mid-block circulation should be designed as to not rely on active retail uses to be functional, comfortable, or approachable. Consider CPTED concepts, solar exposure, legibility for these mid-block spaces.
The Upper Block lacks many of these characteristics found in the Lower Block. The block is almost entirely filled with one building (parking garage). The Fore Street façade will include liner buildings to continue the commercial/mixed uses already happening on that street. The Spring Street façade is less active with one corner activated by an office use and arcade. The concern is whether this is an adequate "face" to Spring Street, whether Cotton and Cross streets are appropriately addressed when it comes to circulation through the block and relationship to the street grid and pedestrian networks as the standard calls for.

Architectural Design: The Lower Block has already received design review and approval of the hotel facing Commercial Street. Therefore, the two remaining buildings – office and residential are the focus of review. Staff found the residential building to be out of character with the context and the identity of the MDP. The materials, façade composition, proportions do not emphasize or reference characteristics of the surrounding context or even within the proposed development. The office building has a good direction for massing and composition that transition between the buildings in context. The fenestration and proportions on the side streets require further iteration and review.
The Upper Block tries to mitigate the scale of the garage and footprint of the building by varying the massing of the upper floors. The result, however, are forms and rooflines that are complex and anachronistic with the character of buildings in Portland and the immediate context. These forms should be reconsidered, simplified, with forms and massing that relate to the context. The treatment of the building as it steps down the grade on the "B streets" also need further consideration. Generally, design review should focus on how the building relate to the streetscape/human scale and also from the long-views.

Overall, there are some elements that create cohesive identity – material palette being one. Staff caution against the buildings being too similar as to create an artificial character. The character of these new buildings should draw from the characteristics found nearby (simplicity, regularity) but also creating new identity as appropriate for new, contemporary buildings – most of the proposed buildings seem headed in this direction.

Future Considerations
Staff recommends:

- That the Historic Preservation Board review the MDP and provide comment regarding compatibility prior to further staff/Planning Board review
- That design guidelines be developed within this Master Plan that would apply to future site plan applications to guide on relationship to context and within the complex.

Att. 2

Portland Maine | Yes. Google's good here.

Matthew Grooms <mgrooms@portlandmaine.gov>

one Portland square master plan

Jeff Tarling <jst@portlandmaine.gov> Wed, May 8, 2019 at 1:53 PM
To: Matthew Grooms <mgrooms@portlandmaine.gov>

Hi Matt -

I agree with Lauren on this in regards to Master Planning effort, if trees & landscape elements are not included early on it is really tough when we get to the individual site plan reviews.

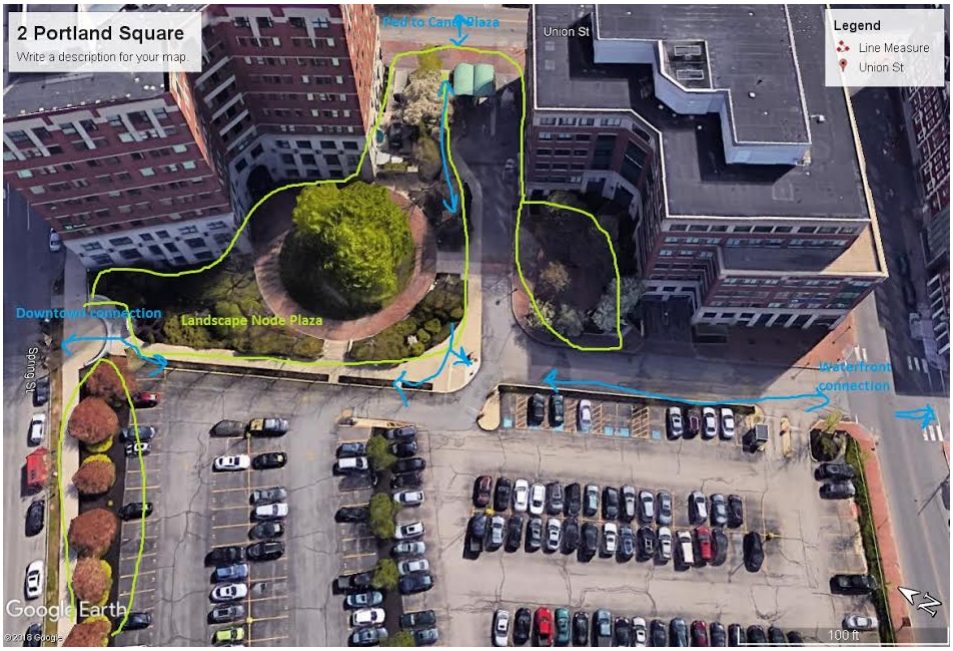
That said, often the master planning process organizes the use and draft concepts and then plugs in the greenery once we know where the structures are proposed.

It would be a major goal if we could continue the greenery that the One Portland Square project created and expand that element throughout the project edges and Cross Street. Cross Street could become an important pedestrian walkway connecting Commercial Street to the Downtown / One City Center & Monument Square. The existing link between the 2 Portland Square buildings already connects to Canal Plaza.

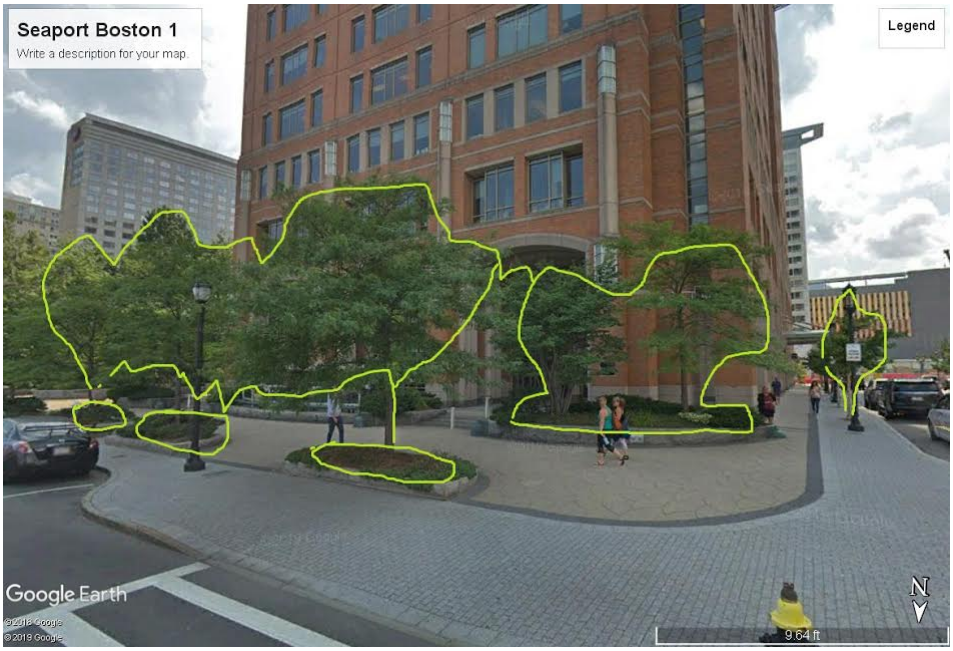
Now that Portland has become more of a tourist destination (hotel uses) being less car centric and more pedestrian along with the greenery and plaza nodes should be a theme in these new concept plans. One can look to the much larger, urban Boston Seaport to see great examples of creating public spaces for visitors along with the buffering provided by street trees, plazas and landscaping.

Take a closer look at these pics below...




2 Portland Square
Write a description for your map.
Union St
Legend
Line Measure
Union St
Downtown connection
Landscape Node Plaza
Spring St
Waterfront connection
Google Earth
100 ft


Seaport Boston 1
Write a description for your map.
Legend
Greenery = Plaza +
Street trees
Google Earth
7.79 ft





Jeff Tarling
City Arborist - City of Portland Maine
Parks, Recreation & Facilities Department
Forestry & Horticulture
212 Canco Road
Portland, ME. 04103
(207) 808-5446
jst@portlandmaine.gov

[Quoted text hidden]

Att. 3

Portland Maine | Yes. Google's good here.

Matthew Grooms <mgrooms@portlandmaine.gov>

Portland Square MDP - Initial Traffic Comments

Tom Errico <thomas.errico@tylin.com> Thu, May 23, 2019 at 7:51 AM
To: Matthew Grooms <mgrooms@portlandmaine.gov>
Cc: Bruce Hyman <bhyman@portlandmaine.gov>, Mike Tremblay <mtremblay@portlandmaine.gov>, Jeremiah Bartlett <JBartlett@portlandmaine.gov>

Hi Matt – The proposed project generates traffic volumes levels that require a Traffic Movement Permit. The Applicant has submitted a Traffic Movement Permit Application and the Scoping meeting was held on May 15, 2019. A summary of the items discussed at that meeting include:

- The City is requesting that the Applicant reevaluate their Trip Generation estimate. The City does not support the Other Modes reduction factors and is requesting refinement of methods. Some related items include:
  - The Applicant shall consider ITE Trip Generation Land Use Categories for retail space that may be more appropriate for the project.
  - The Applicant shall investigate use of more recent ITE Trip Generation data for confirming/adjusting Other Modes reduction factors used for project.
  - The Applicant shall investigate national data regarding ITE trip generation reductions for Other Modes activity at the hotel. Local data may be required if limited national data is available.

- The traffic study should assume that Cotton Street between Spring Street and Fore Street is two-way and note if any problems are identified.

- The assignment of trips to and from the site during the AM and PM peak hours shall be determined according to a new software program called StreetLight. It is anticipated that more accurate origin/destination patterns will be determined.

- The traffic study will evaluate conditions during the weekday AM (7-9AM) and PM (4-6PM) peak hours.

- The Applicant shall conduct new traffic counts at intersections that are older than 2 years, a MaineDOT requirement. City staff will provide available data to the Applicant.

- The study area for evaluating safety conditions shall be expanded to coincide with the traffic impact area of the project per MaineDOT criteria. The Applicant is being asked to review High Crash Locations (per MaineDOT criteria), locations with high incidents of crashes that may not be an HCL, and locations that have exhibited high injuries/fatalities or pedestrian/bicycle crashes.

- All project driveways shall be reviewed for compliance with engineering standards and traffic operating (level of service) conditions. Mitigation recommendations shall be identified.

- Following revisions to the trip generation and assignment of project trips, the Applicant shall identify a study area according to MaineDOT requirements. The suggested study area shall be reviewed with City staff prior to initiating the analysis.

- The Applicant shall review historical traffic volume information to estimate background traffic volume growth.
- The Applicant shall develop a SImTraffic model for evaluating traffic conditions. The City noted that the model shall include local calibration to reflect observed vehicle queue lengths and include the influence pedestrians have on vehicle mobility.

If you have any questions, please contact me.

Best regards,

Thomas A. Errico, PE
Senior Associate
Traffic Engineering Director
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Visit us online at www.tylin.com
Twitter | Facebook | LinkedIn | Instagram

City of Portland

TRAFFIC MOVEMENT PERMIT SCOPING MEETING

Permit Category: ____ 100 - 200 PCEs _X_ 200 + PCEs
____ New ____ Modification

Attendance: **Date:** May 15, 2019

Tom Errico, Bruce Hyman, Mike Tremblay, Randy Dunton, Matt Grooms, Pat Carroll, Lauren Swett, Jeremiah Bartlett, Barbara Barhydt, Steve Weatherhead, Adam Myers, Lourenco Dantas (via phone)

Meeting Location: Planning Department, City Hall

Project Name: Portland Square
Address:

Applicant: North River Company
Address:

Project Engineer: GPCEI
Address: South Portland, ME

Portland Traffic Engineer (reviewer): Tom Errico

Filings: Has the Applicant notified abutters via certified mail at least 7 days prior to this meeting? Will be documented
Has the "Notice of Intent to File" been published in a local newspaper? *Paper publish date to be provided*

Section 1 - Site and Traffic Information

1A. Site Plan

Size of development parcel (acres): N/A

Size of development parcel to be left non-vegetated (acres): N/A

1B. Existing and Proposed Site Uses

Type of development:

USE	SIZE
See application	
1- and 2-bedroom apartments	
Retail – large space maybe supermarket	

1C. Site and Vicinity Boundaries

Yes Boundary or title survey signed and sealed by a professional land surveyor
Yes Vicinity map provided

1D. Proposed Uses in the Vicinity of Proposed Development

Other approved development(s):
As listed in Application. It will be confirmed if other projects should be included. City staff will provide feedback by end of week. 170 Fore Street requires a TMP and may be included.

1E. Trip Generation

Summary tables for each land use code:

ITE (LUC)	Weekday	AM Peak	PM Peak	Saturday Peak
See Application				

Trip rates obtained from other sources:
Number of locations where driveway counts taken: _____
Dates & time periods when driveway counts taken: _____
Locations where driveway counts where taken: _____
OTHER: _____

The applicant shall conduct a trip generation calculation using Shopping Center for peak hour (for retail SF) and compare with Specialty Retail. Additionally, a review using the ITE 10th Edition should be performed. The applicant shall provide a summary for direction on what to use.

The Shared trip assumptions seem reasonable.

The City does not support the 'Other Modes Reductions. Including not accepting the nearly 50% reduction for the residential component nor the other uses (non-residential)

It is recommended that the applicant conduct a trip generation estimate using the ITE 10th Edition and compare that with the ITE 7th Edition to corroborate the trip adjustments used.

The applicant should incorporate Hotel trip reductions factors according to actual data. VHB will see if they have any data or a local study may be required.

1F. Trip Distribution

_____Stick diagram for each major intersection on either side of the development driveway(s)?
_____ ITE trip generation handbook
_____ Actual survey done? Location? _____
_____ Other. Explain. _____

Comments: _____
_____

1G. Trip Assignment

_____ Stick diagram for each major intersection on either side of the development driveway(s)?
Percent primary trips _____
Percent passer-by trips _____
Percent diverted trips _____

Basis for using above-listed percentages:
_____ Existing traffic patterns of adjacent street
_____ Zip code survey
_____ Gravity model
_____ Other. Explain._____

Comments: The study should assume that Cotton Street is two-way connection. And confirm that from a traffic study perspective no problems are identified.
The assignment of project trips shall utilize the Streetlight program.

Section 2 - Traffic Crashes

_____ Year(s) of MDOT crash records for study area
_____ Number of high crash locations
_____ Collision diagrams provided

Mitigation provided for each high crash location: _____
_____
_____
_____

Other traffic problems: _____
_____
_____
_____

Comments: _____

The study shall increase coverage area to reflect the study area according to peak hour trip thresholds. The crash analysis should also look for large numbers and not just HCL's. It should also include a review of locations that have high levels of injuries and/or fatalities.

Section 3 - Development Entrances and Exits

3A. Entrance and Exit Locations

X Distance to nearest intersecting road or town line (to the nearest hundredth of a mile)

X Number, width and surface of each proposed entrance/exit

3B. Plan View of Each Intersection Created

Names of intersecting road See Site Plan

Posted speed limits See Site Plan

Entrance/Exit Sight Distance:	Left	Right

3C. Entrance/Exit Design

_____ Lighting
_____ Driveway spacing and corner clearance (Access Management)
_____ Adequate sight distance for vehicles exiting development
_____ Entrance grade (see fact sheet)
_____ Entrance/exit widths less than 42 feet (12.8 meters)
_____ Left turn lane
_____ Right turn lane
_____ Signal warranted
_____ Lane encroachment
_____ Separation islands (see fact sheet)
_____ Drainage study using 50 year storm for culverts and to connect to MDOT system
_____ Capacity Analysis
_____ Queuing Analysis
_____ Study to be submitted to MDOT Division Engineer

Comments: All driveways shall be reviewed for operational conditions and if any mitigation requirements are required.

Section 4 - Title, Right or Interest

x Title, right or interest in project site
x Title, right or interest in entrance/exits
x Title, right or interest in drainage easement affecting MDOT

Section 5 - Public or Private Rights-of-Way

x Location and width or proposed streets, easements and other public or private rights-of-way
x No signs, structures or pavement connected to the entrance

Section 6 - Schedule

Project schedule: See Application

Further study items required **($500.00 additional fee)**: _____

_____

Section 7 - Full Traffic Study

_____ **$1,500.00 additional fee required**

Build-out year (Phase 1): _____
Build-out year (Full Occupancy): X

FS 1. Time Period(s) for Traffic Engineering Analysis

X AM weekday peak hour of adjacent street.
_____ Noontime weekday peak hour of adjacent street
X PM weekday peak hour of adjacent street.
_____ Noontime Saturday peak hour of adjacent street.
_____ Other. Explain. _____

AM and PM peak hours are expected to be between 7-9AM and 4-6PM but should be confirmed. Counts shall be 2-years or newer. New current counts – Bruce to check on available data and will provide

FS 2. Background Annual Traffic Growth Rate

Type of counts taken:
_____ Peak hour
_____ AADT
_____ Base counts less than 2 years old?

The applicant will review historical AADT for determination of growth rate

FS 3. Study Area to Include the Following Intersections

The applicant will need to revise the trip assignment for determination of study area. This shall be provided to City before proceeding.

Additional intersection(s) required if one hour volumes from development are:
25 vehicles in left turn only lane
35 vehicles in through, right turn lane or combined through and right turn
35 vehicles (multiplying the left turn volume by 1.5) in a combined left turn and through lane, or a combined left turn, through and right turn lane

FS 4. Intersection Capacity Analysis

_____ Isolated
X Interconnected. Intersection(s) Where appropriate

Software package (isolated): SimTraffic but base model should be calibrated to existing conditions. The City noted that the model shall include local calibration to reflect observed vehicle queue lengths and include the influence pedestrians have on vehicle mobility.
Software package (interconnected): _____

WRIGHT-PIERCE
Engineering a Better Environment

MEMORANDUM

TO:	Matthew Grooms, AICP; Planner	**DATE:**	5/22/2019
FROM:	Michael Guethle, PE; Ryan Wingard, PE	**PROJECT NO.:**	14273B
SUBJECT:	PL-000599-2019.Master Development Plan (1 Portland Sq.)		

Wright-Pierce has reviewed the Master Development Plan Application information provided for the Portland Square Master Development Plan with a focus on stormwater management and site utilities. The development is in two distinct blocks connected by Fore Street, and generally bound by Center Street, Spring Street, Commercial Street and Union Street, and further restricted by Cross and Cotton Streets. The proposed project is anticipated to be constructed in 5 distinct project phases that incorporate parking lot development, mixed-use buildings, site improvements, landscaping improvements, and pedestrian access improvements. In general, the development anticipates addressing utility and stormwater needs in each phase, in a manner that accommodates the final product.

Documents Reviewed by Wright-Pierce:

- Master Development Plan application, dated (most recent) May 6, 2019.
- Permitting Plans, stamped 1/15/2019, uploaded (most recent) April 12, 2019.

Comments:

1) Stormwater Drainage Requirement: *General statements concerning storm water management techniques shall accompany generalized drainage plan.*
    a. The applicant has indicated that future development proposals within the City will fall under the combined requirements of the Site Location of Development Act (SLODA), as the site is currently under SLODA permit, as well as Level III Site Plan requirements within the City of Portland (City). SLODA permit applications within the delegated review authority limitations (<7 ac impervious area) in

Portland are currently under designated review authority and are administered by the City.

b. The applicant has provided general information regarding how the site will accomplish the stormwater management goals pursuant to the regulations of MaineDEP Chapter 500 Stormwater Management Rules, includes conformance with the Basic, General, and Flooding Standards (Ref: Technical Manual, Section 5. II. Applicability in Portland. C. a.; and Ref: City of Portland Code of Ordinances Sec. 14-526. Site Plan Standards, (b). 3. b.)

c. General Standard: The applicant is proposing that the site will be treated under MaineDEP's Redevelopment criteria under the general standard. For this site, treatment would require 50% of the proposed disturbed surface areas to be treated, with a focus on locations with the highest stormwater pollutant loadings. Additional requirements within the City of Portland would include ensuring 50% of the site impervious area is treated. Treatment methods proposed include using concrete chambers, with additional proprietary outlet control systems to provide water quality treatment. The sizing and location of these controls is proposed in three phases; with treatment for Phases 4 and 5 being constructed during earlier earthwork activities.

d. Basic Standard: Per the City's Technical Manual *Portland Stormwater Management Standards and Maine Dep Chapter 500 Stormwater Management*, an Erosion & Sediment Control management plan, notes, and details per the Chapter 500 Rules must be provided to meet the Basic Standard. The applicant has indicated that site plans, details, and erosion and sediment control notes demonstrating compliance with the Basic Standard will be provided as part of future Level III Site Plan Applications, when additional design detail will allow for the identification of the necessary controls.

e. Flooding Standard: The applicant has indicated that as the project is subject to a SLODA permit modification, adherence to the Flooding Standard is required. Confirmation of pre-development and post-development flow rates is also

requested to confirm flows to the combined storm system, as referenced in Land Use Code Chapter 14-526 (b) 3 a. The applicant anticipates providing calculations in future Level III Site Applications for the pre-development and post-development stormwater flow rates for the 24-hour, 2-year, 10-year, and 25-year rain events. Other calculations may be required based on the final design requirements for the proposed stormwater treatment systems. Associated design may require additional best practices for runoff rate reduction in interval storm rates, such as outlet control structures or additional concrete chamber construction.

f. The applicant has indicated that the proposed site does not discharge to areas identified as Urban Impaired Streams, Wetlands, or Lakes Impaired by Phosphorus.

2) Grading and Drainage
   a. The applicant has indicated that conflicts with utilities and above-ground infrastructure and plantings will be evaluated as part of final design.
   b. Connection to Existing Stormwater Systems: Connections to combined sewer systems are currently proposed. The existing systems will require confirmation of combined sewer connection and pipe capacity. As part of future applications, the Department of Public Works will be required to confirm that these connections are appropriate under Land Use section 14-526 (b) 3 a. (iv); and 14-526 (c) 3 a. The applicant has begun initial conversations with the City on these items, and has indicated that they will pursue further conversation as final design develops.

3) Site Utilities Requirement: *A utilities analysis and recommendations prepared by a registered professional engineer per Section 14-527 (e) (2) (xiii)*
   a. Comments regarding utilities within the ROW corridor will be covered by other City staff.
   b. A utility memorandum and sketch plan has been provided by a Professional Engineer.

c. Existing utilities within the project parcels are, in general, proposed to be removed and re-aligned with new connections to existing systems. The applicant has indicated that these connections will be evaluated upon final construction, and coordinated with the appropriate utilities.
    i. Storm drain and sewer infrastructure between 1 Portland Square and 2 Portland Square is anticipated to remain. Opportunities to provide sewer separation should be evaluated for these items, and may be required if proposed conditions convey additional surface flows to this infrastructure.
d. Site lighting is an important aspect to pedestrian safety and pedestrian access through the facility. Lighting is indicated on the Utility Plans but is not described in the utility memorandum. Proposed site lighting is not a required portion of the Master Plan Development process, but will need to be evaluated as a critical piece of future Level III Site Applications.

Recommendations:

The proposed stormwater management memorandum and utility memorandum has provided sufficient general statements concerning storm water management and treatment techniques as required by the Master Development criteria. Additional information provided in future Level III Site Applications will be required to confirm specific erosion and sedimentation control needs, siting and sizing of treatment units, stormwater conveyance systems, connections to existing systems, site utilities, and site grading.

Site plans are generally informative of the proposed conditions for the site. The following required items were observed on Sheet C-200:

- Inventory of existing utilities on site and within public streets (storm sewers and drains, sanitary sewers, electrical lines, fire alarm boxes and lines, gas lines, water mains, lighting, curb and gutter. *(Note: Provided in the Utility Memorandum, not Sheet C-200)*
- Proposed Location, sizing, and directional flows of all existing and proposed utilities
- Existing grades and drainage

- Generalized drainage plan for the site, including drainage ways, flow, points of outfall
- and indicating impacts of development on affected drainage basins.

The following required items should be added to the utility and grading plan:

- Contour information of not less than 2’ intervals.

CARROLL ASSOCIATES

April 5, 2019

Ms. Barbara Barhydt
Development Review Manager
City of Portland Planning Division
389 Congress Street, 4th Floor
Portland, ME 04101

RE: Portland Square, Master Development Plan Submission

Dear Barbara,

On behalf of North River IV, LLC, we are pleased to submit an Application for Master Development Plan for the Portland Square properties owned by North River IV. This project represents full development of a crucial parcel of land in the Old Port. Full development of this property envisions a mixed-use including below grade parking, ground floor retail, upper floors containing professional office and residential uses, and hotel. Upon completion, this project will complete a strong link between the Old Port and the adjacent western neighborhoods that has been missing since the mid 1980's.

Project Description

The project site occupies almost two city blocks and approximately 6.45 acres of land in four parcels bound by Spring, Commercial, Center, Cotton and Cross Streets. The property currently contains approximately 260,000 sf of mixed-use space in Portland Square One and Portland Square Two, the remaining property is currently utilized for surface parking and contains approximately 542 private parking spaces. Recognizing the necessary interface of the proposed development with the existing property, the Master Development Plan has included the Portland Square One and Portland Square Two Buildings in its study, as well as a 135 key Hotel proposed for development by the Fathom Company in an effort to look at the properties holistically. We believe proper integration of all buildings into the fabric of the City is a critical component to the future success of this project.

The proposed project development is envisioned as a mixed-use, phased development which, when completed, will have the following program uses:

Office Space: - 548,127 s.f. (Including PS1/PS2)
Retail Space: - 48,153 s.f. (Including PS1/PS2)
Apartments: - 76- 1BR and 2BR Units
Hotel: - 135 Rooms (By Fathom Co.)
Structured Parking: +/- 1336 Spaces (Including PS2)

The design of the project makes use of the sloping site to locate parking below grade from Spring and Fore Streets with garage entrances located on Spring, Cotton and Cross Streets. On the Upper Site, two levels of parking are proposed below Spring Street, with another five levels of parking above. Building frontage along Spring and Fore Street will be wrapped with retail at the ground level and residential units above. Above the fifth floor, two office towers rising another 4-5 floors are proposed, providing a total of approximately 200,000 sf of Class A Office space on these upper levels. The intent is that the roof areas between the office buildings would be developed with greenroofs, which might function as stormwater treatment or outdoor programmed space for the office tenants.

On the Lower Lot, one level of parking is proposed under the north side of the parcel, with two additional levels of parking rising above Fore Street. Wrapping this parking structure will be retail space along Fore Street and approximately 82,000 sf of office uses above. On the south side of the parcel, a large ground floor retail space is envisioned, with a residential building rising four floors above. A critical, defining element of the project will be a pedestrian street /plaza that runs through the center of the lower site, extending the visual and physical connection of Cotton Street, and ending with a grand public stair connecting to the Commercial Street sidewalk.

A portion of the parcel at the corner of Commercial and Center Streets adjacent to the Richardson Wharf Building will be conveyed to Fathom Company for a 135-room hotel. Plans for the Hotel are included with this Master Development Plan Application, but it is recognized that this project is proceeding independently through its own Level III Review and Approval.

Primary Design Considerations:
The site occupies an important area in the heart of downtown positioned at the western edge of the Fore Street Old Port neighborhood. The site itself is currently used as surface parking, and it is also flanked by additional open parking sites to the west (Baxter Place), and a small lot fronting Commercial Street (on the water side of the MEMIC Building).

Importantly, the site abuts the Commercial Street Historic District and is in close proximity to two significant historic structures, the Richardson Wharf Building built in 1867 and the Tracy Causer Building that survived the great fire of 1866.

The site context also contains a variety of building scales. Fore Street to the east is the heart of the Old Port with its rich historic fabric and pedestrian centered streets. To the north is downtown business district with its larger more contemporary structures such as 1 & 2 Portland Square, Canal Plaza, and the Civic Center. To the west, the fabric begins to transition to a less dense mix of residential and commercial buildings. To the south, the Commercial Street corridor with its mix of water-based industries along the piers combines with vibrant commercial mixed-use structures.

This project offers an opportunity to bridge these varied built environments, “fill in” a significant hole in the urban fabric, and enhance/ extend the pedestrian environment present in the Old Port and the Commercial Street Corridor. The development of a pedestrian street into the site is at the heart of the design concept, and as an extension of Cotton Street, it provides a linkage between the Commercial Street Corridor, the Old Port, and the Downtown Business District.

The buildings are designed with continuous street level storefronts along Fore and parts of Center and Cross Streets as well as a large retail space under the apartments that opens to both the plaza and the streets. Small micro retail spaces are also planned to help activate the plaza with pop up stores and food vendors. The plaza itself will include planters, seating and lighting to enhance the pedestrian experience, and ties into a shared use at the hotel courtyard.

The office building massing has been designed to provide a scale appropriate to the Fore Street streetwall, while providing setbacks from the Richardson Wharf building, from +/- 34’ at the lower levels to further setbacks at the upper levels to achieve a compatible height with the historic structure.

The apartment building facing Center Street and across Fore Street from the Tracy Causer building has a more articulated form further breaking down the scale into smaller elements that are in keeping with the more residential scale of the fabric heading west from the site. The large retail space at its base helps to extend the pedestrian vitality of Fore Street around the corner along Center Street.

Brick and pre-cast concrete elements are the predominant building material for all structures with the office building also making use of glass and metal cladding at the upper levels and the apartment building mixing in a secondary brick color, metal and wood siding.

Service for the Hotel and Lower Site will be from a dedicated service drive off Center Street, and service for the Upper Site will be primarily from a service driveway between the new development and PS1/PS2.

Sidewalk improvements include new brick sidewalks with street trees, streetlights, pedestrian flares at all intersections, and other site improvements (bike racks, etc) to provide an inviting pedestrian zone which feels like an extension of the Old Port.

Attached and made part of this Application are documents, reports, plans, and images that describe the Portland Square Project in full detail. We believe the Application is complete and welcome the opportunity to work closely with City Staff, Planning Board, and interested residents of Portland during its review and approval to ensure this project lives up to its incredible potential.

With Regards,
CARROLL ASSOCIATES



Patrick J. Carroll, Principal

CC: Peter Pachios, NR IV
Adam Meyers, NR IV
Dan Jacques, NR IV
Jim Brady, FC
Stephen Weatherhead, WSA
Barry Sheff, W&C

Att. B

NORTH RIVER COMPANY, LLC

224 12th Avenue
New York, NY 10001-1005
Telephone (212) 695-8090
Facsimile (212) 629-8768

December 10, 2018

Ms. Barbara Barhydt
Development Review Manager
City of Portland
389 Congress Street, 4th Floor
Portland, ME 04101

Re: Letter of authorization for Portland Square development project.

Dear Ms. Barhydt,

On behalf of North River Company, in its capacity as the Manager of North River IV LLC, which is the owner of record for the parcel of land bounded by 486-504 Fore Street, 8-30 Cross Street, 273-285 Commercial Street and 3-19 Center Street (legal description: Map 38, Block G, Lots 1-3-5), (a/k/a "Portland Square lower parking lot"), this letter shall authorize Patrick Carroll of Carroll Associates and Steve Weatherhead of Winton Scott Architects to act as agents in procedural actions related to obtaining City of Portland Planning Board approvals associated with the proposed development project located on the Portland Square lower parking lot.

Sincerely,

Peter L. Pachios

Cc: Patrick Carroll
Steve Weatherhead
Melissa Santiago

Portland, Maine — Yes. Life's good here.

Planning & Urban Development Department

MASTER DEVELOPMENT APPLICATION SUBMISSION CHECKLIST

Please submit each document as a separate PDF file.
Please confirm by electronically checking the boxes to the left

GENERAL APPLICATION DOCUMENTS

Checklist	Items to be Provided
Yes NA Plan ✔	PROJECT DESCRIPTION • Cover Letter with detailed project description
Yes NA Plan ✔	COMPLETED CHECKLIST – LEVEL III APPLICATION
Yes NA Plan ✔	RIGHT, TITLE AND INTEREST • Deeds, leases, or purchase and sales agreements
Yes NA Plan ✔	EVIDENCE OF STATE OR FEDERAL APPROVALS, if applicable • Permits or letters of non-jurisdiction, if applicable
Yes NA Plan ✔	ZONING ASSESSMENT • Table listing required and proposed uses and dimensional standards – Zoning Analysis Table
Yes NA Plan ✔	EXISTING &/OR PROPOSED EASEMENTS OR COVENANTS, if applicable • Evidence of existing easements and any proposed easements
Yes NA Plan ✔	WAIVER REQUESTS • Written request for waiver describing request and reason. Waiver Table
Yes NA Plan ✔	FINANCIAL CAPABILITY • Letter or evidence from a financial institution or third party verifying financial capacity to undertake project
Yes NA Plan ✔	TECHNICAL CAPABILITY • Evidence of technical capability of applicant and consultants – resumes and/or examples of past projects

MASTER DEVELOPMENT SUBMISSION CHECKLIST

Provide assessment of compliance with standards and include supplemental documentation, as applicable. Submit each document as a separate PDF file.

NEIGHBORHOOD CONTEXT

Check list	Assess/Provide/Document:
Yes NA Plan ✔	**Neighborhood Context Statement** • Statement and/or plan as to the general impact of the proposed Master Development Plan upon the area, indicating how the Master Development Plan relates to surrounding properties and what measures will be taken to create appropriate transitions and access from the subject property to abutting public properties (i.e. parks, waterfront, etc.) or other neighboring tracts (if applicable)

CONCEPTUAL MASTER DEVELOPMENT PLAN

Check list	Assess/Provide/Document:
Yes NA Plan ✔	Natural Features • An analysis of existing and/or adjacent natural waterways, wetlands, floodplains topography, soil conditions and other natural features, as applicable
Yes NA Plan ✔	View and Historic Features • An analysis of the designated view corridors, historic resources, and archeological resources associated with the site
Yes NA Plan ✔ ✔	Major Landscaping Assess major landscaping elements, features, open space and plans for preservation of natural features
Yes NA Plan ✔ ✔	Buildings • Existing/proposed buildings and other significant structures, building groupings, exterior building elevations and entrances, parking areas, and other significant physical features of the site
Yes NA Plan ✔	Other Information • Other supportive information that may be beneficial in the evaluation of the Master Development Plan

TRANSPORTATION	
Check list	Assess/Provide/Document:
Yes NA Plan ✔	**Transportation Assessment** • Assessment of major circulation patterns (pedestrian, bicycle, and vehicle) surrounding and serving the site, access ways, easements and any public areas within or next to the site
Yes NA Plan ✔	**Traffic Analysis** • A traffic analysis and recommendations prepared by a registered professional engineer per Section 14-527 (e) (2) (xii)
INFRASTRUCTURE	
Check list	Assess/Provide/Document:
Yes NA Plan ✔	**Public Safety** • An analysis of the public safety services needed to support the master plan
Yes NA Plan ✔	**School Impacts** • An analysis of the anticipated impacts on the public school system to support the Master Development Plan
Yes NA Plan ✔	**Stormwater Drainage** • General statements concerning storm water management techniques shall accompany generalized drainage plan
Yes NA Plan ✔	**Utilities** • **A utilities analysis and recommendations prepared by a registered professional engineer per** Section 14-527 (e) (2) (xiii)

Master Development Plans Checklist

Please upload the following drawings with the listed details into e-Plan as separate pdfs.

☑ NEIGHBORHOOD CONTEXT MAP – Site Plan Ordinance (Section 14-527 (e))

At a scale of not less than 1" to 100' - Neighborhood map, including roads, utilities, pubic facilities and major existing buildings.

CONCEPTUAL SITE PLAN(s) – Site Plan OrdiannceSection 14-527 (e) (2) (I through xv)

☑ General Requirements

- North Arrow
- Date
- Scale
- Legend
- Title of Master Development Plan and Project Name
- Applicant
- Engineer (s), Designer (s) and/or Agent (s)

☑ Existing Conditions

- Approximate boundary lines of existing and proposed lots within and immediately adjacent to Master Development Plan, with approximate areas and dimensions
- Approximate location of structures on abutting property
- Topography
- Locate water courses
- Delineate wetlands and flood plains
- Natural Features
- Zone lines

☑ Proposed Site Plan

- Density
- Lot configuration
- Circulation
- Site Layout
- Ground floor area of existing and proposed building
- Building groupings

☑ Access, Circulation, and Parking

- Streets and intersections adjacent to site
- Existing and proposed streets, ways, and easements
- Public areas within or next to the site.

☑ Site Considerations

- Designated view corridors
- Historic Resources
- Archeological resources

☑ UTILITY PLAN, prepared by registered Professional Engineer (Section 14-526 (e) (xiii)):

- Inventory of existing utilities on site and within public streets (storm sewers and drains, sanitary sewers, electrical lines, fire alarm boxes and lines, gas lines, water mains, lighting, curb and gutter, and etc.
- Proposed Location, sizing, and directional flows of all existing and proposed utilities

☑ GRADING AND DRAINAGE PLAN (Section 14-526 (e) (x):

- Existing grades and drainage
- Generalized drainage plan for the site, including drainage ways, flow, points of outfall and indicating impacts of development on affected drainage basins.
- Contour information of not less than 2' intervals.

☑ PUBLIC SAFETY SERVICES

- Public safety services needed to support master plan

☑ LANDSCAPE PLAN

- Major landscaping elements, features, and open space.
- Plans for preservation of natural features.

☑ ARCHITECTURAL PLANS & RENDERINGS

- Exterior building elevations
- Building entrances
- Context drawings, perspective renderings, photographic montages or computer generated graphics depicting proposed development within context of neighborhood. (Section 14-527 (e) (2) (v))
- Digital three-dimensional model, per Section 14-527 (e) (2) (v)

EVIDENCE OF STATE OR LOCAL APPROVALS

Portland Square will require the following permits and approvals:

Permit Required	Submittal Date	Anticipated Approval Date
• City of Portland Master Development Plan	04/05/2019	07/23/2018
• Level III Site Plan and Subdivision (PH1)	07/18/2019	09/24/2019
• Maine DEP SLODA Amendment	07/18/2019	09/24/2019
• Maine DOT Traffic Movement Permit	04/05/2019	08/15/2019
• State Fire Marshall	09/01/2019	10/15/2019

The Portland Square Project currently has the following Permits and Approvals either in place or pending:

Portland Square One

• Site Plan Approval from City of Portland		November, 1985	July, 1986
• Maine DEP SLODA	#L-013526-26-B-N		July 25, 1986
	#L-013526-26-B-A		July 27, 1987

Portland Square Two

• Site Plan Approval from City of Portland		1988	July 18, 1989
• Maine DEP SLODA	#L-013526-26-C-A		June 19, 1989
	#L-013526-26-C-A (Corrected)		July 21, 1989
	#L-013526-26-D-C		December 21, 1989
	#L-013526-26-F-M		November 30, 1990
	#L-013526-26-G-T		February 2, 1996
	#L-013526-26-H-N		February 15, 1996

Center Street Hotel

• Level III Site Plan Approval from City of Portland	Currently under Review
• Maine DEP SLODA Amendment	Anticipated Submittal with Final Level III Submission

Copies of all Approvals and Findings of Fact are attached to this Application.

MAJOR LANDSCAPING

The site is currently vacant, with minimal landscaping concentrates in planting strips within the right-of-ways on Spring, Cotton, Cross, Commercial, and Center Streets. Four street trees (Honeylocust) are located in cutouts in the sidewalk along Fore Street. Due to the extensive nature of excavation and earthwork required for the project, it is anticipated that all vegetation will be removed from the site and adjacent sidewalks during construction.

The proposed landscape plan envisions installing new sidewalks and street trees on all streets fronting the property. Trees will be located approximately 40 feet on-center and installed in treegrates or raised granite planters per the City Technical manual.

Landscaping within the property will be concentrated to the Cotton Street pedestrian corridor, hotel courtyard, and greenroofs associated with the office and residential buildings. A Conceptual Landscape Master Plan has been prepared and is included in this Application. We intend to work closely with the City Arborist on plant selection and installation requirements to insure long term viability and growth.

EXISTING AND/OR PROPOSED EASEMENTS OR COVENANTS

The following Easements and/or Covenants are existing and/or proposed for the Portland Square Project:

1. Shared Service easement for Hotel and Portland Square from Center Street on south side of lower lot.
2. Eighteen-foot (18') Pedestrian Access easement along "Cotton Street Extension between Commercial Street and Fore Street.
3. Easements within the discontinued section of Cross Street between Spring Street and Fore Street, including the following:
    - 50-foot sewer easement to City of Portland.
    - 50-foot Scenic Easement/ View Corridor, to City of Portland
    - 10-foot pedestrian easement
    - 27-foot utility easement to Central Maine Power
    - 27-foot utility easement to Northern Utilities
    - 10-foot storm drainage easement across Portland Square One and Portland Square Two
    - 25-foot x 35-foot easement to Portland Water District at the intersection of Fore Street and Cross Street
4. Drive Through Teller Easement on Portland Square Two parcel (Lot2)
5. Licenses for building footings, overhangs and canopies located within the public street rights-of-ways.

These easements and licenses will be shown on the ALTA Existing Conditions Survey, Subdivision Plan, or Site Plans that are made part of this Application.

NATURAL FEATURES

The proposed Portland Square Project has been designed to fit within the fabric of the Old Port Neighborhood.

PHYSICAL FEATURES

Based on Preliminary Geotechnical Investigations completed by Haley Aldridge in 2015 and 2016, the site consists of approximately 15-20 feet of urban fill land over marine sand, with bedrock approximately 35 feet below existing grade. This report is available for review if requested.

The current FEMA mapping indicates the site is in Zone C of the Flood Insurance Map, Community Panel 230051 0013 B, which bears an effective date of July 17,1986, and is not in a special hazard area.

The site is gently sloping easterly from Spring Street towards Commercial Street, sloping approximately 20 feet between Spring Street and Fore Street, and another 20 feet between Fore Street and Commercial Streets. The site is primarily paved except for small strips of planting located along the perimeters of the parking areas and streets.

No watercourses, streams, or other waterways are located on the property.

Att. H

People's United Bank

March 8, 2019

Ms. Barbara Barhydt
City of Portland, Planning Division
389 Congress Street, 4th floor
Portland, ME 04101

Re: North River IV, LLC and North River Company, LLC

To Whom It May Concern:

North River Company ("NRC"), the Manager of North River IV LLC, which is the owner of record of the properties known as Portland Square, Portland, ME, has had a banking relationship with People's United Bank, N.A. since 2010. In that time, People's United Bank has provided NRC and its affiliates with real estate financings in excess of $170,000,000, including loans for acquisition, new development and complex renovation projects. We consider the principals of NRC to be of the highest character and, based on our knowledge of NRC's management expertise, financial condition and access to significant liquid assets, People's United Bank would be comfortable entertaining requests for financing any type of real estate project and of any size.

NRC and its affiliates have access to cash reserves and credit facilities well in excess of $20,000,000 with People's United Bank.

People's United Bank is a subsidiary of People's United Financial, Inc., a diversified financial services company with over $45 Billion in assets. Founded in 1842, People's United Bank is a community-based, regional bank in the Northeast offering commercial and retail banking, as well as wealth management services through a network of nearly 400 retail locations in Connecticut, New York, Massachusetts, Vermont, New Hampshire and Maine.

If I may be of any further assistance regarding this highly valued relationship, please contact me at (207) 828-3023 or by email at timothy.mcmachen@peoples.com.

Sincerely,

Timothy J. McMachen
Senior Vice President
Commercial Real Estate

Att. I

MAINE REAL ESTATE TAX-Paid

QUITCLAIM WITH COVENANT DEED

DLN:1001540002732

RREEF AMERICA REIT III-Z4 LLC, a Delaware limited liability company with a place of business in 222 South Riverside Plaza, Chicago, Illinois 60606-5808 for consideration paid, grants to North River IV LLC, a Delaware limited liability company with a place of business at 224 12th Avenue, New York, NY 10001, with **QUITCLAIM COVENANT**, the land, together with all improvements thereon and all rights and easements appurtenant thereto, located at or near Union street and Fore street consisting of unites 1-6 One Portland Square, a Business Condominium, the building known as Two Portland Square and certain related parcels, Portland, Cumberland County, Maine, more particularly described on **Exhibit A** attached hereto.

IN WITNESS WHEREOF, RREEF America REIT III-Z4 LLC, has caused this deed to be executed by James E. Toney, Assistant Vice President its duly authorized Assistant Vice President, this 26th day of March, 2015.

RREEF AMERICA REIT III-Z4 LLC,
a Delaware limited liability company,

By: RREEF AMERICA REIT III-Z LLC,
a Delaware limited liability company, its manager,

By: James E. Toney
Its duly authorized Assistant Vice President

Witness:
Vanessa C. Z

STATE OF ILLINOIS
COUNTY OF COOK

March 26, 2015

Personally appeared before me the above-named James E. Toney, Assistant Vice President of RREEF America REIT III-Z LLC, a Delaware limited liability company, manager of RREEF America REIT III-Z4 LLC, and acknowledged the foregoing instrument to be his free act and deed in his said capacity and the free act and deed of said company.

Notary Public/Attorney at Law
Print name: Beverly A Dillon

OFFICIAL SEAL
BEVERLY A. DILLON
NOTARY PUBLIC - STATE OF ILLINOIS
MY COMMISSION EXPIRES MARCH 3, 2018

EXHIBIT A

Legal Description

Tract 1:

Parcel One - One Portland Square.

Units No. 1, 2, 3, 4, 5, and 6 of One Portland Square, a business condominium, situated at the corner of Union and Spring Streets in the City of Portland, County of Cumberland and State of Maine, as more particularly described in the Declaration of One Portland Square, a business condominium, dated as of October 27, 1987 and recorded in the Cumberland County Registry of Deeds on October 29, 1987 in Book 8039, Page 37, and in the plats and plans incorporated into the declaration and recorded in the Cumberland County Registry of Deeds in Plan Book No. 166, Page 44 sheets 1 through 13, by virtue of the recording of which declaration, plats and plans, the declarant created the condominium pursuant to the Maine Condominium Act, Title 33 of the Maine Revised Statutes of 1964, as amended, Chapter 31, Sections 1601-101 et seq., as amended.

Parcel Two - Upper Parking

A parcel of land shown as "Lot 3" on a land title survey prepared for Northland Realty Corporation by Lewis & Wasina, Inc. dated April 5, 1995, Project No. 9508 located on the southerly side of Spring Street Arterial, the easterly side of Cotton Street and the northerly side of Fore Street, City of Portland, County of Cumberland, State of Maine, and being more particularly described as follows:

Beginning at a found rebar at the intersection of the northerly right of way line of Fore Street and the easterly right of way line of Cotton Street;

Thence, N24° 18' 44" W along the easterly right of way line of Cotton street a distance of 356.32 feet to a set 5/8 inch rebar with aluminum cap stamped "Lewis & Wasina PLS 2114" at the southerly right of way line of Spring Street Arterial;

Thence, N65° 47' 27" E along the southerly right of way line of Spring Street Arterial a distance of 89.72 feet to a found rebar;

Thence, continuing to follow the southerly right of way line of Spring Street Arterial along a curve to the left having a delta of 3° 11' 35", a radius 3887.30 feet, an arc length of 216.65 feet and a chord bearing and length of N64° 11' 39" E, 216.62 feet to a found drill hole in a concrete sidewalk;

Thence, S11° 09' 10" E following the former easterly right of way line of cross street, now discontinued, along lot 1 and lands conveyed by deed to Two Portland Square limited partnership as shown on said plan a total distance of 413.33 feet to a found rebar on the northerly right of way line of Fore Street;

Thence, S78° 49' 49" W along the northerly right of way line of Fore Street a distance of 79.03 feet to a found rebar;

Thence, S75° 13' 06" W along the northerly right of way line of fore street a distance of 137.10 feet to the point of beginning.

All the above mentioned found rebar are 5/8 inch with aluminum cap stamped "SMRT RLS 1314".

Reference should be made to the plan for further details of the boundary and easements.

The basis of bearing for this description is magnetic North, 1972, as shown on said plan.

Parcel Three - Lower Parking

A certain lot or parcel of land being the majority of the block bounded northerly by Fore Street, easterly by Cross Street, southerly by Commercial Street and westerly by Center Street in the City of Portland, County of Cumberland, and State of Maine and further bounded and described as follows:

Beginning at a drill hole at the intersection of the northwesterly line of Commercial Street and the easterly line of Center Street, said point also being the most southwesterly corner of certain land conveyed to the Atbro Corporation by Deed dated October 3, 1979, and recorded in the Cumberland County Registry of Deeds in Book 4506, Page 48;

Thence North 43° 29' 22.8" East along Commercial Street, a distance of 69.18 feet to a reinforcing rod;

Thence North 46° 50' 30" East along said Commercial Street, a distance of 54.32 feet to a reinforcing rod;

Thence North 52° 30' 11.2" east along said Commercial Street, a distance of 35.64 feet to a drill hole;

Thence North 24° 17' 37.6" West along land formerly of Ari Newman and Lee Beamis, and now Harbor Landing Condominium, see Declaration of Condominium recorded in Book 6505, Page 312, Cumberland County Registry of Deeds, a distance of 93.23 feet to a reinforcing rod;

Thence North 65° 44' 46" East along land now or formerly of said Ari Newman and Lee Beamis, a distance of 109.60 feet to a P.K. spike in the westerly line of Cross Street;

Thence North 13° 21' 13.9" West along said Cross Street, a distance of 287.70 feet to a reinforcing rod, said point being located at the intersection of the westerly line of Cross Street and the southerly line of Fore Street;

Thence South 69° 41' 09.0" West along said Fore Street, a distance of 318.64 feet to a reinforcing rod, said point being located at the intersection of the southerly line of Fore Street and the easterly line of Center Street;

Thence South 24° 16' 16.2" East along said Center Street, a distance of 451.12 feet to the point of beginning.

Excepting from the above described premises those premises taken by the State of Maine by its Department of Transportation set forth in its notice of layout and taking dated August 21, 1991 and recorded in the Cumberland County Registry of Deeds in Book 9688, Page 341.

Tract 2: Two Portland Square.

A certain lot or parcel of land with any buildings thereon situated at the intersection of Fore Street and Union Street in the City of Portland, County of Cumberland, and State of Maine, being Lot 2 on plan for Two Portland Square Subdivision by Stevens Morton Rose & Thompson dated October 22, 1987, revised to September 18, 1989 and recorded in Plan Book 182, Page 29.

Subject to and together with that certain parking easement established in Declaration of Easement by Portland Square limited partnership dated December 18, 1989 and recorded in Book 9028, Page 117, as affected by Subject Property Notice dated December 18, 1989 and recorded in Book 9028, Page 136, and by Permitted Parking Areas Plan dated December 18, 1989 and recorded in Book 9028, Page 141.

Rights, easements, covenants, conditions and restrictions set forth in Declaration of Easement by Portland Square Limited Partnership dated October 30, 1987, recorded at Book 8045, Page 303, as affected by Additional Declaration of Easement dated December 18, 1989, recorded at Book 9028, Page 92, Release of Easement dated December 18, 1989, recorded at Book 9028, Page 97, Subject Property Notice dated December 18, 1989, recorded at Book 9028, Page 102, and Permitted Parking Areas Plan dated December 18, 1989, recorded at Book 9028, Page 112.

NORTH RIVER COMPANY



Bulgroup Properties was established in 1981 and managed by Tickly Bender Realty Corp., a predecessor to North River Company LLC ("NRC"). NRC is a privately held real estate investment and management firm based in New York City. NRC invests in and manages real property on behalf of high net worth and institutional investors.

NRC owns and operates a highly-diversified portfolio of office, mixed-use, fine art storage, industrial and retail property. Presently, NRC owns and operates over 3,500,000 square feet of mixed-use properties and over 275 acres of ground-up development in New York, Massachusetts, Maine, Vermont, New Hampshire, Pennsylvania, Colorado and California. NRC has closed on more than 30 acquisitions and dispositions over the past 20 years, representing over $1.6 billion in aggregate transaction volume.

NRC seeks to acquire, manage and develop strategically located real estate assets to provide long-term value to investors through cash flow and asset appreciation. NRC's management experience in a variety of transactions provides a broad background in many types of investments from stabilized assets to value-add properties to long-term redevelopment opportunities. NRC's long-term viewpoint endeavors to successfully take advantage of and protect against adverse market conditions.

NRC's traditional investment structure involves the creation of a special purpose entity to acquire an asset with NRC or an affiliate as the manager of the investment. Depending on the equity level required and the anticipated return and hold period of the investment, investment partners range from a single institutional investor to a syndication of individual private capital and family offices. NRC's management team typically invests between 10% and 20% of the required equity of each transaction.

NRC's management team has extensive commercial real estate investment management experience in an array of markets. NRC's efforts include complex joint-venture arrangements, redevelopment of existing occupied properties, ground-up development, repositioning assets, leasing, property management, assembly of new businesses to create new income streams (self-storage, antique mall, gallery, event space, etc.) and asset management and investment reporting. The management team maintains strong relationships with governmental, civic and business leaders in each location NRC operates. Members of NRC's team belong to local and national real estate boards/associations, as well as several notable non-profit organizations and academic institutions. NRC takes an active, "hand-on" approach, carefully selecting in-house management teams in each market. NRC's full-service business model has consistently delivered results for tenants and investors.

Maine Portfolio



One and Two Portland Square
Portland, Maine
260,000 SF / 5 Acres
Office / Land Development



Merrill's Wharf
254 Commercial Street
Portland, Maine
100,000 SF
Office Conversion



260 Commercial Street
Portland, Maine
17,500 SF
Retail / Office / Warehouse



14 Maine Street
Brunswick, Maine
450,000 SF
Office / Retail / Storage Conversion /
Land Development



Hathaway Creative Center
10 Water Street
Waterville, Maine
230,000 SF / 4 Acres
Office / Multifamily / Retail Conversion

Select Projects/Properties



200 Inner Belt Road
Somerville, Massachusetts
200,000 SF / 8 Acres
Art Storage / Office / Land Development



175 McClellan Highway
East Boston, Massachusetts
400,000 SF / 13 Acres
Residential / Office / Warehouse Conversion / Land Development



Acorda Pharmaceuticals Building
Chelsea, Massachusetts
142,000 SF / 3 Acres
Office / R&D / Manufacturing / Land Development



40 IDX Drive
South Burlington, Vermont
260,000 SF / 5 Acres
Office / Land Development



Terminal Stores
263 11th Avenue
New York, New York
1,200,000 SF
Office / Retail / Storage Conversion

Management Team

Coleman P. Burke
Founder & Chairman

As the Chairman and Managing Partner of NRC and its related entities, Coley is responsible for overseeing the development and execution of NRC's investment strategy. With more than 45 years of real estate investment, development and management experience, Coley plays a central role in identifying new opportunities, capital raising, and in our overall investment and management strategy. Coley graduated from St. Paul's School in 1959, Yale University in 1963 and Case Western Reserve University Law School in 1970. He spent four years (1963-1967) as a Ltjg., Fleet OOD and Communications Officer in the United States Navy. Prior to founding NRC, Coley was admitted to the New York State Bar and practiced law at Burke & Burke in New York City from 1970 to 1983.

Christopher S. Flagg
President

As President of NRC and its related entities, Chris oversees day-to-day management of all aspects of the firm, which includes managing our teams in New York, Massachusetts, Maine, New Hampshire, Vermont, Pennsylvania, Colorado and California, as well as capital raising. With over 29 years of real estate investment, development and management experience, Chris plays a leading role in the strategic direction of NRC. Chris joined the management team in 1990. Chris graduated from Deerfield Academy in 1983 and received a B.A. degree from Hamilton College in 1987.

Christopher H. Pachios
Vice President

As Vice President of NRC and its related entities, Chris helps to oversee day-to-day operations of the firm, while primarily focusing on new acquisitions, business development and sourcing equity and debt. Chris joined the management team in 2003. Prior to joining the firm, Chris worked as a commercial real estate broker in Boston and New York. Chris is also a partner in a family real estate business founded by his grandfather in Portland, Maine. Chris graduated from St. Paul's School in 1994 and received a B.A. degree from Bowdoin College in 1998.

Peter L. Pachios
Managing Director

As Managing Director of NRC and its related entities, Peter's responsibilities include acquisitions, asset management, leasing, operations and development. Peter joined the management team in 2007. Prior to joining the firm, Peter worked for the Boston Red Sox, primarily focusing on growing the non-baseball related business. Peter is also a partner in a family real estate business founded by his grandfather in Portland, Maine. Peter graduated from St. Paul's School in 1999 and received a B.A. degree from Georgetown University in 2003.

Adam K. Myers
Managing Director, Chief Engineer

As Managing Director and Chief Engineer of NRC and its related entities, Adam's broad range of responsibilities include acquisitions, construction management, asset management, operations, and property management. Adam leads the development, construction and maintenance initiatives throughout the company's portfolio. Adam joined the management team in 2011. Prior to joining the firm, Adam worked for over 10 years in real estate development and construction management. He founded, owned and operated a project management consulting company that specialized in commercial construction across North America. Adam graduated from Kenyon College with a B.A. degree in 1997 and the Daniels College of Business at the University of Denver with an M.B.A in 2006.

Anthony J. Gatti
Vice President, Maine Operations

Tony joined NRC in 1993. As Vice President, Tony oversees the day-to-day operations of the Portland, Brunswick and Waterville, Maine teams, primarily focusing on leasing, tenant relations and property management. Anthony is a native of Maine and lives in Scarborough, Maine.

Daniel P. Jacques
Construction Manager, Maine Operations

Dan joined NRC in 2005 as part of the construction management, maintenance and operations team. Dan served as NRC's construction supervisor on the Merrill's Wharf redevelopment for Pierce Atwood. Prior to joining the firm, Dan worked in project management as the east coast manager for a worldwide chemical engineering company. Dan is a Maine native, and graduated with a B.A. from the University of Maine in 1979 and attended the Muskie School at the University of Southern Maine from 1988 to 1989.

CARROLL ASSOCIATES

Firm Description

Carroll Associates is a small consulting firm engaged in the practice of landscape architecture, land planning, and site design. The firm was created in 1993, and is involved in a wide range of design and planning projects throughout Maine and New England.

The firm provides professional services to a broad-based clientele that includes municipal and institutional organizations, architects, engineers, real estate developers, and private individuals. While maintaining a diverse workload, the firm is entrenched in public, urban, and residential based planning and design work. Carroll Associates has significant experience in public, urban waterfront settings, institutional projects ranging from elementary schools to university work; municipal projects and recreational projects including work at Acadia National Park. The overriding objective in each is to provide a sensitive and well thought out solution which respects the natural environment and creates a functional and inviting setting for the building and its user.

Carroll Associates has been involved with many complex state and municipal projects which are specifically relevant to this project. Relevant Site Planning and Urban Design projects in Portland include the following:

- Ocean Gateway Ferry Terminal
- Marriot Residence Inn
- Riverwalk Condominiums (unbuilt)
- Maine State Pier Redevelopment Design Competition (selected design, unbuilt)
- Merrill's Wharf Redevelopment
- Thompsons Point Redevelopment
- International Marine Terminal Expansion
- Portland Gateway Hotel

In all of these projects the ability to integrate a new facility or program with historical buildings, complex physical and environmental sites, and established neighborhoods was critical to the overall success of the project.

We are well experienced with working within an interdisciplinary design team and the need to provide strong design solutions with limited budgets. Key to the firm's success is the commitment to providing attention and focusing on the specific needs of the client, remaining flexible and bringing projects to closure on time and within budget.

Professional services offered through Carroll Associates may include any or all of the following:

- Site Selection and Analysis
- Program Development and Budgeting
- Site Feasibility/ Utilization Studies
- Recreation Planning and Design
- Site Master Planning
- Construction Documents, Bidding, and Administration
- Consultant Team Coordination and Management
- Local, State, and Federal Permitting and Approvals



Brick Hill, South Portland, ME

Brickhill consisted of redevelopment of former Maine Youth Center into mixed use 'Smart Growth' project. The program for the 56 acre site includes 300 affordable housing apartments and condominiums, 250,000 SF of professional office space, recreation amenities including an 8 acre park, boat launch, community gardens, and hiking trails while preserving the historic brick structures on the site. The project is 100% completed in 2017. Carroll Associates provided Master Planning and Site Design Services for the project since 2001.



Forefront at Thompsons Point

The Forefront at Thompson's Point is a mixed-use development located on an existing vacant industrial site on the Fore River in Portland Maine. The original program consisted of a new Sports Event Cente, Concert Hall with an adjacent outdoor amphitheater seating 4500, a 235 room hotel, cultural center, restaurants, and approximately 180,000 sf of professional office space. Carroll Associates has been retained by the Developer to provide Master Planning and Landscape Architectural Services on the project.



Oceangate and Maine State Pier Redevelopment

Redevelopment of underutilized portion of Portland waterfront to provide new berthing for cruise ships and international ferry terminal. Oceangate Project includes extensive parking for ferry arrivals and departures, passengers, and tour busses; integration of adjacent narrow gauge railway, extension of existing streets to provide critical connections, and outdoor plazas and parks providing strong pedestrian connectivity to adjacent open space systems. Maine State Pier project includes redevelopment of aging waterfront pier and landside property to provide strong mixed use including office, retail, hotel, and a 2 acre park and with direct access to the waterfront.



Harborcorp, Portsmouth, NH

Redevelopment of vacant property in West End of Portsmouth, NH to provide mixed use development. Project envisions up to 115 Hotel rooms, 24 Condominium Units, Conference Facilities, Retail, dedicated parkland, and Structured Parking. The project ties into the existing Sheraton Hotel across the street. Approvals are in place and construction is expected to begin in 2019

CARROLL ASSOCIATES

PATRICK J. CARROLL
Principal Landscape Architect



Professional Registration:
Maine, New Jersey, New Hampshire, CLARB

Education:
Utah State University
Bachelor of Landscape Architecture,1978

Prior Experience
Carroll Associates, Portland ME 1993-
Moore Weinrich Architects, ME 1989- 2003
Environmental Planning and Design, ME 1988
Design Workshop, CO 1982- 1988
Land Design, UT 1989- 1988

As founder of Carroll Associates, Pat brings 40 years of landscape Architectural experience on a wide variety of projects throughout Maine, New England, and the Western United States. His successful project experience on largescale master planning and urban design provides a strong basis for solving complex design issues and managing important design and permitting challenges. His sensitivity and understanding of environmental constraints and culture provides for successful projects that are fitting and appropriate to each setting.

Erin Kay
Project Manager



Professional Registration:
Maine

Education:
Rhode Island School of Design
Master of Landscape Architecture, 2010

University of New Hampshire
BA Studio Art, 2004

Prior Experience
Carroll Associates, Portland ME 2013-
Crossby/Schlessinger, MA 2010- 2013

Erin joined Carroll Associates in 2010, and brings significant experience in urban design and planning from her experience in Boston prior to joining the firm. She has actively participated in many of the larger urban projects Carroll Associates has undertaken in the last five years, including Thompsons Point, Harborcorp and other complex and challenging projects. Her ability to quickly synthesize a site and develop creative solutions make her a valuable member of the design team.

WSA

WINTON SCOTT
ARCHITECTS

5 Milk Street, Portland, ME 04101
207.774.4811|www.wintonscott.com

Established in 1975, Winton Scott Architects is a small, design-oriented architectural practice located in Portland, Maine. Our work encompasses a diverse array of project types and scales ranging from multi-block urban developments, to historic renovations, commercial and institutional buildings, and multifamily and single family residences.

Our firm has been recognized numerous times for design excellence by the Maine and New England Chapters of the American Institute of Architects, as well as the United States Green Building Council; and our work has been profiled in national trade journals, local publications, and several books focussed on design and architecture.

Winton Scott Architects is comprised of a staff of six, including four senior architects ranging in experience from 15 to 45 years. The office is organized horizontally with all staff members capable of managing projects from program and design through production of construction documents and construction contract administration. This depth of experience and continuity in staffing have allowed WSA to take on large, complex projects while consistently delivering the highest level of professional services to our clients. The culture of the office is that of an open, creative collaboration of seasoned architects striving for the highest level of design excellence and client satisfaction.

We believe that architecture should be sustainable, adaptable, timeless, and derivative of its context and function. All buildings, even the most modest in scale and budget, can be at once artful, functional, and inspiring if they are rigorously conceived and executed with craft and precision. Each of our designs responds to the specific needs of our clients and the individual character of a particular site and its surrounding context.









Project Images From Top:

Ocean Gateway Cruise Ship Terminal
Skidompha Library
Youth Alternatives Family Center
Merrill Auditorium

Winton Scott Architects

Recent Urban Design / Planning Projects



Project: Maine State Pier Redevelopment

Program: Offices, Hotel, Retail, Restaurants, Marine Operations, Park

Areas: Site area = 7.2 Acres
Buildings = 325,000 S.F.

WSA Role: Design Team Leader, Masterplanning, Architect for Office Building.



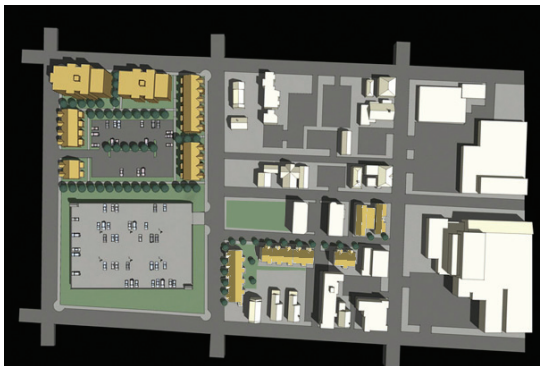
Project: Brick Hill- (Maine Youth Center Redevelopment)

Value: $65M

Program: Offices, apartments, condominiums

Areas: Site area = 59 Acres
Buildings = 336,000 S.F.

WSA Role: Masterplanning, Architects for 3 apartment projects, 2 office buildings

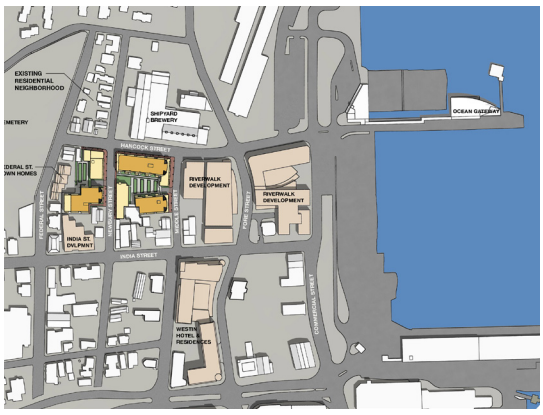


Project: Pearl Place & Unity Village Infill Housing

Program: Market rate & Subsidized apartments (188 Units)

Areas: Site area = 2.5 Acres
Buildings = 220,000 S.F.

WSA Role: Masterplanning, Architecture



Projects: Westin Hotel & Residences
The Village at Oceangate
Eastern Waterfront Garage
Oceangateway Cruiseship Terminal

Program: Hotel, Condominiums, Office, Retail Parking Garage, Terminal

Areas: Site area = 14.75 Acres
Buildings = 890,000 S.F.

WSA Role: Masterplanning, Architecture

WSA
WINTON SCOTT
ARCHITECTS



Winton Scott, NCARB
President

Professional Registrations	Maine, Massachusetts, and NCARB Certification
Other Experience	Louis I. Kahn, Architect, Philadelphia, PA Senior Project Architect Phillips Exeter Library Eero Saarinen and Assoc., New Haven Designer and Job Captain Ford Foundation Headquarters
Education	University of Texas, Bachelor of Architecture with Highest Honors, 1960

Before founding founding Winton Scott Architects in 1975, Winton Scott had built an impressive list of project experiences with some of the most highly respected architectural firms in the country. During this same period, he also accepted several teaching appointments with some notable schools of architecture, honing his own design interests.

Although Winton is a skilled designer, comfortable with any site, any building type and any scale, one of his special interests is urban design. His keen sensibilities in this arena are dramatically apparent in several recent projects completed by WSA



Stephen W. Weatherhead, RA
Principal

Professional Registrations	Licensed Architect, State of Maine
Education	Syracuse University, Bachelor of Architecture Professional Degree, 1988 Syracuse University in Florence, Italy Architecture Study Abroad Program, 1986

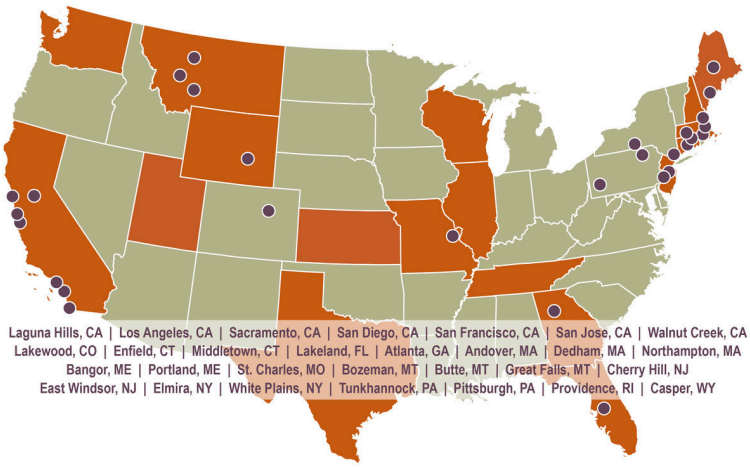
Steve joined Winton Scott Architects in 1994 to take on the role of Project Architect for the renovations to Merrill Auditorium. Since that time, he has gained extensive design and management experience on a wide range of renovation and new construction projects undertaken by the firm. His work encompasses projects ranging from custom homes to large scale commercial and institutional projects as well as a large portion of the firm's municipal work which includes a multitude of projects completed for the City of Portland.

With over 28 years of experience in all phases of architectural practice from conceptual design through construction, Steve knows how to effectively manage the design team and lead an open process that has consistently produced successful building projects based on the specific needs of his clients. He has managed projects for WSA totaling over $100M in construction value that have utilized a full range of project delivery methods both in the private and public sectors.

PROFILE OF THE FIRM

Woodard & Curran is an integrated engineering, science, and operations company. Privately held and steadily growing, we serve public and private clients locally and nationwide.

Talented people are at the heart of our firm. Our company was founded in 1979 on a simple business concept: provide an enjoyable place to work with opportunity, integrity, and commitment, and we will attract talented people. It happened. At the heart of our company are people who are experts in their fields and passionate about what they do, showing a level of commitment and integrity that drive results for our clients. You experience this power every day in our actions, our solutions, and our promises kept.



Commitment evident in personal approach

Our commitment is reflected in the personal attention, collaborative resources, and dedication to results that we devote to each project. We assign the right people with the right expertise to the job, and provide clients with easy accessibility to senior experts.

Our work is characterized by responsiveness, resourcefulness, and willingness to do what it takes to get the job done properly. Examples range from helping communities garner state and federal funding for wastewater treatment system improvement to managing a multi-vendor manufacturing project through a major snowstorm and getting production lines up and running. We are experts at navigating the complexities of environmental regulations and have been involved in transforming many brownfields sites into marketable properties. In defining moments like these, it is commitment that brings our clients results.

Woodard & Curran serves clients locally and nationwide from offices throughout the U.S. Headquartered in Portland, Maine, the firm operates offices in the locations noted above, as well as treatment facilities in the states that appear in orange.

Operating with integrity

Our integrity impacts our decision-making at all junctures of our work — from the openness of our communication to the fairness of our prices to placing your interests above our pocketbook. We hire people who share our values of honesty, respect, and fairness and who want to do the right thing. They, in turn, treat everyone — our people, our clients, regulators, and stakeholders — respectfully and honestly.

Full-service firm with multidisciplined staff

Our integrity and commitment are matched only by the depth of our expertise. Our staff are specialists in their fields, offering in-depth understanding of cutting-edge technology, astute problem-solving, multidisciplinary engineering, and expert regulatory guidance. The firm has received numerous honors and awards, and we have ranked among *Engineering News-Record's* top 100 environmental firms every year since 2000.

Services to the private sector

Woodard & Curran provides a range of site/civil and environmental engineering, science, and operations support to companies in the real estate sector, as well as to hospitals, colleges and universities, and law firms, helping our clients realize their project vision.



BARRY SHEFF, PE
PRINCIPAL-IN-CHARGE

Professional Profile

Barry is a Senior Principal and Senior Project Manager with over 25 years' experience working with the public sector on infrastructure planning and implementation, and with the private sector on urban revitalization projects. He is responsible for design and project management, with expertise engaging and facilitating stakeholder processes. His project work has involved utility infrastructure with focus on stormwater and wastewater utility planning studies, evaluations, and engineering; green infrastructure; master development planning and site design; and environmental/land-use permitting at the local, state, and federal levels. Barry focuses his work on sustainable environmental design and is committed to collaborating with owners and stakeholders to develop practical solutions to complex problems. He has been involved in numerous projects with high-performance buildings and LEED certification. Barry has a track record of understanding client expectations, consistent budget controls and excellent communication skills that enable him to drive the success of small and large projects of varying complexities.

Related Experience

Maine Medical Center, Portland, ME – Parking Garage. Principal-in-Charge for the permitting and design of the new 2,000+ car parking garage in St. John Valley neighborhood of Portland. The project is the result of a partnership between a private land-owner and Maine Medical Center (MMC) as part of the hospital's major campus expansion. Woodard & Curran's work involves site options analysis, land-use and environmental permitting, site/civil engineering and utility infrastructure design for the multi-level parking structure to serve MMC employees. Focus areas of the project involve the coordination with employee shuttle services, and the need for accommodating employee commuting patterns and routes while reducing demand on the existing urban street network surrounding the hospital campus.

Patrons Oxford Insurance – Patrons Oxford Insurance Headquarters. Principal-in-Charge for the permitting and design of the new Patrons Oxford Insurance Headquarters in Portland, Maine. The project was the first development in the Portland Technology Park in Portland (designed by Woodard & Curran). The project involved close coordination with the design team and owner, and included the low impact design considerations for parking and site features, as well as integration into the Technology Park's stormwater management plan.

East Brown Cow Management Inc., South Portland, ME – Sable Oaks Office.
Principal-in-Charge responsible for civil site design and land-use permitting of a 45,000-SF office building with associated parking lot, access drives, plazas, and landscaping. The project included design of stormwater treatment systems, erosion control, site amenities, and utilities. Permitting efforts involved the City of South Portland, Maine Department of Environmental Protection (DEP), Army Corps of Engineers, and Federal Aviation Administration given proximity to the Portland International Jetport.

Education

- Bachelors, Civil / Environmental Engineering, University of Vermont

Registrations

- Registered Professional Engineer - ME, #9708
- NCEES License - National, 60366
- Maine DOT Local Project Administration Tier 1 Certification

Professional Associations

- American Society of Civil Engineers
- American Public Works Association
- New England Water Environment Association (NEWEA)
- Order of the Engineer

East Brown Cow Management Inc., Portland, ME – Hyatt Place Hotel. Principal-in-Charge for this redevelopment project to convert an existing parking lot on a 20,000 SF urban parcel of land into an 80,000 SF hotel. We collaborated with the architect and owner's representative to provide local permitting and site / civil engineering design associated with the project. The project was complicated by private power distribution infrastructure that crossed the site and needed to be maintained, as well as the City's desire to have off-site roadway improvements incorporated into the project.

PDT Architects, Portland, ME – Adams School Workforce Housing. Project Manager for this urban redevelopment project, supporting AVESTA Housing and its design team. Located in the Munjoy Hill neighborhood of Portland, the project is a result of a public RFP for redevelopment proposals of this brownfield site, the home of a former elementary school. The project involved the demolition of the existing Adams School building and site amenities, and remediation of environmental contamination; and development of a 16-unit affordable ownership-housing complex, with public open space and playground area. Our work involved local and state environmental permitting, and site engineering and design associated with the placement of this project in a densely developed residential neighborhood. The engineering effort required an intensive balance of earthwork activities to control remediation costs and ensure adequate environmental protections for the residents and users of the open spaces.

The Watermark and Ocean Gateway Garage – Mixed Use Development. Project Manager for the environmental due diligence phases (Phase 1 environmental site assessment and soil/groundwater investigations), site design, and permitting for this private mixed use development on the Portland waterfront (adjacent to the Ocean Gateway facility) with boutique hotel, luxury condominiums, retail, commercial space, office building, 750-car parking garage, and additional surface parking lots. Site/civil work includes layout, grading, drainage, erosion and sedimentation control, and utility design. Permitting includes City Site Plan, Subdivision, Historic Preservation, Maine DEP Site Law, and Maine Historic Preservation permitting. The parking garage was constructed while the remaining portions of the project were unbuilt.

