PLANNING BOARD

Tuesday, November 26, 2024 at 4:30 PM
Room 24 (Ground Level of City Hall) and Zoom

MEMBERS
Brandon Mazer, Chair
Justin Barker, Vice Chair
Marpheen Chann
Sean Murphy
David Silk
Austin Smith
Maggie Stanley

The Planning Board invites the public to attend the meeting **in person or Zoom** pursuant to the Remote Meeting Policy adopted by the Planning Board. Prior to the meeting, please check the Agenda Center https://www.portlandmaine.gov/602/Agendas-Minutes to view memos and reports which will be posted by the end of the day on the Friday before the Planning Board meeting. To submit written public comment on an agenda item, email planningboard@portlandmaine.gov. Submissions must be received by 12:00 pm **the day before** the Planning Board meeting to guarantee their inclusion in the agenda packet. All submissions must include the commenter's name and legal address. To help ensure your comment is submitted for the correct item, please include the name of the agenda item (see below).

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AGENDA:

WORKSHOP - 4:30 PM

i. Technical Manual; City of Portland, Applicant. The Planning Board will hold a hybrid workshop to consider amendments to the City of Portland Technical Manual, to modify the City's stormwater management and site landscaping requirements, introduce new low impact development requirements, and revise submission requirements for site plan and subdivision applications. Other amendments include reformatting of the technical manual and minor clean-up of text to align with ReCode. More information will be posted to the City's agenda center under this item closer to the meeting date.

PUBLIC HEARING - 5:30 PM

1. ROLL CALL AND DECLARATION OF QUORUM

2. COMMUNICATION AND REPORTS

3. REPORT OF ATTENDANCE AT THE MEETING HELD ON NOVEMBER 12, 2024

Workshop
716 Stevens Ave: Barker, Chann, Murphy, Silk, and Smith present. Mazer recused, Stanley absent.
197 Oxford Street: Barker, Chann, Murphy, and Smith present. Mazer and Silk recused, Stanley absent.

Public Hearing
19 Willis Street: Barker, Chann, Murphy, Silk, and Smith present. Mazer and Stanley absent.
100 W Commercial Street: Barker, Chann, Murphy, Silk, and Smith present. Mazer and Stanley absent.

4. REPORTS OF DECISIONS AT THE MEETING HELD ON NOVEMBER 12, 2024

i. Remand of Level III Site Plan and Subdivision; 19 Willis Street/33 Montreal Street; 37 Montreal, LLC, Applicant. Silk motioned, and Murphy seconded a motion to reopen the evidentiary record in the matter of application PL-000807-2019 pursuant to the Superior Court's Remand Order dated September 30, 2024, and set a public hearing at its regularly scheduled meeting on December 10, 2024, to permit the presentation of additional evidence from the applicant, the City and through public comment, limited only to information that is relevant to the three issues that were in front of the court, specifically, the calculation of the height of the building, whether the development meets the applicable setbacks, and whether the development complies with Section 14-526(d)(5)(b). Vote 5-0 (Mazer and Stanley absent).

ii. Major Site Plan and Conditional Use; 100 W Commercial Street; New Yard, LLC, Applicant. Silk motioned, and Smith seconded a motion to waive Technical Manual Sec. 12.2 related to light trespass at the property line, to allow for an average light trespass of 1.25 fc at the property line. Vote 5-0 (Mazer and Stanley absent). Silk motioned, and Smith seconded a motion to waive Technical Manual Sec. 5.III, the Maine DEP Ch. 500 Flooding Standard, on the basis of the receiving capacity of the Fore River. Vote 5-0 (Mazer and Stanley absent). Silk

motioned, and Smith seconded a motion to approve the major site plan and conditional use application. Vote 5-0 (Mazer and Stanley absent).

5. NEW BUSINESS

i. Major Site Plan; 1001 Westbrook Street (Jetport Parking Expansion); City of Portland, Applicant. The Planning Board will hold a hybrid public hearing to consider a proposal to expand surface parking at the Portland International Jetport. The project would involve the construction of 5.5 acres of new surface parking area, distributed across two separate lots, with a total capacity for 684 vehicles. This project is subject to both Site Location of Development (SLOD) review, as well as Natural Resource Protection Act (NRPA) review with Maine DEP. The subject property is zoned AB Airport Business zone. A project and plan summary are available for viewing on the city's CSS Portal (https://css.portlandmaine.gov/) by referencing Plan Number PL-002853-2024.

ii. Major Site Plan; 360 Spring Street; Waynflete School, Applicant. The Planning Board will hold a hybrid public hearing to consider a proposal to demolish the existing gymnasium at Waynflete's campus, and construct a new 11,290 square foot gymnasium in the same location. The subject property totals 3.03 acres, is zoned R-4 Residential, is located within the Waynflete Overlay zone, and is also located within the West End Historic District. A project and plan summary are available for viewing on the city's CSS Portal (https://css.portlandmaine.gov/) by referencing Plan Number PL-003072-2024.

Memorandum
Planning and Urban Development Department

To:	Chair Mazer & Members of the Planning Board
From:	Matthew Grooms, Development Review Manager
Date:	November 22, 2024
Re:	Technical Manual Updates
Meeting Date:	November 26, 2024

I. INTRODUCTION

The Department of Planning & Urban Development, in close coordination with the Department of Public Works and the Department of Parks & Recreation, has prepared a reformatted and updated version of the *City of Portland Technical Manual*, in order to align the City's technical standards and requirements with ReCode Portland; a years-long effort to update the Land Use Code to facilitate the implementation of *Portland's Plan 2030*. This effort has involved reorganization of the document, reformatting of content to visually tie this document to the land use code, and a series of substantive amendments stemming from ReCode; including the establishment of a new Low Impact Development (LID) section, along with updates to the City's stormwater management and site landscaping requirements. In large part, the proposed edits represent an effort to bring standards into alignment with current and best practice, and to reorganize material for legibility and consistency with the land use code.

This workshop was noticed in the Portland Press Herald, appearing in the November 14th and November 15th editions of the publication.

II. PROPOSED FORMAT

The following table summarizes at a high level, how content from the currently adopted version of the technical manual has been reorganized and amended within the updated draft. The column at left, lists out each of the current sections of the technical manual, with the column at right, identifying where content was relocated to within the updated draft. Notes are provided beneath each section to identify how content was reorganized, and where minor or more substantive amendments have been made. Across all sections, some clean-up has occurred, which includes for example, the removal of purpose or intention statements, citations of building code requirements, and other content that is not regulatory in nature.

Current Technical Manual Sections	Updated Technical Manual Sections
Sec. 1 – Transportation Systems and Street Design Standards	**Sec. 1 – Transportation Systems and Street Design Standards**
Notes: • Content remains largely unchanged, with text and tables having been reformatted. • Provides additional guidance around the location of required bicycle parking.	
Sec. 2 – Sanitary Sewer and Storm Drain Design Standards	**Sec. 6 – Sanitary Sewer and Storm Drain Design Standards**
Notes: • Content remains largely unchanged, with text and tables having been reformatted. • Section was moved within the document, to be paired with like content.	
Sec. 3 – Public Safety Standards	**Sec. 10 – Public Safety Standards**
Notes: • Content remains largely unchanged, with text and tables having been reformatted. • Section was moved within the document, to be paired with like content.	

<table>
<tr><td colspan="2">

- Sprinkler requirements for one- and two-family development and elevator sizing requirements were removed, as these are building and life/safety code requirements.
- Content around blasting was struck in alignment with the elimination of the 'Regulation of Explosives' Article of the land use code. This content has been relocated to Ch. 10 in the Code or Ordinances.

</td></tr>
<tr><td>Sec. 4 – Landscaping and Landscape Preservation Standards</td><td>Sec. 3 – Low Impact Development Standards & Sec. 4 – Site Landscaping Standards and</td></tr>
<tr><td colspan="2">Notes:

- Text and tables have been reformatted.
- Landscape preservation content has been relocated to new Sec. 3 of the Technical Manual, Low Impact Development Standards.
- Options for several street tree alternatives has been eliminated, with applicants now being required to either plant new street trees within the right-of-way or within close proximity of the right-of-way, or pay the fee in-lieu.
- Fee in lieu amount for new street trees has increased from $400 per tree to $1,000 per tree.
- Section was reorganized to flow more logically.

</td></tr>
<tr><td>Sec. 5 – Stormwater Management Standards and Maine DEP CH. 500 Stormwater Management</td><td>Sec. 5 – Stormwater Management Standards</td></tr>
<tr><td colspan="2">Notes:

- Stormwater requirements have been substantively amended in anticipated of upcoming changes to Maine DEP Ch. 500.
- Revised draft strikes purpose statement, and reorganizes content to more clearly identify stormwater management thresholds and requirements.
- Thresholds revised to be based off of proposed site impacts, as opposed to site plan application type.
- Introduces new minimum stormwater detention volume requirements.
- Introduces new small-scale residential stormwater requirements.
- Increases treatment requirements for non-roof redeveloped area from 50% to 95%.
- Provides additional flexibility around stormwater treatment for linear impervious surface areas, such as walkways.
- Text and tables are reformatted, and section was reorganized to flow more logically.

</td></tr>
<tr><td>Sec. 6 – Erosion and Sedimentation Control Standards</td><td>Sec. 12 – Erosion and Sedimentation Control Standards</td></tr>
<tr><td colspan="2">Notes:

- Content remains largely unchanged, with text and tables having been reformatted.

</td></tr>
<tr><td>Sec. 7 – Soil Survey Standards</td><td>Sec. 14 – Submission and Plan Requirements</td></tr>
<tr><td colspan="2">Notes:

- Content relocated to Sec. 14 – Submission and Plan Requirements, and section has been eliminated.

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<tr><td>Sec. 8 – Standards for Development Adjacent to Wetlands</td><td>Sec. 3 – Low Impact Development Standards & Sec. 14 – Submission and Plan Requirements</td></tr>
<tr><td colspan="2">Notes:

- Content relocated to Sec. 3 – Low Impact Development Standards, and Sec. 14 - Submission and Plan Requirements, and section has been eliminated.

</td></tr>
<tr><td>Sec. 9 – Water Supply Standards</td><td>Sec. 7 – Water Supply Standards</td></tr>
<tr><td colspan="2">Notes:

- Content remains largely unchanged, with text and tables having been reformatted.
- Added language around ground water protection, taken from recommendations in the adopted Casco Bay Aquifer Study (1987).

</td></tr>
<tr><td>Sec. 10 – Municipal Street Lighting Standards</td><td>Sec. 8 – Lighting Standards & Sec. 14 – Submission and Plan Requirements.</td></tr>
<tr><td colspan="2">Notes:</td></tr>
</table>

• Content remains largely unchanged, with text and tables having been reformatted. • Newly proposed Sec. 8 – Lighting Standards, now includes requirements for both site lighting and municipal street lighting. • Photometric plan requirements have been relocated to Sec. 14 – Submission and Plan Requirements.	
Sec. 11 – Shadow Standards	**Sec. 9 – Shadow Standards**
Notes: • Content remains largely unchanged, with text and tables having been reformatted.	
Sec. 12 – Site Lighting Standards	**Sec. 8 – Lighting Standards & Sec. 14 – Submission and Plan Requirements**
Notes: • Content remains largely unchanged, with text and tables having been reformatted. • Newly proposed Sec. 8 – Lighting Standards, now includes requirements for both site lighting and municipal street lighting. • Plan requirements have been relocated to Sec. 14 – Submission and Plan Requirements.	
Sec. 13 – Boundary Survey Requirements	**Sec. 14 – Submission and Plan Requirements**
Notes: • Content relocated to Sec. 14 – Submission and Plan Requirements, and section has been eliminated.	
Sec. 14 – Standards for Site Location of Development	**Sec. 11 – Site Location of Development Standards**
Notes: • Content remains largely unchanged, with text and tables having been reformatted.	
Sec. 15 – Solar Energy Generation	**Sec. 13 – Solar Energy Standards**
Notes: • Content remains largely unchanged, with text and tables having been reformatted.	
Sec. 16 – Application Submission Requirements	**Sec. 14 – Submission and Plan Requirements**
Notes: • Submission requirements have been added for other application types, including conditional use and zoning map and text amendment applications. • Site Plan and Subdivision application requirements have been updated to require additional information necessary to confirm a project's compliance with the newly proposed low impact development standards • Supplemental plan requirements, such as those for boundary surveys, soil surveys, wetland surveys, stormwater management plans, and lighting plans have been relocated to this section. • Text and tables having been reformatted.	
Sec. 17 – Transportation Studies and Plans	**Sec. 2 – Transportation Studies and Plans**
Notes: • Content remains largely unchanged, with text and tables having been reformatted.	
Proposed Technical Manual Sections	
1. Transportation and Street Standards 2. Transportation Studies 3. Low Impact Development Standards 4. Site Landscaping Standards 5. Stormwater Management Standards 6. Sanitary Sewer and Storm Drain Standards 7. Water Supply Standards	8. Lighting Standards 9. Shadow Standards 10. Public Safety Standards 11. Site Location of Development Standards 12. Erosion and Sedimentation Control Standards 13. Solar Energy Standards 14. Submission and Plan Requirements

III. HOW EDITS ARE COMMUNICATED IN THE DRAFT

Similar to ReCode, the draft Technical Manual has been comprehensively reformatted, with some text being converted to tables or other graphics, and other content being relocated across the various sections. Given this, a true redline of the document is very difficult to review and interpret. In order to present these edits in a more legible way, staff have developed the above matrix, and have elected to redline certain content changes, where altogether new content has been added, or where existing content has been substantively edited or removed.

IV. SUBSTANTIVE AMENDMENTS

A. Section 3 - Low Impact Development (LID) Standards

Within the current version of the technical manual, applicants are encouraged to consider ways to incorporate low impact development strategies into new development in both Section 4 (Landscape Preservation and Landscaping Standards), and Section 5 (Portland Stormwater Management Standards and Maine DEP Chapter 500 Stormwater Management), though neither of these standards include enforceable language around LID.

For the reference of the Planning Board and members of the public, low impact development is defined as an approach to land use and stormwater management that mimics natural hydrologic conditions in order to reduce the impact of development on the environment.

In July of 2020, the City of Portland was issued a Municipal Separate Storm Sewer General Permit (MS4GP) by Maine DEP, which was later modified in November of 2021. A stipulation of this permit was that the City adopt a low impact development ordinance no later than July of 2024. The City of Portland, along with 14 other MS4 communities, developed the Interlocal Stormwater Working Group (ISWG), and coordinated closely to develop a model ordinance for low-impact development (Attachment B) to serve as a framework for the member communities. The July 2024 timeframe has since been extended, however the City of Portland, as part of ReCode, is seeking to adopt low impact development regulations, in consultation with the Maine DEP, prior to the State's required timing.

The proposed LID framework largely draws from existing City requirements around natural resource protection, stormwater management, site landscaping, and erosion and sedimentation control, and establishes a quantifiable rubric for evaluating new development, and ensuring that impacts associated with the aforementioned requirements are broadly minimized, while continuing to provide flexibility for various forms of new development and uses in a variety of different locations.

The draft low impact development standards feature five separate categories of impacts, which are as follows:

1. Wetlands, Streams and Drainage
2. Natural Areas and Habitats
3. Soils and Slopes
4. Vegetation and Landscaping
5. Impervious Area and Stormwater Management

These categories are organized around a common hierarchy for evaluating impacts, which first prioritizes the preservation of the natural resource or feature, and if this is infeasible, then requires mitigation to help off-set the impact of new development with respect to these categories.

A key component of the City's proposed LID framework is that it is objective and measurable, and incorporates a separate scoring tool to evaluate development (Attachment 3a). The scoring tool parallels the draft LID standards, and awards applications points based upon the degree to which impacts are minimized or mitigated. Projects may receive up to 178 points in total, and are required to receive a minimum score of 80 points in order to comply with the LID standard. This tool was designed specifically to provide a wide variety of development types, including redevelopment, infill development or greenfield development, for commercial, institutional, residential, and industrial uses, numerous potential pathways to achieve a passing score. In testing this tool on past high-impact development applications, several applications as designed and approved were found to not receive a passing score, though for each application, there were reasonable strategies that were identified which, if implemented, would have led to the project receiving a passing score.

The tool also incorporates bonus points, which are awarded for applications that incorporate innovative site design or engineering that supports low impact development aims. These for example include the use of structured parking, the provision of a green roof, the provision of stormwater treatment beyond what is required, or the restoration of previously degraded natural features.

B. Section 4 - Site Landscaping Requirements

The site landscaping section of the technical manual currently includes two key areas of content; landscape preservation, and site landscaping, with supplemental and associated requirements around the use of other materials, such as fences or other structures, which may also function to help screen various uses and/or site elements. Within this draft, the section around landscape preservation has been relocated to the LID section of the technical manual, as these requirements align with the principles of LID, to preserve and minimize impacts to natural resources. As with other sections of this document, content has been reorganized to flow more logically, and text and tables have been reformatted.

Substantive changes are largely centered around street tree requirements, which were updated as part of ReCode. This update revised how street tree requirements are calculated for multi-family residential development, which previously had been based upon the number of residential units, as opposed to the property's street frontage (one tree per 25 to 35 feet of frontage), which is the basis for other land uses. ReCode brought the multi-family street tree requirement into alignment with this model, which will likely result in a significantly reduced street tree requirement for most multi-family projects. Whereas previously, a project such as 201 Federal Street, was required to provide 268 street trees, that project would now be required to provide approximately 13 street trees. With this lesser requirement, the City is seeking to reinforce its street tree requirement and encourage applicants to employ additional protective measures as necessary to ensure that planted trees survive and mature. In order to achieve this, the City is proposing to eliminate several of the identified street tree alternatives, which for example permit the planting of new street trees in locations off-site. These alternatives are rarely utilized by applicants, and require substantial coordination between the City and applicant, and on-going monitoring. Additionally, the City is proposing to increase the fee in-lieu cost per tree from $400 to $1,000. The current fee amount was last amended in 2016, and is insufficient to cover the cost of planting a new tree. The proposed increase better reflects the true costs associated with purchasing, planting, and maintaining trees, which will help to ensure the sustainability of the City's tree canopy.

C. Section 5 - Stormwater Management Standards

The City of Portland has delegated review authority to review applications subject to stormwater review under Maine DEP Ch. 500; with many of the regulations of Ch. 500 adopted and referred to in the current Section 5 of the Technical Manual. For example, stormwater treatment requirements are referenced in section 5, with applicants required to review the state statute to understand exact requirements. These include the basic standard, related to erosion and sedimentation control requirements; the general standard, related to stormwater quality treatment; the flooding standard, related to stormwater quantity control; the redevelopment standard, related to requirements for the redevelopment of non-roof impervious areas; and the urban impaired stream standard, related to development within an identified urban impaired stream watershed.

The City has adopted more stringent stormwater management requirements as compared with the State's minimum requirements, particularly around the thresholds at which point stormwater standards are applied, in part due to the nature and scale of development that occurs in Portland. Currently, the City requires stormwater management for all major site plan applications, and minor site plan applications that involve the creation of 1,000 square feet or more of new impervious area, 5,000 square feet of new non-roof redeveloped area (such as off-street parking or other ground-level hardscaped area), and 10,000 square feet of new non-impervious developed area. These thresholds are significantly beneath the State's thresholds, which apply when more than one acre of land area is disturbed.

Reorganization: In this draft the City is proposing to restructure the existing section 5 document to have it flow more logically, and introduces a series of substantive amendments to the City's stormwater management requirements. In the current version, all major site plan applications are required to submit a stormwater management plan, along with minor site plan applications which surpass the above listed thresholds. With this draft, most development, excluding small-scale residential uses (one through four units), which surpass the above listed thresholds, would be required to submit a stormwater management plan demonstrating compliance with applicable review standards. This means that major site plans beneath these thresholds would no longer be required to submit a stormwater plan, which is currently a requirement.

Redevelopment Standard: The City is also proposing to amend the treatment requirement for projects triggering the redevelopment standard. Whereas currently such projects are required to treat a minimum of 50% of non-roof redeveloped area, under this draft, such projects would be required to treat 95% of non-roof redeveloped area, which aligns with the current treatment requirement for new impervious surface, and which would markedly increase the level of treatment provided for many infill and redevelopment projects that the City reviews. This amendment may also encourage the conversion of existing non-roof impervious area, such as off-street surface parking into building area or pervious surface.

Stormwater Detention Volume Standard: This draft establishes a new minimum stormwater detention volume standard, which would require applicable projects to detain a minimum volume of stormwater, calculated as 1-inch of rainfall times the project's proposed impervious surfaces, and controlling the discharge of the detained flows into the City's storm sewer system at the specified maximum rate. The goal of this standard is to reduce the volume of stormwater runoff a project site releases into the City's storm sewer system during the most frequent rainfall events to improve system wide storm sewer capacity and to help the City meet it's long term water quality goals through combined sewer overflow reduction and stream channel protection. The level of required detention would be dependent upon whether the project

is tying into a separated or combined sewer system as specified in the draft standard.

Small-Scale Residential Uses: The City currently exempts one- and two-family residential development from most of the City's locally adopted stormwater management requirements, with the exception that such development is required to adhere to the basic erosion and sedimentation control standard. The proposed draft would create a new requirement for small scale residential projects, expanded to encompass one through four family residential development, in line with code amendments adopted through ReCode. This standard would now require such projects to provide stormwater treatment for at least 75% of newly created impervious area, using an approved best management practice (BMP), located in the City of Portland Stormwater Credit Manual. While the standard would require additional treatment, it does continue to exempt such projects from entering into a stormwater maintenance agreement with the City, and allows for such projects to claim stormwater credits to help off-set their stormwater service charge. As noted above, this change would increase the level of treatment being provided for one- and two-family development, while simultaneously reducing the stormwater management requirements for small-scale multi-family development, with three or four units.

V. STAFF ANALYSIS

Section 2.1.10 of the City's land use code grants the Planning Board the authority to review and approve technical standards through the *Technical Manual*. In order to do so, the Planning Board must find that such standards are additional to and consistent with the provisions of the land use code, necessary and reasonable, and "in accordance with sound engineering…practice." As discussed previously, in addition to clerical edits for the sake of clarity or consistency and reorganization to assist with document legibility and administration, the proposed edits to the *Technical Manual* also include substantive edits. These edits are generally designed to reflect lessons learned through practice, and to bring standards into alignment with state and national guidance in engineering and other relevant fields.

VI. NEXT STEPS

Following the Planning Board workshop, staff will consider and incorporate feedback from the Board and members of the public as necessary, and will prepare revised drafts for public hearing.

VII. ATTACHMENTS

A. Draft Technical Manual
    1. Title Page and Table of Contents
    2. Transportation and Street Standards
    3. Transportation Studies
    4. Low Impact Development Standards
        i. LID Scoring Tool
    5. Site Landscaping Standards
    6. Stormwater Management Standards
    7. Sanitary Sewer and Storm Drain Standards
    8. Water Supply Standards
    9. Lighting Standards
    10. Shadow Standards
    11. Public Safety Standards
    12. Site Location of Development Standards
    13. Erosion and Sedimentation Control Standards
    14. Solar Energy Standards

15. Submission and Plan Requirements

B. Low Impact Development Model Ordinance
C. Summary of LID Approach to DEP
D. LID Scoring Tool Guide
E. Comparison of Proposed Stormwater Requirements Compared with Ch. 500 Requirements

CITY OF PORTLAND TECHNICAL MANUAL

DRAFT

1. November 2024

PREAMBLE

The technical standards contained herein have been promulgated by the Departments of Public Works and the Planning and Urban Development pursuant to §13.5.3(A) and §14.3.1. of the City of Portland Land Use Code following a public hearing of the Planning Board on December 10, 2024.

The technical standards contained herein may be periodically updated and/or amended by the Planning Board pursuant to §2.1.10(P) of the City of Portland Land Use Code.

RECORD OF AMENDMENTS		
Date	Section(s)	Application Number

TABLE OF CONTENTS

1 TRANSPORTATION & STREET STANDARDS

2 TRANSPORTATION STUDIES

3 LOW IMPACT DEVELOPMENT STANDARDS

4 SITE LANDSCAPING STANDARDS

5 STORMWATER MANAGEMENT STANDARDS

6 SANITARY SEWER & STORM DRAIN STANDARDS

7 WATER SUPPLY STANDARDS

8 LIGHTING STANDARDS

9 SHADOW STANDARDS

10 PUBLIC SAFETY STANDARDS

11 SITE LOCATION OF DEVELOPMENT STANDARDS

12 EROSION & SEDIMENTATION CONTROL STANDARDS

13 SOLAR ENERGY STANDARDS

14 SUBMISSION & PLAN REQUIREMENTS

1.TRANSPORTATION SYSTEMS, STREET DESIGN STANDARDS

1.1. HORIZONTAL ALIGNMENT OF STREETS

The horizontal alignment of all proposed streets shall conform to the following standards:

1.1.1. Horizontal curves shall have centerline radii of not less than 110 feet.

1.1.2. The alignment centerline shall be straight for at least 100 feet between reverse curves whenever either curve has a centerline radius of less than 200 feet.

1.1.3. When two streets intersect and one street is an arterial or collector street, or both streets are arterial or collector streets, the angle of intersection shall be 90 degrees. When two streets intersect and neither street is an arterial or collector street, the angle of intersection shall be at least 75 degrees and no greater than 105 degrees.

1.1.4. When two streets intersect, adjoining right-of-way lines shall be connected by a circular arc with radius of at least ten (10) feet. The connecting arc shall be tangent to the right-of-way lines on both streets. When the angle of intersection is other than 90 degrees, a radius greater than ten (10) feet may be required.

1.1.5. All dead-end streets shall provide a turnaround at the end of the street, subject to approval by the reviewing authority. Turnarounds shall be designed to facilitate future street connectivity and shall always be designed to the right (refer to Figure I-5).

1.1.6. Street intersections with more than four (4) legs shall be prohibited.

1.1.7. The minimum distance between intersections on any street shall be as follows unless the Department of Public Works determines that unique conditions of the site necessitate a lesser length. The distance between intersections shall be measured from the intersection of street centerlines at one intersection to the intersection of street centerlines at the other intersection. Streets shall be classified in accordance with the Functional Classification Guidelines as set forth by MaineDOT.

Local Street and Local Street Intersection	200 feet
Local Street and Collector Street Intersection	250 feet
Local Street and Arterial Street Intersection	300 feet
Collector Street and Collector Street Intersection	400 feet
Collector Street and Arterial Street Intersection	500 feet
Arterial Street and Arterial Street Intersection	500 feet

1.2. STREET GRADES

1.2.1. Street grades shall conform to the following standards, as shown in Figures I-1, I-2, and I-3:

A. The maximum grade for the centerline of all streets shall not exceed eight (8) percent).
B. The minimum grade for the centerline of all streets shall not be less than one-half (0.5) percent.
C. The cross-slope for local streets shall be three (3) percent. The cross-slope for other street classifications shall be two (2) percent.
D. Cross-slopes for sidewalks shall be one (1) percent minimum and two (2) percent maximum, sloping down and away from the street line to the top of the curb at the gutter line, including pedestrian access routes across driveways, as shown in Figure I-10C.
E. Street grades at intersections shall not be more than three (3) percent for a distance of one hundred (100) feet from the center of the intersection.

1.2.2. Curbless "shared streets" shall be considered on a case-by-case basis after consideration of context, design, and maintenance. Approval of any curbless "shared street" shall be subject to review by the Department of Public Works.

1.3. VERTICAL ALIGNMENT

Where two adjacent street segments are proposed to have different straight-line centerline finish grades, vertical curves shall be used to connect the adjacent street segments. Vertical curves shall be parabolic and tangent to each of the adjacent grades. The minimum vertical curve length, "L", shall be calculated based on the following formula:

$$L = K \times A$$

where "A" is the absolute value of the algebraic difference between the beginning grade and the ending grade of the vertical curve, with both grades expressed in percent, and "K" is a factor whose value depends on street design speed. The K values corresponding to the minimum vertical curve lengths for the above street classifications and vertical curve types (sag curve or crest curve) are as follows:

TABLE 1-A VERTICAL ALIGNMENT STANDARDS

Vertical Curve Type	Local Street	Collector Street	Arterial Street
Crest	K = 20	K = 30	K = 50
Sag	K = 30	K = 40	

1.4. SIGHT DISTANCE

Where driveways or new streets enter an existing street, vehicular sight-distance shall conform to standards established by the MaineDOT as contained in their publication, *Chapter 299, Highway Driveway and Entrance Rules*. For driveways frequently accessed by large vehicles, greater site distance will be required according to Maine DOT guidelines.

1.5. DRIVEWAY DESIGN

1.5.1. All driveways shall be designed according to Table 1-B., unless otherwise approved by the Department of Public Works.

TABLE 1-B. DRIVEWAY DESIGN STANDARDS

Requirement	Minor Driveway (serving <10 residential spaces)	All other driveways
A. Number of driveways	No more than one (1) driveway shall be permitted.	No more than two (2) driveways shall be permitted. Adjacent sites under common ownership shall have no more than two (2) driveways combined.
B. Minimum/ maximum driveway width	10 feet minimum, 20 feet maximum, measured at the property line.	For two-way driveways (preferred): • 20 feet minimum, 24 feet maximum for residential/commercial uses • 30 feet maximum for industrial uses Larger driveway openings may be permitted by the Department of Public Works on a case-by-case basis.
C. Driveway Spacing	Spacing of new or reconfigured driveways shall take the existing pattern of driveways in the surrounding context into account, and shall limit the impact to on-street parking and existing street trees. Shared driveways are encouraged. Driveway locations may be rejected based on documented or anticipated safety or operational issues.	• 50 feet along local streets • 100 feet along arterial and collector streets with posted speeds of 35 mph or less • 150 feet for roadways posted at speeds greater than 35 mph Driveway locations may be rejected based on documented or anticipated safety or operational issues.
D. Driveway separation from intersections	• At least 35 feet along local roads • 50 feet along collectors/ arterials Distance shall be measured from the projection of the right-of-way line at the roadway to the centerline of the driveway. Driveway locations may be rejected based on documented or anticipated safety or operational issues.	• At least 35 feet along local roads • 100 feet along collectors/ arterials Distance shall be measured from the projection of the right-of-way line at the driveway to the centerline of the driveway. Driveway locations may be rejected based on documented or anticipated safety or operational issues.
E. Curbing	2-foot granite corner radius "bugs" (also known as a "bullnose") shall be used where possible. Tipdowns may be used if the driveway crosses a narrow sidewalk.	Granite radii (where sufficient esplanade is available) or tipdowns shall be used. Granite radii shall not cross the pedestrian access route.
F. Driveway intersection angle	Perpendicular to the street, where possible. Where necessary, the driveway shall intersect the street between 75 and 105 degrees unless otherwise approved by the Department of Public Works.	
G. Design vehicle	Driveways shall be designed to accommodate site-specific design vehicles, and shall not be designed larger than necessary, as determined by turning movement diagrams and engineering judgment.	
H. Loading	All necessary functions for loading, circulation, and parking maneuvers shall occur within the site and outside of the right-of-way to the extent practicable, given the site context.	
I. Circulation	Vehicle circulation shall be completely contained within the site to the extent practicable, given the site context.	
J. Backing Maneuvers	Backing maneuvers may be permitted to enter the site. Backing maneuvers from a site may be permitted based on upon site context including functional class of the adjacent street, traffic volumes, and speeds.	Backing maneuvers into and out of the site are prohibited. All vehicles must enter and exit the site facing forward.
K. Parking area size	All driveways shall serve a parking area of at least 8' x 16', clear of any encroachment, plus any setbacks required by zoning. Parking areas and parked cars shall not encroach upon the public right-of-way.	

1.5.2. Auxiliary lanes serving driveways. A left-turn lane and/or right-turn lane with appropriate storage and transition may be considered where engineering analysis indicates a need. The need for auxiliary lanes shall be

considered with the context of the impacts to sidewalks, bikeways, transit stop, on-street parking, and traffic safety. All new auxiliary lanes are subject to the approval of the Department of Public Works.

1.6. SIDEWALK AND CURB RAMPS

1.6.1. Sidewalk construction and materials. Sidewalks shall be brick, concrete or hot mix asphalt. The City Sidewalk Materials Policy (Appendix 1) shall be consulted to determine the appropriate type of sidewalk and driveway construction to use on various streets and in different areas of the City. Within the city's historic districts, only brick shall be used. Sidewalk and driveway construction details are illustrated in Figures I-10 and I-11. All new concreate sidewalks which abut existing concrete sidewalks must be doweled in prior to pouring. All new brick sidewalks shall be constructed with bricks running perpendicular to the path of pedestrian travel, including through driveway crossings.

1.6.2. Sidewalk accessibility. All sidewalks shall meet any minimum standards set forth by current Americans with Disabilities Act (ADA) and Public Right-of-Way Accessibility Guidelines (PROWAG). There are no exceptions unless technical infeasibilities are identified, documented, and approved by the Department of Public Works. In case of conflict, these standards shall supersede this manual.

A. **Sidewalk width.** The minimum sidewalk clear width shall be five (5) feet. Where obstructions, such as utility poles, are located in sidewalks, a minimum clear and direct pedestrian access route width of five (5) feet shall be provided between the obstruction and one edge of the sidewalk. Wider sidewalks may be required in locations where heavy pedestrian traffic is expected, based on the site context. New sidewalks shall be at least as wide within the right-of-way as the sidewalk(s) along the adjacent properties.
B. **Level changes.** The maximum allowable vertical level change at any point is ¼-inch. A level change of ¼-inch to ½-inch shall be formed with a beveled slope no steeper than 26.6 degrees (2:1). Level changes greater than ½-inch shall be designed as ramps.
C. **Running slope.** Sidewalks shall be designed with a running slope no greater than the adjacent street slope.
D. **Cross-slope.** Sidewalks, including pedestrian access routes across driveways, shall be constructed with a minimum cross-slope of 1% and a maximum cross-slope of 2% post-construction. Finished cross-slopes of greater than 2% shall not be acceptable. Designed cross-slopes of 1.5% are encouraged. Cross-slopes shall be consistent across the width of the sidewalk.

1.6.3. Curb ramps. ADA-compliant curb ramps are required on all projects involving construction of new streets or new sidewalks, and on all projects involving alterations to the abutting street, including repaving of existing streets and sidewalks.

Curb ramps shall be designed to prevent ponding of water at the base of the ramp. Ramp designs and details will indicate how positive drainage away from the landing in the vicinity of curb ramps will be achieved.

A. **Applicability.** ADA-compliant curb ramps are required at all marked and unmarked crossing locations. Ramps shall not be provided only where there is no crossing present due to safety concerns or a lack of pedestrian facilities on the opposite corner.
B. **Orientation.** Curb ramps shall be designed with the direction of travel on the ramp perpendicular to the curb line and parallel to the crosswalk, where feasible. Where existing conditions, such as narrow right-of-way width or utility constraints preclude such layouts, parallel ramps, where the entire sidewalk ramps down, are acceptable.

Diagonal ramps are not desirable, but may be approved by DPW on a case-by-case basis. Ramp design standards are provided in Figure I-6.

C. **Detectable warning panels.** All pedestrian curb ramps shall include truncated dome warning panels as shown in Figure I-7. Any curb ramp that is not intended to be used by pedestrians (e.g., ramps serving bikeways) shall not include warning panels. Warning panels shall also be provided where a crossing is present without a curb ramp (for example, where pedestrian facilities are at the same grade as the street, within a median refuge, etc.). All warning panels shall be uncoated cast iron, as detailed in Figure I-7. DPW reserves the right to require the installation of warning panels at driveway locations in such situations where volume or configuration of traffic may necessitate their placement.

1.6.4. Shared use paths. Shared use paths and other pedestrian access routes in the right-of-way shall conform to the same ADA requirements as sidewalks discussed herein. The appropriate material for shared use paths may differ from the material prescribed in the Sidewalk Material Policy. The appropriate material shall be determined by the Department of Public Works if not already documented in a transportation plan or master plan. Shared use paths shall be 10 feet in width or greater to allow for two-way traffic and passing.

1.6.5. Curb extensions. Curb extensions (also known as bump-outs, bulb-outs, or neckdowns) describe any localized narrowing of the roadway, typically at pedestrian crosswalk locations. The installation of any curb extension is subject to the approval of the Department of Public Works.

A. **Applicability.** Curb extensions may be considered where one or more of the following conditions are met:
   1. There is a documented speeding issued confirmed by a speed study;
   2. Curb extensions are necessary to construct one or more ADA-compliant curb ramps at an existing or proposed crosswalk;
   3. As determined necessary at uncontrolled midblock crossings;
   4. At signalized intersections, where reducing the pedestrian crossing time improves signal timing;
   5. At locations where there is a history of crashes involving pedestrians and/or crashes involving right-turning vehicles; or
   6. Where they are prescribed in a master plan or transportation plan.

B. **Curb extension design.** Curb extensions, where permitted, shall be constructed to achieve the applicable goal(s) without disrupting the functionality of the roadway or intersection. Curb extensions:
   1. Shall not impede necessary turning movements for trucks or emergency vehicles or winter operations;
   2. Shall not negatively impact drainage without adequate mitigation;
   3. Shall not impede upon, or narrow to an unacceptable degree, the adjacent travel or bicycle lanes; and
   4. Shall be constructed with radial curb (typically 10-foot radius or greater) at transition points to assist with drainage and maintenance, as shown in Figure I-19.

Curb extensions that encompass on-street parallel parking lanes should generally no exceed six (6) feet in width, as shown in Figure I-19.

1.6.6. Non-compliance. ADA-compliance is required both within and outside of the public right-of-way. Any construction within the public right-of-way that is not built to ADA-compliance shall be reconstructed at the Applicant's expense.

Where strict compliance with ADA is technically infeasible in an alteration of an existing condition, the alteration must be made to the maximum extent technically feasible. The extent to which compliance is technically infeasible shall be documented, and an acceptable design shall be approved by the Department of Public Works. This process should occur during the design phase.

1.7. DRIVEWAY APRONS

Any driveway, or section thereof, located within any public street right-of-way shall be designed and built according to the following specifications:

1.7.1. Construction and materials. The portion of the driveway within the public-right-of-way within the pedestrian access route shall be comprised of the same material as the abutting sidewalk as identified in the Sidewalk Material Policy (Appendix 1) and constructed according to Figure I-10 through I-12.

1.7.2. Pedestrian access route. Where a driveway crosses a sidewalk, shared use path, or other pedestrian access route, a pedestrian access route shall be constructed across the driveway apron with a maximum cross-slope of 2% (1.5% preferred). The pedestrian access route shall be designed and constructed to meet the elevation of the adjacent sidewalk or shared use pathway to the extent feasible.

The pedestrian access route shall be constructed at the same width as the adjacent sidewalk or shared use path to the extent feasible. For pedestrian access routes connecting to adjacent sidewalks, the minimum width is four (4) feet, with five (5) feet preferred.

1.7.3. Driveway apron slope. The driveway apron shall ramp up to the grade of the sidewalk, where feasible. The portion of the driveway between the roadway and the pedestrian access route shall be designed to a maximum slope of 15%, unless otherwise approved by the Department of Public Works. This slope should be minimized to the extent possible while maintaining ADA-compliance and continuity of travel along the pedestrian access route.

1.7.4. Driveway design. Where feasible, driveways shall be designed to keep the pedestrian access route at a consistent elevation for continuity of travel. The portion of the driveway between the roadway and pedestrian access route shall be sloped to provide the full transition between the roadway and sidewalk elevations where feasible. Along roadways where the sidewalk width plus esplanade width is less than seven (7) feet, the sidewalk may be transitioned using ADA-compliant ramps in order to create a suitable driveway crossing.

1.8. ROADWAY CONSTRUCTION, SURFACE, AND AGGREGATES

1.8.1. All roadways shall be constructed in accordance with Chapter 25 of the City of Portland Code of Ordinances and the most current edition of the MaineDOT Standard Specifications unless otherwise indicated herein or otherwise directed in writing by the Department of Public Works.

1.8.2. Aggregates used in concrete mixes and in the construction of street, sidewalks and aprons shall meet the requirements in SECTION 703 – AGGREGATES of the most current edition of the *State of Maine Department of Transportation Standard Specifications* with the following clarifications, additions and modifications:

A. 703.06(a) Aggregate Base Gravels shall adhere to MaineDOT standard specifications listed in Sections 304 and 703 for type "A" material.
B. 703.06(c) Aggregate Subbase Gravels shall adhere to MaineDOT standard specifications listed in Sections 304 and 703 for type "D" material.
C. 703.18 Common Borrow shall not contain any particle of bituminous material.
D. 703.19 Granular Borrow shall adhere to MaineDOT standard specification 703.19 for Granular Borrow material.
E. 703.20 Gravel Borrow shall adhere to MaineDOT standard specification 703.20 for Gravel Borrow material.

TABLE 1-C. MINIMUM THICKNESS FOR PAVEMENT STRUCTURE MATERIALS

Street Classification	Minimum Materials Thickness (Inches)			
	Wearing Course Pavement	Base Course Pavement	Agg. Base Course	Agg. Subbase Course
Minor Residential	1 ½	2	3	15
Residential	1 ½	2	3	15
Collector	1 ½	2 ½	3	18
Commercial/ Industrial	2	3	3	18

TABLE 1.D. MINIMUM PLACEMENT TEMPERATURES FOR HOT MIX ASPHALT PAVEMENT

Base Temperature (° F)	Mat Thickness (Inches)					
	½	¾	1	1 ½	2	3+
40-50*	-	-	-	-	285	275
50-60	-	310	300	295	280	270
60-70	310	300	290	285	275	265
70-80	300	290	285	280	270	265
80-90	290	280	275	270	265	260
90+	280	275	270	265	260	255

* Surface course pavement shall be placed when the air or road base temperature is less than 50 degrees F.

1.9. STREETS ON ISLANDS IN CASCO BAY

Reserved.

1.10. PARKING LOT AND PARKING SPACE DESIGN

1.10.1. Parking lots, except for temporary lots to be used for less than one year, shall be constructed of a permanent and durable hard surface that is not subject to ponding or erosion, both onsite and within the right-of-way, and shall meet accessibility standards. Any proposed permanent parking lot surface must allow for delineation of parking spaces and circulation aisles.

1.10.2. Parking spaces shall meet the following dimensional requirements:

A. Standard parking space: 9 feet wide by 18 feet long, except that low turnover parking spaces, such as those used by residents or employees, may be designed with a width of 8.5' and considered a standard parking space.
B. Compact parking space: 8 feet wide by 15 feet long
C. Motorcycle/motorized scooter parking space: 4 feet wide by 8 feet long

1.10.3. Obstructions within parking areas, including columns and other permanent fixtures, shall not be located within the dimensions of a parking space. Where these obstructions are present, parking shall be striped and dimensioned to omit these obstructions. Such obstructions should not significantly impact vehicle maneuverability, visibility ability to open doors, etc.

1.10.4. All spaces provided shall be safely accessible. Substandard and specialty spaces that are open to the general public shall be labeled as such using signage or pavement markings to inform users.

1.10.5. Compact spaces. Any parking lot with five or more spaces may contain a mix of standard and compact spaces. Up to 20% of parking spaces in a parking area may be compact. Compact parking spaces should be limited in high-turnover parking areas or locations where the typical vehicle is likely to be larger than a typical passenger vehicle. Vehicle turning analysis may be required for review by the Department of Public Works to ensure that spaces function as designed.

1.10.6. Accessible parking. All parking areas shall provide accessible parking per ADA and the Maine Fair Housing Act. ADA standards for number of spaces, dimensions, buffers, cross-slopes, materials, pedestrian accessibility, and other requirements shall apply with no exceptions. Accessible spaces shall be considered "standard" parking spaces for the purposes of calculating the allowable number of compact spaces.

1.10.7. Vehicular access shall be provided by one or more aisles. The minimum two-way drive aisle width is 24 feet for standard, right-angle parking, and is otherwise dependent on parking space orientation, as illustrated in Figure I-16A. Accessible parking spaces shall be served by at least one aisle of standard width or greater.

1.11. MOTORCYCLE/MOTORIZED SCOOTER/MOPED PARKING

To distinguish motorcycle/motorized scooter/moped parking spaces from standard parking spaces, the spaces shall be painted and delineated with signage. These painted spaces shall be angled and shall be four (4) feet wide by eight (8) feet long. The dimensions for on-street motorcycle/motorized scooter/moped parking are outlined in Figure I-16B. On-street motorcycle/motorized scooter/moped parking may also be located where standard vehicle parking would be prohibited because of sight restrictions, such as adjacent to a crosswalk or an approach to a traffic control device. Motorcycles/motorized scooters/mopeds do not create the same sight impediment as a standard vehicle.

1.12. BICYCLE PARKING

1.12.1. Bicycle parking shall:

A. Provide secure, durable racks that maintain bicycles in an upright position and to which bicycles can be affixed with customary lock and cable mechanisms. Fence-type ("wheel bender") racks designed to secure the front wheel only and wave racks are prohibited from counting toward bicycle parking requirements;
B. Be installed on a hard surface that is suitably sized and provides sufficient clearance from obstacles;
C. Be separated from car parking by a physical barrier such as curbing, wheel stops, parking bollards or similar features;
D. Be adequately illuminated where nighttime use is anticipated;
E. Be provided under covered areas and/or in secure storage lockers or rooms, if intended for long-term use; and
F. Be provided within the public right-of-way or be publicly accessible if intended for uses that expect visitation, customers, or short-term usage.

1.12.2. Placement of off-street bicycle parking racks shall conform to the bicycle parking rack placement criteria (drawn from the *Bicycle Facility Design Guide of the District Department of Transportation, 2006*) as illustrated in Figure I-24.

1.12.3. For commercial or industrial uses requiring more than ten (10) bicycle parking spaces:

A. A minimum of ten percent (10%) of required bicycle parking shall be provided within fifty (50) feet of the main entry point of the structure, or shall be no further from such entry than the nearest five (5) non-handicapped parking spaces; and
B. Where there is more than one structure on a site, or where a structure has more than one main entrance, the parking shall be distributed to adequately serve all structures or main entrances.

1.12.4. Directional signage. If bicycle parking is not directly visible from the public right-of-way, directional signage shall be provided indicating the availability and location of bicycle parking facilities.

1.12.5. Approved bicycle rack design. Bicycle racks that are required to meet site plan requirements shall:

A. Provide multiple points of contact between the rack and the bicycle;
B. Allow bicycles to be located without the need to lift the bicycle into the rack; and
C. Be placed in such a way as to allow the intended number of bikes to be securely locked. A minimum of ten percent (10%) of required bicycle parking shall be provided within fifty (50) feet of the main entry point of the structure, or shall be no further from such entry than the nearest five (5) non-handicapped parking spaces.

2.12.6. Approved bicycle racks by location. Bicycle racks that are required to meet site plan requirements shall use approved racks based on the proposed location of the rack:

A. **Private property.** A variety of commercially available racks are acceptable for installation on private property, including but not limited to those catalogue listings identified herein (Figures I-24 and I-25).
B. **In the Public Right-of-Way.** Bicycle parking may be located within a public right-of-way where site conditions cannot reasonably accommodate bicycle parking on private property or in the case of sites that expect high-turnover or short-term bike parking usage. Bike parking may be placed either adjacent to or within reasonable walking distance of the site, if such areas are available that meet the bicycle parking rack placement criteria (drawn from the *Bicycle Facility Design Guide of the District Department of Transportation, 2006*) as illustrated in

Figure I-24. Bicycle racks within the public right-of-way shall be placed to allow for the safe storage of bicycles while limiting encroachment onto adjacent sidewalks. If no location within the right-of-way is available, a financial contribution commensurate with the cost for purchase and installation of the required number of bicycle racks shall be made to the Sustainable Transportation Fund.

The following approved brands, installed according to company specifications, shall be permitted in the public right-of-way:

1. DERO 'Downtown Rack' Inverted U-Rack (Figure I-25);
2. DERO 'Bike Hitch' (Figure I-24); or
3. Old Port District, including Commercial Street: DERO Bike Hitch only (Figure I-24).

Equivalent bicycle racks by other manufacturers are acceptable upon prior approval by the reviewing authority.

Bicycle racks in the public right-of-way shall become the property of the City of Portland.

Bicycle racks in the public right-of-way shall match the designated street furniture color for that location, as described in the Municipal Street Lighting Standards in this manual. Where there is no designated street furniture color, bicycle racks in the public right-of-way shall be black (manufacturer's specification).

1.13. BICYCLE ROUTES AND LANES

The City has developed bike network plans to show present and proposed bikeways, including neighborhood byways, dedicated bicycle lanes, and shared use pathways. Positive identification of bikeways shall be provided by pavement markings, bike lane symbols, and/or signage. The following standards shall be applied to the installation of bike facilities:

1.13.1. Design. The design of any new or modified bicycle facility shall be reviewed and approved by the Department of Public Works prior to application and shall be consistent with the following design standards:

A. Vehicular travel lanes and bicycle lanes shall be separated by a minimum six (6) inch solid white painted edge line adjacent to the travel lane. At intersections, the white edge line shall be a dashed line (two (2) foot painted length by four (4) foot opening) across the intersection and for 50 feet to 100 feet in advance of the intersection, as appropriate. Where there is the potential for right-turning vehicle conflicts with through bicycle movements at intersections, green paint within the bicycle lane is recommended and may be required;
B. Bike lanes shall have a minimum width of five (5) feet. Six (6) feet is preferred for bicycle lanes adjacent to curbed street sections. Where sufficient street width exists, a painted buffer of one (1) foot or more may be provided between the bicycle lane and vehicle travel lanes. Where a bicycle lane is adjacent to on-street parking with moderate to high utilization and/or turnover rates, this buffer should be placed between the bicycle lane and parking lane. The location of the buffer shall be determined in consultation with the Department of Public Works. Where a buffer of one foot or greater is provided, the width of the bicycle lane may be reduced to four (4) feet, if necessary, with approval from the Department of Public Works. Design shall take into account the location of potential obstructions, such as catch basins;

C. Where the minimum or recommended width for bicycle lanes is not immediately available, reallocation of general travel lane widths or the number and configuration of general travel lanes shall be considered, as appropriate, in consultation with the Department of Public Works;
D. On-street bicycle lanes and associated buffers shall not exceed eight (8) feet in total width unless vertical delineation is provided in the buffer area. Applicability and materials of vertical delineation shall be determined by the Department of Public Works;
E. Shared use paths shall be designed to facilitate two-way traffic by users of multiple, nonmotorized modes. In general, shared use paths shall be ten (10) feet or greater in width, and free of any obstructions, including a 2-foot clear zone on each side of the pathway. Refer to the AASHTO *Guide for the Development of Bicycle Facilities* for shared use path design considerations;
F. On bicycle routes, or other roads with considerable bicycle traffic and insufficient roadway width to provide a bicycle lane, shared lane markings ("sharrows") may be used. Where used, sharrows shall be placed in the center of the travel lane(s) serving the bike route(s) or where bicyclists are expected;
G. On two-way roadways with excess roadway width for one bicycle lane, but not two, installation of a single bicycle lane should be considered. The single bicycle lane should be placed in the uphill direction, if located on a hill. Otherwise, if parking is provided on only one side of the roadway, bicycle lane placement should be prioritized on the side of the street with no parking. Where possible, streets with bicycle lanes in only one direction should be paired with another lane on an adjacent parallel street to achieve bicycle mobility in both directions, if possible; and
H. Standard bike lanes and all other on-street bicycle facilities such as separated bike lanes shall be designed in accordance with the most recent version of nationally-recognized design guides, such as the NACTO *Urban Bikeway Design Guide*, the NACTO *Urban Street Design Guide*, the FHWA *Separated Bike Lane Planning and Design Guide*, MassDOT's *Separated Bike Lane Planning & Design Guide*, or other best practice as it becomes available.

1.13.2. Bike network considerations. Bicycle facilities shall be designed within the context of the citywide bicycle network.

1.13.3. Pavement markings and signage. Bicycle lanes shall be marked with appropriate pavement markings such as longitudinal lines and stenciled symbols, as illustrated in Figure I-18. Bike routes shall be identified by appropriate signage as found in the FHWA 'Manual of Uniform Traffic Control Devices', as illustrated in Figure I-18.

1.14. ELECTRIC VEHICLE INFRASTRUCTURE

1.14.1. New structured and surface parking lots of five or more spaces shall include energized electrical outlets or installed chargers capable of providing Level 2 EV charging or higher to 20% of parking spaces (rounded down to the nearest whole number). An additional 50% of spaces must be made EV-ready, meaning that they are served by sufficient conduit and electrical service to allow for future installation of electric vehicle supply equipment at every space.

1.14.2. An applicant may request a reduction in the number of required EV-installed or EV-ready parking spaces in Level 3 EV charging is proposed. In this case, spaces served by Level 3 charging may be substituted for Level 2 at a ratio to be determined in consultation with the Department of Public Works.

1.14.3. In the case of new structured and surface parking of greater than 100 spaces, the review authority may establish the EV parking requirements on the basis of an EV parking demand study. Such study shall be prepared by a qualified professional using industry best practice, and account for future growth in EV demand.

1.15. TRAFFIC CONTROL DEVICES

All intersections of two or more roadways shall be controlled by one of the traffic control methods listed herein. All traffic control shall be selected and installed in accordance with the Manual on Uniform Traffic Control Devices (MUTCD).

1.15.1. Traffic signals.

A. All new traffic signals are subject to the approval of the Department of Public Works. Proposed traffic signals are required to meet at least one traffic signal warrant set by the MUTCD. Signals justified Warrant 3 (Peak Hour Volume), Warrant 7 (Crash Experience), or Warrant 8 (Roadway Network) without meeting at least one other warrant may require additional study. Development projects that trigger, or further exceed, one or more signal warrants at one or more existing or proposed intersections or driveways may be required to install a traffic signal at those locations.
B. New or modified traffic signals also required the submission of a traffic signal plan, including locations of all equipment, underground utilities, phasing and timing plans, and a specific list of all traffic signal hardware. Plans shall be submitted to the Department of Public Works for review and approval prior to installation.
C. New traffic signal proposals are subject to review by MaineDOT, as appropriate. All city, state, and federal guidelines with regard to installation, activation, and monitoring shall apply.
D. Existing traffic signals that do not meet MUTCD signal warrants may be removed if they present operational or safety issues. All removals of existing traffic signals are subject to coordination with and the approval of the Department of Public Works and MaineDOT.
E. The City of Portland traffic signal specifications can be found in the *City of Portland Traffic Signal Policy and Guidance Manual*.

1.15.2. Stop control. Stop signs shall be installed in accordance with MUTCD. Stop signs shall be accompanied by a stop line 12" in width.

Stop control shall not be used for speed control. Stop control should generally not be used on intersection approaches with multiple travel lanes. Stop control shall not be used for intersections with five (5) or more approaches. Such intersections hall be signalized (if warranted), equipped with a roundabout, or otherwise realigned or regulated so that the number of approaches is reduced to four (4) or fewer.

1.15.3. Roundabouts. Where sufficient right-of-way is available, circular intersections (i.e., roundabouts or traffic circles) should be considered. Such intersections may provide operational and safety benefits compared to signalized or stop-controlled intersections. Where selected as the appropriate traffic control measure, roundabouts shall be designed in accordance with the MUTCD Chapter 3C, with signage according to MUTCD Section 2B.07. Neighborhood traffic circles may be considered as stop-controlled intersections as a traffic calming measure. All such treatments are subject to the approval of the Department of Public Works.

1.15.4. Yield control. Yield control should generally only be implemented in the following scenarios:

A. At certain channelized turning lanes separated from adjacent travel lanes by an island (even if the adjacent lanes are controlled by a stop sign or signal);
B. At the entering roadway for a merging movement, including at a roundabout; or
C. Where engineering judgment determines that yield control is appropriate subject to the approval of the Department of Public Works.

1.16. PUBLIC CROSSWALKS

1.16.1. Public crosswalks shall meet the requirements of the Manual on Uniform Traffic Control Devices (MUTCD), unless City standards specify a stricter measure. Public improvements may include but shall not be limited to any one or combination of the following:

A. Crosswalks;
B. Curb bump outs or curb extensions, where warranted;
C. Pedestrian crossing signs (curbside, overhead or in the street);
D. Rectangular Rapid Flashing Beacons (RRFBs);
E. Pedestrian hybrid beacons;
F. Pedestrian activated traffic control signal (red, yellow, green); and
G. Medians or raised islands.

1.16.2. Crossing locations shall be designed to the following standards unless otherwise directed by the Department of Public Works:

A. **Street markings.** Crosswalks on public streets shall consist of 24-inch block style white lines, placed 48 inches apart on center, for an overall width of 8 feet (or wider; at least as wide as the sidewalks served by the crosswalk);
B. **Street lighting.** Crosswalk locations shall be adequately illuminated for visibility at nighttime; and
C. **Signage.** Select crosswalk locations may need to accentuated through the use of signage mounted curbside, overhead, or on the roadway centerline, as described hereinafter. Crosswalk signs shall be placed directly adjacent to crosswalks, and advance warning signs shall be placed in accordance with MUTCD. Standard signs shall be black legend on a fluorescent background.

1.17. PUBLIC TRANSIT FACILITIES

Where required, public transit facilities shall meet the following standards:

1.17.1. Transit pullout bays.

A. Transit pullout bays shall be located in the City right-of-way along the property frontage; or
B. Where space constraints prevent locating a transit pullout bay along the property frontage, transit pullout bays may be located within reasonable walking distance of the site;
C. Where possible, transit pullout bays shall be located at intersections. At signalized intersections, far-side bus stops are preferred. Mid-block bays are not preferred due to impacts to parking and traffic; and

D. The design of the pullout bay shall provide adequate space for vehicles to maneuver through facilities without causing damage to either the vehicles or facilities as detailed herein.

1.17.2. Transit shelters.

A. Transit shelters shall be located within the site, directly adjacent to the right-of-way on which the public transportation route is established; or
B. Where site constraints prevent locating a transit shelter on the site, it shall be located within a public sidewalk area along the property frontage. If a transit shelter is to be located within a public sidewalk area, City sidewalk clearance requirements shall apply; or
C. Where space constraints prevent locating a transit shelter within a public sidewalk area along the property frontage, it may be located within reasonable walking distance of the site; and
D. Installation and ongoing maintenance of transit shelters on private property shall be the responsibility of the property owner. Ongoing maintenance of transit shelters located within the City right-of-way or within an easement held by the City shall be the responsibility of the City or of the local or regional transit authority serving the facility.

1.17.3. Where necessary, developments shall provide easement to the City, sufficient in size to accommodate public transit infrastructure and access to the transit stop.

2. TRANSPORTATION STUDIES AND PLANS

2.1. TRANSPORTATION STUDIES

2.1.1. Passenger car equivalent (PCE). Defined as the number of passenger cars, or, in the case of non-passenger vehicles, the number of passenger cars that would be displaced by non-passenger vehicles. One tractor trailer combination is the equivalent of two passenger cars.

2.1.2 Applicability. Developments that generate 100 PCE or more during a peak hour period, thus requiring a Traffic Movement Permit (TMP), shall meet the requirements of TMP regulations of State Law, in addition to all applicable transportation site plan standards of the City Code. The calculation of the PCE trip level for determination of TMP thresholds shall be made prior to trip reductions for other modes or shared trips.

For more information concerning state TMP requirements, please refer to https://www.maine.gov/mdot/traffic/docs/229c305.pdf or contact the Maine Department of Transportation (MaineDOT). The City of Portland is the delegated reviewing authority for TMP applications.

Developments generating at least 25 PCE and less than 100 PCE during a peak hour period may be required to complete a transportation study. The determination shall be made by the City Traffic Engineer, based upon the proximity of the development site to identified issues related to safety, congestion, and/or multi-modal accessibility.

2.1.3. Preparation. Transportation studies shall be prepared, stamped, and signed by a Professional Engineer licensed in the State of Maine.

2.1.4. Scope of study. The City Traffic Engineer, in consultation with the applicant's engineer, shall determine the scope of the transportation study. The scope of the study may include, but is not limited to the following elements:

A. A description of the development proposal;
B. A description of the existing multi-modal transportation conditions and context;
C. Estimated trip generation by the development and design hour volume for site driveway(s) and study intersections by mode. Trip generation will be based upon current Institute of Transportation Engineers data, or approved alternate methodology, by mode;
D. Trip distribution;
E. Multi-modal level of service analysis pre- and post-development at study area intersections and roadway segments;
F. Capacity analysis at study area intersections, including level of service (LOS), delay, volume-to-capacity ratios, and queue analysis;
G. Crash analysis within the study area, or expanded study area if deemed appropriate;
H. Key findings regarding multi-modal traffic and safety issues in the existing condition or as result of project-generated trips;
I. Analysis of impacts to pedestrians, bicyclists, and transit service and users; and
J. Summary of findings and recommendations for transportation improvements and other impact mitigation measures.

2.1.5. Mitigation. Mitigation of development project impacts may be required under MaineDOT TMP regulations and/or by the City of Portland through a transportation study. In some cases, where safety or capacity improvements to vehicle operations are not feasible due to constraints, mitigation may consist of in-kind multi-modal improvements to pedestrian, bicycle, and/or transit facilities and service. Where required, mitigation measures shall be included in the applicant's transportation study, and shall be approved by the Department of Public Works prior to site plan approval.

2.2. PARKING STUDY

2.2.1. Parking studies shall be produced by a licensed transportation engineer

2.2.2. Where a parking study is required, data shall be determined by values contained in the current version of the Institute of Transportation Engineers (ITE) publication *Parking Generation*, or through local, regional or other pertinent national data. If local or regional data is to be used, the scope and methodology of the parking study shall be coordinated with the City Traffic Engineer.

2.2.3. Parking studies for mixed-use developments shall reference best practices for shared parking, both in terms of calculations and studies, such as the Urban Land Institute's *Shared Parking*.

2.2.4. Where a parking study is required, the scope of study shall be determined in coordination with the City Traffic Engineer. The requirements for the study shall be based on standard transportation engineering practices.

2.3. TRANSPORTATION DEMAND MANAGEMENT (TDM)

All TDM plans shall include the following items:

2.3.1. TDM narrative. Include a transportation narrative that:

A. Describes how the project fits within the multi-modal transportation system serving the district in which the development or site is located;
B. Addresses the specifics of the land uses, occupants, visitors, and location of the development and how it is anticipated to relate to its transportation context; and
C. Address applicable existing conditions and TDM challenges and opportunities for the site related to:
    1. Vehicular access and circulation;
    2. The quality of the bicycling and pedestrian environment and facilities;
    3. Transit service levels and the transit-supportive environment;
    4. Current levels of parking and parking policies; and
    5. For existing developed sites, the current state of any TDM-related efforts should be described.

2.3.2. TDM coordinator. Identify a TDM coordinator(s) and establish the roles and responsibilities of the coordinator(s). The plan should demonstrate how the administration of the TDM plan and role of the TDM coordinator(s) will reflect the scale of the site/development, proposed uses, parking and vehicle trip reduction targets, as well as the ownership and property management framework.

2.3.3. Document baseline TDM data. Document baseline travel demand and supply data for the development or site in tabular format, against which future performance can be measured. Baseline data shall include:

A. Future trip generation estimates (where applicable);
B. Proposed parking supply and future demand estimates (where applicable); and
C. Estimated modal split, recognizing modal split as the uniform metric to be used in TDM reporting in subsequent years.

Baseline data shall correspond to the transportation analysis required for the project, and shall represent best estimates of transportation demand and modal split at time of occupancy, given the transportation context.

2.3.4. Set TDM targets. The TDM plan shall establish short-term (3-5 year) and long-term modal split targets, based on documented baseline transportation demand data, the combination of land uses, location, transportation context, and other data for the site. Modal split targets shall relate directly to the transportation infrastructure provided, TDM strategies to be employed, site context, and shall consider city-wide TDM goals as represented in plans such as *One Climate Future*. The metrics for TDM modal split targets shall be measurable, and shall include goals for reductions in single-occupancy vehicle trips and increases in non-single-occupancy trips, broken down by mode. The targets shall be described in both absolute values and percentage terms. The targets will be reviewed and updated based upon the annual TDM reporting.

2.3.5. Set customized modal split strategies. Every TDM plan shall include a set of strategies designed to achieve the TDM target. The strategies should be customized to reflect the specific mix of uses, the population that will access the site, the scale of development, the location, the modal split targets, and the transportation opportunities available to the site. The strategies should also reflect a broad mix of TDM approaches, including approaches that:

A. Provide TDM infrastructure and operations to the site (e.g., on-site lockers and shower facilities, transit capital or operation funding, programming that supports TDM, such as guaranteed ride home or ride-matching programs);
B. Incentivize TDM options (e.g., through parking cash-out, preferential carpool parking, subsidized transit passes, subsidized bicycle maintenance, or bikeshare memberships); and
C. Educate users of the site about TDM options (e.g., through site-level information-sharing mechanisms, provision of transit maps and schedules, etc.).

For additional information on TDM strategies, see https://www.portlandmaine.gov/721/TDM-Parking.

2.3.6. Establish a monitoring and reporting plan.

A. All TDM plans must include provisions for monitoring program effectiveness over time to establish whether progress toward TDM targets is being met.
B. **Responsibility.** The TDM Coordinator(s) and/or plan administrator(s) are responsible for monitoring the efficacy of the TDM plan and making adjustments to the plan as needed to achieve modal split targets.
C. **Methods.** The methods of monitoring shall be outlined in the TDM plan. Monitoring methods will typically involve use of an annual survey combined with other data collection, such as parking utilization counts where needed.
D. **Reporting.** The results of TDM plan monitoring shall be reported to the City of Portland on an annual basis using reporting tools provided by the City.

2.4. CONSTRUCTION PERMITTING AND TRAFFIC CONTROL PLANS

2.4.1. 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 & charges are all outlined in that Chapter. Rules and Regulations for Excavation Activity are available through the Street Opening Clerk at the Department of Public Works.

2.4.2. Sewer and stormwater 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. See also Section # of the Technical Manual for lateral abandonment requirements associated with demolition permits.

2.4.3. 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 travelling public. Projects that will occur along accepted city streets are required to submit a satisfactory 'maintenance of traffic' (MOT) plan prior to any site plan, subdivision, or street opening permit approval.

Maintenance of Traffic (MOT) plans shall provide for the safe passage of the public by all modes of transportation through or along the construction work zone. On a case-by-case basis, applicants may be allowed to close a street and/or detour a mode of traffic when absolutely necessary for safety. These closures are to be limited to the shortest duration possible with durations specifically noted in the traffic control plan documentation. MOT plans shall employ the appropriate techniques and devices as called for in the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD). In addition:

A. Construction speed signing may be used as needed to slow traffic;
B. Traffic control signs shall not be placed where they are an obstruction to bicycles or pedestrians. ADA-compliant access shall be maintained at all times and documented within traffic control plans; and
C. In some situations, flaggers may be required to allow for safe pedestrian and bicycle movement.

Additional information for temporary traffic control plans is provided in Chapter 6 of the MUTCD (https://mutcd.fhwa.dot.gov/htm/2009/part6/part6_toc.htm).

2.4.4. All existing modes of travel in the work zone area shall be accommodated if impacted by the activity. The safe passage of pedestrians, bicyclists, transit providers, and motorists are of equal importance when planning out the work zone; no pre-existing travel mode may be eliminated without the express approval of the Department of Public Works. Projects shall meet the following standards for the safe passage of cyclists and pedestrians:

A. Traffic control for bicycle and pedestrian facilities or routes through work zones shall be maintained until the bicycle and pedestrian facilities or routes are ready for safe operation. Traffic control will not be removed to allow auto travel at the expense of bicycles and pedestrians;
B. Where pedestrian traffic is significant, and/or where a detour would present a significant delay and/or safety issues to pedestrians, a temporary walkway in the shoulder/parking lane/outside travel lane may be required

where possible. Any temporary walkway shall be ADA-accessible, including temporary ADA ramps leading to/from the walkway where needed, and solid, detectable barriers along the edges of the walkway. Temporary walkways shall be kept clear of snow, ice and debris by the contractor at all times. Temporary walkways shall have a minimum clear width of five (5) feet;

C. Pedestrian detours shall be considered as a last resort where no other practical option is available. Where pedestrian detours are allowed, pedestrians shall be directed to cross at existing crosswalk locations where practical. Temporary crosswalks and curb ramps may be required to shorten the overall detour. Any temporary crosswalk shall be ADA-compliant and shall be located where sight distance is adequate. All temporary crosswalks shall be approved by the Department of Public Works;

D. Where construction requires the closure of a bicycle lane or shared use pathway alongside a high-volume and/or high-speed roadway, bicycle traffic shall be managed by the contractor in coordination with the Department of Public Works. Treatments may include a barrier-protected bicycle lane or shared use path, or bicycle detours as a last resort; and

E. Barrier systems utilized to separate the construction activity from the public street and/or sidewalk shall not inhibit sight distances, particularly for visibility of pedestrians and bicyclists.

For reference, see also *How to Plan, Document, and Implement Pedestrian Mobility in and around Work Zones* (https://portlandmaine.gov/DocumentCenter/View/30884/Work-Zones-ADA).

2.4.5. Use of public parking spaces or the blockage of any portion of sidewalk for the purpose of construction activity shall require an occupancy permit and appropriate fee as assessed by the Department of Public Works.

3. LOW IMPACT DEVELOPMENT STANDARDS

3.1. LOW-IMPACT DEVELOPMENT (LID) EVALUATION

3.1.1. Approach.

Section 3.1. provides guidance on how new development and redevelopment are required to prioritize the protection of - natural resources.

If the preservation of natural resources is unavoidable, the applicant shall design the development to minimize impacts to the extent practicable. Minimization efforts shall be demonstrated through strategies including, but not limited to, the pursuit of waivers, reductions in off-street parking and other impervious surfaces, and the siting of building components to reduce disturbed area.

When preservation and minimization efforts cannot or can only be partially implemented, Applicants shall implement listed treatment strategies to achieve mitigation prioritizing natural solutions, then structural solutions, and finally compensatory fees.

3.1.2. Low Impact Development Scoring Tool.

All development subject to site plan or subdivision review, shall be evaluated using the low impact development scoring tool, included as Appendix A within this section of the technical manual. The scoring tool establishes a points-based system that is intended to quantify a development's impact across five impact categories, with a bonus category to account for other development characteristics that reduce a development's overall impact. Impact categories are listed below:

A. Wetlands, Streams and Drainage.
B. Natural Areas and Habitat.
C. Soils and Slopes.
D. Vegetation and Landscaping.
E. Impervious Area and Stormwater Management.
F. Bonus Points.

All development subject to evaluation using the low impact development scoring tool, is required to achieve a minimum score of 80 points, out of a total possible score of 178 points. The minimum required score may be achieved through any combination of strategies employed across each of the impact categories. The City of Portland offers bonus points for innovative site and/or stormwater design as detailed in the scoring tool.

3.1.3. Relationship to Other Regulations and Technical Requirements.

The City of Portland LID regulation works in concert with other municipally adopted land-use regulations, and is primarily intended as a tool to reinforce City requirements around stormwater management, landscape and habitat preservation, erosion and sedimentation control, wetland and waterbody impact, and soil usage. Additional state and/or federal regulations may apply. In the event of conflict among standards, the more stringent shall apply.

3.2. IMPACT CATEGORIES

3.2.1. Wetlands, Streams and Drainage

A. Preservation.

1. No wetland alteration is permitted in the Coastal Flood Resilience Overlay Zone, except to support climate adaptation projects that meet or exceed the efficacy of an existing wetland and do not have significant negative impacts on existing habitats identified on the Beginning with Habitat Map Viewer or a boundary survey;
2. Projects shall be designed to avoid crossings or disturbance of waterbodies or wetlands and shall maintain and/or establish undisturbed buffer strips of no less than 100 feet, around the waterbody or wetland boundary
3. No wetland alteration is permitted in the Coastal Flood Resilience Overlay Zone, except to support climate adaptation projects that meet or exceed the efficacy of an existing wetland and do not have significant negative impacts on existing habitats identified on the Beginning with Habitat Map Viewer or a boundary survey.
4. Development located adjacent to a perennial or intermittent stream shall maintain a stream buffer of no less than 100 feet and shall place a deed restriction on the property, maintaining the buffer area in perpetuity. Construction activity, clearing, grading, and other site disturbance shall be prohibited within the buffer area.

B. Mitigation.

1. Where an applicant can demonstrate that preservation or minimization of impacts to waterbodies would significantly compromise the development of the site, applicants proposing the alteration of:
    a. 500 square feet of wetland or greater shall mitigate the impacts such that there is no net loss of ecological function and value. Subdivision impacts shall be assessed for the development as a whole and shall account for any impacts associated with future development. Acceptable forms of mitigation include the following:
    b. Restoration of previously degraded wetlands;
    c. Enhancement of existing wetlands;
    d. Preservation of existing wetlands or adjacent uplands elsewhere where the site to be preserved provides significant wetland functions;
    e. Creation of new wetland; or
    f. Payment into the City of Portland Compensation Fee Program.

2. Where an applicant can demonstrate that avoidance of stream crossings would significantly compromise the development of the site, applicants proposing to cross any stream shall:
    a. Use a bridge or open bottom culvert structure sized at 1.2 times the bank full width of the stream; or
    b. Incorporate Maine Stream Smart Principles into the crossing design.
3. Where an applicant can demonstrate that maintaining a 100-foot perennial or intermittent stream buffer area would significantly compromise the development of the site, applicants proposing to reduce this buffer shall:
    a. Provide a brief narrative explaining why there is no practicable alternative to the location of activity within the 100-foot buffer area, and detail how impact to the resource will be minimized.
    b. Provide a minimum 50-foot buffer area between the normal high-water line of perennial streams and areas of proposed disturbance.
    c. Provide a minimum 25-foot buffer area between the normal high-water line of intermittent streams and areas of proposed disturbance.

3.2.2. Natural Areas and Habitats.

A. Preservation.

1. Development activity shall not disturb significant and essential wildlife habitats identified on the State of Maine Beginning with Habitat Map Viewer, or as identified by a Maine licensed surveyor on a boundary survey for the site. Projects shall not disturb, remove, fill, dredge, clear, destroy, or alter any area within a buffer zone of 100 feet of a wetland associated with habitats listed above.
2. Applications shall not disconnect undeveloped habitat blocks, undeveloped block connectors, and riparian connectors that are listed on the State of Maine Beginning with Habitat Map Viewer.

B. Mitigation.

Where the applicant can demonstrate that the preservation of or minimization of impacts to existing habitats would significantly compromise the development of the site, the applicant shall implement one or more of the following mitigation strategies determined to be acceptable by the Planning Authority:

1. Mitigation for undeveloped habitat blocks, undeveloped block connectors, and riparian connectors shall:
    a. Enhance existing undeveloped blocks and connectors on or adjacent to the site;
    b. Establish new undeveloped blocks and connectors on or adjacent to the site; or
    c. Submit payment into the City of Portland Compensation Fee Program.

3.2.3. Soils and Slopes.

A. Preservation.

1. Soil surveys and mapping. The level at which various types of projects must be mapped and guidelines for each intensity level of soil mapping are included in Section 7 of the Technical Manual. Projects shall avoid paving and construction of buildings on site areas with high permeability soils.
2. Projects shall avoid construction on and maintain 20-foot undisturbed vegetated buffers on portions of sites with slopes ≥15%.

B. Mitigation.

1. Where the applicant can demonstrate that preserving or minimizing paving and construction of buildings on high permeability soils would significantly compromise the development of the site, projects shall consider the use of stormwater best management practices that incorporate stormwater infiltration within areas of high permeability soil.
2. Where the applicant can demonstrate that preserving or minimizing paving and construction of buildings on high permeability soils would significantly compromise the development of the site, projects shall consider tilling less permeable soils in areas of proposed revegetation to a depth of at least 10 inches prior to revegetation, and the use of organic matter amendments as needed based upon the soil tests complete.
3. Where the applicant can demonstrate that avoiding or minimizing construction on slopes ≥15% would compromise the development of the site, projects shall implement the following stabilization strategies:
    a. Stabilization of slopes greater than 8% shall use erosion control netting or blanket to stabilize the soils and shall establish coverage with vegetation and/or organic mulch.
    b. Slopes greater than 33% which utilize vegetation for permanent stabilization shall not be mowed.
    c. Stabilization of slopes greater than 50% should prioritize biotechnical methods over structural methods when feasible. If biotechnical methods alone are determined not to be feasible by a licensed engineer, the applicant must incorporate a combination of biotechnical and structural methods, including, but not limited to, terracing rip rap or retaining walls in addition to vegetation.

3.2.4. Vegetation and Landscaping.

A. Preservation.

1. Development shall be designed to protect and incorporate natural features, on-site & street trees ≥10" DBH, and all other existing stands of vegetation and trees in accordance with Section 4 of the Technical Manual, except in cases where the City Arborist or their designee deems such vegetation to be:
    a. Diseased;
    b. In poor condition;
    c. A non-native invasive species, or
    d. Unsalvageable.
2. Heritage trees shall be protected in accordance with Chapter 29 of the City of Portland Code of Ordinances.

3. Trees or groups of trees to be preserved shall be inspected and approved by the City Arborist or their designee and shall be clearly identified on the Site Plan, Subdivision Plat, Landscape Plan, and Grading Plan. Where required by the reviewing authority, property deeds shall include language and plans to help ensure that current and future landowners are aware of all preservation requirements tied to the property.

B. Mitigation.

1. Where the applicant can demonstrate that the preservation of trees required to be preserved would significantly compromise the development of the site, an applicant shall be responsible for planting replacement trees on the City of Portland approved tree list (Section 4 of the Technical Manual, Figure IV-1) at a ratio of one tree per tree removed measuring between 6 and 8 inches DBH, two trees per tree removed that is between 8 and 12 inches DBH, and three trees per tree removed greater than 12 inches DBH. If this is not feasible, the applicant shall contribute to the City of Portland Tree Fund in the amount of $100/inch at DBH.
2. Upon completion of the project, preserved vegetation that show signs of construction damage within a one-year period following construction, including but not limited to bark damage or excessive root damage, grade changes other than those originally indicated in the approved grading plan, soil compaction due to heavy equipment traversing closely, or general decline due to mechanical or natural conditions shall be rejected and must be replaced prior to the release of any defect guarantee.
    a. For every existing tree rejected that is between 6 and 8 inches in caliper DBH, one replacement tree listed on the City of Portland approved tree list (Section 4 of the Technical Manual, Figure IV-1) shall be planted on the site.
    b. For every existing tree rejected that is between 8 and 12 inches in caliper DBH, two replacement trees listed on the City of Portland approved tree list (Section 4 of the Technical Manual, Figure IV-1) shall be planted on the site.
    c. For every existing tree rejected that is greater than 12 inches in caliper DBH, three replacement trees listed on the City of Portland approved tree list (Section 4 of the Technical Manual, Figure IV-1) shall be planted on the site.
3. Where an applicant is providing new site landscaping, the applicant is encouraged to reduce or limit grassed lawn area in favor of more intensive site landscaping, utilizing native vegetation that is locally sourced wherever possible.

3.2.5. Impervious Area and Stormwater Management.

A. Preservation.

1. Development shall be designed to reduce impervious area to the extent practicable, and where possible, employ permeable hardscape materials, such as porous pavers, permeable concrete, and porous asphalt.
2. Development shall prioritize the use of green infrastructure and or other natural stormwater treatment systems.
3. The use of salt or chloride is discouraged, and applicants that are required to develop a stormwater

maintenance agreement, shall be required to detail strategies for reducing salt or chloride use during the winter season, and shall document the use of salts or chlorides as part of the annual monitoring requirement.

B. Mitigation.

1. Development shall be designed in accordance with the City's stormwater standards detailed in Section 5 of the Technical Manual and all applicable state standards, including but not limited to Maine DEP Ch. 500.

3.2.6. Other Measures.

Bonus points are offered for strategies that may go above and beyond typical approaches; may offer particularly innovative site design or engineering; or may help achieve the larger goal of low-impact development on a regional scale.

City of Portland ME . Low-Impact Design Requirements

Owner / applicant name:				
Representative name:				
Projct address:				
Project CBL:				
Application ID (if known):				
	Maximum Points	**How to Apply**	**Points Awarded**	**LID Standard / Approach**
CORE METHODS: Wetlands, Streams, & Drainage				
Protect natural drainage paths	Required			
Shoreland Zoning	Required			
Meeting DEP and ACOE standards for stream crossings	Required			
Protect wetlands	**12**	Select one option		Select a site that does not have wetlands or vernal pools = 12pts
				Project maintains a 50' set-back / no-disturb buffer to all wetlands = 10pts
				Project maintains a 25' set-back / no-disturb buffer to all wetlands = 7pts
				Project does not place structures in wetlands and avoids wetlands impacts from construction and stormwater discharges = 5pts
				Project replicates impacted wetlands elsewhere on site or within watershed = 3pt
				Project pays wetlands impact fee = 0pts
Permanently protect stream (intermittent and perennial) and riparian buffers *(exclusive of approved stream crossings; must include a no-disturb zone with markers installed and deed restriction recorded at registry of deeds)*	**12**	Select one option		Select a site with no streams = 12pts
				Permanently protect all 100ft shoreline buffers = 10pts
				Permanently protect all 75ft shoreline buffers = 7pts
				Permanently protect all 50ft shoreline buffers = 5pt
Stream crossings	**12**	Select one option		Select a site with no streams = 12pts
				Avoid any stream crossings = 10pts
				All stream crossings use a bridge or arch span = 10pts
				All stream crossings use Maine Stream Smart Principles to preserve natural pre-development drainage pathways = 6pts
CORE METHODS: Natural Areas & Habitat				
Preserve threatened or endangered species habitat	Required (Beginning with Habitat Maps at a minimum)			
Protect 30% of trees over 10" DBH	Required (Tree survey required)			
Protect intact, contiguous forests and native trees over 10" DBH	**8**	Select one option		All development and land disturbance outside of existing wooded/forested areas (no site clearing in prior 10 years) = 8pts
				Protect 50% of trees over 10" DBH = 6pts
				Protect 40% of trees over 10" DBH = 4pt
CORE METHODS: Soils & Slopes				
USDA Web Soil Survey	Required (provide details how soil limitations will be mitigated)			
Avoid steep slope disturbance	**5**	Select one option		Selecting a site without slopes 15% or greater = 5pts
				Maintain >20' undisturbed vegetated buffer to all slopes 15% or greater = 3pts
				Maintain 10-20' undisturbed vegetated buffer to all slopes 15% or greater = 2pts
				Maintain 1-10' undisturbed vegetated buffer to all slopes 15% or greater = 1pt
				Disturbance of any slope 15% or greater = 0pts
Protect soils	**5**	Select one option		Redevelopment sites = 5pts
				Detailed, site-specific soil survey; preparation of a Soil Management and Protection Plan; protect highly permeable soils = 5pts
Limit site disturbance and earthwork	**8**	Select one option		Redevelopment limits disturbance to existing footprint = 8pts
				New development disturbs less than 50% of the site = 8pts
				New development disturbs less than 75% of the site = 6pts

Soil preparation & minimizing compaction	6	Select all options that apply		Till soils to a depth of at least 10" prior to revegetation = 3pts
				Organic matter amendments as needed based on soil tests = 3pts
CORE METHODS: Landscaping				
Low-Impact Landscaping	6	Select all options that apply		Redevelopment sites reduce lawn area by 50%, provided no increase in impervious area (lawn becomes landscaping) = 2pt
				New development results in >50% non-impervious developed area is landscaping = 2pt
				Use only native vegetation for landscaped areas = 2pts
				Using only locally-sourced landscape materials = 2pt
CORE METHODS: Impervious Area & SW Management				
Meeting City's stormwater management standards	Required			
Reduce impervious and increase permeable surfaces	10	Select all options that apply, up to a maximum of 10 points		50% or more of proposed hard surfaces are permeable (porous pavers, permeable concrete, porous asphalt) = 6pts
				Minimize parking impervious area by using only the minimum required number of parking spaces, the minimum required parking lot dimensions, maximizing compact spaces and utilizing low-turnover standard parking space width reductions = 4pt
				25% or more of proposed hard surfaces are permeable (porous pavers, permeable concrete, porous asphalt) = 3pts
				Minimize roadway impervious area by developing roadways and driveways at the minimum width and using minimum number of curb cuts = 2pt
				Reducing the number of driveways by using a shared driveway design = 2pt
				Providing transportation alternatives (such as bike share, car share, or similar) = 2pt
Use GI / natural stormwater treatment systems	12	Select all options that apply		Treatment requirements and conveyance achieved through vegetated systems = 6pts
				No more than 1-acre of drainage per treatment system = 3pts
				Increase time of concentration on site (**need to ID the storm**) = 3pts
Limit / eliminate salt use	4	Select one option		Detailed winter maintenance agreement, with annual reporting requirement, limiting chloride use (required in UIS watersheds) = 4pts
Bonus Points				
Bonus points are offered for strategies that may go above and beyond typical approaches; may offer particularly innovative site design or engineering ; or may help achieve the larger goal of low-impact development on a regional scale.	10			Utilizing structured parking = 10pts
	10			Utilizing a green roof (need a size minimum - follow India St. guidelines) = 10pts
	10			Restoration of previously-disturbed natural resources (minimum criteria needed) = 10pts
	10			BMPs designed for known water quality impairment within watershed = 10pts
	10			Connecting to City sewer from a site >200 ft from existing City infrastructure = 10pts
	6			Detention of 1.5 times the required volume = 6pts
	6			Treatment for 1.5 times the required water quality volume = 6pts
	6			Innovative LID site design and/or stormwater improvement - 6pts
	10			Establishing a Traffic Demand Management plan for projects under 50,000ft = 10pts
	Total Possible Points		**Total Points Awarded**	**Minimum points required for approval of LID strategies and techniques**
	178		**0**	**80**

4. LANDSCAPING STANDARDS

~~4.1. PURPOSE~~

~~The Landscaping Standards Section provides guidance on how new development should ensure that site landscaping establishes attractive, low maintenance outdoor spaces that incorporate site definition and screening to achieve one or more of the following outcomes; promote a healthy and biodiverse urban ecosystem, further City goals around climate resiliency and mitigation, create or enhance areas of native habitat, improve stormwater treatment, and/or increase local food production.~~

4.~~2~~1. GENERAL LANDSCAPING STANDARDS

~~4.2.1. **Applicability.** The following types of development are subject to the standards of §4.2. of the Technical Manual:~~

~~**A.** Minor and Major Site Plans;~~
~~**B.** Minor Residential; and~~
~~**C.** Subdivisions.~~

4.~~2~~1.~~2~~1. Plant m~~M~~aterial~~ity~~.

A. Plants.

1. Selection.
   a. All trees and shrubs shall comply with the standards set forth by the American Standard for Nursery Stock (ANSI Z60.1 - 2004). These standards are available through the Department of Public Works.
   b. All trees and shrubs shall be nursery grown, healthy, free of disease, and insect pests, and shall have a well-developed and compact root system. Plant material showing signs of a lack of proper nursery care or a lack of pruning or cultivation, or which is not true to name will be classified as collected stock regardless of its source and shall be rejected.
   c. Proposed trees and shrubs installed as part of the landscape plan shall be comprised of at least 50% native species.
   d. The developer shall be responsible for preventing the spread of existing or the introduction of new invasive species on the site, as identified below. If, within one (1) year following construction, invasive species are identified on the site or if such species are pre-existing on the site but are determined to have spread by the City Arborist, the applicant shall be required to implement appropriate control measures prior to the release of the defect guarantee. Accepted mechanical and chemical control methods are provided by the Maine Natural Areas Program (MNAP) of the Maine Department of Conservation in their Invasive Plant Fact Sheets (available through the Department of Public Services and through the MNAP

program website: http://www.maine.gov/doc/nrimc/mnap/features/invasives.htm. The following plant species are recognized as invasive species that are characteristically adaptable, aggressive, and have a high reproductive capacity:

i. Asiatic Bittersweet (*Celastrus orbiculata*);
ii. Autumn and Russian Olive (Elaeagnus umbellata & angustifolia);
iii. Black Swallowwort (Cynanchum louiseae);
iv. Brazilian Waterweed (Egeria densa);
v. Common and Glossy Buckthorn (Rhamnus cathartica and Frangula alnus);
vi. Common Reed (Phragmites australis);
vii. Eurasian Milfoil (Myriophyllum spicatum);
viii. Fanwort (Cabomba caroliniana);
ix. Garlic Mustard (Alliaria petiolata);
x. Hydrilla (Hydrilla verticillata);
xi. Japanese Barberry (Berberis thunbergii);
xii. Japanese Honeysuckle (Lonicera japonica);
xiii. Japanese Knotweed (Fallopia japonica);
xiv. Japanese Stilt Grass (Microstegium vimineum);
xv. Lesser Celandine (Ranunculus ficaria);
xvi. Mile-a-Minute Weed (Polygonum perfoliatum);
xvii. Morrow and Tartarian Honeysuckle (Lonicera morrowii & tartarica);
xviii. Multiflora/Rambler Rose (Rosa multiflora);
xix. Porcelainberry (Ampelopsis);
xx. Milfoil (Myriophyllum heterophyllum);
xxi. Water Chestnut (Trapa natans);
xxii. Norway Maple (Acer platanoides); and
xxiii. Yellow-flag Iris (Iris pseudacorus).

e. Trees selected from the Recommended Tree List (Figure IV-1) shall conform, at a minimum, to the sizes specified on the list.
f. All upright deciduous and evergreen shrubs shall be a minimum of 3 feet tall at mature height. All spreading evergreen and deciduous shrubs shall be a minimum of 2-2.5 feet in width at maturity.
g. Ground covers planted in lieu of grass shall be planted at a level of coverage equivalent to one complete growing season. Grass areas shall be planted with Kentucky Bluegrass (*Poa pratensis*), Red Fescue (*Festuca rubra*), Tall Fescue (*Festuca arundinacea*) or Perennial Ryegrass (*Lolium perenne L.*). Rolled turf, erosion reducing net or suitable vegetation along with landscaping shall be used in swales or other areas subject to erosion.
h. Mulching material shall be a minimum of three (3) inch deep wood chip or bark mulch. Inorganic mulches are not permitted.
i. No plantings used to satisfy City landscaping requirements shall be comprised of inorganic materials.

4.13.32. Street t-Trees.

A. Selection, arrangement and spacing of trees proposed in the City right of way and/or private roadway, and/or within 20 feet of the edge of the public or private right-of-way and visible to members of the public, shall be coordinated with the Portland City Arborist or their designee. Tree species shall be selected according to the City of Portland recommended tree list (Figure IV-1).

B. Trees proposed in the sidewalk shall be planted in tree wells, as shown in Figures IV-4a, 4b, and 4c and as required by the City Arborist based upon site context and prospects for tree survival.

C. Adequate soil volume, as determined by the City Arborist, shall be required to ensure tree survival. ~~shall also be required, as determined by the City Arborist.~~

~~**D.** Table 3.3.3.A. identifies the required number of street trees by development type and Table 3.3.3.B. lists eligible reductions and alternatives to the required number of street trees.~~

~~**TABLE 4.3.3.A. STREET TREE REDUCTIONS AND ALTERNATIVES**~~

~~Reduction or Alternative~~	~~Description of Reduction or Alternative~~
~~Retention of Existing Healthy Street Tree not identified by the City of Portland or State of Maine as an Invasive Species~~	~~The following reductions can be made based on the caliper in inches at Diameter Breast Height (DBH) of the proposed tree:~~ ~~Over 12 inches DBH: Reduction of 3 trees~~ ~~>8-12 inches DBH: Reduction of 2 trees~~ ~~6-8 inches DBH: Reduction of 1 tree~~
~~Retention of On-Site Existing Healthy Trees within 20 feet of the property line and visible from the public right-of-way~~	
~~Installation of other planted features in the public right-of-way or within 10 feet of the public right-of-way~~	~~Planted features must be visible from the public right-of-way and be documented to the satisfaction of the City Arborist and Planning Authority to meet the objectives of the street tree requirement.~~
~~Off-Site Planting Within Same Neighborhood or Area of City with Minimal Tree Coverage~~	~~Locations may include esplanades, sidewalks and existing empty street tree wells or planting strips, and also places such as parks, playgrounds, and other areas where public benefit would be derived from the addition of new trees. Evidence that the planting site was unlikely to be redeveloped in the near future and that the trees would be protected and maintained are required.~~
~~Waiver: Contribution to the Tree Fund~~	~~When it is demonstrated that meet the street tree requirements as stated or through the reductions listed above in Table 4.6.2., contributions to the City of Portland Tree Fund shall be made as stated below:~~ ~~Contribution for new street tree: $400~~ ~~Contribution for tree to replace feature mature tree: $100/inch diameter of the feature mature tree ($400 shall be subtracted from total if the Applicant plants a replacement tree for the feature mature tree)~~

4.1.3. Street tree alternatives

A. Retention of existing trees.

1. Where an applicant is able to retain existing healthy and non-invasive trees within the public right-of-way, or within 20 feet of the edge of the right-of-way, such trees shall count towards a project's street tree requirement as described below, based upon the tree's diameter at breast height (DBH).

Over 12 inches DBH	**3 Street Trees**
8 – 12 inches DBH	**2 Street Trees**
6 - 8 inches DBH	**1 Street Tree**

4.1.4. Contribution to the tree fund.

Where the planting of required street trees is demonstrated to be infeasible, the applicant shall contribute to the City of Portland Tree Fund at a ratio of $1,000 per required street tree.

4.31.45. On-site landscaping, screening and buffers.

A. Required on-site trees & plantings.

1. ~~In all zoning districts with minimum required front setbacks, one new shade tree is required every 30 linear feet of street frontage as measured along the property line. Alternatives to meeting this requirement are included below in Table 4.3.~~4.
2. Required on-site plantings may be installed anywhere on the site (including a green roof) and may be planted in any arrangement.
3. ~~2.~~The retention of existing and healthy shade trees or plantings, not identified by the City of Portland or State of Maine as an invasive species, shall be permitted to count toward this requirement.

4.13.56. Buffers & sScreening.

A. Parking Lot Screening along Public Right-of-Way. Where all or a portion of a surface parking area is located within 30 feet of a public right-of-way, and is not separated from the public right-of-way by a structure, the parking area shall include a buffer area five feet in width and utilize one of the following screening methods within five feet of the street line:

1. A masonry wall (excluding concrete masonry unit blocks) 30-36" in height with one planting per 10 feet of street frontage; or
2. A decorative wrought-iron-style fence 30-42" in height, with masonry piers that can extend to 48" in height but do not exceed 18" in width, and do not occupy more than 20% of the length of the fence with one planting per 10 feet of street frontage, or
3. A continuous line of shrubs that achieves 80% opaque screening 30-48" in height during summer months.

B. Walls & fences.

1. Fences and walls visible from the public right-of-way must be of high architectural quality.
2. Chain link and wire mesh fences shall not be directly visible from the public right-of-way and shall be vinyl coated and dark in color. Chain link fences shall meet the following design standards:
   a. **Residential Development:** Be a minimum of 6-gauge fence fabric for
   b. **Commercial/Industrial Development:** Be a minimum of 9-gauge fence fabric and mounted on schedule 40 pipe posts

3. Masonry walls shall be constructed of stone, brick or other durable and attractive materials. Concrete block walls are not permitted except where variety in color, design and detailing of the materials are of high architectural quality.
4. Electrified or barbed fencing is not permitted.

~~**CB. Side and Rear Lot Line Buffers & Screening.**~~

~~**Applicability.** Landscaped buffering and screening shall be provided in accordance with Table 4.4.5. along each side or rear lot line where any of the following conditions occur:~~

2. Buffer standards.
   a. **General.** Where required, buffer areas shall be comprised of existing trees and vegetation, new landscaping or a combination thereof to create a dense, mixed buffer incorporating both understory and tree canopy layers. ~~While primarily of benefit from a ground level pedestrian viewpoint, S~~such screening should also effectively provide screening when viewed from upper floors of surrounding properties, where applicable. ~~Breaks in required buffers are permitted to maintain or create sufficient access for existing and/or proposed bicycle, pedestrian, and/or shared use facilities.~~
   b. **Vegetative b~~B~~uffers.** New shrubs shall be spaced six (6) to eight (8) feet apart. Buffers between contrasting land uses may incorporate earthen berms not exceeding 4:1 slope, opaque fencing of high architectural quality, masonry wall or a combination thereof, in addition to landscape plantings. Where fencing or masonry wall is proposed as part of a buffer, less landscaping density is acceptable; however, buffers shall still include trees, shrubs and other vegetation.
   c. **Parking areas.** Landscaping shall be incorporated into the development of surface parking to reduce adverse environmental and aesthetic impacts, to shade pavement to reduce heat island effect and to screen parking areas from public view. Plant materials shall be selected for appearance, durability, and tolerance to salt. Figures IV-6a and IV-6b provide examples of parking lot screening.

      Landscaping that abuts areas of vehicular use shall be adequately protected and separated from vehicles. Protection should take the form of physical or visual separation, such as curb stops, bollards, or continuous curbing. Protection shall be designed with adequate visibility and durability in order to withstand normal snow plowing operations.

Landscaped islands shall be curbed and a minimum of eight (8) feet in width, not including curbing. The incorporation of bioretention into landscaped islands is strongly encouraged.

d. **Snow storage.** Snow storage areas may be located in landscaped areas provided that appropriate landscape materials are selected which can withstand such snow storage. Snow storage shall not be located in a stormwater treatment measure, shoreland zoning setback buffers, or where it would adversely impact the functionality of bioretention or other stormwater management measures.

3. Installation and m~~M~~aintenance of p~~P~~lantings.

~~a. Landscaping, earth moving and grading activities shall be performed according to standards accepted good planting and grading procedures and in accordance with the approved Site Plan, Subdivision Plat, Grading Plan and Landscape Plan.~~

~~b.~~a. No plant shall be moved after the bud break unless so authorized by the City Arborist or their designee. Planting periods are between April 1st and ~~to~~ July 1st and/or September 1st and November 1st.

~~c.~~b. Tree planting and other landscaping for subdivisions that cannot be installed prior to the release of the performance guarantee must be insured by a defect bond as described in ~~Section~~ Article 1~~3~~5 of the City Land Use Code.

~~d.~~c. All bare soil areas shall be vegetated and/or mulched prior to the issuance of a Certificate of Occupancy.

d. New vegetation that shows signs of construction damage within a one-year period following construction, including but not limited to bark damage or excessive root damage, grade changes other than those originally indicated in the approved grading plan, soil compaction due to heavy equipment traversing closely, or general decline due to mechanical or natural conditions shall be rejected and must be replaced prior to the release of any defect guarantee.

e. Slopes with between a 5% and 50% grade change shall incorporate installation of a mixture of vegetation, organic mulch and/or erosion control seed mix.

Stabilization of slopes greater than 50% must incorporate biotechnical and/or structural methods including but not limited to terracing rip rap or retaining walls in addition to vegetation. Retaining walls, if four (4) feet in height or greater from the bottom of the footing to the top of the wall and/or if supporting a surcharge, must be designed by a licensed engineer and require a City of Portland Building Permit.

5. STORMWATER MANAGEMENT

~~5.1. INTENTION~~

~~The City of Portland has adopted local Stormwater Management Standards to address the effects of urban development on both the quantity and quality of stormwater runoff in order to protect and improve water quality, meet Clean Water Act requirements, and to increase the City's long term climate resilience.~~

~~The City's local stormwater management standards rely on definitions and technical design standards listed in the Maine Department of Environmental Protection (Maine DEP) Chapter 500 Stormwater Management rules (herein referred to as "Chapter 500"). The City's local standard aims to address a higher percentage of development and redevelopment projects in Portland and ensure that stormwater management is provided for a higher percentage of redeveloped land in Portland over time.~~

~~The Technical Manual standards support the review criteria contained in Portland's site plan and subdivision ordinances and with the stormwater management requirements within Chapter 32. Please see Chapter 32 of the City Code of Ordinances for regulations governing stormwater systems, illicit discharges and Post Construction Stormwater Management Plans in Portland.~~

5.~~2~~1. APPLICABILITY

5.~~1~~2.1. Projects requiring municipal review only.

All applicable City of Portland stormwater management standards apply as specified below.

5.~~1~~2.2. Projects requiring state permits and municipal review.

Projects that require a Stormwater Permit pursuant to 38 M.R.S.A. Sec. 420-D (Stormwater Management Law) ~~and projects that may substantially affect the environment and require~~ or a site location of development (Site Law) permit pursuant to 38 M.R.S. A Sec 481-490 shall be reviewed for conformance with Chapter 500 under the City's Delegated Review Authority or by the Maine Department of Environmental Protection. All applicable local City of Portland Standards also apply as specified below. In the case of any overlap or ambiguity between local and state standards, the most stringent requirements shall apply.

5.~~1~~2.3. City of Portland stormwater management thresholds.

The following development, redevelopment and subdivision proposals shall submit a Stormwater Management Plan pursuant to the standards and requirements listed below:

A. ~~Minor site plans~~Projects that result in the creation of greater than 1,000 square feet of new impervious area.
B. ~~Minor site plans~~Projects that result in greater than 10,000 square feet of disturbed area.
~~C. Major site plans.~~
~~D.~~C. Projects that include greater than 5,000 square feet of non-roof redeveloped impervious area.
D. Other projects where the City of Portland determines that special conditions warrant a stormwater management plan.
E. ~~Projects that require a Stormwater Permit pursuant to 38 M.R.S.A. Sec. 420-D (Stormwater Management Law), a development that may substantially affect the environment and requires a site location of development (Site Law)~~

~~permit pursuant to 38 M.R.S.A. Sec 481-490; and certain projects that may be eligible for license by rule for the infiltration of stormwater pursuant to 38 M.R.S.A. Sec 413.~~

~~Exemption:~~

~~1. Minor residential, as defined in the Technical Manual - Section 16.~~

Exemptions, Special Conditions and Additional Notes:

A. Small Scale Residential Projects, defined as the development of a residential building with 4 units or less, are exempt from requirements Sec. 5.2.2, Sec. 5.2.3, and Sec.5.2.4 as listed below and shall provide management in accordance with requirements stipulated in Section 5.2.5 "Small Scale Residential Project Requirements".
B. Projects that don't otherwise exceed the thresholds listed above but propose to generate over 500 gallons of additional daily sewer flow and require a new stormwater connection into the City's combined sewer system shall provide management in accordance with requirements listed in Section 5.2.4 "Minimum Detention Volume Requirements".
C. The flooding standard analysis (5.2.~~3~~3) for subdivision projects which are required to construct a new public street shall factor into the analysis developed and impervious area for each proposed lot. This is to ensure the full project build out does not result in down-stream flooding at the conclusion of the project. Impervious area for each residential lot shall be determined by the maximum lot coverage as permitted by the City's zoning regulations.
D. The City's Stormwater Management Standard utilizes Chapter 500 definitions.

5.~~3~~2. STORMWATER MANAGEMENT REQUIREMENTS

5.~~3~~2.1. Erosion and sedimentation control

A. Refer to requirements set forth in Section 12 of the Technical Manual and Chapter 32 of the City's Code of Ordinances.

5.~~3~~2.2. Water quality treatment requirements

A. Stormwater quality treatment shall be provided for
   1. Projects which do not require a State Stormwater Permit:
      a. 95% of new impervious area
      b. 80% of new developed area
      c. ~~50~~95% of non-roof redeveloped impervious area

   2. Projects which do require a State Stormwater or SLOD Permit:
      a. 95% of new impervious area
      b. 80% of new developed area
      c. ~~50~~95% of non-roof redeveloped impervious area
      d. Total redeveloped area as required by Chapter 500

B. Additional notes.
   1. Stormwater treatment systems must be designed in accordance with Chapter 500 rules and the Maine DEP Stormwater BMP Manual.

2. Water quality treatment is not required for existing impervious areas which are developed into building roofs unless otherwise required by a state stormwater permit.
3. The total amount of non-roof redeveloped and new impervious area must exceed 1,000 SF before treatment is required.
4. Redeveloped public street right of way area is exempt from the treatment, flooding and minimum detention volume requirements.
5. Treatment requirements for the linear portions of projects, as defined in Chapter 500, may be reduced as allowed by Chapter 500.

5.~~23~~.3. Flooding standard requirements

A. Comply with the Chapter 500 Flooding Standard.

5.~~23~~.4. Minimum stormwater detention volume requirement

A. Applicable projects proposing to make a stormwater connection into the City's separated storm drain system shall:
1. Provide a minimum on-site stormwater detention volume equal to 1" of rainfall times the TOTAL impervious area within the project's disturbance limits.
2. Control stormwater discharge rates into the City's separated storm drain system to a maximum flow rate of 0.1 CFS until the on-site detention system reaches its design capacity.

B. Applicable projects proposing to make a stormwater connection into the City's combined sewer system shall:
1. Provide a minimum on-site stormwater detention volume equal to the greater of:
a. 1" of rainfall times the TOTAL impervious area within the project's disturbance limits;
b. The project's proposed increase in average daily sewer flow being added to the combined sewer system.
2. Control stormwater discharge rates into the City's combined sewer system to a maximum flow rate of 0.1 CFS until the on-site detention system reaches its design capacity

C. Additional notes.
1. With adequate calculation documentation stormwater storage provided for water quality treatment systems may be used to meet the overall detention volume requirements.
2. The City's separated storm drain system shall include all municipal underground and overland conveyance systems including pipes, ditches, swales and street gutters.

5.~~23~~.~~4~~5. Urban impaired stream requirements

A. **Applicable projects located within Urban Impaired Stream Watersheds.**

Comply with the Urban Impaired Stream Standard pursuant to Maine DEP Chapter 500 Stormwater Management Rules if they are located within the following watersheds:

1. Capisic Brook,
2. Fall Brook,
3. Nasons Brook,
4. Dole Brook
~~4.~~5. As listed in the most recent version of the Maine DEP Chapter 502 Rules.

~~B. Developments which will result in the creation of up to 1,000 square feet of new impervious area or up to 10,000 square feet of new non-impervious developed area, as defined under Definitions in the Maine DEP Chapter 500, are considered de minimis and are exempt from the Urban Impaired Stream Standard.~~

~~C.~~B. The City of Portland has an approved Compensation Fee Utilization Plan (CFUP) and can therefore receive in-lieu-fee payments to meet the UIS Standard

~~D.~~C. Development within the Long Creek watershed shall be subject to the requirements set forth by the Long Creek Watershed Management District.

5.23.5. Small-scale residential project requirements

A. Small scale residential projects are required to provide stormwater management systems to manage at least 75% of new impervious area generated by the project.

B. Small scale residential systems shall generally be designed and implemented in accordance with residential stormwater BMP design criteria located in the City of Portland's Stormwater credit manual.

C. Residential stormwater credits will be available for these properties as specified in the stormwater credit manual. Stormwater credit requests shall be submitted to the Department of Public Works. Small scale residential applicants are encouraged to apply for credits during the site plan review process.

D. Stormwater maintenance agreements **are not required** for small scale residential projects. Any projects which receive residential stormwater credits from the Department of Public Works will be required to provide a self-verification stormwater maintenance form to DPW annually in order to keep credits active.

E. Information pertaining to the City's stormwater credit program can be found here: https://www.portlandmaine.gov/1101/Stormwater-Credits

5.23.6 Other chapter 500 requirements

A. All projects triggering stormwater management plans, except small scale residential projects, must also meet the following Chapter 500 Standards:
   1. Easement and Deed Restriction Standards
   2. Redistribution of Stormwater Discharges Standards
   3. Discharge to Wetlands Standards
   4. Discharges to Public Storm Sewer Standards.

~~5.4. SUBMISSION REQUIREMENTS~~

~~Applicants are required to submit a stormwater management and drainage plan as part of development review application and to provide the following submission items to demonstrate compliance with the applicable stormwater management standards:~~

~~5.4.1. Urban impaired stream standard requirements.~~

Calculations for the Compensation Fee or Mitigation Credit per the tables provided in Chapter 500 Rules and other associated Maine DEP regulations. (Note: The City of Portland has an approved Compensation Fee Utilization Plan (CFUP) and can therefore receive in-lieu fee payments to meet the UIS Standard.)

5.4.2. Water quality treatment requirements.

Written narrative demonstrating compliance, site plans showing grading and drainage infrastructure, site plan showing water quality treatment area(s) with table showing compliance, BMP sizing calculations, construction details, and a Post-Construction Stormwater Inspection & Maintenance Plan per Maine DEP Chapter 500 Appendix B with reporting requirements per Chapter 32 of City of Portland Code of Ordinances, and a Stormwater Maintenance Agreement. The submission documents should include confirmation of design from the manufacturer for any proprietary systems.

5.4.3. Flooding standard requirements.

Sub-catchment plans with flow paths, full hydrology computations/model output of pre- and post-development conditions, summary of pre- and post-development flowrates, and a written request for waiver with rationale for waiver as noted in Chapter 500 (as applicable). The submission documents should include confirmation of design from the manufacturer for any proprietary systems.

5.4.4. Minimum stormwater detention volume requirements.

Applicable drainage calculations, modeling information, plans and details as required to prove that the detention volume and maximum stormwater outflow control requirements are being met. The submission documents should include confirmation of design from the manufacturer for any proprietary systems. Stormwater detention systems shall be included in the project's overall post-construction stormwater inspection & maintenance plan and stormwater maintenance agreement.

5.4.5. Small-scale residential project requirements.

Provide plans and details as stipulated in section 16 of the Technical Manual. The provided site plan must depict the location and sizing of the proposed residential stormwater management system. Details of the proposed systems must also be provided. A short narrative, with supporting calculation documentation, shall be provided to demonstrate that the project is complying with standard 5 III F.

6. SANITARY SEWER AND STORM DRAIN DESIGN STANDARDS

6.1. TECHNICAL REFERENCE

6.1.1. The following technical publications are recognized by the City of Portland for use in the design, construction and testing of sanitary and stormwater systems:

A. *Technical Report #16 (TR-16): Guides for the Design of Wastewater Treatment Works*, Prepared by the New England Interstate Water Pollution Control Commission available for review at the Department of Public Works or online at www.neiwpcc.org/tr16guides.asp; and
B. *Maine Department of Transportation (MDOT) Standard Specifications for Highways and Bridges*, Current Edition.

6.2. SANITARY STANDARDS AND SPECIFICATIONS

6.2.1. Sewer and storm drain systems shall be planned and constructed in accordance with the regulations contained in Chapter 24 of the City Code of Ordinances.

6.2.2. The information presented below are City of Portland exceptions to *TR-16* or additional required standards:

A. The introduction of non-contaminated water such as rain water, non-contact cooling water, groundwater from foundation drains, sump pumps, surface drains, or any other sources of inflow shall not be allowed to discharge into a sewer which conveys sanitary waste unless approved by the Department of Public Works Water Resources Manager or their designee;
B. Appeals will be considered by the Director of Public Works. Refer to §24-44 of the City Code (Public sewer connection limitations);
C. It is not permissible to backfill any excavation with frozen materials, organic materials, clay or blasted ledge. The maximum size of backfill material shall not exceed six inches (6"). Please refer to Division 2 (Street Opening Permits) in the City Code;
D. The Department of Public Works shall be responsible for televising all new sewer construction for acceptability as soon as backfilling has been completed and access is available. The permittee will be invoiced for these services. Information on current rates is available in Chapter 24 (Sewer Ordinance);
E. Permits to connect to the municipal stormwater and sanitary sewer system are required and may be obtained from the Department of Public Works; and
F. Covered or enclosed parking areas, mechanical rooms, garages (parking areas not exposed to rain and snow) shall direct surface drainage to a sanitary sewer. Storm water from outside of these areas shall be directed away from this covered area so that additional storm water is not directed to the sewer. Drainage from these areas shall be collected by an oil/grit separator, as shown in Figure II-20 or an approved equivalent.

6.3. SANITARY MANHOLES

6.3.1. All manholes shall be designed in conformance with City of Portland standards as illustrated in Figure II-02.

6.3.2. When constructing sanitary manhole channels, if the vertical difference between the invert elevation of the manhole channel and the invert elevation of the sewer pipe connecting to such manhole is two vertical feet (2') or greater, a standard City of Portland internal drop manhole shall be provided. Such drop manholes shall conform to the engineering specifications illustrated in Figure II-03. A minimum of two stainless steel pipe anchors shall be used and the manhole diameter shall be five feet (5') minimum.

6.3.3. Sanitary service laterals that are four inches (4") or 6 inches (6") shall not be connected into a sanitary manhole and only into a sanitary sewer main.

6.3.4. Sanitary manholes shall include frames and covers as shown in Figure II-05 or an approved equivalent. Both the frame and riser shall be machined to assure a proper fit.

6.3.5. Manhole covers shall be marked "SEWER".

6.3.6. Manhole frames shall be raised to grade using only brick and mortar as shown in Figure II-02 or approved equal.

6.3.7. Riser rings without tabs as shown in Figure II-06 may be used to adjust manholes to grade with approval of the Department of Public Works.

6.3.8. All new sanitary manholes shall be vacuum tested before backfilling. Refer to *TR-16* for testing standards.

6.3.9. Steps are not required in sewer manholes. Any structures delivered to the site with step "holes" shall be filled with mortar.

6.4. SANITARY GRAVITY PIPES

6.4.1. The types of allowable pipe used for purposes of sanitary sewers shall be:

A. PVC ring type sewer pipe (SDR 35 or equivalent, minimum PS-46 rating);
B. PVC ring type sewer pipe meeting ASTM F 789 or equal to SDR;
C. Ductile Iron Pipe (DIP);
D. High performance polypropylene dual wall sewer pipe (ADS SaniTite HP or equal) meeting ASTM F2736 and have a minimum pipe stiffness of 46 psi with pipes sizes twelve through thirty inches (12"-30"); or
E. High performance polypropylene dual wall sewer pipe (ADS SaniTite HP or equal) meeting ASTM F2764 and have a minimum pipe stiffness of 46 psi with pipes sizes thirty through sixty inches (30"-60").

6.4.2. Minimum velocities for sanitary pipes shall not be less than two feet per second (2 ft./sec.).

6.4.3. All PVC connections shall be made with Solid PVC couplings.

6.4.4. The classes of pipe indicated shall be minimum, however the actual class of pipe used shall be determined by soil weight and compaction loads applied to such pipe in accordance with standard engineering design criteria and subject to the approval of the Department of Public Works.

6.5. FORCE MAINS

6.5.1. Force mains four inches (4") or greater shall terminate at a transition manhole and flow by gravity within a minimum sized eight-inch ("8") pipe to a City manhole.

6.5.2. Force mains less than four inches (4") may terminate to the nearest precast concrete manhole as directed by the City.

6.5.3. Cores into existing manholes shall be made with coring machines and have link seal or equivalent wall penetration seals.

6.5.4. Termination of force mains three inches (3") or less may be permitted into existing City-owned manholes if reconstruction or replacement is performed, depending on the material and condition of the existing manhole as determined by the Department of Public Works.

6.5.5. All force mains shall be at a minimum HDPE SDR-21 made with fully restrained connections or equal. Piping pressure ratings shall be at least two (2) times the operating pressure of the system.

6.5.6. Force main discharge shall be directed into the channel in the direction of gravity flow.

6.6. BUILDING SEWER LATERALS

6.6.1. Construction of building sewers and drains shall conform to Chapter 24 (Sewers) of the City Code of Ordinance.

6.6.2. All building sewer laterals shall have a minimum diameter of four inches (4") and a minimum slope of one eighth-inch per foot (1/8 in./ft.) installed, as shown in Figure II-12.

6.6.3. Typical pipe installation. Where a building sewer lateral is to be installed from the sewer main in the street to a property or building to be served, the lateral shall either extend to the building or to the street line of each lot to be served and the pipe shall be capped air-tight.

6.6.4. An accurate record of each building sewer, its location and its depth at the street line shall be kept by the developer's engineer and a copy of the same shall be provided to the Department of Public Works.

6.6.5. For new construction, the location of the building sewer at the street line shall be physically marked by the placement of a two-inch by four-inch (2" x 4") wooden stake placed at the end of the lateral end-cap and extending one foot (1') above finished grade.

6.6.6. Each stake shall be painted with a fluorescent paint and marked as storm or sanitary sewer with the depth indicated from grade to end-cap. A one-quarter-inch (¼") thick by six-inch (6") square ferrous metal plate or equivalent shall be placed horizontally one foot (1') below grade over the end of the storm drain.

6.6.7. Building sewers and drains shall be connected to the main sanitary sewer line by the use of wyes, tee/wyes, Inserta-Tees or similar approved methods as determined by the Department of Public Works. A manhole shall be installed at the sewer main to connect building laterals when the building later is eight inches (8") or larger in diameter. The lateral connections shall be installed from the main toward the lot where possible. Inserta-Tees can be installed on pipes where the main receiving pipe is at least twelve inches (12") in size and the lateral is not more than half the size of the main receiving pipe in order to use a coring tee-type connection.

6.6.8. Before connecting new pipes into an existing sewer line, the contractor shall obtain a sewer connection permit from the Department of Public Works.

6.6.9. Accessory dwelling unit (ADU) sewer laterals. Per Chapter 24 of the City Code of Ordinance *"A separate and independent building sewer shall be provided for every new building, and a separate connection shall be made for each building sewer."* The Department of Public Works recognizes the following scenarios in Table 6.6.9. for the successful connection of the proposed ADU to the public sewer system (See Figure II-21 for additional information):

TABLE 6-A. PERMITTED SEWER CONNECTIONS FOR ACCESSORY DWELLING UNITS (ADU)

Type of ADU	Permitted Connection Strategy	Option in Figure II-21
Internal or Attached ADU	ADU can connect to the primary residence sewer lateral internal to the primary residence	Option A
Detached ADU	A separate and independent sewer lateral will be provided from both buildings with independent connections to the sewer	Option B
	A separate and independent sewer lateral is provided from both buildings with a connection into a sewer manhole at the property line. The sewer manhole will be a minimum two-foot size providing access to each sewer lateral. The sewer manhole may be placed on the existing sewer lateral from the primary residence with the ADU sewer lateral being fed into it.	Option C

6.6.10. Backflow protection. Fixtures installed on a floor level that is lower than the next upstream manhole cover of the public, or private sewer shall be protected from backflow of sewage by installing an approved type of backwater valve. Fixtures on such floor level that are not below the next upstream manhole cover shall not be required to be protected by a backwater valve. Fixtures on floor levels above such elevation shall not discharge through the backwater valve. Cleanouts from drains that pass through a backwater valve shall be clearly identified with a permanent label stating "backwater valve downstream".

6.6.11. All building floor drains shall discharge to the sanitary sewer system.

6.6.12. Plugging of abandoned sewer laterals. Prior to abandoning any storm water of sanitary sewer lateral, the applicant shall acquire a permit from the Department of Public Works. The applicant shall provide a 48-hour notice

the Public Works Dispatch stating the date and time the applicant wishes to complete the work. The Water Resources Division will mobilize to the site and allow one hour to assist the applicant to plug the lateral in the following manner:

A. The location of the lateral to be plugged shall be televised by the applicant and witnessed by Water Resources staff on site;
B. The applicant shall excavate or other means plug the lateral at the main where the lateral connects to the street sewer, as determined by City staff; and
C. The lateral must be filled with pumped grout starting at the plug and filling out to the points of excavation.

6.7. STORM WATER MANHOLES

6.7.1. Storm water manholes shall include frames and covers as shown in Figure II-05 or an approved equivalent. Bot the frame and riser shall be machined to assure a proper fit.

6.7.2. Manhole frames shall be raised to grade using only brick and mortar, as shown in Figure II-02.

6.7.3. Riser rings without tabs as shown in Figure II-06 may be used to adjust manholes to grade with approval of the Department of Public Works.

6.7.4. Manhole covers shall be marked "DRAIN".

6.7.5. Steps are not required in storm manholes. Any structures delivered to the site with step "holes" shall be filled with mortar.

6.8. STORM DRAINS

6.8.1. The types of allowable pipe and fittings shall be used for purposes of storm drains are included below:

A. All pipes listed for sanitary sewers;
B. Reinforced Concrete Pipe (RCP) with a minimum strength of Class III; or
C. Smooth Bore Height Performance Polypropylene Dual Wall Storm Drain Pipe (ADS HP Storm or equal) meeting a minimum PS-46.

6.8.2. Storm drain lateral may be connected into storm drain mains without the use of a manhole when the lateral is less than half the diameter of the receiving pipe.

6.8.3. Minimum velocities of surface water drains shall not be less than three feet per second (3 ft./sec.).

6.8.4. Ribbed corrugated polyethylene pipe material, smooth wall interior, is not permitted except for underdrain installation. Underdrain diameter shall be no larger than six inches (6").

6.8.5. The classes of pipe indicated shall be minimums, however the actual class of pipe used shall be determined by soil weight and compaction loads applied to such pipe in accordance with standard engineering design criteria and subject to the approval of the Department of Public Works.

6.8.6. Pre-fabricated tees are allowable on storm drains. A pre-fabricated tee connection shall be used and installed in accordance with manufacturer specifications.

6.8.7. Connection of catch basin/storm drain lateral leads to storm drain larger than an eighteen-inch (18") diameter may be performed with the use of a coring machine and suitable connection device. The connecting pipe shall not be more than half the size of the main receiving pipe in order to use a coring tee-type connection.

6.8.8. Underdrains shall be a six-inch (6") diameter perforated pipe SDR 35 PVC or corrugated ADPE with smooth interior wall (AASHTO M252 Type S). They shall have a minimum of two rows of perforations.

6.9. CATCH BASINS

6.9.1. All catch basins and catch basin inlets shall be designed and constructed in accordance with Figures II-07 through II-11.

6.9.2. Catch basin drain pipes of less than ten inches (10") in diameter are not permitted.

6.9.3. All catch basins shall have a four-foot (4') granite headstone of catch basin inlets conforming to City standards as shown in Figure II-11.

6.9.4. No radius catch basin stones shall be permitted.

6.9.5. All catch basins shall be constructed with a minimum sump of three feet (3').

6.9.6. Catch basins shall not be located in driveway openings.

6.9.7. No storm drains or storm drain laterals, with the exception of street underdrains, shall be connected into a catch basin structure.

6.9.8. Catch basin drains and catch basin inlet drain pipe slopes shall be such that minimum flow velocities shall not be less than three feet per second (3 ft./sec.).

6.9.9. Bee hive casting shall be used on drainage structures located at low points in grassed off-road locations.

6.9.10. Field inlets or Type-F catch basins may be used when outside of City street rights-of-way within lawn areas, with Department of Public Works approval. They must have a minimum of a twelve-inch (12") sump and can be plastic or concrete.

6.9.11. All catch basins are required to have a hood on the outlet pipe as shown in Figure II-09.

6.10. SUBSURFACE WASTEWATER DISPOSAL

6.10.1. To ensure that adequate provisions have been made for subsurface wastewater disposal, developers are required to locate, design, and install septic systems in accordance with the latest version of the *Maine Subsurface Wastewater Disposal Rules*, 144 CMR minimum 241, as described in Chapter 6, §6-18(A) of the City Code.

6.10.2. Developers are required to obtain a permit through the City of Portland Inspections Division prior to the installation of any subsurface wastewater disposal system identified on an approved site plan.

6.11. GREASE INTERCEPTORS

6.11.1. Grease control equipment is required for all food establishments based on the City of Portland's Fats, Oils, and Grease Program found in the Rules and Regulations for Use of the Sewer System.

6.11.2. Concrete grease interceptors must have two chambers. Chamber A, where influent enters, must be two-thirds (2/3) of the tank volume.

6.11.3. Concrete grease interceptors must have three (3) twenty-four-inch (24") access points.

6.11.4. Tanks must be designed for H-20 traffic wheel load and a concrete strength of 5,000 PSI at 28 days.

6.11.5. Joints must be sealed with butyl rubber joint sealant such as CS-102 Butyl Rubber Sealant.

6.11.6. Tees inside grease interceptors must be supported. Galvanized riser clamps on drop must be rodded to tank wall with galvanized fasteners six inches (6") below service weight tee. Tees must be accessible via an unobstructed view for cleaning through the top of the grease interceptor.

6.11.7. High density polyethylene grease interceptors are accepted as an equivalent to concrete grease interceptors. Polyethylene units shall be properly anchored to prevent floatation.

6.11.8. A control manhole must be installed downstream of the interceptor before it enters the city sewer system.

6.12. SANITARY STANDARDS AND SPECIFICATIONS

6.12.1. The provisions of Section 703 of the State of Maine Department of Transportation (MDOT) *Standard Specifications for Highways and* Bridges shall apply with the following additions and modifications:

A. **§703.13 Crushed Stone ¾" for Pipe Bedding and Underdrain.** "Crushed Stone" shall be defined as rock of uniform quality and shall consist of clean, angular fragments of quarried rock, free from soft disintegrated pieces or other objectionable matter. Crushed stone used as a bedding material for pipe and underdrain shall be uniformly graded and shall meet the gradations in Table 6.12.1. The stone shall be free from vegetable matter, lumps or balls of clay, and other inappropriate substances.
B. **§703.18 Common Borrow.** Common borrow shall not contain any particle of bituminous material.

C. §703.19 Granular Borrow. Granular borrow shall contain no particles which will not pass a three-inch (3") square mesh sieve.

D. §703.20 Gravel Borrow. Gravel borrow shall not contain particles of rock which will not pass a three-inch (3") square mesh sieve.

TABLE 6-B. AGGREGATE GRADING REQUIREMENTS

Sieve Designation	City of Portland Percentage by Weight Passing Square Mesh Sieve
1 inch	100
¾ inch	90-100
½ inch	20-55
⅜ inch	0-15
No. 4	0-5

7. WATER SUPPLY STANDARDS

~~7.1. APPLICABILITY~~

~~All applications for approval of proposed developments shall include evidence that demonstrates that the developer has made adequate provisions for securing and maintaining a sufficient and healthful water supply.~~

7.~~2~~1. STANDARDS

7.~~1~~2.1. Documentation.

A. If water is to be supplied from an off-site source, applicants must provide a letter from the appropriate utility or water district stating that a sufficient and healthful water supply exists and may be utilized by the development.

B. For on-site water supply wells, provide evidence in the form of well inventory and water quality data on existing water supplies located within one thousand (1,000) feet of any property boundary of the proposed development. The well inventory data must show a probability that proposed wells will produce a safe and adequate water supply. Positive findings by a Maine Certified Geologist must be supported by a report which summarizes and interprets hydrogeologic and groundwater data for the region, with emphasis on the project site. It should include information such as:

   1. The number of wells established in the vicinity of the proposed project;
   2. Identification and locations of these wells on a site map, such as a USGS topographic map;
   3. The type and depths of the wells;
   4. The types and depths of soil and bedrock encountered at the well sites; and
   5. Water quality data from these wells (if applicable).

7.1.2. Development on islands in Casco Bay shall be designed to prioritize protection of existing aquifers as identified in the *City of Portland Island Groundwater Management Study* and/or by the Maine Geological Survey.

Unless the development is to be entirely served by public water and secondary treatment sewer systems, the determination of compliance with this provision shall be based upon one or more comprehensive groundwater analyses and reports prepared by qualified professionals and including assessment of current groundwater aquifer conditions, the impact of the proposed development on the groundwater aquifer, and recommendations for mitigation of potential impacts caused by the development.

7.~~1~~2.3. A common water supply will be required if there is a reasonable doubt that sufficient water quality or quantity will be available from individual wells. A common water supply must have adequate safe yield and storage to a supply a minimum of seventy-five (75) gallons per day per person. For a single-family home, the well must be able to supply a minimum of three hundred (300) gallons per day, per household.

7.~~1~~2.4. The Maine Center for Disease Control (MeCDC), Division of Environmental Health's Drinking Water Program must review and approve of any public drinking water system (if such a system serves an average of at least twenty-five (25) individuals daily at least sixty (60) days out of the year, or has fifteen (15) service connections.

7.12.5. If the water supply wells and subsurface wastewater disposal systems are on-site and any proposed lots are less than 2 acres in area, locations of the wells and subsurface disposal systems must be identified on the site plan.

7.12.6. A water supply report must be submitted, if any well service five (5) or more homes, or any development uses greater than 1,500 gallons per day.

7.12.7. If there is a reasonable doubt that sufficient and healthful water supply can be provided by on-site wells, the following are required:

A. A potability test of water from the development site;
B. Establishment of one or more test wells on the development site;
C. Pump tests of the well(s);
D. A report by a Maine Certified Geologist discussing the yield and potability of water obtained; and
E. A complete hydrogeological assessment of groundwater quality and quantity may also be required.

7.21.8. For developments with shallow to bedrock soils, wells must be cased 20 feet into the solid bedrock surface and the annual space cement/bentonite grouted.

7.32. SUBMISSIONS

7.32.1. For developments to be serviced by individual wells, evidence must be submitted from a Certified Geologist knowledgeable about the project, indicating a sufficient and healthful water supply is likely to be available as follows:

A. Well inventory data indicating number of wells, depth, yield, and approximate locations shown on a USGS topographic map. This data may be available upon request from the inventory database at the Maine Geological Survey;
B. Water quality data from an area well or wells showing potability; and
C. If a common well or wells are to service any portion of a development, submit a detailed water supply report prepared by a Maine Certified Geologist. The report must indicate that the water supply conforms to Maine State Drinking Water Regulations, Title 22 M.R.S.A. Section 601 and it must contain the following information:
    1. Determination of the long-term safe yield of each well including a prediction of operating levels;
    2. Determination of the cone of influence (cone of depression) for the well or wells;
    3. Water quality analysis results in accordance with requirements of the Maine State Drinking Water Regulations, Title 22 M.R.S.A. Section 601;
    4. Delineation of well head protection zones A, B, and C;
    5. Well head protection plans for each zone;
    6. Determination of any off-site wells which may be at risk due to groundwater withdrawal;
    7. Storage, treatment and distribution system that is designed, signed, stamped, and dated by a Maine Registered Professional Engineer; and
    Evidence that adequate provisions will be made for the establishment of an entity to provide long-term maintenance and operation of the water supply system.

8. LIGHTING STANDARDS

8.1. SITE LIGHTING STANDARDS

~~**8.1.1. Purpose.** The requirements set forth in this section are intended to promote and protect public health, safety and general welfare, and encourage the preservation of the natural nighttime outdoor environment. Specifically, the intent of this section is to limit light trespass, glare and light pollution to safeguard adequate safety, night vision, and comfort of the neighboring properties.~~

8.1.~~1~~2. **Applicability.** The following types of development proposals are required to submit a lighting management plan for review and approval:

A. All developments subject to site lighting standards of §14.6.4 of the Land Use Code, and
B. Other projects where the Reviewing Authority determines that special conditions warrant a lighting management plan.

8.1.~~2~~1. **General standards.** Outdoor lighting standards listed below apply to all new developments:

A. **Uniformity.** As measured in foot candles at grade, maximum to minimum illumination levels shall not exceed a ratio of twenty to 1 (20:1).
B. **General Illumination levels.** Minimum, maximum, and average illumination levels for areas intended to be lighted as measured at grade, shall meet the standards in Table 8-A.

TABLE 8-A. ILLUMINATION STANDARDS IN FOOT CANDLES (FC)

Minimum	0.2
Maximum	5.0
Average	1.25

C. **Use-specific illumination levels.** Average illuminance levels for exterior areas specified below, measured in foot candles (fc) at ground level unless noted, shall not exceed the levels listed in Table 8-B:

TABLE 8-B. USE-SPECIFIC ILLUMINATION STANDARDS

Uses	Average (fc)	Uniformity ratio (Average-to- minimum)	Maximum (fc)
ATMs (within 10 ft. perimeter)	10.0	3:1	20.0
Drive-through canopy			
Auto service station			
• Approaches & Drives	1.5	3:1	3.0
• Service Areas	2.0		4.0
• Pump Island Areas	10.0		20.0
Parking Lot			
• Surface	0.5	3:1	4.0
• Structured	0.8		2.0

D. **General and Use-Specific Lumens Standards.** No fixture shall exceed 20,000 lumens (±3%) and shall meet the following lighting type maximums listed in Table 8-C:

TABLE 8-C. LIGHTING TYPE MAXIMUMS (IN LUMENS)

Types of Lighting	Maximum Lumens Allowed

Path lighting	1,500
Building entrance	3,500
Residential/Commercial pole at 20 feet	15,000
Industrial pole at 30 feet	20,000
Auto service station	
• Approaches and drives	4,000
• Service areas	6,000
• Pump island areas	8,000 per fuel pump

E. **Lighting trespass.** The maximum illumination level at a property line shall not exceed 0.1-foot candle, as measured at grade, except where abutting industrial, or other non-sensitive uses. When a commercial or industrial use abuts a public right-of-way, or another commercial or industrial use, lighting must be designed so that the illumination at the property boundary line does not exceed 1.0-foot candles.

All residential uses and natural resource protection areas are to be considered sensitive to light trespass. In certain instances where a proposed development is adjacent to a sensitive use, house-side shielding may be necessary to comply with this standard.

F. **Luminaire types.** All fixtures must be LED and shall not exceed 3,000K Correlated Color Temperature (CCT). Screw-in light fixtures must have LED lamps specified to be maximum of 3,000K CCT.

G. **Full cut-off fixtures and shielding required.** All outdoor lighting fixtures, including pole-mounted and wall-mounted luminaires, shall be constructed full "cut-off" or with full shielding, type where lenses, refractors or lamp sources do not extend below the surface of the fixture housing and no direct light shall be directed at or above the horizontal plane.

Where the light source from an outdoor light fixture is visible beyond the property line, shielding shall be required to reduce glare so that the light source is not visible from within any residential dwelling unit.

Light fixtures mounted under a canopy shall be recessed so that the lens cover is recessed into, or flush with, the underside (ceiling) of the canopy.

H. **Pedestrian walkway lighting.** Pedestrian walkway light fixtures can be a combination of freestanding pole. Bollard, in-place step or building-mounted fixtures. For building-mounted fixtures, the proposed fixture type will be in scale with the building elevation on which it is to be installed and meet the fixture height provisions of Table 8.D. Pedestrian lighting (bollards) shall meet the Technical Manual standards for full cut-off or an exception may be considered in §8.1.3.L and §8.1.3.M.

I. **Fixture height.** Fixtures shall be mounted at the lowest height necessary to meet City standards and the height is measured from grade to the bottom of the lighting fixture. Fixtures shall meet the fixture height standards of Table 8-D. below.

TABLE 8-D. MAXIMUM FIXTURE HEIGHT BY TYPE OF LIGHTING

Types of Lighting	Maximum Fixture Height
Residential (Pedestrian) uses	20 feet
Commercial/Office uses	
Large industrial uses (≥50,000 SF of gross floor area	30 feet
Building mounted/entrances	Below the roof eave or 20 feet, whichever is lower
Bollard fixtures	3.5 feet

J. **Lighting curfew.** For surface and structured parking, lighting in-vehicle parking areas containing twenty or more (≥20) parking spaces shall be reduced to 50% of permitted levels from one hour after the business closing to one hour before business opening. If lighting levels are already below 50% of permitted levels, no curfew adjustment is required. Motion sensor activated lighting shall be permitted during closed hours to activate additional lighting above the 50% permitted, for the purposes of public safety.

K. **Continued maintenance.** Lighting installations must be maintained in good repair to meet the provision of this ordinance on an on-going basis.

L. **General exceptions.** Proposed uses that demonstrate a need to exceed the specific site lighting limits shown below for safe and reasonable exercise of the proposed use must provide a professionally produced lighting plan which adheres to the current Illuminating Engineering Society of North America (IESNA) recommendations for the proposed use. The Planning Authority may grant exceptions to the lighting standards with the finding that the light impacts do not create a public nuisance for abutting residential property. Unless otherwise specified below, exterior lighting shall conform to the recommendations put forth in *Lighting for Exterior Environments RP-33-14,* or its successor, published by the IESNA. Lighting fixtures other than full cut-off fixtures may be allowed only if acceptable luminaires shall include internal and/or external glare control louvers and installed so as to minimize uplight and offsite light trespass.

M. **Historic District, Architectural and Pedestrian Walkway Exception.** Sites which are part of a historic district or require specific decorative lighting fixtures as means to achieve compatibility within an existing architectural context must meet the following standards:

1. Lighting fixtures other than full cut-off fixtures may be allowed only if acceptable luminaires shall include internal and/or external glare control louvers and installed so as to minimize uplight and offsite light trespass, and
2. Low-pressure sodium and metal halide lamps are prohibited.

8.1.3. Lighting safety standards.

A. The lighting of the site and if applicable, building(s), shall enable users to observe movement and activities on the site during the day and at night.

B. Lighting plans should create nighttime illumination of pedestrian travel paths and gathering areas, entrances and exits, and parking lots and garages by achieving the following:

1. Provide a clear view of an area from a distance and enable anyone moving in or immediately around it to be easily seen;
2. Place lighting fixtures to clearly guide users to and from the facility;
3. Prevent potential hiding spaces adjacent to existing and proposed pedestrian travel routes; and
4. Permit facial identification at a distance of at least thirty feet (30') and create the perception of being identified.

8.1.4. Uplighting and architectural and specialty lighting.

A. Lighting shall be designed to minimize lighting of night sky and shall accentuate individual architectural or aesthetic elements, not the entire structure.

B. Lighting shall be directed downward unless the development is located in an area of the City where uplighting is permitted as described in §14.6.4. of the Land Use Code. Where permitted, upward aimed lighting (uplighting) shall:

1. Not exceed 4,000 mean lumens per accent feature;
2. Be placed as close as possible to the base of the building or feature that is being illuminated;
3. Be fully shielded from view off-site, and
4. Use a narrow cone of light for the purpose of confining the light to the object.

C. **Building façade lighting.** The exterior of a building may be lighted provided the following standards are met:

1. The lighting is done to accentuate an architectural or aesthetic element of the building, not the entire building;
2. The light must only be directed onto the building façade and not spillover beyond the plane of the building;

3. Upward aimed lighting must not exceed 4,000 mean lumens per accent feature, must be fully shielded, and mounted as flush to the wall as possible;
4. Lighting exceeding 4,000 mean lumens per accent feature must be aimed downward, fully shielded, and mounted as flush to the wall as possible; and
5. Stripe lighting. Stripe lighting along building structures as articulation may be approved as specialty architectural lighting, provided that it does not create nuisance.

D. **Flag poles, statues, and similar monuments.** A flag pole bearing a state flag, a flag of the United States or a flag of a foreign nation may be illuminated provided the following standards are met:
1. The luminaires must be fully shielded;
2. Upward aiming luminaires must be placed as close to the base as possible, and
3. The luminaires must not collectively exceed 20,000 mean lumens. Public statutes, memorials or other similar monuments may also be lighted upon approval by the Planning Authority, provided the above standards are met.

~~**8.1.4. Submission requirements and photometric plans.**~~

~~A. The lighting plan shall be depicted on a site plan, indicating the location of each current and proposed outdoor lighting fixture with projected hours of use. This plan will need to be stamped and certified by a licensed professional, such as an architect or engineer. The lighting plan may include a key to the proposed lighting that provides the following information:~~
~~1. Type and number of luminaire equipment (fixtures), including the "cut off characteristics", indicating manufacturer and model number(s);~~
~~2. Lamp source type (bulb type, i.e., LED), lumen output, and wattage);~~
~~3. Mounting height with distance noted to the nearest property line for each luminaire;~~
~~4. Types of timing devices used to control the hours set for illumination, as well as the proposed hours when each fixture will be operated; and~~
~~5. Lighting manufacturer supplied specifications ("cut sheets") that include photographs of the fixtures, indicating the certified "cut off characteristics" of the fixture.~~

~~B. A photometric plan shall be provided at 20 scale or larger which shall show the extent of the areas designed and intended for lighting, and within those specific areas show a photometric grid of maximum 10' point spacing, and within those areas provide foot candle calculations of maximum, average, minimum, maximum to minimum ratio, and average to minimum ratio. On the same or additional plan, a photometric plot shall extend to all lot lines and as necessary to reach illumination levels of zero (0) foot candles. Additionally, the applicant shall provide descriptive information, including manufacturer's catalog excerpts, for all proposed light fixtures, lamps, and poles.~~

8.2. MUNICIPAL STREET LIGHTING STANDARDS

8.2.1. Applicability.

Street lighting on City streets and public rights-of-way not subject to decorative street lighting shall follow the General Standards under 8.2.2. of this section.

In addition to the General Standards for lighting applicable throughout the City, the City of Portland has established special street lighting standards for decorative lighting in the following areas and according to the table and figures in this section:

A. Downtown (including portions of Cumberland Avenue)
B. Old Port
C. Peninsula -Eastern Waterfront and Bayside
D. Waterfront – Commercial & Thames Streets
E. Off-Peninsula/Forest Avenue

F. Historic Landscape Districts (including Baxter Boulevard, the Eastern and Western Promenades, Lincoln Park, and Deering Oaks Park)
G. Trails and pathways (including Eastern Promenade Trail, Fore River Trail, and Bayside Trail)

Decorative street lighting specifications include, but are not limited to, fixture type, pole and base type, pole height to top of fixture, pole spacing, and color. Please refer to Section 8.2.4. (Standards for Decorative Lighting) and Figure X-4 for the map of Portland's decorative lighting locations.

Developments subject to site plan review, with the exception of minor residential projects, that are on an existing or proposed street that is not currently illuminated with street lighting meeting City standards shall install the requisite type and number of street lights along all frontages.

Where lighting is being installed in the public right-of-way as part of a private development, developers are responsible for purchasing and installing all street lighting, including light poles, brackets, slip fitters, bases, and all electrical wiring and conduit. The new street lighting shall be connected to an existing metered service, unless otherwise directed by the City. Once installed, operational, and accepted by the city, street lighting located in the City right-of-way shall become the property of the City of Portland.

8.2.2. General standards.

A. **Location.** For areas not designated with decorative lighting, street lighting may be placed on only one side of the street within the furnishing zone. However, when deemed necessary for traffic safety, the Reviewing Authority may require some street lights to be placed on the opposite side of a street.

B. **Specification.** For areas not designated with decorative lighting, the City of Portland has adopted the following typical street light pole and fixture standards in Table 8.E.

TABLE 8.E. STANDARD STREET LIGHT POLE AND FIXTURE STANDARDS BY STREET TYPE

Light Pole Standards	Arterial	Collector	Local/Minor
A. Height (ft.)	20 or 30		14-15
B. Maximum Spacing (ft.)	160	130	120
C. Mounting	Reinforced concrete pole base with 2"-4" reveal above grade, with 4 bolts per pole.*		
D. Selection and Finish	• ≤ ½ mile from shoreline: Beacon RSA-B-SHO-S AA-10 Cobra [Figure X-2F] • ≥ ½ mile from shoreline: Hubbell RTA Upsweep Style [Figure X-2G]		Black aluminum
E. Color	Grey (Manufacturer's Specification)		
E. Minimum Average Foot Candles (fc)	2.0	1.2	0.4
F. Cutoff and Bulb Temperature	Full cutoff, using cost-effective and innovative technologies and shall seek to match uniformity, lumen output, and color of existing streetlights along roadway, where applicable		Full cutoff, using LEDs at a 3,000 Kelvin color temperature, and shall seek to match uniformity, lumen output, and color of existing streetlights along roadway, where applicable

* Local/Minor Street light pole design, mounting bolt pattern, bolt spacing, and bolt size shall be approved by the Department of Public Works.

C. **Standard cobrahead design.** Standard cobraheads shall meet the following design standards in Table 8.F.
D. **New metered services for light fixtures.**

1. New light fixtures shall:
   a. Not be tied to the existing power utility leased lighting system;
   b. Be provided with a NEMA 7-pin receptacle for future connection to the City of Portland lighting control system, with coordination with the City of Portland for final connection and control testing; and
   c. Be specified with a color temperature of 3,000K.
2. The developer is to provide a new metered electrical service in an APX outdoor rated enclosure (See §8.2.3. for unit specification), preventing any new fixtures from being directly connected to the power utility; and
3. The developer will be required to:
   a. Provide an astronomical timeclock inside the electrical enclosure (See §8.2.3. for unit specification) to control light fixtures; or
   b. Provide a standard photocell for each fixture, to be used until lighting control module is installed.

TABLE 8.F. STANDARD COBRAHEAD FIXTURE STANDARDS

Location	Cobrahead Type	Fixture Height	Spacing & Layout
One-lane roadways: Without on-street parking with low traffic	A	20'	One side: 65' – 70' Alt. 125' – 135'
One-lane roadways: With on-street parking with low traffic	A	30'	One side: 70' – 80' Alt. 120' – 130'
Two-lane roadways: With on-street parking with low traffic	B	30'	One side: 80' – 90' Alt. 175' – 185'
Two-lane roadways: With on-street parking with medium traffic	B	20'	One side: 75' – 80' Alt. 145' – 155'
	C	20'	One side: 90' – 100' Alt. 180' – 190'
		30'	One side: 100' – 110' Alt. 200' – 210'
Two or more lane roadways: With on-street parking with high/ medium traffic	D	20'	One side: 95' – 105' Alt. 195' – 210'
Two or more lane roadways: With on-street parking with high traffic	D	30'	One side: 115' – 125' Alt. 245' – 255'
	E	20'	One side: 100' – 110' Alt. 200' – 215'
		30'	One side: 115' – 130' Alt. 240' – 255'

8.2.3. Accessories & bollards.

A. **Cabinets.** The City standard cabinet specifications are included below in Table 8.G.

TABLE 8.G. STANDARD COBRAHEAD FIXTURE STANDARDS

Location	Fixture Type	Fixture Height	Layout	Color
Public right-of-way	APX Enclosures, Inc. Cabinet APX NEMA 3R Pedestal Enclosure APXPE401615	Per Manufacturer's Specification	Mounted on the back side of the sidewalk with door facing street, meter facing building street wall. If site constraints require box to be mounted within sidewalk furnishing zone, then door should face building/private property and meter should be mounted on the opposite side of the travel direction.	Grey/Silver or Clear Coat (Manufacturer's Specification)

B. Cabinet base can be stand-alone type other than above, provided it is not in a sidewalk or on the edge of a plowed pathway, street, or parking lot. Circuits may also be wired into existing traffic signal boxes or other light circuit boxes. This will be determined on a case-by-case basis.

C. Additional specifications for multiuse box with external power for festivals and special events (not required - determined by the Department of Public Works). Square D power panel QO816L100DF/S or QO112L125G with cover QO16US. Circuits required are:
   1. 1=125/250V 50 Amp NEMA 14-50 Receptacle;
   2. 1=125/250V 30 Amp NEMA 14-30 Receptacle; or
   3. 2=125V 20A Standard Receptacle.

D. Wiring & Electrical.
   1. 2" inch conduit (minimum) underground in light pole bases and cabinet base.
   2. Each light fused individually at base Fuse holder type is a (Buchanan 65 kit Cat #65U)
   3. Regular outlet on each pole just below the fixture to be fused at the bottom of the pole base with the same fuse kit as listed above.
   4. Any single photo cell control for all lights shall be in the cabinet, rated for the circuit. This may require an all-purpose contactor.
   5. Wire size and circuit size shall be calculated by the design engineer and inspected by the City inspector to make sure it is correct. This would be done on a case-by-case basis because not all circuits, lights, and systems are the same.

E. Bollards.
   1. This section includes standards for typical lighted bollards. Non-lighted bollards appear in Section 1 (Transportation Systems and Street Design Standards).
   2. Location: Bollards may be used in areas such as underpasses and similar conditions where height is restricted for pedestrian lighting. Spacing and number to be determined by Department of Public works. Locations must be approved by the Department of Public Works and the Planning Authority. The City may approve additional bollard types for streetscape or special projects such as parks or as use for security bollards. Any additional bollard selection must be of equivalent structural strength as approved bollards.
   3. Specification: The City of Portland has adopted the following typical lighted bollard standards in Table 8.H. below:

TABLE 8.H. LIGHTED BOLLARD STANDARDS

Location (including but not limited to)	Fixture Type	Fixture Height (ft.)	Spacing & Layout	Color	Mounting
Underpasses: Park Avenue, St. James Street, St. John Street, Forest Avenue, Preble Street, Franklin Street, Commercial Street, Harborview Park, Tukey's Bridge, Veranda Street	Holophane Freeport Series	45	To be determined by the Department of Public Works	Black (Manufacturer's Specification)	Concrete bases with 2" to 4" reveal above grade, with 4 bolts per pole
Waterfront piers					

8.3.4. Standards for decorative lighting. Figure X-4 identifies the decorative street light locations. The following tables and Figures X-5 through X-12 illustrate the requirements for fixture type, height, layout, and finish for each decorative light fixture, according to street. All light poles shall be mounted on reinforced concrete pole bases with 2" to 4" reveal above grade, with 4 bolts per pole.

TABLE 8.I. OLD PORT DECORATIVE LIGHT STANDARDS

Map – Figure X-6A
Fixtures – Figure X-6B

Location	Fixture Type	Fixture Height	Spacing & Layout	Color
Exchange Street: Congress to Fore Street	STREET [Figure X-6B]	14' 3"	Alt. sides: 60'-80'	Black (Manufacturer's Specification)
Fore Street: Center Street to Franklin Avenue				
Streets between Spring/Middle to Commercial Street: Center Street, Cotton Street, Cross Street, Union Street, Dana Street, Patton Court, Moulton Street, Market Street, Silver Street, Pearl Street, Custom House Street, Portland Square, Milk Street, Wharf Street, Gold Street				
Federal Street W, Middle street,				

Newbury Street W: Temple/Union to Franklin Avenue				
Church Street				
Parks: Post Office, Tommy's				

TABLE 8.J. DOWNTOWN DECORATIVE LIGHT STANDARDS

Map – Figures X-5A, X-5D

Fixtures – Fixtures X-5B, X-5C, X-5E, X-5F

The Technical Manual supersedes the previously adopted City of Portland Downtown Sidewalk and Street Lighting Plan (1994); that Plan may be used for reference or clarification of the standards of this manual.

Location	Fixture Type	Fixture Height	Spacing & Layout	Color
Oak Street, Casco Street, Brown Street, Chestnut Street, Shepley Street, Center Street: Congress to Free Street **Cross Street:** Free to Spring Street	PEDESTRIAN 1- Single or Double Arm [Figure X-5B]	12.5'	One side: 60'-80' Alt. sides: 100'-175' Single-arm fixture placed in furnishing zone with luminaire oriented over sidewalk. Double-arm fixture placed with bracket arms parallel to sidewalk. If sidewalk space is limited, Planning Authority may approve lights within private property or attached to building.	Dark Green – Tiger Drylac RAL 6012
Monument Square and Monument Way: Pedestrian ways	PEDESTRIAN 2 [Figure X-5C]	25'	One side: 90'-100' Alt. sides: 175'-225' Double-arm fixture placed with bracket arms parallel to sidewalk	
Congress Street **Other locations on a case-by-case basis**	STREET – Single or Double Arm [Figure X-5E]	30'	One side: 90'-100' Alt. sides: 175'-225' Double-arm fixture used in median conditions with luminaire overhanging street.	
Congress Street: St. John to Franklin Street	STREET/PED COMBO [Figure X-5F]	30'	One side: 90'-100' Alt. sides: 175'-225'	
Cumberland Avenue: High to Franklin Street				
Spring Street: High to Temple/Union Street				
Free Street: High to Temple Street				
Forest Avenue: Congress Street to Cumberland Avenue				
Center Street: Free to Spring Street				
Temple Street: Congress to Spring/Middle Street				

Myrtle, Chestnut, Elm and Preble Streets: Congress Street to Cumberland Avenue			One side: 90'-100'	
Federal Street: Congress to Temple Street				

TABLE 8.K. PENINSULA DECORATIVE LIGHT STANDARDS

Map – Figures X-7A, X-7C
Fixture – Figure X-6B

Location	Fixture Type	Fixture Height	Spacing & Layout	Color
Wilmot, Chapel, Stone, and Cedar Streets	MEDIUM STREET [Figure X-7B]	19' 3"	One side: 80' – 100' Use Type 2 IES distribution. Fixture placed in furnishing zone overhang towards the street; where fixture conflicts with overhead utilities, may be placed on back of sidewalk with light overhanging sidewalk. Where street lighting is provided by existing cobrahead fixtures, decorative fixtures are not needed on that side of street. If a project includes placing utilities underground, street/pedestrian lighting provided by decorative fixtures.	Black (Manufacturer's Specification)
Alder, Hanover, Parris, Brattle, Mechanic Streets				
Mountfort, Hancock, Hampshire, Newbury East, Federal East Streets				
Preble and Elm Street: Cumberland Avenue to Marginal Way				
Pearl, Chestnut, Myrtle Streets: Cumberland Avenue to Marginal Way				
Oxford West, Lancaster, Kennebec, Somerset Streets				
Portland, Fox, India Streets				
Anderson Street: Everett to Plowman Street				
Washington Avenue: Congress Street to I-295				
Middle Street: Franklin to Hancock Street				
Fore Street: Franklin to Waterville Street				
Marginal Way	LARGE STREET [Figure X-7D]	24' 3"	One side: 90'-100' Alt. sides: 175'-225'	
Forest Avenue: Cumberland Avenue to Park/Portland Street				
*** No streets shall use PEDESTRIAN scale light unless site conditions such as sidewalk width or overhead utilities prevent installation of MEDIUM STREET fixture (Figure X-7D)**	PEDESTRIAN [Figure X-7E]	14'6"	One side: 60'-80' Alt. sides: 100'-175' Fixture shall be oriented to overhang sidewalk. Fixture placed in furnishing zone unless space is limited. Placement on back of sidewalk or private property overhanging sidewalk may be	

			accommodated where space is a constraint.

TABLE 8.L. TRAILS & WATERFRONT DECORATIVE LIGHT STANDARDS

Map – Figure X-8A
Fixture – Fixture X-8B
Trails – This fixture is appropriate for any City trail installation. Standard lighted bollard may also be used in appropriate circumstances.
Bayside Trail – This fixture should only be used on the Bayside Trail if replacing six or more of the existing fixtures.
Waterfront – Commercial/Thames Street, this fixture is suitable to supplement standard cobrahead lighting.

Location	Fixture Type	Fixture Height	Spacing & Layout	Color
Fore River Trail: Casco Bay Bridge to US-1; Harborview Park trail path	TRAIL – Single Arm	18'4"	One side: 90'-125' Alt. sides: 175'-225'	Black (Manufacturer's Specification)
Commercial Street: Fore River Parkway to India Street			Supplemental pedestrian lighting as-needed. One side: 90'-125' Alt. sides: 175'-225'	
Thames Street: India Street to Eastern Promenade Trail			One side: 90'-125' Alt. sides: 175'-225'	
Eastern Promenade Trail	TRAIL – Single or Double Arm		One side: 90'-125' Alt. sides: 175'-225' Single arm fixture oriented to overhang trail; Double arm fixture for medians or similar.	

TABLE 8.M. OFF-PENINSULA DECORATIVE LIGHT STANDARDS

Map – Figure X-9A
Fixture – Fixture X-9B
In addition to the specific locations indicated below, this fixture is suitable for off-peninsula, commercial corridors to supplement standard cobrahead lighting.

Location	Fixture Type	Fixture Height	Spacing & Layout	Color
Forest Avenue: Marginal Way to Woodlawn Avenue	PEDESTRIAN - Single or Double Arm	18' 6"	One side: 60'-80' Alt. sides: 100'-175' Placement on back of sidewalk with single arm fixture oriented to overhang sidewalk; Where site constraints require placement in furnishing zone, use double arm fixture parallel to sidewalk.	Graphite (Manufacturer's Specification)

TABLE 8.N. HISTORIC LANDSCAPE STREET DECORATIVE LIGHT STANDARDS

Map – Figure X-10A
Fixture – Fixture X-10B
Fixture placement should comply with adopted master plans.

Location	Fixture Type	Fixture Height	Spacing & Layout	Color
Eastern Promenade (park side of street only): North Street to Vesper Street	STREET – with shield	21’	One side: 90’-100’ Alt. sides: 175’ – 225’	Black (Manufacturer’s Specification)
Western Promenade (park side of street only): Bramhall Street to Vaughan Street				
Baxter Boulevard (both sides of street): Forest Avenue to Bates Street				
Deering Oaks Park (Abutting Streets, park side only): Deering Avenue, Park Avenue, Forest Avenue	STREET – without shield		One side: 90’-100’ Park side of street only	
Deering Oaks Park (within park): High Street, State Street			One side: 90’-100’ Alt. sides: 175’ – 225’	

TABLE 8.O. HISTORIC LANDSCAPE PEDESTRIAN DECORATIVE LIGHT STANDARDS

Map – Figure X-11A
Fixture – Fixture X-11B
Fixture placement should comply with adopted master plans.

Location	Fixture Type	Fixture Height	Spacing & Layout	Color
Eastern Promenade: Pedestrian paths	Pedestrian	14’6”	One side: 60’-80’	Black (Manufacturer’s Specification)
Western Promenade: Pedestrian paths				
Deering Oaks Park (Interior): Pedestrian paths, High Street, State Street			Use existing light locations or refer to the Deering Oaks Master Plan (2003) for revised locations	

TABLE 8.P. DEERING OAKS BRIDGE DECORATIVE LIGHT STANDARDS

Map – Figure X-12
Fixture placement should comply with adopted master plans.

Location	Fixture Type	Fixture Height	Spacing & Layout	Color
Deering Oaks Park (Bridge)	Bridge Light	6’ (match existing)	One side: 60’-80’	Match existing

8.3.5. City of Portland versus construction contractor responsibilities. For projects where the construction contractor is required by the City to provide new street lighting, the new street lighting shall be connected to an existing metered service, unless otherwise directed by the City (see §8.2.2(D) for new metered services for lighting).

A. Construction contractor responsibilities. The responsibilities of the construction contractor are as follows:
   1. The construction contractor shall furnish and install the following as part of the construction scope as stipulated by the City according to City standards for the given project location:
      a. Street lighting luminaires;

b. Street lighting poles;
c. Bracket arms;
d. Pole accessories; and
e. Decorative base enclosures;

2. Concrete foundation bases for new street lighting poles. Poles shall be mounted on reinforced concrete pole bases with 2" to 4" reveal above grade, with 4 bolts per pole. The installation of the foundation bases shall be coordinated with sidewalk details and requirements as stipulated by the City of Portland Department of Public Works;
3. **Underground conduit and wire between street lighting pole foundation bases.** In addition, underground conduit and wire shall be provided to an electrical service panelboard and meter, as well as to an existing service connection;
4. Wiring to be installed within each street lighting pole and shall be extended at the pole top (or bracket arm), with connection to the street lighting luminaire(s);
5. Upon completion of the erection of the street lighting fixtures, including the installation of all lighting poles and conduit/wire, the construction contractor shall notify the City that the system is ready for operation. The luminaires shall be energized prior to the construction contractor's request for a City Certificate of Occupancy; and
6. It shall be the construction contractor's responsibility to pay all costs associated with the provision of required street lighting including costs associated with street lighting luminaires, street lighting poles, brackets, bases, conduit and wire, panelboards, and metering equipment.

B. **City of Portland responsibilities.** The responsibilities of the City of Portland are as follows:
1. To approve the proposed point of connection for electrical service for new municipal street lighting where a new metered service is provided;
2. Connection of the construction contractor's secondary service conductors at an existing service point, where a new service is provided; and
3. To review and approve the location of the street light fixtures within the public right-of-way.

~~**8.3.6. Submission requirements.** A lighting plan shall be provided which shall show the quantity and location of all existing and proposed street lights. This shall be incorporated into the site plan or presented on an individual lighting plan. Descriptive information including engineering detail drawings depicting the entire proposed fixture (luminaire, bracket arm, slip fitter) along with the proposed finish shall be included on the individual lighting plan.~~

9. SHADOW STANDARDS

~~9.1. APPLICABILITY~~

~~All major and minor site plan proposals outside the B-3, B-5, B-6, and B-7 zones that would result in new shadows long enough to reach significant public resources (except within an hour and a half of sunrise or sunset) are required to submit a preliminary shadow analysis to the Planning Authority for review. If a preliminary analysis indicates the potential for adverse shadow impact, applicants are then required to submit a shadow analysis, as outlined below. In many cases, it may be appropriate to use the services of an architect or other professional skilled in use of computer analysis to perform a shadow analysis; however, this is not a requirement. Anyone undertaking a shadow analysis must use the longitude, latitude, and time information for Portland, Maine.~~

9.1~~2~~. PRELIMINARY SHADOW ANALYSIS REQUIRED SUBMITTALS

A preliminary shadow analysis shall be required for all projects that include new structures or additions to structures ≥6~~4~~5 feet tall, in order to determine if additional shadow analysis is required. A preliminary shadow analysis will need to evaluate the following criteria:

9.~~2~~1.1. Shadow length. The longest shadow that any structure will cast in Portland, Maine during the year (except within an hour of sunrise or sunset) is 4.26 times its height. To conduct a preliminary analysis, multiple this factor by the height of each proposed structure. If no significant public resources, as defined above, are located within that distance from the project site in any direction, no further analysis is required. For example, if a development would result in a 48-foot tall building, its longest shadow would be approximately 192 feet. If there are no significant public resources within 192 feet of the project site, then no further shadow analysis is required.

If a resource is identified, the location of the site in relationship to the resource shall be evaluated to determine the potential for adverse shadow impact and the need for further analysis.

9.~~2~~1.2. Site location. Because of the path that the sun travels across the sky, no shadow can be cast in a triangular area to the south of any given project site. Therefore, if the resource in question is located within that triangular area, no further shadow analysis is required. In Portland, Maine, that area lies between -122 degrees from true north and 122 degrees from true north. Thus, any significant public resource would have to be at an angle from true north greater than -122 degrees or 122 degrees in order to be shaded at any time by the proposed development.

9.1~~2~~.3. Significant public resource. The preliminary shadow analysis shall consider the sensitivity of the significant public resource(s) to shadow. Open spaces or natural features that require direct sunlight for a portion of the day to sustain existing vegetation or to maintain the viability of its current use (e.g., sitting or sunning areas, public gathering spaces, turfed sports fields or children's play areas) require further analysis.

Some significant open space resources may not be sensitive to sunlight, such as paved areas or landscaped areas with all shade-tolerant species. For these types of conditions, not further shadow analysis is needed.

If the above steps are not able to determine that shadows from a proposed development would not reach a shadow-sensitive significant public resource during any time of the year, a full shadow analysis is required.

9.32. PRELIMINARY SHADOW A~~A~~NALYSIS REQUIRED SUBMITTALS

9.32.1. A shadow analysis shall define the extent and duration of additional shadow that a proposed development would cast on significant public resources in the project vicinity during the year, along with the effect that new shadowing would have on any sun-sensitive aspects of the resource(s).

9.23.2. Applicants are encouraged to use professional resources and/or computer analysis to calculate and graphically display shadows, specifically if proposed structures are irregularly shaped or if the project site is located in a densely developed area.

9.23.3. A shadow analysis shall include the following times of year:

A. March 21st or September 21st;
B. June 21st;
C. May 6th or August 6th; and
D. December 21st.

9.23.4. A shadow analysis should identify the types of significant public resources, types of vegetation and common use(s) of the site, along with discussion of the corresponding sunlight requirements for each. The uses and vegetation of open space areas establish its susceptibility to adverse shadow impact. Uses that rely on sunlight include sitting areas, gardens, and play areas. Vegetation that relies on sunlight includes tree canopy, shade-intolerant flowering plants and turf. Shadow-sensitive landscapes and uses generally require a minimum of four to six hours of sunlight a day. If necessary, applicants are encouraged to use the professional services of a landscape architect or recreation planner to inventory and assess the sensitivity of various landscape features to shadow.

9.23.5. In presenting the results of a shadow analysis, the following information shall be included for each date:

A. Duration of incremental shadow on affected features;
B. Times of shadow penetration;
C. Description of affected features (e.g., landscaping, seating, active uses, historic resources); and
D. Time of sunrise and sunset for the date being analyzed.

9.23.6. In addition to a narrative description, the analysis shall include clear graphic representations of the following, as applicable:

A. Relationship between the project site and significant public resources;
B. Calculation of the angles from north for project shadows entering and exiting the affected areas of the resource(s);
C. A map showing pre-development condition shadows and the incremental shadows from the proposed structure(s) on all significant public resource(s) on each representative date;

D. In the case of public open space resources, a site plan of the open space should be used to illustrate the placement of incremental shadows to allow for clear presentation of any impact to sensitive features. The length of time of the project's shadows should be indicated on each map;
E. Photographs of the resource(s), focusing on elements sensitive to sunlight loss that may be impacted by new shadows from the development; and
F. Plan of the significant public resource, showing composite shadows and the location and duration of sunlight.

9.34. DETERMINING SIGNIFICANCE OF SHADOW IMPACTS

A significant shadow impact occurs if the new shadow added by the development proposal reduces sunlight to a level where it would have an adverse impact on existing sunlight-sensitive uses. This includes, but is not limited to, the following scenarios:

9.34.1. Substantial reduction in sunlight where a sensitive use is already subject to substandard sunlight;

9.34.2. Reduction in sunlight to vegetation resulting in less available sunlight than the minimum necessary for its survival; or

9.34.3. Substantial reduction in the usability of an open space area.

9.54. ALTERNATIVES AND MITIGATION

9.45.1. When an adverse shadow impact is identified, mitigation must be assessed. Types of mitigation that may be appropriate include, but are not limited to, relocating facilities within an open space to avoid sunlight loss, relocating or replanting vegetation, undertaking additional maintenance to reduce the likelihood of species loss, or replacement facilities on another nearby site. Where affected open space is a City park, it is appropriate for the applicant to coordinate mitigation options with the Parks Division of the City of Portland Department of Public Services.

9.45.2. Alternatives that may reduce shadow impacts include, but are not limited to:

A. Reorientation of the structure(s) bulk to avoid adverse shadow impacts on sensitive significant public resources;
B. Reorientation of the site plan to include replacement facilities;
C. Where possible, reorientation of the sun sensitive features of the resource itself; and
D. Incorporation of architectural design techniques and/or reflective façade materials to increase available light.

10. PUBLIC SAFETY STANDARDS

10.1. CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN (CPTED) STANDARDS

10.1.1. Natural Surveillance. Site plans shall be designed so that they create formal and informal natural surveillance networks on the site to increase on-site visibility and the safety of legitimate users and to deter potential offenders.

A. **Physical features.** The placement and design of physical features shall maximize visibility to allow for surveillance opportunities to and from site features such as entrances and exits, walkways, assembly areas, corridors, stairways, windows, parking lots, landscaping, fences or walls, and any other physical attributes.

B. **Lighting.** The lighting of the site and building shall meet the City's technical standards for site lighting, as detailed in Section 12 of this manual, and enable users to observe movement and activities on the site during the day and at night. Motion sensor activated lighting is permitted to provide adequate illumination of the site at night while still complying with applicable lighting curfew standards of Section 12 of the Technical Manual. Specifically, the lighting plan should satisfy the following criteria:

   1. Create nighttime illumination of pedestrian travel paths and gathering areas, entrances and exits, and parking lots and garages by achieving the following:
      a. Provide a clear view of an area from a distance and enable anyone moving in or immediately around it to be easily seen.
      b. Deny potential hiding spaces adjacent to existing and proposed pedestrian travel routes.
      c. Permit facial identification at a distance of at least 30' and create the perception of being identified.

C. **Mechanical Surveillance Systems.** If necessary, mechanical surveillance systems such as CCTV may be installed to monitor areas not easily observed such as parking lots and garages.

10.1.2. Access Management. Site plans shall be designed to provide visible pathways and to offer proper guidance for legitimate users to access the site and to discourage unauthorized use of the site.

A. **Orientation and Wayfinding.** The site shall be designed so that the layout, features and/or signage clearly guide the movement of vehicles and pedestrians along safe and predictable paths both during the daytime and nighttime. Specifically, the site plan shall satisfy the following criteria.

   1. Placement of signage, lighting fixtures, landmarks, and landscape design features shall clearly guide users to and from the facility.
   2. Site features shall be designed to avoid the creation of entrapment zones that afford users no opportunity to escape or retreat from an approaching hazard.

B. **Mechanical Access Control.** If necessary, mechanical access control systems may be implemented such as assigning personnel at key building entry points or establishing other procedures such as mechanical auto closing devices, key cards, gates and other locking devices.

10.1.3. Territorial Reinforcement. Proposed developments shall be designed to clearly delineate private, semi-private, and public space.

10.2. FIRE HYDRANT STANDARDS

10.2.1. All development constructed within the limits of the City of Portland shall have a hydrant within five hundred feet (500') of all structures.

10.2.2. All hydrants, private and public, shall comply with City Code Chapter 10 and Portland Water District standards.

10.2.3. Private hydrants shall be maintained by the property owners. A maintenance agreement, or other documentation if deemed acceptable by the Reviewing Authority, shall be required for all private hydrants. A follow-up will be conducted and a financial penalty will be levied for non-compliance. All compliances shall meet City Code Chapter 10, which adopts by reference National Fire Protection Association (NFPA) #1 and #101.

10.2.4. A six-foot (6') clear space shall be maintained around the circumference of fire hydrants, private or public, except as otherwise required or approved.

~~10.3. SINGLE- AND TWO-FAMILY RESIDENTIAL DEVELOPMENT~~

~~As of September 16, 2010, all new construction of one- and two-family homes are required to be sprinkled in compliance with adopted NFPA code.~~

10.4. SITE ACCESS STANDARDS

10.4.1. Every dead-end roadway more than one-hundred-fifty feet (150') 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).

10.4.2. Where possible, developments shall provide access for Fire Department vehicles to at least two sides of all structures. Access may be from streets, access roads, emergency access lanes, or parking areas.

10.4.3. Building setbacks, where required by zoning, shall be adequate to allow for emergency vehicle access and related emergency response activities and shall be evaluated based on the following factors:

A. Building height;
B. Building occupancy;
C. Construction type;
D. Impediments to the structures, and
E. Safety features provided.

10.4.4. Fire Department access roads shall extend to within 50' of an exterior door providing access to the interior of the structure.

10.4.5. Site access shall provide a minimum of nine (9) feet clearance height to accommodate ambulance access.

~~10.4.6.~~ ~~Elevators shall be sized to accommodate an 84" x 24" stretcher.~~

10.4.7. Street name and street numbering shall be determined during development/subdivision review and shall comply with Portland's 911 numbering system.

10.4.8. All structures are required to display the assigned street number. Numbers shall be clearly visible from the public right-of-way.

10.5. STANDARDS FOR EMERGENCY ACCESS LANES AND GATES

10.5.1. No inside turning radius shall be less than twenty-five feet (25').

10.5.2. No outside turning radius shall be less than one-hundred feet (100').

10.5.3. New emergency access lanes shall be a minimum of sixteen feet (16') wide but may be required to be up to twenty feet (20') wide where one or more of the following conditions occur:

A. The access is likely to be used by Fire Department ladder trucks to set up for buildings adjacent to the lane; or
B. The access lane is likely to be used by Fire Department Engine companies to set up pumping operations to fight a fire at building adjacent to the lane.

10.5.4. Access lanes shall be engineered and maintained to support the weight of emergency vehicles during all weather conditions.

10.5.5. Appropriate "No Parking" signs shall be posted in accordance with instructions from the Fire Department having jurisdiction, and a method of enforcing such provisions shall be provided.

10.5.6. All gates shall be located a minimum of thirty feet (30') from the public right-of-way and shall open inward to the site.

10.5.7. Fire Department personnel shall have ready access to locking mechanisms on any gate restricting access to a fire lane. Proposed changes to access shall be pre-approved by the Reviewing Authority.

10.5.8. The clear opening provided through all gates shall be two feet (2') wider than the traveled way.

10.5.9. Blockading of any emergency lane shall be done by gates which are secured by chain and padlock. Padlocks shall be a "Knox" lock.

10.5.10. Emergency lanes shall be maintained and made accessible for emergency use at all times. No parking of vehicles or other use that might obstruct the emergency access lane shall be permitted. An access maintenance agreement or other suitable document acceptable to the Reviewing Authority shall be required.

10.5.11. The use of automatic gates such as the "Click2enter" systems requires prior approval from the Reviewing Authority.

10.6. SUBDIVISION STANDARDS

Subdivisions shall comply with the following minimum street access requirements listed in Table 10.5. All planned building groups shall meet the requirements of NFPA 1141.

TABLE 10.5. MINIMUM NUMBER OF ACCESS ROADS BY SPRINKLERING AND NUMBER OF UNITS

	Required Number of Access Roads by Number of Proposed Units			
Subdivisions by Sprinklering	**1-34**	**35-67**	**68-99**	**≥100**
Subdivisions with an approved sprinkler system designed to NFPA #13D	One (1)		One (1) access road and an emergency access lane	Two (2) access roads
Subdivisions without an approved sprinkler system designed to NFPA #13D	One (1)	Two (2) access roads or a single access road and an emergency access lane	Two (2) access roads	

~~10.7. BLASTING SAFETY STANDARDS~~

~~10.7.1. Submittal Requirements.~~

~~A. All Blast Operations. Applicants for all blasting operations shall obtain a blasting permit from the Planning and Urban Development Department prior to any blasting. Application forms may be obtained through the Inspections Division or can be downloaded from the City of Portland website.~~

~~A. Medium Blast Operations. For medium blast operations, the blasting contractor will also be required to submit a blasting submittal with the blasting application form. The blasting submittal must include, at a minimum the following information:~~

- ~~A. Description of Test Blast, Drill Pattern;~~
- ~~B. Description of Production Blasting, Drill Pattern;~~
- ~~C. Explosives to be used during wet and dry conditions;~~
- ~~D. Stemming material and depth;~~
- ~~E. Description and location of blasting signs;~~
- ~~F. Type of seismograph to be used;~~
- ~~G. Description of proposed transportation and storage of explosives, and~~
- ~~H. Signature of blasting contractor testifying to the accuracy of the above information.~~

~~B. Large Blast Operations. For large blast operations, the blasting contractor will also be required to submit a drilling pattern and loading plan, referred to herein as a blasting plan, with the blasting application for review and approval. Blasting plans must be submitted at least two weeks prior to the start of any drilling and/or blasting operations. A model blasting plan is provided at the end of this section and shall include, at a minimum, the following information:~~

- ~~A. The sequence and schedule of blasting rounds, including a general description of the proposed approach for developing each bedrock excavation area;~~
- ~~B. A diagrammatic description of the typical blast pattern to be used, including pre-splitting pattern if pre-splitting is required;~~
- ~~C. Diameter, spacing, burden, depth and orientation of each drill hole relative to the "free face". Along with details of the delay pattern;~~
- ~~D. A diagrammatic description of the loading plan for a typical production hole include charge weights and distribution of primer, explosives and stemming within a typical hole;~~
- ~~E. Estimation of ground vibration levels at nearest adjacent structures;~~

F. Written evidence of the licensing, experience, and qualifications of the blaster who will be responsible for loading and firing each shot;

G. A listing of the number and type of instrumentation proposed to be used to monitor vibrations and airblast overpresurres; and

H. Safety procedures, security measures, and warning sequences.

10.7.2. Pre-Blast Survey.

A. **Pre-Blast Survey Scope.** Pre-blast surveys are required for all blasting operations. The blasting contractor will hire an independent seismologist or blasting consultant to perform pre blast surveys on all structures (contingent upon property owner agreement) within the distances specified below in Table 8.2.2. The independent seismologist or blasting consultant shall not be an employee of the contractor, subcontractor, explosives manufacturer, or explosives distributor.

TABLE 10-A. PRE-BLAST SURVEY SCOPE BY SIZE OF BLAST

Size of Blast	Scope of pre-blast survey
Small	Within 250 feet of the perimeter of the blasting site
Medium	Within 500 feet of the perimeter of the blasting site
Large	Within 600 feet of the perimeter of the blasting site

B. **Pre-Blast Survey Offer Notice.** Prior to commencement of the pre blast surveys, the contractor shall provide the following documentation to the Department of Planning and Urban Development:

1. A list of property owners to be contacted (in accordance with the distances listed in Table 7.2.2.);
2. Verification that the subject property owners were notified of the pre blast survey work;
3. A copy of the pre-blast survey offer notice; and
4. Whether each offer to conduct a pre blast survey was either accepted, rejected, or there was no response.

The contractor shall retain a copy of each pre blast survey offer notice for their records until the development project receives a final certificate of occupancy or is otherwise deemed complete by the City. Nothing herein shall be construed to discourage repeated efforts by the blasting contractor to contact eligible property owners via phone, hand delivery, or other method in addition to provision of the required offer notice letter.

C. **Pre-Blast Survey Documentation.** All pre blast surveys shall include documentation of interior subgrade and above grade accessible walls, ceilings, floors, roof and visible exterior as viewed from the grade level. Where significant cracks or damage exist, or for more complex structural defects, photographs or video shall be taken.

A high-quality videotape survey with appropriate audio description of the locations, conditions, and defects may substitute for a written pre blast survey. Where necessary, notes and sketches may also be submitted as part of a video pre-blast survey in order to highlight or elaborate on certain aspects of the video documentation.

D. **Pre-Blast Survey Conditions Report.** The pre blast surveys shall include a conditions report for each property. The conditions report may be presented as narrative, photographs, video or a combination thereof. Conditions reports shall summarize the condition of each building and define areas of concern, including deteriorated structures or utilities, structures housing sensitive equipment, and/or manufacturing processes that are sensitive to vibrations.

E. **Verification.** Verification that all pre-blast surveys and conditions reports have been completed shall be submitted to the Department of Planning and Urban Development at least two weeks prior to commencing any drilling and/or blasting operations.

10.7.3. Notification to Neighbors. Notice of blasting operations shall be provided in accordance with the requirements listed in Section VIII of the Land Use Code. For medium and large blasts, please also refer to the additional notification requirements during construction, described in §8.2.7. of this section (Blasting Schedule).

10.7.4. Complaint Protocol. The blasting contractor shall be solely and completely responsible for the safety of all persons and property during the performance of work. The blasting contractor shall have full and complete responsibility for the handling, discharging, or settling of any and all damage or annoyance claims resulting from the blasting activities on the project.

Complaints may be submitted to the Blasting Contractor and to the Department of Planning and Urban Development or the Fire Department throughout the duration of blasting operations. If a property owner submits a complaint regarding alleged blasting related damages, the independent seismologist or blasting consultant shall meet with the property owner within 24 hours of receiving the complaint to discuss the basis for the complaint, review applicable blasting records, and evaluate the reasonableness of the complaint. If a reasonable basis for the complaint is verified, the independent seismologist or blasting consultant shall conduct a second condition survey of the property within 48 hours of receiving the complaint to identify any changes in the property conditions. A condition survey report summary shall be submitted to the Applicant, and verification that the condition survey was completed shall be submitted to the Department of Planning and Urban Development within two weeks of the second condition survey being conducted.

10.7.5. Hours of Blasting and Storage of Explosives. Hours of blasting operations shall be limited to those defined in Chapter 14, Section VIII, *Regulations of Explosives* of the City Code of Ordinances. Only the amount of explosives necessary for the day's work shall be brought to the site, and explosives shall be transported and stored in approved magazines when not in use.

10.7.6. Blast Warning. International Blast Warnings shall be utilized for all blasting operations, as described below in Table 10-B. For large blasts, all persons within 600 feet of the blasting area shall be notified of the "warning" and "all-clear" signals through notices left in mailboxes and signs posted in the vicinity of the blasting site.

10.7.7. Blasting Schedule (Medium and Large Blasts, only). The blasting contractor shall prepare and submit a blasting schedule to the property owner, the general contractor and the Department of Planning and Urban Development at least 10 business days prior to commencing blasting operations. The schedule shall include name and contact information for the blasting contractor, blasting area locations, planned dates and times of blasts, access restrictions to the blast areas, and warning signal protocols.

During construction, the blasting contractor shall coordinate the blasting schedule with the property owner, the general contractor, the Department of Planning and Urban Development, and the Fire Department on a weekly basis.

The morning of a planned detonation, the blasting contractor shall notify the Fire Department and the Department of Planning and Urban Development of the planned time of the blast (+/- one hour), the location where the blasting is to occur, and the amount of explosives to be used.

At least 24 hours prior to any blast, the blasting contractor shall inform all property owners who requested notice of the blasting schedule (+/- one hour).

10.7.8. Vibration Limits and Ground Vibration Monitoring. The seismograph must be set up at the closest structure to record each blast event. Ground vibration from all blasting operations shall be measured in terms peak particle velocity (inches per second (ips)) and frequency (hertz). The permissible maximum ground vibration at

existing nearby structures shall be limited to values established by the U.S. Bureau of Mines[1] to avoid cracking or structural damage in residential structures. Particle velocity shall be recorded in three mutually perpendicular directions. Ground vibration for residential structures shall not exceed the limits listed in Table 8.2.8.

Deteriorated structures or utilities, structures housing sensitive equipment, and/or manufacturing processes that are sensitive to vibrations may require lower PPV limits than those listed above. If information obtained from the pre-blast surveys indicates lower limits are required for certain structures, the independent seismologist or blasting consultant shall identify the limits applicable to a specific structure, and the blasting contractor shall incorporate such provisions in the features of the blasting plan.

In the event the blasting contractor's blasting round results in ground vibrations closely approaching the stated limits, the blasting operations shall be modified to reduce ground vibrations.

In the event the lasting contractor's blasting round results in ground vibrations exceeding the stated limits at structures, the blasting contractor shall cease all blasting activities and submit a written report to the property owner and the general contractor, copied to the Department of Planning and Urban Development and the Fire Department. This report shall describe corrective action to be taken on the next shot. The next shot shall not be loaded until the property owner and the general contractor acknowledge, in writing, copied to the Department of Planning and Urban Development and the Fire Department, that a design change is being attempted.

TABLE 10-B. GROUND VIBRATION LIMITS FOR RESIDENTIAL STRUCTURES

Type of Structure	Maximum PPV (ins/s)	
	Frequencies < 40 HZ	Frequencies ≥ 40 HZ
Modern Homes (drywall interior)	0.75	2.0
Older Homes (Plaster on wood lath for interior walls)	0.50	

10.7.9. Flyrock Control (Large Blasts Only). Blasting mats, soil, or other equally serviceable material shall be utilized for all blast rounds to prevent the throw of flyrock from the blasting area.

10.7.10. Pre-Blast Safety Meeting (Medium and Large Blasts Only). Prior to any blasting, the blasting contractor will conduct a pre-blast safety meeting with all contractors to familiarize them with blast signals and precautions.

10.7.11. Test Blasts (Large Blasts Only). Prior to commencing full-scale blasting, the blasting contractor shall demonstrate the adequacy of the proposed blasting plan by drilling, blasting, and excavating short test sections using small charges and the required monitoring instruments. The blasting contractor shall develop site-specific scaled distance relationships from the test blast rounds to determine the allowable charge weight of explosives to be detonated per delay.

10.7.12. Personnel.

A. **General.** All employees of the blasting contractor working on-site during the blasting operation shall be trained in the use and handling of explosives.
B. **Large Scale Blasts.** The blasting contractor shall be required to carry liability insurance (XCU) coverage in an amount no less than $2,000,000.

[1] United States Bureau of Mines. *Structure Response and Damage Produced By Ground Vibration From Surface Mine Blasting*. Prepared by D.E. Siskind, M.S. Stagg, J.W. Kopp, and C.H. Dowding, Report of Investigations #8507, Appendix B, 1980.

The blasting contractor shall hire a company specializing in the use of explosives for breaking rock and licensed in the State of Maine. The blaster or foreman responsible for the loading and firing of each shot, as well as the person responsible for designing and directing the blasting operation, shall have at least five years of documented experience with similar work responsibilities. IF controlled blasting methods are required, these individuals shall have at least five years of documented experience in controlled blasting techniques.

At least two weeks prior to the commencement of pre blast surveys, the contractor will submit the name and qualifications of the independent seismologist or blasting consultant proposed to conduct the pre blast surveys to the Department of Planning and Urban Development and the applicant, if other than the blasting contractor.

At least two weeks prior to the commencement of drilling and blasting operations, the contractor will submit to the City of Portland and applicant the name and qualifications of the independent seismologist or blasting consultant proposed to monitor and report blasting vibrations.

10.7.13. Record Keeping and Reporting.

A. **Large Blast Monitoring and Analysis.** Blast monitoring and analysis shall be conducted by the independent seismologist or blasting consultant. A minimum of two (2) seismograph instruments will be used to monitor vibrations and airblast pressures for each blast. The seismographs used by the seismologist or blasting consultant for blast monitoring shall comply with the following requirements:

1. Velocity range. 0.005 to 10.0 inches per second;
2. Seismic frequency range. 2 to 250 Hz, within 0 to -3dB of an ideal flat response;
3. Acoustic frequency range. 2 to 250 Hz flat, -3dB at 2 Hz ± 1 dB;
4. Sound range. 100 to 140 dB (linear);
5. Measure, display, and provide a permanent time history record of the event, including both ground vibration and airblast;
6. Measure the three mutually perpendicular components of particle velocity in directions vertical, radial, and perpendicular to the vibration source;
7. The seismograph shall display and provide record of:
    a. The date and time of the event;
    b. Identifying information concerning the company;
    c. The location of the seismograph and of the blast;
    d. Trigger levels;
    e. Verification the instrument was set for "continuous" and not "manual" readings;
    f. Instrument serial number, and
    g. The date of the most recent calibration; and
8. The seismograph shall be calibrated as often as necessary, but at least once every 12 months, and must be performed to a standard traceable to the National Institute of Standards and Technology.

Blast monitoring data obtained by the independent seismologist or blasting consultant must be available for inspection on the blasting site, be submitted in writing to the Applicant within 24 hours following each blast, and be submitted the Department of Planning and Urban Development on a weekly basis. A model blast monitoring report is included at the end of this section.

B. **Blasting Log.** A blasting log summarizing details of the round as shot, weather conditions, proximity of the blast location to nearest structures, exact locations of monitoring instruments, and the results of blast monitoring at each instrument location shall be maintained daily for every blast. The blasting log shall be available for inspection on site, shall be submitted in writing to the Applicant within 24 hours following each blast, and shall be submitted to the City on a weekly basis.

10.7.14. Airblast Overpressure Limits. The peak airblast overpressure at any inhabited building not owned or controlled by the developer shall not be allowed to exceed 133 decibels (linear) when measured by an instrument with a high-pass system and a lower frequency limit of 2Hz.

The seismologist or blasting consultant shall monitor, record, analyze and report airblast pressure resulting from the blasting activities. In the event the blasting contractor's blasting round results in airblast overpressures approaching the stated limits, the Applicant may require the blasting contractor to modify the blasting operations to reduce airblast overpressures. In the event the blasting contractor's blasting round results in airblast overpressures exceeding the stated limits at structures, the blasting contractor shall cease all blasting activities and submit a written report to the Applicant, and copied to the City. This report shall discuss the corrective action to be taken on the next shot, and the next shot shall not be loaded until the Applicant acknowledges, in writing, that a design change is being attempted.

10.7.15. Carbon Monoxide (CO) Control. If any blasting operations are to occur within two hundred and fifty (250) feet of any structure, the blasting company shall:

A. Submit a carbon monoxide (CO) management plan to the Department of Planning and Urban Development with the Blasting Application for review and approval. The plan shall detail strategies that will be employed by the blasting company throughout blasting operations to prevent and mitigate the health and safety risks associated with possible CO migration away from the blast site and into abutting structures. CO management plans shall be tailored to the specific nature of blasting operations but shall include, at a minimum, two or more of the following actions:
   1. Effort to determine the presence and location of one or more operable Carbon Monoxide detector(s) within abutting structures. Where operable Carbon Monoxide detectors are not present, they shall be temporarily provided and placed in the basement of the structure, or on the first floor if there is not basement, until at least 24 hours after completion of the blasting operations;
   2. Immediate excavation of individual shots, with holes remaining vented for an adequate time to allow any CO produced by the blast to dissipate into the atmosphere. Safe CO levels in the blast hole shall be confirmed by a CO detector before the hole is backfilled; or
   3. Identify and document active and abandoned sewer connection locations and sealed drains locations for abutting structures as part of the pre-blast survey in order to identify structures that may pose an increased risk for CO migration. This information is available through the City of Portland Department of Public Services.

B. Notify all commercial and residential abutters of the blast site at least 24 hours prior to the start of blasting by means of door hangers left at both front and rear primary building entrances. Reasonable effort shall be made to also provide face-to-face notification to all building owners and/or occupants of abutting buildings. Door hangers hall be provided to the blasting company by the City of Portland and are available through the Fire Department or the Inspections Division. The language provided on the door hanger is provided at the end of this section.

   If a carbon monoxide detector is in alarm during blasting operations, the blasting company of building occupant shall call 911 immediately. In addition to calling 911, the blasting company shall contact the Fire Department at (207) 874-8405 to notify them of the emergency. The blast location shall be excavated immediately and shall remain open to the atmosphere until CO is no longer detectable in the blast hole.

11. STANDARDS FOR LOCAL SITE LOCATION OF DEVELOPMENT (SLOD) REVIEW

~~**11.1. INTENTION**~~

~~These standards are intended to provide a flexible and practical means by which the City of Portland may exercise its police powers to control the location of these developments substantially affecting the local environment in order to ensure that such developments will be located in a manner which will have minimal adverse impact on the natural environment within the development sites and of their surroundings and to otherwise protection the health, safety and general welfare of the people.~~

11.1. APPLICABILITY

11.1.1. The Planning Board shall review:

A. Subdivisions;
B. Structures;
C. Developments generating passenger car equivalents of between 100-200 per peak hour for compliance with the following standards; and
D. Metallic mineral mining or advanced exploration activity.

11.1.2. Definitions. For the purposes of this section, the following definitions shall be applied by the City of Portland Planning Board:

A. **Subdivisions.** The subdivision of land into 5 or more lots, other than lots for single-family, detached, residential housing, common areas or open space, to be offered for sale or lease to the general public during any 5-year period, if the aggregate land area includes more than 20 acres; or the division of a parcel of land into 15 or more lots for single-family, detached, residential housing, common areas or open space, to be offered for sale or lease to the general public within any 5-year period, if the aggregate land area includes more than 30 acres. The aggregate land area includes lots to be offered together with the roads, common areas, easement areas and all portions of the parcel of land in which rights or interests, whether express or implied, are to be offered. This definition of "subdivision" is subject to the following exceptions:
    1. Lots of 40 or more acres but not more than 500 acres may not be counted as lots except where the proposed subdivision is located wholly or partly within the shoreland zone;
    2. Lots of more than 500 acres in size may not be counted as lots;
    3. Five years after a subdivider establishes a single-family residence for that subdivider's own use on a parcel and actually uses all or part of the parcel for that purpose during that period, a lot containing that residence may not be counted as a lot;
    4. Unless intended to circumvent this article, the following transactions may not be considered lots offered for sale or lease to the general public:
        a. Sale or lease of lots to an abutting owner or to a spouse, child, parent, grandparent or sibling of the developer if those lots are not further divided or transferred to a person not so related to the developer within a 5-year period, except as provided in this subsection;

b. Personal, nonprofit transactions, such as the transfer of lots by gift, if those lots are not further divided or transferred within a 5-year period or the transfer of lots by devise or inheritance; or

c. Grant of a bona fide security interest in the whole lot or subsequent transfer of the whole lot by the original holder of the bona fide security interest or that person's successor in interest;

5. In those subdivisions that would otherwise not require site location approval, unless intended to circumvent this article, the following transactions may not, except as provided, be considered lots offered for sale or lease to the general public:

   a. Sale or lease of common lots created with a conservation easement as defined in Title 33, Section 476, provided that the Department of Environmental Protection is made a party; or

   b. The exception described in paragraph 5 does not apply, and the subdivisions requires site location approval, whenever the use of a lot described in paragraph 5 changes or the lot is offered for sale or lease to the general public without the limitations set forth in paragraph 5; and

6. The transfer of contiguous land by a permit holder to the owner of a lot within a permitted subdivision is exempt from review hereunder, provided that the land was not owned by the permit holder at the time the Department of Environmental Protection, the MDOT or the City approved the subdivision. Further division of the transferred land must be reviewed under these standards.

   For the purposes of this section, a parcel of land is defined as all contiguous land in the same ownership provided that lands located on opposite sides of a public or private road are considered each a separate parcel of land unless that road was established by the owner of land on both sides of the road was established by the owner of land on both sides of the road subsequent to January 1, 1970. A lot to be offered for sale or lease to the general public is counted, for purposes of determining jurisdiction, from the time a municipal subdivision plan showing that lot is recorded or the lot is sold or leased, whichever occurs first, until 5 years after that recording, sale or lease.

B. **Structure.** A "structure" means any building, parking lot, road, paved area, wharf or area to be stripped or graded and not to be revegetated that cause a total project to occupy a ground area in excess of 3 acres. Stripped or graded areas that are not revegetated within a calendar year are included in calculating the 3-acre threshold.

C. **Passenger car equivalents at peak hour.** "Passenger car equivalents at peak hour" means the number of passenger cars, or in the case of non-passenger vehicles, the number of passenger cars that would be displaced by non-passenger vehicles, that pass through an intersection or on a roadway under prevailing roadway and traffic conditions at that hour of the day during which the traffic volume generated by the development is higher than the volume during any other hour of the day. A one tractor-trailer combination is the equivalent of 2 passenger cars.

11.2. REVIEW STANDARDS

The following standards shall be applied in evaluating subdivisions or site plans as defined above, except where Portland elsewhere has adopted more restrictive standards, the more restrictive standards shall control:

11.2.1. Financial and technical capacity. The developer has the financial capacity and technical ability to develop the project in a manner consistent with state environmental standards and with the provisions of Portland's Code of Ordinances. The Planning Board may issue a permit that conditions any site alterations upon a developer providing the Planning Board with evidence that the developer has been granted a line of credit or a loan by a financial institution

authorized to do business in this State or with evidence of any other form of financial assurance the Planning Board determines to be adequate. The Planning Board shall also assess any such application in accordance with the standards set forth in Chapter 373 of the Maine Department of Environmental Protection Site Law Regulations, as may be amended from time to time.

11.2.2. Traffic movement. For any development that generates 100 or more passenger car equivalents at peak hour, the developer has made adequate provision for traffic movement of all types into and out of the development area. Before issuing a permit, the Planning Board shall determine that any traffic increase attributable to the proposed development will not result in unreasonable congestion or unsafe conditions on a road in the vicinity of the proposed development. The Department of Transportation or the City of Portland Traffic Engineer shall provide the Planning Board with an analysis of traffic movement of all types into and out of the development area and with a statement of recommended findings on traffic issues. In making its determination under this subsection, the Planning Board shall consider the analysis and recommendations provided by the City's Traffic Engineer or the Department of Transportation. Traffic movement determinations are subject to the following:

A. A proposed development that involves fewer than 100 passenger car equivalents at peak hour is not subject to traffic review.

B. If any project qualifies for review hereunder solely because it generates 100 or more passenger car equivalents at peak hour then the review hereunder shall be limited only to issues relevant to the traffic movements standards in this section. Otherwise all other standards of review shall be applied.

   In all instances the appropriate representative of the municipality or municipalities where the project is located, shall discuss with the applicant the scope of impact evaluation required for the proposed development. The applicant shall provide notice to abutting municipalities.

C. If a development is located in an area designated as a growth area in a local growth management plan that has been found by the State to be consistent with the growth management program in Title 30-A, Chapter 187, the Planning Board shall require improvements to the level of traffic service only if the level of service adjacent to or in the vicinity of the development is or would be level of service E or F, as determined by the City's Traffic Engineer, in accordance with the "Highway Capacity Manual" (3rd Edition 1994). In these cases, improvements are limited only to those necessary to mitigate for the foreseeable impacts of the development.

D. The Planning Board shall also assess any such application in accordance with the standards set forth in Chapter 374 of the Maine Department of Environmental Protection Site Law Regulations, as may be amended from time to time.

11.2.3. No adverse effect on the natural environment. The developer has made adequate provision for fitting the development harmoniously into the existing natural environment and that 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. In making a determination under this subsection, the Planning Board shall apply the standards set forth in Chapter 375 of the Maine Department of Environmental Protection Site Law Regulations, as may be amended from time to time.

11.2.4. Soil types. The proposed development will be built on soil types that are suitable to the nature of the undertaking. In making a determination under this subsection, the Planning Board shall apply the standards set forth in Chapter 376 of the Maine Department of Environmental Protection Site Law Regulations, as may be amended from time to time.

11.23.5. Ground water. The proposed development will not propose an unreasonable risk that a discharge to a significant ground water aquifer will occur. In making a determination under this subsection, the Planning Board shall apply the standards set forth in Chapter 500 and 502 of the Maine Department of Environmental Stormwater Management and Direct Watersheds of Waterbodies Most at Risk from New Development Rules, as may be amended from time to time.

11.2.6. Ground water. The developer has made adequate provision of utilities, including water supplies, sewerage facilities, solid waste disposal and roadways required for the development and the development will not have an unreasonable adverse effect on the existing or proposed utilities and roadways in the municipality or area served by those services.

11.2.7. Flooding. 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. In making a determination under this subsection, the Planning Board shall apply the standards set forth in Chapter 500 and 502 of the Maine Department of Environmental Stormwater Management and Direct Watersheds of Waterbodies Most at Risk from New Development Rules, as may be amended from time to time.

11.2.8. Storm water management and erosion and sedimentation control. The proposed development meets the standards for storm water management in 38 MRSA §420-D as amended from time to time (See Exhibit 1) and the standard for erosion and sedimentation control in 38 MRSA §420-C as amended from time to time. In making a determination under this subsection, the Planning Board shall apply the standards set forth in Chapter 500 and 502 of the Maine Department of Environmental Stormwater Management and Direct Watersheds of Waterbodies Most at Risk from New Development Rules, as may be amended from time to time.

12. EROSION AND SEDIMENTATION CONTROL STANDARDS

~~The following are the mandatory minimum standards for Construction Activity subject to Chapter 32, Article IV of the City of Portland Code of Ordinances. Minor and Major Site Plans are defined by Chapter 14 of the City of Portland Code of Ordinances.~~

~~For projects that require a **major site plan approval, or those projects that do not require site plan approval which result in 1 acre or more of Disturbed Area**, a Comprehensive Erosion and Sedimentation Control Plan as detailed in section 6.2 below is required for all Construction Activity.~~

~~For projects that require a **minor site plan approval, or those projects that do not require site plan approval which result in less than 1 acre** or more of Disturbed Area, a Basic Erosion Control Plan as detailed in section 6.1 below is required of all Construction Activity.~~

~~**Minor residential** projects must use effective erosion and sedimentation controls for the duration of the Construction Activity, but are not required to submit an Erosion and Sedimentation Control Plan.~~

~~**In all circumstances**, the City reserves the right to require a Comprehensive Erosion and Sedimentation Control Plan, or any component thereof, when site conditions dictate (e.g. proximity to sensitive natural resources, steep grades).~~

12.1. APPLICABILITY

The following are the mandatory minimum standards for Construction Activity subject to Chapter 32, Article IV of the City of Portland Code of Ordinances.

TABLE 12-A. EROSION AND SEDIMENTATION CONTROL REQUIREMENTS BY PROJECT TYPE

	Plan Submission Requirement	Inspector Requirement	Inspection Report Submittal
Major Site Plan > 1 Acre of Disturbance	Comprehensive	Third-Party Inspector	Weekly to Water Resources & Planning
Major Site Plan < 1 Acre of Disturbance	Comprehensive	Qualified Professional	Weekly to Water Resources & Planning (may be waived)
Minor Site Plan	Basic	Self-Inspection	None
~~Minor Residential~~Small-Scale Residential Development (1-4 units)	None	Self-Inspection	None

* In all circumstances, the City reserves the right to require a Comprehensive Erosion and Sedimentation Control Plan, or any component thereof, when site conditions dictate (e.g. proximity to sensitive natural resources, steep grades).

12.2. Basic Erosion and Sedimentation Control

12.2.1. Basic erosion and sedimentation control plan requirements.

Erosion Control BMPs must meet the requirements of sections 12.3 and 12.4 below. The Basic Erosion and Sedimentation Control Plan (Basic ESC Plan) must consist of a graphic representation of the site at a scale no less than 1 inch = 100. The Basic ESC Plan must include the following:

A. Name(s) of and contract information for the person(s) responsible for installation, inspection, and maintenance of ESC BMPs;
B. Parcel boundaries;
C. Locations of coastal sand dune systems, coastal wetlands, significant wildlife habitat, fragile mountain areas, freshwater wetlands, great ponds and rivers, streams or brooks;
D. Locations of all Erosion and Sedimentation Control BMPs to be used; and
E. Details for all Erosion and Sedimentation Control BMPs, meeting the requirements of section 12.3, to be used.

12.2.2. Basic inspection and maintenance requirements.

A. All areas of disturbance, impervious areas, ESC BMPs, materials storage areas exposed to precipitation, and locations where vehicles enter or exit the Site shall be inspected:
    1. Once before any disturbance begins and after all Erosion and Sedimentation Control BMPs specified in the Erosion and Sedimentation Control Plan are in place;
    2. At least once a week as well as before and within 24 hours after a storm event (rainfall); and
    3. Once at project completion to ensure the Site has reached permanent stabilization and all temporary erosion and sedimentation controls have been removed.

B. The applicant is responsible for inspecting the site and maintaining erosion and sedimentation controls in good working order.
C. In general, sites that require a basic ESC plan and have less than 1 acre of disturbance are not required to submit an inspection report, however the City reserves the right to require and review reports for any project.
D. If ESC BMPs need to be maintained, repaired, or enhanced, the work shall be initiated upon discovery of the problem but no later than the end of the next workday or prior to a precipitation event, whichever comes first. If additional ESC BMPs or significant repair of ESC BMPs are necessary, implementation must be completed prior to any storm event (rainfall) and within 7 calendar days of identification. All measures must be maintained in effective operating condition until areas are permanently stabilized.

12.3. Comprehensive Erosion and Sedimentation Control

12.3.1 Comprehensive erosion and sedimentation control requirements.

A Comprehensive Erosion and Sedimentation Control Plan (Comprehensive ESC Plan) shall be prepared by a Qualified Professional as defined in City of Portland Code of Ordinances Chapter 32, Article IV.

The Comprehensive ESC Plan shall consist of a graphic representation of the Site at a scale of no less than 1 inch = 100 feet. The Comprehensive ESC Plan must include the following:

A. Name(s) of and contract information for the person(s) responsible for installation, inspection, and maintenance of ESC BMPs;
B. Parcel boundaries;
C. Topography for site pre-and post-construction conditions as 2-foot elevation contours;
D. Limits of clearing and site work;
E. Locations of coastal sand dune systems, coastal wetlands, significant wildlife habitat, fragile mountain areas, freshwater wetlands, great ponds and rivers, streams or brooks;
F. Locations of areas not to be disturbed by Construction Activity including trees, vegetation, and areas intended for infiltration;
G. Locations of all Erosion and Sedimentation Control BMPs to be used;
H. Details for all Erosion and Sedimentation Control BMPs to be used;
I. Example inspection form meeting the requirements of section 6.2.2;
J. ESC Phasing Plan for Construction as detailed in section 6.5;
K. Dewatering Plan as detailed in section 6.6 and application for review and approval if necessary; and
L. Good Housekeeping and Pollution Prevention Plan as detailed in section 6.7.

12.3.2 Pre-construction meeting.

For sites with a Comprehensive Erosion Control Plan, a pre-construction meeting is required. Once an approved Performance Guarantee, if required, is in hand and at least five (5) days prior to commencing Construction Activity, the applicant shall request a pre-construction meeting with the Enforcement Authority. At a minimum, attendance at the meeting is required by the Enforcement Authority and the applicant or their representative in charge of construction. If the representative in charge of construction is not the primary earthwork contractor, a representative of the earth work contractor must also attend the pre-construction meeting. Erosion and sediment controls should be installed for inspection during the pre-construction meeting and must be installed and inspected prior to the start of construction.

12.3.3. Comprehensive inspection and maintenance requirements.

Erosion and Sedimentation Controls must be inspected, as detailed below, to confirm that BMPs are in place and functioning. Corrective actions must be taken if erosion is occurring or there is a discharge of sediment or turbid water from the construction Site.

A. For all sites with one acre or greater of disturbance, the applicant shall retain the services of a qualified professional third-party inspector to inspect the site weekly, for the duration of construction until final site stabilization is in place. For sites less than one acre of disturbance that are required to have a comprehensive erosion and sediment control plan, the applicant shall retain the services of a qualified professional.
B. The inspection is required in order to ensure that all construction and stabilization activities comply with the approved drawings and specifications; that field decisions regarding erosion control implementation, stormwater system installation, and natural resource protection are based on sound engineering and environmental considerations; and that any changes to the development's erosion control plan, stormwater management plan, or final stabilization plan is communicated to the City of Portland for additional review and approval.

C. All areas of disturbance, impervious areas, ESC BMPs, materials storage areas exposed to precipitation, and locations where vehicles enter or exit the Site shall be inspected at least once a week as well as before and within 24 hours after a storm event (rainfall) and prior to completing permanent stabilization measures.

D. For all sites with one acre or greater of disturbance, the inspector will submit weekly written reports to the Stormwater Coordinator(s) in the Water Resources Division of Public Works and the Development Review Coordinator(s) in Planning. Reports must include: project ID, project address, the date(s) and time(s) of inspection(s), site photographs of areas under construction, and the date(s) and approximate duration(s) of any rainfall events in the prior week. The report will identify and describe any erosion problems or discharge of pollutants and what actions will be taken to address these issues and repair any damage to other properties or natural resources, actions to eliminate the erosion source, and actions to prevent future sediment discharges from the area. Sites with less than 1 acre of disturbance may request a waiver to be reviewed and approved by Water Resources, for weekly inspection report submission, as allowed by Chapter 32- 48 of the Code of Ordinances.

E. If ESC BMPs need to be maintained, repaired, or enhanced, the work shall be initiated upon discovery of the problem but no later than the end of the next workday or prior to a precipitation event, whichever comes first. Immediate corrective actions are required to address active discharges of sediment to municipal streets or storm drains or to surface waters. If additional ESC BMPs or significant repair of ESC BMPs are necessary, implementation must be completed prior to any storm event (rainfall) and within 7 calendar All development constructed within the limits of the City of Portland shall have a hydrant within five hundred feet (500') of all structures. days of identification. All measures must be maintained in effective operating condition until areas are permanently stabilized.

F. An inspection log summarizing the inspections and any corrective actions 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 ESC BMPs, materials storage areas, and vehicle access points to the parcel. Inspection documentation must include maintenance needed, ESC BMPs that failed to operate as designed or proved inadequate for a particular location, and location(s) where additional ESC BMPs are needed. The inspection log must also document what corrective actions are needed and when corrective actions were completed. The inspection log shall be maintained for at least three years from the completion of permanent stabilization.

12.4. Erosion and Sedimentation Control Best Management Practices

Where not otherwise specified in this section, the Erosion and Sedimentation Control (ESC) best management practices (BMPs) shall be designed using performance standards specified in the most recent Maine Erosion and Sediment Control BMPs Manual for Designers and Engineers developed by the Maine Department of Environmental Protection.

12.4.1. Minimizing disturbed areas.

Minimize Disturbed Area and protect natural downgradient buffer areas, and any areas where stormwater may flow off-Site to the extent practicable. Control stormwater volume and velocity within the Site to minimize soil erosion. Minimize the disturbance of steep slopes. Control stormwater Discharges, including both peak flow rates and volume, to minimize erosion at outlets. The Discharge shall not result in erosion of any open drainage channels, swales, stream channels or stream banks, upland, or coastal or freshwater wetlands off the project Site.

A. Whenever practicable, no disturbance activities shall take place within 50 feet of any Protected Natural Resource.
B. If it is not practicable to maintain the 50-foot buffer of no disturbance, the Erosion and Sedimentation Control Plan must include redundant (at least two) perimeter control measures that are appropriate for the soil and slope.

12.4.2. Sediment barriers.

Prior to construction, properly install sediment barriers at the downgradient edge of any area to be disturbed and adjacent to any drainage channels within the Disturbed Area. Sediment barriers shall be installed downgradient of soil and sediment stockpiles and stormwater must be prevented from running onto the stockpile. Maintain the sediment barriers by removing accumulated sediment, or removing and replacing the barrier, until the Disturbed Area is permanently stabilized. Where a Discharge to a storm drain inlet occurs, you must install and maintain protection measures that remove sediment from the Discharge. Storm drain inlet protection must include effective curb inlet or "back throat" protection, where applicable.

12.4.3. Stabilized construction entrance.

Prior to construction, properly install a stabilized construction entrance (SCE) at all points of egress from the Site. The SCE is typically a stabilized pad of aggregate, underlain by a geotextile filter fabric, or an engineered track out control mat which has been approved by Maine DEP which is used to prevent traffic from tracking material away from the Site onto public ROWs. Maintain the SCE until all Disturbed Areas are stabilized. If an alternate SCE has been approved by Maine DEP, provide proof of this with the Plan or application.

12.4.4. Stormwater channels.

Each channel shall be constructed in sections so that the section's grading, shaping, and installation of the permanent lining can be completed the same day. If a channel's final grading or lining installation must be delayed, then diversion berms must be used to divert stormwater away from the channel, properly-spaced check dams must be installed in the channel to slow the water velocity, and a temporary lining installed along the channel to prevent scouring.

12.4.5. Sediment basins.

Sediment basins that will be used to control sediment during construction activities must be designed to provide storage for either the calculated runoff from a 2-year, 24-hour storm or provide for 3,600 cubic feet of capacity per acre draining to the basin. Outlet structures must discharge water from the surface of the basin whenever possible. Erosion controls and velocity dissipation devices must be used if the discharging waters are likely to create erosion. Accumulated sediment must be removed as needed from the basin to maintain at least half of the design capacity of the basin. Clearly visible staking must be installed with marks showing the elevation of half design capacity for easier inspection. The use of cationic treatment chemicals in Sediment Basins, such as polymers, flocculants, or other chemicals that contain an overall positive charge designed to reduce turbidity in stormwater may only be used if the basin does not directly discharge to surface waters and if proof of approval by Maine DEP is provided.

12.5. Timing of ESC Installation and Removal

12.5.1. ESC best management practices required prior to earth disturbance.

Erosion and Sedimentation Control BMPs must be in place prior to earth disturbance. For sites with 1 acre or more of disturbance which require a Comprehensive ESC Plan, ESC BMPs should be installed prior to the required pre-construction meeting.

12.5.2. Temporary stabilization.

Within 7 days of the cessation of Construction Activities in an area that will not be worked for more than 7 days, stabilize any exposed soil with mulch, or other non-erodible cover. Stabilize areas within 75 feet of a wetland or waterbody within 48 hours of the initial disturbance of the soil or prior to any storm event, whichever comes first.

12.5.3. Permanent stabilization.

If the Site or a portion of the Site will not be worked for more than one year or has been brought to final grade, then permanently stabilize the area within 7 days by planting vegetation, seeding, sod, or through the use of permanent mulch, or riprap, or road sub-base. If using vegetation for stabilization, select the proper vegetation for the light, moisture, and soil conditions; amend the Disturbed Area subsoils with topsoil, compost, or fertilizers; protect seeded areas with mulch or, if necessary, erosion control blankets; and schedule sodding, planting, and seeding so to avoid die-off from summer drought and fall frosts. Newly seeded or sodded areas must be protected from vehicle traffic, excessive pedestrian traffic, and concentrated runoff until the vegetation is well-established with 90% cover by healthy vegetation. If necessary, areas must be reworked and restabilized if germination is sparse, plant coverage is spotty, or topsoil erosion is evident. Permanent Stabilization Definitions are as follows:

A. Seeded Areas: For seeded areas, permanent stabilization means a 90% cover of the Disturbed Area with mature, healthy plants with no evidence of washing or rilling of the topsoil.
B. Sodded Areas: For sodded areas, permanent stabilization means the complete binding of the sod roots into the underlying soil with no slumping of the sod or die-off.
C. Permanent Mulch: For mulched areas, permanent mulching means total coverage of the exposed area with an approved mulch material. Erosion control mix may be used as mulch for permanent stabilization according to the approved application rates and limitations.
D. Riprap: For areas stabilized with riprap, permanent stabilization means that slopes stabilized with riprap have an appropriate backing of a well-graded gravel or approved geotextile to prevent soil movement from behind the riprap. Stone must be sized appropriately. It is recommended that angular stone be used.
E. Paved Areas: For paved areas, permanent stabilization means the placement of the compacted gravel subbase is completed, provided it is free of fine materials that may runoff with a rain event.
F. Ditches, Channels, and Swales: For open channels, permanent stabilization means the channel is stabilized with a 90% cover of healthy vegetation, with a well-graded riprap lining, turf reinforcement mat, or with another non-erosive lining such as concrete or asphalt pavement. There must be no evidence of slumping of the channel lining, undercutting of the channel banks, or down-cutting of the channel.

12.5.4. Removal of temporary measures.

Remove any temporary control measures, such as silt fence, within 30 days after permanent stabilization is attained. Remove any accumulated sediments and stabilize.

12.5.4. Winter construction.

Winter construction is Construction Activity performed during the period from November 1 through April 15. If Disturbed Areas are not stabilized with permanent measures by November 1 or new soil

disturbance occurs after November 1, but before April 15, then these areas must be protected and runoff from them must be controlled by the following additional winter construction measures and restrictions:

A. Site Stabilization: Hay mulch is applied at twice the standard temporary stabilization rate. At the end of each construction day, areas that have been brought to final grade must be stabilized. Mulch may not be spread on top of snow.
B. Sediment Barriers: All areas within 75 feet of a Protected Natural Resource must be protected with a double row of sediment barriers.
C. Ditch Lines: Ditch lines must be stabilized with an appropriate stone lining backed by an appropriate gravel bed or geotextile unless specifically released from this standard by the Maine DEP. If release from Maine DEP has been granted, provide proof of this with the Plan or application.
D. Slopes: Mulch netting must be used to anchor mulch on all slopes greater than 8% unless erosion control blankets or erosion control mix is being used on these slopes. Unvegetated slopes less than 8% must be protected with an erosion control blanket, erosion control mix, or riprap.
E. Maintenance: Winter stabilization BMPs must be inspected and maintained as any other erosion and sedimentation control BMP.

12.6. Phasing of Erosion and Sedimentation Control

12.6.1 ESC phasing plan.

Erosion and Sedimentation Control BMPs must be in place before construction begins; additional Erosion and Sedimentation Control BMPs shall be installed as needed and shall be phased in if phasing is used; and ESC BMPs shall be maintained until permanent stabilization is achieved.
Phasing Plan Requirements: No phasing plan is required if the contractor will limit the Disturbed Area to a maximum of 5 acres of disturbance across the Site at any time. If the Construction Activity will result in more than 5 acres of Disturbed area at any one time, the Contractor shall provide a phasing plan showing:

A. Initial area to be disturbed;
B. Portions of the initial disturbance that will be stabilized, and what temporary or permanent stabilization methods will be used;
C. Areas of the site that will subsequently be disturbed and what temporary or permanent stabilization methods will be used; and
D. Each phase of disturbance and stabilization must clearly show the total areas in square feet or acres such that the 5-acre Disturbed Area limit at any one time is met throughout the entire project.

12.7. Dewatering Plan

The Erosion and Sedimentation Control Plan must include provisions to remove or properly disperse the collected water in a manner that prevents sediment from entering stormwater. The City of Portland requires a Dewatering Plan and Application for any construction dewatering discharging to City infrastructure, as detailed in the *Rules and Regulations for Use of the Sewer System*.

12.8 Good Housekeeping and Pollution Prevention Plan

A Good Housekeeping and Pollution Prevention Plan is required as part of a Comprehensive ESC Plan. The Good Housekeeping and Pollution Prevention Plan must be site specific and address the following:

12.8.1 Spill prevention.

Controls must be used to prevent pollutants from construction and waste materials stored on-Site from entering 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.

12.8.2 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.

12.8.3 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 shall be included to minimize tracking of mud and sediment. If off-Site tracking occurs, public roads shall 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, shall wet down unpaved access roads once a week or more frequently as needed with a water additive to suppress fugitive sediment and dust.

12.8.4 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. Sediment generated by concrete or mortar mixing, brick cutting & saw cutting activities must be contained (e.g., sausage boom, straw bales, etc.) and cleaned up using dry methods (i.e., sweeping or vacuuming) to prevent it from entering drainage structures or water resources. These activities shall be done on vegetated areas whenever possible and away from drainage structures and water resources.

12.8.5 Excavation dewatering.

Excavation dewatering 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 otherwise treated to collect the maximum amount of sediment possible, like a coffer dam sedimentation or sediment filter bag. Avoid allowing the water to flow over Disturbed Areas of the Site. If the Maine DEP has approved equivalent measures, provide proof of approval. Note that discharge of excavation dewater fluids from the Site must be visually clear (no visible suspended or settleable solids). Any dewatering discharges from a site to the City right-of way or infrastructure are prohibited unless the City has provided approval of a Dewatering Plan and Application submitted by the Contractor. Discharges from the Site into the City's storm drain or sewer system must first obtain City approval through the Dewatering Program, as detailed in the *Rules and Regulations for Use of the Sewer System*.

12.8.6 Washout from concrete, stucco, paint, curing compounds, or other construction materials.

If washout/cleanout is to be completed on the Site, a designated area(s) shall be established and marked on the Erosion and Sedimentation Control Plan. This area shall be a minimum of 50 feet from all drainage structures, ditches, waterbodies, and resource areas, as well as property boundaries if possible. The area shall not have an outlet to discharge wastes or flows. No detergents shall be used or vehicles washed in this location. A leak-proof pit or container shall be established in the washout area(s), to which washings shall be directed. This area shall be used for washout containment and dewatering by evaporation only. The pit shall not allow infiltration to occur. To prevent clean water from entering the pit, the washout area shall be covered during precipitation events. Inspections of the pit shall be conducted daily to ensure no leaks are present and no discharge is occurring.

12.8.7 Non-stormwater discharges.

Except as allowed or exempted herein, no person shall create, initiate, originate or maintain a non-stormwater discharge to the storm drainage system. Such non-storm water discharges are prohibited, notwithstanding the fact that the City may have approved the connections, drains or conveyances by which a person discharges un-allowed storm water discharges to the storm drain system.

A. Authorized Non-Stormwater Discharges

Where allowed non-stormwater discharges exist, they must be identified, and steps shall 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:

1. Discharges from firefighting activity
2. Hydrant flushing if dechlorinated to 0.05 mg/l or less
3. Vehicle wash water if detergents are not used and washing is limited to the exterior of vehicles (engine, undercarriage, and transmission washing is prohibited)
4. Dust control runoff if it does not cause erosion
5. Routine external building washdown, not including surface paint removal, that does not involve detergents
6. Pavement wash water (where spills/leaks of toxic or hazardous materials have not occurred, unless all spilled material had been removed) if detergents are not used
7. Uncontaminated air conditioning or compressor condensate
8. Uncontaminated groundwater or spring water
9. Foundation or footer drain-water where flows are not contaminated
10. Uncontaminated excavation dewatering per item 5 Excavation Dewatering
11. Potable water including waterline flushings
12. Landscape irrigation

B. Unauthorized non-stormwater discharges.

1. Wastewater from the washout or cleanout of concrete, stucco, paint, form release oils, curing compounds, or other construction materials;
2. Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance;
3. Soaps, solvents, or detergents used in vehicle and equipment washing;
4. Sediment laden discharges; and
5. Toxic or hazardous substances from a spill or other release.

13. SOLAR ENERGY STANDARDS

~~13.1 APPLICABILITY~~

~~**13.1.1** All solar energy generation systems are subject to the standards set out in the Article 6 of the Land Use Code, whether permitted or conditional.~~

~~**13.1.2** Roof mounted and accessory ground mounted solar energy systems as per Article 6 of the Land Use Code not subject to site plan review must comply with technical, safety and maintenance standards as per Building and Fire Code requirements and as determined by the Permitting and Inspections Department when a building permit is submitted. These solar energy systems must obtain a building permit but are not subject to the detailed Technical Standards in 15.2 below.~~

~~**13.1.3** It should be noted that roof mounted systems potentially present a safety issue for the Fire Department in the event of a fire, and it is recommended that any roof mounted solar energy system be discussed with the Fire Department prior to design.~~

~~**13.1.4** The technical standards in 15.2 below apply to any minor or major solar energy generation system that requires site plan approval (through the Planning Division) in accordance with Article 14, Site Plan, of the Land Use Code. These solar energy systems also require a Building Permit and other permits as required by Permitting and Inspections Department. The Permitting and Inspections Department may have additional submittal requirements for solar energy systems.~~

~~**13.1.5** The following technical standards are referenced in Article 6 of the Land Use Code and aim to complement this ordinance and the existing codes and site plan review standards. Together the aim is to ensure safe, effective and efficient installation of solar energy systems compatible with surrounding uses. Within this aim the overall intent is to encourage the installation of solar energy systems.~~

13. 1 TECHNICAL STANDARDS

13.1.1 Site Layout. Wherever possible solar energy systems should be located on the side or rear (i.e. least visible) part of the site. This also applies to associated features such as lighting and infrastructure. Applicants shall take all reasonable efforts to place utility connections underground, unless making use of existing lines, or as otherwise required by the utility. The proposed placement of new poles for electrical connections shall be included in the site plan and construction management plan.

13.1.2 Site Plan Review Standards. Proposals should address the specific requirements for solar energy systems found in Article 6, as well as the site plan review standards, listed in Article 13. It is recognized that some of the Site Plan standards may not be relevant, as determined by the Planning Division/Planning Board during the review. It is likely that the review of any solar energy system would focus on how the proposals avoid or minimize impacts on the following:

A. Existing vegetation and other natural resources - location on brownfield sites and on areas that are already impervious are encouraged; ~~W~~
B. Wetlands and areas subject to flooding - DEP approval may be required;
C. Wildlife and wildlife habitats - information may be requested on resources, impacts and potential mitigation e.g. through specified maintenance regimes;
D. Septic systems, leach fields (unless explicitly allowed by the relevant regulator);
E. Existing topography - ensure adequate temporary and permanent erosion and sedimentation control;
F. Water quality of the stormwater runoff;
G. Airport flight paths (FAA approval may be required);
H. Other specific or local site characteristics as referenced in ordinance standards.

13.2.3 Security. The siting and design of the solar energy installation shall ensure that unauthorized access is prevented, and shall be in conformance with all applicable electrical code requirements. Knox boxes at gates (or similar arrangements as approved during the review) shall be provided for emergency access.

13.2.4 Screening. The ordinance specifies screening from nearby residential/institutional uses and public ways. The proposals should take advantage of existing topography and vegetation where possible to integrate the development (including fencing, infrastructure and connections to the grid) into the landscape, and introduce vegetated buffer areas. Fencing shall be wildlife friendly and as unobtrusive as possible, utilizing measures such as locating the fencing along topographical contours and screening with planting. The selection of new planting would be in accordance with the Technical Standards in Section 4 Site Landscaping.

13.2.5 Construction Impacts. Proposals should include information regarding the methods of construction ~~and a Construction Management Plan may be requested~~. Clearing of existing trees and vegetation shall be restricted to the minimum amount needed for construction access and to avoid shading of the solar development. Construction work should be performed in such a way that erosion and sedimentation is minimized, and measures should be taken to permanently stabilize disturbed areas of the site as soon as possible.

13.2.6 Lighting, signage and materials. Where lighting is necessary it should be at the lowest level to meet functional needs, activated by motion sensors, fully shielded and of cut off design to meet the Site Lighting standards in Section 12 of the Technical Standards. Similarly, signage should meet functional needs of safety/security and emergency contacts and not include advertising. ~~Materials would ideally be of neutral colors and manufactured with a low "carbon footprint".~~

~~**13.2.7 Stormwater Management.** A new solar development will be required to comply with the Technical Standards in Section 5 Portland Stormwater Management Standards and Maine DEP Chapter 500 Stormwater Management.~~

13.3 SAFETY STANDARDS

~~**13.3.1 Building Permit.** All solar energy systems require a building permit prior to installation, whatever level of site plan review. All shall be installed by a qualified solar installer.~~

13.3.2 Certification. Solar energy systems shall be designed, erected and installed in accordance with all applicable codes, regulations and standards, with equipment approved under a certification program certified by the US Department of energy or similar. Experimental, homebuilt and prototype models would not be permitted.

13.3.3 Hazardous Materials. The city is concerned about the creation of hazardous waste in the future and requires a statement from the applicant regarding the content of toxic materials (eg cadmium) in the proposed system. Where the panels contain potentially toxic materials, the Operations and Maintenance Plan (for medium and large ground mounted or dual use systems - see below) shall address future disposal.

13.4 MAINTENANCE STANDARDS

13.4.1 Maintenance. Maintenance includes, but is not limited to: cleaning, mowing, painting, structural repairs, integrity of security measures, maintenance of site access adequate for emergency and maintenance services, planned maintenance of fencing, stormwater systems and vegetation/ground cover, plans for cleaning panels and any specific mowing or other regimes to support the wildlife habitat value of the site.

13.4.2 Operations and Maintenance Plan. All minor and major solar energy systems, as defined in Article 6 of the Land Use Code are required to provide an Operations and Maintenance Plan that is prepared and stamped by a licensed Professional Engineer or other licensed Professional as appropriate. The Plan will vary depending on the site, the method of connecting to the grid, and the number and type of panels- but is expected to address the maintenance items listed in 15.4.1 and any operational time tables as relevant, and include the following:

A. Clarification of the responsible party;
B. Any maintenance items that are particularly important from a public safety perspective;
C. An estimate of the life of the project;
D. What options/actions are anticipated when it has reached the end of its estimated useful life; and
E. How the disposal of any toxic materials will be handled when the system is dismantled.

14. SUBMISSION AND PLAN REQUIREMENTS

14.1. APPLICATION SUBMISSION REQUIREMENTS

14.1.1. Zoning map and/or text amendment.

The applicant shall submit for review a packet of materials and submissions in a form and content as specified by the Department of Planning and Urban Development to demonstrate compliance of the proposed amendment(s). Such submissions shall contain, at a minimum, the following elements:

A. General submission requirements for all zoning amendment applications.
   1. Application form;
   2. Applicable fees;
   3. Cover letter with detailed project description; and
   4. Analysis of the consistency of the requested amendment with the goals, policies and land use plan of Portland's Comprehensive Plan.

B. Additional submission requirements for applications including zoning map amendments.
   1. Evidence of Right, Title and Interest demonstrated through documents such as deeds, leases, or purchase and sales agreements;
   2. Vicinity Map;
   3. Map of Current Zoning and Proposed Map Amendment; and
   4. Site Plan of the area to be rezoned on a 24" x 36" sheet, showing existing and proposed improvements, including such features as building, parking, driveways, walkways, landscaping, and property boundaries.

14.1.2. Conditional use.

The applicant shall submit for review a packet of materials and submissions in a form and content as specified by the Department of Planning and Urban Development to demonstrate compliance of the Conditional Use Permit application. Such submissions shall contain, at a minimum, the following elements:

A. Application form;
B. Applicable fees;
C. Cover letter with detailed project description;
D. Evidence of right, title and interest demonstrated through documents such as deeds, leases, or purchase and sales agreements;
E. Traffic narrative demonstrating that the volume and type of vehicle traffic to be generated, hours of operation, expanse of pavement, and number of parking spaces required are not substantially greater than would normally occur at surrounding uses or other allowable uses in the zone;
F. Environmental impacts narrative that demonstrates that the proposed use will not create any unsanitary or harmful conditions by reason of noise, glare, dust, sewage disposal, emissions to the air, odor, lighting, or litter;
G. Design and operation narrative that demonstrates the design and operation of the proposed use, including but not limited to landscaping, screening, signs, loading, deliveries, trash or waste generation, arrangement of structures, and materials storage will not have a substantially greater effect/impact on surrounding properties than those associated with surrounding uses or other allowable uses in the zone; and
H. Narrative addressing any use- or zone-specific standards of the Land Use Code.

14.1.3. Major and minor site plans (excluding one- through four-unit residential development).

The applicant shall submit for review a packet of materials and submissions in a form and content as specified by the Department of Planning and Urban Development to demonstrate compliance of the development with the site plan standards listed in Article 14 of the Land Use Code. Such submissions shall contain, at a minimum, the following elements:

A. General submission requirements.

1. Application form;
2. Applicable fees;
3. Project description, including contact information for all Maine Licensed Landscape Architects, Certified Soil Scientists, and Professional Engineers working on the project;
4. Evidence of right, title and interest;
5. Evidence of state and/or federal approvals, if applicable;
6. Written assessment of project compliance with applicable zoning requirements;
7. Written assessment of project compliance with site plan standards;
8. Summary of existing and/or proposed easements, covenants, public or private rights-of-way, or other burdens on the site;
9. Written requests for waivers from the city's site plan or technical standards, if applicable;
10. Evidence of financial and technical capacity; and
11. Boundary survey stamped by a professional surveyor licensed to practice in the State of Maine, drawn to scale and tied into the State Plane Coordinates, NAD 1983, Maine West Zone, as specified in Section 13 of the Technical Manual. A boundary survey of the site, may be waived by the Planning Authority for a review of Master Development Plan, where an existing conditions plan is available. The Boundary Survey requirement shall be met for each phase of development. Major Site Plan applications must meet the minimum Boundary Survey Standards of Appendix 1.

B. Written materials for major site plan applications.

1. Construction Management Plan, including a traffic control plan;
2. A traffic study and other applicable transportation plans in accordance with Section 17 of the Technical Manual, where applicable;
3. A narrative describing any significant natural features, wildlife and fisheries habitats or archaeological sites subject to the provisions of Section 14.6.2 of the land use code that are located on or near the project site and a description of the methods that will be used to protect such areas or sites during and post construction;
4. Tree survey prepared by a licensed land surveyor, arborist, forester, or landscape architect that identifies the location of existing street trees and the general location of on-site trees and vegetation. The tree survey shall clearly indicate forest type and the location, size, and species of all existing trees 10" diameter at breast height (DBH) or greater on the site and in the right-of-way, and all feature mature trees on the site and in the right-of-way. Sites with a high density of existing trees, the tree survey shall identify all existing shade and ornamental trees that may have been part of a prior landscape scheme for the site and the location, average size and species of groves of trees, and individual trees greater than 16" DBH;
5. A narrative describing site layout, on and off-site watershed hydrology, new and existing buildings and facilities, total impervious area, disturbed area and developed area created by the project;
6. For Major Site Plans only, Soil Survey prepared to the class required in Appendix 3;
7. Stormwater runoff calculations as described in Section 5 of the Technical Manual;
8. A narrative describing the development's consistency with applicable City Master Plans;

9. Evidence of Utility Capacity to Serve;
10. Estimated types and quantities of solid waste to be generated by the development. For new commercial and industrial development, a description of the estimated amount and type of recyclable material to be generated;
11. A code summary referencing NFPA 1 and all Fire Department technical standards;
12. Where applicable, an assessment of the development's consistency with any applicable design standards contained in Section 14.6.4 of the land use code and/or in the City of Portland Design Manual; and
13. Manufacturer's verification that all proposed HVAC and manufacturing equipment meets applicable state and federal emissions requirements.

C. Plans required for site plan applications

A Plan based upon a standard stamped boundary survey meeting City of Portland standards, stamped by a professional engineer licensed to practice in the State of Maine shall include the following information:

1. Existing and proposed structures, as applicable, and distance from property lines;
2. Approximate location of structures on parcels abutting the site;
3. All streets and intersections adjacent to the site and any proposed geometric modifications to those streets or intersections;
4. Location, dimensions and materials of all existing and proposed driveways, vehicle and pedestrian access ways, and bicycle access ways, with corresponding curb lines;
5. Engineered construction specifications and cross-sectional drawings for all proposed driveways, paved areas, sidewalks;
6. Location and dimensions of all proposed loading areas including turning templates for applicable design delivery vehicles;
7. Existing and proposed public transit infrastructure with applicable dimensions and engineering specifications;
8. Location of existing and proposed vehicle and bicycle parking spaces with applicable dimensional and engineering information;
9. Location of all snow storage areas and/or a snow removal plan;
10. Proposed buffers and preservation measures for significant natural features, where applicable, as defined in the LID Section of the Technical Manual;
11. Location and proposed alteration to any watercourse;
12. A delineation of wetlands boundaries, using methods prescribed by the U.S. Army Corps of Engineers Wetlands Delineation Manual (1987), and prepared by a qualified professional. Maine State Jurisdictional Wetlands and wetlands as defined by the Shoreland Zoning Ordinance should be identified according to the Natural Resources Protection Act (Title 38 M.R.S.A. Section 480-B) and identified on the plan, including a topographic map at a scale of 1" = 100 feet;
13. Proposed buffers and preservation measures for wetlands, that shows all development activity including lots, common areas, driveways, and building windows in conjunction with wetlands;
14. Existing soil conditions, identifying high permeability soils, and location of test pits and test borings;
15. Existing vegetation to be preserved (including Maine Native and Climate-Resilient Northeastern Native Vegetation in buffer areas), proposed site landscaping, screening and proposed street trees, as applicable;
16. A stormwater management and drainage plan that identifies stormwater treatment measures to be used, post-development drainage areas, drainageways and associated time of concentration, and statement of which stormwater treatment measures will be maintained privately and which are proposed to be offered to the City

for acceptance and operation. Stormwater management and drainage plan shall be submitted meeting the application requirements of Appendix 4;

17. Limits of disturbance;
18. Grading plan;
19. Waters of the State (38 M.R.S. §361-A(7)) and their associated Shoreland Protection areas;
20. Ground water protection measures;
21. Existing and proposed sewer mains and connections;
22. Location of all existing and proposed fire hydrants and a life safety plan in accordance with Section 3 of the Technical Manual;
23. Location, sizing, and directional flows of all existing and proposed utilities within the project site and on all abutting streets;
24. Location and dimensions of off-premises public or publicly accessible infrastructure immediately adjacent to the site;
25. Location and size of all on-site solid waste receptacles, including on-site storage containers for recyclable materials for any commercial or industrial property;
26. Plans showing the location, ground floor area, floor plans and grade elevations for all buildings;
27. A shadow analysis as described in Section 11 of the Technical Manual, if applicable;
28. 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;
29. Location and dimensions of all existing and proposed HVAC and mechanical equipment and all proposed screening, where applicable;
30. An exterior lighting plan in accordance with Section 12 of the Technical Manual;
31. A master signage plan showing the location, dimensions, height, setback, materials, and illumination of all existing and proposed signs; and
32. Location, dimensions and ownership of easements, public or private rights of way, both existing and proposed.

14.1.4. Site plans for small scale residential development (one through four units).

The applicant shall submit for review a packet of materials and submissions in a form and content as specified by the Department of Planning and Urban Development to demonstrate compliance of the development with the site plan standards listed in Article 14 of the Land Use Code. Such submissions shall contain, at a minimum, the following elements:

A. General Submission Requirements

1. Application form;
2. Applicable fees;
3. Project description, including contact information for all Maine Licensed Landscape Architects, Certified Soil Scientists, and Professional Engineers working on the project;
4. Evidence of right, title and interest;
5. Evidence of state and/or federal approvals, if applicable;
6. Written assessment of project compliance with applicable zoning requirements;
7. Written assessment of project compliance with site plan standards;
8. Summary of existing and/or proposed easements, covenants, public or private rights-of-way, or other burdens on the site;
9. Written requests for waivers from the city's site plan or technical standards, if applicable;
10. Evidence of financial and technical capacity; and

11. Boundary survey stamped by a professional surveyor licensed to practice in the State of Maine, drawn to scale and tied into the State Plane Coordinates, NAD 1983, Maine West Zone. Applications must meet the minimum Boundary Survey Standards of Appendix 2 for each phase of development

B. Written materials small scale residential applications.

1. Construction Management Plan, including a traffic control plan;
2. A traffic study and other applicable transportation plans in accordance with Section 17 of the Technical Manual, where applicable;
3. A narrative describing any significant natural features, wildlife and fisheries habitats or archaeological sites subject to the provisions of Section 14.6.2 of the land use code that are located on or near the project site and a description of the methods that will be used to protect such areas or sites during and post construction;
4. Tree survey prepared by a licensed land surveyor, arborist, forester, or landscape architect that identifies the location of existing street trees and the general location of on-site trees and vegetation. The tree survey shall clearly indicate forest type and the location, size, and species of all existing trees 10" diameter at breast height (DBH) or greater on the site and in the right-of-way, and all feature mature trees on the site and in the right-of-way. Sites with a high density of existing trees, the tree survey shall identify all existing shade and ornamental trees that may have been part of a prior landscape scheme for the site and the location, average size and species of groves of trees, and individual trees greater than 16" DBH;
5. A narrative describing site layout, on and off-site watershed hydrology, new and existing buildings and facilities, total impervious area, disturbed area and developed area created by the project;
6. Stormwater runoff calculations as described in Section 5 of the Technical Manual;
7. A narrative describing the development's consistency with applicable City Master Plans;
8. Evidence of Utility Capacity to Serve;
9. Estimated types and quantities of solid waste to be generated by the development. For new commercial and industrial development, a description of the estimated amount and type of recyclable material to be generated;
10. A code summary referencing NFPA 1 and all Fire Department technical standards;
11. Where applicable, an assessment of the development's consistency with any applicable design standards contained in Section 14.6.4 of the land use code and/or in the City of Portland Design Manual; and
12. Manufacturer's verification that all proposed HVAC and manufacturing equipment meets applicable state and federal emissions requirements.

C. Plans required for small-scale residential applications

Site plans shall be based upon the boundary survey and shall show the following information:

1. Existing and proposed structures, as applicable, and distance from property lines;
2. Existing and proposed paved areas, if applicable;
3. Proposed ground floor area and finish floor or sill elevation;
4. For minor residential only, exterior building elevation drawings (all sides);
5. Location of proposed utilities;
6. Identification and proposed protection measures for any significant natural features, as defined in the LID Section of the Technical Manual;
7. Identification and proposed protection for alterations of watercourses, if applicable;
8. A delineation of wetlands boundaries, using methods prescribed by the U.S. Army Corps of Engineers Wetlands Delineation Manual (1987), and prepared by a qualified professional. Maine State Jurisdictional Wetlands and wetlands as defined by the Shoreland Zoning Ordinance should be identified according to the Natural

Resources Protection Act (Title 38 M.R.S.A. Section 480-B) and identified on the plan, including a topographic map at a scale of 1" = 100 feet;

9. Proposed buffers and preservation measures for wetlands, that shows all development activity including lots, common areas, driveways, and building windows in conjunction with wetlands;
10. Soil type;
11. Existing and proposed grades and contours;
12. Location, dimensions and ownership of easements, public or private rights of way, both existing and proposed;
13. Overall stormwater approach including and narrative and plan documenting the proposed location and types of stormwater management control and treatment measures, along with an identification of what stormwater treatment measures will be maintained privately and which will be offered to the Municipality for acceptance and operation;
14. Location of all snow storage areas and/or a snow removal plan;
15. Soil erosion control plan;
16. Post-development drainage areas, drainageways, and associated time of concentration;
17. Existing vegetation to be preserved (including Maine Native and Climate-Resilient Northeastern Native Vegetation in buffer areas), proposed site landscaping, screening, and proposed street trees, if applicable;
18. Existing and proposed curb and sidewalk;
19. Location, area, and limits of the proposed site disturbance or alteration;
20. Water of the State and their associated Shoreland Protection areas, if applicable; and
21. Proposed pier, dock, wharf, pier, or slope stabilization in the Shoreland Zone, if applicable.

14.1.5. Subdivision.

The applicant shall submit for review a packet of materials and submissions in a form and content as specified by the Department of Planning and Urban Development to demonstrate compliance of the development with the subdivision standards listed in Article 15 of the Land Use Code. Such submissions shall contain, at a minimum, the following elements:

A. Subdivision plat.

The following information shall be shown on the subdivision plat unless otherwise indicated:

1. Date, north point, title and graphic scale. Scale shall not be more than 60 feet to the inch unless lots are more than an acre, but in no event more than 100 feet to the inch;
2. Based on a recent survey by the subdivider, existing contours at two feet intervals or as otherwise required by the Public Works Authority. Existing structures which are to remain will shall be delineated;
3. Names of proposed streets, width of rights of way, and typical cross section reservation, and depth of construction materials;
4. Locations, widths and purposes of other rights of way or easements to be recorded;
5. All appropriate street curve information, including point of curvature, point of tangency, tangent distance, radii and interior angle, in standard engineering format;
6. Location of those utilities existing on or adjacent to the tract to be subdivided, including size and elevation of buried or underground utilities (may be shown on separate plan);
7. Tract boundary lines and property lines of lots, with accurate dimensions and either bearings or deflection angles. All lots shall be numbered;
8. Names of adjacent property owners with parcels over 25,000 square feet or names of adjacent subdivision;
9. Designation of flood hazard areas, as defined by the National Flood Insurance Program and shown on the city flood hazard boundary map, as well as any other areas in the subdivision subject to inundation by storm water or storm sewer overflow;

10. All potential wetlands within the proposed subdivision, regardless of the size of those wetlands;
11. A narrative and a plan showing all existing and proposed buffer strips, their dimensions, and maintenance plans and responsibilities;
12. A plan showing significant natural features located on or directly adjacent to the proposed subdivision and a description of the methods that will be used to protect such area(s);
13. Any river, stream or brook, or Waters of the State (38 M.R.S. §361-A(7)) and their associated Shoreland Protection areas within or abutting the proposed subdivision. For purposes of this section, ″river, stream or brook″ has the same meaning as in 38 M.R.S. § 480 B, Subsection 9;
14. Identified state and local archaeological sites/resources, and historic sites and structures which either are locally designated, appear on the National Register, or are nominated to the National Register by the state historic preservation officer;
15. Proposed private and public utility system including water, gas, telephone, fire hydrants, and any other services which shall supply the area (may be shown on separate plan);
16. Sanitary sewer and storm drain plans and profiles showing size, kind and slope of pipe, proposed manhole rim and invert elevations and catch basin locations and drains (may be shown on separate plan);
17. Lighting plan showing the location, design, height and spacing from each other of the support poles, in accordance with standards and specifications established by the Public Works Authority (may be shown on separate plan);
18. Tree plan showing groups of existing, sizeable trees which the subdivider intends to preserve (may be shown on separate plan);
19. A detailed plan of the entire subdivision and the immediate vicinity showing all existing and proposed drainage both on- and off-site including drainage areas, drainageways, associated time of concentration, etc., with directional flow arrows and approximate slope grades, and showing proposed finished ″spot elevations″ around the perimeter of the subdivision and proposed stormwater treatment measures to be used, with identification of stormwater treatment measures that will be maintained privately and which will be offered to the City for acceptance and operation. Proposed drainage shall be shown as it may affect or restrict development on individual lots and with reference to improvements for which a performance guarantee is required under this article. Where deemed feasible by the Public Works Authority, proposed finished contours at intervals of two feet shall be provided on the drainage plan upon request (may be shown on separate plan);
20. Location and designation of any zoning district boundaries affecting the subdivision;
21. Plan showing the limits of disturbance;
22. Plan showing locations of snow storage areas;
23. All future phases and sections of the subdivision proposed by the subdivider (may be shown on separate plan);
24. Proposed parks and school sites, or other public open space that the developer proposes to convey to the city;
25. Names, addresses and stamp or certification, if applicable, of registered professional engineer, subdivider, and owner;
26. At the option of the subdivider, any other information that may be necessary for the full and proper consideration of the subdivision shall be submitted in writing;
27. Streets and right of way monuments and property line markers;
28. Vicinity sketch (may be shown on separate plan);
29. Total site data, including total area of the subdivision, total area in streets, total area in recreation or open space and number of house lots; and
30. Profiles of each street or way in the subdivision shall be shown on the subdivision plat. They shall be drawn to a longitudinal scale of 40 feet to one foot and a vertical scale of four feet to one inch. Such profiles shall include

separate profiles of each side line and center line of the street or way. Any buildings abutting on the street shall be shown in standard engineering format as requested by the Public Works Authority.

B. Supplemental submissions.

1. When private sewage systems are used, the results and supporting data of a soil test of each lot in the subdivision conducted by a soil evaluator licensed in the state;
2. When the adequacy of the subdivision's load bearing capacity is in question, the results and supporting data of test borings conducted by a professional engineer registered in the state;
3. When conditions warrant, a program which shall be implemented by the subdivider to control dust, erosion and sedimentation and/or vehicular traffic during construction;
4. Evidence of the applicant's financial capability to carry out all phases of the proposed development;
5. Evidence of technical capacity to undertake the development;
6. Evidence of state and federal approvals, licenses or permits required by law, or the status of applications therefor;
7. Price range of houses that will be built in the subdivision;
8. Traffic impact analysis;
9. High intensity soil survey identifying high permeability soils, if required by the Planning Authority;
10. Types and estimated quantities of solid waste to be generated by the development
11. Construction plan outlining the anticipated sequence of construction of the major features of the project including without limitation roads, retention basins, sewer lines, seeding and other erosion and sedimentation control measures, and pollution abatement measures and also setting forth the approximate dates for commencement and complement of the project; and
12. Where submission drawings are available in electronic form, the applicant shall submit any available electronic CADD.DXF files with final plans.

C. Recording plat.

The Recording plat shall be an original ink drawing on linen or mylar, or as necessary to be acceptable to the Registry of Deeds, and shall be tied to an accepted street or to a proposed street under construction and bonded to insure construction. The plat shall show the following:

1. Title, date, graphic scale, north arrow, name, signature and registration number or seal of a registered land surveyor licensed in the state, name and address of developer and owner;
2. Tract boundary lines and property lines of lots, with accurate dimensions and either bearings or deflection angles. All lots shall be numbered;
3. All appropriate street curve information, including point of tangency, tangent distance, radii and interior angles, in standard engineering form;
4. Street names, width of street rights of way and typical cross section showing only surface dimensions of roadway pavement, esplanade and sidewalk reservation;
5. Street and right of way monuments and property markers. Iron pipes shall be designated by a small circle at the point of installation;
6. Locations, dimensions and purposes of any easement or right of way;
7. Purpose for which sites, other than residential lots, are dedicated or reserved; it being understood that any reservations of areas shall be subject to the proper zoning thereof;
8. Reference to recorded subdivision plats of adjoining platted land by book and page number;
9. Space for the signatures of the Planning Board and date of approval; and

10. Where required by 30 A M.R.S. § 4406, the fact that initial approval or subsequent amendment of a subdivision is based in part upon the granting of a variance from any of the applicable subdivision approval standards.

14.2. BOUNDARY SURVEY REQUIREMENTS

14.2.1. Major and minor site plans (excluding minor residential site plans).

The following items shall be shown on boundary surveys to ensure compliance with City of Portland planning requirements, engineering technical and design standards, and accurate documents are on record for future planning, GIS mapping, and engineering needs:

1. Name and address of the property owner, the applicant and name of the proposed development, and with references to the Deed Book and Page at the Cumberland County Registry of Deeds;
2. North arrow;
3. Scale of not less than one (1) inch to fifty (50) feet;
4. Graphic scale (scale bar);
5. Plan Size: Where possible, it is preferred that plans not exceed a maximum size of 24" x 36";
6. Site Boundaries: The full parcel boundaries must be shown on the survey;
7. Total land area of the site;
8. Zoning district boundaries, if applicable;
9. Required zoning setbacks for the site;
10. Flood Zone statement, where applicable, based on FEMA, FIRM Flood Insurance Rate Maps;
11. Existing and proposed grading contours at intervals of not more than two (2) feet;
12. Existing structures or other improvements on the site and the approximate location of structures or improvements on adjoining lots within fifty feet (50') of the site boundary;
13. Existing streets, right-of-way, restrictions or easements on the site;
14. The location and size of existing utilities servicing the site, including fire hydrants;
15. Significant natural features on or directly adjacent to the site, including wetlands, ponds, watercourses, floodplains, significant wildlife habitats and fisheries or other important natural features as listed in the LID Section of the Technical Manual. Delineation of wetlands boundaries shall use methods prescribed by the U.S. Army Corps of Engineers Wetlands Delineation Manual (1987). Maine State Jurisdictional Wetlands and wetlands as defined by the Shoreland Zoning Ordinance should be identified according to the Natural Resources Protection Act (Title 38 M.R.S.A. Section 480-B) and identified on the plan, including a topographic map at a scale of 1" = 100 feet;
16. Tree survey that identifies the location of existing street trees, the general location of on-site trees and vegetation (including Maine Native & Climate Resilient Northeastern Native Vegetation in General Buffer & Shoreland Zone Buffer areas). Alternately, Applicants may submit a separate tree survey performed by a licensed land surveyor, arborist, forester, or landscape architect to meet the Preservation of Existing Vegetation standards of the LID Section;
17. Waters of the State (38 M.R.S. §361-A(7)) and their associated Shoreland Protection Areas, if applicable;
18. Predevelopment drainage areas, drainageways, and associated time of concentration, if applicable;
19. Existing soil conditions, with identification of high permeability soils;
20. Vicinity Map showing the relationship of the project to the surrounding area at a scale no greater than one-inch equals 2,000 feet;

21. A revision block with a number and date indicating the revision status. The revision block shall be located in the title block or adjacent to it;
22. Rim elevations of all catch basin and manhole structures;
23. Invert elevations of all pipes entering and/or exiting catch basins and manhole structures;
24. The length, material, diameter, and slope of all storm sewer and sanitary sewer piping;
25. The location, with dimensions from existing structures, at the main line pipe and at the street property line, of all sanitary sewer and storm drain laterals. The Public Services Department Engineering Archives may have this information available for existing infrastructure;
26. Location, size, type of material, and invert elevations of culverts;
27. Location of water lines and valves, gas lines and valves, buried electrical lines, buried communication cables, buried TV cables, telephone and electric manholes, utility hand-hold access boxes, transformer pads, utility and light poles;
28. All curbing and sidewalks, stating type of material;
29. Property Corners: Location and descriptions of all property corners set or found, proposed to be set, and all granite survey monuments set. Where no property markers exist, the City of Portland requires that the property markers be installed and that a licensed surveyor set and confirm proposed building locations on site prior to the issuance of a building permit;
30. Boundary Survey plans, based on State of Maine Professional Licensing Boards' legal requirements, shall bear the seal of a Professional Land Surveyor licensed to practice in the State of Maine;
31. City Vertical Datum: It shall be stated on all plans that the City of Portland established vertical datum of NGVD 1929 is used or manhole rim elevation data is used for all information shown on the plan;
32. All plans shall state the Official City of Portland Benchmark used as supplied by the Public Services Engineering Division Archivist;
33. Distances, bearings, and angles shall be shown on the survey or subdivision plans, shall tie the property into the nearest accepted street line and be tied into established City of Portland survey monuments or record survey data at the Public Services Engineering Archives. Ties shall be considered as an inverse line with a bearing and distance to the nearest second and hundredth of a foot;
34. All current conveyances of lots, parcels, easements, and other forms of right, title, and/or interest shall be shown on both the survey plan (as submitted and as amended), with references to the Deed Book and Page at the Cumberland County Registry of Deeds; and
35. Street Status. The Status of the street shall be shown; IE Accepted City Street, Continued Paper Street, Discontinued City Street, Vacated Paper Street, or new Proposed Street as per the project submission.
36. Prior to starting field surveys and design on a project it is strongly advised to contact the City Engineer's office, Public Services Department, Engineering Division at (207) 874-8846 for information on existing infrastructure, additional requirements, or future projects that may affect the proposed project;
37. Proposed Survey Monument Locations, if required. Granite survey monuments shall be set on one side of the street as directed by the Public Services Engineering Division on the 3-foot offset Lines, as offset towards the street. Notes describing monuments found by the Project Surveyor shall include information describing the size, condition, and depth below grade to the top of any buried monuments found;
38. All proposed (if required by Planning) and existing survey monuments shall be shown in bold line type on all utility and site plans;
39. Projects shall be tied into the Maine State Plane Coordinate System (2-zone projection), West Zone using the NAD1983 Datum and the U.S. Survey Foot as the unit of measure. The survey methods, traverse or GPS observations/methods, geodetic control used, and coordinates of new monuments set shall be stated on the survey and subdivision plans;

40. When State Plane Coordinates are required, the State Plane Coordinates (to the nearest hundredth of a foot) of two survey property corners shall be displayed for any two property corners in the project which are the farthest distance apart. Please contact the Public Services Engineering Division for assistance in providing Survey Control Points or GPS Base Station Support;
41. Bearing Basis. When State Plane Coordinates are required, magnetic bearings may be shown on plans submitted, with a note stating that the project was submitted digitally to the City of Portland on State Plane Coordinates, but that the bearings on the plans are magnetic due to survey and boundary retracement considerations. The plan shall show the magnetic declination if magnetic bearings are shown; and
42. All easements and conveyances proposed as part of the project shall be recorded, upon project approval, at the Cumberland County Registry of Deeds. Easement ownership and responsibility must be stated on the survey plans. Revised plans may be requested if deeds are executed during the progression of the project for easements or other conveyances.

14.2.2. Waiver of boundary survey requirement for major and minor site plans.

The reviewing authority may permit the submission of a partial survey depicting only the to-be- developed portion of the improved lot of record if the development:

A. Is proposed on an already improved lot of record; and
B. Comprises less than one (1) acre of said improved lot of record.

14.2.3. Minor residential site plans.

The following items and information shall be shown on boundary surveys for minor residential development site plans (as defined in Section 16 of the Technical Manual) to ensure compliance with City of Portland planning requirements, engineering technical and design standards, and accurate documents are on record for future planning, GIS mapping, and engineering needs:

1. Name and address of the property owner, the applicant and name of the proposed development, and with references to the Deed Book and Page at the Cumberland County Registry of Deeds.
2. North arrow.
3. Scale of not less than one (1) inch to fifty (50) feet.
4. A graphic scale (scale bar).
5. Plan Size: Where possible, it is preferred that plans not exceed a maximum size of 24" x 36".
6. Site Boundaries: The full parcel boundaries must be shown on the survey.
7. Total land area of the site.
8. Significant natural features on or directly adjacent to the site, including wetlands, ponds, watercourses, floodplains, significant wildlife habitats and fisheries or other important natural features as listed in the LID Section of the Technical Manual, if applicable. Delineation of wetlands boundaries shall use methods prescribed by the U.S. Army Corps of Engineers Wetlands Delineation Manual (1987). Maine State Jurisdictional Wetlands and wetlands as defined by the Shoreland Zoning Ordinance should be identified according to the Natural Resources Protection Act (Title 38 M.R.S.A. Section 480-B) and identified on the plan, including a topographic map at a scale of 1" = 100 feet.
9. Tree survey that identifies the location of existing street trees, the general location of on-site trees and vegetation (including Maine Native & Climate Resilient Northeastern Native Vegetation in General Buffer & Shoreland Zone Buffer areas), and meets the tree survey requirements. Alternately, Applicants may submit a

separate tree survey performed by a licensed land surveyor, arborist, forester, or landscape architect to meet the Preservation of Existing Vegetation standards of the LID Section.

10. Waters of the State (38 M.R.S. §361-A(7)) and their associated Shoreland Protection Areas, if applicable.
11. Predevelopment drainage areas, drainageways and associated time of concentration, if applicable.
12. Existing soil conditions, with identification of high permeability soils.
13. Flood Zone statement, where applicable, based on FEMA, FIRM Flood Insurance Rate Maps.
14. Existing streets, right-of-way, restrictions or easements on the site.
15. A revision block with a number and date indicating the revision status. The revision block shall be located in the title block or adjacent to it.
16. Property Corners: Location and descriptions of all property corners set or found, proposed to be set, and all granite survey monuments set. Where no property markers exist, the City of Portland requires that the property markers be installed and that a licensed surveyor set and confirm proposed building locations on site prior to the issuance of a building permit.
17. Boundary Survey plans, based on State of Maine Professional Licensing Boards' legal requirements, shall bear the seal of a Professional Land Surveyor licensed to practice in the State of Maine.
18. City Vertical Datum: It shall be stated on all plans that the City of Portland established vertical datum of NGVD 1929 is used or manhole rim elevation data is used for all information shown on the plan.
19. All plans shall state the Official City of Portland Benchmark used as supplied by the Department of Public Services Engineering Division Archivist.
20. It may be required, especially in areas of old subdivision plans and areas not previously subdivided, that the survey show tie bearings and distances to the nearest street line corner, or to the nearest City of Portland survey monument. Survey tie line precision shall be an inverse line with the bearing to the nearest second and the distance to the nearest hundredth of a foot. This requirement is to aid in adding and verifying the property location on the City of Portland digital GIS basemap.
21. All current conveyances of lots, parcels, easements, and other forms of right, title, and/or interest shall be shown on both the survey plan (as submitted and as amended), with references to the Deed Book and Page at the Cumberland County Registry of Deeds.
22. Street Status: The Status of the street shall be shown; IE Accepted City Street, Continued Paper Street, Discontinued City Street, Vacated Paper Street, or new Proposed Street as per the project submission.

14.2.4. Waiver of boundary survey requirement for minor residential site plans.

If the proposed house is to be located on a lot within an existing subdivision, approved no earlier than 1968, the final subdivision recording plat may be used, provided that the applicant sufficiently documents all existing encumbrances, and can show that no new encumbrances have occurred since recording of the final plat.

14.3. SOIL SURVEY REQUIREMENTS

14.3.1. Soil survey thresholds and requirements.

The level at which various types of projects must be mapped and guidelines for each intensity level of soil mapping are included in Table 1 and Subsection 2:

Table 14-A: Soil Survey standards by development type

Soil Survey Class	Development Threshold	Minimum Standards
A. High Intensity	• Projects with phosphorous control measures (e.g., ponds, infiltration facilities, and buffer strips) • Subdivisions where any lot is less than 2 acres and on-site subsurface wastewater disposal is proposed.	• Mapping units of 1/8 acre or less • Scale is 1-inch equals 100 feet or larger • Ground control – base line and test pits accurately located under the direction of a registered land surveyor or qualified professional engineer • Base map with 2-foot contour lines with ground survey, or aerial survey with ground control • Signed and stamped by a Maine Certified Soil Scientist
B. High Intensity	• Subdivisions ≥20 acres in area with ≥16 lots that includes: o A lot that is <2 acres in area, and o No on-site wastewater disposal, and o New city streets to be constructed. • Project that results in >3 acres of new non-vegetated surface and/or >20 acres in development area.	• Mapping units of 1 acre or less • Scale is 1 inch equals 200 feet or larger • Ground control – test pits located by means of compass by chaining, pacing or taping from known survey points • Base map with 5-foot contour lines survey, or aerial survey with ground control • Signed and stamped by a Maine Certified Soil Scientist.
C. Medium-High Intensity	• Subdivisions where all lots are >2 acres and on-site subsurface wastewater disposal is proposed. • Golf courses, ski areas and trails, and other multi-use recreational developments exceeding 1-acre. • Any project with the City has determined will require a hydrogeological investigation	• Mapping units of 3 acres or less • Scale is 1-inch equals 500 feet or larger • Ground control – as determined by the mapper • Base map – as determined by the mapper • Signed and stamped by a Maine Certified Soil Scientist.
D. Medium Intensity	• All other Major Site Plan and Subdivision developments	Published by Soil Conservation Service for Cumberland County

14.3.2. Additional standards for soil surveys A-C.

A. The soil survey shall be designed using the National Cooperative Soil Survey as a guide and the soils classified at the series level. Soil map units will be phases of soil series.
B. The soil map legend shall include a symbol for each map unit and special symbol for areas too small to be mapped, and the name of each map unit. The soil scientist shall provide a description for each map unit.
C. The soil(s) within an area enclosed by a soil boundary (map unit) will have a minimum of 75 percent of the soil(s) that provide the name of that map unit or similar soil(s). The total amount of dissimilar soils shall not exceed 25 percent of the map unit.
D. Soil boundaries must be observed throughout their length and their placement must correspond to changes in soils and/or land forms.
E. The soil survey must be mapped at a scale as required by the Maine Association of Professional Soil Scientists (MAPSS) Soil Survey Guidelines (available through the Department of Public Services or through the MAPSS website at http://www.mapss.org/publications.htm). The map must identify the soil mapping intensity under which the mapping was conducted.
F. A soil report, completed by a Certified Soil Scientist, shall be submitted with the soil survey and identify all major limitations to the proposed development by the soil characteristics, as well as the SCS Hydrologic Soil Group classification for each soil series.
G. A Maine Certified Soil Scientist shall accurately map and mark in the field the boundaries of any hydric soils identified by the Soil Survey.

14.3.3. Exceptions to soil survey standards.

A. Depending on the nature of the proposed development, the requirement for a soil survey map and report may be waived if the Planning Authority determines that a geotechnical report completed within the past 2 years will provide sufficient information.
B. In the event that greater than 50 percent of a proposed development site is currently developed, an applicant may petition the Planning Authority to accept a lower class of soil survey. The Planning Authority shall review the request, and their decision on the appropriate level of mapping shall be final.
C. The Planning Authority reserves the right to request the preparation of a high intensity soil map or require more intense hydric soil boundary delineation, when special conditions warrant it.

14.4. Stormwater Management and Drainage Plan Requirements

14.4.1. Plan requirements.

Applicants are required to submit a stormwater management and drainage plan as part of development review application and to provide the following submission items to demonstrate compliance with the applicable stormwater management standards:

14.4.2. Urban impaired stream standard requirements.

Calculations for the Compensation Fee or Mitigation Credit per the tables provided in Chapter 500 Rules and other associated Maine DEP regulations. (Note: The City of Portland has an approved Compensation Fee Utilization Plan (CFUP) and can therefore receive in-lieu-fee payments to meet the UIS Standard.)

14.4.3. Water quality treatment requirements.

Written narrative demonstrating compliance, site plans showing grading and drainage infrastructure, site plan showing water quality treatment area(s) with table showing compliance, BMP sizing calculations, construction details, and a

Post-Construction Stormwater Inspection & Maintenance Plan per Maine DEP Chapter 500 Appendix B with reporting requirements per Chapter 32 of City of Portland Code of Ordinances, and a Stormwater Maintenance Agreement. The submission documents should include confirmation of design from the manufacturer for any proprietary systems.

14.4.4. Flooding standard requirements.

Sub-catchment plans with flow paths, full hydrology computations/model output of pre- and post-development conditions, summary of pre- and post-development flowrates, and a written request for waiver with rationale for waiver as noted in Chapter 500 (as applicable). The submission documents should include confirmation of design from the manufacturer for any proprietary systems.

14.4.5. Minimum stormwater detention volume requirements.

Applicable drainage calculations, modeling information, plans and details as required to prove that the detention volume and maximum stormwater outflow control requirements are being met. The submission documents should include confirmation of design from the manufacturer for any proprietary systems. Stormwater detention systems shall be included in the project's overall post construction stormwater inspection & maintenance plan and stormwater maintenance agreement.

14.4.6. Small-scale residential project requirements.

Provide plans and details as stipulated in section 14 of the Technical Manual. The provided site plan must depict the location and sizing of the proposed residential stormwater management system. Details of the proposed systems must also be provided. A short narrative, with supporting calculation documentation, shall be provided to demonstrate that the project is complies with the treatment requirements for small-scale residential development per Section 5 of the Technical Manual.

14.5. Wetland Delineation Requirements

All wetlands shall be delineated and mapped according to the U.S. Army Corps of Engineers Wetlands Delineation Manual (1987). Maine State Jurisdictional Wetlands and wetlands as defined by the Shoreland Zoning Ordinance (hereafter referred to as wetlands) should be identified according to the Natural Resources Protection Act (Title 38 M.R.S.A. Section 480-B) and identified on a map.

14.5.1. General plan requirements.

A. A topographic map with wetlands delineated according to the U.S. Army City of Portland Technical Manual 148 Section 8 - Development in and Adjacent to Wetland Adopted 7/19/10 Corps of Engineers Wetlands Delineation Manual (1987). State of Maine Jurisdictional Wetlands will be identified according to the Natural Resources Protection Act on the same map. The scale should be 1-inch equals 100 feet.
B. A site plan that shows all development activity including lots, common areas, roads, driveways, and building windows in conjunction with wetlands.

14.5.2. Where wetlands filling or alterations is proposed.

A. Areas of wetland fill or alteration must be clearly marked and individually identified on the site plan.
B. A report that contains surface area amounts of wetland fill or alteration for the individually identified fill or alteration locations.
C. A letter from the Department of Inland Fisheries and Wildlife indicating the wetlands on the site contain no significant or valuable wildlife habitat.

D. A letter of non-jurisdiction, a copy of permits received from other regulatory agencies (i.e. Maine Department of Environmental Protection of the U.S. Army Corps. Of Engineers) or report from a qualified professional stating that the proposed work will not require a permit from state of local agencies must be submitted for all projects proposing work either in or adjacent to wetlands prior to issuance of a building permit. This includes wetlands not regulated by the City of Portland

CITY OF PORTLAND TECHNICAL MANUAL

DRAFT

1. November 2024

PREAMBLE

The technical standards contained herein have been promulgated by the Departments of Public Works and the Planning and Urban Development pursuant to §13.5.3(A) and §14.3.1. of the City of Portland Land Use Code following a public hearing of the Planning Board on December 10, 2024.

The technical standards contained herein may be periodically updated and/or amended by the Planning Board pursuant to §2.1.10(P) of the City of Portland Land Use Code.

RECORD OF AMENDMENTS		
Date	Section(s)	Application Number

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1.TRANSPORTATION SYSTEMS, STREET DESIGN STANDARDS

1.1. HORIZONTAL ALIGNMENT OF STREETS

The horizontal alignment of all proposed streets shall conform to the following standards:

1.1.1. Horizontal curves shall have centerline radii of not less than 110 feet.

1.1.2. The alignment centerline shall be straight for at least 100 feet between reverse curves whenever either curve has a centerline radius of less than 200 feet.

1.1.3. When two streets intersect and one street is an arterial or collector street, or both streets are arterial or collector streets, the angle of intersection shall be 90 degrees. When two streets intersect and neither street is an arterial or collector street, the angle of intersection shall be at least 75 degrees and no greater than 105 degrees.

1.1.4. When two streets intersect, adjoining right-of-way lines shall be connected by a circular arc with radius of at least ten (10) feet. The connecting arc shall be tangent to the right-of-way lines on both streets. When the angle of intersection is other than 90 degrees, a radius greater than ten (10) feet may be required.

1.1.5. All dead-end streets shall provide a turnaround at the end of the street, subject to approval by the reviewing authority. Turnarounds shall be designed to facilitate future street connectivity and shall always be designed to the right (refer to Figure I-5).

1.1.6. Street intersections with more than four (4) legs shall be prohibited.

1.1.7. The minimum distance between intersections on any street shall be as follows unless the Department of Public Works determines that unique conditions of the site necessitate a lesser length. The distance between intersections shall be measured from the intersection of street centerlines at one intersection to the intersection of street centerlines at the other intersection. Streets shall be classified in accordance with the Functional Classification Guidelines as set forth by MaineDOT.

Local Street and Local Street Intersection	200 feet
Local Street and Collector Street Intersection	250 feet
Local Street and Arterial Street Intersection	300 feet
Collector Street and Collector Street Intersection	400 feet
Collector Street and Arterial Street Intersection	500 feet
Arterial Street and Arterial Street Intersection	500 feet

1.2. STREET GRADES

1.2.1. Street grades shall conform to the following standards, as shown in Figures I-1, I-2, and I-3:

A. The maximum grade for the centerline of all streets shall not exceed eight (8) percent).
B. The minimum grade for the centerline of all streets shall not be less than one-half (0.5) percent.
C. The cross-slope for local streets shall be three (3) percent. The cross-slope for other street classifications shall be two (2) percent.
D. Cross-slopes for sidewalks shall be one (1) percent minimum and two (2) percent maximum, sloping down and away from the street line to the top of the curb at the gutter line, including pedestrian access routes across driveways, as shown in Figure I-10C.
E. Street grades at intersections shall not be more than three (3) percent for a distance of one hundred (100) feet from the center of the intersection.

1.2.2. Curbless "shared streets" shall be considered on a case-by-case basis after consideration of context, design, and maintenance. Approval of any curbless "shared street" shall be subject to review by the Department of Public Works.

1.3. VERTICAL ALIGNMENT

Where two adjacent street segments are proposed to have different straight-line centerline finish grades, vertical curves shall be used to connect the adjacent street segments. Vertical curves shall be parabolic and tangent to each of the adjacent grades. The minimum vertical curve length, "L", shall be calculated based on the following formula:

$$L = K \times A$$

where "A" is the absolute value of the algebraic difference between the beginning grade and the ending grade of the vertical curve, with both grades expressed in percent, and "K" is a factor whose value depends on street design speed. The K values corresponding to the minimum vertical curve lengths for the above street classifications and vertical curve types (sag curve or crest curve) are as follows:

TABLE 1-A VERTICAL ALIGNMENT STANDARDS

Vertical Curve Type	Local Street	Collector Street	Arterial Street
Crest	K = 20	K = 30	K = 50
Sag	K = 30	K = 40	

1.4. SIGHT DISTANCE

Where driveways or new streets enter an existing street, vehicular sight-distance shall conform to standards established by the MaineDOT as contained in their publication, *Chapter 299, Highway Driveway and Entrance Rules*. For driveways frequently accessed by large vehicles, greater site distance will be required according to Maine DOT guidelines.

1.5. DRIVEWAY DESIGN

1.5.1. All driveways shall be designed according to Table 1-B., unless otherwise approved by the Department of Public Works.

TABLE 1-B. DRIVEWAY DESIGN STANDARDS

Requirement	Minor Driveway (serving <10 residential spaces)	All other driveways
A. Number of driveways	No more than one (1) driveway shall be permitted.	No more than two (2) driveways shall be permitted. Adjacent sites under common ownership shall have no more than two (2) driveways combined.
B. Minimum/ maximum driveway width	10 feet minimum, 20 feet maximum, measured at the property line.	For two-way driveways (preferred): • 20 feet minimum, 24 feet maximum for residential/commercial uses • 30 feet maximum for industrial uses Larger driveway openings may be permitted by the Department of Public Works on a case-by-case basis.
C. Driveway Spacing	Spacing of new or reconfigured driveways shall take the existing pattern of driveways in the surrounding context into account, and shall limit the impact to on-street parking and existing street trees. Shared driveways are encouraged. Driveway locations may be rejected based on documented or anticipated safety or operational issues.	• 50 feet along local streets • 100 feet along arterial and collector streets with posted speeds of 35 mph or less • 150 feet for roadways posted at speeds greater than 35 mph Driveway locations may be rejected based on documented or anticipated safety or operational issues.
D. Driveway separation from intersections	• At least 35 feet along local roads • 50 feet along collectors/ arterials Distance shall be measured from the projection of the right-of-way line at the roadway to the centerline of the driveway. Driveway locations may be rejected based on documented or anticipated safety or operational issues.	• At least 35 feet along local roads • 100 feet along collectors/ arterials Distance shall be measured from the projection of the right-of-way line at the driveway to the centerline of the driveway. Driveway locations may be rejected based on documented or anticipated safety or operational issues.
E. Curbing	2-foot granite corner radius "bugs" (also known as a "bullnose") shall be used where possible. Tipdowns may be used if the driveway crosses a narrow sidewalk.	Granite radii (where sufficient esplanade is available) or tipdowns shall be used. Granite radii shall not cross the pedestrian access route.
F. Driveway intersection angle	Perpendicular to the street, where possible. Where necessary, the driveway shall intersect the street between 75 and 105 degrees unless otherwise approved by the Department of Public Works.	
G. Design vehicle	Driveways shall be designed to accommodate site-specific design vehicles, and shall not be designed larger than necessary, as determined by turning movement diagrams and engineering judgment.	
H. Loading	All necessary functions for loading, circulation, and parking maneuvers shall occur within the site and outside of the right-of-way to the extent practicable, given the site context.	
I. Circulation	Vehicle circulation shall be completely contained within the site to the extent practicable, given the site context.	
J. Backing Maneuvers	Backing maneuvers may be permitted to enter the site. Backing maneuvers from a site may be permitted based on upon site context including functional class of the adjacent street, traffic volumes, and speeds.	Backing maneuvers into and out of the site are prohibited. All vehicles must enter and exit the site facing forward.
K. Parking area size	All driveways shall serve a parking area of at least 8' x 16', clear of any encroachment, plus any setbacks required by zoning. Parking areas and parked cars shall not encroach upon the public right-of-way.	

1.5.2. Auxiliary lanes serving driveways. A left-turn lane and/or right-turn lane with appropriate storage and transition may be considered where engineering analysis indicates a need. The need for auxiliary lanes shall be

considered with the context of the impacts to sidewalks, bikeways, transit stop, on-street parking, and traffic safety. All new auxiliary lanes are subject to the approval of the Department of Public Works.

1.6. SIDEWALK AND CURB RAMPS

1.6.1. Sidewalk construction and materials. Sidewalks shall be brick, concrete or hot mix asphalt. The City Sidewalk Materials Policy (Appendix 1) shall be consulted to determine the appropriate type of sidewalk and driveway construction to use on various streets and in different areas of the City. Within the city's historic districts, only brick shall be used. Sidewalk and driveway construction details are illustrated in Figures I-10 and I-11. All new concreate sidewalks which abut existing concrete sidewalks must be doweled in prior to pouring. All new brick sidewalks shall be constructed with bricks running perpendicular to the path of pedestrian travel, including through driveway crossings.

1.6.2. Sidewalk accessibility. All sidewalks shall meet any minimum standards set forth by current Americans with Disabilities Act (ADA) and Public Right-of-Way Accessibility Guidelines (PROWAG). There are no exceptions unless technical infeasibilities are identified, documented, and approved by the Department of Public Works. In case of conflict, these standards shall supersede this manual.

A. **Sidewalk width.** The minimum sidewalk clear width shall be five (5) feet. Where obstructions, such as utility poles, are located in sidewalks, a minimum clear and direct pedestrian access route width of five (5) feet shall be provided between the obstruction and one edge of the sidewalk. Wider sidewalks may be required in locations where heavy pedestrian traffic is expected, based on the site context. New sidewalks shall be at least as wide within the right-of-way as the sidewalk(s) along the adjacent properties.
B. **Level changes.** The maximum allowable vertical level change at any point is ¼-inch. A level change of ¼-inch to ½-inch shall be formed with a beveled slope no steeper than 26.6 degrees (2:1). Level changes greater than ½-inch shall be designed as ramps.
C. **Running slope.** Sidewalks shall be designed with a running slope no greater than the adjacent street slope.
D. **Cross-slope.** Sidewalks, including pedestrian access routes across driveways, shall be constructed with a minimum cross-slope of 1% and a maximum cross-slope of 2% post-construction. Finished cross-slopes of greater than 2% shall not be acceptable. Designed cross-slopes of 1.5% are encouraged. Cross-slopes shall be consistent across the width of the sidewalk.

1.6.3. Curb ramps. ADA-compliant curb ramps are required on all projects involving construction of new streets or new sidewalks, and on all projects involving alterations to the abutting street, including repaving of existing streets and sidewalks.

Curb ramps shall be designed to prevent ponding of water at the base of the ramp. Ramp designs and details will indicate how positive drainage away from the landing in the vicinity of curb ramps will be achieved.

A. **Applicability.** ADA-compliant curb ramps are required at all marked and unmarked crossing locations. Ramps shall not be provided only where there is no crossing present due to safety concerns or a lack of pedestrian facilities on the opposite corner.
B. **Orientation.** Curb ramps shall be designed with the direction of travel on the ramp perpendicular to the curb line and parallel to the crosswalk, where feasible. Where existing conditions, such as narrow right-of-way width or utility constraints preclude such layouts, parallel ramps, where the entire sidewalk ramps down, are acceptable.

Diagonal ramps are not desirable, but may be approved by DPW on a case-by-case basis. Ramp design standards are provided in Figure I-6.

C. **Detectable warning panels.** All pedestrian curb ramps shall include truncated dome warning panels as shown in Figure I-7. Any curb ramp that is not intended to be used by pedestrians (e.g., ramps serving bikeways) shall not include warning panels. Warning panels shall also be provided where a crossing is present without a curb ramp (for example, where pedestrian facilities are at the same grade as the street, within a median refuge, etc.). All warning panels shall be uncoated cast iron, as detailed in Figure I-7. DPW reserves the right to require the installation of warning panels at driveway locations in such situations where volume or configuration of traffic may necessitate their placement.

1.6.4. Shared use paths. Shared use paths and other pedestrian access routes in the right-of-way shall conform to the same ADA requirements as sidewalks discussed herein. The appropriate material for shared use paths may differ from the material prescribed in the Sidewalk Material Policy. The appropriate material shall be determined by the Department of Public Works if not already documented in a transportation plan or master plan. Shared use paths shall be 10 feet in width or greater to allow for two-way traffic and passing.

1.6.5. Curb extensions. Curb extensions (also known as bump-outs, bulb-outs, or neckdowns) describe any localized narrowing of the roadway, typically at pedestrian crosswalk locations. The installation of any curb extension is subject to the approval of the Department of Public Works.

A. **Applicability.** Curb extensions may be considered where one or more of the following conditions are met:
   1. There is a documented speeding issued confirmed by a speed study;
   2. Curb extensions are necessary to construct one or more ADA-compliant curb ramps at an existing or proposed crosswalk;
   3. As determined necessary at uncontrolled midblock crossings;
   4. At signalized intersections, where reducing the pedestrian crossing time improves signal timing;
   5. At locations where there is a history of crashes involving pedestrians and/or crashes involving right-turning vehicles; or
   6. Where they are prescribed in a master plan or transportation plan.

B. **Curb extension design.** Curb extensions, where permitted, shall be constructed to achieve the applicable goal(s) without disrupting the functionality of the roadway or intersection. Curb extensions:
   1. Shall not impede necessary turning movements for trucks or emergency vehicles or winter operations;
   2. Shall not negatively impact drainage without adequate mitigation;
   3. Shall not impede upon, or narrow to an unacceptable degree, the adjacent travel or bicycle lanes; and
   4. Shall be constructed with radial curb (typically 10-foot radius or greater) at transition points to assist with drainage and maintenance, as shown in Figure I-19.

Curb extensions that encompass on-street parallel parking lanes should generally no exceed six (6) feet in width, as shown in Figure I-19.

1.6.6. Non-compliance. ADA-compliance is required both within and outside of the public right-of-way. Any construction within the public right-of-way that is not built to ADA-compliance shall be reconstructed at the Applicant's expense.

Where strict compliance with ADA is technically infeasible in an alteration of an existing condition, the alteration must be made to the maximum extent technically feasible. The extent to which compliance is technically infeasible shall be documented, and an acceptable design shall be approved by the Department of Public Works. This process should occur during the design phase.

1.7. DRIVEWAY APRONS

Any driveway, or section thereof, located within any public street right-of-way shall be designed and built according to the following specifications:

1.7.1. Construction and materials. The portion of the driveway within the public-right-of-way within the pedestrian access route shall be comprised of the same material as the abutting sidewalk as identified in the Sidewalk Material Policy (Appendix 1) and constructed according to Figure I-10 through I-12.

1.7.2. Pedestrian access route. Where a driveway crosses a sidewalk, shared use path, or other pedestrian access route, a pedestrian access route shall be constructed across the driveway apron with a maximum cross-slope of 2% (1.5% preferred). The pedestrian access route shall be designed and constructed to meet the elevation of the adjacent sidewalk or shared use pathway to the extent feasible.

The pedestrian access route shall be constructed at the same width as the adjacent sidewalk or shared use path to the extent feasible. For pedestrian access routes connecting to adjacent sidewalks, the minimum width is four (4) feet, with five (5) feet preferred.

1.7.3. Driveway apron slope. The driveway apron shall ramp up to the grade of the sidewalk, where feasible. The portion of the driveway between the roadway and the pedestrian access route shall be designed to a maximum slope of 15%, unless otherwise approved by the Department of Public Works. This slope should be minimized to the extent possible while maintaining ADA-compliance and continuity of travel along the pedestrian access route.

1.7.4. Driveway design. Where feasible, driveways shall be designed to keep the pedestrian access route at a consistent elevation for continuity of travel. The portion of the driveway between the roadway and pedestrian access route shall be sloped to provide the full transition between the roadway and sidewalk elevations where feasible. Along roadways where the sidewalk width plus esplanade width is less than seven (7) feet, the sidewalk may be transitioned using ADA-compliant ramps in order to create a suitable driveway crossing.

1.8. ROADWAY CONSTRUCTION, SURFACE, AND AGGREGATES

1.8.1. All roadways shall be constructed in accordance with Chapter 25 of the City of Portland Code of Ordinances and the most current edition of the MaineDOT Standard Specifications unless otherwise indicated herein or otherwise directed in writing by the Department of Public Works.

1.8.2. Aggregates used in concrete mixes and in the construction of street, sidewalks and aprons shall meet the requirements in SECTION 703 – AGGREGATES of the most current edition of the *State of Maine Department of Transportation Standard Specifications* with the following clarifications, additions and modifications:

A. 703.06(a) Aggregate Base Gravels shall adhere to MaineDOT standard specifications listed in Sections 304 and 703 for type "A" material.
B. 703.06(c) Aggregate Subbase Gravels shall adhere to MaineDOT standard specifications listed in Sections 304 and 703 for type "D" material.
C. 703.18 Common Borrow shall not contain any particle of bituminous material.
D. 703.19 Granular Borrow shall adhere to MaineDOT standard specification 703.19 for Granular Borrow material.
E. 703.20 Gravel Borrow shall adhere to MaineDOT standard specification 703.20 for Gravel Borrow material.

TABLE 1-C. MINIMUM THICKNESS FOR PAVEMENT STRUCTURE MATERIALS

Street Classification	Minimum Materials Thickness (Inches)			
	Wearing Course Pavement	Base Course Pavement	Agg. Base Course	Agg. Subbase Course
Minor Residential	1 ½	2	3	15
Residential	1 ½	2	3	15
Collector	1 ½	2 ½	3	18
Commercial/ Industrial	2	3	3	18

TABLE 1.D. MINIMUM PLACEMENT TEMPERATURES FOR HOT MIX ASPHALT PAVEMENT

Base Temperature (° F)	Mat Thickness (Inches)					
	½	¾	1	1 ½	2	3+
40-50*	-	-	-	-	285	275
50-60	-	310	300	295	280	270
60-70	310	300	290	285	275	265
70-80	300	290	285	280	270	265
80-90	290	280	275	270	265	260
90+	280	275	270	265	260	255

* Surface course pavement shall be placed when the air or road base temperature is less than 50 degrees F.

1.9. STREETS ON ISLANDS IN CASCO BAY

Reserved.

1.10. PARKING LOT AND PARKING SPACE DESIGN

1.10.1. Parking lots, except for temporary lots to be used for less than one year, shall be constructed of a permanent and durable hard surface that is not subject to ponding or erosion, both onsite and within the right-of-way, and shall meet accessibility standards. Any proposed permanent parking lot surface must allow for delineation of parking spaces and circulation aisles.

1.10.2. Parking spaces shall meet the following dimensional requirements:

A. Standard parking space: 9 feet wide by 18 feet long, except that low turnover parking spaces, such as those used by residents or employees, may be designed with a width of 8.5' and considered a standard parking space.
B. Compact parking space: 8 feet wide by 15 feet long
C. Motorcycle/motorized scooter parking space: 4 feet wide by 8 feet long

1.10.3. Obstructions within parking areas, including columns and other permanent fixtures, shall not be located within the dimensions of a parking space. Where these obstructions are present, parking shall be striped and dimensioned to omit these obstructions. Such obstructions should not significantly impact vehicle maneuverability, visibility ability to open doors, etc.

1.10.4. All spaces provided shall be safely accessible. Substandard and specialty spaces that are open to the general public shall be labeled as such using signage or pavement markings to inform users.

1.10.5. Compact spaces. Any parking lot with five or more spaces may contain a mix of standard and compact spaces. Up to 20% of parking spaces in a parking area may be compact. Compact parking spaces should be limited in high-turnover parking areas or locations where the typical vehicle is likely to be larger than a typical passenger vehicle. Vehicle turning analysis may be required for review by the Department of Public Works to ensure that spaces function as designed.

1.10.6. Accessible parking. All parking areas shall provide accessible parking per ADA and the Maine Fair Housing Act. ADA standards for number of spaces, dimensions, buffers, cross-slopes, materials, pedestrian accessibility, and other requirements shall apply with no exceptions. Accessible spaces shall be considered "standard" parking spaces for the purposes of calculating the allowable number of compact spaces.

1.10.7. Vehicular access shall be provided by one or more aisles. The minimum two-way drive aisle width is 24 feet for standard, right-angle parking, and is otherwise dependent on parking space orientation, as illustrated in Figure I-16A. Accessible parking spaces shall be served by at least one aisle of standard width or greater.

1.11. MOTORCYCLE/MOTORIZED SCOOTER/MOPED PARKING

To distinguish motorcycle/motorized scooter/moped parking spaces from standard parking spaces, the spaces shall be painted and delineated with signage. These painted spaces shall be angled and shall be four (4) feet wide by eight (8) feet long. The dimensions for on-street motorcycle/motorized scooter/moped parking are outlined in Figure I-16B. On-street motorcycle/motorized scooter/moped parking may also be located where standard vehicle parking would be prohibited because of sight restrictions, such as adjacent to a crosswalk or an approach to a traffic control device. Motorcycles/motorized scooters/mopeds do not create the same sight impediment as a standard vehicle.

1.12. BICYCLE PARKING

1.12.1. Bicycle parking shall:

A. Provide secure, durable racks that maintain bicycles in an upright position and to which bicycles can be affixed with customary lock and cable mechanisms. Fence-type ("wheel bender") racks designed to secure the front wheel only and wave racks are prohibited from counting toward bicycle parking requirements;
B. Be installed on a hard surface that is suitably sized and provides sufficient clearance from obstacles;
C. Be separated from car parking by a physical barrier such as curbing, wheel stops, parking bollards or similar features;
D. Be adequately illuminated where nighttime use is anticipated;
E. Be provided under covered areas and/or in secure storage lockers or rooms, if intended for long-term use; and
F. Be provided within the public right-of-way or be publicly accessible if intended for uses that expect visitation, customers, or short-term usage.

1.12.2. Placement of off-street bicycle parking racks shall conform to the bicycle parking rack placement criteria (drawn from the *Bicycle Facility Design Guide of the District Department of Transportation, 2006*) as illustrated in Figure I-24.

1.12.3. For commercial or industrial uses requiring more than ten (10) bicycle parking spaces:

A. A minimum of ten percent (10%) of required bicycle parking shall be provided within fifty (50) feet of the main entry point of the structure, or shall be no further from such entry than the nearest five (5) non-handicapped parking spaces; and
B. Where there is more than one structure on a site, or where a structure has more than one main entrance, the parking shall be distributed to adequately serve all structures or main entrances.

1.12.4. Directional signage. If bicycle parking is not directly visible from the public right-of-way, directional signage shall be provided indicating the availability and location of bicycle parking facilities.

1.12.5. Approved bicycle rack design. Bicycle racks that are required to meet site plan requirements shall:

A. Provide multiple points of contact between the rack and the bicycle;
B. Allow bicycles to be located without the need to lift the bicycle into the rack; and
C. Be placed in such a way as to allow the intended number of bikes to be securely locked. A minimum of ten percent (10%) of required bicycle parking shall be provided within fifty (50) feet of the main entry point of the structure, or shall be no further from such entry than the nearest five (5) non-handicapped parking spaces.

2.12.6. Approved bicycle racks by location. Bicycle racks that are required to meet site plan requirements shall use approved racks based on the proposed location of the rack:

A. **Private property.** A variety of commercially available racks are acceptable for installation on private property, including but not limited to those catalogue listings identified herein (Figures I-24 and I-25).
B. **In the Public Right-of-Way.** Bicycle parking may be located within a public right-of-way where site conditions cannot reasonably accommodate bicycle parking on private property or in the case of sites that expect high-turnover or short-term bike parking usage. Bike parking may be placed either adjacent to or within reasonable walking distance of the site, if such areas are available that meet the bicycle parking rack placement criteria (drawn from the *Bicycle Facility Design Guide of the District Department of Transportation, 2006*) as illustrated in

Figure I-24. Bicycle racks within the public right-of-way shall be placed to allow for the safe storage of bicycles while limiting encroachment onto adjacent sidewalks. If no location within the right-of-way is available, a financial contribution commensurate with the cost for purchase and installation of the required number of bicycle racks shall be made to the Sustainable Transportation Fund.

The following approved brands, installed according to company specifications, shall be permitted in the public right-of-way:

1. DERO 'Downtown Rack' Inverted U-Rack (Figure I-25);
2. DERO 'Bike Hitch' (Figure I-24); or
3. Old Port District, including Commercial Street: DERO Bike Hitch only (Figure I-24).

Equivalent bicycle racks by other manufacturers are acceptable upon prior approval by the reviewing authority.

Bicycle racks in the public right-of-way shall become the property of the City of Portland.

Bicycle racks in the public right-of-way shall match the designated street furniture color for that location, as described in the Municipal Street Lighting Standards in this manual. Where there is no designated street furniture color, bicycle racks in the public right-of-way shall be black (manufacturer's specification).

1.13. BICYCLE ROUTES AND LANES

The City has developed bike network plans to show present and proposed bikeways, including neighborhood byways, dedicated bicycle lanes, and shared use pathways. Positive identification of bikeways shall be provided by pavement markings, bike lane symbols, and/or signage. The following standards shall be applied to the installation of bike facilities:

1.13.1. Design. The design of any new or modified bicycle facility shall be reviewed and approved by the Department of Public Works prior to application and shall be consistent with the following design standards:

A. Vehicular travel lanes and bicycle lanes shall be separated by a minimum six (6) inch solid white painted edge line adjacent to the travel lane. At intersections, the white edge line shall be a dashed line (two (2) foot painted length by four (4) foot opening) across the intersection and for 50 feet to 100 feet in advance of the intersection, as appropriate. Where there is the potential for right-turning vehicle conflicts with through bicycle movements at intersections, green paint within the bicycle lane is recommended and may be required;
B. Bike lanes shall have a minimum width of five (5) feet. Six (6) feet is preferred for bicycle lanes adjacent to curbed street sections. Where sufficient street width exists, a painted buffer of one (1) foot or more may be provided between the bicycle lane and vehicle travel lanes. Where a bicycle lane is adjacent to on-street parking with moderate to high utilization and/or turnover rates, this buffer should be placed between the bicycle lane and parking lane. The location of the buffer shall be determined in consultation with the Department of Public Works. Where a buffer of one foot or greater is provided, the width of the bicycle lane may be reduced to four (4) feet, if necessary, with approval from the Department of Public Works. Design shall take into account the location of potential obstructions, such as catch basins;

C. Where the minimum or recommended width for bicycle lanes is not immediately available, reallocation of general travel lane widths or the number and configuration of general travel lanes shall be considered, as appropriate, in consultation with the Department of Public Works;
D. On-street bicycle lanes and associated buffers shall not exceed eight (8) feet in total width unless vertical delineation is provided in the buffer area. Applicability and materials of vertical delineation shall be determined by the Department of Public Works;
E. Shared use paths shall be designed to facilitate two-way traffic by users of multiple, nonmotorized modes. In general, shared use paths shall be ten (10) feet or greater in width, and free of any obstructions, including a 2-foot clear zone on each side of the pathway. Refer to the AASHTO *Guide for the Development of Bicycle Facilities* for shared use path design considerations;
F. On bicycle routes, or other roads with considerable bicycle traffic and insufficient roadway width to provide a bicycle lane, shared lane markings ("sharrows") may be used. Where used, sharrows shall be placed in the center of the travel lane(s) serving the bike route(s) or where bicyclists are expected;
G. On two-way roadways with excess roadway width for one bicycle lane, but not two, installation of a single bicycle lane should be considered. The single bicycle lane should be placed in the uphill direction, if located on a hill. Otherwise, if parking is provided on only one side of the roadway, bicycle lane placement should be prioritized on the side of the street with no parking. Where possible, streets with bicycle lanes in only one direction should be paired with another lane on an adjacent parallel street to achieve bicycle mobility in both directions, if possible; and
H. Standard bike lanes and all other on-street bicycle facilities such as separated bike lanes shall be designed in accordance with the most recent version of nationally-recognized design guides, such as the NACTO *Urban Bikeway Design Guide*, the NACTO *Urban Street Design Guide*, the FHWA *Separated Bike Lane Planning and Design Guide*, MassDOT's *Separated Bike Lane Planning & Design Guide*, or other best practice as it becomes available.

1.13.2. Bike network considerations. Bicycle facilities shall be designed within the context of the citywide bicycle network.

1.13.3. Pavement markings and signage. Bicycle lanes shall be marked with appropriate pavement markings such as longitudinal lines and stenciled symbols, as illustrated in Figure I-18. Bike routes shall be identified by appropriate signage as found in the FHWA 'Manual of Uniform Traffic Control Devices', as illustrated in Figure I-18.

1.14. ELECTRIC VEHICLE INFRASTRUCTURE

1.14.1. New structured and surface parking lots of five or more spaces shall include energized electrical outlets or installed chargers capable of providing Level 2 EV charging or higher to 20% of parking spaces (rounded down to the nearest whole number). An additional 50% of spaces must be made EV-ready, meaning that they are served by sufficient conduit and electrical service to allow for future installation of electric vehicle supply equipment at every space.

1.14.2. An applicant may request a reduction in the number of required EV-installed or EV-ready parking spaces in Level 3 EV charging is proposed. In this case, spaces served by Level 3 charging may be substituted for Level 2 at a ratio to be determined in consultation with the Department of Public Works.

1.14.3. In the case of new structured and surface parking of greater than 100 spaces, the review authority may establish the EV parking requirements on the basis of an EV parking demand study. Such study shall be prepared by a qualified professional using industry best practice, and account for future growth in EV demand.

1.15. TRAFFIC CONTROL DEVICES

All intersections of two or more roadways shall be controlled by one of the traffic control methods listed herein. All traffic control shall be selected and installed in accordance with the Manual on Uniform Traffic Control Devices (MUTCD).

1.15.1. Traffic signals.

A. All new traffic signals are subject to the approval of the Department of Public Works. Proposed traffic signals are required to meet at least one traffic signal warrant set by the MUTCD. Signals justified Warrant 3 (Peak Hour Volume), Warrant 7 (Crash Experience), or Warrant 8 (Roadway Network) without meeting at least one other warrant may require additional study. Development projects that trigger, or further exceed, one or more signal warrants at one or more existing or proposed intersections or driveways may be required to install a traffic signal at those locations.
B. New or modified traffic signals also required the submission of a traffic signal plan, including locations of all equipment, underground utilities, phasing and timing plans, and a specific list of all traffic signal hardware. Plans shall be submitted to the Department of Public Works for review and approval prior to installation.
C. New traffic signal proposals are subject to review by MaineDOT, as appropriate. All city, state, and federal guidelines with regard to installation, activation, and monitoring shall apply.
D. Existing traffic signals that do not meet MUTCD signal warrants may be removed if they present operational or safety issues. All removals of existing traffic signals are subject to coordination with and the approval of the Department of Public Works and MaineDOT.
E. The City of Portland traffic signal specifications can be found in the *City of Portland Traffic Signal Policy and Guidance Manual*.

1.15.2. Stop control. Stop signs shall be installed in accordance with MUTCD. Stop signs shall be accompanied by a stop line 12" in width.

Stop control shall not be used for speed control. Stop control should generally not be used on intersection approaches with multiple travel lanes. Stop control shall not be used for intersections with five (5) or more approaches. Such intersections hall be signalized (if warranted), equipped with a roundabout, or otherwise realigned or regulated so that the number of approaches is reduced to four (4) or fewer.

1.15.3. Roundabouts. Where sufficient right-of-way is available, circular intersections (i.e., roundabouts or traffic circles) should be considered. Such intersections may provide operational and safety benefits compared to signalized or stop-controlled intersections. Where selected as the appropriate traffic control measure, roundabouts shall be designed in accordance with the MUTCD Chapter 3C, with signage according to MUTCD Section 2B.07. Neighborhood traffic circles may be considered as stop-controlled intersections as a traffic calming measure. All such treatments are subject to the approval of the Department of Public Works.

1.15.4. Yield control. Yield control should generally only be implemented in the following scenarios:

A. At certain channelized turning lanes separated from adjacent travel lanes by an island (even if the adjacent lanes are controlled by a stop sign or signal);
B. At the entering roadway for a merging movement, including at a roundabout; or
C. Where engineering judgment determines that yield control is appropriate subject to the approval of the Department of Public Works.

1.16. PUBLIC CROSSWALKS

1.16.1. Public crosswalks shall meet the requirements of the Manual on Uniform Traffic Control Devices (MUTCD), unless City standards specify a stricter measure. Public improvements may include but shall not be limited to any one or combination of the following:

A. Crosswalks;
B. Curb bump outs or curb extensions, where warranted;
C. Pedestrian crossing signs (curbside, overhead or in the street);
D. Rectangular Rapid Flashing Beacons (RRFBs);
E. Pedestrian hybrid beacons;
F. Pedestrian activated traffic control signal (red, yellow, green); and
G. Medians or raised islands.

1.16.2. Crossing locations shall be designed to the following standards unless otherwise directed by the Department of Public Works:

A. **Street markings.** Crosswalks on public streets shall consist of 24-inch block style white lines, placed 48 inches apart on center, for an overall width of 8 feet (or wider; at least as wide as the sidewalks served by the crosswalk);
B. **Street lighting.** Crosswalk locations shall be adequately illuminated for visibility at nighttime; and
C. **Signage.** Select crosswalk locations may need to accentuated through the use of signage mounted curbside, overhead, or on the roadway centerline, as described hereinafter. Crosswalk signs shall be placed directly adjacent to crosswalks, and advance warning signs shall be placed in accordance with MUTCD. Standard signs shall be black legend on a fluorescent background.

1.17. PUBLIC TRANSIT FACILITIES

Where required, public transit facilities shall meet the following standards:

1.17.1. Transit pullout bays.

A. Transit pullout bays shall be located in the City right-of-way along the property frontage; or
B. Where space constraints prevent locating a transit pullout bay along the property frontage, transit pullout bays may be located within reasonable walking distance of the site;
C. Where possible, transit pullout bays shall be located at intersections. At signalized intersections, far-side bus stops are preferred. Mid-block bays are not preferred due to impacts to parking and traffic; and

D. The design of the pullout bay shall provide adequate space for vehicles to maneuver through facilities without causing damage to either the vehicles or facilities as detailed herein.

1.17.2. Transit shelters.

A. Transit shelters shall be located within the site, directly adjacent to the right-of-way on which the public transportation route is established; or
B. Where site constraints prevent locating a transit shelter on the site, it shall be located within a public sidewalk area along the property frontage. If a transit shelter is to be located within a public sidewalk area, City sidewalk clearance requirements shall apply; or
C. Where space constraints prevent locating a transit shelter within a public sidewalk area along the property frontage, it may be located within reasonable walking distance of the site; and
D. Installation and ongoing maintenance of transit shelters on private property shall be the responsibility of the property owner. Ongoing maintenance of transit shelters located within the City right-of-way or within an easement held by the City shall be the responsibility of the City or of the local or regional transit authority serving the facility.

1.17.3. Where necessary, developments shall provide easement to the City, sufficient in size to accommodate public transit infrastructure and access to the transit stop.

2. TRANSPORTATION STUDIES AND PLANS

2.1. TRANSPORTATION STUDIES

2.1.1. Passenger car equivalent (PCE). Defined as the number of passenger cars, or, in the case of non-passenger vehicles, the number of passenger cars that would be displaced by non-passenger vehicles. One tractor trailer combination is the equivalent of two passenger cars.

2.1.2 Applicability. Developments that generate 100 PCE or more during a peak hour period, thus requiring a Traffic Movement Permit (TMP), shall meet the requirements of TMP regulations of State Law, in addition to all applicable transportation site plan standards of the City Code. The calculation of the PCE trip level for determination of TMP thresholds shall be made prior to trip reductions for other modes or shared trips.

For more information concerning state TMP requirements, please refer to https://www.maine.gov/mdot/traffic/docs/229c305.pdf or contact the Maine Department of Transportation (MaineDOT). The City of Portland is the delegated reviewing authority for TMP applications.

Developments generating at least 25 PCE and less than 100 PCE during a peak hour period may be required to complete a transportation study. The determination shall be made by the City Traffic Engineer, based upon the proximity of the development site to identified issues related to safety, congestion, and/or multi-modal accessibility.

2.1.3. Preparation. Transportation studies shall be prepared, stamped, and signed by a Professional Engineer licensed in the State of Maine.

2.1.4. Scope of study. The City Traffic Engineer, in consultation with the applicant's engineer, shall determine the scope of the transportation study. The scope of the study may include, but is not limited to the following elements:

A. A description of the development proposal;
B. A description of the existing multi-modal transportation conditions and context;
C. Estimated trip generation by the development and design hour volume for site driveway(s) and study intersections by mode. Trip generation will be based upon current Institute of Transportation Engineers data, or approved alternate methodology, by mode;
D. Trip distribution;
E. Multi-modal level of service analysis pre- and post-development at study area intersections and roadway segments;
F. Capacity analysis at study area intersections, including level of service (LOS), delay, volume-to-capacity ratios, and queue analysis;
G. Crash analysis within the study area, or expanded study area if deemed appropriate;
H. Key findings regarding multi-modal traffic and safety issues in the existing condition or as result of project-generated trips;
I. Analysis of impacts to pedestrians, bicyclists, and transit service and users; and
J. Summary of findings and recommendations for transportation improvements and other impact mitigation measures.

2.1.5. Mitigation. Mitigation of development project impacts may be required under MaineDOT TMP regulations and/or by the City of Portland through a transportation study. In some cases, where safety or capacity improvements to vehicle operations are not feasible due to constraints, mitigation may consist of in-kind multi-modal improvements to pedestrian, bicycle, and/or transit facilities and service. Where required, mitigation measures shall be included in the applicant's transportation study, and shall be approved by the Department of Public Works prior to site plan approval.

2.2. PARKING STUDY

2.2.1. Parking studies shall be produced by a licensed transportation engineer

2.2.2. Where a parking study is required, data shall be determined by values contained in the current version of the Institute of Transportation Engineers (ITE) publication *Parking Generation*, or through local, regional or other pertinent national data. If local or regional data is to be used, the scope and methodology of the parking study shall be coordinated with the City Traffic Engineer.

2.2.3. Parking studies for mixed-use developments shall reference best practices for shared parking, both in terms of calculations and studies, such as the Urban Land Institute's *Shared Parking*.

2.2.4. Where a parking study is required, the scope of study shall be determined in coordination with the City Traffic Engineer. The requirements for the study shall be based on standard transportation engineering practices.

2.3. TRANSPORTATION DEMAND MANAGEMENT (TDM)

All TDM plans shall include the following items:

2.3.1. TDM narrative. Include a transportation narrative that:

A. Describes how the project fits within the multi-modal transportation system serving the district in which the development or site is located;
B. Addresses the specifics of the land uses, occupants, visitors, and location of the development and how it is anticipated to relate to its transportation context; and
C. Address applicable existing conditions and TDM challenges and opportunities for the site related to:
    1. Vehicular access and circulation;
    2. The quality of the bicycling and pedestrian environment and facilities;
    3. Transit service levels and the transit-supportive environment;
    4. Current levels of parking and parking policies; and
    5. For existing developed sites, the current state of any TDM-related efforts should be described.

2.3.2. TDM coordinator. Identify a TDM coordinator(s) and establish the roles and responsibilities of the coordinator(s). The plan should demonstrate how the administration of the TDM plan and role of the TDM coordinator(s) will reflect the scale of the site/development, proposed uses, parking and vehicle trip reduction targets, as well as the ownership and property management framework.

2.3.3. Document baseline TDM data. Document baseline travel demand and supply data for the development or site in tabular format, against which future performance can be measured. Baseline data shall include:

A. Future trip generation estimates (where applicable);
B. Proposed parking supply and future demand estimates (where applicable); and
C. Estimated modal split, recognizing modal split as the uniform metric to be used in TDM reporting in subsequent years.

Baseline data shall correspond to the transportation analysis required for the project, and shall represent best estimates of transportation demand and modal split at time of occupancy, given the transportation context.

2.3.4. Set TDM targets. The TDM plan shall establish short-term (3-5 year) and long-term modal split targets, based on documented baseline transportation demand data, the combination of land uses, location, transportation context, and other data for the site. Modal split targets shall relate directly to the transportation infrastructure provided, TDM strategies to be employed, site context, and shall consider city-wide TDM goals as represented in plans such as *One Climate Future*. The metrics for TDM modal split targets shall be measurable, and shall include goals for reductions in single-occupancy vehicle trips and increases in non-single-occupancy trips, broken down by mode. The targets shall be described in both absolute values and percentage terms. The targets will be reviewed and updated based upon the annual TDM reporting.

2.3.5. Set customized modal split strategies. Every TDM plan shall include a set of strategies designed to achieve the TDM target. The strategies should be customized to reflect the specific mix of uses, the population that will access the site, the scale of development, the location, the modal split targets, and the transportation opportunities available to the site. The strategies should also reflect a broad mix of TDM approaches, including approaches that:

A. Provide TDM infrastructure and operations to the site (e.g., on-site lockers and shower facilities, transit capital or operation funding, programming that supports TDM, such as guaranteed ride home or ride-matching programs);
B. Incentivize TDM options (e.g., through parking cash-out, preferential carpool parking, subsidized transit passes, subsidized bicycle maintenance, or bikeshare memberships); and
C. Educate users of the site about TDM options (e.g., through site-level information-sharing mechanisms, provision of transit maps and schedules, etc.).

For additional information on TDM strategies, see https://www.portlandmaine.gov/721/TDM-Parking.

2.3.6. Establish a monitoring and reporting plan.

A. All TDM plans must include provisions for monitoring program effectiveness over time to establish whether progress toward TDM targets is being met.
B. **Responsibility.** The TDM Coordinator(s) and/or plan administrator(s) are responsible for monitoring the efficacy of the TDM plan and making adjustments to the plan as needed to achieve modal split targets.
C. **Methods.** The methods of monitoring shall be outlined in the TDM plan. Monitoring methods will typically involve use of an annual survey combined with other data collection, such as parking utilization counts where needed.
D. **Reporting.** The results of TDM plan monitoring shall be reported to the City of Portland on an annual basis using reporting tools provided by the City.

2.4. CONSTRUCTION PERMITTING AND TRAFFIC CONTROL PLANS

2.4.1. 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 & charges are all outlined in that Chapter. Rules and Regulations for Excavation Activity are available through the Street Opening Clerk at the Department of Public Works.

2.4.2. Sewer and stormwater 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. See also Section # of the Technical Manual for lateral abandonment requirements associated with demolition permits.

2.4.3. 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 travelling public. Projects that will occur along accepted city streets are required to submit a satisfactory 'maintenance of traffic' (MOT) plan prior to any site plan, subdivision, or street opening permit approval.

Maintenance of Traffic (MOT) plans shall provide for the safe passage of the public by all modes of transportation through or along the construction work zone. On a case-by-case basis, applicants may be allowed to close a street and/or detour a mode of traffic when absolutely necessary for safety. These closures are to be limited to the shortest duration possible with durations specifically noted in the traffic control plan documentation. MOT plans shall employ the appropriate techniques and devices as called for in the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD). In addition:

A. Construction speed signing may be used as needed to slow traffic;
B. Traffic control signs shall not be placed where they are an obstruction to bicycles or pedestrians. ADA-compliant access shall be maintained at all times and documented within traffic control plans; and
C. In some situations, flaggers may be required to allow for safe pedestrian and bicycle movement.

Additional information for temporary traffic control plans is provided in Chapter 6 of the MUTCD (https://mutcd.fhwa.dot.gov/htm/2009/part6/part6_toc.htm).

2.4.4. All existing modes of travel in the work zone area shall be accommodated if impacted by the activity. The safe passage of pedestrians, bicyclists, transit providers, and motorists are of equal importance when planning out the work zone; no pre-existing travel mode may be eliminated without the express approval of the Department of Public Works. Projects shall meet the following standards for the safe passage of cyclists and pedestrians:

A. Traffic control for bicycle and pedestrian facilities or routes through work zones shall be maintained until the bicycle and pedestrian facilities or routes are ready for safe operation. Traffic control will not be removed to allow auto travel at the expense of bicycles and pedestrians;
B. Where pedestrian traffic is significant, and/or where a detour would present a significant delay and/or safety issues to pedestrians, a temporary walkway in the shoulder/parking lane/outside travel lane may be required

where possible. Any temporary walkway shall be ADA-accessible, including temporary ADA ramps leading to/from the walkway where needed, and solid, detectable barriers along the edges of the walkway. Temporary walkways shall be kept clear of snow, ice and debris by the contractor at all times. Temporary walkways shall have a minimum clear width of five (5) feet;

C. Pedestrian detours shall be considered as a last resort where no other practical option is available. Where pedestrian detours are allowed, pedestrians shall be directed to cross at existing crosswalk locations where practical. Temporary crosswalks and curb ramps may be required to shorten the overall detour. Any temporary crosswalk shall be ADA-compliant and shall be located where sight distance is adequate. All temporary crosswalks shall be approved by the Department of Public Works;

D. Where construction requires the closure of a bicycle lane or shared use pathway alongside a high-volume and/or high-speed roadway, bicycle traffic shall be managed by the contractor in coordination with the Department of Public Works. Treatments may include a barrier-protected bicycle lane or shared use path, or bicycle detours as a last resort; and

E. Barrier systems utilized to separate the construction activity from the public street and/or sidewalk shall not inhibit sight distances, particularly for visibility of pedestrians and bicyclists.

For reference, see also *How to Plan, Document, and Implement Pedestrian Mobility in and around Work Zones* (https://portlandmaine.gov/DocumentCenter/View/30884/Work-Zones-ADA).

2.4.5. Use of public parking spaces or the blockage of any portion of sidewalk for the purpose of construction activity shall require an occupancy permit and appropriate fee as assessed by the Department of Public Works.

3. LOW IMPACT DEVELOPMENT STANDARDS

3.1. LOW-IMPACT DEVELOPMENT (LID) EVALUATION

3.1.1. Approach.

Section 3.1. provides guidance on how new development and redevelopment are required to prioritize the protection of - natural resources.

If the preservation of natural resources is unavoidable, the applicant shall design the development to minimize impacts to the extent practicable. Minimization efforts shall be demonstrated through strategies including, but not limited to, the pursuit of waivers, reductions in off-street parking and other impervious surfaces, and the siting of building components to reduce disturbed area.

When preservation and minimization efforts cannot or can only be partially implemented, Applicants shall implement listed treatment strategies to achieve mitigation prioritizing natural solutions, then structural solutions, and finally compensatory fees.

3.1.2. Low Impact Development Scoring Tool.

All development subject to site plan or subdivision review, shall be evaluated using the low impact development scoring tool, included as Appendix A within this section of the technical manual. The scoring tool establishes a points-based system that is intended to quantify a development's impact across five impact categories, with a bonus category to account for other development characteristics that reduce a development's overall impact. Impact categories are listed below:

A. Wetlands, Streams and Drainage.
B. Natural Areas and Habitat.
C. Soils and Slopes.
D. Vegetation and Landscaping.
E. Impervious Area and Stormwater Management.
F. Bonus Points.

All development subject to evaluation using the low impact development scoring tool, is required to achieve a minimum score of 80 points, out of a total possible score of 178 points. The minimum required score may be achieved through any combination of strategies employed across each of the impact categories. The City of Portland offers bonus points for innovative site and/or stormwater design as detailed in the scoring tool.

3.1.3. Relationship to Other Regulations and Technical Requirements.

The City of Portland LID regulation works in concert with other municipally adopted land-use regulations, and is primarily intended as a tool to reinforce City requirements around stormwater management, landscape and habitat preservation, erosion and sedimentation control, wetland and waterbody impact, and soil usage. Additional state and/or federal regulations may apply. In the event of conflict among standards, the more stringent shall apply.

3.2. IMPACT CATEGORIES

3.2.1. Wetlands, Streams and Drainage

A. Preservation.

1. No wetland alteration is permitted in the Coastal Flood Resilience Overlay Zone, except to support climate adaptation projects that meet or exceed the efficacy of an existing wetland and do not have significant negative impacts on existing habitats identified on the Beginning with Habitat Map Viewer or a boundary survey;
2. Projects shall be designed to avoid crossings or disturbance of waterbodies or wetlands and shall maintain and/or establish undisturbed buffer strips of no less than 100 feet, around the waterbody or wetland boundary
3. No wetland alteration is permitted in the Coastal Flood Resilience Overlay Zone, except to support climate adaptation projects that meet or exceed the efficacy of an existing wetland and do not have significant negative impacts on existing habitats identified on the Beginning with Habitat Map Viewer or a boundary survey.
4. Development located adjacent to a perennial or intermittent stream shall maintain a stream buffer of no less than 100 feet and shall place a deed restriction on the property, maintaining the buffer area in perpetuity. Construction activity, clearing, grading, and other site disturbance shall be prohibited within the buffer area.

B. Mitigation.

1. Where an applicant can demonstrate that preservation or minimization of impacts to waterbodies would significantly compromise the development of the site, applicants proposing the alteration of:
    a. 500 square feet of wetland or greater shall mitigate the impacts such that there is no net loss of ecological function and value. Subdivision impacts shall be assessed for the development as a whole and shall account for any impacts associated with future development. Acceptable forms of mitigation include the following:
    b. Restoration of previously degraded wetlands;
    c. Enhancement of existing wetlands;
    d. Preservation of existing wetlands or adjacent uplands elsewhere where the site to be preserved provides significant wetland functions;
    e. Creation of new wetland; or
    f. Payment into the City of Portland Compensation Fee Program.

2. Where an applicant can demonstrate that avoidance of stream crossings would significantly compromise the development of the site, applicants proposing to cross any stream shall:
    a. Use a bridge or open bottom culvert structure sized at 1.2 times the bank full width of the stream; or
    b. Incorporate Maine Stream Smart Principles into the crossing design.
3. Where an applicant can demonstrate that maintaining a 100-foot perennial or intermittent stream buffer area would significantly compromise the development of the site, applicants proposing to reduce this buffer shall:
    a. Provide a brief narrative explaining why there is no practicable alternative to the location of activity within the 100-foot buffer area, and detail how impact to the resource will be minimized.
    b. Provide a minimum 50-foot buffer area between the normal high-water line of perennial streams and areas of proposed disturbance.
    c. Provide a minimum 25-foot buffer area between the normal high-water line of intermittent streams and areas of proposed disturbance.

3.2.2. Natural Areas and Habitats.

A. Preservation.

1. Development activity shall not disturb significant and essential wildlife habitats identified on the State of Maine Beginning with Habitat Map Viewer, or as identified by a Maine licensed surveyor on a boundary survey for the site. Projects shall not disturb, remove, fill, dredge, clear, destroy, or alter any area within a buffer zone of 100 feet of a wetland associated with habitats listed above.
2. Applications shall not disconnect undeveloped habitat blocks, undeveloped block connectors, and riparian connectors that are listed on the State of Maine Beginning with Habitat Map Viewer.

B. Mitigation.

Where the applicant can demonstrate that the preservation of or minimization of impacts to existing habitats would significantly compromise the development of the site, the applicant shall implement one or more of the following mitigation strategies determined to be acceptable by the Planning Authority:

1. Mitigation for undeveloped habitat blocks, undeveloped block connectors, and riparian connectors shall:
    a. Enhance existing undeveloped blocks and connectors on or adjacent to the site;
    b. Establish new undeveloped blocks and connectors on or adjacent to the site; or
    c. Submit payment into the City of Portland Compensation Fee Program.

3.2.3. Soils and Slopes.

A. Preservation.

1. Soil surveys and mapping. The level at which various types of projects must be mapped and guidelines for each intensity level of soil mapping are included in Section 7 of the Technical Manual. Projects shall avoid paving and construction of buildings on site areas with high permeability soils.
2. Projects shall avoid construction on and maintain 20-foot undisturbed vegetated buffers on portions of sites with slopes ≥15%.

B. Mitigation.

1. Where the applicant can demonstrate that preserving or minimizing paving and construction of buildings on high permeability soils would significantly compromise the development of the site, projects shall consider the use of stormwater best management practices that incorporate stormwater infiltration within areas of high permeability soil.
2. Where the applicant can demonstrate that preserving or minimizing paving and construction of buildings on high permeability soils would significantly compromise the development of the site, projects shall consider tilling less permeable soils in areas of proposed revegetation to a depth of at least 10 inches prior to revegetation, and the use of organic matter amendments as needed based upon the soil tests complete.
3. Where the applicant can demonstrate that avoiding or minimizing construction on slopes ≥15% would compromise the development of the site, projects shall implement the following stabilization strategies:
    a. Stabilization of slopes greater than 8% shall use erosion control netting or blanket to stabilize the soils and shall establish coverage with vegetation and/or organic mulch.
    b. Slopes greater than 33% which utilize vegetation for permanent stabilization shall not be mowed.
    c. Stabilization of slopes greater than 50% should prioritize biotechnical methods over structural methods when feasible. If biotechnical methods alone are determined not to be feasible by a licensed engineer, the applicant must incorporate a combination of biotechnical and structural methods, including, but not limited to, terracing rip rap or retaining walls in addition to vegetation.

3.2.4. Vegetation and Landscaping.

A. Preservation.

1. Development shall be designed to protect and incorporate natural features, on-site & street trees ≥10" DBH, and all other existing stands of vegetation and trees in accordance with Section 4 of the Technical Manual, except in cases where the City Arborist or their designee deems such vegetation to be:
    a. Diseased;
    b. In poor condition;
    c. A non-native invasive species, or
    d. Unsalvageable.
2. Heritage trees shall be protected in accordance with Chapter 29 of the City of Portland Code of Ordinances.

3. Trees or groups of trees to be preserved shall be inspected and approved by the City Arborist or their designee and shall be clearly identified on the Site Plan, Subdivision Plat, Landscape Plan, and Grading Plan. Where required by the reviewing authority, property deeds shall include language and plans to help ensure that current and future landowners are aware of all preservation requirements tied to the property.

B. Mitigation.

1. Where the applicant can demonstrate that the preservation of trees required to be preserved would significantly compromise the development of the site, an applicant shall be responsible for planting replacement trees on the City of Portland approved tree list (Section 4 of the Technical Manual, Figure IV-1) at a ratio of one tree per tree removed measuring between 6 and 8 inches DBH, two trees per tree removed that is between 8 and 12 inches DBH, and three trees per tree removed greater than 12 inches DBH. If this is not feasible, the applicant shall contribute to the City of Portland Tree Fund in the amount of $100/inch at DBH.
2. Upon completion of the project, preserved vegetation that show signs of construction damage within a one-year period following construction, including but not limited to bark damage or excessive root damage, grade changes other than those originally indicated in the approved grading plan, soil compaction due to heavy equipment traversing closely, or general decline due to mechanical or natural conditions shall be rejected and must be replaced prior to the release of any defect guarantee.
    a. For every existing tree rejected that is between 6 and 8 inches in caliper DBH, one replacement tree listed on the City of Portland approved tree list (Section 4 of the Technical Manual, Figure IV-1) shall be planted on the site.
    b. For every existing tree rejected that is between 8 and 12 inches in caliper DBH, two replacement trees listed on the City of Portland approved tree list (Section 4 of the Technical Manual, Figure IV-1) shall be planted on the site.
    c. For every existing tree rejected that is greater than 12 inches in caliper DBH, three replacement trees listed on the City of Portland approved tree list (Section 4 of the Technical Manual, Figure IV-1) shall be planted on the site.
3. Where an applicant is providing new site landscaping, the applicant is encouraged to reduce or limit grassed lawn area in favor of more intensive site landscaping, utilizing native vegetation that is locally sourced wherever possible.

3.2.5. Impervious Area and Stormwater Management.

A. Preservation.

1. Development shall be designed to reduce impervious area to the extent practicable, and where possible, employ permeable hardscape materials, such as porous pavers, permeable concrete, and porous asphalt.
2. Development shall prioritize the use of green infrastructure and or other natural stormwater treatment systems.
3. The use of salt or chloride is discouraged, and applicants that are required to develop a stormwater

maintenance agreement, shall be required to detail strategies for reducing salt or chloride use during the winter season, and shall document the use of salts or chlorides as part of the annual monitoring requirement.

B. Mitigation.

1. Development shall be designed in accordance with the City's stormwater standards detailed in Section 5 of the Technical Manual and all applicable state standards, including but not limited to Maine DEP Ch. 500.

3.2.6. Other Measures.

Bonus points are offered for strategies that may go above and beyond typical approaches; may offer particularly innovative site design or engineering; or may help achieve the larger goal of low-impact development on a regional scale.

City of Portland ME . Low-Impact Design Requirements

Owner / applicant name:				
Representative name:				
Projct address:				
Project CBL:				
Application ID (if known):				
	Maximum Points	**How to Apply**	**Points Awarded**	**LID Standard / Approach**
CORE METHODS: Wetlands, Streams, & Drainage				
Protect natural drainage paths	Required			
Shoreland Zoning	Required			
Meeting DEP and ACOE standards for stream crossings	Required			
Protect wetlands	**12**	Select one option		Select a site that does not have wetlands or vernal pools = 12pts
				Project maintains a 50' set-back / no-disturb buffer to all wetlands = 10pts
				Project maintains a 25' set-back / no-disturb buffer to all wetlands = 7pts
				Project does not place structures in wetlands and avoids wetlands impacts from construction and stormwater discharges = 5pts
				Project replicates impacted wetlands elsewhere on site or within watershed = 3pt
				Project pays wetlands impact fee = 0pts
Permanently protect stream (intermittent and perennial) and riparian buffers *(exclusive of approved stream crossings; must include a no-disturb zone with markers installed and deed restriction recorded at registry of deeds)*	**12**	Select one option		Select a site with no streams = 12pts
				Permanently protect all 100ft shoreline buffers = 10pts
				Permanently protect all 75ft shoreline buffers = 7pts
				Permanently protect all 50ft shoreline buffers = 5pt
Stream crossings	**12**	Select one option		Select a site with no streams = 12pts
				Avoid any stream crossings = 10pts
				All stream crossings use a bridge or arch span = 10pts
				All stream crossings use Maine Stream Smart Principles to preserve natural pre-development drainage pathways = 6pts
CORE METHODS: Natural Areas & Habitat				
Preserve threatened or endangered species habitat	Required (Beginning with Habitat Maps at a minimum)			
Protect 30% of trees over 10" DBH	Required (Tree survey required)			
Protect intact, contiguous forests and native trees over 10" DBH	**8**	Select one option		All development and land disturbance outside of existing wooded/forested areas (no site clearing in prior 10 years) = 8pts
				Protect 50% of trees over 10" DBH = 6pts
				Protect 40% of trees over 10" DBH = 4pt
CORE METHODS: Soils & Slopes				
USDA Web Soil Survey	Required (provide details how soil limitations will be mitigated)			
Avoid steep slope disturbance	**5**	Select one option		Selecting a site without slopes 15% or greater = 5pts
				Maintain >20' undisturbed vegetated buffer to all slopes 15% or greater = 3pts
				Maintain 10-20' undisturbed vegetated buffer to all slopes 15% or greater = 2pts
				Maintain 1-10' undisturbed vegetated buffer to all slopes 15% or greater = 1pt
				Disturbance of any slope 15% or greater = 0pts
Protect soils	**5**	Select one option		Redevelopment sites = 5pts
				Detailed, site-specific soil survey; preparation of a Soil Management and Protection Plan; protect highly permeable soils = 5pts
Limit site disturbance and earthwork	**8**	Select one option		Redevelopment limits disturbance to existing footprint = 8pts
				New development disturbs less than 50% of the site = 8pts
				New development disturbs less than 75% of the site = 6pts

Soil preparation & minimizing compaction	6	Select all options that apply		Till soils to a depth of at least 10" prior to revegetation = 3pts
				Organic matter amendments as needed based on soil tests = 3pts
CORE METHODS: Landscaping				
Low-Impact Landscaping	6	Select all options that apply		Redevelopment sites reduce lawn area by 50%, provided no increase in impervious area (lawn becomes landscaping) = 2pt
				New development results in >50% non-impervious developed area is landscaping = 2pt
				Use only native vegetation for landscaped areas = 2pts
				Using only locally-sourced landscape materials = 2pt
CORE METHODS: Impervious Area & SW Management				
Meeting City's stormwater management standards	Required			
Reduce impervious and increase permeable surfaces	10	Select all options that apply, up to a maximum of 10 points		50% or more of proposed hard surfaces are permeable (porous pavers, permeable concrete, porous asphalt) = 6pts
				Minimize parking impervious area by using only the minimum required number of parking spaces, the minimum required parking lot dimensions, maximizing compact spaces and utilizing low-turnover standard parking space width reductions = 4pt
				25% or more of proposed hard surfaces are permeable (porous pavers, permeable concrete, porous asphalt) = 3pts
				Minimize roadway impervious area by developing roadways and driveways at the minimum width and using minimum number of curb cuts = 2pt
				Reducing the number of driveways by using a shared driveway design = 2pt
				Providing transportation alternatives (such as bike share, car share, or similar) = 2pt
Use GI / natural stormwater treatment systems	12	Select all options that apply		Treatment requirements and conveyance achieved through vegetated systems = 6pts
				No more than 1-acre of drainage per treatment system = 3pts
				Increase time of concentration on site (**need to ID the storm**) = 3pts
Limit / eliminate salt use	4	Select one option		Detailed winter maintenance agreement, with annual reporting requirement, limiting chloride use (required in UIS watersheds) = 4pts
Bonus Points				
Bonus points are offered for strategies that may go above and beyond typical approaches; may offer particularly innovative site design or engineering ; or may help achieve the larger goal of low-impact development on a regional scale.	10			Utilizing structured parking = 10pts
	10			Utilizing a green roof (need a size minimum - follow India St. guidelines) = 10pts
	10			Restoration of previously-disturbed natural resources (minimum criteria needed) = 10pts
	10			BMPs designed for known water quality impairment within watershed = 10pts
	10			Connecting to City sewer from a site >200 ft from existing City infrastructure = 10pts
	6			Detention of 1.5 times the required volume = 6pts
	6			Treatment for 1.5 times the required water quality volume = 6pts
	6			Innovative LID site design and/or stormwater improvement - 6pts
	10			Establishing a Traffic Demand Management plan for projects under 50,000ft = 10pts
	Total Possible Points		**Total Points Awarded**	**Minimum points required for approval of LID strategies and techniques**
	178		**0**	**80**

4. LANDSCAPING STANDARDS

~~4.1. PURPOSE~~

~~The Landscaping Standards Section provides guidance on how new development should ensure that site landscaping establishes attractive, low maintenance outdoor spaces that incorporate site definition and screening to achieve one or more of the following outcomes; promote a healthy and biodiverse urban ecosystem, further City goals around climate resiliency and mitigation, create or enhance areas of native habitat, improve stormwater treatment, and/or increase local food production.~~

4.~~2~~1. GENERAL LANDSCAPING STANDARDS

~~4.2.1. **Applicability.** The following types of development are subject to the standards of §4.2. of the Technical Manual:~~

~~**A.** Minor and Major Site Plans;~~
~~**B.** Minor Residential; and~~
~~**C.** Subdivisions.~~

4.~~2~~1.~~2~~1. Plant m~~M~~aterial~~ity~~.

A. Plants.

1. Selection.
   a. All trees and shrubs shall comply with the standards set forth by the American Standard for Nursery Stock (ANSI Z60.1 - 2004). These standards are available through the Department of Public Works.
   b. All trees and shrubs shall be nursery grown, healthy, free of disease, and insect pests, and shall have a well-developed and compact root system. Plant material showing signs of a lack of proper nursery care or a lack of pruning or cultivation, or which is not true to name will be classified as collected stock regardless of its source and shall be rejected.
   c. Proposed trees and shrubs installed as part of the landscape plan shall be comprised of at least 50% native species.
   d. The developer shall be responsible for preventing the spread of existing or the introduction of new invasive species on the site, as identified below. If, within one (1) year following construction, invasive species are identified on the site or if such species are pre-existing on the site but are determined to have spread by the City Arborist, the applicant shall be required to implement appropriate control measures prior to the release of the defect guarantee. Accepted mechanical and chemical control methods are provided by the Maine Natural Areas Program (MNAP) of the Maine Department of Conservation in their Invasive Plant Fact Sheets (available through the Department of Public Services and through the MNAP

program website: http://www.maine.gov/doc/nrimc/mnap/features/invasives.htm. The following plant species are recognized as invasive species that are characteristically adaptable, aggressive, and have a high reproductive capacity:

i. Asiatic Bittersweet (*Celastrus orbiculata*);
ii. Autumn and Russian Olive (Elaeagnus umbellata & angustifolia);
iii. Black Swallowwort (Cynanchum louiseae);
iv. Brazilian Waterweed (Egeria densa);
v. Common and Glossy Buckthorn (Rhamnus cathartica and Frangula alnus);
vi. Common Reed (Phragmites australis);
vii. Eurasian Milfoil (Myriophyllum spicatum);
viii. Fanwort (Cabomba caroliniana);
ix. Garlic Mustard (Alliaria petiolata);
x. Hydrilla (Hydrilla verticillata);
xi. Japanese Barberry (Berberis thunbergii);
xii. Japanese Honeysuckle (Lonicera japonica);
xiii. Japanese Knotweed (Fallopia japonica);
xiv. Japanese Stilt Grass (Microstegium vimineum);
xv. Lesser Celandine (Ranunculus ficaria);
xvi. Mile-a-Minute Weed (Polygonum perfoliatum);
xvii. Morrow and Tartarian Honeysuckle (Lonicera morrowii & tartarica);
xviii. Multiflora/Rambler Rose (Rosa multiflora);
xix. Porcelainberry (Ampelopsis);
xx. Milfoil (Myriophyllum heterophyllum);
xxi. Water Chestnut (Trapa natans);
xxii. Norway Maple (Acer platanoides); and
xxiii. Yellow-flag Iris (Iris pseudacorus).

e. Trees selected from the Recommended Tree List (Figure IV-1) shall conform, at a minimum, to the sizes specified on the list.
f. All upright deciduous and evergreen shrubs shall be a minimum of 3 feet tall at mature height. All spreading evergreen and deciduous shrubs shall be a minimum of 2-2.5 feet in width at maturity.
g. Ground covers planted in lieu of grass shall be planted at a level of coverage equivalent to one complete growing season. Grass areas shall be planted with Kentucky Bluegrass (*Poa pratensis*), Red Fescue (*Festuca rubra*), Tall Fescue (*Festuca arundinacea*) or Perennial Ryegrass (*Lolium perenne L.*). Rolled turf, erosion reducing net or suitable vegetation along with landscaping shall be used in swales or other areas subject to erosion.
h. Mulching material shall be a minimum of three (3) inch deep wood chip or bark mulch. Inorganic mulches are not permitted.
i. No plantings used to satisfy City landscaping requirements shall be comprised of inorganic materials.

4.13.32. Street t-Trees.

A. Selection, arrangement and spacing of trees proposed in the City right of way and/or private roadway, and/or within 20 feet of the edge of the public or private right-of-way and visible to members of the public, shall be coordinated with the Portland City Arborist or their designee. Tree species shall be selected according to the City of Portland recommended tree list (Figure IV-1).

B. Trees proposed in the sidewalk shall be planted in tree wells, as shown in Figures IV-4a, 4b, and 4c and as required by the City Arborist based upon site context and prospects for tree survival.

C. Adequate soil volume, as determined by the City Arborist, shall be required to ensure tree survival. ~~shall also be required, as determined by the City Arborist.~~

~~**D.** Table 3.3.3.A. identifies the required number of street trees by development type and Table 3.3.3.B. lists eligible reductions and alternatives to the required number of street trees.~~

~~**TABLE 4.3.3.A. STREET TREE REDUCTIONS AND ALTERNATIVES**~~

~~Reduction or Alternative~~	~~Description of Reduction or Alternative~~
~~Retention of Existing Healthy Street Tree not identified by the City of Portland or State of Maine as an Invasive Species~~	~~The following reductions can be made based on the caliper in inches at Diameter Breast Height (DBH) of the proposed tree:~~ ~~Over 12 inches DBH: Reduction of 3 trees~~ ~~>8-12 inches DBH: Reduction of 2 trees~~ ~~6-8 inches DBH: Reduction of 1 tree~~
~~Retention of On-Site Existing Healthy Trees within 20 feet of the property line and visible from the public right-of-way~~	
~~Installation of other planted features in the public right-of-way or within 10 feet of the public right-of-way~~	~~Planted features must be visible from the public right-of-way and be documented to the satisfaction of the City Arborist and Planning Authority to meet the objectives of the street tree requirement.~~
~~Off-Site Planting Within Same Neighborhood or Area of City with Minimal Tree Coverage~~	~~Locations may include esplanades, sidewalks and existing empty street tree wells or planting strips, and also places such as parks, playgrounds, and other areas where public benefit would be derived from the addition of new trees. Evidence that the planting site was unlikely to be redeveloped in the near future and that the trees would be protected and maintained are required.~~
~~Waiver: Contribution to the Tree Fund~~	~~When it is demonstrated that meet the street tree requirements as stated or through the reductions listed above in Table 4.6.2., contributions to the City of Portland Tree Fund shall be made as stated below:~~ ~~Contribution for new street tree: $400~~ ~~Contribution for tree to replace feature mature tree: $100/inch diameter of the feature mature tree ($400 shall be subtracted from total if the Applicant plants a replacement tree for the feature mature tree)~~

4.1.3. Street tree alternatives

A. Retention of existing trees.

1. Where an applicant is able to retain existing healthy and non-invasive trees within the public right-of-way, or within 20 feet of the edge of the right-of-way, such trees shall count towards a project's street tree requirement as described below, based upon the tree's diameter at breast height (DBH).

Over 12 inches DBH	**3 Street Trees**
8 – 12 inches DBH	**2 Street Trees**
6 - 8 inches DBH	**1 Street Tree**

4.1.4. Contribution to the tree fund.

Where the planting of required street trees is demonstrated to be infeasible, the applicant shall contribute to the City of Portland Tree Fund at a ratio of $1,000 per required street tree.

4.31.45. On-site landscaping, screening and buffers.

A. Required on-site trees & plantings.

1. ~~In all zoning districts with minimum required front setbacks, one new shade tree is required every 30 linear feet of street frontage as measured along the property line. Alternatives to meeting this requirement are included below in Table 4.3.~~4.
2. Required on-site plantings may be installed anywhere on the site (including a green roof) and may be planted in any arrangement.
3. ~~2.~~The retention of existing and healthy shade trees or plantings, not identified by the City of Portland or State of Maine as an invasive species, shall be permitted to count toward this requirement.

4.13.56. Buffers & sScreening.

A. Parking Lot Screening along Public Right-of-Way. Where all or a portion of a surface parking area is located within 30 feet of a public right-of-way, and is not separated from the public right-of-way by a structure, the parking area shall include a buffer area five feet in width and utilize one of the following screening methods within five feet of the street line:

1. A masonry wall (excluding concrete masonry unit blocks) 30-36" in height with one planting per 10 feet of street frontage; or
2. A decorative wrought-iron-style fence 30-42" in height, with masonry piers that can extend to 48" in height but do not exceed 18" in width, and do not occupy more than 20% of the length of the fence with one planting per 10 feet of street frontage, or
3. A continuous line of shrubs that achieves 80% opaque screening 30-48" in height during summer months.

B. Walls & fences.

1. Fences and walls visible from the public right-of-way must be of high architectural quality.
2. Chain link and wire mesh fences shall not be directly visible from the public right-of-way and shall be vinyl coated and dark in color. Chain link fences shall meet the following design standards:
   a. **Residential Development:** Be a minimum of 6-gauge fence fabric for
   b. **Commercial/Industrial Development:** Be a minimum of 9-gauge fence fabric and mounted on schedule 40 pipe posts

3. Masonry walls shall be constructed of stone, brick or other durable and attractive materials. Concrete block walls are not permitted except where variety in color, design and detailing of the materials are of high architectural quality.
4. Electrified or barbed fencing is not permitted.

~~**CB. Side and Rear Lot Line Buffers & Screening.**~~

~~**Applicability.** Landscaped buffering and screening shall be provided in accordance with Table 4.4.5. along each side or rear lot line where any of the following conditions occur:~~

2. Buffer standards.
   a. **General.** Where required, buffer areas shall be comprised of existing trees and vegetation, new landscaping or a combination thereof to create a dense, mixed buffer incorporating both understory and tree canopy layers. ~~While primarily of benefit from a ground level pedestrian viewpoint, S~~such screening should also effectively provide screening when viewed from upper floors of surrounding properties, where applicable. ~~Breaks in required buffers are permitted to maintain or create sufficient access for existing and/or proposed bicycle, pedestrian, and/or shared use facilities.~~
   b. **Vegetative b~~B~~uffers.** New shrubs shall be spaced six (6) to eight (8) feet apart. Buffers between contrasting land uses may incorporate earthen berms not exceeding 4:1 slope, opaque fencing of high architectural quality, masonry wall or a combination thereof, in addition to landscape plantings. Where fencing or masonry wall is proposed as part of a buffer, less landscaping density is acceptable; however, buffers shall still include trees, shrubs and other vegetation.
   c. **Parking areas.** Landscaping shall be incorporated into the development of surface parking to reduce adverse environmental and aesthetic impacts, to shade pavement to reduce heat island effect and to screen parking areas from public view. Plant materials shall be selected for appearance, durability, and tolerance to salt. Figures IV-6a and IV-6b provide examples of parking lot screening.

      Landscaping that abuts areas of vehicular use shall be adequately protected and separated from vehicles. Protection should take the form of physical or visual separation, such as curb stops, bollards, or continuous curbing. Protection shall be designed with adequate visibility and durability in order to withstand normal snow plowing operations.

Landscaped islands shall be curbed and a minimum of eight (8) feet in width, not including curbing. The incorporation of bioretention into landscaped islands is strongly encouraged.

d. **Snow storage.** Snow storage areas may be located in landscaped areas provided that appropriate landscape materials are selected which can withstand such snow storage. Snow storage shall not be located in a stormwater treatment measure, shoreland zoning setback buffers, or where it would adversely impact the functionality of bioretention or other stormwater management measures.

3. Installation and m~~M~~aintenance of p~~P~~lantings.

~~a. Landscaping, earth moving and grading activities shall be performed according to standards accepted good planting and grading procedures and in accordance with the approved Site Plan, Subdivision Plat, Grading Plan and Landscape Plan.~~

~~b.~~a. No plant shall be moved after the bud break unless so authorized by the City Arborist or their designee. Planting periods are between April 1st and ~~to~~ July 1st and/or September 1st and November 1st.

~~c.~~b. Tree planting and other landscaping for subdivisions that cannot be installed prior to the release of the performance guarantee must be insured by a defect bond as described in ~~Section~~ Article 1~~3~~5 of the City Land Use Code.

~~d.~~c. All bare soil areas shall be vegetated and/or mulched prior to the issuance of a Certificate of Occupancy.

d. New vegetation that shows signs of construction damage within a one-year period following construction, including but not limited to bark damage or excessive root damage, grade changes other than those originally indicated in the approved grading plan, soil compaction due to heavy equipment traversing closely, or general decline due to mechanical or natural conditions shall be rejected and must be replaced prior to the release of any defect guarantee.

e. Slopes with between a 5% and 50% grade change shall incorporate installation of a mixture of vegetation, organic mulch and/or erosion control seed mix.

Stabilization of slopes greater than 50% must incorporate biotechnical and/or structural methods including but not limited to terracing rip rap or retaining walls in addition to vegetation. Retaining walls, if four (4) feet in height or greater from the bottom of the footing to the top of the wall and/or if supporting a surcharge, must be designed by a licensed engineer and require a City of Portland Building Permit.

5. STORMWATER MANAGEMENT

~~5.1. INTENTION~~

~~The City of Portland has adopted local Stormwater Management Standards to address the effects of urban development on both the quantity and quality of stormwater runoff in order to protect and improve water quality, meet Clean Water Act requirements, and to increase the City's long term climate resilience.~~

~~The City's local stormwater management standards rely on definitions and technical design standards listed in the Maine Department of Environmental Protection (Maine DEP) Chapter 500 Stormwater Management rules (herein referred to as "Chapter 500"). The City's local standard aims to address a higher percentage of development and redevelopment projects in Portland and ensure that stormwater management is provided for a higher percentage of redeveloped land in Portland over time.~~

~~The Technical Manual standards support the review criteria contained in Portland's site plan and subdivision ordinances and with the stormwater management requirements within Chapter 32. Please see Chapter 32 of the City Code of Ordinances for regulations governing stormwater systems, illicit discharges and Post Construction Stormwater Management Plans in Portland.~~

5.~~2~~1. APPLICABILITY

5.~~1~~2.1. Projects requiring municipal review only.

All applicable City of Portland stormwater management standards apply as specified below.

5.~~1~~2.2. Projects requiring state permits and municipal review.

Projects that require a Stormwater Permit pursuant to 38 M.R.S.A. Sec. 420-D (Stormwater Management Law) ~~and projects that may substantially affect the environment and require~~ or a site location of development (Site Law) permit pursuant to 38 M.R.S. A Sec 481-490 shall be reviewed for conformance with Chapter 500 under the City's Delegated Review Authority or by the Maine Department of Environmental Protection. All applicable local City of Portland Standards also apply as specified below. In the case of any overlap or ambiguity between local and state standards, the most stringent requirements shall apply.

5.~~1~~2.3. City of Portland stormwater management thresholds.

The following development, redevelopment and subdivision proposals shall submit a Stormwater Management Plan pursuant to the standards and requirements listed below:

A. ~~Minor site plans~~Projects that result in the creation of greater than 1,000 square feet of new impervious area.
B. ~~Minor site plans~~Projects that result in greater than 10,000 square feet of disturbed area.
~~C. Major site plans.~~
~~D.~~C. Projects that include greater than 5,000 square feet of non-roof redeveloped impervious area.
D. Other projects where the City of Portland determines that special conditions warrant a stormwater management plan.
E. ~~Projects that require a Stormwater Permit pursuant to 38 M.R.S.A. Sec. 420-D (Stormwater Management Law), a development that may substantially affect the environment and requires a site location of development (Site Law)~~

~~permit pursuant to 38 M.R.S.A. Sec 481-490; and certain projects that may be eligible for license by rule for the infiltration of stormwater pursuant to 38 M.R.S.A. Sec 413.~~

~~**Exemption:**~~

~~1. Minor residential, as defined in the Technical Manual - Section 16.~~

Exemptions, Special Conditions and Additional Notes:

A. Small Scale Residential Projects, defined as the development of a residential building with 4 units or less, are exempt from requirements Sec. 5.2.2, Sec. 5.2.3, and Sec.5.2.4 as listed below and shall provide management in accordance with requirements stipulated in Section 5.2.5 "Small Scale Residential Project Requirements".
B. Projects that don't otherwise exceed the thresholds listed above but propose to generate over 500 gallons of additional daily sewer flow and require a new stormwater connection into the City's combined sewer system shall provide management in accordance with requirements listed in Section 5.2.4 "Minimum Detention Volume Requirements".
C. The flooding standard analysis (5.2.~~-~~3) for subdivision projects which are required to construct a new public street shall factor into the analysis developed and impervious area for each proposed lot. This is to ensure the full project build out does not result in down-stream flooding at the conclusion of the project. Impervious area for each residential lot shall be determined by the maximum lot coverage as permitted by the City's zoning regulations.
D. The City's Stormwater Management Standard utilizes Chapter 500 definitions.

5.~~3~~2. STORMWATER MANAGEMENT REQUIREMENTS

5.~~3~~2.1. Erosion and sedimentation control

A. Refer to requirements set forth in Section 12 of the Technical Manual and Chapter 32 of the City's Code of Ordinances.

5.~~3~~2.2. Water quality treatment requirements

A. Stormwater quality treatment shall be provided for
   1. Projects which do not require a State Stormwater Permit:
      a. 95% of new impervious area
      b. 80% of new developed area
      c. ~~50~~95% of non-roof redeveloped impervious area

   2. Projects which do require a State Stormwater or SLOD Permit:
      a. 95% of new impervious area
      b. 80% of new developed area
      c. ~~50~~95% of non-roof redeveloped impervious area
      d. Total redeveloped area as required by Chapter 500

B. Additional notes.
   1. Stormwater treatment systems must be designed in accordance with Chapter 500 rules and the Maine DEP Stormwater BMP Manual.

2. Water quality treatment is not required for existing impervious areas which are developed into building roofs unless otherwise required by a state stormwater permit.
3. The total amount of non-roof redeveloped and new impervious area must exceed 1,000 SF before treatment is required.
4. Redeveloped public street right of way area is exempt from the treatment, flooding and minimum detention volume requirements.
5. Treatment requirements for the linear portions of projects, as defined in Chapter 500, may be reduced as allowed by Chapter 500.

5.~~23~~.3. Flooding standard requirements

A. Comply with the Chapter 500 Flooding Standard.

5.~~23~~.4. Minimum stormwater detention volume requirement

A. Applicable projects proposing to make a stormwater connection into the City's separated storm drain system shall:
   1. Provide a minimum on-site stormwater detention volume equal to 1" of rainfall times the TOTAL impervious area within the project's disturbance limits.
   2. Control stormwater discharge rates into the City's separated storm drain system to a maximum flow rate of 0.1 CFS until the on-site detention system reaches its design capacity.

B. Applicable projects proposing to make a stormwater connection into the City's combined sewer system shall:
   1. Provide a minimum on-site stormwater detention volume equal to the greater of:
      a. 1" of rainfall times the TOTAL impervious area within the project's disturbance limits;
      b. The project's proposed increase in average daily sewer flow being added to the combined sewer system.
   2. Control stormwater discharge rates into the City's combined sewer system to a maximum flow rate of 0.1 CFS until the on-site detention system reaches its design capacity

C. Additional notes.
   1. With adequate calculation documentation stormwater storage provided for water quality treatment systems may be used to meet the overall detention volume requirements.
   2. The City's separated storm drain system shall include all municipal underground and overland conveyance systems including pipes, ditches, swales and street gutters.

5.~~23~~.~~4~~5. Urban impaired stream requirements

A. **Applicable projects located within Urban Impaired Stream Watersheds.**

Comply with the Urban Impaired Stream Standard pursuant to Maine DEP Chapter 500 Stormwater Management Rules if they are located within the following watersheds:

1. Capisic Brook,
2. Fall Brook,
3. Nasons Brook,
4. Dole Brook
~~4.~~5. As listed in the most recent version of the Maine DEP Chapter 502 Rules.

~~B. Developments which will result in the creation of up to 1,000 square feet of new impervious area or up to 10,000 square feet of new non-impervious developed area, as defined under Definitions in the Maine DEP Chapter 500, are considered de minimis and are exempt from the Urban Impaired Stream Standard.~~

~~C.~~B. The City of Portland has an approved Compensation Fee Utilization Plan (CFUP) and can therefore receive in-lieu-fee payments to meet the UIS Standard

~~D.~~C. Development within the Long Creek watershed shall be subject to the requirements set forth by the Long Creek Watershed Management District.

5.23.5. Small-scale residential project requirements

A. Small scale residential projects are required to provide stormwater management systems to manage at least 75% of new impervious area generated by the project.

B. Small scale residential systems shall generally be designed and implemented in accordance with residential stormwater BMP design criteria located in the City of Portland's Stormwater credit manual.

C. Residential stormwater credits will be available for these properties as specified in the stormwater credit manual. Stormwater credit requests shall be submitted to the Department of Public Works. Small scale residential applicants are encouraged to apply for credits during the site plan review process.

D. Stormwater maintenance agreements **are not required** for small scale residential projects. Any projects which receive residential stormwater credits from the Department of Public Works will be required to provide a self-verification stormwater maintenance form to DPW annually in order to keep credits active.

E. Information pertaining to the City's stormwater credit program can be found here: https://www.portlandmaine.gov/1101/Stormwater-Credits

5.23.6 Other chapter 500 requirements

A. All projects triggering stormwater management plans, except small scale residential projects, must also meet the following Chapter 500 Standards:
   1. Easement and Deed Restriction Standards
   2. Redistribution of Stormwater Discharges Standards
   3. Discharge to Wetlands Standards
   4. Discharges to Public Storm Sewer Standards.

~~5.4. SUBMISSION REQUIREMENTS~~

~~Applicants are required to submit a stormwater management and drainage plan as part of development review application and to provide the following submission items to demonstrate compliance with the applicable stormwater management standards:~~

~~5.4.1. Urban impaired stream standard requirements.~~

Calculations for the Compensation Fee or Mitigation Credit per the tables provided in Chapter 500 Rules and other associated Maine DEP regulations. (Note: The City of Portland has an approved Compensation Fee Utilization Plan (CFUP) and can therefore receive in-lieu fee payments to meet the UIS Standard.)

5.4.2. Water quality treatment requirements.

Written narrative demonstrating compliance, site plans showing grading and drainage infrastructure, site plan showing water quality treatment area(s) with table showing compliance, BMP sizing calculations, construction details, and a Post-Construction Stormwater Inspection & Maintenance Plan per Maine DEP Chapter 500 Appendix B with reporting requirements per Chapter 32 of City of Portland Code of Ordinances, and a Stormwater Maintenance Agreement. The submission documents should include confirmation of design from the manufacturer for any proprietary systems.

5.4.3. Flooding standard requirements.

Sub-catchment plans with flow paths, full hydrology computations/model output of pre- and post-development conditions, summary of pre- and post-development flowrates, and a written request for waiver with rationale for waiver as noted in Chapter 500 (as applicable). The submission documents should include confirmation of design from the manufacturer for any proprietary systems.

5.4.4. Minimum stormwater detention volume requirements.

Applicable drainage calculations, modeling information, plans and details as required to prove that the detention volume and maximum stormwater outflow control requirements are being met. The submission documents should include confirmation of design from the manufacturer for any proprietary systems. Stormwater detention systems shall be included in the project's overall post-construction stormwater inspection & maintenance plan and stormwater maintenance agreement.

5.4.5. Small-scale residential project requirements.

Provide plans and details as stipulated in section 16 of the Technical Manual. The provided site plan must depict the location and sizing of the proposed residential stormwater management system. Details of the proposed systems must also be provided. A short narrative, with supporting calculation documentation, shall be provided to demonstrate that the project is complying with standard 5 III F.

6. SANITARY SEWER AND STORM DRAIN DESIGN STANDARDS

6.1. TECHNICAL REFERENCE

6.1.1. The following technical publications are recognized by the City of Portland for use in the design, construction and testing of sanitary and stormwater systems:

A. *Technical Report #16 (TR-16): Guides for the Design of Wastewater Treatment Works*, Prepared by the New England Interstate Water Pollution Control Commission available for review at the Department of Public Works or online at www.neiwpcc.org/tr16guides.asp; and
B. *Maine Department of Transportation (MDOT) Standard Specifications for Highways and Bridges*, Current Edition.

6.2. SANITARY STANDARDS AND SPECIFICATIONS

6.2.1. Sewer and storm drain systems shall be planned and constructed in accordance with the regulations contained in Chapter 24 of the City Code of Ordinances.

6.2.2. The information presented below are City of Portland exceptions to *TR-16* or additional required standards:

A. The introduction of non-contaminated water such as rain water, non-contact cooling water, groundwater from foundation drains, sump pumps, surface drains, or any other sources of inflow shall not be allowed to discharge into a sewer which conveys sanitary waste unless approved by the Department of Public Works Water Resources Manager or their designee;
B. Appeals will be considered by the Director of Public Works. Refer to §24-44 of the City Code (Public sewer connection limitations);
C. It is not permissible to backfill any excavation with frozen materials, organic materials, clay or blasted ledge. The maximum size of backfill material shall not exceed six inches (6"). Please refer to Division 2 (Street Opening Permits) in the City Code;
D. The Department of Public Works shall be responsible for televising all new sewer construction for acceptability as soon as backfilling has been completed and access is available. The permittee will be invoiced for these services. Information on current rates is available in Chapter 24 (Sewer Ordinance);
E. Permits to connect to the municipal stormwater and sanitary sewer system are required and may be obtained from the Department of Public Works; and
F. Covered or enclosed parking areas, mechanical rooms, garages (parking areas not exposed to rain and snow) shall direct surface drainage to a sanitary sewer. Storm water from outside of these areas shall be directed away from this covered area so that additional storm water is not directed to the sewer. Drainage from these areas shall be collected by an oil/grit separator, as shown in Figure II-20 or an approved equivalent.

6.3. SANITARY MANHOLES

6.3.1. All manholes shall be designed in conformance with City of Portland standards as illustrated in Figure II-02.

6.3.2. When constructing sanitary manhole channels, if the vertical difference between the invert elevation of the manhole channel and the invert elevation of the sewer pipe connecting to such manhole is two vertical feet (2') or greater, a standard City of Portland internal drop manhole shall be provided. Such drop manholes shall conform to the engineering specifications illustrated in Figure II-03. A minimum of two stainless steel pipe anchors shall be used and the manhole diameter shall be five feet (5') minimum.

6.3.3. Sanitary service laterals that are four inches (4") or 6 inches (6") shall not be connected into a sanitary manhole and only into a sanitary sewer main.

6.3.4. Sanitary manholes shall include frames and covers as shown in Figure II-05 or an approved equivalent. Both the frame and riser shall be machined to assure a proper fit.

6.3.5. Manhole covers shall be marked "SEWER".

6.3.6. Manhole frames shall be raised to grade using only brick and mortar as shown in Figure II-02 or approved equal.

6.3.7. Riser rings without tabs as shown in Figure II-06 may be used to adjust manholes to grade with approval of the Department of Public Works.

6.3.8. All new sanitary manholes shall be vacuum tested before backfilling. Refer to *TR-16* for testing standards.

6.3.9. Steps are not required in sewer manholes. Any structures delivered to the site with step "holes" shall be filled with mortar.

6.4. SANITARY GRAVITY PIPES

6.4.1. The types of allowable pipe used for purposes of sanitary sewers shall be:

A. PVC ring type sewer pipe (SDR 35 or equivalent, minimum PS-46 rating);
B. PVC ring type sewer pipe meeting ASTM F 789 or equal to SDR;
C. Ductile Iron Pipe (DIP);
D. High performance polypropylene dual wall sewer pipe (ADS SaniTite HP or equal) meeting ASTM F2736 and have a minimum pipe stiffness of 46 psi with pipes sizes twelve through thirty inches (12"-30"); or
E. High performance polypropylene dual wall sewer pipe (ADS SaniTite HP or equal) meeting ASTM F2764 and have a minimum pipe stiffness of 46 psi with pipes sizes thirty through sixty inches (30"-60").

6.4.2. Minimum velocities for sanitary pipes shall not be less than two feet per second (2 ft./sec.).

6.4.3. All PVC connections shall be made with Solid PVC couplings.

6.4.4. The classes of pipe indicated shall be minimum, however the actual class of pipe used shall be determined by soil weight and compaction loads applied to such pipe in accordance with standard engineering design criteria and subject to the approval of the Department of Public Works.

6.5. FORCE MAINS

6.5.1. Force mains four inches (4") or greater shall terminate at a transition manhole and flow by gravity within a minimum sized eight-inch ("8") pipe to a City manhole.

6.5.2. Force mains less than four inches (4") may terminate to the nearest precast concrete manhole as directed by the City.

6.5.3. Cores into existing manholes shall be made with coring machines and have link seal or equivalent wall penetration seals.

6.5.4. Termination of force mains three inches (3") or less may be permitted into existing City-owned manholes if reconstruction or replacement is performed, depending on the material and condition of the existing manhole as determined by the Department of Public Works.

6.5.5. All force mains shall be at a minimum HDPE SDR-21 made with fully restrained connections or equal. Piping pressure ratings shall be at least two (2) times the operating pressure of the system.

6.5.6. Force main discharge shall be directed into the channel in the direction of gravity flow.

6.6. BUILDING SEWER LATERALS

6.6.1. Construction of building sewers and drains shall conform to Chapter 24 (Sewers) of the City Code of Ordinance.

6.6.2. All building sewer laterals shall have a minimum diameter of four inches (4") and a minimum slope of one eighth-inch per foot (1/8 in./ft.) installed, as shown in Figure II-12.

6.6.3. Typical pipe installation. Where a building sewer lateral is to be installed from the sewer main in the street to a property or building to be served, the lateral shall either extend to the building or to the street line of each lot to be served and the pipe shall be capped air-tight.

6.6.4. An accurate record of each building sewer, its location and its depth at the street line shall be kept by the developer's engineer and a copy of the same shall be provided to the Department of Public Works.

6.6.5. For new construction, the location of the building sewer at the street line shall be physically marked by the placement of a two-inch by four-inch (2" x 4") wooden stake placed at the end of the lateral end-cap and extending one foot (1') above finished grade.

6.6.6. Each stake shall be painted with a fluorescent paint and marked as storm or sanitary sewer with the depth indicated from grade to end-cap. A one-quarter-inch (¼") thick by six-inch (6") square ferrous metal plate or equivalent shall be placed horizontally one foot (1') below grade over the end of the storm drain.

6.6.7. Building sewers and drains shall be connected to the main sanitary sewer line by the use of wyes, tee/wyes, Inserta-Tees or similar approved methods as determined by the Department of Public Works. A manhole shall be installed at the sewer main to connect building laterals when the building later is eight inches (8") or larger in diameter. The lateral connections shall be installed from the main toward the lot where possible. Inserta-Tees can be installed on pipes where the main receiving pipe is at least twelve inches (12") in size and the lateral is not more than half the size of the main receiving pipe in order to use a coring tee-type connection.

6.6.8. Before connecting new pipes into an existing sewer line, the contractor shall obtain a sewer connection permit from the Department of Public Works.

6.6.9. Accessory dwelling unit (ADU) sewer laterals. Per Chapter 24 of the City Code of Ordinance "*A separate and independent building sewer shall be provided for every new building, and a separate connection shall be made for each building sewer.*" The Department of Public Works recognizes the following scenarios in Table 6.6.9. for the successful connection of the proposed ADU to the public sewer system (See Figure II-21 for additional information):

TABLE 6-A. PERMITTED SEWER CONNECTIONS FOR ACCESSORY DWELLING UNITS (ADU)

Type of ADU	Permitted Connection Strategy	Option in Figure II-21
Internal or Attached ADU	ADU can connect to the primary residence sewer lateral internal to the primary residence	Option A
Detached ADU	A separate and independent sewer lateral will be provided from both buildings with independent connections to the sewer	Option B
	A separate and independent sewer lateral is provided from both buildings with a connection into a sewer manhole at the property line. The sewer manhole will be a minimum two-foot size providing access to each sewer lateral. The sewer manhole may be placed on the existing sewer lateral from the primary residence with the ADU sewer lateral being fed into it.	Option C

6.6.10. Backflow protection. Fixtures installed on a floor level that is lower than the next upstream manhole cover of the public, or private sewer shall be protected from backflow of sewage by installing an approved type of backwater valve. Fixtures on such floor level that are not below the next upstream manhole cover shall not be required to be protected by a backwater valve. Fixtures on floor levels above such elevation shall not discharge through the backwater valve. Cleanouts from drains that pass through a backwater valve shall be clearly identified with a permanent label stating "backwater valve downstream".

6.6.11. All building floor drains shall discharge to the sanitary sewer system.

6.6.12. Plugging of abandoned sewer laterals. Prior to abandoning any storm water of sanitary sewer lateral, the applicant shall acquire a permit from the Department of Public Works. The applicant shall provide a 48-hour notice

the Public Works Dispatch stating the date and time the applicant wishes to complete the work. The Water Resources Division will mobilize to the site and allow one hour to assist the applicant to plug the lateral in the following manner:

A. The location of the lateral to be plugged shall be televised by the applicant and witnessed by Water Resources staff on site;
B. The applicant shall excavate or other means plug the lateral at the main where the lateral connects to the street sewer, as determined by City staff; and
C. The lateral must be filled with pumped grout starting at the plug and filling out to the points of excavation.

6.7. STORM WATER MANHOLES

6.7.1. Storm water manholes shall include frames and covers as shown in Figure II-05 or an approved equivalent. Bot the frame and riser shall be machined to assure a proper fit.

6.7.2. Manhole frames shall be raised to grade using only brick and mortar, as shown in Figure II-02.

6.7.3. Riser rings without tabs as shown in Figure II-06 may be used to adjust manholes to grade with approval of the Department of Public Works.

6.7.4. Manhole covers shall be marked "DRAIN".

6.7.5. Steps are not required in storm manholes. Any structures delivered to the site with step "holes" shall be filled with mortar.

6.8. STORM DRAINS

6.8.1. The types of allowable pipe and fittings shall be used for purposes of storm drains are included below:

A. All pipes listed for sanitary sewers;
B. Reinforced Concrete Pipe (RCP) with a minimum strength of Class III; or
C. Smooth Bore Height Performance Polypropylene Dual Wall Storm Drain Pipe (ADS HP Storm or equal) meeting a minimum PS-46.

6.8.2. Storm drain lateral may be connected into storm drain mains without the use of a manhole when the lateral is less than half the diameter of the receiving pipe.

6.8.3. Minimum velocities of surface water drains shall not be less than three feet per second (3 ft./sec.).

6.8.4. Ribbed corrugated polyethylene pipe material, smooth wall interior, is not permitted except for underdrain installation. Underdrain diameter shall be no larger than six inches (6").

6.8.5. The classes of pipe indicated shall be minimums, however the actual class of pipe used shall be determined by soil weight and compaction loads applied to such pipe in accordance with standard engineering design criteria and subject to the approval of the Department of Public Works.

6.8.6. Pre-fabricated tees are allowable on storm drains. A pre-fabricated tee connection shall be used and installed in accordance with manufacturer specifications.

6.8.7. Connection of catch basin/storm drain lateral leads to storm drain larger than an eighteen-inch (18") diameter may be performed with the use of a coring machine and suitable connection device. The connecting pipe shall not be more than half the size of the main receiving pipe in order to use a coring tee-type connection.

6.8.8. Underdrains shall be a six-inch (6") diameter perforated pipe SDR 35 PVC or corrugated ADPE with smooth interior wall (AASHTO M252 Type S). They shall have a minimum of two rows of perforations.

6.9. CATCH BASINS

6.9.1. All catch basins and catch basin inlets shall be designed and constructed in accordance with Figures II-07 through II-11.

6.9.2. Catch basin drain pipes of less than ten inches (10") in diameter are not permitted.

6.9.3. All catch basins shall have a four-foot (4') granite headstone of catch basin inlets conforming to City standards as shown in Figure II-11.

6.9.4. No radius catch basin stones shall be permitted.

6.9.5. All catch basins shall be constructed with a minimum sump of three feet (3').

6.9.6. Catch basins shall not be located in driveway openings.

6.9.7. No storm drains or storm drain laterals, with the exception of street underdrains, shall be connected into a catch basin structure.

6.9.8. Catch basin drains and catch basin inlet drain pipe slopes shall be such that minimum flow velocities shall not be less than three feet per second (3 ft./sec.).

6.9.9. Bee hive casting shall be used on drainage structures located at low points in grassed off-road locations.

6.9.10. Field inlets or Type-F catch basins may be used when outside of City street rights-of-way within lawn areas, with Department of Public Works approval. They must have a minimum of a twelve-inch (12") sump and can be plastic or concrete.

6.9.11. All catch basins are required to have a hood on the outlet pipe as shown in Figure II-09.

6.10. SUBSURFACE WASTEWATER DISPOSAL

6.10.1. To ensure that adequate provisions have been made for subsurface wastewater disposal, developers are required to locate, design, and install septic systems in accordance with the latest version of the *Maine Subsurface Wastewater Disposal Rules*, 144 CMR minimum 241, as described in Chapter 6, §6-18(A) of the City Code.

6.10.2. Developers are required to obtain a permit through the City of Portland Inspections Division prior to the installation of any subsurface wastewater disposal system identified on an approved site plan.

6.11. GREASE INTERCEPTORS

6.11.1. Grease control equipment is required for all food establishments based on the City of Portland's Fats, Oils, and Grease Program found in the Rules and Regulations for Use of the Sewer System.

6.11.2. Concrete grease interceptors must have two chambers. Chamber A, where influent enters, must be two-thirds (2/3) of the tank volume.

6.11.3. Concrete grease interceptors must have three (3) twenty-four-inch (24") access points.

6.11.4. Tanks must be designed for H-20 traffic wheel load and a concrete strength of 5,000 PSI at 28 days.

6.11.5. Joints must be sealed with butyl rubber joint sealant such as CS-102 Butyl Rubber Sealant.

6.11.6. Tees inside grease interceptors must be supported. Galvanized riser clamps on drop must be rodded to tank wall with galvanized fasteners six inches (6") below service weight tee. Tees must be accessible via an unobstructed view for cleaning through the top of the grease interceptor.

6.11.7. High density polyethylene grease interceptors are accepted as an equivalent to concrete grease interceptors. Polyethylene units shall be properly anchored to prevent floatation.

6.11.8. A control manhole must be installed downstream of the interceptor before it enters the city sewer system.

6.12. SANITARY STANDARDS AND SPECIFICATIONS

6.12.1. The provisions of Section 703 of the State of Maine Department of Transportation (MDOT) *Standard Specifications for Highways and* Bridges shall apply with the following additions and modifications:

A. **§703.13 Crushed Stone ¾" for Pipe Bedding and Underdrain.** "Crushed Stone" shall be defined as rock of uniform quality and shall consist of clean, angular fragments of quarried rock, free from soft disintegrated pieces or other objectionable matter. Crushed stone used as a bedding material for pipe and underdrain shall be uniformly graded and shall meet the gradations in Table 6.12.1. The stone shall be free from vegetable matter, lumps or balls of clay, and other inappropriate substances.
B. **§703.18 Common Borrow.** Common borrow shall not contain any particle of bituminous material.

C. **§703.19 Granular Borrow.** Granular borrow shall contain no particles which will not pass a three-inch (3") square mesh sieve.

D. **§703.20 Gravel Borrow**. Gravel borrow shall not contain particles of rock which will not pass a three-inch (3") square mesh sieve.

TABLE 6-B. AGGREGATE GRADING REQUIREMENTS

Sieve Designation	City of Portland Percentage by Weight Passing Square Mesh Sieve
1 inch	100
¾ inch	90-100
½ inch	20-55
⅜ inch	0-15
No. 4	0-5

7. WATER SUPPLY STANDARDS

~~7.1. APPLICABILITY~~

~~All applications for approval of proposed developments shall include evidence that demonstrates that the developer has made adequate provisions for securing and maintaining a sufficient and healthful water supply.~~

7.~~2~~1. STANDARDS

7.~~1~~1~~2~~.1. Documentation.

A. If water is to be supplied from an off-site source, applicants must provide a letter from the appropriate utility or water district stating that a sufficient and healthful water supply exists and may be utilized by the development.

B. For on-site water supply wells, provide evidence in the form of well inventory and water quality data on existing water supplies located within one thousand (1,000) feet of any property boundary of the proposed development. The well inventory data must show a probability that proposed wells will produce a safe and adequate water supply. Positive findings by a Maine Certified Geologist must be supported by a report which summarizes and interprets hydrogeologic and groundwater data for the region, with emphasis on the project site. It should include information such as:

   1. The number of wells established in the vicinity of the proposed project;
   2. Identification and locations of these wells on a site map, such as a USGS topographic map;
   3. The type and depths of the wells;
   4. The types and depths of soil and bedrock encountered at the well sites; and
   5. Water quality data from these wells (if applicable).

7.1.2. Development on islands in Casco Bay shall be designed to prioritize protection of existing aquifers as identified in the *City of Portland Island Groundwater Management Study* and/or by the Maine Geological Survey.

Unless the development is to be entirely served by public water and secondary treatment sewer systems, the determination of compliance with this provision shall be based upon one or more comprehensive groundwater analyses and reports prepared by qualified professionals and including assessment of current groundwater aquifer conditions, the impact of the proposed development on the groundwater aquifer, and recommendations for mitigation of potential impacts caused by the development.

7.~~1~~1~~2~~.3. A common water supply will be required if there is a reasonable doubt that sufficient water quality or quantity will be available from individual wells. A common water supply must have adequate safe yield and storage to a supply a minimum of seventy-five (75) gallons per day per person. For a single-family home, the well must be able to supply a minimum of three hundred (300) gallons per day, per household.

7.~~1~~1~~2~~.4. The Maine Center for Disease Control (MeCDC), Division of Environmental Health's Drinking Water Program must review and approve of any public drinking water system (if such a system serves an average of at least twenty-five (25) individuals daily at least sixty (60) days out of the year, or has fifteen (15) service connections.

7.12.5. If the water supply wells and subsurface wastewater disposal systems are on-site and any proposed lots are less than 2 acres in area, locations of the wells and subsurface disposal systems must be identified on the site plan.

7.12.6. A water supply report must be submitted, if any well service five (5) or more homes, or any development uses greater than 1,500 gallons per day.

7.12.7. If there is a reasonable doubt that sufficient and healthful water supply can be provided by on-site wells, the following are required:

A. A potability test of water from the development site;
B. Establishment of one or more test wells on the development site;
C. Pump tests of the well(s);
D. A report by a Maine Certified Geologist discussing the yield and potability of water obtained; and
E. A complete hydrogeological assessment of groundwater quality and quantity may also be required.

7.21.8. For developments with shallow to bedrock soils, wells must be cased 20 feet into the solid bedrock surface and the annual space cement/bentonite grouted.

7.32. SUBMISSIONS

7.32.1. For developments to be serviced by individual wells, evidence must be submitted from a Certified Geologist knowledgeable about the project, indicating a sufficient and healthful water supply is likely to be available as follows:

A. Well inventory data indicating number of wells, depth, yield, and approximate locations shown on a USGS topographic map. This data may be available upon request from the inventory database at the Maine Geological Survey;
B. Water quality data from an area well or wells showing potability; and
C. If a common well or wells are to service any portion of a development, submit a detailed water supply report prepared by a Maine Certified Geologist. The report must indicate that the water supply conforms to Maine State Drinking Water Regulations, Title 22 M.R.S.A. Section 601 and it must contain the following information:
    1. Determination of the long-term safe yield of each well including a prediction of operating levels;
    2. Determination of the cone of influence (cone of depression) for the well or wells;
    3. Water quality analysis results in accordance with requirements of the Maine State Drinking Water Regulations, Title 22 M.R.S.A. Section 601;
    4. Delineation of well head protection zones A, B, and C;
    5. Well head protection plans for each zone;
    6. Determination of any off-site wells which may be at risk due to groundwater withdrawal;
    7. Storage, treatment and distribution system that is designed, signed, stamped, and dated by a Maine Registered Professional Engineer; and
    Evidence that adequate provisions will be made for the establishment of an entity to provide long-term maintenance and operation of the water supply system.

8. LIGHTING STANDARDS

8.1. SITE LIGHTING STANDARDS

~~**8.1.1. Purpose.** The requirements set forth in this section are intended to promote and protect public health, safety and general welfare, and encourage the preservation of the natural nighttime outdoor environment. Specifically, the intent of this section is to limit light trespass, glare and light pollution to safeguard adequate safety, night vision, and comfort of the neighboring properties.~~

8.1.~~1~~2. **Applicability.** The following types of development proposals are required to submit a lighting management plan for review and approval:

A. All developments subject to site lighting standards of §14.6.4 of the Land Use Code, and
B. Other projects where the Reviewing Authority determines that special conditions warrant a lighting management plan.

8.1.~~2~~1. **General standards.** Outdoor lighting standards listed below apply to all new developments:

A. **Uniformity.** As measured in foot candles at grade, maximum to minimum illumination levels shall not exceed a ratio of twenty to 1 (20:1).
B. **General Illumination levels.** Minimum, maximum, and average illumination levels for areas intended to be lighted as measured at grade, shall meet the standards in Table 8-A.

TABLE 8-A. ILLUMINATION STANDARDS IN FOOT CANDLES (FC)

Minimum	0.2
Maximum	5.0
Average	1.25

C. **Use-specific illumination levels.** Average illuminance levels for exterior areas specified below, measured in foot candles (fc) at ground level unless noted, shall not exceed the levels listed in Table 8-B:

TABLE 8-B. USE-SPECIFIC ILLUMINATION STANDARDS

Uses	Average (fc)	Uniformity ratio (Average-to- minimum)	Maximum (fc)
ATMs (within 10 ft. perimeter)	10.0	3:1	20.0
Drive-through canopy			
Auto service station			
• Approaches & Drives	1.5	3:1	3.0
• Service Areas	2.0		4.0
• Pump Island Areas	10.0		20.0
Parking Lot			
• Surface	0.5	3:1	4.0
• Structured	0.8		2.0

D. **General and Use-Specific Lumens Standards.** No fixture shall exceed 20,000 lumens (±3%) and shall meet the following lighting type maximums listed in Table 8-C:

TABLE 8-C. LIGHTING TYPE MAXIMUMS (IN LUMENS)

Types of Lighting	Maximum Lumens Allowed

Path lighting	1,500
Building entrance	3,500
Residential/Commercial pole at 20 feet	15,000
Industrial pole at 30 feet	20,000
Auto service station	
• Approaches and drives	4,000
• Service areas	6,000
• Pump island areas	8,000 per fuel pump

E. **Lighting trespass.** The maximum illumination level at a property line shall not exceed 0.1-foot candle, as measured at grade, except where abutting industrial, or other non-sensitive uses. When a commercial or industrial use abuts a public right-of-way, or another commercial or industrial use, lighting must be designed so that the illumination at the property boundary line does not exceed 1.0-foot candles.

All residential uses and natural resource protection areas are to be considered sensitive to light trespass. In certain instances where a proposed development is adjacent to a sensitive use, house-side shielding may be necessary to comply with this standard.

F. **Luminaire types.** All fixtures must be LED and shall not exceed 3,000K Correlated Color Temperature (CCT). Screw-in light fixtures must have LED lamps specified to be maximum of 3,000K CCT.

G. **Full cut-off fixtures and shielding required.** All outdoor lighting fixtures, including pole-mounted and wall-mounted luminaires, shall be constructed full "cut-off" or with full shielding, type where lenses, refractors or lamp sources do not extend below the surface of the fixture housing and no direct light shall be directed at or above the horizontal plane.

Where the light source from an outdoor light fixture is visible beyond the property line, shielding shall be required to reduce glare so that the light source is not visible from within any residential dwelling unit.

Light fixtures mounted under a canopy shall be recessed so that the lens cover is recessed into, or flush with, the underside (ceiling) of the canopy.

H. **Pedestrian walkway lighting.** Pedestrian walkway light fixtures can be a combination of freestanding pole. Bollard, in-place step or building-mounted fixtures. For building-mounted fixtures, the proposed fixture type will be in scale with the building elevation on which it is to be installed and meet the fixture height provisions of Table 8.D. Pedestrian lighting (bollards) shall meet the Technical Manual standards for full cut-off or an exception may be considered in §8.1.3.L and §8.1.3.M.

I. **Fixture height.** Fixtures shall be mounted at the lowest height necessary to meet City standards and the height is measured from grade to the bottom of the lighting fixture. Fixtures shall meet the fixture height standards of Table 8-D. below.

TABLE 8-D. MAXIMUM FIXTURE HEIGHT BY TYPE OF LIGHTING

Types of Lighting	Maximum Fixture Height
Residential (Pedestrian) uses	20 feet
Commercial/Office uses	
Large industrial uses (≥50,000 SF of gross floor area	30 feet
Building mounted/entrances	Below the roof eave or 20 feet, whichever is lower
Bollard fixtures	3.5 feet

J. **Lighting curfew.** For surface and structured parking, lighting in-vehicle parking areas containing twenty or more (≥20) parking spaces shall be reduced to 50% of permitted levels from one hour after the business closing to one hour before business opening. If lighting levels are already below 50% of permitted levels, no curfew adjustment is required. Motion sensor activated lighting shall be permitted during closed hours to activate additional lighting above the 50% permitted, for the purposes of public safety.

K. **Continued maintenance.** Lighting installations must be maintained in good repair to meet the provision of this ordinance on an on-going basis.

L. **General exceptions.** Proposed uses that demonstrate a need to exceed the specific site lighting limits shown below for safe and reasonable exercise of the proposed use must provide a professionally produced lighting plan which adheres to the current Illuminating Engineering Society of North America (IESNA) recommendations for the proposed use. The Planning Authority may grant exceptions to the lighting standards with the finding that the light impacts do not create a public nuisance for abutting residential property. Unless otherwise specified below, exterior lighting shall conform to the recommendations put forth in *Lighting for Exterior Environments RP-33-14,* or its successor, published by the IESNA. Lighting fixtures other than full cut-off fixtures may be allowed only if acceptable luminaires shall include internal and/or external glare control louvers and installed so as to minimize uplight and offsite light trespass.

M. **Historic District, Architectural and Pedestrian Walkway Exception.** Sites which are part of a historic district or require specific decorative lighting fixtures as means to achieve compatibility within an existing architectural context must meet the following standards:

1. Lighting fixtures other than full cut-off fixtures may be allowed only if acceptable luminaires shall include internal and/or external glare control louvers and installed so as to minimize uplight and offsite light trespass, and
2. Low-pressure sodium and metal halide lamps are prohibited.

8.1.3. Lighting safety standards.

A. The lighting of the site and if applicable, building(s), shall enable users to observe movement and activities on the site during the day and at night.

B. Lighting plans should create nighttime illumination of pedestrian travel paths and gathering areas, entrances and exits, and parking lots and garages by achieving the following:

1. Provide a clear view of an area from a distance and enable anyone moving in or immediately around it to be easily seen;
2. Place lighting fixtures to clearly guide users to and from the facility;
3. Prevent potential hiding spaces adjacent to existing and proposed pedestrian travel routes; and
4. Permit facial identification at a distance of at least thirty feet (30') and create the perception of being identified.

8.1.4. Uplighting and architectural and specialty lighting.

A. Lighting shall be designed to minimize lighting of night sky and shall accentuate individual architectural or aesthetic elements, not the entire structure.

B. Lighting shall be directed downward unless the development is located in an area of the City where uplighting is permitted as described in §14.6.4. of the Land Use Code. Where permitted, upward aimed lighting (uplighting) shall:

1. Not exceed 4,000 mean lumens per accent feature;
2. Be placed as close as possible to the base of the building or feature that is being illuminated;
3. Be fully shielded from view off-site, and
4. Use a narrow cone of light for the purpose of confining the light to the object.

C. **Building façade lighting.** The exterior of a building may be lighted provided the following standards are met:

1. The lighting is done to accentuate an architectural or aesthetic element of the building, not the entire building;
2. The light must only be directed onto the building façade and not spillover beyond the plane of the building;

3. Upward aimed lighting must not exceed 4,000 mean lumens per accent feature, must be fully shielded, and mounted as flush to the wall as possible;
4. Lighting exceeding 4,000 mean lumens per accent feature must be aimed downward, fully shielded, and mounted as flush to the wall as possible; and
5. Stripe lighting. Stripe lighting along building structures as articulation may be approved as specialty architectural lighting, provided that it does not create nuisance.

D. **Flag poles, statues, and similar monuments.** A flag pole bearing a state flag, a flag of the United States or a flag of a foreign nation may be illuminated provided the following standards are met:
1. The luminaires must be fully shielded;
2. Upward aiming luminaires must be placed as close to the base as possible, and
3. The luminaires must not collectively exceed 20,000 mean lumens. Public statutes, memorials or other similar monuments may also be lighted upon approval by the Planning Authority, provided the above standards are met.

~~**8.1.4. Submission requirements and photometric plans.**~~

~~A. The lighting plan shall be depicted on a site plan, indicating the location of each current and proposed outdoor lighting fixture with projected hours of use. This plan will need to be stamped and certified by a licensed professional, such as an architect or engineer. The lighting plan may include a key to the proposed lighting that provides the following information:~~
~~1. Type and number of luminaire equipment (fixtures), including the "cut off characteristics", indicating manufacturer and model number(s);~~
~~2. Lamp source type (bulb type, i.e., LED), lumen output, and wattage);~~
~~3. Mounting height with distance noted to the nearest property line for each luminaire;~~
~~4. Types of timing devices used to control the hours set for illumination, as well as the proposed hours when each fixture will be operated; and~~
~~5. Lighting manufacturer supplied specifications ("cut sheets") that include photographs of the fixtures, indicating the certified "cut off characteristics" of the fixture.~~

~~B. A photometric plan shall be provided at 20 scale or larger which shall show the extent of the areas designed and intended for lighting, and within those specific areas show a photometric grid of maximum 10' point spacing, and within those areas provide foot candle calculations of maximum, average, minimum, maximum to minimum ratio, and average to minimum ratio. On the same or additional plan, a photometric plot shall extend to all lot lines and as necessary to reach illumination levels of zero (0) foot candles. Additionally, the applicant shall provide descriptive information, including manufacturer's catalog excerpts, for all proposed light fixtures, lamps, and poles.~~

8.2. MUNICIPAL STREET LIGHTING STANDARDS

8.2.1. Applicability.

Street lighting on City streets and public rights-of-way not subject to decorative street lighting shall follow the General Standards under 8.2.2. of this section.

In addition to the General Standards for lighting applicable throughout the City, the City of Portland has established special street lighting standards for decorative lighting in the following areas and according to the table and figures in this section:

A. Downtown (including portions of Cumberland Avenue)
B. Old Port
C. Peninsula -Eastern Waterfront and Bayside
D. Waterfront – Commercial & Thames Streets
E. Off-Peninsula/Forest Avenue

F. Historic Landscape Districts (including Baxter Boulevard, the Eastern and Western Promenades, Lincoln Park, and Deering Oaks Park)
G. Trails and pathways (including Eastern Promenade Trail, Fore River Trail, and Bayside Trail)

Decorative street lighting specifications include, but are not limited to, fixture type, pole and base type, pole height to top of fixture, pole spacing, and color. Please refer to Section 8.2.4. (Standards for Decorative Lighting) and Figure X-4 for the map of Portland's decorative lighting locations.

Developments subject to site plan review, with the exception of minor residential projects, that are on an existing or proposed street that is not currently illuminated with street lighting meeting City standards shall install the requisite type and number of street lights along all frontages.

Where lighting is being installed in the public right-of-way as part of a private development, developers are responsible for purchasing and installing all street lighting, including light poles, brackets, slip fitters, bases, and all electrical wiring and conduit. The new street lighting shall be connected to an existing metered service, unless otherwise directed by the City. Once installed, operational, and accepted by the city, street lighting located in the City right-of-way shall become the property of the City of Portland.

8.2.2. General standards.

A. **Location.** For areas not designated with decorative lighting, street lighting may be placed on only one side of the street within the furnishing zone. However, when deemed necessary for traffic safety, the Reviewing Authority may require some street lights to be placed on the opposite side of a street.

B. **Specification.** For areas not designated with decorative lighting, the City of Portland has adopted the following typical street light pole and fixture standards in Table 8.E.

TABLE 8.E. STANDARD STREET LIGHT POLE AND FIXTURE STANDARDS BY STREET TYPE

Light Pole Standards	Arterial	Collector	Local/Minor
A. Height (ft.)	20 or 30		14-15
B. Maximum Spacing (ft.)	160	130	120
C. Mounting	Reinforced concrete pole base with 2"-4" reveal above grade, with 4 bolts per pole.*		
D. Selection and Finish	• ≤ ½ mile from shoreline: Beacon RSA-B-SHO-S AA-10 Cobra [Figure X-2F] • ≥ ½ mile from shoreline: Hubbell RTA Upsweep Style [Figure X-2G]		Black aluminum
E. Color	Grey (Manufacturer's Specification)		
E. Minimum Average Foot Candles (fc)	2.0	1.2	0.4
F. Cutoff and Bulb Temperature	Full cutoff, using cost-effective and innovative technologies and shall seek to match uniformity, lumen output, and color of existing streetlights along roadway, where applicable		Full cutoff, using LEDs at a 3,000 Kelvin color temperature, and shall seek to match uniformity, lumen output, and color of existing streetlights along roadway, where applicable

* Local/Minor Street light pole design, mounting bolt pattern, bolt spacing, and bolt size shall be approved by the Department of Public Works.

C. **Standard cobrahead design.** Standard cobraheads shall meet the following design standards in Table 8.F.
D. **New metered services for light fixtures.**

1. New light fixtures shall:
   a. Not be tied to the existing power utility leased lighting system;
   b. Be provided with a NEMA 7-pin receptacle for future connection to the City of Portland lighting control system, with coordination with the City of Portland for final connection and control testing; and
   c. Be specified with a color temperature of 3,000K.
2. The developer is to provide a new metered electrical service in an APX outdoor rated enclosure (See §8.2.3. for unit specification), preventing any new fixtures from being directly connected to the power utility; and
3. The developer will be required to:
   a. Provide an astronomical timeclock inside the electrical enclosure (See §8.2.3. for unit specification) to control light fixtures; or
   b. Provide a standard photocell for each fixture, to be used until lighting control module is installed.

TABLE 8.F. STANDARD COBRAHEAD FIXTURE STANDARDS

Location	Cobrahead Type	Fixture Height	Spacing & Layout
One-lane roadways: Without on-street parking with low traffic	A	20'	One side: 65' – 70' Alt. 125' – 135'
One-lane roadways: With on-street parking with low traffic	A	30'	One side: 70' – 80' Alt. 120' – 130'
Two-lane roadways: With on-street parking with low traffic	B	30'	One side: 80' – 90' Alt. 175' – 185'
Two-lane roadways: With on-street parking with medium traffic	B	20'	One side: 75' – 80' Alt. 145' – 155'
	C	20'	One side: 90' – 100' Alt. 180' – 190'
		30'	One side: 100' – 110' Alt. 200' – 210'
Two or more lane roadways: With on-street parking with high/ medium traffic	D	20'	One side: 95' – 105' Alt. 195' – 210'
Two or more lane roadways: With on-street parking with high traffic	D	30'	One side: 115' – 125' Alt. 245' – 255'
	E	20'	One side: 100' – 110' Alt. 200' – 215'
		30'	One side: 115' – 130' Alt. 240' – 255'

8.2.3. Accessories & bollards.

A. **Cabinets.** The City standard cabinet specifications are included below in Table 8.G.

TABLE 8.G. STANDARD COBRAHEAD FIXTURE STANDARDS

Location	Fixture Type	Fixture Height	Layout	Color
Public right-of-way	APX Enclosures, Inc. Cabinet APX NEMA 3R Pedestal Enclosure APXPE401615	Per Manufacturer's Specification	Mounted on the back side of the sidewalk with door facing street, meter facing building street wall. If site constraints require box to be mounted within sidewalk furnishing zone, then door should face building/private property and meter should be mounted on the opposite side of the travel direction.	Grey/Silver or Clear Coat (Manufacturer's Specification)

B. Cabinet base can be stand-alone type other than above, provided it is not in a sidewalk or on the edge of a plowed pathway, street, or parking lot. Circuits may also be wired into existing traffic signal boxes or other light circuit boxes. This will be determined on a case-by-case basis.

C. Additional specifications for multiuse box with external power for festivals and special events (not required - determined by the Department of Public Works). Square D power panel QO816L100DF/S or QO112L125G with cover QO16US. Circuits required are:
   1. 1=125/250V 50 Amp NEMA 14-50 Receptacle;
   2. 1=125/250V 30 Amp NEMA 14-30 Receptacle; or
   3. 2=125V 20A Standard Receptacle.

D. Wiring & Electrical.
   1. 2" inch conduit (minimum) underground in light pole bases and cabinet base.
   2. Each light fused individually at base Fuse holder type is a (Buchanan 65 kit Cat #65U)
   3. Regular outlet on each pole just below the fixture to be fused at the bottom of the pole base with the same fuse kit as listed above.
   4. Any single photo cell control for all lights shall be in the cabinet, rated for the circuit. This may require an all-purpose contactor.
   5. Wire size and circuit size shall be calculated by the design engineer and inspected by the City inspector to make sure it is correct. This would be done on a case-by-case basis because not all circuits, lights, and systems are the same.

E. Bollards.
   1. This section includes standards for typical lighted bollards. Non-lighted bollards appear in Section 1 (Transportation Systems and Street Design Standards).
   2. Location: Bollards may be used in areas such as underpasses and similar conditions where height is restricted for pedestrian lighting. Spacing and number to be determined by Department of Public works. Locations must be approved by the Department of Public Works and the Planning Authority. The City may approve additional bollard types for streetscape or special projects such as parks or as use for security bollards. Any additional bollard selection must be of equivalent structural strength as approved bollards.
   3. Specification: The City of Portland has adopted the following typical lighted bollard standards in Table 8.H. below:

TABLE 8.H. LIGHTED BOLLARD STANDARDS

Location (including but not limited to)	Fixture Type	Fixture Height (ft.)	Spacing & Layout	Color	Mounting
Underpasses: Park Avenue, St. James Street, St. John Street, Forest Avenue, Preble Street, Franklin Street, Commercial Street, Harborview Park, Tukey's Bridge, Veranda Street	Holophane Freeport Series	45	To be determined by the Department of Public Works	Black (Manufacturer's Specification)	Concrete bases with 2" to 4" reveal above grade, with 4 bolts per pole
Waterfront piers					

8.3.4. Standards for decorative lighting. Figure X-4 identifies the decorative street light locations. The following tables and Figures X-5 through X-12 illustrate the requirements for fixture type, height, layout, and finish for each decorative light fixture, according to street. All light poles shall be mounted on reinforced concrete pole bases with 2" to 4" reveal above grade, with 4 bolts per pole.

TABLE 8.I. OLD PORT DECORATIVE LIGHT STANDARDS

Map – Figure X-6A
Fixtures – Figure X-6B

Location	Fixture Type	Fixture Height	Spacing & Layout	Color
Exchange Street: Congress to Fore Street	STREET [Figure X-6B]	14' 3"	Alt. sides: 60'-80'	Black (Manufacturer's Specification)
Fore Street: Center Street to Franklin Avenue				
Streets between Spring/Middle to Commercial Street: Center Street, Cotton Street, Cross Street, Union Street, Dana Street, Patton Court, Moulton Street, Market Street, Silver Street, Pearl Street, Custom House Street, Portland Square, Milk Street, Wharf Street, Gold Street				
Federal Street W, Middle street,				

Newbury Street W: Temple/Union to Franklin Avenue				
Church Street				
Parks: Post Office, Tommy's				

TABLE 8.J. DOWNTOWN DECORATIVE LIGHT STANDARDS

Map – Figures X-5A, X-5D

Fixtures – Fixtures X-5B, X-5C, X-5E, X-5F

The Technical Manual supersedes the previously adopted City of Portland Downtown Sidewalk and Street Lighting Plan (1994); that Plan may be used for reference or clarification of the standards of this manual.

Location	Fixture Type	Fixture Height	Spacing & Layout	Color
Oak Street, Casco Street, Brown Street, Chestnut Street, Shepley Street, Center Street: Congress to Free Street **Cross Street:** Free to Spring Street	PEDESTRIAN 1- Single or Double Arm [Figure X-5B]	12.5'	One side: 60'-80' Alt. sides: 100'-175' Single-arm fixture placed in furnishing zone with luminaire oriented over sidewalk. Double-arm fixture placed with bracket arms parallel to sidewalk. If sidewalk space is limited, Planning Authority may approve lights within private property or attached to building.	Dark Green – Tiger Drylac RAL 6012
Monument Square and Monument Way: Pedestrian ways	PEDESTRIAN 2 [Figure X-5C]	25'	One side: 90'-100' Alt. sides: 175'-225' Double-arm fixture placed with bracket arms parallel to sidewalk	
Congress Street **Other locations on a case-by-case basis**	STREET – Single or Double Arm [Figure X-5E]	30'	One side: 90'-100' Alt. sides: 175'-225' Double-arm fixture used in median conditions with luminaire overhanging street.	
Congress Street: St. John to Franklin Street	STREET/PED COMBO [Figure X-5F]	30'	One side: 90'-100' Alt. sides: 175'-225'	
Cumberland Avenue: High to Franklin Street				
Spring Street: High to Temple/Union Street				
Free Street: High to Temple Street				
Forest Avenue: Congress Street to Cumberland Avenue				
Center Street: Free to Spring Street				
Temple Street: Congress to Spring/Middle Street				

Myrtle, Chestnut, Elm and Preble Streets: Congress Street to Cumberland Avenue			One side: 90'-100'	
Federal Street: Congress to Temple Street				

TABLE 8.K. PENINSULA DECORATIVE LIGHT STANDARDS

Map – Figures X-7A, X-7C
Fixture – Figure X-6B

Location	Fixture Type	Fixture Height	Spacing & Layout	Color
Wilmot, Chapel, Stone, and Cedar Streets	MEDIUM STREET [Figure X-7B]	19' 3"	One side: 80' – 100' Use Type 2 IES distribution. Fixture placed in furnishing zone overhang towards the street; where fixture conflicts with overhead utilities, may be placed on back of sidewalk with light overhanging sidewalk. Where street lighting is provided by existing cobrahead fixtures, decorative fixtures are not needed on that side of street. If a project includes placing utilities underground, street/pedestrian lighting provided by decorative fixtures.	Black (Manufacturer's Specification)
Alder, Hanover, Parris, Brattle, Mechanic Streets				
Mountfort, Hancock, Hampshire, Newbury East, Federal East Streets				
Preble and Elm Street: Cumberland Avenue to Marginal Way				
Pearl, Chestnut, Myrtle Streets: Cumberland Avenue to Marginal Way				
Oxford West, Lancaster, Kennebec, Somerset Streets				
Portland, Fox, India Streets				
Anderson Street: Everett to Plowman Street				
Washington Avenue: Congress Street to I-295				
Middle Street: Franklin to Hancock Street				
Fore Street: Franklin to Waterville Street				
Marginal Way	LARGE STREET [Figure X-7D]	24' 3"	One side: 90'-100' Alt. sides: 175'-225'	
Forest Avenue: Cumberland Avenue to Park/Portland Street				
*** No streets shall use PEDESTRIAN scale light unless site conditions such as sidewalk width or overhead utilities prevent installation of MEDIUM STREET fixture (Figure X-7D)**	PEDESTRIAN [Figure X-7E]	14'6"	One side: 60'-80' Alt. sides: 100'-175' Fixture shall be oriented to overhang sidewalk. Fixture placed in furnishing zone unless space is limited. Placement on back of sidewalk or private property overhanging sidewalk may be	

			accommodated where space is a constraint.

TABLE 8.L. TRAILS & WATERFRONT DECORATIVE LIGHT STANDARDS

Map – Figure X-8A
Fixture – Fixture X-8B
Trails – This fixture is appropriate for any City trail installation. Standard lighted bollard may also be used in appropriate circumstances.
Bayside Trail – This fixture should only be used on the Bayside Trail if replacing six or more of the existing fixtures.
Waterfront – Commercial/Thames Street, this fixture is suitable to supplement standard cobrahead lighting.

Location	Fixture Type	Fixture Height	Spacing & Layout	Color
Fore River Trail: Casco Bay Bridge to US-1; Harborview Park trail path	TRAIL – Single Arm	18'4"	One side: 90'-125' Alt. sides: 175'-225'	Black (Manufacturer's Specification)
Commercial Street: Fore River Parkway to India Street			Supplemental pedestrian lighting as-needed. One side: 90'-125' Alt. sides: 175'-225'	
Thames Street: India Street to Eastern Promenade Trail			One side: 90'-125' Alt. sides: 175'-225'	
Eastern Promenade Trail	TRAIL – Single or Double Arm		One side: 90'-125' Alt. sides: 175'-225' Single arm fixture oriented to overhang trail; Double arm fixture for medians or similar.	

TABLE 8.M. OFF-PENINSULA DECORATIVE LIGHT STANDARDS

Map – Figure X-9A
Fixture – Fixture X-9B
In addition to the specific locations indicated below, this fixture is suitable for off-peninsula, commercial corridors to supplement standard cobrahead lighting.

Location	Fixture Type	Fixture Height	Spacing & Layout	Color
Forest Avenue: Marginal Way to Woodlawn Avenue	PEDESTRIAN - Single or Double Arm	18' 6"	One side: 60'-80' Alt. sides: 100'-175' Placement on back of sidewalk with single arm fixture oriented to overhang sidewalk; Where site constraints require placement in furnishing zone, use double arm fixture parallel to sidewalk.	Graphite (Manufacturer's Specification)

TABLE 8.N. HISTORIC LANDSCAPE STREET DECORATIVE LIGHT STANDARDS

Map – Figure X-10A
Fixture – Fixture X-10B
Fixture placement should comply with adopted master plans.

Location	Fixture Type	Fixture Height	Spacing & Layout	Color
Eastern Promenade (park side of street only): North Street to Vesper Street	STREET – with shield	21’	One side: 90’-100’ Alt. sides: 175’ – 225’	Black (Manufacturer’s Specification)
Western Promenade (park side of street only): Bramhall Street to Vaughan Street				
Baxter Boulevard (both sides of street): Forest Avenue to Bates Street				
Deering Oaks Park (Abutting Streets, park side only): Deering Avenue, Park Avenue, Forest Avenue	STREET – without shield		One side: 90’-100’ Park side of street only	
Deering Oaks Park (within park): High Street, State Street			One side: 90’-100’ Alt. sides: 175’ – 225’	

TABLE 8.O. HISTORIC LANDSCAPE PEDESTRIAN DECORATIVE LIGHT STANDARDS

Map – Figure X-11A
Fixture – Fixture X-11B
Fixture placement should comply with adopted master plans.

Location	Fixture Type	Fixture Height	Spacing & Layout	Color
Eastern Promenade: Pedestrian paths	Pedestrian	14’6”	One side: 60’-80’	Black (Manufacturer’s Specification)
Western Promenade: Pedestrian paths				
Deering Oaks Park (Interior): Pedestrian paths, High Street, State Street			Use existing light locations or refer to the Deering Oaks Master Plan (2003) for revised locations	

TABLE 8.P. DEERING OAKS BRIDGE DECORATIVE LIGHT STANDARDS

Map – Figure X-12
Fixture placement should comply with adopted master plans.

Location	Fixture Type	Fixture Height	Spacing & Layout	Color
Deering Oaks Park (Bridge)	Bridge Light	6’ (match existing)	One side: 60’-80’	Match existing

8.3.5. City of Portland versus construction contractor responsibilities. For projects where the construction contractor is required by the City to provide new street lighting, the new street lighting shall be connected to an existing metered service, unless otherwise directed by the City (see §8.2.2(D) for new metered services for lighting).

A. Construction contractor responsibilities. The responsibilities of the construction contractor are as follows:
   1. The construction contractor shall furnish and install the following as part of the construction scope as stipulated by the City according to City standards for the given project location:
      a. Street lighting luminaires;

b. Street lighting poles;
c. Bracket arms;
d. Pole accessories; and
e. Decorative base enclosures;

2. Concrete foundation bases for new street lighting poles. Poles shall be mounted on reinforced concrete pole bases with 2" to 4" reveal above grade, with 4 bolts per pole. The installation of the foundation bases shall be coordinated with sidewalk details and requirements as stipulated by the City of Portland Department of Public Works;
3. **Underground conduit and wire between street lighting pole foundation bases.** In addition, underground conduit and wire shall be provided to an electrical service panelboard and meter, as well as to an existing service connection;
4. Wiring to be installed within each street lighting pole and shall be extended at the pole top (or bracket arm), with connection to the street lighting luminaire(s);
5. Upon completion of the erection of the street lighting fixtures, including the installation of all lighting poles and conduit/wire, the construction contractor shall notify the City that the system is ready for operation. The luminaires shall be energized prior to the construction contractor's request for a City Certificate of Occupancy; and
6. It shall be the construction contractor's responsibility to pay all costs associated with the provision of required street lighting including costs associated with street lighting luminaires, street lighting poles, brackets, bases, conduit and wire, panelboards, and metering equipment.

B. **City of Portland responsibilities.** The responsibilities of the City of Portland are as follows:
1. To approve the proposed point of connection for electrical service for new municipal street lighting where a new metered service is provided;
2. Connection of the construction contractor's secondary service conductors at an existing service point, where a new service is provided; and
3. To review and approve the location of the street light fixtures within the public right-of-way.

~~**8.3.6. Submission requirements.** A lighting plan shall be provided which shall show the quantity and location of all existing and proposed street lights. This shall be incorporated into the site plan or presented on an individual lighting plan. Descriptive information including engineering detail drawings depicting the entire proposed fixture (luminaire, bracket arm, slip fitter) along with the proposed finish shall be included on the individual lighting plan.~~

9. SHADOW STANDARDS

~~9.1. APPLICABILITY~~

~~All major and minor site plan proposals outside the B-3, B-5, B-6, and B-7 zones that would result in new shadows long enough to reach significant public resources (except within an hour and a half of sunrise or sunset) are required to submit a preliminary shadow analysis to the Planning Authority for review. If a preliminary analysis indicates the potential for adverse shadow impact, applicants are then required to submit a shadow analysis, as outlined below. In many cases, it may be appropriate to use the services of an architect or other professional skilled in use of computer analysis to perform a shadow analysis; however, this is not a requirement. Anyone undertaking a shadow analysis must use the longitude, latitude, and time information for Portland, Maine.~~

9.1~~2~~. PRELIMINARY SHADOW ANALYSIS REQUIRED SUBMITTALS

A preliminary shadow analysis shall be required for all projects that include new structures or additions to structures ≥6~~4~~5 feet tall, in order to determine if additional shadow analysis is required. A preliminary shadow analysis will need to evaluate the following criteria:

9.~~2~~1.1. Shadow length. The longest shadow that any structure will cast in Portland, Maine during the year (except within an hour of sunrise or sunset) is 4.26 times its height. To conduct a preliminary analysis, multiple this factor by the height of each proposed structure. If no significant public resources, as defined above, are located within that distance from the project site in any direction, no further analysis is required. For example, if a development would result in a 48-foot tall building, its longest shadow would be approximately 192 feet. If there are no significant public resources within 192 feet of the project site, then no further shadow analysis is required.

If a resource is identified, the location of the site in relationship to the resource shall be evaluated to determine the potential for adverse shadow impact and the need for further analysis.

9.~~2~~1.2. Site location. Because of the path that the sun travels across the sky, no shadow can be cast in a triangular area to the south of any given project site. Therefore, if the resource in question is located within that triangular area, no further shadow analysis is required. In Portland, Maine, that area lies between -122 degrees from true north and 122 degrees from true north. Thus, any significant public resource would have to be at an angle from true north greater than -122 degrees or 122 degrees in order to be shaded at any time by the proposed development.

9.1~~2~~.3. Significant public resource. The preliminary shadow analysis shall consider the sensitivity of the significant public resource(s) to shadow. Open spaces or natural features that require direct sunlight for a portion of the day to sustain existing vegetation or to maintain the viability of its current use (e.g., sitting or sunning areas, public gathering spaces, turfed sports fields or children's play areas) require further analysis.

Some significant open space resources may not be sensitive to sunlight, such as paved areas or landscaped areas with all shade-tolerant species. For these types of conditions, not further shadow analysis is needed.

If the above steps are not able to determine that shadows from a proposed development would not reach a shadow-sensitive significant public resource during any time of the year, a full shadow analysis is required.

9.32. PRELIMINARY SHADOW A~~A~~NALYSIS REQUIRED SUBMITTALS

9.32.1. A shadow analysis shall define the extent and duration of additional shadow that a proposed development would cast on significant public resources in the project vicinity during the year, along with the effect that new shadowing would have on any sun-sensitive aspects of the resource(s).

9.23.2. Applicants are encouraged to use professional resources and/or computer analysis to calculate and graphically display shadows, specifically if proposed structures are irregularly shaped or if the project site is located in a densely developed area.

9.23.3. A shadow analysis shall include the following times of year:

A. March 21st or September 21st;
B. June 21st;
C. May 6th or August 6th; and
D. December 21st.

9.23.4. A shadow analysis should identify the types of significant public resources, types of vegetation and common use(s) of the site, along with discussion of the corresponding sunlight requirements for each. The uses and vegetation of open space areas establish its susceptibility to adverse shadow impact. Uses that rely on sunlight include sitting areas, gardens, and play areas. Vegetation that relies on sunlight includes tree canopy, shade-intolerant flowering plants and turf. Shadow-sensitive landscapes and uses generally require a minimum of four to six hours of sunlight a day. If necessary, applicants are encouraged to use the professional services of a landscape architect or recreation planner to inventory and assess the sensitivity of various landscape features to shadow.

9.23.5. In presenting the results of a shadow analysis, the following information shall be included for each date:

A. Duration of incremental shadow on affected features;
B. Times of shadow penetration;
C. Description of affected features (e.g., landscaping, seating, active uses, historic resources); and
D. Time of sunrise and sunset for the date being analyzed.

9.23.6. In addition to a narrative description, the analysis shall include clear graphic representations of the following, as applicable:

A. Relationship between the project site and significant public resources;
B. Calculation of the angles from north for project shadows entering and exiting the affected areas of the resource(s);
C. A map showing pre-development condition shadows and the incremental shadows from the proposed structure(s) on all significant public resource(s) on each representative date;

D. In the case of public open space resources, a site plan of the open space should be used to illustrate the placement of incremental shadows to allow for clear presentation of any impact to sensitive features. The length of time of the project's shadows should be indicated on each map;
E. Photographs of the resource(s), focusing on elements sensitive to sunlight loss that may be impacted by new shadows from the development; and
F. Plan of the significant public resource, showing composite shadows and the location and duration of sunlight.

9.34. DETERMINING SIGNIFICANCE OF SHADOW IMPACTS

A significant shadow impact occurs if the new shadow added by the development proposal reduces sunlight to a level where it would have an adverse impact on existing sunlight-sensitive uses. This includes, but is not limited to, the following scenarios:

9.34.1. Substantial reduction in sunlight where a sensitive use is already subject to substandard sunlight;

9.34.2. Reduction in sunlight to vegetation resulting in less available sunlight than the minimum necessary for its survival; or

9.34.3. Substantial reduction in the usability of an open space area.

9.54. ALTERNATIVES AND MITIGATION

9.45.1. When an adverse shadow impact is identified, mitigation must be assessed. Types of mitigation that may be appropriate include, but are not limited to, relocating facilities within an open space to avoid sunlight loss, relocating or replanting vegetation, undertaking additional maintenance to reduce the likelihood of species loss, or replacement facilities on another nearby site. Where affected open space is a City park, it is appropriate for the applicant to coordinate mitigation options with the Parks Division of the City of Portland Department of Public Services.

9.45.2. Alternatives that may reduce shadow impacts include, but are not limited to:

A. Reorientation of the structure(s) bulk to avoid adverse shadow impacts on sensitive significant public resources;
B. Reorientation of the site plan to include replacement facilities;
C. Where possible, reorientation of the sun sensitive features of the resource itself; and
D. Incorporation of architectural design techniques and/or reflective façade materials to increase available light.

10. PUBLIC SAFETY STANDARDS

10.1. CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN (CPTED) STANDARDS

10.1.1. Natural Surveillance. Site plans shall be designed so that they create formal and informal natural surveillance networks on the site to increase on-site visibility and the safety of legitimate users and to deter potential offenders.

A. **Physical features.** The placement and design of physical features shall maximize visibility to allow for surveillance opportunities to and from site features such as entrances and exits, walkways, assembly areas, corridors, stairways, windows, parking lots, landscaping, fences or walls, and any other physical attributes.

B. **Lighting.** The lighting of the site and building shall meet the City's technical standards for site lighting, as detailed in Section 12 of this manual, and enable users to observe movement and activities on the site during the day and at night. Motion sensor activated lighting is permitted to provide adequate illumination of the site at night while still complying with applicable lighting curfew standards of Section 12 of the Technical Manual. Specifically, the lighting plan should satisfy the following criteria:

   1. Create nighttime illumination of pedestrian travel paths and gathering areas, entrances and exits, and parking lots and garages by achieving the following:
      a. Provide a clear view of an area from a distance and enable anyone moving in or immediately around it to be easily seen.
      b. Deny potential hiding spaces adjacent to existing and proposed pedestrian travel routes.
      c. Permit facial identification at a distance of at least 30' and create the perception of being identified.

C. **Mechanical Surveillance Systems.** If necessary, mechanical surveillance systems such as CCTV may be installed to monitor areas not easily observed such as parking lots and garages.

10.1.2. Access Management. Site plans shall be designed to provide visible pathways and to offer proper guidance for legitimate users to access the site and to discourage unauthorized use of the site.

A. **Orientation and Wayfinding.** The site shall be designed so that the layout, features and/or signage clearly guide the movement of vehicles and pedestrians along safe and predictable paths both during the daytime and nighttime. Specifically, the site plan shall satisfy the following criteria.

   1. Placement of signage, lighting fixtures, landmarks, and landscape design features shall clearly guide users to and from the facility.
   2. Site features shall be designed to avoid the creation of entrapment zones that afford users no opportunity to escape or retreat from an approaching hazard.

B. **Mechanical Access Control.** If necessary, mechanical access control systems may be implemented such as assigning personnel at key building entry points or establishing other procedures such as mechanical auto closing devices, key cards, gates and other locking devices.

10.1.3. Territorial Reinforcement. Proposed developments shall be designed to clearly delineate private, semi-private, and public space.

10.2. FIRE HYDRANT STANDARDS

10.2.1. All development constructed within the limits of the City of Portland shall have a hydrant within five hundred feet (500') of all structures.

10.2.2. All hydrants, private and public, shall comply with City Code Chapter 10 and Portland Water District standards.

10.2.3. Private hydrants shall be maintained by the property owners. A maintenance agreement, or other documentation if deemed acceptable by the Reviewing Authority, shall be required for all private hydrants. A follow-up will be conducted and a financial penalty will be levied for non-compliance. All compliances shall meet City Code Chapter 10, which adopts by reference National Fire Protection Association (NFPA) #1 and #101.

10.2.4. A six-foot (6') clear space shall be maintained around the circumference of fire hydrants, private or public, except as otherwise required or approved.

~~10.3. SINGLE- AND TWO-FAMILY RESIDENTIAL DEVELOPMENT~~

~~As of September 16, 2010, all new construction of one- and two-family homes are required to be sprinkled in compliance with adopted NFPA code.~~

10.4. SITE ACCESS STANDARDS

10.4.1. Every dead-end roadway more than one-hundred-fifty feet (150') 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).

10.4.2. Where possible, developments shall provide access for Fire Department vehicles to at least two sides of all structures. Access may be from streets, access roads, emergency access lanes, or parking areas.

10.4.3. Building setbacks, where required by zoning, shall be adequate to allow for emergency vehicle access and related emergency response activities and shall be evaluated based on the following factors:

A. Building height;
B. Building occupancy;
C. Construction type;
D. Impediments to the structures, and
E. Safety features provided.

10.4.4. Fire Department access roads shall extend to within 50' of an exterior door providing access to the interior of the structure.

10.4.5. Site access shall provide a minimum of nine (9) feet clearance height to accommodate ambulance access.

~~10.4.6.~~ ~~Elevators shall be sized to accommodate an 84" x 24" stretcher.~~

10.4.7. Street name and street numbering shall be determined during development/subdivision review and shall comply with Portland's 911 numbering system.

10.4.8. All structures are required to display the assigned street number. Numbers shall be clearly visible from the public right-of-way.

10.5. STANDARDS FOR EMERGENCY ACCESS LANES AND GATES

10.5.1. No inside turning radius shall be less than twenty-five feet (25').

10.5.2. No outside turning radius shall be less than one-hundred feet (100').

10.5.3. New emergency access lanes shall be a minimum of sixteen feet (16') wide but may be required to be up to twenty feet (20') wide where one or more of the following conditions occur:

A. The access is likely to be used by Fire Department ladder trucks to set up for buildings adjacent to the lane; or
B. The access lane is likely to be used by Fire Department Engine companies to set up pumping operations to fight a fire at building adjacent to the lane.

10.5.4. Access lanes shall be engineered and maintained to support the weight of emergency vehicles during all weather conditions.

10.5.5. Appropriate "No Parking" signs shall be posted in accordance with instructions from the Fire Department having jurisdiction, and a method of enforcing such provisions shall be provided.

10.5.6. All gates shall be located a minimum of thirty feet (30') from the public right-of-way and shall open inward to the site.

10.5.7. Fire Department personnel shall have ready access to locking mechanisms on any gate restricting access to a fire lane. Proposed changes to access shall be pre-approved by the Reviewing Authority.

10.5.8. The clear opening provided through all gates shall be two feet (2') wider than the traveled way.

10.5.9. Blockading of any emergency lane shall be done by gates which are secured by chain and padlock. Padlocks shall be a "Knox" lock.

10.5.10. Emergency lanes shall be maintained and made accessible for emergency use at all times. No parking of vehicles or other use that might obstruct the emergency access lane shall be permitted. An access maintenance agreement or other suitable document acceptable to the Reviewing Authority shall be required.

10.5.11. The use of automatic gates such as the "Click2enter" systems requires prior approval from the Reviewing Authority.

10.6. SUBDIVISION STANDARDS

Subdivisions shall comply with the following minimum street access requirements listed in Table 10.5. All planned building groups shall meet the requirements of NFPA 1141.

TABLE 10.5. MINIMUM NUMBER OF ACCESS ROADS BY SPRINKLERING AND NUMBER OF UNITS

	Required Number of Access Roads by Number of Proposed Units			
Subdivisions by Sprinklering	**1-34**	**35-67**	**68-99**	**≥100**
Subdivisions with an approved sprinkler system designed to NFPA #13D	One (1)		One (1) access road and an emergency access lane	Two (2) access roads
Subdivisions without an approved sprinkler system designed to NFPA #13D	One (1)	Two (2) access roads or a single access road and an emergency access lane	Two (2) access roads	

~~10.7. BLASTING SAFETY STANDARDS~~

~~10.7.1. Submittal Requirements.~~

~~A. All Blast Operations. Applicants for all blasting operations shall obtain a blasting permit from the Planning and Urban Development Department prior to any blasting. Application forms may be obtained through the Inspections Division or can be downloaded from the City of Portland website.~~

~~A. Medium Blast Operations. For medium blast operations, the blasting contractor will also be required to submit a blasting submittal with the blasting application form. The blasting submittal must include, at a minimum the following information:~~

- ~~A. Description of Test Blast, Drill Pattern;~~
- ~~B. Description of Production Blasting, Drill Pattern;~~
- ~~C. Explosives to be used during wet and dry conditions;~~
- ~~D. Stemming material and depth;~~
- ~~E. Description and location of blasting signs;~~
- ~~F. Type of seismograph to be used;~~
- ~~G. Description of proposed transportation and storage of explosives, and~~
- ~~H. Signature of blasting contractor testifying to the accuracy of the above information.~~

~~B. Large Blast Operations. For large blast operations, the blasting contractor will also be required to submit a drilling pattern and loading plan, referred to herein as a blasting plan, with the blasting application for review and approval. Blasting plans must be submitted at least two weeks prior to the start of any drilling and/or blasting operations. A model blasting plan is provided at the end of this section and shall include, at a minimum, the following information:~~

- ~~A. The sequence and schedule of blasting rounds, including a general description of the proposed approach for developing each bedrock excavation area;~~
- ~~B. A diagrammatic description of the typical blast pattern to be used, including pre-splitting pattern if pre-splitting is required;~~
- ~~C. Diameter, spacing, burden, depth and orientation of each drill hole relative to the "free face". Along with details of the delay pattern;~~
- ~~D. A diagrammatic description of the loading plan for a typical production hole include charge weights and distribution of primer, explosives and stemming within a typical hole;~~
- ~~E. Estimation of ground vibration levels at nearest adjacent structures;~~

F. Written evidence of the licensing, experience, and qualifications of the blaster who will be responsible for loading and firing each shot;

G. A listing of the number and type of instrumentation proposed to be used to monitor vibrations and airblast overpresurres; and

H. Safety procedures, security measures, and warning sequences.

10.7.2. Pre-Blast Survey.

A. **Pre-Blast Survey Scope.** Pre-blast surveys are required for all blasting operations. The blasting contractor will hire an independent seismologist or blasting consultant to perform pre blast surveys on all structures (contingent upon property owner agreement) within the distances specified below in Table 8.2.2. The independent seismologist or blasting consultant shall not be an employee of the contractor, subcontractor, explosives manufacturer, or explosives distributor.

TABLE 10-A. PRE-BLAST SURVEY SCOPE BY SIZE OF BLAST

Size of Blast	Scope of pre-blast survey
Small	Within 250 feet of the perimeter of the blasting site
Medium	Within 500 feet of the perimeter of the blasting site
Large	Within 600 feet of the perimeter of the blasting site

B. **Pre-Blast Survey Offer Notice.** Prior to commencement of the pre blast surveys, the contractor shall provide the following documentation to the Department of Planning and Urban Development:

1. A list of property owners to be contacted (in accordance with the distances listed in Table 7.2.2.);
2. Verification that the subject property owners were notified of the pre blast survey work;
3. A copy of the pre-blast survey offer notice; and
4. Whether each offer to conduct a pre blast survey was either accepted, rejected, or there was no response.

The contractor shall retain a copy of each pre blast survey offer notice for their records until the development project receives a final certificate of occupancy or is otherwise deemed complete by the City. Nothing herein shall be construed to discourage repeated efforts by the blasting contractor to contact eligible property owners via phone, hand delivery, or other method in addition to provision of the required offer notice letter.

C. **Pre-Blast Survey Documentation.** All pre blast surveys shall include documentation of interior subgrade and above grade accessible walls, ceilings, floors, roof and visible exterior as viewed from the grade level. Where significant cracks or damage exist, or for more complex structural defects, photographs or video shall be taken.

A high-quality videotape survey with appropriate audio description of the locations, conditions, and defects may substitute for a written pre blast survey. Where necessary, notes and sketches may also be submitted as part of a video pre-blast survey in order to highlight or elaborate on certain aspects of the video documentation.

D. **Pre-Blast Survey Conditions Report.** The pre blast surveys shall include a conditions report for each property. The conditions report may be presented as narrative, photographs, video or a combination thereof. Conditions reports shall summarize the condition of each building and define areas of concern, including deteriorated structures or utilities, structures housing sensitive equipment, and/or manufacturing processes that are sensitive to vibrations.

E. **Verification.** Verification that all pre-blast surveys and conditions reports have been completed shall be submitted to the Department of Planning and Urban Development at least two weeks prior to commencing any drilling and/or blasting operations.

10.7.3. Notification to Neighbors. Notice of blasting operations shall be provided in accordance with the requirements listed in Section VIII of the Land Use Code. For medium and large blasts, please also refer to the additional notification requirements during construction, described in §8.2.7. of this section (Blasting Schedule).

10.7.4. Complaint Protocol. The blasting contractor shall be solely and completely responsible for the safety of all persons and property during the performance of work. The blasting contractor shall have full and complete responsibility for the handling, discharging, or settling of any and all damage or annoyance claims resulting from the blasting activities on the project.

Complaints may be submitted to the Blasting Contractor and to the Department of Planning and Urban Development or the Fire Department throughout the duration of blasting operations. If a property owner submits a complaint regarding alleged blasting related damages, the independent seismologist or blasting consultant shall meet with the property owner within 24 hours of receiving the complaint to discuss the basis for the complaint, review applicable blasting records, and evaluate the reasonableness of the complaint. If a reasonable basis for the complaint is verified, the independent seismologist or blasting consultant shall conduct a second condition survey of the property within 48 hours of receiving the complaint to identify any changes in the property conditions. A condition survey report summary shall be submitted to the Applicant, and verification that the condition survey was completed shall be submitted to the Department of Planning and Urban Development within two weeks of the second condition survey being conducted.

10.7.5. Hours of Blasting and Storage of Explosives. Hours of blasting operations shall be limited to those defined in Chapter 14, Section VIII, *Regulations of Explosives* of the City Code of Ordinances. Only the amount of explosives necessary for the day's work shall be brought to the site, and explosives shall be transported and stored in approved magazines when not in use.

10.7.6. Blast Warning. International Blast Warnings shall be utilized for all blasting operations, as described below in Table 10-B. For large blasts, all persons within 600 feet of the blasting area shall be notified of the "warning" and "all-clear" signals through notices left in mailboxes and signs posted in the vicinity of the blasting site.

10.7.7. Blasting Schedule (Medium and Large Blasts, only). The blasting contractor shall prepare and submit a blasting schedule to the property owner, the general contractor and the Department of Planning and Urban Development at least 10 business days prior to commencing blasting operations. The schedule shall include name and contact information for the blasting contractor, blasting area locations, planned dates and times of blasts, access restrictions to the blast areas, and warning signal protocols.

During construction, the blasting contractor shall coordinate the blasting schedule with the property owner, the general contractor, the Department of Planning and Urban Development, and the Fire Department on a weekly basis.

The morning of a planned detonation, the blasting contractor shall notify the Fire Department and the Department of Planning and Urban Development of the planned time of the blast (+/- one hour), the location where the blasting is to occur, and the amount of explosives to be used.

At least 24 hours prior to any blast, the blasting contractor shall inform all property owners who requested notice of the blasting schedule (+/- one hour).

10.7.8. Vibration Limits and Ground Vibration Monitoring. The seismograph must be set up at the closest structure to record each blast event. Ground vibration from all blasting operations shall be measured in terms peak particle velocity (inches per second (ips)) and frequency (hertz). The permissible maximum ground vibration at

existing nearby structures shall be limited to values established by the U.S. Bureau of Mines[1] to avoid cracking or structural damage in residential structures. Particle velocity shall be recorded in three mutually perpendicular directions. Ground vibration for residential structures shall not exceed the limits listed in Table 8.2.8.

Deteriorated structures or utilities, structures housing sensitive equipment, and/or manufacturing processes that are sensitive to vibrations may require lower PPV limits than those listed above. If information obtained from the pre-blast surveys indicates lower limits are required for certain structures, the independent seismologist or blasting consultant shall identify the limits applicable to a specific structure, and the blasting contractor shall incorporate such provisions in the features of the blasting plan.

In the event the blasting contractor's blasting round results in ground vibrations closely approaching the stated limits, the blasting operations shall be modified to reduce ground vibrations.

In the event the lasting contractor's blasting round results in ground vibrations exceeding the stated limits at structures, the blasting contractor shall cease all blasting activities and submit a written report to the property owner and the general contractor, copied to the Department of Planning and Urban Development and the Fire Department. This report shall describe corrective action to be taken on the next shot. The next shot shall not be loaded until the property owner and the general contractor acknowledge, in writing, copied to the Department of Planning and Urban Development and the Fire Department, that a design change is being attempted.

TABLE 10-B. GROUND VIBRATION LIMITS FOR RESIDENTIAL STRUCTURES

Type of Structure	Maximum PPV (ins/s)	
	Frequencies < 40 HZ	Frequencies ≥ 40 HZ
Modern Homes (drywall interior)	0.75	2.0
Older Homes (Plaster on wood lath for interior walls)	0.50	

10.7.9. Flyrock Control (Large Blasts Only). Blasting mats, soil, or other equally serviceable material shall be utilized for all blast rounds to prevent the throw of flyrock from the blasting area.

10.7.10. Pre-Blast Safety Meeting (Medium and Large Blasts Only). Prior to any blasting, the blasting contractor will conduct a pre-blast safety meeting with all contractors to familiarize them with blast signals and precautions.

10.7.11. Test Blasts (Large Blasts Only). Prior to commencing full-scale blasting, the blasting contractor shall demonstrate the adequacy of the proposed blasting plan by drilling, blasting, and excavating short test sections using small charges and the required monitoring instruments. The blasting contractor shall develop site-specific scaled distance relationships from the test blast rounds to determine the allowable charge weight of explosives to be detonated per delay.

10.7.12. Personnel.

A. **General.** All employees of the blasting contractor working on-site during the blasting operation shall be trained in the use and handling of explosives.
B. **Large Scale Blasts.** The blasting contractor shall be required to carry liability insurance (XCU) coverage in an amount no less than $2,000,000.

[1] United States Bureau of Mines. *Structure Response and Damage Produced By Ground Vibration From Surface Mine Blasting*. Prepared by D.E. Siskind, M.S. Stagg, J.W. Kopp, and C.H. Dowding, Report of Investigations #8507, Appendix B, 1980.

The blasting contractor shall hire a company specializing in the use of explosives for breaking rock and licensed in the State of Maine. The blaster or foreman responsible for the loading and firing of each shot, as well as the person responsible for designing and directing the blasting operation, shall have at least five years of documented experience with similar work responsibilities. IF controlled blasting methods are required, these individuals shall have at least five years of documented experience in controlled blasting techniques.

At least two weeks prior to the commencement of pre blast surveys, the contractor will submit the name and qualifications of the independent seismologist or blasting consultant proposed to conduct the pre blast surveys to the Department of Planning and Urban Development and the applicant, if other than the blasting contractor.

At least two weeks prior to the commencement of drilling and blasting operations, the contractor will submit to the City of Portland and applicant the name and qualifications of the independent seismologist or blasting consultant proposed to monitor and report blasting vibrations.

10.7.13. Record Keeping and Reporting.

A. **Large Blast Monitoring and Analysis.** Blast monitoring and analysis shall be conducted by the independent seismologist or blasting consultant. A minimum of two (2) seismograph instruments will be used to monitor vibrations and airblast pressures for each blast. The seismographs used by the seismologist or blasting consultant for blast monitoring shall comply with the following requirements:

1. Velocity range. 0.005 to 10.0 inches per second;
2. Seismic frequency range. 2 to 250 Hz, within 0 to -3dB of an ideal flat response;
3. Acoustic frequency range. 2 to 250 Hz flat, -3dB at 2 Hz ± 1 dB;
4. Sound range. 100 to 140 dB (linear);
5. Measure, display, and provide a permanent time history record of the event, including both ground vibration and airblast;
6. Measure the three mutually perpendicular components of particle velocity in directions vertical, radial, and perpendicular to the vibration source;
7. The seismograph shall display and provide record of:
    a. The date and time of the event;
    b. Identifying information concerning the company;
    c. The location of the seismograph and of the blast;
    d. Trigger levels;
    e. Verification the instrument was set for "continuous" and not "manual" readings;
    f. Instrument serial number, and
    g. The date of the most recent calibration; and
8. The seismograph shall be calibrated as often as necessary, but at least once every 12 months, and must be performed to a standard traceable to the National Institute of Standards and Technology.

Blast monitoring data obtained by the independent seismologist or blasting consultant must be available for inspection on the blasting site, be submitted in writing to the Applicant within 24 hours following each blast, and be submitted the Department of Planning and Urban Development on a weekly basis. A model blast monitoring report is included at the end of this section.

B. **Blasting Log.** A blasting log summarizing details of the round as shot, weather conditions, proximity of the blast location to nearest structures, exact locations of monitoring instruments, and the results of blast monitoring at each instrument location shall be maintained daily for every blast. The blasting log shall be available for inspection on site, shall be submitted in writing to the Applicant within 24 hours following each blast, and shall be submitted to the City on a weekly basis.

10.7.14. Airblast Overpressure Limits. The peak airblast overpressure at any inhabited building not owned or controlled by the developer shall not be allowed to exceed 133 decibels (linear) when measured by an instrument with a high-pass system and a lower frequency limit of 2Hz.

The seismologist or blasting consultant shall monitor, record, analyze and report airblast pressure resulting from the blasting activities. In the event the blasting contractor's blasting round results in airblast overpressures approaching the stated limits, the Applicant may require the blasting contractor to modify the blasting operations to reduce airblast overpressures. In the event the blasting contractor's blasting round results in airblast overpressures exceeding the stated limits at structures, the blasting contractor shall cease all blasting activities and submit a written report to the Applicant, and copied to the City. This report shall discuss the corrective action to be taken on the next shot, and the next shot shall not be loaded until the Applicant acknowledges, in writing, that a design change is being attempted.

10.7.15. Carbon Monoxide (CO) Control. If any blasting operations are to occur within two hundred and fifty (250) feet of any structure, the blasting company shall:

A. Submit a carbon monoxide (CO) management plan to the Department of Planning and Urban Development with the Blasting Application for review and approval. The plan shall detail strategies that will be employed by the blasting company throughout blasting operations to prevent and mitigate the health and safety risks associated with possible CO migration away from the blast site and into abutting structures. CO management plans shall be tailored to the specific nature of blasting operations but shall include, at a minimum, two or more of the following actions:
   1. Effort to determine the presence and location of one or more operable Carbon Monoxide detector(s) within abutting structures. Where operable Carbon Monoxide detectors are not present, they shall be temporarily provided and placed in the basement of the structure, or on the first floor if there is not basement, until at least 24 hours after completion of the blasting operations;
   2. Immediate excavation of individual shots, with holes remaining vented for an adequate time to allow any CO produced by the blast to dissipate into the atmosphere. Safe CO levels in the blast hole shall be confirmed by a CO detector before the hole is backfilled; or
   3. Identify and document active and abandoned sewer connection locations and sealed drains locations for abutting structures as part of the pre-blast survey in order to identify structures that may pose an increased risk for CO migration. This information is available through the City of Portland Department of Public Services.

B. Notify all commercial and residential abutters of the blast site at least 24 hours prior to the start of blasting by means of door hangers left at both front and rear primary building entrances. Reasonable effort shall be made to also provide face-to-face notification to all building owners and/or occupants of abutting buildings. Door hangers hall be provided to the blasting company by the City of Portland and are available through the Fire Department or the Inspections Division. The language provided on the door hanger is provided at the end of this section.

   If a carbon monoxide detector is in alarm during blasting operations, the blasting company of building occupant shall call 911 immediately. In addition to calling 911, the blasting company shall contact the Fire Department at (207) 874-8405 to notify them of the emergency. The blast location shall be excavated immediately and shall remain open to the atmosphere until CO is no longer detectable in the blast hole.

11. STANDARDS FOR LOCAL SITE LOCATION OF DEVELOPMENT (SLOD) REVIEW

~~**11.1. INTENTION**~~

~~These standards are intended to provide a flexible and practical means by which the City of Portland may exercise its police powers to control the location of these developments substantially affecting the local environment in order to ensure that such developments will be located in a manner which will have minimal adverse impact on the natural environment within the development sites and of their surroundings and to otherwise protection the health, safety and general welfare of the people.~~

11.1. APPLICABILITY

11.1.1. The Planning Board shall review:

A. Subdivisions;
B. Structures;
C. Developments generating passenger car equivalents of between 100-200 per peak hour for compliance with the following standards; and
D. Metallic mineral mining or advanced exploration activity.

11.1.2. Definitions. For the purposes of this section, the following definitions shall be applied by the City of Portland Planning Board:

A. **Subdivisions.** The subdivision of land into 5 or more lots, other than lots for single-family, detached, residential housing, common areas or open space, to be offered for sale or lease to the general public during any 5-year period, if the aggregate land area includes more than 20 acres; or the division of a parcel of land into 15 or more lots for single-family, detached, residential housing, common areas or open space, to be offered for sale or lease to the general public within any 5-year period, if the aggregate land area includes more than 30 acres. The aggregate land area includes lots to be offered together with the roads, common areas, easement areas and all portions of the parcel of land in which rights or interests, whether express or implied, are to be offered. This definition of "subdivision" is subject to the following exceptions:
    1. Lots of 40 or more acres but not more than 500 acres may not be counted as lots except where the proposed subdivision is located wholly or partly within the shoreland zone;
    2. Lots of more than 500 acres in size may not be counted as lots;
    3. Five years after a subdivider establishes a single-family residence for that subdivider's own use on a parcel and actually uses all or part of the parcel for that purpose during that period, a lot containing that residence may not be counted as a lot;
    4. Unless intended to circumvent this article, the following transactions may not be considered lots offered for sale or lease to the general public:
        a. Sale or lease of lots to an abutting owner or to a spouse, child, parent, grandparent or sibling of the developer if those lots are not further divided or transferred to a person not so related to the developer within a 5-year period, except as provided in this subsection;

b. Personal, nonprofit transactions, such as the transfer of lots by gift, if those lots are not further divided or transferred within a 5-year period or the transfer of lots by devise or inheritance; or

c. Grant of a bona fide security interest in the whole lot or subsequent transfer of the whole lot by the original holder of the bona fide security interest or that person's successor in interest;

5. In those subdivisions that would otherwise not require site location approval, unless intended to circumvent this article, the following transactions may not, except as provided, be considered lots offered for sale or lease to the general public:

   a. Sale or lease of common lots created with a conservation easement as defined in Title 33, Section 476, provided that the Department of Environmental Protection is made a party; or

   b. The exception described in paragraph 5 does not apply, and the subdivisions requires site location approval, whenever the use of a lot described in paragraph 5 changes or the lot is offered for sale or lease to the general public without the limitations set forth in paragraph 5; and

6. The transfer of contiguous land by a permit holder to the owner of a lot within a permitted subdivision is exempt from review hereunder, provided that the land was not owned by the permit holder at the time the Department of Environmental Protection, the MDOT or the City approved the subdivision. Further division of the transferred land must be reviewed under these standards.

   For the purposes of this section, a parcel of land is defined as all contiguous land in the same ownership provided that lands located on opposite sides of a public or private road are considered each a separate parcel of land unless that road was established by the owner of land on both sides of the road was established by the owner of land on both sides of the road subsequent to January 1, 1970. A lot to be offered for sale or lease to the general public is counted, for purposes of determining jurisdiction, from the time a municipal subdivision plan showing that lot is recorded or the lot is sold or leased, whichever occurs first, until 5 years after that recording, sale or lease.

B. **Structure.** A "structure" means any building, parking lot, road, paved area, wharf or area to be stripped or graded and not to be revegetated that cause a total project to occupy a ground area in excess of 3 acres. Stripped or graded areas that are not revegetated within a calendar year are included in calculating the 3-acre threshold.

C. **Passenger car equivalents at peak hour.** "Passenger car equivalents at peak hour" means the number of passenger cars, or in the case of non-passenger vehicles, the number of passenger cars that would be displaced by non-passenger vehicles, that pass through an intersection or on a roadway under prevailing roadway and traffic conditions at that hour of the day during which the traffic volume generated by the development is higher than the volume during any other hour of the day. A one tractor-trailer combination is the equivalent of 2 passenger cars.

11.2. REVIEW STANDARDS

The following standards shall be applied in evaluating subdivisions or site plans as defined above, except where Portland elsewhere has adopted more restrictive standards, the more restrictive standards shall control:

11.2.1. Financial and technical capacity. The developer has the financial capacity and technical ability to develop the project in a manner consistent with state environmental standards and with the provisions of Portland's Code of Ordinances. The Planning Board may issue a permit that conditions any site alterations upon a developer providing the Planning Board with evidence that the developer has been granted a line of credit or a loan by a financial institution

authorized to do business in this State or with evidence of any other form of financial assurance the Planning Board determines to be adequate. The Planning Board shall also assess any such application in accordance with the standards set forth in Chapter 373 of the Maine Department of Environmental Protection Site Law Regulations, as may be amended from time to time.

11.2.2. Traffic movement. For any development that generates 100 or more passenger car equivalents at peak hour, the developer has made adequate provision for traffic movement of all types into and out of the development area. Before issuing a permit, the Planning Board shall determine that any traffic increase attributable to the proposed development will not result in unreasonable congestion or unsafe conditions on a road in the vicinity of the proposed development. The Department of Transportation or the City of Portland Traffic Engineer shall provide the Planning Board with an analysis of traffic movement of all types into and out of the development area and with a statement of recommended findings on traffic issues. In making its determination under this subsection, the Planning Board shall consider the analysis and recommendations provided by the City's Traffic Engineer or the Department of Transportation. Traffic movement determinations are subject to the following:

A. A proposed development that involves fewer than 100 passenger car equivalents at peak hour is not subject to traffic review.

B. If any project qualifies for review hereunder solely because it generates 100 or more passenger car equivalents at peak hour then the review hereunder shall be limited only to issues relevant to the traffic movements standards in this section. Otherwise all other standards of review shall be applied.

   In all instances the appropriate representative of the municipality or municipalities where the project is located, shall discuss with the applicant the scope of impact evaluation required for the proposed development. The applicant shall provide notice to abutting municipalities.

C. If a development is located in an area designated as a growth area in a local growth management plan that has been found by the State to be consistent with the growth management program in Title 30-A, Chapter 187, the Planning Board shall require improvements to the level of traffic service only if the level of service adjacent to or in the vicinity of the development is or would be level of service E or F, as determined by the City's Traffic Engineer, in accordance with the "Highway Capacity Manual" (3rd Edition 1994). In these cases, improvements are limited only to those necessary to mitigate for the foreseeable impacts of the development.

D. The Planning Board shall also assess any such application in accordance with the standards set forth in Chapter 374 of the Maine Department of Environmental Protection Site Law Regulations, as may be amended from time to time.

11.2.3. No adverse effect on the natural environment. The developer has made adequate provision for fitting the development harmoniously into the existing natural environment and that 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. In making a determination under this subsection, the Planning Board shall apply the standards set forth in Chapter 375 of the Maine Department of Environmental Protection Site Law Regulations, as may be amended from time to time.

11.2.4. Soil types. The proposed development will be built on soil types that are suitable to the nature of the undertaking. In making a determination under this subsection, the Planning Board shall apply the standards set forth in Chapter 376 of the Maine Department of Environmental Protection Site Law Regulations, as may be amended from time to time.

11.23.5. Ground water. The proposed development will not propose an unreasonable risk that a discharge to a significant ground water aquifer will occur. In making a determination under this subsection, the Planning Board shall apply the standards set forth in Chapter 500 and 502 of the Maine Department of Environmental Stormwater Management and Direct Watersheds of Waterbodies Most at Risk from New Development Rules, as may be amended from time to time.

11.2.6. Ground water. The developer has made adequate provision of utilities, including water supplies, sewerage facilities, solid waste disposal and roadways required for the development and the development will not have an unreasonable adverse effect on the existing or proposed utilities and roadways in the municipality or area served by those services.

11.2.7. Flooding. 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. In making a determination under this subsection, the Planning Board shall apply the standards set forth in Chapter 500 and 502 of the Maine Department of Environmental Stormwater Management and Direct Watersheds of Waterbodies Most at Risk from New Development Rules, as may be amended from time to time.

11.2.8. Storm water management and erosion and sedimentation control. The proposed development meets the standards for storm water management in 38 MRSA §420-D as amended from time to time (See Exhibit 1) and the standard for erosion and sedimentation control in 38 MRSA §420-C as amended from time to time. In making a determination under this subsection, the Planning Board shall apply the standards set forth in Chapter 500 and 502 of the Maine Department of Environmental Stormwater Management and Direct Watersheds of Waterbodies Most at Risk from New Development Rules, as may be amended from time to time.

12. EROSION AND SEDIMENTATION CONTROL STANDARDS

~~The following are the mandatory minimum standards for Construction Activity subject to Chapter 32, Article IV of the City of Portland Code of Ordinances. Minor and Major Site Plans are defined by Chapter 14 of the City of Portland Code of Ordinances.~~

~~For projects that require a **major site plan approval, or those projects that do not require site plan approval which result in 1 acre or more of Disturbed Area**, a Comprehensive Erosion and Sedimentation Control Plan as detailed in section 6.2 below is required for all Construction Activity.~~

~~For projects that require a **minor site plan approval, or those projects that do not require site plan approval which result in less than 1 acre** or more of Disturbed Area, a Basic Erosion Control Plan as detailed in section 6.1 below is required of all Construction Activity.~~

~~**Minor residential** projects must use effective erosion and sedimentation controls for the duration of the Construction Activity, but are not required to submit an Erosion and Sedimentation Control Plan.~~

~~**In all circumstances**, the City reserves the right to require a Comprehensive Erosion and Sedimentation Control Plan, or any component thereof, when site conditions dictate (e.g. proximity to sensitive natural resources, steep grades).~~

12.1. APPLICABILITY

The following are the mandatory minimum standards for Construction Activity subject to Chapter 32, Article IV of the City of Portland Code of Ordinances.

TABLE 12-A. EROSION AND SEDIMENTATION CONTROL REQUIREMENTS BY PROJECT TYPE

	Plan Submission Requirement	Inspector Requirement	Inspection Report Submittal
Major Site Plan > 1 Acre of Disturbance	Comprehensive	Third-Party Inspector	Weekly to Water Resources & Planning
Major Site Plan < 1 Acre of Disturbance	Comprehensive	Qualified Professional	Weekly to Water Resources & Planning (may be waived)
Minor Site Plan	Basic	Self-Inspection	None
~~Minor Residential~~Small-Scale Residential Development (1-4 units)	None	Self-Inspection	None

* In all circumstances, the City reserves the right to require a Comprehensive Erosion and Sedimentation Control Plan, or any component thereof, when site conditions dictate (e.g. proximity to sensitive natural resources, steep grades).

12.2. Basic Erosion and Sedimentation Control

12.2.1. Basic erosion and sedimentation control plan requirements.

Erosion Control BMPs must meet the requirements of sections 12.3 and 12.4 below. The Basic Erosion and Sedimentation Control Plan (Basic ESC Plan) must consist of a graphic representation of the site at a scale no less than 1 inch = 100. The Basic ESC Plan must include the following:

A. Name(s) of and contract information for the person(s) responsible for installation, inspection, and maintenance of ESC BMPs;
B. Parcel boundaries;
C. Locations of coastal sand dune systems, coastal wetlands, significant wildlife habitat, fragile mountain areas, freshwater wetlands, great ponds and rivers, streams or brooks;
D. Locations of all Erosion and Sedimentation Control BMPs to be used; and
E. Details for all Erosion and Sedimentation Control BMPs, meeting the requirements of section 12.3, to be used.

12.2.2. Basic inspection and maintenance requirements.

A. All areas of disturbance, impervious areas, ESC BMPs, materials storage areas exposed to precipitation, and locations where vehicles enter or exit the Site shall be inspected:
    1. Once before any disturbance begins and after all Erosion and Sedimentation Control BMPs specified in the Erosion and Sedimentation Control Plan are in place;
    2. At least once a week as well as before and within 24 hours after a storm event (rainfall); and
    3. Once at project completion to ensure the Site has reached permanent stabilization and all temporary erosion and sedimentation controls have been removed.

B. The applicant is responsible for inspecting the site and maintaining erosion and sedimentation controls in good working order.
C. In general, sites that require a basic ESC plan and have less than 1 acre of disturbance are not required to submit an inspection report, however the City reserves the right to require and review reports for any project.
D. If ESC BMPs need to be maintained, repaired, or enhanced, the work shall be initiated upon discovery of the problem but no later than the end of the next workday or prior to a precipitation event, whichever comes first. If additional ESC BMPs or significant repair of ESC BMPs are necessary, implementation must be completed prior to any storm event (rainfall) and within 7 calendar days of identification. All measures must be maintained in effective operating condition until areas are permanently stabilized.

12.3. Comprehensive Erosion and Sedimentation Control

12.3.1 Comprehensive erosion and sedimentation control requirements.

A Comprehensive Erosion and Sedimentation Control Plan (Comprehensive ESC Plan) shall be prepared by a Qualified Professional as defined in City of Portland Code of Ordinances Chapter 32, Article IV.

The Comprehensive ESC Plan shall consist of a graphic representation of the Site at a scale of no less than 1 inch = 100 feet. The Comprehensive ESC Plan must include the following:

A. Name(s) of and contract information for the person(s) responsible for installation, inspection, and maintenance of ESC BMPs;
B. Parcel boundaries;
C. Topography for site pre-and post-construction conditions as 2-foot elevation contours;
D. Limits of clearing and site work;
E. Locations of coastal sand dune systems, coastal wetlands, significant wildlife habitat, fragile mountain areas, freshwater wetlands, great ponds and rivers, streams or brooks;
F. Locations of areas not to be disturbed by Construction Activity including trees, vegetation, and areas intended for infiltration;
G. Locations of all Erosion and Sedimentation Control BMPs to be used;
H. Details for all Erosion and Sedimentation Control BMPs to be used;
I. Example inspection form meeting the requirements of section 6.2.2;
J. ESC Phasing Plan for Construction as detailed in section 6.5;
K. Dewatering Plan as detailed in section 6.6 and application for review and approval if necessary; and
L. Good Housekeeping and Pollution Prevention Plan as detailed in section 6.7.

12.3.2 Pre-construction meeting.

For sites with a Comprehensive Erosion Control Plan, a pre-construction meeting is required. Once an approved Performance Guarantee, if required, is in hand and at least five (5) days prior to commencing Construction Activity, the applicant shall request a pre-construction meeting with the Enforcement Authority. At a minimum, attendance at the meeting is required by the Enforcement Authority and the applicant or their representative in charge of construction. If the representative in charge of construction is not the primary earthwork contractor, a representative of the earth work contractor must also attend the pre-construction meeting. Erosion and sediment controls should be installed for inspection during the pre-construction meeting and must be installed and inspected prior to the start of construction.

12.3.3. Comprehensive inspection and maintenance requirements.

Erosion and Sedimentation Controls must be inspected, as detailed below, to confirm that BMPs are in place and functioning. Corrective actions must be taken if erosion is occurring or there is a discharge of sediment or turbid water from the construction Site.

A. For all sites with one acre or greater of disturbance, the applicant shall retain the services of a qualified professional third-party inspector to inspect the site weekly, for the duration of construction until final site stabilization is in place. For sites less than one acre of disturbance that are required to have a comprehensive erosion and sediment control plan, the applicant shall retain the services of a qualified professional.
B. The inspection is required in order to ensure that all construction and stabilization activities comply with the approved drawings and specifications; that field decisions regarding erosion control implementation, stormwater system installation, and natural resource protection are based on sound engineering and environmental considerations; and that any changes to the development's erosion control plan, stormwater management plan, or final stabilization plan is communicated to the City of Portland for additional review and approval.

C. All areas of disturbance, impervious areas, ESC BMPs, materials storage areas exposed to precipitation, and locations where vehicles enter or exit the Site shall be inspected at least once a week as well as before and within 24 hours after a storm event (rainfall) and prior to completing permanent stabilization measures.

D. For all sites with one acre or greater of disturbance, the inspector will submit weekly written reports to the Stormwater Coordinator(s) in the Water Resources Division of Public Works and the Development Review Coordinator(s) in Planning. Reports must include: project ID, project address, the date(s) and time(s) of inspection(s), site photographs of areas under construction, and the date(s) and approximate duration(s) of any rainfall events in the prior week. The report will identify and describe any erosion problems or discharge of pollutants and what actions will be taken to address these issues and repair any damage to other properties or natural resources, actions to eliminate the erosion source, and actions to prevent future sediment discharges from the area. Sites with less than 1 acre of disturbance may request a waiver to be reviewed and approved by Water Resources, for weekly inspection report submission, as allowed by Chapter 32- 48 of the Code of Ordinances.

E. If ESC BMPs need to be maintained, repaired, or enhanced, the work shall be initiated upon discovery of the problem but no later than the end of the next workday or prior to a precipitation event, whichever comes first. Immediate corrective actions are required to address active discharges of sediment to municipal streets or storm drains or to surface waters. If additional ESC BMPs or significant repair of ESC BMPs are necessary, implementation must be completed prior to any storm event (rainfall) and within 7 calendar All development constructed within the limits of the City of Portland shall have a hydrant within five hundred feet (500') of all structures. days of identification. All measures must be maintained in effective operating condition until areas are permanently stabilized.

F. An inspection log summarizing the inspections and any corrective actions 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 ESC BMPs, materials storage areas, and vehicle access points to the parcel. Inspection documentation must include maintenance needed, ESC BMPs that failed to operate as designed or proved inadequate for a particular location, and location(s) where additional ESC BMPs are needed. The inspection log must also document what corrective actions are needed and when corrective actions were completed. The inspection log shall be maintained for at least three years from the completion of permanent stabilization.

12.4. Erosion and Sedimentation Control Best Management Practices

Where not otherwise specified in this section, the Erosion and Sedimentation Control (ESC) best management practices (BMPs) shall be designed using performance standards specified in the most recent Maine Erosion and Sediment Control BMPs Manual for Designers and Engineers developed by the Maine Department of Environmental Protection.

12.4.1. Minimizing disturbed areas.

Minimize Disturbed Area and protect natural downgradient buffer areas, and any areas where stormwater may flow off-Site to the extent practicable. Control stormwater volume and velocity within the Site to minimize soil erosion. Minimize the disturbance of steep slopes. Control stormwater Discharges, including both peak flow rates and volume, to minimize erosion at outlets. The Discharge shall not result in erosion of any open drainage channels, swales, stream channels or stream banks, upland, or coastal or freshwater wetlands off the project Site.

A. Whenever practicable, no disturbance activities shall take place within 50 feet of any Protected Natural Resource.
B. If it is not practicable to maintain the 50-foot buffer of no disturbance, the Erosion and Sedimentation Control Plan must include redundant (at least two) perimeter control measures that are appropriate for the soil and slope.

12.4.2. Sediment barriers.

Prior to construction, properly install sediment barriers at the downgradient edge of any area to be disturbed and adjacent to any drainage channels within the Disturbed Area. Sediment barriers shall be installed downgradient of soil and sediment stockpiles and stormwater must be prevented from running onto the stockpile. Maintain the sediment barriers by removing accumulated sediment, or removing and replacing the barrier, until the Disturbed Area is permanently stabilized. Where a Discharge to a storm drain inlet occurs, you must install and maintain protection measures that remove sediment from the Discharge. Storm drain inlet protection must include effective curb inlet or "back throat" protection, where applicable.

12.4.3. Stabilized construction entrance.

Prior to construction, properly install a stabilized construction entrance (SCE) at all points of egress from the Site. The SCE is typically a stabilized pad of aggregate, underlain by a geotextile filter fabric, or an engineered track out control mat which has been approved by Maine DEP which is used to prevent traffic from tracking material away from the Site onto public ROWs. Maintain the SCE until all Disturbed Areas are stabilized. If an alternate SCE has been approved by Maine DEP, provide proof of this with the Plan or application.

12.4.4. Stormwater channels.

Each channel shall be constructed in sections so that the section's grading, shaping, and installation of the permanent lining can be completed the same day. If a channel's final grading or lining installation must be delayed, then diversion berms must be used to divert stormwater away from the channel, properly-spaced check dams must be installed in the channel to slow the water velocity, and a temporary lining installed along the channel to prevent scouring.

12.4.5. Sediment basins.

Sediment basins that will be used to control sediment during construction activities must be designed to provide storage for either the calculated runoff from a 2-year, 24-hour storm or provide for 3,600 cubic feet of capacity per acre draining to the basin. Outlet structures must discharge water from the surface of the basin whenever possible. Erosion controls and velocity dissipation devices must be used if the discharging waters are likely to create erosion. Accumulated sediment must be removed as needed from the basin to maintain at least half of the design capacity of the basin. Clearly visible staking must be installed with marks showing the elevation of half design capacity for easier inspection. The use of cationic treatment chemicals in Sediment Basins, such as polymers, flocculants, or other chemicals that contain an overall positive charge designed to reduce turbidity in stormwater may only be used if the basin does not directly discharge to surface waters and if proof of approval by Maine DEP is provided.

12.5. Timing of ESC Installation and Removal

12.5.1. ESC best management practices required prior to earth disturbance.

Erosion and Sedimentation Control BMPs must be in place prior to earth disturbance. For sites with 1 acre or more of disturbance which require a Comprehensive ESC Plan, ESC BMPs should be installed prior to the required pre-construction meeting.

12.5.2. Temporary stabilization.

Within 7 days of the cessation of Construction Activities in an area that will not be worked for more than 7 days, stabilize any exposed soil with mulch, or other non-erodible cover. Stabilize areas within 75 feet of a wetland or waterbody within 48 hours of the initial disturbance of the soil or prior to any storm event, whichever comes first.

12.5.3. Permanent stabilization.

If the Site or a portion of the Site will not be worked for more than one year or has been brought to final grade, then permanently stabilize the area within 7 days by planting vegetation, seeding, sod, or through the use of permanent mulch, or riprap, or road sub-base. If using vegetation for stabilization, select the proper vegetation for the light, moisture, and soil conditions; amend the Disturbed Area subsoils with topsoil, compost, or fertilizers; protect seeded areas with mulch or, if necessary, erosion control blankets; and schedule sodding, planting, and seeding so to avoid die-off from summer drought and fall frosts. Newly seeded or sodded areas must be protected from vehicle traffic, excessive pedestrian traffic, and concentrated runoff until the vegetation is well-established with 90% cover by healthy vegetation. If necessary, areas must be reworked and restabilized if germination is sparse, plant coverage is spotty, or topsoil erosion is evident. Permanent Stabilization Definitions are as follows:

A. Seeded Areas: For seeded areas, permanent stabilization means a 90% cover of the Disturbed Area with mature, healthy plants with no evidence of washing or rilling of the topsoil.
B. Sodded Areas: For sodded areas, permanent stabilization means the complete binding of the sod roots into the underlying soil with no slumping of the sod or die-off.
C. Permanent Mulch: For mulched areas, permanent mulching means total coverage of the exposed area with an approved mulch material. Erosion control mix may be used as mulch for permanent stabilization according to the approved application rates and limitations.
D. Riprap: For areas stabilized with riprap, permanent stabilization means that slopes stabilized with riprap have an appropriate backing of a well-graded gravel or approved geotextile to prevent soil movement from behind the riprap. Stone must be sized appropriately. It is recommended that angular stone be used.
E. Paved Areas: For paved areas, permanent stabilization means the placement of the compacted gravel subbase is completed, provided it is free of fine materials that may runoff with a rain event.
F. Ditches, Channels, and Swales: For open channels, permanent stabilization means the channel is stabilized with a 90% cover of healthy vegetation, with a well-graded riprap lining, turf reinforcement mat, or with another non-erosive lining such as concrete or asphalt pavement. There must be no evidence of slumping of the channel lining, undercutting of the channel banks, or down-cutting of the channel.

12.5.4. Removal of temporary measures.

Remove any temporary control measures, such as silt fence, within 30 days after permanent stabilization is attained. Remove any accumulated sediments and stabilize.

12.5.4. Winter construction.

Winter construction is Construction Activity performed during the period from November 1 through April 15. If Disturbed Areas are not stabilized with permanent measures by November 1 or new soil

disturbance occurs after November 1, but before April 15, then these areas must be protected and runoff from them must be controlled by the following additional winter construction measures and restrictions:

A. Site Stabilization: Hay mulch is applied at twice the standard temporary stabilization rate. At the end of each construction day, areas that have been brought to final grade must be stabilized. Mulch may not be spread on top of snow.
B. Sediment Barriers: All areas within 75 feet of a Protected Natural Resource must be protected with a double row of sediment barriers.
C. Ditch Lines: Ditch lines must be stabilized with an appropriate stone lining backed by an appropriate gravel bed or geotextile unless specifically released from this standard by the Maine DEP. If release from Maine DEP has been granted, provide proof of this with the Plan or application.
D. Slopes: Mulch netting must be used to anchor mulch on all slopes greater than 8% unless erosion control blankets or erosion control mix is being used on these slopes. Unvegetated slopes less than 8% must be protected with an erosion control blanket, erosion control mix, or riprap.
E. Maintenance: Winter stabilization BMPs must be inspected and maintained as any other erosion and sedimentation control BMP.

12.6. Phasing of Erosion and Sedimentation Control

12.6.1 ESC phasing plan.

Erosion and Sedimentation Control BMPs must be in place before construction begins; additional Erosion and Sedimentation Control BMPs shall be installed as needed and shall be phased in if phasing is used; and ESC BMPs shall be maintained until permanent stabilization is achieved.
Phasing Plan Requirements: No phasing plan is required if the contractor will limit the Disturbed Area to a maximum of 5 acres of disturbance across the Site at any time. If the Construction Activity will result in more than 5 acres of Disturbed area at any one time, the Contractor shall provide a phasing plan showing:

A. Initial area to be disturbed;
B. Portions of the initial disturbance that will be stabilized, and what temporary or permanent stabilization methods will be used;
C. Areas of the site that will subsequently be disturbed and what temporary or permanent stabilization methods will be used; and
D. Each phase of disturbance and stabilization must clearly show the total areas in square feet or acres such that the 5-acre Disturbed Area limit at any one time is met throughout the entire project.

12.7. Dewatering Plan

The Erosion and Sedimentation Control Plan must include provisions to remove or properly disperse the collected water in a manner that prevents sediment from entering stormwater. The City of Portland requires a Dewatering Plan and Application for any construction dewatering discharging to City infrastructure, as detailed in the *Rules and Regulations for Use of the Sewer System*.

12.8 Good Housekeeping and Pollution Prevention Plan

A Good Housekeeping and Pollution Prevention Plan is required as part of a Comprehensive ESC Plan. The Good Housekeeping and Pollution Prevention Plan must be site specific and address the following:

12.8.1 Spill prevention.

Controls must be used to prevent pollutants from construction and waste materials stored on-Site from entering 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.

12.8.2 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.

12.8.3 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 shall be included to minimize tracking of mud and sediment. If off-Site tracking occurs, public roads shall 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, shall wet down unpaved access roads once a week or more frequently as needed with a water additive to suppress fugitive sediment and dust.

12.8.4 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. Sediment generated by concrete or mortar mixing, brick cutting & saw cutting activities must be contained (e.g., sausage boom, straw bales, etc.) and cleaned up using dry methods (i.e., sweeping or vacuuming) to prevent it from entering drainage structures or water resources. These activities shall be done on vegetated areas whenever possible and away from drainage structures and water resources.

12.8.5 Excavation dewatering.

Excavation dewatering 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 otherwise treated to collect the maximum amount of sediment possible, like a coffer dam sedimentation or sediment filter bag. Avoid allowing the water to flow over Disturbed Areas of the Site. If the Maine DEP has approved equivalent measures, provide proof of approval. Note that discharge of excavation dewater fluids from the Site must be visually clear (no visible suspended or settleable solids). Any dewatering discharges from a site to the City right-of way or infrastructure are prohibited unless the City has provided approval of a Dewatering Plan and Application submitted by the Contractor. Discharges from the Site into the City's storm drain or sewer system must first obtain City approval through the Dewatering Program, as detailed in the *Rules and Regulations for Use of the Sewer System*.

12.8.6 Washout from concrete, stucco, paint, curing compounds, or other construction materials.

If washout/cleanout is to be completed on the Site, a designated area(s) shall be established and marked on the Erosion and Sedimentation Control Plan. This area shall be a minimum of 50 feet from all drainage structures, ditches, waterbodies, and resource areas, as well as property boundaries if possible. The area shall not have an outlet to discharge wastes or flows. No detergents shall be used or vehicles washed in this location. A leak-proof pit or container shall be established in the washout area(s), to which washings shall be directed. This area shall be used for washout containment and dewatering by evaporation only. The pit shall not allow infiltration to occur. To prevent clean water from entering the pit, the washout area shall be covered during precipitation events. Inspections of the pit shall be conducted daily to ensure no leaks are present and no discharge is occurring.

12.8.7 Non-stormwater discharges.

Except as allowed or exempted herein, no person shall create, initiate, originate or maintain a non-stormwater discharge to the storm drainage system. Such non-storm water discharges are prohibited, notwithstanding the fact that the City may have approved the connections, drains or conveyances by which a person discharges un-allowed storm water discharges to the storm drain system.

A. Authorized Non-Stormwater Discharges

Where allowed non-stormwater discharges exist, they must be identified, and steps shall 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:

1. Discharges from firefighting activity
2. Hydrant flushing if dechlorinated to 0.05 mg/l or less
3. Vehicle wash water if detergents are not used and washing is limited to the exterior of vehicles (engine, undercarriage, and transmission washing is prohibited)
4. Dust control runoff if it does not cause erosion
5. Routine external building washdown, not including surface paint removal, that does not involve detergents
6. Pavement wash water (where spills/leaks of toxic or hazardous materials have not occurred, unless all spilled material had been removed) if detergents are not used
7. Uncontaminated air conditioning or compressor condensate
8. Uncontaminated groundwater or spring water
9. Foundation or footer drain-water where flows are not contaminated
10. Uncontaminated excavation dewatering per item 5 Excavation Dewatering
11. Potable water including waterline flushings
12. Landscape irrigation

B. Unauthorized non-stormwater discharges.

1. Wastewater from the washout or cleanout of concrete, stucco, paint, form release oils, curing compounds, or other construction materials;
2. Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance;
3. Soaps, solvents, or detergents used in vehicle and equipment washing;
4. Sediment laden discharges; and
5. Toxic or hazardous substances from a spill or other release.

13. SOLAR ENERGY STANDARDS

~~13.1 APPLICABILITY~~

~~**13.1.1** All solar energy generation systems are subject to the standards set out in the Article 6 of the Land Use Code, whether permitted or conditional.~~

~~**13.1.2** Roof mounted and accessory ground mounted solar energy systems as per Article 6 of the Land Use Code not subject to site plan review must comply with technical, safety and maintenance standards as per Building and Fire Code requirements and as determined by the Permitting and Inspections Department when a building permit is submitted. These solar energy systems must obtain a building permit but are not subject to the detailed Technical Standards in 15.2 below.~~

~~**13.1.3** It should be noted that roof mounted systems potentially present a safety issue for the Fire Department in the event of a fire, and it is recommended that any roof mounted solar energy system be discussed with the Fire Department prior to design.~~

~~**13.1.4** The technical standards in 15.2 below apply to any minor or major solar energy generation system that requires site plan approval (through the Planning Division) in accordance with Article 14, Site Plan, of the Land Use Code. These solar energy systems also require a Building Permit and other permits as required by Permitting and Inspections Department. The Permitting and Inspections Department may have additional submittal requirements for solar energy systems.~~

~~**13.1.5** The following technical standards are referenced in Article 6 of the Land Use Code and aim to complement this ordinance and the existing codes and site plan review standards. Together the aim is to ensure safe, effective and efficient installation of solar energy systems compatible with surrounding uses. Within this aim the overall intent is to encourage the installation of solar energy systems.~~

13. 1 TECHNICAL STANDARDS

13.1.1 Site Layout. Wherever possible solar energy systems should be located on the side or rear (i.e. least visible) part of the site. This also applies to associated features such as lighting and infrastructure. Applicants shall take all reasonable efforts to place utility connections underground, unless making use of existing lines, or as otherwise required by the utility. The proposed placement of new poles for electrical connections shall be included in the site plan and construction management plan.

13.1.2 Site Plan Review Standards. Proposals should address the specific requirements for solar energy systems found in Article 6, as well as the site plan review standards, listed in Article 13. It is recognized that some of the Site Plan standards may not be relevant, as determined by the Planning Division/Planning Board during the review. It is likely that the review of any solar energy system would focus on how the proposals avoid or minimize impacts on the following:

A. Existing vegetation and other natural resources - location on brownfield sites and on areas that are already impervious are encouraged; ~~W~~
B. Wetlands and areas subject to flooding - DEP approval may be required;
C. Wildlife and wildlife habitats - information may be requested on resources, impacts and potential mitigation e.g. through specified maintenance regimes;
D. Septic systems, leach fields (unless explicitly allowed by the relevant regulator);
E. Existing topography - ensure adequate temporary and permanent erosion and sedimentation control;
F. Water quality of the stormwater runoff;
G. Airport flight paths (FAA approval may be required);
H. Other specific or local site characteristics as referenced in ordinance standards.

13.2.3 Security. The siting and design of the solar energy installation shall ensure that unauthorized access is prevented, and shall be in conformance with all applicable electrical code requirements. Knox boxes at gates (or similar arrangements as approved during the review) shall be provided for emergency access.

13.2.4 Screening. The ordinance specifies screening from nearby residential/institutional uses and public ways. The proposals should take advantage of existing topography and vegetation where possible to integrate the development (including fencing, infrastructure and connections to the grid) into the landscape, and introduce vegetated buffer areas. Fencing shall be wildlife friendly and as unobtrusive as possible, utilizing measures such as locating the fencing along topographical contours and screening with planting. The selection of new planting would be in accordance with the Technical Standards in Section 4 Site Landscaping.

13.2.5 Construction Impacts. Proposals should include information regarding the methods of construction ~~and a Construction Management Plan may be requested~~. Clearing of existing trees and vegetation shall be restricted to the minimum amount needed for construction access and to avoid shading of the solar development. Construction work should be performed in such a way that erosion and sedimentation is minimized, and measures should be taken to permanently stabilize disturbed areas of the site as soon as possible.

13.2.6 Lighting, signage and materials. Where lighting is necessary it should be at the lowest level to meet functional needs, activated by motion sensors, fully shielded and of cut off design to meet the Site Lighting standards in Section 12 of the Technical Standards. Similarly, signage should meet functional needs of safety/security and emergency contacts and not include advertising. ~~Materials would ideally be of neutral colors and manufactured with a low "carbon footprint".~~

~~**13.2.7 Stormwater Management.** A new solar development will be required to comply with the Technical Standards in Section 5 Portland Stormwater Management Standards and Maine DEP Chapter 500 Stormwater Management.~~

13.3 SAFETY STANDARDS

~~**13.3.1 Building Permit.** All solar energy systems require a building permit prior to installation, whatever level of site plan review. All shall be installed by a qualified solar installer.~~

13.3.2 Certification. Solar energy systems shall be designed, erected and installed in accordance with all applicable codes, regulations and standards, with equipment approved under a certification program certified by the US Department of energy or similar. Experimental, homebuilt and prototype models would not be permitted.

13.3.3 Hazardous Materials. The city is concerned about the creation of hazardous waste in the future and requires a statement from the applicant regarding the content of toxic materials (eg cadmium) in the proposed system. Where the panels contain potentially toxic materials, the Operations and Maintenance Plan (for medium and large ground mounted or dual use systems - see below) shall address future disposal.

13.4 MAINTENANCE STANDARDS

13.4.1 Maintenance. Maintenance includes, but is not limited to: cleaning, mowing, painting, structural repairs, integrity of security measures, maintenance of site access adequate for emergency and maintenance services, planned maintenance of fencing, stormwater systems and vegetation/ground cover, plans for cleaning panels and any specific mowing or other regimes to support the wildlife habitat value of the site.

13.4.2 Operations and Maintenance Plan. All minor and major solar energy systems, as defined in Article 6 of the Land Use Code are required to provide an Operations and Maintenance Plan that is prepared and stamped by a licensed Professional Engineer or other licensed Professional as appropriate. The Plan will vary depending on the site, the method of connecting to the grid, and the number and type of panels- but is expected to address the maintenance items listed in 15.4.1 and any operational time tables as relevant, and include the following:

A. Clarification of the responsible party;
B. Any maintenance items that are particularly important from a public safety perspective;
C. An estimate of the life of the project;
D. What options/actions are anticipated when it has reached the end of its estimated useful life; and
E. How the disposal of any toxic materials will be handled when the system is dismantled.

14. SUBMISSION AND PLAN REQUIREMENTS

14.1. APPLICATION SUBMISSION REQUIREMENTS

14.1.1. Zoning map and/or text amendment.

The applicant shall submit for review a packet of materials and submissions in a form and content as specified by the Department of Planning and Urban Development to demonstrate compliance of the proposed amendment(s). Such submissions shall contain, at a minimum, the following elements:

A. General submission requirements for all zoning amendment applications.
   1. Application form;
   2. Applicable fees;
   3. Cover letter with detailed project description; and
   4. Analysis of the consistency of the requested amendment with the goals, policies and land use plan of Portland's Comprehensive Plan.

B. Additional submission requirements for applications including zoning map amendments.
   1. Evidence of Right, Title and Interest demonstrated through documents such as deeds, leases, or purchase and sales agreements;
   2. Vicinity Map;
   3. Map of Current Zoning and Proposed Map Amendment; and
   4. Site Plan of the area to be rezoned on a 24" x 36" sheet, showing existing and proposed improvements, including such features as building, parking, driveways, walkways, landscaping, and property boundaries.

14.1.2. Conditional use.

The applicant shall submit for review a packet of materials and submissions in a form and content as specified by the Department of Planning and Urban Development to demonstrate compliance of the Conditional Use Permit application. Such submissions shall contain, at a minimum, the following elements:

A. Application form;
B. Applicable fees;
C. Cover letter with detailed project description;
D. Evidence of right, title and interest demonstrated through documents such as deeds, leases, or purchase and sales agreements;
E. Traffic narrative demonstrating that the volume and type of vehicle traffic to be generated, hours of operation, expanse of pavement, and number of parking spaces required are not substantially greater than would normally occur at surrounding uses or other allowable uses in the zone;
F. Environmental impacts narrative that demonstrates that the proposed use will not create any unsanitary or harmful conditions by reason of noise, glare, dust, sewage disposal, emissions to the air, odor, lighting, or litter;
G. Design and operation narrative that demonstrates the design and operation of the proposed use, including but not limited to landscaping, screening, signs, loading, deliveries, trash or waste generation, arrangement of structures, and materials storage will not have a substantially greater effect/impact on surrounding properties than those associated with surrounding uses or other allowable uses in the zone; and
H. Narrative addressing any use- or zone-specific standards of the Land Use Code.

14.1.3. Major and minor site plans (excluding one- through four-unit residential development).

The applicant shall submit for review a packet of materials and submissions in a form and content as specified by the Department of Planning and Urban Development to demonstrate compliance of the development with the site plan standards listed in Article 14 of the Land Use Code. Such submissions shall contain, at a minimum, the following elements:

A. General submission requirements.

1. Application form;
2. Applicable fees;
3. Project description, including contact information for all Maine Licensed Landscape Architects, Certified Soil Scientists, and Professional Engineers working on the project;
4. Evidence of right, title and interest;
5. Evidence of state and/or federal approvals, if applicable;
6. Written assessment of project compliance with applicable zoning requirements;
7. Written assessment of project compliance with site plan standards;
8. Summary of existing and/or proposed easements, covenants, public or private rights-of-way, or other burdens on the site;
9. Written requests for waivers from the city's site plan or technical standards, if applicable;
10. Evidence of financial and technical capacity; and
11. Boundary survey stamped by a professional surveyor licensed to practice in the State of Maine, drawn to scale and tied into the State Plane Coordinates, NAD 1983, Maine West Zone, as specified in Section 13 of the Technical Manual. A boundary survey of the site, may be waived by the Planning Authority for a review of Master Development Plan, where an existing conditions plan is available. The Boundary Survey requirement shall be met for each phase of development. Major Site Plan applications must meet the minimum Boundary Survey Standards of Appendix 1.

B. Written materials for major site plan applications.

1. Construction Management Plan, including a traffic control plan;
2. A traffic study and other applicable transportation plans in accordance with Section 17 of the Technical Manual, where applicable;
3. A narrative describing any significant natural features, wildlife and fisheries habitats or archaeological sites subject to the provisions of Section 14.6.2 of the land use code that are located on or near the project site and a description of the methods that will be used to protect such areas or sites during and post construction;
4. Tree survey prepared by a licensed land surveyor, arborist, forester, or landscape architect that identifies the location of existing street trees and the general location of on-site trees and vegetation. The tree survey shall clearly indicate forest type and the location, size, and species of all existing trees 10" diameter at breast height (DBH) or greater on the site and in the right-of-way, and all feature mature trees on the site and in the right-of-way. Sites with a high density of existing trees, the tree survey shall identify all existing shade and ornamental trees that may have been part of a prior landscape scheme for the site and the location, average size and species of groves of trees, and individual trees greater than 16" DBH;
5. A narrative describing site layout, on and off-site watershed hydrology, new and existing buildings and facilities, total impervious area, disturbed area and developed area created by the project;
6. For Major Site Plans only, Soil Survey prepared to the class required in Appendix 3;
7. Stormwater runoff calculations as described in Section 5 of the Technical Manual;
8. A narrative describing the development's consistency with applicable City Master Plans;

9. Evidence of Utility Capacity to Serve;
10. Estimated types and quantities of solid waste to be generated by the development. For new commercial and industrial development, a description of the estimated amount and type of recyclable material to be generated;
11. A code summary referencing NFPA 1 and all Fire Department technical standards;
12. Where applicable, an assessment of the development's consistency with any applicable design standards contained in Section 14.6.4 of the land use code and/or in the City of Portland Design Manual; and
13. Manufacturer's verification that all proposed HVAC and manufacturing equipment meets applicable state and federal emissions requirements.

C. Plans required for site plan applications

A Plan based upon a standard stamped boundary survey meeting City of Portland standards, stamped by a professional engineer licensed to practice in the State of Maine shall include the following information:

1. Existing and proposed structures, as applicable, and distance from property lines;
2. Approximate location of structures on parcels abutting the site;
3. All streets and intersections adjacent to the site and any proposed geometric modifications to those streets or intersections;
4. Location, dimensions and materials of all existing and proposed driveways, vehicle and pedestrian access ways, and bicycle access ways, with corresponding curb lines;
5. Engineered construction specifications and cross-sectional drawings for all proposed driveways, paved areas, sidewalks;
6. Location and dimensions of all proposed loading areas including turning templates for applicable design delivery vehicles;
7. Existing and proposed public transit infrastructure with applicable dimensions and engineering specifications;
8. Location of existing and proposed vehicle and bicycle parking spaces with applicable dimensional and engineering information;
9. Location of all snow storage areas and/or a snow removal plan;
10. Proposed buffers and preservation measures for significant natural features, where applicable, as defined in the LID Section of the Technical Manual;
11. Location and proposed alteration to any watercourse;
12. A delineation of wetlands boundaries, using methods prescribed by the U.S. Army Corps of Engineers Wetlands Delineation Manual (1987), and prepared by a qualified professional. Maine State Jurisdictional Wetlands and wetlands as defined by the Shoreland Zoning Ordinance should be identified according to the Natural Resources Protection Act (Title 38 M.R.S.A. Section 480-B) and identified on the plan, including a topographic map at a scale of 1" = 100 feet;
13. Proposed buffers and preservation measures for wetlands, that shows all development activity including lots, common areas, driveways, and building windows in conjunction with wetlands;
14. Existing soil conditions, identifying high permeability soils, and location of test pits and test borings;
15. Existing vegetation to be preserved (including Maine Native and Climate-Resilient Northeastern Native Vegetation in buffer areas), proposed site landscaping, screening and proposed street trees, as applicable;
16. A stormwater management and drainage plan that identifies stormwater treatment measures to be used, post-development drainage areas, drainageways and associated time of concentration, and statement of which stormwater treatment measures will be maintained privately and which are proposed to be offered to the City

for acceptance and operation. Stormwater management and drainage plan shall be submitted meeting the application requirements of Appendix 4;

17. Limits of disturbance;
18. Grading plan;
19. Waters of the State (38 M.R.S. §361-A(7)) and their associated Shoreland Protection areas;
20. Ground water protection measures;
21. Existing and proposed sewer mains and connections;
22. Location of all existing and proposed fire hydrants and a life safety plan in accordance with Section 3 of the Technical Manual;
23. Location, sizing, and directional flows of all existing and proposed utilities within the project site and on all abutting streets;
24. Location and dimensions of off-premises public or publicly accessible infrastructure immediately adjacent to the site;
25. Location and size of all on-site solid waste receptacles, including on-site storage containers for recyclable materials for any commercial or industrial property;
26. Plans showing the location, ground floor area, floor plans and grade elevations for all buildings;
27. A shadow analysis as described in Section 11 of the Technical Manual, if applicable;
28. 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;
29. Location and dimensions of all existing and proposed HVAC and mechanical equipment and all proposed screening, where applicable;
30. An exterior lighting plan in accordance with Section 12 of the Technical Manual;
31. A master signage plan showing the location, dimensions, height, setback, materials, and illumination of all existing and proposed signs; and
32. Location, dimensions and ownership of easements, public or private rights of way, both existing and proposed.

14.1.4. Site plans for small scale residential development (one through four units).

The applicant shall submit for review a packet of materials and submissions in a form and content as specified by the Department of Planning and Urban Development to demonstrate compliance of the development with the site plan standards listed in Article 14 of the Land Use Code. Such submissions shall contain, at a minimum, the following elements:

A. General Submission Requirements

1. Application form;
2. Applicable fees;
3. Project description, including contact information for all Maine Licensed Landscape Architects, Certified Soil Scientists, and Professional Engineers working on the project;
4. Evidence of right, title and interest;
5. Evidence of state and/or federal approvals, if applicable;
6. Written assessment of project compliance with applicable zoning requirements;
7. Written assessment of project compliance with site plan standards;
8. Summary of existing and/or proposed easements, covenants, public or private rights-of-way, or other burdens on the site;
9. Written requests for waivers from the city's site plan or technical standards, if applicable;
10. Evidence of financial and technical capacity; and

11. Boundary survey stamped by a professional surveyor licensed to practice in the State of Maine, drawn to scale and tied into the State Plane Coordinates, NAD 1983, Maine West Zone. Applications must meet the minimum Boundary Survey Standards of Appendix 2 for each phase of development

B. Written materials small scale residential applications.

1. Construction Management Plan, including a traffic control plan;
2. A traffic study and other applicable transportation plans in accordance with Section 17 of the Technical Manual, where applicable;
3. A narrative describing any significant natural features, wildlife and fisheries habitats or archaeological sites subject to the provisions of Section 14.6.2 of the land use code that are located on or near the project site and a description of the methods that will be used to protect such areas or sites during and post construction;
4. Tree survey prepared by a licensed land surveyor, arborist, forester, or landscape architect that identifies the location of existing street trees and the general location of on-site trees and vegetation. The tree survey shall clearly indicate forest type and the location, size, and species of all existing trees 10" diameter at breast height (DBH) or greater on the site and in the right-of-way, and all feature mature trees on the site and in the right-of-way. Sites with a high density of existing trees, the tree survey shall identify all existing shade and ornamental trees that may have been part of a prior landscape scheme for the site and the location, average size and species of groves of trees, and individual trees greater than 16" DBH;
5. A narrative describing site layout, on and off-site watershed hydrology, new and existing buildings and facilities, total impervious area, disturbed area and developed area created by the project;
6. Stormwater runoff calculations as described in Section 5 of the Technical Manual;
7. A narrative describing the development's consistency with applicable City Master Plans;
8. Evidence of Utility Capacity to Serve;
9. Estimated types and quantities of solid waste to be generated by the development. For new commercial and industrial development, a description of the estimated amount and type of recyclable material to be generated;
10. A code summary referencing NFPA 1 and all Fire Department technical standards;
11. Where applicable, an assessment of the development's consistency with any applicable design standards contained in Section 14.6.4 of the land use code and/or in the City of Portland Design Manual; and
12. Manufacturer's verification that all proposed HVAC and manufacturing equipment meets applicable state and federal emissions requirements.

C. Plans required for small-scale residential applications

Site plans shall be based upon the boundary survey and shall show the following information:

1. Existing and proposed structures, as applicable, and distance from property lines;
2. Existing and proposed paved areas, if applicable;
3. Proposed ground floor area and finish floor or sill elevation;
4. For minor residential only, exterior building elevation drawings (all sides);
5. Location of proposed utilities;
6. Identification and proposed protection measures for any significant natural features, as defined in the LID Section of the Technical Manual;
7. Identification and proposed protection for alterations of watercourses, if applicable;
8. A delineation of wetlands boundaries, using methods prescribed by the U.S. Army Corps of Engineers Wetlands Delineation Manual (1987), and prepared by a qualified professional. Maine State Jurisdictional Wetlands and wetlands as defined by the Shoreland Zoning Ordinance should be identified according to the Natural

Resources Protection Act (Title 38 M.R.S.A. Section 480-B) and identified on the plan, including a topographic map at a scale of 1" = 100 feet;

9. Proposed buffers and preservation measures for wetlands, that shows all development activity including lots, common areas, driveways, and building windows in conjunction with wetlands;
10. Soil type;
11. Existing and proposed grades and contours;
12. Location, dimensions and ownership of easements, public or private rights of way, both existing and proposed;
13. Overall stormwater approach including and narrative and plan documenting the proposed location and types of stormwater management control and treatment measures, along with an identification of what stormwater treatment measures will be maintained privately and which will be offered to the Municipality for acceptance and operation;
14. Location of all snow storage areas and/or a snow removal plan;
15. Soil erosion control plan;
16. Post-development drainage areas, drainageways, and associated time of concentration;
17. Existing vegetation to be preserved (including Maine Native and Climate-Resilient Northeastern Native Vegetation in buffer areas), proposed site landscaping, screening, and proposed street trees, if applicable;
18. Existing and proposed curb and sidewalk;
19. Location, area, and limits of the proposed site disturbance or alteration;
20. Water of the State and their associated Shoreland Protection areas, if applicable; and
21. Proposed pier, dock, wharf, pier, or slope stabilization in the Shoreland Zone, if applicable.

14.1.5. Subdivision.

The applicant shall submit for review a packet of materials and submissions in a form and content as specified by the Department of Planning and Urban Development to demonstrate compliance of the development with the subdivision standards listed in Article 15 of the Land Use Code. Such submissions shall contain, at a minimum, the following elements:

A. Subdivision plat.

The following information shall be shown on the subdivision plat unless otherwise indicated:

1. Date, north point, title and graphic scale. Scale shall not be more than 60 feet to the inch unless lots are more than an acre, but in no event more than 100 feet to the inch;
2. Based on a recent survey by the subdivider, existing contours at two feet intervals or as otherwise required by the Public Works Authority. Existing structures which are to remain will shall be delineated;
3. Names of proposed streets, width of rights of way, and typical cross section reservation, and depth of construction materials;
4. Locations, widths and purposes of other rights of way or easements to be recorded;
5. All appropriate street curve information, including point of curvature, point of tangency, tangent distance, radii and interior angle, in standard engineering format;
6. Location of those utilities existing on or adjacent to the tract to be subdivided, including size and elevation of buried or underground utilities (may be shown on separate plan);
7. Tract boundary lines and property lines of lots, with accurate dimensions and either bearings or deflection angles. All lots shall be numbered;
8. Names of adjacent property owners with parcels over 25,000 square feet or names of adjacent subdivision;
9. Designation of flood hazard areas, as defined by the National Flood Insurance Program and shown on the city flood hazard boundary map, as well as any other areas in the subdivision subject to inundation by storm water or storm sewer overflow;

10. All potential wetlands within the proposed subdivision, regardless of the size of those wetlands;
11. A narrative and a plan showing all existing and proposed buffer strips, their dimensions, and maintenance plans and responsibilities;
12. A plan showing significant natural features located on or directly adjacent to the proposed subdivision and a description of the methods that will be used to protect such area(s);
13. Any river, stream or brook, or Waters of the State (38 M.R.S. §361-A(7)) and their associated Shoreland Protection areas within or abutting the proposed subdivision. For purposes of this section, ″river, stream or brook″ has the same meaning as in 38 M.R.S. § 480 B, Subsection 9;
14. Identified state and local archaeological sites/resources, and historic sites and structures which either are locally designated, appear on the National Register, or are nominated to the National Register by the state historic preservation officer;
15. Proposed private and public utility system including water, gas, telephone, fire hydrants, and any other services which shall supply the area (may be shown on separate plan);
16. Sanitary sewer and storm drain plans and profiles showing size, kind and slope of pipe, proposed manhole rim and invert elevations and catch basin locations and drains (may be shown on separate plan);
17. Lighting plan showing the location, design, height and spacing from each other of the support poles, in accordance with standards and specifications established by the Public Works Authority (may be shown on separate plan);
18. Tree plan showing groups of existing, sizeable trees which the subdivider intends to preserve (may be shown on separate plan);
19. A detailed plan of the entire subdivision and the immediate vicinity showing all existing and proposed drainage both on- and off-site including drainage areas, drainageways, associated time of concentration, etc., with directional flow arrows and approximate slope grades, and showing proposed finished ″spot elevations″ around the perimeter of the subdivision and proposed stormwater treatment measures to be used, with identification of stormwater treatment measures that will be maintained privately and which will be offered to the City for acceptance and operation. Proposed drainage shall be shown as it may affect or restrict development on individual lots and with reference to improvements for which a performance guarantee is required under this article. Where deemed feasible by the Public Works Authority, proposed finished contours at intervals of two feet shall be provided on the drainage plan upon request (may be shown on separate plan);
20. Location and designation of any zoning district boundaries affecting the subdivision;
21. Plan showing the limits of disturbance;
22. Plan showing locations of snow storage areas;
23. All future phases and sections of the subdivision proposed by the subdivider (may be shown on separate plan);
24. Proposed parks and school sites, or other public open space that the developer proposes to convey to the city;
25. Names, addresses and stamp or certification, if applicable, of registered professional engineer, subdivider, and owner;
26. At the option of the subdivider, any other information that may be necessary for the full and proper consideration of the subdivision shall be submitted in writing;
27. Streets and right of way monuments and property line markers;
28. Vicinity sketch (may be shown on separate plan);
29. Total site data, including total area of the subdivision, total area in streets, total area in recreation or open space and number of house lots; and
30. Profiles of each street or way in the subdivision shall be shown on the subdivision plat. They shall be drawn to a longitudinal scale of 40 feet to one foot and a vertical scale of four feet to one inch. Such profiles shall include

separate profiles of each side line and center line of the street or way. Any buildings abutting on the street shall be shown in standard engineering format as requested by the Public Works Authority.

B. Supplemental submissions.

1. When private sewage systems are used, the results and supporting data of a soil test of each lot in the subdivision conducted by a soil evaluator licensed in the state;
2. When the adequacy of the subdivision's load bearing capacity is in question, the results and supporting data of test borings conducted by a professional engineer registered in the state;
3. When conditions warrant, a program which shall be implemented by the subdivider to control dust, erosion and sedimentation and/or vehicular traffic during construction;
4. Evidence of the applicant's financial capability to carry out all phases of the proposed development;
5. Evidence of technical capacity to undertake the development;
6. Evidence of state and federal approvals, licenses or permits required by law, or the status of applications therefor;
7. Price range of houses that will be built in the subdivision;
8. Traffic impact analysis;
9. High intensity soil survey identifying high permeability soils, if required by the Planning Authority;
10. Types and estimated quantities of solid waste to be generated by the development
11. Construction plan outlining the anticipated sequence of construction of the major features of the project including without limitation roads, retention basins, sewer lines, seeding and other erosion and sedimentation control measures, and pollution abatement measures and also setting forth the approximate dates for commencement and complement of the project; and
12. Where submission drawings are available in electronic form, the applicant shall submit any available electronic CADD.DXF files with final plans.

C. Recording plat.

The Recording plat shall be an original ink drawing on linen or mylar, or as necessary to be acceptable to the Registry of Deeds, and shall be tied to an accepted street or to a proposed street under construction and bonded to insure construction. The plat shall show the following:

1. Title, date, graphic scale, north arrow, name, signature and registration number or seal of a registered land surveyor licensed in the state, name and address of developer and owner;
2. Tract boundary lines and property lines of lots, with accurate dimensions and either bearings or deflection angles. All lots shall be numbered;
3. All appropriate street curve information, including point of tangency, tangent distance, radii and interior angles, in standard engineering form;
4. Street names, width of street rights of way and typical cross section showing only surface dimensions of roadway pavement, esplanade and sidewalk reservation;
5. Street and right of way monuments and property markers. Iron pipes shall be designated by a small circle at the point of installation;
6. Locations, dimensions and purposes of any easement or right of way;
7. Purpose for which sites, other than residential lots, are dedicated or reserved; it being understood that any reservations of areas shall be subject to the proper zoning thereof;
8. Reference to recorded subdivision plats of adjoining platted land by book and page number;
9. Space for the signatures of the Planning Board and date of approval; and

10. Where required by 30 A M.R.S. § 4406, the fact that initial approval or subsequent amendment of a subdivision is based in part upon the granting of a variance from any of the applicable subdivision approval standards.

14.2. BOUNDARY SURVEY REQUIREMENTS

14.2.1. Major and minor site plans (excluding minor residential site plans).

The following items shall be shown on boundary surveys to ensure compliance with City of Portland planning requirements, engineering technical and design standards, and accurate documents are on record for future planning, GIS mapping, and engineering needs:

1. Name and address of the property owner, the applicant and name of the proposed development, and with references to the Deed Book and Page at the Cumberland County Registry of Deeds;
2. North arrow;
3. Scale of not less than one (1) inch to fifty (50) feet;
4. Graphic scale (scale bar);
5. Plan Size: Where possible, it is preferred that plans not exceed a maximum size of 24" x 36";
6. Site Boundaries: The full parcel boundaries must be shown on the survey;
7. Total land area of the site;
8. Zoning district boundaries, if applicable;
9. Required zoning setbacks for the site;
10. Flood Zone statement, where applicable, based on FEMA, FIRM Flood Insurance Rate Maps;
11. Existing and proposed grading contours at intervals of not more than two (2) feet;
12. Existing structures or other improvements on the site and the approximate location of structures or improvements on adjoining lots within fifty feet (50') of the site boundary;
13. Existing streets, right-of-way, restrictions or easements on the site;
14. The location and size of existing utilities servicing the site, including fire hydrants;
15. Significant natural features on or directly adjacent to the site, including wetlands, ponds, watercourses, floodplains, significant wildlife habitats and fisheries or other important natural features as listed in the LID Section of the Technical Manual. Delineation of wetlands boundaries shall use methods prescribed by the U.S. Army Corps of Engineers Wetlands Delineation Manual (1987). Maine State Jurisdictional Wetlands and wetlands as defined by the Shoreland Zoning Ordinance should be identified according to the Natural Resources Protection Act (Title 38 M.R.S.A. Section 480-B) and identified on the plan, including a topographic map at a scale of 1" = 100 feet;
16. Tree survey that identifies the location of existing street trees, the general location of on-site trees and vegetation (including Maine Native & Climate Resilient Northeastern Native Vegetation in General Buffer & Shoreland Zone Buffer areas). Alternately, Applicants may submit a separate tree survey performed by a licensed land surveyor, arborist, forester, or landscape architect to meet the Preservation of Existing Vegetation standards of the LID Section;
17. Waters of the State (38 M.R.S. §361-A(7)) and their associated Shoreland Protection Areas, if applicable;
18. Predevelopment drainage areas, drainageways, and associated time of concentration, if applicable;
19. Existing soil conditions, with identification of high permeability soils;
20. Vicinity Map showing the relationship of the project to the surrounding area at a scale no greater than one-inch equals 2,000 feet;

21. A revision block with a number and date indicating the revision status. The revision block shall be located in the title block or adjacent to it;
22. Rim elevations of all catch basin and manhole structures;
23. Invert elevations of all pipes entering and/or exiting catch basins and manhole structures;
24. The length, material, diameter, and slope of all storm sewer and sanitary sewer piping;
25. The location, with dimensions from existing structures, at the main line pipe and at the street property line, of all sanitary sewer and storm drain laterals. The Public Services Department Engineering Archives may have this information available for existing infrastructure;
26. Location, size, type of material, and invert elevations of culverts;
27. Location of water lines and valves, gas lines and valves, buried electrical lines, buried communication cables, buried TV cables, telephone and electric manholes, utility hand-hold access boxes, transformer pads, utility and light poles;
28. All curbing and sidewalks, stating type of material;
29. Property Corners: Location and descriptions of all property corners set or found, proposed to be set, and all granite survey monuments set. Where no property markers exist, the City of Portland requires that the property markers be installed and that a licensed surveyor set and confirm proposed building locations on site prior to the issuance of a building permit;
30. Boundary Survey plans, based on State of Maine Professional Licensing Boards' legal requirements, shall bear the seal of a Professional Land Surveyor licensed to practice in the State of Maine;
31. City Vertical Datum: It shall be stated on all plans that the City of Portland established vertical datum of NGVD 1929 is used or manhole rim elevation data is used for all information shown on the plan;
32. All plans shall state the Official City of Portland Benchmark used as supplied by the Public Services Engineering Division Archivist;
33. Distances, bearings, and angles shall be shown on the survey or subdivision plans, shall tie the property into the nearest accepted street line and be tied into established City of Portland survey monuments or record survey data at the Public Services Engineering Archives. Ties shall be considered as an inverse line with a bearing and distance to the nearest second and hundredth of a foot;
34. All current conveyances of lots, parcels, easements, and other forms of right, title, and/or interest shall be shown on both the survey plan (as submitted and as amended), with references to the Deed Book and Page at the Cumberland County Registry of Deeds; and
35. Street Status. The Status of the street shall be shown; IE Accepted City Street, Continued Paper Street, Discontinued City Street, Vacated Paper Street, or new Proposed Street as per the project submission.
36. Prior to starting field surveys and design on a project it is strongly advised to contact the City Engineer's office, Public Services Department, Engineering Division at (207) 874-8846 for information on existing infrastructure, additional requirements, or future projects that may affect the proposed project;
37. Proposed Survey Monument Locations, if required. Granite survey monuments shall be set on one side of the street as directed by the Public Services Engineering Division on the 3-foot offset Lines, as offset towards the street. Notes describing monuments found by the Project Surveyor shall include information describing the size, condition, and depth below grade to the top of any buried monuments found;
38. All proposed (if required by Planning) and existing survey monuments shall be shown in bold line type on all utility and site plans;
39. Projects shall be tied into the Maine State Plane Coordinate System (2-zone projection), West Zone using the NAD1983 Datum and the U.S. Survey Foot as the unit of measure. The survey methods, traverse or GPS observations/methods, geodetic control used, and coordinates of new monuments set shall be stated on the survey and subdivision plans;

40. When State Plane Coordinates are required, the State Plane Coordinates (to the nearest hundredth of a foot) of two survey property corners shall be displayed for any two property corners in the project which are the farthest distance apart. Please contact the Public Services Engineering Division for assistance in providing Survey Control Points or GPS Base Station Support;
41. Bearing Basis. When State Plane Coordinates are required, magnetic bearings may be shown on plans submitted, with a note stating that the project was submitted digitally to the City of Portland on State Plane Coordinates, but that the bearings on the plans are magnetic due to survey and boundary retracement considerations. The plan shall show the magnetic declination if magnetic bearings are shown; and
42. All easements and conveyances proposed as part of the project shall be recorded, upon project approval, at the Cumberland County Registry of Deeds. Easement ownership and responsibility must be stated on the survey plans. Revised plans may be requested if deeds are executed during the progression of the project for easements or other conveyances.

14.2.2. Waiver of boundary survey requirement for major and minor site plans.

The reviewing authority may permit the submission of a partial survey depicting only the to-be- developed portion of the improved lot of record if the development:

A. Is proposed on an already improved lot of record; and
B. Comprises less than one (1) acre of said improved lot of record.

14.2.3. Minor residential site plans.

The following items and information shall be shown on boundary surveys for minor residential development site plans (as defined in Section 16 of the Technical Manual) to ensure compliance with City of Portland planning requirements, engineering technical and design standards, and accurate documents are on record for future planning, GIS mapping, and engineering needs:

1. Name and address of the property owner, the applicant and name of the proposed development, and with references to the Deed Book and Page at the Cumberland County Registry of Deeds.
2. North arrow.
3. Scale of not less than one (1) inch to fifty (50) feet.
4. A graphic scale (scale bar).
5. Plan Size: Where possible, it is preferred that plans not exceed a maximum size of 24" x 36".
6. Site Boundaries: The full parcel boundaries must be shown on the survey.
7. Total land area of the site.
8. Significant natural features on or directly adjacent to the site, including wetlands, ponds, watercourses, floodplains, significant wildlife habitats and fisheries or other important natural features as listed in the LID Section of the Technical Manual, if applicable. Delineation of wetlands boundaries shall use methods prescribed by the U.S. Army Corps of Engineers Wetlands Delineation Manual (1987). Maine State Jurisdictional Wetlands and wetlands as defined by the Shoreland Zoning Ordinance should be identified according to the Natural Resources Protection Act (Title 38 M.R.S.A. Section 480-B) and identified on the plan, including a topographic map at a scale of 1" = 100 feet.
9. Tree survey that identifies the location of existing street trees, the general location of on-site trees and vegetation (including Maine Native & Climate Resilient Northeastern Native Vegetation in General Buffer & Shoreland Zone Buffer areas), and meets the tree survey requirements. Alternately, Applicants may submit a

separate tree survey performed by a licensed land surveyor, arborist, forester, or landscape architect to meet the Preservation of Existing Vegetation standards of the LID Section.

10. Waters of the State (38 M.R.S. §361-A(7)) and their associated Shoreland Protection Areas, if applicable.
11. Predevelopment drainage areas, drainageways and associated time of concentration, if applicable.
12. Existing soil conditions, with identification of high permeability soils.
13. Flood Zone statement, where applicable, based on FEMA, FIRM Flood Insurance Rate Maps.
14. Existing streets, right-of-way, restrictions or easements on the site.
15. A revision block with a number and date indicating the revision status. The revision block shall be located in the title block or adjacent to it.
16. Property Corners: Location and descriptions of all property corners set or found, proposed to be set, and all granite survey monuments set. Where no property markers exist, the City of Portland requires that the property markers be installed and that a licensed surveyor set and confirm proposed building locations on site prior to the issuance of a building permit.
17. Boundary Survey plans, based on State of Maine Professional Licensing Boards' legal requirements, shall bear the seal of a Professional Land Surveyor licensed to practice in the State of Maine.
18. City Vertical Datum: It shall be stated on all plans that the City of Portland established vertical datum of NGVD 1929 is used or manhole rim elevation data is used for all information shown on the plan.
19. All plans shall state the Official City of Portland Benchmark used as supplied by the Department of Public Services Engineering Division Archivist.
20. It may be required, especially in areas of old subdivision plans and areas not previously subdivided, that the survey show tie bearings and distances to the nearest street line corner, or to the nearest City of Portland survey monument. Survey tie line precision shall be an inverse line with the bearing to the nearest second and the distance to the nearest hundredth of a foot. This requirement is to aid in adding and verifying the property location on the City of Portland digital GIS basemap.
21. All current conveyances of lots, parcels, easements, and other forms of right, title, and/or interest shall be shown on both the survey plan (as submitted and as amended), with references to the Deed Book and Page at the Cumberland County Registry of Deeds.
22. Street Status: The Status of the street shall be shown; IE Accepted City Street, Continued Paper Street, Discontinued City Street, Vacated Paper Street, or new Proposed Street as per the project submission.

14.2.4. Waiver of boundary survey requirement for minor residential site plans.

If the proposed house is to be located on a lot within an existing subdivision, approved no earlier than 1968, the final subdivision recording plat may be used, provided that the applicant sufficiently documents all existing encumbrances, and can show that no new encumbrances have occurred since recording of the final plat.

14.3. SOIL SURVEY REQUIREMENTS

14.3.1. Soil survey thresholds and requirements.

The level at which various types of projects must be mapped and guidelines for each intensity level of soil mapping are included in Table 1 and Subsection 2:

Table 14-A: Soil Survey standards by development type

Soil Survey Class	Development Threshold	Minimum Standards
A. High Intensity	• Projects with phosphorous control measures (e.g., ponds, infiltration facilities, and buffer strips) • Subdivisions where any lot is less than 2 acres and on-site subsurface wastewater disposal is proposed.	• Mapping units of 1/8 acre or less • Scale is 1-inch equals 100 feet or larger • Ground control – base line and test pits accurately located under the direction of a registered land surveyor or qualified professional engineer • Base map with 2-foot contour lines with ground survey, or aerial survey with ground control • Signed and stamped by a Maine Certified Soil Scientist
B. High Intensity	• Subdivisions ≥20 acres in area with ≥16 lots that includes: o A lot that is <2 acres in area, and o No on-site wastewater disposal, and o New city streets to be constructed. • Project that results in >3 acres of new non-vegetated surface and/or >20 acres in development area.	• Mapping units of 1 acre or less • Scale is 1 inch equals 200 feet or larger • Ground control – test pits located by means of compass by chaining, pacing or taping from known survey points • Base map with 5-foot contour lines survey, or aerial survey with ground control • Signed and stamped by a Maine Certified Soil Scientist.
C. Medium-High Intensity	• Subdivisions where all lots are >2 acres and on-site subsurface wastewater disposal is proposed. • Golf courses, ski areas and trails, and other multi-use recreational developments exceeding 1-acre. • Any project with the City has determined will require a hydrogeological investigation	• Mapping units of 3 acres or less • Scale is 1-inch equals 500 feet or larger • Ground control – as determined by the mapper • Base map – as determined by the mapper • Signed and stamped by a Maine Certified Soil Scientist.
D. Medium Intensity	• All other Major Site Plan and Subdivision developments	Published by Soil Conservation Service for Cumberland County

14.3.2. Additional standards for soil surveys A-C.

A. The soil survey shall be designed using the National Cooperative Soil Survey as a guide and the soils classified at the series level. Soil map units will be phases of soil series.
B. The soil map legend shall include a symbol for each map unit and special symbol for areas too small to be mapped, and the name of each map unit. The soil scientist shall provide a description for each map unit.
C. The soil(s) within an area enclosed by a soil boundary (map unit) will have a minimum of 75 percent of the soil(s) that provide the name of that map unit or similar soil(s). The total amount of dissimilar soils shall not exceed 25 percent of the map unit.
D. Soil boundaries must be observed throughout their length and their placement must correspond to changes in soils and/or land forms.
E. The soil survey must be mapped at a scale as required by the Maine Association of Professional Soil Scientists (MAPSS) Soil Survey Guidelines (available through the Department of Public Services or through the MAPSS website at http://www.mapss.org/publications.htm). The map must identify the soil mapping intensity under which the mapping was conducted.
F. A soil report, completed by a Certified Soil Scientist, shall be submitted with the soil survey and identify all major limitations to the proposed development by the soil characteristics, as well as the SCS Hydrologic Soil Group classification for each soil series.
G. A Maine Certified Soil Scientist shall accurately map and mark in the field the boundaries of any hydric soils identified by the Soil Survey.

14.3.3. Exceptions to soil survey standards.

A. Depending on the nature of the proposed development, the requirement for a soil survey map and report may be waived if the Planning Authority determines that a geotechnical report completed within the past 2 years will provide sufficient information.
B. In the event that greater than 50 percent of a proposed development site is currently developed, an applicant may petition the Planning Authority to accept a lower class of soil survey. The Planning Authority shall review the request, and their decision on the appropriate level of mapping shall be final.
C. The Planning Authority reserves the right to request the preparation of a high intensity soil map or require more intense hydric soil boundary delineation, when special conditions warrant it.

14.4. Stormwater Management and Drainage Plan Requirements

14.4.1. Plan requirements.

Applicants are required to submit a stormwater management and drainage plan as part of development review application and to provide the following submission items to demonstrate compliance with the applicable stormwater management standards:

14.4.2. Urban impaired stream standard requirements.

Calculations for the Compensation Fee or Mitigation Credit per the tables provided in Chapter 500 Rules and other associated Maine DEP regulations. (Note: The City of Portland has an approved Compensation Fee Utilization Plan (CFUP) and can therefore receive in-lieu-fee payments to meet the UIS Standard.)

14.4.3. Water quality treatment requirements.

Written narrative demonstrating compliance, site plans showing grading and drainage infrastructure, site plan showing water quality treatment area(s) with table showing compliance, BMP sizing calculations, construction details, and a

Post-Construction Stormwater Inspection & Maintenance Plan per Maine DEP Chapter 500 Appendix B with reporting requirements per Chapter 32 of City of Portland Code of Ordinances, and a Stormwater Maintenance Agreement. The submission documents should include confirmation of design from the manufacturer for any proprietary systems.

14.4.4. Flooding standard requirements.

Sub-catchment plans with flow paths, full hydrology computations/model output of pre- and post-development conditions, summary of pre- and post-development flowrates, and a written request for waiver with rationale for waiver as noted in Chapter 500 (as applicable). The submission documents should include confirmation of design from the manufacturer for any proprietary systems.

14.4.5. Minimum stormwater detention volume requirements.

Applicable drainage calculations, modeling information, plans and details as required to prove that the detention volume and maximum stormwater outflow control requirements are being met. The submission documents should include confirmation of design from the manufacturer for any proprietary systems. Stormwater detention systems shall be included in the project's overall post construction stormwater inspection & maintenance plan and stormwater maintenance agreement.

14.4.6. Small-scale residential project requirements.

Provide plans and details as stipulated in section 14 of the Technical Manual. The provided site plan must depict the location and sizing of the proposed residential stormwater management system. Details of the proposed systems must also be provided. A short narrative, with supporting calculation documentation, shall be provided to demonstrate that the project is complies with the treatment requirements for small-scale residential development per Section 5 of the Technical Manual.

14.5. Wetland Delineation Requirements

All wetlands shall be delineated and mapped according to the U.S. Army Corps of Engineers Wetlands Delineation Manual (1987). Maine State Jurisdictional Wetlands and wetlands as defined by the Shoreland Zoning Ordinance (hereafter referred to as wetlands) should be identified according to the Natural Resources Protection Act (Title 38 M.R.S.A. Section 480-B) and identified on a map.

14.5.1. General plan requirements.

A. A topographic map with wetlands delineated according to the U.S. Army City of Portland Technical Manual 148 Section 8 - Development in and Adjacent to Wetland Adopted 7/19/10 Corps of Engineers Wetlands Delineation Manual (1987). State of Maine Jurisdictional Wetlands will be identified according to the Natural Resources Protection Act on the same map. The scale should be 1-inch equals 100 feet.
B. A site plan that shows all development activity including lots, common areas, roads, driveways, and building windows in conjunction with wetlands.

14.5.2. Where wetlands filling or alterations is proposed.

A. Areas of wetland fill or alteration must be clearly marked and individually identified on the site plan.
B. A report that contains surface area amounts of wetland fill or alteration for the individually identified fill or alteration locations.
C. A letter from the Department of Inland Fisheries and Wildlife indicating the wetlands on the site contain no significant or valuable wildlife habitat.

D. A letter of non-jurisdiction, a copy of permits received from other regulatory agencies (i.e. Maine Department of Environmental Protection of the U.S. Army Corps. Of Engineers) or report from a qualified professional stating that the proposed work will not require a permit from state of local agencies must be submitted for all projects proposing work either in or adjacent to wetlands prior to issuance of a building permit. This includes wetlands not regulated by the City of Portland

Background and Notes for Future Adopters

The performance standards contained in this document were developed to assist municipalities in addressing the 2022 General Permit for Stormwater Discharges to Municipal Separate Storm Sewer Systems (MS4s), which applies to 30 municipalities in Maine.

An Ordinance Committee and Technical Expert Panel reviewed the elements contained in this document. A white paper describing the rationale for the content of this Maine Model Ordinance for Low Impact Development Strategies (Model Ordinance) is a companion to this document.

Text in black in this document reflects elements that the Authors and Technical Expert Panel agreed were important for implementation of Low Impact Development (LID) in Maine. During comment and reviews, it became apparent that not all elements will be appropriate for implementation in all MS4 municipalities. Therefore, the full Ordinance Committee was polled to assess what elements should be removed from this Model Ordinance, and any elements with a 2/3 majority of votes (one vote per municipality) to remove were removed or made to be optional. Even the resulting recommendations provided in black text may not be consistent with some municipal policies, strategies, or Comprehensive Plans.

Municipalities that elect to adopt elements of this Maine Model Ordinance for Low Impact Development Strategies should review its contents, determine if any elements are inconsistent with existing municipal policies, strategies, or Comprehensive Plans, and make appropriate modifications to their municipality's Model LID Ordinance that is submitted to Maine DEP.

On or before 9/1/2022, each permittee must submit to Maine DEP a Model LID Ordinance for stormwater management on new and Redevelopment sites in accordance with the General Permit for their community.

Maine DEP will post the Model LID Ordinance for public comments and approve it, with or without modifications, on or before 11/1/2022.

Then, MS4 communities must adopt an ordinance that is at least as stringent as the required elements of the Model LID Ordinance by 7/1/2024.

Because municipal ordinances are structured differently, with varying thresholds for development review, submittal requirements, and performance standards, this Maine Model Ordinance for Low Impact Development Strategies does not contain complete language for each section. Instead, it is anticipated the municipalities will embed the required elements in their own Subdivision and Site Plan Ordinances or Regulations. Municipalities may need to adjust some text to be consistent with their own ordinance language.

Throughout this Maine Model Ordinance for Low Impact Development Strategies, instructions to Adopters are contained in bounded text boxes in each section.

Optional elements incorporating Maine Climate Council Recommendations or recommendations from other sources are shown in blue in italics. Municipalities may or may not incorporate these elements as they wish.

Some standard ordinance language is shown in green, also in italics. Municipalities may modify this language to conform to their own ordinances and procedures.

Maine Model Ordinance for Low Impact Development Strategies

Final 7/21/2022

Credits: This model ordinance was prepared by SMPDC, CCSWCD, and Integrated Environmental Engineering, Inc. under award CZM NA21NOS4190082 to the Maine Coastal Program from the National Oceanic and Atmospheric Administration, U.S. Department of Commerce. The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of NOAA or the Department of Commerce.

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Section 1 Purpose

The Purpose of this Maine Model Ordinance for Low Impact Development Strategies (the "Ordinance") is to protect, maintain and enhance the public health, safety and general welfare by establishing minimum requirements and procedures to minimize the adverse effects of New Development and Redevelopment on the environment.

Section 2 Definitions

Note to Future Adopters: Review your Subdivision and Site Plan definitions for inclusion of the following definitions:

Buffers – Means all three kinds of buffers listed below unless a subset of the three is specifically called out:

- **Stormwater Vegetative Buffer** – a buffer constructed in accordance with Appendix F in Chapter 500 for the purposes of providing pollutant removal.
- **Shoreland Zoning Setback Buffer** – A buffer required by the municipal Shoreland Zoning Ordinance to protect a water of the State.
- **General Buffer** – a buffer required by the municipal ordinances to provide screening to parcels or developments from light, noise, other parcels, rubbish areas, or other areas.

Chapter 500 – Means Chapter 500 of the Maine Department of Environmental Protection's Rules ("Stormwater Management Rules").

Chapter 502 - Means Chapter 502 of the Maine Department of Environmental Protection's Rules ("Direct Watersheds of Lakes Most at Risk from New Development, and Urban Impaired Streams").

Climate Resilient Northeast Native Vegetation – Means plants identified as native to the Northeast as identified by the Northeast Regional Invasive Species & Climate Change (RISCC) Network or a Maine Licensed Landscape Architect.

Common Plan of Development or Sale - Means a "subdivision" as defined in Title 30-A M.R.S. §§ 4401 *et seq*. (the Maine Subdivision statute) and in _____ of the Municipality's code of ordinances.

Note: Common Plan of Dev. Or Sale is same definition as MS4 General Permit.

§§ 4401.4 "Subdivision" means the division of a tract or parcel of land into 3 or more lots within any 5-year period that begins on or after September 23, 1971. This definition applies whether the division is accomplished by sale, lease, development, buildings or otherwise. The term "subdivision" also includes the division of a new structure or structures on a tract or parcel of land into 3 or more dwelling units within a 5-year period, the construction or placement of 3 or more dwelling units on a single tract or parcel of land and the division of an existing structure or structures previously used for commercial or industrial use into 3 or more dwelling units within a 5-year period.

Construction Activity – Means any activity on a Site that results in Disturbed Area.

Discharge - Means any spilling, leaking, pumping, pouring, emptying, dumping, disposing or other addition of pollutants to the Waters of the State, other than groundwater.

Disturbed Area - Means all land areas of a Site that are stripped, graded, grubbed, filled, or excavated at any time during the site preparation or removing vegetation for, or construction of, a Project. Cutting of trees, without grubbing, stump removal, disturbance, or exposure of soil is not considered Disturbed Area. Disturbed Area does not include routine maintenance but does include Redevelopment and new Impervious Areas. "Routine maintenance" is maintenance performed to maintain the original line and grade, hydraulic capacity, and original purpose of the facility. Paving impervious gravel surfaces provided that an applicant or permittee can prove the original line and grade and hydraulic capacity shall be maintained and original purpose of the gravel surface remains the same is considered routine maintenance. Replacement of a building is not considered routine maintenance of the building and is therefore considered Disturbed Area.

Note: Disturbed Area definition is from the MS4 General Permit plus addition of the last sentence to ensure that Redevelopment Projects removing buildings take into account that area as Disturbed Area.

Drainageway – Means the same as "Drainageway" defined in Chapter 500

General Permit – Means the General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4) approved October 15, 2020, and modified November 23, 2021, and any amendment or renewal thereof.

High Intensity Soil Survey – Means a Class A survey defined by the March 2009 Guidelines for Maine Certified Soil Scientist for Soil Identification and Mapping, prepared by the Maine Association of Professional Soil Scientists.

High Permeability Soils – Means hydrologic soil groups A or B as determined by on-site soil testing by a certified soil scientist using a High Intensity Soil Survey.

Impervious Area - Means the total area of a Parcel covered with a low-permeability material that is highly resistant to infiltration by water, such as asphalt, concrete, or rooftop, and areas such as gravel roads and unpaved parking areas that will be compacted through design or use to reduce their permeability. Common Impervious Areas include, but are not limited to, rooftops, walkways, patios, driveways, parking lots or storage areas, concrete or asphalt paving, gravel roads, packed earthen materials, and macadam or other surfaces which similarly impede the natural infiltration of stormwater. Pervious pavement, pervious pavers, pervious concrete, and under drained artificial turf fields are all considered impervious. *For the purpose of determining whether a Site exceeds the Impervious Area thresholds requiring conformance to LID performance standards, the municipality may exclude these from calculation of Impervious Area if these are designed to be infiltration Stormwater Treatment Measures.*

Note: this definition is the same as Chapter 500 definition of Impervious Area except Chapter 500 has a sentence at the end was removed, saying that the DEP can exclude Pervious pavement from calculation of Impervious Area was modified.

Lot – Means the same as it is defined under the Municipality's zoning ordinance.

Low Impact Development (LID) - Means a broad approach to site planning that preserves natural resources, processes, and habitat, defines what portions of the Site are suitable for development and then utilizes Stormwater Treatment Measures to manage Runoff from the proposed developed impervious areas. In LID, Stormwater Treatment Measures using natural processes such as vegetated buffers are given preference over constructed treatment Stormwater Treatment Measures. The goals of LID are to minimize the environmental impacts of the development.

Maine Licensed Landscape Architect – Means a person who has an active Landscape Architect license from the Maine Board of Licensure for Architects, Landscape Architects, and Interior Designers.

Maine Native Vegetation – Means vegetation including grass seed mixtures, identified as native to Maine from lists maintained by: US Department of Agriculture Hardiness Zones by the Maine Cooperative Extension, Wild Seed Project, Regional Soil and Water Conservation District, Maine YardScaping Program, or a Maine Licensed Landscape Architect.

Municipal Separate Storm Sewer Systems (MS4) - Means a conveyance or system of conveyances designed or used for collecting or conveying Stormwater (other than a publicly owned treatment works (POTW), as defined at 40 CFR 122.2, or a combined sewer), including, but not limited to, roads with drainage systems, municipal roads, catch basins, curbs, gutters, ditches, human-made channels or storm drains owned or operated by any municipality, sewer or sewage district, Maine Department of Transportation (MDOT), Maine Turnpike Authority (MTA), State agency or Federal agency or other public entity that Discharges to Waters of the State other than groundwater.

Municipality – Means the City/Town of _____.

New Development – Means the same as "New Development or Construction" defined in the General Permit.

The General Permit defines "New Development or Construction" as follows: "New Development or Construction" means activity undertaken to develop property, including but not limited to: the construction of buildings, parking lots, roads and other new impervious surfaces; landscaping; and other activities that disturb land areas. New Development or Construction does not include Redevelopment or maintenance. Permitted municipalities may define New Development more stringently.)

Parcel – Means the same as "Tract or parcel of land" as defined at 30 M.R.S. §4401.6 *et seq*. *(or alternately, the municipality may reference their own definition of parcel).*

§4401.6 Tract or Parcel of land means all contiguous land in the same ownership, except that lands located on opposite sides of a public or private road are considered each a separate tract or parcel of land unless the road was established by the owner of land on both sides of the road after September 22, 1971.

Permitting Authority - Means the Code Enforcement Officer, Building Inspector, Planning Board, or other official or body authorized by State law or the Municipality's ordinances to approve Development or Redevelopment of Sites.

Project – Means Construction Activity undertaken for New Development or Redevelopment, both as defined in the General Permit, located on a Site that will Discharge Stormwater to a Small MS4 located partially or entirely within the Urbanized Area.

Protected Natural Resource - Means coastal sand dunes, coastal wetlands, significant wildlife habitat, fragile mountain areas, freshwater wetlands, community public water system primary protection areas, great ponds, or rivers, streams or brooks as defined in the *Natural Resources Protection Act* at 38 M.R.S. §480-B.

Redevelopment – Means the same as "Redevelopment" defined in the General Permit.

The General Permit defines "Redevelopment" as follows: "Redevelopment" means an activity, not including maintenance, undertaken to redevelop or otherwise improve property in which the newly developed area is located within the same footprint as the existing developed area.

Regulated Small MS4 - Means any Small MS4 authorized by the most recent, in-force General Permit or the general permits for the Discharge of Stormwater from MDOT and MTA Small MS4s or state or federally owned or operated Small MS4s including all those located partially or entirely within the Urbanized Area.

Runoff – Means the part of precipitation from rain or melting ice and snow that flows across a surface as sheet flow, shallow concentrated flow or in Drainageways.

Rural Areas – Means those zones or districts designated as follows on the municipal zoning map: _____.

Small MS4 - Means any MS4 that is not already covered by the Phase I MS4 stormwater program including municipally owned or operated storm sewer systems, state, or federally owned systems, such as colleges, universities, prisons, military bases and facilities, and transportation entities such as MDOT and MTA road systems and facilities. See also 40 CFR 122.26(b)(16).

Significant and Essential Wildlife Habitats – Means the areas identified as Significant or Essential Habitats of endangered or threatened species as identified by the Maine Department of Inland Fisheries and Wildlife either on the Beginning with Habitat viewer or in consultation with the Maine Department of Inland Fisheries and Wildlife.

Site - Means the portion of a Lot, Parcel, or Common Plan of Development which is proposed for Construction Activity, including open space, Stormwater Treatment Measures, and Disturbed Area, subject to this Ordinance.

Stormwater- Means the part of precipitation including Runoff from rain or melting ice and snow that flows across the surface as sheet flow, shallow concentrated flow, or in Drainageways. “Stormwater” has the same meaning as “storm water”.

Stream Crossing - Means the mechanism by which any road, sidewalk, or other structural feature of a Site will cross or pass over or through a Water of the State which has a stream bank full width of 6 feet or less.

Stream Crossing designed in accordance with Maine Stream Smart Principles – Means a Stream Crossing designed by a Maine Professional Engineer who has completed the Maine Audubon Society Stream Smart Workshops (Parts I and II), which includes the standards recommended by that program’s stream span, elevation, slope and skew and substrate to promote passage of fish and other organisms and to limit road-damaging flows from extreme weather.

Stormwater Treatment Measure – Means a Stormwater management system or innovative treatment measure as described in Chapter 500 4.c.(3) Types of treatment measures allowed. These measures include wet ponds, vegetated soil filters, infiltration, buffers, or innovative treatment measures. For purposes of this Ordinance these are cumulatively referred to as Stormwater Treatment Measures, or individually referred to as Stormwater Treatment Wet Pond, Stormwater Treatment Vegetated Soil Filter, Stormwater Treatment Infiltration Measure, Stormwater Treatment Buffer, or Stormwater Treatment Innovative Measure.

Suburban Areas – Means those zones or districts designated as follows on the municipal zoning map: _____.

Time of Concentration – Means the same as "Time of concentration" defined in Chapter 500.

Urban Areas – Means those zones or districts designated as follows on the municipal zoning map: _____.

Urbanized Area - Means the area of the Municipality so defined by the inclusive sum of the 2000 decennial census and the 2010 decennial census by the U.S. Census Bureau.

Waters of the State – See 38 M.R.S. §361-A (7).

Section 3 Applicability

Note to Future Adopters: Thresholds may be updated by inserting the applicability thresholds into applicability sections for Site Plan and Subdivisions. If a municipality has a table of Land Uses, identifying when certain types of reviews are required, a line item should be added specifying that disturbance of one or more acres requires Site Plan review in either *all Zones (optional)* or in the Urbanized Area of the municipality.

The LID Performance Standards contained in Section 7 of this Ordinance apply to any Project for which an application for subdivision or site plan approval is filed with the Municipality on or after 7/1/2024, which results in:

a. Disturbed Area of one or more acres of land, or
b. Disturbed Area that is less than one acre of land if the Construction Activity creating Disturbed Area is less than one acre of land and is part of a larger Common Plan of Development or Sale that as approved or amended would create Disturbed Area of one acre or more, or
c. *20,000 square feet or more of new Impervious Area in the watershed of an Urban Impaired Stream or a Lake Most at Risk, both of which are defined in Chapter 502, or*
d. *5,000 square feet or more new Impervious Area regardless of total Disturbed Area.*

Notwithstanding other provisions in municipal ordinances or state law, requirements to plant "Maine Native Vegetation" or "Climate Resilient Northeast Native Vegetation" shall not be construed as a restriction on the rights of individuals to engage in agricultural practices that are legally protected by the Maine Agriculture Protection Act and the "Right to Food" provision in the Maine Constitution (Constitution, Art. I, §25).

Section 4 Procedure

Note to Future Adopters: No procedure is provided for this Model Ordinance because municipalities will rely on their existing Subdivision and Site Plan procedures for review and approval.

Section 5 Submission Requirements

Note to Future Adopters: Ensure the following elements are contained in your Subdivision and Site Plan submission lists where applicable.

5.1 Project Narrative

The applicant shall provide a Project narrative describing:

- *the overall approach to Stormwater management at the Project Site,*
- *a listing of Stormwater Treatment Measures that will be in use, stating which will be maintained privately and which will be offered to the Municipality for acceptance and operation,*
- *how they have prioritized protection of the sensitive areas from disturbance as required in Section _____, and*
- *a rationale for any waivers from performance standards (see Sections 7 and 10).*

5.2 Project Contacts and Qualifications

The applicant shall provide contact information (i.e., name, company if applicable, phone number, physical address, and email address) as described below:

- Maine Licensed Landscape Architect
- Maine Certified Soil Scientist
- Maine Professional Engineer

5.3 Project Plans Contents

The applicant shall submit Project Plans which shall consist of a graphic representation of the Site at a scale no smaller than 1 inch = 100 feet showing:

- Waters of the State and their associated Shoreland Protection areas
- Protected Natural Resources
- Predevelopment drainage areas, Drainageways and associated Time of Concentration
- High Permeability Soils
- Maine Native and Climate-Resilient Northeastern Native Vegetation in General Buffer areas and Shoreland Zoning Buffer areas

- Significant and Essential Wildlife Habitats
- Limits of disturbance
- Post-development drainage areas, Drainageways and associated Time of Concentration
- Locations of snow storage areas
- Stormwater Treatment Measures to be used

5.4 Submittals related to Infiltration Performance Standard

The applicant shall submit the following to permit review of the Project application under the LID Performance Standards for infiltration:

- Information required by Chapter 500 Section (7)(D)(5)(c) Infiltration Submittals including a plan for use of de-icing materials, pesticides and fertilizers within the drainage area of any infiltration Stormwater Treatment Measures.
- Locations of any Maine Uncontrolled Hazardous Substance Sites, Maine Voluntary Response Action Program sites, federal Resource Conservation and Recovery Act ("RCRA") Corrective Action sites, or Petroleum Remediation sites on or adjacent to the Site.

Section 6 Approval Standards

Note to Future Adopters: The following text is suggested for inclusion in Findings of Fact to reflect that the LID Performance Standards have been reviewed and adhered to by the applicant. Note that this text is a simple paraphrasing of the intent of the Performance Standards.

The Permitting Authority shall use the following criteria in reviewing applications for Projects for site plan/subdivision review and these criteria shall serve as minimum requirements for approval of the Site application:

- *The proposed Project protects sensitive areas, provides on-site volume control, provides treatment of Stormwater, and minimizes Impervious Areas*

Section 7 Performance Standards

Note to Future Adopters: Review the following elements for addition to your Subdivision and Site Plan Performance Standards under existing Stormwater Management Standards or create a new performance standard titled: Low Impact Development.

To show conformance to the MS4 General Permit Requirements, we have included information about which LID Measure from Table 1 Appendix F of the 2022 MS4 General Permit the performance standard addresses. To assist municipalities in applying these performance standards, we have identified whether the standard could apply to Rural, Urban or Suburban Areas. Municipalities may apply any given standard in an existing Zone for which it is appropriate. For example, the "Time of Concentration" standard may apply in RR1 and RR 2 areas, but not in one or more existing zones in downtown cities where impervious area is already at 100%. Similarly, municipalities may apply the "Rural Open Space" standard to their RR1 (or equivalent) zone and the "Suburban Open Space" standard to their RR2 (or equivalent) zone. It is intended that municipalities will determine which of the zones or districts shown on their zoning maps are included in each of the Rural, Urban or Suburban Area categories, and will list those in the Definitions in Section 2.

Regarding Maintenance of Stormwater Treatment Measures, MS4 communities maintain a Post-Construction Runoff Control Ordinance which automatically covers any Stormwater Treatment Measures required under the LID performance standards. Therefore, no Maintenance requirements are contained here. Non-MS4 communities implementing these LID strategies should also adopt the Post Construction Maintenance Ordinance.

Performance Standard	**LID Measure(s) addressed (shown only for informational purposes)**	**Where Standard Applies within Urbanized Area**
Prioritize the protection of the following sensitive areas as listed below (highest priority listed first) by not disturbing land in these areas: i. Waters of the State and associated shoreland protection areas. ii. Protected Natural Resources iii. Predevelopment Drainageways iv. High Permeability Soils v. Maine Native Vegetation and Climate Resilient Northeastern Native Vegetation in General Buffer areas and Shoreland Zoning Setback Buffer areas vi. Significant and Essential Wildlife Habitats	1. Minimize Site Clearing 2. Protect Natural Drainage System 4. Minimize Impervious Area 5. Minimize Effect of Impervious Area 6. Minimize Soil Compaction	Rural, Suburban and Urban

Note that the applicant will need to provide a description in their narrative of how they have prioritized these areas for protection from disturbance. These areas may be counted toward the open space requirements. Exception: Removal of Maine Native Vegetation and Climate Resilient Northeastern Native Vegetation that is diseased or in poor condition is allowed.		
Project Plans shall depict limits of disturbance. Limits of disturbance shall be established on-site prior to disturbance using flagging, fencing, signs or other means to provide a clear indication.	1. Minimize Site Clearing 6. Minimize Soil Compaction	Rural, Suburban and Urban
Optional: Rural New Developments shall preserve at least 40% of the Site as open space and Suburban New Developments shall preserve 25% of the Site as open space. *Exception: Municipalities may allow exceptions per their municipal ordinances. For example, applicants may be allowed to pay a fee-in-lieu which is dedicated to open space or may provide open space in an alternate locations within the same watershed.*	1. Minimize Site Clearing 4. Minimize Impervious Area 7. Minimize Lawns and Maximize Landscaping that Encourages Runoff Retention.	Rural and Suburban
Stream Crossings for Waters of the State shall be designed in accordance with Maine Stream Smart Principles to preserve natural pre-development Drainageways. Exception: Stream Crossings over portions of streams that are artificially channelized are not subject to this standard.	2. Protect natural Drainage System 3. Minimize Decrease in Time of Concentration	Rural, Suburban and Urban
Rural and Suburban Projects shall preserve the natural pre-development Drainageways on the Site by using the natural flow patterns and pathways for the post-construction drainage system. Exceptions are allowed if the Time of Concentration for a predevelopment Drainageway is the same as or shorter than the post-development Drainageway. Exception: The applicant may submit an "alternative analysis" which demonstrates that this performance standard is impracticable.	2. Protect Natural Drainage System 3. Minimize Decrease in Time of Concentration	Rural and Suburban
Projects that have a Disturbed Area of one acre of land or more shall include Stormwater Treatment Measures in	2. Protect Natural Drainage System	Rural, Suburban and Urban

accordance with Chapter 500 Section 4.C General Standards, 4.C.(2) Treatment requirements, 4.C.(3) Types of treatment measures allowed, and 4.D Phosphorus standard (for lake watersheds only) and additionally: • Individual Stormwater Treatment Measure may not treat more than one acre of Impervious Area • Vegetation used in Stormwater Treatment Measures and General Buffers shall be Maine Native Vegetation or Climate Resilient Northeastern Native Vegetation Note that although Chapter 500 General Standards and Phosphorus standard have higher thresholds for developed and Impervious Area, these standards apply to sites within the Urbanized Area of the Municipality at a lower threshold.	5. Minimize Effect of Impervious Area 7. Minimize Lawns and Maximize Landscaping that Encourages Runoff Retention. 10. Stormwater Quality Treatment and Retention Requirements	
Infiltration Standard: Provide volume control on-site (through infiltration or storage) in accordance with the following: • Volume to be controlled = (total area of Impervious Area after New Development and Redevelopment – total area that existed before New Development and Redevelopment) x Rd • Where Rd is the groundwater recharge depth based on the USDA/NRCDS hydrologic soil group as follows: Rd = 0.40 inches or rain for type A soils, 0.25 inches of rain for type B soils, 0.10 inches of rain for type C soils and 0 for type D soils • Stormwater Treatment Measures with liners may not be used to meet the volume requirement via storage. • Restrictions and requirements identified in Sections D(2) through D(4) of Appendix D Infiltration basins, drywells, and subsurface fluid distribution systems; of Chapter 500 apply. Exception: For Sites in Rural and Suburban areas where infiltration will disrupt the preservation of the predevelopment Drainageways, an exception from the infiltration standard will be allowed. Exception: If any Uncontrolled Hazardous Substance Sites, Voluntary Response Action Program sites, RCRA Corrective Action sites, or Petroleum Remediation sites	2. Protect the Natural Drainage System 3. Minimize the Decrease in Time of Concentration 5. Minimize Effect of Impervious Area	Rural, Suburban and Urban

are on or adjacent to the Site, the Site does not need to meet the volume control standard. Exception: Municipalities may allow infiltration on an alternate site within the same watershed in-lieu of on-site infiltration.		
Minimize Impervious Area and the Effect of Impervious Area from road runoff: • At least 70% of roadway Runoff shall be directed into a Stormwater Treatment Measure *Optional:* • *Dead-end streets shall be no longer than 1000 feet (Rural and Suburban Areas).* • *Dead-end roads shall be constructed to provide a hammerhead (when less than 200 feet), or a tear drop cul-de-sac turn-around with a center that is vegetated, used for open space, and/or a Stormwater Treatment Measure as described below (Rural and Suburban Areas).* • *Cul-de-sac roads shall be constructed with the center island used for Stormwater Treatment Measures or vegetation unless type A or B soils are present in the center, in which case this area should be used to promote natural infiltration on-site.*	4. Minimize Impervious Area 5. Minimize Effect of Impervious Area	Rural, Suburban and Urban
Minimize Impervious Area from parking areas: • Vehicle parking stall dimension standard: maximum of 9-foot x 18-foot stall Exceptions for public safety *Optional: (not fully developed as part of this ordinance) Establish "In-Lieu of" Parking programs with the following components:* • *Fee in-lieu of parking* • *Car-share in-lieu of parking* • *Transit in-lieu* • *Bike/pedestrian infrastructure improvements* *Note that the in-lieu program may optionally be tied to incentives, such as density or height bonuses.* *Establish shared parking provisions*	4. Minimize Impervious Area	Rural, Suburban and Urban

Minimum parking requirements shall be based on reasonable parking needs instead of peak use, and maximum parking limits should be established for appropriate areas. Establish maximum parking requirements at current minimum standards. *Reductions in parking volume requirements should consider presence of transit routes within ¼ mile, existing on-road parking, and transportation/parking demand management plan for Sites over a certain size.* • *Commercial parking space size shall be a maximum 9-foot width and an 18-foot length with an allowance for reduction in length at a 1 to 1 ratio for available overhang (1 foot reduction allowed if 1 foot overhang possible).* • *Parking lot travel aisles shall be a maximum of 22 feet wide.* *Require garages/under above building where appropriate, optionally tied to a density or height bonus*		
Runoff from on-site roofs, sidewalks, and peak-use overflow parking Runoff shall be directed into Stormwater Treatment Buffers or Stormwater Treatment Infiltration Measures.	5. Minimize Effect of Impervious Area 8. Provide Vegetated Open-Channel Conveyance Systems	Rural, Suburban and Urban
Construction equipment movement, laydown areas and parking shall be restricted to the Disturbed Area. Areas to be vegetated shall be tilled and the soils amended with organic matter as needed based on the results of soil tests.	6. Minimize Soil Compaction	Rural, Suburban and Urban
Snow storage areas shall be depicted on site plans. The location of snow storage areas in Stormwater Treatment Measures and Shoreland Zoning Setback Buffers shall be prohibited.	5. Minimize Effect of Impervious Area	Rural, Suburban and Urban
Optional Standard: Require the implementation of precipitation storage (e.g., cisterns or rain barrels) for later reuse for landscaping.	9. Rainwater Capture and Reuse	Rural, Suburban and Urban

Note to Future Adopters: By embedding the performance standards into Site Plan and Subdivision Performance Standards, those ordinances' enforcement provisions, Severability and Conflicts and Waivers provisions will automatically cover the LID Performance Standards. No additional enforcement requirements need apply, so those provisions have not been included here.

Section 8 Enforcement

Section 9 Severability and Conflicts

Section 10 Waivers

Section 11 Authority

The Municipality enacts the Ordinance for Low Impact Development Strategies provisions pursuant to Maine Constitution Art. VIII, Part Second, §1 and 30-A M.R.S. §§3001 et seq. (municipal home rule authority), 38 M.R.S. §413 (the Wastewater Discharge Law), 33 USC §§1251 et seq. (the Clean Water Act), and 40 CFR Part 122 (US Environmental Protection Agency's regulations governing the National Pollution Discharge Elimination System (NPDES)). The Maine Department of Environmental Protection, through its promulgation of the General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems has listed the Municipality as having a Regulated Small MS4; under this General Permit, listing as a Regulated Small MS4 necessitates enactment of elements of this Ordinance as part of the Municipality's Stormwater management program in order to satisfy the minimum control measures for Post Construction Stormwater Management in New Development and Redevelopment.

City of Portland | Department of Public Works
Water Resources Division

TO: Gregg Wood, Wastewater Licensing Program Manager
Bureau of Water Quality Management
Maine Department of Environmental Protection

FROM: Department of Public Works and Department of Planning and Urban Development
City of Portland, ME

RE: MS4GP: City of Portland – Draft Low-Impact Development Regulatory Mechanism

DATE: September 1, 2022

Dear Mr. Wood,

Thank you, in advance, for your review and consideration of the Low-Impact Development Program (LIDP) developed by the City of Portland (City) in partial compliance of the requirements of the Municipal Separate Storm Sewer General Permit (MS4GP), #MER04100 issued October 15, 2020, and the Final Permit Modification, issued November 23, 2021. The LIDP in Portland strives to ensure development within the City follows low-impact development (LID) goals and objectives to minimize potential negative effects to the natural environment.

The City has embraced the tenets of LID for many years, prioritizing protection of our natural resources in guiding documents such as *Portland's Plan,* the comprehensive plan, *One Climate Future*, our climate action plan, and the Integrated Plan. Further, the City has operationalized LID principles through the requirements for site plan review in both the City's Code of Ordinances and supporting regulatory documents, such as the City of Portland *Technical Manual*. In many ways, the City has been a leader in real-world low-impact development programs, enacting development standards that support tree preservation, reduce impervious surfaces, and embrace green infrastructure, and establishing a stormwater service charge and credit program which incentivizes the reduction of impervious area, promotes stormwater management and allows for a comprehensive approach to stormwater upgrades throughout the City. The City is grateful for the opportunity to refine and advance our practices and standards around LID through this comprehensive program which will help staff and developers alike in realizing the best path forward for development and redevelopment while protecting our fragile water resources.

The City recognizes and applauds the work of Southern Maine Planning and Development Commission, Cumberland County Soil and Water Conservation District, and Integrated Environmental Engineering, Inc. in developing the Maine Model Ordinance for Low Impact Development Strategies (Model Ordinance) under award CZM NA20NOS4190064 to the Maine Coastal Program from the National Oceanic and Atmospheric Administration, U.S. Department of Commerce. This Model Ordinance has been an invaluable resource while considering the City's LIDP in the context of the MS4GP. Given the complexity

of the City's existing Code of Ordinances, the fact that many of the recommended strategies and standards are already in place within the City' regulatory tools, and the current effort to streamline and reorganize the City's Code of Ordinances and *Technical Manual*, the City will be employing a hybrid, multi-prong approach to implementing and enforcing the LIDP required by the MS4GP.

The City of Portland Low-Impact Development Program will:

- Be referenced in the appropriate City Ordinance (Chapter 14 Land Use and/or Chapter 32 Stormwater) so that the LIDP is integrated, by code, in the development review process;
- Include a set of Low-Impact Development Technical Standards (Table 1) within the City of Portland *Technical Manual* (including revisions to existing standards, as necessary) based on Appendix F of the MS4GP (Attachment 1) as provided in the Final Permit Modification and based on the Maine Model Ordinance for Low Impact Development Standards (Attachment 2);
- Integrate LID-related materials within site plan applications to help guide development projects through the LID planning process; and
- Integrate LID standards into the development review process to ensure LID is employed to the maximum extent practicable for new and redevelopment projects within the City.

Authority

The City of Portland will enact the LID Technical Standards based on Table 1 herein pursuant to 30-A M.R.S. §§3001 et seq. (municipal home rule ordinance authority), 38 M.R.S. §413 (the Wastewater Discharge Law), 33 USC §§1251 et seq. (the Clean Water Act), and 40 CFR Part 122 (US Environmental Protection Agency's regulations governing the National Pollution Discharge Elimination System (NPDES)). The Maine Department of Environmental Protection, through its promulgation of the General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems has listed the City of Portland as having a Regulated Small MS4; under this General Permit, listing as a Regulated Small MS4 necessitates enactment of a regulatory mechanism as part of the City of Portland's Stormwater Management Program in order to satisfy the minimum control measures for Post-Construction Stormwater Management in New Development and Redevelopment.

Purpose

The purpose of these LID Technical Standards is to protect, maintain, and enhance public health, public safety, and general welfare by establishing minimum requirements and procedures to minimize the adverse effects of development and redevelopment on the environment.

Applicability

The LID Technical Standards in the City of Portland will apply to any development applying for Site Plan approval after 6/30/2024 which has stormwater discharges to the Regulated Small MS4 within the Municipality's Urbanized Area and results in:

- Construction Activity with Disturbed Area of one or more acres of land, or
- Construction Activity with Disturbed Area that is less than one acre of land if the Construction Activity creating Disturbed Area less than one acre of land is part of a larger Common Plan of Development or Sale that as approved or amended would create Disturbed Area of one acre or more.

In considering the LID Program, the City of Portland may explore varying applicability frameworks which recognize the differing contexts for greenfield sites, redevelopment sites, and various urban settings. Any thresholds will be at least as stringent as the above.

Technical Standards

The City's Land Use Code provides the authority and structure under which LID strategies will be required for development projects within the City. The existing *Technical Manual*, incorporated by reference into the Land Use Code, will provide the detailed technical standards against which development projects will be reviewed during the site plan review process. This framework is already in place for technical standards such as stormwater and sewer standards, erosion and sedimentation control standards, and transportation design standards. This structure is familiar to staff and to the development community and will establish the LIDP as a measurable and enforceable program.

The LID Technical Standards to be included in the City of Portland *Technical Manual* will be based on those standards included in the table below. As noted above, some of these standards currently exist within the *Technical Manual,* and will simply require reorganization and refinement. Others represent new policy. In the event of any conflicting regulation – whether municipal, state, or federal – the more stringent standard shall apply.

TABLE 1: LID Technical Standards for Development

Guiding Principal	Applicability	Technical Standard
Minimize Site Clearing & Protect Natural Resources	All development projects	Project must prioritize protection of: • Waters of the State and associated shoreland protection areas • Protected natural resources • Predevelopment drainage pathways • High permeability soils • Maine Native and Climate-Resilient Northeastern Native Vegetation in General Buffer areas and Shoreland Zoning Setback Buffer areas • Significant and Essential Wildlife Habitats
	All development projects (submission requirements, *Technical Manual* Section 16)	Site Plan application documents shall show any/all resources listed above.
	All development projects (submission requirements, *Technical Manual* Section 16)	Construction documents shall depict limits of disturbance. Limits of disturbance shall be established on-site prior to disturbance using flagging, fencing, signs or other means to provide a clear indication.
	Projects using vegetated buffers for stormwater treatment, projects that require a percentage of open space (OS)	(OPTIONAL) Projects with OS requirements provide conservation easements (legally enforceable, tied to deed) protecting OS
Protect Natural Drainage System & Maintain or Improve Pre-Development Time of Concentration	Any greenfield site development and for redevelopment projects with existing or proposed crossings of the main stem of urban impaired streams.	Protect Waters of the State (in order of priority): 1) avoid any crossing or modification of Waters of the State; 2) if avoidance isn't feasible, any Stream Crossings for Waters of the State shall use Maine Stream Smart Principles to preserve natural pre-development drainage pathways.

	Exception: Stream crossings over portions of streams that are artificially channelized are not subject to this standard.	
	All development projects	Protect waters of the state, natural drainage ways, and intermittent streams by (in order of priority): 1) avoid any modification of or to natural drainage channel; 2) recreate natural drainage channel (above-ground, naturalized) if avoidance isn't feasible; 3) use a culvert, meeting DEP standards, for drainage ways and intermittent stream only if open channel isn't feasible.
Minimize Impervious Area or Effect of Impervious Area	All development projects	Individual Stormwater Treatment Measure may not treat more than 1-acre of impervious cover
		Projects shall minimize impervious surface by minimizing off-street parking, minimizing drive aisle widths, and using compact parking provisions to the extent practicable.
Minimize Soil Compaction	All development projects	Construction equipment movement, laydown areas and parking shall be restricted to the disturbed area.
		Areas to be vegetated shall be tilled and the soils amended with organic matter as needed based on the results of soil tests.
		Areas of proposed revegetation, and which are to be used toward stormwater runoff calculations, shall be tilled according to the DEP BMP Manual, and permanently protected by conservation easement or other equivalent deed restriction.
		Areas of proposed infiltration BMPs should be roped off and protected from construction activity so as to not compact soils. This should be shown on ESC plan.
Minimize Lawns and Maximize Landscaping that	All development projects	Projects must meet Landscape Preservation Standards as specified in the City's *Technical Manual* Section 4. In meeting those

Encourages Stormwater Retention		standards, priority shall be given to preservation of tree canopy with naturalized, unmanicured vegetated buffers.
		Vegetation used in Stormwater Treatment Measures shall be Maine Native or Climate-Resilient Northeastern Native Vegetation
Stormwater Quality Treatment and Green Infrastructure (including Vegetated Open-Chanel Conveyance Systems)	All development projects	City of Portland and Chapter 500 stormwater requirements as specified in the City's *Technical Manual* Section 5 apply. In meeting these standards, priority shall be given to vegetated open-channel conveyance systems and green infrastructure treatment devices.

Review and Approval Procedures

Guidance for Applicants

The City recognizes that for the LIDP to be most effective, LID strategies must be part of the initial phases of project planning for development sites within the City. Before a project is laid out for a site, the development team must first identify and flag for preservation any areas on site affecting site hydrology, such as high-permeability soils, large tracts of mature vegetation, natural waterways, or wetlands. The City will develop a comprehensive checklist or other guidance to assist development teams. The City will also modify the overall submission requirements in Section 16 of the *Technical Manual* to ensure that all LID-related documentation is submitted as part of the site plan application package.

Additionally, the City will ensure that the LID Technical Standards are broadly shared prior to project submittal and will discuss the LID requirements with project proponents during pre-application meetings. This will allow development projects to modify plans and designs, if needed, to meet the LID Technical Standards prior to site plan application submission. City staff will also be available for consultation with development teams by request.

Review Mechanism for Review Staff

The City also understands that enforcement of LID Technical Standards consists of ensuring that development projects are meeting the Technical Standards to the maximum extent practicable prior to and as a condition of project approval. This process will be the responsibility of the City staff reviewing the project during site plan review. In order to provide an efficient yet comprehensive review, and to ensure that the review will be consistent among staff, the City will develop and employ a structured review process for LID Technical Standards. The structured review process will include an evaluation of the suitability of each standard for their site and the project's proposed method of meeting the standard, and may include checklists and/or scoring criteria.

Timeline

The City of Portland will have all components of the LIDP in place prior to the July 1, 2024 deadline as stated in the MS4GP and Final Permit Modification. To meet this deadline, interim project milestones are proposed as follows (subject to change):

September 1, 2022	Establish proposed framework for LIDP and submit to MEDEP
June 2023	Draft of LID Technical Standards and Land Use Code amendments (if needed) to City staff for review and comment
September 2023	Finalize LID Technical Standards and Land Use Code amendments (if needed)
November 2023	LID Technical Standards and Land Use Code amendments brought to Planning Board and City Council (as needed) for review and approval

City of Portland | Department of Public Works
Water Resources Division

The City of Portland looks forward to DEP's thoughts and comments on the comprehensive Low-Impact Development Program proposed herein. We very much appreciate your careful consideration and look forward to hearing from you and working with you as we move toward full implementation by July 1, 2024.

Kind regards,

William C. Boornazian, P.E.
Water Resources Manager

Enclosures: Attachment 1: Appendix F from the MS4GP
Attachment 2: Maine Model Ordinance for Low-Impact Development Standards

CC: Jodie W. Keene, Stormwater Program Coordinator, DPW
Doug Roncarati, Stormwater Program Coordinator, DPW
Ben Pearson, Compliance Section Coordinator, DPW
Nell Donaldson, Director of Special Projects, PUD
Jen Thompson, Acting Corporation Council
Holliday Keen, DEP

Guidance
Low Impact Development (LID)

LID is a process of developing land that mimics the natural hydrologic regime. LID begins at the design phase of a new development or redevelopment, incorporating planning techniques that minimize site clearing and impervious surfaces to reduce impact and stormwater runoff generated from the site. By reducing the volume of water leaving a site, the pollutant loading is also reduced. Other techniques that will reduce the volume and peak flow rates of runoff from the development are then incorporated throughout the site. LID is an effective tool that reduces pollutant loading, thermal impacts, stream flows, and minimizes stream channel erosion.

LID is not a rigid set of standards, or a one size fits all approach and has many benefits:

- **Benefits to the Developer:** The owner and developer will see reduced costs for land clearing and grading, infrastructure, and stormwater management while seeing an increased aesthetic value in the development.
- **Benefits to the Municipality:** The local government and community will benefit from reduced infrastructure maintenance costs and reductions in property damage from flooding, while having more green space, protected natural resources, and increased water quality.
- **Benefits to the Environment:** The hydrologic cycle is preserved; streams are less prone to erosion, and stream flows are maintained which benefits fish and wildlife.

LID goals and objectives shall be incorporated into the site planning process as early as possible. The following steps serve as a guideline to use in the planning stage:

- Identify and preserve areas that will affect the hydrology of the site. Features that should be protected are sensitive areas and natural resources including down gradient waterways.
- Minimize site disturbance and impervious areas with an alternative layout for the development within the constraints of local development criteria.
- Minimize the impervious surfaces directly connected to drainage conveyance systems to reduce the time of concentration.
- Break the site into smaller drainage areas that can be handled using basic LID techniques.

PLANNING FOR LID

Minimize Site Clearing: Development typically involves new impervious surfaces such as roads and buildings, and landscaped areas for lawns. Avoid developing soils with high permeability where possible. Protect areas that are sensitive to disturbance and that will sustain groundwater recharge and reduce runoff. For example, developing a vegetated, tight clay soil area will have less impact on stormwater runoff than developing a forested area on sandy soils. Once the sensitive areas have been identified, the layout of the development should be aligned with the conservation of these areas.

Minimize Impervious Areas: The traffic distribution network (roadways, sidewalks, driveways, and parking areas) is generally the greatest source of site imperviousness and should be the focus for reducing impervious area. The following techniques may be considered, where appropriate and permitted by local land use codes and/or ordinances:

Alternative Roadway Layout: Alternative roadway layouts can be used to reduce total pavement, while allowing for the same amount of development. Cluster development, in accordance with and as allowed by local ordinances can decrease imperviousness.

- *Narrow Road Sections:* The width of pavement can be reduced by including the primary driving surface, a pervious base for the shoulders, and ditch drainage swale in place of curb and gutter as deemed appropriate. Use of this technique should be evaluated in accordance with site-specific conditions.
- *Sidewalks:* Sidewalks can be reduced to one side of the road or eliminated. The use of pervious materials can reduce runoff.
- *On-Street Parking:* Reduction to one side or elimination of on-street parking has significant potential to reduce overall site imperviousness. On- street parking may be a desirable practice in highly urbanized areas to reduce on-site disturbance.
- *Rooftops:* The number and size of buildings dictates the impervious area associated with rooftops. Vertical construction and/or the use of green roofs can minimize imperviousness.
- *Driveways:* Minimizing paved or impervious driveway area can be accomplished through the design of narrower driveways or by reducing the length of driveways. Shared driveways can also reduce imperviousness, where appropriate. In addition, the use of pervious materials can minimize runoff.

Minimize Connected Impervious Areas: The impacts from impervious surfaces can be minimized by disconnecting these areas from piped drainage networks and by managing runoff at the source.

- Paved driveways and roads can be directed to stabilized, vegetated areas.
- Flows from large, paved surfaces can be broken up to facilitate on-site management of smaller flows. Breaking flows up allows the flows to be directed to vegetation as sheet flow.
- LID techniques can be dispersed throughout the development, such as at individual houselots to obtain the most benefit. They can be incorporated into the landscaping of the property to provide a natural treatment system.

Maintain Time of Concentration: When development occurs, the time of concentration (Tc) is often shortened due to the impervious area, causing greater flows over a shorter period of time. LID practices can maintain the pre-development Tc by:

- Minimizing land disturbance,
- Detaining flows on site,
- Increasing the flow length,
- Increasing the surface roughness of the flow path,
- Creating flatter slopes, and/or
- Disconnecting impervious areas, which will decrease their travel rates.

Manage Stormwater at the Source: The impact from a development can be mitigated atthe source by reestablishing a more natural hydrologic cycle that sustains a clean stream base flow. Typically, the most economical and simplistic stormwater management strategy is achieved by controlling runoff at the source with a variety of small treatment structures that will result in the reduction of stormwater discharge and more flexibility in the site design.

Soil Considerations:

Minimize Compaction: Compaction reduces the natural infiltrating ability of soils; thus, avoiding disturbance by heavy equipment can benefit infiltration. Designing development to situate impervious surfaces and development disturbances on the more impermeable soils of a site can leave more pervious soils to continue infiltrating runoff.

Increase Organic Content of Soils: When constructing many of the LID vegetated techniques, such as filtration Best Management Practices (BMP), a quality topsoil can optimize pollutant removal. In this case, the soil bed should consist of organic content as described in the relevant filtration BMP. This highly organic layer traps contaminants, absorbs more runoff and provides a medium for biological activity that helps break down pollutants. Planting soil provides a healthy growing medium for vegetation by encouraging strong root growth. In addition, microbes found in healthy soils transform nutrients for plant growth. Compost or other organic amendments can be added at the site preparation level, typically by the truckload. It is also available for little or no cost from many community leaf compost programs. For rain gardens and bioretention areas, organic content can also be valuable in absorbing and retaining moisture for plant life, filtering pollutants, and providing an active layer for microorganisms to reside and reproduce. A healthy microorganism population is key to the decomposition of many pollutants, whether in the home rain garden or in a parking lot.

- *Avoid Pesticides/Herbicides:* Healthy soil is alive with microorganisms that decompose and inactivate pollutants, but these may be killed by excessive chemicals. Although the soil microorganisms are not typically the target of these chemicals, many of them may fall victim to the use of pesticides. Additionally, insect species that prey on pests are also killed by pesticides. Since the predatory species tend to have slower reproduction than the pest species, a natural defense against insect pests may be lost.

LID TECHNIQUES

Many LID techniques rely on infiltration, retention, and evapotranspiration of stormwater to reduce runoff. When infiltration is not a possibility, the initial planning techniques described above should be the primary focus, followed by the use of small disconnected underdrained systems that rely on soil and vegetation to retain runoff. Examples of LID measures and techniques are shown on Table 1.

- *Filters (Bioretention Cells and Rain gardens):* Bioretention areas or rain gardens are built with a specific soil filter media (containing organic material and planted with vegetation that can handle wet and dry conditions) that will reduce the volume of runoff through absorption and evapotranspiration. A slight depression allows the ponding of stormwater as it filtrates through the soil media and into the groundwater or to an underdrain for surface discharge.
- *Infiltration:* Infiltration reduces runoff and mimics the natural hydrologic cycle by redirecting water into the ground rather than to a piped system. Runoff can be reduced by using smaller infiltration basins that fit into the natural landscape.
- *Buffers:* Vegetated buffers use soils and vegetation to remove pollutants from stormwater. Buffers can be used as a stormwater BMP for small developments by minimizing the amount of runoff generated through infiltration and evapotranspiration. Filter strips are typically used as pretreatment devices for bioretention cells and other infiltration practices.
- *Collection Cisterns:* In a commercial setting, the collection of rain runoff can be put to use in the building to off-set the cost of water supply. Cisterns can be located either above or below ground, and in out-of-the-way places that can easily be incorporated into a site design. Commercially available systems are typically constructed of high-density plastics and can include pumps and filtration devices. Rain barrels are inexpensive, effective, and easily maintainable when used in residential applications to capture roof runoff for later watering of lawns and gardens.
- *Vegetated Rooftops:* Vegetated rooftops provide three primary benefits: attenuation of stormwater runoff and peak flows, reductions of the heat island effects with an increase in building insulation, and a longer life expectancy for the base roof material. The stormwater benefit is that the smaller more common storm events are absorbed, which minimizes peak runoff and the net volume of runoff typically produced by roofs.

- *Porous Pavement:* Porous pavement is a permeable surface (pervious asphalt, concrete or pavers), a granular base, and subbase materials which allow the penetration of runoff into the underlying soils. The efficiency of pavement alternative systems depends on whether the pavement is designed to store and infiltrate most runoff, or only limited volumes of runoff (e.g., "first-flush") with the remainder discharged to a storm drainage system or overland flow. Maintenance is essential for long-term use and effectiveness. Pavement alternatives vary in load bearing capacities but generally can be designed for low traffic areas such as sidewalks, parking lots, overflowparking and residential roads. It is important to choose a material appropriate for the desired use (light, moderate or heavy use).
- *Other Techniques:* LID is about creativity. Multiple practices can be implemented and adapted into various sites and situations. However, they are mostly dependent upon the layout of the development and the disconnection of its individual elements.

*Table 1 – LID Measures and Techniques**		
LID Measure	**Example Technique**	**Design**
Minimize site clearing	• Promote compact development on the site • Place parking underneath or inside structures • Avoid developing in areas with high-permeable soils to retain natural infiltration • Align development layout with conservation of sensitive areas	Design practices developed at the planning phase that will help mitigate environmental impacts. Ideally, these are cost-effective and environmentally friendly.
Protect natural drainage system	◦ Maintain a minimum 25 foot buffer on all natural water resources including intermittent channels ◦ Do not divert stormwater from its natural sub-watershed	
Minimize the decrease in time of concentration	◦ Break up or disconnect the flow of runoff over impervious surfaces ◦ Sheet flow over pavement that is less than 100 feet	
Minimize impervious area or the effect of impervious area	◦ Build vertically with multi story buildings and parking garages ◦ More than 25% of pavement area (overflow) in pervious pavement. All pedestrian walkways are pavers or pervious pavement. Runoff from paved surfaces should be directed to stabilized, vegetated areas ◦ Disperse LID techniques throughout development and incorporate into the landscaping ◦ Infiltrate as much roof runoff as standards allow Minimize the use of paved areas (sidewalks, driveways and streets) Minimize the use of hardscaped areas.	

*Table 1 – LID Measures and Techniques**		
LID Measure	**Example Technique**	**Design**
Minimize soil compaction	• Minimize the construction window and target the development area • Rototilling all areas to be revegetated	Design practices developed at the planning phase that will help mitigate environmental impacts. Ideally, these are cost-effective and environmentally friendly.
Minimize lawns and maximize landscaping that encourages runoff retention	• Low maintenance Maine native plants • No invasive plants • Limit the use of pesticides and biocides • Fertilizer application only during initial planting and repair of damaged areas.	
Provide vegetated open-channel conveyance systems	• Evaluate road gutters and roof gutters to determine effective means to direct runoff to treatment BMPs • Level spreaders to buffers where possible • Underdrained swales	
Rainwater is stored for later reuse for the building or landscape	Rain Collection Cisterns	
Stormwater Quality Treatment and Retention Requirements	Buffers	Design, size, install and maintain per the Maine recommended guidelines found in a document *entitled Maine Stormwater Management Design Manual, Technical Design Manual, Volume III, May 2016*
	Infiltration (basins, trenches, dry wells, etc.)	
	Underdrained grass filters	
	Underdrained filter bioretention	
	Roofline filtration	
	Roof Greening	
	Pervious Pavement	

*LID measures, example techniques and design practices in this table are intended to be illustrative and shall be taken into consideration where applicable, practicable and allowable pursuant to applicable land use planning and development requirements.

Background and Notes for Future Adopters

The performance standards contained in this document were developed to assist municipalities in addressing the 2022 General Permit for Stormwater Discharges to Municipal Separate Storm Sewer Systems (MS4s), which applies to 30 municipalities in Maine.

An Ordinance Committee and Technical Expert Panel reviewed the elements contained in this document. A white paper describing the rationale for the content of this Model Ordinance is a companion to this document.

Text in black in this document reflects elements that the Authors, and Technical Expert Panel agreed were important for implementation of Low Impact Development in most Maine developments. During comment and reviews, it became apparent that not all elements will be appropriate for implementation in all MS4 municipalities. Therefore, the full Ordinance Committee was polled to assess what elements should be removed from this Model Ordinance, and any elements with a 2/3 majority of votes (one vote per municipality) to remove were removed or made to be optional. Even the resulting recommendations provided in black text may not be consistent with some municipal policies, strategies, or Comprehensive Plans.

Municipalities that elect to adopt elements of this model ordinance should review its contents, determine if any elements are inconsistent with existing municipal policies, strategies, or Comprehensive Plans.

On or before 9/1/2022, each permittee must submit to MDEP a Model Low Impact Development Ordinance for stormwater management on new and redevelopment sites in accordance with the General Permit for their community.

Maine DEP will post the model ordinance for public comments and approve it, with or without modifications, on or before 11/1/2022.

Then MS4 communities must adopt an ordinance that is at least as stringent as the required elements of the model ordinance by 6/30/2024.

Because municipal ordinances are structured differently, with varying thresholds for development review, submittal requirements, and performance standards, this Model Ordinance does not contain complete language for each section. Instead, it is anticipated the municipalities will embed the required elements in their own Subdivision and Site Plan Ordinances or Regulations. Municipalities may need to adjust some text to be consistent with their own ordinance language.

Instructions to Adopters are contained in bounded text boxes at each section.

Optional elements incorporating Maine Climate Council Recommendations or recommendations from other sources is shown in blue in italics. Municipalities may or may not incorporate these elements as they wish.

Some standard ordinance language is shown in green, also in italics. Municipalities may modify this to conform to their own ordinances and procedures.

Maine Model Ordinance for Low Impact Development Strategies

Final Draft 6/5/2022

Credits: This model ordinance was prepared by SMPDC, CCSWCD, and Integrated Environmental Engineering, Inc. under award CZM NA20NOS4190064 to the Maine Coastal Program from the National Oceanic and Atmospheric Administration, U.S. Department of Commerce. The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of NOAA or the Department of Commerce.

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Section 1 Purpose

The Purpose of this Ordinance is to protect, maintain and enhance the public health, safety and general welfare by establishing minimum requirements and procedures to minimize the adverse effects of development and redevelopment on the environment.

Section 2 Definitions

Note to Future Adopters: Review your Subdivision and Site Plan definitions for inclusion of the following definitions:

Buffers – Means all three kinds of buffers listed below unless a subset of the three is specifically called out:

- **Stormwater Vegetative Buffer** – a buffer constructed in accordance with Appendix F in Chapter 500 for the purposes of providing pollutant removal.
- **Shoreland Zoning Setback Buffer** – A buffer required by the municipal Shoreland Zoning Ordinance to protect a water of the State.
- **General Buffer** – a buffer required by the municipal ordinances to provide screening to parcels or developments from light, noise, other parcels, rubbish areas, or other areas.

Climate Resilient Northeast Native Vegetation – Means plants identified as native to the Northeast as identified by the Northeast Regional Invasive Species & Climate Change (RISCC) Network or a Maine Licensed Landscape Architect.

Common Plan of Development or Sale - Means a "subdivision" as defined in Title 30-A M.R.S. §§ 4401 *et seq*. (the Maine Subdivision statute) and in _____ of the Municipality's code of ordinances.

Note: Common Plan of Dev. Or Sale is same definition as MS4 General Permit.

§§ 4401.4"Subdivision" means the division of a tract or parcel of land into 3 or more lots within any 5-year period that begins on or after September 23, 1971. This definition applies whether the division is accomplished by sale, lease, development, buildings or otherwise. The term "subdivision" also includes the division of a new structure or structures on a tract or parcel of land into 3 or more dwelling units within a 5-year period, the construction or placement of 3 or more dwelling units on a single tract or parcel of land and the division of an existing structure or structures previously used for commercial or industrial use into 3 or more dwelling units within a 5-year period.

Construction Activity – Means any activity on a Site that results in Disturbed Area.

Disturbed Area - Means all land areas of a Site that are stripped, graded, grubbed, filled, or excavated at any time during the site preparation or removing vegetation for, or construction of, a Site. Cutting of trees, without grubbing, stump removal, disturbance, or exposure of soil is not considered Disturbed Area. Disturbed Area does not include routine maintenance but does include redevelopment and new Impervious Areas. "Routine maintenance" is maintenance performed to maintain the original line and grade, hydraulic capacity, and original purpose of the facility. Paving impervious gravel surfaces provided that an applicant or permittee can prove the original line and grade and hydraulic capacity shall be maintained and original purpose of the gravel surface remains the same is considered routine maintenance. Replacement of a building is not considered routine maintenance of the building and is therefore considered Disturbed Area.

Note: Disturbed Area definition is from the MS4 General Permit plus addition of the last sentence to ensure that redevelopment sites removing buildings take into account that area as Disturbed Area.

General Permit – Means the General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4) approved October 15, 2020 and modified November 23, 2021 and any amendment or renewal thereof.

High Intensity Soil Survey – Means a Class A survey defined by the March 2009 Guidelines for Maine Certified Soil Scientist for Soil Identification and Mapping, prepared by the Maine Association of Professional Soil Scientists

High Permeability Soils – Means hydrologic soil groups A or B as determined by on-site soil testing by a certified soil scientist using a High Intensity Soil Survey.

Impervious Area - Means the total area of a Parcel covered with a low-permeability material that is highly resistant to infiltration by water, such as asphalt, concrete, or rooftop, and areas such as gravel roads and unpaved parking areas that will be compacted through design or use to reduce their permeability. Common Impervious Areas include, but are not limited to, rooftops, walkways, patios, driveways, parking lots or storage areas, concrete or asphalt paving, gravel roads, packed earthen materials, and macadam or other surfaces which similarly impede the natural infiltration of stormwater. Pervious pavement, pervious pavers, pervious concrete, and under drained artificial turf fields are all considered impervious. For the purpose of determining whether a Site exceeds the Impervious Surface thresholds requiring conformance to LID performance standards, the municipality may exclude these from calculation of Impervious Area if these are designed to be infiltration Stormwater Treatment Measures.

Note: this definition is the same as Chapter 500 definition of Impervious Area except Chapter 500 has a sentence at the end was removed, saying that the DEP can exclude Pervious pavement from calculation of Impervious Area was modified.

Low Impact Development (LID) - Means a broad approach to site planning that preserves natural resources, processes, and habitat, defines what portions of the site are suitable for development and then utilizes Stormwater Treatment Measures to manage runoff from the proposed developed

impervious areas. In LID, Stormwater Treatment Measures using natural processes such as vegetated buffers are given preference over constructed treatment Stormwater Treatment Measures. The goals of LID are to minimize the environmental impacts of the development.

Maine Licensed Landscape Architect – Means a person who has an active Landscape Architects license from the Maine Board of Licensure for Architects, Landscape Architects, and Interior Designers.

Maine Native Vegetation – Means vegetation including grass seed mixtures, identified as native to Maine from lists maintained by: US Department of Agriculture Hardiness Zones by the Maine Cooperative Extension, Wild Seed Project, Regional Soil and Water Conservation District, Maine YardScaping Program, or a Maine Licensed Landscape Architect.

Municipal Separate Storm Sewer Systems (MS4) - Means a conveyance or system of conveyances designed or used for collecting or conveying stormwater (other than a publicly owned treatment works (POTW), as defined at 40 CFR 122.2, or a combined sewer), including, but not limited to, roads with drainage systems, municipal roads, catch basins, curbs, gutters, ditches, human-made channels or storm drains owned or operated by any municipality, sewer or sewage district, Maine Department of Transportation (MDOT), Maine Turnpike Authority (MTA), State agency or Federal agency or other public entity that Discharges to Waters of the State other than groundwater.

Municipality – Means the City/Town of _____.

Parcel – Means the same as "Tract or parcel of land" as defined at 30 M.R.S. §4401.6 *et seq*. *(or alternately, the municipality may reference their own definition of parcel).*

§4401.6 Tract or Parcel of land means all contiguous land in the same ownership, except that lands located on opposite sides of a public or private road are considered each a separate tract or parcel of land unless the road was established by the owner of land on both sides of the road after September 22, 1971.

Permitting Authority - Means the Code Enforcement Officer, Building Inspector, Planning Board, or other official or body authorized by State law or the Municipality's ordinances to approve development or redevelopment of Sites.

Protected Natural Resource - Means coastal sand dunes, coastal wetlands, significant wildlife habitat, fragile mountain areas, freshwater wetlands, community public water system primary protection areas, great ponds, or rivers, streams or brooks as defined in the *Natural Resources Protection Act* at 38 M.R.S. §480-B.

Regulated Small MS4 - Means any Small MS4 authorized by the most recent, in-force MS4 General Permit or the general permits for the Discharge of stormwater from MDOT and MTA Small MS4s or state or federally owned or operated Small MS4s including all those located partially or entirely within an Urbanized Area.

Runoff – Means the part of precipitation from rain or melting ice and snow that flows across a surface as sheet flow, shallow concentrated flow or in drainage ways.

Rural Areas – Areas designated as follows on the municipal zoning map: _____

Small MS4 - Means any MS4 that is not already covered by the Phase I MS4 stormwater program including municipally owned or operated storm sewer systems, state, or federally owned systems, such as colleges, universities, prisons, military bases and facilities, and transportation entities such as MDOT and MTA road systems and facilities. See also 40 CFR 122.26(b)(16).

Significant and Essential Wildlife Habitats – Means the areas identified as Significant or Essential Habitats of endangered or threatened species as identified by the Maine Department of Inland Fisheries and Wildlife either on the Beginning with Habitat viewer or in consultation with the Maine Department of Inland Fisheries and Wildlife.

Site - Means the portion of a Parcel or Common Plan of Development, which is proposed for Construction Activity including open space, Stormwater Treatment Measures, and Disturbed Area, subject to this Ordinance.

Stream Crossing - Means the mechanism by which any road, sidewalk or other structural feature of a Site will cross, or pass over or through a Water of the State which has a stream bank full width of 6 feet or less.

Stream Crossing designed in accordance with Maine Stream Smart Principles – Means a Stream Crossing designed by a Maine Professional Engineer who has completed the Maine Audubon Society Stream Smart Workshops (Parts I and II), which includes the standards recommended by that program's stream span, elevation, slope and skew and substrate to promote passage of fish and other organisms and to limit road-damaging flows from extreme weather.

Stormwater Treatment Measure – Means a stormwater management system or innovative treatment measure as described in Maine DEP Chapter 500 4.c.(3) Types of treatment measures allowed. These measures include wet ponds, vegetated soil filters, infiltration, buffers, or innovative treatment measures. For purposes of this Ordinance these are cumulatively referred to as Stormwater Treatment Measures, or individually referred to as Stormwater Treatment Wet Pond, Stormwater Treatment Vegetated Soil Filter, Stormwater Treatment Infiltration Measure, Stormwater Treatment Buffer, or Stormwater Treatment Innovative Measure.

Suburban Areas – Means areas designated as follows on the municipal zoning map: _____

Time of Concentration – Means the same as "Time of concentration" defined in Maine DEP Chapter 500.

Urban Areas – Means areas designated as follows on the municipal zoning map: _____

Urbanized Area - Means the area of the Municipality so defined by the inclusive sum of

the 2000 decennial census and the 2010 decennial census by the U.S. Census Bureau.

Waters of the State – See 38 M.R.S. §361-A (7).

Section 3 Applicability

Note to Future Adopters: Thresholds may be updated by inserting the applicability thresholds into applicability sections for Site Plan and Subdivisions. If a municipality has a table of Land Uses, identifying when certain types of reviews are required, a line item should be added specifying that disturbance of one or more acres requires Site Plan review in either all Zones (optional) or in the Urbanized Area of the municipality.

The LID Performance Standards contained in Section 7 apply to any Site initially applying for a permit from the municipality after 6/30/2024, with stormwater discharges to the Regulated Small MS4 within the Municipality's Urbanized Area, that results in:

a. Construction Activity with Disturbed Area of one or more acres of land, or
b. Construction Activity with Disturbed Area that is less than one acre of land if the Construction Activity creating Disturbed Area less than one acre of land is part of a larger Common Plan of Development or Sale that as approved or amended would create Disturbed Area of one acre or more, or
c. *20,000 square feet or more of new Impervious Area in the watershed of an Urban Impaired Stream, or*
d. *5,000 square feet or more new Impervious Area regardless of total Disturbed Area.*

Section 4 Procedure

Note to Future Adopters: No procedure is provided for this Model Ordinance because municipalities will rely on their existing Subdivision and Site Plan procedures for review and approval.

Section 5 Submission Requirements

Note to Future Adopters: Ensure the following elements are contained in your Subdivision and Site Plan submission lists where applicable.

5.1 Site Narrative

The applicant shall provide a Site narrative describing:

- *the overall approach to stormwater management at the site*
- *a listing of Stormwater Treatment Measures that will be in use and which will be maintained privately and which will be offered to the municipality for operation*
- *how they have prioritized protection of the sensitive areas from disturbance as required in Section _____,*
- *a rationale for any exceptions from performance standards (see Sections 7 and 11)*

5.2 Site Contacts and Qualifications

The applicant shall provide contact information (i.e., name, company if applicable, phone number, physical address, and email address) as described below:

- Maine Licensed Landscape Architect
- Maine Certified Soil Scientist
- Maine Professional Engineer

5.3 Plan Content

The Site Plans shall consist of a graphic representation of the Site at a scale no smaller than 1 inch = 100 feet showing:

- Waters of the State and their associated Shoreland Protection areas
- Protected Natural Resources
- Predevelopment drainage areas, pathways and associated Time of Concentration
- High Permeability Soils
- Maine Native and Climate-Resilient Northeastern Native Vegetation in General Buffer areas and Shoreland Zoning Buffer areas
- Significant and Essential Wildlife Habitats
- Limits of disturbance
- Post-development drainage areas, pathways and associated Time of Concentration
- Locations of snow storage areas
- Stormwater Treatment Measures to be used

5.4 Submittals related to Infiltration Performance Standard

The LID Performance Standards for Infiltration require the following submittals:

- Information required by Chapter 500 Section (7)(D)(5)(c) Infiltration Submittals including a plan for use of de-icing materials, pesticides and fertilizers within the drainage area of any infiltration Stormwater Treatment Measures.
- Locations of any Uncontrolled Hazardous Substance Sites, Voluntary Response Action Program sites, RCRA Corrective Action sites, or Petroleum Remediation sites on or adjacent to the Site.

Section 6 Approval Standards

Note to Future Adopters: The following text is suggested for inclusion in Findings of Fact to reflect that the LID Performance Standards have been reviewed and adhered to by the applicant. Note that this text is a simple paraphrasing of the intent of the Performance Standards.

The following criteria shall be used by the Permitting Authority in reviewing applications for site plan/subdivision review and shall serve as minimum requirements for approval of the Site application:

- *The Site protects sensitive areas, provides on-site volume control, provides treatment of stormwater, and minimizes impervious areas*

Section 7 Performance Standards

Note to Future Adopters: Review the following elements for addition to your Subdivision and Site Plan Performance Standards under existing Stormwater Management Standards or create a new Performance Standard titled: Low Impact Development.

To show conformance to the MS4 General Permit Requirements, we have included information about which LID Measure from Table 1 Appendix F of the 2022 MS4 General Permit the performance standard addresses. To assist municipalities in applying these performance standards, we have identified whether the standard should apply to Rural, Urban or Suburban Areas.

Regarding Maintenance of Stormwater Treatment Measures, MS4 communities maintain a Post-Construction Runoff Control Ordinance which automatically covers any Stormwater Treatment Measures required under the LID performance standards. Therefore, no Maintenance requirements are contained here. Non-MS4 communities implementing these LID strategies should also adopt the Post Construction Maintenance Ordinance.

Performance Standard	**LID Measure(s) addressed (shown only for informational purposes)**	**Where Standard Applies within Urbanized Area**
Prioritize the protection of the following sensitive areas as listed below (highest priority listed first) by not disturbing land in these areas: i. Waters of the State and associated shoreland protection areas. ii. Protected Natural Resources iii. Predevelopment drainage pathways iv. High Permeability Soils	1. Minimize Site Clearing 2. Protect natural drainage system 4. Minimize Impervious Area 5. Minimize Effect of Impervious Area	Rural, Suburban and Urban

v. Maine Native and Climate-Resilient Northeastern Native Vegetation in General Buffer areas and Shoreland Zoning Setback Buffer areas vi. Significant and Essential Wildlife Habitats Note that the applicant will need to provide a description in their narrative of how they have prioritized these areas for protection from disturbance. These areas may be counted toward the open space requirements. Exception: Removal of Maine Native and Climate-Resilient Northeastern Native Vegetation that is diseased or in poor condition is allowed.		
Construction documents shall depict limits of disturbance. Limits of disturbance shall be established on-site prior to disturbance using flagging, fencing, signs or other means to provide a clear indication.	1. Minimize Site Clearing	Rural, Suburban and Urban
Rural new developments shall preserve at least 40% of the development as open space and Suburban new developments shall preserve 25% of the development as open space.	1. Minimize Site Clearing 4. Minimize Impervious Area 7. Minimize lawns and maximize landscaping that encourages runoff retention.	Rural and Suburban
Stream Crossings for Waters of the State shall use Maine Stream Smart Principles to preserve natural pre-development drainage pathways. Exception: Stream crossings over portions of streams that are artificially channelized are not subject to this standard.	2. Protect natural drainage system 3. Minimize decrease in time of concentration	Rural, Suburban and Urban
Rural and Suburban developments shall preserve the natural pre-development drainage pathways on site by using the natural flow patterns and pathways for the post-construction drainage system. Exceptions are allowed if the Time of Concentration for predevelopment drainage pathways is the same as for post development drainage pathway. Exception: The applicant may submit an "alternative analysis" which demonstrates that this performance standard is impracticable.	2. Protect natural drainage system 3. Minimize decrease in time of concentration	Rural and Suburban
Sites that disturb one acre of land or more shall include Stormwater Treatment Measures in accordance with	2. Protect natural drainage system	Rural, Suburban and Urban

Maine DEP Chapter 500 Section 4.C General Standards 4.C.(2) Treatment requirements, 4.C.(3) Treatment Measures, and 4.D Phosphorus standard (for lake watersheds only) and additionally: • Individual Stormwater Treatment Measure may not treat more than 1-acre of impervious cover • Vegetation used in Stormwater Treatment Measures shall be Maine Native or Climate-Resilient Northeastern Native Vegetation • Note that although Chapter 500 General Standards and Phosphorus standard have higher thresholds for developed and impervious area, these standards apply to sites within the urbanized area of the municipality at a lower threshold.	5. Minimize Effect of Impervious Area 10. Stormwater Quality Treatment and Retention Requirements	
Provide volume control on-site (through infiltration or storage) in accordance with the following: • Volume to be controlled= (total area of impervious cover after development – total area that existed before development) x Rd • Where Rd is the groundwater recharge depth based on the USDA/NRCDS hydrologic soil group as follows: Rd = 0.40 inches or rain for type A soils, 0.25 inches of rain for type B soils, 0.10 inches of rain for type C soils and 0 for type D soils • Restrictions and requirements identified in Sections D(2) through D(4) of Appendix D Infiltration basins, drywells, and subsurface fluid distribution systems; of Chapter 500 apply. Exception: For sites in Rural and Suburban areas where infiltration will disrupt the preservation of the predevelopment drainage pathways, an exception from the infiltration standard will be allowed. Exception: If any Uncontrolled Hazardous Substance Sites, Voluntary Response Action Program sites, RCRA Corrective Action sites, or Petroleum Remediation sites are on or adjacent to the Site, the Site does not need to meet the volume control standard.	5. Minimize Effect of Impervious Area	Rural, Suburban and Urban
Minimize Impervious Area and the Effect of Impervious Area from road runoff: • Dead-end streets shall be no longer than 1000 feet (rural and suburban areas).	4. Minimize Impervious Area 5. Minimize Effect of Impervious Area	Rural, Suburban and Urban

• Dead-end roads shall be constructed to provide a hammerhead (when less than 200 feet), or a tear drop cul-de-sac turn-around with a center that is vegetated, used for open space, and/or a Stormwater Treatment Measure as described below (rural and suburban areas). • Cul-de-sac roads shall be constructed with the center island used for Stormwater Treatment Measures or vegetation unless type A or B soils are present in the center, in which case this area should be used to promote natural infiltration on-site. • At least 70% of Roadway runoff shall be directed into a Stormwater Treatment Measure		
Minimize Impervious Area from parking areas: a. Commercial parking space size shall be a maximum 9-foot width and an 18-foot length with an allowance for reduction in length at a 1 to 1 ratio for available overhang (1 foot reduction allowed if 1 foot overhang possible). b. Compact car parking standards 9-foot x 16-foot space c. Parking lot travel aisles shall be a maximum of 22 feet wide. d. Parking volume requirements shall be based on reasonable parking needs instead of peak use, and maximum parking limits should be established for appropriate areas. Establish maximum parking requirements at current minimum standards. e. Reductions in parking volume requirements should consider presence of transit routes within ¼ mile, existing on-road parking, and transportation/parking demand management plan for Sites over a certain size. *Optional: (not fully developed as part of this ordinance) Establish "In Lieu of" Parking programs with the following components:* • *Fee in lieu of parking* • *Car-share-in-lieu of parking* • *Transit-in-lieu* • *Bike/pedestrian infrastructure improvements* *Note that the in-lieu program may optionally be tied to incentives, such as density or height bonuses.*	4. Minimize Impervious Area	Rural, Suburban and Urban

Establish shared parking provisions Require garages/under above building where appropriate, optionally tied to a density or height bonus		
Runoff from on-site roofs, sidewalks, and peak-use overflow parking runoff shall be directed into Stormwater Treatment Buffers or Stormwater Treatment Infiltration Measures.	5. Minimize Effect of Impervious Area	Rural, Suburban and Urban
Construction equipment movement, laydown areas and parking shall be restricted to the disturbed area. Areas to be vegetated shall be tilled and the soils amended with organic matter as needed based on the results of soil tests.	6. Minimize Soil Compaction	Rural, Suburban and Urban
Snow storage areas shall be depicted on site plans. The location of snow storage areas in Stormwater Treatment Measures and Shoreland Zoning Setback Buffers shall be prohibited.	5. Minimize Effect of Impervious Area	Rural, Suburban and Urban
Optional Standard: Require the implementation of precipitation storage (e.g., cisterns or rain barrels) for later reuse for landscaping.	9. Rainwater Capture and Reuse	Rural, Suburban and Urban

Note to Future Adopters: By embedding the performance standards into Site Plan and Subdivision Performance Standard, those enforcement provisions, Severability and Conflicts and Waivers provisions will automatically cover the LID Performance Standards. No additional Enforcement requirements need apply, so those provisions have not been included here.

Section 8 Enforcement

Section 9 Severability and Conflicts

Section 10 Waivers

Section 11 Exceptions

Some exceptions are allowed from the Performance Standards listed in Section 7 provided the applicant provides a narrative rationale justifying the exception and the municipality accepts the rationale and grants the exception.

Additionally, Notwithstanding other provisions in municipal ordinances or state law, requirements to plant “Climate-Resilient Maine Native Vegetation”, “Maine Native Plants” or “Climate Resilient Northeast Native Vegetation” shall not be construed as a restriction on the rights of individuals to engage in agricultural practices that are legally protected by the Maine Agriculture Protection Act and the “Right to Food” provision in the Maine Constitution (Constitution, Art. I, §25).

Section 11 Authority

The Municipality enacts the LID Model Ordinance Strategies Provisions pursuant to 30-A M.R.S. §§3001 et seq. (municipal home rule ordinance authority), 38 M.R.S. §413 (the Wastewater Discharge Law), 33 USC §§1251 et seq. (the Clean Water Act), and 40 CFR Part 122 (US Environmental Protection Agency’s regulations governing the National Pollution Discharge Elimination System (NPDES)). The Maine Department of Environmental Protection, through its promulgation of the General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems has listed the Municipality as having a Regulated Small MS4; under this General Permit, listing as a Regulated Small MS4 necessitates enactment of elements of this Ordinance as part of the Municipality’s stormwater management program in order to satisfy the minimum control measures for Post Construction Stormwater Management in New Development and Redevelopment.

City of Portland | Low-Impact Development Scoring Tool

Background

The City of Portland (City) has long embraced and prioritized low-impact development strategies by enacting thoughtful development standards that preserve natural resources, reduce impervious surfaces, embrace green infrastructure, and more. And with the development of the stormwater service charge and credit program, the City further incentivized the reduction of impervious area, the use of innovative stormwater management techniques, and comprehensive approaches to stormwater upgrades throughout the City. The comprehensive Low-Impact Development Program (LIDP) was developed in 2024 by the City to further improve public health, public safety, and general welfare through better protection of the natural environment. The LIDP was developed in partial compliance of the requirements of the Municipal Separate Storm Sewer General Permit (MS4GP), #MER04100 issued October 15, 2020, and the Final Permit Modification, issued November 23, 2021.

The LIDP sets minimum standards for development projects through the Land Use Code and the City's Technical Manual, strives to provide clear guidance for internal and external audiences through proactive communication and education, and ensures that projects are meeting the City's LID requirements with consistent, clear, and measurable review by City staff. This LID Scoring Tool is a critical component of the LIDP and provides both clear guidance to development teams of how to meet the City's LID requirements and ensures consistent and clear review of project proposals by City staff.

The City put forth considerable, intentional effort to ensure that the LID requirements are applicable to all development projects, from small-scale infill urban redevelopment to relatively untouched greenfield sites. The City also worked to ensure that LID requirements did not unintentionally encourage greenfield development nor penalize urban redevelopment projects while still scoring them against the core methods of LID: wetland, stream, and drainage protection; protection of natural areas and habitat; protecting and preserving native soils; promoting sustainable landscaping practices; and reducing impervious and effectively managing stormwater on site.

Applicability & Review Process

The City of Portland's LID requirements apply to any development project subject to Site Plan approval which submits an application after 6/30/2024 and which requires a stormwater management plan. As part of the site plan application package applicants must submit a completed Low-Impact Development self-score using the LID Scoring Tool. Project proponents are strongly encouraged to use the LID Scoring Tool at the earliest stages of site design and to bring a completed worksheet to a pre-application meeting with the City.

Minimum Score & Approval

Development projects that are subject to the City's LID requirements must obtain LID Approval from the Water Resources Division within the Department of Public Works. In order for a site plan application to obtain LID Approval, a project must attain a minimum LID Score of 80pts, based upon the LID Scoring Tool.

Using the LID Scoring Tool

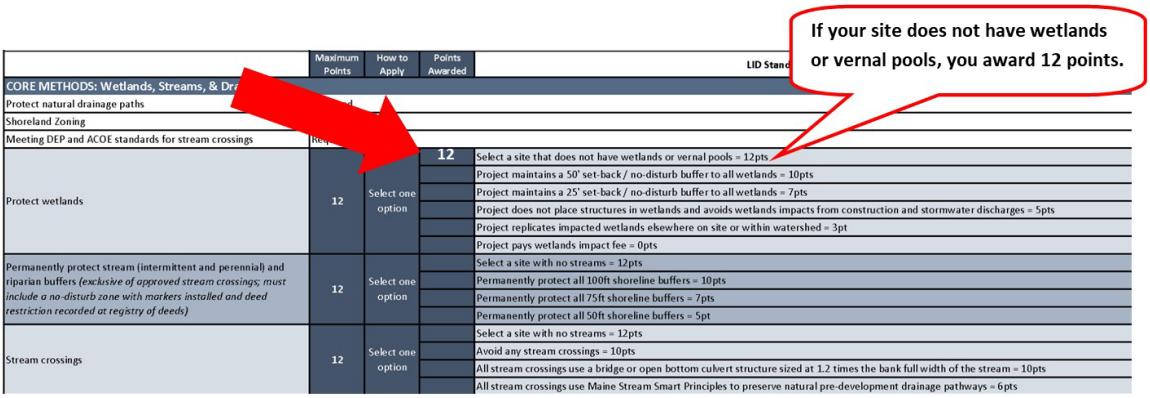
The LID Scoring Tool should be used to self-evaluate the use of Low-Impact Development planning and site design and should serve to inform design priorities early on in the development planning process.

Projects determine which LID Standards / Approaches are going to be utilized on their site and award their project the corresponding points on the spreadsheet. Some Core Methods allow for stacking of points; others require an applicant to select only one applicable approach. Applicants are encouraged to use this tool to help identify which approaches are most appropriate for their site while still obtaining a passing score of 80 pts. When the LID Scoring Tool is used in the original Excel spreadsheet form, the site's total score will be automatically calculated. If an applicant uses a PDF or a printed version, they will need to tabulate their total score.

The only parts the applicant / representative fills in are the top section and the points awarded column. If using the Excel spread-sheet, the table will automatically score the project, otherwise applicants will need to tabulate the total score.

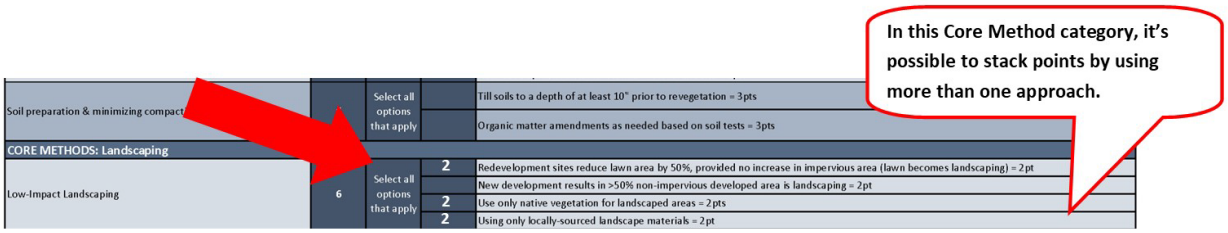
City of Portland ME . Low-Impact Design Requirements				
Owner / applicant name:				
Representative name:				
Projct address:				
Project CBL:				
Application ID (if known):				
	Maximum Points	How to Apply	Points Awarded	
CORE METHODS: [illegible]ds, Streams, & Drainage				
Protect natural de[illegible]ths	Required			
Shoreland Zoni[illegible]	Required			
Meeting DEP [illegible] standards for stream crossings	Required			
Protect wetlands	12	Select one option		Select a site that does not have wetlands or vernal pools = 12pts
				Project maintains a 50' set-back / no-disturb buffer to all wetlands = 10pts
				Project maintains a 25' set-back / no-disturb buffer to all wetlands = 7pts
				Project does not place structures in wetlands and avoids wetlands impacts from construction and stormwater discharges = 5pts
				Project replicates impacted wetlands elsewhere on site or within watershed = 3pt
				Project pays wetlands impact fee = 0pts
Permanently protect stream (intermittent and perennial) and riparian buffers *(exclusive of approved stream crossings; must include a no-disturb zone with markers installed and deed restriction recorded at registry of deeds)*	12	Select one option		Select a site with no streams = 12pts
				Permanently protect all 100ft shoreline buffers = 10pts
				Permanently protect all 75ft shoreline buffers = 7pts
				Permanently protect all 50ft shoreline buffers = 5pt
Stream crossings	12	Select one option		Select a site with no streams = 12pts
				Avoid any stream crossings = 10pts
				All stream crossings use a bridge or open bottom culvert structure sized at 1.2 times the bank full width of the stream = 10pts
				All stream crossings use Maine Stream Smart Principles to preserve natural pre-development drainage pathways = 6pts
CORE METHODS: Natural Areas & Habitat				
Preserve threatened or endangered species habitat	Required (Beginning with Habitat Maps at a minimum)			
Protect 30% of trees over 10" DBH	Required (Tree survey required)			
Protect intact, contiguous forests and native trees over 10" DBH	8	Select one option		All development and land disturbance outside of existing wooded/forested areas (no site clearing in prior 10 years) = 8pts
				Protect 50% of trees over 10" DBH = 6pts
				Protect 40% of trees over 10" DBH = 4pt
CORE METHODS: Soils & Slopes				
USDA Web Soil Survey	Required (provide details how soil limitations will be mitigated)			
Avoid steep slope disturbance	5	Select one option		Selecting a site without slopes 15% or greater = 5pts
				Maintain >20' undisturbed vegetated buffer to all slopes 15% or greater = 3pts
				Maintain 10-20' undisturbed vegetated buffer to all slopes 15% or greater = 2pts
				Maintain 1-10' undisturbed vegetated buffer to all slopes 15% or greater = 1pt
				Disturbance of any slope 15% or greater = 0pts
Protect soils	5	Select one option		Redevelopment sites = 5pts
				Detailed, site-specific soil survey; preparation of a Soil Management and Protection Plan; protect highly permeable soils = 5pts

For some Core Methods categories only one answer is possible. In the example below, the site does not have any wetlands or vernal pools and is therefore awarded the full 12pts. If a site chosen did have wetlands and/or vernal pools but the project was able to maintain a 50' undisturbed vegetated buffer to all wetlands on site, it would be awarded 10pts.



	Maximum Points	How to Apply	Points Awarded	LID Stand
CORE METHODS: Wetlands, Streams, & Dra				
Protect natural drainage paths				
Shoreland Zoning				
Meeting DEP and ACOE standards for stream crossings	Req			
Protect wetlands	12	Select one option	12	Select a site that does not have wetlands or vernal pools = 12pts
				Project maintains a 50' set-back / no-disturb buffer to all wetlands = 10pts
				Project maintains a 25' set-back / no-disturb buffer to all wetlands = 7pts
				Project does not place structures in wetlands and avoids wetlands impacts from construction and stormwater discharges = 5pts
				Project replicates impacted wetlands elsewhere on site or within watershed = 3pt
				Project pays wetlands impact fee = 0pts
Permanently protect stream (intermittent and perennial) and riparian buffers *(exclusive of approved stream crossings; must include a no-disturb zone with markers installed and deed restriction recorded at registry of deeds)*	12	Select one option		Select a site with no streams = 12pts
				Permanently protect all 100ft shoreline buffers = 10pts
				Permanently protect all 75ft shoreline buffers = 7pts
				Permanently protect all 50ft shoreline buffers = 5pt
Stream crossings	12	Select one option		Select a site with no streams = 12pts
				Avoid any stream crossings = 10pts
				All stream crossings use a bridge or open bottom culvert structure sized at 1.2 times the bank full width of the stream = 10pts
				All stream crossings use Maine Stream Smart Principles to preserve natural pre-development drainage pathways = 6pts

Some Core Methods allow for multiple approaches to be used, such as in the example below. If a redevelopment site reduces existing lawn area by 50% (meaning existing lawn becomes densely landscaped using low-impact landscaping methods), they are awarded 2 pts. On that same site, if they use only native vegetation and use only locally-sourced landscape materials, they are awarded an additional 4 pts.



Soil preparation & minimizing compact		Select all options that apply		Till soils to a depth of at least 10" prior to revegetation = 3pts
				Organic matter amendments as needed based on soil tests = 3pts
CORE METHODS: Landscaping				
Low-Impact Landscaping	6	Select all options that apply	2	Redevelopment sites reduce lawn area by 50%, provided no increase in impervious area (lawn becomes landscaping) = 2pt
				New development results in >50% non-impervious developed area is landscaping = 2pt
			2	Use only native vegetation for landscaped areas = 2pts
			2	Using only locally-sourced landscape materials = 2pt

Feedback & Support

Applicants / representatives are urged to reach out to the Department of Public Works Water Resources Division with any questions or if anything is unclear. Regular, open communication is critical to the success of the City of Portland's Low-Impact Development Program and we welcome your thoughts and feedback so we can continue to make program improvements.

DEP Chapter 500/Proposed City of Portland Regulation Comparison
2024-08-30
Justin Pellerin, P.E.
COP Water Resources

ESC, WATER QUALITY TREATMENT, and FLOODING STANDARDS

Stormwater Management Thresholds

When standards apply: DEP Chapter 500

General Treatment Standards and Basic ESC Standards

- A project that requires a Stormwater Management Law permit, other than a stormwater permit by rule (PBR) issued pursuant to Section 6 of this Chapter;
    - Non UIS Watershed Trigger: when a project results in 1 acre of impervious or 5 acres of developed area.
    - UIS Watershed Trigger: when a project results in 20,000 sf of impervious or 5 acres of developed area
- A project that requires a Site Law permit; and (**3 Acres or more of Impervious, 20 acres of developed area)**
- Changes to a project licensed pursuant to the Stormwater Management Law or Site Law that requires a modification of a project's license, as described in Section 16 of this Chapter.

Flooding Standards:

- The flooding standard must be met if the project
    - Results in three acres of more of impervious area or 20 acres or more of developed area; or
    - Requires a site law permit or permit modification.

When standards apply: Proposed City of Portland Regulation

ESC Standards:

- Any work / project with 5,000sf of disturbance will be required to meet the City's ESC standards.
    - Basic ESC Plan required for projects requiring minor site plan approval, or those projects which don't require site plan approval and result in less than 1 acre of disturbed area
    - Comprehensive ESC Plan for projects requiring major site plan approval or those projects which don't require site plan approval and result in 1 acre or more of disturbed area

- Minor residential projects must use effective erosion and sedimentation controls for the duration of the Construction Activity, but are not required to submit an Erosion and Sedimentation Control Plan.
- In all circumstances, the City reserves the right to require a Comprehensive Erosion and Sedimentation Control Plan, or any component thereof, when site conditions dictate (e.g. proximity to sensitive natural resources, steep grades)

Treatment, Flooding Standards:

- A minor/major site plan or subdivision in Portland which results in
  - 1,000 SF of new impervious area, or;
  - 10,000 SF of disturbed area, or;
  - 5,000 SF of non-roof redeveloped impervious area.

Minimum Detention Volume Standard:

- A minor/major site plan or subdivision in Portland which results in
  - 1,000 SF of new impervious area, or;
  - 10,000 SF of disturbed area, or;
  - 5,000 SF of non-roof redeveloped impervious area, AND;
  - More than 500 gallons of average daily sewer flow is being added to the system and a new private stormwater connection is being proposed into the combined sewer system.

Stormwater Management Requirements

ESC Standards

Chapter 500 Basic Standard:

What is required:

- The basic standards apply to all projects described above. The applicant must demonstrate that the erosion and sedimentation control, inspection and maintenance, and housekeeping standards specified in Appendices A, B, and C to this Chapter, respectively, are met, and that the grading or other construction activity will not impede or otherwise alter drainageways so as to have an unreasonable adverse impact on a wetland or waterbody, or an adjacent downslope parcel.

Proposed City of Portland Standard:

City Chapter 32 Stormwater Ordinance and section 6 of the technical manual, recently updated to comply with DEP MS4 Permit Requirement.

What is required:

- Submission and approval of ESC Plan in accordance city ordinance chapter 32 and section 6 of the technical manual.

When standards apply:

- Any work / project with 5,000sf of disturbance will be required to meet the City's ESC standards.
    - Basic ESC Plan required for projects requiring minor site plan approval, or those projects which don't require site plan approval and result in less than 1 acre of disturbed area
    - Comprehensive ESC Plan for projects requiring major site plan approval or those projects which don't require site plan approval and result in 1 acre or more of disturbed area
    - Minor residential projects must use effective erosion and sedimentation controls for the duration of the Construction Activity, but are not required to submit an Erosion and Sedimentation Control Plan.
    - In all circumstances, the City reserves the right to require a Comprehensive Erosion and Sedimentation Control Plan, or any component thereof, when site conditions dictate (e.g. proximity to sensitive natural resources, steep grades).

Water Quality Treatment Standards

Chapter 500 General Standard:

What is required:

- New Development
    - Provide treatment of no less than 95% of the impervious area and no less than 80% of developed area in accordance with Chapter 500-4-3 standards.
    - Note: There are certain stipulations that allow for the reduction of treatment not identified in this summary (i.e. linear projects).
- Redevelopment
    - Treatment requirements based on Pollutant Impact Ranking in accordance with chapter 500-4-3 standards.
    - **Note: For site law projects, a minimum of 50% of redeveloped area must be treated**

Table 3

Treatment Levels for Redevelopment Projects

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

<u>Proposed City of Portland Treatment Standard:</u>

What is required:

- For all minor/major site plans and subdivision projects triggering the City's stormwater standards, treatment[1] must be provided for;
  - 95% of new impervious area
  - 80% of new developed area
  - **95% of non-roof redeveloped impervious area**
- Projects which are regulated by a new or existing Maine DEP site law permit, or meets the threshold requirements for a DEP stormwater management law permit treatment[1] must be provided for;
  - 95% of new impervious area
  - 80% of new developed area
  - **95% of non-roof redeveloped impervious area**
  - **Total redeveloped area as determined by Table's 2 and 3 in the Maine DEP Chapter 500 section 4-3 rules.**

Notes:

1. In accordance with Maine DEP Chapter 500-4-3 and Volume III of the Stormwater BMP Manual.

Flooding Standard

CHAPTER 500 FLOODING STANDARD

What is required:

- The system must detain, retain or result in the infiltration of stormwater from 24-hour storms of the 2-year, 10-year and 25-year frequencies such that peak flows of stormwater from the project site do not exceed the peak flows of stormwater prior to undertaking the project;
- Other stipulations as noted in chapter 500.
- Waivers allowable as described in chapter 500.

PROPOSED CITY REGULATION: CHAPTER 500 FLOODING STANDARD

- No deviations from requirements of Chapter 500 flooding standard other than differing thresholds as noted above.

Minimum Detention Standards (COP REGULATION ONLY)

What is required:

- Projects which trigger City of Portland Post Construction Stormwater Requirements and are proposing stormwater connections to the City's separated storm drain system shall provide
    - a minimum detention volume equal to 1" of rainfall times the TOTAL impervious area within the project's disturbance limits
    - Stormwater discharge rates into the separated storm drain system must be controlled to meet a maximum flow rate of 0.1 CFS until the storage system reaches its design capacity.
- Projects which trigger City of Portland Post Construction Stormwater Requirements and are proposing stormwater connections to the City's Combined Sewer System shall provide
    - A minimum detention volume equal to the greater of 1" of rainfall times the TOTAL impervious area within the project's disturbance limits or the project's proposed increase in average daily sanitary sewer flows being added to the combined sewer system.

    - Stormwater discharge rates into the separated storm drain system must be controlled to meet a maximum flow rate of 0.1 CFS until the storage system

1001 Westbrook Street
Major Site Plan
PL-002853-2024
Portland International Jetport

Submitted to:	Portland Planning Board	**Prepared By:**	Zach Powell
Public Hearing Date:	November 26, 2024	**Date:**	November 22, 2024

I. INTRODUCTION

Portland International Jetport has submitted a Major Site Plan application to facilitate the expansion of an existing short-term paved parking lot and unpaved surface parking area to create a paved parking lot with 667 long-term parking spaces. As part of the proposed development, a 1.9-megawatt battery storage system is also proposed to be installed. The parking lot expansion was envisioned as an intermediate-term project, detailed in the 2018 Portland International Jetport Sustainability Airport Master Plan.

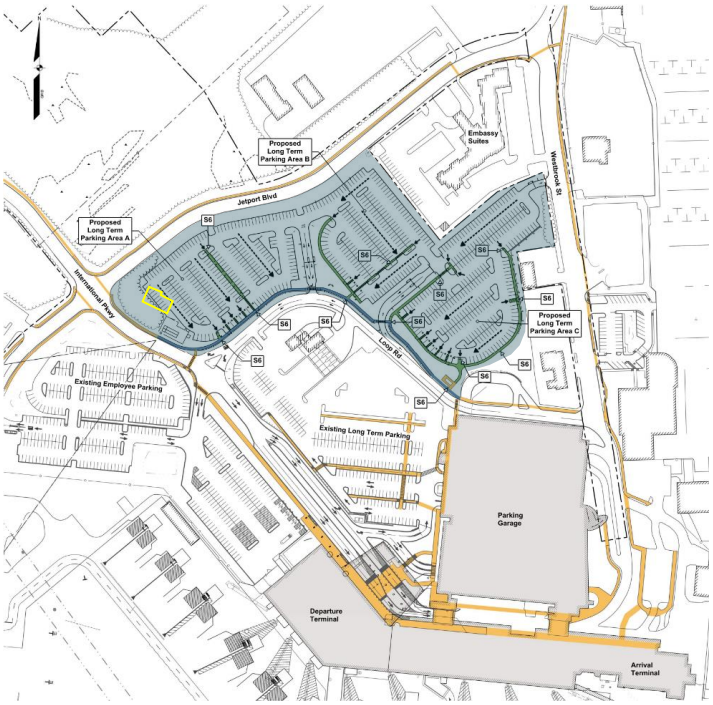


Figure 1: Wayfinding plan showing the site (Highlighted in blue) and the proposed battery storage (Outlined in yellow).

The Applicant has submitted a Site Location of Development (SLOD) amendment to permit L-13760 and NRPA permit, which is still in review by the Maine Department of Environmental Protection (Maine DEP). The Army Corps of Engineers provided authorization on August 14, 2024 (Attachment D1) for the proposed fill of ±11,151 square feet of wetlands on the project site. The project falls under an existing Traffic Movement Permit (TMP) for the Terminal Expansion, which was approved by the Planning Board in 2008.

The Planning Board held a workshop on the application on May 14, 2024, with the discussion on the application focusing on the proposed wetland impacts and landscaping.

The Planning and Urban Development Department mailed 38 notices advertising this meeting to property owners within 500 feet of the site. A legal advertisement ran in the November 14, 2024 and the November 15, 2024 editions of the *Portland Press Herald*.

Applicant: Paul Bradbury, CEO, Portland International Jetport
Representing Agent: Owens McCullough, Sebago Technics

II. REQUIRED REVIEWS AND REQUESTED WAIVERS

Review	Applicable Standards
Major Site Plan Review	Section 14.6
Waiver Requests	**Applicable Standards**
1. Sidewalks are not proposed to be constructed on Jetport Boulevard & Westbrook Street.	Land Use Code §14.6.1(B)(3)(a) - All development shall provide curb and sidewalks along all frontages. *Staff are supportive.*
2. The applicant is requesting to fill ±11,151 square feet of wetlands on the site.	Land Use Code §14.6.2(A)(1) - All development shall preserve and protect significant natural features by incorporating them into site design. *Staff are supportive.*
3. The applicant is requesting the installation of parking lot islands with a total of 24 trees when 267 trees or 133 trees & 400 shrubs are required.	Land Use Code §14.6.2(C)(3)(a) – Developments shall include at least two trees (or one tree and three shrubs) per five parking spaces planted in landscaped islands to screen, shade, and break up parking. *Staff are supportive.*
4. Construction of a parking lot island where a portion of the island is less than 8 feet in width (3.5 feet).	Technical Manual §4.5.5 – Landscaped islands shall be curbed and a minimum of eight (8) feet in width, not including curbing. *Staff are supportive.*
5. The applicant is requesting direct discharge of treated stormwater from the site into Casco Bay.	Technical Manual §5(III): Developments as specified under Section II Applicability in Portland must comply with the most recent version of the Maine Department of Environmental Protection (Maine DEP) Chapter 500 Rules for Stormwater Management. *Staff are supportive.*

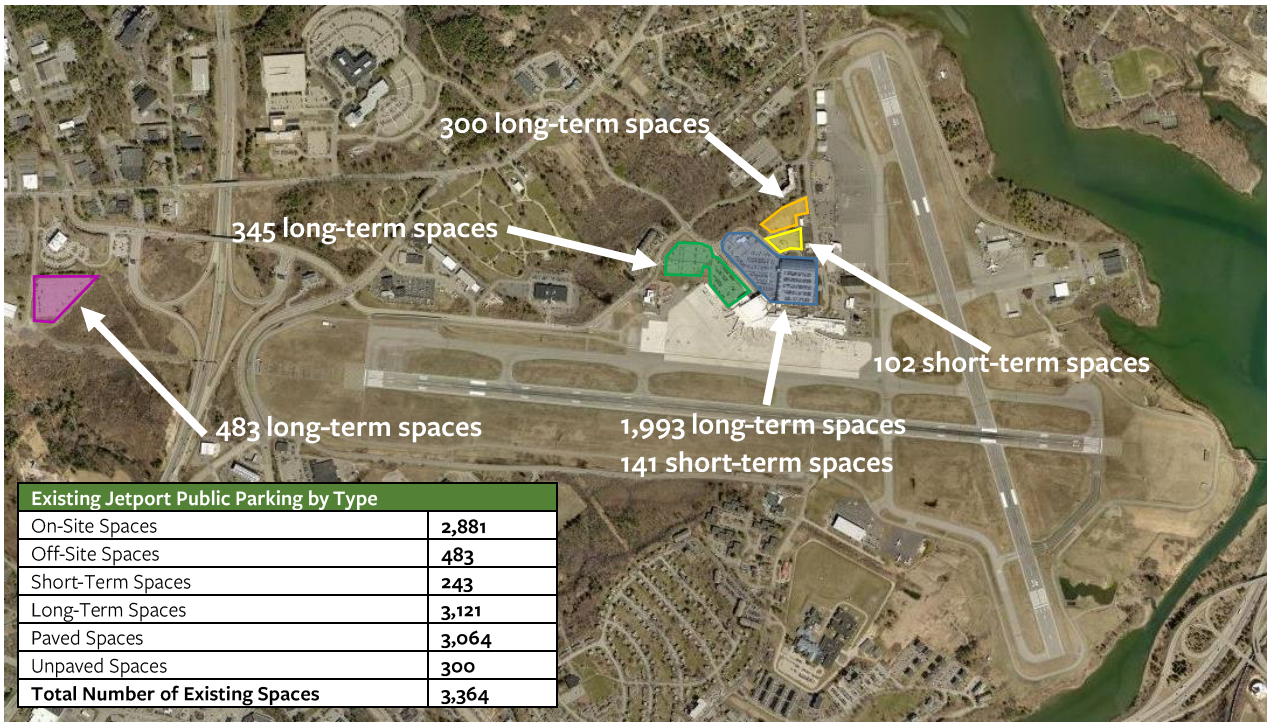
III. PROJECT DATA

Existing Zoning	A-B (Airport Business)		
Existing Use	Off-Street Parking (Surface) (102 paved automobile spaces; 300 unpaved automobile spaces); Undeveloped Land		
Proposed Use	Off-Street Parking (Surface)		667 automobile spaces
Property Size	42,976 SF (0.98 acres)		
	Existing	*Proposed*	*Net Change*
Automobile Parking Spaces	402 spaces 102 paved 300 unpaved	667 paved spaces	+265 spaces
Bicycle Parking Spaces	0 spaces	0 spaces	No change
Curb Cuts	3	3	No change
Trees in Streetscape	±55	88	±33

IV. EXISTING CONDITIONS

The project site is centrally located on the Portland International Jetport campus and occupies half of a city block at 0.98 acres in area. The site is bounded to the north by Jetport Boulevard, to the South by Loop Road, to the East by Westbrook Street, and the West by International Parkway. The site is immediately adjacent to a hotel and proximate to other surface and structured parking for the Jetport and undeveloped land.

The site contains a mixture of paved short-term surface automobile spaces (102) (shown in yellow in **Figure 2**), unpaved long-term valet surface parking spaces (300) (shown in orange in **Figure 2**), informal vehicle storage, and undeveloped land. The Jetport also has an additional 2,821 parking spaces with 2,338 on-site long-term parking spaces, and 483 off-site long-term parking spaces, located in South Portland, as shown in **Figure 2**.



Existing Jetport Public Parking by Type	
On-Site Spaces	**2,881**
Off-Site Spaces	**483**
Short-Term Spaces	**243**
Long-Term Spaces	**3,121**
Paved Spaces	**3,064**
Unpaved Spaces	**300**
Total Number of Existing Spaces	**3,364**

Figure 2: Aerial image showing public parking areas for the Jetport. Off-site parking includes a 483-space long-term parking lot (shown in pink). On-site parking includes 300 long-term valet parking spaces (shown in orange), structured parking with 1,993 long-term and 141 short-term parking spaces (shown in blue), 345 long-term surface parking spaces (shown in green), and 102 short-term surface parking spaces (shown in yellow).

The undeveloped portion of the site contains ±11,151 square feet of wetlands and 169 trees >10" at diameter breast height. Two sculptures from the public art piece Glimpse (2011) are located along the site's frontage on Loop Road as shown in **Figure 3**.

The site has three curb cuts, and sidewalks are provided along the frontages of International Parkway and Loop Road. Bicycle lanes are located along the International Parkway & Jetport Boulevard frontages of the site.

The project site is currently served by public transit with METRO Route #5, with a stop located ~710 feet from the southern boundary of the project site.

Figure 3: View looking west from Loop Road at two of the sculptures from the public art piece *Glimpse (2011)* that are located on the project site.

V. RIGHT, TITLE, AND INTEREST

The property owner is the City of Portland and the Applicant has submitted deeds (Attachment C) verifying that all three properties are under common ownership.

The 2018 Portland International Jetport Sustainability Airport Master Plan identified the acquisition of the area shown in yellow in **Figure 4** to be an intermediate priority of the airport. Order 81-21/22 was unanimously approved by the City Council on November 1, 2021 to purchase that portion of land in yellow that was previously used as a private valet parking service.

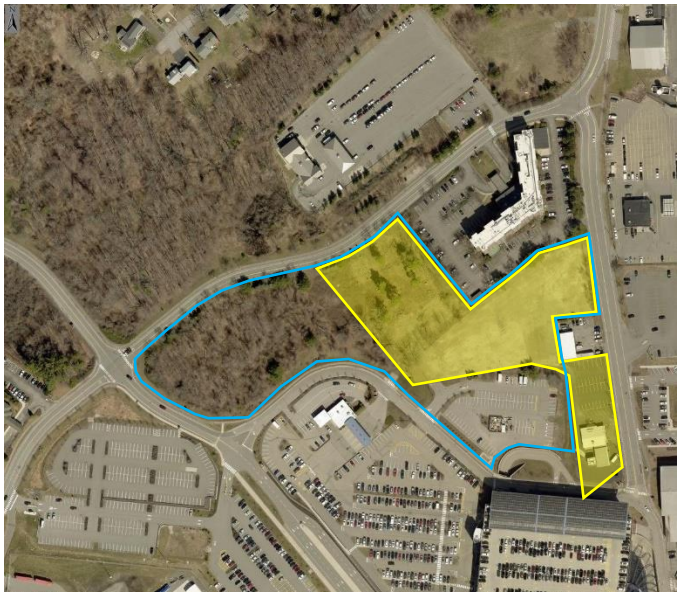


Figure 4: Aerial image showing the project site boundary (in blue) and private land purchased as part of a recommended intermediate priority of the Portland International Jetport Sustainability Airport Master Plan (in yellow).

VI. FINANCIAL AND TECHNICAL CAPACITY

The Applicant has submitted a letter (Attachment H) listing the unrestricted cash fund balance for the Jetport of $39.1 million, with the proposed project anticipated to cost $8 million. Supporting information has been supplied related to the technical capacity of Sebago Technics in Attachment I.

VII. PROPOSED DEVELOPMENT

The applicant is proposing to pave the existing ±1.65-acre unpaved parking area and repave an existing short-term paved lot with 102 spaces (cell phone lot) to create two paved parking lots with 667 long-term parking

spaces. The clearing of the northwestern portion of the site would include the removal of 153 trees >10" at diameter breast height (DBH) and the filling of ±11,151 square feet of wetlands. Of the trees being removed, 19 are Ash trees, which, based upon a site inspection by City Arborist Mark Reiland, the majority of these trees are infected with Emerald Ash Borer.

Existing parking areas are proposed to be redeveloped and regraded, with new subsurface utility and stormwater infrastructure being installed. A 1.9-megawatt lithium-ion battery is proposed to be installed on the western portion of the site, which will be screened with a combination of fencing and landscaping.

Through §1.14 of the Technical Manual, parking lots greater than 100 spaces can establish EV parking requirements based on an EV parking demand study prepared by a qualified professional. The Applicant has submitted an EV parking demand study (Attachment M1) showing that the proposed number of spaces (141 EV-ready spaces & 56 off-site Level 1 chargers) aligns or exceeds practices from peer airports in the region and aligns with the longer parking patterns associated with airline passengers.

Construction is proposed in two phases, as shown in **Figure 5**. Each phase is anticipated to take three months and would start with the western portion of the site (shown in red) and then progress to the eastern portion of the site (shown in yellow).

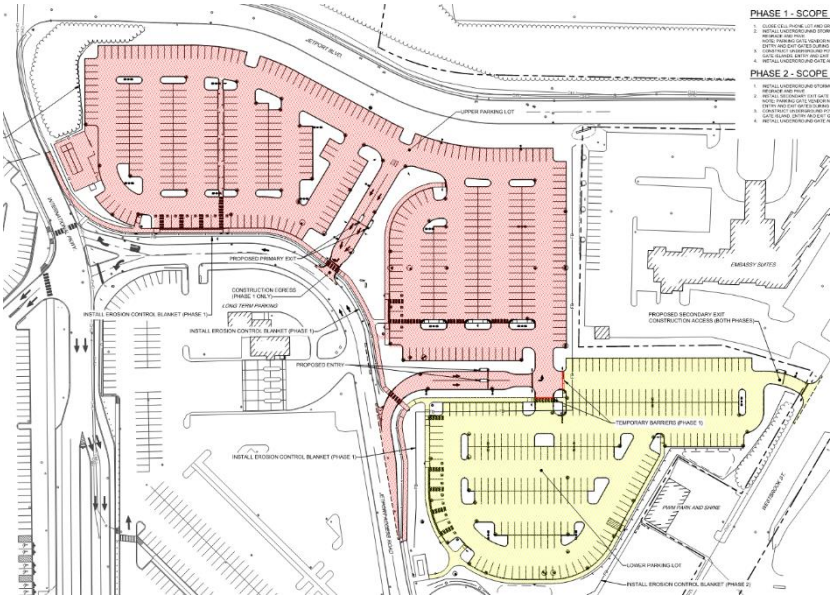


Figure 5: Phasing Plan with Phase 1 (in red) and Phase 2 (in yellow) each anticipated to take three months to complete.

All existing curb cuts would be updated as part of the proposed project, with vehicles entering from Loop Road to pay stations and exiting either onto Loop Road or Westbrook Street.

The two existing public art pieces from *Glimpse* are proposed to be removed from the site. City Staff & the Public Art Committee, in coordination with the artist Wendy Klemperer, are working to develop plans for the removal, storage, and relocation of the sculptures. Final approval for the relocation of the sculptures requires approval from the City Council.

Proposed landscaping for the site includes 93 deciduous and 69 coniferous trees, and a combination of 712 perennials & shrubs.

VIII. ZONING ANALYSIS

The site is located in the A-B (Airport Business) zone. The purpose of the A-B zone is to provide:

...an area for the development of airport-related enterprises. Appropriate uses permitted in this zone are those customarily associated with the operation of the airport terminal and individual airlines and accessory use to provide for the comfort and convenience of the airport's patrons and employees.

The zoning dimensional requirements are permissive and are intended to allow for a variety of commercial and industrial uses that are supportive of the functions of the Jetport, while including setback restrictions from the adjacent Stroudwater neighborhood to minimize negative impacts. As submitted, the application is consistent with applicable A-B zoning standards as shown below in **Table 1**. Additionally, off-street parking is listed as a permitted use in the A-B zone as identified in Table 6-E.

Table 1: Applicable Dimensional Requirements

Dimensional Standard	Requirement	Proposed	Determination
Minimum Lot Area	20,000 square feet	358,094 square feet	**Complies**
Minimum Street Frontage	50 feet	1,450.17 feet	**Complies**
Maximum Impervious Surface Ratio	70%	48%	**Complies**

IX. MAY 14, 2024 WORKSHOP

On May 14, the project appeared for an initial workshop, with the applicant speaking to the short-term and long-term parking needs of the Jetport, including the currently proposed surface parking expansion, and future plans to expand the existing parking garage, along with proposed design/landscaping. Board discussion focused on whether the parking needs associated with future construction could be met through other strategies, such as an off-site lease, or modification of the design to minimize impacts to the wetlands on the site and existing vegetation. The Board also discussed how the proposed tree clearing & landscaping would change the visitor experience on the campus particularly at the gateway to the Jetport along International Parkway.

Figure 6: Wayfinding plan showing the previous location proposed for the battery storage (in red) and the new location (in purple), along with the proposed internal sidewalks (in green) to the existing sidewalk network (in blue).

A total of 21 written comments were submitted in advance of the workshop and no members of the public provided testimony at the meeting. Written comments focused on how the proposed project was perceived to conflict with approved City plans, objections to the wetland fill associated with the project, and promotion of additional parking through other solutions, such as off-site leases.

X. UPDATED APPLICATION MATERIALS

Based on feedback from members of the Board and City Staff, the application was updated to:

- Shift the location of the battery storage plan south and east to minimize the number of existing trees being removed and the wetland area impacted by the development (Previous location shown in red and proposed location shown in purple in **Figure 6**)
- Include internal sidewalks to provide safer connections for pedestrians and corresponding updates to the wayfinding plan (shown in green in **Figure 6**)
- Updated site plan set providing additional background and information on the permitting & impact on wetlands as a result of this project
- Provide an alternatives analysis (Attachment G1) for the proposed removal of the wetlands on the site noting steps taken to minimize impacts
- Revise the photometric plan to meet the site lighting standards of §12 of the Technical Manual
- Provide verification (Attachment A3) that the conditions from the 2008 Traffic Movement Permit have been satisfied.

XI. SITE PLAN STANDARDS

Section 14.6 of the City's Land Use Code establishes standards under which Site Plan applications must be reviewed. Per this section, Site Plans shall adhere to the following requirements:

Section 14.6.1. Transportation Standards

A. Impact on Surrounding Street Systems

Staff Comment: The proposed parking lot is not anticipated to result in significant hazards to the surrounding street network since the facility is located in the core of the Jetport campus. As a parking lot, the proposed use does not require a traffic study since parking lots are not classified as trip generators by traffic engineers.

City reviewers requested confirmation that the 2008 Traffic Movement Permit (TMP) conditions of approval were met, which was provided by the Applicant in Attachment A3. Based on the current pattern of annual enplanements (the number of passengers boarding aircrafts), the existing TMP is anticipated to expire for the site in 2025.

B. Access and Circulation

Staff Comment: Based on City Staff feedback on internal circulation & pedestrian connections, the design has been updated to provide additional internal sidewalks and additional signage to improve connections to the existing sidewalk network.

A waiver has been submitted to not provide sidewalks for the site frontage along Jetport Boulevard & Westbrook Street, citing that there are existing sidewalks on the other sides of the street and that the creation of a new sidewalk would result in additional removal of vegetation & trees, meeting the two minimum criteria for a waiver as provided in §14.6.1(B)(3)(c) of the Land Use Code. Staff from the Department of Public Works have expressed support for the waiver request.

C. Public Transit Access

Staff Comment: Given that an existing transit shelter is located within the airport terminal that is less than ¼ mile from the project site, the project is not required to install a transit shelter.

D. Parking

Staff Comment: Per the City's Land Use Code, under Article 19, Table 19-A, there are no minimum parking requirements for parking lots and/or airports do not have explicitly listed automobile or bicycle parking total requirements in Article 19 of the Land Use Code.

All proposed spaces and aisles meet the minimum dimensional requirements. Snow storage is proposed to be handled by a snow hauler, which will transport snow to an off-site City storage location, which aligns with the snow management strategy for the Jetport campus.

As discussed in Section VII of this report, the Applicant has submitted an EV parking demand study demonstrating that the proposed number of EV-ready spaces (141) & off-site EV spaces in the nearby parking structure (56) align with regional trends for airports. Similarly, the use of Level 1 chargers are justified based on the fact that over 90% of motorists are parked at the Jetport for ≥24 hours, which is the typical charge time for a vehicle using a Level 1 charger.

E. Transportation Demand Management

Staff Comment: The Jetport has an existing TDM plan for the 2008 terminal expansion and the proposed project does not meet a threshold for creating a separate TDM plan. In the latest TDM report, the Jetport has noted that using off-site parking, carpooling, and allowing for more flexible/remote work options have all been successful strategies in reducing overall parking demand for the airport, and have contributed to increases in trips by modes other than single-occupancy vehicles. The frequency and hours of operation of bus service and carpooling have been noted by the Jetport as challenging factors, and the Jetport has indicated that it is pursuing strategies to further incentivize carpooling, improve the experience for ride-share users, and update the Jetport website to include additional information about alternative transportation modes.

Section 14.6.2. Environmental Quality Standards

A. Preservation of Significant Natural Features

Staff Comment: The application proposes impacts to ±11,151 square feet of wetlands, as shown in green in **Figure 7**. 9,967 square feet of previously permitted and filled wetlands are shown in **Figure 7** in orange.

The Applicant has submitted a waiver request for these impacts describing that the wetlands have limited ecological & habitat functions based on Army Corps of Engineers standards. Impacts to the wetlands have been minimized through the relocation of the proposed battery storage, while preservation of the wetlands compromises the development of the site with their central placement & location along areas that require grading. Authorization was provided by the Army Corps of Engineers on August 14, 2024 (Attachment D1) for the proposed fill of ±11,151 square feet of wetlands on the project site, with review by Maine DEP for a SLOD amendment & NRPA permit still ongoing. City Staff are recommending as a condition of approval that evidence of approvals from Maine DEP be submitted prior to issuance of a building permit.

The project area does not propose development within a designated habitat block.

Figure 7: Site plan showing location of wetlands proposed to be impacted (in green) and previously impact wetlands (in orange).

B. Landscape Preservation

Staff Comment: The subject application proposes to retain 25 of the existing 178 trees >10" Diameter Breast Height (DBH) within the project area. 19 of the 153 trees proposed to be removed are Ash trees, with the majority of the trees identified by the City Arborist as being infected by Emerald Ash Borers, which are actively being removed across the city.

Since the workshop, the Applicant has updated the site plan set (Attachment P2) to include landscape preservation measures for trees & vegetation proposed to be preserved along International Boulevard & Westbrook Street.

C. Site Landscaping and Buffers

Staff Comment: The site has 2,295 feet of frontage and is required to provide a combination of 1 tree or six plantings per 30 feet (77 trees or 462 plantings). The site proposes preserving 25 trees and planting 162 new trees, exceeding the minimum requirement.

A total of 667 parking spaces are proposed, requiring the planting of 267 trees or 133 trees & 400 shrubs in landscaped islands at least 8 feet in width. As submitted, a total of 24 trees are to be planted in landscaped islands. The Applicant has noted that conflicts with the stormwater detention & treatment system prevent additional plantings in the islands, with a significant number of trees proposed to be installed in other locations on the site. An additional 33 trees and 248 shrubs are proposed to be planted in landscaped peninsulas, which provide a similar benefit/meet the intent of the requirement. §14.6.3(c) of the Land Use Code states that waiver requests may be submitted when site constraints prevent implementation and can be partially waived, with a contribution to the City of Portland Tree Fund to be provided proportionate to the number of trees not able to be planted (127). Staff are supportive of the waiver and are including a recommended condition of approval that a contribution of $50,800 (127 trees X $400/tree) be provided to the City of Portland Tree Fund or that the applicant demonstrate compliance with the requirements by planting an additional 127 trees throughout the Jetport campus prior to issuance of certificate of occupancy.

A portion of one of the landscaped islands (shown in **Figure 8**) does not meet the minimum width of 8 feet as required in §4.5.5 of the Technical Manual, which the Applicant has submitted has submitted a waiver request. Staff are supportive of the waiver request since the Applicant has provided notes ensuring sufficient

soil depth and high-quality planting mix to promote the long-term viability of the trees, which achieves the same goal as the minimum required landscape island width.

The site has 1,243 feet of frontage along City rights-of-way and is required to provide a minimum of 36 street trees. The Applicant is proposing to utilize street tree alternatives to preserve 12 trees that are less than 20 feet from & visible from the right-of-way, and plant 58 new trees within 20 feet from & visible from the right-of-way, exceeding the minimum requirement for street trees.

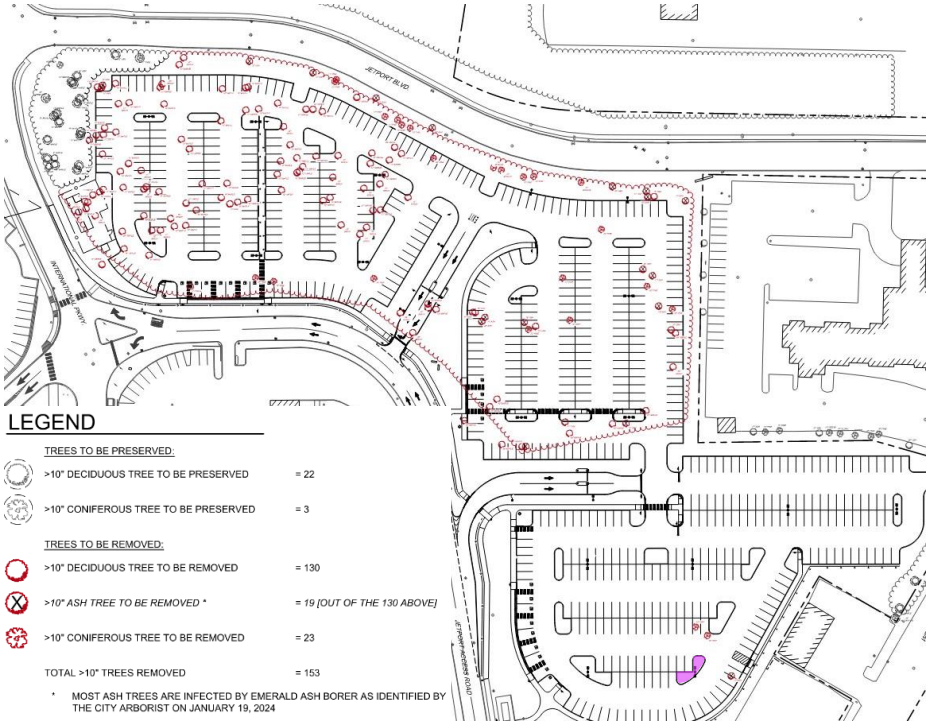


Figure 8: Tree removal plan, which proposes the removal of 153 trees >10" DBH and retention of 25 trees >10" DBH. The landscaped island with a portion less than 8 feet in width that the Applicant is seeking a waiver for is highlighted in pink.

The battery storage is proposed to be screened by an opaque privacy fending. City Staff are recommending a condition of approval that the applicant submit details for the proposed screening, identifying the material, height and structural components of the screening, to be reviewed and approved by the Planning Authority, and ensure compliance with §6.8.8(A) of the Land Use Code and §4.5.7 of the Technical Manual.

D. Water Quality, Stormwater Management, and Erosion Control

Staff Comment: The project proposes the use of two Contech stormfilters with storage to manage stormwater on-site, with additional information on the system submitted since the workshop. Based on the submitted stormwater management report, the proposed design will meet or exceed the detention capability of the site as compared to existing conditions for the 2-, 10-, and 25-year storms.

The project proposes ±5.64 acres of new impervious area and 7.24 acres of developed area. Chapter 500 & §5 of the Technical Manual require at least 80% of developed area and 95% of impervious area of the project to be treated. The proposed design proposes to treat 90.5% of the developed area & 96% of the impervious area to be treated, exceeding the requirements of Chapter 500 and the Technical Manual.

The submitted design proposes directly discharging treated stormwater into Casco Bay and a waiver of the Maine DEP Chapter 500 Flooding Standard has been requested as part of the review of the SLOD amendment. To meet the City of Portland stormwater requirements, the applicant will be required to submit a corresponding flooding waiver, which City Staff is supportive of.

Section 14.6.3. Public Infrastructure and Community Safety Standards

A. Consistency with City Master Plans

Staff Comment: On November 21, 2016, the City Council accepted the Portland International Jetport Sustainable Airport Master Plan (Order 88-16/17). The 2018 Portland International Jetport Sustainability Airport Master Plan identified the acquisition of the central and eastern portion of the project site to be an intermediate priority of the airport. Order 81-21/22 was unanimously approved by the City Council on November 1, 2021 to purchase the land, which was previously used as a private valet parking service.

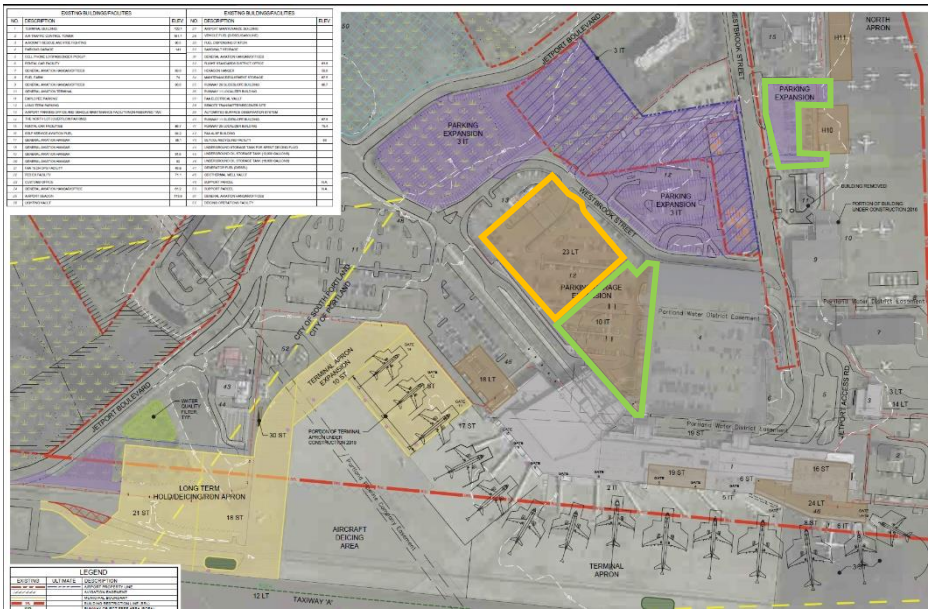


Figure 9: Development plan from *Portland International Jetport Sustainability Airport Master Plan* showing short, intermediate, and long-term development projects.

This project is listed as an intermediate-term project in the Master Plan (**Figure 9**). An additional surface parking expansion on the eastern side of Westbrook Street and a partial expansion of the parking garage are also listed as intermediate-term projects (outlined in green). A second parking expansion is also proposed as a long-term project (outlined in orange).

B. Public Safety and Fire Prevention

Staff Comment: Entry and exit gates are proposed at least 30 feet from the City right-of-way and include Knox boxes to allow for emergency vehicle access.

Based on feedback from the Department of Public Works, the Applicant has provided internal sidewalks and additional signage to provide clearer direction for pedestrians to the terminal to minimize conflicts between pedestrians & motorists.

C. Public Utilities

Staff Comment: Electricity for the parking lots is proposed to be provided through existing underground service from the Jetport, and utility plans have been updated to confirm that lines would not crate conflicts with the proposed stormwater detention tanks.

Connections to the City's storm drain are proposed, along with a waiver request to discharge directly to the Fore River. Two treatment & temporary detention tanks are proposed to discharge stormwater at the same or reduced volume as compared with the existing condition.

Section 14.6.4. Site Design Standards

A. Massing, Ventilation, and Wind Impact
Staff Comment: Not applicable. The proposed application does not propose a structure that would create massing, ventilation, or wind impacts.

B. Shadows
Staff Comment: Not applicable. The proposed application does not propose a structure that would create a significant shadow.

C. Snow and Ice Loading
Staff Comment: Complies. As part of the Jetport's larger snow removal strategy, the parking lot proposes removal to an off-site City storage location.

D. View Corridors
Staff Comment: Not applicable, since the site is not located along a view corridor.

E. Historic Resources
Staff Comment: The proposed development is not located within or within 100 feet of a local historic district, landmark, cemetery, or landscape. A copy of the application has been referred to the Maine Historic Preservation Commission (MHPC) for a Section 106 consultation and MHPC has determined that the project will have no impact on historic properties (Attachment Y).

F. Exterior Lighting
Staff Comment: The submitted photometric plan has been updated to provide information on the two types of luminaires proposed for the parking lot, with a total of 23 luminaires proposed for the parking lot. Information on the illumination and hours of operation (dusk to dawn) has been submitted and meets the standards of §12 of the Technical Manual. Existing street lighting along the City right-of-way complies with the standards of §10 of the Technical Manual.

G. Noise and Vibration
Staff Comment: Not applicable. The site does not propose the installation of utility equipment that will result in negative noise or vibration levels out of compliance with City requirements.

H. Signage and Wayfinding
Staff Comment: Updated signage is proposed to direct drivers to the parking lot from Loop Road, along with corresponding wayfinding signage throughout and around the parking lot to the terminal.

Sign permits will be required to be submitted to confirm compliance with Article 20 of the Land Use Code.

I. Design Standards
Staff Comment: Not applicable. The proposed development is not subject to the standards of the Design Manual.

XII. NEIGBORHOOD MEETING AND PUBLIC COMMENT

As of the writing of this report, five written public comments have been received which focus on conflicts between the proposed project and City plans, objections to the wetland fill associated with the project, and promotion of additional parking through other solutions. The Applicant held a Neighborhood Meeting on April 11, 2024 and 26 members of the public attended (Attachment DD). Comments raised at the Neighborhood Meeting focused on the environmental impacts of the project and support for alternative strategies to provide parking (e.g., prioritizing the structured parking expansion, expanded transit service). The Applicant has established a project webpage as part of the Jetport website (https://portlandjetport.org/parking-lot-expansion-information), which includes an audio recording from an earlier neighborhood meeting on the project on December 12, 2023.

XIII. STAFF RECOMMENDATION

Subject to the proposed motions and conditions of approval listed below, Planning Department staff determines that the application PL-002853-2024, a Major Site Plan at 1001 Westbrook Street, seeking to expand an existing short-term paved parking lot and unpaved surface parking area to create a paved parking lot with 667 long-term parking spaces, meets the applicable standards of Portland's Land Use Code.

XIV. PROPOSED MOTIONS

A. WAIVERS

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 November 26, 2024 for application PL-002853-2024 at 1001 Westbrook Street relevant to the site plan standards of the Land Use Code and the City of Portland's Technical Manual, and other regulations, and the testimony presented at the Planning Board hearing:

1. Sidewalks on Jetport Boulevard & Westbrook Street
   The Planning Board [**finds/does not find**] based upon the City's Review, that extraordinary conditions exist or undue hardship may result from strict compliance with §14.6.1(B)(3)(a) of the Land Use Code, which requires the installation of a sidewalk along all site frontages, that substantial justice and the public interest are secured with the proposed variation in this standard, and that variation is consistent with the intent of the ordinance. The Planning Board [**waives/does not waive**] §14.6.1(B)(3)(a) of the Land Use Code to allow for no sidewalk to be installed on Jetport Boulevard and Westbrook Street.

2. Impacts to Significant Natural Features
   The Planning Board [**finds/does not find**] based upon the City's Review, that extraordinary conditions exist or undue hardship may result from strict compliance with §14.6.2(A)(1) of the Land Use Code which requires the preservation and protection of significant natural features through incorporation into the site design, that substantial justice and the public interest are secured with the proposed variation in this standard, and that variation is consistent with the intent of the ordinance. The Planning Board [**waives/does not waive**] §14.6.2(A)(1) of the Land Use Code to allow the fill of ±11,151 square feet of wetlands.

3. Parking Lot Island Landscaping
   The Planning Board [finds/does not find] based upon the City's Review, that extraordinary conditions exist or undue hardship may result from strict compliance with §14.6.2(C)(3)(a) of the Land Use Code, which requires the planting of two trees (or one tree and three shrubs) per five parking spaces in landscaped islands, that substantial justice and the public interest are secured with the proposed variation in this standard, and that variation is consistent with the intent of the ordinance. The Planning Board [waives/does not waive] §14.6.2(C)(3)(a) of the Land Use Code to permit the planting of 24 trees in landscaped islands.

4. Minimum Parking Lot Island Width
   The Planning Board [finds/does not find] based upon the City's Review, that extraordinary conditions exist or undue hardship may result from strict compliance with §4.5.5 of the Technical Manual, which requires a minimum parking lot island width of 8 feet (not including curbing), that substantial justice and the public interest are secured with the proposed variation in this standard, and that variation is consistent with the intent of the ordinance. The Planning Board [waives/does not waive] §4.5.5 of the Technical Manual to allow for the installation of a landscaped island where a portion of the island is less than 8 feet in width (3.5 feet).

5. Direct Discharge of Treated Stormwater into Fore River
   The Planning Board [finds/does not find] based upon the City's Review, that extraordinary conditions exist or undue hardship may result from strict compliance with §5(III) of the Technical Manual which requires compliance with Chapter 500 Rules for Stormwater Management, that substantial justice and the public interest are secured with the proposed variation in this standard, and that variation is consistent with the intent of the ordinance. The Planning Board [waives/does not waive] §5(III) of the Technical Manual to allow the direct discharge of treated stormwater from the site into the Fore River.

B. 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 November 26, 2024 for application PL-002853-2024 at 1001 Westbrook Street 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 ISSUANCE OF THE BUILDING PERMIT

1. The applicant shall submit evidence of approvals from Maine DEP for the Site Location of Development & NRPA applications associated with the project.
2. The applicant shall provide an ability to serve letter from Central Maine Power (CMP).
3. The Applicant shall submit an updated site plan set listed the materiality, height, and structural components of the proposed privacy fence screening the battery storage.

PRIOR TO ISSUANCE OF CERTIFICATE OF OCCUPANCY

4. The Applicant shall submit verification that Level 1 chargers for 56 parking spaces have been installed in the structured parking at the Jetport.
5. The applicant shall contribute to the tree fund in the amount of $400 per tree for 127 trees, for a total of $50,800 associated with the waiver for parking lot island landscaping or the applicant

shall provide the Planning Authority with documentation that the additional 127 trees have been planted throughout the Jetport property.

C. PLANNING BOARD DECISION

On the basis of the findings, conclusions, and recommendations contained in the Planning Board report for the public hearing on November 26, 2024 related to application PL-002853-2024 for 1001 Westbrook Street, which is attached to the draft approval letter and incorporated therein, the Planning Board **[adopts/does not adopt]** the approval letter as drafted as the Planning Board's decision for application PL-002853-2024, and authorizes the Planning Board Chair to sign the approval letter as drafted.

XV. ATTACHMENTS

Staff Attachments

1. October 28, 2024 Project Worksheet
2. October 28, 2024 City Staff Comments
3. 2008 Terminal Expansion Traffic Movement Permit Conditions of Approval

Applicant's Documents

A. Cover Letter
A1. Applicant Response Letter 2024-05-10
A2. Applicant Response Letter 2024-08-30
A3. Applicant Response Letter 2024-11-11 (Satisfaction of TMP Conditions)
A4. Applicant Response Letter 2024-11-15
B. Major Site Plan Checklist
C. Right, Title, and Interest
D. Evidence of Approvals
D1. Army Corps of Engineers Authorization Letter 2024-08-14
E. Zoning Analysis Table
F. Conformity with Land Use Ordinance
F1. PWM Sustainability Action Evaluation Tool
G. Waiver Table 2024-11-21
G1. Alternatives Analysis
H. Financial Capacity
I. Technical Capacity
J. Impact on Surrounding Streets
K. Access and Circulation
L. Public Transit
M. Off-Street Parking
M1. EV Parking Demand Study
N. Preservation of Natural Features
O. Landscape Preservation
P. Site Landscaping and Buffers
Q. Water Quality, Stormwater & Erosion Control
Q1. Stormwater & ESC Construction Management Plan 2024-09-19
R. Consistency with Master Plans
S. Public Safety and Fire Prevention

T. Availability and Adequacy of Public Utilities
U. Massing, Ventilation, and Wind Impacts
V. Shadows
W. Snow and Ice Loading
X. View Corridor
Y. Historic Resources
Z. Exterior Lighting
Z1. On-Site Lighting Cut Sheets
AA. Noise and Vibration
BB. Signage and Wayfinding
BB1. Wayfinding Exhibit 2024-07-26
BB2. Wayfinding Exhibit 2024-11-14
CC. Zone-Related Design Standards
DD. April 11 Public Meeting Sign-In Sheet
EE. April 11 Public Meeting Presentation Materials
FF. April 11 Public Meeting Minutes

Plans

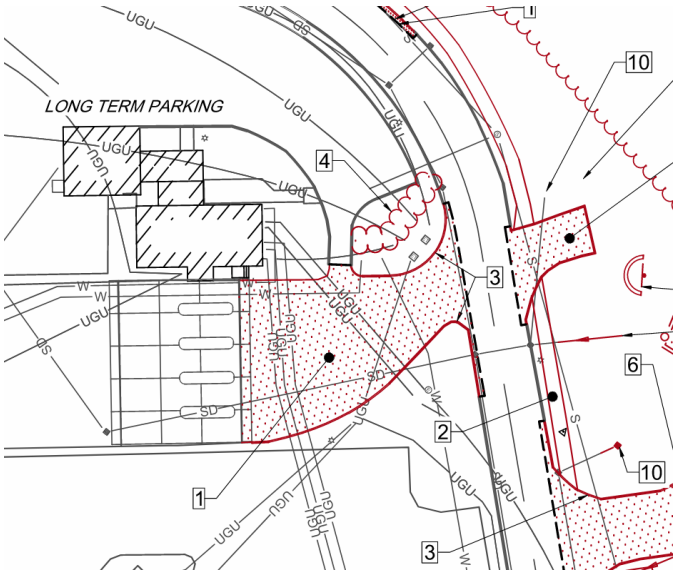
P1. Site Plan Set 2024-08-30
P2. Site Plan Set 2024-11-21
P3. Photometric Plan 2024-08-30
P4. Photometric Plan 2024-11-14

Public Comment

PC1: Carter Waldren 2024-11-12
PC2: Woody Howard 2024-11-14
PC3: Carter Waldren 2024-11-19
PC4: Carter Waldren 2024-11-20
PC5: Carter Waldren 2024-11-21
PC6: Charlotte Witt 2024-11-22
PC7: Roy St. Clair 2024-11-22

General Comments

- The submitted site plan set shows work to straighten the exit driveway from the existing long-term surface and structured parking across from the site. Inclusion of this area as part of the site plan application would require review/compliance of the existing long-term parking site. City Staff recommend that the site plan set be updated to clarify that the proposed realignment of the driveway is to be completed as part of a separate project/building permit.



- The proposed fencing along Loop Road has raised concerns about the visibility of the *Glimpse* pieces proposed to be relocated. City Staff request a note be added to the site plan set stating that the final location of the pieces is to be reviewed by the Public Art Committee and is subject to change, to allow for these concerns to be addressed without necessitating a future site plan amendment.

Zoning Use Review (Article 6)			
Use Permissions (Table 6-E)			
Proposed Use	***Permitted, Conditional or Accessory Use***	***Zone***	***Use Standard***
Off-street parking	***Permitted***	***A-B***	***None***

Zoning Dimensional Review (Article 7)			
Dimensional Standards (Table 7-G)			
Standard	***Requirement***	***Proposed***	***Finding***
Lot area (min.)	***20,000 square feet***	***358,094 square feet***	***Complies***
Street frontage (min.)	***50 feet***	***1,450.17 feet***	***Complies***
Lot width (min.)	***50 feet***	***Not Applicable***	***Not Applicable***
Front Setback (min.)	***20 feet along Westbrook Street***	***Not Applicable***	***Not Applicable***
Rear Setback (min.)	***None***	***Not Applicable***	***Not Applicable***
Side Setback (min.)	***None***	***Not Applicable***	***Not Applicable***
Structure height (max.)	***75 feet***	***Not Applicable***	***Not Applicable***
Impervious surface ratio (max.)	***70%***	***48%***	***Complies***

Site Plan Review Standards (Sec. 14.6)

Transportation Standards (Sec. 14.6.1)

Standard	Discussion	Finding
Impact on Surrounding Street Systems	Overview: Sight distance calculations have been provided and meet minimum standards. A request was made to confirm that the conditions of the current Traffic Movement Permit (TMP) for the site have been met and that a new TMP does not need to be submitted. In the transportation memo, the response to Staff comments to confirm whether the conditions of the TMP were met states, *"Need responses from Paul Bradbury; email sent 5/10/24"*. Responses have not been received demonstrating that the conditions were met and is repeated as a comment. Enplanement data submitted demonstrates that a new TMP does not need to be submitted, but will likely need to be updated in 2025. City Staff are recommending a condition of approval that the update to the Traffic Movement Permit, in coordination with an updated to the Transportation Demand Management Plan for the campus to commence in 2025.	Not met
	Updates Requested • Submit confirmation that all of the conditions for the 2008 Terminal expansion TMP were satisfied.	
Access and Circulation	Overview: Sidewalks are required to be provided along all frontages. While the latest response letter states that there is an intent to submit a waiver, no sidewalk waiver request has been submitted for Jetport Boulevard. City Staff continue to request internal sidewalks of a similar design used in other surface parking lots of the Jetport campus to promote safer interactions between pedestrians & motorists. City Staff encourages revisions to the design of these internal sidewalks to align with desire lines to increase their use by pedestrians.	Not met
	Updates Requested • Update application materials to include a ≥6-foot wide internal sidewalk that connects to the sidewalk along the frontage of the site or submit a waiver request. • Update application materials to include a sidewalk along Jetport Boulevard or submit a waiver request.	
Public Transit Access	Overview: Given that an existing transit shelter is located within the airport terminal that is less than ¼ mile from the project site, the project is not required to install a transit shelter.	Met

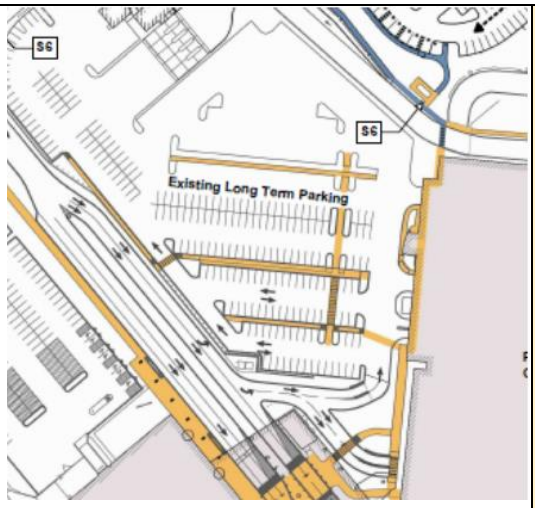
Parking	Overview: Automobile and bicycle parking requirements are not explicitly listed for airports within Article 19 of the Land Use Code. All proposed spaces and aisles meet the minimum dimensional requirements. A waiver request has been submitted to allow the use of Level 1 chargers for the parking lot, with the submission of an EV demand study comparing the number of chargers to other airports in the region. Vehicles in the proposed parking lot are anticipated to be parked for periods of time commensurate with the Level 1 charging rates.	Met
Transportation Demand Management	Overview: The Jetport has an existing TDM plan for the 2008 terminal expansion and the proposed project does not meet a threshold for creating a separate TDM plan. Similar to the recommendation for the Traffic Movement Permit, City Staff will recommend a condition of approval that the campus TDM plan be updated in coordination with the Traffic Movement Permit update.	No action at this time
Environmental Quality Standards (Sec. 14.6.2)		
Standard	***Discussion***	***Finding***
Preservation of Significant Natural Features	Overview: A narrative has been submitted discussing the relocation of the proposed battery storage on the site to preserve a larger section of existing trees on the site. The proposed application proposes impacts to two wetlands (±8,618 square feet in area). A supporting assessment has been submitted that assesses the significance of the wetlands using functions & values established by the U.S. Army Corps of Engineers (ACOE). Based on the assessment, the Wetlands are not significant according to ACOE standards. The submitted narrative does not speak to preservation measures taken to avoid or minimize impacts to the wetlands on the site and should be updated to speak to this, since wetlands are identified as a significant natural feature in §14.6.2.(A) of the Land Use Code. Additionally, any modifications in the design as part of complying with Maine DEP's review of the NRPA & SLOD applications should also be noted. The project area does not propose development within a habitat block. Updates Requested • Update the supporting waiver justification to discuss steps taken to minimize impacts to the wetland on the site, along with any steps taken as part of the Maine DEP review to comply with State & Federal regulations. • Update the waiver table to include a waiver from §14.6.2(A)(1).	Not met
Landscape Preservation	Overview: The subject application proposes to remove the majority of trees >10" Diameter Breast Height (DBH) within the project area, while increasing the number of preserved trees from the previous submission through the relocation of the battery storage & removal of parking spaces. Some of the Ash trees proposed to be removed have been infected by Emerald Ash Borers.	Not met

	Submission of a waiver request & updated waiver table will be required to document what steps have been taken to minimize the removal of existing trees and how the overall landscape plan is meeting the landscape preservation replacement requirements of §14.6.2(B)(4) of the Land Use Code. **Updates Requested** • Submit an updated waiver table documenting the steps taken to minimize the removal of existing trees on site and how new plantings are being used to meet the landscape preservation replacement waiver requirements of §14.6.2(B)(4) of the Land Use Code.	
Site Landscaping and Buffers	**Overview:** The site has 2,295 feet of frontage as is required to provide a combination of 1 tree or six plantings per 30 feet (77 trees or 462 plantings). The site proposes preserving 25 trees and planting 167 new trees, exceeding the minimum requirement. In the response letter, the battery storage corral is proposed to be screened by landscaping and fencing. In the submitted site plan set, the type of fencing is not specified and will need to provide opaque screening to meet the standards of §14.6.2(C)(2)(a). 674 parking spaces are proposed, requiring the planting of 270 trees or 135 trees & 404 shrubs in landscaped islands at least 8 feet in width. As submitted, 25 trees & 9 shrubs are proposed to be planted in landscaped islands. Some of the islands not meeting the minimum width of 8 feet as required in §4.5.5 of the Technical Manual. City Arborist Mark Reiland has recommended that plantings in the parking lot should be excavated to a depth of at least 2 feet and backfill with several yards of high quality planting mix to improve establishment & long-term viability. The site has 1,243 feet of frontage along City rights-of-way and is required to provide a minimum of 36 street trees. The Applicant is proposing to utilize street alternatives to preserve 12 trees that are less than 20 feet from & visible from the right-of-way and plant 57 new trees within 20 feet from & visible from the right-of-way, exceeding the minimum required. **Updates Requested** • Update the site plan set to specify the type of fencing proposed for the battery storage corral. • Update the site plan set to meet the parking lot landscaping standards of §14.6.2(C)(3)(a) & landscape island width standard of §4.5.5 of the Technical Manual, or seek waivers from these standards through submission of an updated waiver table & supporting justification for the waiver(s) demonstrating that the site prevents the implementation of these standards. The supporting justification can, but does not have to, speak to how the intent of the standard is similarly achieved through trees & shrubs in the proposed landscaped peninsulas. • Update the landscape plan to note that plantings in the parking lot should be excavated to a depth of at least 2 feet and backfill with several yards of high quality planting mix.	Not met
Water Quality, Stormwater	**Overview:** The project proposes the use of two Contech stormfilters with storage to manage stormwater on-site. Additional information has been	Not met

Management and Erosion Control	provided to address the majority of comments from Lauren Swett on this system. Lauren Swett has requested review of the erosion control implementation when submitted as part of the construction phasing plan. The submitted design proposed directly discharging treated stormwater into Casco Bay and a waiver request has been submitted as part of the review of the SLOD amendment to meet Chapter 500 standards. As part of meeting the City of Portland standards, a corresponding waiver request shall be submitted for review to the City as part of meeting the City's standards of the Technical Manual. Copies of Maine DEP approvals for the NRPA and SLOD applications are requested to be submitted when available.	
	Updates Requested • Update the construction phasing plan to show ESC measures. • Submit an updated waiver table with a request for directly discharging treated stormwater into Casco Bay as part of meeting the City's stormwater standards. • Submit copies of NRPA and SLOD approvals, when available.	

Public Infrastructure and Community Safety Standards (Sec. 14.6.3)

Standard	***Discussion***	***Finding***
Consistency with City Master Plans	Overview: On November 21, 2016, City Council accepted the Portland International Jetport Sustainable Airport Master Plan (Order 88-16/17). The Master Plan recommends strategies to improve the sustainability of the Jetport for operations and capital improvements. The subject project was included in the plan as an interim capital improvement. The Plan states that as of 2017, all capital improvement projects will use the Sustainability Action Evaluation Tool to identify opportunities to incorporate sustainability enhancements into the project, along with a life cycle cost analysis for the implementation of sustainability alternatives. The submitted application references that copies of these assessments were attached, but were not included as part of the comment response. Where feasible, City staff encourage the integration of sustainability enhancements, including, but not limited to ones identified in Table 7A of the Master Plan into the proposed project.	Not met
	Updates Requested • Submit a copy of Sustainability Action Evaluation Tool in Excel format • Submit a copy of the completed Sustainability Action Evaluation Tool for the subject project, including any corresponding life cycle cost analyses for sustainability alternatives.	

Public Safety and Fire Prevention	Overview: Entry and exit gates are proposed at least 30 feet from the City right-of-way and include Knox boxes to allow for emergency vehicle access. A signage/wayfinding plan has been submitted for the site, along with a response stating that the Applicant believes internal sidewalks would not be used by pedestrians in favor of the shortest path to Loop Road. DPW still finds the lack of internal sidewalk connections insufficient and recommends that the Jetport follows designs used for existing surface long-term parking as shown in the image to the right.  Updates Requested • Update the site plan set to provide internal sidewalks that reflect the design used in the image above, prioritizing a design where internal sidewalks follow desire lines.	Not met
Public Utilities	Overview: Electricity for the parking lots is proposed to be provided through existing underground service with the Jetport and the utility plan has been updated to show service. An ability to serve letter from Central Maine Power will be recommended as a condition of approval, if a letter is not received prior to action by the Planning Board. Connections to the City's storm drain are proposed, along with an anticipated waiver request to discharge directly to the Fore River. Two treatment & temporary detention tanks are proposed to discharge stormwater at the same or better rates than existing conditions.	No action at this time

Site Design Standards (Sec. 14.6.4)

Standard	***Discussion***	***Finding***
Massing, Ventilation and Wind Impact	Overview: Not applicable. The proposed application does not propose a structure that would create massing, ventilation, or wind impacts.	Not applicable
Shadow	Overview: Not applicable. The proposed application does not propose a structure that would create a shadow.	Not applicable
Snow and Ice Loading	Overview: Complies. The parking lot proposes snow removal to an off-site location that aligns with the campus snow management practices.	Met
View Corridors	Overview: Not applicable. The proposed application is not located along a view corridor.	Not applicable

Historic Resources	Overview: The proposed development is not located within or within 100 feet of a local historic district, landmark, cemetery, or landscape. A copy of the application has been referred to the Maine Historic Preservation Commission (MHPC) for a Section 106 consultation and MHPC has determined that the project will have no impact on historic properties.	Met
Exterior Lighting	Overview: An updated photometric plan has been submitted to specify that the proposed on-site lighting will include a combination of Beacon Viper Area/Site Lights that use LED lights and have zero up-light. Information on the hours each fixture will be operated and the timing devices used to control the hours set for illumination still needs to be provided. The proposed application continues to not comply with the following site lighting standards of §12.3 of the Technical Manual: • Surface parking average illuminance (0.5 fc required | 1.9 proposed) • Surface parking uniformity ratio (3:1 required | 3.8:1 proposed) • Surface parking maximum illuminance (4 fc required | 4.8 proposed) • Maximum lumens for fixture (20,000 maximum | 21,466-23,445 listed (24,005-25,053 listed on Beacon Viper Spec Sheets) As part of updating the application, please note that increased illuminance is permitted within a 10-foot perimeter of the credit card kiosks (Average: 10 fc | Maximum: 20 fc). Existing street lighting along the City right-of-way complies with the standards of Section 10 of the Technical Manual. Updates Requested • Update application materials to meet the standards of §12.3 of the Technical Manual or submit a narrative demonstrating how the photometric plan meets the standards of §12.3(11) of the Technical Manual. • Submit information on the hours each fixture will be operated & the timing devices used to set the hours of operation. • Confirm that the listed lumen levels on the photometric plan match the levels listed on the specification sheet for the on-site lighting.	Not met
Noise and Vibration	Overview: Not applicable. The site does not propose the installation of utility equipment that will result in negative noise or vibration.	Not applicable
Signage and Wayfinding	Overview: Updated signage is proposed to direct drivers to the parking lot from Loop Road and is shown on a wayfinding plan. As mentioned under the *Public Safety and Fire Prevention* section, DPW has requested changes to the internal sidewalks for the parking lot that may necessitate the relocation/addition of wayfinding signage. Sign permits will be required to be submitted to confirm compliance with Article 20 of the Land Use Code.	Not met
Design Standards	Overview: Not applicable. The proposed development is not subject to standards of the Design Manual.	Not applicable

Zachary Powell <zpowell@portlandmaine.gov>

1001 Westbrook St - PL-002853-2024

Ann Machado <amachado@portlandmaine.gov> Thu, Oct 10, 2024 at 1:55 PM
To: Zachary Powell <zpowell@portlandmaine.gov>

Zach -

I just took a look at this site plan.

I didn't see any zoning issues.

Feel free to reach out to me if you have any questions.

Ann

Ann Machado
Zoning Administrator
Permitting and Inspections Department
City of Portland, Maine
(207) 874-8709
amachado@portlandmaine.gov

Zachary Powell <zpowell@portlandmaine.gov>

1001 Westbrook Street - Status Traffic Review Comments

1 message

Tom Errico <thomas.errico@tylin.com> Tue, Oct 15, 2024 at 11:06 AM
To: "zpowell@portlandmaine.gov" <zpowell@portlandmaine.gov>
Cc: Jeremiah Bartlett <JBartlett@portlandmaine.gov>, Kristoffer DeVolder <kdevolder@portlandmaine.gov>

Hi Zack – I have reviewed the revised application materials and have the following status review comments.

- The proposed project is proposing three driveway curb cuts and if the abutting streets are classified as public streets, a waiver for the number of driveways may be required.

Status: The applicant shall provide documentation for a waiver for the provision of three driveways to the site.

- The Traffic Movement Permit issued for the Terminal Expansion noted the following. The applicant shall provide documentation that the current TMP is valid.
  - *As related to conditions of approval numbered 2, 3, and 4 associated with the Traffic Movement Permit, at such time as the Jetport reaches enplanements of 1.1 million for 2 out of 4 years the Jetport shall have*

    used the capacity under the Traffic Movement Permit and shall be required to submit an updated Traffic Movement Permit Application to the City.

Status: Based upon enplanement data provided by the applicant the above noted threshold has not been met and accordingly an updated Traffic Movement Permit is not required. Based upon the information, year 2024 enplanements appear to be on track to meet the 1.1 million threshold and an updated TMP may be required. It is suggested that the applicant report final enplanement data at the conclusion of 2024 and update the TMP if required.

- The applicant shall confirm that all requirements of the TMP were met.

Status: To clarify, the applicant shall note if all mitigation requirements of the TMP were implemented.

- I concur with comments from DPW regarding pedestrian facility issues.

Status: Refer to DPW comments.

- Sight distance measurements shall be provided at proposed driveway locations.

Status: The requested information has been provided and acceptable sight distance will be provided. I have no further comment.

Additional Comment

- **The applicant shall perform a sidewalk waiver analysis for all property frontages that do not include an existing or proposed sidewalk. The waiver analysis shall comply with the city ordinance requirements.**

Please contact me if you have any questions.

Best regards,

Tom Errico, P.E.
NE TRAFFIC ENG. DIRECTOR
T +1 207.347.4354
M +1 207.400.0719

TYLin

12 Northbrook Drive
Building A, Suite One
Falmouth, ME 04105, United States

TYLin.com

Zachary Powell <zpowell@portlandmaine.gov>

1001 Westbrook Street Review

1 message

Lauren Swett <lswett@woodardcurran.com> Tue, Oct 15, 2024 at 2:21 PM
To: Zachary Powell <zpowell@portlandmaine.gov>
Cc: Kristoffer DeVolder <kdevolder@portlandmaine.gov>, Justin Pellerin <jrp@portlandmaine.gov>

Hi Zach,

I've reviewed the resubmission for 1001 Westbrook Street and have the following remaining minor comments.

- The Applicant should provide copies when received of MaineDEP approvals for NRPA and Site Location of Development Permits.
- The Applicant has noted that erosion control implementation will be shown on the Construction Phasing Plan. The currently submitted plan does not show these measures. This can be reviewed when submitted.

They've made a few tweaks to the stormwater storage systems and have addressed all my other stormwater comments and questions.

Thanks,

Lauren

Lauren Swett, PE*
Technical Manager | Principal

Woodard & Curran

207.558.3763 207.219.3591 woodardcurran.com

lswett@woodardcurran.com

12 Mountfort St, Portland, ME 04101

*Licensed in Maine, New Hampshire, and Georgia

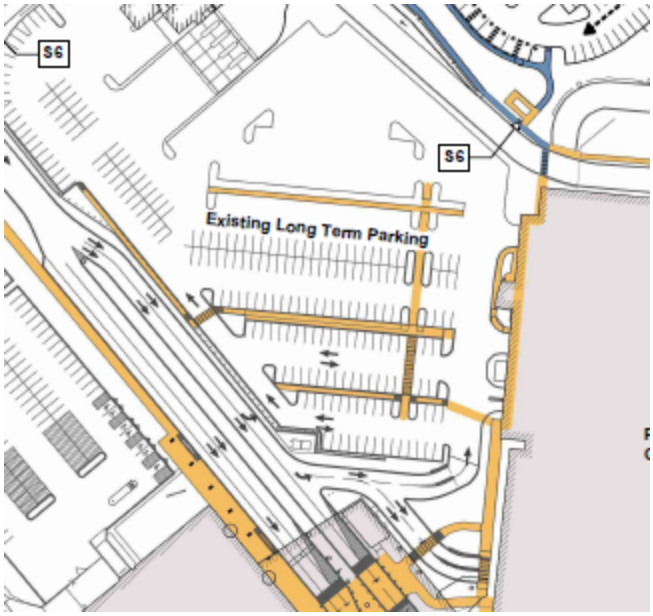
Zachary Powell <zpowell@portlandmaine.gov>

Comments for 1001 Westbrook Street (PL-002853-2024)

Kristoffer DeVolder <kdevolder@portlandmaine.gov> Wed, Oct 16, 2024 at 1:33 PM
To: Zachary Powell <zpowell@portlandmaine.gov>
Cc: Mark Reiland <mreiland@portlandmaine.gov>

Hello Zach,

Below are DPW's comments for PL-002853-2024 1001 Westbrook Street. Let me know if you have any questions.

- **PL-002853-2024 1001 Westbrook Ave** Major Site Plan
  - Comments for Review
  - DPW Transportation
    - DPW still has concerns regarding internal pedestrian circulation and believes that it is insufficient. See the existing Long Term Parking internal pedestrian access as an example of how prior projects have provided this at the Jetport.
    - 

    -
  - DPW Water Resources
    - No comments

Thank you,
Kris
[Quoted text hidden]
--
Kris DeVolder, PE
Sr. Engineer
City of Portland Department of Public Works
212 Canco Rd, City of Portland, ME 04103
kdevolder@portlandmaine.gov
Phone: (207) 874-8817

public works

Zachary Powell <zpowell@portlandmaine.gov>

Re: Portland Jetport Parking comments

Matt Grooms <mgrooms@portlandmaine.gov> Thu, Oct 24, 2024 at 11:52 AM
To: Mark Reiland <mreiland@portlandmaine.gov>
Cc: Zachary Powell <zpowell@portlandmaine.gov>

---------- Forwarded message ---------
From: **Mark Reiland** <mreiland@portlandmaine.gov>
Date: Thu, Oct 24, 2024 at 11:16 AM
Subject: Portland Jetport Parking comments
To: Matt Grooms <mgrooms@portlandmaine.gov>, Eric Freeman <efreeman@portlandmaine.gov>

Hi all,

I couldn't remember who the reviewer is, but ehre are comments for the Jetport Parking:

- Plan is approved by Parks Dept with following recommendation:
  - In the median/island plantings within the parking areas it would greatly improve establishment and long term viability if the planting islands were excavated to a depth of at least 24 inches and backfilled with several yards of high quality planting mix

Mark Reiland
City Arborist

City of Portland, Maine

212 Canco Road - Suite A
Portland, ME 04103

--
Matthew Grooms, AICP (he/him/his)
Development Review Services Manager
Planning & Urban Development Department
389 Congress Street
Portland, ME 04101
mgrooms@portlandmaine.gov
www.portlandmaine.gov
(207) 874-8699

MOTIONS AS PRESENTED AND VOTED BY THE PLANNING BOARD ON AUGUST 12, 2009 FOR THE PORTLAND JETPORT EXPANSION

On the basis of plans and materials submitted by the applicant and on the basis of information contained in Planning Report #16-09 and Planning Board Report #19-09 and on the basis of materials submitted under the request for reconsideration, and memorandum dated August 6, 2009, and materials and testimony of the August 12, 2009 public hearing relevant to standards for site plan regulations, the Planning Board finds that with the imposition of conditions the plan is in conformance with the site plan standards of the City of Portland Land Use Code and the Traffic Movement Permit, subject to the following conditions of approval:

Conditions of Approval:

1. Stormwater
   Prior to issuance of a Building Permit the applicant shall receive approval from the MDEP for all stormwater systems.

2. International Parkway/Jetport Boulevard Intersection
   A. The applicant shall install traffic improvement signs and pavement markings at the intersection within six months from the date of Planning Board approval. The improvements shall be subject to the approval of the Department of Public Services.

   B. A feasibility study shall be conducted that reviews options to address the anticipated capacity issues of the intersection within a year from the date of Planning Board approval. The potential mitigation options reviewed shall include: a full traffic signal warrant study conducted according to the MUCTD and MaineDOT requirements and coordinated with the Department of Public Services, construction of a roundabout, construction of a realigned intersection, maintaining a two-way STOP sign control and adding intersection capacity to attain acceptable levels of service.

   C. Prior to issuance of a Certificate of Occupancy permit, the applicant shall implement all recommendations from the feasibility study.

3. Congress Street/Westbrook Street Intersection
   A. The applicant shall contribute $10,600 towards the installation of street improvements identified by the Department of Public Services. Specific improvements as represented by the applicant shall include:

      i. Pedestrian countdown device;
      ii. A crosswalk with colored stamping, as approved by the Historic Preservation Department; and
      iii. Install a sidewalk between the Westbrook St. and Waldo St. with a crosswalk if the right-of-way is owned by the city.

B. The applicant shall install video detection equipment or contribute $9,400 for such installation in accordance with the Department of Public Services.

C. Prior to the Certificate of Occupancy the applicant shall ensure that all identified traffic mitigation measures are fully funded and implemented by this project through a financial contribution no less than $20,000.

4. Johnson Road/Turnpike Connector/Turnpike Northbound Ramps

A. Prior to issuance of a Certificate of Occupancy the applicant shall be responsible for interconnecting traffic signals at the Johnson Road/Jetport Boulevard/Turnpike Connector, Turnpike Connector/Turnpike NB Ramps, Turnpike Connector/SB Ramps, and Congress Street/Turnpike Connector/Hutchins Drive intersections. Work shall include installing necessary equipment, conducting traffic counts, and developing and inputting timing plans to allow for coordination, and field adjusting once all work has been completed.

B. Prior to issuance of a Certificate of Occupancy the applicant shall be responsible for constructing an eastbound right turn lane on the connector for right turning vehicles onto I-95 NB ramp. The length shall be the maximum allowable without requiring widening of the I-95 overpass.

5. Enplanements

As related to conditions of approval numbered 2, 3, and 4 associated with the Traffic Movement Permit, at such time as the Jetport reaches enplanements of 1.1 million for 2 out of 4 years the Jetport shall have used the capacity under the Traffic Movement Permit and shall be required to submit an updated Traffic Movement Permit Application to the City.

6. Travel Demand Management Plan

A. The applicant shall submit an annual TDM report for review and approval by the Planning Authority, with an initial report submitted within 12 months following the issuance of the Certificate of Occupancy for Terminal Expansion. The report shall summarize the current program elements and participation in the program.

B. Prior to the issuance of a Certificate of Occupancy, as part of the TDM, the applicant shall report to the Planning Board the steps taken to publicize that the preferred route taken to the Jetport are Congress St./Jetport Exit 46 from the Turnpike and the Westbrook Street/Jetport Exit 3 from 295 and other steps to increase public awareness in promoting these routes including but not limited to the following:

i. Alteration of the Jetport Directions Web page;
ii. Signage at the 5B exit informing drivers the "Best Route to Jetport" is Exit 3; and
iii. Inclusion of the preferred route in all marketing launching the "new, improved" Jetport.

7. Trail
The applicant will use good faith efforts to obtain FAA approval for location of a trail along the Fore River from Yellowbird Lane to the South Portland City line, which approval need not encompass an easement or permanent encumbrance upon the Jetport property and may be revocable if deemed necessary for future Jetport improvements, and shall pursue such approval with the FAA at offices of higher authority than the New England Region Office, or, failing approval of a trail in said location, shall pursue FAA approval for the alternate trail connection location as presented to the Planning Board by the applicant and depicted on Board A (unlabeled) at the August 11, 2009 public hearing, and shall dedicate such trail via easement to the City or City designee, subject to any FAA requirements related thereto. If FAA approval is not obtained for such trail location, then applicant shall submit one further alternate location for such trail in a location acceptable to the FAA if such location can be determined, and if no such location can be agreed upon after best efforts, then no such trail or easement shall be required.

8. North/South Runway
If the applicant decides to implement a proposal for expansion of the north/south runway, the applicant shall return to the Planning Board for review of that expansion concerning impacts to adjacent property owners and its affect on capacity of the airport facilities within the City of Portland.

9. Noise Compatibility Program
The Jetport shall comply with its adopted noise compatibility program approved by the FAA, as it may be revised from time to time.

Vote passed 4 in favor (Lewis, Patterson, Lowry, Tevanian) – 1 opposed (Silk)

March 15, 2024
19059

Mr. Matt Grooms
City of Portland
Office of Planning and Urban Development
Congress Street
Portland, ME 04101

Site Plan Application – Portland International Jetport Parking Expansion

Dear Matt:

On behalf of the City of Portland, Sebago Technics Inc. is pleased to submit the enclosed application for Site Plan review of a parking lot expansion at the Portland International Jetport. The proposed project is to be located within the Jetport campus near the intersection of Jetport Boulevard and International Parkway. The subject area is identified as City parcel number 210AA007, 210AA006001, and 210AA002001. The project area is comprised of previously developed and undeveloped land and is approximately 13 acres. The site is bounded by a hotel to the East, airport parking and facilities to the west and south, Jetport Blvd and vacant City owned land to the north. The project area is located within the City of Portland's Airport Business Zone.

The project will be comprised of an expansion of the existing Jetport parking areas with an approximately 240,000 s.f. long-term parking area. The project proposes the construction of two paved parking lots which will provide 684 long-term parking spaces. One of the proposed new lots will convert an existing cell phone lot and gravel valet lot for use as long term parking. This lot will be comprised of 248 standard and 8 ADA compliant parking spaces. The second lot is proposed to include 416 standard and 12 ADA compliant parking spaces. The project in total will provide a net increase of 282 new parking spaces. The proposed parking lots are to be accessed from the Terminal Loop Road that connects to Jetport Boulevard and International Parkway. All means of access and egress will be controlled with credit card kiosks. The project also includes the construction of a concrete pad for a proposed battery storage system to optimize energy usage through battery storage in off-peak times. Please see the information sheets included with this letter for information regarding the battery storage system.

The applicant is proposing to provide 56 Level 1 EV equipped parking spaces within the existing parking garage and will install the infrastructure for a future 141 Level 1 EV parking spaces in

the proposed surface lots. The applicant has requested a waiver from the City requirement of Level 2 or higher charging stations as the parking lots are to be utilized for long-term parking.

The project will result in the creation of a net increase of 4.58 acres of developed area and a net increase of 2.85 acres of new impervious. The overall stormwater management system for the project will consist of catch basins and two (2) subsurface drainage systems. The two (2) subsurface drainage systems will provide water quality treatment with upstream detention designated to the long-term parking lots. Since the Jetport discharges to the Fore River, the applicant will be pursuing a waiver of the Flooding Standard pursuant to MDEP Rules, Chapter 500(4)(F)(3)(b).

The proposed parking expansion will result in approximately 8,618 s.f. of wetland impacts. The project is undergoing Site Law and NRPA review by the Maine DEP.

Thank you for your time and attention to this project. We look forward to discussing the project further with staff and the Planning Board.

Sincerely,

SEBAGO TECHNICS, INC.

Owens McCullough, P.E., LEED-AP
Senior Vice President, Strategy & Client Development

cc: Paul Bradbury, P.E., Airport Director

Battery Storage System

Portland International Jetport ("PWM") plans to install a 1.9-megawatt ("MW") lithium-ion battery storage system ("BSS") on its property in Portland, Maine. The BSS will be financed, owned, and operated by PWM. The BSS project will help advance Maine's clean energy policies and ambitious grid decarbonization efforts. In June 2021, Governor Mills signed Public Law 2021 Chapter 298 (LD 528 - An Act To Advance Energy Storage in Maine). This bipartisan legislation directs multiple important steps to advance energy storage development throughout Maine and sets goals for 300 MW of installed energy storage capacity in the state by the end of 2025 and 400 MW of installed energy storage capacity in the state by the end of 2030. PWM's BSS project will support Maine's efforts to meet these goals.

PWM will charge the BSS from Central Maine Power Company's power grid during periods of high renewable generation in Maine's electricity supply mix and will discharge the BSS to reduce the terminal's grid demand during high-demand periods on CMP's local system. This operations strategy will help soak up widespread intermittent solar generation being developed throughout Maine, will help reduce stress on CMP's grid infrastructure during high-demand periods, and will help displace higher-emitting electric generation sources in the state's supply mix during high-demand periods.

In addition to helping reduce greenhouse gas emissions in Maine's electricity supply mix and reduce stress on CMP's distribution and transmission system during periods of high demand, the BSS will be configured to enable PWM to utilize the system as a backup power resource in the event of a grid outage. The BSS has a nameplate energy capacity of five megawatt-hours, meaning the system will be able to provide several hours of uninterrupted power to the terminal in the event of a grid outage. For normal operating conditions, the BSS is designed to be non-exporting. The electricity discharged by the BSS will only be used to reduce the terminal's onsite electric load and the system will have protective relaying schemes to ensure that no power discharged from the BSS can be sent to CMP's local grid.

Figures 1 and 2 below show the proposed location of the BSS on PWM's property at the intersection of International Parkway and Jetport Boulevard. The BSS will be located adjacent to the new surface lot being developed by PWM. Figure 3 presents the preliminary layout of the BSS components within the system's fence line. The BSS will have security fencing and lighting.

Ameresco, Inc. will be constructing and maintaining the BSS and will utilize battery modules manufactured by Tesla. The BSS will be maintained in accordance with industry leading practices for ongoing preventative checks and performance monitoring. The BSS' technical specifications and warranty guarantees are provided in the attached document titled 'Portland Jetport Tesla Megapack 2 XL Datasheet'. An overview of the BSS' safety features and design is provided in the attached document titled 'Portland Jetport Tesla Megapack 2 XL Safety Overview'. This safety documentation, along with the protective relaying scheme detailed in the attached electrical one-line diagram, demonstrates the project will satisfy all utility interconnection, permitting, and safety requirements.

The BSS is in the advanced stage of CMP's interconnection study process. CMP has determined that the BSS can interconnect and operate in parallel with its local distribution system without any grid upgrades. PWM is awaiting the final review results from ISO New England that will determine whether the project requires a transmission-level interconnection study. Following this decision, PWM will be engaging local permitting authorities within the City of Portland to begin educating key local stakeholders, including Portland Fire Department, on the BSS' design, safety features, fire protection, and protocols in the event

of an emergency. This engagement will be collaborative with the aim of supporting a local permitting process that meets the needs of all key stakeholders.

Figure 1. Location of Proposed Battery Storage System

Figure 2. Preliminary Layout of Battery Storage System & Associated Utilities

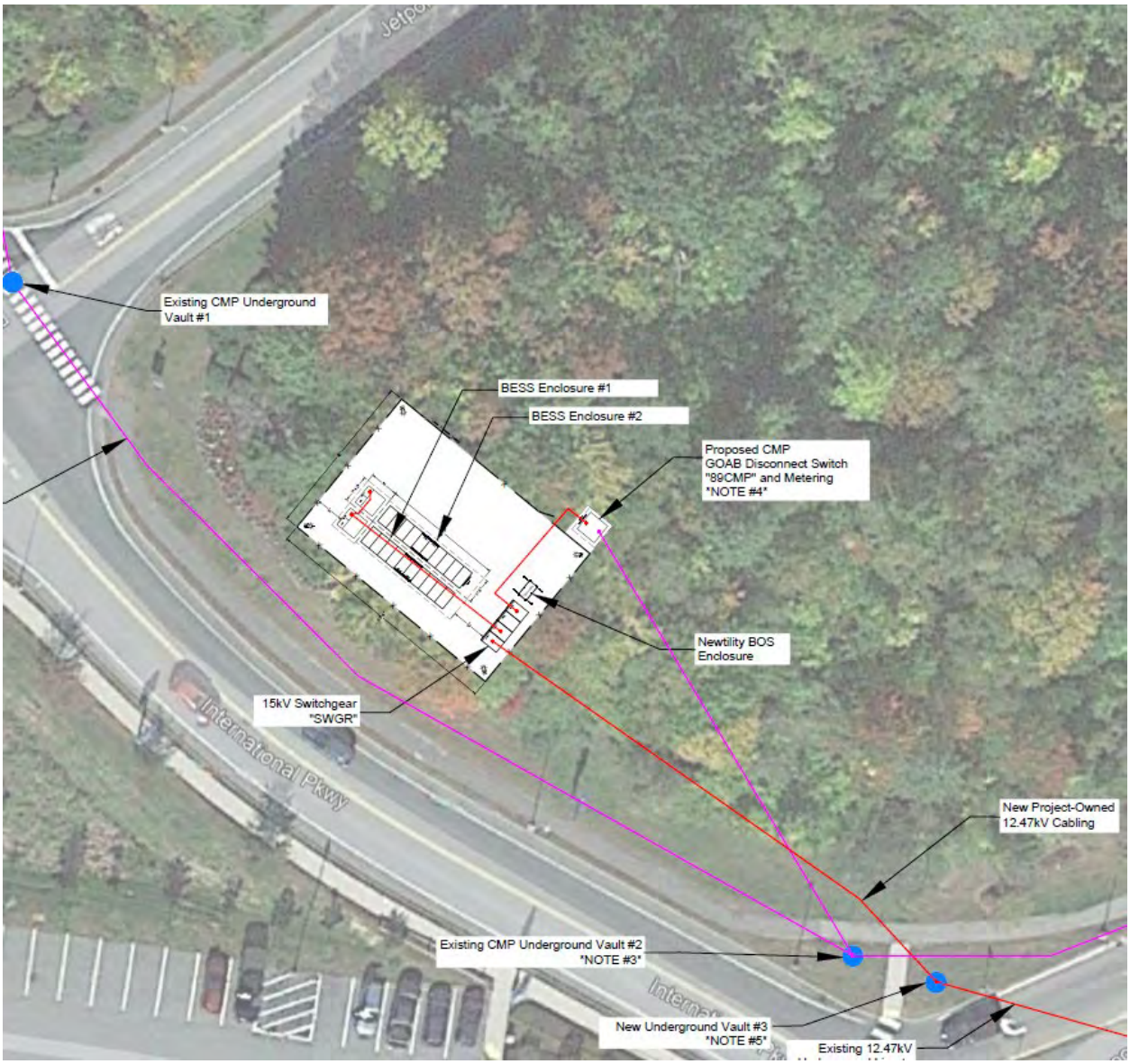
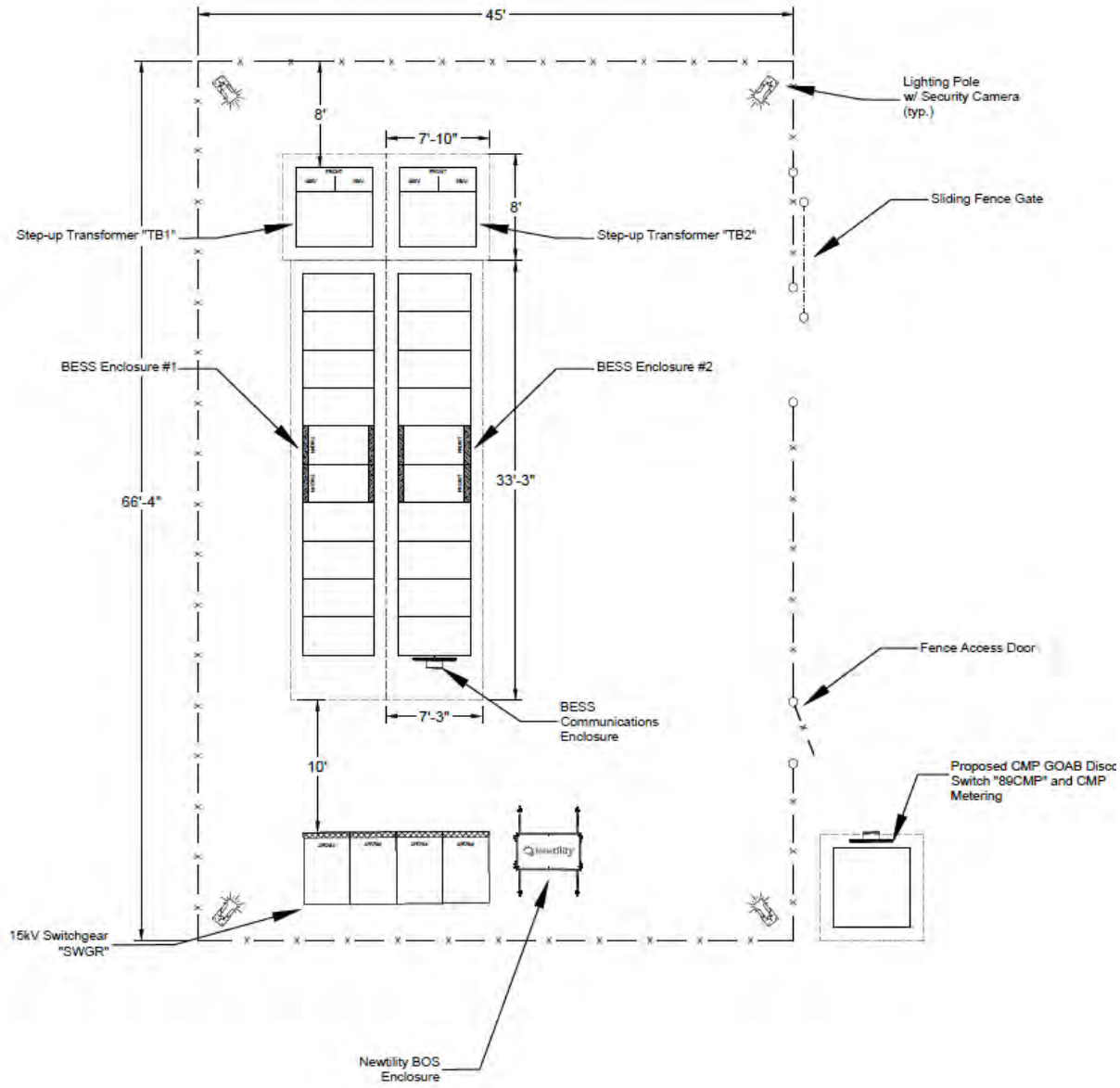
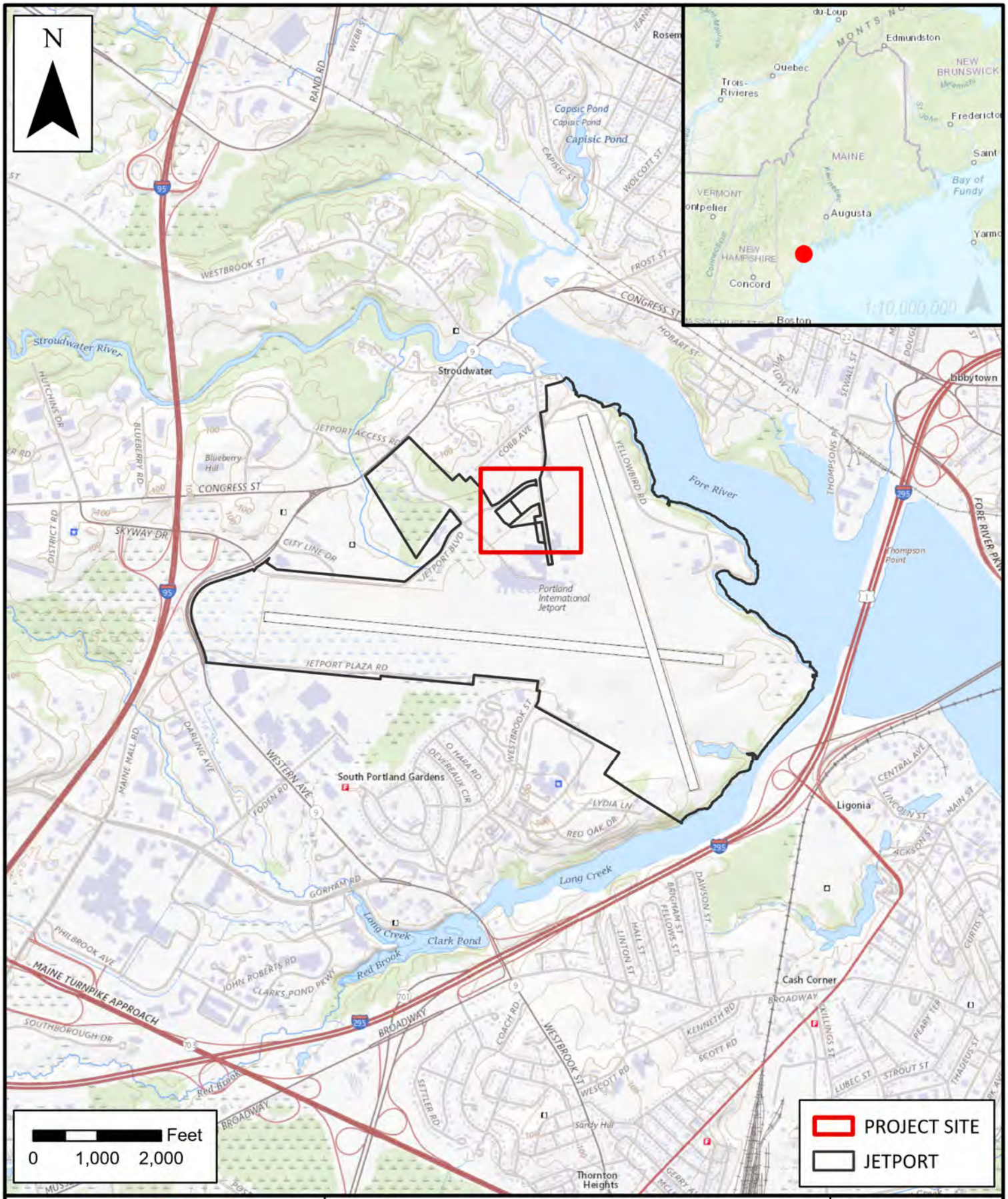


Figure 3. Preliminary Layout of Battery Storage System Components





SEBAGO TECHNICS

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

LOCATION MAP
JETPORT PARKING

SCALE: 1:24,000
DATE: 2/29/2024

LOCATION:
1001 WESTBROOK ST
PORTLAND, ME

INFORMATION:
MAINE GEOLIBRARY
USGS QUADRANGLE

SEBAGO TECHNICS

CIVIL ENGINEERING • SURVEYING • LANDSCAPE ARCHITECTURE

Memorandum

19059

To: City of Portland

Date: May 10, 2024

Subject: Response to Comments, Portland Jetport, Portland

The purpose of this memorandum is to provide a response to the comments received by the City of Portland, dated April 24, 2024. The comments are listed below in italics, with our associated responses:

Comments

1) *Update the application materials to provide a T-intersection entrance to the parking lot that meets the requirements of the Technical Manual.*

   Since the Jetport Access Road is one-way combined with this access serving ingress movements only, a conscious decision was made to design the entrance on a skew to reduce the speed differential between traffic slowing down to enter the parking lot and thru traffic. This, in turn, should improve the safety of motorists within this area. The second concern is regarding the crosswalk location and the safety of pedestrians crossing at this location. A clear line of sight has been provided at this location, along with a radius (centerline radius of approximately 60 feet at the crosswalk location) designed to slow traffic down after they exit the primary flow of traffic on the Jetport Access Road.

2) *Provide sight distance measurements for each of the ingress and egress points of the parking lot.*

   Sight distance was reviewed in the field on May 7, 2024, for the proposed exits to the parking lot. Measurements were conducted from a point ten (10) feet behind the edge of the travelway, considering a height of eye of 3.5 feet and a height of object of 4.25 feet as outlined in the Maine Department of Transportation's *Chapter 299, Highway Driveway and Entrances Rules* as referenced in the City of Portland *Technical Manual.* The minimum sight distance requirements are outlined in Table 1.

Table 1 – Minimum Sight Distance Requirements

Posted Speed (MPH)	*Required Sight Distance (feet)*
25	200’
30	250’
35	305’
40	360’
45	425’
50	495’
55	570’

Westbrook Street is posted at 25 MPH based on signage observed in the field. No signage was identified on Loop Road; therefore, it was assumed that it was also considered a 25 MPH roadway. Sight distance from the proposed exit-only parking lot access on Loop Road was measured to be 525 feet looking left. Loop Road is proposed to remain a one-way road, so no traffic would be expected coming from the right via International Parkway. Sight distance from the proposed secondary access on Westbrook Street was measured to be 430 feet until the authorized vehicles only section of Westbrook Street. The sight distance looking right was measured to be 625 feet.

As such, sight distance from both proposed egress locations exceeded sight distance requirements for a 25 MPH roadway.

3) *The Traffic Movement Permit issued for the Terminal Expansion noted the following. The applicant shall provide documentation that the current TMP is valid.*
   a. *As related to conditions of approval numbered 2, 3, and 4 associated with the Traffic Movement Permit, at such time as the Jetport reaches enplanements of 1.1 million for 2 out of 4 years the Jetport shall have used the capacity under the Traffic Movement Permit and shall be required to submit an updated Traffic Movement Permit Application to the City.*

Enplanements for the last four (4) years have been as follows:

2020: 397,242
2021: 857,312
2022: 999,130
2023: 1,109,037

Given that one (1) year out of the last four (4) years has exceeded 1.1 million enplanements, the Jetport has not exceeded the capacity of the current Traffic Movement Permit (TMP).

4) *Submit confirmation that all of the conditions for the 2008 Terminal expansion TMP were satisfied.*

Need responses from Paul Bradbury; email sent 5/10/24.

75 John Roberts Road – Suite 4A, South Portland, ME 04106-6963 • 207.200.2100 • Fax: 207.856.2206

We are hopeful that the responses and revised material included in this letter are satisfactory and have addressed your concerns. Upon your review of our responses, please contact us with questions or if additional information is required.

SEBAGO TECHNICS, INC.

Bradley Lyon, P.E., PTOE
Vice President of Transportation Engineering

CC: Griffin Steinman, EI

75 John Roberts Road – Suite 4A, South Portland, ME 04106-6963 • 207.200.2100 • Fax: 207.856.2206

August 28, 2024
19059

Mr. Zach Powell
City of Portland
Office of Planning and Urban Development
Congress Street
Portland, ME 04101

Site Plan Application – Portland International Jetport Parking Expansion

Dear Zach:

On behalf of the City of Portland, Sebago Technics Inc. has assembled the following comment response to the site plan review application for the parking lot expansion at the Portland International Jetport. The following provides the review comments in Italic and the responses in bold.

General Comments

• *Application materials include conflicting information on the proposed limits of project disturbance and scope of work. The site plan set only includes work south of Jetport Boulevard, while the submitted wetlands assessment & soil survey include a surface parking lot with 105 spaces on the northern side of Jetport Boulevard. The Applicant shall submit a response that:*

o Confirms whether the 105 spaces north of Jetport Boulevard are included as part of this phase of development

o Confirms whether any site preparation activities for the 105 spaces shown north of Jetport Boulevard are included as part of this phase of development

o Describes, if the 105 spaces north of Jetport Boulevard are not included as part of the proposed phase of development, whether the spaces were originally contemplated as part of this phase of development, what factors resulted in the spaces to be removed from this phase, and if there is a contemplated date/year where a separate application will be submitted for the 105 spaces.

Response: The project limits do not include the northern side of Jetport Boulevard and the scope of the project does not include an additional 105 parking spaces in that area. The wetlands investigation encompassed a larger review area. Previous design concepts included development on the northern side of Jetport Boulevard. The 105 parking spaces north of

Jetport Boulevard was removed from the project responsive to public comment and is no longer part of this project.

• Staff have provided comments on this application under the presumption that the 105 spaces north of Jetport Boulevard are not included as part of this application. If the 105 spaces north of Jetport Boulevard or site preparation activities for the lot are proposed to be included as part of this application, updated application materials will need to be submitted to reflect the limits of project disturbance and additional comments from City Staff & Third-Party Reviewers will be provided.

Response: The 105 spaces north of Jetport Boulevard are not included in this application.

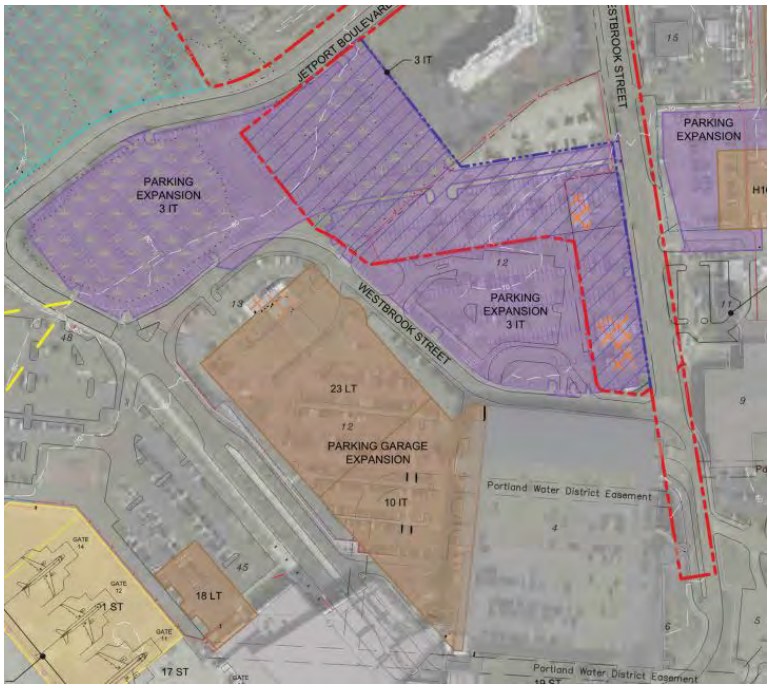
• As part of the Jetport's Sustainable Airport Master Plan, expansion of the existing structured garage is proposed over an existing surface parking area is identified as a future project. Given that the application has stated the Jetport's short- and long-term needs for additional on-site parking, submit an assessment prepared by a licensed engineer confirming that the design of the proposed surface lot permits for a future conversion to a structured parking facility.

Response: To better articulate the short- and long-term needs which includes an integrated approach to both surface parking and a future garage expansion, we have prepared the following narrative for consideration.

Overview:

The Jetports Sustainable Master Plan contemplates both surface parking and a future parking garage expansion. As shown on the excerpt below from the Sustainable Master Plan (Exhibit K – Terminal Area Plan), the location of the proposed surface parking is identified as surface parking on the Terminal Area Plan. The plan also contemplates a future parking garage expansion being an extension of the current parking garage next to the terminal building.

It is important to view the parking Master Plan as sequential process where the proposed surface parking is the initial phase that addresses near term needs in an economical manner and builds parking capacity that will accommodate the displacement of surface parking at a future time when needs and economics support a parking garage expansion adjacent the existing garage and terminal.



Excerpt from Sustainable Master Plan – Exhibit K -Terminal Area Plan

<u>Sustainable Master Plan Parking Garage Next to Terminal and Existing Garage:</u>

The existing parking garage and foreseeable parking garage expansion are integrally planned to provide proximate parking for ease of access to the terminal including an enclosed access bridge that currently exists at level three of the parking garage. The current and planned parking garage expansion as shown in the Sustainable Master Plan exhibits also accommodates rental car ready/return operations. The existing roadway network and travel patterns are well-suited to accommodate the future parking garage expansion adjacent to the terminal. The expanded parking garage shown on the Master Plan is purposely intended to build upon the existing parking garage and will collectively utilize existing vertical transportation components for efficiency, convenience, and proximity to the terminal building.

The surface parking lot proposed as part of this application is planned and located in the area depicted on the Ultimate Facilities Plan and more detailed in the Terminal Area Plan provided in Exhibit K of the Sustainable Airport Master Plan. The proposed surface parking meets the current parking deficiency, is more economical than a parking garage, and is needed logistically to accommodate construction of the future parking garage. Sequentially, the surface parking lot is the initial step in the longer-term parking at the Jetport to meet current needs and plan for the future when economics and parking needs are sufficient to warrant the capital investment of the parking garage in Phase 3 and 4.

As contemplated in the Master Plan, the future parking garage expansion is logically positioned and would be constructed in (2) phases due to cost and expected parking

needs. The Master Plan garage expansion will be a multi-story parking garage expansion of similar floors and height to the existing parking garage with interconnectivity between the existing and future garage. The future parking garage expansion (identified as 10 IT on the Master Plan) is the third phase of the parking garage (two prior phases previously constructed). Should the future beyond the initial parking garage expansion be needed, a Phase (4) identified as 23 LT is provided for on the Master Plan.

Proposed Surface Lot & Future Parking Garage Expansion – Phase 3 & 4 of the Sustainable Master Plan:

At the time the Phase 3 and 4 parking garage expansion becomes a reality, the surface parking lot proposed in this application must be constructed and operational to supplant the spaces that will be impacted during the 2-year-long construction process for a new garage next to the terminal. From a design and construction standpoint, the Phase 3 parking garage expansion shown on the Master Plan, will occupy a portion of the existing long-term parking lot and will require a sequenced construction approach to maintain ingress/egress to the existing parking garage and exit portal. The logistics of the parking garage expansion will fully develop at the time the parking garage expansion becomes necessary. Regardless, the proposed surface lot is critical to accommodate displaced parking at the time the next (2) phases of the parking garage become needed.

While it is possible that over time (once both phases of the Master Plan parking garage expansion are constructed), another phase of the parking garage could encompass the surface parking shown in this application, the timing of this is undefined and likely many years away and would be evaluated as part a future Master Plan update. It is simply not possible to predict when this might become a real need. For the interim time, the surface parking proposed is an economical approach to meet current needs and is logistically needed to accommodate the Garage expansion identified in the Sustainable Master Plan. It is also important to note that the surface parking lot address stormwater management/water quality deficiencies that currently exist on the Park N Fly lot.

Proposed Surface Lot Construction:

Similar to the surface parking lot constructed next to the existing parking garage, a surface parking lot offers an economical approach to parking with a parking garage being constructed in its place as demand warrants over time. This approach is what the Sustainable Master Plan contemplates for the existing surface parking next to the present-day parking garage. As previously stated, the proposed surface parking lot builds capacity meeting interim parking needs, is economical, and builds capacity to alleviate the parking that will be displaced when a parking garage expansion occurs as identified in the Sustainable Master Plan.

Regarding constructing a parking garage to replace the proposed surface parking lot, the timing for this is undefined and could be in the distant future especially given the Phase 3 and 4 parking garage expansion identified in the Sustainable Master Plan. From a construction standpoint, it is important to understand a parking garage is a structure with a different type of construction, and therefore, the surface parking lot would be replaced with a garage structure. A parking garage is essentially a multi-story building to house vehicles and requires foundations responsive to the soil conditions, structural floor structure support systems, ventilation, elevators, egress stairways, helix, or other floor-to-floor vehicle ingress/egress. While both a surface lot and parking garage accommodate parking, a surface lot by convention is constructed differently than a parking garage, is more economical and in the case of the Jetport a planned approach to address current needs and build capacity for future garage construction. It is equally important to note that the surrounding roadway infrastructure will be in place as part of this project to accommodate parking garage construction.

The surface parking lot proposed in this application has been designed with a two-phased construction approach. One phase is located northwesterly between the terminal access road, Jetport Boulevard, and the Jetport egress road. The second phase is located in the existing cell phone lot and gravel valet parking (gravel lot). Should the time come when these lots need to be developed as parking garages, the development of additional parking garage space would likely be completed in similar phases to the surface lot construction and based on cost and need.

<u>Summary:</u>

The proposed surface lots are a critical first step to meet the parking needs at the Jetport. The surface lots will provide capacity to meet the current parking needs and provide capacity for displaced parking that would occur at the time the Master Planned parking garage is initiated next to the terminal building. Additionally, the reconstruction of the existing Park N Jet gravel lot will address current stormwater management and water quality deficiencies. The Park N Jet gravel lot also does not currently adequately address lighting, landscaping, and pedestrian circulation which will be provided for as part of this surface lot parking project.

Should the distant future warrant the conversion of the proposed surface lots to a structured parking garage, the lots are well suited to accommodate the conversion. The surface lots are physically separated from the existing parking garage allowing for the conversion of these surface lots in a phased approach with no appreciable impact to the current parking garage or Jetport ingress/egress and terminal area.

As requested, this narrative was prepared by Owens McCullough, P.E of Sebago Technics, Inc. in collaboration with Paul H. Bradbury, P.E., Airport Director.

• The proposed project will result in the relocation of two sculptures from the public art piece Glimpse. As part of the review of the site plan application, coordination with the Public Art Committee, the artist, and City staff is required to determine how the sculptures will be uninstalled, stored during construction, and where & how they will be reinstalled. Coordinate with Sean King (sking@portlandmaine.gov) to determine next steps on the relocation process.

Response: Understood. Paul Bradbury has coordinated with Sean King regarding the relocation and temporary storage of the public art.

Transportation Standards (Section 14.6.1)

Impact on Surrounding Street Systems
• Update the application materials to provide a T-intersection entrance to the parking lot that meets the requirements of the Technical Manual
• Provide sight distance measurements for each of the ingress and egress points of the parking lot.
• Submit confirmation that all of the conditions for the 2008 Terminal expansion TMP were satisfied.

Response: Please see the attached memorandum prepared by Sebago Technics' Traffic Engineer, dated May 10, 2024. As noted in the traffic memorandum, the conditions of the 2008 Terminal Expansion TMP were satisfied. Sebago has also provided sight distance measurements for the ingress and egress points. In regard to the T-intersection entrance, we prefer to keep the separated lane for reasons explained in the traffic memorandum.

Access and Circulation
• Update application materials to include a ≥6-foot wide internal sidewalk that connects to the sidewalk along the frontage of the site.
• Update application materials of provide ≥8-foot wide sidewalks along the frontage of the site.
• Update application materials to include a sidewalk along Jetport Boulevard or submit a waiver request.

Response: The project design provides for perimeter sidewalks on the terminal side of the parking lots to collect and convey passengers to the terminal building. Passengers within the parking lots tend to take the shortest path to their destination, regardless of the designated walkway. This behavior makes internal sidewalks less effective. Considering the natural behaviors of passengers, the design provides for sidewalks at the perimeter of the parking lot to intercept passengers leaving the parking lots and provides them with convenient and safe routes to and from the terminal building.

We have included two strategically located internal sidewalks in the easterly long-term parking lot. These two locations are along the westerly side of the north-easterly lot and the westerly side of the south-easterly lot. The locations are immediately next to the parking lot and provide a direct route to the perimeter sidewalk leading to the terminal building.

The Jetport does not recommend installing wider sidewalks than what is currently proposed due to practical experience of the Jetport and for the following reasons:

- **Departure and arrival aircraft times vary, creating dispersed times of relatively limited amounts of pedestrian traffic throughout the day.**
- **Most of the accumulated sidewalk pedestrian traffic is located at the terminal building where passengers are dropped off and picked up by family/friends, buses, taxis, and rideshare and passengers tend to congregate and not in the long-term parking areas.**
- **Those passengers who tend to access the long-term parking lots via sidewalks away from the terminal are intermittent given the longer duration stays. Parking data maintained by Standard Parking shows that nearly 50% of the long-term parking users are staying 4 or more days. As a result, there is a low rate of turnover in the long-term parking lots creating smaller pedestrian usage that is dispersed over a long duration.**

The sidewalk proposed along Loop Road meets the 6' wide requirement which is expected to be sufficient to meet the anticipated pedestrian traffic for the reasons described above. The sidewalk will also connect to the existing 6' sidewalks on Westbrook Street and International Boulevard which has consistently met the pedestrian movement needs at the Jetport.

The applicant intends to seek a waiver for a sidewalk along the frontage on the southern side of Jetport Boulevard because there is an existing sidewalk on the northern side of the road and for elevation differences. The grades within the proposed parking lot are 3 to 8 feet below the road grade of Jetport Boulevard; a connection to a sidewalk along the southern side of Jetport Boulevard would not be feasible without retaining walls, would require additional tree removal, and would limit the available area to re-establish a landscape buffer. From a practical standpoint, the passengers using the long-term parking lot will walk in the opposite direction of Jetport Boulevard since the passengers tend to choose the shortest and most direct path to the terminal.

Parking
• Submit an EV parking demand study that meets the requirements of §1.14 of the Technical Manual

Response: Please see the attached waiver request from an EV parking demand study.

Environmental Quality Standards (Sec. 14.6.2)

Preservation of Significant Natural Features
• Update the application to either not impact significant natural resources on the site or submit a waiver request and supporting justification that meets the standards of §14.6.2.(A)(3) of the Land Use Code.

Response: The proposed project does not impact any:

a. **Populations of trees and plants listed on the Official List of Endangered and Threatened Plants in Maine. Please see the attached letter from the Maine Natural Areas Program.**
b. **Habitat for species appearing on the official state or federal list of endangered or threatened animal species. Please see the attached letter from the Maine Department of Inland Fisheries and Wildlife and the endangered species review letter from the US Fish and Wildlife Service.**
c. **High and moderate value waterfowl and wading bird habitat including nesting and feeding areas, as defined by the Department of Inland Fisheries and Wildlife. The proposed project area is within an existing airport and does not provide high or moderate value nesting or feeding areas for waterfowl and wading birds. Please see the attached letter from the Maine Department of Inland Fisheries and Wildlife.**
d. **Aquifers on islands in Casco Bay, as identified in the City of Portland Island Groundwater Management Study and/or by the Maine Geological survey. Not applicable. The proposed project is not located on an island in Casco Bay.**
e. **Waterbodies including wetlands, watercourses, significant vernal pools and floodplains. The proposed project area does not include watercourses, significant vernal pools, or floodplains. The project includes the alteration of small, pocketed forested wetlands within the project area of low function and value. Please see the NRPA Permit application that contains a Functions & Values Assessment, dated February 5, 2024, as well as the updated Wetland Delineation Map and Wetland Delineation Report, dated July 10, 2024. Please note that the proposed wetland alteration are not identified by the Department of Inland Fisheries and Wildlife or identified by Maine Natural Areas Program to contain significant wildlife habitat.**
f. **As requested, we have reviewed the site layout, grading, and the location of development areas and were able to increase the preservation of existing trees. The proposed layout has been revised to reduce impacts to the westernmost wetland on the site. This has been accomplished by reducing the amount of parking in the area and relocating the proposed battery storage area south.**

Landscape Preservation
• Submit supporting materials, including, but not limited to a narrative & alternative parking layout considered, that demonstrate how the proposed layout minimizes disturbance & removal of existing trees to the greatest extent practicable.
• Update application materials to demonstrate protection measures for existing trees and shrubs along Westbrook Street proposed to be retained.

Response: Please see responses to each bullet below:

a. **The proposed location is the most viable location for additional long-term parking within the land owned by PWM within the AB zone and has been targeted as a parking area in the FAA-approved Master Plan since (2008). Each alternative parking lot layout reviewed during the design phase incorporated the existing cell phone lot, gravel valet parking lot areas and the wooded area bound by Jetport Boulevard, International Parkway and the Loop Road. The intent of the design has been to maximize capacity**

for the proposed parking lot in order to provide additional long-term parking within walking distance of the terminal (versus remote lots requiring shuttles) and significantly reduce the number of vehicles that circle the current airport parking lots before being forced to drive to the existing Pink Lot or other remote parking areas. Please see the attached Master Plan from 2008.

b. **Based on comments received from the Planning Board, the parking lot layout has been modified to preserve an additional fifteen (15) 10" trees along International Parkway by relocating the battery storage and removing eight (8) parking spaces. This change will preserve 9,500 SF more of the landscape buffer between the proposed project and the International Parkway. The battery storage will be screened with fencing and landscaping.**
c. **Protection measures for the existing trees along Westbrook Street are outlined in the Tree Preservation Detail on C-504.**
d. **Approximately (21) Ash trees were identified, primarily planted as street trees along Jetport Boulevard, during a site walk with the City Arborist. While the majority are proposed to be removed due to site grading, we had also proposed to remove the remaining Ash trees, which are at different stages of Emerald Ash Borer infestation, and replant with a different street tree species.**

Site Landscaping and Buffers

• Update the landscape plan to:

o Show property boundaries for the entirety of the project area

o Include a legend that uses distinct symbology for shrubs and perennials to assess compliance with §14.6.2(C)(3) of the Land Use Code

o Provides size & notes for shrubs and perennials & grasses to confirm compliance with §4.7.6 of the Technical Manual

o Document the existing trees & shrubs along Westbrook Street proposed to be retained, protection measures for the landscaping during construction, and whether any of the trees are proposed to be counted towards meeting street tree requirements.

Response: Please see responses to each bullet below:

a. **Acknowledged, the boundary lines are shown on the landscape sheets.**
b. **The proposed plant schedule includes shrub and perennial quantities on L-102, L-103, and L-104; page 59 of the site plan application demonstrates how the landscape plan complies with §14.6.2(C)(3).**
c. **Acknowledged, sizes are provided on the proposed plant schedule.**
d. **The existing trees adjacent to Westbrook Street have been located in the field; protection measures are outlined in the Tree Preservation Detail on C-504.**

Water Quality, Stormwater Management, and Erosion Control

• Update the application to address comments raised by Lauren Swett in Attachment 2.

• Submit a waiver request for directly discharging treated stormwater into Casco Bay as part of meeting the City's stormwater standards.

Response: Please see below for our response to Lauren Swett and the revised Stormwater Management Plan.

Public Infrastructure and Community Safety Standards (Sec. 14.6.3)

Consistency with Master Plans
• Submit a copy of Sustainability Action Evaluation Tool in Excel format
• Submit a copy of the completed Sustainability Action Evaluation Tool for the subject project, including any corresponding life cycle cost analyses for sustainability alternatives.

Response: Please see the attached Sustainability Action Evaluation Tool for the proposed parking and battery storage project.

Public Safety and Fire Prevention
• Submit a pedestrian signage plan/wayfinding program that shows a proposed pedestrian circulation route and signage from the proposed parking lot to the terminal.

Response: Please see the attached Pedestrian Wayfinding Exhibit; see sheet C-503 for the pedestrian wayfinding signage detail.

Public Utilities
• Update the site plan set to show the proposed electrical lines to be installed for lighting, entrance & exit gates, and the battery storage area.

Response: The plan set has been updated. Please see sheets C-300 to C-303 for updated utility plans including the preliminary electrical layout.

Site Design Standards (Sec. 14.6.4)

Snow and Ice Loading
• Update narrative to describe how snow storage is currently handled for the Jetport and whether snow would be removed to an alternate location within the Jetport/at an off-site location in addition to the two proposed snow storage areas.

Response: SP Plus Corporation is currently responsible for snow removal at the Jetport and exports all snow to the City of Portland Snow Disposal Area. Any excess snow in the proposed parking lot will similarly be removed and taken off the premises to the City Snow Disposal site. There will be no permanent or temporary snow storage areas proposed in the new parking lot.

Exterior Lighting
• Update application materials to meet the standards of §12.3 of the Technical Manual
• Submit information on each proposed fixture to meet the standards of §12.6 of the Technical Manual.

Response: The updated photometrics plan complies with the standards of §12.3 of the Technical Manual.

Signage and Wayfinding
As mentioned under Public Safety and Fire Prevention, City staff has requested a signage plan that directs pedestrians to use safe & direct pedestrian facilities to the terminal.
Sign permits will be required to be submitted to confirm compliance with Article 20 of the Land Use Code.

Response: Please see the attached Pedestrian Wayfinding Exhibit; see sheet C-503 for the pedestrian wayfinding signage detail.

Lauren Swett - Woodard and Curran Comments

- *The proposed project is required to comply with MaineDEP Chapter 500 and City of Portland Technical Manual Section 5 standards for stormwater management. I have the following comments on the proposed stormwater management systems.*
    - *It is my understanding that the proposed improvements will be part of a site that currently has an existing Site Location of Development permit that would be modified by the proposed project. This existing permit has previously been reviewed by the MaineDEP, so I would anticipate that the MaineDEP would continue to review amendments and ultimately grant approval of the amendments.*
    - *Basic Standards – The project is generally providing for erosion and sedimentation control in accordance with the Basic Standards.*
        - *Erosion control measures are shown on the grading plans. The Applicant has also provided a Construction Phasing plan. I would suggest using this plan to incorporate erosion control systems relative to the proposed phasing. This could impact sediment barrier locations as well as potentially create the need for multiple construction entrances.*

Erosion Control measures and systems will be implemented relative to the proposed phasing. This will be shown on the Construction Phasing Plan.

    - *General Standards – The project is proposing to utilize Contech Stormfilters with associated below-grade storage to provide for stormwater treatment. This system is an approved proprietary stormwater BMP.*
        - *I've reviewed the provided calculations for stormwater management areas, and while I believe the system is meeting the standard for the amount of treatment required, I would ask the Applicant to clarify some of their calculations. There is no discussion of redevelopment to account for the reconstruction of existing paved and gravel areas into new paved areas; instead it appears that the entire treated area is accounted for considering these areas as new impervious and new landscaped. There are existing impervious areas noted as "to remain" that are not receiving*

treatment, and it appears that these areas are all outside of the project area, and will not be impacted by the proposed work. Can the Applicant please confirm that this interpretation of the calculations is correct?

The Redevelopment Standard was not used to calculate treatment requirements for the redevelopment/reconstruction of paved and gravel areas into new paved areas. The totality of the development footprint was considered to be "newly developed" from a treatment perspective. Sebago used the General Standard for the total disturbed area to provide a greater water quality treatment for gravel parking and paved cellphone lot. The paved impervious that is noted "to remain" and not receiving treatment is outside of the project limits and will not be impacted by the proposed work.

- *The Applicant has included a written plan to cover construction and post-construction stormwater maintenance. The proposed Stormfilter systems have been included as part of the post-construction plan, but the subsurface detention systems should also be added with reference to the use of the inspection risers that have been proposed. A stormwater maintenance agreement will be required to include both the Stormfilters and the subsurface detention systems.*

Acknowledged. The subsurface detention systems have been included in the Inspection, Maintenance & Housekeeping Plan, with reference to use the provided access & inspection risers.

- *Flooding Standards – The project discharges to the Fore River, which would qualify the project for a waiver of the Flooding Standard.*
  - *MaineDEP will review this SLOD amendment, and is anticipated to grant the waiver through that approval. It is noted that the proposed project has been modeled and will not increase stormwater flows.*

- *I would recommend that some additional information be included relative to the proposed below-grade storage system to ensure accurate evaluation of the systems for conflicts and to assist with construction.*
  - *The below-grade storage should be shown on the grading plan – there is a proposed change in grade across each section of parking lot, and this should be accounted for in how the storage piping will need to be installed with a slope and/or with variations in cover.*

Acknowledged. Please see Sheets C-200 and C-201 for updating grading plans showing the proposed outline of the subsurface detention systems. Furthermore, the proposed subsurface detention system #2 was lowered 1-foot to increase the proposed minimum cover from 1.5-feet (minimum required by manufacturer) to 2.5'. This allows the system envelope to be installed beneath the pavement subbase.

- *In the details provided for the below-grade storage, it was not clear how the proposed inlet and outlet pipes will be connected, specifically, how their inverts*

compare to the inverts of the storage pipes themselves. I also didn't see inverts or depth of cover for the proposed storage pipes. This is needed for construction and to ensure that there are no conflicts (see later comment on lighting infrastructure).

Acknowledged. Please see sheet C-507 for section details of the proposed subsurface detention systems, detailing the proposed surface elevations above the systems as well as the proposed elevations of the systems. For pipe connections, typically the manufacturer welds a CMP stub at the connection point at the elevation specified, and the proposed piping is then connected to the stub using a gasket/boot. The mating procedures of the proposed pipes to the stub connections will be coordinated with the manufacturer during construction. Elevations of the proposed connections can be seen on the Contech Subsurface Detention System Details on Sheets C-505 & C-506.

- *Additional information should be provided on the plan view plans for the proposed stone drip edge. The location of the system is provided on the utility plan with the proposed piping, but I do not see the system shown on the grading, landscaping, or site plan to show the extent of the proposed stone. The detail includes standard minimum dimensions, but I'd suggest showing the extent of the stone on the plans to ensure it does not conflict with proposed landscaping.*

Acknowledged. Please see Sheets C-202 and C-203 for the proposed riprap extents of the drip edge.

- *Some areas of landscaping are shown in areas with relatively steep proposed and existing slopes. The Applicant should confirm that the proposed plantings are appropriate for the sloped areas and note how it will interact with proposed erosion control blanket shown on the grading plans in these areas.*

Acknowledged. The application proposes ground cover plantings that are appropriate for the sloped area between Jetport Boulevard and the proposed parking lot. The erosion control blanket shown on the grading plans will be installed prior to the installation of plantings to provide protection during the non-stabilized condition, and during the installation of plantings, the blanket will be modified to install the plants per plan.