MaineDOT, Portland, ME – Ocean Gateway Multimodal Facility. Program and Project Manager of the permitting and design for implementing first phase of the Master Plan of the redevelopment of a 19.5-acre ship repair facility to a multi-use marine transportation facility on Portland's waterfront. The phase one facility encompassed the former Bath Iron Works site and the associated City-owned land-based infrastructure. Under Barry's responsible charge, Woodard & Curran prepared, submitted, and obtained land-use and environmental permits for the project, including local land-use and Board of Harbor Commissioners approvals; Maine Department of Public Safety Construction Permit; Maine Traffic Movement Permit; U.S. Army Corps of Engineers Department of the Army Permit; and Maine DEP Site Location of Development Permit and Natural Resources Protection Act. We also designed the site infrastructure (vehicle queuing, pick-up and drop-off, short- and long-term parking) to be flexible in its use. The project includes the design of City streets, a major regional trail connection, and the narrow gauge passenger railway. The design creates a new city block and the impetus for economic development. The design of utility infrastructure and blending the facility into an existing congested urban environment proved challenging, but in the end, met the City's future needs. Barry was responsible for working with a steering committee to develop and refine concepts working within available construction funding constraints, and for preparing Phase 1 improvement recommendations as a summary of the preliminary design efforts. As the Program Manager, Barry was responsible for managing the contract with the State of Maine and the 10-firm design team.

University of Southern Maine, Portland, ME – Community Education Center and Parking Garage. Project Manager/Engineer responsible for site and utility design of a 1200-car parking garage, 500-seat lecture hall, and 15,000-SF office classroom building. Coordinated the site survey; completed preliminary site evaluations; prepared grading and utility plans for surface parking areas, open space, and roadways; developed construction documents; completed stormwater design; coordinated with the City of Portland for roadway realignments and discontinuances; coordinated design plans with the project architect and landscape architect; and prepared technical specifications for construction documents. Coordinated with the regulatory agency; prepared local Demolition Permit applications; prepared Application for Maine DEP Site Law and City's Major Site Plan Applications under tight time frames. The project is LEED Gold certified.

City of Portland, ME – Bayside Adapts, Phase I. Principal-in-Charge of the team providing planning and engineering services to facilitate the City's first climate change adaptation planning effort, for the City's Bayside neighborhood. The focus of the project was to conduct a Sewer and Stormwater Data Gap Analysis, and public engagement process to help the community identify a socially responsible, technically sound and financially feasible adaptive strategy to protect the Bayside Neighborhood from the effect of rising tides, extreme rain events and storm surge. Our work involved coordination and contracting with a subconsultant, RPS ASA to evaluate and recommend sea level rise and storm surge scenarios appropriate for City of Portland's planning horizon.

BECKER
STRUCTURAL ENGINEERS

About Us

Becker Structural Engineers, Inc., was founded in 1995 and is a full service structural consulting firm with a staff of twenty-seven. We provide practical, cost-effective and innovative solutions on a wide range of challenging projects in three practice areas; buildings, parking structures and bridges.

We believe in competency and character as our defining values. We are pro-active and interactive in our approach. Our dedicated staff and our investment in technology allows us to deliver high quality service on multiple large and small projects simultaneously. We embrace an engineering approach to projects which combines classical engineering theory and practical experience, paired with the versatility and efficiency of Autodesk Revit to create structural models which interact and coordinate with architectural and mechanical models to define the comprehensive building system. This approach advances the design and coordination of our projects.

Our building design practice includes residential, commercial, education and public institutional buildings. We have substantial experience with contemporary building design which is complemented by an extensive background and expertise renovating and restoring historic structures. Our design capabilities are complemented by our construction phase services, which include construction reviews for general conformance and implementation and administration of the IBC Special Inspections Program. We believe a strong job site presence contributes to enhanced quality and improved construction efficiency. Working with the owner, architects, contractor and testing agencies our office provides a full range of construction monitoring capabilities.

Becker Structural Engineers have been the selected structural engineering consultant for municipalities, owners and developers throughout New England. Recent and relevant work includes on-going services under a **General Consulting Services for the City of Portland** and a **General A/E Services** agreement with the **Portland Housing Authority.** Significant buildings in Portland include the multi-story medical offices for **InterMed**, the **Hyatt Hotel** located on Fore St. and the rehabilitation of the **historic Twitchell-Champlain** building on Merill's Wharf which now serves as the law offices for Pierce Atwood**.** We strive to integrate ourselves in understanding the overall approach that each owner is seeking to obtain, with guidance on analysis and cost recommendations to fit within the sustainability of the program design.


City of Portland
International Jetport
Parking Garage



Hyatt Hotel


InterMed Medical Offices


Historic Twitchell-Champlain Offices

75 York Street, Portland, Maine 04101 ■ 207.879.1838 ■ beckerstructural.com

BECKER
STRUCTURAL ENGINEERS



Casco Bay Ferry Terminal



Canal Zero Redevelopment



Maine Medical Center
Employee Parking Garage



Portland Public Library

50 Sewall Street M.O.B. (LEED Certified), Portland, ME
58 Fore Street Building 2/3 & Marina Building, Portland, ME
84 Marginal Way M.O.B and Parking Structure, Portland, ME
173 Main Street Redevelopment, Waterville, ME
409 Cumberland Ave Housing, Portland, ME
Bayside Anchor Housing, Portland, ME
Bayside Village Student Housing, Portland, ME
Berlin City Honda Showroom, South Portland, ME
Berlin City TSL Showroom, South Portland, ME
Canal Zero, Portland, ME
Casco Bay Ferry Terminal, Portland, ME
CEI Office Building (LEED Certified), Brunswick, ME
Consigli Office Building, Milford, MA
Dead River Corporate Office, South Portland, ME
DHS Office Building, Portland & Lewiston, ME
Elm Terrace Apartments, Portland, ME
Emerson Shailer Housing, Portland, ME
Exactitude Office/Manufacturing Building, Cumberland, ME
Ferry Terminal Redevelopment IMT Office Building, Portland, ME
Genest Warehouse Addition, Biddeford, ME
Gorham Savings Bank Operations Center, Gorham, ME
Handyboat Restaurant/Dockside Grill, Falmouth Foreside, ME
Hill Farm Equestrian Center, New Gloucester, ME
Huston Commons, Portland, ME
Hyatt - Old Port Hotel, Portland, ME
IDEXX Laboratories Data Center Relocation, Westbrook, ME
Irish Heritage Center Structural Review, Portland, ME
Jackson Laboratories Building Renovation, Bar Harbor, ME
LL Bean Vertical Expansion Feasibility Study, Freeport, ME
Maine DEP - Deering & Greenlaw Buildings, Augusta, ME
Maine Medical Center Family Practice Office Building, Portland, ME
Maine Medical Center Employee Parking Garage, Portland, ME
Maine Municipal Association Office Addition, Augusta, ME
Maine Standards Building, Cumberland, ME
Maine Veterans Homes Office Building, Augusta, ME
Marriot Residence Inn, Portland, ME
Merrill Auditorium, Portland City Hall, Portland, ME
Norway Savings Bank, Gray, ME
Park Danforth New Residence Wing, Portland, ME
Patrons Insurance Building, Portland, ME
Pearl Place I & II, Portland, ME
Pinetree Shopping Center Retail Development, Portland, ME
Portland Public Library, Portland, ME
Portland Public Market Redevelopment, Portland, ME
RMS Office Building, South Portland, ME
Saco Biddeford Savings Bank (LEED Silver), Saco, ME
Shops at Falmouth Village, Falmouth, ME
Strand Theatre, Rockland, ME
Topsham Retail Center, Topsham, ME
Twitchell - Champlin Building, Portland, ME
Vortechnics Office Building, Scarborough, ME
Westin Hotel, Portland, ME

BECKER
STRUCTURAL ENGINEERS



Paul B. Becker, P.E., SECB
President

As the founder of Becker Structural Engineers, Paul has over thirty-eight years of structural engineering experience in New England and the Mid-Atlantic States. His technical experience covers all aspects of the structural engineering profession including complex building systems using steel framing, cast in place, precast and post-tensioned concrete, deep foundation support systems, earth retaining structures, masonry and timber framing. He has served as lead design engineer and project manager, responsible for establishing and monitoring schedules, budgets and quality control on projects with construction costs of up to $75 million. As Principal in Charge of a project, he collaborates with the client and project team to establish the project scope, schedule and contracts and monitors the progress and quality of work.

PROFESSIONAL ENGINEER REGISTRATION

- Maine (#6554)
- Massachusetts (#39009)
- New Hampshire (#6258)
- New York (#86255
- Vermont (#7773)
- Georgia (#033280)
- Connecticut (#20725)
- Rhode Island (#9067)
- Ohio (#74529)
- Certified in the Practice of Structural Engineering (#2285-0708)



Todd M. Neal, P.E.
Vice President

A principal of BSE, Todd is a registered Professional Engineer in the State of Maine and has extensive experience in the design and fabrication of precast/prestressed concrete garages, building components, bridge components, architectural precast concrete. Specialty topics include repair and maintenance of parking structures. He offers expertise in construction management, structural testing and administration of special inspection programs in accordance with the IBC Codes. Todd is currently an active member on the PCI Parking Garage Design Committee and Joint Sealant Sub-Committee and contributed to the publication of the PCI “Maintenance Manual for Precast Parking Structures” and the PCI Committee Report “Joints in Precast Parking Structures”.

PROFESSIONAL ENGINEER REGISTRATION

- Maine (#9406)
- Connecticut (#27306)
- Massachusetts (#51354)
- West Virginia (#20277)
- New Brunswick, Canada (#L5173)
- Nova Scotia, Canada (#11330)
- Certified in the Practice of Structural Engineering (#2639-0708)



Ethan A. Rhile, P.E.
Senior Associate

Ethan joined BSE in September of 2001 after practicing structural engineering in the Mid-Atlantic States. He has extensive experience in the design of multiple story buildings and industrial facilities, with several projects eclipsing 250,000 square feet. He has served as a Project Manager, responsible for the technical design, quality control, budgeting, and construction administration for building projects up to ten stories in height, with construction budgets up to $100 million. He has an in-depth knowledge of computer software packages including STAAD-III, SAPP 2000, RISA 3D, RAM Elements, RAM Structural System, SP Mats, AutoCAD and Revit.

PROFESSIONAL ENGINEER REGISTRATION

- Maine (#10266)
- Commonwealth of Pennsylvania (#057589)

CONSIGLI CONSTRUCTION CO., INC.

At a Glance

CONSIGLI
Est. 1905

HISTORY & LEADERSHIP

Established in **1905**

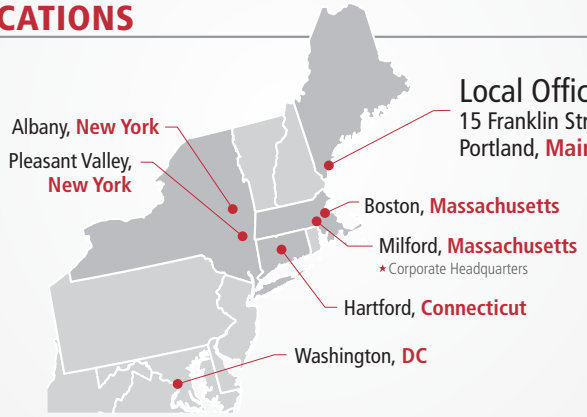
100% Employee Owned

ANTHONY CONSIGLI, CEO
MATTHEW CONSIGLI, President
MATTHEW TONELLO, Director of Operations/ME

FINANCIAL STRENGTH

$110M	$1.2B	$2B	$400M
2018 Revenue (MAINE)	2018 Revenue (CORPORATE)	Aggregate Bonding Limit	Single Project Bonding Limit

OFFICE LOCATIONS



PEOPLE

90	1,000	350	7
Employees (MAINE)	Employees (CORPORATE)	Self-perform Craftspeople	Regional Office Locations

OUR STORY

In 1905, Peter Consigli, a skilled mason, established Peter Consigli & Sons in Milford, Massachusetts, on the cornerstones of hard work, integrity and pride in craftsmanship. Four generations and over 100 years later, Consigli has grown from a local business into one of the largest construction managers in the Northeast.

With more than 1,000 employees corprate-wide and 90 in Maine, Consigli has expanded its roots, while maintaining its core competencies as a true builder with more than 350 skilled carpenters, laborers and masons on staff.

RELEVANT EXPERIENCE

Consigli has extensive knowledge of every component included in the Portland Square project from a wealth of lessons learned from similar projects. We are experts in parking garage construction having completed more than a dozen in recent years, including five of 750 cars or more. On the following pages we have demonstrated our experience with parking structures, deep foundations and office buildings in urban environments.

39	30,000	150+	2M+ SF
Total Parking Garages Constructed or in Construction	Total Parking Spaces Constructed or in Construction	Office Buildings Constructed or in Construction	of Office Space Constructed or in Construction



RELEVANT EXPERIENCE

CONSIGLI
Est. 1905



Cow Plaza Hotel LLC, Hyatt Place Hotel, Portland, ME

New construction of a 80,000 sq. ft. hotel in downtown Portland. The facility, located at the corner of Fore and Union Streets, contains 130 guest rooms and 1,000 sq. ft. of street-level retail space, a swimming pool and other high-end amenities.



East Brown Cow Inc., Canal Zero, Portland, ME

20,000 sq. ft. renovation and re-branding of East Brown Cow's Canal Plaza in Portland's Downtown will bring new life to the quiet plaza, which rests between four corporate office buildings. The plaza will feature locally quarried pavers, stairs and retaining wall and a new boutique circular building constructed of a mixture of exposed architectural concrete and a custom curtainwall system.



Aura, Club Renovations/Expansion, Portland, ME

8,460 sq. ft. renovation and 14,400 sq. ft. new construction to Portland's iconic nightclub will allow the venue to hold larger events, conferences, private events and weddings. Project scope includes demolition and reconstruction of much of the existing building and new kitchen, bar areas, dance floors and finishes. The project is being executed across three distinct phases with carefully planned urban logistics.



Maine Medical Center, Employee Parking Garage, Portland, ME

New 810,000 sq. ft., 2,400-car parking garage built to support Maine Medical Center's master plan in providing a consolidated parking option for employees. The nine-story garage will be supported on steel H-piles and cast-in-place concrete foundations with the above-grade structure consisting of precast concrete. Construction will occur adjacent to occupied businesses, private residences and active railroad tracks.



City of Portsmouth, Foundry Place Parking Garage, Portsmouth, NH

This six-story, 618-space parking garage on Deer Street, while also making roadway improvements. This challenging site—located in a tidal zone and abutted on both sides by a freight railroad and residential neighborhood—is also a heavily-contaminated brownfield, hosting heavy metals, lead, petroleum and oil. Extensive remediation efforts will be required, in tandem with abatement and demolition of several small existing structures on the site.

RELEVANT EXPERIENCE

CONSIGLI
Est. 1905



City Square II Development Co., CitySquare Underground Garage, Worcester, MA

Construction of a 564-space, 160,000 sq. ft. two-story below-grade garage as part of the CitySquare development in Worcester. The project required management of hazardous soils, challenging logistics and groundwater issues. The project also included the Installation of a public plaza atop the new below-grade structure.



Related Beal, Lovejoy Wharf, Boston, MA

New construction of a 250,000 sq. ft., 17-story residential building featuring 157 luxury condominiums plus amenities, public spaces and 2,000 sq. ft. of ground-floor retail space. This cast-in-place concrete structure was built around an active, waterfront site, adjacent to the TD Garden and Zakim Bridge.



Maine Historical Society, Brown Library & Longfellow Garden, Portland, ME

This 10,000 sq. ft. renovation and 10,000 sq. ft. expansion of historic library was completed within a constricted urban site; included upgrades to M/E/P and life safety systems and ADA requirements. The addition features a dramatic Kawneer curtain wall façade.



MaineHealth, Corporate Headquarters, Portland, ME

Conversion of a 1940s retail building, originally built for Sears & Roebuck, into 90,000 sq. ft. Class A office space for this leading regional healthcare network. The central core of the building was removed to create a new atrium that maximizes natural light throughout the building. Consigli procured and managed the installation of custom furniture systems.



Immucell Corp., Mast-out Facility, Portland, ME

16,800 sq. ft. new construction of a pharmaceutical-grade production facility for Mast Out, a treatment for a common infection found in cows worldwide. The cGMP facility will house space for fermentation, laboratory, processing and warehouse program areas, and it is utilizing pre-fabrication for equipment and building systems to manage the aggressive schedule.

COMMITMENT & INTEGRITY
DRIVE RESULTS

41 Hutchins Drive
Portland, Maine 04102
www.woodardcurran.com

T 800.426.4262
T 207.774.2112
F 207.774.6635

MEMORANDUM

TO: Patrick Carroll, Carroll Associates Landscape Architects
FROM: Lauren Swett, PE & Amy LeBel, EIT
DATE: April 5, 2019
RE: Portland Square Master Development Plan – Stormwater Management

---

Woodard & Curran has reviewed the stormwater requirements for the proposed Portland Square redevelopment projects based on City of Portland and Maine Department of Environmental Protection regulations. The proposed redevelopment will largely convert existing surface parking lot area to rooftop area, which will by itself greatly improve water quality conditions, and in addition, we will be providing stormwater treatment for each of the development phases.

PERMIT REQUIREMENTS

Woodard & Curran assessed the regulatory thresholds for permitting under MaineDEP Stormwater Law and MaineDEP Site Location of Development (Site Law) for the proposed redevelopment of Portland Square. The Portland Square property received a Site Location of Development Act Order (#L-013526-A-N) (SLOD) from the DEP in 1986. Since that time, a number of amendments have been made to that permit. The current project proposes to redevelop existing surface parking lots with a series of phases including a hotel, structured parking, retail space, residences, and offices. This change will require an amendment to the existing SLOD. Revisions to the SLOD will be addressed separately with the Level III Site Plan Applications submitted for each phase of development. The SLOD amendments will be reviewed by the City of Portland as part of their Delegated Review Authority.

The redevelopment project will abide by regulations of Maine DEP Chapter 500 Stormwater Management Rules as applicable to Site Law and City of Portland Technical Manual Section 5 including Basic, General and Flooding Standards. Due to the project location, it will not be required to comply with the Phosphorous and Urban Impaired Stream Standards. The following sections discuss stormwater management requirements for the Site relative to these Standards.

BASIC STANDARD (SOIL EROSION AND SEDIMENTATION CONTROL)

Site plans, details, and erosion and sediment control notes demonstrating compliance with the Basic Standard will be provided as part of future Level III Site Plan Applications, when additional design detail will allow for the identification of the necessary controls.

GENERAL STANDARD (WATER QUALITY)

A land use and pollutant impact analysis was conducted to determine the stormwater treatment requirements for the proposed redevelopment project per Chapter 500.4.C.(2)(d)(i). The existing land use (high use parking lots, pollutant ranking 5) has a higher pollutant ranking than the proposed land use (flat asphalt rooftops, pollutant ranking 3). Therefore, the ranked impact change for the redevelopment project is 0.0 or less. The following table, which is taken from MaineDEP Chapter 500, describes the treatment level requirements for redevelopment projects.

Table 3
Treatment Levels for Redevelopment Projects (Maine DEP Chapter 500)

Ranked Impact Change Due to Redevelopment	Percentage of Developed Area that Must be Treated
0.0 or less	0% (Stormwater projects) **50% (Site projects)**
≥ 0.0 to ≤ 1.0	60%
> 1.0 to ≤ 2.0	70%
> 2.0 to ≤ 3.0	80%
> 3.0	Same treatment level as for new development

The project will be required to provide for treatment of 50% the redeveloped area as is required redevelopment on Site Law projects. Although green roof systems are being considered for portions of the building roofs in each phase, the site was considered 100% impervious for preliminary sizing of stormwater treatment systems to provide a conservative evaluation. Based on this assumption, stormwater treatment systems were sized for water quality volumes of 1 inch of rainfall over the required 50% treatment area. The stormwater management design will include bypass systems as required to convey 100% of the stormwater from the site.

Jellyfish Filters for treatment and R-Tank subsurface systems for pre-treatment channel protection volume storage were evaluated for the preliminary stormwater design. These proprietary systems are approved by Maine DEP as stormwater best management practices, and they are relatively versatile for installation within tight urban settings. We are currently anticipating that the proposed stormwater systems will be constructed during phases 1, 2, and 3, and the systems will be sized and designed to support the future work in phases 4 and 5. The attached drainage plan shows approximate locations of the proposed treatment systems for each phase. Location, orientation and R-tank configuration will be refined during Level III Site Plan design to avoid conflicts with utilities and structural components, provide adequate access for maintenance, and minimize depth of excavation. Preliminary sizing of these systems are provided in the following table.

Phase Current & (Future)	Area Summary			Double R-Tank Size					
	Total Redeveloped Area (SF)	50% Treatment Required (SF)	WQV (CF)	R-Tanks Required (#)	Layout	Length (FT)	Width (FT)	Depth (FT)	Footprint (SF)
1	27,990	13,995	1,167	182	19LX5W	48.57	10.56	2.82	513
2 (5)	79,850	39,925	3,328	518	42LX3W	144.75	7.94	2.82	1149
					5LX17W	15.73	26.31	2.82	414
3 (4)	75,630	37,815	3,152	491	36LX7W	88.45	13.19	2.82	1166

The stormwater management system for Phase 1 (Center Street Hotel) is proposed within the Center Street Service Access Easement. The design details for this system will be submitted separately as part of a response to comments for the Level III Site Plan (PL-000448-2018) that is currently under review.

The Phase 2 subsurface system is currently proposed with subsurface storage located both underneath an existing walkway east of the proposed development, and underneath the proposed parking garage. This layout will require further coordination with the City of Portland, as the subsurface storage proposed outside of the garage is within an existing sewer easement. This system is proposed to tie into the existing separated storm drain located between Portland Square 1 and 2. We have had preliminary conversations with the City, and will be continuing to discuss the options for installation in this area, as we advance the design for this phase of work.

The subsurface system for Phase 3 and 4 is proposed within a landscaped corridor between the proposed development and the adjacent existing building. This system is proposed to tie into the combined sewer in Cross Street. In the existing condition, the surface parking lot discharges to the combined sewer in Center Street. These two combined sewers ultimately discharge into the same combined sewer on Commercial Street. The design team intends to discuss location and capacity of the Cross Street combined sewer with the City as the design progresses.

FLOODING STANDARD (WATER QUANTITY)

The project will be required to ensure that stormwater runoff quantity is not increased in the 2-, 10-, and 25-year storm events, as required for a project receiving an amendment to an existing SLOD. Based on the existing highly impervious condition of the site, it is not anticipated that significant additional stormwater storage will be required to meet the Flooding Standard, and the channel protection storage provided to meet the General Standard will likely be adequate to meet the Flooding Standard as well.

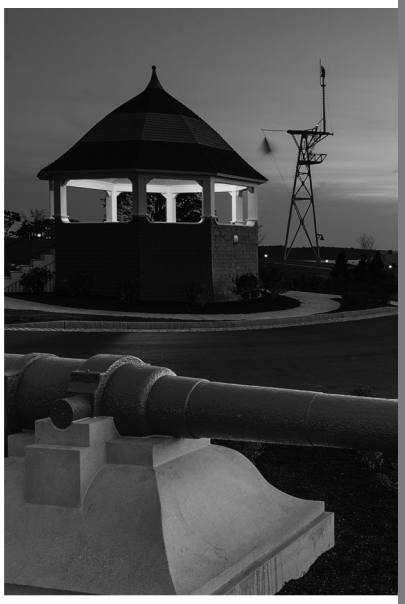
The design must also consider that stormwater from the site may not overwhelm the City's existing stormwater and sewer infrastructure. The existing stormwater from the project area currently discharges to different City combined sewer and storm drain lines located in Center Street, Cotton Street, and Union Street. We anticipate that some of the storm drain connection locations will change. With these changes, there may be opportunities to connect to separated storm drain systems where current connections are to combined sewer systems. At each phase of the project, the design team will coordinate with the City of Portland to confirm location and capacity of stormwater connection locations.

SUMMARY

The proposed redevelopment project will primarily replace existing surface parking areas with building roof. To meet the Maine DEP and City of Portland stormwater requirements, we are proposing proprietary stormwater treatment systems that are approved stormwater BMPs to provide treatment for at least 50% of the proposed redeveloped areas. The enclosed stormwater drawing shows the approximate locations of these systems and their anticipated connection locations. As design of each phase continues, consideration may be given to different treatment systems than what has been shown here, but treatment will always be designed to meet the 50% requirement.

Att. L

Relationships.
Responsiveness.
Results.









REVISED Traffic Permit Application Request for Scoping Meeting Mixed-Use Development Portland, Maine

PREPARED FOR:
North River Company
224 12th Avenue
New York, NY 10001

April 2019

SUBMITTED BY:
Gorrill Palmer
707 Sable Oaks Drive
Suite 30
So. Portland, ME 04106
207.772.2515

GORRILL PALMER

707 Sable Oaks Drive, Suite 30
South Portland, Maine 04106
207.772.2515

April 2, 2019

Mr. Matthew Grooms
City of Portland Planner
389 Congress Street, 4th Floor
Portland, Maine 04101

RE: Application for Traffic Movement Permit
Portland Square
Portland, Maine

Dear Matthew,

On behalf of North River Company (applicant), Gorrill Palmer (GP) is pleased to submit this Traffic Movement Permit Application for a mixed use project located in the Portland Square area in downtown Portland.

We have attached the following information in support of this application:

- Sections 1-6
- Signed Application Form
- Notice of Intent to File
- List of Abutters
- $1500 application fee

We look forward to scheduling a Scoping Meeting in the near future.

Sincerely,

Gorrill Palmer

Randy Dunton, PE, PTOE
Project Manager

Copy: Adam Myers, North River Company
Patrick Carroll, Carroll Associates
Steve Weatherhead, Winton Scott Architects
Randy Illian, MaineDOT

Department of Transportation
Traffic Engineering Division
16 State House Station
Augusta, Maine 04333
Telephone: 207-287-3775

FOR MDOT USE 12/99
ID#_____

Total Fees:_____
Date Received: _____

****

PERMIT APPLICATION – TRAFFIC
TRAFFIC MOVEMENT PERMIT, 23 M.R.S.A. §704-A

Please type or print:

This application is for (check all that apply): Traffic 100-200 PCE's ☐
Traffic 200 + PCE's ☒

Name of Applicant: Mr. Adam K Myers, North River Company

Address: **224 12th Avenue New York, NY 10001** Telephone: _____

Name of local contact or agent: **Randy Dunton – Gorrill Palmer**

Address: **707 Sable Oaks Drive, South Portland, ME 04106** Telephone: **(207) 772-2515**

Name and type of development: The development consists of 287,786 sf of office space, 35,613 sf of retail, 76 dwelling apartment units, and a 135 room hotel.

Location of development including road, street, or nearest route number: The upper lot is located on the block bounded by Spring Street, Cross Street, Fore Street, and Cotton Street. The lower lot is located on the block bounded by Fore Street, Cross Street, Commercial Street, and Center Street.

City/~~Town~~/~~Plantation~~: **Portland** County: Cumberland Tax Maps: **38** Lots: **B001, B002, B003, G001, G003, G005, and G007**

Do you want a consolidated review with DEP pursuant to 23 M.R.S.A. § 704-A (7)? **No** _____

Was this development started prior to obtaining a traffic permit? **No**

Is the project located in an area designated as a growth area (as defined in M.R.S.A. title 30-A, chapter 187)?
Yes _____ No _____

Is this project located within a compact area of an urban compact municipality? Yes X No_____

Is this development or any portion of the site currently subject to state or municipal enforcement action?

None Known _____

Existing DEP or MDOT permit number (if applicable): None Known

Name(s) DOT staff person(s) contacted concerning this application _____

Name(s) of DOT staff person(s) present at the scoping meeting for 200+ applicants: _____

N/A

Department of Transportation
Traffic Engineering Division
16 State House Station
Augusta, Maine 04333
Telephone: 207-287-3775

FOR MDOT USE 12/99
ID#_____

Total Fees:_____
Date Received: _____

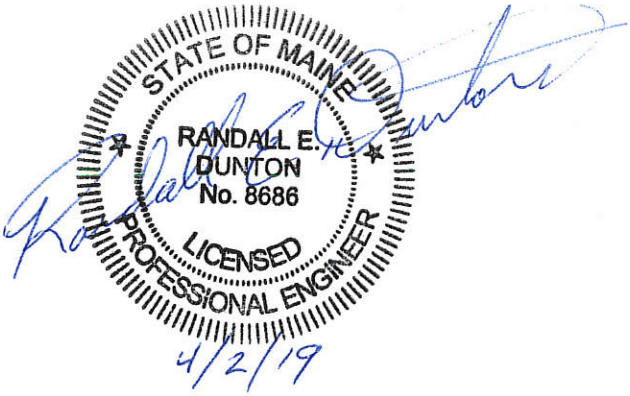
CERTIFICATION

This person responsible for preparing this application and/or attaching pertinent site and traffic information hereto, by signing below, certifies that the applicant for traffic approval is complete and accurate to the best of his/her knowledge.

Signature: Randall E. Dunton Re/Cert/Lic No.:_____

Name (print): **Randall E. Dunton** Engineer: **Maine PE # 8686**

Date: April 2, 2019 Other: _____



If the signature below is not the applicant's signature, attach letter of agent authorization signed by applicant.

"I certify under penalty of law that I have personally examined the information submitted in this document and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the information is true, accurate, and complete. I authorize the Department to enter the property that is the subject of this application, at reasonable hours, including buildings, structures or conveyances on the property, to determine the accuracy of any information provided herein. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

_____ _____

Signature of applicant Date

Form C 7/97

NOTICE OF INTENT TO FILE

Please take notice that:

Mr. Adam K Myers
North River Company
224 12th Avenue
New York, NY 10001

is intending to file a MaineDOT Traffic Movement Permit application with the City of Portland, who has delegated review authority to administer the application, pursuant to the provisions of 23 M.R.S.A. §704 – A on or about April 5, 2019.

This application is for:

The development of three proposed mixed use buildings in Portland, Maine. The site is located on two blocks, the upper lot and the lower lot. The proposed development is to include two multi-level parking garages, one on each lot, 287,786 sf of office space, 35,613 sf retail space, 76 dwelling apartment units, and a 135 room hotel. The hotel is under different ownership than the rest of the site, but was owned by the same owner within the last ten years and has been included in this application due to common scheme of development. The project is forecast to generate 850 and 787 AM and PM weekday peak hour of the generator trip ends respectively. The entire project is expected to be phased with full completion of all phases by end of 2029.

At the following location:

The upper lot is located on the block bounded by Spring Street, Cross Street, Fore Street, and Cotton Street and the lower lot is located on the block bounded by Fore Street, Cross Street, Commercial Street, and Center Street in Portland, Maine.

A request for a public hearing must be received by the City, in writing no later than 20 days after the application is found by the City to be complete and is accepted for processing. Public comment on the application will be accepted throughout the processing of the application.

The application will be filed for public inspection at the Department of Transportation's office in Scarborough (Region 1) during normal working hours. A copy of the application may also be seen at the municipal offices in Portland, Maine.

Written public comments may be sent to the following address: Attention Matthew Grooms, Planning Department, City of Portland, 389 Congress Street, Portland, ME 04101.

Randall E. Dunton

Randall Dunton, P.E., PTOE
Gorrill-Palmer Consulting Engineers, Inc.

STATE OF MAINE
RANDALL E. DUNTON
No. 8686
LICENSED PROFESSIONAL ENGINEER

4-2-19

CARROLL ASSOCIATES
LANDSCAPE ARCHITECTS

Portland Square
List of Direct Abutters

Tax Map	Address	Name	Mailing Address
032 I 007001	0 Canal Plaza	Cow Plaza 1 LLC	100 Commercial St, Portland, ME 04101
032 I 033001	2 Canal Plaza	Cow Plaza 1 LLC	100 Commercial St, Portland, ME 04101
032 I 036001	1 Canal Plaza	Cow Plaza 1 LLC	100 Commercial St, Portland, ME 04101
032 I 039001	40 Union St	Central Maine Power Co	One City Center, 4th Floor, Portland, ME 04101
032 I 040	44 Exchange Street	Cow Plaza 1 LLC	100 Commercial St, Portland, ME 04101
032 P 001001	2 City Center	Two City Center LLC	157 Deer Street, Portsmouth, NH 03801
032 P 003001	4 City Center	Four City Center Properties, LLC	4 Milk Street, Ste 103, Portland, ME 04101
032 P 005	0 Spring Street	City of Portland	389 Congress St, Portland, ME 04101
038 B 001001	1 Portland Square	North River IV, LLC	221 12th Ave, NY, NY 10001
038 B 001007	1 Portland Square	PS One Realty, LLC	One City Center, 4th Floor, Portland, ME 04101
038 B 002	2 Portland Square	North River IV, LLC	221 12th Ave, NY, NY 10001
038 C 008	28 Cotton Street	City of Portland	389 Congress St, Portland, ME 04101
038 C 009	24 Cotton Street	Casco View Holdings II, LLC	PO Box 1137, Portland ME 04101
038 C 010, 011, 012	8 Cotton Street	Casco View Holdings II, LLC	PO Box 1137, Portland ME 04101
038 C 016, 017, 034	8 Cotton Street	Casco View Holdings II, LLC	PO Box 1137, Portland ME 04101
038 E 019	52 Center Street	MH & RB LLC	100 Commercial St, Portland, ME 04101
038 F 008	470 Fore Street	Dictar Associates II	470 Fore St, St 400, Portland, ME 04101
038 F 019,020	Cross Street	Casco View Holdings II, LLC	PO Box 1137, Portland ME 04101
038 G 00202A	269 Commercial St, Unit 2A	Eugene J and Diane H Gosselin	269 Commercial St, Unit 2A, Portland, ME 04101
038 G 00202B	269 Commercial St, Unit 2B	Maxwell Poe	269 Commercial St, Unit 2B, Portland, ME 04101
038 G 00202C	269 Commercial St, Unit 2C	Paul Schneider	269 Commercial St, Unit 2C, Portland, ME 04101
038 G 00202D	269 Commercial St, Unit 2D	Jean S and Virgil Cumming	269 Commercial St, Unit 2D, Portland, ME 04101
038 G 00202E	269 Commercial St, Unit 2E	Jacques K Devillier	269 Commercial St, Unit 2E, Portland, ME 04101
038 G 00202F	269 Commercial St, Unit 2F	Anne-Marie and Steven McKenzie	6 Serendipity Lane, North Yarmouth, ME 04097
038 G 00203A	269 Commercial St, Unit 3A	Peter J. Albee	1885 Chinook Trail, Wonalancet, NH 03897
038 G 00203B	269 Commercial St, Unit 3B	Lee P Rice	5224 Sunnydale Cir S, Sarasota, FL 34233
038 G 00203C	269 Commercial St, Unit 3C	Charles H Norchi	269 Commercial St, Unit 3C, Portland, ME 04101
038 G 00203D	269 Commercial St, Unit 3D	Wilfred R Hudson	PO Box 718, Wells, ME 04090
038 G 00203E	269 Commercial St, Unit 3E	Henry C Conklin	PO Box 219, Islesboro, ME 04848
038 G 00203F	269 Commercial St, Unit 3F	Harold W Tucker III	41 Mallett Dr, Topsham, ME 04086
038 G 00204A	269 Commercial St, Unit 4A	Susan Sernoffsky	269 Commercial St, Unit 4A, Portland, ME 04101

038 G 00204B	269 Commercial St, Unit 4B	269 Commercial St, LLC	PO Box 8211, Lewiston, ME 04240
038 G 00204C	269 Commercial St, Unit 4C	John J McDevitt IV	269 Commercial St, Unit 4C, Portland, ME 04101
038 G 00204D	269 Commercial St, Unit 4D	Sue Ellen Kimball	269 Commercial St, Unit 4D, Portland, ME 04101
038 G 00204E	269 Commercial St, Unit 4E	Kate Lowry	8 Bowdoin Drive, Falmouth, ME 04105
038 G 00204F	269 Commercial St, Unit 4F	Rocket Wong and Acuna M Lilliana	269 Commercial St, Unit 4F, Portland, ME 04101
038 G 00205A	269 Commercial St, Unit 5A	Eric O Berg, Jr/ Eric O Berg Revocable Trust	1190 Mountain Laurel Drive, Watkinsville, GA 30677
038 G 00205B	269 Commercial St, Unit 5B	Jeffery H Tarbox	269 Commercial St, Unit 5B, Portland, ME 04101
038 G 00205C	269 Commercial St, Unit 5C	Robert A Caldwell	269 Commercial St, Unit 5C, Portland, ME 04101
038 G 00205D	269 Commercial St, Unit 5D	Brenna L Muehle	269 Commercial St, Unit 5D, Portland, ME 04101
038 G 00205E	269 Commercial St, Unit 5E	Christopher F Flaherty	PSC 851 Box 490, FPO AE 09834
038 G 00205F	269 Commercial St, Unit 5F	Anthony W. Foster	269 Commercial St, Unit 5F, Portland, ME 04101
038 G 002267	269 Commercial St	267 Commercial Street, LLC	1297 Broadway, South Portland, ME 04106
038 G 002271	269 Commercial St	JKC LLC	267 Warren Ave, Portland, ME 04103
040 B 017	4 Pleasant Street	Archie S and Matilda M Giobbi	1184 Washington Ave, Portland, ME 04103
040 F 009	305 Commercial St	Baxter Place, LLC	723 Riverside St, Portland, ME 04103
040 F 011	14 York St	J B Brown and Sons	PO Box 207, Portland, Me 04102
041 A 012, 014	280 Commercial St	City of Portland	384 Congress St, Portland, ME 04101
041 A 0121	284 Commercial St	Freedom Fish, LLC	450 Commercial St, Portland, ME 04101

Index Number - E9NE

April 1 2012 fy 2013 Tax Map Index; http://www.portlandassessors.com/taxmaps.htm

E9SW E9SE E10SW

O7NE E9NW

F10SW F9SE F9SW

1 inch = 50 feet

CENTER ST
YORK ST
DANFORTH ST
PLEASANT ST
MAPLE ST
SPRING ST
SOUTH ST
FORE ST
COTTON ST
CIVIC CENTER SQ
FREE ST
OAK ST
CONGRESS ST
BROWN ST
CASCO ST
TOLMAN PL
SHEPLEY ST

CUMBERLAND COUNTY CIVIC CENTER

37 PLEASANT ST CONDO

SOUTH STREET CONDO

70 CENTER STREET CONDO

110 FREE STREET CONDO

500 CONGRESS STREET CONDO

540 CONGRESS ST CONDO

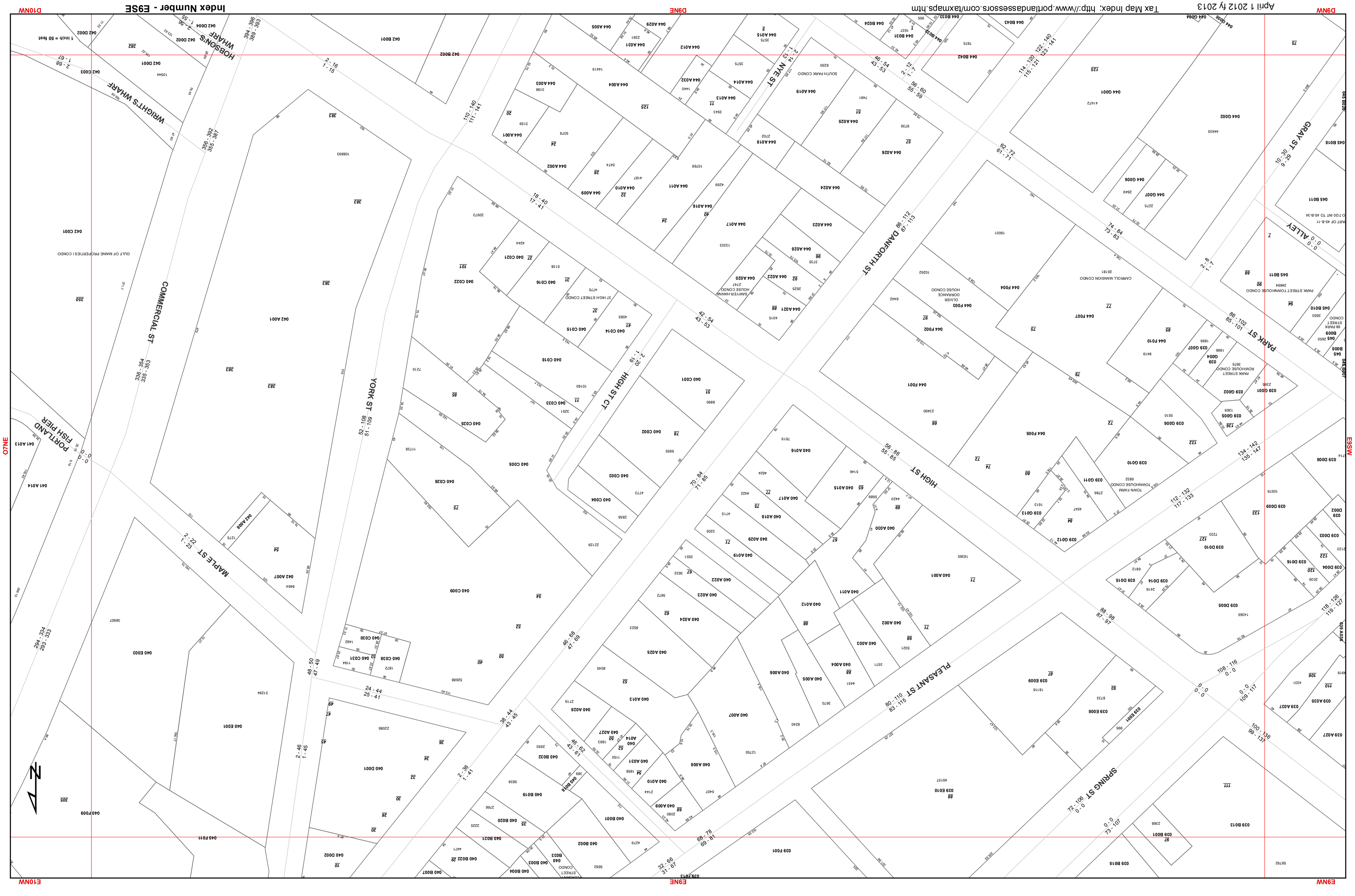
CONGRESS STREET CONDO

537 LOFTS CONDO

WINDOW LOFTS CONDO

KIMBALL COURT CONDO

ONE PORTLAND SQUARE CONDO


1 inch = 50 feet
COMMERCIAL ST
YORK ST
HIGH ST CT
HIGH ST
DAMFORTH ST
PARK ST
GRAY ST
ALLEY
PLEASANT ST
SPRING ST
MAPLE ST
WRIGHT'S WHARF
HOGSONS WHARF
PORTLAND FISH PIER
NYE ST
SOUTH PARK CONDO
SWEETE-HANNA HOUSE CONDO
37 HIGH STREET CONDO
SULLIVAN STREET CONDO
SULLIVAN STREET CONDO
SULLIVAN

F9SE F10SW F10SE

E9NE E10NW

E9SE E10SW E10SE

SPRING ST
ONE PORTLAND SQUARE CONDO
39393
032 I036
032 I040
CANAL PLZ
1 - 4
0 - 0
032 I039
21195
40
038 B001
39520
038 B002
2
455
463
469
UNION ST
24 - 48
23 - 49
47 - 97
41764
032 I041
PATTON CT
11 - 1
18 - 2
032 I013
1880
032 I017
032 I018
395
3315
032 F014
365 - 377
379 - 387
366 - 380
382 - 388
376
370
380 - 396
398 - 406
384
388
12
392
032 J001
2812
032 J002
1892
398
FORE ST
032 J005
958
FORE-DANA CONDO
3120
404
408 - 412
401 - 403
414 - 426
405 - 427
428 - 448
429 - 457
032 N011
414
416
418
032 N010
2178
410
032 N009
1120
420
1080
424
423
426
032 N012
2079
12 - 15
12 - 15
20 - 36
19 - 35
032 R001
1740
432
037
032 R004
434
032 R003
1036
436
1426
43
032 R007
4739
45
446
032 R008
1891
51
47
WHARF ST
37 - 53
38 - 54
42
46
44
032 V015
4590
032 V016
2630
34
36
10
032 V001
3469
205
032 V002
3805
207
032 V004
4324
211
215
032 V005
6530
217
219
223
032 V014
8048
50
52
032 V012
032 V008
5392
227
225
1
ONE UNION ST CONDO
5109
231
235
237
DANA ST
1 - 11
2 - 10
032 S001
5808
11
9
032 S003
2727
7
032 S004
161
3600
5
032 S005
3
3576
MOULTON ST
1 - 11
2 - 10
032 U005
3983
7
032 U003
3991
032 U004
2406
1
032 T004
6093
4
10
MARKET ST
1 - 15
2 - 16
029 S001
14978
145
COMMERCIAL ST
136 - 154
141 - 153
155 - 171
156 - 170
172 - 180
173 - 183
182 - 194
185 - 197
144
116426
105.6
176.58
031 H002
184
DOCK
15996
031 H001
031 J030
79792
031 J031
SILVER ST
1 - 15
2 - 16
029 D001
030 C006
100
030 C007
030 C008
030 C005
030 C004
030 C003
030 C002
138
030 C001
030 A001
030 A002
9
030 B002
030 B003
22
030 B006
030 B001
40 PORTLAND PIER CONDO
8269
40
39
030 H008
030 H001
48169
030 H004
144
030 H007
030 H017
030 H019
030 H018
5
030 H013
5100
DOCK
PORTLAND PIER
2 - 64
1 - 63
031 H007
1500
12016
12
7407
2229
1800
1873
1832
2000
1864
1760
1920
87.09
38.27
60.9
38.02
FORE ST
450 - 472
455 - 481
17.44
28337
468
470
038 F008
2128
038 F009
9 - 13
10 - 15
18 - 22
196 - 214
198 - 215
0 - 0
216 - 234
217 - 237
182 - 194
185 - 197
031 J031
79792
031 L038
11786
2278
1
031 K103
031 L035
30
147389
031 L036
041 A018
041 A012
041 A017
041 A016
7390
14948
031 L034
250
031 L037
26336
1
031 L135
031 K003
218
13200
031 K008
34048
031 J032
1712
031 J003
CHANDLER'S WHARF CONDO
81980
71280
031 J002
031 K010
031 L036
71280
CHANDLER'S WHARF
1 - 717
2 - 718
700
701
702
709
703
709
704
712
705
710
716
706
711
717
707
713
719
708
714
715
86862
81980
DOCK
298453
LONG WHARF
1 - 25
2 - 26
WIDGERY'S WHARF
2 - 32
1 - 31
2 - 96
1 - 95
UNION WHARF
36
30
COTTON ST
498 - 516
505 - 517
474 - 496
463 - 503
040 F009
64954
040 F011
305
68736
038 G001
6002
038 F019
12471
CROSS ST
1 - 39
2 - 38
038 G003
038 G007
16950
038 G005
12386
CENTER ST
1 - 39
2 - 40
038 F006
245
038 F004
241
4857
038 F010
261
4930
4463
038 F020
9430
226 - 252
229 - 251
254 - 268
253 - 265
041 A015
260
12983
041 A014
041 A011
254
041 A0121
12 A
22352
041
COMMERCIAL ST
1 - 39
2 - 40
256 - 282
257 - 291
038 G002
HARBOR LANDING CONDO
8568
233 - 253
234 - 254
0 - 0
0 - 12

April 1 2012 fy 2013

Tax Map Index; http://www.portlandassessors.com/taxmaps.htm

Index Number - E10NW

1 inch = 50 feet

Section 1
Site and Traffic Information

1.A. Site Description and Site Plan

The site is located on two adjacent blocks, referred to as the upper lot and lower lot, located in Portland, Maine. The upper lot is located on the block bounded by Spring Street, Cross Street, Fore Street, and Cotton Street. The lower lot is located on the block bounded by Fore Street, Cross Street, Commercial Street, and Center Street. The aggregate site is identified on City Tax Map 38, Lots B001, B002, B003, G001, G003, G005, and G007. The proposed site plan is included in Attachment 1A.

It should be noted that the lower lot includes the parcel for the proposed Center Street Hotel. The lower lot was subdivided and the Center Street Hotel parcel is under different ownership than the rest of the site; however, since the block was subdivided within the last five years, the proposed Center Street Hotel is required to be included in this application due to common scheme of development.

1.B. Existing and Proposed Site Uses

The following describes the existing and proposed uses in each lot:

Upper Lot

The existing upper lot is accessed through an enter only driveway at the end of Cross Street and an exit only driveway onto Cross Street to the south of the existing entrance. The existing upper lot is currently a 205 space surface parking lot that is proposed to be eliminated.

The upper lot is proposed to include a multi-level parking garage with approximately 1,125 parking spaces and the following land uses:

- Office: 205,086 sf
- Retail: 5,964 sf
- Apartments: 18 Dwelling Units

The upper lot is proposed to be accessed via four full movement accesses onto the site; one full movement into the parking garage and one service access one onto Cross

Street, one full movement into the parking garage onto Cotton Street, and one full movement into the parking garage onto Spring Street.

Lower Lot

The existing lower lot has one full movement access on Center Street and is a 306 space parking lot that is proposed to be eliminated.

The redevelopment is proposed to include a multi-level parking garage with approximately 194 spaces and the following land uses:

- Office: 82,700 sf
- Retail: 29,649 sf
- Apartments: 58 Dwelling Units
- Center Street Hotel: 135 Rooms

The lower lot is proposed to include three site accesses; one full movement into the parking garage, one potential minor passenger vehicle access onto Cross Street, and one service access onto Center Street.

1.C. Site and Vicinity Boundaries

A site location map showing the development area is included in Attachment 1B. The site is bounded by Spring Street to the north, Center Street to the west, Commercial Street to the south, and Cross Street to the east.

1.D. Proposed Uses in the Vicinity of the Proposed Development

Projects that have been approved but are not yet occupied as well as projects for which applications have been filed and are ahead of this application in the approval process are required to be included in the predevelopment traffic volumes for this project. Based on conversations with Portland City Staff, there are several projects in the vicinity of the site that should be considered. The trip generation for the following projects will need to be included in background traffic for this project:

- 383 Commercial Street
- Canal Landing
- 184 Commercial Street (Potential)
- Eastern Waterfront TMP

The trip generation for these projects will be included in the Traffic Impact Study, to be completed after the scoping meeting is held.

I.E. Trip Generation

The trip generation for the site was calculated using the Institute of Transportation Engineers' (ITE) publication, *Trip Generation*, Seventh Edition. More recent editions of ITE are available; however, the Seventh Edition is the most recent edition accepted by MaineDOT. The trip generation for the upper and lower lots combined have been based on the following uses and sizes:

- Office: 287,786 sf
- Retail: 35,613 sf
- Apartments: 76 Dwelling Units
- Hotel: 135 Rooms

The following summarizes the ITE Land Use Codes (LUCs) used to calculate the trip generation for the proposed site:

- LUC 710 – General Office Building
- LUC 814 – Specialty Retail
- LUC 220 – Apartment
- LUC 310 – Hotel

The trip generation calculations are included in Attachment 1C. The following table summarizes the ITE trip generation for the site:

ITE Trip Generation Summary

Building Use	Size	ITE Trip Generation				
		AM Adj St	PM Adj St	AM Gen	PM Gen	Sat Gen
Upper Lot						
General Office	205,086 sf	333	320	333	320	88
Specialty Retail	5,964 sf	4	16	41	30	21
Apartment	18 Units	9	11	10	12	9
Subtotal		**346**	**347**	**384**	**362**	**118**
Lower Lot						
General Office	82,700 sf	161	155	161	155	43
Specialty Retail	29,649 sf	22	80	203	149	106
Apartment	58 Units	30	36	32	39	30
Hotel	135 Rooms	76	80	70	82	97
Subtotal		**289**	**351**	**466**	**425**	**276**
Site Total		**635**	**698**	**850**	**787**	**394**

As shown in the table, the combined site is forecast to generate 850 trip ends during the AM peak hour of the generator and 787 trip ends during the PM peak hour of the generator. A trip end is a trip into or out of the site, thus a round trip is equal to two trip ends. The site is forecast to generate over 99 trip ends during a peak hour, so a MaineDOT Traffic Movement Permit (TMP) is required. Additionally, since the site is forecast to generate greater than 199 trip ends during a peak hour, Section 7 (Traffic Impact Study) is required. A Traffic Impact Study will be completed and submitted after the Scoping Meeting is held.

I.E. Trip Generation Reductions

Although the proposed project requires a MaineDOT TMP based on the ITE trip generation of 850 trip ends and 787 trip ends during the AM and PM peak hours of the generator, respectively, the traffic that is forecast to impact the adjacent roadway network is anticipated to be lower than the ITE trip generation. Since the project is a mixed use development with complementary uses and it is located in a downtown area, a shared use reduction and an "other modes" reduction can be applied to the ITE trip generation. The following summarizes these reductions and their impact on the trip generation.

Shared Use Reduction

The National Cooperative Highway Research Program (NCHRP) 684 Internal Capture Estimation Tool has been used to estimate the traffic that will visit more than one

destination without leaving the site. The NCHRP 684 spreadsheet uses the ITE forecast trip generation for each type of land use (office, retail, residential, and hotel) and estimates the trips that will travel between two uses without leaving the site. This yields an internal trip capture percentage, which is the percentage of trip ends that will travel between two uses. The following tables summarize the AM and PM peak hour internal trip capture percentages for the proposed site:

AM Peak Hour Adjacent Street NCHRP 684 Internal Trip Capture

Land Use	ITE Trip Generation		Internal Capture %		Internal Capture Trip Ends		
	Enter	Exit	Enter	Exit	Enter	Exit	Total
Office	445	49	4%	10%	17	5	22
Retail	15	11	40%	27%	6	3	9
Residential	8	31	0%	3%	0	1	1
Hotel	45	31	0%	45%	0	14	14
Total	**513**	**122**	**4%**	**19%**	**23**	**23**	**46**

*These values are taken directly from the NCHRP spreadsheets (Attachment 1C), which may not match exact calculations due to rounding in the spreadsheet.

PM Peak Hour Adjacent Street NCHRP 684 Internal Trip Capture

Land Use	ITE Trip Generation		Internal Capture %		Internal Capture Trip Ends		
	Enter	Exit	Enter	Exit	Enter	Exit	Total
Office	71	404	3%	1%	2	4	6
Retail	43	53	19%	34%	8	18	26
Residential	30	17	50%	35%	15	6	21
Hotel	44	36	9%	3%	4	1	5
Total	**188**	**510**	**15%**	**6%**	**29**	**29**	**58**

*These values are taken directly from the NCHRP spreadsheets (Attachment 1C), which may not match exact calculations due to rounding in the spreadsheet.

AM Peak Hour Generator NCHRP 684 Internal Trip Capture

Land Use	ITE Trip Generation		Internal Capture %		Internal Capture Trip Ends		
	Enter	Exit	Enter	Exit	Enter	Exit	Total
Office	445	49	7%	29%	32	14	46
Retail	123	121	15%	15%	18	18	36
Residential	13	29	0%	3%	0	1	1
Hotel	39	31	0%	55%	0	17	17
Total	**620**	**230**	**8%**	**22%**	**50**	**50**	**100**

*These values are taken directly from the NCHRP spreadsheets (Attachment 1C), which may not match exact calculations due to rounding in the spreadsheet.

PM Peak Hour Generator NCHRP 684 Internal Trip Capture

Land Use	ITE Trip Generation		Internal Capture %		Internal Capture Trip Ends		
	Enter	Exit	Enter	Exit	Enter	Exit	Total
Office	71	404	4%	2%	3	9	12
Retail	99	80	19%	25%	19	20	39
Residential	30	21	50%	52%	15	11	26
Hotel	49	33	10%	6%	5	2	7
Total	**249**	**538**	**17%**	**8%**	**42**	**42**	**84**

*These values are taken directly from the NCHRP spreadsheets (Attachment 1C), which may not match exact calculations due to rounding in the spreadsheet.

The NCHRP 684 spreadsheet does not have information for the Saturday peak hour of the generator. To estimate a reduction for a Saturday, the AM and PM trip capture percentages were averaged and applied to the Saturday peak hour of the generator. This resulted in a Saturday internal trip capture of approximately 10% of total trips which results in a reduction of 38 trip ends (20 entering and 18 exiting).

The following table summarizes the reduced trip generation for the proposed site due to shared use trips:

Reduced Trip Generation Summary

Building Use	Trip Generation				
	AM Adj St	PM Adj St	AM Gen	PM Gen	Sat Gen
ITE Total	635	698	850	787	394
Shared Use Reduction	-46	-58	-100	-84	-38
Reduced Site Total	**589**	**640**	**750**	**703**	**356**

As shown in the table, the proposed site with the shared use reduction is forecast to generate 750 trip ends and 703 trip ends during the AM and PM peak hours of the generator respectively.

Other Modes of Transportation Reduction

Since the site is located in an urban environment, it is expected that a portion of site traffic will use alternative modes of transportation to get to and from the site. These other modes could include options such as transit, biking, or walking. A trip generation reduction due to other modes of transportation has been applied to the proposed site trip generation with the shared use reduction. The other modes reduction has been evaluated separately for the non-residential site uses and the proposed hotel.

Residential: The other modes reduction for residential land uses is based on information from the 2009-2013 American Community Survey (ACS) Five-Year Estimate by Census Tract for the City of Portland. Rick Harbison, Planner and GIS Specialist for the Greater Portland Council of Governments, used this data to create maps (attached) that show the estimated percentage of workers living in each Census Tract in the Greater Portland area that use each mode of transportation to travel to work. The site is located in Census Tract 3, so the reduction was calculated by dividing the estimated number of people walking, bicycling, and taking the bus to work by the estimated total number of working people in Census Tract 3. This calculation yields a reduction of 49.7%.

Non-Residential: The other modes reduction for non-residential land uses was based on 2010 Consensus Transportation Planning Products (CTPP) means of transportation to work data for Census Tract 3, where the site is located. This data indicates that the ratio of cars to workers is 82% in the area (calculations attached), indicating that approximately 18% of employees use modes of transportation other than a car to commute to work. A reduction of 18% was applied to the non-residential uses

Hotel: There is limited data available for hotels, so a conservative reduction of 10% was used for the hotel trip generation.

The following table summarizes the other modes of transportation reduction for the site trip generation:

Other Modes of Transportation Reduction Summary

Trip Generation	AM Adj St	PM Adj St	AM Gen	PM Gen	Sat Gen
Site Trip Generation (After Shared Use Reduction)					
Residential Trip Gen	38	26	41	25	35
Non-Residential Trip Gen	489	539	656	603	233
Hotel Trip Gen	62	75	53	75	88
Subtotal	**589**	**640**	**750**	**703**	**356**
Other Modes Reduction					
Residential Reduction	19	12	20	12	17
Non-Residential Reduction	88	96	118	108	42
Hotel Reduction	7	7	5	7	9
Total Reduction	**114**	**115**	**143**	**127**	**68**
Reduced Trip Generation	**475**	**525**	**607**	**576**	**288**

As shown in the table, the forecast trip generation for the proposed site that will be added to the adjacent roadway network, is 607 trip ends during the AM peak hour of the generator and 576 trip ends during the PM peak hour of the generator.

I.F Trip Distribution

Based on ITE's *Trip Generation*, the NCHRP 684 Internal Capture, and the other modes of transportation reduction, the following trip distribution is anticipated for the site trip generation that is forecast to be added to the adjacent roadway network:

- AM Peak Hour Adjacent Street: 402 in / 73 out
- PM Peak Hour Adjacent Street: 130 in / 395 out
- AM Peak Hour Generator: 467 in / 140 out
- PM Peak Hour Generator: 170 in / 406 out
- Saturday Peak Hour Generator: 153 in / 135 out

I.G. Trip Composition and Assignment

Based on ITE's *Trip Generation Handbook*, the trip composition anticipated for the site is approximately 35% pass by for the retail. All other uses are assumed to be primary. Primary trips are made with the sole purpose of going to or from the site, while pass-by trips occur when drivers stop at the site on their way to or from another destination.

The trip assignment has been based on the location of the site driveways, existing traffic patterns identified from a combination of AADT values provided in MaineDOT's MapViewer tool and turning movement counts completed at the intersections in the vicinity of the site and then adjusted to design hour volumes (DHV). The adjustments from raw volumes to adjusted volumes are shown on the attached figures.

The preliminary AM and PM Trip Assignment is shown on Figure 6 in Attachment 1B.

I.H. Attachments

Attachment 1A – Site Survey, Proposed Site Plan
Attachment 1B – Site Location Map, Trip Assignment Diagrams
Attachment 1C – Trip Generation Calculations

Attachment 1A

Site Survey

Proposed Site Plan

Plan References:

1. ALTA/ACSM LAND TITLE SURVEY FOR PORTLAND SQUARE LIMITED PARTNERSHIP, TWO PORTLAND SQUARE, CITY OF PORTLAND, COUNTY OF CUMBERLAND, STATE OF MAINE, BY STEVENS, MORTON, ROSE & THOMPSON DATED DEC. 11, 1989, REVISED THROUGH DEC. 11, 1992.
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15. ALTA/ACSM LAND TITLE SURVEY, oNE PORTLAND SQUARE, TWO PORTLAND SQUARE AND PORTLAND SQUARE PARKING, PORTLAND, MAINE, MADE FOR NORTH RIVER IV LLC FEBRUARY 12, 2015 BY OWEN HASKELL, INC.

Utility Note:

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES. CALL 1–888–DIGSAFE AT LEAST THREE BUSINESS DAYS BEFORE PERFORMING ANY CONSTRUCTION. DUE TO OSHA CONFINED SPACE REQUIREMENTS, ALL INVERTS AND PIPE SIZES MUST BE VERIFIED PRIOR TO ANY CONSTRUCTION.

Flood Zone Note:

BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS IN ZONE C OF THE FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 230051 0013 B, WHICH BEARS AN EFFECTIVE DATE OF JULY 17, 1986 AND IS NOT IN A SPECIAL FLOOD HAZARD AREA.

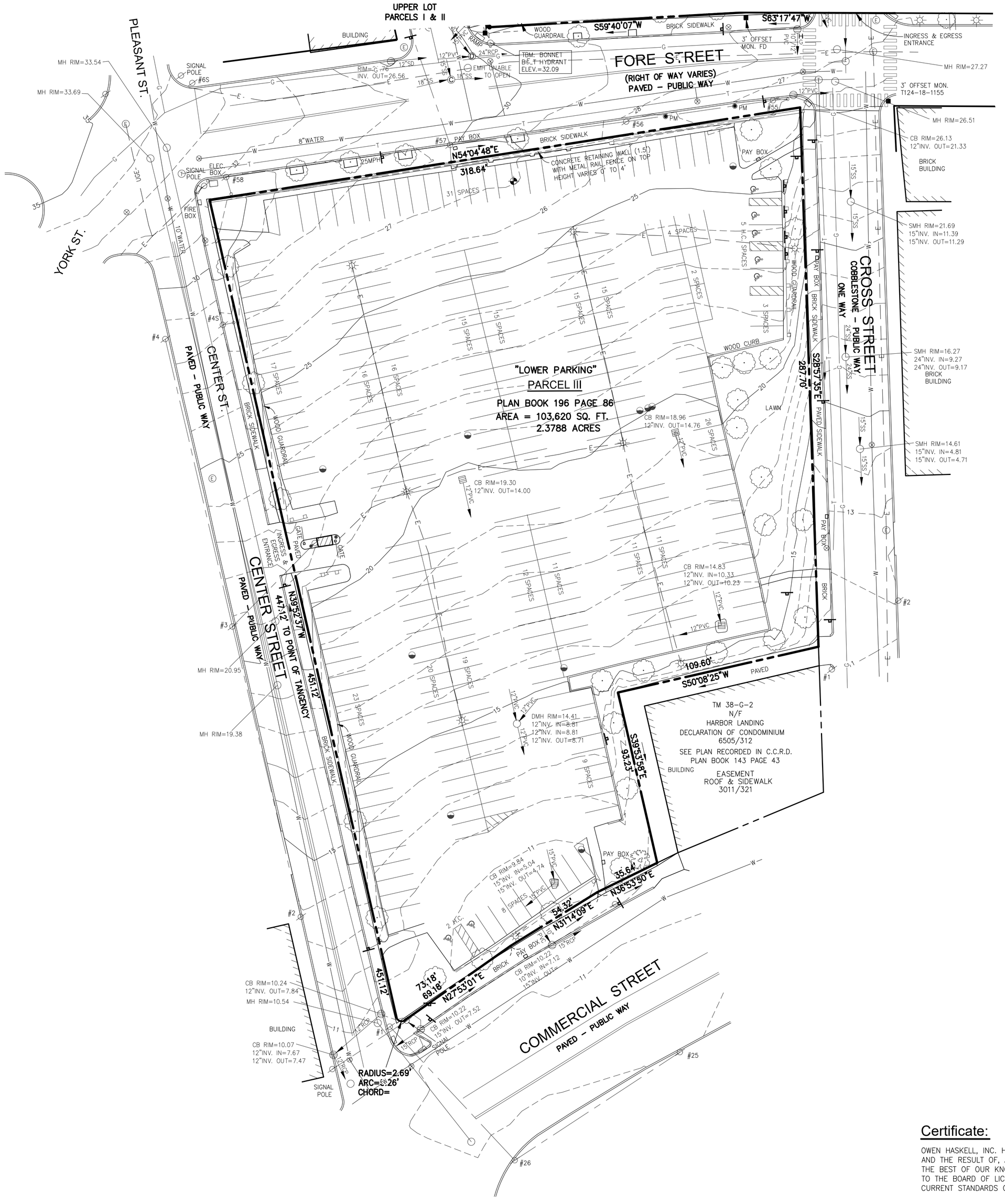
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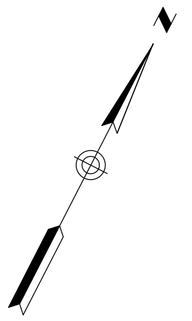
1. OWNER OF RECORD: NORTH RIVER IV LLC, 224 12TH AVENUE, NEW YORK, NY 10001 C.C.R.D. BOOK 32163 PAGE 33

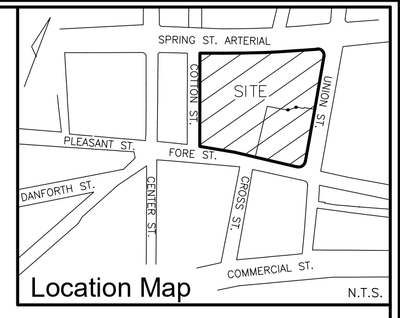
2. BEARINGS ARE BASED ON MAINE STATE PLANE COORDINATE SYSTEM MAINE WEST NAD83. CITY POINT T124–18–1143 N:299542.1747 E:2928944.1068 AND T124–18–1155 N:299607.6956 E:2929152.2276 HELD.

3. ELEVATIONS ARE BASED ON CITY DATUM.

3. THE LOCUS IS SHOWN AS LOT 1, 3, 5 BLOCK G ON THE CITY OF PORTLAND ASSESSORS MAP 38.







Legend:

- IRON PIPE OR ROD FOUND
- GRANITE MONUMENT FOUND
- WATER VALVE
- HYDRANT
- VALVE
- UTILITY POLE
- LIGHT POLE
- MANHOLE
- CATCH BASIN
- BORING
- DEDUCIOUS TREE
- CONIFEROUS TREE
- CURB
- SS — SANITARY SEWER
- SD — STORM DRAIN
- SL — SECURITY LINE
- E — UNDERGROUND ELECTRIC
- PT — PNEUMATIC TUBE
- W — WATER LINE
- T — TELEPHONE LINE
- C — COMMUNICATION CABLE
- 25 — 1' CONTOUR
- N/F — NOW OR FORMERLY
- 000/000 — DEED BOOK/PAGE
- CONC. — CONCRETE

GRAPHIC SCALE

0 15' 30' 60' 120'

Certificate:

OWEN HASKELL, INC. HEREBY CERTIFIES THAT THIS PLAN IS BASED ON, AND THE RESULT OF, AN ON THE GROUND FIELD SURVEY AND THAT TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, IT CONFORMS TO THE BOARD OF LICENSURE FOR PROFESSIONAL LAND SURVEYORS CURRENT STANDARDS OF PRACTICE.

DATE

JOHN W. SWAN, PLS NO. 1038

BOUNDARY AND TOPOGRAPHIC SURVEY

LOWER PARKING LOT

FORE STREET, CROSS STREET, COMMERCIAL STREET & CENTER STREET, PORTLAND, MAINE

MADE FOR

CARROLL ASSOCIATES

217 COMMERCIAL STREET, PORTLAND, MAINE

OWEN HASKELL, INC.
PROFESSIONAL LAND SURVEYORS
390 U.S. ROUTE ONE, FALMOUTH, ME 04105 (207)774–0424

Drawn By RS	Date	Job No.
Trace By JLW	DECEMBER 5, 2016	2016–129 P
Check By JWS	Scale	Drwg. No.
Book No. FILE	1" = 30'	2

Plan References:

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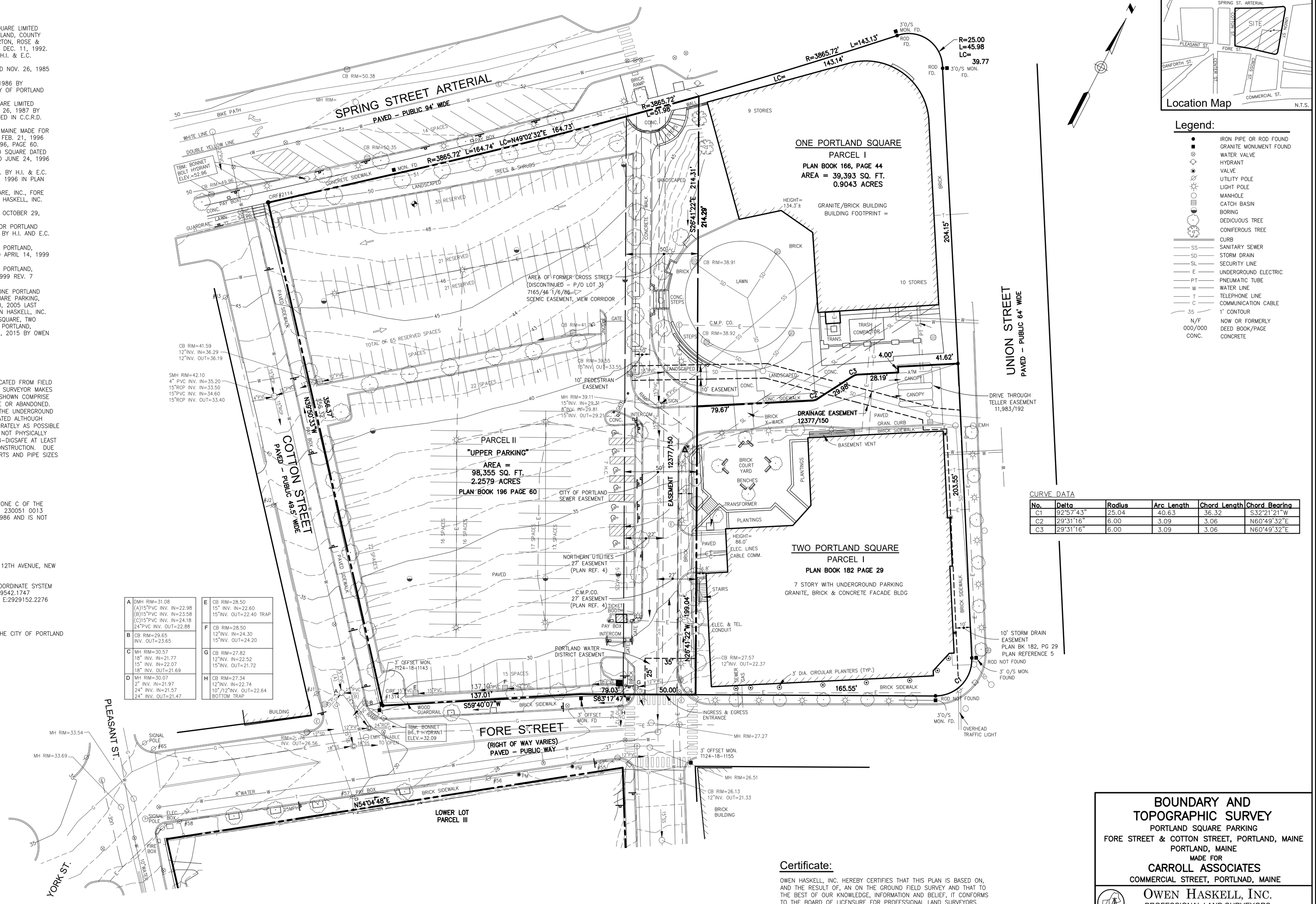
Notes:

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3. ELEVATIONS ARE BASED ON CITY DATUM.

4. THE LOCUS IS SHOWN AS LOT 3 BLOCK B ON THE CITY OF PORTLAND ASSESSORS MAP 38.



A	DMH RIM=31.08 (A)15"PVC INV. IN=22.98 (B)15"PVC INV. IN=23.58 (C)15"PVC INV. IN=24.18 24"PVC INV. OUT=22.88
B	CB RIM=29.65 INV. OUT=23.65
C	MH RIM=30.57 18" INV. IN=21.77 15" INV. IN=22.07 18" INV. OUT=21.69
D	MH RIM=30.07 2" INV. IN=21.97 24" INV. IN=21.57 24" INV. OUT=21.47
E	CB RIM=28.50 15" INV. IN=22.60 15"INV. OUT=22.40 TRAP
F	CB RIM=28.50 12"INV. IN=24.30 15"INV. OUT=24.20
G	CB RIM=27.82 12"INV. IN=22.52 15"INV. OUT=21.72
H	CB RIM=27.34 12"INV. IN=22.74 10"/12"INV. OUT=22.64 BOTTOM TRAP

Legend:

- IRON PIPE OR ROD FOUND
- GRANITE MONUMENT FOUND
- WATER VALVE
- HYDRANT
- VALVE
- UTILITY POLE
- LIGHT POLE
- MANHOLE
- CATCH BASIN
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- T — TELEPHONE LINE
- C — COMMUNICATION CABLE
- 35 — 1' CONTOUR
- N/F — NOW OR FORMERLY
- 000/000 — DEED BOOK/PAGE
- CONC. — CONCRETE

CURVE DATA

No.	Delta	Radius	Arc Length	Chord Length	Chord Bearing
C1	92°57'43"	25.04	40.63	36.32	S32°21'21"W
C2	29°31'16"	6.00	3.09	3.06	N60°49'32"E
C3	29°31'16"	6.00	3.09	3.06	N60°49'32"E

Certificate:

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DATE

JOHN W. SWAN, PLS NO. 1038

BOUNDARY AND TOPOGRAPHIC SURVEY

PORTLAND SQUARE PARKING
FORE STREET & COTTON STREET, PORTLAND, MAINE
PORTLAND, MAINE
MADE FOR
CARROLL ASSOCIATES
COMMERCIAL STREET, PORTLNAD, MAINE

OWEN HASKELL, INC.
PROFESSIONAL LAND SURVEYORS
390 U.S. ROUTE ONE, FALMOUTH, ME 04105 (207) 774–0424

Drawn By RS	Date	Job No.
Trace By JLW	DECEMBER 5, 2016	2016–129 P
Check By JWS	Scale	Drwg. No.
Book No. FILE	1" = 30'	1



LOT CONFIGURATION & DENSITY

OVERALL LOT AREA	103,620 SF	2.38 AC
LOT 1	79,829 SF	1.83 AC
LOT 2	23,791 SF	0.55 AC
LOT 3	98,355 SF	2.26 AC

BUILDING USE DENSITY

LOT 1		
- OFFICE SPACE	82,700 SF	
- RETAIL SPACE	29,849 SF	
- RESIDENTIAL	72,288 SF	58 UNITS
- STRUCTURED PARKING	89,750 SF	194 SPACES
LOT 2		
- HOTEL	97,828 SF	135 ROOMS
- BAR / RESTAURANT *INCLUDES ROOFTOP BAR	4,172 SF	
LOT 3 (EXISTING - PORTLAND SQ. 1&2)		
- OFFICE SPACE	260,341 S.F.	
- RETAIL SPACE	12,850 S.F.	18 UNITS
- STRUCTURED PARKING	15,425 S.F.	31 SPACES
LOT 3 (PROPOSED NEW DEVELOPMENT)		
- OFFICE SPACE	205,086 S.F.	
- RETAIL SPACE	5,964 S.F.	
- RESIDENTIAL	38,756 S.F.	18 UNITS
- STRUCTURED PARKING	408,880 S.F.	1,125 SPACES

LEGEND (PROPOSED IMPROVEMENTS)

- PROPERTY LINE
- PROPOSED BUILDINGS "PORTLAND SQUARE"
- EXISTING BUILDING "PORTLAND SQUARE"
- PROPOSED BUILDING "CENTER STREET BOUTIQUE HOTEL"
- BRICK PAVING
- CONCRETE PAVING
- BITUMINOUS CONCRETE PAVING
- SPECIAL PAVING
- GREEN ROOF
- PROPOSED TREE
- TREE GRATE
- TREE PLANTER (RAISED)
- VERTICAL GRANITE CURB
- TRANSITION OR FLUSH CURB
- CROSS WALK
- ADA CURB RAMP

PLANT SCHEDULE -STREET TREES

SYM.	BOTANICAL NAME	COMMON NAME	APPROPRIATE LOCATION	MATURE SIZE (HEIGHT X SPREAD)	NATIVE
	GLEDITSIA TRIACANTHOS VAR. INERMIS	THORNLESS HONEYLOCUS	STREET TREE / FULL SUN	50' X 35'	NO
	ZELKOVA SERRETA 'GREEN VASE'	GREEN VASE ZELKOVA	STREET TREE / FULL SUN	70' X 35'	NO
	QUERCUS PALUSTRIS	PIN OAK	STREET TREE / FULL SUN	50' X 40'	NO
	GINKGO BILOBA	GINKO	STREET TREE / PART SHADE	60' X 30'	NO
	ACER RUBRUM 'KARPICK'	RED MAPLE	STREET TREE / PART SHADE	40' X 15'	YES

0 20 40 80
SCALE in FEET
1"=40'

Portland Square

Master Development Plan

Portland, Maine

Owner / Developers
NORTH RIVER, LLC
New York, NY

CARROLL ASSOCIATES LANDSCAPE ARCHITECTS
217 Commercial St, Suite 200
Portland, ME 04101
207.772.1552
www.carroll-assoc.com

WINTON SCOTT ARCHITECTS, PA
5 Milk Street
Portland, ME 04101
774-4811
www.wintonscott.com

BECKER STRUCTURAL ENGINEERS, INC.
75 York Street, Suite 3
Portland, ME 04101
207.879.1838
www.beckerstructural.com

WOODAR & CURRAN
41 Hutchins Dr.
Portland, ME 04101
207.558.3785
www.woodardcurran.com

HALEY & ALDRICH, INC.
75 Washington Ave, Suite 1A
Portland, ME 04101
207.482.4609
www.haleyaldrich.com

GORRILL PALMER
707 Sable Oaks Drive, Suite 30
South Portland, ME 04106
207.239.7470
www.gorrillpalmer.com

Revisions		
1	4.5.19	MDP SUBMISSION TO CITY

Drawing Title: SITE PLAN

Scale: 1"=40'-0"

Date: MARCH 4, 2019

Phase: Permitting

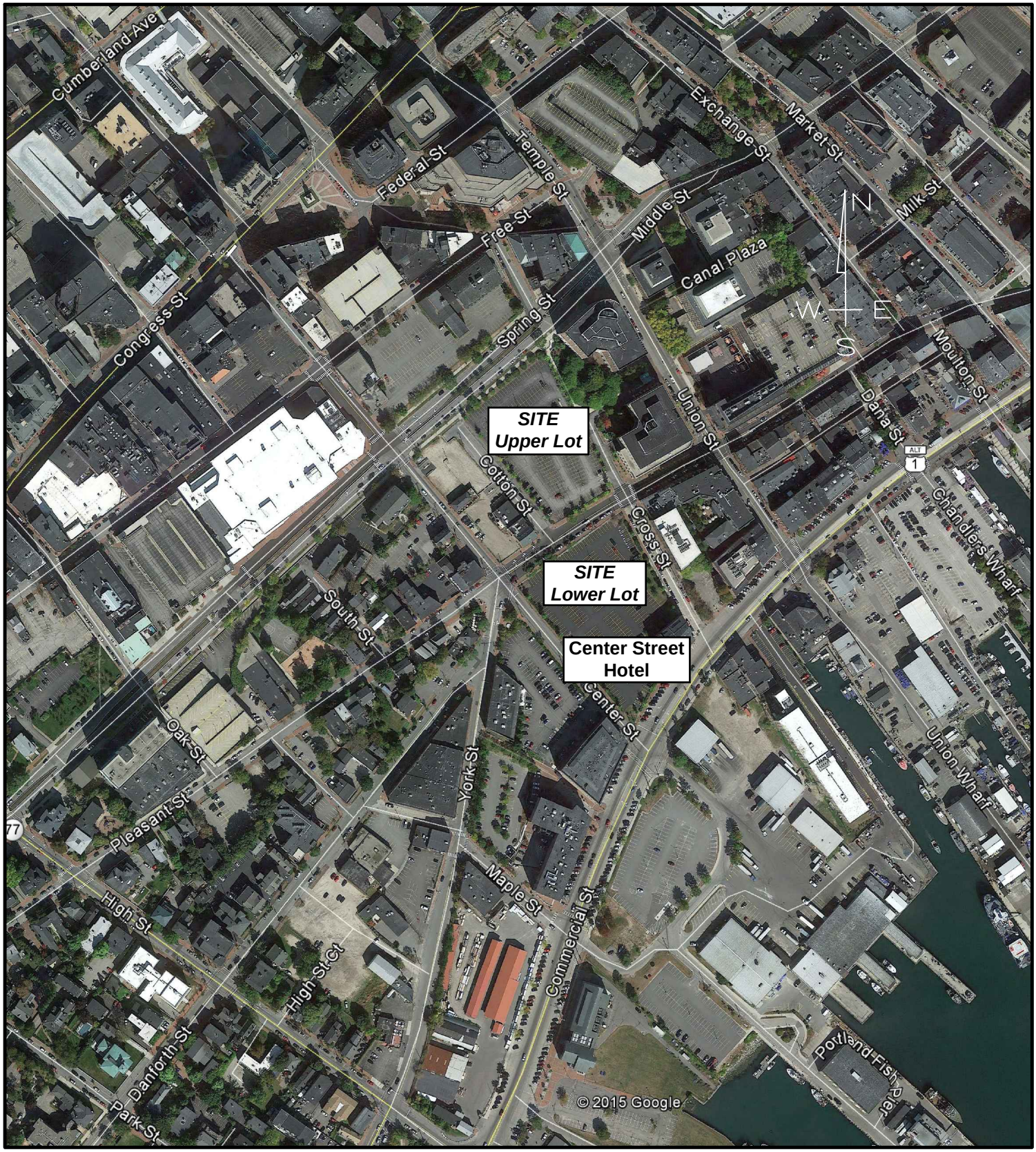
Attachment 1B

Site Location Map

Trip Assignment Diagram

Location Map

Figure No. 1



PORTLAND SQUARE
PORTLAND, MAINE

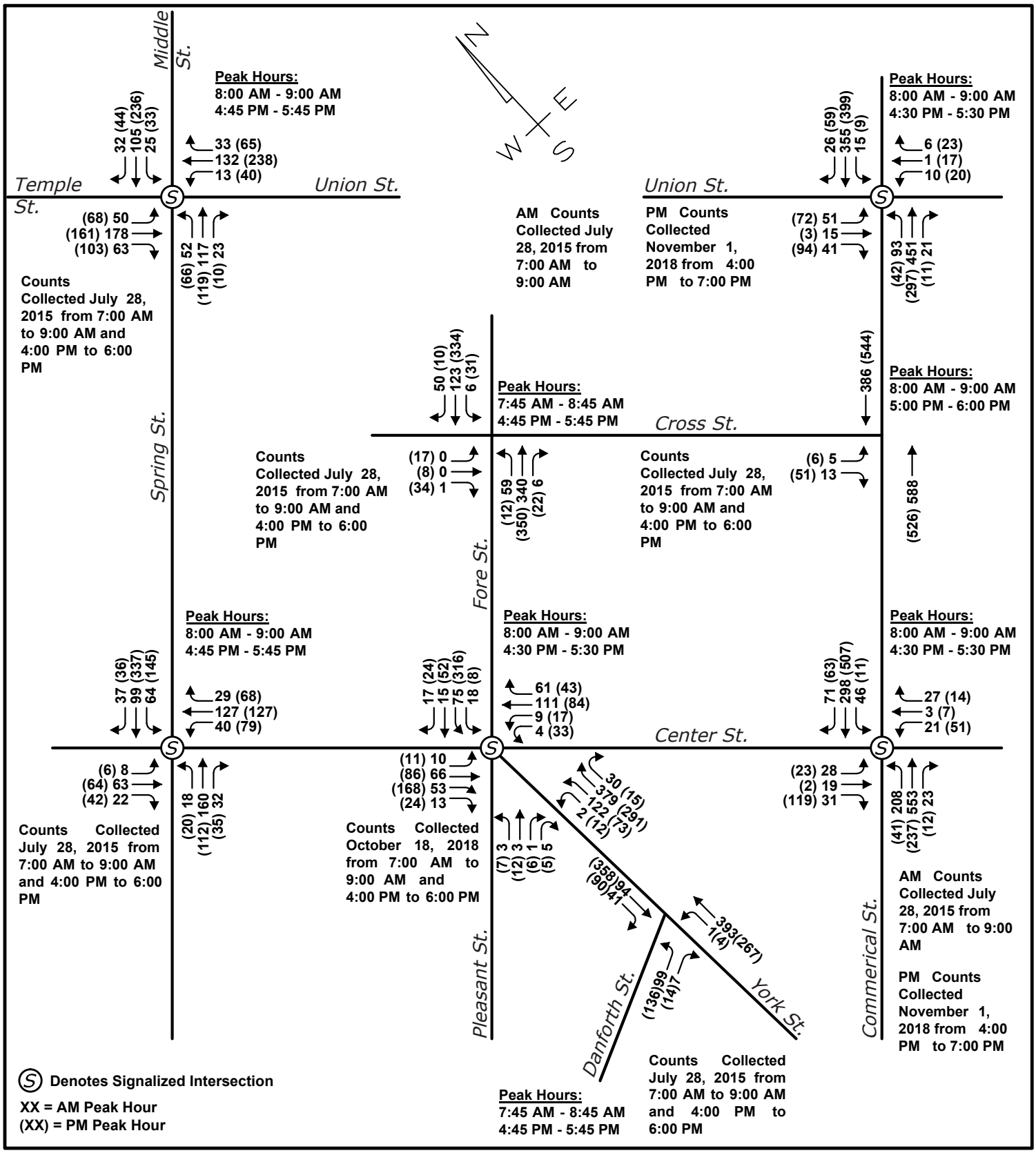
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Date: MAY 2, 2019
File Name: 3020.01_Figures

GORRILL PALMER

Relationships. Responsiveness. Results.
www.gorrillpalmer.com
207.772.2515

Raw Volumes

Figure No. 2



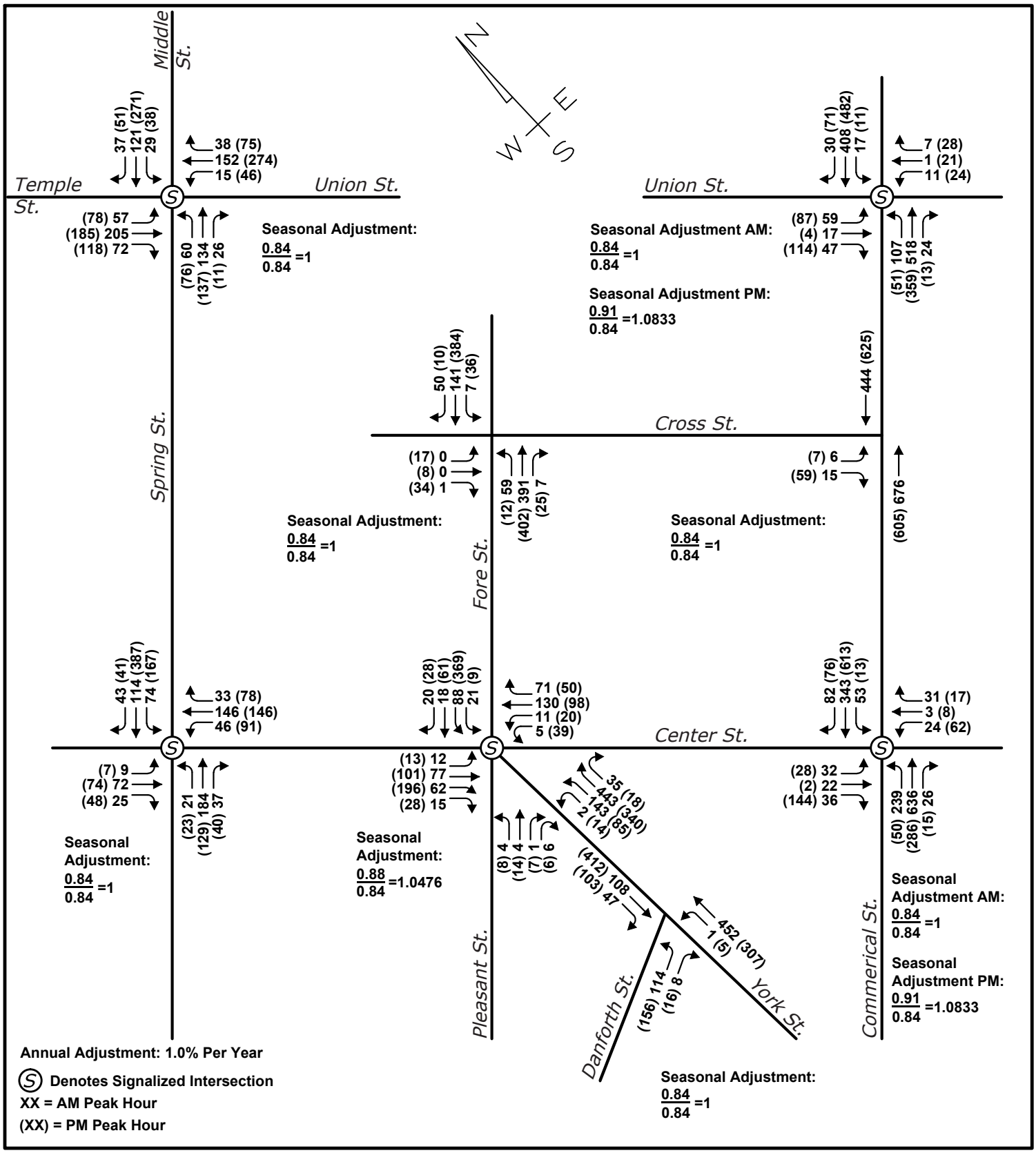
PORTLAND SQUARE
PORTLAND, MAINE

Design: MC
Draft:
Checked: EAL
Scale: NONE
Date: MAY 2, 2019
File Name: 3020.01_Figures

GORRILL PALMER
Relationships. Responsiveness. Results.
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207.772.2515

2029 Adjusted Volumes

Figure No. 3



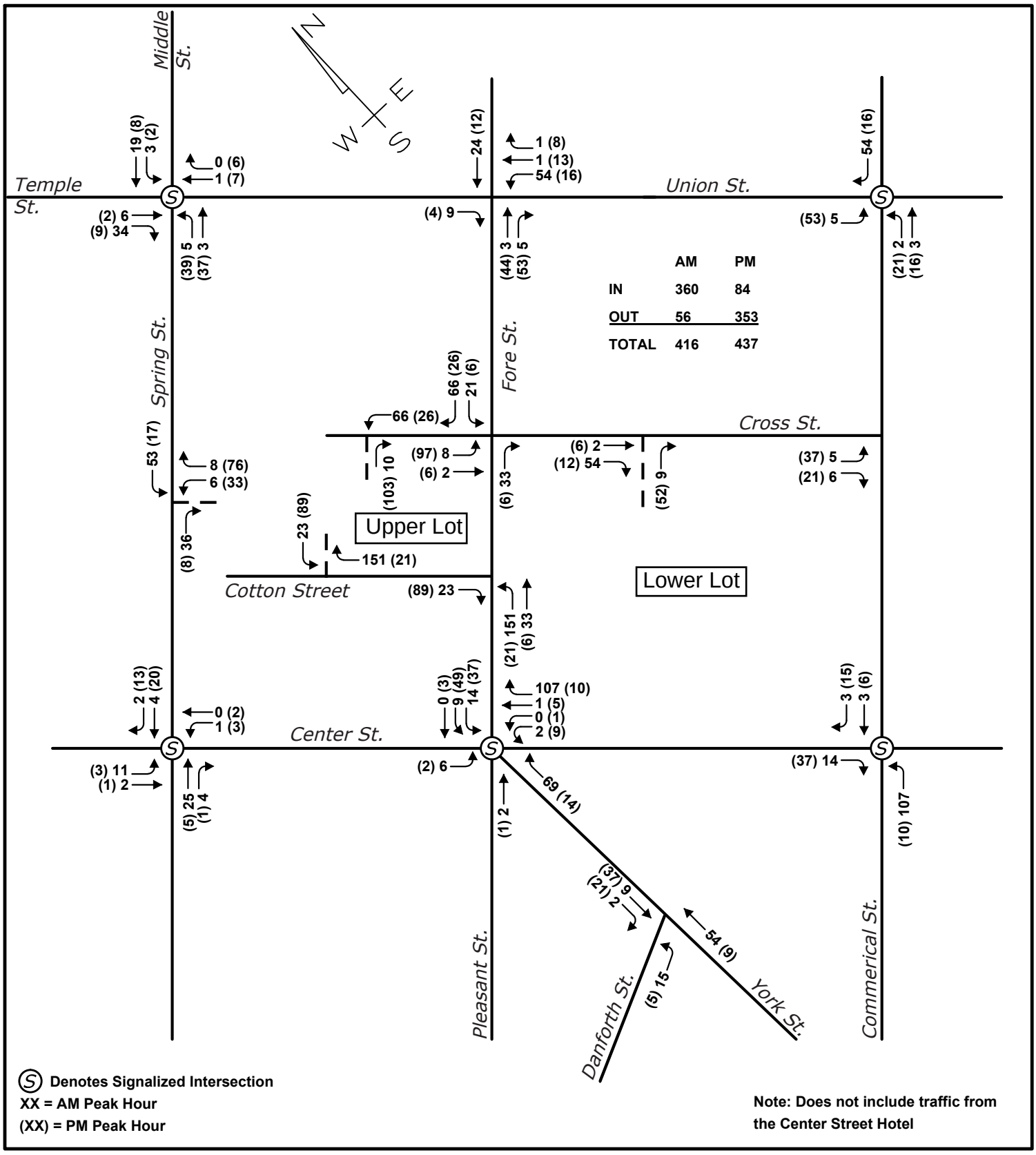
PORTLAND SQUARE
PORTLAND, MAINE

Design: MC
Draft:
Checked: EAL
Scale: NONE
Date: MAY 2, 2019
File Name: 3020.01_Figures

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Relationships. Responsiveness. Results.
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Portland Square Primary Trip Assignment

Figure No. 4



(S) Denotes Signalized Intersection
XX = AM Peak Hour
(XX) = PM Peak Hour

Note: Does not include traffic from the Center Street Hotel

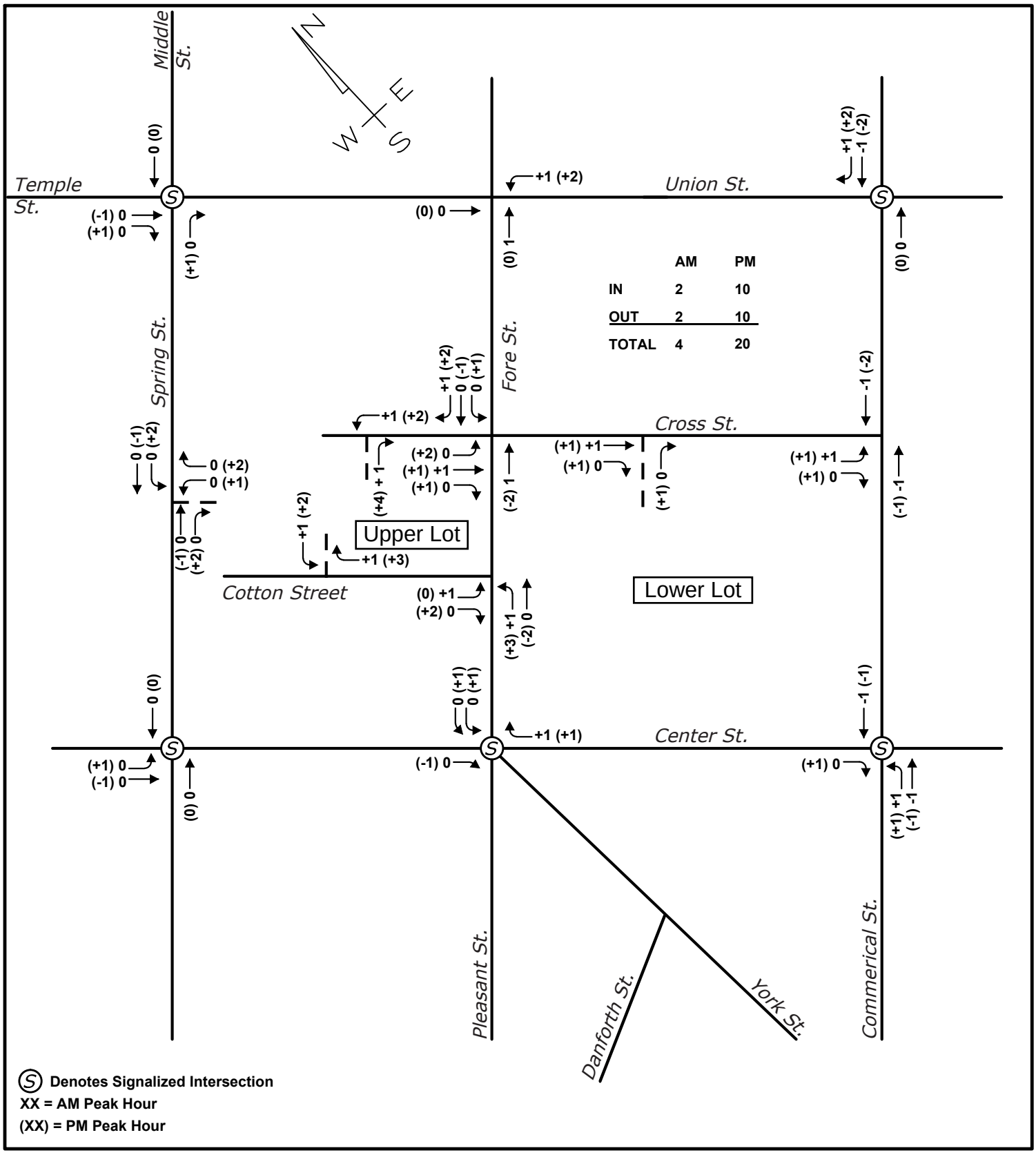
PORTLAND SQUARE
PORTLAND, MAINE

Design: MC Scale: NONE
Draft: Date: MAY 2, 2019
Checked: EAL File Name: 3020.01_Figures

GORRILL PALMER
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207.772.2515

Portland Square Pass-By Trip Assignment

Figure No. 5



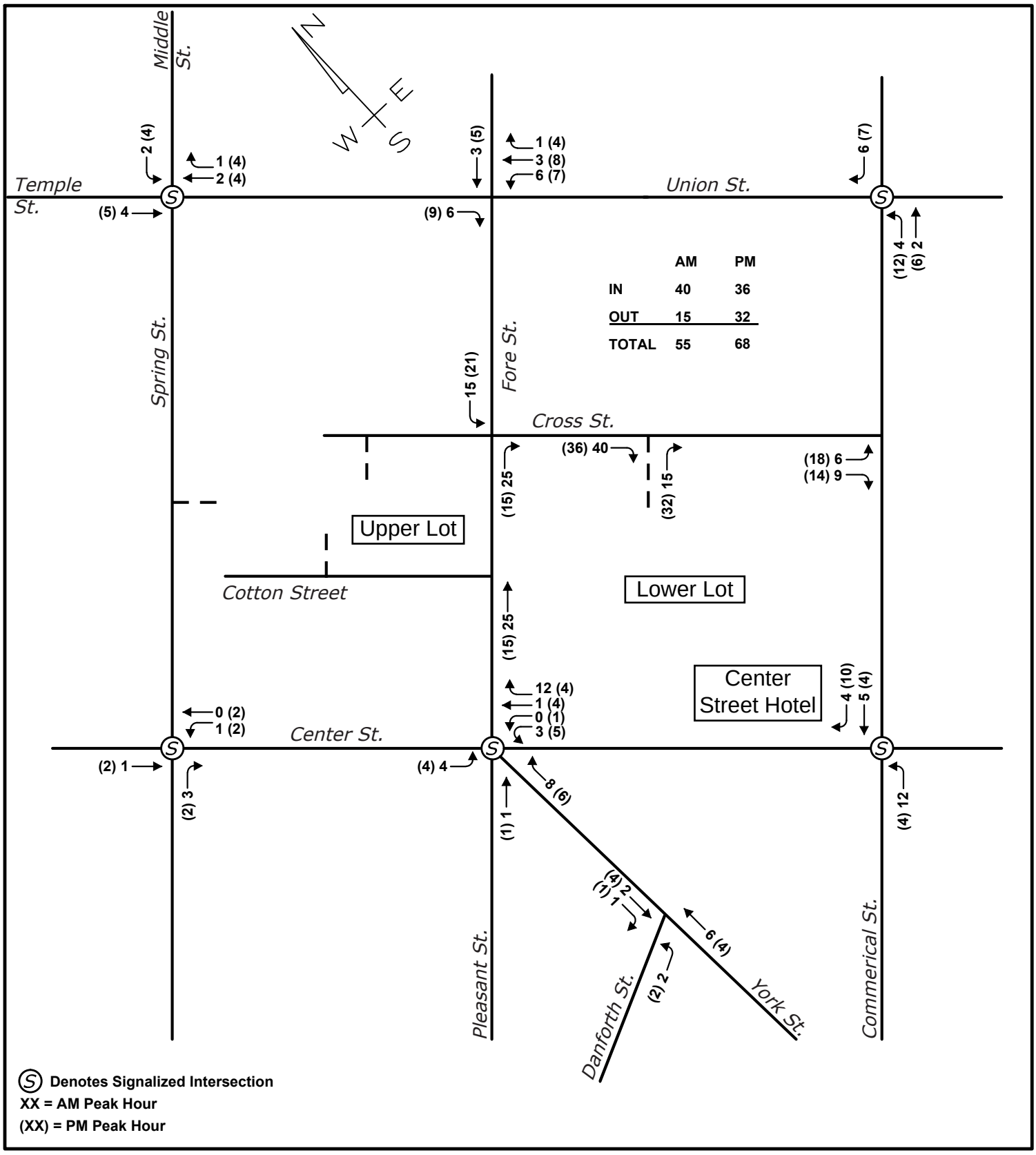
PORTLAND SQUARE
PORTLAND, MAINE

Design: MC
Draft:
Checked: EAL
Scale: NONE
Date: MAY 2, 2019
File Name: 3020.01_Figures

GORRILL PALMER
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Center Street Hotel Primary Trip Assignment

Figure No. 6



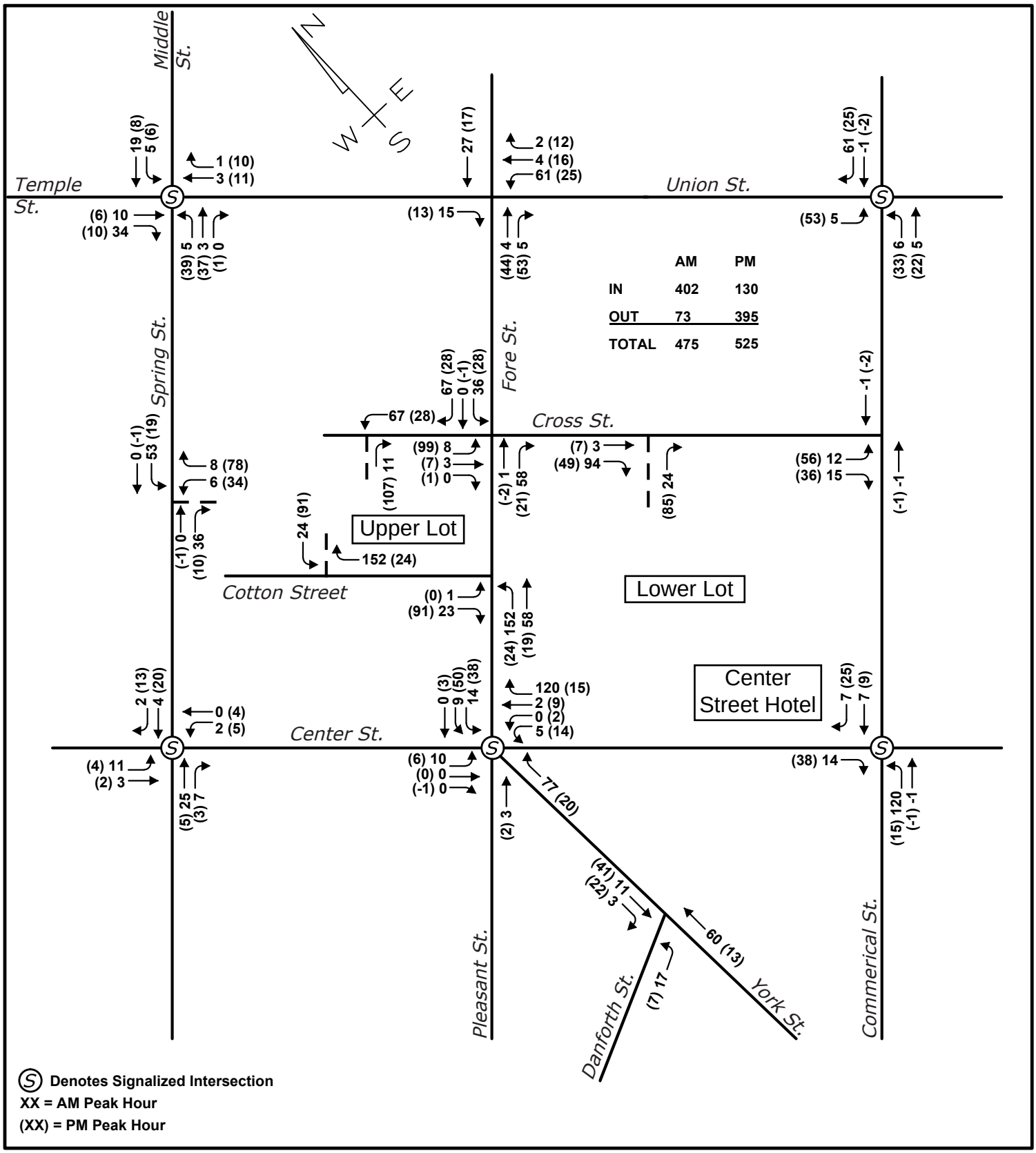
PORTLAND SQUARE
PORTLAND, MAINE

Design: MC
Draft:
Checked: EAL
Scale: NONE
Date: MAY 2, 2019
File Name: 3020.01_Figures

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Total Trip Assignment

Figure No. 7



PORTLAND SQUARE
PORTLAND, MAINE

Design: MC Scale: NONE
Draft: Date: MAY 2, 2019
Checked: EAL File Name: 3020.01_Figures

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207.772.2515

Attachment 1C

Trip Generation Calculations

NCHRP 684 Spreadsheets

Other Modes Reduction Calculations

JN: 3020.01
Project Description: Portland Square
Project Location: Portland, ME
Date: March 14, 2019
Computed By: MC
Checked By: EAL

Gorrill Palmer
707 Sable Oaks Drive
Suite 30
South Portland, Maine 04106

General Office Building
Land Use Code (LUC) 710

	Upper Lot
Square Feet	205,086

Trip Ends Based on Fitted Curve Equation

Time Period	ITE Trip Rate	Trip Ends	Number of Studies	Directional Split *		Directional Distribution		R^2
				IN	OUT	IN	OUT	
Weekday	Ln (T) = 0.77 Ln (X) + 3.65	2319	78	50%	50%	1160	1159	0.80
AM Peak Hour	**Ln (T) = 0.80 Ln (X) + 1.55**	**333**	**217**	**90%**	**10%**	**300**	**33**	**0.83**
PM Peak Hour	T = 1.12 (X) + 78.81	309	235	15%	85%	46	263	0.82
Saturday	T = 2.14 (X) + 18.47	457	17	50%	50%	229	228	0.66
Peak Hour of Generator	Ln (T) = 0.81 Ln (X) - 0.12	66	10	55%	45%	36	30	0.59

* Percentages rounded to nearest 5%

Trip Ends Based on Average Rate

Time Period	ITE Trip Rate	Trip Ends	Number of Studies	Directional Split *		Directional Distribution		R^2
				IN	OUT	IN	OUT	
Weekday	T = 11.01 (X)	2258	78	50%	50%	1129	1129	---
AM Peak Hour	T = 1.55 (X)	318	217	90%	10%	286	32	---
PM Peak Hour	T = 1.49 (X)	306	235	15%	85%	46	260	---
Saturday	T = 2.37 (X)	486	17	50%	50%	243	243	---
Saturday Peak Hour of Gen.	T = 0.41 (X)	84	10	50%	50%	42	42	**---**

* Percentages rounded to nearest 5%

PM Peak Hour:	**T = 1.49/1.55 (AM Peak)**	**320**		**15%**	**85%**	**48**	**272**
Saturday Peak Hour:	**T = 0.41/1.55 (AM Peak)**	**88**		**55%**	**45%**	**48**	**40**

JN:	3020.01	Gorrill Palmer
Project Description:	Portland Square	707 Sable Oaks Drive
Project Location:	Portland, ME	Suite 30
Date:	March 14, 2019	South Portland, Maine 04106
Computed By:	MC	
Checked By:	EAL	

Specialty Retail Center
Land Use Code (LUC) 814

Upper Lot

Gross Floor Area (ft^2): 5,964

Average Rate

Time Period	ITE Trip Rate	Trip Ends	Number of Studies	Directional Split * IN	Directional Split * OUT	Directional Distribution IN	Directional Distribution OUT	R^2
Weekday	T = 44.32 (X)	264	4	50%	50%	132	132	---
Peak Hour of Adjacent Street Traffic 7-9 AM**	---	---	---	---	---	---	---	---
Peak Hour of Adjacent Street Traffic 4-6 PM	**T = 2.71 (X)**	**16**	5	45%	55%	7	9	---
AM Peak Hour of Generator	**T = 6.84 (X)**	**41**	**4**	**50%**	**50%**	**21**	**20**	**---**
PM Peak Hour of Generator	**T = 5.02 (X)**	**30**	**3**	**55%**	**45%**	**17**	**13**	**---**
Saturday	T = 42.04 (X)	251	3	50%	50%	126	125	---
Saturday Peak Hour of Gen.***	---	---	---	---	---	---	---	---
AM Peak of Adjacent Street 7-9 AM* **	**T = 0.275 (PM Peak Hour)**	**4**		**60%**	**40%**	**2**	**2**	
Saturday Peak Hour* **	**T = 1.325 (PM Peak Hour)**	**21**		**50%**	**50%**	**11**	**10**	

**Based on ratio of AM/PM traffic for LUC 820, Shopping Center
***Saturday Peak Hour comes from a ratio of PM to Saturday trip rates from LUC 820 - Shopping Center

* Percentages rounded to nearest 5%

Fitted Curve Equation

Time Period	ITE Trip Rate	Trip Ends	Number of Studies	Directional Split * IN	Directional Split * OUT	Directional Distribution IN	Directional Distribution OUT	R^2
Weekday	T = 42.78 (X) + 37.66	293	4	50%	50%	147	146	0.69
Peak Hour of Adjacent Street Traffic 7-9 AM	---	---	---	---	---	---	---	---
Peak Hour of Adjacent Street Traffic 4-6 PM	T = 2.40 (X) + 21.48	36	5	45%	55%	16	20	0.98
AM Peak Hour of Generator	T = 4.91 (X) + 115.59	145	4	50%	50%	73	72	0.90
PM Peak Hour of Generator	---	---	---	---	---	---	---	---
Saturday	---	---	---	---	---	---	---	---
Saturday Peak Hour of Gen.	---	---	---	---	---	---	---	---
AM Peak of Adjacent Street 7-9 AM***	T = 0.275 (PM Peak Hour)	10		60%	40%	6	4	
Saturday Peak Hour***	T = 1.325 (PM Peak Hour)	48		50%	50%	24	24	

**Based on ratio of AM/PM traffic for LUC 820, Shopping Center
***Saturday Peak Hour comes from a ratio of PM to Saturday trip rates from LUC 820 - Shopping Center

* Percentages rounded to nearest 5%
(---) Not Given

JN: 3020.01
Project Description: Portland Square
Project Location: Portland, ME
Date: March 14, 2019
Computed By: MC
Checked By: EAL

Gorrill Palmer
707 Sable Oaks Drive
Suite 30
South Portland, Maine 04106

Apartment
Land Use Code (LUC) 220

Upper Lot
Dwelling Units: 18

Average Rate

Time Period	ITE Trip Rate	Sample Size	Trip Ends		Directional Split * IN	Directional Split * OUT	Directional Distribution IN	Directional Distribution OUT	R^2
Weekday	T = 6.72 (X)	86	121		50%	50%	61	60	N/A
AM Peak Hour of Adj. Street Traffic	**T = 0.51 (X)**	**78**	**9**		**20%**	**80%**	**2**	**7**	**N/A**
PM Peak Hour of Adj. Street Traffic	**T = 0.62 (X)**	**90**	**11**		**65%**	**35%**	**7**	**4**	**N/A**
AM Peak Hour of Generator	**T = 0.55 (X)**	**81**	**10**		**30%**	**70%**	**3**	**7**	**N/A**
PM Peak Hour of Generator	**T = 0.67 (X)**	**83**	**12**		**60%**	**40%**	**7**	**5**	**N/A**
Saturday	T = 6.39 (X)	15	115		50%	50%	58	57	N/A
Saturday Peak Hour of Gen.	**T = 0.52 (X)**	**14**	**9**	**	**50%**	**50%**	**5**	**4**	**N/A**

* Percentages rounded to nearest 5%
** Not Available (Assumption)

Fitted Curve Equation

Time Period	ITE Trip Rate	Sample Size	Trip Ends		Directional Split * IN	Directional Split * OUT	Directional Distribution IN	Directional Distribution OUT	R^2
Weekday	T = 6.01 (X) + 150.35	86	259		50%	50%	129	130	0.88
AM Peak Hour of Adj. Street Traffic	T = 0.49 (X) + 3.73	78	13		20%	80%	3	10	0.83
PM Peak Hour of Adj. Street Traffic	T = 0.55 (X) + 17.65	90	28		65%	35%	18	10	0.77
AM Peak Hour of Generator	T = 0.53 (X) + 4.21	81	14		30%	70%	4	10	0.82
PM Peak Hour of Generator	T = 0.60 (X) + 17.52	83	28		60%	40%	17	11	0.80
Saturday	T = 7.85 (X) - 256.19	15	-115		50%	50%	-57	-58	0.85
Saturday Peak Hour of Gen.	T = 0.41 (X) + 19.23	14	27	**	50%	50%	13	14	0.56

* Percentages rounded to nearest 5%
** Not Available (Assumption)

JN:	3020.01	Gorrill Palmer
Project Description:	Portland Square	707 Sable Oaks Drive
Project Location:	Portland, ME	Suite 30
Date:	March 14, 2019	South Portland, Maine 04106
Computed By:	MC	
Checked By:	EAL	

Hotel
Land Use Code (LUC) 310

	Upper Lot
Numer of Rooms:	0

Trip Ends Based on Fitted Curve Equation

Time Period	ITE Trip Rate	Trip Ends	Directional Split *		Directional Distribution	
			IN	OUT	IN	OUT
Weekday	T = 8.95 (X) - 373.16	-373	50%	50%	-187	-186
AM Peak Adjacent Street	Ln(T) = 1.24 Ln(X) - 2.00	#NUM!	60%	40%	#NUM!	#NUM!
PM Peak Adjacent Street	---	---	55%	45%	---	---
AM Peak hour of Generator	Ln(T) = 0.87 Ln(X) + 0.02	#NUM!	55%	45%	#NUM!	#NUM!
PM Peak Hour of Generator	Ln(T) = 1.00 Ln(X) - 0.58	#NUM!	60%	40%	#NUM!	#NUM!
Saturday	T = 9.62 (X) - 294.56	-295	50%	50%	-148	-147
Saturday Peak Hour of Gen.	T = 0.69 (X) + 4.32	4	55%	45%	2	2

* Percentages rounded to nearest 5%

Trip Ends Based on Average Rate

Time Period	ITE Trip Rate	Trip Ends	Directional Split *		Directional Distribution	
			IN	OUT	IN	OUT
Weekday	T = 8.17 (X)	0	50%	50%	0	0
AM Peak Adjacent Street	**T = 0.56 (X)**	**0**	**60%**	**40%**	**0**	**0**
PM Peak Adjacent Street	**T = 0.59 (X)**	**0**	**55%**	**45%**	**0**	**0**
AM Peak Hour of Generator	**T = 0.52 (X)**	**0**	**55%**	**45%**	**0**	**0**
PM Peak Hour of Generator	**T = 0.61 (X)**	**0**	**60%**	**40%**	**0**	**0**
Saturday	T = 8.19 (X)	0	50%	50%	0	0
Saturday Peak Hour of Gen.	**T = 0.72 (X)**	**0**	**55%**	**45%**	**0**	**0**

* Percentages rounded to nearest 5%

JN: 3020.01
Project Description: Portland Square
Project Location: Portland, ME
Date: March 14, 2019
Computed By: MC
Checked By: EAL

Gorrill Palmer
707 Sable Oaks Drive
Suite 30
South Portland, Maine 04106

General Office Building
Land Use Code (LUC) 710

	Lower Lot
Square Feet	82,700

Trip Ends Based on Fitted Curve Equation

Time Period	ITE Trip Rate	Trip Ends	Number of Studies	Directional Split *		Directional Distribution		R^2
				IN	OUT	IN	OUT	
Weekday	Ln (T) = 0.77 Ln (X) + 3.65	1153	78	50%	50%	577	576	0.80
AM Peak Hour	**Ln (T) = 0.80 Ln (X) + 1.55**	**161**	**217**	**90%**	**10%**	**145**	**16**	**0.83**
PM Peak Hour	T = 1.12 (X) + 78.81	171	235	15%	85%	26	145	0.82
Saturday	T = 2.14 (X) + 18.47	195	17	50%	50%	98	97	0.66
Peak Hour of Generator	Ln (T) = 0.81 Ln (X) - 0.12	32	10	55%	45%	18	14	0.59

* Percentages rounded to nearest 5%

Trip Ends Based on Average Rate

Time Period	ITE Trip Rate	Trip Ends	Number of Studies	Directional Split *		Directional Distribution		R^2
				IN	OUT	IN	OUT	
Weekday	T = 11.01 (X)	911	78	50%	50%	456	455	---
AM Peak Hour	T = 1.55 (X)	128	217	90%	10%	115	13	---
PM Peak Hour	T = 1.49 (X)	123	235	15%	85%	18	105	---
Saturday	T = 2.37 (X)	196	17	50%	50%	98	98	---
Saturday Peak Hour of Gen.	T = 0.41 (X)	34	10	50%	50%	17	17	**---**

* Percentages rounded to nearest 5%

PM Peak Hour:	**T = 1.49/1.55 (AM Peak)**	**155**	**15%**	**85%**	**23**	**132**
Saturday Peak Hour:	**T = 0.41/1.55 (AM Peak)**	**43**	**55%**	**45%**	**24**	**19**

JN:	3020.01	Gorrill Palmer
Project Description:	Portland Square	707 Sable Oaks Drive
Project Location:	Portland, ME	Suite 30
Date:	March 14, 2019	South Portland, Maine 04106
Computed By:	MC	
Checked By:	EAL	

Specialty Retail Center
Land Use Code (LUC) 814

Lower Lot

Gross Floor Area (ft^2): 29,649

Average Rate

Time Period	ITE Trip Rate	Trip Ends	Number of Studies	Directional Split * IN	Directional Split * OUT	Directional Distribution IN	Directional Distribution OUT	R^2
Weekday	T = 44.32 (X)	1314	4	50%	50%	657	657	---
Peak Hour of Adjacent Street Traffic 7-9 AM**	---	---	---	---	---	---	---	---
Peak Hour of Adjacent Street Traffic 4-6 PM	**T = 2.71 (X)**	**80**	**5**	**45%**	**55%**	**36**	**44**	---
AM Peak Hour of Generator	**T = 6.84 (X)**	**203**	**4**	**50%**	**50%**	**102**	**101**	---
PM Peak Hour of Generator	**T = 5.02 (X)**	**149**	**3**	**55%**	**45%**	**82**	**67**	---
Saturday	T = 42.04 (X)	1246	3	50%	50%	623	623	---
Saturday Peak Hour of Gen.***	---	---	---	---	---	---	---	---
AM Peak of Adjacent Street 7-9 AM* **	**T = 0.275 (PM Peak Hour)**	**22**		**60%**	**40%**	**13**	**9**	
Saturday Peak Hour* **	**T = 1.325 (PM Peak Hour)**	**106**		**50%**	**50%**	**53**	**53**	

**Based on ratio of AM/PM traffic for LUC 820, Shopping Center
***Saturday Peak Hour comes from a ratio of PM to Saturday trip rates from LUC 820 - Shopping Center

* Percentages rounded to nearest 5%

Fitted Curve Equation

Time Period	ITE Trip Rate	Trip Ends	Number of Studies	Directional Split * IN	Directional Split * OUT	Directional Distribution IN	Directional Distribution OUT	R^2
Weekday	T = 42.78 (X) + 37.66	1306	4	50%	50%	653	653	0.69
Peak Hour of Adjacent Street Traffic 7-9 AM	---	---	---	---	---	---	---	---
Peak Hour of Adjacent Street Traffic 4-6 PM	T = 2.40 (X) + 21.48	93	5	45%	55%	42	51	0.98
AM Peak Hour of Generator	T = 4.91 (X) + 115.59	261	4	50%	50%	131	130	0.90
PM Peak Hour of Generator	---	---	---	---	---	---	---	---
Saturday	---	---	---	---	---	---	---	---
Saturday Peak Hour of Gen.	---	---	---	---	---	---	---	---
AM Peak of Adjacent Street 7-9 AM***	T = 0.275 (PM Peak Hour)	26		60%	40%	16	10	
Saturday Peak Hour***	T = 1.325 (PM Peak Hour)	123		50%	50%	62	61	

* Percentages rounded to nearest 5%
(---) Not Given

**Based on ratio of AM/PM traffic for LUC 820, Shopping Center
***Saturday Peak Hour comes from a ratio of PM to Saturday trip rates from LUC 820 - Shopping Center

JN: 3020.01
Project Description: Portland Square
Project Location: Portland, ME
Date: March 14, 2019
Computed By: MC
Checked By: EAL

Gorrill Palmer
707 Sable Oaks Drive
Suite 30
South Portland, Maine 04106

Apartment
Land Use Code (LUC) 220

Lower Lot
Dwelling Units: 58

Average Rate

Time Period	ITE Trip Rate	Sample Size	Trip Ends		Directional Split * IN	Directional Split * OUT	Directional Distribution IN	Directional Distribution OUT	R^2
Weekday	T = 6.72 (X)	86	390		50%	50%	195	195	N/A
AM Peak Hour of Adj. Street Traffic	**T = 0.51 (X)**	**78**	**30**		**20%**	**80%**	**6**	**24**	**N/A**
PM Peak Hour of Adj. Street Traffic	**T = 0.62 (X)**	**90**	**36**		**65%**	**35%**	**23**	**13**	**N/A**
AM Peak Hour of Generator	**T = 0.55 (X)**	**81**	**32**		**30%**	**70%**	**10**	**22**	**N/A**
PM Peak Hour of Generator	**T = 0.67 (X)**	**83**	**39**		**60%**	**40%**	**23**	**16**	**N/A**
Saturday	T = 6.39 (X)	15	371		50%	50%	186	185	N/A
Saturday Peak Hour of Gen.	**T = 0.52 (X)**	**14**	**30**	**	**50%**	**50%**	**15**	**15**	**N/A**

* Percentages rounded to nearest 5%
** Not Available (Assumption)

Fitted Curve Equation

Time Period	ITE Trip Rate	Sample Size	Trip Ends		Directional Split * IN	Directional Split * OUT	Directional Distribution IN	Directional Distribution OUT	R^2
Weekday	T = 6.01 (X) + 150.35	86	499		50%	50%	249	250	0.88
AM Peak Hour of Adj. Street Traffic	T = 0.49 (X) + 3.73	78	32		20%	80%	6	26	0.83
PM Peak Hour of Adj. Street Traffic	T = 0.55 (X) + 17.65	90	50		65%	35%	32	18	0.77
AM Peak Hour of Generator	T = 0.53 (X) + 4.21	81	35		30%	70%	10	25	0.82
PM Peak Hour of Generator	T = 0.60 (X) + 17.52	83	52		60%	40%	31	21	0.80
Saturday	T = 7.85 (X) - 256.19	15	199		50%	50%	100	99	0.85
Saturday Peak Hour of Gen.	T = 0.41 (X) + 19.23	14	43	**	50%	50%	22	21	0.56

* Percentages rounded to nearest 5%
** Not Available (Assumption)

JN:	3020.01	Gorrill Palmer
Project Description:	Portland Square	707 Sable Oaks Drive
Project Location:	Portland, ME	Suite 30
Date:	March 14, 2019	South Portland, Maine 04106
Computed By:	MC	
Checked By:	EAL	

Hotel
Land Use Code (LUC) 310

	Lower Lot
Numer of Rooms:	135

Trip Ends Based on Fitted Curve Equation

Time Period	ITE Trip Rate	Trip Ends	Directional Split *		Directional Distribution	
			IN	OUT	IN	OUT
Weekday	T = 8.95 (X) - 373.16	835	50%	50%	418	417
AM Peak Adjacent Street	Ln(T) = 1.24 Ln(X) - 2.00	59	60%	40%	35	24
PM Peak Adjacent Street	---	---	55%	45%	---	---
AM Peak hour of Generator	Ln(T) = 0.87 Ln(X) + 0.02	73	55%	45%	40	33
PM Peak Hour of Generator	Ln(T) = 1.00 Ln(X) - 0.58	76	60%	40%	46	30
Saturday	T = 9.62 (X) - 294.56	1004	50%	50%	502	502
Saturday Peak Hour of Gen.	T = 0.69 (X) + 4.32	97	55%	45%	53	44

* Percentages rounded to nearest 5%

Trip Ends Based on Average Rate

Time Period	ITE Trip Rate	Trip Ends	Directional Split *		Directional Distribution	
			IN	OUT	IN	OUT
Weekday	T = 8.17 (X)	1103	50%	50%	551	552
AM Peak Adjacent Street	**T = 0.56 (X)**	**76**	**60%**	**40%**	**45**	**31**
PM Peak Adjacent Street	**T = 0.59 (X)**	**80**	**55%**	**45%**	**44**	**36**
AM Peak Hour of Generator	**T = 0.52 (X)**	**70**	**55%**	**45%**	**39**	**31**
PM Peak Hour of Generator	**T = 0.61 (X)**	**82**	**60%**	**40%**	**49**	**33**
Saturday	T = 8.19 (X)	1106	50%	50%	553	553
Saturday Peak Hour of Gen.	**T = 0.72 (X)**	**97**	**55%**	**45%**	**53**	**44**

* Percentages rounded to nearest 5%

JN: 3020.01
Project Description: Portland Square
Project Location: Portland, ME
Date: March 14, 2019
Computed By: MC
Checked By: EAL

Gorrill Palmer
707 Sable Oaks Drive
Suite 30
South Portland, Maine 04106

Portland Square Trip Generation

Task: Calcualate trip generation

Reference: ITE Publication, Trip Generation 7th Edition

Calculations:

Upper Lot ITE Raw Trip Generation

Time Period	Office			Retail			Residential			Hotel			Total		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
AM Peak Adjacent Street	300	33	333	2	2	4	2	7	9	0	0	0	304	42	346
PM Peak Adjacent Street	48	272	320	7	9	16	7	4	11	0	0	0	62	285	347
AM Peak of Generator	300	33	333	21	20	41	3	7	10	0	0	0	324	60	384
PM Peak of Generator	48	272	320	17	13	30	7	5	12	0	0	0	72	290	362
Saturday Peak Hour of Gen.	48	40	88	11	10	21	5	4	9	0	0	0	64	54	118

Lower Lot ITE Raw Trip Generation

Time Period	Office			Retail			Residential			Hotel			Total		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
AM Peak Adjacent Street	145	16	161	13	9	22	6	24	30	45	31	76	209	80	289
PM Peak Adjacent Street	23	132	155	36	44	80	23	13	36	44	36	80	126	225	351
AM Peak of Generator	145	16	161	102	101	203	10	22	32	39	31	70	296	170	466
PM Peak of Generator	23	132	155	82	67	149	23	16	39	49	33	82	177	248	425
Saturday Peak Hour of Gen.	24	19	43	53	53	106	15	15	30	53	44	97	145	131	276

Total Combined Trip Generation

Time Period	Office			Retail			Residential			Hotel			Total		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
AM Peak Adjacent Street	445	49	494	15	11	26	8	31	39	45	31	76	513	122	635
PM Peak Adjacent Street	71	404	475	43	53	96	30	17	47	44	36	80	188	510	698
AM Peak of Generator	445	49	494	123	121	244	13	29	42	39	31	70	620	230	850
PM Peak of Generator	71	404	475	99	80	179	30	21	51	49	33	82	249	538	787
Saturday Peak Hour of Gen.	72	59	131	64	63	127	20	19	39	53	44	97	209	185	394

NCHRP 684 Reduction

Time Period	Office			Retail			Residential			Hotel			Total			
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	
AM Peak Adjacent Street	17	5	22	6	3	9	0	1	1	0	14	14	23	23	46	7%
PM Peak Adjacent Street	2	4	6	8	18	26	15	6	21	4	1	5	29	29	58	8%
AM Peak of Generator	32	14	46	18	18	36	0	1	1	0	17	17	50	50	100	12%
PM Peak of Generator	3	9	12	19	20	39	15	11	26	5	2	7	42	42	84	11%
Saturday Peak Hour of Gen.	7	6	13	6	6	12	2	2	4	5	4	9	20	18	38	10%

NCHRP 684 Reduced

Time Period	Office			Retail			Residential			Hotel			Total		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
AM Peak Adjacent Street	428	44	472	9	8	17	8	30	38	45	17	62	490	99	589
PM Peak Adjacent Street	69	400	469	35	35	70	15	11	26	40	35	75	159	481	640
AM Peak of Generator	413	35	448	105	103	208	13	28	41	39	14	53	570	180	750
PM Peak of Generator	68	395	463	80	60	140	15	10	25	44	31	75	207	496	703
Saturday Peak Hour of Gen.	65	53	118	58	57	115	18	17	35	48	40	88	189	167	356

Other Modes Reduction	18%	18%	49.7%	10%

Time Period	Office			Retail			Residential			Hotel			Total		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
AM Peak Adjacent Street	77	8	85	2	1	3	4	15	19	5	2	7	88	26	114
PM Peak Adjacent Street	12	72	84	6	6	12	7	5	12	4	3	7	29	86	115
AM Peak of Generator	74	6	80	19	19	38	6	14	20	4	1	5	103	40	143
PM Peak of Generator	12	71	83	14	11	25	7	5	12	4	3	7	37	90	127
Saturday Peak Hour of Gen.	12	10	22	10	10	20	9	8	17	5	4	9	36	32	68

Total Reduced Trip Generation

Time Period	Office			Retail			Residential			Hotel			Total		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
AM Peak Adjacent Street	351	36	387	7	7	14	4	15	19	40	15	55	**402**	**73**	**475**
PM Peak Adjacent Street	57	328	385	29	29	58	8	6	14	36	32	68	**130**	**395**	**525**
AM Peak of Generator	339	29	368	86	84	170	7	14	21	35	13	48	**467**	**140**	**607**
PM Peak of Generator	56	324	380	66	49	115	8	5	13	40	28	68	**170**	**406**	**576**
Saturday Peak Hour of Gen.	53	43	96	48	47	95	9	9	18	43	36	79	**153**	**135**	**288**

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Portland Square and Hotel	**Organization:**	GP
Project Location:	Portland, Maine	**Performed By:**	MC
Scenario Description:	Portland Square with Proposed Hotel	**Date:**	3/15/2019
Analysis Year:		**Checked By:**	EAL
Analysis Period:	**AM Street Peak Hour**	**Date:**	3/19/2019

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office	710	287,786	SF	494	445	49
Retail	814	35,613	SF	26	15	11
Restaurant				0		
Cinema/Entertainment				0		
Residential	220	76	Units	39	8	31
Hotel	310	135	Rooms	76	45	31
All Other Land Uses[2]				0		
Total				635	513	122

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		5	0	0	0	0
Retail	3		0	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	0	0	0		0
Hotel	13	1	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	635	513	122
Internal Capture Percentage	7%	4%	19%
External Vehicle-Trips[3]	589	490	99
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	4%	10%
Retail	40%	27%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	0%	3%
Hotel	0%	45%

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	Portland Square and Hotel
Analysis Period:	**AM Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	445	445	1.00	49	49
Retail	1.00	15	15	1.00	11	11
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	8	8	1.00	31	31
Hotel	1.00	45	45	1.00	31	31

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		14	31	0	0	0
Retail	3		1	0	2	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	0	6	0		0
Hotel	23	4	3	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		5	0	0	0	0
Retail	18		0	0	0	0
Restaurant	62	1		0	0	2
Cinema/Entertainment	0	0	0		0	0
Residential	13	3	0	0		0
Hotel	13	1	0	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	17	428	445	428	0	0
Retail	6	9	15	9	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	8	8	8	0	0
Hotel	0	45	45	45	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	5	44	49	44	0	0
Retail	3	8	11	8	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	1	30	31	30	0	0
Hotel	14	17	31	17	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Portland Square and Hotel	**Organization:**	GP
Project Location:	Portland, Maine	**Performed By:**	MC
Scenario Description:	Portland Square with Proposed Hotel	**Date:**	3/15/2019
Analysis Year:		**Checked By:**	EAL
Analysis Period:	**PM Street Peak Hour**	**Date:**	3/19/2019

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office	710	287,786	SF	475	71	404
Retail	814	35,613	SF	96	43	53
Restaurant						
Cinema/Entertainment						
Residential	220	76	Units	47	30	17
Hotel	310	135	Rooms	80	44	36
All Other Land Uses[2]						
Total				698	188	510

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		3	0	0	1	0
Retail	1		0	0	14	3
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	4	0	0		1
Hotel	0	1	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	698	188	510
Internal Capture Percentage	8%	15%	6%
External Vehicle-Trips[3]	640	159	481
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	3%	1%
Retail	19%	34%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	50%	35%
Hotel	9%	3%

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	Portland Square and Hotel
Analysis Period:	**PM Street Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	71	71	1.00	404	404
Retail	1.00	43	43	1.00	53	53
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	30	30	1.00	17	17
Hotel	1.00	44	44	1.00	36	36

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		81	16	0	8	0
Retail	1		15	2	14	3
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	7	4	0		1
Hotel	0	6	24	0	1	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		3	0	0	1	0
Retail	22		0	0	14	7
Restaurant	21	22		0	5	31
Cinema/Entertainment	4	2	0		1	0
Residential	40	4	0	0		5
Hotel	0	1	0	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	2	69	71	69	0	0
Retail	8	35	43	35	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	15	15	30	15	0	0
Hotel	4	40	44	40	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	4	400	404	400	0	0
Retail	18	35	53	35	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	6	11	17	11	0	0
Hotel	1	35	36	35	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Portland Square and Hotel	**Organization:**	GP
Project Location:	Portland, Maine	**Performed By:**	MC
Scenario Description:	Portland Square with Proposed Hotel	**Date:**	3/15/2019
Analysis Year:		**Checked By:**	EAL
Analysis Period:	**AM Generator Peak Hour**	**Date:**	3/19/2019

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office	710	287,786	SF	494	445	49
Retail	814	35,613	SF	244	123	121
Restaurant						
Cinema/Entertainment						
Residential	220	76	Units	42	13	29
Hotel	310	135	Rooms	70	39	31
All Other Land Uses[2]						
Total				850	620	230

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		14	0	0	0	0
Retail	18		0	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	0	0	0		0
Hotel	13	4	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	850	620	230
Internal Capture Percentage	12%	8%	22%
External Vehicle-Trips[3]	750	570	180
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	7%	29%
Retail	15%	15%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	0%	3%
Hotel	0%	55%

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	Portland Square and Hotel
Analysis Period:	**AM Generator Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	445	445	1.00	49	49
Retail	1.00	123	123	1.00	121	121
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	13	13	1.00	29	29
Hotel	1.00	39	39	1.00	31	31

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		14	31	0	0	0
Retail	35		16	0	17	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	0	6	0		0
Hotel	23	4	3	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		39	0	0	0	0
Retail	18		0	0	0	0
Restaurant	62	10		0	1	2
Cinema/Entertainment	0	0	0		0	0
Residential	13	21	0	0		0
Hotel	13	5	0	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	32	413	445	413	0	0
Retail	18	105	123	105	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	13	13	13	0	0
Hotel	0	39	39	39	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	14	35	49	35	0	0
Retail	18	103	121	103	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	1	28	29	28	0	0
Hotel	17	14	31	14	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Portland Square and Hotel	**Organization:**	GP
Project Location:	Portland, Maine	**Performed By:**	MC
Scenario Description:	Portland Square with Proposed Hotel	**Date:**	3/15/2019
Analysis Year:		**Checked By:**	EAL
Analysis Period:	**PM Generator Peak Hour**	**Date:**	3/19/2019

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office	710	287,786	SF	475	71	404
Retail	814	35,613	SF	179	99	80
Restaurant						
Cinema/Entertainment						
Residential	220	76	Units	51	30	21
Hotel	310	135	Rooms	82	49	33
All Other Land Uses[2]						
Total				787	249	538

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		8	0	0	1	0
Retail	2		0	0	14	4
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	9	0	0		1
Hotel	0	2	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	787	249	538
Internal Capture Percentage	11%	17%	8%
External Vehicle-Trips[3]	703	207	496
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	4%	2%
Retail	19%	25%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	50%	52%
Hotel	10%	6%

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	Portland Square and Hotel
Analysis Period:	**PM Generator Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	71	71	1.00	404	404
Retail	1.00	99	99	1.00	80	80
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	30	30	1.00	21	21
Hotel	1.00	49	49	1.00	33	33

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		81	16	0	8	0
Retail	2		23	3	21	4
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	9	4	0		1
Hotel	0	5	22	0	1	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		8	0	0	1	0
Retail	22		0	0	14	8
Restaurant	21	50		0	5	35
Cinema/Entertainment	4	4	0		1	0
Residential	40	10	0	0		6
Hotel	0	2	0	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	3	68	71	68	0	0
Retail	19	80	99	80	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	15	15	30	15	0	0
Hotel	5	44	49	44	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	9	395	404	395	0	0
Retail	20	60	80	60	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	11	10	21	10	0	0
Hotel	2	31	33	31	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

ArcGIS Southern Maine Commute Data (ACS 2009-2013, 5-Yr Est. by Census Tract)

Details | Basemap |

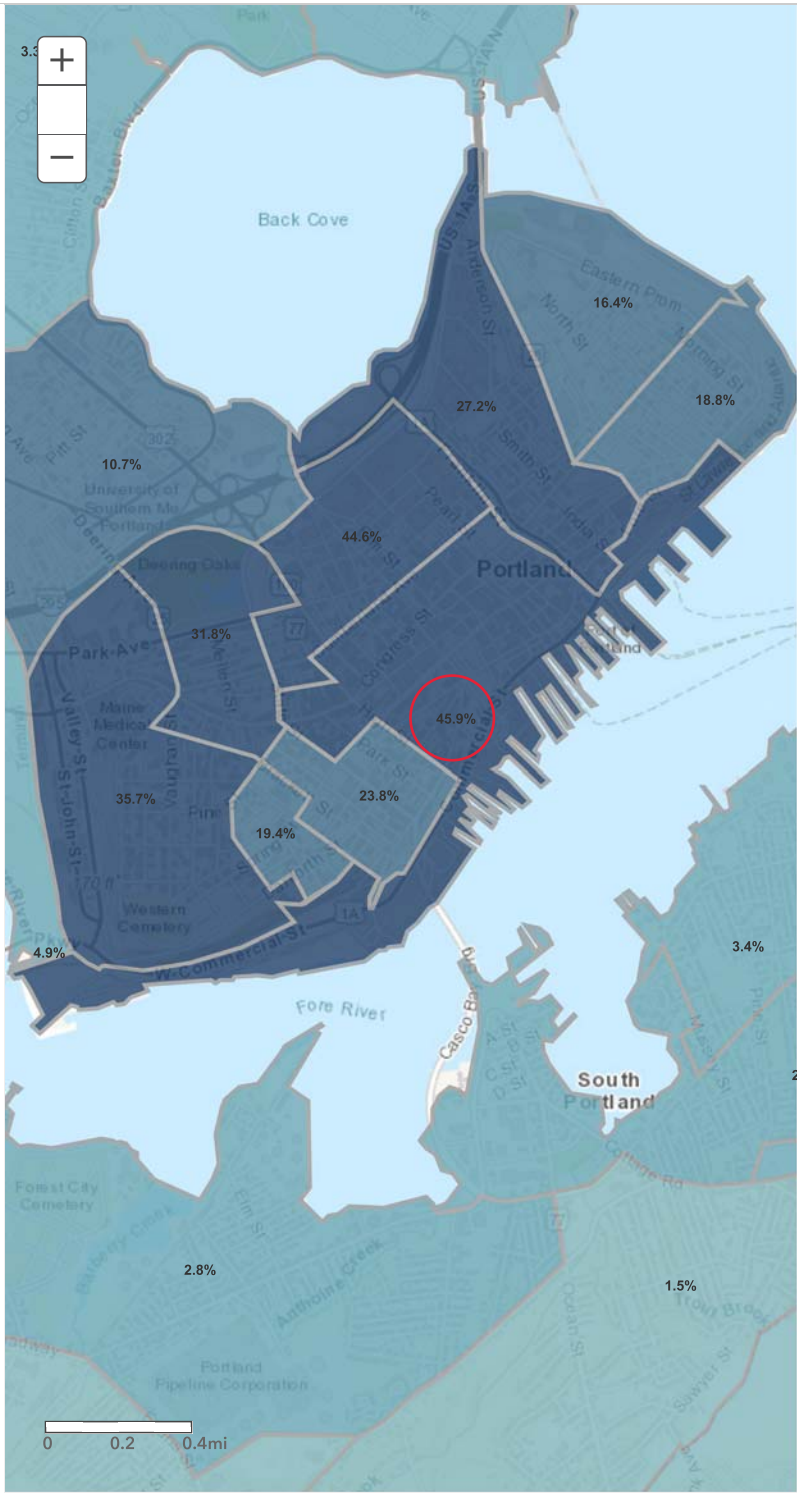
About Content Legend

Contents

- [x] Walked
- [ ] Biked
- [ ] Public Transportation
- [ ] Carpooled
- [ ] Drove Alone
- [ ] Taxi/Motorcycle/Other
- [ ] Worked at Home

Topographic

Walked = 45.9%



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ArcGIS Southern Maine Commute Data (ACS 2009-2013, 5-Yr Est. by Census Tract)

Details | Basemap |

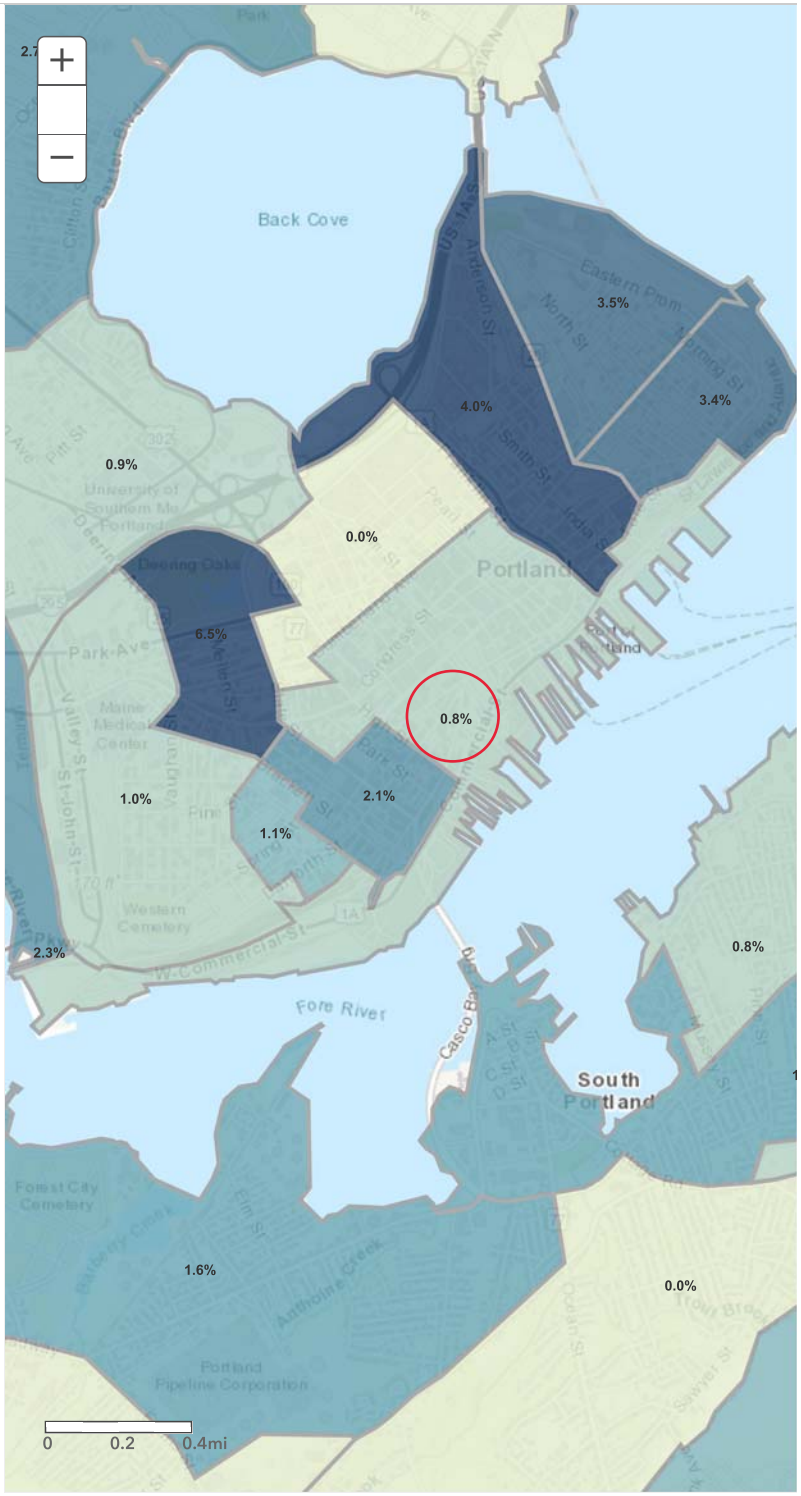
About Content Legend

Contents

- [ ] Walked
- [x] Biked
- [ ] Public Transportation
- [ ] Carpooled
- [ ] Drove Alone
- [ ] Taxi/Motorcycle/Other
- [ ] Worked at Home

Topographic

Biked = 0.8%



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ArcGIS Southern Maine Commute Data (ACS 2009-2013, 5-Yr Est. by Census Tract)

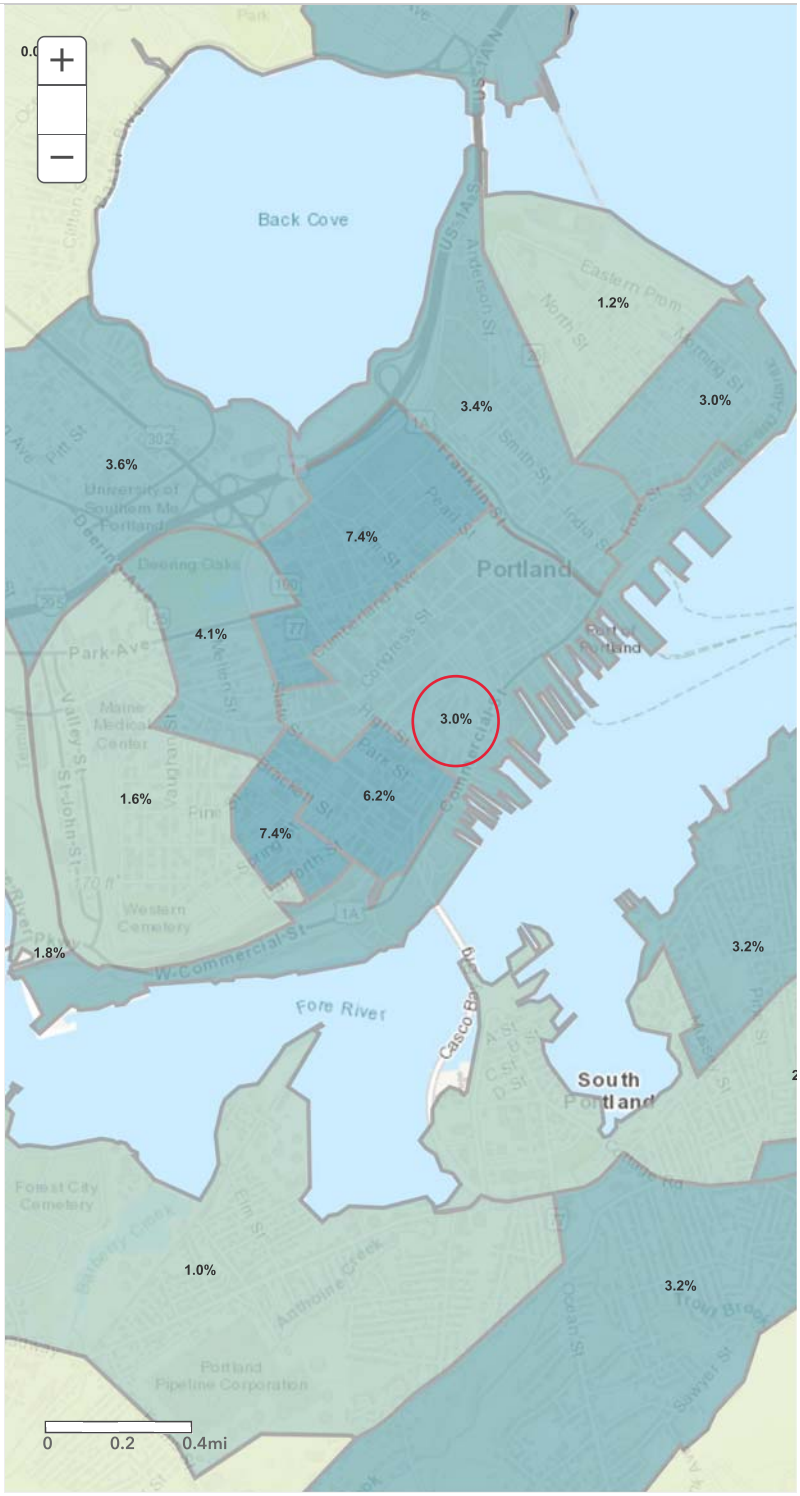
Details | Basemap |

About Content Legend

Contents

- [ ] Walked
- [ ] Biked
- [x] Public Transportation
- [ ] Carpooled
- [ ] Drove Alone
- [ ] Taxi/Motorcycle/Other
- [ ] Worked at Home

Topographic



Public Transit = 3.0%

Walked + Biked + Public Transit = 45.9% + 0.8% +3.0% = **49.7%**

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Section 2
Traffic Crashes

2.A. Crash Summary Data

Gorrill Palmer obtained the crash data from MaineDOT for the period of 2015-2017, the most recent period available (Attachment 2A).

In order to evaluate whether a location has a crash problem, MaineDOT uses two criteria to define a High Crash Location (HCL). Both criteria must be met in order to be classified as an HCL.

1. A critical rate factor (CRF) of 1.00 or more for a three year period. A CRF compares the actual crash rate to the rate for similar intersections in the state. A CRF of less than 1.00 indicates a rate of less than average **and**:

2. A minimum of eight crashes over the same three year period.

Based on the crash data provided by MaineDOT, there are no HCLs in the immediate vicinity of the site. However, there have been three crashes involving bicyclists and five crashes involving pedestrians during the most recent three year period.