- *The utility plans do not show any proposed underground utility lines connecting to the proposed battery storage area. The schematic location plan included in the project description shows the existing CMP-owned circuit connecting to the battery area. The concrete pad is surrounded by fairly extensive proposed plantings. Any utility connection work required in the area should be shown to help avoid conflicts.*

Acknowledged. Please see the updated Utility plans and battery storage plans showing a preliminary electrical layout. The electrical layout will be refined during the generation of construction drawings to provide necessary services to the equipment, including conduit type, size, wiring, and the number of conduits. During the production of Construction

Drawings, an electrical engineer contracted by the owner will review and design the electrical layout accordingly to avoid conflicts with plantings and utilities presented as part of this application.

- *The utility plans also do not show proposed electric utility lines associated with lighting or electric and communications lines associated with the parking lot entrances. Light poles are proposed within stormwater treatment system areas. I'd recommend showing conduit to ensure that there will not be conflict with any of the other below-grade systems. As noted earlier, more detail is needed to confirm the depths of the proposed stormwater storage systems to ensure there is not a conflict with the installation.*

Acknowledged. Please see previous responses. As stated previously, the electrical layout will be refined during the production of Construction Drawings as necessary to avoid conflicts.

- *The vertical granite curb detail included in the plans includes aggregate base course embedment. The City's Technical Manual now includes a requirement for concrete embedment. This should be provided for any curbing within City streets.*

Acknowledged. Please see updated Vertical Granite Curb Detail on Sheet C-502.

- *The Applicant has noted that they have submitted a NRPA permit to the MaineDEP for the proposed wetland impacts. The Applicant has provided a copy of their wetland study, which includes a note "the cumulative extent of previous approved wetland impacts is relevant to determining the applicable Tier of NRPA permitting." Can the Applicant clarify if there are cumulative wetland impacts that have been considered on this site?*

Yes, the prior impacts were accounted for to determine the applicable tier of NRPA permitting. An NRPA Tier 3 was submitted to the Maine DEP to account for the cumulative wetland impacts.

Tom Errico Traffic Review Comments

- *The proposed project is proposing three driveway curb cuts and if the abutting streets are classified as public streets, a waiver for the number of driveways may be required.*

Acknowledged. The project does not propose to increase curb cuts along Westbrook Street or the Loop Road.

- *The Traffic Movement Permit issued for the Terminal Expansion noted the following. The applicant shall provide documentation that the current TMP is valid.*
    - *As related to conditions of approval numbered 2, 3, and 4 associated with the Traffic Movement Permit, at such time as the Jetport reaches enplanements of 1.1 million for 2 out of 4 years the Jetport shall have used the capacity under the Traffic Movement Permit and shall be required to submit an updated Traffic Movement Permit Application to the City.*

Response: Please see the attached traffic memo outlining the number of enplanements from 2020-2023.

- *The applicant shall confirm that all requirements of the TMP were met.*

Response: Please see the attached memorandum prepared by Sebago Technics' Traffic Engineer, dated May 10, 2024. As noted, the remaining conditions of the TMP have been met by PWM. Conditions 2-4 aren't applicable until 1.1. million enplanements are reached.

- *I concur with comments from DPW regarding pedestrian facility issues.*

Response: Please see the response to the above comment regarding pedestrian facility issues in this comment response.

- *Sight distance measurements shall be provided at proposed driveway locations.*

Response: Please see the attached traffic memo regarding sight distance measurements at the proposed exits.

Janine Ba DPW Development Review Comments

DPW Transportation

- *The applicant shall provide internal pedestrian circulation (walkways for the users) throughout the parking lots and connect to the existing route to the airport terminal. The parking lot internal sidewalk width shall be a minimum of 6 feet and the external sidewalk width shall be 8 feet.*

The current parking configurations at the Jetport have been studied for pedestrian circulation. In the long-term parking lot west of the parking garage, the provided sidewalks are in between the parking bays. In many cases, these sidewalks are inaccessible due to vehicles being parked within the sidewalk limits. In the winter, these sidewalks are difficult to maintain given the amount of vehicles impeding the sidewalks, and the travel-ways are more accessible, therefore a majority of passengers walk between the vehicular travel-way and parked vehicles. In the proposed lot, the sidewalks are provided to pick up pedestrians that walk between the vehicles and the travel-ways without vehicles blocking the sidewalks to direct them to the terminal and provide safe crossings at the Loop Road and International Parkway.

- *The applicant shall provide a pedestrian circulation route and signage plan from parking to the airport terminal.*

Please see the updated site plans for circulation and signage from parking to the terminal.

- *The entrance to the parking lot off of Jetport Access Road shall be designed as a T intersection with a commercial driveway to provide a safer crossing for pedestrians.*

Please see the provided traffic memorandum detailing the design for the proposed parking lot entrance.

DPW Water Resources

- *No comments at this time.*

Thank you for your time and attention to this project. We look forward to discussing the project further with staff and the Planning Board.

Sincerely,

SEBAGO TECHNICS, INC.

Owens McCullough, P.E., LEED-AP
Senior Vice President, Strategy & Client Development

cc: Paul Bradbury, P.E., Airport Director

JANET T. MILLS
GOVERNOR

STATE OF MAINE
DEPARTMENT OF
INLAND FISHERIES & WILDLIFE
353 WATER STREET
41 STATE HOUSE STATION
AUGUSTA ME 04333-0041

JUDITH CAMUSO
COMMISSIONER

November 17, 2023

Rebecca Gabryszewski
Sebago Technics
75 John Roberts Road, Suite 4A
South Portland, ME 04106

RE: Information Request – Portland Jetport Environmental Assessment Project (ERID 3138)

Dear Rebecca:

Per your request received on August 18, 2023, we have reviewed current Maine Department of Inland Fisheries and Wildlife (MDIFW) information for known locations of Endangered, Threatened, and Special Concern species; designated Essential and Significant Wildlife Habitats; and inland fisheries habitat concerns within the vicinity of the *Portland Jetport Environmental Assessment* project.

Our Department has not mapped any Essential Habitats that would be directly affected by your project. Essential Habitats are areas formally designated as essential to the conservation of a State Endangered or Threatened species and are protected pursuant to the Maine Endangered Species Act (MESA, 12 M.R.S, §12804.2). Currently, Essential Habitats are only designated for three State Endangered coastal breeding bird species.

Endangered, Threatened, and Special Concern Species

Bat Species – Of the eight species of bats that occur in Maine, four species are afforded protection under Maine's Endangered Species Act (MESA, 12 M.R.S §12801 et. seq.): little brown bat (State Endangered), northern long-eared bat (State Endangered), eastern small-footed bat (State Threatened), and tri-colored bat (State Threatened). The four remaining bat species are designated as Species of Special Concern (Rare): big brown bat, red bat, hoary bat, and silver-haired bat. While a comprehensive statewide inventory for bats has not been completed, based on historical evidence, it is likely that several of these species occur within the project area during spring/fall migration, the summer breeding season, and/or for overwintering. However, our Agency does not anticipate significant impacts to any of the bat species as a result of this project.

Significant Wildlife Habitat

Significant Vernal Pools – Significant Vernal Pools (SVPs) are Significant Wildlife Habitats under Maine's Natural Resources Protection Act. MDIFW's resource maps do not currently document SVPs on the project parcel. However, a comprehensive statewide inventory for SVPs has not been completed. SVPs are not included on MDIFW maps until project areas have been surveyed using approved methods and the survey results confirmed. Thus, their absence from resource maps is not necessarily indicative of an absence on the ground. MDIFW recommends that surveys for vernal pools be conducted within the project boundary by qualified wetland scientists prior to final project design to determine whether there are SVPs present in the area. These surveys should extend up to 250 feet beyond the anticipated project footprint because of potential performance standard requirements for off-site SVPs, assuming such pools

are located on land owned or controlled by the applicant. Once surveys are completed, survey forms should be submitted to our Agency for review well before the submission of any necessary permits. Our Department will need to review and verify any vernal pool data prior to final determination of significance.

Aquatic Resources

Fish Habitat - We generally recommend maintaining 100-foot undisturbed vegetated buffers from the upland edge of all intermittent and perennial streams and any contiguous wetlands. Maintaining and enhancing buffers along these resources is critical to the protection of water temperatures, water quality, natural inputs of coarse woody debris, and various forms of aquatic life necessary to support fish and other aquatic species. Riparian buffers also provide critical habitat and important travel corridors for a variety of wildlife species. Stream crossings should be avoided, but if a stream crossing is necessary, or an existing crossing needs to be modified, it should be designed to provide for full aquatic passage. Small streams, including intermittent streams, can provide crucial rearing habitat, cold water for thermal refugia, and abundant food for juvenile salmonids on a seasonal basis. Undersized crossings may inhibit these functions and become a frequent maintenance problem that causes reoccurring damage to the resource. Generally, MDIFW recommends that all new, modified, and replacement stream crossings be sized to span at least 1.2 times the bankfull width of the stream. In addition, we generally recommend that stream crossings be open bottomed (i.e., natural bottom), although embedded structures which are backfilled with representative streambed material have been shown to be effective in providing habitat connectivity for fish and other aquatic organisms. Construction Best Management Practices should be closely followed to avoid erosion, sedimentation, alteration of stream flow, and other impacts as eroding soils can travel significant distances as well as transport other pollutants resulting in direct impacts to fish, other aquatic life, and their habitats. In addition, we recommend that any necessary instream work occur between July 15 and October 1.

This consultation review has been conducted specifically for known MDIFW jurisdictional features and should not be interpreted as a comprehensive review for the presence of other regulated features that may occur in this area. Prior to the start of any future site disturbance, we recommend additional consultation with the municipality, and other state resource agencies including the Maine Natural Areas Program and Maine Department of Environmental Protection in order to avoid unintended protected resource disturbance.

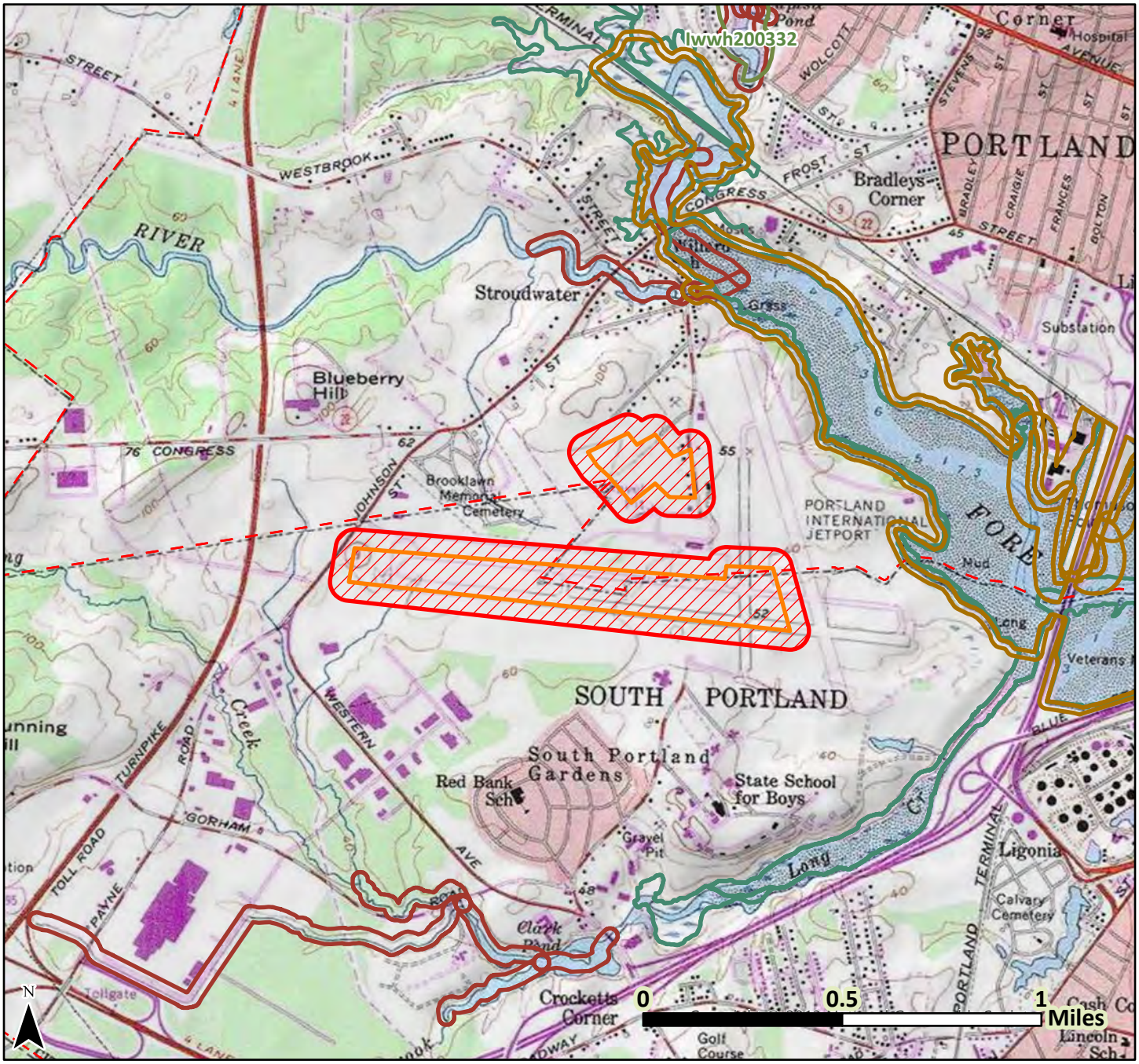
Please feel free to contact my office if you have any questions regarding this information, or if I can be of any further assistance.

Best regards,

Emily Robinson
Resource Biologist

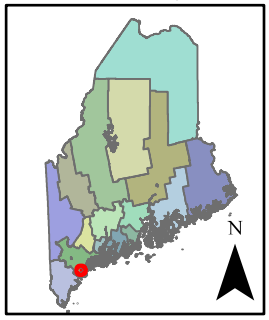
Maine Department of Inland Fisheries and Wildlife
Environmental Review of Fish and Wildlife Observations and Priority Habitats

Portland Jetport Environmental Assessment



County Boundary
Township Boundary
Project Footprint
Search Area
Inland Waterfowl/Wading Bird
Shorebird Area
Special Concern Fish
Tidal Waterfowl/Wading Bird

Date: 8/29/2023
Projection:
UTM Zone 19N, NAD83



Legend only lists resources visible in the map; see response letter for all resources that were evaluated.

STATE OF MAINE
DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY
177 STATE HOUSE STATION
AUGUSTA, MAINE 04333

JANET T. MILLS
GOVERNOR

AMANDA E. BEAL
COMMISSIONER

August 18, 2023

Rebecca Gabryszewski
Sebago Technics
75 John Roberts Road, Suite 4A
South Portland, ME 04106

Via email: rgabryszewski@sebagotechnics.net

Re: Rare and exemplary botanical features in proximity to: #19059, Portland International Airport, Parking Lot Expansion and Runway Improvements, Portland and South Portland, Maine

Dear Rebecca Gabryszewski:

I have searched the Maine Natural Areas Program's Biological and Conservation Data System files in response to your request received August 17, 2023 for information on the presence of rare or unique botanical features documented from the vicinity of the project in Portland and South 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. Based on the information in our files and the landscape context of this project, there is a low probability that rare or significant botanical features occur at this project location.

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.

The Maine Natural Areas Program (MNAP) 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. MNAP welcomes coordination with individuals or organizations proposing environmental alteration, or conducting environmental assessments. If, however, data provided by MNAP are to be published in any form, the Program should be informed at the outset and credited as the source.

MOLLY DOCHERTY, DIRECTOR
MAINE NATURAL AREAS PROGRAM
90 BLOSSOM LANE, DEERING BUILDING

PHONE: (207) 287-8044
WWW.MAINE.GOV/DACF/MNAP

The Maine 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 MNAP 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,

Lisa St. Hilaire

Lisa St. Hilaire | Information Manager | Maine Natural Areas Program
207-287-8044 | lisa.st.hilaire@maine.gov

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

In Reply Refer To: February 28, 2024
Project Code: 2024-0055545
Project Name: Parking Expansion at Portland International Jetport

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The 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 IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through IPaC 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/or 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 and/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: https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see Migratory Bird Permit | What We Do | U.S. Fish & Wildlife Service (fws.gov).

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

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 Code 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

Project Code: 2024-0055545
Project Name: Parking Expansion at Portland International Jetport
Project Type: Airport - Maintenance/Modification
Project Description: The proposed project involves the creation of additional surface parking at the Portland International Airport

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@43.65007515,-70.31203215287977,14z

Counties: Cumberland County, Maine

ENDANGERED SPECIES ACT SPECIES

There is a total of 2 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.

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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	Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

IPAC USER CONTACT INFORMATION

Agency: Portland city
Name: Rebecca Gabryszewski
Address: 75 John Roberts Road, Suite 4A
City: South Portland
State: ME
Zip: 04005
Email rgabryszewski@sebagotechnics.com
Phone: 2072002065

SEBAGO TECHNICS

CIVIL ENGINEERING • SURVEYING • LANDSCAPE ARCHITECTURE

Memorandum

19059

To: City of Portland

Date: November 11th, 2024

Subject: Response to TMP Conditions of Approval, Portland Jetport, Portland

The purpose of this memorandum is to respond to comments that were received to confirm whether the Conditions of Approval numbered 2, 3 and 4 were completed as outlined in the Traffic Movement Permit (TMP) for the Portland Jetport's Terminal Expansion.

These conditions are listed below in italics, with our associated responses:

Condition 2. International Parkway/Jetport Boulevard Intersection

A. The applicant shall install traffic improvement signs and pavement markings at the intersection within six months from the date of Planning Board approval. The improvements shall be subject to the approval of the Department of Public Services.

This has been completed.

B. A feasibility study shall be conducted that reviews options to address the anticipated capacity issues of the intersection within a year from the date of Planning Board approval. The potential mitigation options reviewed shall include: a full traffic signal warrant study conducted according to the MUCTD and MaineDOT requirements and coordinated with the Department of Public Services, construction of a roundabout, construction of a realigned intersection, maintaining a two-way STOP sign control and adding intersection capacity to attain acceptable levels of service.

This has been completed.

C. Prior to issuance of a Certificate of Occupancy permit, the applicant shall implement all recommendations from the feasibility study.

Recommendations from the feasibility study were implemented and a Certificate of Occupancy was issued to the Portland Jetport.

Condition 3. Congress Street/Westbrook Street Intersection

A. The applicant shall contribute $10,600 towards the installation of street improvements identified by the Department of Public Services. Specific improvements as represented by the applicant shall include:
i. Pedestrian countdown device;

Six (6) total pedestrian signal heads with countdown displays were provided for all three (3) crosswalks as shown below:

Congress Street SW Corner

Congress Street SE Corner

75 John Roberts Road – Suite 4A, South Portland, ME 04106-6963 • 207.200.2100 • Fax: 207.856.2206

Congress Street NW Corner

75 John Roberts Road – Suite 4A, South Portland, ME 04106-6963 • 207.200.2100 • Fax: 207.856.2206

Congress Street NE Corner

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Westbrook Street SW Corner

Westbrook Street NE Corner

ii. A crosswalk with colored stamping, as approved by the Historic Preservation Department; and

A crosswalk at the northerly side of the intersection was added across Congress Street but has since been restriped and is no longer colored. See below for the "before" and "after" conditions.

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"Before" conditions without a crosswalk at the northerly side of the intersection.

"After" conditions with a crosswalk at the northerly side of the intersection.

iii. Install a sidewalk between the Westbrook St. and Waldo St. with a crosswalk if the right-of-way is owned by the city.

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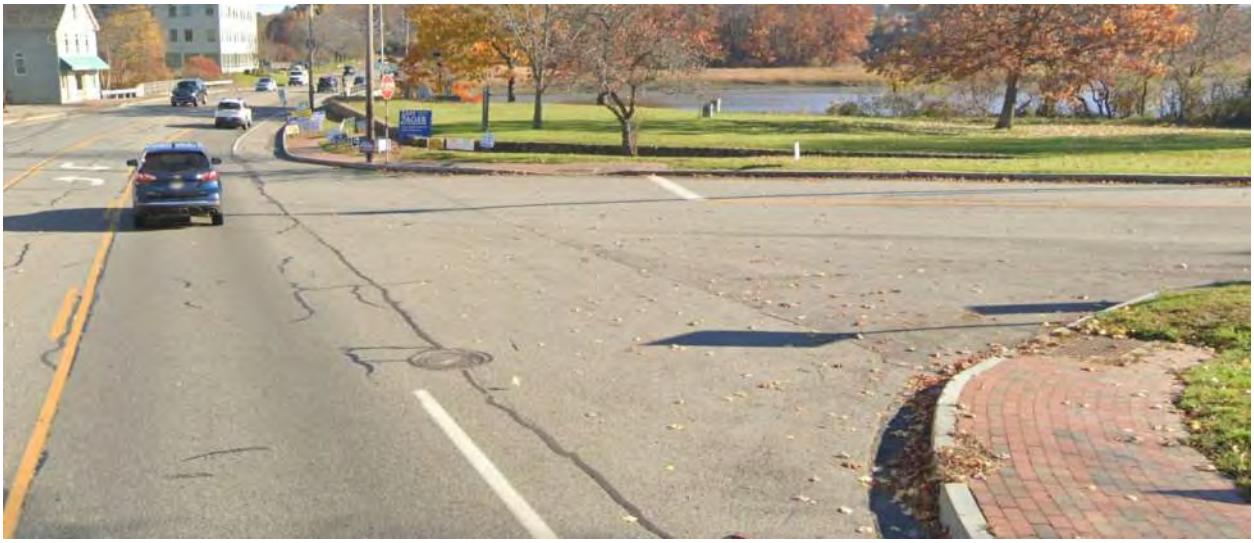
A sidewalk was installed on the southerly side of Congress Street between Westbrook Street and Waldo Street. A crosswalk was not provided. See below:

Sidewalk along Congress Street between Westbrook Street and Waldo Street looking West.



Sidewalk along Congress Street between Westbrook Street and Waldo Street looking East.

B. The applicant shall install video detection equipment or contribute $9,400 for such installation in accordance with the Department of Public Services.

Video detection was provided for all approaches. See below:

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Congress Street looking West. Video detection shown on mast arms for all approaches.

C. Prior to the Certificate of Occupancy the applicant shall ensure that all identified traffic mitigation measures are fully funded and implemented by this project through a financial contribution no less than $20,000.

All mitigation was implemented as shown above.

Condition 4. Johnson Road/Turnpike Connector/Turnpike Northbound Ramps

A. Prior to issuance of a Certificate of Occupancy the applicant shall be responsible for interconnecting traffic signals at the Johnson Road/Jetport Boulevard/Turnpike Connector, Turnpike Connector/Turnpike NB Ramps, Turnpike Connector/SB Ramps, and Congress Street/Turnpike Connector/Hutchins Drive intersections. Work shall include installing necessary equipment, conducting traffic counts, and developing and inputting timing plans to allow for coordination, and field adjusting once all work has been completed.

All referenced intersections were interconnected with communications established at the South Portland Fire Station located on Western Avenue. Coordination plans were developed and implemented with these signals connected to the legacy *Streetwise* server which is maintained and operated by the PACTS RTMS. A screenshot has been provided from the Streetwise system showing the connection of these intersections below:

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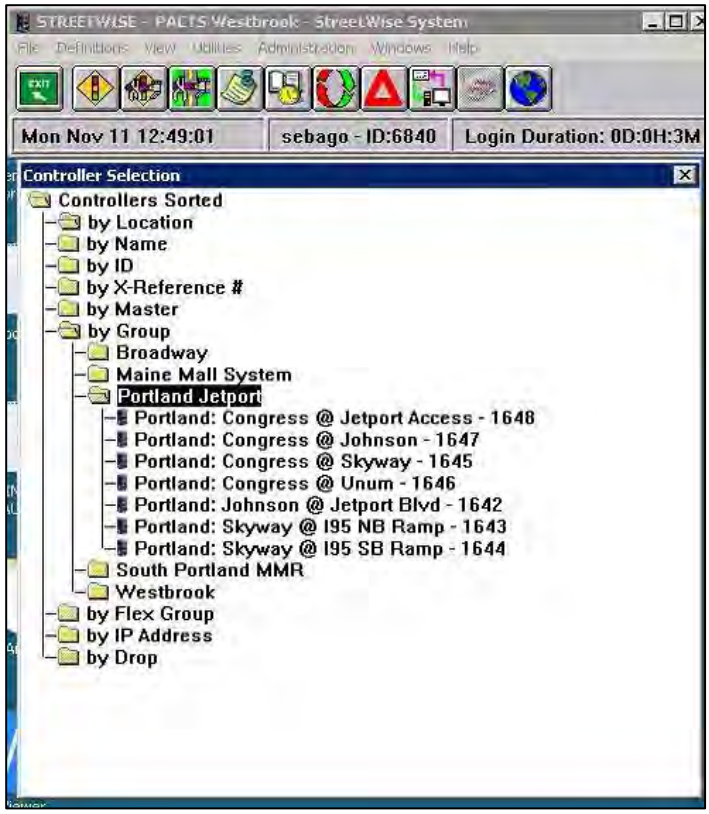

Signals shown on Streetwise

B. Prior to issuance of a Certificate of Occupancy the applicant shall be responsible for constructing an eastbound right tum lane on the connector for right turning vehicles onto 1-95 NB ramp. The length shall be the maximum allowable without requiring widening of the 1-95 overpass.

A right turn lane was constructed for the EB direction at the intersection of Skyway Drive @ the I-95 NB Connector as shown below:

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Skyway Drive @ I-95 NB Connector “Before” Conditions (No Right Turn Lane) in EB Direction

75 John Roberts Road – Suite 4A, South Portland, ME 04106-6963 • 207.200.2100 • Fax: 207.856.2206

Skyway Drive @ I-95 NB Connector “After” Conditions (Right Turn Lane Constructed) in EB Direction

SEBAGO TECHNICS, INC.

Bradley Lyon, P.E., PTOE
Vice President of Transportation Engineering

75 John Roberts Road – Suite 4A, South Portland, ME 04106-6963 • 207.200.2100 • Fax: 207.856.2206

November 15, 2024
19059

Mr. Zach Powell
City of Portland
Office of Planning and Urban Development
Congress Street
Portland, ME 04101

Site Plan Application – Portland International Jetport Parking Expansion

Dear Zach:

On behalf of the City of Portland, Sebago Technics Inc. has assembled the following comment response to the site plan review application for the parking lot expansion at the Portland International Jetport. The following provides the review comments in Italic and the responses in bold.

General Comments

• *The submitted site plan set shows work to straighten the exit driveway from the existing long-term surface and structured parking across from the site. Inclusion of this area as part of the site plan application would require review/compliance of the existing long-term parking site. City Staff recommend that the site plan set be updated to clarify that the proposed realignment of the driveway is to be completed as part of a separate project/building permit.*
Response: Acknowledged. Please see the updated site plan.

• *The proposed fencing along Loop Road has raised concerns about the visibility of the Glimpse pieces proposed to be relocated. City Staff request a note be added to the site plan set stating that the final location of the pieces is to be reviewed by the Public Art Committee and is subject to change, to allow for these concerns to be addressed without necessitating a future site plan amendment.*
Response: Acknowledged. Grading will be adjusted to ensure the sight lines are appropriate at the time of installation.

Site Plan Review Standards
Transportation Standards (Sec. 14.6.1)

Impact on Surrounding Street Systems
• *Submit confirmation that all of the conditions for the 2008 Terminal expansion TMP were satisfied.*

Response: All conditions for the 2008 Terminal expansion TMP have been satisfied. Please see the attached memo.

Access and Circulation

• Update application materials to include a >= 6-foot wide internal sidewalk that connects to the sidewalk along the frontage of the site or submit a waiver request.

Response: Please see the updated plan set showing the addition of internal sidewalks coordinated with city staff. It is also important to note that as long-term parking, the turnover is infrequent with low volume pedestrian movements. Therefore, the applicant is proposing 5-ft wide sidewalks and requesting a waiver for the 6-ft or greater requirement.

• Update application materials to include a sidewalk along Jetport Boulevard or submit a waiver request.

Response: Please refer to updated waiver request table.

Environmental Quality Standards (Sec. 14.6.2)

Preservation of Significant Natural Features

• Update the supporting waiver justification to discuss steps taken to minimize impacts to the wetland on the site, along with any steps taken as part of the Maine DEP review to comply with State & Federal regulations.

Response: The waiver justification has been updated with the following narrative for consideration. Steps taken to minimize wetland impacts included removing the cell phone lot development area originally planned for the westerly side of Jetport Boulevard responsive to public input. During the city review process, the Jetport further modified the parking lot design to reduce wetland impacts along Jetport Boulevard and retain a vegetated buffer by shifting the location of the proposed battery storage project and parking lot as now shown on the site plans. During the MDEP permitting process, a site walk was held at the Jetport to field review the wetlands and project area. The area of wetland alteration is pocketed and isolated (no connection to surface drainage) and was determined to not contain essential functions or values. This was confirmed through the MDEP and USACE review and permitting process. The USACE has issued their permit approving the wetland alternative for the project. We understand the MDEP is working on the permit which the Jetport will provide to the city upon issuance.

In support of this response please see the updated waiver table, the Avoidance & Minimization Statement/Alternatives Analysis that was provided as part of the Maine DEP submittal, and the approved Master Plan of the Jetport.

• Update the waiver table to include a waiver from 14.6.2 (A)(1)

Response: Please see the updated waiver table.

Landscape Preservation

• Submit an updated waiver table documenting the steps taken to minimize the removal of existing trees on site and how new plantings are being used to meet the landscape preservation replacement waiver requirement of 14.6.2 (B)(4) of the Land Use Code.

Response: Please see the updated waiver table and the plan set.

Site Landscaping and Buffers

• Update the site plan set to specify the type of fencing proposed for the battery storage corral.

Response: Please see the plan set for updated information regarding the fencing around the battery storage corral to be a 6' tall opaque fence

• Update the site plan set to meet the parking lot landscaping standards for 14.6.2 ©(3)(a) & landscape island width standard of 4.5.5 of the Technical Manual, or seek waivers from these standards through submission of an updated waiver table & supporting justification for the waiver(s) demonstrating that the site prevents the implementation of these standards. The supporting justification can, but does not have to, speak to how the intent of the standard is similarly achieved through trees & shrubs in the proposed landscaped peninsulas.

Response: Please see the updated Landscape Plans. The vegetation removal required for the parking lot is within the area designated in the approved Master Plan for parking lot expansion. The plan has been revised to preserve vegetation near the intersection of International Parkway and Jetport Blvd. The intent of the Landscape Plan is to achieve the overall number of required plantings by planting along the perimeter buffer, the main pedestrian sidewalk, and within the peninsulas near the entrances and exits. The landscape preservation replacement waiver requirement will be met by planting 162 trees, 473 shrubs and 239 perennials to compensate for the 153 trees (10" or greater) to be removed. (Note 19 of the trees to be removed are Ash trees likely infected with Emerald Ash Borer and reviewed with City Arborist). The current site plan shows a reduction from 674 to 667 parking spaces (-7 spaces) and the number of trees within the parking lots has decreased from 25 to 24 with the addition of internal sidewalks. The number of trees and plantings shown along the frontage exceeds the minimum requirement to compensate for the reduced number within the parking lot islands.

• Update the landscape plan to note that plantings in the parking lot should be excavated to a depth of at least 2 feet and backfill with several yards of high-quality planting mix.

Response: Please see the updated landscaping notes regarding the planting plan.

Water Quality, Stormwater Management, and Erosion Control

• Update the construction phasing plan to show ESC measures.

Response: Please see the updated construction plan for the ESC measures.

• Submit an updated waiver table with a request for directly discharging treated stormwater into Casco Bay as part of meeting the City's stormwater standards.

Response: Please see the updated waiver table.

• *Submit copies of NRPA and SLODA approvals when available.*
Response: The NRPA and SLODA approvals will be forwarded upon receipt. The USACE permit has been received and is attached.

Public Infrastructure and Community Safety Standards (Sec. 14.6.3)
Consistency with Master Plans
• *Submit a copy of Sustainability Action Evaluation Tool in Excel format*
Response: A copy of the Sustainability Action Evaluation Tool has been submitted with this response.

• *Submit a copy of the completed Sustainability Action Evaluation Tool for the subject project, including any corresponding life cycle cost analyses for sustainability alternatives.*
Response: A copy of the Sustainability Action Evaluation Tool has been submitted with this response.

Public Safety and Fire Prevention
• *Update the site plan set to provide internal sidewalks that reflect the design used in the image above, prioritizing a design where internal sidewalks follow desire lines.*
Response: The proposed design has been revised incorporating agreed upon modifications with the City during a November 5th coordination meeting.. Please see the plan set.

Site Design Standards (Sec. 14.6.4)

Exterior Lighting
• *Update application materials to meet the standards of §12.3 of the Technical Manual or submit a narrative demonstrating how photometric plan meets the standards of 12.3(11) of the Technical Manual*
Response: Updated lighting information has been included with this response.

• *Submit information on the hours each proposed fixture will be operated & the timing devices used to set the hours of operation.*
Response: The proposed lighting will be utilized during dusk to dawn. The airport operates 24 hours a day, therefore lighting must be made available in the parking areas during the night-time hours for safety and security reasons.

• *Confirm that the listed lumen levels on the photometric plan match the levels listed on the specification sheet for the on-site lighting.*
Response: Confirmed. The listed lumen levels have been revised and conform to the city lighting standards. Please see the photometric plan and lighting specification information.

Signage and Wayfinding
• *As mentioned under Public Safety and Fire Prevention, DPW has requested changes to the internal sidewalks for the parking lot that may necessitate the relocation/addition of wayfinding signage. Sign permits will be required to be submitted to confirm compliance with Article 20 of the Land Use Code.*

Response: The site plan has been revised to accommodate internal sidewalks as discussed in the City meeting on November 5th. The applicant acknowledges that the relocation/addition of any wayfinding signage will need to be permitted and conform with Article 20 of the Land Use Code. Please see the attached Way Finding Exhibit.

Lauren Swett - Woodard and Curran Comments

• The Applicant should provide copies when received of MaineDEP approvals for NRPA and Site Location of Development Permits.

Response: Understood. Copies of the State permits will be forwarded upon receipt.

•The Applicant has noted that erosion control implementation will be shown on the Construction Phasing Plan. The currently submitted plan does not show these measures. This can be reviewed when submitted.

Response: Understood.

Tom Errico Traffic Review Comments

- *The proposed project is proposing three driveway curb cuts and if the abutting streets are classified as public streets, a waiver for the number of driveways may be required.*

Status: The applicant shall provide documentation for a waiver for the provision of three driveways to the site.

Response: The project does not propose to increase curb cuts along Westbrook Street or the Loop Road and is all internal to the Jetport Campus.

- *The Traffic Movement Permit issued for the Terminal Expansion noted the following. The applicant shall provide documentation that the current TMP is valid.*
    - *As related to conditions of approval numbered 2, 3, and 4 associated with the Traffic Movement Permit, at such time as the Jetport reaches enplanements of 1.1 million for 2 out of 4 years the Jetport shall have used the capacity under the Traffic Movement Permit and shall be required to submit an updated Traffic Movement Permit Application to the City.*

Status: Based upon enplanement data provided by the applicant the above noted threshold has not been met and accordingly an updated Traffic Movement Permit is not required. Based upon the information, year 2024 enplanements appear to be on track to meet the 1.1 million threshold and an updated TMP may be required. It is suggested that the applicant report final enplanement data at the conclusion of 2024 and update the TMP is required.

Response: Understood. The TMP will be updated should the enplanement data meet the established threshold.

- *The applicant shall confirm that all requirements of the TMP were met.*

Status: To clarify, the applicant shall note if all mitigation requirements of the TMP were implemented.

Response: All requirements of the TMP have been met. Please see the attached traffic memo.

- *I concur with comments from DPW regarding pedestrian facility issues.*

Status: Refer to DPW comments.

Response: Please see our response to the Department of Public Works.

Additional Comment

- *The applicant shall perform a sidewalk waiver analysis for all property frontages that do not include an existing or proposed sidewalk. The waiver analysis shall comply with the city ordinance requirements.*

Response: See waiver table.

Kristoffer DeVolder DPW Development Review Comments

DPW Transportation

- *The DPW still has concerns regarding internal pedestrian circulation and believes that it is insufficient.*

Response: Understood. Please see the plan set for the revisions that were discussed at the November 5th meeting with the city.

Mark Reiland, City Arborist

- *Plan approved by the Parks Dept with following recommendation:*
  In the median/island plantings within the parking areas it would greatly improve establishment and long term viability if the planting islands were excavated to a depth of at least 24 inches and backfilled with several yards of high quality planting mix.

Response: See note on updated landscape plan to include the requested 24 inches minimum depth of high-quality planting mix.

Thank you for your time and attention to this project. We look forward to discussing the project further with staff and the Planning Board.

Sincerely,

SEBAGO TECHNICS, INC.

Owens McCullough, P.E., LEED-AP
Senior Vice President, Strategy & Client Development

cc: Paul Bradbury, P.E., Airport Director

Noise and Vibration 14-14.6.4 (G)

Not applicable. The proposed project involves the construction of two parking lots and the site design does not include heating, ventilation, and air conditioning equipment. The parking lots are to be located within the existing airport campus and any noise generated will be consistent with allowable amounts for the area. Any proposed noise levels at the property line will be consistent with the allowed amounts noted in the City of Portland ordinance.

CITY OF PORTLAND
Planning & Urban Development Department

MAJOR SITE PLAN
GENERAL DOCUMENT AND DRAWINGS CHECKLIST
Please submit each document as a separate PDF file.
Please confirm by electronically checking the boxes in the left-hand column.

**** PLEASE FILL OUT AND UPLOAD THE ZONING ASSESSMENT TABLE AND WAIVER TABLE SEPARATELY AS NOTED BELOW ****

At the time of application submission, please contact the Department of Public Works regarding E-911 addressing for your project.

GENERAL APPLICATION DOCUMENTS	
Yes NA	**Project Description** ● Cover letter with detailed project description
Yes NA	**Completed Checklist** (this document)
Yes NA	**Evidence of Right, Title, and Interest** ● Deeds, leases, or purchase and sales agreements
Yes NA	**Evidence of State or Federal Approvals** ● Permits or letters of non-jurisdiction, if applicable
Yes NA	**Zoning Assessment** (see Zoning Assessment Table) Summary of compliance with use and dimensional standards of the land use code
Yes NA	**Site Plan Standards Assessment** (see Section 14.6 of the land use code) • Summary of project compliance with site plan standards of the land use code
Yes NA	**Summary of Existing and/or Proposed Easements or Covenants, applicable.** ● Evidence of existing easements and any proposed easements, covenants, public or private rights-of-way
Yes NA	**Waiver Requests** (see Waiver Table) ● Written request for waiver describing request and compliance with applicable waiver standards
Yes NA	**Financial Capability** ● Letter or evidence from a financial institution or third party verifying financial capacity to undertake project
Yes NA	**Technical Capability** ● Evidence of technical capability of applicant and consultants – resumes and/or examples of past projects

MAJOR 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	
Yes **NA**	**Impact on Surrounding Street Systems (14-14.6.1(A))** ● Describe incremental volume of traffic impacts and mitigation measures. If needed
Yes **NA**	**Access and Circulation (14-14.6.1(B))** Identify and describe the following: ● Site access and internal circulation, including ADA access ● Drive-up features, if applicable ● Loading and servicing needs, routes, and geometry, providing turning templates for delivery vehicles, if applicable ● Sidewalks and condition along street frontages and internal walkways ● Engineered details for ADA ramps and public sidewalks, meeting sidewalk material policy and construction requirements (Technical Manual, Section 1)
Yes **NA**	**Public Transit (14-14.6.1(C)), if applicable** Identify and describe the following: ● Existing available transit service and proposed transit improvements, including design details, such as easement, pad base, and shelter
Yes **NA**	**Off-Street Parking (14-14.6.1(D)), if applicable** Identify and describe the following: ● Proposed vehicular and bicycle parking supply (including ADA-compliant parking) in relation to applicable parking requirements in Article 19 of the land use code ● Curb cut separation and parking layout (Technical Manual, Section 1) ● Construction details for bicycle racks ● Management plan for snow storage and removal
Yes **NA**	**Transportation Demand Management (TDM) (14-14.6.1(E)), if applicable** ● Provide TDM plan drafted in accordance with Technical Manual Section 1 requirements

ENVIRONMENTAL	
Yes NA	**Preservation of Significant Natural Features (14-14.6.2(A)), if applicable** Identify and describe the following: ● High and moderate value waterfowl and wading habitat ● Aquifers (for Casco Bay Islands) ● Waterbodies (including wetlands, watercourses, significant vernal pools and floodplains) ● Proposed preservation areas and protection measures ● Documentation from environmental compliance consultants and determinations from applicable state and federal agencies
Yes NA	**Landscape Preservation (14-14.6.2(B))** Identify and describe the following: ● Measures to preserve trees, including within required zoning setbacks (Technical Manual, Section 4) ● Measures to protect existing vegetation during construction
Yes NA	**Site Landscaping and Buffers (14-14.6.2(C))** Identify and describe the following: ● Overall landscaping approach and consistency with standards ● The use of screening and buffering of service areas and between non-residential and residential uses ● Existing Heritage or Feature Trees on site and measures to preserve ● Compliance with street tree requirements
Yes NA	**Water Quality, Stormwater Management, and Erosion Control (14-14.6.2(D))** Identify and describe the following: ● Erosion and sedimentation control plan and measures ● Evidence of compliance with Urban Impaired Stream Standards pursuant to DEP Chapter 500 stormwater law, as applicable ● Subsurface sanitary sewage disposal and groundwater protection measures

PUBLIC INFRASTRUCTURE AND COMMUNITY SAFETY	
Yes **NA**	**Consistency with City Master Plans (14-14.6.3(A))** ● Describe proposed easements, rights and improvements to connect or continue off-premises public infrastructure, as applicable
Yes **NA**	**Public Safety and Fire Prevention (14-14.6.3(B))** Identify and describe the following: ● Compliance with Crime Prevention through Environmental Design (CPTED) requirements (Technical Manual, Section 3) ● Emergency vehicle access ● Consistency with public safety standards (Technical Manual, Section 3)
Yes **NA**	**Availability and Adequacy of Public Utilities (14-14.6.3(C)) (Technical Manual, Sections 2 & 9)** Identify and describe the following: ● Electrical services, including providing underground services ● Existing and proposed connections for public utilities and required public utility upgrades ● Sewer line connections
SITE DESIGN	
Yes **NA**	**Massing, Ventilations and Wind Impact (14-14.6.4(A))** Identify and describe the following: ● Wind and ventilation impacts on adjoining structures and/or adjacent public spaces, including wind study, if applicable ● Bulk, location, or height impacts on adjoining structures
Yes **NA**	**Shadows (14-14.6.4(B)), if applicable** ● Provide shadow analysis of impacts on publicly accessible open space (Technical Manual, Section 11)
Yes **NA**	**Snow and Ice Loading (14-14.6.4(C))** ● Describe building design measures to prevent snow and ice from loading or falling onto adjacent properties or public ways
Yes **NA**	**View Corridors (14-14.6.4(D)), if applicable** ● Describe any protection of designated view corridors (Portland Design Manual, Appendix. 1)
Yes **NA**	**Historic Resources (14-14.6.4(E)), if applicable** Identify and describe the following: ● The site's status as a designated landmark, within a historic district or historic landscape district, or within 100 feet of any designated landmark, historic district, or historic landscape district ● Compliance with standards for preservation and documentation of archaeological resources

Yes NA	**Exterior Lighting (14-14.6.4(F))** ● Describe how the proposed site lighting will adhere to photometrics requirements as it relates to light trespass and full cutoff fixture design, pursuant to Technical Manual Section 12
Yes NA	**Noise and Vibration (14-14.6.4(G))** ● Provide data on noise levels for HVAC and other mechanical equipment, such as design specifications, to demonstrate consistency with state and federal noise emissions requirements as well as City code
Yes NA	**Signage and Wayfinding (14-14.6.4(H)), if applicable** ● Provide signage plan showing the location, dimensions, height and setback of all existing and proposed signs ● Provide drawings of all commercial and directional signage on site
Yes NA	**Zone-Related Design Standards (14-14.6.4(I))** ● Address any applicable design review standards by zone, including compliance with Design Manual

MAJOR SITE PLAN
DRAWINGS CHECKLIST

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

All drawings must be submitted in a 24 x 36 sheet size.

BOUNDARY SURVEY (stamped by a Maine Licensed Surveyor and drawn as per Technical Manual Sec. 13)

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

All sheets – Include a title block with project title and the following information:

- Project street address
- Name and address of property owner & applicant
- Licensed design professional, incl firm that produced plans
- North arrow
- Date of preparation and revision history block
- Tax parcel (chart, block, and lot) number

Existing Conditions Plan with the following:

- Existing structures, with distance from primary building façade(s) to the property line
- Approximate location of structures on abutting properties
- All streets and intersections adjacent to the site
- Existing driveways, pedestrian ways, and bicycle infrastructure, including dimensions and materials
- Existing public transit infrastructure
- Existing vehicle & bicycle parking areas
- Existing utilities on site and within adjacent rights-of-way
- Existing grades (two-foot contours preferred)
- Location of water courses, wetlands, and vegetation, or other significant natural features
- Existing soil conditions and location of test pits and borings
- Zoning boundary lines, including overlays
- Location of all existing easements and rights-of-way

Proposed Site Plan with the following:

- Proposed structures, including distance from primary building façade(s) to property lines
- Ground floor area, and finished floor elevations for all buildings
- Any proposed geometric modifications to streets and intersections adjacent to site
- Location, dimensions and materials of all 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, including turning templates
- Proposed transit infrastructure with dimensions/ engineering specifications
- Location of vehicle and bicycle parking with dimensions and engineering specifications
- Location of all snow storage areas
- Exterior lighting (please see Technical Manual Sec. 12 for photometrics requirements)

- Location of fire hydrants
- Location of solid waste management receptacles
- Location of all proposed HVAC and mechanical equipment, including proposed screening, where applicable
- Location of proposed easements and rights-of-way, including dimensions
- Please utilize color-coding and/or hatches and shading to delineate changes between the pre and post development condition as needed

UTILITY PLAN including:

- Proposed electrical infrastructure
- Location, sizing and directional flows of all proposed sewer and stormwater infrastructure
- Location and dimensions of off-premises public or publicly accessible infrastructure adjacent to site
- Electric utility infrastructure

GRADING AND DRAINAGE PLAN including:

- Proposed grades
- Proposed stormwater management measures meeting Technical Manual (Section 5) standards
- Any proposed alteration of a watercourse or wetlands
- Any groundwater protection measures
- Proposed buffers and preservation measures for wetlands or significant natural features

LANDSCAPE PLAN including:

- Existing vegetation to be preserved and preservation measures
- Proposed landscaping, screening, and street trees, including caliper widths for trees
- Planting schedule, including street trees

ARCHITECTURAL PLANS AND RENDERINGS including:

- Exterior building elevations, color renderings, illustrations of all sides
- Axonometric and street-level views for structures greater than three stories in height
- Provide context drawings, if applicable (Design Manual, page 1)
- Floor plans

CONSTRUCTION MANAGEMENT PLAN including:

- Specifics on traffic control, sidewalk sheds, and pedestrian rerouting
- Include a drawing and written narrative

OTHER

- Details and cross-sections, as necessary

Signage and Wayfinding 14-14.6.4 (H)

1. Signage location and scale will be in compliance with the City Ordinance and consistent with existing signage at the Jetport. Wayfinding signs will be utilized to direct vehicular traffic to the parking lot entrance and as needed of internal circulation within the lots.

2. All on-site directional traffic signage will be sited in such a way as to not adversely affect visibility at intersections or offsite.

Please see the plan set for signage placement and proportions.

Att. C

MAINE REAL ESTATE TAX-Paid

DLN: 1002140172253

QUITCLAIM DEED WITH COVENANT

Maine Statutory Short Form

KNOW ALL BY THESE PRESENTS THAT **TOYE AIRPORT PARK, LLC**, a Maine limited liability company with a place of business in the City of South Portland, County of Cumberland, State of Maine, for consideration paid, grants to the **CITY OF PORTLAND**, a Maine municipal corporation with a principal office at 389 Congress Street, Portland, Maine 04101, with **QUITCLAIM COVENANT**, the land, together with any improvements thereon, located in the City of Portland, County of Cumberland, and State of Maine more particularly described in **Exhibit A** attached hereto and made a part hereof.

IN WITNESS WHEREOF, the said TOYE AIRPORT PARK, LLC has caused this instrument to be signed and sealed this 16th day of November, 2021.

WITNESS:

TOYE AIRPORT PARK, LLC

By _____
Thomas A. Toye, III
Sole Member

STATE OF MAINE
COUNTY OF CUMBERLAND

November 16, 2021

Then personally appeared the above named Thomas A. Toye, III, in his said capacity, and acknowledged the foregoing instrument to be his free act and deed, and the free act and deed of said limited liability company, before me.

_____
Attorney at Law/~~Notary Public~~
Drew A. Anderson
Printed Name

EXHIBIT A
TO
TOYE AIRPORT PARK, LLC DEED

City of Portland Assessor's reference as Map 208, Block A, Lots 5, 6 & 7 and Map 210A, Block A, Lot 2, which properties are located in the City of Portland, County of Cumberland and State of Maine and are more particularly bounded and described as follows:

PARCEL ONE (Tax Map 208, Block A, Lot 6):

A certain lot or parcel of land with the buildings thereon, situated in Portland, on the westerly side of Westbrook Street, County of Cumberland and State of Maine, bounded and described as follows:

Beginning at a stake on the west side of said Westbrook Street North four and one-half degrees East (N 4 ½° E) eight hundred six (806) feet from Abner Gould's corner; thence South seventy-four and one-half degrees West (S 74 ½° W) along the line of land now or formerly of Nellie R. Johnson one hundred six and fifty-seven hundredths (106.57) feet to a point; thence from said point North four and one-half degrees East (N 4 ½° E) and parallel with said Westbrook Street eighty-six (86) feet to a point; thence from said last mentioned point in an easterly direction and at right angles to the last described bound one hundred (100) feet to a point on the westerly side of Westbrook Street; thence from said point on the Westerly side of Westbrook Street South four and one-half degrees West (S 4 ½° W) along the side of said Westbrook Street fifty (50) feet to the point of beginning.

TOGETHER with that property conveyed by the City of Portland to Toye Airport Park, LLC, dated November 16, 2001 and recorded in said Registry of Deeds in Book 16971, Page 193 described as Parcel 2 and further bounded and described as follows:

A certain lot or parcel of land on the westerly side of Westbrook Street, in the City of Portland, County of Cumberland, State of Maine, being shown as "Area to be Conveyed to Thomas Toye, III" on a plan of land titled "Survey Plot Plan of Land to be Conveyed" for Dufresne-Henry, Inc. dated 11-15-01 by Sebago Technics, Inc., said parcel being more particularly bounded and described as follows:

Beginning at a 5/8-inch capped iron rebar at the southeasterly corner of land now or formerly of Thomas A. Toye, III by deed recorded at the Cumberland County Registry of

Deeds in Book 10097, Page 17;

Thence S 08°-54'-54" E, by and along said Westbrook Street, a distance of 11.71 feet to a point;

Thence S 55°-13'-45" W, passing through land of the Grantor, a distance of 21.88 feet to a point;

Thence N 83°-28'-06" W, passing through land of the Grantor, a distance of 22.38 feet to a point on the southerly line of said land of Toye, said point being the easterly corner of "Area A to be Conveyed";

Thence N 60°-44'-36" E, by and along said Toye, a distance of 44.00 feet to the point of beginning.

Meaning and intending to describe a certain lot or parcel of land containing 403 square feet, more or less, and being shown as "Land to be Conveyed to Thomas Toye III" on a plan of land titled "Survey Plot Plan of Land to be Conveyed" for Dufresne-Henry, Inc., dated through 11-15-01 by Sebago Technics, Inc.

EXCEPTED from the above property is that property conveyed by Toye Airport Park, LLC to the City of Portland by Warranty Deed, dated November 16, 2001 and recorded in the Cumberland County Registry of Deeds in Book 16971, Page 184 described as Parcel 1.

NOTE: The first course in the first described parcel of land has been incorrectly described as running North seventy-four and one-half degrees West (N 74 ½° W) dating back to at least 1909.

PARCEL TWO (Tax Map 208, Block A, Lot 7):

A certain lot or parcel of land, situated on the westerly side of Westbrook Street, in the City of Portland, County of Cumberland and State of Maine, bounded and described as follows: Beginning on the westerly sideline of Westbrook Street at the northeasterly corner of land conveyed by Sarah D. Rich to Raymond L. Cousins, by deed dated August 28, 1922, and recorded in the Cumberland County Registry of Deeds in Book 1115, Page 5; thence northerly by the westerly sideline of Westbrook Street one hundred (100) feet to the southeasterly corner of land conveyed by Sarah D. Rich to Catherine M. Lindell, by deed dated September 28, 1929, and recorded in said Registry of Deeds in Book 1333, Page 260; thence westerly at right angles with Westbrook Street and by said Lindell land one hundred (100) feet to land conveyed by Sarah D. Rich to Isaac H. Fairweather; thence

southerly parallel with Westbrook Street and by said Fairweather land one hundred (100) feet to the northwesterly corner of said Cousins land; thence easterly by said Cousins land and at right angles with Westbrook Street one hundred (100) feet to the point of beginning, containing 10,000 square feet, or less.

PARCEL THREE (Tax Map 208, Block A, Lot 5):

A certain lot or parcel of land, with the buildings thereon, situated on the westerly side of Westbrook Street, in Portland, in the County of Cumberland and State of Maine, and bounded and described as follows:

Beginning at a point on said westerly side of Westbrook Street, distant northerly one hundred (100) feet from the point of intersection of said westerly side of Westbrook Street with the northerly sideline of a certain lot or parcel of land conveyed to Raymond L. Cousins by deed dated August 28, 1922, and recorded in said Registry of Deeds in Book 1115, Page 5; thence running northerly along said westerly side of Westbrook Street a distance of one hundred fifty (150) feet to a point; thence running westerly and along a line at right angles to said westerly side of Westbrook Street a distance of one hundred (100) feet to a point; thence running southerly and along a line parallel to said westerly sideline of said street a distance of one hundred fifty (150) feet to a point; thence running easterly and on a line again at right angles to said westerly side of said street a distance of one hundred (100) feet to a point of beginning.

TOGETHER with that property conveyed by the City of Portland to Toye Airport Park, LLC, dated November 16, 2001 and recorded in said Registry of Deeds in Book 16971, Page 193 described as Parcel 1 and further bounded and described as follows:

A certain lot or parcel of land situated on the westerly side of, but not adjacent to, Westbrook Street, in the City of Portland, County of Cumberland, State of Maine, and being depicted as "Area to be Conveyed to Thomas Toye III" on a plan of land titled "Survey Plot Plan of Land to be Conveyed" for Dufresne-Henry, Inc., dated through November 15, 2001 by Sebago Technics, Inc. (the "Plan"), said parcel being more particularly bounded and described as follows:

Beginning at the northwesterly corner of land now or formerly of Toye Airport Park, LLC, by deed recorded in the Cumberland County Registry of Deeds in Book 15957, Page 160, at land of the Grantor;

Thence S 08°-54'-54" E, by and along said land of Toye Airport Park, LLC, a distance of 17.43 feet to a point;

Thence N 78°-54'-06" W, passing through land of the Grantor, a distance of 50.84 feet to a point in the southerly line of other land of Thomas A. Toye III recorded in said Registry of Deeds in Book 6290, Page 27;

Thence N 81°-02'-37" E, by and along said other lands of Toye, a distance of 47.77 feet to the point of beginning.

Meaning and intending to describe a certain triangular parcel of land containing 416 square feet, more or less, and depicted as "Area to be Conveyed to Thomas Toye III" on a plan of land titled "Survey Plot Plan of Land to be Conveyed" for Dufresne-Henry, Inc., dated through 11-15-01, by Sebago Technics, Inc.

PARCEL FOUR (Tax Map 210A, Block A, Lot 2):

A certain lot or parcel of land, with the buildings thereon, situated in Portland, County of Cumberland and State of Maine, bounded and described as follows:

Beginning at a point on the westerly side of Westbrook Street, said point being distant northerly along said westerly side of said Westbrook Street 774.36 feet from the northerly terminus of the discontinuance of said Street by the County Commissioners as defined in Docket 1175 and dated January, 1957, on file in the office of said County Commissioners, Portland, Maine, said point being the northerly corner of land of the Norman Realty Holding Corporation; thence North eighty-two degrees forty-four minutes West (N 82° 44' W) by land of said Norman Realty Holding Corporation and at right angles to the said westerly sideline of said Westbrook Street a distance of 100.00 feet to a point; thence South seven degrees sixteen minutes West (S 7° 16' W) on a line parallel to and distant 100.00 feet westerly of the said westerly sideline of said Westbrook Street and at right angles to the last described course a distance of 100.00 feet to a point; thence North eighty-two degrees forty-four minutes West (N 82° 44' W) by land conveyed by Bertram J. Fairweather to the City of Portland by Warranty Deed dated August 30, 1967 and recorded in the Cumberland County Registry of Deeds in Book 3009, Page 666 and at right angles to the last-described course a distance of Four Hundred Seventy (470) Feet, more or less, to land as conveyed to John A. and Lorena A. Knight by deed dated May 26, 1955 and recorded in said Registry of Deeds in Book 2231, Page 116; thence North sixty-six degrees thirty-five and one-half minutes East (N 66° 35½' E) by land now or formerly of said Knight a distance of Five Hundred Twelve and One-Half (512½) Feet to a point; thence North eighty-one degrees fifty-two and one-half minutes East (N 81° 52½' E) by land of said Knight a distance of one hundred thirty-four (134) feet, more or less, to the westerly sideline of said Westbrook Street; thence South seven degrees sixteen minutes West (S 7° 16' W) by the westerly sideline of said Westbrook Street a distance of One Hundred Ninety-Seven (197) Feet, more or less, to said land of said Norman Realty

Holding Corporation and the point of beginning, containing 1.78 acres, more or less.

Together with a right-of-way fifteen (15) feet in width lying to the west of a line distant 100.00 feet westerly and parallel to the said westerly sideline of said Westbrook Street and to extend Two Hundred Twenty-Five (225) Feet to the south from the most southerly boundary line of the parcel above described and conveyed to the Grantee, within which a septic tank effluent drain may be maintained, repaired and replaced so long as said drain may be needed to serve the premises herein described and conveyed to the Grantee.

Also the Grantor herein conveys and assigns to the Grantee any rights it may have as a result of the provision in the deed from Bertram J. Fairweather to the City of Portland, dated August 30, 1967 and recorded in said Registry of Deeds in Book 3009, Page 666, whereby the City of Portland agreed that should there be constructed within a period of not more than ten (10) years from the date of said deed, a public airport access road, crossing the land therein conveyed to the City to a point on Congress Street; said City will convey to the assigns of the Grantor a right-of-way twenty (20) feet in width extending from the land herein above conveyed to this Grantee in a location lying to the South of the division line between the land now or formerly of John A. and Lorena A. Knight and extending in a westerly direction by said division line to the easterly sideline of said future airport access road, it being understood and agreed that such a right-of-way when granted shall be for the purpose of travel only and for no other purpose and that no building, structure or other encumbrance of any nature shall be placed, erected or maintained therein.

The above-described premises together with the rights of way are all and the same as reserved and covenanted by said Fairweather and City of Portland in the aforesaid 1967 deed between said parties.

EXCEPTED from the above property is that property conveyed by Toye Airport Park, LLC to the City of Portland by Warranty Deed, dated November 16, 2001 and recorded in the Cumberland County Registry of Deeds in Book 16971, Page 184 described as Parcel Two.

Meaning and intending to convey and hereby conveying the remaining premises as described in the Quitclaim Deed Without Covenant from Thomas A. Toye to Toye Airport Park, LLC, dated January 8, 2001 and recorded in said Registry of Deeds in Book 15957, Page 160 and the same premises as described in the Quitclaim Deed from the City of Portland to Toye Airport Park, LLC, dated November 16, 2001 and recorded in said Registry of Deeds in Book 16971, Page 193.

MAINE REAL ESTATE TAX-Paid

DLN: 1002140172279

QUITCLAIM DEED WITH COVENANT

Maine Statutory Short Form

KNOW ALL BY THESE PRESENTS THAT **TOYE REALTY HOLDINGS III, LLC**, a Maine limited liability company with a place of business in the City of South Portland, County of Cumberland, State of Maine, for consideration paid, grants to the **CITY OF PORTLAND**, a Maine municipal corporation with a principal office at 389 Congress Street, Portland, Maine 04101, with **QUITCLAIM COVENANT**, the land, together with any improvements thereon, located in the City of Portland, County of Cumberland, and State of Maine more particularly described in **Exhibit A** attached hereto and made a part hereof.

IN WITNESS WHEREOF, the said TOYE REALTY HOLDINGS III, LLC has caused this instrument to be signed and sealed this 16th day of November, 2021.

WITNESS:

TOYE REALTY HOLDINGS III, LLC

By _____
Thomas A. Toye, III
Sole Member

STATE OF MAINE
COUNTY OF CUMBERLAND

November 16, 2021

Then personally appeared the above named Thomas A. Toye, III, in his said capacity, and acknowledged the foregoing instrument to be his free act and deed, and the free act and deed of said limited liability company, before me.

_____
Attorney at Law/~~Notary Public~~
Drew A. Anderson
Printed Name

EXHIBIT A
TO
TOYE REALTY HOLDINGS III, LLC DEED

The property known as 0 Jetport Boulevard, together with any improvements thereon, situated in the City of Portland, Cumberland County and State of Maine, and currently identified by the City of Portland Assessor's reference as Map 210A, Block A, Lot 6, more particularly bounded and described as follows:

A certain lot or parcel of land situated on the southeasterly side of a strip of land now or formerly owned by the City of Portland, said strip running southwesterly from the westerly sideline of Westbrook Street, so called, in the City of Portland, County of Cumberland, State of Maine as shown on Standard Boundary Survey of Thomas A. Toye Property, Westbrook Street, Portland, Maine for Toye Realty Holdings LLC, dated November 27, 2000 and recorded in the Cumberland County Registry of Deeds in Plan Book 201, Page 22, being more particularly bounded and described as follows:

Beginning at a 5/8 inch capped iron rebar set on the northwesterly sideline of land now or formerly owned by the City of Portland by a deed dated August 30, 1967 and recorded in said Registry of Deeds in Book 3009, Page 666, said rebar being located N 50°-10'-25" E, a distance of 25.51 feet from a found 1¼ inch iron pipe found 12 inches high;

Thence N 38°-04'-35" W, by and along land now or formerly owned by the City of Portland by a deed dated February 4, 1991 and recorded in said Registry of Deeds in Book 9492, Page 231, a distance of 307.77 feet to a 5/8 inch capped iron rebar set on the southeasterly sideline of land now or formerly owned by the City of Portland by a deed recorded in said Registry of Deeds in Book 13434, Page 266;

Thence N 51°-55'-25" E, by and along said land of the City of Portland, a distance of 287.17 feet to a 5/8 inch capped iron rebar set at the northwesterly corner of land now or formerly owned by Portland Jetport Title Corp. by a deed dated June 10, 1991 and recorded in said Registry of Deeds in Book 9684, Page 257;

Thence S 38°-04'-35" E, by and along said land of Portland Jetport Title Corp., a distance of 299.0 feet to a 5/8 inch capped iron rebar set on the northwesterly sideline of land now or formerly owned by Thomas A. Toye III by a deed dated November 1, 1982 and recorded in said Registry of Deeds in Book 6290, Page 27;

Thence S 50°-10'-25" W, by and along said land of Thomas Toye and land of the City of Portland, a total distance of 287.30 feet to the point of beginning.

This property is subject to any easements of record.

EXCEPTED from the above property is that property conveyed by Toye Realty Holdings III, LLC to the City of Portland, dated November 16, 2001 and recorded in said Registry of Deeds in Book 16971, Page 190.

Meaning and intending to convey and hereby conveying the remaining property described in the Release Deed from Toye Realty Holdings, LLC to Toye Realty Holdings III, LLC, dated January 8, 2001 and recorded in said Registry of Deeds in Book 15976, Page 325.

TOYT110/1608103

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		

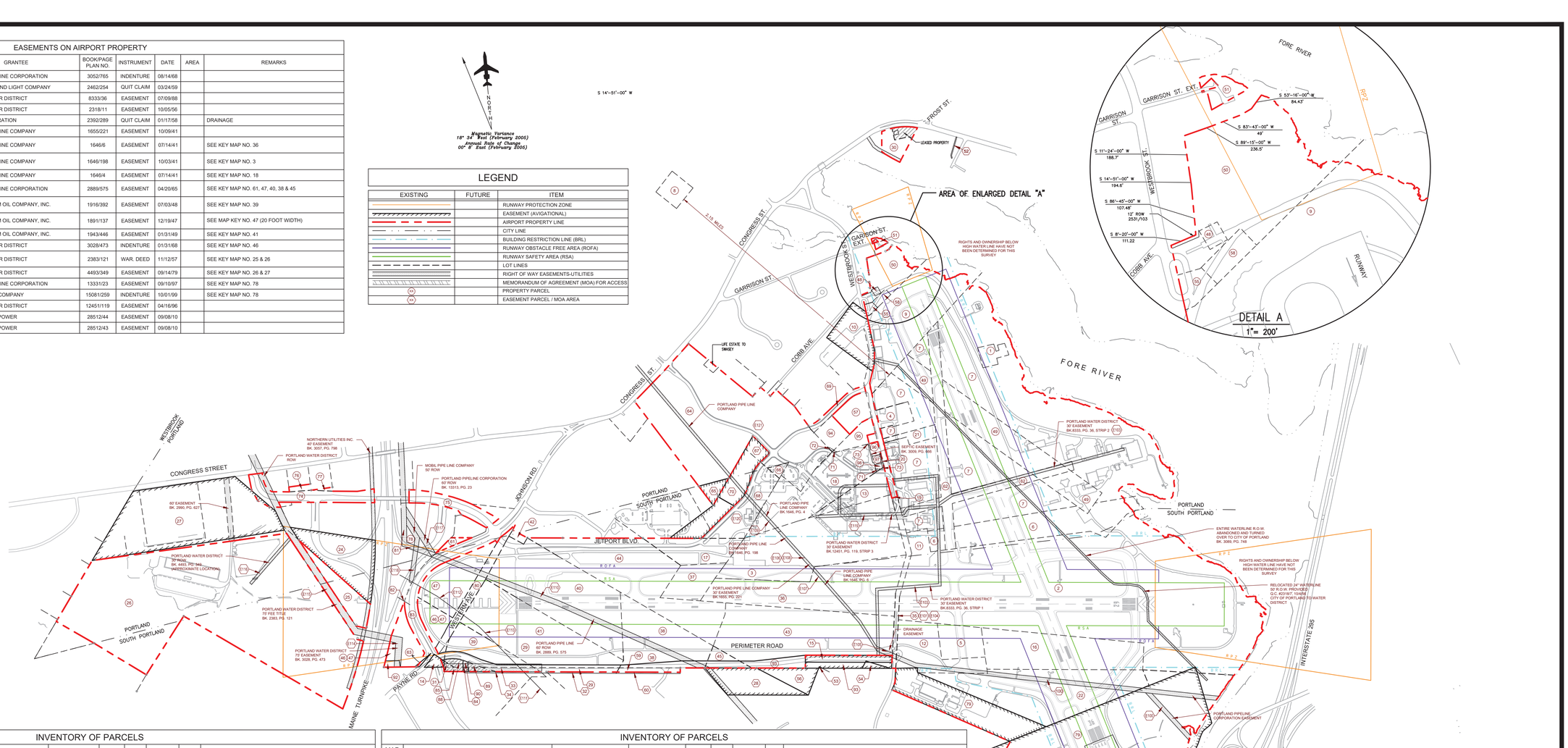
NORTH

Magnetic Variance
18° 34' West (February 2006)
Annual Rate of Change
00° 6' East (February 2006)

S 14°-51'-00" W

LEGEND

EXISTING	FUTURE	ITEM
		RUNWAY PROTECTION ZONE
		EASEMENT (AVIGATIONAL)
		AIRPORT PROPERTY LINE
		CITY LINE
		BUILDING RESTRICTION LINE (BRL)
		RUNWAY OBSTACLE FREE AREA (ROFA)
		RUNWAY SAFETY AREA (RSA)
		LOT LINES
		RIGHT OF WAY EASEMENTS-UTILITIES
		MEMORANDUM OF AGREEMENT (MOA) FOR ACCESS
(##)		PROPERTY PARCEL
(##)		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	WAR. DEED	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	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	2996	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	6/19/67	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 3007/617 IN ERROR SEE AFFIDAVIT 3458/116							
58	RAY L. & JOLA 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	Q.C. 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	12/28/01	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 (15 YEAR)	-	-	7/16/18	0.30	FAA APPROVAL BY LETTER DATED 2-23-18 FOR LAND USE CHANGE FROM AERONAUTICAL TO NON-AERONAUTICAL USE
93	CITY OF PORTLAND	CITY OF SOUTH PORTLAND	EASEMENT	23141	44	12/12/05	8.70	SUBJECT TO ALL EASEMENTS OF RECORD
94	CITY OF PORTLAND	TOYE REALTY HOLDINGS III, LLC	Q.C. W/COVEN	38899	127	11/16/21	2.00	TM 210A, BLK A, LOT 6
95	CITY OF PORTLAND	TOYE AIRPORT PARK, LLC	Q.C. W/COVEN	38899	51	11/16/21	1.78	PARCEL FOUR (TM 210A, BLK A, LOT 2)
96	CITY OF PORTLAND	TOYE AIRPORT PARK, LLC	Q.C. W/COVEN	38899	52	11/16/21	0.34	PARCEL THREE (TM 208, BLK A, LOT 5)
97	CITY OF PORTLAND	TOYE AIRPORT PARK, LLC	Q.C. W/COVEN	38899	53	11/16/21	0.23	PARCEL TWO (TM 208, BLK A, LOT 7)
98	CITY OF PORTLAND	TOYE AIRPORT PARK, LLC	Q.C. W/COVEN	38899	50	11/16/21	0.16	PARCEL ONE (TM 208, BLK A, LOT 6)

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. THE BASE PROPERTY LINE INFORMATION FOR THIS EXHIBIT 'A' WAS SOURCED FROM THE BOUNDARY SURVEY FOR THE PORTLAND INTERNATIONAL JETPORT LAST UPDATED JANUARY 26, 2022.
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. 62 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
8	ADDED MAP KEY PARCELS 94 THRU 98 AND ADJUSTED OIL PIPELINE EASEMENT	03.11.22	LA	DDA
7	MAP KEY PARCEL # 92 ADDED 2-23-18 FAA APPROVAL DATE FOR NON AERONAUTICAL USE	04.17.19	LA	DDA
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.

APPROVAL BLOCK
City of Portland, Maine
Paul Bradbury 03/11/2022

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
APPROVED BY: Dwight Anderson
FILE NAME: STANTEC-EXHIBIT_A

March 2022 | SHEET EXHIBIT 'A'

Coffman Associates Airport Consultants

\\US0261-PPFSS01\workgroup\1953\inactive\fstr\Jetport\MASTER FILES\PROPERTY EXHIBIT\stantec-exhibit_a.dwg Iranthony 3/11/2022 12:06 PM

Zone Related Design Standards 14-14.6.4 (I)

Not applicable.

The proposed project has been designed in accordance with the City Technical Manual and the airport master plan.

Please see the plan set.

Evidence of State or Federal Approvals

The proposed project will require permits from the Maine Department of Environmental Protection and the Army Corps of Engineers. Applications were submitted to the Maine Department of Environmental Protection and the Army Corps of Engineers for review on February 29, 2024. Proof of approvals will be forwarded upon receipt.

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW ENGLAND DISTRICT
NEW ENGLAND DISTRICT OFFICE
696 VIRGINIA ROAD
CONCORD MASSACHUSETTS 01742-2751

August 14, 2024

Regulatory Division
Maine Section
File No. NAE-2008-00053

Paul Bradbury
City of Portland
1001 Westbrook Street
Portland, ME 04102
Via Email: phb@portlandmaine.gov

Dear Mr. Bradbury:

This letter is in response to the application you submitted to the New England District on February 28, 2024 for a Department of the Army general permit verification. This project has been assigned the file number NAE-2008-00053. This file number should be referenced in all correspondence with this office.

A review of the information provided indicates the proposed work to discharge 11,151 square feet (SF) (0.256 acre) of fill into freshwater wetlands in association with improvements to existing parking areas in addition to the construction of the Portland International Jetport surface parking expansion. The project is located in unnamed wetlands; at Jetport Blvd and International Pkwy, at Latitude 43.644120º and Longitude -70.303260º; in Portland, Cumberland County, Maine. The work is shown on the enclosed plans titled “PWM Parking Expansion”, on 2 sheets, and dated 2/29/2024.

Based on the information you have provided; we verify that the activity is authorized under General Permit #08 of the 2020-2025, Federal Permit known as the Maine General Permits (GPs). If the extent of the project area and/or nature of the authorized impacts to waters are modified, a revised application must be submitted to this office for written approval before work is initiated. A copy of these permits can be found at: https://www.nae.usace.army.mil/Missions/Regulatory/State-General-Permits/

Any deviation from the terms and conditions of the permit, or your submitted plans, may subject the permittee to the enforcement provisions of our regulations. Therefore, in the event changes to this project are contemplated, it is recommended you coordinate with this office prior to proceeding with the work. This office must approve any changes before you undertake them. You must perform this work in compliance with the terms and conditions of the GPs listed above, as well as:

1. The permittee shall complete and return the enclosed Work-Start Notification Form to this office at least two weeks prior to the anticipated construction start date.

2. The permittee shall complete and return the enclosed Completion Certification Form to this office at least one month following the completion of the authorized work.

3. You must maintain the activity herein in good condition and in conformance with the terms and conditions of this authorization. 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 a General Condition of this GPs. Should you wish to cease to maintain the authorized activities, or should you desire to abandon it without a good faith transfer, you must obtain a modification of this authorization from this office, which may require restoration of the area.

You must also perform the work in compliance with the following special conditions:

Project-specific Special Conditions:

1. Compensatory mitigation shall consist of purchasing 0.26 In-Lieu-Fee (ILF) credits from the Maine Natural Resource Conservation Fund. The current cost to purchase these credits can be found at the following Maine DEP web page: https://www.maine.gov/dep/land/nrpa/ILF_and_NRCP/ILF/fs-in-lieu-fee.pdf. The in-lieu fee amount is subject to change yearly and the exact cost is dependent on the date of purchase. The permittee must send a cashier's check or bank draft for the credit amount, as calculated on the enclosed "In Lieu Fee (ILF) Project Impact Worksheet" to: ME DEP, Attn: ILF Program Administrator, State House Station 17, Augusta, ME 04333. The check must include the Corps file number "NAE-2008-00053" and the statement: "For ILF account only". **No impacts authorized by this permit shall begin until ILF credits are purchased**, and the Corps receives a copy of the letter from the Maine Department of Environmental Protection (ME DEP) to the permittee stating that the ME DEP has received the check and accepts responsibility for mitigation.

This authorization expires on October 14, 2025. You must commence or have under contract to commence the work authorized herein by October 14, 2025, and complete the work by October 14, 2026. If not, you must contact this office to determine the need for further authorization and we recommend you contact us before the work authorized herein expires. Please contact us immediately if you change the plans or construction methods for work within our jurisdiction as we must approve any changes before you undertake them. Performing work within our jurisdiction that is not specifically authorized by this determination or failing to comply with the special condition(s)

provided above or all of the terms and conditions of the GPs may subject you to the enforcement provisions of our regulations.

This general permit verification and any associated authorizations does not preclude the necessity to obtain any other Federal, State, or local permits, licenses, and/or certifications, which may be required.

If you have any questions related to this verification or have issues accessing documents referenced in this letter, please contact Zachary Normile, Project Manager at 978-318-8916, or by email at zachary.normile@usace.army.mil. This agency continually strives to improve our customer service. In order to better serve you, please complete the Customer Service Survey located at: https://regulatory.ops.usace.army.mil/customer-service-survey/.

Sincerely,

Ryan Malterud
Deputy Chief
Regulatory Division

Enclosures

Cc (w/enclosures):
Owen McCullough, Sebago Technics, Inc. (via omccullough@sebagotechnics.com)
Dawn Hallowell, ME DEP (via Dawn.Hallowell@maine.gov)
Mary York, ME DEP (via marylisa.york@maine.gov)
Mike Marsh, US EPA (via Marsh.mike@epa.gov)

Work-Start Notification Form

File Number: NAE-2008-00053 State: Maine County: Cumberland

Permittee: City of Portland, Paul Bradbury
Date Verification Issued: 8/14/2024
Project Manager: Zachary Normile

At least two weeks prior to commencing the activity authorized by this permit, sign this certification and return it to the following address:

US ARMY CORPS OF ENGINEERS
New England District
Attn: Zachary Normile
442 Civic Center Dr Suite 350
Augusta, Maine 04330
or
zachary.normile@usace.army.mil
978-318-8916

Please note that your permitted activity is subject to a compliance inspection by a U. S. Army Corps of Engineers (USACE) representative. Failure to comply with any terms or conditions of this authorization may result in the USACE suspending, modifying or revoking the authorization and/or issuing a Class I administrative penalty, or initiating other appropriate legal action.

The people (e.g. contractor) listed below will do the work, and they understand the permit's conditions and limitations.

Contractor Name/Contractor Firm: _____
Business Address: _____
_____
Contractor Phone and Email: _____

Proposed Construction Dates: Start: _____ **Finish:** _____

_____ _____
Signature of Permittee **Date**

Compliance Certification Form

File Number: NAE-2008-00053 State: Maine County: Cumberland

Permittee: City of Portland, Paul Bradbury
Date Verification Issued: 8/14/2024
Project Manager: Zachary Normile

Within one month of completion of the activity authorized by this permit and any mitigation required by the permit (you must submit this form after mitigation is complete, but not the mitigation monitoring, which requires separate submittals), sign this certification and return it to the following address:

US ARMY CORPS OF ENGINEERS
New England District
Attn: Zachary Normile
442 Civic Center Dr Suite 350
Augusta, Maine 04330
or
zachary.normile@usace.army.mil

Please note that your permitted activity is subject to a compliance inspection by a U. S. Army Corps of Engineers (USACE) representative. Failure to comply with any terms or conditions of this authorization may result in the USACE suspending, modifying, or revoking the authorization and/or issuing a Class I administrative penalty, or initiating other appropriate legal action.

I hereby certify that the work, and mitigation (if applicable), authorized by the above referenced permit has been completed in accordance with the terms and conditions of the said permit including any general or specific conditions.

Date Authorized Work Started: _____ **Completed:** _____

Describe any deviations from permit (attach drawing(s) depicting the deviations):

_____

_____

***Note: The description of any deviations on this form does not constitute approval by the USACE.**

_____ _____

Signature of Permittee **Date**

MAINE IN-LIEU-FEE (ILF)
PROJECT IMPACT WORKSHEET

DEP Invoice #: *Filled in by ILF Administrator in Augusta*

Project Name: Portland Jetport – Parking

Permittee(s): City of Portland

DEP Permit #: Issued Date: *Attach a copy of DEP Permit*

Corp Permit #: NAE-2008-00053 Issued Date: *Attach a copy of Corp Permit*

DEP/Corps Project Managers: Corps-Zachary Normile

Project Address: Jetport Blvd and International Pkwy, Portland, Maine

Biophysical Region – Section: Southern Maine

Biophysical Region – Subsection: Gulf of Maine Coastal Lowlands

ILF Credits (credits to be purchased): 0.26

Credit Calculations (see examples below): $261,795.60 (1 ac ILF Cumberland Co) * 0.26 wetland credit = $68,066.86

Check Date: Check Amount:

Resource Types (list all that apply, separate line for each resource)	**Types of Impacts** (list all that apply, by resource type)	**SF Impacted** (by resource type)	**Multiplier or Reduction** (if none, use 1 or N/A)	**Credit Required** (including multipliers & reductions)	**Linear FT of Streams Impacted** (for Corps use)
PFO	Fill	11,151	1	0.26	0
	Total SF Impacts:		**Total Credits:**		

Resource Types: Wetlands by NWI Type (PEM, PFO, PSS, PUB, M1, M2, E1, E2, M1AB3*, etc.), significant vernal pool depression (SVP), significant vernal pool critical terrestrial habitat (VPCTH), shorebird feeding & staging habitat (shorebird), inland waterfowl & wading bird habitat (IWWH), Tidal waterfowl & wading bird habitat (TWWH), lake or pond (L1, L2), river/stream/brook (RSB)

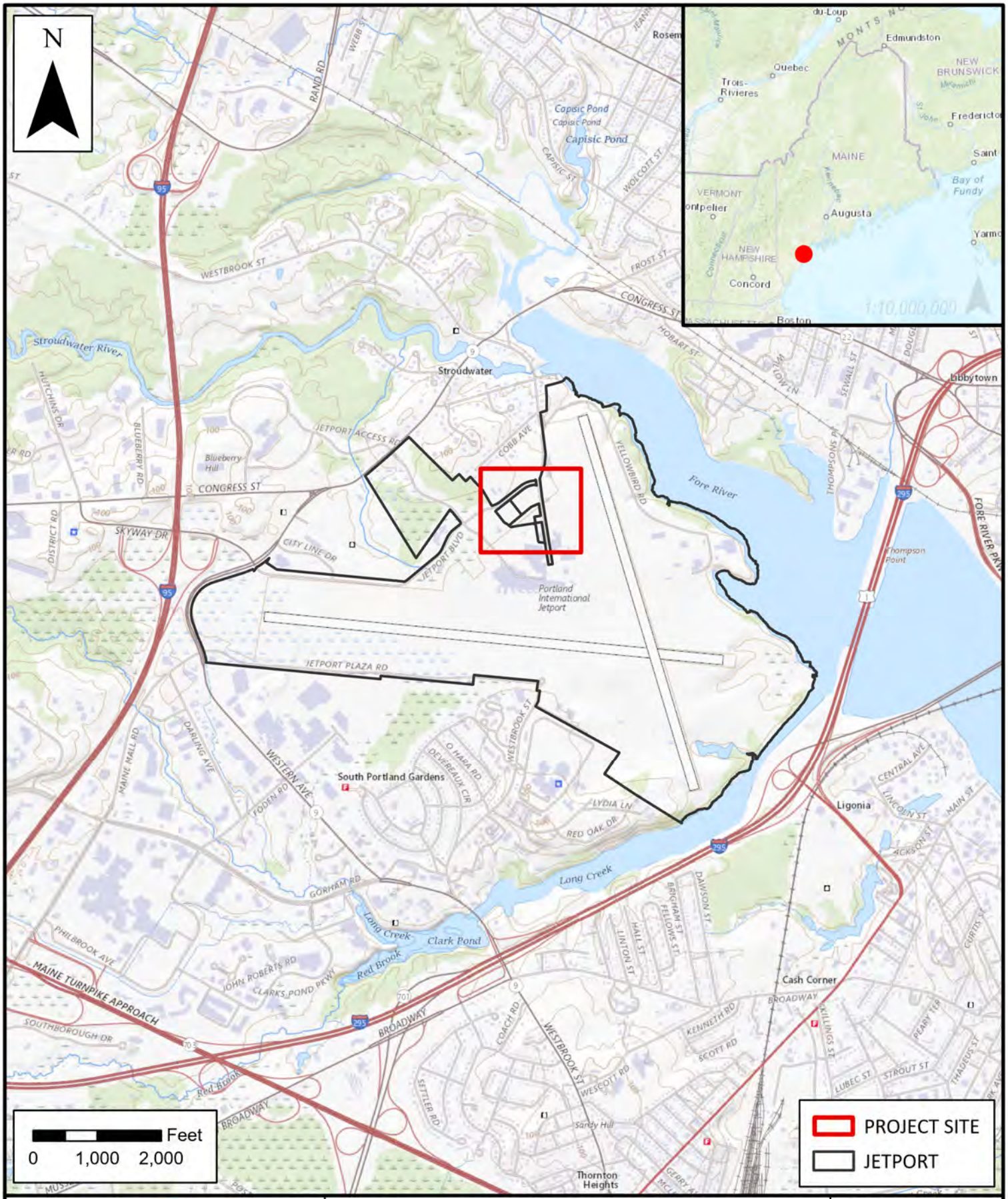
Types of Impacts: May include filling, dredging, vegetation conversion (e.g. forested to shrub/scrub), excavation with associated discharge, etc.

Credit Calculation examples: 1 credit = 1 acre (43,560 sq ft)

- For US Army Corps permit use Current ILF Fact Sheet effective at the time of payment. (See example below)
- If no US Army Corps permit is required and DEP specified a ILF amount in the permit, pay that amount.
- IF both US Army Corps permit and DEP permit are required, pay the higher of the two fees (the one specified in DEP permit or the one calculated according to the steps below based on the number of credits to be purchased).

Example 1: mitigation requirement for a project in Kennebec County = 0.5 credits
Step 1: 1 acre ILF in Kennebec County = $228,690.00
Step 2: Multiply credit requirement per acre cost
228690 x 0.5 = $114,345.00
Example 2: Mitigation requirement for a project in Cumberland County = 0.154 credits
Step 1: 1 acre ILF in Cumberland County = $261,795.60
Step 2: Multiply credit requirement per acre cost
261795.60 x 0.154 = $40,316.52

Revised 7/1/24



SEBAGO TECHNICS

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

LOCATION MAP
JETPORT PARKING

SCALE: 1:24,000
DATE: 2/29/2024

LOCATION:
1001 WESTBROOK ST
PORTLAND, ME

INFORMATION:
MAINE GEOLIBRARY
USGS QUADRANGLE

PROPOSED WETLAND IMPACT: 5,812 SF

PROPOSED WETLAND IMPACT: 2,806 SF

PROPOSED WETLAND IMPACT: 791 SF
(PREVIOUSLY PERMITTED BUT NOT IMPACTED WETLAND, L-26841-TC-A-N)

PREVIOUSLY PERMITTED AND IMPACTED WETLAND
(L-26841-TC-A-N)

PROPOSED WETLAND IMPACT: 1,742 SF

AVIS RENTAL

JETPORT BLVD.

INTERNATIONAL PKWY.

LONG TERM PARKING

EMBASSY SUITES

PWM PARK AND SHINE

JETPORT ACCESS ROAD

PARKING GARAGE

PARK 'N JET

WEST COMMERCIAL ST.

GRAPHIC SCALE
50 0 25 50 100
(IN FEET)
1 INCH = 50 FT.

PAUL D. OSTROWSKI PE 11175

AMY BELL SEGAL, RLA 2265

STATE OF MAINE
PAUL D. OSTROWSKI
No. 11175
REGISTERED PROFESSIONAL ENGINEER
07/08/2024

REV.	BY	DATE:	STATUS
C	PDO	05/28/2024	OVERALL GRADING PLAN REISSUED TO MAINE DEP AND ACOE
B	PDO	03/19/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
A	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM SEBAGO TECHNICS, INC. ANY ALTERATIONS AUTHORIZED BY OTHERS 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

OVERALL GRADING PLAN

OF:

PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

FOR:

PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 50'
PROJECT	19059

SHEET C-200

F:\Projects\19000\19059\DWG\Design\19059 G.dwg - 7/8/2024 4:02 PM - TANNER F. GOODINE

19059 G.dwg, TAB:C-200 Overall Grading

SEBAGO TECHNICS

Neighborhood Meeting Sign-In Sheet

April 11, 2024

Proposed Parking Expansion at the Portland Jetport
Major Site Plan Review

Applicant and Design Team in Attendance

Name	E-mail
1. Owens McCullough, Sebago Technics	omccullough@sebagotechnics.com
2. Tanner F. Goodine, EI – Sebago Technics	tgoodine@sebagotechnics.com
3. Cole Peters	cpeters@sebagotechnics.com
4. Paul Bradbury - Portland Int'l Jetport (PWM)	phb@portlandmaine.gov
5. Amy Bell Segal - Sebago Technics	absegal@sebagotechnics.com
6.	
7.	

Members of the Public in Attendance

NAME	Address	E-mail
JIM IOVINE	30 PORTLAND	PORTLANDNATIVE@MAINE
FRED FALLER	1443 Westbrook St.	FFaller@Verizon.net
Ellen Faller	1443 Westbrook St	efaller@verizon.net
Jen Stenberg	25 Stroudwater Rd	jensten.88@gmail.com
LORETTA EDES	127 FENWAY ST	LORETTA.ALLEN.EDES@GMAIL.COM
WILLIAM EDES	"	N/A
Angela Wheaton	30 Partridge	AngelaJWheaton@yahoo.com
Brewster Harding	1168 Westbrook St	brewsterharding@gmail.com
Barry Dana	37 Tide Mill	barryf@dana.com
Dolores Testa	50 Cobb Ave	dolaalladee@gmail.com
Martha Cleary	37 Cobb Ave	marthacleary207@gmail.com
Woody Howard	28 Roundabout Lane	g.bwoodye aol.com

NAME	Address	E-mail
Karen Sokolsky [illegible]	1221 [illegible]	KS hstrat@gmail.com
Anne Taintor	1258 Westbrook St	annemtaintor@gmail.com
Nathan Janoff	1258 Westbrook St	njanoff45@gmail.com
Harmony Renna	90 Cobb Ave	harmonynella@hotmail.com
Tom Ainsworth	12 Garrison St	Tainsworth207@gmail.com
Amanda Scrivani	22 Trailhead Way	a.scrivani@gmail.com
David Roberts	22 Trailhead Way	David.Roberts.maine@gmail.com
MARK OKRENT	17 GARRISON ST	MOKRENT@BATOL.EDU
CHARLOTTE WITT	17 GARRISON ST.	CHARLOTTE.WITT@UNH.EDU
Katherine Moncure	1169 Westbrook St.	kpmoncure@gmail.com
Eugenie de Rham	1810 Congress St	epderham@gmail.com
William de Rham	1810 Congress St	ederham@maine.rr.com
JIM WILBERG	44 TIDE MILL RD	jwwilberg@gmail.com
Nancy Dano	35 Tide Mill Rd	nancy@dano.com

NAME	Address	E-mail

ZONING ANALYSIS Relevant Zone(s) AB Airport

All Projects:

	Required	Proposed
Lot Size	20,000 sf	n/a
Area Per Dwelling Unit	---	n/a
Minimum Street Frontage	50 ft	n/a
Front Yard Minimum	---	n/a
Front Yard Maximum	---	n/a
Rear Yard	---	n/a
Yard Right	---	n/a
Yard Left	---	n/a
Side Street Setback	---	n/a
Step Back	---	n/a
Maximum Lot Coverage	---	n/a
Minimum Lot Coverage	---	n/a
Maximum Height	75ft/45ft	n/a
Open Space	---	n/a
Maximum Impervious Area	70%	48%
Pavement Setback	---	n/a
Floor Area Ratio	na	none
Off Street Parking Spaces	---	282 net increase
Loading Bays	na	none
Other 1		
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):			

Att. EE

PWM Public Informational Meeting Proposed Parking Expansion

April 11, 2024 at 6:00 pm

PWM Portland International Jetport | Maine's Home Airport.

Agenda

- Welcome – Paul Bradbury
- Air Service Trends at PWM – Paul Bradbury
- Proposed Parking Project Review – Paul Bradbury & Owens McCollough, Sebago Technics
- Questions & Answers
- Close

AT A GLANCE

American Airlines
Breeze
DELTA AIR LINES
jetBlue AIRWAYS
FRONTIER AIRLINES
Southwest
sun country airlines
UNITED
FedEx

NON-STOP DESTINATIONS

Seasonal Flights

NON-STOP SERVICE

*Seasonal Service

Atlanta	DELTA
Baltimore/Washington	Southwest
Charleston	Breeze
Charlotte	American Airlines
Chicago Midway	*Southwest
Chicago O'Hare	American Airlines, UNITED
Dallas	*American Airlines
Denver	*UNITED
Detroit	DELTA
Fort Myers	*Breeze
Miami	*American Airlines
Minneapolis/St. Paul	*DELTA, *suncountry airlines
Nashville	Southwest
Newark/New York City	UNITED
New York Islip	*Breeze
New York/JFK	*jetBlue, DELTA
New York/LaGuardia	American Airlines, DELTA
Norfolk	*Breeze
Orlando	FRONTIER, Breeze
Philadelphia	American Airlines
Pittsburgh	*Breeze
Raleigh-Durham	*FRONTIER
Tampa	Breeze
Washington Dulles	UNITED
Washington Reagan	American Airlines

PWM Air Service Trends

From 1997 to 2019 operations are down 54.8% and total passengers are up 78.1%.

For 2023 Operations are 7.3% below 2019 levels and total passengers are 1.8% above 2019 levels.

What Changed?

1997 Aircraft:

- Beechcraft: 19 seats
- Saab 340: 34 seats
- ERJ 135: 37 seats
- ERJ 140: 44 seats
- Dornier 328: 45 seats
- CRJ: 50 seats
- B737-300: 126 seats
- MD80: 142 seats

Average seats per flight:
57.5

Dornier 328

Beechcraft

Saab 340

CRJ

MD80

What Changed?

2023 Aircraft:

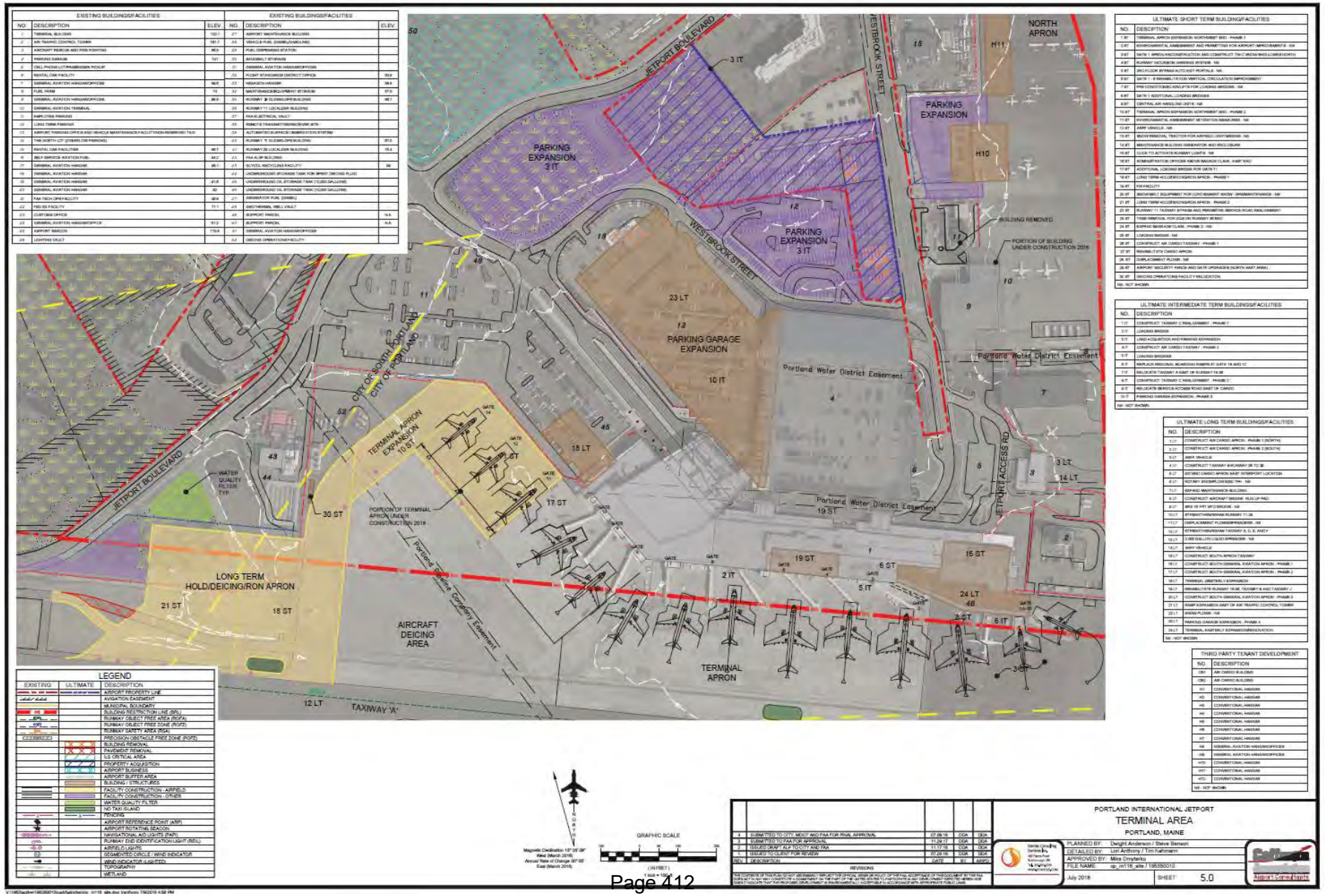
- E-145: 50 seats
- E-170: 65 seats
- E-175: 76 seats
- CRJ 900: 76 seats
- A220: 137 seats
- A319: 126 seats
- A320: 150 seats
- A320neo: 186 seats
- A321: 230 seats
- A321neo: 240 seats
- B737- 700: 143 seats
- B737-800: 175 seats
- B737-900: 179 seats
- B737-Max 9: 179 seats

Average seats per flight:

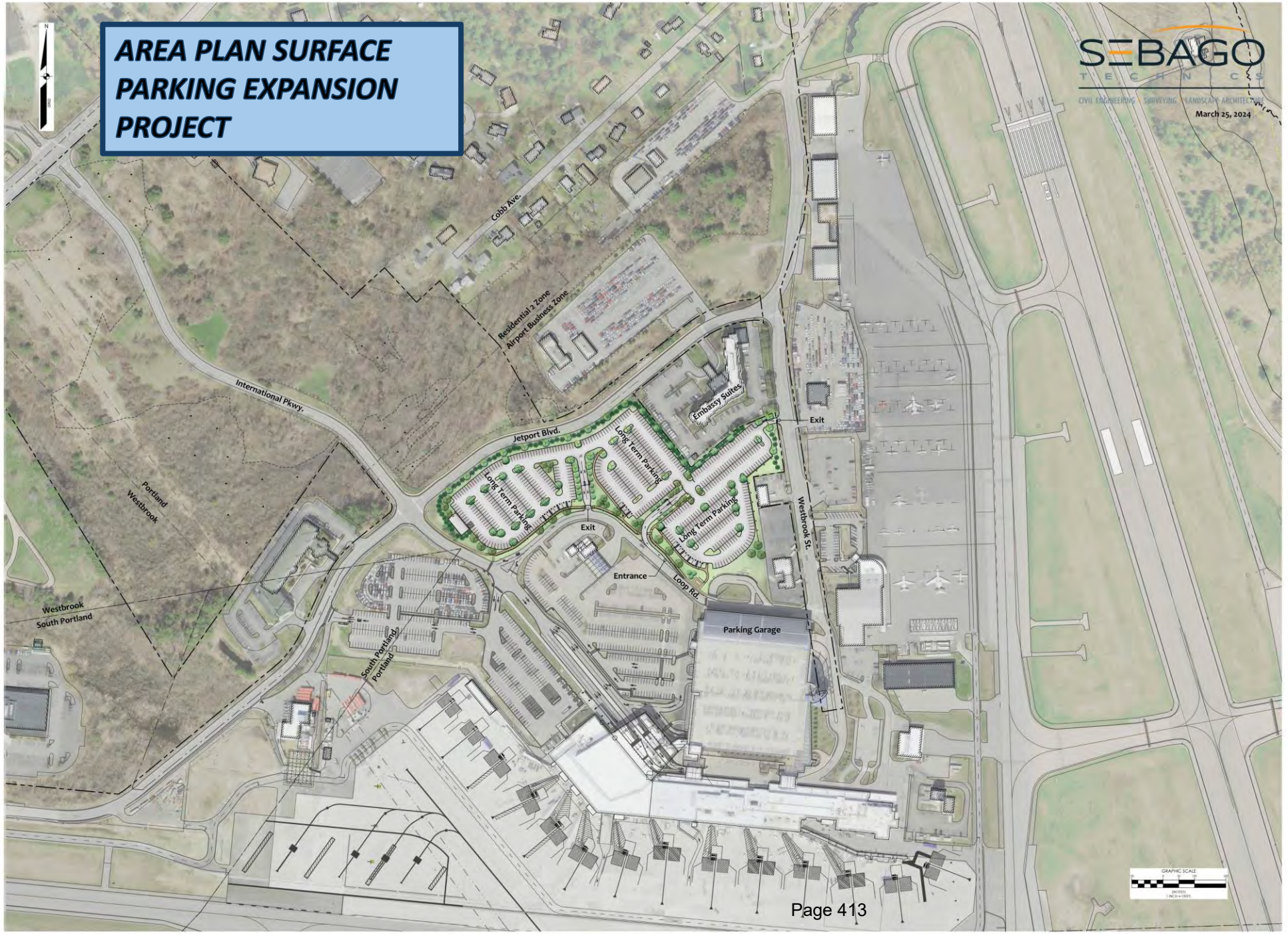
110.7

Proposed Parking Project

Proposed Parking Project



AREA PLAN SURFACE PARKING EXPANSION PROJECT



Portland International Jetport | Maine's Home Airport.

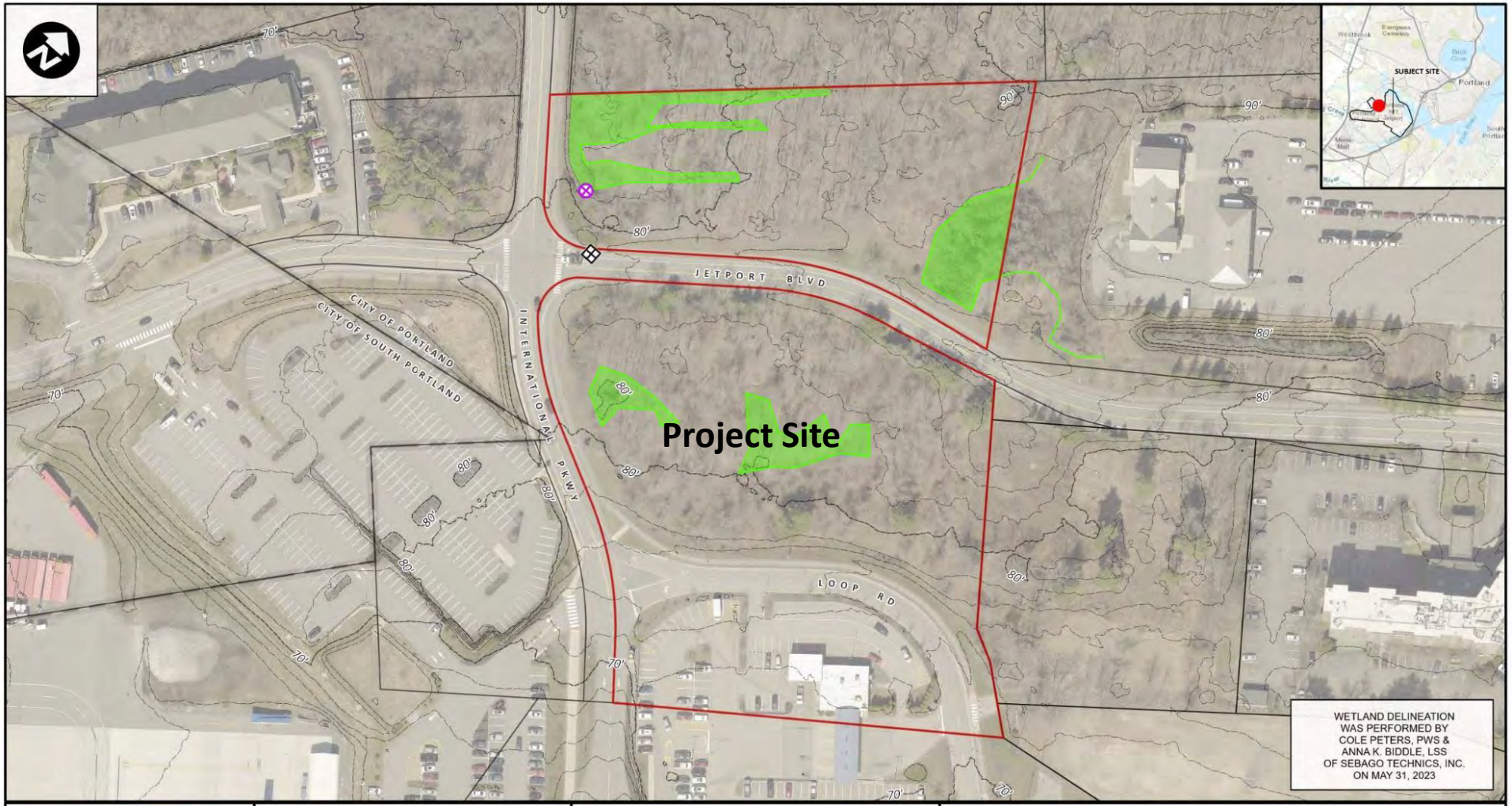
- *Two-Paved Parking Lots*
- *Reconfigures Existing Parking Lots and New Parking Lot Construction*
- *Consistent with Parking Masterplan*
- *Current Total Long -Term Parking: 3,223*
- *Displaced Parking: 402 Spaces (Valet and Cell Phone Lot)*
- *Total Parking Construction Shown: 684*
- *Net Increase: 282 Spaces*
- *56 Level 1 EV Parking*
- *141 Level 1 EV Ready*

PWM Portland International Jetport | Maine's Home Airport.

SURFACE PARKING EXPANSION PROJECT

- PARKING PLAN

Wetland Mapping



SEBAGO TECHNICS

WWW.SEBAGOTECHNICS.COM

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

0 100 200 300
Feet
1" = 100' when printed at 11 x 17

INFORMATION: MAINE GEOLIBRARY
2020 USGS LIDAR TOPOGRAPHY
2021 SPRING ORTHOIMAGERY

THIS IS NOT A BOUNDARY SURVEY.
WETLAND FEATURES WERE DELINEATED
USING GPS TECHNOLOGY CAPABLE OF SUB-METER ACCURACY.

FIGURE 1: NATURAL RESOURCES MAP

TAX MAP 210A, LOTS B-1 & A-7

LOCATION: JETPORT BOULEVARD PORTLAND, ME

DATE: 7/10/2023

PROJECT NUMBER: 19059

19059.aprx

AREA OF INTEREST (AOI)
TOWN BOUNDARY
CATCH BASIN
CULVERT OUTLET - 24" RCP
DELINEATED WETLAND BOUNDARY
WETLANDS WITHIN AOI
2' CONTOUR
10' CONTOUR

Map Projection : NAD 1983 StatePlane Maine West FIPS 1802 Feet

Portland International Jetport | Maine's Home Airport.

Wetland Mapping

8,618 S.F. of Wetland Alteration.

Questions?

Site Plan Standards Assessment

The Proposed project has been designed to be in compliance with the site plan standards as outlined in 14.6 of the land use code. Please see the submittal materials for how each of the specific standards are met.

Portland International Jetport
Sustainability Action Dashboard

vhb | SPOT
Sustainability Planning Optimization Tool

	Actions Aggregated	Greenhouse Gas Emissions	Energy	Waste Management and Recycling	Ground Access and Transportation	Social Responsibility	Governance	Noise	Water Quality
Total Feasible Actions	57	8	12	7	9	10	4	4	3
Completed Actions	0	0	0	0	0	0	0	0	0
Actions In-Progress	4	2	0	2	0	0	0	0	0
Actions Not Started	52	6	12	5	8	10	4	4	3
Actions Flagged	0	0	0	0	0	0	0	0	0
Short-term Actions	0	0	0	0	0	0	0	0	0
Mid-term Actions	2	0	0	0	1	0	0	1	0
Long-term Actions	1	0	0	0	0	0	0	1	0

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Portland International Jetport

Portland International Jetport Sustainability Action Evaluation Tool

vhb | SPOT Sustainability Planning Optimization Tool

Action ID	Action	Action Description	Primary Sustainability Category	Stakeholder Involvement	Timeframe	Feasibility: Jetport Constraints	Feasibility: Regulatory Constraints	Feasibility: Safety	Feasibility: Other	Feasibility Determination
1	Determine the feasibility of replacing outdated HVAC equipment in the Old Terminal with more efficient alternatives	Replacing outdated HVAC equipment with more efficient alternatives would lead to improved energy and fuel consumption efficiency at the Jetport.	Energy	Internal Stakeholders (Jetport Staff Only)		Feasible	Feasible	Feasible	Feasible	Feasible
2	Evaluate the potential for combined heat and power systems at Jetport facilities, where applicable	Combined heat and power (CHP) systems capitalize on the heat produced by Jetport facility systems and provide opportunities for improved energy efficiency.	Energy	Internal Stakeholders (Combination of Jetport and Tenant Employees)		Feasible	Feasible	Feasible	Feasible	Feasible
3	Continue to install occupancy sensors for lighting systems throughout the Jetport's occupied spaces, including tenant spaces	Installing lighting occupancy sensors within the Jetport's occupied facilities would automatically shut off lighting in unoccupied spaces, likely reducing overall energy use at the Jetport.	Energy	Internal Stakeholders (Combination of Jetport and Tenant Employees)		Feasible	Feasible	Feasible	Feasible	Feasible
4	Support the development of an on-site solar power purchase agreement to increase the Jetport's consumption of renewable energy	Supporting a solar power purchase agreement (PPA) would enable the Jetport to increase the percentage of renewable power consumed. Solar PPAs also typically offer reduced electricity rates compared to traditional power sources. Note: The City of Portland recently put out a Request for Proposals for a Solar PPA at municipal properties, including the Jetport. It did not receive responses for the Jetport due to glare concerns and the associated installation costs. The Jetport considers this a long-term opportunity, as conditions and costs may change.	Energy	Internal Stakeholders (Jetport Staff Only)		Feasible	Feasible	Feasible	Feasible	Feasible
5	Upgrade the building envelope of the Old Terminal	Enhancing the doorway and window seals, building insulation, and flooring and roofing materials would reduce the heating and cooling requirements of Jetport facilities, leading to reductions in energy and fuel consumption.	Energy	Internal Stakeholders (Jetport Staff Only)		Feasible	Feasible	Feasible	Feasible	Feasible
6	Retro-commission the building systems at the Old Terminal	Retro-commissioning of the building systems provides a procedural approach to verifying the operability and efficiency of the building systems to identify and correct inefficiencies or damaged components..	Energy	Internal Stakeholders (Jetport Staff Only)		Feasible	Feasible	Feasible	Feasible	Feasible
7	Continue to upgrade lighting within the parking garage to LEDs	The Jetport should continue to upgrade the lighting within its parking garage with LEDs. LED lighting can provide significant benefits over traditional lighting, including reduced electricity consumption and related costs as well as reduced maintenance requirements. They may also provide enhanced lighting quality, thereby improving safety conditions.	Energy	Internal Stakeholders (Jetport Staff Only)		Feasible	Feasible	Feasible	Feasible	Feasible
8	Install public charging stations in the garage to accommodate electric vehicles	Installing public electric vehicle charging stations would facilitate the use of electric vehicles for Jetport users traveling to and from the Jetport; electric and plug-in hybrid vehicles produce less local and regional air emissions.	Greenhouse Gas Emissions	Internal and External Stakeholders		Feasible	Feasible	Feasible	Feasible	Feasible
9	Implement a Jetport-wide IT energy conservation program	A Jetport-wide IT energy conservation program would help reduce the plug load from personal computers and other electronic equipment, thereby reducing the overall electricity use at the Jetport.	Energy	Internal Stakeholders (Jetport Staff Only)		Feasible	Feasible	Feasible	Feasible	Feasible
10	Install a pilot-controlled lighting system	A pilot controlled airfield lighting system would reduce Jetport energy consumption by extinguishing airfield lighting when not needed.	Energy	Internal Stakeholders (Select Jetport Tenants Only)		Feasible	Feasible	Feasible	Feasible	Feasible
11	Develop and implement an energy audit program	An energy audit program with regularly scheduled energy audits and standard record keeping processes would enable the Jetport to gather and retain accurate records of Jetport energy usage and identify trends and opportunities for improvement.	Energy	Internal Stakeholders (Combination of Jetport and Tenant Employees)		Feasible	Feasible	Feasible	Feasible	Feasible
12	Outfit existing vending machines with "Watt Stoppers"	Installing "Watt Stoppers" for Jetport vending machines would reduce Jetport energy usage by automatically shutting off power during extended periods of inactivity.	Energy	Internal Stakeholders (Jetport Staff Only)		Feasible	Feasible	Feasible	Feasible	Feasible
13	Provide pre-conditioned air (PCA) at all commercial service aircraft gates	The Jetport should outfit its jet bridges with PCA supply modules that would connect to parked aircraft. PCA would provide clean air for aircraft, eliminating the need for aircraft tenants to operate standalone gas-powered air compressors. Using PCA instead of standalone modules would increase the Jetport's energy consumption, but reduce overall greenhouse gas emissions and improve local air quality.	Greenhouse Gas Emissions	Internal Stakeholders (Combination of Jetport and Tenant Employees)		Feasible	Feasible	Feasible	Feasible	Feasible
14	Prepare an annual Jetport-wide greenhouse gas emissions inventory, and voluntarily report the Jetport's carbon performance	Annual greenhouse gas emissions reporting would enhance the Jetport's accountability, improve communication with internal and external stakeholders, and serve as a tool to encourage and measure future greenhouse gas emissions reductions. Such reporting may also strengthen funding pursuits for projects that would reduce the Jetport's greenhouse gas emissions. The Carbon Disclosure Project (https://www.cdp.net) is one potential reporting mechanism.	Greenhouse Gas Emissions	Internal Stakeholders (Combination of Jetport and Tenant Employees)		Feasible	Feasible	Feasible	Feasible	Feasible
15	Encourage the procurement of hybrid/alternative-fuel vehicles among rental car companies	Rental car companies at the Jetport generate a significant amount of vehicle miles traveled at the Jetport and in the surrounding areas. By encouraging rental car companies to procure and promote hybrid or alternative fuel vehicles, the Jetport could indirectly reduce the emission of greenhouse gases and other air pollutants. Such encouragement could take the form of financial incentives or priority accommodations. The Jetport could encourage rental car customers to rent these vehicles through targeted marketing.	Greenhouse Gas Emissions	Internal Stakeholders (Select Jetport Tenants Only)		Feasible	Feasible	Feasible	Feasible	Feasible
16	Encourage tenants to procure alternative fuel and/or fuel-efficient ground support equipment	The Jetport should offer incentives to encourage tenants to replace petroleum-based ground support equipment with low emission and/or fuel efficient alternatives and thereby reduce the Jetport's overall negative impact on air quality by reducing associated greenhouse gas emissions and criteria pollutants. Incentives may include preferred facility locations and/or other financial discounts.	Greenhouse Gas Emissions	Internal Stakeholders (Select Jetport Tenants Only)		Feasible	Feasible	Feasible	Feasible	Feasible
17	Expand the use of CNG among the Jetport's fleet vehicles	As the necessary fueling infrastructure becomes more available at the local level, the Jetport will consider converting its petroleum oil-based fleet vehicles to compressed natural gas (CNG). This would reduce the Jetport's overall negative impact on air quality by reducing the associated emission of criteria pollutants and greenhouse gases, and could potentially provide long-term financial benefits through reduced fuel costs. The Jetport's fleet vehicles include ground support equipment, including tugs and tows, and other operational vehicles.	Greenhouse Gas Emissions	Internal Stakeholders (Jetport Staff Only)		Feasible	Feasible	Feasible	Feasible	Feasible
18	Use warm-mix asphalt instead of hot mix asphalt, where applicable	The Jetport should determine the feasibility of replacing hot-mix asphalt with warm-mix asphalt on a project-by-project basis. This would decrease the amount of process energy by lowering the temperature at which the asphalt mixture is produced and applied. This would also decrease the amount of generated greenhouse gas emissions and other air pollutants. Additionally, warm-mix asphalt could reduce project timeframes because of lower viscosity and better workability. Areas like parking lots, taxiways, and aprons are examples of where warm-mix asphalt can be applied.	Greenhouse Gas Emissions	Internal Stakeholders (Jetport Staff Only)		Feasible	Feasible	Feasible	Feasible	Feasible
19	Post "No Idling" signs around the Jetport property, particularly targeted toward taxis and livery cars	The Jetport should install "no idling" signs around Jetport property to remind visitors, particularly taxis and livery cars, to turn off their vehicles while not in motion. This would reduce associated greenhouse gas emissions and the generation of other air pollutants. It could also improve the visitor experience by minimizing associated noise. These signs could serve as an educational tool that would raise visitor awareness of the environmental impact of vehicle idling to discourage against idling at other locations in and outside the Jetport. Note: The City of Portland has an anti-idling ordinance (Chapter 28, Section 28-195); however, this only applies to private passenger vehicles.	Greenhouse Gas Emissions	External Stakeholders		Feasible	Feasible	Feasible	Feasible	Feasible
20	Increase the number of recycling bins and strategically co-locate them with standard trash receptacles throughout the Jetport's facilities and exterior spaces to maximize use	The Jetport may be able to improve the overall diversion rate by providing more bins for recycling and more convenient and intuitive locations for recycling bin locations.	Waste Management and Recycling	Internal Stakeholders (Jetport Staff Only)		Feasible	Feasible	Feasible	Feasible	Feasible
21	Design and implement a recycling awareness campaign for employees and passengers	A recycling awareness campaign at the Jetport seeks to improve internal and external awareness of recycling practices in an effort to improve overall diversion rate and reduce unwanted mingling of recyclables with trash.	Waste Management and Recycling	Internal and External Stakeholders		Feasible	Feasible	Feasible	Feasible	Feasible
22	Convert or replace the existing waste management contract with one that is performance-based	Converting or replacing the existing waste management contract with a performance-based contract provides built-in incentives for the waste management contractor to keep accurate records of waste disposal and continually identify opportunities for recycling, composting, or other reuse.	Waste Management and Recycling	Internal Stakeholders (Jetport Staff Only)		Feasible	Feasible	Feasible	Feasible	Feasible
23	Make permanent the existing composting pilot program, and expand it beyond the Jetport's back-of-house food preparation to include the passenger/public organic waste stream	By increasing the scope and organization of the existing composting program, the Jetport could further reduce waste generated and improve the volume of compostable materials. Expanding the program to passengers and public spaces also increases program visibility.	Waste Management and Recycling	Internal and External Stakeholders		Feasible	Feasible	Feasible	Feasible	Feasible
24	Encourage restaurants to coordinate and use compostable/ recyclable disposable cups, plates, and cutlery	Through financial, policy, or contractual incentives, the Jetport may encourage food-dispensing tenants to use compostable or recyclable dishes and flatware in order improve the Jetport's overall diversion rate.	Waste Management and Recycling	Internal Stakeholders (Select Jetport Tenants Only)		Feasible	Feasible	Feasible	Feasible	Feasible
25	Conduct regular waste audits	A waste audit program at the Jetport would enable the Jetport to systematically track waste generation, diversion rates, and other metrics associated with waste and record this information in standard formats. Armed with this information, the Jetport may identify trends and opportunities to improve waste disposal practices.	Waste Management and Recycling	Internal Stakeholders (Combination of Jetport and Tenant Employees)		Feasible	Feasible	Feasible	Feasible	Feasible
26	Promote ridesharing for employee commutes	The Jetport should promote ridesharing opportunities to reduce employee vehicle miles traveled, which would decrease related greenhouse gas emissions and the generation of other air pollutants to better regional air quality. It would also decrease on-site demand for employee parking. Promotion could take the form of preferred parking and/or online boards such as Zimride by Enterprise (https://www.zimride.com/).	Ground Access and Transportation	Internal Stakeholders (Combination of Jetport and Tenant Employees)		Feasible	Feasible	Feasible	Feasible	Feasible
27	Continue to work with regional entities to enhance/expand public transportation service to the Jetport, and establish connections to local points of interest	The Jetport should work with regional entities to provide greater access to the Jetport through an expansion of public transportation services. This would greatly decrease the environmental impact of visitors traveling to and from the Jetport by reducing the generation of related greenhouse gas emissions and other air pollutants. A focus of this strategy should be establishing earlier runtimes to accommodate the Jetport's first-shift employees. This strategy should also consider connections to local points of interest such as the Casco Bay Ferry Terminal and Thompson's Point.	Ground Access and Transportation	External Stakeholders		Feasible	Feasible	Feasible	Feasible	Feasible
28	Obtain up-to-date traffic counts for Jetport roadways, including curbside counts, when appropriate	Based on need, determined on a project-by-project basis, the Jetport should gather traffic counts for on-Jetport roadways and curbside areas to establish baseline conditions from which future transportation planning could be conducted. Such data could also be utilized in a Jetport-wide greenhouse gas emissions inventory.	Ground Access and Transportation	Internal Stakeholders (Jetport Staff Only)		Feasible	Feasible	Feasible	Feasible	Feasible
29	Group hotels by their proximity to one another, and consolidate shuttle buses by hotel group	The Jetport should coordinate with local hotels to establish hotel groupings based on geography, and establish consolidated shuttle services for each grouping. This would reduce vehicle miles traveled by hotel guests traveling to and from the Jetport, which would limit the generation of greenhouse gas emissions and other air pollutants.	Ground Access and Transportation	External Stakeholders		Feasible	Feasible	Feasible	Feasible	Feasible
30	Work with regional transportation and institutional entities to develop a bike-sharing program with connections to the Jetport	The Jetport should work with regional entities to develop a local bike-sharing program that would offer employees and visitors an additional option to travel to and from the Jetport. This should be done in association with the City of Portland, who has already expressed an interest in establishing such a system; a Request for Information was sent to vendors in 2014. A bike-sharing program would reduce greenhouse gas emissions and other air pollutants, decrease on-site demand for parking, and promote health and wellness through physical activity.	Ground Access and Transportation	Internal and External Stakeholders		Feasible	Feasible	Feasible	Feasible	Feasible
31	Encourage employees and passengers to use the existing bike and walking paths connected to the Jetport, while advocating for their enhancement	The Jetport should promote the use of existing bike and walking paths among employees and passengers could reduce related greenhouse gas emissions and demand for on-site parking. Promotion could be conducted through the creation and publication of related maps, improving on-site infrastructure, and incentives – potentially linked to the Jetport's employee Safety Incentive Program.	Ground Access and Transportation	Internal and External Stakeholders		Feasible	Feasible	Feasible	Feasible	Feasible
32	Install displays in the baggage claim area that provide information on local transportation options as well as promote the use of related websites and mobile apps	To assist passengers in navigating the Portland area, the Jetport should install displays in the baggage claim area that provide information on local transportation options. Given this information would not be available once a passenger leaves the Jetport, local websites and mobile applications that provide similar information should be promoted. This strategy would assist passengers in efficiently coordinating their travel plans, helping to make their trips less stressful.	Ground Access and Transportation	External Stakeholders		Feasible	Feasible	Feasible	Feasible	Feasible
33	Update the employee transportation survey	To better understand employee commuting behavior, the Jetport should administer an update to its employee transportation survey. The findings of this survey could help to identify related challenges and opportunities. Such baseline information could be leveraged to make employee commuting more efficient and enjoyable.	Ground Access and Transportation	Internal Stakeholders (Combination of Jetport and Tenant Employees)		Feasible	Feasible	Feasible	Feasible	Feasible
34	Develop an external communications plan focused on the Jetport's sustainability program	The Jetport should share information on its sustainability program with its external stakeholders to enhance the transparency of its operations and keep it accountable for its sustainability performance. Further, it could create a conversation around sustainability that would bring attention to the issue and lead to stakeholder collaborations. For this effort, the Jetport could utilize communication platforms such as its website, in-person presentations and webinars, conference participation, and social media.	Social Responsibility	External Stakeholders		Feasible	Feasible	Feasible	Feasible	Feasible
35	Increase local collaborations by participating in local and regional partnerships and working groups	The Jetport should increase its visibility in the community through increased partnerships/collaborations. These relationships would assist all organizations involved in improving their sustainability performance by leveraging combined resources, where appropriate, and sharing best practices.	Social Responsibility	Internal and External Stakeholders		Feasible	Feasible	Feasible	Feasible	Feasible
36	Enhance the existing and/or create a new public aircraft observation area	By enhancing and/or constructing a new public aircraft observation area, the Jetport would provide a community benefit in the form of a passive recreational opportunity. The aircraft observation area would allow the public to view aircraft take-offs and landings. The space could be leveraged to provide a history of aviation in the local community and to highlight the Jetport's sustainability activities.	Social Responsibility	External Stakeholders		Feasible	Feasible	Feasible	Feasible	Feasible
37	Conduct regular employee satisfaction surveys	The Jetport should administer a regular employee satisfaction survey to offer its employees an opportunity to provide feedback on the challenges they face in their workplace as well as opportunities for improvement. Resulting actions could improve employee satisfaction. Regular surveys would allow the Jetport to determine changes in employee satisfaction over time.	Social Responsibility	Internal Stakeholders (Jetport Staff Only)		Feasible	Feasible	Feasible	Feasible	Feasible
38	Develop an internal sustainability awareness program to communicate the Jetport's sustainability guidelines and related practices to its employees and tenants	The Jetport should develop internal sustainability awareness by communicating elements of its sustainability program, including its goals, objectives, and targets as well as past, current, and future actions, to its staff and tenants. By building internal awareness, the Jetport is inviting participation and creating a shared sense of ownership to improve its sustainability performance. Such a strategy would also assist the Jetport in fostering an inclusive organizational culture. Communicating elements of the Jetport's sustainability program can be accomplished by posting the sustainability guidelines in all employee spaces and including sustainability updates in frequently read employee communications, among other methods.	Social Responsibility	Internal Stakeholders (Combination of Jetport and Tenant Employees)		Feasible	Feasible	Feasible	Feasible	Feasible
39	Delineate and promote the use of a wellness/walking path within the terminals	The Jetport should designate walking paths within the terminal to offer employees and passengers the opportunity to get physical exercise during their downtime. The walking paths could be marked with signage to promote their utilization and track distance. This signage could be augmented with educational displays related to living a healthier lifestyle or other sustainability principles.	Social Responsibility	Internal and External Stakeholders		Feasible	Feasible	Feasible	Feasible	Feasible
40	Create indoor landscaped areas that celebrate and display flora of Maine	The Jetport should expand indoor landscaping to enhance the aesthetics of the Jetport's occupied spaces and to foster a sense of place. These indoor plantings could be context sensitive by including flora that is native to Maine. Further, indoor plantings would improve indoor air quality.	Social Responsibility	Internal and External Stakeholders		Feasible	Feasible	Feasible	Feasible	Feasible
41	Incorporate the Jetport's sustainability guidelines into future tenant and service contracts, and provide training on these guidelines, as needed	The Jetport should incorporate its sustainability guidelines into its leases and contracts as well as provide appropriate trainings to ensure that its sustainability aspirations are properly integrated into the work performed by its tenants and service providers. Incorporating sustainability metrics into these documents would assist the Jetport in the tracking and reporting related performance as well as to identify opportunities for improvement.	Governance	Internal and External Stakeholders		Feasible	Feasible	Feasible	Feasible	Feasible
42	Include a requirement on all capital improvement applications to identify a proposed project's sustainability elements and any known alternatives that serve the same purpose with greater efficiency and/or environmental/social performance	As part of the CIP process, the Jetport should request that all capital improvement applications identify a project's sustainability elements. With such a request, the Jetport would be asking the applicant to consider sustainability during the early stages of project planning. This could lead to the discovery of potential alternatives or enhancements that would make the project more sustainable. Further, documentation of the sustainable elements of a project could be used in future reporting.	Governance	Internal Stakeholders (Jetport Staff Only)		Feasible	Feasible	Feasible	Feasible	Feasible
43	Establish the Jetport's focus on sustainability as one of its core values, and communicate these values to the its stakeholders	By establishing sustainability as one of its core values, the Jetport would demonstrate its commitment to integrating sustainability principles into its day-to-day decision-making and organizational culture. These values should be prominently displayed in all employee spaces to raise awareness. They should also be communicated to its other stakeholders to guide engagement activities.	Governance	Internal and External Stakeholders		Feasible	Feasible	Feasible	Feasible	Feasible
44	Publish an annual "scorecard" to report on the Jetport's ongoing sustainability performance	The Jetport will use an annual sustainability scorecard as a mechanism to report its sustainability performance relative to its goals and targets. This would enhance the Jetport's transparency of operations as well as keep it accountable for continuous performance improvement. Through this channel of communication, the Jetport can take a leadership position in sustainability – within its industry and community – to set an example for others to follow. The Jetport can leverage this leadership position to foster dialogues that can address shared responsibilities. The Jetport will publish its annual sustainability scorecard to its website among other digital means of distribution.	Governance	Internal and External Stakeholders		Feasible	Feasible	Feasible	Feasible	Feasible

Action ID	Goal Applicability: Greenhouse Gas Emissions	Energy	Waste Management and Recycling	Ground Access and Transportation	Social Responsibility	Governance	Goal Score	Asset Management	Asset Management Score
1	2 - Peripherally Related	3 - Directly Related	1 - Not Related	1 - Not Related	1 - Not Related	2 - Peripherally Related	1.7	0 - Requires the construction of new facilities and/or the acquisition of new equipment	
2	2 - Peripherally Related	3 - Directly Related	1 - Not Related	1 - Not Related	1 - Not Related	2 - Peripherally Related	1.7	0 - Requires the construction of new facilities and/or the acquisition of new equipment	
3	2 - Peripherally Related	3 - Directly Related	1 - Not Related	1 - Not Related	1 - Not Related	2 - Peripherally Related	1.7	3 - Will enhance existing facilities or equipment	3.0
4	3 - Directly Related	3 - Directly Related	1 - Not Related	1 - Not Related	2 - Peripherally Related	2 - Peripherally Related	2.0	3 - Will enhance existing facilities or equipment	3.0
5	2 - Peripherally Related	3 - Directly Related	1 - Not Related	1 - Not Related	1 - Not Related	2 - Peripherally Related	1.7	3 - Will enhance existing facilities or equipment	3.0
6	2 - Peripherally Related	3 - Directly Related	1 - Not Related	1 - Not Related	1 - Not Related	2 - Peripherally Related	1.7	3 - Will enhance existing facilities or equipment	3.0
7	2 - Peripherally Related	3 - Directly Related	1 - Not Related	2 - Peripherally Related	1 - Not Related	2 - Peripherally Related	1.8	3 - Will enhance existing facilities or equipment	3.0
8	3 - Directly Related	0 - Contradicts	1 - Not Related	3 - Directly Related	2 - Peripherally Related	2 - Peripherally Related	1.8	0 - Requires the construction of new facilities and/or the acquisition of new equipment	
9	2 - Peripherally Related	3 - Directly Related	1 - Not Related	1 - Not Related	2 - Peripherally Related	3 - Directly Related	2.0	2 - Will maintain existing facilities or equipment	2.0
10	2 - Peripherally Related	3 - Directly Related	1 - Not Related	1 - Not Related	1 - Not Related	2 - Peripherally Related	1.7	3 - Will enhance existing facilities or equipment	3.0
11	2 - Peripherally Related	3 - Directly Related	1 - Not Related	1 - Not Related	1 - Not Related	2 - Peripherally Related	1.7	2 - Will maintain existing facilities or equipment	2.0
12	2 - Peripherally Related	3 - Directly Related	1 - Not Related	1 - Not Related	1 - Not Related	2 - Peripherally Related	1.7	3 - Will enhance existing facilities or equipment	3.0
13	3 - Directly Related	0 - Contradicts	1 - Not Related	1 - Not Related	1 - Not Related	2 - Peripherally Related	1.3	0 - Requires the construction of new facilities and/or the acquisition of new equipment	
14	3 - Directly Related	2 - Peripherally Related	2 - Peripherally Related	2 - Peripherally Related	2 - Peripherally Related	3 - Directly Related	2.3	1 - Will not impact the Jetport's existing facilities or equipment	1.0
15	3 - Directly Related	0 - Contradicts	1 - Not Related	3 - Directly Related	2 - Peripherally Related	2 - Peripherally Related	1.8	1 - Will not impact the Jetport's existing facilities or equipment	1.0
16	3 - Directly Related	0 - Contradicts	1 - Not Related	2 - Peripherally Related	1 - Not Related	2 - Peripherally Related	1.5	1 - Will not impact the Jetport's existing facilities or equipment	1.0
17	3 - Directly Related	1 - Not Related	1 - Not Related	2 - Peripherally Related	1 - Not Related	2 - Peripherally Related	1.7	0 - Requires the construction of new facilities and/or the acquisition of new equipment	
18	3 - Directly Related	2 - Peripherally Related	1 - Not Related	1 - Not Related	1 - Not Related	2 - Peripherally Related	1.7	3 - Will enhance existing facilities or equipment	3.0
19	3 - Directly Related	1 - Not Related	1 - Not Related	2 - Peripherally Related	3 - Directly Related	2 - Peripherally Related	2.0	3 - Will enhance existing facilities or equipment	3.0
20	2 - Peripherally Related	1 - Not Related	3 - Directly Related	1 - Not Related	2 - Peripherally Related	2 - Peripherally Related	1.8	0 - Requires the construction of new facilities and/or the acquisition of new equipment	
21	2 - Peripherally Related	1 - Not Related	3 - Directly Related	1 - Not Related	3 - Directly Related	2 - Peripherally Related	2.0	3 - Will enhance existing facilities or equipment	3.0
22	2 - Peripherally Related	1 - Not Related	3 - Directly Related	1 - Not Related	1 - Not Related	2 - Peripherally Related	1.7	3 - Will enhance existing facilities or equipment	3.0
23	2 - Peripherally Related	1 - Not Related	3 - Directly Related	1 - Not Related	2 - Peripherally Related	3 - Directly Related	2.0	0 - Requires the construction of new facilities and/or the acquisition of new equipment	
24	2 - Peripherally Related	1 - Not Related	3 - Directly Related	1 - Not Related	2 - Peripherally Related	2 - Peripherally Related	1.8	1 - Will not impact the Jetport's existing facilities or equipment	1.0
25	2 - Peripherally Related	1 - Not Related	3 - Directly Related	1 - Not Related	1 - Not Related	2 - Peripherally Related	1.7	1 - Will not impact the Jetport's existing facilities or equipment	1.0
26	3 - Directly Related	1 - Not Related	1 - Not Related	3 - Directly Related	2 - Peripherally Related	2 - Peripherally Related	2.0	1 - Will not impact the Jetport's existing facilities or equipment	1.0
27	3 - Directly Related	1 - Not Related	1 - Not Related	3 - Directly Related	3 - Directly Related	2 - Peripherally Related	2.2	1 - Will not impact the Jetport's existing facilities or equipment	1.0
28	2 - Peripherally Related	1 - Not Related	1 - Not Related	3 - Directly Related	1 - Not Related	2 - Peripherally Related	1.7	1 - Will not impact the Jetport's existing facilities or equipment	1.0
29	3 - Directly Related	1 - Not Related	1 - Not Related	3 - Directly Related	2 - Peripherally Related	2 - Peripherally Related	2.0	1 - Will not impact the Jetport's existing facilities or equipment	1.0
30	3 - Directly Related	1 - Not Related	1 - Not Related	3 - Directly Related	3 - Directly Related	2 - Peripherally Related	2.2	1 - Will not impact the Jetport's existing facilities or equipment	1.0
31	3 - Directly Related	1 - Not Related	1 - Not Related	3 - Directly Related	3 - Directly Related	2 - Peripherally Related	2.2	1 - Will not impact the Jetport's existing facilities or equipment	1.0
32	2 - Peripherally Related	1 - Not Related	1 - Not Related	3 - Directly Related	2 - Peripherally Related	2 - Peripherally Related	1.8	0 - Requires the construction of new facilities and/or the acquisition of new equipment	
33	3 - Directly Related	1 - Not Related	1 - Not Related	3 - Directly Related	3 - Directly Related	2 - Peripherally Related	2.2	1 - Will not impact the Jetport's existing facilities or equipment	1.0
34	2 - Peripherally Related	2 - Peripherally Related	2 - Peripherally Related	2 - Peripherally Related	3 - Directly Related	3 - Directly Related	2.3	1 - Will not impact the Jetport's existing facilities or equipment	1.0
35	2 - Peripherally Related	2 - Peripherally Related	2 - Peripherally Related	2 - Peripherally Related	3 - Directly Related	3 - Directly Related	2.3	1 - Will not impact the Jetport's existing facilities or equipment	1.0
36	1 - Not Related	1 - Not Related	1 - Not Related	1 - Not Related	3 - Directly Related	2 - Peripherally Related	1.5	0 - Requires the construction of new facilities and/or the acquisition of new equipment	
37	1 - Not Related	1 - Not Related	1 - Not Related	1 - Not Related	3 - Directly Related	2 - Peripherally Related	1.5	1 - Will not impact the Jetport's existing facilities or equipment	1.0
38	2 - Peripherally Related	2 - Peripherally Related	2 - Peripherally Related	2 - Peripherally Related	3 - Directly Related	3 - Directly Related	2.3	1 - Will not impact the Jetport's existing facilities or equipment	1.0
39	1 - Not Related	1 - Not Related	1 - Not Related	1 - Not Related	3 - Directly Related	2 - Peripherally Related	1.5	3 - Will enhance existing facilities or equipment	3.0
40	1 - Not Related	1 - Not Related	1 - Not Related	1 - Not Related	3 - Directly Related	2 - Peripherally Related	1.5	3 - Will enhance existing facilities or equipment	3.0
41	2 - Peripherally Related	2 - Peripherally Related	2 - Peripherally Related	2 - Peripherally Related	2 - Peripherally Related	3 - Directly Related	2.2	1 - Will not impact the Jetport's existing facilities or equipment	1.0
42	2 - Peripherally Related	2 - Peripherally Related	2 - Peripherally Related	2 - Peripherally Related	2 - Peripherally Related	3 - Directly Related	2.2	3 - Will enhance existing facilities or equipment	3.0
43	2 - Peripherally Related	2 - Peripherally Related	2 - Peripherally Related	2 - Peripherally Related	3 - Directly Related	3 - Directly Related	2.3	1 - Will not impact the Jetport's existing facilities or equipment	1.0
44	2 - Peripherally Related	2 - Peripherally Related	2 - Peripherally Related	2 - Peripherally Related	3 - Directly Related	3 - Directly Related	2.3	1 - Will not impact the Jetport's existing facilities or equipment	1.0

Action ID	Estimated Costs: Capital	Operations and Maintenance	Staffing	Simple Payback	Estimated Costs Score
1	3 - Marginal Cost: <$50,000	3 - Neutral/Positive	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.8
2	3 - Marginal Cost: <$50,000	3 - Neutral/Positive	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.8
3	3 - Marginal Cost: <$50,000	2 - Low Cost: <$25,000	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.5
4	3 - Marginal Cost: <$50,000	3 - Neutral/Positive	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.8
5	0 - Very Expensive: >$200,000	2 - Low Cost: <$25,000	2 - Low: <40 hours per month	3 - Immediate: <1 year	1.8
6	2 - Low Cost: $50,000 to $100,000	2 - Low Cost: <$25,000	2 - Low: <40 hours per month	2 - Short: 1 to 5 years	2.0
7	2 - Low Cost: $50,000 to $100,000	2 - Low Cost: <$25,000	2 - Low: <40 hours per month	2 - Short: 1 to 5 years	2.0
8	1 - Moderately Expensive: $100,000 to $200,000	1 - Moderately Expensive: $25,000 to $50,000	2 - Low: <40 hours per month	0 - Long: >10 years	1.0
9	3 - Marginal Cost: <$50,000	3 - Neutral/Positive	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.8
10	3 - Marginal Cost: <$50,000	2 - Low Cost: <$25,000	2 - Low: <40 hours per month	0 - Long: >10 years	1.8
11	3 - Marginal Cost: <$50,000	1 - Moderately Expensive: $25,000 to $50,000	2 - Low: <40 hours per month	2 - Short: 1 to 5 years	2.0
12	3 - Marginal Cost: <$50,000	2 - Low Cost: <$25,000	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.5
13	2 - Low Cost: $50,000 to $100,000	0 - Very Expensive: >$50,000	2 - Low: <40 hours per month	2 - Short: 1 to 5 years	1.5
14	2 - Low Cost: $50,000 to $100,000	3 - Neutral/Positive	2 - Low: <40 hours per month	2 - Short: 1 to 5 years	2.3
15	3 - Marginal Cost: <$50,000	2 - Low Cost: <$25,000	2 - Low: <40 hours per month	0 - Long: >10 years	1.8
16	3 - Marginal Cost: <$50,000	1 - Moderately Expensive: $25,000 to $50,000	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.3
17	2 - Low Cost: $50,000 to $100,000	3 - Neutral/Positive	2 - Low: <40 hours per month	2 - Short: 1 to 5 years	2.3
18	1 - Moderately Expensive: $100,000 to $200,000	0 - Very Expensive: >$50,000	2 - Low: <40 hours per month	2 - Short: 1 to 5 years	1.3
19	3 - Marginal Cost: <$50,000	3 - Neutral/Positive	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.8
20	3 - Marginal Cost: <$50,000	2 - Low Cost: <$25,000	2 - Low: <40 hours per month	1 - Moderate: 5 to 10 years	2.0
21	3 - Marginal Cost: <$50,000	2 - Low Cost: <$25,000	2 - Low: <40 hours per month	1 - Moderate: 5 to 10 years	2.0
22	3 - Marginal Cost: <$50,000	3 - Neutral/Positive	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.8
23	2 - Low Cost: $50,000 to $100,000	2 - Low Cost: <$25,000	2 - Low: <40 hours per month	2 - Short: 1 to 5 years	2.0
24	3 - Marginal Cost: <$50,000	3 - Neutral/Positive	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.8
25	2 - Low Cost: $50,000 to $100,000	2 - Low Cost: <$25,000	1 - Moderate: 40 to 80 hours per month	1 - Moderate: 5 to 10 years	1.5
26	3 - Marginal Cost: <$50,000	3 - Neutral/Positive	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.8
27	3 - Marginal Cost: <$50,000	3 - Neutral/Positive	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.8
28	2 - Low Cost: $50,000 to $100,000	3 - Neutral/Positive	2 - Low: <40 hours per month	0 - Long: >10 years	1.8
29	3 - Marginal Cost: <$50,000	3 - Neutral/Positive	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.8
30	3 - Marginal Cost: <$50,000	3 - Neutral/Positive	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.8
31	3 - Marginal Cost: <$50,000	3 - Neutral/Positive	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.8
32	2 - Low Cost: $50,000 to $100,000	2 - Low Cost: <$25,000	2 - Low: <40 hours per month	0 - Long: >10 years	1.5
33	3 - Marginal Cost: <$50,000	3 - Neutral/Positive	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.8
34	3 - Marginal Cost: <$50,000	3 - Neutral/Positive	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.8
35	3 - Marginal Cost: <$50,000	3 - Neutral/Positive	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.8
36	1 - Moderately Expensive: $100,000 to $200,000	2 - Low Cost: <$25,000	2 - Low: <40 hours per month	0 - Long: >10 years	1.3
37	3 - Marginal Cost: <$50,000	3 - Neutral/Positive	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.8
38	3 - Marginal Cost: <$50,000	3 - Neutral/Positive	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.8
39	3 - Marginal Cost: <$50,000	2 - Low Cost: <$25,000	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.5
40	1 - Moderately Expensive: $100,000 to $200,000	1 - Moderately Expensive: $25,000 to $50,000	2 - Low: <40 hours per month	2 - Short: 1 to 5 years	1.5
41	3 - Marginal Cost: <$50,000	3 - Neutral/Positive	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.8
42	3 - Marginal Cost: <$50,000	3 - Neutral/Positive	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.8
43	3 - Marginal Cost: <$50,000	3 - Neutral/Positive	3 - Neutral/Positive	3 - Immediate: <1 year	3.0
44	2 - Low Cost: $50,000 to $100,000	2 - Low Cost: <$25,000	1 - Moderate: 40 to 80 hours per month	2 - Short: 1 to 5 years	1.8

Action ID	Estimated Effects: Energy Consumption and Generation	Air Quality and Human Health	Greenhouse Gas Emissions Reduction	Water Conservation	Waste Management and Recycling	Sustainable Materials
1	2 - Decreases energy consumption by less than 5% below baseline levels	2 - Moderately improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	0 - Increases waste generation or portion going to regional landfills	1 - Is not applicable
2	3 - Decreases energy consumption by more than 5% below baseline levels and/or generates renewable energy	1 - Has no effect on regional or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
3	2 - Decreases energy consumption by less than 5% below baseline levels	1 - Has no effect on regional or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
4	3 - Decreases energy consumption by more than 5% below baseline levels and/or generates renewable energy	1 - Has no effect on regional or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
5	3 - Decreases energy consumption by more than 5% below baseline levels and/or generates renewable energy	3 - Significantly improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	2 - Contains between 5 and 40 percent sustainable content
6	2 - Decreases energy consumption by less than 5% below baseline levels	1 - Has no effect on regional or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	2 - Moderately reduces potable water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
7	2 - Decreases energy consumption by less than 5% below baseline levels	1 - Has no effect on regional or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	2 - Decreases waste generation and/or increases the recycling rate by less than 5% from baseline	1 - Is not applicable
8	0 - Increases energy consumption	2 - Moderately improves regional air quality and/or indoor air quality	0 - Increases GHG emissions	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
9	2 - Decreases energy consumption by less than 5% below baseline levels	1 - Has no effect on regional or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
10	2 - Decreases energy consumption by less than 5% below baseline levels	1 - Has no effect on regional or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
11	3 - Decreases energy consumption by more than 5% below baseline levels and/or generates renewable energy	1 - Has no effect on regional or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
12	2 - Decreases energy consumption by less than 5% below baseline levels	1 - Has no effect on regional or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
13	0 - Increases energy consumption	2 - Moderately improves regional air quality and/or indoor air quality	3 - Reduces GHG emissions by more than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
14	2 - Decreases energy consumption by less than 5% below baseline levels	2 - Moderately improves regional air quality and/or indoor air quality	3 - Reduces GHG emissions by more than 5% below baseline levels	1 - Has no effect on water consumption	2 - Decreases waste generation and/or increases the recycling rate by less than 5% from baseline	1 - Is not applicable
15	1 - Has no effect on energy consumption or generation	2 - Moderately improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
16	0 - Increases energy consumption	2 - Moderately improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
17	1 - Has no effect on energy consumption or generation	2 - Moderately improves regional air quality and/or indoor air quality	3 - Reduces GHG emissions by more than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
18	2 - Decreases energy consumption by less than 5% below baseline levels	1 - Has no effect on regional or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	2 - Contains between 5 and 40 percent sustainable content
19	1 - Has no effect on energy consumption or generation	2 - Moderately improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
20	1 - Has no effect on energy consumption or generation	1 - Has no effect on regional or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	3 - Decreases waste generation and/or increases the recycling rate by more than 5% from baseline	1 - Is not applicable
21	1 - Has no effect on energy consumption or generation	1 - Has no effect on regional or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	3 - Decreases waste generation and/or increases the recycling rate by more than 5% from baseline	1 - Is not applicable
22	1 - Has no effect on energy consumption or generation	1 - Has no effect on regional or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	3 - Decreases waste generation and/or increases the recycling rate by more than 5% from baseline	1 - Is not applicable
23	1 - Has no effect on energy consumption or generation	1 - Has no effect on regional or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	3 - Decreases waste generation and/or increases the recycling rate by more than 5% from baseline	1 - Is not applicable
24	1 - Has no effect on energy consumption or generation	1 - Has no effect on regional or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	2 - Decreases waste generation and/or increases the recycling rate by less than 5% from baseline	3 - Contains 40 percent or more sustainable content
25	1 - Has no effect on energy consumption or generation	1 - Has no effect on regional or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	3 - Decreases waste generation and/or increases the recycling rate by more than 5% from baseline	1 - Is not applicable
26	1 - Has no effect on energy consumption or generation	2 - Moderately improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
27	1 - Has no effect on energy consumption or generation	2 - Moderately improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
28	1 - Has no effect on energy consumption or generation	2 - Moderately improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
29	1 - Has no effect on energy consumption or generation	2 - Moderately improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
30	1 - Has no effect on energy consumption or generation	2 - Moderately improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
31	1 - Has no effect on energy consumption or generation	2 - Moderately improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
32	0 - Increases energy consumption	2 - Moderately improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
33	1 - Has no effect on energy consumption or generation	2 - Moderately improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
34	2 - Decreases energy consumption by less than 5% below baseline levels	2 - Moderately improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	2 - Moderately reduces potable water consumption	2 - Decreases waste generation and/or increases the recycling rate by less than 5% from baseline	2 - Contains between 5 and 40 percent sustainable content
35	2 - Decreases energy consumption by less than 5% below baseline levels	2 - Moderately improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	2 - Moderately reduces potable water consumption	2 - Decreases waste generation and/or increases the recycling rate by less than 5% from baseline	2 - Contains between 5 and 40 percent sustainable content
36	1 - Has no effect on energy consumption or generation	1 - Has no effect on regional or indoor air quality	1 - Has no effect on GHG emissions	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
37	1 - Has no effect on energy consumption or generation	1 - Has no effect on regional or indoor air quality	1 - Has no effect on GHG emissions	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
38	2 - Decreases energy consumption by less than 5% below baseline levels	2 - Moderately improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	2 - Moderately reduces potable water consumption	2 - Decreases waste generation and/or increases the recycling rate by less than 5% from baseline	2 - Contains between 5 and 40 percent sustainable content
39	1 - Has no effect on energy consumption or generation	1 - Has no effect on regional or indoor air quality	1 - Has no effect on GHG emissions	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
40	1 - Has no effect on energy consumption or generation	2 - Moderately improves regional air quality and/or indoor air quality	1 - Has no effect on GHG emissions	0 - Increases water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable
41	2 - Decreases energy consumption by less than 5% below baseline levels	2 - Moderately improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	2 - Moderately reduces potable water consumption	2 - Decreases waste generation and/or increases the recycling rate by less than 5% from baseline	2 - Contains between 5 and 40 percent sustainable content
42	2 - Decreases energy consumption by less than 5% below baseline levels	2 - Moderately improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	2 - Moderately reduces potable water consumption	2 - Decreases waste generation and/or increases the recycling rate by less than 5% from baseline	2 - Contains between 5 and 40 percent sustainable content
43	2 - Decreases energy consumption by less than 5% below baseline levels	2 - Moderately improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	2 - Moderately reduces potable water consumption	2 - Decreases waste generation and/or increases the recycling rate by less than 5% from baseline	2 - Contains between 5 and 40 percent sustainable content
44	2 - Decreases energy consumption by less than 5% below baseline levels	2 - Moderately improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	2 - Moderately reduces potable water consumption	2 - Decreases waste generation and/or increases the recycling rate by less than 5% from baseline	2 - Contains between 5 and 40 percent sustainable content

Action ID	Regional Economic Benefit	Natural Resources	Climate Adaptation	Customer Satisfaction	Employee Satisfaction	Safety	Estimated Effects Score	Total Score	Total Weighted Score
1	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	2 - Indirect (Improves satisfaction through the provision of information)	2 - Indirect (Improves satisfaction through the provision of information)	1 - No effect	1.3	8.5	18.9
2	3 - Improves the regional economy by generating new employment and/or economic activity	1 - Has no effect on impact local natural resources	3 - Improves the Jetport's resilience to climate change through critical infrastructure improvements	1 - No Effect	1 - No Effect	1 - No effect	1.6	8.8	19.5
3	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	1 - No Effect	1 - No Effect	1 - No effect	1.2	10.8	20.7
4	3 - Improves the regional economy by generating new employment and/or economic activity	1 - Has no effect on impact local natural resources	3 - Improves the Jetport's resilience to climate change through critical infrastructure improvements	1 - No Effect	1 - No Effect	1 - No effect	1.6	12.1	23.5
5	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	3 - Improves the Jetport's resilience to climate change through critical infrastructure improvements	2 - Indirect (Improves satisfaction through the provision of information)	2 - Indirect (Improves satisfaction through the provision of information)	1 - No effect	1.8	10.0	20.3
6	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	1 - No Effect	1 - No Effect	1 - No effect	1.3	9.9	18.8
7	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	1 - No Effect	1 - No Effect	1 - No effect	1.3	10.1	19.4
8	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	3 - Direct (Improves satisfaction through active participation)	1 - No Effect	1 - No effect	1.1	4.9	11.3
9	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	1 - No Effect	1 - No Effect	1 - No effect	1.2	10.7	21.4
10	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	1 - No Effect	1 - No Effect	1 - No effect	1.2	9.3	16.9
11	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	1 - No Effect	1 - No Effect	1 - No effect	1.3	8.9	18.1
12	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	1 - No Effect	1 - No Effect	1 - No effect	1.2	10.8	20.7
13	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	1 - No Effect	1 - No Effect	1 - No effect	1.2	5.5	13.0
14	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	2 - Indirect (Improves satisfaction through the provision of information)	2 - Indirect (Improves satisfaction through the provision of information)	1 - No effect	1.6	9.4	20.8
15	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	3 - Direct (Improves satisfaction through active participation)	1 - No Effect	1 - No effect	1.3	7.7	15.8
16	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	1 - No Effect	1 - No Effect	1 - No effect	1.1	8.1	16.8
17	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	1 - No Effect	1 - No Effect	1 - No effect	1.3	7.4	16.7
18	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	1 - No Effect	1 - No Effect	1 - No effect	1.3	8.4	16.7
19	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	2 - Indirect (Improves satisfaction through the provision of information)	1 - No Effect	1 - No effect	1.3	11.8	22.5
20	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	2 - Indirect (Improves satisfaction through the provision of information)	2 - Indirect (Improves satisfaction through the provision of information)	1 - No effect	1.4	7.3	16.3
21	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	3 - Direct (Improves satisfaction through active participation)	3 - Direct (Improves satisfaction through active participation)	1 - No effect	1.6	10.6	20.3
22	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	1 - No Effect	1 - No Effect	1 - No effect	1.3	11.4	21.5
23	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	3 - Direct (Improves satisfaction through active participation)	3 - Direct (Improves satisfaction through active participation)	1 - No effect	1.6	7.6	17.8
24	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	1 - No Effect	1 - No Effect	1 - No effect	1.3	9.7	20.3
25	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	1 - No Effect	1 - No Effect	1 - No effect	1.3	6.9	14.8
26	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	1 - No Effect	3 - Direct (Improves satisfaction through active participation)	1 - No effect	1.3	9.8	20.8
27	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	2 - Improves the Jetport's resilience to climate change through related education or planning efforts	3 - Direct (Improves satisfaction through active participation)	3 - Direct (Improves satisfaction through active participation)	1 - No effect	1.6	10.3	21.8
28	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	1 - No Effect	1 - No Effect	1 - No effect	1.2	7.3	14.8
29	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	0 - Negative	1 - No Effect	1 - No effect	1.1	9.6	20.0
30	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	3 - Direct (Improves satisfaction through active participation)	3 - Direct (Improves satisfaction through active participation)	1 - No effect	1.5	10.2	21.8
31	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	3 - Direct (Improves satisfaction through active participation)	3 - Direct (Improves satisfaction through active participation)	2 - Improves safety through infrastructure improvements	1.6	10.3	22.0
32	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	3 - Direct (Improves satisfaction through active participation)	3 - Direct (Improves satisfaction through active participation)	1 - No effect	1.4	6.3	14.1
33	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	2 - Improves the Jetport's resilience to climate change through related education or planning efforts	1 - No Effect	3 - Direct (Improves satisfaction through active participation)	1 - No effect	1.4	10.1	21.3
34	2 - Improves the regional economy by encouraging external workforce training	2 - Contributes to the protection of local natural resources	2 - Improves the Jetport's resilience to climate change through related education or planning efforts	3 - Direct (Improves satisfaction through active participation)	2 - Indirect (Improves satisfaction through the provision of information)	3 - Improves safety through operational adjustments	2.2	11.0	23.9
35	2 - Improves the regional economy by encouraging external workforce training	2 - Contributes to the protection of local natural resources	2 - Improves the Jetport's resilience to climate change through related education or planning efforts	2 - Indirect (Improves satisfaction through the provision of information)	3 - Direct (Improves satisfaction through active participation)	3 - Improves safety through operational adjustments	2.2	11.0	23.9
36	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	3 - Direct (Improves satisfaction through active participation)	3 - Direct (Improves satisfaction through active participation)	1 - No effect	1.3	5.3	12.1
37	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	1 - No Effect	3 - Direct (Improves satisfaction through active participation)	1 - No effect	1.2	9.2	18.6
38	2 - Improves the regional economy by encouraging external workforce training	2 - Contributes to the protection of local natural resources	2 - Improves the Jetport's resilience to climate change through related education or planning efforts	2 - Indirect (Improves satisfaction through the provision of information)	3 - Direct (Improves satisfaction through active participation)	3 - Improves safety through operational adjustments	2.2	11.0	23.9
39	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	3 - Direct (Improves satisfaction through active participation)	3 - Direct (Improves satisfaction through active participation)	1 - No effect	1.3	10.8	20.3
40	1 - Has no effect on the regional economy	3 - Enhances local natural resources	1 - Has no impact on the Jetport's resilience to climate change	3 - Direct (Improves satisfaction through active participation)	3 - Direct (Improves satisfaction through active participation)	1 - No effect	1.5	9.0	17.2
41	2 - Improves the regional economy by encouraging external workforce training	2 - Contributes to the protection of local natural resources	2 - Improves the Jetport's resilience to climate change through related education or planning efforts	2 - Indirect (Improves satisfaction through the provision of information)	2 - Indirect (Improves satisfaction through the provision of information)	1 - No effect	1.9	10.6	22.7
42	2 - Improves the regional economy by encouraging external workforce training	2 - Contributes to the protection of local natural resources	3 - Improves the Jetport's resilience to climate change through critical infrastructure improvements	2 - Indirect (Improves satisfaction through the provision of information)	3 - Direct (Improves satisfaction through active participation)	1 - No effect	2.1	12.8	25.0
43	2 - Improves the regional economy by encouraging external workforce training	2 - Contributes to the protection of local natural resources	2 - Improves the Jetport's resilience to climate change through related education or planning efforts	2 - Indirect (Improves satisfaction through the provision of information)	3 - Direct (Improves satisfaction through active participation)	1 - No effect	2.0	11.3	24.2
44	2 - Improves the regional economy by encouraging external workforce training	2 - Contributes to the protection of local natural resources	2 - Improves the Jetport's resilience to climate change through related education or planning efforts	2 - Indirect (Improves satisfaction through the provision of information)	2 - Indirect (Improves satisfaction through the provision of information)	1 - No effect	1.9	8.8	19.7

Action ID	Additional Information: Action Source	First Name	Last Name	Division	Phone/Email	Initial Recognition Status	Closing Recognition Status	Assumptions	References
1	Research							Energy Consumption - Assumed reduction in energy usage of less than 5% overall baseline energy use, but may be more depending on the existing baseline and age of existing system. GHG Emissions - Assumed reduction in scope 2 GHG emissions due to reduced energy consumption, but action will not produce a direct reduction in scope 1 GHG emissions. Assumes waste generated from the replacement of equipment. Assumes the feasibility determination can be made internally, and associated equipment would not be purchased locally. Costing assumes use of capital funds, and only includes the effort of conducting the feasibility study; it does not include implementation	SAGA: http://www.airportsustainability.org/practice/495
2	Research							Regional Economic - Possible benefit to regional economy if awarding such a large-scale project to a local firm. Climate Adaptation - On-site generation would allow for the generation of electric power for critical facilities Assumes use of capital funds, and only includes the evaluation; it does not include the construction and operation of the cogeneration facility	ACRP Synthesis 42 - SFO Case Study
3	Research								
4	Research							Costing assumes the inclusion of a siting/feasibility study. Energy/GHG Emissions - While this technically incentivizes energy generation, the Jetport may not be able to take credit for this generation as it is technically not the producer, but the purchaser. Accordingly, this action would represent a substantial reduction in scope 2 GHG emissions as the Jetport would be purchasing and consuming renewable energy rather than conventionally generated energy. Regional Economic - Possible benefit to regional economy if awarding such a large-scale project to a local firm. Safety - Assuming a glare assessment would be conducted and approved Assumes costs savings from incentives would be passed on to the Jetport, reducing its electricity costs. Staffing includes obtaining proper clearances.	
5	Research							Sustainable Materials - Assumed enhancements to the building envelope could use sustainably sourced materials. Satisfaction - An upgraded building envelope could result in improved building interior comfort	http://www.airportsustainability.org/practice/482
6	Research							All scored benefits from this action are potential benefits, but may not necessarily occur; for instance, the retrocommissioning process may not reveal any inefficiencies in the existing HVAC equipment. Satisfaction - Retrocommissioning could lead to improved occupant comfort Capital based on a cost of $0.40 per square foot - see reference. Payback is usually less than 2 years.	https://www1.eere.energy.gov/femp/pdfs/OM_7.pdf
7	Research							Waste - LED lighting has a longer lifecycle than traditional lighting, and must be replaced less frequently than traditional lighting, therefore generating less hazardous waste from used lamps. Costing estimates included in SAGA were scaled down based on work performed to date; Payback would be less than 2 years.	http://www.airportsustainability.org/practice/477
8	Research							Electric vehicle charging equipment can run as much as $65,000, including installation. Energy - Assumes slight increase in overall energy consumption due to demand from electric vehicle charging and this is provided at no public cost. Air Quality - Assumes slight reduction in air pollutants through incentivizing use of Evs. GHG - While Jetport scope 2 GHG emissions may increase slightly due to increased energy use, use of EVs would benefit overall regional air quality over traditional gasoline vehicles. Satisfaction - Assumes increases in employee and customer satisfaction due to facilitating EV use for Jetport use and commuting. Assumes EV charging stations would not be available to employees.	http://www.airportsustainability.org/practice/366 http://onlinepubs.trb.org/onlinepubs/acrp/acrp_syn_054.pdf
9	Research								http://www.airportsustainability.org/practice/460
10	Research								http://www.airportsustainability.org/practice/489 http://www.jraa.org/newsandevents/airportlightingupdate.html
11	Research	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	All identified benefits associated with this action are potential benefits, but may not necessarily occur. For instance, the auditing program may not reveal inefficiencies initially, but over time the program will ensure continual improvement in energy efficiency. Assumes energy audit requires the support of a local consultant. Payback would be less than two years.	http://www.airportsustainability.org/practice/456
12	Research								http://www.wattstopper.com/
13	Research							Air Quality - Assumes improvements in local air quality due to elimination of local generators.	http://www.airportsustainability.org/practice/493
14	Research							All scored benefits from this action are potential benefits, but may not necessarily occur. For instance, the GHG inventory may not produce direct reductions in GHG emissions, but over time the program will ensure continual improvement in GHG reductions and allow the Jetport to identify areas for improvement.	http://www.airportsustainability.org/practice/28
15	Research							Assumes fleet vehicles would be purchased by rental corporations - not at local dealerships Assumes no infrastructure improvements would be incur costs to the Jetport	
16	Research							Assumes that this would take the form of policy changes and not infrastructure improvements and that tenant GSE may consume Jetport electricity.	
17	Research							Payback assumes the replacement of 10 vehicles with a conversion cost of $8,000. O+M would be positive due to reduced fuel costs	http://www.ngvamerica.org/vehicles/for-fleets/airports/ http://www.cngnow.com/vehicles/calculator/pages/information.aspx
18	Research							Sustainable Materials - Warm-mix asphalt can include reclaimed asphalt pavement. Natural Resources - Although impervious, when compared to the alternative of hot-mix asphalt - there is no change to impacts to Natural Resources	SAGA: http://www.airportsustainability.org/practice/332
19	Research								http://www.airportsustainability.org/practice/373
20	Research								
21	Research	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable		http://www.airportsustainability.org/practice/697
22	Research							Assumes waste management infrastructure will be outfitted with smart trash technology.	SAGA: http://www.airportsustainability.org/practice/184 Observation decks around the world: http://www.usatoday.com/story/travel/columnist/hobica/2013/11/19/airport-observation-deck-plane-spotting/3628587/
23	Research								http://www.airportsustainability.org/practice/701
24	Research								http://www.airportsustainability.org/practice/698
25	Research								http://www.airportsustainability.org/practice/706
26	Research							Climate Adaptation - Ridesharing could enable employees to get to the Jetport during emergencies/disruptions	
27	Research							Climate Adaptation - Enhanced public transit could enable employees to get to the Jetport during emergencies/disruptions	SAGA: http://www.airportsustainability.org/practice/3
28	Research							Assumes traffic count data would be used to identify opportunities to make traffic flow at access points and onsite roadways more efficient.	
29	Research							Customer Satisfaction - Assumes that customers might have to wait longer to ride the hotel shuttle.	
30	Research							Climate Adaptation - A bike-sharing program could enable employees to get to the Jetport during emergencies/disruptions Assumes engagement only; does not include purchase of equipment	
31	Research							Climate Adaptation - Strengthening access points could enable employees to get to the Jetport during emergencies/disruptions Safety - Improved infrastructure would include enhanced safety measures	
32	Research							Assumes the signage would be electronic.	
33	Research							Assumes data would be used to identify opportunities for greater efficiency. Climate Adaptation - By understanding employee travel patterns, the Jetport can better prepare for disruptive events.	
34	Research							Assumes greater accountability and motivation for continuous improvement.	
35	Research							Assumes greater accountability and opportunities to learn best/innovative practices. Assumes employees would be engaged in collaborations	
36	Research							Assumes employee use.	
37	Research								http://www.airportsustainability.org/practice/119
38	Research							Assumes the creation of employee buy-in and support.	
39	Research								http://www.airportsustainability.org/practice/177
40	Research								http://www.airportsustainability.org/practice/166
41	Research								
42	Research								
43	Research								
44	Research								http://www.airportsustainability.org/practice/25

45	Conduct a walkability assessment of the terminal building	A walkability assessment of the terminal building would evaluate the structure based on a series of characteristics such as pedestrian room/space to maneuver, presence of bottlenecks or bottlenecking equipment, ease of wayfinding, or perceived safety. From the results of the walkability assessments, the Jetport may decide to pursue improvements that address identified deficiencies, particularly as they pertain to improving conditions for the elderly, persons with disabilities, and other travelers with special needs. The results of the walkability assessments may also be used to direct the planning and design of future facilities.	Social Responsibility	Internal and External Stakeholders		Feasible	Feasible	Feasible	Feasible	Feasible	1 - Not Related	1 - Not Related	1 - Not Related	2 - Peripherally Related	3 - Directly Related	2 - Peripherally Related	1.7	3 - Will enhance existing facilities or equipment	3.0	2 - Low Cost: $50,000 to $100,000	3 - Marginal Cost: <$50,000	2 - Low: <40 hours per month	0 - Long: >10 years	1.8	1 - Has no effect on energy consumption or generation	1 - Has no effect on regional or indoor air quality	1 - Has no effect on GHG emissions	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	3 - Direct (Improves satisfaction through active participation)	3 - Direct (Improves satisfaction through active participation)	1 - No effect	1.3	9.5	17.1	Research								
46	Consider ways to improve the energy efficiency of the Jetport's baggage handling system	Baggage handling systems at airports have large energy loads. By upgrading system components, the Jetport can create significant energy savings. This may include the conversion of a friction-based belt system to one that has teeth; variable frequency drives (VFDs) to provide speed controls when the baggage handling system does not require full-speed operation; and the creation of an energy management zone, which would enable the Jetport to shut the baggage handling system down when not in use.	Energy	Internal Stakeholders (Jetport Staff Only)		Feasible	Feasible	Feasible	Feasible	Feasible	2 - Peripherally Related	3 - Directly Related	1 - Not Related	1 - Not Related	1 - Not Related	1 - Not Related	1.5	3 - Will enhance existing facilities or equipment	3.0	0 - Very Expensive: >$200,000	1 - Moderately Expensive: $100,000 to $200,000	1 - Moderate: 40 to 80 hours per month	2 - Short: 1 to 5 years	1.0	2 - Decreases energy consumption by less than 5% below baseline levels	1 - Has no effect on regional or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	1 - No Effect	1 - No Effect	1 - No effect	1.2	7.7	15.2	Internal							Action includes opportunities to improve the energy efficiency of the baggage handling system when it is not in full operation.	http://www.airportsustainability.org/practice/225
47	Explore the potential to process spent deicing fluid into usable Type I aircraft deicing fluid to be reused at the Jetport	The Jetport's deicing recycling contractor, Inland Technologies, has a patent on processing spent deicing fluid into usable Type I aircraft deicing fluid. The Jetport could take advantage of this capability, with FAA approval, to close the loop on the on-site use of manufactured glycol for aircraft applications. This would reduce associated chemical sourcing and costs. Pending market conditions, the Jetport could use this technology to generate revenue by selling excess re-manufactured glycol to other airports and off-site entities.	Waste Management and Recycling	Internal Stakeholders (Select Jetport Tenants Only)		Feasible	Feasible	Feasible	Feasible	Feasible	2 - Peripherally Related	1 - Not Related	3 - Directly Related	2 - Peripherally Related	1 - Not Related	1 - Not Related	1.7	3 - Will enhance existing facilities or equipment	3.0	0 - Very Expensive: >$200,000	2 - Low Cost: $50,000 to $100,000	2 - Low: <40 hours per month	1 - Moderate: 5 to 10 years	1.3	1 - Has no effect on energy consumption or generation	2 - Moderately improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	0 - Increases water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable	3 - Improves the regional economy by generating new employment and/or economic activity	1 - Has no effect on impact local natural resources	2 - Improves the Jetport's resilience to climate change through related education or planning efforts	1 - No Effect	1 - No Effect	1 - No effect	1.3	8.5	16.3	Internal							Assumes modifications to the deicing facility will not require any more energy consumption than existing conditions, but will require additional potable water consumption. Also assumes that new jobs will be created. The ability to produce Type 1 fluid on-site improves the Jetport's ability to operate under disruptive conditions.	
48	Work with regional entities such as Portland Trails to seek the establishment of a public trail along Fore River	The Jetport should collaborate with local groups that have the aim to enhance regional bicycle and pedestrian infrastructure such as Portland Trails (http://trails.org/), and seek to develop trails adjacent to the Jetport – particularly along Fore River in the resource protection zone adjacent to Yellow Bird Road. Public trails can enhance the quality-of-life for local residents, contribute to a sense of place, and conserve and/or create green space.	Social Responsibility	External Stakeholders		Feasible	Feasible	Feasible	Feasible	Feasible	2 - Peripherally Related	1 - Not Related	1 - Not Related	3 - Directly Related	2 - Peripherally Related	3 - Directly Related	2.0	1 - Will not impact the Jetport's existing facilities or equipment	1.0	3 - Marginal Cost: <$50,000	3 - Marginal Cost: <$50,000	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.8	1 - Has no effect on energy consumption or generation	2 - Moderately improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable	1 - Has no effect on the regional economy	2 - Contributes to the protection of local natural resources	1 - Has no impact on the Jetport's resilience to climate change	3 - Direct (Improves satisfaction through active participation)	3 - Direct (Improves satisfaction through active participation)	1 - No effect	1.6	10.1	21.3	Internal							Assumes trails would not be within areas near the runways that would jeopardize the safety of trail users or aircraft pilots and passengers. The creation of these trails has the potential to protect surrounding natural areas for the foreseeable future.	
49	Create a curbside rental car drop-off	Create a more accessible rental car drop-off, perhaps at curbside or in the lower level of the parking garage with elevator access, to improve the connection between the rental car return area and the terminal building. Reducing the walking distance between these areas would enhance the Jetport's convenience, thereby improving passenger satisfaction.	Social Responsibility	Internal Stakeholders (Select Jetport Tenants Only)		Feasible	Feasible	Feasible	Feasible	Feasible	2 - Peripherally Related	1 - Not Related	1 - Not Related	2 - Peripherally Related	3 - Directly Related	1 - Not Related	1.7	1 - Will not impact the Jetport's existing facilities or equipment	1.0	2 - Low Cost: $50,000 to $100,000	3 - Marginal Cost: <$50,000	2 - Low: <40 hours per month	2 - Short: 1 to 5 years	2.3	1 - Has no effect on energy consumption or generation	2 - Moderately improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	3 - Direct (Improves satisfaction through active participation)	1 - No Effect	1 - No effect	1.3	8.5	17.8	Internal								http://www.airportsustainability.org/practice/349
50	Install additional "green" on-site stormwater management infrastructure, where appropriate	"Green" stormwater management infrastructure such as bioswales, rain gardens, and permeable pavements naturally control and/or treat stormwater. Such projects can minimize stormwater runoff at the Jetport; however, their design should avoid attracting unwanted wildlife to ensure safety of aircraft operations.	Water Quality	Internal and External Stakeholders		Feasible	Feasible	Feasible	Feasible	Feasible	1 - Not Related	1 - Not Related	1 - Not Related	1 - Not Related	2 - Peripherally Related	1 - Not Related	1.2	1 - Will not impact the Jetport's existing facilities or equipment	1.0	1 - Moderately Expensive: $100,000 to $200,000	2 - Low Cost: $50,000 to $100,000	2 - Low: <40 hours per month	2 - Short: 1 to 5 years	1.8	1 - Has no effect on energy consumption or generation	2 - Moderately improves regional air quality and/or indoor air quality	1 - Has no effect on GHG emissions	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable	1 - Has no effect on the regional economy	3 - Enhances local natural resources	3 - Improves the Jetport's resilience to climate change through critical infrastructure improvements	1 - No Effect	1 - No Effect	1 - No effect	1.4	7.1	14.2								Assumes such infrastructure would not act as a wildlife attractant.	http://www.airportsustainability.org/practice/265
51	Harvest rainwater to reduce the volume of the Jetport's stormwater runoff	The practice of harvesting rainwater on-site would also allow the Jetport to minimize its stormwater runoff. If the Jetport uses the harvested rainwater in non-potable applications such as landscaping (i.e., irrigation), this practice could reduce the Jetport's water consumption and related costs.	Water Quality	Internal Stakeholders (Jetport Staff Only)		Feasible	Feasible	Feasible	Feasible	Feasible	1 - Not Related	1 - Not Related	1 - Not Related	2 - Not Related	0 - Not Related	2 - Not Related	1.2	3 - Will enhance existing facilities or equipment	3.0	1 - Moderately Expensive: $100,000 to $200,000	3 - Marginal Cost: <$50,000	2 - Low: <40 hours per month	1 - Moderate: 5 to 10 years	1.8	1 - Has no effect on energy consumption or generation	1 - Has no effect on regional or indoor air quality	1 - Has no effect on GHG emissions	2 - Moderately reduces potable water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable	1 - Has no effect on the regional economy	2 - Contributes to the protection of local natural resources	3 - Improves the Jetport's resilience to climate change through critical infrastructure improvements	1 - No Effect	1 - No Effect	1 - No effect	1.3	9.0	15.4									http://www.airportsustainability.org/practice/314
52	Utilize GIS technology to inventory, monitor condition, and schedule maintenance/replacement of stormwater conveyance and control infrastructure	A task of the Jetport's Sustainable Airport Master Plan included creating detailed geospatially referenced inventory of stormwater conveyance and control infrastructure. Also included were photos, dates of last inspection, installation dates, elevations, size, and a statement of conditions. Utilizing GIS technology to maintain this inventory and schedule maintenance and replacement of stormwater systems will help provide a cost-effective functional stormwater system.	Water Quality	Internal Stakeholders (Jetport Staff Only)		Feasible	Feasible	Feasible	Feasible	Feasible	1 - Not Related	1 - Not Related	1 - Not Related	3 - Not Related	1 - Not Related	2 - Peripherally Related	1.5	3 - Will enhance existing facilities or equipment	3.0	2 - Low Cost: $50,000 to $100,000	3 - Marginal Cost: <$50,000	2 - Low: <40 hours per month	2 - Short: 1 to 5 years	2.3	1 - Has no effect on energy consumption or generation	1 - Has no effect on regional or indoor air quality	1 - Has no effect on GHG emissions	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable	1 - Has no effect on the regional economy	2 - Contributes to the protection of local natural resources	2 - Improves the Jetport's resilience to climate change through related education or planning efforts	1 - No Effect	1 - No Effect	1 - No effect	1.2	10.2	18.3									
53	Continue to monitor operations and noise complaints with the NAC to recommend an update to the 14 CFR Part 150 study at the appropriate time	Current operational levels suggest that an update in the short-term would be premature. The Jetport, along with the NAC, can continue to monitor changes in operational levels, aircraft fleet mix, compliance with the current noise abatement program, as well as noise complaints for when an update to the Part 150 study would be appropriate.	Noise	External Stakeholders	Long-term (More than 5 years)	Feasible	Feasible	Feasible	Feasible	Feasible	1 - Not Related	1 - Not Related	1 - Not Related	4 - Not Related	3 - Directly Related	3 - Directly Related	2.2	1 - Will not impact the Jetport's existing facilities or equipment	1.0	3 - Marginal Cost: <$50,000	3 - Marginal Cost: <$50,000	2 - Low: <40 hours per month	3 - Immediate: <1 year	2.8	1 - Has no effect on energy consumption or generation	1 - Has no effect on regional or indoor air quality	1 - Has no effect on GHG emissions	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	1 - No Effect	1 - No Effect	1 - No effect	1.0	9.7	20.1									
54	Identify any existing and planned noise-generating mechanical systems and relocate them away from residential areas, where applicable and feasible	Relocating existing noise generating mechanical equipment away from residential areas, where applicable and feasible, would lessen the impact of such noise on sensitive sites, potentially improving community relations. The Jetport should consider potential noise impacts in the planning and design of new facilities.	Noise	Internal Stakeholders (Combination of Jetport and Tenant Employees)		Feasible	Feasible	Feasible	Feasible	Feasible	1 - Not Related	1 - Not Related	1 - Not Related	5 - Not Related	3 - Directly Related	1 - Not Related	2.0	1 - Will not impact the Jetport's existing facilities or equipment	1.0	2 - Low Cost: $50,000 to $100,000	3 - Marginal Cost: <$50,000	2 - Low: <40 hours per month	2 - Short: 1 to 5 years	2.3	1 - Has no effect on energy consumption or generation	1 - Has no effect on regional or indoor air quality	1 - Has no effect on GHG emissions	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	3 - Improves the Jetport's resilience to climate change through critical infrastructure improvements	1 - No Effect	1 - No Effect	1 - No effect	1.2	8.7	17.8								Assumes that resiliency would be a relocation consideration (e.g., flood elevations)	
55	Require all construction contractors working on the Jetport to mitigate unwanted noise and vibration to the greatest extent practicable	The Jetport should stipulate noise and vibration mitigation measures in its contractor specifications to lessen related impacts from the construction of future on-site facilities. To the extent practicable, the Jetport should ensure compliance through regular monitoring.	Noise	Internal Stakeholders (Combination of Jetport and Tenant Employees)		Feasible	Feasible	Feasible	Feasible	Feasible	2 - Peripherally Related	2 - Peripherally Related	1 - Not Related	6 - Not Related	3 - Directly Related	3 - Directly Related	2.8	1 - Will not impact the Jetport's existing facilities or equipment	1.0	3 - Marginal Cost: <$50,000	3 - Marginal Cost: <$50,000	3 - Neutral/Positive	3 - Immediate: <1 year	3.0	2 - Decreases energy consumption by less than 5% below baseline levels	2 - Moderately improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	1 - Has no impact on the Jetport's resilience to climate change	1 - No Effect	1 - No Effect	1 - No effect	1.3	11.1	23.9								Includes construction equipment and practices. Assumes reduced noise complaints would decrease staff time.	
56	With NAC input, and within two to five years, review the Jetport's voluntary preferential use of Runway 11-29	The voluntary preferential use of Runway 11-29 is one of the FAA-approved measures from the 2005 Part 150 Study. Since its implementation, neighbors have raised concerns on how well it is followed. The Jetport can review the preferential use program with the NAC, and look for means to further encourage voluntary compliance. The review is needed to ensure the Jetport's outreach to pilots is following best practice and is providing the most effective compliance possible.	Noise	Internal and External Stakeholders	Mid-term (1 - 5 years)	Feasible	Feasible	Feasible	Feasible	Feasible	1 - Not Related	1 - Not Related	1 - Not Related	7 - Not Related	3 - Directly Related	2 - Peripherally Related	2.5	1 - Will not impact the Jetport's existing facilities or equipment	1.0	3 - Marginal Cost: <$50,000	3 - Marginal Cost: <$50,000	3 - Neutral/Positive	3 - Immediate: <1 year	3.0	1 - Has no effect on energy consumption or generation	1 - Has no effect on regional or indoor air quality	1 - Has no effect on GHG emissions	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	1 - Is not applicable	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources	2 - Has no impact on the Jetport's resilience to climate change	1 - No Effect	1 - No Effect	1 - No effect	1.1	10.6	21.9								Involves the tracking of FAA's use of preferential runways, as it is Jetport recommended and FAA implemented. Assumes reduced noise complaints would decrease staff time.	
57	Construct new long-term surface parking & battery storage.	Constructing new long-term surface parking to provide greater capacity closest to the facility. The project would redevelop the existing gravel valet lot and cellphone lot. Installing a battery reduces strain on grid during peak hours.	Ground Access and Transportation	Internal and External Stakeholders	Mid-term (1 - 5 years)	Feasible	Feasible	Feasible	Feasible	Feasible	2 - Peripherally Related	3 - Directly Related	1 - Not Related	3 - Directly Related	3 - Directly Related	3 - Directly Related	2.5	3 - Will enhance existing facilities or equipment	3.0	0 - Very Expensive: >$200,000	3 - Marginal Cost: <$50,000	2 - Low: <40 hours per month	2 - Short: 1 to 5 years	1.8	1 - Has no effect on energy consumption or generation	1 - Has no effect on regional or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	1 - Has no effect on water consumption	1 - Has no effect on waste generation or diversion	2 - Contains between 5 and 40 percent sustainable content	1 - Has no effect on the regional economy	0 - Impairs local natural resources	3 - Improves the Jetport's resilience to climate change through critical infrastructure improvements	3 - Direct (Improves satisfaction through active participation)	3 - Direct (Improves satisfaction through active participation)	2 - Improves safety through infrastructure improvements	1.7	10.7	21.6									
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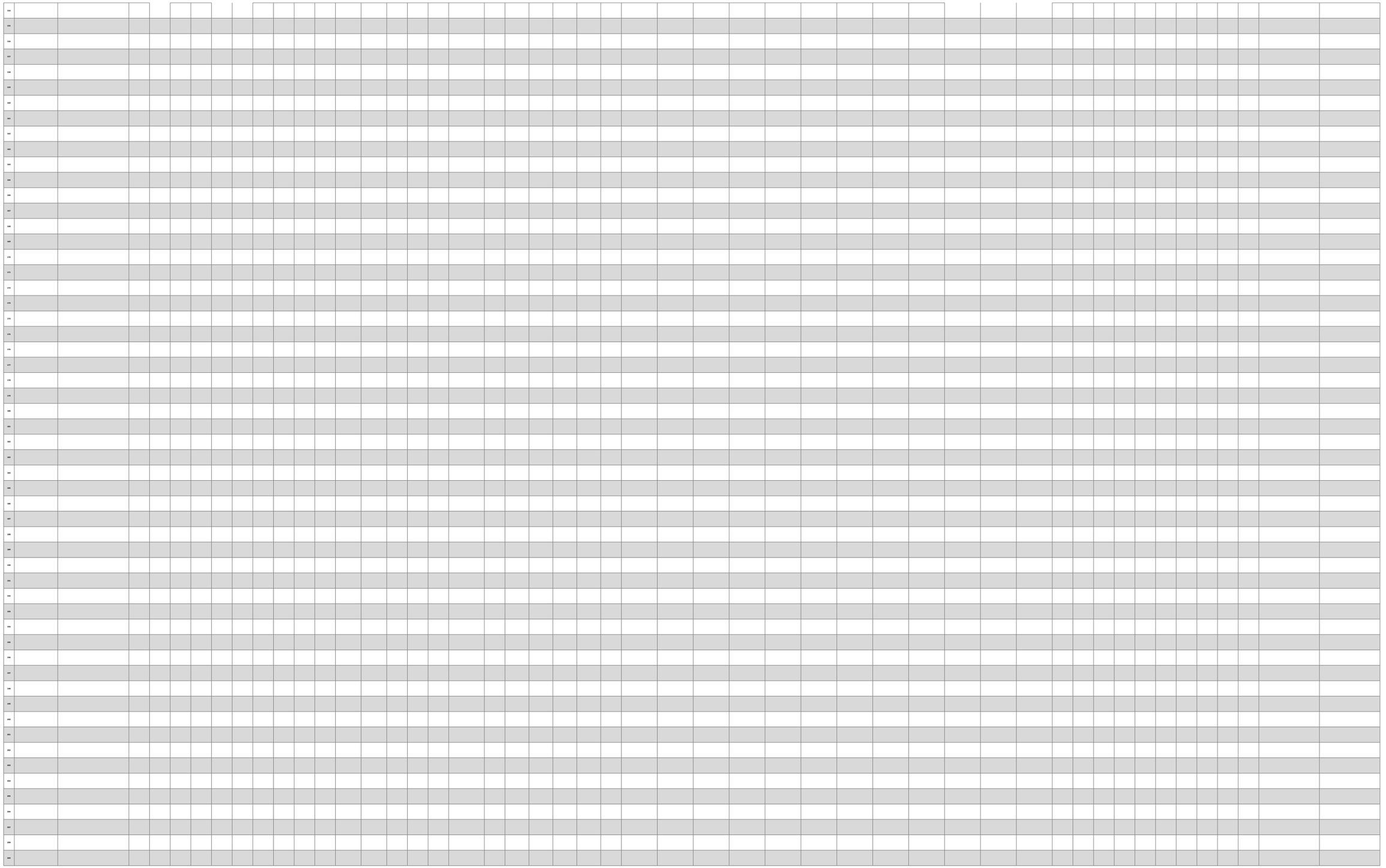

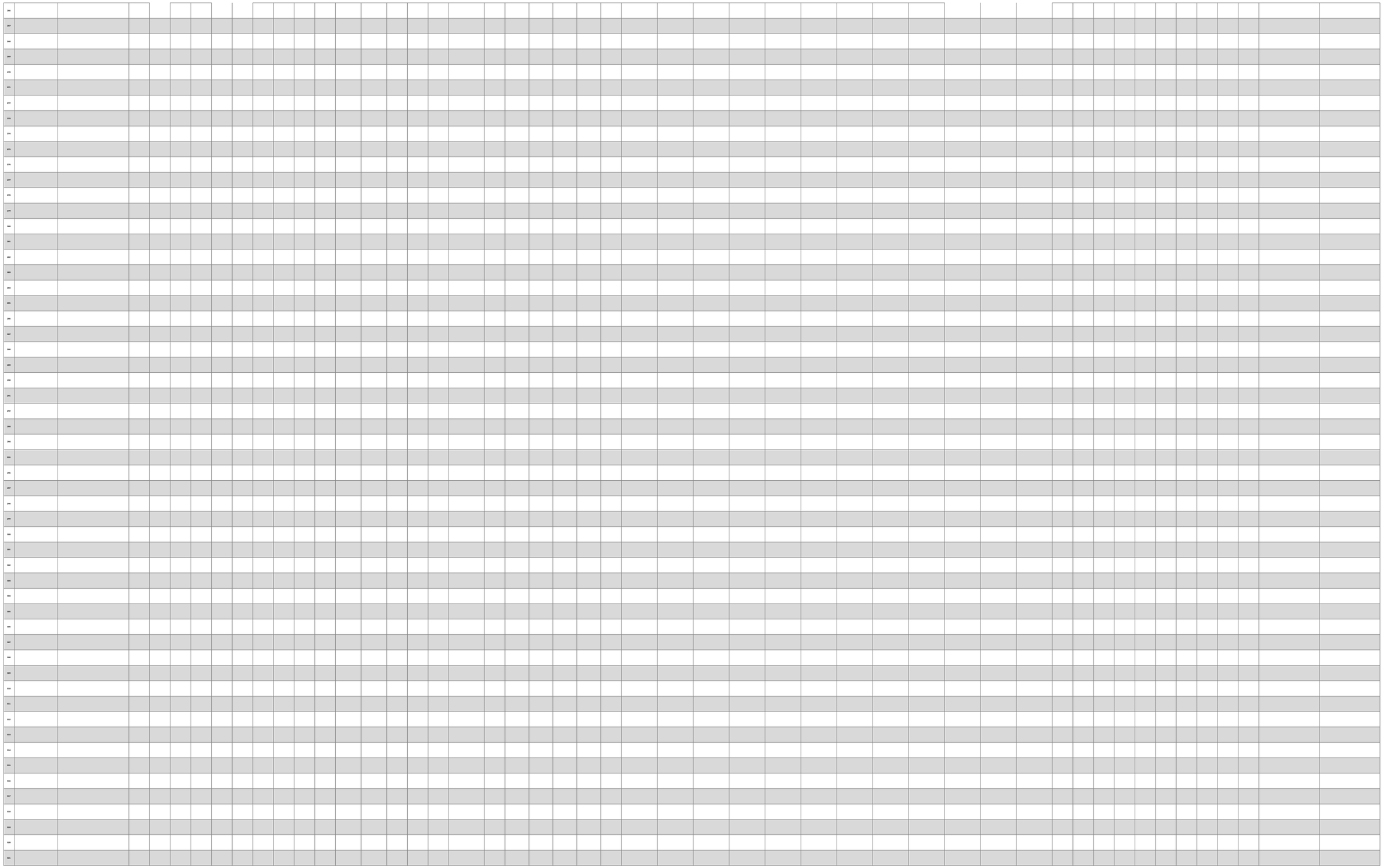

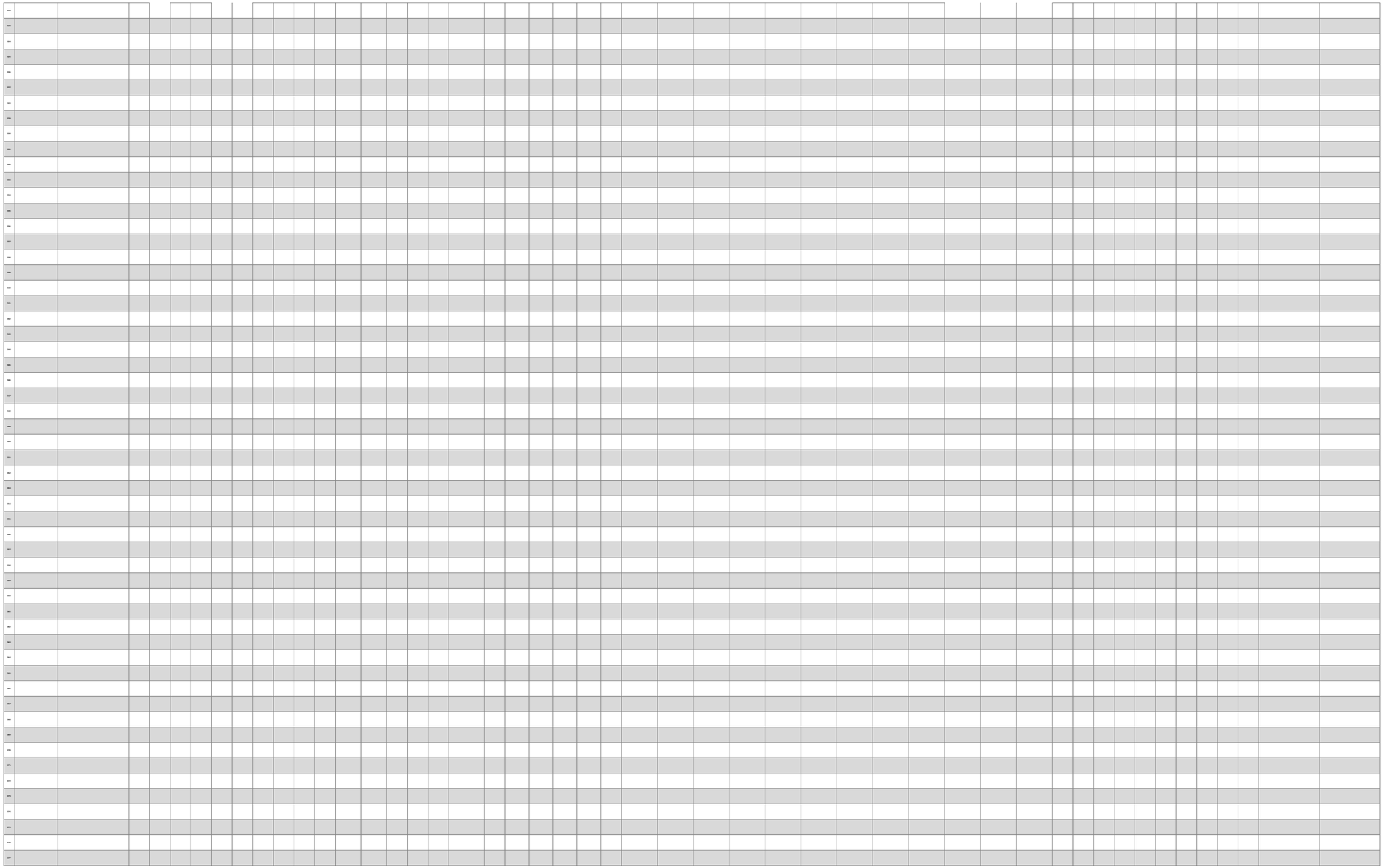

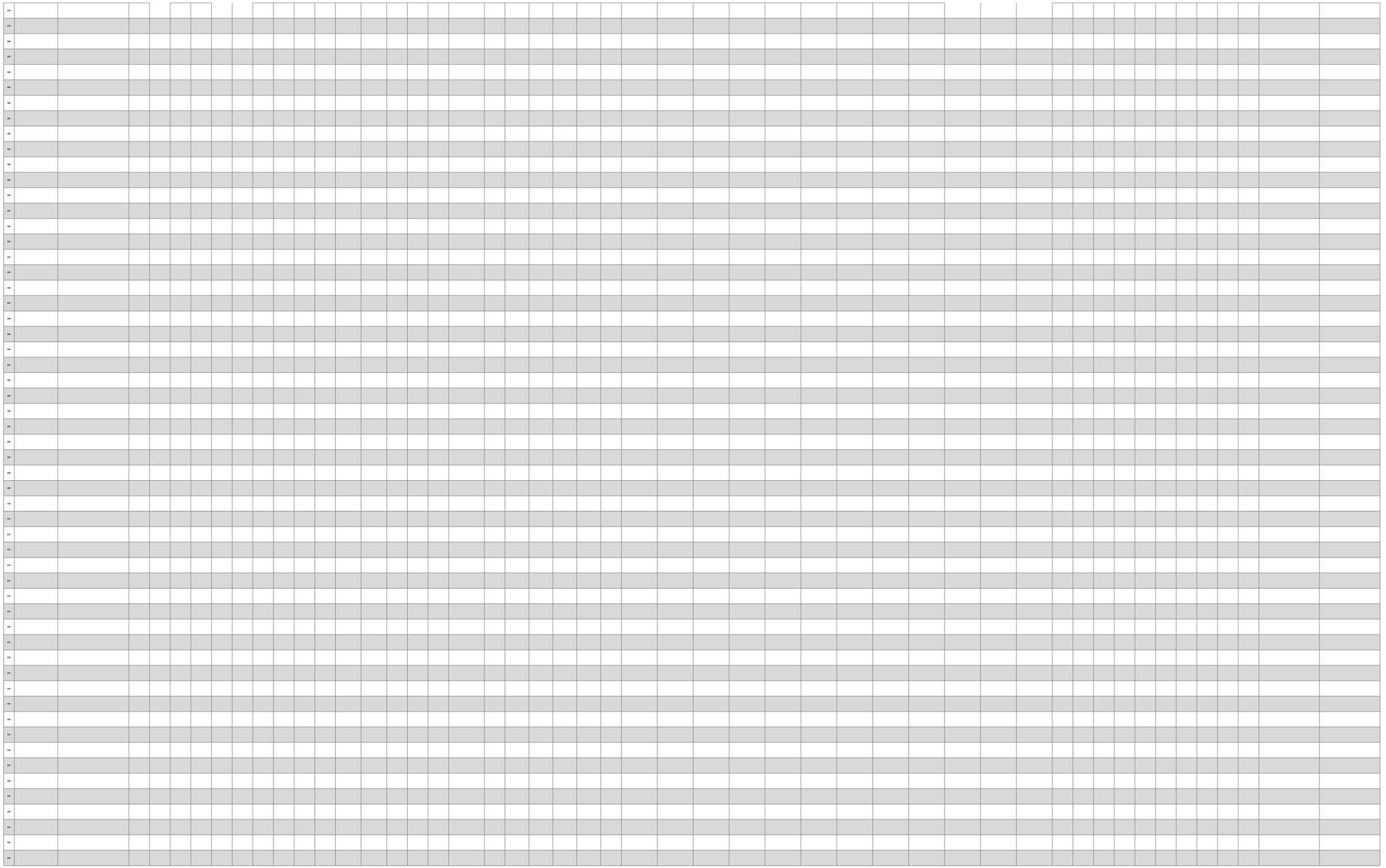

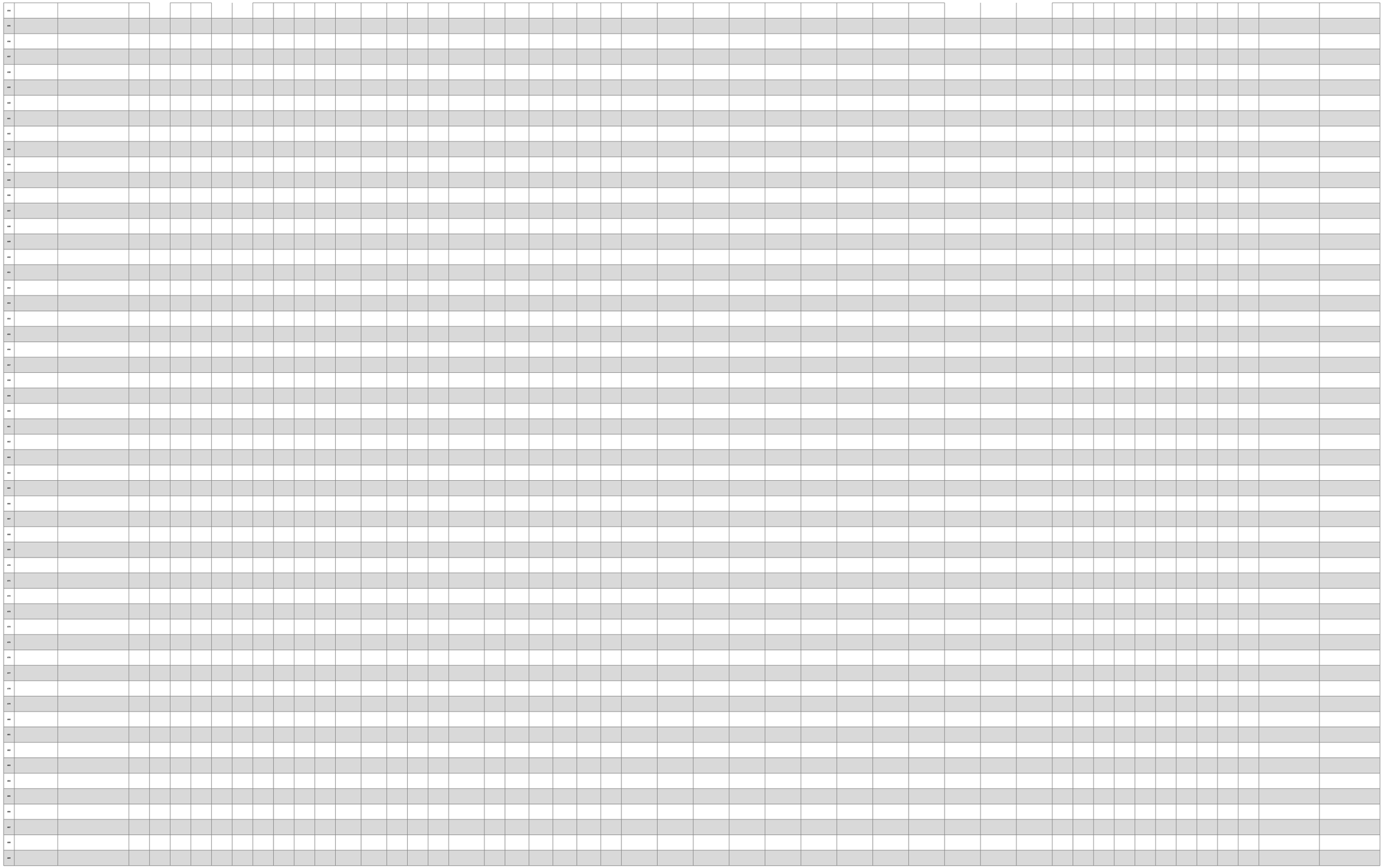

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Portland International Jatport Sustainability Action Implementation Tool

Action no.(#)	Actions	Action Description	Primary Sustainability Category	Timeframe	Implementation Status	Last Status Update	Start Date	Projected Completion Date	Completion Date	Action Leader			Implementation								Supporting Information	Data		Costs		
										Name	Email	Phone Number	Task 1		Task 2		Task 3		Task 4					Estimated Capital	Actual Capital ($)	Estimated Annual Operations and Maintenance	Actual Annual Operations and Maintenance	Estimated Staffing
													Description	Leader	Description	Leader	Description	Leader	Description	Leader		Data to be Collected	Data Location				
1	Assess the feasibility of replacing outdated HVAC systems with high-efficiency models to reduce energy consumption and emissions.	Replacing outdated HVAC equipment with more efficient units has been a crucial step in reducing energy consumption and emissions at the airport.	Energy		Not Started																			Design/cost: ~$50,000		Saved/Deferred	
2	Evaluate the potential for installing rainwater and wastewater collection systems to reduce the airport's reliance on municipal water supplies.	Implementing rainwater and greywater collection systems can help reduce the airport's reliance on municipal water supplies, thereby conserving valuable water resources.	Energy		Not Started																			Design/cost: ~$50,000		Saved/Deferred	
3	Optimize the use of natural daylighting in terminal buildings and other airport facilities to reduce the need for artificial lighting during the day.	Installing skylights, clerestory windows, or other daylighting features can help reduce the need for artificial lighting during the day, thereby reducing energy consumption and costs.	Energy		Not Started																			Design/cost: ~$50,000		Low Cost: <$25,000		Low: <$5K hours per month
4	Implement a comprehensive energy management system to monitor and control energy usage throughout the airport.	Implementing a comprehensive energy management system can help the airport to monitor and control energy usage in real-time, identify areas for improvement, and optimize energy efficiency.	Energy		Not Started																			Design/cost: ~$50,000		Saved/Deferred	
5	Upgrade the building envelope of the FBO terminal	Upgrading the building envelope of the FBO terminal can help reduce energy consumption, improve occupant comfort, and enhance the overall sustainability of the facility.	Energy		Not Started																			Any Expenses: ~$250,000		Saved/Deferred		Low: <$5K hours per month
6	Assess and enhance the building envelope of the terminal buildings	Regular assessments of the building envelope's performance can help identify areas for improvement, such as insulation upgrades or air sealing, to reduce energy consumption and emissions.	Energy		Not Started																			Design/cost: ~$50,000		Low Cost: <$25,000		Low: <$5K hours per month
7	Explore the feasibility of installing solar panels on airport buildings and parking structures	Installing solar panels on airport buildings and parking structures can help reduce the airport's reliance on grid electricity and decrease its carbon footprint.	Energy		Not Started																			Design/cost: ~$50,000		Saved/Deferred	
8	Install electric charging stations for the general aviation fleet and ground support equipment	Installing electric charging stations for the general aviation fleet and ground support equipment can help reduce emissions and promote the use of electric vehicles.	Energy		Not Started																			Design/cost: ~$50,000		Low Cost: <$25,000		Low: <$5K hours per month
9	Implement a comprehensive waste management program to reduce landfill waste and promote recycling.	Implementing a comprehensive waste management program can help reduce landfill waste and promote recycling, which can help reduce the airport's environmental impact.	Waste Management and Recycling		Not Started																			Design/cost: ~$50,000		Saved/Deferred	
10	Install a solar-powered energy audit program	Installing a solar-powered energy audit program can help identify areas for energy conservation and provide real-time data on energy usage.	Energy		Not Started																			Design/cost: ~$50,000		Saved/Deferred	
11	Install a solar-powered lighting system	A solar-powered lighting system would reduce the airport's energy consumption by using energy from the sun to power lighting fixtures.	Energy		Not Started																			Design/cost: ~$50,000		Low Cost: <$25,000		Low: <$5K hours per month
12	Develop and implement an energy audit program	Conducting regular energy audits can help identify areas for improvement and provide valuable data for energy management decisions.	Energy		Not Started																			Design/cost: ~$50,000		Saved/Deferred	
13	Install a solar-powered air traffic control tower	Installing a solar-powered air traffic control tower can help reduce the airport's energy consumption and emissions, while also providing a reliable source of power for critical operations.	Energy		Not Started																			Design/cost: ~$50,000		Low Cost: <$25,000		Low: <$5K hours per month
14	Provide gate conditioned air (PCA) on all commercial service aircraft gates	The airport's current aircraft ground gate conditioned air (PCA) system provides the aircraft passenger cabin with conditioned air while parked at the gate. This system is designed to reduce aircraft energy consumption and emissions by providing an alternative to using the aircraft's onboard auxiliary power unit (APU) when parked at the gate.	Greenhouse Gas Emissions		In Progress																			Any Expenses: ~$50,000		Any Expenses: ~$50,000		Low: <$5K hours per month
15	Prepare an annual airport-wide greenhouse gas emissions inventory, and voluntarily report the airport's emissions to relevant parties.	Annual greenhouse gas emissions inventory is a process that helps airports measure, manage, and reduce their carbon footprint. It involves collecting data on various sources of emissions, such as energy consumption, transportation, and waste management, and then calculating the total amount of greenhouse gases released into the atmosphere.	Greenhouse Gas Emissions		Not Started																			Any Cost: $50,000 to $100,000		Saved/Deferred		Low: <$5K hours per month
16	Encourage the procurement of hybrid/alternative fuel vehicles among airport car companies.	Encouraging the procurement of hybrid/alternative fuel vehicles among airport car companies can help reduce the airport's greenhouse gas emissions and promote the use of cleaner transportation options. The airport can work with its car rental partners to offer incentives or discounts for customers who choose hybrid or alternative fuel vehicles. This can help to reduce the number of traditional vehicles on the road and promote the adoption of cleaner transportation options.	Greenhouse Gas Emissions		Not Started																			Design/cost: ~$50,000		Low Cost: <$25,000		Low: <$5K hours per month
17	Encourage electric ground service vehicles that are powered by renewable energy sources.	Encouraging electric ground service vehicles that are powered by renewable energy sources can help reduce the airport's greenhouse gas emissions and promote the use of cleaner transportation options. The airport can work with its ground handling partners to offer incentives or discounts for customers who choose electric vehicles. This can help to reduce the number of traditional vehicles on the road and promote the adoption of cleaner transportation options.	Greenhouse Gas Emissions		Not Started																			Design/cost: ~$50,000		Low Cost: <$25,000		Low: <$5K hours per month
18	Expand the use of EVs among the Airport's fleet vehicles	The airport's current fleet vehicles are primarily powered by internal combustion engines, which contribute to greenhouse gas emissions and air pollution. By transitioning to electric vehicles, the airport can reduce its carbon footprint and improve air quality.	Greenhouse Gas Emissions		In Progress																			Design/cost: ~$50,000		Any Expenses: ~$50,000		Low: <$5K hours per month
19	Assess the capital impact of low-carbon materials, when supported.	Assessing the capital impact of low-carbon materials can help airports make informed decisions about their investments in sustainable infrastructure. By evaluating the costs and benefits of using low-carbon materials, airports can identify opportunities to reduce their carbon footprint while also ensuring the long-term viability of their projects.	Greenhouse Gas Emissions		In Progress																			Design/cost: ~$50,000		Saved/Deferred		Low: <$5K hours per month
20	Add "No Idling" signs around the airport terminal and parking facilities to remind travelers to turn off their vehicles.	The airport's current fleet vehicles are primarily powered by internal combustion engines, which contribute to greenhouse gas emissions and air pollution. By transitioning to electric vehicles, the airport can reduce its carbon footprint and improve air quality.	Greenhouse Gas Emissions		Not Started																			Design/cost: ~$50,000		Saved/Deferred		Low: <$5K hours per month
21	Increase the number of recycling bins and signage to encourage proper waste disposal.	Increasing the number of recycling bins and signage can help encourage proper waste disposal and reduce the amount of waste sent to landfills. By providing more convenient and visible recycling options, airports can make it easier for passengers and employees to participate in recycling programs.	Waste Management and Recycling		Not Started																			Design/cost: ~$50,000		Low Cost: <$25,000		Low: <$5K hours per month
22	Design and implement a recycling awareness campaign for employees and passengers.	Implementing a recycling awareness campaign can help reduce waste and promote sustainability among employees and passengers. By educating them about the importance of recycling and providing convenient recycling options, airports can encourage more people to participate in recycling programs.	Waste Management and Recycling		Not Started																			Design/cost: ~$50,000		Low Cost: <$25,000		Low: <$5K hours per month
23	Convert to rubber for existing water management roof mat	Converting to rubber for existing water management roof mat with a performance-based approach can help airports reduce their environmental impact while also ensuring that they can meet the needs of water management and flexibility. By focusing on the key outcomes, such as reducing energy consumption and minimizing waste, airports can make informed decisions about their investments in sustainable infrastructure.	Waste Management and Recycling		Not Started																			Design/cost: ~$50,000		Saved/Deferred		Low: <$5K hours per month
24	Make sure to use the energy-reducing roof mat program, and support request for support to the airport's sustainability initiatives and to encourage regular waste removal.	By increasing the value and organization of the existing composting program, the airport could further reduce waste generated and improve the welcome?	Waste Management and Recycling		In Progress																			Design/cost: ~$50,000		Saved/Deferred		Low: <$5K hours per month
25	Encourage improvements to wastewater, salt and contaminated runoff collection to reduce the impact on the environment and surrounding public utility and safety	Through financial, policy, or technical incentives. The airport's fuel farm energy-efficient and environmentally responsible. Accessible device, and will have to in order improve the airport's overall sustainability.	Waste Management and Recycling		Not Started																			Design/cost: ~$50,000		Saved/Deferred		Low: <$5K hours per month
26	Conduct regular waste audits	A waste audit program at the airport would enable the airport to systematically track and measure its waste generation, identify areas for improvement, and develop targeted strategies to reduce waste and increase recycling rates. By conducting regular waste audits, the airport can demonstrate its commitment to environmental stewardship and engage passengers, employees, and stakeholders in the waste reduction process.	Waste Management and Recycling		Not Started																			Any Cost: $50,000 to $100,000		Low Cost: <$25,000		Middle Low: $50,000 to $75,000 per month
27	Promote carpooling for employees	Promoting carpooling for employees can help reduce the number of single-occupancy vehicles on the road, thereby reducing traffic congestion and emissions. The airport can encourage carpooling by providing incentives, such as preferred parking spaces or discounted parking rates, for employees who carpool.	Natural Resource and Transportation		Not Started																			Design/cost: ~$50,000		Saved/Deferred		Low: <$5K hours per month
28	Incentivize travel with regional entities to enhance/support a positive perception across the airport, and establish commitments to the local business interest	The airport's current ground transportation system is largely dependent on single-occupancy vehicles, which contributes to traffic congestion and emissions. By encouraging the use of alternative modes of transportation, such as public transportation, carpooling, and cycling, the airport can reduce its environmental impact and improve the overall passenger experience.	Natural Resource and Transportation		Not Started																			Design/cost: ~$50,000		Saved/Deferred		Low: <$5K hours per month
29	Assess and implement a comprehensive transportation demand management (TDM) program to reduce single-occupancy vehicle trips to the airport.	The airport's current fleet vehicles are primarily powered by internal combustion engines, which contribute to greenhouse gas emissions and air pollution. By transitioning to electric vehicles, the airport can reduce its carbon footprint and improve air quality.	Natural Resource and Transportation		Not Started																			Any Cost: $50,000 to $100,000		Saved/Deferred		Low: <$5K hours per month
30	Design loading bay door proximity to the weather, and make vulnerable shuttle bus by emergency	The airport's current operations and maintenance practices can have a significant impact on the environment, including the generation of waste, the consumption of resources, and the emission of greenhouse gases. By implementing sustainable practices, the airport can reduce its environmental footprint and improve its overall sustainability performance.	Natural Resource and Transportation		Not Started																			Design/cost: ~$50,000		Saved/Deferred		Low: <$5K hours per month
31	Work with regional transportation and environmental partners to develop a ride-sharing program with discounts for the airport	The airport's current parking garage facilities are a significant source of revenue, but they also have a negative impact on the environment. By implementing a parking garage revenue optimization program, the airport can reduce its environmental impact while also increasing its revenue.	Natural Resource and Transportation		Not Started																			Design/cost: ~$50,000		Saved/Deferred		Low: <$5K hours per month
32	Encourage employees and passengers to use alternative modes of transportation to and from the airport, while assessing the first mile/last mile	The airport's current parking garage facilities are a significant source of revenue, but they also have a negative impact on the environment. By implementing a parking garage revenue optimization program, the airport can reduce its environmental impact while also increasing its revenue.	Natural Resource and Transportation		Not Started																			Design/cost: ~$50,000		Saved/Deferred		Low: <$5K hours per month
33	Install signage in the baggage claim area that provides information on local transportation options, including public transportation, ride-sharing services, and shuttle services.	The airport's current parking garage facilities are a significant source of revenue, but they also have a negative impact on the environment. By implementing a parking garage revenue optimization program, the airport can reduce its environmental impact while also increasing its revenue.	Natural Resource and Transportation		Not Started																			Any Cost: $50,000 to $100,000		Low Cost: <$25,000		Low: <$5K hours per month
34	Upgrade the employee transportation survey	The airport's current parking garage facilities are a significant source of revenue, but they also have a negative impact on the environment. By implementing a parking garage revenue optimization program, the airport can reduce its environmental impact while also increasing its revenue.	Natural Resource and Transportation		Not Started																			Design/cost: ~$50,000		Saved/Deferred		Low: <$5K hours per month
35	Develop an electric vehicle incentive policy	The airport's current parking garage facilities are a significant source of revenue, but they also have a negative impact on the environment. By implementing a parking garage revenue optimization program, the airport can reduce its environmental impact while also increasing its revenue.	Natural Responsibility		Not Started																			Design/cost: ~$50,000		Saved/Deferred		Low: <$5K hours per month
36	Increase the sustainability by developing a land and business practices that support a sustainable airport	The airport's current parking garage facilities are a significant source of revenue, but they also have a negative impact on the environment. By implementing a parking garage revenue optimization program, the airport can reduce its environmental impact while also increasing its revenue.	Natural Responsibility		Not Started																			Design/cost: ~$50,000		Saved/Deferred		Low: <$5K hours per month
37	Achieve the existing airport master plan to reduce the environmental impact	By implementing such an assessment, it is possible to identify and prioritize areas for improvement and develop a plan to reduce the airport's environmental impact. This can help to improve the airport's sustainability performance, reduce its carbon footprint, and enhance its reputation as a leader in environmental stewardship.	Natural Responsibility		Not Started																			Any Expenses: ~$250,000		Saved/Deferred		Low: <$5K hours per month
38	Conduct regular employee satisfaction surveys	The airport's current parking garage facilities are a significant source of revenue, but they also have a negative impact on the environment. By implementing a parking garage revenue optimization program, the airport can reduce its environmental impact while also increasing its revenue.	Natural Responsibility		Not Started																			Design/cost: ~$50,000		Saved/Deferred		Low: <$5K hours per month
39	Develop an internal sustainability awareness program to communicate the airport's sustainability initiatives and encourage employee participation	The airport's current parking garage facilities are a significant source of revenue, but they also have a negative impact on the environment. By implementing a parking garage revenue optimization program, the airport can reduce its environmental impact while also increasing its revenue.	Natural Responsibility		Not Started																			Design/cost: ~$50,000		Saved/Deferred		Low: <$5K hours per month
40	Wildlife and wildlife attractants are a part of sustainability and wildlife attractants	The airport's current parking garage facilities are a significant source of revenue, but they also have a negative impact on the environment. By implementing a parking garage revenue optimization program, the airport can reduce its environmental impact while also increasing its revenue.	Natural Responsibility		Not Started																			Design/cost: ~$50,000		Low Cost: <$25,000		Low: <$5K hours per month
41	Create a tenant development policy that minimizes the following environmental	The airport's current parking garage facilities are a significant source of revenue, but they also have a negative impact on the environment. By implementing a parking garage revenue optimization program, the airport can reduce its environmental impact while also increasing its revenue.	Natural Responsibility		Not Started																			Any Cost: $50,000 to $100,000		Saved/Deferred		Low: <$5K hours per month
42	Incorporate the airport's sustainability guidelines and best practices and ensure compliance with relevant regulations and standards	The airport's current parking garage facilities are a significant source of revenue, but they also have a negative impact on the environment. By implementing a parking garage revenue optimization program, the airport can reduce its environmental impact while also increasing its revenue.	Natural Responsibility		Not Started																			Any Cost: $50,000 to $100,000		Saved/Deferred		Low: <$5K hours per month
43	Provide a recommend on an update communication, information center, and a process to collect and track feedback and a process and action plan that is on the same page as the airport's sustainability goals	The airport's current parking garage facilities are a significant source of revenue, but they also have a negative impact on the environment. By implementing a parking garage revenue optimization program, the airport can reduce its environmental impact while also increasing its revenue.	Awareness		Not Started																			Design/cost: ~$50,000		Saved/Deferred		Low: <$5K hours per month
44	Establish the airport's focus on sustainability and develop a sustainability plan that aligns with the airport's overall goals and objectives	The airport's current parking garage facilities are a significant source of revenue, but they also have a negative impact on the environment. By implementing a parking garage revenue optimization program, the airport can reduce its environmental impact while also increasing its revenue.	Awareness		Not Started																			Design/cost: ~$50,000		Saved/Deferred		Neutral/Positive
45	Publicize annual "carbon-free" to capture the airport's ongoing sustainability performance	The airport's current parking garage facilities are a significant source of revenue, but they also have a negative impact on the environment. By implementing a parking garage revenue optimization program, the airport can reduce its environmental impact while also increasing its revenue.	Awareness		Not Started																			Any Cost: $50,000 to $100,000		Low Cost: <$25,000		Middle Low: $50,000 to $75,000 per month
46	Conduct a feasibility assessment of the electrical bussing	The airport's current parking garage facilities are a significant source of revenue, but they also have a negative impact on the environment. By implementing a parking garage revenue optimization program, the airport can reduce its environmental impact while also increasing its revenue.	Natural Responsibility		Not Started																			Any Cost: $50,000 to $100,000		Design/cost: ~$100,000		Low: <$5K hours per month
47	Develop and implement an airport-wide energy management system	The airport's current parking garage facilities are a significant source of revenue, but they also have a negative impact on the environment. By implementing a parking garage revenue optimization program, the airport can reduce its environmental impact while also increasing its revenue.	Energy		In Progress																			Any Expenses: ~$250,000		Saved/Deferred		Middle Low: $50,000 to $75,000 per month
48	Explore the potential for a biomass energy system to heat and cool airport buildings	The airport's current parking garage facilities are a significant source of revenue, but they also have a negative impact on the environment. By implementing a parking garage revenue optimization program, the airport can reduce its environmental impact while also increasing its revenue.	Waste Management and Recycling		Not Started																			Design/cost: ~$50,000		Saved/Deferred		Low: <$5K hours per month
49	Work with airport tenants/FBOs such as Skyfield Fuels to use SAF, available such as a pilot for energy purchase	The airport's current parking garage facilities are a significant source of revenue, but they also have a negative impact on the environment. By implementing a parking garage revenue optimization program, the airport can reduce its environmental impact while also increasing its revenue.	Natural Responsibility		Not Started																			Design/cost: ~$50,000		Design/cost: ~$100,000		Low: <$5K hours per month
50	Create a vehicle control on shops off	The airport's current parking garage facilities are a significant source of revenue, but they also have a negative impact on the environment. By implementing a parking garage revenue optimization program, the airport can reduce its environmental impact while also increasing its revenue.	Natural Responsibility		Not Started																			Any Cost: $50,000 to $100,000		Design/cost: ~$100,000		Low: <$5K hours per month
51	Install additional "green" or use-only-hauler waste receptacles in public areas as appropriate	The airport's current parking garage facilities are a significant source of revenue, but they also have a negative impact on the environment. By implementing a parking garage revenue optimization program, the airport can reduce its environmental impact while also increasing its revenue.	Water Quality		Not Started																			Saved/Deferred		Low Cost: $50,000 to $100,000		Low: <$5K hours per month
52	Reduce renewable fuel base fuel emissions of the airport's vehicle/water runoff	The airport's current parking garage facilities are a significant source of revenue, but they also have a negative impact on the environment. By implementing a parking garage revenue optimization program, the airport can reduce its environmental impact while also increasing its revenue.	Water Quality		Not Started																			Saved/Deferred		Design/cost: ~$100,000		Low: <$5K hours per month
53	Outreach and training for inventory, vendor and tenant sustainability	The airport's current parking garage facilities are a significant source of revenue, but they also have a negative impact on the environment. By implementing a parking garage revenue optimization program, the airport can reduce its environmental impact while also increasing its revenue.	Water Quality		Not Started																			Any Expenses: ~$250,000		Design/cost: ~$100,000		Low: <$5K hours per month
54	Continue to monitor opportunities and review the airport's sustainability initiatives and identify new opportunities for improvement	The airport's current parking garage facilities are a significant source of revenue, but they also have a negative impact on the environment. By implementing a parking garage revenue optimization program, the airport can reduce its environmental impact while also increasing its revenue.	Status	Long-term (More than 5 years)	Not Started																			Any Expenses: ~$250,000		Design/cost: ~$100,000		Low: <$5K hours per month
55	Identify recurring training for personnel on key operational, maintenance, safety, and security topics, and ensure training is current, applicable, and flexible	Implementing a recurring training program for personnel is an important way to ensure that they have the knowledge and skills they need to perform their jobs safely and effectively. By providing regular training, airports can help to reduce the risk of accidents and incidents, improve the overall safety and security of the airport, and enhance the professionalism of their staff.	Status		Not Started																			Any Cost: $50,000 to $100,000		Design/cost: ~$100,000		Low: <$5K hours per month
56	Regularly review and update the airport's emergency response plan, ensuring that it is consistent with the airport's overall mission and objectives	The airport's emergency response plan is a critical document that outlines the procedures and protocols that will be followed in the event of an emergency. It is important to regularly review and update the plan to ensure that it is consistent with the airport's overall mission and objectives. This includes considering changes in the airport's operations, infrastructure, and personnel, as well as changes in the surrounding community.	Status		Not Started																			Any Cost: $50,000 to $100,000		Design/cost: ~$100,000		Saved/Deferred
57	Install new tenant signs with airport, new to the users, and the airport's overall mission by professional new efficiency, and	The airport's current signage is outdated and does not reflect the airport's overall mission or objectives. This can create confusion for passengers and visitors, and it can also make it difficult for the airport to attract new tenants. By installing new signs that are consistent with the airport's overall mission and objectives, the airport can improve the passenger experience and make it more attractive to potential tenants.	Status	Mid-term (1 - 5 years)	Not Started																			Design/cost: ~$50,000		Design/cost: ~$100,000		Saved/Deferred
58	Construct new long-term surface parking lot	The airport's current parking garage facilities are a significant source of revenue, but they also have a negative impact on the environment. By implementing a parking garage revenue optimization program, the airport can reduce its environmental impact while also increasing its revenue.	General Aviation and Transportation	Mid-term (1 - 5 years)																			Any Expenses: ~$250,000		Design/cost: ~$100,000		Low: <$5K hours per month
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Actual Staffing (Hours/Month)	Estimated Simplic Payback (Years)	Actual Simplic Payback (Years)	Potential Funding Sources	Estimated Benefits	Realized Benefits	Lessons Learned	Notes
	Immediate <1 year						
	Immediate <1 year						
	Immediate <1 year						
	Immediate <1 year						
	Immediate <1 year						
	Short 1-3x Systems						
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	Medium 3x 10 x 10 years						Notes and 50 of written include 8 of new 5 every Plan points. Not Sharing Use, or Local Ideas.
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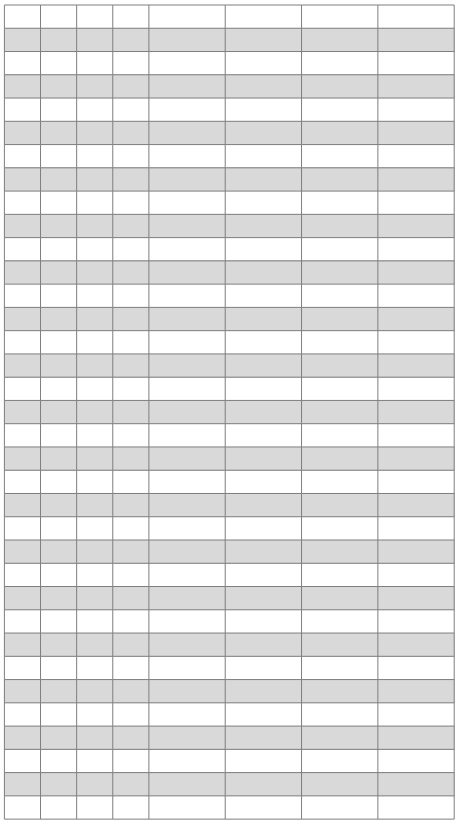
	Short 1-3x Systems						



Sustainability Action Implementation Plan

Action ID:	1	**Action:**	Determine the feasibility of replacing outdated HVAC equipment in the Old Terminal with more efficient alternatives		
Category	Energy				
Action Description:	Replacing outdated HVAC equipment with more efficient alternatives would lead to improved energy and fuel consumption efficiency at the Jetport.				
Action Leader:		**Phone:**		**Email:**	
Status:	Not Started	**Started:**		**Completed:**	
Data Needs:				**File Location:**	
Expected Capital:	Marginal Cost: <$50,000	**Expected O&M:**	Neutral/Positive	**Expected Staff Hrs.:**	Low: <40 hours per month
Capital To-Date:		**O&M To-Date:**		**Staff Hrs. To-Date:**	

Implementation Steps:

TASK	TASK DESCRIPTION	TASK LEADER
1		
2		
3		
4		
5		

Supporting Information:	
Realized Benefits:	
Lessons Learned:	
Last Revised:	

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Primary Sustainability Category	Stakeholder Impact
Greenhouse Gas Emissions	Internal Stakeholders (Jetport Staff Only)
Energy	Internal Stakeholders (Select Jetport Tenants (
Waste Management and Recycling	Internal Stakeholders (Combination of Jetport and Tenant Employees)
Ground Access and Transportation	External Stakeholders
Social Responsibility	Internal and External Stakeholders
Governance	
Noise	
Water Quality	
None	

Action ID
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ınd International Jetport
inability Tools Control Area

Timeframe	Status
Short-term (Less than 1 year)	Not Started
Mid-term (1 - 5 years)	In Progress
Long-term (More than 5 years)	Completed
	Flagged

Feasibility	Goal Applicability	Asset Management
Feasible	0 - Contradicts	0 - Requires the construction of new facilities and/or the acquisition of new equipment
Not Feasible	1 - Not Related	1 - Will not impact the Jetport's existing facilities or equipment
	2 - Peripherally Related	2 - Will maintain existing facilities or equipment
	3 - Directly Related	3 - Will enhance existing facilities or equipment

Estimated Costs			
Capital	**Operations and Maintenance**	**Staffing**	**Simple Payback**
0 - Very Expensive: >$200,000	0 - Very Expensive: >$50,000	0 - High: >80 hours per month	0 - Long: >10 years
1 - Moderately Expensive: $100,000 to $200,000	1 - Moderately Expensive: $25,000 to $50,000	1 - Moderate: 40 to 80 hours per month	1 - Moderate: 5 to 10 years
2 - Low Cost: $50,000 to $100,000	2 - Low Cost: <$25,000	2 - Low: <40 hours per month	2 - Short: 1 to 5 years
3 - Marginal Cost: <$50,000	3 - Neutral/Positive	3 - Neutral/Positive	3 - Immediate: <1 year

Energy Consumption and Generation	Air Quality and Human Health	Greenhouse Gas Emissions Reduction	Water Conservation
0 - Increases energy consumption	0 - Impairs local air quality and/or indoor air quality	0 - Increases GHG emissions	0 - Increases water consumption
1 - Has no effect on energy consumption or generation	1 - Has no effect on regional or indoor air quality	1 - Has no effect on GHG emissions	1 - Has no effect on water consumption
2 - Decreases energy consumption by less than 5% below baseline levels	2 - Moderately improves regional air quality and/or indoor air quality	2 - Reduces GHG emissions by less than 5% below baseline levels	2 - Moderately reduces potable water consumption
3 - Decreases energy consumption by more than 5% below baseline levels and/or generates renewable energy	3 - Significantly improves regional air quality and/or indoor air quality	3 - Reduces GHG emissions by more than 5% below baseline levels	3 - Significantly reduces potable water consumption and/or uses reclaimed water

Estimated Effects			
Waste Management and Recycling	**Sustainable Materials**	**Regional Economic Benefit**	**Natural Resources**
0 - Increases waste generation or portion going to regional landfills	0 - Contains less than 5 percent sustainable content or sustainable content is unknown	0 - Decreases regional employment	0 - Impairs local natural resources
1 - Has no effect on waste generation or diversion	1 - Is not applicable	1 - Has no effect on the regional economy	1 - Has no effect on impact local natural resources
2 - Decreases waste generation and/or increases the recycling rate by less than 5% from baseline	2 - Contains between 5 and 40 percent sustainable content	2 - Improves the regional economy by encouraging external workforce training	2 - Contributes to the protection of local natural resources
3 - Decreases waste generation and/or increases the recycling rate by more than 5% from baseline	3 - Contains 40 percent or more sustainable content	3 - Improves the regional economy by generating new employment and/or economic activity	3 - Enhances local natural resources

			Ad
Climate Adaptation	**Customer/Employee Satisfaction**	**Safety**	**Action Source**
0 - Increases the Jetport's vulnerability to climate change	0 - Negative	0 - Impedes safety	Internal
1 - Has no impact on the Jetport's resilience to climate change	1 - No Effect	1 - No effect	External
2 - Improves the Jetport's resilience to climate change through related education or planning efforts	2 - Indirect (Improves satisfaction through the provision of information)	2 - Improves safety through infrastructure improvements	Research
3 - Improves the Jetport's resilience to climate change through critical infrastructure improvements	3 - Direct (Improves satisfaction through active participation)	3 - Improves safety through operational adjustments	

ditional Information

Division	Recognition Status
Facilities and Engineering	Contacted
Finance	Not Contacted
Marketing	Contact Information Not Available
Operations	Not Applicable
Security	
Not Applicable	

PUBLIC INFORMATIONAL MEETING NOTES

PORTLAND JETPORT SURFACE PARKING EXPANSION PROJECT

APRIL 11, 2024, 6:00 P.M.

Meeting Location: Portland Jetport Terminal Lower Level.

Presentation and Project Overview:

A PowerPoint presentation and presentation boards on easels were utilized for the meeting presentation.

Paul Bradbury introduced the project and air trends. He noted the long-term trend toward larger aircraft by the airlines, an industry trend called up-gauging. Jetport operations (takeoffs and landings) peaked in 1997 at nearly 129,000 annually. Annual operations in 2023 were just under 54,000, less than half the 1997 peak. Despite the dramatic reduction in operations, total passenger volumes increased from 1.224 million in 1997 to 2.219 million in 2023 as the average seats per commercial flight at the Jetport increased from 57.5 to 110.7 over this period. This up-gauging has allowed the Jetport to meet record passenger volumes with fewer flights on larger, quieter, and more fuel-efficient aircraft.

The project area was described as the existing cell phone lot accessed from the loop road and the existing gravel park-n-fly valet lot along with the acquired land from ParkNJet that was previously impacted and a wooded area adjacent to Jetport Boulevard. The project area is north of the internal loop road and access road to the terminal and south of Jetport Boulevard. The location is adjacent to the existing long-term access. The Jetport Sustainable Masterplan also included the project area as a "Parking Expansion".

The originally proposed replacement for the "Cellphone Lot" north of Jetport Boulevard was removed after discussions with Stroudwater residents. The Cellphone Lot is used as a temporary parking location for vehicles waiting to pick up passengers. When passengers arrive and are on the baggage claim curb waiting for pick-up they can call or text the person waiting in the cell phone lot that they are ready. Additionally, the lot is a geofence check-in location for any Transportation Network Companies (TNCs), Uber & Lyft that are seeking to pick up rideshare requests.

The project includes two proposed paved parking lots with a net increase of 282 parking spaces over what currently exists. The Jetport currently has approximately 3,223 long-term parking spaces comprised of the parking garage, existing surface parking, and the "Pink Lot" (Shuttle Parking at District Road). The parking lot construction will include the reconstruction of the gravel Valet Parking Lot (former ParkNJet lot) and the Cellphone Lot which accommodates approximately 402 parking spaces. The total amount of parking to be constructed will be 684 parking spaces which includes the 402 existing parking spaces in the existing gravel Valet Parking Lot and the cellphone Parking Lot. The parking project will create a net increase of 282 parking spaces. Project work also includes the construction of two subsurface stormwater collection and treatment systems designed to collect and treat stormwater runoff from the development area. Presently, no stormwater treatment exists for the gravel Valet Parking and Cellphone Lot. The project will also include a landscaping plan around the perimeter of the parking lot.

As required by city ordinance, 20% of the new net parking spaces will include level 1 EV charging and 50% of the new net parking spaces will be EV-ready. The Jetport is proposing to create 56 (20%) Level 1 EV charging parking spaces in the existing parking garage and will install conduit to the 141 (50%) Level 1 EV charging parking spaces in the new surface parking lot.

A wetlands and vernal pool study was conducted on the Jetport property. Two wetland areas were identified in the wooded area that will be developed as parking totaling 8,618 s.f. A wetland permit application was filed with the MDEP for the wetland alteration in addition to the Maine DEP Site Location of Development Application.

Public Discussion:

- A question was asked about the use of the General Aviation Apron for Long-term parking. During the peak February and Spring break this year, the Jetport obtained temporary approvals to park vehicles on the general aviation apron next to Northeast Air. This area could only be used temporarily for parking since the area is dedicated to aviation use and the FAA restricts the use of space for non-aeronautical purposes. At it's peak this season the temporary apron provided 264 spaces.
- Discussion was held regarding the sustainable masterplan prepared by the Jetport and whether the parking was included in this plan. Included in the masterplan was a graphic prepared by Stantec and Coffman Associates showing the project area as "Parking Expansion."
- Comments were made asking about the use of additional lots even when the parking is not full. The parking lots are full during peak travel times and morning push. The parking garages are managed to prepare for the morning push and the peak times to avoid pushing early morning passengers to farther out lots. Typically, vehicles are pushed out to the remote lots beginning around 9 a.m. during peak travel times.
- A Question was asked about the new hotel being proposed at the Jetport. The hotel is not a Jetport project and will not be located on Jetport property.
- Comments were made regarding the wetland alterations. Wetland alteration is a term used to describe impacts to wetlands. All wetland alterations/impacts will need to be approved by the Maine DEP and the US Army Corps of Engineers. In addition to the Site Location Application, a separate Natural Resources Protection Act Permit application will also be filed with the Maine DEP.
- A question was asked about the eventual construction of a parking garage. At some undetermined point in the future and based upon need, a parking garage expansion may occur and would include at least 1,000 parking spaces. The existing parking garage and adjacent parking will remain operational during the proposed parking lot construction. After construction, all other existing parking lots will remain operational and are needed to accommodate peak parking demands. Additionally, the surface parking proposed under this project will assist in the parking garage development by covering some of the displaced parking during garage construction.
- The Airport Director noted that the project also includes a 1.9 MW/5MWhr battery storage project. The location is adjacent to the parking lot and is located to optimize access to the electrical feed to the terminal. The battery storage will allow the Jetport to store energy to use during peak demand periods reducing impacts on the electrical grid during the peak times. The

battery storage will charge during non-peak times. This project provides resiliency and will load shed reducing demand on the electrical grid during peak times.

- A question was asked about the parking numbers and price in the original allocation. The Airport Director explained that the Jetport is looking for a net increase of 250-375 parking spaces as described in his original memo to the city council. The proposed project will provide a net increase of 282 spaces and will improve drainage from the existing gravel Valet Lot by treating stormwater to meet the Maine DEP stormwater standards. The 282 net spaces would have been closer to the 375 if the Cellphone lot had been retained but was eliminated based upon public comment. The parking lot numbers include the park-n-fly lot.
- Comments were made about building the parking garage now. Constructing the parking garage now would remove surface spaces and significantly disrupt the existing surface parking and the cost is much higher. Since the Jetport is short on parking now, the disruption of the surface parking for a parking garage would only worsen the situation. The airport is severely land-constrained and this project is part of the Jetport development masterplan.
- A question was asked about the Portland 2030 goals and completing developments in an environmentally sustainable way and whether the project will have impacts on wetlands. The Airport Director explained that the project area is needed for growth at the Jetport and that is important to construct parking close to the multimodal nodes. Surface parking is needed and part of the development sequence. When the next increase in demand occurs, the need for a parking garage additional would be reassessed.
- A question was asked about the environmental impacts of the project. As part of the permitting process, the wetland areas that will be impacted are evaluated for their functions and values. The project area wetlands were delineated by Cole Peters of Sebago Technics, Inc. No critical or endangered habitats were identified including vernal pools. The total amount of wetland alteration will be 8,618 s.f. and includes two isolated wetlands in the wooded area. Drainage from the development areas will be collected and treated in two subsurface systems to MDEP standards.
- A question was asked about the percent of impervious surface on the upper former ParkNJet parcel the jetport acquired. This information is included in the stormwater analysis.
- A question was asked about parking lot revenues. The Airport Director noted that parking is a large part of the revenue in addition to rental cars and airline revenues.
- A comment was made that parking garages tend to last 50 years. The Airport Director noted that if they are maintained, that is achievable and that the Jetport invests approximately $800k in maintenance annually.
- A question was about the age of the parking garage. The Airport Director noted the garage was constructed in 2001 and 2008. Further conversation was held about expansion and if Jetport owns land toward Congress Street. The Airport Director responded yes, but the land along the International Parkway toward Congress Street is not zoned correctly and is part of Jetport wetland conservation areas.
- Comments were made about the use of shuttles and transit and EV infrastructure.
- A question was asked about eliminating the Cellphone Lot and where Uber/Lyft stage. The Jetport is evaluating options that could include accommodating this need within the long-term parking or elsewhere.
- A question was asked if the meeting was recorded. The meeting was not recorded.

- Comments were made about the former ParkNJet property relating to the prior wetland impacts on the property and the status of the permits.
- Comments were made about the build-out of the Jetport and concern for development in a patchwork fashion.
- Comments were made regarding the construction of the parking garage now and reducing demand through regional buses and electric shuttles.
- Comments were expressed regarding forward thinking and the need for parking including a parking garage and the need to be more creative.
- Reviewed the layout of the parking lot noting that the project doesn't preclude future development and that the parking lot grade will be lower than Jetport Boulevard including landscaping with more plantings than being removed. The design team Landscape Architect noted that the plantings will be native species for better survivability. Cole Peters noted that ash trees are present, some of which are impacted by the Emerald Ash Bore, and that the understory is mainly invasive species.
- A question was asked about how people will get to the terminal from the parking lot. Sidewalks will be installed at the perimeter of the new parking lot that will connect to existing sidewalks providing pedestrian routes to the terminal.

End of Notes:

Note: The purpose of the meeting notes are intended to provide a general summary of the public meeting conversation. The meeting minutes are not intended to capture every detail or nuances of the meeting and are limited to a general summary of the conversation as recorded by Sebago Technics, Inc.

PWM Public Informational Meeting Proposed Parking Expansion

April 11, 2024 at 6:00 pm

PWM Portland International Jetport | Maine's Home Airport.

Agenda

- Welcome – Paul Bradbury
- Air Service Trends at PWM – Paul Bradbury
- Proposed Parking Project Review – Paul Bradbury & Owens McCollough, Sebago Technics
- Questions & Answers
- Close

AT A GLANCE

American Airlines
Breeze
DELTA AIR LINES
jetBlue AIRWAYS
FRONTIER AIRLINES
Southwest
sun country airlines
UNITED
FedEx

NON-STOP DESTINATIONS

Seasonal Flights

NON-STOP SERVICE

*Seasonal Service

Atlanta	DELTA
Baltimore/Washington	Southwest
Charleston	Breeze
Charlotte	American Airlines
Chicago Midway	*Southwest
Chicago O'Hare	American Airlines, UNITED
Dallas	*American Airlines
Denver	*UNITED
Detroit	DELTA
Fort Myers	*Breeze
Miami	*American Airlines
Minneapolis/St. Paul	*DELTA, *suncountry airlines
Nashville	Southwest
Newark/New York City	UNITED
New York Islip	*Breeze
New York/JFK	*jetBlue, DELTA
New York/LaGuardia	American Airlines, DELTA
Norfolk	*Breeze
Orlando	FRONTIER, Breeze
Philadelphia	American Airlines
Pittsburgh	*Breeze
Raleigh-Durham	*FRONTIER
Tampa	Breeze
Washington Dulles	UNITED
Washington Reagan	American Airlines

PWM Air Service Trends

From 1997 to 2019 operations are down 54.8% and total passengers are up 78.1%.

For 2023 Operations are 7.3% below 2019 levels and total passengers are 1.8% above 2019 levels.

What Changed?

1997 Aircraft:

- Beechcraft: 19 seats
- Saab 340: 34 seats
- ERJ 135: 37 seats
- ERJ 140: 44 seats
- Dornier 328: 45 seats
- CRJ: 50 seats
- B737-300: 126 seats
- MD80: 142 seats

Average seats per flight:
57.5

Dornier 328

Beechcraft

Saab 340

CRJ

MD80

What Changed?

2023 Aircraft:

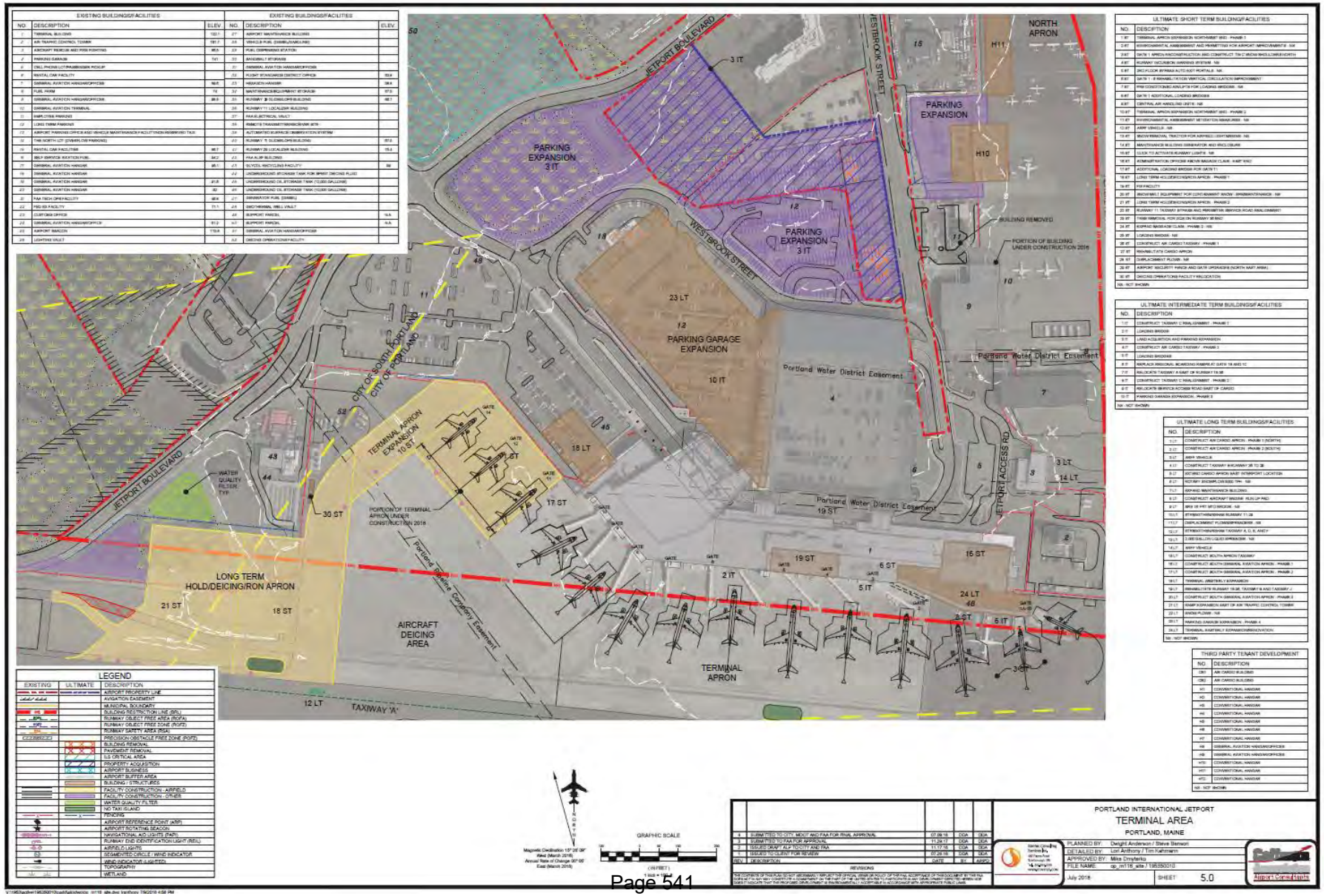
- E-145: 50 seats
- E-170: 65 seats
- E-175: 76 seats
- CRJ 900: 76 seats
- A220: 137 seats
- A319: 126 seats
- A320: 150 seats
- A320neo: 186 seats
- A321: 230 seats
- A321neo: 240 seats
- B737- 700: 143 seats
- B737-800: 175 seats
- B737-900: 179 seats
- B737-Max 9: 179 seats

Average seats per flight:

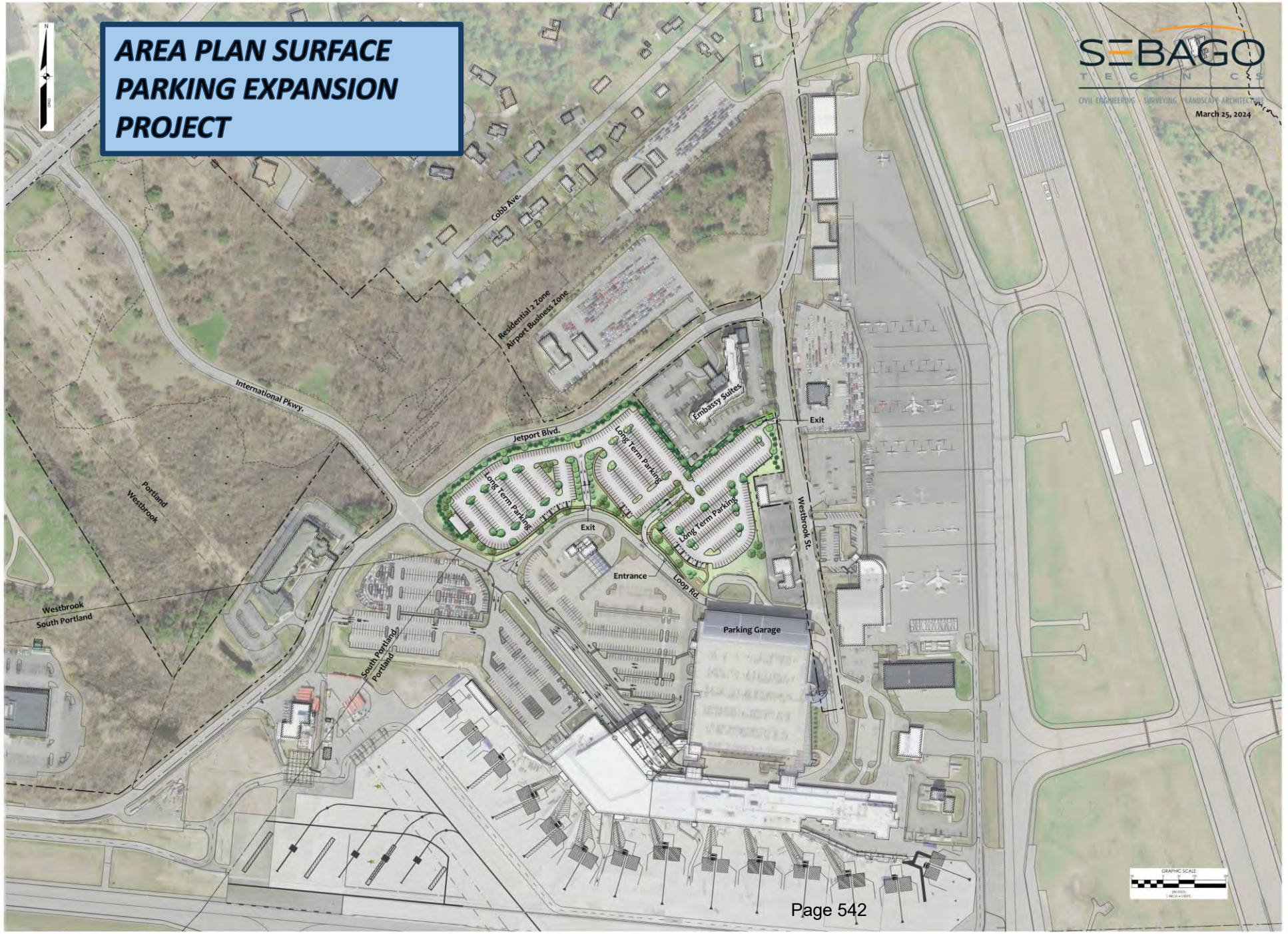
110.7

Proposed Parking Project

Proposed Parking Project



AREA PLAN SURFACE PARKING EXPANSION PROJECT



PWM Portland International Jetport | Maine's Home Airport.

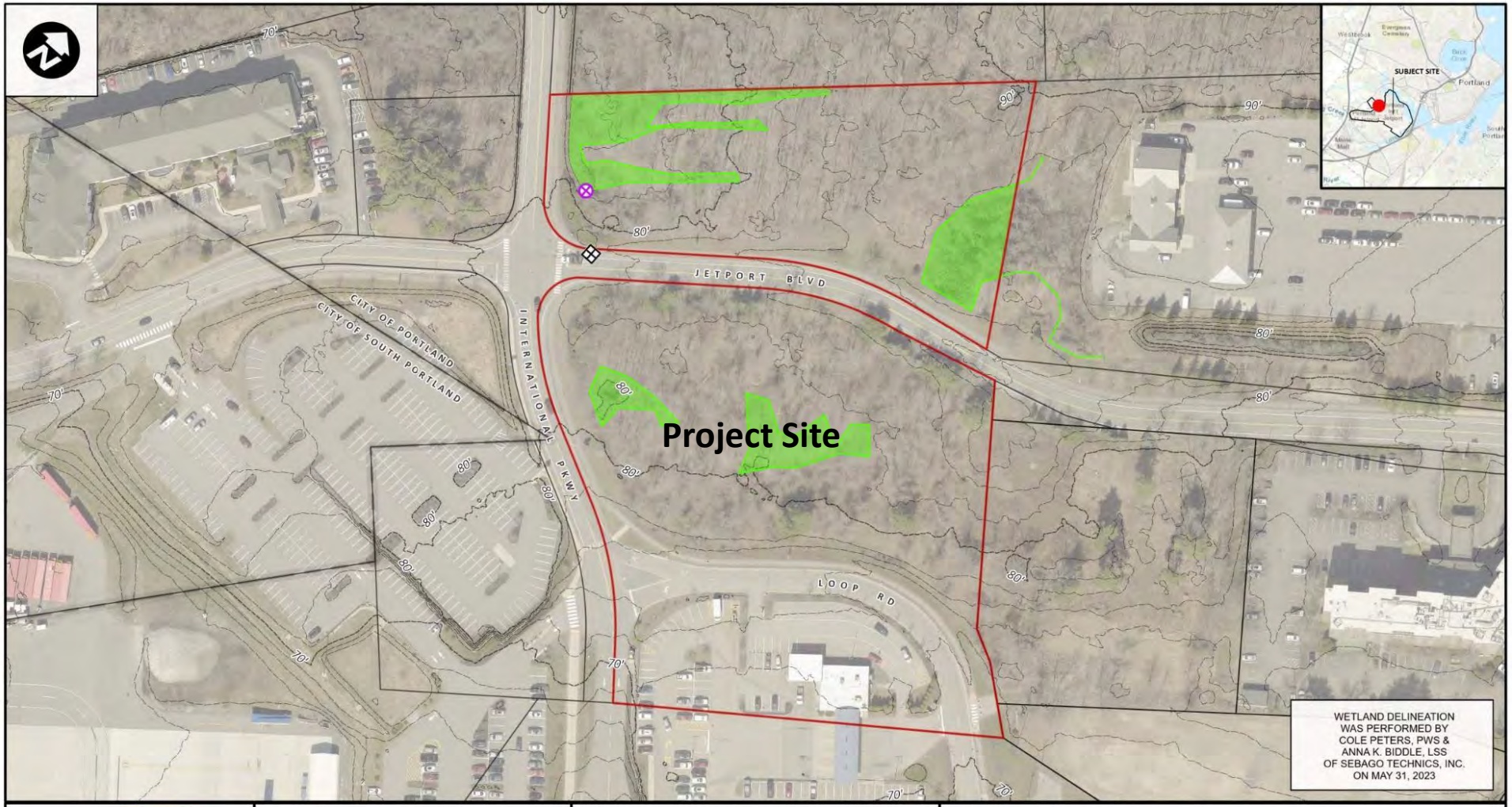
- *Two-Paved Parking Lots*
- *Reconfigures Existing Parking Lots and New Parking Lot Construction*
- *Consistent with Parking Masterplan*
- *Current Total Long -Term Parking: 3,223*
- *Displaced Parking: 402 Spaces (Valet and Cell Phone Lot)*
- *Total Parking Construction Shown: 684*
- *Net Increase: 282 Spaces*
- *56 Level 1 EV Parking*
- *141 Level 1 EV Ready*

PWM Portland International Jetport | Maine's Home Airport.

SURFACE PARKING EXPANSION PROJECT

- PARKING PLAN

Wetland Mapping



SEBAGO TECHNICS

WWW.SEBAGOTECHNICS.COM

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

0 100 200 300
Feet
1" = 100' when printed at 11 x 17

INFORMATION: MAINE GEOLIBRARY
2020 USGS LIDAR TOPOGRAPHY
2021 SPRING ORTHOIMAGERY

THIS IS NOT A BOUNDARY SURVEY.
WETLAND FEATURES WERE DELINEATED
USING GPS TECHNOLOGY CAPABLE OF SUB-METER ACCURACY.

FIGURE 1: NATURAL RESOURCES MAP

TAX MAP 210A, LOTS B-1 & A-7

LOCATION: JETPORT BOULEVARD PORTLAND, ME

DATE: 7/10/2023

PROJECT NUMBER: 19059

19059.aprx

AREA OF INTEREST (AOI)
TOWN BOUNDARY
CATCH BASIN
CULVERT OUTLET - 24" RCP
DELINEATED WETLAND BOUNDARY
WETLANDS WITHIN AOI
2' CONTOUR
10' CONTOUR

Map Projection : NAD 1983 StatePlane Maine West FIPS 1802 Feet

Portland International Jetport | Maine's Home Airport.

Wetland Mapping

8,618 S.F. of Wetland Alteration.

Questions?

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.
Land Use Code14.6.2 (A) (1) Environmental Quality Standards A. Preservation of significant natural features	All development shall preserve and protect significant natural features by incorporating them into site design.	The applicant seeks a waiver to allow for impacts to two small wetlands located within the project area.	Steps taken to minimize wetland impacts included removing the cell phone lot development area originally planned for the westerly side of Jetport Boulevard responsive to public input. During the city review process, the Jetport further modified the parking lot
Land Use Code 14.6.2 (B)(4) Landscape Preservation 4. Waiver	Where the applicant can demonstrate that preservation of existing vegetation would compromise development [...].	The applicant seeks a waiver for removal of vegetation within the parking lot area.	The vegetation removal required for the parking lot is within the area designated in the approved Master Plan for parking lot expansion. The plan has been revised to preserve vegetation near the intersection of International Parkway and

Attachment 5 Avoidance & Minimization/Alternatives Analysis

Avoidance & Minimization:

The proposed project involves the construction of a much-needed expanded parking area on the Jetport campus. The proposed project area is located within a planned area of airport facility growth as outlined in the approved airport masterplan. In siting the parking expansion, the location of existing surface lots, feasibility of use in respect to the airport layout, and proximity to abutting properties was considered. Every effort was made to avoid or minimize impacts on the natural resources located on the subject parcel. A previously developed lot is being repurposed to provide additional long-term parking. The proposed development has a robust landscaping plan to provide buffering to abutting properties and to replace diseased trees that are to be removed.

Alternatives Analysis:

The proposed project is part of the Jetports long term Sustainable Airport Master Plan. This plan was created to best meet the needs of those utilizing the airport while being compatible with the surrounding environment. For the purposes of this project three proposed action alternatives were reviewed: No Action Alternative; Alternate Location Alternative; Proposed Alternative.

No Action Alternative

The Portland Jetport is currently facing a parking crisis. There has been no substantial increase in available parking since 2012. There is insufficient parking for the number of people using the airport. This lack of parking results in people driving around the airport loop road multiple times in search of a parking space. The no action alternative is not practical. As a transportation facility serving a large demographic parking requirements for the airport must be responsive to customer needs.

Alternate Location Alternative

The applicant reviewed other potential areas on the airport campus, as well as the expansion of the airport parking garage. A parking garage expansion is not a financially practical option at this time. The number of enplanements currently and projected for the near future do not justify the cost of a parking garage expansion. Other available open space on the campus would either impact more wetlands or be sited closer to abutting residential properties. The Alternate locations alternative is not practical.

Proposed Alternative

The proposed alternative provides for parking consistent with the Jetport Parking Masterplan (attached) and is located next to the existing surface parking lot. This approach provides for an efficient means of adding surface parking to the Jetport. The parking lot will be accessed from existing roadway infrastructure and will integrate with existing surface parking and pedestrian pathways to the terminal.

The proposed alternative includes converting an existing developed area, an undeveloped area, a paved cell phone lot and a gravel valet lot, into one of the new long term parking areas.

By developing the two lots in this configuration it allows for the increased parking near the terminal building and provides for an efficient continuation of existing parking avoid fragmentation of parking while fitting appropriately within the Jetport campus.

Financial Capability

The proposed project is being funded through the Jetport unrestricted fund balance. Please see the attached letter regarding the unrestricted cash fund balance.

Portland International Jetport

Maine's Home Airport.

PAUL H. BRADBURY, P.E.
AIRPORT DIRECTOR
ZACHARY R. SUNDQUIST, A.A.E.
ASSISTANT AIRPORT DIRECTOR

February 27, 2024

Mr. Owens McCullough, PE
Senior Vice President
Sebago Technics, Inc.
75 John Roberts Road, Suite 4A
South Portland, ME 04106

Subject: Portland International Jetport Surface Parking Expansion Project Funding

Dear Mr. McCullough:

The Portland International Jetport's unrestricted cash fund balance as of June 30, 2023 (the close of its prior fiscal year) was $39.1 million. Based on the current engineering estimate of $8 million for the surface parking lot expansion the Jetport intends to fully fund this project out of its unrestricted cash reserves.

Please feel free to contact me if you have any questions or require any additional information.

Best regards,

Paul H. Bradbury, P.E.
Airport Director
Portland International Jetport

Technical Capability

The Jetport has contracted with Sebago Technics Inc. for design and permitting services.

Sebago Technics, Inc. (STI) is a multi-disciplinary engineering firm that offers a wide range of services specializing in land development, planning, permitting, and engineering design services. We maintain a staff of multi-disciplinary professionals to provide services in the areas of general civil engineering, road and utility infrastructure design, construction management, permitting, landscape architecture, soil science, wetlands science, land surveying, and environmental services. Over the years, we have found our depth of service to be a key element in meeting the customer's needs with timely and responsive services.

AMY BELL SEGAL, RLA

Senior Project Manager/Senior Landscape Architect

In the course of her 30 year career, Amy has worked on a great variety of projects in the public and private sectors across Maine and New England. Her work has included site planning, permitting and construction management for residential, commercial, institutional, and industrial properties as well as recreation, trail, and community planning. She has earned a wonderful reputation through great work, relationships and communication.

EXPERIENCE

- **Portland Tree Canopy Project, Portland, ME**: Working with Parks and Forestry Staff to plan and implement tree planting strategies to increase the canopy within Bayside and Downtown neighborhoods.
- Working with Left Turn Enterprises to develop **Lakeside Norway,** a 6-acre four season event and recreation center and new brewery for Norway Brewing Company on Lake Pennesseewassee within the Downtown Gateway Area.
- **Arthur P. Girard Columbarium Garden,Westbrook, ME:** Conceptual design through construction documentation for a 400 niche columbarium garden in Woodlawn Cemetery. The Garden includes public and veterans sections, extensive landscaping, and a pergola for outdoor funeral services.
- **Red Cross Park Renovation, Greenville, ME:** Master Plan for renovation of 6-acre park on Moosehead Lake that provides swimming and boating access. Plan includes shoreland stabilization, improved parking, accessibility, playspace, trails, and a pump track. Park applying for funding through the Land & Water Conservation Fund Grant program.
- **Evergreen Cemetery Expasion, Rangeley, ME:** Master Plan for a multi generation expansion for Town-owned cemetery. Highlights of initial phases include a 500 in ground plots, 250 cremains plots, columbarium niche walls and a gathering space that overlooks Rangeley Lake and the western mountains.

Prior to her employment with Sebago Technics, Amy's experience includes:

- **Scarborough Municipal Campus Master Plan:** Developed in collaboration with Town Staff, the Master Plan provides short, medium and long-term planning strategies for balancing future development and recreational open space needs with environmental limitations.
- **Waterfront Zoning Study, Portland, ME:** Worked with Portland Planning Dept. to develop 3D Modeling analysis, height massing study, and evaluate viewshed impacts of proposed zoning changes within the WPDZ.
- **Portland Observatory Zoning Study, Greater Portland Landmarks:** Developed 3D Modeling analysis and height massing study of potential development surrounding historic structure.
- **Tannery Site Concept Master Plan, Camden, ME:** Concept Plan to guide the redevelopment of a brownfield site into a community park with space for a farmer's market, festivals, concerts, and an adventure playground along the Riverwalk Trail and Megunticook River.
- **Bonney Park, Androscoggin Riverwalk, Riverpark, Moulton Park Rail Trail, and Little Andy Park, Auburn, ME:** A series of linked open spaces along the Androscoggin River. Design, permitting, and construction management.

EDUCATION

BSLA, Cornell University
Denmark International Study Program, 1992

REGISTRATIONS

Maine Licensed Landscape Architect #2265
CLARB Certified
Maine DOT LPA Certified 2019 - 2023

SPECIAL TRAINING

MeDEP Low Impact Development Stormwater BMP training
Courses in ADA standards, Complete Streets, Sustainable Sites (ASLA LEED equiv)

PROFESSIONAL EMPLOYMENT

2020 - Present: Sebago Technics, Inc.
South Portland, ME

1992 - 2020: TJD&A
Landscape Architects & Planners
Yarmouth, ME

1988 - 1992: Bell & Spina Architects
Camillus,NY

SEBAGO TECHNICS

OWENS A. MCCULLOUGH, PE, LEED-AP

Senior Vice President of Strategy & Client Development

Mr. McCullough joined Sebago Technics in August of 1987 and is the Senior Vice President of Strategy and Client Development. He is responsible for the overall coordination and management of engineering, quality control, budgeting, planning and providing technical assistance to project managers and technical staff. His experience includes a broad range of civil engineering projects for both public and private clients including the related disciplines of surveying and landscape architecture. Mr. McCullough oversees the project's progress and monitors budgets, schedules, and client satisfaction.

In addition to his management responsibilities, Mr. McCullough is a Senior Project Manager. He works with municipal clients on public works projects, which include engineering review services, inspections, land planning, site and civil design, solid waste transfer and disposal, street reconstruction, utility system designs, airport engineering, SLODA/NRPA Permitting, site plan reviews, design-build projects, stormwater management/erosion control, construction specifications and regulatory agency applications.

Mr. McCullough also provides technical design and project management on private sector projects to include small and large-scale retail, municipal, commercial and industrial projects. These projects involve grading/drainage and utility design, public presentations and regulatory permitting. The extent and diversity of projects that Mr. McCullough has been involved with has provided him with a well-balanced technical and working knowledge within the municipal and private sectors.

EXPERIENCE

- **Managed Three General Services Contracts** (1993–1996, 2000–2004 and 2014–current) along with project specific general consulting - City of Portland, ME.
- **Managed a General Services Contract** (1996 through 2007 and 2014 - current) - Portland International Jetport.
- **Lead Design Team & Environmental Investigations** for Baxter Boulevard North Storage Conduit Storage Project (2012-2013), a 2 Million Gallon CSO Storage Project.
- **Roadway Engineering and General Consulting** - Gorham, Casco, Portland and Raymond, ME.
- **Landfill Closings** for the Town of Raymond, Fryeburg, Gorham, Naples, Winterport and City of Portland, ME.
- **Site Feasibility Assessment, Land Planning and Regulatory Permitting** for a new marine ramp on Cliff Island in Casco Bay.
- **Lewiston Auburn Water Pollution Control Authority:** Served as owner's techincal advisor and consultant for the strategic planning and preparation of Design-Build RFP for a new 2.1 Million Gallon CSO Storage Factility.
- Led the planning, design, bidding, and construction for a new **Municipal Services Facility in the City of South Portland.**
- **City of Biddeford LAP Sidewalk Project** - Owens provided design and construction administration, and inspection services of this 0.5 ± mile sidewalk in Biddeford, ME.
- Led the planning, design, bidding, and construction for a new **Municipal Services Facility in the City of Westbrook.**
- **Led Project Team** for Investigations and regulatory coordination to secure a VRAP at the former Plan-it recycling facility in Gorham, ME.
- **Facilities Planning** - Led Team and provided consultation for evaluations of the South Portland Police Station, Hamlin School, Cash Corner Fire Station, & O'Neil Street site redevelopment.
- **Maine Turnpike Authority York Toll Plaza** (2017-2018). Led the environmental investigation and secured the Maine NRPA and USACOE Individual Permits.
- Served as an expert witness for **Portland Air Freight** during litigation and subsequently prepared corrective design plan with construction administration for a Freight Terminal Facility.
- **Back Cove South Storage CSO Facility** - Project Manager for alternative planning and preparation of a Business Case Evaluation.

CERTIFICATIONS

Maine DOT Local Project Administration Recertification, 2023

LEED Accredited Professional

EDUCATION

University of Colorado, Denver, CO
B.S., Civil Engineering, 1987

REGISTRATIONS

Professional Engineer: Maine #7122

LEED Accredited Professional

MEMBERSHIPS

ACEC Maine – Board of Directors
President (2016-2017)
National Director 2018-2019

Rotary International

American Society of Civil Engineers

Former – Town of Gorham, Maine, Appeals Board, Member and Chairman

Former - Town of Limington, Maine, Planning Board, Member and Chairman

MEREDA Public Policy Committee

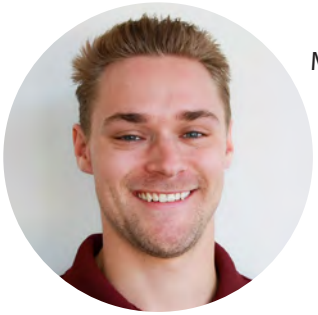
RECOGNITION

2013 ACEC Engineering Excellence Award, Baxter Boulevard South Storage Conduit

SEBAGO TECHNICS

TANNER F. GOODINE, EI

Civil Engineer



Mr. Goodine joined Sebago Technics, Inc., (STI) in March of 2021. Tanner graduated from the University of Maine with a degree in Civil Engineering. He has experience in construction with the Lane Corporation and in project design and inspection with Walsh Associates. He has served as a Resident Project Representative, permitted and designed projects and performed surveys using GPS. While at Sebago Technics, Tanner has served as a full-time construction inspector, performed erosion control inspections in both Maine and New Hampshire, and helped with design while not in the field.

EXPERIENCE

Bowdoin College Athletic Fields – Brunswick, ME – The project, situated in the Mare Brook Watershed in Brunswick—an Urban Impaired Watershed—involved three artificial turf fields and two natural grass fields. As the lead engineer on the project, Tanner oversaw site grading beyond the field boundaries, as well as stormwater design, and federal, state, and local permitting. This resulted in the three turf fields serving as self-treating BMPs, along with a 33,000 sq ft. subsurface stormwater detention and treatment system. The stormwater design met the Urban Impaired Stream Standard set by Maine DEP, and it even generated an excess of credits, signifying that the project not only met but exceeded expectations, further enhancing the quality of life in the watershed.

Portland Transportation Center Parking Lot Reconstruction & Stormwater Improvements – Full-time resident inspections and construction administration for the construction of a 3-acre parking lot and 17,000 square foot subsurface sand filter stormwater system along Thompson's Point in Portland, ME.

Boothbay Harbor Route 27 Sidewalk – Full-time resident inspections on a Locally Administered Project (LAP) of the construction of approximately 0.25 miles of paved sidewalk extension on Route 27 in Boothbay Harbor, ME.

Somerset Street & Kennebec Street Redesign, Portland, ME – Provided full-time resident inspections and construction administration for both the Somerset Street & Kennebec Street redevelopment projects for the City of Portland, ME.

3rd Party Inspections & Town Engineer Reviews for Wells, Cape Elizabeth, and Rye, NH – Performed weekly construction inspections as a third-party reviewer for Maine DEP to inspect stormwater and erosion control measures as well as performed engineering peer reviews for the Towns of Wells and Cape Elizabeth, ME, and Rye, NH.

Clifford Park, Boothbay, ME – Designed and provided construction administration for the redevelopment of a municipal park and three sports fields in Boothbay, ME. The project provided the area with an updated little league field, two multi-purpose recreational fields, stormwater and municipal utility improvements.

Shawnee Peak Parking Development – Provided engineering design and construction administration for the construction of a 2-acre parking lot and two underdrained soil filters in a critical watershed in Bridgton, ME.

EDUCATION

University of Maine - Orono, ME
B.S., Civil Engineering
2020

CERTIFICATIONS

Erosion and Sediment Control Certification Program

Local Project Administration (LPA)

OSHA-10

SEBAGO TECHNICS

Impact on Surrounding Street Systems 14-14.6.1 (A)

The proposed project will not create or aggravate any significant hazard to safety on the surrounding street network nor will it substantially increase congestion on any street which is already at a level of service below Level “D”. In designing the proposed layout of the project considerable attention has been placed on vehicular circulation and possible impacts to the surrounding area.

The proposed project involves the construction of 240,000 s.f. of additional parking within the Jetport campus to better serve the current customers.

Access and Circulation 14-14.6.1 (B)

1. *In general*

    a. The proposed project involves the development of a new surface parking lot to service the existing users of the Portland Jetport. The additional parking area has been designed to work within the existing internal vehicular circulation of the Jetport campus.

    b. The proposed development site is partially comprised of an undeveloped area, an existing paved lot, and an existing gravel lot located in the Jetport campus. The proposed project will result in improvements to campus parking and has been designed to have sidewalks that connect to existing sidewalks to allow for better pedestrian circulation to and from the main terminal building.

    c. All points of access and egress to the parking lot have been located to avoid conflicts with existing turning movements and traffic flows.

2. *Loading and servicing*
   Not applicable. The proposed project involves the construction of a surface parking lot.

3. *Curb and sidewalks*
   The proposed project site has been designed to include sidewalks. All proposed improvements will be designed based to the standards of the City Technical Manual.

   Please see the plan set for more detailed information regarding vehicular and pedestrian circulation.

Public Transit 14-14.6.1(C)

1. A transit shelter is not required.

   The proposed surface lot is to be located within the existing Portland Jetport campus which has a bus stop located at the Ground Transportation Booth near the airport baggage claim. The proposed surface lot will be utilized by Jetport customers who arrive at the site via car. The lot will not be utilized by mass transit users; therefore an additional transit shelter is not being proposed.

2. Not applicable

Off-Street Parking 14-14.6.1 (D)

1. *Vehicular Parking:* The proposed project involves the construction of a surface parking lot which will provide 684 parking spaces. All parking will be designed in accordance with the requirements outlined in the city code. Please refer to the plan set for parking layout information.

Existing Surface Parking (Provided by Standard Parking)

Parking Garage Long Term	1,993 spaces
Pink Lot	483 spaces
Surface Long Term	345 Spaces
Sub-total	**2,821 spaces**
Valet Parking	300 spaces
Cell Phone Lot	102
Total w/ Valet Parking	**3,223 with Vallet Parking**

New Built Condition Parking Summary

Parking Garage Long Term	1,993 spaces
Pink Lot	483 spaces
Surface Long Term	345 Spaces
Sub-total	**2,821 spaces**
New Long-Term Parking including displaced Valet Parking	684 spaces
Total	**3,505**
Net Increase	**282 Spaces**

2. *Bicycle Parking:* No additional bicycle racks are proposed with these improvements. The Jetport has a designated area for bicycle parking located on the north and south ends of the terminal.

3. *Snow Storage:* The proposed project is located on the Portland Jetport campus which has an existing snow removal plan. Snow storage areas have been provided on the plans. Sidewalks will be cleared of snow in accordance with the Jetport maintenance plan.

4. *Electric Vehicle charging:* The applicant proposes to provide EV charging stations within the existing airport parking garage and to construct the new surface lot to be EV ready along the perimeter parking spaces of the two lots.

EV parking requirements for the site:

20% EV = 56 spaces

50% capable = 141 spaces

The applicant has requested a waiver for the Level 2 requirement as outlined in the Technical Manual, as the lots are to be utilized for long-term parking therefore making a Level 1 charging station more appropriate.

Waiver Request

The applicant requests a waiver from the Portland Technical Manual *Transportation Systems, 1.14 Electric Vehicle Infrastructure* standard:

> *New structured and surface parking lots of five or more spaces shall include energized electrical outlets or installed chargers capable of providing Level 2 EV charging or higher to 20% of parking spaces (rounded down to the nearest whole number). An additional 50% of spaces must be made EV-ready, meaning that they are served by sufficient conduit and electrical service to allow for future installation of electric vehicle supply equipment at every space.*
>
> *An applicant may request a reduction in the number of required EV-installed or EV ready parking spaces if Level 3 EV charging is proposed. In this case, spaces served by Level 3 charging may be substituted for Level 2 at a ratio to be determined in consultation with the Department of Public Works.*
>
> *In the case of new structured and surface parking of greater than 100 spaces, the review authority may establish the EV parking requirements on the basis of an EV parking demand study. Such study shall be prepared by a qualified professional using industry best practice, and account for future growth in EV demand.*

The applicant is proposing to meet the number of EV ready and capable sites as outlined in the Technical Manual but is requesting a waiver of the charger level (Level 1 chargers instead of Level 2). The proposed project involves the construction of a surface lot for long-term parking; therefore, Level 1 charging capability is more appropriate for the use.

Charging Levels

EV charging stations fall into three level categories: Level 1, 2, and 3.

Level 3 Charging: Level 3 stations will charge a vehicle from empty in a short period of time. The charge time typically ranges from 20-40 mins with some variability depending on the charger and vehicle manufacturer. This level of charger is often found at shopping centers, rest stations, and privately owned pay-to-park parking lots. These are more costly charging stations to install and supply power to.

Level 2 Charging: Level 2 chargers will charge a vehicle from empty in approximately 10-12 hours (depending on charger and vehicle manufacturer). This level of charger is often utilized by private residences and train or bus stations, where people might leave their car for the day.

Level 1 Charging: Level 1 chargers will charge a vehicle from empty in approximately 24-50 hours (depending on charger and vehicle manufacturer). This level of charger is utilized for residential use and in situations where there is more time available for vehicle charging.

Level 1 charging is well suited to the business and vacation travel patterns that exist at an airport. Given the nature of how parking is utilized at the airport (primarily multi-day stays*), level 2 and 3 chargers are not as practical. The level 1 charger will serve the needs of the airport users as well as provide a cost-effective means for the airport to provide greater coverage of this amenity.

**For example, the average duration of parking stay at the airport in September 2023 was 4.25 days (per Michael Collins of SP Plus parking)*

EV Charger Availability Regionally

The Portland International Jetport is committed to sustainable practices and providing environmentally friendly services to airport customers. Understanding how EV chargers are best utilized and being able to provide this service without causing an unnecessary financial burden on the taxpayers of the City of Portland was an important part of the design process of the proposed parking expansion. The incorporation of EV chargers in developments is relatively new. Research of the subject found no suitable studies that discuss EV charger availability and use at airports; therefore, STI conducted a review of similarly sized airports within the surrounding region to provide a frame of reference of existing industry standards. A review of eight airports was completed: Bangor International Airport; Manchester-Boston Regional Airport; Portsmouth International Airport (at Pease); Bradley International Airport; Rhode Island T.F. Green International Airport; Patrick Leahy Burlington International Airport; and Cape Cod Gateway Airport.

Review of these airports found that the majority had very few EV charging stations (0-2) and these stations were located primarily in hourly parking areas or in cell phone lots (see Table 1). There were two airports that had between 15 – 17 charging stations: Rhode Island (17) and Burlington (15). One of these (Rhode Island) relied on a third-party parking provider located abutting the airport for all but one of these stations. The number of EV chargers and EV ready stations that are proposed for this project far exceeds what is provided at any of the similarly sized airports in the northeast. The proposed project will position the Jetport well ahead of area airports as being prepared for any future increase in EV use by the public.

Table 1. EV Availability

Airport	EV Stations**
Portland International Jetport	Existing: 12 (4 Level 2 in short term, 8 level 1 in long term) Proposed: 56 chargers/141 EV ready
Bangor International	0
Manchester-Boston Regional	2 (short term/hourly parking)
Portsmouth International	0
Bradley International	0 (long term/short term) 2 stations in cell phone lot (must stay with car)
Rhode Island T.F. Green International	17 (16 in privately owned parking garage next to airport utilized for overflow/1 in short term parking)
Patrick Leahy Burlington International	15 (in garage long term/short term parking – stations may have penalty for long term use)
Cape Cod Gateway	0 (In the process of obtaining funding)

***A review of each airport website for parking information was completed and confirmation via phone was completed.*

EV Charging Nationally

The U.S. Department of Energy – Efficiency and Renewable Energy maintains a national database of Electric and Plug-in Hybrids Nationally State by State. The most recent data (2022 from USDOE) identifies Maine as having 0.4% of all registered vehicles being electric and 0.5% of all registered vehicles comprised of Plug in Hybrids. The aggregated total is 0.9% of all registered vehicles. On a percentage basis the Jetport is proposing to provide 20% EV Level 1 and 50% EV ready, vastly exceeding the current volumes providing capacity to accommodate growth over time.

Parking Use

The yearly increase in enplanements at the Jetport speaks to the need for an increase in parking availability. Review of the average duration of these trips shows how parking is utilized and reinforces Level 1 chargers as being the more suitable choice. Over the last 6 years, even with the impacts to travel as a result of covid, the number of enplanements has increased (see Table 2)

Table 2. Enplanements

Year	Total Enplanements
2018	1,073,567
2019	1,094,038
2020	397,242
2021	857,312
2022	999,130
2023	1,109,037
2024(Jan-June)	472,137 (extrapolating using July-December 2023 1,150,096)

Review of past years by SP Plus parking found that there has also been an increase in the duration of stays for those using the Jetport parking areas. In September of 2019 the average stay was 3 days 22 hours. In September of 2023 the duration had increased 8 hours to an average 4 days 6 hours.

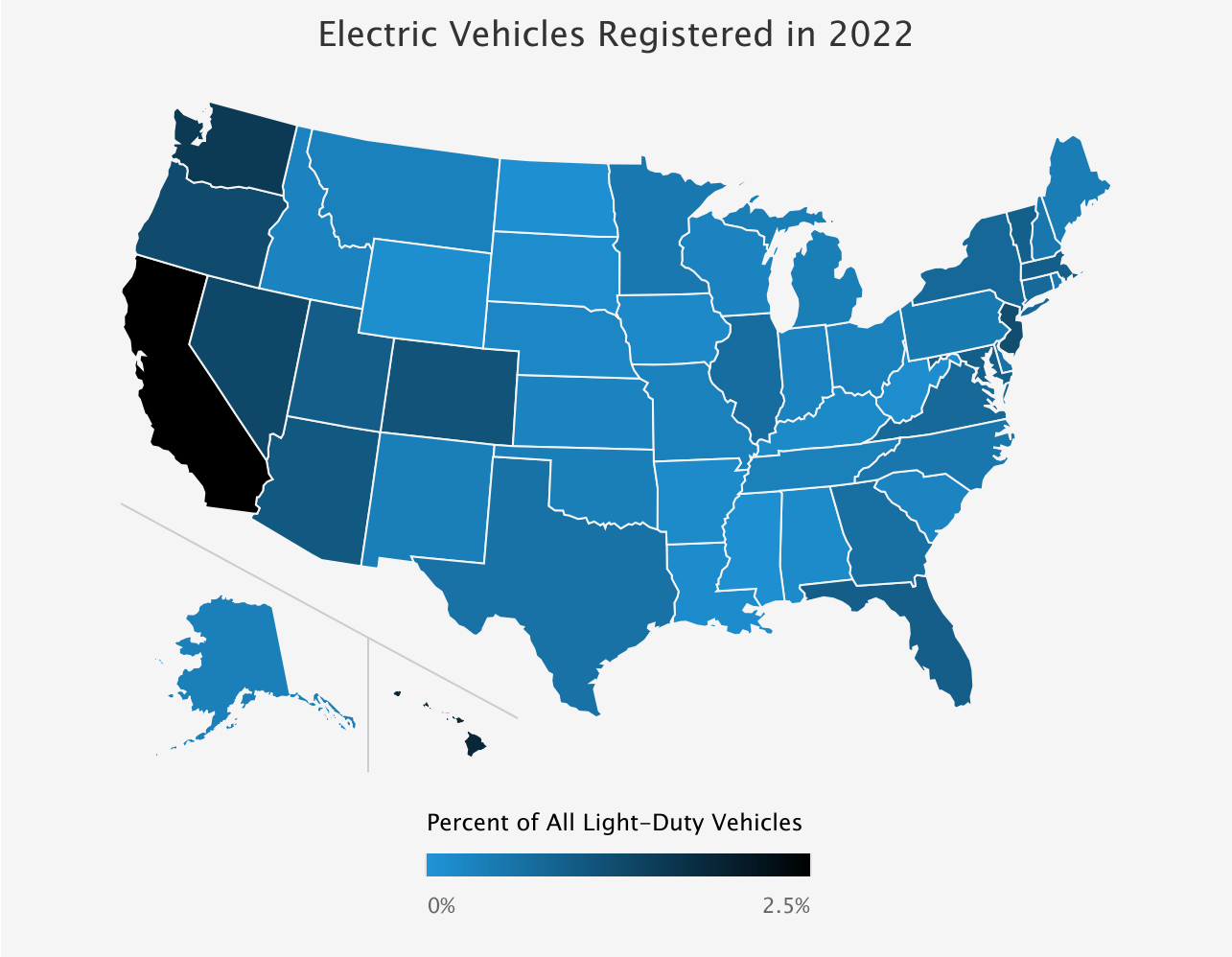
In support of the waiver, the Jetports Parking Manager (SP Parking) tracks parking data at the Jetport. Attached is a spreadsheet provided SP Parking that includes data on the length of stays the Jetport based on transaction. The length of stay longer than 24 hours is 93.23% of the parking transactions. Given that more than 90% are staying 24 hours or longer, the data reinforces the approach of installing Level 1 charges given the length of stay.

TransAtlas

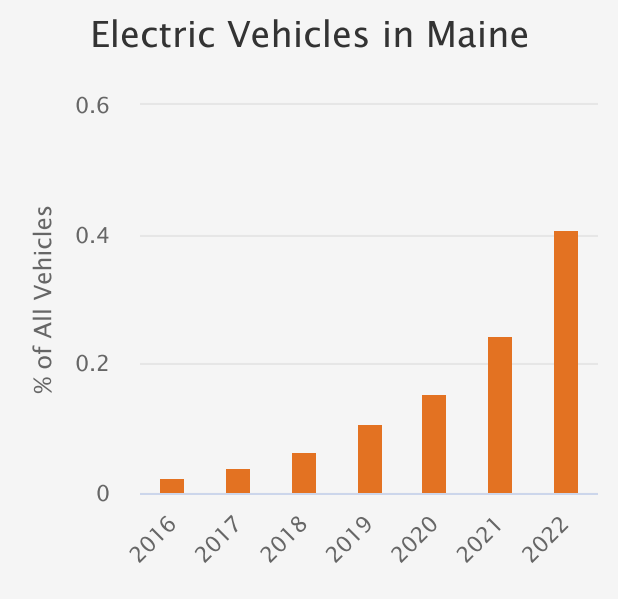
This map shows the density of light-duty vehicles per state based on registration counts derived by the National Renewable Energy Laboratory with data from Experian Information Solutions. Counts are rounded to the closest 100 vehicles and reflect the total number of light-duty registered vehicles through the selected year. Fuel types are based on vehicle identification numbers (VINs), which do not reflect aftermarket conversions to use different fuels or power sources.

For a table of this data comparing state counts by fuel type, see Vehicle Registration Counts by State (/vehicle-registration). For related fueling infrastructure, see the Alternative Fueling Station Locator (/stations/) and the Station Counts by State (/stations/states) page.

2022 | **Electric Vehicles**



Maine



○ Vehicle Count ◉ Market Share ○ Population

(mailto:technicalresponse@icf.com) **Need project assistance?**
Email the Technical Response Service (mailto:technicalresponse@icf.com) or call 800-254-6735 (tel:800-254-6735)

The AFDC is a resource of the U.S. Department of Energy's Vehicle Technologies Office (https://energy.gov/eere/vehicles/technology-integration).

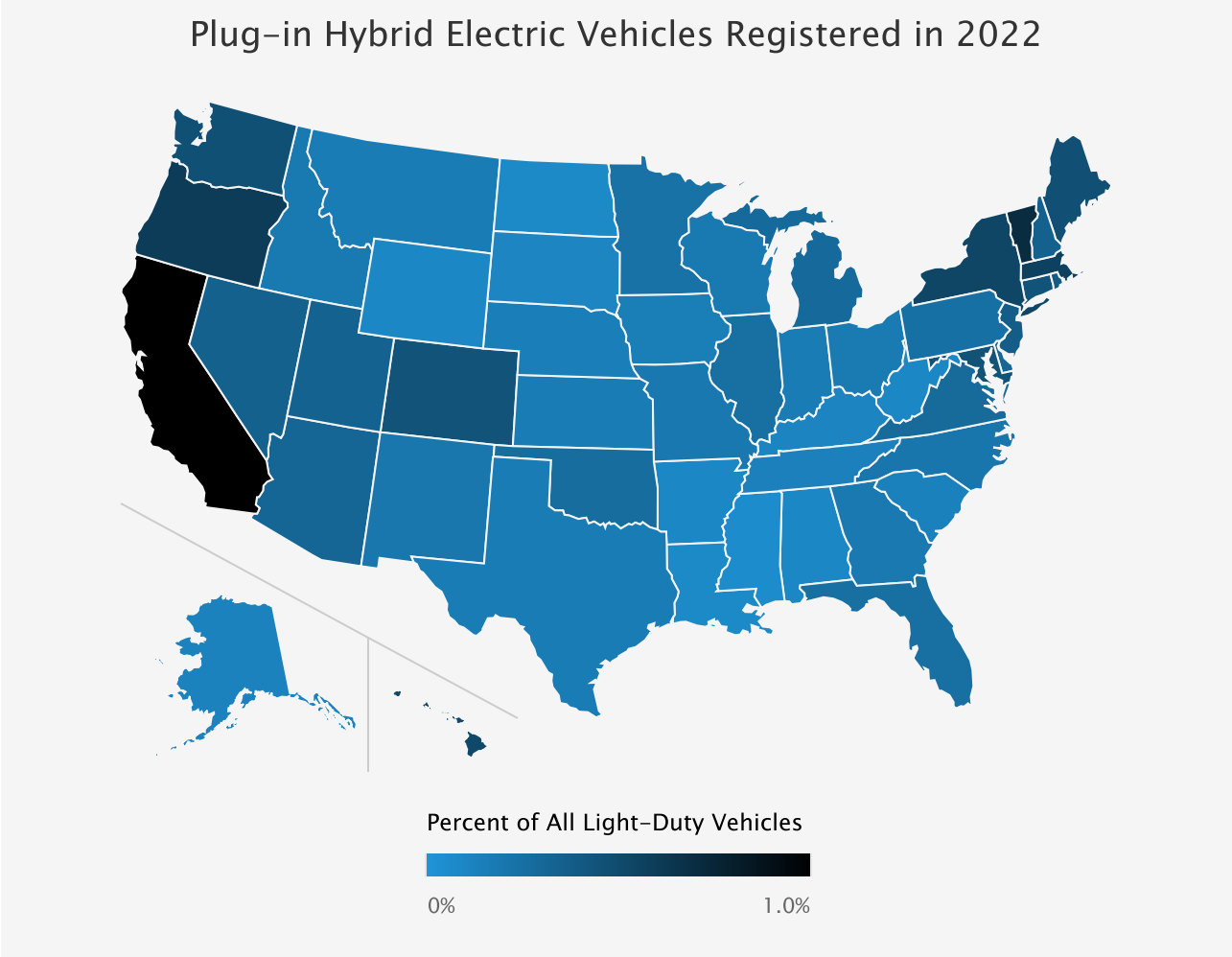
Contacts (/contacts.html) | Web Site Policies (https://energy.gov/about-us/web-policies) | U.S. Department of Energy (https://energy.gov) | USA.gov (https://www.usa.gov)

TransAtlas

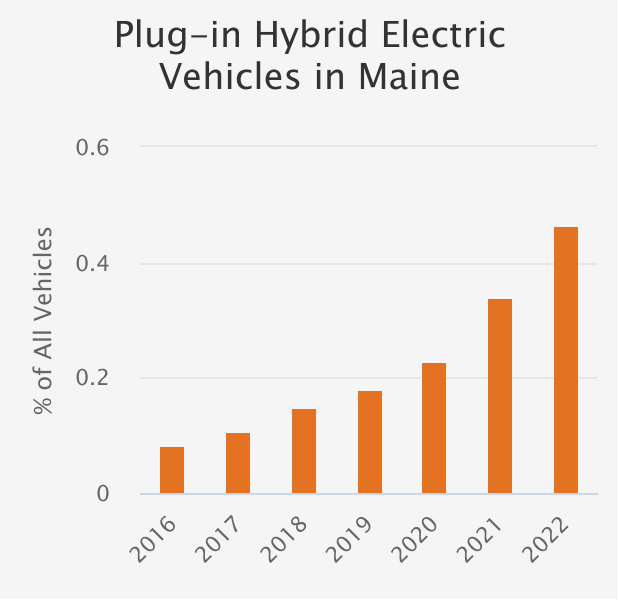
This map shows the density of light-duty vehicles per state based on registration counts derived by the National Renewable Energy Laboratory with data from Experian Information Solutions. Counts are rounded to the closest 100 vehicles and reflect the total number of light-duty registered vehicles through the selected year. Fuel types are based on vehicle identification numbers (VINs), which do not reflect aftermarket conversions to use different fuels or power sources.

For a table of this data comparing state counts by fuel type, see Vehicle Registration Counts by State (/vehicle-registration). For related fueling infrastructure, see the Alternative Fueling Station Locator (/stations/) and the Station Counts by State (/stations/states) page.

2022 | Plug-in Hybrid Electric Vehicles



Maine



○ Vehicle Count ◉ Market Share ○ Population

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Contacts (/contacts.html) | Web Site Policies (https://energy.gov/about-us/web-policies) | U.S. Department of Energy (https://energy.gov) | USA.gov (https://www.usa.gov)

DURATION OF STAY REPORT

Facilities: (DEFAULT)
Fee Computers, Auto Pay Stations, Opus Express Parc

From: 01/01/2024 00:01
To: 06/30/2024 23:59

Rate = '4'
or Rate = '5'

Printed on 08/21/2024 13:49

TRANSIENT ACTIVITY

Time Categories								
From	To	Transactions	% of Total Transactions	Total Net Amount	% of Total Amount	Average Net Ticket Value	Test Ticket Amount	Projected Ticket Total
0 hr -	0 hr 30 mn	7	0.01%	$0.00	0.00%	$0.00	$0.00	$0.00
0 hr 30 mn -	1 hr	4	0.01%	$0.00	0.00%	$0.00	$0.00	$0.00
1 hr -	1 hr 30 mn	260	0.33%	$723.00	0.01%	$2.78	$0.00	$0.00
1 hr 30 mn -	2 hr	246	0.31%	$926.00	0.02%	$3.76	$0.00	$0.00
2 hr -	2 hr 30 mn	209	0.26%	$960.00	0.02%	$4.59	$0.00	$0.00
2 hr 30 mn -	3 hr	169	0.21%	$976.00	0.02%	$5.78	$0.00	$0.00
3 hr -	4 hr	305	0.39%	$2,171.00	0.04%	$7.12	$0.00	$0.00
4 hr -	5 hr	245	0.31%	$2,240.00	0.04%	$9.14	$0.00	$0.00
5 hr -	6 hr	247	0.31%	$2,758.00	0.05%	$11.17	$0.00	$0.00
6 hr -	7 hr	223	0.28%	$2,957.00	0.05%	$13.26	$0.00	$0.00
7 hr -	8 hr	258	0.33%	$3,552.00	0.07%	$13.77	$0.00	$0.00
8 hr -	9 hr	212	0.27%	$2,845.00	0.05%	$13.42	$0.00	$0.00
9 hr -	10 hr	202	0.26%	$2,737.00	0.05%	$13.55	$0.00	$0.00
10 hr -	11 hr	162	0.20%	$2,143.00	0.04%	$13.23	$0.00	$0.00
11 hr -	12 hr	202	0.26%	$2,848.00	0.05%	$14.10	$0.00	$0.00
12 hr -	13 hr	260	0.33%	$3,667.00	0.07%	$14.10	$0.00	$0.00
13 hr -	14 hr	247	0.31%	$3,469.00	0.06%	$14.04	$0.00	$0.00
14 hr -	15 hr	186	0.24%	$2,621.00	0.05%	$14.09	$0.00	$0.00
15 hr -	16 hr	157	0.20%	$2,224.00	0.04%	$14.17	$0.00	$0.00
16 hr -	24 hr	1,554	1.96%	$21,916.00	0.40%	$14.10	$0.00	$0.00
24 hr -	36 hr	3,338	4.22%	$87,145.00	1.61%	$26.11	$0.00	$0.00
36 hr -	48 hr	4,010	5.07%	$112,956.00	2.08%	$28.17	$0.00	$0.00
48 hr -	60 hr	6,971	8.81%	$274,845.00	5.07%	$39.43	$0.00	$0.00
60 hr -	72 hr	6,424	8.12%	$271,140.00	5.00%	$42.21	$0.00	$0.00
72 hr -	84 hr	8,842	11.17%	$469,213.00	8.65%	$53.07	$0.00	$0.00
84 hr -	96 hr	7,055	8.91%	$396,704.00	7.31%	$56.23	$0.00	$0.00
96 hr -	108 hr	6,964	8.80%	$467,308.00	8.61%	$67.10	$0.00	$0.00
108 hr -	120 hr	5,436	6.87%	$382,055.00	7.04%	$70.28	$0.00	$0.00
120 hr -	132 hr	3,735	4.72%	$304,057.00	5.60%	$81.41	$0.00	$0.00
132 hr -	144 hr	3,225	4.07%	$271,734.00	5.01%	$84.26	$0.00	$0.00
144 hr -	156 hr	2,188	2.76%	$208,981.00	3.85%	$95.51	$0.00	$0.00
156 hr -	168 hr	2,099	2.65%	$206,444.00	3.81%	$98.35	$0.00	$0.00
168 hr -	180 hr	2,743	3.47%	$295,789.00	5.45%	$107.83	$0.00	$0.00
180 hr -	192 hr	2,708	3.42%	$304,042.00	5.60%	$112.28	$0.00	$0.00
192 hr -	999 hr	8,049	10.17%	$1,310,616.00	24.16%	$162.83	$0.00	$0.00
	Totals	**79,142**	**100.00%**	**$5,424,762.00**	**100.00%**	**$68.54**		**$0.00**

DURATION OF STAY REPORT

Facilities: (DEFAULT)

From: 01/01/2024 00:01
To: 06/30/2024 23:59

Printed on 08/21/2024 13:49

CONTRACT ACTIVITY

Time Categories			% of Total
From	To	Transactions	Transactions
0 hr -	0 hr 30 mn	17,813	18.44%
0 hr 30 mn -	1 hr	5,831	6.04%
1 hr -	1 hr 30 mn	4,077	4.22%
1 hr 30 mn -	2 hr	3,056	3.16%
2 hr -	2 hr 30 mn	3,038	3.15%
2 hr 30 mn -	3 hr	2,745	2.84%
3 hr -	4 hr	5,700	5.90%
4 hr -	5 hr	6,388	6.61%
5 hr -	6 hr	5,327	5.51%
6 hr -	7 hr	4,702	4.87%
7 hr -	8 hr	4,340	4.49%
8 hr -	9 hr	11,904	12.32%
9 hr -	10 hr	8,157	8.44%
10 hr -	11 hr	5,128	5.31%
11 hr -	12 hr	2,349	2.43%
12 hr -	13 hr	1,109	1.15%
13 hr -	14 hr	565	0.58%
14 hr -	15 hr	439	0.45%
15 hr -	16 hr	227	0.24%
16 hr -	24 hr	602	0.62%
24 hr -	36 hr	265	0.27%
36 hr -	48 hr	204	0.21%
48 hr -	60 hr	332	0.34%
60 hr -	72 hr	311	0.32%
72 hr -	84 hr	372	0.39%
84 hr -	96 hr	222	0.23%
96 hr -	108 hr	270	0.28%
108 hr -	120 hr	150	0.16%
120 hr -	132 hr	145	0.15%
132 hr -	144 hr	116	0.12%
144 hr -	156 hr	129	0.13%
156 hr -	168 hr	80	0.08%
168 hr -	180 hr	70	0.07%
180 hr -	192 hr	48	0.05%
192 hr -	999 hr	381	0.39%
	Totals	**96,592**	**100.00%**

DURATION OF STAY REPORT

Facilities: (DEFAULT)

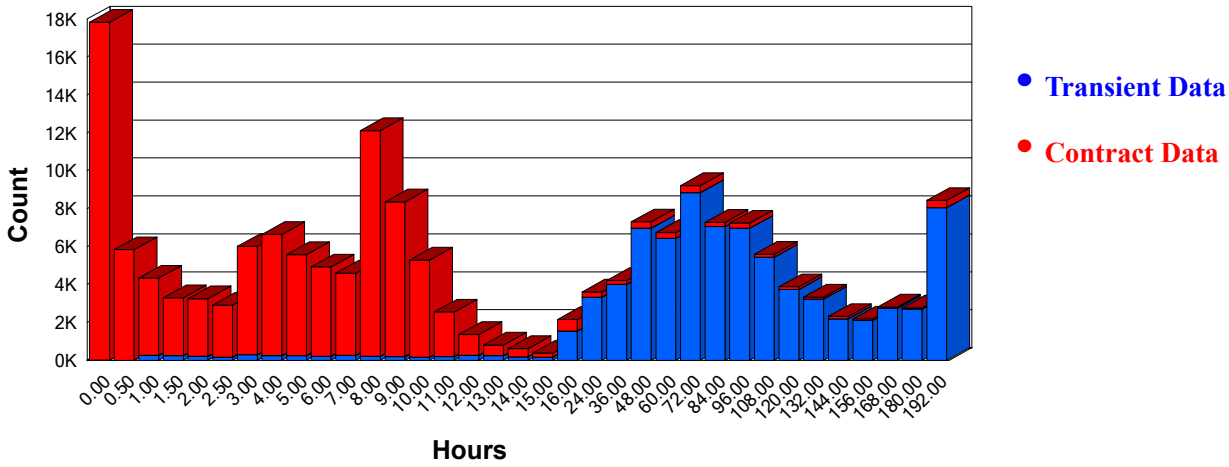
From: 01/01/2024 00:01
To: 06/30/2024 23:59

Rate = '4'
or Rate = '5'

Printed on 08/21/2024 13:49

Duration of Stay Graph

Based on Report Categories



Preservation of Significant Natural Features 14-14.6.2(A)

The project site does not include any significant natural features. The proposed project area is comprised of existing gravel and bituminous parking areas and a previously undeveloped area of the Portland Jetport campus. The project will result in approximately 8,618 sf of wetland impacts.

Please see the attached wetlands report and the plan set for the existing conditions plan.

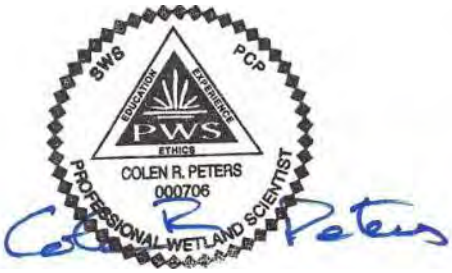
Wetland Delineation

To: **Owens McCullough, P.E. Project Manager**

From: **Cole Peters, PWS**

Date: **July 10, 2023**

Project: **19059- Portland Jetport Parking Expansion**



A field delineation of jurisdictional wetlands has been completed at the Portland International Jetport on both sides of Jetport Boulevard, northeast of International Parkway (Figure 1). The Federal Emergency Management Agency (FEMA) has prepared Flood Insurance Rate Maps (FIRM) for this part of Portland (Community Panel Number 230051 0012C, effective date 12/8/1998). No part of the area reviewed occurs within a FEMA designated 100-year floodplain (Zone A, AE). The City of Portland Zoning Map (June 24, 2022) identifies the area including the Site as the Airport Business (AB) District and no part of the area reviewed is subject to the City's Shoreland Zoning Ordinance.

Wetland Delineation:

Wetland boundaries were delineated at the Site by Cole Peters, PWS, and Anna Biddle, LSS, on May 31, 2023 with sequentially numbered pink flagging. The flagging was then located with a sub-meter accuracy global position system (GPS) unit to depict these boundaries on Figure 1.

Evidence indicative of wetland from three parameters – vegetation, soils and hydrology – was used to identify and delineate the wetlands in accordance with the 1987 *US Army Corps of Engineers Wetland Delineation Manual* and the subsequent *Regional Supplement to the US Army Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (January 2012). With the exception of unusual or atypical situations, evidence of wetland must be exhibited by all three parameters for an area or position to be designated as wetland. Characteristics of the delineated wetland are described below.

The freshwater wetland community on the Site is dominated by trees and shrubs that include: red maple (*Acer rubrum*), speckled alder (*Alnus incana*), arrowwood (*Viburnum recognitum*), glossy buckthorn (*Frangula alna*), and winterberry holly (*Ilex verticillata*). In open areas and the herbaceous understory are: meadowsweet (*Spirea latifolia*), bluejoint (*Calamagrostis canadensis*), tussock sedge (*Carex stricta*), and royal, cinnamon and sensitive ferns (*Osmunda regalis, Osmumdastrum cinnamomeum*, *Onoclea sensibilis*). All of these plants are identified as "Obligate" (OBL), "Facultative Wetland" (FACW) or "Facultative" (FAC) indicators of wetland by the 2016, *State of Maine National Wetland Plant List* prepared by the US Army Corps of Engineers and are therefore hydrophytes.

Dominant vegetation throughout upland areas of the Site consists of: white pine (*Pinus strobus,*), northern red oak (*Quercus rubra*), trembling aspen (*Populus tremuloides*), Tatarian honeysuckle (*Lonicera tatarica*), Japanese barberry (*Berberis thunbergii*), multiflora rose (*Rosa multiflora*), and bracken fern (*Pteridium aquilinum*). All of these plants are classified as "Facultative Upland" (FACU) or are not indicative of wetland, and when in predominance are indicative of upland.

The medium intensity soil survey prepared by the USDA Natural Resource Conservation Service (NRCS) indicates the poorly drained Swanton (Sz) Series occurs beneath wetlands delineated at the Site. The fine sandy loam of the Sz Series is designated as hydric and indicative of wetlands. A hand auger was also used to evaluate soils in areas delineated as wetlands. At sampling locations in areas dominated by hydrophytes, characteristics were representative of hydric soil indicator criteria F3: Depleted Matrix.

Hydrology is considered to be the "*driving force*" of wetlands (Mitch and Gosselink, 1986) and inherently is responsible for the adaptation of certain vegetation (hydrophytes) and the development of specific soil characteristics (hydric) indicative of wetlands. At the time of the survey, evidence of wetland hydrology observed at the Site included: localized standing water, saturated soils, sediment deposits, water-stained leaves, and drainage patterns indicative of wetlands.

The National Wetland Inventory (NWI) makes use of *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et. al, 1979) to differentiate types of wetlands. With this system, freshwater wetlands are classified based on dominant plant type as: Palustrine Forested (**PFO**), Palustrine Scrub-Shrub (**PSS**), Palustrine Emergent (**PEM**), Palustrine Open Water (**POW**), or Palustrine Unconsolidated Bottom (**PUB**). Wetlands classified by this system as PFO or PSS are more commonly known of as swamps whereas PEM typically represent marshes or meadows. POW and PUB generally lack vegetation and correspond to pond.

On the southeast side of Jetport Boulevard, deciduous trees generally dominate the two small isolated areas of deciduous forested wetlands (Photos 1, 2) (Figure 1) that are designated as PFO1 by the NWI Classification System. PFO1 wetland also occurs on the opposite side of Jetport Boulevard along International Parkway (Photo 3). The narrow, linear, parallel configuration of wetland indicate it was previously ditched, potentially for agriculture. Another area of wetland to the northeast borders the landscaped edge of Jetport Boulevard and extends onto adjoining property to the north (Photo 4). The wetland is dominated by a mixture of deciduous trees and shrubs designated by NWI as PFO1/PSS1. Based on depth, water near Jetport Boulevard in this wetland is likely to be permanent, potentially due to the absence of a drainage outlet.

Vernal Pools:

Vernal pools (**VP**s) are defined by the Maine Department of Environmental Protection (MDEP) as: "*a natural, temporary to semi-permanent body of water occurring in a shallow depression that typically fills during the spring or fall and may dry during the summer. Vernal pools have no permanent inlet or outlet and no viable populations of predatory fish*" (Chapter 335 §9). "Significant vernal pools" (**SVP**s) are recognized by the presence of fairy shrimp (*Eubrandhipus* spp.), or more than 40 wood frog (*Rana sylvatica*) egg masses or at least 10 blue spotted salamander (*Ambystoma laterale*) or 20 spotted salamander (*A. maculatum*) egg masses. VPs documented to be used by state-listed rare, endangered, or threatened species such as Blanding's turtles (*Emydoidea blanddingii*), spotted turtles (*Clemmys guttata*), ringed boghaunter dragonflies (*Williamsoni linterni*), Eastern ribbon snakes (*Thamnophis sauritus*), wood turtles (*Clemmys insculpta*), four-toed salamanders (*Hemidactylium scutalum*), swamp darner dragonflies (*Epiaeschna heros*), and comet darner dragonflies (*Anax longipes*), are also considered to be SVPs (Ch 335 §9B 1-4).

Under the provisions of Section 404 of the federal Clean Water Act, the US Army Corps of Engineers (USACE) regulates activities in "*waters of the United States"* including VPs, which are defined by the USACE New England District in the State of Maine General Permit (GP, reissued on October 14, 2020). The NED definition, while very similar to MDEP's, does not reference "natural" and does not recognize

or differentiate SVPs based on number of indicator species egg masses. Instead, the GP definition states: "*VPs are depressional wetland basins that typically go dry in most years and may contain inlets or outlets, typically of intermittent flow. Vernal pools range in both size and depth depending on landscape position and parent material(s). In most years, VPs support one or more of the following obligate species: wood frog (Rana sylvatica), spotted salamander (Ambystoma maculatum), blue spotted salamander (A. laterale) fairy shrimp (Eubrandhipus* spp.). *However, they should preclude sustainable populations of predatory fish."*

West of Penobscot Bay and southward from Augusta to Fryeburg, the Maine Department of Inland Fisheries and Wildlife (MDIFW) recommends evidence of VP indicator species egg masses be observed on separate dates during periods established for wood frogs (April 10th to April 25th) and spotted salamanders (April 20th to May 10th). Potential vernal pools (**PVP**s) can be identified outside (before/after) the recommended survey period, but are not necessarily indicative of regulatory jurisdiction. During the recommended survey periods VP and SVP characteristics are to be documented on MDIFW data forms and located with submeter accuracy GPS in order to identify the portion of Critical Terrestrial Habitat (**CTH**) within 250 feet around an SVP referred to as *Significant Vernal Pool Habitat* (**SVPH** Ch 335 §9A (7)).

Vernal pool surveys were conducted at the Site on April 11, and 23, 2023. Depressions do not occur in the three areas of PFO1 wetland for ponding of surface water to a depth and duration that is suitable for the occurrence of any form of vernal pool or indicator species egg masses. Ponded water in the PFO1/PSS1 wetland is suggestive of a vernal pool however, no amphibian indicator egg masses were observed here during either survey date. During the second survey, a solitary mallard (*Anas platyrhynchos*) drake was feeding in the pool.

Regulatory Assessment:

Activities in and adjacent to wetlands are regulated by the MDEP under the provisions of the Natural Resources Protection Act (NRPA) and associated Permit by Rule (Chapter 305), Wetland and Waterbodies Protection (Chapter 310) and Significant Wildlife Habitat (Chapter 335) Rules. Certain characteristics are relevant to whether a wetland is regulated as a "wetland of special significance" (WOSS).

Wetlands at the Site:

- do not contain a "critically imperiled (S1)" (Ch 310 §3F) or an "imperiled (S2)" (Ch 310 §3L) community as defined by the Natural Areas Program;
- do not contain significant wildlife habitat (38 MRSA §480-B (10) mapped by MDIFW;
- are not located within 250 feet of a "coastal wetland" (38 MRSA §480-B (2));
- are not located within 250 feet of a "great pond" (38 MRSA §465-A);
- do not contain more than 20,000 square feet of open water or aquatic or emergent marsh vegetation;
- do not occur in a 100-year floodplain mapped by the Federal Emergency Management Agency (FEMA) (38 MRSA §480-B(2-D));
- are not a "peatland" (Ch 310 §3P); and

- do not occur within 25 feet of a "river, stream or brook" (38 MRSA §480-B (9)).

Wetlands at the Site are therefore not "wetlands of special significance" (WOSS- Ch 310 §4A (1-8)).

Typically, activities requiring alteration of less than 4,300 square feet of non-WOSS wetland would be a "minor alteration" and would not require a NRPA permit (38 M.R.S.A. §480 Q (17)). In excess of this but less than 15,000 square feet would require a Tier 1 permit and a Tier 2 permit would be necessary for impacts between 15,000 square feet and an acre (43,560 square feet). The cumulative extent of previous approved wetland impacts is relevant to determining the applicable Tier of NRPA permitting. Excluding specific activities authorized by Permit by Rule (PBR - Chapter 305) provisions of the NRPA, activities exceeding one acre would require a Tier 3 permit.

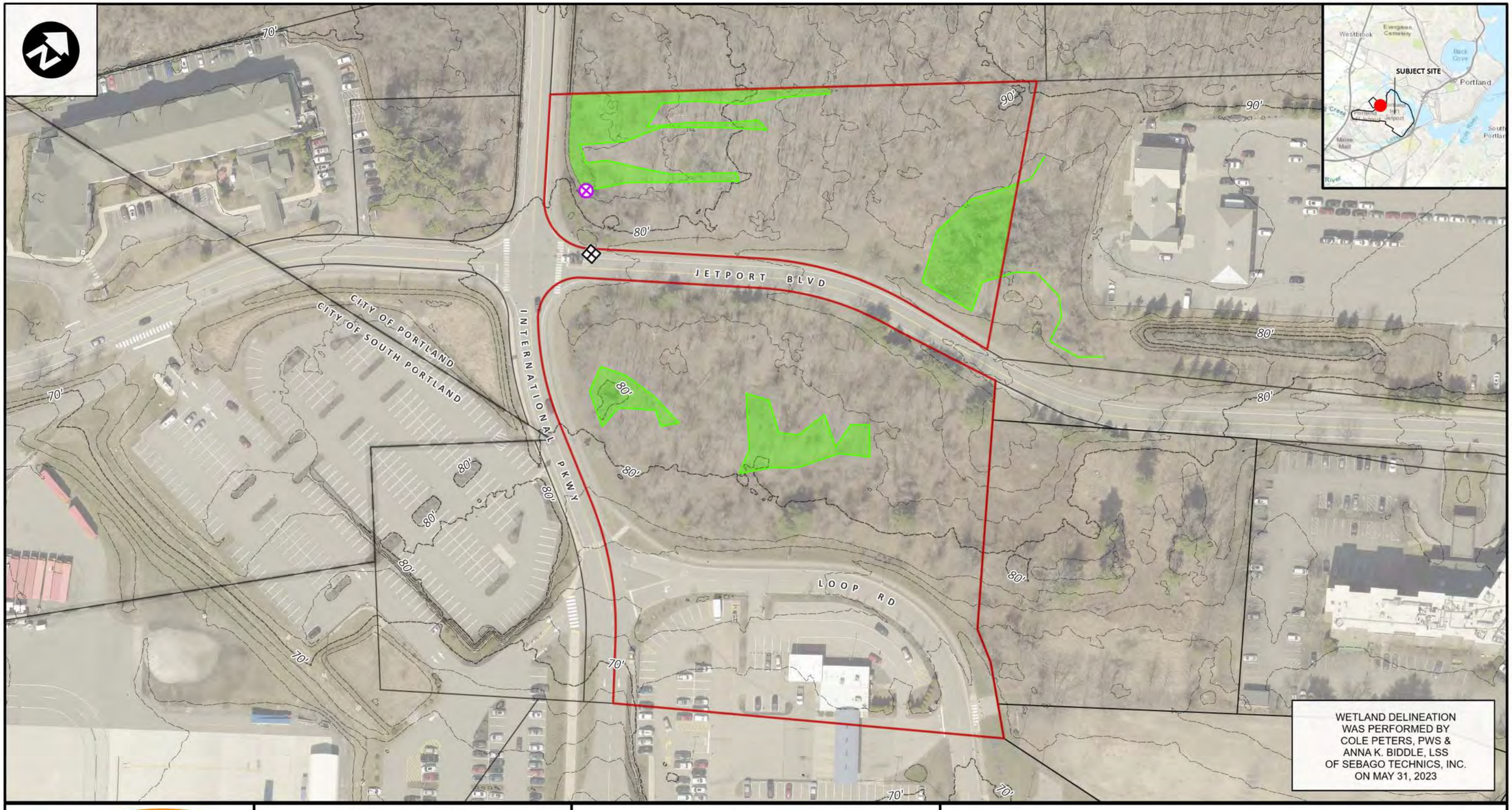
Wetlands at the Site are also regulated by the US Army Corps of Engineers as "*waters of the United States*" under the provisions of Section 404 of the Clean Water Act. To authorize minimal-impact activities in wetlands, including placement of fill, the Corps makes use of a General Permit (GP) for the State of Maine. Such impacts to wetlands are broken down into two permit categories under the GP based on the following area thresholds: Category 1 – less than 15,000 square feet and Category 2 – 15,000 square feet to three acres. Activities eligible for Category 1 activities can be authorized with a Self-Verification Notification (SVN) Form submitted to the Corps. Category 2 activities are reviewed in conjunction with the US Fish and Wildlife Service, and the US Environmental Protection Agency and as appropriate the National Marine Fisheries Services, and require an application and written approval from the Corps of Engineers.

Photograph 1: Southwestward view of the 2,810± sq ft isolated forested wetland (PFO1) with International Parkway in the background.

Photograph 2: Eastward view of the 5,820± isolated forested wetland (PFO1) with the Loop Road at center-right.

Photograph 3 Westward down gradient view of the forested wetland (PFO1) on the north side of Jetport Boulevard that appears to have been historically ditched.

Photograph 4: Northward view of ponded water in the deciduous forested and scrub shrub (PFO1/PSS1) wetland on the north side of Jetport Boulevard. No amphibian egg masses indicative of vernal pools were observed in the wetland during surveys conducted on April 11 and 21, 2023.



SEBAGO TECHNICS

WWW.SEBAGOTECHNICS.COM

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

0 100 200 300
Feet
1" = 100' when printed at 11 x 17

FIGURE 1: NATURAL RESOURCES MAP

TAX MAP 210A, LOTS B-1 & A-7

INFORMATION: MAINE GEOLIBRARY
2020 USGS LIDAR TOPOGRAPHY
2021 SPRING ORTHOIMAGERY

THIS IS NOT A BOUNDARY SURVEY.
WETLAND FEATURES WERE DELINEATED
USING GPS TECHNOLOGY CAPABLE OF SUB-METER ACCURACY.

LOCATION: JETPORT BOULEVARD
PORTLAND, ME

DATE: 7/10/2023
PROJECT NUMBER: 19059

19059.aprx

- AREA OF INTEREST (AOI)
- TOWN BOUNDARY
- CATCH BASIN
- CULVERT OUTLET - 24" RCP
- DELINEATED WETLAND BOUNDARY
- WETLANDS WITHIN AOI
- 2' CONTOUR
- 10' CONTOUR

Map Projection : NAD 1983 StatePlane Maine West FIPS 1802 Feet

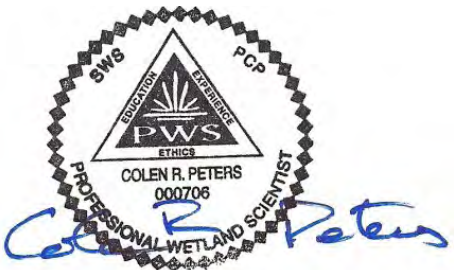
Wetland Functional Assessment

To: **Owens McCullough, P.E. Project Manager**

From: **Cole Peters, PWS**

Date: **February 5, 2024**

Project: 19059- Portland Jetport Parking Expansion



Parking expansion at the Portland International Jetport (PWM) will require 8,625 sq ft (0.198 acre) of wetland impact (the "Project"). Locations of impact are identified on the Grading Plan (Sheet C-203) with respective extents of the two areas which range between 2,807 and 5,818 sq ft (0.064 to 0.133 acre).

Surface drainage at this part of PWM is generally to the southwest toward an unnamed perennial tributary of the Stroudwater River. The mixed deciduous forested wetland (PFO1) at the Site occurs in the upper watershed of this stream more than approximately 900 ft from a defined stream channel (Figure 1). Wetland to be impacted by the Project lacks characteristics indicative of a "freshwater wetland of special significance" (Chapter 310 §4-A (1–8).

A field delineation of jurisdictional wetlands has been completed at PWM on both sides of Jetport Boulevard, northeast of International Parkway (Figure 1). The Federal Emergency Management Agency (FEMA) has prepared Flood Insurance Rate Maps (FIRM) for this part of Portland (Community Panel Number 230051 0012C, effective date 12/8/1998). No part of the area reviewed occurs within a FEMA designated 100-year floodplain (Zone A, AE). The City of Portland Zoning Map (June 24, 2022) identifies the area including the Site as the Airport Business (AB) District and no part of the area reviewed is subject to the City's Shoreland Zoning Ordinance.

An assessment of wetland functions and values that will be lost or degraded is necessary for alterations exceeding 15,000 square feet, in a freshwater wetland not of special significance (Chapter 310 §5-C (6)(a)(ii). The functional assessment presented below is based on field observations during the wetland delineation, referenced maps and other relevant, published information.

Functional Assessment Method:

A Descriptive Approach to assessing wetland functions and values described in a September 1999 supplement (the Supplement)[1] to *The Highway Methodology Workbook* by the New England Division of the U.S. Army Corps of Engineer (Corps) is an assessment method accepted by Maine Department of Environmental Protection (MDEP). Functions and values of wetlands at the Site are evaluated by this method and are discussed below.

The Supplement indicates "*Wetland functions are self-sustaining properties of a wetland ecosystem that exist in the absence of society*". Wetland functions relate to the ecological significance of wetland properties without regard to subjective values. Wetland functions are generally considered to be the

[1] US Army Corps of Engineers, New England District, 1999. *The Highway Methodology Workbook Supplement: Wetland Functions and Values, A Descriptive Approach,* NAEEP-360-1-30A, 32 pgs.

result of biologic, geologic, hydrologic, biogeochemical, and/or physical processes that occur or take place in a wetland. Functions attributed to wetlands include the following:

- Groundwater Recharge/Discharge
- Floodflow Alteration (Storage & Desynchronization)
- Fish and Shellfish Habitat
- Sediment/Toxicant/Pathogen Retention
- Nutrient Removal/Retention/Transformation
- Production (Nutrient) Export
- Sediment/Shoreline Stabilization; and
- Wildlife Habitat

Wetland values are generally considered to be benefits derived from either these functions or other characteristics of a wetland. Perceived values arise from the functional ecological processes exhibited by wetlands but are determined also by human perceptions, the location of a specific wetland, the human pressures on a wetland, and the extent of the resource (Mitsch and Gosselink 2000)[2]. The value of a specific function, or combination thereof, is based on human judgment of the worth, merit, quality, or importance attributed to those functions. Values attributed to wetlands include the following:

- Recreation
- Education/Scientific Value
- Uniqueness/Heritage
- Visual Quality/Aesthetics; and
- Threatened or Endangered Species Habitat

The functions and values identified above may vary slightly in terminology, but encompass all the functions identified in, and addressed by, the Natural Resource Protection Act (NRPA) Wetland Protection Rules. As defined in these Rules, "functions" are:

> *The roles wetlands serve which are of value to society or the environment, including but not limited to, flood storage, flood water conveyance, ground water recharge and discharge, erosion control, wave attenuation, water quality protection, scenic and aesthetic use, food chain support, fisheries, wetland plant habitat, aquatic habitat and wildlife habitat* (Chapter 310 §3J).

A basic concept presented by the Supplement is an identification of "Considerations/Qualifiers" that can be used as indicators or descriptors of the presence of specific functions or values. From as few as three to as many as 32 of these Considerations/Qualifiers are identified in Appendix A of the Supplement for each of the respective wetland functions and values. These Considerations/ Qualifiers therefore become a checklist or outline of indicators of functions and values for wetland scientists to observe, compare against, and structure assessments. The Supplement indicates these Considerations are intended to be flexible and are ultimately based on "best professional judgment."

Site Wetland Functions and Values:

Functions and values of the wetland to be impacted by the Project are dependent on, and influenced by, various physical characteristics at the Site, which are indicative of relative levels of function and value.

[2] Mitch, W.J., and Gosselink, J.G., 2000. *Wetlands* (3rd ed.), Van Nostrand Reinhold Company, NY, 920 pgs.

These include size and proximity of wetlands to ongoing development activity, geologic setting, soil characteristics, presence and duration of hydrology, landscape position, and wetland cover type. Consequently, the effects of changes to these physical characteristics are evaluated in assessing whether an activity or project impacts wetland-specific functions and values.

Considerations/Qualifiers listed in Appendix A of the Supplement and observed in impacted wetlands at the Site are recorded for individual functions and values on the accompanying Wetland Function-Value Evaluation Form. The significance of these Considerations/Qualifiers to functions and values associated with these wetlands are discussed below and on the attached data form.

- **Groundwater Recharge/Discharge** – The Maine Geological Survey has not designated the unconsolidated deposits beneath the Site as a Significant Sand and Gravel Aquifer on this part of the Portland West Quadrangle (MGS Open-File No. 99-11). Recharge of underlying groundwater by the wetlands is therefore limited. No evidence of groundwater discharge was observed in the wetlands.

- **Floodflow Alteration (Storage and Desynchronization)** – Wetland where the Project is proposed does not occur in a 100-year floodplain mapped by the Federal Emergency Management Agency on the most recent Flood Insurance Rate Maps (Community Panel Number 230051 0012C, effective date 12/8/1998), for this part of Portland.

- **Fish and Shellfish Habitat** – Habitat for fish and shellfish does not occur in the non-riparian PFO wetland.

- **Sediment/Toxicant/Pathogen Retention** – This form of water quality improvement prevents degradation of water quality and *"relates to the effectiveness of the wetland as a trap for sediments, toxicants or pathogens in runoff from surrounding uplands or upstream eroding wetland areas*" (USACE NED, 1999). Wetlands have intrinsic abilities to modify or trap a wide spectrum of water-borne substances commonly considered pollutants or contaminents (Hammer, 1997)[3]. Wetlands at the Site provide this function to a limited extent, however this benefit to water quality improvement is generally constrained due to the absence of sources impacting water quality.

- **Nutrient Removal/Retention/Transformation** – "*This function relates to the effectiveness of the wetland to prevent adverse effects of excess nutrients entering aquifers or surface waters such as ponds, lakes, streams, rivers, or estuaries*" (USACE NED, 1999). Retention time in the wetland is influenced by physical characteristics of the wetland basin, and by the edaphic (soils), micro topographic, and vegetative conditions within the wetland. Wetlands at the Site provide this function to a limited extent, however this benefit to water quality improvement is generally constrained due to the absence of sources impacting water quality.

- **Production (Nutrient) Export** – "*This function relates to the effectiveness of a wetland to produce food or usable products for humans or other living organisms"* (USACE NED, 1999). No export can occur from the closed isolated depressions dominate by woody vegetation that lacks berries, fruit, nuts or other mast.

[3] Hammer, D.A., 1997. *Creating Freshwater Wetlands* (2nd ed.), Lewis Publishers, NY, 406 pgs.

- **Sediment/Shoreline Stabilization** – This function is typically associated with wetland areas that stabilize streambanks and shorelines of waterbodies from erosion and is therefore not provided by the wetland to be impacted.

- **Wildlife Habitat** – "*This function considers the effectiveness of a wetland to provide habitat for various types and populations of animals typically associated with wetlands and the wetland edge*" (USACE NED, 1999). The forested wetland at the Site provides habitat cover for transitory wildlife that may travel through the area but the small, localized areas of wetlands do not provide habitat for most "wetland dependent wildlife" such as beaver, mink, muskrat, otter, and waterfowl. Although the August 2016 Portland Beginning with Habitat Map prepared MDIFW identifies presence of endangered New England Cottontail (NEC, *Sylvilagus transitionalis*) habitat in this part of the Jetport and the residential neighborhood to the northwest, based on previous work at PWM coordinated with MDIFW, the vegetative cover where work is proposed does not provide suitable habitat for NEC. Based on spring 2023 surveys conducted during the recommended period, significant vernal pools do not occur at the Site.

- **Recreation** – Wetlands support many types of direct recreation including hunting, trapping, fishing, wildlife watching, nature photography, berry picking, picnicking, hiking, walking, and boating (Hammer, 1997). Trails or other evidence of recreational use do not exist in the PFO1 wetland. This wetland value will not be impaired by the proposed Project.

- **Educational/Scientific Value** – The wetland does not contain attributes, nor does it occur in a location that merits being the topic and destination of school field trips. It is unknown whether scientific studies or research by students have taken place in the wetland but is unlikely.

- **Uniqueness/Heritage** – The PFO1 wetland at the Site is typical of one of the most common wetland types in southern Maine. This wetland type is not a critically imperiled (S1) or imperiled (S2) wetland community.

- **Visual Quality/Aesthetics** – Aesthetics, one of the most subjective values attributed to wetlands, generally is heightened by distant views or vistas with bodies of water. No open water or areas offering significant vistas are in the wetland.

- **Endangered Species Habitat** – The wetlands at the Site are not known to contain any federal or state-listed endangered or threatened species. As determined from the Portland Beginning with Habitat Map, no Rare or Exemplary Plant and Natural Communities tracked by the Maine Natural Areas Program (MNAP) in its Biological and Conservation Data system occur at the Site.

Conclusions:

As described above, all five values commonly attributed to wetlands are essentially absent from wetlands at the Site and therefore there is no effect or loss to result from the 8,625 sq ft (0.198 acre) of direct wetland impacts by placement of fill. In addition, three of the eight functions attributed to wetlands – Groundwater Recharge/Discharge, Fish and Shellfish Habitat, and Sediment Shoreline Protection – are also absent or not provided by wetlands at the Site and will also not be affected.

As justified by the absence of site-specific "Considerations/Qualifiers" indicative of the functions, the remaining five wetland functions at the Site are less than high or moderate quality.

Photo 1 – Wetlands that are to be impacted by the Project are located in the small patch of undeveloped woods in the upper right corner of this northward view across the Jetport Boulevard–International Parkway (left to right) intersection.

Photo 2 – Eastward view of the smaller (2,807 sq ft) isolated (no connection to surface drainage) PFO1 wetland located along the north side of International Parkway with the PWM terminal and existing long term parking area in the background.

Photo 3 – Eastward view of the larger (5,818 sq ft) isolated PFO1 wetland located near the center of the small patch of undeveloped woods, with the existing long term overnight parking lot in the background.

Wetland I.D. **#19059**

Total Area of Wetland: **8,624 sq ft** Human made? **No** Is wetland part of a wildlife corridor? **No** Or a "habitat island"? **No** Latitude: **43°39'00.46** Longitude: **70°18'50.09"**

Adjacent land use: **Portland International Jetport (PWM)** Distance to nearest roadway or other development: **< 20 ft** Prepared by: **Cole Peters, PWS** Date: **8/24/2023**

Dominant wetland systems present: **PFO1** Contiguous undeveloped buffer zone present: **None** Wetland Impact Type: **Fill - 8,624 sq ft (0.198 ac)**

Is the wetland a separate hydraulic system? **Yes, Isolated basin** If not, where does the wetland lie in the drainage basin? **High/Top** Evaluation based on: Office- **Yes** Field- **Yes**

How many tributaries contribute to the wetland? **None** Wildlife & vegetation diversity/abundance (**See accompanying report**) Corps manual wetland delineation completed: **Yes**

Function/Value	Suitability Y	Suitability N	#	PF	Comments-Rationales (Reference #)
Groundwater Recharge/ Discharge		X		---	The wetland does not occur on/over an MGS-designated Sand & Gravel Aquifer and groundwater recharge is limited by low permeability soils. No evidence of groundwater discharge was observed at the Site.
Floodflow Alteration		X		---	The wetland is in an isolated basin with a small catchment area and is not in a FEMA designated floodplain.
Fish and Shellfish Habitat		X		---	N/A- No stream or waterbody present.
Sediment/Toxicant Retention	X			No	Toxicant sources in the small watershed adjacent to wetland are not abundant.
Nutrient Removal	X			No	Nutrient sources in the small watershed adjacent to wetland are not abundant.
Production Export		X		---	No stream occurs within the wetland for downgradient export.
Sediment/Shoreline stabilization		X		--	N/A- Applies to wetlands along a streambank or shoreline.
Wildlife Habitat		X		---	Minimal wildlife habitat is provided by the wetland which is bordered on three sides by Jetport Drive, International Parkway and Loop Road that all lead to parking areas surrounding the terminal for Maine's busiest airport approximately 650 feet away.
Recreation		X		---	N/A- The forested wetland provides no recreational use.
Educational/Scientific		X		---	N/A- Site is undistinctive and not near schools.
Uniqueness/Heritage		X		---	N/A- PFO1 is a very common wetland type throughout southern Maine.
Visual Quality/Aesthetics		X		---	N/A- The forested wetland lacks a vista and is not discernably distinguishable from adjoining upland woods.
Endangered Species Habitat		X		---	No record or evidence observed.
Other				---	

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JANET T. MILLS
GOVERNOR

MELANIE LOYZIM
COMMISSIONER

February 9, 2024

Paul Bradbury
Portland International Jetport
1001 Westbrook Street
Portland, ME 04102

Re: Vernal Pool Significance Determination, Pool ID # 5273–Portland

Dear Paul Bradbury:

Vernal pools are temporary to semi-permanent wetlands occurring in shallow depressions that typically fill during the spring and dry during the summer or in drought years. They provide important breeding and foraging habitat for a wide variety of specialized wildlife species including several rare, threatened, and endangered species.

After conducting a field survey at your request, it has been determined that the vernal pool identified above on your property is NOT SIGNIFICANT because either: 1. the feature does not meet the definition of a vernal pool under the Significant Wildlife Habitat rules, 06-096 CMR 335(9) or 2. the vernal pool does not meet the biological standards for exceptional wildlife use of the Significant Wildlife Habitat rules, 06-096 CMR 335(9)(B). Therefore, activities within 250 feet of the pool are not regulated under the Natural Resources Protection Act (NRPA) unless there are other protected natural resources nearby such as streams or freshwater wetlands. I have attached a copy of the database printout that verifies the State's findings with respect to your survey.

I want to also advise you that the pool area on your property can be considered a freshwater wetland and therefore direct pool alterations may require permitting under the NRPA.

If you have any questions or need further clarification, please contact Mark Stebbins at 207-592-4810 or email at: Mark.N.Stebbins@maine.gov

Sincerely,

Robert Wood
Director, Bureau of Land Resources

cc. town file

AUGUSTA
17 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0017
(207) 287-7688 FAX: (207) 287-7826

BANGOR
106 HOGAN ROAD, SUITE 6
BANGOR, MAINE 04401
207-941-4570 FAX: (207) 941-4584

PORTLAND
312 CANCO ROAD
PORTLAND, MAINE 04103
(207) 822-6300 FAX: (207) 822-6303

PRESQUE ISLE
1235 CENTRAL DRIVE, SKYWAY PARK
PRESQUE ISLE, MAINE 04769
(207) 764-0477 FAX: (207) 760-3143

WEBSITE: www.maine.gov/dep

IFW Recommendations for Significant Vernal Pool Determinations

The following is a list of pools and IFW's recommendations for whether or not they qualify as Significant Vernal Pools, one of Maine's Significant Wildlife Habitats.

Data current as of: Friday, February 09, 2024

IFW's Pool ID: 5273 Twp: Portland
Observer's ID: VP-1

UTM Coordinates of Pool Center: 394121 E, 4833920 N
ProjectType: 19059-PWM parking

Landowner:	Paul Bradbury - Portland International Jetport	Contact:	Cole Peters - Sebago Technics, Inc
	1001 Westbrook Street		75 John Roberts Road,Suite 4A
	Portland, ME 04102		South Portland, ME 04106
	(207) 756-8029 phb@portlandmaine.gov		(207) 200-2100 Cpeters@sebagotechnics.com

Survey Date: 4/11/2023 Additional Survey Dates: 04/21/2023

IFW's Recommendation: RED: NOT SIGNIFICANT, does not meet the vernal pool definition

IFW Comments:

Landscape Preservation 14-14.6.2 (B)

1. The proposed project site consists of previously developed parking lots and an undeveloped wooded area; existing tree species within the wooded area include Ash, Maple, Oak, Birch, Aspen, Pine, Spruce, and Hemlock. Trees not impacted by the project will be protected throughout construction. The proposed project has a comprehensive landscaping plan that includes extensive buffers along road frontages, and a variety of canopy trees and plantings dispersed throughout the new parking lot.

2. Proposed removals are identified on the site demolition and tree removal drawings, and new plantings are presented on the landscape plans. Where applicable, protection measures outlined in the standards of the City Technical Manual will be utilized.

3. Trees ten (10) inches or larger diameter at breast height (DBH) within the project area have been located and documented as required. On January 19, 2024, Sebago Technics visited the site with City Arborist Mark Reiland to review the proposed project and the extent of tree removal and opportunities for tree preservation. During the review, the City Arborist noted numerous Ash trees (*Fraxinus species*) along Jetport Boulevard displaying signs of Emerald Ash Borer infestation and damage. Ash trees are the predominant deciduous street tree present along both sides of Jetport Boulevard, planted as part of a previous landscape scheme for the site. The landscape plan proposes to remove the infested Ash Trees along the south side of Jetport Boulevard adjacent to the proposed parking lot. The City Arborist also noted a few Hemlock trees (*Tsuga canadensis*) closest to the intersection of Jetport Boulevard and International Parkway, while not identified to be removed, would likely not thrive the change in sunlight and exposure to the parking lot. The landscape plan proposes to replace the Hemlocks with native evergreen trees. No mature feature trees as described in the Technical Manual were found on site.

4. Waivers are not requested, and a contribution to the City of Portland Tree Fund described in the Technical Manual is not necessary or proposed.

Please see the plan set for the proposed landscaping plans.

Site Landscaping and Buffers 14-14.6.2(C)

The proposed project has been designed to comply with the applicable landscape and buffering requirements of the City Ordinance. The project is located in the A-B zone.

1. Landscaping.
    a. Landscape plans are provided within the plan set, identifying proposed plantings and existing trees to remain. The proposed plantings include a mixture of deciduous trees, evergreen trees, shrubs, perennials, and grasses. Diverse buffers are proposed along the perimeter of the project, with enhanced plantings around the entrance and exits of the new parking lot; canopy trees are proposed within most of the internal parking lot islands. Parking lot islands located above the subsurface stormwater infrastructure do not have proposed trees. Native species have been incorporated into the planting design, and most trees can be found on the City of Portland Recommended Tree List and/or have been recommended by the City Arborist.

2. Buffers.
    a. Loading and service areas are not included in this project. The proposed battery storage will be screened by evergreen trees and evergreen shrubs; additionally, fencing will be provided around the perimeter of the battery storage.
    b. The proposed project abuts the Residential 1 Zone along Jetport Boulevard. A fifteen (15) foot wide buffer consisting of evergreen trees, deciduous trees, and understory plantings is proposed along the south side of Jetport Boulevard Road to buffer views of the parking lot from abutting property.

3. Parking and vehicle display lot landscaping.
    a. The applicant is required to provide one (1) tree and three (3) shrubs for every five (5) parking spaces. The proposed surface parking lot has 684 (434 new) parking spaces, which will require 137 trees and 411 shrubs. The applicant is proposing 177 trees and 552 shrubs.
    b. Landscape islands have been distributed between parking stalls so that uninterrupted pavement does not exceed 40 parking spaces.

4. Street Trees.
    a. Street Trees are proposed along Jetport Boulevard, Loop Road, and Westbrook Street. The spacing of street trees varies due to numerous factors, including utility conflicts and other site constraints. Proposed street trees include species identified on the City of Portland Recommended Tree List.

    Please see the plan set for the proposed landscaping plans.

Water Quality, Stormwater Management, and Erosion Control 14-14.6.2(D)

1. The subject site is comprised of a partially developed area (an existing paved lot and a gravel lot) and an undeveloped area. The proposed plan has been designed to meet the applicable City standards for stormwater management to minimize to the extent practicable the total area of impervious surface on site, as well as the volume and rate of runoff from the lot.

   Please see the stormwater management plan.

2. The proposed project has been designed to be in compliance with the stormwater management standards of the City Technical Manual. Please see the stormwater management plan.

3. The proposed development does not propose any stormwater infiltration or other practices that would be expected to pose a risk of groundwater contamination either during or post-construction. Please see the plan set and the stormwater management plan.

SEBAGO TECHNICS

CIVIL ENGINEERING • SURVEYING • LANDSCAPE ARCHITECTURE

STORMWATER MANAGEMENT REPORT

For

PORTLAND INTERNATIONAL JETPORT
PORTLAND, MAINE

Prepared for:

Portland International Jetport
1001 Westbrook Street
Portland, ME 04101

Prepared by:

Sebago Technics, Inc.
75 John Roberts Rd, Suite 4A
South Portland, ME 04106

February, 2024

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STORMWATER MANAGEMENT REPORT
PORTLAND INTERNATIONAL JETPORT
PORTLAND, ME

1. Introduction

This Stormwater Management Plan Report has been prepared to present analyses performed to address the potential impacts associated with the project due to proposed modification in stormwater runoff characteristics and land cover changes. The stormwater management controls that are outlined in this report have been designed to suit the proposed development and to comply with applicable regulatory requirements.

The project will require a major site plan approval from the City of Portland along with an amendment to the Site Location of Development Act (SLODA) permit (L-13760) and a Natural Resources Protection Act (NRPA) permit through the Maine Department of Environmental Protection (DEP) due to wetland impacts and a related permit through the US Army Core of Engineers (USACE).

The City of Portland zoning maps indicate the property is zoned “Airport Business” with the allowed uses including “parking lots and garages” (Sec. 14-197.1. Permitted uses) and a maximum impervious surface ratio of 70% (City Order No. 295-88, 5-23-88).

2. Existing Conditions

The project site is located at the Portland International Jetport (PWM) and is owned by the City of Portland. The entire acreage for the property is approximately 666 acres with 473 acres of airfield area and 193 acres of area beyond the airfield.

The project site for the proposed development is located near the intersection of Jetport Boulevard and International Parkway. There is an existing paved cellphone lot as well as an existing gravel lot located off Loop Road in the southern section of the project site. The gravel lot drains to the south on the surface of the lot as there is no storm drain network or water quality treatment within this lot. The stormwater runoff from the surface enters a grass swale between the lots and eventually drains to a catch basin near the southeastern corner of the cellphone lot. The northern section of the site consists of undeveloped, wooded land. The project site is approximately 13 acres.

The slopes range from 0% to 8% throughout the entire project site with the lowest approximate elevation of 52 FT and the highest approximate elevation of 90 FT.

The site is tributary to the Fore River, which is considered a major river segment. The site is not located within an urban impaired stream or lake-most at risk watershed according to Chapter 502 of the Maine DEP regulations.

The proposed development area of the site is not located in an identified flood zone per the FEMA Flood Insurance Rate Map.

3. Soils

Soil characteristics were obtained from the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Survey completed by Sebago Technics. The Hydrologic Groups (HSG) of the soils is classified by Technical Release TR-55 of the Soil Conservation Service as follows:

Soil Map Symbol	Soil Name	Slope (%)	HSG
BuB	Lamoine silt loam	3-8	C/D
Gp	Gravel pits	N/A	N/A
PbB	Paxton fine sandy loam	3-8	C
Sn	Scantic silt loam	0-3	D
Sz	Swanton fine sandy loam	0-3	C/D
WmB	Windsor loamy sand	0-8	A

Hydrologic Soil Group boundaries are delineated on the Watershed Map. A copy of the Class D Intensity Soil Survey is included as Appendix 4.

4. Proposed Site Improvements

The proposed development will consist of two (2) paved parking lots: the lower lot and the upper lot. The upper and lower lots together are proposed to consist of 684 long- term parking spaces. There are landscaped islands proposed in each of the lots.

In total, the proposed site improvements result in 7.24 acres of disturbed area and 7.24 acres of proposed developed area, which consists of 5.64 acres of new impervious area and 1.60 acres of new landscaped or vegetated area.

Lower Lot

The lower lot is proposed to be located where the existing paved cellphone and valet gravel lots currently exist. There is a proposed entrance on Loop Road and exit on Westbrook Street. There is also an internal connecting road from the lower lot to the upper lot. The lower lot is proposed to consist of eight (8) ADA- compliant parking spaces and 248 standard parking spaces. The lower lot is proposed to be treated by one (1) Contech Stormfilter BMP with upstream CMP Pipe Detention. The total area tributary to the treatment system is equal to 105,340 SF (2.42 Ac), which includes approximately 90,030 SF (2.07 Ac) of impervious area.

Upper Lot

The upper lot is proposed to be located northwest of the lower lot, bounded by Jetport Boulevard to the northeast and Loop Road to the southwest. The entrance to the upper lot is the same as the lower lot on Loop Road with an exit onto Loop Road. The upper lot is proposed to consist of twelve (12) ADA-compliant parking spaces and 416 standard parking spaces. The upper lot is proposed to be treated by one (1) Contech Stormfilter BMP with upstream CMP Pipe Detention. The total area of the lot is approximately 180,210 SF (4.14 Ac), which includes approximately 146,080 SF (3.35 Ac) of impervious area.

The overall stormwater management system for the project will consist of catch basins and two (2) subsurface drainage systems. The two (2) subsurface drainage systems will be water quality treatment systems with upstream detention designated to the long-term parking lots. Since the Jetport discharges to the Fore River, the applicant will be pursuing a waiver of the Flooding Standard pursuant to MDEP Rules, Chapter 500(4)(F)(3)(b).

5. Existing Conditions Model

The existing conditions watershed plan consists of nine (9) subcatchments labeled 1S through 9S in the HydroCAD model. Four (4) locations were identified as Points of Analyses (POA) for comparing peak runoff rates. Please refer to the Existing Conditions HydroCAD model and Existing Conditions Watershed Plan. The overall drainage area included in the model is equal to 11.88 acres.

POA-1 is located near the intersection of Loop Road and Westbrook Street and represents the discharge pipe of existing catch basin B-32A. For the specific study point, there are five (5) existing catch basins that capture the stormwater runoff of the contributing watersheds. Watersheds 1S, 2S, 3S, 4S, 6S, and 8S contribute to POA-1 with an overall runoff area of approximately 9.06 acres.

POA-2 is located along Westbrook Street at an existing drainage manhole (WS-DMH-2). Watershed 5S contributes to this study point with a runoff area of approximately 0.82 acres.

POA-3 is located on an abutting property at an existing catch basin. Watershed 9S contributes to this study point with a runoff area of approximately 0.36 acres.

POA-4 is located along Loop Road at an existing drainage manhole (unlabeled). Watershed 7S contributes to this study point with a runoff area of approximately 1.64 acres.

6. Proposed Conditions Model

The proposed conditions consists of the same overall watershed area as the existing conditions, however, the pre-development subcatchments have been broken into smaller

watersheds as a result of the proposed development. The total area in the proposed conditions model remains unchanged from the existing conditions model at 11.88 acres.

POA1: Subcatchments 1S, 2.1S, 3.1S thru 3.7S, 4.1S thru 4.8S, 6.1S, and 8.1S thru 8.12S are tributary to POA-1 with an overall tributary area of 10.21 acres. The increase in tributary area is a result of the proposed development and alteration of drainage patterns to convey and treat stormwater to the two (2) subsurface drainage systems.

Subcatchments 8.2S thru 8.12S are tributary to Stormfilter Treatment Unit #1 (SF-1), represented by nodes 8.83P, 8.84P, and 8.85P. 8.83P represents the water quality detention of the Stormfilter, while 8.84P represents the peak flow detention of the upstream storage configuration. 8.85P represents the 18" discharge pipe that combines the water quality discharge and peak detention flow, which eventually drains to POA-1.

Subcatchments 3.1S thru 3.7S and 4.2S thru 4.8S are tributary to Stormfilter Treatment Unit #2 (SF-2), represented by nodes 3.32P, 3.33P, and 3.34P. 3.32P represents the water quality detention of the Stormfilter, while 3.33P represents the peak flow detention of the upstream storage configuration. 3.34P represents the 24" discharge pipe that combines the water quality discharge and peak detention flow, which eventually drains to POA-1.

Subcatchment 1S remains unchanged from the existing condition. Subcatchment 2.1S represents existing conditions subcatchment 2S that has been altered as a result of the proposed project through the change in land cover type and altered grading and drainage patterns. Subcatchment 6.1S represents the existing conditions subcatchment 6S that has been altered as a result of the proposed project through grading and land cover changes. Subcatchment 8.1S represents the remainder of existing conditions subcatchment 8S that remains largely unchanged from the existing condition and does not drain to SF-1. Subcatchments 1S, 2.1S, 6.1S and 8.1S are tributary to existing conditions catch basin B-34, represented by node 2P, which eventually drains to POA-1.

POA-2: Subcatchment 5.1S is tributary to POA-2 with an overall tributary area of 0.47 acres. 5.1S represents the remainder of existing conditions subcatchment 5S that continues to drain to POA-2. 5.1S is the result of the alterations to subcatchment 9S in the proposed development, which consists of grading and conveyance of stormwater to be attenuated and treated by SF-2.

POA-3: Subcatchment 9.1S is tributary to POA-3 with an overall tributary area of 0.16 acres. 9.1S represents the remainder of existing conditions subcatchment 9S that continues to drain to POA-3. 9.1S is the result of the alterations to subcatchment 9S in the proposed development, which consists of grading and conveyance of stormwater to be attenuated and treated by SF-1.

POA-4: Subcatchment 7.1S is tributary to POA-4 with an overall tributary area of 1.02 acres. 7.1S represents the remainder of existing conditions subcatchment 7S that continues to

drain to the existing conditions drain manhole that is represented by node 7P in the existing and proposed conditions models.

7. Stormwater Management

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. We have avoided adverse impacts by providing an Erosion & Sedimentation Control Plan, and an Inspection, Maintenance and Housekeeping Plan (Appendix 3) to be implemented during construction and post-construction stabilization of 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, two (2) Contech Stormfilter Treatment BMP's have been implemented into the stormwater management infrastructure. Filtration BMPs are very effective at removing a wide range of pollutants through the use of organic soil filter media.

The Best Management Practices (two (2) subsurface drainage systems) 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 1. Through the use of the aforementioned BMP's 96.0% of new impervious area and 90.5% of new developed area will be receiving treatment. This meets the requirements for the Maine DEP General Standards.

It is worth noting that in the proposed condition, the redevelopment of the area occupied by the existing gravel and cellphone lots will provide greater water quality than in the existing condition. As described above, in the existing condition, the existing gravel parking lot has no storm drain network to drain the runoff and is not treated prior to entering the Jetport storm drain network. It contributes untreated, turbulent stormwater runoff to the existing system. In the proposed condition, with the implementation of the proposed BMP's, the system will remove pollutants, cool the water, and provide attenuation to the stormwater runoff of the area. This will mitigate impacts to the Fore River Watershed from an area that is already developed.

Flooding Standard - Chapter 500, Section 4(F)

Since the planned project will create more than three (3) acres of impervious surface, MDEP Flooding Standards must 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. The project is located within the direct watershed of the Fore River, which is a major river segment. Therefore, the project qualifies for a waiver from the Flooding Standard as defined in MDEP's Chapter 500, Section 4(F)-3(a). As stated above, the majority of the proposed developed area discharges to the existing stormdrain network. Therefore, the project was designed to treat and attenuate stormwater discharge so the pipe capacity of the existing stormdrain network was not increased or exceeded.

A runoff 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.

HydroCAD Stormwater Analysis

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 24-hour rainfall values utilized in the hydrologic model were obtained from Appendix H of MDEP's Chapter 500: Stormwater Management (effective date August 2015). Rainfall values for Cumberland SE County are listed in the table below.

Storm Frequency Precipitation (in./24 hr) Cumberland SE County	
2-year	3.1
10-year	4.6
25-year	5.8

The following table presents the results of the peak runoff calculations at the analysis points for the existing and proposed conditions.

Peak Runoff Rate Summary Table			
Analysis Point	**Storm Event**	**Existing Conditions (cfs)**	**Proposed Conditions (cfs)**
POA-1	2-year	12.9	9.0
	10-year	20.7	15.0
	25-year	27.0	19.8
POA-2	2-year	2.3	1.2
	10-year	3.5	1.9
	25-year	4.5	2.5
POA-3	2-year	0.6	0.3
	10-year	1.2	0.5
	25-year	1.6	0.7
POA-4	2-year	2.3	2.3
	10-year	3.8	3.6
	25-year	5.0	4.6

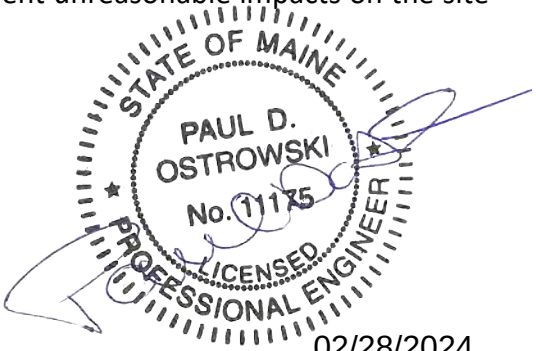
The HydroCAD Data output sheets from this analysis are appended to this report (Appendix 2) along with the Stormwater Management Plans (Appendix 5). The model predicts that the peak runoff rates in the proposed condition at Points of Analyses 1, 2, 3, & 4 are at or below existing condition runoff rates for the 2, 10, and 25-year storm events with implementation of the proposed stormwater management practices.

8. Summary

The proposed development has been designed to manage stormwater runoff through Best Management Practices approved by MDEP. Stormwater BMP's provide treatment to 96.0% (95% required) of impervious areas, and 90.5% (80% required) of the total developed area. Runoff discharging from the site in the proposed condition will be at or below existing conditions for the 2, 10, and 25-year storm events at points of analyses 1, 2, 3, & 4. Additionally, erosion and sedimentation controls along with associated maintenance and housekeeping procedures have been outlined to prevent unreasonable impacts on the site and to the surrounding environment.

Prepared by:

SEBAGO TECHNICS, INC.



02/28/2024

Tanner F. Goodine, EI
Civil Engineer
TFG/PDO

Paul D. Ostrowski, PE
Senior Project Engineer

Appendix 1

Stormwater Quality Calculations

Table 1: MDEP GENERAL STANDARD CALCULATIONS

Job #19059: Portland International Jetport (PWM) Parking Expansion

AREA ID	WATERSHED SIZE (S.F.)	EXISTING ONSITE IMPERVIOUS AREA TO REMAIN (S.F.)	NEW ONSITE IMPERVIOUS AREA (S.F.)	NEW ONSITE IMPERVIOUS AREA NOT TREATED BY POROUS ASPHALT* (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
1S	34,840	33,500			1,340		0	34,840	NO	0	0	0	
2.1S	29,840	16,315	4,530		1,065	7,930	12,460	17,380	NO	0	0	0	
3.1S	1,450		900			550	1,450	0	YES	900	550	1,450	SF-2
3.2S	4,400		2,300			2,100	4,400	0	YES	2,300	2,100	4,400	SF-2
3.3S	7,500		6,550			950	7,500	0	YES	6,550	950	7,500	SF-2
3.4S	5,170		4,660			510	5,170	0	YES	4,660	510	5,170	SF-2
3.5S	7,350		6,520			830	7,350	0	YES	6,520	830	7,350	SF-2
3.6S	7,080		7,080				7,080	0	YES	7,080	0	7,080	SF-2
3.7S	6,280		5,470			810	6,280	0	YES	5,470	810	6,280	SF-2
4.1S	30,540	15,510			8,544	4,758	4,758	24,054	NO	0	0	0	
4.2S	11,860		9,785			2,075	11,860	0	YES	9,785	2,075	11,860	SF-2
4.3S	10,630		9,425			1,205	10,630	0	YES	9,425	1,205	10,630	SF-2
4.4S	11,040		9,180			1,860	11,040	0	YES	9,180	1,860	11,040	SF-2
4.5S	5,620		3,490			2,130	5,620	0	YES	3,490	2,130	5,620	SF-2
4.6S	9,090		7,990			1,100	9,090	0	YES	7,990	1,100	9,090	SF-2
4.7S	6,020		6,020			0	6,020	0	YES	6,020	0	6,020	SF-2
4.8S	11,850		10,665			1,185	11,850	0	YES	10,665	1,185	11,850	SF-2
5.1S	20,660	10,000	495		10,165		495	20,165	NO	0	0	0	
6.1S	50,370	41,330	900		8,140	0	900	49,470	NO	0	0	0	
7.1S	44,485	28,795	2,450		4,120	7,640	10,090	32,915	NO	0	0	0	
8.1S	13,930	5,530	1,380		7,020		1,380	12,550	NO	0	0	0	
8.2S	19,350		16,340			3,010	19,350	0	YES	16,340	3,010	19,350	SF-1
8.3S	33,150		31,640			1,510	33,150	0	YES	31,640	1,510	33,150	SF-1
8.4S	22,420		17,510			4,910	22,420	0	YES	17,510	4,910	22,420	SF-1
8.5S	15,090		12,280			2,810	15,090	0	YES	12,280	2,810	15,090	SF-1
8.6S	9,090		0			9,090	9,090	0	YES	0	9,090	9,090	SF-1
8.7S	11,120		7,885			3,235	11,120	0	YES	7,885	3,235	11,120	SF-1
8.8S	5,080		1,800			3,280	5,080	0	YES	1,800	3,280	5,080	SF-1
8.9S	9,920		8,240			1,680	9,920	0	YES	8,240	1,680	9,920	SF-1
8.10S	17,310		16,705			605	17,310	0	YES	16,705	605	17,310	SF-1
8.11S	8,440		7,765			675	8,440	0	YES	7,765	675	8,440	SF-1
8.12S	26,900		23,570			3,330	26,900	0	YES	23,570	3,330	26,900	SF-1
8.13S	2,340		2,340				2,340	0	YES	2,340	0	2,340	SF-1
9.1S	6,800					2,000			NO	0	0	0	
TOTAL (S.F.)	**517,015**	**150,980**	**245,865**		**40,394**	**71,768**	**315,633**	**191,374**		**236,110**	**49,440**	**285,550**	

TOTAL NEW IMPERVIOUS AREA (S.F.)	**245,865**	**TOTAL DEVELOPED AREA (S.F.)**	**315,633**
TOTAL IMPERVIOUS AREA RECEIVING TREATMENT (S.F.)	**236,110**	**TOTAL AREA RECEIVING TREATMENT (S.F.)**	**285,550**
% OF IMPERVIOUS AREA RECEIVING TREATMENT	**96.0%**	**% OF AREA RECEIVING TREATMENT**	**90.5%**

Contech Engineered Solutions LLC
71 US Rte 1, Suite F
Scarborough, ME 04074
Phone: (207) 885-6191
www.ContechES.com

December 13, 2023

Tanner Goodine, EI
Sebago Technics, Inc.
75 John Roberts Road, Suite 4A
South Portland, ME 04106

RE: Portland Jetport Parking (Contech Reference No. 777919)
Review of StormFilter Design

To whom it may concern,

The purpose of this letter is to document Contech Engineered Solutions review of the plans and the proposed application of the StormFilter Media Filtration System water quality unit for your project.

Contech Engineered Solutions (Contech) has reviewed the StormFilter (SF) design for this project. We believe the SF configuration to be an appropriate water quality solution for this site.

The SF system with Phosphosorb (Psorb) media cartridges is approved for use by MEDEP meeting the General Standard of the Stormwater rules (Chapter 500) if designed, installed, and maintained in accordance with the provisions noted in the February 24, 2023 approval letter from the MEDEP.

The StormFilter system is designed in accordance with the maximum drain down rate of 1.67 gallons per minute per square foot of filter surface area (18.79 gpm per 27" cartridge). Additionally, the StormFilter is designed with an upstream water quality volume (WQv) detention system to retain, route and treat the entire WQ event flow from the contributing drainage area to the treatment unit. The resultant volume from the WQ event storm is detained in the upstream detention to an elevation below any bypass flow paths resulting in a routed storm event volume through the SF cartridges with a required emptying time of 24 to 48 hours.