2.B. Attachments

Attachment 2A – Node Map, Crash Summary Report

Attachment 2A

Node Map
Crash Report

NODE MAP - PORTLAND SQUARE



The Maine Department of Transportation provides this publication for information only. Reliance upon this information is at user risk. It is subject to revision and may be incomplete depending upon changing conditions. The Department assumes no liability if injuries or damages result from this information. This map is not intended to support emergency dispatch.

0.07 Miles

1 inch = 0.05 miles

Date: 3/14/2019
Time: 11:58:08 AM

Maine Department Of Transportation - Traffic Engineering, Crash Records Section

Crash Summary Report

Report Selections and Input Parameters

REPORT SELECTIONS

☑ **Crash Summary I** ☐ **Section Detail** ☑ **Crash Summary II** ☐ **1320 Public** ☐ **1320 Private** ☐ **1320 Summary**

REPORT DESCRIPTION

Portland - intersections and entering links in the area of Center St where it intersects with Fore St and Commercial St

REPORT PARAMETERS

Year 2015, Start Month 1 through Year 2017 End Month: 12

Route: **0001A**	Start Node: **18968**	Start Offset: **0**	☑ **Exclude First Node**
	End Node: **16790**	End Offset: **0**	☑ **Exclude Last Node**
Route: **0560286**	Start Node: **18786**	Start Offset: **0**	☑ **Exclude First Node**
	End Node: **18964**	End Offset: **0**	☐ **Exclude Last Node**
Route: **0560584**	Start Node: **18978**	Start Offset: **0**	☑ **Exclude First Node**
	End Node: **18964**	End Offset: **0**	☑ **Exclude Last Node**
Route: **3209862**	Start Node: **16788**	Start Offset: **0**	☑ **Exclude First Node**
	End Node: **69082**	End Offset: **0**	☑ **Exclude Last Node**
Route: **0560122**	Start Node: **16788**	Start Offset: **0**	☑ **Exclude First Node**
	End Node: **18964**	End Offset: **0**	☑ **Exclude Last Node**
Route: **0560122**	Start Node: **18964**	Start Offset: **0**	☑ **Exclude First Node**
	End Node: **18975**	End Offset: **0**	☐ **Exclude Last Node**
Route: **3200508**	Start Node: **18964**	Start Offset: **0**	☑ **Exclude First Node**
	End Node: **18967**	End Offset: **0**	☑ **Exclude Last Node**
Route: **0560191**	Start Node: **19130**	Start Offset: **0**	☑ **Exclude First Node**
	End Node: **18981**	End Offset: **0**	☑ **Exclude Last Node**
Route: **0561017**	Start Node: **18966**	Start Offset: **0**	☑ **Exclude First Node**
	End Node: **18972**	End Offset: **0**	☐ **Exclude Last Node**
Route: **0561017**	Start Node: **16789**	Start Offset: **0**	☑ **Exclude First Node**
	End Node: **18966**	End Offset: **0**	☑ **Exclude Last Node**

Crash Summary Report

Report Selections and Input Parameters

REPORT SELECTIONS

☑ **Crash Summary I** ☐ **Section Detail** ☑ **Crash Summary II** ☐ **1320 Public** ☐ **1320 Private** ☐ **1320 Summary**

REPORT DESCRIPTION

Portland - intersections and entering links in the area of Center St where it intersects with Fore St and Commercial St

REPORT PARAMETERS

Year 2015, Start Month 1 through Year 2017 End Month: 12

Route: **0561016**	Start Node: **18965**	Start Offset: **0**	☑ **Exclude First Node**
	End Node: **18969**	End Offset: **0**	☐ **Exclude Last Node**
Route: **3209786**	Start Node: **67712**	Start Offset: **0**	☑ **Exclude First Node**
	End Node: **18975**	End Offset: **0**	☑ **Exclude Last Node**
Route: **0560672**	Start Node: **18975**	Start Offset: **0**	☑ **Exclude First Node**
	End Node: **18974**	End Offset: **0**	☑ **Exclude Last Node**
Route: **0560122**	Start Node: **18975**	Start Offset: **0**	☑ **Exclude First Node**
	End Node: **18976**	End Offset: **0**	☑ **Exclude Last Node**

Crash Summary I

Nodes

Node	Route - MP	Node Description	U/R	Total Crashes	Injury Crashes K	A	B	C	PD	Percent Injury	Annual M Ent-Veh	Crash Rate	Critical Rate	CRF
16789	0001A - 11.41	Int of COMMERCIAL ST CROSS ST S	2	4	0	0	1	1	2	50.0	5.107	0.26	0.39	0.00
												Statewide Crash Rate:	0.16	
16788	0001A - 11.35	Int of CENTER ST COMMERCIAL ST ENT TO FISH PIER	9	6	0	0	0	0	6	0.0	5.797	0.34	1.24	0.00
												Statewide Crash Rate:	0.74	
18966	0560286 - 0.95	Int of CROSS ST S FORE ST	2	1	0	0	0	1	0	100.0	2.423	0.14	0.45	0.00
												Statewide Crash Rate:	0.15	
18964	0560286 - 1.02	Int of CENTER ST, FORE ST, PLEASANT ST, YORK ST	9	11	0	0	1	2	8	27.3	3.961	0.93	1.34	0.00
												Statewide Crash Rate:	0.74	
18965	0560286 - 0.99	Int of COTTON ST FORE ST	2	2	0	0	1	0	1	50.0	2.481	0.27	0.45	0.00
												Statewide Crash Rate:	0.15	
18975	0560122 - 0.20	Int of CENTER ST SPRING ST	9	12	0	0	2	4	6	50.0	3.338	1.20	1.39	0.00
												Statewide Crash Rate:	0.74	
19130	3200508 - 0.02	Int of DANFORTH ST YORK ST	9	2	0	0	1	0	1	50.0	2.551	0.26	1.48	0.00
												Statewide Crash Rate:	0.74	
18972	0561017 - 0.12	End of CROSS ST S	2	0	0	0	0	0	0	0.0	0.087	0.00	0.11	0.00
												Statewide Crash Rate:	0.14	
18969	0561016 - 0.07	End of COTTON ST	2	1	0	0	0	0	1	0.0	0.068	4.94	-0.19	0.00
												Statewide Crash Rate:	0.14	
Study Years:	3.00	**NODE TOTALS:**		39	0	0	6	8	25	35.9	25.813	0.50	0.71	0.71

Crash Summary I

Sections

Start Node	End Node	Element	Offset Begin - End	Route - MP	Section Length	U/R	Total Crashes	Injury Crashes K	A	B	C	PD	Percent Injury	Annual HMVM	Crash Rate	Critical Rate	CRF
16788	18968	3119256	0 - 0.04	0001A - 11.31	0.04	2	3	0	0	0	2	1	66.7	0.00223	447.73	608.83	0.00
Int of CENTER ST COMMERCIAL ST ENT TO FISH PIER				US 1A											Statewide Crash Rate: 218.39		
16788	16789	3120368	0 - 0.06	0001A - 11.35	0.06	2	7	0	0	0	0	5	0.0	0.00285	817.38	571.37	1.43
Int of CENTER ST COMMERCIAL ST ENT TO FISH PIER				US 1A											Statewide Crash Rate: 218.39		
16789	16790	3120311	0 - 0.06	0001A - 11.41	0.06	2	7	0	0	1	1	5	28.6	0.00278	839.47	575.31	1.46
Int of COMMERCIAL ST CROSS ST S				US 1A											Statewide Crash Rate: 218.39		
18786	18966	3106807	0 - 0.05	0560286 - 0.90	0.05	2	1	0	0	0	0	1	0.0	0.00116	288.50	609.06	0.00
Int of FORE ST UNION ST				RD INV 05 60286											Statewide Crash Rate: 174.81		
18965	18966	3124004	0 - 0.04	0560286 - 0.95	0.04	2	1	0	0	0	0	1	0.0	0.00094	352.98	638.21	0.00
Int of COTTON ST FORE ST				RD INV 05 60286											Statewide Crash Rate: 174.81		
18964	18965	3106829	0 - 0.03	0560286 - 0.99	0.03	2	0	0	0	0	0	0	0.0	0.00074	0.00	672.52	0.00
Int of CENTER ST, FORE ST, PLEASANT ST, YORK ST				RD INV 05 60286											Statewide Crash Rate: 174.81		
18964	18978	194644	0 - 0.07	0560584 - 0.26	0.07	2	5	0	0	0	1	4	20.0	0.00031	5299.07	1571.45	3.37
Int of CENTER ST, FORE ST, PLEASANT ST, YORK ST				RD INV 05 60584											Statewide Crash Rate: 407.82		
16788	69082	3506290	0 - 0.01	3209862 - 0	0.01	2	0	0	0	0	0	0	0.0	0.00000	0.00	-406499.83	0.00
Int of CENTER ST COMMERCIAL ST ENT TO FISH PIER				RD INV 3209862											Statewide Crash Rate: 407.82		
16788	18964	192464	0 - 0.10	0560122 - 0	0.10	2	2	0	0	0	0	1	0.0	0.00125	533.75	1124.22	0.00
Int of CENTER ST COMMERCIAL ST ENT TO FISH PIER				RD INV 05 60122											Statewide Crash Rate: 407.82		
18964	18975	194643	0 - 0.10	0560122 - 0.10	0.10	2	4	0	0	0	1	3	25.0	0.00124	1079.48	1127.47	0.00
Int of CENTER ST, FORE ST, PLEASANT ST, YORK ST				RD INV 05 60122											Statewide Crash Rate: 407.82		
18964	19130	3106830	0 - 0.02	3200508 - 0	0.02	2	0	0	0	0	0	0	0.0	0.00050	0.00	719.91	0.00
Int of CENTER ST, FORE ST, PLEASANT ST, YORK ST				RD INV 3200508											Statewide Crash Rate: 174.81		
18967	19130	194651	0 - 0.04	3200508 - 0.02	0.04	2	0	0	0	0	0	0	0.0	0.00073	0.00	1289.57	0.00
Non Int YORK ST				RD INV 3200508											Statewide Crash Rate: 407.82		
18981	19130	3106832	0 - 0.10	0560191 - 0	0.10	2	4	0	0	0	0	2	0.0	0.00075	1787.17	671.33	2.66
Int of DANFORTH ST MAPLE ST				RD INV 05 60191											Statewide Crash Rate: 174.81		
18966	18972	194648	0 - 0.04	0561017 - 0.08	0.04	2	1	0	0	0	0	1	0.0	0.00007	4796.44	1612.40	2.97
Int of CROSS ST S FORE ST				RD INV 05 61017											Statewide Crash Rate: 407.82		
16789	18966	192467	0 - 0.08	0561017 - 0	0.08	2	0	0	0	0	0	0	0.0	0.00033	0.00	1556.43	0.00
Int of COMMERCIAL ST CROSS ST S				RD INV 05 61017											Statewide Crash Rate: 407.82		
18965	18969	194647	0 - 0.07	0561016 - 0	0.07	2	1	0	0	0	0	0	0.0	0.00009	3526.03	1733.84	2.03
Int of COTTON ST FORE ST				RD INV 05 61016											Statewide Crash Rate: 407.82		
67712	18975	3417147	0 - 0.10	3209786 - 0.17	0.10	2	0	0	0	0	0	0	0.0	0.00067	0.00	685.28	0.00
Non Int SPRING ST				RD INV 3209786											Statewide Crash Rate: 174.81		

Crash Summary I

Sections

Start Node	End Node	Element	Offset Begin - End	Route - MP	Section Length	U/R	Total Crashes	Injury Crashes K	A	B	C	PD	Percent Injury	Annual HMVM	Crash Rate	Critical Rate	CRF
18974	18975	3119282	0 - 0.10	0560672 - 1.02	0.10	2	1	0	0	0	0	1	0.0	0.00157	212.93	565.33	0.00
Int of CROSS ST N	SPRING ST			RD INV 05 60672											Statewide Crash Rate: 174.81		
18975	18976	194658	0 - 0.04	0560122 - 0.20	0.04	2	0	0	0	0	0	0	0.0	0.00039	0.00	1504.36	0.00
Int of CENTER ST	SPRING ST			RD INV 05 60122											Statewide Crash Rate: 407.82		
Study Years:	3.00			**Section Totals:**	1.15		37	0	0	1	5	25	16.2	0.01861	662.79	411.40	1.61
				Grand Totals:	1.15		76	0	0	7	13	50	26.3	0.01861	1361.41	554.84	2.45

Section 3
Development Entrances and Exits

3.A. Entrance and Exit Locations

The site is located on two adjacent blocks, referred to as the upper lot and lower lot, located in Portland, Maine.

The existing upper lot is accessed through an enter only driveway at the end of Cross Street and an exit only driveway onto Cross Street to the south of the existing entrance. The upper lot is proposed to be accessed via four full movement accesses onto the site; one full movement into the parking garage from Cross Street, one full movement into the parking garage from Cotton Street, one full movement into the parking garage from Spring Street, and one service access onto Cross Street.

The existing lower lot has one full movement access on Center Street. The existing site is being used as a public parking lot. The lower lot is proposed to include three site accesses; one full movement into the parking garage and one potential minor access onto Cross Street, and one service access onto Center Street.

3.B. Plan View

Attachment 1A of Section 1 shows the proposed site plan.

- Frontage Roads – Center Street, Cross Street, Cotton Street, and Spring Street.
- Posted Speed Limit – Unposted on Center Street, Cross Street, Cotton Street, and Spring Street, so assumed to be 25 mph.
- Sight Lines – A speed limit of 25 mph requires a MaineDOT and City of Portland sight distance of 200 feet. Sight distance is measured as follows:

  The MaineDOT evaluation method is as follows:

Driveway observation point:	10 feet from traveled way
Height of eye at driveway:	3 ½ feet above ground
Height of approaching vehicle:	4 ¼ feet above ground

Based on a field review, it appears the sight distances at all accesses, including service accesses, can be accomplished. However, on-street parking would need to be removed adjacent to the driveways along several streets in order to achieve the recommended sight distances. It should be noted that limited available sight distance due to on-street parking is extremely common throughout the City. The following tables summarize sight distances if parking spaces were not a factor:

Sight Distance Summary Upper Lot

Approach	Sight Distance (ft)			
	Portland Required	MaineDOT Required[1]	Looking Left	Looking Right
Cross Street (Exit)	200	200	170[1]	30[1]
Cross Street (Service Access)	200	200	N/A	N/A
Spring Street (Exit)	200	200	200[1]	200[1]
Cotton Street (Exit)	200	200	170[1]	170[1]

1= Road ended or went to next intersection

Sight Distance Summary Lower Lot

Approach	Sight Distance (ft)			
	Portland Required	MaineDOT Required[1]	Looking Left	Looking Right
Cross Street (Exit)	200	200	115[1]	--[2]
Cross Street (Potential Access)	200	200	200	--[2]
Center Street (Service Access)	200	200	200	200[1]

1 = Road ended or went to next intersection
2 = One-way street

This will need to be discussed in more detail at the Scoping Meeting and then in Section 7, Traffic Impact Study.

Section 4
Title, Right, or Interest

4.A. Evidence of Title, Right, or Interest

A copy of the Deeds are included in Attachment 4A.

4.B. Attachments

Attachment 4A – Deeds

Attachment 4A

Deeds

MAINE REAL ESTATE TAX-Paid

QUITCLAIM WITH COVENANT DEED

DLN:1001540002732

RREEF AMERICA REIT III-Z4 LLC, a Delaware limited liability company with a place of business in 222 South Riverside Plaza, Chicago, Illinois 60606-5808 for consideration paid, grants to North River IV LLC, a Delaware limited liability company with a place of business at 224 12th Avenue, New York, NY 10001, with **QUITCLAIM COVENANT**, the land, together with all improvements thereon and all rights and easements appurtenant thereto, located at or near Union street and Fore street consisting of unites 1-6 One Portland Square, a Business Condominium, the building known as Two Portland Square and certain related parcels, Portland, Cumberland County, Maine, more particularly described on **Exhibit A** attached hereto.

IN WITNESS WHEREOF, RREEF America REIT III-Z4 LLC, has caused this deed to be executed by James E. Toney, Assistant Vice President its duly authorized Assistant Vice President, this 26th day of March, 2015.

RREEF AMERICA REIT III-Z4 LLC,
a Delaware limited liability company,

By: RREEF AMERICA REIT III-Z LLC,
a Delaware limited liability company, its manager,

By: James E. Toney
Its duly authorized Assistant Vice President

Witness:
Vanessa C. Z

STATE OF ILLINOIS
COUNTY OF COOK

March 26, 2015

Personally appeared before me the above-named James E. Toney, Assistant Vice President of RREEF America REIT III-Z LLC, a Delaware limited liability company, manager of RREEF America REIT III-Z4 LLC, and acknowledged the foregoing instrument to be his free act and deed in his said capacity and the free act and deed of said company.

Notary Public/Attorney at Law
Print name: Beverly A Dillon

OFFICIAL SEAL
BEVERLY A. DILLON
NOTARY PUBLIC - STATE OF ILLINOIS
MY COMMISSION EXPIRES MARCH 3, 2018

EXHIBIT A

Legal Description

Tract 1:

Parcel One - One Portland Square.

Units No. 1, 2, 3, 4, 5, and 6 of One Portland Square, a business condominium, situated at the corner of Union and Spring Streets in the City of Portland, County of Cumberland and State of Maine, as more particularly described in the Declaration of One Portland Square, a business condominium, dated as of October 27, 1987 and recorded in the Cumberland County Registry of Deeds on October 29, 1987 in Book 8039, Page 37, and in the plats and plans incorporated into the declaration and recorded in the Cumberland County Registry of Deeds in Plan Book No. 166, Page 44 sheets 1 through 13, by virtue of the recording of which declaration, plats and plans, the declarant created the condominium pursuant to the Maine Condominium Act, Title 33 of the Maine Revised Statutes of 1964, as amended, Chapter 31, Sections 1601-101 et seq., as amended.

Parcel Two - Upper Parking

A parcel of land shown as "Lot 3" on a land title survey prepared for Northland Realty Corporation by Lewis & Wasina, Inc. dated April 5, 1995, Project No. 9508 located on the southerly side of Spring Street Arterial, the easterly side of Cotton Street and the northerly side of Fore Street, City of Portland, County of Cumberland, State of Maine, and being more particularly described as follows:

Beginning at a found rebar at the intersection of the northerly right of way line of Fore Street and the easterly right of way line of Cotton Street;

Thence, N24° 18' 44" W along the easterly right of way line of Cotton street a distance of 356.32 feet to a set 5/8 inch rebar with aluminum cap stamped "Lewis & Wasina PLS 2114" at the southerly right of way line of Spring Street Arterial;

Thence, N65° 47' 27" E along the southerly right of way line of Spring Street Arterial a distance of 89.72 feet to a found rebar;

Thence, continuing to follow the southerly right of way line of Spring Street Arterial along a curve to the left having a delta of 3° 11' 35", a radius 3887.30 feet, an arc length of 216.65 feet and a chord bearing and length of N64° 11' 39" E, 216.62 feet to a found drill hole in a concrete sidewalk;

Thence, S11° 09' 10" E following the former easterly right of way line of cross street, now discontinued, along lot 1 and lands conveyed by deed to Two Portland Square limited partnership as shown on said plan a total distance of 413.33 feet to a found rebar on the northerly right of way line of Fore Street;

Thence, S78° 49' 49" W along the northerly right of way line of Fore Street a distance of 79.03 feet to a found rebar;

Thence, S75° 13' 06" W along the northerly right of way line of fore street a distance of 137.10 feet to the point of beginning.

All the above mentioned found rebar are 5/8 inch with aluminum cap stamped "SMRT RLS 1314".

Reference should be made to the plan for further details of the boundary and easements.

The basis of bearing for this description is magnetic North, 1972, as shown on said plan.

Parcel Three - Lower Parking

A certain lot or parcel of land being the majority of the block bounded northerly by Fore Street, easterly by Cross Street, southerly by Commercial Street and westerly by Center Street in the City of Portland, County of Cumberland, and State of Maine and further bounded and described as follows:

Beginning at a drill hole at the intersection of the northwesterly line of Commercial Street and the easterly line of Center Street, said point also being the most southwesterly corner of certain land conveyed to the Atbro Corporation by Deed dated October 3, 1979, and recorded in the Cumberland County Registry of Deeds in Book 4506, Page 48;

Thence North 43° 29' 22.8" East along Commercial Street, a distance of 69.18 feet to a reinforcing rod;

Thence North 46° 50' 30" East along said Commercial Street, a distance of 54.32 feet to a reinforcing rod;

Thence North 52° 30' 11.2" east along said Commercial Street, a distance of 35.64 feet to a drill hole;

Thence North 24° 17' 37.6" West along land formerly of Ari Newman and Lee Beamis, and now Harbor Landing Condominium, see Declaration of Condominium recorded in Book 6505, Page 312, Cumberland County Registry of Deeds, a distance of 93.23 feet to a reinforcing rod;

Thence North 65° 44' 46" East along land now or formerly of said Ari Newman and Lee Beamis, a distance of 109.60 feet to a P.K. spike in the westerly line of Cross Street;

Thence North 13° 21' 13.9" West along said Cross Street, a distance of 287.70 feet to a reinforcing rod, said point being located at the intersection of the westerly line of Cross Street and the southerly line of Fore Street;

Thence South 69° 41' 09.0" West along said Fore Street, a distance of 318.64 feet to a reinforcing rod, said point being located at the intersection of the southerly line of Fore Street and the easterly line of Center Street;

Thence South 24° 16' 16.2" East along said Center Street, a distance of 451.12 feet to the point of beginning.

Excepting from the above described premises those premises taken by the State of Maine by its Department of Transportation set forth in its notice of layout and taking dated August 21, 1991 and recorded in the Cumberland County Registry of Deeds in Book 9688, Page 341.

Tract 2: Two Portland Square.

A certain lot or parcel of land with any buildings thereon situated at the intersection of Fore Street and Union Street in the City of Portland, County of Cumberland, and State of Maine, being Lot 2 on plan for Two Portland Square Subdivision by Stevens Morton Rose & Thompson dated October 22, 1987, revised to September 18, 1989 and recorded in Plan Book 182, Page 29.

Subject to and together with that certain parking easement established in Declaration of Easement by Portland Square limited partnership dated December 18, 1989 and recorded in Book 9028, Page 117, as affected by Subject Property Notice dated December 18, 1989 and recorded in Book 9028, Page 136, and by Permitted Parking Areas Plan dated December 18, 1989 and recorded in Book 9028, Page 141.

Rights, easements, covenants, conditions and restrictions set forth in Declaration of Easement by Portland Square Limited Partnership dated October 30, 1987, recorded at Book 8045, Page 303, as affected by Additional Declaration of Easement dated December 18, 1989, recorded at Book 9028, Page 92, Release of Easement dated December 18, 1989, recorded at Book 9028, Page 97, Subject Property Notice dated December 18, 1989, recorded at Book 9028, Page 102, and Permitted Parking Areas Plan dated December 18, 1989, recorded at Book 9028, Page 112.

Section 5
Public or Private Right-of-Way

5.A. Public or Private Rights-of-Way

The site is proposed to be accessed as described in Section 3. No additional public or private rights of way are proposed.

Section 6
Schedule

6.A. Schedule

The proposed project is planned to be constructed in phases, with the first phase being the hotel. The remaining phases are planned to be completed over the next ten years, with full buildout by end of 2029.

VIEWS AND HISTORIC FEATURES

The proposed Portland Square Project has been designed to fit within the fabric of the Old Port Neighborhood.

VIEWS

The project site contains a total of approximately 7 acres of land and gently slopes west to east towards the Portland Waterfront. The site is currently occupied by Portland Square One and Portland Square Two, office buildings containing over 260,000 sf of office and retail space. The remaining portions of the site are vacant of buildings and occupied by surface parking which serves the adjacent office uses.

Views currently extend across the site as well as from the upper floors of the office buildings. The Master Plan for Portland Square has been designed to protect and enhance the views of the waterfront and downtown Portland through sensitive placement of the office buildings to allow views from the lower site and through to the upper site.

A fifty-foot (50') view/ scenic easement was established along the upper portions of Cross Street between Fore and Spring Streets when the street was discontinued in 1986. This viewshed is important and has been maintained with the development of the buildings on this site.

HISTORIC FEATURES

Based on our review of Historical Sanborn maps of the site (Upper and Lower Lots), it appears that each Lot contained multiple structures (buildings) developed between approximately 1886 and 1980. In general, the structures consisted of tenements or those that housed industrial, commercial or manufacturing facilities (e.g., blacksmith, machine, metal and wood shops) as well as ice houses and lumber yards.

Each Lot became completely vacant of structures between 1980 and 1986. There are no known buildings of significant architectural importance that occupied this site. Historical Sanborn Maps of the Lots (shaded in green) were compiled in 2015 by Haley and Aldridge and are attached to this Application for informational purposes.

The lower end of the property falls within the Portland Waterfront (Old Port) Historic District, which encompasses a significant and distinct part of Portland. Based on the City Historic Preservation Mapping, there are several Buildings of Historical Significance in the immediate vicinity of the Proposed Portland Square Development. These include the following:

- Richardson Wharf Company Block, 269 Commercial Street, 1864-1867
- Baxter Davis Block, 305 Commercial Street, 1902
- Tracy Causer Block, 505 Fore Street, 1886, added to NRHP 1994

Standard to be Waived: Cite Ordinance or Technical Manual Standard	**Cite Standard Language:** Cite specific language of applicable Ordinance or Technical Manual Standard	**Waiver Being Sought:** Describe waiver being sought. Ex. – We are requesting a two-way parking lot drive aisle width of 20' feet.	**Justification for Waiver:** Address specific waiver criteria, if applicable, and document reasons for the waiver request.
Sec 14-352	Each Loading Bay shall have a minimum dimension of fifty (50) feet byfourteen (14) feet, ...	We are requesting that each loading bay on the south building serving the hotel and ground level retail be narrowed to to twelve(12) feet in width to allow for two delivery vehicles and a dedicated sidewalk (30 ft total)	The service requirements for the hotel and future retail are not projected to be extensive. Having the ability to utilize either bay should provide flexibility and ease congestion on adjacent streets.

Portland, Maine Yes. Life's good here.

Planning & Urban Development Department

ZONING ANALYSIS Relevant Zone(s) B-3 / DEOZ / PAD

All Projects:

	Required	Proposed
Lot Size	None	2.25 A
Area Per Dwelling Unit	None	- -
Minimum Street Frontage	15'	856'
Front Yard Minimum	0'	0'
Front Yard Maximum	5'	0'
Rear Yard	None	- -
Yard Right	None	- -
Yard Left	None	- -
Side Street Setback	None	- -
Step Back	Yes	Yes
Maximum Lot Coverage	100%	100%
Minimum Lot Coverage	None	- -
Maximum Height	125' / 85'	125' / 85'
Open Space	None	- -
Maximum Impervious Area	100%	100%
Pavement Setback	None	- -
Floor Area Ratio	None	- -
Off Street Parking Spaces	Yes	1,100
Loading Bays	1	1
PAD Zone	@ Fore St.	@ Fore St.
Other 2		
Other 3		

Planned Residential Unit Developments (PRUD) Requirements

	Required	Proposed
Minimum Lot Size		
Minimum Lot Area per Dwelling		
Maximum # Units per Building		
Maximum Building Length		
Maximum Accessory Building Length		
Minimum Setbacks		
Minimum Building Separation		
Minimum Open Space		

Affordable Housing Density Bonuses (if applicable)

	Bonus Increase or Decrease	Maximum Allowable With Bonus	Proposed
Density			
Height			
Setback Reduction			
Recreation Space			
Maximum Accessory Building Length			
Minimum Setbacks			
Minimum Building Separation			
Minimum Open Space			
Explanatory Text 1 (optional):			
Explanatory Text 2 (optional):			
Explanatory Text 3 (optional):			

Portland, Maine Yes. Life's good here.

Planning & Urban Development Department

ZONING ANALYSIS Relevant Zone(s) B-3 / DEOZ / PAD

All Projects:

	Required	Proposed
Lot Size	None	2.25 A
Area Per Dwelling Unit	None	- -
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Rear Yard	None	- -
Yard Right	None	- -
Yard Left	None	- -
Side Street Setback	None	- -
Step Back	Yes	Yes
Maximum Lot Coverage	100%	100%
Minimum Lot Coverage	None	- -
Maximum Height	125' / 85'	125' / 85'
Open Space	None	- -
Maximum Impervious Area	100%	100%
Pavement Setback	None	- -
Floor Area Ratio	None	- -
Off Street Parking Spaces	Yes	1,100
Loading Bays	1	1
Other 1	@ Fore St.	@ Fore St.
Other 2		
Other 3		

Planned Residential Unit Developments (PRUD) Requirements

	Required	Proposed
Minimum Lot Size		
Minimum Lot Area per Dwelling		
Maximum # Units per Building		
Maximum Building Length		
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Minimum Setbacks		
Minimum Building Separation		
Minimum Open Space		

Affordable Housing Density Bonuses (if applicable)

	Bonus Increase or Decrease	Maximum Allowable With Bonus	Proposed
Density			
Height			
Setback Reduction			
Recreation Space			
Maximum Accessory Building Length			
Minimum Setbacks			
Minimum Building Separation			
Minimum Open Space			
Explanatory Text 1 (optional):			
Explanatory Text 2 (optional):			
Explanatory Text 3 (optional):			

Google Groups

Public Comment on Plan Number PL-000599-2019 1 Portland Square

Elizabeth Parsons <ecparsons33@hotmail.com> May 2, 2019 10:14 AM

Posted in group: **Planning Board**

As a West Ender and climate activist who's recently been told by DPW staff about how storm water runoff from this part of town is causing manhole covers on Commercial Street to blow and who follows the work of GMRI regarding sea level rise, I am mystified as to why city officials continue to approve large construction projects of this sort in this part of town. Perhaps there's information to which I am not privy, but from my vantage point it seems that short term interests are being valued over long term ones.

Elizabeth Parsons

44 Winter Street

Portland

Portland Maine Yes. Google's good here.

Matthew Grooms <mgrooms@portlandmaine.gov>

one Portland square master plan

Lauren Reiter <laurenjreiter@yahoo.com> Sun, May 5, 2019 at 7:31 PM
Reply-To: Lauren Reiter <laurenjreiter@yahoo.com>
To: "mgrooms@portlandmaine.gov" <mgrooms@portlandmaine.gov>
Cc: Jeff Levine <jlevine@portlandmaine.gov>, Deb Andrews <dga@portlandmaine.gov>, Caitlin Cameron <ccameron@portlandmaine.gov>

Dear Mr. Grooms, as a Portland architect and near neighbor to the proposed development of One Portland Square, I support the development of these lots and the introduction of structured parking in lieu of all the on-grade parking. And I am also pleased to see that a fair amount of green roof is proposed.

However, I think the master plan's landscaping at the perimeters of the development is disappointingly sparse and unimaginative. It appears that the zoning-dictated-minimum of street trees is what is planned, and nothing more. These megalithic blocks, particularly along Spring and Center Streets, would do well to have some intervening landscaped areas that give a nod to the pedestrians moving around ad through the area, and would provide much needed cooling, shade and stormwater mitigation.

I do hope that the plan as it currently exists will be further refined to provide a far more sensitive street life that includes vegetation, and perhaps even some amount of public art.

sincerely,
Lauren Reiter

Reiter Architecture & Design
Lauren J. Reiter, RA, LEED AP
laurenjreiter@yahoo.com
tel. 917.502.2225
6 South St., Portland, ME 04101
www.facebook.com/reiterarchitecture

Plan References:

1. ALTA/ACSM LAND TITLE SURVEY FOR PORTLAND SQUARE LIMITED PARTNERSHIP, TWO PORTLAND SQUARE, CITY OF PORTLAND, COUNTY OF CUMBERLAND, STATE OF MAINE, BY STEVENS, MORTON, ROSE & THOMPSON DATED DEC. 11, 1989, REVISED THROUGH DEC. 11, 1992.
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Utility Note:

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES. CALL 1–888–DIGSAFE AT LEAST THREE BUSINESS DAYS BEFORE PERFORMING ANY CONSTRUCTION. DUE TO OSHA CONFINED SPACE REQUIREMENTS, ALL INVERTS AND PIPE SIZES MUST BE VERIFIED PRIOR TO ANY CONSTRUCTION.

Flood Zone Note:

BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS IN ZONE C OF THE FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 230051 0013 B, WHICH BEARS AN EFFECTIVE DATE OF JULY 17, 1986 AND IS NOT IN A SPECIAL FLOOD HAZARD AREA.

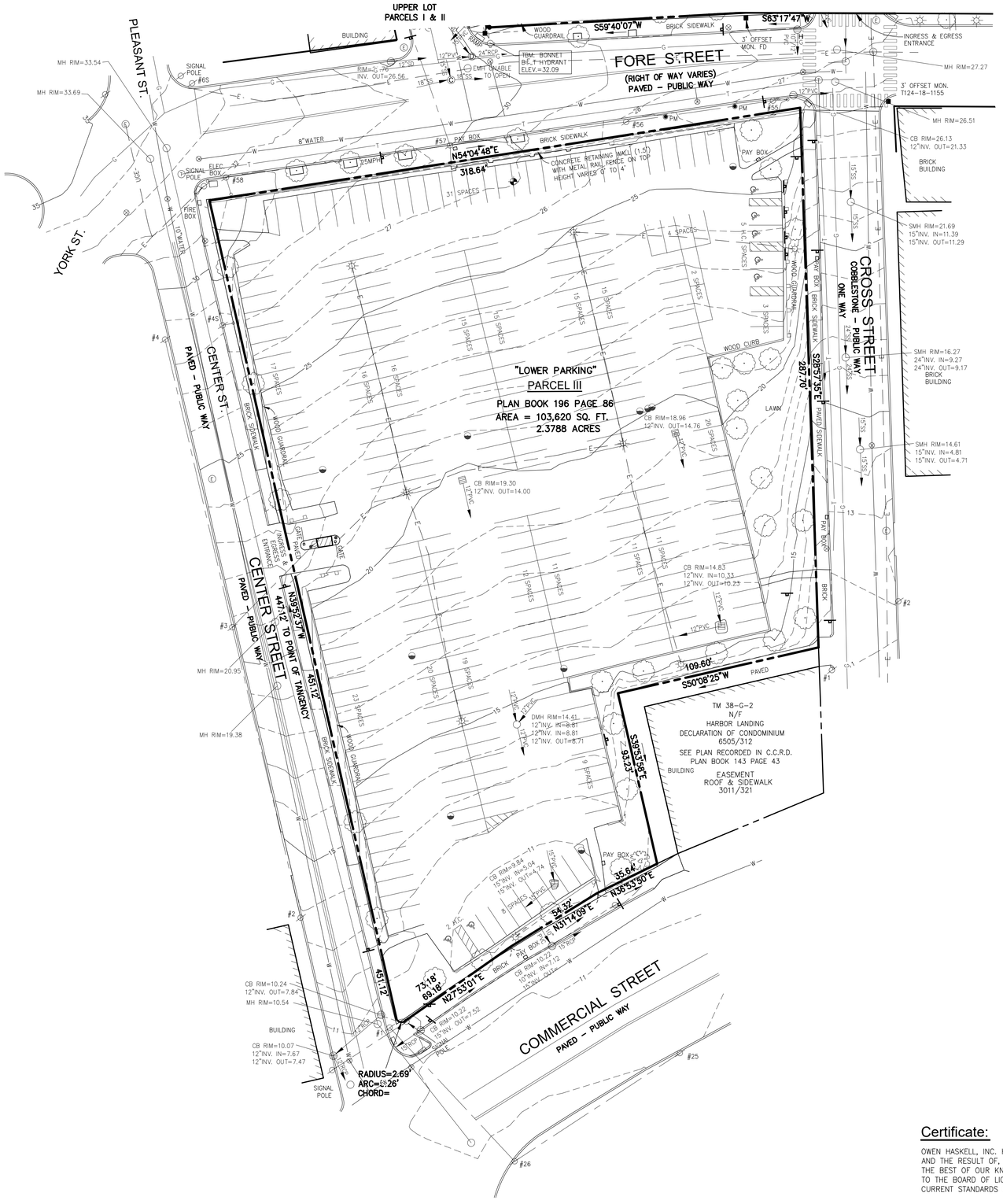
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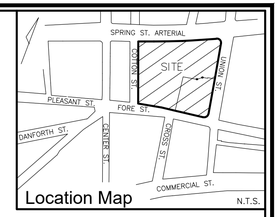
1. OWNER OF RECORD: NORTH RIVER IV LLC, 224 12TH AVENUE, NEW YORK, NY 10001 C.C.R.D. BOOK 32163 PAGE 33

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3. ELEVATIONS ARE BASED ON CITY DATUM.

3. THE LOCUS IS SHOWN AS LOT 1, 3, 5 BLOCK G ON THE CITY OF PORTLAND ASSESSORS MAP 38.





Legend:

- IRON PIPE OR ROD FOUND
- GRANITE MONUMENT FOUND
- WATER VALVE
- HYDRANT
- VALVE
- UTILITY POLE
- LIGHT POLE
- MANHOLE
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- DEDICUOUS TREE
- CONIFEROUS TREE
- CURB
- SS — SANITARY SEWER
- SD — STORM DRAIN
- SL — SECURITY LINE
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- 000/000 — DEED BOOK/PAGE
- CONC. — CONCRETE

GRAPHIC SCALE

0 15' 30' 60' 120'

Certificate:

OWEN HASKELL, INC. HEREBY CERTIFIES THAT THIS PLAN IS BASED ON, AND THE RESULT OF, AN ON THE GROUND FIELD SURVEY AND THAT TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, IT CONFORMS TO THE BOARD OF LICENSURE FOR PROFESSIONAL LAND SURVEYORS CURRENT STANDARDS OF PRACTICE.

DATE

JOHN W. SWAN, PLS NO. 1038

BOUNDARY AND TOPOGRAPHIC SURVEY

LOWER PARKING LOT

FORE STREET, CROSS STREET, COMMERCIAL STREET & CENTER STREET, PORTLAND, MAINE

MADE FOR

CARROLL ASSOCIATES

217 COMMERCIAL STREET, PORTLAND, MAINE

OWEN HASKELL, INC.
PROFESSIONAL LAND SURVEYORS
390 U.S. ROUTE ONE, FALMOUTH, ME 04105 (207)774–0424

Drawn By RS	Date	Job No.
Trace By JLW	DECEMBER 5, 2016	2016–129 P
Check By JWS	Scale	Drwg. No.
Book No. FILE	1" = 30'	2

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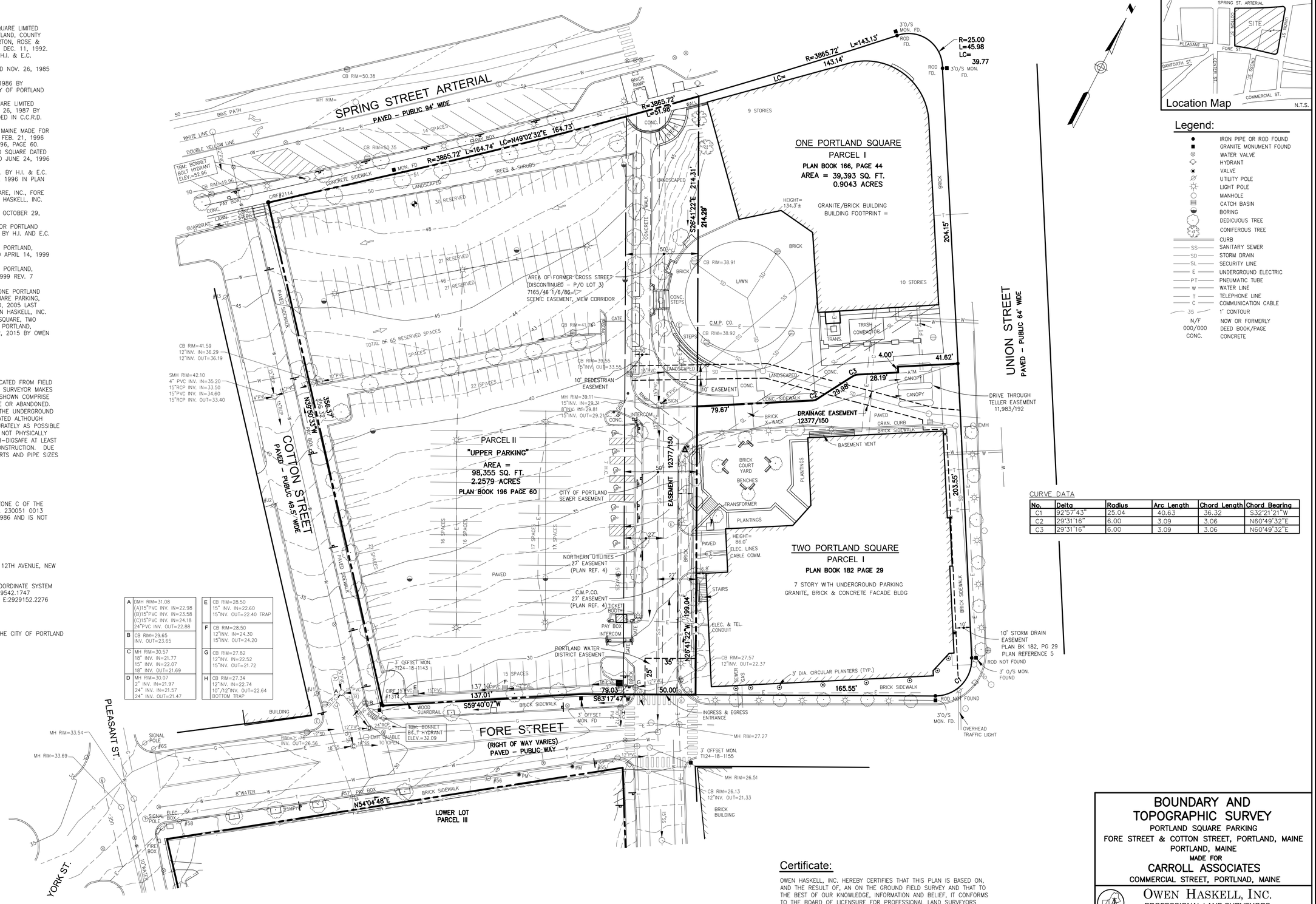
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Legend:

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- GRANITE MONUMENT FOUND
- WATER VALVE
- HYDRANT
- VALVE
- UTILITY POLE
- LIGHT POLE
- MANHOLE
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- C — COMMUNICATION CABLE
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- N/F — NOW OR FORMERLY
- 000/000 — DEED BOOK/PAGE
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CURVE DATA

No.	Delta	Radius	Arc Length	Chord Length	Chord Bearing
C1	92°57'43"	25.04	40.63	36.32	S32°21'21"W
C2	29°31'16"	6.00	3.09	3.06	N60°49'32"E
C3	29°31'16"	6.00	3.09	3.06	N60°49'32"E

A	DMH RIM=31.08 (A)15"PVC INV. IN=22.98 (B)15"PVC INV. IN=23.58 (C)15"PVC INV. IN=24.18 24"PVC INV. OUT=22.88	
B	CB RIM=29.65 INV. OUT=23.65	
C	MH RIM=30.57 18" INV. IN=21.77 15" INV. IN=22.07 18" INV. OUT=21.69	
D	MH RIM=30.07 2" INV. IN=21.97 24" INV. IN=21.57 24" INV. OUT=21.47	
E	CB RIM=28.50 15" INV. IN=22.60 15"INV. OUT=22.40 TRAP	
F	CB RIM=28.50 12"INV. IN=24.30 15"INV. OUT=24.20	
G	CB RIM=27.82 12"INV. IN=22.52 15"INV. OUT=21.72	
H	CB RIM=27.34 12"INV. IN=22.74 10"/12"INV. OUT=22.64 BOTTOM TRAP	

GRAPHIC SCALE
0 15' 30' 60' 120'

Certificate:

OWEN HASKELL, INC. HEREBY CERTIFIES THAT THIS PLAN IS BASED ON, AND THE RESULT OF, AN ON THE GROUND FIELD SURVEY AND THAT TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, IT CONFORMS TO THE BOARD OF LICENSURE FOR PROFESSIONAL LAND SURVEYORS CURRENT STANDARDS OF PRACTICE.

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JOHN W. SWAN, PLS NO. 1038

BOUNDARY AND TOPOGRAPHIC SURVEY

PORTLAND SQUARE PARKING
FORE STREET & COTTON STREET, PORTLAND, MAINE
PORTLAND, MAINE
MADE FOR
CARROLL ASSOCIATES
COMMERCIAL STREET, PORTLNAD, MAINE

OWEN HASKELL, INC.
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Drawn By RS	Date	Job No.
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Book No. FILE	1" = 30'	1



Portland Square

Master Development Plan

Portland, Maine

Owner / Developers
NORTH RIVER, LLC
New York, NY

CARROLL ASSOCIATES
LANDSCAPE ARCHITECTS
217 Commercial St, Suite 200
Portland, ME 04101
207.772.1552
www.carroll-assoc.com

WINTON SCOTT
ARCHITECTS, PA
5 Milk Street
Portland, ME 04101
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Revisions		
1	4.5.19	MDP SUBMISSION TO CITY

Drawing Title: **DRAINAGE PLAN**

Scale: 1" = 40'

Date: April 2019

Phase: Permitting

C-200

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Portland Square

Master Development Plan

Portland, Maine

Owner / Developers
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New York, NY

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1	4.5.19	MDP SUBMISSION TO CITY

Drawing Title: UTILITY PLAN

Scale: 1" = 40'

Date: April 2019

Phase: Permitting

C-201

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LOT CONFIGURATION & DENSITY

OVERALL LOT AREA	280,886 SF	6.45 AC
LOT 1a	39,393 SF	0.90 AC
LOT 1b	39,520 SF	0.90 AC
LOT 2	98,353 SF	2.26 AC
LOT 3	79,829 SF	1.83 AC
LOT 4	23,791 SF	0.55 AC

BUILDING USE DENSITY

LOT 1a (EXISTING - PORTLAND SQ.)		
- OFFICE SPACE	133,141 S.F.	
- RETAIL SPACE	1,700 S.F.	
LOT 1b (EXISTING - PORTLAND SQ.)		
- OFFICE SPACE	127,200 S.F.	
- RETAIL SPACE	11,150 S.F.	
- STRUCTURED PARKING		42 SPACES
LOT 2 (PROPOSED NEW DEVELOPMENT)		
- OFFICE SPACE	205,086 S.F.	
- RETAIL SPACE	5,964 S.F.	
- RESIDENTIAL	- S.F.	18 UNITS
- STRUCTURED PARKING	- S.F.	1,100 SPACES
LOT 3 (PROPOSED NEW DEVELOPMENT)		
- OFFICE SPACE	82,7000 SF	
- RETAIL SPACE	29,649 SF	
- RESIDENTIAL	- SF	58 UNITS
- STRUCTURED PARKING	- SF	194 SPACES
LOT 4		
- HOTEL	97,828 SF	135 ROOMS
- BAR / RESTAURANT *INCLUDES ROOFTOP BAR	4,172 SF	

LEGEND (PROPOSED IMPROVEMENTS)

- PROPERTY LINE
- PROPOSED BUILDINGS "PORTLAND SQUARE"
- EXISTING BUILDING "PORTLAND SQUARE"
- PROPOSED BUILDING "CENTER STREET BOUTIQUE HOTEL"
- BRICK PAVING
- CONCRETE PAVING
- BITUMINOUS CONCRETE PAVING
- SPECIAL PAVING
- GREEN ROOF
- PROPOSED TREE
- TREE GRATE
- TREE PLANTER (RAISED)
- VERTICAL GRANITE CURB
- TRANSITION OR FLUSH CURB
- CROSS WALK
- ADA CURB RAMP

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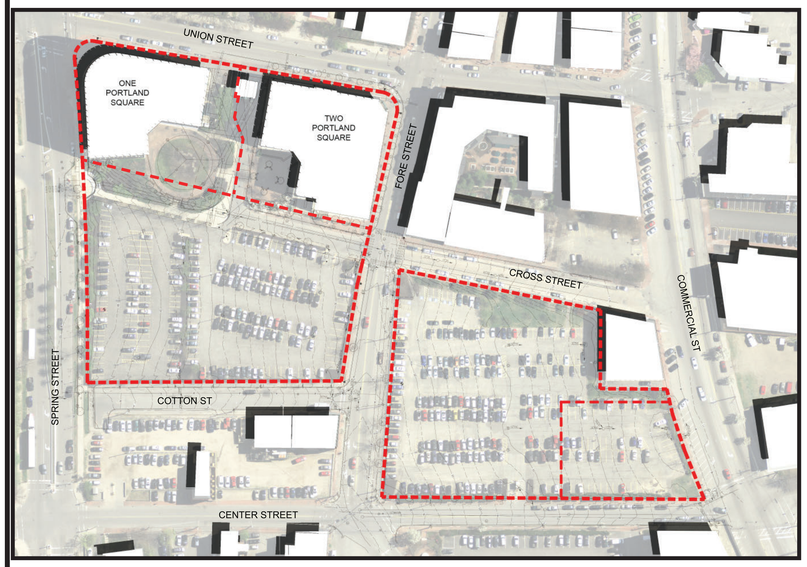
Revisions		
1	4.5.19	MDP SUBMISSION TO CITY

Drawing Title: SITE PLAN

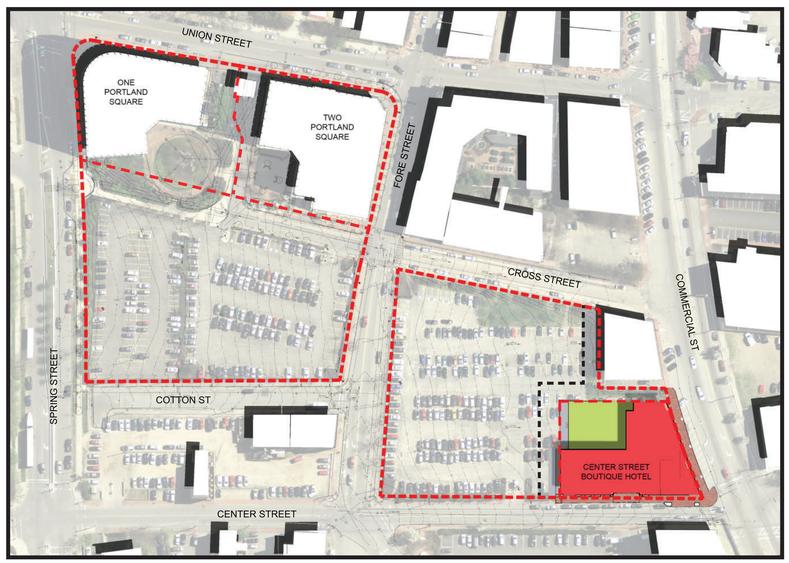
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Date: APRIL 5, 2019

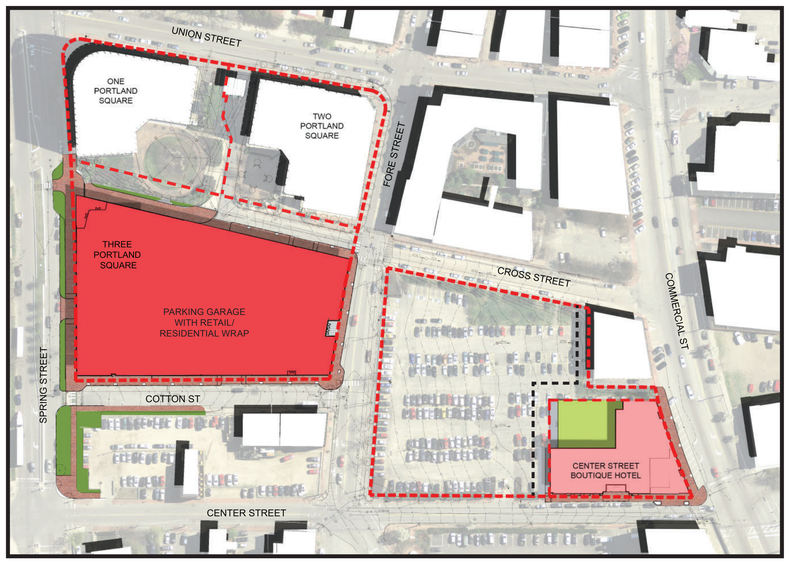
Phase: Permitting



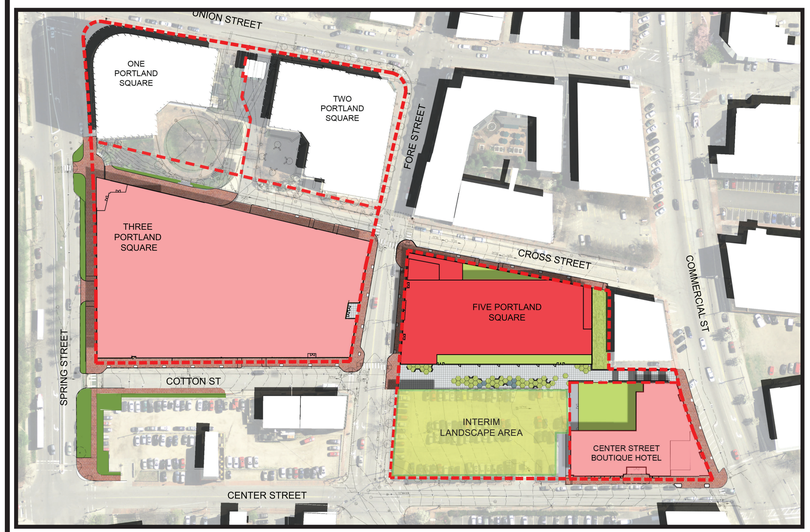
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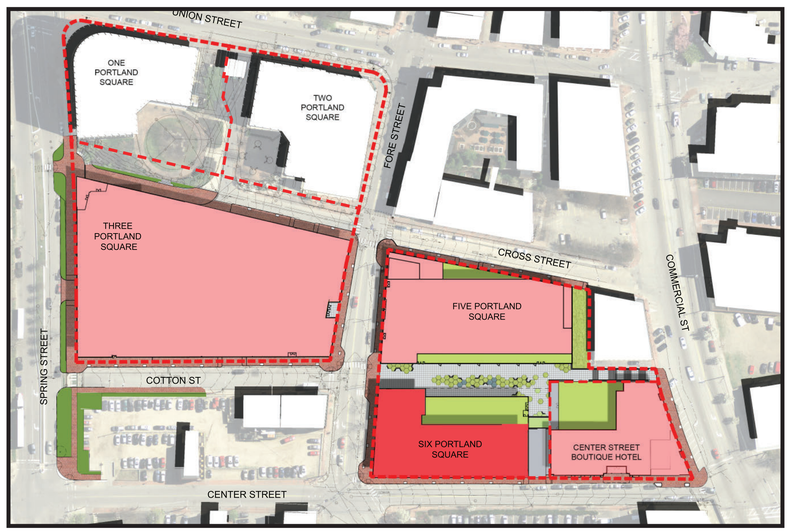
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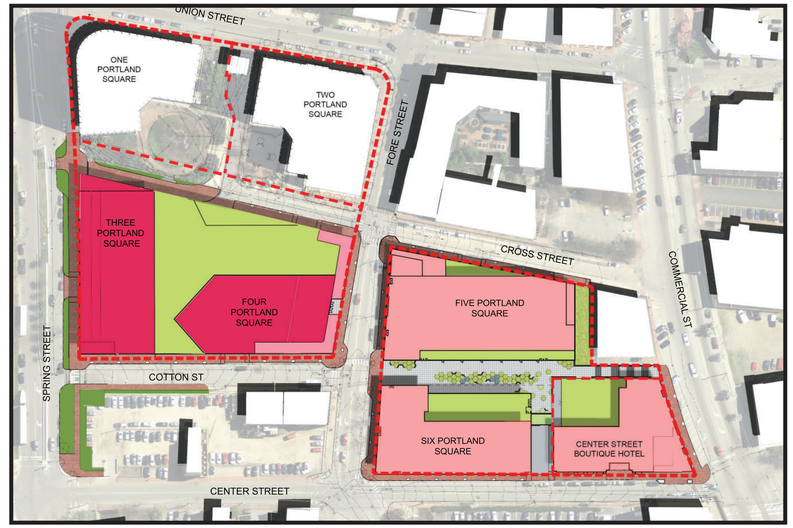
PHASE 2



PHASE 3



PHASE 4



PHASE 5

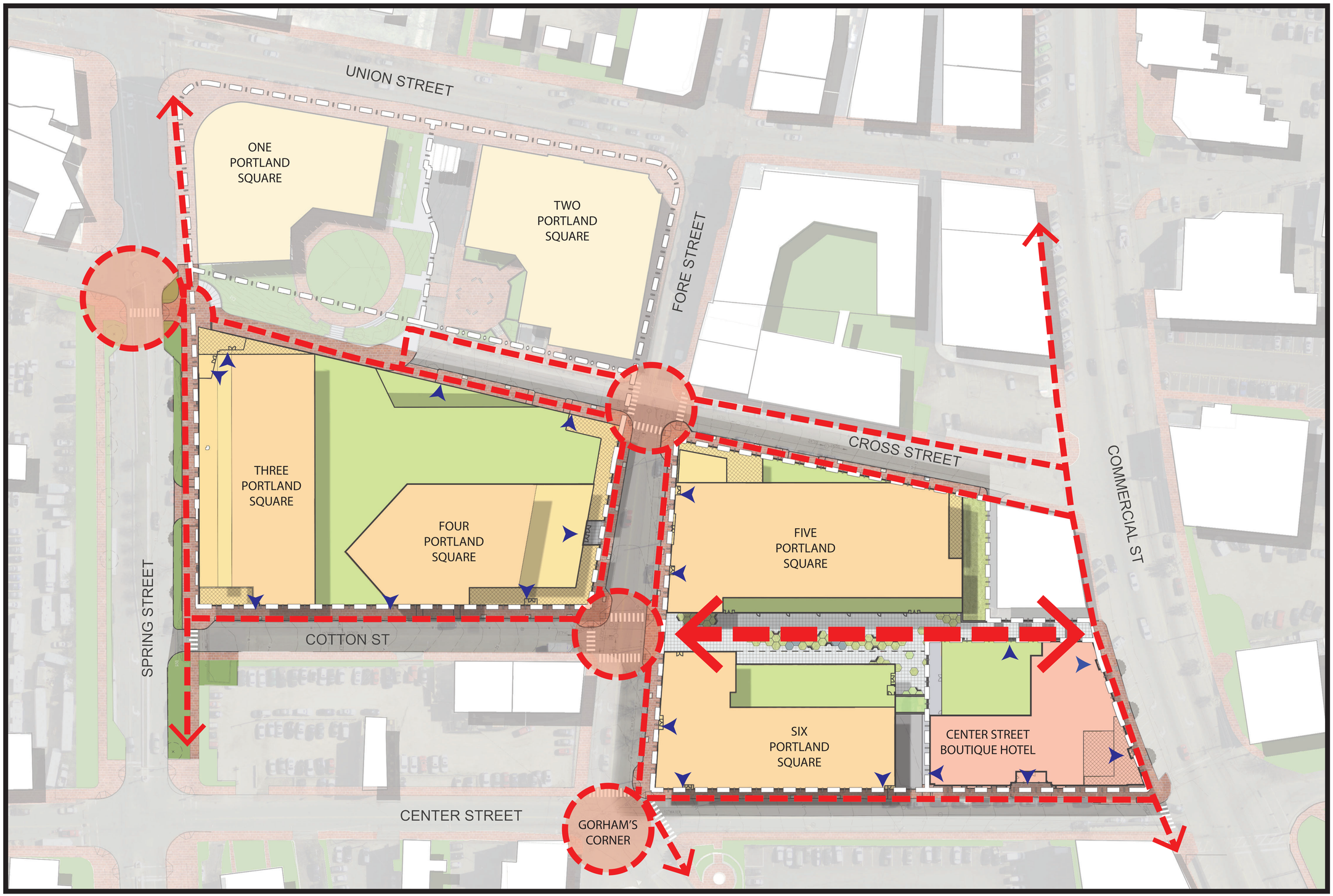
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New York, NY

DATE: APRIL 5, 2019

PORTLAND SQUARE

MASTER DEVELOPMENT
PHASING PLAN

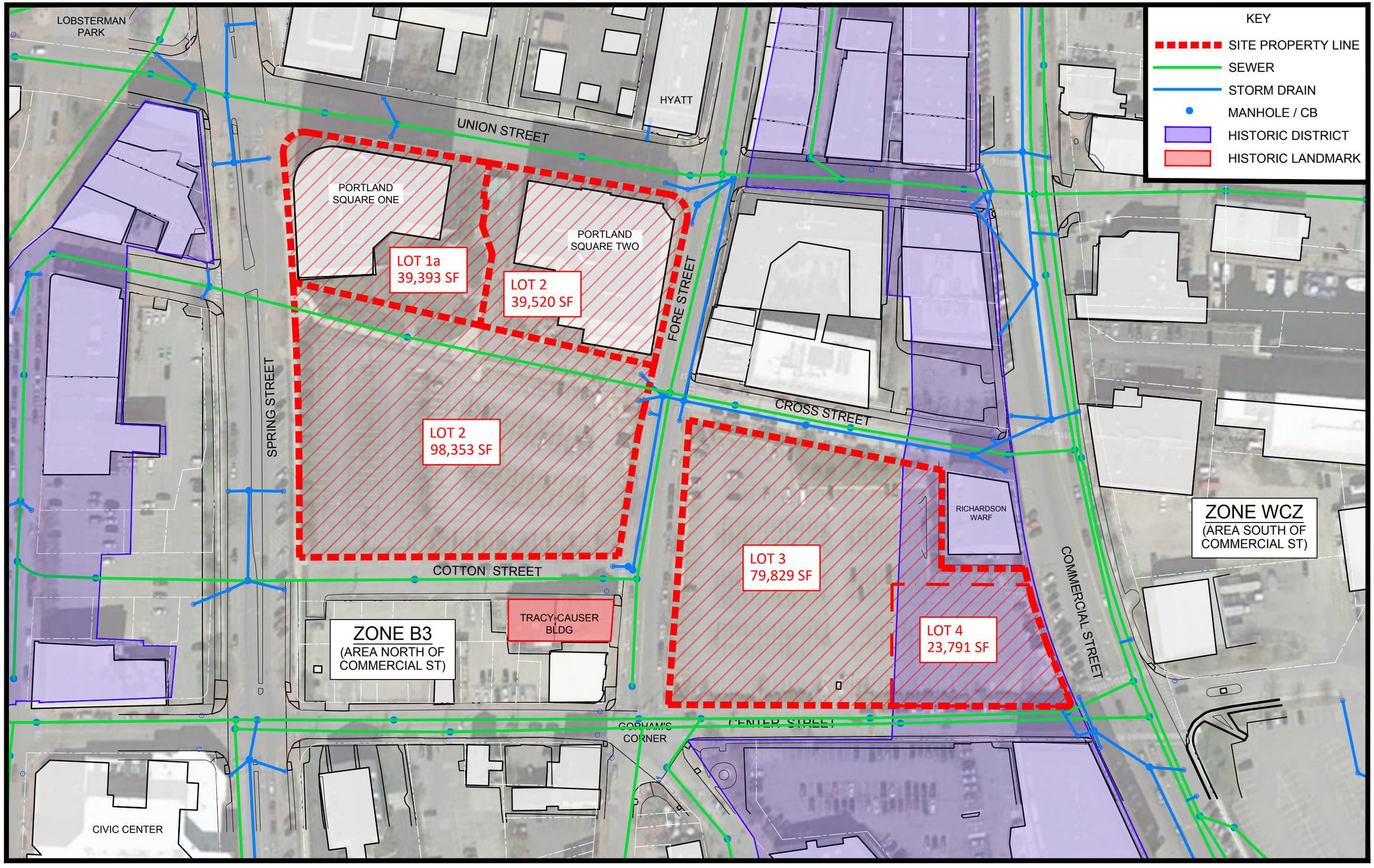
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SCALE in FEET
1"=40'

N

Pedestrian Circulation Diagram



Neighborhood Context Map



PLANT SCHEDULE -STREET TREES

SYM.	BOTANICAL NAME	COMMON NAME	APPROPRIATE LOCATION	MATURE SIZE (HEIGHT X SPREAD)	NATIVE
	GLEDITSIA TRIACANTHOS VAR. INERMIS	THORNLESS HONEYLOCUS	STREET TREE / FULL SUN	50' X 35'	NO
	ZELKOVA SERRETA 'GREEN VASE'	GREEN VASE ZELKOVA	STREET TREE / FULL SUN	70' X 35'	NO
	QUERCUS PALUSTRIS	PIN OAK	STREET TREE / FULL SUN	50' X 40'	NO
	GINKGO BILOBA	GINKO	STREET TREE / PART SHADE	60' X 30'	NO
	ACER RUBRUM 'KARPICK'	RED MAPLE	STREET TREE / PART SHADE	40' X 15'	YES

PLANT SCHEDULE -EXTENSIVE GREENROOF

SYM.	BOTANICAL NAME	COMMON NAME	APPROPRIATE LOCATION	MATURE SIZE (HEIGHT)	NATIVE
	SEDUM REFLEXUM 'BLUE SPRUCE'	STONECROP	FULL SUN	8"	NO
	ALLIUM SCHOENOPRASUM	CHIVES	FULL SUN/PART SHADE	10"	NO
	SEDUM SPURIUM 'DRAGON'S BLOOD'	TWO ROW STONECROP	FULL SUN	4"	NO
	SEDUM SEXANGULARE	STONECROP	FULL SUN/SHADE	4"	NO
	CAREX PENSYLVANICA	SEDGE	PLANTER / FULL SHADE	6"	YES
	ANEMONE PATENS	PASQUE FLOWER	FULL SUN	6"	YES
	FRAGARIA VIRGINIANA	WILD STRAWBERRY	FULL SUN	6"	YES
	SOLIDAGO PTARMICOIDES	UPLAND WHITE ASTER	FULL SUN	12"	YES

PLANT SCHEDULE -SHRUBS, GROUNDCOVERS & HERBACEOUS'

SYM.	BOTANICAL NAME	COMMON NAME	APPROPRIATE LOCATION	MATURE SIZE (HEIGHT X SPREAD)	NATIVE
	CLETHRA ALNIFOLIA 'COMPACTA'	SUMMERSWEET	PLANTER / PART SHADE	4' X 4'	YES
	RHUS AROMATICA 'GRO-LOW'	FRAGRANT SUMAC	PLANTER / PART SHADE	2' X 6'	YES
	DENNSTAEDTIA PUNCTILOBULA	HAY SCENTED FERN	PLANTER / PART SHADE	18" HT.	YES
	ARCTOSTAPHYLOS UVA-URSI	BEARBERRY	PLANTER / PART SHADE	6" X 36"	YES
	PENNISETUM ALOPECUROIDES	DWARF FOUNTAIN GRASS	PLANTER / SUN	24" X 24"	NO
	ILEX GALABRA 'SHAMROCK'	INKBERRY, SHAMROCK	PLANTER / PART SHADE	5' X 5'	NO
	HYDRANGEA ARBORESCENS	SMOOTH HYDRANGEA	PLANTER / PART SHADE	4' X 6'	NO
	AMSONIA HUBRICHTII	BLUESTAR	PLANTER / SUN-PART SHADE	3' X 3'	YES
	CAREX PENSYLVANICA	SEDGE	PLANTER / FULL SHADE	6" X12"	YES
	ALLIUM SPHAEROCEPHALON	DRUMSTICK ALLIUM	PLANTER / SUN	4" X 24"	NO
	ALLIUM GLOBEMASTER	FLOWERING ONION	PLANTER / SUN	36" X 18"	NO

0 20 40 80
SCALE in FEET
1"=40'

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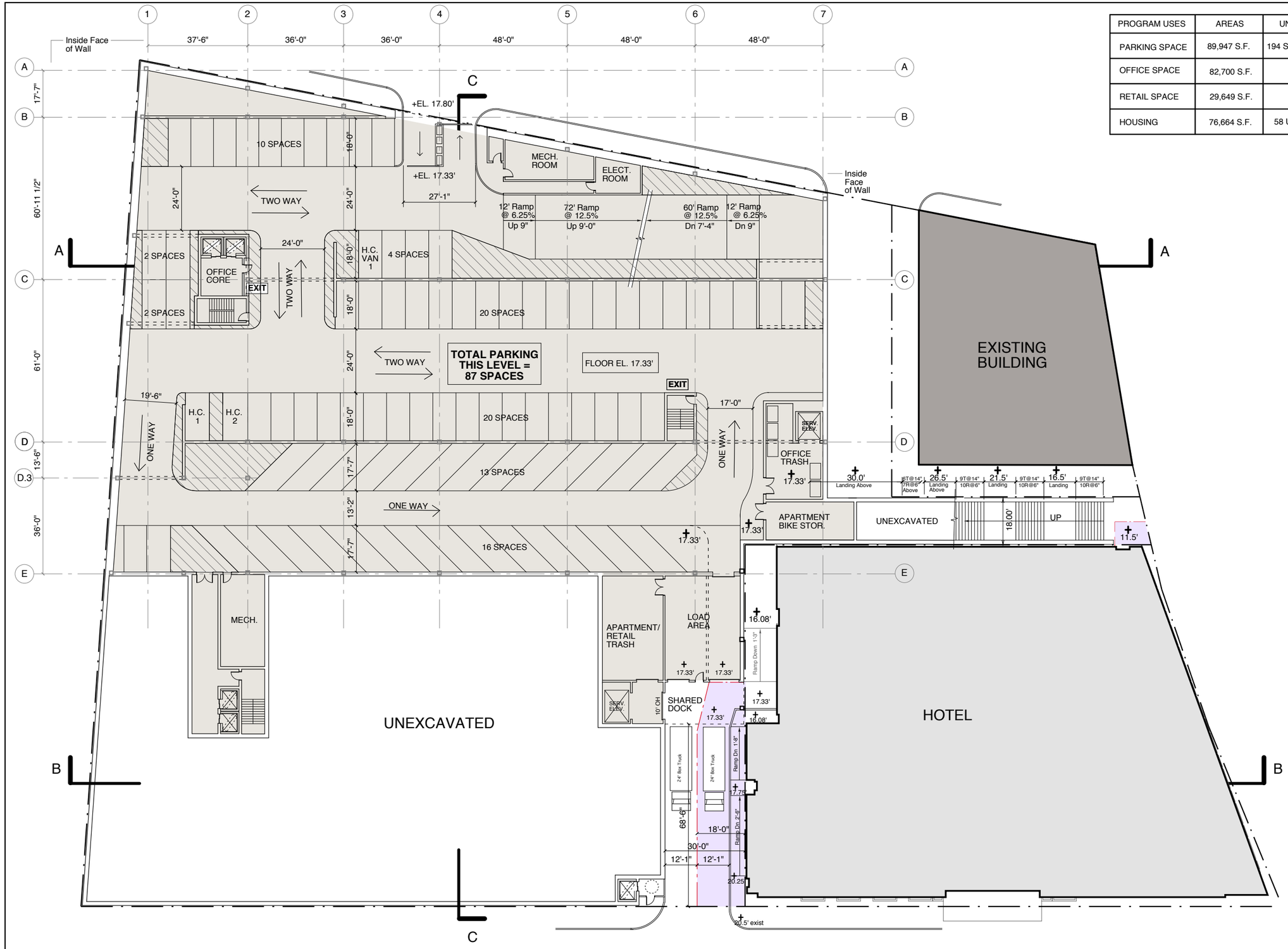
Drawing Title: CONCEPTUAL LANDSCAPE PLAN

Scale: 1"=40'-0"

Date: APRIL 5, 2019

Phase: Permitting

PROGRAM USES	AREAS	UNITS
PARKING SPACE	89,947 S.F.	194 SPACES
OFFICE SPACE	82,700 S.F.	-
RETAIL SPACE	29,649 S.F.	-
HOUSING	76,664 S.F.	58 UNITS



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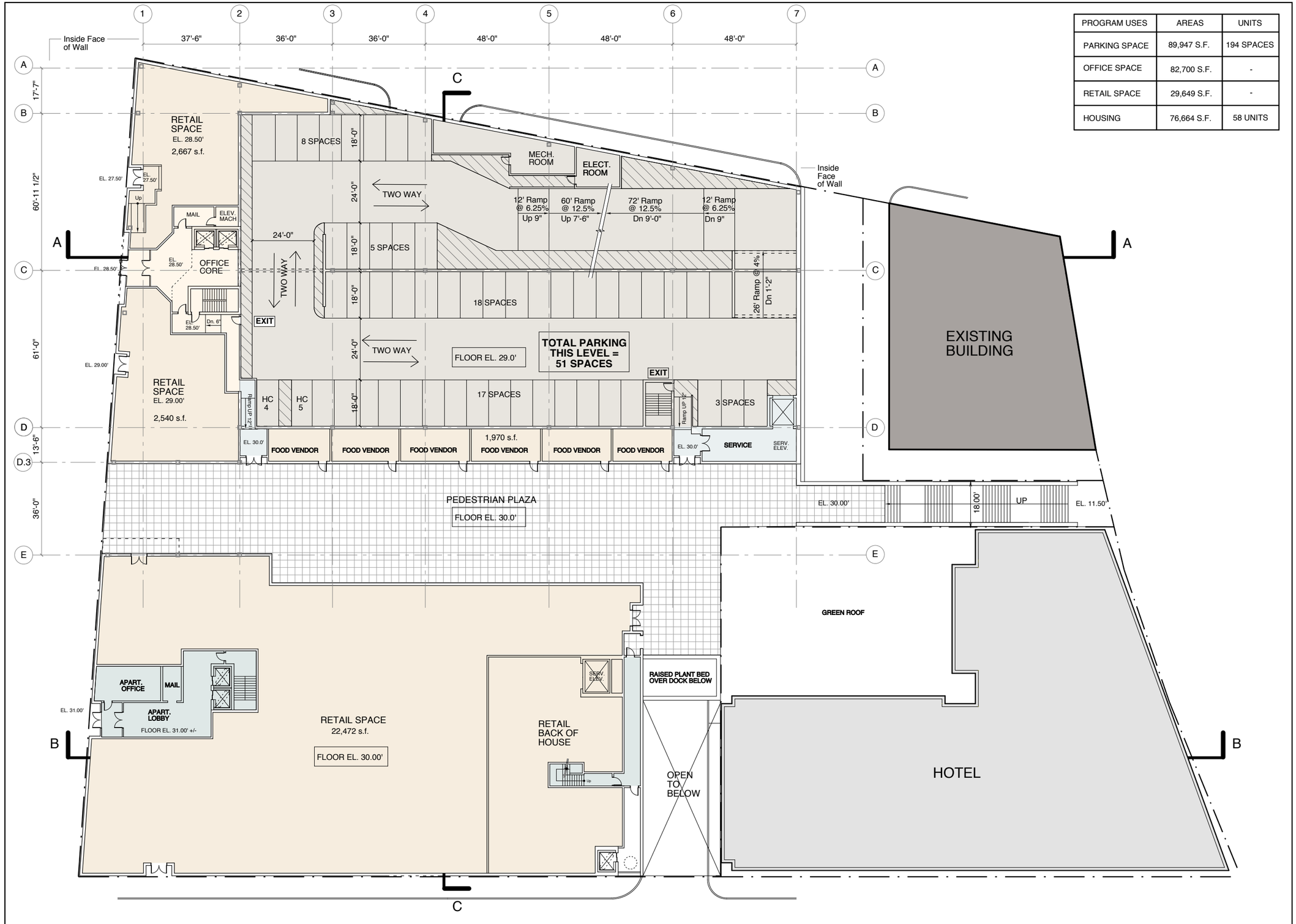
Drawing Title: Scale: 1/16"=1'-0"

LOWER SITE

GARAGE LEVEL 1
EL. 17.33'

Date: 04.03.19
Phase: Permitting

A2.1



PROGRAM USES	AREAS	UNITS
PARKING SPACE	89,947 S.F.	194 SPACES
OFFICE SPACE	82,700 S.F.	-
RETAIL SPACE	29,649 S.F.	-
HOUSING	76,664 S.F.	58 UNITS

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Revisions	#	Date	Description

Drawing Title: LOWER SITE

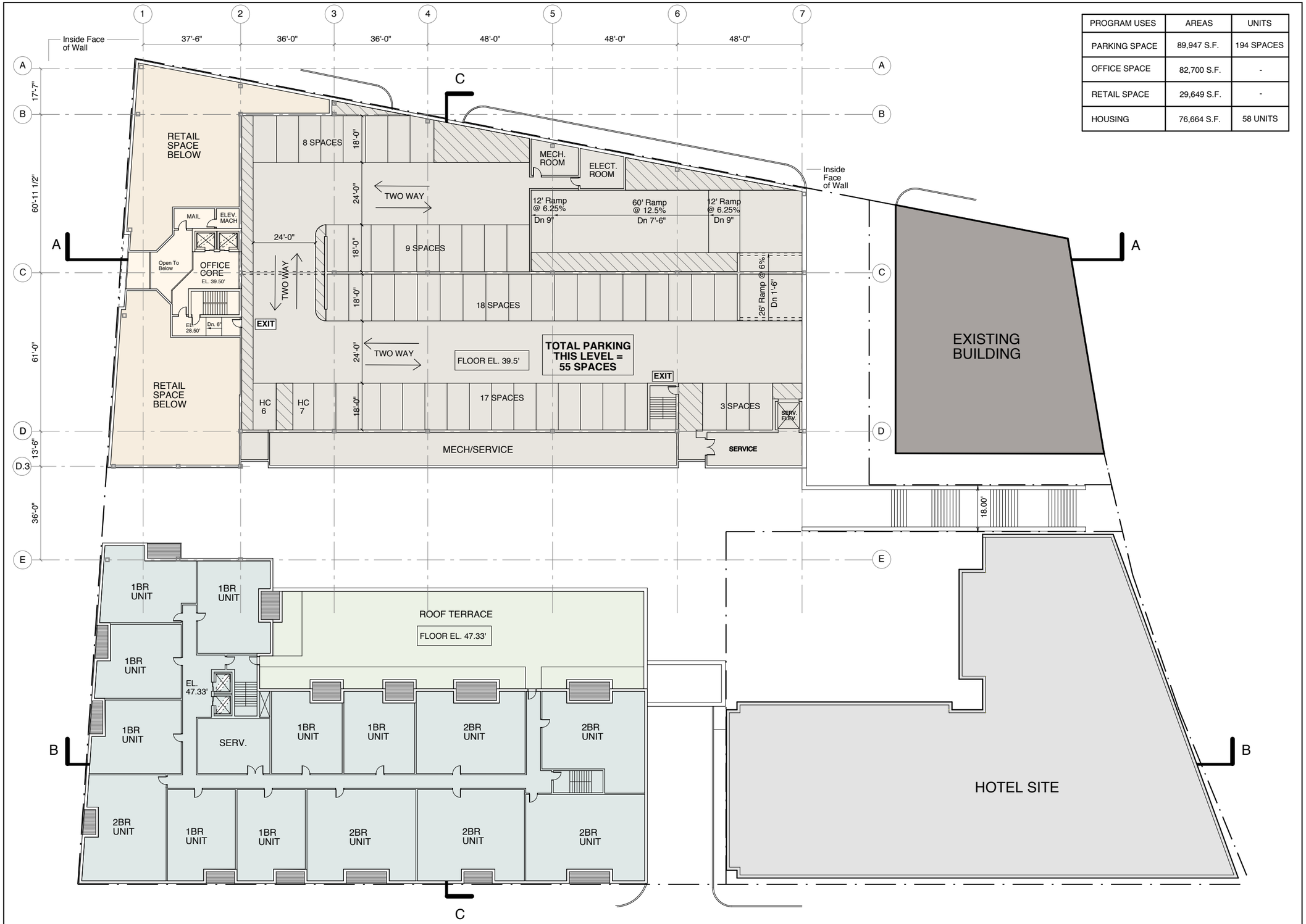
Scale: 1/16"=1'-0"

GARAGE LEVEL 2: EL. 29.00'
PLAZA LEVEL: EL. 30.00'

Date: 04.03.19
Phase: Permitting

A2.2

PROGRAM USES	AREAS	UNITS
PARKING SPACE	89,947 S.F.	194 SPACES
OFFICE SPACE	82,700 S.F.	-
RETAIL SPACE	29,649 S.F.	-
HOUSING	76,664 S.F.	58 UNITS



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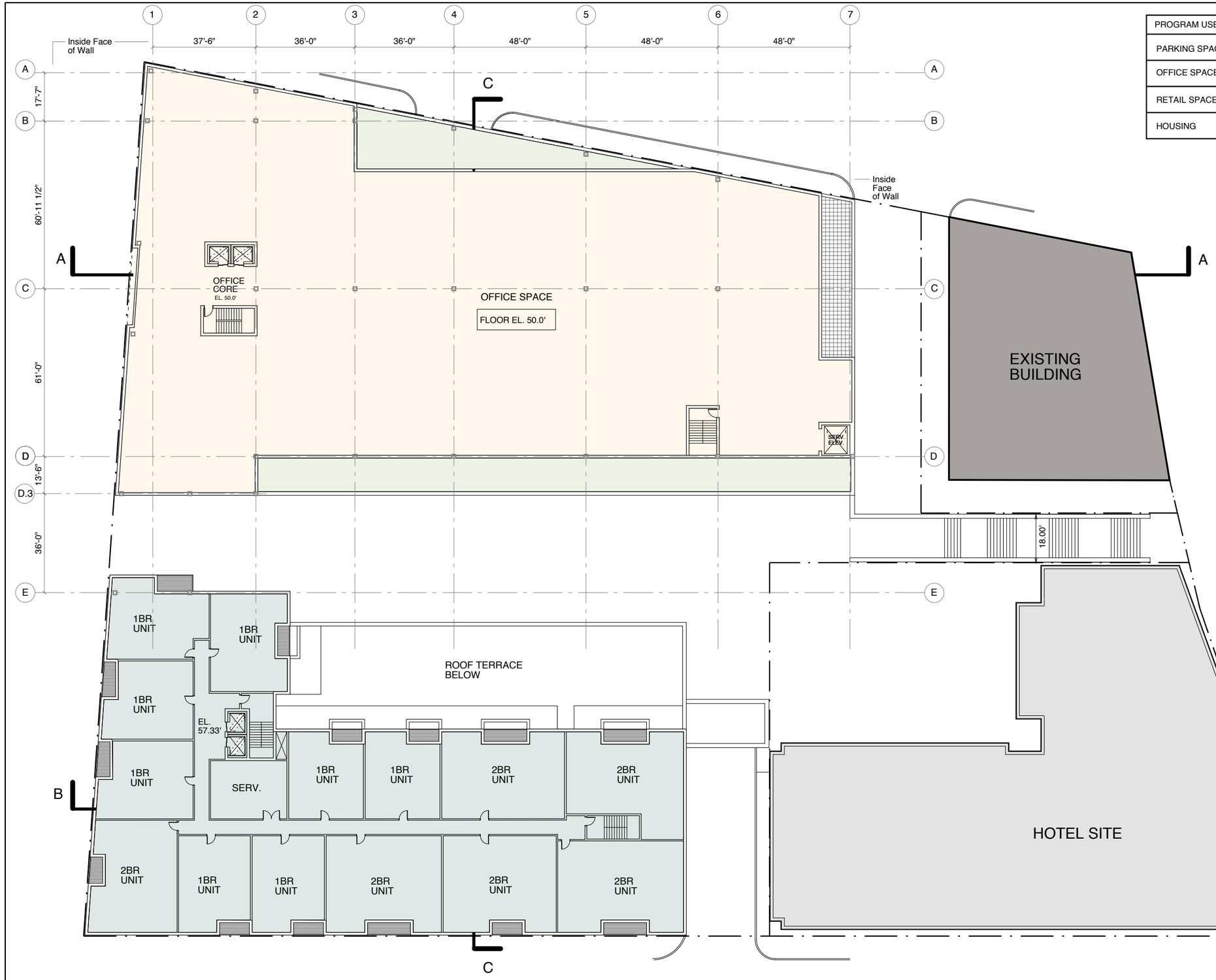
Revisions	#	Date	Description

Drawing Title: LOWER SITE
Scale: 1/16"=1'-0"

GARAGE LEVEL 3: EL. 39.50'
HOUSING LEVEL 1: EL. 47.33'

Date: 04.03.19
Phase: Permitting

A2.3



PROGRAM USES	AREAS	UNITS
PARKING SPACE	89,947 S.F.	194 SPACES
OFFICE SPACE	82,700 S.F.	-
RETAIL SPACE	29,649 S.F.	-
HOUSING	76,664 S.F.	58 UNITS

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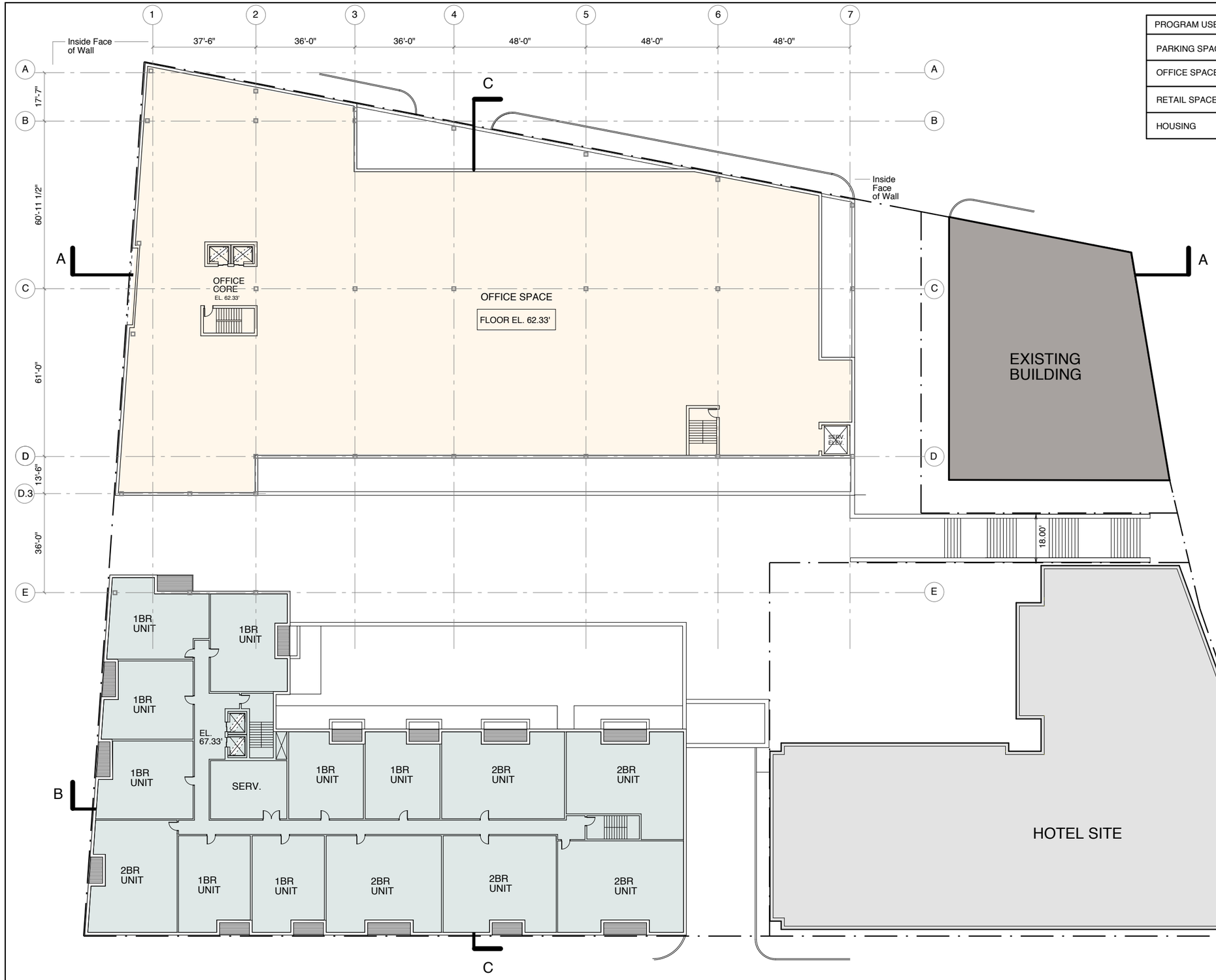
Revisions	#	Date	Description

Drawing Title: LOWER SITE
Scale: 1/16"=1'-0"

OFFICE LEVEL 1: EL. 50.00'
HOUSING LEVEL 2: EL. 57.33'

Date: 04.03.19
Phase: Permitting

A2.4



PROGRAM USES	AREAS	UNITS
PARKING SPACE	89,947 S.F.	194 SPACES
OFFICE SPACE	82,700 S.F.	-
RETAIL SPACE	29,649 S.F.	-
HOUSING	76,664 S.F.	58 UNITS

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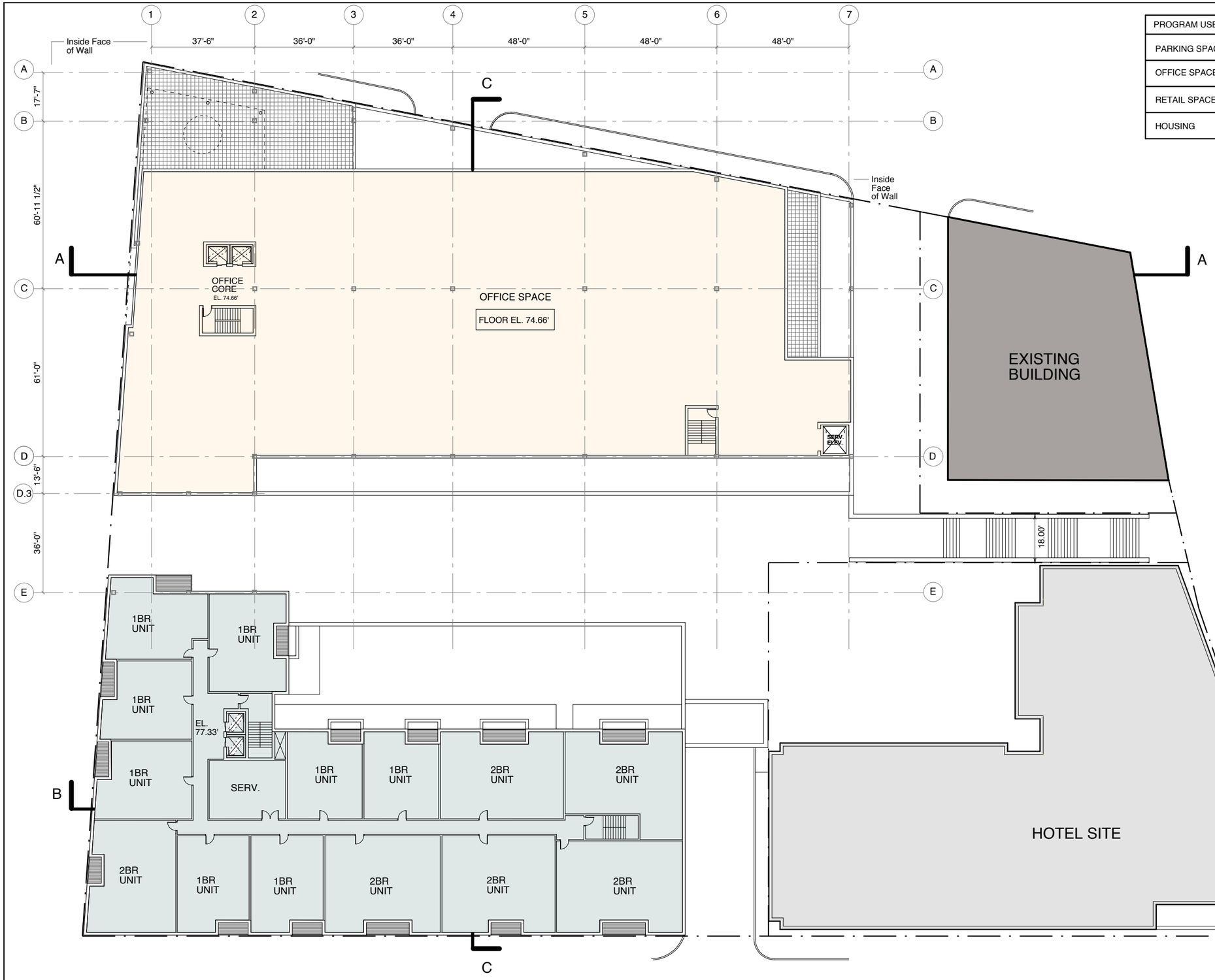
Revisions #	Date	Description

Drawing Title: LOWER SITE
Scale: 1/16"=1'-0"

OFFICE LEVEL 2: EL. 62.33'
HOUSING LEVEL 3: EL. 67.33'

Date: 04.03.19
Phase: Permitting

A2.5



PROGRAM USES	AREAS	UNITS
PARKING SPACE	89,947 S.F.	194 SPACES
OFFICE SPACE	82,700 S.F.	-
RETAIL SPACE	29,649 S.F.	-
HOUSING	76,664 S.F.	58 UNITS

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Revisions #	Date	Description

Drawing Title: LOWER SITE

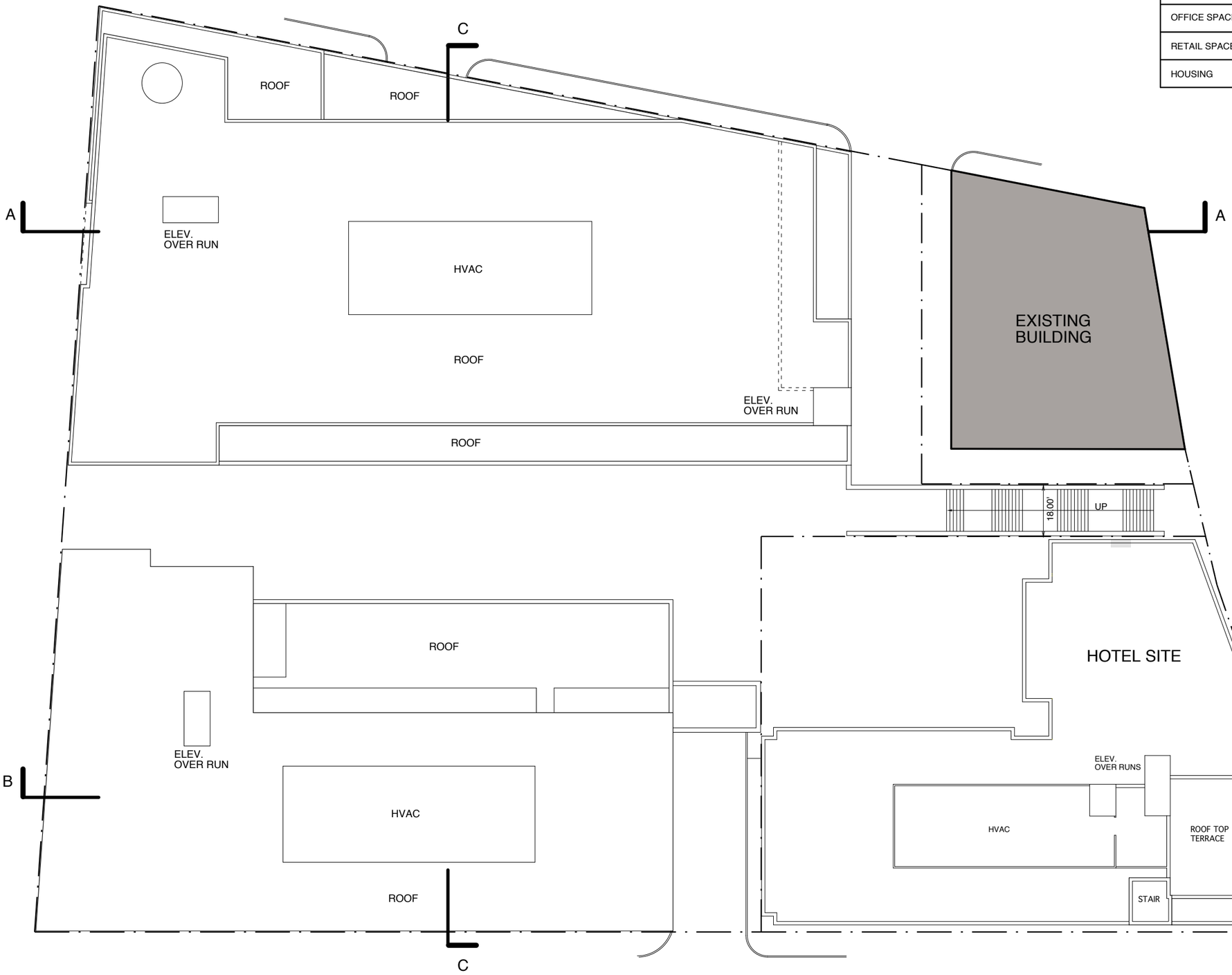
Scale: 1/16"=1'-0"

OFFICE LEVEL 2: EL. 74.66'
HOUSING LEVEL 4: EL. 77.30'

Date: 04.03.19
Phase: Permitting

A2.6

PROGRAM USES	AREAS	UNITS
PARKING SPACE	89,947 S.F.	194 SPACES
OFFICE SPACE	82,700 S.F.	-
RETAIL SPACE	29,649 S.F.	-
HOUSING	76,664 S.F.	58 UNITS



Portland Square

MASTER DEVELOPMENT PLAN

Portland, Maine

Owner / Developers
NORTH RIVER, LLC
New York, NY

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www.wintonscott.com

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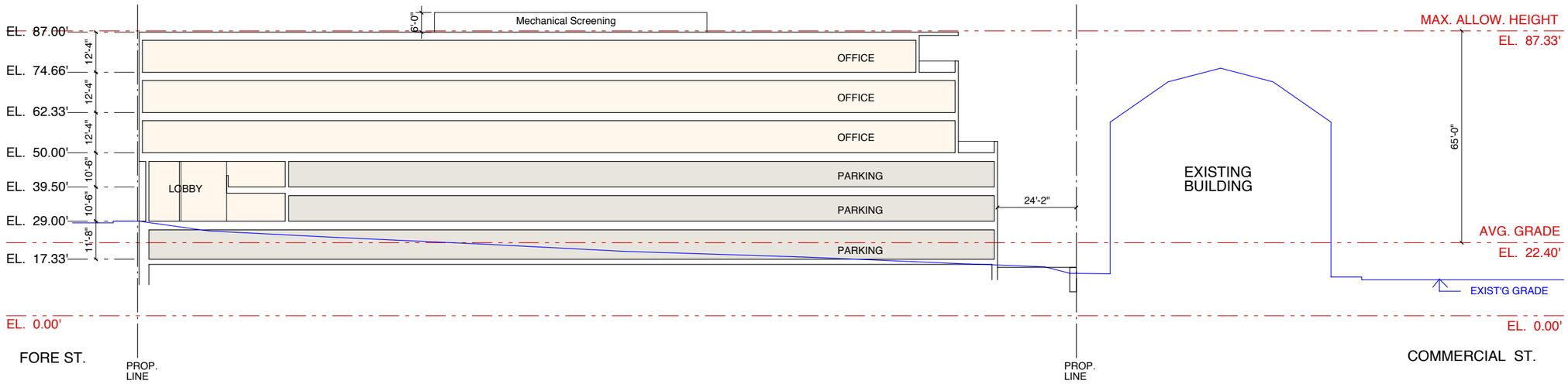
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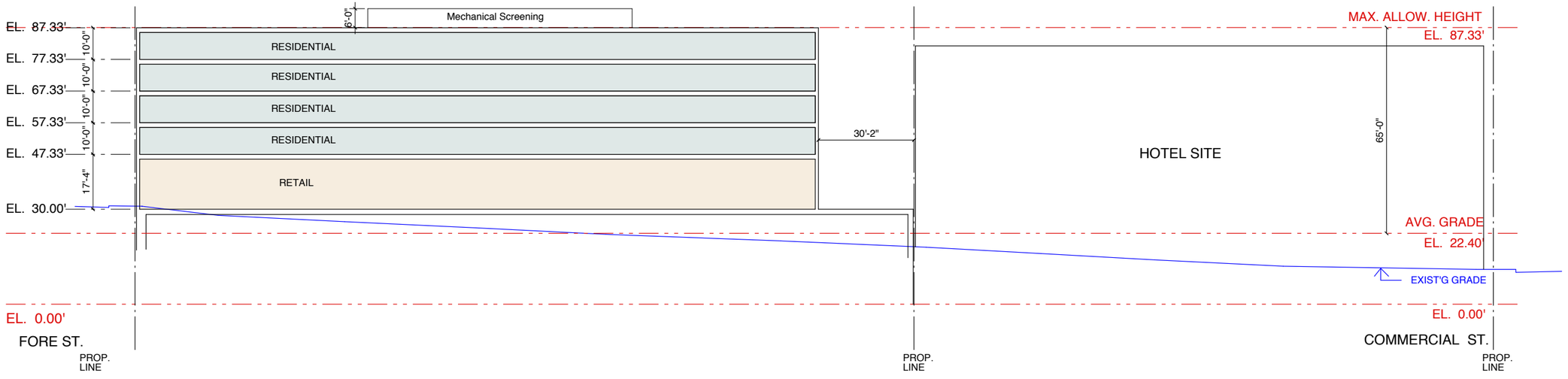
OFFICE ROOF: EL. 87.00'
HOUSING ROOF: EL. 87.30'

Date: 04.03.19
Phase: Permitting

A2.7



SECTION A-A OFFICE BUILDING



SECTION B-B APARTMENT BUILDING / RETAIL

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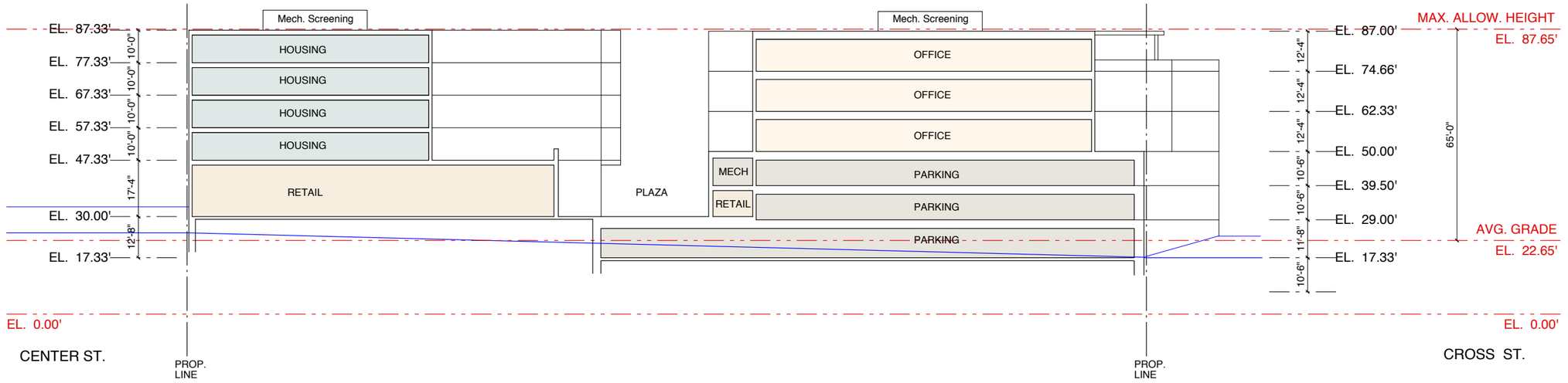
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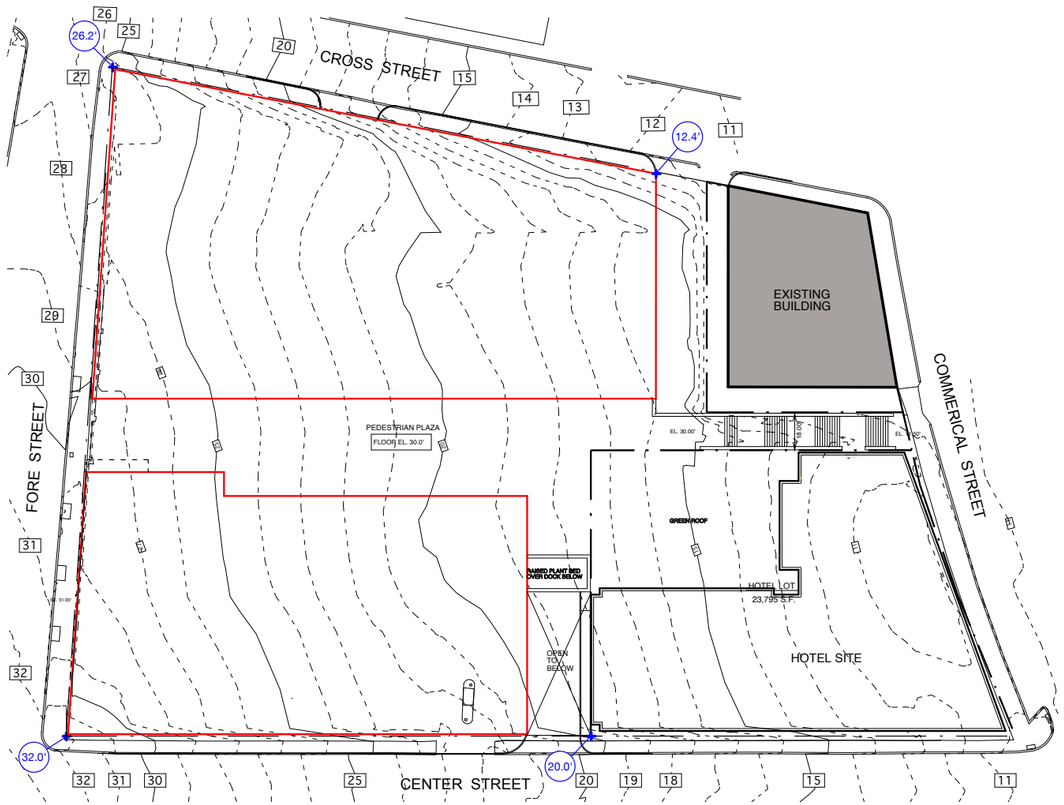
LOWER SITE
BUILDING SECTIONS
A-A & B-B

Date: 04.03.19
Phase: Permitting

A2.8



SECTION C-C OFFICE BUILDING / PLAZA / APARTMENT BUILDING



32' + 26.2' + 12.4' + 20.0' = 90.6'

90.6' / 4 = 22.65' AVERAGE GRADE

AVERAGE GRADE CALCULATION DIAGRAM

Portland Square

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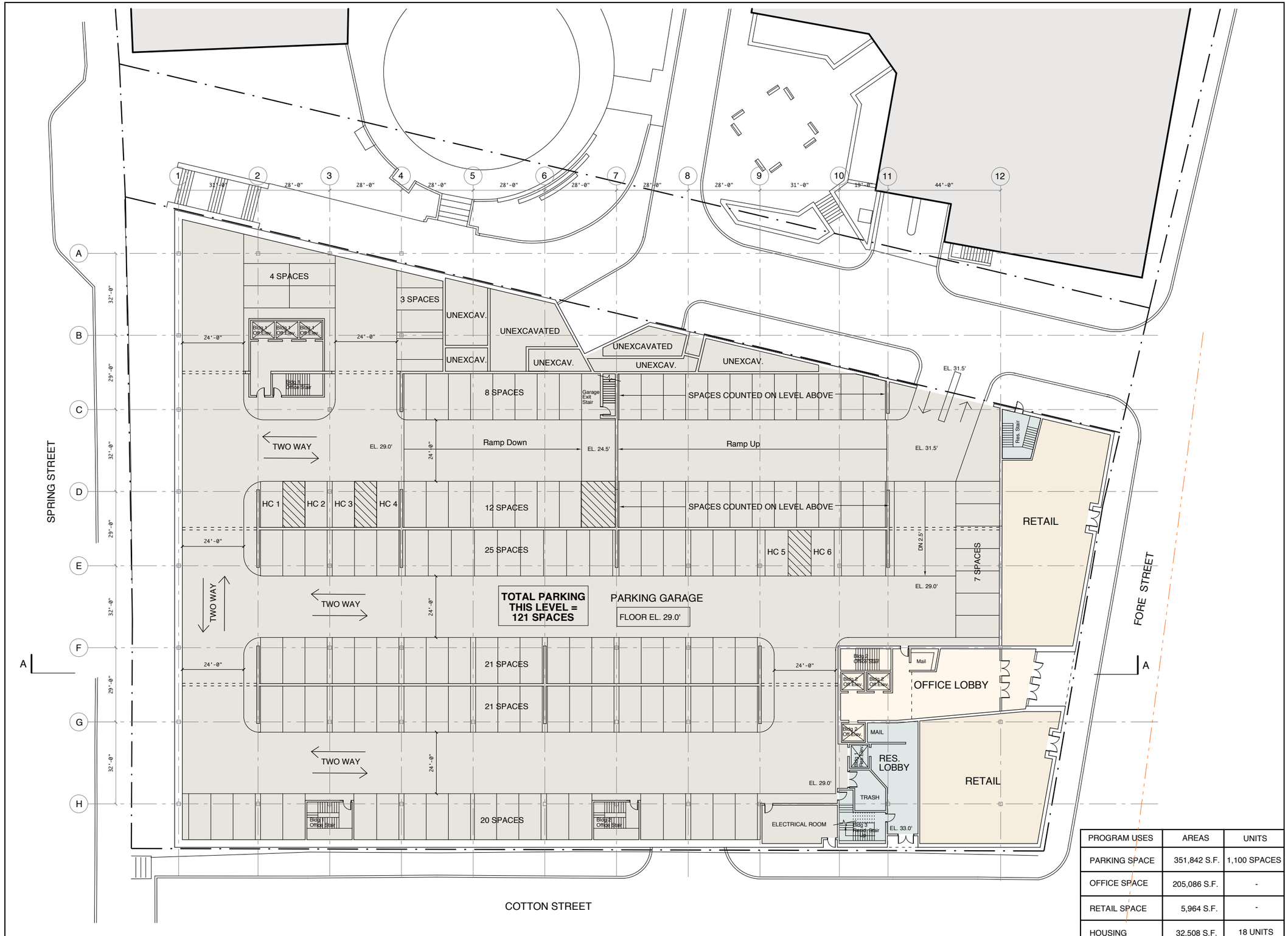
Revisions	#	Date	Description

Drawing Title: LOWER SITE
BUILDING SECTIONS C-C AND AVERAGE GRADE CALC. DIAGRAM

Scale: 1/16"=1'-0"

Date: 04.03.19
Phase: Permitting

A2.9



PROGRAM USES	AREAS	UNITS
PARKING SPACE	351,842 S.F.	1,100 SPACES
OFFICE SPACE	205,086 S.F.	-
RETAIL SPACE	5,964 S.F.	-
HOUSING	32,508 S.F.	18 UNITS

Portland Square

MASTER DEVELOPMENT PLAN

Portland, Maine

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Revisions #	Date	Description

Drawing Title: Scale: 1/16"=1'-0"

UPPER SITE

LEVEL G PARKING
El. 29.0'

Date: 03.05.19
Phase: Permitting

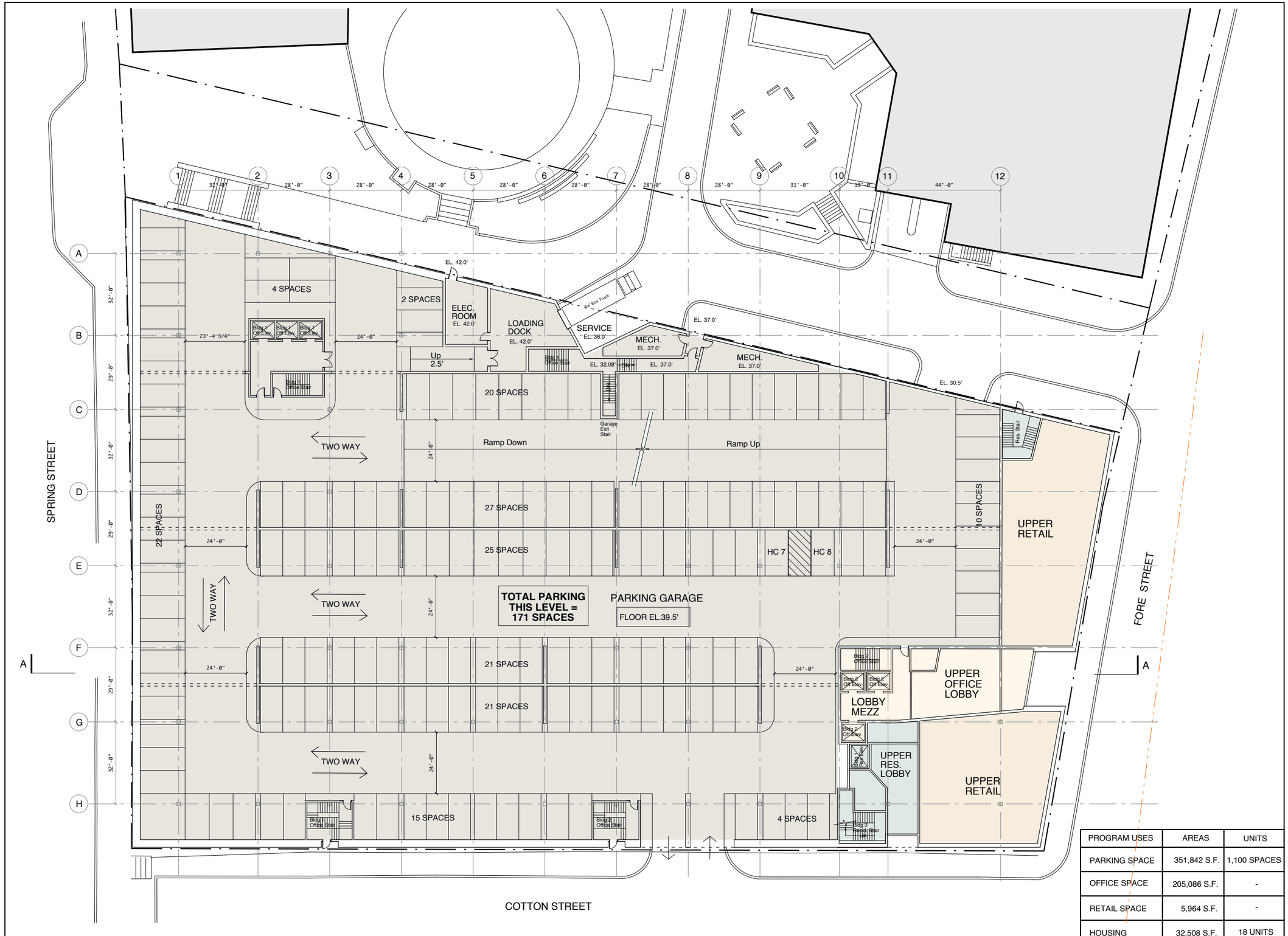
A1.0

BUILDING ELEVATIONS
OPTION B

BUILDING ELEVATIONS
OPTION B

BUIL
OPTIC

DING ELEVATIONS
N B



PROGRAM USES	AREAS	UNITS
PARKING SPACE	351,842 S.F.	1,100 SPACES
OFFICE SPACE	205,086 S.F.	-
RETAIL SPACE	5,964 S.F.	-
HOUSING	32,508 S.F.	18 UNITS

Portland Square

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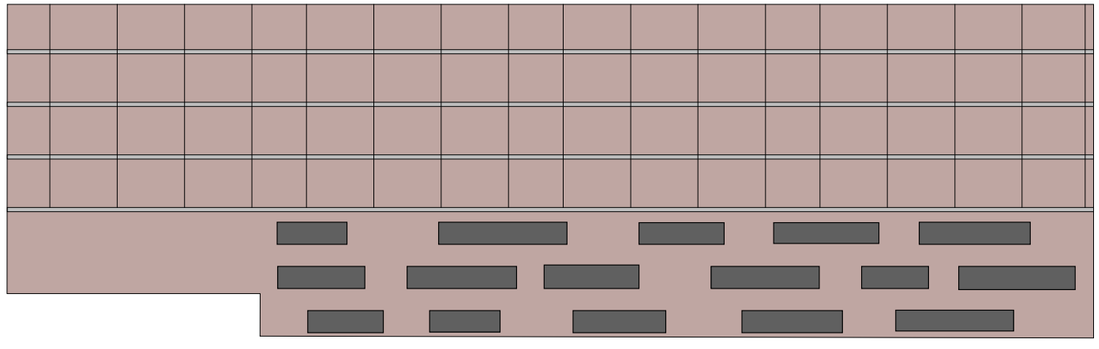
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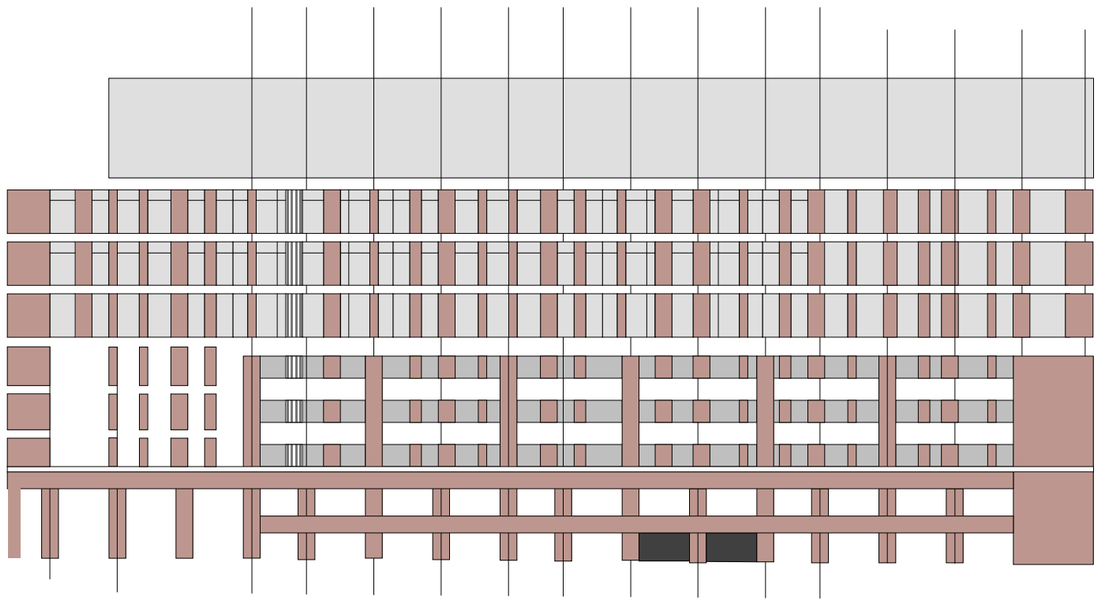
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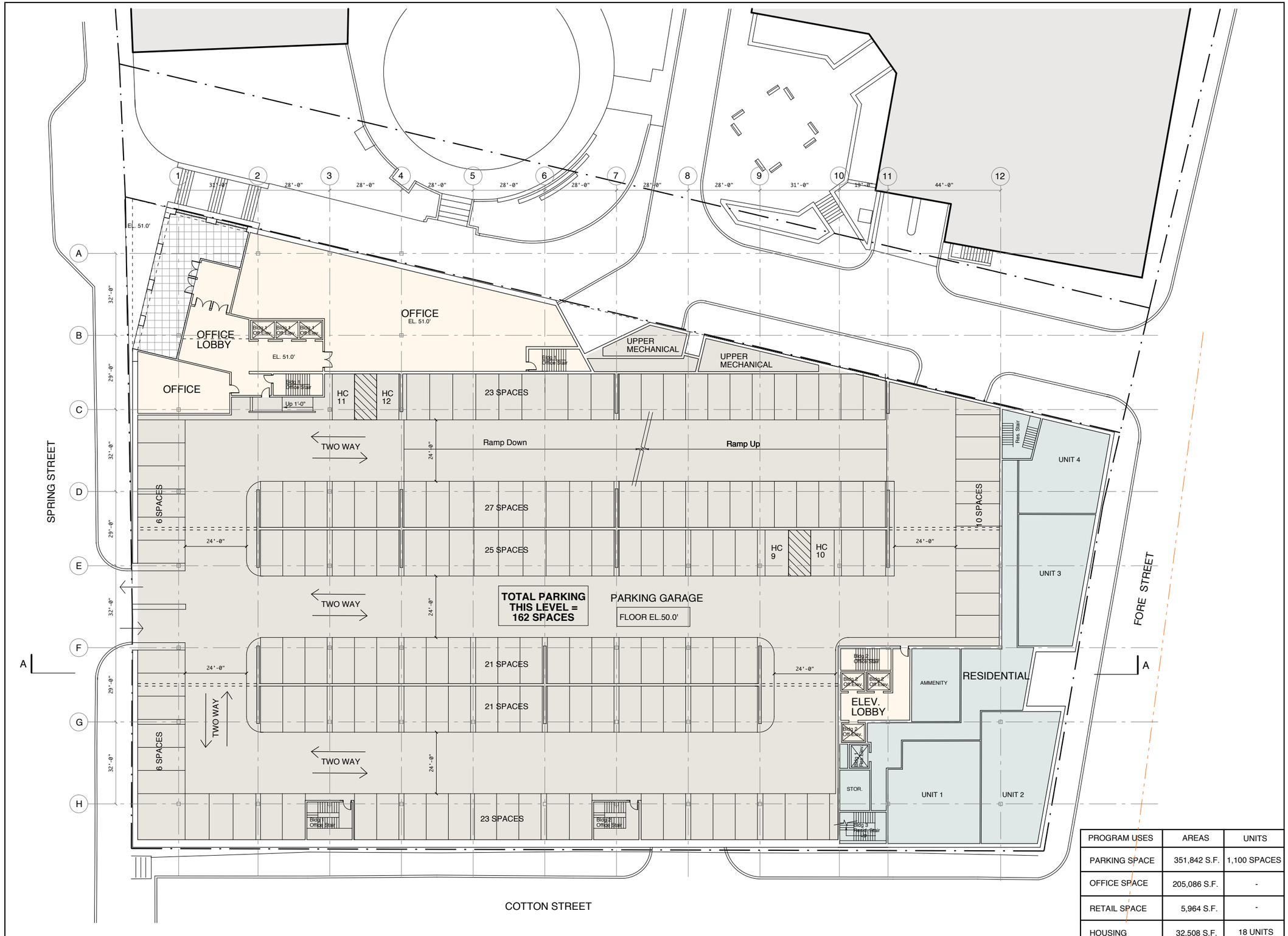
LEVEL 1 PARKING
El. 39.5'

Date: 03.05.19
Phase: Permitting

A1.1







PROGRAM USES	AREAS	UNITS
PARKING SPACE	351,842 S.F.	1,100 SPACES
OFFICE SPACE	205,086 S.F.	-
RETAIL SPACE	5,964 S.F.	-
HOUSING	32,508 S.F.	18 UNITS

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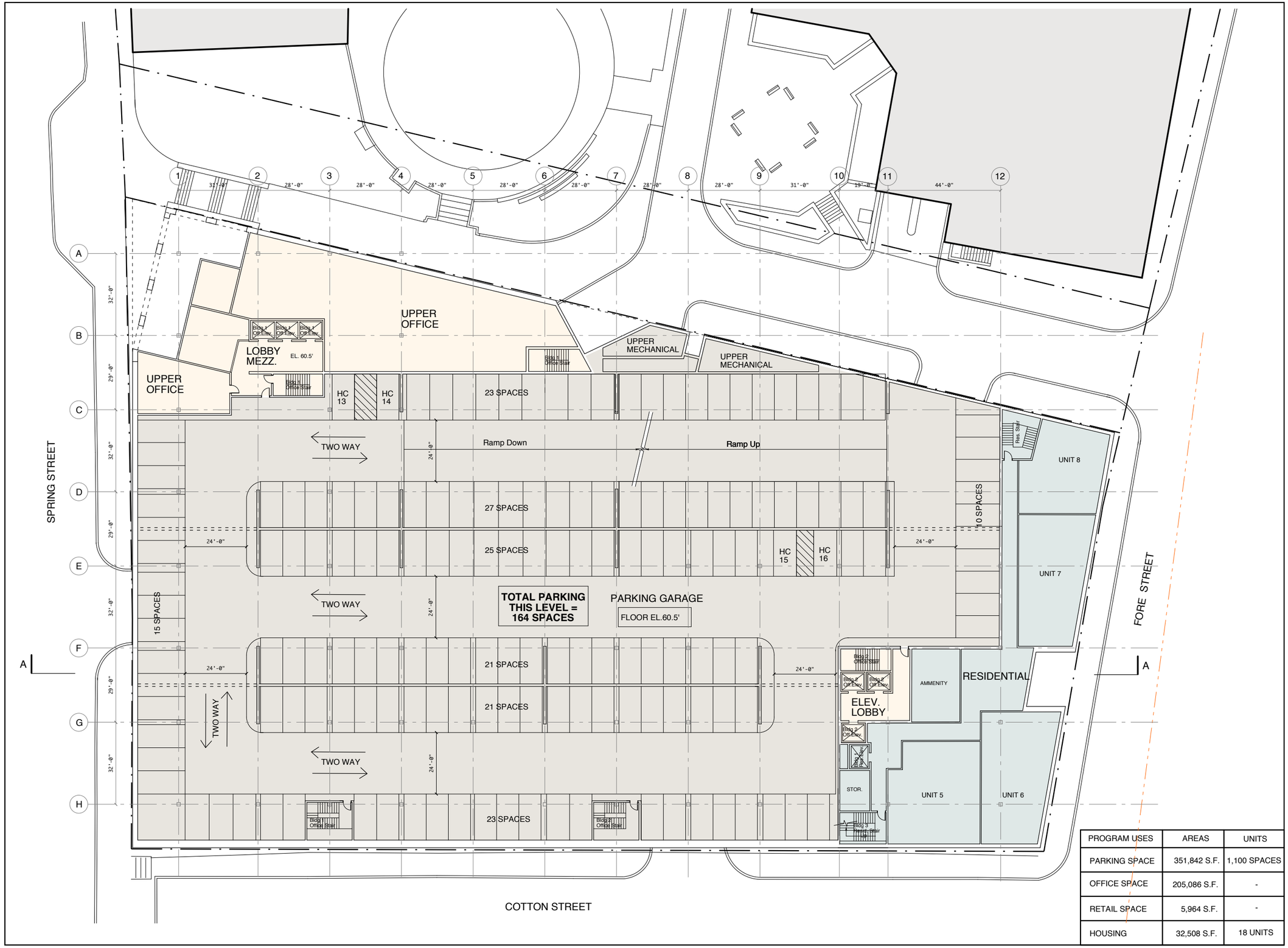
Drawing Title: Scale: 1/16"=1'-0"

UPPER SITE

LEVEL 2 PARKING
El. 50.0'

Date: 03.05.19
Phase: Permitting

A1.2



PROGRAM USES	AREAS	UNITS
PARKING SPACE	351,842 S.F.	1,100 SPACES
OFFICE SPACE	205,086 S.F.	-
RETAIL SPACE	5,964 S.F.	-
HOUSING	32,508 S.F.	18 UNITS

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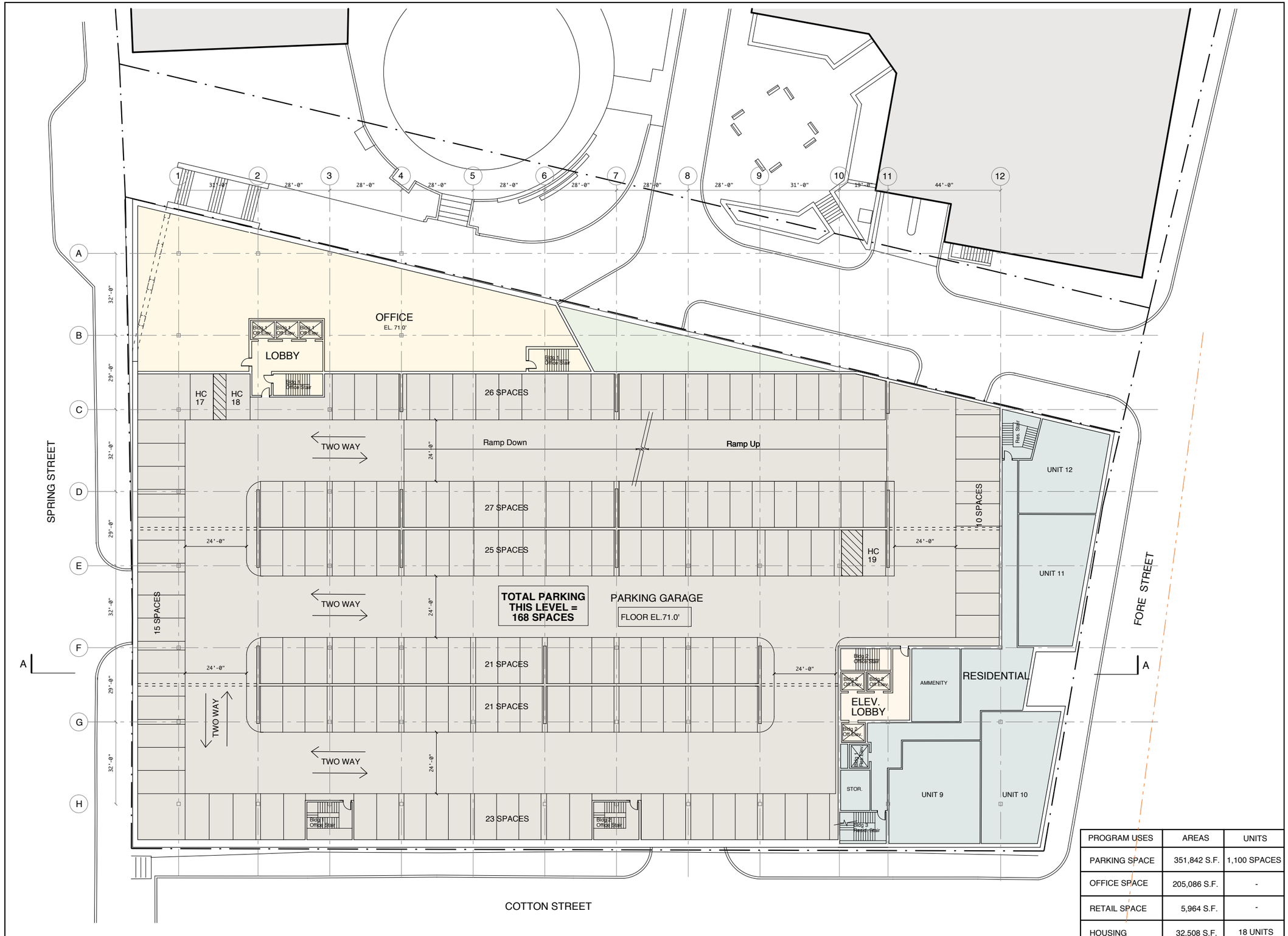
Drawing Title: UPPER SITE

Scale: 1/16"=1'-0"

LEVEL 3 PARKING
El. 60.5'

Date: 03.05.19
Phase: Permitting

A1.3



PROGRAM USES	AREAS	UNITS
PARKING SPACE	351,842 S.F.	1,100 SPACES
OFFICE SPACE	205,086 S.F.	-
RETAIL SPACE	5,964 S.F.	-
HOUSING	32,508 S.F.	18 UNITS

Portland Square

MASTER DEVELOPMENT PLAN

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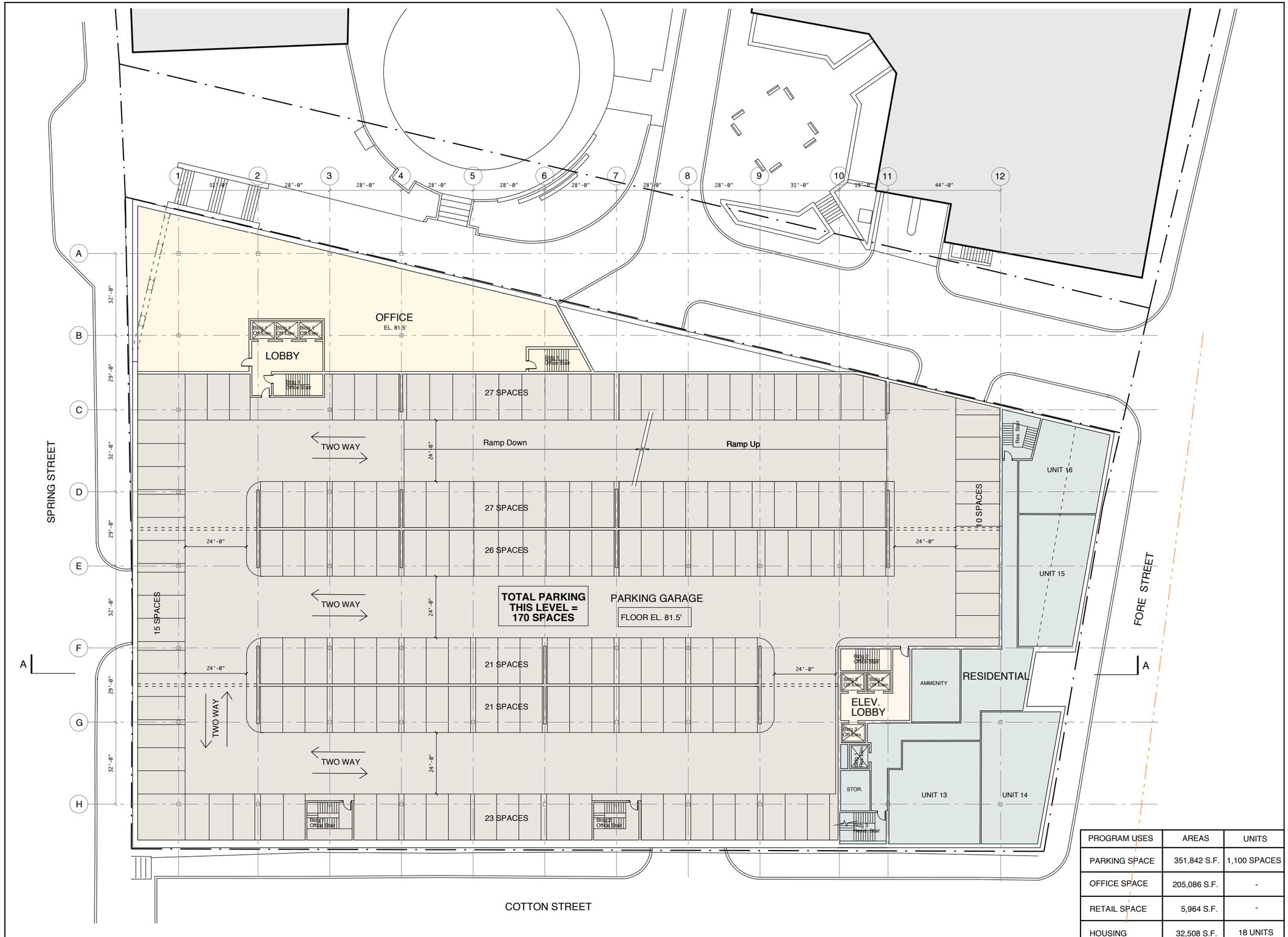
Drawing Title: **UPPER SITE**

Scale: 1/16"=1'-0"

LEVEL 4 PARKING
El. 71.0'

Date: 03.05.19
Phase: Permitting

A1.4



PROGRAM USES	AREAS	UNITS
PARKING SPACE	351,842 S.F.	1,100 SPACES
OFFICE SPACE	205,086 S.F.	-
RETAIL SPACE	5,964 S.F.	-
HOUSING	32,508 S.F.	18 UNITS

Portland Square

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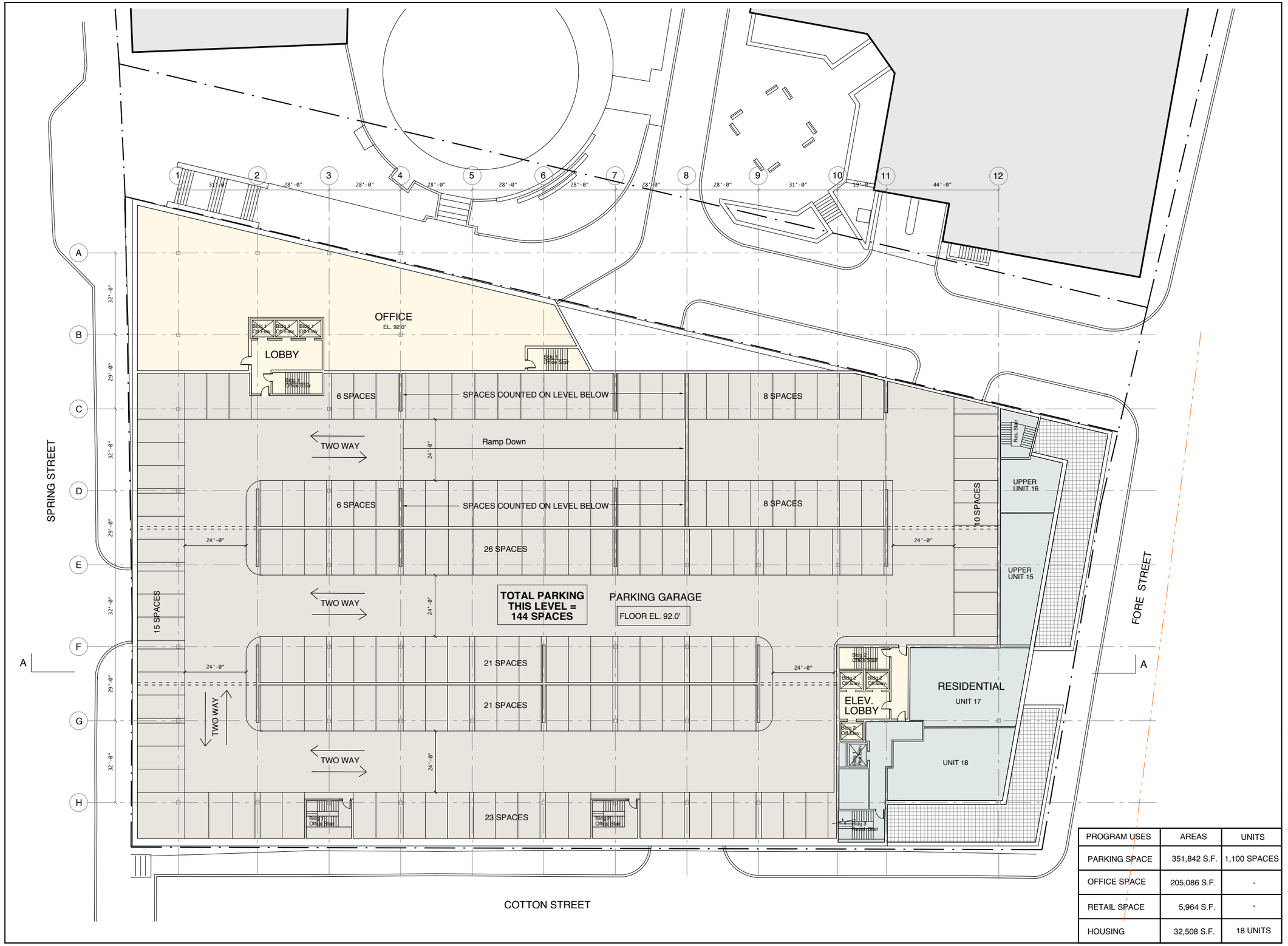
Drawing Title: UPPER SITE

Scale: 1/16"=1'-0"

LEVEL 5 PARKING
El. 81.50'

Date: 03.05.19
Phase: Permitting

A1.5



PROGRAM USES	AREAS	UNITS
PARKING SPACE	351,842 S.F.	1,100 SPACES
OFFICE SPACE	205,086 S.F.	-
RETAIL SPACE	5,964 S.F.	-
HOUSING	32,508 S.F.	18 UNITS

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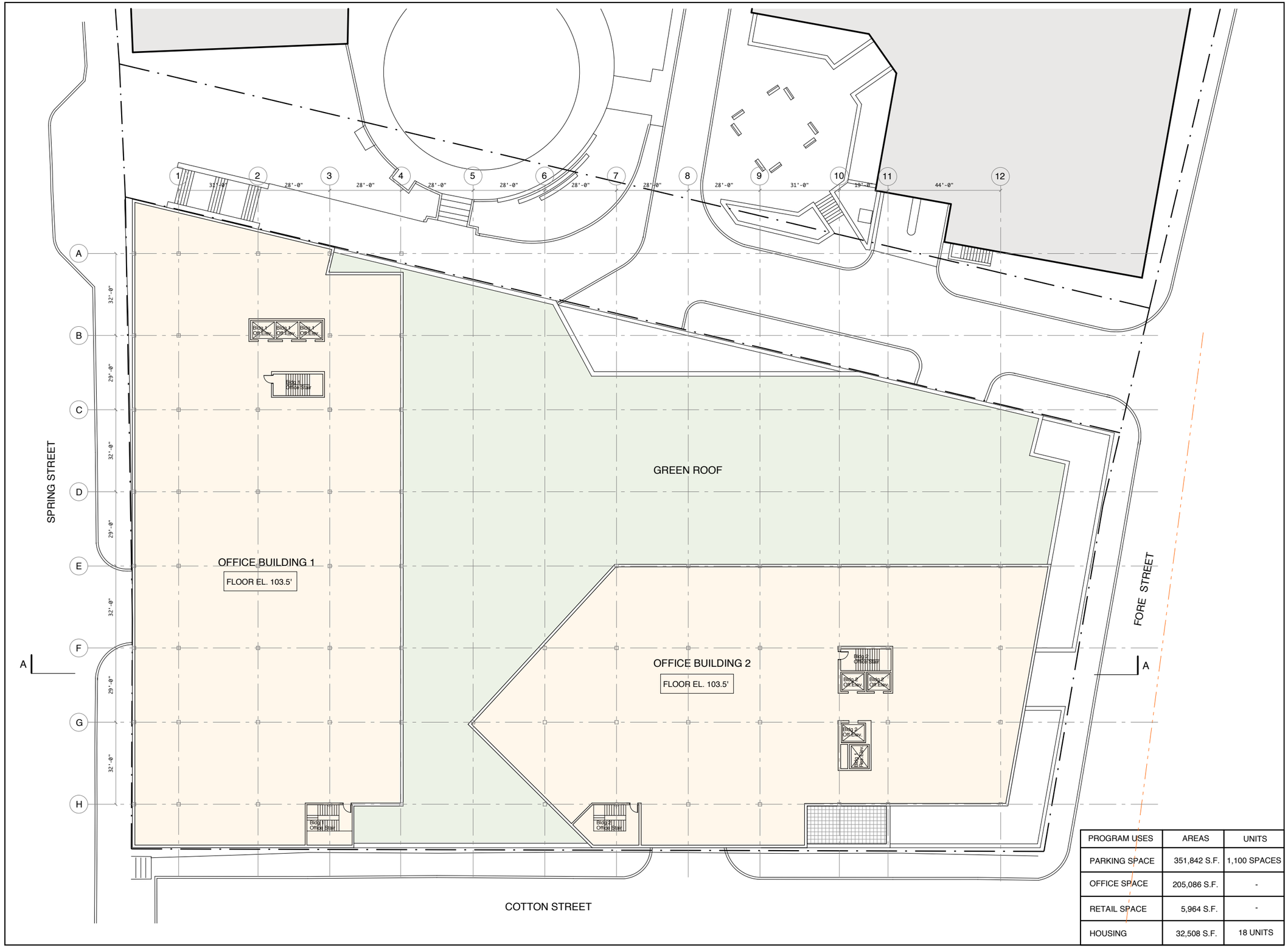
Drawing Title: **UPPER SITE**

Scale: 1/16"=1'-0"

LEVEL 6 PARKING
El. 92.0'

Date: 03.05.19
Phase: Permitting

A1.6



PROGRAM USES	AREAS	UNITS
PARKING SPACE	351,842 S.F.	1,100 SPACES
OFFICE SPACE	205,086 S.F.	-
RETAIL SPACE	5,964 S.F.	-
HOUSING	32,508 S.F.	18 UNITS

Portland Square

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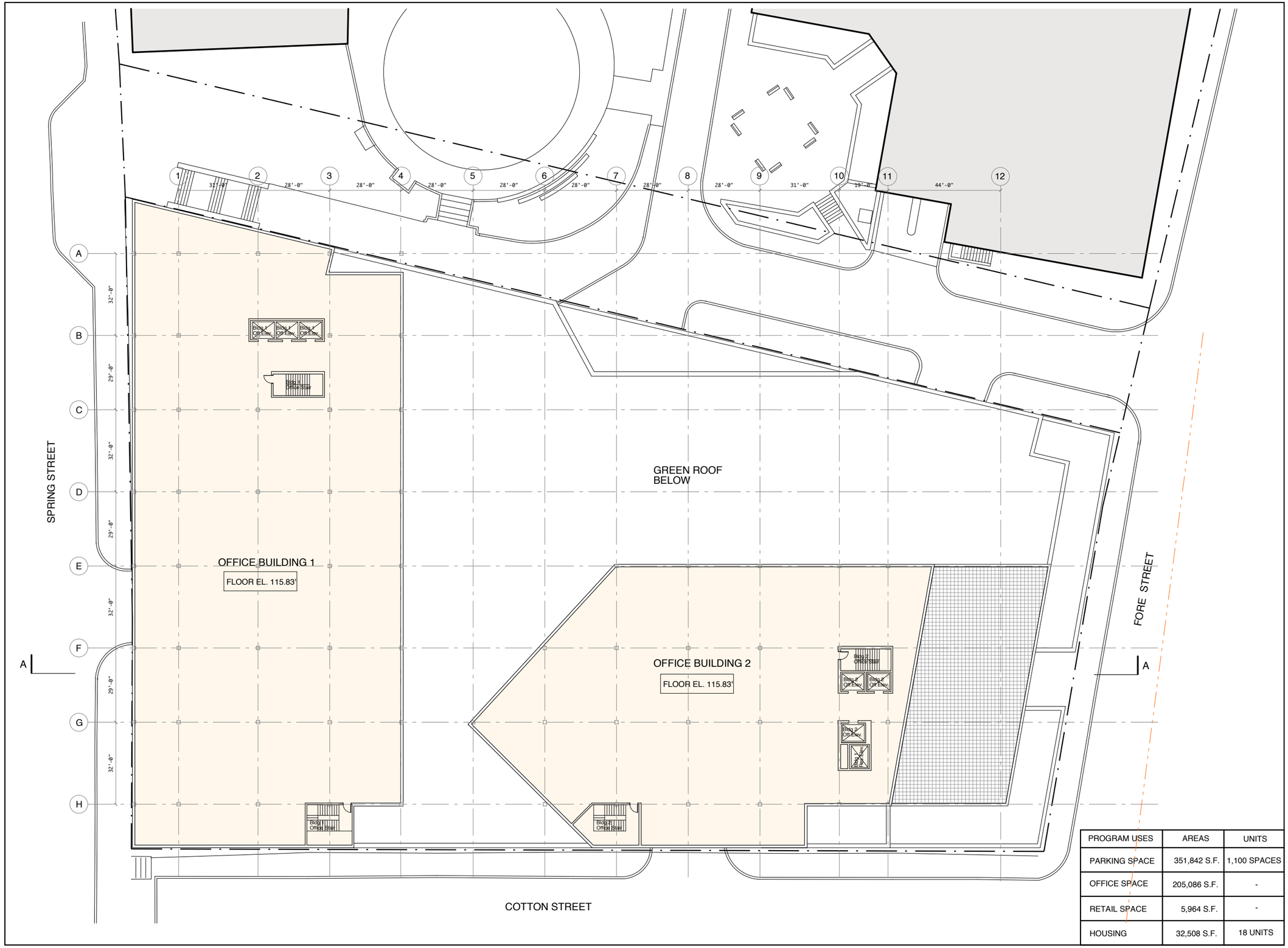
Drawing Title: **UPPER SITE**

Scale: 1/16"=1'-0"

LEVEL 7 OFFICE
El. 103.5'

Date: 03.05.19
Phase: Permitting

A1.7



PROGRAM USES	AREAS	UNITS
PARKING SPACE	351,842 S.F.	1,100 SPACES
OFFICE SPACE	205,086 S.F.	-
RETAIL SPACE	5,964 S.F.	-
HOUSING	32,508 S.F.	18 UNITS

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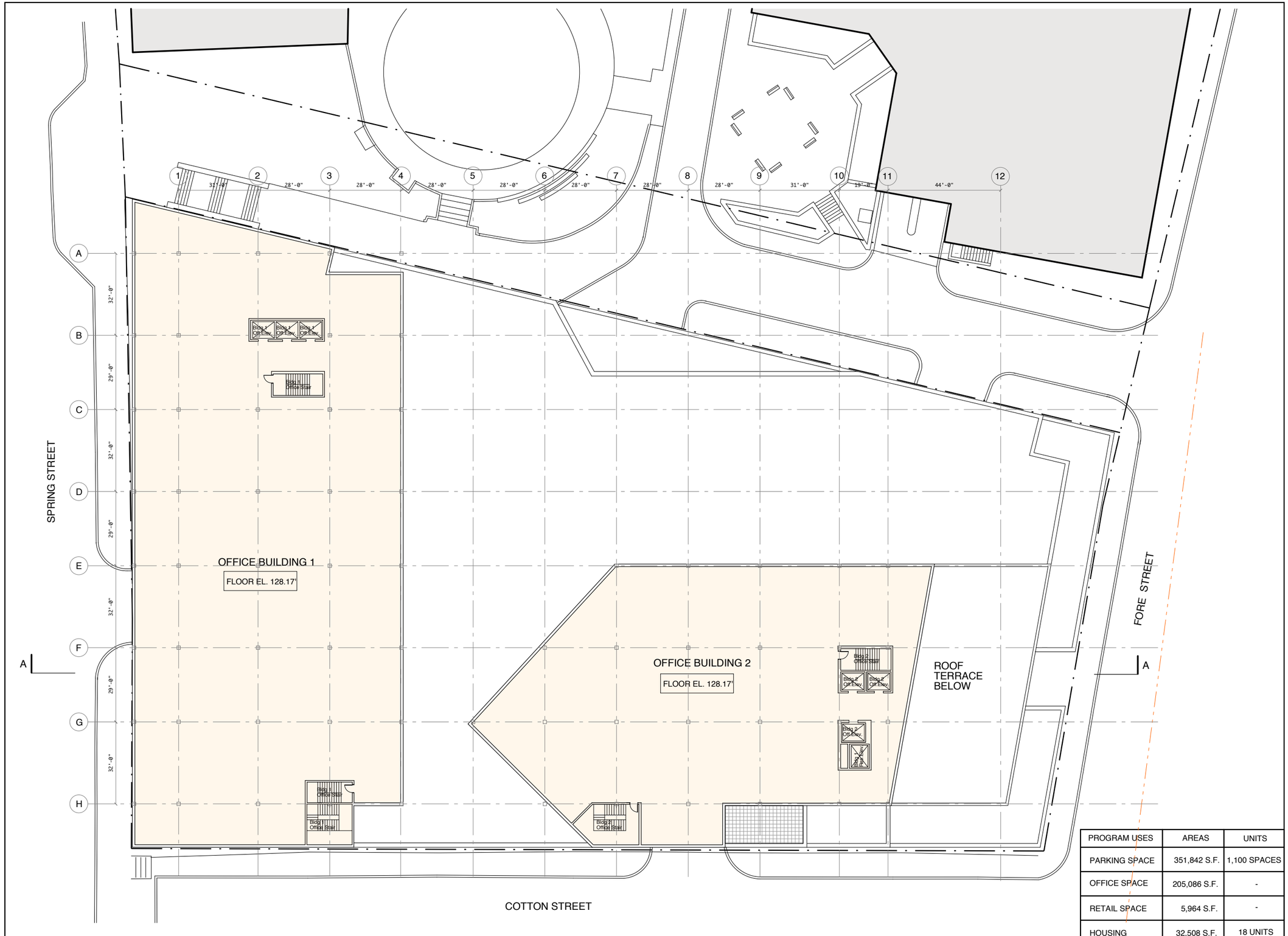
Drawing Title: Scale: 1/16"=1'-0"

UPPER SITE

LEVEL 8 OFFICE
El. 115.83'

Date: 03.05.19
Phase: Permitting

A1.8



PROGRAM USES	AREAS	UNITS
PARKING SPACE	351,842 S.F.	1,100 SPACES
OFFICE SPACE	205,086 S.F.	-
RETAIL SPACE	5,964 S.F.	-
HOUSING	32,508 S.F.	18 UNITS

Portland Square

MASTER DEVELOPMENT PLAN

Portland, Maine

Owner / Developers
NORTH RIVER, LLC
New York, NY

WINTON SCOTT ARCHITECTS, PA
5 Milk Street
Portland, ME 04101
774-4811
www.wintonscott.com

CARROLL ASSOCIATES LANDSCAPE ARCHITECTS
217 Commercial St, Suite 200
Portland, ME 04101
207.772.1552
www.carroll-assoc.com