Due to the extended detention time upstream of the SF in the WQv detention system, Contech assumes sedimentation of the larger solids at an estimated 50 percent reduction of the total suspended solids prior to the treatment by the StormFilter vault.

StormFilter 1: The engineer of record provided a drainage area of 4.14 acres, of which 3.35 acres is impervious. In order to adequately treat the runoff from this area, Contech recommends an offline StormFilter Vault 8'x11' (model SF0811) with quantity 18 x 27" Phosphosorb cartridges based on sediment mass loading design methodology.

StormFilter 2: The engineer of record provided a drainage area of 2.42 acres, of which 2.07 acres is impervious. In order to adequately treat the runoff from this area, Contech recommends an offline StormFilter 96" diameter Manhole (model SFMH96) with quantity 11 x 27" Phosphosorb cartridges based on sediment mass loading design methodology.

The SF system requires a hydraulic headwater condition to fully immerse the media and activate the cartridge float valve. For 27" SF cartridges, this headwater condition is 3.05 ft above SF outlet invert. This is achieved by the either physical inlet to outlet pipe elevation drop or an upstream WQ detention filling during the WQ storm flow to the required SF float valve activation elevation.

The WQv is routed through the SF vault and the detention system WQ outlet control shall be designed by the Engineer of Record to drain down in 24 to 48 hours after the beginning of the storm resulting in a cumulative treated WQv.

Contech Engineered Solutions LLC
71 US Rte 1, Suite F
Scarborough, ME 04074
Phone: (207) 885-6191
www.ContechES.com

It is recommended to have the site detention system storage designed to store the WQv and flood control volume separately with the two parts of the detention system separated by a weir to ensure that the WQv is captured for treatment prior to overflowing into the flood control detention.

Our systems require periodic maintenance to continue operating properly. Given typical runoff pollutant loading rates, Contech recommends maintenance inspections on an annual basis.

This system is expected to operate in accordance with Contech's design intent. Please feel free to contact me if you have any questions or concerns.

Sincerely,

David Adams, PE
Contech Engineered Solutions, LLC.
(207) 885-6191
dadams@conteches.com

StormFilter Design Calculation

CONTECH Stormwater Solutions Inc. Engineer:	**DRA**	
Date	**12/1/2023**	

Site Information

Project Name	**Portland Jetport Parking**	
Project State	**ME**	
Project Location	**Portland**	
Site Designation	**Lot 1**	
Drainage Area, Ad	**4.14**	ac
Impervious Area, Ai	**3.35**	ac
Pervious Area, Ap	**0.78**	
% Impervious	**81**	%
Runoff Coefficient, Rc	**0.78**	

Upstream Detention System

Detention pretreatment credit	**50%**	

Mass loading calculations

Mean Annual Rainfall, P	**49**	in
Agency required % removal	**80%**	
Percent Runoff Capture	**90%**	
Mean Annual Runoff, V_t	**516,267**	ft^3
Event Mean Concentration of Pollutant, EMC	**75**	mg/l
Annual Mass Load, M_{total}	**2,416**	lbs

Water Quality Volume

90% Rainfall Depth	**1.00**	in
Volume to be treated	**0.269**	ac-ft
Volume to be treated by filters	**11,707**	ft^3

Filter System

Filtration brand	**StormFilter**	
Specific Flow Rate	**1.00**	gpm/ft^2
Cartridge height	**27**	in

Number of cartridges - mass loading

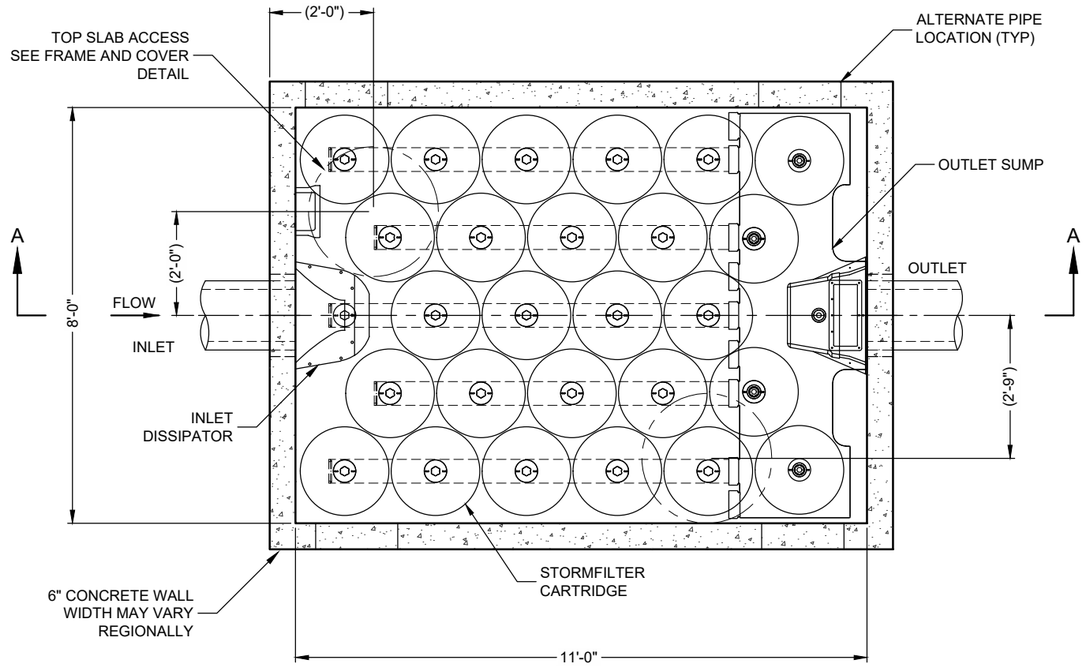
Mass removed by pretreatment system, M_{pre}	**1,208**	lbs
Mass load to filters after pretreatment, M_{pass1}	**1,208**	lbs
Mass to be captured by filters, M_{filter}	**966**	lbs
Allowable Cartridge Flow rate, Q_{cart}	**11.25**	gpm
Mass load per cartridge, M_{cart} (lbs)	**54**	lbs
Number of Cartridges required, N_{mass}	**18**	ea
Treatment Capacity	**0.451**	cfs

Determine Critical Sizing Value

Method to Use:	**MASS-LOADING**

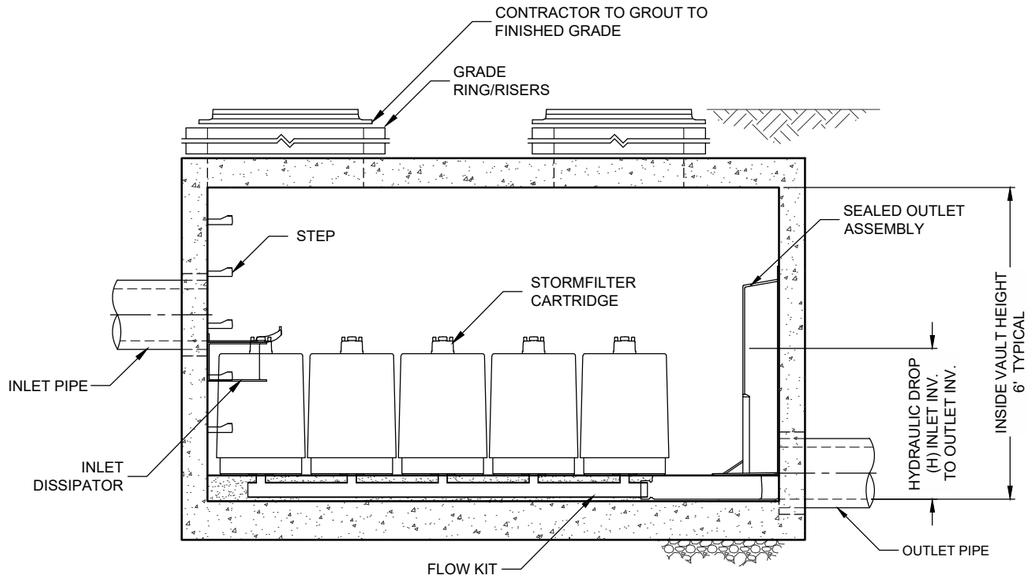
SUMMARY

Treatment Flow Rate (cfs)	0.451
Cartridge Flow Rate (gpm)	11.25
Number of Cartridges	18



PLAN VIEW

VAULT STYLE: OUTLET SUMP (NIB)



SECTION A-A

The Stormwater Management StormFilter®

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,322,629; 5,324,070; 5,707,527; 5,985,157; 8,027,839; 8,848,048; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

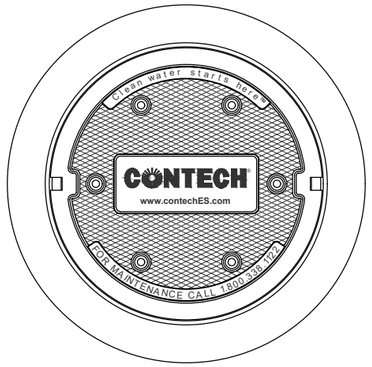
STORMFILTER DESIGN NOTES

STORMFILTER TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE SELECTION AND THE NUMBER OF CARTRIDGES. THE STANDARD VAULT STYLE IS SHOWN WITH THE MAXIMUM NUMBER OF CARTRIDGES (26). VAULT STYLE OPTIONS INCLUDE INLET BAY (17), INLET BAY/OUTLET BAY (12), OUTLET BAY (21), FULL HEIGHT BAFFLE WALL (17). STORMFILTER 8X11 PEAK HYDRAULIC CAPACITY IS 1.8 CFS. IF THE SITE CONDITIONS EXCEED 1.8 CFS AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

CARTRIDGE SELECTION

CARTRIDGE HEIGHT	27"			18"			LOW DROP		
RECOMMENDED HYDRAULIC DROP (H)	3.05'			2.3'			1.8'		
SPECIFIC FLOW RATE (gpm/sf)	2 gpm/sf	1.67* gpm/sf	1 gpm/sf	2 gpm/sf	1.67* gpm/sf	1 gpm/sf	2 gpm/sf	1.67* gpm/sf	1 gpm/sf
CARTRIDGE FLOW RATE (gpm)	22.5	18.79	11.25	15	12.53	7.5	10	8.35	5

* 1.67 gpm/sf SPECIFIC FLOW RATE IS APPROVED WITH PHOSPHOSORB® (PSORB) MEDIA ONLY



FRAME AND COVER

(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	*
WATER QUALITY FLOW RATE (cfs)	*
PEAK FLOW RATE (cfs)	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
CARTRIDGE HEIGHT (27", 18", LOW DROP(LD))	*
NUMBER OF CARTRIDGES REQUIRED	*
CARTRIDGE FLOW RATE	*
MEDIA TYPE (PERLITE, ZPG, PSORB)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE #1	*	*	*
INLET PIPE #2	*	*	*
OUTLET PIPE	*	*	*

UPSTREAM RIM ELEVATION	*
DOWNSTREAM RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR SITE SPECIFIC DRAWINGS WITH DETAILED VAULT DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
4. STORMFILTER WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 5' AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
6. FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF CLEANING. RADIAL MEDIA DEPTH SHALL BE 7-INCHES. FILTER MEDIA CONTACT TIME SHALL BE AT LEAST 38 SECONDS.
7. SPECIFIC FLOW RATE IS EQUAL TO THE FILTER TREATMENT CAPACITY (gpm) DIVIDED BY THE FILTER CONTACT SURFACE AREA (sq ft).
8. STORMFILTER STRUCTURE SHALL BE PRECAST CONFORMING TO ASTM C-857 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER VAULT (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL VAULT SECTIONS AND ASSEMBLE VAULT.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH OUTLET PIPE INVERT WITH OUTLET BAY FLOOR.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.

CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

SF0811
STORMFILTER
STANDARD DETAIL

I:\STORMWATER\COMMOPS\10 STORMFILTER\40 STANDARD DRAWINGS\VAULT\DWG\SF0811-DTL SEALED OUTLET RISER.DWG 8/10/2021 2:40 PM

StormFilter Design Calculation

CONTECH Stormwater Solutions Inc. Engineer:	**DRA**	
Date	**12/1/2023**	

Site Information

Project Name	**Portland Jetport Parking**	
Project State	**ME**	
Project Location	**Portland**	
Site Designation	**Lot 2**	
Drainage Area, Ad	**2.42**	ac
Impervious Area, Ai	**2.07**	ac
Pervious Area, Ap	**0.35**	
% Impervious	**85**	%
Runoff Coefficient, Rc	**0.82**	

Upstream Detention System

Detention pretreatment credit	**50%**	

Mass loading calculations

Mean Annual Rainfall, P	**49**	in
Agency required % removal	**80%**	
Percent Runoff Capture	**90%**	
Mean Annual Runoff, V_t	**317,144**	ft^3
Event Mean Concentration of Pollutant, EMC	**75**	mg/l
Annual Mass Load, M_{total}	**1,484**	lbs

Water Quality Volume

90% Rainfall Depth	**1.00**	in
Volume to be treated	**0.165**	ac-ft
Volume to be treated by filters	**7,191**	ft^3

Filter System

Filtration brand	**StormFilter**	
Specific Flow Rate	**1.00**	gpm/ft^2
Cartridge height	**27**	in

Number of cartridges - mass loading

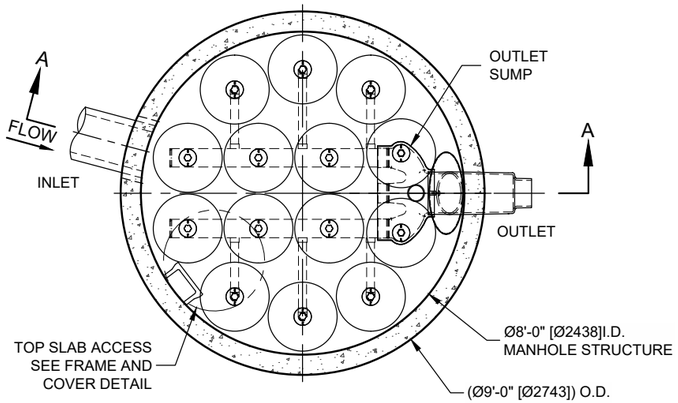
Mass removed by pretreatment system, M_{pre}	**742**	lbs
Mass load to filters after pretreatment, M_{pass1}	**742**	lbs
Mass to be captured by filters, M_{filter}	**594**	lbs
Allowable Cartridge Flow rate, Q_{cart}	**11.25**	gpm
Mass load per cartridge, M_{cart} (lbs)	**54**	lbs
Number of Cartridges required, N_{mass}	**11**	ea
Treatment Capacity	**0.276**	cfs

Determine Critical Sizing Value

Method to Use:	**MASS-LOADING**

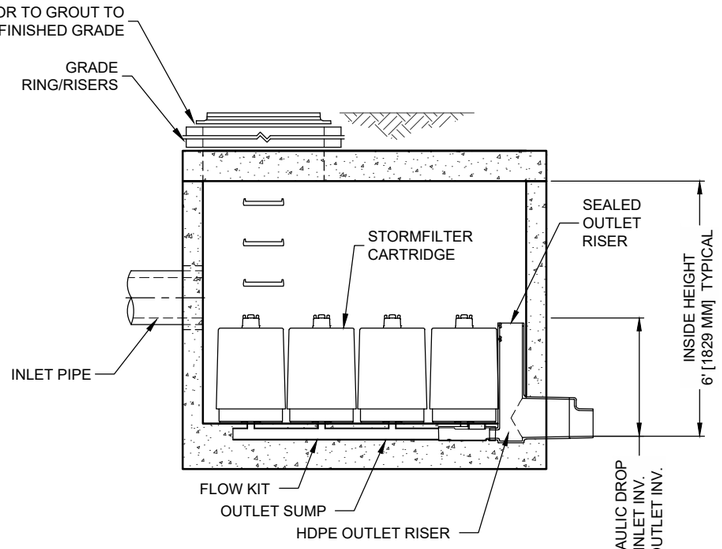
SUMMARY

Treatment Flow Rate (cfs)	0.276
Cartridge Flow Rate (gpm)	11.25
Number of Cartridges	11



PLAN VIEW

STANDARD OUTLET RISER
FLOWKIT: 43A



SECTION A-A

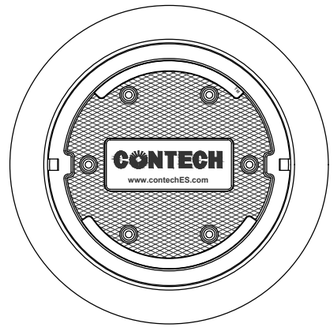
STORMFILTER DESIGN NOTES

STORMFILTER TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE SELECTION AND THE NUMBER OF CARTRIDGES. THE STANDARD MANHOLE STYLE IS SHOWN WITH THE MAXIMUM NUMBER OF CARTRIDGES (14). VOLUME SYSTEM IS ALSO AVAILABLE WITH MAXIMUM 14 CARTRIDGES. Ø8'-0" [2438 mm] MANHOLE STORMFILTER PEAK HYDRAULIC CAPACITY IS 1.8 CFS [51 L/s] . IF THE SITE CONDITIONS EXCEED 1.8 CFS [51 L/s] AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

CARTRIDGE SELECTION

CARTRIDGE HEIGHT	27" [686 mm]			18" [458 mm]			LOW DROP		
RECOMMENDED HYDRAULIC DROP (H)	3.05' [930 mm]			2.3' [700 mm]			1.8' [550 mm]		
SPECIFIC FLOW RATE (gpm/sf) [L/s/m^2]	2 [1.30]	1.67* [1.08]	1 [0.65]	2 [1.30]	1.67* [1.08]	1 [0.65]	2 [1.30]	1.67* [1.08]	1 [0.65]
CARTRIDGE FLOW RATE (gpm) [L/s]	22.5 [1.42]	18.79 [1.19]	11.25 [0.71]	15 [0.95]	12.53 [0.79]	7.5 [0.44]	10 [0.63]	8.35 [0.54]	5 [0.32]

* 1.67 gpm/sf [1.08 L/s/m^2] SPECIFIC FLOW RATE IS APPROVED WITH PHOSPHOSORB® (PSORB) MEDIA ONLY



FRAME AND COVER

(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	*
WATER QUALITY FLOW RATE (cfs) [L/s]	*
PEAK FLOW RATE (cfs) [L/s]	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
CARTRIDGE HEIGHT (SEE TABLE ABOVE)	*
NUMBER OF CARTRIDGES REQUIRED	*
CARTRIDGE FLOW RATE	*
MEDIA TYPE (PERLITE, ZPG, PSORB)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE #1	*	*	*
INLET PIPE #2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR SITE SPECIFIC DRAWINGS WITH DETAILED VAULT DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
4. STORMFILTER WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS-20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 5' [1524 mm] AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
6. FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF CLEANING. RADIAL MEDIA DEPTH SHALL BE 7-INCHES [178 mm]. FILTER MEDIA CONTACT TIME SHALL BE AT LEAST 38 SECONDS.
7. SPECIFIC FLOW RATE IS EQUAL TO THE FILTER TREATMENT CAPACITY (gpm) [L/s] DIVIDED BY THE FILTER CONTACT SURFACE AREA (sq ft)[m^2].
8. STORMFILTER STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET PIPE(S).
E. CONTRACTOR TO PROVIDE AND INSTALL CONNECTOR TO THE OUTLET RISER STUB. STORMFILTER EQUIPPED WITH A DUAL DIAMETER HDPE OUTLET STUB AND SAND COLLAR. IF OUTLET PIPE IS LARGER THAN 8 INCHES [200 mm], CONTRACTOR TO REMOVE THE 8 INCH [200 mm] OUTLET STUB AT MOLDED-IN CUT LINE. COUPLING BY FERNCO OR EQUAL AND PROVIDED BY CONTRACTOR.
F. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.

The Stormwater Management StormFilter®

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,322,629; 5,524,576; 5,707,527; 5,985,157; 6,027,639; 6,649,048; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

SFMH96
STORMFILTER
STANDARD DETAIL

Summary for Pond 8.83P: WQ DET & SF-1

Inflow Area = 180,210 sf, 81.06% Impervious, Inflow Depth = 0.83" for WQ SF-1 event
Inflow = 3.7 cfs @ 12.09 hrs, Volume= 12,434 cf
Outflow = 0.7 cfs @ 12.52 hrs, Volume= 12,434 cf, Atten= 80%, Lag= 26.3 min
Primary = 0.5 cfs @ 12.52 hrs, Volume= 12,311 cf
Secondary = 0.3 cfs @ 12.52 hrs, Volume= 123 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 68.62' @ 12.52 hrs Surf.Area= 1,115 sf Storage= 4,521 cf

Plug-Flow detention time= 93.2 min calculated for 12,434 cf (100% of inflow)
Center-of-Mass det. time= 93.2 min (880.1 - 786.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	62.50'	0 cf	**10.00'W x 111.50'L x 8.00'H Field A** 8,920 cf Overall - 5,504 cf Embedded = 3,416 cf x 0.0% Voids
#2A	62.50'	5,504 cf	**CMP Round 96** x 5 Inside #1 Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf Overall Size= 96.0"W x 96.0"H x 20.00'L Row Length Adjustment= +1.50' x 50.27 sf x 1 rows 8.00' Header x 50.27 sf x 1 = 402.1 cf Inside
		5,504 cf	Total Available Storage

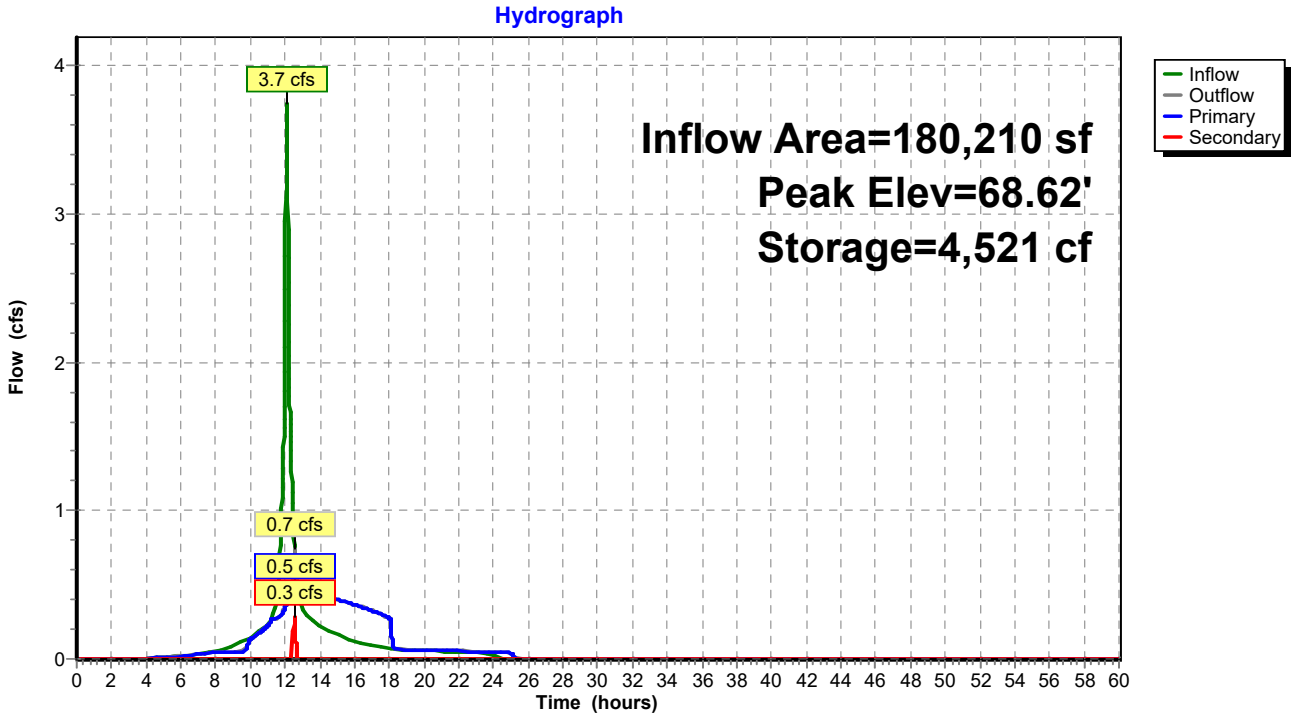
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Device 2	62.50'	**12.0" Round Culvert** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 62.50' / 62.50' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 3	60.60'	**Tube/Siphon/Float Valve X 18.00** 0.586" Diameter, C= 0.600, 0.263" Trickle Diameter Starts@63.35'
#3	Primary	60.60'	**12.0" Round 12" Stormfilter Outlet** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 60.60' / 60.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Secondary	68.58'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 6.08 6.16 6.24 6.32 6.40 6.48 6.56 6.64 6.72 6.80 6.88 6.96 7.04 7.12 7.20 7.28 7.36 7.44 7.52 7.60 7.68 7.76 7.84 7.92 8.00 Width (feet) 6.83 6.73 6.63 6.52 6.40 6.28 6.15 6.01 5.87 5.71 5.55 5.38 5.20 5.01 4.80 4.58 4.34 4.08 3.80 3.49 3.14 2.73 2.24 1.59 0.00

Primary OutFlow Max=0.5 cfs @ 12.52 hrs HW=68.62' (Free Discharge)
└**3=12" Stormfilter Outlet** (Passes 0.5 cfs of 8.2 cfs potential flow)
└**2=Tube/Siphon/Float Valve** (Orifice Controls 0.5 cfs @ 13.64 fps)
└**1=Culvert** (Passes 0.5 cfs of 9.0 cfs potential flow)

Secondary OutFlow Max=0.2 cfs @ 12.52 hrs HW=68.62' (Free Discharge)
└**4=Custom Weir/Orifice** (Weir Controls 0.2 cfs @ 0.69 fps)

Pond 8.83P: WQ DET & SF-1



Summary for Pond 3.32P: WQ DET & SF-2

Inflow Area = 105,340 sf, 85.47% Impervious, Inflow Depth = 0.82" for WQ SF-2 event
Inflow = 2.2 cfs @ 12.09 hrs, Volume= 7,215 cf
Outflow = 0.3 cfs @ 12.59 hrs, Volume= 7,215 cf, Atten= 85%, Lag= 30.1 min
Primary = 0.3 cfs @ 12.59 hrs, Volume= 7,195 cf
Secondary = 0.0 cfs @ 12.59 hrs, Volume= 20 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 62.41' @ 12.59 hrs Surf.Area= 1,634 sf Storage= 2,580 cf

Plug-Flow detention time= 87.6 min calculated for 7,214 cf (100% of inflow)
Center-of-Mass det. time= 87.6 min (874.4 - 786.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	60.00'	0 cf	**8.00'W x 204.25'L x 9.00'H Field A** 14,706 cf Overall - 10,166 cf Embedded = 4,540 cf x 0.0% Voids
#2A	60.00'	10,166 cf	**CMP Round 96** x 9 Inside #1 Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf Overall Size= 96.0"W x 96.0"H x 20.00'L Row Length Adjustment= +14.25' x 50.27 sf x 1 rows 8.00' Header x 50.27 sf x 1 = 402.1 cf Inside
		10,166 cf	Total Available Storage

Storage Group A created with Chamber Wizard

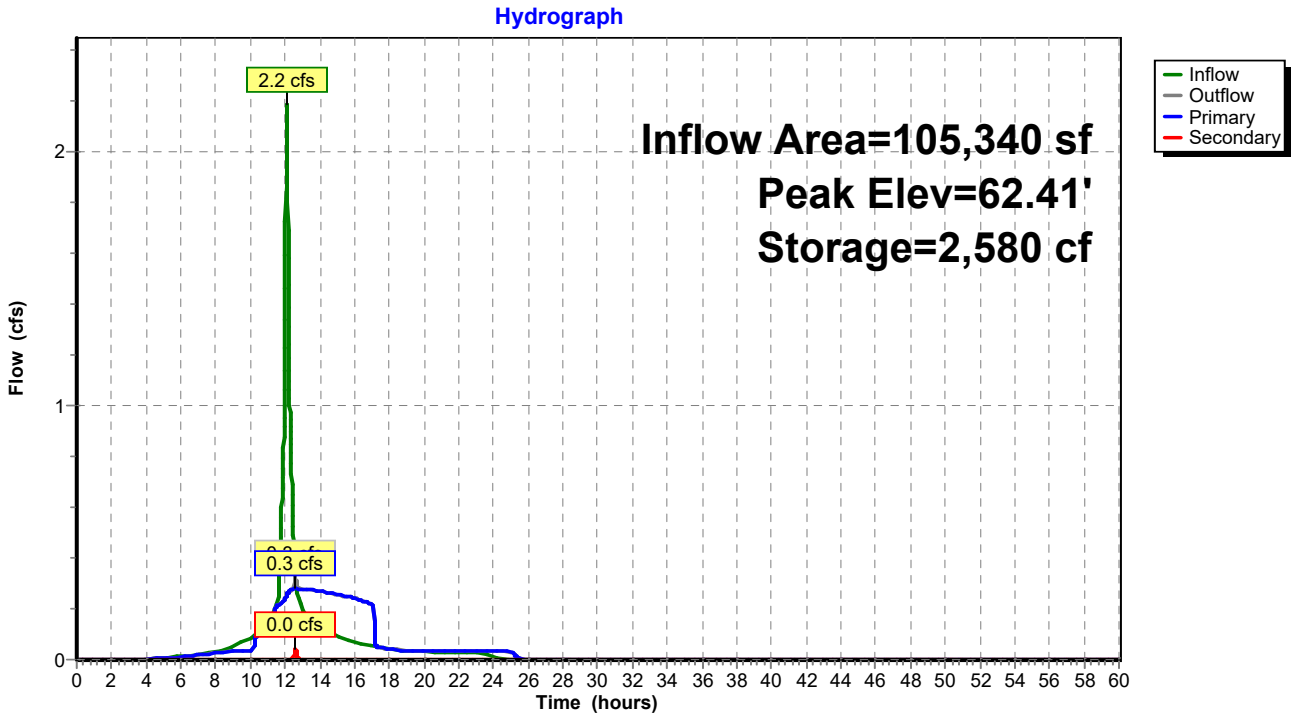
Device	Routing	Invert	Outlet Devices
#1	Device 2	60.00'	**12.0" Round Culvert** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 60.00' / 59.95' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 3	57.70'	**Tube/Siphon/Float Valve X 11.00** 0.668" Diameter, C= 0.600, 0.263" Trickle Diameter Starts@60.45'
#3	Primary	57.70'	**12.0" Round 12" Stormfilter Outlet** L= 13.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 57.70' / 57.60' S= 0.0077 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Secondary	62.40'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 2.40 2.48 2.56 2.64 2.72 2.80 2.88 2.96 3.04 3.12 3.20 3.28 3.36 3.44 3.52 3.60 3.68 3.76 3.84 3.92 4.00 4.08 4.16 4.24 4.32 4.40 4.48 4.56 4.64 4.72 4.80 4.88 4.96 5.04 5.12 5.20 5.28 5.36 5.44 5.52 5.60 5.68 5.76 5.84 5.92 6.00 6.08 6.16 6.24 6.32 6.40 6.48 6.56 6.64 6.72 6.80 6.88 6.96 7.04 7.12 7.20 7.28 7.36 7.44 7.52 7.60 7.68 7.76 7.84 7.92 8.00 Width (feet) 7.33 7.40 7.46 7.52 7.58 7.63 7.68 7.72 7.77 7.80 7.84 7.87 7.90 7.92 7.94 7.96 7.97 7.99 7.99 8.00 8.00 8.00 7.99 7.99 7.97 7.96 7.94 7.92 7.90 7.87 7.84 7.80 7.77 7.72 7.68 7.63 7.58 7.52 7.46 7.40 7.33 7.26 7.18 7.10 7.02 6.93 6.83 6.73 6.63 6.52 6.40 6.28 6.15 6.01 5.87 5.71 5.55 5.38 5.20 5.01 4.80 4.58 4.34 4.08 3.80 3.49 3.14 2.73 2.24 1.59

0.00

Primary OutFlow Max=0.3 cfs @ 12.59 hrs HW=62.41' (Free Discharge)
└**3=12" Stormfilter Outlet** (Passes 0.3 cfs of 6.1 cfs potential flow)
└**2=Tube/Siphon/Float Valve** (Orifice Controls 0.3 cfs @ 10.45 fps)
└**1=Culvert** (Passes 0.3 cfs of 5.2 cfs potential flow)

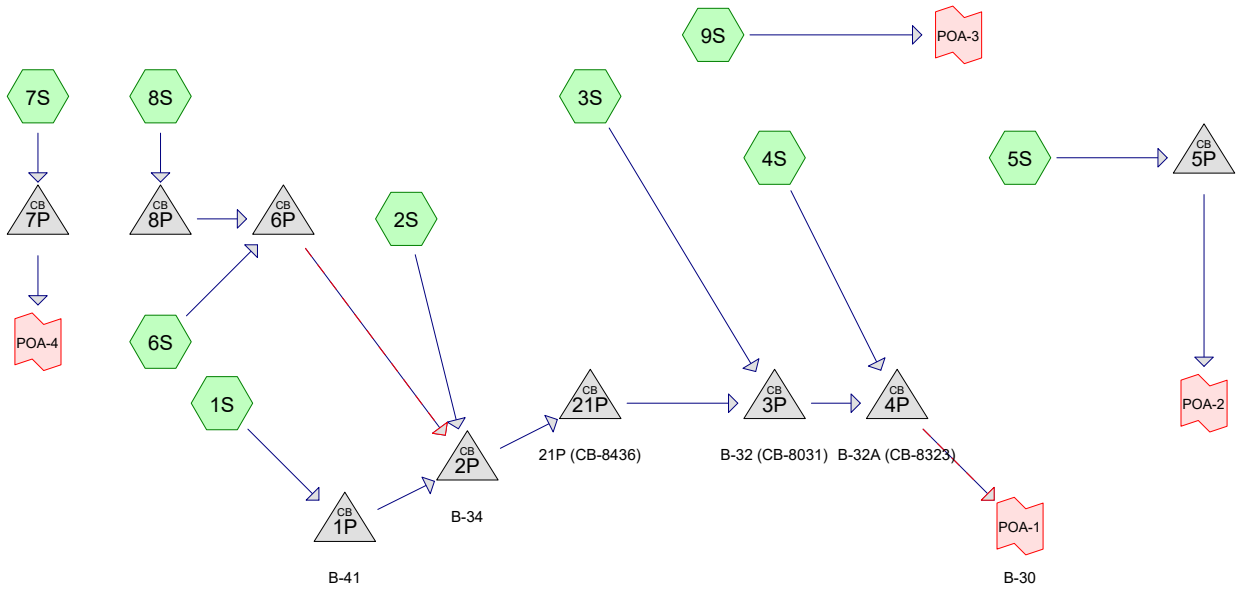
Secondary OutFlow Max=0.0 cfs @ 12.59 hrs HW=62.41' (Free Discharge)
└**4=Custom Weir/Orifice** (Weir Controls 0.0 cfs @ 0.33 fps)

Pond 3.32P: WQ DET & SF-2



Appendix 2A

Existing Conditions HydroCAD Summary



Subcat Reach Pond Link

Routing Diagram for 19059 - PRE
Prepared by Sebago Technics, Inc., Printed 2/23/2024
HydroCAD® 10.00-24 s/n 01856 © 2018 HydroCAD Software Solutions LLC

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Runoff Area=34,840 sf 96.15% Impervious Runoff Depth=2.82"
Tc=6.0 min CN=WQ Runoff=2.4 cfs 8,185 cf

Subcatchment2S: Runoff Area=23,550 sf 62.59% Impervious Runoff Depth=2.43"
Tc=6.0 min CN=WQ Runoff=1.4 cfs 4,761 cf

Subcatchment3S: Runoff Area=107,470 sf 32.46% Impervious Runoff Depth=2.04"
Flow Length=835' Tc=33.4 min CN=WQ Runoff=3.0 cfs 18,233 cf

Subcatchment4S: Runoff Area=80,650 sf 29.23% Impervious Runoff Depth=2.58"
Flow Length=480' Tc=7.8 min CN=WQ Runoff=4.9 cfs 17,338 cf

Subcatchment5S: Runoff Area=35,560 sf 28.26% Impervious Runoff Depth=2.62"
Tc=6.0 min CN=WQ Runoff=2.3 cfs 7,757 cf

Subcatchment6S: Runoff Area=63,780 sf 67.70% Impervious Runoff Depth=2.37"
Flow Length=280' Tc=14.5 min CN=WQ Runoff=2.9 cfs 12,622 cf

Subcatchment7S: Runoff Area=71,445 sf 40.30% Impervious Runoff Depth=2.05"
Flow Length=460' Tc=25.7 min CN=WQ Runoff=2.3 cfs 12,219 cf

Subcatchment8S: Runoff Area=84,725 sf 9.68% Impervious Runoff Depth=1.36"
Flow Length=505' Tc=27.8 min CN=WQ Runoff=1.7 cfs 9,571 cf

Subcatchment9S: Runoff Area=15,800 sf 0.00% Impervious Runoff Depth=1.53"
Tc=6.0 min CN=83 Runoff=0.6 cfs 2,011 cf

Pond 1P: B-41 Peak Elev=58.76' Inflow=2.4 cfs 8,185 cf
18.0" Round Culvert n=0.013 L=15.0' S=0.0100 '/' Outflow=2.4 cfs 8,185 cf

Pond 2P: B-34 Peak Elev=59.25' Inflow=6.7 cfs 35,138 cf
18.0" Round Culvert n=0.013 L=140.0' S=0.0116 '/' Outflow=6.7 cfs 35,138 cf

Pond 3P: B-32 (CB-8031) Peak Elev=57.21' Inflow=8.1 cfs 53,372 cf
24.0" Round Culvert n=0.013 L=22.0' S=-0.0036 '/' Outflow=8.1 cfs 53,372 cf

Pond 4P: B-32A (CB-8323) Peak Elev=57.69' Inflow=12.9 cfs 70,710 cf
Primary=12.9 cfs 70,710 cf Secondary=0.0 cfs 0 cf Outflow=12.9 cfs 70,710 cf

Pond 5P: Peak Elev=60.88' Inflow=2.3 cfs 7,757 cf
15.0" Round Culvert n=0.013 L=50.0' S=0.0100 '/' Outflow=2.3 cfs 7,757 cf

Pond 6P: Peak Elev=64.44' Inflow=4.1 cfs 22,193 cf
Primary=4.1 cfs 22,193 cf Secondary=0.0 cfs 0 cf Outflow=4.1 cfs 22,193 cf

Pond 7P: Peak Elev=66.07' Inflow=2.3 cfs 12,219 cf
12.0" Round Culvert n=0.013 L=100.0' S=0.0100 '/' Outflow=2.3 cfs 12,219 cf

Pond 8P: Peak Elev=64.34' Inflow=1.7 cfs 9,571 cf
12.0" Round Culvert n=0.013 L=70.0' S=0.0189 '/' Outflow=1.7 cfs 9,571 cf

Pond 21P: 21P (CB-8436) Peak Elev=57.37' Inflow=6.7 cfs 35,138 cf
24.0" Round Culvert n=0.013 L=90.0' S=0.0029 '/' Outflow=6.7 cfs 35,138 cf

Link POA-1: B-30 Inflow=12.9 cfs 70,710 cf
Primary=12.9 cfs 70,710 cf

Link POA-2: Inflow=2.3 cfs 7,757 cf
Primary=2.3 cfs 7,757 cf

Link POA-3: Inflow=0.6 cfs 2,011 cf
Primary=0.6 cfs 2,011 cf

Link POA-4: Inflow=2.3 cfs 12,219 cf
Primary=2.3 cfs 12,219 cf

Total Runoff Area = 517,820 sf Runoff Volume = 92,697 cf Average Runoff Depth = 2.15"
61.97% Pervious = 320,900 sf 38.03% Impervious = 196,920 sf

Summary for Subcatchment 1S:

Runoff = 2.4 cfs @ 12.08 hrs, Volume= 8,185 cf, Depth= 2.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
33,500	98	Paved parking, HSG D
1,340	84	50-75% Grass cover, Fair, HSG D
34,840		Weighted Average
1,340		3.85% Pervious Area
33,500		96.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 2S:

Runoff = 1.4 cfs @ 12.09 hrs, Volume= 4,761 cf, Depth= 2.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
14,740	98	Paved parking, HSG D
730	96	Gravel surface, HSG D
8,080	84	50-75% Grass cover, Fair, HSG D
23,550		Weighted Average
8,810		37.41% Pervious Area
14,740		62.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 3S:

Runoff = 3.0 cfs @ 12.44 hrs, Volume= 18,233 cf, Depth= 2.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
34,880	98	Paved parking, HSG D
7,880	96	Gravel surface, HSG D
2,770	84	50-75% Grass cover, Fair, HSG D
58,940	83	Woods, Poor, HSG D
3,000	77	Woods, Poor, HSG C
107,470		Weighted Average
72,590		67.54% Pervious Area
34,880		32.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.5	100	0.0150	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.10"
6.8	250	0.0150	0.61		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.6	100	0.0300	2.79		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
0.1	10	0.0100	1.50		**Shallow Concentrated Flow, D-E** Grassed Waterway Kv= 15.0 fps
0.1	25	0.0200	2.87		**Shallow Concentrated Flow, E-F** Paved Kv= 20.3 fps
0.1	10	0.0200	2.12		**Shallow Concentrated Flow, F-G** Grassed Waterway Kv= 15.0 fps
0.7	170	0.0400	4.06		**Shallow Concentrated Flow, G-H** Paved Kv= 20.3 fps
0.5	170	0.0100	5.90	4.63	**Pipe Channel, H-I** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
33.4	835	Total			

Summary for Subcatchment 4S:

Runoff = 4.9 cfs @ 12.11 hrs, Volume= 17,338 cf, Depth= 2.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
23,570	98	Paved parking, HSG D
46,780	96	Gravel surface, HSG D
10,300	84	50-75% Grass cover, Fair, HSG D
80,650		Weighted Average
57,080		70.77% Pervious Area
23,570		29.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	20	0.0400	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.10"
1.0	180	0.0350	3.01		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
2.2	280	0.0200	2.12		**Shallow Concentrated Flow, C-D** Grassed Waterway Kv= 15.0 fps
7.8	480	Total			

Summary for Subcatchment 5S:

Runoff = 2.3 cfs @ 12.08 hrs, Volume= 7,757 cf, Depth= 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	10,050	98	Paved parking, HSG D
	22,320	96	Gravel surface, HSG D
	3,190	84	50-75% Grass cover, Fair, HSG D
	35,560		Weighted Average
	25,510		71.74% Pervious Area
	10,050		28.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 6S:

Runoff = 2.9 cfs @ 12.19 hrs, Volume= 12,622 cf, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
37,150	98	Paved parking, HSG D
6,030	98	Roofs, HSG D
640	96	Gravel surface, HSG D
1,670	79	50-75% Grass cover, Fair, HSG C
6,470	84	50-75% Grass cover, Fair, HSG D
11,820	77	Woods, Poor, HSG C
63,780		Weighted Average
20,600		32.30% Pervious Area
43,180		67.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0700	0.13		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.10"
1.0	65	0.0500	1.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.3	115	0.0100	5.90	4.63	**Pipe Channel, C-D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
14.5	280	Total			

Summary for Subcatchment 7S:

Runoff = 2.3 cfs @ 12.36 hrs, Volume= 12,219 cf, Depth= 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
28,795	98	Paved parking, HSG D
4,120	79	50-75% Grass cover, Fair, HSG C
38,530	83	Woods, Poor, HSG D
71,445		Weighted Average
42,650		59.70% Pervious Area
28,795		40.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.5	110	0.0225	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.10"
2.4	90	0.0150	0.61		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.1	10	0.0150	1.84		**Shallow Concentrated Flow, C-D** Grassed Waterway Kv= 15.0 fps
0.7	250	0.0100	5.90	4.63	**Pipe Channel, D-E** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
25.7	460	Total			

Summary for Subcatchment 8S:

Runoff = 1.7 cfs @ 12.39 hrs, Volume= 9,571 cf, Depth= 1.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
8,205	98	Paved parking, HSG D
10,390	83	Woods, Poor, HSG D
66,130	77	Woods, Poor, HSG C
84,725		Weighted Average
76,520		90.32% Pervious Area
8,205		9.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	110	0.0300	0.09		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.10"
6.9	180	0.0075	0.43		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.4	35	0.1000	1.58		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
0.5	180	0.0100	5.90	4.63	**Pipe Channel, D-E** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
27.8	505	Total			

Summary for Subcatchment 9S:

Runoff = 0.6 cfs @ 12.09 hrs, Volume= 2,011 cf, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
15,800	83	Woods, Poor, HSG D
15,800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Pond 1P: B-41

Inflow Area = 34,840 sf, 96.15% Impervious, Inflow Depth = 2.82" for 2-YR event
Inflow = 2.4 cfs @ 12.08 hrs, Volume= 8,185 cf
Outflow = 2.4 cfs @ 12.08 hrs, Volume= 8,185 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.4 cfs @ 12.08 hrs, Volume= 8,185 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 58.76' @ 12.08 hrs
Flood Elev= 63.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	57.90'	**18.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900

Inlet / Outlet Invert= 57.90' / 57.75' S= 0.0100 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.4 cfs @ 12.08 hrs HW=58.76' (Free Discharge)
1=Culvert (Barrel Controls 2.4 cfs @ 3.26 fps)

Summary for Pond 2P: B-34

Inflow Area = 206,895 sf, 48.15% Impervious, Inflow Depth = 2.04" for 2-YR event
Inflow = 6.7 cfs @ 12.11 hrs, Volume= 35,138 cf
Outflow = 6.7 cfs @ 12.11 hrs, Volume= 35,138 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.7 cfs @ 12.11 hrs, Volume= 35,138 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 59.25' @ 12.11 hrs
Flood Elev= 63.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	57.50'	**18.0" Round Culvert**
			L= 140.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 57.50' / 55.88' S= 0.0116 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=6.7 cfs @ 12.11 hrs HW=59.25' (Free Discharge)
1=Culvert (Inlet Controls 6.7 cfs @ 3.80 fps)

Summary for Pond 3P: B-32 (CB-8031)

Inflow Area = 314,365 sf, 42.79% Impervious, Inflow Depth = 2.04" for 2-YR event
Inflow = 8.1 cfs @ 12.13 hrs, Volume= 53,372 cf
Outflow = 8.1 cfs @ 12.13 hrs, Volume= 53,372 cf, Atten= 0%, Lag= 0.0 min
Primary = 8.1 cfs @ 12.13 hrs, Volume= 53,372 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 57.21' @ 12.13 hrs
Flood Elev= 66.13'

Device	Routing	Invert	Outlet Devices
#1	Primary	55.52'	**24.0" Round Culvert**
			L= 22.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 55.44' / 55.52' S= -0.0036 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=8.1 cfs @ 12.13 hrs HW=57.21' (Free Discharge)
1=Culvert (Barrel Controls 8.1 cfs @ 3.66 fps)

Summary for Pond 4P: B-32A (CB-8323)

Inflow Area = 395,015 sf, 40.02% Impervious, Inflow Depth = 2.15" for 2-YR event
Inflow = 12.9 cfs @ 12.12 hrs, Volume= 70,710 cf
Outflow = 12.9 cfs @ 12.12 hrs, Volume= 70,710 cf, Atten= 0%, Lag= 0.0 min
Primary = 12.9 cfs @ 12.12 hrs, Volume= 70,710 cf
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 57.69' @ 12.12 hrs
Flood Elev= 59.75'

Device	Routing	Invert	Outlet Devices
#1	Primary	55.52'	**24.0" Round Culvert** L= 115.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 55.52' / 54.90' S= 0.0054 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Secondary	59.39'	**15.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=12.9 cfs @ 12.12 hrs HW=57.69' (Free Discharge)
└**1=Culvert** (Inlet Controls 12.9 cfs @ 4.11 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=55.52' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Summary for Pond 5P:

Inflow Area = 35,560 sf, 28.26% Impervious, Inflow Depth = 2.62" for 2-YR event
Inflow = 2.3 cfs @ 12.08 hrs, Volume= 7,757 cf
Outflow = 2.3 cfs @ 12.08 hrs, Volume= 7,757 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.3 cfs @ 12.08 hrs, Volume= 7,757 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 60.88' @ 12.08 hrs
Flood Elev= 66.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	60.00'	**15.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 60.00' / 59.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.3 cfs @ 12.08 hrs HW=60.88' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.3 cfs @ 2.52 fps)

Summary for Pond 6P:

Inflow Area = 148,505 sf, 34.60% Impervious, Inflow Depth = 1.79" for 2-YR event
Inflow = 4.1 cfs @ 12.23 hrs, Volume= 22,193 cf
Outflow = 4.1 cfs @ 12.23 hrs, Volume= 22,193 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.1 cfs @ 12.23 hrs, Volume= 22,193 cf
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 64.44' @ 12.23 hrs
Flood Elev= 71.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	62.08'	**12.0" Round Culvert** L= 300.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.08' / 57.67' S= 0.0147 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	70.50'	**12.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=4.1 cfs @ 12.23 hrs HW=64.44' (Free Discharge)
1=Culvert (Inlet Controls 4.1 cfs @ 5.19 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=62.08' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

Summary for Pond 7P:

Inflow Area = 71,445 sf, 40.30% Impervious, Inflow Depth = 2.05" for 2-YR event
Inflow = 2.3 cfs @ 12.36 hrs, Volume= 12,219 cf
Outflow = 2.3 cfs @ 12.36 hrs, Volume= 12,219 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.3 cfs @ 12.36 hrs, Volume= 12,219 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 66.07' @ 12.36 hrs
Flood Elev= 69.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	65.00'	**12.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.00' / 64.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.3 cfs @ 12.36 hrs HW=66.07' (Free Discharge)
1=Culvert (Inlet Controls 2.3 cfs @ 2.87 fps)

Summary for Pond 8P:

Inflow Area = 84,725 sf, 9.68% Impervious, Inflow Depth = 1.36" for 2-YR event
Inflow = 1.7 cfs @ 12.39 hrs, Volume= 9,571 cf
Outflow = 1.7 cfs @ 12.39 hrs, Volume= 9,571 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.7 cfs @ 12.39 hrs, Volume= 9,571 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 64.34' @ 12.39 hrs
Flood Elev= 71.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	63.50'	**12.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 63.50' / 62.18' S= 0.0189 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.7 cfs @ 12.39 hrs HW=64.34' (Free Discharge)
1=Culvert (Inlet Controls 1.7 cfs @ 2.46 fps)

Summary for Pond 21P: 21P (CB-8436)

Inflow Area = 206,895 sf, 48.15% Impervious, Inflow Depth = 2.04" for 2-YR event
Inflow = 6.7 cfs @ 12.11 hrs, Volume= 35,138 cf
Outflow = 6.7 cfs @ 12.11 hrs, Volume= 35,138 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.7 cfs @ 12.11 hrs, Volume= 35,138 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 57.37' @ 12.11 hrs
Flood Elev= 67.48'

Device	Routing	Invert	Outlet Devices
#1	Primary	55.88'	**24.0" Round Culvert** L= 90.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 55.88' / 55.62' S= 0.0029 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=6.7 cfs @ 12.11 hrs HW=57.37' (Free Discharge)
1=Culvert (Barrel Controls 6.7 cfs @ 3.73 fps)

Summary for Link POA-1: B-30

Inflow Area = 395,015 sf, 40.02% Impervious, Inflow Depth = 2.15" for 2-YR event
Inflow = 12.9 cfs @ 12.12 hrs, Volume= 70,710 cf
Primary = 12.9 cfs @ 12.12 hrs, Volume= 70,710 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Link POA-2:

Inflow Area = 35,560 sf, 28.26% Impervious, Inflow Depth = 2.62" for 2-YR event
Inflow = 2.3 cfs @ 12.08 hrs, Volume= 7,757 cf
Primary = 2.3 cfs @ 12.08 hrs, Volume= 7,757 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Link POA-3:

Inflow Area = 15,800 sf, 0.00% Impervious, Inflow Depth = 1.53" for 2-YR event
Inflow = 0.6 cfs @ 12.09 hrs, Volume= 2,011 cf
Primary = 0.6 cfs @ 12.09 hrs, Volume= 2,011 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Link POA-4:

Inflow Area = 71,445 sf, 40.30% Impervious, Inflow Depth = 2.05" for 2-YR event
Inflow = 2.3 cfs @ 12.36 hrs, Volume= 12,219 cf
Primary = 2.3 cfs @ 12.36 hrs, Volume= 12,219 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Runoff Area=34,840 sf 96.15% Impervious Runoff Depth=4.31"
Tc=6.0 min CN=WQ Runoff=3.6 cfs 12,507 cf

Subcatchment2S: Runoff Area=23,550 sf 62.59% Impervious Runoff Depth=3.86"
Tc=6.0 min CN=WQ Runoff=2.2 cfs 7,569 cf

Subcatchment3S: Runoff Area=107,470 sf 32.46% Impervious Runoff Depth=3.40"
Flow Length=835' Tc=33.4 min CN=WQ Runoff=5.0 cfs 30,468 cf

Subcatchment4S: Runoff Area=80,650 sf 29.23% Impervious Runoff Depth=4.05"
Flow Length=480' Tc=7.8 min CN=WQ Runoff=7.5 cfs 27,187 cf

Subcatchment5S: Runoff Area=35,560 sf 28.26% Impervious Runoff Depth=4.09"
Tc=6.0 min CN=WQ Runoff=3.5 cfs 12,119 cf

Subcatchment6S: Runoff Area=63,780 sf 67.70% Impervious Runoff Depth=3.78"
Flow Length=280' Tc=14.5 min CN=WQ Runoff=4.5 cfs 20,090 cf

Subcatchment7S: Runoff Area=71,445 sf 40.30% Impervious Runoff Depth=3.42"
Flow Length=460' Tc=25.7 min CN=WQ Runoff=3.8 cfs 20,353 cf

Subcatchment8S: Runoff Area=84,725 sf 9.68% Impervious Runoff Depth=2.56"
Flow Length=505' Tc=27.8 min CN=WQ Runoff=3.3 cfs 18,052 cf

Subcatchment9S: Runoff Area=15,800 sf 0.00% Impervious Runoff Depth=2.81"
Tc=6.0 min CN=83 Runoff=1.2 cfs 3,706 cf

Pond 1P: B-41 Peak Elev=59.00' Inflow=3.6 cfs 12,507 cf
18.0" Round Culvert n=0.013 L=15.0' S=0.0100 '/' Outflow=3.6 cfs 12,507 cf

Pond 2P: B-34 Peak Elev=60.86' Inflow=10.9 cfs 58,219 cf
18.0" Round Culvert n=0.013 L=140.0' S=0.0116 '/' Outflow=10.9 cfs 58,219 cf

Pond 3P: B-32 (CB-8031) Peak Elev=57.96' Inflow=13.4 cfs 88,687 cf
24.0" Round Culvert n=0.013 L=22.0' S=-0.0036 '/' Outflow=13.4 cfs 88,687 cf

Pond 4P: B-32A (CB-8323) Peak Elev=59.43' Inflow=20.7 cfs 115,873 cf
Primary=20.4 cfs 115,836 cf Secondary=0.3 cfs 37 cf Outflow=20.7 cfs 115,873 cf

Pond 5P: Peak Elev=61.19' Inflow=3.5 cfs 12,119 cf
15.0" Round Culvert n=0.013 L=50.0' S=0.0100 '/' Outflow=3.5 cfs 12,119 cf

Pond 6P: Peak Elev=70.56' Inflow=7.0 cfs 38,143 cf
Primary=6.5 cfs 37,911 cf Secondary=0.5 cfs 231 cf Outflow=7.0 cfs 38,143 cf

Pond 7P: Peak Elev=67.08' Inflow=3.8 cfs 20,353 cf
12.0" Round Culvert n=0.013 L=100.0' S=0.0100 '/' Outflow=3.8 cfs 20,353 cf

Pond 8P: Peak Elev=65.25' Inflow=3.3 cfs 18,052 cf
12.0" Round Culvert n=0.013 L=70.0' S=0.0189 '/' Outflow=3.3 cfs 18,052 cf

Pond 21P: 21P (CB-8436) Peak Elev=57.91' Inflow=10.9 cfs 58,219 cf
24.0" Round Culvert n=0.013 L=90.0' S=0.0029 '/' Outflow=10.9 cfs 58,219 cf

Link POA-1: B-30 Inflow=20.7 cfs 115,873 cf
Primary=20.7 cfs 115,873 cf

Link POA-2: Inflow=3.5 cfs 12,119 cf
Primary=3.5 cfs 12,119 cf

Link POA-3: Inflow=1.2 cfs 3,706 cf
Primary=1.2 cfs 3,706 cf

Link POA-4: Inflow=3.8 cfs 20,353 cf
Primary=3.8 cfs 20,353 cf

Total Runoff Area = 517,820 sf Runoff Volume = 152,052 cf Average Runoff Depth = 3.52"
61.97% Pervious = 320,900 sf 38.03% Impervious = 196,920 sf

Summary for Subcatchment 1S:

Runoff = 3.6 cfs @ 12.08 hrs, Volume= 12,507 cf, Depth= 4.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
33,500	98	Paved parking, HSG D
1,340	84	50-75% Grass cover, Fair, HSG D
34,840		Weighted Average
1,340		3.85% Pervious Area
33,500		96.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 2S:

Runoff = 2.2 cfs @ 12.08 hrs, Volume= 7,569 cf, Depth= 3.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
14,740	98	Paved parking, HSG D
730	96	Gravel surface, HSG D
8,080	84	50-75% Grass cover, Fair, HSG D
23,550		Weighted Average
8,810		37.41% Pervious Area
14,740		62.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 3S:

Runoff = 5.0 cfs @ 12.44 hrs, Volume= 30,468 cf, Depth= 3.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
34,880	98	Paved parking, HSG D
7,880	96	Gravel surface, HSG D
2,770	84	50-75% Grass cover, Fair, HSG D
58,940	83	Woods, Poor, HSG D
3,000	77	Woods, Poor, HSG C
107,470		Weighted Average
72,590		67.54% Pervious Area
34,880		32.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.5	100	0.0150	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.10"
6.8	250	0.0150	0.61		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.6	100	0.0300	2.79		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
0.1	10	0.0100	1.50		**Shallow Concentrated Flow, D-E** Grassed Waterway Kv= 15.0 fps
0.1	25	0.0200	2.87		**Shallow Concentrated Flow, E-F** Paved Kv= 20.3 fps
0.1	10	0.0200	2.12		**Shallow Concentrated Flow, F-G** Grassed Waterway Kv= 15.0 fps
0.7	170	0.0400	4.06		**Shallow Concentrated Flow, G-H** Paved Kv= 20.3 fps
0.5	170	0.0100	5.90	4.63	**Pipe Channel, H-I** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
33.4	835	Total			

Summary for Subcatchment 4S:

Runoff = 7.5 cfs @ 12.11 hrs, Volume= 27,187 cf, Depth= 4.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
23,570	98	Paved parking, HSG D
46,780	96	Gravel surface, HSG D
10,300	84	50-75% Grass cover, Fair, HSG D
80,650		Weighted Average
57,080		70.77% Pervious Area
23,570		29.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	20	0.0400	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.10"
1.0	180	0.0350	3.01		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
2.2	280	0.0200	2.12		**Shallow Concentrated Flow, C-D** Grassed Waterway Kv= 15.0 fps
7.8	480	Total			

Summary for Subcatchment 5S:

Runoff = 3.5 cfs @ 12.08 hrs, Volume= 12,119 cf, Depth= 4.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	10,050	98	Paved parking, HSG D
	22,320	96	Gravel surface, HSG D
	3,190	84	50-75% Grass cover, Fair, HSG D
	35,560		Weighted Average
	25,510		71.74% Pervious Area
	10,050		28.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 6S:

Runoff = 4.5 cfs @ 12.19 hrs, Volume= 20,090 cf, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
37,150	98	Paved parking, HSG D
6,030	98	Roofs, HSG D
640	96	Gravel surface, HSG D
1,670	79	50-75% Grass cover, Fair, HSG C
6,470	84	50-75% Grass cover, Fair, HSG D
11,820	77	Woods, Poor, HSG C
63,780		Weighted Average
20,600		32.30% Pervious Area
43,180		67.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0700	0.13		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.10"
1.0	65	0.0500	1.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.3	115	0.0100	5.90	4.63	**Pipe Channel, C-D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
14.5	280	Total			

Summary for Subcatchment 7S:

Runoff = 3.8 cfs @ 12.34 hrs, Volume= 20,353 cf, Depth= 3.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
28,795	98	Paved parking, HSG D
4,120	79	50-75% Grass cover, Fair, HSG C
38,530	83	Woods, Poor, HSG D
71,445		Weighted Average
42,650		59.70% Pervious Area
28,795		40.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.5	110	0.0225	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.10"
2.4	90	0.0150	0.61		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.1	10	0.0150	1.84		**Shallow Concentrated Flow, C-D** Grassed Waterway Kv= 15.0 fps
0.7	250	0.0100	5.90	4.63	**Pipe Channel, D-E** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
25.7	460	Total			

Summary for Subcatchment 8S:

Runoff = 3.3 cfs @ 12.39 hrs, Volume= 18,052 cf, Depth= 2.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
8,205	98	Paved parking, HSG D
10,390	83	Woods, Poor, HSG D
66,130	77	Woods, Poor, HSG C
84,725		Weighted Average
76,520		90.32% Pervious Area
8,205		9.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	110	0.0300	0.09		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.10"
6.9	180	0.0075	0.43		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.4	35	0.1000	1.58		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
0.5	180	0.0100	5.90	4.63	**Pipe Channel, D-E** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
27.8	505	Total			

Summary for Subcatchment 9S:

Runoff = 1.2 cfs @ 12.09 hrs, Volume= 3,706 cf, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
15,800	83	Woods, Poor, HSG D
15,800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Pond 1P: B-41

Inflow Area = 34,840 sf, 96.15% Impervious, Inflow Depth = 4.31" for 10-YR event
Inflow = 3.6 cfs @ 12.08 hrs, Volume= 12,507 cf
Outflow = 3.6 cfs @ 12.08 hrs, Volume= 12,507 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.6 cfs @ 12.08 hrs, Volume= 12,507 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 59.00' @ 12.08 hrs
Flood Elev= 63.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	57.90'	**18.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900

Inlet / Outlet Invert= 57.90' / 57.75' S= 0.0100 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.6 cfs @ 12.08 hrs HW=59.00' (Free Discharge)
1=Culvert (Barrel Controls 3.6 cfs @ 3.57 fps)

Summary for Pond 2P: B-34

Inflow Area = 206,895 sf, 48.15% Impervious, Inflow Depth = 3.38" for 10-YR event
Inflow = 10.9 cfs @ 12.12 hrs, Volume= 58,219 cf
Outflow = 10.9 cfs @ 12.12 hrs, Volume= 58,219 cf, Atten= 0%, Lag= 0.0 min
Primary = 10.9 cfs @ 12.12 hrs, Volume= 58,219 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 60.86' @ 12.12 hrs
Flood Elev= 63.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	57.50'	**18.0" Round Culvert**
			L= 140.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 57.50' / 55.88' S= 0.0116 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=10.8 cfs @ 12.12 hrs HW=60.86' (Free Discharge)
1=Culvert (Inlet Controls 10.8 cfs @ 6.14 fps)

Summary for Pond 3P: B-32 (CB-8031)

Inflow Area = 314,365 sf, 42.79% Impervious, Inflow Depth = 3.39" for 10-YR event
Inflow = 13.4 cfs @ 12.26 hrs, Volume= 88,687 cf
Outflow = 13.4 cfs @ 12.26 hrs, Volume= 88,687 cf, Atten= 0%, Lag= 0.0 min
Primary = 13.4 cfs @ 12.26 hrs, Volume= 88,687 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 57.96' @ 12.26 hrs
Flood Elev= 66.13'

Device	Routing	Invert	Outlet Devices
#1	Primary	55.52'	**24.0" Round Culvert**
			L= 22.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 55.44' / 55.52' S= -0.0036 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=13.4 cfs @ 12.26 hrs HW=57.96' (Free Discharge)
1=Culvert (Barrel Controls 13.4 cfs @ 4.37 fps)

Summary for Pond 4P: B-32A (CB-8323)

Inflow Area = 395,015 sf, 40.02% Impervious, Inflow Depth = 3.52" for 10-YR event
Inflow = 20.7 cfs @ 12.12 hrs, Volume= 115,873 cf
Outflow = 20.7 cfs @ 12.12 hrs, Volume= 115,873 cf, Atten= 0%, Lag= 0.0 min
Primary = 20.4 cfs @ 12.12 hrs, Volume= 115,836 cf
Secondary = 0.3 cfs @ 12.12 hrs, Volume= 37 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 59.43' @ 12.12 hrs
Flood Elev= 59.75'

Device	Routing	Invert	Outlet Devices
#1	Primary	55.52'	**24.0" Round Culvert** L= 115.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 55.52' / 54.90' S= 0.0054 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Secondary	59.39'	**15.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=20.4 cfs @ 12.12 hrs HW=59.42' (Free Discharge)
└**1=Culvert** (Inlet Controls 20.4 cfs @ 6.48 fps)

Secondary OutFlow Max=0.3 cfs @ 12.12 hrs HW=59.42' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 0.3 cfs @ 0.52 fps)

Summary for Pond 5P:

Inflow Area = 35,560 sf, 28.26% Impervious, Inflow Depth = 4.09" for 10-YR event
Inflow = 3.5 cfs @ 12.08 hrs, Volume= 12,119 cf
Outflow = 3.5 cfs @ 12.08 hrs, Volume= 12,119 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.5 cfs @ 12.08 hrs, Volume= 12,119 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 61.19' @ 12.08 hrs
Flood Elev= 66.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	60.00'	**15.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 60.00' / 59.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=3.5 cfs @ 12.08 hrs HW=61.19' (Free Discharge)
└**1=Culvert** (Inlet Controls 3.5 cfs @ 2.93 fps)

Summary for Pond 6P:

Inflow Area = 148,505 sf, 34.60% Impervious, Inflow Depth = 3.08" for 10-YR event
Inflow = 7.0 cfs @ 12.23 hrs, Volume= 38,143 cf
Outflow = 7.0 cfs @ 12.23 hrs, Volume= 38,143 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.5 cfs @ 12.23 hrs, Volume= 37,911 cf
Secondary = 0.5 cfs @ 12.23 hrs, Volume= 231 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 70.56' @ 12.23 hrs
Flood Elev= 71.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	62.08'	**12.0" Round Culvert** L= 300.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.08' / 57.67' S= 0.0147 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	70.50'	**12.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=6.5 cfs @ 12.23 hrs HW=70.56' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 6.5 cfs @ 8.23 fps)

Secondary OutFlow Max=0.5 cfs @ 12.23 hrs HW=70.56' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.5 cfs @ 0.70 fps)

Summary for Pond 7P:

Inflow Area = 71,445 sf, 40.30% Impervious, Inflow Depth = 3.42" for 10-YR event
Inflow = 3.8 cfs @ 12.34 hrs, Volume= 20,353 cf
Outflow = 3.8 cfs @ 12.34 hrs, Volume= 20,353 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.8 cfs @ 12.34 hrs, Volume= 20,353 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 67.08' @ 12.34 hrs
Flood Elev= 69.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	65.00'	**12.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.00' / 64.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.8 cfs @ 12.34 hrs HW=67.08' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 3.8 cfs @ 4.78 fps)

Summary for Pond 8P:

Inflow Area = 84,725 sf, 9.68% Impervious, Inflow Depth = 2.56" for 10-YR event
Inflow = 3.3 cfs @ 12.39 hrs, Volume= 18,052 cf
Outflow = 3.3 cfs @ 12.39 hrs, Volume= 18,052 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.3 cfs @ 12.39 hrs, Volume= 18,052 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 65.25' @ 12.39 hrs
Flood Elev= 71.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	63.50'	**12.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 63.50' / 62.18' S= 0.0189 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.3 cfs @ 12.39 hrs HW=65.25' (Free Discharge)
1=Culvert (Inlet Controls 3.3 cfs @ 4.26 fps)

Summary for Pond 21P: 21P (CB-8436)

Inflow Area = 206,895 sf, 48.15% Impervious, Inflow Depth = 3.38" for 10-YR event
Inflow = 10.9 cfs @ 12.12 hrs, Volume= 58,219 cf
Outflow = 10.9 cfs @ 12.12 hrs, Volume= 58,219 cf, Atten= 0%, Lag= 0.0 min
Primary = 10.9 cfs @ 12.12 hrs, Volume= 58,219 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 57.91' @ 12.12 hrs
Flood Elev= 67.48'

Device	Routing	Invert	Outlet Devices
#1	Primary	55.88'	**24.0" Round Culvert** L= 90.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 55.88' / 55.62' S= 0.0029 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=10.9 cfs @ 12.12 hrs HW=57.91' (Free Discharge)
1=Culvert (Barrel Controls 10.9 cfs @ 4.23 fps)

Summary for Link POA-1: B-30

Inflow Area = 395,015 sf, 40.02% Impervious, Inflow Depth = 3.52" for 10-YR event
Inflow = 20.7 cfs @ 12.12 hrs, Volume= 115,873 cf
Primary = 20.7 cfs @ 12.12 hrs, Volume= 115,873 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Link POA-2:

Inflow Area = 35,560 sf, 28.26% Impervious, Inflow Depth = 4.09" for 10-YR event
Inflow = 3.5 cfs @ 12.08 hrs, Volume= 12,119 cf
Primary = 3.5 cfs @ 12.08 hrs, Volume= 12,119 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Link POA-3:

Inflow Area = 15,800 sf, 0.00% Impervious, Inflow Depth = 2.81" for 10-YR event
Inflow = 1.2 cfs @ 12.09 hrs, Volume= 3,706 cf
Primary = 1.2 cfs @ 12.09 hrs, Volume= 3,706 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Link POA-4:

Inflow Area = 71,445 sf, 40.30% Impervious, Inflow Depth = 3.42" for 10-YR event
Inflow = 3.8 cfs @ 12.34 hrs, Volume= 20,353 cf
Primary = 3.8 cfs @ 12.34 hrs, Volume= 20,353 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Runoff Area=34,840 sf 96.15% Impervious Runoff Depth=5.50"
Tc=6.0 min CN=WQ Runoff=4.5 cfs 15,975 cf

Subcatchment2S: Runoff Area=23,550 sf 62.59% Impervious Runoff Depth=5.02"
Tc=6.0 min CN=WQ Runoff=2.9 cfs 9,856 cf

Subcatchment3S: Runoff Area=107,470 sf 32.46% Impervious Runoff Depth=4.53"
Flow Length=835' Tc=33.4 min CN=WQ Runoff=6.7 cfs 40,604 cf

Subcatchment4S: Runoff Area=80,650 sf 29.23% Impervious Runoff Depth=5.23"
Flow Length=480' Tc=7.8 min CN=WQ Runoff=9.6 cfs 35,138 cf

Subcatchment5S: Runoff Area=35,560 sf 28.26% Impervious Runoff Depth=5.28"
Tc=6.0 min CN=WQ Runoff=4.5 cfs 15,635 cf

Subcatchment6S: Runoff Area=63,780 sf 67.70% Impervious Runoff Depth=4.93"
Flow Length=280' Tc=14.5 min CN=WQ Runoff=5.9 cfs 26,203 cf

Subcatchment7S: Runoff Area=71,445 sf 40.30% Impervious Runoff Depth=4.55"
Flow Length=460' Tc=25.7 min CN=WQ Runoff=5.0 cfs 27,091 cf

Subcatchment8S: Runoff Area=84,725 sf 9.68% Impervious Runoff Depth=3.60"
Flow Length=505' Tc=27.8 min CN=WQ Runoff=4.7 cfs 25,399 cf

Subcatchment9S: Runoff Area=15,800 sf 0.00% Impervious Runoff Depth=3.91"
Tc=6.0 min CN=83 Runoff=1.6 cfs 5,143 cf

Pond 1P: B-41 Peak Elev=59.18' Inflow=4.5 cfs 15,975 cf
18.0" Round Culvert n=0.013 L=15.0' S=0.0100 '/' Outflow=4.5 cfs 15,975 cf

Pond 2P: B-34 Peak Elev=62.76' Inflow=14.3 cfs 77,433 cf
18.0" Round Culvert n=0.013 L=140.0' S=0.0116 '/' Outflow=14.3 cfs 77,433 cf

Pond 3P: B-32 (CB-8031) Peak Elev=58.77' Inflow=17.9 cfs 118,037 cf
24.0" Round Culvert n=0.013 L=22.0' S=-0.0036 '/' Outflow=17.9 cfs 118,037 cf

Pond 4P: B-32A (CB-8323) Peak Elev=59.66' Inflow=27.0 cfs 153,175 cf
Primary=21.1 cfs 149,393 cf Secondary=5.8 cfs 3,782 cf Outflow=27.0 cfs 153,175 cf

Pond 5P: Peak Elev=61.57' Inflow=4.5 cfs 15,635 cf
15.0" Round Culvert n=0.013 L=50.0' S=0.0100 '/' Outflow=4.5 cfs 15,635 cf

Pond 6P: Peak Elev=70.69' Inflow=9.5 cfs 51,602 cf
Primary=6.5 cfs 48,670 cf Secondary=3.0 cfs 2,932 cf Outflow=9.5 cfs 51,602 cf

Pond 7P: Peak Elev=68.28' Inflow=5.0 cfs 27,091 cf
12.0" Round Culvert n=0.013 L=100.0' S=0.0100 '/' Outflow=5.0 cfs 27,091 cf

Pond 8P: Peak Elev=66.50' Inflow=4.7 cfs 25,399 cf
12.0" Round Culvert n=0.013 L=70.0' S=0.0189 '/' Outflow=4.7 cfs 25,399 cf

Pond 21P: 21P (CB-8436) Peak Elev=58.59' Inflow=14.3 cfs 77,433 cf
24.0" Round Culvert n=0.013 L=90.0' S=0.0029 '/' Outflow=14.3 cfs 77,433 cf

Link POA-1: B-30 Inflow=27.0 cfs 153,175 cf
Primary=27.0 cfs 153,175 cf

Link POA-2: Inflow=4.5 cfs 15,635 cf
Primary=4.5 cfs 15,635 cf

Link POA-3: Inflow=1.6 cfs 5,143 cf
Primary=1.6 cfs 5,143 cf

Link POA-4: Inflow=5.0 cfs 27,091 cf
Primary=5.0 cfs 27,091 cf

Total Runoff Area = 517,820 sf Runoff Volume = 201,043 cf Average Runoff Depth = 4.66"
61.97% Pervious = 320,900 sf 38.03% Impervious = 196,920 sf

Summary for Subcatchment 1S:

Runoff = 4.5 cfs @ 12.08 hrs, Volume= 15,975 cf, Depth= 5.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
33,500	98	Paved parking, HSG D
1,340	84	50-75% Grass cover, Fair, HSG D
34,840		Weighted Average
1,340		3.85% Pervious Area
33,500		96.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 2S:

Runoff = 2.9 cfs @ 12.08 hrs, Volume= 9,856 cf, Depth= 5.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
14,740	98	Paved parking, HSG D
730	96	Gravel surface, HSG D
8,080	84	50-75% Grass cover, Fair, HSG D
23,550		Weighted Average
8,810		37.41% Pervious Area
14,740		62.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 3S:

Runoff = 6.7 cfs @ 12.44 hrs, Volume= 40,604 cf, Depth= 4.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
34,880	98	Paved parking, HSG D
7,880	96	Gravel surface, HSG D
2,770	84	50-75% Grass cover, Fair, HSG D
58,940	83	Woods, Poor, HSG D
3,000	77	Woods, Poor, HSG C
107,470		Weighted Average
72,590		67.54% Pervious Area
34,880		32.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.5	100	0.0150	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.10"
6.8	250	0.0150	0.61		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.6	100	0.0300	2.79		**Shallow Concentrated Flow, C-D** Unpaved Kv= 16.1 fps
0.1	10	0.0100	1.50		**Shallow Concentrated Flow, D-E** Grassed Waterway Kv= 15.0 fps
0.1	25	0.0200	2.87		**Shallow Concentrated Flow, E-F** Paved Kv= 20.3 fps
0.1	10	0.0200	2.12		**Shallow Concentrated Flow, F-G** Grassed Waterway Kv= 15.0 fps
0.7	170	0.0400	4.06		**Shallow Concentrated Flow, G-H** Paved Kv= 20.3 fps
0.5	170	0.0100	5.90	4.63	**Pipe Channel, H-I** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
33.4	835	Total			

Summary for Subcatchment 4S:

Runoff = 9.6 cfs @ 12.11 hrs, Volume= 35,138 cf, Depth= 5.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
23,570	98	Paved parking, HSG D
46,780	96	Gravel surface, HSG D
10,300	84	50-75% Grass cover, Fair, HSG D
80,650		Weighted Average
57,080		70.77% Pervious Area
23,570		29.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	20	0.0400	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.10"
1.0	180	0.0350	3.01		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
2.2	280	0.0200	2.12		**Shallow Concentrated Flow, C-D** Grassed Waterway Kv= 15.0 fps
7.8	480	Total			

Summary for Subcatchment 5S:

Runoff = 4.5 cfs @ 12.08 hrs, Volume= 15,635 cf, Depth= 5.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	10,050	98	Paved parking, HSG D
	22,320	96	Gravel surface, HSG D
	3,190	84	50-75% Grass cover, Fair, HSG D
	35,560		Weighted Average
	25,510		71.74% Pervious Area
	10,050		28.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 6S:

Runoff = 5.9 cfs @ 12.19 hrs, Volume= 26,203 cf, Depth= 4.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
37,150	98	Paved parking, HSG D
6,030	98	Roofs, HSG D
640	96	Gravel surface, HSG D
1,670	79	50-75% Grass cover, Fair, HSG C
6,470	84	50-75% Grass cover, Fair, HSG D
11,820	77	Woods, Poor, HSG C
63,780		Weighted Average
20,600		32.30% Pervious Area
43,180		67.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0700	0.13		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.10"
1.0	65	0.0500	1.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.3	115	0.0100	5.90	4.63	**Pipe Channel, C-D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
14.5	280	Total			

Summary for Subcatchment 7S:

Runoff = 5.0 cfs @ 12.34 hrs, Volume= 27,091 cf, Depth= 4.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
28,795	98	Paved parking, HSG D
4,120	79	50-75% Grass cover, Fair, HSG C
38,530	83	Woods, Poor, HSG D
71,445		Weighted Average
42,650		59.70% Pervious Area
28,795		40.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.5	110	0.0225	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.10"
2.4	90	0.0150	0.61		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.1	10	0.0150	1.84		**Shallow Concentrated Flow, C-D** Grassed Waterway Kv= 15.0 fps
0.7	250	0.0100	5.90	4.63	**Pipe Channel, D-E** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
25.7	460	Total			

Summary for Subcatchment 8S:

Runoff = 4.7 cfs @ 12.39 hrs, Volume= 25,399 cf, Depth= 3.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
8,205	98	Paved parking, HSG D
10,390	83	Woods, Poor, HSG D
66,130	77	Woods, Poor, HSG C
84,725		Weighted Average
76,520		90.32% Pervious Area
8,205		9.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	110	0.0300	0.09		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.10"
6.9	180	0.0075	0.43		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.4	35	0.1000	1.58		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
0.5	180	0.0100	5.90	4.63	**Pipe Channel, D-E** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
27.8	505	Total			

Summary for Subcatchment 9S:

Runoff = 1.6 cfs @ 12.09 hrs, Volume= 5,143 cf, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
15,800	83	Woods, Poor, HSG D
15,800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Pond 1P: B-41

Inflow Area = 34,840 sf, 96.15% Impervious, Inflow Depth = 5.50" for 25-YR event
Inflow = 4.5 cfs @ 12.08 hrs, Volume= 15,975 cf
Outflow = 4.5 cfs @ 12.08 hrs, Volume= 15,975 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.5 cfs @ 12.08 hrs, Volume= 15,975 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 59.18' @ 12.08 hrs
Flood Elev= 63.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	57.90'	**18.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900

Inlet / Outlet Invert= 57.90' / 57.75' S= 0.0100 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=4.5 cfs @ 12.08 hrs HW=59.18' (Free Discharge)
└**1=Culvert** (Barrel Controls 4.5 cfs @ 3.77 fps)

Summary for Pond 2P: B-34

Inflow Area = 206,895 sf, 48.15% Impervious, Inflow Depth = 4.49" for 25-YR event
Inflow = 14.3 cfs @ 12.12 hrs, Volume= 77,433 cf
Outflow = 14.3 cfs @ 12.12 hrs, Volume= 77,433 cf, Atten= 0%, Lag= 0.0 min
Primary = 14.3 cfs @ 12.12 hrs, Volume= 77,433 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 62.76' @ 12.12 hrs
Flood Elev= 63.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	57.50'	**18.0" Round Culvert**
			L= 140.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 57.50' / 55.88' S= 0.0116 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=14.3 cfs @ 12.12 hrs HW=62.76' (Free Discharge)
└**1=Culvert** (Inlet Controls 14.3 cfs @ 8.07 fps)

Summary for Pond 3P: B-32 (CB-8031)

Inflow Area = 314,365 sf, 42.79% Impervious, Inflow Depth = 4.51" for 25-YR event
Inflow = 17.9 cfs @ 12.26 hrs, Volume= 118,037 cf
Outflow = 17.9 cfs @ 12.26 hrs, Volume= 118,037 cf, Atten= 0%, Lag= 0.0 min
Primary = 17.9 cfs @ 12.26 hrs, Volume= 118,037 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 58.77' @ 12.26 hrs
Flood Elev= 66.13'

Device	Routing	Invert	Outlet Devices
#1	Primary	55.52'	**24.0" Round Culvert**
			L= 22.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 55.44' / 55.52' S= -0.0036 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=17.9 cfs @ 12.26 hrs HW=58.77' (Free Discharge)
└**1=Culvert** (Inlet Controls 17.9 cfs @ 5.70 fps)

Summary for Pond 4P: B-32A (CB-8323)

Inflow Area = 395,015 sf, 40.02% Impervious, Inflow Depth = 4.65" for 25-YR event
Inflow = 27.0 cfs @ 12.12 hrs, Volume= 153,175 cf
Outflow = 27.0 cfs @ 12.12 hrs, Volume= 153,175 cf, Atten= 0%, Lag= 0.0 min
Primary = 21.1 cfs @ 12.12 hrs, Volume= 149,393 cf
Secondary = 5.8 cfs @ 12.12 hrs, Volume= 3,782 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 59.66' @ 12.12 hrs
Flood Elev= 59.75'

Device	Routing	Invert	Outlet Devices
#1	Primary	55.52'	**24.0" Round Culvert** L= 115.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 55.52' / 54.90' S= 0.0054 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Secondary	59.39'	**15.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=21.1 cfs @ 12.12 hrs HW=59.65' (Free Discharge)
└**1=Culvert** (Inlet Controls 21.1 cfs @ 6.73 fps)

Secondary OutFlow Max=5.8 cfs @ 12.12 hrs HW=59.65' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 5.8 cfs @ 1.46 fps)

Summary for Pond 5P:

Inflow Area = 35,560 sf, 28.26% Impervious, Inflow Depth = 5.28" for 25-YR event
Inflow = 4.5 cfs @ 12.08 hrs, Volume= 15,635 cf
Outflow = 4.5 cfs @ 12.08 hrs, Volume= 15,635 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.5 cfs @ 12.08 hrs, Volume= 15,635 cf

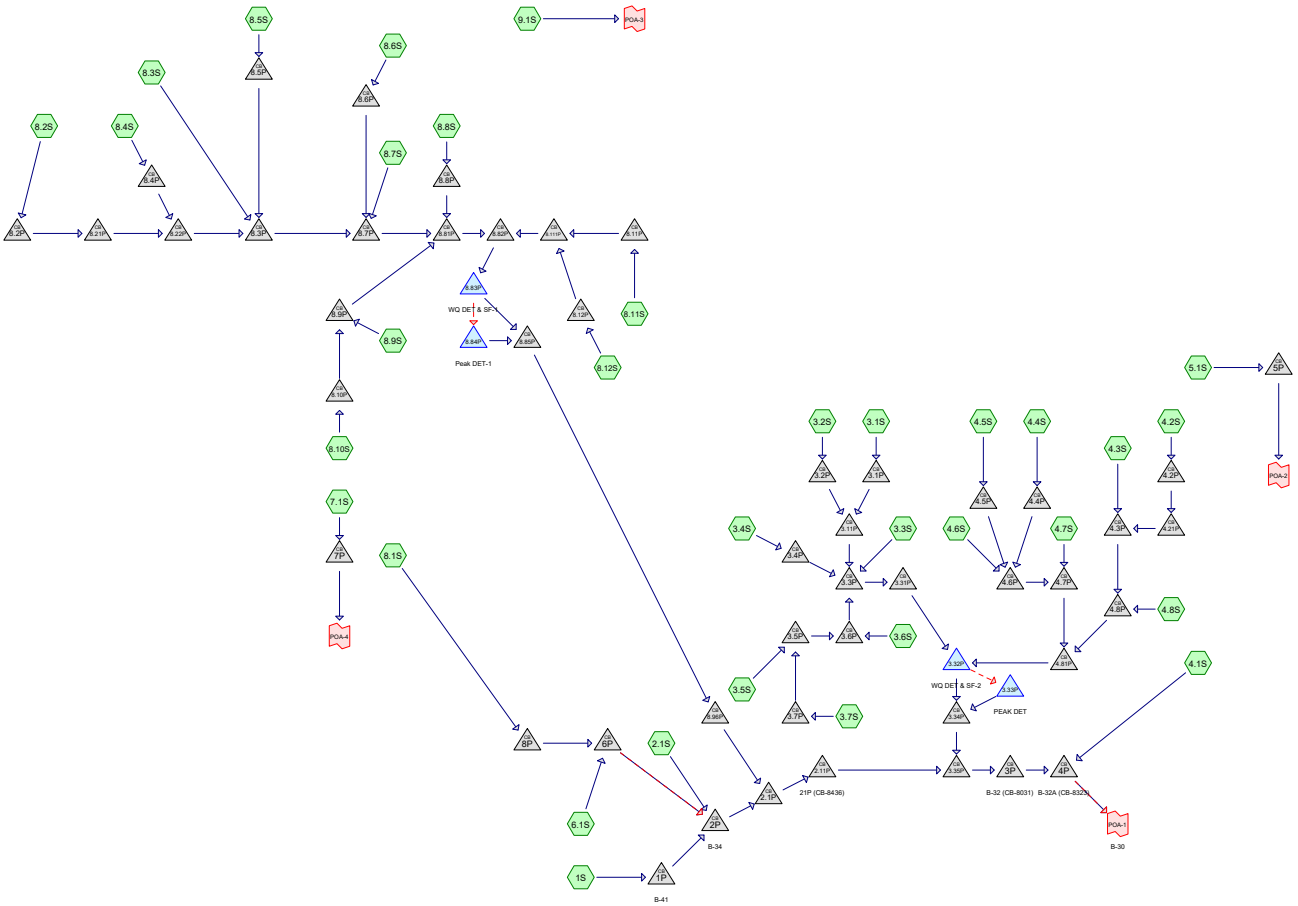
Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 61.57' @ 12.08 hrs
Flood Elev= 66.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	60.00'	**15.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 60.00' / 59.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=4.5 cfs @ 12.08 hrs HW=61.56' (Free Discharge)
└**1=Culvert** (Inlet Controls 4.5 cfs @ 3.68 fps)

Appendix 2B

Proposed Conditions
HydroCAD Summary



Subcat Reach Pond Link

Routing Diagram for 19059 - POST
Prepared by Sebago Technics, Printed 2/28/2024
HydroCAD® 10.20-4b s/n 00643 © 2023 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	Type III 24-hr		Default	24.00	1	3.10	2
2	10-YR	Type III 24-hr		Default	24.00	1	4.60	2
3	25-YR	Type III 24-hr		Default	24.00	1	5.80	2

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Runoff Area=34,840 sf 96.15% Impervious Runoff Depth=2.82"
Tc=6.0 min CN=WQ Runoff=2.4 cfs 8,185 cf

Subcatchment2.1S: Runoff Area=29,840 sf 69.86% Impervious Runoff Depth=2.49"
Tc=6.0 min CN=WQ Runoff=1.8 cfs 6,180 cf

Subcatchment3.1S: Runoff Area=1,450 sf 62.07% Impervious Runoff Depth=2.28"
Tc=6.0 min CN=WQ Runoff=0.1 cfs 276 cf

Subcatchment3.2S: Runoff Area=4,400 sf 52.27% Impervious Runoff Depth=2.13"
Tc=6.0 min CN=WQ Runoff=0.2 cfs 782 cf

Subcatchment3.3S: Runoff Area=7,500 sf 87.33% Impervious Runoff Depth=2.67"
Tc=6.0 min CN=WQ Runoff=0.5 cfs 1,670 cf

Subcatchment3.4S: Runoff Area=5,170 sf 90.14% Impervious Runoff Depth=2.72"
Tc=6.0 min CN=WQ Runoff=0.3 cfs 1,170 cf

Subcatchment3.5S: Runoff Area=7,350 sf 88.71% Impervious Runoff Depth=2.69"
Tc=6.0 min CN=WQ Runoff=0.5 cfs 1,650 cf

Subcatchment3.6S: Runoff Area=7,080 sf 100.00% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=98 Runoff=0.5 cfs 1,692 cf

Subcatchment3.7S: Runoff Area=6,280 sf 87.10% Impervious Runoff Depth=2.67"
Tc=6.0 min CN=WQ Runoff=0.4 cfs 1,397 cf

Subcatchment4.1S: Runoff Area=30,540 sf 50.79% Impervious Runoff Depth=2.24"
Flow Length=135' Tc=12.1 min CN=WQ Runoff=1.4 cfs 5,709 cf

Subcatchment4.2S: Runoff Area=11,860 sf 82.50% Impervious Runoff Depth=2.65"
Tc=6.0 min CN=WQ Runoff=0.8 cfs 2,615 cf

Subcatchment4.3S: Runoff Area=10,630 sf 88.66% Impervious Runoff Depth=2.69"
Tc=6.0 min CN=WQ Runoff=0.7 cfs 2,386 cf

Subcatchment4.4S: Runoff Area=11,040 sf 83.15% Impervious Runoff Depth=2.61"
Tc=6.0 min CN=WQ Runoff=0.7 cfs 2,399 cf

Subcatchment4.5S: Runoff Area=5,620 sf 62.10% Impervious Runoff Depth=2.28"
Tc=6.0 min CN=WQ Runoff=0.3 cfs 1,069 cf

Subcatchment4.6S: Runoff Area=9,090 sf 87.90% Impervious Runoff Depth=2.68"
Tc=6.0 min CN=WQ Runoff=0.6 cfs 2,031 cf

Subcatchment4.7S: Runoff Area=6,020 sf 100.00% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=98 Runoff=0.4 cfs 1,439 cf

Subcatchment4.8S: Runoff Area=11,850 sf 90.00% Impervious Runoff Depth=2.71"
Tc=6.0 min CN=WQ Runoff=0.8 cfs 2,680 cf

Subcatchment5.1S: Runoff Area=20,660 sf 50.80% Impervious Runoff Depth=2.24"
Tc=6.0 min CN=WQ Runoff=1.2 cfs 3,863 cf

Subcatchment6.1S: Runoff Area=50,370 sf 83.84% Impervious Runoff Depth=2.65"
Flow Length=280' Tc=14.5 min CN=WQ Runoff=2.5 cfs 11,130 cf

Subcatchment7.1S: Runoff Area=45,290 sf 74.03% Impervious Runoff Depth=2.45"
Flow Length=425' Tc=11.4 min CN=WQ Runoff=2.3 cfs 9,250 cf

Subcatchment8.10S: Runoff Area=8,440 sf 92.00% Impervious Runoff Depth=2.74"
Tc=6.0 min CN=WQ Runoff=0.6 cfs 1,930 cf

Subcatchment8.11S: Runoff Area=26,900 sf 87.62% Impervious Runoff Depth=2.68"
Tc=6.0 min CN=WQ Runoff=1.7 cfs 6,001 cf

Subcatchment8.12S: Runoff Area=2,340 sf 100.00% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=98 Runoff=0.2 cfs 559 cf

Subcatchment8.1S: Runoff Area=13,930 sf 49.61% Impervious Runoff Depth=2.02"
Tc=6.0 min CN=WQ Runoff=0.7 cfs 2,349 cf

Subcatchment8.2S: Runoff Area=19,350 sf 84.44% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=WQ Runoff=1.2 cfs 4,238 cf

Subcatchment8.3S: Runoff Area=48,240 sf 91.04% Impervious Runoff Depth=2.73"
Tc=6.0 min CN=WQ Runoff=3.2 cfs 10,974 cf

Subcatchment8.4S: Runoff Area=22,420 sf 78.10% Impervious Runoff Depth=2.53"
Tc=6.0 min CN=WQ Runoff=1.4 cfs 4,727 cf

Subcatchment8.5S: Runoff Area=9,090 sf 0.00% Impervious Runoff Depth=1.33"
Tc=6.0 min CN=80 Runoff=0.3 cfs 1,004 cf

Subcatchment8.6S: Runoff Area=11,120 sf 70.91% Impervious Runoff Depth=2.42"
Tc=6.0 min CN=WQ Runoff=0.7 cfs 2,242 cf

Subcatchment8.7S: Runoff Area=5,080 sf 35.43% Impervious Runoff Depth=1.87"
Tc=6.0 min CN=WQ Runoff=0.2 cfs 792 cf

Subcatchment8.8S: Runoff Area=9,920 sf 83.06% Impervious Runoff Depth=2.61"
Tc=6.0 min CN=WQ Runoff=0.6 cfs 2,155 cf

Subcatchment8.9S: Runoff Area=17,310 sf 96.50% Impervious Runoff Depth=2.81"
Tc=6.0 min CN=WQ Runoff=1.2 cfs 4,059 cf

Subcatchment9.1S: Runoff Area=6,800 sf 0.00% Impervious Runoff Depth=1.47"
Tc=6.0 min CN=WQ Runoff=0.3 cfs 832 cf

Pond 1P: B-41 Peak Elev=58.76' Inflow=2.4 cfs 8,185 cf
18.0" Round Culvert n=0.013 L=15.0' S=0.0100 '/' Outflow=2.4 cfs 8,185 cf

Pond 2.11P: 21P (CB-8436) Peak Elev=57.49' Inflow=7.4 cfs 66,525 cf
24.0" Round Culvert n=0.013 L=80.0' S=0.0024 '/' Outflow=7.4 cfs 66,525 cf

Pond 2.1P: Peak Elev=57.59' Inflow=7.4 cfs 66,525 cf
24.0" Round Culvert n=0.013 L=40.0' S=0.0032 '/' Outflow=7.4 cfs 66,525 cf

Pond 2P: B-34 Peak Elev=59.27' Inflow=6.8 cfs 27,844 cf
18.0" Round Culvert n=0.013 L=140.0' S=0.0116 '/' Outflow=6.8 cfs 27,844 cf

Pond 3.11P: Peak Elev=66.16' Inflow=0.3 cfs 1,057 cf
12.0" Round Culvert n=0.013 L=30.0' S=0.0117 '/' Outflow=0.3 cfs 1,057 cf

Pond 3.1P: Peak Elev=67.45' Inflow=0.1 cfs 276 cf
12.0" Round Culvert n=0.013 L=70.0' S=0.0200 '/' Outflow=0.1 cfs 276 cf

Pond 3.2P: Peak Elev=67.04' Inflow=0.2 cfs 782 cf
12.0" Round Culvert n=0.013 L=80.0' S=0.0109 '/' Outflow=0.2 cfs 782 cf

Pond 3.31P: Peak Elev=62.55' Inflow=2.5 cfs 8,636 cf
24.0" Round Culvert n=0.013 L=42.0' S=0.0119 '/' Outflow=2.5 cfs 8,636 cf

Pond 3.32P: WQ DET & SF-2 Peak Elev=62.81' Storage=3,180 cf Inflow=6.8 cfs 23,255 cf
Primary=0.3 cfs 13,778 cf Secondary=6.3 cfs 9,478 cf Outflow=6.6 cfs 23,255 cf

Pond 3.33P: PEAK DET Peak Elev=62.04' Storage=8,295 cf Inflow=6.3 cfs 9,478 cf
Outflow=0.1 cfs 9,478 cf

Pond 3.34P: Peak Elev=57.80' Inflow=0.4 cfs 23,255 cf
24.0" Round Culvert n=0.013 L=62.0' S=0.0102 '/' Outflow=0.4 cfs 23,255 cf

Pond 3.35P: Peak Elev=57.35' Inflow=7.8 cfs 89,780 cf
24.0" Round Culvert n=0.013 L=25.0' S=0.0028 '/' Outflow=7.8 cfs 89,780 cf

Pond 3.3P: Peak Elev=63.64' Inflow=2.5 cfs 8,636 cf
18.0" Round Culvert n=0.013 L=45.0' S=0.0111 '/' Outflow=2.5 cfs 8,636 cf

Pond 3.4P: Peak Elev=66.58' Inflow=0.3 cfs 1,170 cf
12.0" Round Culvert n=0.013 L=50.0' S=0.0160 '/' Outflow=0.3 cfs 1,170 cf

Pond 3.5P: Peak Elev=64.85' Inflow=0.9 cfs 3,047 cf
12.0" Round Culvert n=0.013 L=50.0' S=0.0100 '/' Outflow=0.9 cfs 3,047 cf

Pond 3.6P: Peak Elev=64.19' Inflow=1.4 cfs 4,739 cf
15.0" Round Culvert n=0.013 L=45.0' S=0.0111 '/' Outflow=1.4 cfs 4,739 cf

Pond 3.7P: Peak Elev=65.16' Inflow=0.4 cfs 1,397 cf
12.0" Round Culvert n=0.013 L=40.0' S=0.0100 '/' Outflow=0.4 cfs 1,397 cf

Pond 3P: B-32 (CB-8031) Peak Elev=57.17' Inflow=7.8 cfs 89,780 cf
24.0" Round Culvert n=0.013 L=22.0' S=-0.0036 '/' Outflow=7.8 cfs 89,780 cf

Pond 4.21P: Peak Elev=67.52' Inflow=0.8 cfs 2,615 cf
15.0" Round Culvert n=0.013 L=82.0' S=0.0121 '/' Outflow=0.8 cfs 2,615 cf

Pond 4.2P: Peak Elev=68.67' Inflow=0.8 cfs 2,615 cf
15.0" Round Culvert n=0.013 L=104.0' S=0.0100 '/' Outflow=0.8 cfs 2,615 cf

Pond 4.3P: Peak Elev=66.43' Inflow=1.5 cfs 5,001 cf
18.0" Round Culvert n=0.013 L=105.0' S=0.0158 '/' Outflow=1.5 cfs 5,001 cf

Pond 4.4P: Peak Elev=68.38' Inflow=0.7 cfs 2,399 cf
12.0" Round Culvert n=0.013 L=83.0' S=0.0169 '/' Outflow=0.7 cfs 2,399 cf

Pond 4.5P: Peak Elev=69.41' Inflow=0.3 cfs 1,069 cf
12.0" Round Culvert n=0.013 L=122.0' S=0.0213 '/' Outflow=0.3 cfs 1,069 cf

Pond 4.6P: Peak Elev=66.65' Inflow=1.6 cfs 5,500 cf
18.0" Round Culvert n=0.013 L=77.0' S=0.0169 '/' Outflow=1.6 cfs 5,500 cf

Pond 4.7P: Peak Elev=64.71' Inflow=2.0 cfs 6,938 cf
18.0" Round Culvert x 2.00 n=0.013 L=22.0' S=0.0227 '/' Outflow=2.0 cfs 6,938 cf

Pond 4.81P: Peak Elev=64.20' Inflow=4.3 cfs 14,619 cf
24.0" Round Culvert n=0.013 L=15.0' S=0.0267 '/' Outflow=4.3 cfs 14,619 cf

Pond 4.8P: Peak Elev=64.36' Inflow=2.2 cfs 7,680 cf
24.0" Round Culvert n=0.013 L=35.0' S=0.0100 '/' Outflow=2.2 cfs 7,680 cf

Pond 4P: B-32A (CB-8323) Peak Elev=57.12' Inflow=9.0 cfs 95,489 cf
Primary=9.0 cfs 95,489 cf Secondary=0.0 cfs 0 cf Outflow=9.0 cfs 95,489 cf

Pond 5P: Peak Elev=60.59' Inflow=1.2 cfs 3,863 cf
15.0" Round Culvert n=0.013 L=50.0' S=0.0100 '/' Outflow=1.2 cfs 3,863 cf

Pond 6P: Peak Elev=63.56' Inflow=3.0 cfs 13,479 cf
Primary=3.0 cfs 13,479 cf Secondary=0.0 cfs 0 cf Outflow=3.0 cfs 13,479 cf

Pond 7P: Peak Elev=66.08' Inflow=2.3 cfs 9,250 cf
12.0" Round Culvert n=0.013 L=100.0' S=0.0100 '/' Outflow=2.3 cfs 9,250 cf

Pond 8.10P: Peak Elev=69.73' Inflow=0.6 cfs 1,930 cf
12.0" Round Culvert n=0.013 L=15.0' S=0.0367 '/' Outflow=0.6 cfs 1,930 cf

Pond 8.111P: Peak Elev=68.67' Inflow=1.9 cfs 6,560 cf
18.0" Round Culvert n=0.013 L=160.0' S=0.0103 '/' Outflow=1.9 cfs 6,560 cf

Pond 8.11P: Peak Elev=70.69' Inflow=1.7 cfs 6,001 cf
15.0" Round Culvert n=0.013 L=144.0' S=0.0122 '/' Outflow=1.7 cfs 6,001 cf

Pond 8.12P: Peak Elev=70.97' Inflow=0.2 cfs 559 cf
12.0" Round Culvert n=0.013 L=120.0' S=0.0121 '/' Outflow=0.2 cfs 559 cf

Pond 8.21P: Peak Elev=71.51' Inflow=1.2 cfs 4,238 cf
24.0" Round Culvert n=0.013 L=100.0' S=0.0240 '/' Outflow=1.2 cfs 4,238 cf

Pond 8.22P: Peak Elev=69.27' Inflow=2.6 cfs 8,965 cf
24.0" Round Culvert n=0.013 L=30.0' S=0.0133 '/' Outflow=2.6 cfs 8,965 cf

Pond 8.2P: Peak Elev=74.27' Inflow=1.2 cfs 4,238 cf
18.0" Round Culvert n=0.013 L=120.0' S=0.0183 '/' Outflow=1.2 cfs 4,238 cf

Pond 8.3P: Peak Elev=69.24' Inflow=6.1 cfs 20,942 cf
24.0" Round Culvert n=0.013 L=45.0' S=0.0178 '/' Outflow=6.1 cfs 20,942 cf

Pond 8.4P: Peak Elev=70.65' Inflow=1.4 cfs 4,727 cf
15.0" Round Culvert n=0.013 L=40.0' S=0.0163 '/' Outflow=1.4 cfs 4,727 cf

Pond 8.5P: Peak Elev=74.76' Inflow=0.3 cfs 1,004 cf
12.0" Round Culvert n=0.013 L=50.0' S=0.0220 '/' Outflow=0.3 cfs 1,004 cf

Pond 8.6P: Peak Elev=71.73' Inflow=0.7 cfs 2,242 cf
15.0" Round Culvert n=0.013 L=60.0' S=0.0200 '/' Outflow=0.7 cfs 2,242 cf

Pond 8.7P: Peak Elev=68.12' Inflow=7.0 cfs 23,976 cf
30.0" Round Culvert n=0.013 L=57.0' S=0.0114 '/' Outflow=7.0 cfs 23,976 cf

Pond 8.81P: Peak Elev=67.63' Inflow=9.4 cfs 32,121 cf
36.0" Round Culvert n=0.013 L=13.0' S=0.0192 '/' Outflow=9.4 cfs 32,121 cf

Pond 8.82P: Peak Elev=66.85' Inflow=11.3 cfs 38,681 cf
36.0" Round Culvert n=0.013 L=7.0' S=0.0214 '/' Outflow=11.3 cfs 38,681 cf

Pond 8.83P: WQ DET & SF-1 Peak Elev=69.22' Storage=4,933 cf Inflow=11.3 cfs 38,681 cf
Primary=0.5 cfs 22,563 cf Secondary=10.8 cfs 16,118 cf Outflow=11.2 cfs 38,681 cf

Pond 8.84P: Peak DET-1 Peak Elev=64.90' Storage=12,614 cf Inflow=10.8 cfs 16,118 cf
Outflow=1.0 cfs 16,118 cf

Pond 8.85P: Peak Elev=61.11' Inflow=1.4 cfs 38,681 cf
18.0" Round Culvert n=0.013 L=226.0' S=0.0084 '/' Outflow=1.4 cfs 38,681 cf

Pond 8.8P: Peak Elev=70.92' Inflow=0.6 cfs 2,155 cf
15.0" Round Culvert n=0.013 L=23.0' S=0.0217 '/' Outflow=0.6 cfs 2,155 cf

Pond 8.96P: Peak Elev=59.11' Inflow=1.4 cfs 38,681 cf
18.0" Round Culvert n=0.013 L=80.0' S=0.0311 '/' Outflow=1.4 cfs 38,681 cf

Pond 8.9P: Peak Elev=70.24' Inflow=1.7 cfs 5,989 cf
12.0" Round Culvert n=0.013 L=18.0' S=0.0361 '/' Outflow=1.7 cfs 5,989 cf

Pond 8P: Peak Elev=61.06' Inflow=0.7 cfs 2,349 cf
12.0" Round Culvert n=0.013 L=70.0' S=0.0100 '/' Outflow=0.7 cfs 2,349 cf

Link POA-1: B-30 Inflow=9.0 cfs 95,489 cf
Primary=9.0 cfs 95,489 cf

Link POA-2: Inflow=1.2 cfs 3,863 cf
Primary=1.2 cfs 3,863 cf

Link POA-3: Inflow=0.3 cfs 832 cf
Primary=0.3 cfs 832 cf

Link POA-4: Inflow=2.3 cfs 9,250 cf
Primary=2.3 cfs 9,250 cf

Total Runoff Area = 517,820 sf Runoff Volume = 109,434 cf Average Runoff Depth = 2.54"
22.92% Pervious = 118,690 sf 77.08% Impervious = 399,130 sf

Summary for Subcatchment 1S:

Runoff = 2.4 cfs @ 12.08 hrs, Volume= 8,185 cf, Depth= 2.82"
Routed to Pond 1P : B-41

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
33,500	98	Paved parking, HSG D
1,340	84	50-75% Grass cover, Fair, HSG D
34,840		Weighted Average
1,340		3.85% Pervious Area
33,500		96.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 2.1S:

Runoff = 1.8 cfs @ 12.08 hrs, Volume= 6,180 cf, Depth= 2.49"
Routed to Pond 2P : B-34

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
20,845	98	Paved parking, HSG D
8,995	84	50-75% Grass cover, Fair, HSG D
29,840		Weighted Average
8,995		30.14% Pervious Area
20,845		69.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 3.1S:

Runoff = 0.1 cfs @ 12.09 hrs, Volume= 276 cf, Depth= 2.28"
Routed to Pond 3.1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
550	80	>75% Grass cover, Good, HSG D
900	98	Paved parking, HSG D
1,450		Weighted Average
550		37.93% Pervious Area
900		62.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 3.2S:

Runoff = 0.2 cfs @ 12.09 hrs, Volume= 782 cf, Depth= 2.13"
Routed to Pond 3.2P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
2,100	80	>75% Grass cover, Good, HSG D
2,300	98	Paved parking, HSG D
4,400		Weighted Average
2,100		47.73% Pervious Area
2,300		52.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 3.3S:

Runoff = 0.5 cfs @ 12.08 hrs, Volume= 1,670 cf, Depth= 2.67"
Routed to Pond 3.3P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
950	80	>75% Grass cover, Good, HSG D
6,550	98	Paved parking, HSG D
7,500		Weighted Average
950		12.67% Pervious Area
6,550		87.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 3.4S:

Runoff = 0.3 cfs @ 12.08 hrs, Volume= 1,170 cf, Depth= 2.72"
Routed to Pond 3.4P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
510	80	>75% Grass cover, Good, HSG D
4,660	98	Paved parking, HSG D
5,170		Weighted Average
510		9.86% Pervious Area
4,660		90.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 3.5S:

Runoff = 0.5 cfs @ 12.08 hrs, Volume= 1,650 cf, Depth= 2.69"
Routed to Pond 3.5P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
6,520	98	Paved parking, HSG D
830	80	>75% Grass cover, Good, HSG D
7,350		Weighted Average
830		11.29% Pervious Area
6,520		88.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 3.6S:

Runoff = 0.5 cfs @ 12.08 hrs, Volume= 1,692 cf, Depth= 2.87"
Routed to Pond 3.6P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
7,080	98	Paved parking, HSG D
7,080		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 3.7S:

Runoff = 0.4 cfs @ 12.08 hrs, Volume= 1,397 cf, Depth= 2.67"
Routed to Pond 3.7P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
810	80	>75% Grass cover, Good, HSG D
5,470	98	Paved parking, HSG D
6,280		Weighted Average
810		12.90% Pervious Area
5,470		87.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 4.1S:

Runoff = 1.4 cfs @ 12.16 hrs, Volume= 5,709 cf, Depth= 2.24"
Routed to Pond 4P : B-32A (CB-8323)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
12,790	98	Paved parking, HSG D
15,030	84	50-75% Grass cover, Fair, HSG D
2,720	98	Roofs, HSG D
30,540		Weighted Average
15,030		49.21% Pervious Area
15,510		50.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	110	0.0150	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.10"
0.0	25	0.3300	8.62		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
12.1	135	Total			

Summary for Subcatchment 4.2S:

Runoff = 0.8 cfs @ 12.08 hrs, Volume= 2,615 cf, Depth= 2.65"
Routed to Pond 4.2P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
9,785	98	Paved parking, HSG D
2,075	84	50-75% Grass cover, Fair, HSG D
11,860		Weighted Average
2,075		17.50% Pervious Area
9,785		82.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 4.3S:

Runoff = 0.7 cfs @ 12.08 hrs, Volume= 2,386 cf, Depth= 2.69"
Routed to Pond 4.3P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
1,205	80	>75% Grass cover, Good, HSG D
9,425	98	Paved parking, HSG D
10,630		Weighted Average
1,205		11.34% Pervious Area
9,425		88.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 4.4S:

Runoff = 0.7 cfs @ 12.08 hrs, Volume= 2,399 cf, Depth= 2.61"
Routed to Pond 4.4P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
1,860	80	>75% Grass cover, Good, HSG D
9,180	98	Paved parking, HSG D
11,040		Weighted Average
1,860		16.85% Pervious Area
9,180		83.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 4.5S:

Runoff = 0.3 cfs @ 12.09 hrs, Volume= 1,069 cf, Depth= 2.28"
Routed to Pond 4.5P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
2,130	80	>75% Grass cover, Good, HSG D
3,490	98	Paved parking, HSG D
5,620		Weighted Average
2,130		37.90% Pervious Area
3,490		62.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 4.6S:

Runoff = 0.6 cfs @ 12.08 hrs, Volume= 2,031 cf, Depth= 2.68"
Routed to Pond 4.6P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
7,990	98	Paved parking, HSG D
1,100	80	>75% Grass cover, Good, HSG D
9,090		Weighted Average
1,100		12.10% Pervious Area
7,990		87.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 4.7S:

Runoff = 0.4 cfs @ 12.08 hrs, Volume= 1,439 cf, Depth= 2.87"
Routed to Pond 4.7P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
6,020	98	Paved parking, HSG D
6,020		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 4.8S:

Runoff = 0.8 cfs @ 12.08 hrs, Volume= 2,680 cf, Depth= 2.71"
Routed to Pond 4.8P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
10,665	98	Paved parking, HSG D
1,185	80	>75% Grass cover, Good, HSG D
11,850		Weighted Average
1,185		10.00% Pervious Area
10,665		90.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 5.1S:

Runoff = 1.2 cfs @ 12.09 hrs, Volume= 3,863 cf, Depth= 2.24"
Routed to Pond 5P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	10,495	98	Paved parking, HSG D
	10,165	84	50-75% Grass cover, Fair, HSG D
	20,660		Weighted Average
	10,165		49.20% Pervious Area
	10,495		50.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 6.1S:

Runoff = 2.5 cfs @ 12.19 hrs, Volume= 11,130 cf, Depth= 2.65"
Routed to Pond 6P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
36,200	98	Paved parking, HSG D
6,030	98	Roofs, HSG D
1,670	79	50-75% Grass cover, Fair, HSG C
6,470	84	50-75% Grass cover, Fair, HSG D
50,370		Weighted Average
8,140		16.16% Pervious Area
42,230		83.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0700	0.13		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.10"
1.0	65	0.0500	1.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.3	115	0.0100	5.90	4.63	**Pipe Channel, C-D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
14.5	280	Total			

Summary for Subcatchment 7.1S:

Runoff = 2.3 cfs @ 12.15 hrs, Volume= 9,250 cf, Depth= 2.45"
Routed to Pond 7P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
31,245	98	Paved parking, HSG D
11,760	79	50-75% Grass cover, Fair, HSG C
2,285	98	Unconnected pavement, HSG D
45,290		Weighted Average
11,760		25.97% Pervious Area
33,530		74.03% Impervious Area
2,285		6.81% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.0200	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.10"
0.7	75	0.0150	1.84		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
0.7	250	0.0100	5.90	4.63	**Pipe Channel, C-D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
11.4	425	Total			

Summary for Subcatchment 8.10S:

Runoff = 0.6 cfs @ 12.08 hrs, Volume= 1,930 cf, Depth= 2.74"
Routed to Pond 8.10P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
675	80	>75% Grass cover, Good, HSG D
7,765	98	Paved parking, HSG D
8,440		Weighted Average
675		8.00% Pervious Area
7,765		92.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.11S:

Runoff = 1.7 cfs @ 12.08 hrs, Volume= 6,001 cf, Depth= 2.68"
Routed to Pond 8.11P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
3,330	80	>75% Grass cover, Good, HSG D
23,570	98	Paved parking, HSG D
26,900		Weighted Average
3,330		12.38% Pervious Area
23,570		87.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.12S:

Runoff = 0.2 cfs @ 12.08 hrs, Volume= 559 cf, Depth= 2.87"
Routed to Pond 8.12P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
2,340	98	Paved parking, HSG D
2,340		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.1S:

Runoff = 0.7 cfs @ 12.09 hrs, Volume= 2,349 cf, Depth= 2.02"
Routed to Pond 8P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
6,910	98	Paved parking, HSG D
2,655	74	>75% Grass cover, Good, HSG C
4,365	80	>75% Grass cover, Good, HSG D
13,930		Weighted Average
7,020		50.39% Pervious Area
6,910		49.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.2S:

Runoff = 1.2 cfs @ 12.08 hrs, Volume= 4,238 cf, Depth= 2.63"
Routed to Pond 8.2P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
3,010	80	>75% Grass cover, Good, HSG D
16,340	98	Paved parking, HSG D
19,350		Weighted Average
3,010		15.56% Pervious Area
16,340		84.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.3S:

Runoff = 3.2 cfs @ 12.08 hrs, Volume= 10,974 cf, Depth= 2.73"
Routed to Pond 8.3P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
4,320	80	>75% Grass cover, Good, HSG D
43,920	98	Paved parking, HSG D
48,240		Weighted Average
4,320		8.96% Pervious Area
43,920		91.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.4S:

Runoff = 1.4 cfs @ 12.08 hrs, Volume= 4,727 cf, Depth= 2.53"
Routed to Pond 8.4P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
4,910	80	>75% Grass cover, Good, HSG D
17,510	98	Paved parking, HSG D
22,420		Weighted Average
4,910		21.90% Pervious Area
17,510		78.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.5S:

Runoff = 0.3 cfs @ 12.09 hrs, Volume= 1,004 cf, Depth= 1.33"
Routed to Pond 8.5P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
9,090	80	>75% Grass cover, Good, HSG D
9,090		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.6S:

Runoff = 0.7 cfs @ 12.08 hrs, Volume= 2,242 cf, Depth= 2.42"
Routed to Pond 8.6P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
3,235	80	>75% Grass cover, Good, HSG D
7,885	98	Paved parking, HSG D
11,120		Weighted Average
3,235		29.09% Pervious Area
7,885		70.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.7S:

Runoff = 0.2 cfs @ 12.09 hrs, Volume= 792 cf, Depth= 1.87"
Routed to Pond 8.7P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
3,280	80	>75% Grass cover, Good, HSG D
1,800	98	Paved parking, HSG D
5,080		Weighted Average
3,280		64.57% Pervious Area
1,800		35.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.8S:

Runoff = 0.6 cfs @ 12.08 hrs, Volume= 2,155 cf, Depth= 2.61"
Routed to Pond 8.8P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
1,680	80	>75% Grass cover, Good, HSG D
8,240	98	Paved parking, HSG D
9,920		Weighted Average
1,680		16.94% Pervious Area
8,240		83.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.9S:

Runoff = 1.2 cfs @ 12.08 hrs, Volume= 4,059 cf, Depth= 2.81"
Routed to Pond 8.9P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
605	80	>75% Grass cover, Good, HSG D
16,705	98	Paved parking, HSG D
17,310		Weighted Average
605		3.50% Pervious Area
16,705		96.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 9.1S:

Runoff = 0.3 cfs @ 12.09 hrs, Volume= 832 cf, Depth= 1.47"
Routed to Link POA-3 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
4,800	83	Woods, Poor, HSG D
2,000	80	>75% Grass cover, Good, HSG D
6,800		Weighted Average
6,800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Pond 1P: B-41

Inflow Area = 34,840 sf, 96.15% Impervious, Inflow Depth = 2.82" for 2-YR event
Inflow = 2.4 cfs @ 12.08 hrs, Volume= 8,185 cf
Outflow = 2.4 cfs @ 12.08 hrs, Volume= 8,185 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.4 cfs @ 12.08 hrs, Volume= 8,185 cf
Routed to Pond 2P : B-34

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 58.76' @ 12.08 hrs
Flood Elev= 63.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	57.90'	**18.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 57.90' / 57.75' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.4 cfs @ 12.08 hrs HW=58.76' (Free Discharge)
1=Culvert (Barrel Controls 2.4 cfs @ 3.26 fps)

Summary for Pond 2.11P: 21P (CB-8436)

Inflow Area = 309,190 sf, 80.71% Impervious, Inflow Depth = 2.58" for 2-YR event
Inflow = 7.4 cfs @ 12.10 hrs, Volume= 66,525 cf
Outflow = 7.4 cfs @ 12.10 hrs, Volume= 66,525 cf, Atten= 0%, Lag= 0.0 min
Primary = 7.4 cfs @ 12.10 hrs, Volume= 66,525 cf
Routed to Pond 3.35P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 57.49' @ 12.10 hrs
Flood Elev= 68.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	55.88'	**24.0" Round Culvert** L= 80.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 55.88' / 55.69' S= 0.0024 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=7.4 cfs @ 12.10 hrs HW=57.49' (Free Discharge)
1=Culvert (Barrel Controls 7.4 cfs @ 3.72 fps)

Summary for Pond 2.1P:

Inflow Area = 309,190 sf, 80.71% Impervious, Inflow Depth = 2.58" for 2-YR event
Inflow = 7.4 cfs @ 12.10 hrs, Volume= 66,525 cf
Outflow = 7.4 cfs @ 12.10 hrs, Volume= 66,525 cf, Atten= 0%, Lag= 0.0 min
Primary = 7.4 cfs @ 12.10 hrs, Volume= 66,525 cf
Routed to Pond 2.11P : 21P (CB-8436)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 57.59' @ 12.10 hrs
Flood Elev= 67.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	56.01'	**24.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 56.01' / 55.88' S= 0.0032 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=7.4 cfs @ 12.10 hrs HW=57.59' (Free Discharge)
1=Culvert (Barrel Controls 7.4 cfs @ 3.80 fps)

Summary for Pond 2P: B-34

Inflow Area = 128,980 sf, 80.23% Impervious, Inflow Depth = 2.59" for 2-YR event
Inflow = 6.8 cfs @ 12.10 hrs, Volume= 27,844 cf
Outflow = 6.8 cfs @ 12.10 hrs, Volume= 27,844 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.8 cfs @ 12.10 hrs, Volume= 27,844 cf
Routed to Pond 2.1P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 59.27' @ 12.10 hrs
Flood Elev= 63.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	57.50'	**18.0" Round Culvert** L= 140.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 57.50' / 55.88' S= 0.0116 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=6.8 cfs @ 12.10 hrs HW=59.27' (Free Discharge)
1=Culvert (Inlet Controls 6.8 cfs @ 3.84 fps)

Summary for Pond 3.11P:

Inflow Area = 5,850 sf, 54.70% Impervious, Inflow Depth = 2.17" for 2-YR event
Inflow = 0.3 cfs @ 12.09 hrs, Volume= 1,057 cf
Outflow = 0.3 cfs @ 12.09 hrs, Volume= 1,057 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.3 cfs @ 12.09 hrs, Volume= 1,057 cf
Routed to Pond 3.3P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Peak Elev= 66.16' @ 12.09 hrs
Flood Elev= 71.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	65.85'	**12.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.85' / 65.50' S= 0.0117 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.3 cfs @ 12.09 hrs HW=66.16' (Free Discharge)
1=Culvert (Inlet Controls 0.3 cfs @ 1.50 fps)

Summary for Pond 3.1P:

Inflow Area = 1,450 sf, 62.07% Impervious, Inflow Depth = 2.28" for 2-YR event
Inflow = 0.1 cfs @ 12.09 hrs, Volume= 276 cf
Outflow = 0.1 cfs @ 12.09 hrs, Volume= 276 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.1 cfs @ 12.09 hrs, Volume= 276 cf
Routed to Pond 3.11P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 67.45' @ 12.09 hrs
Flood Elev= 72.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	67.30'	**12.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.30' / 65.90' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.1 cfs @ 12.09 hrs HW=67.45' (Free Discharge)
1=Culvert (Inlet Controls 0.1 cfs @ 1.05 fps)

Summary for Pond 3.2P:

Inflow Area = 4,400 sf, 52.27% Impervious, Inflow Depth = 2.13" for 2-YR event
Inflow = 0.2 cfs @ 12.09 hrs, Volume= 782 cf
Outflow = 0.2 cfs @ 12.09 hrs, Volume= 782 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.2 cfs @ 12.09 hrs, Volume= 782 cf
Routed to Pond 3.11P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 67.04' @ 12.09 hrs
Flood Elev= 70.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.77'	**12.0" Round Culvert** L= 80.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.77' / 65.90' S= 0.0109 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.2 cfs @ 12.09 hrs HW=67.04' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.2 cfs @ 1.39 fps)

Summary for Pond 3.31P:

Inflow Area = 39,230 sf, 85.34% Impervious, Inflow Depth = 2.64" for 2-YR event
Inflow = 2.5 cfs @ 12.08 hrs, Volume= 8,636 cf
Outflow = 2.5 cfs @ 12.08 hrs, Volume= 8,636 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.5 cfs @ 12.08 hrs, Volume= 8,636 cf
Routed to Pond 3.32P : WQ DET & SF-2

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 62.55' @ 12.08 hrs
Flood Elev= 70.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	61.80'	**24.0" Round Culvert** L= 42.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 61.80' / 61.30' S= 0.0119 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=2.5 cfs @ 12.08 hrs HW=62.55' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.5 cfs @ 2.33 fps)

Summary for Pond 3.32P: WQ DET & SF-2

Inflow Area = 105,340 sf, 85.47% Impervious, Inflow Depth = 2.65" for 2-YR event
Inflow = 6.8 cfs @ 12.08 hrs, Volume= 23,255 cf
Outflow = 6.6 cfs @ 12.10 hrs, Volume= 23,255 cf, Atten= 2%, Lag= 1.1 min
Primary = 0.3 cfs @ 12.10 hrs, Volume= 13,778 cf
Routed to Pond 3.34P :
Secondary = 6.3 cfs @ 12.10 hrs, Volume= 9,478 cf
Routed to Pond 3.33P : PEAK DET

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 62.81' @ 12.10 hrs Surf.Area= 1,634 sf Storage= 3,180 cf

Plug-Flow detention time= 55.9 min calculated for 23,251 cf (100% of inflow)
Center-of-Mass det. time= 55.9 min (819.3 - 763.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	60.00'	0 cf	**8.00'W x 204.25'L x 9.00'H Field A** 14,706 cf Overall - 10,166 cf Embedded = 4,540 cf x 0.0% Voids
#2A	60.00'	10,166 cf	**CMP Round 96** x 9 Inside #1 Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf Overall Size= 96.0"W x 96.0"H x 20.00'L Row Length Adjustment= +14.25' x 50.27 sf x 1 rows 8.00' Header x 50.27 sf x 1 = 402.1 cf Inside
		10,166 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Device 2	60.00'	**12.0" Round Culvert** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 60.00' / 59.95' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 3	57.70'	**Tube/Siphon/Float Valve X 11.00** 0.668" Diameter, C= 0.600, 0.263" Trickle Diameter Starts@60.45'
#3	Primary	57.70'	**12.0" Round 12" Stormfilter Outlet** L= 13.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 57.70' / 57.60' S= 0.0077 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Secondary	62.40'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 2.40 2.48 2.56 2.64 2.72 2.80 2.88 2.96 3.04 3.12 3.20 3.28 3.36 3.44 3.52 3.60 3.68 3.76 3.84 3.92 4.00 4.08 4.16 4.24 4.32 4.40 4.48 4.56 4.64 4.72 4.80 4.88 4.96 5.04 5.12 5.20 5.28 5.36 5.44 5.52 5.60 5.68 5.76 5.84 5.92 6.00 6.08 6.16 6.24 6.32 6.40 6.48 6.56 6.64 6.72 6.80 6.88 6.96 7.04 7.12 7.20 7.28 7.36 7.44 7.52 7.60 7.68 7.76 7.84 7.92 8.00 Width (feet) 7.33 7.40 7.46 7.52 7.58 7.63 7.68 7.72 7.77 7.80 7.84 7.87 7.90 7.92 7.94 7.96 7.97 7.99 7.99 8.00 8.00 8.00 7.99 7.99 7.97 7.96 7.94 7.92 7.90 7.87 7.84 7.80 7.77 7.72 7.68 7.63 7.58 7.52 7.46 7.40 7.33 7.26 7.18 7.10 7.02 6.93 6.83 6.73 6.63 6.52 6.40 6.28 6.15 6.01 5.87 5.71 5.55 5.38 5.20 5.01 4.80 4.58 4.34 4.08 3.80 3.49 3.14 2.73 2.24 1.59 0.00

Primary OutFlow Max=0.3 cfs @ 12.10 hrs HW=62.81' (Free Discharge)
└**3=12" Stormfilter Outlet** (Passes 0.3 cfs of 6.4 cfs potential flow)
└**2=Tube/Siphon/Float Valve** (Orifice Controls 0.3 cfs @ 10.88 fps)
└**1=Culvert** (Passes 0.3 cfs of 5.7 cfs potential flow)

Secondary OutFlow Max=6.3 cfs @ 12.10 hrs HW=62.81' (Free Discharge)
└**4=Custom Weir/Orifice** (Weir Controls 6.3 cfs @ 2.08 fps)

Summary for Pond 3.33P: PEAK DET

Inflow = 6.3 cfs @ 12.10 hrs, Volume= 9,478 cf
Outflow = 0.1 cfs @ 13.71 hrs, Volume= 9,478 cf, Atten= 98%, Lag= 96.2 min
Primary = 0.1 cfs @ 13.71 hrs, Volume= 9,478 cf
Routed to Pond 3.34P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 62.04' @ 13.71 hrs Surf.Area= 8,258 sf Storage= 8,295 cf

Plug-Flow detention time= 616.5 min calculated for 9,476 cf (100% of inflow)
Center-of-Mass det. time= 616.7 min (1,357.2 - 740.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	60.00'	0 cf	**63.00'W x 124.00'L x 8.00'H Field A** 62,496 cf Overall - 38,152 cf Embedded = 24,344 cf x 0.0% Voids
#2A	60.00'	38,152 cf	**CMP Round 96** x 30 Inside #1 Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf Overall Size= 96.0"W x 96.0"H x 20.00'L Row Length Adjustment= +16.00' x 50.27 sf x 6 rows 63.00' Header x 50.27 sf x 1 = 3,166.7 cf Inside
#3	60.00'	3,217 cf	**CMP Round 96** x 3 Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf Overall Size= 96.0"W x 96.0"H x 20.00'L Row Length Adjustment= +4.00' x 50.27 sf x 1 rows
		41,368 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	60.00'	**2.0" Vert. DRAINDOWN ORIFICE** C= 0.600 Limited to weir flow at low heads
#2	Primary	65.50'	**0.5' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#3	Primary	63.50'	**36.0" W x 6.0" H Vert. CAPACITY ORIFICE** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.1 cfs @ 13.71 hrs HW=62.04' (Free Discharge)
- **1=DRAINDOWN ORIFICE** (Orifice Controls 0.1 cfs @ 6.73 fps)
- **2=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)
- **3=CAPACITY ORIFICE** (Controls 0.0 cfs)

Summary for Pond 3.34P:

Inflow Area = 105,340 sf, 85.47% Impervious, Inflow Depth = 2.65" for 2-YR event
Inflow = 0.4 cfs @ 13.56 hrs, Volume= 23,255 cf
Outflow = 0.4 cfs @ 13.56 hrs, Volume= 23,255 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.4 cfs @ 13.56 hrs, Volume= 23,255 cf
Routed to Pond 3.35P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 57.80' @ 13.56 hrs
Flood Elev= 67.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	57.50'	**24.0" Round Culvert** L= 62.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 57.50' / 56.87' S= 0.0102 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.4 cfs @ 13.56 hrs HW=57.80' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.4 cfs @ 1.46 fps)

Summary for Pond 3.35P:

Inflow Area = 414,530 sf, 81.92% Impervious, Inflow Depth = 2.60" for 2-YR event
Inflow = 7.8 cfs @ 12.10 hrs, Volume= 89,780 cf
Outflow = 7.8 cfs @ 12.10 hrs, Volume= 89,780 cf, Atten= 0%, Lag= 0.0 min
Primary = 7.8 cfs @ 12.10 hrs, Volume= 89,780 cf
Routed to Pond 3P : B-32 (CB-8031)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 57.35' @ 12.10 hrs
Flood Elev= 67.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	55.69'	**24.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 55.69' / 55.62' S= 0.0028 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=7.8 cfs @ 12.10 hrs HW=57.35' (Free Discharge)
└**1=Culvert** (Barrel Controls 7.8 cfs @ 3.79 fps)

Summary for Pond 3.3P:

Inflow Area = 39,230 sf, 85.34% Impervious, Inflow Depth = 2.64" for 2-YR event
Inflow = 2.5 cfs @ 12.08 hrs, Volume= 8,636 cf
Outflow = 2.5 cfs @ 12.08 hrs, Volume= 8,636 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.5 cfs @ 12.08 hrs, Volume= 8,636 cf
Routed to Pond 3.31P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 63.64' @ 12.08 hrs
Flood Elev= 69.95'

Device	Routing	Invert	Outlet Devices
#1	Primary	62.80'	**18.0" Round Culvert** L= 45.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.80' / 62.30' S= 0.0111 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.5 cfs @ 12.08 hrs HW=63.64' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.5 cfs @ 2.46 fps)

Summary for Pond 3.4P:

Inflow Area = 5,170 sf, 90.14% Impervious, Inflow Depth = 2.72" for 2-YR event
Inflow = 0.3 cfs @ 12.08 hrs, Volume= 1,170 cf
Outflow = 0.3 cfs @ 12.08 hrs, Volume= 1,170 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.3 cfs @ 12.08 hrs, Volume= 1,170 cf
Routed to Pond 3.3P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 66.58' @ 12.08 hrs
Flood Elev= 69.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.25'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.25' / 65.45' S= 0.0160 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.3 cfs @ 12.08 hrs HW=66.57' (Free Discharge)
1=Culvert (Inlet Controls 0.3 cfs @ 1.53 fps)

Summary for Pond 3.5P:

Inflow Area = 13,630 sf, 87.97% Impervious, Inflow Depth = 2.68" for 2-YR event
Inflow = 0.9 cfs @ 12.08 hrs, Volume= 3,047 cf
Outflow = 0.9 cfs @ 12.08 hrs, Volume= 3,047 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.9 cfs @ 12.08 hrs, Volume= 3,047 cf
Routed to Pond 3.6P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 64.85' @ 12.08 hrs
Flood Elev= 68.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	64.30'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 64.30' / 63.80' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.9 cfs @ 12.08 hrs HW=64.85' (Free Discharge)
1=Culvert (Inlet Controls 0.9 cfs @ 1.99 fps)

Summary for Pond 3.6P:

Inflow Area = 20,710 sf, 92.08% Impervious, Inflow Depth = 2.75" for 2-YR event
Inflow = 1.4 cfs @ 12.08 hrs, Volume= 4,739 cf
Outflow = 1.4 cfs @ 12.08 hrs, Volume= 4,739 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.4 cfs @ 12.08 hrs, Volume= 4,739 cf
Routed to Pond 3.3P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Peak Elev= 64.19' @ 12.08 hrs
Flood Elev= 69.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	63.55'	**15.0" Round Culvert** L= 45.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 63.55' / 63.05' S= 0.0111 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.4 cfs @ 12.08 hrs HW=64.19' (Free Discharge)
1=Culvert (Inlet Controls 1.4 cfs @ 2.15 fps)

Summary for Pond 3.7P:

Inflow Area = 6,280 sf, 87.10% Impervious, Inflow Depth = 2.67" for 2-YR event
Inflow = 0.4 cfs @ 12.08 hrs, Volume= 1,397 cf
Outflow = 0.4 cfs @ 12.08 hrs, Volume= 1,397 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.4 cfs @ 12.08 hrs, Volume= 1,397 cf
Routed to Pond 3.5P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 65.16' @ 12.08 hrs
Flood Elev= 68.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	64.80'	**12.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 64.80' / 64.40' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.4 cfs @ 12.08 hrs HW=65.16' (Free Discharge)
1=Culvert (Inlet Controls 0.4 cfs @ 1.61 fps)

Summary for Pond 3P: B-32 (CB-8031)

Inflow Area = 414,530 sf, 81.92% Impervious, Inflow Depth = 2.60" for 2-YR event
Inflow = 7.8 cfs @ 12.10 hrs, Volume= 89,780 cf
Outflow = 7.8 cfs @ 12.10 hrs, Volume= 89,780 cf, Atten= 0%, Lag= 0.0 min
Primary = 7.8 cfs @ 12.10 hrs, Volume= 89,780 cf
Routed to Pond 4P : B-32A (CB-8323)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 57.17' @ 12.10 hrs
Flood Elev= 66.13'

Device	Routing	Invert	Outlet Devices
#1	Primary	55.52'	**24.0" Round Culvert** L= 22.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 55.44' / 55.52' S= -0.0036 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=7.8 cfs @ 12.10 hrs HW=57.17' (Free Discharge)
└**1=Culvert** (Barrel Controls 7.8 cfs @ 3.61 fps)

Summary for Pond 4.21P:

Inflow Area = 11,860 sf, 82.50% Impervious, Inflow Depth = 2.65" for 2-YR event
Inflow = 0.8 cfs @ 12.08 hrs, Volume= 2,615 cf
Outflow = 0.8 cfs @ 12.08 hrs, Volume= 2,615 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.8 cfs @ 12.08 hrs, Volume= 2,615 cf
Routed to Pond 4.3P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 67.52' @ 12.08 hrs
Flood Elev= 72.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	67.05'	**15.0" Round Culvert** L= 82.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.05' / 66.06' S= 0.0121 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.8 cfs @ 12.08 hrs HW=67.52' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.8 cfs @ 1.83 fps)

Summary for Pond 4.2P:

Inflow Area = 11,860 sf, 82.50% Impervious, Inflow Depth = 2.65" for 2-YR event
Inflow = 0.8 cfs @ 12.08 hrs, Volume= 2,615 cf
Outflow = 0.8 cfs @ 12.08 hrs, Volume= 2,615 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.8 cfs @ 12.08 hrs, Volume= 2,615 cf
Routed to Pond 4.21P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 68.67' @ 12.08 hrs
Flood Elev= 72.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	68.20'	**15.0" Round Culvert** L= 104.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 68.20' / 67.16' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.8 cfs @ 12.08 hrs HW=68.67' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.8 cfs @ 1.83 fps)

Summary for Pond 4.3P:

Inflow Area = 22,490 sf, 85.42% Impervious, Inflow Depth = 2.67" for 2-YR event
Inflow = 1.5 cfs @ 12.08 hrs, Volume= 5,001 cf
Outflow = 1.5 cfs @ 12.08 hrs, Volume= 5,001 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.5 cfs @ 12.08 hrs, Volume= 5,001 cf
Routed to Pond 4.8P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 66.43' @ 12.08 hrs
Flood Elev= 70.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	65.81'	**18.0" Round Culvert** L= 105.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.81' / 64.15' S= 0.0158 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.5 cfs @ 12.08 hrs HW=66.43' (Free Discharge)
1=Culvert (Inlet Controls 1.5 cfs @ 2.11 fps)

Summary for Pond 4.4P:

Inflow Area = 11,040 sf, 83.15% Impervious, Inflow Depth = 2.61" for 2-YR event
Inflow = 0.7 cfs @ 12.08 hrs, Volume= 2,399 cf
Outflow = 0.7 cfs @ 12.08 hrs, Volume= 2,399 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.7 cfs @ 12.08 hrs, Volume= 2,399 cf
Routed to Pond 4.6P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 68.38' @ 12.08 hrs
Flood Elev= 71.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	67.90'	**12.0" Round Culvert** L= 83.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.90' / 66.50' S= 0.0169 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.7 cfs @ 12.08 hrs HW=68.38' (Free Discharge)
1=Culvert (Inlet Controls 0.7 cfs @ 1.86 fps)

Summary for Pond 4.5P:

Inflow Area = 5,620 sf, 62.10% Impervious, Inflow Depth = 2.28" for 2-YR event
Inflow = 0.3 cfs @ 12.09 hrs, Volume= 1,069 cf
Outflow = 0.3 cfs @ 12.09 hrs, Volume= 1,069 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.3 cfs @ 12.09 hrs, Volume= 1,069 cf
Routed to Pond 4.6P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Peak Elev= 69.41' @ 12.09 hrs
Flood Elev= 72.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	69.10'	**12.0" Round Culvert** L= 122.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 69.10' / 66.50' S= 0.0213 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.3 cfs @ 12.09 hrs HW=69.41' (Free Discharge)
1=Culvert (Inlet Controls 0.3 cfs @ 1.50 fps)

Summary for Pond 4.6P:

Inflow Area = 25,750 sf, 80.23% Impervious, Inflow Depth = 2.56" for 2-YR event
Inflow = 1.6 cfs @ 12.08 hrs, Volume= 5,500 cf
Outflow = 1.6 cfs @ 12.08 hrs, Volume= 5,500 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.6 cfs @ 12.08 hrs, Volume= 5,500 cf
Routed to Pond 4.7P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 66.65' @ 12.08 hrs
Flood Elev= 70.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.00'	**18.0" Round Culvert** L= 77.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.00' / 64.70' S= 0.0169 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.6 cfs @ 12.08 hrs HW=66.65' (Free Discharge)
1=Culvert (Inlet Controls 1.6 cfs @ 2.17 fps)

Summary for Pond 4.7P:

Inflow Area = 31,770 sf, 83.98% Impervious, Inflow Depth = 2.62" for 2-YR event
Inflow = 2.0 cfs @ 12.08 hrs, Volume= 6,938 cf
Outflow = 2.0 cfs @ 12.08 hrs, Volume= 6,938 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.0 cfs @ 12.08 hrs, Volume= 6,938 cf
Routed to Pond 4.81P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 64.71' @ 12.08 hrs
Flood Elev= 69.75'

Device	Routing	Invert	Outlet Devices
#1	Primary	64.20'	**18.0" Round Culvert X 2.00** L= 22.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 64.20' / 63.70' S= 0.0227 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.0 cfs @ 12.08 hrs HW=64.71' (Free Discharge)
1=Culvert (Inlet Controls 2.0 cfs @ 1.91 fps)

Summary for Pond 4.81P:

Inflow Area = 66,110 sf, 85.55% Impervious, Inflow Depth = 2.65" for 2-YR event
Inflow = 4.3 cfs @ 12.08 hrs, Volume= 14,619 cf
Outflow = 4.3 cfs @ 12.08 hrs, Volume= 14,619 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.3 cfs @ 12.08 hrs, Volume= 14,619 cf
Routed to Pond 3.32P : WQ DET & SF-2

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 64.20' @ 12.08 hrs
Flood Elev= 69.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	63.20'	**24.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 63.20' / 62.80' S= 0.0267 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=4.2 cfs @ 12.08 hrs HW=64.20' (Free Discharge)
1=Culvert (Inlet Controls 4.2 cfs @ 2.69 fps)

Summary for Pond 4.8P:

Inflow Area = 34,340 sf, 87.00% Impervious, Inflow Depth = 2.68" for 2-YR event
Inflow = 2.2 cfs @ 12.08 hrs, Volume= 7,680 cf
Outflow = 2.2 cfs @ 12.08 hrs, Volume= 7,680 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.2 cfs @ 12.08 hrs, Volume= 7,680 cf
Routed to Pond 4.81P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 64.36' @ 12.08 hrs
Flood Elev= 68.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	63.65'	**24.0" Round Culvert** L= 35.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 63.65' / 63.30' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=2.2 cfs @ 12.08 hrs HW=64.35' (Free Discharge)
1=Culvert (Inlet Controls 2.2 cfs @ 2.26 fps)

Summary for Pond 4P: B-32A (CB-8323)

Inflow Area = 445,070 sf, 79.79% Impervious, Inflow Depth = 2.57" for 2-YR event
Inflow = 9.0 cfs @ 12.11 hrs, Volume= 95,489 cf
Outflow = 9.0 cfs @ 12.11 hrs, Volume= 95,489 cf, Atten= 0%, Lag= 0.0 min
Primary = 9.0 cfs @ 12.11 hrs, Volume= 95,489 cf
Routed to Link POA-1 : B-30
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link POA-1 : B-30

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 57.12' @ 12.11 hrs
Flood Elev= 59.75'

Device	Routing	Invert	Outlet Devices
#1	Primary	55.52'	**24.0" Round Culvert** L= 115.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 55.52' / 54.90' S= 0.0054 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Secondary	59.39'	**15.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=9.0 cfs @ 12.11 hrs HW=57.12' (Free Discharge)
1=Culvert (Barrel Controls 9.0 cfs @ 4.57 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=55.52' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

Summary for Pond 5P:

Inflow Area = 20,660 sf, 50.80% Impervious, Inflow Depth = 2.24" for 2-YR event
Inflow = 1.2 cfs @ 12.09 hrs, Volume= 3,863 cf
Outflow = 1.2 cfs @ 12.09 hrs, Volume= 3,863 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.2 cfs @ 12.09 hrs, Volume= 3,863 cf
Routed to Link POA-2 :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 60.59' @ 12.09 hrs
Flood Elev= 66.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	60.00'	**15.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 60.00' / 59.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.2 cfs @ 12.09 hrs HW=60.58' (Free Discharge)
1=Culvert (Inlet Controls 1.2 cfs @ 2.06 fps)

Summary for Pond 6P:

Inflow Area = 64,300 sf, 76.42% Impervious, Inflow Depth = 2.52" for 2-YR event
Inflow = 3.0 cfs @ 12.17 hrs, Volume= 13,479 cf
Outflow = 3.0 cfs @ 12.17 hrs, Volume= 13,479 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.0 cfs @ 12.17 hrs, Volume= 13,479 cf
Routed to Pond 2P : B-34
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond 2P : B-34

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 63.56' @ 12.17 hrs
Flood Elev= 71.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	62.08'	**12.0" Round Culvert** L= 300.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.08' / 57.67' S= 0.0147 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	70.50'	**12.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=3.0 cfs @ 12.17 hrs HW=63.56' (Free Discharge)
1=Culvert (Inlet Controls 3.0 cfs @ 3.76 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=62.08' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

Summary for Pond 7P:

Inflow Area = 45,290 sf, 74.03% Impervious, Inflow Depth = 2.45" for 2-YR event
Inflow = 2.3 cfs @ 12.15 hrs, Volume= 9,250 cf
Outflow = 2.3 cfs @ 12.15 hrs, Volume= 9,250 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.3 cfs @ 12.15 hrs, Volume= 9,250 cf
Routed to Link POA-4 :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 66.08' @ 12.15 hrs
Flood Elev= 69.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	65.00'	**12.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.00' / 64.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.3 cfs @ 12.15 hrs HW=66.08' (Free Discharge)
1=Culvert (Inlet Controls 2.3 cfs @ 2.89 fps)

Summary for Pond 8.10P:

Inflow Area = 8,440 sf, 92.00% Impervious, Inflow Depth = 2.74" for 2-YR event
Inflow = 0.6 cfs @ 12.08 hrs, Volume= 1,930 cf
Outflow = 0.6 cfs @ 12.08 hrs, Volume= 1,930 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.6 cfs @ 12.08 hrs, Volume= 1,930 cf
Routed to Pond 8.9P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 69.73' @ 12.08 hrs
Flood Elev= 72.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	69.30'	**12.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 69.30' / 68.75' S= 0.0367 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.6 cfs @ 12.08 hrs HW=69.73' (Free Discharge)
1=Culvert (Inlet Controls 0.6 cfs @ 1.75 fps)

Summary for Pond 8.111P:

Inflow Area = 29,240 sf, 88.61% Impervious, Inflow Depth = 2.69" for 2-YR event
Inflow = 1.9 cfs @ 12.08 hrs, Volume= 6,560 cf
Outflow = 1.9 cfs @ 12.08 hrs, Volume= 6,560 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.9 cfs @ 12.08 hrs, Volume= 6,560 cf
Routed to Pond 8.82P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 68.67' @ 12.08 hrs
Flood Elev= 74.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	67.95'	**18.0" Round Culvert** L= 160.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.95' / 66.30' S= 0.0103 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.9 cfs @ 12.08 hrs HW=68.67' (Free Discharge)
1=Culvert (Inlet Controls 1.9 cfs @ 2.28 fps)

Summary for Pond 8.11P:

Inflow Area = 26,900 sf, 87.62% Impervious, Inflow Depth = 2.68" for 2-YR event
Inflow = 1.7 cfs @ 12.08 hrs, Volume= 6,001 cf
Outflow = 1.7 cfs @ 12.08 hrs, Volume= 6,001 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.7 cfs @ 12.08 hrs, Volume= 6,001 cf
Routed to Pond 8.111P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Peak Elev= 70.69' @ 12.08 hrs
Flood Elev= 73.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	69.95'	**15.0" Round Culvert** L= 144.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 69.95' / 68.20' S= 0.0122 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.7 cfs @ 12.08 hrs HW=70.69' (Free Discharge)
1=Culvert (Inlet Controls 1.7 cfs @ 2.31 fps)

Summary for Pond 8.12P:

Inflow Area = 2,340 sf,100.00% Impervious, Inflow Depth = 2.87" for 2-YR event
Inflow = 0.2 cfs @ 12.08 hrs, Volume= 559 cf
Outflow = 0.2 cfs @ 12.08 hrs, Volume= 559 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.2 cfs @ 12.08 hrs, Volume= 559 cf
Routed to Pond 8.111P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 70.97' @ 12.08 hrs
Flood Elev= 74.35'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.75'	**12.0" Round Culvert** L= 120.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 70.75' / 69.30' S= 0.0121 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.2 cfs @ 12.08 hrs HW=70.97' (Free Discharge)
1=Culvert (Inlet Controls 0.2 cfs @ 1.26 fps)

Summary for Pond 8.21P:

Inflow Area = 19,350 sf, 84.44% Impervious, Inflow Depth = 2.63" for 2-YR event
Inflow = 1.2 cfs @ 12.08 hrs, Volume= 4,238 cf
Outflow = 1.2 cfs @ 12.08 hrs, Volume= 4,238 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.2 cfs @ 12.08 hrs, Volume= 4,238 cf
Routed to Pond 8.22P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 71.51' @ 12.08 hrs
Flood Elev= 76.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	71.00'	**24.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 71.00' / 68.60' S= 0.0240 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=1.2 cfs @ 12.08 hrs HW=71.51' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.2 cfs @ 1.93 fps)

Summary for Pond 8.22P:

Inflow Area = 41,770 sf, 81.04% Impervious, Inflow Depth = 2.58" for 2-YR event
Inflow = 2.6 cfs @ 12.08 hrs, Volume= 8,965 cf
Outflow = 2.6 cfs @ 12.08 hrs, Volume= 8,965 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.6 cfs @ 12.08 hrs, Volume= 8,965 cf
Routed to Pond 8.3P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 69.27' @ 12.08 hrs
Flood Elev= 75.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	68.50'	**24.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 68.50' / 68.10' S= 0.0133 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=2.6 cfs @ 12.08 hrs HW=69.27' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.6 cfs @ 2.35 fps)

Summary for Pond 8.2P:

Inflow Area = 19,350 sf, 84.44% Impervious, Inflow Depth = 2.63" for 2-YR event
Inflow = 1.2 cfs @ 12.08 hrs, Volume= 4,238 cf
Outflow = 1.2 cfs @ 12.08 hrs, Volume= 4,238 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.2 cfs @ 12.08 hrs, Volume= 4,238 cf
Routed to Pond 8.21P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 74.27' @ 12.08 hrs
Flood Elev= 79.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.70'	**18.0" Round Culvert** L= 120.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 73.70' / 71.50' S= 0.0183 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.2 cfs @ 12.08 hrs HW=74.26' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.2 cfs @ 2.02 fps)

Summary for Pond 8.3P:

Inflow Area = 99,100 sf, 78.48% Impervious, Inflow Depth = 2.54" for 2-YR event
Inflow = 6.1 cfs @ 12.08 hrs, Volume= 20,942 cf
Outflow = 6.1 cfs @ 12.08 hrs, Volume= 20,942 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.1 cfs @ 12.08 hrs, Volume= 20,942 cf
Routed to Pond 8.7P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 69.24' @ 12.08 hrs
Flood Elev= 74.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	68.00'	**24.0" Round Culvert** L= 45.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 68.00' / 67.20' S= 0.0178 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=6.1 cfs @ 12.08 hrs HW=69.24' (Free Discharge)
1=Culvert (Inlet Controls 6.1 cfs @ 2.99 fps)

Summary for Pond 8.4P:

Inflow Area = 22,420 sf, 78.10% Impervious, Inflow Depth = 2.53" for 2-YR event
Inflow = 1.4 cfs @ 12.08 hrs, Volume= 4,727 cf
Outflow = 1.4 cfs @ 12.08 hrs, Volume= 4,727 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.4 cfs @ 12.08 hrs, Volume= 4,727 cf
Routed to Pond 8.22P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 70.65' @ 12.08 hrs
Flood Elev= 75.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.00'	**15.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 70.00' / 69.35' S= 0.0163 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.4 cfs @ 12.08 hrs HW=70.64' (Free Discharge)
1=Culvert (Inlet Controls 1.4 cfs @ 2.16 fps)

Summary for Pond 8.5P:

Inflow Area = 9,090 sf, 0.00% Impervious, Inflow Depth = 1.33" for 2-YR event
Inflow = 0.3 cfs @ 12.09 hrs, Volume= 1,004 cf
Outflow = 0.3 cfs @ 12.09 hrs, Volume= 1,004 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.3 cfs @ 12.09 hrs, Volume= 1,004 cf
Routed to Pond 8.3P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Peak Elev= 74.76' @ 12.09 hrs
Flood Elev= 77.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	74.45'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 74.45' / 73.35' S= 0.0220 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.3 cfs @ 12.09 hrs HW=74.76' (Free Discharge)
1=Culvert (Inlet Controls 0.3 cfs @ 1.51 fps)

Summary for Pond 8.6P:

Inflow Area = 11,120 sf, 70.91% Impervious, Inflow Depth = 2.42" for 2-YR event
Inflow = 0.7 cfs @ 12.08 hrs, Volume= 2,242 cf
Outflow = 0.7 cfs @ 12.08 hrs, Volume= 2,242 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.7 cfs @ 12.08 hrs, Volume= 2,242 cf
Routed to Pond 8.7P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 71.73' @ 12.08 hrs
Flood Elev= 75.15'

Device	Routing	Invert	Outlet Devices
#1	Primary	71.30'	**15.0" Round Culvert** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 71.30' / 70.10' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.7 cfs @ 12.08 hrs HW=71.73' (Free Discharge)
1=Culvert (Inlet Controls 0.7 cfs @ 1.76 fps)

Summary for Pond 8.7P:

Inflow Area = 115,300 sf, 75.85% Impervious, Inflow Depth = 2.50" for 2-YR event
Inflow = 7.0 cfs @ 12.08 hrs, Volume= 23,976 cf
Outflow = 7.0 cfs @ 12.08 hrs, Volume= 23,976 cf, Atten= 0%, Lag= 0.0 min
Primary = 7.0 cfs @ 12.08 hrs, Volume= 23,976 cf
Routed to Pond 8.81P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 68.12' @ 12.08 hrs
Flood Elev= 73.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.90'	**30.0" Round Culvert** L= 57.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.90' / 66.25' S= 0.0114 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=7.0 cfs @ 12.08 hrs HW=68.11' (Free Discharge)
└**1=Culvert** (Inlet Controls 7.0 cfs @ 2.96 fps)

Summary for Pond 8.81P:

Inflow Area = 150,970 sf, 79.60% Impervious, Inflow Depth = 2.55" for 2-YR event
Inflow = 9.4 cfs @ 12.08 hrs, Volume= 32,121 cf
Outflow = 9.4 cfs @ 12.08 hrs, Volume= 32,121 cf, Atten= 0%, Lag= 0.0 min
Primary = 9.4 cfs @ 12.08 hrs, Volume= 32,121 cf
Routed to Pond 8.82P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 67.63' @ 12.08 hrs
Flood Elev= 74.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.25'	**36.0" Round Culvert** L= 13.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.25' / 66.00' S= 0.0192 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=9.4 cfs @ 12.08 hrs HW=67.63' (Free Discharge)
└**1=Culvert** (Barrel Controls 9.4 cfs @ 4.34 fps)

Summary for Pond 8.82P:

Inflow Area = 180,210 sf, 81.06% Impervious, Inflow Depth = 2.58" for 2-YR event
Inflow = 11.3 cfs @ 12.08 hrs, Volume= 38,681 cf
Outflow = 11.3 cfs @ 12.08 hrs, Volume= 38,681 cf, Atten= 0%, Lag= 0.0 min
Primary = 11.3 cfs @ 12.08 hrs, Volume= 38,681 cf
Routed to Pond 8.83P : WQ DET & SF-1

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 66.85' @ 12.08 hrs
Flood Elev= 75.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	65.25'	**36.0" Round Culvert** L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.25' / 65.10' S= 0.0214 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=11.3 cfs @ 12.08 hrs HW=66.85' (Free Discharge)
└**1=Culvert** (Barrel Controls 11.3 cfs @ 4.25 fps)

Summary for Pond 8.83P: WQ DET & SF-1

Inflow Area = 180,210 sf, 81.06% Impervious, Inflow Depth = 2.58" for 2-YR event
Inflow = 11.3 cfs @ 12.08 hrs, Volume= 38,681 cf
Outflow = 11.2 cfs @ 12.09 hrs, Volume= 38,681 cf, Atten= 0%, Lag= 0.5 min
Primary = 0.5 cfs @ 12.09 hrs, Volume= 22,563 cf
Routed to Pond 8.85P :
Secondary = 10.8 cfs @ 12.09 hrs, Volume= 16,118 cf
Routed to Pond 8.84P : Peak DET-1

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 69.22' @ 12.09 hrs Surf.Area= 1,115 sf Storage= 4,933 cf

Plug-Flow detention time= 61.1 min calculated for 38,674 cf (100% of inflow)
Center-of-Mass det. time= 61.1 min (826.7 - 765.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	62.50'	0 cf	**10.00'W x 111.50'L x 8.00'H Field A** 8,920 cf Overall - 5,504 cf Embedded = 3,416 cf x 0.0% Voids
#2A	62.50'	5,504 cf	**CMP Round 96** x 5 Inside #1 Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf Overall Size= 96.0"W x 96.0"H x 20.00'L Row Length Adjustment= +1.50' x 50.27 sf x 1 rows 8.00' Header x 50.27 sf x 1 = 402.1 cf Inside
		5,504 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Device 2	62.50'	**12.0" Round Culvert** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 62.50' / 62.50' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 3	60.60'	**Tube/Siphon/Float Valve X 18.00** 0.586" Diameter, C= 0.600, 0.263" Trickle Diameter Starts@63.35'
#3	Primary	60.60'	**12.0" Round 12" Stormfilter Outlet** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 60.60' / 60.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Secondary	68.58'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 6.08 6.16 6.24 6.32 6.40 6.48 6.56 6.64 6.72 6.80 6.88 6.96 7.04 7.12 7.20 7.28 7.36 7.44 7.52 7.60 7.68 7.76 7.84 7.92 8.00 Width (feet) 6.83 6.73 6.63 6.52 6.40 6.28 6.15 6.01 5.87 5.71 5.55 5.38 5.20 5.01 4.80 4.58 4.34 4.08 3.80 3.49 3.14 2.73 2.24 1.59 0.00

Primary OutFlow Max=0.5 cfs @ 12.09 hrs HW=69.21' (Free Discharge)
└**3=12" Stormfilter Outlet** (Passes 0.5 cfs of 8.5 cfs potential flow)
└**2=Tube/Siphon/Float Valve** (Orifice Controls 0.5 cfs @ 14.13 fps)
└**1=Culvert** (Passes 0.5 cfs of 9.4 cfs potential flow)

Secondary OutFlow Max=10.7 cfs @ 12.09 hrs HW=69.21' (Free Discharge)
└**4=Custom Weir/Orifice** (Weir Controls 10.7 cfs @ 2.65 fps)

Summary for Pond 8.84P: Peak DET-1

Inflow = 10.8 cfs @ 12.09 hrs, Volume= 16,118 cf
Outflow = 1.0 cfs @ 12.66 hrs, Volume= 16,118 cf, Atten= 91%, Lag= 34.0 min
Primary = 1.0 cfs @ 12.66 hrs, Volume= 16,118 cf
Routed to Pond 8.85P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 64.90' @ 12.66 hrs Surf.Area= 10,780 sf Storage= 12,614 cf

Plug-Flow detention time= 576.8 min calculated for 16,118 cf (100% of inflow)
Center-of-Mass det. time= 576.8 min (1,316.4 - 739.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	62.50'	0 cf	**98.00'W x 110.00'L x 8.00'H Field A** 86,240 cf Overall - 50,064 cf Embedded = 36,176 cf x 0.0% Voids
#2A	62.50'	50,064 cf	**CMP Round 96** x 45 Inside #1 Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf Overall Size= 96.0"W x 96.0"H x 20.00'L 45 Chambers in 9 Rows 96.00' Header x 50.27 sf x 1 = 4,825.5 cf Inside
		50,064 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	70.00'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Primary	66.00'	**36.0" W x 12.0" H Vert. OVERFLOW ORIFICE** C= 0.600 Limited to weir flow at low heads
#3	Primary	62.50'	**2.0" Vert. DRAINDOWN ORIFICE** C= 0.600 Limited to weir flow at low heads
#4	Primary	64.50'	**6.0" W x 6.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.0 cfs @ 12.66 hrs HW=64.90' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)
└**2=OVERFLOW ORIFICE** (Controls 0.0 cfs)
└**3=DRAINDOWN ORIFICE** (Orifice Controls 0.2 cfs @ 7.32 fps)
└**4=Orifice/Grate** (Orifice Controls 0.8 cfs @ 2.02 fps)

Summary for Pond 8.85P:

Inflow Area = 180,210 sf, 81.06% Impervious, Inflow Depth = 2.58" for 2-YR event
Inflow = 1.4 cfs @ 12.66 hrs, Volume= 38,681 cf
Outflow = 1.4 cfs @ 12.66 hrs, Volume= 38,681 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.4 cfs @ 12.66 hrs, Volume= 38,681 cf
Routed to Pond 8.96P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 61.11' @ 12.66 hrs
Flood Elev= 73.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	60.50'	**18.0" Round Culvert** L= 226.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 60.50' / 58.60' S= 0.0084 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.4 cfs @ 12.66 hrs HW=61.11' (Free Discharge)
1=Culvert (Inlet Controls 1.4 cfs @ 2.10 fps)

Summary for Pond 8.8P:

Inflow Area = 9,920 sf, 83.06% Impervious, Inflow Depth = 2.61" for 2-YR event
Inflow = 0.6 cfs @ 12.08 hrs, Volume= 2,155 cf
Outflow = 0.6 cfs @ 12.08 hrs, Volume= 2,155 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.6 cfs @ 12.08 hrs, Volume= 2,155 cf
Routed to Pond 8.81P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 70.92' @ 12.08 hrs
Flood Elev= 75.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.50'	**15.0" Round Culvert** L= 23.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 70.50' / 70.00' S= 0.0217 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.6 cfs @ 12.08 hrs HW=70.92' (Free Discharge)
1=Culvert (Inlet Controls 0.6 cfs @ 1.74 fps)

Summary for Pond 8.96P:

Inflow Area = 180,210 sf, 81.06% Impervious, Inflow Depth = 2.58" for 2-YR event
Inflow = 1.4 cfs @ 12.66 hrs, Volume= 38,681 cf
Outflow = 1.4 cfs @ 12.66 hrs, Volume= 38,681 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.4 cfs @ 12.66 hrs, Volume= 38,681 cf
Routed to Pond 2.1P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Peak Elev= 59.11' @ 12.66 hrs
Flood Elev= 68.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	58.50'	**18.0" Round Culvert** L= 80.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 58.50' / 56.01' S= 0.0311 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.4 cfs @ 12.66 hrs HW=59.11' (Free Discharge)
1=Culvert (Inlet Controls 1.4 cfs @ 2.10 fps)

Summary for Pond 8.9P:

Inflow Area = 25,750 sf, 95.03% Impervious, Inflow Depth = 2.79" for 2-YR event
Inflow = 1.7 cfs @ 12.08 hrs, Volume= 5,989 cf
Outflow = 1.7 cfs @ 12.08 hrs, Volume= 5,989 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.7 cfs @ 12.08 hrs, Volume= 5,989 cf
Routed to Pond 8.81P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 70.24' @ 12.08 hrs
Flood Elev= 73.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	69.40'	**12.0" Round Culvert** L= 18.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 69.40' / 68.75' S= 0.0361 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.7 cfs @ 12.08 hrs HW=70.24' (Free Discharge)
1=Culvert (Inlet Controls 1.7 cfs @ 2.46 fps)

Summary for Pond 8P:

Inflow Area = 13,930 sf, 49.61% Impervious, Inflow Depth = 2.02" for 2-YR event
Inflow = 0.7 cfs @ 12.09 hrs, Volume= 2,349 cf
Outflow = 0.7 cfs @ 12.09 hrs, Volume= 2,349 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.7 cfs @ 12.09 hrs, Volume= 2,349 cf
Routed to Pond 6P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 61.06' @ 12.09 hrs
Flood Elev= 71.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	60.58'	**12.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 60.58' / 59.88' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.7 cfs @ 12.09 hrs HW=61.06' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.7 cfs @ 1.86 fps)

Summary for Link POA-1: B-30

Inflow Area = 445,070 sf, 79.79% Impervious, Inflow Depth = 2.57" for 2-YR event
Inflow = 9.0 cfs @ 12.11 hrs, Volume= 95,489 cf
Primary = 9.0 cfs @ 12.11 hrs, Volume= 95,489 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Link POA-2:

Inflow Area = 20,660 sf, 50.80% Impervious, Inflow Depth = 2.24" for 2-YR event
Inflow = 1.2 cfs @ 12.09 hrs, Volume= 3,863 cf
Primary = 1.2 cfs @ 12.09 hrs, Volume= 3,863 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Link POA-3:

Inflow Area = 6,800 sf, 0.00% Impervious, Inflow Depth = 1.47" for 2-YR event
Inflow = 0.3 cfs @ 12.09 hrs, Volume= 832 cf
Primary = 0.3 cfs @ 12.09 hrs, Volume= 832 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Link POA-4:

Inflow Area = 45,290 sf, 74.03% Impervious, Inflow Depth = 2.45" for 2-YR event
Inflow = 2.3 cfs @ 12.15 hrs, Volume= 9,250 cf
Primary = 2.3 cfs @ 12.15 hrs, Volume= 9,250 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Runoff Area=34,840 sf 96.15% Impervious Runoff Depth=4.31"
Tc=6.0 min CN=WQ Runoff=3.6 cfs 12,507 cf

Subcatchment2.1S: Runoff Area=29,840 sf 69.86% Impervious Runoff Depth=3.92"
Tc=6.0 min CN=WQ Runoff=2.9 cfs 9,759 cf

Subcatchment3.1S: Runoff Area=1,450 sf 62.07% Impervious Runoff Depth=3.67"
Tc=6.0 min CN=WQ Runoff=0.1 cfs 444 cf

Subcatchment3.2S: Runoff Area=4,400 sf 52.27% Impervious Runoff Depth=3.50"
Tc=6.0 min CN=WQ Runoff=0.4 cfs 1,282 cf

Subcatchment3.3S: Runoff Area=7,500 sf 87.33% Impervious Runoff Depth=4.13"
Tc=6.0 min CN=WQ Runoff=0.7 cfs 2,584 cf

Subcatchment3.4S: Runoff Area=5,170 sf 90.14% Impervious Runoff Depth=4.18"
Tc=6.0 min CN=WQ Runoff=0.5 cfs 1,803 cf

Subcatchment3.5S: Runoff Area=7,350 sf 88.71% Impervious Runoff Depth=4.16"
Tc=6.0 min CN=WQ Runoff=0.7 cfs 2,547 cf

Subcatchment3.6S: Runoff Area=7,080 sf 100.00% Impervious Runoff Depth=4.36"
Tc=6.0 min CN=98 Runoff=0.7 cfs 2,575 cf

Subcatchment3.7S: Runoff Area=6,280 sf 87.10% Impervious Runoff Depth=4.13"
Tc=6.0 min CN=WQ Runoff=0.6 cfs 2,161 cf

Subcatchment4.1S: Runoff Area=30,540 sf 50.79% Impervious Runoff Depth=3.65"
Flow Length=135' Tc=12.1 min CN=WQ Runoff=2.3 cfs 9,281 cf

Subcatchment4.2S: Runoff Area=11,860 sf 82.50% Impervious Runoff Depth=4.11"
Tc=6.0 min CN=WQ Runoff=1.2 cfs 4,061 cf

Subcatchment4.3S: Runoff Area=10,630 sf 88.66% Impervious Runoff Depth=4.16"
Tc=6.0 min CN=WQ Runoff=1.1 cfs 3,683 cf

Subcatchment4.4S: Runoff Area=11,040 sf 83.15% Impervious Runoff Depth=4.06"
Tc=6.0 min CN=WQ Runoff=1.1 cfs 3,733 cf

Subcatchment4.5S: Runoff Area=5,620 sf 62.10% Impervious Runoff Depth=3.68"
Tc=6.0 min CN=WQ Runoff=0.5 cfs 1,721 cf

Subcatchment4.6S: Runoff Area=9,090 sf 87.90% Impervious Runoff Depth=4.14"
Tc=6.0 min CN=WQ Runoff=0.9 cfs 3,139 cf

Subcatchment4.7S: Runoff Area=6,020 sf 100.00% Impervious Runoff Depth=4.36"
Tc=6.0 min CN=98 Runoff=0.6 cfs 2,189 cf

Subcatchment4.8S: Runoff Area=11,850 sf 90.00% Impervious Runoff Depth=4.18"
Tc=6.0 min CN=WQ Runoff=1.2 cfs 4,130 cf

Subcatchment5.1S: Runoff Area=20,660 sf 50.80% Impervious Runoff Depth=3.65"
Tc=6.0 min CN=WQ Runoff=1.9 cfs 6,279 cf

Subcatchment6.1S: Runoff Area=50,370 sf 83.84% Impervious Runoff Depth=4.11"
Flow Length=280' Tc=14.5 min CN=WQ Runoff=3.8 cfs 17,267 cf

Subcatchment7.1S: Runoff Area=45,290 sf 74.03% Impervious Runoff Depth=3.87"
Flow Length=425' Tc=11.4 min CN=WQ Runoff=3.6 cfs 14,605 cf

Subcatchment8.10S: Runoff Area=8,440 sf 92.00% Impervious Runoff Depth=4.22"
Tc=6.0 min CN=WQ Runoff=0.8 cfs 2,967 cf

Subcatchment8.11S: Runoff Area=26,900 sf 87.62% Impervious Runoff Depth=4.14"
Tc=6.0 min CN=WQ Runoff=2.7 cfs 9,278 cf

Subcatchment8.12S: Runoff Area=2,340 sf 100.00% Impervious Runoff Depth=4.36"
Tc=6.0 min CN=98 Runoff=0.2 cfs 851 cf

Subcatchment8.1S: Runoff Area=13,930 sf 49.61% Impervious Runoff Depth=3.35"
Tc=6.0 min CN=WQ Runoff=1.2 cfs 3,893 cf

Subcatchment8.2S: Runoff Area=19,350 sf 84.44% Impervious Runoff Depth=4.08"
Tc=6.0 min CN=WQ Runoff=1.9 cfs 6,581 cf

Subcatchment8.3S: Runoff Area=48,240 sf 91.04% Impervious Runoff Depth=4.20"
Tc=6.0 min CN=WQ Runoff=4.8 cfs 16,889 cf

Subcatchment8.4S: Runoff Area=22,420 sf 78.10% Impervious Runoff Depth=3.97"
Tc=6.0 min CN=WQ Runoff=2.1 cfs 7,410 cf

Subcatchment8.5S: Runoff Area=9,090 sf 0.00% Impervious Runoff Depth=2.55"
Tc=6.0 min CN=80 Runoff=0.6 cfs 1,929 cf

Subcatchment8.6S: Runoff Area=11,120 sf 70.91% Impervious Runoff Depth=3.84"
Tc=6.0 min CN=WQ Runoff=1.0 cfs 3,554 cf

Subcatchment8.7S: Runoff Area=5,080 sf 35.43% Impervious Runoff Depth=3.19"
Tc=6.0 min CN=WQ Runoff=0.4 cfs 1,351 cf

Subcatchment8.8S: Runoff Area=9,920 sf 83.06% Impervious Runoff Depth=4.06"
Tc=6.0 min CN=WQ Runoff=1.0 cfs 3,353 cf

Subcatchment8.9S: Runoff Area=17,310 sf 96.50% Impervious Runoff Depth=4.30"
Tc=6.0 min CN=WQ Runoff=1.8 cfs 6,203 cf

Subcatchment9.1S: Runoff Area=6,800 sf 0.00% Impervious Runoff Depth=2.74"
Tc=6.0 min CN=WQ Runoff=0.5 cfs 1,550 cf

Pond 1P: B-41 Peak Elev=59.00' Inflow=3.6 cfs 12,507 cf
18.0" Round Culvert n=0.013 L=15.0' S=0.0100 '/' Outflow=3.6 cfs 12,507 cf

Pond 2.11P: 21P (CB-8436) Peak Elev=58.18' Inflow=12.4 cfs 103,791 cf
24.0" Round Culvert n=0.013 L=80.0' S=0.0024 '/' Outflow=12.4 cfs 103,791 cf

Pond 2.1P: Peak Elev=58.25' Inflow=12.4 cfs 103,791 cf
24.0" Round Culvert n=0.013 L=40.0' S=0.0032 '/' Outflow=12.4 cfs 103,791 cf

Pond 2P: B-34 Peak Elev=60.68' Inflow=10.5 cfs 43,426 cf
18.0" Round Culvert n=0.013 L=140.0' S=0.0116 '/' Outflow=10.5 cfs 43,426 cf

Pond 3.11P: Peak Elev=66.26' Inflow=0.5 cfs 1,726 cf
12.0" Round Culvert n=0.013 L=30.0' S=0.0117 '/' Outflow=0.5 cfs 1,726 cf

Pond 3.1P: Peak Elev=67.50' Inflow=0.1 cfs 444 cf
12.0" Round Culvert n=0.013 L=70.0' S=0.0200 '/' Outflow=0.1 cfs 444 cf

Pond 3.2P: Peak Elev=67.12' Inflow=0.4 cfs 1,282 cf
12.0" Round Culvert n=0.013 L=80.0' S=0.0109 '/' Outflow=0.4 cfs 1,282 cf

Pond 3.31P: Peak Elev=62.75' Inflow=3.8 cfs 13,396 cf
24.0" Round Culvert n=0.013 L=42.0' S=0.0119 '/' Outflow=3.8 cfs 13,396 cf

Pond 3.32P: WQ DET & SF-2 Peak Elev=62.94' Storage=3,395 cf Inflow=10.4 cfs 36,052 cf
Primary=0.3 cfs 17,012 cf Secondary=9.9 cfs 19,040 cf Outflow=10.2 cfs 36,052 cf

Pond 3.33P: PEAK DET Peak Elev=63.37' Storage=16,581 cf Inflow=9.9 cfs 19,040 cf
Outflow=0.2 cfs 19,039 cf

Pond 3.34P: Peak Elev=57.81' Inflow=0.5 cfs 36,051 cf
24.0" Round Culvert n=0.013 L=62.0' S=0.0102 '/' Outflow=0.5 cfs 36,051 cf

Pond 3.35P: Peak Elev=58.01' Inflow=12.8 cfs 139,843 cf
24.0" Round Culvert n=0.013 L=25.0' S=0.0028 '/' Outflow=12.8 cfs 139,843 cf

Pond 3.3P: Peak Elev=63.89' Inflow=3.8 cfs 13,396 cf
18.0" Round Culvert n=0.013 L=45.0' S=0.0111 '/' Outflow=3.8 cfs 13,396 cf

Pond 3.4P: Peak Elev=66.66' Inflow=0.5 cfs 1,803 cf
12.0" Round Culvert n=0.013 L=50.0' S=0.0160 '/' Outflow=0.5 cfs 1,803 cf

Pond 3.5P: Peak Elev=65.01' Inflow=1.3 cfs 4,708 cf
12.0" Round Culvert n=0.013 L=50.0' S=0.0100 '/' Outflow=1.3 cfs 4,708 cf

Pond 3.6P: Peak Elev=64.37' Inflow=2.1 cfs 7,283 cf
15.0" Round Culvert n=0.013 L=45.0' S=0.0111 '/' Outflow=2.1 cfs 7,283 cf

Pond 3.7P: Peak Elev=65.25' Inflow=0.6 cfs 2,161 cf
12.0" Round Culvert n=0.013 L=40.0' S=0.0100 '/' Outflow=0.6 cfs 2,161 cf

Pond 3P: B-32 (CB-8031) Peak Elev=57.86' Inflow=12.8 cfs 139,843 cf
24.0" Round Culvert n=0.013 L=22.0' S=-0.0036 '/' Outflow=12.8 cfs 139,843 cf

Pond 4.21P: Peak Elev=67.64' Inflow=1.2 cfs 4,061 cf
15.0" Round Culvert n=0.013 L=82.0' S=0.0121 '/' Outflow=1.2 cfs 4,061 cf

Pond 4.2P: Peak Elev=68.79' Inflow=1.2 cfs 4,061 cf
15.0" Round Culvert n=0.013 L=104.0' S=0.0100 '/' Outflow=1.2 cfs 4,061 cf

Pond 4.3P: Peak Elev=66.59' Inflow=2.2 cfs 7,744 cf
18.0" Round Culvert n=0.013 L=105.0' S=0.0158 '/' Outflow=2.2 cfs 7,744 cf

Pond 4.4P: Peak Elev=68.52' Inflow=1.1 cfs 3,733 cf
12.0" Round Culvert n=0.013 L=83.0' S=0.0169 '/' Outflow=1.1 cfs 3,733 cf

Pond 4.5P: Peak Elev=69.50' Inflow=0.5 cfs 1,721 cf
12.0" Round Culvert n=0.013 L=122.0' S=0.0213 '/' Outflow=0.5 cfs 1,721 cf

Pond 4.6P: Peak Elev=66.83' Inflow=2.5 cfs 8,593 cf
18.0" Round Culvert n=0.013 L=77.0' S=0.0169 '/' Outflow=2.5 cfs 8,593 cf

Pond 4.7P: Peak Elev=64.84' Inflow=3.1 cfs 10,783 cf
18.0" Round Culvert x 2.00 n=0.013 L=22.0' S=0.0227 '/' Outflow=3.1 cfs 10,783 cf

Pond 4.81P: Peak Elev=64.49' Inflow=6.5 cfs 22,657 cf
24.0" Round Culvert n=0.013 L=15.0' S=0.0267 '/' Outflow=6.5 cfs 22,657 cf

Pond 4.8P: Peak Elev=64.54' Inflow=3.4 cfs 11,874 cf
24.0" Round Culvert n=0.013 L=35.0' S=0.0100 '/' Outflow=3.4 cfs 11,874 cf

Pond 4P: B-32A (CB-8323) Peak Elev=58.09' Inflow=15.0 cfs 149,124 cf
Primary=15.0 cfs 149,124 cf Secondary=0.0 cfs 0 cf Outflow=15.0 cfs 149,124 cf

Pond 5P: Peak Elev=60.77' Inflow=1.9 cfs 6,279 cf
15.0" Round Culvert n=0.013 L=50.0' S=0.0100 '/' Outflow=1.9 cfs 6,279 cf

Pond 6P: Peak Elev=64.94' Inflow=4.6 cfs 21,160 cf
Primary=4.6 cfs 21,160 cf Secondary=0.0 cfs 0 cf Outflow=4.6 cfs 21,160 cf

Pond 7P: Peak Elev=66.93' Inflow=3.6 cfs 14,605 cf
12.0" Round Culvert n=0.013 L=100.0' S=0.0100 '/' Outflow=3.6 cfs 14,605 cf

Pond 8.10P: Peak Elev=69.84' Inflow=0.8 cfs 2,967 cf
12.0" Round Culvert n=0.013 L=15.0' S=0.0367 '/' Outflow=0.8 cfs 2,967 cf

Pond 8.111P: Peak Elev=68.86' Inflow=2.9 cfs 10,129 cf
18.0" Round Culvert n=0.013 L=160.0' S=0.0103 '/' Outflow=2.9 cfs 10,129 cf

Pond 8.11P: Peak Elev=70.91' Inflow=2.7 cfs 9,278 cf
15.0" Round Culvert n=0.013 L=144.0' S=0.0122 '/' Outflow=2.7 cfs 9,278 cf

Pond 8.12P: Peak Elev=71.02' Inflow=0.2 cfs 851 cf
12.0" Round Culvert n=0.013 L=120.0' S=0.0121 '/' Outflow=0.2 cfs 851 cf

Pond 8.21P: Peak Elev=71.64' Inflow=1.9 cfs 6,581 cf
24.0" Round Culvert n=0.013 L=100.0' S=0.0240 '/' Outflow=1.9 cfs 6,581 cf

Pond 8.22P: Peak Elev=69.47' Inflow=4.0 cfs 13,991 cf
24.0" Round Culvert n=0.013 L=30.0' S=0.0133 '/' Outflow=4.0 cfs 13,991 cf

Pond 8.2P: Peak Elev=74.42' Inflow=1.9 cfs 6,581 cf
18.0" Round Culvert n=0.013 L=120.0' S=0.0183 '/' Outflow=1.9 cfs 6,581 cf

Pond 8.3P: Peak Elev=69.64' Inflow=9.5 cfs 32,809 cf
24.0" Round Culvert n=0.013 L=45.0' S=0.0178 '/' Outflow=9.5 cfs 32,809 cf

Pond 8.4P: Peak Elev=70.84' Inflow=2.1 cfs 7,410 cf
15.0" Round Culvert n=0.013 L=40.0' S=0.0163 '/' Outflow=2.1 cfs 7,410 cf

Pond 8.5P: Peak Elev=74.90' Inflow=0.6 cfs 1,929 cf
12.0" Round Culvert n=0.013 L=50.0' S=0.0220 '/' Outflow=0.6 cfs 1,929 cf

Pond 8.6P: Peak Elev=71.85' Inflow=1.0 cfs 3,554 cf
15.0" Round Culvert n=0.013 L=60.0' S=0.0200 '/' Outflow=1.0 cfs 3,554 cf

Pond 8.7P: Peak Elev=68.47' Inflow=10.9 cfs 37,713 cf
30.0" Round Culvert n=0.013 L=57.0' S=0.0114 '/' Outflow=10.9 cfs 37,713 cf

Pond 8.81P: Peak Elev=68.04' Inflow=14.5 cfs 50,237 cf
36.0" Round Culvert n=0.013 L=13.0' S=0.0192 '/' Outflow=14.5 cfs 50,237 cf

Pond 8.82P: Peak Elev=67.33' Inflow=17.4 cfs 60,366 cf
36.0" Round Culvert n=0.013 L=7.0' S=0.0214 '/' Outflow=17.4 cfs 60,366 cf

Pond 8.83P: WQ DET & SF-1 Peak Elev=69.45' Storage=5,079 cf Inflow=17.4 cfs 60,366 cf
Primary=0.5 cfs 27,880 cf Secondary=16.9 cfs 32,486 cf Outflow=17.4 cfs 60,366 cf

Pond 8.84P: Peak DET-1 Peak Elev=66.00' Storage=21,025 cf Inflow=16.9 cfs 32,486 cf
Outflow=2.9 cfs 32,486 cf

Pond 8.85P: Peak Elev=61.50' Inflow=3.3 cfs 60,366 cf
18.0" Round Culvert n=0.013 L=226.0' S=0.0084 '/' Outflow=3.3 cfs 60,366 cf

Pond 8.8P: Peak Elev=71.03' Inflow=1.0 cfs 3,353 cf
15.0" Round Culvert n=0.013 L=23.0' S=0.0217 '/' Outflow=1.0 cfs 3,353 cf

Pond 8.96P: Peak Elev=59.50' Inflow=3.3 cfs 60,366 cf
18.0" Round Culvert n=0.013 L=80.0' S=0.0311 '/' Outflow=3.3 cfs 60,366 cf

Pond 8.9P: Peak Elev=70.67' Inflow=2.6 cfs 9,170 cf
12.0" Round Culvert n=0.013 L=18.0' S=0.0361 '/' Outflow=2.6 cfs 9,170 cf

Pond 8P: Peak Elev=61.22' Inflow=1.2 cfs 3,893 cf
12.0" Round Culvert n=0.013 L=70.0' S=0.0100 '/' Outflow=1.2 cfs 3,893 cf

Link POA-1: B-30 Inflow=15.0 cfs 149,124 cf
Primary=15.0 cfs 149,124 cf

Link POA-2: Inflow=1.9 cfs 6,279 cf
Primary=1.9 cfs 6,279 cf

Link POA-3: Inflow=0.5 cfs 1,550 cf
Primary=0.5 cfs 1,550 cf

Link POA-4: Inflow=3.6 cfs 14,605 cf
Primary=3.6 cfs 14,605 cf

Total Runoff Area = 517,820 sf Runoff Volume = 171,559 cf Average Runoff Depth = 3.98"
22.92% Pervious = 118,690 sf 77.08% Impervious = 399,130 sf

Summary for Subcatchment 1S:

Runoff = 3.6 cfs @ 12.08 hrs, Volume= 12,507 cf, Depth= 4.31"
Routed to Pond 1P : B-41

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
33,500	98	Paved parking, HSG D
1,340	84	50-75% Grass cover, Fair, HSG D
34,840		Weighted Average
1,340		3.85% Pervious Area
33,500		96.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 2.1S:

Runoff = 2.9 cfs @ 12.08 hrs, Volume= 9,759 cf, Depth= 3.92"
Routed to Pond 2P : B-34

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
20,845	98	Paved parking, HSG D
8,995	84	50-75% Grass cover, Fair, HSG D
29,840		Weighted Average
8,995		30.14% Pervious Area
20,845		69.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 3.1S:

Runoff = 0.1 cfs @ 12.08 hrs, Volume= 444 cf, Depth= 3.67"
Routed to Pond 3.1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
550	80	>75% Grass cover, Good, HSG D
900	98	Paved parking, HSG D
1,450		Weighted Average
550		37.93% Pervious Area
900		62.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 3.2S:

Runoff = 0.4 cfs @ 12.09 hrs, Volume= 1,282 cf, Depth= 3.50"
Routed to Pond 3.2P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
2,100	80	>75% Grass cover, Good, HSG D
2,300	98	Paved parking, HSG D
4,400		Weighted Average
2,100		47.73% Pervious Area
2,300		52.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 3.3S:

Runoff = 0.7 cfs @ 12.08 hrs, Volume= 2,584 cf, Depth= 4.13"
Routed to Pond 3.3P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
950	80	>75% Grass cover, Good, HSG D
6,550	98	Paved parking, HSG D
7,500		Weighted Average
950		12.67% Pervious Area
6,550		87.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 3.4S:

Runoff = 0.5 cfs @ 12.08 hrs, Volume= 1,803 cf, Depth= 4.18"
Routed to Pond 3.4P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
510	80	>75% Grass cover, Good, HSG D
4,660	98	Paved parking, HSG D
5,170		Weighted Average
510		9.86% Pervious Area
4,660		90.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 3.5S:

Runoff = 0.7 cfs @ 12.08 hrs, Volume= 2,547 cf, Depth= 4.16"
Routed to Pond 3.5P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
6,520	98	Paved parking, HSG D
830	80	>75% Grass cover, Good, HSG D
7,350		Weighted Average
830		11.29% Pervious Area
6,520		88.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 3.6S:

Runoff = 0.7 cfs @ 12.08 hrs, Volume= 2,575 cf, Depth= 4.36"
Routed to Pond 3.6P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
7,080	98	Paved parking, HSG D
7,080		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 3.7S:

Runoff = 0.6 cfs @ 12.08 hrs, Volume= 2,161 cf, Depth= 4.13"
Routed to Pond 3.7P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
810	80	>75% Grass cover, Good, HSG D
5,470	98	Paved parking, HSG D
6,280		Weighted Average
810		12.90% Pervious Area
5,470		87.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 4.1S:

Runoff = 2.3 cfs @ 12.16 hrs, Volume= 9,281 cf, Depth= 3.65"
Routed to Pond 4P : B-32A (CB-8323)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
12,790	98	Paved parking, HSG D
15,030	84	50-75% Grass cover, Fair, HSG D
2,720	98	Roofs, HSG D
30,540		Weighted Average
15,030		49.21% Pervious Area
15,510		50.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	110	0.0150	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.10"
0.0	25	0.3300	8.62		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
12.1	135	Total			

Summary for Subcatchment 4.2S:

Runoff = 1.2 cfs @ 12.08 hrs, Volume= 4,061 cf, Depth= 4.11"
Routed to Pond 4.2P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
9,785	98	Paved parking, HSG D
2,075	84	50-75% Grass cover, Fair, HSG D
11,860		Weighted Average
2,075		17.50% Pervious Area
9,785		82.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 4.3S:

Runoff = 1.1 cfs @ 12.08 hrs, Volume= 3,683 cf, Depth= 4.16"
Routed to Pond 4.3P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
1,205	80	>75% Grass cover, Good, HSG D
9,425	98	Paved parking, HSG D
10,630		Weighted Average
1,205		11.34% Pervious Area
9,425		88.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 4.4S:

Runoff = 1.1 cfs @ 12.08 hrs, Volume= 3,733 cf, Depth= 4.06"
Routed to Pond 4.4P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
1,860	80	>75% Grass cover, Good, HSG D
9,180	98	Paved parking, HSG D
11,040		Weighted Average
1,860		16.85% Pervious Area
9,180		83.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 4.5S:

Runoff = 0.5 cfs @ 12.08 hrs, Volume= 1,721 cf, Depth= 3.68"
Routed to Pond 4.5P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
2,130	80	>75% Grass cover, Good, HSG D
3,490	98	Paved parking, HSG D
5,620		Weighted Average
2,130		37.90% Pervious Area
3,490		62.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 4.6S:

Runoff = 0.9 cfs @ 12.08 hrs, Volume= 3,139 cf, Depth= 4.14"
Routed to Pond 4.6P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
7,990	98	Paved parking, HSG D
1,100	80	>75% Grass cover, Good, HSG D
9,090		Weighted Average
1,100		12.10% Pervious Area
7,990		87.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 4.7S:

Runoff = 0.6 cfs @ 12.08 hrs, Volume= 2,189 cf, Depth= 4.36"
Routed to Pond 4.7P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
6,020	98	Paved parking, HSG D
6,020		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 4.8S:

Runoff = 1.2 cfs @ 12.08 hrs, Volume= 4,130 cf, Depth= 4.18"
Routed to Pond 4.8P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
10,665	98	Paved parking, HSG D
1,185	80	>75% Grass cover, Good, HSG D
11,850		Weighted Average
1,185		10.00% Pervious Area
10,665		90.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 5.1S:

Runoff = 1.9 cfs @ 12.09 hrs, Volume= 6,279 cf, Depth= 3.65"
Routed to Pond 5P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	10,495	98	Paved parking, HSG D
	10,165	84	50-75% Grass cover, Fair, HSG D
	20,660		Weighted Average
	10,165		49.20% Pervious Area
	10,495		50.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 6.1S:

Runoff = 3.8 cfs @ 12.19 hrs, Volume= 17,267 cf, Depth= 4.11"
Routed to Pond 6P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
36,200	98	Paved parking, HSG D
6,030	98	Roofs, HSG D
1,670	79	50-75% Grass cover, Fair, HSG C
6,470	84	50-75% Grass cover, Fair, HSG D
50,370		Weighted Average
8,140		16.16% Pervious Area
42,230		83.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0700	0.13		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.10"
1.0	65	0.0500	1.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.3	115	0.0100	5.90	4.63	**Pipe Channel, C-D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
14.5	280	Total			

Summary for Subcatchment 7.1S:

Runoff = 3.6 cfs @ 12.15 hrs, Volume= 14,605 cf, Depth= 3.87"
Routed to Pond 7P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
31,245	98	Paved parking, HSG D
11,760	79	50-75% Grass cover, Fair, HSG C
2,285	98	Unconnected pavement, HSG D
45,290		Weighted Average
11,760		25.97% Pervious Area
33,530		74.03% Impervious Area
2,285		6.81% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.0200	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.10"
0.7	75	0.0150	1.84		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
0.7	250	0.0100	5.90	4.63	**Pipe Channel, C-D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
11.4	425	Total			

Summary for Subcatchment 8.10S:

Runoff = 0.8 cfs @ 12.08 hrs, Volume= 2,967 cf, Depth= 4.22"
Routed to Pond 8.10P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
675	80	>75% Grass cover, Good, HSG D
7,765	98	Paved parking, HSG D
8,440		Weighted Average
675		8.00% Pervious Area
7,765		92.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.11S:

Runoff = 2.7 cfs @ 12.08 hrs, Volume= 9,278 cf, Depth= 4.14"
Routed to Pond 8.11P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
3,330	80	>75% Grass cover, Good, HSG D
23,570	98	Paved parking, HSG D
26,900		Weighted Average
3,330		12.38% Pervious Area
23,570		87.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.12S:

Runoff = 0.2 cfs @ 12.08 hrs, Volume= 851 cf, Depth= 4.36"
Routed to Pond 8.12P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
2,340	98	Paved parking, HSG D
2,340		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.1S:

Runoff = 1.2 cfs @ 12.09 hrs, Volume= 3,893 cf, Depth= 3.35"
Routed to Pond 8P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
6,910	98	Paved parking, HSG D
2,655	74	>75% Grass cover, Good, HSG C
4,365	80	>75% Grass cover, Good, HSG D
13,930		Weighted Average
7,020		50.39% Pervious Area
6,910		49.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.2S:

Runoff = 1.9 cfs @ 12.08 hrs, Volume= 6,581 cf, Depth= 4.08"
Routed to Pond 8.2P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
3,010	80	>75% Grass cover, Good, HSG D
16,340	98	Paved parking, HSG D
19,350		Weighted Average
3,010		15.56% Pervious Area
16,340		84.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.3S:

Runoff = 4.8 cfs @ 12.08 hrs, Volume= 16,889 cf, Depth= 4.20"
Routed to Pond 8.3P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
4,320	80	>75% Grass cover, Good, HSG D
43,920	98	Paved parking, HSG D
48,240		Weighted Average
4,320		8.96% Pervious Area
43,920		91.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.4S:

Runoff = 2.1 cfs @ 12.08 hrs, Volume= 7,410 cf, Depth= 3.97"
Routed to Pond 8.4P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
4,910	80	>75% Grass cover, Good, HSG D
17,510	98	Paved parking, HSG D
22,420		Weighted Average
4,910		21.90% Pervious Area
17,510		78.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.5S:

Runoff = 0.6 cfs @ 12.09 hrs, Volume= 1,929 cf, Depth= 2.55"
Routed to Pond 8.5P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
9,090	80	>75% Grass cover, Good, HSG D
9,090		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.6S:

Runoff = 1.0 cfs @ 12.08 hrs, Volume= 3,554 cf, Depth= 3.84"
Routed to Pond 8.6P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
3,235	80	>75% Grass cover, Good, HSG D
7,885	98	Paved parking, HSG D
11,120		Weighted Average
3,235		29.09% Pervious Area
7,885		70.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.7S:

Runoff = 0.4 cfs @ 12.09 hrs, Volume= 1,351 cf, Depth= 3.19"
Routed to Pond 8.7P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
3,280	80	>75% Grass cover, Good, HSG D
1,800	98	Paved parking, HSG D
5,080		Weighted Average
3,280		64.57% Pervious Area
1,800		35.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.8S:

Runoff = 1.0 cfs @ 12.08 hrs, Volume= 3,353 cf, Depth= 4.06"
Routed to Pond 8.8P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
1,680	80	>75% Grass cover, Good, HSG D
8,240	98	Paved parking, HSG D
9,920		Weighted Average
1,680		16.94% Pervious Area
8,240		83.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.9S:

Runoff = 1.8 cfs @ 12.08 hrs, Volume= 6,203 cf, Depth= 4.30"
Routed to Pond 8.9P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
605	80	>75% Grass cover, Good, HSG D
16,705	98	Paved parking, HSG D
17,310		Weighted Average
605		3.50% Pervious Area
16,705		96.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 9.1S:

Runoff = 0.5 cfs @ 12.09 hrs, Volume= 1,550 cf, Depth= 2.74"
Routed to Link POA-3 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
4,800	83	Woods, Poor, HSG D
2,000	80	>75% Grass cover, Good, HSG D
6,800		Weighted Average
6,800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Pond 1P: B-41

Inflow Area = 34,840 sf, 96.15% Impervious, Inflow Depth = 4.31" for 10-YR event
Inflow = 3.6 cfs @ 12.08 hrs, Volume= 12,507 cf
Outflow = 3.6 cfs @ 12.08 hrs, Volume= 12,507 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.6 cfs @ 12.08 hrs, Volume= 12,507 cf
Routed to Pond 2P : B-34

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 59.00' @ 12.08 hrs
Flood Elev= 63.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	57.90'	**18.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 57.90' / 57.75' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.6 cfs @ 12.08 hrs HW=59.00' (Free Discharge)
1=Culvert (Barrel Controls 3.6 cfs @ 3.57 fps)

Summary for Pond 2.11P: 21P (CB-8436)

Inflow Area = 309,190 sf, 80.71% Impervious, Inflow Depth = 4.03" for 10-YR event
Inflow = 12.4 cfs @ 12.11 hrs, Volume= 103,791 cf
Outflow = 12.4 cfs @ 12.11 hrs, Volume= 103,791 cf, Atten= 0%, Lag= 0.0 min
Primary = 12.4 cfs @ 12.11 hrs, Volume= 103,791 cf
Routed to Pond 3.35P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 58.18' @ 12.11 hrs
Flood Elev= 68.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	55.88'	**24.0" Round Culvert** L= 80.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 55.88' / 55.69' S= 0.0024 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=12.4 cfs @ 12.11 hrs HW=58.18' (Free Discharge)
1=Culvert (Barrel Controls 12.4 cfs @ 4.29 fps)

Summary for Pond 2.1P:

Inflow Area = 309,190 sf, 80.71% Impervious, Inflow Depth = 4.03" for 10-YR event
Inflow = 12.4 cfs @ 12.11 hrs, Volume= 103,791 cf
Outflow = 12.4 cfs @ 12.11 hrs, Volume= 103,791 cf, Atten= 0%, Lag= 0.0 min
Primary = 12.4 cfs @ 12.11 hrs, Volume= 103,791 cf
Routed to Pond 2.11P : 21P (CB-8436)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 58.25' @ 12.11 hrs
Flood Elev= 67.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	56.01'	**24.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 56.01' / 55.88' S= 0.0032 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=12.4 cfs @ 12.11 hrs HW=58.24' (Free Discharge)
1=Culvert (Barrel Controls 12.4 cfs @ 4.41 fps)

Summary for Pond 2P: B-34

Inflow Area = 128,980 sf, 80.23% Impervious, Inflow Depth = 4.04" for 10-YR event
Inflow = 10.5 cfs @ 12.10 hrs, Volume= 43,426 cf
Outflow = 10.5 cfs @ 12.10 hrs, Volume= 43,426 cf, Atten= 0%, Lag= 0.0 min
Primary = 10.5 cfs @ 12.10 hrs, Volume= 43,426 cf
Routed to Pond 2.1P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 60.68' @ 12.10 hrs
Flood Elev= 63.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	57.50'	**18.0" Round Culvert** L= 140.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 57.50' / 55.88' S= 0.0116 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=10.5 cfs @ 12.10 hrs HW=60.68' (Free Discharge)
1=Culvert (Inlet Controls 10.5 cfs @ 5.93 fps)

Summary for Pond 3.11P:

Inflow Area = 5,850 sf, 54.70% Impervious, Inflow Depth = 3.54" for 10-YR event
Inflow = 0.5 cfs @ 12.09 hrs, Volume= 1,726 cf
Outflow = 0.5 cfs @ 12.09 hrs, Volume= 1,726 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.5 cfs @ 12.09 hrs, Volume= 1,726 cf
Routed to Pond 3.3P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Peak Elev= 66.26' @ 12.09 hrs
Flood Elev= 71.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	65.85'	**12.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.85' / 65.50' S= 0.0117 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.5 cfs @ 12.09 hrs HW=66.26' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 0.5 cfs @ 1.71 fps)

Summary for Pond 3.1P:

Inflow Area = 1,450 sf, 62.07% Impervious, Inflow Depth = 3.67" for 10-YR event
Inflow = 0.1 cfs @ 12.08 hrs, Volume= 444 cf
Outflow = 0.1 cfs @ 12.08 hrs, Volume= 444 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.1 cfs @ 12.08 hrs, Volume= 444 cf
Routed to Pond 3.11P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 67.50' @ 12.08 hrs
Flood Elev= 72.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	67.30'	**12.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.30' / 65.90' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.1 cfs @ 12.08 hrs HW=67.50' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 0.1 cfs @ 1.19 fps)

Summary for Pond 3.2P:

Inflow Area = 4,400 sf, 52.27% Impervious, Inflow Depth = 3.50" for 10-YR event
Inflow = 0.4 cfs @ 12.09 hrs, Volume= 1,282 cf
Outflow = 0.4 cfs @ 12.09 hrs, Volume= 1,282 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.4 cfs @ 12.09 hrs, Volume= 1,282 cf
Routed to Pond 3.11P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 67.12' @ 12.09 hrs
Flood Elev= 70.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.77'	**12.0" Round Culvert** L= 80.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.77' / 65.90' S= 0.0109 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.4 cfs @ 12.09 hrs HW=67.12' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.4 cfs @ 1.58 fps)

Summary for Pond 3.31P:

Inflow Area = 39,230 sf, 85.34% Impervious, Inflow Depth = 4.10" for 10-YR event
Inflow = 3.8 cfs @ 12.08 hrs, Volume= 13,396 cf
Outflow = 3.8 cfs @ 12.08 hrs, Volume= 13,396 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.8 cfs @ 12.08 hrs, Volume= 13,396 cf
Routed to Pond 3.32P : WQ DET & SF-2

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 62.75' @ 12.08 hrs
Flood Elev= 70.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	61.80'	**24.0" Round Culvert** L= 42.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 61.80' / 61.30' S= 0.0119 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=3.8 cfs @ 12.08 hrs HW=62.75' (Free Discharge)
└**1=Culvert** (Inlet Controls 3.8 cfs @ 2.62 fps)

Summary for Pond 3.32P: WQ DET & SF-2

Inflow Area = 105,340 sf, 85.47% Impervious, Inflow Depth = 4.11" for 10-YR event
Inflow = 10.4 cfs @ 12.08 hrs, Volume= 36,052 cf
Outflow = 10.2 cfs @ 12.10 hrs, Volume= 36,052 cf, Atten= 2%, Lag= 1.0 min
Primary = 0.3 cfs @ 12.10 hrs, Volume= 17,012 cf
Routed to Pond 3.34P :
Secondary = 9.9 cfs @ 12.10 hrs, Volume= 19,040 cf
Routed to Pond 3.33P : PEAK DET

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 62.94' @ 12.10 hrs Surf.Area= 1,634 sf Storage= 3,395 cf

Plug-Flow detention time= 48.5 min calculated for 36,046 cf (100% of inflow)
Center-of-Mass det. time= 48.5 min (804.8 - 756.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	60.00'	0 cf	**8.00'W x 204.25'L x 9.00'H Field A** 14,706 cf Overall - 10,166 cf Embedded = 4,540 cf x 0.0% Voids
#2A	60.00'	10,166 cf	**CMP Round 96** x 9 Inside #1 Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf Overall Size= 96.0"W x 96.0"H x 20.00'L Row Length Adjustment= +14.25' x 50.27 sf x 1 rows 8.00' Header x 50.27 sf x 1 = 402.1 cf Inside
		10,166 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Device 2	60.00'	**12.0" Round Culvert** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 60.00' / 59.95' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 3	57.70'	**Tube/Siphon/Float Valve X 11.00** 0.668" Diameter, C= 0.600, 0.263" Trickle Diameter Starts@60.45'
#3	Primary	57.70'	**12.0" Round 12" Stormfilter Outlet** L= 13.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 57.70' / 57.60' S= 0.0077 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Secondary	62.40'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 2.40 2.48 2.56 2.64 2.72 2.80 2.88 2.96 3.04 3.12 3.20 3.28 3.36 3.44 3.52 3.60 3.68 3.76 3.84 3.92 4.00 4.08 4.16 4.24 4.32 4.40 4.48 4.56 4.64 4.72 4.80 4.88 4.96 5.04 5.12 5.20 5.28 5.36 5.44 5.52 5.60 5.68 5.76 5.84 5.92 6.00 6.08 6.16 6.24 6.32 6.40 6.48 6.56 6.64 6.72 6.80 6.88 6.96 7.04 7.12 7.20 7.28 7.36 7.44 7.52 7.60 7.68 7.76 7.84 7.92 8.00 Width (feet) 7.33 7.40 7.46 7.52 7.58 7.63 7.68 7.72 7.77 7.80 7.84 7.87 7.90 7.92 7.94 7.96 7.97 7.99 7.99 8.00 8.00 8.00 7.99 7.99 7.97 7.96 7.94 7.92 7.90 7.87 7.84 7.80 7.77 7.72 7.68 7.63 7.58 7.52 7.46 7.40 7.33 7.26 7.18 7.10 7.02 6.93 6.83 6.73 6.63 6.52 6.40 6.28 6.15 6.01 5.87 5.71 5.55 5.38 5.20 5.01 4.80 4.58 4.34 4.08 3.80 3.49 3.14 2.73 2.24 1.59 0.00

Primary OutFlow Max=0.3 cfs @ 12.10 hrs HW=62.94' (Free Discharge)
└**3=12" Stormfilter Outlet** (Passes 0.3 cfs of 6.5 cfs potential flow)
└**2=Tube/Siphon/Float Valve** (Orifice Controls 0.3 cfs @ 11.03 fps)
└**1=Culvert** (Passes 0.3 cfs of 5.9 cfs potential flow)

Secondary OutFlow Max=9.9 cfs @ 12.10 hrs HW=62.94' (Free Discharge)
└**4=Custom Weir/Orifice** (Weir Controls 9.9 cfs @ 2.40 fps)

Summary for Pond 3.33P: PEAK DET

Inflow = 9.9 cfs @ 12.10 hrs, Volume= 19,040 cf
Outflow = 0.2 cfs @ 14.65 hrs, Volume= 19,039 cf, Atten= 98%, Lag= 152.8 min
Primary = 0.2 cfs @ 14.65 hrs, Volume= 19,039 cf
Routed to Pond 3.34P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 63.37' @ 14.65 hrs Surf.Area= 8,318 sf Storage= 16,581 cf

Plug-Flow detention time= 947.8 min calculated for 19,036 cf (100% of inflow)
Center-of-Mass det. time= 948.1 min (1,691.2 - 743.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	60.00'	0 cf	**63.00'W x 124.00'L x 8.00'H Field A** 62,496 cf Overall - 38,152 cf Embedded = 24,344 cf x 0.0% Voids
#2A	60.00'	38,152 cf	**CMP Round 96** x 30 Inside #1 Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf Overall Size= 96.0"W x 96.0"H x 20.00'L Row Length Adjustment= +16.00' x 50.27 sf x 6 rows 63.00' Header x 50.27 sf x 1 = 3,166.7 cf Inside
#3	60.00'	3,217 cf	**CMP Round 96** x 3 Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf Overall Size= 96.0"W x 96.0"H x 20.00'L Row Length Adjustment= +4.00' x 50.27 sf x 1 rows
		41,368 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	60.00'	**2.0" Vert. DRAINDOWN ORIFICE** C= 0.600 Limited to weir flow at low heads
#2	Primary	65.50'	**0.5' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#3	Primary	63.50'	**36.0" W x 6.0" H Vert. CAPACITY ORIFICE** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.2 cfs @ 14.65 hrs HW=63.37' (Free Discharge)
- **1=DRAINDOWN ORIFICE** (Orifice Controls 0.2 cfs @ 8.73 fps)
- **2=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)
- **3=CAPACITY ORIFICE** (Controls 0.0 cfs)

Summary for Pond 3.34P:

Inflow Area = 105,340 sf, 85.47% Impervious, Inflow Depth > 4.11" for 10-YR event
Inflow = 0.5 cfs @ 14.43 hrs, Volume= 36,051 cf
Outflow = 0.5 cfs @ 14.43 hrs, Volume= 36,051 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.5 cfs @ 14.43 hrs, Volume= 36,051 cf
Routed to Pond 3.35P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 57.81' @ 14.43 hrs
Flood Elev= 67.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	57.50'	**24.0" Round Culvert** L= 62.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 57.50' / 56.87' S= 0.0102 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.5 cfs @ 14.43 hrs HW=57.81' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.5 cfs @ 1.50 fps)

Summary for Pond 3.35P:

Inflow Area = 414,530 sf, 81.92% Impervious, Inflow Depth = 4.05" for 10-YR event
Inflow = 12.8 cfs @ 12.11 hrs, Volume= 139,843 cf
Outflow = 12.8 cfs @ 12.11 hrs, Volume= 139,843 cf, Atten= 0%, Lag= 0.0 min
Primary = 12.8 cfs @ 12.11 hrs, Volume= 139,843 cf
Routed to Pond 3P : B-32 (CB-8031)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 58.01' @ 12.11 hrs
Flood Elev= 67.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	55.69'	**24.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 55.69' / 55.62' S= 0.0028 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=12.8 cfs @ 12.11 hrs HW=58.01' (Free Discharge)
└**1=Culvert** (Barrel Controls 12.8 cfs @ 4.42 fps)

Summary for Pond 3.3P:

Inflow Area = 39,230 sf, 85.34% Impervious, Inflow Depth = 4.10" for 10-YR event
Inflow = 3.8 cfs @ 12.08 hrs, Volume= 13,396 cf
Outflow = 3.8 cfs @ 12.08 hrs, Volume= 13,396 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.8 cfs @ 12.08 hrs, Volume= 13,396 cf
Routed to Pond 3.31P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 63.89' @ 12.08 hrs
Flood Elev= 69.95'

Device	Routing	Invert	Outlet Devices
#1	Primary	62.80'	**18.0" Round Culvert** L= 45.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.80' / 62.30' S= 0.0111 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.8 cfs @ 12.08 hrs HW=63.89' (Free Discharge)
└**1=Culvert** (Inlet Controls 3.8 cfs @ 2.80 fps)

Summary for Pond 3.4P:

Inflow Area = 5,170 sf, 90.14% Impervious, Inflow Depth = 4.18" for 10-YR event
Inflow = 0.5 cfs @ 12.08 hrs, Volume= 1,803 cf
Outflow = 0.5 cfs @ 12.08 hrs, Volume= 1,803 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.5 cfs @ 12.08 hrs, Volume= 1,803 cf
Routed to Pond 3.3P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 66.66' @ 12.08 hrs
Flood Elev= 69.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.25'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.25' / 65.45' S= 0.0160 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.5 cfs @ 12.08 hrs HW=66.66' (Free Discharge)
1=Culvert (Inlet Controls 0.5 cfs @ 1.71 fps)

Summary for Pond 3.5P:

Inflow Area = 13,630 sf, 87.97% Impervious, Inflow Depth = 4.15" for 10-YR event
Inflow = 1.3 cfs @ 12.08 hrs, Volume= 4,708 cf
Outflow = 1.3 cfs @ 12.08 hrs, Volume= 4,708 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.3 cfs @ 12.08 hrs, Volume= 4,708 cf
Routed to Pond 3.6P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 65.01' @ 12.08 hrs
Flood Elev= 68.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	64.30'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 64.30' / 63.80' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.3 cfs @ 12.08 hrs HW=65.01' (Free Discharge)
1=Culvert (Inlet Controls 1.3 cfs @ 2.26 fps)

Summary for Pond 3.6P:

Inflow Area = 20,710 sf, 92.08% Impervious, Inflow Depth = 4.22" for 10-YR event
Inflow = 2.1 cfs @ 12.08 hrs, Volume= 7,283 cf
Outflow = 2.1 cfs @ 12.08 hrs, Volume= 7,283 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.1 cfs @ 12.08 hrs, Volume= 7,283 cf
Routed to Pond 3.3P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Peak Elev= 64.37' @ 12.08 hrs
Flood Elev= 69.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	63.55'	**15.0" Round Culvert** L= 45.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 63.55' / 63.05' S= 0.0111 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.1 cfs @ 12.08 hrs HW=64.37' (Free Discharge)
1=Culvert (Inlet Controls 2.1 cfs @ 2.43 fps)

Summary for Pond 3.7P:

Inflow Area = 6,280 sf, 87.10% Impervious, Inflow Depth = 4.13" for 10-YR event
Inflow = 0.6 cfs @ 12.08 hrs, Volume= 2,161 cf
Outflow = 0.6 cfs @ 12.08 hrs, Volume= 2,161 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.6 cfs @ 12.08 hrs, Volume= 2,161 cf
Routed to Pond 3.5P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 65.25' @ 12.08 hrs
Flood Elev= 68.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	64.80'	**12.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 64.80' / 64.40' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.6 cfs @ 12.08 hrs HW=65.25' (Free Discharge)
1=Culvert (Inlet Controls 0.6 cfs @ 1.80 fps)

Summary for Pond 3P: B-32 (CB-8031)

Inflow Area = 414,530 sf, 81.92% Impervious, Inflow Depth = 4.05" for 10-YR event
Inflow = 12.8 cfs @ 12.11 hrs, Volume= 139,843 cf
Outflow = 12.8 cfs @ 12.11 hrs, Volume= 139,843 cf, Atten= 0%, Lag= 0.0 min
Primary = 12.8 cfs @ 12.11 hrs, Volume= 139,843 cf
Routed to Pond 4P : B-32A (CB-8323)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 57.86' @ 12.11 hrs
Flood Elev= 66.13'

Device	Routing	Invert	Outlet Devices
#1	Primary	55.52'	**24.0" Round Culvert** L= 22.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 55.44' / 55.52' S= -0.0036 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=12.8 cfs @ 12.11 hrs HW=57.85' (Free Discharge)
└**1=Culvert** (Barrel Controls 12.8 cfs @ 4.28 fps)

Summary for Pond 4.21P:

Inflow Area = 11,860 sf, 82.50% Impervious, Inflow Depth = 4.11" for 10-YR event
Inflow = 1.2 cfs @ 12.08 hrs, Volume= 4,061 cf
Outflow = 1.2 cfs @ 12.08 hrs, Volume= 4,061 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.2 cfs @ 12.08 hrs, Volume= 4,061 cf
Routed to Pond 4.3P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 67.64' @ 12.08 hrs
Flood Elev= 72.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	67.05'	**15.0" Round Culvert** L= 82.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.05' / 66.06' S= 0.0121 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.2 cfs @ 12.08 hrs HW=67.64' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.2 cfs @ 2.06 fps)

Summary for Pond 4.2P:

Inflow Area = 11,860 sf, 82.50% Impervious, Inflow Depth = 4.11" for 10-YR event
Inflow = 1.2 cfs @ 12.08 hrs, Volume= 4,061 cf
Outflow = 1.2 cfs @ 12.08 hrs, Volume= 4,061 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.2 cfs @ 12.08 hrs, Volume= 4,061 cf
Routed to Pond 4.21P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 68.79' @ 12.08 hrs
Flood Elev= 72.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	68.20'	**15.0" Round Culvert** L= 104.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 68.20' / 67.16' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.2 cfs @ 12.08 hrs HW=68.79' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.2 cfs @ 2.06 fps)

Summary for Pond 4.3P:

Inflow Area = 22,490 sf, 85.42% Impervious, Inflow Depth = 4.13" for 10-YR event
Inflow = 2.2 cfs @ 12.08 hrs, Volume= 7,744 cf
Outflow = 2.2 cfs @ 12.08 hrs, Volume= 7,744 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.2 cfs @ 12.08 hrs, Volume= 7,744 cf
Routed to Pond 4.8P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 66.59' @ 12.08 hrs
Flood Elev= 70.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	65.81'	**18.0" Round Culvert** L= 105.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.81' / 64.15' S= 0.0158 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.2 cfs @ 12.08 hrs HW=66.59' (Free Discharge)
1=Culvert (Inlet Controls 2.2 cfs @ 2.38 fps)

Summary for Pond 4.4P:

Inflow Area = 11,040 sf, 83.15% Impervious, Inflow Depth = 4.06" for 10-YR event
Inflow = 1.1 cfs @ 12.08 hrs, Volume= 3,733 cf
Outflow = 1.1 cfs @ 12.08 hrs, Volume= 3,733 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.1 cfs @ 12.08 hrs, Volume= 3,733 cf
Routed to Pond 4.6P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 68.52' @ 12.08 hrs
Flood Elev= 71.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	67.90'	**12.0" Round Culvert** L= 83.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.90' / 66.50' S= 0.0169 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.1 cfs @ 12.08 hrs HW=68.52' (Free Discharge)
1=Culvert (Inlet Controls 1.1 cfs @ 2.11 fps)

Summary for Pond 4.5P:

Inflow Area = 5,620 sf, 62.10% Impervious, Inflow Depth = 3.68" for 10-YR event
Inflow = 0.5 cfs @ 12.08 hrs, Volume= 1,721 cf
Outflow = 0.5 cfs @ 12.08 hrs, Volume= 1,721 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.5 cfs @ 12.08 hrs, Volume= 1,721 cf
Routed to Pond 4.6P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Peak Elev= 69.50' @ 12.08 hrs
Flood Elev= 72.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	69.10'	**12.0" Round Culvert** L= 122.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 69.10' / 66.50' S= 0.0213 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.5 cfs @ 12.08 hrs HW=69.50' (Free Discharge)
1=Culvert (Inlet Controls 0.5 cfs @ 1.71 fps)

Summary for Pond 4.6P:

Inflow Area = 25,750 sf, 80.23% Impervious, Inflow Depth = 4.00" for 10-YR event
Inflow = 2.5 cfs @ 12.08 hrs, Volume= 8,593 cf
Outflow = 2.5 cfs @ 12.08 hrs, Volume= 8,593 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.5 cfs @ 12.08 hrs, Volume= 8,593 cf
Routed to Pond 4.7P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 66.83' @ 12.08 hrs
Flood Elev= 70.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.00'	**18.0" Round Culvert** L= 77.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.00' / 64.70' S= 0.0169 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.5 cfs @ 12.08 hrs HW=66.83' (Free Discharge)
1=Culvert (Inlet Controls 2.5 cfs @ 2.45 fps)

Summary for Pond 4.7P:

Inflow Area = 31,770 sf, 83.98% Impervious, Inflow Depth = 4.07" for 10-YR event
Inflow = 3.1 cfs @ 12.08 hrs, Volume= 10,783 cf
Outflow = 3.1 cfs @ 12.08 hrs, Volume= 10,783 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.1 cfs @ 12.08 hrs, Volume= 10,783 cf
Routed to Pond 4.81P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 64.84' @ 12.08 hrs
Flood Elev= 69.75'

Device	Routing	Invert	Outlet Devices
#1	Primary	64.20'	**18.0" Round Culvert X 2.00** L= 22.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 64.20' / 63.70' S= 0.0227 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.1 cfs @ 12.08 hrs HW=64.84' (Free Discharge)
1=Culvert (Inlet Controls 3.1 cfs @ 2.15 fps)

Summary for Pond 4.81P:

Inflow Area = 66,110 sf, 85.55% Impervious, Inflow Depth = 4.11" for 10-YR event
Inflow = 6.5 cfs @ 12.08 hrs, Volume= 22,657 cf
Outflow = 6.5 cfs @ 12.08 hrs, Volume= 22,657 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.5 cfs @ 12.08 hrs, Volume= 22,657 cf
Routed to Pond 3.32P : WQ DET & SF-2

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 64.49' @ 12.08 hrs
Flood Elev= 69.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	63.20'	**24.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 63.20' / 62.80' S= 0.0267 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=6.5 cfs @ 12.08 hrs HW=64.48' (Free Discharge)
1=Culvert (Inlet Controls 6.5 cfs @ 3.05 fps)

Summary for Pond 4.8P:

Inflow Area = 34,340 sf, 87.00% Impervious, Inflow Depth = 4.15" for 10-YR event
Inflow = 3.4 cfs @ 12.08 hrs, Volume= 11,874 cf
Outflow = 3.4 cfs @ 12.08 hrs, Volume= 11,874 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.4 cfs @ 12.08 hrs, Volume= 11,874 cf
Routed to Pond 4.81P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 64.54' @ 12.08 hrs
Flood Elev= 68.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	63.65'	**24.0" Round Culvert** L= 35.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 63.65' / 63.30' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=3.4 cfs @ 12.08 hrs HW=64.54' (Free Discharge)
1=Culvert (Inlet Controls 3.4 cfs @ 2.53 fps)

Summary for Pond 4P: B-32A (CB-8323)

Inflow Area = 445,070 sf, 79.79% Impervious, Inflow Depth = 4.02" for 10-YR event
Inflow = 15.0 cfs @ 12.12 hrs, Volume= 149,124 cf
Outflow = 15.0 cfs @ 12.12 hrs, Volume= 149,124 cf, Atten= 0%, Lag= 0.0 min
Primary = 15.0 cfs @ 12.12 hrs, Volume= 149,124 cf
Routed to Link POA-1 : B-30
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link POA-1 : B-30

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 58.09' @ 12.12 hrs
Flood Elev= 59.75'

Device	Routing	Invert	Outlet Devices
#1	Primary	55.52'	**24.0" Round Culvert** L= 115.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 55.52' / 54.90' S= 0.0054 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Secondary	59.39'	**15.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=14.9 cfs @ 12.12 hrs HW=58.09' (Free Discharge)
1=Culvert (Inlet Controls 14.9 cfs @ 4.76 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=55.52' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

Summary for Pond 5P:

Inflow Area = 20,660 sf, 50.80% Impervious, Inflow Depth = 3.65" for 10-YR event
Inflow = 1.9 cfs @ 12.09 hrs, Volume= 6,279 cf
Outflow = 1.9 cfs @ 12.09 hrs, Volume= 6,279 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.9 cfs @ 12.09 hrs, Volume= 6,279 cf
Routed to Link POA-2 :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 60.77' @ 12.09 hrs
Flood Elev= 66.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	60.00'	**15.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 60.00' / 59.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.9 cfs @ 12.09 hrs HW=60.77' (Free Discharge)
1=Culvert (Inlet Controls 1.9 cfs @ 2.36 fps)

Summary for Pond 6P:

Inflow Area = 64,300 sf, 76.42% Impervious, Inflow Depth = 3.95" for 10-YR event
Inflow = 4.6 cfs @ 12.16 hrs, Volume= 21,160 cf
Outflow = 4.6 cfs @ 12.16 hrs, Volume= 21,160 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.6 cfs @ 12.16 hrs, Volume= 21,160 cf
Routed to Pond 2P : B-34
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond 2P : B-34

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 64.94' @ 12.16 hrs
Flood Elev= 71.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	62.08'	**12.0" Round Culvert** L= 300.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.08' / 57.67' S= 0.0147 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	70.50'	**12.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=4.6 cfs @ 12.16 hrs HW=64.94' (Free Discharge)
1=Culvert (Inlet Controls 4.6 cfs @ 5.84 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=62.08' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

Summary for Pond 7P:

Inflow Area = 45,290 sf, 74.03% Impervious, Inflow Depth = 3.87" for 10-YR event
Inflow = 3.6 cfs @ 12.15 hrs, Volume= 14,605 cf
Outflow = 3.6 cfs @ 12.15 hrs, Volume= 14,605 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.6 cfs @ 12.15 hrs, Volume= 14,605 cf
Routed to Link POA-4 :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 66.93' @ 12.15 hrs
Flood Elev= 69.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	65.00'	**12.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.00' / 64.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.6 cfs @ 12.15 hrs HW=66.92' (Free Discharge)
1=Culvert (Inlet Controls 3.6 cfs @ 4.54 fps)

Summary for Pond 8.10P:

Inflow Area = 8,440 sf, 92.00% Impervious, Inflow Depth = 4.22" for 10-YR event
Inflow = 0.8 cfs @ 12.08 hrs, Volume= 2,967 cf
Outflow = 0.8 cfs @ 12.08 hrs, Volume= 2,967 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.8 cfs @ 12.08 hrs, Volume= 2,967 cf
Routed to Pond 8.9P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 69.84' @ 12.08 hrs
Flood Elev= 72.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	69.30'	**12.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 69.30' / 68.75' S= 0.0367 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.8 cfs @ 12.08 hrs HW=69.84' (Free Discharge)
1=Culvert (Inlet Controls 0.8 cfs @ 1.97 fps)

Summary for Pond 8.111P:

Inflow Area = 29,240 sf, 88.61% Impervious, Inflow Depth = 4.16" for 10-YR event
Inflow = 2.9 cfs @ 12.08 hrs, Volume= 10,129 cf
Outflow = 2.9 cfs @ 12.08 hrs, Volume= 10,129 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.9 cfs @ 12.08 hrs, Volume= 10,129 cf
Routed to Pond 8.82P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 68.86' @ 12.08 hrs
Flood Elev= 74.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	67.95'	**18.0" Round Culvert** L= 160.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.95' / 66.30' S= 0.0103 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.9 cfs @ 12.08 hrs HW=68.86' (Free Discharge)
1=Culvert (Inlet Controls 2.9 cfs @ 2.57 fps)

Summary for Pond 8.11P:

Inflow Area = 26,900 sf, 87.62% Impervious, Inflow Depth = 4.14" for 10-YR event
Inflow = 2.7 cfs @ 12.08 hrs, Volume= 9,278 cf
Outflow = 2.7 cfs @ 12.08 hrs, Volume= 9,278 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.7 cfs @ 12.08 hrs, Volume= 9,278 cf
Routed to Pond 8.111P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Peak Elev= 70.91' @ 12.08 hrs
Flood Elev= 73.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	69.95'	**15.0" Round Culvert** L= 144.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 69.95' / 68.20' S= 0.0122 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.7 cfs @ 12.08 hrs HW=70.91' (Free Discharge)
1=Culvert (Inlet Controls 2.7 cfs @ 2.63 fps)

Summary for Pond 8.12P:

Inflow Area = 2,340 sf,100.00% Impervious, Inflow Depth = 4.36" for 10-YR event
Inflow = 0.2 cfs @ 12.08 hrs, Volume= 851 cf
Outflow = 0.2 cfs @ 12.08 hrs, Volume= 851 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.2 cfs @ 12.08 hrs, Volume= 851 cf
Routed to Pond 8.111P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 71.02' @ 12.08 hrs
Flood Elev= 74.35'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.75'	**12.0" Round Culvert** L= 120.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 70.75' / 69.30' S= 0.0121 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.2 cfs @ 12.08 hrs HW=71.02' (Free Discharge)
1=Culvert (Inlet Controls 0.2 cfs @ 1.40 fps)

Summary for Pond 8.21P:

Inflow Area = 19,350 sf, 84.44% Impervious, Inflow Depth = 4.08" for 10-YR event
Inflow = 1.9 cfs @ 12.08 hrs, Volume= 6,581 cf
Outflow = 1.9 cfs @ 12.08 hrs, Volume= 6,581 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.9 cfs @ 12.08 hrs, Volume= 6,581 cf
Routed to Pond 8.22P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 71.64' @ 12.08 hrs
Flood Elev= 76.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	71.00'	**24.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 71.00' / 68.60' S= 0.0240 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=1.9 cfs @ 12.08 hrs HW=71.64' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.9 cfs @ 2.16 fps)

Summary for Pond 8.22P:

Inflow Area = 41,770 sf, 81.04% Impervious, Inflow Depth = 4.02" for 10-YR event
Inflow = 4.0 cfs @ 12.08 hrs, Volume= 13,991 cf
Outflow = 4.0 cfs @ 12.08 hrs, Volume= 13,991 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.0 cfs @ 12.08 hrs, Volume= 13,991 cf
Routed to Pond 8.3P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 69.47' @ 12.08 hrs
Flood Elev= 75.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	68.50'	**24.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 68.50' / 68.10' S= 0.0133 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=4.0 cfs @ 12.08 hrs HW=69.47' (Free Discharge)
└**1=Culvert** (Inlet Controls 4.0 cfs @ 2.65 fps)

Summary for Pond 8.2P:

Inflow Area = 19,350 sf, 84.44% Impervious, Inflow Depth = 4.08" for 10-YR event
Inflow = 1.9 cfs @ 12.08 hrs, Volume= 6,581 cf
Outflow = 1.9 cfs @ 12.08 hrs, Volume= 6,581 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.9 cfs @ 12.08 hrs, Volume= 6,581 cf
Routed to Pond 8.21P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 74.42' @ 12.08 hrs
Flood Elev= 79.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.70'	**18.0" Round Culvert** L= 120.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 73.70' / 71.50' S= 0.0183 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.9 cfs @ 12.08 hrs HW=74.41' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.9 cfs @ 2.27 fps)

Summary for Pond 8.3P:

Inflow Area = 99,100 sf, 78.48% Impervious, Inflow Depth = 3.97" for 10-YR event
Inflow = 9.5 cfs @ 12.08 hrs, Volume= 32,809 cf
Outflow = 9.5 cfs @ 12.08 hrs, Volume= 32,809 cf, Atten= 0%, Lag= 0.0 min
Primary = 9.5 cfs @ 12.08 hrs, Volume= 32,809 cf
Routed to Pond 8.7P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 69.64' @ 12.08 hrs
Flood Elev= 74.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	68.00'	**24.0" Round Culvert** L= 45.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 68.00' / 67.20' S= 0.0178 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=9.5 cfs @ 12.08 hrs HW=69.64' (Free Discharge)
1=Culvert (Inlet Controls 9.5 cfs @ 3.44 fps)

Summary for Pond 8.4P:

Inflow Area = 22,420 sf, 78.10% Impervious, Inflow Depth = 3.97" for 10-YR event
Inflow = 2.1 cfs @ 12.08 hrs, Volume= 7,410 cf
Outflow = 2.1 cfs @ 12.08 hrs, Volume= 7,410 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.1 cfs @ 12.08 hrs, Volume= 7,410 cf
Routed to Pond 8.22P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 70.84' @ 12.08 hrs
Flood Elev= 75.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.00'	**15.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 70.00' / 69.35' S= 0.0163 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.1 cfs @ 12.08 hrs HW=70.83' (Free Discharge)
1=Culvert (Inlet Controls 2.1 cfs @ 2.46 fps)

Summary for Pond 8.5P:

Inflow Area = 9,090 sf, 0.00% Impervious, Inflow Depth = 2.55" for 10-YR event
Inflow = 0.6 cfs @ 12.09 hrs, Volume= 1,929 cf
Outflow = 0.6 cfs @ 12.09 hrs, Volume= 1,929 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.6 cfs @ 12.09 hrs, Volume= 1,929 cf
Routed to Pond 8.3P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Peak Elev= 74.90' @ 12.09 hrs
Flood Elev= 77.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	74.45'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 74.45' / 73.35' S= 0.0220 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.6 cfs @ 12.09 hrs HW=74.90' (Free Discharge)
1=Culvert (Inlet Controls 0.6 cfs @ 1.81 fps)

Summary for Pond 8.6P:

Inflow Area = 11,120 sf, 70.91% Impervious, Inflow Depth = 3.84" for 10-YR event
Inflow = 1.0 cfs @ 12.08 hrs, Volume= 3,554 cf
Outflow = 1.0 cfs @ 12.08 hrs, Volume= 3,554 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.0 cfs @ 12.08 hrs, Volume= 3,554 cf
Routed to Pond 8.7P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 71.85' @ 12.08 hrs
Flood Elev= 75.15'

Device	Routing	Invert	Outlet Devices
#1	Primary	71.30'	**15.0" Round Culvert** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 71.30' / 70.10' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.0 cfs @ 12.08 hrs HW=71.85' (Free Discharge)
1=Culvert (Inlet Controls 1.0 cfs @ 1.99 fps)

Summary for Pond 8.7P:

Inflow Area = 115,300 sf, 75.85% Impervious, Inflow Depth = 3.93" for 10-YR event
Inflow = 10.9 cfs @ 12.08 hrs, Volume= 37,713 cf
Outflow = 10.9 cfs @ 12.08 hrs, Volume= 37,713 cf, Atten= 0%, Lag= 0.0 min
Primary = 10.9 cfs @ 12.08 hrs, Volume= 37,713 cf
Routed to Pond 8.81P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 68.47' @ 12.08 hrs
Flood Elev= 73.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.90'	**30.0" Round Culvert** L= 57.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.90' / 66.25' S= 0.0114 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=10.9 cfs @ 12.08 hrs HW=68.47' (Free Discharge)
└**1=Culvert** (Inlet Controls 10.9 cfs @ 3.37 fps)

Summary for Pond 8.81P:

Inflow Area = 150,970 sf, 79.60% Impervious, Inflow Depth = 3.99" for 10-YR event
Inflow = 14.5 cfs @ 12.08 hrs, Volume= 50,237 cf
Outflow = 14.5 cfs @ 12.08 hrs, Volume= 50,237 cf, Atten= 0%, Lag= 0.0 min
Primary = 14.5 cfs @ 12.08 hrs, Volume= 50,237 cf
Routed to Pond 8.82P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 68.04' @ 12.08 hrs
Flood Elev= 74.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.25'	**36.0" Round Culvert** L= 13.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.25' / 66.00' S= 0.0192 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=14.5 cfs @ 12.08 hrs HW=68.04' (Free Discharge)
└**1=Culvert** (Barrel Controls 14.5 cfs @ 4.73 fps)

Summary for Pond 8.82P:

Inflow Area = 180,210 sf, 81.06% Impervious, Inflow Depth = 4.02" for 10-YR event
Inflow = 17.4 cfs @ 12.08 hrs, Volume= 60,366 cf
Outflow = 17.4 cfs @ 12.08 hrs, Volume= 60,366 cf, Atten= 0%, Lag= 0.0 min
Primary = 17.4 cfs @ 12.08 hrs, Volume= 60,366 cf
Routed to Pond 8.83P : WQ DET & SF-1

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 67.33' @ 12.08 hrs
Flood Elev= 75.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	65.25'	**36.0" Round Culvert** L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.25' / 65.10' S= 0.0214 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=17.4 cfs @ 12.08 hrs HW=67.32' (Free Discharge)
└**1=Culvert** (Barrel Controls 17.4 cfs @ 4.70 fps)

Summary for Pond 8.83P: WQ DET & SF-1

Inflow Area = 180,210 sf, 81.06% Impervious, Inflow Depth = 4.02" for 10-YR event
Inflow = 17.4 cfs @ 12.08 hrs, Volume= 60,366 cf
Outflow = 17.4 cfs @ 12.09 hrs, Volume= 60,366 cf, Atten= 0%, Lag= 0.4 min
Primary = 0.5 cfs @ 12.09 hrs, Volume= 27,880 cf
Routed to Pond 8.85P :
Secondary = 16.9 cfs @ 12.09 hrs, Volume= 32,486 cf
Routed to Pond 8.84P : Peak DET-1

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 69.45' @ 12.09 hrs Surf.Area= 1,115 sf Storage= 5,079 cf

Plug-Flow detention time= 53.2 min calculated for 60,356 cf (100% of inflow)
Center-of-Mass det. time= 53.2 min (811.8 - 758.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	62.50'	0 cf	**10.00'W x 111.50'L x 8.00'H Field A** 8,920 cf Overall - 5,504 cf Embedded = 3,416 cf x 0.0% Voids
#2A	62.50'	5,504 cf	**CMP Round 96** x 5 Inside #1 Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf Overall Size= 96.0"W x 96.0"H x 20.00'L Row Length Adjustment= +1.50' x 50.27 sf x 1 rows 8.00' Header x 50.27 sf x 1 = 402.1 cf Inside
		5,504 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Device 2	62.50'	**12.0" Round Culvert** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 62.50' / 62.50' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 3	60.60'	**Tube/Siphon/Float Valve X 18.00** 0.586" Diameter, C= 0.600, 0.263" Trickle Diameter Starts@63.35'
#3	Primary	60.60'	**12.0" Round 12" Stormfilter Outlet** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 60.60' / 60.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Secondary	68.58'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 6.08 6.16 6.24 6.32 6.40 6.48 6.56 6.64 6.72 6.80 6.88 6.96 7.04 7.12 7.20 7.28 7.36 7.44 7.52 7.60 7.68 7.76 7.84 7.92 8.00 Width (feet) 6.83 6.73 6.63 6.52 6.40 6.28 6.15 6.01 5.87 5.71 5.55 5.38 5.20 5.01 4.80 4.58 4.34 4.08 3.80 3.49 3.14 2.73 2.24 1.59 0.00

Primary OutFlow Max=0.5 cfs @ 12.09 hrs HW=69.45' (Free Discharge)
└**3=12" Stormfilter Outlet** (Passes 0.5 cfs of 8.6 cfs potential flow)
└**2=Tube/Siphon/Float Valve** (Orifice Controls 0.5 cfs @ 14.33 fps)
└**1=Culvert** (Passes 0.5 cfs of 9.6 cfs potential flow)

Secondary OutFlow Max=16.9 cfs @ 12.09 hrs HW=69.45' (Free Discharge)
└**4=Custom Weir/Orifice** (Weir Controls 16.9 cfs @ 3.13 fps)

Summary for Pond 8.84P: Peak DET-1

Inflow = 16.9 cfs @ 12.09 hrs, Volume= 32,486 cf
Outflow = 2.9 cfs @ 12.53 hrs, Volume= 32,486 cf, Atten= 83%, Lag= 26.5 min
Primary = 2.9 cfs @ 12.53 hrs, Volume= 32,486 cf
Routed to Pond 8.85P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 66.00' @ 12.53 hrs Surf.Area= 10,780 sf Storage= 21,025 cf

Plug-Flow detention time= 344.9 min calculated for 32,486 cf (100% of inflow)
Center-of-Mass det. time= 344.9 min (1,087.2 - 742.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	62.50'	0 cf	**98.00'W x 110.00'L x 8.00'H Field A** 86,240 cf Overall - 50,064 cf Embedded = 36,176 cf x 0.0% Voids
#2A	62.50'	50,064 cf	**CMP Round 96** x 45 Inside #1 Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf Overall Size= 96.0"W x 96.0"H x 20.00'L 45 Chambers in 9 Rows 96.00' Header x 50.27 sf x 1 = 4,825.5 cf Inside
		50,064 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	70.00'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Primary	66.00'	**36.0" W x 12.0" H Vert. OVERFLOW ORIFICE** C= 0.600 Limited to weir flow at low heads
#3	Primary	62.50'	**2.0" Vert. DRAINDOWN ORIFICE** C= 0.600 Limited to weir flow at low heads
#4	Primary	64.50'	**6.0" W x 6.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.9 cfs @ 12.53 hrs HW=66.00' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)
└**2=OVERFLOW ORIFICE** (Controls 0.0 cfs)
└**3=DRAINDOWN ORIFICE** (Orifice Controls 0.2 cfs @ 8.89 fps)
└**4=Orifice/Grate** (Orifice Controls 2.7 cfs @ 5.37 fps)

Summary for Pond 8.85P:

Inflow Area = 180,210 sf, 81.06% Impervious, Inflow Depth = 4.02" for 10-YR event
Inflow = 3.3 cfs @ 12.53 hrs, Volume= 60,366 cf
Outflow = 3.3 cfs @ 12.53 hrs, Volume= 60,366 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.3 cfs @ 12.53 hrs, Volume= 60,366 cf
Routed to Pond 8.96P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 61.50' @ 12.53 hrs
Flood Elev= 73.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	60.50'	**18.0" Round Culvert** L= 226.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 60.50' / 58.60' S= 0.0084 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.3 cfs @ 12.53 hrs HW=61.50' (Free Discharge)
1=Culvert (Inlet Controls 3.3 cfs @ 2.68 fps)

Summary for Pond 8.8P:

Inflow Area = 9,920 sf, 83.06% Impervious, Inflow Depth = 4.06" for 10-YR event
Inflow = 1.0 cfs @ 12.08 hrs, Volume= 3,353 cf
Outflow = 1.0 cfs @ 12.08 hrs, Volume= 3,353 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.0 cfs @ 12.08 hrs, Volume= 3,353 cf
Routed to Pond 8.81P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 71.03' @ 12.08 hrs
Flood Elev= 75.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.50'	**15.0" Round Culvert** L= 23.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 70.50' / 70.00' S= 0.0217 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.0 cfs @ 12.08 hrs HW=71.03' (Free Discharge)
1=Culvert (Inlet Controls 1.0 cfs @ 1.95 fps)

Summary for Pond 8.96P:

Inflow Area = 180,210 sf, 81.06% Impervious, Inflow Depth = 4.02" for 10-YR event
Inflow = 3.3 cfs @ 12.53 hrs, Volume= 60,366 cf
Outflow = 3.3 cfs @ 12.53 hrs, Volume= 60,366 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.3 cfs @ 12.53 hrs, Volume= 60,366 cf
Routed to Pond 2.1P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Peak Elev= 59.50' @ 12.53 hrs
Flood Elev= 68.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	58.50'	**18.0" Round Culvert** L= 80.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 58.50' / 56.01' S= 0.0311 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.3 cfs @ 12.53 hrs HW=59.50' (Free Discharge)
1=Culvert (Inlet Controls 3.3 cfs @ 2.68 fps)

Summary for Pond 8.9P:

Inflow Area = 25,750 sf, 95.03% Impervious, Inflow Depth = 4.27" for 10-YR event
Inflow = 2.6 cfs @ 12.08 hrs, Volume= 9,170 cf
Outflow = 2.6 cfs @ 12.08 hrs, Volume= 9,170 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.6 cfs @ 12.08 hrs, Volume= 9,170 cf
Routed to Pond 8.81P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 70.67' @ 12.08 hrs
Flood Elev= 73.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	69.40'	**12.0" Round Culvert** L= 18.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 69.40' / 68.75' S= 0.0361 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.6 cfs @ 12.08 hrs HW=70.66' (Free Discharge)
1=Culvert (Inlet Controls 2.6 cfs @ 3.32 fps)

Summary for Pond 8P:

Inflow Area = 13,930 sf, 49.61% Impervious, Inflow Depth = 3.35" for 10-YR event
Inflow = 1.2 cfs @ 12.09 hrs, Volume= 3,893 cf
Outflow = 1.2 cfs @ 12.09 hrs, Volume= 3,893 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.2 cfs @ 12.09 hrs, Volume= 3,893 cf
Routed to Pond 6P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 61.22' @ 12.09 hrs
Flood Elev= 71.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	60.58'	**12.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 60.58' / 59.88' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.2 cfs @ 12.09 hrs HW=61.22' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.2 cfs @ 2.16 fps)

Summary for Link POA-1: B-30

Inflow Area = 445,070 sf, 79.79% Impervious, Inflow Depth = 4.02" for 10-YR event
Inflow = 15.0 cfs @ 12.12 hrs, Volume= 149,124 cf
Primary = 15.0 cfs @ 12.12 hrs, Volume= 149,124 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Link POA-2:

Inflow Area = 20,660 sf, 50.80% Impervious, Inflow Depth = 3.65" for 10-YR event
Inflow = 1.9 cfs @ 12.09 hrs, Volume= 6,279 cf
Primary = 1.9 cfs @ 12.09 hrs, Volume= 6,279 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Link POA-3:

Inflow Area = 6,800 sf, 0.00% Impervious, Inflow Depth = 2.74" for 10-YR event
Inflow = 0.5 cfs @ 12.09 hrs, Volume= 1,550 cf
Primary = 0.5 cfs @ 12.09 hrs, Volume= 1,550 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Link POA-4:

Inflow Area = 45,290 sf, 74.03% Impervious, Inflow Depth = 3.87" for 10-YR event
Inflow = 3.6 cfs @ 12.15 hrs, Volume= 14,605 cf
Primary = 3.6 cfs @ 12.15 hrs, Volume= 14,605 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Runoff Area=34,840 sf 96.15% Impervious Runoff Depth=5.50"
Tc=6.0 min CN=WQ Runoff=4.5 cfs 15,975 cf

Subcatchment2.1S: Runoff Area=29,840 sf 69.86% Impervious Runoff Depth=5.09"
Tc=6.0 min CN=WQ Runoff=3.7 cfs 12,667 cf

Subcatchment3.1S: Runoff Area=1,450 sf 62.07% Impervious Runoff Depth=4.82"
Tc=6.0 min CN=WQ Runoff=0.2 cfs 582 cf

Subcatchment3.2S: Runoff Area=4,400 sf 52.27% Impervious Runoff Depth=4.63"
Tc=6.0 min CN=WQ Runoff=0.5 cfs 1,696 cf

Subcatchment3.3S: Runoff Area=7,500 sf 87.33% Impervious Runoff Depth=5.31"
Tc=6.0 min CN=WQ Runoff=0.9 cfs 3,321 cf

Subcatchment3.4S: Runoff Area=5,170 sf 90.14% Impervious Runoff Depth=5.37"
Tc=6.0 min CN=WQ Runoff=0.7 cfs 2,313 cf

Subcatchment3.5S: Runoff Area=7,350 sf 88.71% Impervious Runoff Depth=5.34"
Tc=6.0 min CN=WQ Runoff=0.9 cfs 3,271 cf

Subcatchment3.6S: Runoff Area=7,080 sf 100.00% Impervious Runoff Depth=5.56"
Tc=6.0 min CN=98 Runoff=0.9 cfs 3,282 cf

Subcatchment3.7S: Runoff Area=6,280 sf 87.10% Impervious Runoff Depth=5.31"
Tc=6.0 min CN=WQ Runoff=0.8 cfs 2,778 cf

Subcatchment4.1S: Runoff Area=30,540 sf 50.79% Impervious Runoff Depth=4.80"
Flow Length=135' Tc=12.1 min CN=WQ Runoff=3.0 cfs 12,211 cf

Subcatchment4.2S: Runoff Area=11,860 sf 82.50% Impervious Runoff Depth=5.29"
Tc=6.0 min CN=WQ Runoff=1.5 cfs 5,229 cf

Subcatchment4.3S: Runoff Area=10,630 sf 88.66% Impervious Runoff Depth=5.34"
Tc=6.0 min CN=WQ Runoff=1.3 cfs 4,730 cf

Subcatchment4.4S: Runoff Area=11,040 sf 83.15% Impervious Runoff Depth=5.23"
Tc=6.0 min CN=WQ Runoff=1.4 cfs 4,813 cf

Subcatchment4.5S: Runoff Area=5,620 sf 62.10% Impervious Runoff Depth=4.82"
Tc=6.0 min CN=WQ Runoff=0.7 cfs 2,257 cf

Subcatchment4.6S: Runoff Area=9,090 sf 87.90% Impervious Runoff Depth=5.32"
Tc=6.0 min CN=WQ Runoff=1.1 cfs 4,034 cf

Subcatchment4.7S: Runoff Area=6,020 sf 100.00% Impervious Runoff Depth=5.56"
Tc=6.0 min CN=98 Runoff=0.8 cfs 2,790 cf

Subcatchment4.8S: Runoff Area=11,850 sf 90.00% Impervious Runoff Depth=5.37"
Tc=6.0 min CN=WQ Runoff=1.5 cfs 5,299 cf

Subcatchment5.1S: Runoff Area=20,660 sf 50.80% Impervious Runoff Depth=4.80"
Tc=6.0 min CN=WQ Runoff=2.5 cfs 8,261 cf

Subcatchment6.1S: Runoff Area=50,370 sf 83.84% Impervious Runoff Depth=5.29"
Flow Length=280' Tc=14.5 min CN=WQ Runoff=4.9 cfs 22,223 cf

Subcatchment7.1S: Runoff Area=45,290 sf 74.03% Impervious Runoff Depth=5.03"
Flow Length=425' Tc=11.4 min CN=WQ Runoff=4.6 cfs 18,973 cf

Subcatchment8.10S: Runoff Area=8,440 sf 92.00% Impervious Runoff Depth=5.41"
Tc=6.0 min CN=WQ Runoff=1.1 cfs 3,802 cf

Subcatchment8.11S: Runoff Area=26,900 sf 87.62% Impervious Runoff Depth=5.32"
Tc=6.0 min CN=WQ Runoff=3.4 cfs 11,924 cf

Subcatchment8.12S: Runoff Area=2,340 sf 100.00% Impervious Runoff Depth=5.56"
Tc=6.0 min CN=98 Runoff=0.3 cfs 1,085 cf

Subcatchment8.1S: Runoff Area=13,930 sf 49.61% Impervious Runoff Depth=4.46"
Tc=6.0 min CN=WQ Runoff=1.5 cfs 5,180 cf

Subcatchment8.2S: Runoff Area=19,350 sf 84.44% Impervious Runoff Depth=5.26"
Tc=6.0 min CN=WQ Runoff=2.4 cfs 8,477 cf

Subcatchment8.3S: Runoff Area=48,240 sf 91.04% Impervious Runoff Depth=5.39"
Tc=6.0 min CN=WQ Runoff=6.1 cfs 21,654 cf

Subcatchment8.4S: Runoff Area=22,420 sf 78.10% Impervious Runoff Depth=5.13"
Tc=6.0 min CN=WQ Runoff=2.8 cfs 9,590 cf

Subcatchment8.5S: Runoff Area=9,090 sf 0.00% Impervious Runoff Depth=3.60"
Tc=6.0 min CN=80 Runoff=0.9 cfs 2,728 cf

Subcatchment8.6S: Runoff Area=11,120 sf 70.91% Impervious Runoff Depth=4.99"
Tc=6.0 min CN=WQ Runoff=1.3 cfs 4,626 cf

Subcatchment8.7S: Runoff Area=5,080 sf 35.43% Impervious Runoff Depth=4.30"
Tc=6.0 min CN=WQ Runoff=0.6 cfs 1,819 cf

Subcatchment8.8S: Runoff Area=9,920 sf 83.06% Impervious Runoff Depth=5.23"
Tc=6.0 min CN=WQ Runoff=1.2 cfs 4,323 cf

Subcatchment8.9S: Runoff Area=17,310 sf 96.50% Impervious Runoff Depth=5.49"
Tc=6.0 min CN=WQ Runoff=2.2 cfs 7,924 cf

Subcatchment9.1S: Runoff Area=6,800 sf 0.00% Impervious Runoff Depth=3.82"
Tc=6.0 min CN=WQ Runoff=0.7 cfs 2,163 cf

Pond 1P: B-41 Peak Elev=59.18' Inflow=4.5 cfs 15,975 cf
18.0" Round Culvert n=0.013 L=15.0' S=0.0100 '/' Outflow=4.5 cfs 15,975 cf

Pond 2.11P: 21P (CB-8436) Peak Elev=58.94' Inflow=16.6 cfs 133,997 cf
24.0" Round Culvert n=0.013 L=80.0' S=0.0024 '/' Outflow=16.6 cfs 133,997 cf

Pond 2.1P: Peak Elev=58.94' Inflow=16.6 cfs 133,997 cf
24.0" Round Culvert n=0.013 L=40.0' S=0.0032 '/' Outflow=16.6 cfs 133,997 cf

Pond 2P: B-34 Peak Elev=62.26' Inflow=13.4 cfs 56,046 cf
18.0" Round Culvert n=0.013 L=140.0' S=0.0116 '/' Outflow=13.4 cfs 56,046 cf

Pond 3.11P: Peak Elev=66.32' Inflow=0.7 cfs 2,279 cf
12.0" Round Culvert n=0.013 L=30.0' S=0.0117 '/' Outflow=0.7 cfs 2,279 cf

Pond 3.1P: Peak Elev=67.53' Inflow=0.2 cfs 582 cf
12.0" Round Culvert n=0.013 L=70.0' S=0.0200 '/' Outflow=0.2 cfs 582 cf

Pond 3.2P: Peak Elev=67.17' Inflow=0.5 cfs 1,696 cf
12.0" Round Culvert n=0.013 L=80.0' S=0.0109 '/' Outflow=0.5 cfs 1,696 cf

Pond 3.31P: Peak Elev=62.89' Inflow=4.9 cfs 17,244 cf
24.0" Round Culvert n=0.013 L=42.0' S=0.0119 '/' Outflow=4.9 cfs 17,244 cf

Pond 3.32P: WQ DET & SF-2 Peak Elev=63.04' Storage=3,551 cf Inflow=13.2 cfs 46,396 cf
Primary=0.3 cfs 19,032 cf Secondary=12.7 cfs 27,363 cf Outflow=13.0 cfs 46,396 cf

Pond 3.33P: PEAK DET Peak Elev=63.81' Storage=19,431 cf Inflow=12.7 cfs 27,363 cf
Outflow=1.9 cfs 27,359 cf

Pond 3.34P: Peak Elev=58.19' Inflow=2.2 cfs 46,391 cf
24.0" Round Culvert n=0.013 L=62.0' S=0.0102 '/' Outflow=2.2 cfs 46,391 cf

Pond 3.35P: Peak Elev=58.73' Inflow=17.0 cfs 180,388 cf
24.0" Round Culvert n=0.013 L=25.0' S=0.0028 '/' Outflow=17.0 cfs 180,388 cf

Pond 3.3P: Peak Elev=64.09' Inflow=4.9 cfs 17,244 cf
18.0" Round Culvert n=0.013 L=45.0' S=0.0111 '/' Outflow=4.9 cfs 17,244 cf

Pond 3.4P: Peak Elev=66.72' Inflow=0.7 cfs 2,313 cf
12.0" Round Culvert n=0.013 L=50.0' S=0.0160 '/' Outflow=0.7 cfs 2,313 cf

Pond 3.5P: Peak Elev=65.14' Inflow=1.7 cfs 6,050 cf
12.0" Round Culvert n=0.013 L=50.0' S=0.0100 '/' Outflow=1.7 cfs 6,050 cf

Pond 3.6P: Peak Elev=64.51' Inflow=2.6 cfs 9,331 cf
15.0" Round Culvert n=0.013 L=45.0' S=0.0111 '/' Outflow=2.6 cfs 9,331 cf

Pond 3.7P: Peak Elev=65.32' Inflow=0.8 cfs 2,778 cf
12.0" Round Culvert n=0.013 L=40.0' S=0.0100 '/' Outflow=0.8 cfs 2,778 cf

Pond 3P: B-32 (CB-8031) Peak Elev=58.56' Inflow=17.0 cfs 180,388 cf
24.0" Round Culvert n=0.013 L=22.0' S=-0.0036 '/' Outflow=17.0 cfs 180,388 cf

Pond 4.21P: Peak Elev=67.73' Inflow=1.5 cfs 5,229 cf
15.0" Round Culvert n=0.013 L=82.0' S=0.0121 '/' Outflow=1.5 cfs 5,229 cf

Pond 4.2P: Peak Elev=68.88' Inflow=1.5 cfs 5,229 cf
15.0" Round Culvert n=0.013 L=104.0' S=0.0100 '/' Outflow=1.5 cfs 5,229 cf

Pond 4.3P: Peak Elev=66.71' Inflow=2.8 cfs 9,959 cf
18.0" Round Culvert n=0.013 L=105.0' S=0.0158 '/' Outflow=2.8 cfs 9,959 cf

Pond 4.4P: Peak Elev=68.62' Inflow=1.4 cfs 4,813 cf
12.0" Round Culvert n=0.013 L=83.0' S=0.0169 '/' Outflow=1.4 cfs 4,813 cf

Pond 4.5P: Peak Elev=69.57' Inflow=0.7 cfs 2,257 cf
12.0" Round Culvert n=0.013 L=122.0' S=0.0213 '/' Outflow=0.7 cfs 2,257 cf

Pond 4.6P: Peak Elev=66.97' Inflow=3.2 cfs 11,104 cf
18.0" Round Culvert n=0.013 L=77.0' S=0.0169 '/' Outflow=3.2 cfs 11,104 cf

Pond 4.7P: Peak Elev=64.94' Inflow=4.0 cfs 13,894 cf
18.0" Round Culvert x 2.00 n=0.013 L=22.0' S=0.0227 '/' Outflow=4.0 cfs 13,894 cf

Pond 4.81P: Peak Elev=64.70' Inflow=8.3 cfs 29,152 cf
24.0" Round Culvert n=0.013 L=15.0' S=0.0267 '/' Outflow=8.3 cfs 29,152 cf

Pond 4.8P: Peak Elev=64.67' Inflow=4.3 cfs 15,258 cf
24.0" Round Culvert n=0.013 L=35.0' S=0.0100 '/' Outflow=4.3 cfs 15,258 cf

Pond 4P: B-32A (CB-8323) Peak Elev=59.27' Inflow=19.8 cfs 192,599 cf
Primary=19.8 cfs 192,599 cf Secondary=0.0 cfs 0 cf Outflow=19.8 cfs 192,599 cf

Pond 5P: Peak Elev=60.91' Inflow=2.5 cfs 8,261 cf
15.0" Round Culvert n=0.013 L=50.0' S=0.0100 '/' Outflow=2.5 cfs 8,261 cf

Pond 6P: Peak Elev=68.61' Inflow=5.9 cfs 27,403 cf
Primary=5.9 cfs 27,403 cf Secondary=0.0 cfs 0 cf Outflow=5.9 cfs 27,403 cf

Pond 7P: Peak Elev=67.89' Inflow=4.6 cfs 18,973 cf
12.0" Round Culvert n=0.013 L=100.0' S=0.0100 '/' Outflow=4.6 cfs 18,973 cf

Pond 8.10P: Peak Elev=69.92' Inflow=1.1 cfs 3,802 cf
12.0" Round Culvert n=0.013 L=15.0' S=0.0367 '/' Outflow=1.1 cfs 3,802 cf

Pond 8.111P: Peak Elev=69.01' Inflow=3.7 cfs 13,009 cf
18.0" Round Culvert n=0.013 L=160.0' S=0.0103 '/' Outflow=3.7 cfs 13,009 cf

Pond 8.11P: Peak Elev=71.10' Inflow=3.4 cfs 11,924 cf
15.0" Round Culvert n=0.013 L=144.0' S=0.0122 '/' Outflow=3.4 cfs 11,924 cf

Pond 8.12P: Peak Elev=71.06' Inflow=0.3 cfs 1,085 cf
12.0" Round Culvert n=0.013 L=120.0' S=0.0121 '/' Outflow=0.3 cfs 1,085 cf

Pond 8.21P: Peak Elev=71.74' Inflow=2.4 cfs 8,477 cf
24.0" Round Culvert n=0.013 L=100.0' S=0.0240 '/' Outflow=2.4 cfs 8,477 cf

Pond 8.22P: Peak Elev=69.62' Inflow=5.2 cfs 18,067 cf
24.0" Round Culvert n=0.013 L=30.0' S=0.0133 '/' Outflow=5.2 cfs 18,067 cf

Pond 8.2P: Peak Elev=74.52' Inflow=2.4 cfs 8,477 cf
18.0" Round Culvert n=0.013 L=120.0' S=0.0183 '/' Outflow=2.4 cfs 8,477 cf

Pond 8.3P: Peak Elev=70.04' Inflow=12.2 cfs 42,448 cf
24.0" Round Culvert n=0.013 L=45.0' S=0.0178 '/' Outflow=12.2 cfs 42,448 cf

Pond 8.4P: Peak Elev=70.98' Inflow=2.8 cfs 9,590 cf
15.0" Round Culvert n=0.013 L=40.0' S=0.0163 '/' Outflow=2.8 cfs 9,590 cf

Pond 8.5P: Peak Elev=75.00' Inflow=0.9 cfs 2,728 cf
12.0" Round Culvert n=0.013 L=50.0' S=0.0220 '/' Outflow=0.9 cfs 2,728 cf

Pond 8.6P: Peak Elev=71.93' Inflow=1.3 cfs 4,626 cf
15.0" Round Culvert n=0.013 L=60.0' S=0.0200 '/' Outflow=1.3 cfs 4,626 cf

Pond 8.7P: Peak Elev=68.74' Inflow=14.1 cfs 48,892 cf
30.0" Round Culvert n=0.013 L=57.0' S=0.0114 '/' Outflow=14.1 cfs 48,892 cf

Pond 8.81P: Peak Elev=68.34' Inflow=18.6 cfs 64,942 cf
36.0" Round Culvert n=0.013 L=13.0' S=0.0192 '/' Outflow=18.6 cfs 64,942 cf

Pond 8.82P: Peak Elev=67.67' Inflow=22.4 cfs 77,951 cf
36.0" Round Culvert n=0.013 L=7.0' S=0.0214 '/' Outflow=22.4 cfs 77,951 cf

Pond 8.83P: WQ DET & SF-1 Peak Elev=69.63' Storage=5,179 cf Inflow=22.4 cfs 77,951 cf
Primary=0.5 cfs 31,184 cf Secondary=21.8 cfs 46,767 cf Outflow=22.3 cfs 77,951 cf

Pond 8.84P: Peak DET-1 Peak Elev=66.56' Storage=25,516 cf Inflow=21.8 cfs 46,767 cf
Outflow=7.5 cfs 46,766 cf

Pond 8.85P: Peak Elev=62.66' Inflow=8.0 cfs 77,951 cf
18.0" Round Culvert n=0.013 L=226.0' S=0.0084 '/' Outflow=8.0 cfs 77,951 cf

Pond 8.8P: Peak Elev=71.11' Inflow=1.2 cfs 4,323 cf
15.0" Round Culvert n=0.013 L=23.0' S=0.0217 '/' Outflow=1.2 cfs 4,323 cf

Pond 8.96P: Peak Elev=60.66' Inflow=8.0 cfs 77,951 cf
18.0" Round Culvert n=0.013 L=80.0' S=0.0311 '/' Outflow=8.0 cfs 77,951 cf

Pond 8.9P: Peak Elev=71.13' Inflow=3.3 cfs 11,726 cf
12.0" Round Culvert n=0.013 L=18.0' S=0.0361 '/' Outflow=3.3 cfs 11,726 cf

Pond 8P: Peak Elev=61.35' Inflow=1.5 cfs 5,180 cf
12.0" Round Culvert n=0.013 L=70.0' S=0.0100 '/' Outflow=1.5 cfs 5,180 cf

Link POA-1: B-30 Inflow=19.8 cfs 192,599 cf
Primary=19.8 cfs 192,599 cf

Link POA-2: Inflow=2.5 cfs 8,261 cf
Primary=2.5 cfs 8,261 cf

Link POA-3: Inflow=0.7 cfs 2,163 cf
Primary=0.7 cfs 2,163 cf

Link POA-4: Inflow=4.6 cfs 18,973 cf
Primary=4.6 cfs 18,973 cf

Total Runoff Area = 517,820 sf Runoff Volume = 222,000 cf Average Runoff Depth = 5.14"
22.92% Pervious = 118,690 sf 77.08% Impervious = 399,130 sf

Summary for Subcatchment 1S:

Runoff = 4.5 cfs @ 12.08 hrs, Volume= 15,975 cf, Depth= 5.50"
Routed to Pond 1P : B-41

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
33,500	98	Paved parking, HSG D
1,340	84	50-75% Grass cover, Fair, HSG D
34,840		Weighted Average
1,340		3.85% Pervious Area
33,500		96.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 2.1S:

Runoff = 3.7 cfs @ 12.08 hrs, Volume= 12,667 cf, Depth= 5.09"
Routed to Pond 2P : B-34

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
20,845	98	Paved parking, HSG D
8,995	84	50-75% Grass cover, Fair, HSG D
29,840		Weighted Average
8,995		30.14% Pervious Area
20,845		69.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 3.1S:

Runoff = 0.2 cfs @ 12.08 hrs, Volume= 582 cf, Depth= 4.82"
Routed to Pond 3.1P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
550	80	>75% Grass cover, Good, HSG D
900	98	Paved parking, HSG D
1,450		Weighted Average
550		37.93% Pervious Area
900		62.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 3.2S:

Runoff = 0.5 cfs @ 12.09 hrs, Volume= 1,696 cf, Depth= 4.63"
Routed to Pond 3.2P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
2,100	80	>75% Grass cover, Good, HSG D
2,300	98	Paved parking, HSG D
4,400		Weighted Average
2,100		47.73% Pervious Area
2,300		52.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 3.3S:

Runoff = 0.9 cfs @ 12.08 hrs, Volume= 3,321 cf, Depth= 5.31"
Routed to Pond 3.3P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
950	80	>75% Grass cover, Good, HSG D
6,550	98	Paved parking, HSG D
7,500		Weighted Average
950		12.67% Pervious Area
6,550		87.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 3.4S:

Runoff = 0.7 cfs @ 12.08 hrs, Volume= 2,313 cf, Depth= 5.37"
Routed to Pond 3.4P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
510	80	>75% Grass cover, Good, HSG D
4,660	98	Paved parking, HSG D
5,170		Weighted Average
510		9.86% Pervious Area
4,660		90.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 3.5S:

Runoff = 0.9 cfs @ 12.08 hrs, Volume= 3,271 cf, Depth= 5.34"
Routed to Pond 3.5P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
6,520	98	Paved parking, HSG D
830	80	>75% Grass cover, Good, HSG D
7,350		Weighted Average
830		11.29% Pervious Area
6,520		88.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 3.6S:

Runoff = 0.9 cfs @ 12.08 hrs, Volume= 3,282 cf, Depth= 5.56"
Routed to Pond 3.6P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
7,080	98	Paved parking, HSG D
7,080		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 3.7S:

Runoff = 0.8 cfs @ 12.08 hrs, Volume= 2,778 cf, Depth= 5.31"
Routed to Pond 3.7P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
810	80	>75% Grass cover, Good, HSG D
5,470	98	Paved parking, HSG D
6,280		Weighted Average
810		12.90% Pervious Area
5,470		87.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 4.1S:

Runoff = 3.0 cfs @ 12.16 hrs, Volume= 12,211 cf, Depth= 4.80"
Routed to Pond 4P : B-32A (CB-8323)

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
12,790	98	Paved parking, HSG D
15,030	84	50-75% Grass cover, Fair, HSG D
2,720	98	Roofs, HSG D
30,540		Weighted Average
15,030		49.21% Pervious Area
15,510		50.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	110	0.0150	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.10"
0.0	25	0.3300	8.62		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
12.1	135	Total			

Summary for Subcatchment 4.2S:

Runoff = 1.5 cfs @ 12.08 hrs, Volume= 5,229 cf, Depth= 5.29"
Routed to Pond 4.2P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
9,785	98	Paved parking, HSG D
2,075	84	50-75% Grass cover, Fair, HSG D
11,860		Weighted Average
2,075		17.50% Pervious Area
9,785		82.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 4.3S:

Runoff = 1.3 cfs @ 12.08 hrs, Volume= 4,730 cf, Depth= 5.34"
Routed to Pond 4.3P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
1,205	80	>75% Grass cover, Good, HSG D
9,425	98	Paved parking, HSG D
10,630		Weighted Average
1,205		11.34% Pervious Area
9,425		88.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 4.4S:

Runoff = 1.4 cfs @ 12.08 hrs, Volume= 4,813 cf, Depth= 5.23"
Routed to Pond 4.4P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
1,860	80	>75% Grass cover, Good, HSG D
9,180	98	Paved parking, HSG D
11,040		Weighted Average
1,860		16.85% Pervious Area
9,180		83.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 4.5S:

Runoff = 0.7 cfs @ 12.08 hrs, Volume= 2,257 cf, Depth= 4.82"
Routed to Pond 4.5P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
2,130	80	>75% Grass cover, Good, HSG D
3,490	98	Paved parking, HSG D
5,620		Weighted Average
2,130		37.90% Pervious Area
3,490		62.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 4.6S:

Runoff = 1.1 cfs @ 12.08 hrs, Volume= 4,034 cf, Depth= 5.32"
Routed to Pond 4.6P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
7,990	98	Paved parking, HSG D
1,100	80	>75% Grass cover, Good, HSG D
9,090		Weighted Average
1,100		12.10% Pervious Area
7,990		87.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 4.7S:

Runoff = 0.8 cfs @ 12.08 hrs, Volume= 2,790 cf, Depth= 5.56"
Routed to Pond 4.7P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
6,020	98	Paved parking, HSG D
6,020		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 4.8S:

Runoff = 1.5 cfs @ 12.08 hrs, Volume= 5,299 cf, Depth= 5.37"
Routed to Pond 4.8P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
10,665	98	Paved parking, HSG D
1,185	80	>75% Grass cover, Good, HSG D
11,850		Weighted Average
1,185		10.00% Pervious Area
10,665		90.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 5.1S:

Runoff = 2.5 cfs @ 12.08 hrs, Volume= 8,261 cf, Depth= 4.80"
Routed to Pond 5P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	10,495	98	Paved parking, HSG D
	10,165	84	50-75% Grass cover, Fair, HSG D
	20,660		Weighted Average
	10,165		49.20% Pervious Area
	10,495		50.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 6.1S:

Runoff = 4.9 cfs @ 12.19 hrs, Volume= 22,223 cf, Depth= 5.29"
Routed to Pond 6P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
36,200	98	Paved parking, HSG D
6,030	98	Roofs, HSG D
1,670	79	50-75% Grass cover, Fair, HSG C
6,470	84	50-75% Grass cover, Fair, HSG D
50,370		Weighted Average
8,140		16.16% Pervious Area
42,230		83.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0700	0.13		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.10"
1.0	65	0.0500	1.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.3	115	0.0100	5.90	4.63	**Pipe Channel, C-D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
14.5	280	Total			

Summary for Subcatchment 7.1S:

Runoff = 4.6 cfs @ 12.15 hrs, Volume= 18,973 cf, Depth= 5.03"
Routed to Pond 7P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
31,245	98	Paved parking, HSG D
11,760	79	50-75% Grass cover, Fair, HSG C
2,285	98	Unconnected pavement, HSG D
45,290		Weighted Average
11,760		25.97% Pervious Area
33,530		74.03% Impervious Area
2,285		6.81% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.0200	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.10"
0.7	75	0.0150	1.84		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
0.7	250	0.0100	5.90	4.63	**Pipe Channel, C-D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
11.4	425	Total			

Summary for Subcatchment 8.10S:

Runoff = 1.1 cfs @ 12.08 hrs, Volume= 3,802 cf, Depth= 5.41"
Routed to Pond 8.10P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
675	80	>75% Grass cover, Good, HSG D
7,765	98	Paved parking, HSG D
8,440		Weighted Average
675		8.00% Pervious Area
7,765		92.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.11S:

Runoff = 3.4 cfs @ 12.08 hrs, Volume= 11,924 cf, Depth= 5.32"
Routed to Pond 8.11P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
3,330	80	>75% Grass cover, Good, HSG D
23,570	98	Paved parking, HSG D
26,900		Weighted Average
3,330		12.38% Pervious Area
23,570		87.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.12S:

Runoff = 0.3 cfs @ 12.08 hrs, Volume= 1,085 cf, Depth= 5.56"
Routed to Pond 8.12P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
2,340	98	Paved parking, HSG D
2,340		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.1S:

Runoff = 1.5 cfs @ 12.09 hrs, Volume= 5,180 cf, Depth= 4.46"
Routed to Pond 8P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
6,910	98	Paved parking, HSG D
2,655	74	>75% Grass cover, Good, HSG C
4,365	80	>75% Grass cover, Good, HSG D
13,930		Weighted Average
7,020		50.39% Pervious Area
6,910		49.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.2S:

Runoff = 2.4 cfs @ 12.08 hrs, Volume= 8,477 cf, Depth= 5.26"
Routed to Pond 8.2P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
3,010	80	>75% Grass cover, Good, HSG D
16,340	98	Paved parking, HSG D
19,350		Weighted Average
3,010		15.56% Pervious Area
16,340		84.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.3S:

Runoff = 6.1 cfs @ 12.08 hrs, Volume= 21,654 cf, Depth= 5.39"
Routed to Pond 8.3P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
4,320	80	>75% Grass cover, Good, HSG D
43,920	98	Paved parking, HSG D
48,240		Weighted Average
4,320		8.96% Pervious Area
43,920		91.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.4S:

Runoff = 2.8 cfs @ 12.08 hrs, Volume= 9,590 cf, Depth= 5.13"
Routed to Pond 8.4P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
4,910	80	>75% Grass cover, Good, HSG D
17,510	98	Paved parking, HSG D
22,420		Weighted Average
4,910		21.90% Pervious Area
17,510		78.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.5S:

Runoff = 0.9 cfs @ 12.09 hrs, Volume= 2,728 cf, Depth= 3.60"
Routed to Pond 8.5P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
9,090	80	>75% Grass cover, Good, HSG D
9,090		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.6S:

Runoff = 1.3 cfs @ 12.08 hrs, Volume= 4,626 cf, Depth= 4.99"
Routed to Pond 8.6P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
3,235	80	>75% Grass cover, Good, HSG D
7,885	98	Paved parking, HSG D
11,120		Weighted Average
3,235		29.09% Pervious Area
7,885		70.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.7S:

Runoff = 0.6 cfs @ 12.09 hrs, Volume= 1,819 cf, Depth= 4.30"
Routed to Pond 8.7P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
3,280	80	>75% Grass cover, Good, HSG D
1,800	98	Paved parking, HSG D
5,080		Weighted Average
3,280		64.57% Pervious Area
1,800		35.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.8S:

Runoff = 1.2 cfs @ 12.08 hrs, Volume= 4,323 cf, Depth= 5.23"
Routed to Pond 8.8P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
1,680	80	>75% Grass cover, Good, HSG D
8,240	98	Paved parking, HSG D
9,920		Weighted Average
1,680		16.94% Pervious Area
8,240		83.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 8.9S:

Runoff = 2.2 cfs @ 12.08 hrs, Volume= 7,924 cf, Depth= 5.49"
Routed to Pond 8.9P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
605	80	>75% Grass cover, Good, HSG D
16,705	98	Paved parking, HSG D
17,310		Weighted Average
605		3.50% Pervious Area
16,705		96.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Subcatchment 9.1S:

Runoff = 0.7 cfs @ 12.09 hrs, Volume= 2,163 cf, Depth= 3.82"
Routed to Link POA-3 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
4,800	83	Woods, Poor, HSG D
2,000	80	>75% Grass cover, Good, HSG D
6,800		Weighted Average
6,800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, DIRECT ENTRY**

Summary for Pond 1P: B-41

Inflow Area = 34,840 sf, 96.15% Impervious, Inflow Depth = 5.50" for 25-YR event
Inflow = 4.5 cfs @ 12.08 hrs, Volume= 15,975 cf
Outflow = 4.5 cfs @ 12.08 hrs, Volume= 15,975 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.5 cfs @ 12.08 hrs, Volume= 15,975 cf
Routed to Pond 2P : B-34

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 59.18' @ 12.08 hrs
Flood Elev= 63.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	57.90'	**18.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 57.90' / 57.75' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=4.5 cfs @ 12.08 hrs HW=59.18' (Free Discharge)
1=Culvert (Barrel Controls 4.5 cfs @ 3.77 fps)

Summary for Pond 2.11P: 21P (CB-8436)

Inflow Area = 309,190 sf, 80.71% Impervious, Inflow Depth = 5.20" for 25-YR event
Inflow = 16.6 cfs @ 12.11 hrs, Volume= 133,997 cf
Outflow = 16.6 cfs @ 12.11 hrs, Volume= 133,997 cf, Atten= 0%, Lag= 0.0 min
Primary = 16.6 cfs @ 12.11 hrs, Volume= 133,997 cf
Routed to Pond 3.35P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 58.94' @ 12.11 hrs
Flood Elev= 68.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	55.88'	**24.0" Round Culvert** L= 80.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 55.88' / 55.69' S= 0.0024 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=16.6 cfs @ 12.11 hrs HW=58.94' (Free Discharge)
1=Culvert (Barrel Controls 16.6 cfs @ 5.27 fps)

Summary for Pond 2.1P:

Inflow Area = 309,190 sf, 80.71% Impervious, Inflow Depth = 5.20" for 25-YR event
Inflow = 16.6 cfs @ 12.11 hrs, Volume= 133,997 cf
Outflow = 16.6 cfs @ 12.11 hrs, Volume= 133,997 cf, Atten= 0%, Lag= 0.0 min
Primary = 16.6 cfs @ 12.11 hrs, Volume= 133,997 cf
Routed to Pond 2.11P : 21P (CB-8436)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 58.94' @ 12.11 hrs
Flood Elev= 67.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	56.01'	**24.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 56.01' / 55.88' S= 0.0032 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=16.6 cfs @ 12.11 hrs HW=58.94' (Free Discharge)
1=Culvert (Inlet Controls 16.6 cfs @ 5.28 fps)

Summary for Pond 2P: B-34

Inflow Area = 128,980 sf, 80.23% Impervious, Inflow Depth = 5.21" for 25-YR event
Inflow = 13.4 cfs @ 12.10 hrs, Volume= 56,046 cf
Outflow = 13.4 cfs @ 12.10 hrs, Volume= 56,046 cf, Atten= 0%, Lag= 0.0 min
Primary = 13.4 cfs @ 12.10 hrs, Volume= 56,046 cf
Routed to Pond 2.1P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 62.26' @ 12.10 hrs
Flood Elev= 63.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	57.50'	**18.0" Round Culvert** L= 140.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 57.50' / 55.88' S= 0.0116 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=13.4 cfs @ 12.10 hrs HW=62.25' (Free Discharge)
1=Culvert (Inlet Controls 13.4 cfs @ 7.60 fps)

Summary for Pond 3.11P:

Inflow Area = 5,850 sf, 54.70% Impervious, Inflow Depth = 4.67" for 25-YR event
Inflow = 0.7 cfs @ 12.08 hrs, Volume= 2,279 cf
Outflow = 0.7 cfs @ 12.08 hrs, Volume= 2,279 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.7 cfs @ 12.08 hrs, Volume= 2,279 cf
Routed to Pond 3.3P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Peak Elev= 66.32' @ 12.08 hrs
Flood Elev= 71.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	65.85'	**12.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.85' / 65.50' S= 0.0117 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.7 cfs @ 12.08 hrs HW=66.32' (Free Discharge)
1=Culvert (Inlet Controls 0.7 cfs @ 1.85 fps)

Summary for Pond 3.1P:

Inflow Area = 1,450 sf, 62.07% Impervious, Inflow Depth = 4.82" for 25-YR event
Inflow = 0.2 cfs @ 12.08 hrs, Volume= 582 cf
Outflow = 0.2 cfs @ 12.08 hrs, Volume= 582 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.2 cfs @ 12.08 hrs, Volume= 582 cf
Routed to Pond 3.11P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 67.53' @ 12.08 hrs
Flood Elev= 72.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	67.30'	**12.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.30' / 65.90' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.2 cfs @ 12.08 hrs HW=67.52' (Free Discharge)
1=Culvert (Inlet Controls 0.2 cfs @ 1.27 fps)

Summary for Pond 3.2P:

Inflow Area = 4,400 sf, 52.27% Impervious, Inflow Depth = 4.63" for 25-YR event
Inflow = 0.5 cfs @ 12.09 hrs, Volume= 1,696 cf
Outflow = 0.5 cfs @ 12.09 hrs, Volume= 1,696 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.5 cfs @ 12.09 hrs, Volume= 1,696 cf
Routed to Pond 3.11P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 67.17' @ 12.09 hrs
Flood Elev= 70.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.77'	**12.0" Round Culvert** L= 80.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.77' / 65.90' S= 0.0109 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.5 cfs @ 12.09 hrs HW=67.17' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.5 cfs @ 1.70 fps)

Summary for Pond 3.31P:

Inflow Area = 39,230 sf, 85.34% Impervious, Inflow Depth = 5.27" for 25-YR event
Inflow = 4.9 cfs @ 12.08 hrs, Volume= 17,244 cf
Outflow = 4.9 cfs @ 12.08 hrs, Volume= 17,244 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.9 cfs @ 12.08 hrs, Volume= 17,244 cf
Routed to Pond 3.32P : WQ DET & SF-2

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 62.89' @ 12.08 hrs
Flood Elev= 70.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	61.80'	**24.0" Round Culvert** L= 42.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 61.80' / 61.30' S= 0.0119 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=4.9 cfs @ 12.08 hrs HW=62.89' (Free Discharge)
└**1=Culvert** (Inlet Controls 4.9 cfs @ 2.81 fps)

Summary for Pond 3.32P: WQ DET & SF-2

Inflow Area = 105,340 sf, 85.47% Impervious, Inflow Depth = 5.29" for 25-YR event
Inflow = 13.2 cfs @ 12.08 hrs, Volume= 46,396 cf
Outflow = 13.0 cfs @ 12.10 hrs, Volume= 46,396 cf, Atten= 2%, Lag= 0.9 min
Primary = 0.3 cfs @ 12.10 hrs, Volume= 19,032 cf
Routed to Pond 3.34P :
Secondary = 12.7 cfs @ 12.10 hrs, Volume= 27,363 cf
Routed to Pond 3.33P : PEAK DET

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 63.04' @ 12.10 hrs Surf.Area= 1,634 sf Storage= 3,551 cf

Plug-Flow detention time= 45.1 min calculated for 46,388 cf (100% of inflow)
Center-of-Mass det. time= 45.1 min (797.7 - 752.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	60.00'	0 cf	**8.00'W x 204.25'L x 9.00'H Field A** 14,706 cf Overall - 10,166 cf Embedded = 4,540 cf x 0.0% Voids
#2A	60.00'	10,166 cf	**CMP Round 96** x 9 Inside #1 Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf Overall Size= 96.0"W x 96.0"H x 20.00'L Row Length Adjustment= +14.25' x 50.27 sf x 1 rows 8.00' Header x 50.27 sf x 1 = 402.1 cf Inside
		10,166 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Device 2	60.00'	**12.0" Round Culvert** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 60.00' / 59.95' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 3	57.70'	**Tube/Siphon/Float Valve X 11.00** 0.668" Diameter, C= 0.600, 0.263" Trickle Diameter Starts@60.45'
#3	Primary	57.70'	**12.0" Round 12" Stormfilter Outlet** L= 13.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 57.70' / 57.60' S= 0.0077 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Secondary	62.40'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 2.40 2.48 2.56 2.64 2.72 2.80 2.88 2.96 3.04 3.12 3.20 3.28 3.36 3.44 3.52 3.60 3.68 3.76 3.84 3.92 4.00 4.08 4.16 4.24 4.32 4.40 4.48 4.56 4.64 4.72 4.80 4.88 4.96 5.04 5.12 5.20 5.28 5.36 5.44 5.52 5.60 5.68 5.76 5.84 5.92 6.00 6.08 6.16 6.24 6.32 6.40 6.48 6.56 6.64 6.72 6.80 6.88 6.96 7.04 7.12 7.20 7.28 7.36 7.44 7.52 7.60 7.68 7.76 7.84 7.92 8.00 Width (feet) 7.33 7.40 7.46 7.52 7.58 7.63 7.68 7.72 7.77 7.80 7.84 7.87 7.90 7.92 7.94 7.96 7.97 7.99 7.99 8.00 8.00 8.00 7.99 7.99 7.97 7.96 7.94 7.92 7.90 7.87 7.84 7.80 7.77 7.72 7.68 7.63 7.58 7.52 7.46 7.40 7.33 7.26 7.18 7.10 7.02 6.93 6.83 6.73 6.63 6.52 6.40 6.28 6.15 6.01 5.87 5.71 5.55 5.38 5.20 5.01 4.80 4.58 4.34 4.08 3.80 3.49 3.14 2.73 2.24 1.59 0.00

Primary OutFlow Max=0.3 cfs @ 12.10 hrs HW=63.04' (Free Discharge)
└**3=12" Stormfilter Outlet** (Passes 0.3 cfs of 6.6 cfs potential flow)
└**2=Tube/Siphon/Float Valve** (Orifice Controls 0.3 cfs @ 11.13 fps)
└**1=Culvert** (Passes 0.3 cfs of 6.0 cfs potential flow)

Secondary OutFlow Max=12.7 cfs @ 12.10 hrs HW=63.04' (Free Discharge)
└**4=Custom Weir/Orifice** (Weir Controls 12.7 cfs @ 2.61 fps)

Summary for Pond 3.33P: PEAK DET

Inflow = 12.7 cfs @ 12.10 hrs, Volume= 27,363 cf
Outflow = 1.9 cfs @ 12.58 hrs, Volume= 27,359 cf, Atten= 85%, Lag= 28.9 min
Primary = 1.9 cfs @ 12.58 hrs, Volume= 27,359 cf
Routed to Pond 3.34P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 63.81' @ 12.58 hrs Surf.Area= 8,323 sf Storage= 19,431 cf

Plug-Flow detention time= 763.4 min calculated for 27,354 cf (100% of inflow)
Center-of-Mass det. time= 763.7 min (1,507.1 - 743.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	60.00'	0 cf	**63.00'W x 124.00'L x 8.00'H Field A** 62,496 cf Overall - 38,152 cf Embedded = 24,344 cf x 0.0% Voids
#2A	60.00'	38,152 cf	**CMP Round 96** x 30 Inside #1 Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf Overall Size= 96.0"W x 96.0"H x 20.00'L Row Length Adjustment= +16.00' x 50.27 sf x 6 rows 63.00' Header x 50.27 sf x 1 = 3,166.7 cf Inside
#3	60.00'	3,217 cf	**CMP Round 96** x 3 Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf Overall Size= 96.0"W x 96.0"H x 20.00'L Row Length Adjustment= +4.00' x 50.27 sf x 1 rows
		41,368 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	60.00'	**2.0" Vert. DRAINDOWN ORIFICE** C= 0.600 Limited to weir flow at low heads
#2	Primary	65.50'	**0.5' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#3	Primary	63.50'	**36.0" W x 6.0" H Vert. CAPACITY ORIFICE** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.9 cfs @ 12.58 hrs HW=63.81' (Free Discharge)
- **1=DRAINDOWN ORIFICE** (Orifice Controls 0.2 cfs @ 9.29 fps)
- **2=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)
- **3=CAPACITY ORIFICE** (Orifice Controls 1.7 cfs @ 1.79 fps)

Summary for Pond 3.34P:

Inflow Area = 105,340 sf, 85.47% Impervious, Inflow Depth > 5.28" for 25-YR event
Inflow = 2.2 cfs @ 12.58 hrs, Volume= 46,391 cf
Outflow = 2.2 cfs @ 12.58 hrs, Volume= 46,391 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.2 cfs @ 12.58 hrs, Volume= 46,391 cf
Routed to Pond 3.35P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 58.19' @ 12.58 hrs
Flood Elev= 67.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	57.50'	**24.0" Round Culvert** L= 62.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 57.50' / 56.87' S= 0.0102 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=2.2 cfs @ 12.58 hrs HW=58.19' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.2 cfs @ 2.24 fps)

Summary for Pond 3.35P:

Inflow Area = 414,530 sf, 81.92% Impervious, Inflow Depth = 5.22" for 25-YR event
Inflow = 17.0 cfs @ 12.11 hrs, Volume= 180,388 cf
Outflow = 17.0 cfs @ 12.11 hrs, Volume= 180,388 cf, Atten= 0%, Lag= 0.0 min
Primary = 17.0 cfs @ 12.11 hrs, Volume= 180,388 cf
Routed to Pond 3P : B-32 (CB-8031)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 58.73' @ 12.11 hrs
Flood Elev= 67.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	55.69'	**24.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 55.69' / 55.62' S= 0.0028 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=17.0 cfs @ 12.11 hrs HW=58.72' (Free Discharge)
└**1=Culvert** (Inlet Controls 17.0 cfs @ 5.42 fps)

Summary for Pond 3.3P:

Inflow Area = 39,230 sf, 85.34% Impervious, Inflow Depth = 5.27" for 25-YR event
Inflow = 4.9 cfs @ 12.08 hrs, Volume= 17,244 cf
Outflow = 4.9 cfs @ 12.08 hrs, Volume= 17,244 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.9 cfs @ 12.08 hrs, Volume= 17,244 cf
Routed to Pond 3.31P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 64.09' @ 12.08 hrs
Flood Elev= 69.95'

Device	Routing	Invert	Outlet Devices
#1	Primary	62.80'	**18.0" Round Culvert** L= 45.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.80' / 62.30' S= 0.0111 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=4.9 cfs @ 12.08 hrs HW=64.09' (Free Discharge)
└**1=Culvert** (Inlet Controls 4.9 cfs @ 3.05 fps)

Summary for Pond 3.4P:

Inflow Area = 5,170 sf, 90.14% Impervious, Inflow Depth = 5.37" for 25-YR event
Inflow = 0.7 cfs @ 12.08 hrs, Volume= 2,313 cf
Outflow = 0.7 cfs @ 12.08 hrs, Volume= 2,313 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.7 cfs @ 12.08 hrs, Volume= 2,313 cf
Routed to Pond 3.3P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 66.72' @ 12.08 hrs
Flood Elev= 69.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.25'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.25' / 65.45' S= 0.0160 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.7 cfs @ 12.08 hrs HW=66.72' (Free Discharge)
1=Culvert (Inlet Controls 0.7 cfs @ 1.83 fps)

Summary for Pond 3.5P:

Inflow Area = 13,630 sf, 87.97% Impervious, Inflow Depth = 5.33" for 25-YR event
Inflow = 1.7 cfs @ 12.08 hrs, Volume= 6,050 cf
Outflow = 1.7 cfs @ 12.08 hrs, Volume= 6,050 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.7 cfs @ 12.08 hrs, Volume= 6,050 cf
Routed to Pond 3.6P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 65.14' @ 12.08 hrs
Flood Elev= 68.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	64.30'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 64.30' / 63.80' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.7 cfs @ 12.08 hrs HW=65.13' (Free Discharge)
1=Culvert (Inlet Controls 1.7 cfs @ 2.46 fps)

Summary for Pond 3.6P:

Inflow Area = 20,710 sf, 92.08% Impervious, Inflow Depth = 5.41" for 25-YR event
Inflow = 2.6 cfs @ 12.08 hrs, Volume= 9,331 cf
Outflow = 2.6 cfs @ 12.08 hrs, Volume= 9,331 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.6 cfs @ 12.08 hrs, Volume= 9,331 cf
Routed to Pond 3.3P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Peak Elev= 64.51' @ 12.08 hrs
Flood Elev= 69.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	63.55'	**15.0" Round Culvert** L= 45.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 63.55' / 63.05' S= 0.0111 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.6 cfs @ 12.08 hrs HW=64.50' (Free Discharge)
1=Culvert (Inlet Controls 2.6 cfs @ 2.63 fps)

Summary for Pond 3.7P:

Inflow Area = 6,280 sf, 87.10% Impervious, Inflow Depth = 5.31" for 25-YR event
Inflow = 0.8 cfs @ 12.08 hrs, Volume= 2,778 cf
Outflow = 0.8 cfs @ 12.08 hrs, Volume= 2,778 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.8 cfs @ 12.08 hrs, Volume= 2,778 cf
Routed to Pond 3.5P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 65.32' @ 12.08 hrs
Flood Elev= 68.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	64.80'	**12.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 64.80' / 64.40' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.8 cfs @ 12.08 hrs HW=65.32' (Free Discharge)
1=Culvert (Inlet Controls 0.8 cfs @ 1.93 fps)

Summary for Pond 3P: B-32 (CB-8031)

Inflow Area = 414,530 sf, 81.92% Impervious, Inflow Depth = 5.22" for 25-YR event
Inflow = 17.0 cfs @ 12.11 hrs, Volume= 180,388 cf
Outflow = 17.0 cfs @ 12.11 hrs, Volume= 180,388 cf, Atten= 0%, Lag= 0.0 min
Primary = 17.0 cfs @ 12.11 hrs, Volume= 180,388 cf
Routed to Pond 4P : B-32A (CB-8323)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 58.56' @ 12.11 hrs
Flood Elev= 66.13'

Device	Routing	Invert	Outlet Devices
#1	Primary	55.52'	**24.0" Round Culvert** L= 22.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 55.44' / 55.52' S= -0.0036 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=17.0 cfs @ 12.11 hrs HW=58.55' (Free Discharge)
└**1=Culvert** (Inlet Controls 17.0 cfs @ 5.42 fps)

Summary for Pond 4.21P:

Inflow Area = 11,860 sf, 82.50% Impervious, Inflow Depth = 5.29" for 25-YR event
Inflow = 1.5 cfs @ 12.08 hrs, Volume= 5,229 cf
Outflow = 1.5 cfs @ 12.08 hrs, Volume= 5,229 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.5 cfs @ 12.08 hrs, Volume= 5,229 cf
Routed to Pond 4.3P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 67.73' @ 12.08 hrs
Flood Elev= 72.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	67.05'	**15.0" Round Culvert** L= 82.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.05' / 66.06' S= 0.0121 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.5 cfs @ 12.08 hrs HW=67.73' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.5 cfs @ 2.21 fps)

Summary for Pond 4.2P:

Inflow Area = 11,860 sf, 82.50% Impervious, Inflow Depth = 5.29" for 25-YR event
Inflow = 1.5 cfs @ 12.08 hrs, Volume= 5,229 cf
Outflow = 1.5 cfs @ 12.08 hrs, Volume= 5,229 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.5 cfs @ 12.08 hrs, Volume= 5,229 cf
Routed to Pond 4.21P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 68.88' @ 12.08 hrs
Flood Elev= 72.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	68.20'	**15.0" Round Culvert** L= 104.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 68.20' / 67.16' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.5 cfs @ 12.08 hrs HW=68.88' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.5 cfs @ 2.21 fps)

Summary for Pond 4.3P:

Inflow Area = 22,490 sf, 85.42% Impervious, Inflow Depth = 5.31" for 25-YR event
Inflow = 2.8 cfs @ 12.08 hrs, Volume= 9,959 cf
Outflow = 2.8 cfs @ 12.08 hrs, Volume= 9,959 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.8 cfs @ 12.08 hrs, Volume= 9,959 cf
Routed to Pond 4.8P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 66.71' @ 12.08 hrs
Flood Elev= 70.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	65.81'	**18.0" Round Culvert** L= 105.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.81' / 64.15' S= 0.0158 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.8 cfs @ 12.08 hrs HW=66.71' (Free Discharge)
1=Culvert (Inlet Controls 2.8 cfs @ 2.55 fps)

Summary for Pond 4.4P:

Inflow Area = 11,040 sf, 83.15% Impervious, Inflow Depth = 5.23" for 25-YR event
Inflow = 1.4 cfs @ 12.08 hrs, Volume= 4,813 cf
Outflow = 1.4 cfs @ 12.08 hrs, Volume= 4,813 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.4 cfs @ 12.08 hrs, Volume= 4,813 cf
Routed to Pond 4.6P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 68.62' @ 12.08 hrs
Flood Elev= 71.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	67.90'	**12.0" Round Culvert** L= 83.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.90' / 66.50' S= 0.0169 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.4 cfs @ 12.08 hrs HW=68.62' (Free Discharge)
1=Culvert (Inlet Controls 1.4 cfs @ 2.28 fps)

Summary for Pond 4.5P:

Inflow Area = 5,620 sf, 62.10% Impervious, Inflow Depth = 4.82" for 25-YR event
Inflow = 0.7 cfs @ 12.08 hrs, Volume= 2,257 cf
Outflow = 0.7 cfs @ 12.08 hrs, Volume= 2,257 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.7 cfs @ 12.08 hrs, Volume= 2,257 cf
Routed to Pond 4.6P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Peak Elev= 69.57' @ 12.08 hrs
Flood Elev= 72.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	69.10'	**12.0" Round Culvert** L= 122.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 69.10' / 66.50' S= 0.0213 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.7 cfs @ 12.08 hrs HW=69.57' (Free Discharge)
1=Culvert (Inlet Controls 0.7 cfs @ 1.84 fps)

Summary for Pond 4.6P:

Inflow Area = 25,750 sf, 80.23% Impervious, Inflow Depth = 5.17" for 25-YR event
Inflow = 3.2 cfs @ 12.08 hrs, Volume= 11,104 cf
Outflow = 3.2 cfs @ 12.08 hrs, Volume= 11,104 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.2 cfs @ 12.08 hrs, Volume= 11,104 cf
Routed to Pond 4.7P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 66.97' @ 12.08 hrs
Flood Elev= 70.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.00'	**18.0" Round Culvert** L= 77.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.00' / 64.70' S= 0.0169 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.2 cfs @ 12.08 hrs HW=66.97' (Free Discharge)
1=Culvert (Inlet Controls 3.2 cfs @ 2.64 fps)

Summary for Pond 4.7P:

Inflow Area = 31,770 sf, 83.98% Impervious, Inflow Depth = 5.25" for 25-YR event
Inflow = 4.0 cfs @ 12.08 hrs, Volume= 13,894 cf
Outflow = 4.0 cfs @ 12.08 hrs, Volume= 13,894 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.0 cfs @ 12.08 hrs, Volume= 13,894 cf
Routed to Pond 4.81P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 64.94' @ 12.08 hrs
Flood Elev= 69.75'

Device	Routing	Invert	Outlet Devices
#1	Primary	64.20'	**18.0" Round Culvert X 2.00** L= 22.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 64.20' / 63.70' S= 0.0227 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=4.0 cfs @ 12.08 hrs HW=64.93' (Free Discharge)
└**1=Culvert** (Inlet Controls 4.0 cfs @ 2.30 fps)

Summary for Pond 4.81P:

Inflow Area = 66,110 sf, 85.55% Impervious, Inflow Depth = 5.29" for 25-YR event
Inflow = 8.3 cfs @ 12.08 hrs, Volume= 29,152 cf
Outflow = 8.3 cfs @ 12.08 hrs, Volume= 29,152 cf, Atten= 0%, Lag= 0.0 min
Primary = 8.3 cfs @ 12.08 hrs, Volume= 29,152 cf
Routed to Pond 3.32P : WQ DET & SF-2

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 64.70' @ 12.08 hrs
Flood Elev= 69.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	63.20'	**24.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 63.20' / 62.80' S= 0.0267 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=8.3 cfs @ 12.08 hrs HW=64.70' (Free Discharge)
└**1=Culvert** (Inlet Controls 8.3 cfs @ 3.29 fps)

Summary for Pond 4.8P:

Inflow Area = 34,340 sf, 87.00% Impervious, Inflow Depth = 5.33" for 25-YR event
Inflow = 4.3 cfs @ 12.08 hrs, Volume= 15,258 cf
Outflow = 4.3 cfs @ 12.08 hrs, Volume= 15,258 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.3 cfs @ 12.08 hrs, Volume= 15,258 cf
Routed to Pond 4.81P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 64.67' @ 12.08 hrs
Flood Elev= 68.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	63.65'	**24.0" Round Culvert** L= 35.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 63.65' / 63.30' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=4.3 cfs @ 12.08 hrs HW=64.67' (Free Discharge)
└**1=Culvert** (Inlet Controls 4.3 cfs @ 2.71 fps)

Summary for Pond 4P: B-32A (CB-8323)

Inflow Area = 445,070 sf, 79.79% Impervious, Inflow Depth = 5.19" for 25-YR event
Inflow = 19.8 cfs @ 12.18 hrs, Volume= 192,599 cf
Outflow = 19.8 cfs @ 12.18 hrs, Volume= 192,599 cf, Atten= 0%, Lag= 0.0 min
Primary = 19.8 cfs @ 12.18 hrs, Volume= 192,599 cf
Routed to Link POA-1 : B-30
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link POA-1 : B-30

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 59.27' @ 12.18 hrs
Flood Elev= 59.75'

Device	Routing	Invert	Outlet Devices
#1	Primary	55.52'	**24.0" Round Culvert** L= 115.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 55.52' / 54.90' S= 0.0054 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Secondary	59.39'	**15.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=19.8 cfs @ 12.18 hrs HW=59.27' (Free Discharge)
1=Culvert (Inlet Controls 19.8 cfs @ 6.30 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=55.52' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

Summary for Pond 5P:

Inflow Area = 20,660 sf, 50.80% Impervious, Inflow Depth = 4.80" for 25-YR event
Inflow = 2.5 cfs @ 12.08 hrs, Volume= 8,261 cf
Outflow = 2.5 cfs @ 12.08 hrs, Volume= 8,261 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.5 cfs @ 12.08 hrs, Volume= 8,261 cf
Routed to Link POA-2 :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 60.91' @ 12.08 hrs
Flood Elev= 66.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	60.00'	**15.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 60.00' / 59.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.4 cfs @ 12.08 hrs HW=60.91' (Free Discharge)
1=Culvert (Inlet Controls 2.4 cfs @ 2.56 fps)

Summary for Pond 6P:

Inflow Area = 64,300 sf, 76.42% Impervious, Inflow Depth = 5.11" for 25-YR event
Inflow = 5.9 cfs @ 12.16 hrs, Volume= 27,403 cf
Outflow = 5.9 cfs @ 12.16 hrs, Volume= 27,403 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.9 cfs @ 12.16 hrs, Volume= 27,403 cf
Routed to Pond 2P : B-34
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond 2P : B-34

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 68.61' @ 12.16 hrs
Flood Elev= 71.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	62.08'	**12.0" Round Culvert** L= 300.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.08' / 57.67' S= 0.0147 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	70.50'	**12.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=5.9 cfs @ 12.16 hrs HW=68.60' (Free Discharge)
1=Culvert (Barrel Controls 5.9 cfs @ 7.52 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=62.08' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

Summary for Pond 7P:

Inflow Area = 45,290 sf, 74.03% Impervious, Inflow Depth = 5.03" for 25-YR event
Inflow = 4.6 cfs @ 12.15 hrs, Volume= 18,973 cf
Outflow = 4.6 cfs @ 12.15 hrs, Volume= 18,973 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.6 cfs @ 12.15 hrs, Volume= 18,973 cf
Routed to Link POA-4 :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 67.89' @ 12.15 hrs
Flood Elev= 69.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	65.00'	**12.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.00' / 64.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.6 cfs @ 12.15 hrs HW=67.88' (Free Discharge)
1=Culvert (Inlet Controls 4.6 cfs @ 5.87 fps)

Summary for Pond 8.10P:

Inflow Area = 8,440 sf, 92.00% Impervious, Inflow Depth = 5.41" for 25-YR event
Inflow = 1.1 cfs @ 12.08 hrs, Volume= 3,802 cf
Outflow = 1.1 cfs @ 12.08 hrs, Volume= 3,802 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.1 cfs @ 12.08 hrs, Volume= 3,802 cf
Routed to Pond 8.9P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 69.92' @ 12.08 hrs
Flood Elev= 72.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	69.30'	**12.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 69.30' / 68.75' S= 0.0367 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.1 cfs @ 12.08 hrs HW=69.92' (Free Discharge)
1=Culvert (Inlet Controls 1.1 cfs @ 2.11 fps)

Summary for Pond 8.111P:

Inflow Area = 29,240 sf, 88.61% Impervious, Inflow Depth = 5.34" for 25-YR event
Inflow = 3.7 cfs @ 12.08 hrs, Volume= 13,009 cf
Outflow = 3.7 cfs @ 12.08 hrs, Volume= 13,009 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.7 cfs @ 12.08 hrs, Volume= 13,009 cf
Routed to Pond 8.82P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 69.01' @ 12.08 hrs
Flood Elev= 74.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	67.95'	**18.0" Round Culvert** L= 160.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 67.95' / 66.30' S= 0.0103 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.7 cfs @ 12.08 hrs HW=69.01' (Free Discharge)
1=Culvert (Inlet Controls 3.7 cfs @ 2.77 fps)

Summary for Pond 8.11P:

Inflow Area = 26,900 sf, 87.62% Impervious, Inflow Depth = 5.32" for 25-YR event
Inflow = 3.4 cfs @ 12.08 hrs, Volume= 11,924 cf
Outflow = 3.4 cfs @ 12.08 hrs, Volume= 11,924 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.4 cfs @ 12.08 hrs, Volume= 11,924 cf
Routed to Pond 8.111P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Peak Elev= 71.10' @ 12.08 hrs
Flood Elev= 73.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	69.95'	**15.0" Round Culvert** L= 144.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 69.95' / 68.20' S= 0.0122 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=3.4 cfs @ 12.08 hrs HW=71.10' (Free Discharge)
↑**1=Culvert** (Inlet Controls 3.4 cfs @ 2.88 fps)

Summary for Pond 8.12P:

Inflow Area = 2,340 sf,100.00% Impervious, Inflow Depth = 5.56" for 25-YR event
Inflow = 0.3 cfs @ 12.08 hrs, Volume= 1,085 cf
Outflow = 0.3 cfs @ 12.08 hrs, Volume= 1,085 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.3 cfs @ 12.08 hrs, Volume= 1,085 cf
Routed to Pond 8.111P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 71.06' @ 12.08 hrs
Flood Elev= 74.35'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.75'	**12.0" Round Culvert** L= 120.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 70.75' / 69.30' S= 0.0121 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.3 cfs @ 12.08 hrs HW=71.06' (Free Discharge)
↑**1=Culvert** (Inlet Controls 0.3 cfs @ 1.49 fps)

Summary for Pond 8.21P:

Inflow Area = 19,350 sf, 84.44% Impervious, Inflow Depth = 5.26" for 25-YR event
Inflow = 2.4 cfs @ 12.08 hrs, Volume= 8,477 cf
Outflow = 2.4 cfs @ 12.08 hrs, Volume= 8,477 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.4 cfs @ 12.08 hrs, Volume= 8,477 cf
Routed to Pond 8.22P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 71.74' @ 12.08 hrs
Flood Elev= 76.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	71.00'	**24.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 71.00' / 68.60' S= 0.0240 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=2.4 cfs @ 12.08 hrs HW=71.74' (Free Discharge)
1=Culvert (Inlet Controls 2.4 cfs @ 2.31 fps)

Summary for Pond 8.22P:

Inflow Area = 41,770 sf, 81.04% Impervious, Inflow Depth = 5.19" for 25-YR event
Inflow = 5.2 cfs @ 12.08 hrs, Volume= 18,067 cf
Outflow = 5.2 cfs @ 12.08 hrs, Volume= 18,067 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.2 cfs @ 12.08 hrs, Volume= 18,067 cf
Routed to Pond 8.3P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 69.62' @ 12.08 hrs
Flood Elev= 75.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	68.50'	**24.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 68.50' / 68.10' S= 0.0133 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=5.2 cfs @ 12.08 hrs HW=69.62' (Free Discharge)
1=Culvert (Inlet Controls 5.2 cfs @ 2.85 fps)

Summary for Pond 8.2P:

Inflow Area = 19,350 sf, 84.44% Impervious, Inflow Depth = 5.26" for 25-YR event
Inflow = 2.4 cfs @ 12.08 hrs, Volume= 8,477 cf
Outflow = 2.4 cfs @ 12.08 hrs, Volume= 8,477 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.4 cfs @ 12.08 hrs, Volume= 8,477 cf
Routed to Pond 8.21P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 74.52' @ 12.08 hrs
Flood Elev= 79.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.70'	**18.0" Round Culvert** L= 120.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 73.70' / 71.50' S= 0.0183 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.4 cfs @ 12.08 hrs HW=74.52' (Free Discharge)
1=Culvert (Inlet Controls 2.4 cfs @ 2.44 fps)

Summary for Pond 8.3P:

Inflow Area = 99,100 sf, 78.48% Impervious, Inflow Depth = 5.14" for 25-YR event
Inflow = 12.2 cfs @ 12.08 hrs, Volume= 42,448 cf
Outflow = 12.2 cfs @ 12.08 hrs, Volume= 42,448 cf, Atten= 0%, Lag= 0.0 min
Primary = 12.2 cfs @ 12.08 hrs, Volume= 42,448 cf
Routed to Pond 8.7P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 70.04' @ 12.08 hrs
Flood Elev= 74.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	68.00'	**24.0" Round Culvert** L= 45.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 68.00' / 67.20' S= 0.0178 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=12.2 cfs @ 12.08 hrs HW=70.04' (Free Discharge)
1=Culvert (Inlet Controls 12.2 cfs @ 3.88 fps)

Summary for Pond 8.4P:

Inflow Area = 22,420 sf, 78.10% Impervious, Inflow Depth = 5.13" for 25-YR event
Inflow = 2.8 cfs @ 12.08 hrs, Volume= 9,590 cf
Outflow = 2.8 cfs @ 12.08 hrs, Volume= 9,590 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.8 cfs @ 12.08 hrs, Volume= 9,590 cf
Routed to Pond 8.22P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 70.98' @ 12.08 hrs
Flood Elev= 75.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.00'	**15.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 70.00' / 69.35' S= 0.0163 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.8 cfs @ 12.08 hrs HW=70.98' (Free Discharge)
1=Culvert (Inlet Controls 2.8 cfs @ 2.66 fps)

Summary for Pond 8.5P:

Inflow Area = 9,090 sf, 0.00% Impervious, Inflow Depth = 3.60" for 25-YR event
Inflow = 0.9 cfs @ 12.09 hrs, Volume= 2,728 cf
Outflow = 0.9 cfs @ 12.09 hrs, Volume= 2,728 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.9 cfs @ 12.09 hrs, Volume= 2,728 cf
Routed to Pond 8.3P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Peak Elev= 75.00' @ 12.09 hrs
Flood Elev= 77.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	74.45'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 74.45' / 73.35' S= 0.0220 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.9 cfs @ 12.09 hrs HW=75.00' (Free Discharge)
1=Culvert (Inlet Controls 0.9 cfs @ 1.99 fps)

Summary for Pond 8.6P:

Inflow Area = 11,120 sf, 70.91% Impervious, Inflow Depth = 4.99" for 25-YR event
Inflow = 1.3 cfs @ 12.08 hrs, Volume= 4,626 cf
Outflow = 1.3 cfs @ 12.08 hrs, Volume= 4,626 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.3 cfs @ 12.08 hrs, Volume= 4,626 cf
Routed to Pond 8.7P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 71.93' @ 12.08 hrs
Flood Elev= 75.15'

Device	Routing	Invert	Outlet Devices
#1	Primary	71.30'	**15.0" Round Culvert** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 71.30' / 70.10' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.3 cfs @ 12.08 hrs HW=71.93' (Free Discharge)
1=Culvert (Inlet Controls 1.3 cfs @ 2.14 fps)

Summary for Pond 8.7P:

Inflow Area = 115,300 sf, 75.85% Impervious, Inflow Depth = 5.09" for 25-YR event
Inflow = 14.1 cfs @ 12.08 hrs, Volume= 48,892 cf
Outflow = 14.1 cfs @ 12.08 hrs, Volume= 48,892 cf, Atten= 0%, Lag= 0.0 min
Primary = 14.1 cfs @ 12.08 hrs, Volume= 48,892 cf
Routed to Pond 8.81P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 68.74' @ 12.08 hrs
Flood Elev= 73.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.90'	**30.0" Round Culvert** L= 57.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.90' / 66.25' S= 0.0114 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=14.1 cfs @ 12.08 hrs HW=68.74' (Free Discharge)
└**1=Culvert** (Inlet Controls 14.1 cfs @ 3.64 fps)

Summary for Pond 8.81P:

Inflow Area = 150,970 sf, 79.60% Impervious, Inflow Depth = 5.16" for 25-YR event
Inflow = 18.6 cfs @ 12.08 hrs, Volume= 64,942 cf
Outflow = 18.6 cfs @ 12.08 hrs, Volume= 64,942 cf, Atten= 0%, Lag= 0.0 min
Primary = 18.6 cfs @ 12.08 hrs, Volume= 64,942 cf
Routed to Pond 8.82P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 68.34' @ 12.08 hrs
Flood Elev= 74.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	66.25'	**36.0" Round Culvert** L= 13.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 66.25' / 66.00' S= 0.0192 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=18.6 cfs @ 12.08 hrs HW=68.34' (Free Discharge)
└**1=Culvert** (Barrel Controls 18.6 cfs @ 4.99 fps)

Summary for Pond 8.82P:

Inflow Area = 180,210 sf, 81.06% Impervious, Inflow Depth = 5.19" for 25-YR event
Inflow = 22.4 cfs @ 12.08 hrs, Volume= 77,951 cf
Outflow = 22.4 cfs @ 12.08 hrs, Volume= 77,951 cf, Atten= 0%, Lag= 0.0 min
Primary = 22.4 cfs @ 12.08 hrs, Volume= 77,951 cf
Routed to Pond 8.83P : WQ DET & SF-1

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 67.67' @ 12.08 hrs
Flood Elev= 75.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	65.25'	**36.0" Round Culvert** L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.25' / 65.10' S= 0.0214 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=22.3 cfs @ 12.08 hrs HW=67.67' (Free Discharge)
└**1=Culvert** (Barrel Controls 22.3 cfs @ 5.00 fps)

Summary for Pond 8.83P: WQ DET & SF-1

Inflow Area = 180,210 sf, 81.06% Impervious, Inflow Depth = 5.19" for 25-YR event
Inflow = 22.4 cfs @ 12.08 hrs, Volume= 77,951 cf
Outflow = 22.3 cfs @ 12.09 hrs, Volume= 77,951 cf, Atten= 0%, Lag= 0.3 min
Primary = 0.5 cfs @ 12.09 hrs, Volume= 31,184 cf
Routed to Pond 8.85P :
Secondary = 21.8 cfs @ 12.09 hrs, Volume= 46,767 cf
Routed to Pond 8.84P : Peak DET-1

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 69.63' @ 12.09 hrs Surf.Area= 1,115 sf Storage= 5,179 cf

Plug-Flow detention time= 48.9 min calculated for 77,938 cf (100% of inflow)
Center-of-Mass det. time= 48.9 min (803.7 - 754.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	62.50'	0 cf	**10.00'W x 111.50'L x 8.00'H Field A** 8,920 cf Overall - 5,504 cf Embedded = 3,416 cf x 0.0% Voids
#2A	62.50'	5,504 cf	**CMP Round 96** x 5 Inside #1 Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf Overall Size= 96.0"W x 96.0"H x 20.00'L Row Length Adjustment= +1.50' x 50.27 sf x 1 rows 8.00' Header x 50.27 sf x 1 = 402.1 cf Inside
		5,504 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Device 2	62.50'	**12.0" Round Culvert** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 62.50' / 62.50' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 3	60.60'	**Tube/Siphon/Float Valve X 18.00** 0.586" Diameter, C= 0.600, 0.263" Trickle Diameter Starts@63.35'
#3	Primary	60.60'	**12.0" Round 12" Stormfilter Outlet** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 60.60' / 60.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Secondary	68.58'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 6.08 6.16 6.24 6.32 6.40 6.48 6.56 6.64 6.72 6.80 6.88 6.96 7.04 7.12 7.20 7.28 7.36 7.44 7.52 7.60 7.68 7.76 7.84 7.92 8.00 Width (feet) 6.83 6.73 6.63 6.52 6.40 6.28 6.15 6.01 5.87 5.71 5.55 5.38 5.20 5.01 4.80 4.58 4.34 4.08 3.80 3.49 3.14 2.73 2.24 1.59 0.00

Primary OutFlow Max=0.5 cfs @ 12.09 hrs HW=69.63' (Free Discharge)
└**3=12" Stormfilter Outlet** (Passes 0.5 cfs of 8.7 cfs potential flow)
└**2=Tube/Siphon/Float Valve** (Orifice Controls 0.5 cfs @ 14.47 fps)
└**1=Culvert** (Passes 0.5 cfs of 9.7 cfs potential flow)

Secondary OutFlow Max=21.8 cfs @ 12.09 hrs HW=69.63' (Free Discharge)
└**4=Custom Weir/Orifice** (Weir Controls 21.8 cfs @ 3.46 fps)

Summary for Pond 8.84P: Peak DET-1

Inflow = 21.8 cfs @ 12.09 hrs, Volume= 46,767 cf
Outflow = 7.5 cfs @ 12.35 hrs, Volume= 46,766 cf, Atten= 66%, Lag= 15.6 min
Primary = 7.5 cfs @ 12.35 hrs, Volume= 46,766 cf
Routed to Pond 8.85P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 66.56' @ 12.35 hrs Surf.Area= 10,780 sf Storage= 25,516 cf

Plug-Flow detention time= 265.4 min calculated for 46,759 cf (100% of inflow)
Center-of-Mass det. time= 265.7 min (1,008.4 - 742.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	62.50'	0 cf	**98.00'W x 110.00'L x 8.00'H Field A** 86,240 cf Overall - 50,064 cf Embedded = 36,176 cf x 0.0% Voids
#2A	62.50'	50,064 cf	**CMP Round 96** x 45 Inside #1 Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf Overall Size= 96.0"W x 96.0"H x 20.00'L 45 Chambers in 9 Rows 96.00' Header x 50.27 sf x 1 = 4,825.5 cf Inside
		50,064 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	70.00'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Primary	66.00'	**36.0" W x 12.0" H Vert. OVERFLOW ORIFICE** C= 0.600 Limited to weir flow at low heads
#3	Primary	62.50'	**2.0" Vert. DRAINDOWN ORIFICE** C= 0.600 Limited to weir flow at low heads
#4	Primary	64.50'	**6.0" W x 6.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=7.5 cfs @ 12.35 hrs HW=66.56' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)
└**2=OVERFLOW ORIFICE** (Orifice Controls 4.0 cfs @ 2.40 fps)
└**3=DRAINDOWN ORIFICE** (Orifice Controls 0.2 cfs @ 9.60 fps)
└**4=Orifice/Grate** (Orifice Controls 3.2 cfs @ 6.47 fps)

Summary for Pond 8.85P:

Inflow Area = 180,210 sf, 81.06% Impervious, Inflow Depth = 5.19" for 25-YR event
Inflow = 8.0 cfs @ 12.35 hrs, Volume= 77,951 cf
Outflow = 8.0 cfs @ 12.35 hrs, Volume= 77,951 cf, Atten= 0%, Lag= 0.0 min
Primary = 8.0 cfs @ 12.35 hrs, Volume= 77,951 cf
Routed to Pond 8.96P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 62.66' @ 12.35 hrs
Flood Elev= 73.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	60.50'	**18.0" Round Culvert** L= 226.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 60.50' / 58.60' S= 0.0084 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=8.0 cfs @ 12.35 hrs HW=62.66' (Free Discharge)
1=Culvert (Inlet Controls 8.0 cfs @ 4.51 fps)

Summary for Pond 8.8P:

Inflow Area = 9,920 sf, 83.06% Impervious, Inflow Depth = 5.23" for 25-YR event
Inflow = 1.2 cfs @ 12.08 hrs, Volume= 4,323 cf
Outflow = 1.2 cfs @ 12.08 hrs, Volume= 4,323 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.2 cfs @ 12.08 hrs, Volume= 4,323 cf
Routed to Pond 8.81P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 71.11' @ 12.08 hrs
Flood Elev= 75.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.50'	**15.0" Round Culvert** L= 23.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 70.50' / 70.00' S= 0.0217 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.2 cfs @ 12.08 hrs HW=71.11' (Free Discharge)
1=Culvert (Inlet Controls 1.2 cfs @ 2.09 fps)

Summary for Pond 8.96P:

Inflow Area = 180,210 sf, 81.06% Impervious, Inflow Depth = 5.19" for 25-YR event
Inflow = 8.0 cfs @ 12.35 hrs, Volume= 77,951 cf
Outflow = 8.0 cfs @ 12.35 hrs, Volume= 77,951 cf, Atten= 0%, Lag= 0.0 min
Primary = 8.0 cfs @ 12.35 hrs, Volume= 77,951 cf
Routed to Pond 2.1P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Peak Elev= 60.66' @ 12.35 hrs
Flood Elev= 68.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	58.50'	**18.0" Round Culvert** L= 80.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 58.50' / 56.01' S= 0.0311 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=8.0 cfs @ 12.35 hrs HW=60.66' (Free Discharge)
1=Culvert (Inlet Controls 8.0 cfs @ 4.51 fps)

Summary for Pond 8.9P:

Inflow Area = 25,750 sf, 95.03% Impervious, Inflow Depth = 5.46" for 25-YR event
Inflow = 3.3 cfs @ 12.08 hrs, Volume= 11,726 cf
Outflow = 3.3 cfs @ 12.08 hrs, Volume= 11,726 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.3 cfs @ 12.08 hrs, Volume= 11,726 cf
Routed to Pond 8.81P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 71.13' @ 12.08 hrs
Flood Elev= 73.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	69.40'	**12.0" Round Culvert** L= 18.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 69.40' / 68.75' S= 0.0361 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.3 cfs @ 12.08 hrs HW=71.13' (Free Discharge)
1=Culvert (Inlet Controls 3.3 cfs @ 4.21 fps)

Summary for Pond 8P:

Inflow Area = 13,930 sf, 49.61% Impervious, Inflow Depth = 4.46" for 25-YR event
Inflow = 1.5 cfs @ 12.09 hrs, Volume= 5,180 cf
Outflow = 1.5 cfs @ 12.09 hrs, Volume= 5,180 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.5 cfs @ 12.09 hrs, Volume= 5,180 cf
Routed to Pond 6P :

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 61.35' @ 12.09 hrs
Flood Elev= 71.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	60.58'	**12.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 60.58' / 59.88' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.5 cfs @ 12.09 hrs HW=61.35' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.5 cfs @ 2.36 fps)

Summary for Link POA-1: B-30

Inflow Area = 445,070 sf, 79.79% Impervious, Inflow Depth = 5.19" for 25-YR event
Inflow = 19.8 cfs @ 12.18 hrs, Volume= 192,599 cf
Primary = 19.8 cfs @ 12.18 hrs, Volume= 192,599 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Link POA-2:

Inflow Area = 20,660 sf, 50.80% Impervious, Inflow Depth = 4.80" for 25-YR event
Inflow = 2.5 cfs @ 12.08 hrs, Volume= 8,261 cf
Primary = 2.5 cfs @ 12.08 hrs, Volume= 8,261 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Link POA-3:

Inflow Area = 6,800 sf, 0.00% Impervious, Inflow Depth = 3.82" for 25-YR event
Inflow = 0.7 cfs @ 12.09 hrs, Volume= 2,163 cf
Primary = 0.7 cfs @ 12.09 hrs, Volume= 2,163 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Link POA-4:

Inflow Area = 45,290 sf, 74.03% Impervious, Inflow Depth = 5.03" for 25-YR event
Inflow = 4.6 cfs @ 12.15 hrs, Volume= 18,973 cf
Primary = 4.6 cfs @ 12.15 hrs, Volume= 18,973 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

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101 Subcat 3.3S:
101 Subcat 3.4S:
102 Subcat 3.5S:
102 Subcat 3.6S:
103 Subcat 3.7S:
103 Subcat 4.1S:
103 Subcat 4.2S:
104 Subcat 4.3S:
104 Subcat 4.4S:
105 Subcat 4.5S:
105 Subcat 4.6S:
105 Subcat 4.7S:
106 Subcat 4.8S:
106 Subcat 5.1S:
107 Subcat 6.1S:
107 Subcat 7.1S:
108 Subcat 8.10S:
108 Subcat 8.11S:
108 Subcat 8.12S:
109 Subcat 8.1S:
109 Subcat 8.2S:
110 Subcat 8.3S:
110 Subcat 8.4S:
110 Subcat 8.5S:
111 Subcat 8.6S:
111 Subcat 8.7S:
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113 Pond 2.11P: 21P (CB-8436)
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128 Pond 8.111P:
128 Pond 8.11P:
129 Pond 8.12P:
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131 Pond 8.5P:
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133 Pond 8.82P:
133 Pond 8.83P: WQ DET & SF-1
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136 Pond 8.96P:
137 Pond 8.9P:
137 Pond 8P:
138 Link POA-1: B-30
138 Link POA-2:
138 Link POA-3:
138 Link POA-4:

Summary for Pond 6P:

Inflow Area = 148,505 sf, 34.60% Impervious, Inflow Depth = 4.17" for 25-YR event
Inflow = 9.5 cfs @ 12.23 hrs, Volume= 51,602 cf
Outflow = 9.5 cfs @ 12.23 hrs, Volume= 51,602 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.5 cfs @ 12.23 hrs, Volume= 48,670 cf
Secondary = 3.0 cfs @ 12.23 hrs, Volume= 2,932 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 70.69' @ 12.23 hrs
Flood Elev= 71.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	62.08'	**12.0" Round Culvert** L= 300.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 62.08' / 57.67' S= 0.0147 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	70.50'	**12.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=6.5 cfs @ 12.23 hrs HW=70.69' (Free Discharge)
1=Culvert (Barrel Controls 6.5 cfs @ 8.27 fps)

Secondary OutFlow Max=2.9 cfs @ 12.23 hrs HW=70.69' (Free Discharge)
2=Broad-Crested Rectangular Weir (Weir Controls 2.9 cfs @ 1.24 fps)

Summary for Pond 7P:

Inflow Area = 71,445 sf, 40.30% Impervious, Inflow Depth = 4.55" for 25-YR event
Inflow = 5.0 cfs @ 12.34 hrs, Volume= 27,091 cf
Outflow = 5.0 cfs @ 12.34 hrs, Volume= 27,091 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.0 cfs @ 12.34 hrs, Volume= 27,091 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 68.28' @ 12.34 hrs
Flood Elev= 69.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	65.00'	**12.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.00' / 64.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=5.0 cfs @ 12.34 hrs HW=68.27' (Free Discharge)
1=Culvert (Inlet Controls 5.0 cfs @ 6.33 fps)

Summary for Pond 8P:

Inflow Area = 84,725 sf, 9.68% Impervious, Inflow Depth = 3.60" for 25-YR event
Inflow = 4.7 cfs @ 12.39 hrs, Volume= 25,399 cf
Outflow = 4.7 cfs @ 12.39 hrs, Volume= 25,399 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.7 cfs @ 12.39 hrs, Volume= 25,399 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 66.50' @ 12.39 hrs
Flood Elev= 71.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	63.50'	**12.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 63.50' / 62.18' S= 0.0189 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.7 cfs @ 12.39 hrs HW=66.50' (Free Discharge)
1=Culvert (Inlet Controls 4.7 cfs @ 6.00 fps)

Summary for Pond 21P: 21P (CB-8436)

Inflow Area = 206,895 sf, 48.15% Impervious, Inflow Depth = 4.49" for 25-YR event
Inflow = 14.3 cfs @ 12.12 hrs, Volume= 77,433 cf
Outflow = 14.3 cfs @ 12.12 hrs, Volume= 77,433 cf, Atten= 0%, Lag= 0.0 min
Primary = 14.3 cfs @ 12.12 hrs, Volume= 77,433 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 58.59' @ 12.12 hrs
Flood Elev= 67.48'

Device	Routing	Invert	Outlet Devices
#1	Primary	55.88'	**24.0" Round Culvert** L= 90.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 55.88' / 55.62' S= 0.0029 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=14.3 cfs @ 12.12 hrs HW=58.59' (Free Discharge)
1=Culvert (Barrel Controls 14.3 cfs @ 4.54 fps)

Summary for Link POA-1: B-30

Inflow Area = 395,015 sf, 40.02% Impervious, Inflow Depth = 4.65" for 25-YR event
Inflow = 27.0 cfs @ 12.12 hrs, Volume= 153,175 cf
Primary = 27.0 cfs @ 12.12 hrs, Volume= 153,175 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Link POA-2:

Inflow Area = 35,560 sf, 28.26% Impervious, Inflow Depth = 5.28" for 25-YR event
Inflow = 4.5 cfs @ 12.08 hrs, Volume= 15,635 cf
Primary = 4.5 cfs @ 12.08 hrs, Volume= 15,635 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Link POA-3:

Inflow Area = 15,800 sf, 0.00% Impervious, Inflow Depth = 3.91" for 25-YR event
Inflow = 1.6 cfs @ 12.09 hrs, Volume= 5,143 cf
Primary = 1.6 cfs @ 12.09 hrs, Volume= 5,143 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Link POA-4:

Inflow Area = 71,445 sf, 40.30% Impervious, Inflow Depth = 4.55" for 25-YR event
Inflow = 5.0 cfs @ 12.34 hrs, Volume= 27,091 cf
Primary = 5.0 cfs @ 12.34 hrs, Volume= 27,091 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Appendix 3

Inspection, Maintenance and Housekeeping Plan

INSPECTION, MAINTENANCE, AND HOUSEKEEPING PLAN

For:
Portland International Jetport (PWM) Parking Expansion
Portland, ME

By:
Sebago Technics, Inc.
75 John Roberts Road, Suite 4A
South Portland, Maine

Introduction

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. 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 (0.5" of rainfall), 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 (0.5" of rainfall).

3. **Documentation:** A log summarizing the inspections and any corrective action taken must be maintained on-site. 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. Sediment Barriers:

- 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 (0.5" of rainfall). 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. 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.

C. 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.

D. 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).

E. 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.

F. 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.

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 owner or assigned heirs to comply with the inspection and maintenance procedures outlined in this section. All measures must be maintained in effective operating condition. The owner shall inspect and maintain the BMPs, including but not limited to any parking areas, catch basins, drainage swales, detention basins and ponds, pipes and related structures, in accordance with all municipal and state inspection, cleaning and maintenance requirements of the approved post-construction stormwater management plan.

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. If the BMP requires maintenance, repair or replacement to function as intended by the approved post-construction stormwater management plan, the owner or operator of the BMP shall take corrective action(s) to address the deficiency or deficiencies as soon as possible after the deficiency is discovered and shall provide a record of the deficiency and corrective action(s) to the local municipality in the annual report.

   A. Vegetated Areas:

   - Inspect vegetated areas, particularly slopes and embankments, early in the growing season or after heavy rains (>0.5") 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. Culverts:

- Inspect culverts in the spring, in the late fall, and after heavy rains (>0.5") 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.

D. Removal of Winter Sand:

- Clear accumulations of winter sand in parking lots and along roadways at least once a year, preferably in the spring.
- Accumulations on pavement may be removed by pavement sweeping.
- 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.

E. Stormfilter:

- Refer to the Contech – Stormfilter Operation Manual for guidance on required maintenance and inspection.

3. Documentation:

A. The owner or operator of a BMP or a qualified post-construction stormwater inspector hired by that person, shall, as required by the local municipality, provide a completed and signed certification on a form provided by the local municipality, 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 1 of this Inspection, Maintenance, and Housekeeping Plan.

4. 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.

ATTACHMENT 1 – STORMWATER INSPECTION AND MAINTENANCE LOG

Portland International Jetport (PWM) Parking Expansion
Portland, ME

This log is intended to accompany the Inspection, Maintenance, and Housekeeping Plan for the parking expansion at the Portland International Jetport (PWM) 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 sections below. This log shall be kept on file for a minimum of five (5) years and shall be available for review by the City of Portland and the Maine DEP. Qualified personnel familiar with the drainage systems and soils shall perform all inspections. A copy of the construction and post-construction maintenance logs are provided.

INSPECTION MAINTENANCE AND HOUSEKEEPING FORM			
General Information			
Project Name:		**Inspection Date:**	
Project Location:		**Current Weather:**	
		Date / Amount Last Precip:	
BMP Owner:		**Company conducting inspection:**	
Owner Mailing Address:		**Company Mailing Address**	
Owner Phone #:		**Company Phone #:**	
Owner Email:		**Inspector Name:**	
		Inspector Email:	
Site Element	**Suggested Maintenance (recm'd frequency)**	**Observations**	**Inspection Notes/Recommended Action**
Vegetated Areas	Inspect Slopes/Embankments for erosion (annually)		
	Replant bare areas or areas of sparse growth (annually)		
Ditches/Swales	Remove obstructions/debris/sediment (monthly)		
	Inspect for erosion/repair as needed (annually)		
	Remove woody vegetation (annually)		
	Mow vegetated ditches (annually)		
Catch Basins	Remove sediment/debris from sump (annually)		
	Remove accumulated debris from inlet grate		
Culverts	Remove sediment/debris from inlet/outlet aprons (annually)		
	Inspect inlet/outlet aprons for erosion, repair as needed (annually)		
	Inspect, repair as needed, riprap aprons for dislodged/sparse coverage (annually)		
Pipe Outlets	Remove sediment/debris from outlet aprons (annually)		
	Inspect outlet aprons for erosion, repair as needed (annually)		
	Inspect, repair as needed, riprap aprons for dislodged/sparse coverage (annually)		
Stormfilter	Inspect Anually		
Additional Notes/Observations:			

Appendix 4

Subsurface Investigations

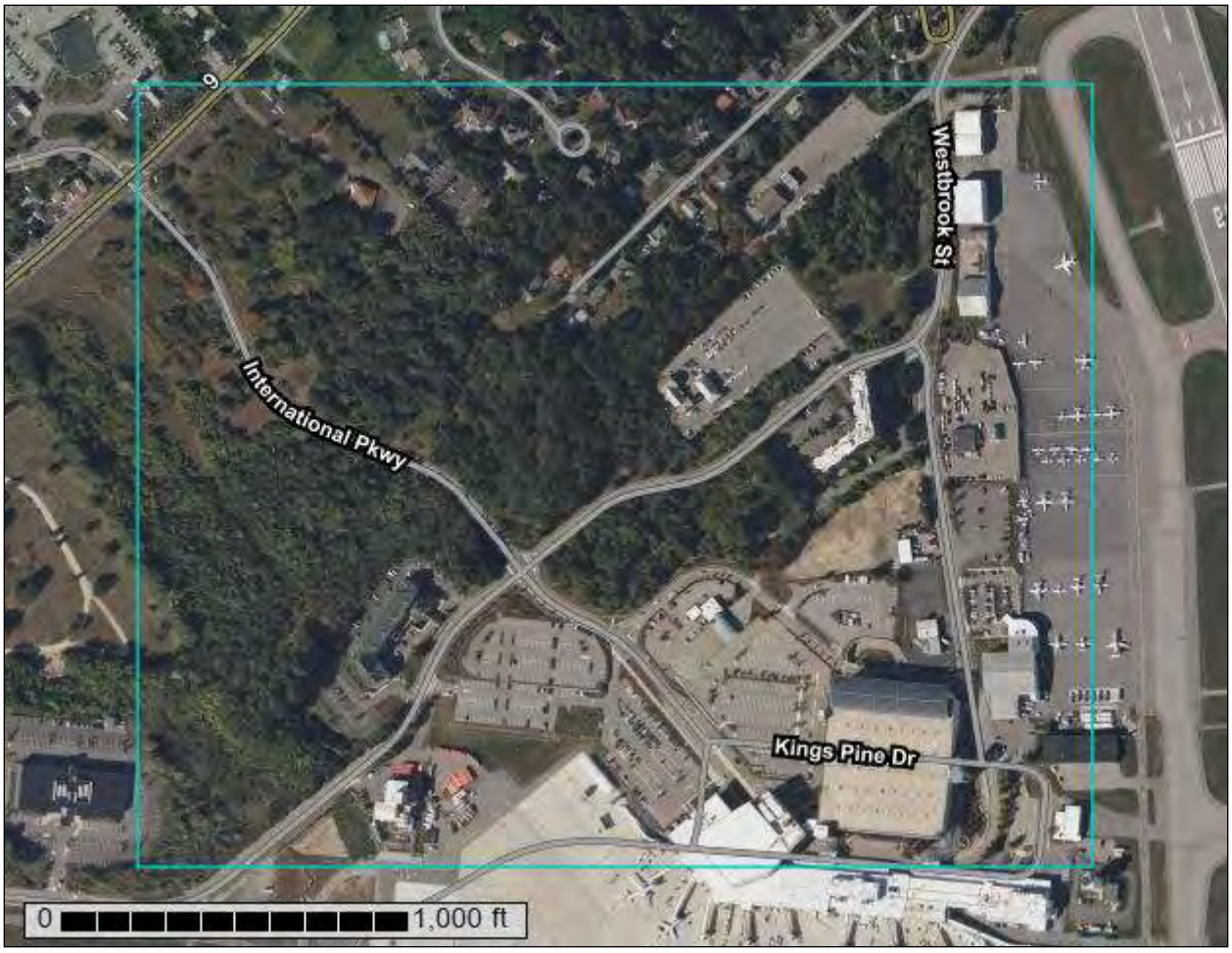
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Cumberland County and Part of Oxford County, Maine



August 14, 2023

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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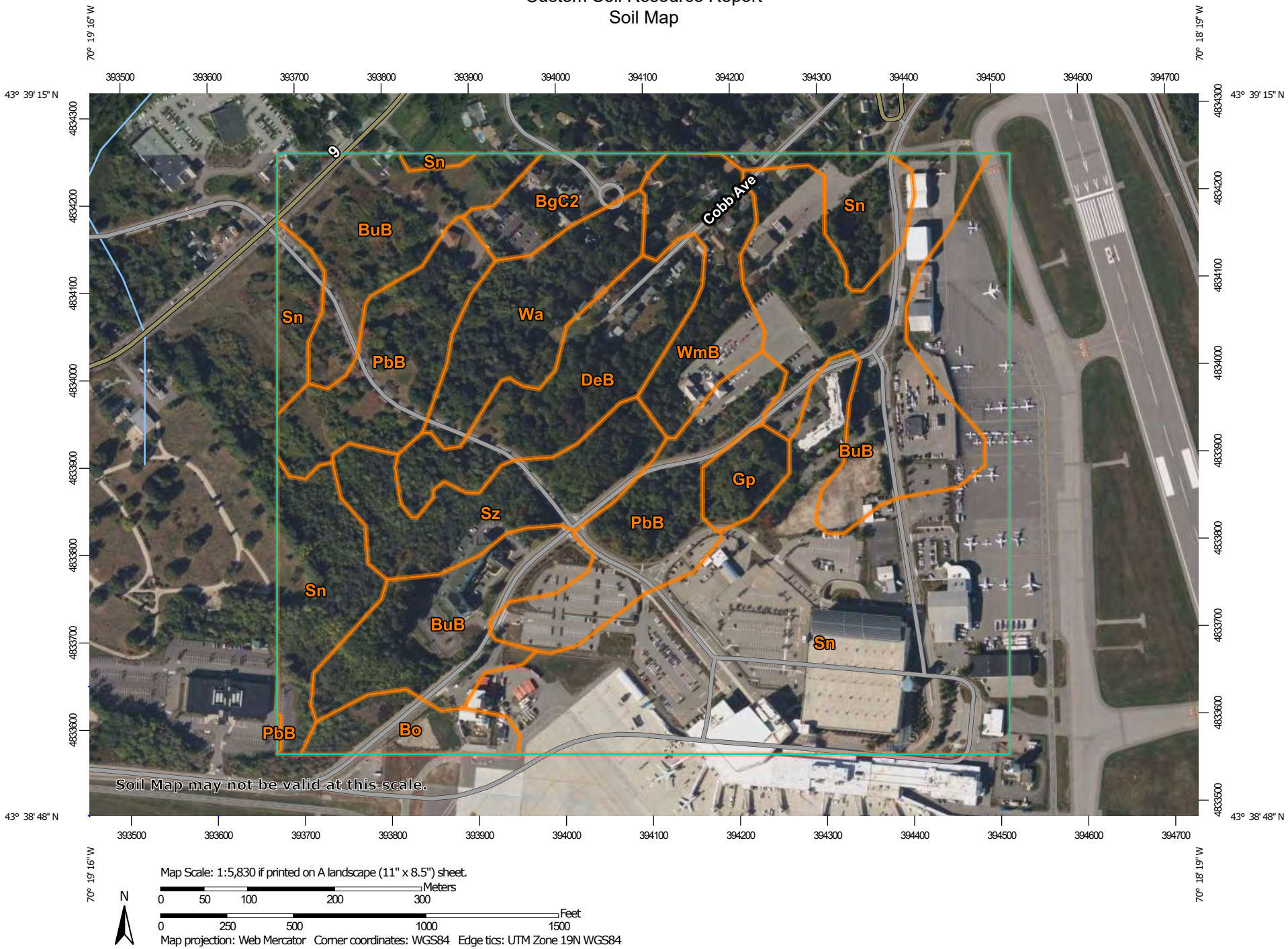
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.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394100
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PbB
DeB
Gp
Sz
Bo
Soil Map may not be valid at this scale.
Map Scale: 1:5,830 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 50 100 200 300
Feet
0 250 500 1000 1500
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 Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

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 19, Aug 30, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 19, 2020—Oct 7, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BgC2	Nicholville very fine sandy loam, 8 to 15 percent slopes	3.6	2.5%
Bo	Biddeford mucky peat, 0 to 3 percent slopes	3.3	2.3%
BuB	Lamoine silt loam, 3 to 8 percent slopes	32.7	22.8%
DeB	Deerfield loamy fine sand, 3 to 8 percent slopes	8.9	6.2%
Gp	Gravel pits	2.0	1.4%
PbB	Paxton fine sandy loam, 3 to 8 percent slopes	16.1	11.2%
Sn	Scantic silt loam, 0 to 3 percent slopes	54.6	38.0%
Sz	Swanton fine sandy loam	8.3	5.7%
Wa	Walpole fine sandy loam	7.4	5.1%
WmB	Windsor loamy sand, 0 to 8 percent slopes	6.8	4.7%
Totals for Area of Interest		**143.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the

scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Cumberland County and Part of Oxford County, Maine

BgC2—Nicholville very fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2yjg6
Elevation: 20 to 2,300 feet
Mean annual precipitation: 34 to 50 inches
Mean annual air temperature: 37 to 45 degrees F
Frost-free period: 90 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Nicholville and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nicholville

Setting

Landform: Lakebeds (relict), eskers
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-silty glaciomarine deposits

Typical profile

Ap - 0 to 7 inches: very fine sandy loam
Bs - 7 to 19 inches: very fine sandy loam
BC - 19 to 30 inches: very fine sandy loam
C - 30 to 65 inches: loamy very fine sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F144BY501ME - Loamy Slope (Northern Hardwoods)
Hydric soil rating: No

Bo—Biddeford mucky peat, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2t0jn
Elevation: 10 to 900 feet
Mean annual precipitation: 33 to 60 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Biddeford and similar soils: 82 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Biddeford

Setting

Landform: Marine terraces, river valleys
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave, linear
Parent material: Organic material over glaciomarine deposits

Typical profile

Oe - 0 to 12 inches: mucky peat
Eg - 12 to 16 inches: silt loam
Bg - 16 to 45 inches: silty clay
Cg - 45 to 65 inches: clay

Properties and qualities

Slope: 0 to 3 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: High (about 11.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: D
Ecological site: F144BY002ME - Marine Terrace Depression, F144BY304ME - Wet Clay Flat
Hydric soil rating: Yes

BuB—Lamoine silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2t0kc
Elevation: 10 to 490 feet
Mean annual precipitation: 33 to 60 inches
Mean annual air temperature: 36 to 52 degrees F
Frost-free period: 90 to 160 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Lamoine and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lamoine

Setting

Landform: Marine terraces, river valleys
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine glaciomarine deposits

Typical profile

Ap - 0 to 7 inches: silt loam
Bw - 7 to 13 inches: silt loam
Bg - 13 to 24 inches: silty clay loam
Cg - 24 to 65 inches: silty clay

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 6 to 17 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F144BY401ME - Clay Flat
Hydric soil rating: No

DeB—Deerfield loamy fine sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2xfg9
Elevation: 0 to 1,190 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Deerfield and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Deerfield

Setting

Landform: Kame terraces, outwash plains, outwash terraces, outwash deltas
Landform position (three-dimensional): Tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Parent material: Sandy outwash derived from granite, gneiss, and/or quartzite

Typical profile

Ap - 0 to 9 inches: loamy fine sand
Bw - 9 to 25 inches: loamy fine sand
BC - 25 to 33 inches: fine sand
Cg - 33 to 60 inches: sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: About 15 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Sodium adsorption ratio, maximum: 11.0
Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A
Ecological site: F144AY027MA - Moist Sandy Outwash
Hydric soil rating: No

Gp—Gravel pits

Map Unit Composition

Gravel pits: 92 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gravel Pits

Typical profile

H1 - 0 to 6 inches: extremely gravelly sand
H2 - 6 to 60 inches: extremely gravelly sand

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Ecological site: F144BY601ME - Dry Sand
Hydric soil rating: No

PbB—Paxton fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: bljf
Elevation: 0 to 930 feet
Mean annual precipitation: 48 to 50 inches
Mean annual air temperature: 45 to 46 degrees F
Frost-free period: 145 to 155 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Paxton and similar soils: 87 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton

Setting

Landform: Drumlinoid ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Coarse-loamy lodgment till derived from mica schist

Typical profile

H1 - 0 to 8 inches: fine sandy loam
H2 - 8 to 20 inches: fine sandy loam
H3 - 20 to 65 inches: fine sandy loam

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 18 to 40 inches to densic material
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 30 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F144BY501ME - Loamy Slope (Northern Hardwoods)
Hydric soil rating: No

Sn—Scantic silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2slv3
Elevation: 10 to 900 feet
Mean annual precipitation: 33 to 60 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Scantic and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scantic

Setting

Landform: Marine terraces, river valleys
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Glaciomarine deposits

Typical profile

Ap - 0 to 9 inches: silt loam
Bg1 - 9 to 16 inches: silty clay loam
Bg2 - 16 to 29 inches: silty clay
Cg - 29 to 65 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 12 inches

Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Ecological site: F144BY304ME - Wet Clay Flat
Hydric soil rating: Yes

Sz—Swanton fine sandy loam

Map Unit Setting

National map unit symbol: blk4
Elevation: 10 to 900 feet
Mean annual precipitation: 36 to 48 inches
Mean annual air temperature: 39 to 46 degrees F
Frost-free period: 90 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Swanton and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Swanton

Setting

Landform: Outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy glaciolacustrine deposits

Typical profile

H1 - 0 to 9 inches: fine sandy loam
H2 - 9 to 32 inches: fine sandy loam
H3 - 32 to 65 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Hydric soil rating: Yes

Wa—Walpole fine sandy loam

Map Unit Setting

National map unit symbol: blk7
Elevation: 0 to 540 feet
Mean annual precipitation: 48 to 49 inches
Mean annual air temperature: 45 to 46 degrees F
Frost-free period: 145 to 165 days
Farmland classification: Not prime farmland

Map Unit Composition

Walpole and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Walpole

Setting

Landform: Outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy glaciofluvial deposits

Typical profile

H1 - 0 to 8 inches: fine sandy loam
H2 - 8 to 20 inches: fine sandy loam
H3 - 20 to 65 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F144BY303ME - Acidic Swamp
Hydric soil rating: Yes

WmB—Windsor loamy sand, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2w2x2
Elevation: 0 to 1,410 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Windsor and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor

Setting

Landform: Outwash terraces, deltas, outwash plains, dunes
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: loamy sand
Bw - 3 to 25 inches: loamy sand
C - 25 to 65 inches: sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F144BY601ME - Dry Sand
Hydric soil rating: No

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REPORT

19-0714 S

November 16, 2023

Explorations and Geotechnical Engineering Services

Proposed Parking Lot Expansion
Jetport Blvd and Loop Road
Portland, Maine

Prepared For:
Sebago Technics, Inc.
Attention: Owens McCullough, P.E., LEED AP
75 John Roberts Road
South Portland, Maine 04106

Prepared By:
S. W. Cole Engineering, Inc.
286 Portland Road
Gray, Maine
T: 207-657-2866

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19-0714 S

November 16, 2023

Sebago Technics, Inc.
Attention: Owens McCullough, P.E., LEED AP
75 Jon Roberts Road
South Portland ME 04106

Subject: Explorations and Geotechnical Engineering Services
Proposed Parking Lots
Jetport Blvd
Portland, Maine

Dear Owens:

In accordance with our revised Proposal, dated October 23, 2023, we have performed subsurface explorations for the subject project. This report summarizes our findings and geotechnical recommendations, and its contents are subject to the limitations set forth in Appendix A.

1.0 INTRODUCTION

1.1 Scope and Purpose

The purpose of our services was to obtain subsurface information at the site in order to develop geotechnical recommendations relative to earthwork and pavement associated with the proposed construction. Our scope of services included test pit explorations, soils laboratory testing, a geotechnical analysis of the subsurface findings and preparation of this report.

1.2 Site and Proposed Construction

We understand the site consists of four parcels:

1) A large, wooded lot located on the northerly side of the Portland Jetport Terminal building and parking garage, between Loop Road and Jetport Blvd. This parcel

is approximately 300 by 800 feet in plan dimensions. Existing grades vary in elevation from approximately 72 to 87 feet.

2) A small, wooded lot located on the north side of Jetport Blvd approximately 200 by 300 feet in plan dimensions. Existing grades appear to vary from about elevation 80 to 89.
3) A gravel parking lot (Park & Jet Lot) located south of the Embassy Suites hotel and west of Westbrook Street. This parcel is approximately 175 by 400 feet in plan dimensions. Existing grades appear to vary from about elevation 68 to 77.
4) A paved parking lot (Cell Phone Lot) located adjacent to the northerly side of Loop Road. This parcel is approximately 170 by 270 feet in plan dimensions. Existing grades appear to vary from about 68 to 71 feet.

We understand development plans call for construction of new paved parking lots on each of these parcels. We understand subsurface stormwater systems are planned in some areas. Based on the plans provided, existing site grades vary from about elevation 68 to 89 feet (southeast to northwest) and finish site pavement grades will vary from about elevation 68 to 89 feet. It appears much of the proposed parking lot area(s) will require up to about 3 feet of tapered cuts and fills to establish proposed pavement grades. A portion of the site, however, located between Jetport Blvd and Loop Road will require tapered cuts varying from greater than 3 to as much as 9+/- feet to establish proposed pavement grades.

Proposed and existing site features are shown on the “Exploration Location Plan” attached in Appendix B.

2.0 EXPLORATION AND TESTING

2.1 Explorations

Twenty-four test pits (TP-1 through TP-4, TP-6 through TP-9, TP-11 through TP-13, TP-15 through TP-17, TP-19, TP-21 through TP-23, TP-25, TP-27, and TP-29 through TP-32) were made at the site on October 25 and 26, 2023 by Shaw Earthworks, Inc. As requested by STI, certain test pit locations were omitted due to exploration time constraints. The exploration locations were selected and established in the field by STI using GPS methods. The approximate exploration locations are shown on the “Exploration Location Plan” attached in Appendix B. Logs of the explorations and a key

to the notes and symbols used on the logs are attached in Appendix C. The approximate, interpolated elevations shown on the logs were estimated based on topographic information shown on the “Exploration Location Plan”.

2.2 Testing

The explorations were made using a small excavator. Soil samples obtained from the explorations were returned to our laboratory for further classification and testing. Moisture content test results are noted on the logs. The results of four soil gradation tests are attached in Appendix D.

3.0 SUBSURFACE CONDITIONS

3.1 Soil and Bedrock

The test pits were attempted to depths of either 6 feet or 10 feet (10 feet in possible subsurface stormwater management areas) as directed by STI. Below a surficial layer of forest duff and topsoil with organics or uncontrolled fill, the explorations encountered a subsurface profile generally consisting of native deposits of sand with varying amounts of silt and gravel, some cobbles, and a few small boulders as well as sandy clayey silt and stiff to medium silty clay. An uncontrolled fill consisting of mixed clayey silty sand with some organics and clayey silty sand was encountered at test pits TP-1 and TP-2 (cell phone lot) to depths of about 7 and 2.5 feet respectively. Test pits TP-3, TP-4, TP-6, and TP-7 (gravel Park & Jet lot) encountered about 18 to 30 inches of gravelly sand, some silt (uncontrolled fill) overlying about 6-inches of relic topsoil and/or soils with rootlets overlying native soils. Test pits made in wooded areas encountered tree roots to depths varying from about 1.5 to 2.5 feet below the ground surface. Practical refusal surfaces (probable boulders) were encountered at depths of about 10 and 9 feet at test pits TP-2 and TP-12, respectively.

Not all the strata were encountered at each exploration; refer to the attached logs for more detailed subsurface information.

3.2 Groundwater

The soils encountered at the test pits were moist to wet from the ground surface. Where encountered, saturated soil and groundwater seepage was observed at depths varying from about 3.5 to 9.5 feet below the existing ground surface. Groundwater likely becomes

perched on the relatively impervious clayey silt and silty clay encountered at some of the test pits. Long term groundwater information is not available. It should be anticipated that groundwater levels will fluctuate, particularly in response to periods of snowmelt and precipitation, as well as changes in site use.

4.0 EVALUATION AND RECOMMENDATIONS

4.1 General Findings

Based on the subsurface findings, the proposed construction appears feasible from a geotechnical standpoint. The principle geotechnical considerations include:

- All topsoil, soils with roots and organics, buried relic topsoil, uncontrolled fill and disturbed soils must be completely removed from beneath proposed paved areas.

- The soil encountered was generally wet, becoming saturated with depth with groundwater seepage noted in some test pits. Care will need to be taken not to disturb the native soils during construction. Earthwork and grading activities should occur during drier, non-freezing weather of Spring, Summer, and Fall. Rubber tired construction equipment should not operate directly on the native soil subgrades, particularly when wet. Excavation of bearing surfaces should be completed with a smooth-edged bucket to lessen subgrade disturbance.

- Swales and subsurface drainage systems may be needed in some areas, particularly in deeper planned cut areas.

4.2 Site and Subgrade Preparation

We recommend that site preparation begin with the construction of an erosion control system to protect adjacent drainage ways and areas outside the construction limits. All topsoil, soils with roots and organics, buried relic topsoil, uncontrolled fill and disturbed soils must be completely removed from beneath proposed paved areas. The extent of removal should extend 1 foot laterally outward from outside edge of pavement for every 1-foot of excavation depth (1H:1V bearing splay). The over-excavated area should be backfilled with compacted Granular Borrow. As much vegetation as possible should remain outside the construction areas to lessen the potential for erosion and site disturbance.

Beneath pipes and utility structures with soft trench bottoms, we recommend over excavating with a smooth-edged bucket and installing at least 1 foot of Underdrain Sand below customary bedding materials wrapped in non-woven geotextile fabric. The depth of customary bedding materials for soft trench bottoms should be at least 12 inches below pipes and 24 inches below structures.

4.3 Excavation and Dewatering

Excavation work will generally encounter topsoil, soils with roots and organics, buried relic topsoil, uncontrolled fills, native granular soils, silty clay, and clayey silt soils. Wet to saturated soils and groundwater should be expected with depth. Care must be exercised during construction to limit disturbance of the subgrade soils. Earthwork and grading activities should occur during drier, non-freezing weather of Spring, Summer and Fall. Rubber tired construction equipment should not operate directly on the subgrades, particularly when wet. Low ground pressure tracked equipment may be needed and temporary haul roads overlying geotextile fabric may be necessary. Final cuts to subgrade should be performed with a smooth-edged bucket to help reduce strength loss from soil disturbance.

Sumping and pumping and/or temporary ditching dewatering techniques should be adequate to control groundwater in excavations. Controlling the water levels to at least one foot below planned excavation depths will help stabilize subgrades during construction. Excavations must be properly shored or sloped in accordance with OSHA Regulations to prevent sloughing and caving of the sidewalls during construction. Care must be taken to preclude undermining adjacent structures, utilities, and roadways. The design and planning of excavations, excavation support systems, and dewatering is the responsibility of the contractor.

4.4 Site Drainage

Surface grades should be sloped away from paved areas for positive surface water drainage. Perimeter drainage swales should be deep enough to help control water from intruding into adjacent pavement subbase/base aggregates. We recommend a deeper swale or groundwater cut-off trench drain be considered beneath the proposed swale located in the proposed deeper cut planned in the area near test pit TP-25 to help control water intrusion beneath adjacent pavemen. The trench drain should follow the MaineDOT specifications for French Drains. The underdrain pipe should consist of 6-inch diameter,

perforated foundation drainpipe bedded in Crushed Stone and wrapped in non-woven geotextile filter fabric. The underdrain pipe must have a positive gravity outlet protected from freezing, clogging and backflow.

4.5 Fill, Backfill and Compaction

We recommend the following fill and backfill materials: recycled products must also be tested in accordance with applicable environmental regulations and approved by a qualified environmental consultant.

Common Borrow: Fill to raise grades in landscape areas should be non-organic compactable earth meeting the requirements of 2020 MaineDOT Standard Specification 703.18 Common Borrow.

Granular Borrow: Fill to raise grades in paved areas, as well as to repair soft areas, should be sand or silty sand meeting the requirements of 2020 MaineDOT Standard Specification 703.19 Granular Borrow.

Underdrain Sand: Sand used beneath bedding materials in soft trench bottoms should be clean, free-draining sand meeting the requirements of 2020 MaineDOT Standard Specification 703.22 Underdrain Backfill Material Type B.

Crushed Stone: Crushed Stone, used for underdrain aggregate should be washed ¾-inch crushed stone meeting the requirements of 2020 MaineDOT Standard Specification 703.13 Crushed Stone ¾-Inch.

Reuse of Site Soils: The organic soils, soils with roots and silty clay are unsuitable for reuse as fill in paved areas but may be suitable for reuse as Common Borrow in landscape areas, provided they are at a compactable moisture content at the time of reuse. The native granular soils and granular portions of existing fills can likely be re-used as Granular Borrow provided the soil is at a compactable moisture content at the time of re-use.

Placement and Compaction: Fill should be placed in horizontal lifts and compacted such that the desired density is achieved throughout the lift thickness with 3 to 5 passes of the compaction equipment. Loose lift thicknesses for grading, fill and backfill

activities should not exceed 12 inches. We recommend that fill and backfill in paved areas be compacted to at least 95 percent of its maximum dry density as determined by ASTM D-1557. Crushed Stone should be compacted with 3 to 5 passes of a vibratory plate compactor having a static weight of at least 500 pounds.

4.6 Weather Considerations

Construction activity should be limited during wet and freezing weather and the site soil may require drying or thawing before construction activities may continue. The contractor should anticipate the need for water to temper fills to facilitate compaction during dry weather. If construction takes place during cold weather, subgrades must be protected during freezing conditions.

4.7 Paved Areas

We anticipate paved areas will be subjected primarily to passenger vehicle and light delivery truck traffic. Considering the findings at the explorations and proposed usage, we offer the following pavement section for consideration.

FLEXIBLE (HMA) PAVEMENT SECTION – 2020 MaineDOT Standard Specs	
Pavement Layer	**Material Thickness**
MaineDOT 9.5 mm Hot Mix Asphalt	1 ½ inches
MaineDOT 12.5 mm Hot Mix Asphalt	2 ½ inches
MaineDOT 703.06 Aggregate Base Type A	3 inches
MaineDOT 703.06 Aggregate Subbase Type D	18 inches

The base and subbase materials should be compacted to at least 95 percent of their maximum dry density as determined by ASTM D-1557. Hot mix asphalt pavement should be compacted to 92 to 97 percent of its theoretical maximum density as determined by ASTM D-2041. A tack coat should be used between successive lifts of bituminous pavement.

Frost penetration can be on the order of 4.5 feet in this area. It should be understood that in the absence of full depth excavation of frost susceptible soils below paved areas and subsequent replacement with non-frost susceptible compacted fill, frost penetration into the subgrade will occur and some heaving and distress of pavement must be anticipated.

4.8 Design Review and Construction Testing

S.W.COLE should be retained to review the construction documents prior to bidding to determine that our earthwork and pavement recommendations have been properly interpreted and implemented.

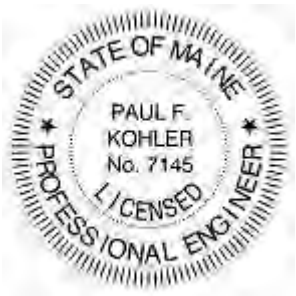
A construction materials testing and quality assurance program should be implemented during construction to observe compliance with the design concepts, plans, and specifications. S.W.COLE is available to observe earthwork activities, the preparation of pavement subgrades, as well as to provide laboratory and field testing of soil and asphalt construction materials.

5.0 CLOSURE

It has been a pleasure to be of assistance to you with this phase of your project. We look forward to working with you during the construction phase of the project.

Sincerely,

S. W. Cole Engineering, Inc.



Paul F. Kohler, P.E.
Principal Geotechnical Engineer

PFK:tjb

APPENDIX A

Limitations

This report has been prepared for the exclusive use of Sebago Technics, Inc. for specific application to the proposed parking lots at the Portland Jetport Facility in Portland, Maine. S. W. Cole Engineering, Inc. (S.W.COLE) has endeavored to conduct our services in accordance with generally accepted soil and foundation engineering practices. No warranty, expressed or implied, is made.

The soil profiles described in the report are intended to convey general trends in subsurface conditions. The boundaries between strata are approximate and are based upon interpretation of exploration data and samples.

The analyses performed during this investigation and recommendations presented in this report are based in part upon the data obtained from subsurface explorations made at the site. Variations in subsurface conditions may occur between explorations and may not become evident until construction. If variations in subsurface conditions become evident after submission of this report, it will be necessary to evaluate their nature and to review the recommendations of this report.

Observations have been made during exploration work to assess site groundwater levels. Fluctuations in water levels will occur due to variations in rainfall, temperature, and other factors.

S.W.COLE's scope of services has not included the investigation, detection, or prevention of any Biological Pollutants at the project site or in any existing or proposed structure at the site. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and the byproducts of any such biological organisms.

Recommendations contained in this report are based substantially upon information provided by others regarding the proposed project. In the event that any changes are made in the design, nature, or location of the proposed project, S.W.COLE should review such changes as they relate to analyses associated with this report. Recommendations contained in this report shall not be considered valid unless the changes are reviewed by S.W.COLE.