WOODARD & CURRAN
41 Hutchins Drive
Portland, ME 04102
800.426.4262
www.woodardcurran.com

BECKER STRUCTURAL ENGINEERS, INC.
75 York Street, Suite 3
Portland, ME 04101
207.879.1838
www.beckerstructural.com

GORRILL PALMER
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South Portland, ME 04106
207.239.7470
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HALEY & ALDRICH, INC.
75 Washington Avenue
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www.haleyaldrich.com

Revisions #	Date	Description

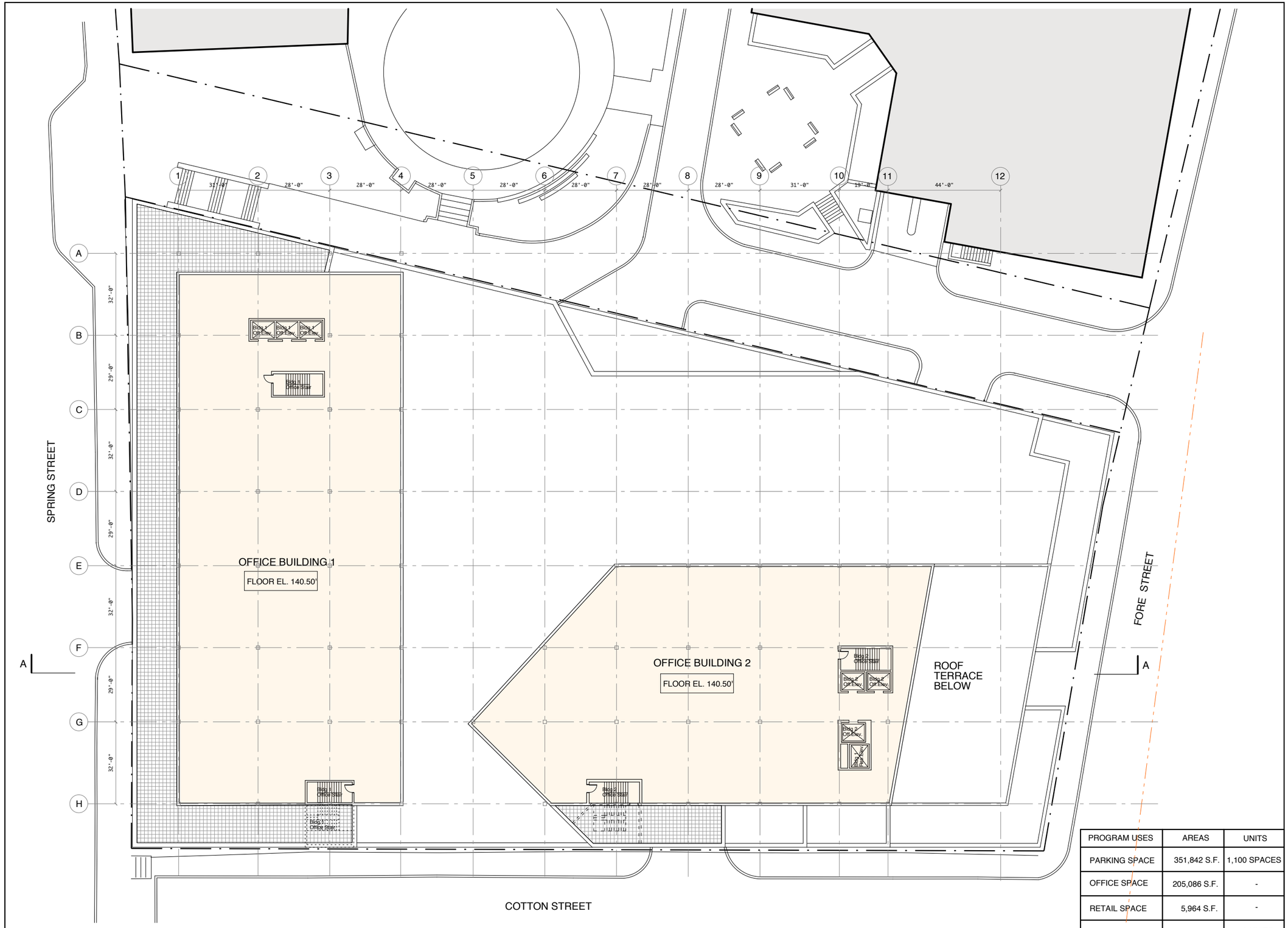
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UPPER SITE

LEVEL 9 OFFICE
El. 128.17'

Date: 03.05.19
Phase: Permitting

A1.9



PROGRAM USES	AREAS	UNITS
PARKING SPACE	351,842 S.F.	1,100 SPACES
OFFICE SPACE	205,086 S.F.	-
RETAIL SPACE	5,964 S.F.	-
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Portland Square

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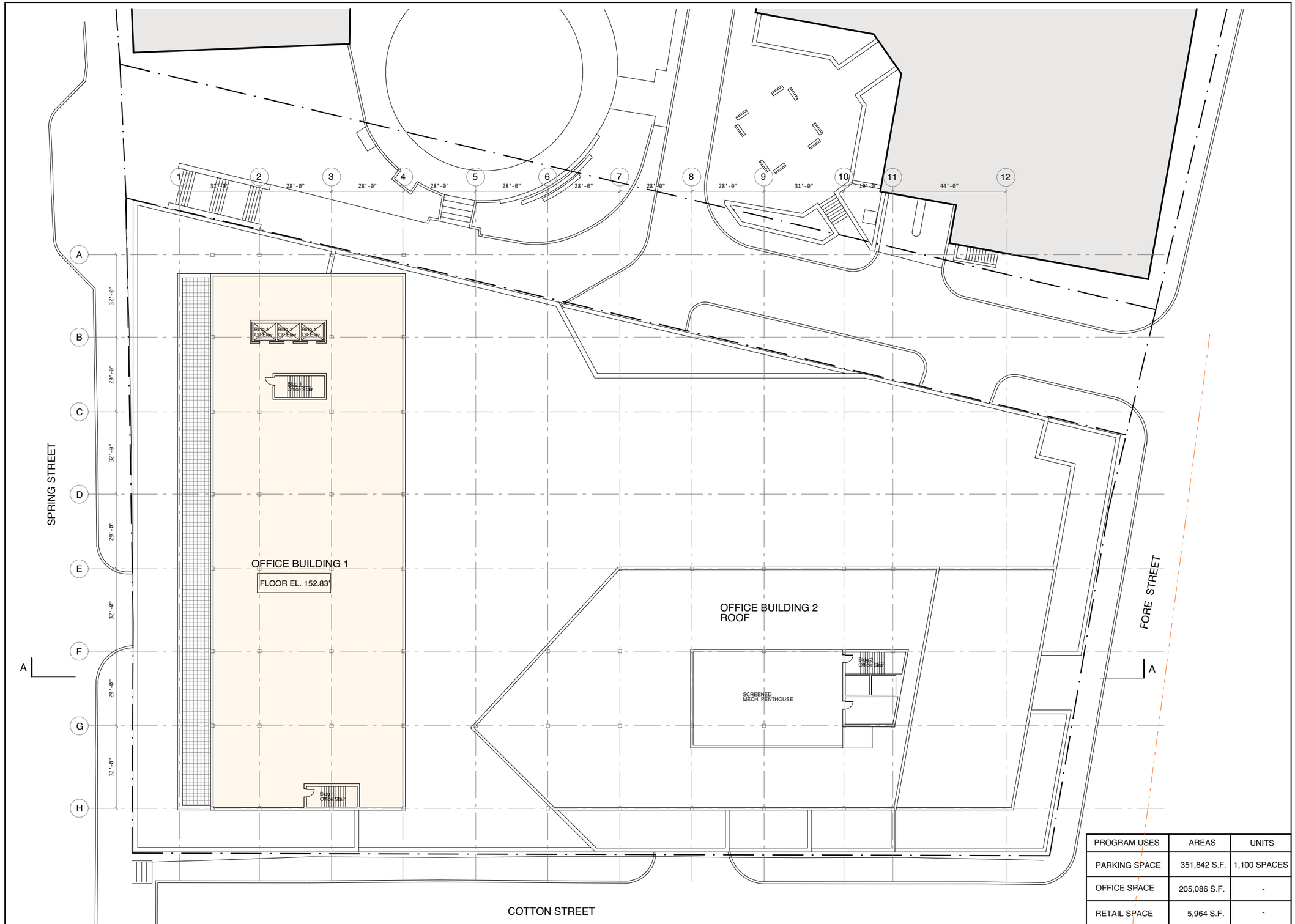
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Drawing Title: **UPPER SITE**
Scale: 1/16"=1'-0"

LEVEL10 OFFICE
El. 140.50'

Date: 03.05.19
Phase: Permitting

A1.10



PROGRAM USES	AREAS	UNITS
PARKING SPACE	351,842 S.F.	1,100 SPACES
OFFICE SPACE	205,086 S.F.	-
RETAIL SPACE	5,964 S.F.	-
HOUSING	32,508 S.F.	18 UNITS

Portland Square

MASTER DEVELOPMENT PLAN

Portland, Maine

Owner / Developers
NORTH RIVER, LLC
New York, NY

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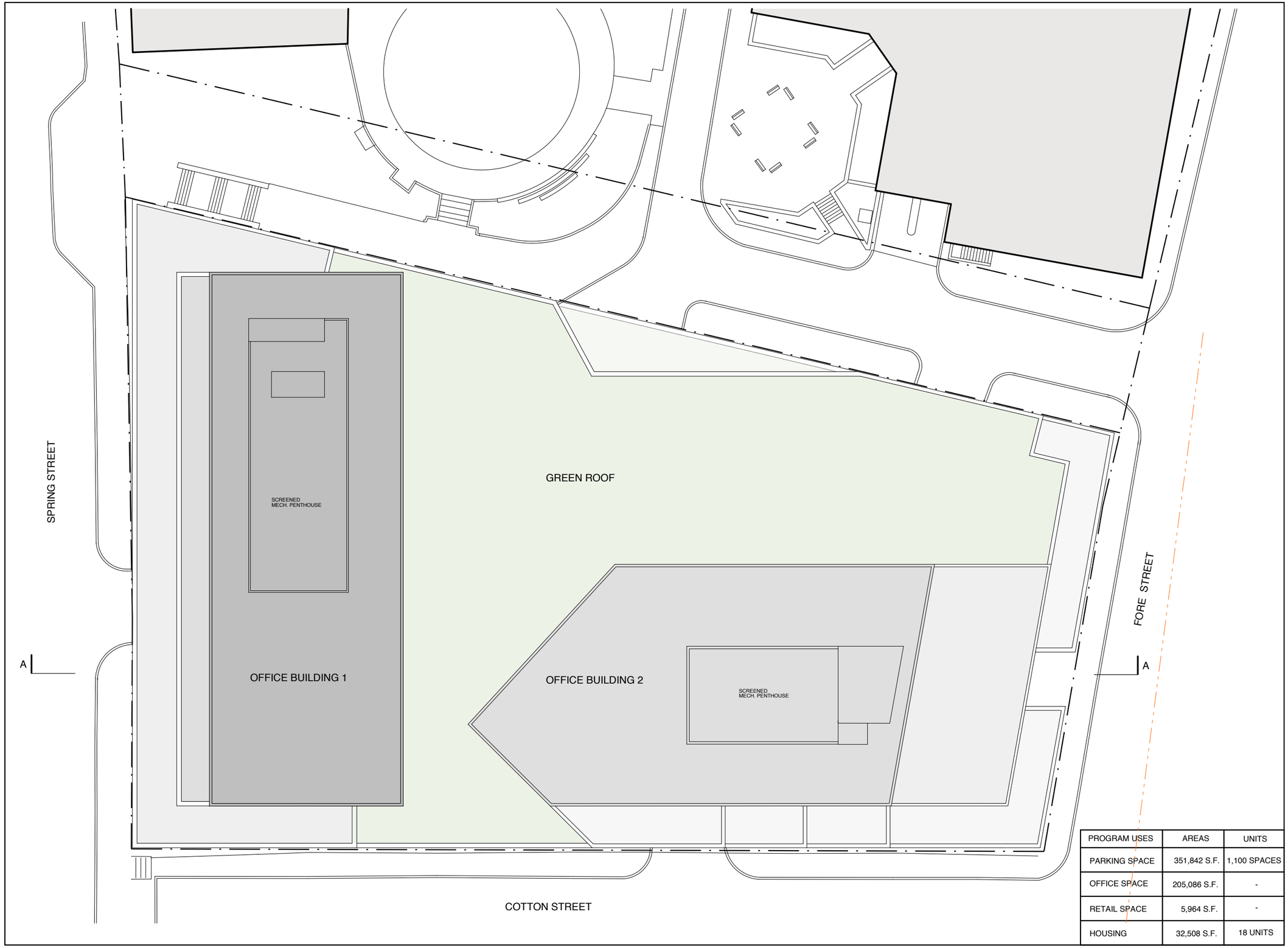
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Scale: 1/16"=1'-0"

LEVEL 11 OFFICE
El. 152.83'

Date: 03.05.19
Phase: Permitting

A1.11



PROGRAM USES	AREAS	UNITS
PARKING SPACE	351,842 S.F.	1,100 SPACES
OFFICE SPACE	205,086 S.F.	-
RETAIL SPACE	5,964 S.F.	-
HOUSING	32,508 S.F.	18 UNITS

Portland Square

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Portland, Maine

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New York, NY

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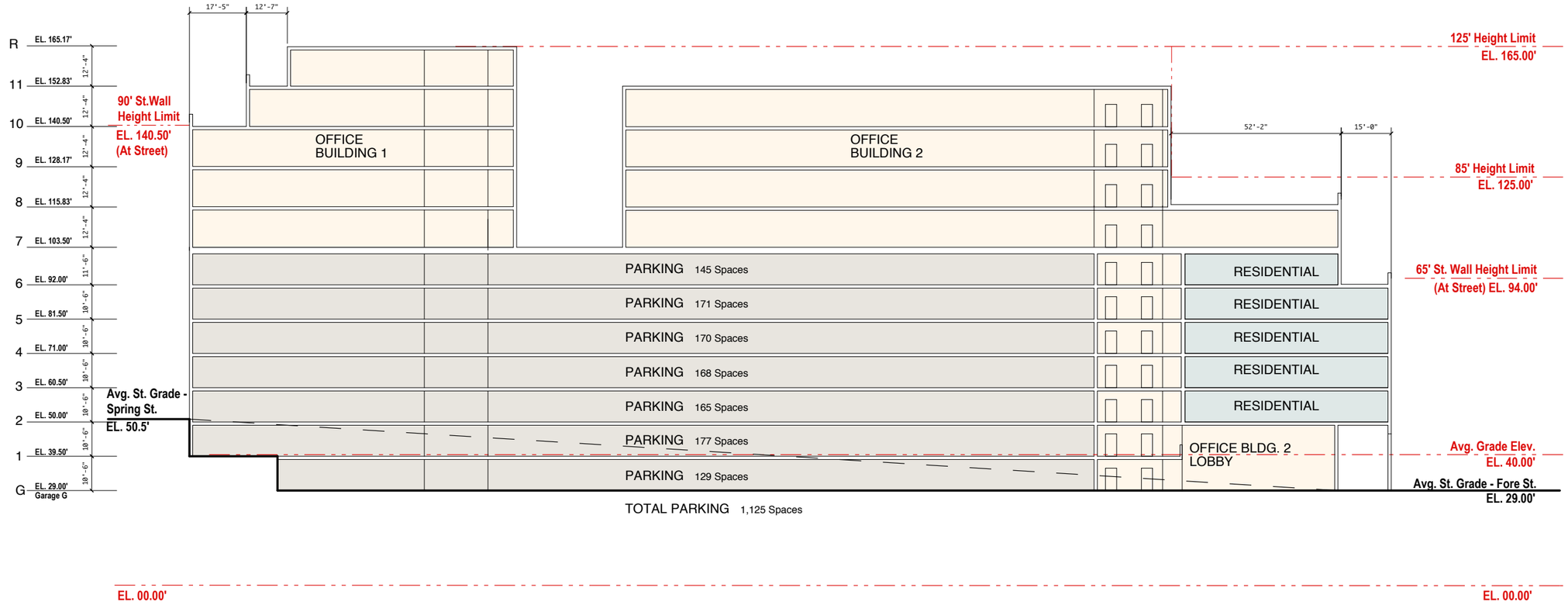
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UPPER SITE

LEVEL 12 ROOF
El. 165.17'

Date: 03.05.19
Phase: Permitting

A1.12



SECTION A-A BUILDINGS 1 & 2



51.1' + 28.5' + 30.3' + 50.1' = 160.0'

160.0' / 4 = 40.0' AVERAGE GRADE

AVERAGE GRADE CALCULATION DIAGRAM

Portland Square

MASTER DEVELOPMENT PLAN

Portland, Maine

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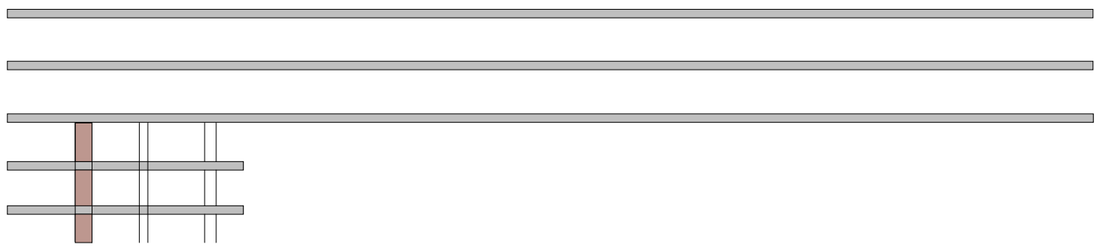
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UPPER SITE

BUILDING SECTION A-A AND AVERAGE GARDE CALC DIAGRAM

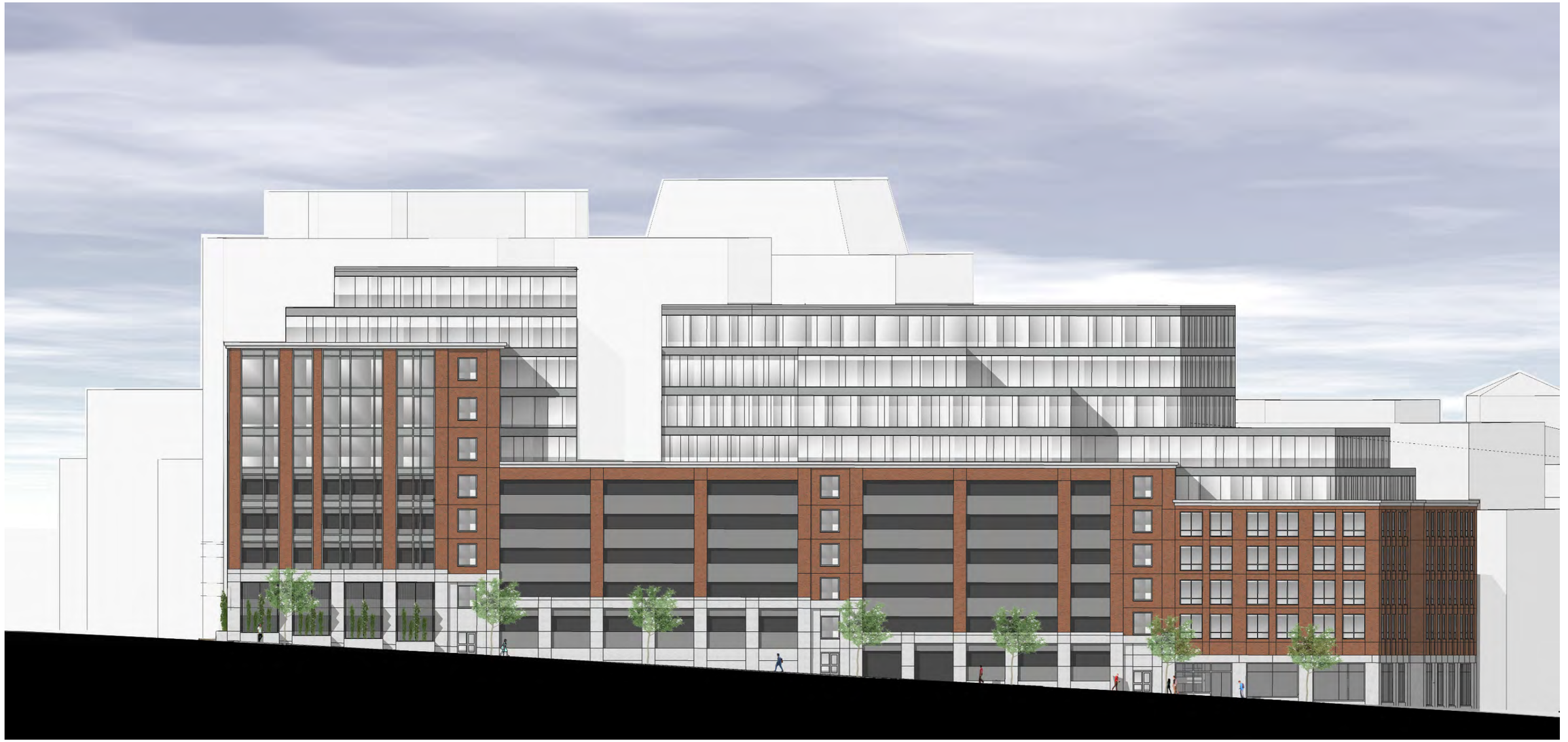
Date: 03.05.19
Phase: Permitting

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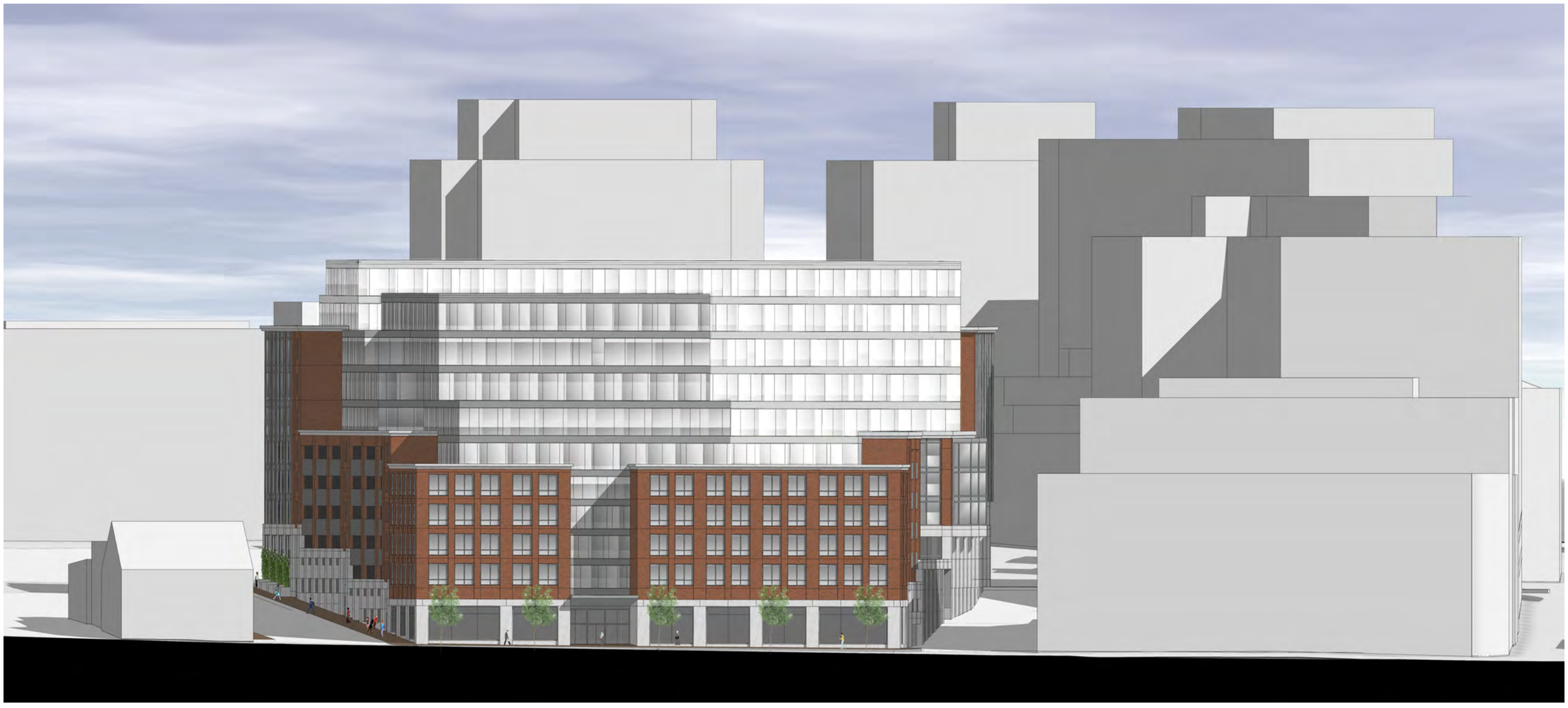
CENTER STREET ELEVATION



COTTON STREET ELEVATION



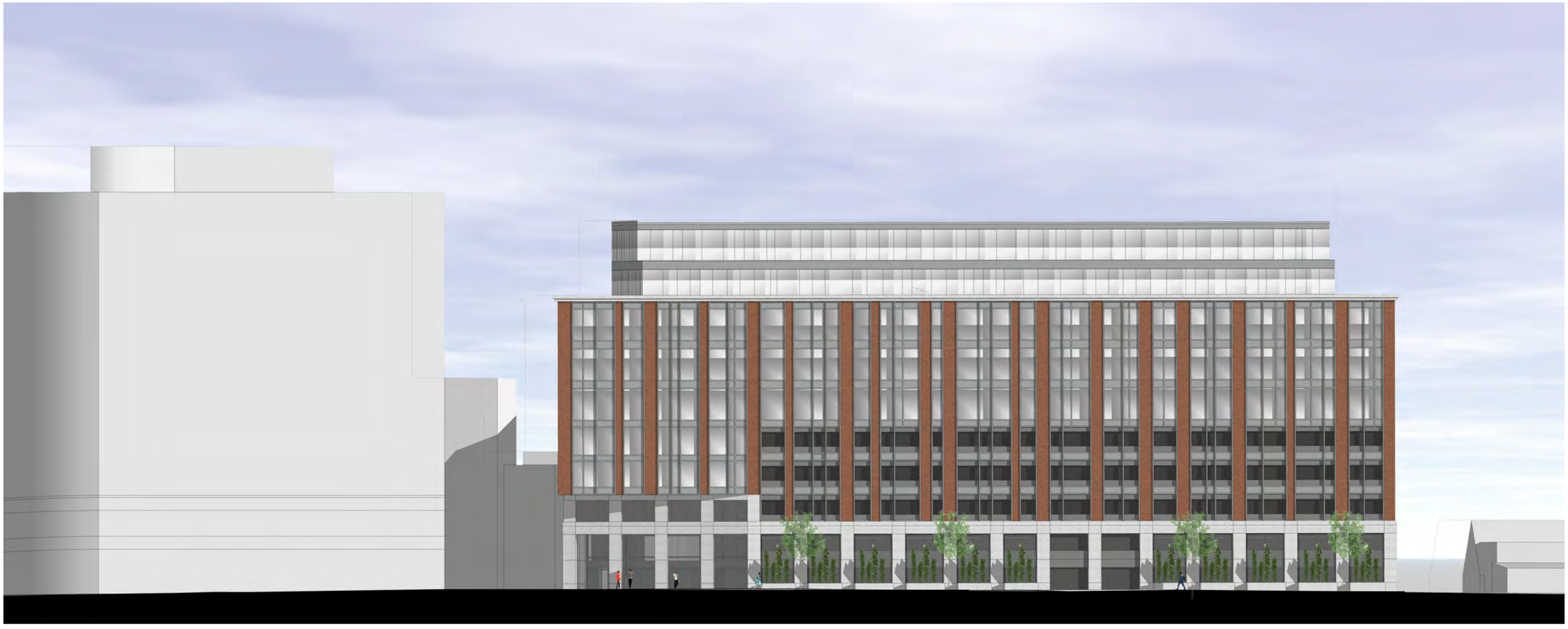
CROSS STREET ELEVATION



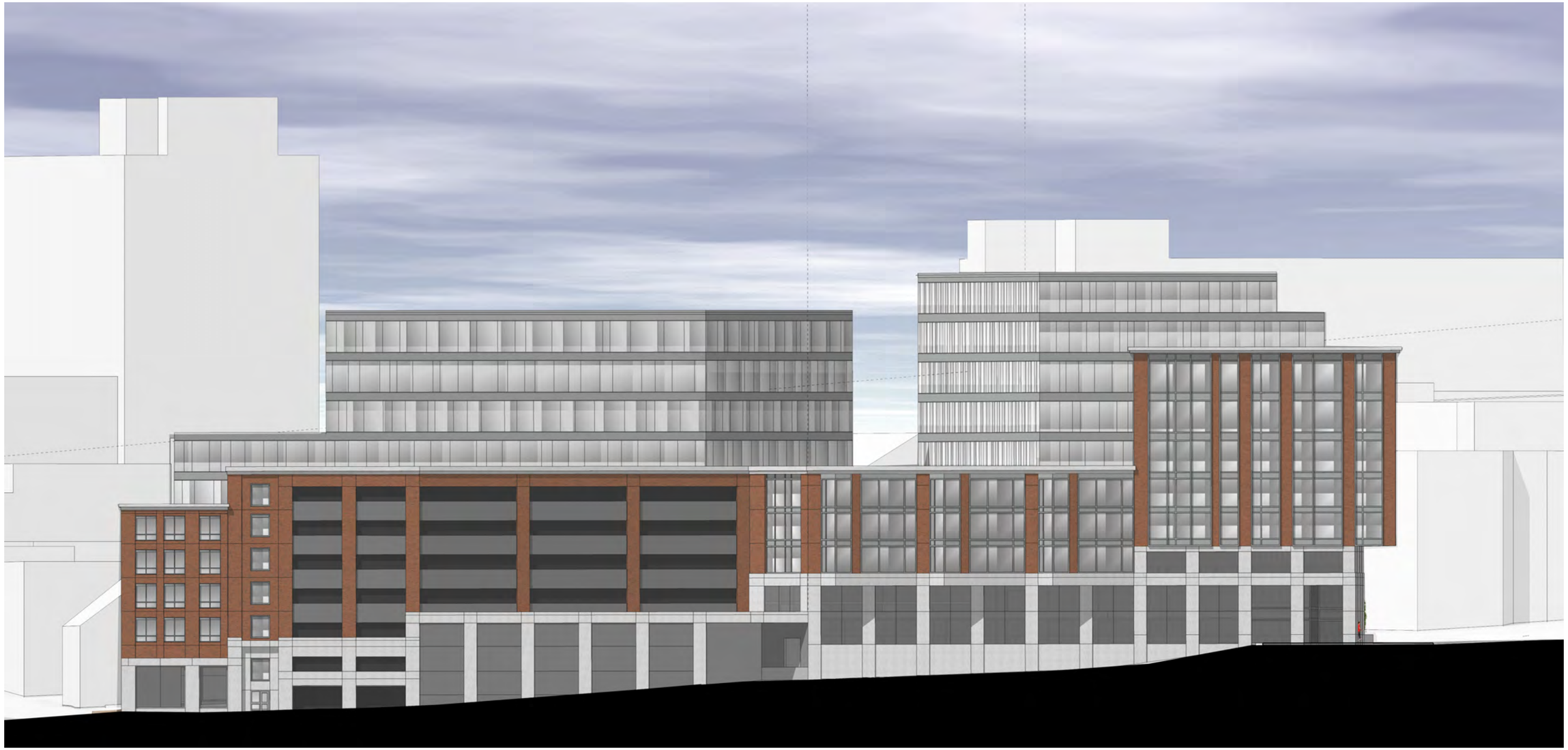
FORE STREET NORTH ELEVATION



FORE STREET SOUTH ELEVATION



SPRING STREET ELEVATION



UPPER CROSS STREET ELEVATION



OVERHEAD VIEW (NE)



OVERHEAD VIEW (NW)



OVERHEAD VIEW (PLAZA)



OVERHEAD VIEW (SE)



CORNER OF FORE/CENTER ST.



CORNER OF FORE/COTTON



CORNER OF FORE/CROSS ST.



CORNER OF SPRING/COTTON ST.



VIEW UP CROSS STREET



ABUTTING PROPERTY VIEW



PLAZA VIEW FROM FORE ST



PLAZA VIEW



SPRING ST ENTRY VIEW



STAIR VIEW



RAMP TO SPRING ST VIEW

Memorandum
Planning and Urban Development Department
Planning Division

To: Sean Dundon , Chair and Members of the Portland Planning Board
From: Matthew Grooms, Planner
Date: May 23, 2019
Re: Portland Square Parking Amendment, 1 Portland Square, North River, LLC
Project #: PL-000606-2019
Meeting Date: May 28, 2019

I. INTRODUCTION

North River IV, LLC has submitted a Level III Site Plan Amendment application to amend the existing Site Location of Development Approval that was granted for Portland Square One and Two, and adjust the parking requirement for those two developments, to allow for the dispensation of a portion of the property to Fathom Company, LLC for a new 135-room hotel project at 1 Center Street. The property is located in the B-3 Downtown Business District, and currently operates as a surface parking lot servicing Portland Square One and Two, and provides additional parking for members of the public.

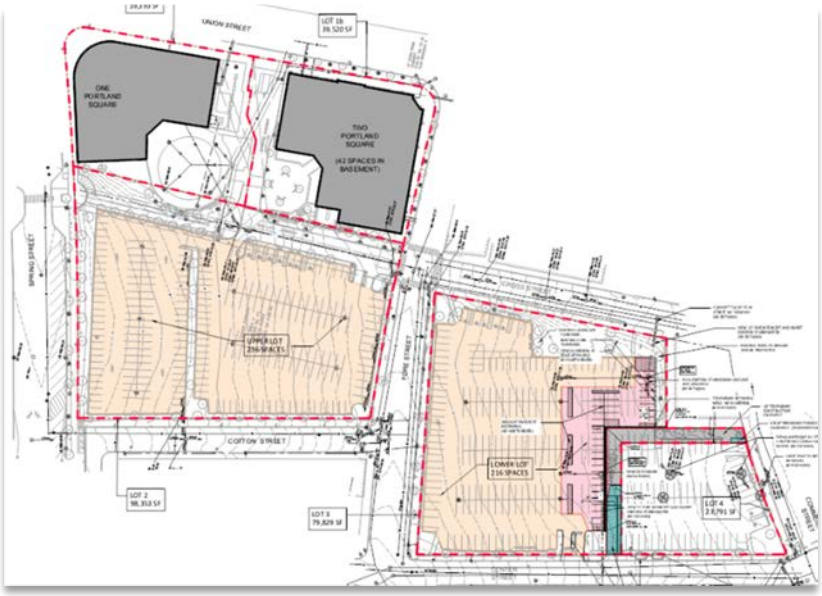


Figure 1: Overall site configuration

The proposal is being referred to the Planning Board for compliance with Site Plan standards, as well as Site Location of Development Act (SLODA) requirements, as the City has been granted delegated review of this project by Maine DEP. The property is located partially within the Old Port Historic District, and shall undergo an advisory review as part of the Portland Square Master Development Plan. A total of 213 notices were sent to property owners within 500 feet of the site and a legal ad ran in the Portland Press Herald on May 17th and May 18th. A Neighborhood Meeting was held on May 23, 2019. The meeting notes are not yet received, and shall be made available prior to the workshop.

Applicant: North River IV, LLC

Consultants: Stephen Weatherhead, Winton Scott Architects; Patrick Carroll, Carroll Associates; John Swan, Owen Haskell, Jacques Dan, North River Company/Waterfront Maine

II. REQUIRED REVIEWS

Review	Applicable Standards
Site Plan	Section 14-526

Site Location of Development	Technical Manual Section 14
Waivers	**Applicable Standards**
Sec. 1.14: Parking Lot and Parking Space Design – Proposal is to allow parking dimension of 8' 18', which is the existing condition. **Staff Recommendation:** Staff are supportive of this waiver request, given that this is the existing condition, and that the applicant is not increasing the level of non-conformity.	Sec. 1.14 of the Technical Manual requires that a standard sized parking space be 9' x 18' or compact spaces be 8' x 15'.

III. PROJECT DATA

Existing Zoning	B-3 Downtown Business, DE Overlay, PAD, Old Port Historic District		
Existing Use	Surface Parking Lot (542 spaces)		
Proposed Use	Surface Parking Lot (452 spaces)		
Property Size	6.45 acres		
	Existing	*Proposed*	*Net Change*
Impervious Surface Area	225,000 SF	220,000 SF	-5,000 SF
Parking Spaces	565 spaces	452	-113

IV. BACKGROUND AND EXISTING CONDITIONS

The existing site, totaling 6.45 acres spread across two City blocks, was approved for its current configuration by the City in two phases, with One Portland Square approved by the City and Maine DEP in 1986, and Two Portland Square approved in 1989 (constructed in 1987 and 1989 respectively). This approval required a total parking count of 542 spaces to serve Portland Square One and Two, though ultimately, 565 spaces were created.

As part of Phase 1 of the Portland Square Master Development Plan (MDP) the property owner is seeking to sell off a 0.55 acre parcel of land at the southeast corner of the lower lot (2.38 acres) to Fathom Company, to develop a new 135-room hotel with associated restaurant uses at ground and roof level (4,192 square feet). To do this, a total of 113 existing parking spaces would need to be removed, 90 of which are required by the site plan approval on file for Portland Square One and Two.

V. PROJECT DESCRIPTION

A. Parking Analysis

The applicant proposes to utilize a categorical exception to modify off-street parking requirements that is established in Division 20, Off-Street Parking Requirements, to reduce the overall parking requirement by Portland Square One and Two by a total of 90 spaces. This exception reads:

> *Site plans over 50,000 square feet and projects in the B-6, B-7, and USM Overlay Zones: Where construction is proposed of new structures having a total floor area in excess of fifty thousand (50,000) square feet, the planning board shall establish the parking requirement for such structures. The parking requirement shall be determined based upon a parking analysis submitted by the applicant and upon the recommendation of the city transportation engineer.*

Portland Square One and Two contain 260,341 square feet of office space and 12,850 square feet of retail space, well in excess of the 50,000 square foot minimum threshold for this categorical exception.

The applicant has submitted a parking analysis completed by VHB to justify the parking reduction, wherein current parking demands, generated by existing tenants, as well as potential future demand, calculated by an assessment of currently vacant space (4,000 square feet), were evaluated. Information compiled for this analysis are based upon assumed 'peak activity periods' during March and April 2018 and September and October 2018. These dates account for maximum usage by office tenants and exclude summer months where the parking count would include additional seasonal traffic. During these periods, the average peak occupancy was 442 spaces, or approximately 82 percent of available capacity. Of this figure, monthly tenant parkers account for 76% of the total number of spaces occupied.

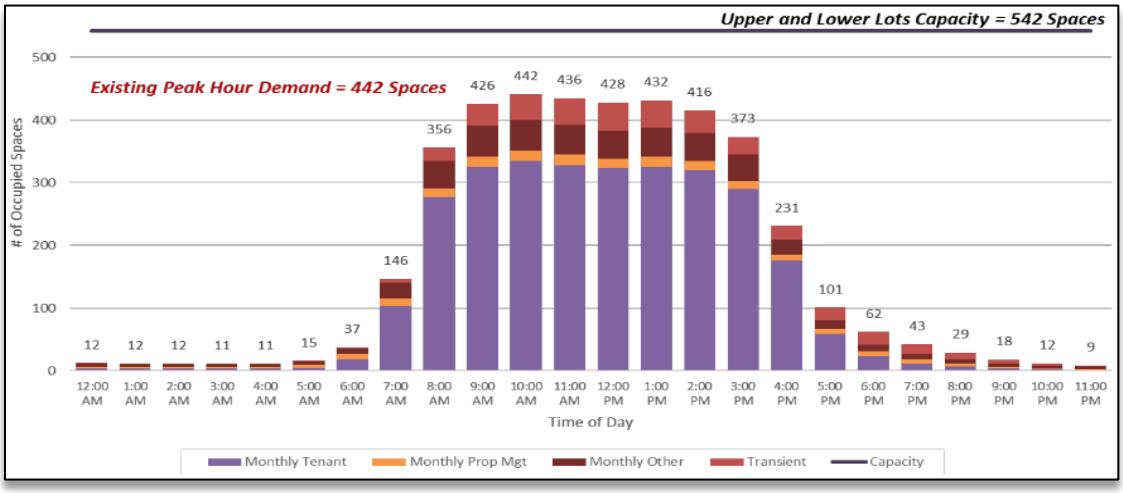


Figure 2: Peak hour parking demand by time of day

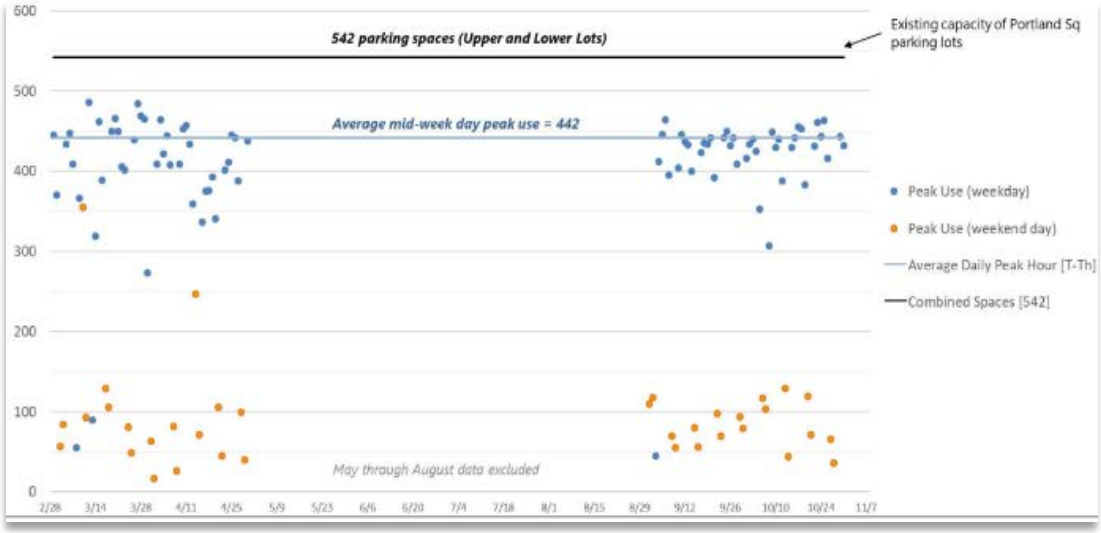


Figure 3: Parking demand by time of year.

The report notes that this proposed reduction is only intended to satisfy an interim condition, and depends upon future development of additional parking at the upper section of the property. As stated in the parking analysis, the parking lot would operate slightly over capacity, once the 64 spaces being allocated to the hotel development come

online. The parking analysis argues that this is a worst-case scenario, and that likely, the hotel would complement the office/business uses based upon peak demand for each use. Hotels for example are busiest during the weekend, whereas office uses are busiest during the week, and specifically during the day.

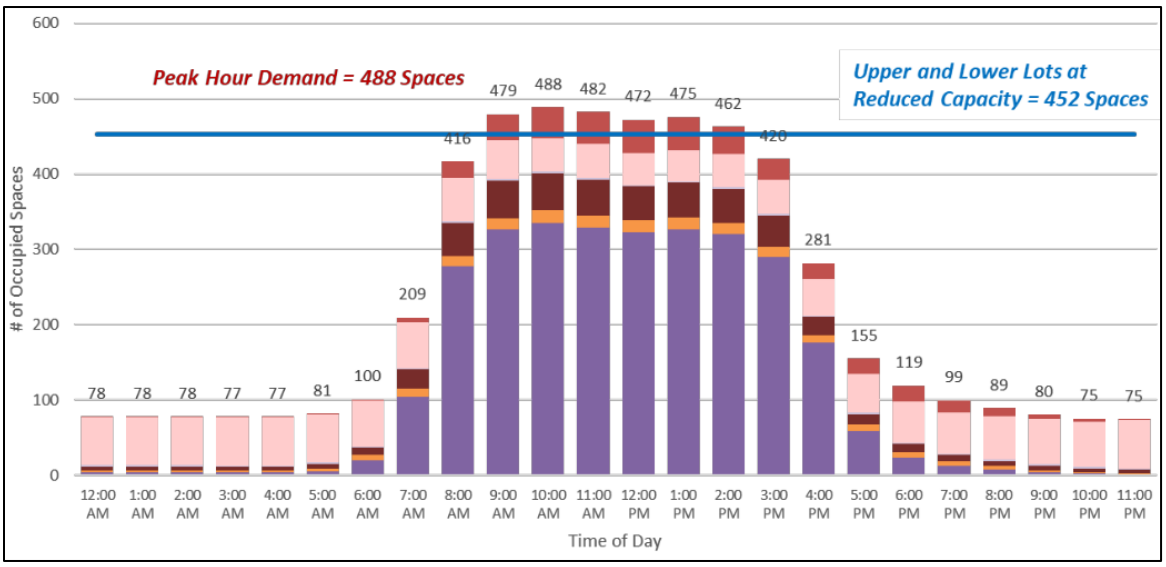


Figure 4: Projected peak hour demand with hotel demand and reduced parking count.

While it is anticipated that uses will complement one another, the report does state that the applicant is committed to further exploring and employing a series of parking demand management actions to ensure that demand conditions do not exceed supply and create unintended impacts. These measures include:

- Third party monthly pass users account for approximately 50 occupied parking spaces during peak times. These are considered "tenants-at-will" and the property owner may choose to not renew these leases.

- On peak days where the lots reach their capacity, transient parkers may not be permitted to access the lots. According to the applicant, this happens infrequently, approximately 40 days per year, and only between the hours of 10:00 a.m. and 2:00 p.m. At other times, the lot still operates under capacity.

- Modified pricing strategies.

- Valet services associated with the hotel may help achieve a more efficient use of the parking lots during these short windows of peak capacity.

B. SITE RECONFIGURATION

The primary consideration before the Board relates to the parking analysis discussed above, used as justification to reduce the overall parking requirement for Portland Square One and Two. However, in order to cleanly separate the 0.55-acre parcel for the hotel, a few minor site improvements were deemed to be required. These include relocation of two stormwater lines, minor regrading and installation of a wall/guardrail, and restriping of a small portion of the lower lot to facilitate improved circulation. Much of this work will be coordinated with Fathom Company during the construction of the hotel, and may be made a condition of this approval. A plan showing such improvements can be seen below.

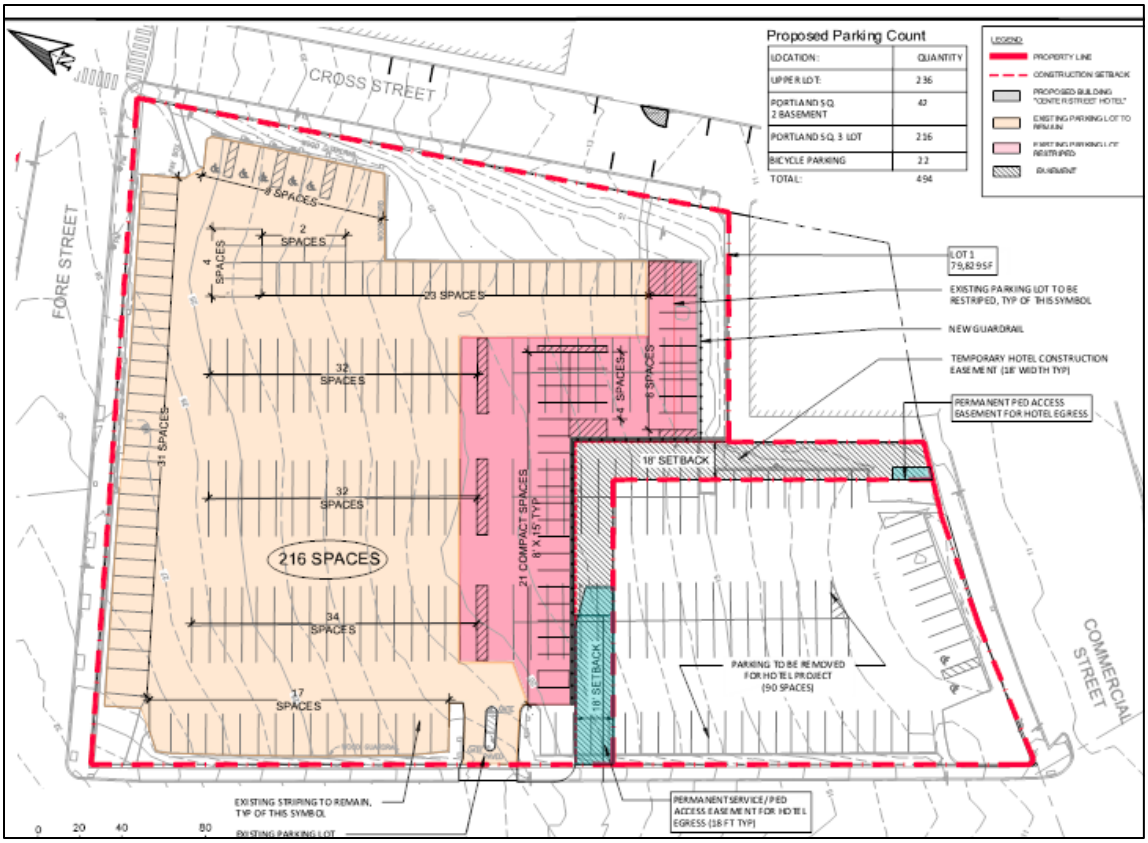


Figure 5: Proposed reconfiguration of lower lot.

C. Site Location of Development

As part of this application, the applicant submitted a separate application to amend the SLODA approval for this project, required when any amendment is processed on a property where SLODA review has occurred. Site Location Law requires a showing that certain standards are being met. The following is a list of standards to be adhered to, outlined under Section 14 of the Technical Manual:

- Financial and Technical capacity to complete a project as proposed
- Traffic Movement
- No adverse effect on the natural environment
- Soil types analysis
- No adverse impact to ground water
- Comprehensive assessment of infrastructure needs
- Flooding accountability
- Stormwater management and erosion/sedimentation control

Under the exhibits file for the SLODA application, included in the applicant's materials, a discussion of each of these points is provided.

VI. DISCUSSION OF SUBMISSION MATERIALS

Staff has reviewed the material provided by the applicant and finds it to be generally consistent with the standards of the site plan ordinance, the B-3 zone and Site Location of Development review standards. At the time of the hearing, staff will prepare a complete finding of consistency for the reference of the Board.

For the purposes of this workshop, we aim to address whether or not the parking analysis provides ample justification for the proposed reduction in parking. We also want to determine whether or not this parking analysis should be expanded to account for parking allocation during future phases of development to be analyzed as part of the MDP and hotel reviews. As proposed, the parking analysis is only intended to account for current need, as a means to eliminate certain available parking and sell of a parcel to Fathom Company for the Center Street Hotel project. Staff will be looking for Board feedback on these topic areas at the May 28th workshop, with the aim of moving to a public hearing for this particular application in the near future.

Regarding the parking analysis, Tom Errico, P.E. with T.Y. Lin, and consulting traffic engineer for the City, has reviewed the submitted material, stating that the methods and contents of the report are comprehensive and generally appear to be acceptable, and offers the following preliminary comments:

- The Analysis should include/document existing Portland Square employees that do not park in the subject surface parking lots. It is our understanding that some employees park in other paid parking facilities. The parking program for existing employees should be summarized.

- The analysis should include discussion of parking impacts during construction for each project phase. It is important to understand how parking supply will be impacted during construction activities. It is suggested that a graphic be provided illustrating construction phasing activities and the impacts to parking supply.

- Calculations for estimating parking demand (64 spaces) for the hotel should be provided. The demand should be based upon a parking generation analysis and not zoning requirements.

- An explanation on the management and designation of users of the 42-space parking garage shall be provided.

- To fully understand year-long seasonal parking usage in the subject lots, parking demand during all months shall be provided.

- A number of the data points in Figure 3 fall above the average line particularly during the late winter time period. Some discussion on the use of average conditions versus an 85th percentile conditions should be provided.

- I will continue to review suggested parking management strategies and will provide comments in the future. My general conclusion at this time is that both Other Monthly and Transient parkers are likely to be reduced/eliminated to offset the parking supply loss.

VII. NEXT STEPS

Prior to the public hearing, the applicant should address staff review comments regarding the parking analysis and any questions that may come up at the May 28th workshop. Additionally, the neighborhood meeting notes should be provided as soon as they are available.

VIII. ATTACHMENTS

Staff Attachments

1. Preliminary Traffic Review Comments

Applicant's Documents

A. Cover Letter
B. Locus Map
C. Parcel Deed
D. Financial Capacity
E. Statement of Good Standing
F. Technical Capacity
G. Authorization Letter
H. Easements and Covenants
I. Evidence of State/Federal Approvals
J. Level II and III Checklist
K. Portland Square Parking Use Analysis
L. SLODA Application
M. SLODA exhibits
N. Waiver Table

Applicant's Plans

Plan 1: Upper Lot Survey
Plan 2: Lower Lot Survey
Plan 3: Overall Parking Plan
Plan 4: Lower Lot Improvements

Portland Maine | Yes. Google's good here.

Matthew Grooms <mgrooms@portlandmaine.gov>

Portland Square Parking Analysis - Preliminary Traffic Comments

Tom Errico <thomas.errico@tylin.com> Thu, May 23, 2019 at 9:35 AM
To: Matthew Grooms <mgrooms@portlandmaine.gov>
Cc: Bruce Hyman <bhyman@portlandmaine.gov>, Mike Tremblay <mtremblay@portlandmaine.gov>, Jeremiah Bartlett <JBartlett@portlandmaine.gov>

Hi Matt – I have reviewed the April 16, 2019 Parking Analysis Memorandum prepared by VHB. In general, I find the methods and contents to be comprehensive and generally I find it to be acceptable with the following preliminary comments.

- The Analysis should include/document existing Portland Square employees that do not park in the subject surface parking lots. It is our understanding that some employees park in other paid parking facilities. The parking program for existing employees should be summarized.
- The analysis should include discussion of parking impacts during construction for each project phase. It is important to understand how parking supply will be impacted during construction activities. It is suggested that a graphic be provided illustrating construction phasing activities and the impacts to parking supply.
- Calculations for estimating parking demand (64 spaces) for the hotel should be provided. The demand should be based upon a parking generation analysis and not zoning requirements.
- An explanation on the management and designation of users of the 42-space parking garage shall be provided.
- To fully understand year-long seasonal parking usage in the subject lots, parking demand during all months shall be provided.
- A number of the data points in Figure 3 fall above the average line particularly during the late winter time period. Some discussion on the use of average conditions versus an 85^{th} percentile conditions should be provided.
- I will continue to review suggested parking management strategies and will provide comments in the future. My general conclusion at this time is that both Other Monthly and Transient parkers are likely to be reduced/eliminated to offset the parking supply loss.

If you have any questions, please contact me.

Best regards,

Thomas A. Errico, PE
Senior Associate
Traffic Engineering Director
TY LIN INTERNATIONAL
12 Northbrook Drive
Falmouth, ME 04105
+1.207.781.4721 main
+1.207.347.4354 direct
+1.207.400.0719 mobile
thomas.errico@tylin.com
Visit us online at www.tylin.com
Twitter | Facebook | LinkedIn | Instagram

CARROLL ASSOCIATES

April 12, 2019

Ms. Barbara Barhydt
Development Review Manager
City of Portland Planning Division
389 Congress Street, 4th Floor
Portland, ME 04101

RE: Portland Square, Amendment to One and Two Portland Square

Dear Barbara,

On behalf of North River IV, LLC, we are pleased to submit a Level III Application for the existing One and Two Portland Square properties owned by North River IV. The intent of this Application is to seek an Amendment to the existing Site Plan Requirements for One and Two Portland Square specifically relating to the required parking for the project. The current approval requires a total of 565 spaces, the majority of which are located in two surface lots adjacent to the development. Based on a detailed analysis of the current and projected utilization of parking in these lots, we believe a reduction in required parking is justified. The immediate goal of this reduction is to allow a 0.55 Acre portion of the lower lot to be transferred to the Fathom Company for development as a Hotel.

This Amendment request is integral to the Master Development Plan for Portland Square which was submitted to the City last week, as well as the Center Street Hotel project which is currently undergoing a Level III review. There are several minor site improvements necessary within the lower lot to enable the Hotel project to proceed, including relocation of two stormwater lines, minor regrading and installation of a wall/ guardrail, and restriping of a small portion of the lower lot to reorganize it to accommodate the Hotel parcel. We are indicating proposed striping improvements on the attached Site Plans, but believe that other physical improvements necessary are crucial to the enabling work for the Fathom Company to proceed with their hotel project, and at our meeting April 12 we all agreed the Fathom Design Team would include this work in their Level III Site Plan Application package. It is noted that North River is granting temporary construction easements on the remaining parcel for these construction enabling activities to occur.

In addition to the Site Plan Amendment, we believe this work triggers an Amendment to the existing SLODA which is attached to this property. We understand that the City has been assigned delegated review authority by DEP for this Amendment and that its application will be reviewed concurrent with the Level III Application. A copy of the SLODA Amendment is included with this application, and two hard copies will be delivered to your office as required.

<u>Project Description</u>
The project site occupies almost two city blocks and approximately 6.45 acres of land in four parcels bound by Spring, Commercial, Center, Cotton and Cross Streets. The property currently contains approximately 260,000 sf of mixed-use space in Portland Square One and Portland Square Two, the remaining property is currently utilized for surface parking, containing approximately 542 private parking spaces on the upper and lower lots straddling Fore Street, not including 42 existing spaces in the basement of 2 Portland Square.

North River Company has entered into an agreement to sell a 0.55 Acre parcel of land at the southeast corner of the lower lot (2.38 ac) property at Commercial and Center Streets to the Fathom Company for development of a proposed 135 room Hotel, which is currently being reviewed by the City. This parcel effectively reduces the number of parking spaces available for Portland Square One and Portland Square Two tenants by approximately 90 spaces, from 542 down to 452 spaces as proposed. Key to this proposed reduction is insuring the reduced parking still meets the needs of One and Two Portland Square. A detailed Parking Utilization Study was recently completed by VHB Consultants of Boston. Their report is attached to this application, and analyzed in detail at the existing use of the parking lots, as well as projected future utilization resulting from full occupancy of the buildings and projected hotel parking. The results indicate that the parking lot will continue to meet the daily needs of Portland Square One/ Two at 452 spaces, and notes that once the Hotel is on line the surface lots will operate at slightly over capacity if current demand levels remain. The report offers several management tools that the Owners might consider to reduce overall demand.

It is recognized that the Portland Square Master Development Plan proposes its first phase of development to be on the upper lot, where an 1100 car parking structure is proposed. Once this structure is complete, it is anticipated that North River will have more than enough capacity to meet the needs of the entire project, including the Hotel. The North River Company is working closely with VHB to determine appropriate parking demands for the proposed buildout of that project, as well as developing a Traffic Demand Management Plan that encompasses the entire project.

Attached and made part of this Application are documents, reports, plans, and images that describe the Portland Square Amendment Request in full detail. We believe the Application is complete and welcome the opportunity to work closely with City Staff, Planning Board, and interested residents of Portland during its review and approval.

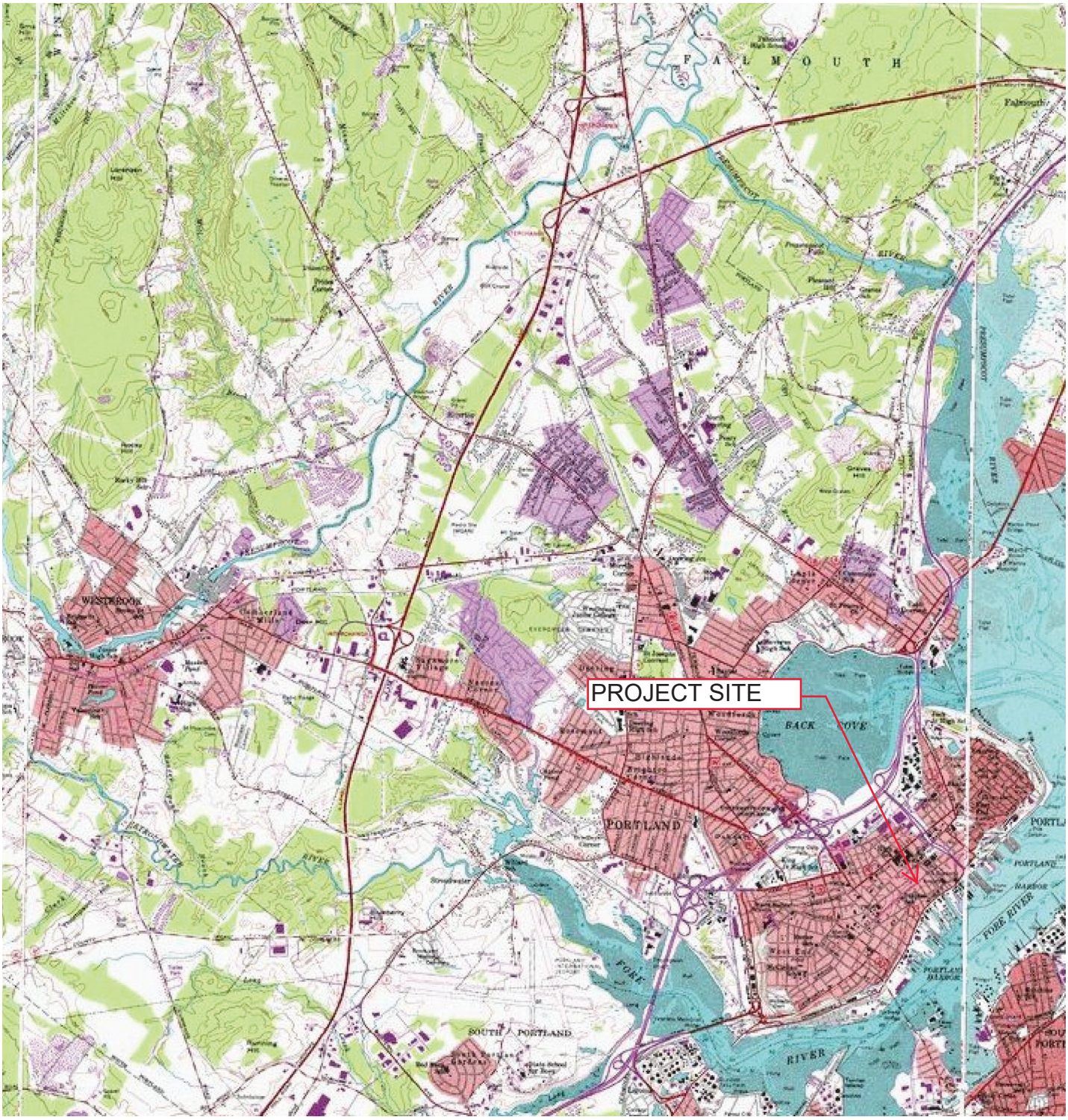
With Regards,
CARROLL ASSOCIATES



Patrick J. Carroll, Principal

CC: Peter Pachios, NR IV
Adam Meyers, NR IV
Dan Jacques, NR IV
Jim Brady, FC
Stephen Weatherhead, WSA
Barry Sheff, W&C

ATTACHMENT #2



USGS TOPOGRAPHIC MAP
PORTLAND WEST- 43070-F3

1-2 PORTLAND SQUARE
SLODA #L-013526-26-A-N

ATTACHMENT #3

MAINE REAL ESTATE TAX-Paid

QUITCLAIM WITH COVENANT DEED

DLN:1001540002732

RREEF AMERICA REIT III-Z4 LLC, a Delaware limited liability company with a place of business in 222 South Riverside Plaza, Chicago, Illinois 60606-5808 for consideration paid, grants to North River IV LLC, a Delaware limited liability company with a place of business at 224 12th Avenue, New York, NY 10001, with **QUITCLAIM COVENANT**, the land, together with all improvements thereon and all rights and easements appurtenant thereto, located at or near Union street and Fore street consisting of unites 1-6 One Portland Square, a Business Condominium, the building known as Two Portland Square and certain related parcels, Portland, Cumberland County, Maine, more particularly described on **Exhibit A** attached hereto.

IN WITNESS WHEREOF, RREEF America REIT III-Z4 LLC, has caused this deed to be executed by James E. Toney, Assistant Vice President its duly authorized Assistant Vice President, this 26th day of March, 2015.

RREEF AMERICA REIT III-Z4 LLC,
a Delaware limited liability company,

By: RREEF AMERICA REIT III-Z LLC,
a Delaware limited liability company, its manager,

By: James E. Toney
Its duly authorized Assistant Vice President

Witness:
Vanessa C. Z

STATE OF ILLINOIS
COUNTY OF COOK

March 26, 2015

Personally appeared before me the above-named James E. Toney, Assistant Vice President of RREEF America REIT III-Z LLC, a Delaware limited liability company, manager of RREEF America REIT III-Z4 LLC, and acknowledged the foregoing instrument to be his free act and deed in his said capacity and the free act and deed of said company.

Notary Public/Attorney at Law
Print name: Beverly A Dillon

OFFICIAL SEAL
BEVERLY A. DILLON
NOTARY PUBLIC - STATE OF ILLINOIS
MY COMMISSION EXPIRES MARCH 3, 2018

EXHIBIT A

Legal Description

Tract 1:

Parcel One - One Portland Square.

Units No. 1, 2, 3, 4, 5, and 6 of One Portland Square, a business condominium, situated at the corner of Union and Spring Streets in the City of Portland, County of Cumberland and State of Maine, as more particularly described in the Declaration of One Portland Square, a business condominium, dated as of October 27, 1987 and recorded in the Cumberland County Registry of Deeds on October 29, 1987 in Book 8039, Page 37, and in the plats and plans incorporated into the declaration and recorded in the Cumberland County Registry of Deeds in Plan Book No. 166, Page 44 sheets 1 through 13, by virtue of the recording of which declaration, plats and plans, the declarant created the condominium pursuant to the Maine Condominium Act, Title 33 of the Maine Revised Statutes of 1964, as amended, Chapter 31, Sections 1601-101 et seq., as amended.

Parcel Two - Upper Parking

A parcel of land shown as "Lot 3" on a land title survey prepared for Northland Realty Corporation by Lewis & Wasina, Inc. dated April 5, 1995, Project No. 9508 located on the southerly side of Spring Street Arterial, the easterly side of Cotton Street and the northerly side of Fore Street, City of Portland, County of Cumberland, State of Maine, and being more particularly described as follows:

Beginning at a found rebar at the intersection of the northerly right of way line of Fore Street and the easterly right of way line of Cotton Street;

Thence, N24° 18' 44" W along the easterly right of way line of Cotton street a distance of 356.32 feet to a set 5/8 inch rebar with aluminum cap stamped "Lewis & Wasina PLS 2114" at the southerly right of way line of Spring Street Arterial;

Thence, N65° 47' 27" E along the southerly right of way line of Spring Street Arterial a distance of 89.72 feet to a found rebar;

Thence, continuing to follow the southerly right of way line of Spring Street Arterial along a curve to the left having a delta of 3° 11' 35", a radius 3887.30 feet, an arc length of 216.65 feet and a chord bearing and length of N64° 11' 39" E, 216.62 feet to a found drill hole in a concrete sidewalk;

Thence, S11° 09' 10" E following the former easterly right of way line of cross street, now discontinued, along lot 1 and lands conveyed by deed to Two Portland Square limited partnership as shown on said plan a total distance of 413.33 feet to a found rebar on the northerly right of way line of Fore Street;

Thence, S78° 49' 49" W along the northerly right of way line of Fore Street a distance of 79.03 feet to a found rebar;

Thence, S75° 13' 06" W along the northerly right of way line of fore street a distance of 137.10 feet to the point of beginning.

All the above mentioned found rebar are 5/8 inch with aluminum cap stamped "SMRT RLS 1314".

Reference should be made to the plan for further details of the boundary and easements.

The basis of bearing for this description is magnetic North, 1972, as shown on said plan.

Parcel Three - Lower Parking

A certain lot or parcel of land being the majority of the block bounded northerly by Fore Street, easterly by Cross Street, southerly by Commercial Street and westerly by Center Street in the City of Portland, County of Cumberland, and State of Maine and further bounded and described as follows:

Beginning at a drill hole at the intersection of the northwesterly line of Commercial Street and the easterly line of Center Street, said point also being the most southwesterly corner of certain land conveyed to the Atbro Corporation by Deed dated October 3, 1979, and recorded in the Cumberland County Registry of Deeds in Book 4506, Page 48;

Thence North 43° 29' 22.8" East along Commercial Street, a distance of 69.18 feet to a reinforcing rod;

Thence North 46° 50' 30" East along said Commercial Street, a distance of 54.32 feet to a reinforcing rod;

Thence North 52° 30' 11.2" east along said Commercial Street, a distance of 35.64 feet to a drill hole;

Thence North 24° 17' 37.6" West along land formerly of Ari Newman and Lee Beamis, and now Harbor Landing Condominium, see Declaration of Condominium recorded in Book 6505, Page 312, Cumberland County Registry of Deeds, a distance of 93.23 feet to a reinforcing rod;

Thence North 65° 44' 46" East along land now or formerly of said Ari Newman and Lee Beamis, a distance of 109.60 feet to a P.K. spike in the westerly line of Cross Street;

Thence North 13° 21' 13.9" West along said Cross Street, a distance of 287.70 feet to a reinforcing rod, said point being located at the intersection of the westerly line of Cross Street and the southerly line of Fore Street;

Thence South 69° 41' 09.0" West along said Fore Street, a distance of 318.64 feet to a reinforcing rod, said point being located at the intersection of the southerly line of Fore Street and the easterly line of Center Street;

Thence South 24° 16' 16.2" East along said Center Street, a distance of 451.12 feet to the point of beginning.

Excepting from the above described premises those premises taken by the State of Maine by its Department of Transportation set forth in its notice of layout and taking dated August 21, 1991 and recorded in the Cumberland County Registry of Deeds in Book 9688, Page 341.

Tract 2: Two Portland Square.

A certain lot or parcel of land with any buildings thereon situated at the intersection of Fore Street and Union Street in the City of Portland, County of Cumberland, and State of Maine, being Lot 2 on plan for Two Portland Square Subdivision by Stevens Morton Rose & Thompson dated October 22, 1987, revised to September 18, 1989 and recorded in Plan Book 182, Page 29.

Subject to and together with that certain parking easement established in Declaration of Easement by Portland Square limited partnership dated December 18, 1989 and recorded in Book 9028, Page 117, as affected by Subject Property Notice dated December 18, 1989 and recorded in Book 9028, Page 136, and by Permitted Parking Areas Plan dated December 18, 1989 and recorded in Book 9028, Page 141.

Rights, easements, covenants, conditions and restrictions set forth in Declaration of Easement by Portland Square Limited Partnership dated October 30, 1987, recorded at Book 8045, Page 303, as affected by Additional Declaration of Easement dated December 18, 1989, recorded at Book 9028, Page 92, Release of Easement dated December 18, 1989, recorded at Book 9028, Page 97, Subject Property Notice dated December 18, 1989, recorded at Book 9028, Page 102, and Permitted Parking Areas Plan dated December 18, 1989, recorded at Book 9028, Page 112.

ATTACHMENT 4

People's United Bank

March 8, 2019

Ms. Barbara Barhydt
City of Portland, Planning Division
389 Congress Street, 4th floor
Portland, ME 04101

Re: North River IV, LLC and North River Company, LLC

To Whom It May Concern:

North River Company ("NRC"), the Manager of North River IV LLC, which is the owner of record of the properties known as Portland Square, Portland, ME, has had a banking relationship with People's United Bank, N.A. since 2010. In that time, People's United Bank has provided NRC and its affiliates with real estate financings in excess of $170,000,000, including loans for acquisition, new development and complex renovation projects. We consider the principals of NRC to be of the highest character and, based on our knowledge of NRC's management expertise, financial condition and access to significant liquid assets, People's United Bank would be comfortable entertaining requests for financing any type of real estate project and of any size.

NRC and its affiliates have access to cash reserves and credit facilities well in excess of $20,000,000 with People's United Bank.

People's United Bank is a subsidiary of People's United Financial, Inc., a diversified financial services company with over $45 Billion in assets. Founded in 1842, People's United Bank is a community-based, regional bank in the Northeast offering commercial and retail banking, as well as wealth management services through a network of nearly 400 retail locations in Connecticut, New York, Massachusetts, Vermont, New Hampshire and Maine.

If I may be of any further assistance regarding this highly valued relationship, please contact me at (207) 828-3023 or by email at timothy.mcmachen@peoples.com.

Sincerely,

Timothy J. McMachen
Senior Vice President
Commercial Real Estate

State of Maine

Department of the Secretary of State

I, the Secretary of State of Maine, certify *that according to the provisions of the Constitution and Laws of the State of Maine, the Department of the Secretary of State is the legal custodian of the Great Seal of the State of Maine which is hereunto affixed and of the reports of qualification of foreign limited liability companies in this State and annual reports filed by the same.*

I further certify *that NORTH RIVER COMPANY, LLC, a DELAWARE limited liability company, is a duly qualified foreign limited liability company under the laws of the State of Maine and that the application for authority to transact business in this State was filed on March 18, 2015.*

I further certify *that said foreign limited liability company has filed annual reports due to this Department, and that no action is now pending by or on behalf of the State of Maine to forfeit the authority to transact business in this State and that according to the records in the Department of the Secretary of State, said foreign limited liability company is a legally existing limited liability company in good standing under the laws of the State of Maine at the present time.*

In testimony whereof, I have caused the Great Seal of the State of Maine to be hereunto affixed. Given under my hand at Augusta, Maine, this sixteenth day of April 2019.

Matthew Dunlap
Secretary of State

NORTH RIVER COMPANY



Bulgroup Properties was established in 1981 and managed by Tickly Bender Realty Corp., a predecessor to North River Company LLC ("NRC"). NRC is a privately held real estate investment and management firm based in New York City. NRC invests in and manages real property on behalf of high net worth and institutional investors.

NRC owns and operates a highly-diversified portfolio of office, mixed-use, fine art storage, industrial and retail property. Presently, NRC owns and operates over 3,500,000 square feet of mixed-use properties and over 275 acres of ground-up development in New York, Massachusetts, Maine, Vermont, New Hampshire, Pennsylvania, Colorado and California. NRC has closed on more than 30 acquisitions and dispositions over the past 20 years, representing over $1.6 billion in aggregate transaction volume.

NRC seeks to acquire, manage and develop strategically located real estate assets to provide long-term value to investors through cash flow and asset appreciation. NRC's management experience in a variety of transactions provides a broad background in many types of investments from stabilized assets to value-add properties to long-term redevelopment opportunities. NRC's long-term viewpoint endeavors to successfully take advantage of and protect against adverse market conditions.

NRC's traditional investment structure involves the creation of a special purpose entity to acquire an asset with NRC or an affiliate as the manager of the investment. Depending on the equity level required and the anticipated return and hold period of the investment, investment partners range from a single institutional investor to a syndication of individual private capital and family offices. NRC's management team typically invests between 10% and 20% of the required equity of each transaction.

NRC's management team has extensive commercial real estate investment management experience in an array of markets. NRC's efforts include complex joint-venture arrangements, redevelopment of existing occupied properties, ground-up development, repositioning assets, leasing, property management, assembly of new businesses to create new income streams (self-storage, antique mall, gallery, event space, etc.) and asset management and investment reporting. The management team maintains strong relationships with governmental, civic and business leaders in each location NRC operates. Members of NRC's team belong to local and national real estate boards/associations, as well as several notable non-profit organizations and academic institutions. NRC takes an active, "hand-on" approach, carefully selecting in-house management teams in each market. NRC's full-service business model has consistently delivered results for tenants and investors.