APPENDIX B

Figures

LEGEND:

APPROXIMATE TEST PIT LOCATION

NOTES:

1. EXPLORATION LOCATION PLAN WAS PREPARED FROM A SCALE PLAN OF THE SITE PROVIDED SEBAGO TECHNICS, INC., RECEIVED 11/08/2023.
2. THE TEST PIT LOCATIONS WERE SELECTED AND ESTABLISHED IN THE FIELD BY SEBAGO TECHNICS, INC AND PROVIDED ON THE ABOVE REFERENCED PLAN.
3. THIS PLAN SHOULD BE USED IN CONJUNCTION WITH THE ASSOCIATED S. W. COLE ENGINEERING, INC. GEOTECHNICAL REPORT.
4. THE PURPOSE OF THIS PLAN IS ONLY TO DEPICT THE LOCATION OF THE EXPLORATIONS IN RELATION TO THE EXISTING CONDITIONS AND PROPOSED CONSTRUCTION AND IS NOT TO BE USED FOR CONSTRUCTION.

0 40 80 Feet

S.W.COLE ENGINEERING, INC.

SEBAGO TECHNICS, INC.

EXPLORATION LOCATION PLAN

PROPOSED PARKING LOTS
PORTLAND JETPORT
JETPORT BLVD AND LOOP ROAD, PORTLAND, MAINE

Job No.:	19-0714	Scale:	1" = 40'
Date :	11/14/2023	Sheet:	1

APPENDIX C

Exploration Logs and Key

TEST PIT LOGS

CLIENT: Sebago Technics, Inc.
PROJECT: Proposed Parking Lots
LOCATION: Jetport Blvd., Portland, ME

PROJECT NO.: 19-0714
LOGGED BY: Paul Kohler
CONTRACTOR: Shaw Earthworks, Inc.
EQUIPMENT: Takeuchi TB 290

TEST PIT TP- 1

DATE: 10/26/2023 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 67.5' Estimated **COMPLETION DEPTH (FT):** 10.0
WATER LEVEL DEPTHS (FT): Soils wet, Some seepage at 3.5'. **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Grassed Topsoil					
		1.7 Brown clayey SILT and SAND, some organics (Mixed FILL)	▽ 3.5				
5							
		7.0 Stiff brown-gray silty CLAY					
10		Bottom of Exploration at 10.0 feet					

TEST PIT TP- 2

DATE: 10/26/2023 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 71' Estimated **COMPLETION DEPTH (FT):** 10.0
WATER LEVEL DEPTHS (FT): Soils moist to wet. Free water at 9.5 ft **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Grassed Topsoil					
		1.0 Brown silty SAND, some gravel, trace clay (Mixed Fill)					
		2.5 Very stiff gray-brown silty CLAY					
5							
		8.0 Medium dark gray silty CLAY, boulder at bottom of test pit	▽ 9				
10		Bottom of Exploration at 10.0 feet					

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

KEY TO NOTES AND SYMBOLS:
Water Level
▽ At time of Digging
▼ At Completion of Digging
▼ After Digging

q_p = Pocket Penetrometer Strength, kips/sq.ft.

TEST PIT 19-0714.GPJ SWCE TEMPLATE.GDT 11/16/23

TEST PIT LOGS

CLIENT: Sebago Technics, Inc.
PROJECT: Proposed Parking Lots
LOCATION: Jetport Blvd., Portland, ME

PROJECT NO.: 19-0714
LOGGED BY: Tyler Demers
CONTRACTOR: Shaw Earthworks, Inc.
EQUIPMENT: Takeuchi TB 290

TEST PIT TP- 3

DATE: 10/25/2023 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 69.5' Estimated **COMPLETION DEPTH (FT):** 6.0
WATER LEVEL DEPTHS (FT): Soils appear saturated below 5 feet **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Brown gravelly SAND some silt; occasional cobbles (Fill)					
		2.5 Buried Topsoil					
		2.6 Brown-orange gravelly SAND, some silt					
		4.0 Gray-brown gravelly silty SAND					
5							

Bottom of Exploration at 6.0 feet

TEST PIT TP- 4

DATE: 10/25/2023 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 71.5' Estimated **COMPLETION DEPTH (FT):** 6.0
WATER LEVEL DEPTHS (FT): No free water observed **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Brown gravelly SAND some silt; occasional cobbles (Fill)					
		1.5 Brown-light brown silty gravelly SAND					
		3.8 Brown-gray fine to medium SAND some gravel, some silt					
5							

Bottom of Exploration at 6.0 feet

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

KEY TO NOTES AND SYMBOLS:
Water Level
▽ At time of Digging
▼ At Completion of Digging
▼ After Digging

q_p = Pocket Penetrometer Strength, kips/sq.ft.

TEST PIT 19-0714.GPJ SWCE TEMPLATE.GDT 11/16/23

TEST PIT LOGS

CLIENT: Sebago Technics, Inc.
PROJECT: Proposed Parking Lots
LOCATION: Jetport Blvd., Portland, ME

PROJECT NO.: 19-0714
LOGGED BY: Tyler Demers
CONTRACTOR: Shaw Earthworks, Inc.
EQUIPMENT: Takeuchi TB 290

TEST PIT TP- 6

DATE: 10/25/2023 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 74' Estimated **COMPLETION DEPTH (FT):** 6.0
WATER LEVEL DEPTHS (FT): No free water observed **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Brown gravelly SAND some silt (Fill)					
		1.5 Dark brown silty fine SAND; with rootlets (Probable Fill)					
		3.0 Gray-brown SILT and CLAY					
				1S		4-5	
5							
		Bottom of Exploration at 6.0 feet					

TEST PIT TP- 7

DATE: 10/25/2023 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 73' Estimated **COMPLETION DEPTH (FT):** 6.0
WATER LEVEL DEPTHS (FT): **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Brown GRAVEL and SAND, some silt (Fill)		1S		0-1	ID 23292S w =6.6 %
		1.5 Buried Topsoil with roots					
		2.0 Gray-brown SILT and CLAY					
5							
		Bottom of Exploration at 6.0 feet					

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

KEY TO NOTES AND SYMBOLS:
Water Level
▽ At time of Digging
▼ At Completion of Digging
▼ After Digging

q_p = Pocket Penetrometer Strength, kips/sq.ft.

TEST PIT 19-0714.GPJ SWCE TEMPLATE.GDT 11/16/23

TEST PIT LOGS

CLIENT: Sebago Technics, Inc.
PROJECT: Proposed Parking Lots
LOCATION: Jetport Blvd., Portland, ME

PROJECT NO.: 19-0714
LOGGED BY: Tyler Demers
CONTRACTOR: Shaw Earthworks, Inc.
EQUIPMENT: Takeuchi TB 290

TEST PIT TP- 8

DATE: 10/25/2023 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 72' Estimated **COMPLETION DEPTH (FT):** 6.0
WATER LEVEL DEPTHS (FT): No free water observed **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Grassed Topsoil					
		1.5 Gray SILT and fine SAND with roots (probable Buried Topsoil)					
		2.0 Gray-brown fine sandy clayey SILT					
5							
		Bottom of Exploration at 6.0 feet					

TEST PIT TP- 9

DATE: 10/25/2023 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 73.5' Estimated **COMPLETION DEPTH (FT):** 6.0
WATER LEVEL DEPTHS (FT): No free water observed **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Forest Duff / Topsoil					
		2.0 Gray-brown clayey fine sandy SILT					
5							
		Bottom of Exploration at 6.0 feet					

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

KEY TO NOTES AND SYMBOLS:
Water Level
▽ At time of Digging
▼ At Completion of Digging
▼ After Digging

q_p = Pocket Penetrometer Strength, kips/sq.ft.

TEST PIT 19-0714.GPJ SWCE TEMPLATE.GDT 11/16/23

TEST PIT LOGS

CLIENT: Sebago Technics, Inc.
PROJECT: Proposed Parking Lots
LOCATION: Jetport Blvd., Portland, ME

PROJECT NO.: 19-0714
LOGGED BY: Paul Kohler
CONTRACTOR: Shaw Earthworks, Inc.
EQUIPMENT: Takeuchi TB 290

TEST PIT TP-11

DATE: 10/26/2023 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 76.5' Estimated **COMPLETION DEPTH (FT):** 10.0
WATER LEVEL DEPTHS (FT): Soils wet to saturated below 8'+/- **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Forest Duff / Topsoil					
		1.0 Brown silty SAND with gravel, some cobbles					
		3.5 Gray-brown SILT and SAND, trace gravel					
5							
		6.5 Brown SILT and SAND, trace clay					
		8.0 Gray clayey SILT and SAND, some gravel, some cobbles					
10		Bottom of Exploration at 10.0 feet					

TEST PIT TP-12

DATE: 10/26/2023 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 79.5' Estimated **COMPLETION DEPTH (FT):** 9.0
WATER LEVEL DEPTHS (FT): Soils moist to wet. Saturated below 8'+/- **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Topsoil and organics					
		0.7 Brown silty SAND with gravel, some cobbles					
5		5.0 Gray-brown silty SAND, some gravel, some cobbles Small boulder at bottom of test pit					
		Bottom of Exploration at 9.0 feet					

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

KEY TO NOTES AND SYMBOLS:
Water Level
▽ At time of Digging
▼ At Completion of Digging
▼ After Digging

q_p = Pocket Penetrometer Strength, kips/sq.ft.

TEST PIT 19-0714.GPJ SWCE TEMPLATE.GDT 11/16/23

TEST PIT LOGS

CLIENT: Sebago Technics, Inc.
PROJECT: Proposed Parking Lots
LOCATION: Jetport Blvd., Portland, ME

PROJECT NO.: 19-0714
LOGGED BY: Tyler Demers
CONTRACTOR: Shaw Earthworks, Inc.
EQUIPMENT: Takeuchi TB 290

TEST PIT TP-13

DATE: 10/25/2023 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 79.5' Estimated **COMPLETION DEPTH (FT):** 6.0
WATER LEVEL DEPTHS (FT): No free water observed **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Forest Duff / Topsoil					
		0.8 Gray-brown gravelly SILT and fine SAND					
		2.5 Gray SILT and CLAY					
5							

Bottom of Exploration at 6.0 feet

TEST PIT TP-15

DATE: 10/25/2023 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 79' Estimated **COMPLETION DEPTH (FT):** 6.0
WATER LEVEL DEPTHS (FT): No free water observed **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Grassed Topsoil					
		1.5 Brown, gravelly silty SAND		1S	☒	3-4	ID 23293S w =11.2 %
5							

Bottom of Exploration at 6.0 feet

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

KEY TO NOTES AND SYMBOLS:
Water Level
▽ At time of Digging
▼ At Completion of Digging
▼ After Digging

q_p = Pocket Penetrometer Strength, kips/sq.ft.

TEST PIT 19-0714.GPJ SWCE TEMPLATE.GDT 11/16/23

TEST PIT LOGS

CLIENT: Sebago Technics, Inc.
PROJECT: Proposed Parking Lots
LOCATION: Jetport Blvd., Portland, ME

PROJECT NO.: 19-0714
LOGGED BY: Tyler Demers
CONTRACTOR: Shaw Earthworks, Inc.
EQUIPMENT: Takeuchi TB 290

TEST PIT TP-16

DATE: 10/25/2023 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 77.5' Estimated **COMPLETION DEPTH (FT):** 6.0
WATER LEVEL DEPTHS (FT): No free water observed **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Forest Duff / Topsoil					
		1.0 Brown, silty SAND, some gravel					
		3.5 Gray-brown gravelly silty SAND					
5							

Bottom of Exploration at 6.0 feet

TEST PIT TP-17

DATE: 10/25/2023 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 78.5' Estimated **COMPLETION DEPTH (FT):** 6.0
WATER LEVEL DEPTHS (FT): Soils appear saturated below 5.8 feet **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Forest Duff / Topsoil					
		2.0 Gray-brown silty fine to medium SAND, some gravel					
5							
		5.8 Gray SILT and fine SAND					

Bottom of Exploration at 6.0 feet

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

KEY TO NOTES AND SYMBOLS:
Water Level
▽ At time of Digging
▼ At Completion of Digging
▼ After Digging

q_p = Pocket Penetrometer Strength, kips/sq.ft.

TEST PIT 19-0714.GPJ SWCE TEMPLATE.GDT 11/16/23

TEST PIT LOGS

CLIENT: Sebago Technics, Inc.
PROJECT: Proposed Parking Lots
LOCATION: Jetport Blvd., Portland, ME

PROJECT NO.: 19-0714
LOGGED BY: Tyler Demers
CONTRACTOR: Shaw Earthworks, Inc.
EQUIPMENT: Takeuchi TB 290

TEST PIT TP-19

DATE: 10/25/2023 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 83' Estimated **COMPLETION DEPTH (FT):** 6.0
WATER LEVEL DEPTHS (FT): No free water observed **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Forest Duff / Topsoil					
		0.7 Light gray silty fine SAND, some gravel		1S		3-4	ID 23294S w =8.5 %
5							
		Bottom of Exploration at 6.0 feet					

TEST PIT TP-21

DATE: 10/25/2023 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 81' Estimated **COMPLETION DEPTH (FT):** 6.0
WATER LEVEL DEPTHS (FT): No free water observed **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Forest Duff / Topsoil					
		1.5 Brown gravelly silty SAND					
		3.0 Gray gravelly SILT and fine SAND					
5							
		Bottom of Exploration at 6.0 feet					

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

KEY TO NOTES AND SYMBOLS:
Water Level
▽ At time of Digging
▼ At Completion of Digging
▼ After Digging

q_p = Pocket Penetrometer Strength, kips/sq.ft.

TEST PIT 19-0714.GPJ SWCE TEMPLATE.GDT 11/16/23

TEST PIT LOGS

CLIENT: Sebago Technics, Inc.
PROJECT: Proposed Parking Lots
LOCATION: Jetport Blvd., Portland, ME

PROJECT NO.: 19-0714
LOGGED BY: Paul Kohler
CONTRACTOR: Shaw Earthworks, Inc.
EQUIPMENT: Takeuchi TB 290

TEST PIT TP-22

DATE: 10/26/2023 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 80.5' Estimated **COMPLETION DEPTH (FT):** 9.5
WATER LEVEL DEPTHS (FT): Soils wet to saturated. Slight seepage at 8.5'. **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Forest Duff / Topsoil					
		1.0 Light brown layered,silty SAND and clayey SILT, some gravel, some cobbles					
5		4.5 Gray-brown clayey SILT and SAND, trace gravel, some cobbles					
		8.5 Gray-brown silty SAND with gravel, cobbles	▽ 8.5				

Bottom of Exploration at 9.5 feet

TEST PIT TP-23

DATE: 10/25/2023 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 79' Estimated **COMPLETION DEPTH (FT):** 6.0
WATER LEVEL DEPTHS (FT): No free water observed **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Forest Duff / Topsoil					
		1.5 Light brown-gray Silty SAND some gravel; occasional cobbles					
5		4.0 Gray, SILT and fine SAND					

Bottom of Exploration at 6.0 feet

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

KEY TO NOTES AND SYMBOLS:
Water Level
▽ At time of Digging
▼ At Completion of Digging
▼ After Digging

q_p = Pocket Penetrometer Strength, kips/sq.ft.

TEST PIT 19-0714.GPJ SWCE TEMPLATE.GDT 11/16/23

TEST PIT LOGS

CLIENT: Sebago Technics, Inc.
PROJECT: Proposed Parking Lots
LOCATION: Jetport Blvd., Portland, ME

PROJECT NO.: 19-0714
LOGGED BY: Tyler Demers
CONTRACTOR: Shaw Earthworks, Inc.
EQUIPMENT: Takeuchi TB 290

TEST PIT TP-25

DATE: 10/25/2023 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 86.5' Estimated **COMPLETION DEPTH (FT):** 6.0
WATER LEVEL DEPTHS (FT): No free water observed **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Forest Duff / Topsoil					
		1.5 Light gray gravelly silty fine SAND					
5							
		Bottom of Exploration at 6.0 feet					

TEST PIT TP-27

DATE: 10/25/2023 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 83' Estimated **COMPLETION DEPTH (FT):** 8.0
WATER LEVEL DEPTHS (FT): No free water observed **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Forest Duff / Topsoil					
		1.5 Gray gravelly SILT and fine SAND					
5							
		Bottom of Exploration at 8.0 feet					

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

KEY TO NOTES AND SYMBOLS:
Water Level
▽ At time of Digging
▼ At Completion of Digging
▼ After Digging

q_p = Pocket Penetrometer Strength, kips/sq.ft.

TEST PIT 19-0714.GPJ SWCE TEMPLATE.GDT 11/16/23

TEST PIT LOGS

CLIENT: Sebago Technics, Inc.
PROJECT: Proposed Parking Lots
LOCATION: Jetport Blvd., Portland, ME

PROJECT NO.: 19-0714
LOGGED BY: Paul Kohler
CONTRACTOR: Shaw Earthworks, Inc.
EQUIPMENT: Takeuchi TB 290

TEST PIT TP-29

DATE: 10/26/2023 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 83.5' Estimated **COMPLETION DEPTH (FT):** 9.5
WATER LEVEL DEPTHS (FT): Soils wet **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Forest Duff / Topsoil					
		1.0 Light brown gravelly silty SAND, some cobbles					
		2.5 Gray-brown silty SAND, trace clay					
5							
		7.0 Gray-brown silty SAND, trace clay, some gravel, some cobbles					

Bottom of Exploration at 9.5 feet

TEST PIT TP-30

DATE: 10/26/2023 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 81' Estimated **COMPLETION DEPTH (FT):** 10.0
WATER LEVEL DEPTHS (FT): Soils moist to wet **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Forest Duff / Topsoil					
		1.0 Brown silty SAND, some gravel, some cobbles, small boulder					
		4.0 Gray-brown SAND. some silt, some gravel					
5							
		6.0 Gray-brown silty SAND, trace clay					
10							

Bottom of Exploration at 10.0 feet

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

KEY TO NOTES AND SYMBOLS:
Water Level
▽ At time of Digging
▼ At Completion of Digging
▼ After Digging

q_p = Pocket Penetrometer Strength, kips/sq.ft.

TEST PIT 19-0714.GPJ SWCE TEMPLATE.GDT 11/16/23

TEST PIT LOGS

CLIENT: Sebago Technics, Inc.
PROJECT: Proposed Parking Lots
LOCATION: Jetport Blvd., Portland, ME

PROJECT NO.: 19-0714
LOGGED BY: Tyler Demers
CONTRACTOR: Shaw Earthworks, Inc.
EQUIPMENT: Takeuchi TB 290

TEST PIT TP-31

DATE: 10/25/2023 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 86' Estimated **COMPLETION DEPTH (FT):** 6.0
WATER LEVEL DEPTHS (FT): No free water observed **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Grassed Topsoil					
		1.8 Gray Silty fine to medium SAND some gravel					
		3.0 Gray SILT and fine SAND, trace gravel		1S		4-5	ID 23295S w =17.7 %
5		5.0 Gray SILT and CLAY					

Bottom of Exploration at 6.0 feet

TEST PIT TP-32

DATE: 10/25/2023 **LOCATION:** See Exploration Location Plan **SURFACE ELEVATION (FT):** 85.5' Estimated **COMPLETION DEPTH (FT):** 6.0
WATER LEVEL DEPTHS (FT): Soils appear saturated below 4 feet **REMARKS:**

Depth (feet)	Graphic Log	Stratum Description	H_20 Depth	Sample No.	Type	Sample Depth (ft)	Field / Lab Test Data
		Forest Duff / Topsoil					
		1.5 Brown silty gravelly SAND					
		2.5 Gray-brown silty fine to medium SAND, some gravel					
5							

Bottom of Exploration at 6.0 feet

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

KEY TO NOTES AND SYMBOLS:
Water Level
▽ At time of Digging
▼ At Completion of Digging
▼ After Digging

q_p = Pocket Penetrometer Strength, kips/sq.ft.

TEST PIT 19-0714.GPJ SWCE TEMPLATE.GDT 11/16/23

KEY TO NOTES & SYMBOLS

Test Boring and Test Pit Explorations

Stratification lines represent the approximate boundary between soil types and the transition may be gradual.

Key to Symbols Used:

w	-	water content, percent (dry weight basis)
q_u	-	unconfined compressive strength, kips/sq. ft. - laboratory test
S_v	-	field vane shear strength, kips/sq. ft.
L_v	-	lab vane shear strength, kips/sq. ft.
q_p	-	unconfined compressive strength, kips/sq. ft. – pocket penetrometer test
O	-	organic content, percent (dry weight basis)
W_L	-	liquid limit - Atterberg test
W_P	-	plastic limit - Atterberg test
WOH	-	advance by weight of hammer
WOM	-	advance by weight of man
WOR	-	advance by weight of rods
HYD	-	advance by force of hydraulic piston on drill
RQD	-	Rock Quality Designator - an index of the quality of a rock mass.
γ_T	-	total soil weight
γ_B	-	buoyant soil weight

Description of Proportions:

Trace:	0 to 5%
Some:	5 to 12%
"Y"	12 to 35%
And	35+%
With	Undifferentiated

Description of Stratified Soils

Parting:	0 to 1/16" thickness
Seam:	1/16" to 1/2" thickness
Layer:	½" to 12" thickness
Varved:	Alternating seams or layers
Occasional:	one or less per foot of thickness
Frequent:	more than one per foot of thickness

REFUSAL: **Test Boring Explorations** - Refusal depth indicates that depth at which, in the drill foreman's opinion, sufficient resistance to the advance of the casing, auger, probe rod or sampler was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

REFUSAL: **Test Pit Explorations** - Refusal depth indicates that depth at which sufficient resistance to the advance of the backhoe bucket was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

Although refusal may indicate the encountering of the bedrock surface, it may indicate the striking of large cobbles, boulders, very dense or cemented soil, or other buried natural or man-made objects or it may indicate the encountering of a harder zone after penetrating a considerable depth through a weathered or disintegrated zone of the bedrock.

APPENDIX D

Laboratory Test Results

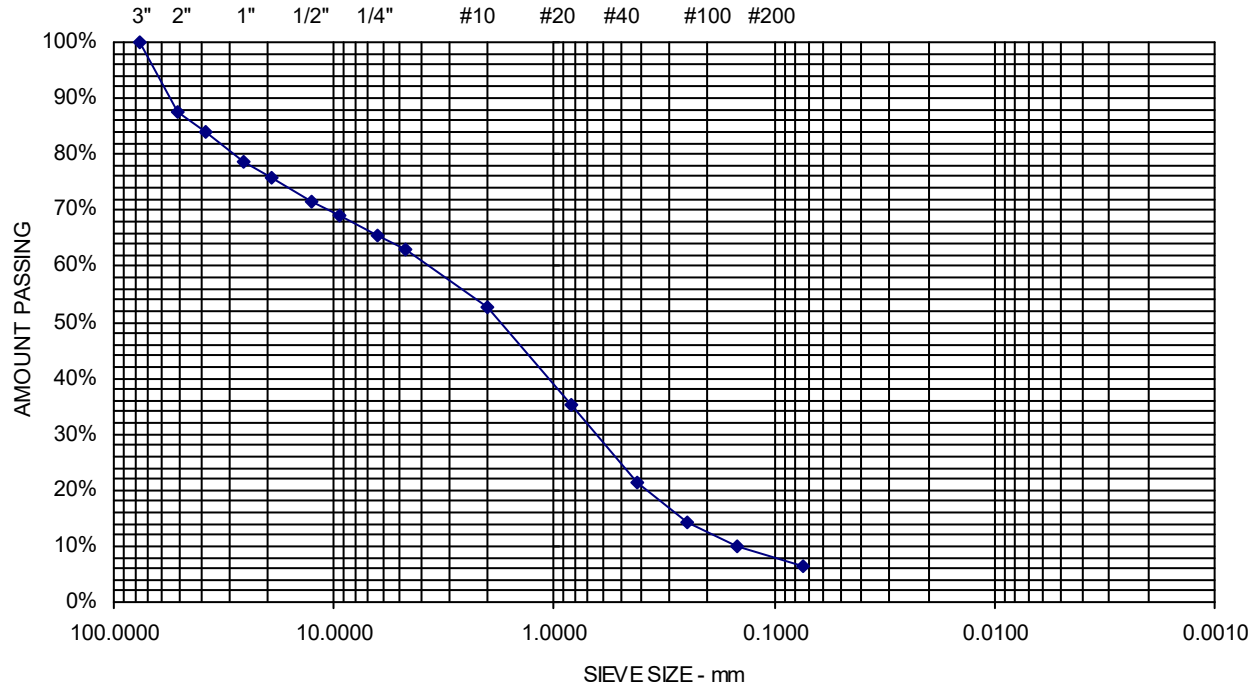
S.W.COLE ENGINEERING, INC.

Report of Gradation

ASTM C-117 & C-136

Project Name	PORTLAND ME - PROPOSED JETPORT PARKING LOTS - EXPLORATIONS AND GEOTECHNICAL ENGINEERING SERVICES	Project Number	19-0714
Client	SEBAGO TECHNICS, INC.	Lab ID	23292S
		Date Received	10/31/2023
		Date Completed	11/8/2023
Material Source	**TP-7, 1S, 0.0'-1.0'**	Tested By	BRADLEY GERSCHWILER

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
75 mm	**3"**	**100**	
50 mm	**2"**	**87**	
38.1 mm	**1-1/2"**	**84**	
25.0 mm	**1"**	**78**	
19.0 mm	**3/4"**	**76**	
12.5 mm	**1/2"**	**72**	
9.5 mm	**3/8"**	**69**	
6.3 mm	**1/4"**	**65**	
4.75 mm	**No. 4**	**63**	37.1% Gravel
2.00 mm	**No. 10**	**53**	
850 um	**No. 20**	**35**	
425 um	**No. 40**	**21**	56.6% Sand
250 um	**No. 60**	**14**	
150 um	**No. 100**	**10**	
75 um	**No. 200**	**6.3**	6.3% Fines



Comments: Moisture Content = 6.6%

Sheet

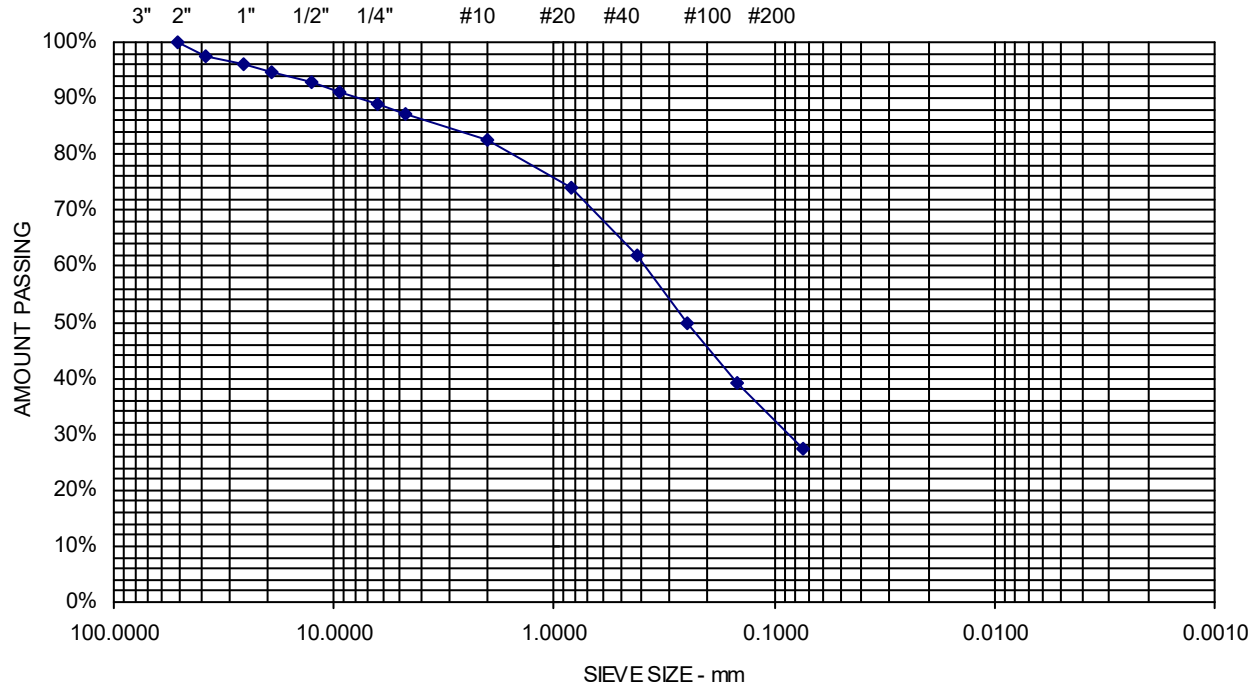
S.W.COLE ENGINEERING, INC.

Report of Gradation

ASTM C-117 & C-136

Project Name	PORTLAND ME - PROPOSED JETPORT PARKING LOTS - EXPLORATIONS AND GEOTECHNICAL ENGINEERING SERVICES	Project Number	19-0714
Client	SEBAGO TECHNICS, INC.	Lab ID	23293S
		Date Received	10/31/2023
		Date Completed	11/8/2023
Material Source	**TP-15, 1S, 3.0'-4.0'**	Tested By	BRADLEY GERSCHWILER

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**98**	
25.0 mm	**1"**	**96**	
19.0 mm	**3/4"**	**95**	
12.5 mm	**1/2"**	**93**	
9.5 mm	**3/8"**	**91**	
6.3 mm	**1/4"**	**89**	
4.75 mm	**No. 4**	**87**	12.6% Gravel
2.00 mm	**No. 10**	**83**	
850 um	**No. 20**	**74**	
425 um	**No. 40**	**62**	59.9% Sand
250 um	**No. 60**	**50**	
150 um	**No. 100**	**39**	
75 um	**No. 200**	**27.5**	27.5% Fines



Comments: Moisture Content = 11.2%

Sheet

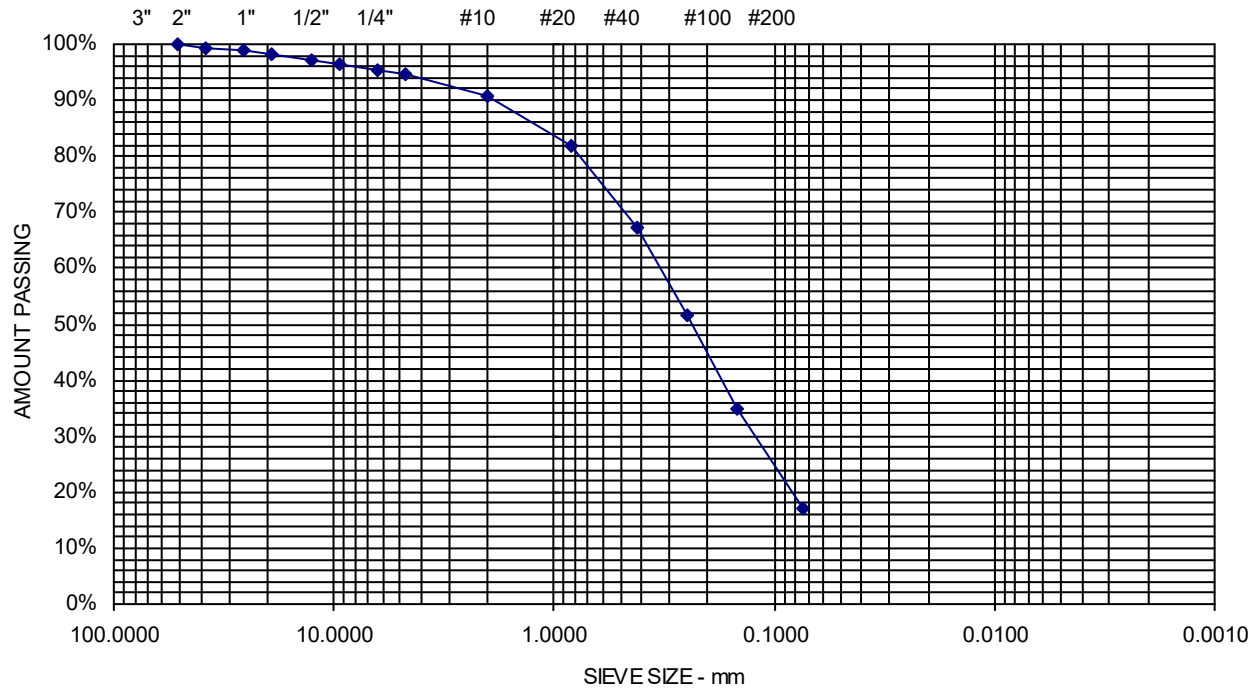
S.W.COLE ENGINEERING, INC.

Report of Gradation

ASTM C-117 & C-136

Project Name	PORTLAND ME - PROPOSED JETPORT PARKING LOTS - EXPLORATIONS AND GEOTECHNICAL ENGINEERING SERVICES	Project Number	19-0714
Client	SEBAGO TECHNICS, INC.	Lab ID	23294S
		Date Received	10/31/2023
		Date Completed	11/8/2023
Material Source	**TP-19, 1S, 3.0'-4.0'**	Tested By	BRADLEY GERSCHWILER

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**99**	
25.0 mm	**1"**	**99**	
19.0 mm	**3/4"**	**98**	
12.5 mm	**1/2"**	**97**	
9.5 mm	**3/8"**	**96**	
6.3 mm	**1/4"**	**95**	
4.75 mm	**No. 4**	**95**	5.4% Gravel
2.00 mm	**No. 10**	**91**	
850 um	**No. 20**	**82**	
425 um	**No. 40**	**67**	77.5% Sand
250 um	**No. 60**	**52**	
150 um	**No. 100**	**35**	
75 um	**No. 200**	**17.1**	17.1% Fines



Comments: Moisture Content = 8.5%

Sheet

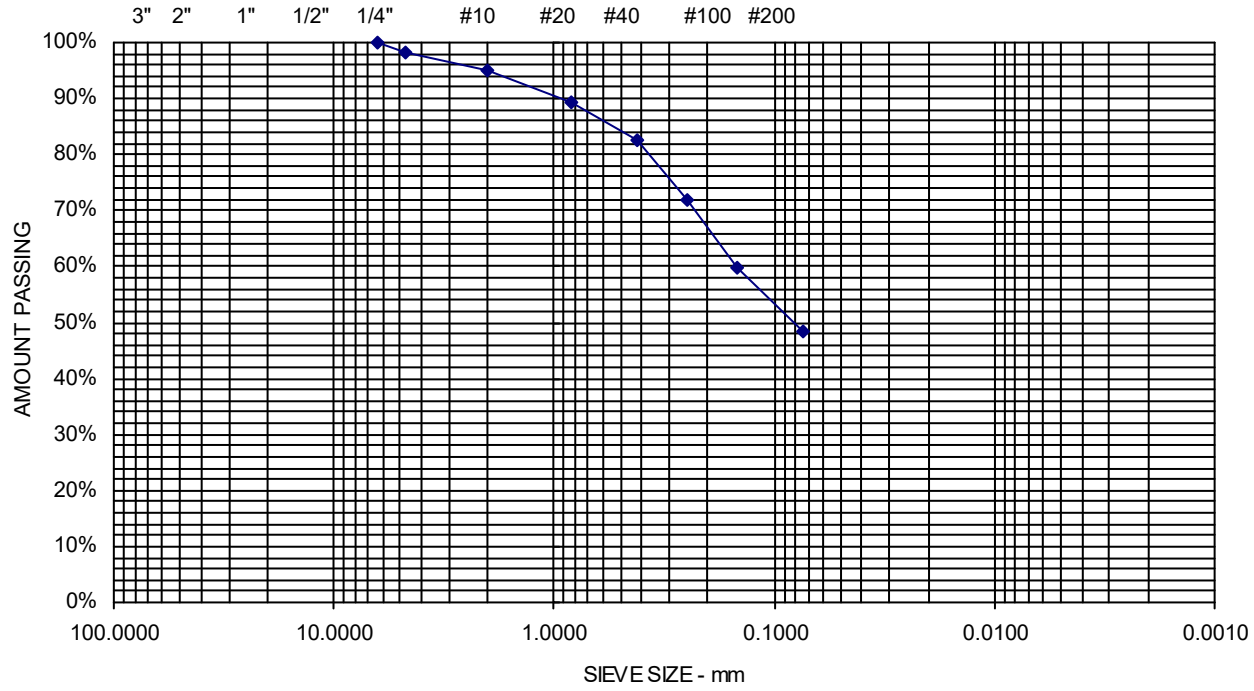
S.W.COLE ENGINEERING, INC.

Report of Gradation

ASTM C-117 & C-136

Project Name	PORTLAND ME - PROPOSED JETPORT PARKING LOTS - EXPLORATIONS AND GEOTECHNICAL ENGINEERING SERVICES	Project Number	19-0714
Client	SEBAGO TECHNICS, INC.	Lab ID	23295S
		Date Received	10/31/2023
		Date Completed	11/8/2023
Material Source	**TP-31, 1S, 4.0'-5.0'**	Tested By	BRADLEY GERSCHWILER

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
6.3 mm	**1/4"**	**100**	
4.75 mm	**No. 4**	**98**	1.9% Gravel
2.00 mm	**No. 10**	**95**	
850 um	**No. 20**	**89**	
425 um	**No. 40**	**83**	49.6% Sand
250 um	**No. 60**	**72**	
150 um	**No. 100**	**60**	
75 um	**No. 200**	**48.5**	48.5% Fines

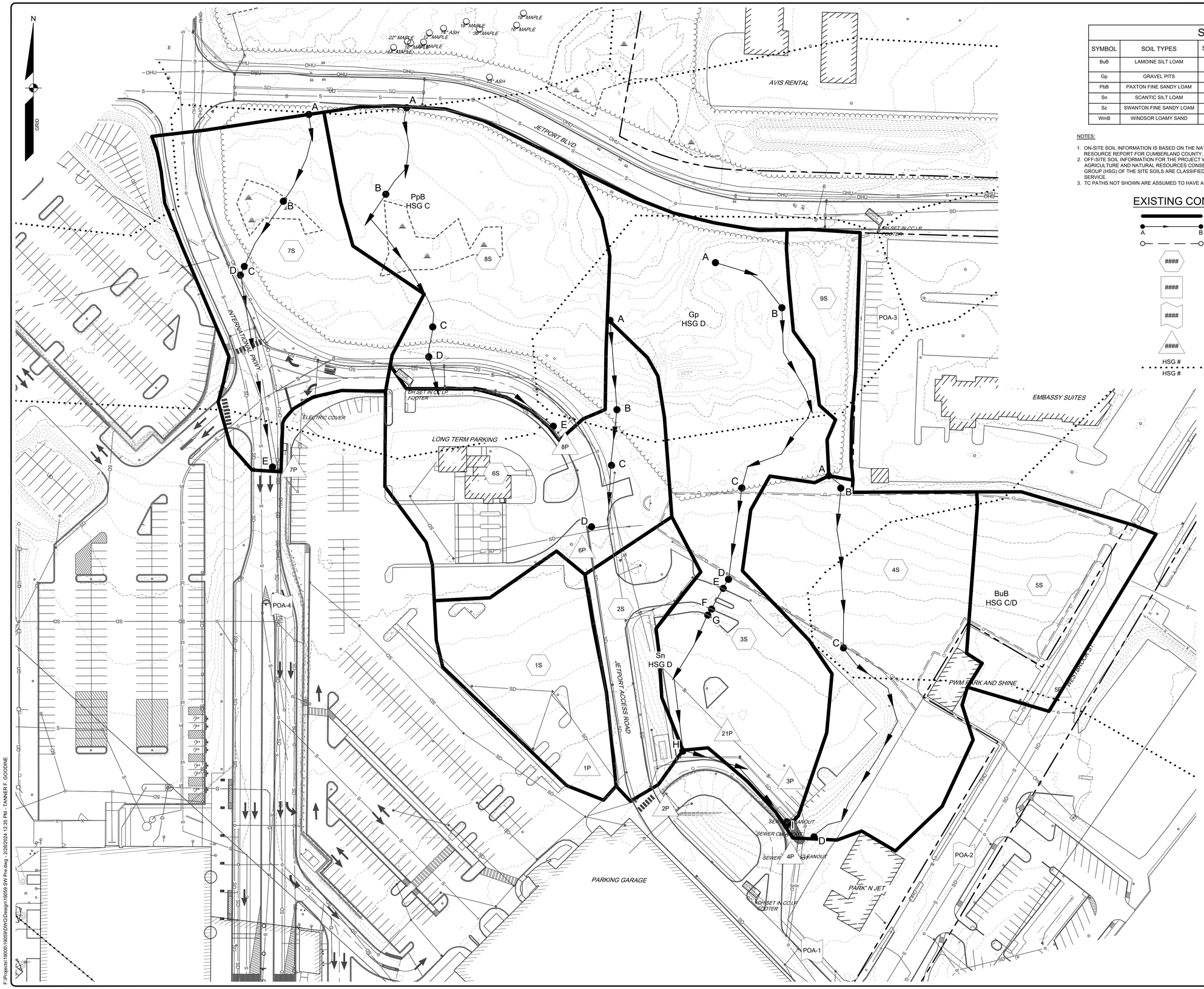


Comments: Moisture Content = 17.7%

Sheet

Appendix 5

Stormwater Management Plans



SOIL TYPES

SYMBOL	SOIL TYPES	SLOPES (%)	HSG	DRAINAGE CLASS
BuB	LAMOINE SILT LOAM	3-8	C/D	SOMEWHAT POORLY DRAINED
Gp	GRAVEL PITS	-	-	-
PbB	PAXTON FINE SANDY LOAM	3-8	C	WELL DRAINED
Sn	SCANTIC SILT LOAM	0-3	D	POORLY DRAINED
Sz	SWANTON FINE SANDY LOAM	-	C/D	POORLY DRAINED
WmB	WINDSOR LOAMY SAND	0-8	A	EXCESSIVELY DRAINED

NOTES:

1. ON-SITE SOIL INFORMATION IS BASED ON THE NATURAL RESOURCES CONSERVATION SERVICE (NRCS) CUSTOM SOIL RESOURCE REPORT FOR CUMBERLAND COUNTY, MAINE, DATED AUGUST 14, 2023.
2. OFF-SITE SOIL INFORMATION FOR THE PROJECT WAS OBTAINED VIA THE USDA UNITED STATES DEPARTMENT OF AGRICULTURE AND NATURAL RESOURCES CONSERVATION SERVICE'S WEB SOIL SURVEY. THE HYDROLOGIC SOIL GROUP (HSG) OF THE SITE SOILS ARE CLASSIFIED BY TECHNICAL RELEASE TR-55 OF THE SOIL CONSERVATION SERVICE.
3. TC PATHS NOT SHOWN ARE ASSUMED TO HAVE A MINIMUM VALUE OF 6.0 MINUTES BASED ON TR-55 STANDARDS.

EXISTING CONDITIONS LEGEND

- WATERSHED BOUNDARY
- TIME OF CONCENTRATION (A → B)
- REACH
- SUBCATCHMENT LABEL (####)
- REACH (####)
- POINT OF ANALYSIS (####)
- STORMWATER TREATMENT/DETENTION POND (####)
- SOILS BOUNDARY (HSG # / HSG #)

GRAPHIC SCALE
50 0 25 50 100
(IN FEET)
1 INCH = 50 FT.

PAUL D. OSTROWSKI PE 11175

STATE OF MAINE
PAUL D. OSTROWSKI
No. 11175
LICENSED
PROFESSIONAL ENGINEER
02/28/2024

REV:	BY:	DATE:	STATUS:
A	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

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

EXISTING CONDITIONS WATERSHED PLAN

OF:
PORTLAND INTL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

FOR:
PORTLAND INTL JETPORT - PWM
CITY OF PORTLAND
1001 WESTBROOK STREET, PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 50'
PROJECT	19059

SHEET 1 OF 2

19059 SW Pre.dwg, TAB:Existing Conditions

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SOIL TYPES

SYMBOL	SOIL TYPES	SLOPES (%)	HSG	DRAINAGE CLASS
BuB	LAMOINE SILT LOAM	3-8	C/D	SOMEWHAT POORLY DRAINED
Gp	GRAVEL PITS	-	-	-
PbB	PAXTON FINE SANDY LOAM	3-8	C	WELL DRAINED
Sn	SCANTIC SILT LOAM	0-3	D	POORLY DRAINED
Sz	SWANTON FINE SANDY LOAM	-	C/D	POORLY DRAINED
WmB	WINDSOR LOAMY SAND	0-8	A	EXCESSIVELY DRAINED

NOTES:

1. ON-SITE SOIL INFORMATION IS BASED ON THE NATURAL RESOURCES CONSERVATION SERVICE (NRCS) CUSTOM SOIL RESOURCE REPORT FOR CUMBERLAND COUNTY, MAINE, DATED AUGUST 14, 2023.
2. OFF-SITE SOIL INFORMATION FOR THE PROJECT WAS OBTAINED VIA THE USDA UNITED STATES DEPARTMENT OF AGRICULTURE AND NATURAL RESOURCES CONSERVATION SERVICE'S WEB SOIL SURVEY. THE HYDROLOGIC SOIL GROUP (HSG) OF THE SITE SOILS ARE CLASSIFIED BY TECHNICAL RELEASE TR-55 OF THE SOIL CONSERVATION SERVICE.
3. TC PATHS NOT SHOWN ARE ASSUMED TO HAVE A MINIMUM VALUE OF 6.0 MINUTES BASED ON TR-55 STANDARDS.

PROPOSED CONDITIONS LEGEND

- WATERSHED BOUNDARY
- TIME OF CONCENTRATION (A, B)
- REACH
- SUBCATCHMENT LABEL
- #### REACH
- #### POINT OF ANALYSIS
- #### STORMWATER TREATMENT/DETENTION POND
- HSG # / HSG # SOILS BOUNDARY

GRAPHIC SCALE
50 0 25 50 100
(IN FEET)
1 INCH = 50 FT.

PAUL D. OSTROWSKI PE 11175
STATE OF MAINE — PAUL D. OSTROWSKI — No. 11175 — REGISTERED PROFESSIONAL ENGINEER — 02/28/2024

REV.	BY	DATE	STATUS
A	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM SEBAGO TECHNICS, INC. ANY ALTERATIONS AUTHORIZED BY OTHERS 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

PROPOSED CONDITIONS WATERSHED PLAN
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT - PWM
CITY OF PORTLAND
1001 WESTBROOK STREET, PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	08/14/2023
SCALE	1" = 50'
PROJECT	19059

SHEET 2 OF 2

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19059 SW Post.dwg, TAB:Overall Proposed Conditions

INSPECTION, MAINTENANCE, AND HOUSEKEEPING PLAN

For:
Portland International Jetport (PWM) Parking Expansion
Portland, ME

By:
Sebago Technics, Inc.
75 John Roberts Road, Suite 4A
South Portland, Maine

Introduction

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. 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 (0.5" of rainfall), 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 (0.5" of rainfall).

3. **Documentation:** A log summarizing the inspections and any corrective action taken must be maintained on-site. 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. Sediment Barriers:

- 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 (0.5" of rainfall). 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. 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.

C. 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.

D. 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).

E. 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.

F. 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.

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 owner or assigned heirs to comply with the inspection and maintenance procedures outlined in this section. All measures must be maintained in effective operating condition. The owner shall inspect and maintain the BMPs, including but not limited to any parking areas, catch basins, drainage swales, detention basins and ponds, pipes and related structures, in accordance with all municipal and state inspection, cleaning and maintenance requirements of the approved post-construction stormwater management plan.

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. If the BMP requires maintenance, repair or replacement to function as intended by the approved post-construction stormwater management plan, the owner or operator of the BMP shall take corrective action(s) to address the deficiency or deficiencies as soon as possible after the deficiency is discovered and shall provide a record of the deficiency and corrective action(s) to the local municipality in the annual report.

   A. Vegetated Areas:

   - Inspect vegetated areas, particularly slopes and embankments, early in the growing season or after heavy rains (>0.5") 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. Culverts:

- Inspect culverts in the spring, in the late fall, and after heavy rains (>0.5") 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.

D. Removal of Winter Sand:

- Clear accumulations of winter sand in parking lots and along roadways at least once a year, preferably in the spring.
- Accumulations on pavement may be removed by pavement sweeping.
- 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.

E. Stormfilter:

- Refer to the Contech – Stormfilter Operation Manual for guidance on required maintenance and inspection.

F. CMP Detention:

- Inspect systems at least annually, preferably in the spring during dry weather.
- Clear accumulation of winter sand in pipes at least once a year, preferably in the spring using the proposed inspection risers.

3. Documentation:

A. The owner or operator of a BMP or a qualified post-construction stormwater inspector hired by that person, shall, as required by the local municipality, provide a completed and signed certification on a form provided by the local municipality, 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 1 of this Inspection, Maintenance, and Housekeeping Plan.

4. 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.

ATTACHMENT 1 – STORMWATER INSPECTION AND MAINTENANCE LOG

Portland International Jetport (PWM) Parking Expansion
Portland, ME

This log is intended to accompany the Inspection, Maintenance, and Housekeeping Plan for the parking expansion at the Portland International Jetport (PWM) 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 sections below. This log shall be kept on file for a minimum of five (5) years and shall be available for review by the City of Portland and the Maine DEP. Qualified personnel familiar with the drainage systems and soils shall perform all inspections. A copy of the construction and post-construction maintenance logs are provided.

Consistency with City Master Plans 14-14.6.3 (A)

1. The proposed project has been designed to be consistent with the City Master Plans. The proposed improvements involve two surface lots for long-term parking on the Jetport campus. The Portland International Jetport has an existing approved Master Plan that outlines growth within the airport campus. The need for additional parking and the proposed location for new lots is outlined within the Master Plan.

2. There is no existing off premises public infrastructure that requires easements across the property.

Please see the plan set and the Master Plan for additional information.

Public Safety and Fire Prevention 14-14.6.3 (B)

1. The proposed project has been designed following public safety principles for Crime Prevention through Environmental Design:

    a. The proposed parking lots have been designed to be well lit and visible to the existing surveillance systems in place on the Jetport campus.

    b. The parking lots have both a gated entrance and exit to ensure only customers of the lots have vehicular access.

    c. The site has been designed with the appropriate territorial reinforcements to promote a sense of ownership and responsibility. The parking area is gated and there is landscaping and hardscape that denotes the limits of the parking area and its purpose.

2. The proposed project has been designed to provide adequate emergency vehicle access to the site as outlined in the Technical Manual. All gated points are equipped with a knox box to allow emergency vehicles to access the site.

Please see the plan set for the site plans and landscape plans detailing the site features related to this subject.

Availability and Adequacy of Public Utilities 14-14.6.3 (C)

1. The development will not overburden sanitary sewers and storm drains, water lines, or other public infrastructure and utilities.

   The proposed project does not include improvements requiring additional water or sewer capacity.

   Included in the application is a Stormwater Management Plan detailing the proposed site drainage improvements and stormwater treatment proposed.

2. Electrical service is to be provided underground, from existing service lines at the Jetport. Please see the utility plans.

3. All proposed sanitary sewers, storm drains, water lines or other utilities are designed and are to be constructed in accordance with the applicable provisions of the City Technical manual. No changes to existing water or sewer lines are proposed as part of this project. Please see the utility plan and details for project utility information.

4. The proposed development will be connected to the exiting public sanitary system per City requirements. Please see the utility plan.

5. The proposed project has been designed to provide additional trash receptacles along the new sidewalks. Receptacles will be emptied regularly. Please refer to the site plans.

Please see the site plans for additional information.

Massing, Ventilations and Wind Impact 14-14.6.4 (A)

Not applicable. The proposed project involves the construction of a parking lot. No buildings or significant structures that might result in massing, ventilation, or wind impacts are proposed. Please see the plan set.

Shadows 14-14.6.4 (B)

Not applicable. The proposed project involves the construction of a parking lot and will not result in the generation of shadows that impact surrounding properties.

Snow and Ice Loading 14-14.6.4 (C)

The proposed project does not include structures that could result in snow or ice fall hazards. Snow will be removed from the lot and sidewalks in accordance with the Jetport maintenance plan.

View Corridor 14-14.6.4 (D)

Not applicable. The proposed project involves the construction of two parking lots at the Portland International Jetport.

Historic Resources 14-14.6.4 (E)

1. The proposed project is not located in a designated historic district.

2. The proposed development is located on the Jetport campus and is consistent with airport masterplan.

3. The proposed project area previously developed (partially) site with no known historic or archaeological resources.

Please see the attached review letter from the Maine Historic Preservation Commission.

SEBAGO TECHNICS

RECEIVED
AUG 18 2023
By 1227-23

August 18, 2023
19059

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

mhpcprojectreview@maine.gov

Re: Portland International Airport
Parking Lot Expansion and Runway Improvements
1001 Westbrook Street, Portland

Dear Mr. Mohney:

On behalf of our client, Sebago Technics respectfully requests a site review for the proposed improvements at the Portland International Airport in Portland/South Portland. The proposed improvements include the expansion of an existing parking lot (see figure for Project Area A) and the reconfiguration of an existing taxiway (see figure for Project Area B). As part of the site review for permitting and design, we request a review by the Maine Historic Preservation Commission for any properties or structures of historical significance in the proposed site's vicinity.

Improvements to the Project A area include the expansion of an existing surface lot to provide greatly needed additional parking spaces. Improvements in Project Area B will include reconstruction of Taxiways A and F with new taxiway and shoulder pavement and select electrical component replacement/addition including in-pavement taxiway centerline lights, runway guard lights, signs and wiring for the associated taxiways. The taxiway segments to be reconstructed are 75 feet wide and wider at radii leading onto the Runway, with up to 15-foot-wide shoulders which will be widened to up to 30 feet to meet current FAA standards. A new taxiway stub near the mid-point of the existing taxiway stubs E and D is also proposed. All improvements will occure on the existing Jetport campus. Improvements to the taxiway will improve movement within and functionality of the Jetport. There are no proposed additional runways or extensions.

A review of the National Register of Historic Places identified the Stroudwater Neighborhood as being in the vicinity of the Jetport. Included with this neighborhood is the Tate House which was constructed in 1755. The Brooklawn Memorial Cemetary (not listed) which was opened in 1935 is located in the vicinity of the Jetport. Neither of these sites are within the viewshed of the project or are abutters to the proposed improvement areas. Review of the City of Portland/South Portland property records found no abutting or viewshed properties with structures 50+ years of age.

Please see the attached aerial which illustrates the two project areas. If you have any questions, please do not hesitate to contact me at rgabryszewski@sebagotechnics.com or (207) 200-2065. I look forward to hearing from you.

Sincerely,

SEBAGO TECHNICS, INC.

Rebecca Gabryszewski
Senior Team Leader, Entitlements Group

enc.

Based on the information submitted, I have concluded that there will be no historic properties affected by the proposed undertaking, as defined by Section 106 of the National Historic Preservation Act. Consequently, pursuant to 36 CFR 800.4(d)(1), no further Section 106 consultation is required unless additional resources are discovered during project implementation pursuant to 36 CFR 800.13.

Kirk F. Mohney — 8/29/23

Kirk F. Mohney, — **Date**
State Historic Preservation Officer
Maine Historic Preservation Commission

MHPC # 1227-23

75 John Roberts Road – Suite 1A, South Portland, ME 04106-6563 • 207-200-2100 • Fax: 207-856-2206

Exterior Lighting 14-14.6.4 (F)

1. Site lighting. All proposed lighting will conform to the lighting standards of the zone and the Technical Manual.

2. Architectural and specialty lighting. Any proposed architectural or specialty lighting will conform to the lighting standards of the Technical Manual.

3. Street lighting. The proposed improvements are within an established airport with existing lighting. Any lighting proposed to replace or enhance the existing lighting will conform to the lighting standards of the Technical Manual.

Please see attached photometric plans for the project site.

NLS LIGHTING

NV-1

AREA, SITE & ROADWAY

LED WATTAGE CHART

	16L	32L	48L	64L
400 milliamps	21w	-	-	-
530 milliamps	28w	-	-	-
700 milliamps	36w	71w	104w	136w
1050 milliamps	56w	106w	156w	205w

FORM AND FUNCTION

- Sleek, low profile housing
- Spec grade performance
- Engineered for optimum thermal management
- Low depreciation rate
- Reduces energy consumption and costs up to 65%
- Exceeds IES foot candle levels utilizing the least number of poles and fixtures per project
- Optical system designed for:
  - Parking Lots
  - Auto Dealerships
  - General Area Lighting

CONSTRUCTION

- Die Cast Aluminum
- External cooling fins
- Corrosion resistant external hardware
- One-piece silicone gasket ensures IP65 seal for electronics compartment
- One-piece Optics Plate™ mounting silicone Micro Optics
- Two-piece silicone Micro Optic system ensures IP67 level seal around each PCB
- Grade 2 Clear Anodized Optics Plate™ standard

FINISH

- 3-5 mils electrostatic powder coat.
- NLS' standard high-quality finishes prevent corrosion, protects against extreme environmental conditions

WARRANTY

Five-year limited warranty for drivers and LEDs.

BUY AMERICAN

To ensure the latest BAA/TAA/BABA Standards are being met, please select BAA, TAA, or BABA in the options section. Please contact the factory before placing an order for any NLS products requesting BAA (Buy American Act), TAA (Trade American Act), or BABA (Build America, Buy America).

Project Name:	Type:

NV-1 ORDERING GUIDE

Cat#

NV-1
(NV-1)

Light Dist.

Type 2
(T2)

Type 3
(T3)

Type 4
(T4)

Type 5
(T5)

Type 5 Wide
(T5W)

Nema 3
30o Narrow Beam
(N3)

Corner Distribution Left
(CDL)

Corner Distribution Right
(CDR)

of LEDs

16
(16L)

32
(32L) [15]

48
(48L) [15]

64
(64L) [15]

Miliamps

400
(40)

530
(53)

700
(7)

1050
(1)

Kelvin

Amber 586-600nM
(AMBER) [10, 12, 13]

2700K, 70 CRI
(27K7) [6]

2700K, 80 CRI
(27K8) [1, 6]

3000K, 70 CRI
(30K7) [6]

3000K, 80 CRI
(30K8) [1, 6]

3500K, 80 CRI
(35K8) [1]

4000K, 70 CRI
(40K7)

4000K, 80 CRI
(40K8) [1]

5000K, 70 CRI
(50K7)

5000K, 80 CRI
(50K8) [1]

Volts

120-277
(UNV)

347-480
(HV)

Mounting

Architectural Sweep Arm
(ASA)

Direct Pole 3" Arm Single
D180
(DPS3) [2]

Direct Pole 7" Arm
D180, D90, T90, T120, Quad
(DPS7) [2]

Knuckle Mount
(KM)

Wall Mount
(WM)

Trunnion Mount
(TM) [3]

Tennis Arm Mount
(TA)

Mast Arm Mount
(MA)

Color

Bronze Textured
(BRZ)

White Textured
(WHT)

Smooth White Gloss
(SWT)

Silver Metallic
(SVR)

Black Textured
(BLK)

Smooth Black Gloss
(SBK)

Graphite Textured
(GPH)

Grey Textured
(GRY)

Green Textured
(GRN)

Hunter Green Textured
(HGN)

Custom
(CS)

Controls Options

Nema 7-Pin Receptacle
(PE7)

Photocell + Receptacle
(PCR)

Receptacle + Shorting Cap
(PER)

FSP-211 with Motion
Sensor/Photocell
9'-20' Heights
(FSP211-20) [4, 16]

21'-40' Heights
(FSP211-40) [4, 16]

FSP-221 with Motion
Sensor/Photocell
9'-20' Heights
(FSP221-20) [17]

21'-40' Heights
(FSP221-40) [17]

Custom Controls Integration
(CCI) [9]

Button Type Photocell
(PC) [4]

Options

Bird Spikes
(BS)

Marine Grade Finish
(MGF)

Optic Plate Painted
to Match Fixture
(OPP)

Quick Mount Bracket
(QMB)

Retrofit Mount Bracket
(RQMB)

Round Pole Adaptor
3"-4" Pole
(RPA4)

Round Pole Adaptor
5"-6" Pole
(RPA5)

Rotated Optic Left
(ROL)

Rotated Optic Right
(ROR)

House Side Shield
(HSS) [5]

Black Hardware
(BH)

Black Optic Frame
(BOF)

Buy American Act
(BAA) [11]

Trade Agreement Act
(TAA) [11]

Build America Buy American
(BABA) [11]

Lens Options

Glass Lens
(GL) [7, 14]

HAL Lens
(HAL) [8, 14]

NOTES:

1. Consult Factory for Lead Time. Consult Factory for 90 CRI Requests.
2. For Round Pole Specify RPA4 or RPA5
3. Standard finish is stainless steel. Can be painted to match fixture.
4. Universal Voltage 120-277
5. HSS not applicable with Nema 2.
6. 3000K or lower, with fixed mounting options only, must be selected to meet International Dark-Sky Association certification.
7. Glass Lens: Low iron glass, fully tempered per ANSI C1047 (QCH-2201-37)
8. HAL Lens: Yellow Polycarbonate Lens – less than 2% Blue Light Content
9. Please contact Factory for Custom Control Integration requests (nLight, NX, WaveLinx, Crestron, DMX/RDM, Synapse, Casambi, Dali II, Avi-On, or other control systems)
10. Turtle Safe
11. Consult factory for all BAA/TAA/BABA requests
12. Consult Factory for Lead Time
13. Not Available above 700mA
14. Contact Factory
15. Available only in 700mA and 1050mA
16. FSP-211, 120V/277V, 230-240VAC (single phase), 50/60Hz
17. FSP-221, 100–347VAC (single phase) or 208/230/480VAC (phase-to-phase)

PRODUCT SPECIFICATIONS

ELECTRICAL

- 120-277 Volts (UNV) or 347-480 Volts (HV)
- 0-10V dimming driver
- Driver power factor at maximum load is ≥ .95, THD maximum load is 15%
- LED Drivers Ambient Temp. Min is -40°C and Ambient Temp. Max ranges from 50°C to 55°C and, in some cases, even higher. Consult the factory for revalidation by providing the fixture catalog string before quoting and specifying it
- All internal wiring UL certified for 600 VAC and 105°C
- All drivers, controls, and sensors housed in enclosed IP65 compartment
- CRI 70, 80 or 90 (Contact factory for 90 CRI)
- Color temperatures: Amber, 2700K, 3000K, 3500K, 4000K, 5000K
- Surge Protection: 20KVA supplied as standard

CONSTRUCTION

- Die Cast Aluminum
- External cooling fins
- Corrosion resistant external hardware
- One-piece silicone gasket ensures IP65 seal for electronics compartment
- One-piece Optics Plate™ mounting silicone Micro Optics
- Two-piece silicone Micro Optic system ensures IP67 level seal around each PCB
- Grade 2 Clear Anodized Optics Plate™ standard

OPTIONS

- BIRD SPIKES (BS) - Offers a practical and humane deterrent for larger bird species and provides a cost-effective long-term solution to nuisance bird infestations and protects your property
- MARINE GRADE FINISH (MGF) - A multi-step process creating protective finishing coat against harsh environments. Chemically washed in a 5 stage cleaning system. Pre-baked, Powder coated 3-5 mils of Zinc Rich Super Durable Polyester Primer. Oven Baked. Finished Powder Coating of Super Durable Polyester Powder Coat 3-5 mil thickness
- OPTIC PLATE PAINTED TO MATCH FIXTURE (OPP) - Optic plate is clear anodized as standard. The optic plate can be powder coated to match the finish of the fixture.
- QUICK MOUNT BRACKET (QMB) - Optional Cast Aluminum Bracket designed for quick mounting on Direct Square or Round Poles. Cleat mounts directly to pole for easily hung fixtures. Has a 2"x4" Drill Pattern
- RETROFIT MOUNT BRACKET - Optional Cast Aluminum Bracket designed for quick mounting on Direct Square or Round Poles. Cleat mounts directly to pole for easily hung fixtures. Drill Pattern is adjustable from 2"x4" to 2"x6"
- ROUND POLE ADAPTER (RPA) - When using round poles, specify Round Pole Adapter (RPA). Specify RPA4 when installing on 3"-4" round poles, and RPA5 when installing on 5"-6" round poles
- ROTATED OPTICS (ROL) (ROR) - Rotated optics are designed for perimeter lighting for auto dealerships
- HOUSE SIDE SHIELD (HSS) Designed for full property line cut-off
- BLACK HARDWARE (BH) - Optional black, zinc coated steel hardware
- BLACK OPTIC FRAME (BOF) - Optional black optic frame. Standard is white
- GLASS LENS (GL) - Low Iron Glass, fully tempered
- High performance amber lens (hal)

CONTROL OPTIONS

- FSP-211 (FSP-X) - Passive infrared (PIR) sensor providing multi-level control based on motion/daylight contribution
- All control parameters adjustable via wireless configuration remote storing and transmitting sensor profiles
- FSP-20 mounting heights 9-20 feet
- FSP-40 mounting heights 21-40 feet
- Includes 5 dimming event cycles, 0-10V dimming with motion sensing, re-programmable in the field
- FSIR-100 commissioning remote is required to change sensor settings. Please contact factory for ordering
- NEMA 7-PIN RECEPTACLE (PE7)—An ANSI C136.41-2013 receptacle provides electrical and mechanical interconnection between photo control cell and luminaire. Dimming receptacle available two or four dimming contacts supports 0-10 VDC dimming methods or Digital Addressable Lighting Interface (DALI), providing reliable power interconnect
- PHOTOCELL + RECEPTACLE (PCR)–7-Pin Receptacle and Electronic Twist Lock Photocell for dusk to dawn operation
- RECEPTACLE + SHORTING CAP (PER)–7-Pin Receptacle and Shorting Cap
- Controls Agnostic: Please contact factory for your preferred controls option. (nLight, NX, WaveLinx, Crestron, DMX/RDM, Synapse, Casambi, DALI II, Avi-On, or other control systems)

FINISH

- 3-5 mils electrostatic powder coat
- NLS Light's standard high-quality finishes prevent corrosion protects against and extreme environmental conditions

WARRANTY

Five-year limited warranty for drivers and LEDs.

OPTICS

Silicone optics high thermal stability and light output provide higher powered LEDs with minimized lumen depreciation. UV stability with scratch resistance increases exterior application durability. Silicone optics do not yellow, crack or brittle over time

LISTINGS

- Certified to UL 1598
- UL 8750
- CSA C22.2 No. 250.0
- DesignLights Consortium® (DLC)
- DesignLights Consortium Premium® (DLCP)
- IP65/ IP67 Rated
- 3G Vibration Rated per ANSI C136.31-2010
- IDA Dark Sky Approved
- IK10 Rated

BUY AMERICAN OPTION

While all of the NLS Lighting products listed in this document qualify for the Buy America(n) Act of 1933, we reserve the right to change our listings without notice.

The information provided above is for general informational purposes only. We encourage you to consult legal professionals for advice particular to your projects concerning BAA, TAA, BABA or Buy America.

Additional NLS Products that meet BAA, TAA standards can be found at the following link:

https://nlslighting.com/buy-american/

The information and specifications on this document are subject to change without any notification. All values are design, nominal, typical or prorated values when measured under internal and external laboratory conditions.

LUMENS CHART 16L, 32L, & 48L

CAT#	N3	LM/W	T2	LM/W	T3	LM/W	T4	LM/W	T5	LM/W	T5W	LM/W	W
NV-1-16L-40-27K7	1,749	83	2,324	111	2,342	112	2,307	110	2,360	112	2,309	110	21
NV-1-16L-40-30K7	2,037	97	2,333	111	2,532	121	2,316	110	2,552	122	2,497	119	21
NV-1-16L-40-40K7	2,436	116	2,715	129	2,736	130	2,695	128	2,757	131	2,698	128	21
NV-1-16L-40-50K7	2,520	120	2,715	129	2,736	130	2,695	128	2,757	131	2,698	128	21
NV-1-16L-53-27K7	2,543	91	2,588	92	3,015	108	2,920	104	3,041	109	3,060	109	28
NV-1-16L-53-30K7	3,136	112	3,192	114	3,220	115	3,119	111	3,248	116	3,308	118	28
NV-1-16L-53-40K7	3,248	116	3,472	124	3,472	124	3,444	123	3,500	125	3,574	128	28
NV-1-16L-53-50K7	3,360	120	3,612	129	3,640	130	3,584	128	3,668	131	3,574	128	28
NV-1-16L-7-27K7	3,269	91	3,327	92	3,876	108	3,755	104	3,910	109	4,041	109	36
NV-1-16L-7-30K7	4,032	112	3,960	110	3,960	110	3,973	110	3,996	111	4,369	118	36
NV-1-16L-7-40K7	4,176	116	4,428	123	4,284	119	4,212	117	4,320	120	4,721	128	36
NV-1-16L-7-50K7	4,320	120	4,644	129	4,500	125	4,428	123	4,500	125	4,721	128	36
NV-1-16L-1-27K7	5,085	91	5,176	92	6,030	108	5,841	104	6,082	109	6,061	108	56
NV-1-16L-1-30K7	6,272	112	6,160	110	6,384	114	6,232	111	6,440	115	6,553	117	56
NV-1-16L-1-40K7	6,496	116	6,832	122	6,888	123	6,776	121	6,944	124	7,081	126	56
NV-1-16L-1-50K7	6,720	120	7,168	128	7,224	129	7,112	127	7,280	130	7,081	126	56
NV-1-32L-7-27K7	6,447	91	7,313	103	7,313	103	7,246	102	7,379	104	7,863	111	71
NV-1-32L-7-30K7	7,952	112	7,810	110	7,810	110	7,739	109	7,881	111	8,501	120	71
NV-1-32L-7-40K7	8,236	116	9,017	127	8,449	119	8,307	117	8,520	120	9,185	129	71
NV-1-32L-7-50K7	8,520	120	9,159	129	8,875	125	8,733	123	8,946	126	9,185	129	71
NV-1-32L-1-27K7	11,116	105	10,917	103	11,314	107	11,067	104	11,414	108	11,794	111	106
NV-1-32L-1-30K7	11,872	112	11,660	110	12,084	114	11,820	112	12,190	115	12,752	120	106
NV-1-32L-1-40K7	12,296	116	12,932	122	13,038	123	12,826	121	13,144	124	13,778	130	106
NV-1-32L-1-50K7	12,720	120	13,568	128	13,674	129	13,462	127	13,780	130	13,778	130	106
NV-1-48L-7-27K7	10,906	105	10,711	103	10,711	103	10,614	102	10,809	104	11,321	109	104
NV-1-48L-7-30K7	11,648	112	11,440	110	11,440	110	11,336	109	11,544	111	12,240	118	104
NV-1-48L-7-40K7	12,064	116	13,208	127	12,376	119	12,168	117	12,480	120	13,225	127	104
NV-1-48L-7-50K7	12,480	120	13,520	130	13,000	125	12,792	123	13,104	126	13,225	127	104
NV-1-48L-1-27K7	16,359	105	16,067	103	16,651	107	16,359	105	16,798	108	16,981	109	156
NV-1-48L-1-30K7	17,472	112	17,160	110	17,784	114	17,472	112	17,940	115	18,360	118	156
NV-1-48L-1-40K7	18,096	116	19,032	122	19,188	123	18,876	121	19,344	124	19,838	127	156
NV-1-48L-1-50K7	18,720	120	19,968	128	20,124	129	19,812	127	20,280	130	19,838	127	156

3000K or lower, with fixed mounting options only, must be selected to meet International Dark-Sky Association certification.

LUMENS CHART 64L ONLY

CAT#	N3	LM/W	T2	LM/W	T3	LM/W	T4	LM/W	T5	LM/W	T5W	LM/W	CDL*	LM/W	CDR*	LM/W	W
NV-1-64L-7-27K7	14,262	105	14,007	103	14,007	103	13,880	102	14,135	104	15,044	109	5,797	43	5,725	42	136
NV-1-64L-7-30K7	15,232	112	14,960	110	14,960	110	14,824	109	15,096	111	16,266	118	6,191	46	6,190	46	136
NV-1-64L-7-40K7	15,776	116	17,272	127	16,184	119	15,912	117	16,320	120	17,575	127	6,689	49	6,689	49	136
NV-1-64L-7-50K7	16,320	120	17,680	130	17,000	125	16,728	123	17,136	126	17,575	127	7,013	52	6,689	49	136
NV-1-64L-1-27K7	21,252	106	21,114	106	21,882	109	21,498	107	22,074	110	22,567	109	8,695	43	8,588	43	200
NV-1-64L-1-30K7	22,960	115	22,550	113	23,370	117	22,960	115	23,575	118	24,399	118	9,286	46	9,286	46	200
NV-1-64L-1-40K7	23,780	119	25,010	125	25,215	126	24,805	124	25,420	127	26,363	127	10,034	50	10,033	50	200
NV-1-64L-1-50K7	24,600	123	26,240	131	26,445	132	26,035	130	26,650	133	26,363	127	10,519	53	10,033	50	200

3000K or lower, with fixed mounting options only, must be selected to meet International Dark-Sky Association certification.

LUMEN MAINTENANCE DATA

Ambient Temperature	Drive Current	L90 Hours*	L70 Hours**	30,000 Hours*	50,000 Hours*	60,00 Hours*	100,000 Hours**
25°C	Up to 700mA	58,000	173,000	95.7%	91.6%	89.6%	82.1%
	1050mA	48,000	143,000	94.3%	89.5%	87.2%	78.5%

*Reported extrapolations per IESNA TM-21 **Projected extrapolations per IESNA TM-21

MULTILPLIERS FOR 70/80 CRI (Scaling Factor of 5000K 70 CRI)

CRI	70 CRI	80 CRI
2700K	0.8560	0.8015
3000K	-	0.8594
3500K	-	0.8594
4000K	-	0.9255
5000K	-	0.9255

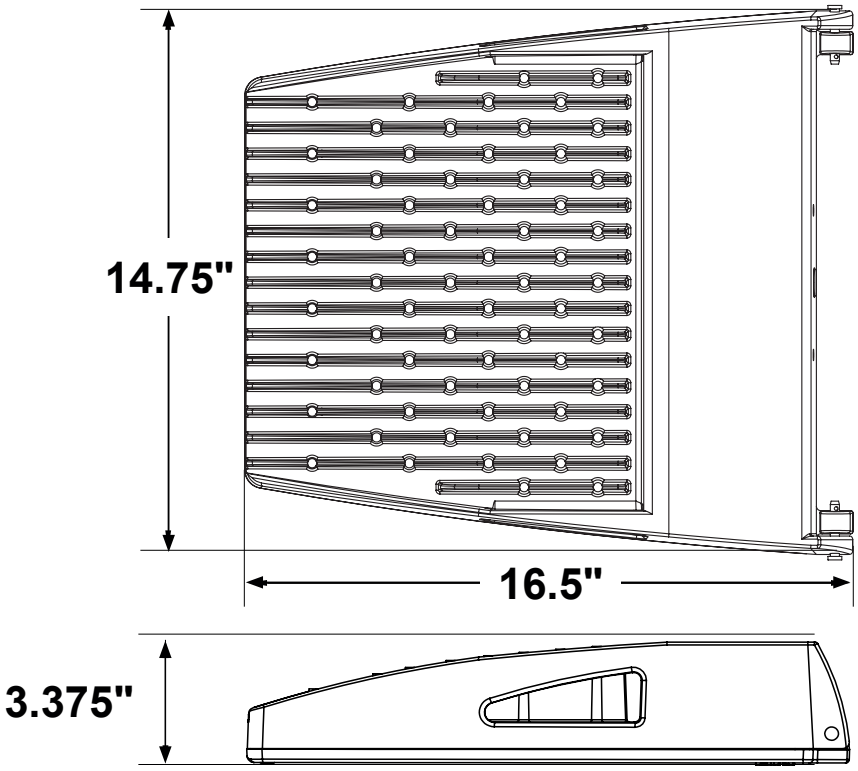
BUG RATINGS 16L, 32L, & 48L				
CAT#	**T2**	**T3**	**T4**	**T5**
NV-1-16L-40-27K7	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G0
NV-1-16L-40-30K7	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G0
NV-1-16L-40-40K7	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G1
NV-1-16L-40-50K7	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G1
NV-1-16L-53-27K7	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G1
NV-1-16L-53-30K7	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G1
NV-1-16L-53-40K7	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G1
NV-1-16L-53-50K7	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G1
NV-1-16L-7-27K7	B1-U0-G1	B1-U0-G1	B1-U0-G1	B3-U0-G1
NV-1-16L-7-30K7	B1-U0-G1	B1-U0-G1	B1-U0-G1	B3-U0-G1
NV-1-16L-7-40K7	B1-U0-G1	B1-U0-G1	B1-U0-G1	B3-U0-G1
NV-1-16L-7-50K7	B1-U0-G1	B1-U0-G1	B1-U0-G1	B3-U0-G1
NV-1-16L-1-27K7	B1-U0-G1	B1-U0-G1	B1-U0-G1	B3-U0-G1
NV-1-16L-1-30K7	B1-U0-G1	B1-U0-G1	B1-U0-G1	B3-U0-G1
NV-1-16L-1-40K7	B1-U0-G1	B2-U0-G2	B2-U0-G2	B3-U0-G2
NV-1-16L-1-50K7	B1-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G2
NV-1-32L-7-27K7	B1-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G2
NV-1-32L-7-30K7	B1-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G2
NV-1-32L-7-40K7	B1-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G2
NV-1-32L-7-50K7	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G2
NV-1-32L-1-27K7	B2-U0-G2	B2-U0-G2	B2-U0-G2	B4-U0-G2
NV-1-32L-1-30K7	B2-U0-G2	B2-U0-G2	B2-U0-G2	B4-U0-G2
NV-1-32L-1-40K7	B2-U0-G2	B2-U0-G2	B3-U0-G2	B4-U0-G2
NV-1-32L-1-50K7	B2-U0-G2	B3-U0-G3	B3-U0-G3	B4-U0-G2
NV-1-48L-7-27K7	B2-U0-G2	B2-U0-G2	B2-U0-G2	B4-U0-G2
NV-1-48L-7-30K7	B2-U0-G2	B2-U0-G2	B2-U0-G2	B4-U0-G2
NV-1-48L-7-40K7	B2-U0-G2	B2-U0-G2	B2-U0-G2	B4-U0-G2
NV-1-48L-7-50K7	B2-U0-G2	B3-U0-G3	B3-U0-G3	B4-U0-G2
NV-1-48L-1-27K7	B3-U0-G3	B3-U0-G3	B3-U0-G3	B4-U0-G2
NV-1-48L-1-30K7	B3-U0-G3	B3-U0-G3	B3-U0-G3	B4-U0-G2
NV-1-48L-1-40K7	B3-U0-G3	B3-U0-G3	B3-U0-G3	B5-U0-G3
NV-1-48L-1-50K7	B3-U0-G3	B3-U0-G3	B3-U0-G3	B5-U0-G3
3000K or lower, with fixed mounting options only, must be selected to meet International Dark-Sky Association certification.				

BUG RATINGS 64L						
CAT#	**T2**	**T3**	**T4**	**T5**	**CDL***	**CDR***
NV-1-64L-7-27K7	B2-U0-G2	B3-U0-G3	B3-U0-G3	B4-U0-G2	B1-U0-G2	B1-U0-G2
NV-1-64L-7-30K7	B2-U0-G2	B3-U0-G3	B3-U0-G3	B4-U0-G2	B1-U0-G2	B1-U0-G2
NV-1-64L-7-40K7	B3-U0-G3	B3-U0-G3	B3-U0-G3	B4-U0-G2	B1-U0-G2	B1-U0-G2
NV-1-64L-7-50K7	B3-U0-G3	B3-U0-G3	B3-U0-G3	B4-U0-G2	B1-U0-G2	B1-U0-G2
NV-1-64L-1-27K7	B3-U0-G3	B3-U0-G3	B3-U0-G3	B5-U0-G3	B1-U0-G2	B1-U0-G2
NV-1-64L-1-30K7	B3-U0-G3	B3-U0-G3	B3-U0-G3	B5-U0-G3	B1-U0-G2	B1-U0-G2
NV-1-64L-1-40K7	B3-U0-G3	B3-U0-G3	B3-U0-G4	B5-U0-G3	B1-U0-G2	B1-U0-G2
NV-1-64L-1-50K7	B3-U0-G3	B3-U0-G3	B3-U0-G4	B5-U0-G3	B1-U0-G2	B1-U0-G2
3000K or lower, with fixed mounting options only, must be selected to meet International Dark-Sky Association certification.						

*64L Only

LUMEN HSS										
PART NUMBER	**T2 HSS**	**LM/W**	**BUG**	**T3 HSS**	**LM/W**	**BUG**	**T4 HSS**	**LM/W**	**BUG**	**W**
NV-1-16L-40-27K7	1386	66	B0-U0-G0	1336	64	B0-U0-G0	1343	64	B0-U0-G0	21
NV-1-16L-40-30K7	1499	71	B0-U0-G0	1445	69	B0-U0-G0	1452	69	B0-U0-G0	21
NV-1-16L-40-40K7	1620	77	B0-U0-G0	1561	74	B0-U0-G0	1569	75	B0-U0-G0	21
NV-1-16L-40-50K7	1620	77	B0-U0-G0	1561	74	B0-U0-G0	1569	75	B0-U0-G0	21
NV-1-16L-530-27K7	1837	66	B0-U0-G0	1771	63	B0-U0-G0	1780	64	B0-U0-G1	28
NV-1-16L-530-30K7	1986	71	B0-U0-G0	1914	68	B0-U0-G1	1924	69	B0-U0-G1	28
NV-1-16L-530-40K7	2146	77	B0-U0-G0	2068	74	B0-U0-G1	2079	74	B0-U0-G1	28
NV-1-16L-530-50K7	2146	77	B0-U0-G0	2068	74	B0-U0-G1	2079	74	B0-U0-G1	28
NV-1-16L-700-27K7	2426	67	B0-U0-G1	2338	65	B0-U0-G1	2350	65	B0-U0-G1	36
NV-1-16L-700-30K7	2623	73	B0-U0-G1	2528	70	B0-U0-G1	2541	71	B0-U0-G1	36
NV-1-16L-700-40K7	2835	79	B0-U0-G1	2732	76	B0-U0-G1	2746	76	B0-U0-G1	36
NV-1-16L-700-50K7	2835	79	B0-U0-G1	2732	76	B0-U0-G1	2746	76	B0-U0-G1	36
NV-1-16L-1050-27K7	3639	65	B0-U0-G1	3508	63	B0-U0-G1	3526	63	B0-U0-G1	56
NV-1-16L-1050-30K7	3935	70	B1-U0-G1	3792	68	B0-U0-G1	3812	68	B0-U0-G1	56
NV-1-16L-1050-40K7	4252	76	B1-U0-G1	4098	73	B0-U0-G1	4119	74	B0-U0-G1	56
NV-1-16L-1050-50K7	4252	76	B1-U0-G1	4098	73	B0-U0-G1	4119	74	B0-U0-G1	56
NV-1-32L-700-27K7	4853	68	B1-U0-G1	4677	66	B0-U0-G1	4701	66	B0-U0-G1	71
NV-1-32L-700-30K7	5247	74	B1-U0-G1	5057	71	B0-U0-G1	5083	72	B1-U0-G2	71
NV-1-32L-700-40K7	5669	80	B1-U0-G1	5464	77	B0-U0-G2	5492	77	B1-U0-G2	71
NV-1-32L-700-50K7	5669	80	B1-U0-G1	5464	77	B0-U0-G2	5492	77	B1-U0-G2	71
NV-1-32L-1050-27K7	7279	69	B1-U0-G2	7015	66	B1-U0-G2	7051	67	B1-U0-G2	106
NV-1-32L-1050-30K7	7870	74	B1-U0-G2	7585	72	B1-U0-G2	7624	72	B1-U0-G2	106
NV-1-32L-1050-40K7	8504	80	B1-U0-G2	8196	77	B1-U0-G2	8238	78	B1-U0-G2	106
NV-1-32L-1050-50K7	8504	80	B1-U0-G2	8196	77	B1-U0-G2	8238	78	B1-U0-G2	106
NV-1-48L-700-27K7	7279	70	B1-U0-G2	7015	67	B1-U0-G2	7051	68	B1-U0-G2	104
NV-1-48L-700-30K7	7870	76	B1-U0-G2	7585	73	B1-U0-G2	7624	73	B1-U0-G2	104
NV-1-48L-700-40K7	8504	82	B1-U0-G2	8196	79	B1-U0-G2	8238	79	B1-U0-G2	104
NV-1-48L-700-50K7	8504	82	B1-U0-G2	8196	79	B1-U0-G2	8238	79	B1-U0-G2	104
NV-1-48L-1050-27K7	10918	70	B1-U0-G2	10523	67	B1-U0-G2	10577	68	B1-U0-G2	156
NV-1-48L-1050-30K7	11805	76	B1-U0-G2	11377	73	B1-U0-G2	11436	73	B1-U0-G2	156
NV-1-48L-1050-40K7	12755	82	B1-U0-G2	12293	79	B1-U0-G2	12356	79	B1-U0-G2	156
NV-1-48L-1050-50K7	12755	82	B1-U0-G2	12293	79	B1-U0-G2	12356	79	B1-U0-G2	156
NV-1-64L-700-27K7	9705	71	B1-U0-G2	9354	69	B1-U0-G2	9402	69	B1-U0-G2	136
NV-1-64L-700-30K7	10493	77	B1-U0-G2	10113	74	B1-U0-G2	10165	75	B1-U0-G2	136
NV-1-64L-700-40K7	11338	83	B1-U0-G2	10927	80	B1-U0-G2	10983	81	B1-U0-G2	136
NV-1-64L-700-50K7	11338	83	B1-U0-G2	10927	80	B1-U0-G2	10983	81	B1-U0-G2	136
NV-1-64L-1050-27K7	14558	71	B1-U0-G2	14031	68	B1-U0-G2	14103	69	B1-U0-G3	205
NV-1-64L-1050-30K7	15740	77	B1-U0-G2	15170	74	B1-U0-G3	15248	74	B1-U0-G3	205
NV-1-64L-1050-40K7	17007	83	B2-U0-G2	16391	80	B1-U0-G3	16475	80	B1-U0-G3	205
NV-1-64L-1050-50K7	17007	83	B2-U0-G2	16391	80	B1-U0-G3	16475	80	B1-U0-G3	205

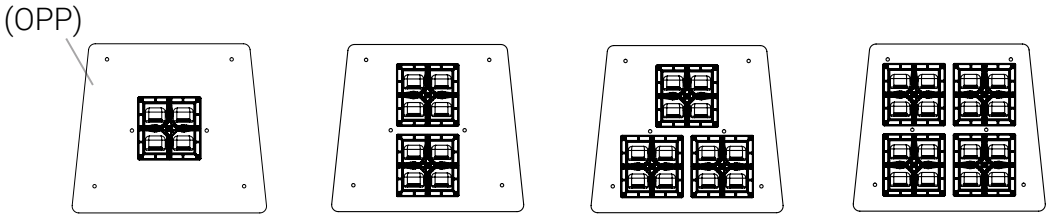
3000K or lower, with fixed mounting options only, must be selected to meet International Dark-Sky Association certification.



Weight: 24 lbs

OPTICAL CONFIGURATIONS

Rotatable Optics (ROR) Rotated Right, (ROL) Rotated Left options available. Optics field and factory rotatable.



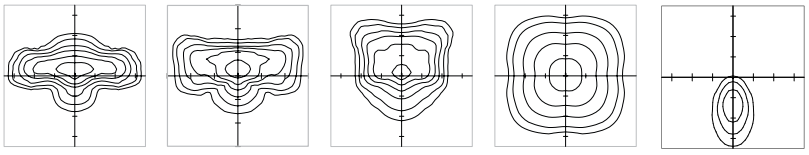
NV-1 / 16L **NV-1 / 32L** **NV-1 / 48L** **NV-1 / 64L**

* OPTIC PLATE PAINTED TO MATCH FIXTURE FINISH (OPP)– Optic Plate standard clear anodized, Grade 2. When (OPP) specified, Optic Plate finish will match fixture finish.

OPTICS

Silicone optics high photothermal stability and light output provides higher powered LEDs with minimized lumen depreciation LED life. UV and thermal stability with scratch resistance increases exterior application durability.

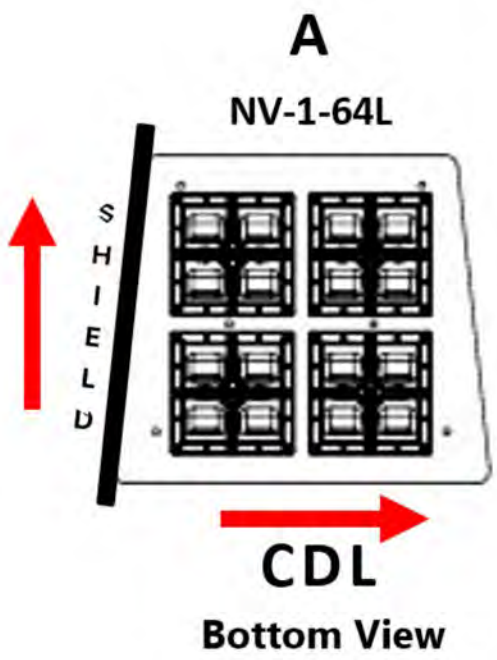
IES Types



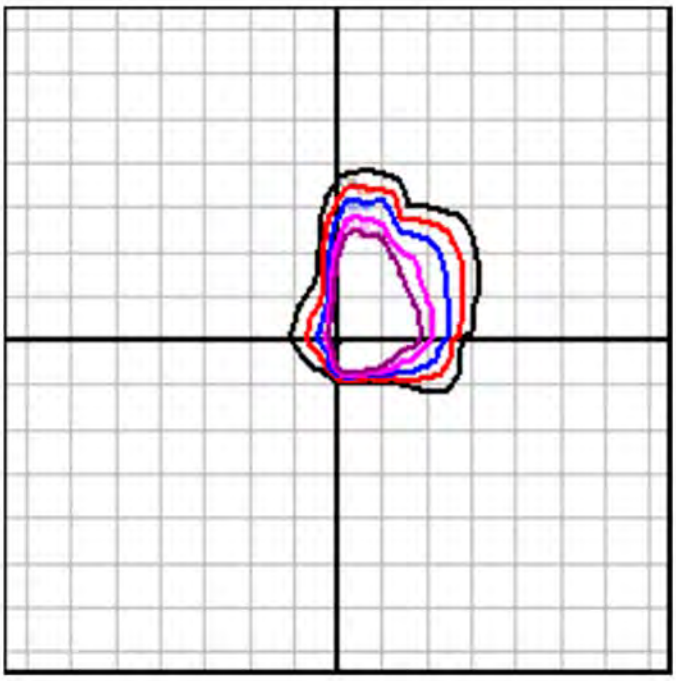
TYPE II (T2) TYPE III (T3) TYPE IV (T4) TYPE V (T5) NEMA 3 (N3)

OPTICAL CONFIGURATIONS (CONTINUED) - Corner Optics (CDL/CDR)

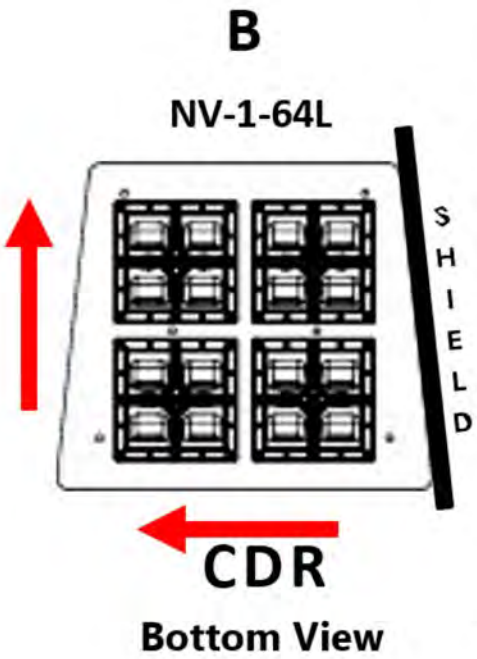
Blended optical distributions include a HSS over the optic and are aimed forward. Fixtures also feature an external side mounted shield.



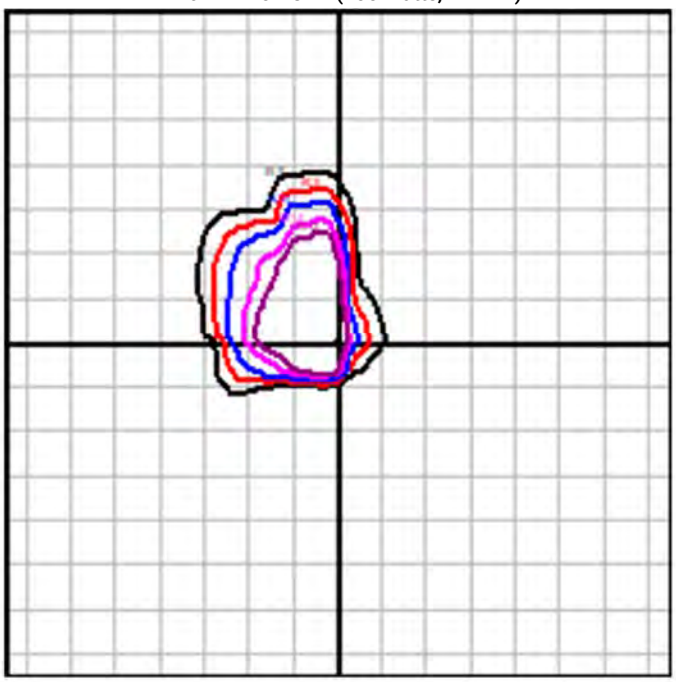
NV-64L-1-40K-CDL (205 Watts, 49LPW)



Mounting Height is 15ft, each sq equals 1 mounting height.



NV-64L-1-40K-CDR (205 Watts, 49LPW)

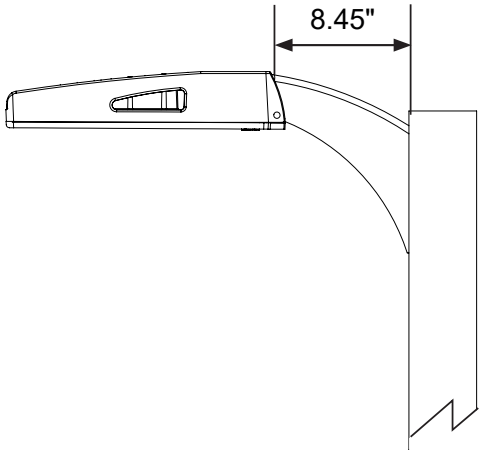


Mounting Height is 15ft, each sq equals 1 mounting height.

MOUNTING OPTIONS

ARCHITECTURAL SWEEP ARM (ASA)

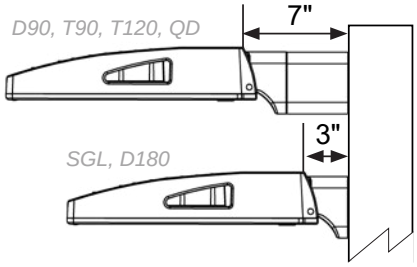
Cast Sweep Arm includes (as standard)
Internal Quick Mount Bracket.



DIRECT POLE (DP)

Standard mounting arm is extruded aluminum in lengths of 3" and 7".

**Arm lengths may vary depending on configuration*

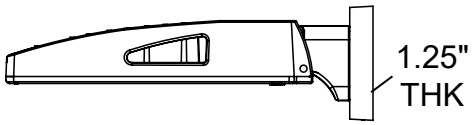


DPX ARM LENGTH

DPX ARM LENGTH	SGL	D90	D180	D180	T90	T120	QD
NV-1	3"	7"	3"	7"	7"	7"	7"

WALL MOUNT (WM)

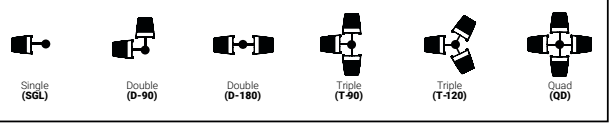
Cast Aluminum Plate for direct wall mount.
3" extruded aluminum arm mounts directly to a cast wall mount box.



EPA

EPA	SGL	D90	D180	T90	T120	QD
NV-1-DP3	0.46	-	0.92	-	-	-
NV-1-DP7	-	1.14	1.05	1.34	1.37	1.34
NV-1-KM	0.54	N/A	1.08	N/A	N/A	N/A
NV-1-ASA	0.75	1.29	1.50	1.99	2.05	1.99

MOUNTING CONFIGURATION

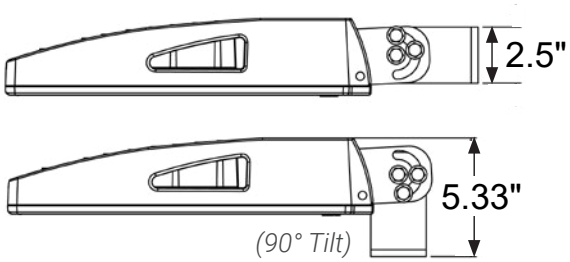


MOUNTING OPTIONS

TRUNNION MOUNT (TM)

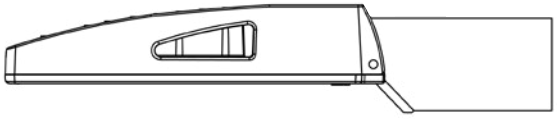
Steel, bolt-on-mounting for adjustable installation with a maximum uplift of 90 degrees.

**Unpainted stainless steel is standard*



TENNIS ARM (TA)

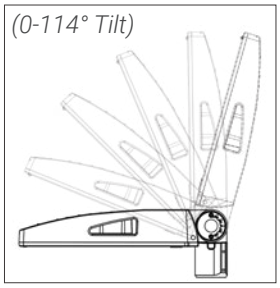
Steel fitter slips over 3.5" x 1.5" rectangular arm. *See Tennis Arm Spec Sheet for details

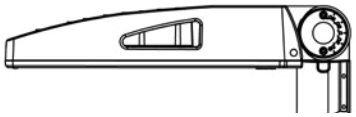


KNUCKLE MOUNT (KM)

Die Cast Knuckle great for adjustable installation on 2-3/8" OD vertical or horizontal tenon.

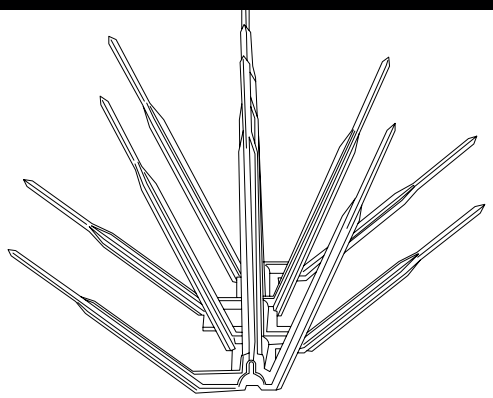
- Max Up-tilt of 90 degrees
- Adjustable in 6 degree increments
- 1.5G Vibration Rated per ANSI C136.31-2010





BIRD SPIKES (BS)

Bird Spikes offers effective and humane deterrent for larger bird species and provides cost-effective long-term solution to nuisance bird infestations and protect your property.



MARINE GRADE FINISH (MGF)

The **(MGF)** is a multi step process. Chemically washed in a 5 stage cleaning system. Pre-baked. Powder coated 3-5 mils of Zinc Rich Super Durable Polyester Primer. Oven Baked. Finished Powder Coating of Super Durable Polyester Powder Coat 3-5 mil thickness.

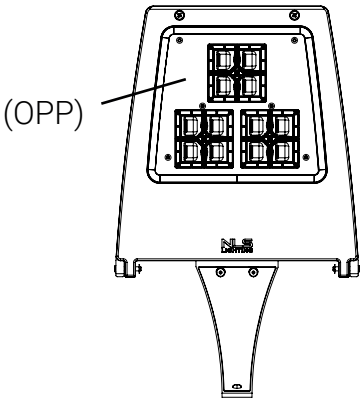
Powder Coat Finish
3-5 mil Powder Coat

Primer Layer
3-5 mil Zinc Rich Super Durable Polyester Primer

Prepared Casting
Chemically washed in multi Step 5 stage cleaning process

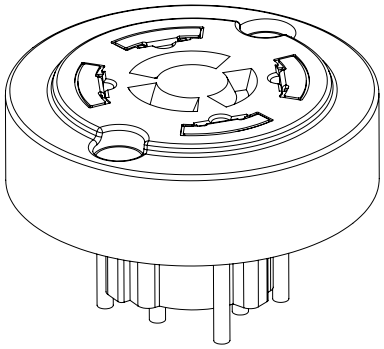
OPTIC PLATE PAINTED TO MATCH (OPP)

Optic plate is clear anodized as standard. The optic plate can be powder coated to match the finish of the fixture.



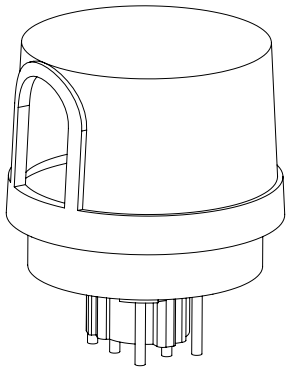
NEMA 7-PIN RECEPTACLE (PE7)

An ANSI C136.41-2013 receptacle provides electrical and mechanical interconnection between photo control cell and luminaire. Dimming receptacle available two or four dimming contacts supports 0-10 VDC dimming methods or Digital Addressable Lighting Interface (DALI), providing reliable power interconnect.



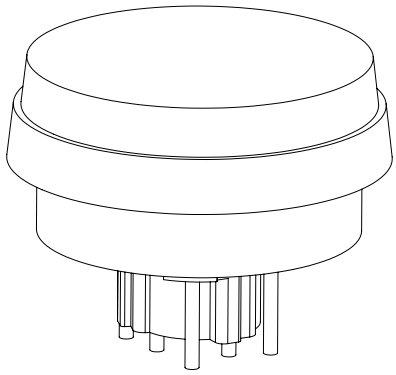
PHOTOCELL + RECEPTACLE (PCR)

7-Pin Receptacle and Electronic Twist Lock Photocell for dusk to dawn operation.



RECEPTACLE + SHORTING CAP (PER)

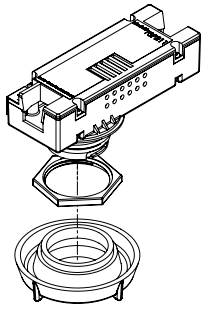
7-Pin Receptacle and Shorting Cap.



FSP-211 WITH MOTION SENSOR (FSP-XX)

- FSP-211 (FSP-X)—Passive infrared (PIR) sensor providing multi-level control based on motion/daylight contribution
- All control parameters adjustable via wireless configuration remote storing and transmitting sensor profiles
- FSP-20 mounting heights 9-20 feet
- FSP-40 mounting heights 21-40 feet
- Includes 5 dimming event cycles, 0-10V dimming with motion sensing, re-programmable in the field

FSP-211



QUICK MOUNT BRACKET (QMB)

Optional Cast Aluminum Bracket designed for quick mounting on Direct Square or Round Poles. Cleat mounts directly to pole for easily hung fixtures. Has a 2”x4” Drill Pattern.

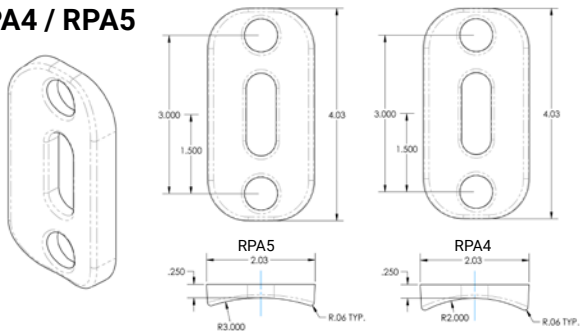
RETROFIT MOUNT BRACKET (RQMB)

Optional Cast Aluminum Bracket designed for quick mounting on Direct Square or Round Poles. Cleat mounts directly to pole for easily hung fixtures. Drill Pattern is adjustable from 2”x4” to 2”x6”.

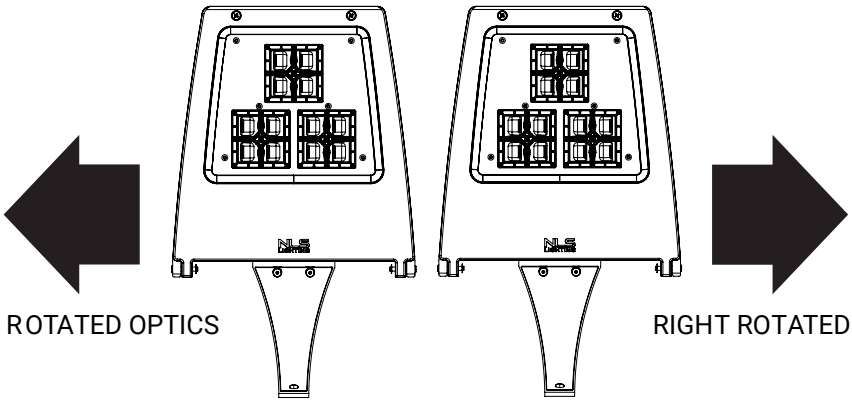
ROUND POLE ADAPTER OPTIONS (RPA4) (RPA5)

When using round poles, specify Round Pole Adapter (RPA). Specify RPA4 when installing on 3”-4” round poles, and RPA5 when installing on 5”-6” round poles.

RPA4 / RPA5



ROTATED OPTICS (ROL) (ROR)



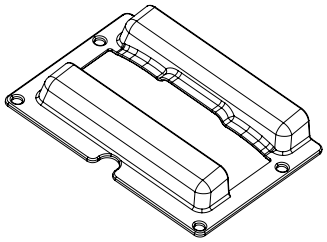
LEFT ROTATED OPTICS

RIGHT ROTATED OPTICS

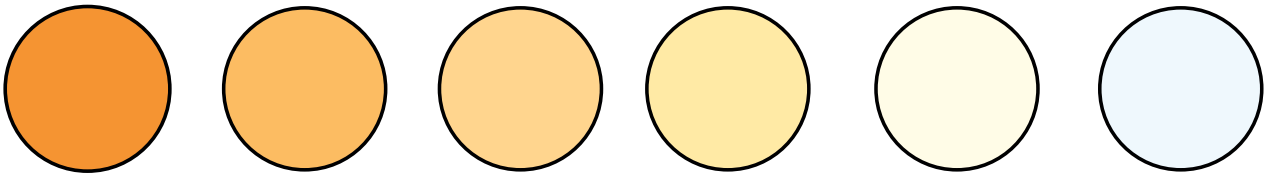
SHIELDING OPTIONS (AHS) (HSS)

SHIELDS (HSS, AHS)—House Side Shield (HSS) is designed for full property line cut-off.

HOUSE SIDE SHIELD



LED KELVIN RANGE



AMBER
585-600 nm

2700K 70 CRI

3000K 70 CRI

3500K 80 CRI

4000K 70 CRI

5000K 70 CRI

Color	Dominant or Peak Wavelength Range (nm)	
	Minimum	Maximum
Amber	585	600

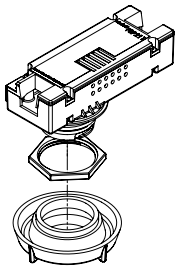
BLACK HARDWARE

Optional black, zinc coated steel hardware.

BLACK OPTIC FRAME

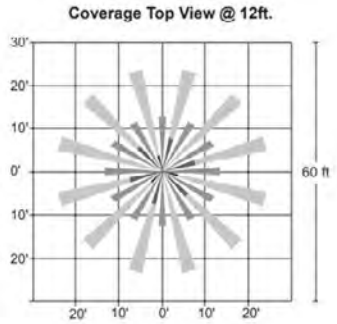
Optional Black Optic Frame.
Standard is white.

CONTROLS

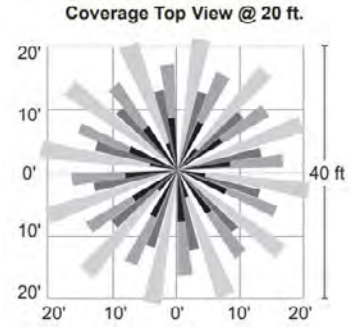


- DIMMING CONTROL (FSP)—Passive infrared (PIR) sensor providing multi-level control based on motion/daylight contribution
- All control parameters adjustable via wireless configuration remote storing and transmitting sensor profiles
- FSP-8 mounting heights 8 feet and below
- FSP-20 mounting heights 9-20 feet
- FSP-40 mounting heights 21-40 feet
- Includes 5 dimming event cycles, 0-10V dimming with motion sensing, re-programmable in the field

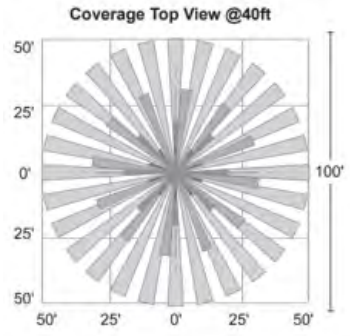
FSP-8

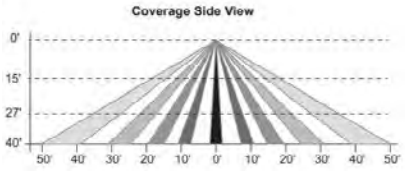


FSP-20



FSP-40





Waldren, Carter <waldrenc@westbrookschools.org> Nov 12, 2024, 3:42:56 PM (8 days ago)
to planning@portlandmaine.gov

Portland jetport surface parking application. sorry this is scrappy but I need to get this information out there.

Mr. Kevin Craft
Re.. Porltand jetport parking expansion.

Two issues I would like corrected in any future presentation . The planning board needs facts and what was presented was not facts. It lacked the complete picture of the wetland impacts, and claimed the project was part of the 2018 Pwm master plan. There is a new sloda mapping that shows the wetland impacts on the parking lot that were not disclosed to the public at either the planning board meeting or the initial dep meeting on dec 12 2023. The only description of the pathway forward in the master plan is to build a parking garage expansion. That is what is supported in the Master plan .

Please correct any future mapping to disclose the wetland impact on the parking area from the expired and illegally filled wetlands of the upper Toye.
Now listed as previously permitted and expired before the city bought the property in 2020 (the dep permitted project was for a gravel parking lot with a detention pond.)

I have also vehemently disputed the assessment for the vernal pond 5273 that is located across Jetport Blvd and should be afforded the 250 foot federal protection as a wildlife habitat containing more than 40 wood egg frog masses. This Assessment is totally incorrect . The proposed project would fall within those boundaries and the assessment that it has zero wildlife value is incorrect . I have movies, photos, testimony, witnesses, and years of watching that habitat and it is a vibrant wood frog and tree frog habitat.

Secondly,

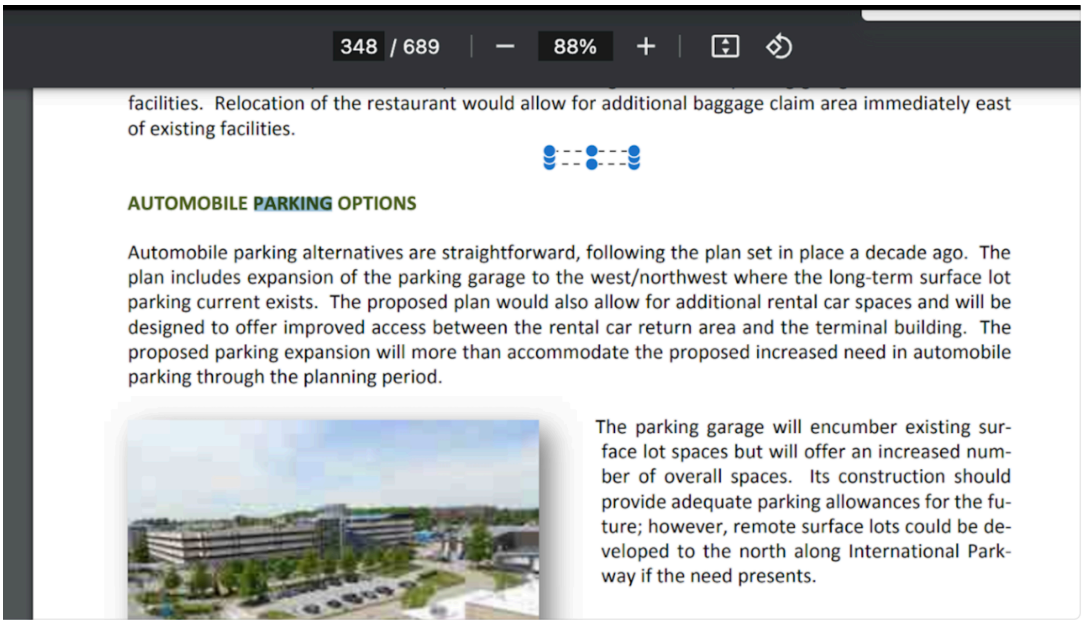
The slide shown at the last planning meeting related to this project claimed that the project was part of the master planning document of 2018 for PWM. I dispute that and the only mention of parking in the body of the master plan is shown below. If you look at the map the Pwm management is using to justify the expansion on the wetlands is from the appendix and dated around 2016. 4 years before the city even owned the property . Look at the map. Here is what the master plan says about parking. The previous planning is a reference to the
Portland city department of transportation parking plan of 2000 that outlines the plans for the parking garage phases. If more parking is needed then it should be expanded along International way and that has already been done. There is no mention of the parking expansion in the Master plan .

This plan lacks environmental review and the pwm management is using the 2018 EA review for a totally different project of expanding the runway length to minimize the possible negative impacts of this surface parking expansion. Please read that document.

The community's main objections are lack of environmental oversight related to noise, pollution and heat islands.
The FAA requires airports to be good neighbors . It is built into the process. I have all those documents as well.

Sincerely

Carter Waldren



Can I call you and get some of this material over to the planning board before the scheduled meeting?

This is a very serious issue and the planning board needs facts. The plan is not outlined in the short term , intermediate term or long term planning mapping that was created for the master plan. Please request that Mr. Bradbury write a letter that describes how this surface parking plan is part of the Master plan 2018 and explain how previous attempts to justify it should be included if the city did not own it till two years after the master plan was approved and the dep permit expired and the land was illegally filled in the first place. Please have him or any other city official do this before the planning board meeting .

Or please stop saying that the plan is called out for in the Master plan and start saying it is not called out for in the master plan 2018 .

Carter Waldren

gibwoody@aol.com <gibwoody@aol.com> Nov 14, 2024, 6:24:14 AM (6 days ago)

to kkraft, planningboard@portlandmaine.gov

Dear Planning Board,

I am writing as a citizen of Portland interested in the upcoming Planning Board review concerning the Portland Jetport's application for expanded surface parking areas. I think the initial workshop on this topic was held in May of 2024. Can you please share with me any communications from the Jetport that have come your way concerning this application in the ensuing months? I want to be intelligently prepared for the discussion on November 26 and need to know what adjustments the Jetport may have made to their stance since May.

In the same vein, I wanted to know if the changes in the Site Location Map regarding Development Planning (SLODA) have been received and added to your packet of information regarding this application. The Department of Environmental Protection (DEP) and the Army Corps of Engineers have made clear that some of the mapped area under discussion is wetlands. Have you included this adjustment in your materials?

Please get back to me at your earliest convenience so that I will have up to date information when I attend your upcoming meeting on the Jetport's application. Thank you!

Sincerely,

Woody Howard
28 Roundabout Lane
Portland, Maine 04102-1610
gibwoody@aol.com

Waldren, Carter <waldrenc@westbrookschools.org> Nov 19, 2024, 1:42:46 PM (21 hours ago)
to planningboard@portlandmaine.gov, ELWOOD HOWARD, Thomas Ainsworth, Deborah

PC3

Please submit this to the plan documents for public comment.

Carter Waldren
40 Garrison Street
Portland,Maine 04102

To the Portland Planning board for consideration related to the proposed surface parking project for long term surface parking.

The removal of the sloped forested hill at PWM to be replaced with 11-13 acres of new surface parking will increase sound, light , air and air pollution. As well as damage the environment and create a large heat sink.

The proposed surface parking lot at PWM (Portland International Jetport) could have several unintended negative consequences, particularly to the environment and the surrounding community. The plan involves flattening a sloped hill that currently serves as a natural sound and pollution barrier. This hill is located within the Stroudwater River watershed and directly impacts the health of nearby wetlands, the fore river and vernal ponds.

Key issues include:

1. **Environmental Impact**: Flattening the hill would damage the watershed, the wetlands, and the vernal pon
2. **Sound Barrier Loss**: The hill acts as a natural 21-foot high berm that helps deaden sound and pollution fr
3. **Increased Pollution**: The new surface parking lot, which would cover 11-13 acres, would create a new he
4. **Proximity to Homes**: The proposed parking lot is located near existing car rental lots, and its flattening of
5. **Impact on Flight Noise**: The noise from airport flights already impacts the area, especially with increased

In summary, the proposed parking lot would not only damage important environmental features but also increase noise, pollution, and heat in the surrounding area, negatively impacting both the natural environment and the people living nearby. I encourage the planning board members to visit the site in relation to the runways to truly understand the negative impacts that its removal will have.

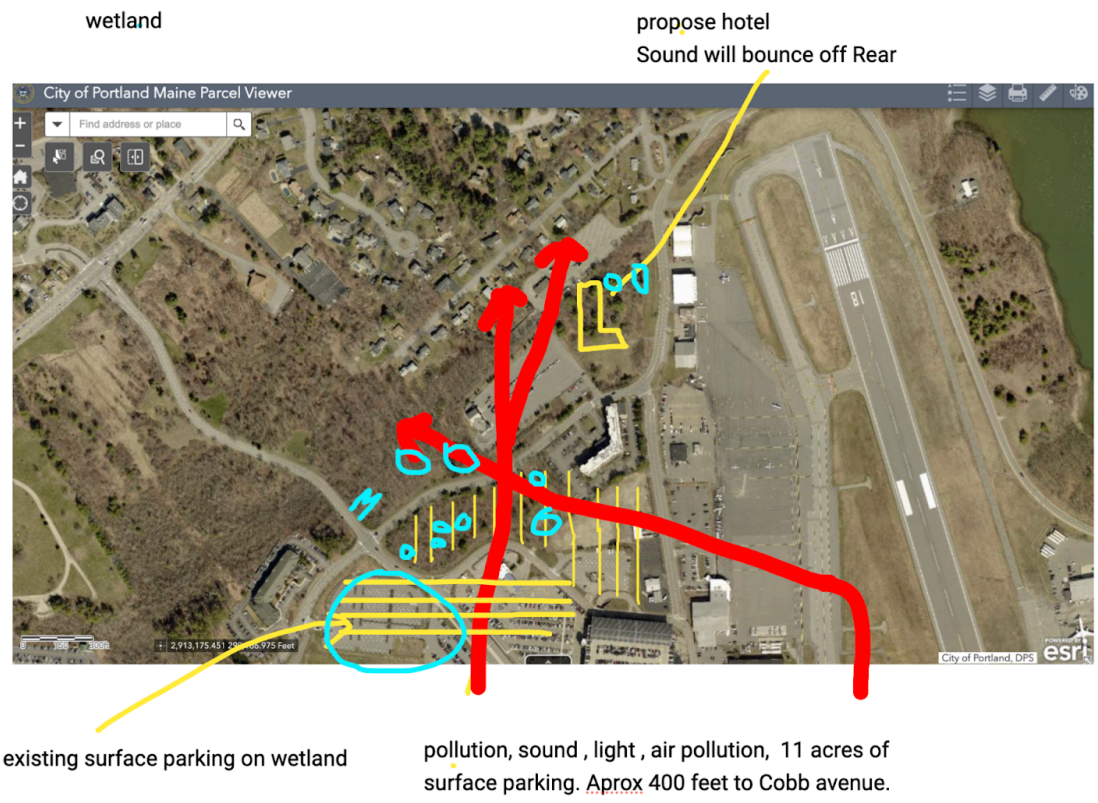
Decibel levels from my house at 40 Garrison supposedly well out of the 65 decibel contours.

Ground operations are not monitored by Pwm and the noise levels exceed epa community levels of 55 DB. Portland has a noise ordinance and it should be followed. Am hours from 10 pm to 6.59 receive a 10 point decibel penalty. The meter is certified and A weighted and the recordings are maximum readings done every second.
The airport management is not being transparent about the negative impacts. The morning flights are very disruptive to sleep. 65 DB is the FAA threshold for highly annoying.

Unit A weighted	Quiet hours 10pm to 6.59 am	Airliine flight data	Decibles I max.	Duration aprox	type of aircraft	landing /takeoff	Runway
certication number BLE82071F Reed Instrum	would receive 10 decible penalty						
Location, 40 Garrison st. Portland, Maine:	quiet hours						
		all flights by radar data not schedule					
11 West , 18 North, 29 east , 36 south							
Quiet hours 10pm to 6.59 am.							
Time /Date							
Nov 5 2024 4.40 pm	n	United 3678	73.1	30	airbus 319	dep	west
4.46 pm	n	DL 5611 New york	72.2	20	embraer 170	dep	west
5.16 pm	n	DI3751 detroit	66.1	20	Mitsubishi crj-900	dep	west
5.22 pm	n	AA 5092 Washington	65.7	20	Mitsubishi crj-900	dep	west
6.23 pm	n	Net JetsEJA	65.43	20	eja 640	dep	west
6.27 pm	n	Ua 3619	54.6	20	embraer 170	landing	east
7.07 pm	n	?	74.4	20	unknown	dep	west
7.25 pm	n	Ua 3582	72.8	20	embraer 170	dep	west
7.56 pm cut across south portland	n	6197 Washington	65.7	15	embraer 170	landing	East
8.05 pm cut across south porland	n	AA 5040 Philidelphia	72.6	15	Mitsubishi crj-900	landing	east
8.10 pm	n	Easy jet a 674 jfk	63.8	15	cessna citation	landing	East
8.13 pm	n	AA 2330 Charlotte	70.8	15	Airbus 320	landing	East
			10 db penalty				
Nov 6th am 5.19 am	Yes	Delta 5821 JFK	65.4. (75.4)	30	embraer 175 short wing	dep	West
5.26 am	yes	AA 5657 Washi	62.2. (72.2	30	Mitusbishi crj 900	dep	west
6.05 am	yes	AA 5043 Philidelphi	68.4. (78.4)	30	Mitsubishi crj 900	dep	West
5.56 am	yes	Delta 4122 Det	60.1. (70.1)	20	Misubishi CRJ 900	dep	west
6.24 am	yes	UA 2455 new	71.5. (81.5)	30	boeing 737 max	dep	west 11
6.40 am	yes	Delta 5270 LGA	68.5. (78.5)	30	Mitsubishi crj 900	dep	west 11
6.52 am	yes	FED X 1491 Memphis	54.7. (64.7)	20	Boeing 757	landing	East
nov 7th 2024							
5.13 am	yes	dl 5821 jfk	64.5.(74.5)	20	ebraer 175 sw	dep	west
5.39 am	yes	WN 429 southwest Baltimore	59.1.(69.1)	30	boeing 737 max 8	dep	west
5.41 am	yes	DL4122 Detroit	66.7 (77.7)	20	Mitsubishi crj -900	dep	west
6.21 am	yes	DL 1117 Atlanta	64.2 (74.2)	20	airbus 321	dep	west
6.39 am	yes	DL 5270	62 (72.2)	20	Mitsubishi crj -900	dep	west
Nov 8th							
5.49 am	yes	UA 1172	62.4. (72.4)	20	Airbus 319	dep	west
5.50 am	yes	5821 JFK	62.2. (72.2)	20	Embraer 175 sw	dep	west
5.51 am	yes	Sw wn 429	65.9 (65.9)	20	Boeing 737 max 8	dep	west
5.52 am	yes	DI 4122	64.3. (74.3)	20	mitusbishi crj -900	dep	west
5.52 am	yes	AA 5043	63.2 (73.2)	20	mitusbishi crj -900	dep	west
6.23 am	yes	FX 1491	57.7. (67.7)	30 long rumble	boeing 757-200	arrival	east over south portland
6.36 am	yes	DL. 5270 LGA	60.5 (70.5)	20	mitsubishi -200	dep	west
nov 11th am							
12 midnight	yes	UA 2165 Washington	66.9 (76.9)	30	Airbus 319	dep	west
11.40 pm	yes	Wn SW 1733 Baltimore	69.9 (79.9)	30	boeing 737-800	dep	west
5.14 am	yes	Delta 3652 det	66.5 (76)	30	mitsubishi crj -900i	dep	west
5.22 am	yes	Delta 5610. JFX	66.8. (76.8)	30	Embraer 175 sw	dep	west

Here is how the sound will travel into the neighborhood across the car rental lots and into Cobb and then to the Stroudwater Neighborhood. Pictured is the end of the north south runway. The above chart is from the east west runway takeoffs and departures mostly to the west.

The 2005 part 150 describes the sound entering the northern neighborhoods as being hard to quantify due to elevation changes.

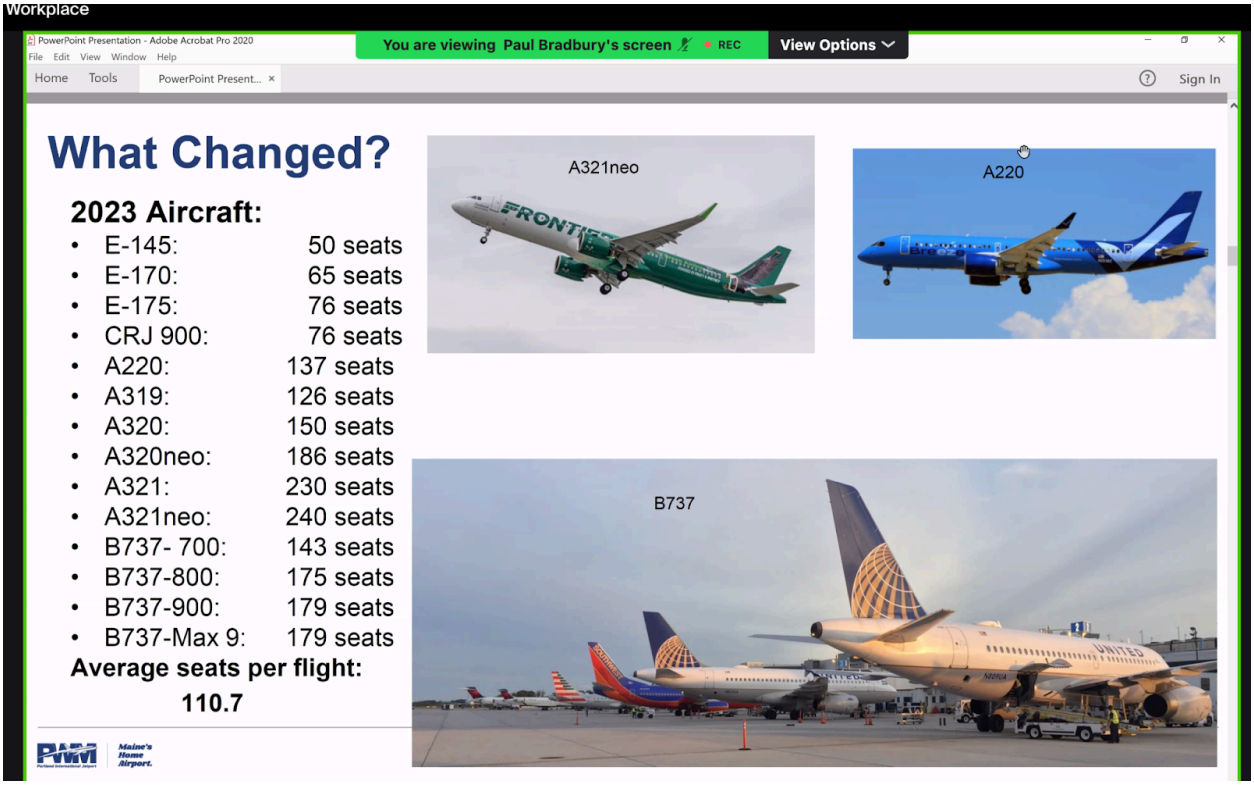


The city and PWM management claim that fewer, quieter planes result in less impact, but this overlooks the fact that larger planes generate more noise and air pollution than smaller regional jets on takeoff especially. Enplanements are over 1.2 million with de-planments around the same total. The " upgauging", to bigger aircraft has not been studied for its environmental impact. The larger planes have led to increased need to repave the runways. Leading to two partial shutdowns that are very impactful to the nearby residences.

The claim by the city that the environmental assessment that was completed in 2018 covers the impacts for this project is false because that project was for a runway expansion and not to study noise entering into a neighborhood by removing a wetland natural barrier.

Airport mapping is very airport centric and leaves out the proximity of the impacted neighborhoods. Here you can see the relationship of the houses to the PWM runways. Note the green areas as the watershed.

The fleet changes represent a deviation from previous planning. The levels and amounts of operations are reaching the upper limit of the 2019 Sustainable master plan scope master plan. The below images are screen shots from a presentation by Mr Bradbury to the noise abatement committee.


Workplace
PowerPoint Presentation - Adobe Acrobat Pro 2020
You are viewing Paul Bradbury's screen
REC
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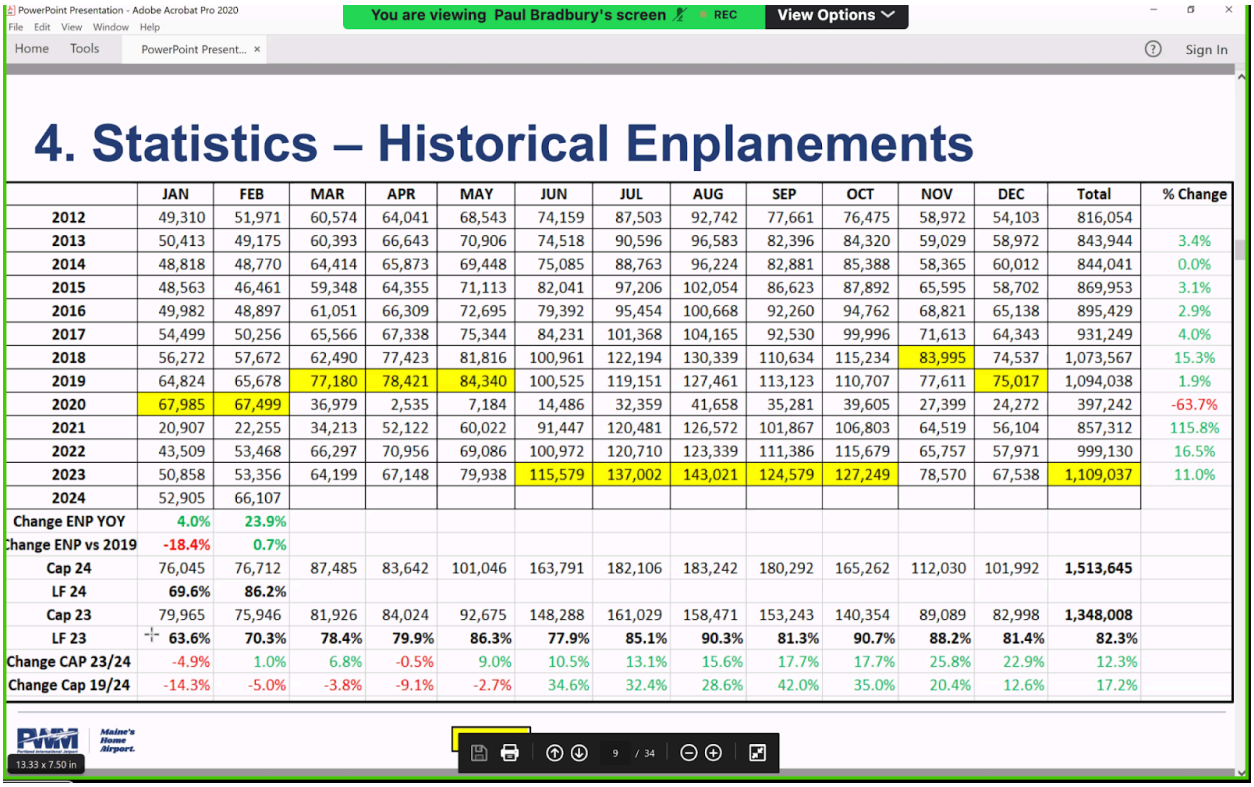
Sign In
What Changed?
2023 Aircraft:
• E-145: 50 seats
• E-170: 65 seats
• E-175: 76 seats
• CRJ 900: 76 seats
• A220: 137 seats
• A319: 126 seats
• A320: 150 seats
• A320neo: 186 seats
• A321: 230 seats
• A321neo: 240 seats
• B737- 700: 143 seats
• B737-800: 175 seats
• B737-900: 179 seats
• B737-Max 9: 179 seats
Average seats per flight:
110.7
A321neo
A220
B737
PWM
Maine's Home Airport.



PowerPoint Presentation - Adobe Acrobat Pro 2020

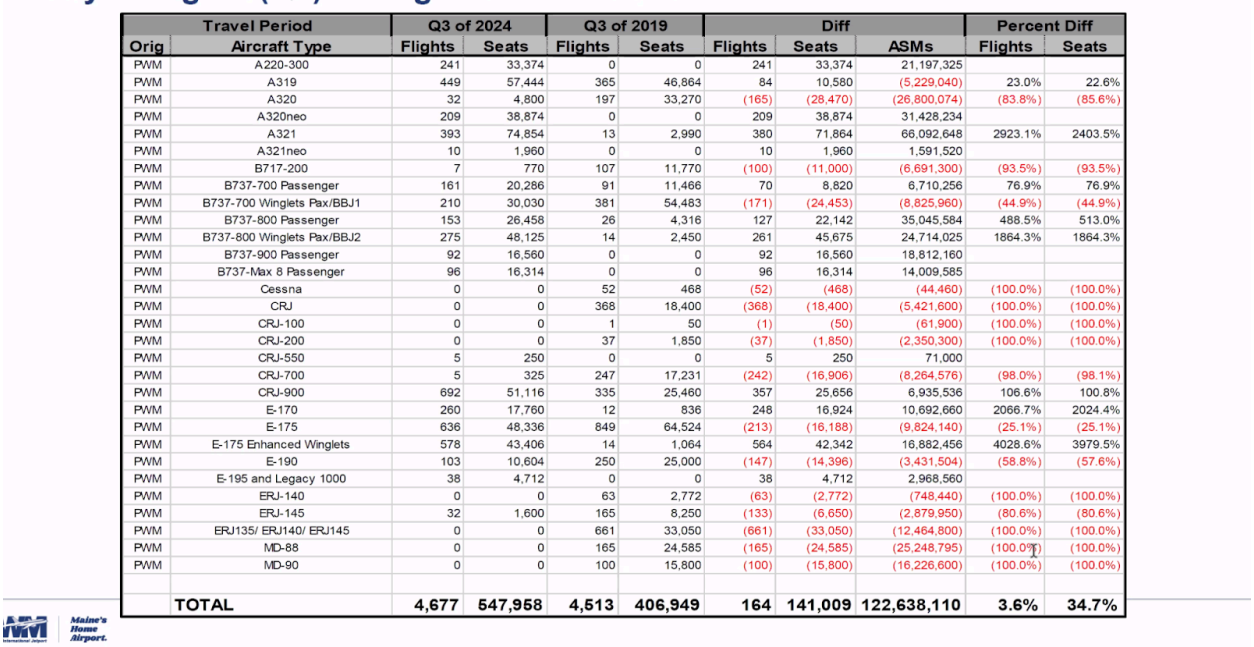
You are viewing Paul Bradbury's screen REC View Options

4. Statistics – Historical Enplanements

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total	% Change
2012	49,310	51,971	60,574	64,041	68,543	74,159	87,503	92,742	77,661	76,475	58,972	54,103	816,054	
2013	50,413	49,175	60,393	66,643	70,906	74,518	90,596	96,583	82,396	84,320	59,029	58,972	843,944	3.4%
2014	48,818	48,770	64,414	65,873	69,448	75,085	88,763	96,224	82,881	85,388	58,365	60,012	844,041	0.0%
2015	48,563	46,461	59,348	64,355	71,113	82,041	97,206	102,054	86,623	87,892	65,595	58,702	869,953	3.1%
2016	49,982	48,897	61,051	66,309	72,695	79,392	95,454	100,668	92,260	94,762	68,821	65,138	895,429	2.9%
2017	54,499	50,256	65,566	67,338	75,344	84,231	101,368	104,165	92,530	99,996	71,613	64,343	931,249	4.0%
2018	56,272	57,672	62,490	77,423	81,816	100,961	122,194	130,339	110,634	115,234	83,995	74,537	1,073,567	15.3%
2019	64,824	65,678	77,180	78,421	84,340	100,525	119,151	127,461	113,123	110,707	77,611	75,017	1,094,038	1.9%
2020	67,985	67,499	36,979	2,535	7,184	14,486	32,359	41,658	35,281	39,605	27,399	24,272	397,242	-63.7%
2021	20,907	22,255	34,213	52,122	60,022	91,447	120,481	126,572	101,867	106,803	64,519	56,104	857,312	115.8%
2022	43,509	53,468	66,297	70,956	69,086	100,972	120,710	123,339	111,386	115,679	65,757	57,971	999,130	16.5%
2023	50,858	53,356	64,199	67,148	79,938	115,579	137,002	143,021	124,579	127,249	78,570	67,538	1,109,037	11.0%
2024	52,905	66,107												
Change ENP YOY	4.0%	23.9%												
Change ENP vs 2019	-18.4%	0.7%												
Cap 24	76,045	76,712	87,485	83,642	101,046	163,791	182,106	183,242	180,292	165,262	112,030	101,992	1,513,645	
LF 24	69.6%	86.2%												
Cap 23	79,965	75,946	81,926	84,024	92,675	148,288	161,029	158,471	153,243	140,354	89,089	82,998	1,348,008	
LF 23	63.6%	70.3%	78.4%	79.9%	86.3%	77.9%	85.1%	90.3%	81.3%	90.7%	88.2%	81.4%	82.3%	
Change CAP 23/24	-4.9%	1.0%	6.8%	-0.5%	9.0%	10.5%	13.1%	15.6%	17.7%	17.7%	25.8%	22.9%	12.3%	
Change Cap 19/24	-14.3%	-5.0%	-3.8%	-9.1%	-2.7%	34.6%	32.4%	28.6%	42.0%	35.0%	20.4%	12.6%	17.2%	

PWM Maine's Home Airport. 13.33 x 7.50 in

9 / 34



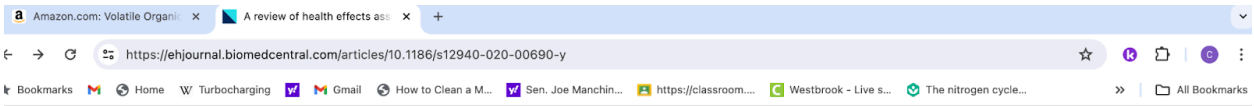
4. July – August (Q3) Changes 2024 vs 2019

	Travel Period	Q3 of 2024		Q3 of 2019		Diff			Percent Diff	
Orig	Aircraft Type	Flights	Seats	Flights	Seats	Flights	Seats	ASMs	Flights	Seats
PWM	A220-300	241	33,374	0	0	241	33,374	21,197,325		
PWM	A319	449	57,444	365	46,864	84	10,580	(5,229,040)	23.0%	22.6%
PWM	A320	32	4,800	197	33,270	(165)	(28,470)	(26,800,074)	(83.8%)	(85.6%)
PWM	A320neo	209	38,874	0	0	209	38,874	31,428,234		
PWM	A321	393	74,854	13	2,990	380	71,864	66,092,648	2923.1%	2403.5%
PWM	A321neo	10	1,960	0	0	10	1,960	1,591,520		
PWM	B717-200	7	770	107	11,770	(100)	(11,000)	(6,691,300)	(93.5%)	(93.5%)
PWM	B737-700 Passenger	161	20,286	91	11,466	70	8,820	6,710,256	76.9%	76.9%
PWM	B737-700 Winglets Pax/BBJ1	210	30,030	381	54,483	(171)	(24,453)	(8,825,960)	(44.9%)	(44.9%)
PWM	B737-800 Passenger	153	26,458	26	4,316	127	22,142	35,045,584	488.5%	513.0%
PWM	B737-800 Winglets Pax/BBJ2	275	48,125	14	2,450	261	45,675	24,714,025	1864.3%	1864.3%
PWM	B737-900 Passenger	92	16,560	0	0	92	16,560	18,812,160		
PWM	B737-Max 8 Passenger	96	16,314	0	0	96	16,314	14,009,585		
PWM	Cessna	0	0	52	468	(52)	(468)	(44,460)	(100.0%)	(100.0%)
PWM	CRJ	0	0	368	18,400	(368)	(18,400)	(5,421,600)	(100.0%)	(100.0%)
PWM	CRJ-100	0	0	1	50	(1)	(50)	(61,900)	(100.0%)	(100.0%)
PWM	CRJ-200	0	0	37	1,850	(37)	(1,850)	(2,350,300)	(100.0%)	(100.0%)
PWM	CRJ-550	5	250	0	0	5	250	71,000		
PWM	CRJ-700	5	325	247	17,231	(242)	(16,906)	(8,264,576)	(98.0%)	(98.1%)
PWM	CRJ-900	692	51,116	335	25,460	357	25,656	6,935,536	106.6%	100.8%
PWM	E-170	260	17,760	12	836	248	16,924	10,692,660	2066.7%	2024.4%
PWM	E-175	636	48,336	849	64,524	(213)	(16,188)	(9,824,140)	(25.1%)	(25.1%)
PWM	E-175 Enhanced Winglets	578	43,406	14	1,064	564	42,342	16,882,456	4028.6%	3979.5%
PWM	E-190	103	10,604	250	25,000	(147)	(14,396)	(3,431,504)	(58.8%)	(57.6%)
PWM	E-195 and Legacy 1000	38	4,712	0	0	38	4,712	2,968,560		
PWM	ERJ-140	0	0	63	2,772	(63)	(2,772)	(748,440)	(100.0%)	(100.0%)
PWM	ERJ-145	32	1,600	165	8,250	(133)	(6,650)	(2,879,950)	(80.6%)	(80.6%)
PWM	ERJ135/ ERJ140/ ERJ145	0	0	661	33,050	(661)	(33,050)	(12,464,800)	(100.0%)	(100.0%)
PWM	MD-88	0	0	165	24,585	(165)	(24,585)	(25,248,795)	(100.0%)	(100.0%)
PWM	MD-90	0	0	100	15,800	(100)	(15,800)	(16,226,600)	(100.0%)	(100.0%)
	TOTAL	4,677	547,958	4,513	406,949	164	141,009	122,638,110	3.6%	34.7%

PWM Maine's Home Airport.

It is plain to see that there are more frequent larger planes and more operations.
I strongly encourage the planning board members and members of the council to visit the site of the proposed buffer removal
And strongly discourage the planning board to endorse the removal of the northern barrier to add 11-13 more acres of surface parking. There are many negative possible impacts of removing this northern buffer that is written into the master plan to retain .

Airports are big polluter's and the negative health impacts of living near one is well studied.
Proceeding with this project and not fully understanding its possible negative impacts from a community standpoint is negligent .



and had more respiratory complaint on days with increased exposure to aircraft emissions and concludes that health effects of air traffic emissions are similar to those caused by road traffic [59]. A biomonitoring study showed increased blood levels of the inflammatory marker IL-6 in volunteers with mild to moderate asthma after a walk in a zone with high levels of aircraft emissions [107]. It is well-known that other types of air pollution including diesel exhaust cause morbidity and mortality [113]. Taken together, these results suggest that the exposure to aircraft emissions induce pulmonary and systemic inflammation, which potentially contributes to cancer, asthma, respiratory and coronary heart disease.

Five mechanistic studies on the toxicity of airport particles were identified, one animal study in mice and four cell studies: Airport particles were reported to act as adjuvants in the activation of inflammatory cells or pathways [110] and induce pro-inflammatory cytokines [111]. Airport particles were shown to have similar inflammatory potency and similar ability to induce DNA damage as traffic emission particles [50], such as diesel exhaust particles [36]. In turn, airport particles induced significant levels of the biomarker Saa following intratracheal instillation in mice, associated with risk of cardiovascular disease [36], and they have the potential to generate ROS at similar levels as traffic emission particles [49, 50]. Thus, the conclusions from these in vitro and in vivo studies support the overall concern addressed in previous sections that airport emission particles are capable of inducing toxic responses comparable to the responses observed for other air pollution particles such as diesel exhaust particles.

Discussion

Although a range of kerosene-based aircraft fuel types are in use, they are overall similar in chemical composition [24, 29]. Kerosene lies between the distillated crude oil fractions of gasoline (gasoline combustion exhaust, IARC group 2b) and diesel (diesel combustion

Sections | Figures | References

Abstract

Background

Toxicity of jet fuel exposure

Exposure studies

Health effects

Discussion

Conclusion

Advertisement

Maine DEP

Oct 31 20 2024

Carter Waldren

Maine Dep.
To Mr. Samuel Sheppard
Alison, Sirois.

I respectfully request that PWM management and the city clarify where in the master plan the parking expansion is explicitly requested or detailed, aside from the to the city's acquisition of the land. The reliance on this mapping, created when the city lacked ownership and was not part of the core master plan, is not a valid j parking expansion. Page 348 of the SAMP 2019 clearly outlines the pathway forward is to build a parking garage. The project is not outlined in short term mapp mapping or long term mapping.

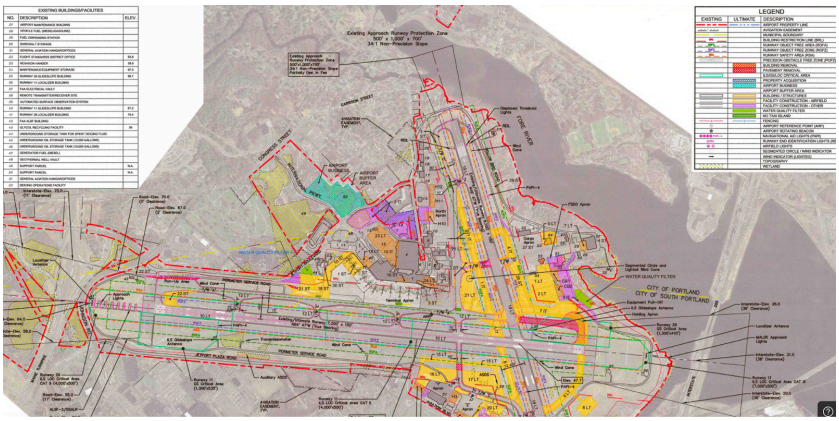
Thank you for considering this argument against the parking expansion proposal.

Sincerely,
Carter Waldren

Argument that the mapping shown in the appendix that was created in 2016 and found in the PWM Master plan of 2018 appendix does not support or justify the p is in fact a hopeful idea because the city did not own the land at the time the Master plan was approved in 2018 and the body of the Master plan outlines the pat parking garage expansion. In fact when this mapping was being created the illegal filling had begun and the proposal by Sabego to put a gravel parking lot for However the city would not purchase the property till 2 years after the Master plan was approved in 2020 and the permit had expired and the wetlands remained

Mapping being used to justify the parking expansion.

The below mapping was done in 2016 and outlines the land that is labeled as a land acquisition. This document is not found in the body of the master plan and is property was not purchased until 2020 and at the time this map was created the Land was owned by Mr. Thomas Toye, the acceptance of the Dep that this some expansion makes no sense. The Toye land permit expired before the city acquired the property. The land was started as an illegal filling around 2016 and draws permitting process and the public input related to this mapping. This mapping does show the completion of the parking garage. I have reiterated before that the body of the master plan outlines a straightforward path to any future parking needs such as the construction of a parking garage as outlined in the Portland Maine study done in 2000 . Please ask the Pwm management and city to outline where in the Master plan the parking expansion is requested or detailed other than ma years prior to the Master plan being approved , when the city did not own the land and the plan is not outlined in the body of the PWM Master plan of 2018.



The above mapping clearly states land acquisition and parking expansion listed as 3t. However the city did not have any assurances that Mr Toye would sell the wetland issues that needed to be resolved so this mapping can hardly be described as prior planning of a parking expansion before the parking garage. The sub 2018 outlines the pathway forward in the body of the plan is to complete the garage expansion as outlined on this mapping in brown. The body of the master pla parking up to jetport blvd only after the garage expansion is completed and only if parking is needed after the garage expansion. This mapping has wetlands on it initial dep meeting and even by using it and the later disclosure that the wetlands were damaged is not being up front with overall wetland impacts with the DEP taking of the wetlands. The northern buffer is outlined to remain as a buffer in the Master plan.

The below mapping should be disregarded by the Maine DEP as a justification of the parking expansion being part of the master plan. This is prior planning ma would be able to complete but the city did not own the property.

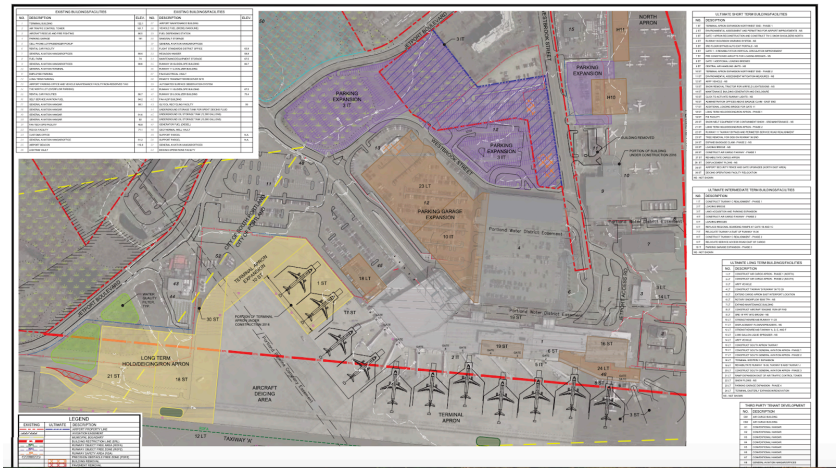
Key points: the city did not own the Toye property when the mapping was created.

The Wetlands were not properly outlined to the public on Dec 12th related to the Toye property.

The body of the master plan clearly calls for a parking garage expansion.

The master plan calls for retaining the northern buffer and the taking of it as a last resort after the parking garage expansion.

The city's own parking transportation planning shows the parking garage and is careful to not take the wetlands and to restore them after the construction of the p



PC5

Fwd: I am reviewing the permit for a parking garage at pwm . I see that there is a letter from DEP that describes the pools on the property as not significant .

Subscribe

1 view

Waldren, Carter <waldrenc@westbrookschools… Nov 20, 2024, 7:51:41 AM (yesterday)
to planning@portlandmaine.gov

to be added to PL -002853. application for parking expansion.

Communications with the dep should be included with the application to the planning board. There have been many struggles with the non disclosure of the
wetlands and assessment that the vernal Pond 5273 being designated a non wildlife habitat except the dates are wrong and the assessment is wrong.

This was pointed out to the applicant at the dec 12th 2023 meeting by the public. The subsequent addition of the wetlands to the upper toye land is an indication that the property does not have a valid permit and the city is attempting to roll the application into the larger existing permit. But the wetlands are still there; the vernal pond 5273 should be afforded the 250 foot setback and the city did not properly disclose the wetland impact to the public or in the original application.
The upper toye lot was illegally damaged in the first place and for the city to profit off this in the future and to coop this process is deceptive to the public.

The pond does have more than 40 wood frog egg masses. There are at least 150 and I have shown the fish and wildlife and the assessment that the pond does not dry out is 100 % wrong. The assessment dates are wrong on the sloda and in the photographs .

Carter Waldren

---------- Forwarded message ---------
From: **Waldren, Carter** <waldrenc@westbrookschools.org>
Date: Mon, Oct 21, 2024 at 3:14 PM
Subject: Re: I am reviewing the permit for a parking garage at pwm . I see that there is a letter from DEP that describes the pools on the property as not significant .
To: Stebbins, Mark N <Mark.N.Stebbins@maine.gov>, ELWOOD HOWARD <gibwoody@aol.com>, Sheppard, Samuel L <samuel.l.sheppard@maine.gov>

Mr. Stebbins

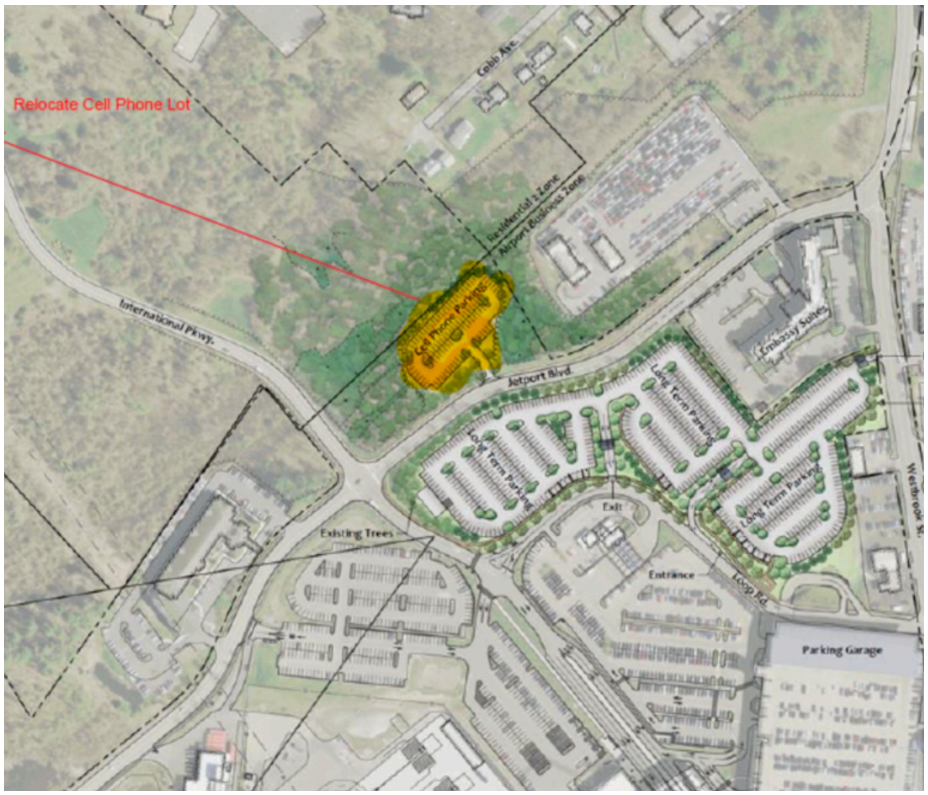
Seems like the state is set in the assessment being correct for this pond 5273 and it is 100 percent wrong. Can you at least tell me when the assessment was sent to the state for approval? I know the letter was not received by Mr Bradbury until Feb because it was shortly after that the sloda applicaiton was turned in. I have asked the Dep and have received no response. If it was after the Dec 12 meeting with the public at Pwm airport then that establishes that it was created after the meeting. If it was before then that shows that the applicant and Sabego did not disclose any wetlands at that dep meeting at the location of the cell phone proposed lot. I have sent transcripts to the Dep that show the public indicated to the airport and Sabego that there was a frog pond location at 5273 in December and I showed the wetlands to Mr Bradbury and Mr Peters at that meeting that they claimed did not exist.
This whole thing has been off the rails since that meeting. Either way the pond does meet the criteria of 40 egg masses of wood frogs it is full of wood frogs . This process has been more about making up stuff and not disclosing it than actually being straight forward with the public from the start. I can accept that Perhaps Mr. Peters missed the egg masses but the public has known about this frog

pond for 20 years and that fact seems to have no value in this process and that is not right and totally takes the public out of the decision making process and that is not right. The non disclosure of those areas at the initial dep meeting show the airport either knew about them or that they did not want to disclose them. Those wetlands were mapped and are supposed to be retained in the cities own parking transportation planning. Have you read the transcripts does the state really think the public was making up stuff about the pond and pointing out to the applicant that the mapping did not show the wetlands across jetport blvd. I see now that the new SIODA mapping says previously permitted for the wetlands on the upper toye. That is great and is a step forward. but it still does not explain that the permit has expired and was for a totally different project that had a retention pond and would have allowed for natural drainage into the soil as a gravel parking lot. All the other permit did was allow for the damage to the wetlands that are still there no matter how much it was attempted to get rid of it.

I would appreciate knowing when the application for the pond assessment was received at the state related to the pond assessment for 5273 and when it was processed and then sent out to Mr. Bradbury. I can get you in touch with this person and there are others who testified at the initial meeting. The transcript is available at the Pwm web site There were 80 people there.

> 1181 Westbrook Street. And I've walked this whole area you're talking about for about 20 years now, so I know it intimately. And when you were talking about, well, first of all, I watched what's happening.
>
> andrea hawks?
> with the trees on this area, however it happened, they all got taken down long before we had a chance to talk to them. That's one thing that we saw. The second thing is... She's going to be better than you.
>
> andrea hawks?
> It's just not for him, but for everybody else. Oh, okay. My voice carries anyway. But I noticed when you were giving us a little pointer about the vernal pool, You are very careful not to go across the street.
>
> andrea hawks?
> There could be vernal pools. There are tiny vernal pools, perhaps on the Amos Street. But where that cell phone parking lot is one of the biggest vernal pools around. Oh, yes. No, there's actually, there's no, where.
>
> Key points: vernal pool oh yes
>
> andrea hawks?
> No, no, let me finish. I've walked that and I think I have people can confirm that. That is one of the largest peeper sections in the spring I have ever heard. I've taken videos of it. It is beautiful.
>
> andrea hawks?
> And for you to turn it into cell phone parking is really criminal, Paul. Thank you. Thank you. Thank you. Thank you. So I agree. And we're not touching the wetlands with the cell phone lot. So those wetlands are actually right here.
>
> Key points: turn it into cell phone parking
>
> Paul Bradbury
> No, they're here. They are not. So I have, and so has Owens, and so has our wetlands mapping. Obviously not. What's in there? It's a safe one. I'll flip. I don't think you can see it on this one. But we can show you the wetlands mapping.

Mapping that was shown to the public on dec 12th. that did not disclose the status of the pond 5273 or any other wetlands across jetport blvd. .

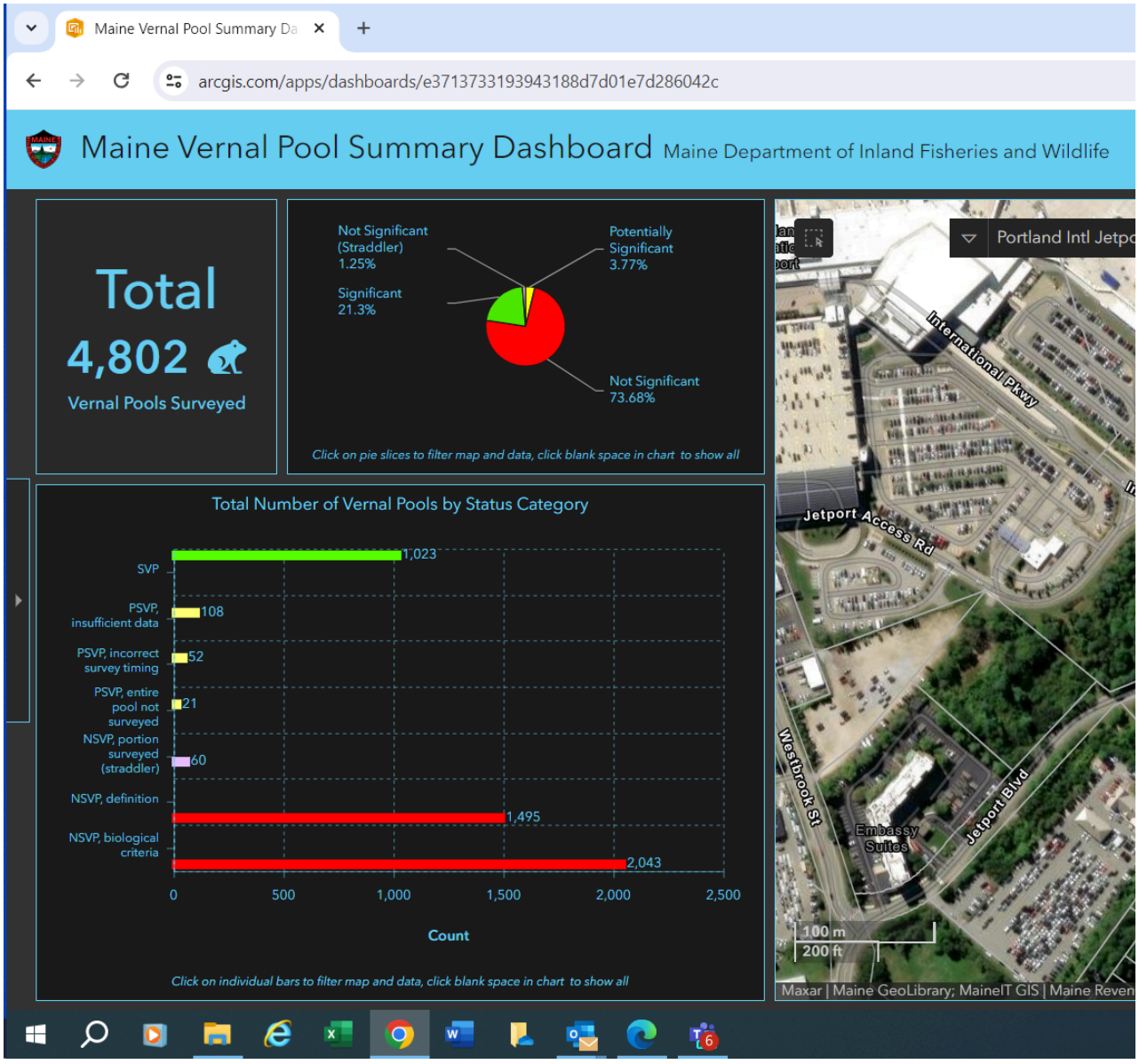


Mr Bradbury only disclosed the wetlands on the property south of jetport blvd that were included in the original Sloda application. 8k . That are part of the wetlands in the wetland mapper. and he pointed out those . The public disputed the mapping at that initial meeting. I dispute the assessment of the pond and so does the neighborhood and any one else who has actually been over there in the spring. We all hear the frogs. They are not just peepers there is a whole other pond that was missed by the pwm mapping that is full of peepers almost where the red line entering the mapping is.
.
Just not accepting this fact does not change the status of this vernal pond or the minds of the public that lives here and listens to the frogs and sees its value.
What is it going to take another hundreds of egg masses in the spring unless the pond is destroyed by the work across the street. That does not sound like a way to protect the habitat. What does this process indicate to the public that lives here ?
Carter Waldren

On Tue, Apr 9, 2024 at 12:42 PM Stebbins, Mark N <Mark.N.Stebbins@maine.gov> wrote:

> Good afternoon, Carter,
>
> Thank you for your inquiry concerning the Portland Jetport and vernal pool locations. Attached is the vernal pool (VP) survey, IFW recommendations (see page 7) and a screen shot of the VP #5273 which depicts its location. All VP survey forms are sent to IFW for their review and determination of significance. After reviewing the report, VP 5273 did not meet the biological criteria for significance, which is based on egg mass counts.
>
> Abundance. Any one of or combination of the following species abundance levels, documented in any given year, determine the significance of a vernal pool habitat (See Chapter 335 Significant Wildlife Habitat)

Species	Abundance Criteria
Fairy shrimp	Presence in any life stage.
Blue spotted salamanders	Presence of 10 or more egg masses.
Spotted salamanders	Presence of 20 or more egg masses.
Wood frogs	Presence of 40 or more egg masses.



The link for the Maine Vernal Poll Summary Dashboard can be found here:

https://www.arcgis.com/apps/dashboards/e3713733193943188d7d01e7d286042c

Hopefully, this is helpful.

thanks

Mark Stebbins

Field Services Director, Bureau of Land Resources

Maine Department of Environmental Protection

Tel: (207) 592-4810 (mobile)

www.maine.gov/dep

From: Waldren, Carter <waldrenc@westbrookschools.org>
Sent: Saturday, March 23, 2024 7:49 AM
To: Stebbins, Mark N <Mark.N.Stebbins@maine.gov>
Subject: I am reviewing the permit for a parking garage at pwm . I see that there is a letter from DEP that describes the pools on the property as not significant .

EXTERNAL: This email originated from outside of the State of Maine Mail System. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Firstly I am wondering what pools were inspected with the exact location and date of inspection. There are several pools on that property and as we live here we hear the frogs etc every spring.

The letter is not specific enough and certainly does not describe the pools or weltand that are there that do have frogs etc in them. In addition the property that is claimed to not have wetlands has 10,800 square feet of Wetland in addition to the 8 thousand listed in the application. I have better maps and would certainly like the opportunity to describe the pools and their location. You are welcome to come over in the spring and listen to the frog chorus. The pools were not marked with the wetland mapping that was done with lidar. I have a copy of the first permit in 2016 that has lapsed in that shows the 10,800 square feet of wetland. Please describe what about these ponds does not meet the specifications. This is obviously a frog habitat.

I would appreciate your attention to this matter.

Carter Waldren

Search in mail
Active

PC6

Jetport Parking Proposal 11/26 Meeting

From: Charlotte Witt <Unknown>
Date: Friday, November 22, 2024 at 8:38:39 AM UTC-5
Subject: Jetport Parking Proposal 11/26 Meeting
To: planni...@portlandmaine.gov <Unknown>
Cc: Charlotte Witt <Unknown>

To the Planning Board,

I write to oppose the proposed Jetport paving projects because they do not meet the Plan Review Standards in two respects. They do not meet Environmental Standards and they are inconsistent with City Master Plans.

(14.6) Plan Review Standards

(14.6.2) Environmental Standards

e. Waterbodies including wetlands, watercourses, significant vernal pools and floodlands **Proposed paving is on wetlands and vernal pools.**

(14.6.3) A. Consistency with City master plans: All developments shall be designed so as to be consistent with City Council-approved master plans and facilities plans and with off-premises infrastructure. **Proposed paving wetlands and vernal pools is not consistent with the city master plan: Portland 2030. (see excerpts and references below)**.

Portland 2030 on new construction in the city:

"A proposal in direct contradiction to Portland's Plan would need to be modified to generally conform with the plan, or be discarded." (Portland 2030).

The proposed PWM new parking construction is in direct contradiction to Portland 2030.

--Portland 2030 commits to protection of wetlands, but proposed construction is on wetlands. (p. 19)

--Portland 2030 commits to increase the urban tree canopy, but proposed construction will destroy acres of trees (p. 20)

--Portland 2030 commits to minimize light and noise pollution, but proposed construction will increase it radically (p. 22)

--Portland 2030 commits to support livability by improving the quality of life in neighborhoods and. improving the public health of residents, but proposed construction will worsen neighborhood quality of life. (p. 73)

Sincerely,
Charlotte Witt
17 Garrison St. Portland ME. 04102
Charlotte.Witt@unh.edu

PC7

PWM Parking Proposal

Fri, Nov 22, 2024 at 11:35 AM

From: rstc...@aol.com <Unknown>
Date: Friday, November 22, 2024 at 11:02:07 AM UTC-5
Subject: PWM Parking Proposal
To: planni...@portlandmaine.gov <Unknown>
Cc: Mark Dion <Unknown>, Regina Phillips <Unknown>

Please consider rejecting the Portland Jetport plan for surface parking lot expansion.

There is no good reason to construct new paved lots when other (better) options are readily available - namely off-site, existing, already paved and under-utilized open spaces like in the Maine Mall area.

Analysis shows that on-site parking fills up only on a few dates (mostly spring break) while off-site parking is underutilized much of the year.

Furthermore, it appears that a proper, thorough environmental assessment has not been conducted nor shared with the public. Notwithstanding the habitat destruction that would be caused by paving over woods and wetlands, the Stroudwater neighbors would also lose valuable noise buffers and an important natural bulwark against runoff going directly into the Casco Bay. This new parking plan directly contradicts the City of Portland's stated sustainability goals.

This plan is a significant waste of land and money.

Roy St.Clair
Elizabeth Germani
48 Stroudwater Road
Portland, ME

Carter Waldren <waldrenc@westbrookschools.org> 12:37 PM (1 hour ago)
to ELWOOD HOWARD, Frederick Faller, Charlotte Witt, Deborah, Thomas Ainsworth, planning@portlandmaine.gov

To be added to the permit application for PL-002853-2024 PWM. Jetport parking expansion proposal.

For the attention and consideration of the Portland City Planning Board, City Council, Mayor, City Manager, Maine DEP, Army Corps of Engineers, State Level DEP, and the NDEP. Maine fish and wildlife department.

General Statement of Objections:

Community support is **crucial** for PWM airport's sustainable growth. The proposed long-term parking project at PWM is a short-term fix for a larger issue. Approving it won't fix the airport's future challenges and might worsen public perception, leading to lasting negative environmental repercussions for the city and its residents. The current 5 acre wooded wetland buffer plays a crucial role in mitigating noise and pollution, but replacing it with surface parking would amplify these issues, creating more noise, heat, air light pollution, trash, point pollution, runoff, trash , heat sinks, and contributing to global warming and encouraging a car-dependent culture.

List of objections and corresponding evidence:

1. The current surface parking expansion is not outlined or described in the PWM sustainable master plan 2018 .

Evidence

"Automobile parking alternatives are straightforward, following the plan set in place a decade ago. The plan includes expansion of the parking garage to the west/northwest where the long-term surface lot parking currently exists. The proposed plan would also allow for additional rental car spaces and will be designed to offer improved access between the rental car return area and the terminal building. The proposed parking

expansion will more than accommodate the proposed increased need in automobile parking through the planning period. " As stated in the PWM master plan 2018.

2. The Faa requires the neighborhood to be major stakeholders in the process and the city has purposefully excluded the neighborhood. No objections to the project are noted in the Dep application or the planning board outline of the project. (The airport did put some community objections in the stormwater application after objections by me.) Except the document was produced in April 4 months after the initial dep meeting and did not go to the Maine DEP.

Evidence

Objections are absent from the SLODA permit application, City of Portland planning notification, and DEP disclosures related to public input and the application process that were not followed are all key documents indicating the exclusion of the neighborhood in the planning process.

3. There are 6 negative outcomes per the FAA that will result in not including the immediate neighbors as major stakeholders in the process.

Evidence

Per the FAA advisory circular 150/5190-4B, Airport land use compatibility planning document .

Consequences of incompatible development per the FAA.

- Lead to delays in airport development or require redevelopment
- Constrain capacity expansion
- Restrict airport operations
- Result in more stringent environmental requirements (including greater environmental impact analysis and mitigation requirements
- Increase public outreach requirements
- In some cases litigation.

4. No environmental studies have been conducted to assess whether the proposed parking expansion project meets the "Do no harm" criteria outlined by DEP requirements or the standards of Maine DEP , SLODA, NERPA, and DEP application processes. (the applications contain false information related to impervious surfaces and false vernal pond assessments.). I have evidence for both concerns and have met with the Fish and wildlife representatives. (the application does not mention the 10,989 square feet of wetland the airport is claiming is impervious) This is an illegally filled wetland that the permit expired in 2020. I have photos and movies etc. It is not filled and is still a forest.
5. The Maine Dep has indicated that the airport is exempt from the noise standards however this is not true either and I have written a long discussion about this issue. The airport does not monitor ground operations and that is where the most pollution and excessive noise is generated. I have the data to show this also.

Evidence

No documented environmental studies cover sound, light, air pollution, increased runoff, or the effects of adding 11 acres of surface parking. Community objections are absent in DEP, SLODA permit, stormwater runoff, or Nerpa applications. The airport director's quotes in local media minimize environmental impacts (PPH, Maine Public Radio). The city's project description to the planning board lacks objections and underestimates wetland or impervious surface impacts. Purposeful nondisclosure of wetlands and environmental concerns is evident. Undisclosed wetland impacts and improper procedures are noted. The project is proposed on an illegally filled wetland with an expired permit, described as impervious in the current SLODA application. The stormwater document submitted has the wrong impervious amounts on it and did not disclose the wetlands on 2 acres of property. Listing the impact as 3 acres and not the actual 5.

5. The northern buffer is recommended in the 2018 PWM master plan to be retained.

Evidence

Pwm master plan

Environmental sensitivities mapping

Airport wetland mapping

6. The FAA and EPA noise standards of 55 decibels, must align, prioritizing community well-being. Future planning should aim for lower noise and pollution exposure, not an increase. The city must map noise contours and mitigate impacts accordingly. The Faa has indicated the 65 decibel noise level threshold may no longer be valid and has acknowledged that it is highly annoying. Large sections of the Stroudwater neighborhood fall within the 60 -65 range. Future planning must take this into consideration.

Evidence

FAA documents, EPA documents, documentation on health impacts of living near airports, and other relevant documents provide valuable insights into various aspects of airport operations, environmental concerns, and health effects.

7. Ground operations, not monitored by the FAAor the Pwm airport management , cause significant community noise and pollution. (Takeoffs and landings) The city, as airport owner, must enforce its noise ordinances. Mitigating harm to its citizens is the city's moral and fiscal responsibility.

Evidence

Emails describing the lack of ground operations in airport noise calculations from the FAA and Mr. Bradbury, Documents that outline the FAA's role in terms of owners responsibilities. FAA documents that outline community involvement . The PWM , FAA 150 noise study in 2005, city noise ordinance, and incomplete data on community impacts are all relevant to understanding the issue .

8. Enhance city council oversight of night-time flight scheduling to reduce the current 23% volume between 10pm and 7 am. Implement recommendations from the 2005 study on night flights to alleviate parking congestion. Require city council approval for flight schedules, as recommended in the 2005 , 150 FAA sound study plan.

Evidence

Original FAA 150 sound document, advisory notes, NAC meeting charts, letters in the PWM master plan, national sleep studies, and environmental effects of living near the airport are all pertinent sources of information.

9. The increase in plane size doesn't reduce noise or air pollution due to larger engines. Bigger planes operating during quiet night hours (10pm-7am) exacerbate the issues. 8 flights before 7 am each morning with average of 70 decibles starting at 5 am.

Evidence, 1.

Lack of recent sound studies and compliance paperwork, along with unapproved scheduling changes, show negligence. Evidence from Mr. Bradbury's documents outline the issue, absence of sound studies since 2005, unfiled paperwork, and NAC limitations support this.

Evidence, 2.

Mr. Bradbury's documents highlight the operation of larger planes during nighttime hours. There have been no sound studies since the FAA 150 report in 2005 . Compliance paperwork or changes to the original 150 plan have not been filed. Scheduling changes adding flights during nighttime hours lack city council approval. The total number of night flights is not disclosed to the NAC. The Noise Advisory Council's role is limited, with suggestions regarding community impacts on the Stroudwater Neighborhood are often ignored by airport management.

10. The proposed surface parking is a short term solution and will cause community harm and environmental harm. The mapping in the PWM master plan does not support the parking expansion.

Evidence

Mr. Philips Bogden's parking analysis document, city documents in the 2018 master plan, mapping from the 2018 master plan, environmental sensitivities mapping, short-term

mapping, intermediate mapping, and long-term planning maps all fail to depict the Surface parking expansion.

11. The current parking proposal differs significantly from the 2020 plan presented for exploration by the city council in 2020. The Toye lot acquisition and use of the northern buffer were not part of the original discussion outlined in Mr. Bradbury's letter.

Evidence

- See letter

12. The proposed parking expansion contradicts Portland's planning documents and isn't recommended. Converting an urban forested wetland buffer into surface parking goes against environmental principles, contributing to global warming.

Evidence

Portland 2030, Portland Sustainable 2017 Report The Paris Agreement, the reduction of CO2 goals city wide , The Portland South Portland Sustainable documents, FAA recommendations, EPA community recommendations, Charlotte's Witts document, global warming, coastal damage, damage to the Fore River ecosystem, and the lack of environmental oversight contribute to a comprehensive lack of understanding of environmental sustainability efforts, goals, and impacts on the community and ecosystems.

13. Portland's city government isn't considering neighborhood concerns in the airport management process. There's no comprehensive airport development plan addressing negative impacts to the community. The 2018 Sustainable Master Plan, created with community input, isn't being followed. Stakeholders must be involved in future plans.

Evidence

There's no existing airport development plan addressing negative issues and constraints with stakeholder input. The PWM master plan lacks nodal transportation concepts and fails to address expansion-related challenges and solutions. If the 2018 master plan isn't being adhered to regarding expansion, a new airport development plan should be created,

incorporating community involvement and adherence to its directives. The airport's mission statement should guide this process.

14. Portland's government neglects environmental impacts on neighborhoods from airport management. One solution would be to form a community committee to collaborate with airport management on best practices. . Proceeding with the expansion as proposed could lead to property devaluation, legal issues, and costly mitigation efforts in the future.

Evidence

Total wetlands taken are not disclosed. ,Total impervious surfaces are not disclosed , total CO2 production is not disclosed , chemical input to the Fore River, pollution in various forms, carbon production, wetland damage totals, forested wetlands removed for surface Surface parking , previous impacts and removal of forested wetlands , total runoff outflow to the Fore River, downplaying environmental concerns, and non adherence to the airport's mission statement should all be considered when evaluating the environmental impact and sustainability of airport operations and expansion plans into the future.

15. Examples of not involving the community as major stakeholders: Non-disclosure of impacted wetlands at public meetings, exclusion of objections in permit applications, failure to disclose wetland impacts and inaccuracies in applications, justification of the project using a misrepresented proposal, downplaying environmental impact, damage to urban forest and buffer contrary to the master plan, lack of project description in the master plan, then using it to justify the project, statements in applications lacking environmental impact studies, unwillingness to address neighborhood concerns and rushing the process, and master plan contradictions regarding parking expansion mapping are all indications of inadequate environmental consideration and community engagement in the project.

Evidence, 1.

The proposed parking expansion isn't depicted in the master plan's mapping for short, intermediate, or long-term development. Despite this, the process is portrayed as straightforward for building the expansion by the Airport management and described as “called out for in the

DEP sloda application" . This is false. There is no justification for this project outlined in the 2018 master plan.

.

Evidence, 2.

The PWM 2018 sustainable plan encompasses short-term, intermediate, and long-term planning along with recommended development and sensitivities mapping. It includes wetland mapping and recommendations for sustainable development in line with environmental sensitivities.

16. Portland city governance is not taking into consideration community planning issues related to the negative aspects of the airport growth such as traffic on congress, transportation inadequacies, Enforcement of EPA standards related to water and pollution, FAA recommendations related to community input. The airport seems to exist in a vacuum unrelated to environmental concerns or community input.

Evidence

FAA documents, EPA documents, DEP documents, documents on chemical exposure near airports, the Airport 150 sound plan, point pollution documents, airport chemical and health exposure documents, sleep studies, and the airport's mission statement are all crucial for understanding environmental and health impacts, as well as compliance and mitigation measures related to airport operations

17. No alternatives to the Parking expansion plan have been explored by the city. The city and airport have put forth zero alternatives to this project and the justification for this project is not based on data for parking needs or impact. No alternatives have been explored in the DEP application or the Portland planning documents.

Potential alternatives:

- Utilize existing offsite locations for long-term parking.

- Improve the parking pay system for enhanced efficiency.
- Maximize the use of existing parking spaces.
- Upgrade the lower Toye area to accommodate an additional 300 parking spaces.
- Implement cell phone pay options for convenience.
- Enhance tracking mechanisms for better management of parking availability
- Improve online reservation systems to streamline parking access.
- Install covers on existing parking garages for weather protection.
- Expand parking garage infrastructure to meet growing demand.
- Making efficient use of existing resources to optimize parking solutions.

We recommend improving city council involvement in night-time flight scheduling to reduce the current 23% volume, thereby addressing parking issues promptly. Adhere to scheduling recommendations outlined in the 2005 Airport 150 plan regarding night flights. Require city council approval for flight schedules, as advised in the 2005 150 plan, ensuring community input and oversight.

18. Acknowledge community harm by the airport. Start to work with the community to find solutions. This will be very costly to mitigate in the future. The airport is causing harm and the city needs to acknowledge this . Air pollution , noise pollution, water pollution - this parking expansion conflicts with the airports *own mission statement.*

Evidence

PWM Mission statement

"The Portland International Jetport commits to be a premier New England Airport. We will provide a convenient, safe , and environmentally conscious gateway that exceeds our travelers expectations while reflecting the essence of the Maine experience. "

19. The proposed parking project lacks nodal transportation planning and is a short-term, environmentally harmful solution. Instead, explore creative, comprehensive transportation

solutions like raised garages to improve citywide transportation, as outlined in the City Sustainable Plan 2017 and addressing broader transportation issues.

Evidence

Transcripts of initial DEP meetings and community objections related to transportation issues and non-disclosure of illegally filled wetlands sets a negative environmental precedent and makes future enforcement challenging. Profiting from this practice undermines environmental leadership and misleads the public. The city's approval of this approach will have lasting negative impacts and shouldn't be acceptable for wetland acquisition permits.

Future Transportation Planning Proposals:

Consider incorporating the following elements into future transportation planning:

- City Sustainable Plan 2017: Align transportation initiatives with the sustainability goals outlined in the city's plan, prioritizing eco-friendly modes of transportation and reducing carbon emissions.
- COG Planning: Collaborate with regional Councils of Governments (COGs) to coordinate transportation planning efforts across municipalities and address broader regional transportation challenges.
- Bus Service: Invest in the expansion and improvement of bus services to enhance public transportation accessibility and encourage modal shift away from single-occupancy vehicles.
- Larger Transportation Issues: Address larger transportation issues such as traffic congestion, infrastructure maintenance, and accessibility to ensure a comprehensive and integrated approach to transportation planning.

By integrating these elements into transportation planning efforts, the city can work towards creating more sustainable, efficient, and accessible transportation systems that benefit both residents and the environment.

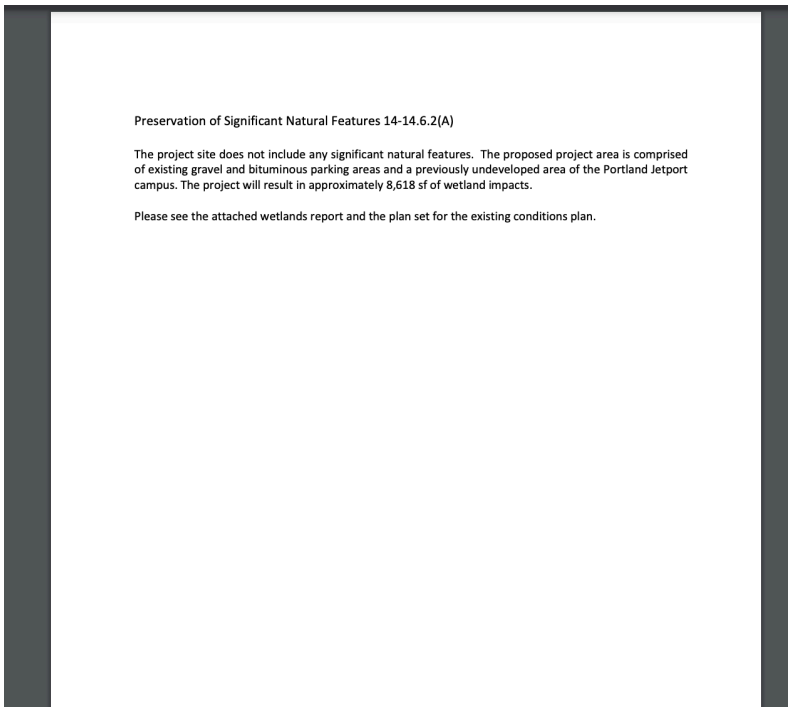
Key Evidence regarding the non disclosure of impacted wetlands.

1. Non-disclosure of a vernal pond (pond 5273) despite its importance for local ecosystems.
2. Lack of information or disclosure about the impacts of the development on the surrounding environment.
3. Incorrect disclosures regarding impervious areas in the SLODA permit application, which could affect assessments of environmental impact.
4. Failure to disclose the presence of wetlands on the Toye property and the illegal filling of these wetlands during the initial DEP meeting.
5. Incomplete mapping and non-disclosure of wetland impacts, further obscuring the true environmental consequences of the project.
6. Incomplete mapping and non disclosure of wetland impacts related to the original cell phone location and non disclosure of public input in the subsequent Dep application. .

Conclusion

Community support is integral to the sustainable growth of the PWM airport. While the proposed long-term parking project may seem like a quick solution, it fails to address the larger issues at hand. Its approval risks exacerbating public perception and leading to lasting negative environmental consequences for our city and its residents. The importance of preserving the current 5-acre wooded wetland buffer cannot be overstated, as it serves as a vital safeguard against noise and pollution. Replacing it with surface parking would only amplify these issues, contributing to a car-dependent culture and undermining our efforts towards a greener, more sustainable future.

Waldren, Carter <waldrenc@westbrookschools.org> 1:38 PM (21 minutes ago)
to planning@portlandmaine.gov



Preservation of Significant Natural Features 14-14.6.2(A)

The project site does not include any significant natural features. The proposed project area is comprised of existing gravel and bituminous parking areas and a previously undeveloped area of the Portland Jetport campus. The project will result in approximately 8,618 sf of wetland impacts.

Please see the attached wetlands report and the plan set for the existing conditions plan.

The area is not an existing gravel parking area; it is a sloped wetland, shrub and tree hill.
This total is wrong. The wetlands for the upper Toye have been added to the Sloda mapping and should be included in the total impact. The attempt to roll this project into the existing wetland permit that has expired and then do a wetland survey but not include them in this total makes no sense . The vernal pond 5273 is in fact a vernal pond and should be afforded the 250 buffer zone. The dates for the assessment are incorrect per other permit documents and the pond is not permanent hydric and has more than the requisite amount of wood frog egg masses to qualify as a protected wetland pond.

Carter Waldren
Portland Maine, 04102

marchie1962@gmail.com <marchie1962@gmail.com> 1:22 PM (1 hour ago)

to planningboard@portlandmaine.gov

To the Planning Board,

The proposed expansion of surface parking lots at the Portland Jetport raises serious concerns. The plan involves the unnecessary destruction of acres of woods and wetlands—contradicting the City's sustainability goals and neglecting viable, less destructive alternatives.

The Jetport's plan also fails to align with Portland's long-term vision for sustainable, multi-modal transportation. Instead, it prioritizes short-term, car-centric fixes at the expense of the Jetport's charm, character, and environmental integrity.

Alternatives have been proposed by the community, including accelerating the time table for expanding the existing parking garage or taking the generous offer made by South Portland to utilize empty parking lots at the Maine Mall. These options address parking needs without causing avoidable environmental harm.

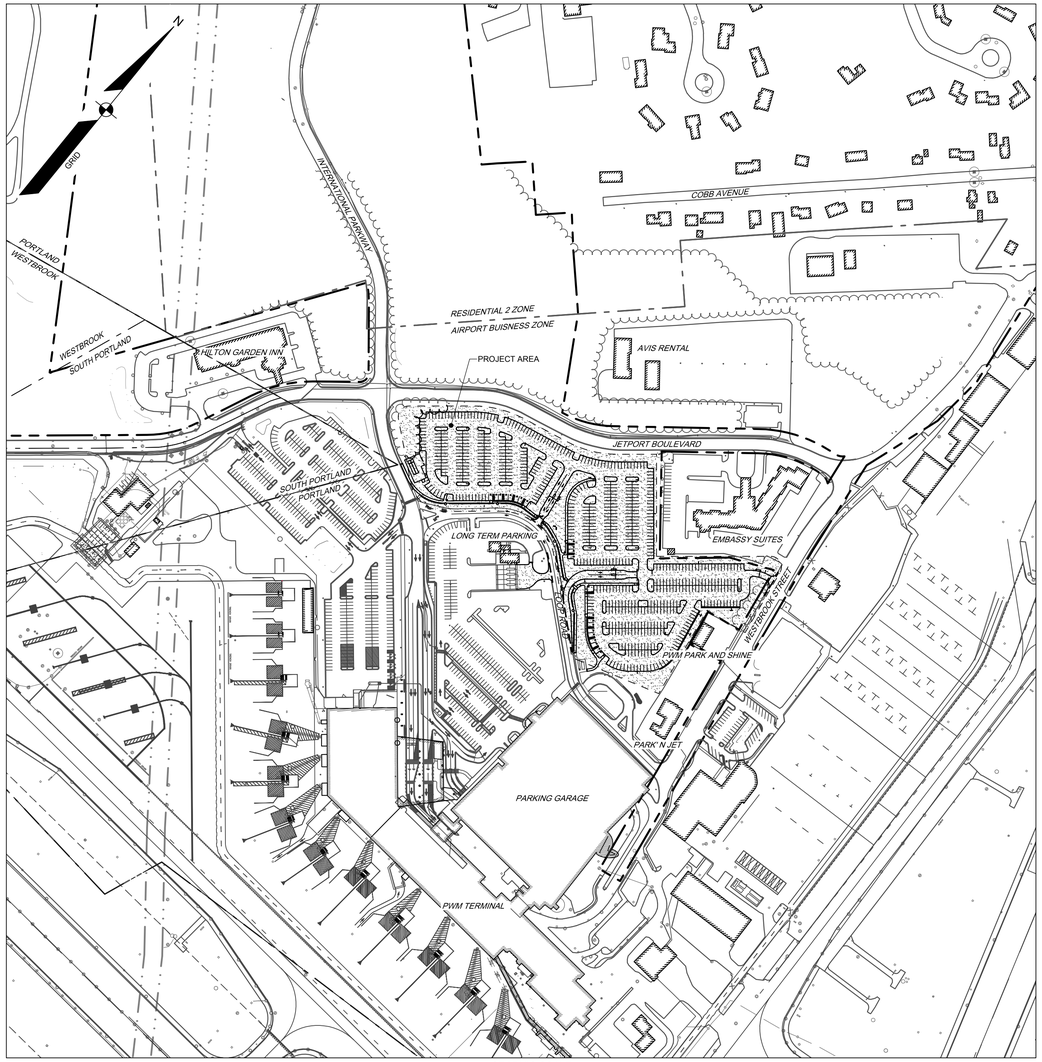
I urge the Planning Board to advocate for solutions that support growth while preserving our environment. Growth and sustainability are not mutually exclusive—creative, intentional planning can achieve both.

Thank you for your consideration.

Sincerely,
Michael Archibald
126 Stroudwater Rd
Portland, ME 04102

PORTLAND INTERNATIONAL JETPORT
PARKING EXPANSION

1001 WESTBROOK STREET
PORTLAND, MAINE 04102



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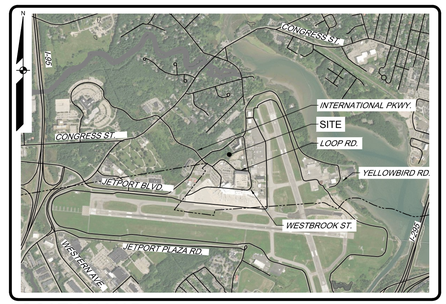
1 INCH = 200FT.



LOCATION MAP NTS

Sheet List Table

SHEET	TITLE
G-001	COVER SHEET
G-002	NOTES & LEGEND
C-003	DEMOLITION PLAN
C-100	OVERALL SITE PLAN
C-101	SITE PLAN
C-102	SITE PLAN
C-103	SITE PLAN
C-200	OVERALL GRADING PLAN
C-201	GRADING PLAN
C-202	GRADING PLAN
C-203	GRADING PLAN
C-300	OVERALL UTILITY PLAN
C-301	UTILITY PLAN
C-302	UTILITY PLAN
C-303	UTILITY PLAN
C-304	PIPE AND STRUCTURE DATA TABLES
L-100	OVERALL LANDSCAPE PLAN
L-101	TREE REMOVAL & PRESERVATION PLAN
L-102	LANDSCAPE PLAN
L-103	LANDSCAPE PLAN
L-104	LANDSCAPE PLAN
C-400	CONSTRUCTION SEQUENCE PLAN
C-500	EROSION CONTROL NOTES
C-501	EROSION CONTROL DETAILS
C-502	SITE DETAILS
C-503	SITE DETAILS
C-504	SITE DETAILS
C-505	SITE DETAILS
C-506	SITE DETAILS
C-507	SITE DETAILS
1 OF 5	BOUNDARY SURVEY
2 OF 5	BOUNDARY SURVEY
3 OF 5	BOUNDARY SURVEY
4 OF 5	BOUNDARY SURVEY
5 OF 5	BOUNDARY SURVEY
1 OF 1	SITE PHOTOMETRICS PLAN

APPLICANT:

PORTLAND INTERNATIONAL JETPORT
PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

ENGINEER/SURVEYOR/
LANDSCAPE ARCHITECT:

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

AMY BELL SEGAL, RLA 2265
LICENSED LANDSCAPE ARCHITECT — STATE OF MAINE — Amy Bell Segal No. 2265 — 08.30.24

PAUL D. OSTROWSKI, PE 11175
STATE OF MAINE — REGISTERED PROFESSIONAL ENGINEER — PAUL D. OSTROWSKI No. 11175 — 08/30/2024

REV.	BY:	DATE:	STATUS:
E.	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
D.	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
C.	PDO	06/28/2024	OVERALL GRADING PLAN REISSUED TO MAINE DEP AND ACOE
B.	PDO	03/19/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
A.	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM SEBAGO TECHNICS, INC. ANY ALTERATIONS AUTHORIZED BY OTHERS, 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

COVER SHEET
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 200'
PROJECT	19059

SHEET G-001

F:\Projects\19000\19059\DWG\Design\19059 C.dwg - 8/30/2024 2:00 PM - TANNER F. GOODINE

19059 C.dwg, TAB:G-001 Cover

LEGEND

EXISTING		PROPOSED
	PROPERTY LINE/R.O.W.	
	ABUTTER LINE/R.O.W.	
	DEED LINE/R.O.W.	
	TIE LINE	
	SETBACK	
	EASEMENT	
	BUFFER	
	FLOODPLAIN	
	FLOODWAY	
	CENTERLINE	
⊡	MONUMENT	■
◎	IRON PIPE/ROD	●
◎	DRILL HOLE	◉
C1/L1	DEED CALL	
C1/L1	CURVE/LINE NO.	C1/L1
	SOILS	
	ZONE LINE	
	ZONE LINE ON PL	
BENCHMARK DESCRIPTION WITH ELEVATION	BENCHMARK	
△	SURVEY CONTROL	
TP-1	TEST PIT	
MW-1	MONITORING WELL	
B-1	BORING	
	BUILDING	
	DECK/STEPS/ OVERHANG	
	EDGE WETLAND	
	WETLANDS	
	UPLANDS	
	STREAM	
	LEDGE	
	EDGE PAVEMENT	
	PAVEMENT SAWCUT	
	EDGE CONCRETE	
	PAVEMENT PAINT	
	EDGE GRAVEL	
	CURB LINE	
	EDGE OF WATER	
	TREELINE	
120 118	CONTOURS	120
×120.00	SPOT GRADE	+120.00
	CHAIN LINK FENCE	
X	BARB WIRE FENCE	X
	STOCKADE FENCE	
	GUARD RAIL	
	STONE WALL	
	RETAINING WALL	
	DECIDUOUS TREE	X
	CONIFEROUS TREE	X
	MULCH LINE	
	BOLLARD	●
	SIGN	
	RAILROAD	
G	GAS	G
	GAS GATE VALVE	GV
GM	GAS METER	
G	GAS MANHOLE	
W	WATER	W
	WATER GATE VALVE	WV
	WATER SHUT OFF	WV
	HYDRANT	
W	WATER MANHOLE	
W	WELL	W
S	SANITARY SEWER	S
FM	FORCE MAIN	FM
S	SANITARY MANHOLE	
	SEWER CLEAN OUT	CO
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	E
EM	ELECTRIC METER	
H	HVAC UNIT	
T	TELEPHONE MANHOLE	
	LIGHT POLE	
	UTILITY POLE	
	GUY WIRE	
	DRAINAGE DITCH	
	EROSION CONTROL BLANKET	
	FILTER BARRIER	FB
	RIPRAP	
	CHECK DAM	
	INLET PROTECTION	
	BOULDER	

GENERAL 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. CURRENT OWNER:

   CITY OF PORTLAND
   389 CONGRESS ST.
   PORTLAND, MAINE 04101
6. ALL WORK SHALL CONFORM TO THE APPLICABLE CODES AND ORDINANCES.
7. CONTRACTOR SHALL VISIT THE SITE AND FAMILIARIZE HIM OR HERSELF WITH ALL CONDITIONS AFFECTING THE PROPOSED WORK AND SHALL MAKE PROVISIONS AS TO THE COST THEREOF. CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIM OR HERSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.
8. CONTRACTOR SHALL NOTIFY ENGINEER OF ALL PRODUCTS OR ITEMS NOTED AS "EXISTING" WHICH ARE NOT FOUND IN THE FIELD.
9. PROVIDE ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND OWNER'S REQUIREMENTS UNLESS SPECIFICALLY OTHERWISE INDICATED OR WHERE LOCAL CODES OR REGULATIONS TAKE PRECEDENCE.
10. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. ANY UNUSUAL CONDITIONS SHALL BE REPORTED TO THE ATTENTION OF THE ENGINEER.
11. CONTRACTOR SHALL CLEAN AND REMOVE DEBRIS AND SEDIMENT DEPOSITED ON PUBLIC STREETS, SIDEWALKS, ADJACENT AREAS, OR OTHER PUBLIC WAYS DUE TO CONSTRUCTION.
12. CONTRACTOR SHALL INCORPORATE PROVISIONS AS NECESSARY IN CONSTRUCTION TO PROTECT EXISTING STRUCTURES, PHYSICAL FEATURES, AND MAINTAIN SITE STABILITY DURING CONSTRUCTION. CONTRACTOR SHALL RESTORE ALL AREAS TO ORIGINAL CONDITION AND AS DIRECTED BY DESIGN DRAWINGS.
13. SITE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS PRIOR TO CONSTRUCTION.
14. ALL PAVEMENT MARKINGS AND DIRECTIONAL SIGNAGE SHOWN ON THE PLAN SHALL CONFORM TO THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) STANDARDS.
15. ALL PAVEMENT JOINTS SHALL BE SAWCUT PRIOR TO PAVING TO PROVIDE A DURABLE AND UNIFORM JOINT.
16. NO HOLES, TRENCHES OR STRUCTURES SHALL BE LEFT OPEN OVERNIGHT IN ANY EXCAVATION ACCESSIBLE TO THE PUBLIC OR IN PUBLIC RIGHTS-OF-WAY.
17. IMMEDIATELY UPON COMPLETION OF CUTS/FILLS, THE CONTRACTOR SHALL STABILIZE DISTURBED AREAS IN ACCORDANCE WITH EROSION CONTROL NOTES AND AS SPECIFIED ON PLANS.
18. THE CONTRACTOR SHALL BE FULLY AND SOLELY RESPONSIBLE FOR THE REMOVAL, REPLACEMENT AND RECTIFICATION OF ALL DAMAGED AND DEFECTIVE MATERIAL AND WORKMANSHIP IN CONNECTION WITH THE CONTRACT WORK. THE CONTRACTOR SHALL REPLACE OR REPAIR AS DIRECTED BY THE ENGINEER ALL SUCH DAMAGED OR DEFECTIVE MATERIALS WHICH APPEAR WITHIN A PERIOD OF ONE YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION.
19. ALL WORK PERFORMED BY THE GENERAL CONTRACTOR AND/OR TRADE SUBCONTRACTOR SHALL CONFORM TO THE REQUIREMENTS OF LOCAL, STATE OR FEDERAL LAWS, AS WELL AS ANY OTHER GOVERNING REQUIREMENTS, WHETHER OR NOT SPECIFIED ON THE DRAWINGS.
20. WHERE THE TERMS "APPROVED EQUAL", "OTHER APPROVED", "EQUAL TO", "ACCEPTABLE" OR OTHER GENERAL QUALIFYING TERMS ARE USED IN THESE NOTES, IT SHALL BE UNDERSTOOD THAT REFERENCE IS MADE TO THE RULING AND JUDGEMENT OF SEBAGO TECHNICS, INC.
21. THE GENERAL CONTRACTOR SHALL PROVIDE ALL NECESSARY PROTECTION FOR THE WORK UNTIL TURNED OVER TO THE OWNER.
22. THE GENERAL CONTRACTOR SHALL MAINTAIN A CURRENT AND COMPLETE SET OF CONSTRUCTION DRAWINGS ON SITE DURING ALL PHASES OF CONSTRUCTION FOR USE OF ALL TRADES.
23. THE CONTRACTOR SHALL TAKE FULL RESPONSIBILITY FOR ANY CHANGES AND DEVIATION OF APPROVED PLANS NOT AUTHORIZED BY THE ARCHITECT/ENGINEER AND/OR CLIENT/OWNER.
24. DETAILS ARE INTENDED TO SHOW END RESULT OF DESIGN. ANY MODIFICATION TO SUIT FIELD DIMENSION AND CONDITION SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ANY WORK.
25. BEFORE THE FINAL ACCEPTANCE OF THE PROJECT, THE CONTRACTOR SHALL REMOVE ALL EQUIPMENT AND MATERIALS, REPAIR OR REPLACE PRIVATE OR PUBLIC PROPERTY WHICH MAY HAVE BEEN DAMAGED OR DESTROYED DURING CONSTRUCTION, CLEAN THE AREAS WITHIN AND ADJACENT TO THE PROJECT WHICH HAVE BEEN OBSTRUCTED BY HIS/HER OPERATIONS, AND LEAVE THE PROJECT AREA NEAT AND PRESENTABLE.
26. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING FLOW THROUGH THE EXISTING CLOSED STORM DRAINAGE SYSTEM DURING CONSTRUCTION AND SHALL SUBMIT A WORK PLAN FOR APPROVAL BY THE DESIGN ENGINEER.
27. A WETLAND DELINEATION WAS PERFORMED ON THIS PROJECT SITE MAY OF 2023 BY COLE PETERS, PROFESSIONAL WETLAND SCIENTIST OF SEBAGO TECHNICS, INC. AND LOCATED BY GROUND SURVEY. THIS DELINEATION CONFORMS TO THE STANDARDS AND METHODS OUTLINED IN THE 1987 WETLANDS DELINEATION MANUAL AND NORTHEAST REGIONAL SUPPLEMENT AUTHORED AND PUBLISHED BY THE U.S. ARMY CORPS OF ENGINEERS.

UTILITY DEMOLITION NOTES

1. PROTECT EXISTING BOUNDARY LINE MONUMENTATION. IF DISTURBED, EXISTING MONUMENTATION TO BE RESET BY A PROFESSIONAL LAND SURVEYOR.
2. DEMOLITION OF UTILITIES REQUIRING TREE REMOVAL SHALL BE COORDINATED WITH THE OWNER AND IN ACCORDANCE WITH PROJECT PLANS.
3. UTILITY DEMOLITION SHALL BE COMPLETED IN COORDINATION WITH NEW INFRASTRUCTURE. CONTRACTOR SHALL ENSURE EXISTING SURFACE DRAINAGE IS MAINTAINED DURING CONSTRUCTION.
4. EXISTING SEWER AND STORM DRAINAGE INFRASTRUCTURE TO REMAIN ACTIVE DURING CONSTRUCTION AND UPON COMPLETION OF PROJECT. DEMOLITION/CONSTRUCTION ACTIVITIES SHALL NOT INTERFERE OR IMPEDE EXISTING FLOWS. CONTRACTOR SHALL PROVIDE BYPASS PUMPING AS REQUIRED DURING SEWER AND STORM DEMOLITION AND NEW CONSTRUCTION. DAMAGE TO EXISTING SEWER INFRASTRUCTURE SHALL BE REPAIRED BY CONTRACTOR AT THEIR EXPENSE.
5. DEMOLITION SHOWN IS FOR MAJOR SITE ELEMENTS TO BE DEMOLISHED. OTHER MINOR DEMOLITION MAY BE REQUIRED AS PART OF CONSTRUCTION AND SHALL BE CONSIDERED INCIDENTAL TO THE COST OF CONSTRUCTION. COORDINATE ALL DEMOLITION WORK WITH SITE AND BUILDING DRAWINGS.
6. PRIOR TO ANY DEMOLITION, THE CONTRACTOR SHALL SUBMIT A SEQUENCE OF DEMOLITION PLANS TO THE OWNER. THIS PLAN SHALL DEPICT LOCATIONS OF PROPOSED TERMINATIONS AND ANY TEMPORARY SERVICES THAT WILL BE NEEDED.
7. CONTRACTOR REQUIRED TO CONFIRM/MAINTAIN BENCHMARKS. IF IMPACTED CONTRACTOR IS RESPONSIBLE FOR NOTIFICATION/RELOCATION AND COORDINATION WITH PROJECT TEAM.

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, 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, PAVEMENTS, WALKS, ETC.) SHALL RECEIVE LOAM AND SEED PER DETAIL.
4. SEE UTILITY DRAWINGS FOR PIPE AND STRUCTURE DATA TABLES.

CONSTRUCTION PLAN

1. PROVIDE EROSION CONTROL MEASURES PRIOR TO SITE DISTURBANCE.
2. WETLANDS, ASSOCIATED SETBACKS AND STREAM SETBACKS TO BE STAKED BY OWNER PRIOR TO SITE DISTURBANCE.
3. GRADING AND CLEARING LIMITS SHALL NOT ENCROACH ON ADJACENT PROPERTIES UNLESS NOTED OTHERWISE ON THE PLANS.
4. OPEN AREAS SHALL BE LIMITED TO AREAS BEING WORKED IN. THE AREA STRIPPED OF EXISTING VEGETATION AT ANY GIVEN TIME SHALL BE MINIMIZED AND BE PHASED WHERE PRACTICAL SO THAT AREAS ARE REVEGETATED AND PERMANENTLY STABILIZED BEFORE ADDITIONAL AREAS ARE STRIPPED OF EXISTING VEGETATION. STABILIZE CONSTRUCTION AREAS BY USE OF RIPRAP, SEED, MULCH, OR OTHER GROUND COVER WITHIN ONE WEEK FROM THE TIME IT WAS ACTIVELY WORKED. SURFACES SHALL BE STABILIZED PRIOR TO DIRECTING STORMWATER RUNOFF TOWARD STORMWATER BMPS. PLEASE REFER TO DRAINAGE PLANS FOR WATERSHED AREAS.

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.
13. DURING CLEANING OF SITE AND PRIOR TO TREE AND SHRUB INSTALLATION, CONTRACTOR SHALL REMOVE INVASIVE PLANTS. AREAS WHERE INVASIVE PLANTS ARE REMOVED AND NO OTHER PLANTING IS PROPOSED, AREA SHALL BE LOAM AND SEEDED.

UTILITY NOTES

1. UTILITY INFORMATION DEPICTED HEREON IS COMPILED USING PHYSICAL EVIDENCE LOCATED IN THE FIELD. UTILITIES DEPICTED HEREON MAY NOT NECESSARILY REPRESENT ALL EXISTING UTILITIES. CONTRACTORS AND/OR DESIGNERS NEED TO CONTACT DIG-SAFE SYSTEMS, INC. (1-888-DIG-SAFE) AND FIELD VERIFY EXISTING UTILITIES PRIOR TO CONSTRUCTION AND/OR EXCAVATION. PROTECT EXISTING ONSITE SEWER PIPE AND ADJUST MANHOLE RIMS TO GRADE WHERE APPLICABLE.
2. ALL GRAVITY CONDUIT PIPES SHALL BE INSTALLED USING A PIPE LASER AND TARGET SYSTEM THROUGH THE PIPE. ON PIPE RUNS 50 FEET OR LESS, THE CONTRACTOR SHALL REQUEST ENGINEER'S APPROVAL TO USE OR NOT USE A GROUND LASER.
3. MAINTAIN MINIMUM 5'-6" OF COVER ABOVE TOP OF WATER SERVICE PIPE.
4. MAINTAIN MINIMUM 10 FEET HORIZONTAL SEPARATION BETWEEN WATER SERVICES AND OTHER UTILITIES. MAINTAIN MINIMUM 18 INCHES VERTICAL SEPARATION BETWEEN WATER SERVICES AND OTHER UTILITIES.
5. LOWER OR RAISE WATER SERVICES AS REQUIRED TO MAINTAIN MINIMUM 12 INCH VERTICAL SEPARATION FROM OTHER UTILITIES. WATER SERVICES CROSSING SEWERS SHALL MAINTAIN 12 INCH MINIMUM SEPARATION BETWEEN THE BOTTOM OF WATER LINE AND TOP OF SEWER UNLESS NOTED OTHERWISE ON THE PLANS.
6. PIPE:
   - SEWER PIPE SHALL BE SDR 35 PVC OR APPROVED EQUAL.
   - STORMDRAIN SHALL BE ADS N-12 DUAL WALL HDPE PIPE WITH SMOOTH-WALLED INTERIOR OR APPROVED EQUAL UNLESS NOTED OTHERWISE ON THE UTILITY PLANS.
   - WATER PIPE AND FITTINGS SHALL CONFORM TO THE DISTRICT HAVING JURISDICTION'S SPECIFICATIONS. MAIN WATER SERVICE PIPE SHALL BE DUCTILE IRON, CLASS 52 PUSH-ON PIPE MEETING THE REQUIREMENTS OF AWWA/ANSI C-111/A21.11 (LATEST REVISION). PIPE SHALL BE CEMENT-LINED AWWA/ANSI C104/A21.4 WITH LINING TWICE THE THICKNESS SPECIFIED, AND COATED TWICE WITH A BITUMINOUS SEAL COATING. PROVIDE THRUST BLOCKS AT ALL WATER SERVICE BENDS.
7. COORDINATE ALL UTILITY LOCATIONS AND INVERTS AT BUILDING WITH ARCHITECTURAL, STRUCTURAL AND PLUMBING DRAWINGS.
8. WATER SERVICE ENTRANCE DESIGNS TO INCLUDE METERS AND BACKFLOW PREVENTERS TO MEET ALL STANDARDS AND REQUIREMENTS OF THE DISTRICT HAVING JURISDICTION.
9. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY GRADE CHANGES THAT WILL IMPACT STORM DRAINAGE INFRASTRUCTURE OR OTHER UTILITIES.
10. UTILITIES WITHIN 5 FEET FROM FACE OF BUILDING ARE COORDINATED ON RELEVANT M.E.P. DRAWINGS. CONTRACTOR SHALL COORDINATE INVERTS, CONNECTIONS AND MATERIALS WITH ALL DRAWINGS.
11. CONTRACTOR SHALL FURNISH AND INSTALL TRENCHING, MATERIALS AND BACKFILL FOR ALL UTILITIES. ELECTRICAL AND TELECOM/DATA PROVIDERS WILL PULL PRIMARY SERVICE TO TRANSFORMER AND PANEL. CONTRACTOR RESPONSIBLE FOR TIMING AND COORDINATION WITH UTILITIES AND DRAWINGS. COORDINATE WITH ELECTRICAL DRAWINGS FOR CONDUIT SCHEDULE, TYPE AND SIZES.
12. COORDINATE ALL WATER RELATED WORK WITH DISTRICT HAVING JURISDICTION.
13. THE CONTRACTOR IS HEREBY CAUTIONED THAT ALL SITE FEATURES SHOWN HEREON ARE BASED ON FIELD OBSERVATIONS BY THE SURVEYOR AND BY INFORMATION PROVIDED BY UTILITY COMPANIES. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR SHALL CONTACT DIG SAFE (811) AT LEAST THREE (3) BUT NOT MORE THAN THIRTY (30) DAYS PRIOR TO COMMENCEMENT OF EXCAVATION OR DEMOLITION TO VERIFY HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES.
14. CONTRACTOR SHALL BE AWARE THAT DIG SAFE ONLY NOTIFIES ITS "MEMBER" UTILITIES ABOUT THE DIG. WHEN NOTIFIED, DIG SAFE WILL ADVISE CONTRACTOR OF MEMBER UTILITIES IN THE AREA. CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND CONTACTING NON-MEMBER UTILITIES DIRECTLY. NON-MEMBER UTILITIES MAY INCLUDE TOWN OR CITY WATER AND SEWER DISTRICTS AND SMALL LOCAL UTILITIES, AS WELL AS USG PUBLIC WORKS SYSTEMS.
15. CONTRACTORS SHALL BE RESPONSIBLE FOR COMPLIANCE WITH THE REQUIREMENTS OF 23 MRSA 3360-A. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE WITH THE APPROPRIATE UTILITIES TO OBTAIN AUTHORIZATION PRIOR TO RELOCATION OF ANY EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THESE PLANS. IF A UTILITY CONFLICT ARISES, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER, THE MUNICIPALITY AND APPROPRIATE UTILITY COMPANY PRIOR TO PROCEEDING WITH ANY RELOCATION.

TYPICAL ABBREVIATIONS

AC	ACRE
AFG	ABOVE FINISH GRADE
APPROX.	APPROXIMATELY
BC	BOTTOM OF CURB
BCC	BITUMINOUS CONCRETE CURB
BIT	BITUMINOUS
BLDG	BUILDING
BW	BOTTOM OF WALL
CB	CATCH BASIN
CONC	CONCRETE
CONT	CONTINUOUS
DI	DUCTILE IRON
DIA	DIAMETER
DMH	DRAIN MANHOLE
E.W.	EACH WAY
ELEV	ELEVATION
FFE	FINISH FLOOR ELEVATION
FIN. GR.	FINISH GRADE
FTG	FOOTING
HDPE	HIGH DENSITY POLYETHYLENE
HGT	HEIGHT
HMA	HOT MIX ASPHALT
INV	INVERT
LF	LINEAR FEET
OC	ON CENTER
PVC	POLYVINYL CHLORIDE
PWD	PORTLAND WATER DISTRICT
R	RADIUS
R.O.W.	RIGHT OF WAY
S.F.	SQUARE FEET
SCH	SCHEDULE
SCSC	SLIPFORM CONCRETE SLOPED CURB
SCVC	SLIPFORM CONCRETE VERTICAL CURB
SD	STORM DRAIN
SGC	SLOPED GRANITE CURB
SMH	SEWER MANHOLE SPECS SPECIFICATIONS
SS	SANITARY SEWER
SSGC	SALVAGED SLOPED GRANITE CURB
SVGC	SALVAGED VERTICAL GRANITE CURB
TC	TOP OF CURB
TW	TOP OF WALL
TYP	TYPICAL
VGC	VERTICAL GRANITE CURB
VIF	VERIFY IN FIELD

AMY BELL SEGAL RLA 2265

STATE OF MAINE — LICENSED LANDSCAPE ARCHITECT — Amy Bell Segal — No. 2265 — 08.30.24

PAUL D. OSTROWSKI PE 11175

STATE OF MAINE — PAUL D. OSTROWSKI — No. 11175 — LICENSED PROFESSIONAL ENGINEER — 08/30/2024

REV.	BY	DATE	STATUS
E.	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
D.	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
C.	PDO	05/28/2024	OVERALL GRADING PLAN REISSUED TO MAINE DEP AND ACOE
B.	PDO	03/18/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
A.	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM SEBAGO TECHNICS, INC. ANY ALTERATIONS AUTHORIZED BY OTHERS 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

NOTES & LEGEND

OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

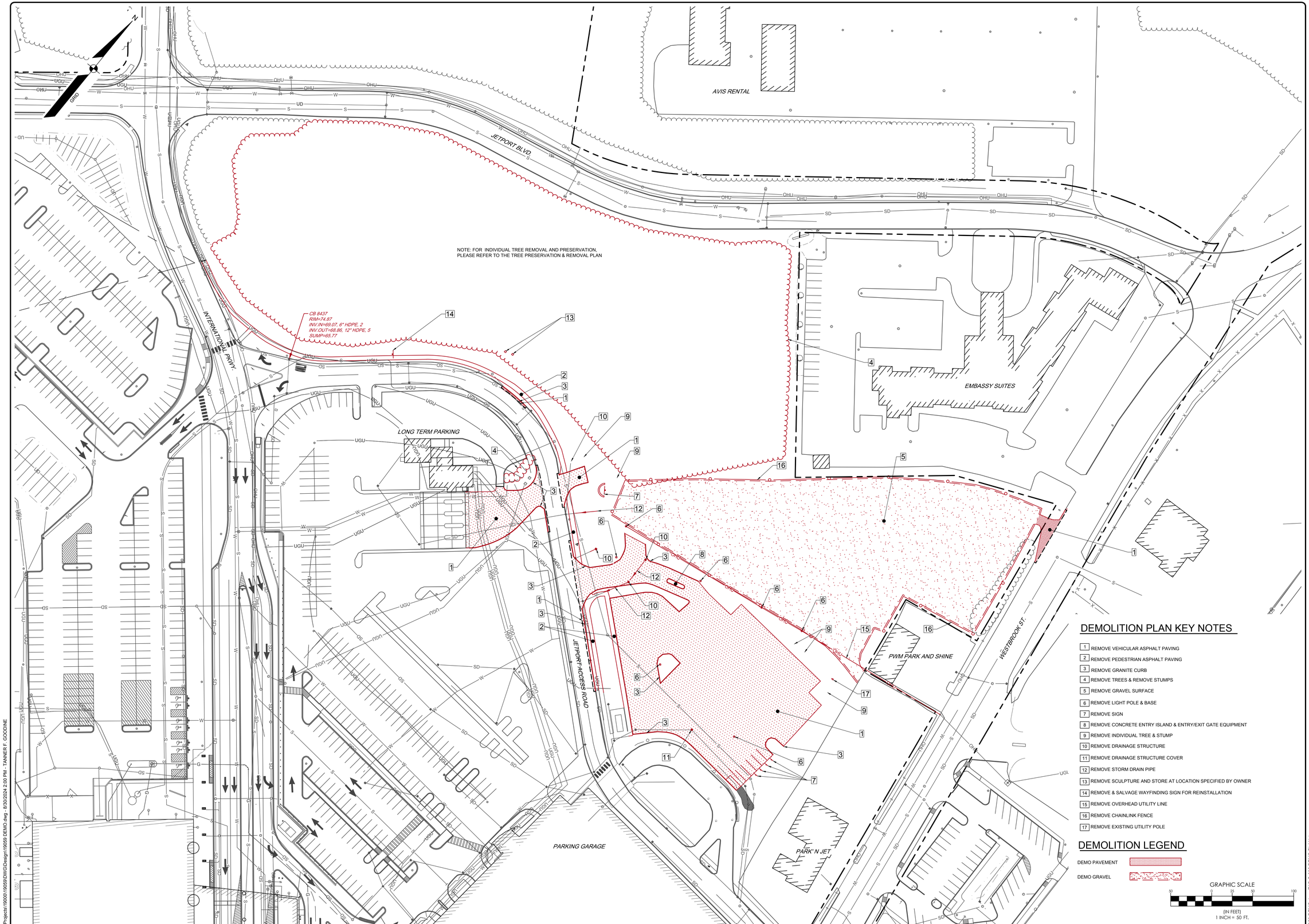
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	N/A
PROJECT	19059

SHEET G-002

F:\Projects\19000\19059\DWG\Design\19059 NL.dwg - 8/30/2024 2:00 PM - TANNER F. GOODINE

19059 NL.dwg - TAB:G-002 Notes & Legend



DEMOLITION PLAN KEY NOTES

1. REMOVE VEHICULAR ASPHALT PAVING
2. REMOVE PEDESTRIAN ASPHALT PAVING
3. REMOVE GRANITE CURB
4. REMOVE TREES & REMOVE STUMPS
5. REMOVE GRAVEL SURFACE
6. REMOVE LIGHT POLE & BASE
7. REMOVE SIGN
8. REMOVE CONCRETE ENTRY ISLAND & ENTRY/EXIT GATE EQUIPMENT
9. REMOVE INDIVIDUAL TREE & STUMP
10. REMOVE DRAINAGE STRUCTURE
11. REMOVE DRAINAGE STRUCTURE COVER
12. REMOVE STORM DRAIN PIPE
13. REMOVE SCULPTURE AND STORE AT LOCATION SPECIFIED BY OWNER
14. REMOVE & SALVAGE WAYFINDING SIGN FOR REINSTALLATION
15. REMOVE OVERHEAD UTILITY LINE
16. REMOVE CHAINLINK FENCE
17. REMOVE EXISTING UTILITY POLE

DEMOLITION LEGEND

DEMO PAVEMENT

DEMO GRAVEL

GRAPHIC SCALE

50 0 25 50 100

(IN FEET)
1 INCH = 50 FT.

AMY BELL SEGAL RLA 2265

LICENSED LANDSCAPE ARCHITECT
Amy Bell Segal
No. 2265
STATE OF MAINE
08.30.24

PAUL D. OSTROWSKI PE 11175

STATE OF MAINE
PAUL D. OSTROWSKI
No. 11175
LICENSED PROFESSIONAL ENGINEER
08/30/2024

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South Portland, ME 04106
Tel. 207-200-2100

DEMOLITION PLAN

OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

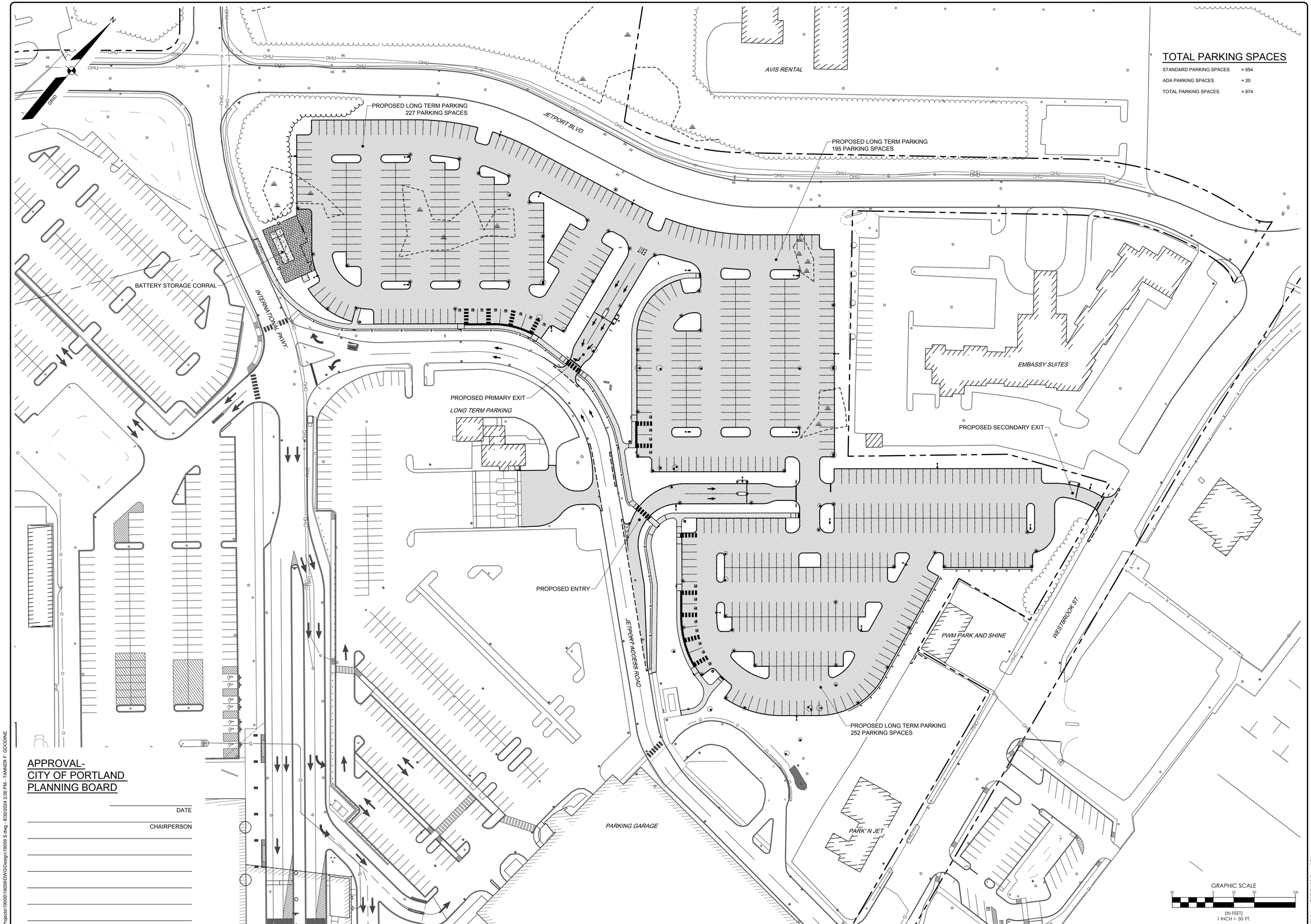
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 50'
PROJECT	19059

SHEET C-003

19059 DEMO.dwg, TAB:C-002 DEMO PLAN 1

F:\Projects\19000\19059\DWG\Design\19059 DEMO.dwg - 8/30/2024 2:00 PM - TANNER F. GOODINE



APPROVAL-
CITY OF PORTLAND
PLANNING BOARD

DATE

CHAIRPERSON

F:\Projects\19000\19059\DWG\Design\19059 S.dwg 8/30/2024 2:00 PM - TANNER F. GOODINE

AMY BELL SEGAL RLA 2265

LICENSED LANDSCAPE ARCHITECT
Amy Bell Segal
No. 2265
STATE OF MAINE
08.30.24

PAUL D. OSTROWSKI PE 11175

STATE OF MAINE
PAUL D. OSTROWSKI
No. 11175
LICENSED PROFESSIONAL ENGINEER
08/30/2024

REV.	BY:	DATE:	STATUS:
E	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
D	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
C	PDO	05/28/2024	OVERALL GRADING PLAN REISSUED TO MAINE DEP AND ACOE
B	PDO	03/18/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
A	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

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

OVERALL SITE PLAN
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 50'
PROJECT	19059

19059 S.dwg, TAB:C-100 Overall Site

SHEET C-100

MATCH LINE - SEE THIS SHEET

MATCH LINE - SEE SHEET C-102

(18) 9' X 18' PARKING SPACES

TRASH RECEPTACLE, TYP. BY OTHERS

PAVEMENT SAWCUT

EXISTING LIGHT POLE, TO REMAIN

ENTRY GATE ISLAND, SEE DETAIL

CURB MATERIAL TRANSITION POINT

STOP BAR

6' CROSSWALK

ADA DETECTABLE WARNING PANELS, TYP.

DIRECTIONAL ARROW, TYP.

(12) 9' X 18' PARKING SPACES

INSTALL PEDESTRIAN FENCE, TYP.

PEDESTRIAN PAVEMENT

(6) 9' X 18' PARKING SPACES
(8) 11' X 18' ADA PARKING SPACES

JETPORT ACCESS ROAD

EXISTING LIGHT POLE, TO REMAIN

ADA DETECTABLE WARNING PANELS, TYP.

TRASH RECEPTACLE, TYP. BY OTHERS

PROPOSED SIDEWALK TO CONNECT TO EXISTING SIDEWALK AND RAMP

4" WHITE PARKING PAINT STRIPING

(28) 9' X 18' PARKING SPACES

(26) 9' X 18' PARKING SPACES

(26) 9' X 18' PARKING SPACES

CURB MATERIAL TRANSITION POINT

SECONDARY EXIT GATE ISLAND, SEE DETAIL

QUEUING FOR ONE PASSENGER VEHICLE

GATE ARM, TYP.

PAVEMENT SAWCUT

(10) 9' X 18' PARKING SPACES

(10) 9' X 18' PARKING SPACES

(12) 9' X 18' PARKING SPACES

(22) 9' X 18' PARKING SPACES

SEE LUMINAIRE SCHEDULE FOR ADDITIONAL LIGHTING INFORMATION

(19) 9' X 18' PARKING SPACES

(17) 9' X 18' PARKING SPACES

(12) 9' X 18' PARKING SPACES

(8) 9' X 18' PARKING SPACES

(36) 9' X 18' PARKING SPACES

EX DMH-8436

4" WHITE PARKING PAINT STRIPING

VEHICULAR PAVEMENT

VEHICULAR GUARDRAIL, TYP.

EXISTING TREE CANOPY TO REMAIN

PWM PARK AND SHINE

PARK' N JET

WESTBROOK ST.

GRID

CURB ABBREVIATIONS

VSCC - VERTICAL SLIPFORM CONCRETE CURB
SSCC - SLOPED SLIPFORM CONCRETE CURB
VGC - VERTICAL GRANITE CURB

TIPDOWN ABBREVIATIONS

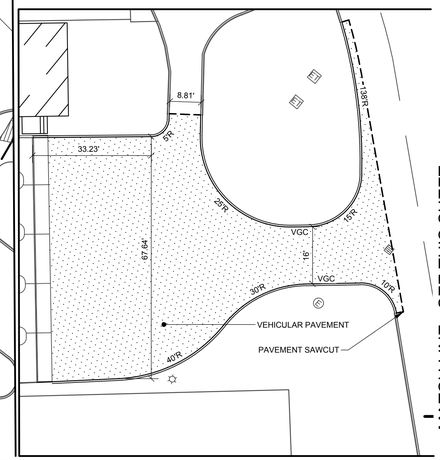
TD1 - SLIPFORM CONCRETE TIPDOWN
TD2 - VERTICAL GRANITE TIPDOWN

SIGN SCHEDULE

S-1 : STOP SIGN
S-2: DO NOT ENTER SIGN
S-3: ADA ACCESSIBLE PARKING SIGN [*MOUNTED ON BOLLARD*]
S-4: STOP & LEFT TURN PROHIBITION SIGN
S-5: VEHICULAR LONG-TERM PARKING SIGNAGE
S-6: PEDESTRIAN WAYFINDING SIGNAGE
S-7: ALTERNATE LANE MERGE SIGN
S-8: CAUTION VEHICLE EXITING SIGN

LUMINAIRE SCHEDULE

LABEL	MOUNTING HEIGHT	LLF	LUM. LUMENS	LUM. WATTS	DESCRIPTION
A5	30'-0" AFG	0.900	9036	85	VP-ST-1-36L-85-3K7-5QW
C1	30'-0" AFG	0.900	5002	39	VP-ST-1-36L-39-3K7-CL
S4	30'-0" AFG	0.900	6876	55	VP-ST-1-36L-55-3K7-4W



MATCH LINE - SEE THIS SHEET

GRAPHIC SCALE
30 0 10 20 40
(IN FEET)
1 INCH = 20 FT.

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AMY BELL SEGAL, RLA 2265

LICENSED LANDSCAPE ARCHITECT
Amy Bell Segal
No. 2265
STATE OF MAINE
08.30.24

PAUL D. OSTROWSKI, PE 11175

STATE OF MAINE
PAUL D. OSTROWSKI
No. 11175
REGISTERED PROFESSIONAL ENGINEER
08/30/2024

SEBAGO TECHNICS
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Suite 4A
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SITE PLAN
OF:
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1001 WESTBROOK STREET
PORTLAND, MAINE 04102
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1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 20'
PROJECT	19059

SHEET C-101

F:\Projects\19000\19059\DWG\Design\19059 S.dwg - 8/30/2024 2:00 PM - TANNER F. GOODINE

19059 S.dwg, TAB:C-101 Site

CURB ABBREVIATIONS

VSCC - VERTICAL SLIPFORM CONCRETE CURB
SSCC - SLOPED SLIPFORM CONCRETE CURB
VGC - VERTICAL GRANITE CURB

TIPDOWN ABBREVIATIONS

TD1 - SLIPFORM CONCRETE TIPDOWN
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S-7: ALTERNATE LANE MERGE SIGN
S-8: CAUTION VEHICLE EXITING SIGN

LUMINAIRE SCHEDULE

LABEL	MOUNTING HEIGHT	LLF	LUM. LUMENS	LUM. WATTS	DESCRIPTION
A5	30'-0" AFG	0.900	9036	85	VP-ST-1-36L-85-3K7-5QW
C1	30'-0" AFG	0.900	5002	39	VP-ST-1-36L-39-3K7-CL
S4	30'-0" AFG	0.900	6876	55	VP-ST-1-36L-55-3K7-4W

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 INCH = 20 FT.

MATCH LINE - SEE SHEET C-103

MATCH LINE - SEE SHEET C-101

JETPORT BLVD.

EMBASSY SUITES

7" HARDWOOD

8" HARDWOOD

13" ASH

12" ASH

12" ASH

15" ASH

CURB MATERIAL TRANSITION POINT

(21) 9' X 18' PARKING SPACES

SEE LUMINAIRE SCHEDULE FOR ADDITIONAL LIGHTING INFORMATION

PEDESTRIAN PAVEMENT

VEHICULAR PAVEMENT

INSTALL PEDESTRIAN FENCE, TYP.

(18) 9' X 18' PARKING SPACES
(4) 11' X 18' ADA PARKING SPACES

(13) 9' X 18' PARKING SPACES

(19) 9' X 18' PARKING SPACES

(20) 9' X 18' PARKING SPACES

(20) 9' X 18' PARKING SPACES

(20) 9' X 18' PARKING SPACES

(28) 9' X 18' PARKING SPACES

TRASH RECEPTACLE, TYP. BY OTHERS

PAVEMENT SAWCUT

EXISTING LIGHT POLE, TO REMAIN

6' CROSSWALK

ENTRY GATE ISLAND, SEE DETAIL

ADA DETECTABLE WARNING PANELS, TYP.

DIRECTIONAL ARROW, TYP.

STOP BAR

4" WHITE PARKING PAINT STRIPING

(18) 9' X 18' PARKING SPACES

(12) 9' X 18' PARKING SPACES

(28) 9' X 18' PARKING SPACES

(26) 9' X 18' PARKING SPACES

(26) 9' X 18' PARKING SPACES

SECONDARY EXIT GATE ISLAND, SEE DETAIL

QUEUING FOR ONE PASSENGER VEHICLE

GATE ARM, TYP.

PAVEMENT SAWCUT

AMY BELL SEGAL, RLA 2265

PAUL D. OSTROWSKI, PE 11175

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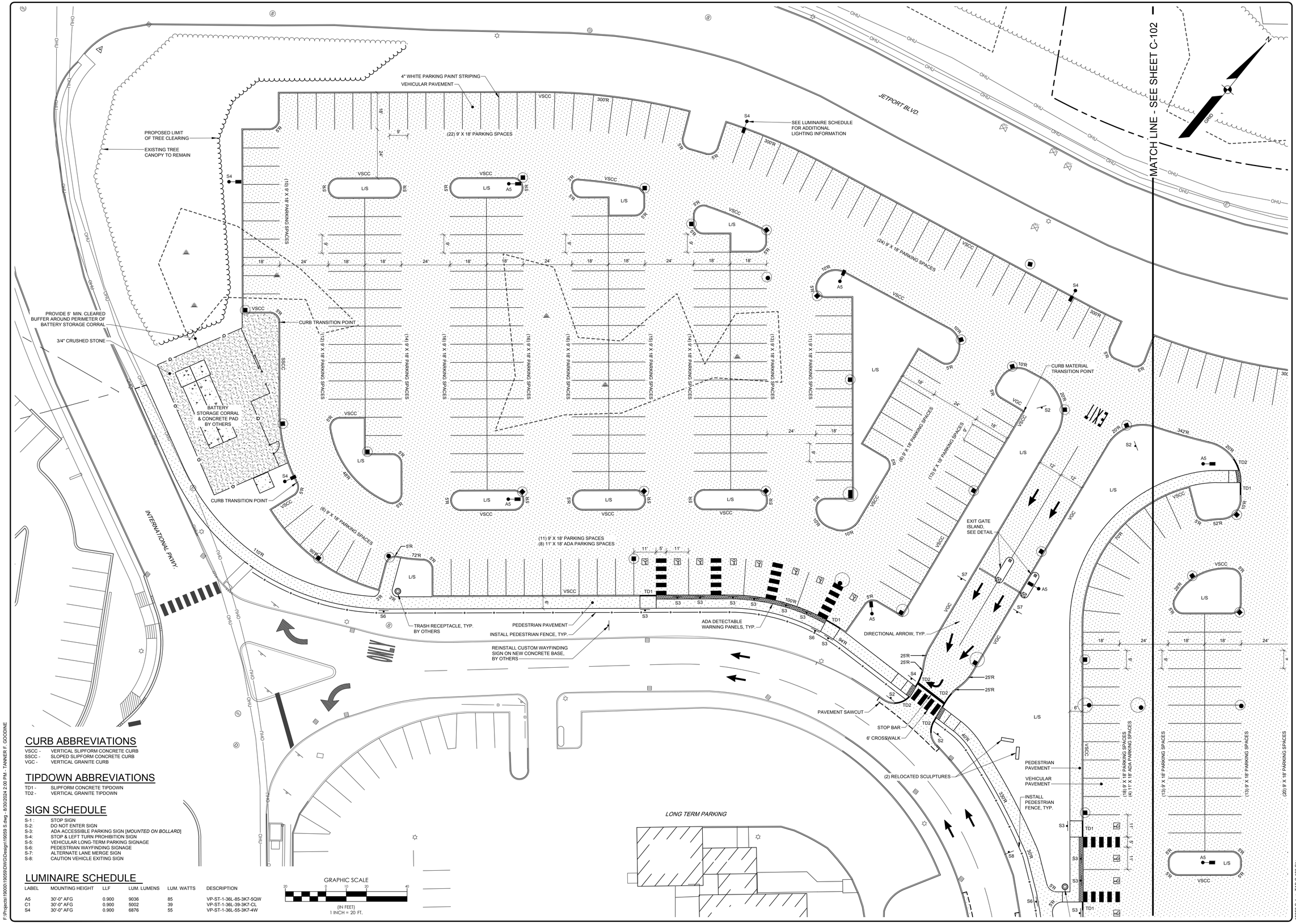
SITE PLAN
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 20'
PROJECT	19059

SHEET C-102

F:\Projects\19000\19059\DWG\Design\19059 S.dwg 8/30/2024 2:00 PM TANNER F. GOODINE

19059 S.dwg, TAB:C-102 Site



CURB ABBREVIATIONS

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SSCC - SLOPED SLIPFORM CONCRETE CURB
VGC - VERTICAL GRANITE CURB

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SIGN SCHEDULE

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LUMINAIRE SCHEDULE

LABEL	MOUNTING HEIGHT	LLF	LUM. LUMENS	LUM. WATTS	DESCRIPTION
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B.	PDO	03/18/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
A.	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

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AMY BELL SEGAL, RLA 2265

LICENSED LANDSCAPE ARCHITECT
Amy Bell Segal
No. 2265
STATE OF MAINE
08.30.24

PAUL D. OSTROWSKI, PE 11175

STATE OF MAINE
PAUL D. OSTROWSKI
No. 11175
LICENSED PROFESSIONAL ENGINEER
08/30/2024

SEBAGO TECHNICS
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SITE PLAN
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 20'
PROJECT	19059

SHEET C-103

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19059 S dwg, TAB C-103 Site

PROPOSED WETLAND IMPACT: 5,812 SF

PROPOSED WETLAND IMPACT: 2,806 SF

PROPOSED WETLAND IMPACT: 791 SF
(PREVIOUSLY PERMITTED BUT NOT IMPACTED WETLAND, L-26841-TC-A-N)

PREVIOUSLY PERMITTED AND IMPACTED WETLAND
(L-26841-TC-A-N)

PROPOSED WETLAND IMPACT: 1,742 SF

AVIS RENTAL

JETPORT BLVD.

INTERNATIONAL PKWY.

LONG TERM PARKING

EMBASSY SUITES

PWM PARK AND SHINE

S. WESTBROOK ST.

JETPORT ACCESS ROAD

PARKING GARAGE

PARK 'N JET

GRAPHIC SCALE
50 0 25 50 100
(IN FEET)
1 INCH = 50 FT.

REV.	BY	DATE	STATUS
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PAUL D. OSTROWSKI PE 11175

AMY BELL SEGAL RLA 2265

STATE OF MAINE
PAUL D. OSTROWSKI
No. 11175
REGISTERED PROFESSIONAL ENGINEER
08/30/2024

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

OVERALL GRADING PLAN

OF:

PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

FOR:

PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 50'
PROJECT	19059

SHEET C-200

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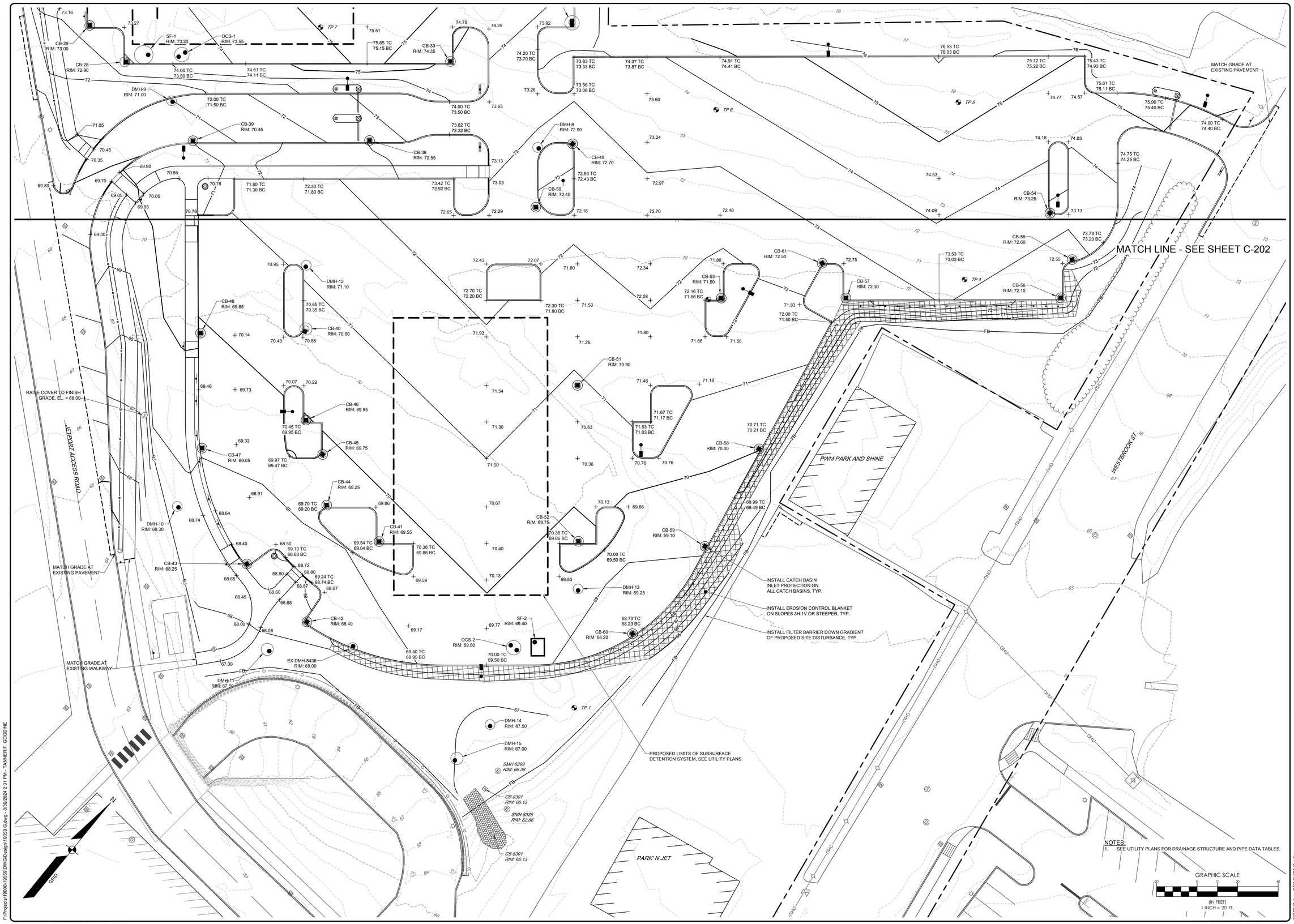
19059 G.dwg, TAB C-200 Overall Grading



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PAUL D. OSTROWSKI PE 11175

AMY BELL SEGAL RLA 2265

STATE OF MAINE — PAUL D. OSTROWSKI — No. 11175 — REGISTERED PROFESSIONAL ENGINEER — 08/30/2024

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GRADING PLAN

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SCALE	1" = 20'
PROJECT	19059

SHEET C-201

19059 G.dwg, TAB C-201 Grading

MATCH LINE - SEE SHEET C-203

JETPORT BLVD.

EMBASSY SUITES

GRID

INSTALL STONE DRIP EDGE, SEE DETAIL

PROPOSED WETLAND IMPACT: 791 SF
(PREVIOUSLY PERMITTED BUT NOT IMPACTED WETLAND, L-26841-TC-A-N)

INSTALL FILTER BARRIER DOWN GRADIENT OF PROPOSED SITE DISTURBANCE, TYP.

INSTALL EROSION CONTROL BLANKET ON SLOPES 3H:1V OR STEEPER, TYP.

PROPOSED LIMITS OF SUBSURFACE DETENTION SYSTEM, SEE UTILITY PLANS

INSTALL CATCH BASIN INLET PROTECTION ON ALL CATCH BASINS, TYP.

PREVIOUSLY PERMITTED AND IMPACTED WETLAND (L-26841-TC-A-N)

PROPOSED WETLAND IMPACT: 1,742 SF

MATCH GRADE AT EXISTING PAVEMENT

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 INCH = 20 FT.

MATCH LINE - SEE SHEET C-201

CB-16 RIM: 77.45
CB-18 RIM: 77.20
CB-21 RIM: 77.80
CB-22 RIM: 77.60
CB-23 RIM: 74.60
CB-25 RIM: 78.15
CB-26 RIM: 77.15
CB-27 RIM: 75.25
CB-28 RIM: 72.90
CB-29 RIM: 73.00
CB-30 RIM: 73.80
CB-31 RIM: 77.25
CB-32 RIM: 78.90
CB-33 RIM: 74.35
CB-34 RIM: 75.00
CB-35 RIM: 77.10
CB-36 RIM: 75.80
CB-37 RIM: 73.55
CB-38 RIM: 72.55
CB-39 RIM: 70.45
CB-49 RIM: 72.70
CB-50 RIM: 72.40
CB-54 RIM: 73.25
CB 8267 RIM: 79.95
CB 8135 RIM: 79.95
CB 8267 RIM: 75.37
CB 8263 RIM: 75.25
DMH 8265 RIM: 80.50
DMH 8265 RIM: 75.64
DMH-3 RIM: 74.80
DMH-4 RIM: 75.35
DMH-6 RIM: 76.40
DMH-7 RIM: 76.50
DMH-8 RIM: 72.90
DMH-9 RIM: 71.00
SF-1 RIM: 73.20
OCS-1 RIM: 73.55
TP 23
TP 11
TP 10
TP 9
TP 8
TP 7
TP 6
TP 5

PAUL D. OSTROWSKI PE 11175
AMY BELL SEGAL, RLA 2265

STATE OF MAINE
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08/30/2024

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GRADING PLAN
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FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 20'
PROJECT	19059

SHEET C-202

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19059 G.dwg, TAB C-202 Grading

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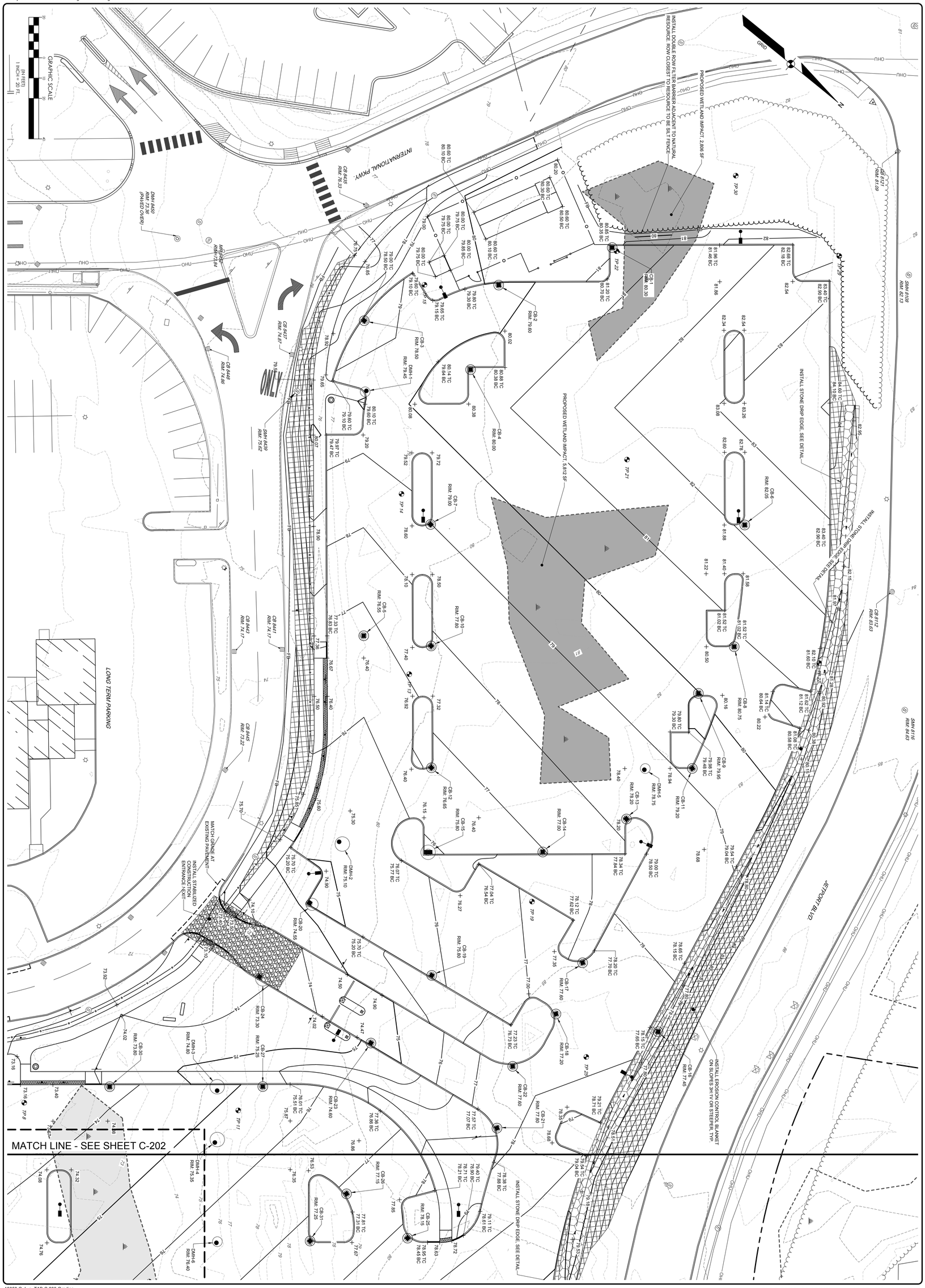

19059 G.dwg, TAB-C-203 Grading

PAUL D. OSTROWSKI PE 11175

AMY BELL SEGAL RLA 2265

SHEET C-203

PROJECT	19059
DATE	02/29/2024
SCALE	1" = 20'
CHECKED	PDO
DRAWN	EPR
DESIGNED	TFG

GRADING PLAN

OF:

PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

FOR:

PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

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

REV:	BY:	DATE:	STATUS:
E	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
D	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
C	PDO	05/28/2024	OVERALL GRADING PLAN REISSUED TO MAINE DEP AND ACOE
B	PDO	03/18/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
A	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

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.

STATE OF MAINE
PAUL D. OSTROWSKI
No. 11175
LICENSED PROFESSIONAL ENGINEER
08/30/2024

UTILITY NOTES:

1. ELECTRICAL LAYOUT SHOWN IS PRELIMINARY. ALL ELECTRICAL WORK, INCLUDING CONDUIT SIZE, TYPE, AND ROUTING TO BE COORDINATED WITH ELECTRICAL ENGINEER.
2. NUMBER OF CONDUITS REQUIRED TO PROVIDE NECESSARY SERVICES TO ENTRY/EXIT GATES, FUTURE ELECTRICAL VEHICLE (EV) CHARGING STATIONS, AND POWER TO SITE LIGHTING TO BE DETERMINED BY ELECTRICAL ENGINEER PRIOR TO CONSTRUCTION.
3. SEE SHEET C-304 FOR PIPE AND STRUCTURE DATA TABLES.

AVIS RENTAL
JETPORT BLVD.
INTERNATIONAL PKWY.
LONG TERM PARKING
EMBASSY SUITES
SUBSURFACE DETENTION & TREATMENT SYSTEM #1 (SF-1)
SUBSURFACE DETENTION & TREATMENT SYSTEM #2 (SF-2)
JETPORT ACCESS ROAD
PARKING GARAGE
PWM PARK AND SHINE
WESTBROOK ST.
PARK' N JET
TP 1 TP 2 TP 3 TP 4 TP 5 TP 6 TP 7 TP 8 TP 9 TP 10 TP 11 TP 12 TP 13 TP 14 TP 15 TP 19 TP 21 TP 22 TP 23 TP 25 TP 31

GRAPHIC SCALE
50 0 25 50 100
(IN FEET)
1 INCH = 50 FT.

REV.	BY	DATE:	STATUS:
E.	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
D.	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
C.	PDO	05/28/2024	OVERALL GRADING PLAN REISSUED TO MAINE DEP AND ACOE
B.	PDO	03/19/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
A.	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

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PAUL D. OSTROWSKI PE 11175
AMY BELL SEGAL RLA 2265

STATE OF MAINE — REGISTERED PROFESSIONAL ENGINEER — PAUL D. OSTROWSKI — No. 11175 — 08/30/2024

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

OVERALL UTILITY PLAN
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 50'
PROJECT	19059

SHEET C-300

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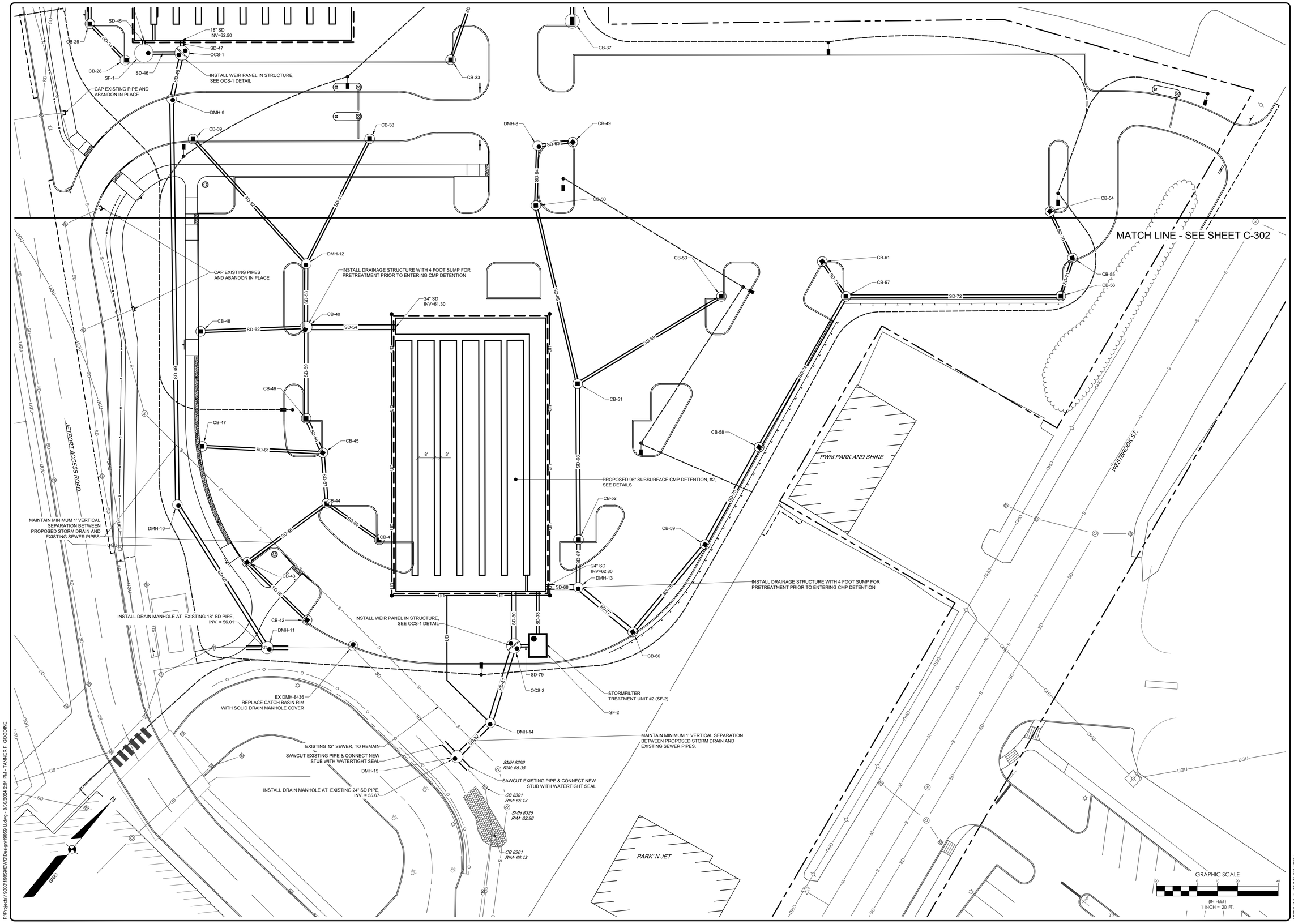
19059 U.dwg, TAB:C-300 Overall Utility



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AMY BELL SEGAL RLA 2265

PAUL D. OSTROWSKI PE 11175

STATE OF MAINE
PAUL D. OSTROWSKI
No. 11175
LICENSED PROFESSIONAL ENGINEER
08/30/2024

REV.	BY:	DATE:	STATUS:
E	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
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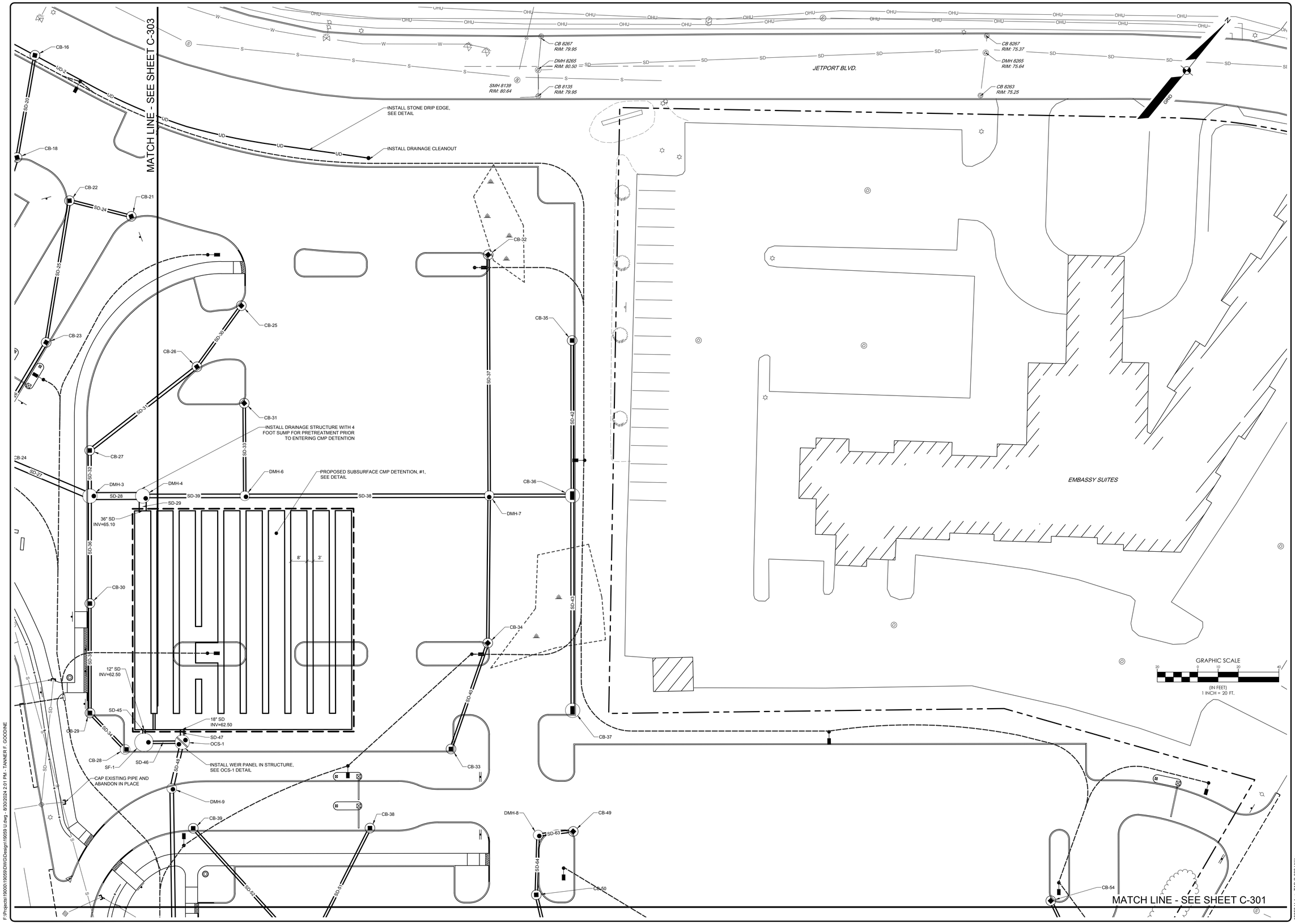
UTILITY PLAN
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 20'
PROJECT	19059

19059 U.dwg, TAB:C-301 Utility

SHEET C-301



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AMY BELL SEGAL RLA 2265

PAUL D. OSTROWSKI PE 11175

STATE OF MAINE
PAUL D. OSTROWSKI
No. 11175
LICENSED
PROFESSIONAL ENGINEER
08/30/2024

REV	BY	DATE	STATUS
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UTILITY PLAN

OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 20'
PROJECT	19059

19059 U.dwg, TAB:C-302 Utility

SHEET C-302

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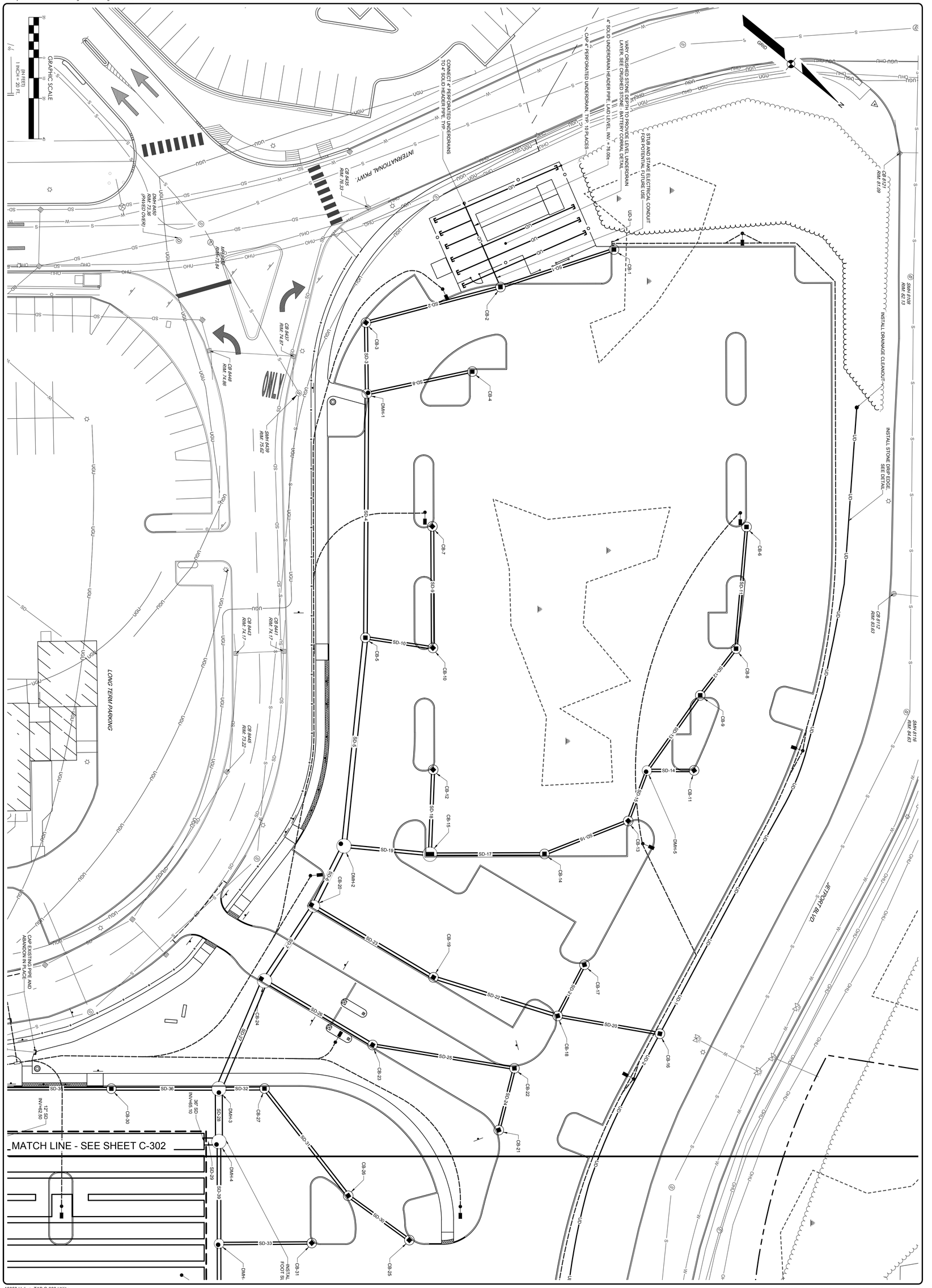

Page 940

19059 U.dwg, TAB-C-303 Utility

PAUL D. OSTROWSKI PE 11175

AMY BELL SEGAL RLA 2265

SHEET C-303

PROJECT	DESIGNED
19059	TFG
SCALE	DRAWN
1" = 20'	EPR
DATE	CHECKED
02/29/2024	PDO

UTILITY PLAN

OF:

PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

FOR:

PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

SEBAGO TECHNICS
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75 John Roberts Rd.
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REV:	BY:	DATE:	STATUS:
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STATE OF MAINE
PAUL D. OSTROWSKI
No. 11175
LICENSED
PROFESSIONAL ENGINEER
08/30/2024

STORM DRAIN STRUCTURE DATA

STRUCTURE	RIM	INV. IN	INV. OUT:	DIAM.
CB-1	80.30		76.70 (SD-1)	48" DIA.
CB-2	79.60	76.00 (SD-1) 76.00 (UD-3)	75.90 (SD-2)	48" DIA.
CB-3	78.50	74.90 (SD-2)	74.65 (SD-3)	48" DIA.
CB-4	80.00		75.50 (SD-8)	48" DIA.
CB-5	76.55	71.75 (SD-10) 71.50 (SD-4)	71.00 (SD-5)	48" DIA.
CB-6	82.05		78.45 (SD-11)	48" DIA.
CB-7	79.00		74.25 (SD-9)	48" DIA.
CB-8	80.75	76.90 (SD-11)	76.80 (SD-12)	48" DIA.
CB-9	79.95	76.35 (SD-12)	76.10 (SD-13)	48" DIA.
CB-10	77.80	72.60 (SD-9)	72.50 (SD-10)	48" DIA.
CB-11	79.20		75.60 (SD-14)	48" DIA.
CB-12	76.65		72.90 (SD-18)	48" DIA.
CB-13	78.20	74.20 (SD-15)	74.10 (SD-16)	48" DIA.
CB-14	77.00	73.40 (SD-16)	73.30 (SD-17)	48" DIA.
CB-15	75.80	72.20 (SD-17) 72.15 (SD-18)	70.00 (SD-19)	72" DOUBLE GRATE
CB-16	77.45	74.45 (UD-1) 74.45 (UD-2)	74.35 (SD-20)	48" DIA.
CB-17	77.60		73.65 (SD-21)	48" DIA.
CB-18	77.20	73.35 (SD-21) 73.35 (SD-20)	73.10 (SD-22)	48" DIA.
CB-19	75.80	71.85 (SD-22)	71.75 (SD-23)	48" DIA.
CB-20	74.55	70.70 (SD-23) 68.10 (SD-6)	68.00 (SD-7)	60" DIA.
CB-21	77.80		74.00 (SD-24)	48" DIA.
CB-22	77.60	73.20 (SD-24)	73.10 (SD-25)	48" DIA.
CB-23	74.60	71.00 (SD-25)	69.30 (SD-26)	48" DIA.
CB-24	73.30	68.15 (SD-26) 67.40 (SD-7)	66.90 (SD-27)	72" DIA.
CB-25	78.15		74.55 (SD-30)	48" DIA.
CB-26	77.15	73.30 (SD-30)	73.05 (SD-31)	48" DIA.
CB-27	75.25	70.75 (SD-31)	70.50 (SD-32)	48" DIA.
CB-28	72.90		68.95 (SD-34)	48" DIA.
CB-29	73.00	68.80 (SD-34)	68.70 (SD-35)	48" DIA.

STORM DRAIN STRUCTURE DATA

STRUCTURE	RIM	INV. IN	INV. OUT:	DIAM.
CB-30	73.80	68.25 (SD-35)	68.00 (SD-36)	48" DIA.
CB-31	77.25		73.65 (SD-33)	48" DIA.
CB-32	78.90		75.30 (SD-37)	48" DIA.
CB-33	74.35		70.75 (SD-40)	48" DIA.
CB-34	75.00	70.15 (SD-40)	70.05 (SD-41)	48" DIA.
CB-35	77.10		73.50 (SD-42)	48" DIA.
CB-36	75.80	72.20 (SD-42) 68.90 (SD-43)	68.65 (SD-44)	72" DOUBLE GRATE
CB-37	73.55		69.95 (SD-43)	72" DOUBLE GRATE
CB-38	72.55		67.30 (SD-51)	48" DIA.
CB-39	70.45		66.77 (SD-52)	48" DIA.
CB-40	70.60	62.30 (SD-59) 65.50 (SD-53) 65.45 (SD-62)	61.80 (SD-54)	60" DIA.
CB-41	69.55		65.95 (SD-60)	48" DIA.
CB-42	68.40		64.80 (SD-55)	48" DIA.
CB-43	68.25	64.40 (SD-55)	64.30 (SD-56)	48" DIA.
CB-44	69.25	65.65 (SD-60) 63.80 (SD-56)	63.55 (SD-57)	48" DIA.
CB-45	69.75	63.30 (SD-57) 64.80 (SD-61)	63.20 (SD-58)	48" DIA.
CB-46	69.95	63.05 (SD-58)	62.80 (SD-59)	48" DIA.
CB-47	69.05		65.45 (SD-61)	48" DIA.
CB-48	69.85		66.05 (SD-62)	48" DIA.
CB-49	72.70		69.10 (SD-63)	48" DIA.
CB-50	72.40	68.40 (SD-64)	68.30 (SD-65)	48" DIA.
CB-51	70.90	66.50 (SD-65) 66.50 (SD-69)	66.00 (SD-66)	48" DIA.
CB-52	69.75	64.70 (SD-66)	64.20 (SD-67)	48" DIA.
CB-53	71.50		67.90 (SD-69)	48" DIA.
CB-54	73.25		69.55 (SD-70)	48" DIA.
CB-55	72.60	69.00 (SD-70)	68.90 (SD-71)	48" DIA.
CB-56	72.10	68.30 (SD-71)	68.20 (SD-72)	48" DIA.
CB-57	72.30	67.16 (SD-72) 67.93 (SD-73)	67.05 (SD-74)	48" DIA.
CB-58	70.00	66.06 (SD-74)	65.81 (SD-75)	48" DIA.

STORM DRAIN STRUCTURE DATA

STRUCTURE	RIM	INV. IN	INV. OUT:	DIAM.
CB-59	69.10	64.81 (SD-75)	64.71 (SD-76)	48" DIA.
CB-60	68.20	64.15 (SD-76)	63.65 (SD-77)	48" DIA.
CB-61	72.50		68.50 (SD-73)	48" DIA.
DMH-1	79.45	73.70 (SD-3) 74.20 (SD-8)	73.60 (SD-4)	48" DIA.
DMH-2	75.10	69.35 (SD-19) 68.60 (SD-5)	68.50 (SD-6)	72" DIA.
DMH-3	74.80	66.25 (SD-27) 70.00 (SD-32) 67.50 (SD-36)	65.75 (SD-28)	72" DIA.
DMH-4	75.35	65.35 (SD-28) 66.30 (SD-39)	65.25 (SD-29)	72" DIA.
DMH-5	78.75	76.10 (SD-13) 75.30 (SD-14)	75.20 (SD-15)	48" DIA.
DMH-6	76.40	66.82 (SD-38) 72.50 (SD-33)	66.72 (SD-39)	48" DIA.
DMH-7	76.50	72.90 (SD-37) 69.30 (SD-41) 68.20 (SD-44)	67.95 (SD-38)	48" DIA.
DMH-8	72.90	68.95 (SD-63)	68.85 (SD-64)	48" DIA.
DMH-9	71.00	60.30 (SD-48)	60.20 (SD-49)	48" DIA.
DMH-10	68.30	58.60 (SD-49)	58.50 (SD-50)	48" DIA.
DMH-11	67.50	56.01 (SD-50) 56.01 (EX. SD-1)	56.01 (EX. SD-2)	60" DIA.
DMH-12	71.10	65.95 (SD-51) 65.95 (SD-52)	65.85 (SD-53)	48" DIA.
DMH-13	69.25	63.70 (SD-67) 63.30 (SD-77)	63.20 (SD-68)	48" DIA.
DMH-14	67.50	57.20 (SD-81) 58.92 (GW-1)	57.10 (SD-82)	48" DIA.
DMH-15	67.00	56.87 (SD-82) 55.67 (EX. SD-3)	55.67 (EX. SD-4)	60" DIA.
EX DMH-8436	69.00			SEE SHEET C-301
OCS-1	73.55	62.50 (SD-47) 60.50 (SD-46)	60.40 (SD-48)	72" DIA.
OCS-2	69.50	57.60 (SD-79) 59.00 (SD-80)	57.50 (SD-81)	72" DIA.
SF-1	73.20	62.50 (SD-45)	60.60 (SD-46)	96" DIA.
SF-2	69.40	59.00 (SD-78)	57.70 (SD-79)	72 x 96 inch Rectangular Structure

STORM DRAIN PIPE DATA

NAME	SIZE	LENGTH	SLOPE
EX. SD-1	18"	8'	0.40%
EX. SD-2	18"	8'	0.30%
EX. SD-3	24"	7'	0.38%
EX. SD-4	24"	6'	0.41%
GW-1	6"	28'	0.50%
SD-1	12"	55'	1.27%
SD-2	12"	65'	1.55%
SD-3	15"	31'	3.07%
SD-4	18"	118'	1.77%
SD-5	24"	100'	2.39%
SD-6	24"	28'	1.44%
SD-7	24"	39'	1.56%
SD-8	12"	49'	2.64%
SD-9	15"	58'	2.85%
SD-10	12"	32'	2.37%
SD-11	12"	58'	2.66%
SD-12	12"	27'	1.66%
SD-13	12"	43'	0.00%
SD-14	12"	19'	1.56%
SD-15	12"	23'	4.42%
SD-16	12"	40'	1.73%
SD-17	12"	52'	2.14%
SD-18	15"	37'	2.04%
SD-19	15"	37'	1.78%
SD-20	12"	47'	2.12%
SD-21	12"	25'	1.22%
SD-22	15"	60'	2.08%
SD-23	15"	64'	1.64%
SD-24	12"	29'	2.72%
SD-25	12"	67'	3.14%

STORM DRAIN PIPE DATA

NAME	SIZE	LENGTH	SLOPE
SD-26	15"	57'	2.02%
SD-27	30"	52'	1.25%
SD-28	36"	20'	1.99%
SD-29	36"	4'	3.44%
SD-30	12"	33'	3.76%
SD-31	15"	63'	3.64%
SD-32	15"	18'	2.85%
SD-33	12"	44'	2.63%
SD-34	12"	21'	0.72%
SD-35	12"	50'	0.90%
SD-36	15"	48'	1.04%
SD-37	12"	115'	2.09%
SD-38	18"	117'	0.97%
SD-39	18"	45'	0.92%
SD-40	12"	51'	1.17%
SD-41	12"	69'	1.09%
SD-42	12"	72'	1.82%
SD-43	15"	103'	1.02%
SD-44	15"	36'	1.25%
SD-45	12"	2'	0.00%
SD-46	12"	12'	0.84%
SD-47	18"	3'	0.00%
SD-48	18"	18'	0.54%
SD-49	18"	196'	0.82%
SD-50	18"	79'	3.15%
SD-51	12"	65'	2.07%
SD-52	12"	79'	1.04%
SD-53	15"	27'	1.30%
SD-54	24"	42'	1.20%
SD-55	12"	37'	1.08%

STORM DRAIN PIPE DATA

NAME	SIZE	LENGTH	SLOPE
SD-56	12"	45'	1.11%
SD-57	15"	23'	1.08%
SD-58	15"	15'	1.01%
SD-59	18"	41'	1.23%
SD-60	12"	28'	1.09%
SD-61	12"	56'	1.17%
SD-62	12"	50'	1.21%
SD-63	12"	13'	1.12%
SD-64	12"	28'	1.64%
SD-65	12"	86'	2.08%
SD-66	18"	77'	1.69%
SD-67	18"	22'	2.32%
SD-68	24"	14'	2.86%
SD-69	12"	83'	1.69%
SD-70	12"	21'	2.56%
SD-71	12"	18'	3.39%
SD-72	15"	104'	1.00%
SD-73	12"	21'	2.74%
SD-74	15"	82'	1.21%
SD-75	18"	51'	1.96%
SD-76	18"	54'	1.04%
SD-77	24"	33'	1.07%
SD-78	12"	23'	0.00%
SD-79	12"	6'	1.70%
SD-80	24"	24'	0.00%
SD-81	24"	35'	0.86%
SD-82	24"	19'	1.19%
UD-1	6"	34'	1.61%
UD-2	6"	26'	2.15%
UD-3	4"	6'	0.00%

PAUL D. OSTROWSKI PE 11175
AMY BELL SEGAL RLA 2265

STATE OF MAINE
PAUL D. OSTROWSKI
No. 11175
REGISTERED PROFESSIONAL ENGINEER
08/30/2024

REV.	BY	DATE:	STATUS:
E.	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
D.	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
C.	PDO	05/28/2024	OVERALL GRADING PLAN REISSUED TO MAINE DEP AND ACOE
B.	PDO	03/18/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
A.	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM SEBAGO TECHNICS, INC. ANY ALTERATIONS AUTHORIZED BY OTHERS WILL 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

PIPE AND STRUCTURE DATA TABLES
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	N/A
PROJECT	19059

SHEET C-304

19059 U.dwg, TAB-C-304 Structure & Pipe Data

F:\Projects\19000\19059\DWG\Design\19059 U.dwg 8/30/2024 2:01 PM TANNER F. GOODINE

PLANT TOTALS:

PROPOSED DECIDUOUS TREES	= 98
PROPOSED CONIFEROUS TREES	= 69
PROPOSED SHRUBS	= 459
PROPOSED PERENNIALS	= 290

SEE SHEETS L102, L103, AND L104 FOR THE PLANT SCHEDULE.

JETPORT BLVD.

INTERNATIONAL PKWY.

JETPORT ACCESS ROAD

WESTBROOK ST.

GRAPHIC SCALE
50 0 25 50 100
(IN FEET)
1 INCH = 50 FT.

F:\Projects\19000\19059\DWG\Design\19059 LS dwg - 8/30/2024 3:15 PM - TANNER F. GOODINE

19059 LS dwg, TAB1-L-100 Overall Landscape

AMY BELL SEGAL RLA 2265

PAUL D. OSTROVSKI PE 11175

LICENSED LANDSCAPE ARCHITECT
Amy Bell Segal
No. 2265
STATE OF MAINE
08.30.24

REV.	BY	DATE:	STATUS:
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WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd.
Suite A
South Portland, ME 04106
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OVERALL LANDSCAPE PLAN
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 50'
PROJECT	19059

SHEET L-100

LEGEND

TREES TO BE PRESERVED:

	>10" DECIDUOUS TREE TO BE PRESERVED	= 22
	>10" CONIFEROUS TREE TO BE PRESERVED	= 3

TREES TO BE REMOVED:

	>10" DECIDUOUS TREE TO BE REMOVED	= 130
X	*>10" ASH TREE TO BE REMOVED **	*= 19 [OUT OF THE 130 ABOVE]*
	>10" CONIFEROUS TREE TO BE REMOVED	= 23
	TOTAL >10" TREES REMOVED	= 153

* MOST ASH TREES ARE INFECTED BY EMERALD ASH BORER AS IDENTIFIED BY THE CITY ARBORIST ON JANUARY 19, 2024

NOTES

1. THIS TREE PRESERVATION AND REMOVAL PLAN HAS BEEN PREPARED IN ACCORDANCE WITH SECTION 4.3 OF THE CITY OF PORTLAND TECHNICAL MANUAL. A TOTAL OR 164 TREES WITH A MINIMUM OF 10" DIAMETER AT BREAST HEIGHT (DBH) WILL BE REMOVED AS A RESULT OF SITE GRADING ASSOCIATED WITH THE DEVELOPMENT OF THE PARKING LOT EXPANSION.
2. TWENTY-SIX (26) TREES, 10" OR GREATER, HAVE BEEN IDENTIFIED TO REMAIN AND BE PROTECTED UNTIL THEY ARE REASSESSED IN THE FIELD FOR PRESERVATION OR REMOVAL BASED ON CONSTRUCTION IMPACTS; A LICENSED LANDSCAPE ARCHITECT FROM SEBAGO TECHNICS WILL VISIT THE SITE WITH THE CITY ARBORIST TO MAKE THE DETERMINATION.
3. TREES TO BE PRESERVED WILL BE FLAGGED IN THE FIELD AND PROTECTED PER THE TREE PRESERVATION DETAILS ON THE PLAN.
4. FENCING/PROTECTIVE BARRIERS SHALL BE ERECTED TO THE WIDEST EXTENT FEASIBLE DURING CONSTRUCTION. THE EXTENT OF THE DRIP LINE WILL NOT BE FEASIBLE GIVEN THE ADJACENT GRADING AND SITE DEVELOPMENT.
5. SIGNS SHALL BE POSTED DURING CONSTRUCTION IDENTIFYING THE "TREE PROTECTION ZONE" OR "LIMIT OF WORK ZONE".

GRAPHIC SCALE
50 0 25 50 100
(IN FEET)
1 INCH = 50 FT.

AMY BELL SEGAL RLA 2265

LICENSED LANDSCAPE ARCHITECT
Amy Bell Segal
No. 2265
STATE OF MAINE
08.30.24

PAUL D. OSTROVSKI PE 11175

REV.	BY	DATE:	STATUS:
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75 John Roberts Rd.
Suite 4A
South Portland, ME 04106
Tel. 207-200-2100

TREE REMOVAL & PRESERVATION PLAN

OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

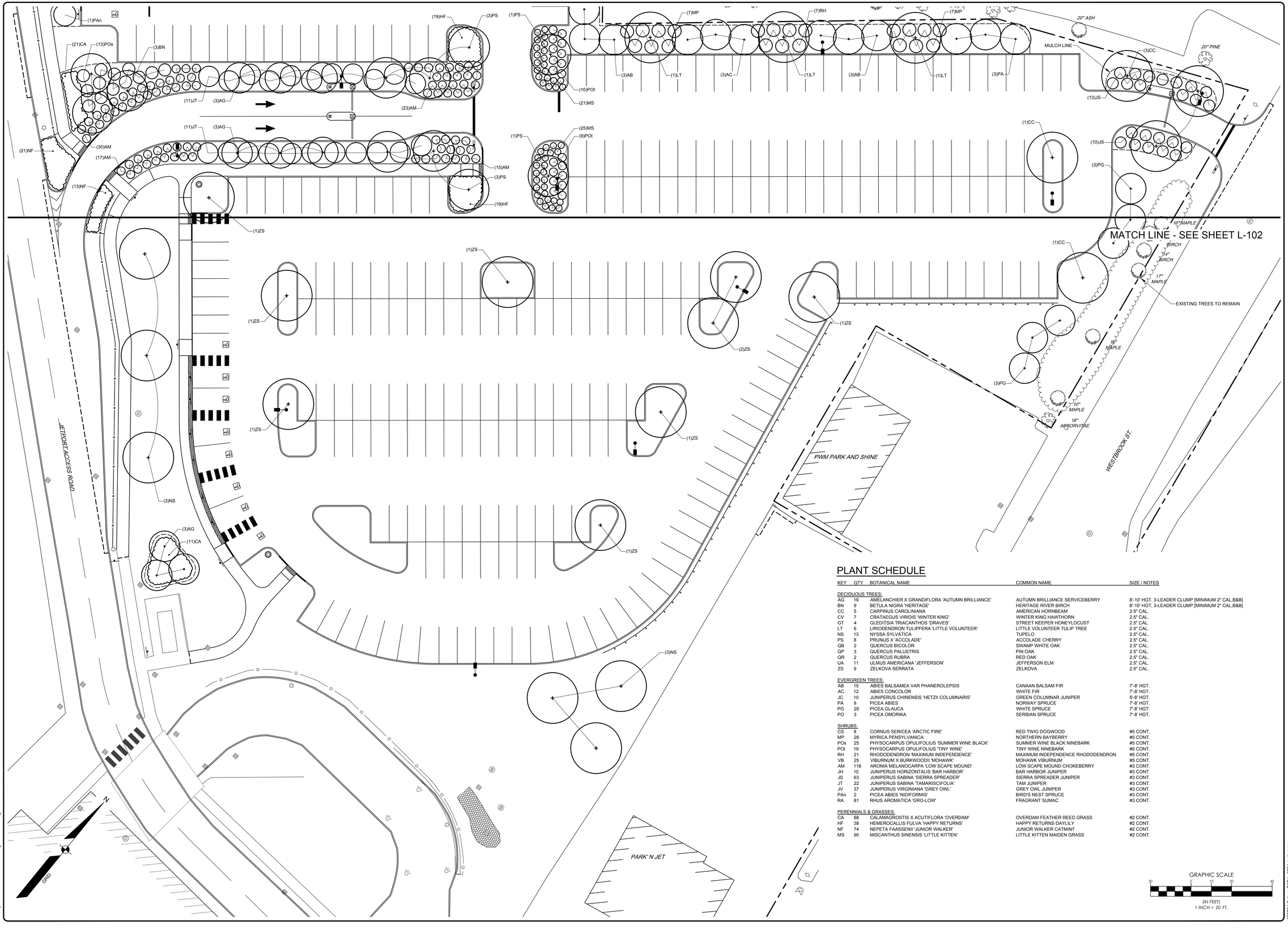
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 50'
PROJECT	19059

SHEET L-101

F:\Projects\19000\19059\DWG\Design\19059 LS.dwg - 8/30/2024 2:02 PM - TANNER F. GOODINE

19059 LS.dwg - TAB:L-101 Remove & Preserve



PLANT SCHEDULE

KEY	QTY	BOTANICAL NAME	COMMON NAME	SIZE / NOTES
DECIDUOUS TREES:				
AG	19	AMELANCHIER X GRANDIFLORA 'AUTUMN BRILLIANCE'	AUTUMN BRILLIANCE SERVICEBERRY	8'-10' HGT, 3-LEADER CLUMP [MINIMUM 2" CAL.B&B]
BN	9	BETULA NIGRA 'HERITAGE'	HERITAGE RIVER BIRCH	8'-10' HGT, 3-LEADER CLUMP [MINIMUM 2" CAL.B&B]
CC	5	CARPINUS CAROLINIANA	AMERICAN HORNBEAM	2.5" CAL.
CV	7	CRATAEGUS VIRIDIS 'WINTER KING'	WINTER KING HAWTHORN	2.5" CAL.
GT	4	GLEDITSIA TRIACANTHOS 'DRAVES'	STREET KEEPER HONEYLOCUST	2.5" CAL.
LT	6	LIRIODENDRON TULIPFERA 'LITTLE VOLUNTEER'	LITTLE VOLUNTEER TULIP TREE	2.5" CAL.
NS	13	NYSSA SYLVATICA	TUPELO	2.5" CAL.
PS	8	PRUNUS X 'ACCOLADE'	ACCOLADE CHERRY	2.5" CAL.
QB	2	QUERCUS BICOLOR	SWAMP WHITE OAK	2.5" CAL.
QP	3	QUERCUS PALUSTRIS	PIN OAK	2.5" CAL.
QR	2	QUERCUS RUBRA	RED OAK	2.5" CAL.
UA	11	ULMUS AMERICANA 'JEFFERSON'	JEFFERSON ELM	2.5" CAL.
ZS	9	ZELKOVA SERRATA	ZELKOVA	2.5" CAL.
EVERGREEN TREES:				
AB	15	ABIES BALSAMEA VAR PHANEROLEPSIS	CANAAN BALSAM FIR	7'-8' HGT.
AC	12	ABIES CONCOLOR	WHITE FIR	7'-8' HGT.
JC	10	JUNIPERUS CHINENSIS 'HETZII COLUMNARIS'	GREEN COLUMNAR JUNIPER	5'-6' HGT.
PA	9	PICEA ABIES	NORWAY SPRUCE	7'-8' HGT.
PG	20	PICEA GLAUCA	WHITE SPRUCE	7'-8' HGT.
PO	3	PICEA OMORIKA	SERBIAN SPRUCE	7'-8' HGT.
SHRUBS:				
CS	8	CORNUS SERICEA 'ARCTIC FIRE'	RED TWIG DOGWOOD	#5 CONT.
MP	28	MYRICA PENSYLVANICA	NORTHERN BAYBERRY	#5 CONT.
POs	25	PHYSOCARPUS OPULIFOLIUS 'SUMMER WINE BLACK'	SUMMER WINE BLACK NINEBARK	#5 CONT.
POt	19	PHYSOCARPUS OPULIFOLIUS 'TINY WINE'	TINY WINE NINEBARK	#5 CONT.
RH	21	RHODODENDRON 'MAXIMUM INDEPENDENCE'	MAXIMUM INDEPENDENCE RHODODENDRON	#5 CONT.
VB	25	VIBURNUM X BURKWOODII 'MOHAWK'	MOHAWK VIBURNUM	#5 CONT.
AM	118	ARONIA MELANOCARPA 'LOW SCAPE MOUND'	LOW SCAPE MOUND CHOKEBERRY	#3 CONT.
JH	10	JUNIPERUS HORIZONTALIS 'BAR HARBOR'	BAR HARBOR JUNIPER	#3 CONT
JS	63	JUNIPERUS SABINA 'SIERRA SPREADER'	SIERRA SPREADER JUNIPER	#3 CONT.
JT	22	JUNIPERUS SABINA 'TAMARISCIFOLIA'	TAM JUNIPER	#3 CONT.
JV	37	JUNIPERUS VIRGINIANA 'GREY OWL'	GREY OWL JUNIPER	#3 CONT.
PAn	2	PICEA ABIES 'NIDIFORMIS'	BIRD'S NEST SPRUCE	#3 CONT.
RA	81	RHUS AROMATICA 'GRO-LOW'	FRAGRANT SUMAC	#3 CONT.
PERENNIALS & GRASSES:				
CA	88	CALAMAGROSTIS X ACUTIFLORA 'OVERDAM'	OVERDAM FEATHER REED GRASS	#2 CONT.
HF	38	HEMEROCALLIS FULVA 'HAPPY RETURNS'	HAPPY RETURNS DAYLILY	#2 CONT.
NF	74	NEPETA FAASSENII 'JUNIOR WALKER'	JUNIOR WALKER CATMINT	#2 CONT.
MS	90	MISCANTHUS SINENSIS 'LITTLE KITTEN'	LITTLE KITTEN MAIDEN GRASS	#2 CONT.

AMY BELL SEGAL RLA 2265

PAUL D. OSTROVSKI PE 11175

Amy Bell Segal No. 2265 LICENSED LANDSCAPE ARCHITECT STATE OF MAINE 08.30.24

REV.	BY	DATE:	STATUS:
A.	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION
B.	PDO	03/18/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
C.	PDO	05/28/2024	OVERALL GRADING PLAN REISSUED TO MAINE DEP AND ACOE
D.	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
E.	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT

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WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd.
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LANDSCAPE PLAN

OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

FOR:
PORTLAND INTERNATIONAL JETPORT PWM

CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 20'
PROJECT	19059

SHEET L-102

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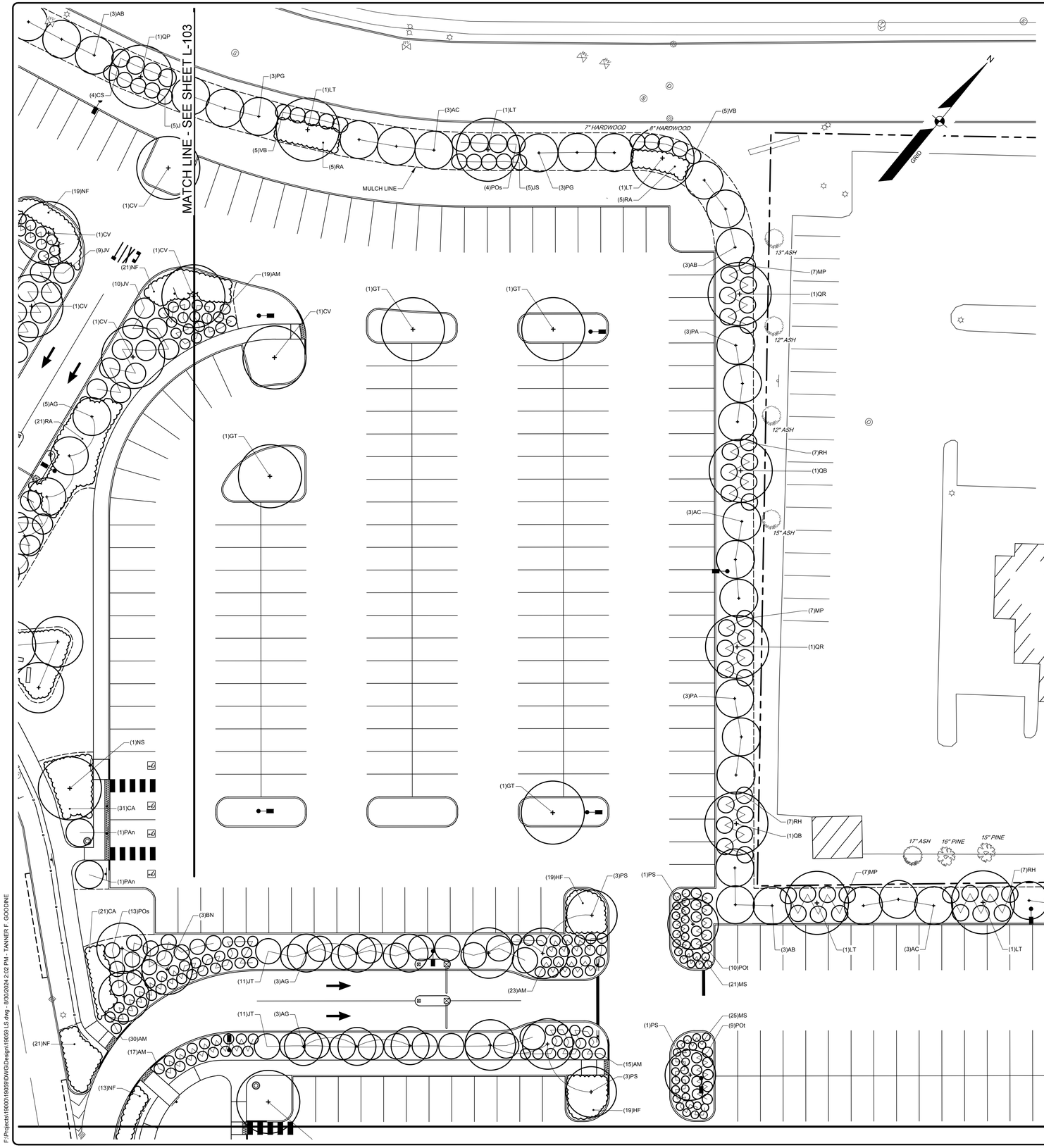
19059 LS.dwg, TAB L-102 Landscape



PLANT SCHEDULE

KEY	QTY	BOTANICAL NAME	COMMON NAME	SIZE / NOTES
DECIDUOUS TREES:				
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BN	9	BETULA NIGRA 'HERITAGE'	HERITAGE RIVER BIRCH	8'-10' HGT, 3-LEADER CLUMP [MINIMUM 2" CAL,B&B]
CC	5	CARPINUS CAROLINIANA	AMERICAN HORNBEAM	2.5" CAL.
CV	7	CRATAEGUS VIRIDIS 'WINTER KING'	WINTER KING HAWTHORN	2.5" CAL.
GT	4	GLEDITSIA TRIACANTHOS 'DRAVES'	STREET KEEPER HONEYLOCUST	2.5" CAL.
LT	6	LIRIODENDRON TULIPFERA 'LITTLE VOLUNTEER'	LITTLE VOLUNTEER TULIP TREE	2.5" CAL.
NS	13	NYSSA SYLVATICA	TUPELO	2.5" CAL.
PS	8	PRUNUS X 'ACCOLADE'	ACCOLADE CHERRY	2.5" CAL.
QB	2	QUERCUS BICOLOR	SWAMP WHITE OAK	2.5" CAL.
QP	3	QUERCUS PALUSTRIS	PIN OAK	2.5" CAL.
QR	2	QUERCUS RUBRA	RED OAK	2.5" CAL.
UA	11	ULMUS AMERICANA 'JEFFERSON'	JEFFERSON ELM	2.5" CAL.
ZS	9	ZELKOVA SERRATA	ZELKOVA	2.5" CAL.
EVERGREEN TREES:				
AB	15	ABIES BALSAMEA VAR PHANEROLEPSIS	CANAAN BALSAM FIR	7'-8' HGT.
AC	12	ABIES CONCOLOR	WHITE FIR	7'-8' HGT.
JC	10	JUNIPERUS CHINENSIS 'HETZII COLUMNARIS'	GREEN COLUMNAR JUNIPER	5'-6' HGT.
PA	9	PICEA ABIES	NORWAY SPRUCE	7'-8' HGT.
PG	20	PICEA GLAUCA	WHITE SPRUCE	7'-8' HGT.
PO	3	PICEA OMORIKA	SERBIAN SPRUCE	7'-8' HGT.
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CS	8	CORNUS SERICEA 'ARCTIC FIRE'	RED TWIG DOGWOOD	#5 CONT,
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NF	74	NEPETA FAASSENII 'JUNIOR WALKER'	JUNIOR WALKER CATMINT	#2 CONT.
MS	90	MISCANTHUS SINENSIS 'LITTLE KITTEN'	LITTLE KITTEN MAIDEN GRASS	#2 CONT.

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 INCH = 20 FT.

REV.	BY	DATE:	STATUS:
E.	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
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AMY BELL SEGAL, RLA 2265
PAUL D. OSTROWSKI, PE 11175

LICENSED LANDSCAPE ARCHITECT
Amy Bell Segal
No. 2265
STATE OF MAINE
08.30.24

SEBAGO TECHNICS
WWW.SEBAGOTECHNICS.COM
75 John Roberts Rd.
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LANDSCAPE PLAN
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 20'
PROJECT	19059

SHEET L-103

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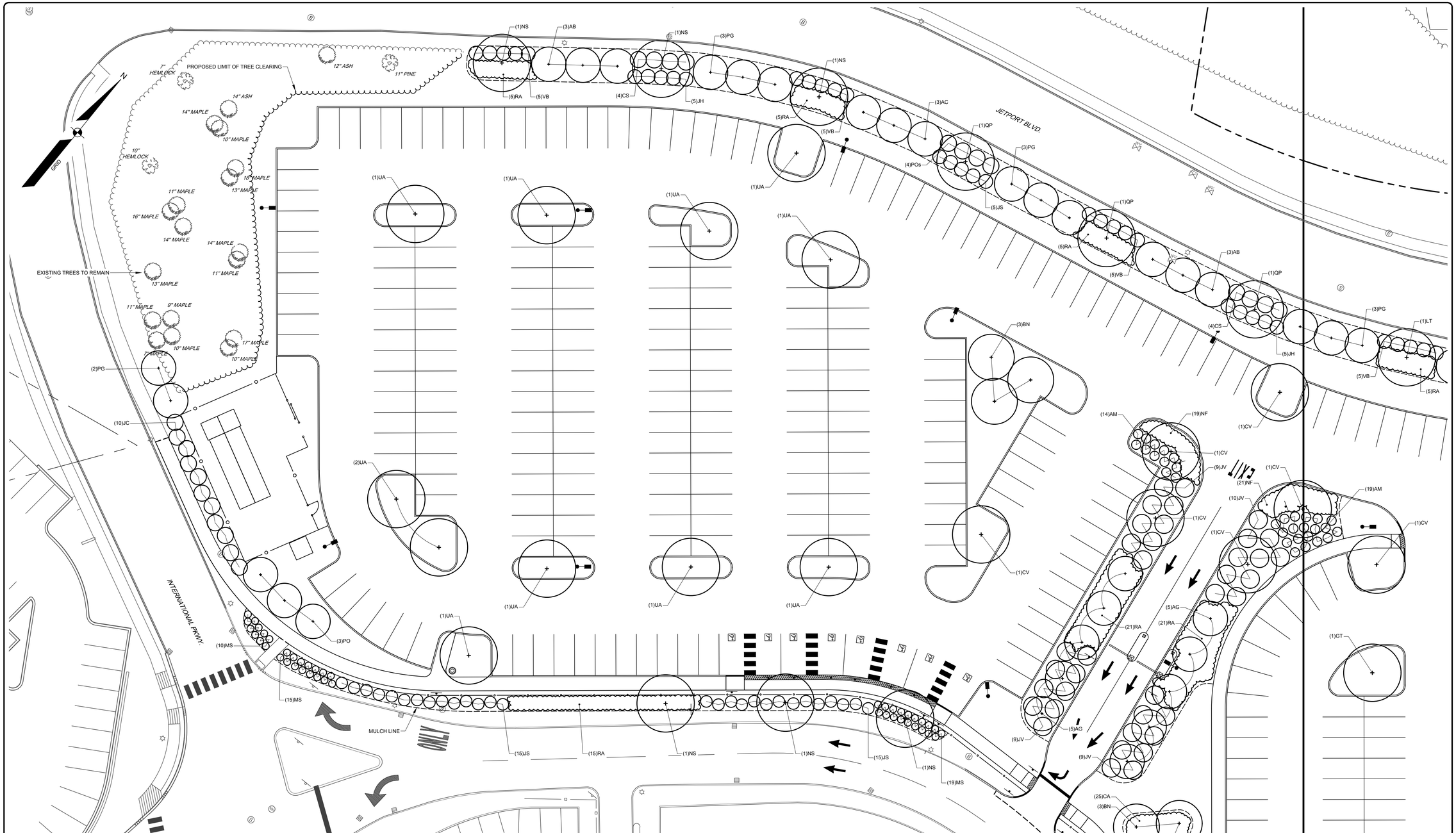
19059 LS.dwg T.AB L-103 Landscape



PLANT SCHEDULE

KEY	QTY	BOTANICAL NAME	COMMON NAME	SIZE / NOTES
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KEY	QTY	BOTANICAL NAME	COMMON NAME	SIZE / NOTES
SHRUBS:				
CS	8	CORNUS SERICEA 'ARCTIC FIRE'	RED TWIG DOGWOOD	#5 CONT.
MP	28	MYRICA PENSYLVANICA	NORTHERN BAYBERRY	#5 CONT.
POs	25	PHYSOCARPUS OPULIFOLIUS 'SUMMER WINE BLACK'	SUMMER WINE BLACK NINEBARK	#5 CONT.
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MS	90	MISCANTHUS SINENSIS 'LITTLE KITTEN'	LITTLE KITTEN MAIDEN GRASS	#2 CONT.
NF	74	NEPETA FAASSENII 'JUNIOR WALKER'	JUNIOR WALKER CATMINT	#2 CONT.

AMY BELL SEGAL RLA 2265
PAUL D. OSTROVSKI PE 11175

REV	BY:	DATE:	STATUS:
A	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION
B	PDO	03/19/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
C	PDO	05/28/2024	OVERALL GRADING PLAN REISSUED TO MAINE DEP AND ACOE
D	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
E	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT

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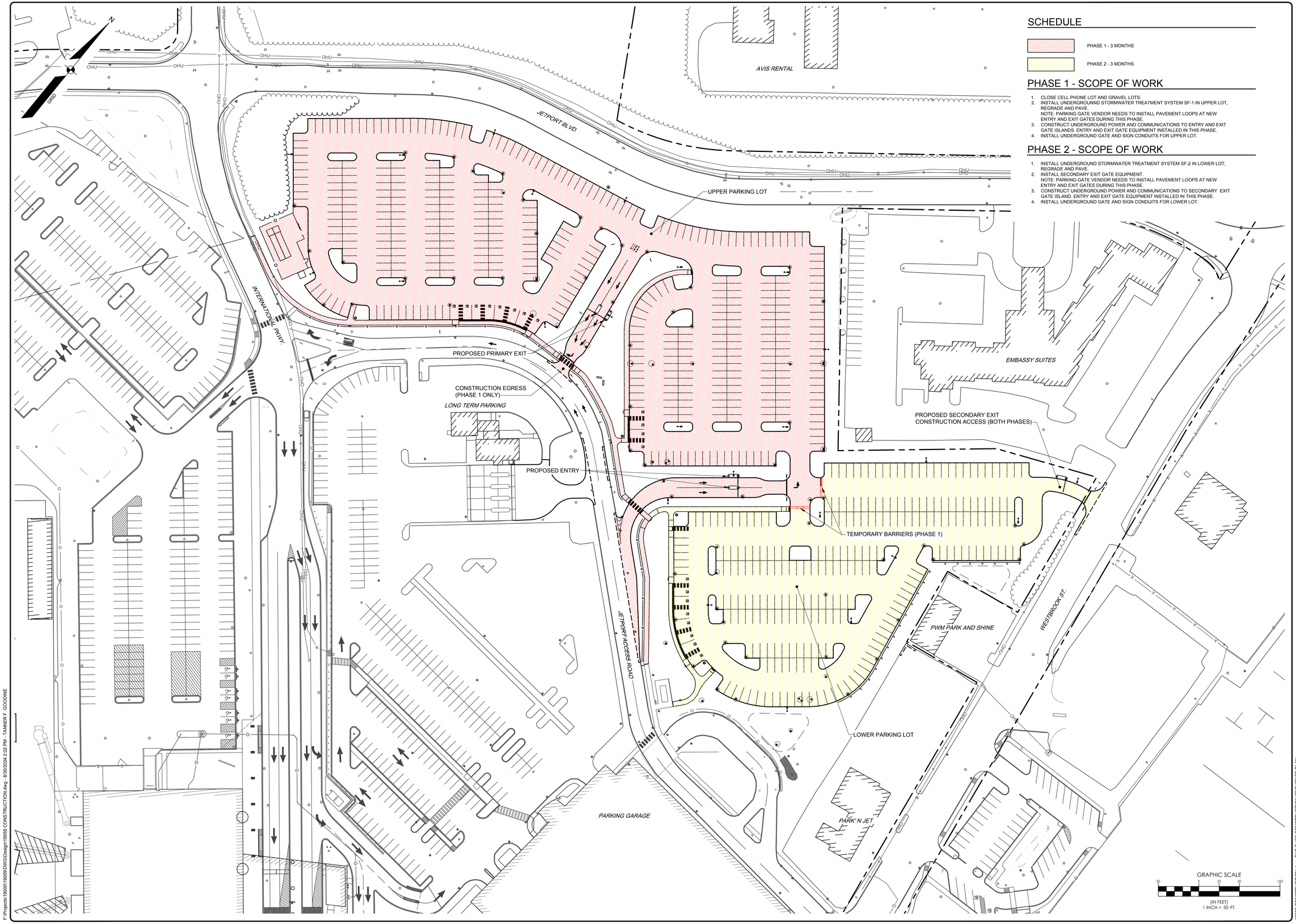
Tel. 207-200-2100

LANDSCAPE PLAN
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 20'
PROJECT	19059

SHEET L-104

F:\Projects\19000\19059\DWG\Design\19059 LS.dwg - 8/30/2024 2:02 PM - TANNER F. GOODINE
19059 LS.dwg, TAB L-104 Landscape



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PAUL D. OSTROWSKI PE 11175

AMY BELL SEGAL RLA 2265

STATE OF MAINE
PAUL D. OSTROWSKI
No. 11175
REGISTERED PROFESSIONAL ENGINEER
08/30/2024

REV.	BY	DATE	STATUS
E.	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
D.	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
C.	PDO	05/28/2024	OVERALL GRADING PLAN REISSUED TO MAINE DEP AND ACOE
B.	PDO	03/18/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
A.	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

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Tel. 207-200-2100

CONSTRUCTION SEQUENCE PLAN

OF:

PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

FOR:

PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 50'
PROJECT	19059

SHEET C-400

19059 CONSTRUCTION dwg, TAB C-400 CONSTRUCTION SEQUENCE PLAN

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 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, SUCH AS ACTIVE EXCAVATION AND ACTIVE GRADING. LIMIT THE EXPOSED AREA TO THOSE AREAS IN WHICH WORK IS ACTIVELY OCCURRING OR CAN BE MULCHED IN THE SAME DAY. OPEN AREAS SHALL BE ANCHORED WITH TEMPORARY EROSION CONTROL AS SHOWN ON THE DESIGN PLANS AND AS DESCRIBED WITHIN THIS EROSION CONTROL PLAN WITHIN SEVEN (7) DAYS OF DISTURBANCE. AREAS LOCATED WITHIN 100 FEET 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. DISTURBED AREAS ADJACENT TO NATURAL RESOURCES THAT ARE NOT GRADED WITHIN SEVEN (7) 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 33%. 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. SEDIMENT BARRIERS SHALL BE INSTALLED DOWNGRADIENT OF STOCKPILES, AND STORMWATER SHALL BE PREVENTED FROM RUNNING ONTO THE STOCKPILE.

3. NATURAL RESOURCES PROTECTION:

ANY AREAS WITHIN 100 FEET FROM ANY NATURAL RESOURCES 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 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 NOT BE INSTALLED ADJACENT TO WETLAND. INSTALL 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 NOT BE USED ADJACENT TO WETLANDS. INSTALL 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. EROSION CONTROL MIX BERMS SHALL NOT BE USED AT THE BOTTOM OF STEEP SLOPES (>8%) OR SLOPES WITH FLOWING WATER.

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 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: STONE 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: BALES SHALL BE WIRE-BOUND OR STRING-TIED. BALES SHALL BE INSTALLED WITHIN A MINIMUM 4 INCH DEEP TRENCH LINE WITH ENDS OF ADJACENT BALES TIGHTLY ABUTTING ONE ANOTHER. HAY BALES SHALL BE 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.

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 INLET OR 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 TO FURTHER MINIMIZE THE TRACKING OF MUD, DUST OR DEBRIS FROM THE CONSTRUCTION AREA. THE TERM "SWEEP" IS UNDERSTOOD TO MEAN REMOVAL AND RECOVERY OF TRACKED SEDIMENT WITH A STREET SWEEPER, NOT BRUSHING THE MATERIAL INTO SWALES OR STRUCTURES WITH A MECHANICAL BROOM. STABILIZED CONSTRUCTION EXITS SHALL BE CONSTRUCTED IN AREAS SPECIFIED ON THE PLANS AND AS DETAILED ON THE PLANS. THE CONTRACTOR SHALL MAINTAIN THE STABILIZED CONSTRUCTION ENTRANCE UNTIL ALL DISTURBED AREAS ARE STABILIZED.

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. IF OFFSITE TRACKING OCCURS, PUBLIC ROADS SHOULD BE SWEPT IMMEDIATELY AND NOT LESS THAN ONCE A WEEK AND PRIOR TO SIGNIFICANT STORM EVENTS.

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 MANUALS FOR CONTRACTORS AND ENGINEERS, LATEST REVISION. ALTERNATIVE EROSION CONTROL MEASURES SHOULD BE USED IF SEEDING CAN NOT BE DONE BEFORE SEPTEMBER 15TH OF THE CONSTRUCTION YEAR.

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 SEED MIX METHOD #1 - PARK MIXTURE)

SEED TYPE	APPLICATION RATE
CREEPING RED FESCUE	1.8 LBS/1,000 S.F. (78.4 LBS/ACRE)
KENTUCKY BLUEGRASS	1.0 LBS/1,000 S.F. (43.6 LBS/ACRE)
CHEWINGS FESCUE	0.60 LBS/1,000 S.F. (26.1 LBS/ACRE)
PERENNIAL RYEGRASS	0.40 LBS/1,000 S.F. (17.4 LBS/ACRE)
ANNUAL RYEGRASS	0.20 LBS/1,000 S.F. (8.70 LBS/ACRE)
TOTAL	4.00 LBS/1,000 S.F. (174.20 LBS/ACRE)

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 2016 OR LATEST REVISION.

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.

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 CONTRACTOR 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 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 DISTURBED SOIL. THE CONTRACTOR 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 CONTRACTOR WILL REMOVE ANY SNOW ACCUMULATION ON THE DISTURBED SLOPE. THE CONTRACTOR 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 CONTRACTOR 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 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 SOIL BEFORE NOVEMBER 15, THEN THE CONTRACTOR WILL MULCH THE AREA FOR OVER-WINTER PROTECTION AS DESCRIBED IN ITEM 3(C.) OF THIS STANDARD.
B. STABILIZE THE SOIL WITH SOD -- THE CONTRACTOR WILL 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.
C. STABILIZE THE SOIL WITH MULCH -- BY NOVEMBER 15 THE CONTRACTOR 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 CONTRACTOR WILL REMOVE ANY SNOW ACCUMULATION ON THE DISTURBED AREA. IMMEDIATELY AFTER APPLYING THE MULCH, THE CONTRACTOR WILL ANCHOR THE MULCH WITH PLASTIC NETTING TO PREVENT WIND FROM MOVING THE MULCH OFF THE DISTURBED SOIL.

1. MAINTENANCE MEASURES SHALL BE APPLIED AS NEEDED DURING THE ENTIRE CONSTRUCTION CYCLE. AFTER EACH RAINFALL, SNOW STORM OR PERIOD OF THAWING AND RUNOFF, AND AT LEAST EVERY SEVEN (7) DAYS, THE CONTRACTOR SHALL PERFORM A VISUAL INSPECTION OF ALL INSTALLED EROSION CONTROL MEASURES. THE CONTRACTOR SHALL PERFORM REPAIRS NO LATER THAN THE END OF THE NEXT WORKDAY, 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 WITHIN SEVEN (7) DAYS.

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 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:

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.

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.

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.

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.

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.

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;
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;
K. POTABLE WATER SOURCES INCLUDING WATERLINE FLUSHINGS; AND
L. LANDSCAPE IRRIGATION.

7. UNAUTHORIZED NON-STORMWATER DISCHARGES. THE DEPARTMENT'S APPROVAL DOES NOT AUTHORIZE A DISCHARGE THAT IS MIXED WITH A SOURCE OF NON-STORMWATER, OTHER THAN THOSE DISCHARGES. SPECIFICALLY, THE DEPARTMENT'S APPROVAL DOES NOT AUTHORIZE DISCHARGES OF THE FOLLOWING:
A. WASTEWATER FROM THE WASHOUT OR CLEAN OUT 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.

WINTER EROSION CONTROL MEASURES

THE WINTER CONSTRUCTION PERIOD IS FROM NOVEMBER 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 1 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. 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 SHALL BE 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 ORDER TO MINIMIZE AREAS WITHOUT EROSION CONTROL PROTECTION.

1. SOIL STOCKPILES

STOCKPILES OF SOIL OR SUBSOIL WILL BE MULCHED FOR OVER WINTER PROTECTION WITH HAY OR STRAW AT TWICE THE NORMAL RATE OR AT 150 LBS/1,000 S.F. (3 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 OR SNOWFALL. ANY SOIL STOCKPILE WILL NOT BE PLACED (EVEN COVERED WITH HAY OR STRAW) WITHIN 100 FEET FROM ANY NATURAL RESOURCES.

2. 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 BY DECEMBER 1 AND ANCHORED WITH PLASTIC NETTING OR PROTECTED WITH EROSION CONTROL MATS. DURING WINTER CONSTRUCTION, A DOUBLE LINE OF SEDIMENT BARRIERS (I.E. SILT FENCE BACKED WITH HAY BALES OR EROSION CONTROL MIX) WILL 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. EXISTING PROJECTS NOT STABILIZED BY DECEMBER 1 SHALL BE PROTECTED WITH THE SECOND LINE OF SEDIMENT BARRIER TO ENSURE FUNCTIONALITY DURING THE SPRING THAW AND RAINS.

3. SEDIMENT BARRIERS

DURING FROZEN CONDITIONS, SEDIMENT BARRIERS SHALL CONSIST OF WOOD WASTE FILTER BERMS AS FROZEN SOIL PREVENTS THE PROPER INSTALLATION OF HAY BALES AND SEDIMENT SILT FENCES.

4. MULCHING

ALL AREA SHALL BE CONSIDERED TO BE DENUDED UNTIL AREAS OF FUTURE LOAM AND SEED HAVE BEEN LOAMED, SEEDED AND MULCHED. HAY AND STRAW MULCH SHALL BE APPLIED AT A RATE OF 150 LB. PER 1.000 SQUARE FEET OR 3 TONS/ACRE (TWICE THE NORMAL ACCEPTED RATE OF 75-LBS./1,000 S.F. OR 1.5 TONS/ACRE) AND SHALL BE PROPERLY ANCHORED. MULCH SHALL NOT BE SPREAD ON TOP OF SNOW. THE SNOW WILL BE REMOVED DOWN TO A ONE-INCH DEPTH OR LESS PRIOR TO APPLICATION. AFTER EACH DAY OF FINAL GRADING, THE AREA WILL BE PROPERLY STABILIZED WITH ANCHORED HAY OR STRAW OR EROSION CONTROL MATTING. AN AREA SHALL BE CONSIDERED TO HAVE BEEN STABILIZED WHEN EXPOSED SURFACES HAVE BEEN EITHER MULCHED WITH STRAW OR HAY AT A RATE OF 150 LB. PER 1.000 SQUARE FEET (3TONS/ACRE) AND ADEQUATELY ANCHORED THAT GROUND SURFACE IS NOT VISIBLE THOUGH THE MULCH.

BETWEEN THE DATES OF SEPTEMBER 1 AND APRIL 15, ALL MULCH SHALL BE ANCHORED BY EITHER PEG LINE, MULCH NETTING, ASPHALT EMULSION CHEMICAL, TRACK OR WOOD CELLULOSE FIBER. WHEN GROUND SURFACE IS NOT VISIBLE THOUGH THE MULCH THEN COVER IS SUFFICIENT.
AFTER NOVEMBER 1ST, MULCH AND ANCHORING OF ALL BARE SOIL SHALL OCCUR AT THE END OF EACH FINAL GRADING WORK DAY.

5. MULCHING ON SLOPES AND DITCHES

SLOPES SHALL NOT BE LEFT EXPOSED FOR ANY EXTENDED TIME OF WORK SUSPENSION UNLESS FULLY MULCHED AND ANCHORED WITH PEG AND NETTING OR WITH EROSION CONTROL BLANKETS. MULCHING SHALL BE APPLIED AT A RATE OF 230 LBS/1,000 S.F. ON ALL SLOPES GREATER THAN 8%. MULCH NETTING SHALL BE USED TO ANCHOR MULCH IN ALL DRAINAGE WAYS WITH A SLOPE GREATER THAN 3% FOR SLOPES EXPOSED TO DIRECT WINDS AND FOR ALL OTHER SLOPES GREATER THAN 5%. EROSION CONTROL BLANKETS SHALL BE USED IN LIEU OF MULCH IN ALL DRAINAGE WAYS WITH SLOPES 8%. EROSION CONTROL MIX CAN BE USED TO SUBSTITUTE EROSION CONTROL BLANKETS ON ALL SLOPES EXCEPT DITCHES.

6. SEEDING

BETWEEN THE DATES OF OCTOBER 15 AND APRIL 1ST, LOAM OR SEED WILL NOT BE REQUIRED. DURING PERIODS OF ABOVE FREEZING TEMPERATURES FINISHED AREAS SHALL BE FINE GRADED AND EITHER PROTECTED WITH MULCH OR TEMPORARILY SEEDED AND MULCHED UNTIL SUCH TIME AS THE FINAL TREATMENT CAN BE APPLIED. IF THE DATE IS AFTER NOVEMBER 1ST AND IF THE EXPOSED AREA HAS BEEN LOOMED, FINAL GRADED WITH A UNIFORM SURFACE, THEN THE AREA MAY BE DORMANT SEEDED AT A RATE OF 3 TIMES HIGHER THAN SPECIFIED FOR PERMANENT SEED AND THEN MULCHED. DORMANT SEEDING MAY BE SELECTED TO BE PLACED PRIOR TO THE PLACEMENT OF MULCH AND FABRIC NETTING ANCHORED WITH STAPLES. IF DORMANT SEEDING IS USED FOR THE SITE, ALL DISTURBED AREAS SHALL RECEIVE 4' OF LOAM AND SEED AT AN APPLICATION RATE OF 5LBS/1000 S.F. ALL AREAS SEEDED DURING THE WINTER WILL BE INSPECTED IN THE SPRING FOR ADEQUATE CATCH. ALL AREAS SUFFICIENTLY VEGETATED (LESS THAN 75% CATCH) SHALL BE REVEGETATED BY REPLACING LOAM, SEED AND MULCH. IF DORMANT SEEDING IS NOT USED FOR THE SITE, ALL DISTURBED AREAS SHALL BE REVEGETATED IN THE SPRING. SEED TYPE SHALL BE WINTER RYE.

7. INSPECTION AND MONITORING

MAINTENANCE MEASURES SHALL BE APPLIED AS NEEDED DURING THE ENTIRE CONSTRUCTION SEASON. AT A MINIMUM, AFTER EACH RAINFALL, SNOW STORM OR PERIOD OF THAWING AND RUNOFF, THE SITE CONTRACTOR SHALL PERFORM A VISUAL INSPECTION OF ALL INSTALLED EROSION CONTROL MEASURES AND PERFORM REPAIRS AS NEEDED TO INSURE THEIR CONTINUOUS FUNCTION.
FOLLOWING THE TEMPORARY AND/OR FINAL SEEDING AND MULCHING, THE CONTRACTOR SHALL IN THE SPRING INSPECT AND REPAIR ANY DAMAGES AND/ OR UNESTABLISHED SPOTS. ESTABLISHED VEGETATIVE COVER MEANS A MINIMUM OF 90% OF AREAS VEGETATED WITH VIGOROUS GROWTH.

STANDARDS FOR TIMELY STABILIZATION OF CONSTRUCTION SITES DURING WINTER

1. STANDARD FOR THE TIMELY STABILIZATION OF DITCHES AND CHANNELS -- THE APPLICANT WILL CONSTRUCT AND STABILIZE ALL STONE-LINED DITCHES AND CHANNELS ON THE SITE BY NOVEMBER 15. THE APPLICANT WILL CONSTRUCT AND STABILIZE ALL GRASS-LINED DITCHES AND CHANNELS ON THE SITE BY SEPTEMBER 15. IF THE APPLICANT FAILS TO STABILIZE A DITCH OR CHANNEL TO BE GRASS-LINED BY SEPTEMBER 15, THEN THE APPLICANT WILL TAKE ONE OF THE FOLLOWING ACTIONS TO STABILIZE THE DITCH FOR LATE FALL AND WINTER.

INSTALL A SOD LINING IN THE DITCH -- THE APPLICANT WILL LINE THE DITCH 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, 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.
INSTALL A STONE LINING IN THE DITCH --THE APPLICANT WILL LINE THE DITCH WITH STONE RIPRAP BY NOVEMBER 15. THE APPLICANT WILL 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 APPLICANT WILL REGRADE THE DITCH PRIOR TO PLACING THE STONE LINING SO TO PREVENT THE STONE LINING FROM REDUCING THE DITCH'S CROSS-SECTIONAL AREA.

2. STANDARD FOR THE TIMELY STABILIZATION OF DISTURBED SLOPES -- THE APPLICANT WILL CONSTRUCT AND STABILIZE STONE-COVERED SLOPES BY NOVEMBER 15. THE APPLICANT WILL 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 APPLICANT FAILS TO STABILIZE ANY SLOPE TO BE VEGETATED BY SEPTEMBER 15, THEN THE APPLICANT WILL TAKE ONE OF THE FOLLOWING ACTIONS TO STABILIZE THE SLOPE FOR LATE FALL AND WINTER.

STABILIZE THE SOIL WITH TEMPORARY VEGETATION AND EROSION CONTROL MATS -- BY OCTOBER 1 THE APPLICANT WILL 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 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 SLOPE BY NOVEMBER 1, THEN THE APPLICANT WILL COVER THE SLOPE WITH A LAYER OF WOOD WASTE COMPOST AS DESCRIBED IN ITEM III OF THIS CONDITION OR WITH STONE RIPRAP AS DESCRIBED IN ITEM IV OF THIS CONDITION.

STABILIZE THE SLOPE WITH SOD -- THE APPLICANT 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).

STABILIZE THE SLOPE WITH WOOD WASTE COMPOST -- THE APPLICANT 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.

STABILIZE THE SLOPE WITH STONE RIPRAP -- THE APPLICANT 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.

3. STANDARD FOR THE TIMELY STABILIZATION OF DISTURBED SOILS -- BY SEPTEMBER 15 THE APPLICANT WILL SEED AND MULCH ALL DISTURBED SOILS ON AREAS HAVING A SLOPE LESS THAN 15%. IF THE APPLICANT FAILS TO STABILIZE THESE SOILS BY THIS DATE, THEN THE APPLICANT WILL TAKE ONE OF THE FOLLOWING ACTIONS TO STABILIZE THE SOIL FOR LATE FALL AND WINTER.
STABILIZE THE SOIL WITH TEMPORARY VEGETATION -- BY OCTOBER 1 THE APPLICANT 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 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 III OF THIS STANDARD.
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.
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.

AMY BELL SEGAL RLA 2265

PAUL D. OSTROWSKI PE 11175

STATE OF MAINE
PAUL D. OSTROWSKI
No. 11175
LICENSED PROFESSIONAL ENGINEER
08/30/2024

REV:	BY:	DATE:	STATUS:
E	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
D	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
C	PDO	05/28/2024	OVERALL GRADING PLAN REISSUED TO MAINE DEP AND ACOE
B	PDO	03/18/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
A	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

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.

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EROSION CONTROL NOTES
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	N/A
PROJECT	19059

SHEET C-500

19059 D.dwg, TAB:C-500 Erosion Control Notes

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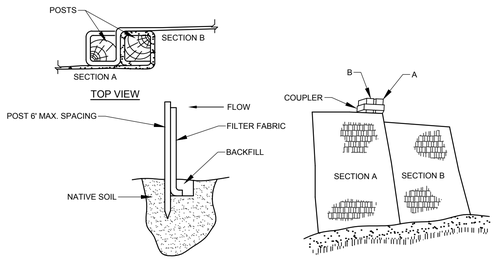
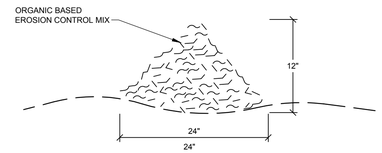


INSTALLATION:

1. EXCAVATE A 6"x 6" TRENCH ALONG THE LINE OF PLACEMENT FOR THE FILTER BARRIER.
2. UNROLL A SECTION AT A TIME AND POSITION THE POSTS AGAINST THE BACK (DOWNSTREAM) WALL OF THE TRENCH.
3. DRIVE POSTS INTO THE GROUND UNTIL APPROXIMATELY 2" OF FABRIC IS LYING ON THE TRENCH BOTTOM.
4. LAY THE TOE-IN FLAP OF FABRIC ONTO THE UNDISTURBED BOTTOM OF THE TRENCH, BACKFILL THE TRENCH AND TAMP THE SOIL. TOE-IN CAN ALSO BE ACCOMPLISHED BY LAYING THE FABRIC FLAP ON UNDISTURBED GROUND AND PILING AND TAMPING FILL AT THE BASE, BUT MUST BE ACCOMPANIED BY AN INTERCEPTION DITCH.
5. JOIN SECTION AS SHOWN ABOVE.
6. BARRIER SHALL BE MIRAFI SILT FENCE OR EQUAL.

FILTER BARRIER
NOT TO SCALE



COMPOSITION:

EROSION CONTROL MIX SHALL BE MANUFACTURED ON OR OFF THE PROJECT SITE SUCH THAT ITS COMPOSITION IS IN ACCORDANCE WITH THE MDEP MAINE EROSION AND SEDIMENT CONTROL BMP MANUAL, LAST REVISED 3/2003 OR LATER. IT MUST CONSIST PRIMARILY OF ORGANIC MATERIAL, SEPARATED AT THE POINT OF GENERATION, AND MAY INCLUDE: SHREDDED BARK, STUMP GRINDINGS, COMPOSTED BARK, OR ACCEPTABLE MANUFACTURED PRODUCTS. WOOD AND BARK CHIPS, GROUND CONSTRUCTION DEBRIS OR REPROCESSED WOOD PRODUCTS WILL NOT BE ACCEPTABLE AS THE ORGANIC COMPONENT OF THE MIX.

INSTALLATION:

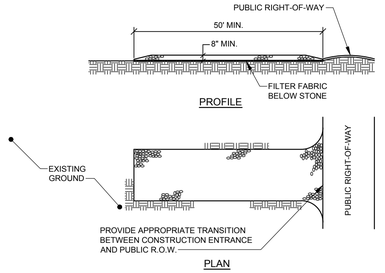
1. THE BARRIER MUST BE PLACED ACROSS THE SLOPE, ALONG THE CONTOUR.

2. EXISTING GROUND SHALL BE PREPARED SUCH THAT THE BARRIER MAY LIE NEARLY FLAT ALONG THE GROUND TO AVOID THE CREATION OF VOIDS AND BRIDGES IN ORDER TO MINIMIZE THE POTENTIAL OF WASH OUTS UNDER THE BARRIER

3. THE BARRIER SHALL BE A MINIMUM OF 1 FOOT HIGH (AS MEASURED ON THE UPHILL SIDE) AND 2 FEET WIDE FOR SLOPES LESS THAN 5% IN GRADE AND SHALL BE WIDER TO ACCOMMODATE THE ADDITIONAL RUNOFF.

4. EROSION CONTROL MIX CAN BE INSTALLED WHERE SILT FENCE IS ILLUSTRATED ON THE DESIGN PLANS IN AREAS EXCEPT IN, BUT NOT LIMITED TO, THE FOLLOWING AREAS: WETLAND AREAS, AT POINTS OF CONCENTRATED FLOW, BELOW CULVERT OUTLET APRONS, AROUND CATCH BASINS AND CLOSED STORM SYSTEMS AND AT THE BOTTOM OF STEEP SLOPES THAT ARE MORE THAN 50 FEET FROM TOP TO BOTTOM.

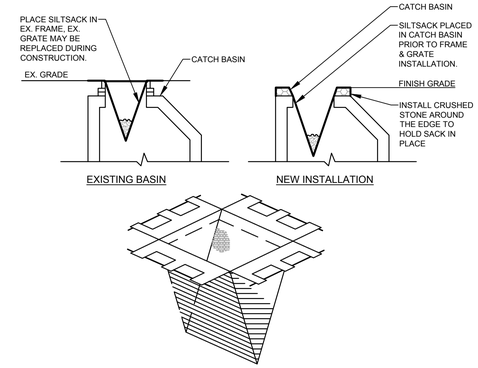
EROSION CONTROL MIX BERM
NOT TO SCALE



NOTES:

1. STONE SIZE- AASHTO DESIGNATION M43, SIZE NO. 2 (2 1/2" TO 1 1/2"). USE CRUSHED STONE.
2. LENGTH- AS SHOWN ON PLANS, MIN. 50 FEET.
3. THICKNESS- NOT LESS THAN EIGHT (8) INCHES.
4. WIDTH- NOT LESS THAN FULL WIDTH OF ALL POINT OF INGRESS OR EGRESS.
5. MAINTENANCE- THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHT-OF-WAY MUST BE REMOVED IMMEDIATELY.

STABILIZED CONSTRUCTION ENTRANCE
NOT TO SCALE



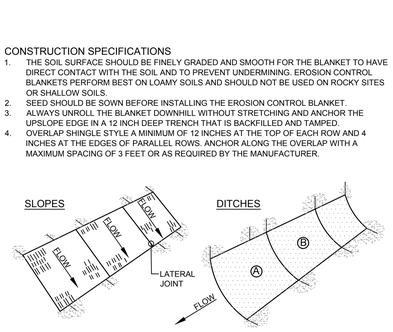
NOTES:

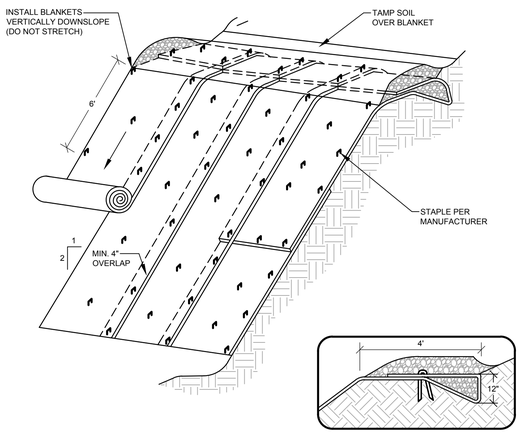
PRIOR TO FINAL GRADING AND PAVING OPERATIONS BEGIN A CATCH BASIN INSERT (SUCH AS A SILT SACK OR A DANDY BAG II) MUST BE INSTALLED IN EACH BASIN PER MANUFACTURES INSTRUCTIONS. HAY BALES SHOULD BE REMOVED ONCE INSERTS ARE INSTALLED.

CATCH BASIN PROTECTION DETAIL
NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

1. THE SOIL SURFACE SHOULD BE FINELY GRADED AND SMOOTH FOR THE BLANKET TO HAVE DIRECT CONTACT WITH THE SOIL AND TO PREVENT UNDERMINING. EROSION CONTROL BLANKETS PERFORM BEST ON LOAMY SOILS AND SHOULD NOT BE USED ON ROCKY SITES OR SHALLOW SOILS.
2. SEED SHOULD BE SOWN BEFORE INSTALLING THE EROSION CONTROL BLANKET.
3. ALWAYS UNROLL THE BLANKET DOWNHILL WITHOUT STRETCHING AND ANCHOR THE UPSLOPE EDGE IN A 12 INCH DEEP TRENCH THAT IS BACKFILLED AND TAMPED.
4. OVERLAP SHINGLE STYLE A MINIMUM OF 12 INCHES AT THE TOP OF EACH ROW AND 4 INCHES AT THE EDGES OF PARALLEL ROWS. ANCHOR ALONG THE OVERLAP WITH A MAXIMUM SPACING OF 3 FEET OR AS REQUIRED BY THE MANUFACTURER.

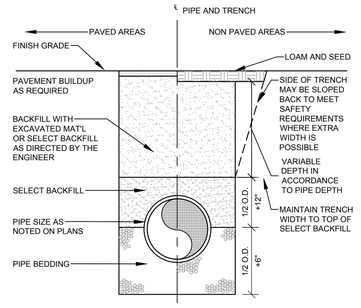




NOTES:

1. BURY THE TOP END OF THE MESH MATERIAL IN A 6" TRENCH AND BACKFILL AND TAMP. TRENCHING SECURE END WITH STAPLES AT 6" SPACING, 4" DOWN FROM EXPOSED END.
2. FLOW DIRECTION JOINTS TO HAVE UPPER END OF LOWER STRIP BURIED WITH UPPER LAYERS OVERLAPPED 4" AND STAPLED. OVERLAP B OVER A.
3. LATERAL JOINTS TO HAVE 4" OVERLAP OF STRIPS. STAPLE 18" ON CENTER.
4. STAPLE OUTSIDE LATERAL EDGE 2" ON CENTER.
5. WIRE STAPLES TO BE MIN OF #11 WIRE 6" LONG AND 1-1/2" WIDE.
6. USE NORTH AMERICAN GREEN DS 150 OR APPROVED EQUAL.

EROSION CONTROL BLANKET
NOT TO SCALE



TRENCH BACKFILL SCHEDULE		
PIPE TYPE	PIPE BEDDING MATERIAL	SELECT BACKFILL
CORRUGATED METAL DUCTILE IRON REINFORCED CONCRETE	MDOT 703.22 TYPE B UD BACKFILL	MDOT 703.22 TYPE B UD BACKFILL
SOLID PVC-SDR 35 HDPE	MDOT 703.13 3/4" CRUSHED STONE	MDOT 703.22 TYPE B UD BACKFILL, OR MDOT 703.13 3/4" CRUSHED STONE
PERFORATED PVC-SDR 35 HDPE	MDOT 703.13 3/4" CRUSHED STONE	MDOT 703.22 TYPE B UD BACKFILL, OR MDOT 703.13 3/4" CRUSHED STONE

NOTE:
ALL BRACING AND SHEETING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL MEET ALL STATE AND O.S.H.A. SAFETY STANDARDS.

TRENCH SECTION
NOT TO SCALE

AMY BELL SEGAL, RLA 2265

PAUL D. OSTROWSKI PE 11175

STATE OF MAINE · PAUL D. OSTROWSKI · 11175 · REGISTERED PROFESSIONAL ENGINEER · 08/30/2024

REV.	BY	DATE	
E.	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
D.	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
C.	PDO	05/28/2024	OVERALL GRADING PLAN REISSUED TO MAINE DEP AND ACOE
B.	PDO	03/19/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
A.	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM SEBAGO TECHNICS, INC. ANY ALTERATIONS AUTHORIZED BY OTHERS SHALL BE AT THE USER'S SOLE RISK AND UNTO ALL LIABILITY TO SEBAGO TECHNICS, INC.

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

EROSION CONTROL DETAILS

OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

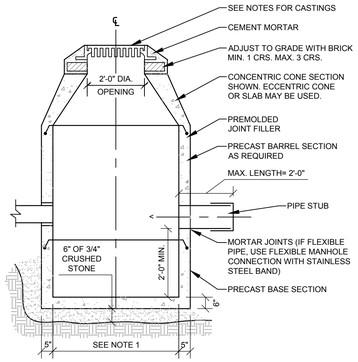
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	N/A
PROJECT	19059

SHEET C-501

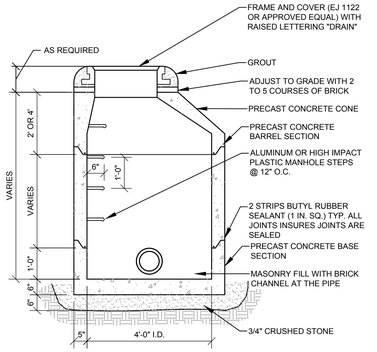
F:\Projects\19000\19059\DWG\Design\19059 D.dwg - 8/30/2024 2:02 PM - TANNER F. GOODINE

19059 D.dwg - TAB-C-501 Details

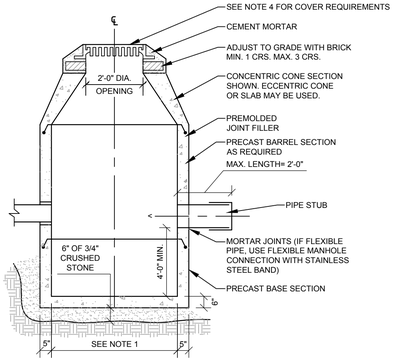


NOTES:
1. 4'-0" I.D. TYPICAL, SOME STRUCTURES MAY REQUIRE LARGER I.D. PROVIDE SHOP DRAWINGS.
2. DRAINAGE STRUCTURES TO BE DESIGNED FOR H-20 LOADING.
3. PIPE SIZES AND INVERTS AS NOTED ON PLANS.
4. CATCH BASIN FRAME AND GRATE TO BE EJ 5520M5, OR APPROVED EQUAL.

CATCH BASIN
NOT TO SCALE

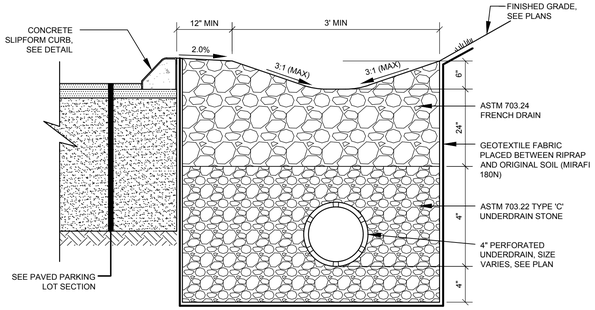


PRECAST MANHOLE
NOT TO SCALE

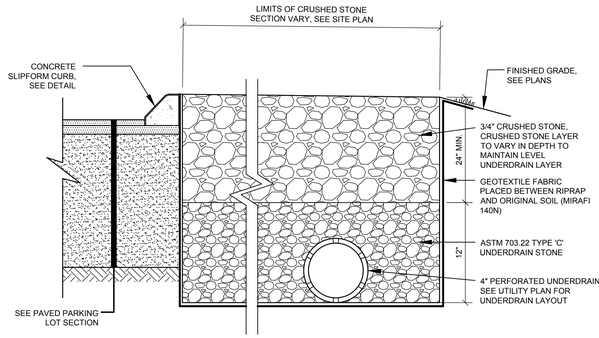


NOTES:
1. 4'-0" I.D. TYPICAL. SOME STRUCTURES MAY REQUIRE LARGER I.D. PROVIDE SHOP DRAWINGS.
2. DRAINAGE STRUCTURES TO BE DESIGNED FOR H-20 LOADING.
3. PIPE SIZES AND INVERTS AS NOTED ON PLANS.
4. COVER FOR PRETREATMENT DRAINAGE STRUCTURES SHALL BE A SOLID MANHOLE COVER OR A CATCH BASIN GRATE AS SPECIFIED ON PLANS.
5. CATCH BASIN FRAME AND GRATE TO BE EJ 5520M5, OR APPROVED EQUAL.
6. DRAIN MANHOLE COVER TO BE EJ 1122 OR APPROVED EQUAL WITH RAISED LETTERING "DRAIN".

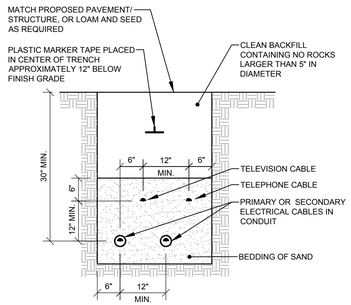
PRE-TREATMENT DRAINAGE STRUCTURE
NOT TO SCALE



STONE DRIP EDGE
NOT TO SCALE

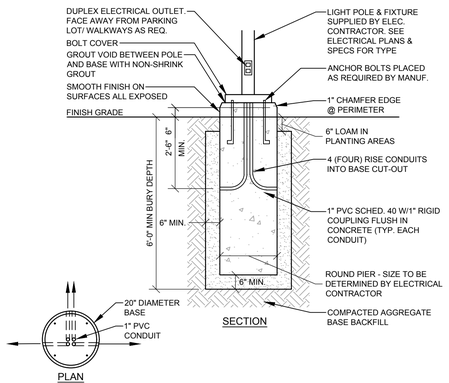


CRUSHED STONE - BATTERY CORRAL
NOT TO SCALE



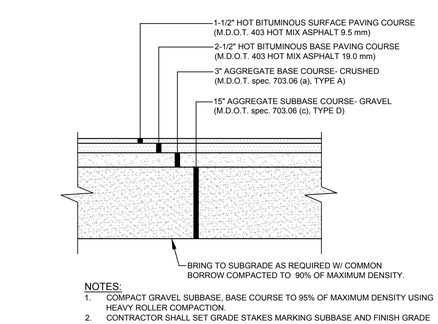
NOTES:
CABLES TO BE ENCASED IN SCHEDULE 40 PVC CONDUIT.

UNDERGROUND CABLE INSTALLATION
NOT TO SCALE



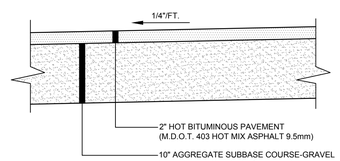
NOTES:
1. CONCRETE f'c=5000 psi @ 28 DAYS WITH STEEL REINFORCEMENT
2. CONDUIT AND ANCHOR BOLTS PLACED AS REQUIRED PROVIDED BY ELECTRICAL CONTRACTOR
3. PROVIDE 2 COATS BITUMINOUS DAMPROOFING FOR ALL CONCRETE BELOW GRADE.
4. INSTALL BASE 3'-0" ABOVE FINISH GRADE IN LOCATIONS WHERE POLES ARE IN PARKING LOT PAVEMENT. MAINTAIN MINIMUM BURY DEPTH.
5. LIGHT POLE BASE AS MANUFACTURED BY SUPERIOR CONCRETE OR APPROVED EQUAL

24" ROUND LIGHT POLE BASE
NOT TO SCALE

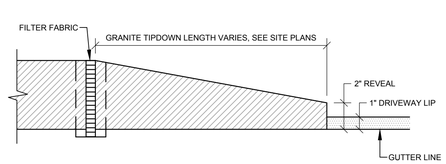


NOTES:
1. COMPACT GRAVEL SUBBASE, BASE COURSE TO 95% OF MAXIMUM DENSITY USING HEAVY ROLLER COMPACTION.
2. CONTRACTOR SHALL SET GRADE STAKES MARKING SUBBASE AND FINISH GRADE ELEVATIONS FOR CONSTRUCTION REFERENCE.

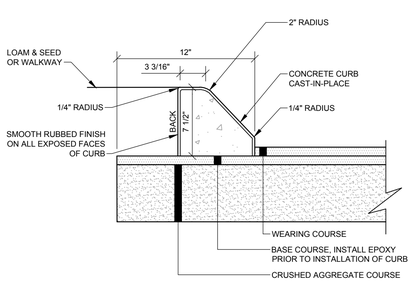
VEHICULAR PAVEMENT SECTION
NOT TO SCALE



PEDESTRIAN PAVEMENT SECTION
NOT TO SCALE

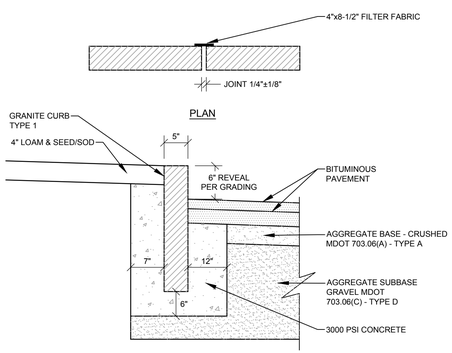


TIPDOWN CURB INSTALLATION
NOT TO SCALE



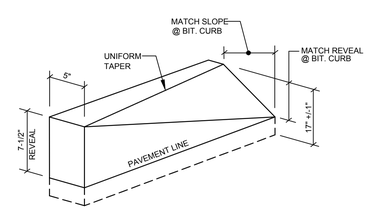
NOTES:
1. SEE TYPICAL ACCESS DRIVE SECTION FOR ROADWAY MATERIAL SPECIFICATIONS AND DEPTHS.
2. TIPDOWNS SHALL BE PROVIDED AS SHOWN ON PLANS.

SLIPFORM CURB SECTION - MOLD 1
NOT TO SCALE



NOTES:
1. EXCAVATION INCIDENTAL TO COST OF CURB
2. SUBBASE SHALL BE COMPACTED TO A FIRM EVEN SURFACE PRIOR TO SETTING OF CURB

VERTICAL GRANITE CURB
NOT TO SCALE



VERTICAL TO SLOPED CURB GRANITE TRANSITION STONES
NOT TO SCALE

PAUL D. OSTROWSKI PE 11175
AMY BELL SEGAL RLA 2265

STATE OF MAINE — PAUL D. OSTROWSKI — 11175 — REGISTERED PROFESSIONAL ENGINEER — 08/30/2024

REV.	BY	DATE	STATUS
E.	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
D.	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
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A.	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

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SITE DETAILS

OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

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

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	N/A
PROJECT	19059

SHEET C-502

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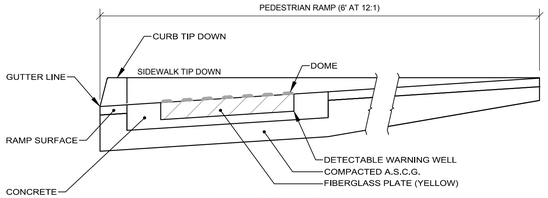
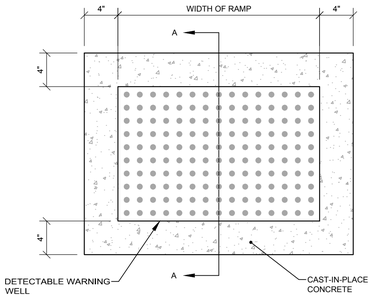
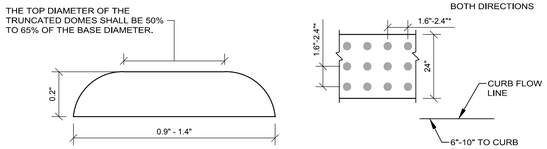
19059 D.dwg, TAB:C-502 Details



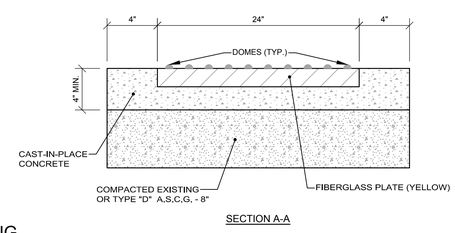
SIDE SECTION VIEW OF
DETECTABLE WARNING, WELL, CURB AND GUTTER



PLAN VIEW OF DETECTABLE WARNING AND WELL



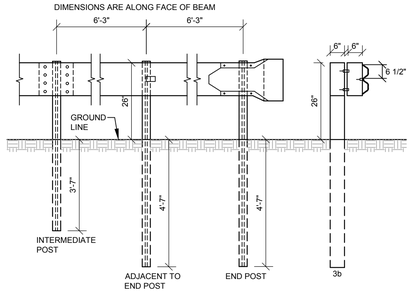
DOME AND DETECTABLE WARNING DETAILS



SECTION A-A

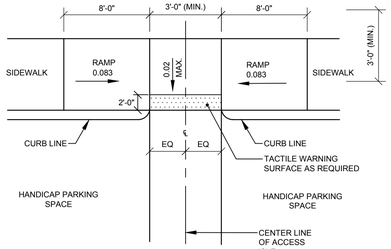
NOTE: ALL DETECTABLE WARNING AREAS SHALL START 6" - 10" FROM THE FLOW LINE OF THE CURB, BE 24" IN DEPTH, AND COVER THE COMPLETE WIDTH OF THE RAMP AREA ONLY.

TRUNCATED DOME PAVING
NOT TO SCALE

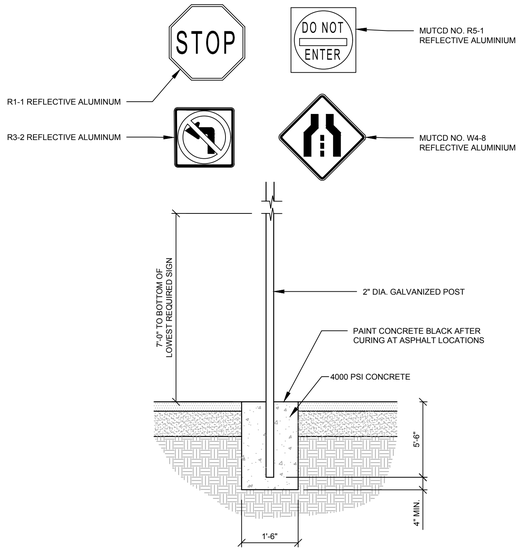


NOTES:
1. INTERMEDIATE POST SPACING SHALL BE 6'-3" UNLESS OTHERWISE SHOWN.
2. POSTS AND OFFSET BRACKETS FOR TYPE 3b GUARD RAIL SHALL BE W 6x9.
3. ALL HOLES IN BEAM TO BE SHOP-PUNCHED BEFORE GALVANIZING.

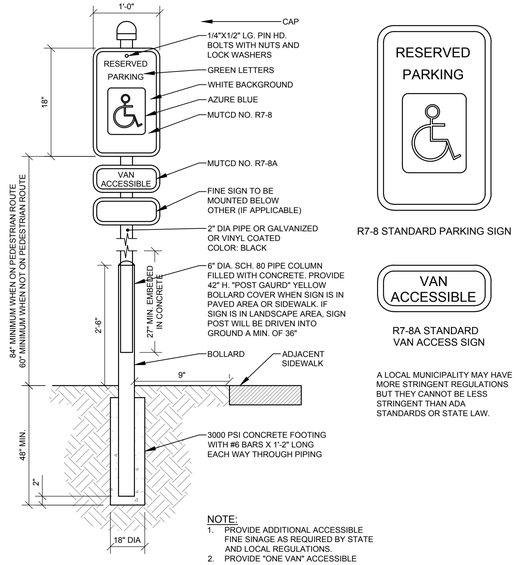
GUARDRAIL TYPE 3b
NOT TO SCALE



ADA ACCESSIBLE RAMP
NOT TO SCALE



TYPICAL TRAFFIC CONTROL SIGN
NOT TO SCALE



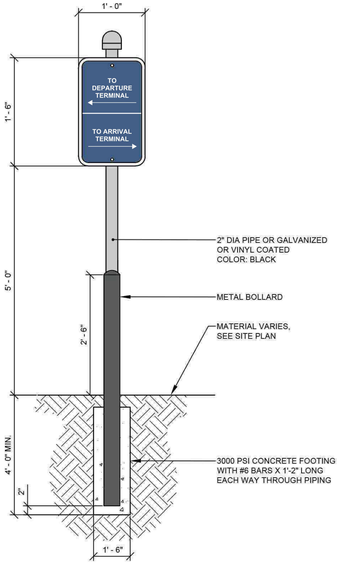
NOTE:
1. PROVIDE ADDITIONAL ACCESSIBLE FINE SINAGE AS REQUIRED BY STATE AND LOCAL REGULATIONS.
2. PROVIDE "ONE VAN" ACCESSIBLE SIGN PER 25 HC SPACES REQUIRED.
3. WHENEVER POSSIBLE SIGN SHALL BE MOUNTED CENTERED ON PARKING SPACE UNLESS SPECIFIED OTHERWISE.
4. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS PRIOR TO ORDERING MATERIALS.

R7-8 STANDARD PARKING SIGN

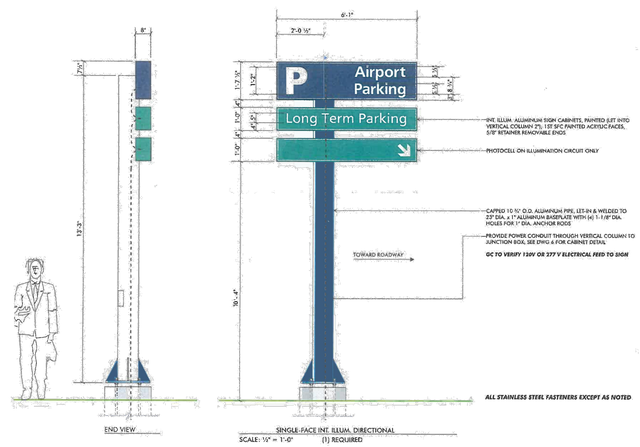
R7-8A STANDARD
VAN ACCESS SIGN

A LOCAL MUNICIPALITY MAY HAVE MORE STRINGENT REGULATIONS BUT THEY CANNOT BE LESS STRINGENT THAN ADA STANDARDS OR STATE LAW.

RESERVED PARKING SIGN - BOLLARD (S-3)
NOT TO SCALE



PEDESTRIAN WAYFINDING SIGNAGE (S6)
NOT TO SCALE
[SIMILAR TO EXISTING SIGNS BY NEOKRAFT SIGNS]

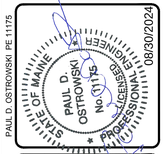


PROPOSED LONG TERM PARKING SIGN (S5)
[SIMILAR TO EXISTING SIGNS BY NEOKRAFT SIGNS]

RESERVED PARKING SIGN - BOLLARD (S-3)
NOT TO SCALE

AMY BELL SEGAL, RLA 2265

PAUL D. OSTROWSKI, PE 11175



REV.	BY	DATE:	STATUS:
E.	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
D.	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
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B.	PDO	03/18/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
A.	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

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

SITE DETAILS
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	N/A
PROJECT	19059

SHEET C-503

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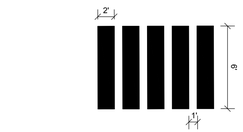
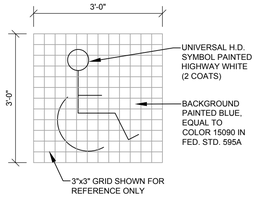
19059 D.dwg, TAB:C-503 Details



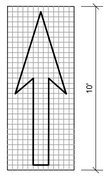
PAVEMENT MARKING NOTES

1. ALL PAVEMENT MARKINGS SHALL BE IN CONFORMANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS, U.S. DOT, FHWA, LATEST EDITION.
2. ALL PAVEMENT MARKING LINES SHALL BE PAINT AND 4" WIDE, EXCEPT FOR:
   SWSL-12"
   SYCL-12"
   CROSSWALK BARS - 24"
3. PAVEMENT WORD AND SYMBOL MARKINGS SHALL BE WHITE PAINT.
4. SOLID WHITE STOP LINE SHALL BE A MINIMUM OF 4' BEHIND THE EDGE OF CROSSWALK.

CROSSWALK DETAIL
NOT TO SCALE

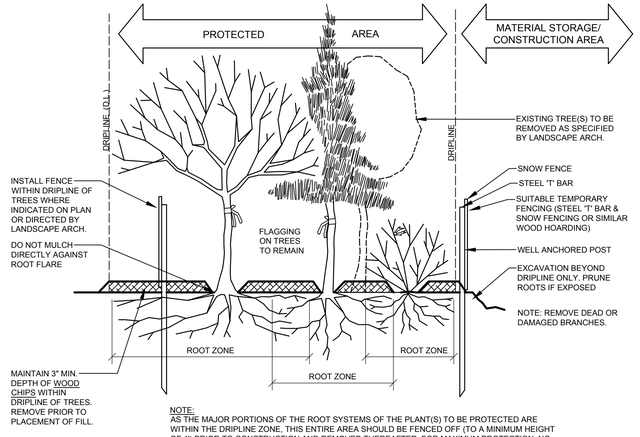


ADA RESERVED PARKING
NOT TO SCALE



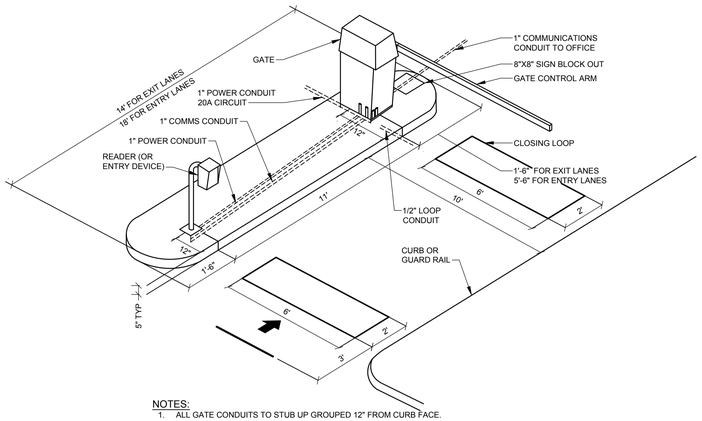
13 SQUARE FEET

PAVEMENT ARROW DETAIL
NOT TO SCALE



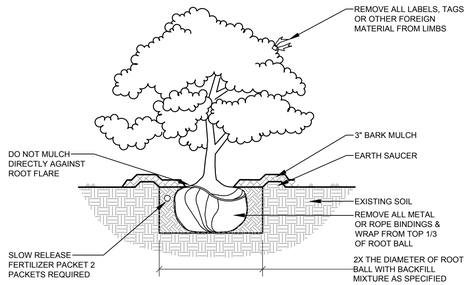
NOTE:
AS THE MAJOR PORTIONS OF THE ROOT SYSTEMS OF THE PLANT(S) TO BE PROTECTED ARE WITHIN THE DRIPLINE ZONE, THIS ENTIRE AREA SHOULD BE FENCED OFF (TO A MINIMUM HEIGHT OF 4') PRIOR TO CONSTRUCTION AND REMOVED THEREAFTER. FOR MAXIMUM PROTECTION, NO VEHICLE TRESPASS, EXCAVATION, FILL, WASTE DISCHARGE OR OR MATERIAL STORAGE SHOULD BE ALLOWED IN THIS ZONE.

TREE PROTECTION DETAIL
NOT TO SCALE
CROSS-SECTION OF TYPICAL PLANT GROUPING

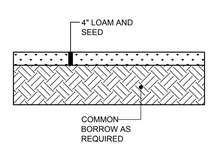


NOTES:
1. ALL GATE CONDUITS TO STUB UP GROUPED 12" FROM CURB FACE.
2. EXIT/ENTRY DEVICE CONDUIT TO STUB UP 12" FROM CURB FACE.
3. DISTANCE BETWEEN GATE AND REVENUE DEVICE SHOULD BE 11' ON CENTER.
4. EACH LANE SHOULD HAVE ITS OWN 20A CIRCUIT.
5. CONTRACTOR TO VERIFY WITH PARKING GATE VENDOR THE DIMENSIONS AND PLACEMENT OF CONDUITS AND BLOCK OUTS PRIOR TO PLACING CONCRETE FOR THESE ISLANDS

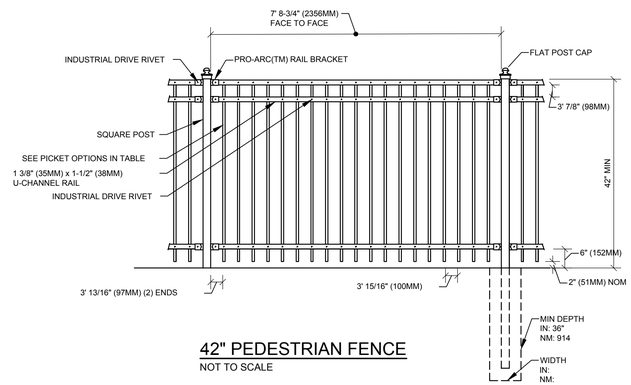
PARKING ENTRY ISLAND
NOT TO SCALE



DECIDUOUS & EVERGREEN SHRUB
NOT TO SCALE



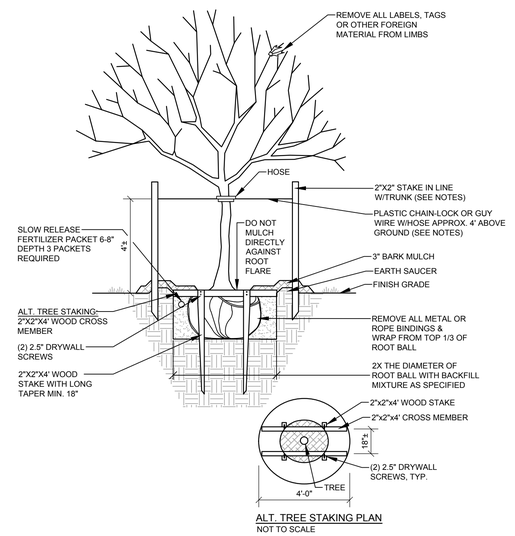
LOAM & SEED SECTION
NOT TO SCALE



NOTES:
1. METRIC DIMENSIONS ARE NOMINAL EQUIVALENTS TO UI.S. DIMENSIONS.
2. SPECIFICATIONS SHOWN CAN BE CHANGED BY MAST HALCO ONL.Y
3. FOOTING WIDTH TO BE (4)X POST WIDTH
4. FOR MATCHING GATE SEE DRAWING 6-5010M (SINGLE) OR 6-5015M (DOUBLE)
5. IMPERIAL "B" GUARDRAIL BY MASTER HALCO. Co. (1-800-229-5615)
6. ALL SURFACES SHALL BE BLACK POWDER COATED FINISH BY MANUFACTURER.

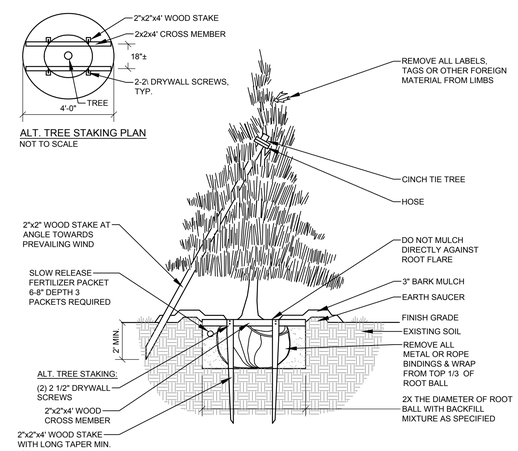
PICKET SIZE	GAUGE
3/4" [19MM]	14 GA

42" PEDESTRIAN FENCE
NOT TO SCALE



ALT. TREE STAKING PLAN
NOT TO SCALE

DECIDUOUS TREES
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

AMY BELL SEGAL, RLA 2265
08.30.24

PAUL D. OSTROWSKI, PE 11175
08/30/2024

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DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	N/A
PROJECT	19059

SHEET C-504

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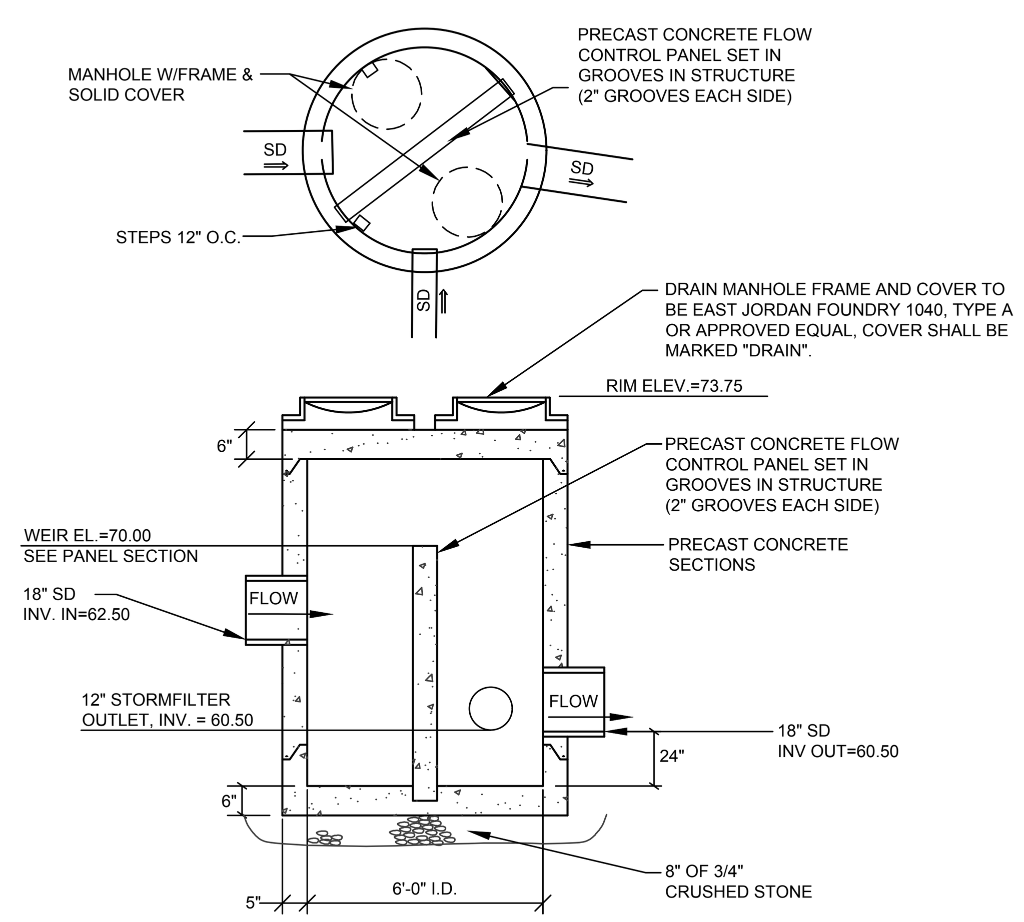
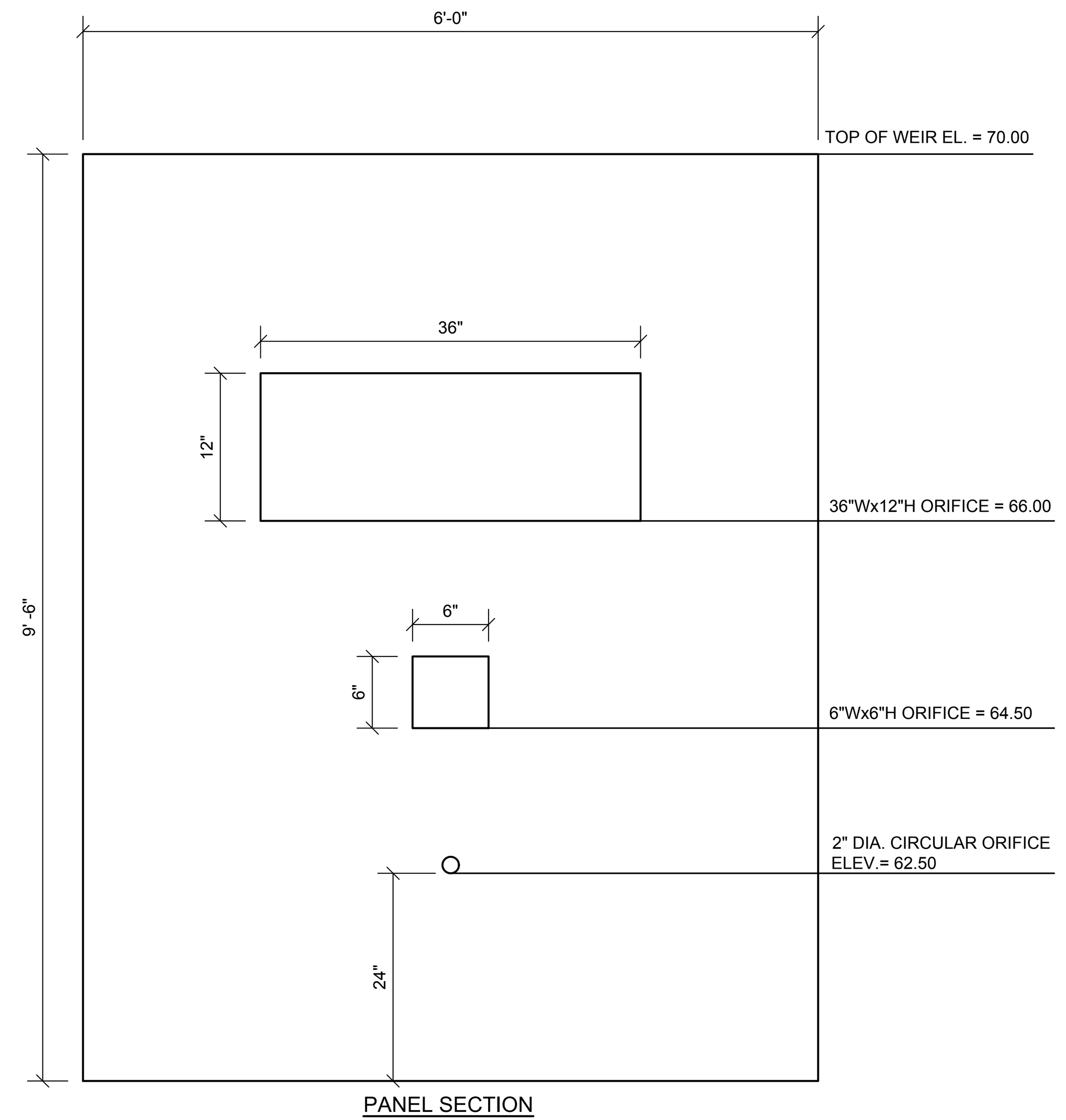
19059 D.dwg, TAB C-504 Details

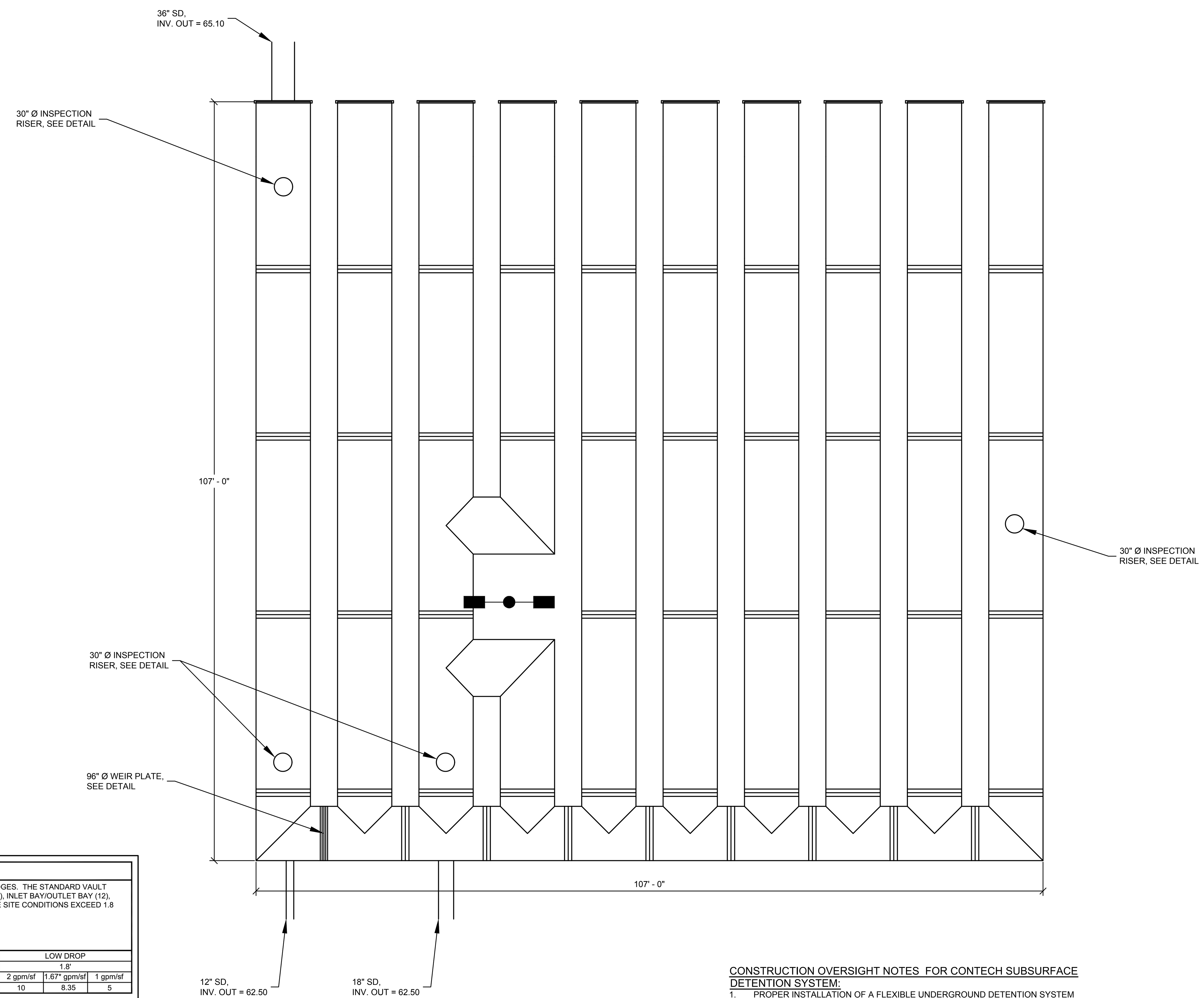


NOTES:
1. SUBMIT SHOP DRAWINGS FOR OWNER/ENGINEER APPROVAL.
2. STRUCTURE SHALL BE DESIGNED FOR H-20 LOADING.



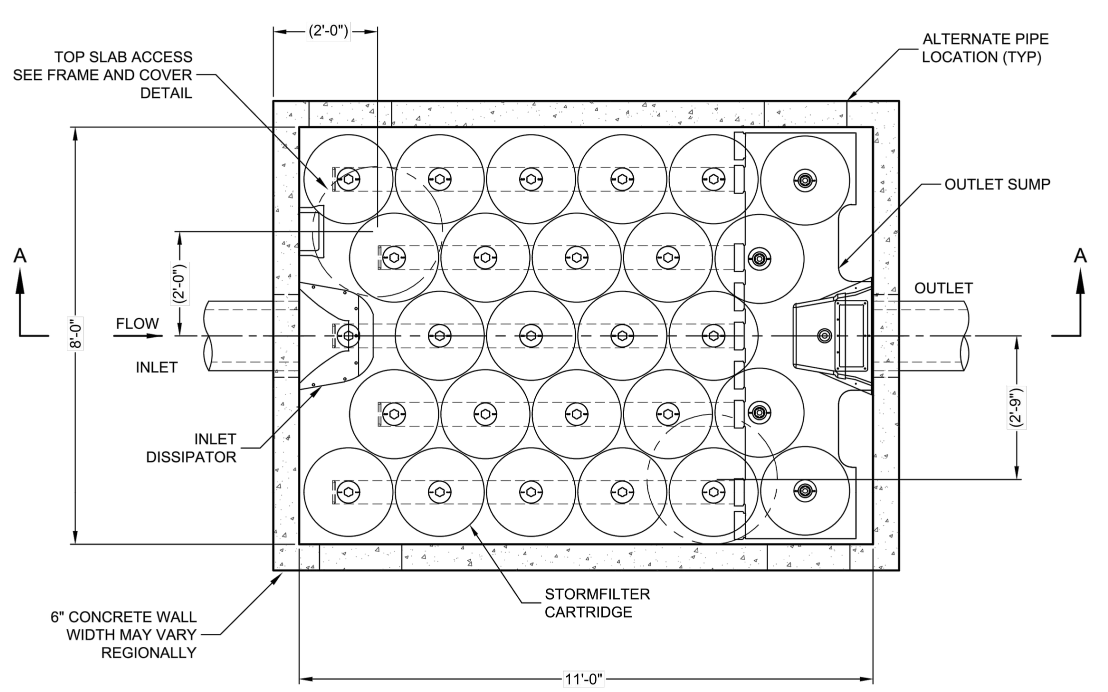
PANEL SECTION

OUTLET CONTROL STRUCTURE (OCS-1)
NOT TO SCALE

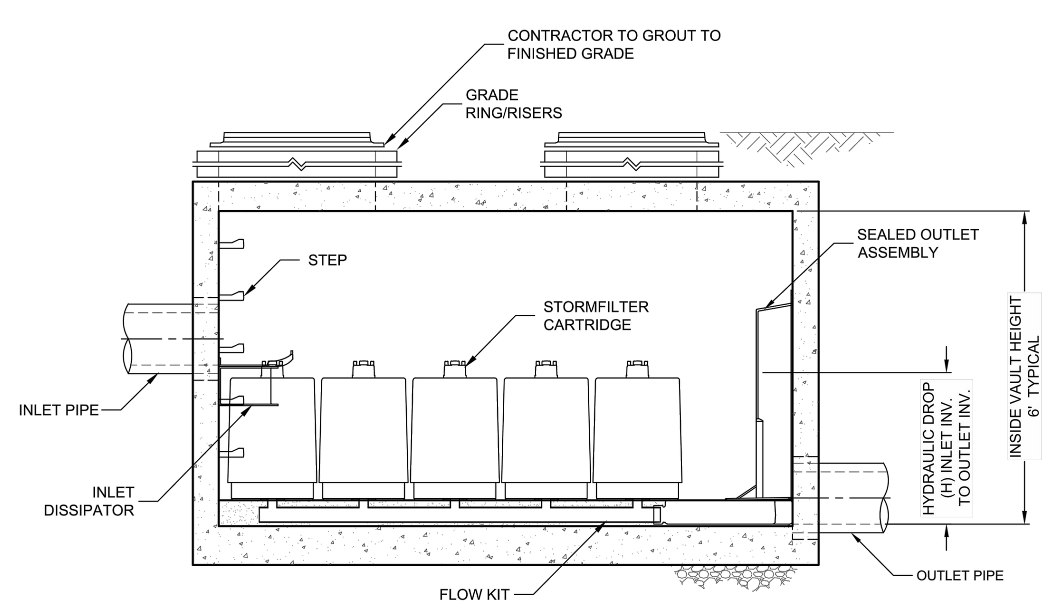


CONTECH SUBSURFACE DETENTION SYSTEM SF-1
NOT TO SCALE

CONSTRUCTION OVERSIGHT NOTES FOR CONTECH SUBSURFACE DETENTION SYSTEM:
1. PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THE SUBMITTAL DRAWINGS, ARE APPROPRIATE FOR YOUR SITE.
2. INSPECTIONS BY A PROFESSIONAL ENGINEER SHALL CONSIST OF WEEKLY VISITS TO THE SITE TO INSPECT THE CONSTRUCTION AND STABILIZATION OF THE PROPOSED SUBSURFACE DETENTION SYSTEM TO BE BUILT ON THE SITE. INSPECTIONS SHALL CONSIST OF AN APPROPRIATE NUMBER OF VISITS TO THE SITE TO INSPECT THE INSTALLATION OF THE SUBSURFACE DETENTION SYSTEM CONSTRUCTION FROM INITIAL GROUND DISTURBANCE TO BACKFILL OVER THE SYSTEM.



PLAN VIEW
VAULT STYLE: OUTLET SUMP (NIB)



SECTION A-A

The Stormwater Management StormFilter®

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,322,629; 5,624,576; 5,707,527; 5,985,157; 6,027,639; 6,649,048; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

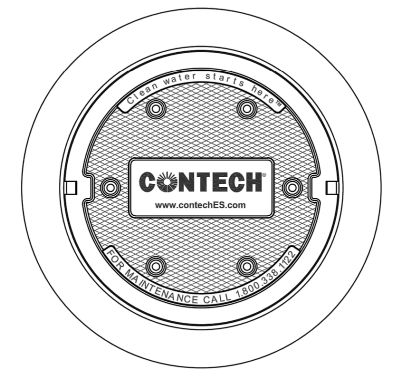
STORMFILTER DESIGN NOTES

STORMFILTER TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE SELECTION AND THE NUMBER OF CARTRIDGES. THE STANDARD VAULT STYLE IS SHOWN WITH THE MAXIMUM NUMBER OF CARTRIDGES (26). VAULT STYLE OPTIONS INCLUDE INLET BAY (17), INLET BAY/OUTLET BAY (12), OUTLET BAY (21), FULL HEIGHT BAFFLE WALL (17). STORMFILTER 8X11 PEAK HYDRAULIC CAPACITY IS 1.8 CFS. IF THE SITE CONDITIONS EXCEED 1.8 CFS AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

CARTRIDGE SELECTION

CARTRIDGE HEIGHT	27"			18"			LOW DROP		
RECOMMENDED HYDRAULIC DROP (H)	3.05'			2.3'			1.8'		
SPECIFIC FLOW RATE (gpm/sf)	2 gpm/sf	1.67* gpm/sf	1 gpm/sf	2 gpm/sf	1.67* gpm/sf	1 gpm/sf	2 gpm/sf	1.67* gpm/sf	1 gpm/sf
CARTRIDGE FLOW RATE (gpm)	22.5	18.79	11.25	15	12.53	7.5	10	8.35	5

* 1.67 gpm/sf SPECIFIC FLOW RATE IS APPROVED WITH PHOSPHOSORB® (PSORB) MEDIA ONLY



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	*
WATER QUALITY FLOW RATE (cfs)	*
PEAK FLOW RATE (cfs)	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
CARTRIDGE HEIGHT (27", 18", LOW DROP(LD))	*
NUMBER OF CARTRIDGES REQUIRED	*
CARTRIDGE FLOW RATE	*
MEDIA TYPE (PERLITE, ZPG, PSORB)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE #1	*	*	*
INLET PIPE #2	*	*	*
OUTLET PIPE	*	*	*

UPSTREAM RIM ELEVATION	*
DOWNSTREAM RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

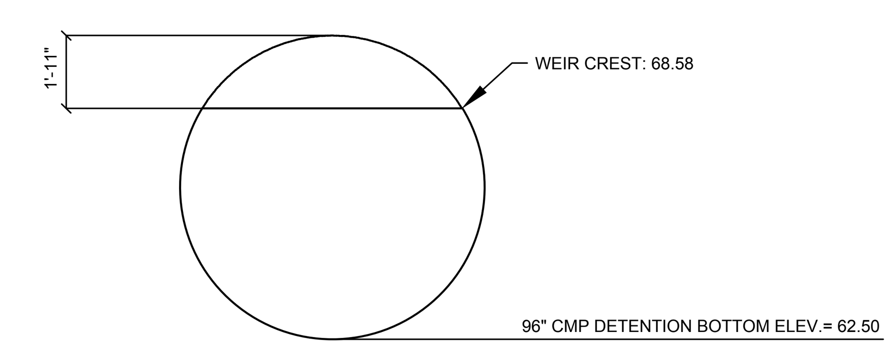
* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR SITE SPECIFIC DRAWINGS WITH DETAILED VAULT DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
4. STORMFILTER WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 5' AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
6. FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF CLEANING. RADIAL MEDIA DEPTH SHALL BE 7-INCHES. FILTER MEDIA CONTACT TIME SHALL BE AT LEAST 38 SECONDS.
7. SPECIFIC FLOW RATE IS EQUAL TO THE FILTER TREATMENT CAPACITY (gpm) DIVIDED BY THE FILTER CONTACT SURFACE AREA (sq ft).
8. STORMFILTER STRUCTURE SHALL BE PRECAST CONFORMING TO ASTM C-857 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER VAULT (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL VAULT SECTIONS AND ASSEMBLE VAULT.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH OUTLET PIPE INVERT WITH OUTLET BAY FLOOR.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.

CONTECH® ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

SF0811
STORMFILTER
STANDARD DETAIL



96" Ø WEIR PLATE DETAIL
NOT TO SCALE

AMY BELL SEGAL RLA 2265

PAUL D. OSTROWSKI PE 11175

STATE OF MAINE PAUL D. OSTROWSKI No. 11175 LICENSED PROFESSIONAL ENGINEER 08/30/2024

REV:	BY:	DATE:	STATUS:
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DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	N/A
PROJECT	19059

SHEET C-505

19059 D.dwg, TAB:C-505 Details

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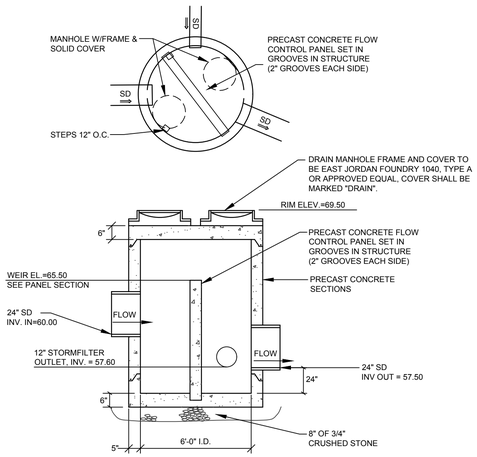
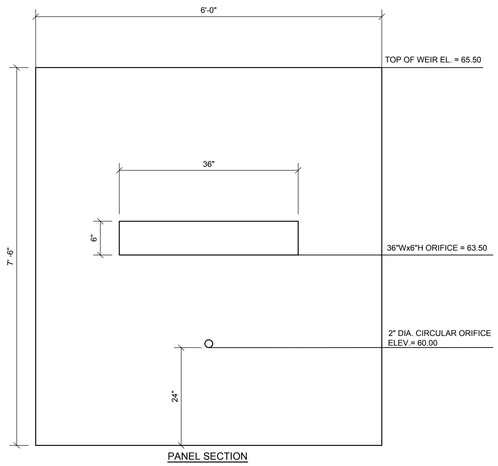
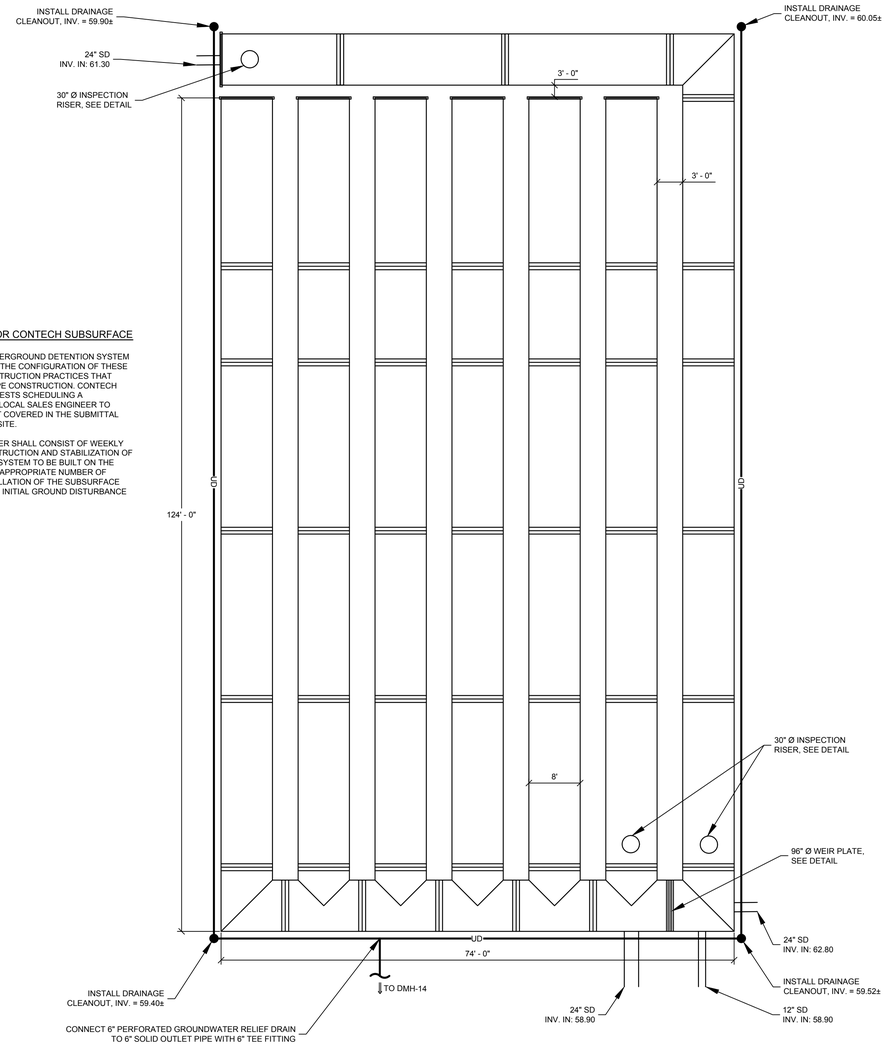


NOTES:
1. SUBMIT SHOP DRAWINGS FOR OWNER/ENGINEER APPROVAL.
2. STRUCTURE SHALL BE DESIGNED FOR H-20 LOADING.



PANEL SECTION

OUTLET CONTROL STRUCTURE (OCS-2)
NOT TO SCALE



CONTECH SUBSURFACE DETENTION SYSTEM SF-2
NOT TO SCALE

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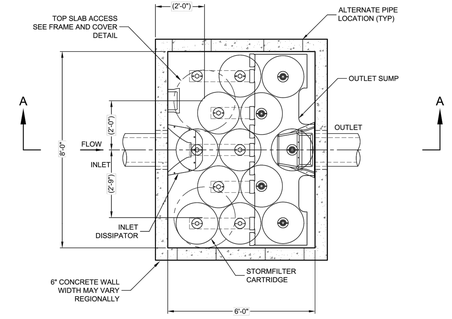
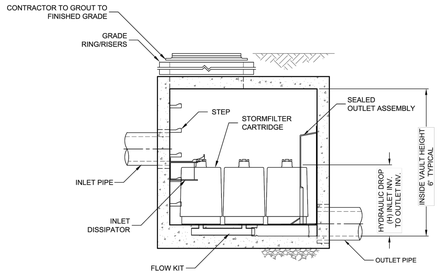


SECTION B-B
VAULT STYLE: OUTLET SUMP (NIB)



SECTION A-A

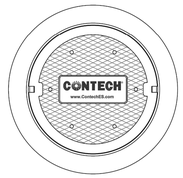
STORMFILTER DESIGN NOTES

STORMFILTER TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE SELECTION AND THE NUMBER OF CARTRIDGES. THE STANDARD VAULT STYLE IS SHOWN WITH THE MAXIMUM NUMBER OF CARTRIDGES (12). VAULT STYLE OPTIONS INCLUDE OUTLET BAY (7), STORMFILTER 8X6 PEAK HYDRAULIC CAPACITY IS 1.8 CFS. IF THE SITE CONDITIONS EXCEED 1.8 CFS AN UPSTREAM BYPASS STRUCTURE IS REQUIRED

CARTRIDGE SELECTION

CARTRIDGE HEIGHT	27"			18"			LOW DROP		
RECOMMENDED HYDRAULIC DROP (H)	3.05'			2.3'			1.8'		
SPECIFIC FLOW RATE (gpm/sf)	2 gpm/sf	1.67* gpm/sf	1 gpm/sf	2 gpm/sf	1.67* gpm/sf	1 gpm/sf	2 gpm/sf	1.67* gpm/sf	1 gpm/sf
CARTRIDGE FLOW RATE (gpm)	22.5	18.79	11.25	15	12.53	7.5	10	8.35	5

* 1.67 gpm/sf SPECIFIC FLOW RATE IS APPROVED WITH PHOSPHOSORB® (PSORB) MEDIA ONLY



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	*
WATER QUALITY FLOW RATE (cfs)	*
PEAK FLOW RATE (cfs)	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
CARTRIDGE HEIGHT (27", 18", LOW DROP(LD))	*
NUMBER OF CARTRIDGES REQUIRED	*
CARTRIDGE FLOW RATE	*
MEDIA TYPE (PERLITE, ZPG, PSORB)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE #1	*	*	*
INLET PIPE #2	*	*	*
OUTLET PIPE	*	*	*

UPSTREAM RIM ELEVATION	*
DOWNSTREAM RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

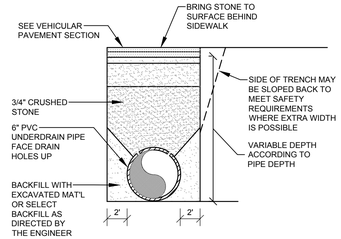
* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR SITE SPECIFIC DRAWINGS WITH DETAILED VAULT DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
4. STORMFILTER WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 5' AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
6. FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF CLEANING. RADIAL MEDIA DEPTH SHALL BE 7-INCHES. FILTER MEDIA CONTACT TIME SHALL BE AT LEAST 38 SECONDS.
7. SPECIFIC FLOW RATE IS EQUAL TO THE FILTER TREATMENT CAPACITY (gpm) DIVIDED BY THE FILTER CONTACT SURFACE AREA (sq ft).
8. STORMFILTER STRUCTURE SHALL BE PRECAST CONFORMING TO ASTM C-857 AND AASHTO LOAD FACTOR DESIGN METHOD.

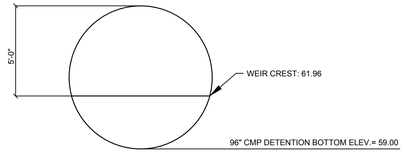
INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER VAULT (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL VAULT SECTIONS AND ASSEMBLE VAULT.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH OUTLET PIPE INVERT WITH OUTLET BAY FLOOR.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

SF806
STORMFILTER
STANDARD DETAIL



GROUNDWATER RELIEF DRAIN
NOT TO SCALE



96" Ø WEIR PLATE DETAIL
NOT TO SCALE

THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM SEBAGO TECHNICS, INC. ANY ALTERATIONS AS PROPOSED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO SEBAGO TECHNICS, INC.

PAUL D. OSTROWSKI PE 11175
AMY BELL SEGAL RLA 2265

STATE OF MAINE — REGISTERED PROFESSIONAL ENGINEER — PAUL D. OSTROWSKI — NO. 11175 — 08/30/2024

REV.	BY	DATE	
E.	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
D.	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
C.	PDO	05/28/2024	OVERALL GRADING PLAN REISSUED TO MAINE DEP AND ACOE
B.	PDO	03/19/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
A.	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

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

SITE DETAILS
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	N/A
PROJECT	19059

SHEET C-506

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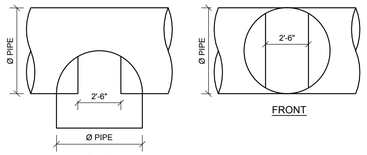
I:\STORMWATER\CCOMMOP\10 STORMFILTER\40 STANDARD DRAWINGS\VAULT TOWG\SF8066.DTL SEALED OUTLET RISER.DWG 9/20/2021 2:09 PM

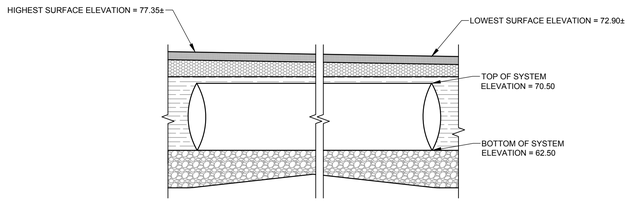
19059 D.dwg - TAB C-506 Details



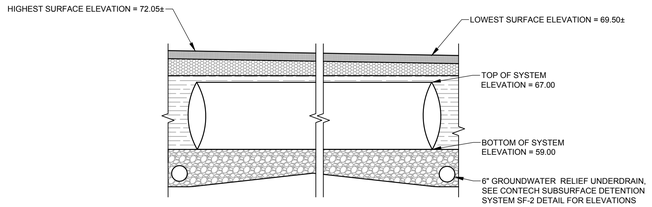
NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.

NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.

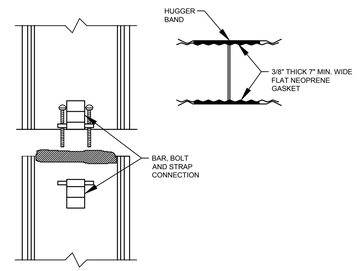
INSPECTION RISER DETAIL
NOT TO SCALE



SUBSURFACE DETENTION 1
SECTION VIEW



SUBSURFACE DETENTION 2
SECTION VIEW

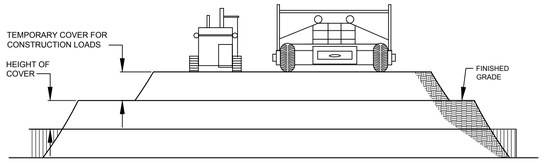


CONNECTION DETAIL SINGLE BOLT, BAR AND STRAP

NOTES

1. BANDS ARE NORMALLY FURNISHED AS FOLLOWS:
   12" THRU 48", 1-PIECE
   54" THRU 96", 2-PIECE
   102" THRU 144", 3-PIECES
2. BAND FASTENERS ARE ATTACHED WITH SPOT WELDS, RIVETS OR HAND WELDS
3. REROLLED ANNULAR END CORRUGATIONS ARE NORMALLY 2 2/3" x 1/2". DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES

12" HUGGER BAND DETAIL
NOT TO SCALE



CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM
NOT TO SCALE

(1) MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

FOUNDATION/BEDDING PREPARATION

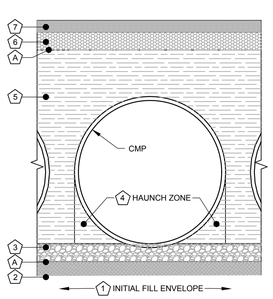
(2) PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION. THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

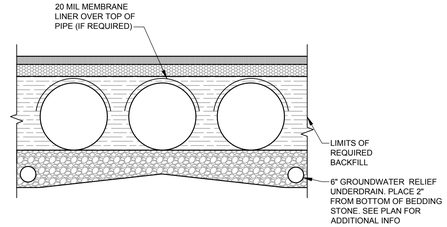
(4) HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMLY COMPACTED WITHOUT SOFT SPOTS.

BACKFILL

WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT (16") DIFFERENTIAL BETWEEN ANY OF THE LENGTH OF THE DETENTION SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON THE PIPE.

OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.





DETENTION SYSTEMS - CMP DETENTION / CMP DRAINAGE

	MATERIAL LOCATION	DESCRIPTION	MATERIAL DESIGNATION	DESIGNATION
7	RIGID OR FLEXIBLE PAVEMENT (IF APPLICABLE)			
6	ROAD BASE (IF APPLICABLE)			
A	GEOTEXTILE LAYER	NON-WOVEN GEOTEXTILE	CONTECT C-40 OR C-45	ENGINEER DECISION FOR CONSIDERATION TO PREVENT SOIL MIGRATION INTO VARYING SOIL TYPES
5	BACKFILL	WELL GRADED GRANULAR MATERIAL WHICH MAY CONTAIN SMALL AMOUNTS OF SILT OR CLAY.	AASHTO M 145- A-1, A-2, A-3	PLACED IN 8" ± LOOSE LIFTS AND COMPACTED TO 90% STANDARD PROCTOR PER AASHTO T 99
3	BEDDING STONE	WELL GRADED GRANULAR BEDDING MATERIAL WITH MAXIMUM PARTICLE SIZE OF 3"	AASHTO M43- 3, 357, 4, 467, 5, 56, 57	ENGINEER TO DETERMINE IF BEDDING IS REQUIRED. PIPE MAY BE PLACED ON THE TRENCH BOTTOM OF A RELATIVELY LOOSE, NATIVE SUITABLE WELL GRADED AND GRANULAR MATERIAL. FOR ARCH PIPES IT IS RECOMMENDED TO BE SHAPED TO A RELATIVELY FLAT BOTTOM OR FINE-GRADE THE FOUNDATION TO A SLIGHT V-SHAPE. UNSUITABLE MATERIAL SHOULD BE OVER-EXCAVATED AND RE-PLACED WITH A 4"-6" LAYER OF WELL GRADED AND GRANULAR STONE PER THE MATERIAL DESIGNATION. SEE AASHTO 26.3.8.1/26.5.3 BEDDING INFO.
A	GEOTEXTILE LAYER	NON-WOVEN GEOTEXTILE	CONTECH C-40 OR C-45	ENGINEER DECISION FOR CONSIDERATION TO PREVENT SOIL MIGRATION INTO VARYING SOIL TYPES

NOTE: BACKFILL USING CONTROLLED LOW-STRENGTH MATERIAL (CLSM, "FLASH FILL" OR "FLOWABLE FILL") WHEN THE SPACING BETWEEN THE PIPES WILL NOT ALLOW FOR PLACEMENT AND ADEQUATE COMPACTION OF THE BACKFILL.

DETENTION SYSTEM
NOT TO SCALE

SPECIFICATION FOR CORRUGATED STEEL PIPE-ALUMINIZED TYPE 2 STEEL

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE CORRUGATED STEEL PIPE (CSP) DETAILED IN THE PROJECT PLANS.

MATERIAL
THE ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M274 OR ASTM A929.

PIPE
THE CSP SHALL BE MANUFACTURED IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF AASHTO M36 OR ASTM A760. THE PIPE SIZES, GAGES AND CORRUGATIONS SHALL BE AS SHOWN ON THE PROJECT PLANS.

ALL FABRICATION OF THE PRODUCT SHALL OCCUR WITHIN THE UNITED STATES.

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH RECOMMENDATIONS OF THE NATIONAL CORRUGATED STEEL PIPE ASSOCIATION (NCSPA)

INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II OR ASTM A798 AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

MATERIAL SPECIFICATION
NOT TO SCALE

PAUL D. OSTROWSKI PE 11175
AMY BELL SEGAL RLA 2265

STATE OF MAINE — REGISTERED PROFESSIONAL ENGINEER — PAUL D. OSTROWSKI — No. 11175 — 08/30/2024

REV.	BY	DATE	
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A.	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

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

SITE DETAILS
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	N/A
PROJECT	19059

SHEET C-507

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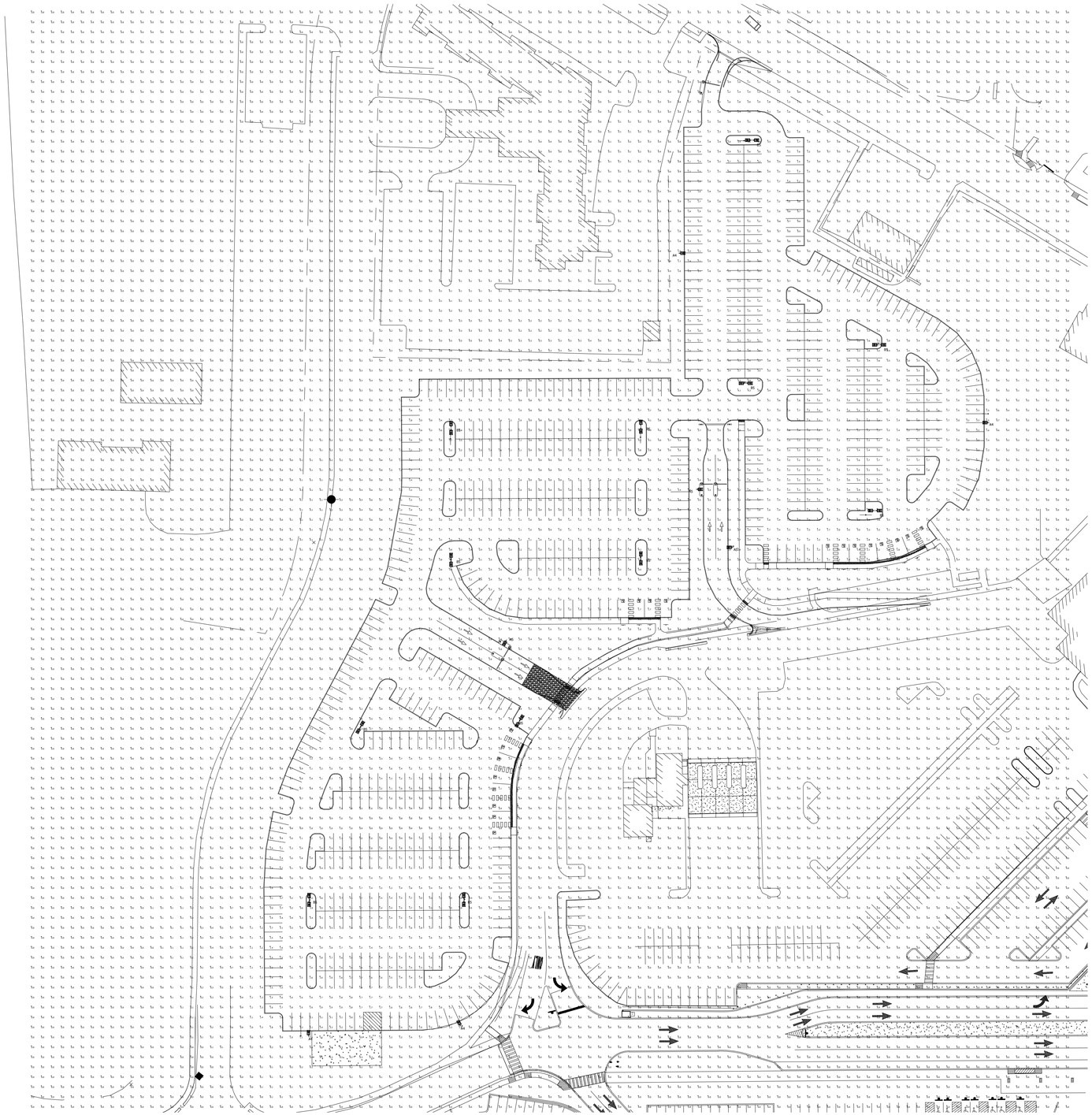


Luminaire Schedule							
Symbol	Qty	Label	Mounting Height	LLF	Lum. Lumens	Lum. Watts	Description
	3	A5	30' - 0" AFG	0.900	23445	240	VP-2-72L-240-3K7-5QW
	12	B5	30' - 0" AFG	0.900	23445	240	VP-2-72L-240-3K7-5QW
	4	A4	30' - 0" AFG	0.900	21466	240	VP-2-72L-240-3K7-4W

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
Overall Area	Illuminance	Fc	0.53	4.8	0.0	N.A.	N.A.
Parking Area	Illuminance	Fc	1.90	4.8	0.5	3.80	9.60

60 0 30 60 120 240

1 Inch = 60 - FT.

1. THIS LIGHTING DESIGN IS BASED ON LIMITED INFORMATION SUPPLIED BY OTHERS TO CURRENT. SITE DETAILS PROVIDED HEREON ARE REPRODUCED ONLY AS A VISUALIZATION AID. FIELD DEVIATIONS MAY SIGNIFICANTLY AFFECT PREDICTED PERFORMANCE. PRIOR TO INSTALLATION, CRITICAL SITE INFORMATION (POLE LOCATIONS, ORIENTATION, MOUNTING HEIGHT, ETC.) SHOULD BE COORDINATED WITH THE CONTRACTOR AND/OR SPECIFIER RESPONSIBLE FOR THE PROJECT.
2. LUMINAIRE DATA IS TESTED TO INDUSTRY STANDARDS UNDER LABORATORY CONDITIONS. OPERATING VOLTAGE AND NORMAL MANUFACTURING TOLERANCES OF LAMP, BALLAST, AND LUMINAIRE MAY AFFECT FIELD RESULTS.
3. CONFORMANCE TO FACILITY CODE AND OTHER LOCAL REQUIREMENTS IS THE RESPONSIBILITY OF THE OWNER AND/OR THE OWNER'S REPRESENTATIVE.

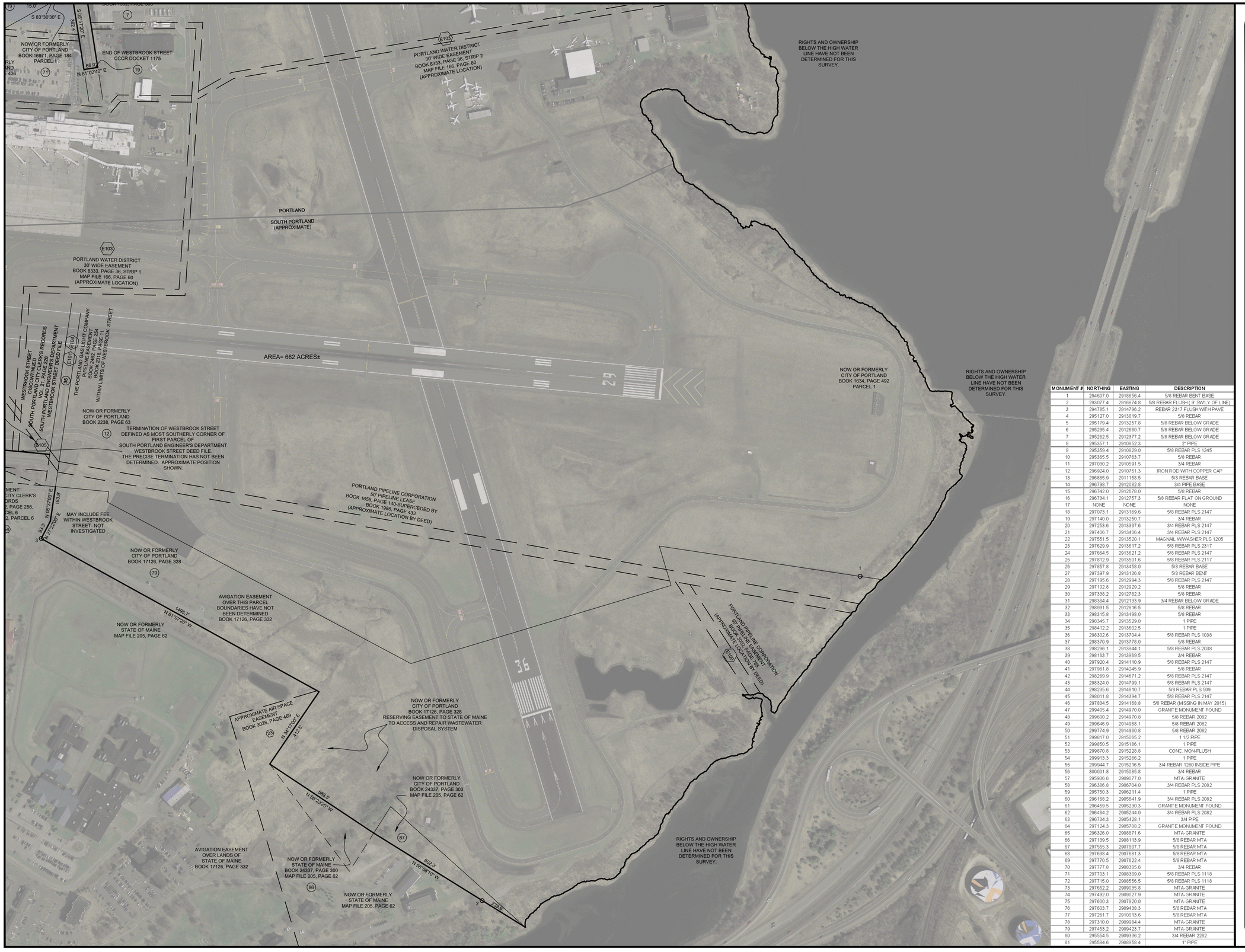
TITLE:

PORTLAND JETWAY
PORTLAND, ME
SITE PHOTOMETRIC PLAN

REVISED FROM DRAWING NUMBER(S):	
R1: 11/27/23	R5: 02/07/24
R2: 01/23/24	
R3: 01/30/24	
R4: 02/05/24	

Current

DN BY: DHK	DATE: 11/17/23	CHK BY: N/A
REV. BY: DHK	DATE: 02/05/24	SCALE: AS NOTED
QUOTE: N/A	DRAWING / DESIGN NO.: A232214R5	



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 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	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	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	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	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	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

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.
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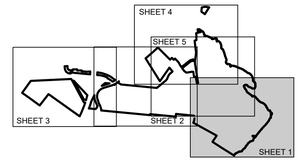
5. AERIAL PHOTOGRAPHY SHOWN WAS TAKEN IN 2015.
6. CURRENT OWNER: CITY OF PORTLAND
389 CONGRESS ST.
PORTLAND, MAINE 04101

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 7-9-2018, 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 20220126.DWG

DATE: JANUARY 26, 2022

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 BELOW GRADE
32	298991.5	2912816.5	5/8 REBAR
33	298315.8	2913488.0	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	298299.9	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	300001.8	2915085.8	3/4 REBAR
57	295936.6	2909077.0	MT A-GRANITE
58	296388.8	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 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

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   389 CONGRESS ST.
   PORTLAND, MAINE 04101

LEGEND

- 1 — MONUMENT FOUND WITH REFERENCE NUMBER
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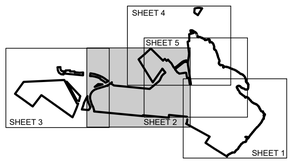
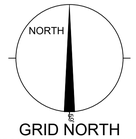


SHEET INDEX

NOT TO SCALE



GRID NORTH

MAINE COORDINATE SYSTEM OF 1983 (2011)
WEST ZONE

SCALE: 1"= 200'

200' 0 200' 400' 600' 800'

SURVEY STANDARD

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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:	SHEET:
14078 MASTER PLAN 20220126.DWG	2 OF 5
DATE: JANUARY 26, 2022	
SCALE: 1"=200'	

MONUMENT #	NORTHING	EASTING	DESCRIPTION	MONUMENT #	NORTHING	EASTING	DESCRIPTION	MONUMENT #	NORTHING	EASTING	DESCRIPTION
1	294607.0	2918656.4	5/8 REBAR BENT BASE	27	297397.9	2913136.8	5/8 REBAR BENT	53	299870.8	2915228.8	CONC. MON-FLUSH
2	293077.4	2916874.8	5/8 REBAR FLUSH (.9' SW'LY OF LINE)	28	297195.6	2912994.3	5/8 REBAR PLS 2147	54	299913.3	2915266.2	1 PIPE
3	294785.1	2914796.2	REBAR 2317 FLUSH WITH PAVE	29	297102.8	2912929.2	5/8 REBAR	55	299944.7	2915216.5	3/4 REBAR 1280 INSIDE PIPE
4	295127.0	2913819.7	5/8 REBAR	30	297338.2	2912782.3	5/8 REBAR	56	300001.8	2915085.8	3/4 REBAR
5	295179.4	2913257.8	5/8 REBAR BELOW GRADE	31	298384.4	2912133.9	3/4 REBAR BELOW GRADE	57	295936.6	2909077.0	MTA-GRANITE
6	295235.4	2912660.7	5/8 REBAR BELOW GRADE	32	298991.5	2912816.5	5/8 REBAR	58	296386.8	2906704.0	3/4 REBAR PLS 2082
7	295262.5	2912377.2	5/8 REBAR BELOW GRADE	33	298315.8	2913498.0	5/8 REBAR	59	295750.3	2906211.4	1 PIPE
8	295357.1	2910852.3	2" PIPE	34	298345.7	2913529.0	1 PIPE	60	296168.2	2905641.9	3/4 REBAR PLS 2082
9	295359.4	2910829.0	5/8 REBAR PLS 1245	35	298412.2	2913602.5	1 PIPE	61	296459.5	2905230.3	GRANITE MONUMENT FOUND
10	295365.5	2910763.7	5/8 REBAR	36	298302.6	2913704.4	5/8 REBAR PLS 1038	62	296484.2	2905244.0	3/4 REBAR PLS 2082
11	297030.2	2910591.5	3/4 REBAR	37	298370.9	2913778.0	5/8 REBAR	63	296734.3	2905428.1	3/4 PIPE
12	296924.0	2910751.3	IRON ROD WITH COPPER CAP	38	298296.1	2913844.1	5/8 REBAR PLS 2038	64	297124.3	2905708.2	GRANITE MONUMENT FOUND
13	296885.9	2911158.5	5/8 REBAR BASE	39	298163.7	2913969.5	3/4 REBAR	65	296326.0	2908871.6	MTA-GRANITE
14	296798.7	2912082.8	3/4 PIPE BASE	40	297920.4	2914110.9	5/8 REBAR PLS 2147	66	297139.5	2908113.9	5/8 REBAR MTA
15	296742.0	2912678.0	5/8 REBAR	41	297981.8	2914245.9	5/8 REBAR	67	297555.3	2907807.7	5/8 REBAR MTA
16	296734.1	2912757.3	5/8 REBAR FLAT ON GROUND	42	298289.9	2914671.2	5/8 REBAR PLS 2147	68	297638.4	2907681.3	5/8 REBAR MTA
17	NONE	NONE	NONE	43	298324.0	2914799.1	5/8 REBAR PLS 2147	69	297770.5	2907622.4	5/8 REBAR MTA
18	297073.1	2913169.6	5/8 REBAR PLS 2147	44	298235.6	2914810.7	5/8 REBAR PLS 509	70	297777.8	2908305.6	3/4 REBAR
19	297140.0	2913250.7	3/4 REBAR	45	298011.8	2914394.7	5/8 REBAR PLS 2147	71	297703.1	2908309.0	5/8 REBAR PLS 1118
20	297253.6	2913337.6	3/4 REBAR PLS 2147	46	297834.5	2914168.8	5/8 REBAR (MISSING IN MAY 2015)	72	297715.0	2908556.5	5/8 REBAR PLS 1118
21	297406.7	2913406.4	3/4 REBAR PLS 2147	47	299405.4	2914970.0	GRANITE MONUMENT FOUND	73	297652.2	2909035.8	MTA-GRANITE
22	297551.5	2913520.1	MAGNAIL W/WASHER PLS 1205	48	299600.2	2914970.8	5/8 REBAR 2082	74	297492.0	2909027.9	MTA-GRANITE
23	297629.9	2913617.2	5/8 REBAR PLS 2317	49	299646.9	2914968.1	5/8 REBAR 2082	75	297600.3	2907920.0	MTA-GRANITE
24	297664.5	2913621.2	5/8 REBAR PLS 2147	50	299774.9	2914960.8	5/8 REBAR 2082	76	297603.7	2909438.3	5/8 REBAR MTA
25	297812.9	2913501.6	5/8 REBAR PLS 2117	51	299817.0	2915065.2	1 1/2 PIPE	77	297261.7	2910013.6	5/8 REBAR MTA
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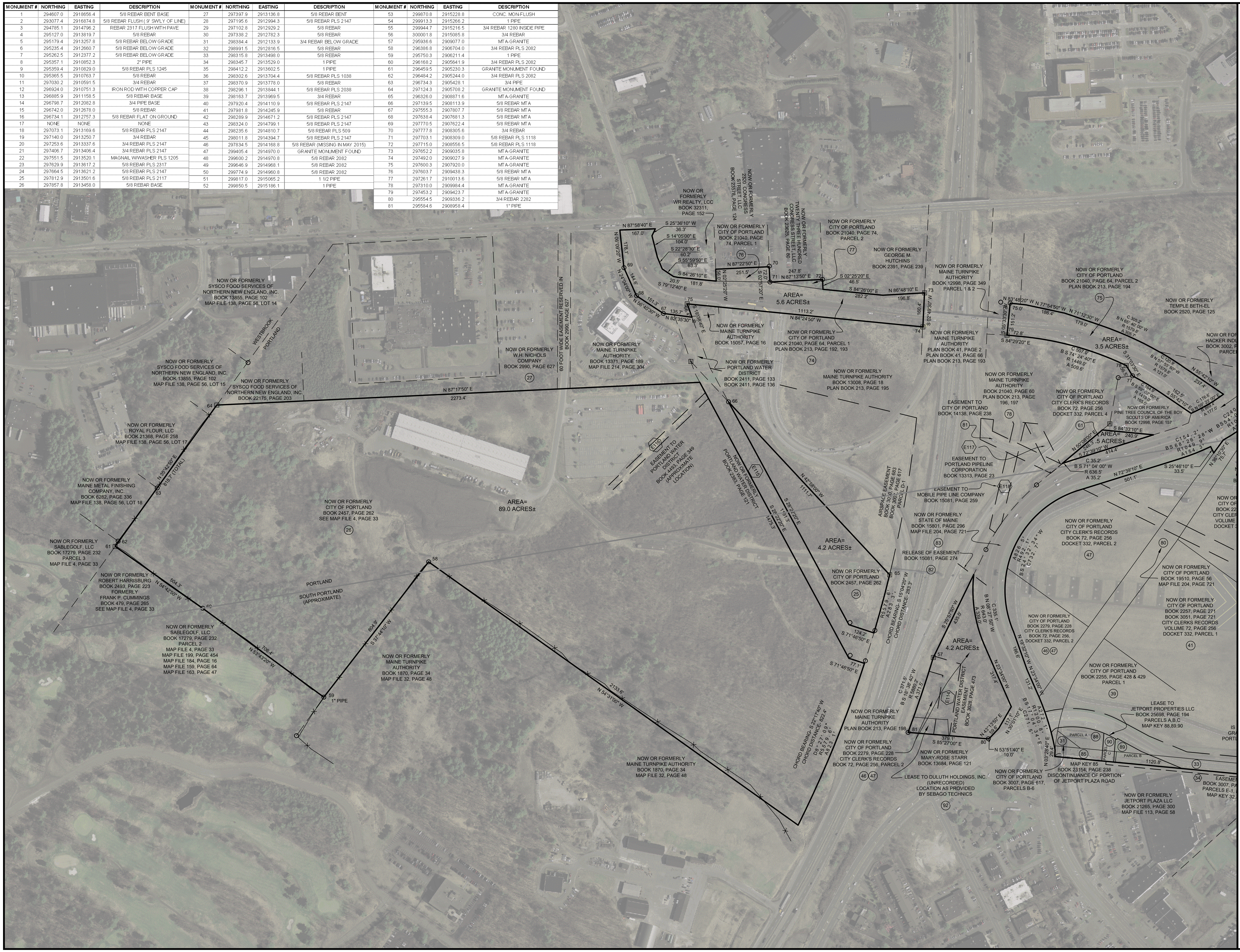

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6. CURRENT OWNER: CITY OF PORTLAND
   389 CONGRESS ST.
   PORTLAND, MAINE 04101

LEGEND

- MONUMENT FOUND WITH REFERENCE NUMBER
- HIGHWAY MONUMENT FOUND WITH REFERENCE NUMBER
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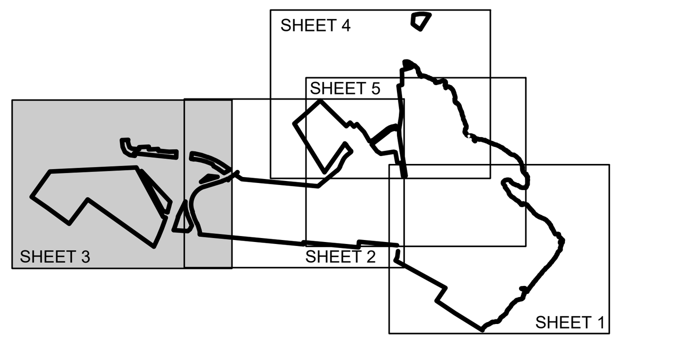

SHEET INDEX
NOT TO SCALE

NORTH

GRID NORTH
MAINE COORDINATE SYSTEM OF 1983 (2011)
WEST ZONE

SCALE: 1"= 200'

200' 0 200' 400' 600' 800'

SURVEY STANDARD

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STATE OF MAINE CLARK G. STAPLES NO. 2332 PROFESSIONAL LAND SURVEYOR

BOUNDARY SURVEY

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-PORTLAND & SOUTH PORTLAND-
CUMBERLAND COUNTY, MAINE
FOR
Stantec

GOOD DEEDS
LAND SURVEYING • DEED RESEARCH
109 MAIN STREET
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DWG: 14078 MASTER PLAN 20220126.DWG
DATE: JANUARY 26, 2022
SCALE: 1"=200'
SHEET: 3 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)
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4	295127.0	2913819.7	5/8 REBAR
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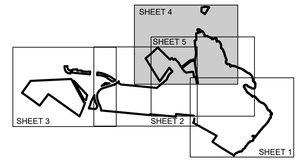
15	296742.0	2912678.0	5/8 REBAR
16	296734.1	2912757.3	5/8 REBAR FLAT ON GROUND
17	NONE	NONE	NONE
18	297073.1	2913169.6	5/8 REBAR PLS 2147
19	297140.0	2913250.7	3/4 REBAR
20	297253.6	2913337.6	3/4 REBAR PLS 2147
21	297406.7	2913406.4	3/4 REBAR PLS 2147
22	297555.5	2913520.1	MAGNAIL W/WASHER PLS 1205
23	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	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 MT A
67	297555.3	2907807.7	5/8 REBAR MT A
68	297638.4	2907681.3	5/8 REBAR MT A
69	297710.5	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

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 (H) — 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 7-9-2018, 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 20220126.DWG

DATE: JANUARY 26, 2022

SCALE: 1"=200'

SHEET: 4 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' SW'LY 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 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
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51	299817.0	2915065.2	1 1/2 PIPE
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MONUMENT #	NORTHING	EASTING	DESCRIPTION
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
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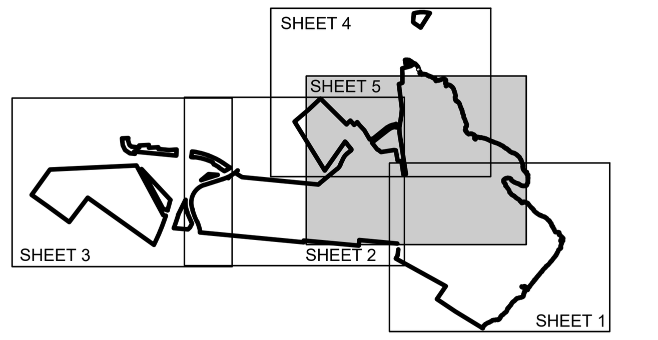
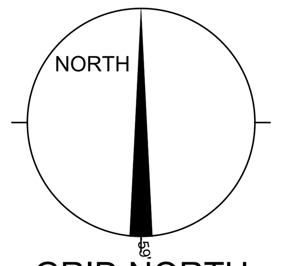
389 CONGRESS ST.
PORTLAND, MAINE 04101

LEGEND

- MONUMENT FOUND WITH REFERENCE NUMBER (1)
- HIGHWAY MONUMENT FOUND WITH REFERENCE NUMBER (79)
- STONE/GRANITE FOUND WITH REFERENCE NUMBER (64)
- EASEMENT BOUNDARY
- PROPERTY LINE
- INTERIOR PARCEL BOUNDARY
- APPROXIMATE ABUTTER BOUNDARY
- PARCEL NUMBERING CORRESPONDS WITH DRAWING "PORTLAND INTERNATIONAL JETPORT EXHIBIT 'A'" DATED 7-9-2018, BY COFFMAN ASSOCIATES (E105) (12)



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

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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

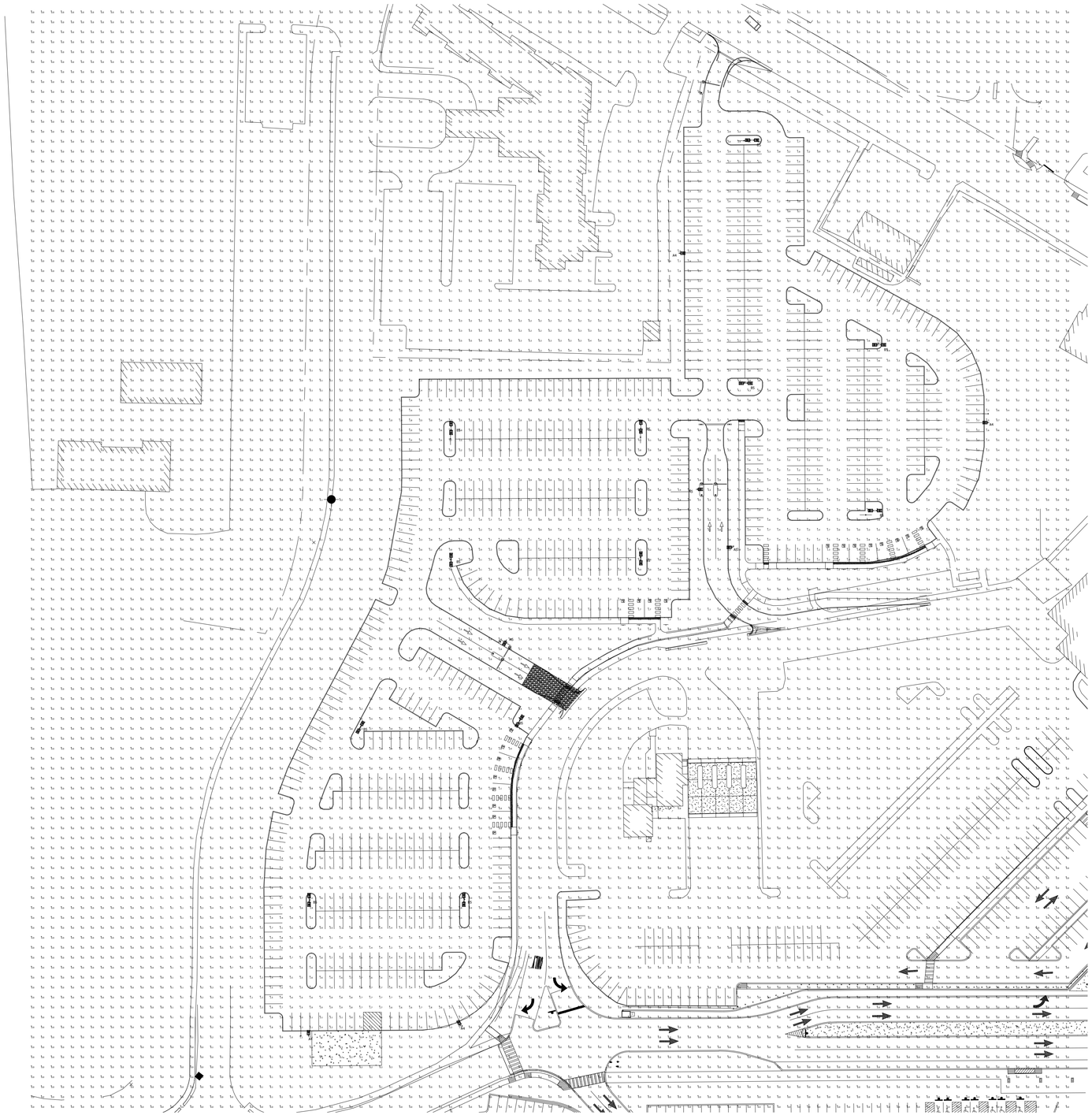
IN THE VICINITY OF

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 20220126.DWG
DATE: JANUARY 26, 2022
SCALE: 1"=200'
SHEET: 5 OF 5



Luminaire Schedule							
Symbol	Qty	Label	Mounting Height	LLF	Lum. Lumens	Lum. Watts	Description
	3	A5	30' - 0" AFG	0.900	23445	240	VP-2-72L-240-3K7-5QW
	12	B5	30' - 0" AFG	0.900	23445	240	VP-2-72L-240-3K7-5QW
	4	A4	30' - 0" AFG	0.900	21466	240	VP-2-72L-240-3K7-4W

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
Overall Area	Illuminance	Fc	0.53	4.8	0.0	N.A.	N.A.
Parking Area	Illuminance	Fc	1.90	4.8	0.5	3.80	9.60

60 0 30 60 120 240

1 Inch = 60 - FT.

1. THIS LIGHTING DESIGN IS BASED ON LIMITED INFORMATION SUPPLIED BY OTHERS TO CURRENT. SITE DETAILS PROVIDED HEREON ARE REPRODUCED ONLY AS A VISUALIZATION AID. FIELD DEVIATIONS MAY SIGNIFICANTLY AFFECT PREDICTED PERFORMANCE. PRIOR TO INSTALLATION, CRITICAL SITE INFORMATION (POLE LOCATIONS, ORIENTATION, MOUNTING HEIGHT, ETC.) SHOULD BE COORDINATED WITH THE CONTRACTOR AND/OR SPECIFIER RESPONSIBLE FOR THE PROJECT.
2. LUMINAIRE DATA IS TESTED TO INDUSTRY STANDARDS UNDER LABORATORY CONDITIONS. OPERATING VOLTAGE AND NORMAL MANUFACTURING TOLERANCES OF LAMP, BALLAST, AND LUMINAIRE MAY AFFECT FIELD RESULTS.
3. CONFORMANCE TO FACILITY CODE AND OTHER LOCAL REQUIREMENTS IS THE RESPONSIBILITY OF THE OWNER AND/OR THE OWNER'S REPRESENTATIVE.

TITLE:

PORTLAND JETWAY
PORTLAND, ME
SITE PHOTOMETRIC PLAN

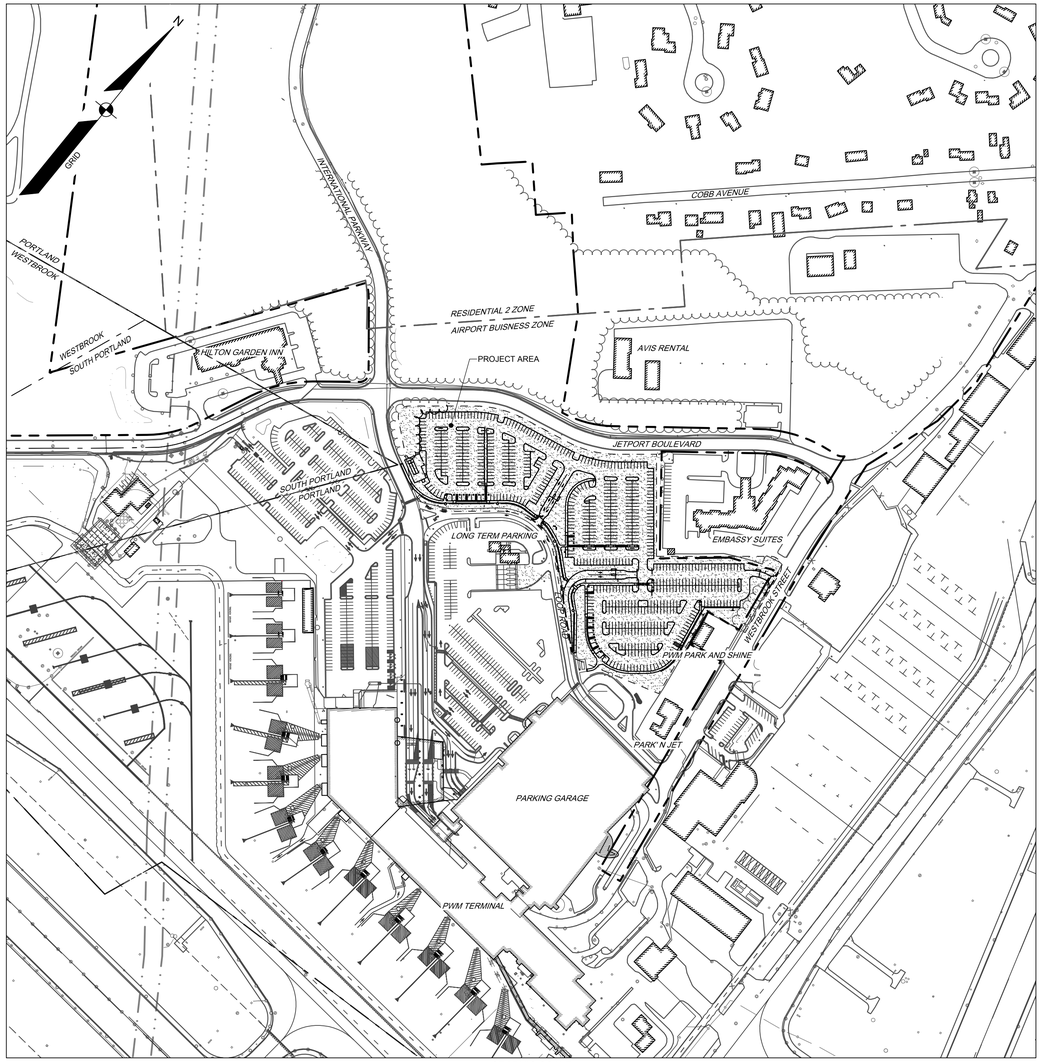
REVISED FROM DRAWING NUMBER(S):	
R1: 11/27/23	R5: 02/07/24
R2: 01/23/24	
R3: 01/30/24	
R4: 02/05/24	

Current

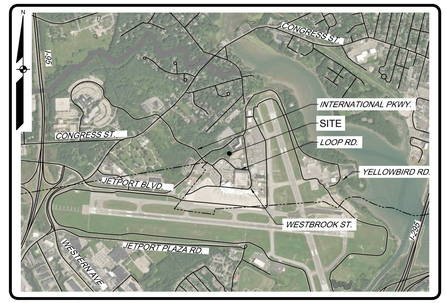
DN BY: DHK	DATE: 11/17/23	CHK BY: N/A
REV. BY: DHK	DATE: 02/05/24	SCALE: AS NOTED
QUOTE: N/A	DRAWING / DESIGN NO.: A232214R5	

PORTLAND INTERNATIONAL JETPORT
PARKING EXPANSION

1001 WESTBROOK STREET
PORTLAND, MAINE 04102



GRAPHIC SCALE
200 0 100 200 400
(IN FEET)
1 INCH = 200FT.



LOCATION MAP NTS

Sheet List Table

SHEET	TITLE
G-001	COVER SHEET
G-002	NOTES & LEGEND
C-003	DEMOLITION PLAN
C-100	OVERALL SITE PLAN
C-101	SITE PLAN
C-102	SITE PLAN
C-103	SITE PLAN
C-200	OVERALL GRADING PLAN
C-201	GRADING PLAN
C-202	GRADING PLAN
C-203	GRADING PLAN
C-300	OVERALL UTILITY PLAN
C-301	UTILITY PLAN
C-302	UTILITY PLAN
C-303	UTILITY PLAN
C-304	PIPE AND STRUCTURE DATA TABLES
L-100	OVERALL LANDSCAPE PLAN
L-101	TREE REMOVAL & PRESERVATION PLAN
L-102	LANDSCAPE PLAN
L-103	LANDSCAPE PLAN
L-104	LANDSCAPE PLAN
C-400	CONSTRUCTION SEQUENCE PLAN
C-500	EROSION CONTROL NOTES
C-501	EROSION CONTROL DETAILS
C-502	SITE DETAILS
C-503	SITE DETAILS
C-504	SITE DETAILS
C-505	SITE DETAILS
C-506	SITE DETAILS
C-507	SITE DETAILS
1 OF 5	BOUNDARY SURVEY
2 OF 5	BOUNDARY SURVEY
3 OF 5	BOUNDARY SURVEY
4 OF 5	BOUNDARY SURVEY
5 OF 5	BOUNDARY SURVEY
1 OF 1	SITE PHOTOMETRICS PLAN

APPLICANT:

PORTLAND INTERNATIONAL JETPORT
PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

ENGINEER/SURVEYOR/
LANDSCAPE ARCHITECT:

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

REV.	BY:	DATE:	STATUS:
A.	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION
B.	PDO	03/19/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
C.	PDO	05/28/2024	OVERALL GRADING PLAN REISSUED TO MAINE DEP AND ACOE
D.	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
E.	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
F.	OAM	11/15/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT

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.

OWENS A. MCCULLOUGH PE 7122
AMY BELL SEGAL RLA 2265

STATE OF MAINE
OWENS A. MCCULLOUGH
No. 7122
REGISTERED PROFESSIONAL ENGINEER

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

COVER SHEET
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 200'
PROJECT	19059

SHEET G-001

F:\Projects\19000\19059\DWG\Design\19059 C.dwg - 11/15/2024 4:42 PM - EBEN ROBICHAUD

19059 C.dwg, TAB:G-001 Cover

LEGEND

EXISTING		PROPOSED
	PROPERTY LINE/R.O.W.	
	ABUTTER LINE/R.O.W.	
	DEED LINE/R.O.W.	
	TIE LINE	
	SETBACK	
	EASEMENT	
	BUFFER	
	FLOODPLAIN	
	FLOODWAY	
	CENTERLINE	
⊡	MONUMENT	■
◎	IRON PIPE/ROD	●
◎	DRILL HOLE	◉
C1/L1	DEED CALL	
C1/L1	CURVE/LINE NO.	C1/L1
	SOILS	
	ZONE LINE	
	ZONE LINE ON PL	
BENCHMARK DESCRIPTION WITH ELEVATION	BENCHMARK	
	SURVEY CONTROL	
TP-1	TEST PIT	
MW-1	MONITORING WELL	
B-1	BORING	
	BUILDING	
	DECK/STEPS/ OVERHANG	
	EDGE WETLAND	
	WETLANDS	
	UPLANDS	
	STREAM	
	LEDGE	
	EDGE PAVEMENT	
	PAVEMENT SAWCUT	
	EDGE CONCRETE	
	PAVEMENT PAINT	
	EDGE GRAVEL	
	CURB LINE	
	EDGE OF WATER	
	TREELINE	
120 118	CONTOURS	120
×120.00	SPOT GRADE	+120.00
	CHAIN LINK FENCE	
X	BARB WIRE FENCE	X
	STOCKADE FENCE	
	GUARD RAIL	
	STONE WALL	
	RETAINING WALL	
	DECIDUOUS TREE	X
	CONIFEROUS TREE	X
	MULCH LINE	
	BOLLARD	●
	SIGN	
	RAILROAD	
G	GAS	G
GV	GAS GATE VALVE	GV
GM	GAS METER	
G	GAS MANHOLE	
W	WATER	W
WV	WATER GATE VALVE	WV
	WATER SHUT OFF	
	HYDRANT	
W	WATER MANHOLE	
W	WELL	W
S	SANITARY SEWER	S
FM	FORCE MAIN	FM
S	SANITARY MANHOLE	
	SEWER CLEAN OUT	
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	E
EM	ELECTRIC METER	
H	HVAC UNIT	
T	TELEPHONE MANHOLE	
	LIGHT POLE	
	UTILITY POLE	
	GUY WIRE	
	DRAINAGE DITCH	
	EROSION CONTROL BLANKET	
	FILTER BARRIER	FB
	RIPRAP	
	CHECK DAM	
	INLET PROTECTION	
	BOULDER	

GENERAL 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. CURRENT OWNER:

   CITY OF PORTLAND
   389 CONGRESS ST.
   PORTLAND, MAINE 04101
6. ALL WORK SHALL CONFORM TO THE APPLICABLE CODES AND ORDINANCES.
7. CONTRACTOR SHALL VISIT THE SITE AND FAMILIARIZE HIM OR HERSELF WITH ALL CONDITIONS AFFECTING THE PROPOSED WORK AND SHALL MAKE PROVISIONS AS TO THE COST THEREOF. CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIM OR HERSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.
8. CONTRACTOR SHALL NOTIFY ENGINEER OF ALL PRODUCTS OR ITEMS NOTED AS "EXISTING" WHICH ARE NOT FOUND IN THE FIELD.
9. PROVIDE ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND OWNER'S REQUIREMENTS UNLESS SPECIFICALLY OTHERWISE INDICATED OR WHERE LOCAL CODES OR REGULATIONS TAKE PRECEDENCE.
10. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. ANY UNUSUAL CONDITIONS SHALL BE REPORTED TO THE ATTENTION OF THE ENGINEER.
11. CONTRACTOR SHALL CLEAN AND REMOVE DEBRIS AND SEDIMENT DEPOSITED ON PUBLIC STREETS, SIDEWALKS, ADJACENT AREAS, OR OTHER PUBLIC WAYS DUE TO CONSTRUCTION.
12. CONTRACTOR SHALL INCORPORATE PROVISIONS AS NECESSARY IN CONSTRUCTION TO PROTECT EXISTING STRUCTURES, PHYSICAL FEATURES, AND MAINTAIN SITE STABILITY DURING CONSTRUCTION. CONTRACTOR SHALL RESTORE ALL AREAS TO ORIGINAL CONDITION AND AS DIRECTED BY DESIGN DRAWINGS.
13. SITE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS PRIOR TO CONSTRUCTION.
14. ALL PAVEMENT MARKINGS AND DIRECTIONAL SIGNAGE SHOWN ON THE PLAN SHALL CONFORM TO THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) STANDARDS.
15. ALL PAVEMENT JOINTS SHALL BE SAWCUT PRIOR TO PAVING TO PROVIDE A DURABLE AND UNIFORM JOINT.
16. NO HOLES, TRENCHES OR STRUCTURES SHALL BE LEFT OPEN OVERNIGHT IN ANY EXCAVATION ACCESSIBLE TO THE PUBLIC OR IN PUBLIC RIGHTS-OF-WAY.
17. IMMEDIATELY UPON COMPLETION OF CUTS/FILLS, THE CONTRACTOR SHALL STABILIZE DISTURBED AREAS IN ACCORDANCE WITH EROSION CONTROL NOTES AND AS SPECIFIED ON PLANS.
18. THE CONTRACTOR SHALL BE FULLY AND SOLELY RESPONSIBLE FOR THE REMOVAL, REPLACEMENT AND RECTIFICATION OF ALL DAMAGED AND DEFECTIVE MATERIAL AND WORKMANSHIP IN CONNECTION WITH THE CONTRACT WORK. THE CONTRACTOR SHALL REPLACE OR REPAIR AS DIRECTED BY THE ENGINEER ALL SUCH DAMAGED OR DEFECTIVE MATERIALS WHICH APPEAR WITHIN A PERIOD OF ONE YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION.
19. ALL WORK PERFORMED BY THE GENERAL CONTRACTOR AND/OR TRADE SUBCONTRACTOR SHALL CONFORM TO THE REQUIREMENTS OF LOCAL, STATE OR FEDERAL LAWS, AS WELL AS ANY OTHER GOVERNING REQUIREMENTS, WHETHER OR NOT SPECIFIED ON THE DRAWINGS.
20. WHERE THE TERMS "APPROVED EQUAL", "OTHER APPROVED", "EQUAL TO", "ACCEPTABLE" OR OTHER GENERAL QUALIFYING TERMS ARE USED IN THESE NOTES, IT SHALL BE UNDERSTOOD THAT REFERENCE IS MADE TO THE RULING AND JUDGEMENT OF SEBAGO TECHNICS, INC.
21. THE GENERAL CONTRACTOR SHALL PROVIDE ALL NECESSARY PROTECTION FOR THE WORK UNTIL TURNED OVER TO THE OWNER.
22. THE GENERAL CONTRACTOR SHALL MAINTAIN A CURRENT AND COMPLETE SET OF CONSTRUCTION DRAWINGS ON SITE DURING ALL PHASES OF CONSTRUCTION FOR USE OF ALL TRADES.
23. THE CONTRACTOR SHALL TAKE FULL RESPONSIBILITY FOR ANY CHANGES AND DEVIATION OF APPROVED PLANS NOT AUTHORIZED BY THE ARCHITECT/ENGINEER AND/OR CLIENT/OWNER.
24. DETAILS ARE INTENDED TO SHOW END RESULT OF DESIGN. ANY MODIFICATION TO SUIT FIELD DIMENSION AND CONDITION SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ANY WORK.
25. BEFORE THE FINAL ACCEPTANCE OF THE PROJECT, THE CONTRACTOR SHALL REMOVE ALL EQUIPMENT AND MATERIALS, REPAIR OR REPLACE PRIVATE OR PUBLIC PROPERTY WHICH MAY HAVE BEEN DAMAGED OR DESTROYED DURING CONSTRUCTION, CLEAN THE AREAS WITHIN AND ADJACENT TO THE PROJECT WHICH HAVE BEEN OBSTRUCTED BY HIS/HER OPERATIONS, AND LEAVE THE PROJECT AREA NEAT AND PRESENTABLE.
26. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING FLOW THROUGH THE EXISTING CLOSED STORM DRAINAGE SYSTEM DURING CONSTRUCTION AND SHALL SUBMIT A WORK PLAN FOR APPROVAL BY THE DESIGN ENGINEER.
27. A WETLAND DELINEATION WAS PERFORMED ON THIS PROJECT SITE MAY OF 2023 BY COLE PETERS, PROFESSIONAL WETLAND SCIENTIST OF SEBAGO TECHNICS, INC. AND LOCATED BY GROUND SURVEY. THIS DELINEATION CONFORMS TO THE STANDARDS AND METHODS OUTLINED IN THE 1987 WETLANDS DELINEATION MANUAL AND NORTHEAST REGIONAL SUPPLEMENT AUTHORED AND PUBLISHED BY THE U.S. ARMY CORPS OF ENGINEERS.

UTILITY DEMOLITION NOTES

1. PROTECT EXISTING BOUNDARY LINE MONUMENTATION. IF DISTURBED, EXISTING MONUMENTATION TO BE RESET BY A PROFESSIONAL LAND SURVEYOR.
2. DEMOLITION OF UTILITIES REQUIRING TREE REMOVAL SHALL BE COORDINATED WITH THE OWNER AND IN ACCORDANCE WITH PROJECT PLANS.
3. UTILITY DEMOLITION SHALL BE COMPLETED IN COORDINATION WITH NEW INFRASTRUCTURE. CONTRACTOR SHALL ENSURE EXISTING SURFACE DRAINAGE IS MAINTAINED DURING CONSTRUCTION.
4. EXISTING SEWER AND STORM DRAINAGE INFRASTRUCTURE TO REMAIN ACTIVE DURING CONSTRUCTION AND UPON COMPLETION OF PROJECT. DEMOLITION/CONSTRUCTION ACTIVITIES SHALL NOT INTERFERE OR IMPEDE EXISTING FLOWS. CONTRACTOR SHALL PROVIDE BYPASS PUMPING AS REQUIRED DURING SEWER AND STORM DEMOLITION AND NEW CONSTRUCTION. DAMAGE TO EXISTING SEWER INFRASTRUCTURE SHALL BE REPAIRED BY CONTRACTOR AT THEIR EXPENSE.
5. DEMOLITION SHOWN IS FOR MAJOR SITE ELEMENTS TO BE DEMOLISHED. OTHER MINOR DEMOLITION MAY BE REQUIRED AS PART OF CONSTRUCTION AND SHALL BE CONSIDERED INCIDENTAL TO THE COST OF CONSTRUCTION. COORDINATE ALL DEMOLITION WORK WITH SITE AND BUILDING DRAWINGS.
6. PRIOR TO ANY DEMOLITION, THE CONTRACTOR SHALL SUBMIT A SEQUENCE OF DEMOLITION PLANS TO THE OWNER. THIS PLAN SHALL DEPICT LOCATIONS OF PROPOSED TERMINATIONS AND ANY TEMPORARY SERVICES THAT WILL BE NEEDED.
7. CONTRACTOR REQUIRED TO CONFIRM/MAINTAIN BENCHMARKS. IF IMPACTED CONTRACTOR IS RESPONSIBLE FOR NOTIFICATION/RELOCATION AND COORDINATION WITH PROJECT TEAM.

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, 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, PAVEMENTS, WALKS, ETC.) SHALL RECEIVE LOAM AND SEED PER DETAIL.
4. SEE UTILITY DRAWINGS FOR PIPE AND STRUCTURE DATA TABLES.

CONSTRUCTION PLAN

1. PROVIDE EROSION CONTROL MEASURES PRIOR TO SITE DISTURBANCE.
2. WETLANDS, ASSOCIATED SETBACKS AND STREAM SETBACKS TO BE STAKED BY OWNER PRIOR TO SITE DISTURBANCE.
3. GRADING AND CLEARING LIMITS SHALL NOT ENCROACH ON ADJACENT PROPERTIES UNLESS NOTED OTHERWISE ON THE PLANS.
4. OPEN AREAS SHALL BE LIMITED TO AREAS BEING WORKED IN. THE AREA STRIPPED OF EXISTING VEGETATION AT ANY GIVEN TIME SHALL BE MINIMIZED AND BE PHASED WHERE PRACTICAL SO THAT AREAS ARE REVEGETATED AND PERMANENTLY STABILIZED BEFORE ADDITIONAL AREAS ARE STRIPPED OF EXISTING VEGETATION. STABILIZE CONSTRUCTION AREAS BY USE OF RIPRAP, SEED, MULCH, OR OTHER GROUND COVER WITHIN ONE WEEK FROM THE TIME IT WAS ACTIVELY WORKED. SURFACES SHALL BE STABILIZED PRIOR TO DIRECTING STORMWATER RUNOFF TOWARD STORMWATER BMPS. PLEASE REFER TO DRAINAGE PLANS FOR WATERSHED AREAS.

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.
13. DURING CLEANING OF SITE AND PRIOR TO TREE AND SHRUB INSTALLATION, CONTRACTOR SHALL REMOVE INVASIVE PLANTS. AREAS WHERE INVASIVE PLANTS ARE REMOVED AND NO OTHER PLANTING IS PROPOSED, AREA SHALL BE LOAM AND SEEDED.

UTILITY NOTES

1. UTILITY INFORMATION DEPICTED HEREON IS COMPILED USING PHYSICAL EVIDENCE LOCATED IN THE FIELD. UTILITIES DEPICTED HEREON MAY NOT NECESSARILY REPRESENT ALL EXISTING UTILITIES. CONTRACTORS AND/OR DESIGNERS NEED TO CONTACT DIG-SAFE SYSTEMS, INC. (1-888-DIG-SAFE) AND FIELD VERIFY EXISTING UTILITIES PRIOR TO CONSTRUCTION AND/OR EXCAVATION. PROTECT EXISTING ONSITE SEWER PIPE AND ADJUST MANHOLE RIMS TO GRADE WHERE APPLICABLE.
2. ALL GRAVITY CONDUIT PIPES SHALL BE INSTALLED USING A PIPE LASER AND TARGET SYSTEM THROUGH THE PIPE. ON PIPE RUNS 50 FEET OR LESS, THE CONTRACTOR SHALL REQUEST ENGINEER'S APPROVAL TO USE OR NOT USE A GROUND LASER.
3. MAINTAIN MINIMUM 5'-6" OF COVER ABOVE TOP OF WATER SERVICE PIPE.
4. MAINTAIN MINIMUM 10 FEET HORIZONTAL SEPARATION BETWEEN WATER SERVICES AND OTHER UTILITIES. MAINTAIN MINIMUM 18 INCHES VERTICAL SEPARATION BETWEEN WATER SERVICES AND OTHER UTILITIES.
5. LOWER OR RAISE WATER SERVICES AS REQUIRED TO MAINTAIN MINIMUM 12 INCH VERTICAL SEPARATION FROM OTHER UTILITIES. WATER SERVICES CROSSING SEWERS SHALL MAINTAIN 12 INCH MINIMUM SEPARATION BETWEEN THE BOTTOM OF WATER LINE AND TOP OF SEWER UNLESS NOTED OTHERWISE ON THE PLANS.
6. PIPE:
   - SEWER PIPE SHALL BE SDR 35 PVC OR APPROVED EQUAL.
   - STORMDRAIN SHALL BE ADS N-12 DUAL WALL HDPE PIPE WITH SMOOTH-WALLED INTERIOR OR APPROVED EQUAL UNLESS NOTED OTHERWISE ON THE UTILITY PLANS.
   - WATER PIPE AND FITTINGS SHALL CONFORM TO THE DISTRICT HAVING JURISDICTION'S SPECIFICATIONS. MAIN WATER SERVICE PIPE SHALL BE DUCTILE IRON, CLASS 52 PUSH-ON PIPE MEETING THE REQUIREMENTS OF AWWA/ANSI C-111/A21.11 (LATEST REVISION). PIPE SHALL BE CEMENT-LINED AWWA/ANSI C104/A21.4 WITH LINING TWICE THE THICKNESS SPECIFIED, AND COATED TWICE WITH A BITUMINOUS SEAL COATING. PROVIDE THRUST BLOCKS AT ALL WATER SERVICE BENDS.
7. COORDINATE ALL UTILITY LOCATIONS AND INVERTS AT BUILDING WITH ARCHITECTURAL, STRUCTURAL AND PLUMBING DRAWINGS.
8. WATER SERVICE ENTRANCE DESIGNS TO INCLUDE METERS AND BACKFLOW PREVENTERS TO MEET ALL STANDARDS AND REQUIREMENTS OF THE DISTRICT HAVING JURISDICTION.
9. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY GRADE CHANGES THAT WILL IMPACT STORM DRAINAGE INFRASTRUCTURE OR OTHER UTILITIES.
10. UTILITIES WITHIN 5 FEET FROM FACE OF BUILDING ARE COORDINATED ON RELEVANT M.E.P. DRAWINGS. CONTRACTOR SHALL COORDINATE INVERTS, CONNECTIONS AND MATERIALS WITH ALL DRAWINGS.
11. CONTRACTOR SHALL FURNISH AND INSTALL TRENCHING, MATERIALS AND BACKFILL FOR ALL UTILITIES. ELECTRICAL AND TELECOM/DATA PROVIDERS WILL PULL PRIMARY SERVICE TO TRANSFORMER AND PANEL. CONTRACTOR RESPONSIBLE FOR TIMING AND COORDINATION WITH UTILITIES AND DRAWINGS. COORDINATE WITH ELECTRICAL DRAWINGS FOR CONDUIT SCHEDULE, TYPE AND SIZES.
12. COORDINATE ALL WATER RELATED WORK WITH DISTRICT HAVING JURISDICTION.
13. THE CONTRACTOR IS HEREBY CAUTIONED THAT ALL SITE FEATURES SHOWN HEREON ARE BASED ON FIELD OBSERVATIONS BY THE SURVEYOR AND BY INFORMATION PROVIDED BY UTILITY COMPANIES. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR SHALL CONTACT DIG SAFE (811) AT LEAST THREE (3) BUT NOT MORE THAN THIRTY (30) DAYS PRIOR TO COMMENCEMENT OF EXCAVATION OR DEMOLITION TO VERIFY HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES.
14. CONTRACTOR SHALL BE AWARE THAT DIG SAFE ONLY NOTIFIES ITS "MEMBER" UTILITIES ABOUT THE DIG. WHEN NOTIFIED, DIG SAFE WILL ADVISE CONTRACTOR OF MEMBER UTILITIES IN THE AREA. CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND CONTACTING NON-MEMBER UTILITIES DIRECTLY. NON-MEMBER UTILITIES MAY INCLUDE TOWN OR CITY WATER AND SEWER DISTRICTS AND SMALL LOCAL UTILITIES, AS WELL AS USG PUBLIC WORKS SYSTEMS.
15. CONTRACTORS SHALL BE RESPONSIBLE FOR COMPLIANCE WITH THE REQUIREMENTS OF 23 MRSA 3360-A. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE WITH THE APPROPRIATE UTILITIES TO OBTAIN AUTHORIZATION PRIOR TO RELOCATION OF ANY EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THESE PLANS. IF A UTILITY CONFLICT ARISES, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER, THE MUNICIPALITY AND APPROPRIATE UTILITY COMPANY PRIOR TO PROCEEDING WITH ANY RELOCATION.

TYPICAL ABBREVIATIONS

AC	ACRE
AFG	ABOVE FINISH GRADE
APPROX.	APPROXIMATELY
BC	BOTTOM OF CURB
BCC	BITUMINOUS CONCRETE CURB
BIT	BITUMINOUS
BLDG	BUILDING
BW	BOTTOM OF WALL
CB	CATCH BASIN
CONC	CONCRETE
CONT	CONTINUOUS
DI	DUCTILE IRON
DIA	DIAMETER
DMH	DRAIN MANHOLE
E.W.	EACH WAY
ELEV	ELEVATION
FFE	FINISH FLOOR ELEVATION
FIN. GR.	FINISH GRADE
FTG	FOOTING
HDPE	HIGH DENSITY POLYETHYLENE
HGT	HEIGHT
HMA	HOT MIX ASPHALT
INV	INVERT
LF	LINEAR FEET
OC	ON CENTER
PVC	POLYVINYL CHLORIDE
PWD	PORTLAND WATER DISTRICT
R	RADIUS
R.O.W.	RIGHT OF WAY
S.F.	SQUARE FEET
SCH	SCHEDULE
SCSC	SLIPFORM CONCRETE SLOPED CURB
SCVC	SLIPFORM CONCRETE VERTICAL CURB
SD	STORM DRAIN
SGC	SLOPED GRANITE CURB
SMH	SEWER MANHOLE SPECS SPECIFICATIONS
SS	SANITARY SEWER
SSGC	SALVAGED SLOPED GRANITE CURB
SVGC	SALVAGED VERTICAL GRANITE CURB
TC	TOP OF CURB
TW	TOP OF WALL
TYP	TYPICAL
VGC	VERTICAL GRANITE CURB
VIF	VERIFY IN FIELD

AMY BELL SEGAL, RLA 2265

OWENS A. MCCULLOUGH PE 7122

STATE OF MAINE — OWENS A. MCCULLOUGH — No. 7122 — REGISTERED PROFESSIONAL ENGINEER

REV.	BY	DATE	STATUS
F.	OAM	11/15/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
E.	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
D.	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
C.	PDO	05/28/2024	OVERALL GRADING PLAN REISSUED TO MAINE DEP AND ACOE
B.	PDO	03/18/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
A.	PDO	02/29/2024	ISSUED TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

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

NOTES & LEGEND

OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	N/A
PROJECT	19059

SHEET G-002

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19059 NL.dwg - TAB:G-002 Notes & Legend

NOTE: FOR INDIVIDUAL TREE REMOVAL AND PRESERVATION, PLEASE REFER TO THE TREE PRESERVATION & REMOVAL PLAN

CB 8437
RIM=74.87
INV IN=69.07, 6" HDPE, 2
INV OUT=68.86, 12" HDPE, 5
SUMP=65.77

AVIS RENTAL

JETPORT BLVD.

INTERNATIONAL PKWY.

LONG TERM PARKING

JETPORT ACCESS ROAD

PARKING GARAGE

EMBASSY SUITES

PWM PARK AND SHINE

WESTBROOK ST.

PARK' N JET

DEMOLITION PLAN KEY NOTES

1. REMOVE VEHICULAR ASPHALT PAVING
2. REMOVE PEDESTRIAN ASPHALT PAVING
3. REMOVE GRANITE CURB
4. REMOVE TREES & REMOVE STUMPS
5. REMOVE GRAVEL SURFACE
6. REMOVE LIGHT POLE & BASE
7. REMOVE SIGN
8. REMOVE CONCRETE ENTRY ISLAND & ENTRY/EXIT GATE EQUIPMENT
9. REMOVE INDIVIDUAL TREE & STUMP
10. REMOVE DRAINAGE STRUCTURE
11. REMOVE DRAINAGE STRUCTURE COVER
12. REMOVE STORM DRAIN PIPE
13. REMOVE SCULPTURE AND STORE AT LOCATION SPECIFIED BY OWNER
14. REMOVE & SALVAGE WAYFINDING SIGN FOR REINSTALLATION
15. REMOVE OVERHEAD UTILITY LINE
16. REMOVE CHAINLINK FENCE
17. REMOVE EXISTING UTILITY POLE

DEMOLITION LEGEND

DEMO PAVEMENT

DEMO GRAVEL

GRAPHIC SCALE
50 0 25 50 100
(IN FEET)
1 INCH = 50 FT.

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19059 DEMO.dwg, TAB:C-002 DEMO PLAN 1

AMY BELL SEGAL RLA 2265

OWENS A. MCCULLOUGH PE 7122

STATE OF MAINE
OWENS A. MCCULLOUGH
No. 7122
REGISTERED PROFESSIONAL ENGINEER

REV.	BY	DATE	STATUS
A	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION
B	PDO	03/19/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
C	PDO	05/28/2024	OVERALL GRADING PLAN REISSUED TO MAINE DEP AND ACOE
D	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
E	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
F	OAM	11/15/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT

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SEBAGO TECHNICS
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75 John Roberts Rd.
Suite A4
South Portland, ME 04106
Tel. 207-200-2100

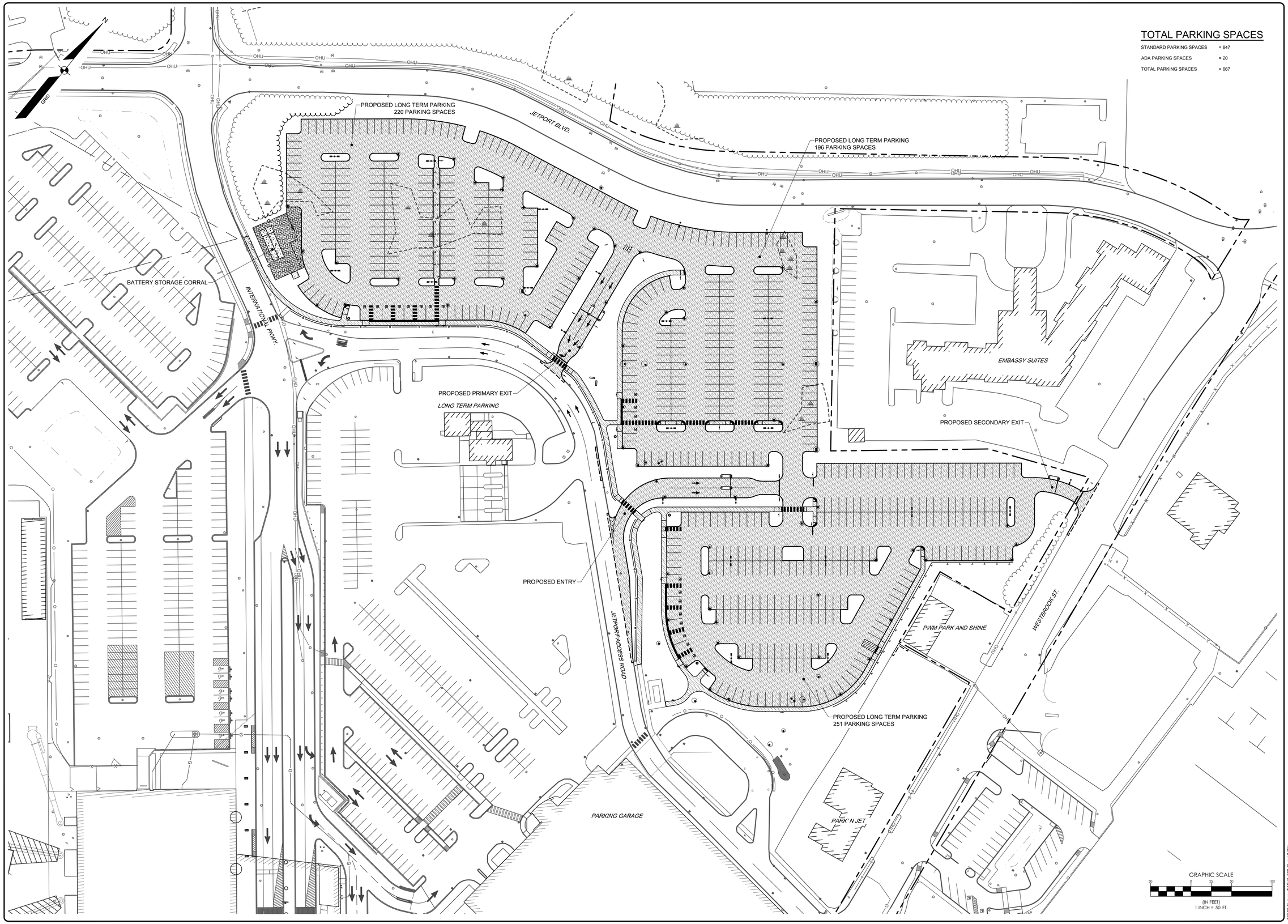
DEMOLITION PLAN

OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 50'
PROJECT	19059

SHEET C-003



TOTAL PARKING SPACES

STANDARD PARKING SPACES	= 647
ADA PARKING SPACES	= 20
TOTAL PARKING SPACES	= 667

AMY BELL SEGAL RLA 2265

REGISTERED LANDSCAPE ARCHITECT
AMY BELL SEGAL
No. 2265
STATE OF MAINE

OWENS A. MCCULLOUGH PE 7122

STATE OF MAINE
OWENS A. MCCULLOUGH
No. 7122
LICENSED
PROFESSIONAL ENGINEER

REV	BY:	DATE:	STATUS:
F	OAM	11/15/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
E	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
D	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
C	PDO	05/28/2024	OVERALL GRADING PLAN REISSUED TO MAINE DEP AND ACOE
B	PDO	03/18/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
A	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

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

OVERALL SITE PLAN

OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 50'
PROJECT	19059

19059 S.dwg, TAB:C-100 Overall Site

SHEET C-100

(18) 9' X 18' PARKING SPACES

TRASH RECEPTACLE, TYP. BY OTHERS

PAVEMENT SAWCUT

EXISTING LIGHT POLE, TO REMAIN

ENTRY GATE ISLAND, SEE DETAIL

CURB MATERIAL TRANSITION POINT

4" WHITE PARKING PAINT STRIPING

CURB MATERIAL TRANSITION POINT

SECONDARY EXIT GATE ISLAND, SEE DETAIL

QUEUING FOR ONE PASSENGER VEHICLE

6' CROSSWALK

ADA DETECTABLE WARNING PANELS, TYP.

DIRECTIONAL ARROW, TYP.

STOP BAR

(28) 9' X 18' PARKING SPACES

GATE ARM, TYP.

(26) 9' X 18' PARKING SPACES

(12) 9' X 18' PARKING SPACES

(26) 9' X 18' PARKING SPACES

MATCH LINE - SEE SHEET C-102

INSTALL PEDESTRIAN FENCE, TYP.

PEDESTRIAN PAVEMENT

(6) 9' X 18' PARKING SPACES
(8) 11' X 18' ADA PARKING SPACES

5' CROSSWALK

(10) 9' X 18' PARKING SPACES

(10) 9' X 18' PARKING SPACES

(12) 9' X 18' PARKING SPACES

(22) 9' X 18' PARKING SPACES

(19) 9' X 18' PARKING SPACES

(17) 9' X 18' PARKING SPACES

(12) 9' X 18' PARKING SPACES

(8) 9' X 18' PARKING SPACES

(35) 9' X 18' PARKING SPACES

DIAGONAL STRIPING

4" WHITE PARKING PAINT STRIPING

VEHICULAR PAVEMENT

VEHICULAR GUARDRAIL, TYP.

EXISTING TREE CANOPY TO REMAIN

PWM PARK AND SHINE

PARK' N JET

JETPORT ACCESS ROAD

WESTBROOK ST.

PAVEMENT SAWCUT

EXISTING LIGHT POLE, TO REMAIN

ADA DETECTABLE WARNING PANELS, TYP.

TRASH RECEPTACLE, TYP. BY OTHERS

EX DMH-8436

PROPOSED SIDEWALK TO CONNECT TO EXISTING SIDEWALK AND RAMP

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 INCH = 20 FT.

CURB ABBREVIATIONS

VSCC - VERTICAL SLIPFORM CONCRETE CURB
SSCC - SLOPED SLIPFORM CONCRETE CURB
VGC - VERTICAL GRANITE CURB

TIPDOWN ABBREVIATIONS

TD1 - SLIPFORM CONCRETE TIPDOWN
TD2 - VERTICAL GRANITE TIPDOWN

SIGN SCHEDULE

S-1 : STOP SIGN
S-2: DO NOT ENTER SIGN
S-3: ADA ACCESSIBLE PARKING SIGN [*MOUNTED ON BOLLARD*]
S-4: STOP & LEFT TURN PROHIBITION SIGN
S-5: VEHICULAR LONG-TERM PARKING SIGNAGE
S-6: PEDESTRIAN WAYFINDING SIGNAGE
S-7: ALTERNATE LANE MERGE SIGN
S-8: CAUTION VEHICLE EXITING SIGN

LUMINAIRE SCHEDULE

SYMBOL	QTY.	LABEL	HGT.	LLF.	WATTS	DESCRIPTION
	7	N1	30'-0"	0.85	56	NV-1-T4L-16L-1-30K7-SINGLE
	16	N2	30'-0"	0.85	39	NV-1-T5QW-32L-530-30K7-TWIN TUMED TO 39W

AMY BELL SEGAL, RLA 2265

REGISTERED LANDSCAPE ARCHITECT
AMY BELL SEGAL
No.2265
STATE OF MAINE

OWENS A. MCCULLOUGH, PE 7122

STATE OF MAINE
OWENS A. MCCULLOUGH
No. 7122
REGISTERED PROFESSIONAL ENGINEER

REV.	BY	DATE	STATUS
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SITE PLAN
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 20'
PROJECT	19059

SHEET C-101

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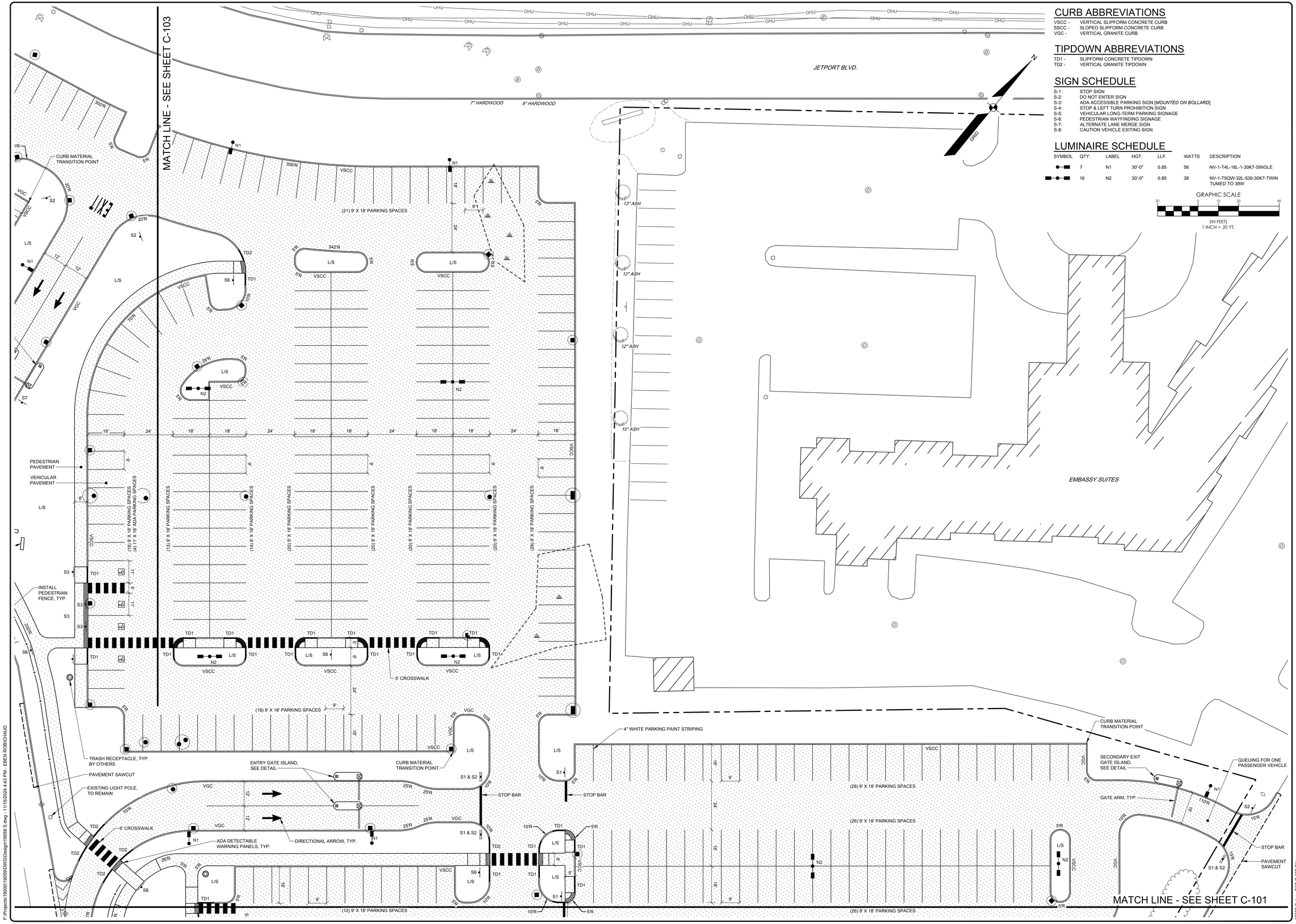
19059 S.dwg - TAB:C-101 Site



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	16	N2	30'-0"	0.85	39	NV-1-T5QW-32L-530-30K7-TWIN TUMED TO 39W

GRAPHIC SCALE
20 0 10 20 40
[IN FEET]
1 INCH = 20 FT.

AMY BELL SEGAL RLA 2265

REGISTERED LANDSCAPE ARCHITECT STATE OF MAINE AMY BELL SEGAL No.2265

OWENS A. MCCULLOUGH PE 7122

STATE OF MAINE OWENS A. MCCULLOUGH No. 7122 REGISTERED PROFESSIONAL ENGINEER

REV.	BY	DATE	STATUS
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SITE PLAN
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 20'
PROJECT	19059

SHEET C-102

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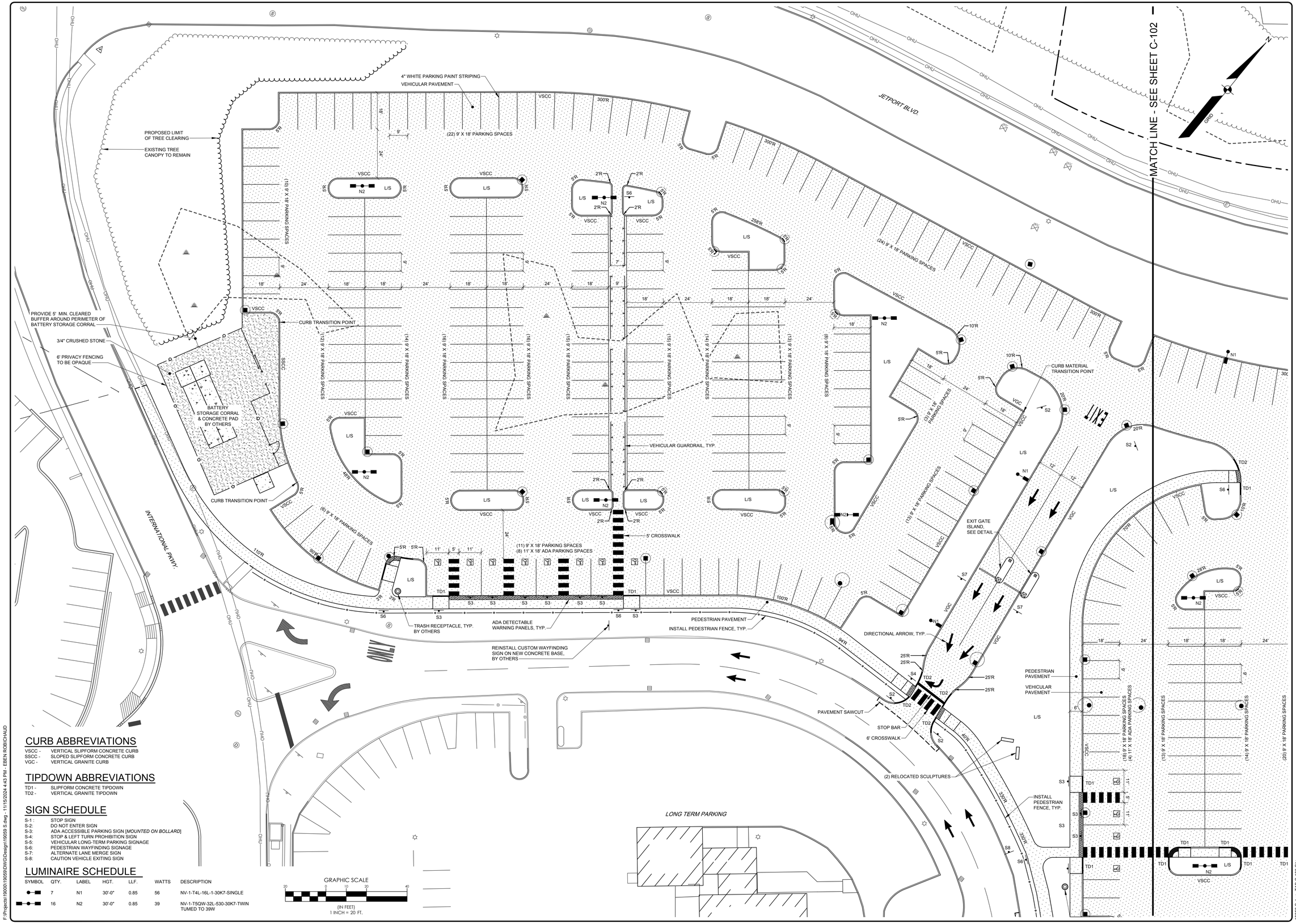
19059 S.dwg, TAB:C-102 Site



CURB ABBREVIATIONS

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LUMINAIRE SCHEDULE

SYMBOL	QTY.	LABEL	HGT.	LLF.	WATTS	DESCRIPTION
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AMY BELL SEGAL, RLA 2265

REGISTERED LANDSCAPE ARCHITECT STATE OF MAINE AMY BELL SEGAL No.2265

OWENS A. MCCULLOUGH, PE 7122

STATE OF MAINE OWENS A. MCCULLOUGH No. 7122 REGISTERED PROFESSIONAL ENGINEER

REV.	BY	DATE	STATUS
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75 John Roberts Rd.
Suite A
South Portland, ME 04106
Tel. 207-200-2100

SITE PLAN

OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 20'
PROJECT	19059

SHEET C-103

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19059 S.dwg, TAB:C-103 Site

PROPOSED WETLAND IMPACT: 5,812 SF

PROPOSED WETLAND IMPACT: 2,806 SF

PROPOSED WETLAND IMPACT: 791 SF
(PREVIOUSLY PERMITTED BUT NOT IMPACTED WETLAND, L-26841-TC-A-N)

PREVIOUSLY PERMITTED AND IMPACTED WETLAND
(L-26841-TC-A-N)

PROPOSED WETLAND IMPACT: 1,742 SF

JETPORT BLVD.

INTERNATIONAL PKWY.

AVIS RENTAL

EMBASSY SUITES

LONG TERM PARKING

PWM PARK AND SHINE

WESTBROOK ST.

JETPORT ACCESS ROAD

PARKING GARAGE

PARK 'N JET

GRAPHIC SCALE
50 0 25 50 100
(IN FEET)
1 INCH = 50 FT.

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OWENS A. MCCULLOUGH, PE 7122

AMY BELL SEGAL, RLA 2265

SEBAGO TECHNICS

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

WWW.SEBAGOTECHNICS.COM

OVERALL GRADING PLAN

OF:

PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

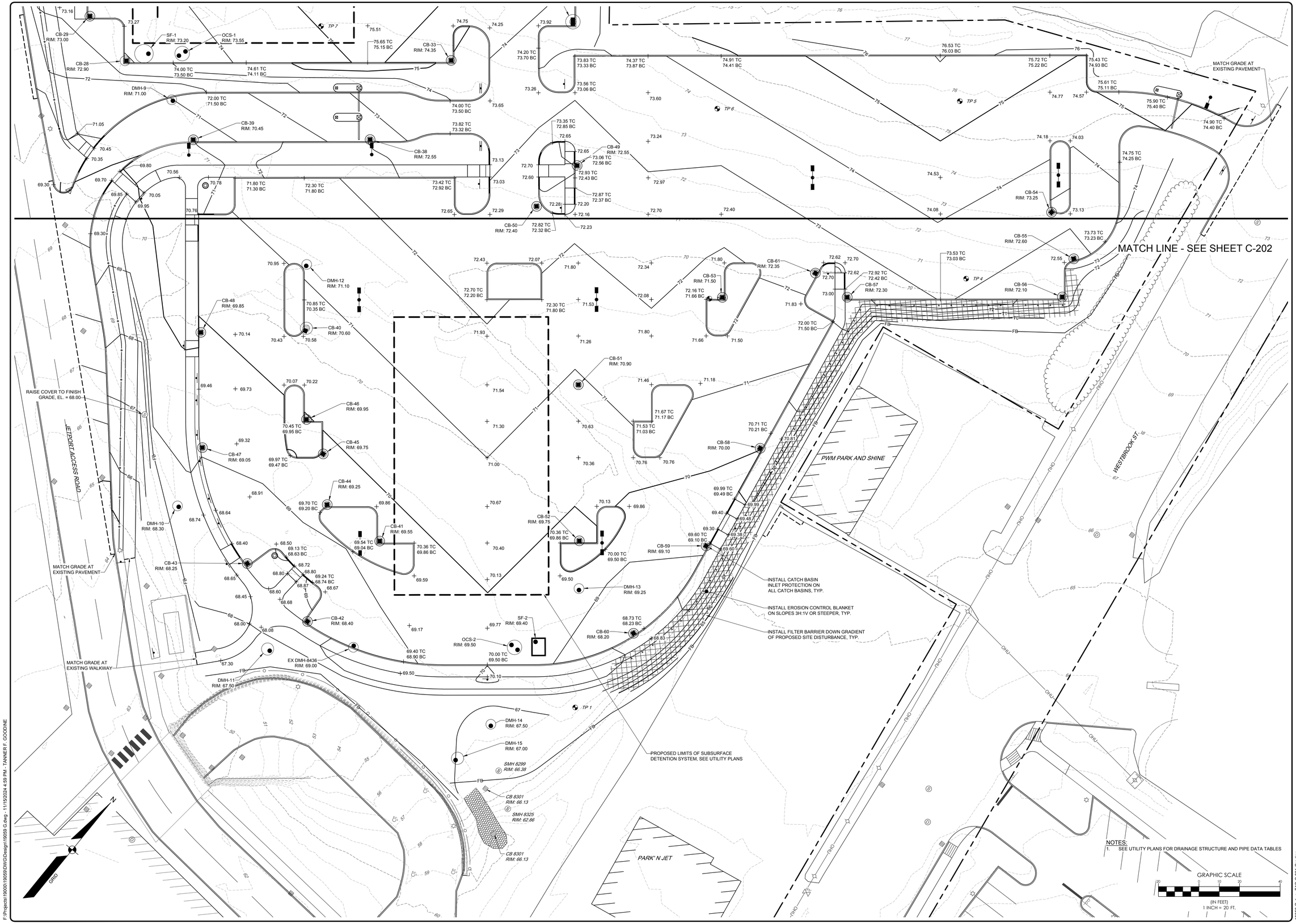
FOR:

PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 50'
PROJECT	19059

SHEET C-200

19059 G.dwg, TAB:C-200 Overall Grading



NOTES:
1. SEE UTILITY PLANS FOR DRAINAGE STRUCTURE AND PIPE DATA TABLES

REV.	BY	DATE	STATUS
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OWENS A. MCCULLOUGH PE 7122

AMY BELL SEGAL, RLA 2265

STATE OF MAINE
OWENS A. MCCULLOUGH
No. 7122
REGISTERED PROFESSIONAL ENGINEER

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75 John Roberts Rd.
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GRADING PLAN

OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 20'
PROJECT	19059

SHEET C-201

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19059 G.dwg, TAB:C-201 Grading

MATCH LINE - SEE SHEET C-203

JETPORT BLVD.

EMBASSY SUITES

GRID

PROPOSED WETLAND IMPACT: 791 SF
(PREVIOUSLY PERMITTED BUT NOT IMPACTED WETLAND, L-26841-TC-A-N)

INSTALL FILTER BARRIER DOWN GRADIENT OF PROPOSED SITE DISTURBANCE, TYP.

INSTALL EROSION CONTROL BLANKET ON SLOPES 3H:1V OR STEEPER, TYP.

PROPOSED LIMITS OF SUBSURFACE DETENTION SYSTEM, SEE UTILITY PLANS

INSTALL CATCH BASIN INLET PROTECTION ON ALL CATCH BASINS, TYP.

PREVIOUSLY PERMITTED AND IMPACTED WETLAND (L-26841-TC-A-N)

PROPOSED WETLAND IMPACT: 1,742 SF

INSTALL STONE DRIP EDGE, SEE DETAIL

MATCH GRADE AT EXISTING PAVEMENT

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 INCH = 20 FT.

MATCH LINE - SEE SHEET C-201

CB-16 RIM: 77.45
CB-18 RIM: 77.20
CB-21 RIM: 77.80
CB-22 RIM: 77.60
CB-23 RIM: 74.60
CB-25 RIM: 78.15
CB-26 RIM: 77.15
CB-27 RIM: 75.25
CB-28 RIM: 72.90
CB-29 RIM: 73.00
CB-30 RIM: 73.80
CB-31 RIM: 77.50
CB-32 RIM: 78.90
CB-33 RIM: 74.35
CB-34 RIM: 75.25
CB-35 RIM: 77.10
CB-36 RIM: 75.80
CB-37 RIM: 73.55
CB-38 RIM: 72.55
CB-39 RIM: 70.45
CB-49 RIM: 72.55
CB-50
CB-54 RIM: 73.25
CB 8267 RIM: 79.95
CB 8135 RIM: 79.95
CB 8267 RIM: 75.37
CB 8263 RIM: 75.25
DMH 8265 RIM: 80.50
DMH 8265 RIM: 75.64
DMH-3 RIM: 74.80
DMH-4 RIM: 75.35
DMH-6 RIM: 76.40
DMH-7 RIM: 76.50
DMH-9 RIM: 71.00
SF-1 RIM: 73.20
OCS-1 RIM: 73.55
TP 23
TP 11
TP 10
TP 9
TP 8
TP 7
TP 6
TP 5

OWENS A. MCCULLOUGH PE 7122
AMY BELL SEGAL RLA 2265

STATE OF MAINE
OWENS A. MCCULLOUGH
No. 7122
REGISTERED PROFESSIONAL ENGINEER

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GRADING PLAN

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CHECKED	PDO
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PROJECT	19059

SHEET C-202

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19059 G.dwg, TAB C-202 Grading

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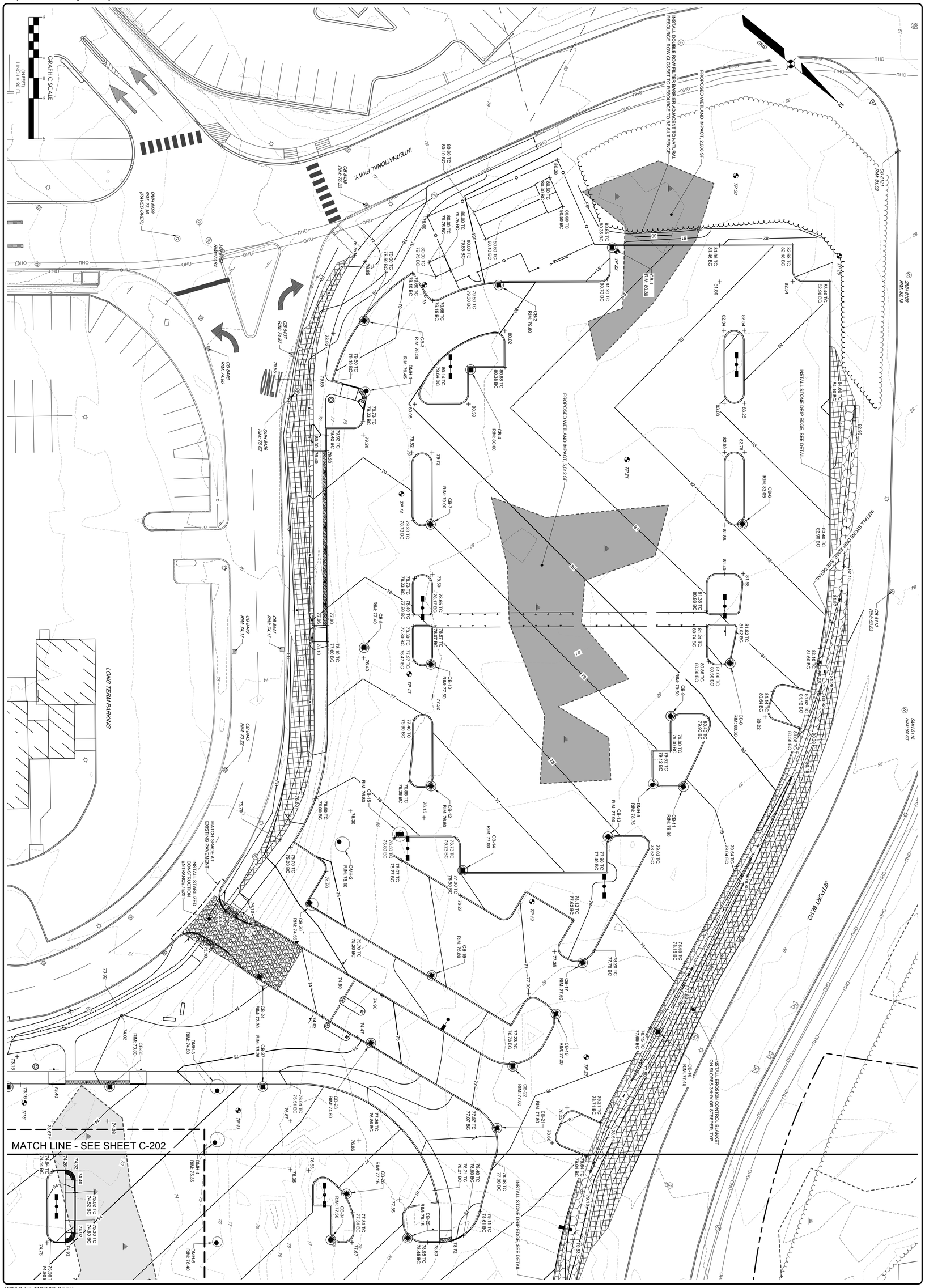

Page 973

19059 G.dwg, TAB-C-203 Grading

OWENS A. MCCULLOUGH PE 7122

AMY BELL SEGAL RLA 2265

SHEET C-203

PROJECT	
DATE	19059
SCALE	02/29/2024
CHECKED	1" = 20'
DRAWN	PDO
DESIGNED	EPR
	TFG

GRADING PLAN

OF:

PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

FOR:

PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
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STATE OF MAINE
OWENS A. MCCULLOUGH
No. 7122
REGISTERED PROFESSIONAL ENGINEER

UTILITY NOTES:

1. ELECTRICAL LAYOUT SHOWN IS PRELIMINARY. ALL ELECTRICAL WORK, INCLUDING CONDUIT SIZE, TYPE, AND ROUTING TO BE COORDINATED WITH ELECTRICAL ENGINEER.
2. NUMBER OF CONDUITS REQUIRED TO PROVIDE NECESSARY SERVICES TO ENTRY/EXIT GATES, FUTURE ELECTRICAL VEHICLE (EV) CHARGING STATIONS, AND POWER TO SITE LIGHTING TO BE DETERMINED BY ELECTRICAL ENGINEER PRIOR TO CONSTRUCTION.
3. SEE SHEET C-304 FOR PIPE AND STRUCTURE DATA TABLES.

AVIS RENTAL
JETPORT BLVD.
INTERNATIONAL PKWY.
LONG TERM PARKING
SUBSURFACE DETENTION & TREATMENT SYSTEM #1 (SF-1)
EMBASSY SUITES
SUBSURFACE DETENTION & TREATMENT SYSTEM #2 (SF-2)
PWM PARK AND SHINE
WESTBROOK ST.
JETPORT ACCESS ROAD
PARKING GARAGE
PARK' N JET
TP 1 TP 2 TP 3 TP 4 TP 5 TP 6 TP 7 TP 8 TP 9 TP 10 TP 11 TP 12 TP 13 TP 14 TP 15 TP 19 TP 21 TP 22 TP 23 TP 25 TP 26 TP 27 TP 30 TP 31

GRAPHIC SCALE
50 0 25 50 100
(IN FEET)
1 INCH = 50 FT.

REV.	BY	DATE	STATUS
F.	OAM	11/15/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
E.	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
D.	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
C.	PDO	05/28/2024	OVERALL GRADING PLAN REISSUED TO MAINE DEP AND ACOE
B.	PDO	03/19/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
A.	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

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OWENS A. MCCULLOUGH PE 7122
AMY BELL SEGAL RLA 2265

STATE OF MAINE
OWENS A. MCCULLOUGH
No. 7122
REGISTERED PROFESSIONAL ENGINEER

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

OVERALL UTILITY PLAN

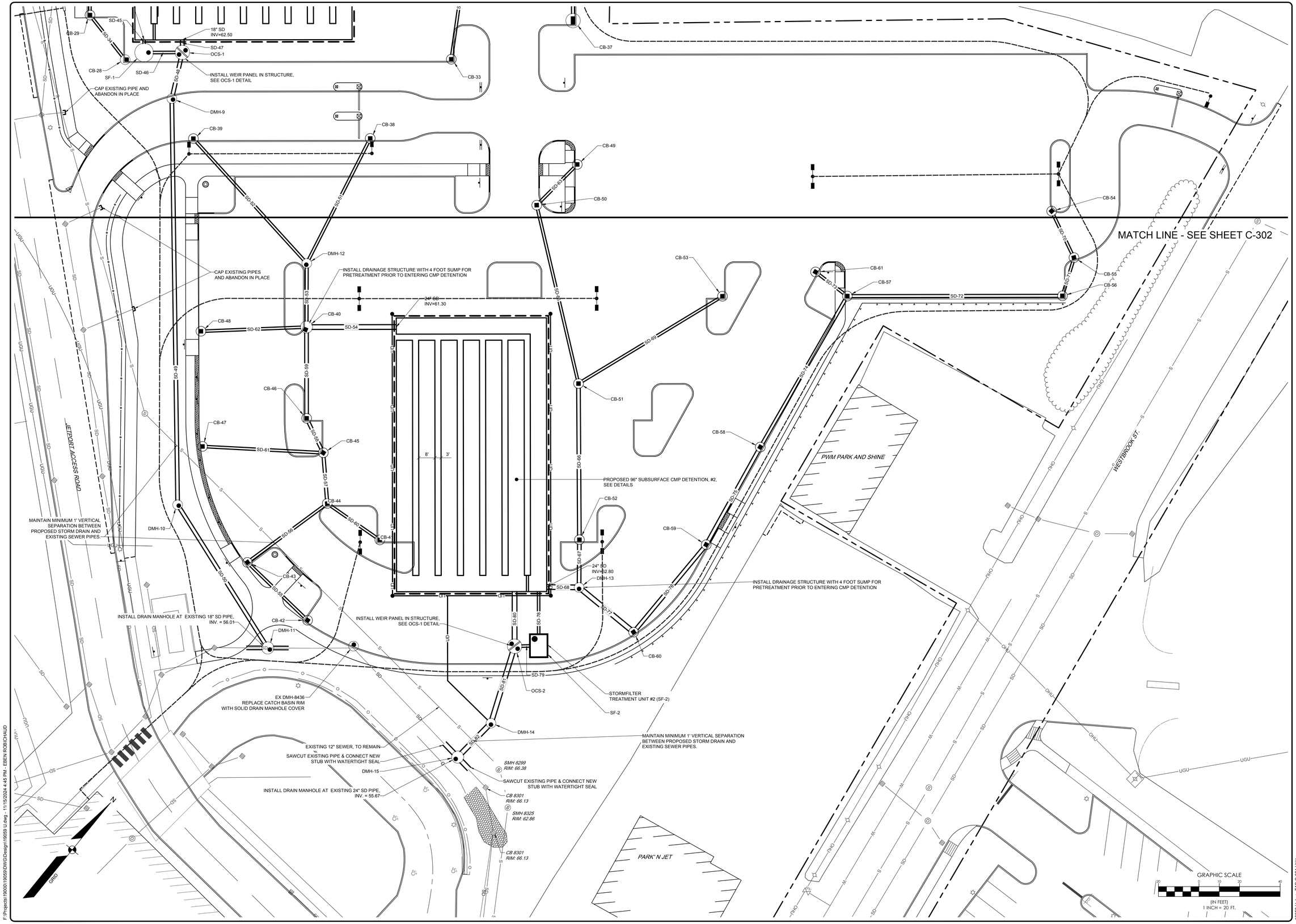
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 50'
PROJECT	19059

SHEET C-300

F:\Projects\19000\19059\DWG\Design\19059 U.dwg - 11/15/2024 4:45 PM - EBEN ROBICHAUD
19059 U.dwg, TAB:C-300 Overall Utility



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UTILITY PLAN

OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 20'
PROJECT	19059

SHEET C-301

F:\Projects\19000\19059\DWG\Design\19059 U.dwg - 11/15/2024 4:45 PM - EBEN ROBICHAUD

19059 U.dwg, TAB:C-301 Utility

MATCH LINE - SEE SHEET C-303

CB-16
UD-2
UD
SD-20
CB-18
CB-22
CB-21
SD-24
SD-25
CB-23
CB-24
SD-27
CB-25
CB-26
SD-30
CB-31
SD-34
CB-27
SD-32
SD-33
DMH-3
DMH-4
SD-28
SD-39
SD-29
SD-38
36" SD
INV=65.10
SD-36
CB-30
SD-35
12" SD
INV=62.50
SD-45
CB-29
SD-44
CB-28
SF-1
SD-46
18" SD
INV=62.50
SD-47
OCS-1
SD-48
INSTALL WEIR PANEL IN STRUCTURE, SEE OCS-1 DETAIL
CAP EXISTING PIPE AND ABANDON IN PLACE
DMH-9
CB-39
SD-52
SD-51
INSTALL DRAINAGE STRUCTURE WITH 4 FOOT SUMP FOR PRETREATMENT PRIOR TO ENTERING CMP DETENTION
DMH-6
PROPOSED SUBSURFACE CMP DETENTION, #1, SEE DETAIL
8'
3'
INSTALL STONE DRIP EDGE, SEE DETAIL
INSTALL DRAINAGE CLEANOUT
CB-32
CB-35
SD-31
SD-42
CB-36
DMH-7
SD-43
CB-34
SD-40
CB-37
CB-33
CB-38
CB-49
SD-53
CB-50
CB-54
JETPORT BLVD.
SMH 8139
RIM: 80.64
CB 8267
RIM: 79.95
DMH 8265
RIM: 80.50
CB 8135
RIM: 79.95
CB 8267
RIM: 75.37
DMH 8265
RIM: 75.64
CB 8263
RIM: 75.25
GRID
EMBASSY SUITES
GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 INCH = 20 FT.
MATCH LINE - SEE SHEET C-301

F:\Projects\19000\19059\DWG\Design\19059 U.dwg - 11/15/2024 4:45 PM - EBEN ROBICHAUD

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AMY BELL SEGAL RLA 2265

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FOR:
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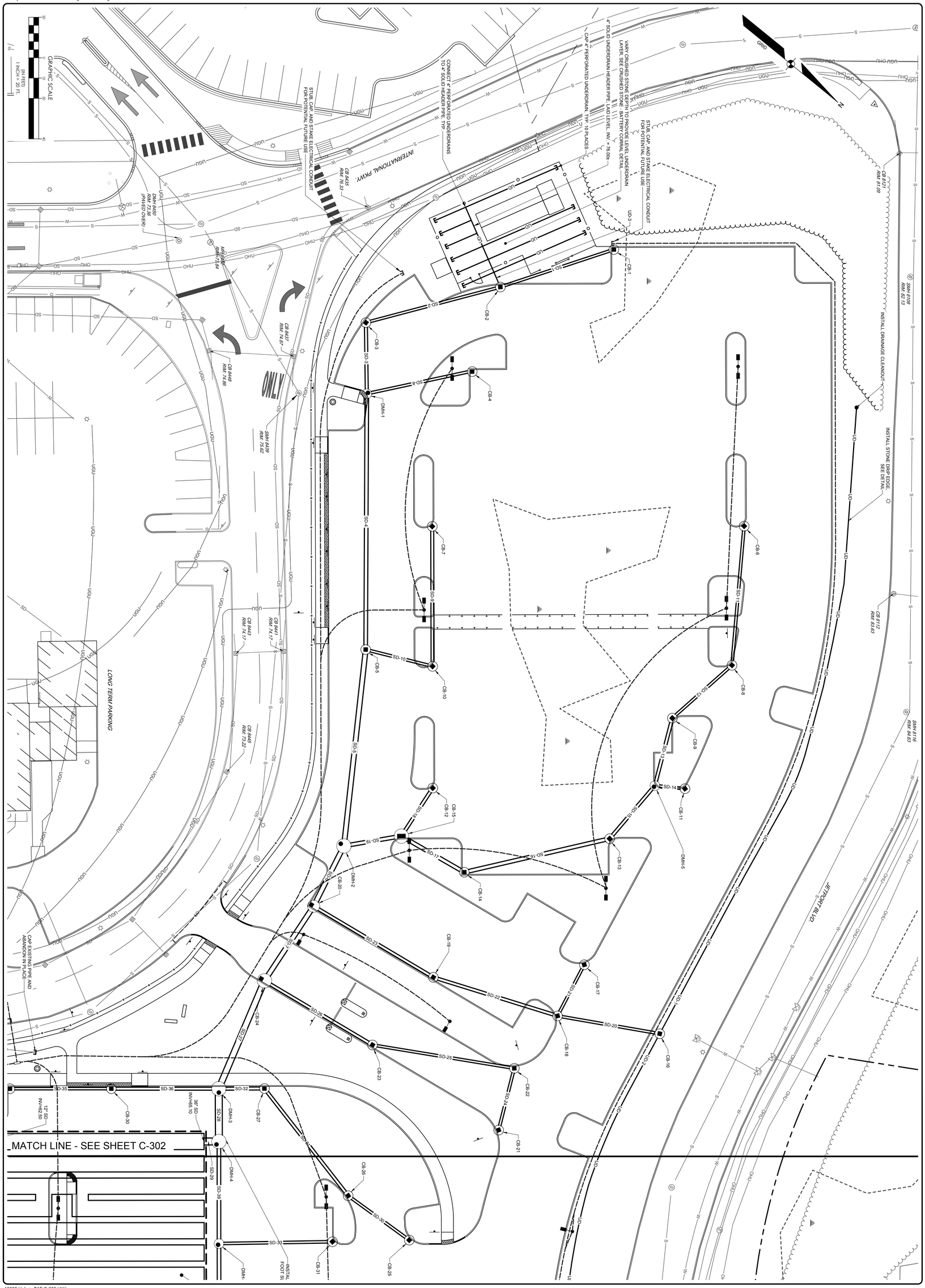
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 20'
PROJECT	19059

SHEET C-302

19059 U.dwg, TAB C-302 Utility

F:\Projects\19000\19059\DWG\Design\19059 U.dwg - 11/15/2024 4:45 PM - EBEN ROBICHAUD



19059 U.dwg, TAB-C-303 Utility

OWENS A. MCCULLOUGH PE 7122

AMY BELL SEGAL RLA 2265

SHEET C-303

PROJECT	DESIGNED
19059	TFG
SCALE	DRAWN
1" = 20'	EPR
DATE	CHECKED
02/29/2024	PDO

UTILITY PLAN

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PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

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STATE OF MAINE
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REGISTERED PROFESSIONAL ENGINEER

STORM DRAIN STRUCTURE DATA

STRUCTURE	RIM	INV. IN	INV. OUT:	DIAM.
CB-1	80.30		76.70 (SD-1)	48" DIA.
CB-2	79.60	76.00 (SD-1) 76.00 (UD-3)	75.90 (SD-2)	48" DIA.
CB-3	78.50	74.90 (SD-2)	74.65 (SD-3)	48" DIA.
CB-4	80.00		75.50 (SD-8)	48" DIA.
CB-5	77.40	72.95 (SD-10) 71.50 (SD-4)	71.00 (SD-5)	48" DIA.
CB-6	82.05		78.45 (SD-11)	48" DIA.
CB-7	79.00		75.40 (SD-9)	48" DIA.
CB-8	80.60	77.00 (SD-11)	76.80 (SD-12)	48" DIA.
CB-9	79.50	75.90 (SD-12)	75.65 (SD-13)	48" DIA.
CB-10	77.50	73.90 (SD-9)	73.80 (SD-10)	48" DIA.
CB-11	78.90		75.30 (SD-14)	48" DIA.
CB-12	76.50		72.90 (SD-18)	48" DIA.
CB-13	77.90	74.05 (SD-15)	73.90 (SD-16)	48" DIA.
CB-14	77.00	72.90 (SD-16)	72.80 (SD-17)	48" DIA.
CB-15	75.80	71.70 (SD-17) 72.20 (SD-18)	71.60 (SD-19)	72" DOUBLE GRATE
CB-16	77.45	74.45 (UD-1) 74.45 (UD-2)	74.35 (SD-20)	48" DIA.
CB-17	77.60		73.65 (SD-21)	48" DIA.
CB-18	77.20	73.35 (SD-21) 73.35 (SD-20)	73.10 (SD-22)	48" DIA.
CB-19	75.80	71.85 (SD-22)	71.75 (SD-23)	48" DIA.
CB-20	74.55	70.70 (SD-23) 68.10 (SD-6)	68.00 (SD-7)	60" DIA.
CB-21	77.80		74.00 (SD-24)	48" DIA.
CB-22	77.60	73.20 (SD-24)	73.10 (SD-25)	48" DIA.
CB-23	74.60	71.00 (SD-25)	69.30 (SD-26)	48" DIA.
CB-24	73.30	68.15 (SD-26) 67.40 (SD-7)	66.90 (SD-27)	72" DIA.
CB-25	78.15		74.55 (SD-30)	48" DIA.
CB-26	77.15	73.30 (SD-30)	73.05 (SD-31)	48" DIA.
CB-27	75.25	70.75 (SD-31)	70.50 (SD-32)	48" DIA.
CB-28	72.90		68.95 (SD-34)	48" DIA.
CB-29	73.00	68.80 (SD-34)	68.70 (SD-35)	48" DIA.

STORM DRAIN STRUCTURE DATA

STRUCTURE	RIM	INV. IN	INV. OUT:	DIAM.
CB-30	73.80	68.25 (SD-35)	68.00 (SD-36)	48" DIA.
CB-31	77.50		73.90 (SD-33)	48" DIA.
CB-32	78.90		75.30 (SD-37)	48" DIA.
CB-33	74.35		70.75 (SD-40)	48" DIA.
CB-34	75.25	70.15 (SD-40)	70.05 (SD-41)	48" DIA.
CB-35	77.10		73.50 (SD-42)	48" DIA.
CB-36	75.80	72.20 (SD-42) 68.90 (SD-43)	68.65 (SD-44)	72" DOUBLE GRATE
CB-37	73.55		69.95 (SD-43)	72" DOUBLE GRATE
CB-38	72.55		67.30 (SD-51)	48" DIA.
CB-39	70.45		66.77 (SD-52)	48" DIA.
CB-40	70.60	62.30 (SD-59) 65.50 (SD-53) 65.45 (SD-62)	61.80 (SD-54)	CB-ST-60
CB-41	69.55		65.95 (SD-60)	48" DIA.
CB-42	68.40		64.80 (SD-55)	48" DIA.
CB-43	68.25	64.40 (SD-55)	64.30 (SD-56)	48" DIA.
CB-44	69.25	65.65 (SD-60) 63.80 (SD-56)	63.55 (SD-57)	48" DIA.
CB-45	69.75	63.30 (SD-57) 64.80 (SD-61)	63.20 (SD-58)	48" DIA.
CB-46	69.95	63.05 (SD-58)	62.80 (SD-59)	48" DIA.
CB-47	69.05		65.45 (SD-61)	48" DIA.
CB-48	69.85		66.05 (SD-62)	48" DIA.
CB-49	72.55		68.95 (SD-63)	48" DIA.
CB-50	72.40	68.40 (SD-63)	68.30 (SD-65)	48" DIA.
CB-51	70.90	66.50 (SD-65) 66.50 (SD-69)	66.00 (SD-66)	48" DIA.
CB-52	69.75	64.70 (SD-66)	64.20 (SD-67)	48" DIA.
CB-53	71.50		67.90 (SD-69)	48" DIA.
CB-54	73.25		69.55 (SD-70)	48" DIA.
CB-55	72.60	69.00 (SD-70)	68.90 (SD-71)	48" DIA.
CB-56	72.10	68.30 (SD-71)	68.20 (SD-72)	48" DIA.
CB-57	72.30	67.16 (SD-72) 67.93 (SD-73)	67.05 (SD-74)	48" DIA.
CB-58	70.00	66.06 (SD-74)	65.81 (SD-75)	48" DIA.

STORM DRAIN STRUCTURE DATA

STRUCTURE	RIM	INV. IN	INV. OUT:	DIAM.
CB-59	69.10	64.81 (SD-75)	64.71 (SD-76)	48" DIA.
CB-60	68.20	64.15 (SD-76)	63.65 (SD-77)	48" DIA.
CB-61	72.35		68.50 (SD-73)	48" DIA.
DMH-1	79.45	73.70 (SD-3) 74.20 (SD-8)	73.60 (SD-4)	48" DIA.
DMH-2	75.10	71.00 (SD-19) 68.60 (SD-5)	68.50 (SD-6)	72" DIA.
DMH-3	74.80	66.25 (SD-27) 70.00 (SD-32) 67.50 (SD-36)	65.75 (SD-28)	72" DIA.
DMH-4	75.35	65.35 (SD-28) 66.30 (SD-39)	65.25 (SD-29)	72" DIA.
DMH-5	78.75	74.90 (SD-13) 75.15 (SD-14)	74.80 (SD-15)	48" DIA.
DMH-6	76.40	66.82 (SD-38) 72.50 (SD-33)	66.72 (SD-39)	48" DIA.
DMH-7	76.50	72.90 (SD-37) 69.30 (SD-41) 68.20 (SD-44)	67.95 (SD-38)	48" DIA.
DMH-9	71.00	60.30 (SD-48)	60.20 (SD-49)	48" DIA.
DMH-10	68.30	58.60 (SD-49)	58.50 (SD-50)	48" DIA.
DMH-11	67.50	56.01 (SD-50) 56.01 (EX. SD-1)	56.01 (EX. SD-2)	60" DIA.
DMH-12	71.10	65.95 (SD-51) 65.95 (SD-52)	65.85 (SD-53)	48" DIA.
DMH-13	69.25	63.70 (SD-67) 63.30 (SD-77)	63.20 (SD-68)	48" DIA.
DMH-14	67.50	57.20 (SD-81) 58.92 (GW-1)	57.10 (SD-82)	48" DIA.
DMH-15	67.00	56.87 (SD-82) 55.67 (EX. SD-3)	55.67 (EX. SD-4)	60" DIA.
EX DMH-8436	69.00			SEE SHEET C-301
OCS-1	73.55	62.50 (SD-47) 60.50 (SD-46)	60.40 (SD-48)	72" DIA.
OCS-2	69.50	57.60 (SD-79) 59.00 (SD-80)	57.50 (SD-81)	72" DIA.
SF-1	73.20	62.50 (SD-45)	60.60 (SD-46)	96" DIA.
SF-2	69.40	59.00 (SD-78)	57.70 (SD-79)	72 x 96 inch Rectangular Structure

STORM DRAIN PIPE DATA

NAME	SIZE	LENGTH	SLOPE
EX. SD-1	18"	8'	0.40%
EX. SD-2	18"	8'	0.30%
EX. SD-3	24"	7'	0.38%
EX. SD-4	24"	6'	0.41%
GW-1	6"	28'	0.50%
SD-1	12"	55'	1.27%
SD-2	12"	65'	1.55%
SD-3	15"	31'	3.07%
SD-4	18"	122'	1.72%
SD-5	24"	93'	2.59%
SD-6	24"	28'	1.44%
SD-7	24"	39'	1.56%
SD-8	12"	49'	2.64%
SD-9	15"	67'	2.24%
SD-10	12"	30'	2.83%
SD-11	12"	69'	2.10%
SD-12	12"	37'	2.41%
SD-13	15"	30'	2.47%
SD-14	12"	11'	1.37%
SD-15	15"	32'	2.31%
SD-16	18"	74'	1.36%
SD-17	18"	33'	3.35%
SD-18	15"	25'	2.77%
SD-19	18"	23'	2.63%
SD-20	12"	47'	2.12%
SD-21	12"	25'	1.22%
SD-22	15"	60'	2.08%
SD-23	15"	64'	1.64%
SD-24	12"	29'	2.72%
SD-25	12"	67'	3.14%

STORM DRAIN PIPE DATA

NAME	SIZE	LENGTH	SLOPE
SD-26	15"	57'	2.02%
SD-27	30"	52'	1.25%
SD-28	36"	20'	1.99%
SD-29	36"	4'	3.44%
SD-30	12"	33'	3.76%
SD-31	15"	63'	3.64%
SD-32	15"	18'	2.85%
SD-33	12"	54'	2.59%
SD-34	12"	24'	0.63%
SD-35	12"	46'	0.98%
SD-36	15"	48'	1.04%
SD-37	12"	115'	2.09%
SD-38	18"	117'	0.97%
SD-39	18"	45'	0.92%
SD-40	12"	53'	1.14%
SD-41	12"	66'	1.14%
SD-42	12"	72'	1.82%
SD-43	15"	103'	1.02%
SD-44	15"	36'	1.25%
SD-45	12"	2'	0.00%
SD-46	12"	12'	0.84%
SD-47	18"	3'	0.00%
SD-48	18"	18'	0.54%
SD-49	18"	196'	0.82%
SD-50	18"	79'	3.15%
SD-51	12"	65'	2.07%
SD-52	12"	79'	1.04%
SD-53	15"	27'	1.30%
SD-54	24"	42'	1.20%
SD-55	12"	37'	1.08%

STORM DRAIN PIPE DATA

NAME	SIZE	LENGTH	SLOPE
SD-56	12"	45'	1.11%
SD-57	15"	23'	1.08%
SD-58	15"	15'	1.01%
SD-59	18"	41'	1.23%
SD-60	12"	28'	1.09%
SD-61	12"	56'	1.17%
SD-62	12"	50'	1.21%
SD-63	12"	24'	2.26%
SD-65	12"	86'	2.08%
SD-66	18"	77'	1.69%
SD-67	18"	22'	2.32%
SD-68	24"	14'	2.86%
SD-69	12"	83'	1.69%
SD-70	12"	21'	2.56%
SD-71	12"	18'	3.39%
SD-72	15"	104'	1.00%
SD-73	12"	20'	2.90%
SD-74	15"	82'	1.21%
SD-75	18"	51'	1.96%
SD-76	18"	54'	1.04%
SD-77	24"	33'	1.07%
SD-78	12"	23'	0.00%
SD-79	12"	6'	1.70%
SD-80	24"	24'	0.00%
SD-81	24"	35'	0.86%
SD-82	24"	19'	1.19%
UD-1	6"	34'	1.61%
UD-2	6"	26'	2.15%
UD-3	4"	6'	0.00%

AMY BELL SEGAL RLA 2265

OWENS A. MCCULLOUGH PE 7122

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PIPE AND STRUCTURE DATA TABLES

OF:

PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

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CHECKED	PDO
DATE	02/29/2024
SCALE	N/A
PROJECT	19059

SHEET C-304

F:\Projects\19000\19059\DWG\Design\19059 U.dwg - 11/15/2024 4:45 PM - EBEN ROBICHAUD

19059 U.dwg, TAB C-304 Structure & Pipe Data

PLANT TOTALS:

PROPOSED TREES	= 162
PROPOSED SHRUBS	= 473
PROPOSED PERENNIALS	= 239

SEE SHEETS L102, L103, AND L104 FOR THE PLANT SCHEDULE.

JETPORT BLVD.

INTERNATIONAL PKWY.

JETPORT ACCESS ROAD

WESTBROOK ST.

GRAPHIC SCALE
50 0 25 50 100
(IN FEET)
1 INCH = 50 FT.

REV.	BY	DATE	STATUS
F.	OAM	11/15/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
E.	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
D.	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
C.	PDO	05/28/2024	OVERALL GRADING PLAN REISSUED TO MAINE DEP AND ACOE
B.	PDO	03/18/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
A.	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

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AMY BELL SEGAL RLA 2265

OWENS A. MCCULLOUGH PE 7122

REGISTERED LANDSCAPE ARCHITECT
AMY BELL SEGAL
No.2265
STATE OF MAINE

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

OVERALL LANDSCAPE PLAN

OF:

PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

FOR:

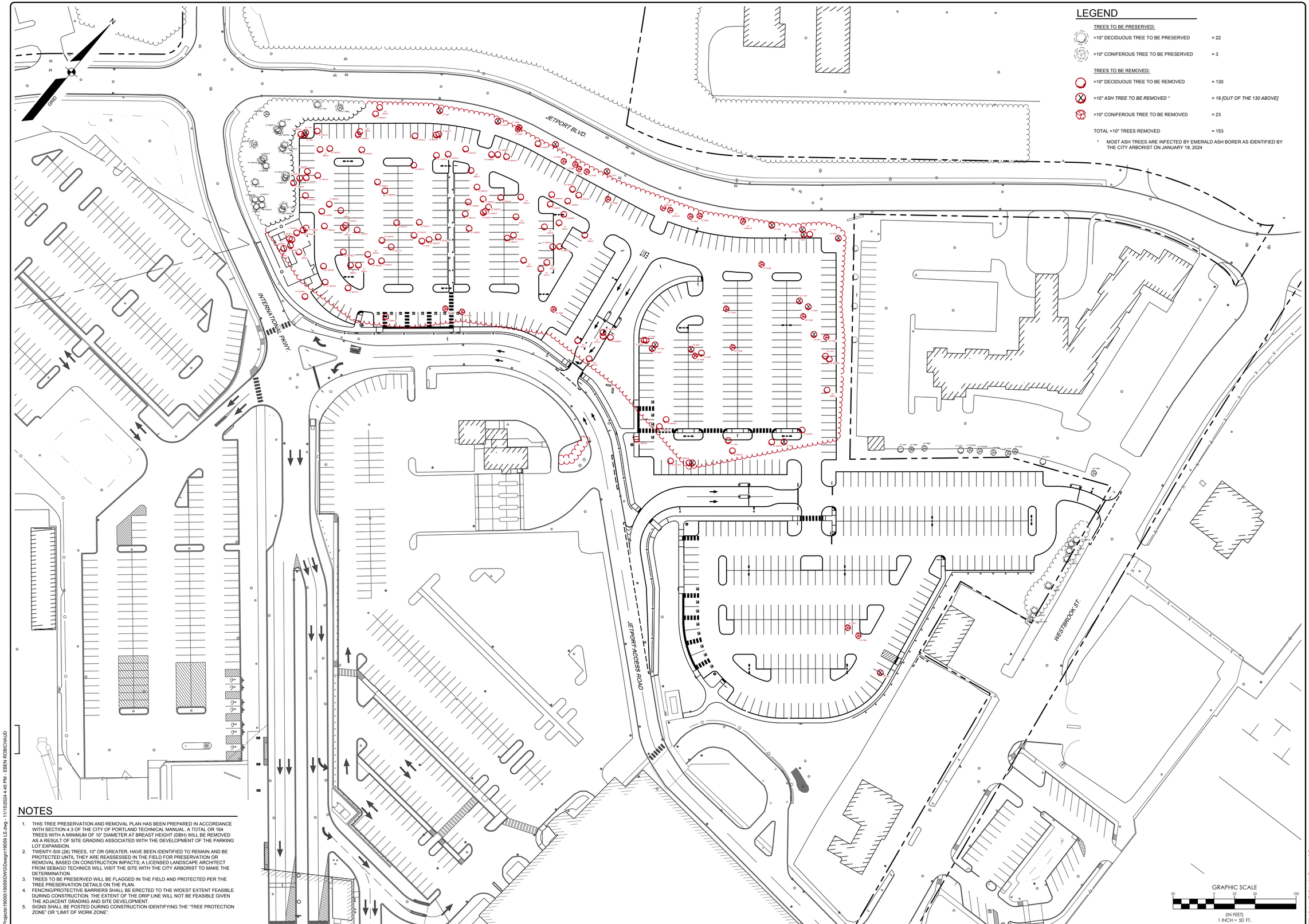
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 50'
PROJECT	19059

SHEET L-100

F:\Projects\19000\19059\DWG\Design\19059 LS dwg - 11/15/2024 4:45 PM - EBEN ROBICHAUD

19059 LS dwg, TAB L-100 Overall Landscape



LEGEND

TREES TO BE PRESERVED:

>10" DECIDUOUS TREE TO BE PRESERVED	= 22
>10" CONIFEROUS TREE TO BE PRESERVED	= 3

TREES TO BE REMOVED:

>10" DECIDUOUS TREE TO BE REMOVED	= 130
*>10" ASH TREE TO BE REMOVED **	*= 19 [OUT OF THE 130 ABOVE]*
>10" CONIFEROUS TREE TO BE REMOVED	= 23
TOTAL >10" TREES REMOVED	= 153

* MOST ASH TREES ARE INFECTED BY EMERALD ASH BORER AS IDENTIFIED BY THE CITY ARBORIST ON JANUARY 19, 2024

NOTES

1. THIS TREE PRESERVATION AND REMOVAL PLAN HAS BEEN PREPARED IN ACCORDANCE WITH SECTION 4.3 OF THE CITY OF PORTLAND TECHNICAL MANUAL. A TOTAL OR 164 TREES WITH A MINIMUM OF 10" DIAMETER AT BREAST HEIGHT (DBH) WILL BE REMOVED AS A RESULT OF SITE GRADING ASSOCIATED WITH THE DEVELOPMENT OF THE PARKING LOT EXPANSION.
2. TWENTY-SIX (26) TREES, 10" OR GREATER, HAVE BEEN IDENTIFIED TO REMAIN AND BE PROTECTED UNTIL THEY ARE REASSESSED IN THE FIELD FOR PRESERVATION OR REMOVAL BASED ON CONSTRUCTION IMPACTS; A LICENSED LANDSCAPE ARCHITECT FROM SEBAGO TECHNICS WILL VISIT THE SITE WITH THE CITY ARBORIST TO MAKE THE DETERMINATION.
3. TREES TO BE PRESERVED WILL BE FLAGGED IN THE FIELD AND PROTECTED PER THE TREE PRESERVATION DETAILS ON THE PLAN.
4. FENCING/PROTECTIVE BARRIERS SHALL BE ERECTED TO THE WIDEST EXTENT FEASIBLE DURING CONSTRUCTION. THE EXTENT OF THE DRIP LINE WILL NOT BE FEASIBLE GIVEN THE ADJACENT GRADING AND SITE DEVELOPMENT.
5. SIGNS SHALL BE POSTED DURING CONSTRUCTION IDENTIFYING THE "TREE PROTECTION ZONE" OR "LIMIT OF WORK ZONE".

GRAPHIC SCALE
50 0 25 50 100
(IN FEET)
1 INCH = 50 FT.

AMY BELL SEGAL RLA 2265

REGISTERED LANDSCAPE ARCHITECT
AMY BELL SEGAL
No.2265
STATE OF MAINE

OWENS A. MCCULLOUGH PE 7122

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

TREE REMOVAL & PRESERVATION PLAN

OF:

PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

FOR:

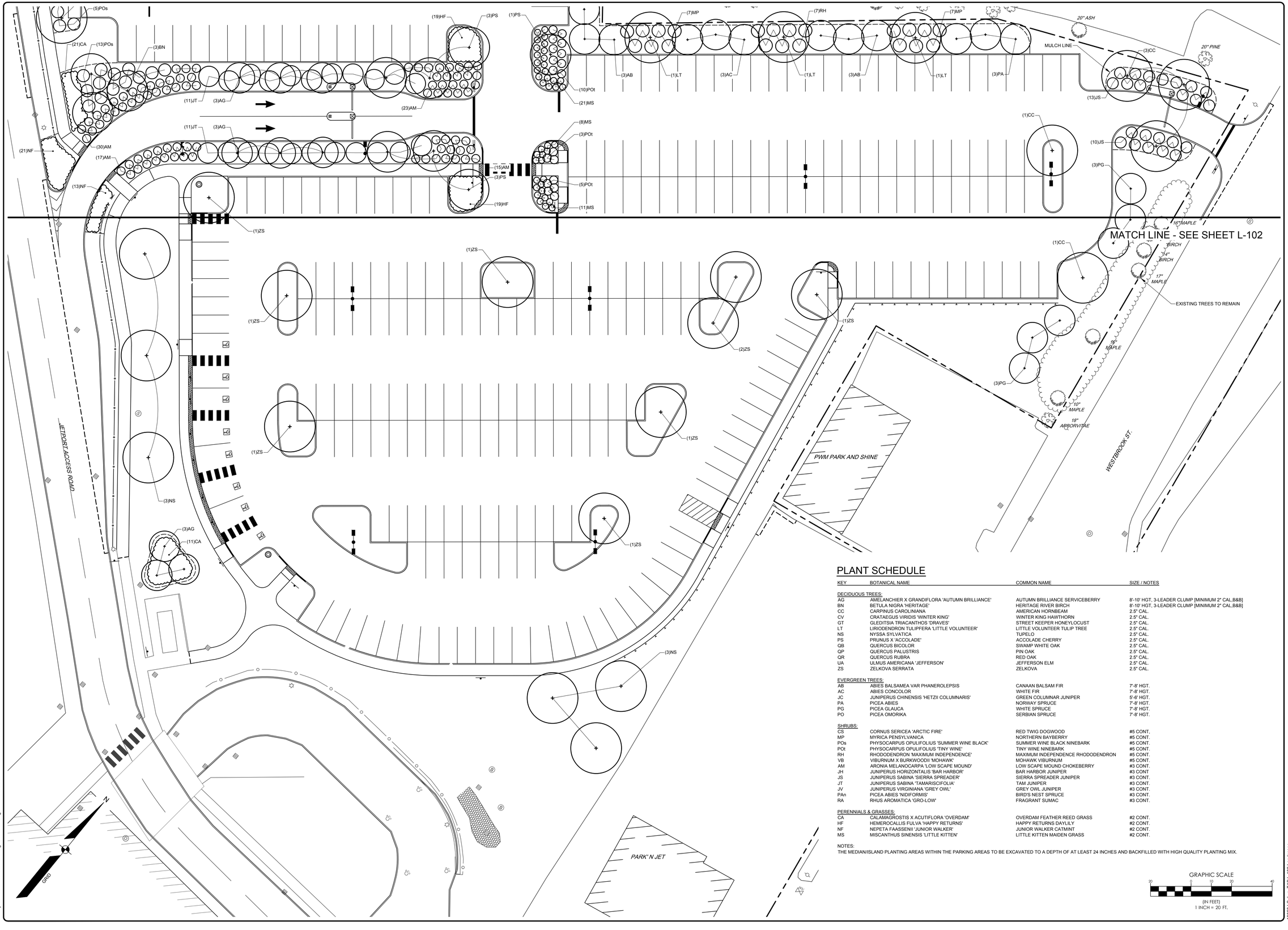
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 50'
PROJECT	19059

SHEET L-101

F:\Projects\19000\19059\DWG\Design\19059 LS.dwg - 11/15/2024 4:45 PM - EBEN ROBICHAUD

19059 LS.dwg, TAB1-101 Remove & Preserve



PLANT SCHEDULE

KEY	BOTANICAL NAME	COMMON NAME	SIZE / NOTES
DECIDUOUS TREES:			
AG	AMELANCHIER X GRANDIFLORA 'AUTUMN BRILLIANCE'	AUTUMN BRILLIANCE SERVICEBERRY	8'-10' HGT, 3-LEADER CLUMP [MINIMUM 2" CAL.B&B]
BN	BETULA NIGRA 'HERITAGE'	HERITAGE RIVER BIRCH	8'-10' HGT, 3-LEADER CLUMP [MINIMUM 2" CAL.B&B]
CC	CARPINUS CAROLINIANA	AMERICAN HORNBEAM	2.5" CAL.
CV	CRATAEGUS VIRIDIS 'WINTER KING'	WINTER KING HAWTHORN	2.5" CAL.
GT	GLEDITSIA TRIACANTHOS 'DRAVES'	STREET KEEPER HONEYLOCUST	2.5" CAL.
LT	LIRIODENDRON TULIPFERA 'LITTLE VOLUNTEER'	LITTLE VOLUNTEER TULIP TREE	2.5" CAL.
NS	NYSSA SYLVATICA	TUPELO	2.5" CAL.
PS	PRUNUS X 'ACCOLADE'	ACCOLADE CHERRY	2.5" CAL.
QB	QUERCUS BICOLOR	SWAMP WHITE OAK	2.5" CAL.
QP	QUERCUS PALUSTRIS	PIN OAK	2.5" CAL.
QR	QUERCUS RUBRA	RED OAK	2.5" CAL.
UA	ULMUS AMERICANA 'JEFFERSON'	JEFFERSON ELM	2.5" CAL.
ZS	ZELKOVA SERRATA	ZELKOVA	2.5" CAL.
EVERGREEN TREES:			
AB	ABIES BALSAMEA VAR PHANEROLEPSIS	CANAAN BALSAM FIR	7'-8' HGT.
AC	ABIES CONCOLOR	WHITE FIR	7'-8' HGT.
JC	JUNIPERUS CHINENSIS 'HETZII COLUMNARIS'	GREEN COLUMNAR JUNIPER	5'-6' HGT.
PA	PICEA ABIES	NORWAY SPRUCE	7'-8' HGT.
PG	PICEA GLAUCA	WHITE SPRUCE	7'-8' HGT.
PO	PICEA OMORIKA	SERBIAN SPRUCE	7'-8' HGT.
SHRUBS:			
CS	CORNUS SERICEA 'ARCTIC FIRE'	RED TWIG DOGWOOD	#5 CONT.
MP	MYRICA PENSYLVANICA	NORTHERN BAYBERRY	#5 CONT.
POs	PHYSOCARPUS OPULIFOLIUS 'SUMMER WINE BLACK'	SUMMER WINE BLACK NINEBARK	#5 CONT.
POt	PHYSOCARPUS OPULIFOLIUS 'TINY WINE'	TINY WINE NINEBARK	#5 CONT.
RH	RHODODENDRON 'MAXIMUM INDEPENDENCE'	MAXIMUM INDEPENDENCE RHODODENDRON	#5 CONT.
VB	VIBURNUM X BURKWOODII 'MOHAWK'	MOHAWK VIBURNUM	#5 CONT.
AM	ARONIA MELANOCARPA 'LOW SCAPE MOUND'	LOW SCAPE MOUND CHOKEBERRY	#3 CONT.
JH	JUNIPERUS HORIZONTALIS 'BAR HARBOR'	BAR HARBOR JUNIPER	#3 CONT
JS	JUNIPERUS SABINA 'SIERRA SPREADER'	SIERRA SPREADER JUNIPER	#3 CONT.
JT	JUNIPERUS SABINA 'TAMARISCIFOLIA'	TAM JUNIPER	#3 CONT.
JV	JUNIPERUS VIRGINIANA 'GREY OWL'	GREY OWL JUNIPER	#3 CONT.
PAn	PICEA ABIES 'NIDIFORMIS'	BIRD'S NEST SPRUCE	#3 CONT.
RA	RHUS AROMATICA 'GRO-LOW'	FRAGRANT SUMAC	#3 CONT.
PERENNIALS & GRASSES:			
CA	CALAMAGROSTIS X ACUTIFLORA 'OVERDAM'	OVERDAM FEATHER REED GRASS	#2 CONT.
HF	HEMEROCALLIS FULVA 'HAPPY RETURNS'	HAPPY RETURNS DAYLILY	#2 CONT.
NF	NEPETA FAASSENII 'JUNIOR WALKER'	JUNIOR WALKER CATMINT	#2 CONT.
MS	MISCANTHUS SINENSIS 'LITTLE KITTEN'	LITTLE KITTEN MAIDEN GRASS	#2 CONT.

NOTES:
THE MEDIAN/ISLAND PLANTING AREAS WITHIN THE PARKING AREAS TO BE EXCAVATED TO A DEPTH OF AT LEAST 24 INCHES AND BACKFILLED WITH HIGH QUALITY PLANTING MIX.

GRAPHIC SCALE
30 0 10 20 40
(IN FEET)
1 INCH = 20 FT.

AMY BELL SEGAL RLA 2265

OWENS A. MCCULLOUGH PE 7122

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LANDSCAPE PLAN
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 20'
PROJECT	19059

SHEET L-102

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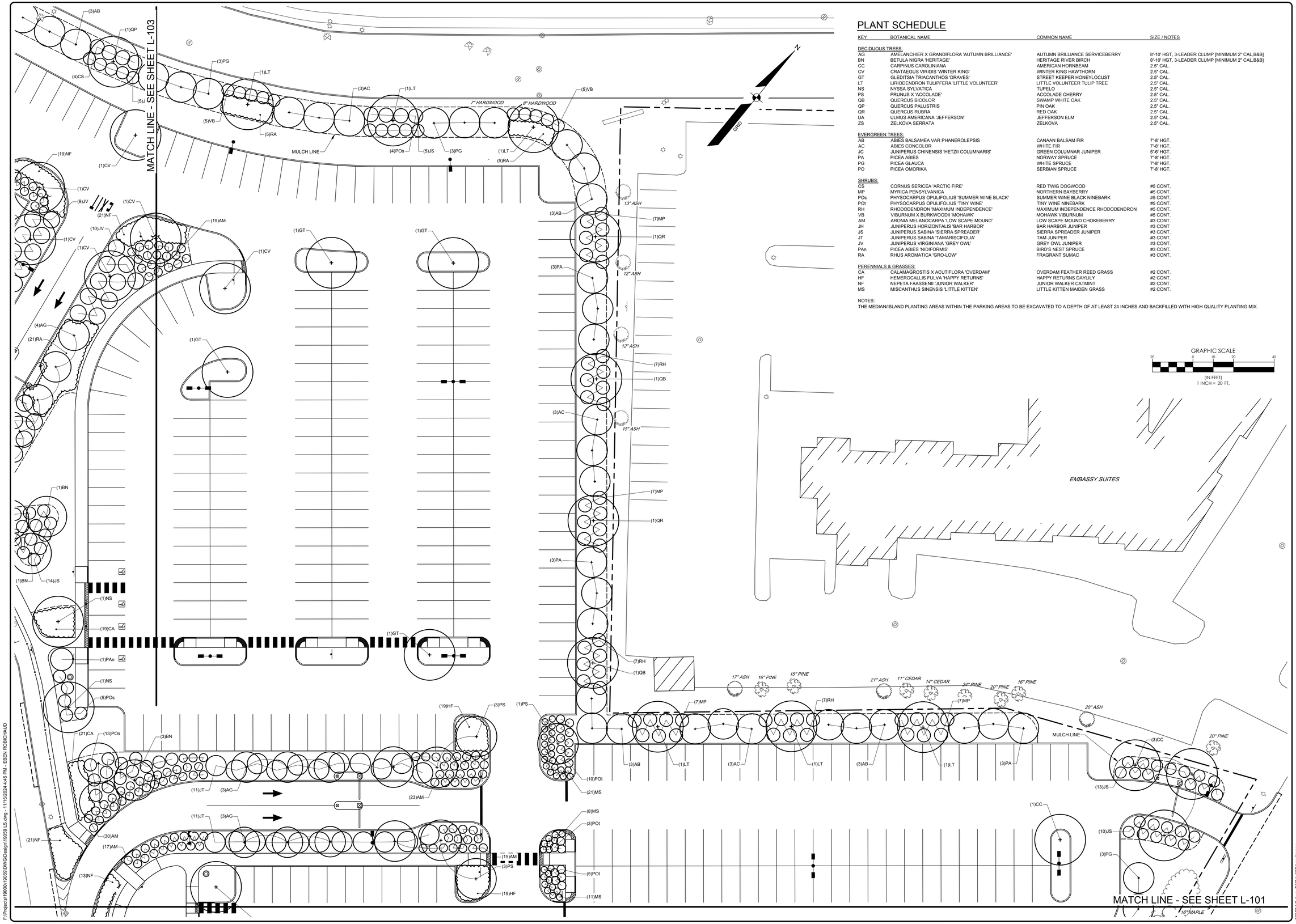
19059 LS dwg, TAB L-102 Landscape



PLANT SCHEDULE

KEY	BOTANICAL NAME	COMMON NAME	SIZE / NOTES
DECIDUOUS TREES:			
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BN	BETULA NIGRA 'HERITAGE'	HERITAGE RIVER BIRCH	8'-10' HGT, 3-LEADER CLUMP [MINIMUM 2" CAL,B&B]
CC	CARPINUS CAROLINIANA	AMERICAN HORNBEAM	2.5" CAL.
CV	CRATAEGUS VIRIDIS 'WINTER KING'	WINTER KING HAWTHORN	2.5" CAL.
GT	GLEDITSIA TRIACANTHOS 'DRAVES'	STREET KEEPER HONEYLOCUST	2.5" CAL.
LT	LIRIODENDRON TULIPFERA 'LITTLE VOLUNTEER'	LITTLE VOLUNTEER TULIP TREE	2.5" CAL.
NS	NYSSA SYLVATICA	TUPELO	2.5" CAL.
PS	PRUNUS X 'ACCOLADE'	ACCOLADE CHERRY	2.5" CAL.
QB	QUERCUS BICOLOR	SWAMP WHITE OAK	2.5" CAL.
QP	QUERCUS PALUSTRIS	PIN OAK	2.5" CAL.
QR	QUERCUS RUBRA	RED OAK	2.5" CAL.
UA	ULMUS AMERICANA 'JEFFERSON'	JEFFERSON ELM	2.5" CAL.
ZS	ZELKOVA SERRATA	ZELKOVA	2.5" CAL.
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AB	ABIES BALSAMEA VAR PHANEROLEPSIS	CANAAN BALSAM FIR	7'-8' HGT.
AC	ABIES CONCOLOR	WHITE FIR	7'-8' HGT.
JC	JUNIPERUS CHINENSIS 'HETZII COLUMNARIS'	GREEN COLUMNAR JUNIPER	5'-6' HGT.
PA	PICEA ABIES	NORWAY SPRUCE	7'-8' HGT.
PG	PICEA GLAUCA	WHITE SPRUCE	7'-8' HGT.
PO	PICEA OMORIKA	SERBIAN SPRUCE	7'-8' HGT.
SHRUBS:			
CS	CORNUS SERICEA 'ARCTIC FIRE'	RED TWIG DOGWOOD	#5 CONT,
MP	MYRICA PENSYLVANICA	NORTHERN BAYBERRY	#5 CONT.
POs	PHYSOCARPUS OPULIFOLIUS 'SUMMER WINE BLACK'	SUMMER WINE BLACK NINEBARK	#5 CONT.
POt	PHYSOCARPUS OPULIFOLIUS 'TINY WINE'	TINY WINE NINEBARK	#5 CONT.
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VB	VIBURNUM X BURKWOODII 'MOHAWK'	MOHAWK VIBURNUM	#5 CONT.
AM	ARONIA MELANOCARPA 'LOW SCAPE MOUND'	LOW SCAPE MOUND CHOKEBERRY	#3 CONT.
JH	JUNIPERUS HORIZONTALIS 'BAR HARBOR'	BAR HARBOR JUNIPER	#3 CONT
JS	JUNIPERUS SABINA 'SIERRA SPREADER'	SIERRA SPREADER JUNIPER	#3 CONT.
JT	JUNIPERUS SABINA 'TAMARISCIFOLIA'	TAM JUNIPER	#3 CONT.
JV	JUNIPERUS VIRGINIANA 'GREY OWL'	GREY OWL JUNIPER	#3 CONT.
PAn	PICEA ABIES 'NIDIFORMIS'	BIRD'S NEST SPRUCE	#3 CONT.
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HF	HEMEROCALLIS FULVA 'HAPPY RETURNS'	HAPPY RETURNS DAYLILY	#2 CONT.
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NOTES:
THE MEDIAN/ISLAND PLANTING AREAS WITHIN THE PARKING AREAS TO BE EXCAVATED TO A DEPTH OF AT LEAST 24 INCHES AND BACKFILLED WITH HIGH QUALITY PLANTING MIX.

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 INCH = 20 FT.

AMY BELL SEGAL, RLA 2265

OWENS A. MCCULLOUGH, PE 7122

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1001 WESTBROOK STREET
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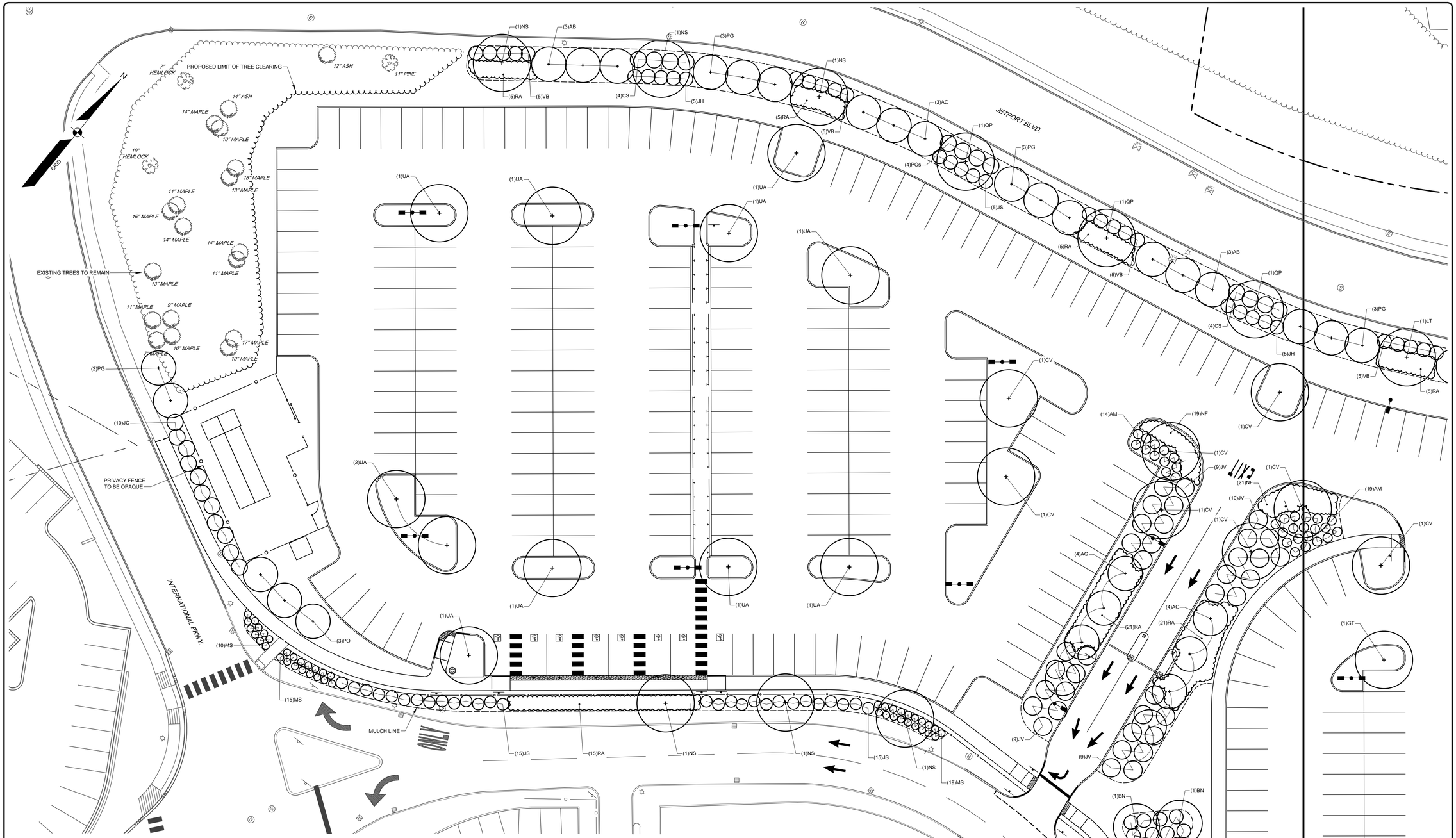
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 20'
PROJECT	19059

SHEET L-103

F:\Projects\19000\19059\DWG\Design\19059 LS.dwg - 11/15/2024 4:45 PM - EBEN ROBICHAUD

19059 LS.dwg - TAB L-103 Landscape



PLANT SCHEDULE

KEY	QTY	BOTANICAL NAME	COMMON NAME	SIZE / NOTES
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CC		CARPINUS CAROLINIANA	AMERICAN HORNBEAM	2.5" CAL.
CV		CRATAEGUS VIRIDIS 'WINTER KING'	WINTER KING HAWTHORN	2.5" CAL.
GT		GLEDITSIA TRIACANTHOS 'DRAVES'	STREET KEEPER HONEYLOCUST	2.5" CAL.
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KEY	QTY	BOTANICAL NAME	COMMON NAME	SIZE / NOTES
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POs		PHYSOCARPUS OPULIFOLIUS 'SUMMER WINE BLACK'	SUMMER WINE BLACK NINEBARK	#5 CONT.
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AMY BELL SEGAL, RLA 2265

REGISTERED LANDSCAPE ARCHITECT
AMY BELL SEGAL
No.2265
STATE OF MAINE

OWENS A. MCCULLOUGH, PE 7122

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B.	PDO	03/19/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
A.	PDO	02/29/2024	ISSUED TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

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LANDSCAPE PLAN
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 20'
PROJECT	19059

SHEET L-104

19059_LS.dwg, TAB L-104 Landscape

SCHEDULE

PHASE 1 - 3 MONTHS

PHASE 2 - 3 MONTHS

PHASE 1 - SCOPE OF WORK

1. CLOSE CELL PHONE LOT AND GRAVEL LOTS.
2. INSTALL UNDERGROUNND STORMWATER TREATMENT SYSTEM SF-1 IN UPPER LOT, REGRADE AND PAVE.
   NOTE: PARKING GATE VENDOR NEEDS TO INSTALL PAVEMENT LOOPS AT NEW ENTRY AND EXIT GATES DURING THIS PHASE.
3. CONSTRUCT UNDERGROUND POWER AND COMMUNICATIONS TO ENTRY AND EXIT GATE ISLANDS. ENTRY AND EXIT GATE EQUIPMENT INSTALLED IN THIS PHASE.
4. INSTALL UNDERGROUND GATE AND SIGN CONDUITS FOR UPPER LOT.

PHASE 2 - SCOPE OF WORK

1. INSTALL UNDERGROUND STORMWATER TREATMENT SYSTEM SF-2 IN LOWER LOT, REGRADE AND PAVE.
2. INSTALL SECONDARY EXIT GATE EQUIPMENT.
   NOTE: PARKING GATE VENDOR NEEDS TO INSTALL PAVEMENT LOOPS AT NEW ENTRY AND EXIT GATES DURING THIS PHASE.
3. CONSTRUCT UNDERGROUND POWER AND COMMUNICATIONS TO SECONDARY EXIT GATE ISLAND. ENTRY AND EXIT GATE EQUIPMENT INSTALLED IN THIS PHASE.
4. INSTALL UNDERGROUND GATE AND SIGN CONDUITS FOR LOWER LOT.

AVIS RENTAL
JETPORT BLVD.
UPPER PARKING LOT
INSTALL EROSION CONTROL BLANKET (PHASE 1)
INTERNATIONAL PKWY.
PROPOSED PRIMARY EXIT
CONSTRUCTION EGRESS (PHASE 1 ONLY)
LONG TERM PARKING
INSTALL EROSION CONTROL BLANKET (PHASE 1)
INSTALL EROSION CONTROL BLANKET (PHASE 1)
PROPOSED ENTRY
EMBASSY SUITES
PROPOSED SECONDARY EXIT
CONSTRUCTION ACCESS (BOTH PHASES)
TEMPORARY BARRIERS (PHASE 1)
INSTALL EROSION CONTROL BLANKET (PHASE 1)
JETPORT ACCESS ROAD
PWM PARK AND SHINE
WESTBROOK ST.
LOWER PARKING LOT
INSTALL EROSION CONTROL BLANKET (PHASE 2)
PARKING GARAGE
PARK 'N JET
GRAPHIC SCALE
50 0 25 50 100
(IN FEET)
1 INCH = 50 FT.

REV.	BY	DATE	STATUS
F.	OAM	11/15/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
E.	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
D.	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
C.	PDO	05/28/2024	OVERALL GRADING PLAN REISSUED TO MAINE DEP AND ACOE
B.	PDO	03/19/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
A.	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

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OWENS A. MCCULLOUGH PE 7122
AMY BELL SEGAL RLA 2265

STATE OF MAINE
OWENS A. MCCULLOUGH
No. 7122
REGISTERED PROFESSIONAL ENGINEER

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CONSTRUCTION SEQUENCE PLAN
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	1" = 50'
PROJECT	19059

SHEET C-400

19059 CONSTRUCTION.dwg, TAB C-400 CONSTRUCTION SEQUENCE PLAN

F:\Projects\19000\19059\DWG\Design\19059 CONSTRUCTION.dwg - 11/15/2024 4:46 PM - EBEN ROBICHAUD

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 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, SUCH AS ACTIVE EXCAVATION AND ACTIVE GRADING. LIMIT THE EXPOSED AREA TO THOSE AREAS IN WHICH WORK IS ACTIVELY OCCURRING OR CAN BE MULCHED IN THE SAME DAY. OPEN AREAS SHALL BE ANCHORED WITH TEMPORARY EROSION CONTROL AS SHOWN ON THE DESIGN PLANS AND AS DESCRIBED WITHIN THIS EROSION CONTROL PLAN WITHIN SEVEN (7) DAYS OF DISTURBANCE. AREAS LOCATED WITHIN 100 FEET 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. DISTURBED AREAS ADJACENT TO NATURAL RESOURCES THAT ARE NOT GRADED WITHIN SEVEN (7) 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 33%. 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. SEDIMENT BARRIERS SHALL BE INSTALLED DOWNGRADIENT OF STOCKPILES, AND STORMWATER SHALL BE PREVENTED FROM RUNNING ONTO THE STOCKPILE.

3. NATURAL RESOURCES PROTECTION:

ANY AREAS WITHIN 100 FEET FROM ANY NATURAL RESOURCES 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 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 NOT BE INSTALLED ADJACENT TO WETLAND. INSTALL 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 NOT BE USED ADJACENT TO WETLANDS. INSTALL 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. EROSION CONTROL MIX BERMS SHALL NOT BE USED AT THE BOTTOM OF STEEP SLOPES (>8%) OR SLOPES WITH FLOWING WATER.

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 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: STONE 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: BALES SHALL BE WIRE-BOUND OR STRING-TIED. BALES SHALL BE INSTALLED WITHIN A MINIMUM 4 INCH DEEP TRENCH LINE WITH ENDS OF ADJACENT BALES TIGHTLY ABUTTING ONE ANOTHER. HAY BALES SHALL BE 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.

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 INLET OR 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 TO FURTHER MINIMIZE THE TRACKING OF MUD, DUST OR DEBRIS FROM THE CONSTRUCTION AREA. THE TERM "SWEEP" IS UNDERSTOOD TO MEAN REMOVAL AND RECOVERY OF TRACKED SEDIMENT WITH A STREET SWEEPER, NOT BRUSHING THE MATERIAL INTO SWALES OR STRUCTURES WITH A MECHANICAL BROOM. STABILIZED CONSTRUCTION EXITS SHALL BE CONSTRUCTED IN AREAS SPECIFIED ON THE PLANS AND AS DETAILED ON THE PLANS. THE CONTRACTOR SHALL MAINTAIN THE STABILIZED CONSTRUCTION ENTRANCE UNTIL ALL DISTURBED AREAS ARE STABILIZED.

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. IF OFFSITE TRACKING OCCURS, PUBLIC ROADS SHOULD BE SWEPT IMMEDIATELY AND NOT LESS THAN ONCE A WEEK AND PRIOR TO SIGNIFICANT STORM EVENTS.

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 MANUALS FOR CONTRACTORS AND ENGINEERS, LATEST REVISION. ALTERNATIVE EROSION CONTROL MEASURES SHOULD BE USED IF SEEDING CAN NOT BE DONE BEFORE SEPTEMBER 15TH OF THE CONSTRUCTION YEAR.

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 SEED MIX METHOD #1 - PARK MIXTURE)

SEED TYPE		APPLICATION RATE
CREEPING RED FESCUE		1.8 LBS/1,000 S.F. (78.4 LBS/ACRE)
KENTUCKY BLUEGRASS		1.0 LBS/1,000 S.F. (43.6 LBS/ACRE)
CHEWINGS FESCUE		0.60 LBS/1,000 S.F. (26.1 LBS/ACRE)
PERENNIAL RYEGRASS		0.40 LBS/1,000 S.F. (17.4 LBS/ACRE)
ANNUAL RYEGRASS		0.20 LBS/1,000 S.F. (8.70 LBS/ACRE)
	TOTAL	4.00 LBS/1,000 S.F. (174.20 LBS/ACRE)

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 2016 OR LATEST REVISION.

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.

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 CONTRACTOR 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 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 DISTURBED SOIL. THE CONTRACTOR 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 CONTRACTOR WILL REMOVE ANY SNOW ACCUMULATION ON THE DISTURBED SLOPE. THE CONTRACTOR 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 CONTRACTOR 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 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 SOIL BEFORE NOVEMBER 15, THEN THE CONTRACTOR WILL MULCH THE AREA FOR OVER-WINTER PROTECTION AS DESCRIBED IN ITEM 3(C.) OF THIS STANDARD.
B. STABILIZE THE SOIL WITH SOD -- THE CONTRACTOR WILL 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.
C. STABILIZE THE SOIL WITH MULCH -- BY NOVEMBER 15 THE CONTRACTOR 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 CONTRACTOR WILL REMOVE ANY SNOW ACCUMULATION ON THE DISTURBED AREA. IMMEDIATELY AFTER APPLYING THE MULCH, THE CONTRACTOR WILL ANCHOR THE MULCH WITH PLASTIC NETTING TO PREVENT WIND FROM MOVING THE MULCH OFF THE DISTURBED SOIL.

1. MAINTENANCE MEASURES SHALL BE APPLIED AS NEEDED DURING THE ENTIRE CONSTRUCTION CYCLE. AFTER EACH RAINFALL, SNOW STORM OR PERIOD OF THAWING AND RUNOFF, AND AT LEAST EVERY SEVEN (7) DAYS, THE CONTRACTOR SHALL PERFORM A VISUAL INSPECTION OF ALL INSTALLED EROSION CONTROL MEASURES. THE CONTRACTOR SHALL PERFORM REPAIRS NO LATER THAN THE END OF THE NEXT WORKDAY, 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 WITHIN SEVEN (7) DAYS.

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 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:

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.

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.

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.

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.

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.

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;
   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;
   K. POTABLE WATER SOURCES INCLUDING WATERLINE FLUSHINGS; AND
   L. LANDSCAPE IRRIGATION.

7. UNAUTHORIZED NON-STORMWATER DISCHARGES. THE DEPARTMENT'S APPROVAL DOES NOT AUTHORIZE A DISCHARGE THAT IS MIXED WITH A SOURCE OF NON-STORMWATER, OTHER THAN THOSE DISCHARGES. SPECIFICALLY, THE DEPARTMENT'S APPROVAL DOES NOT AUTHORIZE DISCHARGES OF THE FOLLOWING:
   A. WASTEWATER FROM THE WASHOUT OR CLEAN OUT 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.

WINTER EROSION CONTROL MEASURES

THE WINTER CONSTRUCTION PERIOD IS FROM NOVEMBER 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 1 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. 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 SHALL BE 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 ORDER TO MINIMIZE AREAS WITHOUT EROSION CONTROL PROTECTION.

1. SOIL STOCKPILES

   STOCKPILES OF SOIL OR SUBSOIL WILL BE MULCHED FOR OVER WINTER PROTECTION WITH HAY OR STRAW AT TWICE THE NORMAL RATE OR AT 150 LBS/1,000 S.F. (3 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 OR SNOWFALL. ANY SOIL STOCKPILE WILL NOT BE PLACED (EVEN COVERED WITH HAY OR STRAW) WITHIN 100 FEET FROM ANY NATURAL RESOURCES.

2. 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 BY DECEMBER 1 AND ANCHORED WITH PLASTIC NETTING OR PROTECTED WITH EROSION CONTROL MATS. DURING WINTER CONSTRUCTION, A DOUBLE LINE OF SEDIMENT BARRIERS (I.E. SILT FENCE BACKED WITH HAY BALES OR EROSION CONTROL MIX) WILL 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. EXISTING PROJECTS NOT STABILIZED BY DECEMBER 1 SHALL BE PROTECTED WITH THE SECOND LINE OF SEDIMENT BARRIER TO ENSURE FUNCTIONALITY DURING THE SPRING THAW AND RAINS.

3. SEDIMENT BARRIERS

   DURING FROZEN CONDITIONS, SEDIMENT BARRIERS SHALL CONSIST OF WOOD WASTE FILTER BERMS AS FROZEN SOIL PREVENTS THE PROPER INSTALLATION OF HAY BALES AND SEDIMENT SILT FENCES.

4. MULCHING

   ALL AREA SHALL BE CONSIDERED TO BE DENUDED UNTIL AREAS OF FUTURE LOAM AND SEED HAVE BEEN LOAMED, SEEDED AND MULCHED. HAY AND STRAW MULCH SHALL BE APPLIED AT A RATE OF 150 LB. PER 1.000 SQUARE FEET OR 3 TONS/ACRE (TWICE THE NORMAL ACCEPTED RATE OF 75-LBS./1,000 S.F. OR 1.5 TONS/ACRE) AND SHALL BE PROPERLY ANCHORED. MULCH SHALL NOT BE SPREAD ON TOP OF SNOW. THE SNOW WILL BE REMOVED DOWN TO A ONE-INCH DEPTH OR LESS PRIOR TO APPLICATION. AFTER EACH DAY OF FINAL GRADING, THE AREA WILL BE PROPERLY STABILIZED WITH ANCHORED HAY OR STRAW OR EROSION CONTROL MATTING. AN AREA SHALL BE CONSIDERED TO HAVE BEEN STABILIZED WHEN EXPOSED SURFACES HAVE BEEN EITHER MULCHED WITH STRAW OR HAY AT A RATE OF 150 LB. PER 1.000 SQUARE FEET (3TONS/ACRE) AND ADEQUATELY ANCHORED THAT GROUND SURFACE IS NOT VISIBLE THOUGH THE MULCH.

   BETWEEN THE DATES OF SEPTEMBER 1 AND APRIL 15, ALL MULCH SHALL BE ANCHORED BY EITHER PEG LINE, MULCH NETTING, ASPHALT EMULSION CHEMICAL, TRACK OR WOOD CELLULOSE FIBER. WHEN GROUND SURFACE IS NOT VISIBLE THOUGH THE MULCH THEN COVER IS SUFFICIENT.
   AFTER NOVEMBER 1ST, MULCH AND ANCHORING OF ALL BARE SOIL SHALL OCCUR AT THE END OF EACH FINAL GRADING WORK DAY.

5. MULCHING ON SLOPES AND DITCHES

   SLOPES SHALL NOT BE LEFT EXPOSED FOR ANY EXTENDED TIME OF WORK SUSPENSION UNLESS FULLY MULCHED AND ANCHORED WITH PEG AND NETTING OR WITH EROSION CONTROL BLANKETS. MULCHING SHALL BE APPLIED AT A RATE OF 230 LBS/1,000 S.F. ON ALL SLOPES GREATER THAN 8%. MULCH NETTING SHALL BE USED TO ANCHOR MULCH IN ALL DRAINAGE WAYS WITH A SLOPE GREATER THAN 3% FOR SLOPES EXPOSED TO DIRECT WINDS AND FOR ALL OTHER SLOPES GREATER THAN 5%. EROSION CONTROL BLANKETS SHALL BE USED IN LIEU OF MULCH IN ALL DRAINAGE WAYS WITH SLOPES 8%. EROSION CONTROL MIX CAN BE USED TO SUBSTITUTE EROSION CONTROL BLANKETS ON ALL SLOPES EXCEPT DITCHES.

6. SEEDING

   BETWEEN THE DATES OF OCTOBER 15 AND APRIL 1ST, LOAM OR SEED WILL NOT BE REQUIRED. DURING PERIODS OF ABOVE FREEZING TEMPERATURES FINISHED AREAS SHALL BE FINE GRADED AND EITHER PROTECTED WITH MULCH OR TEMPORARILY SEEDED AND MULCHED UNTIL SUCH TIME AS THE FINAL TREATMENT CAN BE APPLIED. IF THE DATE IS AFTER NOVEMBER 1ST AND IF THE EXPOSED AREA HAS BEEN LOOMED, FINAL GRADED WITH A UNIFORM SURFACE, THEN THE AREA MAY BE DORMANT SEEDED AT A RATE OF 3 TIMES HIGHER THAN SPECIFIED FOR PERMANENT SEED AND THEN MULCHED. DORMANT SEEDING MAY BE SELECTED TO BE PLACED PRIOR TO THE PLACEMENT OF MULCH AND FABRIC NETTING ANCHORED WITH STAPLES. IF DORMANT SEEDING IS USED FOR THE SITE, ALL DISTURBED AREAS SHALL RECEIVE 4' OF LOAM AND SEED AT AN APPLICATION RATE OF 5LBS/1000 S.F. ALL AREAS SEEDED DURING THE WINTER WILL BE INSPECTED IN THE SPRING FOR ADEQUATE CATCH. ALL AREAS SUFFICIENTLY VEGETATED (LESS THAN 75% CATCH) SHALL BE REVEGETATED BY REPLACING LOAM, SEED AND MULCH. IF DORMANT SEEDING IS NOT USED FOR THE SITE, ALL DISTURBED AREAS SHALL BE REVEGETATED IN THE SPRING. SEED TYPE SHALL BE WINTER RYE.

7. INSPECTION AND MONITORING

   MAINTENANCE MEASURES SHALL BE APPLIED AS NEEDED DURING THE ENTIRE CONSTRUCTION SEASON. AT A MINIMUM, AFTER EACH RAINFALL, SNOW STORM OR PERIOD OF THAWING AND RUNOFF, THE SITE CONTRACTOR SHALL PERFORM A VISUAL INSPECTION OF ALL INSTALLED EROSION CONTROL MEASURES AND PERFORM REPAIRS AS NEEDED TO INSURE THEIR CONTINUOUS FUNCTION.
   FOLLOWING THE TEMPORARY AND/OR FINAL SEEDING AND MULCHING, THE CONTRACTOR SHALL IN THE SPRING INSPECT AND REPAIR ANY DAMAGES AND/ OR UNESTABLISHED SPOTS. ESTABLISHED VEGETATIVE COVER MEANS A MINIMUM OF 90% OF AREAS VEGETATED WITH VIGOROUS GROWTH.

STANDARDS FOR TIMELY STABILIZATION OF CONSTRUCTION SITES DURING WINTER

1. STANDARD FOR THE TIMELY STABILIZATION OF DITCHES AND CHANNELS -- THE APPLICANT WILL CONSTRUCT AND STABILIZE ALL STONE-LINED DITCHES AND CHANNELS ON THE SITE BY NOVEMBER 15. THE APPLICANT WILL CONSTRUCT AND STABILIZE ALL GRASS-LINED DITCHES AND CHANNELS ON THE SITE BY SEPTEMBER 15. IF THE APPLICANT FAILS TO STABILIZE A DITCH OR CHANNEL TO BE GRASS-LINED BY SEPTEMBER 15, THEN THE APPLICANT WILL TAKE ONE OF THE FOLLOWING ACTIONS TO STABILIZE THE DITCH FOR LATE FALL AND WINTER.

   INSTALL A SOD LINING IN THE DITCH -- THE APPLICANT WILL LINE THE DITCH 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, 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.
   INSTALL A STONE LINING IN THE DITCH --THE APPLICANT WILL LINE THE DITCH WITH STONE RIPRAP BY NOVEMBER 15. THE APPLICANT WILL 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 APPLICANT WILL REGRADE THE DITCH PRIOR TO PLACING THE STONE LINING SO TO PREVENT THE STONE LINING FROM REDUCING THE DITCH'S CROSS-SECTIONAL AREA.

2. STANDARD FOR THE TIMELY STABILIZATION OF DISTURBED SLOPES -- THE APPLICANT WILL CONSTRUCT AND STABILIZE STONE-COVERED SLOPES BY NOVEMBER 15. THE APPLICANT WILL 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 APPLICANT FAILS TO STABILIZE ANY SLOPE TO BE VEGETATED BY SEPTEMBER 15, THEN THE APPLICANT WILL TAKE ONE OF THE FOLLOWING ACTIONS TO STABILIZE THE SLOPE FOR LATE FALL AND WINTER.

   STABILIZE THE SOIL WITH TEMPORARY VEGETATION AND EROSION CONTROL MATS -- BY OCTOBER 1 THE APPLICANT WILL 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 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 SLOPE BY NOVEMBER 1, THEN THE APPLICANT WILL COVER THE SLOPE WITH A LAYER OF WOOD WASTE COMPOST AS DESCRIBED IN ITEM III OF THIS CONDITION OR WITH STONE RIPRAP AS DESCRIBED IN ITEM IV OF THIS CONDITION.

   STABILIZE THE SLOPE WITH SOD -- THE APPLICANT 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).

   STABILIZE THE SLOPE WITH WOOD WASTE COMPOST -- THE APPLICANT 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.

   STABILIZE THE SLOPE WITH STONE RIPRAP -- THE APPLICANT 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.

3. STANDARD FOR THE TIMELY STABILIZATION OF DISTURBED SOILS -- BY SEPTEMBER 15 THE APPLICANT WILL SEED AND MULCH ALL DISTURBED SOILS ON AREAS HAVING A SLOPE LESS THAN 15%. IF THE APPLICANT FAILS TO STABILIZE THESE SOILS BY THIS DATE, THEN THE APPLICANT WILL TAKE ONE OF THE FOLLOWING ACTIONS TO STABILIZE THE SOIL FOR LATE FALL AND WINTER.
   STABILIZE THE SOIL WITH TEMPORARY VEGETATION -- BY OCTOBER 1 THE APPLICANT 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 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 III OF THIS STANDARD.
   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.
   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.

AMY BELL SEGAL RLA 2265

OWENS A. MCCULLOUGH PE 7122

STATE OF MAINE
OWENS A. McCULLOUGH
No. 7122
LICENSED PROFESSIONAL ENGINEER

REV:	BY:	DATE:	STATUS:
F	OAM	11/15/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
E	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
D	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
C	PDO	05/28/2024	OVERALL GRADING PLAN REISSUED TO MAINE DEP AND ACOE
B	PDO	03/18/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
A	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

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.

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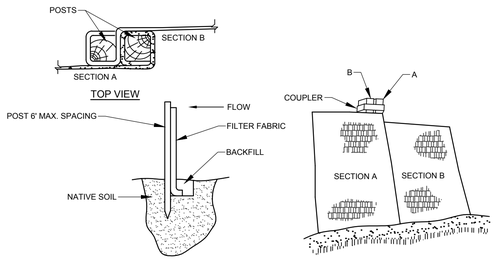
EROSION CONTROL NOTES
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	N/A
PROJECT	19059

SHEET C-500

19059 D.dwg, TAB:C-500 Erosion Control Notes

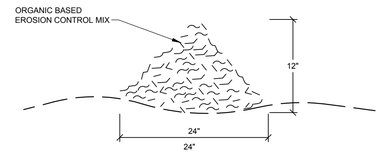
F:\Projects\19000\19059\DWG\Design\19059 D.dwg - 11/15/2024 4:46 PM - EBEN ROBICHAUD



INSTALLATION:

1. EXCAVATE A 6"x 6" TRENCH ALONG THE LINE OF PLACEMENT FOR THE FILTER BARRIER.
2. UNROLL A SECTION AT A TIME AND POSITION THE POSTS AGAINST THE BACK (DOWNSTREAM) WALL OF THE TRENCH.
3. DRIVE POSTS INTO THE GROUND UNTIL APPROXIMATELY 2" OF FABRIC IS LYING ON THE TRENCH BOTTOM.
4. LAY THE TOE-IN FLAP OF FABRIC ONTO THE UNDISTURBED BOTTOM OF THE TRENCH, BACKFILL THE TRENCH AND TAMP THE SOIL. TOE-IN CAN ALSO BE ACCOMPLISHED BY LAYING THE FABRIC FLAP ON UNDISTURBED GROUND AND PILING AND TAMPING FILL AT THE BASE, BUT MUST BE ACCOMPANIED BY AN INTERCEPTION DITCH.
5. JOIN SECTION AS SHOWN ABOVE.
6. BARRIER SHALL BE MIRAFI SILT FENCE OR EQUAL.

FILTER BARRIER
NOT TO SCALE



COMPOSITION:

EROSION CONTROL MIX SHALL BE MANUFACTURED ON OR OFF THE PROJECT SITE SUCH THAT ITS COMPOSITION IS IN ACCORDANCE WITH THE MDEP MAINE EROSION AND SEDIMENT CONTROL BMP MANUAL, LAST REVISED 3/2003 OR LATER. IT MUST CONSIST PRIMARILY OF ORGANIC MATERIAL, SEPARATED AT THE POINT OF GENERATION, AND MAY INCLUDE: SHREDDED BARK, STUMP GRINDINGS, COMPOSTED BARK, OR ACCEPTABLE MANUFACTURED PRODUCTS. WOOD AND BARK CHIPS, GROUND CONSTRUCTION DEBRIS OR REPROCESSED WOOD PRODUCTS WILL NOT BE ACCEPTABLE AS THE ORGANIC COMPONENT OF THE MIX.

INSTALLATION:

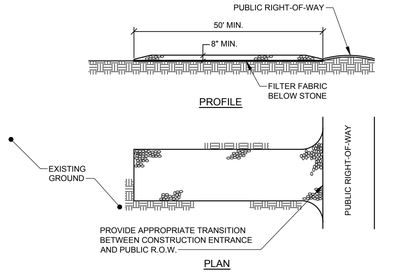
1. THE BARRIER MUST BE PLACED ACROSS THE SLOPE, ALONG THE CONTOUR.

2. EXISTING GROUND SHALL BE PREPARED SUCH THAT THE BARRIER MAY LIE NEARLY FLAT ALONG THE GROUND TO AVOID THE CREATION OF VOIDS AND BRIDGES IN ORDER TO MINIMIZE THE POTENTIAL OF WASH OUTS UNDER THE BARRIER

3. THE BARRIER SHALL BE A MINIMUM OF 1 FOOT HIGH (AS MEASURED ON THE UPHILL SIDE) AND 2 FEET WIDE FOR SLOPES LESS THAN 5% IN GRADE AND SHALL BE WIDER TO ACCOMMODATE THE ADDITIONAL RUNOFF.

4. EROSION CONTROL MIX CAN BE INSTALLED WHERE SILT FENCE IS ILLUSTRATED ON THE DESIGN PLANS IN AREAS EXCEPT IN, BUT NOT LIMITED TO, THE FOLLOWING AREAS: WETLAND AREAS, AT POINTS OF CONCENTRATED FLOW, BELOW CULVERT OUTLET APRONS, AROUND CATCH BASINS AND CLOSED STORM SYSTEMS AND AT THE BOTTOM OF STEEP SLOPES THAT ARE MORE THAN 50 FEET FROM TOP TO BOTTOM.

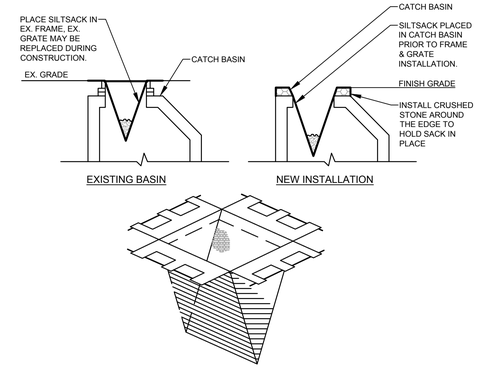
EROSION CONTROL MIX BERM
NOT TO SCALE



NOTES:

1. STONE SIZE- AASHTO DESIGNATION M43, SIZE NO. 2 (2 1/2" TO 1 1/2"). USE CRUSHED STONE.
2. LENGTH- AS SHOWN ON PLANS, MIN. 50 FEET.
3. THICKNESS- NOT LESS THAN EIGHT (8) INCHES.
4. WIDTH- NOT LESS THAN FULL WIDTH OF ALL POINT OF INGRESS OR EGRESS.
5. MAINTENANCE- THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHT-OF-WAY MUST BE REMOVED IMMEDIATELY.

STABILIZED CONSTRUCTION ENTRANCE
NOT TO SCALE



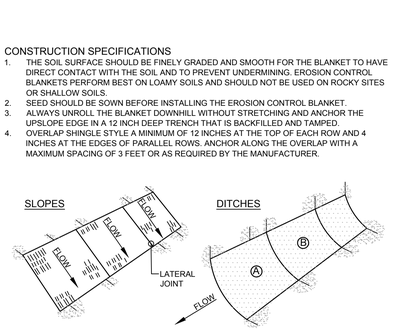
NOTES:

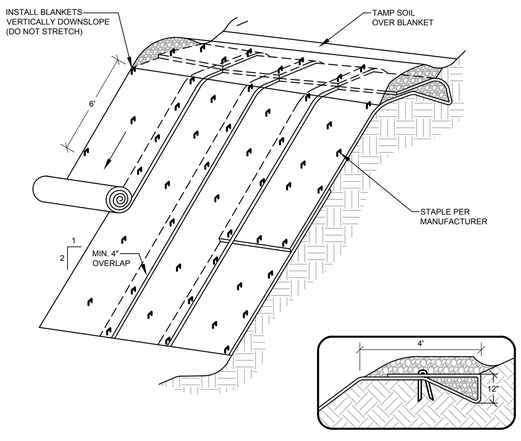
PRIOR TO FINAL GRADING AND PAVING OPERATIONS BEGIN A CATCH BASIN INSERT (SUCH AS A SILT SACK OR A DANDY BAG II) MUST BE INSTALLED IN EACH BASIN PER MANUFACTURES INSTRUCTIONS. HAY BALES SHOULD BE REMOVED ONCE INSERTS ARE INSTALLED.

CATCH BASIN PROTECTION DETAIL
NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

1. THE SOIL SURFACE SHOULD BE FINELY GRADED AND SMOOTH FOR THE BLANKET TO HAVE DIRECT CONTACT WITH THE SOIL AND TO PREVENT UNDERMINING. EROSION CONTROL BLANKETS PERFORM BEST ON LOAMY SOILS AND SHOULD NOT BE USED ON ROCKY SITES OR SHALLOW SOILS.
2. SEED SHOULD BE SOWN BEFORE INSTALLING THE EROSION CONTROL BLANKET.
3. ALWAYS UNROLL THE BLANKET DOWNHILL WITHOUT STRETCHING AND ANCHOR THE UPSLOPE EDGE IN A 12 INCH DEEP TRENCH THAT IS BACKFILLED AND TAMPED.
4. OVERLAP SHINGLE STYLE A MINIMUM OF 12 INCHES AT THE TOP OF EACH ROW AND 4 INCHES AT THE EDGES OF PARALLEL ROWS. ANCHOR ALONG THE OVERLAP WITH A MAXIMUM SPACING OF 3 FEET OR AS REQUIRED BY THE MANUFACTURER.

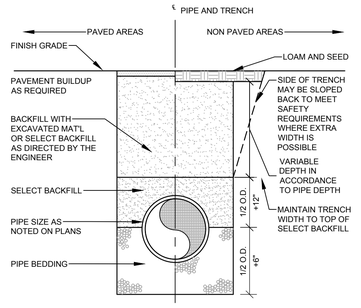




NOTES:

1. BURY THE TOP END OF THE MESH MATERIAL IN A 6" TRENCH AND BACKFILL AND TAMP. TRENCHING SECURE END WITH STAPLES AT 6" SPACING, 4" DOWN FROM EXPOSED END.
2. FLOW DIRECTION JOINTS TO HAVE UPPER END OF LOWER STRIP BURIED WITH UPPER LAYERS OVERLAPPED 4" AND STAPLED. OVERLAP B OVER A.
3. LATERAL JOINTS TO HAVE 4" OVERLAP OF STRIPS. STAPLE 18" ON CENTER.
4. STAPLE OUTSIDE LATERAL EDGE 2" ON CENTER.
5. WIRE STAPLES TO BE MIN OF #11 WIRE 6" LONG AND 1-1/2" WIDE.
6. USE NORTH AMERICAN GREEN DS 150 OR APPROVED EQUAL.

EROSION CONTROL BLANKET
NOT TO SCALE



TRENCH BACKFILL SCHEDULE		
PIPE TYPE	PIPE BEDDING MATERIAL	SELECT BACKFILL
CORRUGATED METAL DUCTILE IRON REINFORCED CONCRETE	MDOT 703.22 TYPE B UD BACKFILL	MDOT 703.22 TYPE B UD BACKFILL
SOLID PVC-SDR 35 HDPE	MDOT 703.13 3/4" CRUSHED STONE	MDOT 703.22 TYPE B UD BACKFILL, OR MDOT 703.13 3/4" CRUSHED STONE
PERFORATED PVC-SDR 35 HDPE	MDOT 703.13 3/4" CRUSHED STONE	MDOT 703.22 TYPE B UD BACKFILL, OR MDOT 703.13 3/4" CRUSHED STONE

NOTE:
ALL BRACING AND SHEETING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL MEET ALL STATE AND O.S.H.A. SAFETY STANDARDS.

TRENCH SECTION
NOT TO SCALE

AMY BELL SEGAL RLA 2265

OWENS A. MCCULLOUGH PE 7122

STATE OF MAINE
OWENS A. MCCULLOUGH
No. 7122
REGISTERED PROFESSIONAL ENGINEER

REV.	BY	DATE	STATUS
F.	OAM	11/15/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
E.	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
D.	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
C.	PDO	05/28/2024	OVERALL GRADING PLAN REISSUED TO MAINE DEP AND ACOE
B.	PDO	03/19/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
A.	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

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

EROSION CONTROL DETAILS

OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	N/A
PROJECT	19059

SHEET C-501

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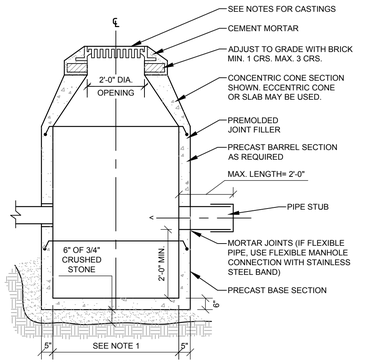
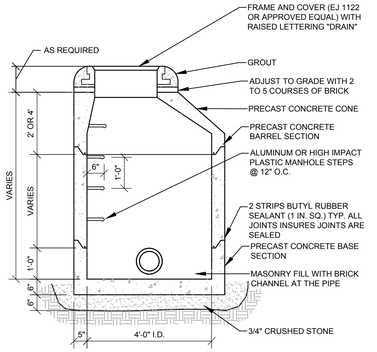
19059 D.dwg - TAB:C-501 Details

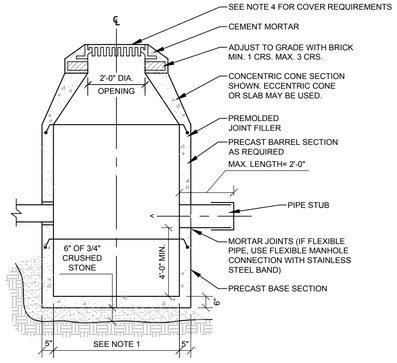


NOTES:
1. 4'-0" I.D. TYPICAL, SOME STRUCTURES MAY REQUIRE LARGER I.D. PROVIDE SHOP DRAWINGS.
2. DRAINAGE STRUCTURES TO BE DESIGNED FOR H-20 LOADING.
3. PIPE SIZES AND INVERTS AS NOTED ON PLANS.
4. CATCH BASIN FRAME AND GRATE TO BE EJ 5520M5, OR APPROVED EQUAL.

CATCH BASIN
NOT TO SCALE

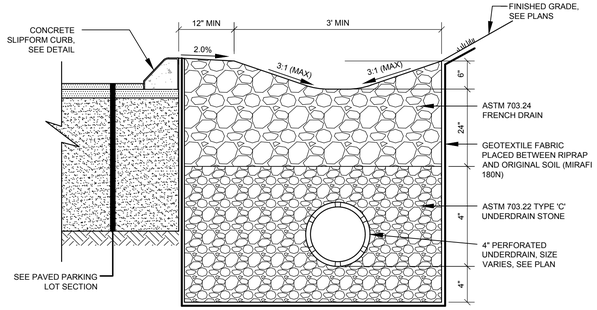


PRECAST MANHOLE
NOT TO SCALE

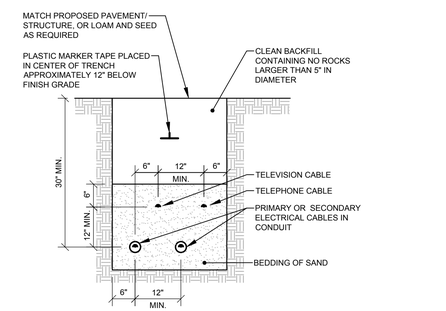


NOTES:
1. 4'-0" I.D. TYPICAL, SOME STRUCTURES MAY REQUIRE LARGER I.D. PROVIDE SHOP DRAWINGS.
2. DRAINAGE STRUCTURES TO BE DESIGNED FOR H-20 LOADING.
3. PIPE SIZES AND INVERTS AS NOTED ON PLANS.
4. COVER FOR PRETREATMENT DRAINAGE STRUCTURES SHALL BE A SOLID MANHOLE COVER OR A CATCH BASIN GRATE AS SPECIFIED ON PLANS.
5. CATCH BASIN FRAME AND GRATE TO BE EJ 5520M5, OR APPROVED EQUAL.
6. DRAIN MANHOLE COVER TO BE EJ 1122 OR APPROVED EQUAL WITH RAISED LETTERING "DRAIN".

PRE-TREATMENT DRAINAGE STRUCTURE
NOT TO SCALE

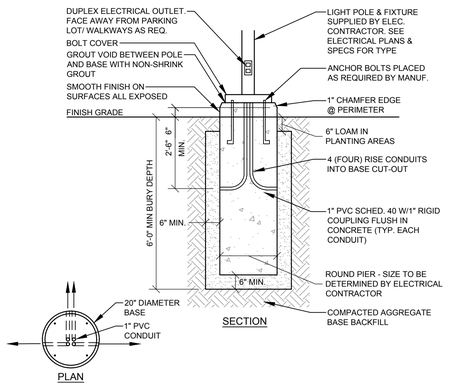


STONE DRIP EDGE
NOT TO SCALE



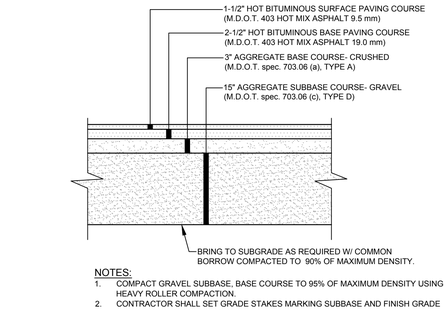
NOTES:
CABLES TO BE ENCASED IN SCHEDULE 40 PVC CONDUIT.

UNDERGROUND CABLE INSTALLATION
NOT TO SCALE



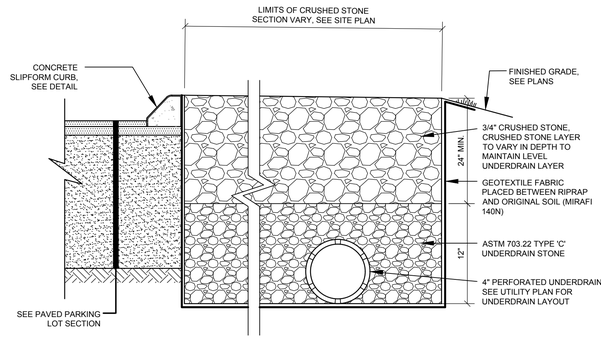
NOTES:
1. CONCRETE f'c=5000 psi @ 28 DAYS WITH STEEL REINFORCEMENT
2. CONDUIT AND ANCHOR BOLTS PLACED AS REQUIRED PROVIDED BY ELECTRICAL CONTRACTOR
3. PROVIDE 2 COATS BITUMINOUS DAMPROOFING FOR ALL CONCRETE BELOW GRADE.
4. INSTALL BASE 3'-0" ABOVE FINISH GRADE IN LOCATIONS WHERE POLES ARE IN PARKING LOT PAVEMENT. MAINTAIN MINIMUM BURY DEPTH.
5. LIGHT POLE BASE AS MANUFACTURED BY SUPERIOR CONCRETE OR APPROVED EQUAL

24" ROUND LIGHT POLE BASE
NOT TO SCALE

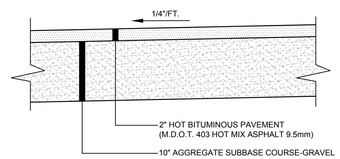


NOTES:
1. COMPACT GRAVEL SUBBASE, BASE COURSE TO 95% OF MAXIMUM DENSITY USING HEAVY ROLLER COMPACTION.
2. CONTRACTOR SHALL SET GRADE STAKES MARKING SUBBASE AND FINISH GRADE ELEVATIONS FOR CONSTRUCTION REFERENCE.

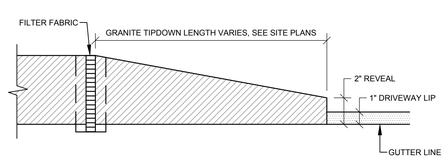
VEHICULAR PAVEMENT SECTION
NOT TO SCALE



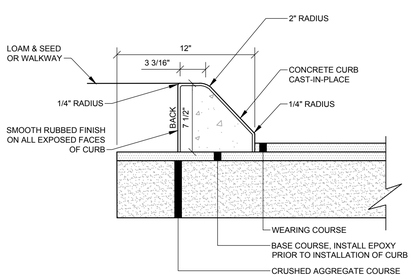
CRUSHED STONE - BATTERY CORRAL
NOT TO SCALE



PEDESTRIAN PAVEMENT SECTION
NOT TO SCALE

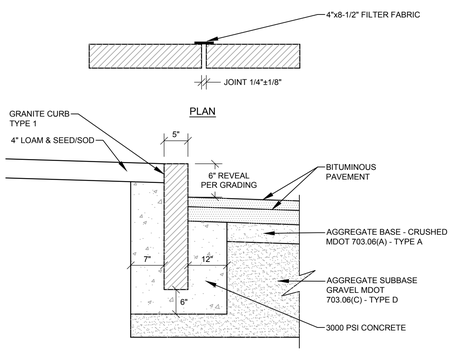


TIPDOWN CURB INSTALLATION
NOT TO SCALE



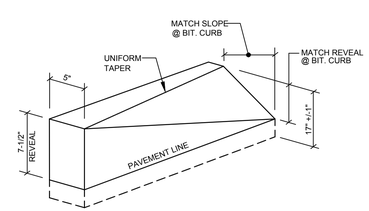
NOTES:
1. SEE TYPICAL ACCESS DRIVE SECTION FOR ROADWAY MATERIAL SPECIFICATIONS AND DEPTHS.
2. TIPDOWNS SHALL BE PROVIDED AS SHOWN ON PLANS.

SLIPFORM CURB SECTION - MOLD 1
NOT TO SCALE



NOTES:
1. EXCAVATION INCIDENTAL TO COST OF CURB
2. SUBBASE SHALL BE COMPACTED TO A FIRM EVEN SURFACE PRIOR TO SETTING OF CURB

VERTICAL GRANITE CURB
NOT TO SCALE



VERTICAL TO SLOPED CURB GRANITE TRANSITION STONES
NOT TO SCALE

AMY BELL SEGAL, RLA 2265

OWENS A. MCCULLOUGH PE 7122
STATE OF MAINE
OWENS A. MCCULLOUGH
No. 7122
REGISTERED PROFESSIONAL ENGINEER

REV.	BY	DATE	STATUS
F.	OAM	11/15/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
E.	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
D.	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
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SITE DETAILS
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

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

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	N/A
PROJECT	19059

SHEET C-502

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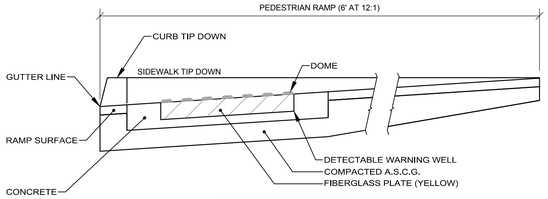
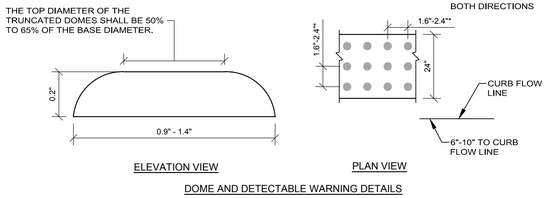
19059 D.dwg - TAB:C-502 Details



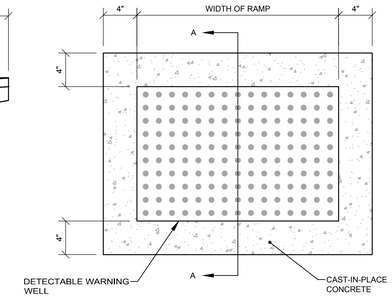
SIDE SECTION VIEW OF
DETECTABLE WARNING, WELL, CURB AND GUTTER



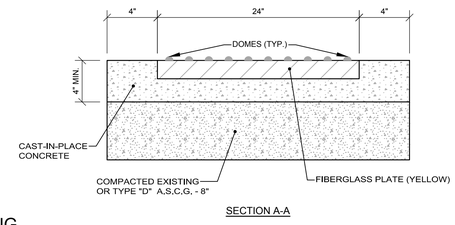
ELEVATION VIEW PLAN VIEW

DOME AND DETECTABLE WARNING DETAILS

NOTE: ALL DETECTABLE WARNING AREAS SHALL START 6" - 10" FROM THE FLOW LINE OF THE CURB, BE 24" IN DEPTH, AND COVER THE COMPLETE WIDTH OF THE RAMP AREA ONLY.

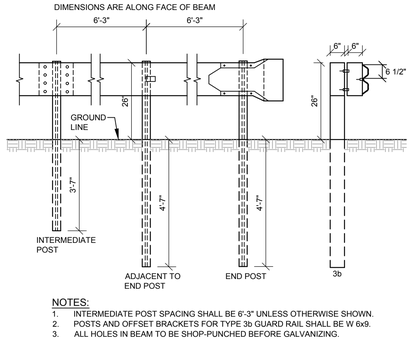


PLAN VIEW OF DETECTABLE WARNING AND WELL



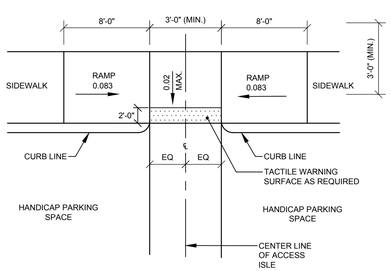
SECTION A-A

TRUNCATED DOME PAVING
NOT TO SCALE

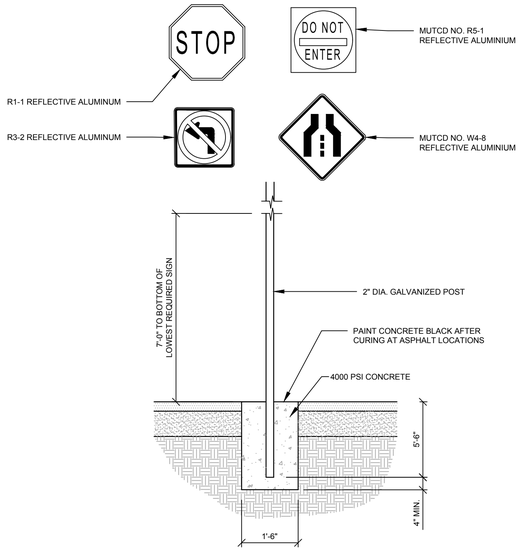


NOTES:
1. INTERMEDIATE POST SPACING SHALL BE 6'-3" UNLESS OTHERWISE SHOWN.
2. POSTS AND OFFSET BRACKETS FOR TYPE 3b GUARD RAIL SHALL BE W 6x9.
3. ALL HOLES IN BEAM TO BE SHOP-PUNCHED BEFORE GALVANIZING.

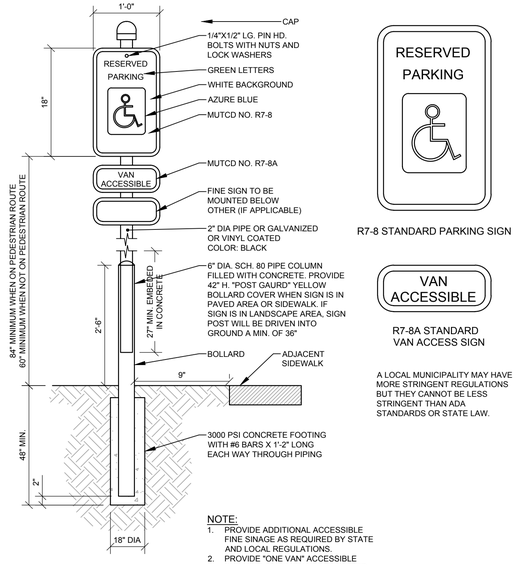
GUARDRAIL TYPE 3b
NOT TO SCALE



ADA ACCESSIBLE RAMP
NOT TO SCALE



TYPICAL TRAFFIC CONTROL SIGN
NOT TO SCALE



NOTE:
1. PROVIDE ADDITIONAL ACCESSIBLE FINE SINAGE AS REQUIRED BY STATE AND LOCAL REGULATIONS.
2. PROVIDE "ONE VAN" ACCESSIBLE SIGN PER 25 HC SPACES REQUIRED.
3. WHENEVER POSSIBLE SIGN SHALL BE MOUNTED CENTERED ON PARKING SPACE UNLESS SPECIFIED OTHERWISE.
4. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS PRIOR TO ORDERING MATERIALS.

R7-8 STANDARD PARKING SIGN

R7-8A STANDARD
VAN ACCESS SIGN

A LOCAL MUNICIPALITY MAY HAVE MORE STRINGENT REGULATIONS BUT THEY CANNOT BE LESS STRINGENT THAN ADA STANDARDS OR STATE LAW.

RESERVED PARKING SIGN - BOLLARD (S-3)
NOT TO SCALE

Missing or invalid reference
File: ..\..\Images\2024-05-24_Wayfinding Signage Exhibit\19059_Pedestrain Wayfinding Sign (S6)_2024-05-24.pdf
Sheet: 1

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Sheet: 1

REV.	BY	DATE:	STATUS:
A.	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION
B.	PDO	03/18/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
C.	PDO	05/28/2024	OVERALL GRADING PLAN REISSUED TO MAINE DEP AND ACOE
D.	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
E.	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
F.	OAM	11/15/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT

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OWENS A. MCCULLOUGH PE 7122
AMY BELL SEGAL RLA 2265

STATE OF MAINE
OWENS A. MCCULLOUGH
No. 7122
REGISTERED PROFESSIONAL ENGINEER
PROFESSIONAL ENGINEER

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

SITE DETAILS
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	N/A
PROJECT	19059

SHEET C-503

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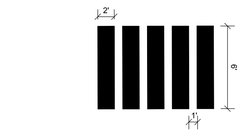
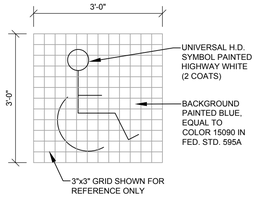


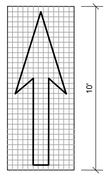
PAVEMENT MARKING NOTES

1. ALL PAVEMENT MARKINGS SHALL BE IN CONFORMANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS, U.S. DOT, FHWA, LATEST EDITION.
2. ALL PAVEMENT MARKING LINES SHALL BE PAINT AND 4" WIDE, EXCEPT FOR:
   SWSL-12"
   SYCL-12"
   CROSSWALK BARS - 24"
3. PAVEMENT WORD AND SYMBOL MARKINGS SHALL BE WHITE PAINT.
4. SOLID WHITE STOP LINE SHALL BE A MINIMUM OF 4' BEHIND THE EDGE OF CROSSWALK.

CROSSWALK DETAIL
NOT TO SCALE

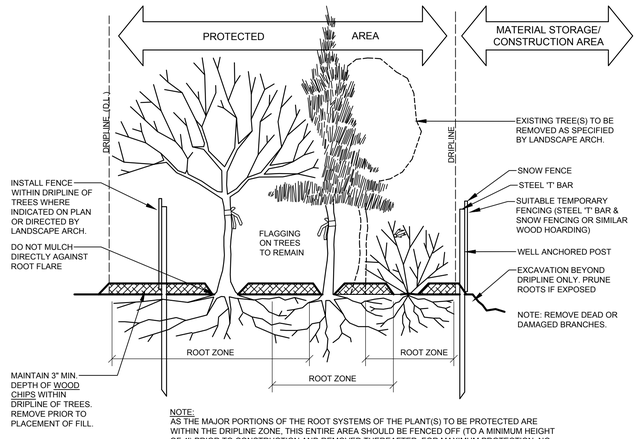


ADA RESERVED PARKING
NOT TO SCALE



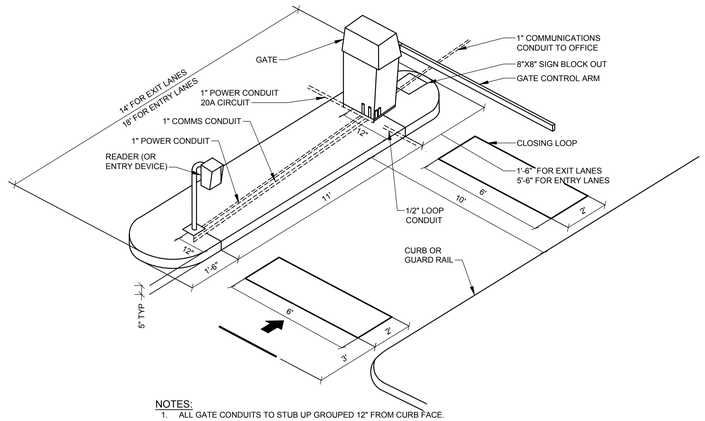
13 SQUARE FEET

PAVEMENT ARROW DETAIL
NOT TO SCALE



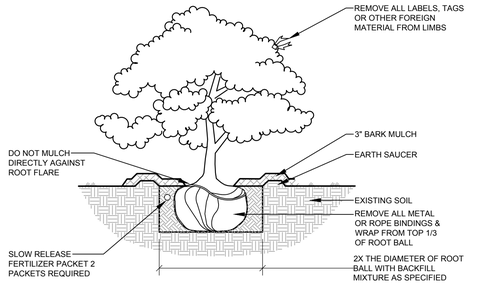
NOTE:
AS THE MAJOR PORTIONS OF THE ROOT SYSTEMS OF THE PLANT(S) TO BE PROTECTED ARE WITHIN THE DRIPLINE ZONE, THIS ENTIRE AREA SHOULD BE FENCED OFF (TO A MINIMUM HEIGHT OF 4') PRIOR TO CONSTRUCTION AND REMOVED THEREAFTER. FOR MAXIMUM PROTECTION, NO VEHICLE TRESPASS, EXCAVATION, FILL, WASTE DISCHARGE OR OR MATERIAL STORAGE SHOULD BE ALLOWED IN THIS ZONE.

TREE PROTECTION DETAIL
NOT TO SCALE
CROSS-SECTION OF TYPICAL PLANT GROUPING

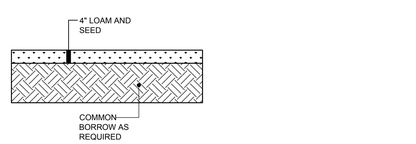


NOTES:
1. ALL GATE CONDUITS TO STUB UP GROUPED 12" FROM CURB FACE.
2. EXIT/ENTRY DEVICE CONDUIT TO STUB UP 12" FROM CURB FACE.
3. DISTANCE BETWEEN GATE AND REVENUE DEVICE SHOULD BE 11' ON CENTER.
4. EACH LANE SHOULD HAVE ITS OWN 20A CIRCUIT.
5. CONTRACTOR TO VERIFY WITH PARKING GATE VENDOR THE DIMENSIONS AND PLACEMENT OF CONDUITS AND BLOCK OUTS PRIOR TO PLACING CONCRETE FOR THESE ISLANDS

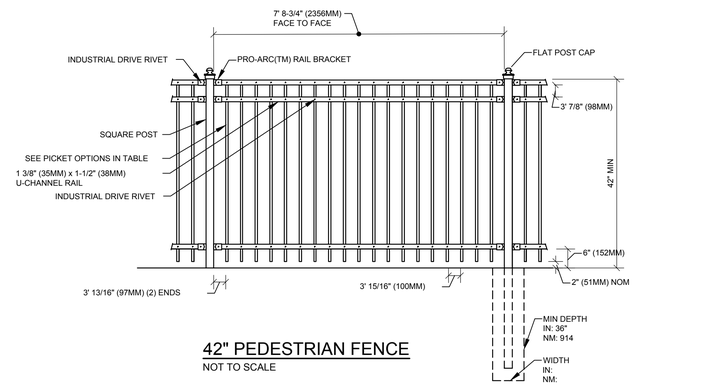
PARKING ENTRY ISLAND
NOT TO SCALE



DECIDUOUS & EVERGREEN SHRUB
NOT TO SCALE



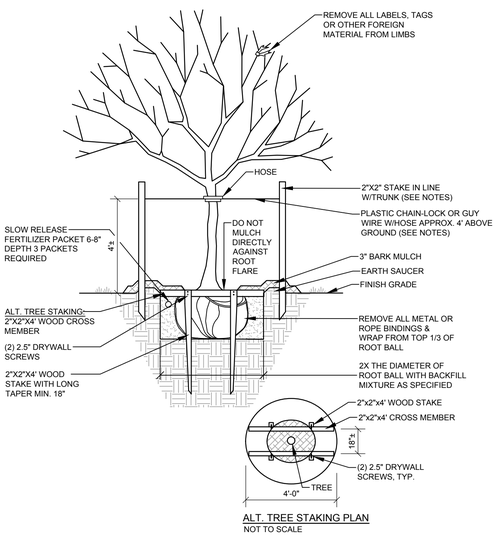
LOAM & SEED SECTION
NOT TO SCALE



NOTES:
1. METRIC DIMENSIONS ARE NOMINAL EQUIVALENTS TO UI.S. DIMENSIONS.
2. SPECIFICATIONS SHOWN CAN BE CHANGED BY MAST HALCO ONL.Y
3. FOOTING WIDTH TO BE (4)X POST WIDTH
4. FOR MATCHING GATE SEE DRAWING 6-5010M (SINGLE) OR 6-5015M (DOUBLE)
5. IMPERIAL "B" GUARDRAIL BY MASTER HALCO. Co. (1-800-229-5615)
6. ALL SURFACES SHALL BE BLACK POWDER COATED FINISH BY MANUFACTURER.

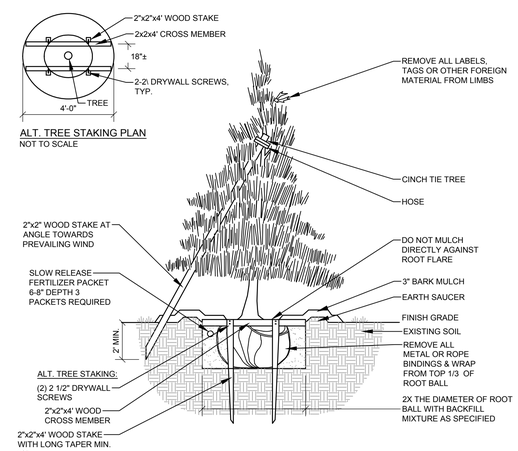
PICKET SIZE	GAUGE
3/4" [19MM]	14 GA

42" PEDESTRIAN FENCE
NOT TO SCALE



ALT. TREE STAKING PLAN
NOT TO SCALE

DECIDUOUS TREES
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

OWENS A. MCCULLOUGH PE 7122
AMY BELL SEGAL RLA 2265

STATE OF MAINE
OWENS A. MCCULLOUGH
No. 7122
REGISTERED PROFESSIONAL ENGINEER

F.	OAM	11/15/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
E.	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
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REV.	BY	DATE:	STATUS:

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75 John Roberts Rd.
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SITE DETAILS
OF:
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FOR:
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CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	N/A
PROJECT	19059

SHEET C-504

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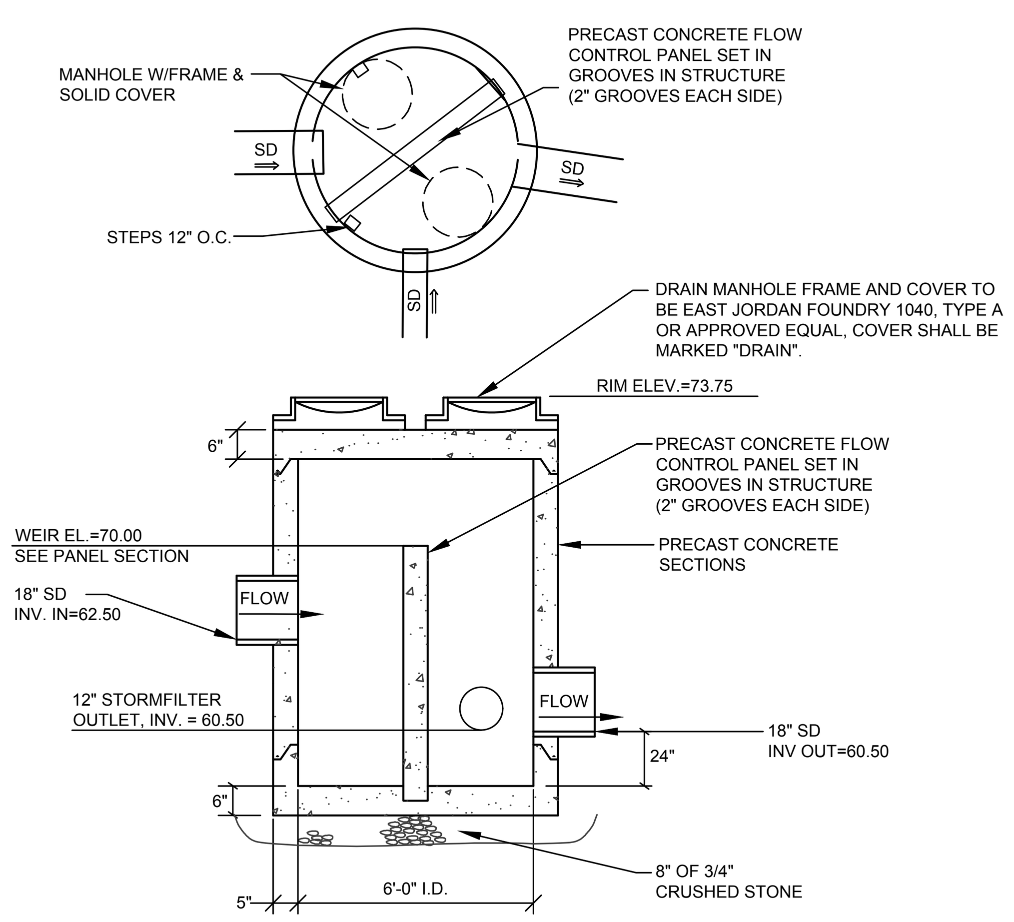
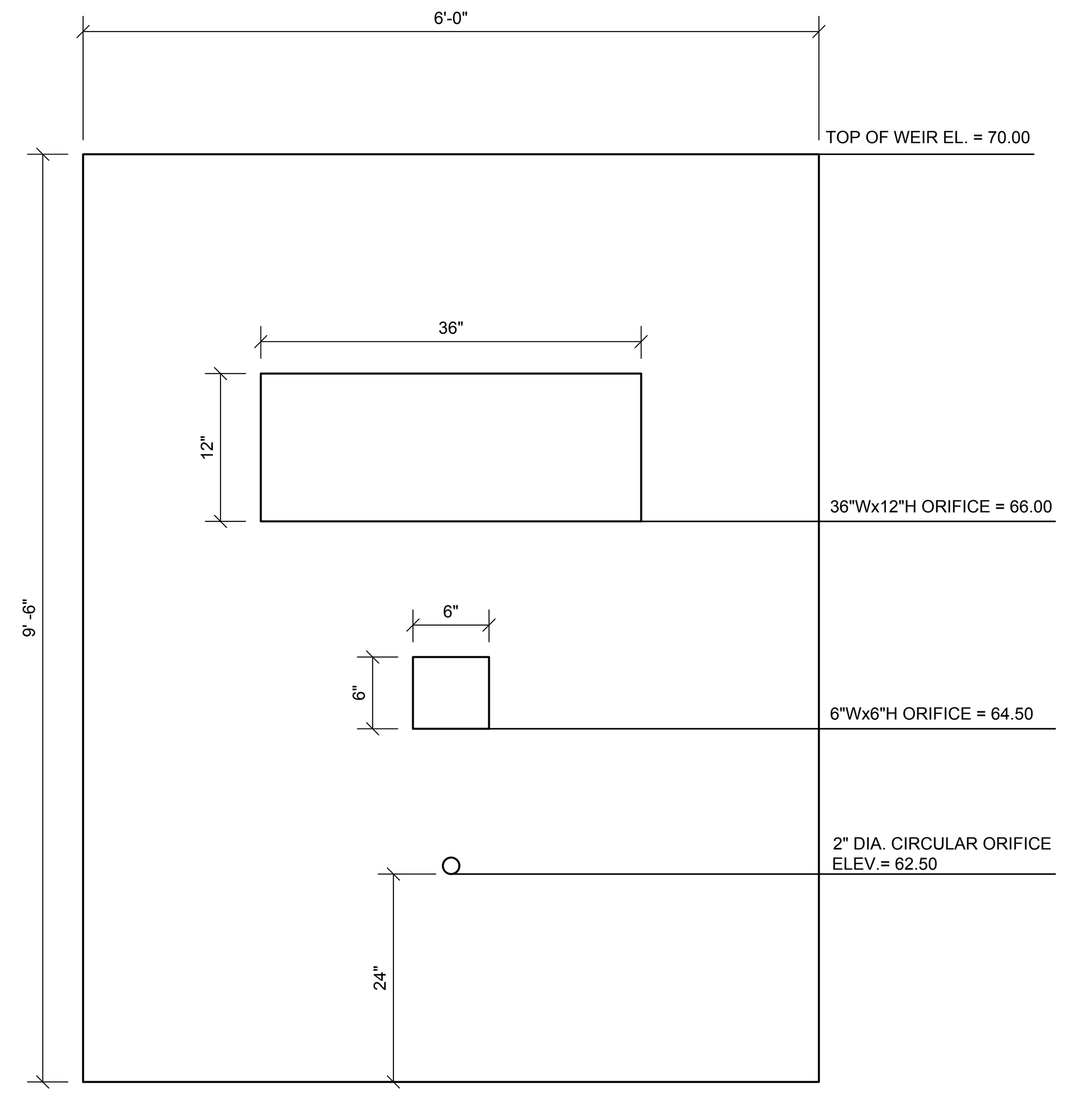
19059 D.dwg, TAB:C-504 Details



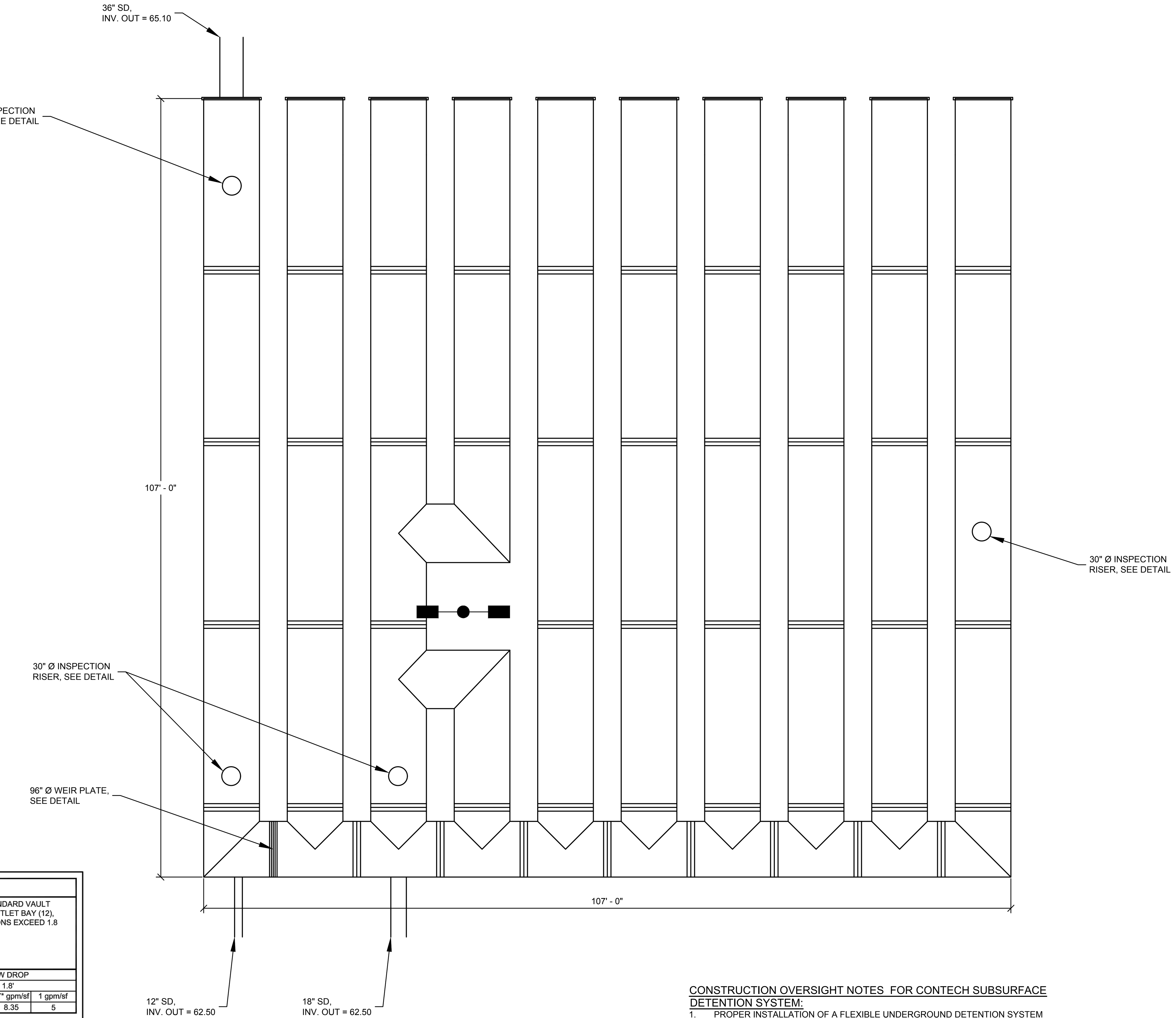
NOTES:
1. SUBMIT SHOP DRAWINGS FOR OWNER/ENGINEER APPROVAL.
2. STRUCTURE SHALL BE DESIGNED FOR H-20 LOADING.



PANEL SECTION

OUTLET CONTROL STRUCTURE (OCS-1)

NOT TO SCALE

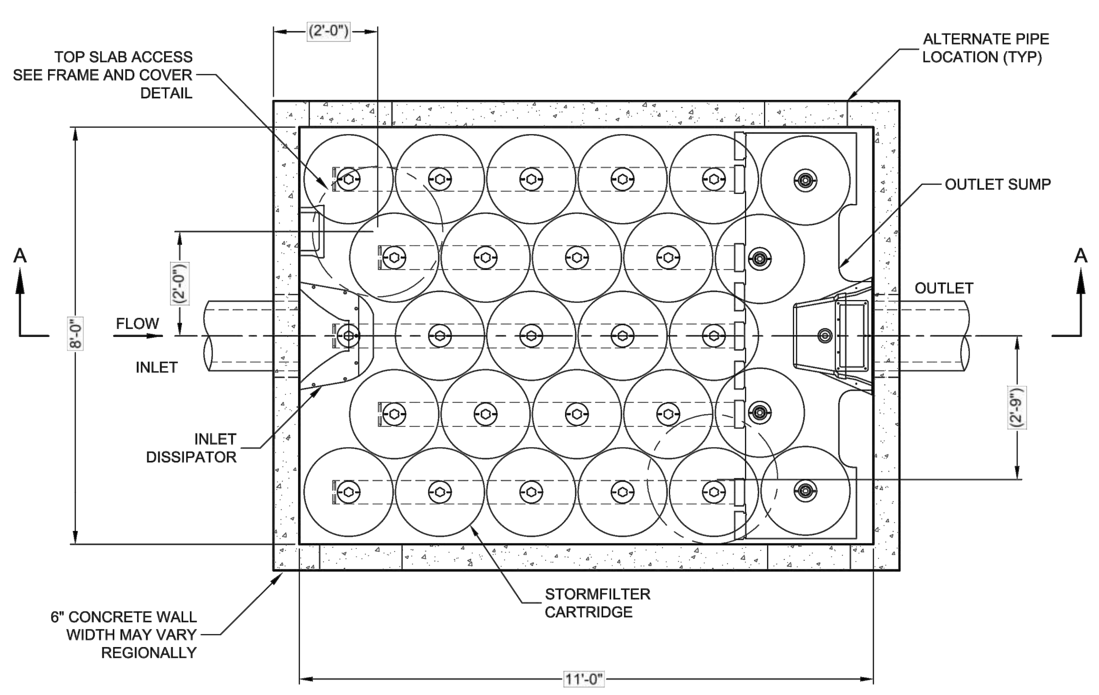


CONTECH SUBSURFACE DETENTION SYSTEM SF-1

NOT TO SCALE

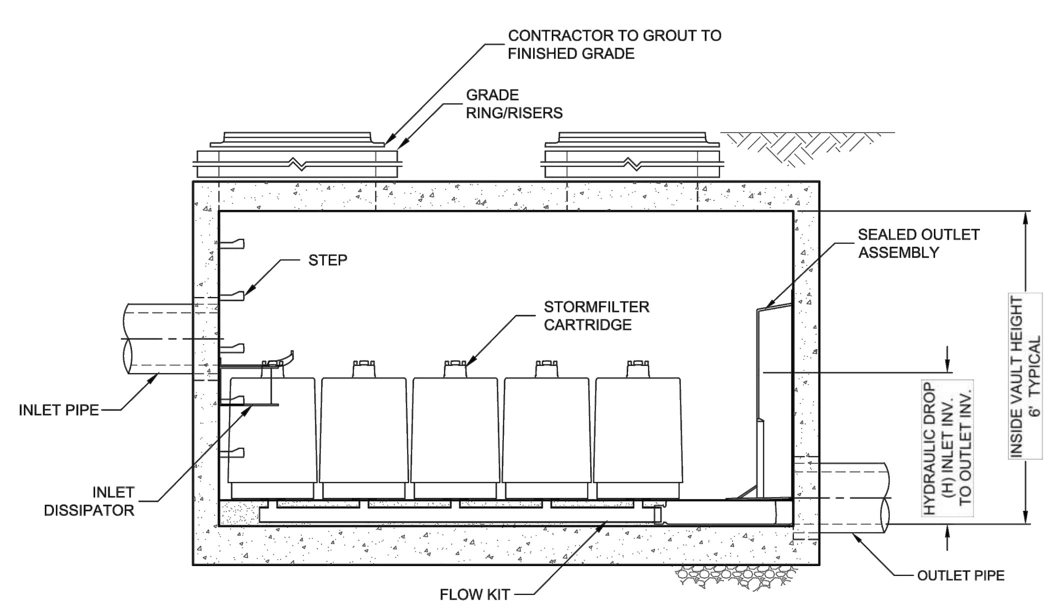
CONSTRUCTION OVERSIGHT NOTES FOR CONTECH SUBSURFACE DETENTION SYSTEM:

1. PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THE SUBMITTAL DRAWINGS, ARE APPROPRIATE FOR YOUR SITE.
2. INSPECTIONS BY A PROFESSIONAL ENGINEER SHALL CONSIST OF WEEKLY VISITS TO THE SITE TO INSPECT THE CONSTRUCTION AND STABILIZATION OF THE PROPOSED SUBSURFACE DETENTION SYSTEM TO BE BUILT ON THE SITE. INSPECTIONS SHALL CONSIST OF AN APPROPRIATE NUMBER OF VISITS TO THE SITE TO INSPECT THE INSTALLATION OF THE SUBSURFACE DETENTION SYSTEM CONSTRUCTION FROM INITIAL GROUND DISTURBANCE TO BACKFILL OVER THE SYSTEM.



PLAN VIEW

VAULT STYLE: OUTLET SUMP (NIB)



SECTION A-A

The Stormwater Management StormFilter®

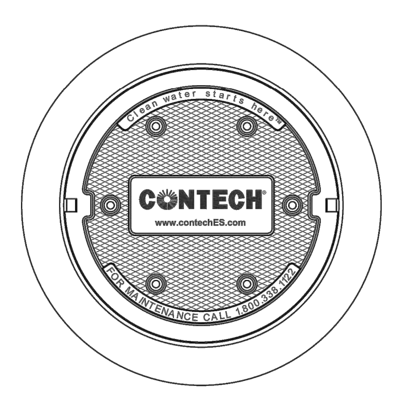
STORMFILTER DESIGN NOTES

STORMFILTER TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE SELECTION AND THE NUMBER OF CARTRIDGES. THE STANDARD VAULT STYLE IS SHOWN WITH THE MAXIMUM NUMBER OF CARTRIDGES (26). VAULT STYLE OPTIONS INCLUDE INLET BAY (17), INLET BAY/OUTLET BAY (12), OUTLET BAY (21), FULL HEIGHT BAFFLE WALL (17). STORMFILTER 8X11 PEAK HYDRAULIC CAPACITY IS 1.8 CFS. IF THE SITE CONDITIONS EXCEED 1.8 CFS AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

CARTRIDGE SELECTION

CARTRIDGE HEIGHT	27"			18"			LOW DROP		
RECOMMENDED HYDRAULIC DROP (H)	3.05'			2.3'			1.8'		
SPECIFIC FLOW RATE (gpm/sf)	2 gpm/sf	1.67* gpm/sf	1 gpm/sf	2 gpm/sf	1.67* gpm/sf	1 gpm/sf	2 gpm/sf	1.67* gpm/sf	1 gpm/sf
CARTRIDGE FLOW RATE (gpm)	22.5	18.79	11.25	15	12.53	7.5	10	8.35	5

* 1.67 gpm/sf SPECIFIC FLOW RATE IS APPROVED WITH PHOSPHOSORB® (PSORB) MEDIA ONLY



FRAME AND COVER

(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	*
WATER QUALITY FLOW RATE (cfs)	*
PEAK FLOW RATE (cfs)	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
CARTRIDGE HEIGHT (27", 18", LOW DROP(LD))	*
NUMBER OF CARTRIDGES REQUIRED	*
CARTRIDGE FLOW RATE	*
MEDIA TYPE (PERLITE, ZPG, PSORB)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE #1	*	*	*
INLET PIPE #2	*	*	*
OUTLET PIPE	*	*	*

UPSTREAM RIM ELEVATION	*
DOWNSTREAM RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

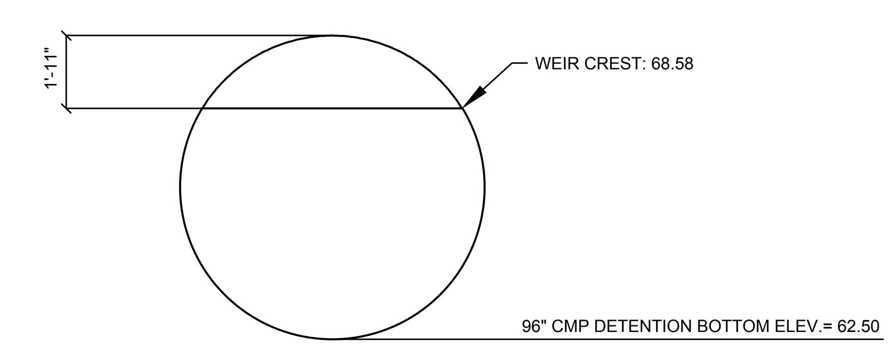
* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR SITE SPECIFIC DRAWINGS WITH DETAILED VAULT DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
4. STORMFILTER WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 5' AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
6. FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF CLEANING. RADIAL MEDIA DEPTH SHALL BE 7-INCHES. FILTER MEDIA CONTACT TIME SHALL BE AT LEAST 38 SECONDS.
7. SPECIFIC FLOW RATE IS EQUAL TO THE FILTER TREATMENT CAPACITY (gpm) DIVIDED BY THE FILTER CONTACT SURFACE AREA (sq ft).
8. STORMFILTER STRUCTURE SHALL BE PRECAST CONFORMING TO ASTM C-857 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER VAULT (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL VAULT SECTIONS AND ASSEMBLE VAULT.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH OUTLET PIPE INVERT WITH OUTLET BAY FLOOR.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.

CONTECH® ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

SF0811
STORMFILTER
STANDARD DETAIL



96" Ø WEIR PLATE DETAIL

NOT TO SCALE

AMY BELL SEGAL RLA 2265

OWENS A. MCCULLOUGH PE 7122

STATE OF MAINE OWENS A. MCCULLOUGH No. 7122 LICENSED PROFESSIONAL ENGINEER

REV:	BY:	DATE:	STATUS:
F	OAM	11/15/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
E	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
D	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
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75 John Roberts Rd.
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SITE DETAILS
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
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FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	N/A
PROJECT	19059

SHEET C-505

19059 D.dwg, TAB:C-505 Details

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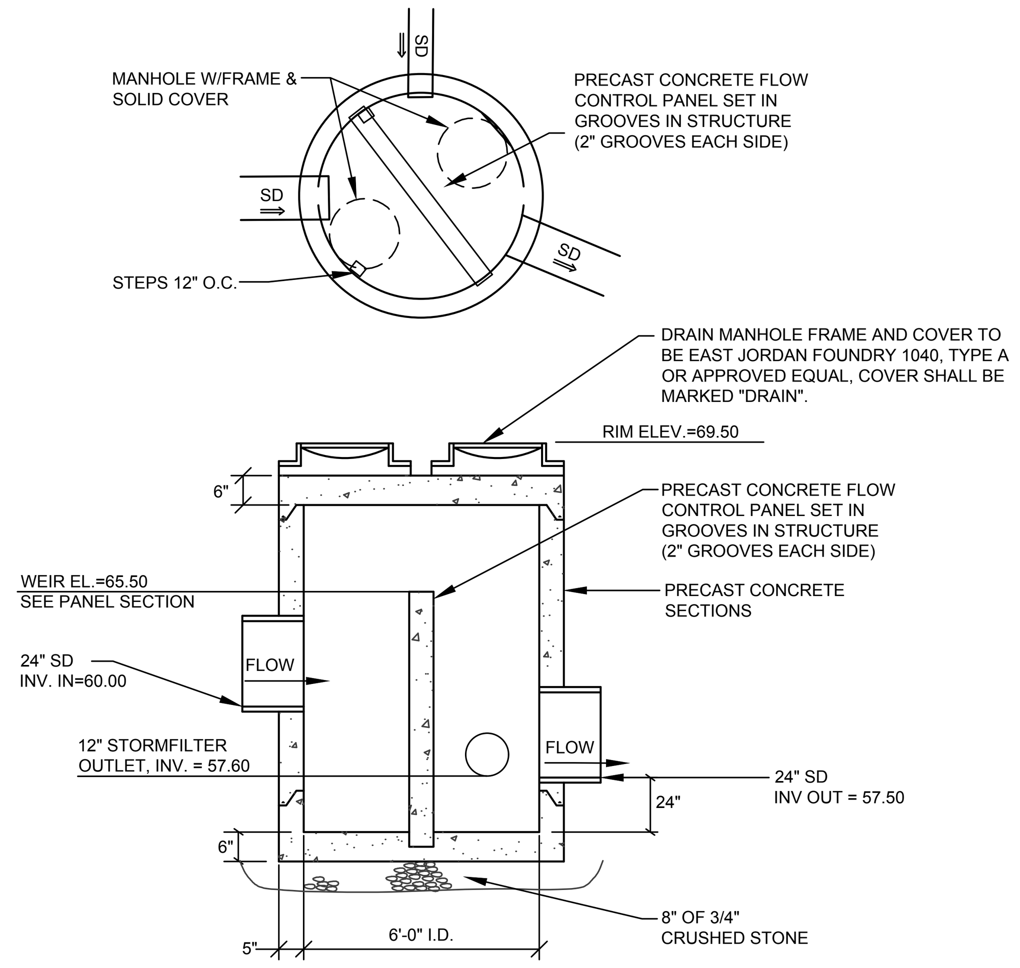
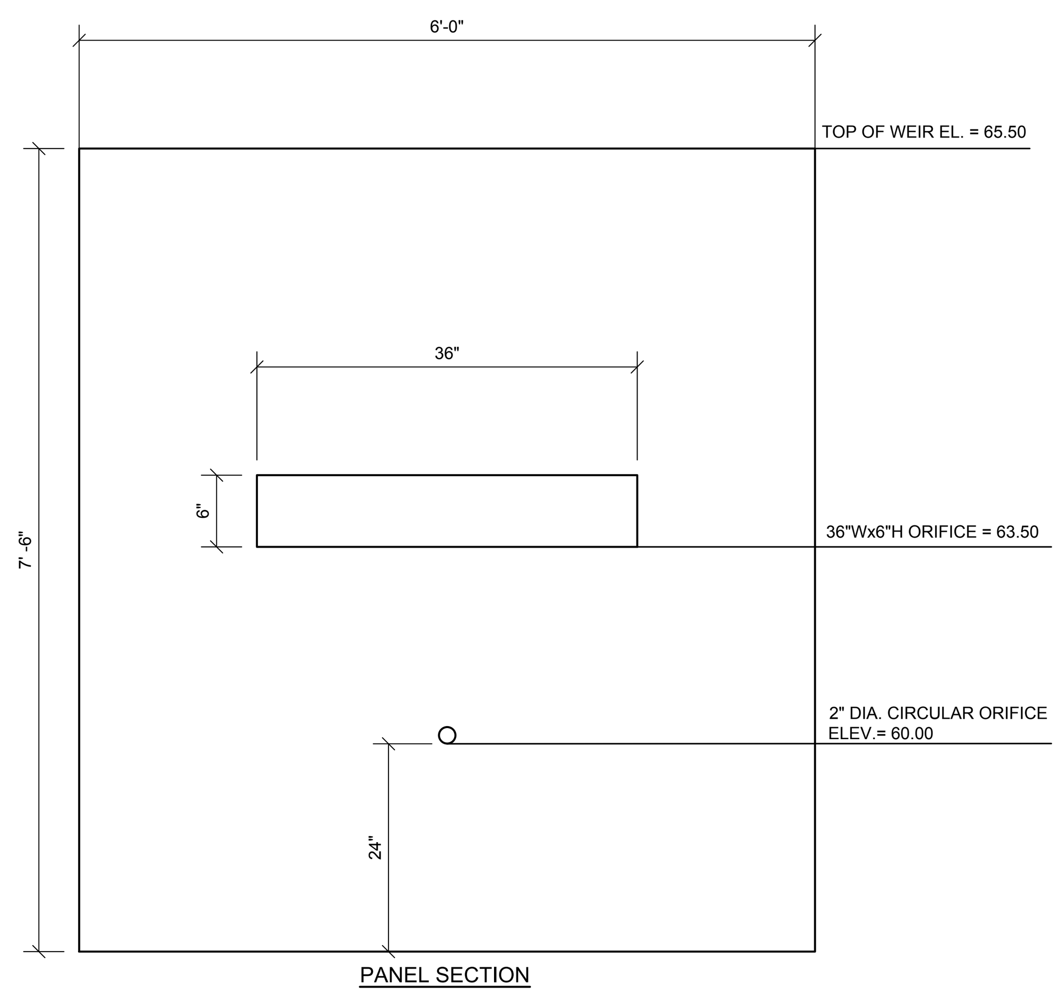


NOTES:
1. SUBMIT SHOP DRAWINGS FOR OWNER/ENGINEER APPROVAL.
2. STRUCTURE SHALL BE DESIGNED FOR H-20 LOADING.



OUTLET CONTROL STRUCTURE (OCS-2)

NOT TO SCALE

CONSTRUCTION OVERSIGHT NOTES FOR CONTECH SUBSURFACE DETENTION SYSTEM:

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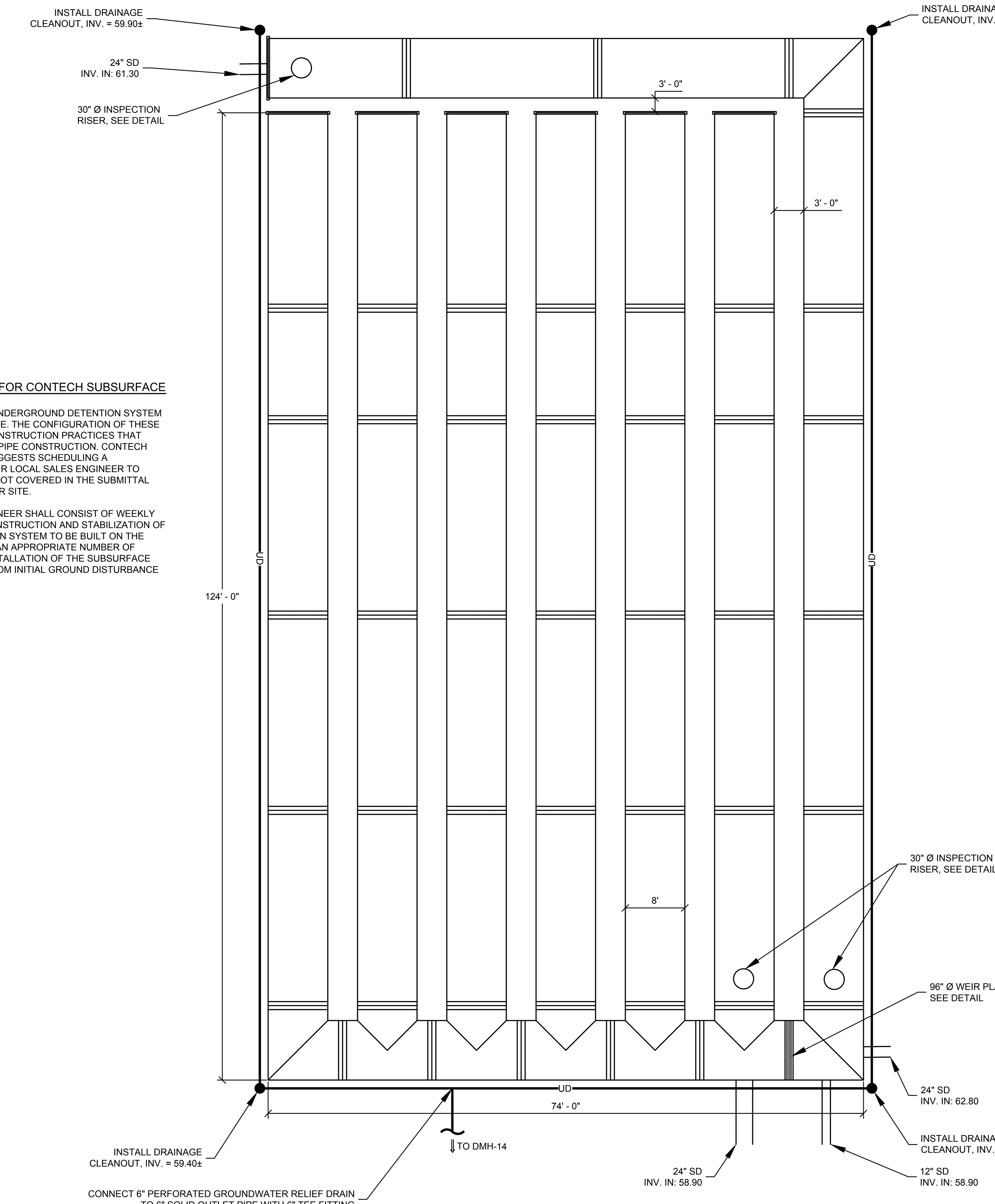
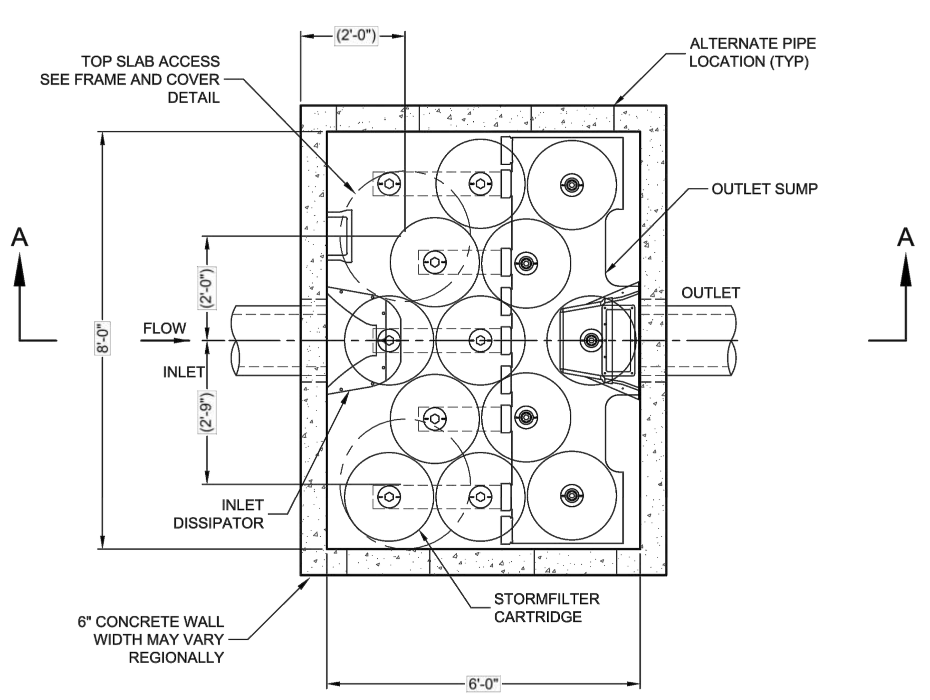
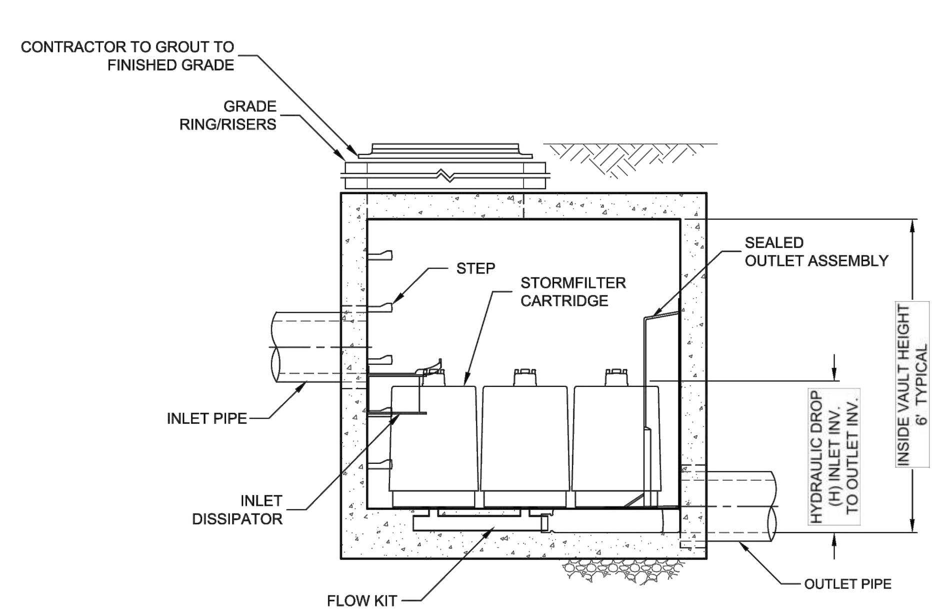


CONTECH SUBSURFACE DETENTION SYSTEM SF-2

NOT TO SCALE



SECTION B-B
VAULT STYLE: OUTLET SUMP (NIB)



SECTION A-A

The Stormwater Management StormFilter®

I:\STORMWATER\COMMOPS\10 STORMFILTER\40 STANDARD DRAWINGS\VAULT\DWG\SF0806-DTL SEALED OUTLET RISER.DWG 9/30/2021 2:58 PM

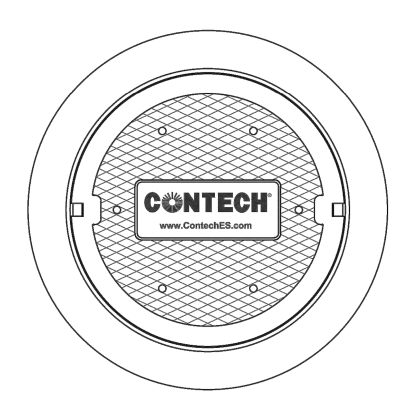
STORMFILTER DESIGN NOTES

STORMFILTER TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE SELECTION AND THE NUMBER OF CARTRIDGES. THE STANDARD VAULT STYLE IS SHOWN WITH THE MAXIMUM NUMBER OF CARTRIDGES (12). VAULT STYLE OPTIONS INCLUDE OUTLET BAY (7). STORMFILTER 8X6 PEAK HYDRAULIC CAPACITY IS 1.8 CFS. IF THE SITE CONDITIONS EXCEED 1.8 CFS AN UPSTREAM BYPASS STRUCTURE IS REQUIRED

CARTRIDGE SELECTION

CARTRIDGE HEIGHT	27"			18"			LOW DROP		
RECOMMENDED HYDRAULIC DROP (H)	3.05'			2.3'			1.8'		
SPECIFIC FLOW RATE (gpm/sf)	2 gpm/sf	1.67* gpm/sf	1 gpm/sf	2 gpm/sf	1.67* gpm/sf	1 gpm/sf	2 gpm/sf	1.67* gpm/sf	1 gpm/sf
CARTRIDGE FLOW RATE (gpm)	22.5	18.79	11.25	15	12.53	7.5	10	8.35	5

* 1.67 gpm/sf SPECIFIC FLOW RATE IS APPROVED WITH PHOSPHOSORB® (PSORB) MEDIA ONLY



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

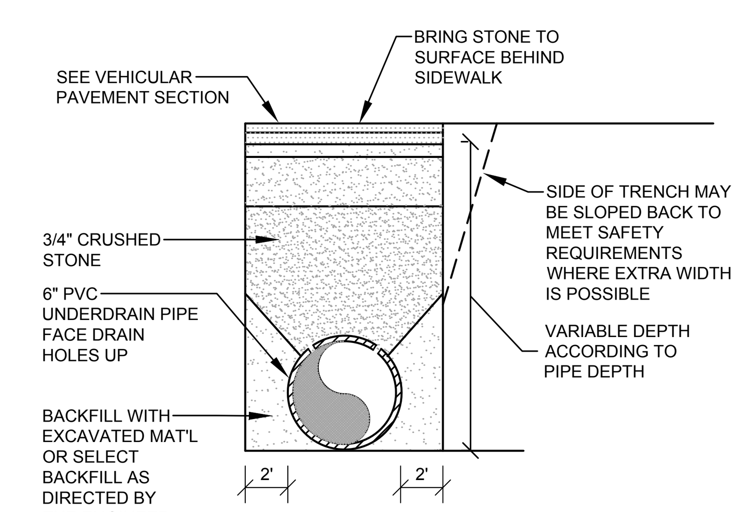
STRUCTURE ID			*
WATER QUALITY FLOW RATE (cfs)			*
PEAK FLOW RATE (cfs)			*
RETURN PERIOD OF PEAK FLOW (yrs)			*
CARTRIDGE HEIGHT (27", 18", LOW DROP(LD))			*
NUMBER OF CARTRIDGES REQUIRED			*
CARTRIDGE FLOW RATE			*
MEDIA TYPE (PERLITE, ZPG, PSORB)			*
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE #1	*	*	*
INLET PIPE #2	*	*	*
OUTLET PIPE	*	*	*
UPSTREAM RIM ELEVATION			*
DOWNSTREAM RIM ELEVATION			*
ANTI-FLOTATION BALLAST		WIDTH	HEIGHT
		*	*
NOTES/SPECIAL REQUIREMENTS:			
* PER ENGINEER OF RECORD			

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR SITE SPECIFIC DRAWINGS WITH DETAILED VAULT DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
4. STORMFILTER WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 5' AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
6. FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF CLEANING. RADIAL MEDIA DEPTH SHALL BE 7-INCHES. FILTER MEDIA CONTACT TIME SHALL BE AT LEAST 38 SECONDS.
7. SPECIFIC FLOW RATE IS EQUAL TO THE FILTER TREATMENT CAPACITY (gpm) DIVIDED BY THE FILTER CONTACT SURFACE AREA (sq ft).
8. STORMFILTER STRUCTURE SHALL BE PRECAST CONFORMING TO ASTM C-857 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER VAULT (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL VAULT SECTIONS AND ASSEMBLE VAULT.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH OUTLET PIPE INVERT WITH OUTLET BAY FLOOR.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.

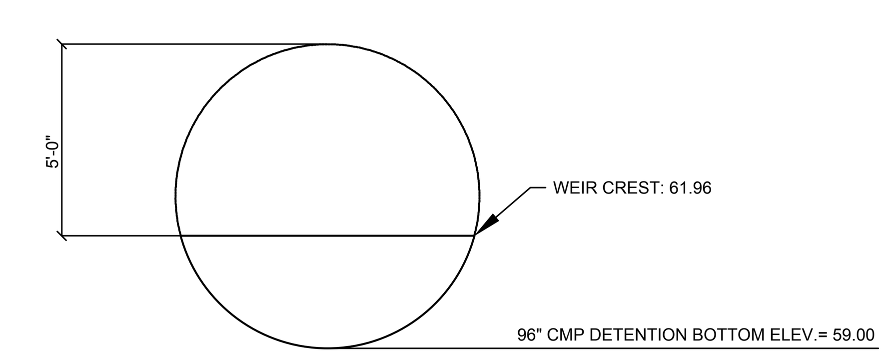
CONTECH® ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

SF806
STORMFILTER
STANDARD DETAIL



GROUNDWATER RELIEF DRAIN

NOT TO SCALE



96" Ø WEIR PLATE DETAIL

NOT TO SCALE

AMY BELL SEGAL RLA 2265

OWENS A. MCCULLOUGH PE 7122

STATE OF MAINE — OWENS A. McCULLOUGH No. 7122 — LICENSED PROFESSIONAL ENGINEER

REV:	BY:	DATE:	STATUS:
F	OAM	11/15/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
E	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
D	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
C	PDO	05/28/2024	OVERALL GRADING PLAN REISSUED TO MAINE DEP AND ACOE
B	PDO	03/18/2024	ISSUED TO CITY FOR MAJOR SITE PLAN AMENDMENT
A	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

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

SITE DETAILS

OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102

FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	N/A
PROJECT	19059

SHEET C-506

19059 D.dwg, TAB:C-506 Details

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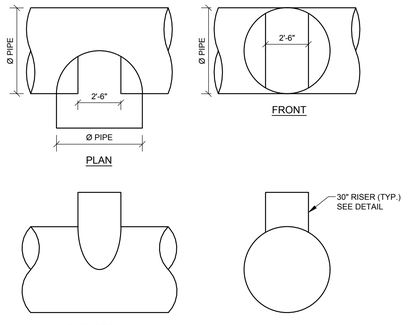
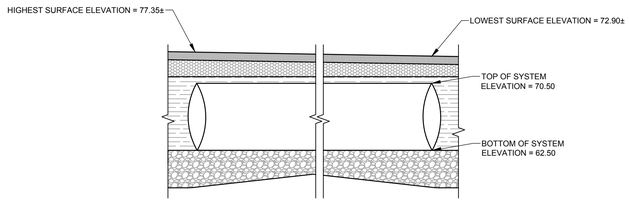


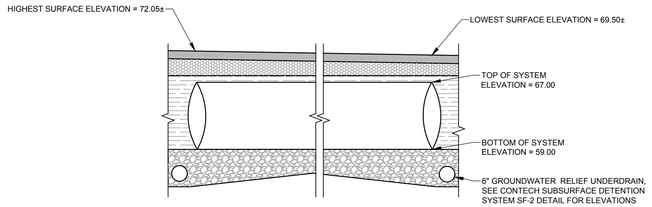
NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.

NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.

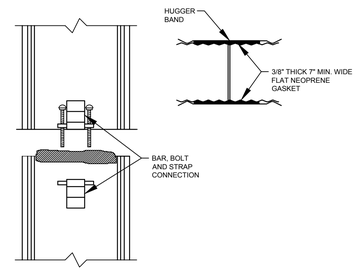
INSPECTION RISER DETAIL
NOT TO SCALE



SUBSURFACE DETENTION 1
SECTION VIEW



SUBSURFACE DETENTION 2
SECTION VIEW

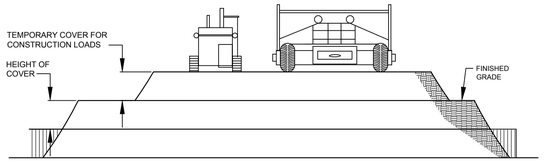


CONNECTION DETAIL SINGLE BOLT, BAR AND STRAP

NOTES

1. BANDS ARE NORMALLY FURNISHED AS FOLLOWS:
   12" THRU 48", 1-PIECE
   54" THRU 96", 2-PIECE
   102" THRU 144", 3-PIECES
2. BAND FASTENERS ARE ATTACHED WITH SPOT WELDS, RIVETS OR HAND WELDS
3. REROLLED ANNULAR END CORRUGATIONS ARE NORMALLY 2 2/3" x 1/2". DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES

12" HUGGER BAND DETAIL
NOT TO SCALE



CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM
NOT TO SCALE

(1) MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

FOUNDATION/BEDDING PREPARATION

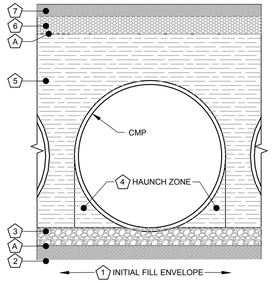
(2) PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION. THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

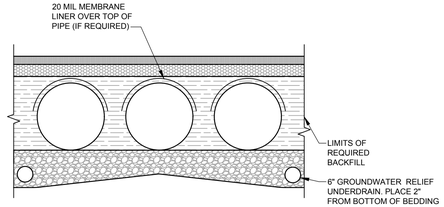
(4) HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMLY COMPACTED WITHOUT SOFT SPOTS.

BACKFILL

WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT (16") DIFFERENTIAL BETWEEN ANY OF THE LENGTH OF THE DETENTION SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON THE PIPE.

OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.





DETENTION SYSTEMS - CMP DETENTION / CMP DRAINAGE

	MATERIAL LOCATION	DESCRIPTION	MATERIAL DESIGNATION	DESIGNATION
7	RIGID OR FLEXIBLE PAVEMENT (IF APPLICABLE)			
6	ROAD BASE (IF APPLICABLE)			
A	GEOTEXTILE LAYER	NON-WOVEN GEOTEXTILE	CONTECT C-40 OR C-45	ENGINEER DECISION FOR CONSIDERATION TO PREVENT SOIL MIGRATION INTO VARYING SOIL TYPES
5	BACKFILL	WELL GRADED GRANULAR MATERIAL WHICH MAY CONTAIN SMALL AMOUNTS OF SILT OR CLAY.	AASHTO M 145- A-1, A-2, A-3	PLACED IN 8" ± LOOSE LIFTS AND COMPACTED TO 90% STANDARD PROCTOR PER AASHTO T 99
3	BEDDING STONE	WELL GRADED GRANULAR BEDDING MATERIAL WITH MAXIMUM PARTICLE SIZE OF 3"	AASHTO M43- 3, 357, 4, 467, 5, 56, 57	ENGINEER TO DETERMINE IF BEDDING IS REQUIRED. PIPE MAY BE PLACED ON THE TRENCH BOTTOM OF A RELATIVELY LOOSE, NATIVE SUITABLE WELL GRADED AND GRANULAR MATERIAL. FOR ARCH PIPES IT IS RECOMMENDED TO BE SHAPED TO A RELATIVELY FLAT BOTTOM OR FINE-GRADE THE FOUNDATION TO A SLIGHT V-SHAPE. UNSUITABLE MATERIAL SHOULD BE OVER-EXCAVATED AND RE-PLACED WITH A 4"-6" LAYER OF WELL GRADED AND GRANULAR STONE PER THE MATERIAL DESIGNATION. SEE AASHTO 26.3.8.1/26.5.3 BEDDING INFO.
A	GEOTEXTILE LAYER	NON-WOVEN GEOTEXTILE	CONTECH C-40 OR C-45	ENGINEER DECISION FOR CONSIDERATION TO PREVENT SOIL MIGRATION INTO VARYING SOIL TYPES
	NOTE: BACKFILL USING CONTROLLED LOW-STRENGTH MATERIAL (CLSM, "FLASH FILL" OR "FLOWABLE FILL") WHEN THE SPACING BETWEEN THE PIPES WILL NOT ALLOW FOR PLACEMENT AND ADEQUATE COMPACTION OF THE BACKFILL.			

DETENTION SYSTEM
NOT TO SCALE

SPECIFICATION FOR CORRUGATED STEEL PIPE-ALUMINIZED TYPE 2 STEEL

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE CORRUGATED STEEL PIPE (CSP) DETAILED IN THE PROJECT PLANS.

MATERIAL
THE ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M274 OR ASTM A929.

PIPE
THE CSP SHALL BE MANUFACTURED IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF AASHTO M36 OR ASTM A760. THE PIPE SIZES, GAGES AND CORRUGATIONS SHALL BE AS SHOWN ON THE PROJECT PLANS.

ALL FABRICATION OF THE PRODUCT SHALL OCCUR WITHIN THE UNITED STATES.

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH RECOMMENDATIONS OF THE NATIONAL CORRUGATED STEEL PIPE ASSOCIATION (NCSPA)

INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II OR ASTM A798 AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

MATERIAL SPECIFICATION
NOT TO SCALE

AMY BELL SEGAL, RLA 2265

OWENS A. MCCULLOUGH PE 7122
STATE OF MAINE
OWENS A. MCCULLOUGH
No. 7122
REGISTERED PROFESSIONAL ENGINEER

REV.	BY	DATE	STATUS
F.	OAM	11/15/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
E.	PDO	08/30/2024	RE-ISSUE TO CITY OF PORTLAND FOR MAJOR SITE PLAN AMENDMENT
D.	PDO	08/16/2024	SHEET C-507 REISSUED TO MAINE DEP
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A.	PDO	02/29/2024	ISSUE TO MDEP FOR SLODA / NRPA PERMIT APPLICATION

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SITE DETAILS
OF:
PORTLAND INTERNATIONAL JETPORT PARKING EXPANSION
1001 WESTBROOK STREET
PORTLAND, MAINE 04102
FOR:
PORTLAND INTERNATIONAL JETPORT PWM
CITY OF PORTLAND
1001 WESTBROOK STREET PORTLAND, MAINE 04102

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

DESIGNED	TFG
DRAWN	EPR
CHECKED	PDO
DATE	02/29/2024
SCALE	N/A
PROJECT	19059

SHEET C-507

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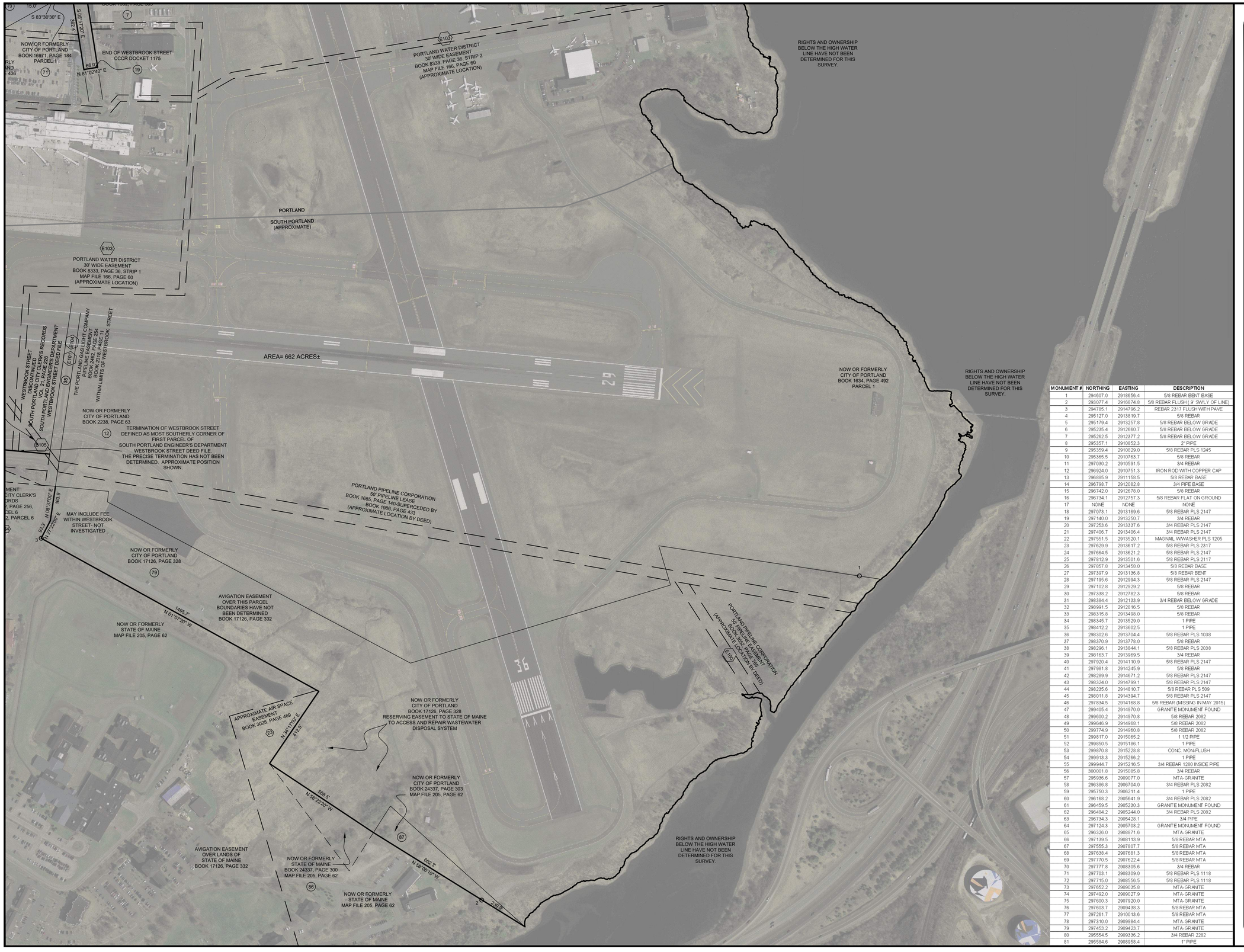
19059 D.dwg - TAB:C-507 Details



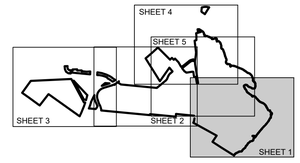
MONUMENT #	NORTHING	EASTING	DESCRIPTION
1	294607.0	2918656.4	5/8 REBAR BENT BASE
2	293077.4	2916874.8	5/8 REBAR FLUSH (9' SWLY OF LINE)
3	294785.1	2914796.2	REBAR 2317 FLUSH WITH PAVE
4	295127.0	2913819.7	5/8 REBAR
5	295179.4	2913257.8	5/8 REBAR BELOW GRADE
6	295235.4	2912660.7	5/8 REBAR BELOW GRADE
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 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	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	297861.8	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	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	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	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	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

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 7-9-2018, 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 20220126.DWG

DATE: JANUARY 26, 2022

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

MONUMENT #	NORTHING	EASTING	DESCRIPTION
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	2912816.5	5/8 REBAR
33	298315.8	2913488.0	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	298299.9	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

MONUMENT #	NORTHING	EASTING	DESCRIPTION
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	MT A GRANITE
58	296388.8	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 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

NOTES

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2. NO MONUMENTS WERE SET AS OF THE DATE OF THIS PLAN.
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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 (HWY) — HIGHWAY MONUMENT FOUND WITH REFERENCE NUMBER
- 64 □ — STONE/GRANITE FOUND WITH REFERENCE NUMBER
- EASEMENT BOUNDARY
- PROPERTY LINE
- INTERIOR PARCEL BOUNDARY
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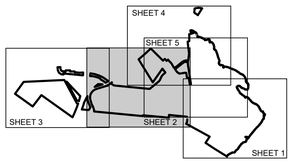
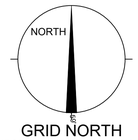


SHEET INDEX

NOT TO SCALE



GRID NORTH

MAINE COORDINATE SYSTEM OF 1983 (2011)
WEST ZONE

SCALE: 1"= 200'

200' 0 200' 400' 600' 800'

SURVEY STANDARD

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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

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FOR

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LAND SURVEYING • DEED RESEARCH
109 MAIN STREET
BELFAST, ME 04915
(207) 338-5743

DWG: 14078 MASTER PLAN 20220126.DWG

DATE: JANUARY 26, 2022

SCALE: 1"=200'

SHEET: 2 OF 5

MONUMENT #	NORTHING	EASTING	DESCRIPTION
1	294607.0	2916656.4	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
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   389 CONGRESS ST.
   PORTLAND, MAINE 04101

LEGEND

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- 79 (H) — HIGHWAY MONUMENT FOUND WITH REFERENCE NUMBER
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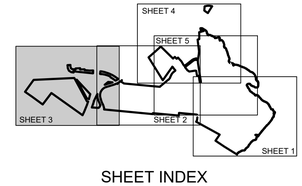

SHEET INDEX
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73	297652.2	2909035.8	MT A-GRANITE
74	297492.0	2909027.9	MT A-GRANITE
75	297600.3	2907920.0	MT A-GRANITE
76	297603.7	2909438.3	5/8 REBAR MT A
77	297261.7	2910013.6	5/8 REBAR MT A
78	297310.0	2909984.4	MT A-GRANITE
79	297453.2	2909423.7	MT A-GRANITE
80	295554.5	2909336.2	3/4 REBAR 2282
81	295584.6	2908958.4	1" PIPE

NOTES

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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.
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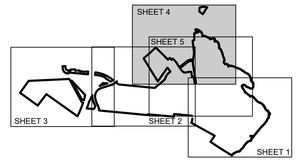
5. AERIAL PHOTOGRAPHY SHOWN WAS TAKEN IN 2015.
6. CURRENT OWNER: CITY OF PORTLAND
   389 CONGRESS ST.
   PORTLAND, MAINE 04101

LEGEND

- 1 — MONUMENT FOUND WITH REFERENCE NUMBER
- 79 (H) — 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 7-9-2018, 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

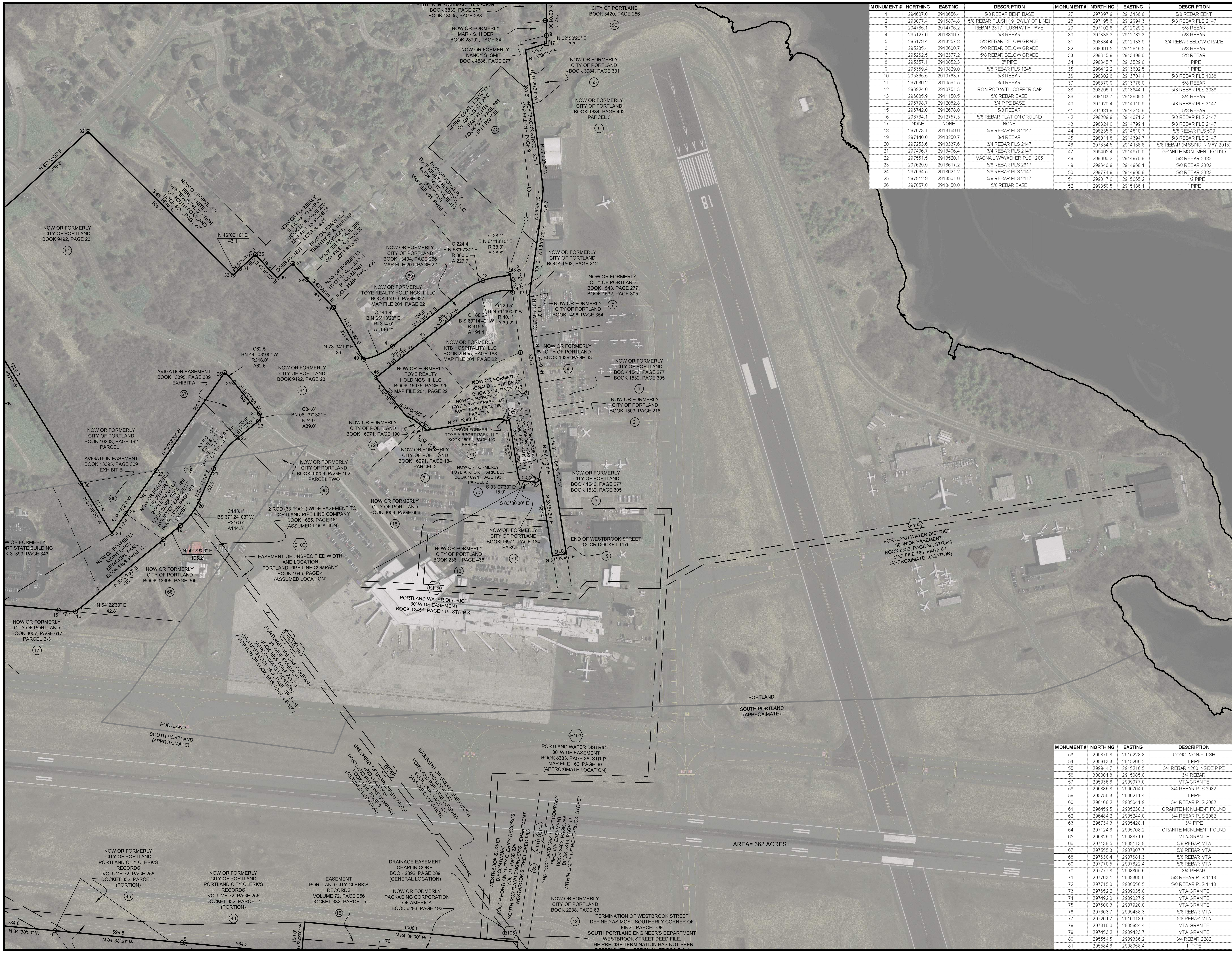
GOOD DEEDS
LAND SURVEYING • DEED RESEARCH
109 MAIN STREET
BELFAST, ME 04915
(207) 338-5743

DWG: 14078 MASTER PLAN 20220126.DWG

DATE: JANUARY 26, 2022

SCALE: 1"=200'

SHEET: 4 OF 5



MONUMENT #	NORTHING	EASTING	DESCRIPTION	MONUMENT #	NORTHING	EASTING	DESCRIPTION
1	294607.0	2918656.4	5/8 REBAR BENT BASE	27	297397.9	2913136.8	5/8 REBAR BENT
2	293077.4	2916874.8	5/8 REBAR FLUSH (.9' SW'LY OF LINE)	28	297195.6	2912994.3	5/8 REBAR PLS 2147
3	294785.1	2914796.2	REBAR 2317 FLUSH WITH PAVE	29	297102.8	2912929.2	5/8 REBAR
4	295127.0	2913819.7	5/8 REBAR	30	297338.2	2912782.3	5/8 REBAR
5	295179.4	2913257.8	5/8 REBAR BELOW GRADE	31	298384.4	2912133.9	3/4 REBAR BELOW GRADE
6	295235.4	2912660.7	5/8 REBAR BELOW GRADE	32	298991.5	2912816.5	5/8 REBAR
7	295262.5	2912377.2	5/8 REBAR BELOW GRADE	33	298315.8	2913498.0	5/8 REBAR
8	295357.1	2910852.3	2" PIPE	34	298345.7	2913529.0	1 PIPE
9	295359.4	2910829.0	5/8 REBAR PLS 1245	35	298412.2	2913602.5	1 PIPE
10	295365.5	2910763.7	5/8 REBAR	36	298302.6	2913704.4	5/8 REBAR PLS 1038
11	297030.2	2910591.5	3/4 REBAR	37	298370.9	2913778.0	5/8 REBAR
12	296924.0	2910751.3	IRON ROD WITH COPPER CAP	38	298296.1	2913844.1	5/8 REBAR PLS 2038
13	296885.9	2911158.5	5/8 REBAR BASE	39	298163.7	2913969.5	3/4 REBAR
14	296798.7	2912082.8	3/4 PIPE BASE	40	297920.4	2914110.9	5/8 REBAR PLS 2147
15	296742.0	2912678.0	5/8 REBAR	41	297981.8	2914245.9	5/8 REBAR
16	296734.1	2912757.3	5/8 REBAR FLAT ON GROUND	42	298289.9	2914671.2	5/8 REBAR PLS 2147
17	NONE	NONE	NONE	43	298324.0	2914799.1	5/8 REBAR PLS 2147
18	297073.1	2913169.6	5/8 REBAR PLS 2147	44	298235.6	2914810.7	5/8 REBAR PLS 509
19	297140.0	2913250.7	3/4 REBAR	45	298011.8	2914394.7	5/8 REBAR PLS 2147
20	297253.6	2913337.6	3/4 REBAR PLS 2147	46	297834.5	2914168.8	5/8 REBAR (MISSING IN MAY 2015)
21	297406.7	2913406.4	3/4 REBAR PLS 2147	47	299405.4	2914970.0	GRANITE MONUMENT FOUND
22	297551.5	2913520.1	MAGNAIL W/WASHER PLS 1205	48	299600.2	2914970.8	5/8 REBAR 2082
23	297629.9	2913617.2	5/8 REBAR PLS 2317	49	299646.9	2914968.1	5/8 REBAR 2082
24	297664.5	2913621.2	5/8 REBAR PLS 2147	50	299774.9	2914960.8	5/8 REBAR 2082
25	297812.9	2913501.6	5/8 REBAR PLS 2117	51	299817.0	2915065.2	1 1/2 PIPE
26	297857.8	2913458.0	5/8 REBAR BASE	52	299850.5	2915186.1	1 PIPE

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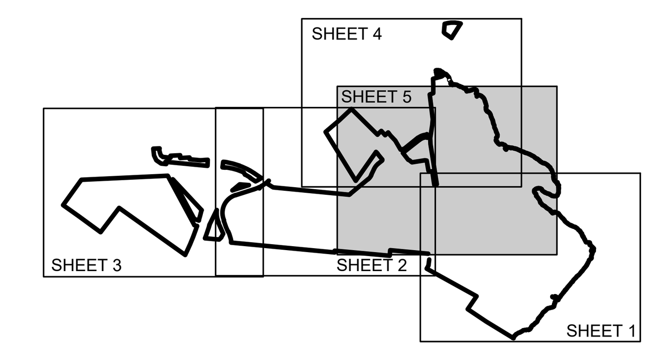

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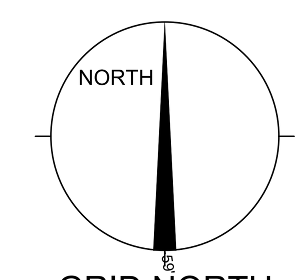

GRID NORTH
MAINE COORDINATE SYSTEM OF 1983 (2011)
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200' 0 200' 400' 600' 800'

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CLARK G. STAPLES, MAINE LICENSED
PROFESSIONAL LAND SURVEYOR No. 2332

STATE OF MAINE · CLARK G. STAPLES · NO. 2332 · PROFESSIONAL LAND SURVEYOR

MONUMENT #	NORTHING	EASTING	DESCRIPTION
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	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	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
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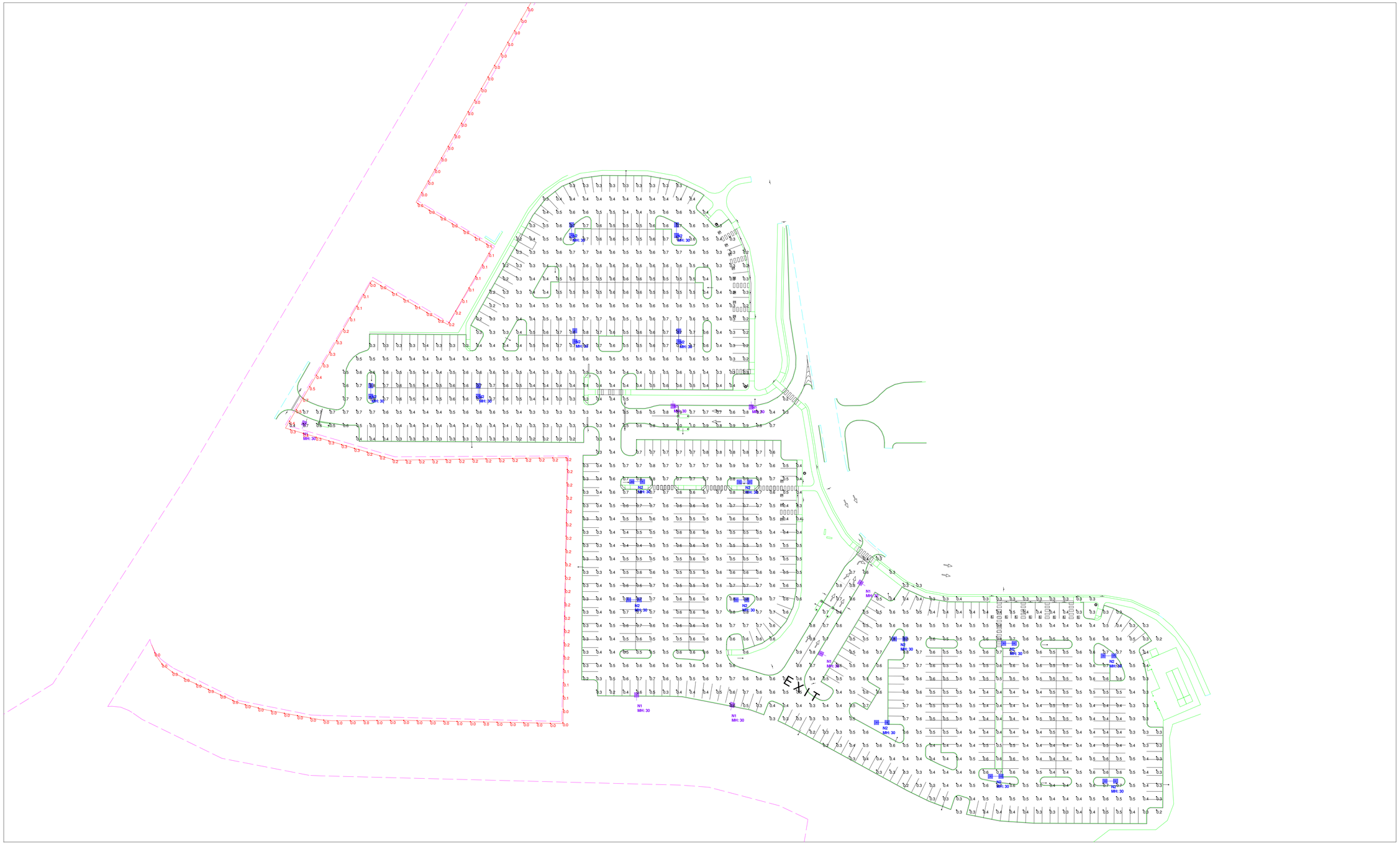
79	297453.2	2909423.7	MTA-GRANITE
80	295554.5	2909336.2	3/4 REBAR 2282
81	295584.6	2908958.4	1" PIPE

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 20220126.DWG
DATE: JANUARY 26, 2022
SCALE: 1"=200'
SHEET: 5 OF 5



Scale: 1 inch= 50.00 Ft.

Luminaire Schedule

Symbol	Qty	Label	LLF	Description	Lum. Watts
	7	N1	0.850	NV-1-T4L-16L-1-30K7-SINGLE	56
	16	N2	0.850	NV-1-T5QW-32L-530-30K7-TWIN TUMED TO 39W	39

Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
PROPERTY LINE	Illuminance	Fc	0.09	0.7	0.0	N.A.	N.A.
SITE CALCS	Illuminance	Fc	0.50	1.0	0.2	2.50	5.00

NLS LIGHTING

Date:11/14/2024

PROJECT:

PORTLAND MAINE INTERNATIONAL JETPORT EXPANSION

CHARRON REFLEX LIGHTING

Drawing:

Photometric Study

Brandon Mazer, Chair
Justin Barker, Vice Chair
Maggie Stanley
Marpheen Chann
Sean Murphy
David Silk
Austin Smith

November 26, 2024

Paul Bradbury
Portland International Jetport
1001 Westbrook Street
Portland, ME 04102

Project Name:	Major Site Plan
Project ID:	PL-002853-2024
Address:	1001 Westbrook Street
CBL:	447 A001001
Applicant:	Portland International Jetport
Planner:	Zach Powell

Dear Paul Bradbury:

On November 26, 2024, the Planning Board approved a major site plan project at 1001 Westbrook Street to facilitate the expansion of an existing short-term paved parking lot and unpaved surface parking area to create a paved parking lot with 667 long-term parking spaces and installation of a 1.9-megawatt storage system. The property is located in the A-B Airport Business Zone. Based on the information provided to the Board in the application, plans, reports, through testimony and other information submitted by the applicant, the Planning Board [adopts/does not adopt] the findings, conclusions and recommendations contained in the Planning Board Report for the public hearing on November 26, 2024, which is attached hereto and incorporated herein by reference. Based upon those findings, conclusions, and recommendations, the Planning Board found that the application met all relevant standards and voted [vote count] to approve the application with the following conditions as presented below.

A. WAIVERS

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 November 26, 2024 for application 002853-2024 at 1001 Westbrook Street relevant to the Site Plan Standards of the Land Use Code and the City of Portland's Technical Manual, and other regulations, and the testimony presented at the Planning Board hearing:

1. Sidewalks on Jetport Boulevard & Westbrook Street
   The Planning Board [finds/does not find] based upon the City's Review, that extraordinary conditions exist or undue hardship may result from strict compliance with §14.6.1(B)(3)(a) of the Land Use Code, which requires the installation of a sidewalk along all site frontages, that substantial justice and the public interest are secured with the proposed variation in this standard, and that variation is consistent with the intent of the ordinance. The Planning Board [waives/does not waive] §14.6.1(B)(3)(a) of the Land Use Code to allow for no sidewalk to be installed on Jetport Boulevard and Westbrook Street.

2. Impacts to Significant Natural Features

The Planning Board [finds/does not find] based upon the City's Review, that extraordinary conditions exist or undue hardship may result from strict compliance with §14.6.2(A)(1) of the Land Use Code which requires the preservation and protection of significant natural features through incorporation into the site design, that substantial justice and the public interest are secured with the proposed variation in this standard, and that variation is consistent with the intent of the ordinance. The Planning Board [waives/does not waive] §14.6.2(A)(1) of the Land Use Code to allow the fill of ±11,151 square feet of wetlands.

3. Parking Lot Island Landscaping
   The Planning Board [finds/does not find] based upon the City's Review, that extraordinary conditions exist or undue hardship may result from strict compliance with §14.6.2(C)(3)(a) of the Land Use Code, which requires the planting of two trees (or one tree and three shrubs) per five parking spaces in landscaped islands, that substantial justice and the public interest are secured with the proposed variation in this standard, and that variation is consistent with the intent of the ordinance. The Planning Board [waives/does not waive] §14.6.2(C)(3)(a) of the Land Use Code to permit the planting of 24 trees in landscaped islands.

4. Minimum Parking Lot Island Width
   The Planning Board [finds/does not find] based upon the City's Review, that extraordinary conditions exist or undue hardship may result from strict compliance with §4.5.5 of the Technical Manual, which requires a minimum parking lot island width of 8 feet (not including curbing), that substantial justice and the public interest are secured with the proposed variation in this standard, and that variation is consistent with the intent of the ordinance. The Planning Board [waives/does not waive] §4.5.5 of the Technical Manual to allow for the installation of a landscaped island where a portion of the island is less than 8 feet in width (3.5 feet).

5. Direct Discharge of Treated Stormwater into Fore River
   The Planning Board [finds/does not find] based upon the City's Review, that extraordinary conditions exist or undue hardship may result from strict compliance with §5(III) of the Technical Manual which requires compliance with Chapter 500 Rules for Stormwater Management, that substantial justice and the public interest are secured with the proposed variation in this standard, and that variation is consistent with the intent of the ordinance. The Planning Board [waives/does not waive] §5(III) of the Technical Manual to allow the direct discharge of treated stormwater from the site into the Fore River.

B. 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 November 26, 2024 for application PL-002853-2024 at 1001 Westbrook Street 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 ISSUANCE OF A BUILDING PERMIT

1. The applicant shall submit evidence of approvals from Maine DEP for the Site Location of Development & NRPA applications associated with the project.
2. The applicant shall provide an ability to serve letter from Central Maine Power (CMP).
3. The Applicant shall submit an updated site plan set listed the materiality, height, and structural components of the proposed privacy fence screening the battery storage.

PRIOR TO ISSUANCE OF CERTIFICATE OF OCCUPANCY

1. The Applicant shall submit verification that Level 1 chargers for 56 parking spaces have been installed in the structured parking at the Jetport.
2. The applicant shall contribute to the tree fund in the amount of $400 per tree for 127 trees, for a total of $50,800 associated with the waiver for parking lot island landscaping or the applicant shall provide the Planning Authority with documentation that the additional 127 trees have been planted throughout the Jetport property.

C. PLANNING BOARD DECISION

On the basis of the findings, conclusions, and recommendations contained in the Planning Board report for the public hearing on November 26, 2024 related to application PL-002853-2024 for 1001 Westbrook Street, which is attached to the draft approval letter and incorporated therein, the Planning Board [adopts/does not adopt] the approval letter as drafted as the Planning Board's decision for application PL-002853-2024, and authorizes the Planning Board Chair to sign the approval letter as drafted.

The approval is based on the submitted plans and findings related to site plan review as contained in the Planning Board report dated November 22, 2024 for application PL-002853-2024 which is attached.

Standard Procedures

Note: The following standard procedures and requirements apply to all approved site plans:

1. Site Plan Expiration The site plan approval will be deemed to have expired unless work has commenced within one (1) year of the approval or within a time period up to three (3) years from the approval date as agreed upon in writing by the City and the applicant. Requests to extend approvals must be received before the one (1) year expiration date.

2. Separate Building Permits Are Required This approval does not constitute approval of building plans, which must be reviewed and approved by the City of Portland's Permitting and Inspections Department.

3. Performance Guarantee and Inspection Fees A performance guarantee covering the site improvements and an inspection fee payment of 2.0% of the guarantee amount and three (3) final sets of plans must be submitted to and approved by the Planning and Urban Development Department and Public Works Department prior to the release of a building permit, street opening permit or certificate of occupancy for site plans.

4. Construction Management Plans The applicant, contractor and subcontractors are required to conform to the approved Construction Management Plan, and all conditions contained within the project's approval, for the entire duration of the project. Any amendments to the approved Construction Management Plan shall be reviewed and approved by the Department of Public Works prior to the execution. The Planning Authority and the Department of Public Works have the right to seek revisions to an approved Construction Management Plan. The applicant shall coordinate the project's construction schedule with the timing of nearby construction activities to avoid cumulative impacts on a neighborhood and prevent unsafe vehicle and pedestrian movements. Accordingly, nearby construction activities could involve a delay in the commencement of construction.

5. Preconstruction Meeting Prior to the release of a building permit and scheduling of a preconstruction meeting, a hard copy set of approved plans shall be submitted to the Development Review Coordinator. A pre-construction meeting shall be held at the project site with the contractor, Development Review Coordinator, Public Works representative, and owner to review the construction schedule and critical aspects of the site work. At that time, the Development Review Coordinator will confirm that the contractor is working from the approved site plan and the approved Construction Management Plan. The site/building contractor shall provide one (1) copy of a detailed construction schedule to the attending City representative. It shall be the contractor's responsibility to arrange a mutually agreeable time for the pre-construction meeting.

6. Department of Public Works Permits If work or obstructions will occur within the public right-of-way, such as utilities, curb, sidewalk, driveway construction, site deliveries and equipment siting, a Street Opening and/or Occupancy Permits are required for your site. Please contact the Department of Public Works Permit Clerk at (207) 874-8300, ext. 8828. (Only excavators licensed by the City of Portland are eligible.)

7. Develop Site According to Plan The site shall be developed and maintained as depicted on the site plan and in the written submission of the applicant. Any modifications of an approved site plan or alteration of a parcel, or of any approved exterior elevations, which were the subject of site plan approval after May 20, 1974, shall require the prior approval of an amended site plan by the Planning Board or Planning Authority pursuant to the terms of Chapter 14, Land Use, of the Portland City Code.

8. Stormwater Management The owner/operator of an approved stormwater management system, and all assigns shall comply with the conditions of Chapter 32, Stormwater including Article III, Post Construction Stormwater Management, which specifies the annual inspections and reporting requirements.

   A maintenance agreement for the stormwater drainage system, as attached, or in substantially the same form, shall be submitted for review by Corporation Counsel. Once approved, the document shall be signed and recorded at the Cumberland County Registry of Deeds prior to the issuance of a building permit. Final copies shall be submitted to both the Department of Planning and Urban Development and the Department of Public Works.

9. Third Party Inspections For all sites with one acre or greater of disturbance, the applicant shall retain the services of a third-party inspector for the duration of construction until final site stabilization is in place. The inspection is required in order to ensure that all construction and stabilization activities comply with the approved drawings and specifications; that field decisions regarding erosion control implementation, stormwater system installation, and natural resource protection are based on sound engineering and environmental considerations; and that any changes to the development's erosion control plan, stormwater management plan, or final stabilization plan is communicated to the City of Portland for additional review and approval.

   The inspector will submit weekly written reports to the Stormwater Coordinator(s) in the Water Resources Division of Public Works. Reports must include: project ID, project address, the date(s) and time(s) of inspection(s), site photographs of areas under construction, and the date(s) and approximate duration(s) of any rainfall events. The report will identify and describe any erosion problems or discharge of pollutants and what actions will be taken to address these issues and repair any damage to other properties or natural resources, actions to eliminate the erosion source, and actions to prevent future sediment discharges from the area.

10. Defect Guarantee A defect guarantee, consisting of 10% of the performance guarantee, must be posted before the performance guarantee will be released.

11. As-Built Final Plans Final sets of as-built plans shall be submitted digitally to the Planning and Urban Development Department, on a CD or DVD, in AutoCAD format (.dwg), release AutoCAD 2005 or greater. Please provide one hard copy of the mylar.

12. Mylar Copies Mylar copies of the as-built drawings for the public streets and other public infrastructure in the subdivision must be submitted to Public Works prior to the issuance of a certificate of occupancy.

13. Impact Fees New development or changes of use that result in net new residential dwelling units, non-residential building square footage, or water meters, are subject to the City of Portland's impact fee ordinance (Chapter 14, Article XVII). Impact fees are calculated at the time of building permit and must be paid prior to the certificate of occupancy. For more information, visit https://www.portlandmaine.gov/2409/Impact-Fees

The Development Review Coordinator must be notified five (5) working days prior to the date required for final site inspection. The Development Review Coordinator can be reached at the Planning and Urban Development Department

at drc@portlandmaine.gov or (207)874-8901. All site plan requirements must be completed and approved by the Development Review Coordinator prior to issuance of a Certificate of Occupancy. Please schedule any property closing with these requirements in mind.

If there are any questions, please contact Zach Powell at (207) 756-8083 or via email at zpowell@portlandmaine.gov.

Sincerely,

Brandon Mazer, Planning Board Chair

Attachments:
1. Planning Board Report
2. Portland City Code: Chapter 32
3. Sample Stormwater Maintenance Agreement
4. Performance Guarantee Packet

360 Spring Street
Major Site Plan Application
PL-003072-2024
Waynflete School, Applicant
Woodard & Curran, Representative

Submitted to:	Portland Planning Board	**Prepared By:**	Eric Freeman
Public Hearing Date:	November 26, 2024	**Date:**	November 20, 2024

I. INTRODUCTION

The Waynflete School has submitted a Major Site Plan application for the construction of a new three-story Wellness & Athletic Center to replace the school's existing gymnasium facility located at 360 Spring Street within the Residential-4 zone and the Waynflete Overlay Zone. This application is being referred to the Planning Board for compliance with the City of Portland's Land Use Code Site Plan Standards, Section 14.6.

The Planning and Urban Development Department mailed 196 notices advertising this meeting to property owners within 500 feet of the site. A legal advertisement ran in the November 14th and 15th editions of the Portland Press Herald.

Applicant: Waynflete School
Applicant Representatives: Woodard & Curran

Figure 1: The Proposed Wellness & Athletic Center

II. REQUIRED REVIEWS

Review	Applicable Standards
Site Plan	Section 14.6
Historic Preservation	Section 17.1

III. PROJECT DATA

Existing Zoning	R-4, Waynflete Overlay
Property Size	27,605 SF
Existing Use	Gymnasium
Proposed Development Program	Demolition and replacement of existing gymnasium and athletic facility

IV. WAIVER REQUESTS

Waver Requests	Applicable Standards
1. Transportation Standards, Access and circulation, Curbs and Sidewalks.	City of Portland Land Use Code: Section 14.6.1.B.3 *All new development shall provide curb and sidewalk along all frontages, installed to specifications as described in the transportation systems and street design standards of the Technical Manual.*

The applicant is requesting a waiver of Land Use Code Section 14.6.1.B.3, which requires new development to install sidewalk along all project frontages. Given the extremely narrow nature of Fletcher Street, the applicant is seeking a waiver of this standard.

Planning Staff are supportive of this waiver request.

V. EXISTING CONDITIONS AND SURROUNDING AREA

The existing gymnasium is located within the Waynflete campus in the West End neighborhood bounded by Spring, Danforth, Storer and Fletcher Streets. The Waynflete campus is comprised of a mixture of two- and three-story buildings which are similar in scale to surrounding neighborhood buildings, which are a mixture of single-family homes and small-scale multifamily buildings. The existing two-story gymnasium is located on the western edge of the Waynflete campus along Fletcher Street and was constructed in the early 1970's. The gym features a multi-use court, bleachers, changing facilities, a training room and staff offices. The gym's primary entrance is internal to the Waynflete campus, with secondary entrances and pedestrian walkways along Fletcher Street. There is a playground area immediately to the east of the gymnasium.

In 2016, the Waynflete School received a Level III Site Plan Approval from the City of Portland Planning Board (Project ID: 2017-046) for renovations and additions to the Lower School including the demolition and reconstruction of the existing athletic facility, and associated site and utility features. In 2017, an amendment to the original site plan approval was granted, removing the athletic facility from the project. The Lower School and associated site and utility improvements were completed in 2018.

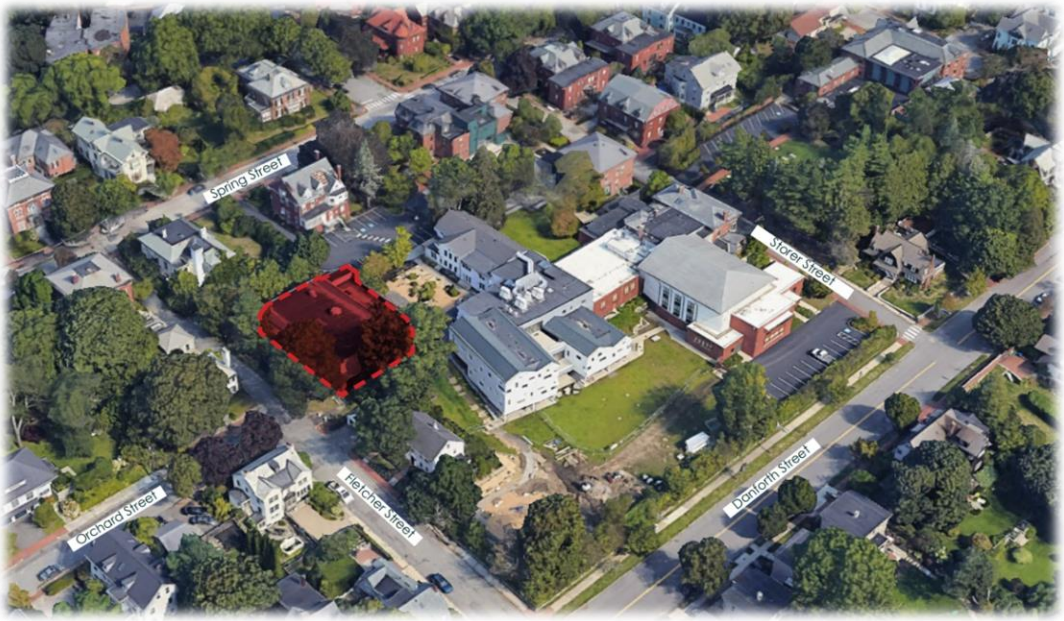


Figure 2: The location of the existing gymnasium within the Waynflete campus

VI. PROPOSED DEVELOPMENT

The proposed development involves the demolition of the existing gymnasium facility and the construction of a new, three-story athletic facility in the same location. The court level of the proposed athletic facility will be six feet lower than the existing gymnasium to enhance the facility's compatibility with the surrounding historic residential neighborhood. The building will feature a mixture of brick siding, corrugated metal and wood veneer siding. Rooftop mechanical equipment will be screened on all sides. The primary entrance to the new athletic facility will be internal to the Waynflete campus, with the building's lobby and entrance courtyard fronting the Lower School playground and the Thomas House. Two secondary entrances would be located along Fletcher Street and would be used primarily for emergency egress.

The building will be three stories in height with a ground-floor "court level" with a lobby area, multi-use court facility, bleacher seating, locker room facilities and staff offices. The court level also includes a basement connection to the Lower School, which will enable direct enclosed access between the two buildings. This area will also house equipment storage and support space for the new athletic facility. The first floor will be partially open to the court level below, and would contain additional staff offices and restroom facilities. The second floor will have a dedicated fitness area with training equipment and an area of sports turf. The third floor will accommodate additional staff offices, classrooms and movement rooms for low-impact activities. The building will have a central elevator and two stairwells
Additional site improvements include new landscaping and plantings along Fletcher Street, with a total of 16 new trees and 56 shrubs to be planted on site. The new athletic facility will be served by existing utilities which were installed in 2017-2018 as part of the construction of the lower school complex.

Figure 3: Building Elevations

VII. RIGHT, TITLE, & INTEREST

The applicant has provided a full succession of Deeds demonstrating Waynflete's ownership of this parcel dating to 1959. The deed is recorded in the Cumberland County Registry of Deeds Book 2507, Page 101.

Full Right, Title & Interest documentation is included as attachment G

VIII. FINANCIAL & TECHNICAL CAPACITY

The Waynflete School has provided a detailed presentation providing conformation of the organization's financial capacity to complete this project.

Full Financial Capacity documentation is included as attachment F

Woodard & Curran is serving as the agent for this application and has demonstrated extensive experience developing projects of a similar scale throughout Maine and New England.

IX. ZONING ANALYSIS

The subject properties lie within the R-4 Residential Zone and the Waynflete Campus Overlay. The proposed use is a use that is permitted by right within the Waynflete Campus Overlay zone. The requirements of the Waynflete School Overlay Zone are outlined in section 8.10 of the City of Portland Land Use Code. The intent of the Overlay Zone is to protect the established surrounding residential neighborhood while allowing Waynflete to continue operating and to upgrade existing uses within the campus. At the time of the 2016 Level III Site Plan approval, required front and side yard setbacks were established by averaging the existing setbacks of neighboring properties. The rear yard setback was not calculated as the existing setback was maintained.

The site will be required to meet the dimensional requirements of the Waynflete Campus Overlay Zone as described below.

The applicant has included a full zoning analysis included as attachment J and M

	Required	Proposed
Lot Size	6,000	27,605 SF
Minimum Street Frontage (%)	50 ft.	48.5 ft.
Front Yard Minimum	15.6 ft.	15.7 ft.
Rear Yard	10.1 ft.	10.1 ft.
Yard Left	9.8 ft.	10.2 ft.
Maximum Height	35 ft.	34.2 ft.
Maximum Lot Coverage	Waynflete Core: 40% Waynflete Edge: 30%	Waynflete Core: 33% Waynflete Edge: 23%

X. SITE PLAN STANDARDS (Section 14.6)

The proposed development has been reviewed by staff for conformance with the relevant review standards of the City of Portland's Site Plan Ordinance, Section 14.6. Staff comments are below.

1. Transportation Standards (Section 14.6.1)

A. Impact on surrounding street systems

The proposed facility will not have an impact on the surrounding street systems. The existing facility is being demolished, and the new gym will be installed in the same location. The facility is located adjacent to Fletcher Street, a narrow, one-way local street. The proposed facility will not encroach on any City right-of-way. There is no anticipated increase in traffic volumes for

Staff consider this standard to be met.

B. Access and circulation

There is no direct vehicular access proposed for the reconstructed athletic facility. Existing access and circulation patterns for the overall Waynflete campus will remain unchanged. The primary entrance for the new gymnasium will be internal to the campus with the lobby area fronting the Lower School entrance, with secondary emergency egress points located along Fletcher Street. There is an existing pedestrian walkway south of the existing gymnasium connecting the Lower School to Fletcher Street. This walkway will be preserved and ungraded with decorative brick and wood pavers. Existing student pick-up and drop-off locations will remain unchanged.

Staff consider this standard to be met.

C. Public transit access

The Waynflete campus is served by METRO Route 8. Waynflete makes METRO bus passes available to all staff.

Staff consider this standard to be met.

D. Parking

This project does not include any changes to existing parking on the Waynflete campus. The project is not anticipated to have a significant impact on parking needs for the school as its primary purpose of the new gymnasium facility is to improve quality and services associated with existing operations with no significant capacity increases proposed.

The Waynflete School has a previously approved transportation and parking demand management plan which included the gymnasium reconstruction.

The full transportation and parking demand management plan is included as attachment K

Staff consider this standard to be met.

E. Transportation demand management (TDM)
The Waynflete School has an existing Transportation and Parking Demand Management Plan that was created by Gorrill Palmer and first adopted in 2008. This plan was last updated in 2016 as part of the Site Plan permitting process for the Lower School. This plan remains in place and is currently utilized by the school.

Staff consider this standard to be met.

2. Environmental Quality Standards (Section 14.6.2)

A. Preservation of significant natural features
The project will be demolishing the existing gymnasium and placing the new facility in the same location. There are no significant natural features located in the vicinity of the project.

Staff consider this standard to be met.

B. Landscape preservation
Existing site landscaping that were previously installed with the approved Site Plan for the Lower School will be preserved. Four mature trees of 10" DbH or greater located between the existing gymnasium and Fletcher Street will be removed. All vegetation removed for construction of the athletic facility will be replaced with new plantings detailed in the landscaping plan.

A full landscaping plan is included as attachment 25.

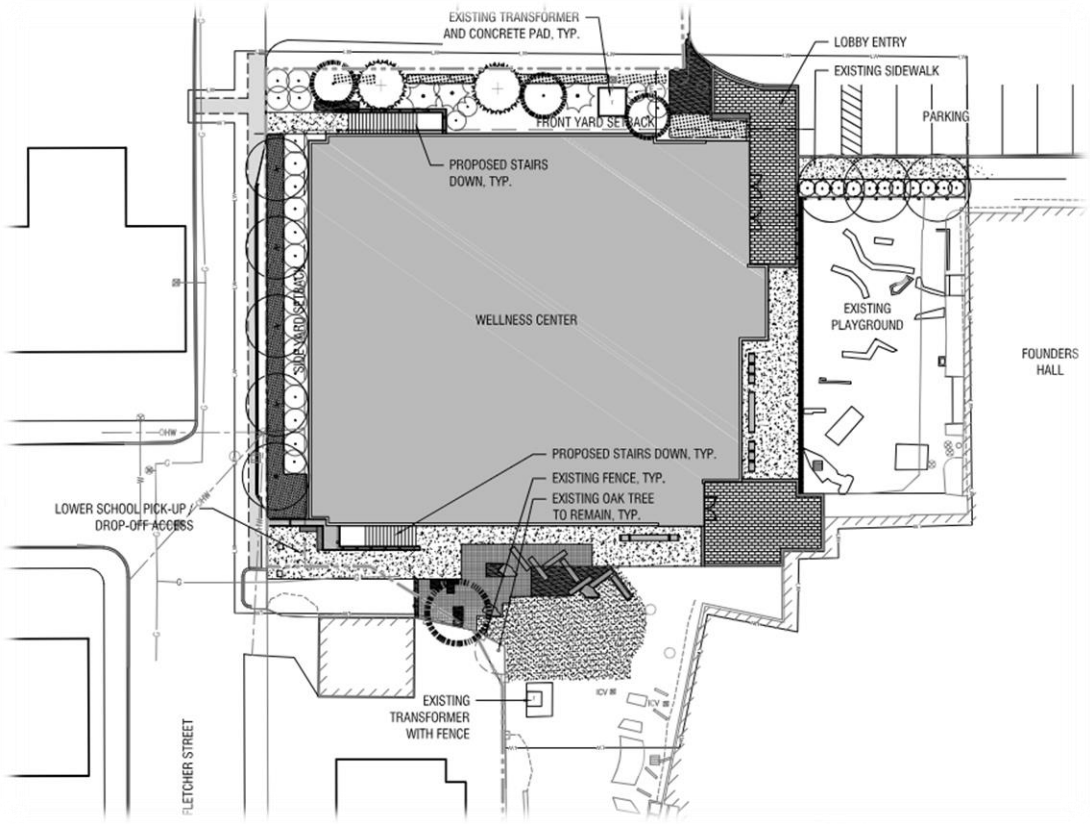


Figure 4: Overall Site Plan

C. Site landscaping and buffers

This application proposes to plant a total of 16 new trees and 56 new shrubs and an array of grasses and perennial plants. The proposed plantings will also provide replacement for the existing trees and vegetation being removed to facilitate construction of the gymnasium. The athletic facility will be buffered from Fletcher street by new trees and a hedge row. This application also involves the planting of a clover garden on the southern side of the new athletic facility and decorative landscape elements along the pick-up-drop-off walkway connecting the lower school to Fletcher Street.

Staff consider this standard to be met.

D. Water quality/storm water management/erosion control

This application is required to comply with the Maine Department of Environmental Protection (DEP) Chapter 500 and City of Portland Technical Manual Section 5 standards for stormwater management. This application involves the creation of 3,700 square feet of non-roof, redeveloped impervious surface, which is below the treatment threshold for the redevelopment standard; however, of this area, approximately 3,100 square feet will be new impervious surface, which exceeds the 1,000 square foot threshold to require compliance with the General Standards, which requires treatment of 95% of that area.

A stormwater management plan was approved as part of the Level III Site Plan for the Lower School in 2016. This management plan accounted for the future construction of the new athletic facility. The stormwater system was installed as part of the Lower School's construction in 2017-20`8. A manhole was installed at the northwest corner of the Lower School to provide a connection point for future stormwater connections. Stormwater flow from the project area associated with this application will be directly managed by the previously approved and installed system.

As part of the Level III Site Plan approved in 2016, a subsurface sand filter was designed and installed to provide treatment for both the Lower School and the gymnasium that was proposed at that time. The system was sized to treat 13,700 square feet of impervious surface and provide treatment for the entirety of the proposed lower school and gymnasium site.

The applicant has provided updated Stormwater Management and Erosion & Sedimentation Control plans to respond to comments from Staff and peer reviewers. Staff have included a Condition of Approval requiring the applicant to address any additional or outstanding comments on these items.

Staff consider this standard to be met.

3. Public Infrastructure and Community Safety Standards (Section 14.6.3)

A. Consistency with City Master Plans

There are no long-range plans that apply to this project.

B. Public safety and fire prevention

A life safety plan and fire suppression plan was included as part of this application. Emergency Vehicle access to the site will remain unchanged. The proposed athletic facility has a full sprinkler system and Fire Department Connection.

Staff consider this standard to be met.

C. Availability and capacity of public utilities

The proposed athletic facility was taken into consideration as part of the construction of the Lower School in 2017-2018. New utility services were designed to facilitate connections from the future athletic facility and allow for sewer, water and electrical connections internal to the Waynflete campus. The only new utility service proposed as part of this application is a natural gas connection from Fletcher Street.

The applicant is seeking ability to serve letters from utility providers.

Staff consider this standard to be met.

4. Site Design Standards (Section 14.6.4)

A. Massing, ventilation, and wind impact

The proposed athletic facility is similar in height and scale to surrounding neighborhood buildings and has been designed to minimize impact on surrounding properties and public streets.

Staff consider this standard to be met.

B. Shadows
The existing building is below the allowable height within this Waynflete campus overlay and will be buffered from surrounding buildings and public Rights-of-way. There are no anticipated shadow impacts associated with this application.

Staff consider this standard to be met,

C. Snow and ice loading
Waynflete currently manages snow on their property, clearing snow following storm events and removing it as necessary. The school's existing plan for snow removal will not change as part of this application.

Staff consider this standard to be met.

D. View corridors
This application is not within an established view corridor. This standard is not applicable to this application.

E. Historic resources
This application is within the Western End Historic District and is subject to review by the Historic Preservation Board. The Historic Preservation Board held a workshop for this application on November 6, 2024. Board comments centered on:

- Extending the brick facade on Fletcher Street to partially wrap around the building

- Adding and relocating windows along all frontages

- Massing of the building along Fletcher Street.

The applicant will be required to receive a Certificate of Appropriateness from the Historic Preservation Board before applying for a building permit.

Staff consider this standard to be met.

F. Exterior lighting
The proposed athletic facility will feature building mounted fixtures and full cutoff dark-sky compliant light fixtures. No architectural or decorative lighting is proposed.
A full photometric plan is included as attachment O

Staff consider this standard to be met.

G. Noise and vibration
Mechanical systems will be located on the roof and will be fully screened to minimize noise and vibration.

Staff finding consider this standard to be met.

H. Signage and wayfinding
No new signage is proposed as part of this application.

I. Zoning-related design standards
The building has been designed to fit the context within the historic West End neighborhood and will be reviewed by the Historic Preservation Board.

XI. NEIGHBORHOOD MEETING & PUBLIC COMMENT

A neighborhood meeting was held on October 30, 2024 at 5pm in the Waynflete Campus library. 10 members of the public were in attendance.

Questions and comments from the public focused primarily on construction management, mitigation of construction impacts, parking and gym operations.

The full neighborhood meeting materials are included as attachment Q

XII. STAFF RECOMMENDATION

Subject to the proposed motions and conditions of approval listed below, Planning & Urban Development Department staff recommends that the Planning Board find that the proposed athletic facility at 360 Spring Street (PL-003072-2024) meets all relevant Site Plan standards.

XIII. PROPOSED MOTIONS

1) WAIVERS

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 November 26, 2024 for application PL-0023072-2024 at 360 Spring Street relevant to the Site Plan Standards of the Land Use Code and the City of Portland's Technical Manual, and other regulations, and the testimony presented at the Planning Board hearing:

1) Transportation Standards, Access and circulation, Curbs and Sidewalks.

A. The Planning Board **[finds/does not find]** based upon the City's Review, that extraordinary conditions exist or undue hardship may result from strict compliance with the Technical Manual standard Section 14.6.1.B.3 which requires that new development provide curbs and sidewalks along all frontages, that substantial justice and the public interest are secured with the proposed variation in this standard, and that variation is consistent with the intent of the ordinance. The Planning Board **[waives/does not waive]** Technical Manual standard Section 14.6.1.B.3 to remove the requirement for the applicant to construct a sidewalk along Fletcher Street.

B. 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 November 26, 2024 for application # PL-003072-2024 at 360 Spring Street 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 APPLYING FOR A BUILDING PERMIT

(1) The applicant shall provide the Planning Authority with an ability to serve letter from Central Maine Power and Wastewater Capacity Authorization from the Department of Public Works.
(2) The applicant shall receive a Certificate of Appropriateness from the Historic Preservation Board.
(3) The updated stormwater management plan, received on Wednesday November 20th in response to the City's 10/24/2024 review comments, shall be reviewed and approved by the City's third party stormwater reviewer.

2) PLANNING BOARD DECISION

On the basis of the findings, conclusions and recommendations contained in the Planning Board report for the public hearing on November 26, 2024 related to application PL-003072-2024 for 360 Spring Street, which is attached to the draft approval letter and incorporated therein, the Planning Board [adopts/does not adopt] the approval letter as drafted as the Planning Board's decision for application PL-003072-2024 and authorizes the Planning Board Chair to sign the approval letter as drafted.

XIV. ATTACHMENTS

Staff Materials

S1. Staff Review Comments
S2. Approval Letter

Applicants Submittal

A. Cover & Introduction Narrative
B. Major Site Plan Checklist
C. Applicant Response to Comments
D. Agent Letter
E. Permitting & Zoning
F. Financial Capacity
G. Property Deeds
H. Area Coverage
I. Site Plan Standards

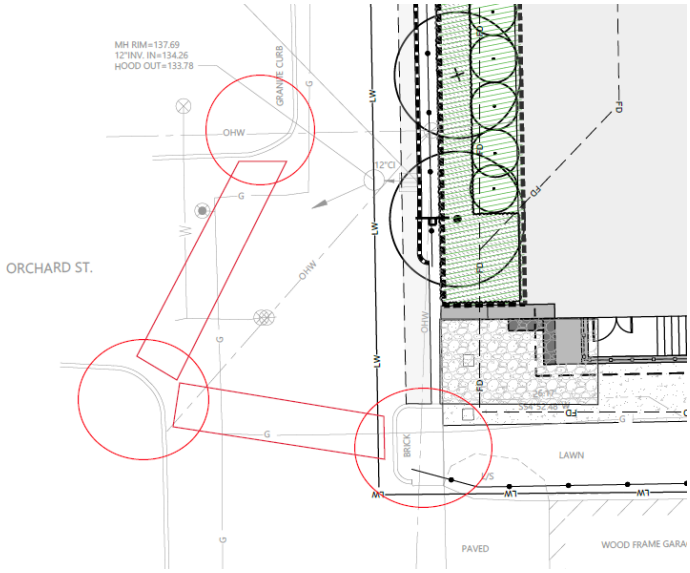
J. Zoning Analysis Table
K. Existing Transportation and Parking Demand Management Plan
L. Construction Management Plan
M. Gym Setbacks
N. Stormwater Report
O. Site Lighting
P. Waiver Table
Q. Notice of Neighborhood Meeting and Meeting Materials

Drawings

1. Existing Conditions Survey
2. Survey
3. Code Plan
4. Overall Site Plan
5. General Notes
6.. Utility Plan
7. Materials Plan
8. Elevation 1
9. Elevation 2
10. Elevation 3
11. Elevation 4
12. Court Level Plan a
13. Court Level Plan b
14. Court Level Plan c
15. Court Level Plan d
16. Court Level Plan e
17. 1st Floor Plan
18. 2nd Floor Plan
19. 3rd Floor Plan
20. Roof Plan
21. Demolition Plan
22. Site Plan
23. Grading & Drainage Plan
24. Civil Site Details
25. Planting Plan
26. Landscape Details

Site Plan Review Standards (Sec. 14.6)

Transportation Standards (Sec. 14.6.1)

Standard	*Discussion*	*Finding*
Impact on Surrounding Street Systems	Overview: The proposed gymnasium is not anticipated to have a significant impact on traffic to or from the Waynflete campus. The replacement of the gymnasium will not significantly expand capacity and will be primarily used by students and staff. Updates Requested • Upgrade ramps At Orchard Street & Fletcher Street to meet ADA requirements and provide striping. (See below) 	Not Met
Access and Circulation	Overview: There is no direct vehicular access to the proposed gymnasium facility. Existing access and circulation patterns for both vehicles and pedestrians will remain unchanged. Updates Requested • C-4.0 - The plans do not have enough information to determine if the existing sidewalks are accessible (ADA complaint). The applicant shall update the plans. Spot grades and slopes shall be added to plans at locations where existing sidewalk meets proposed (driveways, egress locations, pedestrian ramps, accessible crossings, sidewalks and steps)	
Parking	Overview:	

	This project does not include any changes to parking on the Waynflete campus. This project is not anticipated to have a significant impact on overall parking needs for the Waynflete campus. Updates Requested • It is assumed that this project will not increase attendance capacity of the gymnasium and therefore no increase in traffic or parking is expected. The applicant should confirm this assumption. If this is the case, the project would not be expected to have a significant impact on traffic mobility and safety on area streets.	
Transportation Demand Management (TDM)	Overview: Waynflete has an existing Transportation and Parking Demand Management Plan that was created by Gorrill Palmer and first issued in 2008. This plan was last updated in 2016 as part of the Site Plan permitting process for the Lower School and the Gymnasium. This plan remains in place. Updates Requested • None	Met
Environmental Quality Standards (Sec. 14.6.2)		
Standard	*Discussion*	*Finding*
Preservation of Significant Natural Features and Landscape Preservation	Overview: There are no significant natural features located in the vicinity of this project Updates Requested • None	Met
Site Landscaping and Buffers	Overview: Existing site landscaping will be preserved, including landscaping features that were previously installed with the approved Site Plan for the Lower School. With the new facility's placement in the same location as the existing gymnasium. Tree removals along Fletcher street will be replaced with new plantings. Updates Requested • None	Met
Water Quality, Stormwater Management and Erosion Control	Overview: A stormwater management plan was approved as part of a previous Level III Site Plan for the lower school and gymnasium. A new stormwater system was installed as part of the lower school construction. Updates Requested • It's DPW's opinion that the stormwater treatment system constructed as part of a previous development phase is providing enough treatment and water quantity control to satisfy DPW's combined sewer detention volume requirement. • There appear to be a few existing catch basins within the limit of work that will need silt sacks. Please add these to plans	Not Met

	• See attached peer-review design comments.	
Public Infrastructure and Community Safety Standards (Sec. 14.6.3)		
Standard	***Discussion***	***Finding***
Consistency with City Master Plans	Overview: There are no City Master Plans applicable to this application Updates Requested: • None	Met
Public Safety and Fire Prevention	Overview: A life safety plan and fire suppressing plan was included with this submittal. Updates Requested • None	Met
Public Utilities	Overview: New utility services were installed at the time of the lower school construction that allow for connection internal to the site with the gymnasium. The only new utility service proposed is a natural gas connection within Fletcher street. The applicant is working with utility providers to update ability to serve letters. Updates Requested • The project survey should be updated to reflect recent development and also depict the stormwater treatment system that is being utilized to provide treatment for this project phase. The survey provided is from 2015 and doesn't account for significant site changes that have occurred since then. • Regardless of previous approvals and discussions, the applicant should submit a new wastewater capacity application for this project phase or provide evidence that previous authorizations cover the anticipated change in sewer flows being proposed by this project. • This project will require a comprehensive ESC plan per the City's new ESC ordinance and updated technical standards. Please review section 6 of the tech manual and make sure the project design is in compliance with these new standards.	Not Met
Site Design Standards (Sec. 14.6.4)		
Standard	***Discussion***	***Finding***
Massing, Ventilation and Wind Impact	Overview: The proposed building will be in the same location as the existing building, and there will not be a reduction in ventilation or change in wind impact due to the proposed structure Updates Requested None	Met
Historic Resources	Overview: The school is located within a Historic District, and the project will be reviewed by the Historic Preservation Board.	Met

	Updates Requested • None	
Design Standards	Overview:	Met
	Updates Requested • Not applicable to this application.	