Maine Portfolio



One and Two Portland Square
Portland, Maine
260,000 SF / 5 Acres
Office / Land Development



Merrill's Wharf
254 Commercial Street
Portland, Maine
100,000 SF
Office Conversion



260 Commercial Street
Portland, Maine
17,500 SF
Retail / Office / Warehouse



14 Maine Street
Brunswick, Maine
450,000 SF
Office / Retail / Storage Conversion /
Land Development



Hathaway Creative Center
10 Water Street
Waterville, Maine
230,000 SF / 4 Acres
Office / Multifamily / Retail Conversion

Select Projects/Properties



200 Inner Belt Road
Somerville, Massachusetts
200,000 SF / 8 Acres
Art Storage / Office / Land Development



175 McClellan Highway
East Boston, Massachusetts
400,000 SF / 13 Acres
Residential / Office / Warehouse Conversion /
Land Development



Acorda Pharmaceuticals Building
Chelsea, Massachusetts
142,000 SF / 3 Acres
Office / R&D / Manufacturing /
Land Development



40 IDX Drive
South Burlington, Vermont
260,000 SF / 5 Acres
Office / Land Development



Terminal Stores
263 11th Avenue
New York, New York
1,200,000 SF
Office / Retail / Storage Conversion

Management Team

Coleman P. Burke
Founder & Chairman

As the Chairman and Managing Partner of NRC and its related entities, Coley is responsible for overseeing the development and execution of NRC's investment strategy. With more than 45 years of real estate investment, development and management experience, Coley plays a central role in identifying new opportunities, capital raising, and in our overall investment and management strategy. Coley graduated from St. Paul's School in 1959, Yale University in 1963 and Case Western Reserve University Law School in 1970. He spent four years (1963-1967) as a Ltjg., Fleet OOD and Communications Officer in the United States Navy. Prior to founding NRC, Coley was admitted to the New York State Bar and practiced law at Burke & Burke in New York City from 1970 to 1983.

Christopher S. Flagg
President

As President of NRC and its related entities, Chris oversees day-to-day management of all aspects of the firm, which includes managing our teams in New York, Massachusetts, Maine, New Hampshire, Vermont, Pennsylvania, Colorado and California, as well as capital raising. With over 29 years of real estate investment, development and management experience, Chris plays a leading role in the strategic direction of NRC. Chris joined the management team in 1990. Chris graduated from Deerfield Academy in 1983 and received a B.A. degree from Hamilton College in 1987.

Christopher H. Pachios
Vice President

As Vice President of NRC and its related entities, Chris helps to oversee day-to-day operations of the firm, while primarily focusing on new acquisitions, business development and sourcing equity and debt. Chris joined the management team in 2003. Prior to joining the firm, Chris worked as a commercial real estate broker in Boston and New York. Chris is also a partner in a family real estate business founded by his grandfather in Portland, Maine. Chris graduated from St. Paul's School in 1994 and received a B.A. degree from Bowdoin College in 1998.

Peter L. Pachios
Managing Director

As Managing Director of NRC and its related entities, Peter's responsibilities include acquisitions, asset management, leasing, operations and development. Peter joined the management team in 2007. Prior to joining the firm, Peter worked for the Boston Red Sox, primarily focusing on growing the non-baseball related business. Peter is also a partner in a family real estate business founded by his grandfather in Portland, Maine. Peter graduated from St. Paul's School in 1999 and received a B.A. degree from Georgetown University in 2003.

Adam K. Myers
Managing Director, Chief Engineer

As Managing Director and Chief Engineer of NRC and its related entities, Adam's broad range of responsibilities include acquisitions, construction management, asset management, operations, and property management. Adam leads the development, construction and maintenance initiatives throughout the company's portfolio. Adam joined the management team in 2011. Prior to joining the firm, Adam worked for over 10 years in real estate development and construction management. He founded, owned and operated a project management consulting company that specialized in commercial construction across North America. Adam graduated from Kenyon College with a B.A. degree in 1997 and the Daniels College of Business at the University of Denver with an M.B.A in 2006.

Anthony J. Gatti
Vice President, Maine Operations

Tony joined NRC in 1993. As Vice President, Tony oversees the day-to-day operations of the Portland, Brunswick and Waterville, Maine teams, primarily focusing on leasing, tenant relations and property management. Anthony is a native of Maine and lives in Scarborough, Maine.

Daniel P. Jacques
Construction Manager, Maine Operations

Dan joined NRC in 2005 as part of the construction management, maintenance and operations team. Dan served as NRC's construction supervisor on the Merrill's Wharf redevelopment for Pierce Atwood. Prior to joining the firm, Dan worked in project management as the east coast manager for a worldwide chemical engineering company. Dan is a Maine native, and graduated with a B.A. from the University of Maine in 1979 and attended the Muskie School at the University of Southern Maine from 1988 to 1989.

CARROLL ASSOCIATES

Firm Description

Carroll Associates is a small consulting firm engaged in the practice of landscape architecture, land planning, and site design. The firm was created in 1993, and is involved in a wide range of design and planning projects throughout Maine and New England.

The firm provides professional services to a broad-based clientele that includes municipal and institutional organizations, architects, engineers, real estate developers, and private individuals. While maintaining a diverse workload, the firm is entrenched in public, urban, and residential based planning and design work. Carroll Associates has significant experience in public, urban waterfront settings, institutional projects ranging from elementary schools to university work; municipal projects and recreational projects including work at Acadia National Park. The overriding objective in each is to provide a sensitive and well thought out solution which respects the natural environment and creates a functional and inviting setting for the building and its user.

Carroll Associates has been involved with many complex state and municipal projects which are specifically relevant to this project. Relevant Site Planning and Urban Design projects in Portland include the following:

- Ocean Gateway Ferry Terminal
- Marriot Residence Inn
- Riverwalk Condominiums (unbuilt)
- Maine State Pier Redevelopment Design Competition (selected design, unbuilt)
- Merrill's Wharf Redevelopment
- Thompsons Point Redevelopment
- International Marine Terminal Expansion
- Portland Gateway Hotel

In all of these projects the ability to integrate a new facility or program with historical buildings, complex physical and environmental sites, and established neighborhoods was critical to the overall success of the project.

We are well experienced with working within an interdisciplinary design team and the need to provide strong design solutions with limited budgets. Key to the firm's success is the commitment to providing attention and focusing on the specific needs of the client, remaining flexible and bringing projects to closure on time and within budget.

Professional services offered through Carroll Associates may include any or all of the following:

- Site Selection and Analysis
- Program Development and Budgeting
- Site Feasibility/ Utilization Studies
- Recreation Planning and Design
- Site Master Planning
- Construction Documents, Bidding, and Administration
- Consultant Team Coordination and Management
- Local, State, and Federal Permitting and Approvals



Brick Hill, South Portland, ME

Brickhill consisted of redevelopment of former Maine Youth Center into mixed use 'Smart Growth' project. The program for the 56 acre site includes 300 affordable housing apartments and condominiums, 250,000 SF of professional office space, recreation amenities including an 8 acre park, boat launch, community gardens, and hiking trails while preserving the historic brick structures on the site. The project is 100% completed in 2017. Carroll Associates provided Master Planning and Site Design Services for the project since 2001.



Forefront at Thompsons Point

The Forefront at Thompson's Point is a mixed-use development located on an existing vacant industrial site on the Fore River in Portland Maine. The original program consisted of a new Sports Event Cente, Concert Hall with an adjacent outdoor amphitheater seating 4500, a 235 room hotel, cultural center, restaurants, and approximately 180,000 sf of professional office space. Carroll Associates has been retained by the Developer to provide Master Planning and Landscape Architectural Services on the project.



Oceangate and Maine State Pier Redevelopment

Redevelopment of underutilized portion of Portland waterfront to provide new berthing for cruise ships and international ferry terminal. Oceangate Project includes extensive parking for ferry arrivals and departures, passengers, and tour busses; integration of adjacent narrow gauge railway, extension of existing streets to provide critical connections, and outdoor plazas and parks providing strong pedestrian connectivity to adjacent open space systems. Maine State Pier project includes redevelopment of aging waterfront pier and landside property to provide strong mixed use including office, retail, hotel, and a 2 acre park and with direct access to the waterfront.



Harborcorp, Portsmouth, NH

Redevelopment of vacant property in West End of Portsmouth, NH to provide mixed use development. Project envisions up to 115 Hotel rooms, 24 Condominium Units, Conference Facilities, Retail, dedicated parkland, and Structured Parking. The project ties into the existing Sheraton Hotel across the street. Approvals are in place and construction is expected to begin in 2019

CARROLL ASSOCIATES

PATRICK J. CARROLL
Principal Landscape Architect



Professional Registration:
Maine, New Jersey, New Hampshire, CLARB

Education:
Utah State University
Bachelor of Landscape Architecture,1978

Prior Experience
Carroll Associates, Portland ME 1993-
Moore Weinrich Architects, ME 1989- 2003
Environmental Planning and Design, ME 1988
Design Workshop, CO 1982- 1988
Land Design, UT 1989- 1988

As founder of Carroll Associates, Pat brings 40 years of landscape Architectural experience on a wide variety of projects throughout Maine, New England, and the Western United States. His successful project experience on largescale master planning and urban design provides a strong basis for solving complex design issues and managing important design and permitting challenges. His sensitivity and understanding of environmental constraints and culture provides for successful projects that are fitting and appropriate to each setting.

Erin Kay
Project Manager



Professional Registration:
Maine

Education:
Rhode Island School of Design
Master of Landscape Architecture, 2010

University of New Hampshire
BA Studio Art, 2004

Prior Experience
Carroll Associates, Portland ME 2013-
Crossby/Schlessinger, MA 2010- 2013

Erin joined Carroll Associates in 2010, and brings significant experience in urban design and planning from her experience in Boston prior to joining the firm. She has actively participated in many of the larger urban projects Carroll Associates has undertaken in the last five years, including Thompsons Point, Harborcorp and other complex and challenging projects. Her ability to quickly synthesize a site and develop creative solutions make her a valuable member of the design team.

WSA

WINTON SCOTT
ARCHITECTS

5 Milk Street, Portland, ME 04101
207.774.4811|www.wintonscott.com

Established in 1975, Winton Scott Architects is a small, design-oriented architectural practice located in Portland, Maine. Our work encompasses a diverse array of project types and scales ranging from multi-block urban developments, to historic renovations, commercial and institutional buildings, and multifamily and single family residences.

Our firm has been recognized numerous times for design excellence by the Maine and New England Chapters of the American Institute of Architects, as well as the United States Green Building Council; and our work has been profiled in national trade journals, local publications, and several books focussed on design and architecture.

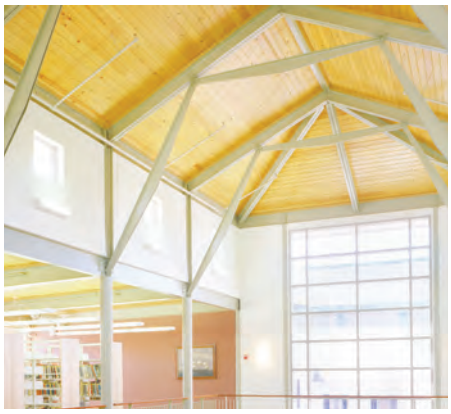
Winton Scott Architects is comprised of a staff of six, including four senior architects ranging in experience from 15 to 45 years. The office is organized horizontally with all staff members capable of managing projects from program and design through production of construction documents and construction contract administration. This depth of experience and continuity in staffing have allowed WSA to take on large, complex projects while consistently delivering the highest level of professional services to our clients. The culture of the office is that of an open, creative collaboration of seasoned architects striving for the highest level of design excellence and client satisfaction.

We believe that architecture should be sustainable, adaptable, timeless, and derivative of its context and function. All buildings, even the most modest in scale and budget, can be at once artful, functional, and inspiring if they are rigorously conceived and executed with craft and precision. Each of our designs responds to the specific needs of our clients and the individual character of a particular site and its surrounding context.

Project Images From Top:

Ocean Gateway Cruise Ship Terminal
Skidompha Library
Youth Alternatives Family Center
Merrill Auditorium









Winton Scott Architects

Recent Urban Design / Planning Projects



Project: Maine State Pier Redevelopment

Program: Offices, Hotel, Retail, Restaurants, Marine Operations, Park

Areas: Site area = 7.2 Acres
Buildings = 325,000 S.F.

WSA Role: Design Team Leader, Masterplanning, Architect for Office Building.



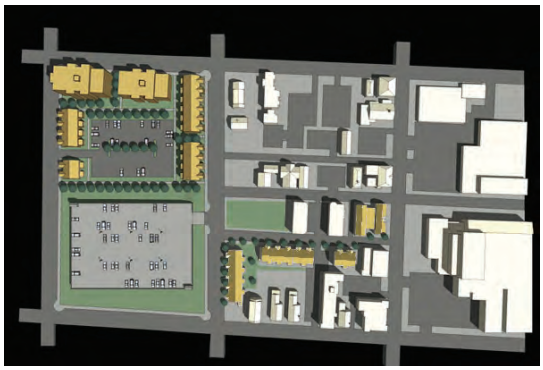
Project: Brick Hill- (Maine Youth Center Redevelopment)

Value: $65M

Program: Offices, apartments, condominiums

Areas: Site area = 59 Acres
Buildings = 336,000 S.F.

WSA Role: Masterplanning, Architects for 3 apartment projects, 2 office buildings

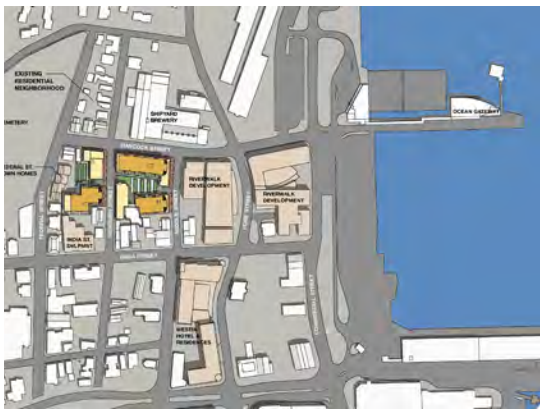


Project: Pearl Place & Unity Village Infill Housing

Program: Market rate & Subsidized apartments (188 Units)

Areas: Site area = 2.5 Acres
Buildings = 220,000 S.F.

WSA Role: Masterplanning, Architecture



Projects: Westin Hotel & Residences
The Village at Oceangate
Eastern Waterfront Garage
Oceangateway Cruiseship Terminal

Program: Hotel, Condominiums, Office, Retail Parking Garage, Terminal

Areas: Site area = 14.75 Acres
Buildings = 890,000 S.F.

WSA Role: Masterplanning, Architecture

WSA
WINTON SCOTT
ARCHITECTS



Winton Scott, NCARB
President

Professional Registrations	Maine, Massachusetts, and NCARB Certification
Other Experience	Louis I. Kahn, Architect, Philadelphia, PA Senior Project Architect Phillips Exeter Library Eero Saarinen and Assoc., New Haven Designer and Job Captain Ford Foundation Headquarters
Education	University of Texas, Bachelor of Architecture with Highest Honors, 1960

Before founding founding Winton Scott Architects in 1975, Winton Scott had built an impressive list of project experiences with some of the most highly respected architectural firms in the country. During this same period, he also accepted several teaching appointments with some notable schools of architecture, honing his own design interests.

Although Winton is a skilled designer, comfortable with any site, any building type and any scale, one of his special interests is urban design. His keen sensibilities in this arena are dramatically apparent in several recent projects completed by WSA



Stephen W. Weatherhead, RA
Principal

Professional Registrations	Licensed Architect, State of Maine
Education	Syracuse University, Bachelor of Architecture Professional Degree, 1988 Syracuse University in Florence, Italy Architecture Study Abroad Program, 1986

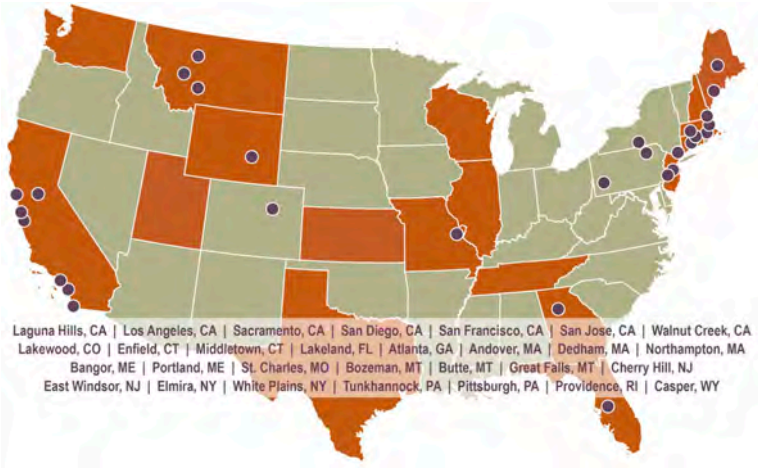
Steve joined Winton Scott Architects in 1994 to take on the role of Project Architect for the renovations to Merrill Auditorium. Since that time, he has gained extensive design and management experience on a wide range of renovation and new construction projects undertaken by the firm. His work encompasses projects ranging from custom homes to large scale commercial and institutional projects as well as a large portion of the firm's municipal work which includes a multitude of projects completed for the City of Portland.

With over 28 years of experience in all phases of architectural practice from conceptual design through construction, Steve knows how to effectively manage the design team and lead an open process that has consistently produced successful building projects based on the specific needs of his clients. He has managed projects for WSA totaling over $100M in construction value that have utilized a full range of project delivery methods both in the private and public sectors.

PROFILE OF THE FIRM

Woodard & Curran is an integrated engineering, science, and operations company. Privately held and steadily growing, we serve public and private clients locally and nationwide.

Talented people are at the heart of our firm. Our company was founded in 1979 on a simple business concept: provide an enjoyable place to work with opportunity, integrity, and commitment, and we will attract talented people. It happened. At the heart of our company are people who are experts in their fields and passionate about what they do, showing a level of commitment and integrity that drive results for our clients. You experience this power every day in our actions, our solutions, and our promises kept.



Woodard & Curran serves clients locally and nationwide from offices throughout the U.S. Headquartered in Portland, Maine, the firm operates offices in the locations noted above, as well as treatment facilities in the states that appear in orange.

Commitment evident in personal approach

Our commitment is reflected in the personal attention, collaborative resources, and dedication to results that we devote to each project. We assign the right people with the right expertise to the job, and provide clients with easy accessibility to senior experts.

Our work is characterized by responsiveness, resourcefulness, and willingness to do what it takes to get the job done properly. Examples range from helping communities garner state and federal funding for wastewater treatment system improvement to managing a multi-vendor manufacturing project through a major snowstorm and getting production lines up and running. We are experts at navigating the complexities of environmental regulations and have been involved in transforming many brownfields sites into marketable properties. In defining moments like these, it is commitment that brings our clients results.

Operating with integrity

Our integrity impacts our decision-making at all junctures of our work — from the openness of our communication to the fairness of our prices to placing your interests above our pocketbook. We hire people who share our values of honesty, respect, and fairness and who want to do the right thing. They, in turn, treat everyone — our people, our clients, regulators, and stakeholders — respectfully and honestly.

Full-service firm with multidisciplined staff

Our integrity and commitment are matched only by the depth of our expertise. Our staff are specialists in their fields, offering in-depth understanding of cutting-edge technology, astute problem-solving, multidisciplinary engineering, and expert regulatory guidance. The firm has received numerous honors and awards, and we have ranked among *Engineering News-Record's* top 100 environmental firms every year since 2000.

Services to the private sector

Woodard & Curran provides a range of site/civil and environmental engineering, science, and operations support to companies in the real estate sector, as well as to hospitals, colleges and universities, and law firms, helping our clients realize their project vision.



BARRY SHEFF, PE
PRINCIPAL-IN-CHARGE

Professional Profile

Barry is a Senior Principal and Senior Project Manager with over 25 years' experience working with the public sector on infrastructure planning and implementation, and with the private sector on urban revitalization projects. He is responsible for design and project management, with expertise engaging and facilitating stakeholder processes. His project work has involved utility infrastructure with focus on stormwater and wastewater utility planning studies, evaluations, and engineering; green infrastructure; master development planning and site design; and environmental/land-use permitting at the local, state, and federal levels. Barry focuses his work on sustainable environmental design and is committed to collaborating with owners and stakeholders to develop practical solutions to complex problems. He has been involved in numerous projects with high-performance buildings and LEED certification. Barry has a track record of understanding client expectations, consistent budget controls and excellent communication skills that enable him to drive the success of small and large projects of varying complexities.

Related Experience

Maine Medical Center, Portland, ME – Parking Garage. Principal-in-Charge for the permitting and design of the new 2,000+ car parking garage in St. John Valley neighborhood of Portland. The project is the result of a partnership between a private land-owner and Maine Medical Center (MMC) as part of the hospital's major campus expansion. Woodard & Curran's work involves site options analysis, land-use and environmental permitting, site/civil engineering and utility infrastructure design for the multi-level parking structure to serve MMC employees. Focus areas of the project involve the coordination with employee shuttle services, and the need for accommodating employee commuting patterns and routes while reducing demand on the existing urban street network surrounding the hospital campus.

Patrons Oxford Insurance – Patrons Oxford Insurance Headquarters. Principal-in-Charge for the permitting and design of the new Patrons Oxford Insurance Headquarters in Portland, Maine. The project was the first development in the Portland Technology Park in Portland (designed by Woodard & Curran). The project involved close coordination with the design team and owner, and included the low impact design considerations for parking and site features, as well as integration into the Technology Park's stormwater management plan.

East Brown Cow Management Inc., South Portland, ME – Sable Oaks Office. Principal-in-Charge responsible for civil site design and land-use permitting of a 45,000-SF office building with associated parking lot, access drives, plazas, and landscaping. The project included design of stormwater treatment systems, erosion control, site amenities, and utilities. Permitting efforts involved the City of South Portland, Maine Department of Environmental Protection (DEP), Army Corps of Engineers, and Federal Aviation Administration given proximity to the Portland International Jetport.

Education

- Bachelors, Civil / Environmental Engineering, University of Vermont

Registrations

- Registered Professional Engineer - ME, #9708
- NCEES License - National, 60366
- Maine DOT Local Project Administration Tier 1 Certification

Professional Associations

- American Society of Civil Engineers
- American Public Works Association
- New England Water Environment Association (NEWEA)
- Order of the Engineer

East Brown Cow Management Inc., Portland, ME – Hyatt Place Hotel. Principal-in-Charge for this redevelopment project to convert an existing parking lot on a 20,000 SF urban parcel of land into an 80,000 SF hotel. We collaborated with the architect and owner's representative to provide local permitting and site / civil engineering design associated with the project. The project was complicated by private power distribution infrastructure that crossed the site and needed to be maintained, as well as the City's desire to have off-site roadway improvements incorporated into the project.

PDT Architects, Portland, ME – Adams School Workforce Housing. Project Manager for this urban redevelopment project, supporting AVESTA Housing and its design team. Located in the Munjoy Hill neighborhood of Portland, the project is a result of a public RFP for redevelopment proposals of this brownfield site, the home of a former elementary school. The project involved the demolition of the existing Adams School building and site amenities, and remediation of environmental contamination; and development of a 16-unit affordable ownership-housing complex, with public open space and playground area. Our work involved local and state environmental permitting, and site engineering and design associated with the placement of this project in a densely developed residential neighborhood. The engineering effort required an intensive balance of earthwork activities to control remediation costs and ensure adequate environmental protections for the residents and users of the open spaces.

The Watermark and Ocean Gateway Garage – Mixed Use Development. Project Manager for the environmental due diligence phases (Phase 1 environmental site assessment and soil/groundwater investigations), site design, and permitting for this private mixed use development on the Portland waterfront (adjacent to the Ocean Gateway facility) with boutique hotel, luxury condominiums, retail, commercial space, office building, 750-car parking garage, and additional surface parking lots. Site/civil work includes layout, grading, drainage, erosion and sedimentation control, and utility design. Permitting includes City Site Plan, Subdivision, Historic Preservation, Maine DEP Site Law, and Maine Historic Preservation permitting. The parking garage was constructed while the remaining portions of the project were unbuilt.

MaineDOT, Portland, ME – Ocean Gateway Multimodal Facility. Program and Project Manager of the permitting and design for implementing first phase of the Master Plan of the redevelopment of a 19.5-acre ship repair facility to a multi-use marine transportation facility on Portland's waterfront. The phase one facility encompassed the former Bath Iron Works site and the associated City-owned land-based infrastructure. Under Barry's responsible charge, Woodard & Curran prepared, submitted, and obtained land-use and environmental permits for the project, including local land-use and Board of Harbor Commissioners approvals; Maine Department of Public Safety Construction Permit; Maine Traffic Movement Permit; U.S. Army Corps of Engineers Department of the Army Permit; and Maine DEP Site Location of Development Permit and Natural Resources Protection Act. We also designed the site infrastructure (vehicle queuing, pick-up and drop-off, short- and long-term parking) to be flexible in its use. The project includes the design of City streets, a major regional trail connection, and the narrow gauge passenger railway. The design creates a new city block and the impetus for economic development. The design of utility infrastructure and blending the facility into an existing congested urban environment proved challenging, but in the end, met the City's future needs. Barry was responsible for working with a steering committee to develop and refine concepts working within available construction funding constraints, and for preparing Phase 1 improvement recommendations as a summary of the preliminary design efforts. As the Program Manager, Barry was responsible for managing the contract with the State of Maine and the 10-firm design team.

University of Southern Maine, Portland, ME – Community Education Center and Parking Garage. Project Manager/Engineer responsible for site and utility design of a 1200-car parking garage, 500-seat lecture hall, and 15,000-SF office classroom building. Coordinated the site survey; completed preliminary site evaluations; prepared grading and utility plans for surface parking areas, open space, and roadways; developed construction documents; completed stormwater design; coordinated with the City of Portland for roadway realignments and discontinuances; coordinated design plans with the project architect and landscape architect; and prepared technical specifications for construction documents. Coordinated with the regulatory agency; prepared local Demolition Permit applications; prepared Application for Maine DEP Site Law and City's Major Site Plan Applications under tight time frames. The project is LEED Gold certified.

City of Portland, ME – Bayside Adapts, Phase I. Principal-in-Charge of the team providing planning and engineering services to facilitate the City's first climate change adaptation planning effort, for the City's Bayside neighborhood. The focus of the project was to conduct a Sewer and Stormwater Data Gap Analysis, and public engagement process to help the community identify a socially responsible, technically sound and financially feasible adaptive strategy to protect the Bayside Neighborhood from the effect of rising tides, extreme rain events and storm surge. Our work involved coordination and contracting with a subconsultant, RPS ASA to evaluate and recommend sea level rise and storm surge scenarios appropriate for City of Portland's planning horizon.

BECKER
STRUCTURAL ENGINEERS

About Us

Becker Structural Engineers, Inc., was founded in 1995 and is a full service structural consulting firm with a staff of twenty-seven. We provide practical, cost-effective and innovative solutions on a wide range of challenging projects in three practice areas; buildings, parking structures and bridges.

We believe in competency and character as our defining values. We are pro-active and interactive in our approach. Our dedicated staff and our investment in technology allows us to deliver high quality service on multiple large and small projects simultaneously. We embrace an engineering approach to projects which combines classical engineering theory and practical experience, paired with the versatility and efficiency of Autodesk Revit to create structural models which interact and coordinate with architectural and mechanical models to define the comprehensive building system. This approach advances the design and coordination of our projects.

Our building design practice includes residential, commercial, education and public institutional buildings. We have substantial experience with contemporary building design which is complemented by an extensive background and expertise renovating and restoring historic structures. Our design capabilities are complemented by our construction phase services, which include construction reviews for general conformance and implementation and administration of the IBC Special Inspections Program. We believe a strong job site presence contributes to enhanced quality and improved construction efficiency. Working with the owner, architects, contractor and testing agencies our office provides a full range of construction monitoring capabilities.

Becker Structural Engineers have been the selected structural engineering consultant for municipalities, owners and developers throughout New England. Recent and relevant work includes on-going services under a **General Consulting Services for the City of Portland** and a **General A/E Services** agreement with the **Portland Housing Authority.** Significant buildings in Portland include the multi-story medical offices for **InterMed**, the **Hyatt Hotel** located on Fore St. and the rehabilitation of the **historic Twitchell-Champlain** building on Merill's Wharf which now serves as the law offices for Pierce Atwood**.** We strive to integrate ourselves in understanding the overall approach that each owner is seeking to obtain, with guidance on analysis and cost recommendations to fit within the sustainability of the program design.


City of Portland
International Jetport
Parking Garage


Hyatt Hotel


InterMed Medical Offices


Historic Twitchell-Champlain Offices

BECKER
STRUCTURAL ENGINEERS



Casco Bay Ferry Terminal



Canal Zero Redevelopment



Maine Medical Center
Employee Parking Garage



Portland Public Library

50 Sewall Street M.O.B. (LEED Certified), Portland, ME
58 Fore Street Building 2/3 & Marina Building, Portland, ME
84 Marginal Way M.O.B and Parking Structure, Portland, ME
173 Main Street Redevelopment, Waterville, ME
409 Cumberland Ave Housing, Portland, ME
Bayside Anchor Housing, Portland, ME
Bayside Village Student Housing, Portland, ME
Berlin City Honda Showroom, South Portland, ME
Berlin City TSL Showroom, South Portland, ME
Canal Zero, Portland, ME
Casco Bay Ferry Terminal, Portland, ME
CEI Office Building (LEED Certified), Brunswick, ME
Consigli Office Building, Milford, MA
Dead River Corporate Office, South Portland, ME
DHS Office Building, Portland & Lewiston, ME
Elm Terrace Apartments, Portland, ME
Emerson Shailer Housing, Portland, ME
Exactitude Office/Manufacturing Building, Cumberland, ME
Ferry Terminal Redevelopment IMT Office Building, Portland, ME
Genest Warehouse Addition, Biddeford, ME
Gorham Savings Bank Operations Center, Gorham, ME
Handyboat Restaurant/Dockside Grill, Falmouth Foreside, ME
Hill Farm Equestrian Center, New Gloucester, ME
Huston Commons, Portland, ME
Hyatt - Old Port Hotel, Portland, ME
IDEXX Laboratories Data Center Relocation, Westbrook, ME
Irish Heritage Center Structural Review, Portland, ME
Jackson Laboratories Building Renovation, Bar Harbor, ME
LL Bean Vertical Expansion Feasibility Study, Freeport, ME
Maine DEP - Deering & Greenlaw Buildings, Augusta, ME
Maine Medical Center Family Practice Office Building, Portland, ME
Maine Medical Center Employee Parking Garage, Portland, ME
Maine Municipal Association Office Addition, Augusta, ME
Maine Standards Building, Cumberland, ME
Maine Veterans Homes Office Building, Augusta, ME
Marriot Residence Inn, Portland, ME
Merrill Auditorium, Portland City Hall, Portland, ME
Norway Savings Bank, Gray, ME
Park Danforth New Residence Wing, Portland, ME
Patrons Insurance Building, Portland, ME
Pearl Place I & II, Portland, ME
Pinetree Shopping Center Retail Development, Portland, ME
Portland Public Library, Portland, ME
Portland Public Market Redevelopment, Portland, ME
RMS Office Building, South Portland, ME
Saco Biddeford Savings Bank (LEED Silver), Saco, ME
Shops at Falmouth Village, Falmouth, ME
Strand Theatre, Rockland, ME
Topsham Retail Center, Topsham, ME
Twitchell - Champlin Building, Portland, ME
Vortechnics Office Building, Scarborough, ME
Westin Hotel, Portland, ME

BECKER
STRUCTURAL ENGINEERS



Paul B. Becker, P.E., SECB
President

As the founder of Becker Structural Engineers, Paul has over thirty-eight years of structural engineering experience in New England and the Mid-Atlantic States. His technical experience covers all aspects of the structural engineering profession including complex building systems using steel framing, cast in place, precast and post-tensioned concrete, deep foundation support systems, earth retaining structures, masonry and timber framing. He has served as lead design engineer and project manager, responsible for establishing and monitoring schedules, budgets and quality control on projects with construction costs of up to $75 million. As Principal in Charge of a project, he collaborates with the client and project team to establish the project scope, schedule and contracts and monitors the progress and quality of work.

PROFESSIONAL ENGINEER REGISTRATION

- Maine (#6554)
- Massachusetts (#39009)
- New Hampshire (#6258)
- New York (#86255
- Vermont (#7773)
- Georgia (#033280)
- Connecticut (#20725)
- Rhode Island (#9067)
- Ohio (#74529)
- Certified in the Practice of Structural Engineering (#2285-0708)



Todd M. Neal, P.E.
Vice President

A principal of BSE, Todd is a registered Professional Engineer in the State of Maine and has extensive experience in the design and fabrication of precast/prestressed concrete garages, building components, bridge components, architectural precast concrete. Specialty topics include repair and maintenance of parking structures. He offers expertise in construction management, structural testing and administration of special inspection programs in accordance with the IBC Codes. Todd is currently an active member on the PCI Parking Garage Design Committee and Joint Sealant Sub-Committee and contributed to the publication of the PCI “Maintenance Manual for Precast Parking Structures” and the PCI Committee Report “Joints in Precast Parking Structures”.

PROFESSIONAL ENGINEER REGISTRATION

- Maine (#9406)
- Connecticut (#27306)
- Massachusetts (#51354)
- West Virginia (#20277)
- New Brunswick, Canada (#L5173)
- Nova Scotia, Canada (#11330)
- Certified in the Practice of Structural Engineering (#2639-0708)



Ethan A. Rhile, P.E.
Senior Associate

Ethan joined BSE in September of 2001 after practicing structural engineering in the Mid-Atlantic States. He has extensive experience in the design of multiple story buildings and industrial facilities, with several projects eclipsing 250,000 square feet. He has served as a Project Manager, responsible for the technical design, quality control, budgeting, and construction administration for building projects up to ten stories in height, with construction budgets up to $100 million. He has an in-depth knowledge of computer software packages including STAAD-III, SAPP 2000, RISA 3D, RAM Elements, RAM Structural System, SP Mats, AutoCAD and Revit.

PROFESSIONAL ENGINEER REGISTRATION

- Maine (#10266)
- Commonwealth of Pennsylvania (#057589)

CONSIGLI CONSTRUCTION CO., INC.

At a Glance

CONSIGLI
Est. 1905

HISTORY & LEADERSHIP

Established in **1905**

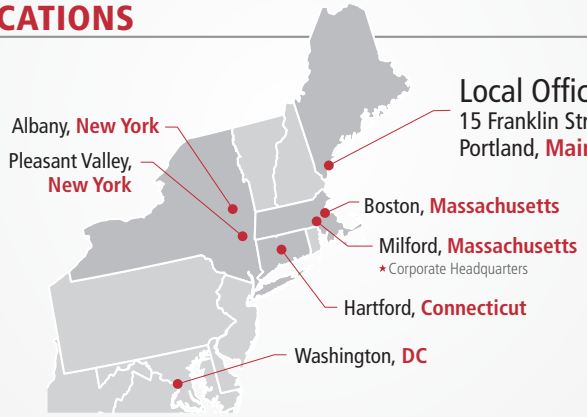
100% Employee Owned

ANTHONY CONSIGLI, CEO
MATTHEW CONSIGLI, President
MATTHEW TONELLO, Director of Operations/ME

FINANCIAL STRENGTH

$110M	$1.2B	$2B	$400M
2018 Revenue (MAINE)	2018 Revenue (CORPORATE)	Aggregate Bonding Limit	Single Project Bonding Limit

OFFICE LOCATIONS



PEOPLE

90	1,000	350	7
Employees (MAINE)	Employees (CORPORATE)	Self-perform Craftspeople	Regional Office Locations

OUR STORY

In 1905, Peter Consigli, a skilled mason, established Peter Consigli & Sons in Milford, Massachusetts, on the cornerstones of hard work, integrity and pride in craftsmanship. Four generations and over 100 years later, Consigli has grown from a local business into one of the largest construction managers in the Northeast.

With more than 1,000 employees corprate-wide and 90 in Maine, Consigli has expanded its roots, while maintaining its core competencies as a true builder with more than 350 skilled carpenters, laborers and masons on staff.

RELEVANT EXPERIENCE

Consigli has extensive knowledge of every component included in the Portland Square project from a wealth of lessons learned from similar projects. We are experts in parking garage construction having completed more than a dozen in recent years, including five of 750 cars or more. On the following pages we have demonstrated our experience with parking structures, deep foundations and office buildings in urban environments.

39	30,000	150+	2M+ SF
Total Parking Garages Constructed or in Construction	Total Parking Spaces Constructed or in Construction	Office Buildings Constructed or in Construction	of Office Space Constructed or in Construction



RELEVANT EXPERIENCE

CONSIGLI
Est. 1905



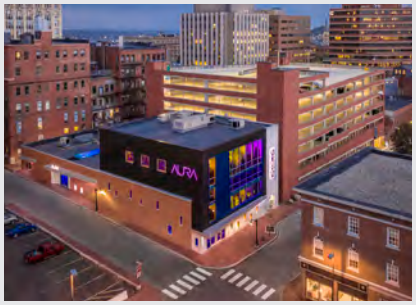
Cow Plaza Hotel LLC, Hyatt Place Hotel, Portland, ME

New construction of a 80,000 sq. ft. hotel in downtown Portland. The facility, located at the corner of Fore and Union Streets, contains 130 guest rooms and 1,000 sq. ft. of street-level retail space, a swimming pool and other high-end amenities.



East Brown Cow Inc., Canal Zero, Portland, ME

20,000 sq. ft. renovation and re-branding of East Brown Cow's Canal Plaza in Portland's Downtown will bring new life to the quiet plaza, which rests between four corporate office buildings. The plaza will feature locally quarried pavers, stairs and retaining wall and a new boutique circular building constructed of a mixture of exposed architectural concrete and a custom curtainwall system.



Aura, Club Renovations/Expansion, Portland, ME

8,460 sq. ft. renovation and 14,400 sq. ft. new construction to Portland's iconic nightclub will allow the venue to hold larger events, conferences, private events and weddings. Project scope includes demolition and reconstruction of much of the existing building and new kitchen, bar areas, dance floors and finishes. The project is being executed across three distinct phases with carefully planned urban logistics.



Maine Medical Center, Employee Parking Garage, Portland, ME

New 810,000 sq. ft., 2,400-car parking garage built to support Maine Medical Center's master plan in providing a consolidated parking option for employees. The nine-story garage will be supported on steel H-piles and cast-in-place concrete foundations with the above-grade structure consisting of precast concrete. Construction will occur adjacent to occupied businesses, private residences and active railroad tracks.



City of Portsmouth, Foundry Place Parking Garage, Portsmouth, NH

This six-story, 618-space parking garage on Deer Street, while also making roadway improvements. This challenging site—located in a tidal zone and abutted on both sides by a freight railroad and residential neighborhood—is also a heavily-contaminated brownfield, hosting heavy metals, lead, petroleum and oil. Extensive remediation efforts will be required, in tandem with abatement and demolition of several small existing structures on the site.

RELEVANT EXPERIENCE

CONSIGLI
Est. 1905



City Square II Development Co., CitySquare Underground Garage, Worcester, MA

Construction of a 564-space, 160,000 sq. ft. two-story below-grade garage as part of the CitySquare development in Worcester. The project required management of hazardous soils, challenging logistics and groundwater issues. The project also included the Installation of a public plaza atop the new below-grade structure.



Related Beal, Lovejoy Wharf, Boston, MA

New construction of a 250,000 sq. ft., 17-story residential building featuring 157 luxury condominiums plus amenities, public spaces and 2,000 sq. ft. of ground-floor retail space. This cast-in-place concrete structure was built around an active, waterfront site, adjacent to the TD Garden and Zakim Bridge.



Maine Historical Society, Brown Library & Longfellow Garden, Portland, ME

This 10,000 sq. ft. renovation and 10,000 sq. ft. expansion of historic library was completed within a constricted urban site; included upgrades to M/E/P and life safety systems and ADA requirements. The addition features a dramatic Kawneer curtain wall façade.



MaineHealth, Corporate Headquarters, Portland, ME

Conversion of a 1940s retail building, originally built for Sears & Roebuck, into 90,000 sq. ft. Class A office space for this leading regional healthcare network. The central core of the building was removed to create a new atrium that maximizes natural light throughout the building. Consigli procured and managed the installation of custom furniture systems.



Immucell Corp., Mast-out Facility, Portland, ME

16,800 sq. ft. new construction of a pharmaceutical-grade production facility for Mast Out, a treatment for a common infection found in cows worldwide. The cGMP facility will house space for fermentation, laboratory, processing and warehouse program areas, and it is utilizing pre-fabrication for equipment and building systems to manage the aggressive schedule.

NORTH RIVER COMPANY, LLC

224 12th Avenue
New York, NY 10001-1005
Telephone (212) 695-8090
Facsimile (212) 629-8768

December 10, 2018

Ms. Barbara Barhydt
Development Review Manager
City of Portland
389 Congress Street, 4th Floor
Portland, ME 04101

Re: Letter of authorization for Portland Square development project.

Dear Ms. Barhydt,

On behalf of North River Company, in its capacity as the Manager of North River IV LLC, which is the owner of record for the parcel of land bounded by 486-504 Fore Street, 8-30 Cross Street, 273-285 Commercial Street and 3-19 Center Street (legal description: Map 38, Block G, Lots 1-3-5), (a/k/a "Portland Square lower parking lot"), this letter shall authorize Patrick Carroll of Carroll Associates and Steve Weatherhead of Winton Scott Architects to act as agents in procedural actions related to obtaining City of Portland Planning Board approvals associated with the proposed development project located on the Portland Square lower parking lot.

Sincerely,

Peter L. Pachios

Cc: Patrick Carroll
Steve Weatherhead
Melissa Santiago

EXISTING AND/OR PROPOSED EASEMENTS OR COVENANTS

The following Easements and/or Covenants are existing and/or proposed for the Portland Square Project:

1. Shared Service easement for Hotel and Portland Square from Center Street on south side of lower lot.
2. Eighteen-foot (18') Pedestrian Access easement along "Cotton Street Extension between Commercial Street and Fore Street.
3. Easements within the discontinued section of Cross Street between Spring Street and Fore Street, including the following:
    - 50-foot sewer easement to City of Portland.
    - 50-foot Scenic Easement/ View Corridor, to City of Portland
    - 10-foot pedestrian easement
    - 27-foot utility easement to Central Maine Power
    - 27-foot utility easement to Northern Utilities
    - 10-foot storm drainage easement across Portland Square One and Portland Square Two
    - 25-foot x 35-foot easement to Portland Water District at the intersection of Fore Street and Cross Street
4. Drive Through Teller Easement on Portland Square Two parcel (Lot2)
5. Licenses for building footings, overhangs and canopies located within the public street rights-of-ways.

These easements and licenses will be shown on the ALTA Existing Conditions Survey, Subdivision Plan, or Site Plans that are made part of this Application.

EVIDENCE OF STATE OR LOCAL APPROVALS

Portland Square will require the following permits and approvals:

Permit Required	Submittal Date	Anticipated Approval Date
• City of Portland Master Development Plan	04/05/2019	07/23/2018
• Level III Site Plan and Subdivision (PH1)	07/18/2019	09/24/2019
• Maine DEP SLODA Amendment	07/18/2019	09/24/2019
• Maine DOT Traffic Movement Permit	04/05/2019	08/15/2019
• State Fire Marshall	09/01/2019	10/15/2019

The Portland Square Project currently has the following Permits and Approvals either in place or pending:

Portland Square One

• Site Plan Approval from City of Portland		November, 1985	July, 1986
• Maine DEP SLODA	#L-013526-26-B-N		July 25, 1986
	#L-013526-26-B-A		July 27, 1987

Portland Square Two

• Site Plan Approval from City of Portland		1988	July 18, 1989
• Maine DEP SLODA	#L-013526-26-C-A		June 19, 1989
	#L-013526-26-C-A (Corrected)		July 21, 1989
	#L-013526-26-D-C		December 21, 1989
	#L-013526-26-F-M		November 30, 1990
	#L-013526-26-G-T		February 2, 1996
	#L-013526-26-H-N		February 15, 1996

Center Street Hotel

• Level III Site Plan Approval from City of Portland	Currently under Review
• Maine DEP SLODA Amendment	Anticipated Submittal with Final Level III Submission

Copies of all Approvals and Findings of Fact are attached to this Application.

Memorandum

To: Adam Myers, North River Companies
Dan Jacques, Waterfront Maine and North River Companies
Patrick Carroll, Carroll Associates

Date: April 16, 2019

Project #: 55265.00

From: Sean Manning, PE
Lourenço Dantas, AICP

Re: Portland Square Parking Analysis
Phase 1 – Hotel Site Conveyance

Overview

VHB has been retained by North River Companies to assess the utilization patterns of the existing One Portland Square and Two Portland Square surface parking lots. The Client intends to convey a portion of the lower lot parcel (a portion of the existing lower parking lot) to another proponent who then intends to develop a hotel on this defined sub-parcel. Further, the parking spaces to be allocated to this proposed new hotel would also be accommodated within these reconfigured parking lots.

The purpose of this effort is to specifically delineate and quantify peak period parking activity in the two lots, quantify the holistic parking needs of the existing Portland Square development, and then calculate projected future supply/demand conditions with the proposed hotel in place. The overriding goals of this effort are to generate affirmative answers to the following key points:

1. Quantify that the typical existing parking demand conditions (inclusive of the parking needs of any vacancies within One and Two Portland Square) are accommodated by the striped parking supply within the parking lots.
2. Determine that there is ample availability within the lots to allow for the conveyance of a sub-parcel of land to support construction of the proposed hotel.
3. Determine that the reconfigured parking lots due to construction of the hotel (i.e., reduced parking supply) can accommodate the parking needs of both the existing Portland Square properties as well as the needs of the proposed hotel.

We reviewed the current parking demands generated by the existing tenants, employees, and other parking lot users, and estimated the additional incremental parking needs of other identified vacant space within the two office buildings. We also determined the anticipated change in parking supply that would be incurred in connection with the future construction of the proposed hotel. Finally, we estimated future anticipated parking demands to be generated by the hotel and compared those future demand conditions to the expected interim supply that would be provided on site once the hotel is constructed. (Note that this condition is an interim one that is expected to be in place for only a near-term period prior to the implementation of the overall Portland Square Master Plan, which includes provision of structured parking spaces that will fulfill the long-term parking needs of this proposed redevelopment effort).

Based on our analysis, we have determined that the capacity of the two lots can be reduced in the short-term while accommodating existing parking needs, as well as the parking needs of the proposed hotel, within the two parking reconfigured lots. To ensure that parking demand remains below a reduced supply level, North River Co. is prepared

99 High Street
10th Floor
Boston, MA 02110-2354
P 617.728.7777

to employ proactive parking management actions to ensure that the resultant supply meets future anticipated demands. A more detailed analysis and assessment is provided and discussed in the following sections.

Existing Conditions

Two buildings, known as One Portland Square and Two Portland Square, with a parking lot (Lot 1) occupy the upper parcel, and a parking lot (Lot 2) is located on the lower parcel (See Table 1 and Figure 1). Portland Square is located on two parcels of land that are roughly bound by Spring Street, Union Street, Fore Street, and Cotton Street (upper parcel) and Fore Street, Cross Street, Commercial Street, and Center Street (lower parcel).

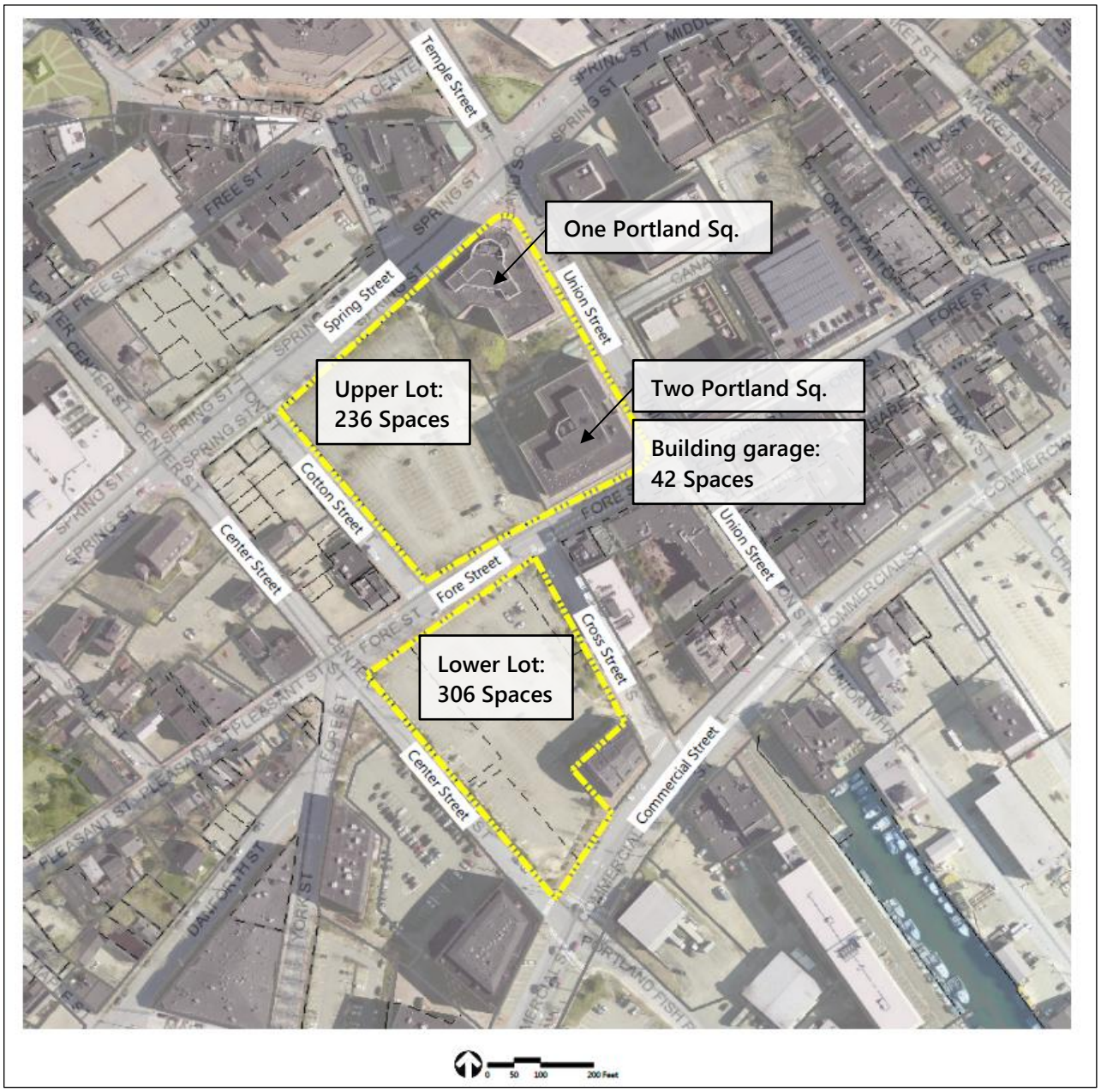
The combined capacity of the two existing parking lots is 542 spaces, while an additional 42 spaces are provided inside the Two Portland Square building garage, for a total of 584 spaces on site. The two parking lots operate under revenue/passcard control, while the parking garage uses a separate access-control system. Use of the parking garage spaces is assigned to a limited number of specific tenants, whereas the lots are used by passcard holders and transient parkers.

Table 1
Portland Square Program Use and Parking Summary

	Office (SF)	Retail (SF)	Parking Spaces
Upper Site and Lot			
One Portland Square	133,141	1,700	
Two Portland Square	127,200	11,150	
	260,341	***12,850***	
Two Portland Square Building Garage			42
Upper Parking Lot (Lot 1)			236
Lower Lot			
Lower Parking Lot (Lot 2)			306
		Total Parking Spaces	**584**
		Surface Lot Parking Spaces (Upper and Lower Lots only)	**542**

Source: North River Companies, April 2019

Figure 1
Portland Square Parcels: One and Two Portland Square and Upper and Lower Parking Lots



Existing Parking Lot Use

The property owners provided parking transaction data for the two lots for peak user months in 2018.[1] We used this information to calculate hourly parking space occupancy for each day in the typical activity months of March and April 2018 (spring) and September and October 2018 (fall). Months that generally are characteristic of school and summer vacation periods and/or poor weather conditions were excluded from this analysis to provide a basis of "typical peak weekday utilization". *(The analysis only pertains to the use of the revenue-controlled parking lots and excludes the use and capacity of the building garage.)*

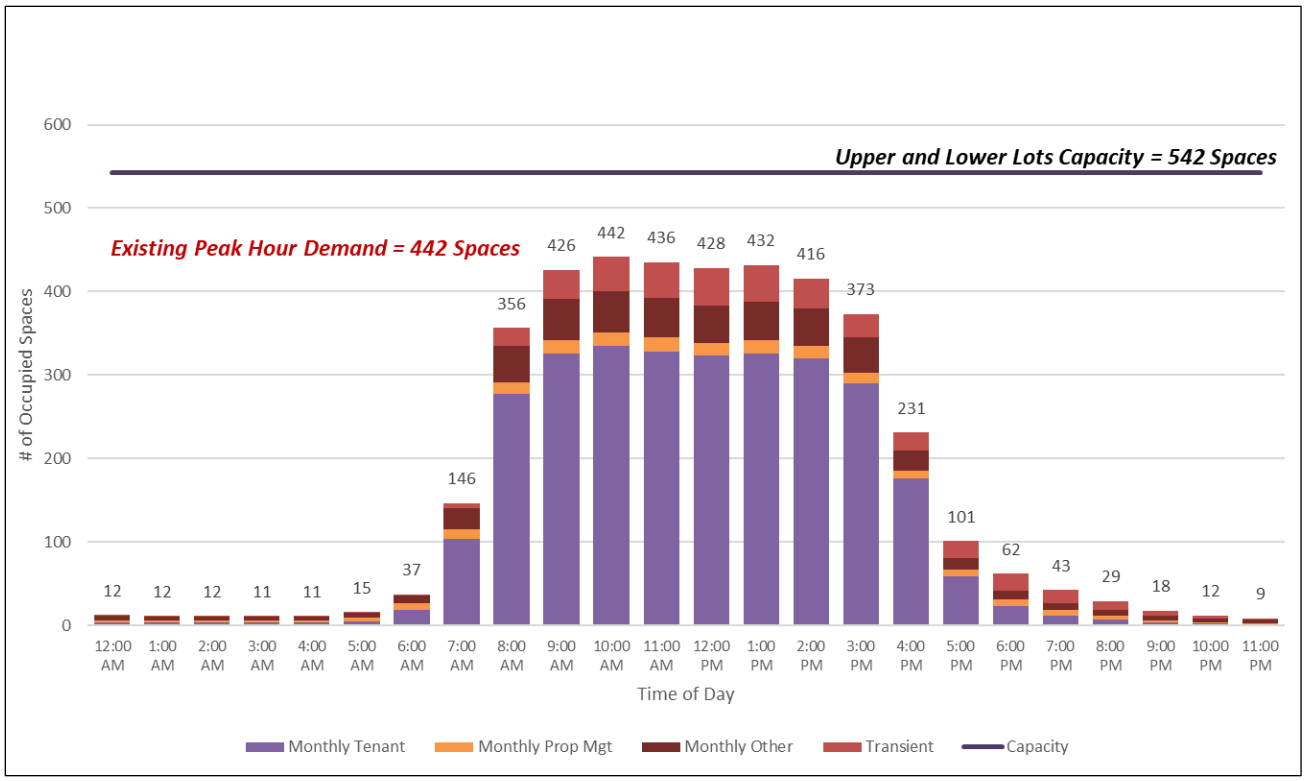
The parking transaction data also identifies the type of user, which has been classified as:

- monthly pass holder, tenant ("monthly tenant")
- pass holder, property management and vendor ("prop mgt")
- monthly pass holder, non-tenant ("monthly other"), and
- transient (hourly) user.

This more detailed breakdown allows for study of the distribution of parking occupancy throughout the day by type of parker (see Figure 2). The average peak occupancy of the lots for a mid-weekday (excluding vacation and holiday periods) was 442 spaces, or about 82 percent of available capacity.

[1] The demand (parked vehicles) comparison to capacity (parking spaces) excludes the building parking garage from the analysis, because transaction data for the garage is not available and those spaces are assigned to specific tenants.

Figure 2
2018 Typical Peak Weekday Parking Lot Occupancy



Source: North River Companies, Parking Transaction Data, supplied February 2019. The parking demand/capacity analysis excludes the use of the 42 spaces in the garage, for which parking transaction data is not available.

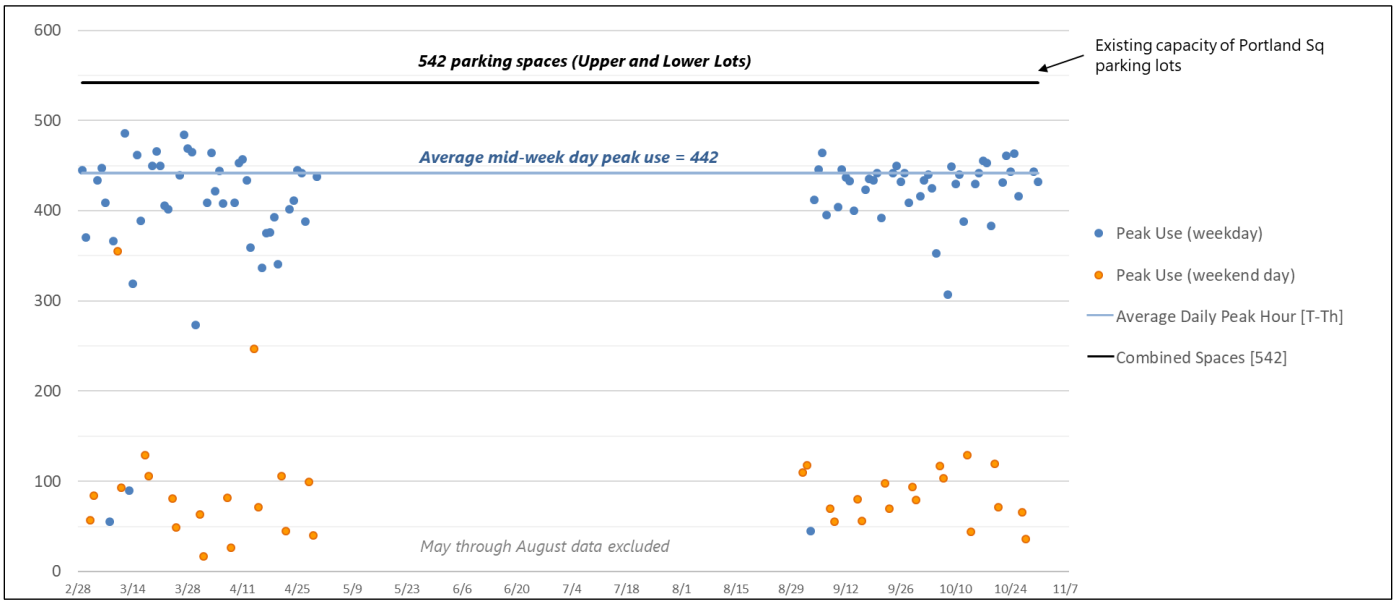
Monthly tenant parkers make up about 76 percent of peak parking space use, property management and vendors occupy about 3-4 percent of occupied parking spaces, transient parkers (e.g., visitors to Portland Square) occupy about 9 percent of occupied parking spaces at peak use, while "Other" monthly parkers occupy about 11 percent of used spaces at peak (or about 49-53 spaces).

Typically, about 100 parking spaces are available during peak weekday use periods. The peak occupancy of the lots generally occurs between the hours of 10:00 AM through 2:00 PM. Use of the parking lots primarily occurs during normal weekday business hours. Monday and Friday activity were determined to be generally lower than mid-weekend activity and was not included within this summary of compiled peak period data. Overnight and weekend parking use is typically very low (and also excluded from the analysis).

Figure 3 provides a wider assessment of the seasonal daily peak parking occupancy over the study period (March/April/September/October). Some key points to discern from the chart:

- Each point on the chart indicates the respective peak parking occupancy of every individual day during these four "typical peak" study months.
- Note that in all cases, the lots' peak parking demands never approach striped capacity.
- On most days, the peak occupancy is significantly lower than the profiled mid-week "study day" used to support this analysis.
- The peak points represented generally occur for a window of only about four hours (10:00 AM – 2:00 PM). The lots' occupancy during all other hours of these respective days is significantly lower than what is represented here (as illustrated in Figure 2).

Figure 3
2018 Peak Month/Daily Peak Parking Space Use (March/April/September/October)

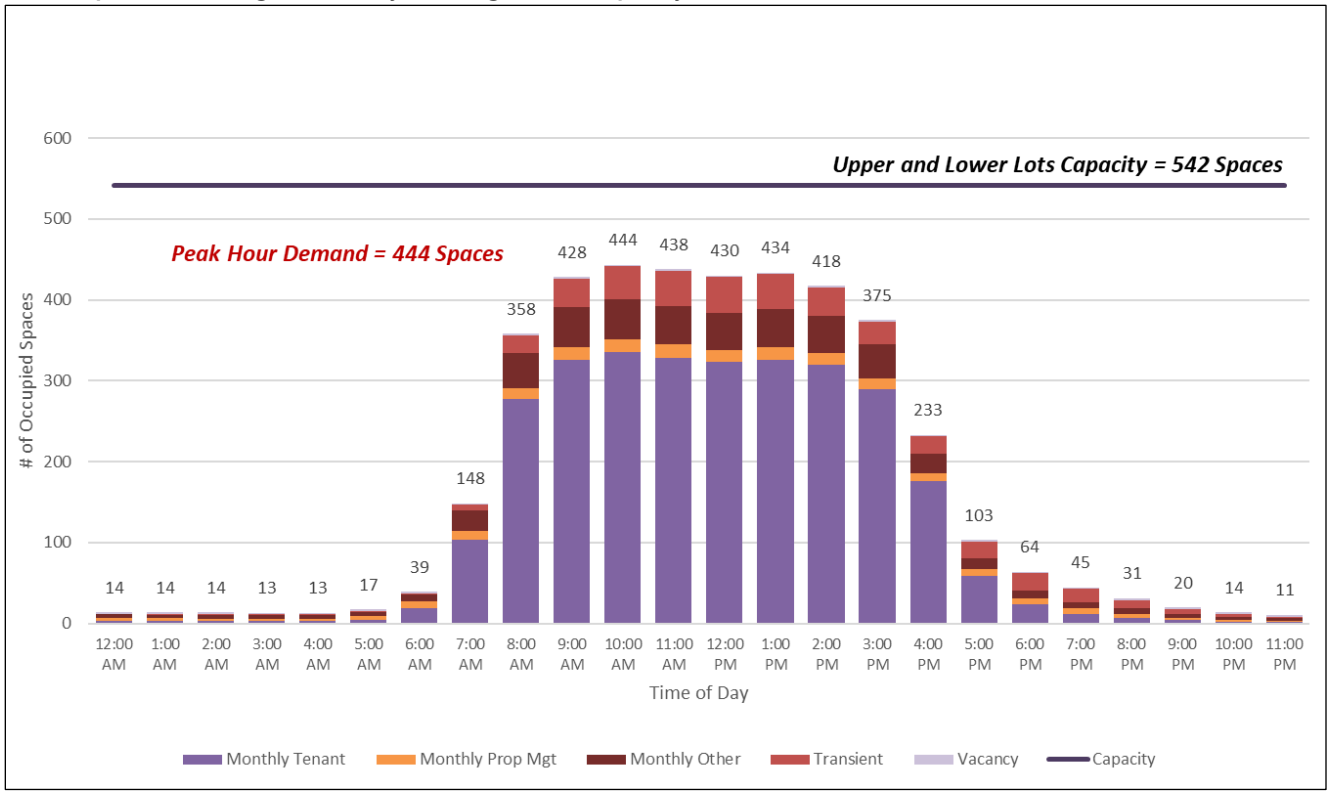


Source: North River Companies, Parking Transaction Data, supplied February 2019. The parking demand/capacity analysis excludes the use of the 42 spaces in the garage, for which parking transaction data is not available.

Parking Lot Use with Full Portland Square Occupancy

Most of One and Two Portland Square buildings are currently occupied by active tenants. Only about 4,000 square feet of office is currently vacant (or about 1.5 percent of the total leasable square feet). This vacant space was recently leased to a new tenant, and the property manager has allocated seven monthly parking spaces to that lease, two of which would occupy parking lot spaces (and the remainder in the building). Assuming full use of those spaces, the expected condition (use of the lots) assuming fully-occupied buildings does not result in any significant change to the availability of spaces. (See Figure 4; the eight spaces are identified as "vacancy" in the chart.) At peak use, for a typical mid-week weekday, we expect the parking lots will have 444 spaces occupied, on average, or at about 82 percent of capacity. This corresponds to about 98 parking spaces available during peak use.

Figure 4
2018 Expected Average Weekday Parking Lot Occupancy (Fully-Occupied Portland Sq Building)

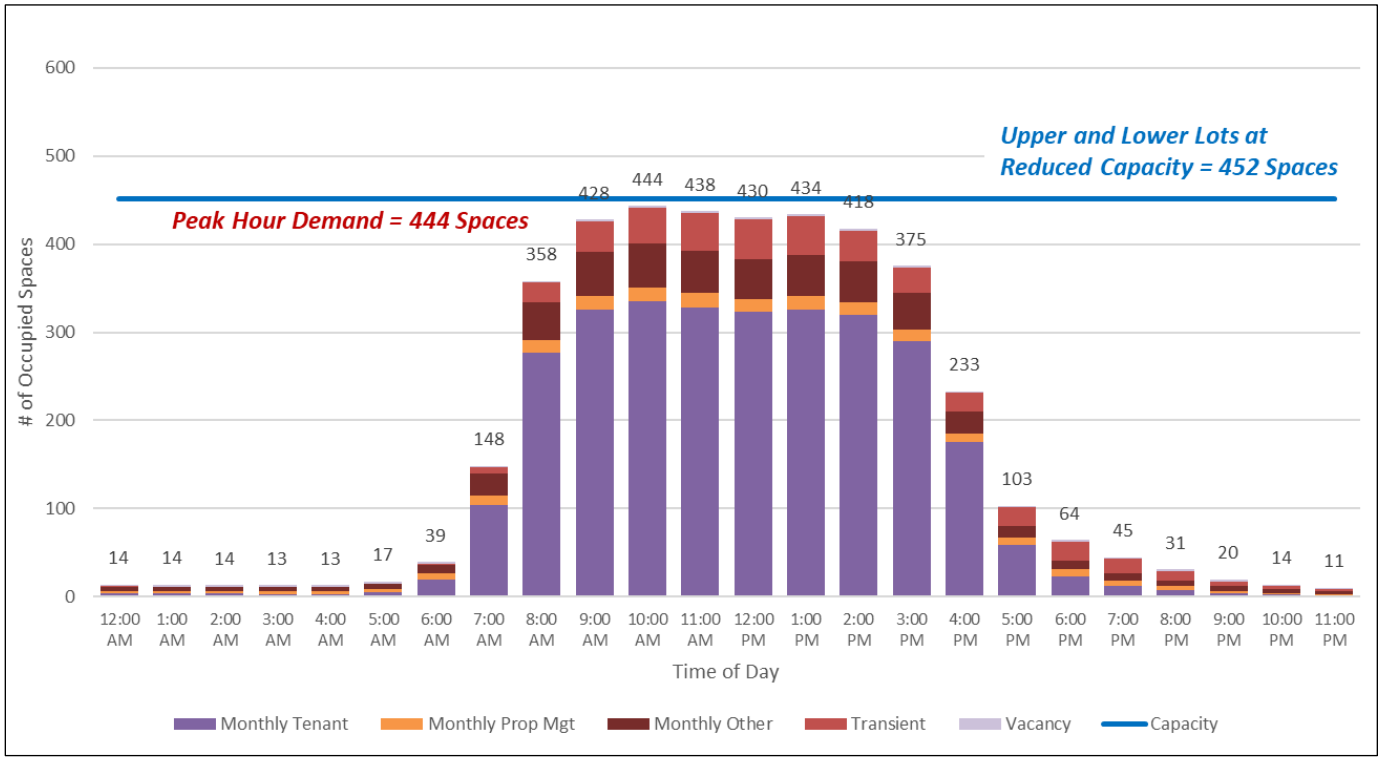


Source: North River Companies, Parking Transaction Data, supplied February 2019. The parking demand/capacity analysis excludes the use of the 42 spaces in the garage, for which parking transaction data is not available.

Future Interim Condition – Reduced Parking Space Count

The proposed conveyance of a parcel in the lower lot would impact the existing supply of parking provided on the two parking lots. Both the footprint of the hotel, and the resulting reconfiguration of the parking fields would result in an overall reduced parking supply. With this condition in place, the resulting capacity for the combined Upper and Lower Lots is anticipated to decrease to 452 spaces. Note, however, that the average peak occupancy of the lots continues to remain below this modified capacity (see Figure 5).

Figure 5
Expected Future Average Weekday Parking Lot Occupancy (with Reduced Parking Lot Capacity)



Source: North River Companies, Parking Transaction Data, supplied February 2019. The parking demand/capacity analysis excludes the use of the 42 spaces in the garage, for which parking transaction data is not available.

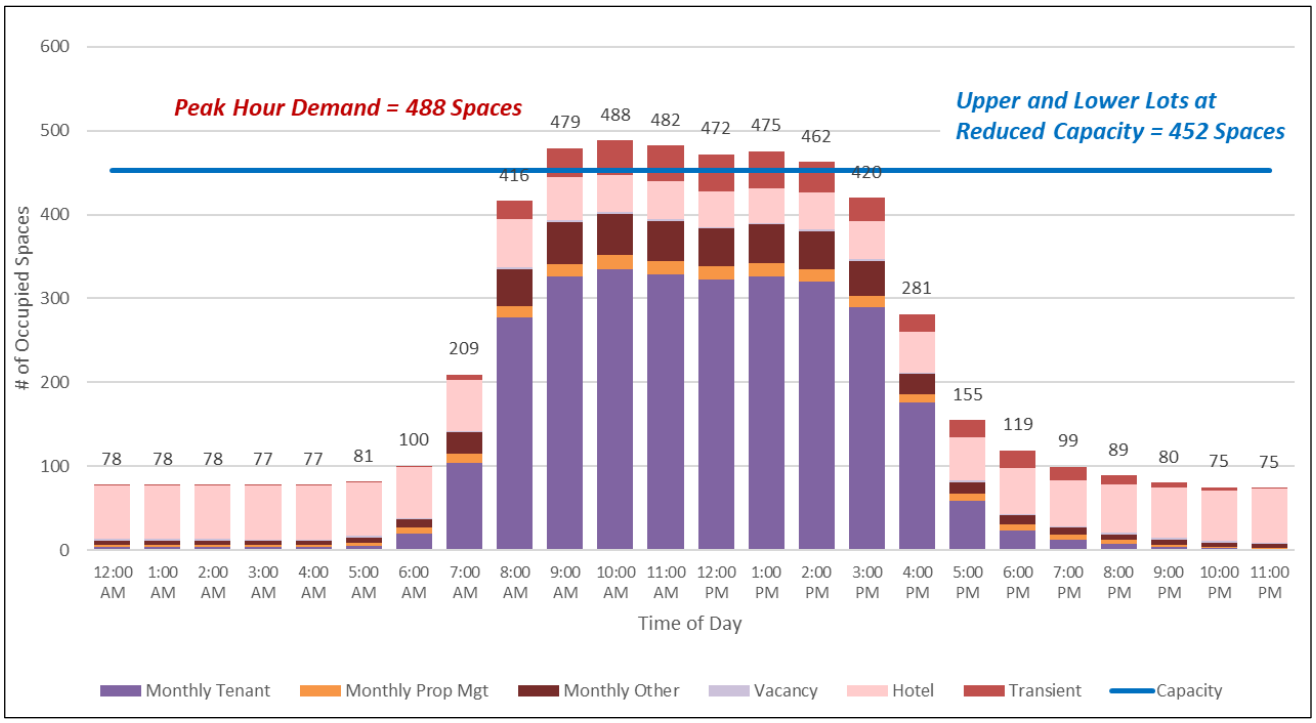
Future Interim Condition – Proposed Hotel Parking Space Allocation

In addition to the reduced capacity of the Portland Square lots, the proposed hotel is anticipated to be provided an allocation of up to 64 parking spaces. This additional parking demand (assuming a full room occupancy of the hotel during the mid-week) will result in additional increased use of the parking lots (see Figure 6). Under peak month, peak weekday conditions, the lot will operate slightly over capacity if current demand levels remain (as described and quantified previously).

Note that this assumes a "worst-case" scenario. In practice, the temporal use of the hotel and its allocated spaces will likely complement the office/business hours use of spaces, which dominate weekday, daytime utilization needs in the lots. For example, mid-week use of the lots by hotel guests and staff will likely be lower than their weekend use, and midday use by hotel guests and employees is expected to be lower than evening/overnight use. Thus, the demand levels illustrated in Figure 6 may be conservative and somewhat overstated.

However, the Project proponent is committed to further exploring and employing a series of parking demand management actions to ensure that demand conditions do not exceed supply and create unintended impacts.

Figure 6
Expected Future Average Weekday Parking Lot Occupancy (With Reduced Parking Lot Capacity and Hotel Parking Space Allocation)



Source: North River Companies, Parking Transaction Data, supplied February 2019. The parking demand/capacity analysis excludes the use of the 42 spaces in the garage, for which parking transaction data is not available.

Potential Parking Management Strategies

To accommodate the increase in use of lots with the reduction of parking spaces, the property manager can reduce demand for use of the lot and seek operational parking strategies to manage demand at peak periods. The following measures are currently being explored to better manage the interim parking supply and ensure that demands are accommodated during peak conditions:

- Third party monthly pass users account for about 50 occupied parking spaces at the peak times. These are "tenants-at-will" and some of these leases may not be renewed.
- On peak days where the lots reach their capacity, transient parkers will not be permitted to access the lots. Note that this condition is expected to occur only during "peak month weekdays" – a condition we believe will occur on about 40 days over the course of a calendar year. Further, this condition is expected to last only between the hours of 10:00 AM and 2:00 PM on those days (i.e., big picture, the lots are expected to operate at or above capacity for only very short periods of time over the course of an entire year).
- Modified pricing strategies may be put in place to further manage demands.
- The use of valet and valet assist services by the hotel will help to achieve more efficient use of the parking lots during these short windows of peak utilization.

Conclusions

- The existing parking lots operate well below their striped capacity – typical peak use is about 442 parking spaces (or about 82 percent of capacity) on midweek weekdays. The expected full occupancy of the Portland Square buildings will not significantly change the expected parking demand for the lots.
- The lots are mainly used by monthly tenant parkers (about 76 percent of occupied spaces at peak times). Other users include:
  - Monthly Property Management / Vendors (3-4 percent)
  - Monthly Third Party Leased Parkers (11 percent)
  - Transient Parkers (9 percent)
- Under the interim condition with a reduced number of spaces in the lower lot, Portland Square parking demand would still fall below capacity during peak times.
- Allocating spaces to the new hotel may result in overuse without employment of some parking management strategies during some weekdays in peak utilization months.
- With a defined parking management plan in place, the interim capacity for Portland Square's Upper and Lower parking lots will satisfy the demand for both the existing Portland Square buildings, the conveyance of land to support construction of the proposed new hotel, and additionally, the operational parking requirements once in place and fully-occupied.