Zoning Dimensional Review (Article 7)

Dimensional Standards (Table 7-A – Table 7-H)

Standard	*Requirement 1*	*Requirement 2*	*Proposed*	*Finding*
Lot Size (SF)	*6,000 SF*		*No change*	*Met*
Front Yard Minimum	*15 ft.*		*15.7 ft.*	*Met*
Rear Setback	*10 ft.*		*10.1 ft.*	*Met*
Side Setback	*9.7 ft.*		*10.2 ft.*	*Met*
Building Height	*35 ft.*		*34.1 ft.. (See Comments)*	*Not Met*
Lot Coverage	*40% / 30%*		*33.0% / 22.6 %*	*Met*

Zoning Comments

	Updates Requested • The court level appears to be below grade. The applicant needs to provide elevations that show the bottom of the court level. • What is the average grade? How is it calculated? It needs to be shown on the elevations. • Looking at the four court level plans, A101a, A101b, A101c and A101d. it appears that there is a connection to the lower school building. Is this connection underground? Can this be shown on the site plan?	*Not Met*

CITY OF PORTLAND, MAINE

PLANNING BOARD

Brandon Mazer, Chair
Justin Barker, Vice Chair
Marpheen Chann
Sean Murphy
David Silk
Austin Smith
Maggie Stanley

November 26, 2024

Lauren Swett
Woodard & Curran
12 Mountfort Street
Portland, ME 04101

Project Name:	Waynflete Athletic Center	**Project ID:**	PL-003072-2024
Address:	360 Spring Street	**CBL:**	061 F003
Applicant:	Waynflete School		
Planner:	Eric Freeman		

Dear Lauren Swett,

On November 26, 2024, the Planning Board approved a major site plan application for the construction of a new three-story athletic and wellness facility for the Waynflete School at 360 Spring Street within the Residential-4 zone and the Waynflete Campus Overlay. The decision is based upon the application, documents and plans as submitted. The Planning Board reviewed the proposal for conformance with the standards of the Site Plan Ordinance, Ch. 14, Article 14, Section 14.6. based on the information provided to the Board in the application, plans, and reports through testimony and other information submitted by the applicant, the Planning Board adopted the findings, conclusions and recommendations contained in the Planning Board Report for the public hearing on November 26, 2024, which is attached hereto and incorporated herein by reference. Based upon those findings, conclusions and recommendations, the Planning Board found that the application met all relevant standards and voted (X-X) to approve the application with the following conditions as presented below.

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 November 26, 2024 for application # PL-003072-2024 relevant to the site plan regulations; and the testimony presented at the Planning Board hearing, the Planning Board voted (X-X) to 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 APPLYING FOR A BUILDING PERMIT

1. The applicant shall provide the Planning Authority with an ability to serve letter from Central Maine Power and Wastewater Capacity Authorization from the Department of Public Works.

2. The applicant shall receive a Certificate of Appropriateness from the Historic Preservation Board.
3. The updated stormwater management plan, received on Wednesday November 20th in response to the City's 10/24/2024 review comments, shall be reviewed and approved by the City's third-party stormwater reviewer.

Standard Procedures

Note: The following standard procedures and requirements apply to all approved site plans:

1. Site Plan Expiration The site plan approval will be deemed to have expired unless work has commenced within one (1) year of the approval or within a time period up to three (3) years from the approval date as agreed upon in writing by the City and the applicant. Requests to extend approvals must be received before the one (1) year expiration date.

2. Separate Building Permits Are Required This approval does not constitute approval of building plans, which must be reviewed and approved by the City of Portland's Permitting and Inspections Department.

3. Performance Guarantee and Inspection Fees A performance guarantee covering the site improvements and an inspection fee payment of 2.0% of the guarantee amount and three (3) final sets of plans must be submitted to and approved by the Planning and Urban Development Department and Public Works Department prior to the release of a building permit, street opening permit or certificate of occupancy for site plans.

4. Construction Management Plans The applicant, contractor and subcontractors are required to conform to the approved Construction Management Plan, and all conditions contained within the project's approval, for the entire duration of the project. Any amendments to the approved Construction Management Plan shall be reviewed and approved by the Department of Public Works prior to the execution. The Planning Authority and the Department of Public Works have the right to seek revisions to an approved Construction Management Plan. The applicant shall coordinate the project's construction schedule with the timing of nearby construction activities to avoid cumulative impacts on a neighborhood and prevent unsafe vehicle and pedestrian movements. Accordingly, nearby construction activities could involve a delay in the commencement of construction.

5. Preconstruction Meeting Prior to the release of a building permit and scheduling of a preconstruction meeting, a hard copy set of approved plans shall be submitted to the Development Review Coordinator. A pre-construction meeting shall be held at the project site with the contractor, Development Review Coordinator, Public Works representative, and owner to review the construction schedule and critical aspects of the site work. At that time, the Development Review Coordinator will confirm that the contractor is working from the approved

site plan and the approved Construction Management Plan. The site/building contractor shall provide one (1) copy of a detailed construction schedule to the attending City representative. It shall be the contractor's responsibility to arrange a mutually agreeable time for the pre-construction meeting.

6. Department of Public Works Permits If work or obstructions will occur within the public right-of-way, such as utilities, curb, sidewalk, driveway construction, site deliveries and equipment siting, a Street Opening and/or Occupancy Permits are required for your site. Please contact the Department of Public Works Permit Clerk at (207) 874-8300, ext. 8828. (Only excavators licensed by the City of Portland are eligible.)

7. Develop Site According to Plan The site shall be developed and maintained as depicted on the site plan and in the written submission of the applicant. Any modifications of an approved site plan or alteration of a parcel, or of any approved exterior elevations, which were the subject of site plan approval after May 20, 1974, shall require the prior approval of an amended site plan by the Planning Board or Planning Authority pursuant to the terms of Chapter 14, Land Use, of the Portland City Code.

8. Stormwater Management The owner/operator of an approved stormwater management system, and all assigns shall comply with the conditions of Chapter 32, Stormwater including Article III, Post Construction Stormwater Management, which specifies the annual inspections and reporting requirements.

   A maintenance agreement for the stormwater drainage system, as attached, or in substantially the same form, shall be submitted for review by Corporation Counsel. Once approved, the document shall be signed and recorded at the Cumberland County Registry of Deeds prior to the issuance of a building permit. Final copies shall be submitted to both the Department of Planning and Urban Development and the Department of Public Works.

9. Defect Guarantee A defect guarantee, consisting of 10% of the performance guarantee, must be posted before the performance guarantee will be released.

10. As-Built Final Plans Final sets of as-built plans shall be submitted digitally to the Planning and Urban Development Department, on a CD or DVD, in AutoCAD format (.dwg), release AutoCAD 2005 or greater. Please provide one hard copy of the mylar.

11. Mylar Copies Mylar copies of the as-built drawings for the public streets and other public infrastructure in the subdivision must be submitted to Public Works prior to the issuance of a certificate of occupancy.

12. Impact Fees New development or changes of use that result in net new residential dwelling units, non- residential building square footage, or water meters, are subject to the City of Portland's impact fee ordinance (Chapter 14, Article XVII). Impact fees are calculated at the time of building permit and must be paid prior to the certificate of occupancy. For more information, visit https://www.portlandmaine.gov/2409/Impact-Fees

The Development Review Coordinator must be notified five (5) working days prior to the date required for final site inspection. The Development Review Coordinator can be reached at the Planning and Urban Development Department at drc@portlandmaine.gov or (207)874-8984. All site plan requirements must be completed and approved by the Development Review Coordinator prior to issuance of a Certificate of Occupancy. Please schedule any property closing with these requirements in mind.

If there are any questions, please contact Eric Freeman at (207)874-8724 or via email at efreeman@portlandmaine.gov

Sincerely,

Brandon Mazer, Planning Board Chair

Attachments:
1. Planning Board Report
2. Portland City Code: Chapter 32
3. Sample Stormwater Maintenance Agreement
4. Performance Guarantee Packet

Att. A

Waynflete Wellness & Athletic Center

Major Site Plan Application

360 Spring Street
Portland, ME 04102

12 Mountfort Street
Portland, ME 04101
800.426.4262

woodardcurran.com

235326
Waynflete
September 2024

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1. PROJECT SUMMARY

On behalf of the property owner and Applicant, the Waynflete School, Woodard & Curran, acting as the agent, is submitting a Major Site Plan Application for the proposed Waynflete Wellness & Athletic Center (WWAC). This new facility will replace the school's existing gymnasium on their Spring Street property. A letter authorizing Woodard & Curran to act as the agent on behalf of the Applicant is attached to this section. This application has been prepared in accordance with the City of Portland's Chapter 14, Land Use Code and the applicable sections of the City of Portland Design and Technical Manuals. The proposed work is shown on the drawings submitted with this application.

1.1 Project Site and Background

The Waynflete School is located at 360 Spring Street in Portland, Maine. The property is located within the Residential (R4) Zone and the Waynflete Overlay Zone. A view of the parcel and zoning maps from the City's online GIS viewer are provided in Figures 1 and 2 and an aerial photo of the project neighborhood is provided in Figure 3. The school owns approximately 5.6 acres of an area bound by Spring, Storer, Danforth, Emery, and Fletcher Streets; the boundary survey included with this application shows the full Waynflete School Campus area.

Figure 1-1 Project Parcel Tax Map (City of Portland Parcels and Tax Map Viewer)

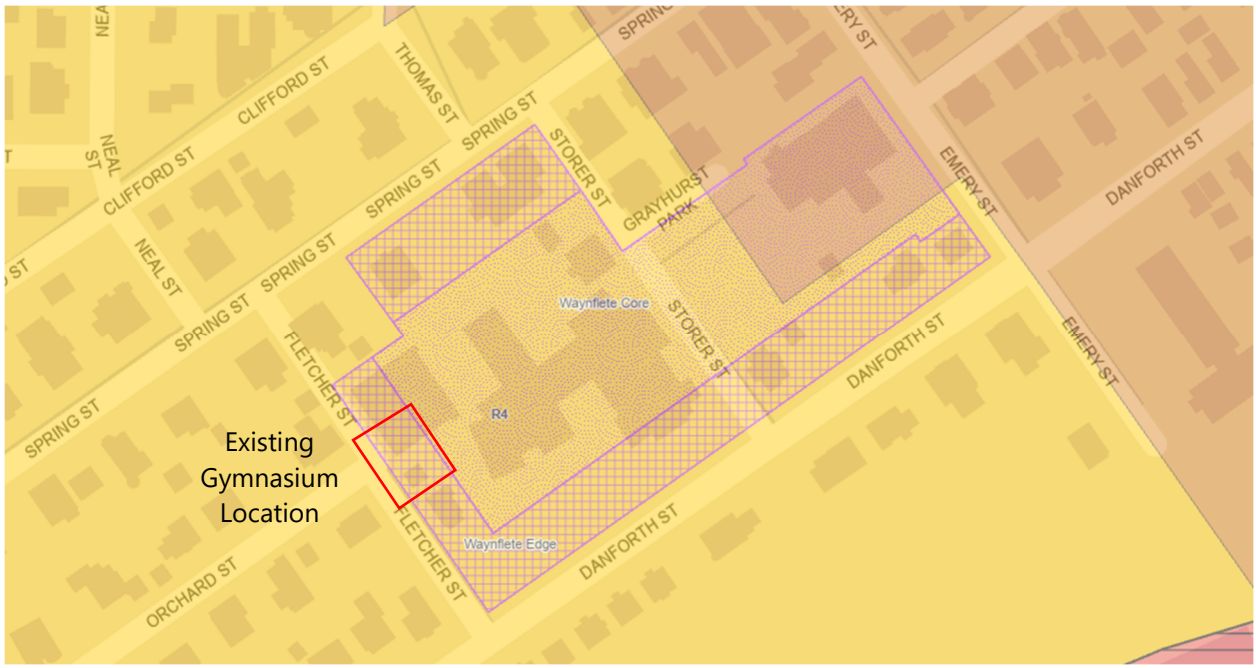

Figure 1-2 Project Zoning Map (City of Portland Zoning Map Viewer)

Figure 1-3 Project Location Map (Google Aerial Photo, Imagery September 2022)

In 2016, the Waynflete School received a Level III Site Plan Approval from the City of Portland Planning Board for renovations and additions to the Lower School, the demolition and reconstruction of the existing athletic facility, and associated site and utility features. In 2017, an amendment to the original Site Plan Approval was granted, removing the athletic facility from the project, and the Lower School and associated site and utility improvements were constructed with completion in 2018.

This current Major Site Plan Application is being submitted for the demolition and reconstruction of the athletic facility and additional site improvements needed to complete this portion of the work. Some of the site features constructed as part of the Lower School project, like the water services from Spring Street, and the stormwater management system in the Lower School's field on Danforth Street were designed to consider the future gym construction and will remain in place for the benefit of this project.

1.2 Project Description

Located on the Spring Street campus of the Waynflete School, the existing gymnasium dates from the early 1970's. The current sports court is undersized without adequate safety margins. In addition, the facility lacks the necessary support facilities such as bleachers, visitors and flex locker rooms, public toilets, staff space, athletic training, and general storage.

The Waynflete Wellness and Athletic Center intends to replace the gym with new construction. To maintain the scale of the adjacent West End historic neighborhood and still achieve the height necessary for a high school gymnasium, the WWAC bottom floor will be 6 feet lower than the current gymnasium. Support space will be positioned towards the interior of the campus with the new building lobby directly off the school's primary entry from Spring Street, their Loop Road. No changes to driveway entrances or site access will be necessary as part of this project.

The building program will include a floor dedicated to fitness with an equipment area and a length of sports turf. The uppermost floor will accommodate the Wellness Center with classrooms for group counseling and movement rooms for low-impact activities such as yoga.

Building construction will be steel frame with composite concrete on metal decks. Mechanical equipment will be located on the gymnasium with perimeter screening. On Fletcher Street, the elevation will be brick veneer, as a recognition to the historic context. The gymnasium volume will be a corrugated metal siding. At the campus interior, the building will use hardwood siding and brick veneer at grade level facing the Lower School playground. Upper and Lower roof levels will be flat to facilitate the future use of a PV system.

Site improvements will be completed in the area around the new facility, with some minor grading to tie into the building's site entrances, and surface improvements that are detailed on the included civil and landscape plans. Many of the utility services needed for the new WWAC facility were partially installed as part of the construction of the Lower School. New water, sewer, and stormwater services are all located in close proximity to the proposed building, facilitating easy connection as part of the current project. The only utility that will require a new service location is natural gas which will be connected from Fletcher Street.

The overall intent for the project is to create a new gymnasium and wellness facility for use by the Waynflete community, minimizing impact to the neighborhood by keeping disturbance primarily within the existing

building footprint, and internal to the Waynflete campus. Thought was put into building material choices and landscaping to ensure that the new facility continues to fit well into its existing space.

1.3 Attachments

- Agent authorization letter
- Project Plans (uploaded separately to Plans folder)

CITY OF PORTLAND
Planning & Urban Development Department

MAJOR SITE PLAN
GENERAL DOCUMENT AND DRAWINGS CHECKLIST
Please submit each document as a separate PDF file.
Please confirm by electronically checking the boxes in the left-hand column.

**** PLEASE FILL OUT AND UPLOAD THE ZONING ASSESSMENT TABLE AND WAIVER TABLE SEPARATELY AS NOTED BELOW ****

At the time of application submission, please contact the Department of Public Works regarding E-911 addressing for your project.

GENERAL APPLICATION DOCUMENTS	
Yes NA	**Project Description** ● Cover letter with detailed project description
Yes NA	**Completed Checklist** (this document)
Yes NA	**Evidence of Right, Title, and Interest** ● Deeds, leases, or purchase and sales agreements
Yes **NA**	**Evidence of State or Federal Approvals** ● Permits or letters of non-jurisdiction, if applicable
Yes NA	**Zoning Assessment** (see Zoning Assessment Table) Summary of compliance with use and dimensional standards of the land use code
Yes NA	**Site Plan Standards Assessment** (see Section 14.6 of the land use code) • Summary of project compliance with site plan standards of the land use code
Yes NA	**Summary of Existing and/or Proposed Easements or Covenants, applicable.** ● Evidence of existing easements and any proposed easements, covenants, public or private rights-of-way
Yes **NA**	**Waiver Requests** (see Waiver Table) ● Written request for waiver describing request and compliance with applicable waiver standards
Yes NA	**Financial Capability** ● Letter or evidence from a financial institution or third party verifying financial capacity to undertake project
Yes NA	**Technical Capability** ● Evidence of technical capability of applicant and consultants – resumes and/or examples of past projects

MAJOR 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	
Yes **NA**	**Impact on Surrounding Street Systems (14-14.6.1(A))** ● Describe incremental volume of traffic impacts and mitigation measures. If needed
Yes **NA**	**Access and Circulation (14-14.6.1(B))** Identify and describe the following: ● Site access and internal circulation, including ADA access ● Drive-up features, if applicable ● Loading and servicing needs, routes, and geometry, providing turning templates for delivery vehicles, if applicable ● Sidewalks and condition along street frontages and internal walkways ● Engineered details for ADA ramps and public sidewalks, meeting sidewalk material policy and construction requirements (Technical Manual, Section 1)
Yes **NA**	**Public Transit (14-14.6.1(C)), if applicable** Identify and describe the following: ● Existing available transit service and proposed transit improvements, including design details, such as easement, pad base, and shelter
Yes **NA**	**Off-Street Parking (14-14.6.1(D)), if applicable** Identify and describe the following: ● Proposed vehicular and bicycle parking supply (including ADA-compliant parking) in relation to applicable parking requirements in Article 19 of the land use code ● Curb cut separation and parking layout (Technical Manual, Section 1) ● Construction details for bicycle racks ● Management plan for snow storage and removal
Yes **NA**	**Transportation Demand Management (TDM) (14-14.6.1(E)), if applicable** ● Provide TDM plan drafted in accordance with Technical Manual Section 1 requirements

ENVIRONMENTAL	
Yes NA	**Preservation of Significant Natural Features (14-14.6.2(A)), if applicable** Identify and describe the following: ● High and moderate value waterfowl and wading habitat ● Aquifers (for Casco Bay Islands) ● Waterbodies (including wetlands, watercourses, significant vernal pools and floodplains) ● Proposed preservation areas and protection measures ● Documentation from environmental compliance consultants and determinations from applicable state and federal agencies
Yes NA	**Landscape Preservation (14-14.6.2(B))** Identify and describe the following: ● Measures to preserve trees, including within required zoning setbacks (Technical Manual, Section 4) ● Measures to protect existing vegetation during construction
Yes NA	**Site Landscaping and Buffers (14-14.6.2(C))** Identify and describe the following: ● Overall landscaping approach and consistency with standards ● The use of screening and buffering of service areas and between non-residential and residential uses ● Existing Heritage or Feature Trees on site and measures to preserve ● Compliance with street tree requirements
Yes NA	**Water Quality, Stormwater Management, and Erosion Control (14-14.6.2(D))** Identify and describe the following: ● Erosion and sedimentation control plan and measures ● Evidence of compliance with Urban Impaired Stream Standards pursuant to DEP Chapter 500 stormwater law, as applicable ● Subsurface sanitary sewage disposal and groundwater protection measures

PUBLIC INFRASTRUCTURE AND COMMUNITY SAFETY		
Yes	NA	**Consistency with City Master Plans (14-14.6.3(A))** ● Describe proposed easements, rights and improvements to connect or continue off-premises public infrastructure, as applicable
Yes	NA	**Public Safety and Fire Prevention (14-14.6.3(B))** Identify and describe the following: ● Compliance with Crime Prevention through Environmental Design (CPTED) requirements (Technical Manual, Section 3) ● Emergency vehicle access ● Consistency with public safety standards (Technical Manual, Section 3)
Yes	NA	**Availability and Adequacy of Public Utilities (14-14.6.3(C)) (Technical Manual, Sections 2 & 9)** Identify and describe the following: ● Electrical services, including providing underground services ● Existing and proposed connections for public utilities and required public utility upgrades ● Sewer line connections
SITE DESIGN		
Yes	NA	**Massing, Ventilations and Wind Impact (14-14.6.4(A))** Identify and describe the following: ● Wind and ventilation impacts on adjoining structures and/or adjacent public spaces, including wind study, if applicable ● Bulk, location, or height impacts on adjoining structures
Yes	NA	**Shadows (14-14.6.4(B)), if applicable** ● Provide shadow analysis of impacts on publicly accessible open space (Technical Manual, Section 11)
Yes	NA	**Snow and Ice Loading (14-14.6.4(C))** ● Describe building design measures to prevent snow and ice from loading or falling onto adjacent properties or public ways
Yes	NA	**View Corridors (14-14.6.4(D)), if applicable** ● Describe any protection of designated view corridors (Portland Design Manual, Appendix. 1)
Yes	NA	**Historic Resources (14-14.6.4(E)), if applicable** Identify and describe the following: ● The site's status as a designated landmark, within a historic district or historic landscape district, or within 100 feet of any designated landmark, historic district, or historic landscape district ● Compliance with standards for preservation and documentation of archaeological resources

Yes **NA**	**Exterior Lighting (14-14.6.4(F))** ● Describe how the proposed site lighting will adhere to photometrics requirements as it relates to light trespass and full cutoff fixture design, pursuant to Technical Manual Section 12
Yes **NA**	**Noise and Vibration (14-14.6.4(G))** ● Provide data on noise levels for HVAC and other mechanical equipment, such as design specifications, to demonstrate consistency with state and federal noise emissions requirements as well as City code
Yes **NA**	**Signage and Wayfinding (14-14.6.4(H)), if applicable** ● Provide signage plan showing the location, dimensions, height and setback of all existing and proposed signs ● Provide drawings of all commercial and directional signage on site
Yes **NA**	**Zone-Related Design Standards (14-14.6.4(I))** ● Address any applicable design review standards by zone, including compliance with Design Manual

MAJOR SITE PLAN
DRAWINGS CHECKLIST

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

All drawings must be submitted in a 24 x 36 sheet size.

BOUNDARY SURVEY (stamped by a Maine Licensed Surveyor and drawn as per Technical Manual Sec. 13)

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

All sheets – Include a title block with project title and the following information:

- Project street address
- Name and address of property owner & applicant
- Licensed design professional, incl firm that produced plans
- North arrow
- Date of preparation and revision history block
- Tax parcel (chart, block, and lot) number

Existing Conditions Plan with the following:

- Existing structures, with distance from primary building façade(s) to the property line
- Approximate location of structures on abutting properties
- All streets and intersections adjacent to the site
- Existing driveways, pedestrian ways, and bicycle infrastructure, including dimensions and materials
- Existing public transit infrastructure
- Existing vehicle & bicycle parking areas
- Existing utilities on site and within adjacent rights-of-way
- Existing grades (two-foot contours preferred)
- Location of water courses, wetlands, and vegetation, or other significant natural features
- Existing soil conditions and location of test pits and borings
- Zoning boundary lines, including overlays
- Location of all existing easements and rights-of-way

Proposed Site Plan with the following:

- Proposed structures, including distance from primary building façade(s) to property lines
- Ground floor area, and finished floor elevations for all buildings
- Any proposed geometric modifications to streets and intersections adjacent to site
- Location, dimensions and materials of all 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, including turning templates
- Proposed transit infrastructure with dimensions/ engineering specifications
- Location of vehicle and bicycle parking with dimensions and engineering specifications
- Location of all snow storage areas
- Exterior lighting (please see Technical Manual Sec. 12 for photometrics requirements)

- Location of fire hydrants
- Location of solid waste management receptacles
- Location of all proposed HVAC and mechanical equipment, including proposed screening, where applicable
- Location of proposed easements and rights-of-way, including dimensions
- Please utilize color-coding and/or hatches and shading to delineate changes between the pre and post development condition as needed

UTILITY PLAN including:

- Proposed electrical infrastructure
- Location, sizing and directional flows of all proposed sewer and stormwater infrastructure
- Location and dimensions of off-premises public or publicly accessible infrastructure adjacent to site
- Electric utility infrastructure

GRADING AND DRAINAGE PLAN including:

- Proposed grades
- Proposed stormwater management measures meeting Technical Manual (Section 5) standards
- Any proposed alteration of a watercourse or wetlands
- Any groundwater protection measures
- Proposed buffers and preservation measures for wetlands or significant natural features

LANDSCAPE PLAN including:

- Existing vegetation to be preserved and preservation measures
- Proposed landscaping, screening, and street trees, including caliper widths for trees
- Planting schedule, including street trees

ARCHITECTURAL PLANS AND RENDERINGS including:

- Exterior building elevations, color renderings, illustrations of all sides
- Axonometric and street-level views for structures greater than three stories in height
- Provide context drawings, if applicable (Design Manual, page 1)
- Floor plans

CONSTRUCTION MANAGEMENT PLAN including:

- Specifics on traffic control, sidewalk sheds, and pedestrian rerouting
- Include a drawing and written narrative

OTHER

- Details and cross-sections, as necessary

12 Mountfort Street
Portland, Maine 04101
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F 207.774.6635

Att. C

November 20, 2024

Eric Freeman
Planner
City of Portland
389 Congress Street
Portland, ME 04101

Re: PL-003072-2024 Waynflete Wellness & Athletic Center Major Site Plan
Response to Comments

Dear Eric:

Thank you for coordinating the review of the Waynflete Wellness & Athletic Center Major Site Plan Application. We have received the Project Review Letter, Site Plan Worksheet, and Wright Pierce peer review memo, and are providing this letter with responses to comments. We look forward to working with you towards appearing before the Planning Board for a Public Hearing on November 26, 2024.

Responses to updates requested in the Site Plan Worksheet and comments provided in the peer review memo are provided below. We have repeated the City and peer reviewer comments below in italics, with our responses following each. Please note that items from the Site Plan Worksheet that were identified as "met" were not repeated below.

Site Plan Worksheet Comments:

Impact on Surrounding Street Systems

- *Upgrade ramps at Orchard Street & Fletcher Street to meet ADA requirements and provide striping.*

  Response: We have met with DPW staff to review the layout of this intersection, and the plans have been updated to upgrade these ramps and to provide a more favorable configuration.

Access and Circulation

- The City has confirmed that the comments provided in this section were not for this project, and we have not included them here.

Parking

- *It is assumed that this project will not increase attendance capacity of the gymnasium and therefore no increase in traffic or parking is expected. The applicant should confirm this assumption. If this is the case, the project would not be expected to have a significant impact on traffic mobility and safety on area streets.*

  Response: At the time of the previous site plan approval for the Lower School and original gymnasium plan, the Traffic and Parking Demand Management Plan (TPDMP)

was updated to account for the planned increased facility capacity. The 2016 TPDMP was submitted with the Site Plan application and still remains in effect at Waynflete. The plan accounted for an increased gymnasium seating capacity. The main intent for this increased capacity is to allow for an on-campus location to seat the entire student body. This use will not have an impact on traffic and parking. As was noted in the TPDMP, there will be occasional events that utilize the facility, having an impact on traffic and parking in the neighborhood. As noted in the TPDMP, Waynflete will adjust parking management efforts as needed to mitigate these impacts, creating parking plans for these specific events, as they do now for events that occur in the Theater on campus.

Water Quality, Stormwater Management and Erosion Control

- *There appear to be a few existing catch basins within the limit of work that will need silt sacks. Please add these to the plans.*

  Response: Additional catch basin protection has been noted on the plans.

- *See attached peer review design comments.*

  Response: Peer review comments are addressed separately below.

Public Utilities

- *The project survey should be updated to reflect recent development and also depict the stormwater treatment system that is being utilized to provide treatment for this project phase. The survey provided is from 2015 and doesn't account for significant site changes that have occurred since then.*

  Response: An updated survey of the project area completed in 2024 has been provided.

- *Regardless of previous approvals and discussions, the applicant should submit a new wastewater capacity application for this project phase or provide evidence that previous authorizations cover the anticipated change in sewer flows being proposed by this project.*

  Response: A request for wastewater capacity will be made to the City. We ask that this be made a condition of approval.

- *This project will require a comprehensive ESC plan per the City's new ESC ordinance and updated technical standards. Please review section 6 of the tech manual and make sure the project design is in compliance with these new standards.*

  Response: The project plans include most technical components required as part of the new Comprehensive ESC plan. The project engineer and general contractor will work to determine responsibilities for ESC inspections. We ask that the final Comprehensive ESC plan be made a condition of approval.

Building Height/Zoning Comments

- *The court level appears to be below grade. The Applicant needs to provide elevations that show the bottom of the court level.*

  Response: Updated Building Elevations have been provided to show the elevation of the bottom of the court level.

- *What is the average grade? How is it calculated? It needs to be shown on the elevations.*

  Response: The average grade was described within the project narrative. Spot grades are noted at building corners on the grading plan, and these have been highlighted more clearly now. The grades are 141.5' at the northwest corner, 141.5' at the northeast corner, 141.0' and the southwest corner, and 141.5' at the southeast corner, giving an average of 141.375'. This value is now shown on the elevation drawings.

- *Looking at the four court level plans, A101a, A101b, A101c, and A101d, it appears that there is a connection to the lower school building. Is this connection underground? Can this be shown on the site plan?*

  Response: Yes, the connection is an underground tunnel and is shown on the site plan. We have added a note to the plans to make the extents of this connection clearer.

Peer Review Comments:

1. *Maine DEP Chapter 500 Review: The applicant has provided a stormwater management memo. The following comments are related to review of this memo and associated plan details as they relate to standards required in Maine DEP Chapter 500.*

    a. *Urban Impaired Stream Standard*

        i. *Based on the Maine DEP Maine Urban Impaired Stream Watersheds ArcGIS Map, the project area is not within an Urban Impaired Stream Watershed.*

    b. *Basic Standard*

        i. *As stated in the City of Portland Technical Manual (Section 5), major site plans must comply with the Basic Standard as outlined in Maine DEP Chapter 500.*

        ii. *We would recommend adding that temporary erosion control measures should be removed within 30 days of the site being permanently stabilized to Sheet C-200 as required by Appendix A of Chapter 500.*

            Response: This note has been added to the plans.

        iii. *We would recommend providing a post-construction inspection and maintenance plan as required by Appendix B of Chapter 500.*

Response: The stormwater memo has been updated to reference the inspection and maintenance requirements that were included as part of the previously approved stormwater management plan. A copy of the previous stormwater report is now included. Waynflete currently has their stormwater system inspected yearly, and files the required reports for this work with the City. Any issues that are discovered as part of these inspections are repaired as necessary.

c. *General Standard*

   i. *The applicant states that treatment requirements for the General Standards are well exceeded because the previously constructed subsurface sand filter was approved and designed to treat 13,700 square feet of impervious surface for the project site. It is also stated that despite the additional 1,700 square feet of impervious area from the 2016 design, treatment requirements will still be well exceeded. Please provide a figure of subcatchment areas and a table of treatment areas for the subsurface sand filter for the entire site to verify treatment requirements are met.*

   Response: The stormwater memo includes a description of all areas, with reference to the included figure. A copy of the previous stormwater report is now included, to provide information on the previous design. It is believed that this will provide for the required information, but please let us know if any further clarification is required.

d. *Flooding Standard*

   i. *The applicant provided a table of peak runoff rates for the 2-, 10-, and 25-year storms that demonstrates the flooding standard has been met based on a 2016 HydroCAD model that has been updated to include the additional impervious area. We would recommend the applicant provide the updated HydroCAD report to verify inputs and results.*

   Response: A copy of the original stormwater management report from the 2016 submission, and the updated 2024 post-development HydroCAD output report has been provided.

2. *General Comments*

   a. *The City of Portland Technical Manual (Section 6) requires that the site be inspected before the site has been permanently stabilized. We would recommend adding this requirement to the Erosion and Sedimentation Control Notes on Sheet C-200.*

   Response: This note has been added to the plans.

b. *Based on the City of Portland Technical Manual (Section 6), the proposed project (Major Site Plan with less than 1 acre of disturbance) will require a comprehensive plan. Section 6.2.2 states that the on-site inspector must submit weekly written reports to the Stormwater Coordinators in the Water Resource Division and Development Review Coordinators in Planning. This requirement may be waived for sites with less than 1 acre of disturbance. We would recommend adding this requirement to the inspection and maintenance plan or requesting a waiver.*

   Response: As noted in response to the previous comment from the City, we ask that the final Comprehensive ESC Plan, including these items be a condition of approval. We can work with the City to determine what level of inspection is required based on the project size.

c. *The applicant states in the Permitting and Zoning narrative, "The primary standard considered from the R-4 zone is structure height, which is set with a maximum of 35 feet" and explains the average height of the building is 34.125 feet, which is less than the maximum height. However, the Exterior Elevations Architectural Plans (A201-A204) appear to show the building height taller than 35 feet. Please clarify the height of the building and update plans as needed.*

   Response: The elevation plans have been updated to reflect average grade as noted previously as part of the response to zoning comments. It is also noted that per the City of Portland Land Use Code, Section 7.2 Dimensional Standards Rules of Measurement, height is measured to the roof beam in flat roofs. There are building materials that extend above the roof beam, and the elevations reflect these materials. The elevation notes have been updated to make this clear.

3. *Stormwater Memo*

   a. *As stated in the City of Portland Technical Manual (Section 5), a stormwater management plan must be submitted for Major Site plans. In the Stormwater Memo, the applicant states that a "Stormwater management plan was developed to include both the Lower School and the Gymnasium, and after the Site Plan was amended to remove the gymnasium, the complete stormwater treatment system, consisting of a subsurface sand filter, was installed with the Lower School project." We would recommend providing the previously approved stormwater management plan and updates to the plans as necessary.*

      Response: A copy of the previously approved stormwater management plan has been provided for reference. The plans submitted with this application are for the proposed construction of the Wellness and Athletic Center (formerly called the gymnasium) and include the stormwater management infrastructure (structures and piping) that is required for this project. No changes are proposed to the previously installed stormwater treatment/storage system.

4. *Plan Comments*

a. *On Sheet C-101 and C-102, CB2 is listed with a 1-foot diameter in the Structure Table. We would recommend verifying the structure's diameter.*

Response: The structure table has been updated to change the diameter of CB2 to 4 feet.

b. *It is unclear how drainage will enter the stormwater system on the southern corner of the site. Please clarify if the intent is for drainage in this area to be captured and treated by the proposed and existing stormwater system.*

Response: The southwest corner of the site beyond the building is not included as part of the area draining to the stormwater management system located within the Lower School field. This area was not originally included as part of the drainage area due to grading, and that drainage intent was maintained. The area will continue to drain to the Fletcher Street drainage system as it does now.

c. *The Stabilized Construction Entrance Detail on Sheet C-200 shows that the stabilized construction entrance should be minimum 12 feet wide and minimum 50 feet long. The stabilized construction entrance on the Existing Conditions & Demolition Plan (Sheet C-003) is shown to have a length of 22 feet. We would recommend updating the dimension of the stabilized construction entrance on Sheet C-003 to match the detail on Sheet C-200.*

Response: The stabilized construction entrance has been updated to be 50 feet long.

d. *The Catch Basin Hood detail in the City of Portland Technical Manual (Section 2) has larger dimensions than the Catch Basin Hood details provided on Sheets C-201 and C-202. We would recommend revising the details on Sheets C-201 and C-202 to meet the City's detail requirements.*

Response: The catch basin hood detail has been updated to match the Technical Manual.

e. *The City of Portland Technical Manual (Section 1) states that "aggregate base gravels shall adhere to Maine DOT standard specifications in sections 304 and 703 for type "A" material." The Bituminous Pavement Section detail notes the use of aggregate base course type "B" gravel. We would recommend revising the type of gravel to match the City's Technical Manual.*

Response: The bituminous pavement section detail has been updated to match the Technical Manual.

f. *The following General Notes for Manholes and Catch Basins from the City of Portland Technical Manual (Section 2) were not seen on the Civil Detail sheets:*

Response: It is noted that many of these items are covered as part of project technical specifications that are not submitted as part of the Site Plan Review

application. Some of these items are also included in separate details. We have General Notes for Manholes and Catch Basins included on sheet C-202, and these notes have been updated to include the items below as noted. We have also reorganized some of the details for clarification.

i. *All catch basin outlets shall be installed with a hood/casco trap.*

Response: The catch basin detail shows a catch basin hood for the outlet pipe. The note on the catch basin detail was updated to state that this is required on all outlets.

ii. *Sewer brick shall conform to ASTM spec. designate on C-32-63, grade MA and SA.*

Response: This note has been added to the General Notes for Manholes and Catch Basins included on sheet C-202.

iii. *All pipes entering manholes and catch basins shall have flexible pipe connections with stainless steel bands. Fill any annual space with non-shrink grout.*

Response: A detail was provided on sheet C-201. A note has now been added to the General Notes for Manholes and Catch Basins included on sheet C-202.

iv. *All storm and sewer manhole covers shall be solid (no drilled pick hole).*

Response: This note has been updated.

v. *All manholes and catch basins require buoyancy calculations and the structures shall be modified as necessary based on those calculations.*

Response: This has been added to the General Notes for Manholes and Catch Basins included on sheet C-202.

g. *It is understood site constraints may not allow, but we would recommend providing a drop between the inlet and outlet pipe of EXDMH1 to promote positive drainage.*

Response: A drop between the inlet and outlet pipes in EXDMH1 is not possible due to site constraints. The structure inlet is impacted by the upstream infrastructure crossing beneath the proposed building tunnel, and the outlet is defined by the downstream infrastructure that is already in place. It is our opinion that the benefit of providing a drop between the inverts is not worth the site impact required to re-install downstream infrastructure. With the pipe sizes and calculated flows, there are no anticipated issues with positive drainage through the system.

h. *Per Section 4.5.6 of the City of Portland Technical Manual: Please confirm snow storage area.*

Response: As noted in the application, Waynflete has a campus-wide snow management plan. Snow is plowed, and removed as needed following larger storm events. As the proposed building is being installed in the location of the existing building, there will be no change to the snow management plan on site. No new snow storage areas are proposed.

i. *Per Section 4.5.9 of the City of Portland Technical Manual: Please confirm Low Impact Development practices.*

Response: Per Section 4.5.9 of the Technical Manual, it is the "City's policy to encourage Low Impact Design (LID) strategies and practices to capture and infiltrate stormwater runoff". LID is not a requirement to implement, however the project's design has taken this into consideration. The Landscape Materials and Planting plans show planted areas proposed around the building. Black Locust 'Permeable Pro-Flow Pavers' are proposed within an existing high traffic play space on the south side of the Wellness Center, to eliminate soil compaction and allow water to infiltrate, thus reducing the rate of flow during storm events down the adjacent slope. The project has also aimed to maintain a minimized impact area, maintaining existing planted and playground areas within the Waynflete site.

j. *Site plan notes indicate landscape plan will have more information on site materials, stone wall, and site features. However, information is located on the materials plan.*

Response: The Materials Plan is part of the set of landscape drawings that was provided, all identified as L-sheets. The Site Plan note referencing the Landscape Plans is accurate.

k. *Confirm if metal benches are to be surface mounted or removable.*

Response: The intention is for the benches to be surface mounted, but this will be per the final selection of Waynflete. It is not believed that this is an item requiring approval as part of site plan.

l. *Provide clear callouts and dimensions by masking hatch layers or pulling callouts outside of proposed work.*

Response: Plans have been reviewed and updated as necessary for clarity.

As noted in our responses, we have made edits to the drawings to reflect various comments. We have also made a few additional updates to the drawings to reflect changes to the electrical utility on Fletcher Street. All updated drawings and documents have been uploaded to ProjectDox.

A neighborhood meeting was held on October 30, 2024. All required certification documentation, including the invitation letter, attendance list, and meeting notes have been uploaded to ProjectDox as well.

If there are any additional questions or comments, please don't hesitate to reach out to me via phone (207)558-3763 or email lswett@woodardcurran.com. I will also note that I will be away from November 15, through December 1, and during that time you can reach out to Project Manager Caitlin Suhr via phone (207)558-3707 or email csuhr@woodardcurran.com.

Sincerely,

Woodard & Curran, Inc.

Lauren Swett, PE

Technical Manager

Enclosures (uploaded separately to ProjectDox)

Geoffrey K. Wagg
Head of School
207-274-5202 *Tel* 207-772-4782 *Fax*
gwagg@waynflete.org *E-mail*

August 29, 2024

RE: Waynflete Wellness & Athletic Center

To Whom It May Concern:

Woodard & Curran, Inc. will be acting as the agent on behalf of the Waynflete School in applying for permitting approvals associated with the Waynflete Wellness & Athletic Center.

Please contact me if you have any questions.

Yours sincerely,

Geoffrey Wagg
Head of School
Waynflete School

2. PERMITTING AND ZONING

This application for a Major Site Plan for the proposed work will meet the Site Plan and Zoning requirements for an application as outlined in the City of Portland Land Use Code.

In addition to the Major Site Plan Application, the project will also be submitted to the City of Portland Historic Preservation Board for a Certificate of Appropriateness due to the project's location within the West End Historic District. The project is also anticipated to require the submission of a Maine Construction General Permit from the Maine Department of Environmental Protection (DEP). This will be submitted prior to the start of construction and a copy can be provided to the City for records.

2.1 Site Plan

As noted, the Waynflete School previously received a Level III Site Plan Approval in 2016, with an Amendment in 2017 to remove the Athletic Facility from the project. This Major Site Plan Application is specifically for the construction of the new Waynflete Wellness and Athletic Center in the location of the existing gymnasium. The project has been designed to meet the applicable site plan standards, as outlined in Section 3 of this report. The Major Site Plan Checklist has been provided as a separate attachment with this application.

2.2 Zoning

The proposed project is located in the R4 Residential Zone and the Waynflete School Overlay Zone and will be held to the standards outlined in the Land Use Code for these zones. The Zoning Assessment Table demonstrates the project's compliance with dimensional requirements and is provided as a separate attachment with this application. The site is not located within any flood zones and will not be subject to the City's Shoreland and Flood Plain Management regulations.

2.2.1 R-4 Zone

The property is located in the R-4 zone and will meet all applicable standards for this section, however most dimensional standards are overwritten by the Waynflete Overlay Zone, as described in the next section. The primary standard considered from the R-4 zone is structure height, which is set with a maximum of 35 feet. The northwest, northeast, and southeast building corners all have a proposed grade of 141.5 feet, which is consistent with the finish floor elevation (FFE) at all building doors. The southwest corner has a proposed grade of 141 feet. This gives an average of 141.375 feet. On the architectural drawings, the door FFE was set to 0 feet, and the height of the building was set to 34 feet. Converting these values to true elevations gives a building roof elevation at 175.5 feet. Comparing this elevation to average grade gives a building height of 34.125 feet, which is less than the zone maximum of 35 feet. The grading plan provided with the civil site drawings includes spot grades at building corners and the building elevations includes the building height.

2.2.2 Waynflete School Overlay Zone

The requirements of the Waynflete School Overlay Zone are outlined in section 8.10 of the City of Portland Land Use Code. The intent of the Overlay Zone is to protect the established surrounding residential neighborhood, while allowing the Waynflete School to continue to operate and upgrade its existing uses.

The Overlay Zone is divided into two subdistricts, the Waynflete Core and the Waynflete Edge. The existing athletic facility is located across these two subdistricts, and the proposed facility will be in the same location.

For the Waynflete Overlay Zone, school uses are allowed, including auditoriums and gymnasiums. The existing athletic facility will be replaced by a new athletic facility which will meet the zoning requirements for use. The project does not involve any uses or residential conversions that are prohibited by the Overlay Zone.

2.2.2.1 Dimensional Requirements

The site will be required to meet the dimensional requirements of the Overlay Zone as described below.

Setbacks

At the time of the 2016 Level III Site Plan approval, required front and side yard setbacks were established by averaging the existing setbacks of neighboring properties. The rear yard setback was not calculated, as the existing setback was being maintained. A copy of this figure has been included for reference and has been updated to reflect the current project. The proposed WWAC facility is subject to front, side and rear yard setback requirements, and will meet these requirements as noted:

Table 2-1 Waynflete Wellness and Athletic Center Setbacks

Setback	Required	Provided
Front Yard	15.63 ft	15.7 ft
Side Yard	9.76 ft	10.0-10.2 ft
Rear Yard	Existing 10.1 ft maintained	

These provided setback dimensions are noted on the site plan included with the project set.

Street Frontage

No changes are proposed to street frontages as part of this project.

Building Coverage

The maximum coverage by buildings within the Waynflete School Overlay Zone shall be the same as in the underlying zone, except that maximum coverage within the Waynflete Campus Core Subdistrict shall be 40% and all the land within the Campus owned or occupied by Waynflete School shall be considered a single lot for the purpose of calculating maximum coverage by buildings. A portion of the proposed gymnasium is located within the Waynflete Edge Subdistrict; all other work is located within the Waynflete Core Subdistrict. The space and bulk regulations of the R-4 district continue to apply within the Campus Edge Subdistrict, which has a maximum lot coverage of 30%.

The total campus building area, accounting for the demolition and reconstruction of the existing gym is now 69,575 square feet, which is approximately 28.5% of the Waynflete Campus. The proposed WWAC structure has a footprint that is approximately 380 square feet larger than the building proposed and

approved in 2016. The coverage within the Core and Edge subdistricts of the Waynflete Overlay Zone has been checked, and the proposed lot coverage does not exceed the requirements of the Waynflete Campus Core Subdistrict or the Campus Edge Subdistrict. Figure 2.1, attached to the end of this section includes an update to the area coverage figure that was generated in 2016. This figure shows that the building coverage is 33% for the Core Subdistrict, compared to a maximum allowed of 40%, and 20.6% for the Edge Subdistrict compared to a maximum allowed of 30%.

2.2.2.2 Parking

No new parking is proposed as part of this project, and the intent for the replacement of the existing gymnasium is to improve conditions for the existing use, not change capacity. The facility utilizes an existing Traffic and Parking Demand Management plan, which is included for reference with this application and is described further in Section 3.

2.2.2.3 Loading

There are no specific loading areas provided as part of this project.

2.2.2.4 Signage

Signage will comply with the requirements of the Land Use Code.

2.3 Waiver Requests

There are no waivers being requested at this time. A copy of the waiver table is provided as a separate attachment for record.

2.4 Evidence of State and/or Federal Permits

No additional State or Federal permits are anticipated to be required for this project.

2.5 Evidence of Financial Capability

Attached is a memo from the Waynflete School as well as a detailed presentation report providing confirmation of the financial capacity for the completion of this project.

2.6 Evidence of Right, Title, and Interest

The proposed project is located on the Waynflete School's property located on Spring Street in Portland. A copy of the property's deed documentation is attached as well as a copy of an easement deed granting certain rights related to the abutting 11 Fletcher Street property.

2.7 Evidence of Technical Capability

The project is being developed by a team with experience in site and building development in the City of Portland, and throughout the State of Maine.

Woodard & Curran has extensive experience with design for site development projects and specifically on the peninsula within the City of Portland. Woodard & Curran, a 1,300-person Portland-based firm, has

provided engineering services to the public and private sector for over 40 years, including permitting, civil/site engineering, stormwater, and construction management services. Woodard & Curran has done work on the Waynflete campus, completing the site work and permitting previously for the Lower School.

Simons Architects is a full-service architectural firm with a 30-year history of practice in Portland, Maine. Its staff size is 16 and includes nine licensed architects in addition to landscape architects and interior designers. While practicing throughout New England, notable projects for the City of Portland include Renovation and Additions to the Main Branch of the Portland Public Library, renovations and additions to the Casco Bay Ferry Terminal and most recently, the Kiwanis Aquatics Center. Simons Architects also has a long history of work on the Waynflete Campus. During the last 25 years, SA has crafted and revised Campus Framework and Master Plans. New buildings and work on campus include the Waynflete Arts Center, the Loop Road Drop-off, the Franklin Theater, Sills Hall, Hurd Hall renovations, and most recently, the Waynflete Lower School. SA also successfully advocated for the Waynflete Overlay Zone within the City's Land Use Ordinance.

The project team also includes Aceto Landscape Architecture for landscape design, Thornton Tomasetti for structural engineering, and Allied Engineering for mechanical, electrical, and plumbing engineering. Each of these consultants is a Portland-based firm with experience supporting site development projects in the City. Zachau Construction has also been selected as the construction manager for the project.

2.8 Attachments

- Major Site Plan Checklist (uploaded separately to Documents folder)
- Zoning Assessment Table (uploaded separately to Documents folder)
- Waiver Table (uploaded separately to Documents folder)
- Financial Capacity Memo and Report
- Property Deeds
- Boundary Survey (uploaded separately to Plans folder)
- Figure 2-1 Area Coverage Figure

Waynflete

360 Spring Street, Portland, ME 04102 | T: 207.774.5721 | waynflete.org

To: Members of the City of Portland Planning Board
From: Traci Dowd, Director of Finance, Waynflete School
Date: August 23, 2024
Re: Wellness and Athletic Center

The construction of a new Wellness and Athletic Center is an important priority for the Waynflete Board of Trustees. We are seeking to replace our current gym which will enhance spaces for a wider range of athletic interests as well as fitness and wellness programs. It will also offer a more welcoming space for our community and visitors to the School.

Waynflete is in the beginning phase of a $19,000,000 fundraising campaign. Donor interest for campaign goals has been strong with nearly $8,500,000 in gifts and pledges so far.

In addition to our fundraising efforts, the School has established an ad hoc committee of Finance to explore financing options and debt capacity. M&T Bank prepared a Debt Capacity and Construction Financing presentation for the Finance Committee on February 10, 2023, and with additional input from this committee, it was updated and presented to the full Board of Trustees on March 3, 2023.

The Waynflete School

Debt Capacity and Construction Financing Discussion

February 27, 2023

M&T Bank

Background

- The Bank has been asked to provide Waynflete with an estimate of current debt capacity and an overview of construction financing, related to the school's pending 20-year master plan for the campus.

- The information provided herein is based on financial information included in the FY2022 Audit as well as assumptions of both debt levels and capital campaign receipts associated with future projects.

- Based on current conditions, Waynflete can borrow up $30 million while still meeting the existing covenants of the Bank. Several options exist to finance capital projects through and beyond the construction period.

- This presentation is prepared for informational purposes only and does not serve as a commitment of terms or to lend.

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Current Debt Position

Facility	Commitment (000s)	Balance (000s)	Put/Expiry	Amortize To	Rate	Fixed or Variable	Annual Total Debt Service (000s)	Full Advance Debt Service[1] (000s)
Working Capital LOC	$ 750	$ -	2/28/2025	N/A	6.34%	V	$ -	$ 47.6
Equipment Revolver[2]	$ 250	$ -	2/28/2025	N/A	5.59%	V or F	$ -	$ 56.9
Series 2014 Bond-Tranche A	$ 8,980	$ 8,980	10/28/2029	10/28/2044	4.05%	Swap	$ 580.7	
Series 2014 Bond-Tranche B1	$ 6,003	$ 6,003	10/28/2029	10/28/2044	2.21%	Swap	$ 341.8	
Series 2014 Bond-Tranche B2	$ 2,262	$ 2,262	10/28/2029	10/28/2044	3.98%	V	$ 163.7	
Capital Leases	$ 55	$ 55	2024	N/A	-	F	$ 23.5	
Total / Weighted Average	$ 18,300	$ 17,300			4.13%		$ 1,109.7	$ 1,214.2

Note (1): Assumes WCLOC is fully drawn (rate L+1.75%) and Equipment Revolver is fully drawn with a fixed interest rate (COF+1.75%) amortizing over 5 yrs

Note (2): Availability renews in 2025. Each advance amortizes over up to 5 years. Interest rate based on either floating or fixed (at School's decision)

Note (3): Tranche A swap with Wells Fargo, Tranche B swap with M&T

- Waynflete School currently services approximately $17.3MM in term debt including leases, with a weighted average interest rate of 4.13%
- Bank collateral includes a negative pledge on Waynflete's campus (2 buildings excluded) and a priority UCC lien on all business assets of the school

Key Credit Metrics

	Size		Operating		Liquidity		Leverage
	Revenue (000s)	Total Liquidity[1] (000s)	Debt Service Coverage[2]	Operating Margin	UR Liquidity[1]/ Debt	Total Liquidity[2]/ Debt	Debt/ Capitalization
Bank Requirement			≥1.20		≥0.50		
Actual FYE22	$ 18,770	$ 37,687	3.48	12%	1.56	2.18	31%
Debt + $10MM		$ 47,687	2.24		1.35	1.75	41%
Debt + $20MM		$ 57,687	1.65		1.26	1.55	49%
Debt + $30MM		$ 67,687	1.31		1.20	1.43	55%
Bank Peer Group	$ 22,971	$ 96,592	3.83	7%	2.03	5.91	12%
Moody's Median	$ 48,000	$ 161,000	3.38	5%	N/A	6.35	11%

Note(1): Liquidity increased to mirror the increase in debt; assuming campaign receipts mirror project costs and results in growth of cash/investments

Note(2): Assuming no usage on the working capital line of credit or equipment revolver; with full usage, $30MM of new debt equates to DSC of 1.26x

- Waynflete's current credit profile compares favorably to the Bank's other independent schools and Moody's investment-grade medians
- Additional capacity exists to take on new indebtedness of up to $30MM while maintaining Bank covenants and a solid credit profile
- Strength of existing cash flow gives Waynflete the option of using campaign receipts to build investments/endowment for long-term sustainability of the school and provide financial flexibility with future cash flow needs.

Project Financing Options :: Construction Line of Credit

- Short-term, construction financing can be leveraged in conjunction with future long-term, tax-exempt bonds along with fundraising/campaign receipts
    - Accomplished with a **Construction Line of Credit** or Bridge Loan
- A Construction Line of Credit allows Waynflete to draw on funds in line with the construction schedule and repay project costs on an interest-only basis for a period of up to 3 years, at a variable rate

Facility	Commitment (000s)	Balance (000s)	Put/Expiry	Amortize To	Rate	Fixed or Variable	Annual Total Debt Service (000s)
Total Existing Debt	$ 18,300	$ 17,300	Various	Various	4.13%	Various	$ 1,109.7
New Construction LOC	$ 30,000	$ 20,000	3 years	N/A	6.81%	V	$ 1,362.0
Total Debt / Average	$ 48,300	$ 37,300			5.36%		$ 2,471.7

Fees

Legal fees to close the line of credit; commitment fees and construction monitoring fees

Key Points

- Affords Waynflete sufficient time to consider long-term financing options along with timing of exercisable option in 2029 on existing bonds
- No penalty for undrawn funds, paydown of principal as desired through term of line, and interest-only payments based on drawn funds

Project Financing Options :: Bridge Loan

- Short-term, construction financing can be leveraged in conjunction with future long-term, tax-exempt debt along with fundraising/campaign receipts to fund project costs
    - Accomplished with a Construction Line of Credit or **Bridge Loan**
- A Bridge Loan allows Waynflete to draw 100% of funds on Day One and repay on an interest-only basis for a period of up to 3 years, at a fixed-rate

Facility	Commitment (000s)	Balance (000s)	Put/Expiry	Amortize To	Rate	Fixed or Variable	Annual Total Debt Service (000s)
Total Existing Debt	$ 18,300	$ 17,300	Various	Various	4.13%	Various	$ 1,109.7
New Bridge Loan	$ 30,000	$ 30,000	3 years	N/A	6.53%	V	$ 1,959.0
Total Debt / Average	$ 48,300	$ 47,300			5.43%		$ 3,068.7

Fees

Legal fees to close the Loan; commitment fees and construction monitoring fees TBD

Key Points

- Affords Waynflete sufficient time to consider structure of short- or long-term financing options along with timing of exercisable option in 2029 on existing bonds
- Ability to fix the rate at close, reduce any interest-rate risk through construction
- Funds fully drawn and interest payments based on full loan amount regardless of the construction schedule or need

Project Financing Options :: Tax-Exempt Bond Issuance

- Tax-exempt bonds can be issued through FAME in the form of up to a 10-year term and up to a 30-year amortization, providing material interest rate savings compared to a taxable loan (21% rate discount).
- Bond proceeds can be drawn down on an interest-only basis during construction with the interest rate floating through this period. The interest-only period would run in conjunction with the construction schedule, up to 3 years.

Facility	Commitment (000s)	Balance (000s)	Put/Expiry	Amortize To	Rate	Fixed or Variable	Annual Total Debt Service (000s)
Total Existing Debt	$ 18,300	$ 17,300	Various	Various	4.13%	Various	$ 1,109.7
New Tax-Exempt Bond	$ 30,000	$ 30,000	10 years	N/A	4.60%	V	$ 1,845.5
Total Debt / Average	$ 48,300	$ 47,300			4.38%		$ 2,955.2

Fees

Legal fees for tax-exempt financing could be estimated at $150,000; commitment fees and construction monitoring fees TBD

Key Points

- Long-term certainty with fixed rate and most cost effective with current rate environment
- Three-month lead time needed to close tax-exempt facility

Items to Consider

- Use of capital campaign receipts to grow investments/endowment while financing capital projects with long-term debt. This provides Waynflete continued sustainability, financial flexibility in the future, and the ability to meet debt service obligations of current and future capital projects.

- Waynflete has cash flow strength and balance sheet capacity to take on additional long-term debt and continue to maintain a strong credit profile
  - Long-term debt in the form of a tax-exempt bond allows Waynflete material savings with the rate discount and is most cost effective at this time
  - Long-term financing can be in the form of both variable and fixed-rate to provide structured principal paydown and lessen overall interest-rate risk

- Short-term financing option allows flexibility of debt repayment and alignment with receipt of campaign proceeds, and allows time for the rising interest-rate environment to stabilize or abate

- Potential to reissue a portion of the existing bonds to include future projects

- Ability to enter a derivative instrument to hedge interest-rate risk

Relationship Team

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Scarborough, ME 04074
(207) 883-3339
nquigley.com

Att. G

Romano & to Waynflete School -- War

Know All Men by These Presents,

That We, ALBERT W. ROMANO and RALPH ROMANO, JR., both of Portland, in the County of Cumberland and State of Maine,

in consideration of One Dollar ($1.00) and other valuable consideration,

paid by THE WAYNFLETE SCHOOL, a charitable and educational corporation organized and existing under the laws of the State of Maine and located in said Portland,

the receipt whereof we do hereby acknowledge, do hereby give, grant, bargain, sell and convey unto the said THE WAYNFLETE SCHOOL, its successors

~~heirs~~ and assigns forever, a certain lot or parcel of land with the buildings thereon situated in part on the easterly side of Fletcher Street in the City of Portland, County of Cumberland and State of Maine, bounded and described as follows:

Beginning at a point marked by an iron on the said easterly side of Fletcher Street one hundred and ninety (190) feet northerly from a stone post located at the intersection of the northerly side of Danforth Street and the easterly side of said Fletcher Street, said point of beginning also being the northwesterly corner of land now or formerly of Philip J. Deering, Jr.; thence running easterly by said Deering land sixty (60) feet to an iron; thence running southerly at right angles with said last named course by said Deering land ninety (90) feet to an iron and land now or formerly of the Parent Realty Company; thence running easterly by land of said Parent Realty Company one hundred and three (103) feet to an iron and land now or formerly of the Waynflete Latin School, Incorp.; thence northerly by land of said Waynflete Latin School, Incorp. one hundred fifty-three and three tenths (153.3) feet to a point; thence westerly at right angles with said last named course and by land of said Waynflete Latin School, Incorp. fifty-six (56) feet to an iron; thence northerly by land of said Waynflete Latin School, Incorp. fifty and one-tenth (50.1) feet to an iron situated at the southeast corner of land now or formerly of Sarah A. Wescott; thence westerly by land now or formerly of Sarah A. Wescott one hundred seven and seven tenths (107.7) feet to a passageway leading southerly from Spring Street to Fletcher and Orchard Streets; thence southerly by said passageway and by the easterly line of Fletcher Street ninety-three and nine tenths (93.9) feet to an iron; thence same course southerly twenty (20) feet to an iron and point of beginning.

Subject, however, to certain rights of way and easements as more particularly set forth in a certain Warranty Deed given by Raffaele Romano to Philip J. Deering, Jr., dated September 13, 1926 and recorded in Cumberland County Registry of Deeds in Book 1244, Page 437, to which deed reference is hereby made for a more particular description of said rights and easements.

The above described premises are a portion of the premises conveyed to said Raffaele Romano by Caroline M. Crisfield et al by Warranty Deed dated July 20, 1922 and recorded in said Registry of Deeds in Book 1110, Page 27.

To have and to hold the aforegranted and bargained premises with all the privileges and appurtenances thereof, to the said THE WAYNFLETE SCHOOL, its successors

~~heirs~~ and assigns, to its and their use and behoof forever.

And we do covenant with the said Grantee , its successors ~~heirs~~ and assigns, that we are lawfully seized in fee of the premises, that they are free of all incumbrances, except as aforesaid;
that we have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that we and our heirs shall and will Warrant and Defend the same to the said Grantee , its ~~heirs~~ and assigns forever, against the lawful claims and demands of all persons, except as aforesaid.

In Witness Whereof, we the said ALBERT W. ROMANO and RALPH ROMANO, JR., and Celeste C. Romano, wife of the said Albert W. Romano, and June B. Romano, wife of the said Ralph Romano, Jr.

~~wife of the said~~

joining in this deed as Grantors , and relinquishing and conveying all right by descent and all other rights in the above described premises, have hereunto set our hands and seals this eighth day of October in the year of our Lord one thousand nine hundred and fifty-nine.

Signed, Sealed and Delivered
in presence of

Louis J. Feinstein
to all

Albert W. Romano
Celeste C. Romano
Ralph Romano Jr
June B. Romano

State of Maine. CUMBERLAND, ss. October 8 1959.

Personally appeared the above named Albert W. Romano and Ralph Romano, Jr.

and acknowledged the foregoing instrument to be their free act and deed.

Before me,

Louis J. Feinstein
Justice of the Peace

OCT 9 1959
REGISTRY OF DEEDS, CUMBERLAND COUNTY, MAINE
Received at 11 H 50 M AM, and recorded in BOOK 2505 PAGE 259
Martha W. Staley Deputy Register

281

Know All Men by These Presents,

That I, MILLARD C. WEBBER, JR., of Portland, in the County of Cumberland and State of Maine,

Webber Jr

in consideration of One Dollar ($1.00) and other valuable consideration, being less than One Hundred Dollars ($100.00),

to

Waynflete School

paid by THE WAYNFLETE SCHOOL, a charitable and educational corporation organized and existing under the laws of the State of Maine and located in said Portland,

--

War

the receipt whereof I do hereby acknowledge, do hereby give, grant, bargain, sell and convey unto the said THE WAYNFLETE SCHOOL, its successors

heirs and assigns forever, a certain lot or parcel of land situated Easterly of Fletcher Street, in said Portland, bounded and described as follows: Beginning at an iron at the Northeast corner of the lot of land conveyed by John W. Gordon et al to this Grantor by deed dated October 1, 1959 and recorded in Cumberland County Registry of Deeds in Book 2507, Page 101, said corner marking an angle in land conveyed by Albert W. Romano et al to said Waynflete School by deed dated October 9, 1959 and recorded in said Registry, Book 2505, Page 259; thence by said Waynflete land S 18° 10' E 14.03 feet to an iron; thence by other land of the Grantor N 45° 57' W 15.87 feet to an iron and land of said Waynflete School; said iron also marking the most Easterly corner of other land conveyed by said Waynflete School to the Grantor by deed of even date herewith; thence by said Waynflete School land N 71° 50' E 7.35 feet to the point of beginning, and being a portion of the land conveyed to this Grantor by John W. Gordon et al as aforesaid. Said above described courses are magnetic and of the date of 1955.

Also hereby conveying all my right, title and interest in and to a certain twenty (20) foot right of way over land now of this Grantee, said right of way being more particularly described in the second paragraph of said deed from John W. Gordon et al to this Grantor.

Also hereby conveying all my right, title and interest in the use of the driveway over land now of this Grantee as more particularly described in paragraph three of said deed from John W. Gordon et al to this Grantor.

Also hereby conveying all my right, title and interest in and to a certain gas pipe easement over land now of this Grantee as more particularly described in paragraph three of said deed from John W. Gordon et al to this Grantor.

282 To have and to hold the aforegranted and bargained premises with all the privileges and appurtenances thereof, to the said THE WAYNFLETE SCHOOL, its successors

~~he~~ ___ ___ ___gns, to its and their use and behoof forever.

And I do covenant with the said Grantee , its successors ~~heirs~~ and assigns, that I am lawfully seized in fee of the premises, that they are free of all incumbrances;

that I have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that I and my heirs shall and will Warrant and Defend the same to the said Grantee , its successors ~~heirs~~ and assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof. I, the said MILLARD C. WEBBER, JR.,

and HELEN A. WEBBER,

wife of the said Millard C. Webber, Jr.,

joining in this deed as Grantor , and relinquishing and conveying all right by descent and all other rights in the above described premises, have hereunto set our hands and seals this 30th day of November in the year of our Lord one thousand nine hundred and fifty-nine.

Signed, Sealed and Delivered
in presence of

Carl Beyer

Millard C. Webber Jr.

Helen A. Webber

State of Maine. CUMBERLAND, ss. November 30, 1959.

Personally appeared the above named Millard C. Webber, Jr.

and acknowledged the foregoing instrument to be his free act and deed.

Before me, Carl Beyer
Justice of the Peace
~~Notary Public~~

REGISTRY OF DEEDS, CUMBERLAND COUNTY, MAINE DEC 1 1959
Received at 11 H 57 M A M, and recorded in
BOOK 2513 PAGE 281 Howard P. Thompson Register

No. 166

1620

Know All Men by these Presents,

That I, MAGEL W. BRAWN, of Portland in the County of Cumberland and State of Maine,

in consideration of one dollar ($1.00) and other valuable considerations,

paid by THE WAYNFLETE SCHOOL, a corporation organized and existing under the laws of the State of Maine and having its principal place of business at said Portland, whose address is 356 Spring Street, Portland, Maine 04102,

the receipt whereof I do hereby acknowledge, do hereby give, grant, bargain, sell and convey, unto the said The Waynflete School,

its Successors and Assigns, forever,

the following described property: A certain lot or parcel of land, with the buildings thereon, situated on the easterly side of Fletcher Street in Portland in the County of Cumberland and State of Maine, bounded and described as follows:

Beginning on the easterly side line of said Fletcher Street at the southwesterly corner of that certain lot or parcel of land conveyed to Roy E. Brawn and the Grantor by Alice D. Kilborn by deed, dated August 25, 1952 and recorded in the Cumberland County Registry of Deeds in Book 2100, Page 221; thence easterly by land formerly of T. C. Hersey and parallel with the southerly side line of Spring Street one hundred seven and seven-tenths (107.7) feet to the westerly side of a passageway about thirteen (13) feet wide leading southerly from Spring Street to the former residence of the late T. C. Hersey; thence northerly by said passageway thirty and one hundredth (30.01) feet to a drill hole; thence westerly at an included angle of ninety-one degrees forty-five minutes (91° 45') with the last described course one hundred six and eighty-four hundredths (106.84) feet, more or less, to a drill hole in said easterly side line of Fletcher Street; thence southerly by said easterly side line of Fletcher Street thirty (30) feet to the point of beginning.

Being a portion of the premises conveyed to Roy E. Brawn and Magel W. Brawn, as joint tenants and not as tenants in common, by Alice D. Kilborn by said deed, dated August 25, 1952 and recorded in said Registry of Deeds in Book 2100, Page 221. The said Roy E. Brawn died on May 13, 1961.

To have and to hold the aforegranted and bargained premises, with all privileges and appurtenances thereof to the said The Waynflete School, its Successors and Assigns, to its and their use and behoof forever.

And I do covenant with the said Grantee, its Successors and Assigns, that I am lawfully seized in fee of the premises; that they are free of all incumbrances;

that I have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that I and my Heirs, shall and will Warrant and Defend the same to the said Grantee, its Successors and Assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof, I, the said Hagel W. Brawn, being a widow,

[illegible] have hereunto set my hand and seal this eighteenth day of January in the year of our Lord one thousand nine hundred and seventy-three.

Signed, Sealed and Delivered in presence of

Hagel W. Brawn

State of Maine,
Cumberland } ss. January 18, 1973

Personally appeared the above named Hagel W. Brawn and acknowledged the above instrument to be her free act and deed.

Before me,

Notary Public

JAN 23 1973

REGISTRY OF DEEDS, CUMBERLAND COUNTY, MAINE
Received at 1 H 25 M P.M. and recorded in
BOOK 3353 PAGE 19

Register

Know all Men by these Presents, That

Waynflete Latin School, Incorporated, a corporation duly organized under and existing by the laws of the State of Maine and having a place of business at Portland, in the County of Cumberland and State of Maine, in consideration of one dollar and other good and valuable considerations to it paid by The Waynflete School, a literary, educational and scientific corporation organized and existing under the provisions of Chapter 70 of the Revised Statutes of Maine and all acts additional thereto and amendatory thereof, and located at said Portland,

the receipt whereof is ~~do~~ hereby acknowledged do hereby give, grant, bargain, sell and convey unto the said The Waynflete School, its successors and assigns forever, A certain lot or parcel of land with the buildings thereon, situated in said Portland, and bounded and described as follows: Beginning at a point in the northeasterly side line of land conveyed by Caroline M. Crisfield and Agnes P. Lowell to Raffaele Romano by deed dated July 20, 1922, and recorded in Cumberland County Registry of Deeds in Book 1110, at page 27, said point being distant along said northeasterly side line one hundred(100) feet from the northerly side line of Danforth Street; thence south, seventy-one degrees (71°) thirty minutes(30') west, a distance of sixty(60) feet to a point; thence north, eighteen degrees(18°) thirty minutes(30') west, a distance of one hundred fifty-three and three tenths(153.3) feet, to a point; thence south, seventy-one degrees(71°) thirty minutes(30') west, a distance of fifty-six (56) feet to a point; thence north, eighteen degrees(18°) thirty minutes(30') west, a distance of fifty and seven-hundredths(50.07) feet to the southwesterly corner of a thirteen(13) foot passageway described in a deed from Margaret C. Dudley to said Crisfield and Lowell, dated April 30, 1912, and recorded in said Cumberland County Registry of Deeds in Book 891, at page 310; thence north, seventy-one degrees(71°) thirty minutes(30') east, along the northwesterly side line of land conveyed by said Crisfield and said Lowell to said Romano, a distance of one hundred sixteen(116) feet to the northerly corner of land so conveyed and to the land of Charles Cook; thence south, eighteen degrees(18°) thirty minutes(30') east, by land of said Cook and by land of the late Edward Fox, along the northeasterly side line of land conveyed as aforesaid by said Crisfield and Lowell to said Romano, a distance of two hundred three and thirty-seven hundredths(203.37) feet to the point of beginning; together with said certain thirteen(13) foot passageway running from the lot hereby conveyed to Spring Street, said passageway being bounded on the west by land now or formerly of George P. Wescott and on the east by land now or formerly of Julia St.F. Thaxter, subject, however, to rights of passage and use heretofore granted to and in said passageway.

The grantor hereby conveys to The Waynflete School the right to maintain for efficient service to the property hereby conveyed, a sewer, water pipes and gas and electric connections in the present location of such sewer, water pipes and gas and electric connections or in any other location provided by said Raffaele Romano or his heirs and assigns.

The premises herein conveyed are subject to a right of way reserved by said Raffaelo Romano for himself, his heirs and assigns, from the land now or formerly belonging to him adjoining the land hereby conveyed on the southwest to said passageway leading to Spring Street and also rights of passage over said passageway leading to Spring Street, said right of way to be an extension of said passageway.

This conveyance is made subject to a certain mortgage from the said Waynflete Latin School, Incorporated to the Maine Savings Bank, dated July 2, 1928 and recorded in said Cumberland County Registry of Deeds, Book 1294, Page 50, which grantee assumes and agrees to pay.

U.S.I.R. $1.00 W.L.S. Inc. 3/20/35

To Have and to Hold the aforegranted and bargained premises, with all the privileges and appurtenances thereof, to the said The Waynflete School, its successors ~~heirs~~ and assigns, to its and their use and behoof forever. And it does ~~do~~ covenant with the said grantee, its successors ~~heirs~~ and assigns, that it is lawfully seized in fee of the premises; that they are free of all in cumbrances; except as above set out, that it has ~~have~~ good right to sell and convey the same to the said grantee to hold as aforesaid; and that it and its successors ~~heirs~~, shall and will warrant and defend the same to the said grantee, its successors ~~heirs~~ and assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof, the said Waynflete Latin School, Incorporated has caused these presents to be signed and its corporate seal to be hereunto affixed by Anne M. Gannett, its President and Philip C. Keith, its Treasurer, hereto duly authorized,

~~hand and seal~~ this 20th day of March ~~have hereunto set~~ in the year of our Lord one thousand nine hundred and thirty-five.

Signed, Sealed and Delivered in presence of

Florence M. Hollywood

Florence M. Hollywood

WAYNFLETE LATIN SCHOOL, INCORPORATED
CORPORATE SEAL
By Anne M. Gannett, its President
And Philip C. Keith, its Treasurer

State of Maine, CUMBERLAND, ss. March -- 1935. Personally appeared the above named Anne M. Gannett, and acknowledged the above instrument, by her signed to be the free act and deed. of the Waynflete Latin School, Incorporated and of herself as President.

Before me, Florence M. Hollywood, Notary Public, Notarial Seal. ~~Justice of the Peace.~~

Received March 20, 1935, at 3 o'clock 30 m. P. M., and recorded according to the original

Received March 30, 1935, at 11h 25m A. M., and recorded according to the original -

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'Parent Realty Co. to Waynflete School War.

U.S.I.R. $1.00 P.R.C. 3/30/35

KNOW ALL MEN BY THESE PRESENTS, That Parent Realty Co., a corporation organized under and existing by the laws of the State of Maine and located at Portland, in the County of Cumberland and State of Maine, in consideration of one dollar and other good and valuable considerations to it paid by The Waynflete School, a literary, educational and scientific corporation organized and existing under the provisions of Chapter 70 of the Revised Statutes of Maine and all acts additional thereto and amendatory thereof, and located at said Portland, the receipt whereof is hereby acknowledged, do hereby give, grant, bargain, sell and convey unto the said The Waynflete School, its successors and assigns forever,

A certain lot or parcel of land situated on the Northerly side of Danforth Street, in Portland, in said County, and bounded and described as follows: Beginning on said side of said Danforth Street at the Southeasterly corner of a certain lot of land conveyed to Raffaele Romano by Caroline M. Crisfield and Agnes P. Lowell by deed dated July 20, 1922, and recorded in Cumberland County Registry of Deeds in Book 1110, Page 27, which corner is on the division line between the land hereby conveyed and land now or formerly of the Estate of Edward Fox, and running thence Northwesterly by said division line one hundred (100) feet, more or less, to land conveyed by said Romano to Waynflete Latin School, Incorporated, by deed dated December 10, 1923, and recorded in said Registry in Book 1158, Page 29; thence Southwesterly by said Waynflete Latin School land to the Southwesterly corner thereof; thence continuing Southwesterly to the Southeasterly corner of a lot of land conveyed by said Romano to Philip J. Deering, Jr., by deed dated September 13, 1926, recorded in said Registry in Book 1244, Page 437; thence continuing Southwesterly by said Deering land to Fletcher Street; thence Southeasterly by said Fletcher Street to Danforth Street; thence Northerly by said Danforth Street to the place of beginning.

Being the same premises conveyed to this Grantor by said Raffaele Romano by warranty deed dated May 19th, 1927, and recorded in said Registry in Book 1265, Page 286.

This conveyance is made subject to a reservation, however, in favor of said Raffaele Romano, his heirs and assigns, of the right to maintain and use a certain sewer running from a building on adjoining land of said Romano across the land hereby conveyed to Danforth Street, with the right to enter whenever necessary upon the land hereby conveyed for the purpose of cleaning, repairing, replacing and removing said sewer, and in the event of such entry the premises are to be restored to their previous condition at the expense of said Romano, his heirs and assigns, exercising such right. Provided, however, that said sewer right may be terminated at any time by the Grantee, its successors and assigns, by giving notice of such termination in writing to the then owner of said adjoining premises served by said sewer, and, in the event of such notice, the then owner of said adjoining premises shall, with-

in ninety (90) days of the receipt of said notice, remove and discontinue the use of said sewer at his expense and shall have the right at his expense to run a sewer across the land hereby conveyed at a location to be designated by the Grantee, its successors or assigns, such location to be suitable for the proper drainage of said adjoining premises of said Romano, his heirs and assigns; and the owners of said adjoining premises and of the premises hereby conveyed shall have the same rights and privileges as to said sewer as are herein provided in connection with the existing sewer.

TO HAVE AND TO HOLD the aforegranted and bargained premises with all the privileges and appurtenances thereof, to the said The Waynflete School, its successors and assigns, to its and their use and behoof forever.

And it does covenant with the said Grantee, its successors and assigns, that it is lawfully seized in fee of the premises, that they are free of all incumbrances except as above set out, that it has good right to sell and convey the same to the said Grantee to hold as aforesaid; and that it and its successors, shall and will warrant and defend the same to the said Grantee, its successors and assigns forever, against the lawful claims and demands of all persons.

IN WITNESS WHEREOF, the said Parent Realty Co. has caused these presents to be signed and a wafer seal which it adopts as its corporate seal to be hereunto affixed by Spaulding Bisbee, its President and William D. Ireland, its Treasurer, hereto duly authorized this 30th day of March, in the year of our Lord one thousand nine hundred and thirty-five.

Signed, Sealed and Delivered in Presence of

Florence M. Hollywood — PARENT REALTY CO. Seal

By Spaulding Bisbee, Its President

Marguerite T. Mahoney — And William D. Ireland Its Treasurer

State of Maine. Cumberland,ss. March 30th, 1935. Personally appeared the above named Spaulding Bisbee and acknowledged the above instrument by him signed to be the free act and deed of the Parent Realty Co. and of himself as President.

Before me, Roger V. Snow Justice of the Peace

Received March 30, 1935, at 11h 45m A. M., and recorded according to the original

---

Thomas to Thomas Disch.

KNOW ALL MEN BY THESE PRESENTS, That I, Claud_H. Thomas of Otisfield, in the County of Cumberland and State of Maine mortgagee owner of a certain mortgage given by Lester F. Thomas of Otisfield, in the County of Cumberland and State of Maine to me dated March 30, 1934 A. D. and recorded in Cumberland Registry of Deeds, Book 1435, Page 196, do hereby acknowledge that I have received full payment and satisfaction of the same and of the debt thereby secured, and in consideration thereof I do hereby cancel and discharge said mortgage, and release unto the said Lester F. Thomas, his heirs and assigns forever the premises therein described.

IN WITNESS WHEREOF, I the said Claud_ H. Thomas have hereunto set my hand and seal this twenty-ninth day of March A. D. 1935.

222

Know all Men by these Presents, That

I, Ethel Fox Baxter, of Cape Elizabeth in the County of Cumberland and State of Maine,

in consideration of one dollar and other valuable considerations paid by Waynflete School, a corporation organized and existing under the laws of the State of Maine and located at Portland in said County of Cumberland and State of Maine, the receipt whereof I do hereby acknowledge, do hereby give, grant, bargain, sell and convey unto the said Waynflete School, its successors and assigns forever, the following described property:

A certain lot or parcel of land with the buildings thereon situated on the northerly side of Danforth Street and westerly side of Storer Street in said City of Portland, bounded and described as follows: Beginning on the northerly side of Danforth Street at the easterly corner of land formerly of T. C. Hersey; thence easterly on Danforth Street one hundred seventy-four (174) feet six and one-half (6½) inches to the center line of Storer Street; thence northerly parallel with said Hersey line and in the middle line of said Storer Street two hundred twenty-seven (227) feet more or less to a point equally distant from Spring Street and Danforth Street; thence westerly one hundred seventy-four (174) feet six and one-half (6½) inches to said Hersey land; thence southerly by said Hersey land to said Danforth Street at the point of beginning, subject to the location of the westerly half of a way twenty-five (25) feet wide now known as Storer Street.

Being the same premises conveyed to me by Clinton L. Baxter, Trustee, by deed dated April 23, 1901, recorded in Cumberland County Registry of Deeds in Book 851, Page 77.

U.S.I.R.
$7.70
E.F.B.
10/1/42

To Have and to Hold the aforegranted and bargained premises, with all the privileges and appurtenances thereof, to the said Waynflete School, its successors ~~heirs~~ and assigns, to its and their use and behoof forever. And I do covenant with the said Grantee, its successors ~~heirs~~ and assigns, that I am lawfully seized in fee of the premises; that they are free of all incumbrances; that I have good right to sell and convey the same to the said Grantee to hold as aforesaid; and that I and my heirs, shall and will warrant and defend the same to the said Grantee, its successors ~~heirs~~ and assigns forever, against the lawful claims and demands of all persons.

In Witness Whereof, I, the said Ethel Fox Baxter by Ellen B. Moyer, my Attorney acting under power of Attorney, dated February 12, 1942 and recorded in Cumberland County Registry of Deeds, said Ethel Fox Baxter being a widow, have hereunto set my hand and seal this first day of October in the year of our Lord one thousand nine hundred and forty-two.

Signed, Sealed and Delivered in presence of

John F. Dana — Ethel Fox Baxter — Seal

by Ellen B. Moyer, her attorney

State of Maine, CUMBERLAND, ss. October 1, 1942. Personally appeared the above named Ellen B. Moyer, Attorney for Ethel Fox Baxter, and acknowledged the above instrument to be her free act and deed. in her said capacity and the free act and deed of said Ethel Fox Baxter.

Before me, John F. Dana, Justice of the Peace.

Received October 1 19 42, at 1 o'clock 44 m. P. M., and recorded according to the original.

EASEMENT DEED

This Easement deed is dated as of this 21st day of September, 2006 by and between **Helen A. Webber** of 11 Fletcher Street, Portland, Maine ("Grantor") and **The Waynflete School**, a Maine non-profit corporation having a mailing address of 360 Spring Street, Portland Maine 04102 ("Grantee").

WHEREAS, Grantee has enjoyed the permissive use of a portion of the land of Grantor located at 11 Fletcher Street ("Grantor's Land") for many years as the location of an existing paved walkway (the "Walkway") for pedestrian access to the adjacent Waynflete School campus (the "Campus"); and

WHEREAS, in exchange for Grantor's permission, Grantee has performed services upon and provided benefits to Grantor's Land in recognition of Grantor's generosity and permission to use the Walkway; and

WHEREAS, Grantor and Grantee wish to create perpetual easement rights in favor of Grantee for the continued use of the Walkway to access the Campus, and to create an obligation on the part of Grantee to continue to perform services to Grantor's Land for as long as Grantor shall live thereupon;

NOW THEREFORE, for Three Thousand Dollars ($3,000), the mutual promises and covenants herein contained, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Grantor and Grantee hereby covenant and agree as follows:

1. Grantor does hereby grant to Grantee, its successors and assigns, a perpetual right and easement for the use of the Walkway in or near its existing location, for use by Grantor, its agents, servants, students and invitees, for the purpose of pedestrian access to the Campus from Fletcher Street and/or Orchard Street, together with a further right and easement in and to the area of Grantor's Land near the Walkway as identified in the sketch attached hereto as **Exhibit A** (such area and the Walkway together known herein and depicted on Exhibit A as the "Easement Area," being generally located north and northwesterly of the existing garage on Grantor's Land), for the purpose of access to the Walkway with personnel and equipment for the maintenance and improvement of the Walkway from time to time to keep it in a safe and attractive condition. Grantee shall further be allowed within the Easement Area to locate landscaping, fencing, lighting, or other related improvements consistent with the ongoing use of the Walkway for the purposes set forth herein, so that its appearance may be integrated with that of the rest of the Campus. Grantee shall have the specific right to construct and maintain a fence line from the corner of the existing garage on Grantor's Land extending across the Walkway to the gymnasium located on the Campus. Grantee shall have the right to resurface (pave) the Walkway from time to time, and shall have a right to reasonably alter or widen its location within the Easement Area consistent with the further terms and conditions hereof. For the purposes of this Easement, "pedestrian access" to the Campus shall

include access by bicycle, wheelchair, or other non-motorized means of conveyance.

2. Grantee shall keep and maintain the Walkway in a good, safe and attractive condition, such maintenance being the sole responsibility of Grantee. Grantee shall provide reasonable advance notice to Grantor prior to the commencement of any work within the Easement Area that shall create unusual noise, vibration, dust, or disturbance.

3. Grantee agrees that (i) any entry or work upon the Easement Area shall not materially adversely interfere with Grantor's use of the remaining portions of Grantor's Land; and (ii) in connection with any entry upon or work performed in or upon the Easement Area by Grantee that shall impact Grantor's Land in any way, Grantee shall promptly and fully restore the property to the same or better condition as existed prior to the entry or work (this shall not act as a license to enter Grantor's Land outside of the Easement Area without advance permission); and (iii) all work that is performed by Grantee shall be performed in a good and workmanlike manner. Grantee shall require any of its contractors or agents performing work upon the Easement Area to carry types and amounts of insurance as are usual and customary.

4. Grantee agrees to indemnify and hold harmless Grantor from and against any and all damages, liabilities, losses, expenses, claims and suits (including the cost of defending the same or enforcing this indemnity, including reasonable attorneys' fees) incurred or suffered in consequence of either bodily injury to any person (including death) or damage to any property arising directly out of Grantee's acts or omissions related to the easement granted hereby, or the exercise by Grantee of the rights granted by this easement or the breach or violation of the terms hereof by Grantee. This indemnity shall not apply, however, to any costs, damages, claims, losses, suits, fees or injuries arising from Grantor's own negligence, recklessness, or willful misconduct.

5. In consideration of the Easement herein described, Grantee further agrees and covenants that during the time that Grantor Helen A. Webber shall reside at the house located on Grantor's Land ("Grantor's House"), Grantee shall mow the lawn around Grantor's House, plow the sidewalk and driveway serving Grantor's House, and promptly remove and dispose of any and all litter or debris which may accumulate on or near the Easement Area. The foregoing obligation as to mowing and plowing shall terminate upon the death of Grantor Helen A. Webber, or upon any conveyance of Grantor's Land other than to a trust or entity controlled by or created for the benefit of Helen A. Webber personally. The obligation for removal of rubbish and debris shall continue as reasonably associated with Grantee's maintenance obligations as to the Easement Area. The termination of Grantee's obligations under this Section 5 shall not revoke, affect, or diminish Grantee's perpetual easement rights described above in any way.

Witness my hand and seal this 21st day of September, 2006.

~~WITNESS~~

Helen A. Webber

State of Maine
County of Cumberland

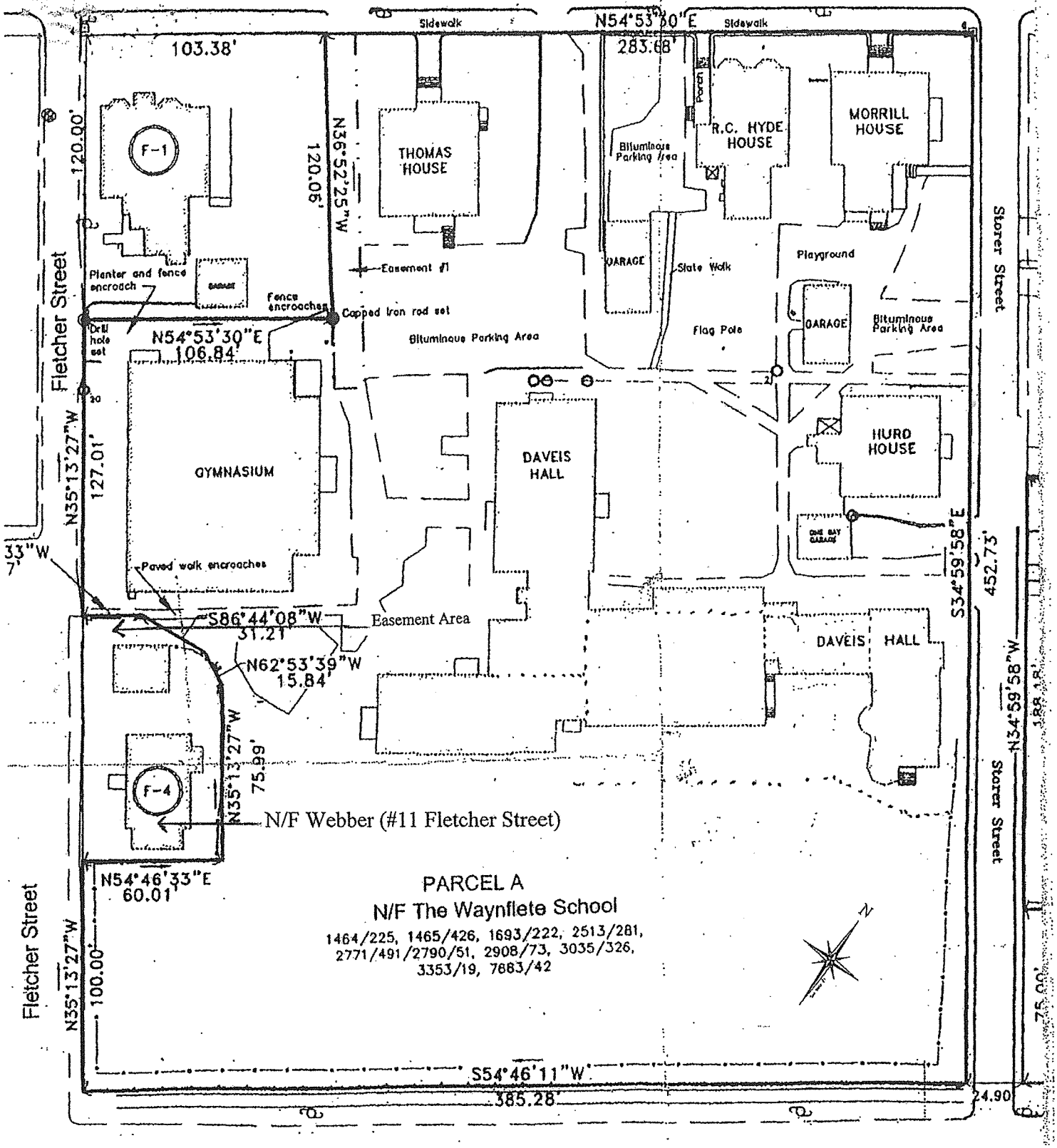
September 21, 2006

Then personally appeared before me the above named Helen A. Webber and acknowledged the foregoing instrument to be her free act and deed.

Before me,

~~Notary Public~~/Attorney at Law

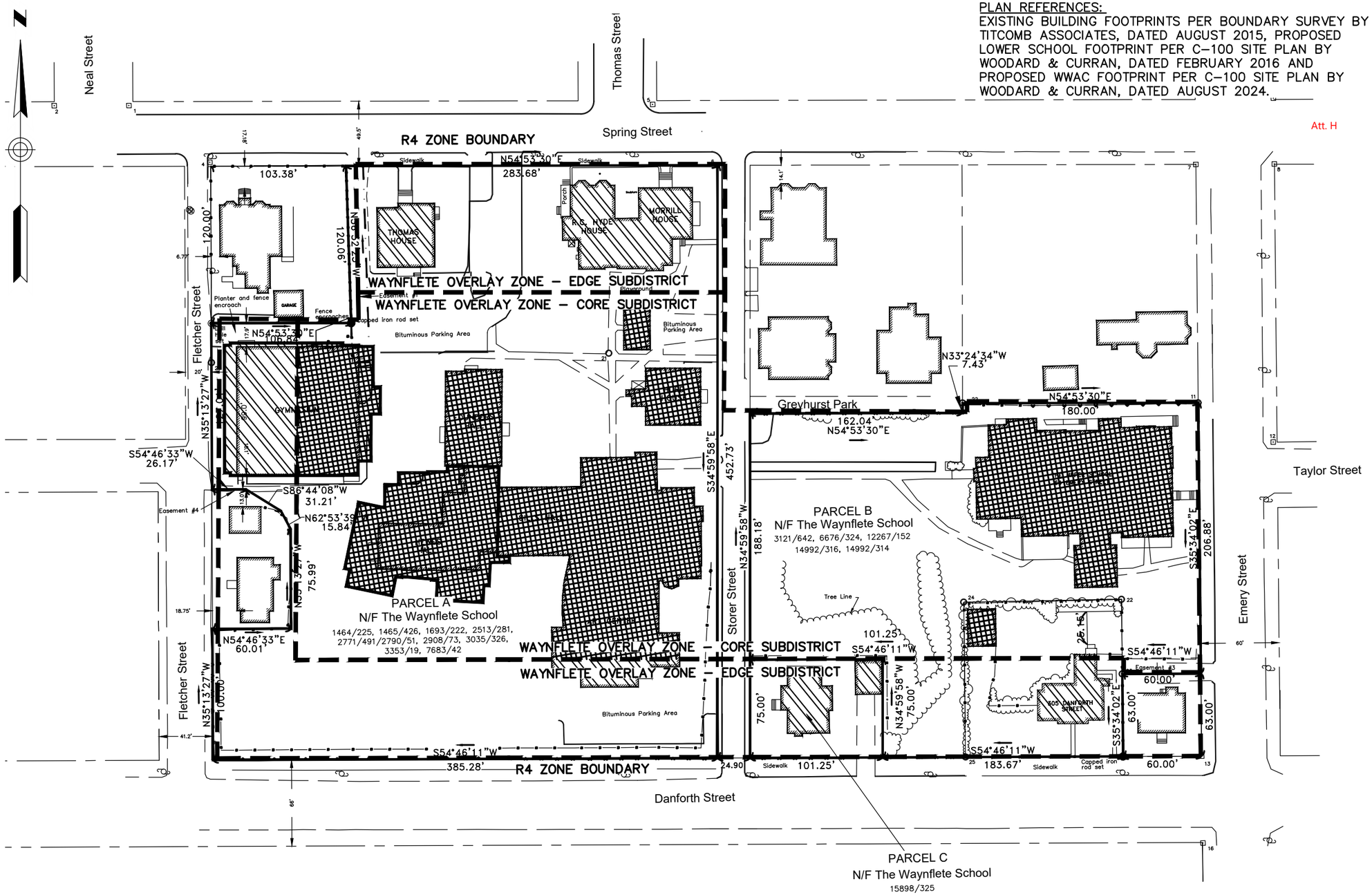
MICHAEL H. HILL



Received
Recorded Register of Deeds
Sep 25,2006 02:11:57P
Cumberland County
John B OBrien

PLAN REFERENCES:
EXISTING BUILDING FOOTPRINTS PER BOUNDARY SURVEY BY TITCOMB ASSOCIATES, DATED AUGUST 2015, PROPOSED LOWER SCHOOL FOOTPRINT PER C-100 SITE PLAN BY WOODARD & CURRAN, DATED FEBRUARY 2016 AND PROPOSED WWAC FOOTPRINT PER C-100 SITE PLAN BY WOODARD & CURRAN, DATED AUGUST 2024.

Att. H



80' 0 80' 160'

BAR SCALE
1" = 80'
CHECK GRAPHIC SCALE BEFORE USING

HATCH LEGEND	WAYNFLETE OVERLAY SUBDISTRICT	TOTAL WAYNFLETE PROPERTY AREA	BUILDING AREA	COVERAGE BY BUILDINGS	
				ALLOWED	ACTUAL
	CAMPUS CORE	155,520 S.F.	51,273 S.F.	40%	33.0%
	CAMPUS EDGE	88,720 S.F.	18,302 S.F.	30%	20.6%

Woodard & Curran
12 Mountfort Street
Portland, Maine 04101
800.426.4262 | www.woodardcurran.com

THIS DOCUMENT IS THE PROPERTY OF WOODARD & CURRAN AND ITS CLIENT. REPRODUCTION OR MODIFICATION WITHOUT WRITTEN PERMISSION IS PROHIBITED.

PERMITTING

CLIENT INFO:
WAYNFLETE SCHOOL
360 SPRING STREET
PORTLAND, ME

JOB NO:	0235326.00
DATE:	9/9/2024
SCALE:	AS NOTED
DESIGNED BY:	LJS
DRAWN BY:	BCM/LJS
CHECKED BY:	LJS
FILENAME:	AREA CALC.dwg

DRAWING TITLE:
AREA COVERAGE FIGURE

DRAWING NO:
FIGURE 2-1

3. CONSISTENCY WITH CITY OF PORTLAND SITE PLAN REVIEW STANDARDS

The project design has considered the Site Plan Review Standards as outlined in Section 146 of the City of Portland Land Use Code. These standards were all considered when the project initially received approval as part of the 2016 Level III Site Plan, and the original approach to meet these standards remains. This section describes the applicable standards and how the project proposes to meet them.

3.1 14.6.1 Transportation Standards

The project is not anticipated to have impacts on site traffic. The replacement of the existing gymnasium on the site is intended to provide improved facilities and capacity for the school's existing users – its students and staff, which is not anticipated to have an impact on traffic.

3.1.1 Impact on surrounding street systems

The proposed facility will not have an impact on the surrounding street systems. The existing facility is being demolished, and the new gym will be installed in the same location. The facility is located adjacent to Fletcher Street, a narrow local street. The proposed facility will not encroach on this City street.

3.1.2 Access and circulation

There is no direct vehicular access in the existing or proposed conditions for the gymnasium. The existing access and circulation patterns for the overall Waynflete campus will remain the same following this project.

3.1.3 Public transit access

Waynflete, as a school, takes full advantage of available public transit access, and provides additional transit options as part of their own operations. The Waynflete campus is located on METRO Route 8, and as part of their existing operations, as noted in their Transportation and Parking Demand Management Plan, the school makes bus passes available to its staff. School bus service is also made available to students within the greater Portland area.

3.1.4 Parking

This project does not include any changes to parking on the Waynflete campus. The project is not anticipated to have a significant impact on parking needs for the school as its primary intent is to improve quality and services associated with existing operations, not provide additional capacity. The Transportation and Parking Demand Management Plan that was previously approved to include the gymnasium reconstruction included an analysis of parking supply and demand and is attached and discussed below.

3.1.5 Transportation Demand Management (TDM)

The Waynflete School has an existing Transportation and Parking Demand Management Plan that was created by Gorrill Palmer and first issued in 2008. This plan was last updated in 2016 as part of the Site Plan permitting process for the Lower School and the Gymnasium. This plan remains in place and is currently utilized by the school. A copy of the 2016 Plan has been included with this site plan application for reference.

3.2 14.6.2 Environmental Quality Standards

3.2.1 Preservation of significant natural features

The project will be demolishing the existing gymnasium and placing the new facility in the same location. There are no significant natural features located in the vicinity of the project.

3.2.2 Landscape preservation

Existing site landscaping will be preserved, including landscaping features that were previously installed with the approved Site Plan for the Lower School. With the new facility's placement in the same location as the existing gymnasium, there will be minimal impact on existing landscaping except for the removal of trees and other vegetation in the area immediately around the gymnasium. This vegetation will be replaced by new plantings as outlined on the landscaping plans.

3.2.3 Site landscaping & buffers

A site landscaping plan is included as part of the submitted project plans. With the proposed facility being located where the existing gymnasium is located, the primary focus for new landscaping is along the new building's north and west faces, buffering the building from Fletcher Street and abutting properties.

Per the City's Site Plan standard, a minimum of one shade tree or six plantings is required per 30 linear feet of property frontages as measured along the property line. Considering the gymnasium specifically, the frontage along Fletcher Street is approximately 127 linear feet, requiring 5 trees or groups of plantings. As shown on the landscape plans, this quantity will be exceeded with trees, shrubs, perennials, and ornamental grasses. The proposed plantings will also provide replacement for the existing trees and vegetation being removed to complete the work.

3.2.4 Water quality, stormwater management, and erosion control

A stormwater management plan was approved as part of the Level III Site Plan for the Lower School and Gymnasium. The stormwater system was installed with the Lower School construction and installed a manhole to utilize for the connection of the gymnasium when it was constructed. Please see the attached stormwater memo which outlines how the original system was designed to consider this future construction.

3.3 14.6.3 Public Infrastructure and Community Safety Standards

3.3.1 Consistency with City master plans

The project will not result in any inconsistencies with City master plans. The proposed building will be in the same location as the existing facility and no access changes are proposed as part of this project.

3.3.2 Public safety and fire protection

Building construction takes into consideration current code requirements relative to requirements for life safety. A Life Safety Plan and Code Summary sheet has been included with this application.

The project will not result in any changes to site access or emergency vehicle access.

3.3.3 Public utilities

At the time of the previous site plan approval, utility design took into consideration the future construction of the gymnasium. New utility services were installed that allow for connection internal to the site with the gymnasium. The only new utility service being proposed is a natural gas connection from Fletcher Street. As part of this project, we are communicating with these utilities to confirm prior project assumptions. Updated confirmation of utility ability to serve will be provided when received.

3.4 14.6.4 Site Design Standards

3.4.1 Massing, ventilation, and wind impact

The proposed building will be in the same location as the existing building, and there will not be a reduction in ventilation or change in wind impact due to the proposed structure.

3.4.2 Shadow

There will not be any adverse impacts due to shadow on publicly accessible open space due to the proposed construction.

3.4.3 Snow and ice loading

Waynflete currently manages snow on their property, clearing snow following storm events and removing it as necessary. The school's existing plan for snow removal will not change due to the replacement of the gymnasium.

3.4.4 View corridors

The proposed building will be in the same location as the existing building, and there will not be an impact on existing view corridors.

3.4.5 Historic resources

The school is located within an existing Historic District, and the project will be reviewed by the Historic Preservation Board.

3.4.6 Exterior lighting

Lighting associated with this project will be provided using building mounted fixtures. Included with this application is a photometrics plan considering these fixtures as well as a cut sheet of the proposed fixtures.

3.4.7 Noise and vibration

All heating and ventilation systems are being designed to meet applicable state and federal emission requirements and will not impact abutting properties.

3.4.8 Signage and wayfinding

Any anticipated signage for the new gymnasium will be located within the Waynflete campus, and sign permitting will be completed as required.

3.4.9 Design standards

The proposed building design considers the facility's location within a Historic District and will be reviewed by the Historic Preservation Board.

3.5 Construction Management Plan

Zachau construction has been brought on board to act as the Construction Manager for the project. They have developed a Construction Management Plan that has been included with this application.

3.6 Attachments

- Existing Transportation and Parking Demand Management Plan (uploaded separately to Documents folder)
- Stormwater Management Memo (uploaded separately to Documents folder)
- Life Safety and Code Summary Plan (uploaded separately to Drawings folder)

Portland, Maine Yes. Life's good here.

Planning & Urban Development Department

ZONING ANALYSIS Relevant Zone(s) R4 and Waynflete Overlay

All Projects:

	Required	Proposed	
Lot Size	6,000 SF	No change	Applies to entire campus area
Area Per Dwelling Unit	N/A	N/A	
Minimum Street Frontage	50'	No change	Applies to entire campus area
Front Yard Minimum	15.63'	15.7'	
Front Yard Maximum	N/A	N/A	
Rear Yard	10.1'	10.1'	
Yard Right	N/A	N/A	
Yard Left	9.76'	10.2'	
Side Street Setback	N/A	N/A	
Step Back	N/A	N/A	
Maximum Lot Coverage	40%/30%	33.0%/22.6%	Waynflete Overlay is split into Core and Edge Districts
Minimum Lot Coverage	N/A	N/A	
Maximum Height	35'	34.125'	
Open Space	N/A	N/A	
Maximum Impervious Area	N/A	N/A	
Pavement Setback	N/A	N/A	
Floor Area Ratio	N/A	N/A	
Off Street Parking Spaces	N/A	N/A	
Loading Bays	N/A	N/A	
Other 1			
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):			

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Waynflete School
Updated - Transportation and Parking Demand Management Plan (TPDM)
May 2016

Introduction

Background:

In 2007 Waynflete School received site plan approval from the City of Portland for the construction of a new 276 seat theater (379 occupancy limit) on their existing campus. The Theater was constructed and has been operational since January 2009. While student enrollment did not increase as a result of the project, the approval from the City of Portland to construct the Arts Center included several conditions. The City of Portland required that Waynflete complete a parking management plan with respect to event parking as a condition of their site plan approval. The specific condition #9 is as follows:

"With respect to the event parking, the applicant will provide a written parking management plan prior to issuance of Certificate of Occupancy and a performance report no less than 18 months to 2 years following Certificate of Occupancy to evaluate effectiveness of the parking management plan. Any identified deficiencies in parking will be rectified by an amendment to the parking management plan subject to approval by the Planning Authority. Prior to the Planning Authority approval, Waynflete shall provide a copy of the plan to the Western Promenade Neighborhood Association for input."

Waynflete retained Gorrill Palmer to create a Transportation and Parking Demand Management Plan (TPDM), which was completed, submitted to the City, and approved November 17, 2008. Since that approval and the creation of a TPDM, a Six Month Interim Assessment was issued in June 2009 and then a Performance Report was issued January 7, 2011. As of the writing of this revised TPDM, all of the action items in the 2008 "Timetable for Plan Action Items" have been completed, with the on-going items still active.

Current:

Waynflete is an independent day school with a student population of over 550 students and employs approximately 110 full-time faculty and staff, bringing approximately 660 individuals to and from the School on a daily basis.

Waynflete is currently planning to upgrade and expand the Lower School and to raze the existing athletic facility and construct a new 600 seat gymnasium. The upgraded and expanded Lower School is not expected to significantly increase traffic or parking demands in the area. However, since the new gymnasium will increase its bleacher capacity from 150 to 600 seats, traffic and parking may increase as a result on occasion. The purpose of this Updated TPDM is to update the previous plan such that it considers the new gymnasium and all of the current policies and procedures Waynflete is currently implementing to reduce the impact of traffic and parking on the adjacent streets and neighborhood.

Parking Supply

There are currently 43 on-campus parking spaces in three parking lots that are used by faculty/staff, visitors, and school vehicles during the school day and are available for night events. In addition, there are 25 rented parking spaces at the First Church of Christ Scientist for school day use. On a couple of occasions the School has rented the Church lot for a night or weekend event. In addition to the on campus and rented parking spaces, there are approximately 640 on street parking spaces identified in a previous study by Gorrill Palmer. These 640 spaces ranged from mostly unrestricted and 2 hour parking during the day down to a few spaces that only allow 15 minutes. Previous studies have all indicated that there is sufficient parking in the area with ample additional parking supply to accommodate additional parking. This was verified in discussions with City staff.

Increase in Traffic or Parking Demand

The proposed Lower School upgrade and expansion is not forecast to significantly impact the traffic volume and parking demand in the area. The existing athletic facility is currently 150 seats and the new gymnasium is planned for 600 seats, an increase of 450 seats. It should be noted that the primary reason for providing 600 seats is that the new design will provide an on-campus location that will seat the entire student body. Although the current gym can hold the entire student body for all school assemblies seated on the floor, there is little room for presenters or performers during those activities. These all-school assemblies during the school day involve the same number of students, faculty and staff as they do now and will not increase traffic volume or parking demand in the area.

Other than the on-campus assemblies, the next largest seating demand anticipated for the new gymnasium will be varsity basketball games. During the 2015-2016 season there were only 10 weekdays that had varsity basketball games. Of those, only a handful are against competition (e.g Falmouth, Yarmouth, Cape Elizabeth) that would be expected to generate any significant additional traffic volume. For these games, the gymnasium could experience a potential seating of up to 400 spectators – nearly equivalent to full occupancy for the Theater. Gorrill Palmer had used an occupancy rate for the previous theater of 2.5 persons per vehicle. For the basketball

events we would anticipate a higher occupancy rate of 3.0. Although we could not verify a rate for this specific size and type of use, the closest we could find was from the ITE 4th Edition of the Parking Generation Manual, using "Live Theater". This use suggests a rate of 0.33 spaces per seat, which is equivalent to a ratio of 3 persons per vehicle, and falls between the 2.5 used for the previous theater and 3.5 which was used for the approved Thompsons Point basketball court. Therefore, the 3.0 appears reasonable. Using the 3.0 persons per vehicle rate, the forecasted demand should yield the need for approximately 134 spaces. Subtracting the 43 available on-campus spaces yields an off-site demand of approximately 91 spaces out of 640 available on-street spaces. Other large events in the new Gymnasium could include the Auction, currently held every other year in the existing Gymnasium and possibly Commencement, currently held in Merrill Auditorium. The School will adjust its parking management efforts, as it does now, for such large events.

Combined Events

The possibility of events occurring at both the Theater and the gymnasium at the same time was also considered. Since Waynflete is responsible for scheduling the use of both the Theater and the Gym, they will be mindful of overlapping parking demands and manage accordingly. In comparing the 2015-2016 schedule of basketball games and events at the Theater, there were only four times when a home basketball game occurred on the same weekday as theater events. Those Theater events included a music recital (approximately 200 people), a State of the School address (approximately 50-100 people), an Upper School concert (approximately 200 people), and a play (approximately 250 people). The largest three events started at approximately 7:00 PM, either after or toward the end of the basketball games. Based on this information, the School is doing a good job of managing the potential overlap of basketball games and Theater events and this oversight will continue with the new gymnasium.

Transportation and Parking Management Plan

Objective- The objective of the Transportation and Parking Demand Management (TPDM) Plan is to reduce the traffic volume and parking demand in the neighborhood surrounding the School by a variety of specific strategies such as policies and procedures, rideshare, transit, bicycling, walking, and utilization of existing off street parking.

Waynflete is a well-established school that is very proactive with their TPDM plan. The following describes the efforts that the school has undertaken to manage their traffic and parking demands since 2008.

- Established Transportation Coordinator
- Education / Informational Materials
- Current School Policies
- Rideshare program
- Incentives to use Public Transportation
- Encouraging bicycling and walking
- Utilization of Satellite Parking Areas
- Event Planning and Coordination
- Survey

These efforts will continue after the upgrade to the new gymnasium. The following is a more detailed description of the efforts.

Transportation Coordinator:

Waynflete's Director of Finance and Operations together with the Executive Assistant to the Head of School administers and directs the parking and transportation initiatives for the gymnasium and Art Center / Theater events, as well as the typical school day to ensure a cohesive and consistent plan. This includes working with the City of Portland Planning staff in implementing the Plan.

Education and Informational Materials:

Waynflete provides a student handbook and includes their current "Transportation, Parking, Towing and No Idling Policy". The first sentence in this section is "Waynflete has adopted a Transportation and Parking Management Plan approved by the City of Portland." The handbook later states; "Please drive slowly, park legally, and obey all city parking signs and regulations at all times." This handbook is distributed to all students, parents and staff annually and is updated at least yearly to highlight the goals of the plan, their participation, and the desired outcomes; and to emphasize how reducing the parking demand integrates into the School's green campus initiative. This handbook is supplemented with emails and newsletters throughout the year. This material emphasizes an "open door" policy with respect to continued feedback and suggestions for the program.

Current School Policies:

As described previously, the school provides a handbook yearly that is distributed to students, parents, and staff identifying very strict policies on parking and vehicle use. These policies are closely monitored by the school. Some of the policies / efforts the school is undertaking are identified as follows, some of which were also identified in the Performance Report (1/7/11) identified in the "Background" section of this update as well as in the handbook:

- Employees are restricted by school policy from parking along a number of streets even though those areas are legal parking areas
- Employees are required to submit commuting plans annually by the start of school
- Upper School students in grades 10-12 must complete a Student and Vehicle Registration form
- Students driving to school are **required** to display a Waynflete parking sticker on their windshield
- Student daytime parking is limited to certain sides of certain streets

Rideshare Program:

This program is designed to encourage carpooling by educating staff, parents, and students about the need to reduce the number of vehicles traveling to campus by matching rideshare candidates and by encouraging carpooling with others they know who commute into the City. The goal is to have at least two riders per vehicle who are not in the same family, with a guaranteed ride home service in case of illness, scheduling conflict, or family emergency. To further encourage rideshare; the Student Handbook provides student's names, addresses (physical and email) and phone numbers such that families can more easily coordinate with each other.

Employees who carpool are given preference to use on-campus parking.

Prior to large special events, reminders are sent to parents via email and encouraged to car pool.

Incentives to Use Public Transportation:

As described in the Waynflete handbook which is distributed to the students and parents, to reduce traffic to / from the school "Waynflete School bus service is available to and from Kennebunk, Bath, Cape Elizabeth, Freeport, Lewiston / Auburn and points in between."

To encourage staff to utilize public bus transportation, Waynflete makes bus transit passes available. These passes are fully paid for by Waynflete. Two to three faculty/staff per year use this option.

This combination of incentives is revisited and re-evaluated by the School annually to determine their efficacy.

Encouraging Bicycling and Walking:

Waynflete currently has bicycle racks at several locations on the campus and will continue to encourage staff and students who live within the area to walk or bike when possible.

Utilization of Satellite Parking Areas:

Waynflete currently rents 25 parking spaces off site for daily use at a local church. This allows for more parking spaces on-site for visitors and guests. In the past, the school has rented these spaces for faculty/staff when a large special event has been scheduled but has found that they were not needed, because there was ample on-street parking.

Event Planning and Coordination:

Waynflete currently creates parking plans for large events at the Arts Center / Theater. The efforts for those larger events includes:

- Making sure on-site campus lots are empty prior to the event
- Informing neighbors
- Placing sandwich board signs to direct drivers and pedestrians to the correct locations
- Staff are stationed outside in brightly colored safety vests to manage parking and direct drivers and pedestrians to the proper venue
- Staff monitor the adjacent neighborhood to ensure driveways are not blocked and in some cases, with the neighbor's permission, place cones in front of the driveways
- For basketball games, the visiting team's athletic directors are given instructions on where to load and unload team members, and also where to park buses during the game

These same efforts will continue and expand to include not only larger events at the Theater but those at the gymnasium as well.

Surveys:

The School has experience surveying and communicating with its employees, parents and students via electronic means, and will continue to do so. It promotes an open door policy in which anyone at any time can communicate with the schools about its concerns. In addition, the school is constantly seeking input from the students, parents and staff in an effort to improve the operations of the campus.

Timetable

Since the initial approval of the Transportation and Parking Demand Management Plan (TPDM) in November of 2008, the school has completed all of the original requirements and continues to implement, refine and improve on the plan. The expanded Lower School and new gymnasium are not anticipated to create new action items for the School, but provide an opportunity for the School to refine and improve upon its current expansive efforts.

Waynflete Wellness and Athletic Center

Construction Management Plan

360 Spring St, Portland ME

August 30th, 2024

Prepared for: Portland Department of Planning and Urban Development

Department of Public Works

Ownership Group: Waynflete School

Construction Manager: Zachau Construction

Purpose:

The purposed of this document is to provide the details related to the construction/addition of a new Wellness and Athletic Center to be built on the site of the existing Waynflete School gymnasium building (to be removed) which is located along Fletcher Street at Waynflete School's main campus at 360 Spring Street. This document will outline Zachau Construction's plan to reduce/minimize, or in some cases, negate impacts related to construction activity including, but not limited to, truck traffic, noise, vibration, dust, etc. to the surrounding neighborhood. It is also the intent of this document to outline Zachau's plan to maintain a safe perimeter around the project site and the means/methods to protect the public from any construction related hazards at all times.

Zachau Construction Contacts:

Project Superintendent: Melissa Lobaccaro

melissa@zachauconstruction.com / 207-807-8979

Project Manager: Tim Hanley

timh@zachauconstruction.com / 207-831-1110

VP of Operations: Curtis Thormann

curtis@zachauconstruction.com / 207-266-6673

Zachau Office (Freeport, ME) – 207-865-9925

Communication Plan:

It is Zachau's plan to maintain a clear line of communication between the work progressing on site with the Ownership group, adjacent abutters/business, city officials, and emergency services. The majority of the communication will be through weekly meetings with Ownership group keeping them apprised of upcoming scheduled work, any changes to schedule and upcoming potential impacts with the work. At that time, it will be decided if any of the work requires communication to outside stakeholders/abutters and they will then be notified accordingly. Construction signage will also be posted on the site providing contact information for Zachau Construction and its site management team so as to be easily accessible.

Construction Schedule:

- Construction is expected to start 2/3/25
- Construction duration is expected to last 17.5 months (2/3/25 – 7/17/26)
- Construction work hours will be in accordance with Section 17-18 and 25-129
- Work hours will be 7AM-7PM Monday through Friday
- Workers will gather at their workplace from 6AM-7AM
- Saturday work will be required periodically with hours from 7AM-5PM

An updated construction schedule will be provided to the Ownership group on a weekly basis utilizing a "4 week look ahead" schedule. This will indicate all activities happening each day on site. A "master project schedule" will also be updated and provided each month to allow Ownership to review long range activities so that accurate planning/preparing can occur.

Security and Public Safety:

A site logistics plan has been included for review. It is the intent of Zachau Construction to establish a safe work zone perimeter utilizing chain link fence panels, construction entrance gates (with locks), and proper safety signage. The purpose of this work zone perimeter is to protect the public and public vehicle traffic from any hazards associated with the construction. All activity on site will comply with local and federal OSHA regulations.

Zachau will work with the Portland Fire Department to ensure any temporary fire protection measures are met. Zachau will also invite PFD to the project site to review the temporary site conditions once they have been established. Zachau will have temporary fire extinguishers built on stands at each floor/stairwell as required by OSHA. Zachau will also control all trash debris inside/outside of the building through daily cleanup efforts to ensure all flammable debris is disposed of in dumpsters and removed from site in a timely manner to maintain a clean site.

Traffic Control Plans:

Per the enclosed site logistics plan, it is the intent of Zachau that the majority of all material deliveries enter the site through the construction gates on the occupied portion of Fletcher Street. Zachau will work to ensure that no deliveries are staged on adjacent streets that could cause any traffic congestion.

A portion of Fletcher Street will be closed to traffic as indicated on the enclosed logistics plans and sidewalk access will be restricted along Fletcher Street. "Road Closed" and "Sidewalk Closed" signs will be posted at either end of the project site. Temporary crosswalks will also be utilized to support the safe re-routing of pedestrian traffic.

See attached Exhibit B for 'Trucking Route.'

See attached Exhibit C for 'Pedestrian Route'

Site Management Controls:

- Trash will be removed from the building/site on a daily basis via 30-yard dumpsters
- During dust generating activities on site, water trucks or calcium will be used to prevent dust.
- Dust generating tools will either use water or HEPA vacuums to prevent dust
- The site contractor will be contracted to provide street sweeping/dust control in public right of ways as required by the City and DEP.
- The site contractor will be contracted for all snow removal within the project site fence. Zachau labor will also shovel, salt, sand walkways to ensure that the construction workers have a safe means of access/egress into the building.
- Snow will be stockpiled on site and if, necessary, will be trucked off to local snow dumps.

Erosion Control:

- Zachau will install all erosion and sediment controls as depicted on the approved erosion and sediment control plan.
- Stabilized entrances will be provided at construction entrances.
- Sediment/erosion control measures will be inspected weekly or after storm events.
- Documentation of these inspections will be maintained by the site contractor and Zachau Construction for review in the event of an inspection/audit.
- If dirt/debris from the project site is tracked into the street it will be cleaned up with a street sweeper.

Construction Staging Area:

- As indicated on the site logistics plan, truck deliveries will be brought in to Fletcher Street via Danforth Street.
- Deliveries will be coordinated/scheduled through Zachau so as to prevent multiple deliveries arriving at the same time.
- Subcontractor material storage will be stored inside the project site fence.
- Zachau will maintain a temporary field office on site staged in the Waynflete parking lot. It will be enclosed by construction fencing.

Construction Parking:

- It is anticipated that between 50 and 75 workers will be on the project site at peak.
- Minimal parking will be on site (within the fence limits) with the balance being off site. Construction workers on the project will follow the existing school parking management plan per Waynflete's city approved Transportation and Parking Demand Management Plan (TPDM). Exhibit D is attached and includes Waynflete's TPDM as well as a map of the allowable parking areas for school students, faculty and staff. Waynflete is currently under-enrolled so there will be less demand on the allowed parking.
- ZCI will encourage the use of carpooling to limit the number of vehicles coming to the site.

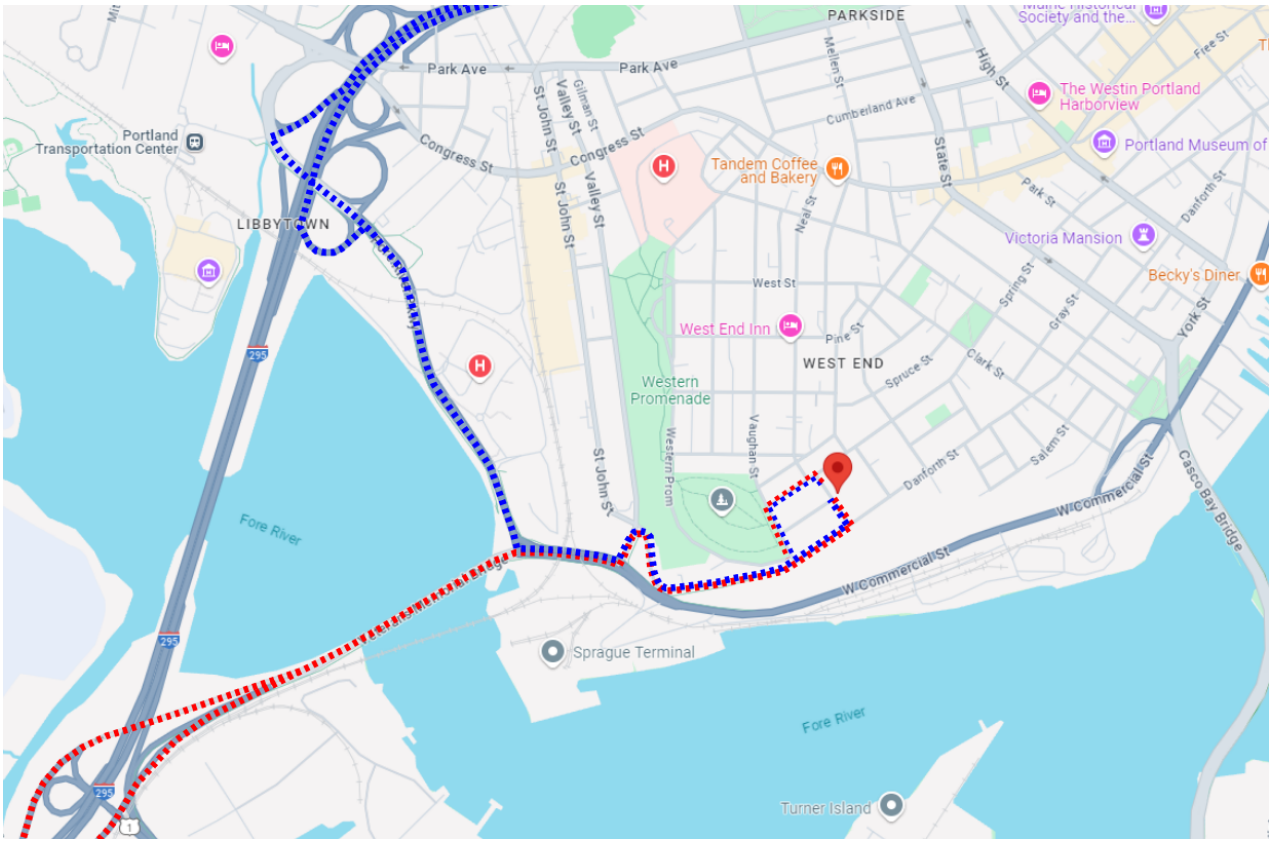
Dewatering:

- Please see the attached Exhibit E for Site Dewatering Plan

EXHIBIT A – SITE LOGISTICS PLANS

ZACHAU CONSTRUCTION EST. 1969
WAYNFLETE
PORTLAND, ME
DELIVERY/CRANE ZONE
CONSTRUCTION DELIVERY ACCESS FROM SPRING ST.
CONSTRUCTION DELIVERY ACCESS FROM DANFORTH ST.
FIELD OFFICE
GATE
EX. OH UTILITY LINES (PLAN REQUIRES RELOCATIONS)
STUDENT WALKWAY

EXHIBIT B – TRUCKING ROUTE



Option #1 – From The North, Utilize Fore River Parkway to Danforth and Fletcher St.

Option #2 – From The South, Utilize Veterans Memorial Bridge to Danforth and Fletcher St.

EXHIBIT C – PEDESTRIAN ROUTE

GORRILL PALMER

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207.772.2515

Waynflete School
Updated - Transportation and Parking Demand Management Plan (TPDM)
May 2016

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Increase in Traffic or Parking Demand

The proposed Lower School upgrade and expansion is not forecast to significantly impact the traffic volume and parking demand in the area. The existing athletic facility is currently 150 seats and the new gymnasium is planned for 600 seats, an increase of 450 seats. It should be noted that the primary reason for providing 600 seats is that the new design will provide an on-campus location that will seat the entire student body. Although the current gym can hold the entire student body for all school assemblies seated on the floor, there is little room for presenters or performers during those activities. These all-school assemblies during the school day involve the same number of students, faculty and staff as they do now and will not increase traffic volume or parking demand in the area.

Other than the on-campus assemblies, the next largest seating demand anticipated for the new gymnasium will be varsity basketball games. During the 2015-2016 season there were only 10 weekdays that had varsity basketball games. Of those, only a handful are against competition (e.g Falmouth, Yarmouth, Cape Elizabeth) that would be expected to generate any significant additional traffic volume. For these games, the gymnasium could experience a potential seating of up to 400 spectators – nearly equivalent to full occupancy for the Theater. Gorrill Palmer had used an occupancy rate for the previous theater of 2.5 persons per vehicle. For the basketball

events we would anticipate a higher occupancy rate of 3.0. Although we could not verify a rate for this specific size and type of use, the closest we could find was from the ITE 4th Edition of the Parking Generation Manual, using "Live Theater". This use suggests a rate of 0.33 spaces per seat, which is equivalent to a ratio of 3 persons per vehicle, and falls between the 2.5 used for the previous theater and 3.5 which was used for the approved Thompsons Point basketball court. Therefore, the 3.0 appears reasonable. Using the 3.0 persons per vehicle rate, the forecasted demand should yield the need for approximately 134 spaces. Subtracting the 43 available on-campus spaces yields an off-site demand of approximately 91 spaces out of 640 available on-street spaces. Other large events in the new Gymnasium could include the Auction, currently held every other year in the existing Gymnasium and possibly Commencement, currently held in Merrill Auditorium. The School will adjust its parking management efforts, as it does now, for such large events.

Combined Events

The possibility of events occurring at both the Theater and the gymnasium at the same time was also considered. Since Waynflete is responsible for scheduling the use of both the Theater and the Gym, they will be mindful of overlapping parking demands and manage accordingly. In comparing the 2015-2016 schedule of basketball games and events at the Theater, there were only four times when a home basketball game occurred on the same weekday as theater events. Those Theater events included a music recital (approximately 200 people), a State of the School address (approximately 50-100 people), an Upper School concert (approximately 200 people), and a play (approximately 250 people). The largest three events started at approximately 7:00 PM, either after or toward the end of the basketball games. Based on this information, the School is doing a good job of managing the potential overlap of basketball games and Theater events and this oversight will continue with the new gymnasium.

Transportation and Parking Management Plan

Objective- The objective of the Transportation and Parking Demand Management (TPDM) Plan is to reduce the traffic volume and parking demand in the neighborhood surrounding the School by a variety of specific strategies such as policies and procedures, rideshare, transit, bicycling, walking, and utilization of existing off street parking.

Waynflete is a well-established school that is very proactive with their TPDM plan. The following describes the efforts that the school has undertaken to manage their traffic and parking demands since 2008.

- Established Transportation Coordinator
- Education / Informational Materials
- Current School Policies
- Rideshare program
- Incentives to use Public Transportation
- Encouraging bicycling and walking
- Utilization of Satellite Parking Areas
- Event Planning and Coordination
- Survey

These efforts will continue after the upgrade to the new gymnasium. The following is a more detailed description of the efforts.

Transportation Coordinator:

Waynflete's Director of Finance and Operations together with the Executive Assistant to the Head of School administers and directs the parking and transportation initiatives for the gymnasium and Art Center / Theater events, as well as the typical school day to ensure a cohesive and consistent plan. This includes working with the City of Portland Planning staff in implementing the Plan.

Education and Informational Materials:

Waynflete provides a student handbook and includes their current "Transportation, Parking, Towing and No Idling Policy". The first sentence in this section is "Waynflete has adopted a Transportation and Parking Management Plan approved by the City of Portland." The handbook later states; "Please drive slowly, park legally, and obey all city parking signs and regulations at all times." This handbook is distributed to all students, parents and staff annually and is updated at least yearly to highlight the goals of the plan, their participation, and the desired outcomes; and to emphasize how reducing the parking demand integrates into the School's green campus initiative. This handbook is supplemented with emails and newsletters throughout the year. This material emphasizes an "open door" policy with respect to continued feedback and suggestions for the program.

Current School Policies:

As described previously, the school provides a handbook yearly that is distributed to students, parents, and staff identifying very strict policies on parking and vehicle use. These policies are closely monitored by the school. Some of the policies / efforts the school is undertaking are identified as follows, some of which were also identified in the Performance Report (1/7/11) identified in the "Background" section of this update as well as in the handbook:

- Employees are restricted by school policy from parking along a number of streets even though those areas are legal parking areas
- Employees are required to submit commuting plans annually by the start of school
- Upper School students in grades 10-12 must complete a Student and Vehicle Registration form
- Students driving to school are **required** to display a Waynflete parking sticker on their windshield
- Student daytime parking is limited to certain sides of certain streets

Rideshare Program:

This program is designed to encourage carpooling by educating staff, parents, and students about the need to reduce the number of vehicles traveling to campus by matching rideshare candidates and by encouraging carpooling with others they know who commute into the City. The goal is to have at least two riders per vehicle who are not in the same family, with a guaranteed ride home service in case of illness, scheduling conflict, or family emergency. To further encourage rideshare; the Student Handbook provides student's names, addresses (physical and email) and phone numbers such that families can more easily coordinate with each other.

Employees who carpool are given preference to use on-campus parking.

Prior to large special events, reminders are sent to parents via email and encouraged to car pool.

Incentives to Use Public Transportation:

As described in the Waynflete handbook which is distributed to the students and parents, to reduce traffic to / from the school "Waynflete School bus service is available to and from Kennebunk, Bath, Cape Elizabeth, Freeport, Lewiston / Auburn and points in between."

To encourage staff to utilize public bus transportation, Waynflete makes bus transit passes available. These passes are fully paid for by Waynflete. Two to three faculty/staff per year use this option.

This combination of incentives is revisited and re-evaluated by the School annually to determine their efficacy.

Encouraging Bicycling and Walking:

Waynflete currently has bicycle racks at several locations on the campus and will continue to encourage staff and students who live within the area to walk or bike when possible.

Utilization of Satellite Parking Areas:

Waynflete currently rents 25 parking spaces off site for daily use at a local church. This allows for more parking spaces on-site for visitors and guests. In the past, the school has rented these spaces for faculty/staff when a large special event has been scheduled but has found that they were not needed, because there was ample on-street parking.

Event Planning and Coordination:

Waynflete currently creates parking plans for large events at the Arts Center / Theater. The efforts for those larger events includes:

- Making sure on-site campus lots are empty prior to the event
- Informing neighbors
- Placing sandwich board signs to direct drivers and pedestrians to the correct locations
- Staff are stationed outside in brightly colored safety vests to manage parking and direct drivers and pedestrians to the proper venue
- Staff monitor the adjacent neighborhood to ensure driveways are not blocked and in some cases, with the neighbor's permission, place cones in front of the driveways
- For basketball games, the visiting team's athletic directors are given instructions on where to load and unload team members, and also where to park buses during the game

These same efforts will continue and expand to include not only larger events at the Theater but those at the gymnasium as well.

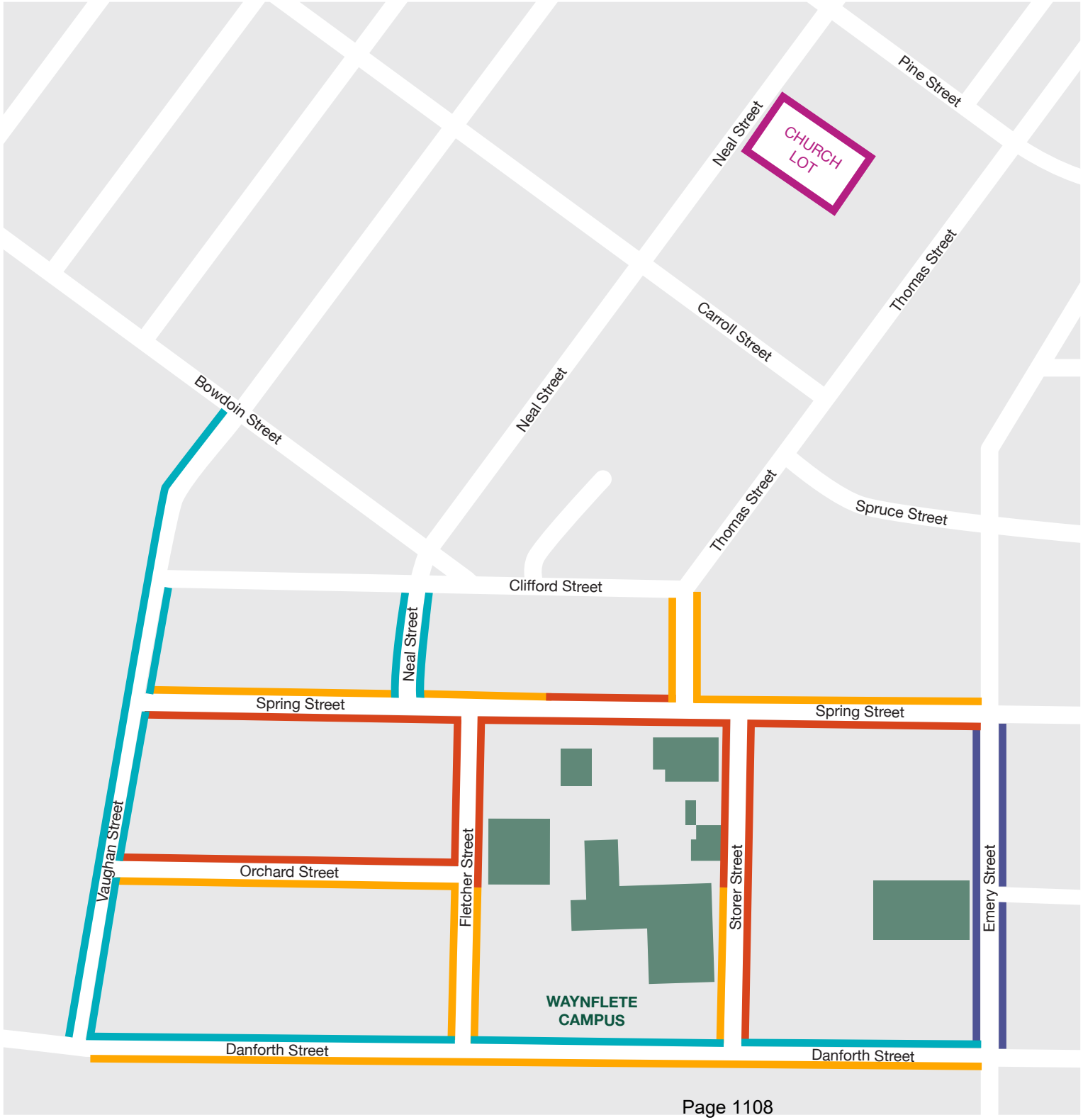
Surveys:

The School has experience surveying and communicating with its employees, parents and students via electronic means, and will continue to do so. It promotes an open door policy in which anyone at any time can communicate with the schools about its concerns. In addition, the school is constantly seeking input from the students, parents and staff in an effort to improve the operations of the campus.

Timetable

Since the initial approval of the Transportation and Parking Demand Management Plan (TPDM) in November of 2008, the school has completed all of the original requirements and continues to implement, refine and improve on the plan. The expanded Lower School and new gymnasium are not anticipated to create new action items for the School, but provide an opportunity for the School to refine and improve upon its current expansive efforts.

Employee Parking Map



PARKING PERMITTED

PARKING BY SCHOOL PERMIT ONLY (<¼ mile walk to campus)

PARKING FOR EMERY FACULTY AND STAFF

PARKING NOT PERMITTED

PARKING NOT PERMITTED BY THE CITY OF PORTLAND

Parking in campus lots is by assignment only.

EXHIBIT E – DEWATERING PLAN

Dewatering Plan – General Excavation

INTRODUCTION

Zachau Construction Inc. has prepared the following Dewatering Plan for implementation on The Waynflete Wellness and Athletic Center project located at 360 Spring Street in the City of Portland. The following proposal provides recommendations and requirements for dewatering efforts during general site excavation and more specifically foundation and utility excavation in the event dewatering of ground water and or runoff is required. We intend to strictly adhere to the requirement of the Contract, Maine DEP's Best Management Practices for Erosion and Sediment Control, and all other Federal, State, and Local laws, regulations and permits concerning environmental protection and pollution control during this project.

PROCEDURAL REQUIRMENTS

1. Ground water / runoff may be encountered during foundation and or utility excavation. To maintain "in the dry" excavated work area dewatering may be required. A competent person will always be onsite while dewatering and discharge operations take place.

2. Water collected from the excavation will be removed and relocated to either a temporary settlement basin adjacent to the excavation or discharged with a sediment filter bag into a catch basin. If the settlement basin sufficiently maintains dewatering efforts, no further action will be necessary.

3. Treated water being discharged into sewer system shall meet the Portland daily discharge limits on the attached document labeled "SCHEDULE A".

4. Treated water will be discharged on an as needed basis throughout the duration of the project.

5. The final hose discharging water will be filtered with a silt bag to ensure that any remaining sediment is collected prior to discharge.

6. The offsite catch basin collecting water from the discharge point will be monitored to ensure that future sediment does not enter/build in the basin and if necessary, will be cleaned (via vac truck) to remove sediment collected in the basin.

7. City of Portland Water Resource Division Compliance Coordinator is Ben Pearson (office # 874-8843).

8. Natural rainwater runoff into catch basins with be protected with sediment filter bags and hay bales, if necessary.

9. No unattended pumping to City infrastructure.

IMPLEMENTATION AND MONITORING

Implementation and continuing enforcement of the plan to ensure compliance with all regulations will be the responsibility of the Onsite Foreman or Superintendent.

The foreman will also be responsible for monitoring and maintaining the dewatering measures once they are implemented. These measures will be inspected daily and after each storm event. Any deficiencies observed by ZCI employees will be promptly reported to the Onsite foreman. Deficiencies should be corrected immediately (if possible).

If site conditions change or are different than anticipated, we are prepared to add or to revise dewatering measures as necessary during the course of the work.

9. SCHEDULE "A"

PORTLAND WATER DISTRICT, PORTLAND POTW AND WESTBROOK INTERMUNICIPAL SEWER SERVICE AGREEMENT AREA

PORTLAND LIMITS	
Parameter	**Discharge Limits Daily Maximum**
BOD	*
TSS	*
Arsenic**	0.092 mg/L
Cadmium	0.024 mg/L
Chromium	1.90 mg/L
Copper	1.88 mg/L
Cyanide	0.13 mg/L
Hydrocarbon (NPM)	100 mg/L
Lead	0.60 mg/L
Mercury	0.014 mg/L
Nickel***	0.76 mg/L
Silver	0.42 mg/L
Total Oil & Grease	500 mg/L
Zinc	2.57 mg/L

INTERMUNICIPAL AGREEMENT LIMITS	
Parameter	**Discharge Limits Daily Maximum**
BOD	*
TSS	*
Arsenic	0.094 mg/L
Cadmium	0.0132 mg/L
Chromium	2.35 mg/L
Copper	0.69 mg/L
Cyanide	0.52 mg/L
Hydrocarbon (NPM)	Not Applicable
Lead	0.33 mg/L
Mercury	0.0037 mg/L
Nickel	0.20 mg/L
Silver	0.14 mg/L
Total Oil & Grease	100 mg/L
Zinc	1.41 mg/L

pH must be greater than 5.0 Standard Units (S.U.) and have a caustic alkalinity less than 1000 mg/l. Any pH result of over 10.3 S.U. must be accompanied by a result for caustic (hydroxide) alkalinity from the same sample. pH above 12.5 is prohibited and is considered hazardous waste.

*** Industrial users permitted in the Industrial Pretreatment Program and discharging effluent which exceeds a de minimis level of Biochemical Oxygen Demand (BOD) and/or Total Suspended Solids (TSS) are individually allocated a pounds per day limit for these parameters. The de minimis levels are 250 mg/L and/or 2,275 lbs/day for BOD and 300 mg/L and/or 1,925 lbs/day for TSS for Portland; and 250 mg/L and/or 375 lbs/day for BOD and 300 mg/L and/or 425 lbs/day for TSS for the Westbrook Intermunicipal Area. The Control Authority reserves the right to permit users based on their potential to discharge high strength BOD/TSS waste. Industrial Users permitted for BOD and TSS must report a certified discharge flow number with each monitoring event.**
**** A two tiered Arsenic limit as follows: Seafood Processors = 0.22 mg/L, All Others = 0.092 mg/L.**
***** Metal Finisher required to meet Categorical Maximum 30 day Average Nickel Discharge Limit of 2.38 mg/L**

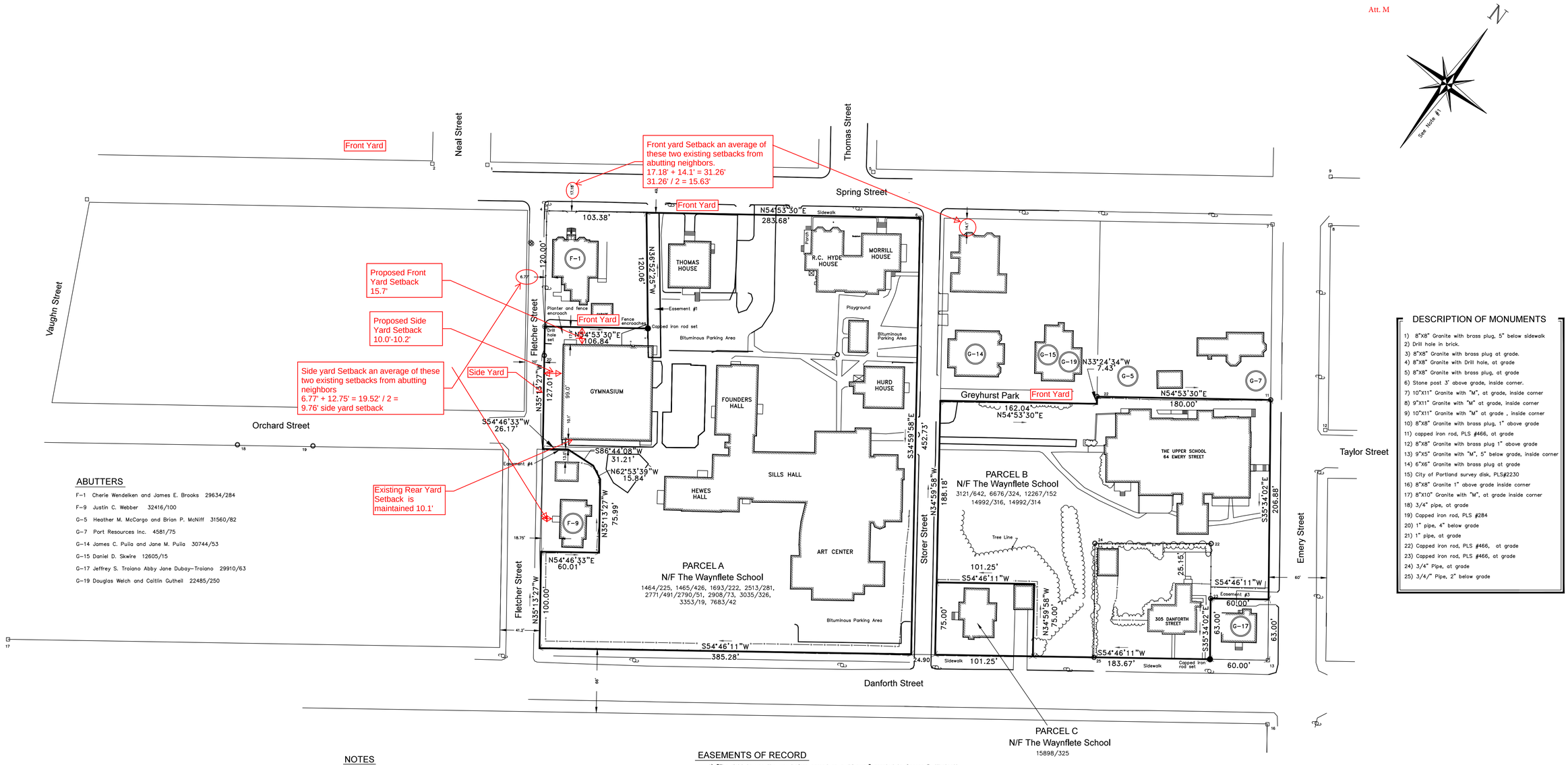
INDUSTRIAL USER LIMIT VARIANCE FOR THE WESTBROOK INTERMUNICIPAL SEWER SERVICE AREA ONLY

The Control Authority may grant a variance to an industrial user discharging into the sewer system when the industrial user provides sufficient historical documentation to support such request. The Control Authority must determine that allowing such a variance ***will not****:*

a) result in an increase of the Maximum Allowable Industrial Headworks Loading
b) result in a non-permitted discharge from the POTW
c) adversely affect the treatment of wastewater
d) adversely impact the sanitary sewer system
e) be in violation of any applicable local, state or federal law or regulation

Should such variances be authorized, any industrial user receiving the variance will impact the total available loadings to other industrial facilities within the treatment system. The Control Authority will be required to assess the effectiveness of any variances. Modifications to local, state or federal requirements or wastewater characteristic changes within the wastewater system would also require the reevaluation of any variances.

Att. M



ABUTTERS

F-1 Cherie Wendelken and James E. Brooks 29634/284
F-9 Justin C. Webber 32416/100
G-5 Heather M. McCargo and Brian P. McNiff 31560/82
G-7 Port Resources Inc. 4581/75
G-14 James C. Puila and Jane M. Puila 30744/53
G-15 Daniel D. Skwire 12605/15
G-17 Jeffrey S. Troiano Abby Jane Dubay-Troiano 29910/63
G-19 Douglas Welch and Caitlin Gutheil 22485/250

DESCRIPTION OF MONUMENTS

1) 8"X8" Granite with brass plug, 5" below sidewalk
2) Drill hole in brick.
3) 8"X8" Granite with brass plug at grade.
4) 8"X8" Granite with Drill hole, at grade
5) 8"X8" Granite with brass plug, at grade
6) Stone post 3' above grade, inside corner.
7) 10"X11" Granite with "M", at grade, inside corner
8) 9"X11" Granite with "M" at grade, inside corner
9) 10"X11" Granite with "M" at grade , inside corner
10) 8"X8" Granite with brass plug, 1" above grade
11) capped iron rod, PLS #466, at grade
12) 8"X8" Granite with brass plug 1" above grade
13) 9"X5" Granite with "M", 5" below grade, inside corner
14) 6"X6" Granite with brass plug at grade
15) City of Portland survey disk, PLS#2230
16) 8"X8" Granite 1" above grade inside corner
17) 8"X10" Granite with "M", at grade inside corner
18) 3/4" pipe, at grade
19) Capped iron rod, PLS #284
20) 1" pipe, 4" below grade
21) 1" pipe, at grade
22) Capped iron rod, PLS #466, at grade
23) Capped iron rod, PLS #466, at grade
24) 3/4" Pipe, at grade
25) 3/4/" Pipe, 2" below grade

LEGEND

- CAPPED IRON SET (CIR)
- IRON PIN FOUND
- MONUMENT FOUND
- UTILITY POLE
- EXISTING BUILDING
- N/F NOW OR FORMERLY OF
- PROPERTY LINE
- EASEMENT LINE
- RIGHT-OF-WAY LINE
- EDGE OF PAVEMENT
- CURBING
- CHAIN LINK FENCE
- RETAINING WALL
- FENCE LINE
- 3121/642 DEED REFERENCE

NOTES

1) Bearings are referenced to the True North as determined by astronomic observation.
2) Deed and Plan Book references are to the Cumberland County Registry of deeds.
3) Pipe sizes shown are inside diameter (I.d.).
4) Street lines for Storer and Fletcher Streets are based on building ties shown in the field notes for Reference #5 and #6. Street lines for Spring, Emery, and Danforth Streets are based on monuments as shown.

PLAN REFERENCES

1) Plan of land at Emery and Danforth Streets, from a copy by M.C. Pingree recorded November 6, 1871 recorded in Plan Book 3 Page 27.
2) "Plan of lot on Emery Street Owned by Charles S. Fobes" by W.A. Goodwin, C.E., dated May 11, 1874, and recorded in Plan Book 3 Page 26.
3) "Plan of Division of Land Belonging to Jerseys, Parleys & Cram". By E.C. Jordan, C.E., dated July 28, 1886 and recorded in Plan Book 6 Page 12.
4) City of Portland monument maps, dated 1925, on file at the City of Portland Department of Public Works.
5) Plan of Fletcher Street, dated December 13, 1934, on file at the City of Portland Department of Public Works.
6) Plan of Storer Street, undated, on file at the City of Portland Department of Public Works.
7) "Plan of Property ... made for John W. Gordon" by H.I. & E.C. Jordan dated September 28, 1959.
8) Plan of Danforth, Salem, May, School, and Briggs Streets by Owen Haskell Inc., dated December 4 1974.
9) Standard Boundary Survey ... made for Christopher M. Harte " by Titcomb Associates Inc. dated February 4, 1997.
10) Standard Boundary Survey made for The Waynflete School by Titcomb Associates Inc. dated April 26, 1999.

EASEMENTS OF RECORD

1) "The right to use the way before named as a driveway" granted to George P. Westcott by Abby D. Hersey et al. by deed dated June 10, 1886, and recorded in Book 529 Page 21.
2) Pole easement granted to Central Maine Power Co. by Waynflete School by deed dated August 16, 1955, and Recorded in Book 2276 Page 253.
3) Driveway easement granted to Monty Q. Hagen and James H. Harrison by Waynflete School by deed dated March 10, 2000, and Recorded in Book 15361 Page 261.
4) Sidewalk Easement Agreement between Helen A. Webber and Waynflete School by deed dated September 25, 2006 and recorded in Book 24399 Page 338.

OWNER OF RECORD / AREA

Parcel 'A' -- The Waynflete School
Area: 156,374 sq ft = 3.59 Acres

Parcel 'B' -- The Waynflete School
Area: 80,272 sq ft = 1.84 Acres

Parcel 'C' -- The Waynflete School
Area: 7,594 sq ft = 0.17 Acres

Total Area: 244240 sq ft = 5.60 Acres

Frontyard and sideyard setback calculations,
Waynflete Gymnasium
March 01, 2016
Scott Simons Architects

Updated September 11, 2024
Woodard & Curran

CERTIFICATION

This survey conforms to the current standards of practice set forth by the Maine State Board of Licensure for Land Surveyors.

Rex J. Croteau, P.L.S. #2273

STATE OF MAINE REX J. CROTEAU #2273 PROFESSIONAL LAND SURVEYOR

(FIG. 3)

50 0 50 100
SCALE IN FEET

Standard Boundary Survey

Spring, Emery, Danforth, Fletcher, & Storer Streets Portland, Maine

made for

The Waynflete School

360 Spring Street Portland, Maine

JOB#	93093	DATE: August 13, 2015	SCALE: 1" = 50'
BOOK#	532		
DISC#	380		
FILE#	6831		

Titcomb Associates
133 Gray Road, Falmouth, Maine 04105
(207)797-9199 www.titcombsurvey.com

S1

Wed Aug 26 09:09:20 2015

12 Mountfort Street
Portland, Maine 04101
www.woodardcurran.com

T 800.426.4262
T 207.774.2112
F 207.774.6635

Att. N

MEMORANDUM

TO: City of Portland Development Review Staff

FROM: Lauren Swett, P.E. Technical Manager

DATE: September 13, 2024 (Updated November 15, 2024)

RE: Waynflete Wellness & Athletic Center – Stormwater Management

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As part of the Major Site Plan Requirements, the Waynflete Wellness & Athletic Center (WWAC) project is required to comply with the Maine Department of Environmental Protection (DEP) Chapter 500 and City of Portland Technical Manual Section 5 standards for stormwater management. This memo provides a summary of how the project will meet these standards using existing stormwater management systems on the site. Updates were made, and additional information provided in response to comments provided by the City of Portland and it's peer reviewer during the site plan review process.

Project Background and Areas

The proposed project located at 360 Spring Street on the Waynflete campus in Portland, was previously approved as part of a Level III Site Plan Application in 2016. A stormwater management plan was developed to include both the Lower School and the Gymnasium, and after the Site Plan was amended to remove the gymnasium, the complete stormwater treatment system, consisting of a subsurface sand filter, was installed with the Lower School project. A copy of the previous stormwater plan is attached to this memo.

As part of the previous design, a manhole was installed near the northwest corner of the Lower School to provide a point for future stormwater connections. Stormwater flow from the currently proposed project area will be directly managed by the previously approved and installed system.

The proposed project will be taking place within an existing developed area of the Waynflete campus. The existing gymnasium will be demolished to install the new facility. The area of the site being redeveloped as part of this project is 24,100 square feet. This includes the building construction as well as surrounding landscaping and surface improvements, utility installations, and the playground area. In the existing condition, this area includes approximately 12,300 square feet of impervious surface. With the previously approved 2016 project, the impervious surface in this area was increased to 13,700 square feet. The current project will result in a total of 15,400 square feet of impervious surface, including approximately 11,700 square feet of building roof. This amounts to an increase in impervious surface of 1,700 square feet from the 2016 project, and an overall increase in impervious surface from the existing condition of 3,100 square feet.

General, Redevelopment, and Flooding Standards

With the proposed project, there will be 3,700 square feet of non-roof, redeveloped impervious surface, which is below the treatment threshold for the redevelopment standard; however, of this area, 3,100 square feet will be new impervious surface, which exceeds the 1,000 square foot threshold to require compliance with the General Standards, which requires treatment of 95% of that area.

For the project approved in 2016, a subsurface sand filter was designed and installed to provide treatment for both the Lower School and the gymnasium that was proposed at that time. The level of treatment provided well exceeded what is currently required. The system was sized to provide treatment for the entire proposed Lower School and gymnasium site, treating all impervious surfaces, including building rooftops. The figure below is taken from the 2016 stormwater management report. The green area represents the proposed subsurface sand filter. The red area is the entire drainage area utilized to design the subsurface sand filter. Within this space, the blue outline represents the currently proposed WWAC project area.

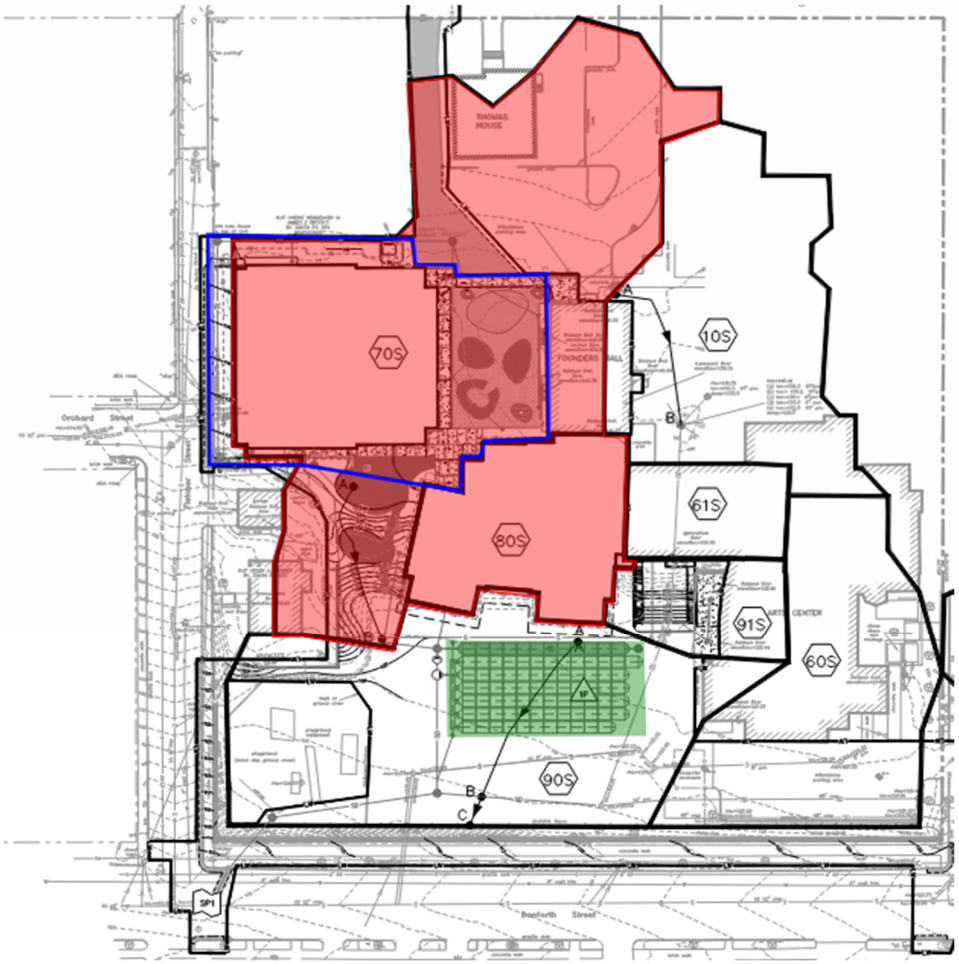


Figure 1 – Waynflete Stormwater Areas

The system sizing in 2016 included the entire 13,700 square feet of impervious surface proposed at that time. While the new project results in 1,700 square feet of additional impervious surface compared to the previous project, with 13,700 square feet of impervious area treated, we are well-exceeding the treatment required by the General standard for the current project.

Flooding Standard

For the 2016 Stormwater Management Report, a detailed model of the site was developed using HydroCAD to evaluate changes to flow on the site. As referenced previously, the red area in Figure 1 represents the portion of the site that is draining to the subsurface sand filter. The system provides treatment and storage for a large portion of the site beyond the WWAC project area.

As noted previously, the new project results in an increase in impervious surface of only 1,700 square feet compared to the previously approved project. The HydroCAD model was re-run with this minor change to areas, and the only impact was a small increase to the 25-year storm flow. The existing subsurface sand filter will provide for a reduction in flow during all storm events, in accordance with the Flooding Standards. A copy of the full HydroCAD model that was reviewed as part of the 2016 Level III Site Plan is now included with this report, along with a copy of the post-development stormwater model revised for the current design.

	PEAK RUNOFF RATE (CFS)		
	2-Year Storm	*10-Year Storm*	*25-Year Storm*
PRE-DEVELOPMENT	3.85	6.95	9.54
POST-DEVELOPMENT (2016)	1.91	3.66	5.39
POST-DEVELOPMENT (2024)	1.91	3.66	5.66
DIFFERENCE (2024)	-1.94	-3.29	-3.88

Stormwater Inspections

Waynflete will be expected to continue to maintain their existing stormwater system, providing for inspection and maintenance as was required with the 2016 approval. No changes to this are expected as part of the current project.

Conclusion

The subsurface sand filter permitted in 2016 was installed as part of the construction of the Lower School and will provide for stormwater treatment and storage for the current WWAC project to meet and exceed the requirements of the current General and Flooding standards as required by the Maine DEP and City of Portland stormwater management regulations.

Attachments

- 2016 Stormwater Management Report
- 2024 Updated Post-Development HydroCAD Report

12. STORMWATER MANAGEMENT PLAN & CALCULATIONS

As previously described, the Site is currently entirely developed by the Waynflete School campus. The project will disturb more than one acre of area and will result in more than 1,000 Square-Feet of new impervious area. Applicable regulations that govern stormwater management on this site include Section 5 of the City of Portland Technical Manual, Chapter 32 of the City of Portland Code of Ordinances, and the Maine Stormwater Best Management Practices (BMP) Manual. Under Section 5 of the City Technical Manual, the project is subject to the Basic, General, and Flooding Standards of the Maine Department of Environmental Protection Chapter 500 Stormwater Regulations.

Adequate provisions have been made to collect, treat, and detain the required amount of stormwater runoff generated from the Site. The following sections describe the proposed compliance with these standards.

12.1 BASIC STANDARD (SOIL EROSION AND SEDIMENTATION CONTROL)

These standards address erosion and sedimentation control, inspection and maintenance, and good housekeeping practices. The application includes erosion and sediment control plans, details, and notes. These notes cover good housekeeping practices. The Erosion and Sedimentation Control Plan for the proposed project is provided below.

12.1.1 Erosion and Sedimentation Control Plan

The overall goal of the Soil Erosion and Sedimentation Plan is to restrict the potential for erosion and sedimentation at the site and down-gradient of the site. A variety of erosion control techniques will be implemented to achieve this goal. During construction, these include:

- Positive grades throughout the construction site to direct flow to sediment control barriers;
- Diversion barriers to keep upslope runoff from flowing through the construction site;
- Preserving and maintaining vegetated areas to the maximum extent possible;
- Installation and maintenance of sedimentation barriers adjacent to the project;
- Installation and maintenance of construction entrances at the travelled interface between stabilized and non-stabilized portions of the project site;
- Controls for fugitive dust, debris, and other materials;
- Permanent seeding and mulching applied as soon as areas are at final grades; and
- Inspection of all in-place measures after every significant rainfall until permanent measures are in place.

Structural measures will be installed where shown on the Soil Erosion and Sedimentation Control Plan, which is included in the drawings attached to Section 3 of this Report; details for the proposed measures are also included in the drawings. All measures will be implemented in accordance with the "Maine Erosion and Sedimentation Handbook for Construction: Best Management Practices"; they will be installed prior to any earth disturbing activities. All temporary measures will be removed after the areas are permanently stabilized.

Permanent erosion control measures will include vegetation and pavement. Areas of concentrated flow will be protected from erosion by establishing vegetation and riprap. All measures will be maintained in effective operating condition. The Contractor will be responsible for implementing and maintaining all erosion and sediment control measures and will use the attached inspection report form or equivalent.

12.2 GENERAL STANDARD (WATER QUALITY)

The DEP Chapter 500 Stormwater Regulations requires that at least 80% of the developed Site and 95% of impervious area be treated through the use of wetponds, filtration, infiltration, or buffers. An Underdrained Subsurface Sand Filter has been selected as the water quality treatment BMP for the Site, as there is limited available space on the Site for treatment measures that require surface area. Alternative methods were considered, such as space efficient Filterra

units, but were not selected because of the large areas required for treatment and because of the potential for snow plow damage on the Site.

Table 12-1 below outlines the treated areas and calculated percentages demonstrating conformance with the DEP Chapter 500 General Standard:

Table 12-1: Water Quality Treatment Percentages

	Net Area Increase (Square-Feet)	Treated by BMP* (Square-Feet)	Percent Treated
Impervious Area	4,776	40,833	>100%
Developed Area	0	47,429	>100%

*Note: Includes both new and existing areas

No new developed area will be created as the site is already entirely developed. The total new impervious area anticipated to result from the construction of the proposed development is approximately 4,776 Square-Feet. 100% of the new impervious area will be treated. This area, in addition to existing impervious and developed areas, will drain to an Underdrained Subsurface Sand Filter, which includes a bed of Stormtech chambers and will store and treat runoff before discharging from the Site.

12.2.1 Underdrained Subsurface Sand Filter

Adequate provisions have been made to collect stormwater runoff from the project area via a series of catch basins and inlets, which drain to an Underdrained Subsurface Sand Filter (USSF) designed to store and treat stormwater volumes generated from the 2-year, 10-year, and 25-year 24-hour storm events. The stormwater is directed through the initial subsurface chamber rows, which are identified as the pretreatment isolator rows of the system, before the remainder of the chambers are filled hydraulically via the porous stone bedding and water infiltrates down through the sand filter; stormwater that is not discarded via infiltration into the subsurface soils will be hydraulically collected by an underdrain system and then discharged to an outlet control structure. When larger storm events occur and the chambers are full, stormwater will be directed over the weir wall within a drainage manhole and bypass the chamber system via a manifold system to the outlet control structure.

The USSF has been designed based on Chapter 7.3 of Volume III of the DEP Stormwater BMP Manual; calculations demonstrating compliance with the BMP design requirements have been included at the end of this Section. Based on the results of the geotechnical evaluation conducted by SW Cole in 2015, separation between the proposed USSF and bedrock/groundwater is not anticipated to be an issue.

On-site soils testing was also completed by a research hydrologist from the sustainable Environments Branch of the National Risk Management Research Laboratory at the Environmental Protection Agency. A City-wide study is being completed to determine the potential for using infiltration systems in the City. Based on the data from this study, we anticipate that the proposed USSF will promote infiltration; however, infiltration has not been modeled so that a conservative outflow estimate can be made for the flooding standard, as described in the following section.

12.2.2 Existing Site Treatment

The existing parking lot located at the Arts Center will be slightly adjusted as a result of this project. The parking lot will be shifted to the west to facilitate fire truck access to the site, but there will be no net increase in parking spaces. The parking lot drains to the existing stormwater management system that was installed as part of the previously approved Arts Center project. This system will continue to provide treatment for the stormwater from this parking lot. The current stormwater model also indicates that the downstream stormwater management system will adequately manage the site's stormwater, including all runoff from this parking lot.

12.3 FLOODING STANDARD (WATER QUANTITY)

The MaineDEP Chapter 500 Stormwater Regulations indicate that the stormwater management system must detain, retain, or result in the infiltration of the stormwater flows from the 24-hour storm of the 2-, 10- and 25-year frequencies such that peak flows from the post-development design of the site do not exceed those from the pre-development design. The proposed USSF will provide both detention and infiltration of stormwater flows, in compliance with the Flooding Standard.

Stormwater modeling was completed using the HydroCAD 10.00 Stormwater Modeling System by Applied Microcomputer Systems, which uses TR-20 runoff calculation methodology. The HydroCAD output for both the pre- and post-development models are attached to this Section. The new Chapter 500 Stormwater regulations, adopted in August 2015, define new standard rainfall amounts for the 2-year, 10-year and 25-year, 24-hour storm events; a Type III rainfall distribution was applied to the storm events.

Subcatchment drainage areas were delineated based on topographical information. HydroCAD provides a lookup table for curve number (CN), which is a measure of the retention and runoff properties of various surfaces based on the Hydrological Soil Group (HSG) and land cover type using TR-55 methodology. The HSG for the Site was taken from the USDA Natural Resources Conservation Service Web Soil Survey; the Site consists entirely of HSG Type A. The area of each land cover type was delineated utilizing topographical information and HydroCAD computed the final CN for each subcatchment based on an area-weighted average.

The Time of Concentration (Tc) is the time required for runoff to travel from the most hydrologically distant point of a watershed to the point of discharge. The Tc for each subcatchment drainage area was computed within HydroCAD using TR-55 methodology as the sum of the travel times for each consecutive flow segment along the longest hydraulic flow path. The longest hydraulic flow path was delineated utilizing contour data and partitioned into segments based on flow types, land cover, and slopes. The primary types of flow consist of sheet flow, shallow concentrated flow, and channel flows. A minimum Tc of five minutes was utilized for all subcatchments.

12.3.1 Pre-Development Conditions

As previously described, the Site is currently entirely developed by the Waynflete School campus. The Site slopes generally in the south-easterly direction and discharges towards the combined sewer system in Danforth Street, which will serve as the study point for the Site. Currently, there are two stormwater pipes entering the combined sewer system in Danforth Street, one at the catch basin located at the intersection of Danforth and Fletcher Streets, and one direct connection mid-block between Fletcher and Storer Street. The Pre-Development stormwater model consists of seven subcatchments. Existing subcatchment boundaries, drainage patterns, and features are shown on Figure 12-1, Pre-Development Drainage Area Plan.

12.3.2 Post-Development Conditions

The proposed drainage structures and features are shown on Figure 12-2, Post-Development Drainage Area Plan. The Post-Development Site has been delineated based on topography as eight subcatchments, similar to those in the Pre-Development model, all of which ultimately discharge to the combined sewer system in Danforth Street. The proposed project will eliminate the two existing connections to the combined sewer, sending all stormwater through a dedicated stormwater pipe connecting to the existing combined sewer line in Danforth Street via a doghouse manhole.

Adequate provisions have been made to collect and dispose of stormwater generated form the developed area of the Site. An USSF, which includes a bed of StormTech storage chambers, has been designed to store and treat stormwater volumes generated on-site. The HydroCAD Reports for both the Pre-and Post-Development conditions are attached to this Section. Table 12-2 below provides a summary of the peak runoff rates for the 24-hour, 2-year, 10-year, and 25-year Type III storm events. As shown below, there is a net decrease in the post-development rate of runoff during all storms at the Site's study point.

Table 12-2: Summary of Peak Runoff Rates

Study Point (Existing Combined Sewer System in Danforth Street)	Peak Runoff Rate (cfs)		
	2-Year Storm	10-Year Storm	25-Year Storm
Pre-Development	3.85	6.95	9.54
Post-Development	1.91	3.66	5.39
Difference	**-1.94**	**-3.29**	**-4.15**

The proposed stormwater management system has been designed to decrease peak flow rates and to improve water quality. As the Site's peak runoff rate has been reduced, the proposed development is not anticipated to result in adverse effects, including flooding and erosion, to abutting and downstream properties.

12.4 INSPECTION AND MAINTENANCE OF STORMWATER SYSTEMS

General inspection and maintenance during and after construction must take place in accordance with the requirements outlined in Chapter 500, Stormwater Management, Appendix B, Inspection and Maintenance and Stormwater Management, Maine Department of Environmental Protection publication No. DEPLW0738. The Waynflete School will be responsible for implementing the maintenance and inspection requirements for the stormwater management system associated with the new development. The USSF and associated stormwater infrastructure will be inspected and maintained per the guidance outlined herein.

In accordance with Ordinance Section 27-1536(2)(b), the Waynflete School will enter into a Drainage Maintenance Agreement with the City in a form acceptable to Corporation Counsel. A third-party person from the list of approved inspectors maintained by the Water Resource Protection Department with knowledge of stormwater management and erosion and sediment control, including the standards and conditions in the permit, shall conduct the inspections and perform maintenance of the facilities. On or by July 15th of each year, Certification that the stormwater management system has been inspected, cleaned, and maintained shall be submitted to the Director of Water Resource Protection in a form provided by that Department.

The inspection and maintenance criteria outlined in Chapter 500 Stormwater Regulations will be followed. Monitoring and maintenance is critical for the proper operation of the USSF and StormTech chamber system. First year post-construction monitoring differs primarily by its increased frequency to assure proper system functioning. Post-construction routine monitoring is based on USEPA requirements for good housekeeping practices.

Post-Construction: Inspection frequency should be at least once every six months and after every major storm in the first year following construction.

- ❑ Ensure system drains within 24-36 hours; and
- ❑ Clean pre-treatment devices and remove debris and sediment buildup from Isolator Rows as needed (when the average depth of sediment throughout the length of the Isolator Row exceeds three inches).

Trash, debris, and sediment shall be removed from storm drain pipes as needed on a semi-annual basis. In addition to the inspection and maintenance of stormwater systems, paved areas will be inspected annually each spring. Periodic sweeping of pavement will reduce the amount of sediment available to enter the USSF, in turn reducing the need to clean the Stormwater system.

12.5 ATTACHMENTS

- Stormwater Erosion & Sedimentation Control Inspection Report Form

- USSF Design Calculations
- Figure 12.1 Pre-Development Drainage Area Plan
- Figure 12.2 Post-Development Drainage Area Plan
- Pre-Development HydroCAD Report
- Post-Development HydroCAD Report

STORMWATER EROSION & SEDIMENTATION CONTROL
INSPECTION REPORT FORM

Inspectors: Date: ___ / ___ / _____

_____ of _____ (Project Owner)

_____ of _____ (Contractor)

_____ of _____

_____ of _____

Storm Event? ☐ Yes ☐ No Rainfall Amount _____ Storm Duration _____ hours

Visual Observations of Activity and Site Conditions:

Disturbed Soil Areas:

Storage Of Soils:

Sediment & Erosion Control Measures:

Construction Site Entrance:

Surface Stabilization:

Corrective Actions Taken

Attachments (if any):

Signature:

_____

Representing:

_____

Representing:

WOODARD &CURRAN
41 HUTCHINS DRIVE
PORTLAND, MAINE 04102
TEL. (207) 774-2112
FAX (207) 774-6635

CLIENT Scott Simons Architects
PROJECT Wayneflete School Campus Upgrades
DESIGNED BY AEA DATE 2-1-16
CHECKED BY _____ DATE _____
PROJECT NO. 229423 SHEET NO. 1 OF 1

Underdrained Subsurface Sand Filter Design Calculations

Per Chapter 7.3 of Volume III of the Maine DEP Stormwater BMP Manual

Treatment Volume: (1" x Impervious Area) + (0.4" x Pervious Area)

Impervious Area = 42,442 SF
Pervious Area = 11,465 SF

→ Treatment Volume Req'd = 3,919 CF √OK
Provided = 4,019 CF

Impoundment Depth: Storage Provided @ Elevation ≤ 18"? Yes √OK

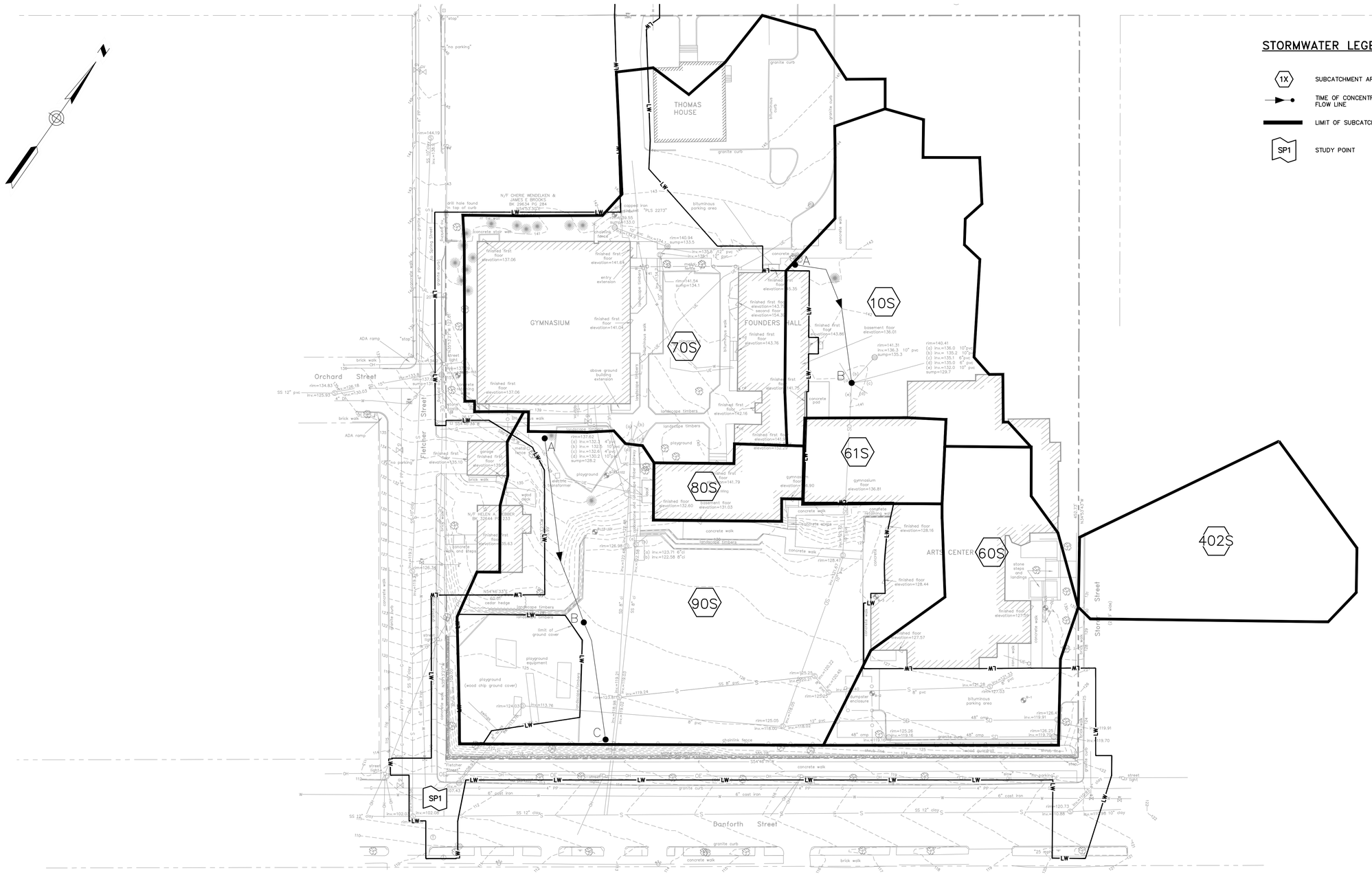
Surface Area: 5% (Impervious Area) + 2% (Pervious Area)

→ Surface Area Req'd = 2,351 SF
Provided = 4,717 SF √OK

Isolator Row Sizing: Treatment Flow Rate (1-yr Storm) = 1.88 CFS / 0.3 CFS = 6 chambers Req'd
MC-3500 Chambers

Chambers Provided = 12 √OK

Release Time: System drains w/in 24-36 hours? 27 hours √OK



30' 0 30' 60'

BAR SCALE
1" = 30'
CHECK GRAPHIC SCALE BEFORE USING

NOT FOR CONSTRUCTION

scott simons architects
designed for human potential

75 York Street
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207.772.4656

WOODARD & CURRAN
41 Hutchins Drive
Portland, Maine 04102
800.426.4262 | www.woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

PROJECT NAME:

WAYNFLETE GYM + LOWER SCHOOL

NEW CONSTRUCTION

WAYNFLETE SCHOOL
360 SPRING STREET
PORTLAND, MAINE 04102

SEAL:

STATE OF MAINE
LAUREN JANE SWETT
12284
REGISTERED PROFESSIONAL ENGINEER

2/16/2016

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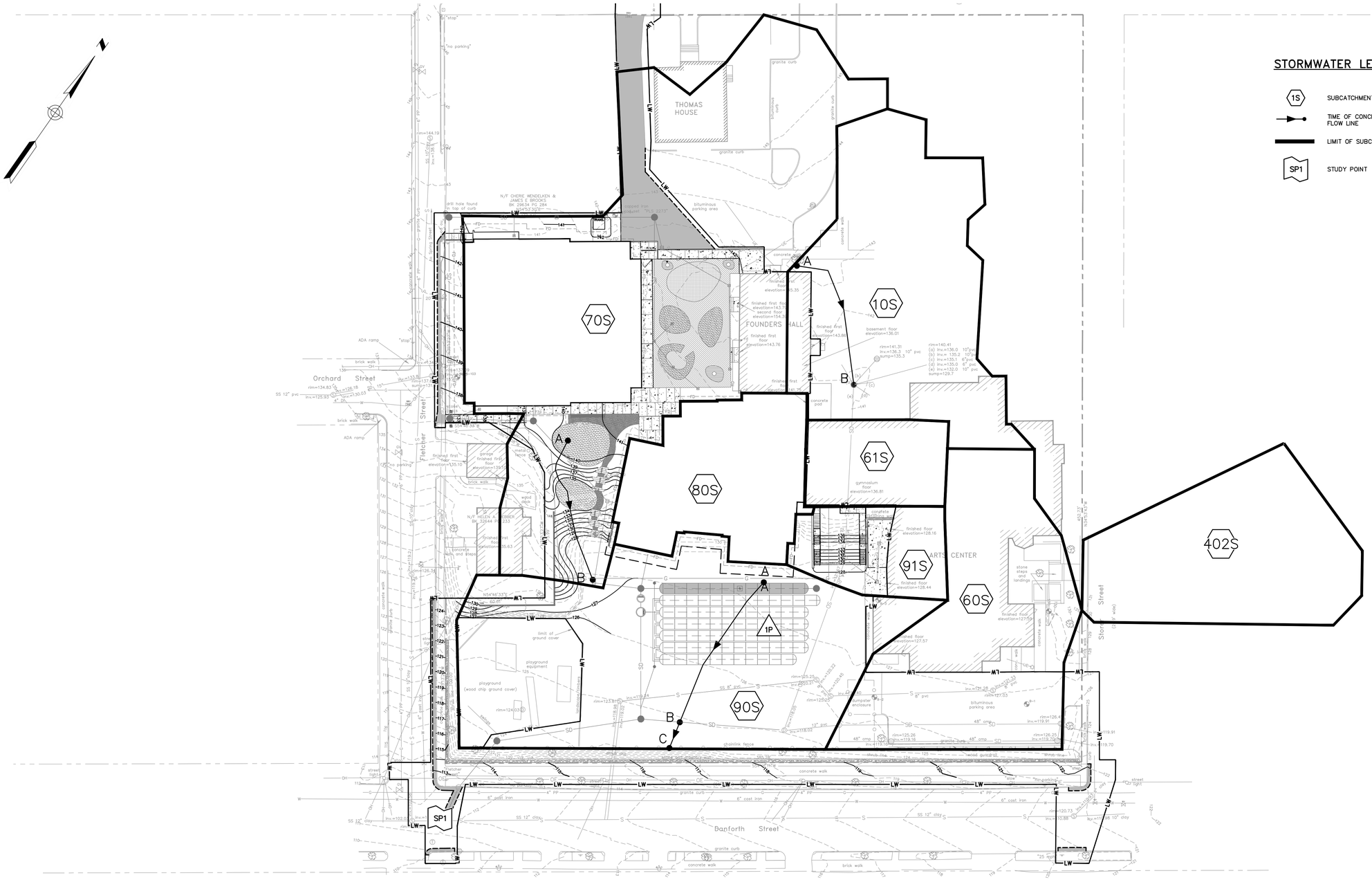
REVISION:

1	DATE
2	DATE
3	DATE
4	DATE
5	DATE
6	DATE

DATE OF ISSUE:	FEBRUARY 2016
PROJECT NUMBER:	229423
STATUS:	PLANNING BOARD SUBMISSION

PRE DEVELOPMENT DRAINAGE AREA PLAN

PRE



STORMWATER LEGEND

- 1S — SUBCATCHMENT AREAS
- TIME OF CONCENTRATION (Tc) FLOW LINE
- LIMIT OF SUBCATCHMENT AREA
- SP1 — STUDY POINT

BAR SCALE
1" = 30'
CHECK GRAPHIC SCALE BEFORE USING

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designed for human potential

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STATE OF MAINE — LICENSED PROFESSIONAL ENGINEER
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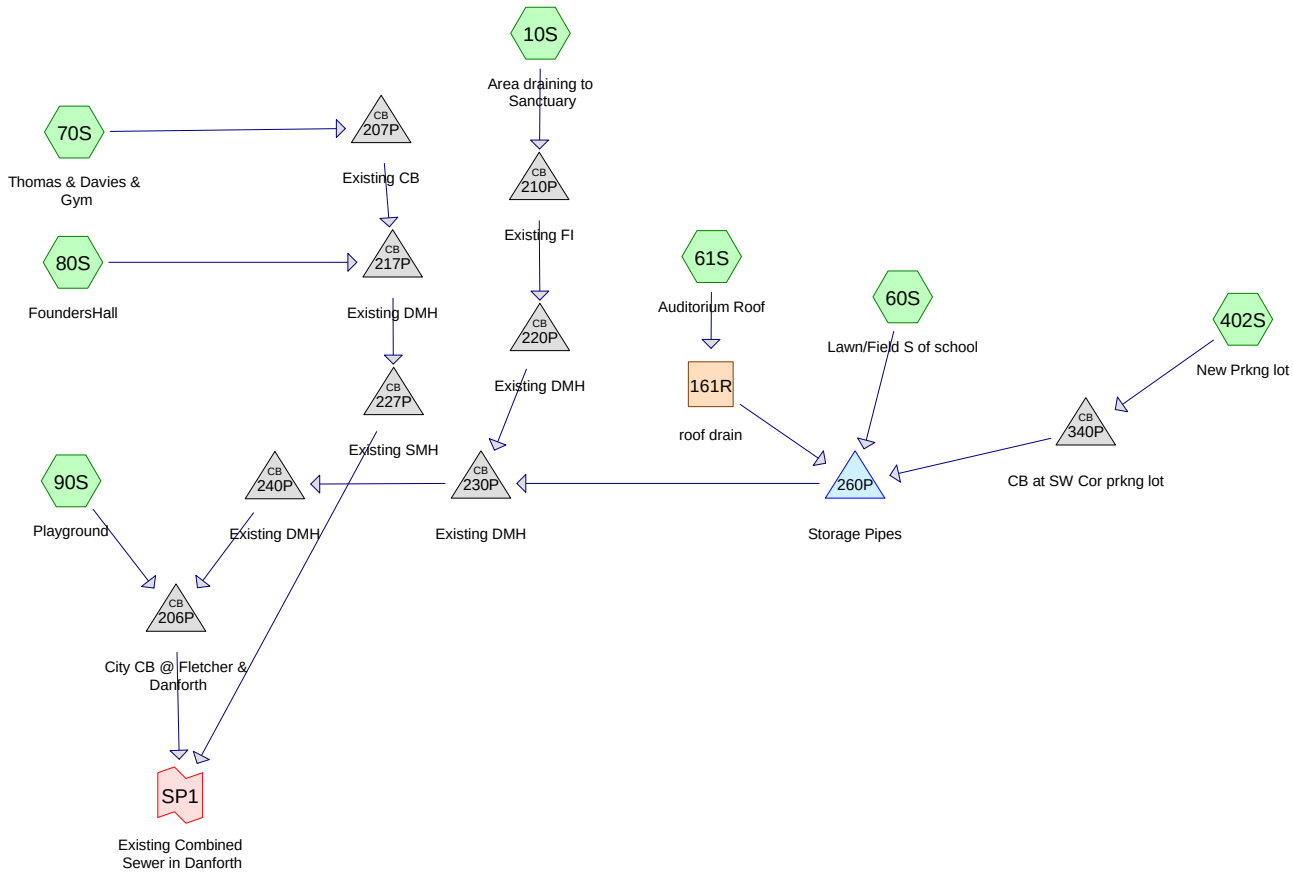
DATE OF ISSUE: **FEBRUARY 2016**
PROJECT NUMBER: **229423**
STATUS: PLANNING BOARD SUBMISSION

POST DEVELOPMENT DRAINAGE AREA PLAN

POST



Subcat Reach Pond Link

Routing Diagram for 5. Pre
Prepared by Woodard & Curran, Printed 2/16/2016
HydroCAD® 10.00-15 s/n 01204 © 2015 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.14	98	Impervious (402S)
1.13	39	Lawn/field, HSG A (10S, 60S, 70S, 90S)
0.09	39	Pervious (402S)
0.18	98	Roof runoff (61S, 80S)
1.59	98	impervious (10S, 60S, 70S, 90S)
3.14	**75**	**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 10S: Area draining to Runoff Area=19,633 sf 57.01% Impervious Runoff Depth>0.92"
Flow Length=91' Slope=0.0300 '/' Tc=7.7 min CN=73 Runoff=0.42 cfs 0.034 af

Subcatchment 60S: Lawn/Field S of school Runoff Area=16,715 sf 84.98% Impervious Runoff Depth>1.99"
Tc=5.0 min CN=89 Runoff=0.92 cfs 0.064 af

Subcatchment 61S: Auditorium Roof Runoff Area=4,485 sf 100.00% Impervious Runoff Depth>2.87"
Tc=5.0 min CN=98 Runoff=0.32 cfs 0.025 af

Subcatchment 70S: Thomas & Davies & Runoff Area=41,034 sf 78.01% Impervious Runoff Depth>1.67"
Tc=5.0 min CN=85 Runoff=1.92 cfs 0.131 af

Subcatchment 80S: FoundersHall Runoff Area=3,498 sf 100.00% Impervious Runoff Depth>2.87"
Tc=5.0 min CN=98 Runoff=0.25 cfs 0.019 af

Subcatchment 90S: Playground Runoff Area=41,240 sf 29.19% Impervious Runoff Depth>0.25"
Flow Length=188' Tc=14.6 min CN=56 Runoff=0.09 cfs 0.020 af

Subcatchment 402S: New Prkng lot Runoff Area=10,240 sf 60.94% Impervious Runoff Depth>1.03"
Tc=5.0 min CN=75 Runoff=0.28 cfs 0.020 af

Reach 161R: roof drain Avg. Flow Depth=0.15' Max Vel=6.63 fps Inflow=0.32 cfs 0.025 af
6.0" Round Pipe n=0.013 L=129.0' S=0.0911 '/' Capacity=1.69 cfs Outflow=0.32 cfs 0.025 af

Pond 206P: City CB @ Fletcher & Danforth Peak Elev=109.59' Inflow=1.79 cfs 0.162 af
8.0" Round Culvert n=0.013 L=18.0' S=0.2750 '/' Outflow=1.79 cfs 0.162 af

Pond 207P: Existing CB Peak Elev=131.47' Inflow=1.92 cfs 0.131 af
10.0" Round Culvert n=0.010 L=60.0' S=0.1287 '/' Outflow=1.92 cfs 0.131 af

Pond 210P: Existing FI Peak Elev=132.39' Inflow=0.42 cfs 0.034 af
10.0" Round Culvert n=0.010 L=102.0' S=0.1008 '/' Outflow=0.42 cfs 0.034 af

Pond 217P: Existing DMH Peak Elev=125.48' Inflow=2.17 cfs 0.150 af
8.0" Round Culvert n=0.013 L=89.0' S=0.0367 '/' Outflow=2.17 cfs 0.150 af

Pond 220P: Existing DMH Peak Elev=122.06' Inflow=0.42 cfs 0.034 af
10.0" Round Culvert n=0.010 L=108.0' S=0.0335 '/' Outflow=0.42 cfs 0.034 af

Pond 227P: Existing SMH Peak Elev=121.98' Inflow=2.17 cfs 0.150 af
8.0" Round Culvert n=0.013 L=71.0' S=0.2025 '/' Outflow=2.17 cfs 0.150 af

Pond 230P: Existing DMH Peak Elev=120.15' Inflow=1.79 cfs 0.143 af
8.0" Round Culvert n=0.010 L=156.0' S=0.0272 '/' Outflow=1.79 cfs 0.143 af

Pond 240P: Existing DMH Peak Elev=115.91' Inflow=1.79 cfs 0.143 af
8.0" Round Culvert n=0.010 L=58.0' S=0.0833 '/' Outflow=1.79 cfs 0.143 af

Pond 260P: Storage Pipes Peak Elev=119.87' Storage=164 cf Inflow=1.52 cfs 0.108 af
12.0" Round Culvert n=0.010 L=30.0' S=0.0380 '/' Outflow=1.37 cfs 0.108 af

Pond 340P: CB at SW Cor prkng lot Peak Elev=129.34' Inflow=0.28 cfs 0.020 af
8.0" Round Culvert n=0.010 L=56.0' S=0.1000 '/' Outflow=0.28 cfs 0.020 af

Link SP1: Existing Combined Sewer in Danforth Inflow=3.85 cfs 0.313 af
Primary=3.85 cfs 0.313 af

Total Runoff Area = 3.14 ac Runoff Volume = 0.313 af Average Runoff Depth = 1.19"
38.86% Pervious = 1.22 ac 61.14% Impervious = 1.92 ac

Summary for Subcatchment 10S: Area draining to Sanctuary

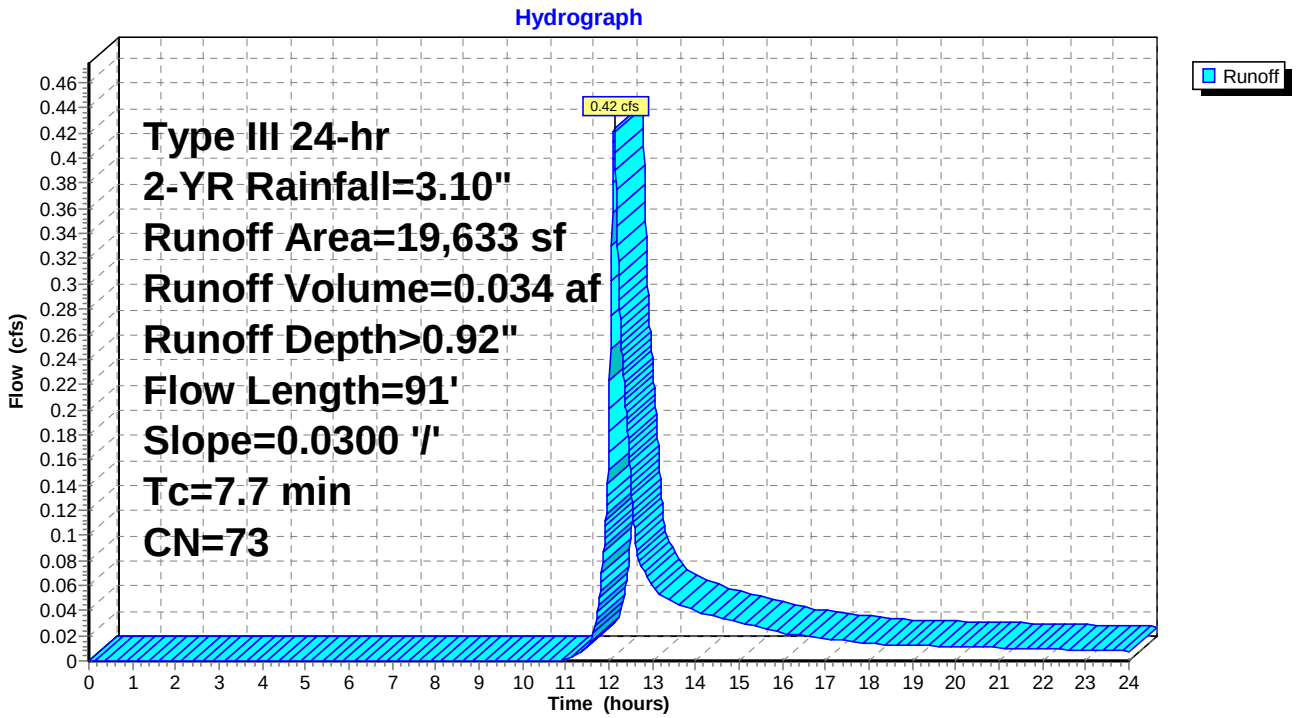
Runoff = 0.42 cfs @ 12.12 hrs, Volume= 0.034 af, Depth> 0.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	11,192	98	impervious
*	8,441	39	Lawn/field, HSG A
	19,633	73	Weighted Average
	8,441		42.99% Pervious Area
	11,192		57.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	91	0.0300	0.20		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"

Subcatchment 10S: Area draining to Sanctuary



Summary for Subcatchment 60S: Lawn/Field S of school

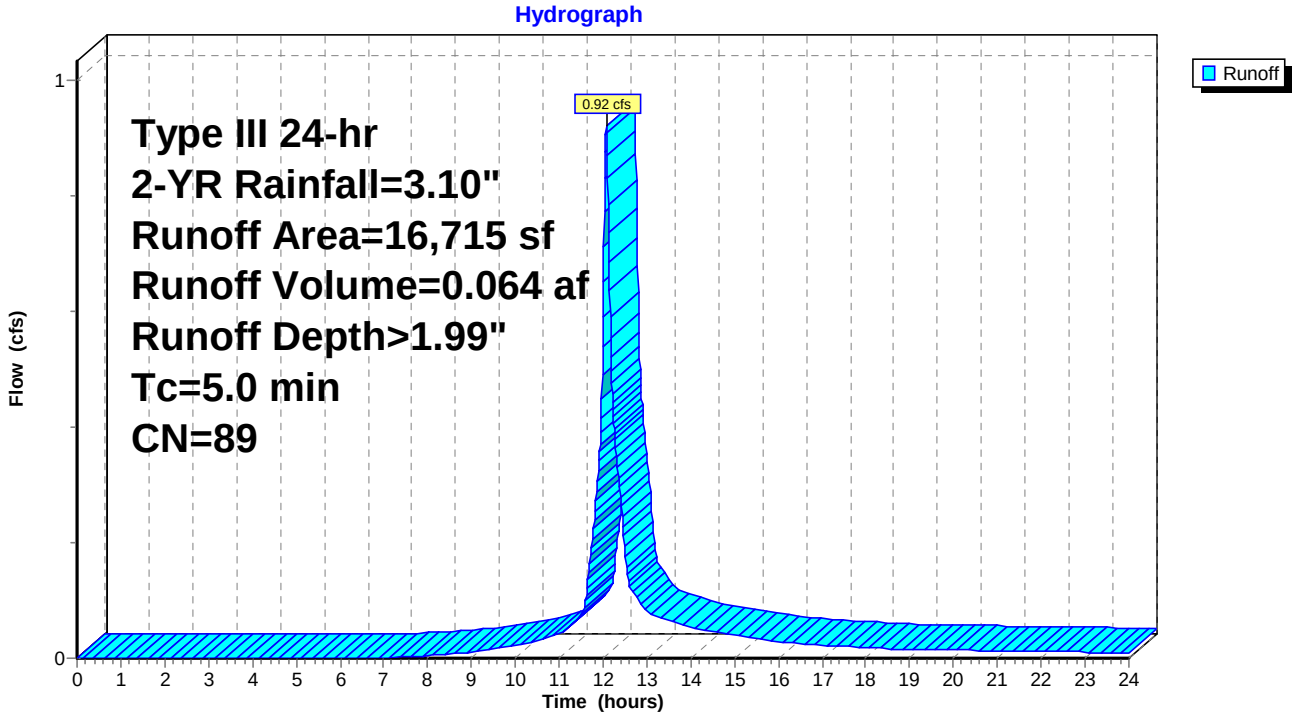
Runoff = 0.92 cfs @ 12.07 hrs, Volume= 0.064 af, Depth> 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	14,205	98	impervious
*	2,510	39	Lawn/field, HSG A
	16,715	89	Weighted Average
	2,510		15.02% Pervious Area
	14,205		84.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 60S: Lawn/Field S of school



Summary for Subcatchment 61S: Auditorium Roof

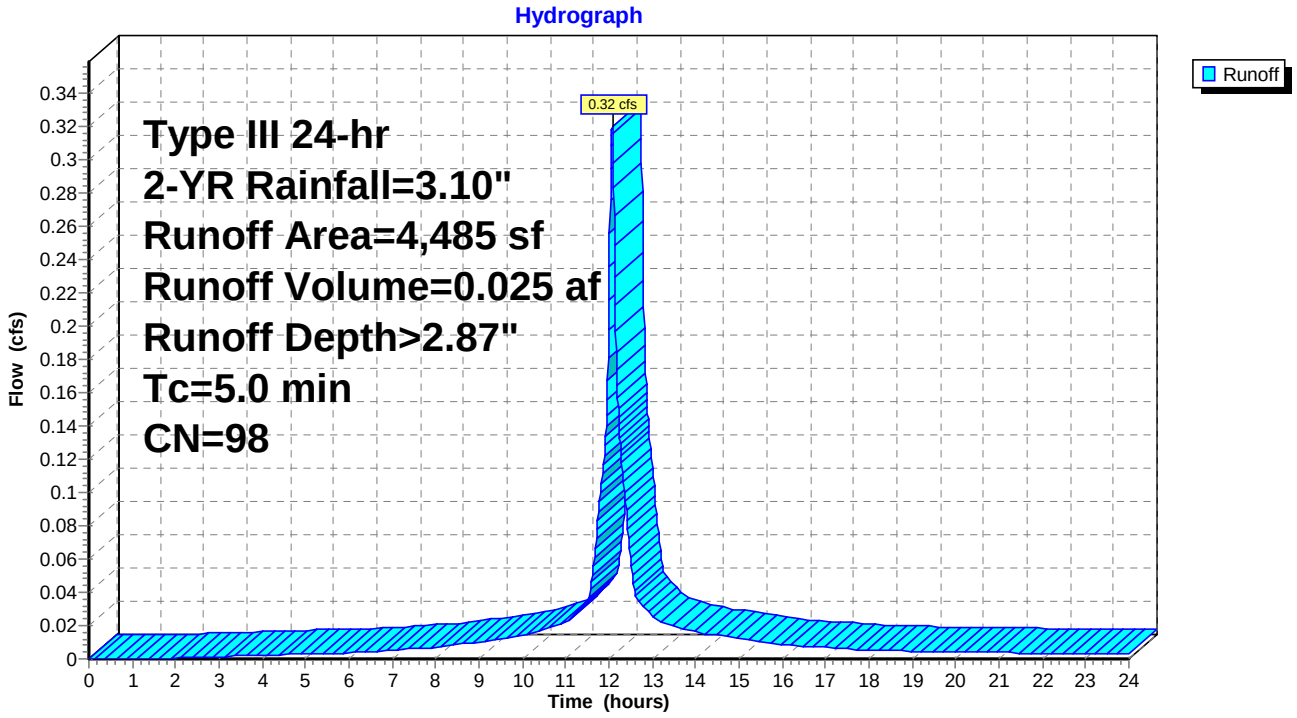
Runoff = 0.32 cfs @ 12.07 hrs, Volume= 0.025 af, Depth> 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	4,485	98	Roof runoff
	4,485		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 61S: Auditorium Roof



Summary for Subcatchment 70S: Thomas & Davies & Gym

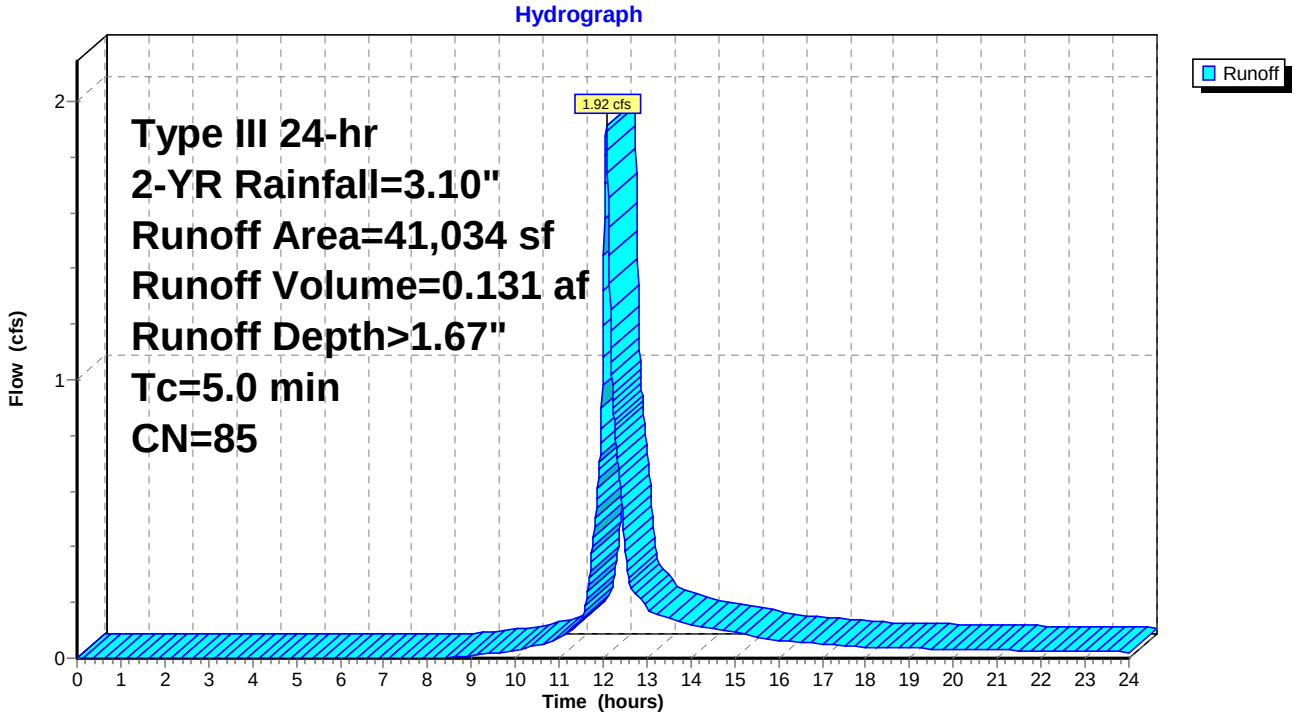
Runoff = 1.92 cfs @ 12.08 hrs, Volume= 0.131 af, Depth> 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	32,011	98	impervious
*	9,023	39	Lawn/field, HSG A
	41,034	85	Weighted Average
	9,023		21.99% Pervious Area
	32,011		78.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment 70S: Thomas & Davies & Gym



Summary for Subcatchment 80S: FoundersHall

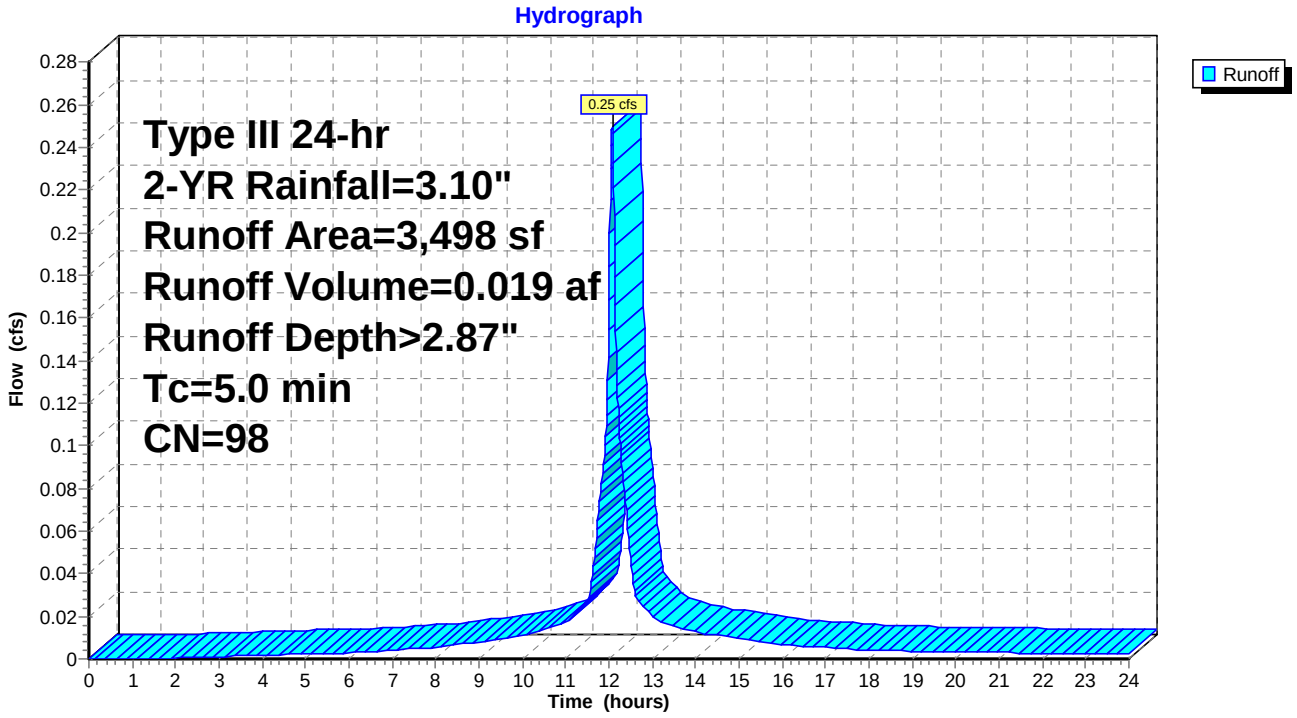
Runoff = 0.25 cfs @ 12.07 hrs, Volume= 0.019 af, Depth> 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	3,498	98	Roof runoff
	3,498		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 80S: FoundersHall



Summary for Subcatchment 90S: Playground

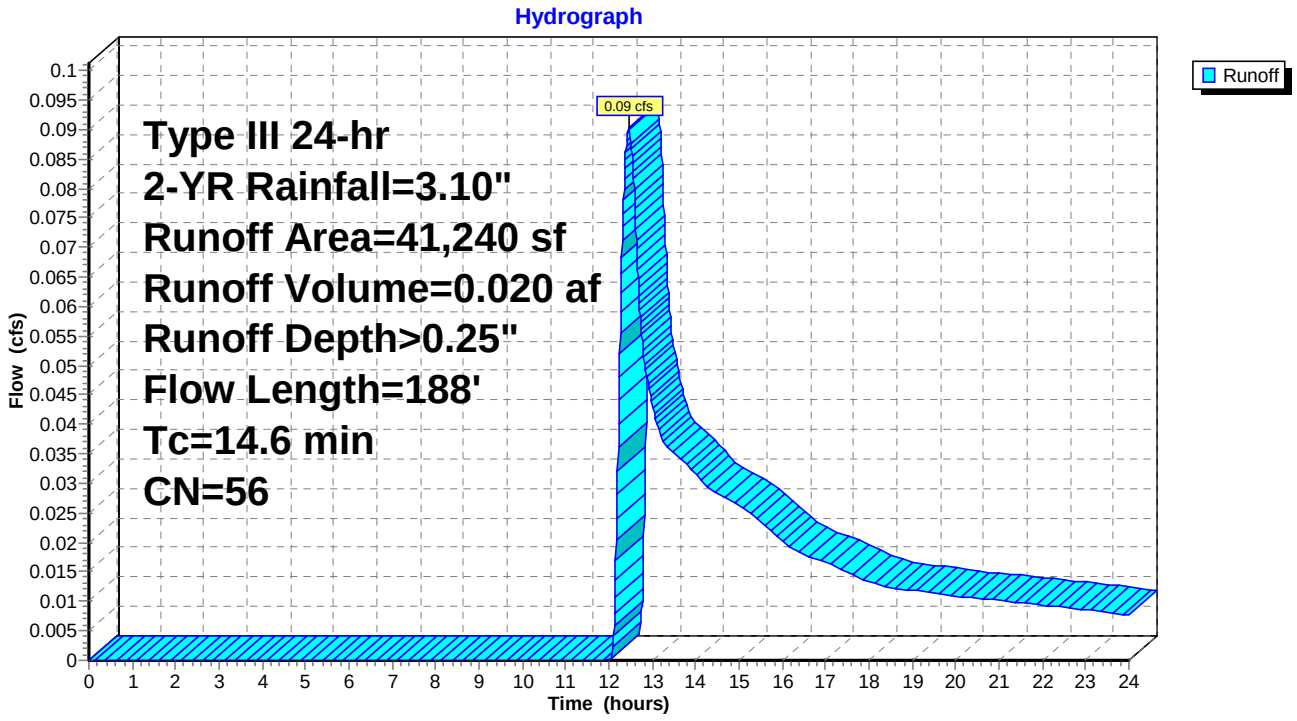
Runoff = 0.09 cfs @ 12.47 hrs, Volume= 0.020 af, Depth> 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	12,037	98	impervious
*	29,203	39	Lawn/field, HSG A
	41,240	56	Weighted Average
	29,203		70.81% Pervious Area
	12,037		29.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"
1.7	88	0.0154	0.87		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
14.6	188	Total			

Subcatchment 90S: Playground



Summary for Subcatchment 402S: New Prkng lot

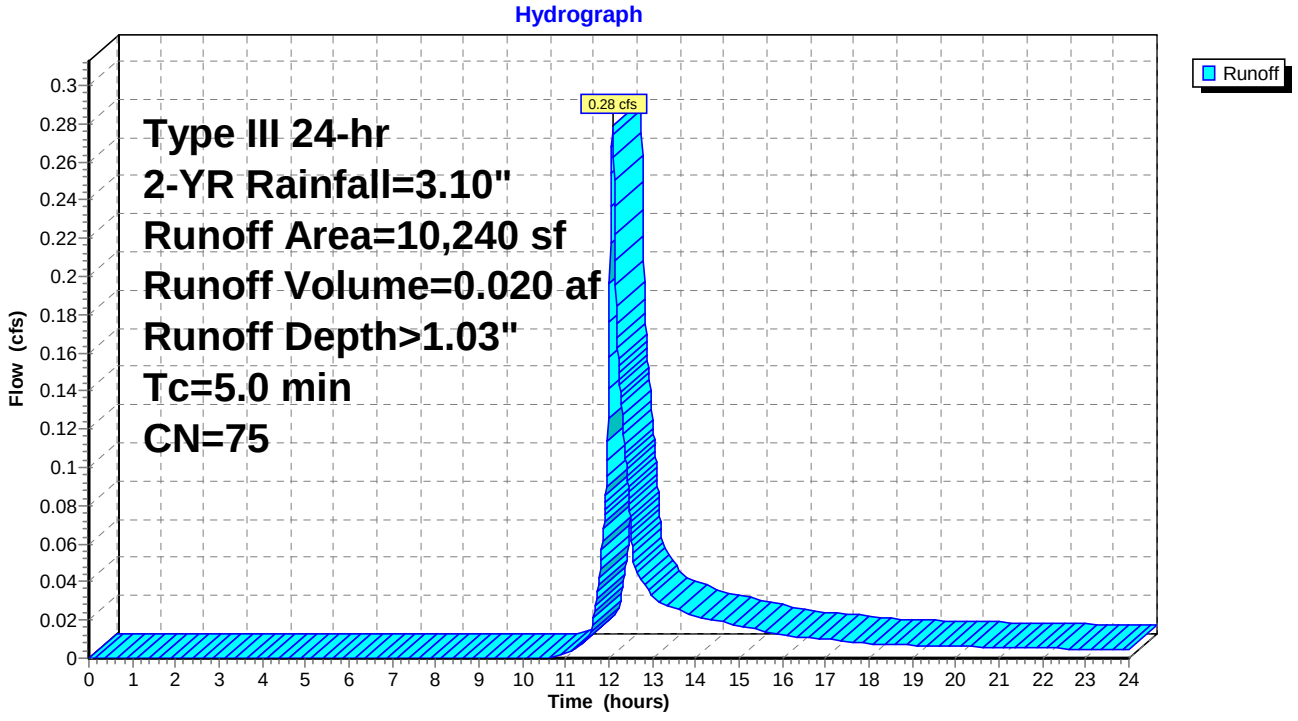
Runoff = 0.28 cfs @ 12.08 hrs, Volume= 0.020 af, Depth> 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	4,000	39	Pervious
*	6,240	98	Impervious
	10,240	75	Weighted Average
	4,000		39.06% Pervious Area
	6,240		60.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 402S: New Prkng lot



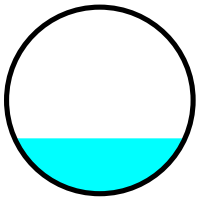
Summary for Reach 161R: roof drain

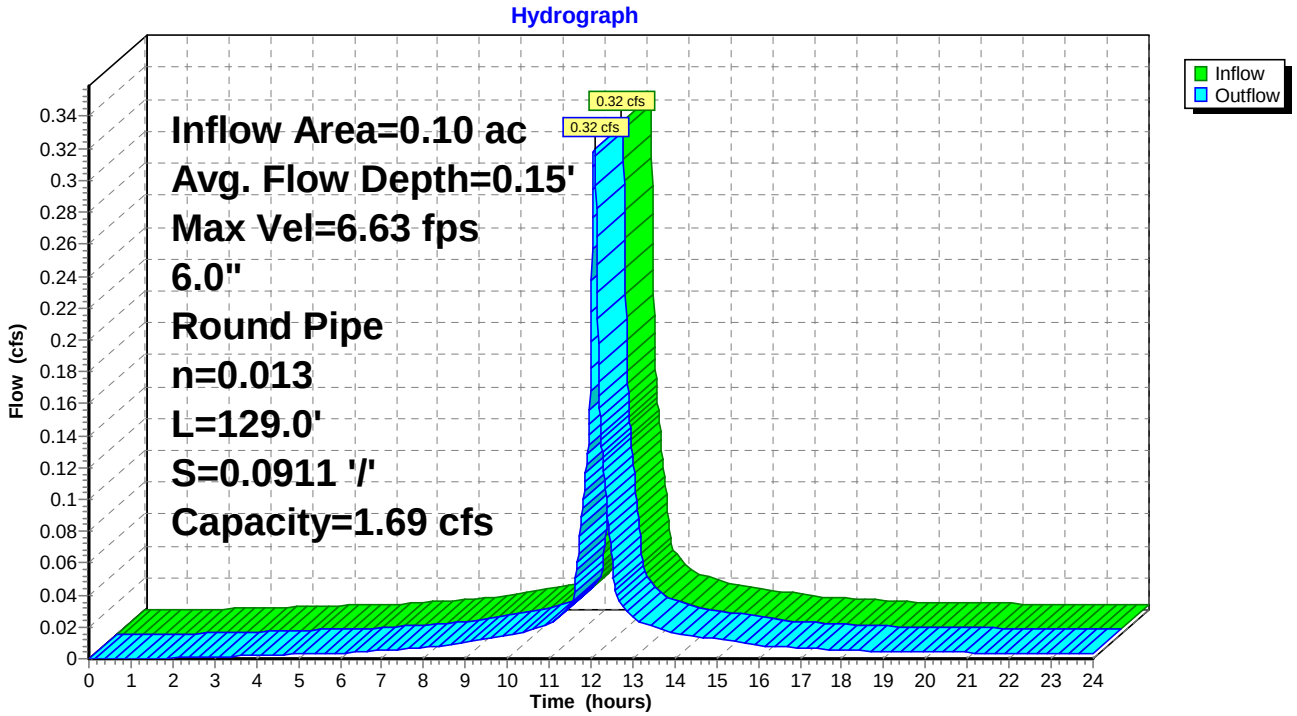
Inflow Area = 0.10 ac,100.00% Impervious, Inflow Depth > 2.87" for 2-YR event
Inflow = 0.32 cfs @ 12.07 hrs, Volume= 0.025 af
Outflow = 0.32 cfs @ 12.08 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.63 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.17 fps, Avg. Travel Time= 1.0 min

Peak Storage= 6 cf @ 12.07 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 1.69 cfs

6.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 129.0' Slope= 0.0911 '/'
Inlet Invert= 130.00', Outlet Invert= 118.25'





Summary for Pond 206P: City CB @ Fletcher & Danforth

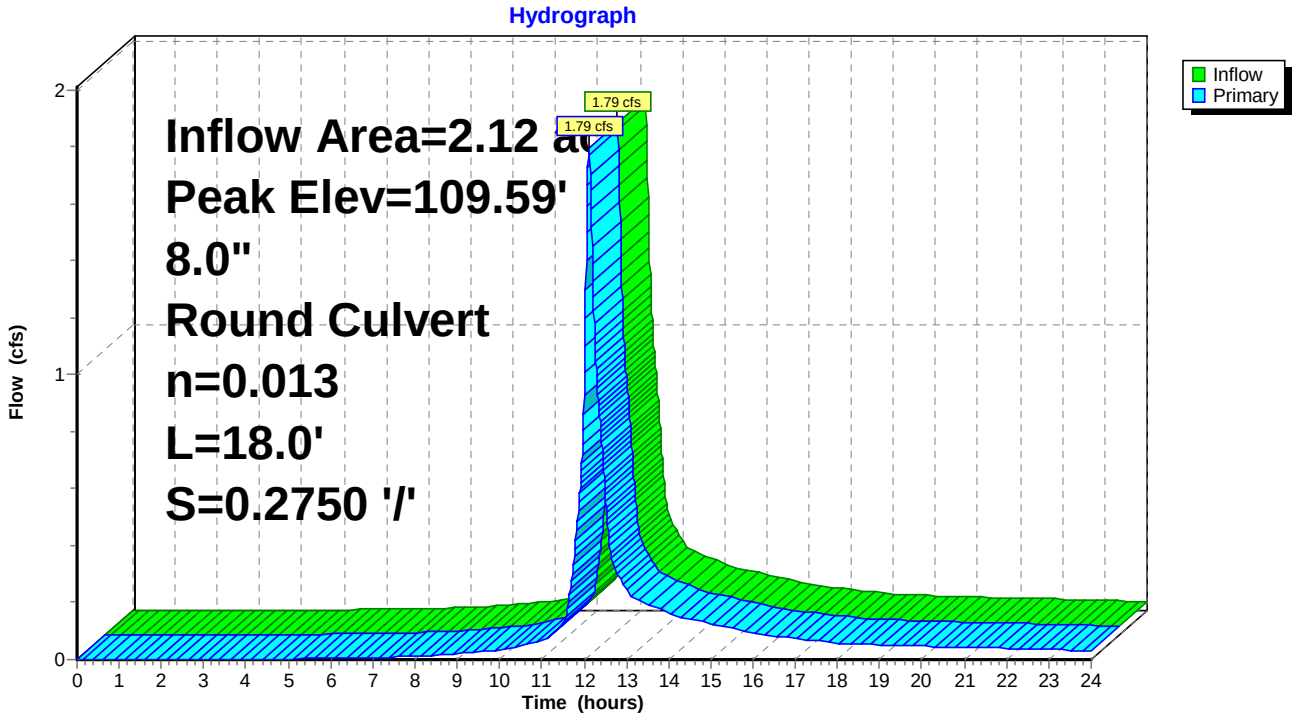
Inflow Area = 2.12 ac, 52.17% Impervious, Inflow Depth > 0.92" for 2-YR event
Inflow = 1.79 cfs @ 12.12 hrs, Volume= 0.162 af
Outflow = 1.79 cfs @ 12.12 hrs, Volume= 0.162 af, Atten= 0%, Lag= 0.0 min
Primary = 1.79 cfs @ 12.12 hrs, Volume= 0.162 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 109.59' @ 12.12 hrs
Flood Elev= 111.26'

Device	Routing	Invert	Outlet Devices
#1	Primary	107.43'	**8.0" Round Culvert** L= 18.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 107.43' / 102.48' S= 0.2750 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 0.35 sf

Primary OutFlow Max=1.79 cfs @ 12.12 hrs HW=109.59' (Free Discharge)
1=Culvert (Inlet Controls 1.79 cfs @ 5.13 fps)

Pond 206P: City CB @ Fletcher & Danforth



Summary for Pond 207P: Existing CB

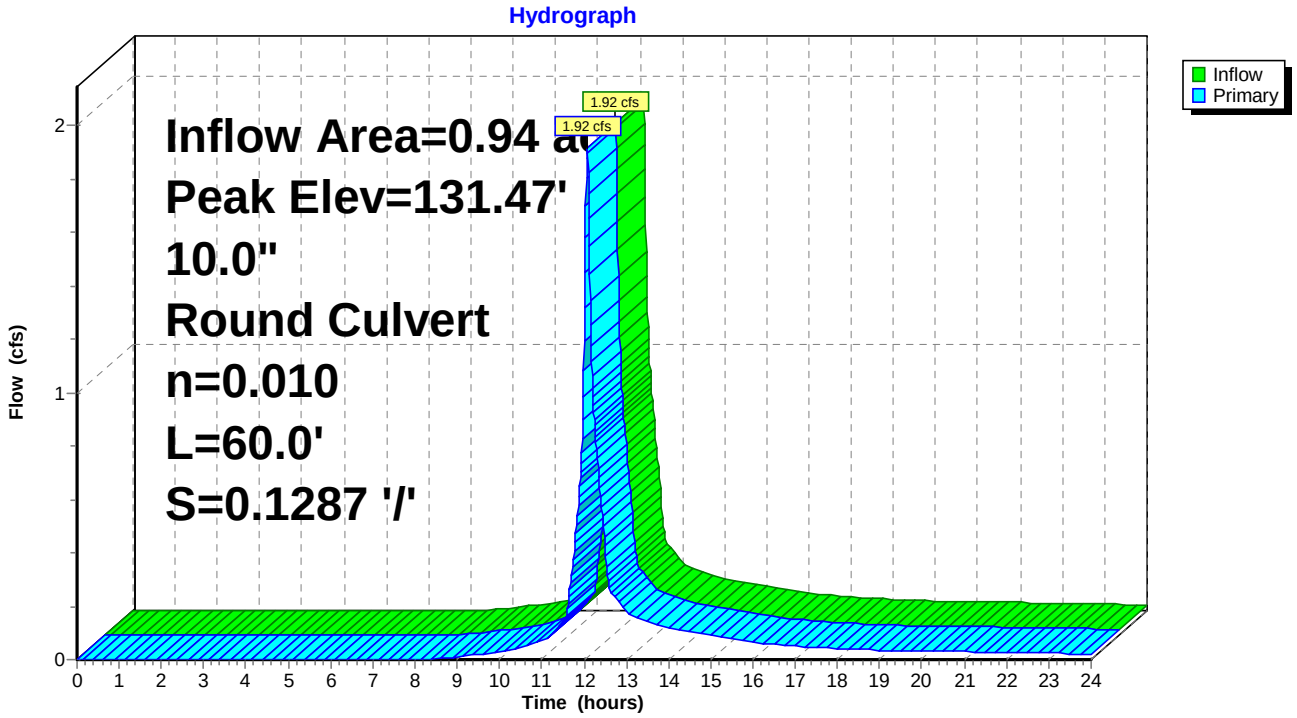
Inflow Area = 0.94 ac, 78.01% Impervious, Inflow Depth > 1.67" for 2-YR event
Inflow = 1.92 cfs @ 12.08 hrs, Volume= 0.131 af
Outflow = 1.92 cfs @ 12.08 hrs, Volume= 0.131 af, Atten= 0%, Lag= 0.0 min
Primary = 1.92 cfs @ 12.08 hrs, Volume= 0.131 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 131.47' @ 12.08 hrs
Flood Elev= 137.62'

Device	Routing	Invert	Outlet Devices
#1	Primary	130.20'	**10.0" Round Culvert** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 130.20' / 122.48' S= 0.1287 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.91 cfs @ 12.08 hrs HW=131.47' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.91 cfs @ 3.51 fps)

Pond 207P: Existing CB



Summary for Pond 210P: Existing FI

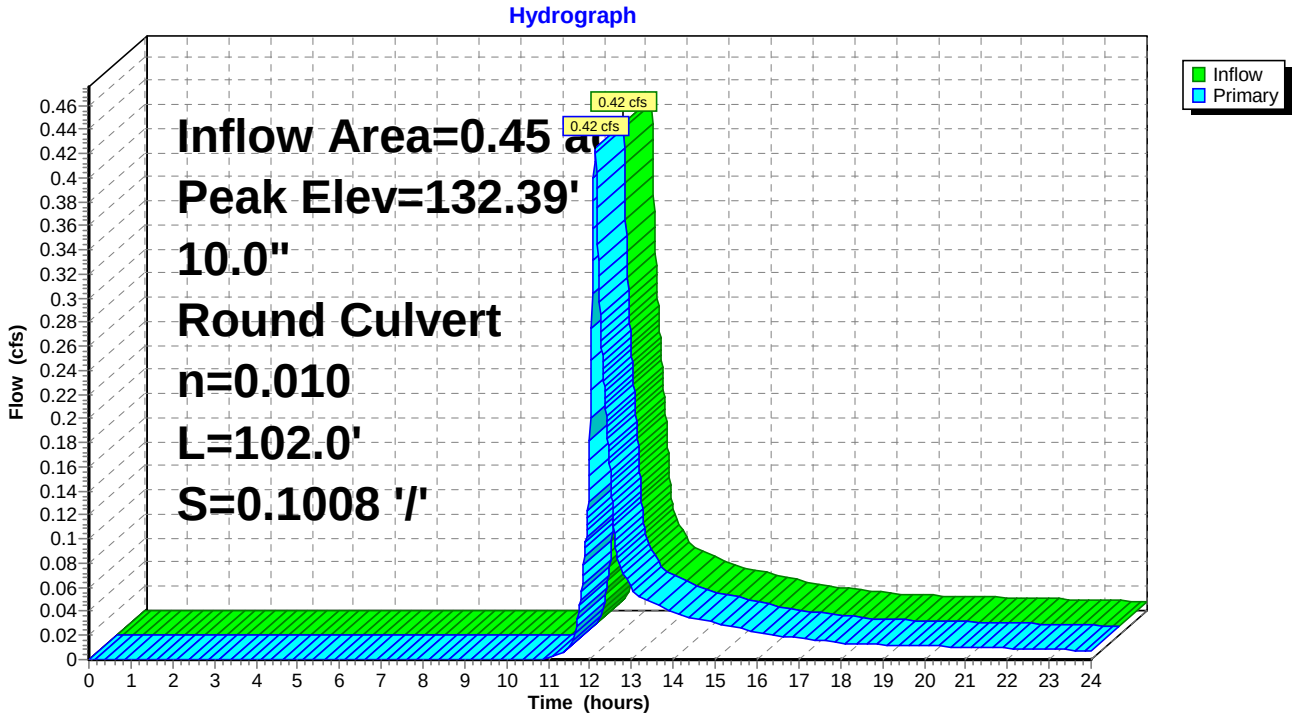
Inflow Area = 0.45 ac, 57.01% Impervious, Inflow Depth > 0.92" for 2-YR event
Inflow = 0.42 cfs @ 12.12 hrs, Volume= 0.034 af
Outflow = 0.42 cfs @ 12.12 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min
Primary = 0.42 cfs @ 12.12 hrs, Volume= 0.034 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 132.39' @ 12.12 hrs
Flood Elev= 140.41'

Device	Routing	Invert	Outlet Devices
#1	Primary	132.00'	**10.0" Round Culvert** L= 102.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 132.00' / 121.72' S= 0.1008 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.42 cfs @ 12.12 hrs HW=132.39' (Free Discharge)
1=Culvert (Inlet Controls 0.42 cfs @ 1.68 fps)

Pond 210P: Existing FI



Summary for Pond 217P: Existing DMH

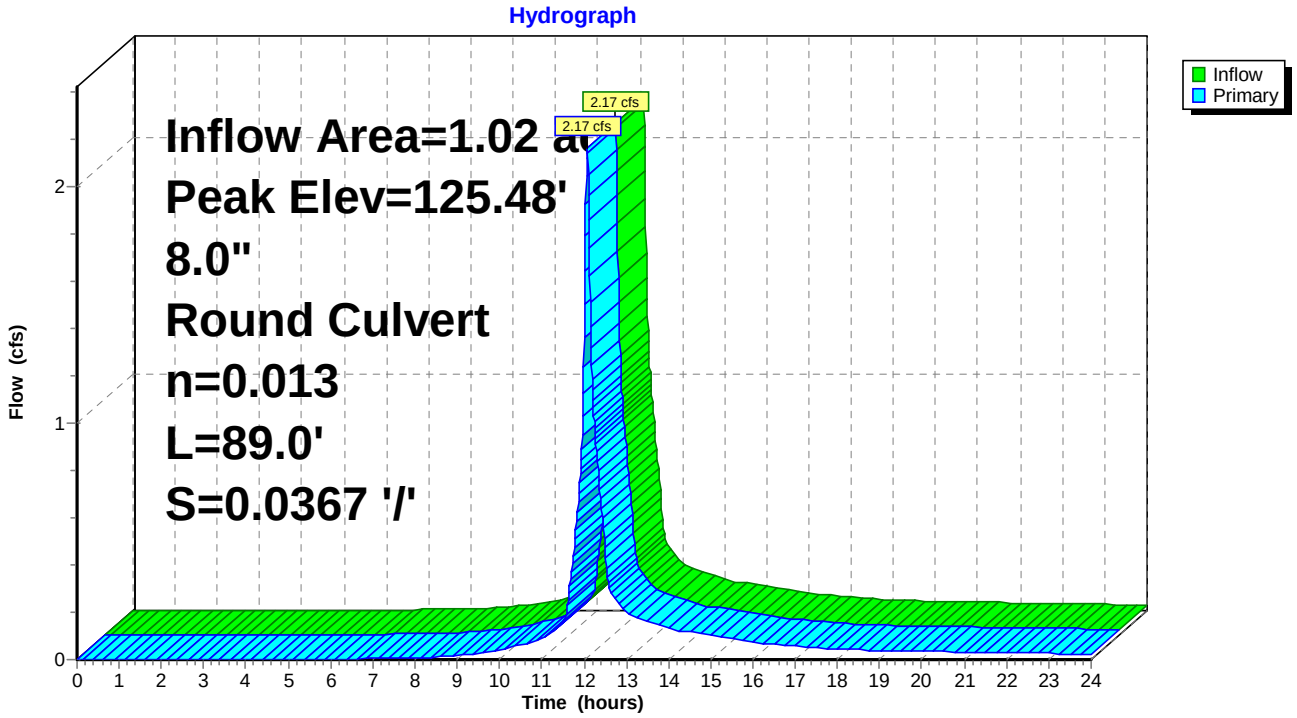
Inflow Area = 1.02 ac, 79.74% Impervious, Inflow Depth > 1.76" for 2-YR event
Inflow = 2.17 cfs @ 12.07 hrs, Volume= 0.150 af
Outflow = 2.17 cfs @ 12.07 hrs, Volume= 0.150 af, Atten= 0%, Lag= 0.0 min
Primary = 2.17 cfs @ 12.07 hrs, Volume= 0.150 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 125.48' @ 12.07 hrs
Flood Elev= 126.98'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.48'	**8.0" Round Culvert** L= 89.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 122.48' / 119.21' S= 0.0367 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 0.35 sf

Primary OutFlow Max=2.16 cfs @ 12.07 hrs HW=125.46' (Free Discharge)
1=Culvert (Inlet Controls 2.16 cfs @ 6.19 fps)

Pond 217P: Existing DMH



Summary for Pond 220P: Existing DMH

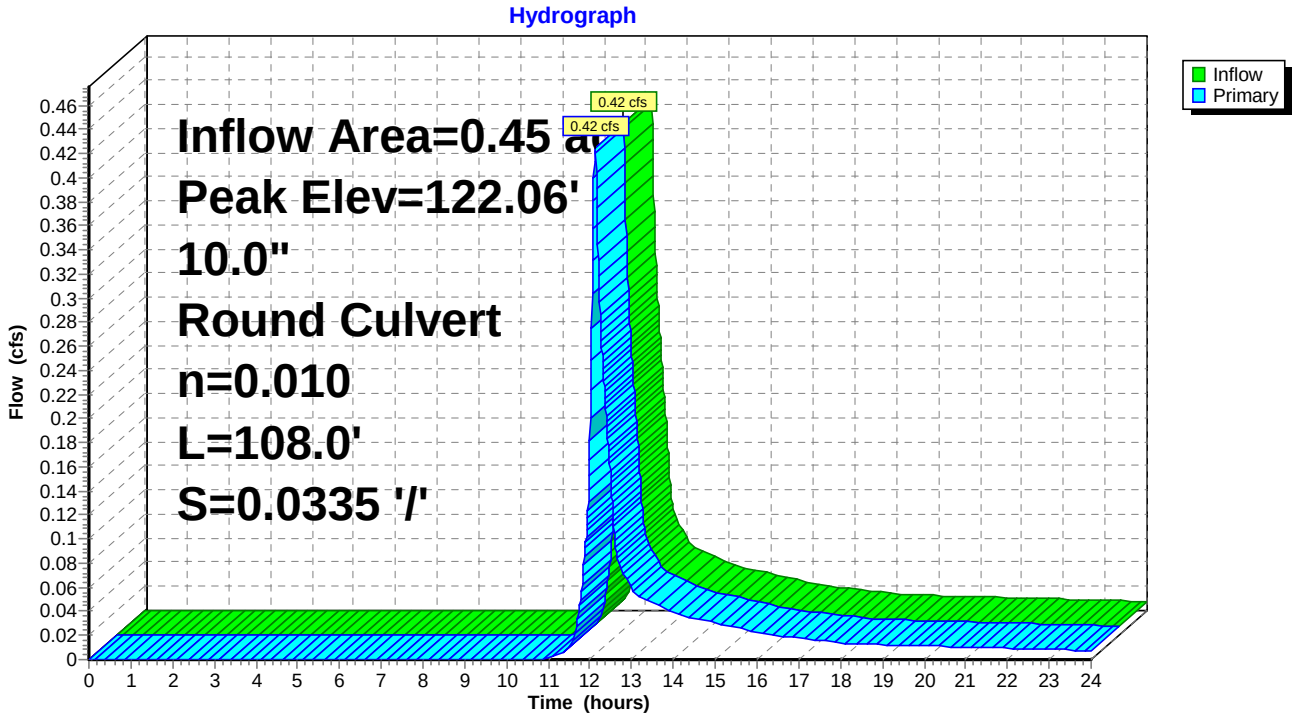
Inflow Area = 0.45 ac, 57.01% Impervious, Inflow Depth > 0.92" for 2-YR event
Inflow = 0.42 cfs @ 12.12 hrs, Volume= 0.034 af
Outflow = 0.42 cfs @ 12.12 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min
Primary = 0.42 cfs @ 12.12 hrs, Volume= 0.034 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 122.06' @ 12.12 hrs
Flood Elev= 128.47'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.67'	**10.0" Round Culvert** L= 108.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 121.67' / 118.05' S= 0.0335 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.42 cfs @ 12.12 hrs HW=122.06' (Free Discharge)
1=Culvert (Inlet Controls 0.42 cfs @ 1.68 fps)

Pond 220P: Existing DMH



Summary for Pond 227P: Existing SMH

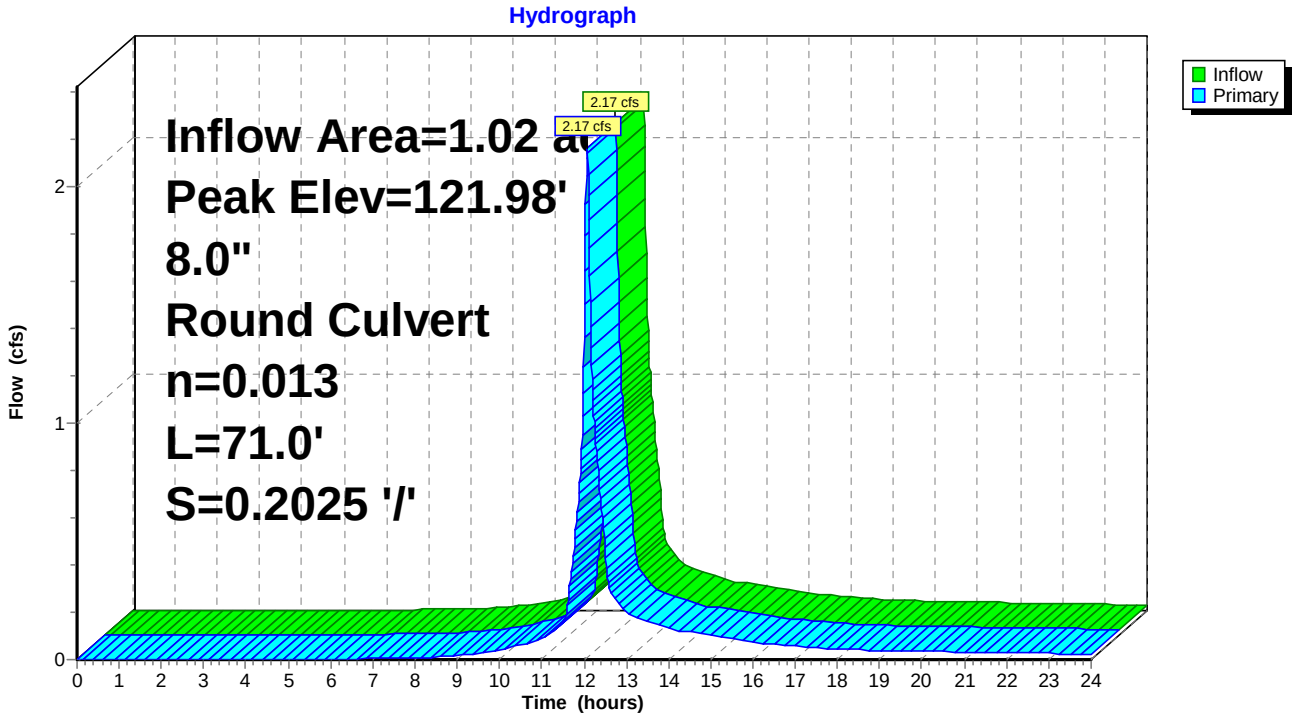
Inflow Area = 1.02 ac, 79.74% Impervious, Inflow Depth > 1.76" for 2-YR event
Inflow = 2.17 cfs @ 12.07 hrs, Volume= 0.150 af
Outflow = 2.17 cfs @ 12.07 hrs, Volume= 0.150 af, Atten= 0%, Lag= 0.0 min
Primary = 2.17 cfs @ 12.07 hrs, Volume= 0.150 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 121.98' @ 12.07 hrs
Flood Elev= 123.81'

Device	Routing	Invert	Outlet Devices
#1	Primary	118.98'	**8.0" Round Culvert** L= 71.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 118.98' / 104.60' S= 0.2025 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 0.35 sf

Primary OutFlow Max=2.16 cfs @ 12.07 hrs HW=121.96' (Free Discharge)
1=Culvert (Inlet Controls 2.16 cfs @ 6.19 fps)

Pond 227P: Existing SMH



Summary for Pond 230P: Existing DMH

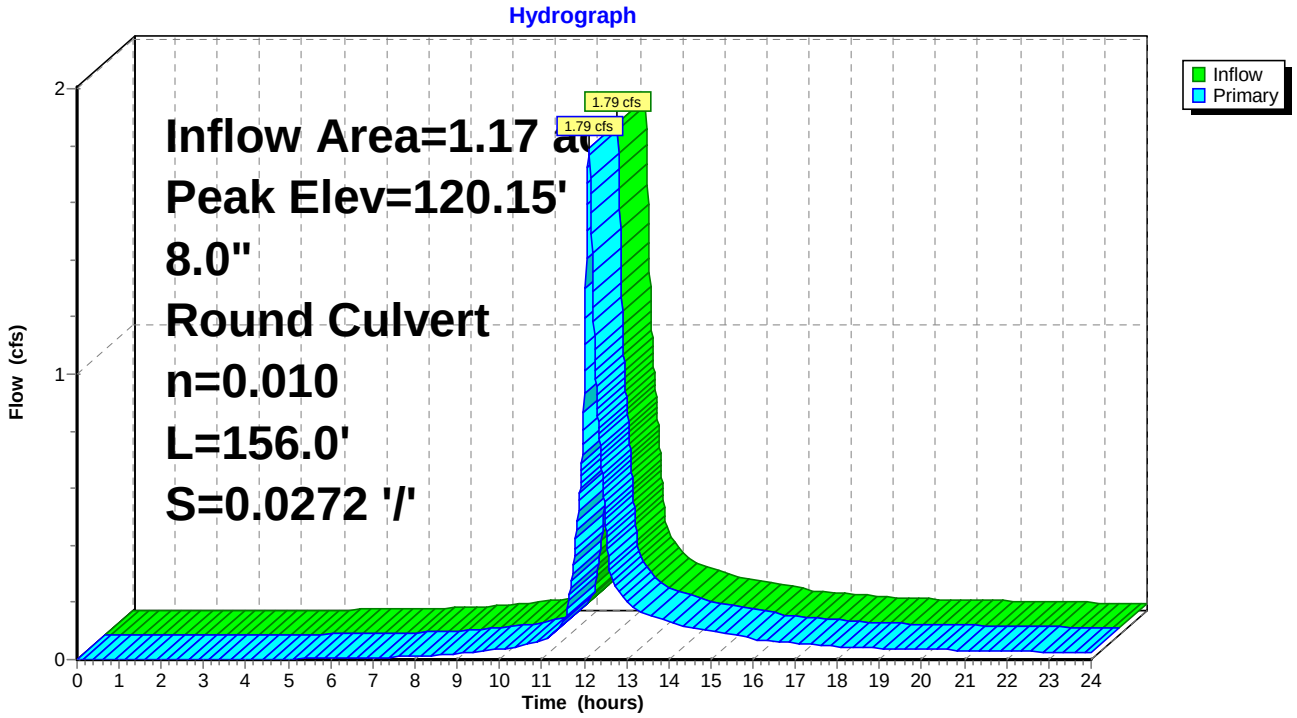
Inflow Area = 1.17 ac, 70.73% Impervious, Inflow Depth > 1.46" for 2-YR event
Inflow = 1.79 cfs @ 12.12 hrs, Volume= 0.143 af
Outflow = 1.79 cfs @ 12.12 hrs, Volume= 0.143 af, Atten= 0%, Lag= 0.0 min
Primary = 1.79 cfs @ 12.12 hrs, Volume= 0.143 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 120.15' @ 12.12 hrs
Flood Elev= 125.05'

Device	Routing	Invert	Outlet Devices
#1	Primary	118.00'	**8.0" Round Culvert** L= 156.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 118.00' / 113.76' S= 0.0272 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=1.79 cfs @ 12.12 hrs HW=120.15' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.79 cfs @ 5.12 fps)

Pond 230P: Existing DMH



Summary for Pond 240P: Existing DMH

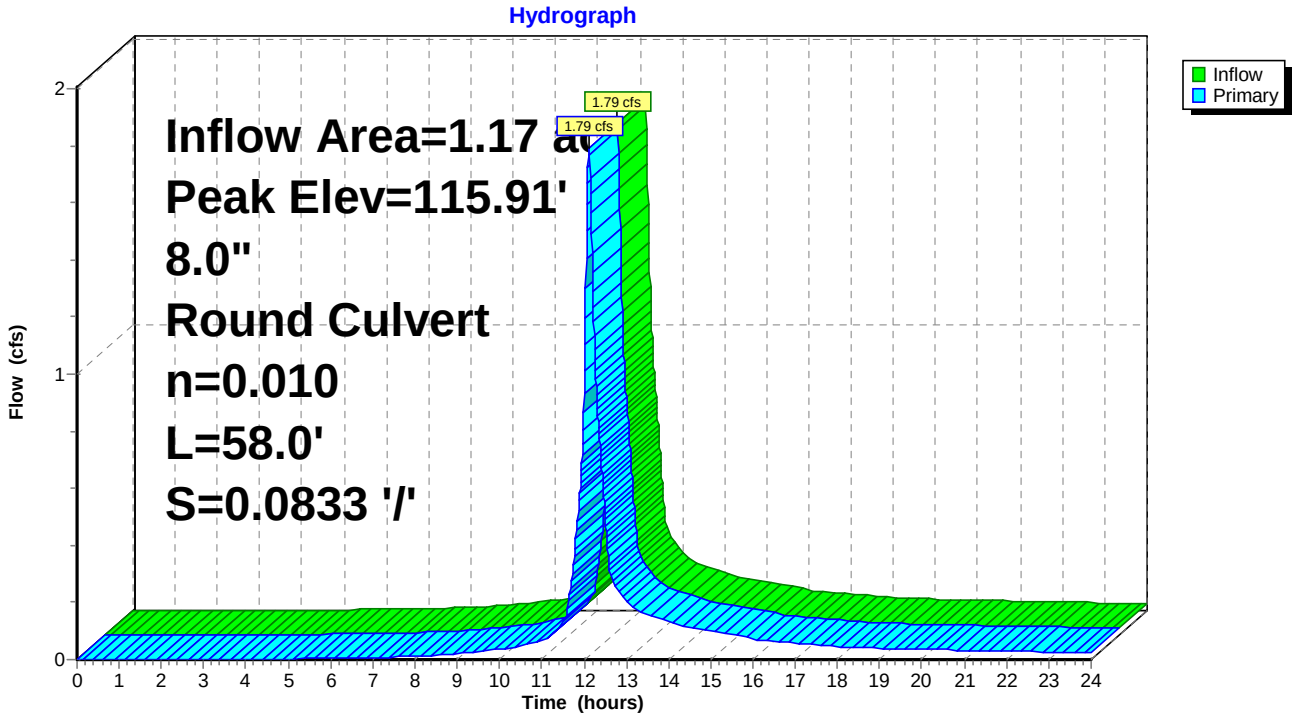
Inflow Area = 1.17 ac, 70.73% Impervious, Inflow Depth > 1.46" for 2-YR event
Inflow = 1.79 cfs @ 12.12 hrs, Volume= 0.143 af
Outflow = 1.79 cfs @ 12.12 hrs, Volume= 0.143 af, Atten= 0%, Lag= 0.0 min
Primary = 1.79 cfs @ 12.12 hrs, Volume= 0.143 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 115.91' @ 12.12 hrs
Flood Elev= 124.03'

Device	Routing	Invert	Outlet Devices
#1	Primary	113.76'	**8.0" Round Culvert** L= 58.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 113.76' / 108.93' S= 0.0833 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=1.79 cfs @ 12.12 hrs HW=115.91' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.79 cfs @ 5.12 fps)

Pond 240P: Existing DMH



Summary for Pond 260P: Storage Pipes

Inflow Area = 0.72 ac, 79.29% Impervious, Inflow Depth > 1.80" for 2-YR event
Inflow = 1.52 cfs @ 12.08 hrs, Volume= 0.108 af
Outflow = 1.37 cfs @ 12.11 hrs, Volume= 0.108 af, Atten= 10%, Lag= 2.3 min
Primary = 1.37 cfs @ 12.11 hrs, Volume= 0.108 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 119.87' @ 12.11 hrs Surf.Area= 564 sf Storage= 164 cf
Flood Elev= 125.26' Surf.Area= 0 sf Storage= 3,468 cf

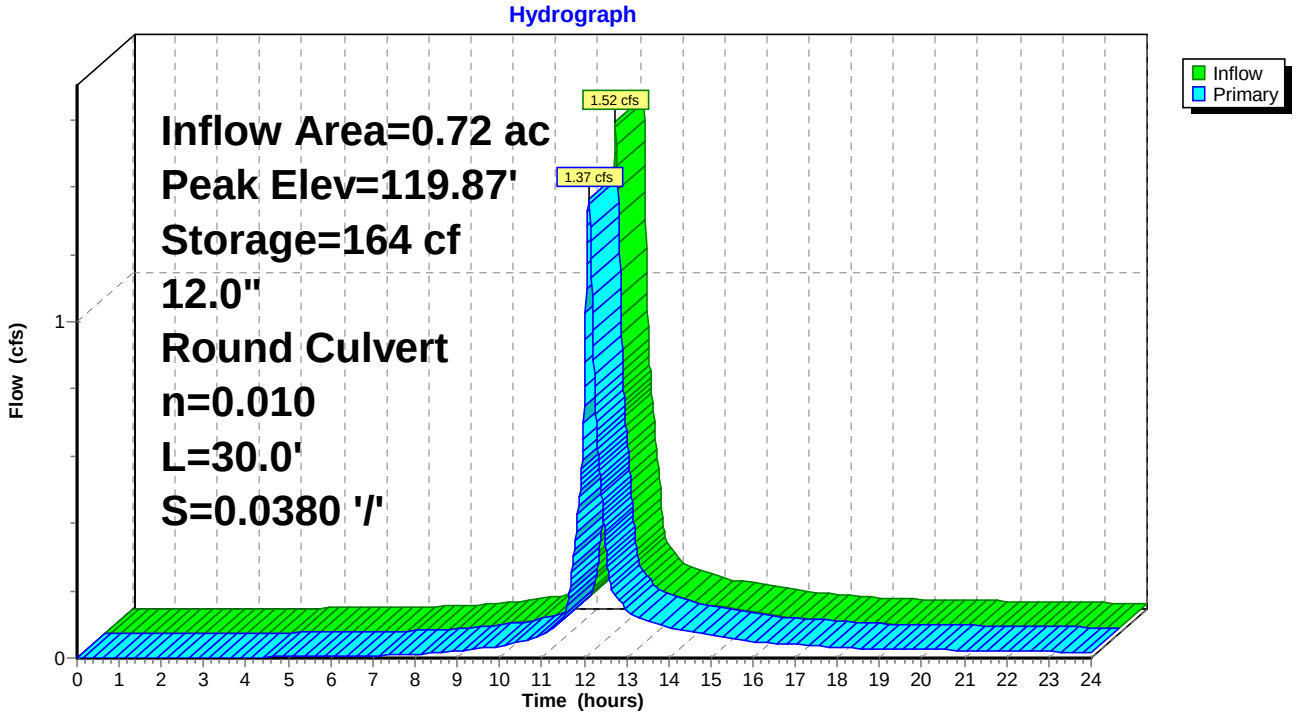
Plug-Flow detention time= 1.1 min calculated for 0.108 af (100% of inflow)
Center-of-Mass det. time= 1.0 min (808.5 - 807.5)

Volume	Invert	Avail.Storage	Storage Description
#1	119.16'	3,468 cf	**48.0" Round Pipe Storage** L= 276.0' S= 0.0027 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.16'	**12.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.16' / 118.02' S= 0.0380 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.36 cfs @ 12.11 hrs HW=119.87' (Free Discharge)
1=Culvert (Inlet Controls 1.36 cfs @ 2.27 fps)

Pond 260P: Storage Pipes



Summary for Pond 340P: CB at SW Cor prkng lot

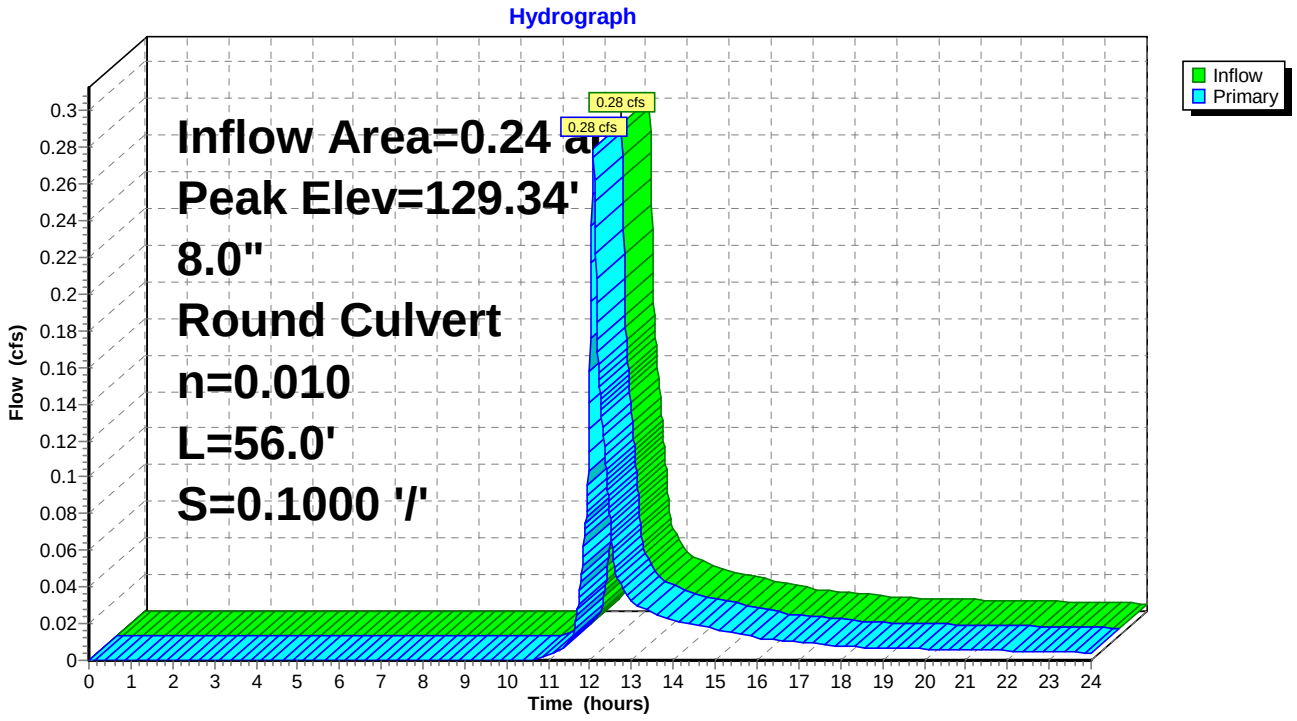
Inflow Area = 0.24 ac, 60.94% Impervious, Inflow Depth > 1.03" for 2-YR event
Inflow = 0.28 cfs @ 12.08 hrs, Volume= 0.020 af
Outflow = 0.28 cfs @ 12.08 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min
Primary = 0.28 cfs @ 12.08 hrs, Volume= 0.020 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 129.34' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	129.00'	**8.0" Round Culvert** L= 56.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 129.00' / 123.40' S= 0.1000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.28 cfs @ 12.08 hrs HW=129.34' (Free Discharge)
1=Culvert (Inlet Controls 0.28 cfs @ 1.57 fps)

Pond 340P: CB at SW Cor prkng lot

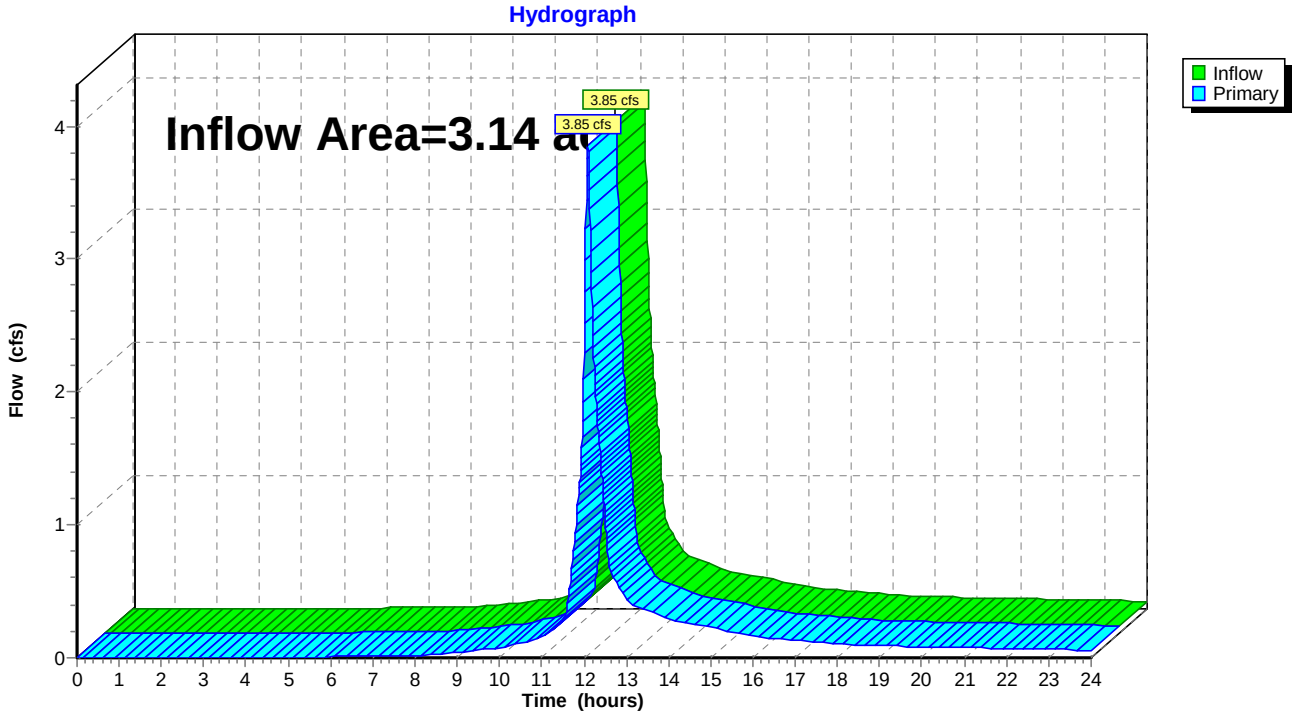


Summary for Link SP1: Existing Combined Sewer in Danforth

Inflow Area = 3.14 ac, 61.14% Impervious, Inflow Depth > 1.19" for 2-YR event
Inflow = 3.85 cfs @ 12.09 hrs, Volume= 0.313 af
Primary = 3.85 cfs @ 12.09 hrs, Volume= 0.313 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link SP1: Existing Combined Sewer in Danforth



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 10S: Area draining to Runoff Area=19,633 sf 57.01% Impervious Runoff Depth>1.97"
Flow Length=91' Slope=0.0300 '/' Tc=7.7 min CN=73 Runoff=0.97 cfs 0.074 af

Subcatchment 60S: Lawn/Field S of school Runoff Area=16,715 sf 84.98% Impervious Runoff Depth>3.39"
Tc=5.0 min CN=89 Runoff=1.54 cfs 0.108 af

Subcatchment 61S: Auditorium Roof Runoff Area=4,485 sf 100.00% Impervious Runoff Depth>4.36"
Tc=5.0 min CN=98 Runoff=0.48 cfs 0.037 af

Subcatchment 70S: Thomas & Davies & Runoff Area=41,034 sf 78.01% Impervious Runoff Depth>3.00"
Tc=5.0 min CN=85 Runoff=3.41 cfs 0.235 af

Subcatchment 80S: FoundersHall Runoff Area=3,498 sf 100.00% Impervious Runoff Depth>4.36"
Tc=5.0 min CN=98 Runoff=0.37 cfs 0.029 af

Subcatchment 90S: Playground Runoff Area=41,240 sf 29.19% Impervious Runoff Depth>0.84"
Flow Length=188' Tc=14.6 min CN=56 Runoff=0.54 cfs 0.066 af

Subcatchment 402S: New Prkng lot Runoff Area=10,240 sf 60.94% Impervious Runoff Depth>2.13"
Tc=5.0 min CN=75 Runoff=0.60 cfs 0.042 af

Reach 161R: roof drain Avg. Flow Depth=0.18' Max Vel=7.42 fps Inflow=0.48 cfs 0.037 af
6.0" Round Pipe n=0.013 L=129.0' S=0.0911 '/' Capacity=1.69 cfs Outflow=0.48 cfs 0.037 af

Pond 206P: City CB @ Fletcher & Danforth Peak Elev=114.62' Inflow=3.48 cfs 0.327 af
8.0" Round Culvert n=0.013 L=18.0' S=0.2750 '/' Outflow=3.48 cfs 0.327 af

Pond 207P: Existing CB Peak Elev=133.32' Inflow=3.41 cfs 0.235 af
10.0" Round Culvert n=0.010 L=60.0' S=0.1287 '/' Outflow=3.41 cfs 0.235 af

Pond 210P: Existing FI Peak Elev=132.64' Inflow=0.97 cfs 0.074 af
10.0" Round Culvert n=0.010 L=102.0' S=0.1008 '/' Outflow=0.97 cfs 0.074 af

Pond 217P: Existing DMH Peak Elev=132.11' Inflow=3.79 cfs 0.265 af
8.0" Round Culvert n=0.013 L=89.0' S=0.0367 '/' Outflow=3.79 cfs 0.265 af

Pond 220P: Existing DMH Peak Elev=122.31' Inflow=0.97 cfs 0.074 af
10.0" Round Culvert n=0.010 L=108.0' S=0.0335 '/' Outflow=0.97 cfs 0.074 af

Pond 227P: Existing SMH Peak Elev=127.45' Inflow=3.79 cfs 0.265 af
8.0" Round Culvert n=0.013 L=71.0' S=0.2025 '/' Outflow=3.79 cfs 0.265 af

Pond 230P: Existing DMH Peak Elev=123.87' Inflow=3.12 cfs 0.261 af
8.0" Round Culvert n=0.010 L=156.0' S=0.0272 '/' Outflow=3.12 cfs 0.261 af

Pond 240P: Existing DMH Peak Elev=119.63' Inflow=3.12 cfs 0.261 af
8.0" Round Culvert n=0.010 L=58.0' S=0.0833 '/' Outflow=3.12 cfs 0.261 af

Pond 260P: Storage Pipes Peak Elev=120.18' Storage=377 cf Inflow=2.62 cfs 0.187 af
12.0" Round Culvert n=0.010 L=30.0' S=0.0380 '/' Outflow=2.16 cfs 0.187 af

Pond 340P: CB at SW Cor prkng lot Peak Elev=129.54' Inflow=0.60 cfs 0.042 af
8.0" Round Culvert n=0.010 L=56.0' S=0.1000 '/' Outflow=0.60 cfs 0.042 af

Link SP1: Existing Combined Sewer in Danforth Inflow=6.95 cfs 0.592 af
Primary=6.95 cfs 0.592 af

Total Runoff Area = 3.14 ac Runoff Volume = 0.592 af Average Runoff Depth = 2.26"
38.86% Pervious = 1.22 ac 61.14% Impervious = 1.92 ac

Summary for Subcatchment 10S: Area draining to Sanctuary

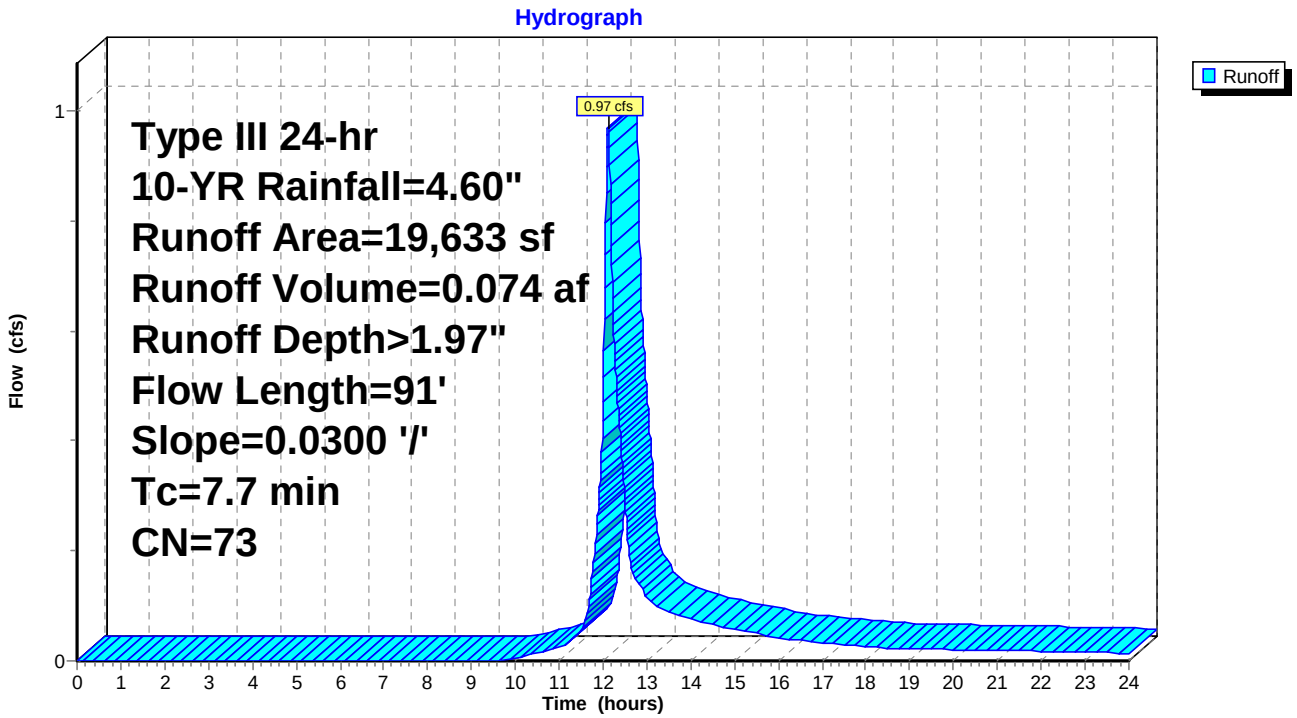
Runoff = 0.97 cfs @ 12.11 hrs, Volume= 0.074 af, Depth> 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	11,192	98	impervious
*	8,441	39	Lawn/field, HSG A
	19,633	73	Weighted Average
	8,441		42.99% Pervious Area
	11,192		57.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	91	0.0300	0.20		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"

Subcatchment 10S: Area draining to Sanctuary



Summary for Subcatchment 60S: Lawn/Field S of school

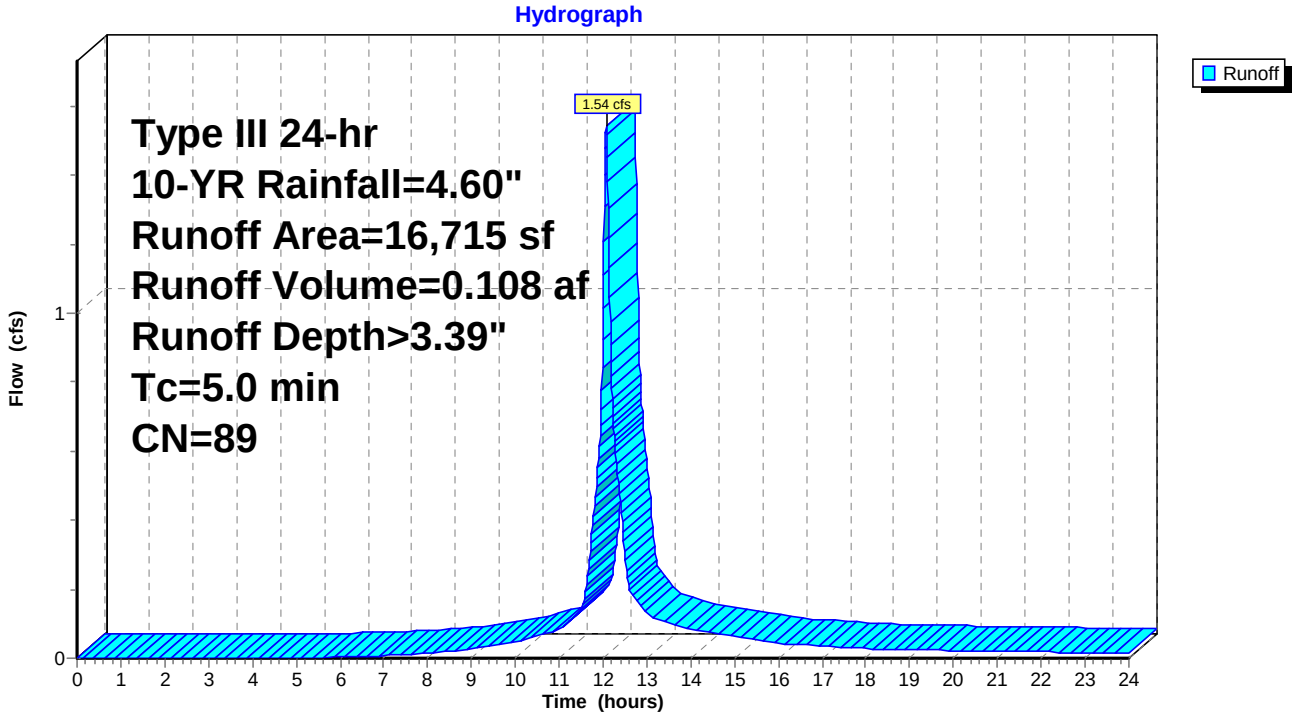
Runoff = 1.54 cfs @ 12.07 hrs, Volume= 0.108 af, Depth> 3.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	14,205	98	impervious
*	2,510	39	Lawn/field, HSG A
	16,715	89	Weighted Average
	2,510		15.02% Pervious Area
	14,205		84.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 60S: Lawn/Field S of school



Summary for Subcatchment 61S: Auditorium Roof

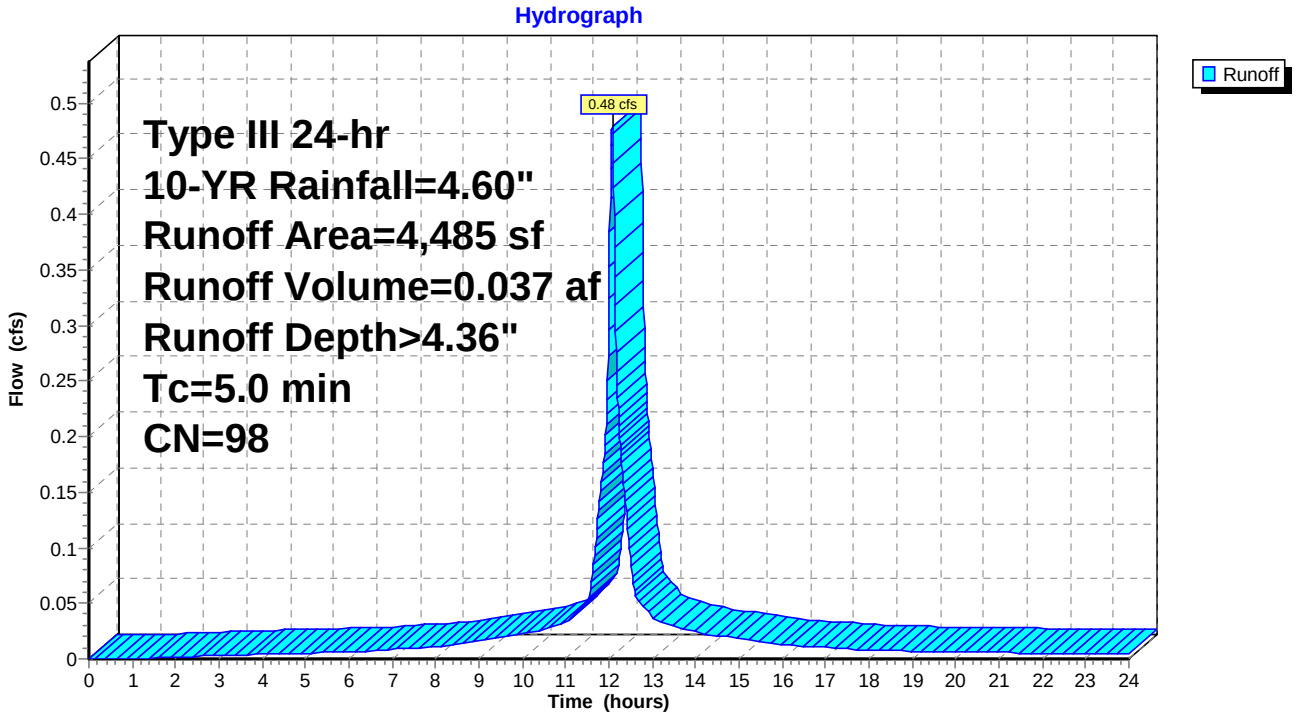
Runoff = 0.48 cfs @ 12.07 hrs, Volume= 0.037 af, Depth> 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	4,485	98	Roof runoff
	4,485		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 61S: Auditorium Roof



Summary for Subcatchment 70S: Thomas & Davies & Gym

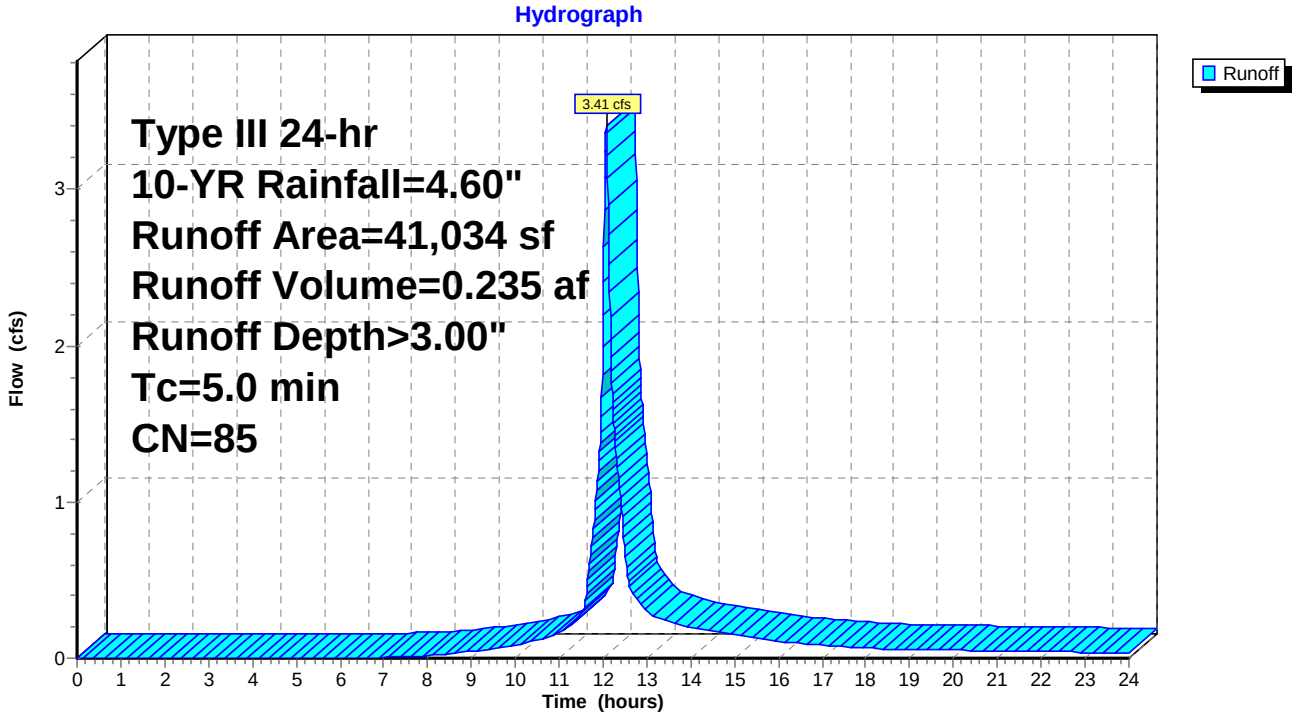
Runoff = 3.41 cfs @ 12.07 hrs, Volume= 0.235 af, Depth> 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	32,011	98	impervious
*	9,023	39	Lawn/field, HSG A
	41,034	85	Weighted Average
	9,023		21.99% Pervious Area
	32,011		78.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment 70S: Thomas & Davies & Gym



Summary for Subcatchment 80S: FoundersHall

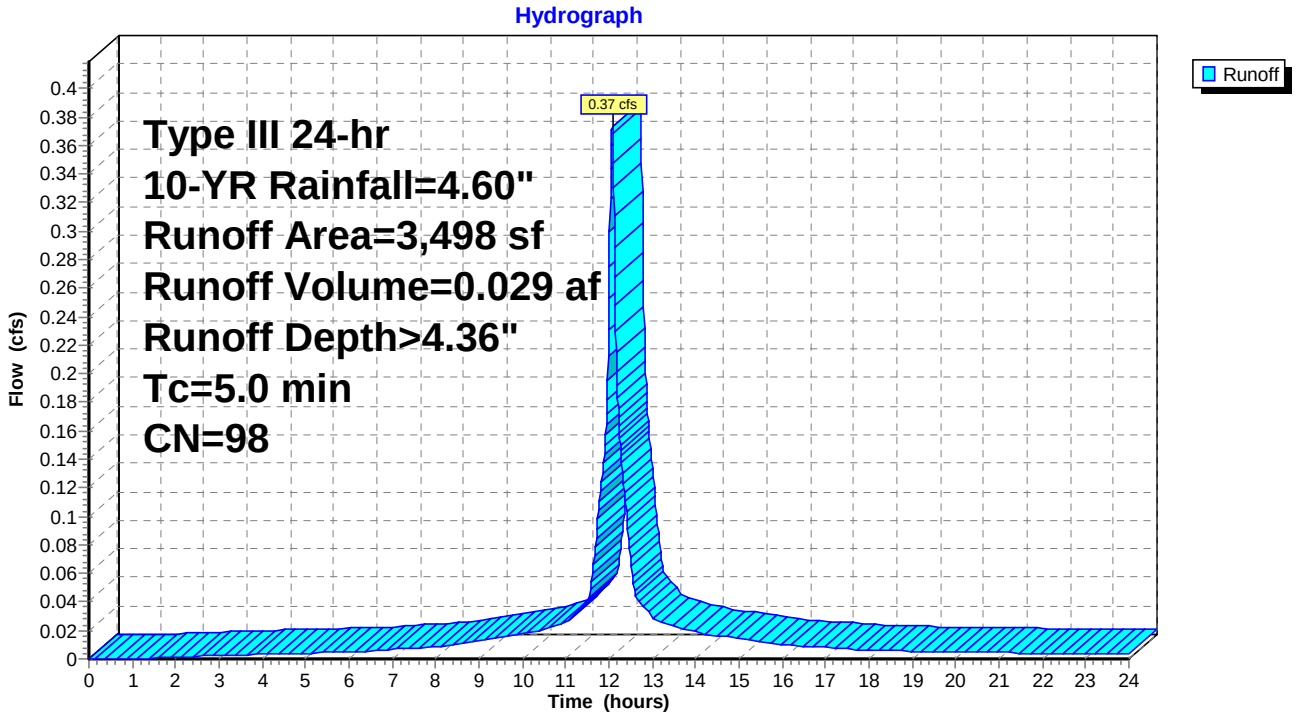
Runoff = 0.37 cfs @ 12.07 hrs, Volume= 0.029 af, Depth> 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	3,498	98	Roof runoff
	3,498		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 80S: FoundersHall



Summary for Subcatchment 90S: Playground

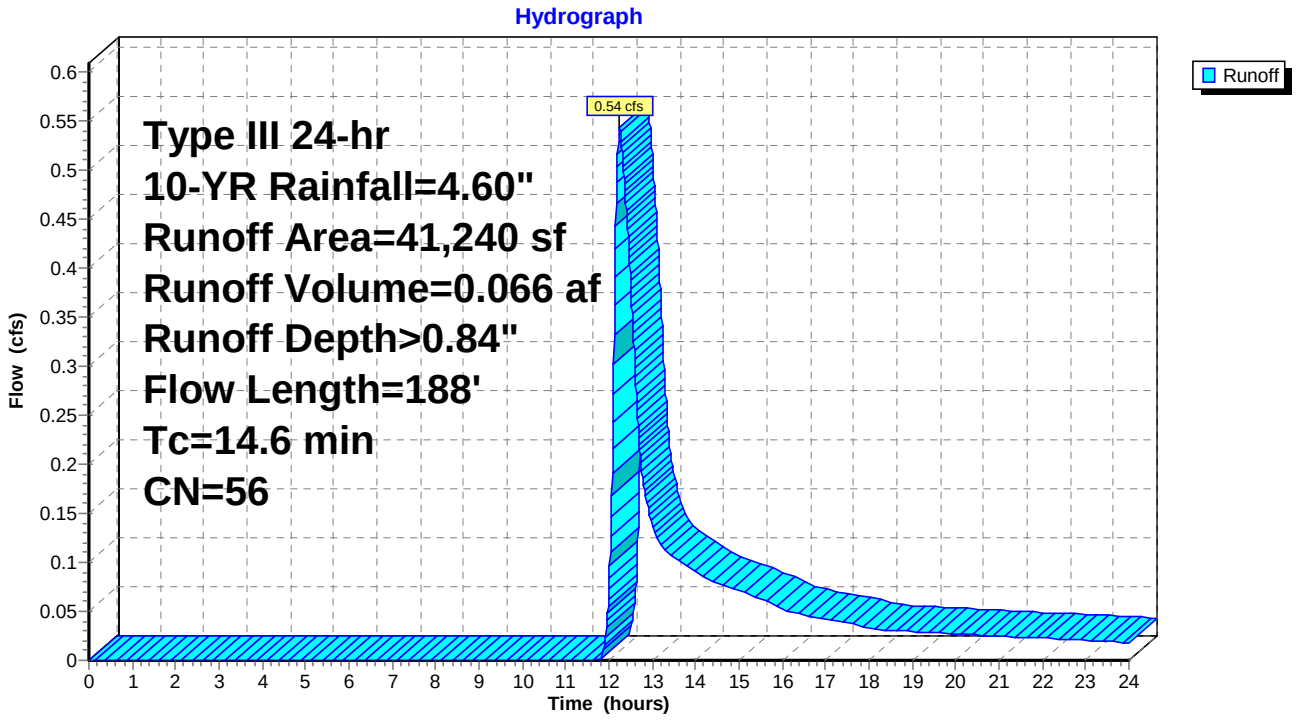
Runoff = 0.54 cfs @ 12.25 hrs, Volume= 0.066 af, Depth> 0.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	12,037	98	impervious
*	29,203	39	Lawn/field, HSG A
	41,240	56	Weighted Average
	29,203		70.81% Pervious Area
	12,037		29.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"
1.7	88	0.0154	0.87		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
14.6	188	Total			

Subcatchment 90S: Playground



Summary for Subcatchment 402S: New Prkng lot

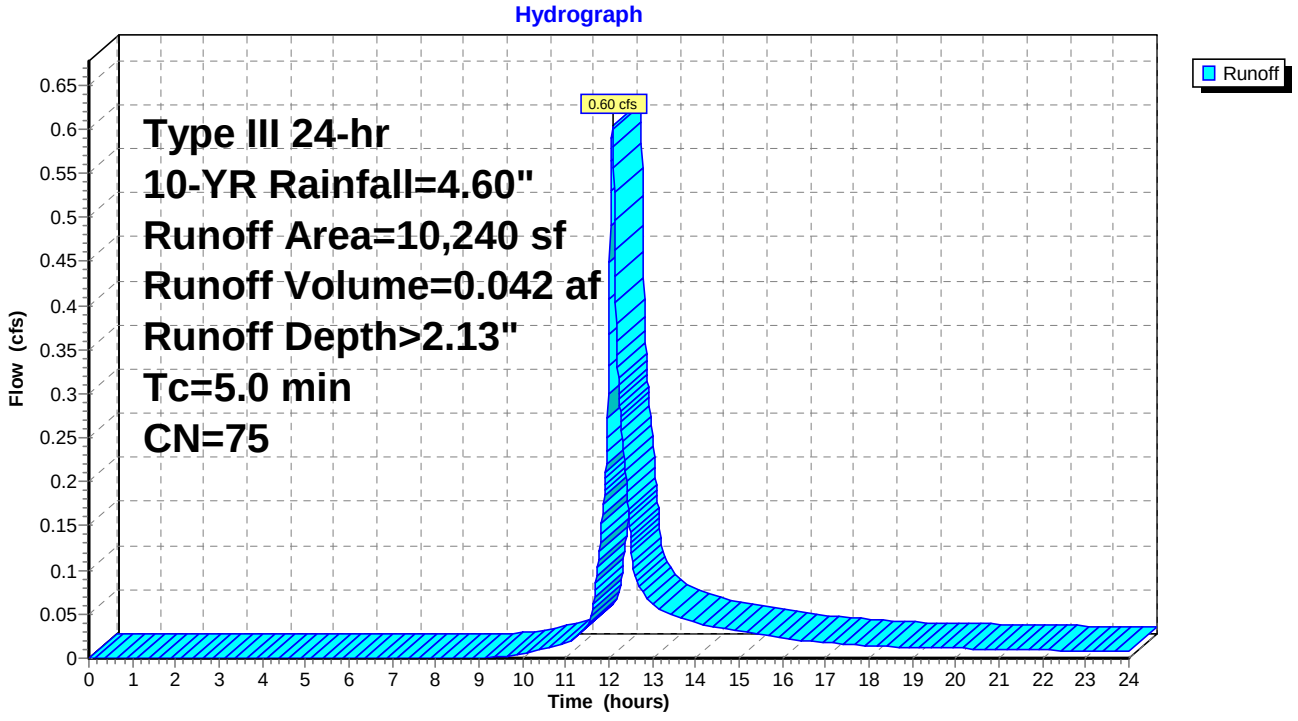
Runoff = 0.60 cfs @ 12.08 hrs, Volume= 0.042 af, Depth> 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	4,000	39	Pervious
*	6,240	98	Impervious
	10,240	75	Weighted Average
	4,000		39.06% Pervious Area
	6,240		60.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 402S: New Prkng lot



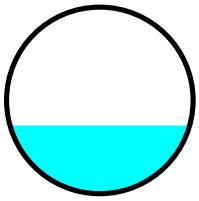
Summary for Reach 161R: roof drain

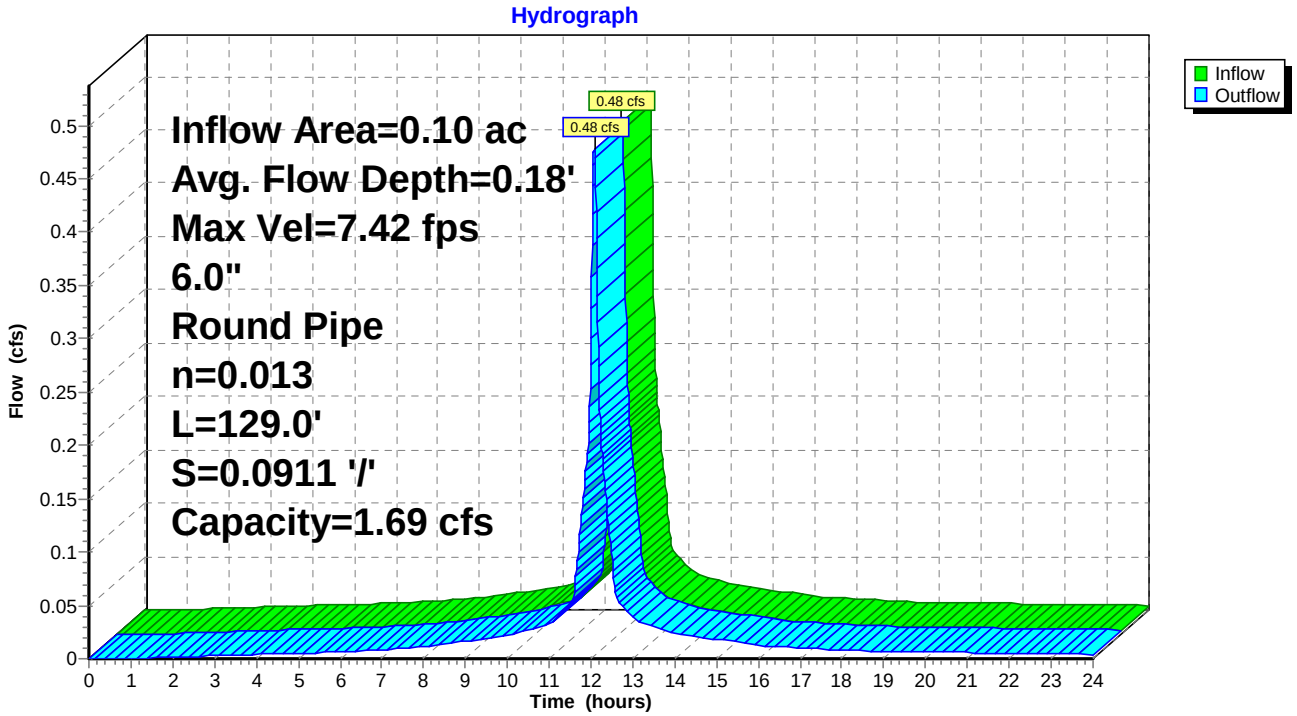
Inflow Area = 0.10 ac,100.00% Impervious, Inflow Depth > 4.36" for 10-YR event
Inflow = 0.48 cfs @ 12.07 hrs, Volume= 0.037 af
Outflow = 0.48 cfs @ 12.08 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.42 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.45 fps, Avg. Travel Time= 0.9 min

Peak Storage= 8 cf @ 12.07 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 1.69 cfs

6.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 129.0' Slope= 0.0911 '/'
Inlet Invert= 130.00', Outlet Invert= 118.25'





Summary for Pond 206P: City CB @ Fletcher & Danforth

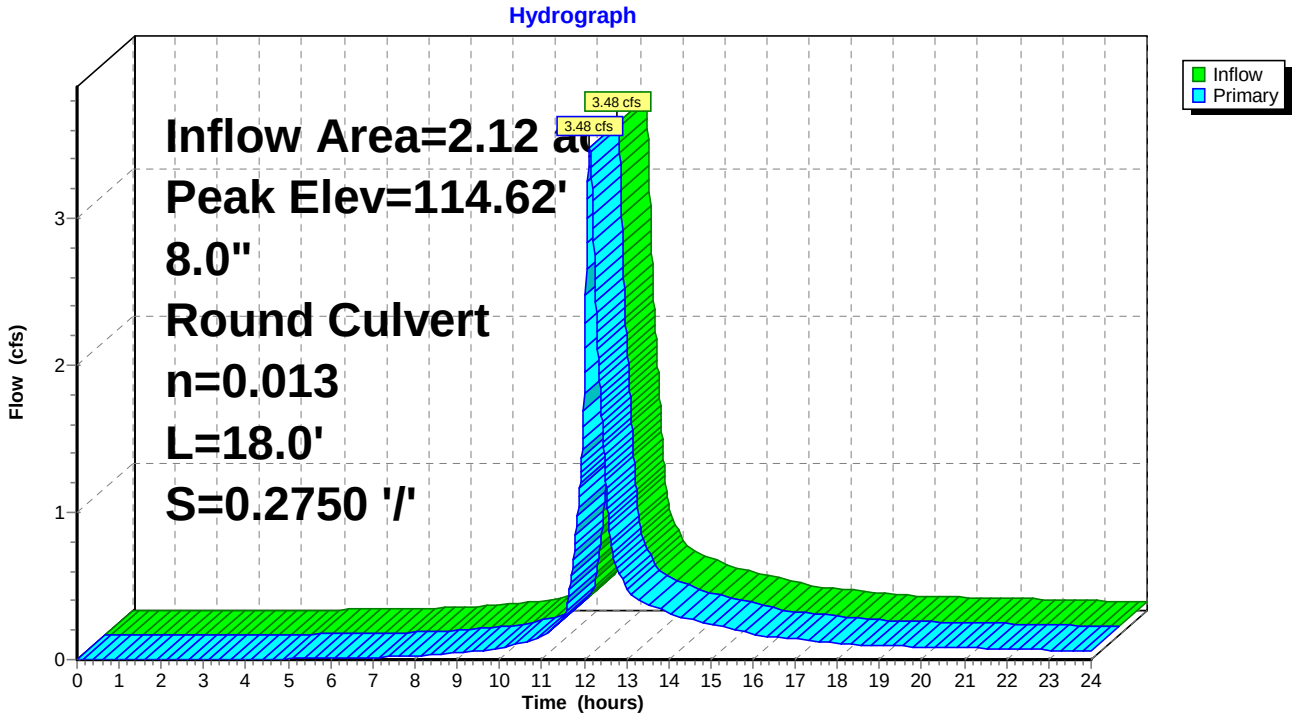
Inflow Area = 2.12 ac, 52.17% Impervious, Inflow Depth > 1.85" for 10-YR event
Inflow = 3.48 cfs @ 12.13 hrs, Volume= 0.327 af
Outflow = 3.48 cfs @ 12.13 hrs, Volume= 0.327 af, Atten= 0%, Lag= 0.0 min
Primary = 3.48 cfs @ 12.13 hrs, Volume= 0.327 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 114.62' @ 12.13 hrs
Flood Elev= 111.26'

Device	Routing	Invert	Outlet Devices
#1	Primary	107.43'	**8.0" Round Culvert** L= 18.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 107.43' / 102.48' S= 0.2750 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 0.35 sf

Primary OutFlow Max=3.47 cfs @ 12.13 hrs HW=114.61' (Free Discharge)
1=Culvert (Inlet Controls 3.47 cfs @ 9.95 fps)

Pond 206P: City CB @ Fletcher & Danforth



Summary for Pond 207P: Existing CB

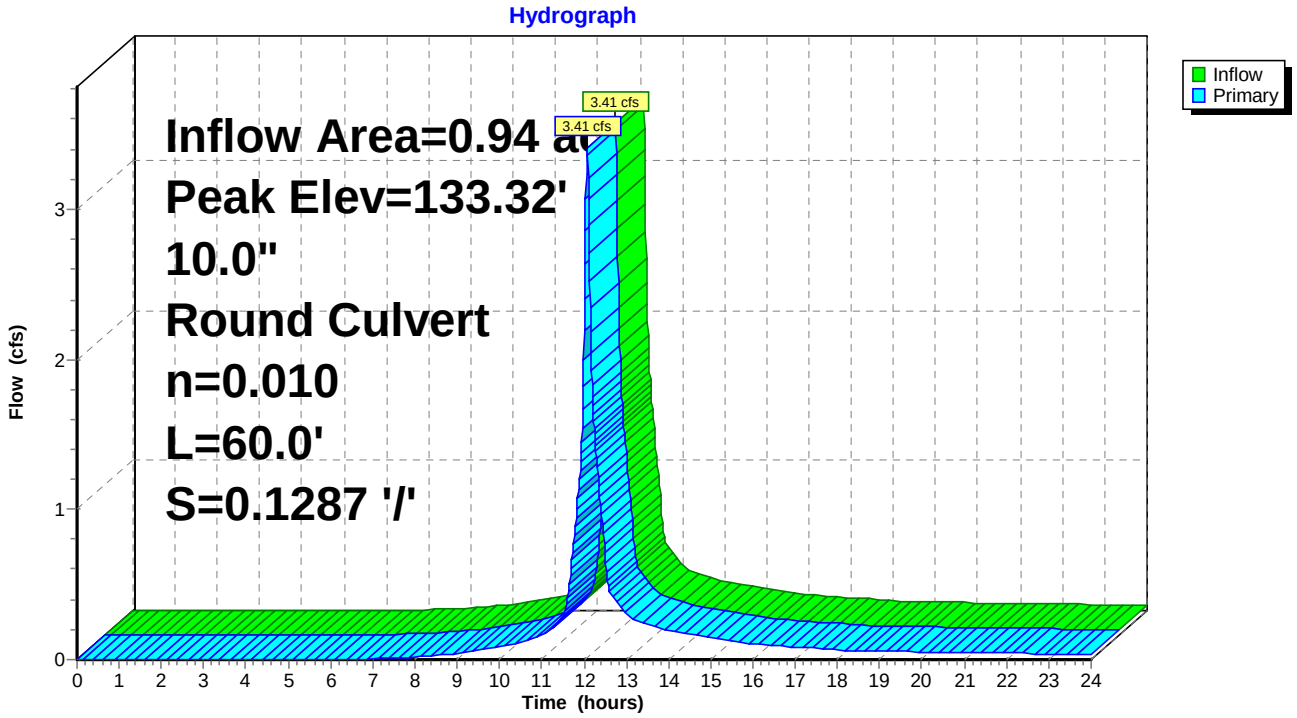
Inflow Area = 0.94 ac, 78.01% Impervious, Inflow Depth > 3.00" for 10-YR event
Inflow = 3.41 cfs @ 12.07 hrs, Volume= 0.235 af
Outflow = 3.41 cfs @ 12.07 hrs, Volume= 0.235 af, Atten= 0%, Lag= 0.0 min
Primary = 3.41 cfs @ 12.07 hrs, Volume= 0.235 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 133.32' @ 12.07 hrs
Flood Elev= 137.62'

Device	Routing	Invert	Outlet Devices
#1	Primary	130.20'	**10.0" Round Culvert** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 130.20' / 122.48' S= 0.1287 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=3.40 cfs @ 12.07 hrs HW=133.31' (Free Discharge)
└**1=Culvert** (Inlet Controls 3.40 cfs @ 6.24 fps)

Pond 207P: Existing CB



Summary for Pond 210P: Existing FI

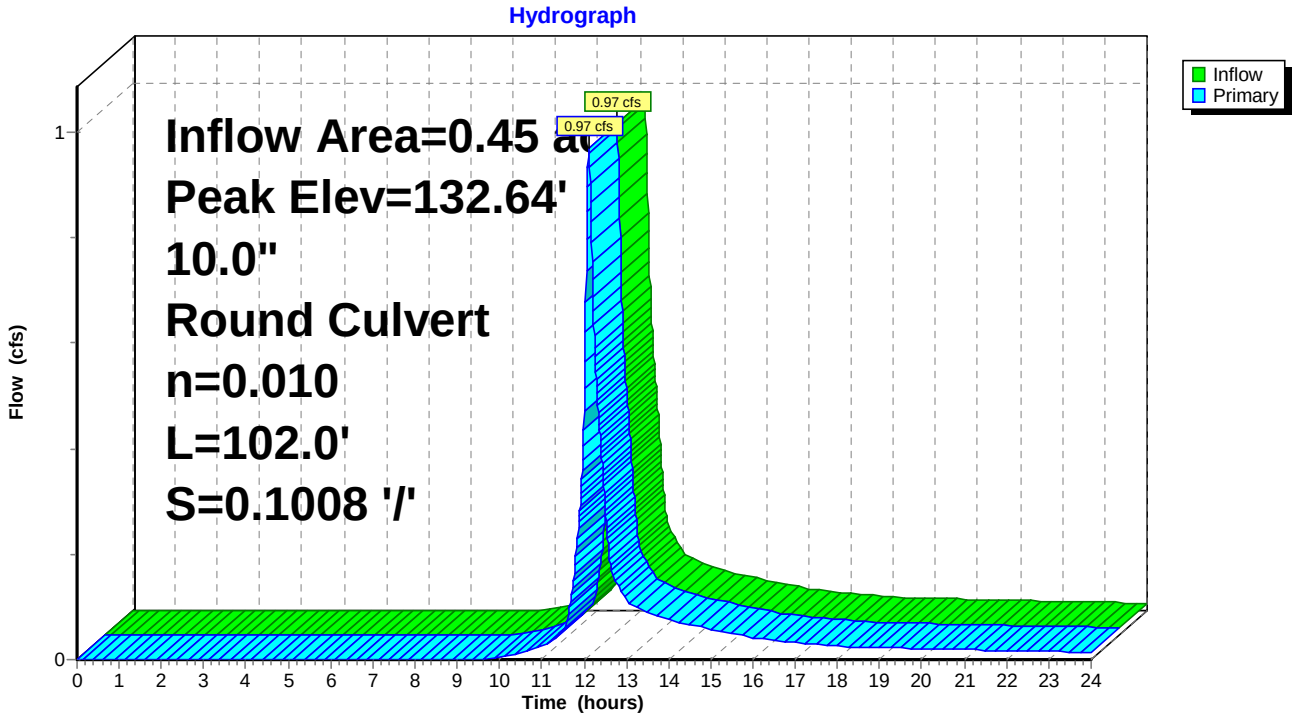
Inflow Area = 0.45 ac, 57.01% Impervious, Inflow Depth > 1.97" for 10-YR event
Inflow = 0.97 cfs @ 12.11 hrs, Volume= 0.074 af
Outflow = 0.97 cfs @ 12.11 hrs, Volume= 0.074 af, Atten= 0%, Lag= 0.0 min
Primary = 0.97 cfs @ 12.11 hrs, Volume= 0.074 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 132.64' @ 12.11 hrs
Flood Elev= 140.41'

Device	Routing	Invert	Outlet Devices
#1	Primary	132.00'	**10.0" Round Culvert** L= 102.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 132.00' / 121.72' S= 0.1008 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.97 cfs @ 12.11 hrs HW=132.64' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.97 cfs @ 2.15 fps)

Pond 210P: Existing FI



Summary for Pond 217P: Existing DMH

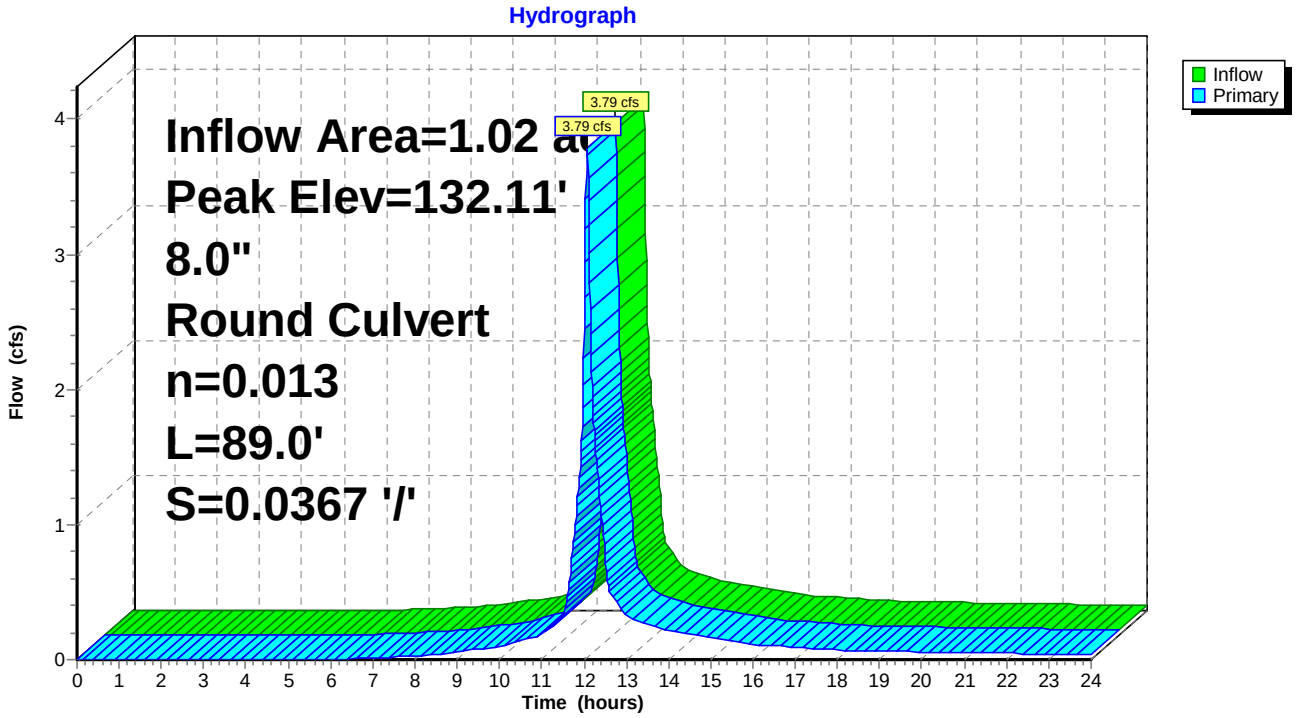
Inflow Area = 1.02 ac, 79.74% Impervious, Inflow Depth > 3.10" for 10-YR event
Inflow = 3.79 cfs @ 12.07 hrs, Volume= 0.265 af
Outflow = 3.79 cfs @ 12.07 hrs, Volume= 0.265 af, Atten= 0%, Lag= 0.0 min
Primary = 3.79 cfs @ 12.07 hrs, Volume= 0.265 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 132.11' @ 12.07 hrs
Flood Elev= 126.98'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.48'	**8.0" Round Culvert** L= 89.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 122.48' / 119.21' S= 0.0367 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 0.35 sf

Primary OutFlow Max=3.78 cfs @ 12.07 hrs HW=132.06' (Free Discharge)
└**1=Culvert** (Barrel Controls 3.78 cfs @ 10.82 fps)

Pond 217P: Existing DMH



Summary for Pond 220P: Existing DMH

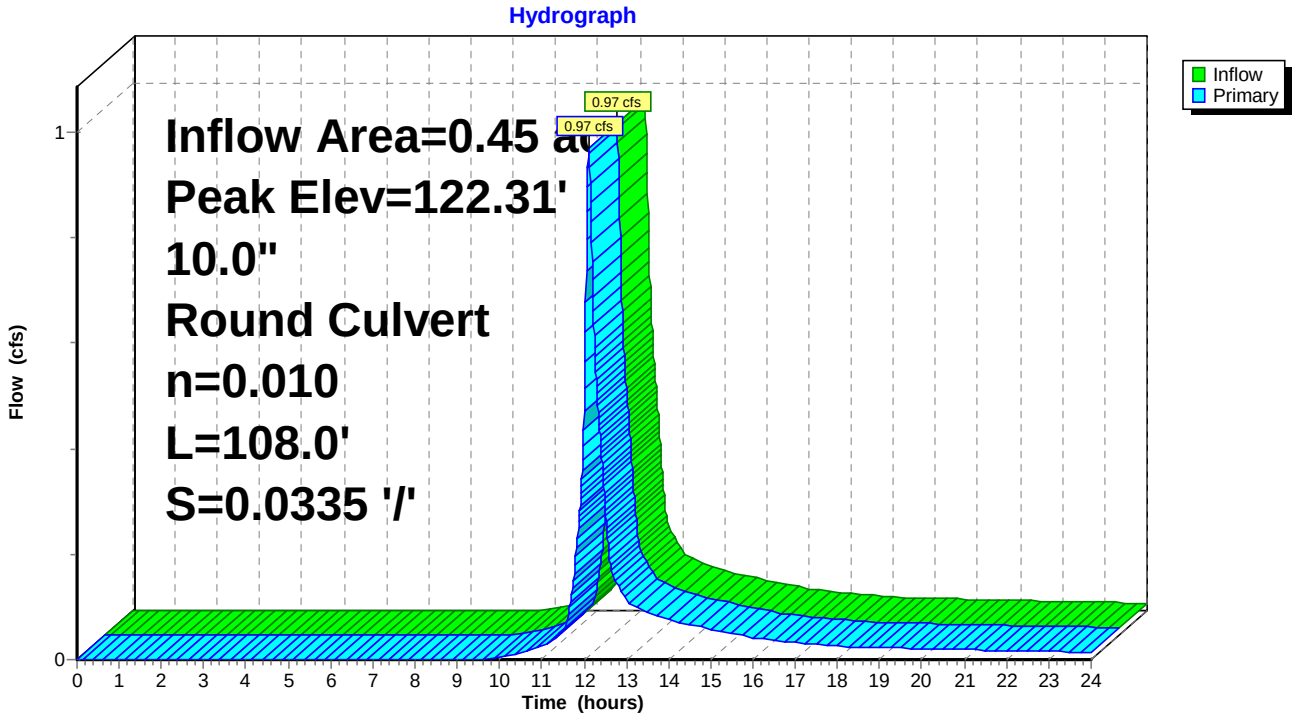
Inflow Area = 0.45 ac, 57.01% Impervious, Inflow Depth > 1.97" for 10-YR event
Inflow = 0.97 cfs @ 12.11 hrs, Volume= 0.074 af
Outflow = 0.97 cfs @ 12.11 hrs, Volume= 0.074 af, Atten= 0%, Lag= 0.0 min
Primary = 0.97 cfs @ 12.11 hrs, Volume= 0.074 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 122.31' @ 12.11 hrs
Flood Elev= 128.47'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.67'	**10.0" Round Culvert** L= 108.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 121.67' / 118.05' S= 0.0335 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.97 cfs @ 12.11 hrs HW=122.31' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.97 cfs @ 2.15 fps)

Pond 220P: Existing DMH



Summary for Pond 227P: Existing SMH

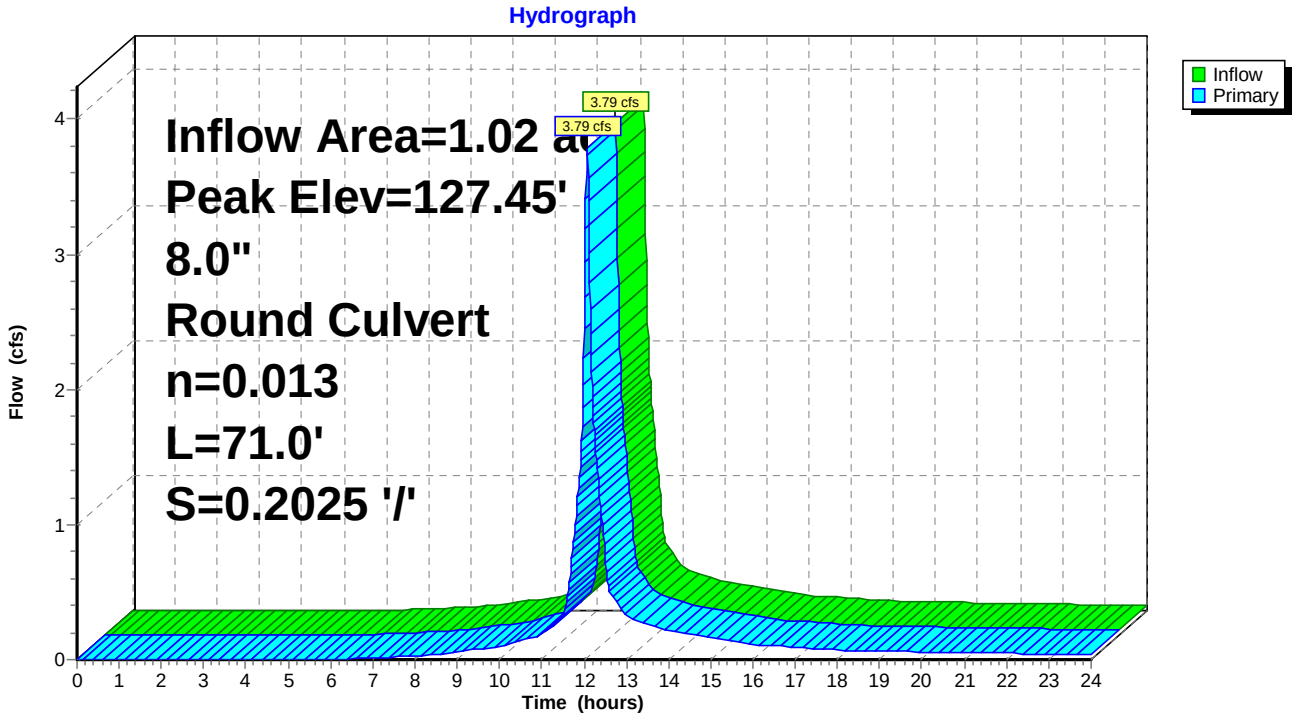
Inflow Area = 1.02 ac, 79.74% Impervious, Inflow Depth > 3.10" for 10-YR event
Inflow = 3.79 cfs @ 12.07 hrs, Volume= 0.265 af
Outflow = 3.79 cfs @ 12.07 hrs, Volume= 0.265 af, Atten= 0%, Lag= 0.0 min
Primary = 3.79 cfs @ 12.07 hrs, Volume= 0.265 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 127.45' @ 12.07 hrs
Flood Elev= 123.81'

Device	Routing	Invert	Outlet Devices
#1	Primary	118.98'	**8.0" Round Culvert** L= 71.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 118.98' / 104.60' S= 0.2025 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 0.35 sf

Primary OutFlow Max=3.78 cfs @ 12.07 hrs HW=127.42' (Free Discharge)
1=Culvert (Inlet Controls 3.78 cfs @ 10.82 fps)

Pond 227P: Existing SMH



Summary for Pond 230P: Existing DMH

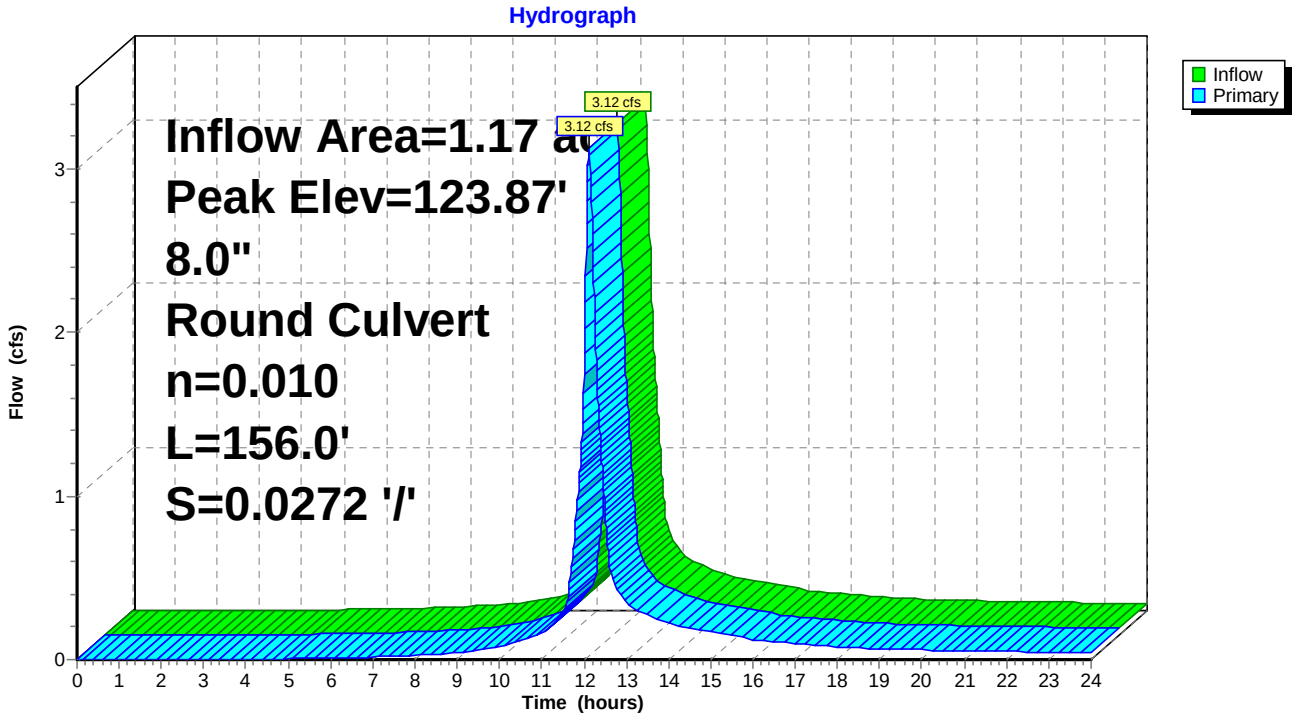
Inflow Area = 1.17 ac, 70.73% Impervious, Inflow Depth > 2.67" for 10-YR event
Inflow = 3.12 cfs @ 12.12 hrs, Volume= 0.261 af
Outflow = 3.12 cfs @ 12.12 hrs, Volume= 0.261 af, Atten= 0%, Lag= 0.0 min
Primary = 3.12 cfs @ 12.12 hrs, Volume= 0.261 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 123.87' @ 12.12 hrs
Flood Elev= 125.05'

Device	Routing	Invert	Outlet Devices
#1	Primary	118.00'	**8.0" Round Culvert** L= 156.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 118.00' / 113.76' S= 0.0272 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=3.12 cfs @ 12.12 hrs HW=123.87' (Free Discharge)
└**1=Culvert** (Inlet Controls 3.12 cfs @ 8.95 fps)

Pond 230P: Existing DMH



Summary for Pond 240P: Existing DMH

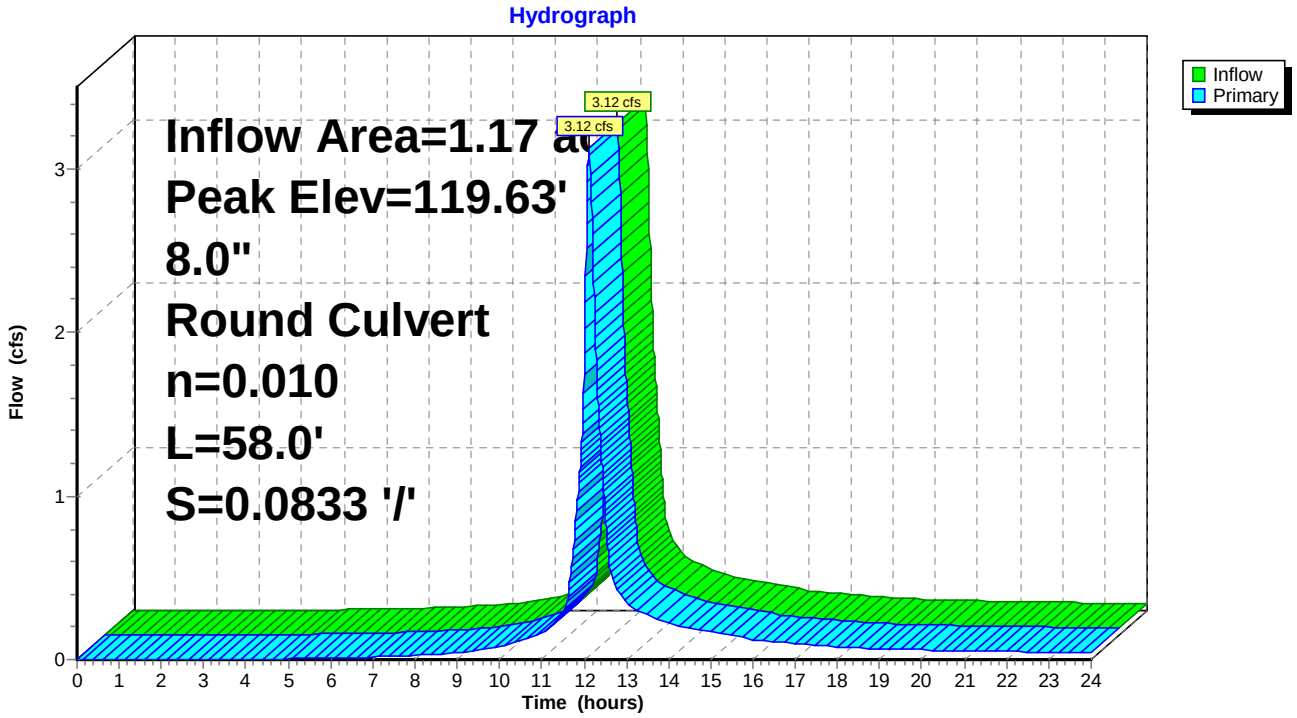
Inflow Area = 1.17 ac, 70.73% Impervious, Inflow Depth > 2.67" for 10-YR event
Inflow = 3.12 cfs @ 12.12 hrs, Volume= 0.261 af
Outflow = 3.12 cfs @ 12.12 hrs, Volume= 0.261 af, Atten= 0%, Lag= 0.0 min
Primary = 3.12 cfs @ 12.12 hrs, Volume= 0.261 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 119.63' @ 12.12 hrs
Flood Elev= 124.03'

Device	Routing	Invert	Outlet Devices
#1	Primary	113.76'	**8.0" Round Culvert** L= 58.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 113.76' / 108.93' S= 0.0833 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=3.12 cfs @ 12.12 hrs HW=119.63' (Free Discharge)
1=Culvert (Inlet Controls 3.12 cfs @ 8.95 fps)

Pond 240P: Existing DMH



Summary for Pond 260P: Storage Pipes

Inflow Area = 0.72 ac, 79.29% Impervious, Inflow Depth > 3.12" for 10-YR event
Inflow = 2.62 cfs @ 12.07 hrs, Volume= 0.187 af
Outflow = 2.16 cfs @ 12.13 hrs, Volume= 0.187 af, Atten= 18%, Lag= 3.1 min
Primary = 2.16 cfs @ 12.13 hrs, Volume= 0.187 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 120.18' @ 12.13 hrs Surf.Area= 797 sf Storage= 377 cf
Flood Elev= 125.26' Surf.Area= 0 sf Storage= 3,468 cf

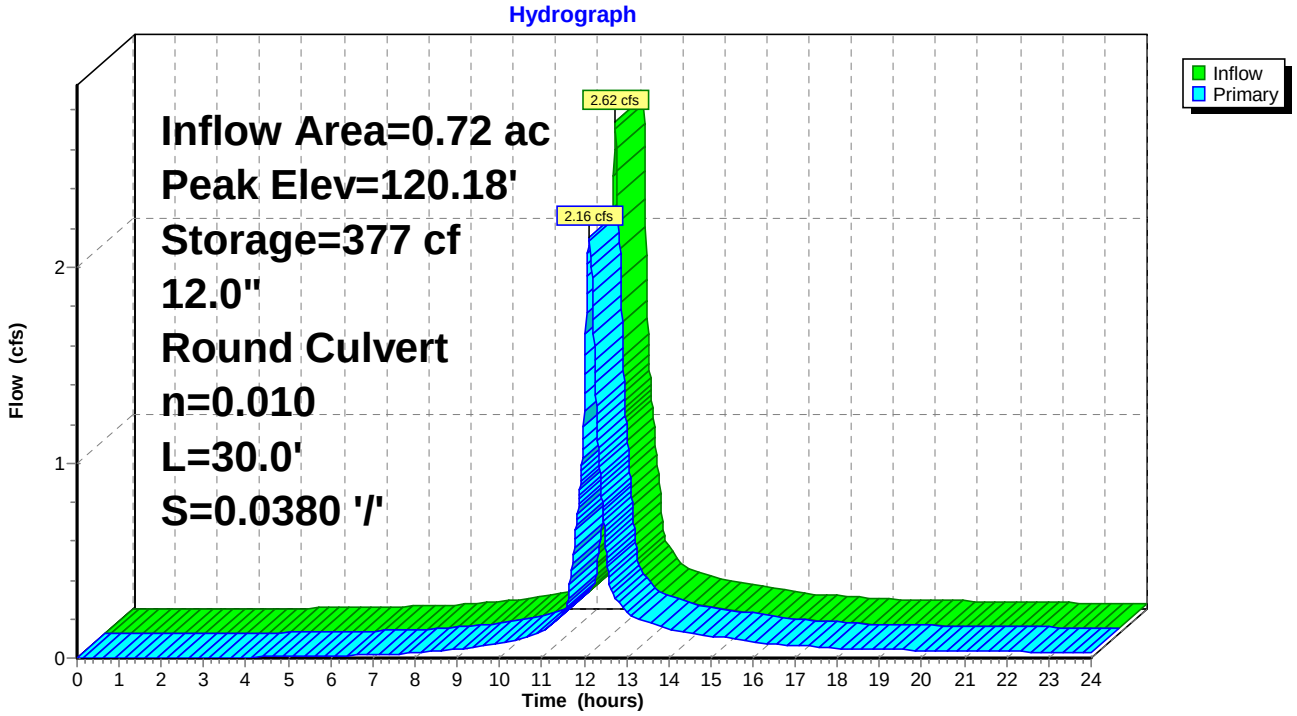
Plug-Flow detention time= 1.4 min calculated for 0.187 af (100% of inflow)
Center-of-Mass det. time= 1.3 min (797.0 - 795.7)

Volume	Invert	Avail.Storage	Storage Description
#1	119.16'	3,468 cf	**48.0" Round Pipe Storage** L= 276.0' S= 0.0027 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.16'	**12.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.16' / 118.02' S= 0.0380 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.15 cfs @ 12.13 hrs HW=120.18' (Free Discharge)
1=Culvert (Inlet Controls 2.15 cfs @ 2.74 fps)

Pond 260P: Storage Pipes



Summary for Pond 340P: CB at SW Cor prkng lot

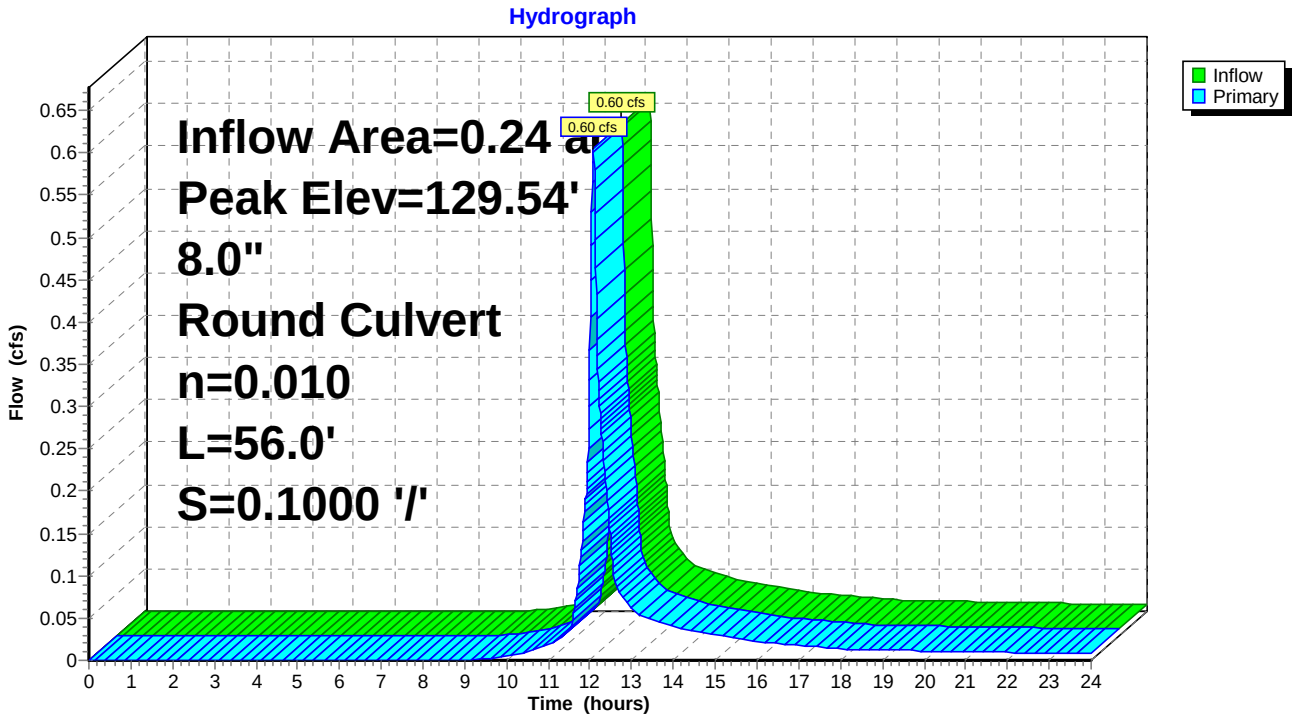
Inflow Area = 0.24 ac, 60.94% Impervious, Inflow Depth > 2.13" for 10-YR event
Inflow = 0.60 cfs @ 12.08 hrs, Volume= 0.042 af
Outflow = 0.60 cfs @ 12.08 hrs, Volume= 0.042 af, Atten= 0%, Lag= 0.0 min
Primary = 0.60 cfs @ 12.08 hrs, Volume= 0.042 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 129.54' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	129.00'	**8.0" Round Culvert** L= 56.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 129.00' / 123.40' S= 0.1000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.60 cfs @ 12.08 hrs HW=129.54' (Free Discharge)
1=Culvert (Inlet Controls 0.60 cfs @ 1.98 fps)

Pond 340P: CB at SW Cor prkng lot

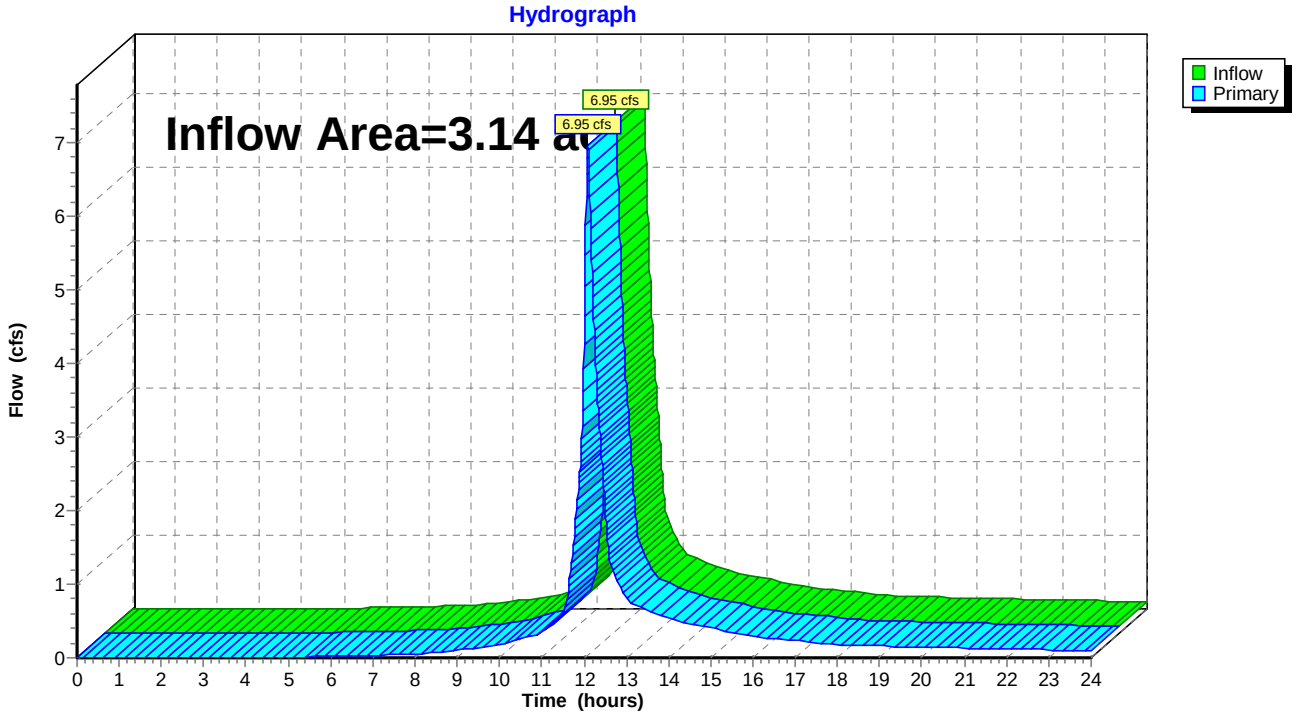


Summary for Link SP1: Existing Combined Sewer in Danforth

Inflow Area = 3.14 ac, 61.14% Impervious, Inflow Depth > 2.26" for 10-YR event
Inflow = 6.95 cfs @ 12.09 hrs, Volume= 0.592 af
Primary = 6.95 cfs @ 12.09 hrs, Volume= 0.592 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link SP1: Existing Combined Sewer in Danforth



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 10S: Area draining to Runoff Area=19,633 sf 57.01% Impervious Runoff Depth>2.92"
Flow Length=91' Slope=0.0300 '/' Tc=7.7 min CN=73 Runoff=1.45 cfs 0.110 af

Subcatchment 60S: Lawn/Field S of school Runoff Area=16,715 sf 84.98% Impervious Runoff Depth>4.54"
Tc=5.0 min CN=89 Runoff=2.04 cfs 0.145 af

Subcatchment 61S: Auditorium Roof Runoff Area=4,485 sf 100.00% Impervious Runoff Depth>5.56"
Tc=5.0 min CN=98 Runoff=0.61 cfs 0.048 af

Subcatchment 70S: Thomas & Davies & Runoff Area=41,034 sf 78.01% Impervious Runoff Depth>4.11"
Tc=5.0 min CN=85 Runoff=4.63 cfs 0.323 af

Subcatchment 80S: FoundersHall Runoff Area=3,498 sf 100.00% Impervious Runoff Depth>5.56"
Tc=5.0 min CN=98 Runoff=0.47 cfs 0.037 af

Subcatchment 90S: Playground Runoff Area=41,240 sf 29.19% Impervious Runoff Depth>1.47"
Flow Length=188' Tc=14.6 min CN=56 Runoff=1.11 cfs 0.116 af

Subcatchment 402S: New Prkng lot Runoff Area=10,240 sf 60.94% Impervious Runoff Depth>3.11"
Tc=5.0 min CN=75 Runoff=0.89 cfs 0.061 af

Reach 161R: roof drain Avg. Flow Depth=0.21' Max Vel=7.90 fps Inflow=0.61 cfs 0.048 af
6.0" Round Pipe n=0.013 L=129.0' S=0.0911 '/' Capacity=1.69 cfs Outflow=0.60 cfs 0.048 af

Pond 206P: City CB @ Fletcher & Danforth Peak Elev=121.80' Inflow=4.97 cfs 0.480 af
8.0" Round Culvert n=0.013 L=18.0' S=0.2750 '/' Outflow=4.97 cfs 0.480 af

Pond 207P: Existing CB Peak Elev=135.60' Inflow=4.63 cfs 0.323 af
10.0" Round Culvert n=0.010 L=60.0' S=0.1287 '/' Outflow=4.63 cfs 0.323 af

Pond 210P: Existing FI Peak Elev=132.91' Inflow=1.45 cfs 0.110 af
10.0" Round Culvert n=0.010 L=102.0' S=0.1008 '/' Outflow=1.45 cfs 0.110 af

Pond 217P: Existing DMH Peak Elev=142.08' Inflow=5.10 cfs 0.360 af
8.0" Round Culvert n=0.013 L=89.0' S=0.0367 '/' Outflow=5.10 cfs 0.360 af

Pond 220P: Existing DMH Peak Elev=122.58' Inflow=1.45 cfs 0.110 af
10.0" Round Culvert n=0.010 L=108.0' S=0.0335 '/' Outflow=1.45 cfs 0.110 af

Pond 227P: Existing SMH Peak Elev=134.09' Inflow=5.10 cfs 0.360 af
8.0" Round Culvert n=0.013 L=71.0' S=0.2025 '/' Outflow=5.10 cfs 0.360 af

Pond 230P: Existing DMH Peak Elev=129.28' Inflow=4.12 cfs 0.363 af
8.0" Round Culvert n=0.010 L=156.0' S=0.0272 '/' Outflow=4.12 cfs 0.363 af

Pond 240P: Existing DMH Peak Elev=123.72' Inflow=4.12 cfs 0.363 af
8.0" Round Culvert n=0.010 L=58.0' S=0.0833 '/' Outflow=4.12 cfs 0.363 af

Pond 260P: Storage Pipes Peak Elev=120.47' Storage=626 cf Inflow=3.53 cfs 0.254 af
12.0" Round Culvert n=0.010 L=30.0' S=0.0380 '/' Outflow=2.69 cfs 0.254 af

Pond 340P: CB at SW Cor prkng lot Peak Elev=129.78' Inflow=0.89 cfs 0.061 af
8.0" Round Culvert n=0.010 L=56.0' S=0.1000 '/' Outflow=0.89 cfs 0.061 af

Link SP1: Existing Combined Sewer in Danforth Inflow=9.54 cfs 0.839 af
Primary=9.54 cfs 0.839 af

Total Runoff Area = 3.14 ac Runoff Volume = 0.839 af Average Runoff Depth = 3.21"
38.86% Pervious = 1.22 ac 61.14% Impervious = 1.92 ac

Summary for Subcatchment 10S: Area draining to Sanctuary

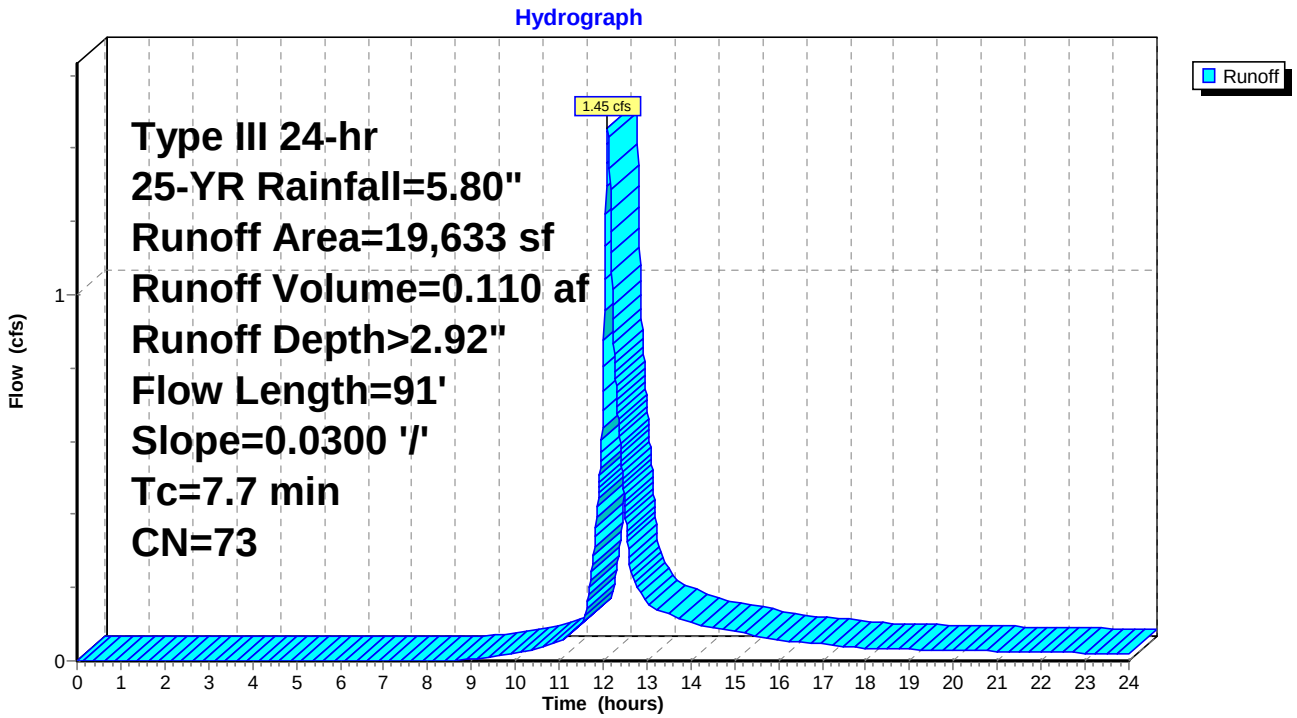
Runoff = 1.45 cfs @ 12.11 hrs, Volume= 0.110 af, Depth> 2.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	11,192	98	impervious
*	8,441	39	Lawn/field, HSG A
	19,633	73	Weighted Average
	8,441		42.99% Pervious Area
	11,192		57.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	91	0.0300	0.20		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"

Subcatchment 10S: Area draining to Sanctuary



Summary for Subcatchment 60S: Lawn/Field S of school

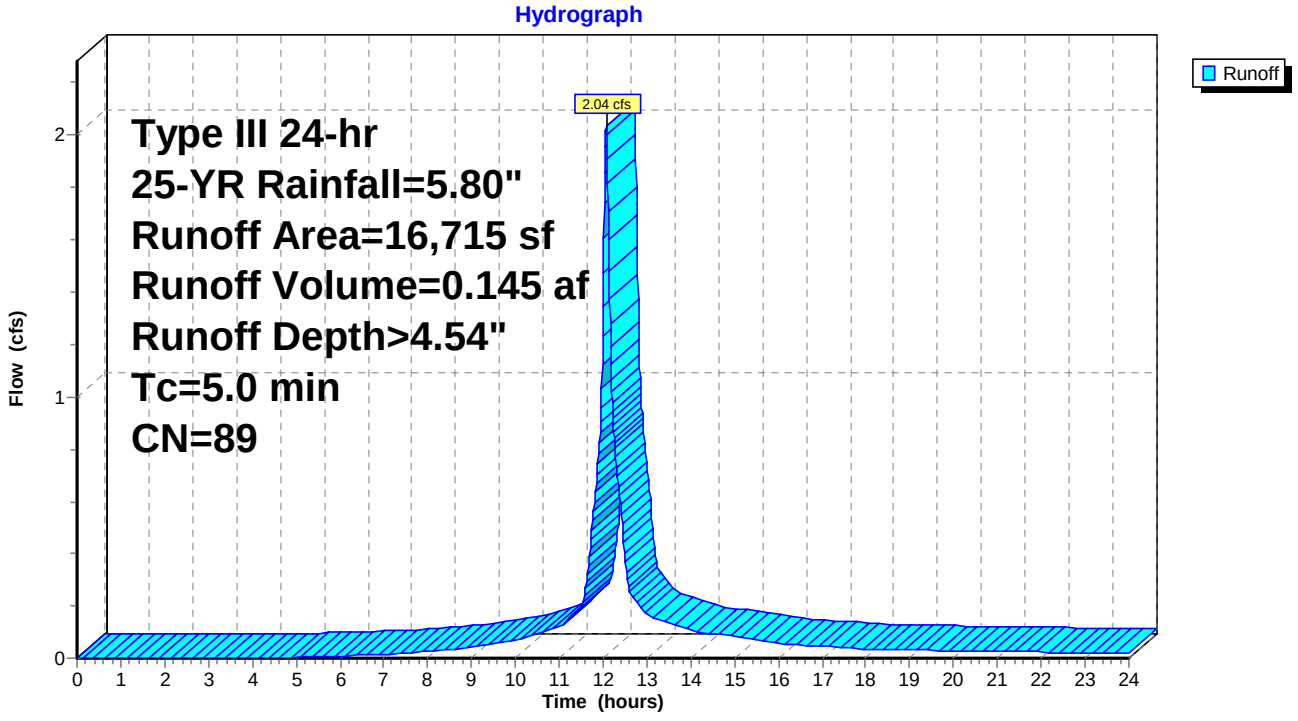
Runoff = 2.04 cfs @ 12.07 hrs, Volume= 0.145 af, Depth> 4.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	14,205	98	impervious
*	2,510	39	Lawn/field, HSG A
	16,715	89	Weighted Average
	2,510		15.02% Pervious Area
	14,205		84.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 60S: Lawn/Field S of school



Summary for Subcatchment 61S: Auditorium Roof

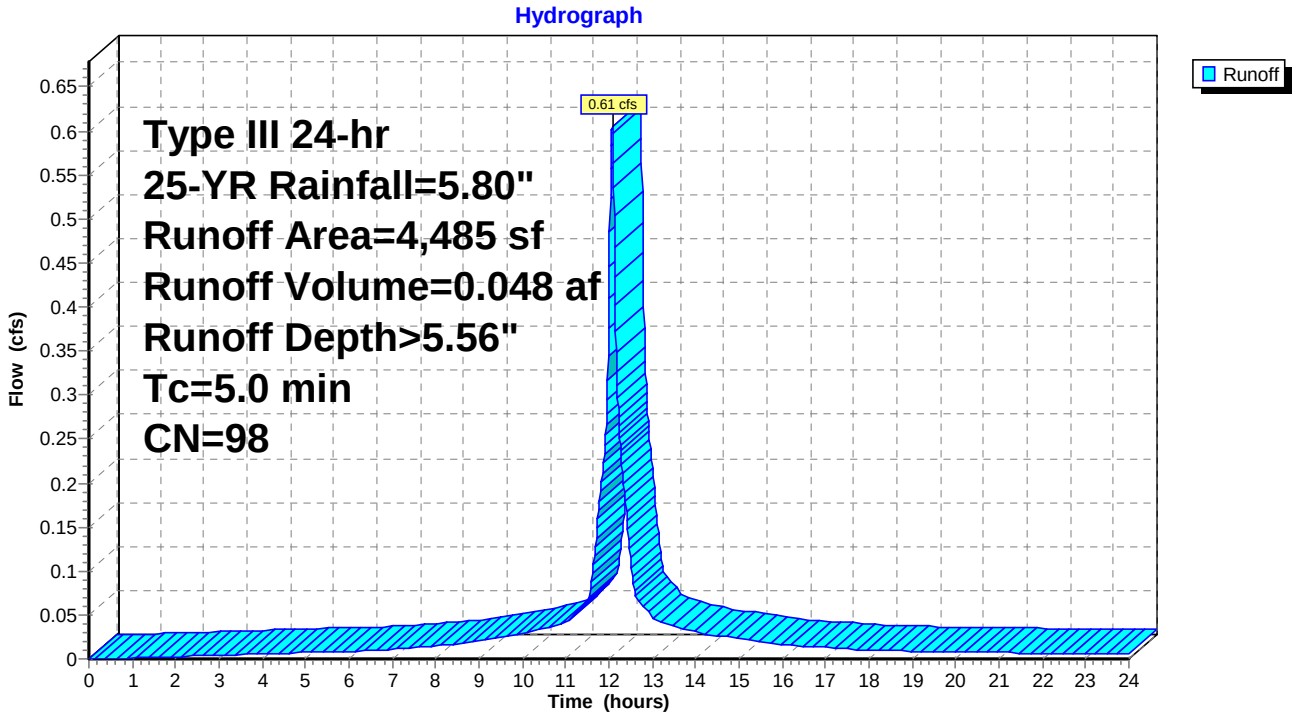
Runoff = 0.61 cfs @ 12.07 hrs, Volume= 0.048 af, Depth> 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	4,485	98	Roof runoff
	4,485		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 61S: Auditorium Roof



Summary for Subcatchment 70S: Thomas & Davies & Gym

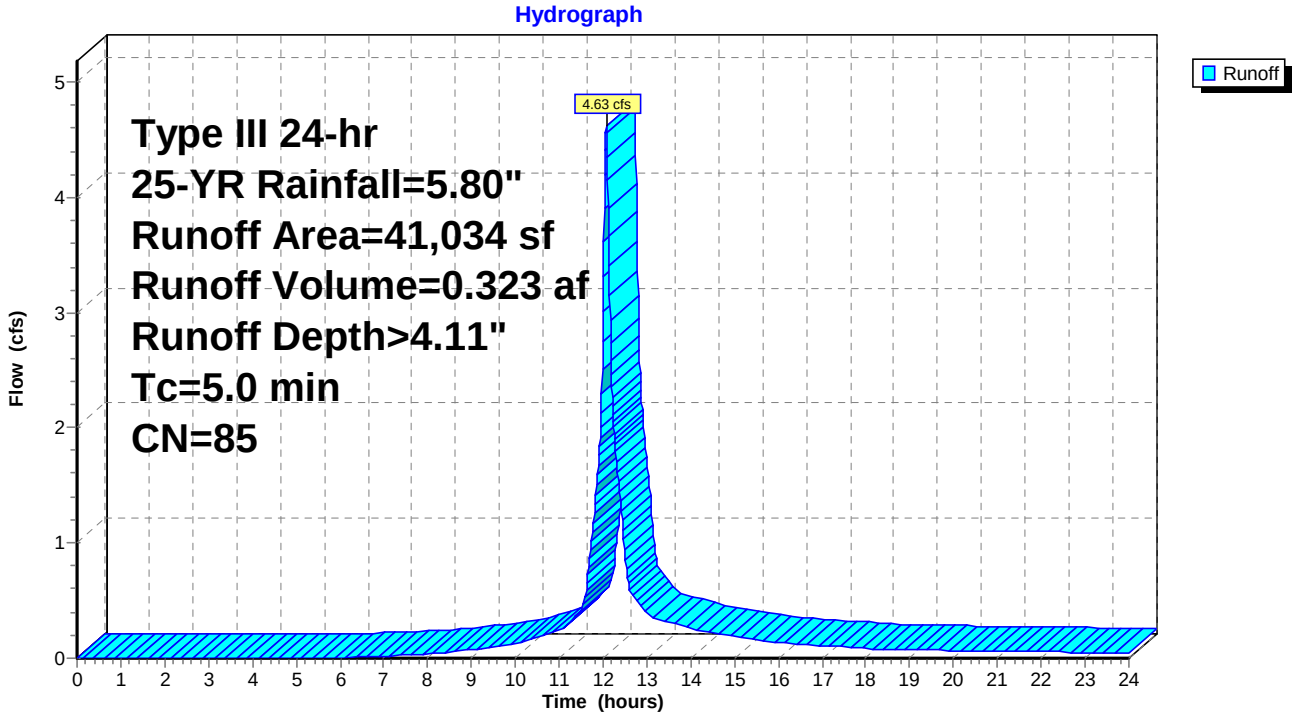
Runoff = 4.63 cfs @ 12.07 hrs, Volume= 0.323 af, Depth> 4.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	32,011	98	impervious
*	9,023	39	Lawn/field, HSG A
	41,034	85	Weighted Average
	9,023		21.99% Pervious Area
	32,011		78.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**

Subcatchment 70S: Thomas & Davies & Gym



Summary for Subcatchment 80S: FoundersHall

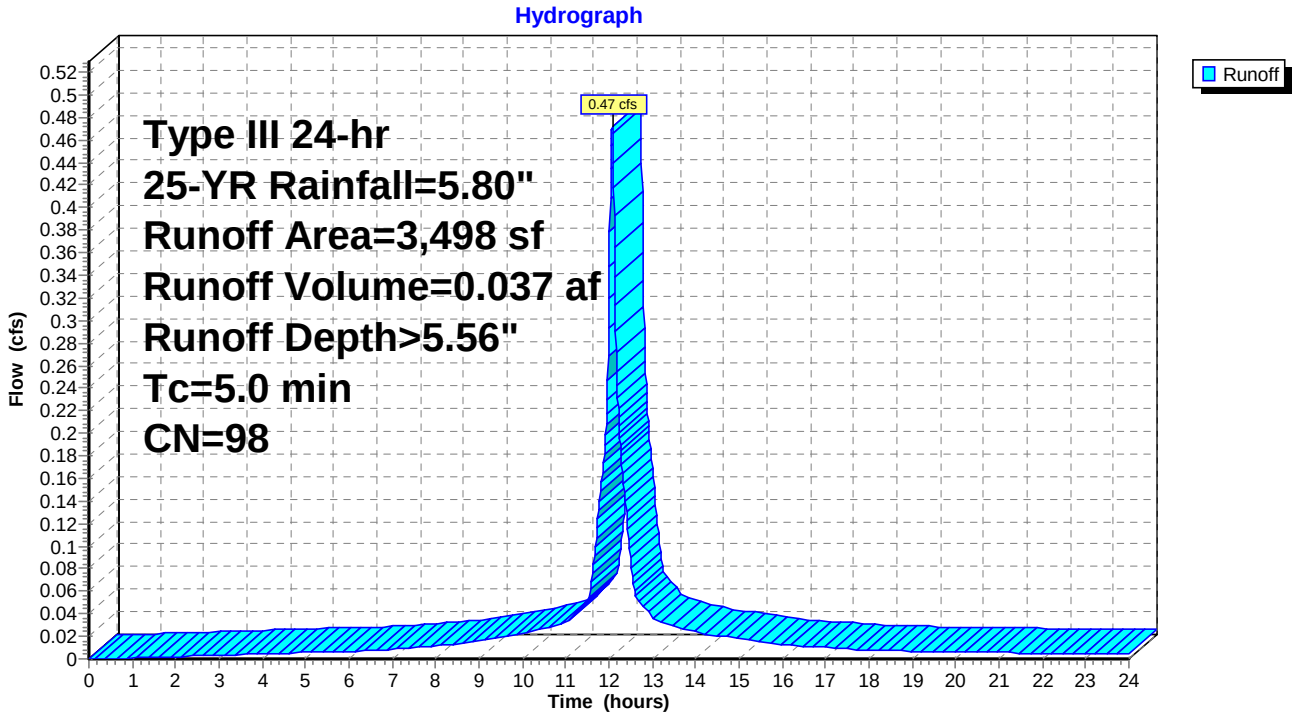
Runoff = 0.47 cfs @ 12.07 hrs, Volume= 0.037 af, Depth> 5.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	3,498	98	Roof runoff
	3,498		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 80S: FoundersHall



Summary for Subcatchment 90S: Playground

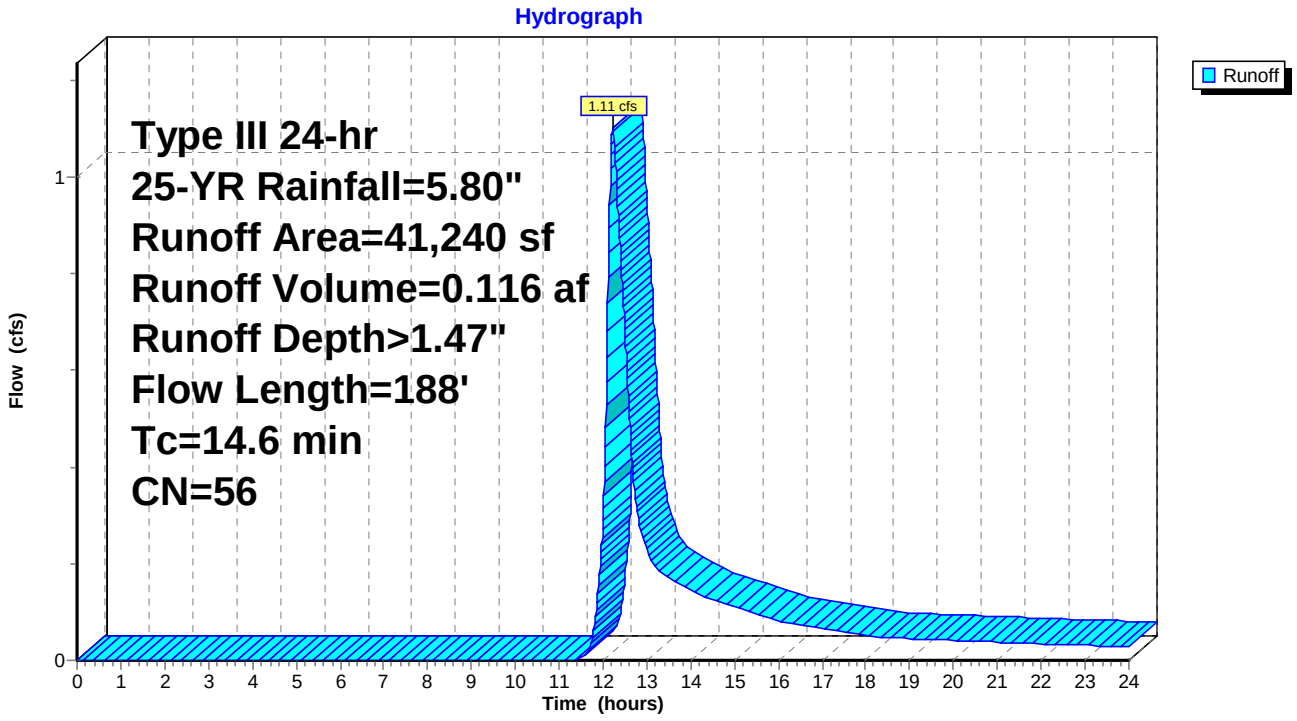
Runoff = 1.11 cfs @ 12.22 hrs, Volume= 0.116 af, Depth> 1.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	12,037	98	impervious
*	29,203	39	Lawn/field, HSG A
	41,240	56	Weighted Average
	29,203		70.81% Pervious Area
	12,037		29.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	100	0.0100	0.13		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"
1.7	88	0.0154	0.87		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
14.6	188	Total			