Department of Environmental Protection
Bureau of Land & Water Quality
17 State House Station
Augusta, Maine 04333
Telephone: 207-287-3901

FOR DEP USE **FORM A PAGE 1**
ATS # _____
L-_____
Total Fees: _____
Date: Received _____

****

SITE LOCATION OF DEVELOPMENT PERMIT APPLICATION 38 M.R.SA. §§481-490

PLEASE TYPE OR PRINT IN *INK ONLY*

This application is for: (CHECK THE ONE THAT APPLIES)	☐ **20 acre development** ☐ **Planning Permit** ☐ **Metallic Mining**	☐ **Marine Oil Terminal** ☐ **Structure** ☐ **Subdivision**	☐ **Major Amendment** ☒ **Minor Amendment**

1. Name of Applicant:	North River Company	**6. Name of Agent (if applicable):**	Carroll Associates
2. Applicant's Mailing Address:	1 Portland Square, Portland, ME 041	**7. Agent's Mailing Address:**	217 Commercial St, Portland ME
3. Applicant's Daytime Phone #:	207-874-6000	**8. Agent's Daytime Phone # :**	207-772-1552
4. Applicant's Fax # (if available):		**9. Agent's Fax # (if available):**	207-772-0712
5. Applicant's *e-mail address* (REQUIRED -license will be sent via: e-mail):	cflagg@wfny.com	**10. Agent's *e-mail address* (REQUIRED - license will be sent via e-mail):**	pcarroll@carroll-assoc.com

PROJECT INFORMATION

11. Name of Development:	One and Two Portland Square						
12. Map and Lot #'s:	**Map #:**	**Lot #:**	**13. Deed Reference #'s:**		**Book #:** 32163	**Page #:** 33	
14. Location of Project City/Town:	Portland	**15. County:**	Cumberland	**16. UTM Northing**		**17. UTM Easting**	
18. Brief Description of Project including total parcel size:	Amendment to existing SLODA Permit relating to required parking for development						

19. Type of Direct Watershed: (Check all that apply)

☐ Lake not most at risk ☐ River, stream or brook ☐ Coastal wetland
☐ Lake most at risk ☐ Urban impaired stream ☐ Wellhead or public water
☐ Lake most at risk, severely blooming ☐ Freshwater wetland

20. Name of Waterbody Project Site drains to:	Fore River		
21. Amount of Developed Area:	Total acres: 6.45	Existing Developed area: 6.45 acres	New Developed area: 6.4 acres
22. Amount of Impervious Area:	Total acres: 5.16	Existing Impervious areas 5.16 acres	New Impervious area: 5.1 acres

23. Development started prior to obtaining a license?:	☐ **Yes** ☒ **No**		
24. .Development or any portion of the site subject to enforcement action?	☐ **Yes** ☒ **No**	**If yes**, name of enforcement staff involved?	
25. Common scheme of development?:	☒ **Yes** ☐ **No**	**26. Title, Right or Interest:**	☐ **own** ☐ **lease** ☐ **purchase option** ☐ **written agreement**
27. Natural Resources Protection Act permit required?:	☐ **Yes** ☒ **No**	**If yes:** ☐ **PBR** ☐ **Tier 1** ☐ **Tier 2** ☐ **Full Permit**	
28. Existing DEP Permit number (if applicable):	#L-013526-26-A-N		
29. Names of DEP staff person(s) present at the pre-application meeting:	City of Portland Staff- Barbara Barhydt		
30. Does agent have an interest in project? If yes, what is the interest?	☐ **Yes** ☒ **No**		

CERTIFICATIONS AND SIGNATURES LOCATED ON PAGE 2

IMPORTANT: IF THE SIGNATURE BELOW IS NOT THE APPLICANT'S SIGNATURE, ATTACH LETTER OF AGENT AUTHORIZATION SIGNED BY THE APPLICANT.

By signing below the applicant (or authorized agent), certifies that he or she has read and understood the following :

CERTIFICATIONS / SIGNATURES

"I certify under penalty of law that I have personally examined the information submitted in this document and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the information is true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment. I authorize the Department to enter the property that is the subject of this application, at reasonable hours, including buildings, structures or conveyances on the property, to determine the accuracy of any information provided herein.

Further, I hereby authorize the DEP to send me an electronically signed decision on the license I am applying for with this application by emailing the decision to the electronic address located on the front page of this application (see #5 for the applicant and #10 for the agent)"..

Signed: _____ **Title** Agent **Date:** April 12, 2019

Notice of Intent to Comply with Maine Construction General Permit	**With this Site Law application form and my signature, I am filing notice of my intent to carry out work which meets the requirements of the Maine Construction General Permit (MCGP). I have read and will comply with all of the MCGP standards.** **If this form is not being signed by the landowner or lessee of the property, attach documentation showing authorization to sign.** **Signed** _____ **Date:** April 12, 20109

NOTE: You must file a MCGP Notice of Termination (Form K) within 20 days of completing permanent stabilization of the project site.

CERTIFICATION

The person responsible for preparing this application and/or attaching pertinent site and design information hereto, by signing below, certifies that the application for development approval is complete and accurate to the best of his/her knowledge.

Signature: _____

Name (print): Patrick Carroll

Date: April 12, 2019

Re/Cert/Lic No.: _____

Engineer _____

Geologist _____

Soil Scientist _____

Land Surveyor _____

Site Evaluator _____

Active Member of the Maine Bar _____

Professional Landscape Architect 0127

Other _____

FORM B

PUBLIC NOTICE:
NOTICE OF INTENT TO FILE

N/A
City Delegated Review

Please take notice that

_____

(*Name, Address and Phone # of Applicant*)

_____

is intending to file a Site Location of Development Act permit application with the Maine Department of Environmental Protection pursuant to the provisions of 38 M.R.S.A. §§ 481 thru 490 on or about

_____

(Anticipated Filing Date)

The application is for

_____

(Description of the Project)

_____

at the following location:

_____

(*Project Location*)

A request for a public hearing or a request that the Board of Environmental Protection assume jurisdiction over this application must be received by the Department in writing, no later than 20 days after the application is found by the Department to be complete and is accepted for processing. A public hearing may or may not be held at the discretion of the Commissioner or Board of Environmental Protection. Public comment on the application will be accepted throughout the processing of the application.

For Federally licensed, permitted, or funded activities in the Coastal Zone, review of this application shall also constitute the State's consistency review in accordance with the Maine Coastal Program pursuant to Section 307 of the federal Coastal Zone Management Act, 16 U.S.C. § 1456. (Delete if not applicable.)

The application will be filed for public inspection at the Department of Environmental Protection's office in (*Portland, Augusta or Bangor*)(circle one) during normal working hours. A copy of the application may also be seen at the municipal offices in _____, Maine.

(*Town*)

Written public comments may be sent to the regional office in Portland, Augusta, or Bangor where the application is filed for public inspection:

MDEP, Central Maine Regional Office, 17 State House Station, Augusta, Maine 04333
MDEP, Southern Maine Regional Office, 312 Canco Road, Portland, Maine 04103
MDEP, Eastern Maine Regional Office, 106 Hogan Road, Bangor, Maine 04401

FORM C

PUBLIC NOTICE FILING AND CERTIFICATION

The DEP Rules, Chapter 2, require an applicant to provide public notice for all Site Location projects with the exception of minor revisions and condition compliance applications. In the notice, the applicant must describe the proposed activity and where it is located. **"Abutter"** for the purposes of the notice provision means any person who owns property that is BOTH (1) adjoining and (2) within one mile of the delineated project boundary, including owners of property directly across a public or private right of way.

1. **Newspaper:** You must publish the Notice of Intent to File in a newspaper circulated in the area where the activity is located. The notice must appear in the newspaper within 30 days prior to the filing of the application with the Department. You may use the attached Notice of Intent to File form, or one containing identical information, for newspaper publication and certified mailing.

2. **Abutting Property Owners:** You must send a copy of the Notice of Intent to File by certified mail to the owners of the property abutting the activity. Their names and addresses can be obtained from the town tax maps or local officials. They must receive notice within 30 days prior to the filing of the application with the Department.

3. **Municipal Office:** You must send a copy of the Notice of Intent to File and a **duplicate of the entire application** to the Municipal Office.

   ATTACH a list of the names and addresses of the owners of abutting property.

CERTIFICATION

By signing below, the applicant or authorized agent certifies that:

1. A Notice of Intent to File was published in a newspaper circulated in the area where the project site is located within 30 days prior to filing the application;
2. A certified mailing of the Notice of Intent to File was sent to all abutters within 30 days of the filing of the application;
3. A certified mailing of the Notice of Intent to File, and a duplicate copy of the application was sent to the town office of the municipality in which the project is located; and
4. Provided notice of, if required, and held a public informational meeting in accordance with Chapter 2, Rules Concerning the Processing of Applications, Section 14, prior to filing the application. Notice of the meeting was sent by certified mail to abutters and to the town office of the municipality in which the project is located at least ten days prior to the meeting. Notice of the meeting was also published once in a newspaper circulated in the area where the project site is located at least seven days prior to the meeting.

The Public Informational Meeting was held on _____.
Date

Approximately _____ members of the public attended the Public Informational Meeting.

_____ _____
Signature of Applicant or Authorized Agent Date

N/A
City has Delegated Review

FORM D

SUBMISSIONS CHECKLIST

If a provision is not applicable, put "NA"

Section 1. Development description

A. Narrative

X 1. Objectives and details

X 2. Existing facilities (with dates of construction)

B. Topographic map

X 1. Location of development boundaries

____ 2. Quadrangle name

C. Construction plan

X 1. Outline of construction sequence (major aspects)

2. Dates

D. Drawings

X 1. Development facilities

X a. Location, function and ground area

NA b. Length/cross-sections for roads

X 2. Site work (nature and extent)

X 3. Existing facilities (location, function ground area and floor area)

4. Topography

X a. Pre- and post-development (contours 2 ft or less)

X b. Previous construction, facilities and lot lines

X **Section 2. Title, right or interest** (copy of document)

Section 3. Financial capacity

X A. Estimated costs

B. Financing

NA 1. Letter of commitment to fund

2. Self-financing

NA a. Annual report

NA b. Bank statement

3. Other

NA a. Cash equity commitment

NA b. Financial plan

X c. Letter

NA 4. Affordable housing information

Section 4. Technical ability (description)

X A. Prior experience (statement)

X B. Personnel (documents)

Section 5. Noise

NA A. Developments producing a minor noise impact (statement)

____ 1. Residential developments

____ 2. Certain non-residential subdivisions

____ 3. Schools and hospitals

____ 4. Other developments

____ a. Type, source and location of noise

____ b. Uses, zoning and plans

____ c. Protected locations

____ d. Minor nature of impact

e. Demonstration

NA B. Developments producing a major noise impact (full noise study)

1. Baseline
   a. Uses, zoning and plans
   b. Protected locations
   c. Quiet area
2. Noise generated by the development
   a. Type, source and location of noise
   b. Sound levels
   c. Control measures
   d. Comparison with regulatory limits
   e. Comparison with local limits

NA **Section 6. Visual quality and scenic character**(narrative, description, visual impact analysis)

NA **Section 7. Wildlife and fisheries** (narrative)

X **Section 8. Historic sites** (narrative)

NA **Section 9. Unusual natural areas** (narrative)

Section 10. Buffers

NA A. Site plan and narrative

Section 11. Soils

NA A. Soil survey map and report
1. Soil investigation narrative
2. Soil survey map

NA B. Soil survey intensity level by development type
1. Class A (High Intensity) Soil Survey
2. Class B (High Intensity) Soil Survey
3. Class C (Medium High-Intensity) Soil Survey
4. Class D (Medium Intensity) Soil Survey

C. Geotechnical Investigation

NA D. Hydric soils mapping

Section 12. Stormwater management

A. Narrative
NA 1. Development location
NA 2. Surface water on or abutting the site
NA 3. Downstream ponds and lakes
NA 4. General topography
NA 5. Flooding
NA 6. Alterations to natural drainage ways
NA 7. Alterations to land cover
NA 8. Modeling assumptions
9. Basic standard
NA 10. Flooding standard
NA 11. General standard
NA 12. Parcel size
13. Developed area
14. Disturbed area
15. Impervious area

B. Maps
NA 1. U.S.G.S. map with site boundaries
NA 2. S.C.S. soils map with site boundaries

NA C. Drainage Plans (a pre-development plan and a post-development plan)

1. Contours
2. Plan elements
3. Land cover types and boundaries
4. Soil group boundaries
5. Stormwater quantity subwatershed boundaries
6. Stormwater quality subwatershed boundaries
7. Watershed analysis points
8. Hydrologic flow lines (w/flow types and flow lengths labeled)
9. Runoff storage areas
10. Roads and drives
11. Buildings, parking lots, and other facilities
12. Drainage system layout for storm drains, catch basins, and culverts
13. Natural and man-made open drainage channels
14. Wetlands
15. Flooded areas
16. Benchmark
17. Stormwater detention, retention, and infiltration facilities
18. Stormwater treatment facilities
19. Drainage easements
20. Identify reaches, ponds, and subwatersheds matching stormwater model
21. Buffers

NA D. Runoff analysis (pre-development and post development)
1. Curve number computations
2. Time of concentration calculations
3. Travel time calculations
4. Peak discharge calculations
5. Reservoir routing calculations

NA E. Flooding Standard
1. Variance submissions (if applicable)
   a. Submissions for discharge to the ocean, great pond, or major river
      i. Map
      ii. Drainage plan
      iii. Drainage system design
      iv. Outfall design
      v. Easements
   b. Insignificant increase
      i. Downstream impacts

   c. Submissions for discharge to a public stormwater system
      i. Letter of permission
      ii. Proof of capacity
      ii. Outfall analysis and design (pictures)
2. Sizing of storm drains and culverts
3. Stormwater ponds and basins
   a. Impoundment sizing calculations
   b. Inlet calculations
   c. Outlet calculations
   d. Emergency spillway calculations
   e. Subsurface investigation report
   f. Embankment specifications
   g. Embankment seepage controls
   h. Outlet seepage controls
   i. Detail sheet
   j. Basin cross sections
   k. Basin plan sheet
4. Infiltration systems
   a. Well locations map
   b. Sand and gravel aquifer map
   c. Subsurface investigation report with test pit or boring logs

d. Permeability analysis
e. Infiltration structure design
f. Pollutant generation and transport analysis
g. Monitoring and operations plan
i. Locations of storage points of potential contaminants
ii. Locations of observation wells and infiltration monitoring plan
iii. Groundwater quality monitoring plan

5. Drainage easement declarations.

NA F. Stormwater quality treatment plan peak discharge calculations

1. Basic stabilization plan
a. Ditches, swales, and other open channel stabilization
b. Culvert and storm-drain outfall stabilization
c. Earthen slope and embankment stabilization
d. Disturbed area stabilization
e. Gravel roads and drives stabilization

2. General Standard
a. Calculations for sizing BMP
b. Impervious area calculation
c. Developed area calculation
d. Summary spreadsheet of calculations

3. Phosphorus control plan
a. Calculations for the site's allowable phosphorus export
b. Calculations for determining the developed site's phosphorus export
c. Calculations for determining any phosphorus compensation fees

4. Offset Credits
a. Urban impaired stream
Offset credit calculation
b. Phosphorus credit determination
i. Location map
ii. Scaled plan
iii. Title and right
iv. Demolition plan
v. Vegetation plan
vi. Offset credit calculation
vii. Calculation for the new allowable export

5. Runoff treatment measures
a. structural measures
i. Design drawings and specifications
ii. Design calculations
iii. Maintenance plan
iv. TSS removal or phosphorus treatment factor determinations
v. Stabilization plan
b. Vegetated buffers
i. Soil survey
ii. Buffer plan
iii. Turnout and level spreader designs
iv. Deed restrictions

6. Control plan for thermal impacts to coldwater fisheries
7. Control plan for other pollutants
8. Engineering inspection of stormwater management facilities

NA G. Maintenance of common facilities or property

1. Components of the maintenance plan
A. Maintenance of facilities by owner or operator
1. Site owner or operator (name legally responsible party)
2. Contact person responsible for maintenance
3. Transfer mechanism

4. List of facilities to be maintained
5. List of inspection and maintenance tasks for each facility
6. Identifications of any deed covenants, easements, or restrictions
7. Sample maintenance log
8. Copies of any third-party maintenance contracts

NA B. Maintenance of facilities by homeowner's association
1. Incorporation documents for the association
2. Membership criteria
3. Association officer responsible for maintenance
4. Establishment of fee assessment for maintenance work
5. Establishment of lien system
6. Reference to department order(s) in association charter
7. Transfer mechanism from developer to association
8. List of facilities to be maintained
9. Identification of any deed covenants, easements, or restrictions
10. Renewal of covenants and leases
11. List of inspection and maintenance tasks for each facility
12. Sample maintenance log
13. Copies of any third-party maintenance contracts

NA C. Maintenance of facilities by municipality or municipal district
1. Identification of the municipal department or utility district
2. Contact person responsible for maintenance
3. Evidence of acceptance of maintenance responsibility
4. Transfer mechanism from developer
5. List of facilities to be maintained
6. List of inspection and maintenance tasks for each facility
7. Identifications of any deed covenants, easements, or restrictions
8. Sample maintenance log

2. General inspection and maintenance requirements
a. Drainage easements
b. Ditches, culverts, and catch-basin systems
c. Roadways and parking surfaces
d. Stormwater detention and retention facilities
1. Embankment inspection and maintenance
2. Outlet inspection and clean-out
3. Spillway maintenance
4. Sediment removal and disposal
e. Stormwater infiltration facilities
1. Sediment protection plan
2. Infiltration rehabilitation plan
3. Sediment removal and disposal
4. Groundwater monitoring plan
f. Proprietary treatment devices
g. Buffers
h. Other practices and measures

Section 13. Urban Impaired Stream Submissions

NA 1. Off-site credits
NA 2. Compensation fees (Urban Impaired Stream/Phosphorus)
NA 3. Development impacts

Section 14. Basic Standards

NA A. Narrative
1. Soil types
2. Existing erosion problems
3. Critical areas
4. Protected natural resources
5. Erosion control measures

_____ 6. Site stabilization
NA B. Implementation schedule
NA C. Erosion and sediment control plan
_____ 1. Pre-development and post-development contours
_____ 2. Plan scale and elements
_____ 3. Land cover types and boundaries
_____ 4. Existing erosion problems
_____ 5. Critical areas
_____ 6. Protected natural resources
_____ 7. Locations (general)
_____ 8. Locations of controls
_____ 9. Disturbed areas
_____ 10. Stabilized construction entrance
NA D. Details and specifications (for both temporary and permanent measures)
NA E. Design calculations
NA F. Stabilization plan
_____ 1. Temporary seeding
_____ 2. Permanent seeding
_____ 3. Sodding
_____ 4. Temporary mulching
_____ 5. Permanent mulching
NA G. Winter construction plan
_____ 1. Dormant seeding
_____ 2. Winter mulching
NA H. Third-party inspections
_____ 1. Inspector's name, address, and telephone number
_____ 2. Inspector's qualifications
_____ 3. Inspection schedule
_____ 4. Contractor contact
_____ 5. Reporting protocol

Section 15. Groundwater

NA A. Narrative
_____ 1. Location and maps
_____ 2. Quantity
_____ 3. Sources
_____ 4. Measures to prevent degradation
NA B. Groundwater protection plan
NA C. Monitoring plan
_____ 1. Monitoring points
_____ 2. Monitoring frequency
_____ 3. Background conditions
_____ 4. Monitoring parameters
_____ 5. Personnel qualifications
_____ 6. Proof of training
_____ 7. Equipment and methods
_____ 8. Quality assurance/quality control
_____ 9. Reporting requirements
_____ 10. Remedial action plan
NA D. Monitoring well installation report
_____ 1. Well location map
_____ 2. Elevation data
_____ 3. Well installation data
_____ 4. Well construction details
_____ 5. Borehole logs
_____ 6. Summary of depth measurements
_____ 7. Characteristics of subsurface strata
_____ 8. Well installation contract

____ 9. Schematic cross-sections
____ 10. Monitoring point summary table
____ 11. Protective casing
____ 12. On-site well identification

Section 16. Water supply

NA A. Water supply method
____ 1. Individual wells (evidence of sufficient/healthful supply)
____ a. Support of findings by well drillers
____ b. Support of findings by geologist
____ 2. Common well(s) (reports)
____ a. Hydrogeology report
____ b. Engineering report
____ c. Well installation report
____ d. Long-term safe yield and zone of influence determination
____ e. Public water supply
____ i. Proposed well or wells
____ ii. Existing well or wells
____ iii. Water quality analysis
____ 3. Well construction in shallow-to-bedrock areas
____ 4. Additional information
____ 5. Off-site utility company or public agency
____ 6. Other sources
NA B. Subsurface wastewater disposal systems (locations of systems and wells)
NA C. Total usage (statement re: total anticipated water usage)

Section 17. Wastewater disposal

NA A. On-site subsurface wastewater disposal systems (investigation results)
____ 1. Site plan
2. Soil conditions summary table
____ 3. Logs of subsurface explorations
4. Additional test pits, borings or probes
____ a. Soil conditions A
____ b. Soils with Profiles 8 and 9 parent material
____ c. Soil conditions D
____ d. Disposal field length 60 feet or greater
____ 5. 3-bedroom design
____ 6. Larger disposal systems
a. System design details
____ b. Plan view
____ c. Cross sections
____ d. Test pit data
____ e. Mounding analysis
NA B. Nitrate-nitrogen impact assessment
____ 1. When required
____ a. Exempted____
i. Conventional systems meeting certain setbacks
ii. Denitrification systems
____ b. Special conditions and other exemptions
____ 2. Assumptions
____ a. Initial concentration
____ b. Background concentration
____ c. Contribution from development
____ d. Mixing and dilution
____ e. Severe-drought scenario
____ f. Wastewater flow to subsurface wastewater disposal fields

3. Assessment report minimum requirements
    a. Narrative and calculations
    b. Site plan
        i. Well locations
        ii. 10 mg/l and 8 mg/l isocons
        iii. Groundwater contours and groundwater flow divides
    c. References
4. Denitrification systems
    a. Design plans and specifications
    b. Installation information
    c. Monitoring plan
    d. Maintenance
    e. Backup system

NA D. Municipal facility or utility company letter

NA E. Storage or treatment lagoons

NA **Section 18. Solid waste** (list: type, quantity, method of collection and location)

NA A. Commercial solid waste facility (final disposal location)

NA B. Off-site disposal of construction/demolition debris (final disposal location)

C. On-site disposal of woodwaste/land clearing debris

1. Applicability of rules (evidence re: applicability of rules)
2. Burning of wood wastes
    a. Delineation on site plan
    b. Plans for handling unburned woodwaste and woodash
    c. Evidence of capacity to accept waste (approved facility)
    d. Usage of materials
    e. Data on mixing ratios and application rates

NA D. Special or Hazardous Waste

Section 19. Flooding

NA A. Explanation of flooding impact

B. Site plan showing 100-year flood elevation

C. Hydrology analysis

D. FEMA flood zone map with site boundaries

Section 20. Blasting

NA A. Site Plan or map

NA B. Report
1. Assessment
2. Blasting plan

Section 21. Air emissions (narrative and summary)

NA A. Point and non-point sources identified

NA B. Emission components (point sources)

Section 22. Odors

NA A. Identification of nature/source

NA B. Estimate of areas affected

NA C. Methods of control)

NA **Section 23. Water vapor** (narrative)

NA **Section 24. Sunlight** (statement and drawing, if required)

Section 25. Notices

NA A. Evidence that notice sent

NA B. List of abutters for purposes of notice

Supplemental requirements for Wind Energy Developments only:

Section 26. Shadow flicker

NA A. A copy of the Windpro Analysis and associated narrative

Section 27. Public Safety

NA A. Design safety certifications or other documents attesting to the safety of the wind turbine equipment.
NA B. Evidence pertaining to overspeed controls
NA C. Site plan documenting safety setbacks zones for each wind turbine
NA D. Other documents as necessary to demonstrate safety considerations

Section 28. Tangible Benefits

____ A. Narrative demonstration of tangible benefits

Section 29. Decommissioning

NA A. Description of implementation trigger for decommissioning
NA B. Description of extent of decommissioning
NA C. Itemization of total cost to complete decommissioning
NA D. Demonstration of financial assurance for completeness of decommissioning plan

Section 30. Generating Facility-visual Quality and Scenic Character

NA A. (narrative, description, visual impact analysis)

Portland Square, Amendment to SLODA #L-013526-26-A-N

On behalf of North River IV, LLC, we are pleased to submit an Application for Amendment to the existing SLODA that is in place for One and Two Portland Square (#L-013526-26-A-N). The intent of this Amendment is to seek a reduction in the required parking for One and Two Portland Square. The current SLODA Permit requires a total of 565 spaces, the majority of which are located in two surface lots adjacent to the development. Based on a detailed analysis of the current and projected utilization of parking in these lots completed by VHB, we believe a reduction in required parking is justified. The immediate goal of this reduction is to bring the parking to an appropriate utilization level and allow a 0.55 Acre portion of the lower lot to be transferred to the Fathom Company for development as a Hotel.

Section 1. Development Description

A. Project Description

The project site occupies almost two city blocks and approximately 6.45 acres of land in four parcels bound by Spring, Commercial, Center, Cotton and Cross Streets. The property currently contains approximately 260,000 sf of mixed-use space in Portland Square One and Portland Square Two, the remaining property is currently utilized for surface parking, containing approximately 542 private parking spaces on the upper and lower lots straddling Fore Street, not including 42 existing spaces in the basement of 2 Portland Square.

The project was approved by the City in two phases, with One Portland Square approved by the City and Maine DEP in 1986, and Two Portland Square approved in 1989. The buildings were constructed in 1987 and 1989 respectively, and are completely occupied at this time. The original SLODA has been amended 8 times, most recently with transfer of the Ownership to North River IV LLC on April 21, 2015.

North River Company has entered into an agreement to sell a 0.55 Acre parcel of land at the southeast corner of the lower lot (2.38 ac) property at Commercial and Center Streets to the Fathom Company for development of a proposed 135 room Hotel, which is currently being reviewed by the City. This parcel effectively reduces the number of parking spaces available for Portland Square One and Portland Square Two tenants by approximately 90 spaces, from 542 down to 452 spaces as proposed. Key to this proposed reduction is insuring the reduced parking still meets the needs of One and Two Portland Square. A detailed Parking Utilization Study was recently completed by VHB Consultants of Boston. Their report is included with this application as Attachment #1, and analyzed in detail at the existing use of the parking lots, as well as projected future utilization resulting from full occupancy of the buildings and projected hotel parking. The results indicate that the parking lot will continue to meet the daily needs of Portland Square One/ Two at 452 spaces, and notes that once the Hotel is on line the surface lots will operate at slightly over capacity if current demand levels remain. The report offers several management tools that the Owners might consider to reduce overall demand.

B. Topographic Map. See Attachment #2.

C. Construction Plan

The modifications to the Lower Lot parking Lot are anticipated to occur in concert with the development of the Center Street Hotel, proposed for the lower 0.55 Acre portion of the existing Lot. The Hotel project is anticipated to develop their complete property, and in addition have secured construction and access easements across an 18-foot-wide zone on the north and west sides of their property. The developer (Fathom Company) will undertake site preparation efforts including removal/ relocation of site electrical and limited stormwater facilities that currently are located within their proposed building zone. The easement area will be utilized for construction access and material laydown, and it is anticipated grading

will occur in this area to allow construction of footings and foundation walls. This area will be fenced and separated from the remaining parking lot owned and managed by North River.

A portion of the existing lot will be restriped to provide appropriate flow through the parking area and minimize the loss of parking from the Hotel project. This work will be completed by North River, it is not anticipated that any additional earthwork or pavement will be required for this effort.

Once the Hotel project is complete, a portion of the easement area along Center Street will be paved for Hotel service, and a small area will be paved to provide required egress from the Hotel along the nort side. All remaining areas disturbed by the Hotel construction will be revegetated with loam/ seed and landscaping along the north side adjacent to the Richardson Wharf Building.

Construction is anticipated to begin in October,2019, with occupancy of the Hotel occurring in April, 2021. The parking lot will be functional at the beginning of construction and anticipate operate at this level until future development of the site occurs.

D. Drawings.

The following drawings are attached to this Application:

D. Existing Topographic and Boundary Surveys of the entire North River Properties, including the lot proposed to be transferred to Fathom Company.
E. L-1.1 Overall Parking Plan, illustrating the proposed modification of the parking distribution on the site.
F. L-1.1 Lower Site Parking Plan, illustrating the extent of restriping and easements relating to the Hotel Project.

Section 2. Title, Right, or interest

Included as Attachment #3 of this Application is the Deed providing evidence of Ownership of the property by the North River Company.

Section 3. Financial Capability

A. Estimated Costs.

Estimated costs for North River to complete the restriping and signage required on the Lower lot is less than $20,000.00.

B. Financing.

Included as Attachment #4 is a letter from People's United Bank indicating an intention to provide any financing for the Portland Square Project.

C. Certificate of Good Standing

Included as Attachment #5 is a Certificate of Good Standing for the North River Company, LLC

Section 4. Technical Ability

Included as Attachment #6 is a profile of the North River Company and its key Design Team Members.

Section 5. Noise

The focus of this Amendment is distribution of surface parking that is in support of the Office/ Retail use of One and Two Portland Square. The current use is permitted and will be maintained. No noise impacts are anticipated as a result of this action.

Section 6. Visual Quality and Scenic Character
The site currently operates as a surface parking lot and its use will continue. Existing vegetation that is in place along the north, east, and south sides of the parking lot will be maintained. There are no elements on the site that contribute to maintenance of any scenic character.

Section7. Wildlife and Fisheries.
The site is currently in use as a surface parking lot, which will be maintained. There are no proposed impacts to wildlife and fisheries as a result of this action.

Section 8. Historic Sites.
The site is currently in use as a surface parking lot, which will be maintained. A small section of the eastern portion site is located within the City of Portland Waterfront Historic District. There are no proposed impacts to any historic structures, sites, or archeological sites resulting from this proposed action.

Section 9. Unusual Natural Areas
There are no known unusual natural areas within the limits of this project.

Section 10. Buffers.
There are no current or proposed buffers proposed for this property. All existing plantings on the property will remain.

Section 11. Soils.
There is no proposed earthwork or disturbance associated with this project. Existing soils will remain during this phase of the project.

Section 12. Stormwater Management. (Flooding and General Standards).
There is no proposed earthwork, paving, or disturbance associated with this project. Existing drainage patterns will remain during this phase of the project. Minor rerouting of underground stormwater will be required to enable the adjacent Hotel project to proceed, this work will be included on the Amendment that will include that component of work.

Section 13. Urban Impaired Stream Submissions.
The project is not within the direct watershed of an urban impaired stream.

Section 14. Basic Standards Submission.
There is no proposed earthwork, paving, or disturbance associated with this project. The site will remain stable with no exposed soils requiring temporary or permanent erosion controls. Restriping efforts will entail cleaning of pavement surface, sealing, and striping to accommodate new parking patterns.

Section 15. Groundwater.
There is no proposed earthwork or site disturbance associated with this project. No groundwater is anticipated to be encountered or contaminated as a result of this project.

Section 16. Water Supply.
No water service is supplied to this site or anticipated to be needed as a result of this project.

Section 17. Wastewater Disposal.
No on-site wastewater service is anticipated to be needed as a result of this project.

Section 18. Solid Waste
No solid waste is anticipated to be generated by this project.

Section 19. Flooding
The project is not within the 100-year flood elevation. Existing drainage patterns will be maintained, and no flooding from the surface lots is anticipated to result from this project.

Section 20. Blasting.
No blasting is anticipated to be required for this project.

Section 21. Air Emissions.
The site currently is in use as a paves surface parking lot, no change in use is anticipated to create air emissions as a result of this project.

Section 22. Odors.
The property is currently developed and in use as a surface parking lot. This use will continue. No odors will be generated as a result of this project.

Section 23. Water Vapor
The property is currently developed and in use as a surface parking lot. This use will continue. No water vapor will be generated as a result of this project.

Section 24. Sunlight.
There are no new structures on the proposed project and therefore no blocking of solar access is anticipated.

Section 25. Notices
The project will be reviewed by the City of Portland under delegated review authority with the Maine DEP. The Amendment will be reviewed by the City Staff and Planning Board concurrent with the associated Level III Application. All noticing will be completed according to City of Portland requirements and policies.

Section26. Shadow Flicker.
There are no wind turbine structures on the proposed project and therefore no shadow flicker is anticipated.

Section 27. Public Safety.
There are no wind turbine structures on the proposed project and therefore no safety hazards to adjacent properties or property use is anticipated.

Section 28. Tangible Benefits.
There are no wind turbine structures on the proposed project and therefore no tangible public benefits necessary for this project.

Section 29. Decommissioning Plan.
There are no wind turbine structures on the proposed project and therefore no decommissioning requirements necessary for this project.

Section 30. Generating Facility- Visual Quality and Scenic Character.
There are no wind turbine structures on the proposed project and therefore no visual/ scenic character effects resulting from this project.

Standard to be Waived: Cite Ordinance or Technical Manual Standard	Cite Standard Language: Cite specific language of applicable Ordinance or Technical Manual Standard	Waiver Being Sought: Describe waiver being sought. Ex. – We are requesting a two-way parking lot drive aisle width of 20' feet.	Justification for Waiver: Address specific waiver criteria, if applicable, and document reasons for the waiver request.
Technical Manual, Sec 1.14 Parking lot and Parking Space Design	Parking Spaces shall meet the following dimensional requirements: * Standard Space: 9'x 18' * Compact Space: 8'x 15' ... Parking Lots with more than 10 spaces may have up to 20% compact spaces	We are requesting that the lot be striped at 8' x 18' for all parking, except approximately 16 spaces on the lower lot that will be designated as compact parking spaces.	The parking lots have been striped at 8 ft width since its completion, and seems to function well at this dimension. The majority of users are office tenants that park all day with little turnover.

Plan References:

1. ALTA/ACSM LAND TITLE SURVEY FOR PORTLAND SQUARE LIMITED PARTNERSHIP, TWO PORTLAND SQUARE, CITY OF PORTLAND, COUNTY OF CUMBERLAND, STATE OF MAINE, BY STEVENS, MORTON, ROSE & THOMPSON DATED DEC. 11, 1989, REVISED THROUGH DEC. 11, 1992.
2. SURVEY FOR ATBRO CORP. DATED JULY 1981 BY H.I. & E.C. JORDAN.
3. LAND TITLE SURVEY FOR NORTHLAND REALTY DATED NOV. 26, 1985 BY H.I. & E.C. JORDAN.
4. "CROSS STREET EASEMENT PLAN" DATED JAN. 3, 1986 BY HUNTER– BALLEW ASSOCIATES ON FILE WITH THE CITY OF PORTLAND DEPT. OF PLANNING AND URBAN DEVELOPMENT.
5. STANDARD BOUNDARY SURVEY FOR PORTLAND SQUARE LIMITED PARTNERSHIP, NORTHLAND REALTY CORP. DATED OCT. 26, 1987 BY STEVENS, MORTON, ROSE & THOMPSON, INC. RECORDED IN C.C.R.D. IN PLAN BOOK 182, PAGE 29.
6. LAND TITLE SURVEY ON FORE STREET, PORTLAND, MAINE MADE FOR TWO PORTLAND SQUARE LIMITED PARTNERSHIP DATED FEB. 21, 1996 BY OWEN HASKELL, INC. RECORDED IN PLAN BOOK 196, PAGE 60.
7. ALTA/ACSM LAND TITLE SURVEY OF ONE PORTLAND SQUARE DATED MAY 16, 1996 BY LEWIS & WASINA, INC. UPDATED TO JUNE 24, 1996 IN PLAN BOOK 196, PAGE 221.
8. PLAN MADE FOR MGI ONE PORTLAND SQUARE, INC. BY H.I. & E.C. JORDAN DATED NOV. 15, 1989 REVISED TO JUNE 26, 1996 IN PLAN BOOK 196, PAGE 86 AND 219.
9. LAND TITLE SURVEY FOR MGI TWO PORTLAND SQUARE, INC., FORE STREET, PORTLAND, MAINE, JUNE 25, 1996 BY OWEN HASKELL, INC. IN PLAN BOOK 196, PAGE 220.
10. PLATS AND PLANS OF A BUSINESS CONDOMINIUM OCTOBER 29, 1987 PLAN BOOK 166, PAGE 44.
11. PLAN OF PROPERTY IN PORTLAND MAINE MADE FOR PORTLAND SQUARE LIMITED PARTNERSHIP DATED NOV. 15, 1989 BY H.I. AND E.C. JORDAN.
12. ALTA/ACSM LAND TITLE SURVEY ON FORE STREET PORTLAND, MAINE MADE FOR MGI, ONE PORTLAND SQUARE DATED APRIL 14, 1999 BY OWEN HASKELL, INC.
13. ALTA/ACSM LAND TITLE SURVEY ON FORE STREET PORTLAND, MAINE MADE FOR TIMOTHY O'NEIL DATED APRIL 14, 1999 REV. 7 3/23/04 BY OWEN HASKELL, INC.
14. ALTA/ACSM LAND TITLE SURVEY, BCIA PROJECT, ONE PORTLAND SQUARE, TWO PORTLAND SQUARE AND PORTLAND SQUARE PARKING, PORTLAND, MAINE, SHEETS 1 AND 2, DATED SEPT. 30, 2005 LAST REVISED FEB. 7, 2006 AND MARCH 3, 2006 BY OWEN HASKELL, INC.
15. ALTA/ACSM LAND TITLE SURVEY, oNE PORTLAND SQUARE, TWO PORTLAND SQUARE AND PORTLAND SQUARE PARKING, PORTLAND, MAINE, MADE FOR NORTH RIVER IV LLC FEBRUARY 12, 2015 BY OWEN HASKELL, INC.

Utility Note:

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES. CALL 1–888–DIGSAFE AT LEAST THREE BUSINESS DAYS BEFORE PERFORMING ANY CONSTRUCTION. DUE TO OSHA CONFINED SPACE REQUIREMENTS, ALL INVERTS AND PIPE SIZES MUST BE VERIFIED PRIOR TO ANY CONSTRUCTION.

Flood Zone Note:

BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS IN ZONE C OF THE FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 230051 0013 B, WHICH BEARS AN EFFECTIVE DATE OF JULY 17, 1986 AND IS NOT IN A SPECIAL FLOOD HAZARD AREA.

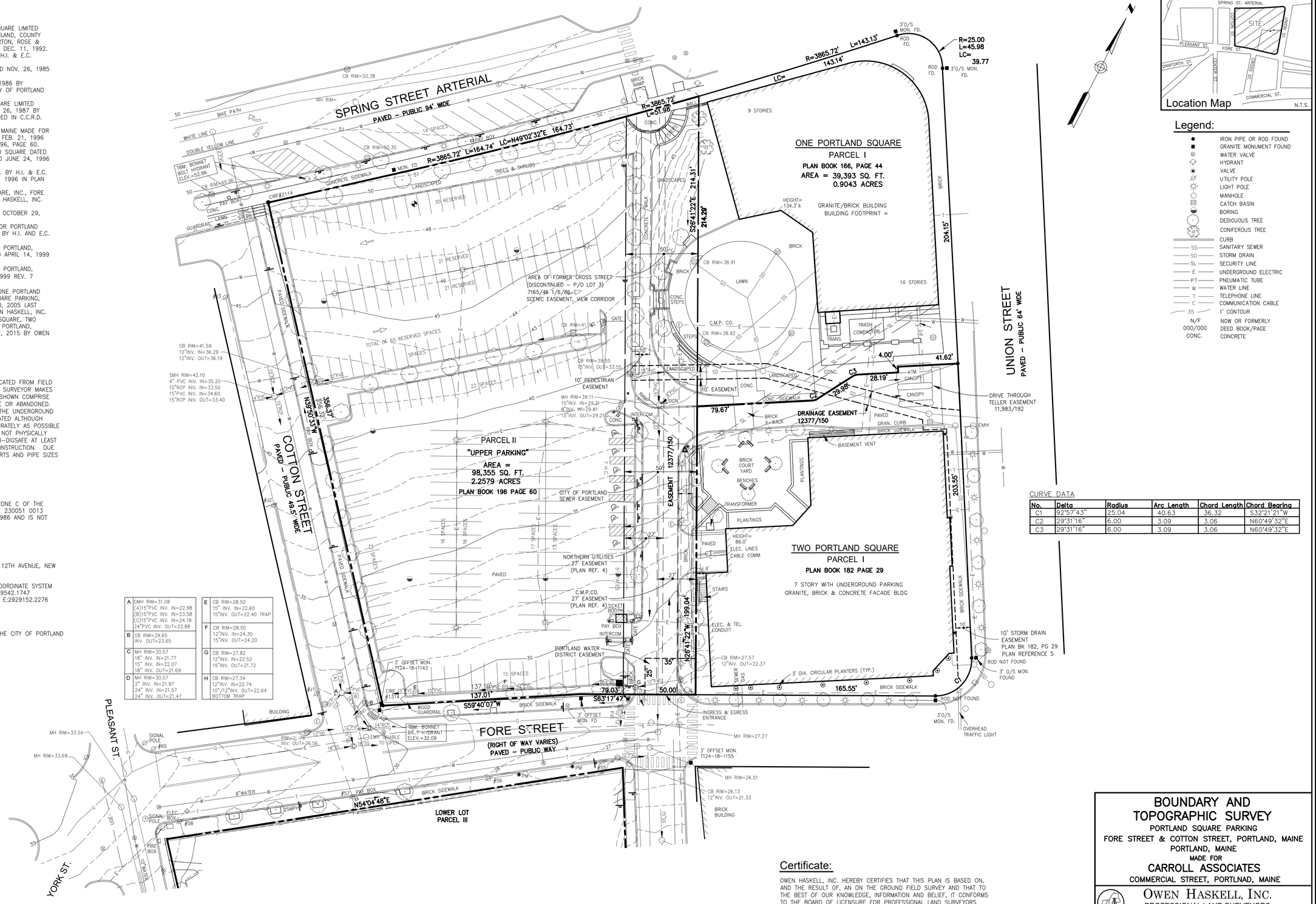
Notes:

1. OWNER OF RECORD: NORTH RIVER IV LLC, 224 12TH AVENUE, NEW YORK, NY 10001 C.C.R.D. BOOK 32163 PAGE 33

2. BEARINGS ARE BASED ON MAINE STATE PLANE COORDINATE SYSTEM MAINE WEST NAD83. CITY POINT T124–18–1143 N:299542.1747 E:2928944.1068 AND T124–18–1155 N:299607.6956 E:2929152.2276 HELD.

3. ELEVATIONS ARE BASED ON CITY DATUM.

4. THE LOCUS IS SHOWN AS LOT 3 BLOCK B ON THE CITY OF PORTLAND ASSESSORS MAP 38.



Legend:

- IRON PIPE OR ROD FOUND
- GRANITE MONUMENT FOUND
- WATER VALVE
- HYDRANT
- VALVE
- UTILITY POLE
- LIGHT POLE
- MANHOLE
- CATCH BASIN
- BORING
- DEDICUOUS TREE
- CONIFEROUS TREE
- CURB
- SS — SANITARY SEWER
- SD — STORM DRAIN
- SL — SECURITY LINE
- E — UNDERGROUND ELECTRIC
- PT — PNEUMATIC TUBE
- W — WATER LINE
- T — TELEPHONE LINE
- C — COMMUNICATION CABLE
- 35 — 1' CONTOUR
- N/F — NOW OR FORMERLY
- 000/000 — DEED BOOK/PAGE
- CONC. — CONCRETE

CURVE DATA

No.	Delta	Radius	Arc Length	Chord Length	Chord Bearing
C1	92°57'43"	25.04	40.63	36.32	S32°21'21"W
C2	29°31'16"	6.00	3.09	3.06	N60°49'32"E
C3	29°31'16"	6.00	3.09	3.06	N60°49'32"E

A	DMH RIM=31.08 (A)15"PVC INV. IN=22.98 (B)15"PVC INV. IN=23.58 (C)15"PVC INV. IN=24.18 24"PVC INV. OUT=22.88	
B	CB RIM=29.65 INV. OUT=23.65	
C	MH RIM=30.57 18" INV. IN=21.77 15" INV. IN=22.07 18" INV. OUT=21.69	
D	MH RIM=30.07 2" INV. IN=21.97 24" INV. IN=21.57 24" INV. OUT=21.47	
E	CB RIM=28.50 15" INV. IN=22.60 15"INV. OUT=22.40 TRAP	
F	CB RIM=28.50 12"INV. IN=24.30 15"INV. OUT=24.20	
G	CB RIM=27.82 12"INV. IN=22.52 15"INV. OUT=21.72	
H	CB RIM=27.34 12"INV. IN=22.74 10"/12"INV. OUT=22.64 BOTTOM TRAP	

GRAPHIC SCALE
0 15' 30' 60' 120'

Certificate:

OWEN HASKELL, INC. HEREBY CERTIFIES THAT THIS PLAN IS BASED ON, AND THE RESULT OF, AN ON THE GROUND FIELD SURVEY AND THAT TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, IT CONFORMS TO THE BOARD OF LICENSURE FOR PROFESSIONAL LAND SURVEYORS CURRENT STANDARDS OF PRACTICE.

DATE

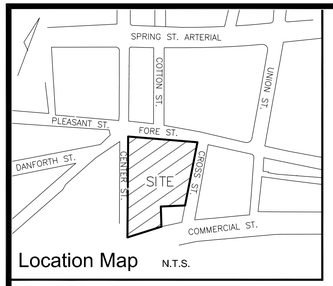
JOHN W. SWAN, PLS NO. 1038

BOUNDARY AND TOPOGRAPHIC SURVEY

PORTLAND SQUARE PARKING
FORE STREET & COTTON STREET, PORTLAND, MAINE
PORTLAND, MAINE
MADE FOR
CARROLL ASSOCIATES
COMMERCIAL STREET, PORTLNAD, MAINE

OWEN HASKELL, INC.
PROFESSIONAL LAND SURVEYORS
390 U.S. ROUTE ONE, FALMOUTH, ME 04105 (207) 774–0424

Drawn By RS	Date	Job No.
Trace By JLW	DECEMBER 5, 2016	2016–129 P
Check By JWS	Scale	Drwg. No.
Book No. FILE	1" = 30'	1



Location Map N.T.S.

Legend

● IRON PIPE OR ROD FOUND	CURB
■ GRANITE MONUMENT FOUND	SS SANITARY SEWER
⊗ WATER VALVE	SD STORM DRAIN
HYDRANT	SL SECURITY LINE
VALVE	E UNDERGROUND ELECTRIC
UTILITY POLE	PT PNEUMATIC TUBE
LIGHT POLE	W WATER LINE
MANHOLE	T TELEPHONE LINE
CATCH BASIN	C COMMUNICATION CABLE
BORING	25 1' CONTOUR
DEDUCIOUS TREE	N/F NOW OR FORMERLY
CONIFEROUS TREE	000/000 DEED BOOK/PAGE
	CONC. CONCRETE
	Ⓐ POSSIBLE ENCROACHMENT
	① SCHEDULE B EXCEPTION

Schedule B Section II Exceptions

OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY
TITLE INSURANCE COMMITMENT FILE NO. BTC4327/TF7674
COMMITMENT DATE: SEPTEMBER 17, 2018

1 – 7. NON SURVEY ITEMS

8. RIGHTS AND EASEMENTS GRANTED TO ARI NEWMAN AND LEE BEAMIS BY PINE STATE BEEF COMPANY AS SET FORTH IN A DEED DATED SEPTEMBER 12, 1967 AND RECORDED IN THE CUMBERLAND COUNTY REGISTRY OF DEEDS IN BOOK 3011, PAGE 321. – THE ROOFS DO NOT OVERHANG ONTO LOCUS PARCEL AND THE "EXISTING PLATFORMS" NO LONGER EXIST

9. RIGHTS AND EASEMENTS GRANTED TO CENTRAL MAINE POWER COMPANY BY POULTRY PROCESSING INC. AS SET FORTH IN AN INSTRUMENT DATED MAY 31, 1978 AND RECORDED IN THE CUMBERLAND COUNTY REGISTRY OF DEEDS IN BOOK 4278 PAGE 303. – REFERENCED POLE #1.1 OR VAULT #1.2 NOT FOUND, POSSIBLE LOCATION ON PROPOSED PARCEL

10. SUCH STATE OF FACTS AS SHOWN ON A PLAN ENTITLED "PLAN OF PROPERTY IN PORTLAND, MAINE MADE FOR MGI ONE PORTLAND SQUARE, INC. LAND TITLE SURVEY" BY H. I. & E. C. JORDAN – SURVEYORS, DATED NOVEMBER 15, 1989, AS REVISED AND RE–CERTIFIED, AND RECORDED IN THE CUMBERLAND COUNTY REGISTRY OF DEEDS IN PLAN BOOK 196, PAGE 219. – PERTINENT INFORMATION AS SHOWN

11. TITLE TO LAND AND GRADING RIGHTS ACQUIRED FROM PORTLAND SQUARE LIMITED PARTNERSHIP BY THE STATE OF MAINE BY ITS DEPARTMENT OF TRANSPORTATION AS SET FORTH IN A NOTICE OF LAYOUT AND TAKING DATED AUGUST 21, 1991 AND RECORDED IN THE CUMBERLAND COUNTY REGISTRY OF DEEDS IN BOOK 9688, PAGE 341.– AS SHOWN

12. SUCH STATE OF FACTS AS SHOWN ON A PLAN ENTITLED "STATE OF MAINE, DEPARTMENT OF TRANSPORTATION RIGHT OF WAY MAP, PORTLAND, CUMBERLAND COUNTY, FEDERAL AID PROJECT NO. M–0685(4)", D.O.T. FILE NO. 3–388, DATED JUNE 1991 AND RECORDED IN THE CUMBERLAND COUNTY REGISTRY OF DEEDS IN PLAN BOOK 193, PAGE 342. – PERTINENT INFORMATION AS SHOWN

13. TERMS AND CONDITIONS STATE OF MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION MODIFICATION FINDINGS OF FACT AND ORDER ISSUED TO PORTLAND SQUARE LIMITED PARTNERSHIP DATED NOVEMBER 30, 1990 AND RECORDED IN THE CUMBERLAND COUNTY REGISTRY OF DEEDS IN BOOK 9418, PAGE 59, AS AFFECTED BY A TRANSFER DATED FEBRUARY 6, 1996 AND RECORDED IN BOOK 12350, PAGE 321, A MODIFICATION DATED FEBRUARY 14, 1996 AND RECORDED IN BOOK 12367, PAGE 325, AND TRANSFER DATED APRIL 21, 2015 AND RECORDED IN IN BOOK 32265, PAGE 156.– NON SURVEY ITEM

14. SUCH STATE OF FACTS AS SHOWN ON A PLAN ENTITLED "ALTA/NSPS LAND TITLE SURVEY, 486 FORE STREET, PORTLAND, CUMBERLAND COUNTY, MAINE MADE FOR FATHOM CC, LLC" SEPTEMBER 18, 2018 BY OWEN HASKELL, INC. – SEE THIS PLAN

General Notes

1. OWNER OF RECORD: NORTH RIVER IV LLC, 224 12TH AVENUE, NEW YORK, NY 10001 C.C.R.D. BOOK 32163 PAGE 33

2. BEARINGS ARE BASED ON MAINE STATE PLANE COORDINATE SYSTEM MAINE WEST NAD83. CITY POINT T124–18–1143 N:299542.1747 E:2928944.1068 AND T124–18–1155 N:299607.6956 E:2929152.2276 HELD.

3. ELEVATIONS ARE BASED ON CITY DATUM.

3. THE LOCUS IS SHOWN AS LOT 1, 3, 5 & 7 BLOCK G ON THE CITY OF PORTLAND ASSESSORS MAP 38.

4. THERE ARE 214 REGULAR PARKING SPACES, 76 COMPACT PARKING SPACES AND 3 HANDICAPPED PARKING SPACES FOR A TOTAL OF 293 PARKING SPACES ON THE SUBJECT PROPERTY.

Zoning Information

NONE PROVIDED

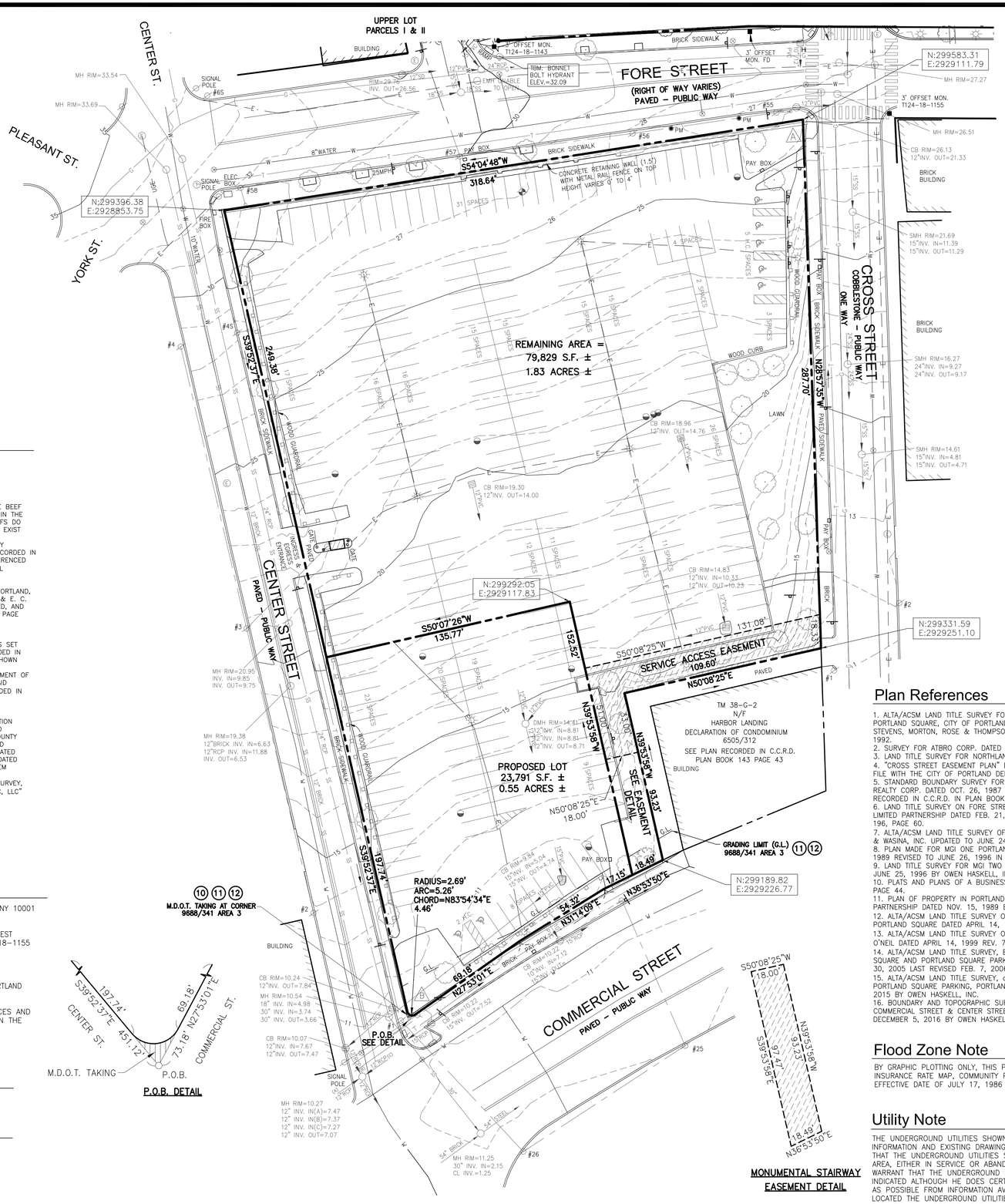
Possible Encroachments

Ⓐ 1.5' WIDE CONCRETE RETAINING WALL INTO CROSS STREET 1.8'±

Ⓑ BRICK SIDEWALK ON COMMERCIAL STREET ONTO SUBJECT PARCEL 2'±

SCALE : 1" = 30'

0' 15' 30' 60'



Legal Descriptions

PROPOSED LOT

A CERTAIN LOT OR PARCEL OF LAND AT THE INTERSECTION OF THE NORTHERLY SIDE OF COMMERCIAL STREET AND THE EASTERLY SIDE OF CENTER STREET, CITY OF PORTLAND, COUNTY OF CUMBERLAND AND STATE OF MAINE, BOUNDED AND DESCRIBED AS FOLLOWS:

COMMENCING ON THE NORTHERLY SIDELINE OF COMMERCIAL STREET AT THE SOUTHWESTERLY CORNER OF LAND NOW OR FORMERLY OF HARBOR LANDING CONDOMINIUM AS DESCRIBED IN A DECLARATION OF CONDOMINIUM RECORDED IN THE CUMBERLAND COUNTY REGISTRY OF DEEDS IN BOOK 6505, PAGE 312;

THENCE, S 36°53'50" W ALONG THE NORTHERLY SIDELINE OF COMMERCIAL STREET 18.49 FEET TO THE POINT OF BEGINNING;

THENCE, FROM SAID POINT OF BEGINNING, N 39°53'58" W THROUGH THE LAND OF NORTH RIVER IV LLC 152.52 FEET;

THENCE, S 50°07'26" W CONTINUING THROUGH THE LAND OF NORTH RIVER IV LLC 135.77 FEET TO THE EASTERLY SIDELINE OF CENTER STREET;

THENCE, S 39°52'37" E ALONG THE EASTERLY SIDELINE OF CENTER STREET 197.74 FEET;

THENCE, ALONG A NON–TANGENT CURVE TO THE LEFT HAVING A RADIUS OF 2.69 FEET, AN ARC LENGTH OF 5.26 FEET, A CHORD BEARING OF N 83°54'34" E AND CHORD DISTANCE OF 4.46 FEET TO THE NORTHERLY SIDELINE OF SAID COMMERCIAL STREET;

THENCE, N 27°53'01" E ALONG THE NORTHERLY SIDELINE OF COMMERCIAL STREET 69.18 FEET;

THENCE, N 31°14'09" E CONTINUING ALONG THE NORTHERLY SIDELINE OF COMMERCIAL STREET 54.32 FEET;

THENCE, N 36°53'50" E CONTINUING ALONG THE NORTHERLY SIDELINE OF COMMERCIAL STREET 17.15 FEET TO THE POINT OF BEGINNING, CONTAINING 23,791 S.F., OR 0.55 ACRES, MORE OR LESS.

BEING A PORTION OF THE PREMISES CONVEYED TO NORTH RIVER IV LLC BY RREEF AMERICA REIT III–Z4, LLC BE DEED DATED MARCH 26, 2015 AND RECORDED IN THE CUMBERLAND COUNTY REGISTRY OF DEEDS IN BOOK 32163, PAGE 33.

SERVICE ACCESS EASEMENT

A CERTAIN LOT OR PARCEL OF LAND ON THE WESTERLY SIDE OF CROSS STREET, CITY OF PORTLAND, COUNTY OF CUMBERLAND AND STATE OF MAINE, BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING ON THE WESTERLY SIDELINE OF CROSS STREET AT THE NORTHEASTERLY CORNER OF LAND NOW OR FORMERLY OF HARBOR LANDING CONDOMINIUM AS DESCRIBED IN A DECLARATION OF CONDOMINIUM RECORDED IN THE CUMBERLAND COUNTY REGISTRY OF DEEDS IN BOOK 6505, PAGE 312;

THENCE, N 28°57'35" W ALONG THE WESTERLY SIDELINE OF CROSS STREET 18.33 FEET;

THENCE, S 50°08'25" W THROUGH THE LAND OF NORTH RIVER IV LLC 131.08 FEET TO THE PROPOSED LOT AS SHOWN ON SAID PLAN;

THENCE, S 39°53'58" E ALONG THE EASTERLY LINE OF SAID PROPOSED LOT 51.00 FEET;

THENCE, N 50°08'25" E THROUGH THE LAND OF NORTH RIVER IV LLC 18.00 FEET TO THE WESTERLY LINE OF LAND OF SAID HARBOR LANDING CONDOMINIUM, BEING AN EASTERLY LINE OF LAND OF SAID NORTH RIVER IV LLC;

THENCE, N 39°53'58" W ALONG SAID EASTERLY LINE OF LAND OF NORTH RIVER IV LLC 33.00 FEET;

THENCE, N 50°08'25" E ALONG THE SOUTHERLY LINE OF LAND OF NORTH RIVER IV LLC 109.60 FEET TO THE POINT OF BEGINNING, CONTAINING 2,922 S.F. OR 0.07 ACRES, MORE OR LESS.

BEING A PORTION OF THE PREMISES CONVEYED TO NORTH RIVER IV LLC BY RREEF AMERICA REIT III–Z4, LLC BY DEED DATED MARCH 26, 2015 AND RECORDED IN THE CUMBERLAND COUNTY REGISTRY OF DEEDS IN BOOK 32163, PAGE 33.

MONUMENTAL STAIRWAY EASEMENT

A CERTAIN LOT OR PARCEL OF LAND ON THE NORTHERLY SIDE OF COMMERCIAL STREET, CITY OF PORTLAND, COUNTY OF CUMBERLAND AND STATE OF MAINE, BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING ON THE NORTHERLY SIDELINE OF COMMERCIAL STREET AT THE SOUTHWESTERLY CORNER OF LAND NOW OR FORMERLY OF HARBOR LANDING CONDOMINIUM AS DESCRIBED IN A DECLARATION OF CONDOMINIUM RECORDED IN THE CUMBERLAND COUNTY REGISTRY OF DEEDS IN BOOK 6505, PAGE 312;

THENCE, N 39°53'58" W ALONG THE WESTERLY LINE OF LAND OF SAID HARBOR LANDING CONDOMINIUM, BEING AN EASTERLY LINE OF LAND OF SAID NORTH RIVER IV LLC 93.23 FEET;

THENCE, S 50°08'25" W THROUGH THE LAND OF NORTH RIVER IV LLC 18.00 FEET TO THE PROPOSED LOT AS SHOWN ON SAID PLAN;

THENCE, S 39°53'58" E ALONG THE EASTERLY LINE OF SAID PROPOSED LOT 97.47 FEET TO THE NORTHERLY SIDELINE OF SAID COMMERCIAL STREET;

THENCE, N 36°53'50" E ALONG THE NORTHERLY SIDELINE OF COMMERCIAL STREET 18.49 FEET TO THE POINT OF BEGINNING, CONTAINING 1,716 S.F., OR 0.04 ACRES, MORE OR LESS.

BEING A PORTION OF THE PREMISES CONVEYED TO NORTH RIVER IV LLC BY RREEF AMERICA REIT III–Z4, LLC BY DEED DATED MARCH 26, 2015 AND RECORDED IN THE CUMBERLAND COUNTY REGISTRY OF DEEDS IN BOOK 32163, PAGE 33.

Plan References

1. ALTA/ACSM LAND TITLE SURVEY FOR PORTLAND SQUARE LIMITED PARTNERSHIP, TWO PORTLAND SQUARE, CITY OF PORTLAND, COUNTY OF CUMBERLAND, STATE OF MAINE, BY STEVENS, MORTON, ROSE & THOMPSON DATED DEC. 11, 1989, REVISED THROUGH DEC. 11, 1992.
2. SURVEY FOR ATBRO CORP. DATED JULY 1981 BY H.I. & E.C. JORDAN.
3. LAND TITLE SURVEY FOR NORTHLAND REALTY DATED NOV. 26, 1985 BY H.I. & E.C. JORDAN.
4. "CROSS STREET EASEMENT PLAN" DATED JAN. 3, 1986 BY HUNTER– BALLEW ASSOCIATES ON FILE WITH THE CITY OF PORTLAND DEPT. OF PLANNING AND URBAN DEVELOPMENT.
5. STANDARD BOUNDARY SURVEY FOR PORTLAND SQUARE LIMITED PARTNERSHIP, NORTHLAND REALTY CORP. DATED OCT. 26, 1987 BY STEVENS, MORTON, ROSE & THOMPSON, INC. RECORDED IN C.C.R.D. IN PLAN BOOK 182, PAGE 29.
6. LAND TITLE SURVEY ON FORE STREET, PORTLAND, MAINE MADE FOR TWO PORTLAND SQUARE LIMITED PARTNERSHIP DATED FEB. 21, 1996 BY OWEN HASKELL, INC. RECORDED IN PLAN BOOK 196, PAGE 60.
7. ALTA/ACSM LAND TITLE SURVEY OF ONE PORTLAND SQUARE DATED MAY 16, 1996 BY LEWIS & WASINA, INC. UPDATED TO JUNE 24, 1996 IN PLAN BOOK 196, PAGE 221.
8. PLAN MADE FOR MGI ONE PORTLAND SQUARE, INC. BY H.I. & E.C. JORDAN DATED NOV. 15, 1989 REVISED TO JUNE 26, 1996 IN PLAN BOOK 196, PAGE 86 AND 219.
9. LAND TITLE SURVEY FOR MGI TWO PORTLAND SQUARE, INC., FORE STREET, PORTLAND, MAINE, JUNE 25, 1996 BY OWEN HASKELL, INC. IN PLAN BOOK 196, PAGE 220.
10. PLATS AND PLANS OF A BUSINESS CONDOMINIUM OCTOBER 29, 1987 PLAN BOOK 166, PAGE 44.
11. PLAN OF PROPERTY IN PORTLAND MAINE MADE FOR PORTLAND SQUARE LIMITED PARTNERSHIP DATED NOV. 15, 1989 BY H.I. AND E.C. JORDAN.
12. ALTA/ACSM LAND TITLE SURVEY ON FORE STREET PORTLAND, MAINE MADE FOR MGI, ONE PORTLAND SQUARE DATED APRIL 14, 1999 BY OWEN HASKELL, INC.
13. ALTA/ACSM LAND TITLE SURVEY ON FORE STREET PORTLAND, MAINE MADE FOR TIMOTHY O'NEIL DATED APRIL 14, 1999 REV. 7 3/23/04 BY OWEN HASKELL, INC.
14. ALTA/ACSM LAND TITLE SURVEY, BCIA PROJECT, ONE PORTLAND SQUARE, TWO PORTLAND SQUARE AND PORTLAND SQUARE PARKING, PORTLAND, MAINE, SHEETS 1 AND 2, DATED SEPT. 30, 2005 LAST REVISED FEB. 7, 2006 AND MARCH 3, 2006 BY OWEN HASKELL, INC.
15. ALTA/ACSM LAND TITLE SURVEY, oNE PORTLAND SQUARE, TWO PORTLAND SQUARE AND PORTLAND SQUARE PARKING, PORTLAND, MAINE, MADE FOR NORTH RIVER IV LLC FEBRUARY 12, 2015 BY OWEN HASKELL, INC.
16. BOUNDARY AND TOPOGRAPHIC SURVEY, LOWER PARKING LOT, FORE STREET, CROSS STREET, COMMERCIAL STREET & CENTER STREET, PORTLAND, MAINE MADE FOR CARROLL ASSOCIATES DECEMBER 5, 2016 BY OWEN HASKELL, INC.

Flood Zone Note

BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS IN ZONE C OF THE FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 230051 0013 B, WHICH BEARS AN EFFECTIVE DATE OF JULY 17, 1986 AND IS NOT IN A SPECIAL FLOOD HAZARD AREA.

Utility Note

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES. CALL 1–888–DIGSAFE AT LEAST THREE BUSINESS DAYS BEFORE PERFORMING ANY CONSTRUCTION. DUE TO OSHA CONFINED SPACE REQUIREMENTS, ALL INVERTS AND PIPE SIZES MUST BE VERIFIED PRIOR TO ANY CONSTRUCTION.

ALTA / NSPS Land Title Survey

Commercial & Center Street
Portland, Cumberland County, Maine
Made For
Fathom CC, LLC
80 Exchange Street, Suite 30, Portland, Maine

Surveyor's Certification

TO: FATHOM CC, LLC, AND OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2016 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 1, 2, 3, 4, 6(A), 11, 13, 14, 16, 17, 19 AND 21 OF TABLE A THEREOF. THE FIELD WORK WAS COMPLETED ON DECEMBER 5, 2016, WITH A FIELD INSPECTION ON SEPTEMBER 18, 2018.

Randy R. Loubier

RANDY R. LOUBIER
PROFESSIONAL LAND SURVEYOR NO. 2407

DATE OF PLAT OR MAP: OCTOBER 12, 2018
DATE OF LAST REVISION:

STATE OF MAINE
RANDY R. LOUBIER 2407
PROFESSIONAL LAND SURVEYOR

OWEN HASKELL, INC.
PROFESSIONAL LAND SURVEYORS
390 U.S. ROUTE ONE, UNIT 10, FALMOUTH, MAINE 04105

DRAWN BY: OHI / JLW	FIELD BOOK: FILE	JOB NO.	2018-239 P
CHECKED BY: RRL	SCALE: 1" = 30'	DRWG. NO.	1

Approved Parking Count

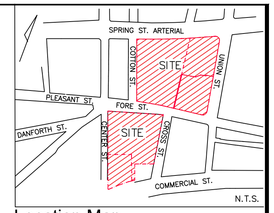
LOCATION:	QUANTITY
UPPER LOT:	234
PORTLAND SQ. 2 BASEMENT	42
PORTLAND SQ. 3 LOT	289
BICYCLE PARKING	0
TOTAL:	565

Existing Parking Count

LOCATION:	QUANTITY
UPPER LOT:	236
PORTLAND SQ. 2 BASEMENT	42
PORTLAND SQ. 3 LOT	306
BICYCLE PARKING	22
TOTAL:	584

Proposed Parking Count

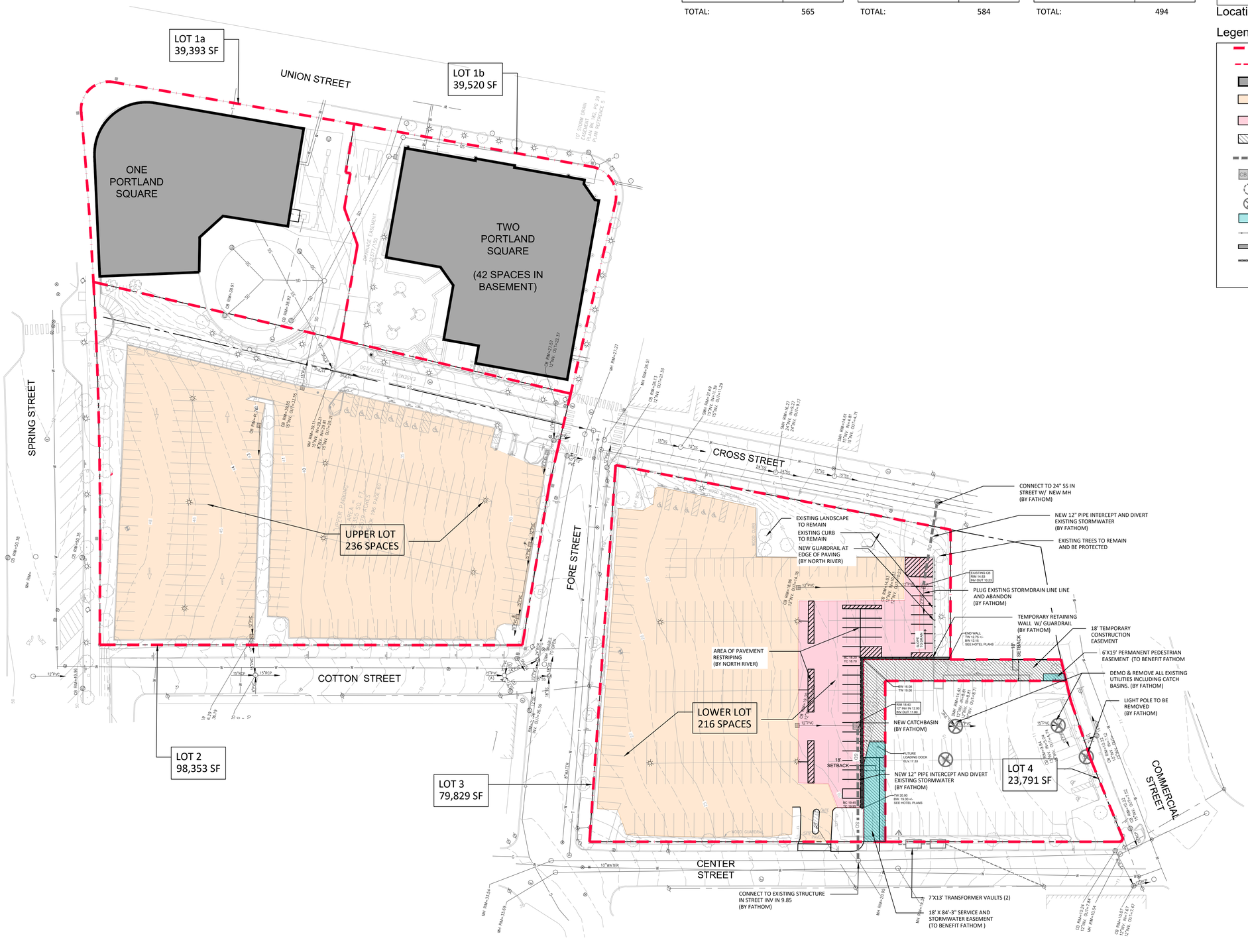
LOCATION:	QUANTITY
UPPER LOT:	236
PORTLAND SQ. 2 BASEMENT	42
PORTLAND SQ. 3 LOT	216
BICYCLE PARKING	22
TOTAL:	494



Location Map

Legend

- PROPERTY LINE
- CONSTRUCTION SETBACK
- EXISTING BUILDINGS
- EXISTING PARKING LOT TO REMAIN
- EXISTING PARKING LOT TO BE RESTRIPED
- TEMPORARY EASEMENT
- INTERIM UTILITIES
- INTERIM CB OR MH
- TO BE RELOCATED
- TO BE REMOVED
- PERMANENT EASEMENT
- GUARDRAIL
- RETAINING WALL
- CURB



One Portland Square - Two Portland Square

LEVEL III AMENDED SITE PLAN

Portland, Maine

Owner / Developers
NORTH RIVER, LLC
New York, NY

CARROLL ASSOCIATES LANDSCAPE ARCHITECTS
217 Commercial St, Suite 200
Portland, ME 04101
207.772.1552
www.carroll-assoc.com

WINTON SCOTT ARCHITECTS, PA
5 Milk Street
Portland, ME 04101
774-4811
www.wintonscott.com

BECKER STRUCTURAL ENGINEERS, INC.
75 York Street, Suite 3
Portland, ME 04101
207.879.1838
www.beckerstructural.com

WOODARD & CURRAN
41 Hutchins Dr.
Portland, ME 04101
207.558.3785
www.woodardcurran.com

HALEY & ALDRICH, INC.
75 Washington Ave, Suite 1A
Portland, ME 04101
207.482.4609
www.haleyaldrich.com

GORRILL PALMER
707 Sable Oaks Drive, Suite 30
South Portland, ME 04106
207.239.7470
www.gorrillpalmer.com

Revisions

Drawing Title:	Scale: 1"=20'-0"

OVERALL PARKING PLAN

Date:	4.12.2019
Phase:	Permitting

L-1.0

Proposed Parking Count

LOCATION:	QUANTITY
UPPER LOT:	236
PORTLAND SQ. 2 BASEMENT	42
PORTLAND SQ. 3 LOT	216
BICYCLE PARKING	22
TOTAL:	494

LEGEND

- PROPERTY LINE
- CONSTRUCTION SETBACK
- PROPOSED BUILDING "CENTER STREET HOTEL"
- EXISTING PARKING LOT TO REMAIN
- EXISTING PARKING LOT RESTRIPED
- EASEMENT

CROSS STREET

FORE STREET

COMMERCIAL STREET

8 SPACES

2 SPACES

4 SPACES

23 SPACES

32 SPACES

31 SPACES

4 SPACES

8 SPACES

32 SPACES

216 SPACES

34 SPACES

17 SPACES

21 COMPACT SPACES 8' X 15' TYP

18' SETBACK

18' SETBACK

WOOD GUARDRAIL

WOOD CURB

PAY BOX

GATE

GATE CAVED

LOT 1
79,829 SF

EXISTING PARKING LOT TO BE RESTRIPED, TYP OF THIS SYMBOL

NEW GUARDRAIL

TEMPORARY HOTEL CONSTRUCTION EASEMENT (18' WIDTH TYP)

PERMANENT PED ACCESS EASEMENT FOR HOTEL EGRESS

PARKING TO BE REMOVED FOR HOTEL PROJECT (90 SPACES)

EXISTING STRIPING TO REMAIN, TYP OF THIS SYMBOL

EXISTING PARKING LOT ENTRANCE TO REMAIN

PERMANENTSERVICE/ PED ACCESS EASEMENT FOR HOTEL EGRESS (18 FT TYP)

0 20 40 80

SCALE in FEET
1"=40'

One Portland Square - Two Portland Square

LEVEL III AMENDED SITE PLAN

Portland, Maine

Owner / Developers
NORTH RIVER, LLC
New York, NY

CARROLL ASSOCIATES
LANDSCAPE ARCHITECTS
217 Commercial St, Suite 200
Portland, ME 04101
207.772.1552
www.carroll-assoc.com

WINTON SCOTT
ARCHITECTS, PA
5 Milk Street
Portland, ME 04101
774-4811
www.wintonscott.com

BECKER STRUCTURAL
ENGINEERS, INC.
75 York Street, Suite 3
Portland, ME 04101
207.879.1838
www.beckerstructural.com

WOODARD & CURRAN
41 Hutchins Dr.
Portland, ME 04101
207.558.3785
www.woodardcurran.com

HALEY & ALDRICH, INC.
75 Washington Ave, Suite 1A
Portland, ME 04101
207.482.4609
www.haleyaldrich.com

GORRILL PALMER
707 Sable Oaks Drive, Suite 30
South Portland, ME 04106
207.239.7470
www.gorrillpalmer.com

Revisions

Drawing Title: LOWER LOT IMPROVEMENTS

Scale: 1"= 40'-0"

Date: 4.12.2019

Phase: Permitting

L-1.1