Subcatchment 90S: Playground



Summary for Subcatchment 402S: New Prkng lot

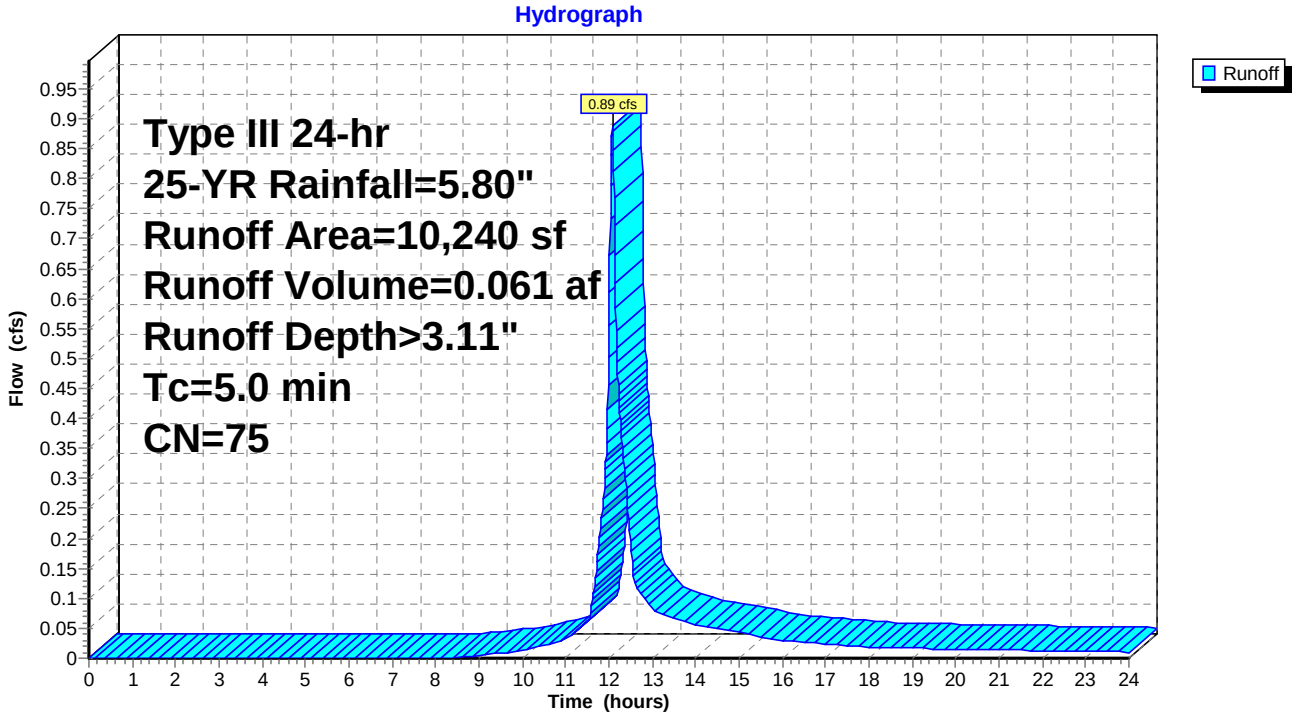
Runoff = 0.89 cfs @ 12.08 hrs, Volume= 0.061 af, Depth> 3.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	4,000	39	Pervious
*	6,240	98	Impervious
	10,240	75	Weighted Average
	4,000		39.06% Pervious Area
	6,240		60.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 402S: New Prkng lot



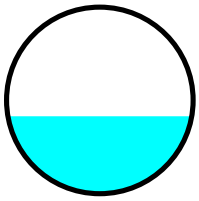
Summary for Reach 161R: roof drain

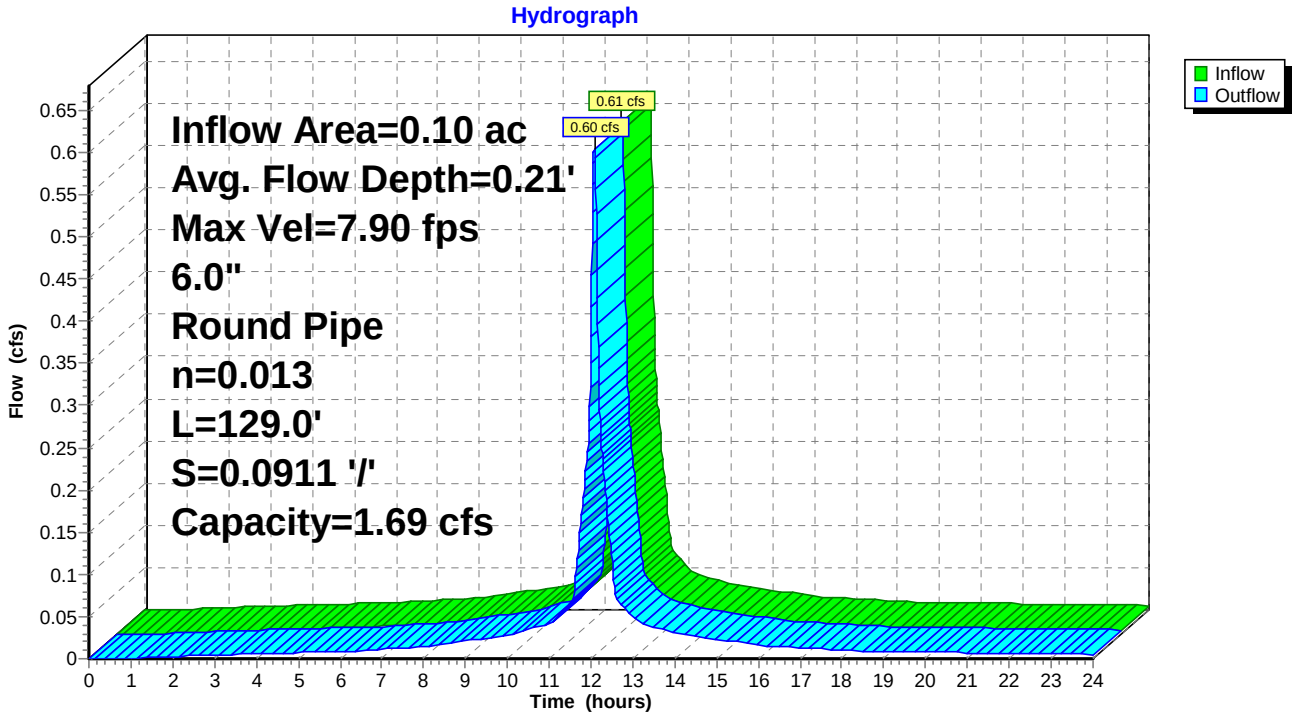
Inflow Area = 0.10 ac,100.00% Impervious, Inflow Depth > 5.56" for 25-YR event
Inflow = 0.61 cfs @ 12.07 hrs, Volume= 0.048 af
Outflow = 0.60 cfs @ 12.08 hrs, Volume= 0.048 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.90 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.64 fps, Avg. Travel Time= 0.8 min

Peak Storage= 10 cf @ 12.07 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 1.69 cfs

6.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 129.0' Slope= 0.0911 '/'
Inlet Invert= 130.00', Outlet Invert= 118.25'





Summary for Pond 206P: City CB @ Fletcher & Danforth

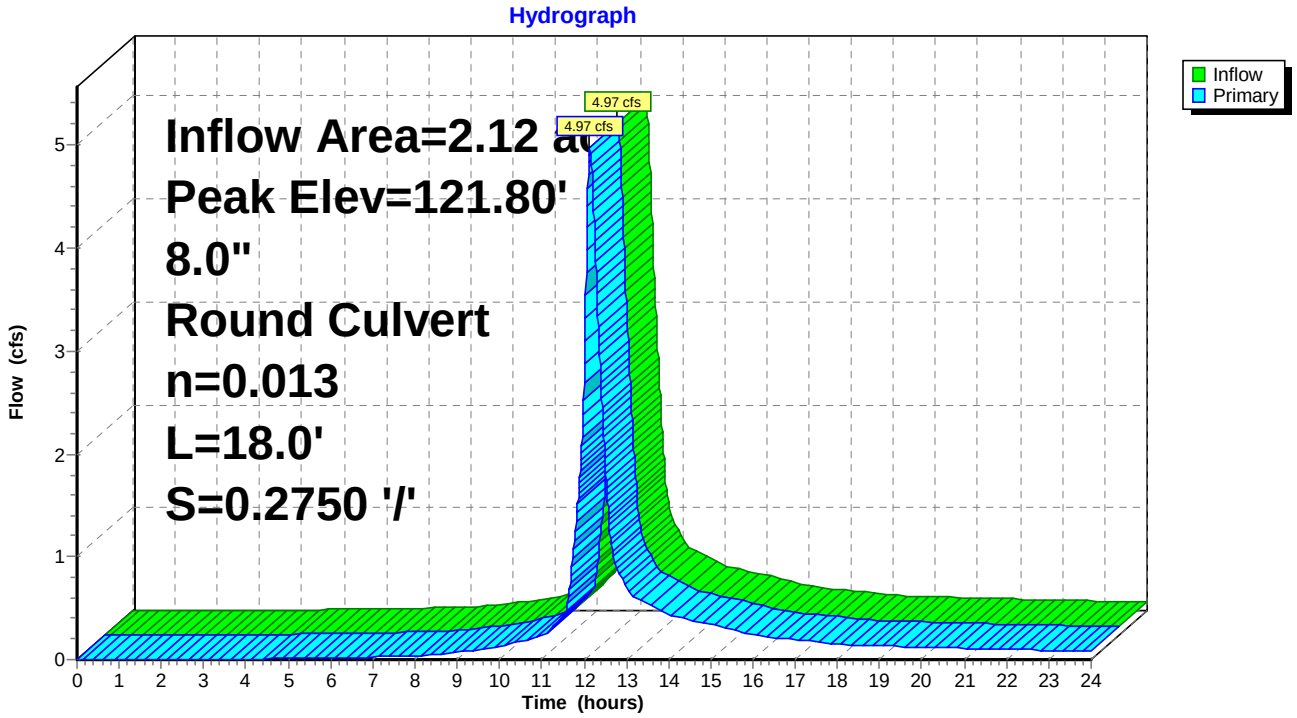
Inflow Area = 2.12 ac, 52.17% Impervious, Inflow Depth > 2.72" for 25-YR event
Inflow = 4.97 cfs @ 12.14 hrs, Volume= 0.480 af
Outflow = 4.97 cfs @ 12.14 hrs, Volume= 0.480 af, Atten= 0%, Lag= 0.0 min
Primary = 4.97 cfs @ 12.14 hrs, Volume= 0.480 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 121.80' @ 12.14 hrs
Flood Elev= 111.26'

Device	Routing	Invert	Outlet Devices
#1	Primary	107.43'	**8.0" Round Culvert** L= 18.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 107.43' / 102.48' S= 0.2750 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 0.35 sf

Primary OutFlow Max=4.97 cfs @ 12.14 hrs HW=121.79' (Free Discharge)
1=Culvert (Inlet Controls 4.97 cfs @ 14.24 fps)

Pond 206P: City CB @ Fletcher & Danforth



Summary for Pond 207P: Existing CB

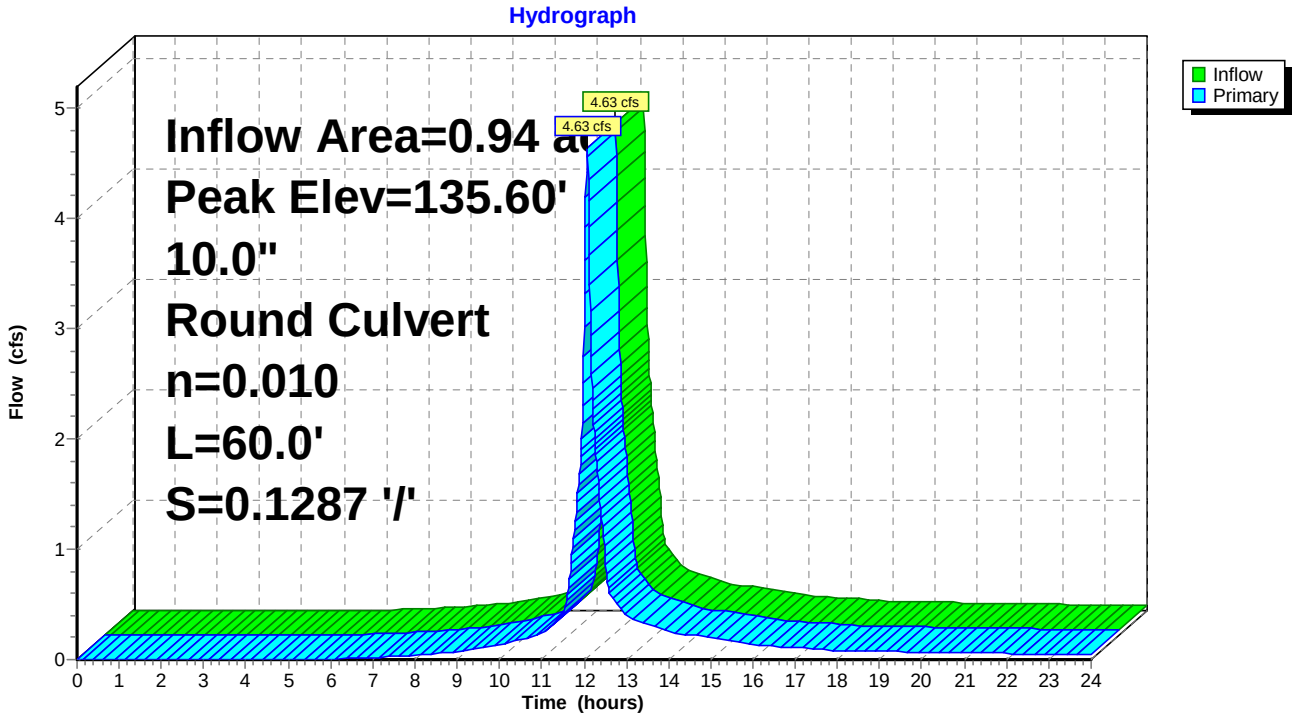
Inflow Area = 0.94 ac, 78.01% Impervious, Inflow Depth > 4.11" for 25-YR event
Inflow = 4.63 cfs @ 12.07 hrs, Volume= 0.323 af
Outflow = 4.63 cfs @ 12.07 hrs, Volume= 0.323 af, Atten= 0%, Lag= 0.0 min
Primary = 4.63 cfs @ 12.07 hrs, Volume= 0.323 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 135.60' @ 12.07 hrs
Flood Elev= 137.62'

Device	Routing	Invert	Outlet Devices
#1	Primary	130.20'	**10.0" Round Culvert** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 130.20' / 122.48' S= 0.1287 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=4.62 cfs @ 12.07 hrs HW=135.58' (Free Discharge)
1=Culvert (Inlet Controls 4.62 cfs @ 8.47 fps)

Pond 207P: Existing CB



Summary for Pond 210P: Existing FI

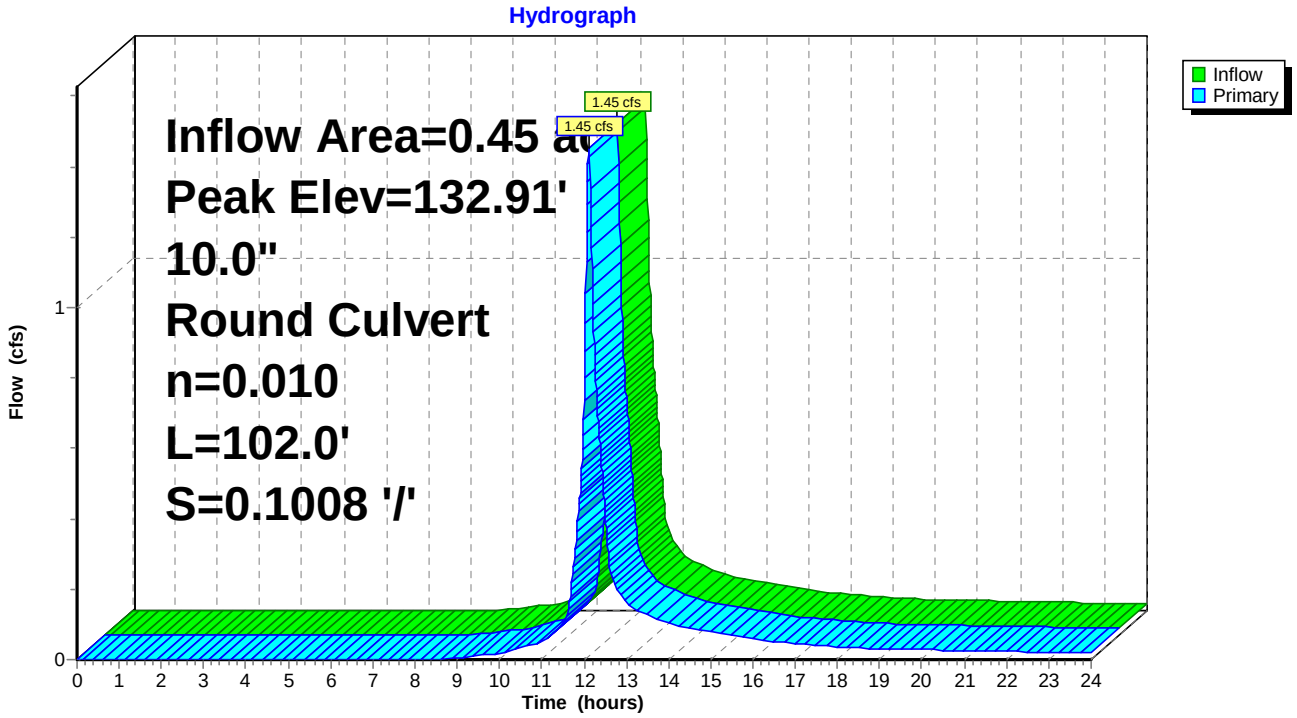
Inflow Area = 0.45 ac, 57.01% Impervious, Inflow Depth > 2.92" for 25-YR event
Inflow = 1.45 cfs @ 12.11 hrs, Volume= 0.110 af
Outflow = 1.45 cfs @ 12.11 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.0 min
Primary = 1.45 cfs @ 12.11 hrs, Volume= 0.110 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 132.91' @ 12.11 hrs
Flood Elev= 140.41'

Device	Routing	Invert	Outlet Devices
#1	Primary	132.00'	**10.0" Round Culvert** L= 102.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 132.00' / 121.72' S= 0.1008 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.45 cfs @ 12.11 hrs HW=132.91' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.45 cfs @ 2.66 fps)

Pond 210P: Existing FI



Summary for Pond 217P: Existing DMH

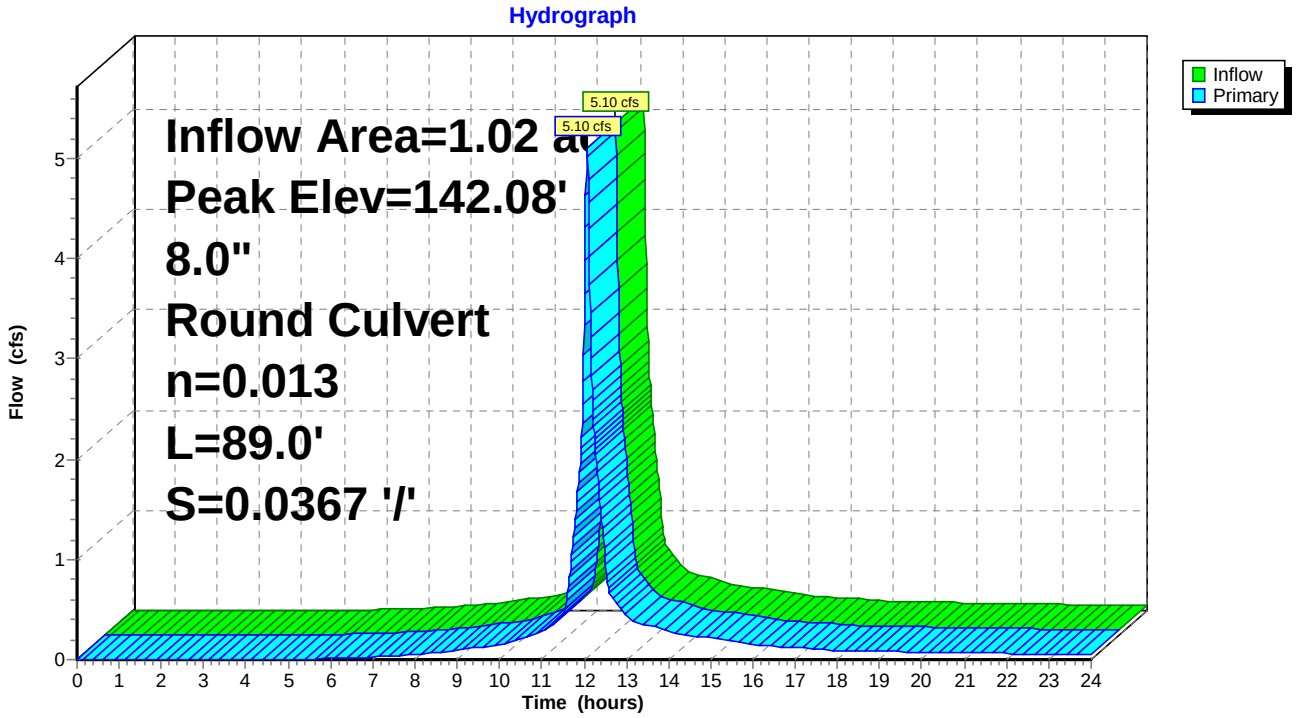
Inflow Area = 1.02 ac, 79.74% Impervious, Inflow Depth > 4.22" for 25-YR event
Inflow = 5.10 cfs @ 12.07 hrs, Volume= 0.360 af
Outflow = 5.10 cfs @ 12.07 hrs, Volume= 0.360 af, Atten= 0%, Lag= 0.0 min
Primary = 5.10 cfs @ 12.07 hrs, Volume= 0.360 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 142.08' @ 12.07 hrs
Flood Elev= 126.98'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.48'	**8.0" Round Culvert** L= 89.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 122.48' / 119.21' S= 0.0367 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 0.35 sf

Primary OutFlow Max=5.09 cfs @ 12.07 hrs HW=142.01' (Free Discharge)
1=Culvert (Barrel Controls 5.09 cfs @ 14.59 fps)

Pond 217P: Existing DMH



Summary for Pond 220P: Existing DMH

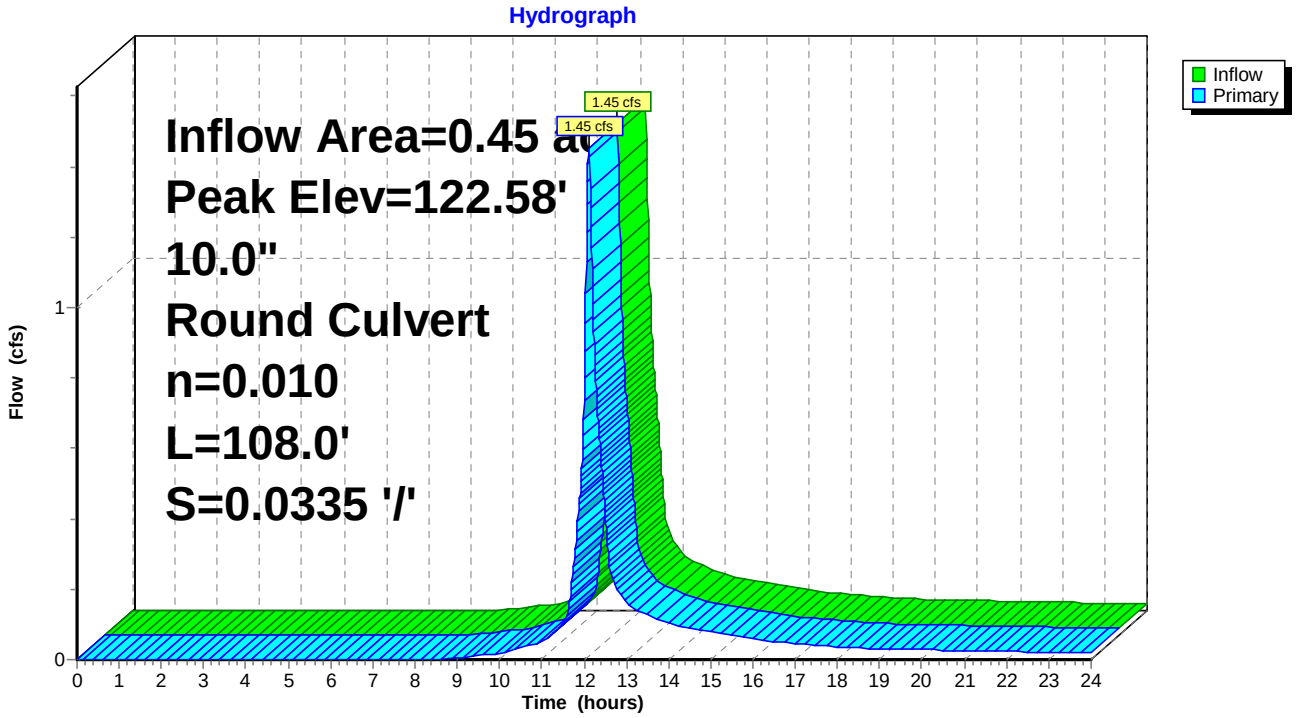
Inflow Area = 0.45 ac, 57.01% Impervious, Inflow Depth > 2.92" for 25-YR event
Inflow = 1.45 cfs @ 12.11 hrs, Volume= 0.110 af
Outflow = 1.45 cfs @ 12.11 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.0 min
Primary = 1.45 cfs @ 12.11 hrs, Volume= 0.110 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 122.58' @ 12.11 hrs
Flood Elev= 128.47'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.67'	**10.0" Round Culvert** L= 108.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 121.67' / 118.05' S= 0.0335 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.45 cfs @ 12.11 hrs HW=122.58' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.45 cfs @ 2.66 fps)

Pond 220P: Existing DMH



Summary for Pond 227P: Existing SMH

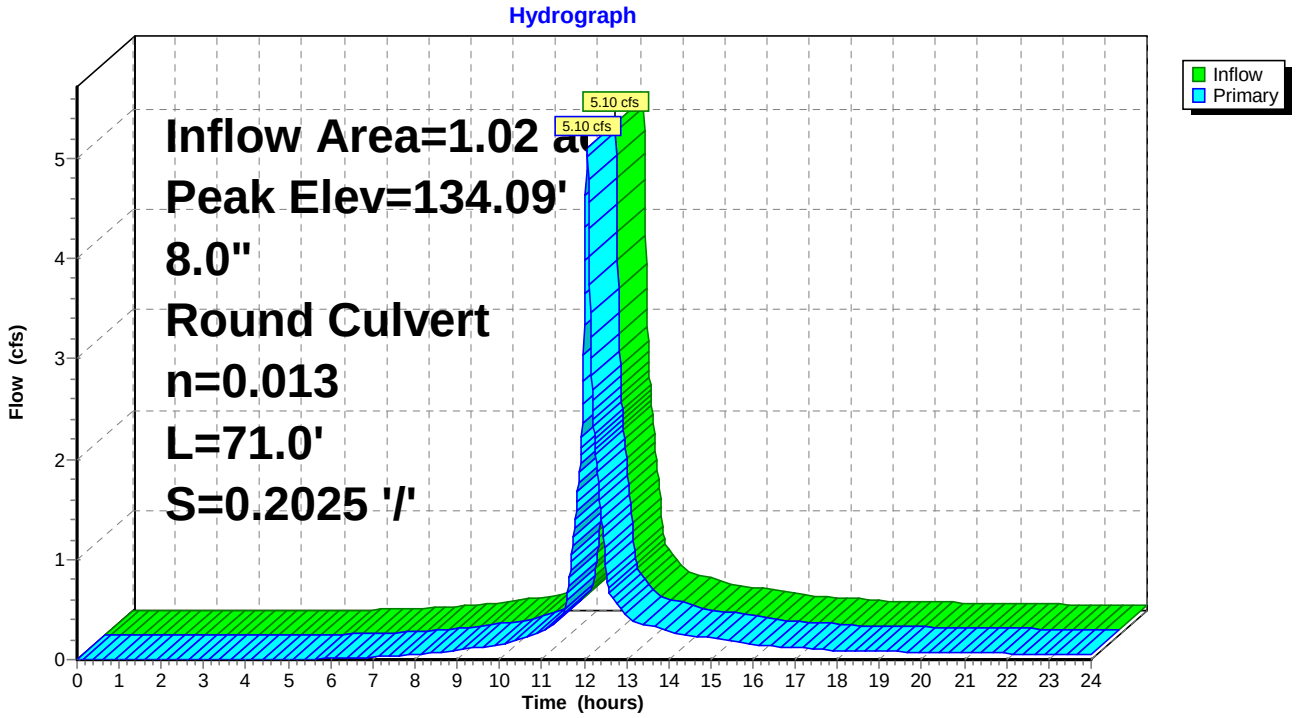
Inflow Area = 1.02 ac, 79.74% Impervious, Inflow Depth > 4.22" for 25-YR event
Inflow = 5.10 cfs @ 12.07 hrs, Volume= 0.360 af
Outflow = 5.10 cfs @ 12.07 hrs, Volume= 0.360 af, Atten= 0%, Lag= 0.0 min
Primary = 5.10 cfs @ 12.07 hrs, Volume= 0.360 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 134.09' @ 12.07 hrs
Flood Elev= 123.81'

Device	Routing	Invert	Outlet Devices
#1	Primary	118.98'	**8.0" Round Culvert** L= 71.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 118.98' / 104.60' S= 0.2025 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 0.35 sf

Primary OutFlow Max=5.09 cfs @ 12.07 hrs HW=134.04' (Free Discharge)
1=Culvert (Inlet Controls 5.09 cfs @ 14.59 fps)

Pond 227P: Existing SMH



Summary for Pond 230P: Existing DMH

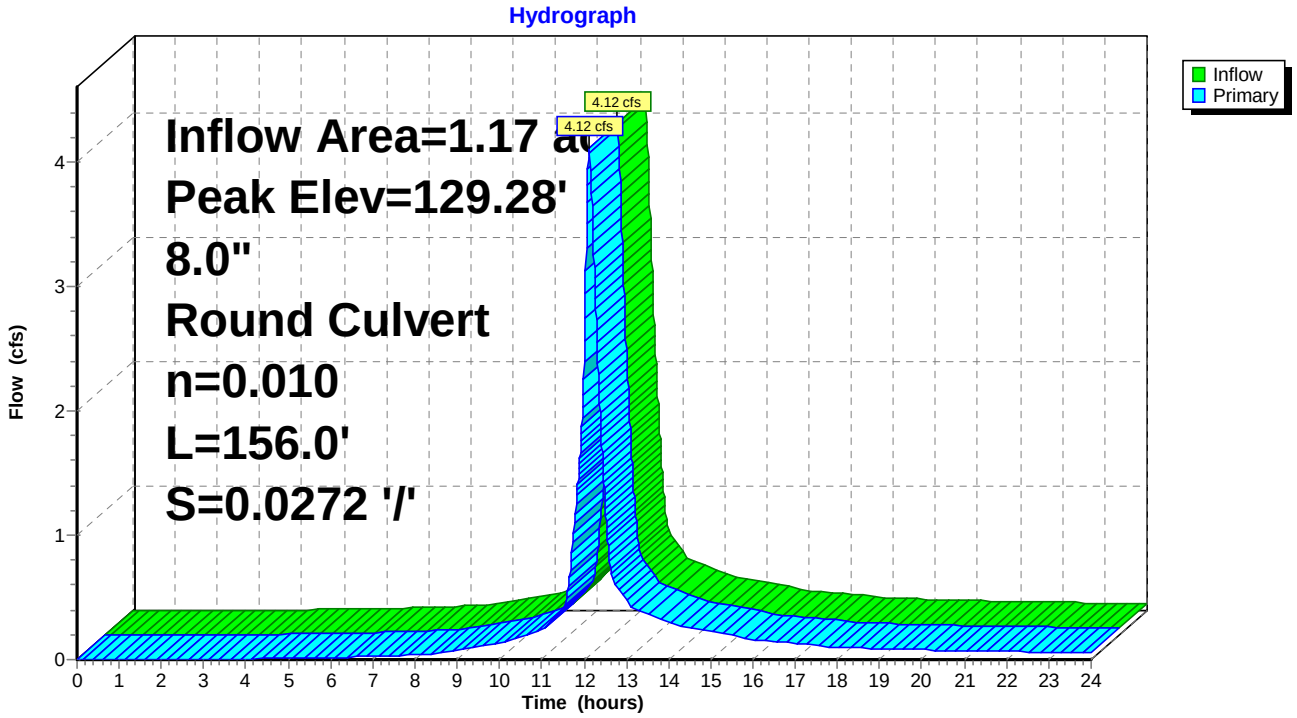
Inflow Area = 1.17 ac, 70.73% Impervious, Inflow Depth > 3.72" for 25-YR event
Inflow = 4.12 cfs @ 12.12 hrs, Volume= 0.363 af
Outflow = 4.12 cfs @ 12.12 hrs, Volume= 0.363 af, Atten= 0%, Lag= 0.0 min
Primary = 4.12 cfs @ 12.12 hrs, Volume= 0.363 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 129.28' @ 12.12 hrs
Flood Elev= 125.05'

Device	Routing	Invert	Outlet Devices
#1	Primary	118.00'	**8.0" Round Culvert** L= 156.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 118.00' / 113.76' S= 0.0272 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=4.11 cfs @ 12.12 hrs HW=129.26' (Free Discharge)
└**1=Culvert** (Barrel Controls 4.11 cfs @ 11.79 fps)

Pond 230P: Existing DMH



Summary for Pond 240P: Existing DMH

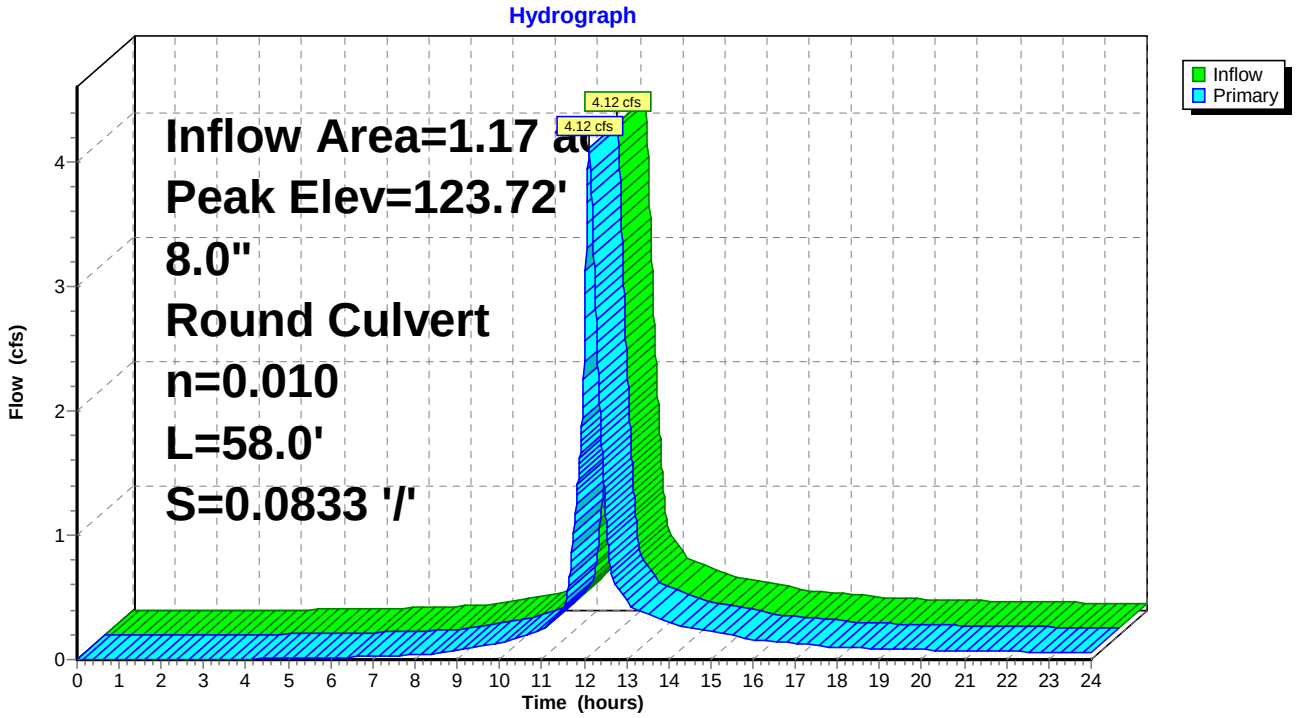
Inflow Area = 1.17 ac, 70.73% Impervious, Inflow Depth > 3.72" for 25-YR event
Inflow = 4.12 cfs @ 12.12 hrs, Volume= 0.363 af
Outflow = 4.12 cfs @ 12.12 hrs, Volume= 0.363 af, Atten= 0%, Lag= 0.0 min
Primary = 4.12 cfs @ 12.12 hrs, Volume= 0.363 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 123.72' @ 12.12 hrs
Flood Elev= 124.03'

Device	Routing	Invert	Outlet Devices
#1	Primary	113.76'	**8.0" Round Culvert** L= 58.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 113.76' / 108.93' S= 0.0833 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=4.11 cfs @ 12.12 hrs HW=123.71' (Free Discharge)
└**1=Culvert** (Inlet Controls 4.11 cfs @ 11.79 fps)

Pond 240P: Existing DMH



Summary for Pond 260P: Storage Pipes

Inflow Area = 0.72 ac, 79.29% Impervious, Inflow Depth > 4.22" for 25-YR event
Inflow = 3.53 cfs @ 12.07 hrs, Volume= 0.254 af
Outflow = 2.69 cfs @ 12.14 hrs, Volume= 0.254 af, Atten= 24%, Lag= 3.8 min
Primary = 2.69 cfs @ 12.14 hrs, Volume= 0.254 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 120.47' @ 12.14 hrs Surf.Area= 924 sf Storage= 626 cf
Flood Elev= 125.26' Surf.Area= 0 sf Storage= 3,468 cf

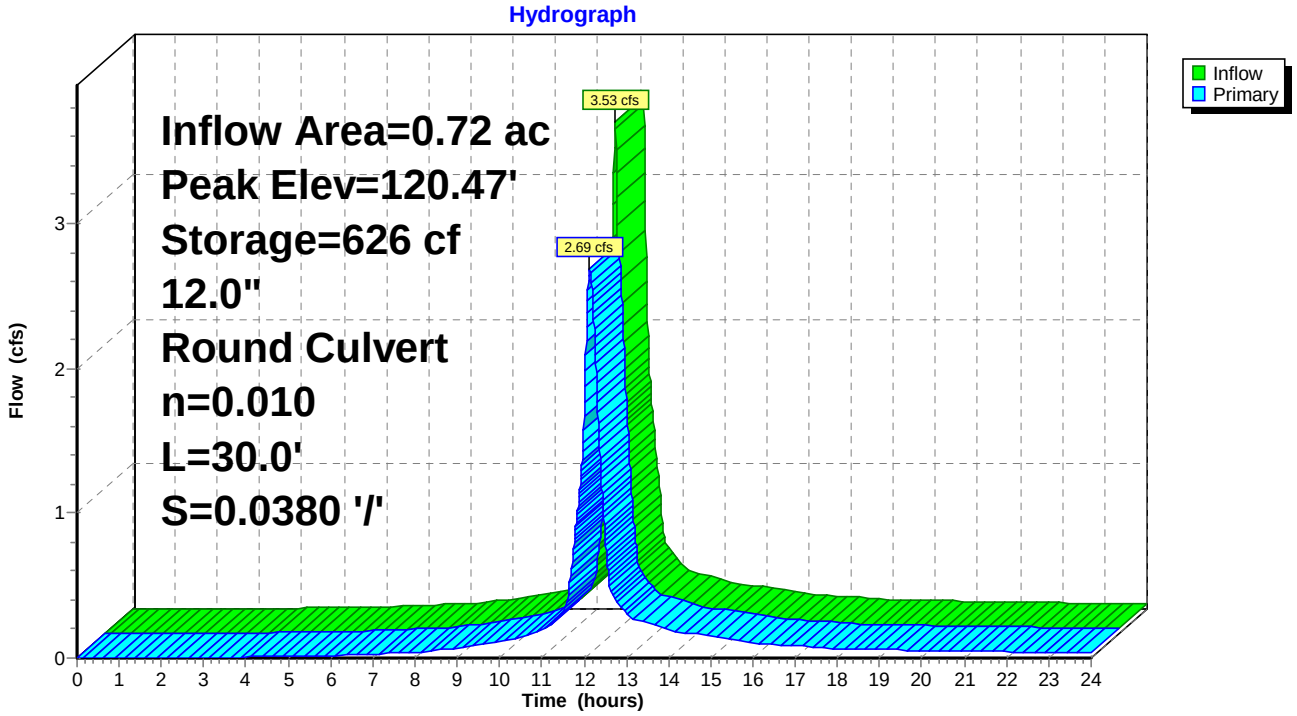
Plug-Flow detention time= 1.6 min calculated for 0.254 af (100% of inflow)
Center-of-Mass det. time= 1.6 min (790.6 - 789.1)

Volume	Invert	Avail.Storage	Storage Description
#1	119.16'	3,468 cf	**48.0" Round Pipe Storage** L= 276.0' S= 0.0027 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.16'	**12.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.16' / 118.02' S= 0.0380 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.68 cfs @ 12.14 hrs HW=120.47' (Free Discharge)
1=Culvert (Inlet Controls 2.68 cfs @ 3.42 fps)

Pond 260P: Storage Pipes



Summary for Pond 340P: CB at SW Cor prkng lot

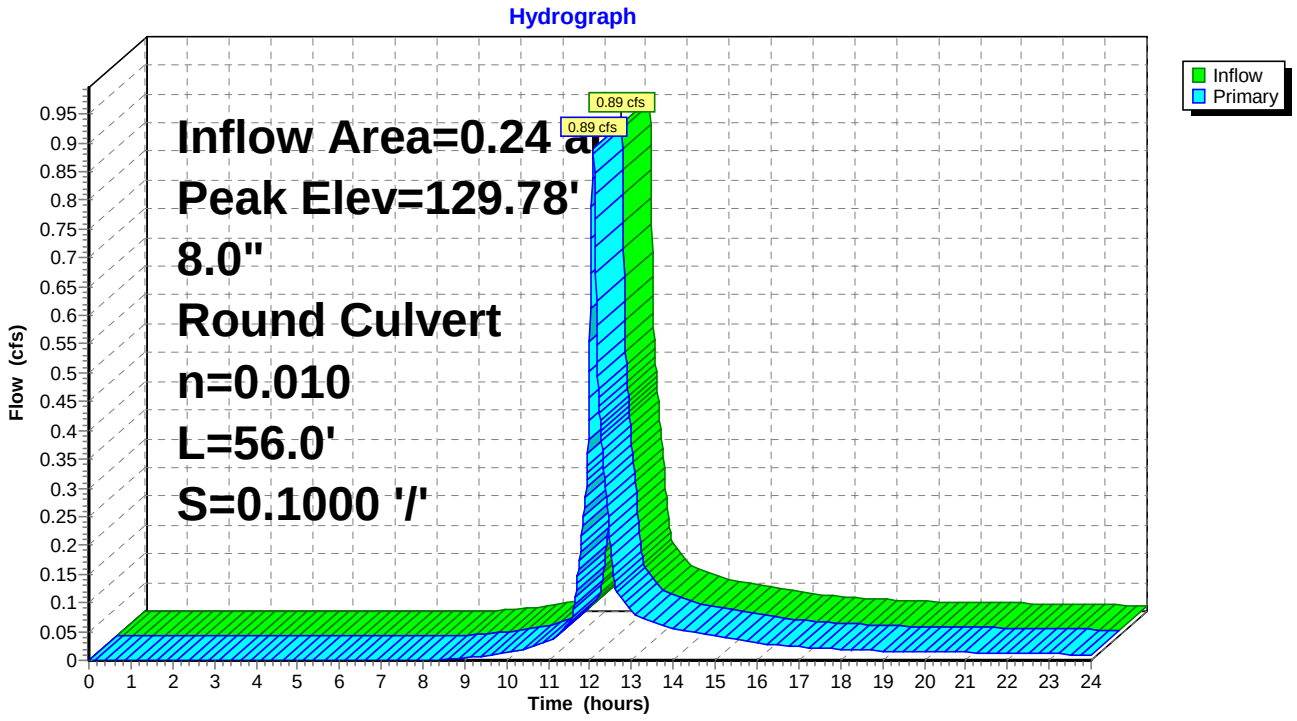
Inflow Area = 0.24 ac, 60.94% Impervious, Inflow Depth > 3.11" for 25-YR event
Inflow = 0.89 cfs @ 12.08 hrs, Volume= 0.061 af
Outflow = 0.89 cfs @ 12.08 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min
Primary = 0.89 cfs @ 12.08 hrs, Volume= 0.061 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 129.78' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	129.00'	**8.0" Round Culvert** L= 56.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 129.00' / 123.40' S= 0.1000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.89 cfs @ 12.08 hrs HW=129.78' (Free Discharge)
1=Culvert (Inlet Controls 0.89 cfs @ 2.54 fps)

Pond 340P: CB at SW Cor prkng lot

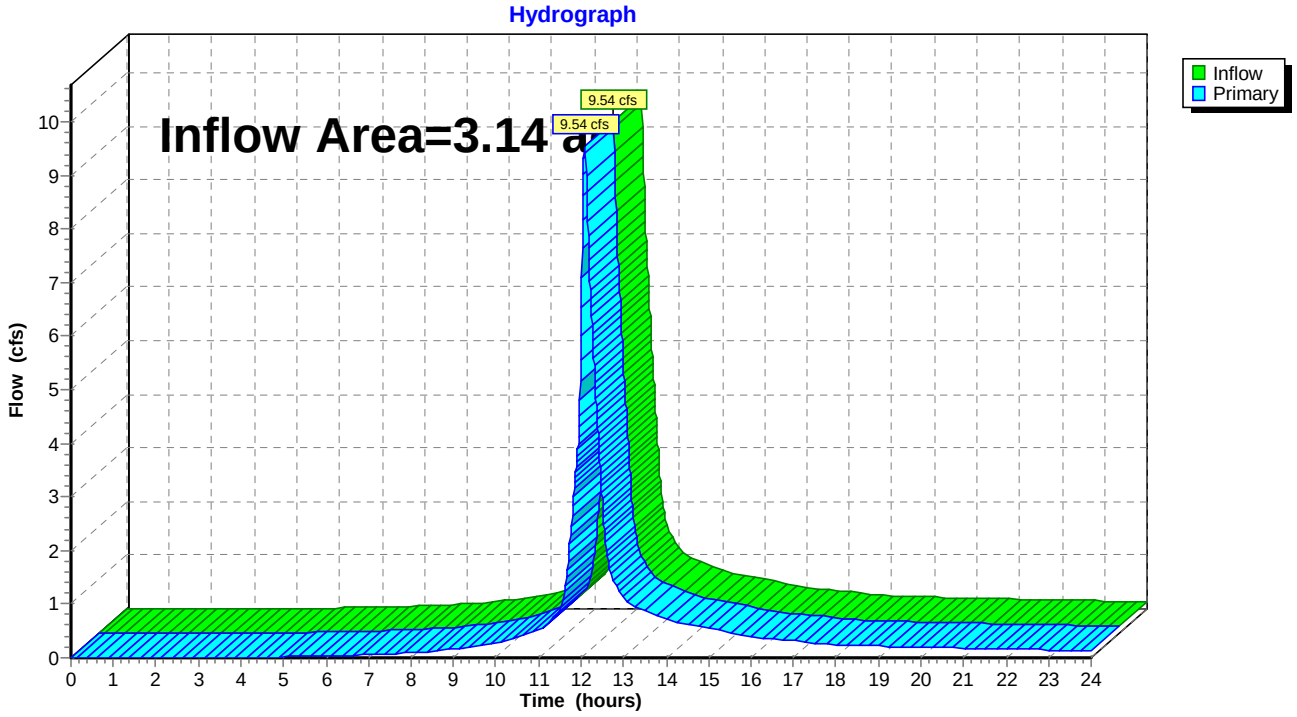


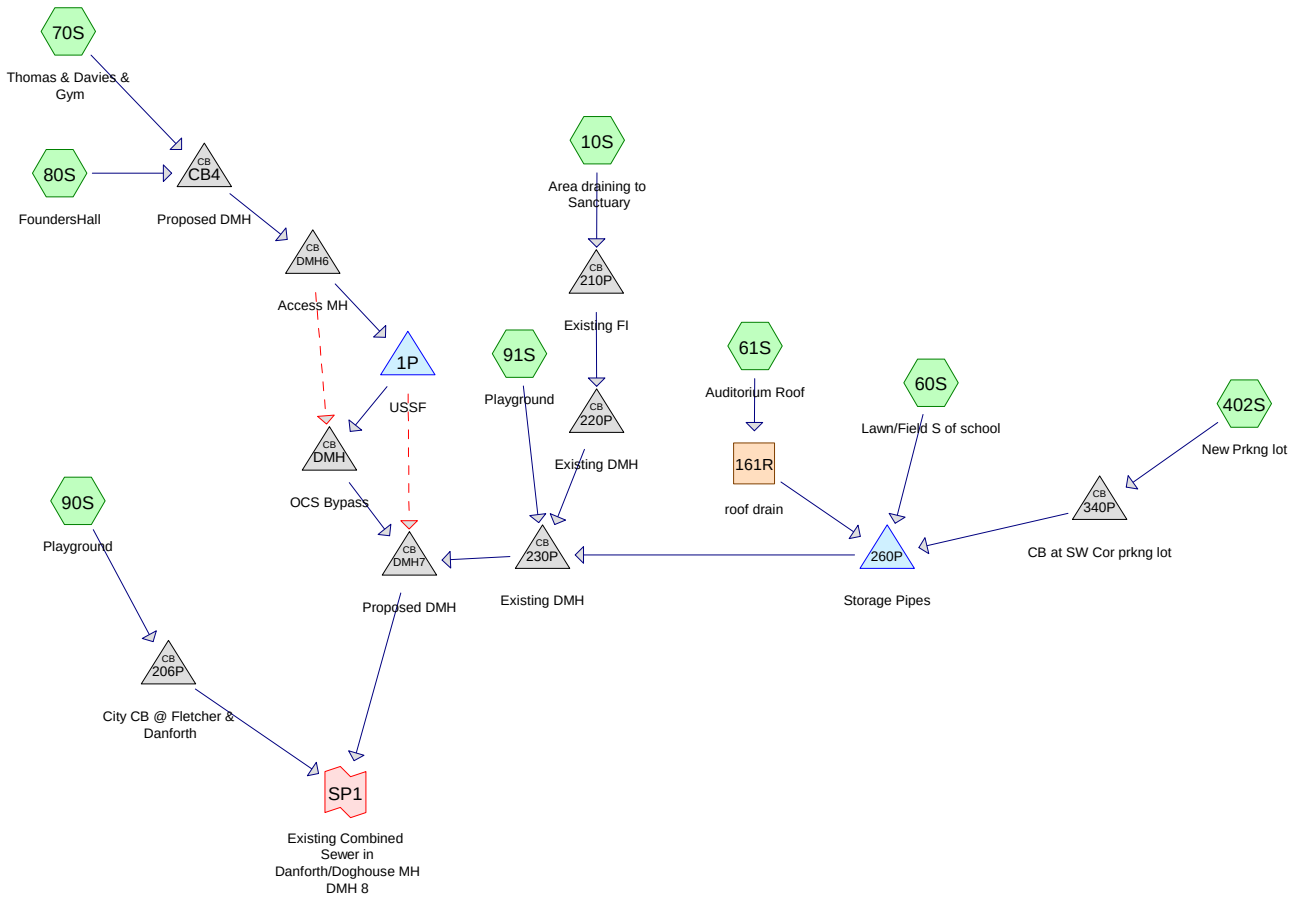
Summary for Link SP1: Existing Combined Sewer in Danforth

Inflow Area = 3.14 ac, 61.14% Impervious, Inflow Depth > 3.21" for 25-YR event
Inflow = 9.54 cfs @ 12.09 hrs, Volume= 0.839 af
Primary = 9.54 cfs @ 12.09 hrs, Volume= 0.839 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link SP1: Existing Combined Sewer in Danforth





Subcat Reach Pond Link

Routing Diagram for 5b. Post
Prepared by Microsoft, Printed 5/27/2016
HydroCAD® 10.00-15 s/n 01204 © 2015 HydroCAD Software Solutions LLC

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 10S: Area draining to Runoff Area=19,254 sf 56.16% Impervious Runoff Depth=0.87"
Flow Length=91' Slope=0.0300 '/' Tc=7.7 min CN=72 Runoff=0.39 cfs 0.032 af

Subcatchment 60S: Lawn/Field S of school Runoff Area=16,715 sf 84.98% Impervious Runoff Depth=1.99"
Tc=5.0 min CN=89 Runoff=0.92 cfs 0.064 af

Subcatchment 61S: Auditorium Roof Runoff Area=4,485 sf 100.00% Impervious Runoff Depth=2.87"
Tc=5.0 min CN=98 Runoff=0.32 cfs 0.025 af

Subcatchment 70S: Thomas & Davies & Runoff Area=44,441 sf 74.20% Impervious Runoff Depth=1.53"
Flow Length=91' Slope=0.1593 '/' Tc=5.0 min CN=83 Runoff=1.89 cfs 0.130 af

Subcatchment 80S: FoundersHall Runoff Area=9,466 sf 100.00% Impervious Runoff Depth=2.87"
Tc=5.0 min CN=98 Runoff=0.68 cfs 0.052 af

Subcatchment 90S: Playground Runoff Area=27,554 sf 25.26% Impervious Runoff Depth=0.20"
Flow Length=117' Tc=9.2 min CN=54 Runoff=0.04 cfs 0.010 af

Subcatchment 91S: Playground Runoff Area=4,688 sf 69.20% Impervious Runoff Depth=1.33"
Tc=5.0 min CN=80 Runoff=0.17 cfs 0.012 af

Subcatchment 402S: New Prkng lot Runoff Area=10,240 sf 60.94% Impervious Runoff Depth=1.03"
Tc=5.0 min CN=75 Runoff=0.28 cfs 0.020 af

Reach 161R: roof drain Avg. Flow Depth=0.15' Max Vel=6.63 fps Inflow=0.32 cfs 0.025 af
6.0" Round Pipe n=0.013 L=129.0' S=0.0911 '/' Capacity=1.69 cfs Outflow=0.32 cfs 0.025 af

Pond 1P: USSF Peak Elev=121.19' Storage=7,622 cf Inflow=2.57 cfs 0.182 af
Primary=0.03 cfs 0.014 af Secondary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.014 af

Pond 206P: City CB @ Fletcher & Danforth Peak Elev=107.54' Inflow=0.04 cfs 0.010 af
12.0" Round Culvert n=0.010 L=20.0' S=0.2475 '/' Outflow=0.04 cfs 0.010 af

Pond 210P: Existing FI Peak Elev=132.37' Inflow=0.39 cfs 0.032 af
10.0" Round Culvert n=0.010 L=102.0' S=0.1008 '/' Outflow=0.39 cfs 0.032 af

Pond 220P: Existing DMH Peak Elev=122.04' Inflow=0.39 cfs 0.032 af
10.0" Round Culvert n=0.010 L=108.0' S=0.0335 '/' Outflow=0.39 cfs 0.032 af

Pond 230P: Existing DMH Peak Elev=119.26' Inflow=1.91 cfs 0.152 af
10.0" Round Culvert n=0.010 L=83.0' S=0.0257 '/' Outflow=1.91 cfs 0.152 af

Pond 260P: Storage Pipes Peak Elev=119.87' Storage=164 cf Inflow=1.52 cfs 0.108 af
12.0" Round Culvert n=0.010 L=30.0' S=0.0380 '/' Outflow=1.37 cfs 0.108 af

Pond 340P: CB at SW Cor prkng lot Peak Elev=129.34' Inflow=0.28 cfs 0.020 af
8.0" Round Culvert n=0.010 L=56.0' S=0.1000 '/' Outflow=0.28 cfs 0.020 af

Pond CB4: Proposed DMH Peak Elev=123.50' Inflow=2.57 cfs 0.182 af
12.0" Round Culvert n=0.010 L=24.0' S=0.0621 '/' Outflow=2.57 cfs 0.182 af

Pond DMH: OCS Bypass Peak Elev=119.51' Inflow=0.03 cfs 0.014 af
10.0" Round Culvert n=0.010 L=60.0' S=0.0692 '/' Outflow=0.03 cfs 0.014 af

Pond DMH6: Access MH Peak Elev=120.69' Inflow=2.57 cfs 0.182 af
Primary=2.57 cfs 0.182 af Secondary=0.00 cfs 0.000 af Outflow=2.57 cfs 0.182 af

Pond DMH7: Proposed DMH Peak Elev=116.43' Inflow=1.91 cfs 0.166 af
10.0" Round Culvert n=0.010 L=57.0' S=0.1739 '/' Outflow=1.91 cfs 0.166 af

Link SP1: Existing Combined Sewer in Danforth/Doghouse MH DMH 8 Inflow=1.91 cfs 0.177 af
Primary=1.91 cfs 0.177 af

Summary for Subcatchment 10S: Area draining to Sanctuary

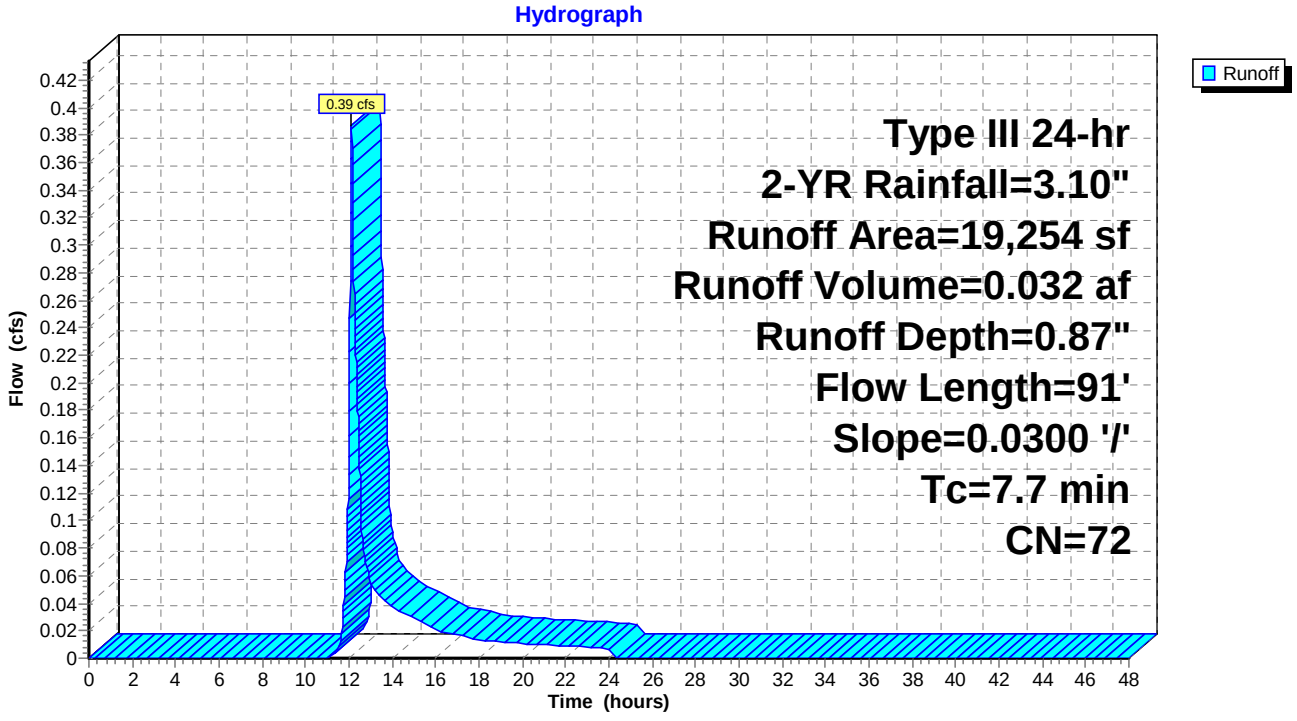
Runoff = 0.39 cfs @ 12.12 hrs, Volume= 0.032 af, Depth= 0.87"

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 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	10,813	98	impervious
*	8,441	39	Lawn/field, HSG A
	19,254	72	Weighted Average
	8,441		43.84% Pervious Area
	10,813		56.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	91	0.0300	0.20		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"

Subcatchment 10S: Area draining to Sanctuary



Summary for Subcatchment 60S: Lawn/Field S of school

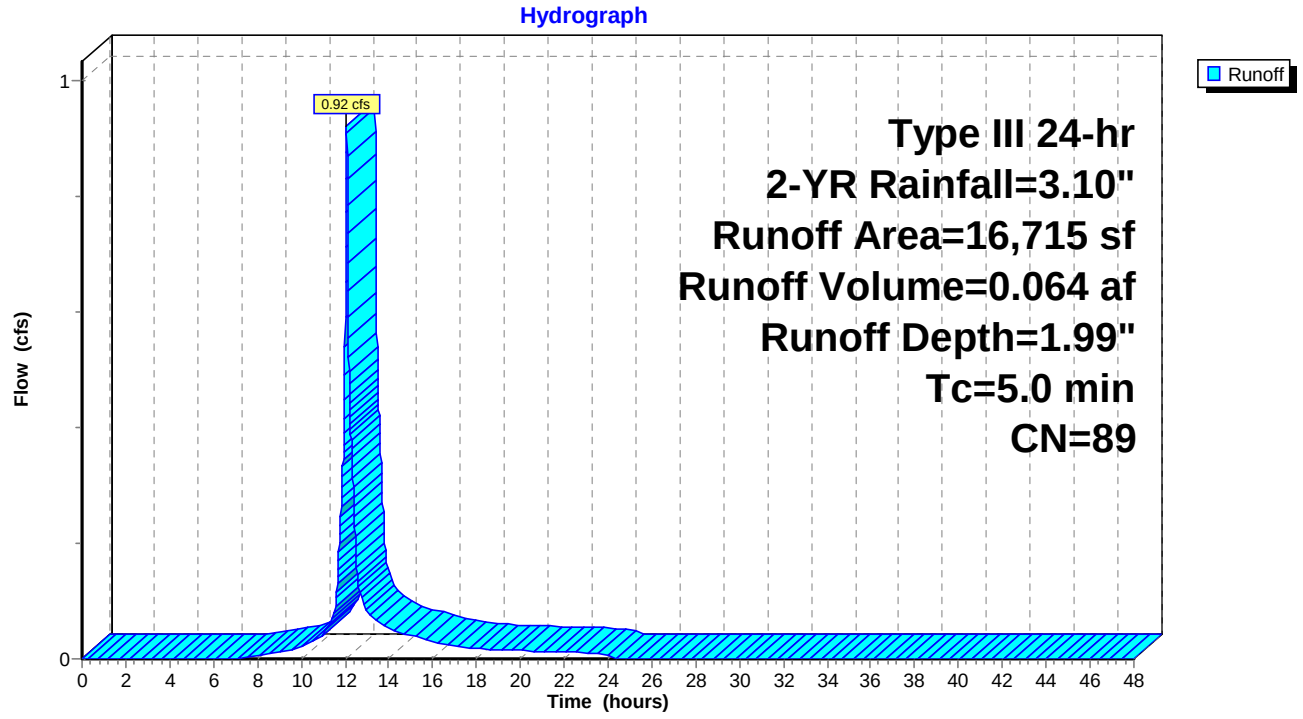
Runoff = 0.92 cfs @ 12.07 hrs, Volume= 0.064 af, Depth= 1.99"

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 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	14,205	98	impervious
*	2,510	39	Lawn/field, HSG A
	16,715	89	Weighted Average
	2,510		15.02% Pervious Area
	14,205		84.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 60S: Lawn/Field S of school



Summary for Subcatchment 61S: Auditorium Roof

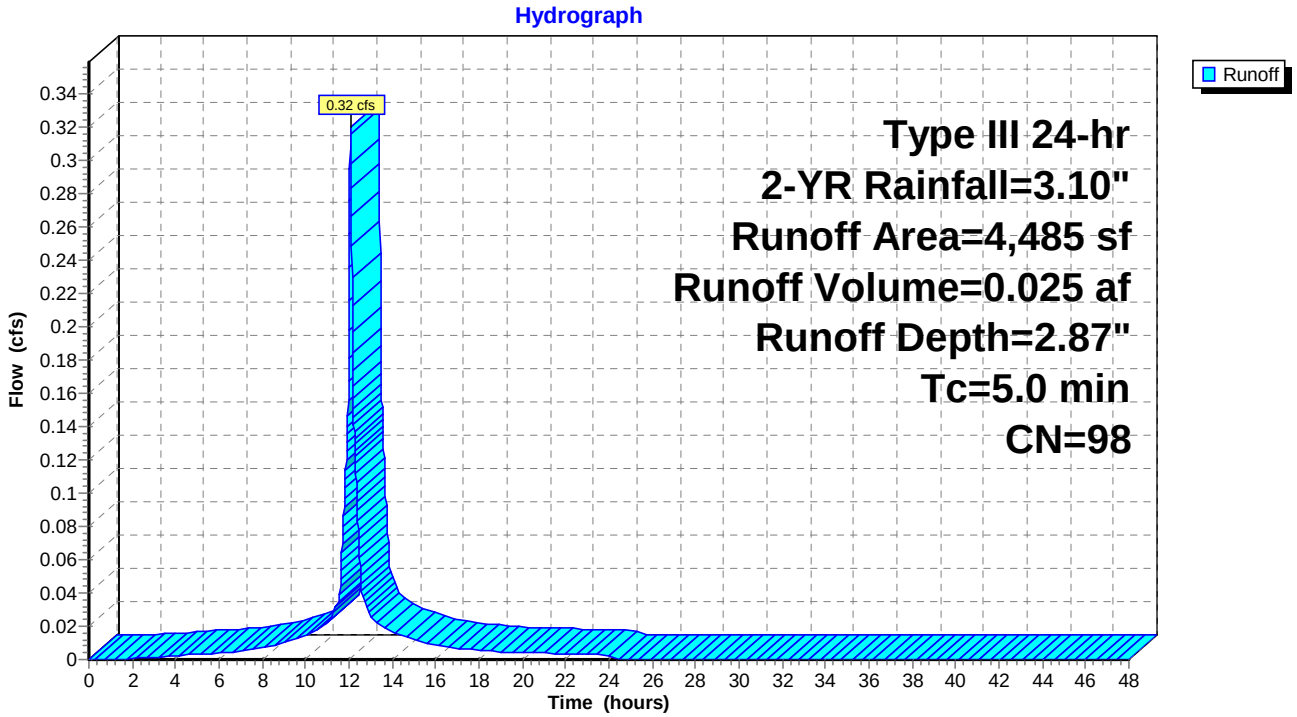
Runoff = 0.32 cfs @ 12.07 hrs, Volume= 0.025 af, Depth= 2.87"

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 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	4,485	98	Roof runoff
	4,485		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 61S: Auditorium Roof



Summary for Subcatchment 70S: Thomas & Davies & Gym

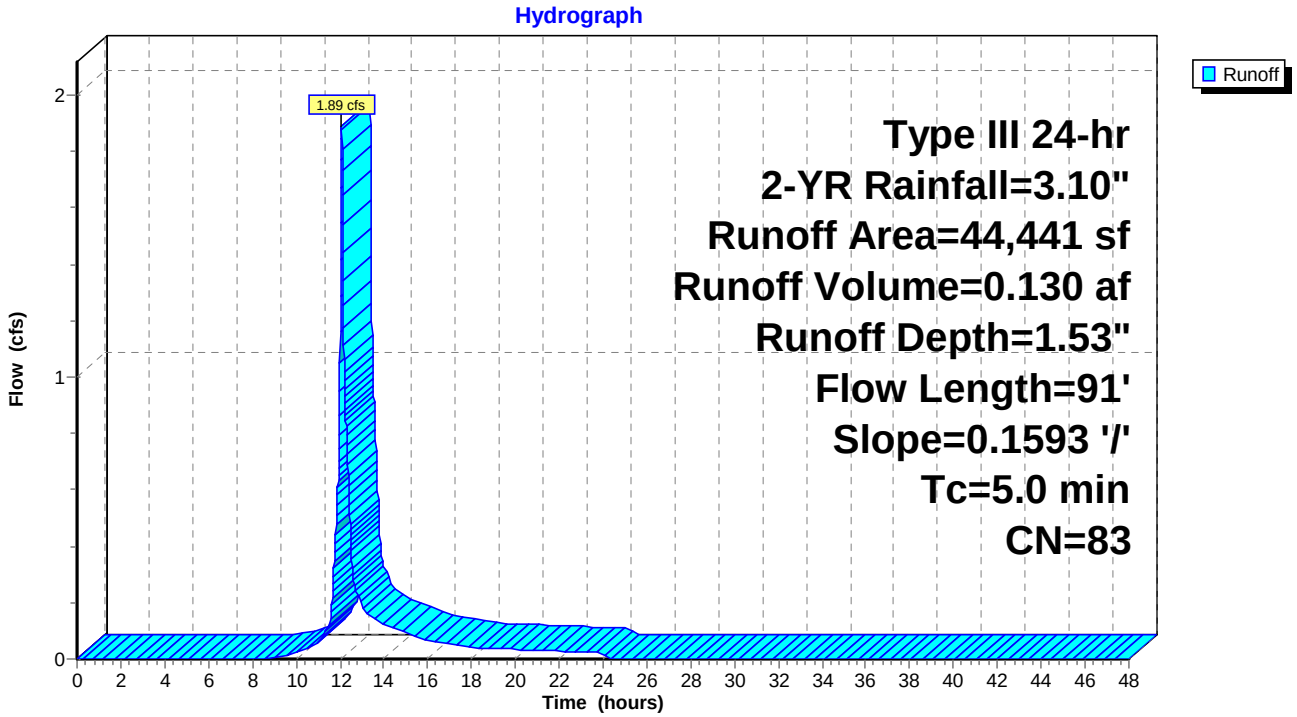
Runoff = 1.89 cfs @ 12.08 hrs, Volume= 0.130 af, Depth= 1.53"

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 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	32,976	98	impervious
*	11,465	39	Lawn/field, HSG A
	44,441	83	Weighted Average
	11,465		25.80% Pervious Area
	32,976		74.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	91	0.1593	0.38		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"
4.0	91	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 70S: Thomas & Davies & Gym



Summary for Subcatchment 80S: FoundersHall

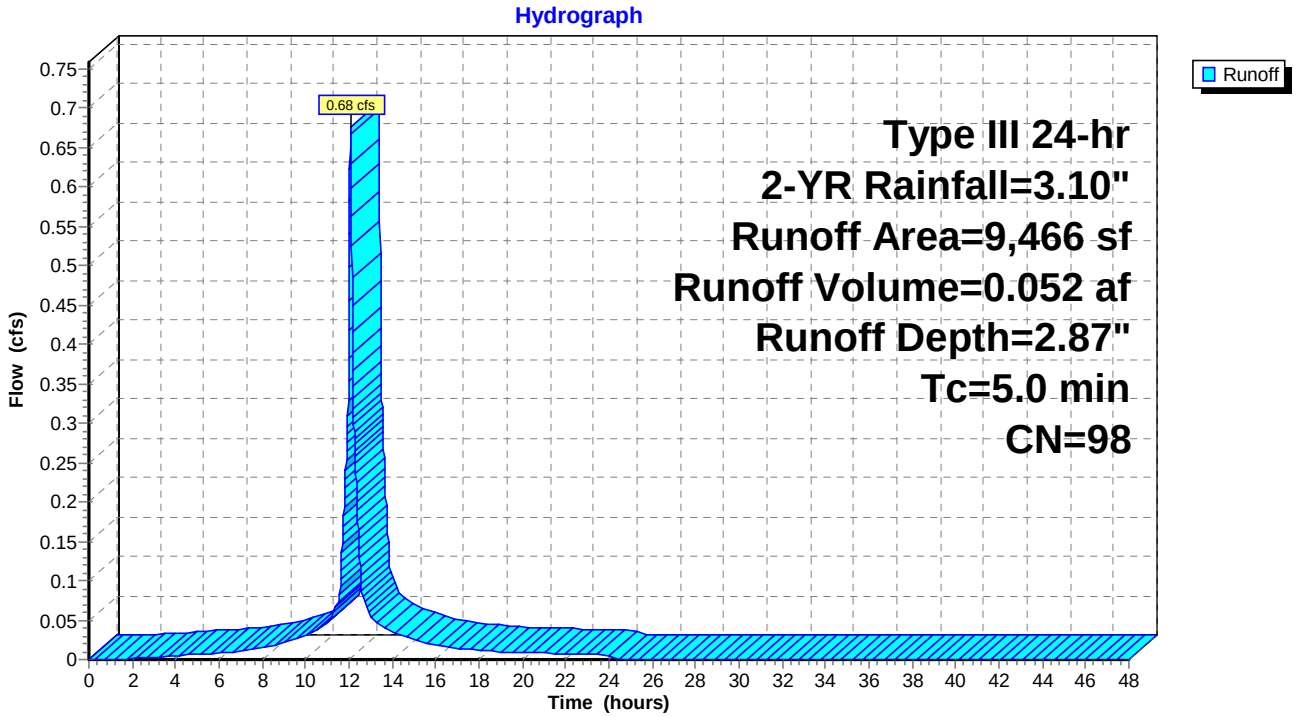
Runoff = 0.68 cfs @ 12.07 hrs, Volume= 0.052 af, Depth= 2.87"

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 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	9,466	98	Roof runoff
	9,466		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 80S: FoundersHall



Summary for Subcatchment 90S: Playground

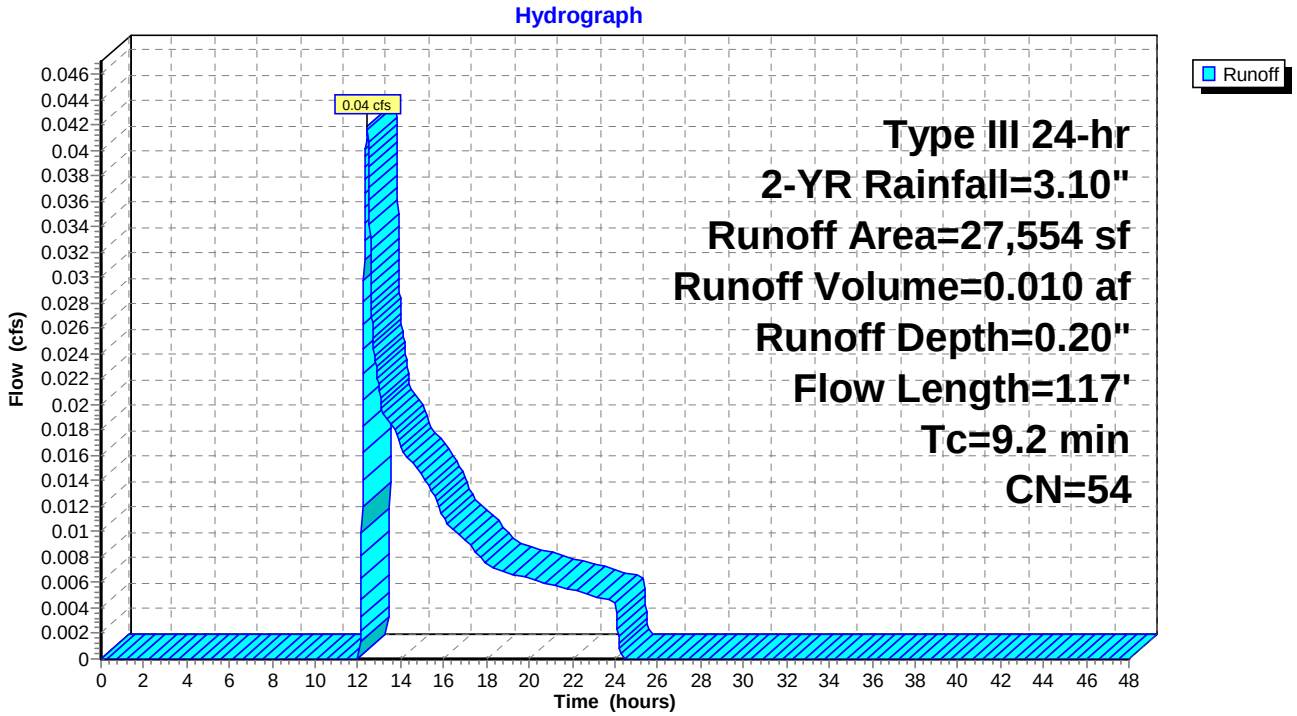
Runoff = 0.04 cfs @ 12.42 hrs, Volume= 0.010 af, Depth= 0.20"

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 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	6,960	98	impervious
*	20,594	39	Lawn/field, HSG A
	27,554	54	Weighted Average
	20,594		74.74% Pervious Area
	6,960		25.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0250	0.19		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"
0.2	17	0.0588	1.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.2	117	Total			

Subcatchment 90S: Playground



Summary for Subcatchment 91S: Playground

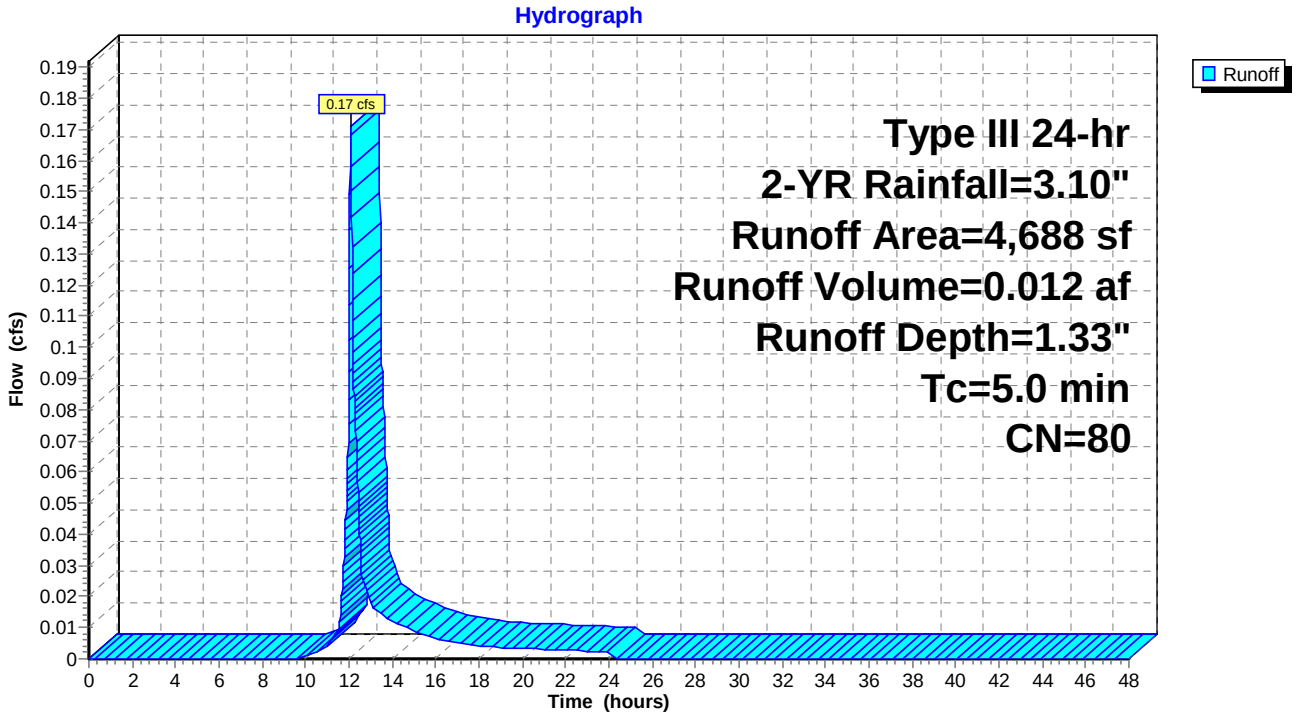
Runoff = 0.17 cfs @ 12.08 hrs, Volume= 0.012 af, Depth= 1.33"

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 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	3,244	98	impervious
*	1,444	39	Lawn/field, HSG A
	4,688	80	Weighted Average
	1,444		30.80% Pervious Area
	3,244		69.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 91S: Playground



Summary for Subcatchment 402S: New Prkng lot

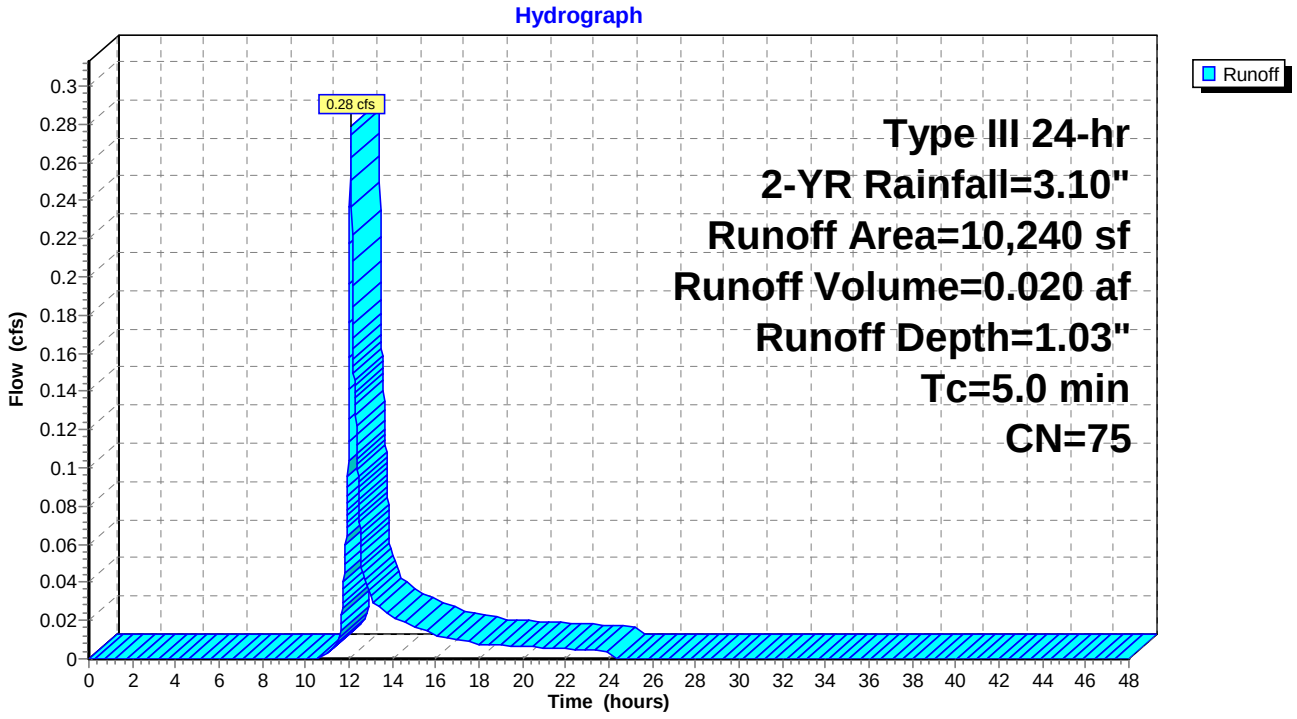
Runoff = 0.28 cfs @ 12.08 hrs, Volume= 0.020 af, Depth= 1.03"

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 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	4,000	39	Pervious
*	6,240	98	Impervious
	10,240	75	Weighted Average
	4,000		39.06% Pervious Area
	6,240		60.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 402S: New Prkng lot



Summary for Reach 161R: roof drain

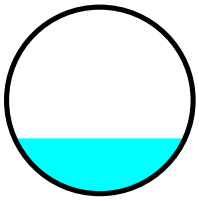
[52] Hint: Inlet/Outlet conditions not evaluated

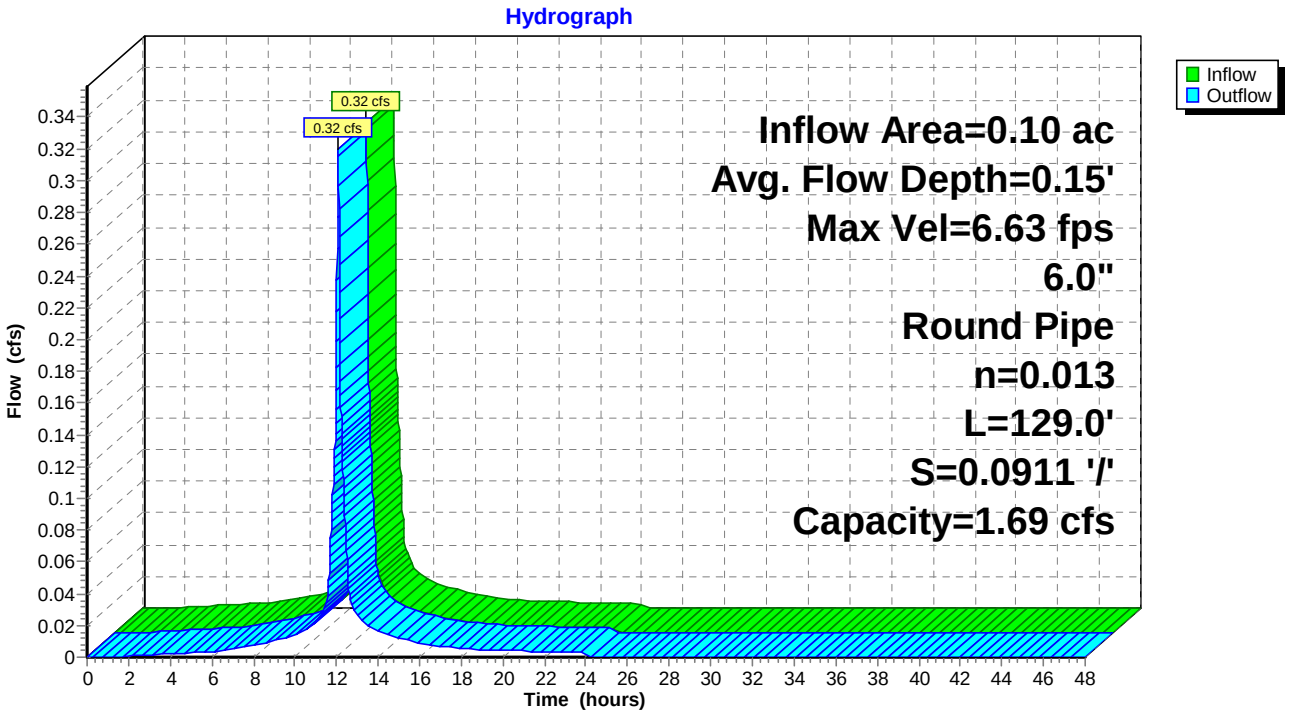
Inflow Area = 0.10 ac,100.00% Impervious, Inflow Depth = 2.87" for 2-YR event
Inflow = 0.32 cfs @ 12.07 hrs, Volume= 0.025 af
Outflow = 0.32 cfs @ 12.08 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.63 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.15 fps, Avg. Travel Time= 1.0 min

Peak Storage= 6 cf @ 12.07 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 1.69 cfs

6.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 129.0' Slope= 0.0911 '/'
Inlet Invert= 130.00', Outlet Invert= 118.25'





Summary for Pond 1P: USSF

[81] Warning: Exceeded Pond DMH6 by 1.41' @ 24.23 hrs

Inflow Area = 1.24 ac, 78.73% Impervious, Inflow Depth = 1.76" for 2-YR event
Inflow = 2.57 cfs @ 12.07 hrs, Volume= 0.182 af
Outflow = 0.03 cfs @ 24.01 hrs, Volume= 0.014 af, Atten= 99%, Lag= 715.9 min
Primary = 0.03 cfs @ 24.01 hrs, Volume= 0.014 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 121.19' @ 24.01 hrs Surf.Area= 4,717 sf Storage= 7,622 cf
Flood Elev= 126.48' Surf.Area= 4,717 sf Storage= 16,044 cf

Plug-Flow detention time= 1,009.8 min calculated for 0.014 af (8% of inflow)
Center-of-Mass det. time= 739.1 min (1,550.5 - 811.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	118.85'	6,599 cf	**51.42'W x 91.74'L x 5.50'H Field A** 25,943 cf Overall - 9,445 cf Embedded = 16,499 cf x 40.0% Voids
#2A	119.60'	9,445 cf	**ADS_StormTech MC-3500 d +Cap** x 84 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 7 Rows of 12 Chambers Cap Storage= +14.9 cf x 2 x 7 rows = 208.6 cf
		16,044 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	119.67'	**8.0" Round Culvert** L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.67' / 119.52' S= 0.0214 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#2	Device 1	123.35'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	121.10'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 5	118.85'	**2.410 in/hr Exfiltration over Surface area above 118.85'** Conductivity to Groundwater Elevation = 113.00' Excluded Surface area = 4,717 sf
#5	Secondary	116.02'	**6.0" Round Culvert** L= 31.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 116.02' / 115.88' S= 0.0045 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.03 cfs @ 24.01 hrs HW=121.19' (Free Discharge)
└**1=Culvert** (Passes 0.03 cfs of 1.44 cfs potential flow)
  ├**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
  └**3=Orifice/Grate** (Orifice Controls 0.03 cfs @ 1.01 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=118.85' (Free Discharge)
└**5=Culvert** (Passes 0.00 cfs of 1.20 cfs potential flow)
  └**4=Exfiltration** (Controls 0.00 cfs)

Pond 1P: USSF - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap storage)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 7 rows = 208.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

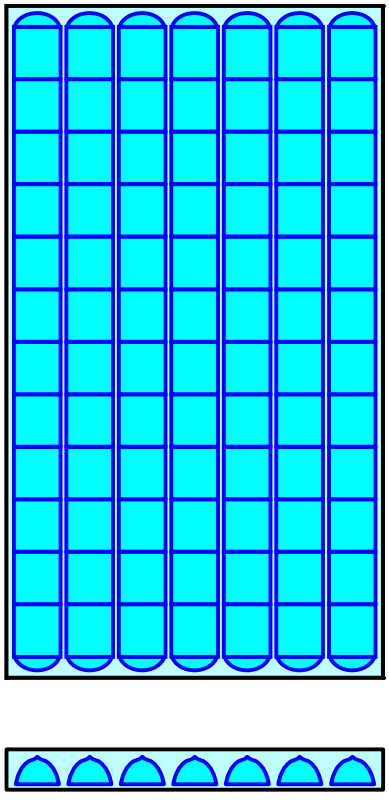
12 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 89.74' Row Length +12.0" End Stone x 2 = 91.74' Base Length
7 Rows x 77.0" Wide + 9.0" Spacing x 6 + 12.0" Side Stone x 2 = 51.42' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

84 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 7 Rows = 9,444.6 cf Chamber Storage

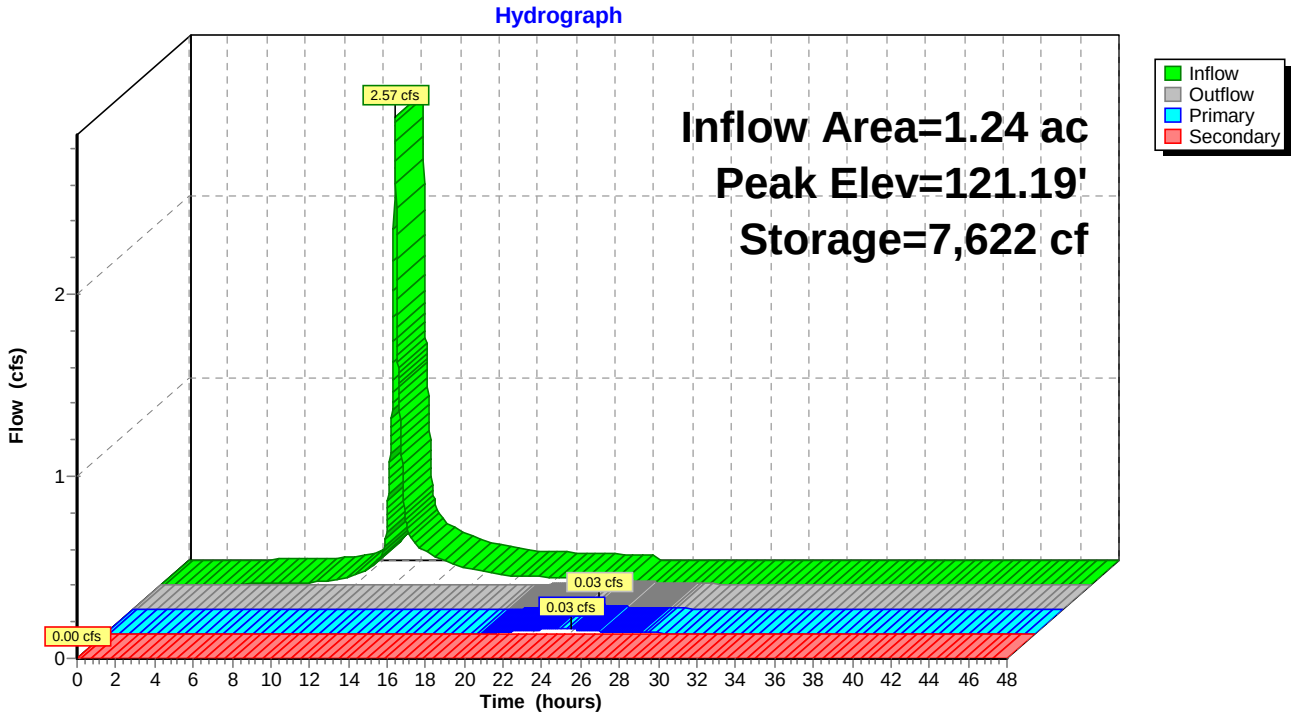
25,943.3 cf Field - 9,444.6 cf Chambers = 16,498.7 cf Stone x 40.0% Voids = 6,599.5 cf Stone Storage

Chamber Storage + Stone Storage = 16,044.1 cf = 0.368 af
Overall Storage Efficiency = 61.8%

84 Chambers
960.9 cy Field
611.1 cy Stone



Pond 1P: USSF


Hydrograph
Inflow Area=1.24 ac
Peak Elev=121.19'
Storage=7,622 cf
2.57 cfs
0.03 cfs
0.03 cfs
0.00 cfs
Inflow
Outflow
Primary
Secondary
Flow (cfs)
Time (hours)
0
1
2
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48

Summary for Pond 206P: City CB @ Fletcher & Danforth

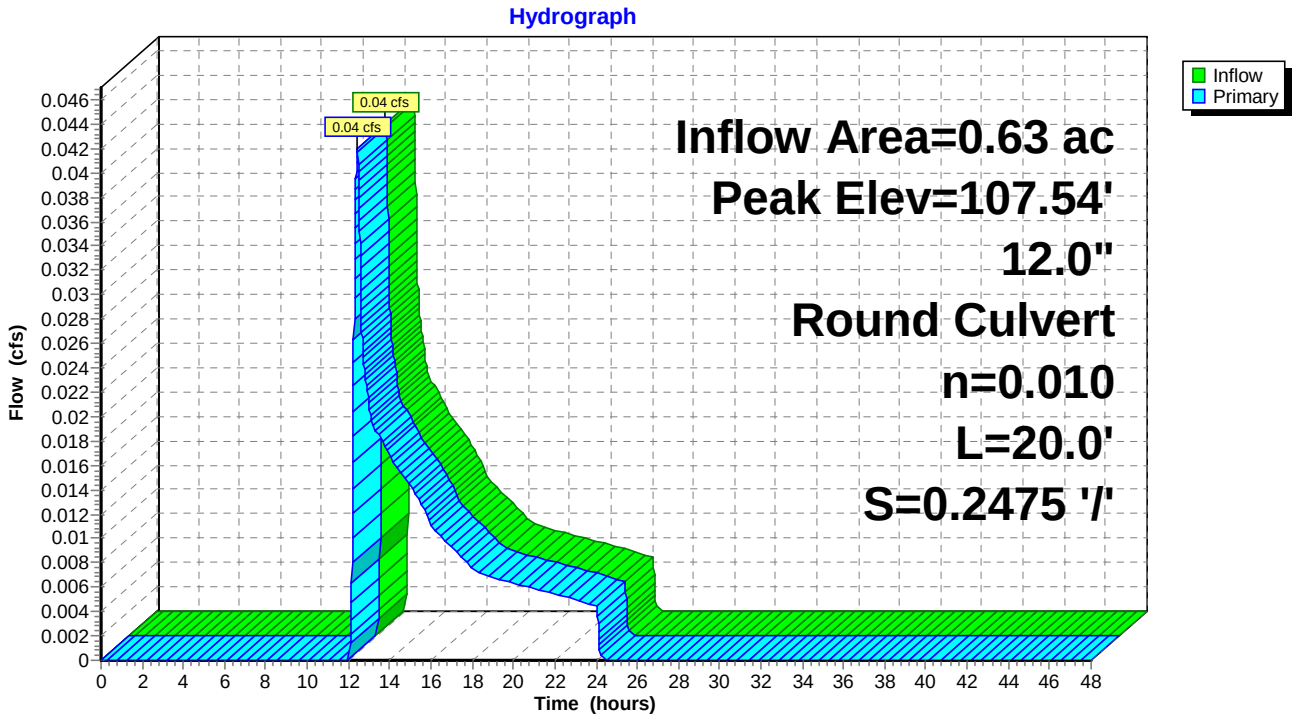
Inflow Area = 0.63 ac, 25.26% Impervious, Inflow Depth = 0.20" for 2-YR event
Inflow = 0.04 cfs @ 12.42 hrs, Volume= 0.010 af
Outflow = 0.04 cfs @ 12.42 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min
Primary = 0.04 cfs @ 12.42 hrs, Volume= 0.010 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 107.54' @ 12.42 hrs
Flood Elev= 111.26'

Device	Routing	Invert	Outlet Devices
#1	Primary	107.43'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 107.43' / 102.48' S= 0.2475 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.04 cfs @ 12.42 hrs HW=107.54' (Free Discharge)
1=Culvert (Inlet Controls 0.04 cfs @ 0.89 fps)

Pond 206P: City CB @ Fletcher & Danforth



Summary for Pond 210P: Existing FI

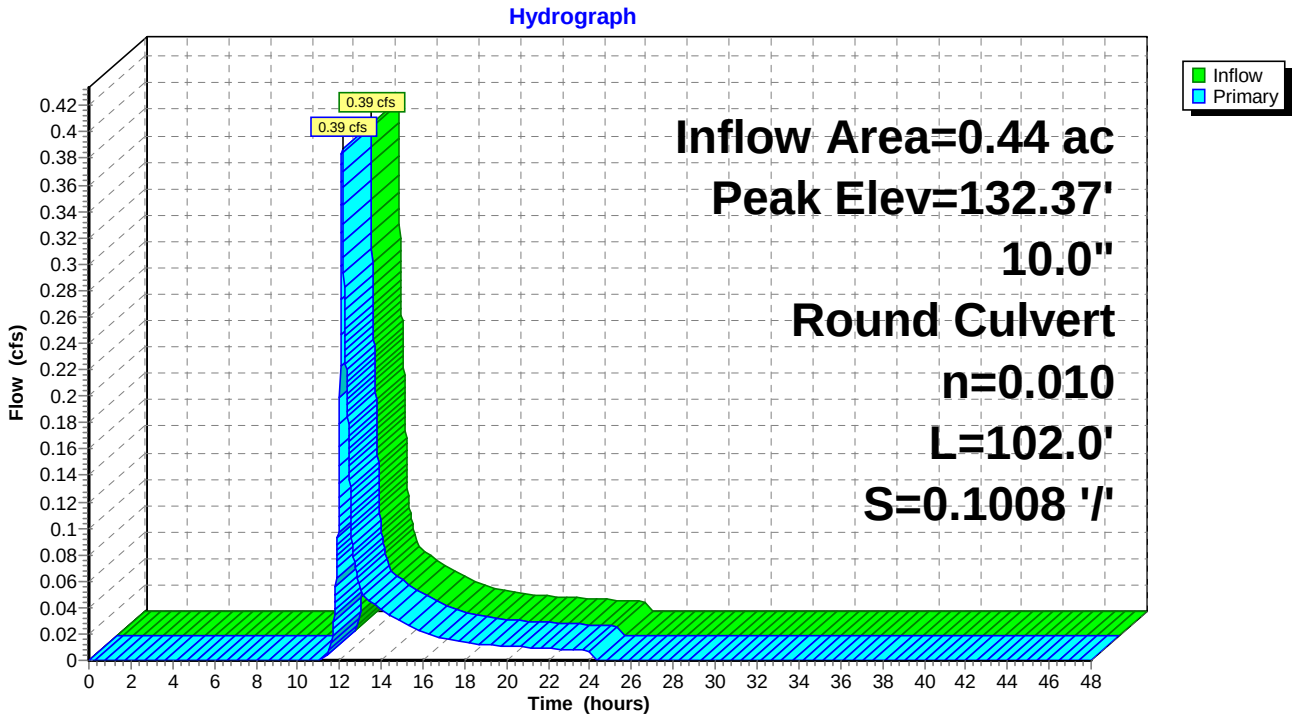
Inflow Area = 0.44 ac, 56.16% Impervious, Inflow Depth = 0.87" for 2-YR event
Inflow = 0.39 cfs @ 12.12 hrs, Volume= 0.032 af
Outflow = 0.39 cfs @ 12.12 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min
Primary = 0.39 cfs @ 12.12 hrs, Volume= 0.032 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 132.37' @ 12.12 hrs
Flood Elev= 140.41'

Device	Routing	Invert	Outlet Devices
#1	Primary	132.00'	**10.0" Round Culvert** L= 102.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 132.00' / 121.72' S= 0.1008 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.38 cfs @ 12.12 hrs HW=132.37' (Free Discharge)
1=Culvert (Inlet Controls 0.38 cfs @ 1.64 fps)

Pond 210P: Existing FI



Summary for Pond 220P: Existing DMH

[79] Warning: Submerged Pond 210P Primary device # 1 OUTLET by 0.32'

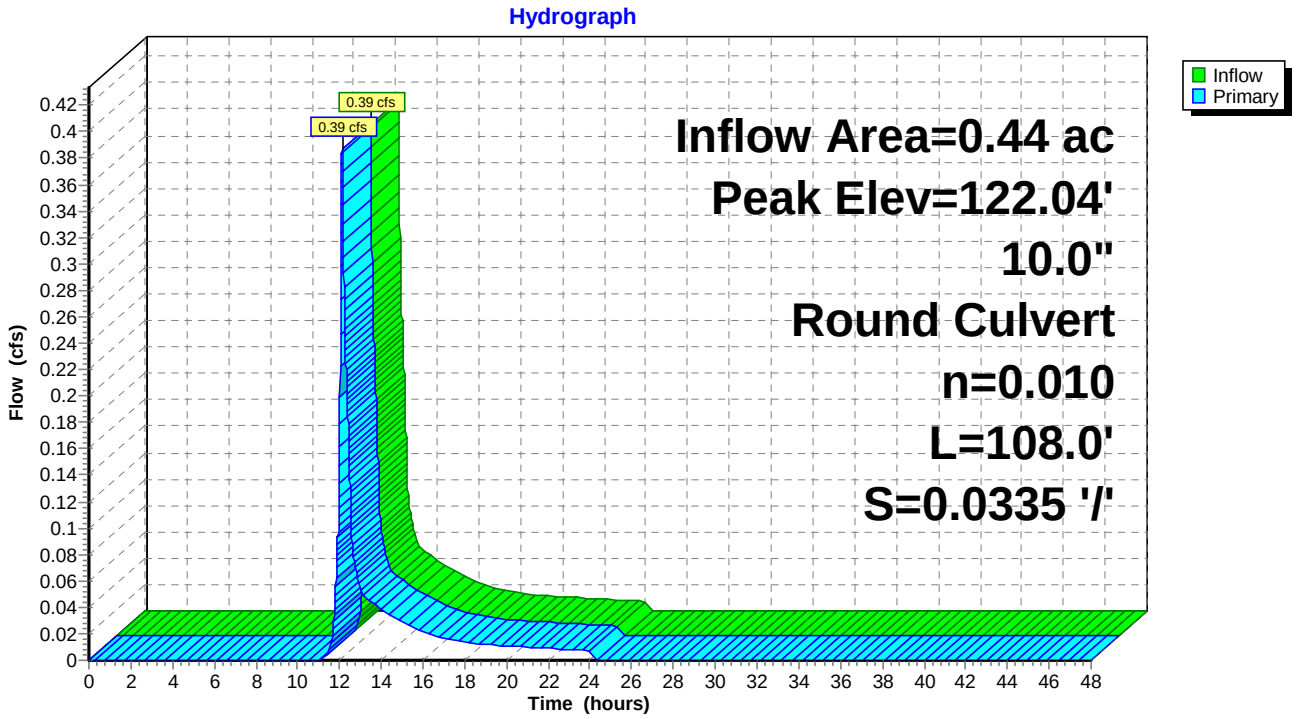
Inflow Area = 0.44 ac, 56.16% Impervious, Inflow Depth = 0.87" for 2-YR event
Inflow = 0.39 cfs @ 12.12 hrs, Volume= 0.032 af
Outflow = 0.39 cfs @ 12.12 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min
Primary = 0.39 cfs @ 12.12 hrs, Volume= 0.032 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 122.04' @ 12.12 hrs
Flood Elev= 128.47'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.67'	**10.0" Round Culvert** L= 108.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 121.67' / 118.05' S= 0.0335 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.39 cfs @ 12.12 hrs HW=122.04' (Free Discharge)
1=Culvert (Inlet Controls 0.39 cfs @ 1.64 fps)

Pond 220P: Existing DMH



Summary for Pond 230P: Existing DMH

[79] Warning: Submerged Pond 220P Primary device # 1 OUTLET by 1.21'
[79] Warning: Submerged Pond 260P Primary device # 1 INLET by 0.10'

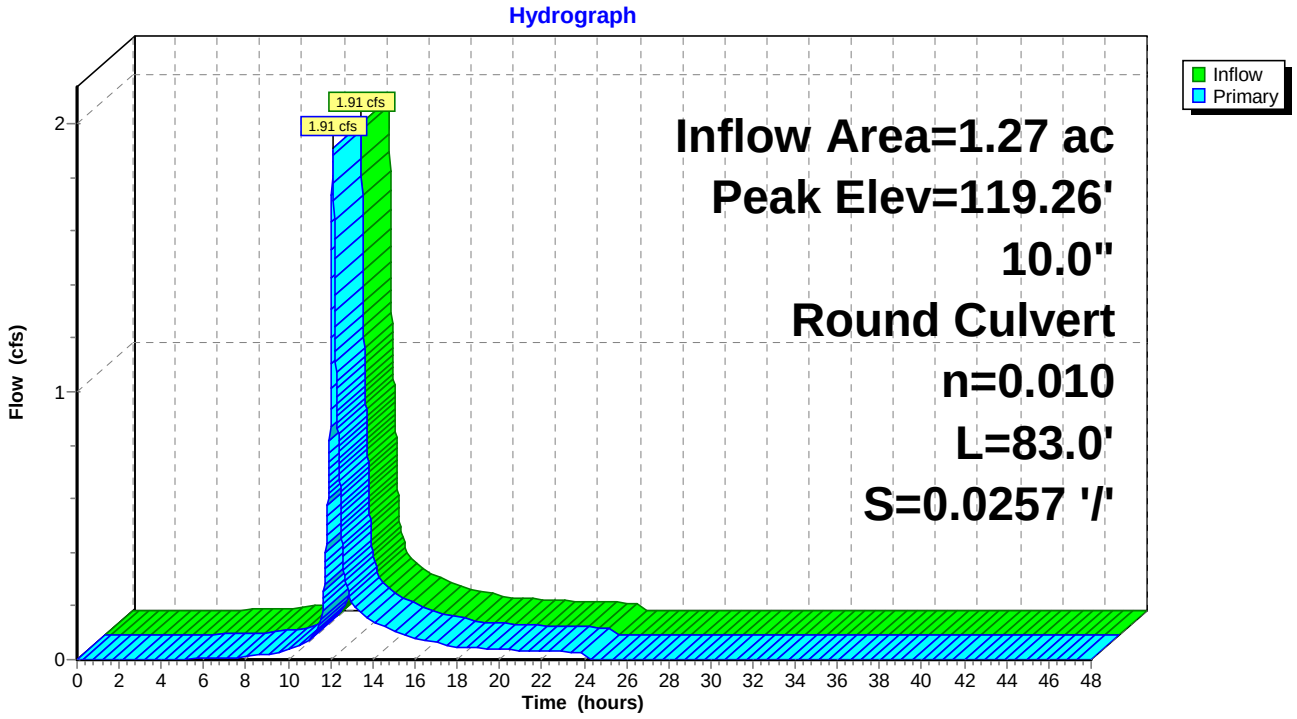
Inflow Area = 1.27 ac, 70.40% Impervious, Inflow Depth = 1.44" for 2-YR event
Inflow = 1.91 cfs @ 12.11 hrs, Volume= 0.152 af
Outflow = 1.91 cfs @ 12.11 hrs, Volume= 0.152 af, Atten= 0%, Lag= 0.0 min
Primary = 1.91 cfs @ 12.11 hrs, Volume= 0.152 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 119.26' @ 12.11 hrs
Flood Elev= 125.05'

Device	Routing	Invert	Outlet Devices
#1	Primary	118.00'	**10.0" Round Culvert** L= 83.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 118.00' / 115.87' S= 0.0257 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.91 cfs @ 12.11 hrs HW=119.26' (Free Discharge)
1=Culvert (Inlet Controls 1.91 cfs @ 3.49 fps)

Pond 230P: Existing DMH



Summary for Pond 260P: Storage Pipes

[62] Hint: Exceeded Reach 161R OUTLET depth by 1.49' @ 12.12 hrs

Inflow Area = 0.72 ac, 79.29% Impervious, Inflow Depth = 1.80" for 2-YR event
Inflow = 1.52 cfs @ 12.08 hrs, Volume= 0.108 af
Outflow = 1.37 cfs @ 12.11 hrs, Volume= 0.108 af, Atten= 10%, Lag= 2.3 min
Primary = 1.37 cfs @ 12.11 hrs, Volume= 0.108 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 119.87' @ 12.11 hrs Surf.Area= 564 sf Storage= 164 cf
Flood Elev= 125.26' Surf.Area= 0 sf Storage= 3,468 cf

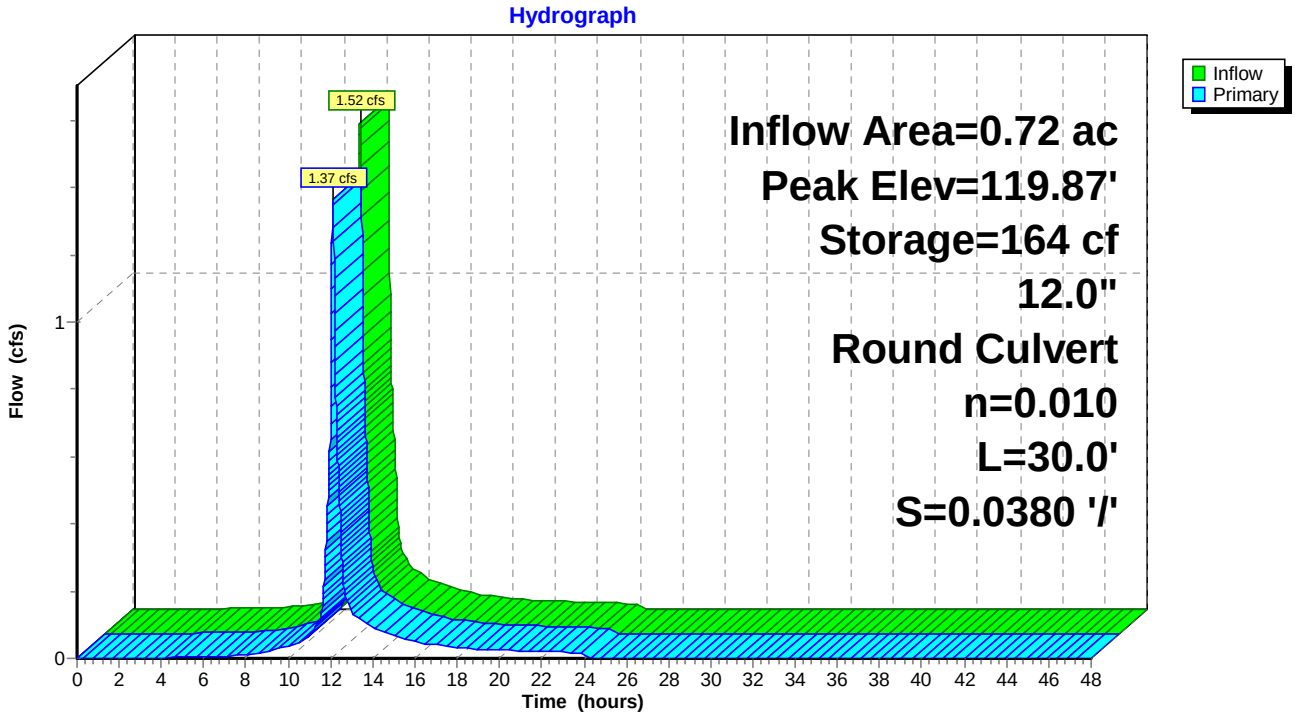
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.1 min (809.2 - 808.1)

Volume	Invert	Avail.Storage	Storage Description
#1	119.16'	3,468 cf	**48.0" Round Pipe Storage** L= 276.0' S= 0.0027 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.16'	**12.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.16' / 118.02' S= 0.0380 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.36 cfs @ 12.11 hrs HW=119.87' (Free Discharge)
1=Culvert (Inlet Controls 1.36 cfs @ 2.27 fps)

Pond 260P: Storage Pipes



Summary for Pond 340P: CB at SW Cor prkng lot

[57] Hint: Peaked at 129.34' (Flood elevation advised)

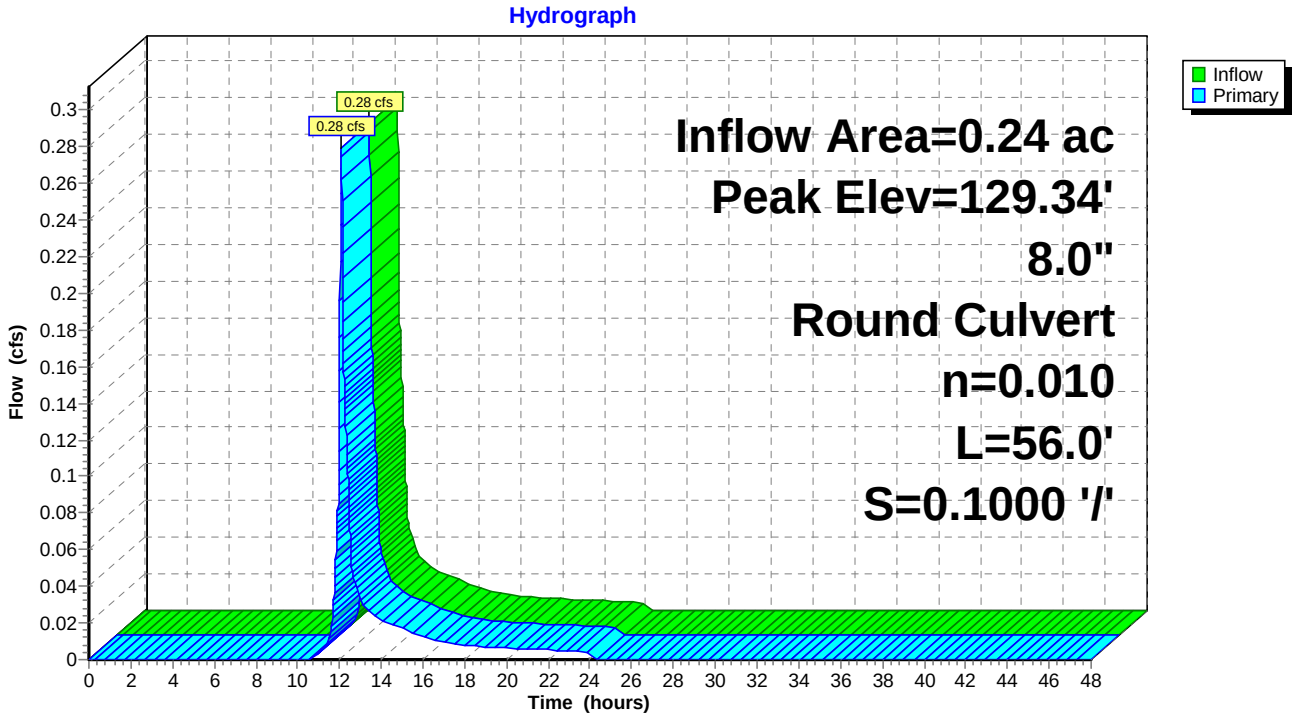
Inflow Area = 0.24 ac, 60.94% Impervious, Inflow Depth = 1.03" for 2-YR event
Inflow = 0.28 cfs @ 12.08 hrs, Volume= 0.020 af
Outflow = 0.28 cfs @ 12.08 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min
Primary = 0.28 cfs @ 12.08 hrs, Volume= 0.020 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 129.34' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	129.00'	**8.0" Round Culvert** L= 56.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 129.00' / 123.40' S= 0.1000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.28 cfs @ 12.08 hrs HW=129.34' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.28 cfs @ 1.57 fps)

Pond 340P: CB at SW Cor prkng lot



Summary for Pond CB4: Proposed DMH

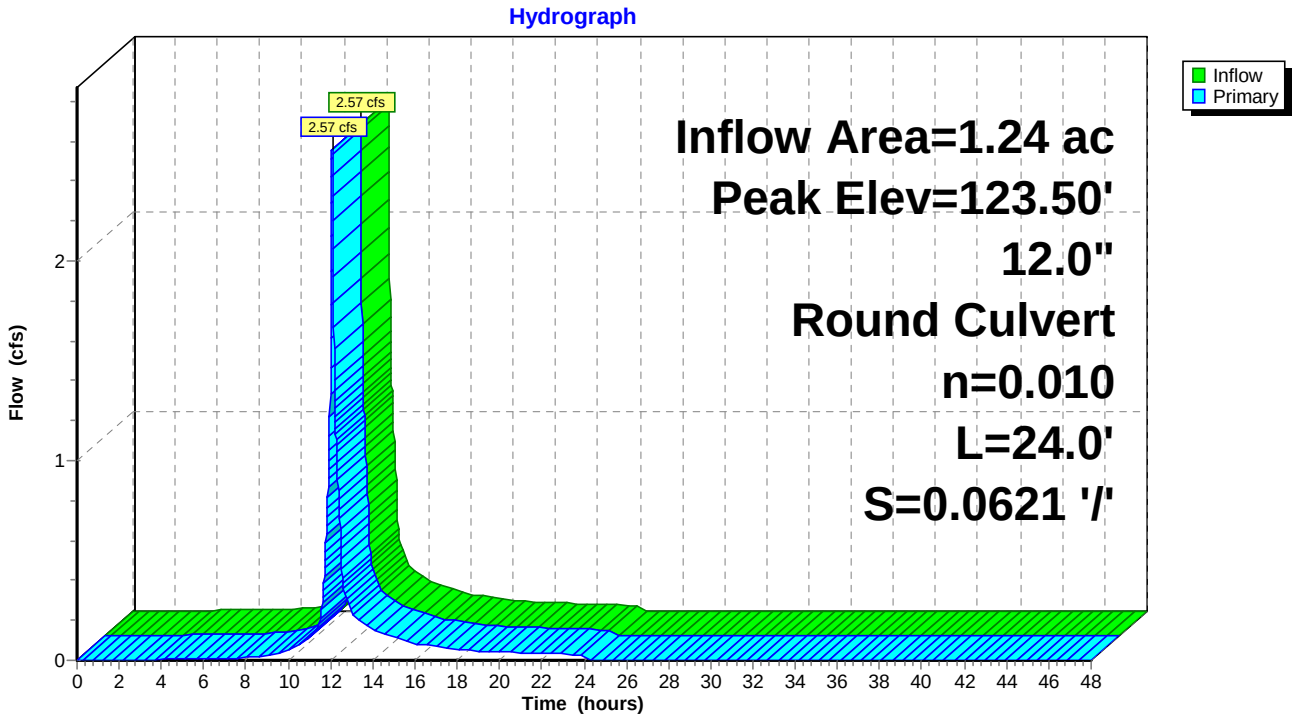
Inflow Area = 1.24 ac, 78.73% Impervious, Inflow Depth = 1.76" for 2-YR event
Inflow = 2.57 cfs @ 12.07 hrs, Volume= 0.182 af
Outflow = 2.57 cfs @ 12.07 hrs, Volume= 0.182 af, Atten= 0%, Lag= 0.0 min
Primary = 2.57 cfs @ 12.07 hrs, Volume= 0.182 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 123.50' @ 12.07 hrs
Flood Elev= 127.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.26'	**12.0" Round Culvert** L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 122.26' / 120.77' S= 0.0621 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.56 cfs @ 12.07 hrs HW=123.50' (Free Discharge)
1=Culvert (Inlet Controls 2.56 cfs @ 3.26 fps)

Pond CB4: Proposed DMH



Summary for Pond DMH: OCS Bypass

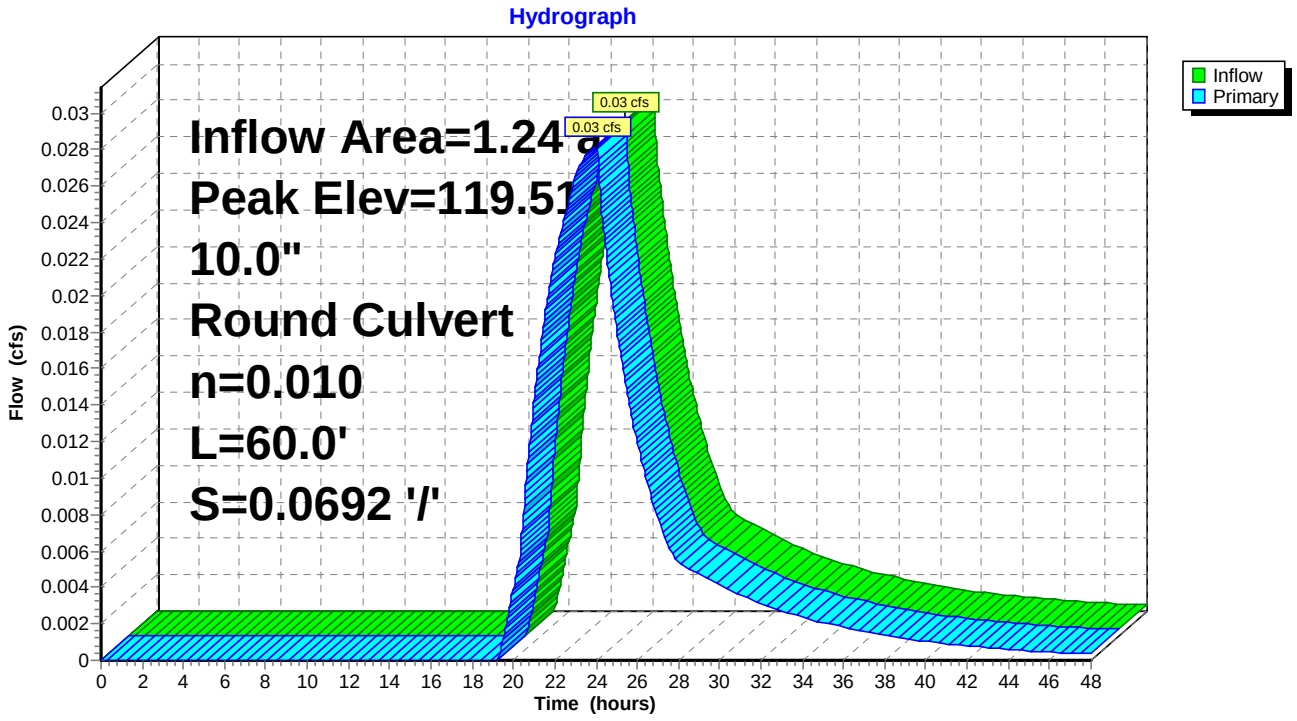
Inflow Area = 1.24 ac, 78.73% Impervious, Inflow Depth > 0.14" for 2-YR event
Inflow = 0.03 cfs @ 24.01 hrs, Volume= 0.014 af
Outflow = 0.03 cfs @ 24.01 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min
Primary = 0.03 cfs @ 24.01 hrs, Volume= 0.014 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 119.51' @ 24.01 hrs
Flood Elev= 126.48'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.42'	**10.0" Round Culvert** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.42' / 115.27' S= 0.0692 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.03 cfs @ 24.01 hrs HW=119.51' (Free Discharge)
1=Culvert (Inlet Controls 0.03 cfs @ 0.80 fps)

Pond DMH: OCS Bypass



Summary for Pond DMH6: Access MH

Inflow Area = 1.24 ac, 78.73% Impervious, Inflow Depth = 1.76" for 2-YR event
Inflow = 2.57 cfs @ 12.07 hrs, Volume= 0.182 af
Outflow = 2.57 cfs @ 12.07 hrs, Volume= 0.182 af, Atten= 0%, Lag= 0.0 min
Primary = 2.57 cfs @ 12.07 hrs, Volume= 0.182 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

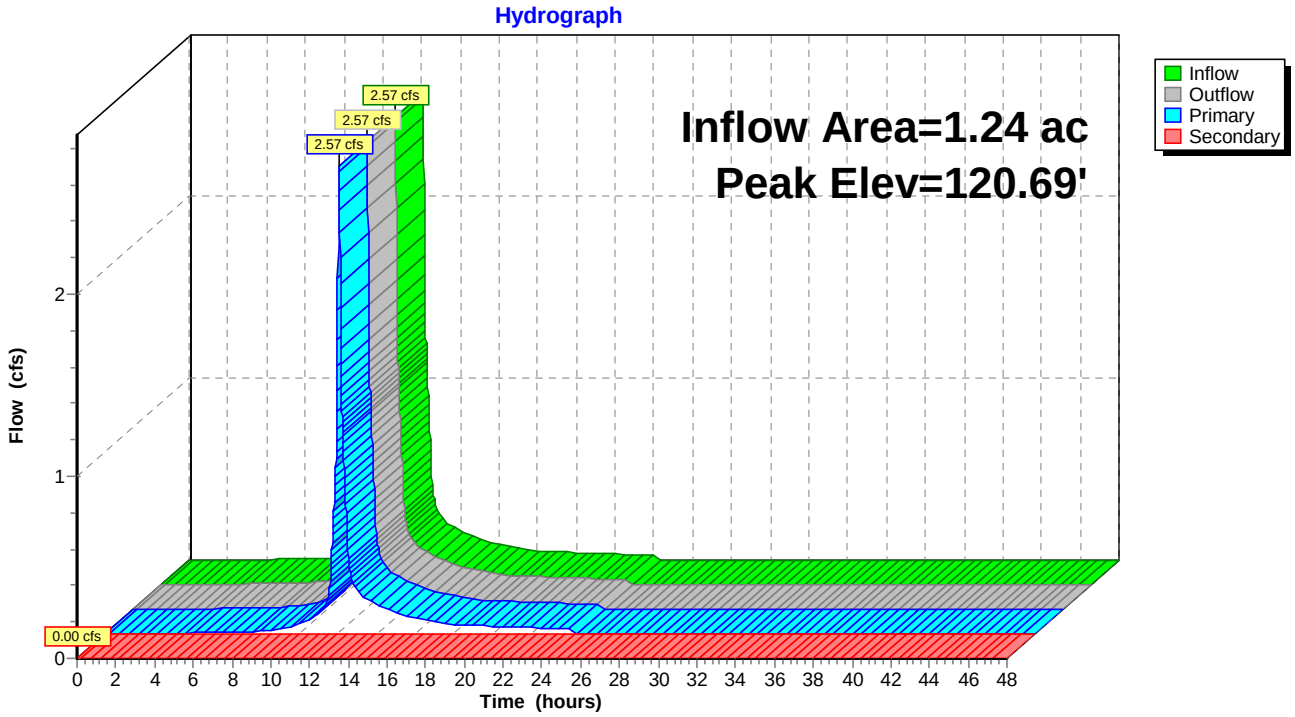
Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 120.69' @ 12.07 hrs
Flood Elev= 126.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.77'	**24.0" Round Culvert** L= 9.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.77' / 119.77' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Secondary	119.77'	**24.0" Round Culvert** L= 2.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.77' / 119.77' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#3	Device 2	123.35'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=2.56 cfs @ 12.07 hrs HW=120.69' (Free Discharge)
└**1=Culvert** (Barrel Controls 2.56 cfs @ 2.68 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=119.77' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond DMH6: Access MH



Summary for Pond DMH7: Proposed DMH

[79] Warning: Submerged Pond 1P Secondary device # 5 INLET by 0.41'
[79] Warning: Submerged Pond 230P Primary device # 1 OUTLET by 0.56'
[79] Warning: Submerged Pond DMH Primary device # 1 OUTLET by 1.16'

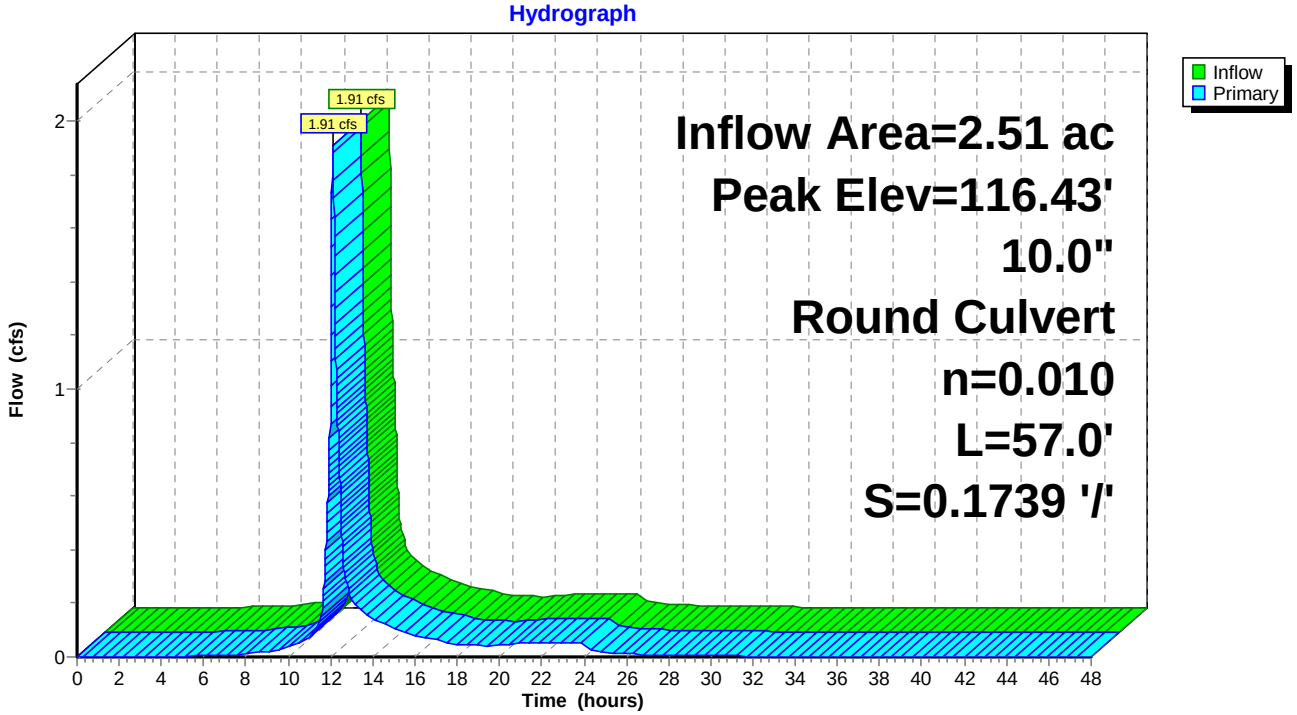
Inflow Area = 2.51 ac, 74.51% Impervious, Inflow Depth > 0.80" for 2-YR event
Inflow = 1.91 cfs @ 12.11 hrs, Volume= 0.166 af
Outflow = 1.91 cfs @ 12.11 hrs, Volume= 0.166 af, Atten= 0%, Lag= 0.0 min
Primary = 1.91 cfs @ 12.11 hrs, Volume= 0.166 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 116.43' @ 12.11 hrs
Flood Elev= 124.69'

Device	Routing	Invert	Outlet Devices
#1	Primary	115.17'	**10.0" Round Culvert** L= 57.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 115.17' / 105.26' S= 0.1739 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.91 cfs @ 12.11 hrs HW=116.43' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.91 cfs @ 3.49 fps)

Pond DMH7: Proposed DMH

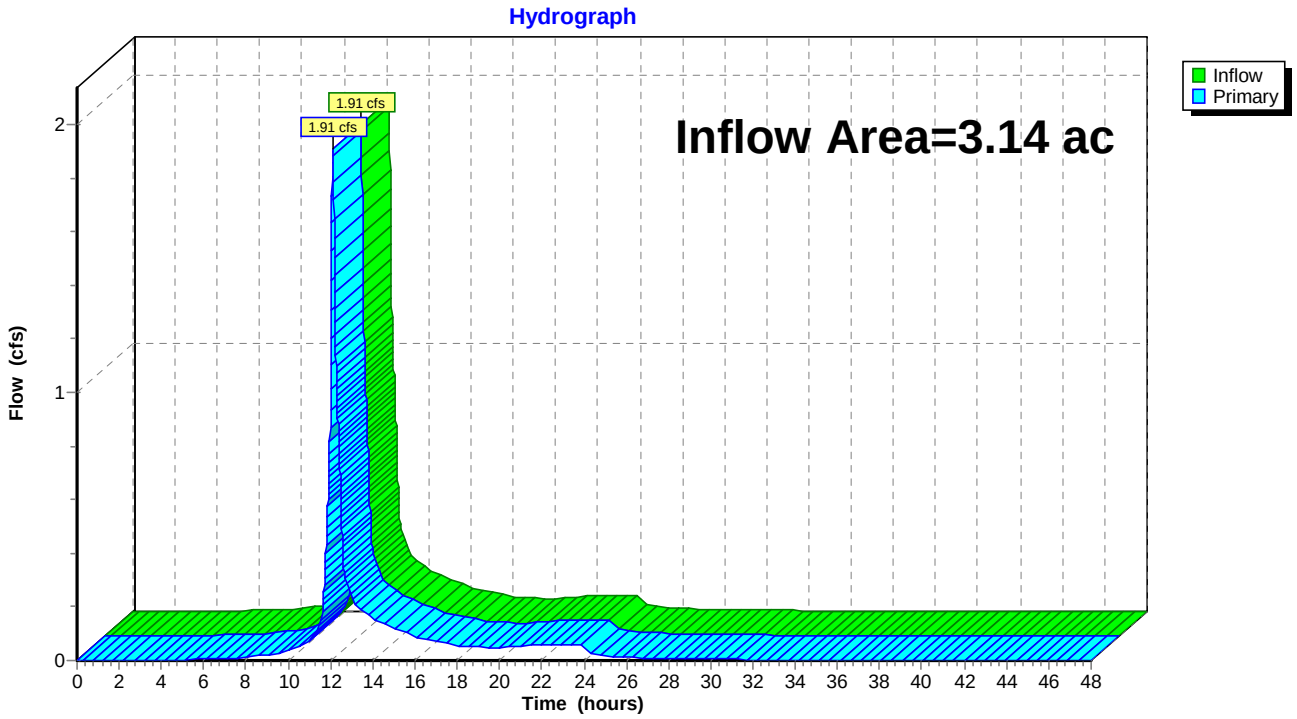


Summary for Link SP1: Existing Combined Sewer in Danforth/Doghouse MH DMH 8

Inflow Area = 3.14 ac, 64.59% Impervious, Inflow Depth > 0.68" for 2-YR event
Inflow = 1.91 cfs @ 12.11 hrs, Volume= 0.177 af
Primary = 1.91 cfs @ 12.11 hrs, Volume= 0.177 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link SP1: Existing Combined Sewer in Danforth/Doghouse MH DMH 8



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 10S: Area draining to Runoff Area=19,254 sf 56.16% Impervious Runoff Depth=1.89"
Flow Length=91' Slope=0.0300 '/' Tc=7.7 min CN=72 Runoff=0.91 cfs 0.070 af

Subcatchment 60S: Lawn/Field S of school Runoff Area=16,715 sf 84.98% Impervious Runoff Depth=3.39"
Tc=5.0 min CN=89 Runoff=1.54 cfs 0.108 af

Subcatchment 61S: Auditorium Roof Runoff Area=4,485 sf 100.00% Impervious Runoff Depth=4.36"
Tc=5.0 min CN=98 Runoff=0.48 cfs 0.037 af

Subcatchment 70S: Thomas & Davies & Runoff Area=44,441 sf 74.20% Impervious Runoff Depth=2.81"
Flow Length=91' Slope=0.1593 '/' Tc=5.0 min CN=83 Runoff=3.48 cfs 0.239 af

Subcatchment 80S: FoundersHall Runoff Area=9,466 sf 100.00% Impervious Runoff Depth=4.36"
Tc=5.0 min CN=98 Runoff=1.01 cfs 0.079 af

Subcatchment 90S: Playground Runoff Area=27,554 sf 25.26% Impervious Runoff Depth=0.73"
Flow Length=117' Tc=9.2 min CN=54 Runoff=0.34 cfs 0.039 af

Subcatchment 91S: Playground Runoff Area=4,688 sf 69.20% Impervious Runoff Depth=2.55"
Tc=5.0 min CN=80 Runoff=0.33 cfs 0.023 af

Subcatchment 402S: New Prkng lot Runoff Area=10,240 sf 60.94% Impervious Runoff Depth=2.13"
Tc=5.0 min CN=75 Runoff=0.60 cfs 0.042 af

Reach 161R: roof drain Avg. Flow Depth=0.18' Max Vel=7.42 fps Inflow=0.48 cfs 0.037 af
6.0" Round Pipe n=0.013 L=129.0' S=0.0911 '/' Capacity=1.69 cfs Outflow=0.48 cfs 0.037 af

Pond 1P: USSF Peak Elev=121.45' Storage=8,567 cf Inflow=4.49 cfs 0.318 af
Primary=0.37 cfs 0.151 af Secondary=0.00 cfs 0.000 af Outflow=0.37 cfs 0.151 af

Pond 206P: City CB @ Fletcher & Danforth Peak Elev=107.75' Inflow=0.34 cfs 0.039 af
12.0" Round Culvert n=0.010 L=20.0' S=0.2475 '/' Outflow=0.34 cfs 0.039 af

Pond 210P: Existing FI Peak Elev=132.62' Inflow=0.91 cfs 0.070 af
10.0" Round Culvert n=0.010 L=102.0' S=0.1008 '/' Outflow=0.91 cfs 0.070 af

Pond 220P: Existing DMH Peak Elev=122.28' Inflow=0.91 cfs 0.070 af
10.0" Round Culvert n=0.010 L=108.0' S=0.0335 '/' Outflow=0.91 cfs 0.070 af

Pond 230P: Existing DMH Peak Elev=121.04' Inflow=3.36 cfs 0.280 af
10.0" Round Culvert n=0.010 L=83.0' S=0.0257 '/' Outflow=3.36 cfs 0.280 af

Pond 260P: Storage Pipes Peak Elev=120.18' Storage=377 cf Inflow=2.62 cfs 0.188 af
12.0" Round Culvert n=0.010 L=30.0' S=0.0380 '/' Outflow=2.16 cfs 0.188 af

Pond 340P: CB at SW Cor prkng lot Peak Elev=129.54' Inflow=0.60 cfs 0.042 af
8.0" Round Culvert n=0.010 L=56.0' S=0.1000 '/' Outflow=0.60 cfs 0.042 af

Pond CB4: Proposed DMH Peak Elev=125.03' Inflow=4.49 cfs 0.318 af
12.0" Round Culvert n=0.010 L=24.0' S=0.0621 '/' Outflow=4.49 cfs 0.318 af

Pond DMH: OCS Bypass Peak Elev=119.78' Inflow=0.37 cfs 0.151 af
10.0" Round Culvert n=0.010 L=60.0' S=0.0692 '/' Outflow=0.37 cfs 0.151 af

Pond DMH6: Access MH Peak Elev=121.01' Inflow=4.49 cfs 0.318 af
Primary=4.49 cfs 0.318 af Secondary=0.00 cfs 0.000 af Outflow=4.49 cfs 0.318 af

Pond DMH7: Proposed DMH Peak Elev=118.21' Inflow=3.36 cfs 0.431 af
10.0" Round Culvert n=0.010 L=57.0' S=0.1739 '/' Outflow=3.36 cfs 0.431 af

Link SP1: Existing Combined Sewer in Danforth/Doghouse MH DMH 8 Inflow=3.66 cfs 0.470 af
Primary=3.66 cfs 0.470 af

Summary for Subcatchment 10S: Area draining to Sanctuary

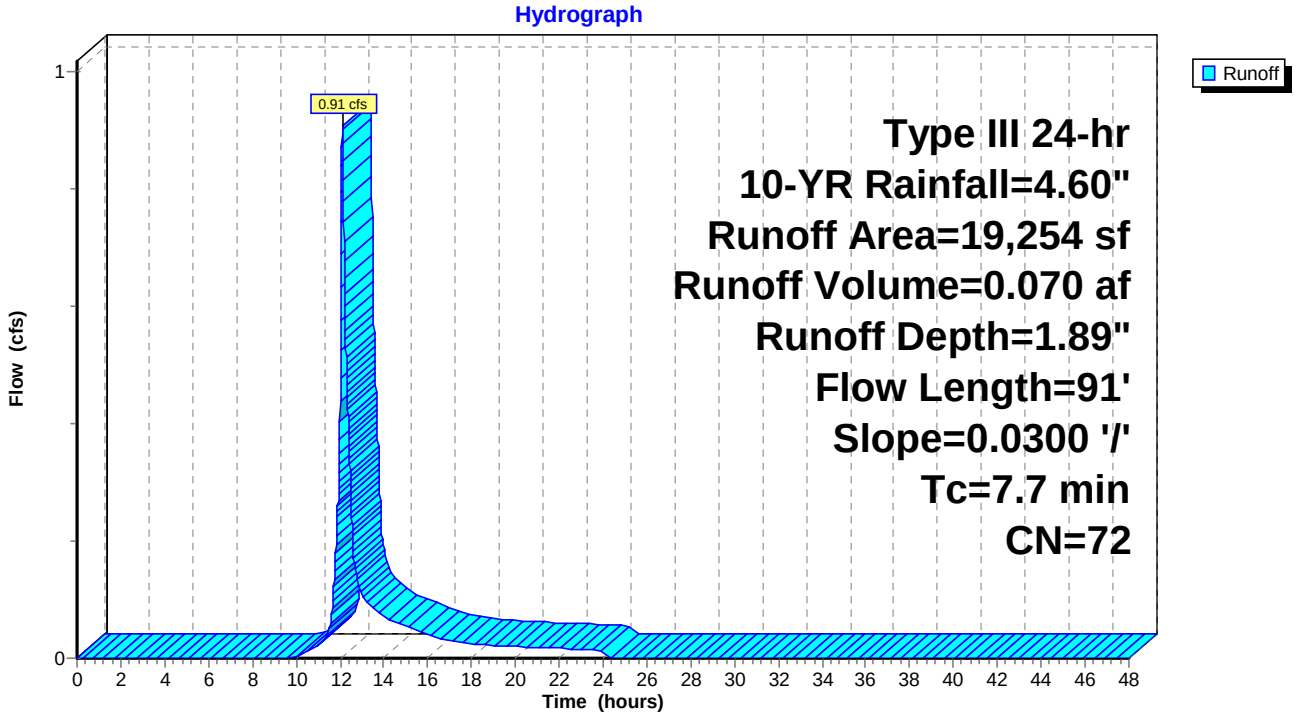
Runoff = 0.91 cfs @ 12.11 hrs, Volume= 0.070 af, Depth= 1.89"

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 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	10,813	98	impervious
*	8,441	39	Lawn/field, HSG A
	19,254	72	Weighted Average
	8,441		43.84% Pervious Area
	10,813		56.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	91	0.0300	0.20		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"

Subcatchment 10S: Area draining to Sanctuary



Summary for Subcatchment 60S: Lawn/Field S of school

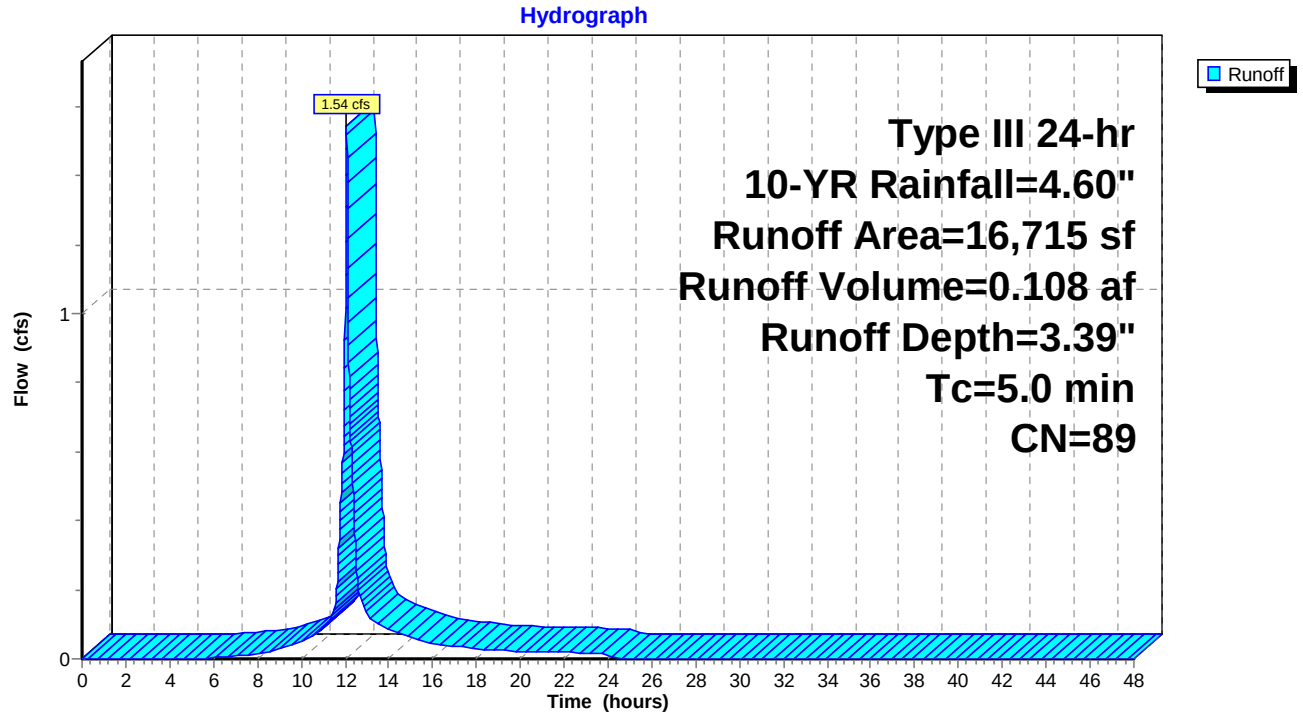
Runoff = 1.54 cfs @ 12.07 hrs, Volume= 0.108 af, Depth= 3.39"

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 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	14,205	98	impervious
*	2,510	39	Lawn/field, HSG A
	16,715	89	Weighted Average
	2,510		15.02% Pervious Area
	14,205		84.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 60S: Lawn/Field S of school



Summary for Subcatchment 61S: Auditorium Roof

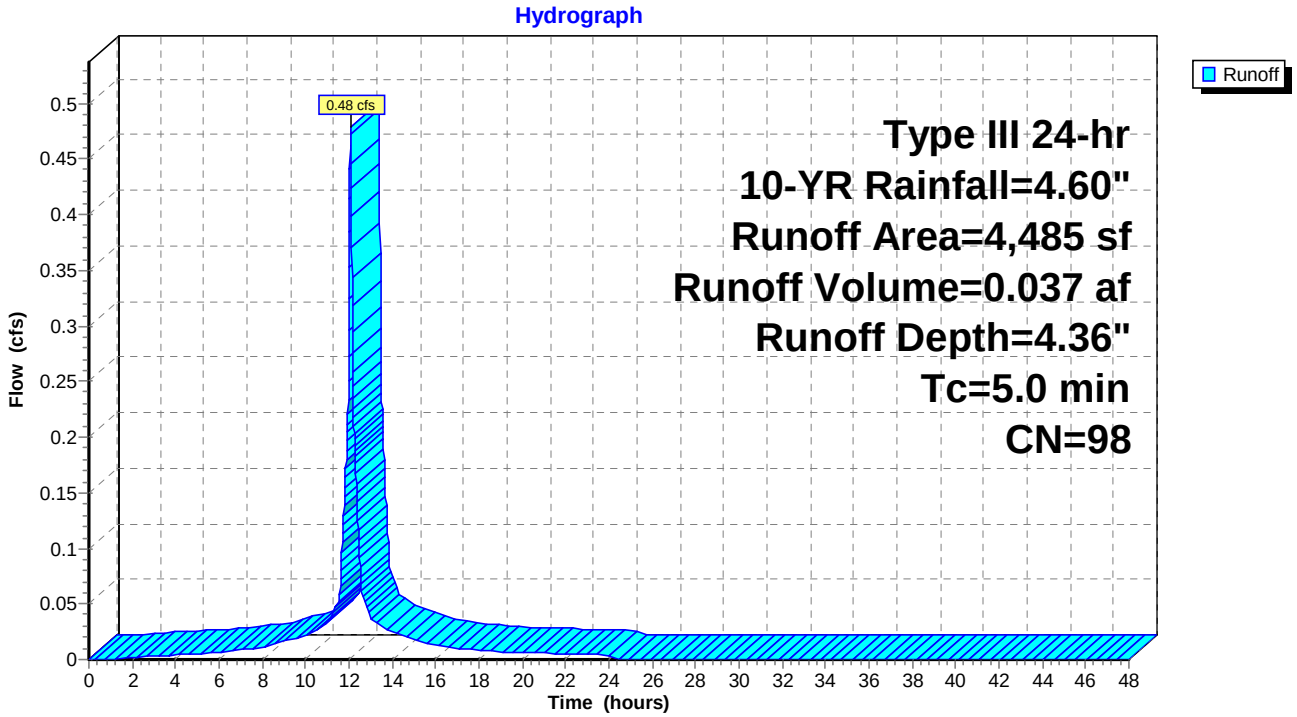
Runoff = 0.48 cfs @ 12.07 hrs, Volume= 0.037 af, Depth= 4.36"

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 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	4,485	98	Roof runoff
	4,485		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 61S: Auditorium Roof



Summary for Subcatchment 70S: Thomas & Davies & Gym

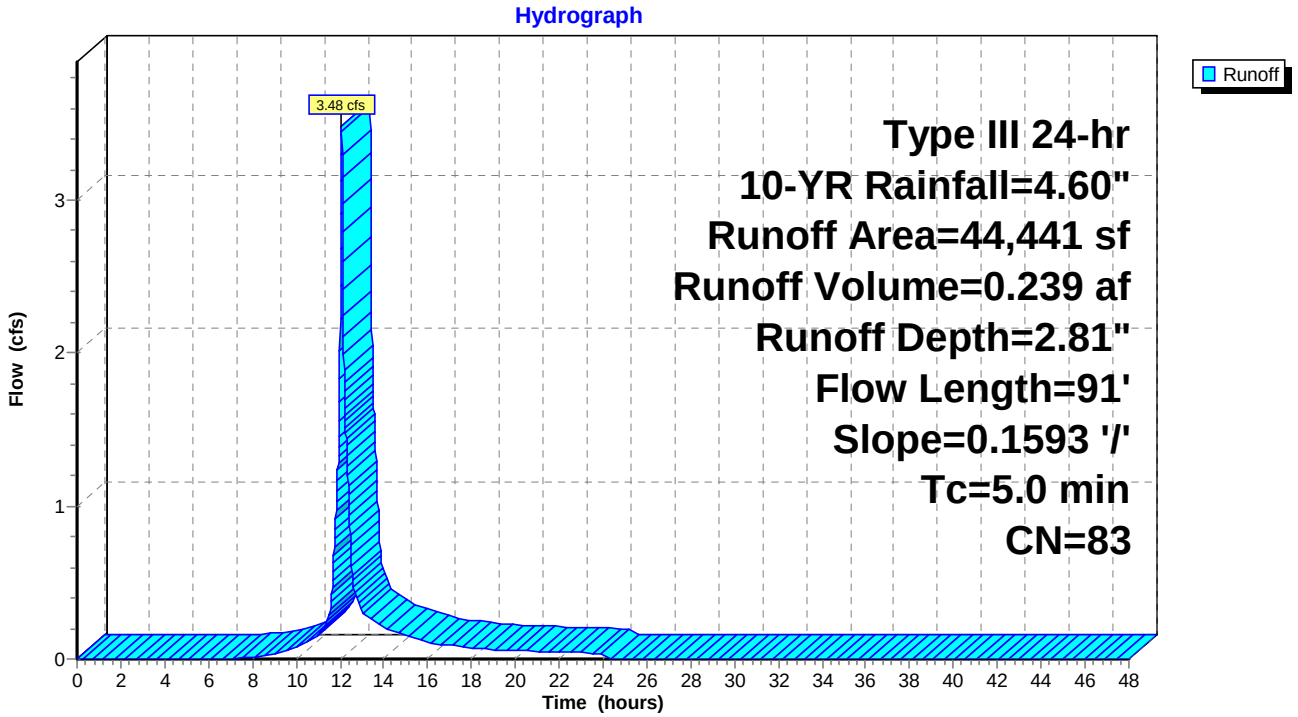
Runoff = 3.48 cfs @ 12.07 hrs, Volume= 0.239 af, Depth= 2.81"

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 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	32,976	98	impervious
*	11,465	39	Lawn/field, HSG A
	44,441	83	Weighted Average
	11,465		25.80% Pervious Area
	32,976		74.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	91	0.1593	0.38		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"
4.0	91	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 70S: Thomas & Davies & Gym



Summary for Subcatchment 80S: FoundersHall

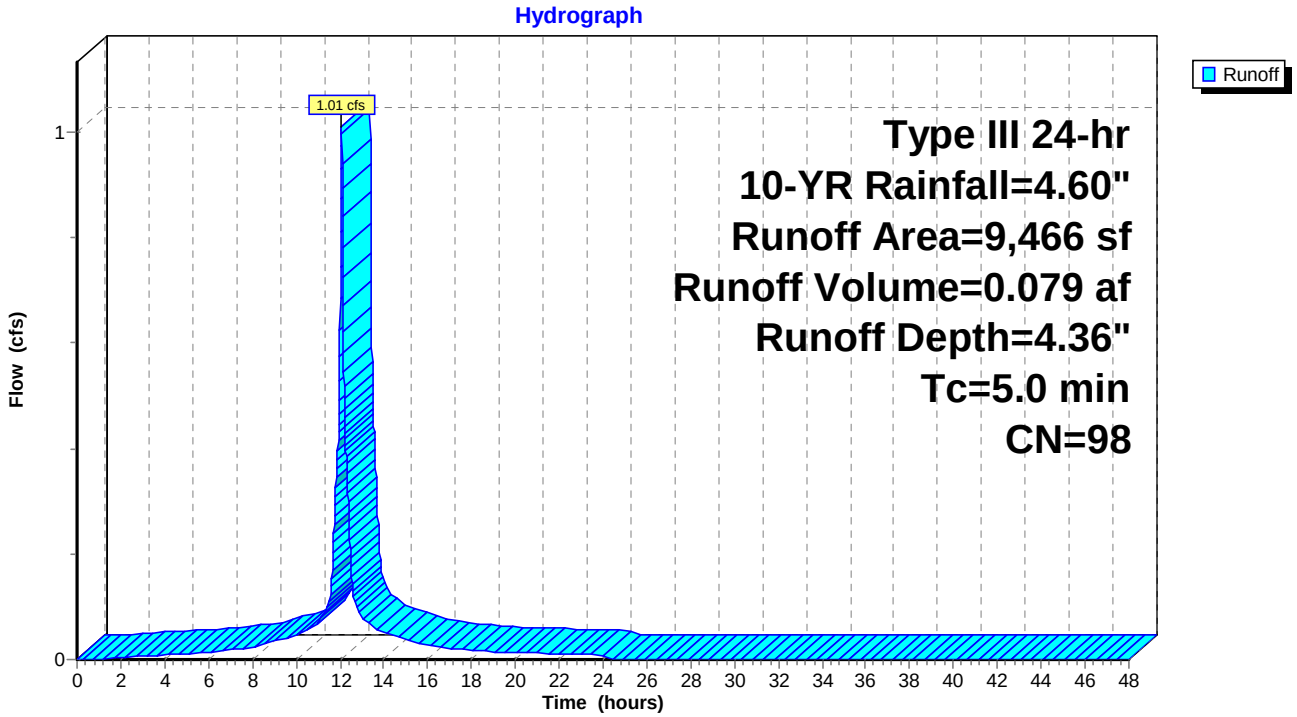
Runoff = 1.01 cfs @ 12.07 hrs, Volume= 0.079 af, Depth= 4.36"

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 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	9,466	98	Roof runoff
	9,466		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 80S: FoundersHall



Summary for Subcatchment 90S: Playground

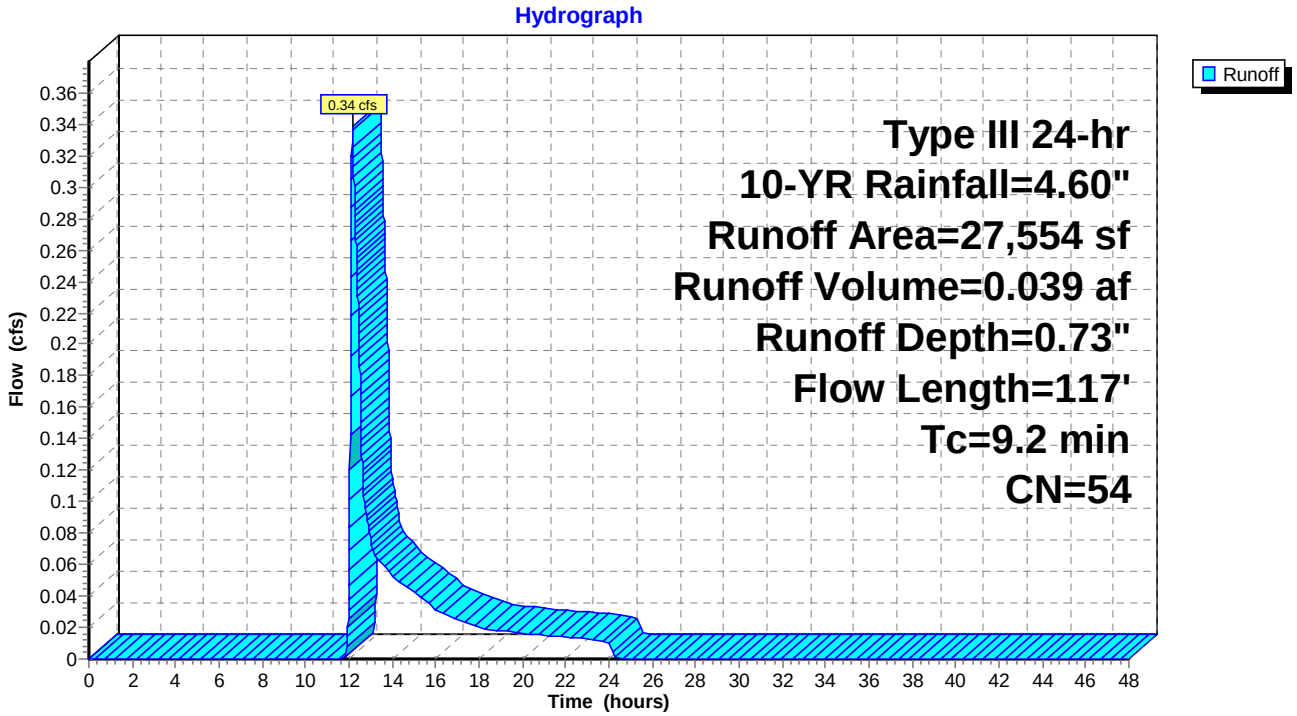
Runoff = 0.34 cfs @ 12.16 hrs, Volume= 0.039 af, Depth= 0.73"

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 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	6,960	98	impervious
*	20,594	39	Lawn/field, HSG A
	27,554	54	Weighted Average
	20,594		74.74% Pervious Area
	6,960		25.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0250	0.19		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"
0.2	17	0.0588	1.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.2	117	Total			

Subcatchment 90S: Playground



Summary for Subcatchment 91S: Playground

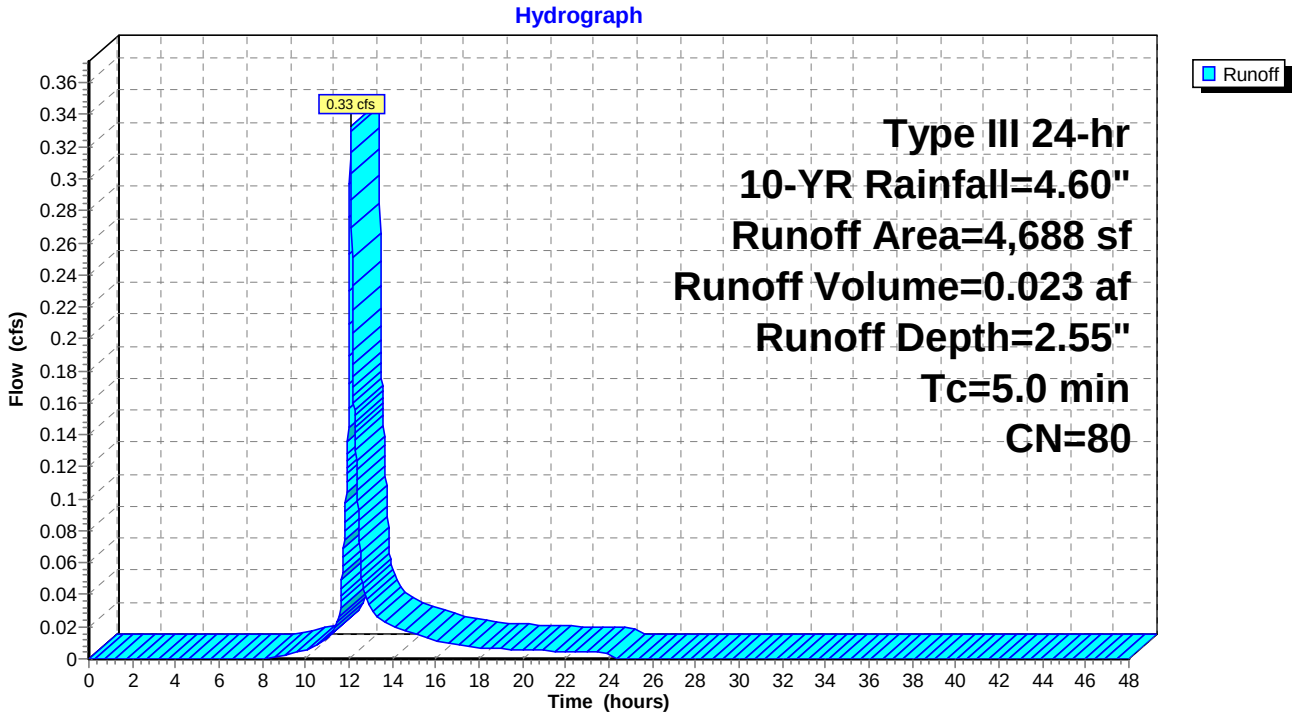
Runoff = 0.33 cfs @ 12.07 hrs, Volume= 0.023 af, Depth= 2.55"

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 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	3,244	98	impervious
*	1,444	39	Lawn/field, HSG A
	4,688	80	Weighted Average
	1,444		30.80% Pervious Area
	3,244		69.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 91S: Playground



Summary for Subcatchment 402S: New Prkng lot

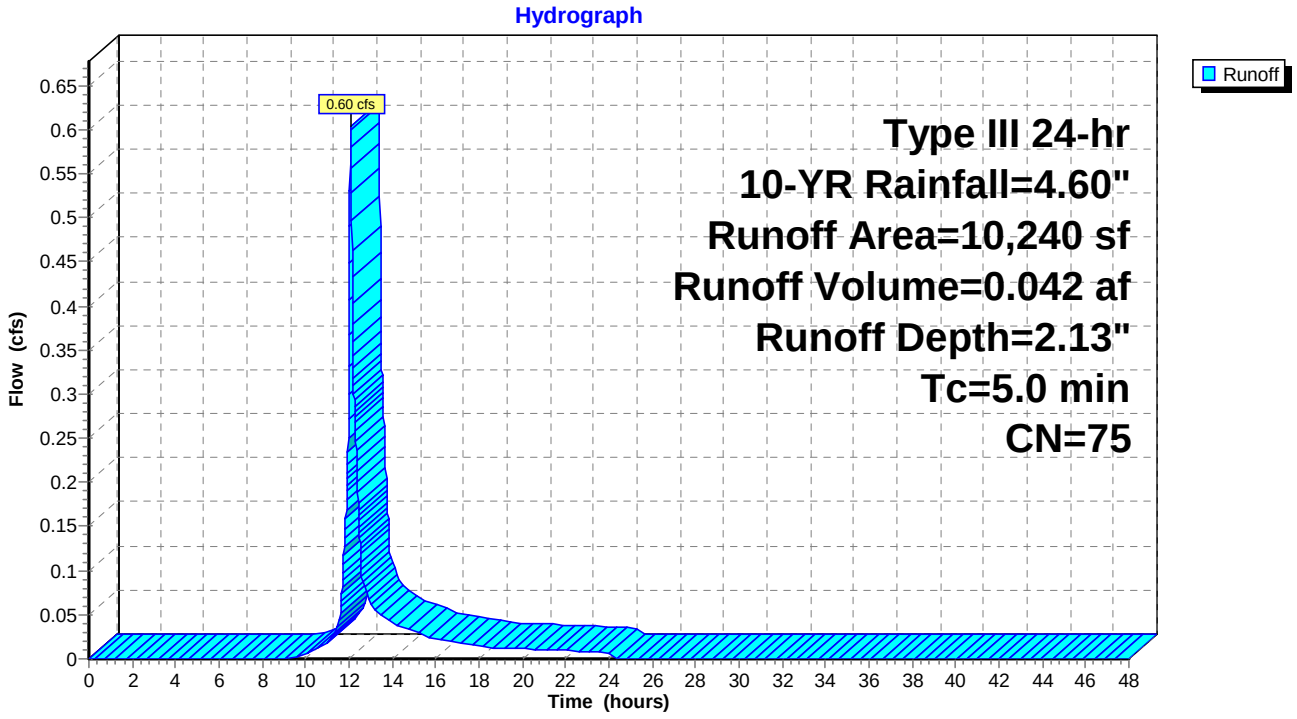
Runoff = 0.60 cfs @ 12.08 hrs, Volume= 0.042 af, Depth= 2.13"

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 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	4,000	39	Pervious
*	6,240	98	Impervious
	10,240	75	Weighted Average
	4,000		39.06% Pervious Area
	6,240		60.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 402S: New Prkng lot



Summary for Reach 161R: roof drain

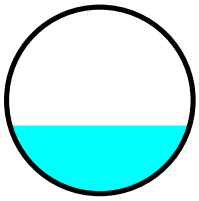
[52] Hint: Inlet/Outlet conditions not evaluated

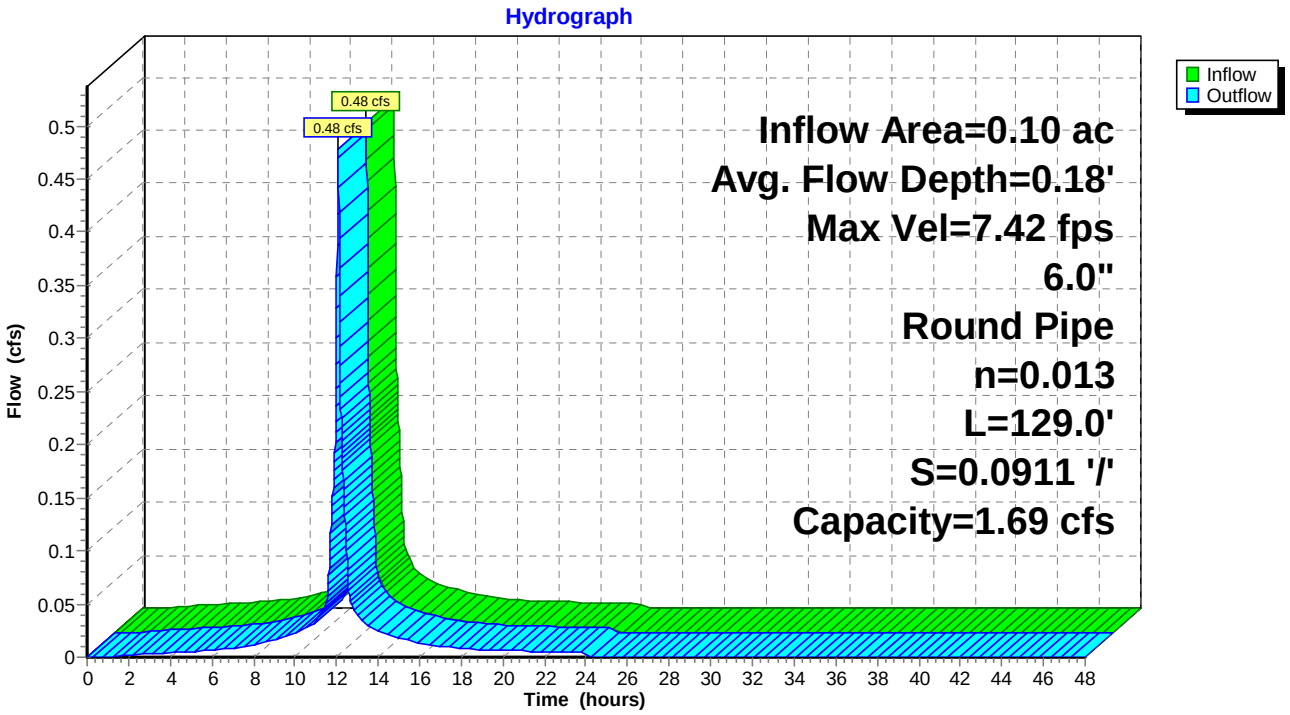
Inflow Area = 0.10 ac,100.00% Impervious, Inflow Depth = 4.36" for 10-YR event
Inflow = 0.48 cfs @ 12.07 hrs, Volume= 0.037 af
Outflow = 0.48 cfs @ 12.08 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.42 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.44 fps, Avg. Travel Time= 0.9 min

Peak Storage= 8 cf @ 12.07 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 1.69 cfs

6.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 129.0' Slope= 0.0911 '/'
Inlet Invert= 130.00', Outlet Invert= 118.25'





Summary for Pond 1P: USSF

[81] Warning: Exceeded Pond DMH6 by 1.44' @ 24.23 hrs

Inflow Area = 1.24 ac, 78.73% Impervious, Inflow Depth = 3.09" for 10-YR event
Inflow = 4.49 cfs @ 12.07 hrs, Volume= 0.318 af
Outflow = 0.37 cfs @ 13.08 hrs, Volume= 0.151 af, Atten= 92%, Lag= 60.5 min
Primary = 0.37 cfs @ 13.08 hrs, Volume= 0.151 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 121.45' @ 13.08 hrs Surf.Area= 4,717 sf Storage= 8,567 cf
Flood Elev= 126.48' Surf.Area= 4,717 sf Storage= 16,044 cf

Plug-Flow detention time= 343.2 min calculated for 0.151 af (47% of inflow)
Center-of-Mass det. time= 222.8 min (1,022.0 - 799.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	118.85'	6,599 cf	**51.42'W x 91.74'L x 5.50'H Field A** 25,943 cf Overall - 9,445 cf Embedded = 16,499 cf x 40.0% Voids
#2A	119.60'	9,445 cf	**ADS_StormTech MC-3500 d +Cap** x 84 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 7 Rows of 12 Chambers Cap Storage= +14.9 cf x 2 x 7 rows = 208.6 cf
		16,044 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	119.67'	**8.0" Round Culvert** L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.67' / 119.52' S= 0.0214 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#2	Device 1	123.35'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	121.10'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 5	118.85'	**2.410 in/hr Exfiltration over Surface area above 118.85'** Conductivity to Groundwater Elevation = 113.00' Excluded Surface area = 4,717 sf
#5	Secondary	116.02'	**6.0" Round Culvert** L= 31.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 116.02' / 115.88' S= 0.0045 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.37 cfs @ 13.08 hrs HW=121.45' (Free Discharge)
└─**1=Culvert** (Passes 0.37 cfs of 1.59 cfs potential flow)
  ├─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Orifice Controls 0.37 cfs @ 2.00 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=118.85' (Free Discharge)
└─**5=Culvert** (Passes 0.00 cfs of 1.20 cfs potential flow)
  └─**4=Exfiltration** (Controls 0.00 cfs)

Pond 1P: USSF - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap storage)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 7 rows = 208.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

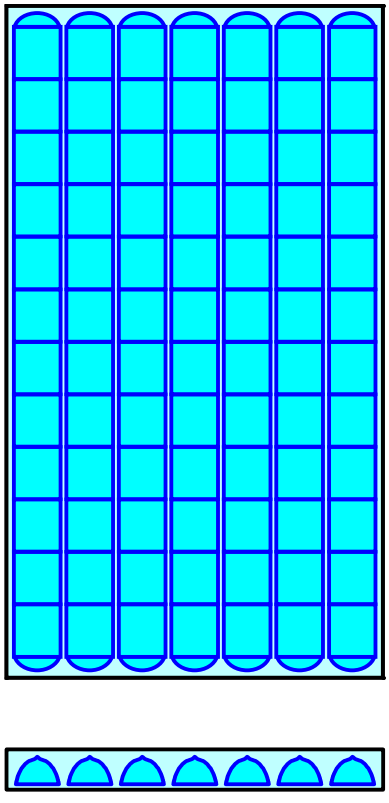
12 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 89.74' Row Length +12.0" End Stone x 2 = 91.74' Base Length
7 Rows x 77.0" Wide + 9.0" Spacing x 6 + 12.0" Side Stone x 2 = 51.42' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

84 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 7 Rows = 9,444.6 cf Chamber Storage

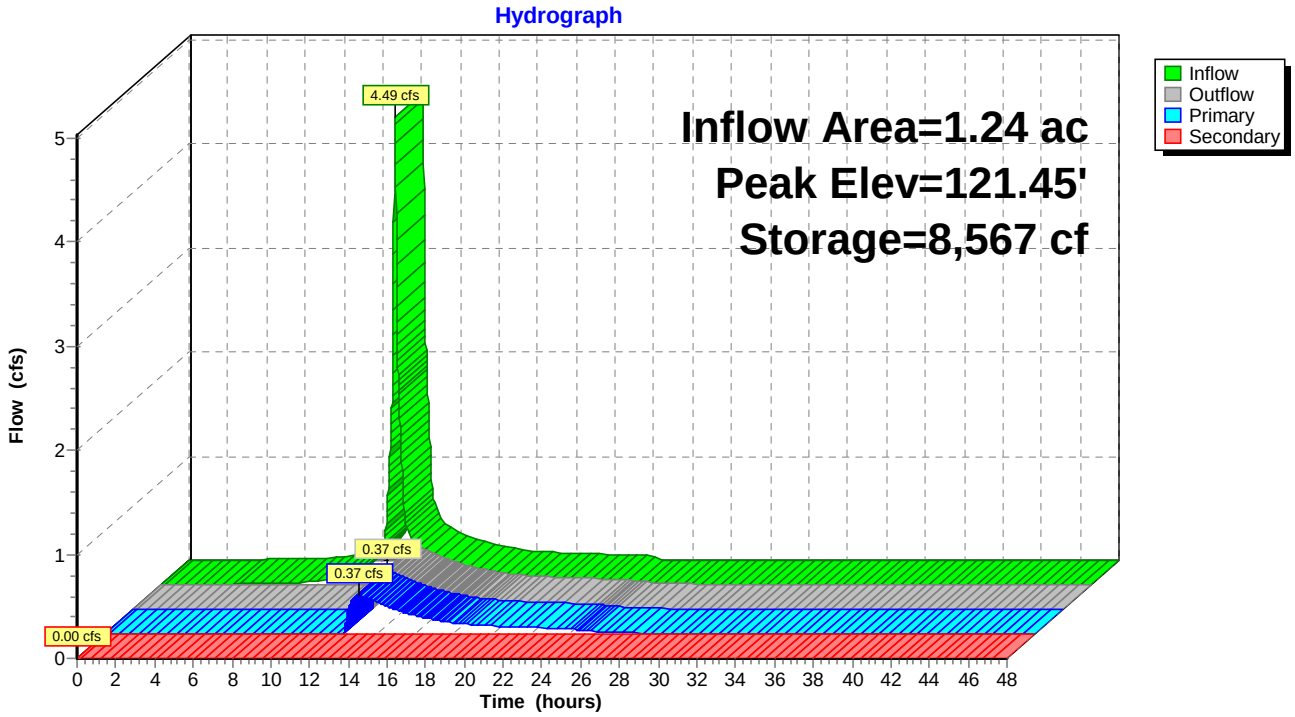
25,943.3 cf Field - 9,444.6 cf Chambers = 16,498.7 cf Stone x 40.0% Voids = 6,599.5 cf Stone Storage

Chamber Storage + Stone Storage = 16,044.1 cf = 0.368 af
Overall Storage Efficiency = 61.8%

84 Chambers
960.9 cy Field
611.1 cy Stone



Pond 1P: USSF


Hydrograph
Inflow Area=1.24 ac
Peak Elev=121.45'
Storage=8,567 cf
4.49 cfs
0.37 cfs
0.37 cfs
0.00 cfs
Inflow
Outflow
Primary
Secondary
Flow (cfs)
Time (hours)
0 1 2 3 4 5
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48

Summary for Pond 206P: City CB @ Fletcher & Danforth

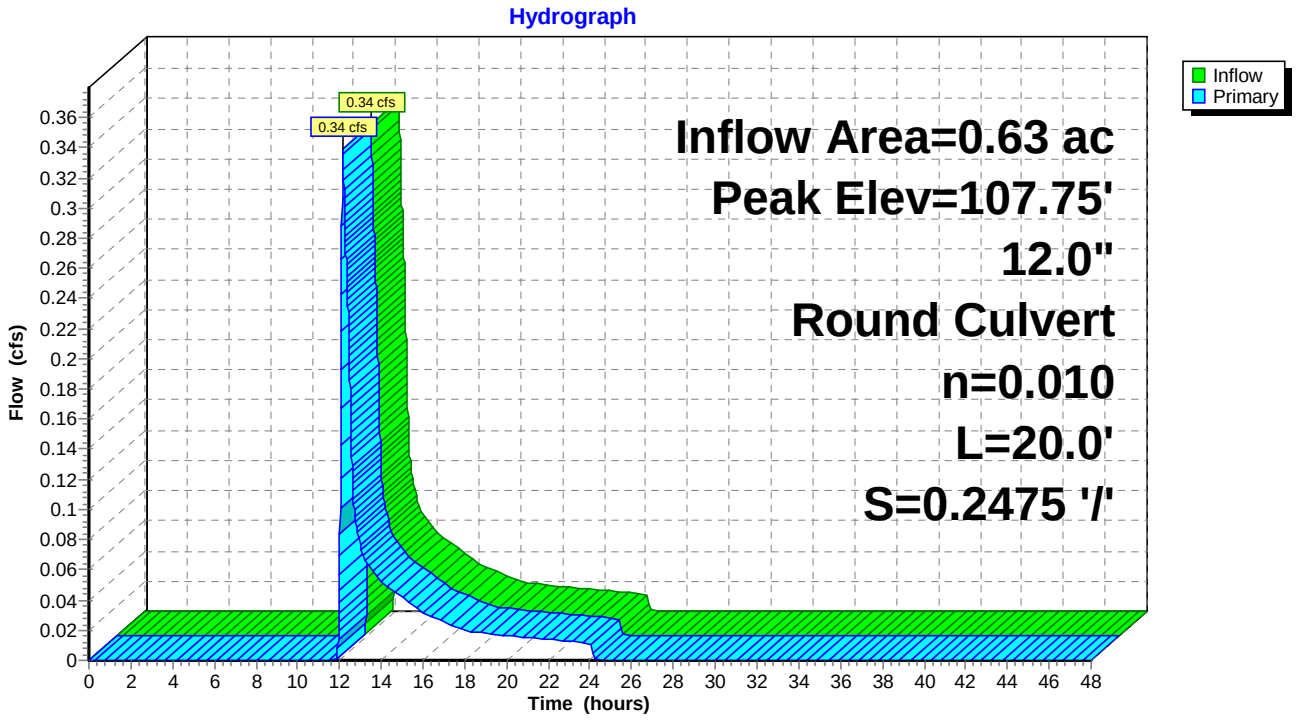
Inflow Area = 0.63 ac, 25.26% Impervious, Inflow Depth = 0.73" for 10-YR event
Inflow = 0.34 cfs @ 12.16 hrs, Volume= 0.039 af
Outflow = 0.34 cfs @ 12.16 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min
Primary = 0.34 cfs @ 12.16 hrs, Volume= 0.039 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 107.75' @ 12.16 hrs
Flood Elev= 111.26'

Device	Routing	Invert	Outlet Devices
#1	Primary	107.43'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 107.43' / 102.48' S= 0.2475 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.34 cfs @ 12.16 hrs HW=107.75' (Free Discharge)
1=Culvert (Inlet Controls 0.34 cfs @ 1.53 fps)

Pond 206P: City CB @ Fletcher & Danforth



Summary for Pond 210P: Existing FI

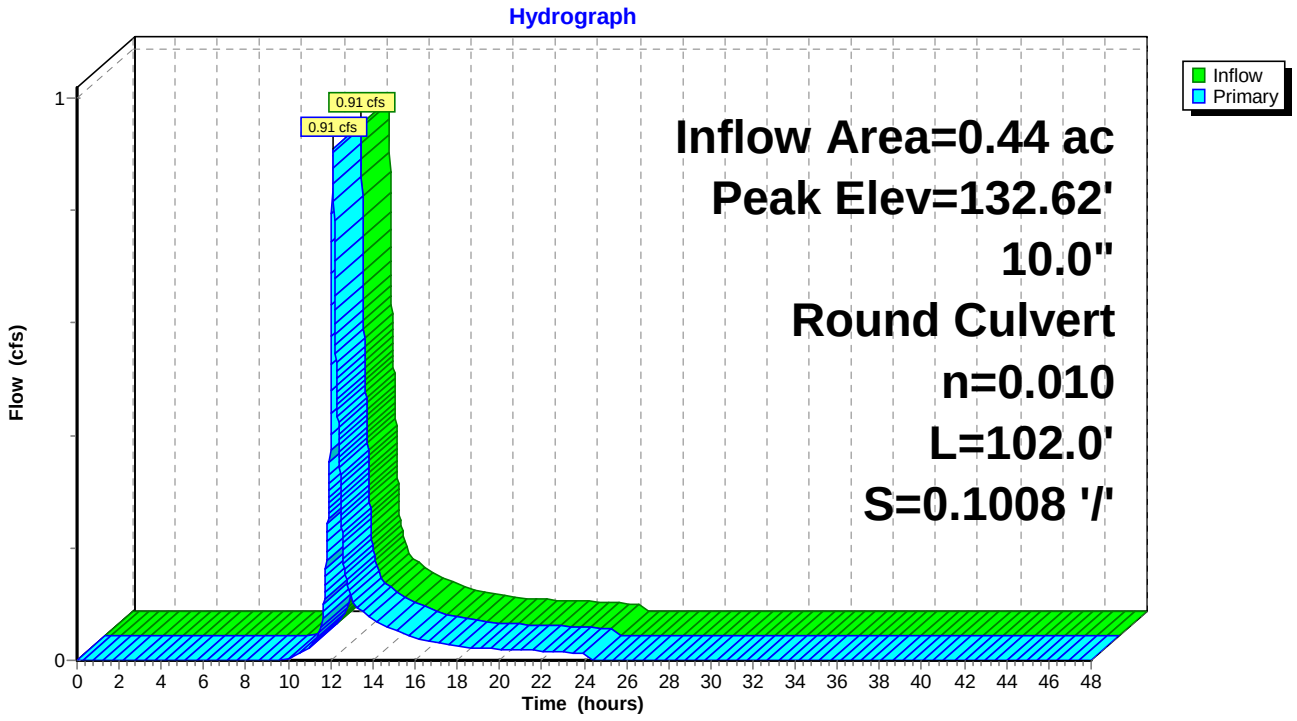
Inflow Area = 0.44 ac, 56.16% Impervious, Inflow Depth = 1.89" for 10-YR event
Inflow = 0.91 cfs @ 12.11 hrs, Volume= 0.070 af
Outflow = 0.91 cfs @ 12.11 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.0 min
Primary = 0.91 cfs @ 12.11 hrs, Volume= 0.070 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 132.62' @ 12.11 hrs
Flood Elev= 140.41'

Device	Routing	Invert	Outlet Devices
#1	Primary	132.00'	**10.0" Round Culvert** L= 102.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 132.00' / 121.72' S= 0.1008 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.91 cfs @ 12.11 hrs HW=132.61' (Free Discharge)
1=Culvert (Inlet Controls 0.91 cfs @ 2.11 fps)

Pond 210P: Existing FI



Summary for Pond 220P: Existing DMH

[79] Warning: Submerged Pond 210P Primary device # 1 OUTLET by 0.56'

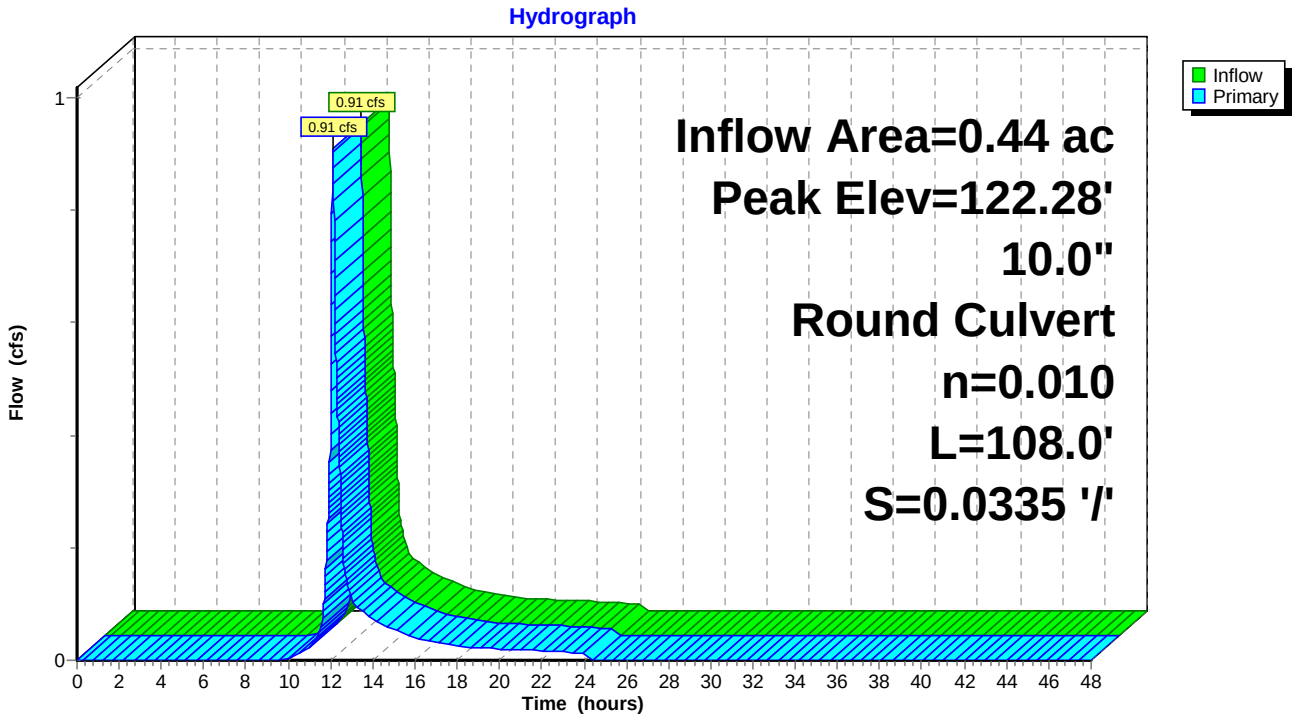
Inflow Area = 0.44 ac, 56.16% Impervious, Inflow Depth = 1.89" for 10-YR event
Inflow = 0.91 cfs @ 12.11 hrs, Volume= 0.070 af
Outflow = 0.91 cfs @ 12.11 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.0 min
Primary = 0.91 cfs @ 12.11 hrs, Volume= 0.070 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 122.28' @ 12.11 hrs
Flood Elev= 128.47'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.67'	**10.0" Round Culvert** L= 108.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 121.67' / 118.05' S= 0.0335 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.91 cfs @ 12.11 hrs HW=122.28' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.91 cfs @ 2.11 fps)

Pond 220P: Existing DMH



Summary for Pond 230P: Existing DMH

[79] Warning: Submerged Pond 220P Primary device # 1 OUTLET by 2.98'
[81] Warning: Exceeded Pond 260P by 0.86' @ 12.11 hrs

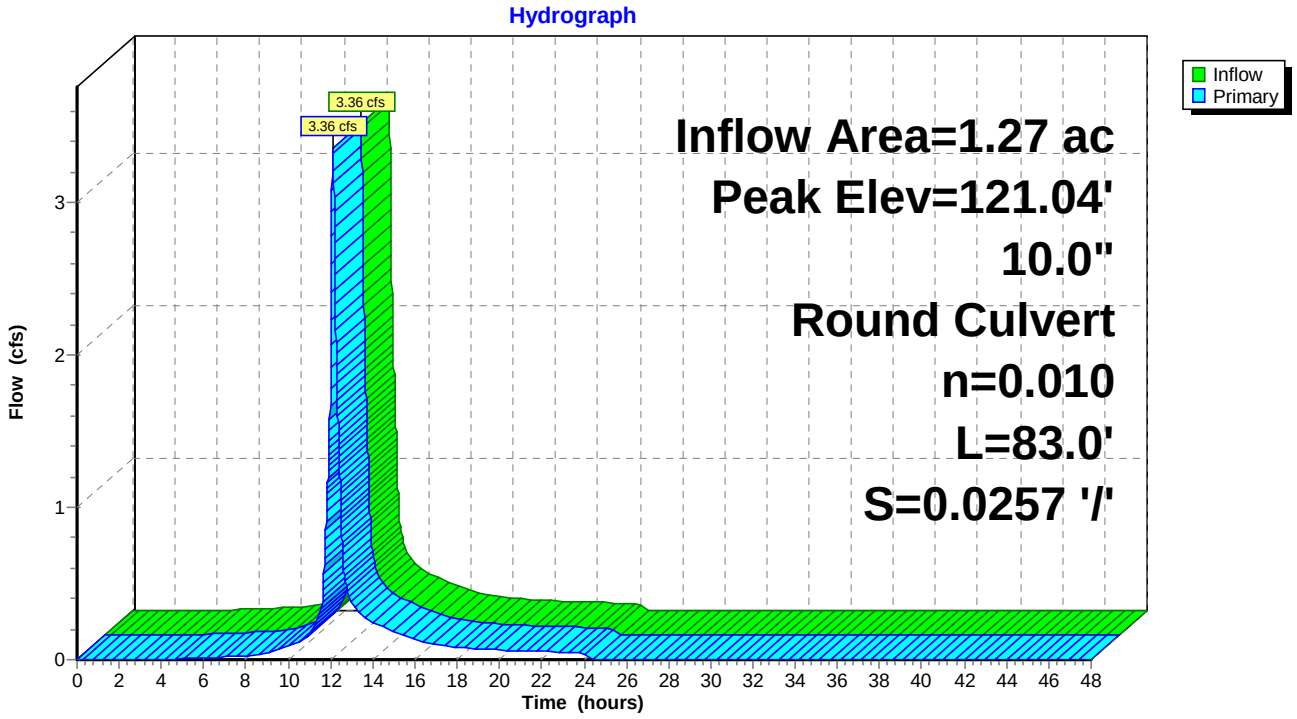
Inflow Area = 1.27 ac, 70.40% Impervious, Inflow Depth = 2.64" for 10-YR event
Inflow = 3.36 cfs @ 12.11 hrs, Volume= 0.280 af
Outflow = 3.36 cfs @ 12.11 hrs, Volume= 0.280 af, Atten= 0%, Lag= 0.0 min
Primary = 3.36 cfs @ 12.11 hrs, Volume= 0.280 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 121.04' @ 12.11 hrs
Flood Elev= 125.05'

Device	Routing	Invert	Outlet Devices
#1	Primary	118.00'	**10.0" Round Culvert** L= 83.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 118.00' / 115.87' S= 0.0257 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=3.35 cfs @ 12.11 hrs HW=121.03' (Free Discharge)
└**1=Culvert** (Inlet Controls 3.35 cfs @ 6.15 fps)

Pond 230P: Existing DMH



Summary for Pond 260P: Storage Pipes

[62] Hint: Exceeded Reach 161R OUTLET depth by 1.77' @ 12.14 hrs

Inflow Area = 0.72 ac, 79.29% Impervious, Inflow Depth = 3.12" for 10-YR event
Inflow = 2.62 cfs @ 12.07 hrs, Volume= 0.188 af
Outflow = 2.16 cfs @ 12.13 hrs, Volume= 0.188 af, Atten= 18%, Lag= 3.1 min
Primary = 2.16 cfs @ 12.13 hrs, Volume= 0.188 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 120.18' @ 12.13 hrs Surf.Area= 797 sf Storage= 377 cf
Flood Elev= 125.26' Surf.Area= 0 sf Storage= 3,468 cf

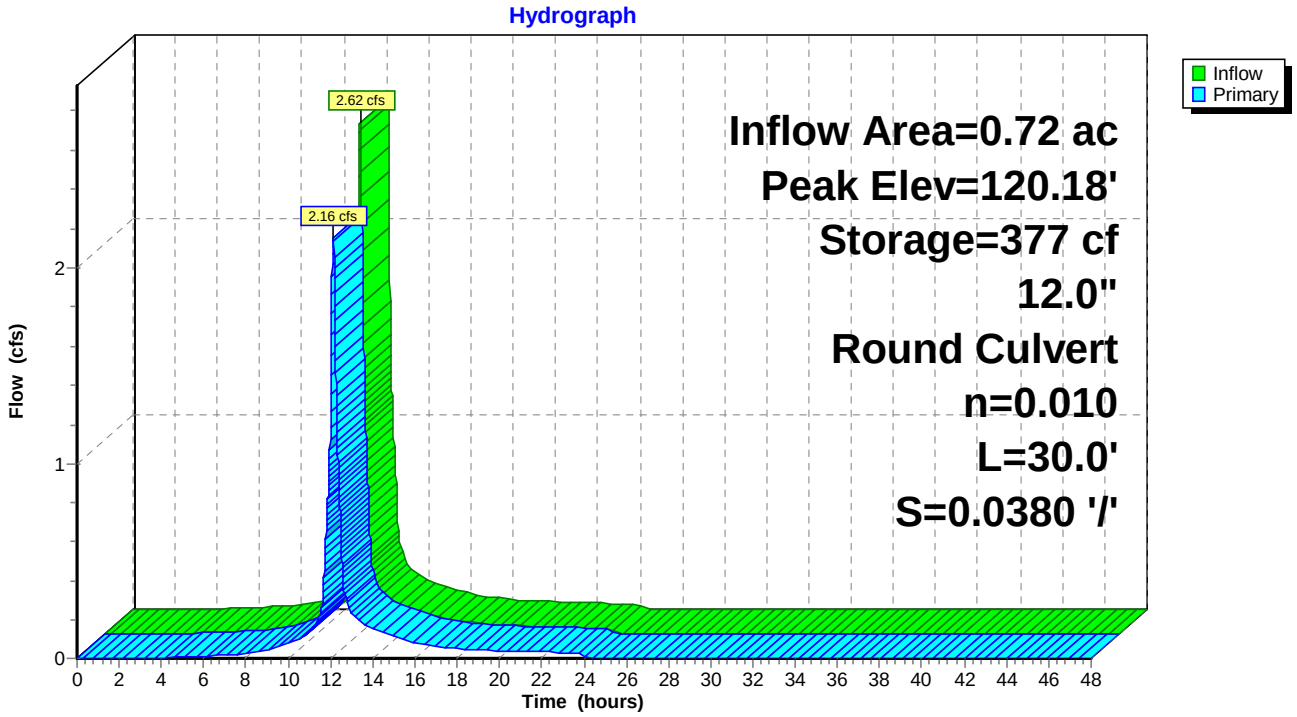
Plug-Flow detention time= 1.4 min calculated for 0.188 af (100% of inflow)
Center-of-Mass det. time= 1.4 min (797.7 - 796.3)

Volume	Invert	Avail.Storage	Storage Description
#1	119.16'	3,468 cf	**48.0" Round Pipe Storage** L= 276.0' S= 0.0027 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.16'	**12.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.16' / 118.02' S= 0.0380 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.15 cfs @ 12.13 hrs HW=120.18' (Free Discharge)
1=Culvert (Inlet Controls 2.15 cfs @ 2.74 fps)

Pond 260P: Storage Pipes



Summary for Pond 340P: CB at SW Cor prkng lot

[57] Hint: Peaked at 129.54' (Flood elevation advised)

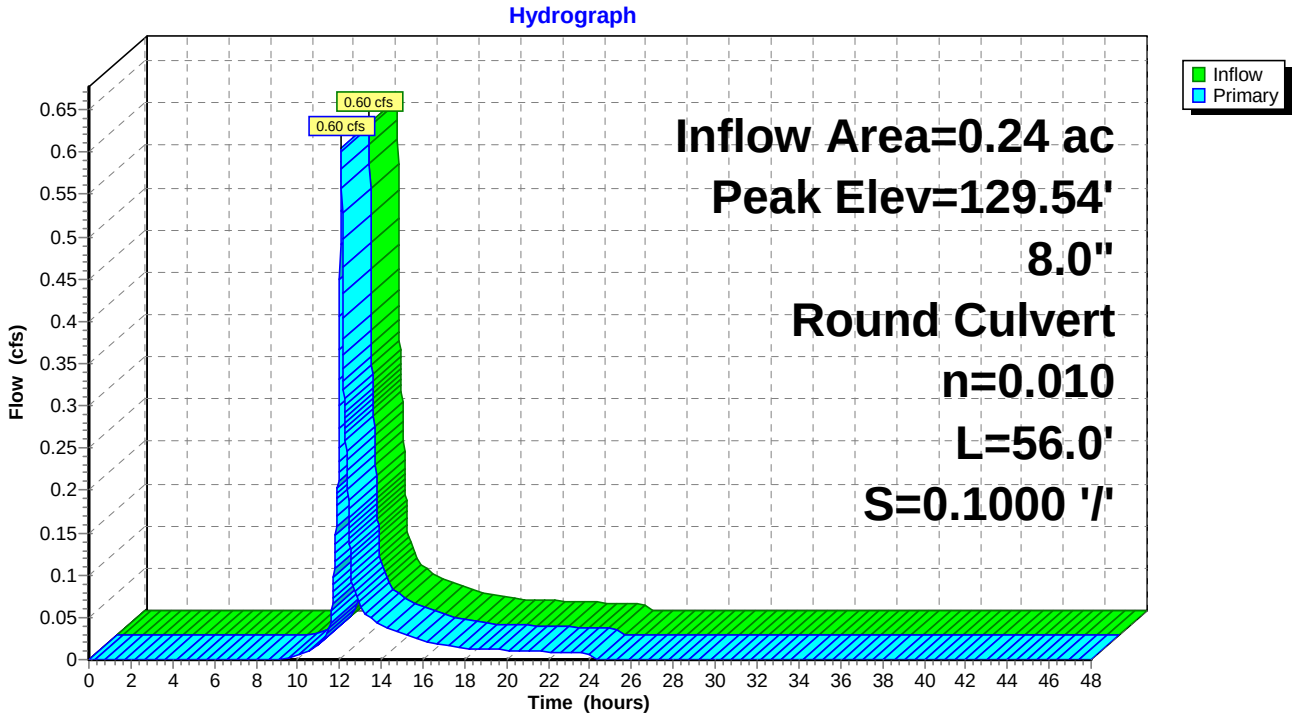
Inflow Area = 0.24 ac, 60.94% Impervious, Inflow Depth = 2.13" for 10-YR event
Inflow = 0.60 cfs @ 12.08 hrs, Volume= 0.042 af
Outflow = 0.60 cfs @ 12.08 hrs, Volume= 0.042 af, Atten= 0%, Lag= 0.0 min
Primary = 0.60 cfs @ 12.08 hrs, Volume= 0.042 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 129.54' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	129.00'	**8.0" Round Culvert** L= 56.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 129.00' / 123.40' S= 0.1000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.60 cfs @ 12.08 hrs HW=129.54' (Free Discharge)
1=Culvert (Inlet Controls 0.60 cfs @ 1.98 fps)

Pond 340P: CB at SW Cor prkng lot



Summary for Pond CB4: Proposed DMH

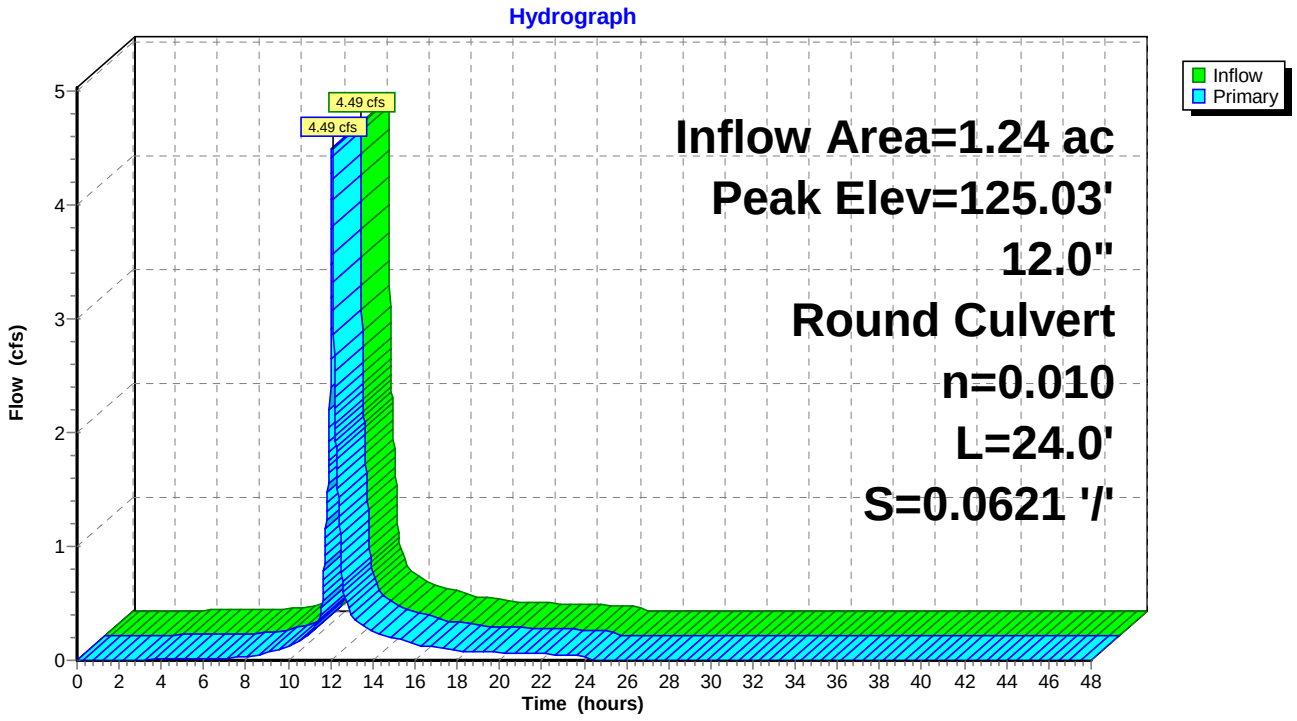
Inflow Area = 1.24 ac, 78.73% Impervious, Inflow Depth = 3.09" for 10-YR event
Inflow = 4.49 cfs @ 12.07 hrs, Volume= 0.318 af
Outflow = 4.49 cfs @ 12.07 hrs, Volume= 0.318 af, Atten= 0%, Lag= 0.0 min
Primary = 4.49 cfs @ 12.07 hrs, Volume= 0.318 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 125.03' @ 12.07 hrs
Flood Elev= 127.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.26'	**12.0" Round Culvert** L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 122.26' / 120.77' S= 0.0621 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.48 cfs @ 12.07 hrs HW=125.02' (Free Discharge)
1=Culvert (Inlet Controls 4.48 cfs @ 5.71 fps)

Pond CB4: Proposed DMH



Summary for Pond DMH: OCS Bypass

[79] Warning: Submerged Pond 1P Primary device # 1 INLET by 0.11'
[79] Warning: Submerged Pond DMH6 Secondary device # 2 by 0.01'

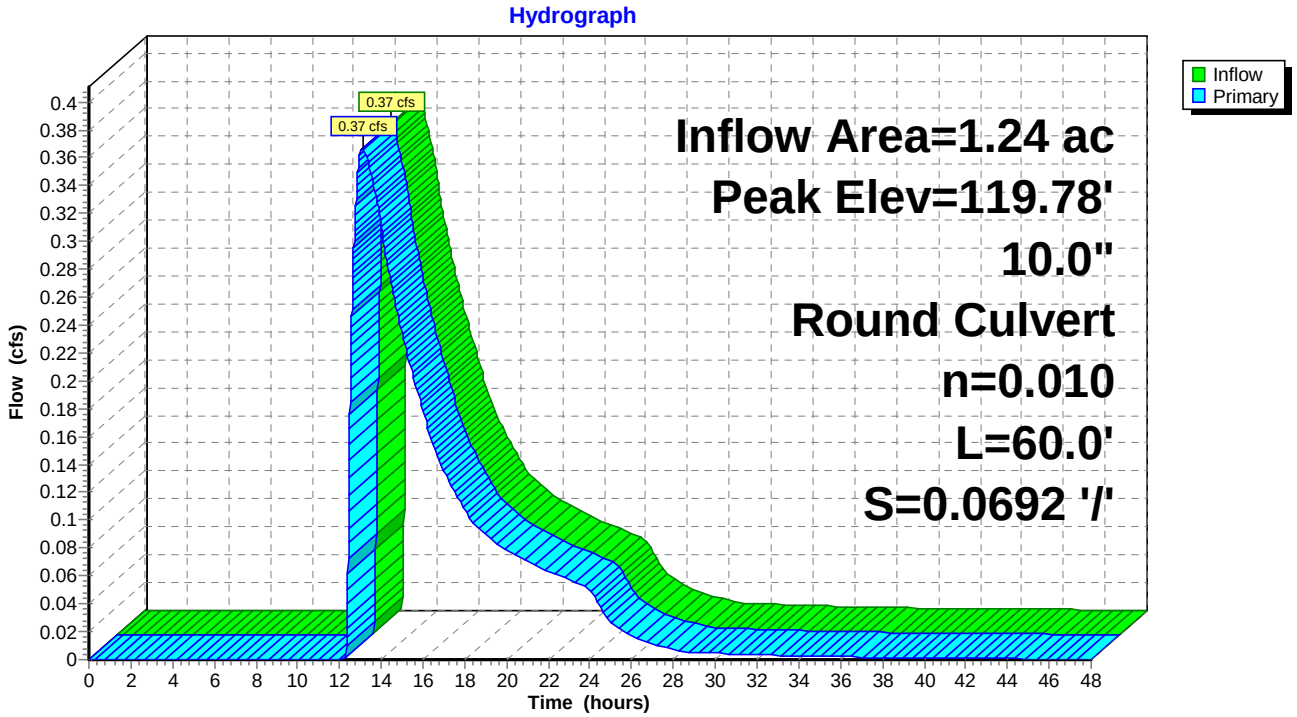
Inflow Area = 1.24 ac, 78.73% Impervious, Inflow Depth > 1.46" for 10-YR event
Inflow = 0.37 cfs @ 13.08 hrs, Volume= 0.151 af
Outflow = 0.37 cfs @ 13.08 hrs, Volume= 0.151 af, Atten= 0%, Lag= 0.0 min
Primary = 0.37 cfs @ 13.08 hrs, Volume= 0.151 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 119.78' @ 13.08 hrs
Flood Elev= 126.48'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.42'	**10.0" Round Culvert** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.42' / 115.27' S= 0.0692 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.37 cfs @ 13.08 hrs HW=119.78' (Free Discharge)
1=Culvert (Inlet Controls 0.37 cfs @ 1.62 fps)

Pond DMH: OCS Bypass



Summary for Pond DMH6: Access MH

[79] Warning: Submerged Pond CB4 Primary device # 1 OUTLET by 0.24'

Inflow Area = 1.24 ac, 78.73% Impervious, Inflow Depth = 3.09" for 10-YR event
Inflow = 4.49 cfs @ 12.07 hrs, Volume= 0.318 af
Outflow = 4.49 cfs @ 12.07 hrs, Volume= 0.318 af, Atten= 0%, Lag= 0.0 min
Primary = 4.49 cfs @ 12.07 hrs, Volume= 0.318 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

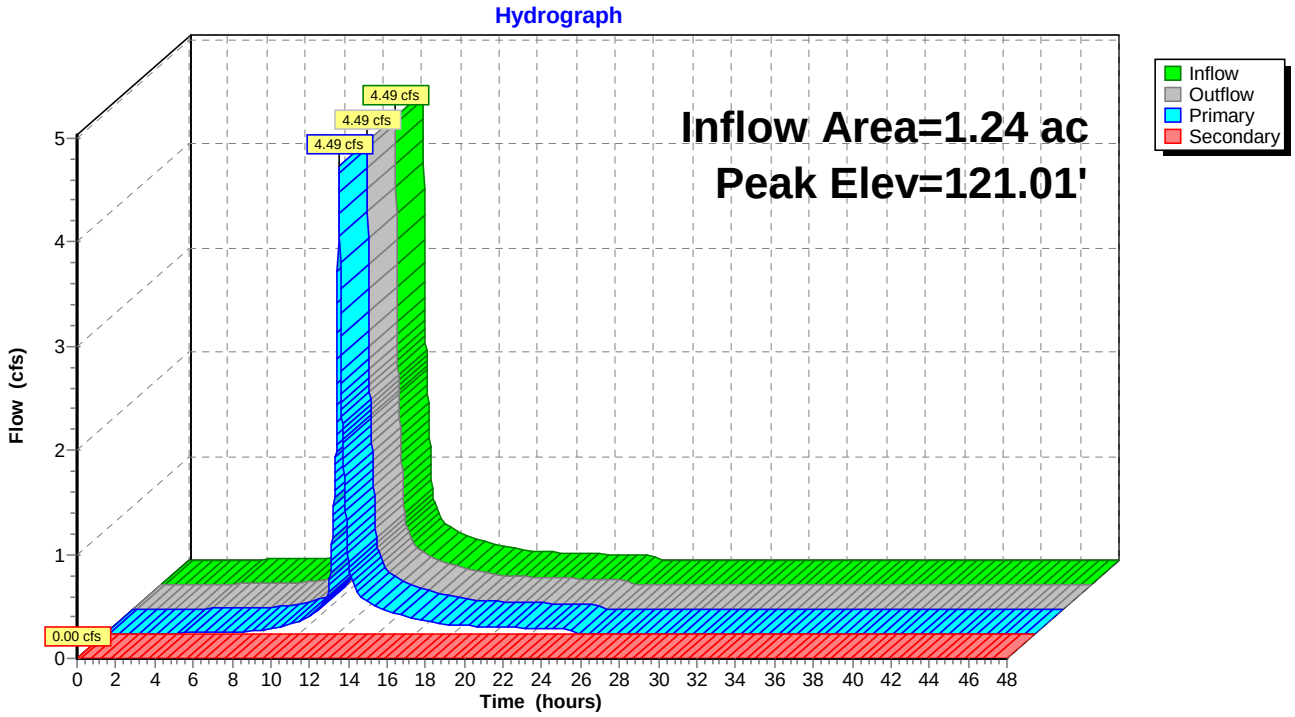
Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 121.01' @ 12.07 hrs
Flood Elev= 126.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.77'	**24.0" Round Culvert** L= 9.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.77' / 119.77' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Secondary	119.77'	**24.0" Round Culvert** L= 2.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.77' / 119.77' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#3	Device 2	123.35'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=4.48 cfs @ 12.07 hrs HW=121.01' (Free Discharge)
└**1=Culvert** (Barrel Controls 4.48 cfs @ 3.14 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=119.77' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond DMH6: Access MH



Summary for Pond DMH7: Proposed DMH

[79] Warning: Submerged Pond 1P Secondary device # 5 INLET by 2.18'
[79] Warning: Submerged Pond 230P Primary device # 1 INLET by 0.20'
[79] Warning: Submerged Pond DMH Primary device # 1 OUTLET by 2.93'

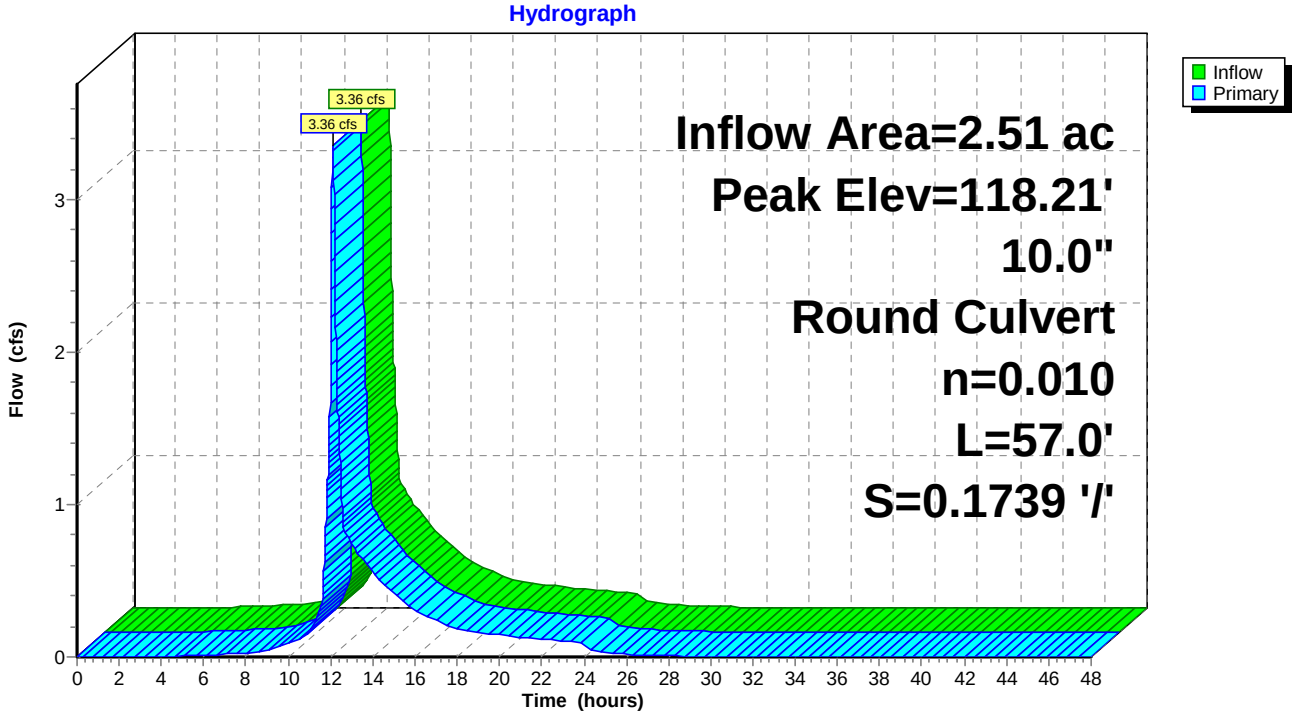
Inflow Area = 2.51 ac, 74.51% Impervious, Inflow Depth > 2.06" for 10-YR event
Inflow = 3.36 cfs @ 12.11 hrs, Volume= 0.431 af
Outflow = 3.36 cfs @ 12.11 hrs, Volume= 0.431 af, Atten= 0%, Lag= 0.0 min
Primary = 3.36 cfs @ 12.11 hrs, Volume= 0.431 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 118.21' @ 12.11 hrs
Flood Elev= 124.69'

Device	Routing	Invert	Outlet Devices
#1	Primary	115.17'	**10.0" Round Culvert** L= 57.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 115.17' / 105.26' S= 0.1739 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=3.35 cfs @ 12.11 hrs HW=118.20' (Free Discharge)
└**1=Culvert** (Inlet Controls 3.35 cfs @ 6.15 fps)

Pond DMH7: Proposed DMH

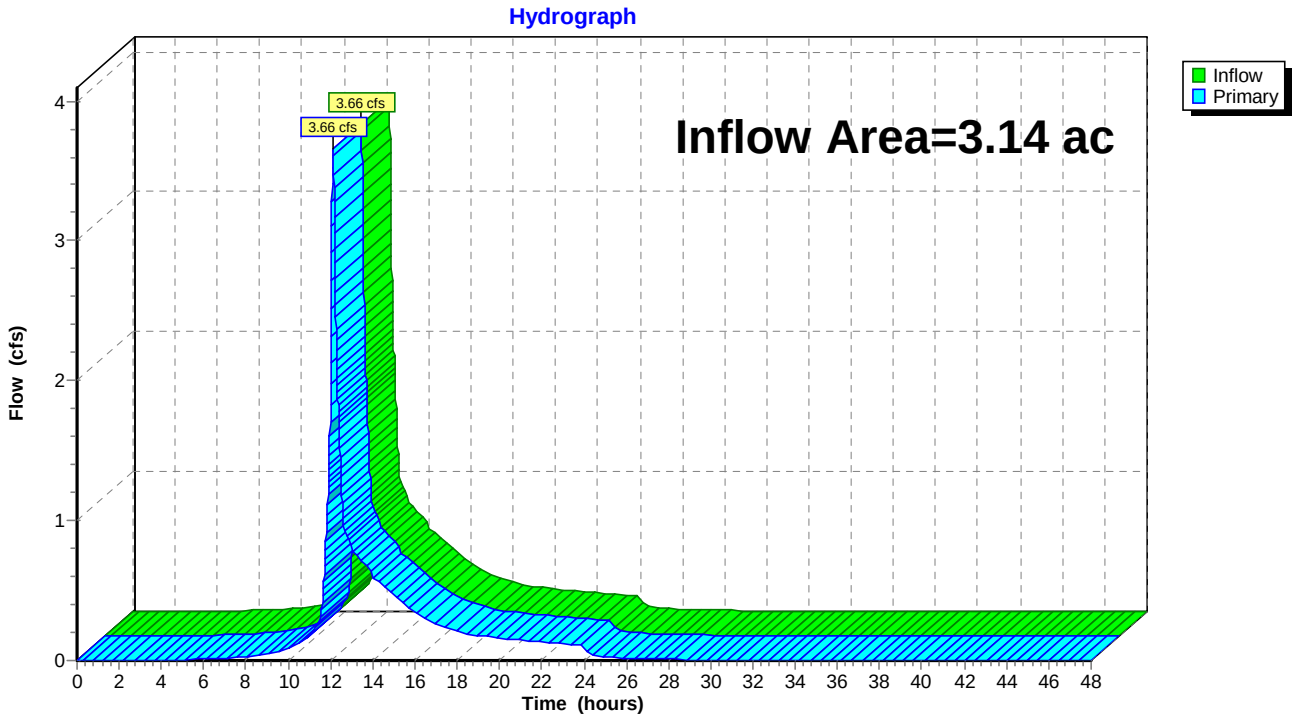


Summary for Link SP1: Existing Combined Sewer in Danforth/Doghouse MH DMH 8

Inflow Area = 3.14 ac, 64.59% Impervious, Inflow Depth > 1.79" for 10-YR event
Inflow = 3.66 cfs @ 12.12 hrs, Volume= 0.470 af
Primary = 3.66 cfs @ 12.12 hrs, Volume= 0.470 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link SP1: Existing Combined Sewer in Danforth/Doghouse MH DMH 8



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 10S: Area draining to Runoff Area=19,254 sf 56.16% Impervious Runoff Depth=2.83"
Flow Length=91' Slope=0.0300 '/' Tc=7.7 min CN=72 Runoff=1.38 cfs 0.104 af

Subcatchment 60S: Lawn/Field S of school Runoff Area=16,715 sf 84.98% Impervious Runoff Depth=4.54"
Tc=5.0 min CN=89 Runoff=2.04 cfs 0.145 af

Subcatchment 61S: Auditorium Roof Runoff Area=4,485 sf 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=98 Runoff=0.61 cfs 0.048 af

Subcatchment 70S: Thomas & Davies & Runoff Area=44,441 sf 74.20% Impervious Runoff Depth=3.91"
Flow Length=91' Slope=0.1593 '/' Tc=5.0 min CN=83 Runoff=4.79 cfs 0.332 af

Subcatchment 80S: FoundersHall Runoff Area=9,466 sf 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=98 Runoff=1.28 cfs 0.101 af

Subcatchment 90S: Playground Runoff Area=27,554 sf 25.26% Impervious Runoff Depth=1.33"
Flow Length=117' Tc=9.2 min CN=54 Runoff=0.75 cfs 0.070 af

Subcatchment 91S: Playground Runoff Area=4,688 sf 69.20% Impervious Runoff Depth=3.60"
Tc=5.0 min CN=80 Runoff=0.47 cfs 0.032 af

Subcatchment 402S: New Prkng lot Runoff Area=10,240 sf 60.94% Impervious Runoff Depth=3.11"
Tc=5.0 min CN=75 Runoff=0.89 cfs 0.061 af

Reach 161R: roof drain Avg. Flow Depth=0.21' Max Vel=7.90 fps Inflow=0.61 cfs 0.048 af
6.0" Round Pipe n=0.013 L=129.0' S=0.0911 '/' Capacity=1.69 cfs Outflow=0.60 cfs 0.048 af

Pond 1P: USSF Peak Elev=121.91' Storage=10,207 cf Inflow=6.07 cfs 0.433 af
Primary=1.16 cfs 0.265 af Secondary=0.00 cfs 0.000 af Outflow=1.16 cfs 0.265 af

Pond 206P: City CB @ Fletcher & Danforth Peak Elev=107.93' Inflow=0.75 cfs 0.070 af
12.0" Round Culvert n=0.010 L=20.0' S=0.2475 '/' Outflow=0.75 cfs 0.070 af

Pond 210P: Existing FI Peak Elev=132.86' Inflow=1.38 cfs 0.104 af
10.0" Round Culvert n=0.010 L=102.0' S=0.1008 '/' Outflow=1.38 cfs 0.104 af

Pond 220P: Existing DMH Peak Elev=122.53' Inflow=1.38 cfs 0.104 af
10.0" Round Culvert n=0.010 L=108.0' S=0.0335 '/' Outflow=1.38 cfs 0.104 af

Pond 230P: Existing DMH Peak Elev=123.02' Inflow=4.45 cfs 0.390 af
10.0" Round Culvert n=0.010 L=83.0' S=0.0257 '/' Outflow=4.45 cfs 0.390 af

Pond 260P: Storage Pipes Peak Elev=120.47' Storage=626 cf Inflow=3.53 cfs 0.254 af
12.0" Round Culvert n=0.010 L=30.0' S=0.0380 '/' Outflow=2.69 cfs 0.254 af

Pond 340P: CB at SW Cor prkng lot Peak Elev=129.78' Inflow=0.89 cfs 0.061 af
8.0" Round Culvert n=0.010 L=56.0' S=0.1000 '/' Outflow=0.89 cfs 0.061 af

Pond CB4: Proposed DMH Peak Elev=126.90' Inflow=6.07 cfs 0.433 af
12.0" Round Culvert n=0.010 L=24.0' S=0.0621 '/' Outflow=6.07 cfs 0.433 af

Pond DMH: OCS Bypass Peak Elev=120.15' Inflow=1.16 cfs 0.265 af
10.0" Round Culvert n=0.010 L=60.0' S=0.0692 '/' Outflow=1.16 cfs 0.265 af

Pond DMH6: Access MH Peak Elev=121.24' Inflow=6.07 cfs 0.433 af
Primary=6.07 cfs 0.433 af Secondary=0.00 cfs 0.000 af Outflow=6.07 cfs 0.433 af

Pond DMH7: Proposed DMH Peak Elev=120.60' Inflow=4.64 cfs 0.656 af
10.0" Round Culvert n=0.010 L=57.0' S=0.1739 '/' Outflow=4.64 cfs 0.656 af

Link SP1: Existing Combined Sewer in Danforth/Doghouse MH DMH 8 Inflow=5.39 cfs 0.726 af
Primary=5.39 cfs 0.726 af

Summary for Subcatchment 10S: Area draining to Sanctuary

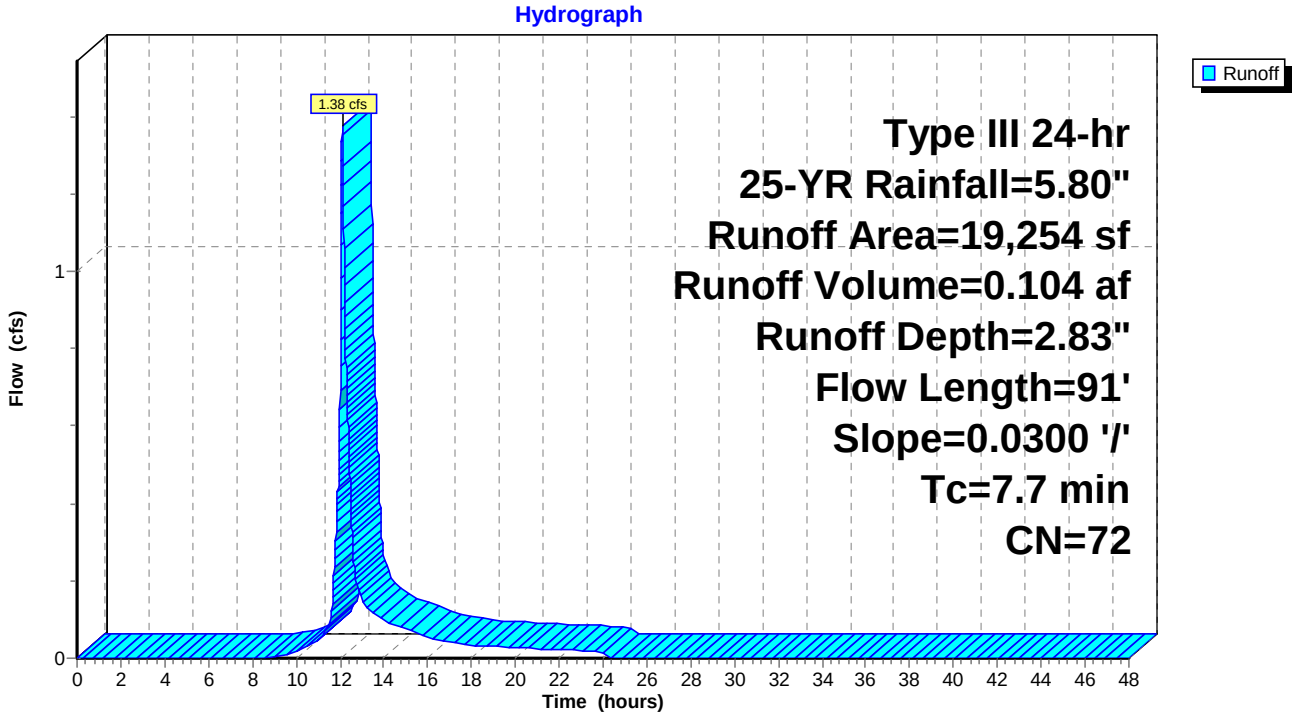
Runoff = 1.38 cfs @ 12.11 hrs, Volume= 0.104 af, Depth= 2.83"

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-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	10,813	98	impervious
*	8,441	39	Lawn/field, HSG A
	19,254	72	Weighted Average
	8,441		43.84% Pervious Area
	10,813		56.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	91	0.0300	0.20		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"

Subcatchment 10S: Area draining to Sanctuary



Summary for Subcatchment 60S: Lawn/Field S of school

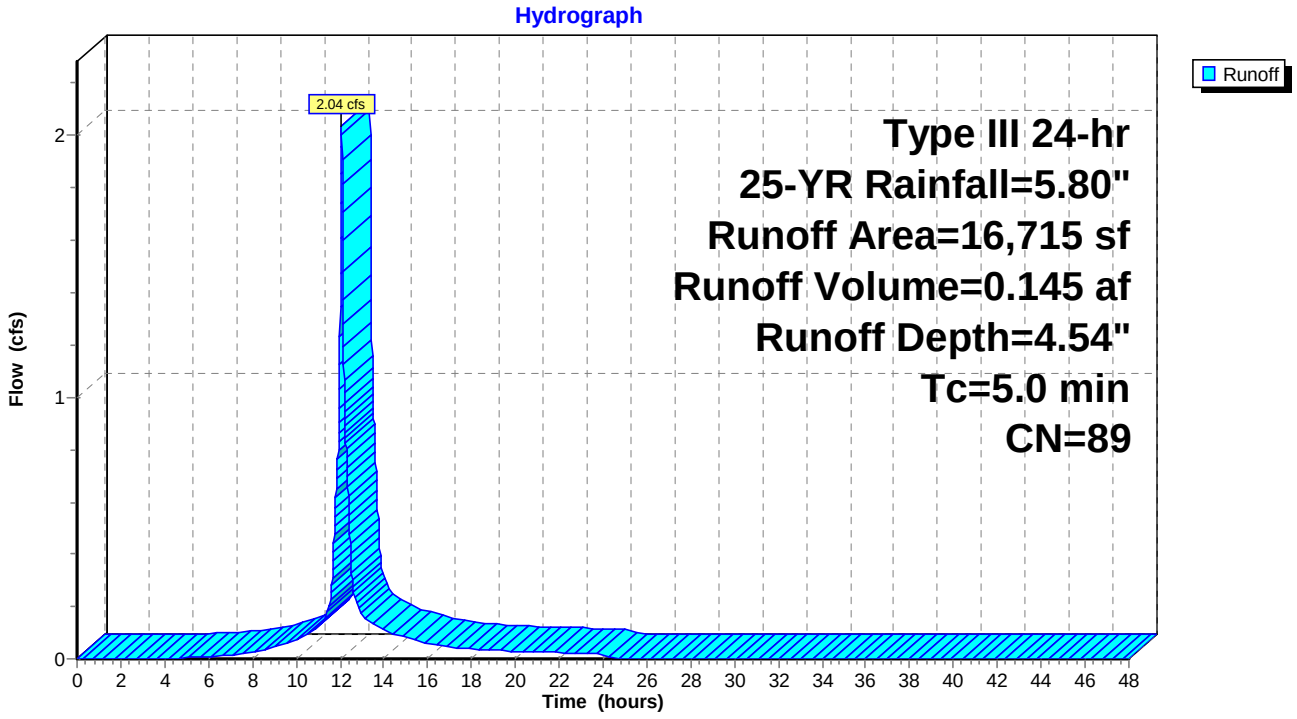
Runoff = 2.04 cfs @ 12.07 hrs, Volume= 0.145 af, Depth= 4.54"

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-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	14,205	98	impervious
*	2,510	39	Lawn/field, HSG A
	16,715	89	Weighted Average
	2,510		15.02% Pervious Area
	14,205		84.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 60S: Lawn/Field S of school



Summary for Subcatchment 61S: Auditorium Roof

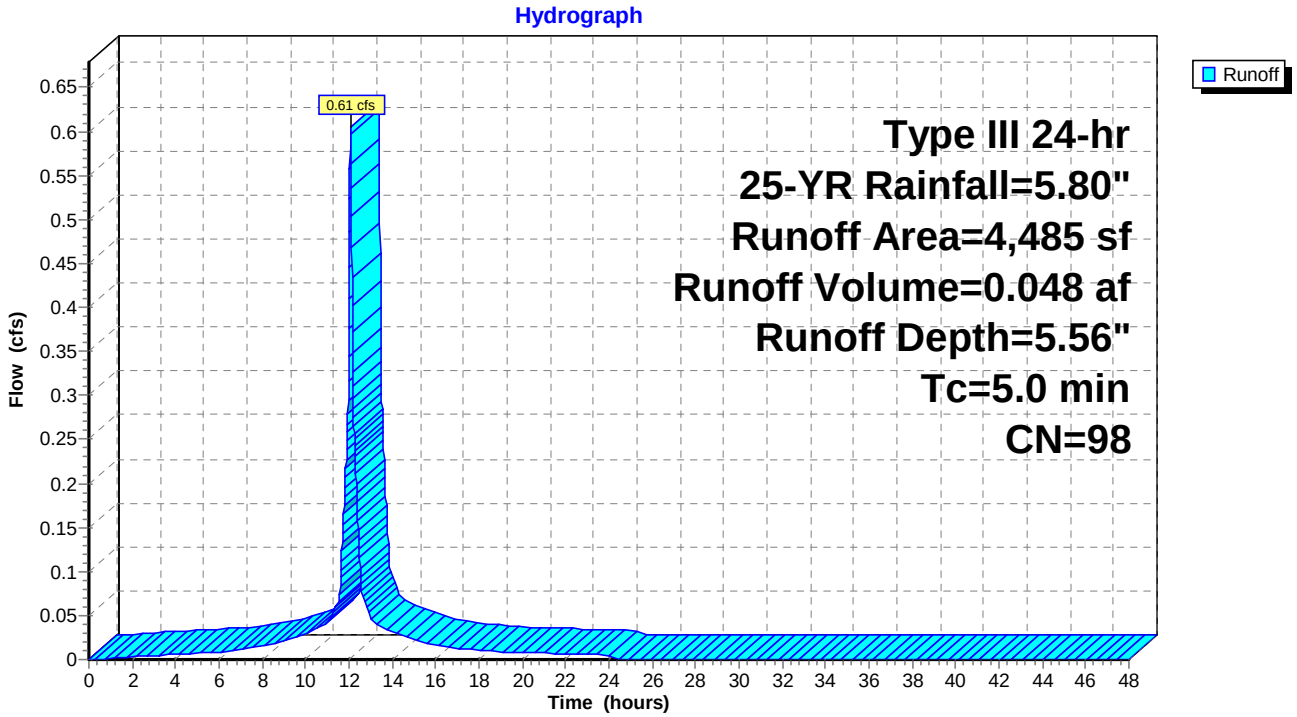
Runoff = 0.61 cfs @ 12.07 hrs, Volume= 0.048 af, Depth= 5.56"

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-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	4,485	98	Roof runoff
	4,485		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 61S: Auditorium Roof



Summary for Subcatchment 70S: Thomas & Davies & Gym

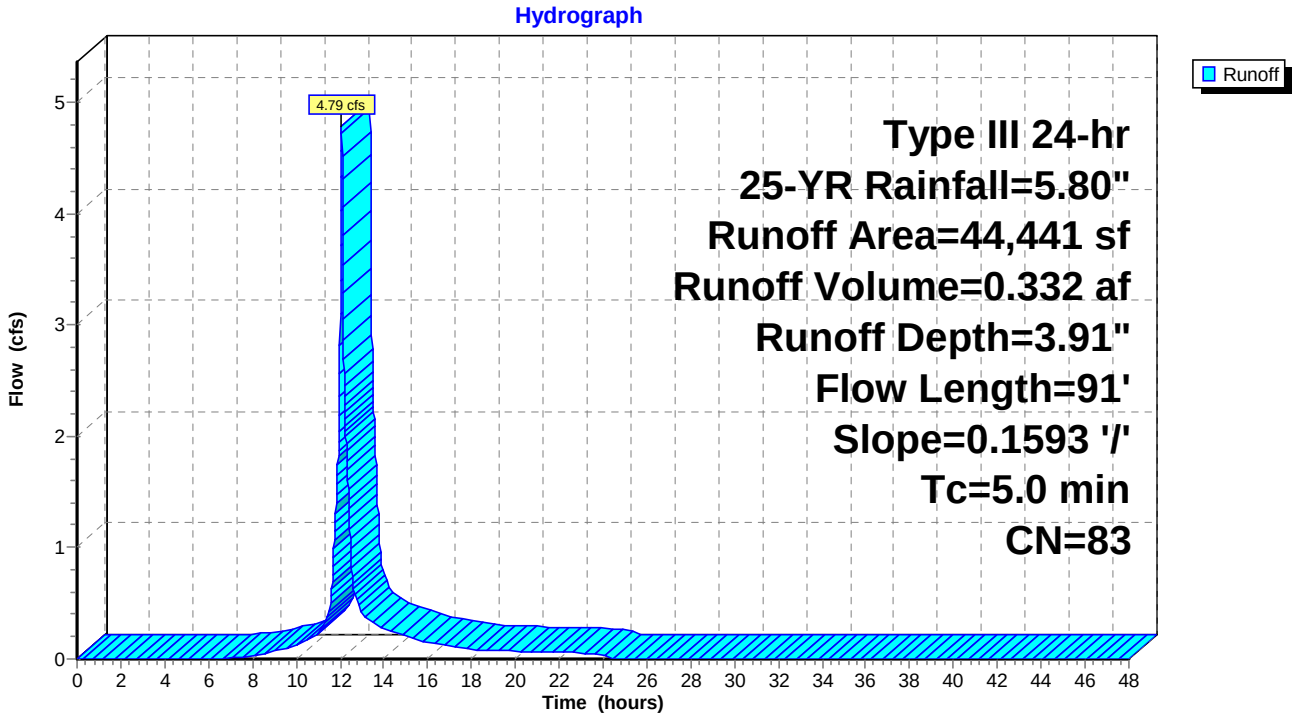
Runoff = 4.79 cfs @ 12.07 hrs, Volume= 0.332 af, Depth= 3.91"

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-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	32,976	98	impervious
*	11,465	39	Lawn/field, HSG A
	44,441	83	Weighted Average
	11,465		25.80% Pervious Area
	32,976		74.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	91	0.1593	0.38		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"
4.0	91	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 70S: Thomas & Davies & Gym



Summary for Subcatchment 80S: FoundersHall

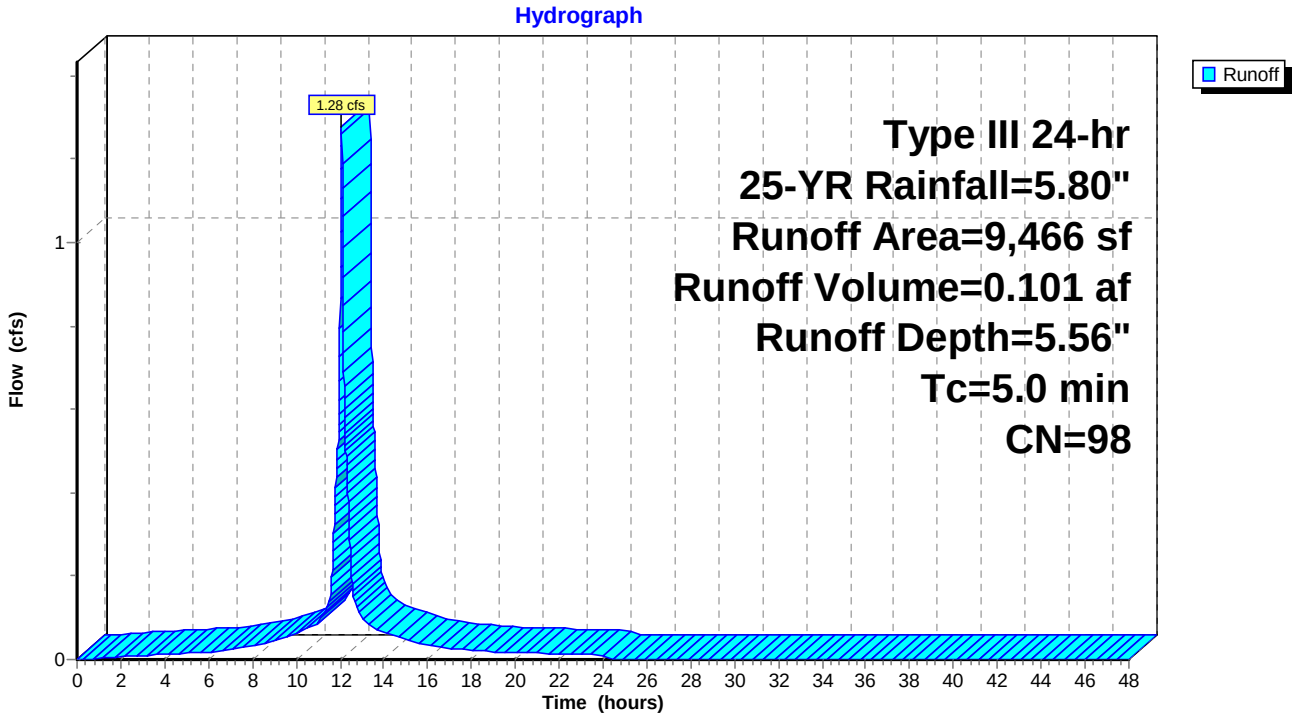
Runoff = 1.28 cfs @ 12.07 hrs, Volume= 0.101 af, Depth= 5.56"

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-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	9,466	98	Roof runoff
	9,466		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 80S: FoundersHall



Summary for Subcatchment 90S: Playground

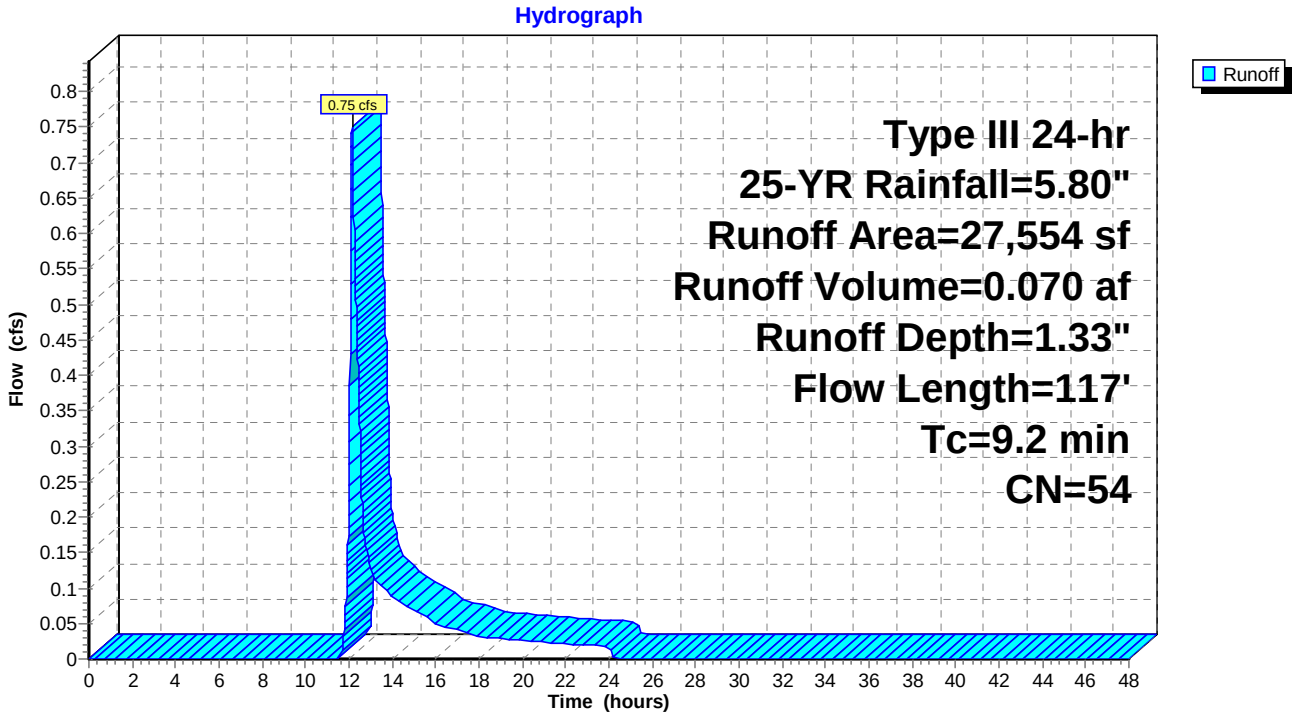
Runoff = 0.75 cfs @ 12.15 hrs, Volume= 0.070 af, Depth= 1.33"

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-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	6,960	98	impervious
*	20,594	39	Lawn/field, HSG A
	27,554	54	Weighted Average
	20,594		74.74% Pervious Area
	6,960		25.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0250	0.19		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"
0.2	17	0.0588	1.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.2	117	Total			

Subcatchment 90S: Playground



Summary for Subcatchment 91S: Playground

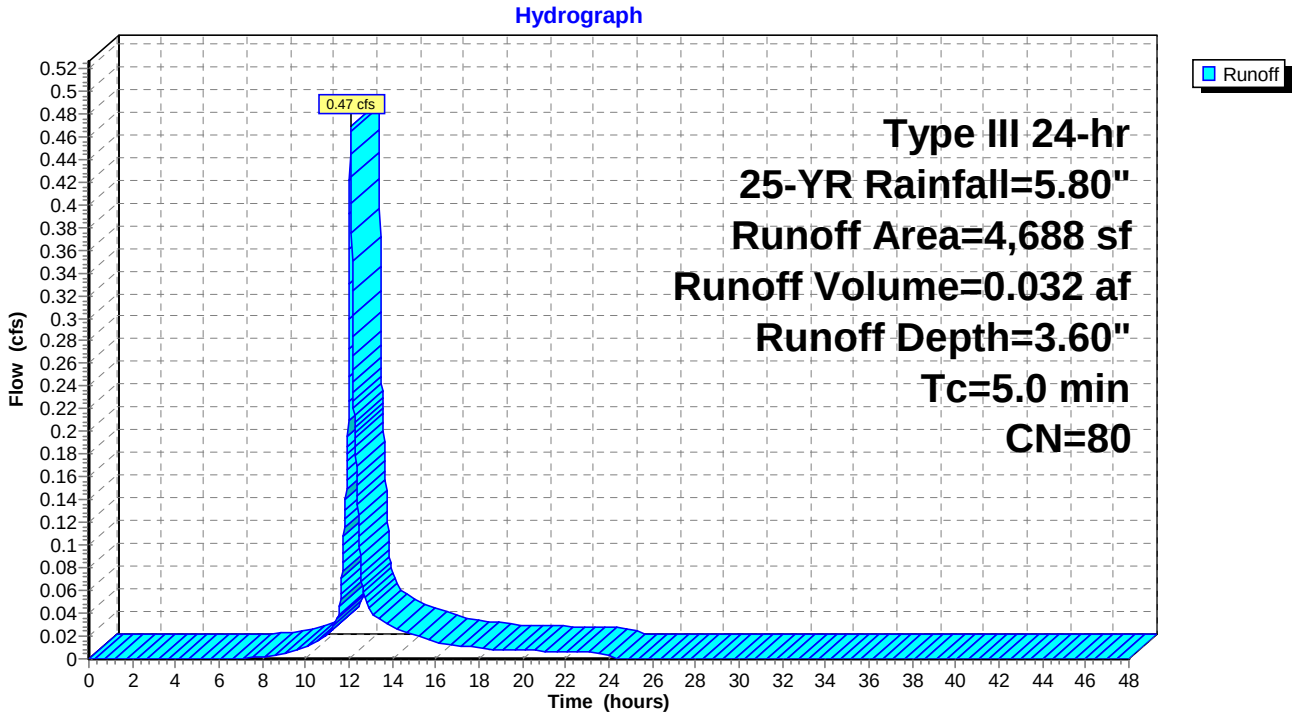
Runoff = 0.47 cfs @ 12.07 hrs, Volume= 0.032 af, Depth= 3.60"

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-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	3,244	98	impervious
*	1,444	39	Lawn/field, HSG A
	4,688	80	Weighted Average
	1,444		30.80% Pervious Area
	3,244		69.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 91S: Playground



Summary for Subcatchment 402S: New Prkng lot

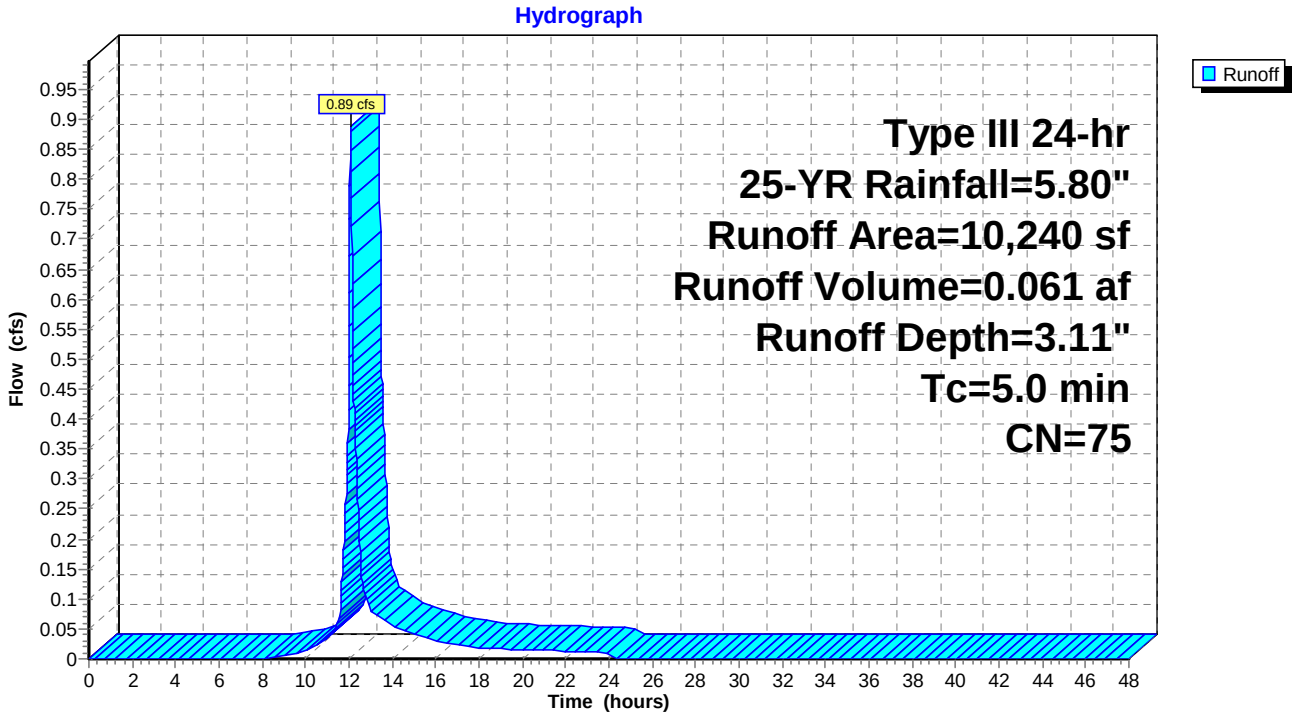
Runoff = 0.89 cfs @ 12.08 hrs, Volume= 0.061 af, Depth= 3.11"

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-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	4,000	39	Pervious
*	6,240	98	Impervious
	10,240	75	Weighted Average
	4,000		39.06% Pervious Area
	6,240		60.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 402S: New Prkng lot



Summary for Reach 161R: roof drain

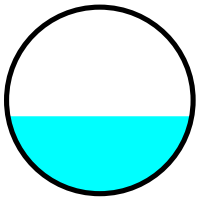
[52] Hint: Inlet/Outlet conditions not evaluated

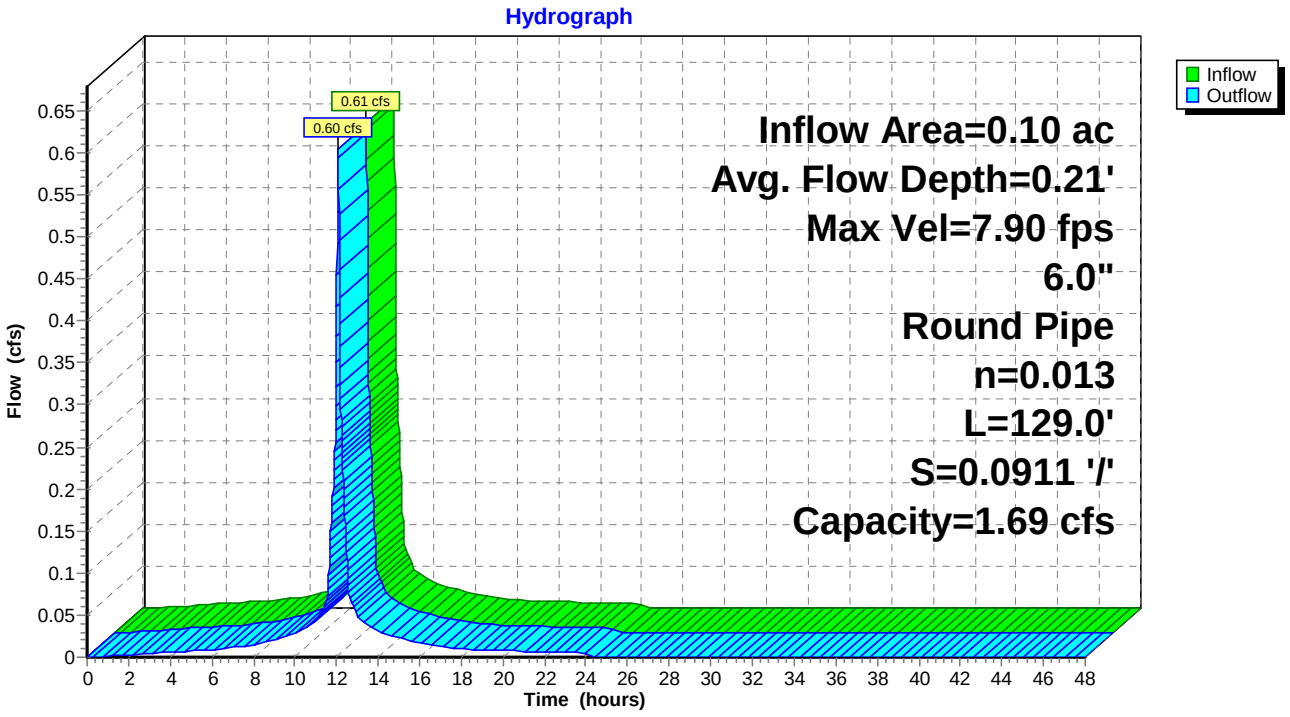
Inflow Area = 0.10 ac,100.00% Impervious, Inflow Depth = 5.56" for 25-YR event
Inflow = 0.61 cfs @ 12.07 hrs, Volume= 0.048 af
Outflow = 0.60 cfs @ 12.08 hrs, Volume= 0.048 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.90 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.62 fps, Avg. Travel Time= 0.8 min

Peak Storage= 10 cf @ 12.07 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 1.69 cfs

6.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 129.0' Slope= 0.0911 '/'
Inlet Invert= 130.00', Outlet Invert= 118.25'





Summary for Pond 1P: USSF

[81] Warning: Exceeded Pond DMH6 by 1.62' @ 12.62 hrs

Inflow Area = 1.24 ac, 78.73% Impervious, Inflow Depth = 4.20" for 25-YR event
Inflow = 6.07 cfs @ 12.07 hrs, Volume= 0.433 af
Outflow = 1.16 cfs @ 12.51 hrs, Volume= 0.265 af, Atten= 81%, Lag= 26.1 min
Primary = 1.16 cfs @ 12.51 hrs, Volume= 0.265 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 121.91' @ 12.51 hrs Surf.Area= 4,717 sf Storage= 10,207 cf
Flood Elev= 126.48' Surf.Area= 4,717 sf Storage= 16,044 cf

Plug-Flow detention time= 259.1 min calculated for 0.265 af (61% of inflow)
Center-of-Mass det. time= 154.4 min (946.7 - 792.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	118.85'	6,599 cf	**51.42'W x 91.74'L x 5.50'H Field A** 25,943 cf Overall - 9,445 cf Embedded = 16,499 cf x 40.0% Voids
#2A	119.60'	9,445 cf	**ADS_StormTech MC-3500 d +Cap** x 84 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 7 Rows of 12 Chambers Cap Storage= +14.9 cf x 2 x 7 rows = 208.6 cf
		16,044 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	119.67'	**8.0" Round Culvert** L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.67' / 119.52' S= 0.0214 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#2	Device 1	123.35'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	121.10'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 5	118.85'	**2.410 in/hr Exfiltration over Surface area above 118.85'** Conductivity to Groundwater Elevation = 113.00' Excluded Surface area = 4,717 sf
#5	Secondary	116.02'	**6.0" Round Culvert** L= 31.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 116.02' / 115.88' S= 0.0045 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=1.16 cfs @ 12.51 hrs HW=121.91' (Free Discharge)
└─**1=Culvert** (Passes 1.16 cfs of 1.83 cfs potential flow)
  ├─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Orifice Controls 1.16 cfs @ 3.34 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=118.85' (Free Discharge)
└─**5=Culvert** (Passes 0.00 cfs of 1.20 cfs potential flow)
  └─**4=Exfiltration** (Controls 0.00 cfs)

Pond 1P: USSF - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap storage)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 7 rows = 208.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

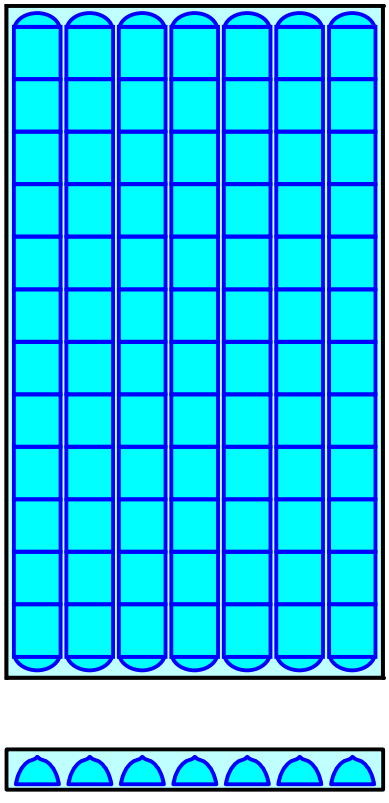
12 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 89.74' Row Length +12.0" End Stone x 2 = 91.74' Base Length
7 Rows x 77.0" Wide + 9.0" Spacing x 6 + 12.0" Side Stone x 2 = 51.42' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

84 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 7 Rows = 9,444.6 cf Chamber Storage

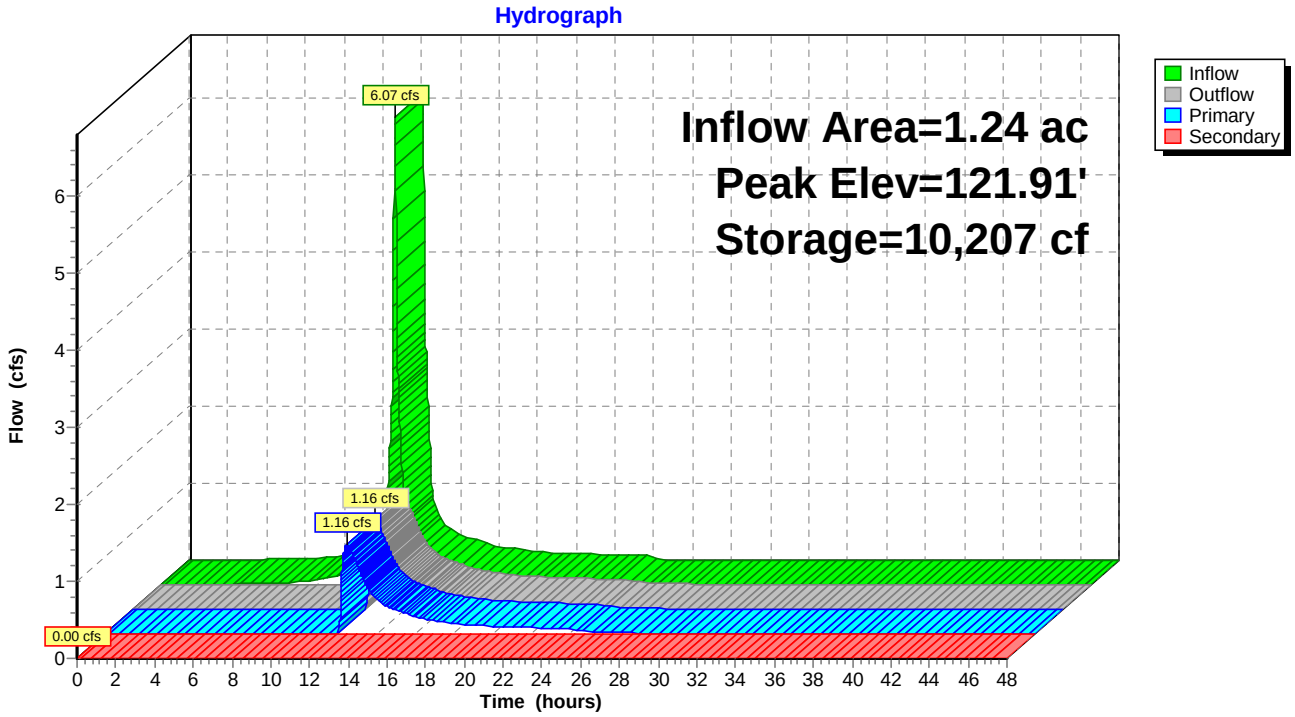
25,943.3 cf Field - 9,444.6 cf Chambers = 16,498.7 cf Stone x 40.0% Voids = 6,599.5 cf Stone Storage

Chamber Storage + Stone Storage = 16,044.1 cf = 0.368 af
Overall Storage Efficiency = 61.8%

84 Chambers
960.9 cy Field
611.1 cy Stone



Pond 1P: USSF


Hydrograph
Inflow Area=1.24 ac
Peak Elev=121.91'
Storage=10,207 cf
Inflow
Outflow
Primary
Secondary
6.07 cfs
1.16 cfs
1.16 cfs
0.00 cfs
Flow (cfs)
Time (hours)
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48
0 1 2 3 4 5 6

Summary for Pond 206P: City CB @ Fletcher & Danforth

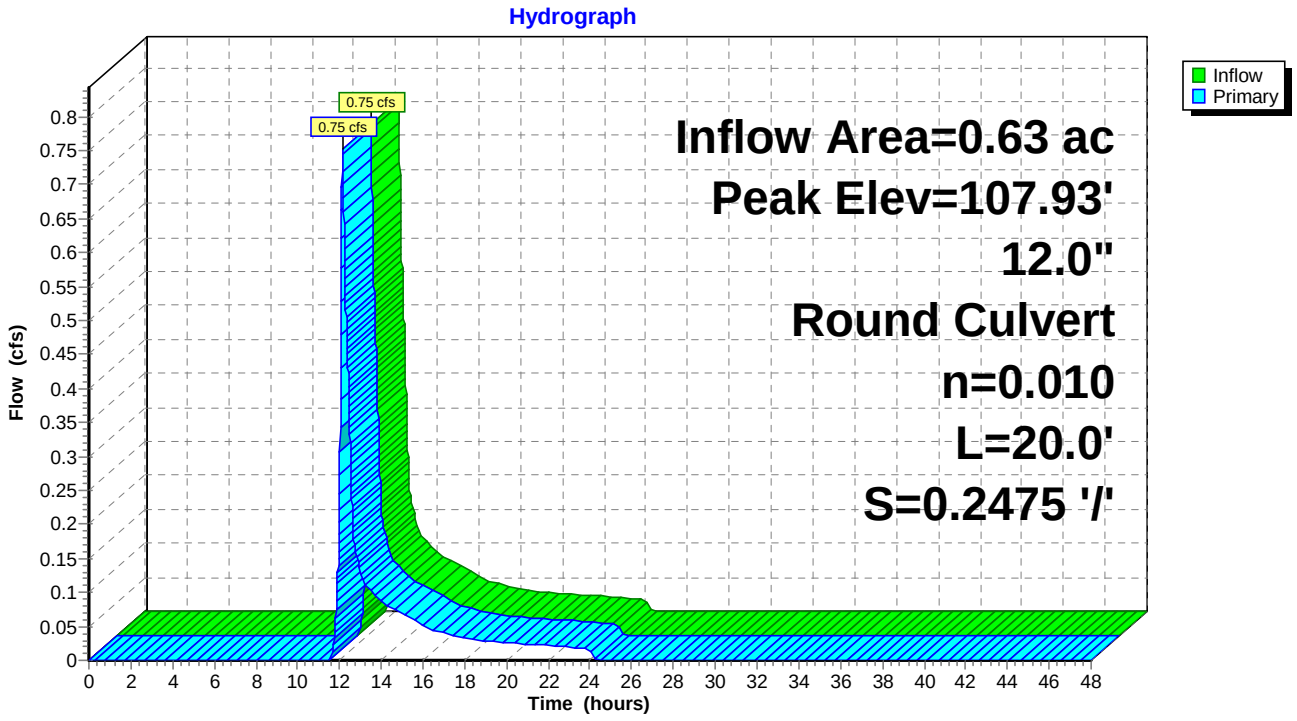
Inflow Area = 0.63 ac, 25.26% Impervious, Inflow Depth = 1.33" for 25-YR event
Inflow = 0.75 cfs @ 12.15 hrs, Volume= 0.070 af
Outflow = 0.75 cfs @ 12.15 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.0 min
Primary = 0.75 cfs @ 12.15 hrs, Volume= 0.070 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 107.93' @ 12.15 hrs
Flood Elev= 111.26'

Device	Routing	Invert	Outlet Devices
#1	Primary	107.43'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 107.43' / 102.48' S= 0.2475 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.75 cfs @ 12.15 hrs HW=107.93' (Free Discharge)
1=Culvert (Inlet Controls 0.75 cfs @ 1.90 fps)

Pond 206P: City CB @ Fletcher & Danforth



Summary for Pond 210P: Existing FI

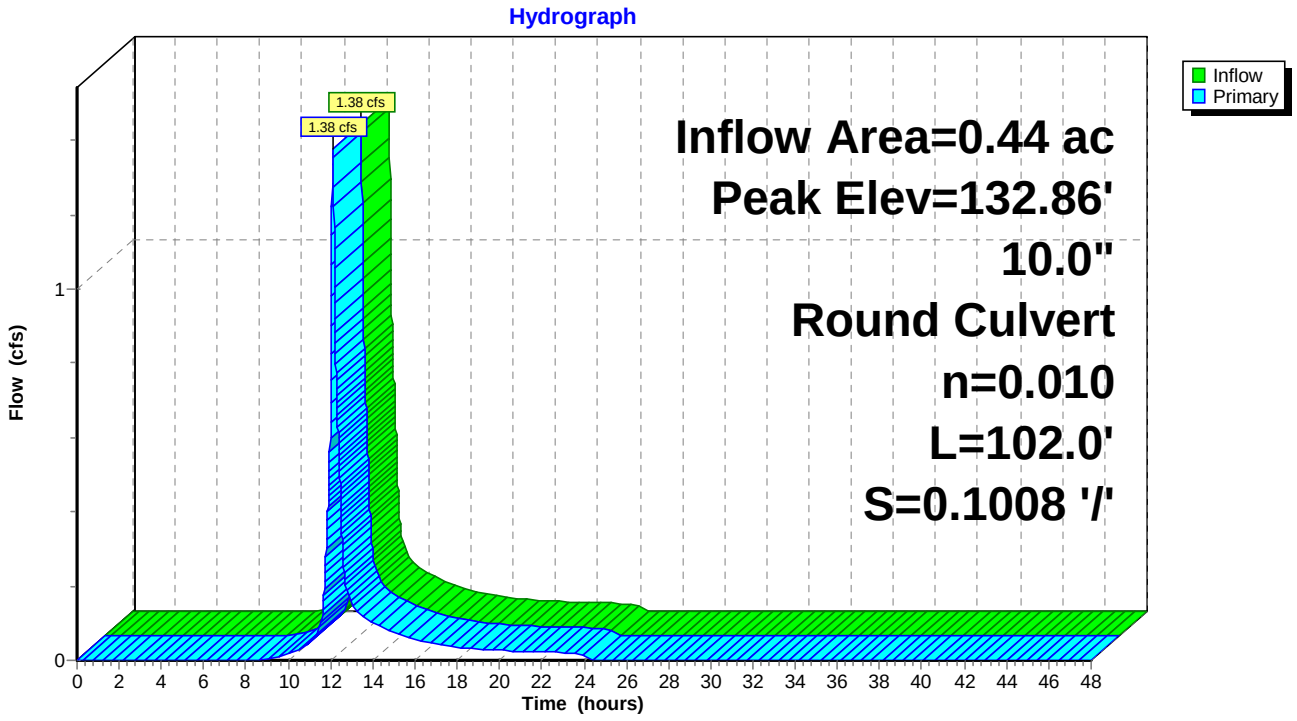
Inflow Area = 0.44 ac, 56.16% Impervious, Inflow Depth = 2.83" for 25-YR event
Inflow = 1.38 cfs @ 12.11 hrs, Volume= 0.104 af
Outflow = 1.38 cfs @ 12.11 hrs, Volume= 0.104 af, Atten= 0%, Lag= 0.0 min
Primary = 1.38 cfs @ 12.11 hrs, Volume= 0.104 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 132.86' @ 12.11 hrs
Flood Elev= 140.41'

Device	Routing	Invert	Outlet Devices
#1	Primary	132.00'	**10.0" Round Culvert** L= 102.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 132.00' / 121.72' S= 0.1008 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.38 cfs @ 12.11 hrs HW=132.86' (Free Discharge)
1=Culvert (Inlet Controls 1.38 cfs @ 2.53 fps)

Pond 210P: Existing FI



Summary for Pond 220P: Existing DMH

[79] Warning: Submerged Pond 210P Primary device # 1 OUTLET by 0.81'

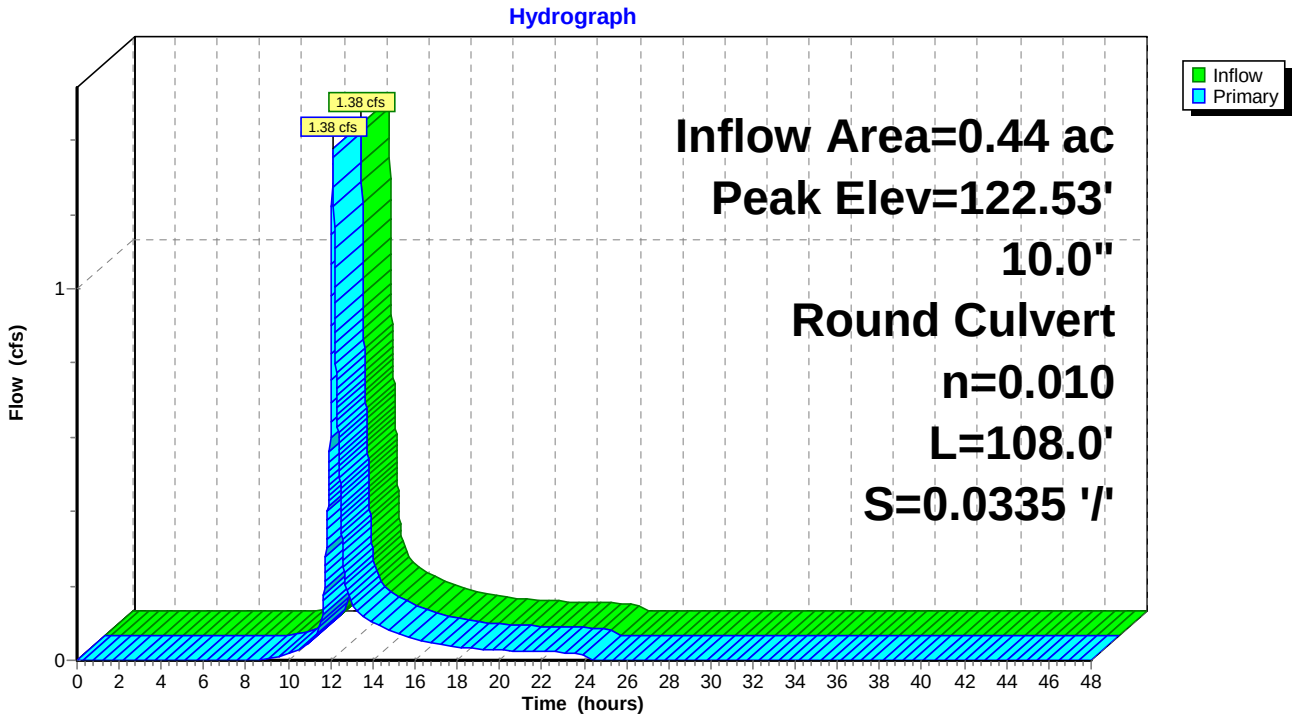
Inflow Area = 0.44 ac, 56.16% Impervious, Inflow Depth = 2.83" for 25-YR event
Inflow = 1.38 cfs @ 12.11 hrs, Volume= 0.104 af
Outflow = 1.38 cfs @ 12.11 hrs, Volume= 0.104 af, Atten= 0%, Lag= 0.0 min
Primary = 1.38 cfs @ 12.11 hrs, Volume= 0.104 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 122.53' @ 12.11 hrs
Flood Elev= 128.47'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.67'	**10.0" Round Culvert** L= 108.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 121.67' / 118.05' S= 0.0335 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.37 cfs @ 12.11 hrs HW=122.53' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.37 cfs @ 2.52 fps)

Pond 220P: Existing DMH



Summary for Pond 230P: Existing DMH

[81] Warning: Exceeded Pond 220P by 0.48' @ 12.12 hrs
[81] Warning: Exceeded Pond 260P by 2.56' @ 12.11 hrs

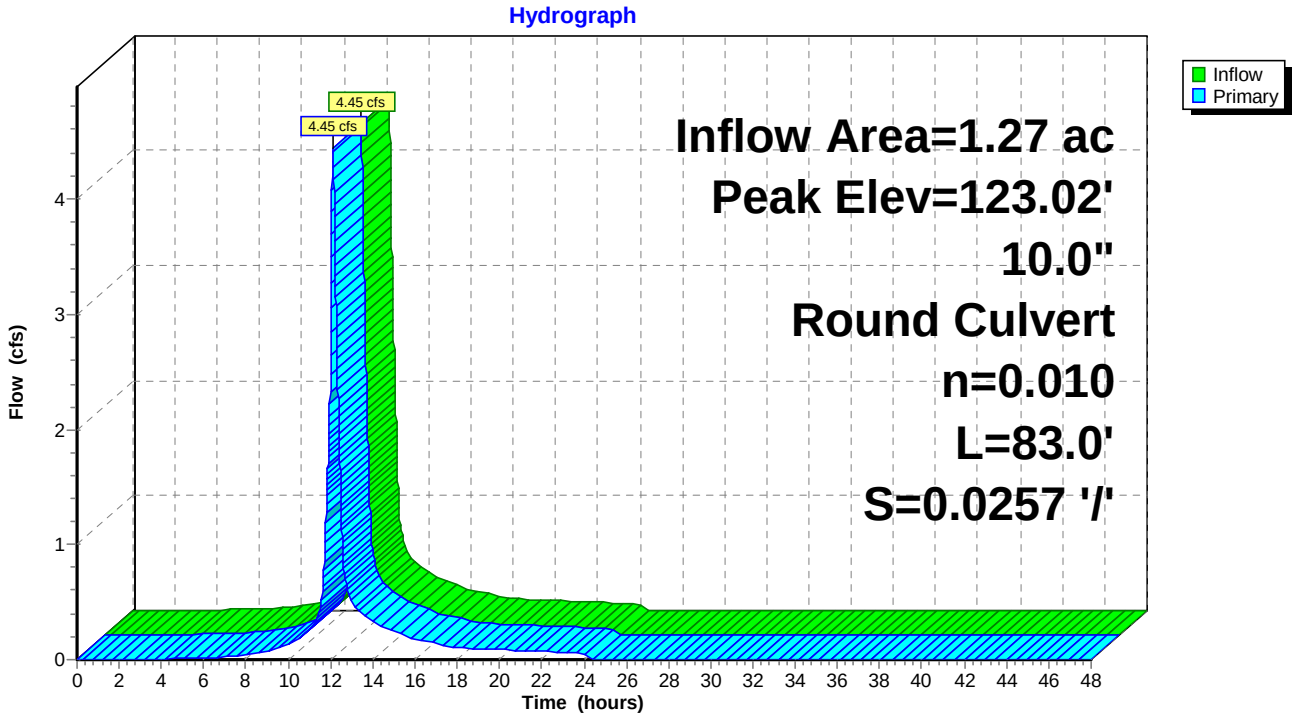
Inflow Area = 1.27 ac, 70.40% Impervious, Inflow Depth = 3.69" for 25-YR event
Inflow = 4.45 cfs @ 12.12 hrs, Volume= 0.390 af
Outflow = 4.45 cfs @ 12.12 hrs, Volume= 0.390 af, Atten= 0%, Lag= 0.0 min
Primary = 4.45 cfs @ 12.12 hrs, Volume= 0.390 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 123.02' @ 12.12 hrs
Flood Elev= 125.05'

Device	Routing	Invert	Outlet Devices
#1	Primary	118.00'	**10.0" Round Culvert** L= 83.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 118.00' / 115.87' S= 0.0257 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=4.44 cfs @ 12.12 hrs HW=123.01' (Free Discharge)
└**1=Culvert** (Inlet Controls 4.44 cfs @ 8.14 fps)

Pond 230P: Existing DMH



Summary for Pond 260P: Storage Pipes

[62] Hint: Exceeded Reach 161R OUTLET depth by 2.04' @ 12.15 hrs

Inflow Area = 0.72 ac, 79.29% Impervious, Inflow Depth = 4.22" for 25-YR event
Inflow = 3.53 cfs @ 12.07 hrs, Volume= 0.254 af
Outflow = 2.69 cfs @ 12.14 hrs, Volume= 0.254 af, Atten= 24%, Lag= 3.8 min
Primary = 2.69 cfs @ 12.14 hrs, Volume= 0.254 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 120.47' @ 12.14 hrs Surf.Area= 924 sf Storage= 626 cf
Flood Elev= 125.26' Surf.Area= 0 sf Storage= 3,468 cf

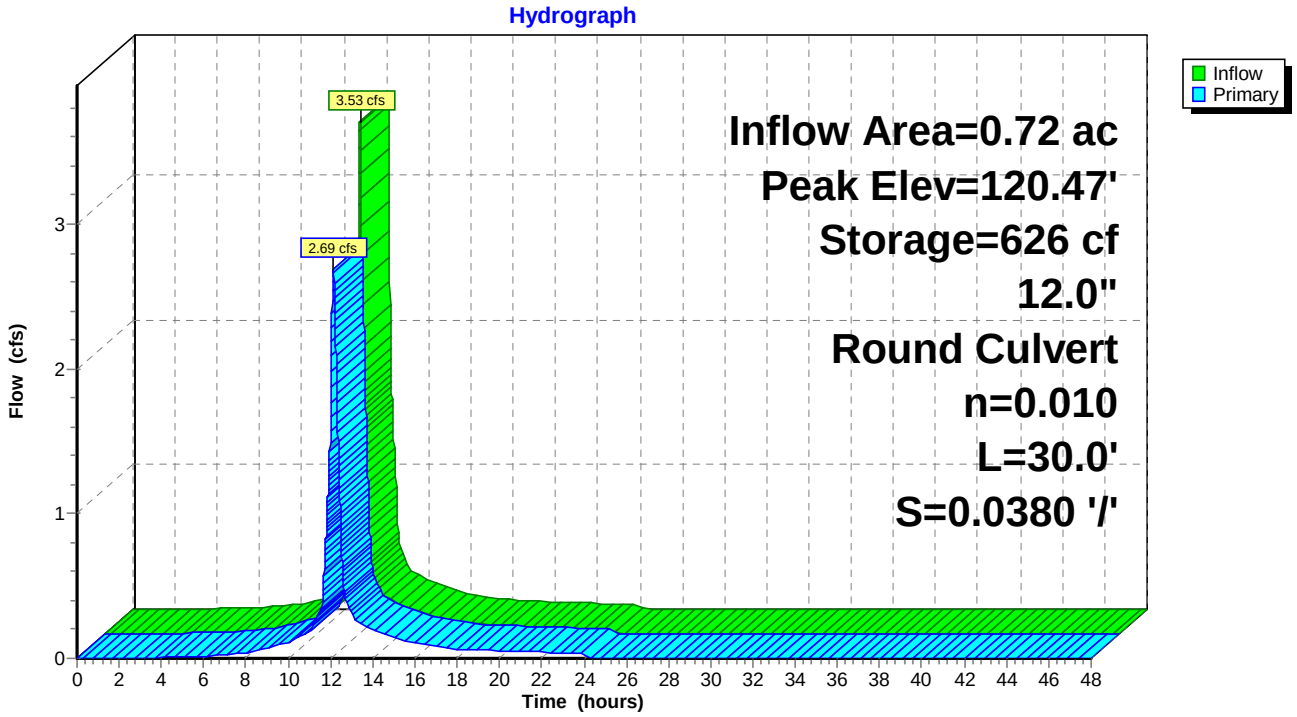
Plug-Flow detention time= 1.6 min calculated for 0.254 af (100% of inflow)
Center-of-Mass det. time= 1.6 min (791.3 - 789.6)

Volume	Invert	Avail.Storage	Storage Description
#1	119.16'	3,468 cf	**48.0" Round Pipe Storage** L= 276.0' S= 0.0027 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.16'	**12.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.16' / 118.02' S= 0.0380 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.68 cfs @ 12.14 hrs HW=120.47' (Free Discharge)
1=Culvert (Inlet Controls 2.68 cfs @ 3.42 fps)

Pond 260P: Storage Pipes



Summary for Pond 340P: CB at SW Cor prkng lot

[57] Hint: Peaked at 129.78' (Flood elevation advised)

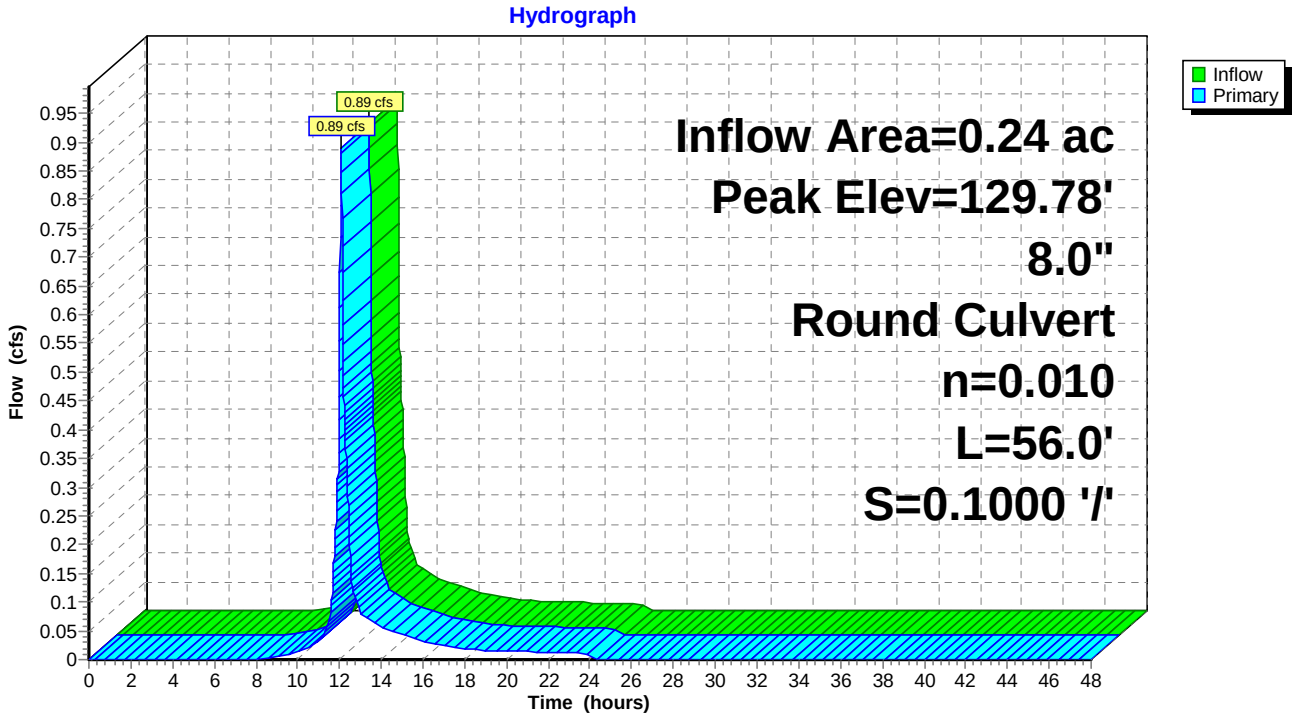
Inflow Area = 0.24 ac, 60.94% Impervious, Inflow Depth = 3.11" for 25-YR event
Inflow = 0.89 cfs @ 12.08 hrs, Volume= 0.061 af
Outflow = 0.89 cfs @ 12.08 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min
Primary = 0.89 cfs @ 12.08 hrs, Volume= 0.061 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 129.78' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	129.00'	**8.0" Round Culvert** L= 56.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 129.00' / 123.40' S= 0.1000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.89 cfs @ 12.08 hrs HW=129.78' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.89 cfs @ 2.54 fps)

Pond 340P: CB at SW Cor prkng lot



Summary for Pond CB4: Proposed DMH

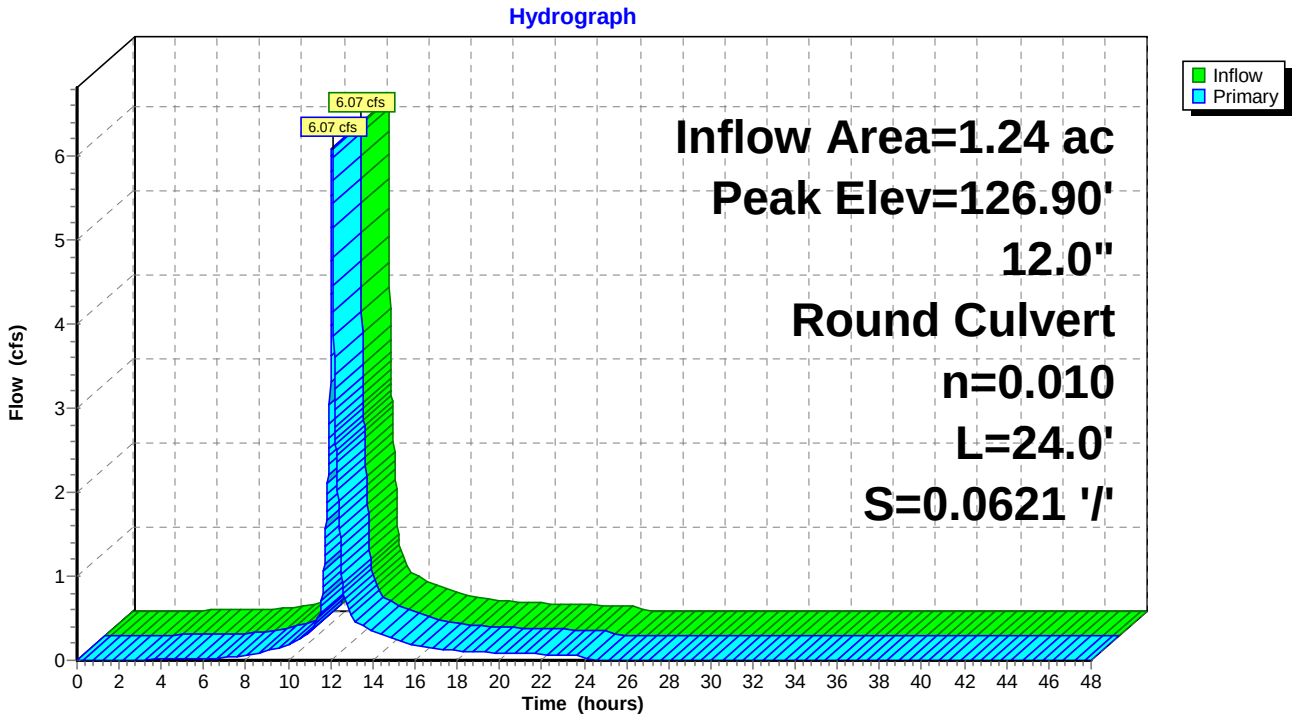
Inflow Area = 1.24 ac, 78.73% Impervious, Inflow Depth = 4.20" for 25-YR event
Inflow = 6.07 cfs @ 12.07 hrs, Volume= 0.433 af
Outflow = 6.07 cfs @ 12.07 hrs, Volume= 0.433 af, Atten= 0%, Lag= 0.0 min
Primary = 6.07 cfs @ 12.07 hrs, Volume= 0.433 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 126.90' @ 12.07 hrs
Flood Elev= 127.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.26'	**12.0" Round Culvert** L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 122.26' / 120.77' S= 0.0621 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=6.06 cfs @ 12.07 hrs HW=126.88' (Free Discharge)
1=Culvert (Inlet Controls 6.06 cfs @ 7.72 fps)

Pond CB4: Proposed DMH



Summary for Pond DMH: OCS Bypass

[79] Warning: Submerged Pond 1P Primary device # 1 INLET by 0.48'
[79] Warning: Submerged Pond DMH6 Secondary device # 2 by 0.38'

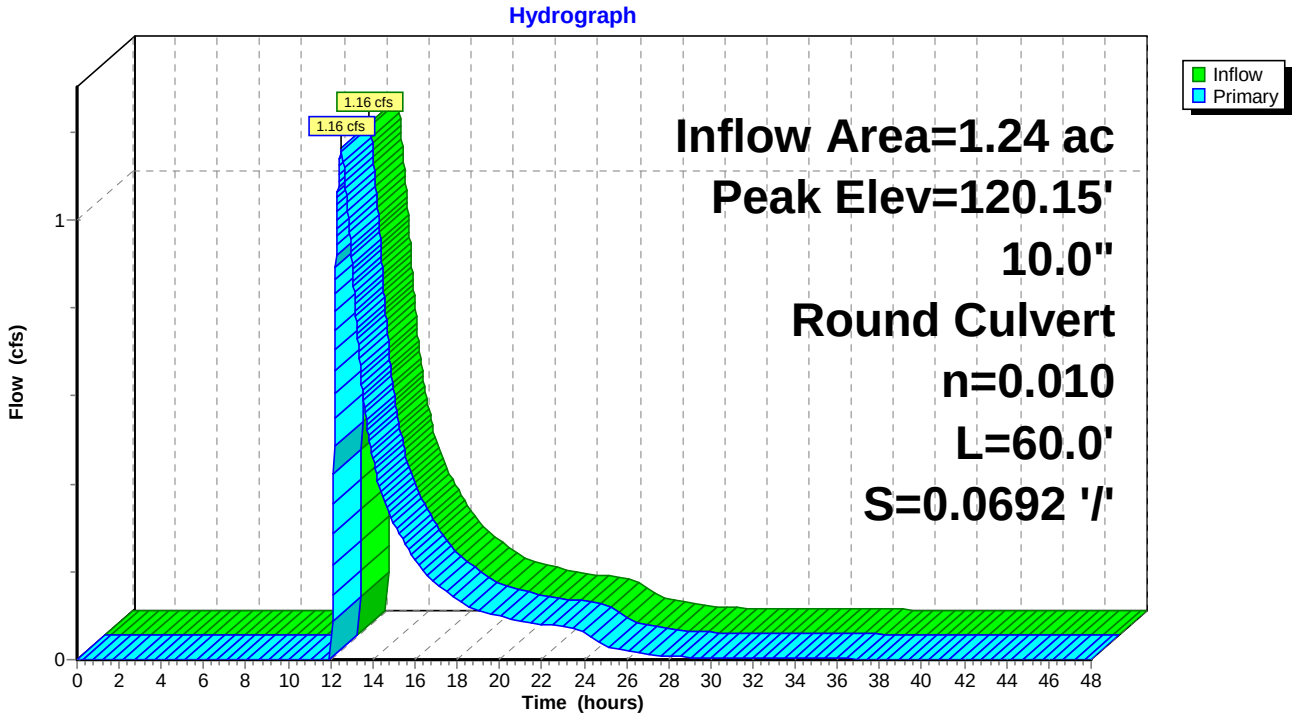
Inflow Area = 1.24 ac, 78.73% Impervious, Inflow Depth > 2.57" for 25-YR event
Inflow = 1.16 cfs @ 12.51 hrs, Volume= 0.265 af
Outflow = 1.16 cfs @ 12.51 hrs, Volume= 0.265 af, Atten= 0%, Lag= 0.0 min
Primary = 1.16 cfs @ 12.51 hrs, Volume= 0.265 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 120.15' @ 12.51 hrs
Flood Elev= 126.48'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.42'	**10.0" Round Culvert** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.42' / 115.27' S= 0.0692 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.17 cfs @ 12.51 hrs HW=120.15' (Free Discharge)
1=Culvert (Inlet Controls 1.17 cfs @ 2.30 fps)

Pond DMH: OCS Bypass



Summary for Pond DMH6: Access MH

[79] Warning: Submerged Pond CB4 Primary device # 1 OUTLET by 0.47'

Inflow Area = 1.24 ac, 78.73% Impervious, Inflow Depth = 4.20" for 25-YR event
Inflow = 6.07 cfs @ 12.07 hrs, Volume= 0.433 af
Outflow = 6.07 cfs @ 12.07 hrs, Volume= 0.433 af, Atten= 0%, Lag= 0.0 min
Primary = 6.07 cfs @ 12.07 hrs, Volume= 0.433 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

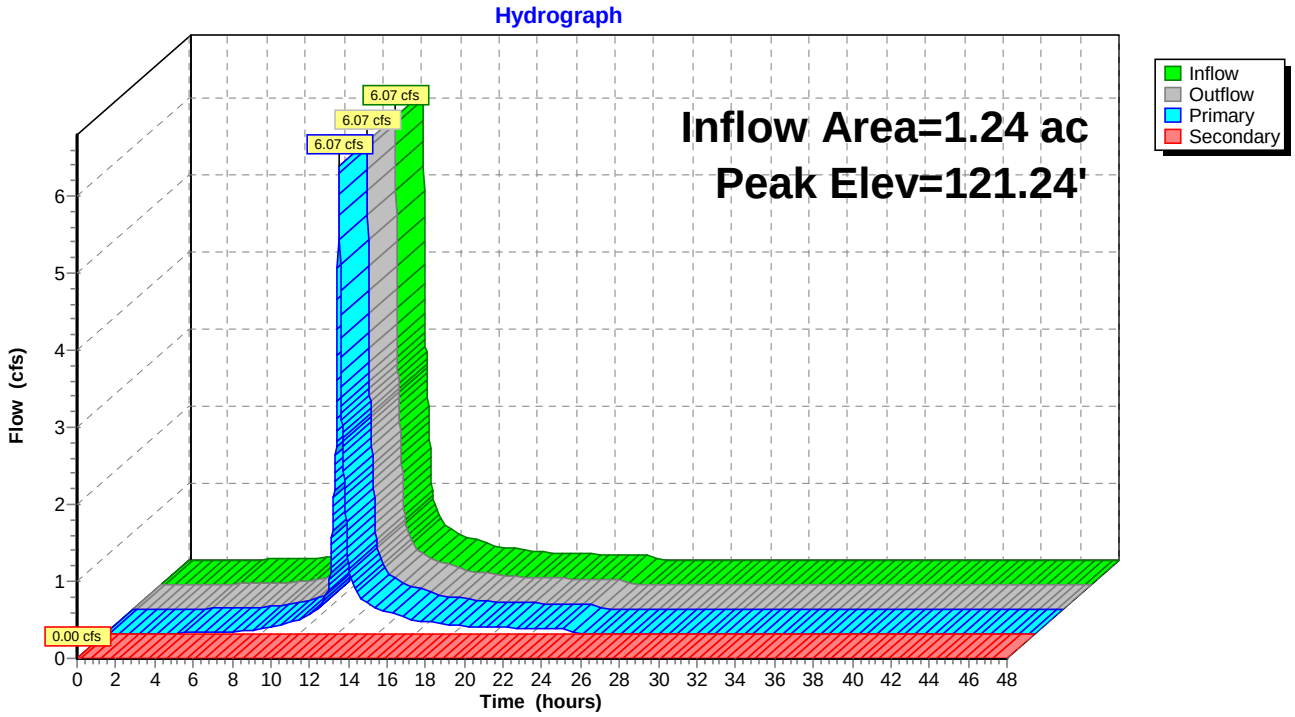
Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 121.24' @ 12.07 hrs
Flood Elev= 126.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.77'	**24.0" Round Culvert** L= 9.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.77' / 119.77' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Secondary	119.77'	**24.0" Round Culvert** L= 2.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.77' / 119.77' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#3	Device 2	123.35'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=6.06 cfs @ 12.07 hrs HW=121.23' (Free Discharge)
└**1=Culvert** (Barrel Controls 6.06 cfs @ 3.43 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=119.77' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond DMH6: Access MH



Summary for Pond DMH7: Proposed DMH

[79] Warning: Submerged Pond 1P Secondary device # 5 INLET by 4.58'
[79] Warning: Submerged Pond 230P Primary device # 1 INLET by 2.60'
[81] Warning: Exceeded Pond DMH by 0.87' @ 12.13 hrs

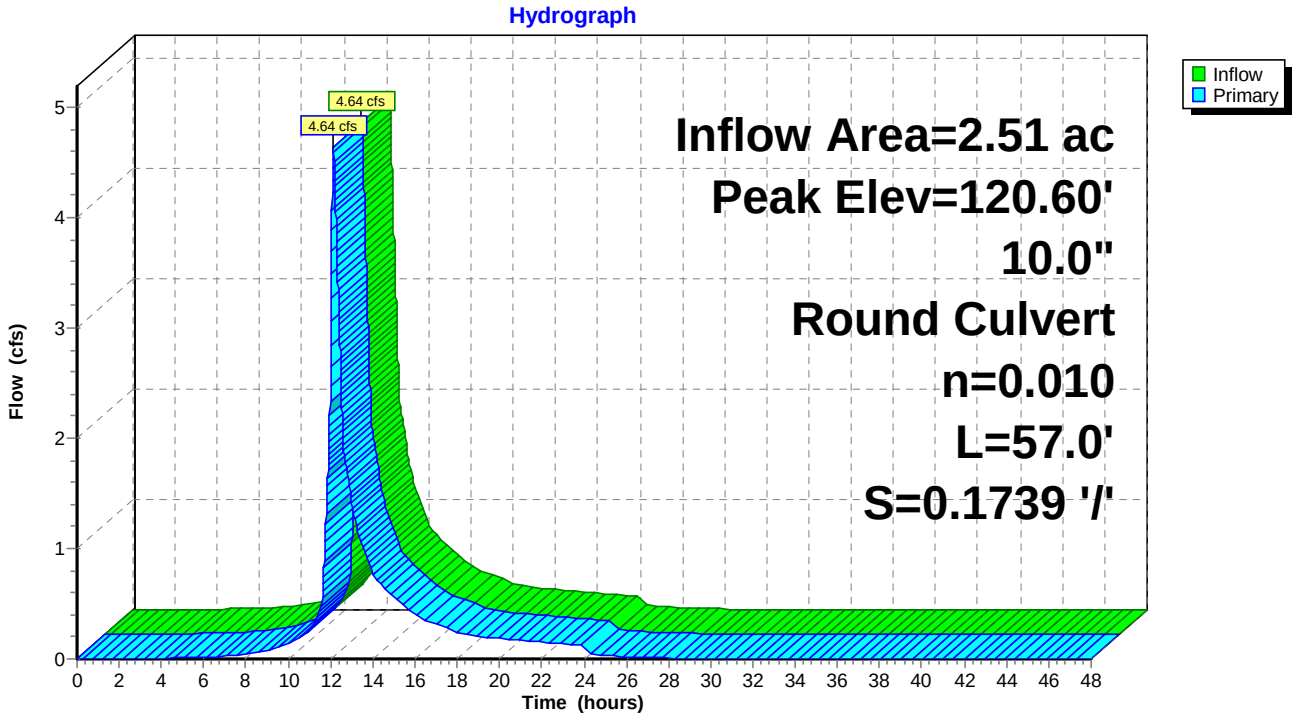
Inflow Area = 2.51 ac, 74.51% Impervious, Inflow Depth = 3.14" for 25-YR event
Inflow = 4.64 cfs @ 12.14 hrs, Volume= 0.656 af
Outflow = 4.64 cfs @ 12.14 hrs, Volume= 0.656 af, Atten= 0%, Lag= 0.0 min
Primary = 4.64 cfs @ 12.14 hrs, Volume= 0.656 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 120.60' @ 12.14 hrs
Flood Elev= 124.69'

Device	Routing	Invert	Outlet Devices
#1	Primary	115.17'	**10.0" Round Culvert** L= 57.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 115.17' / 105.26' S= 0.1739 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=4.64 cfs @ 12.14 hrs HW=120.60' (Free Discharge)
└**1=Culvert** (Inlet Controls 4.64 cfs @ 8.51 fps)

Pond DMH7: Proposed DMH

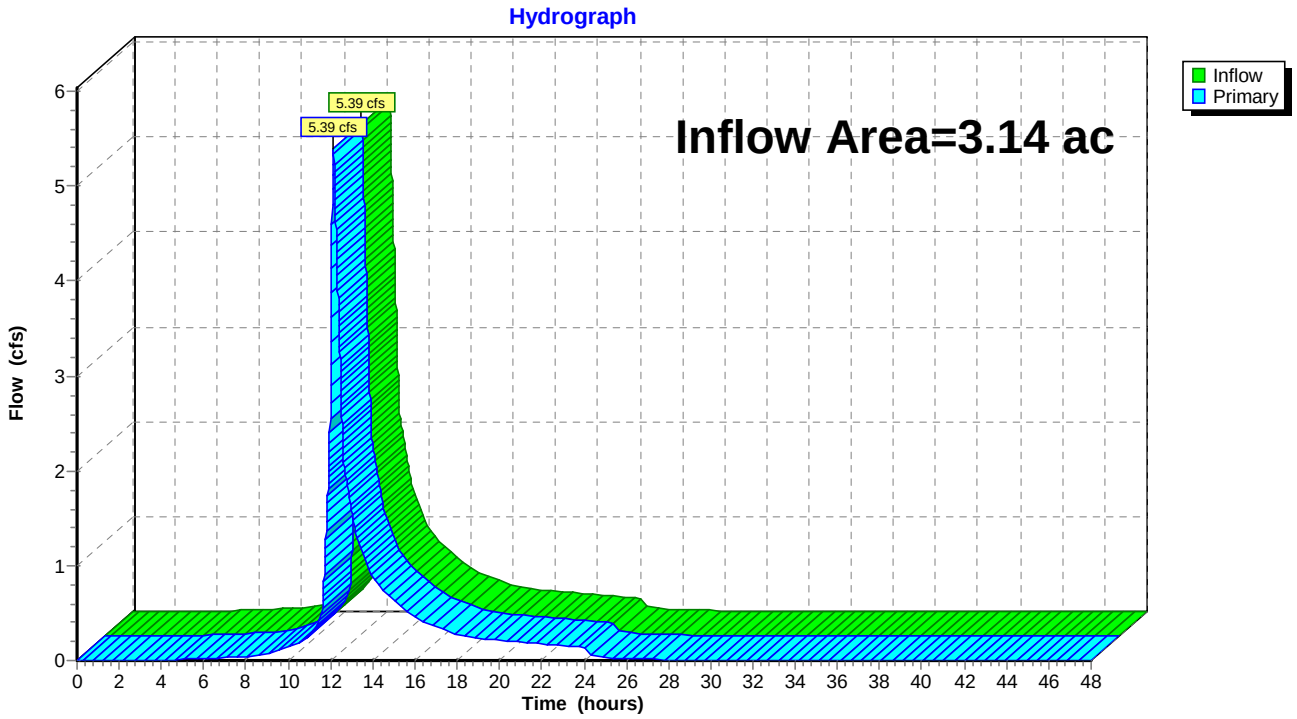


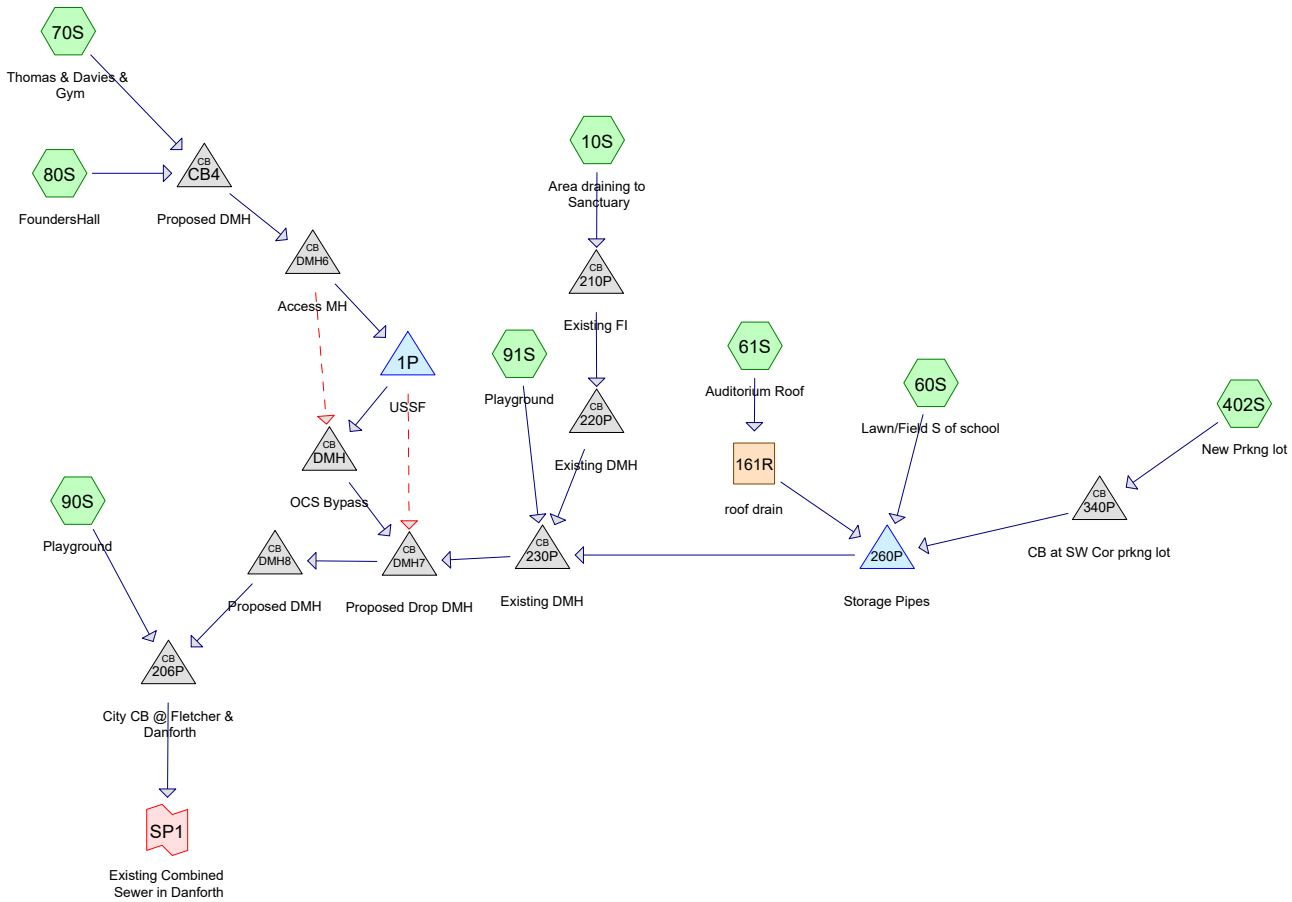
Summary for Link SP1: Existing Combined Sewer in Danforth/Doghouse MH DMH 8

Inflow Area = 3.14 ac, 64.59% Impervious, Inflow Depth = 2.77" for 25-YR event
Inflow = 5.39 cfs @ 12.14 hrs, Volume= 0.726 af
Primary = 5.39 cfs @ 12.14 hrs, Volume= 0.726 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link SP1: Existing Combined Sewer in Danforth/Doghouse MH DMH 8





Subcat Reach Pond Link

Routing Diagram for 6. Post
Prepared by Woodard & Curran, Inc, Printed 11/15/2024
HydroCAD® 10.20-2h s/n 01204 © 2024 HydroCAD Software Solutions LLC

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10S: Area draining to Runoff Area=19,254 sf 56.16% Impervious Runoff Depth=0.87"
Flow Length=91' Slope=0.0300 '/' Tc=7.7 min CN=72 Runoff=0.39 cfs 0.032 af

Subcatchment60S: Lawn/Field S of school Runoff Area=16,715 sf 84.98% Impervious Runoff Depth=1.99"
Tc=5.0 min CN=89 Runoff=0.92 cfs 0.064 af

Subcatchment61S: Auditorium Roof Runoff Area=4,485 sf 100.00% Impervious Runoff Depth=2.87"
Tc=5.0 min CN=98 Runoff=0.32 cfs 0.025 af

Subcatchment70S: Thomas & Davies & Runoff Area=44,441 sf 78.03% Impervious Runoff Depth=1.67"
Flow Length=91' Slope=0.1593 '/' Tc=5.0 min CN=85 Runoff=2.07 cfs 0.142 af

Subcatchment80S: FoundersHall Runoff Area=9,466 sf 100.00% Impervious Runoff Depth=2.87"
Tc=5.0 min CN=98 Runoff=0.68 cfs 0.052 af

Subcatchment90S: Playground Runoff Area=27,554 sf 25.26% Impervious Runoff Depth=0.20"
Flow Length=117' Tc=9.2 min CN=54 Runoff=0.04 cfs 0.010 af

Subcatchment91S: Playground Runoff Area=4,688 sf 69.20% Impervious Runoff Depth=1.33"
Tc=5.0 min CN=80 Runoff=0.17 cfs 0.012 af

Subcatchment402S: New Prkng lot Runoff Area=10,240 sf 60.94% Impervious Runoff Depth=1.03"
Tc=5.0 min CN=75 Runoff=0.28 cfs 0.020 af

Reach 161R: roof drain Avg. Flow Depth=0.15' Max Vel=6.63 fps Inflow=0.32 cfs 0.025 af
6.0" Round Pipe n=0.013 L=129.0' S=0.0911 '/' Capacity=1.69 cfs Outflow=0.32 cfs 0.025 af

Pond 1P: USSF Peak Elev=121.21' Storage=7,687 cf Inflow=2.75 cfs 0.194 af
Primary=0.04 cfs 0.026 af Secondary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.026 af

Pond 206P: City CB @ Fletcher & Danforth Peak Elev=108.33' Inflow=1.91 cfs 0.189 af
12.0" Round Culvert n=0.010 L=20.0' S=0.2475 '/' Outflow=1.91 cfs 0.189 af

Pond 210P: Existing FI Peak Elev=132.37' Inflow=0.39 cfs 0.032 af
10.0" Round Culvert n=0.010 L=102.0' S=0.1008 '/' Outflow=0.39 cfs 0.032 af

Pond 220P: Existing DMH Peak Elev=122.04' Inflow=0.39 cfs 0.032 af
10.0" Round Culvert n=0.010 L=108.0' S=0.0335 '/' Outflow=0.39 cfs 0.032 af

Pond 230P: Existing DMH Peak Elev=119.26' Inflow=1.91 cfs 0.152 af
10.0" Round Culvert n=0.010 L=83.0' S=0.0257 '/' Outflow=1.91 cfs 0.152 af

Pond 260P: Storage Pipes Peak Elev=119.87' Storage=164 cf Inflow=1.52 cfs 0.108 af
12.0" Round Culvert n=0.010 L=30.0' S=0.0380 '/' Outflow=1.37 cfs 0.108 af

Pond 340P: CB at SW Cor prkng lot Peak Elev=129.34' Inflow=0.28 cfs 0.020 af
8.0" Round Culvert n=0.010 L=56.0' S=0.1000 '/' Outflow=0.28 cfs 0.020 af

Pond CB4: Proposed DMH Peak Elev=123.61' Inflow=2.75 cfs 0.194 af
12.0" Round Culvert n=0.010 L=24.0' S=0.0621 '/' Outflow=2.75 cfs 0.194 af

Pond DMH: OCS Bypass Peak Elev=119.53' Inflow=0.04 cfs 0.026 af
10.0" Round Culvert n=0.010 L=60.0' S=0.0692 '/' Outflow=0.04 cfs 0.026 af

Pond DMH6: Access MH Peak Elev=120.72' Inflow=2.75 cfs 0.194 af
Primary=2.75 cfs 0.194 af Secondary=0.00 cfs 0.000 af Outflow=2.75 cfs 0.194 af

Pond DMH7: Proposed Drop DMH Peak Elev=116.43' Inflow=1.91 cfs 0.179 af
10.0" Round Culvert n=0.010 L=84.0' S=0.0175 '/' Outflow=1.91 cfs 0.179 af

Pond DMH8: Proposed DMH Peak Elev=114.96' Inflow=1.91 cfs 0.179 af
10.0" Round Culvert n=0.010 L=33.0' S=0.1445 '/' Outflow=1.91 cfs 0.179 af

Link SP1: Existing Combined Sewer in Danforth Inflow=1.91 cfs 0.189 af
Primary=1.91 cfs 0.189 af

Total Runoff Area = 3.14 ac Runoff Volume = 0.357 af Average Runoff Depth = 1.36"
34.17% Pervious = 1.07 ac 65.83% Impervious = 2.07 ac

Summary for Subcatchment 10S: Area draining to Sanctuary

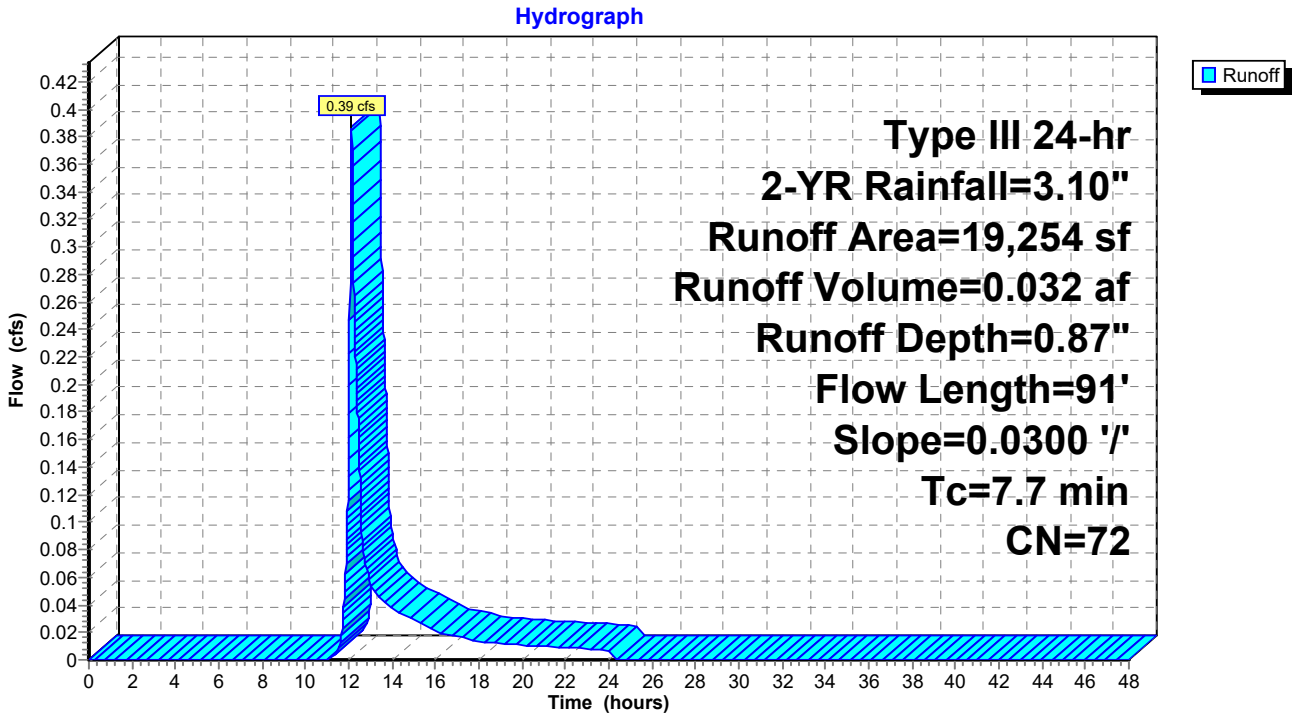
Runoff = 0.39 cfs @ 12.12 hrs, Volume= 0.032 af, Depth= 0.87"
Routed to Pond 210P : Existing FI

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 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	10,813	98	impervious
*	8,441	39	Lawn/field, HSG A
	19,254	72	Weighted Average
	8,441		43.84% Pervious Area
	10,813		56.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	91	0.0300	0.20		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"

Subcatchment 10S: Area draining to Sanctuary



Summary for Subcatchment 60S: Lawn/Field S of school

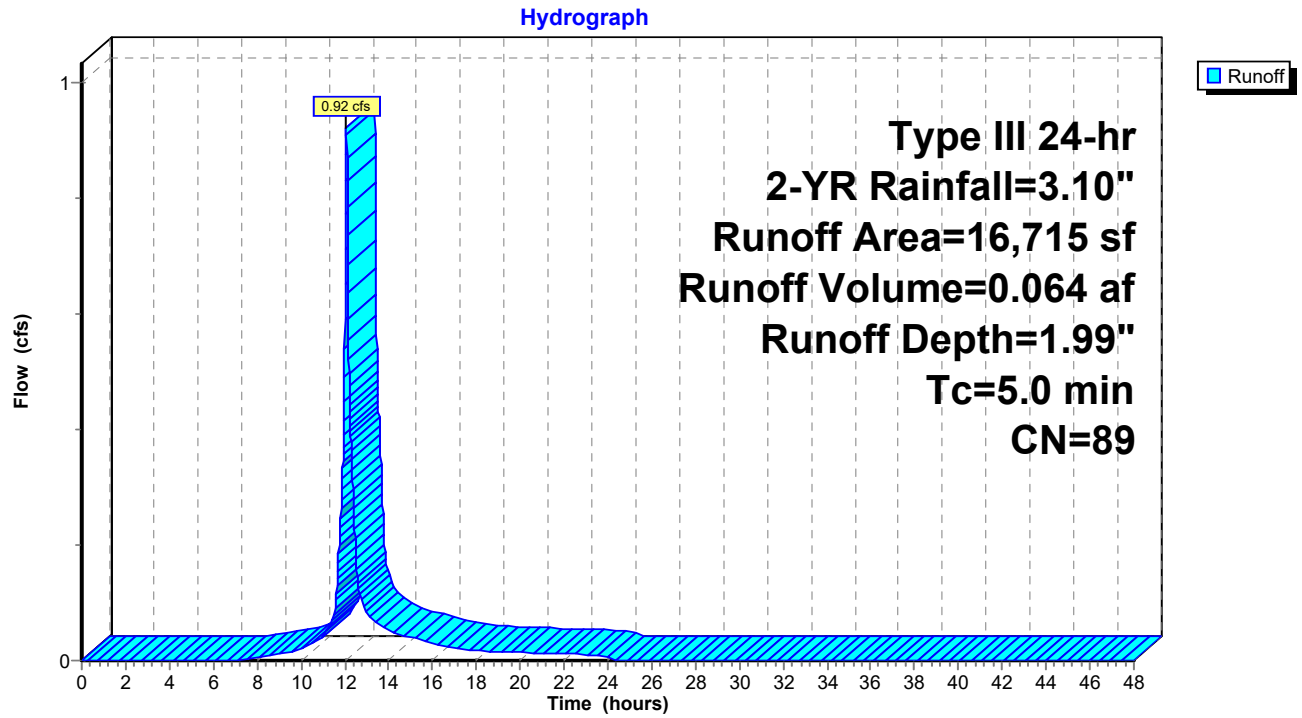
Runoff = 0.92 cfs @ 12.07 hrs, Volume= 0.064 af, Depth= 1.99"
Routed to Pond 260P : Storage Pipes

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 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	14,205	98	impervious
*	2,510	39	Lawn/field, HSG A
	16,715	89	Weighted Average
	2,510		15.02% Pervious Area
	14,205		84.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 60S: Lawn/Field S of school



Summary for Subcatchment 61S: Auditorium Roof

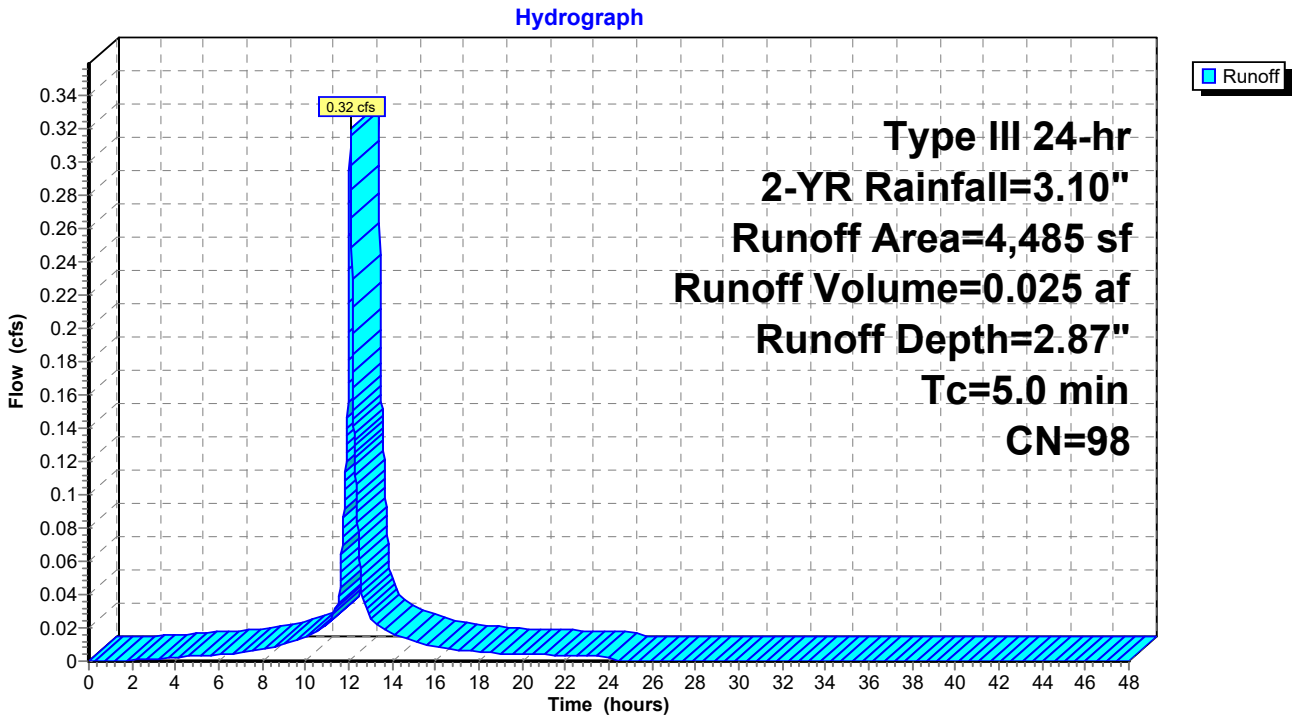
Runoff = 0.32 cfs @ 12.07 hrs, Volume= 0.025 af, Depth= 2.87"
Routed to Reach 161R : roof drain

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 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	4,485	98	Roof runoff
	4,485		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 61S: Auditorium Roof



Summary for Subcatchment 70S: Thomas & Davies & Gym

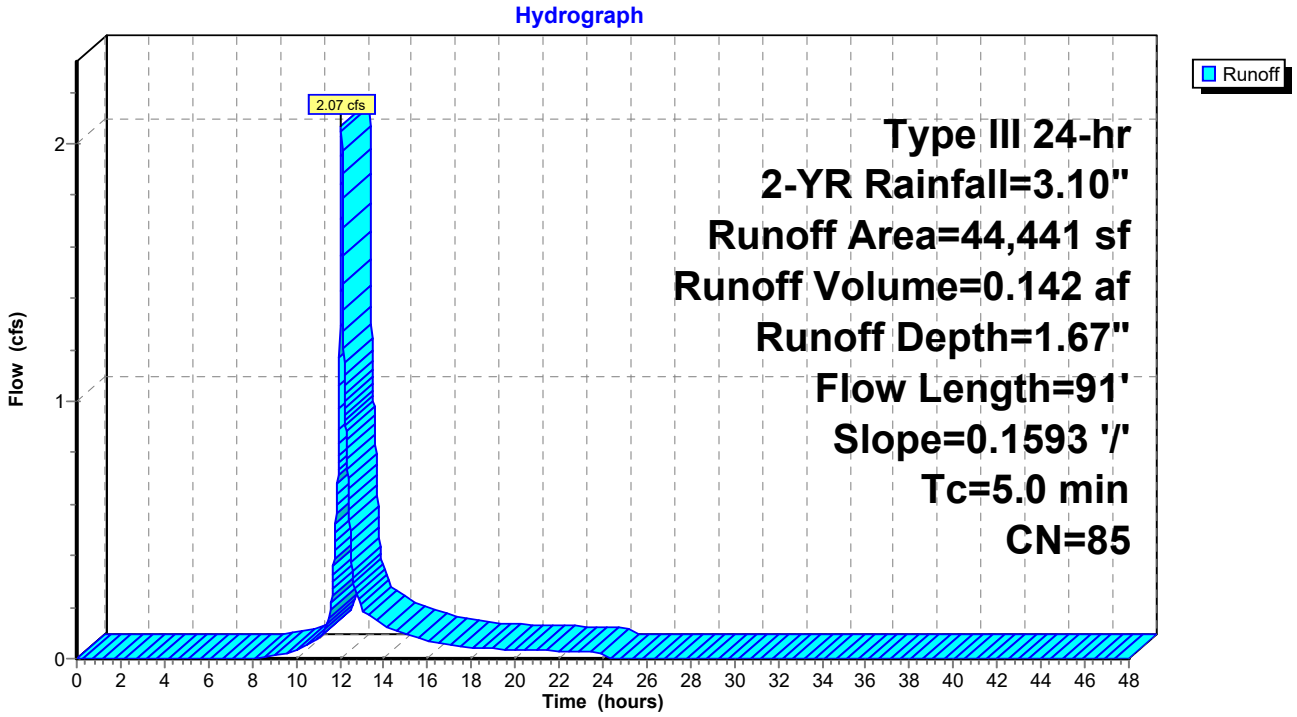
Runoff = 2.07 cfs @ 12.08 hrs, Volume= 0.142 af, Depth= 1.67"
Routed to Pond CB4 : Proposed DMH

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 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	34,676	98	impervious
*	9,765	39	Lawn/field, HSG A
	44,441	85	Weighted Average
	9,765		21.97% Pervious Area
	34,676		78.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	91	0.1593	0.38		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"
4.0	91	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 70S: Thomas & Davies & Gym



Summary for Subcatchment 80S: FoundersHall

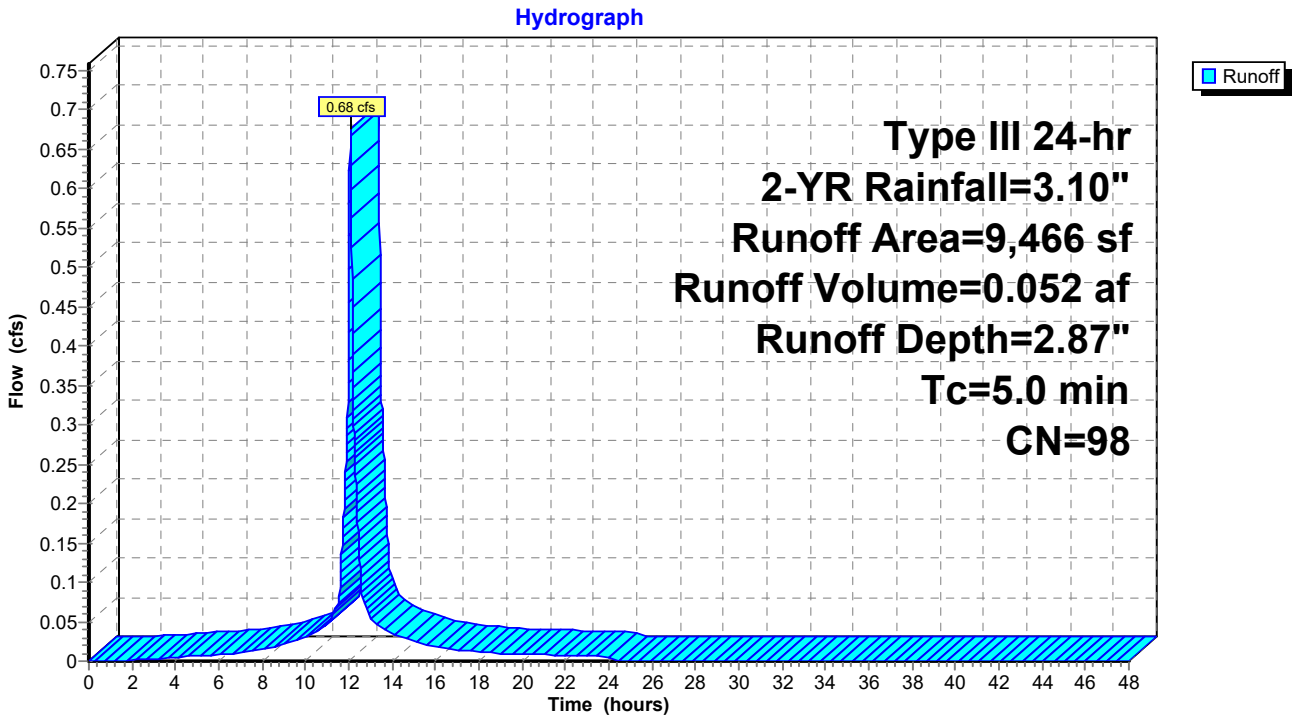
Runoff = 0.68 cfs @ 12.07 hrs, Volume= 0.052 af, Depth= 2.87"
Routed to Pond CB4 : Proposed DMH

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 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	9,466	98	Roof runoff
	9,466		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 80S: FoundersHall



Summary for Subcatchment 90S: Playground

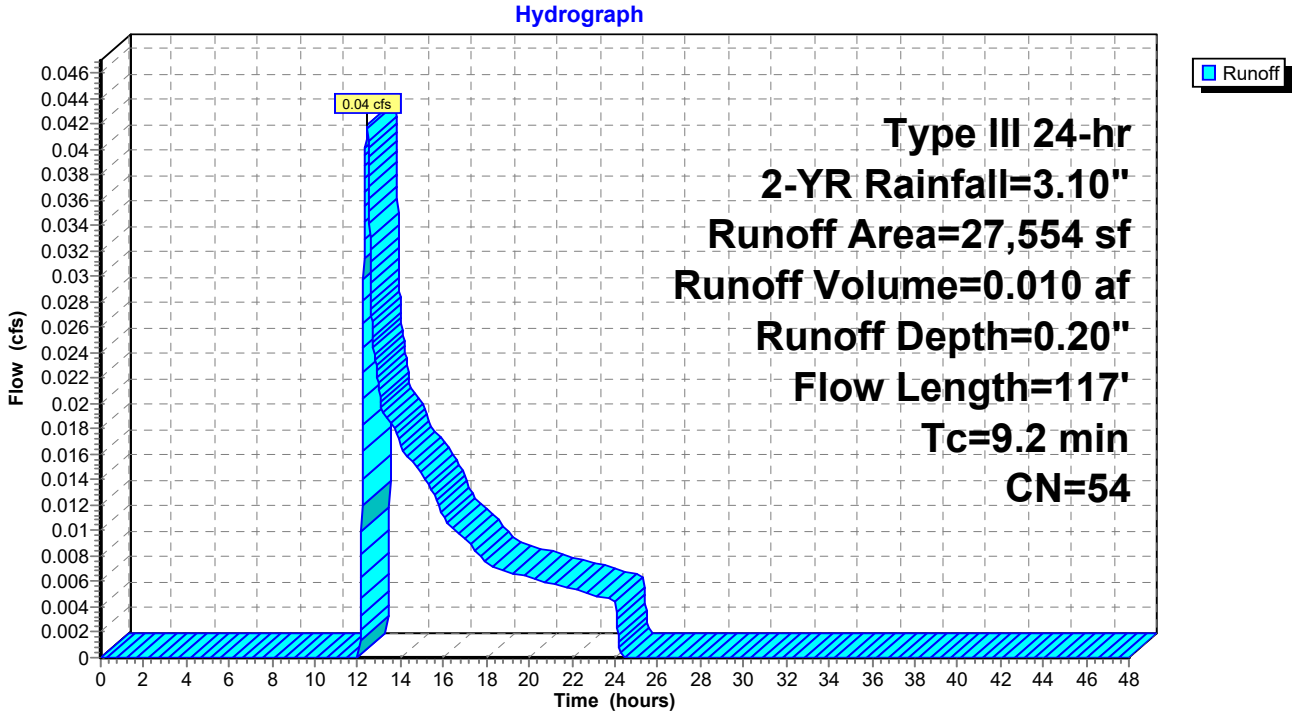
Runoff = 0.04 cfs @ 12.42 hrs, Volume= 0.010 af, Depth= 0.20"
Routed to Pond 206P : City CB @ Fletcher & Danforth

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 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	6,960	98	impervious
*	20,594	39	Lawn/field, HSG A
	27,554	54	Weighted Average
	20,594		74.74% Pervious Area
	6,960		25.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0250	0.19		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"
0.2	17	0.0588	1.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.2	117	Total			

Subcatchment 90S: Playground



Summary for Subcatchment 91S: Playground

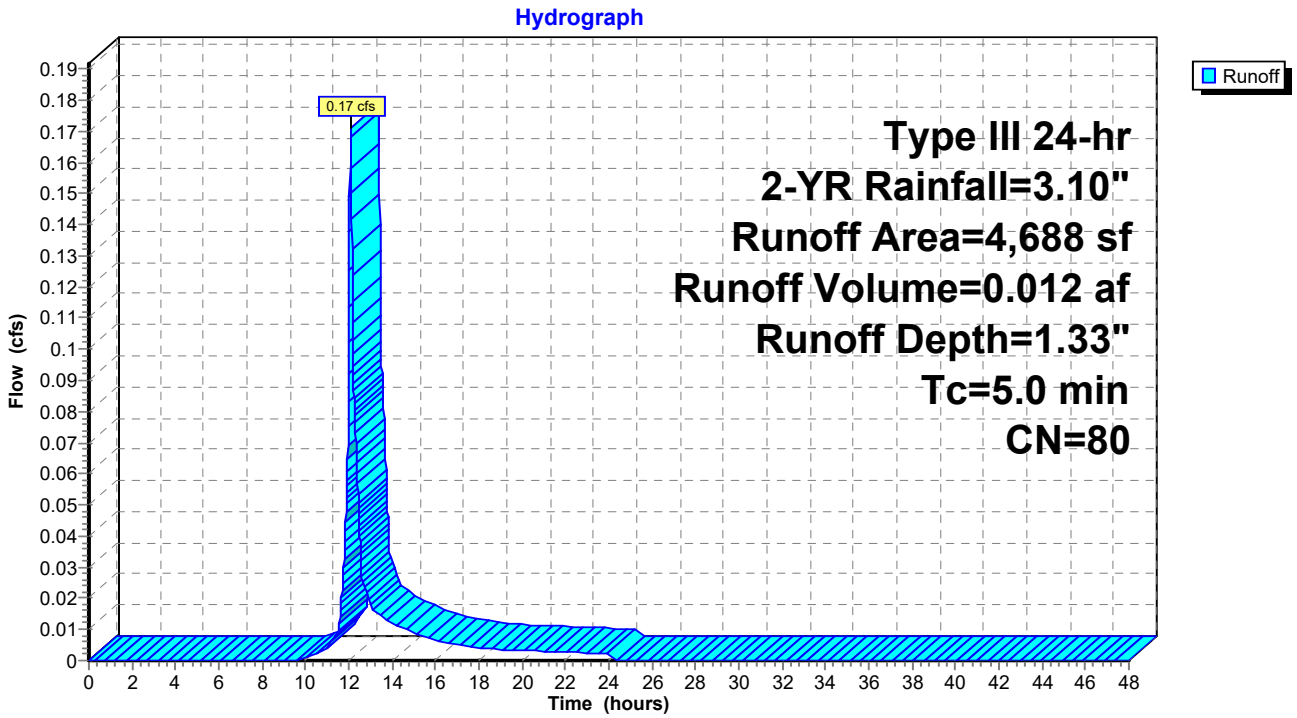
Runoff = 0.17 cfs @ 12.08 hrs, Volume= 0.012 af, Depth= 1.33"
Routed to Pond 230P : Existing DMH

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 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	3,244	98	impervious
*	1,444	39	Lawn/field, HSG A
	4,688	80	Weighted Average
	1,444		30.80% Pervious Area
	3,244		69.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 91S: Playground



Summary for Subcatchment 402S: New Prkng lot

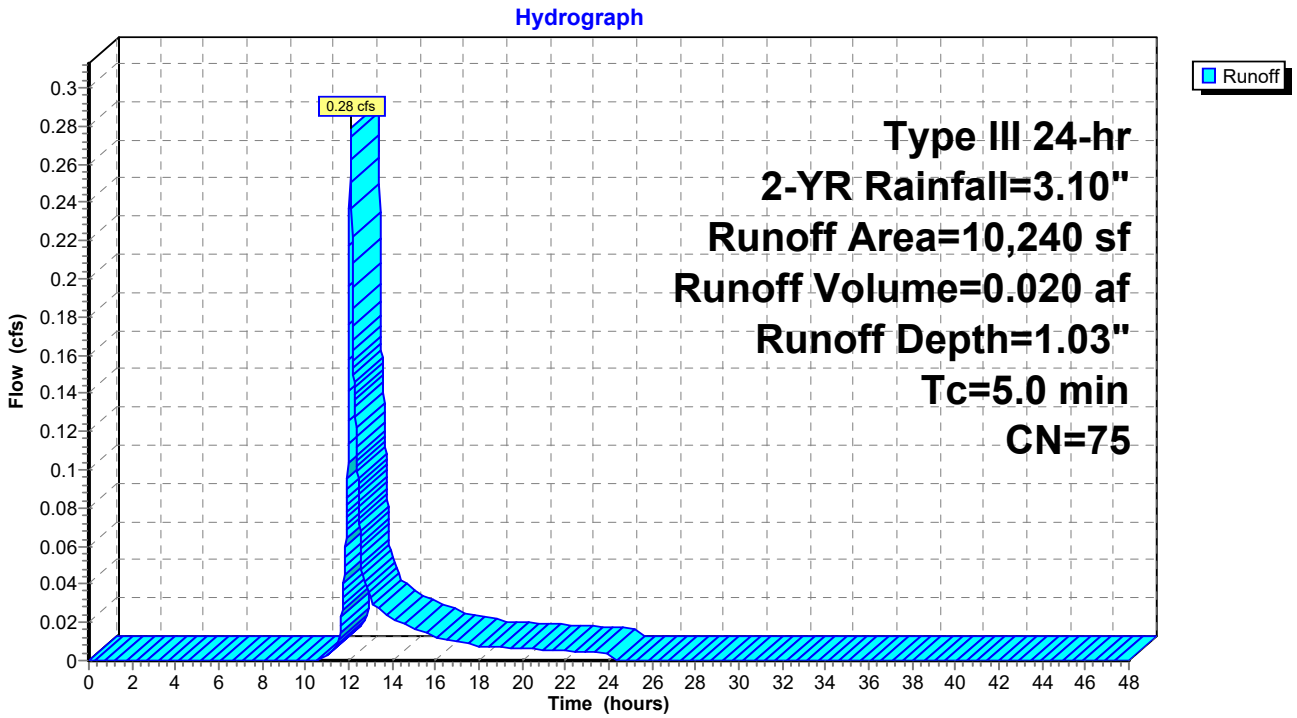
Runoff = 0.28 cfs @ 12.08 hrs, Volume= 0.020 af, Depth= 1.03"
Routed to Pond 340P : CB at SW Cor prkng lot

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 2-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	4,000	39	Pervious
*	6,240	98	Impervious
	10,240	75	Weighted Average
	4,000		39.06% Pervious Area
	6,240		60.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 402S: New Prkng lot



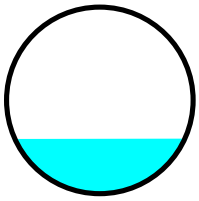
Summary for Reach 161R: roof drain

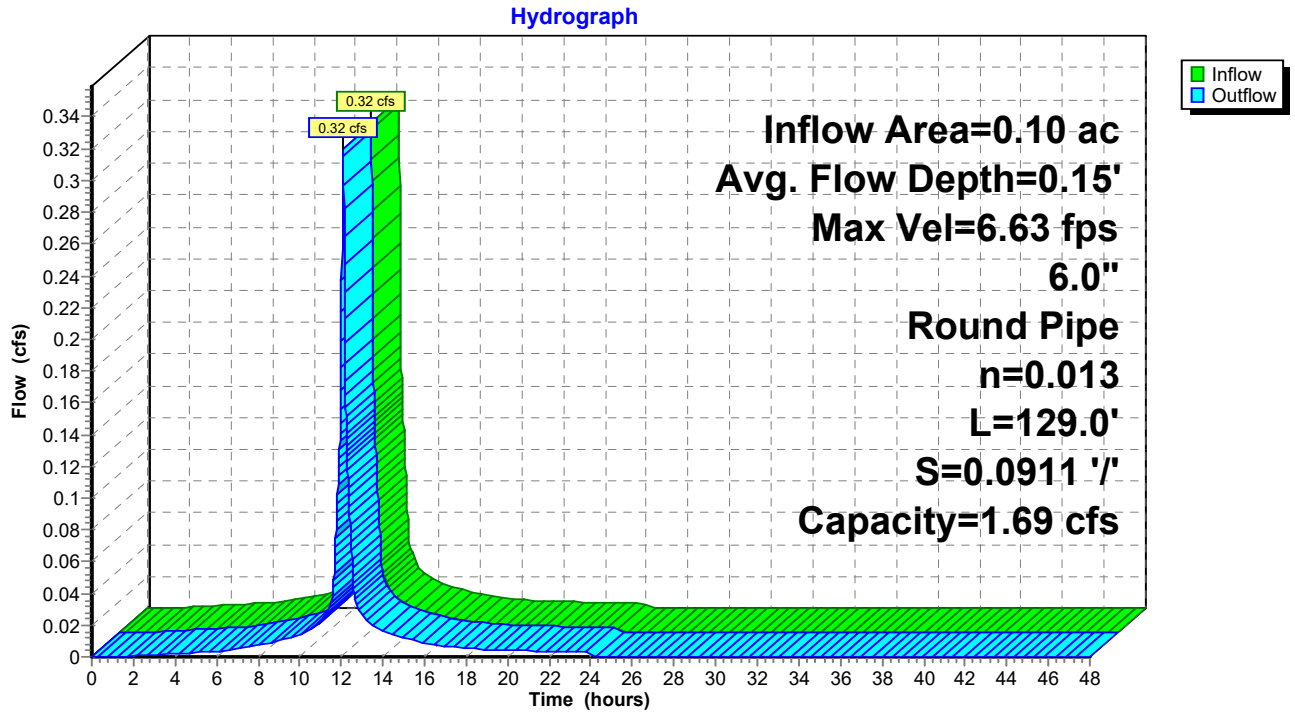
Inflow Area = 0.10 ac,100.00% Impervious, Inflow Depth = 2.87" for 2-YR event
Inflow = 0.32 cfs @ 12.07 hrs, Volume= 0.025 af
Outflow = 0.32 cfs @ 12.08 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.6 min
Routed to Pond 260P : Storage Pipes

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.63 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.15 fps, Avg. Travel Time= 1.0 min

Peak Storage= 6 cf @ 12.07 hrs
Average Depth at Peak Storage= 0.15' , Surface Width= 0.46'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 1.69 cfs

6.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 129.0' Slope= 0.0911 '/'
Inlet Invert= 130.00', Outlet Invert= 118.25'





Summary for Pond 1P: USSF

Inflow Area = 1.24 ac, 81.89% Impervious, Inflow Depth = 1.88" for 2-YR event
Inflow = 2.75 cfs @ 12.07 hrs, Volume= 0.194 af
Outflow = 0.04 cfs @ 21.04 hrs, Volume= 0.026 af, Atten= 99%, Lag= 538.0 min
Primary = 0.04 cfs @ 21.04 hrs, Volume= 0.026 af
Routed to Pond DMH : OCS Bypass
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond DMH7 : Proposed Drop DMH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 121.21' @ 21.04 hrs Surf.Area= 4,717 sf Storage= 7,687 cf
Flood Elev= 126.48' Surf.Area= 4,717 sf Storage= 16,044 cf

Plug-Flow detention time= 804.8 min calculated for 0.026 af (14% of inflow)
Center-of-Mass det. time= 596.6 min (1,404.4 - 807.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	118.85'	6,599 cf	**51.42'W x 91.74'L x 5.50'H Field A** 25,943 cf Overall - 9,445 cf Embedded = 16,499 cf x 40.0% Voids
#2A	119.60'	9,445 cf	**ADS_StormTech MC-3500 d +Cap** x 84 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 84 Chambers in 7 Rows Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf
		16,044 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	119.67'	**8.0" Round Culvert** L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.67' / 119.52' S= 0.0214 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#2	Device 1	123.35'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	121.10'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 5	118.85'	**2.410 in/hr Exfiltration over Surface area above 118.85'** Conductivity to Groundwater Elevation = 113.00' Excluded Surface area = 4,717 sf
#5	Secondary	116.02'	**6.0" Round Culvert** L= 31.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 116.02' / 115.88' S= 0.0045 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.04 cfs @ 21.04 hrs HW=121.21' (Free Discharge)
└─**1=Culvert** (Passes 0.04 cfs of 1.45 cfs potential flow)
  ├─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Orifice Controls 0.04 cfs @ 1.11 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=118.85' (Free Discharge)
└─**5=Culvert** (Passes 0.00 cfs of 1.20 cfs potential flow)
  └─**4=Exfiltration** (Controls 0.00 cfs)

Pond 1P: USSF - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

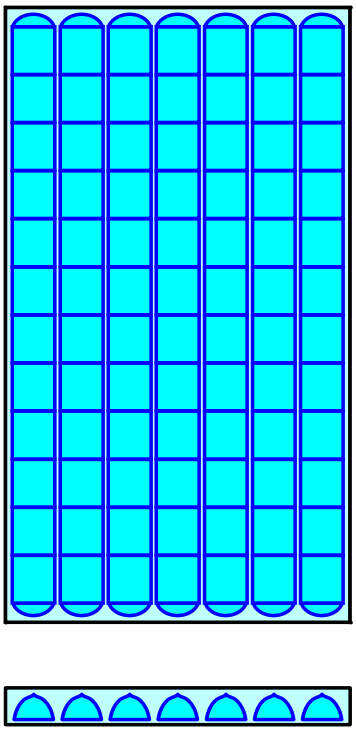
12 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 89.74' Row Length +12.0" End Stone x 2 = 91.74' Base Length
7 Rows x 77.0" Wide + 9.0" Spacing x 6 + 12.0" Side Stone x 2 = 51.42' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

84 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 7 Rows = 9,444.6 cf Chamber Storage

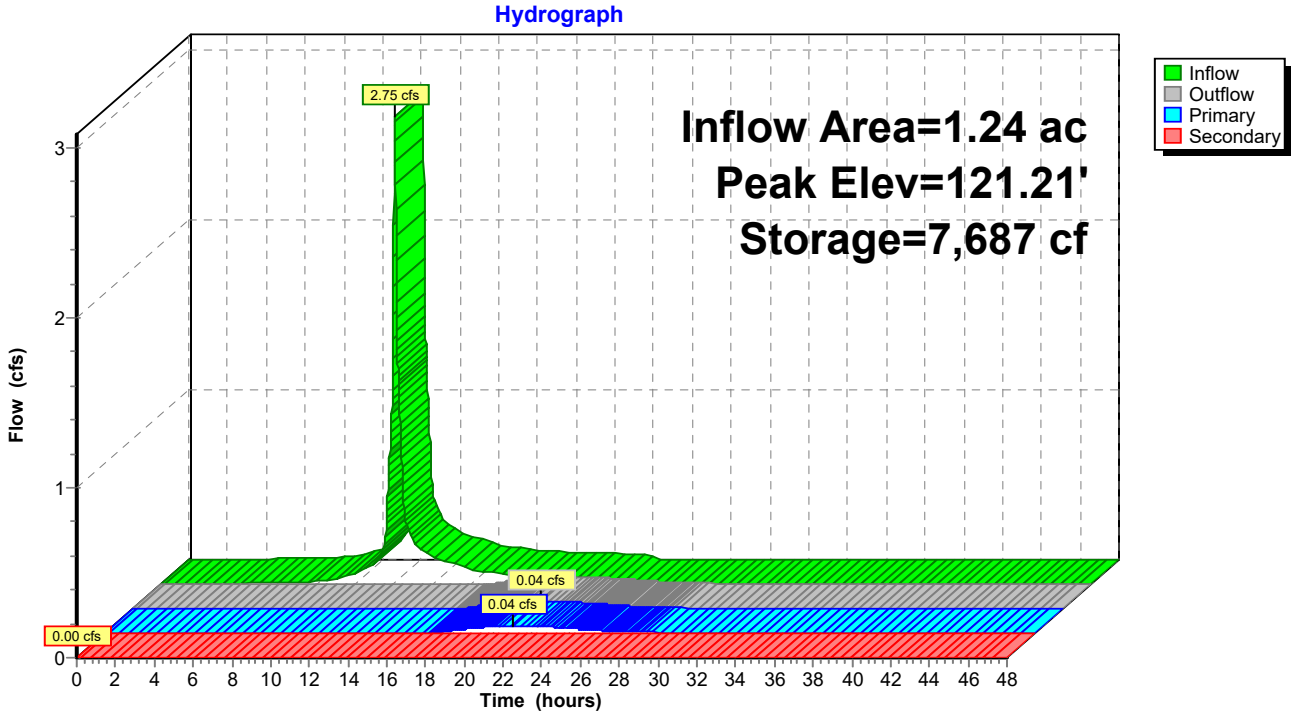
25,943.3 cf Field - 9,444.6 cf Chambers = 16,498.7 cf Stone x 40.0% Voids = 6,599.5 cf Stone Storage

Chamber Storage + Stone Storage = 16,044.1 cf = 0.368 af
Overall Storage Efficiency = 61.8%
Overall System Size = 91.74' x 51.42' x 5.50'

84 Chambers
960.9 cy Field
611.1 cy Stone



Pond 1P: USSF


Hydrograph
Inflow Area=1.24 ac
Peak Elev=121.21'
Storage=7,687 cf
2.75 cfs
0.04 cfs
0.04 cfs
0.00 cfs
Inflow
Outflow
Primary
Secondary
Flow (cfs)
Time (hours)
0 1 2 3
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48

Summary for Pond 206P: City CB @ Fletcher & Danforth

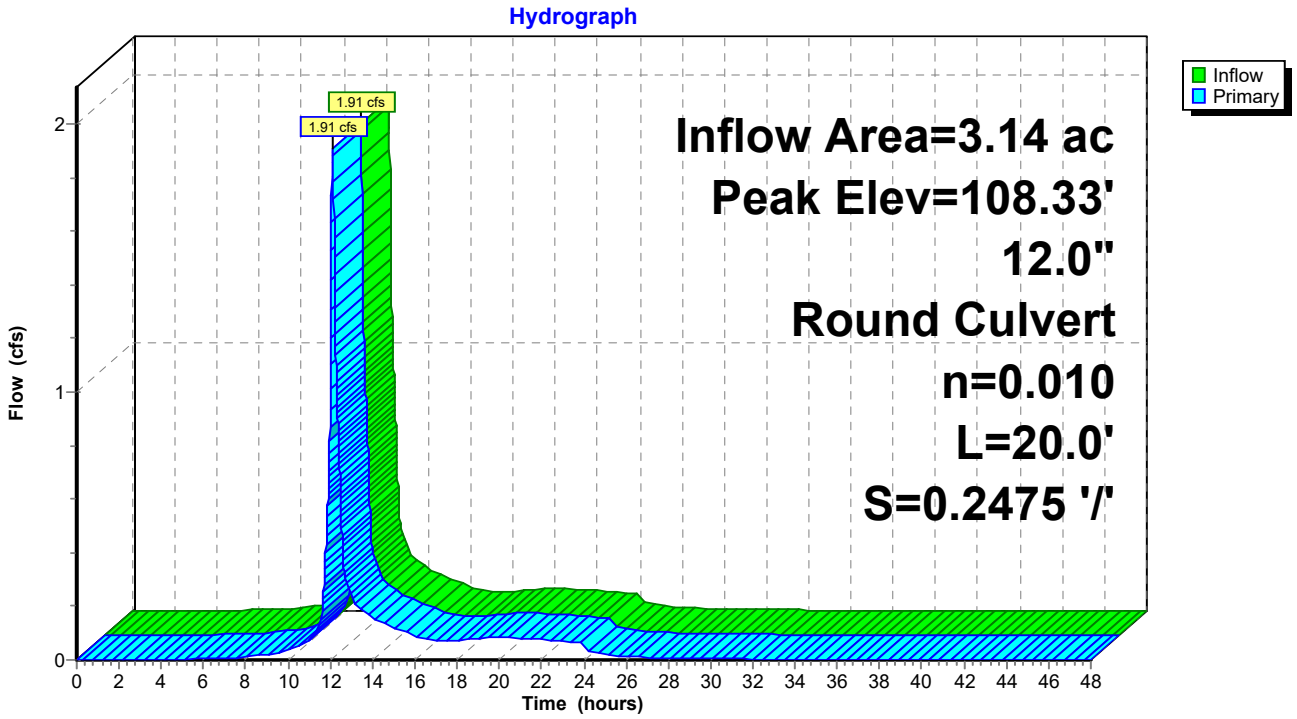
Inflow Area = 3.14 ac, 65.83% Impervious, Inflow Depth > 0.72" for 2-YR event
Inflow = 1.91 cfs @ 12.11 hrs, Volume= 0.189 af
Outflow = 1.91 cfs @ 12.11 hrs, Volume= 0.189 af, Atten= 0%, Lag= 0.0 min
Primary = 1.91 cfs @ 12.11 hrs, Volume= 0.189 af
Routed to Link SP1 : Existing Combined Sewer in Danforth

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 108.33' @ 12.11 hrs
Flood Elev= 111.26'

Device	Routing	Invert	Outlet Devices
#1	Primary	107.43'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 107.43' / 102.48' S= 0.2475 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.91 cfs @ 12.11 hrs HW=108.33' (Free Discharge)
1=Culvert (Inlet Controls 1.91 cfs @ 2.55 fps)

Pond 206P: City CB @ Fletcher & Danforth



Summary for Pond 210P: Existing FI

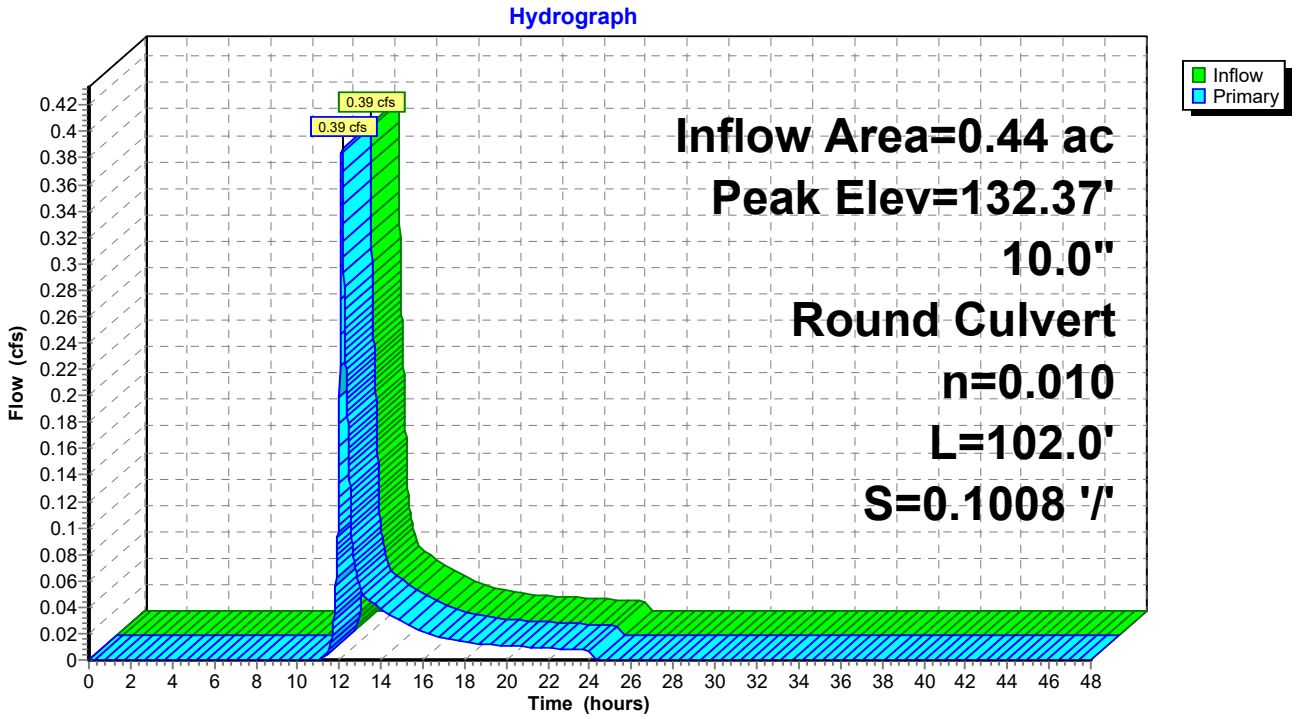
Inflow Area = 0.44 ac, 56.16% Impervious, Inflow Depth = 0.87" for 2-YR event
Inflow = 0.39 cfs @ 12.12 hrs, Volume= 0.032 af
Outflow = 0.39 cfs @ 12.12 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min
Primary = 0.39 cfs @ 12.12 hrs, Volume= 0.032 af
Routed to Pond 220P : Existing DMH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 132.37' @ 12.12 hrs
Flood Elev= 140.41'

Device	Routing	Invert	Outlet Devices
#1	Primary	132.00'	**10.0" Round Culvert** L= 102.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 132.00' / 121.72' S= 0.1008 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.38 cfs @ 12.12 hrs HW=132.37' (Free Discharge)
1=Culvert (Inlet Controls 0.38 cfs @ 1.64 fps)

Pond 210P: Existing FI



Summary for Pond 220P: Existing DMH

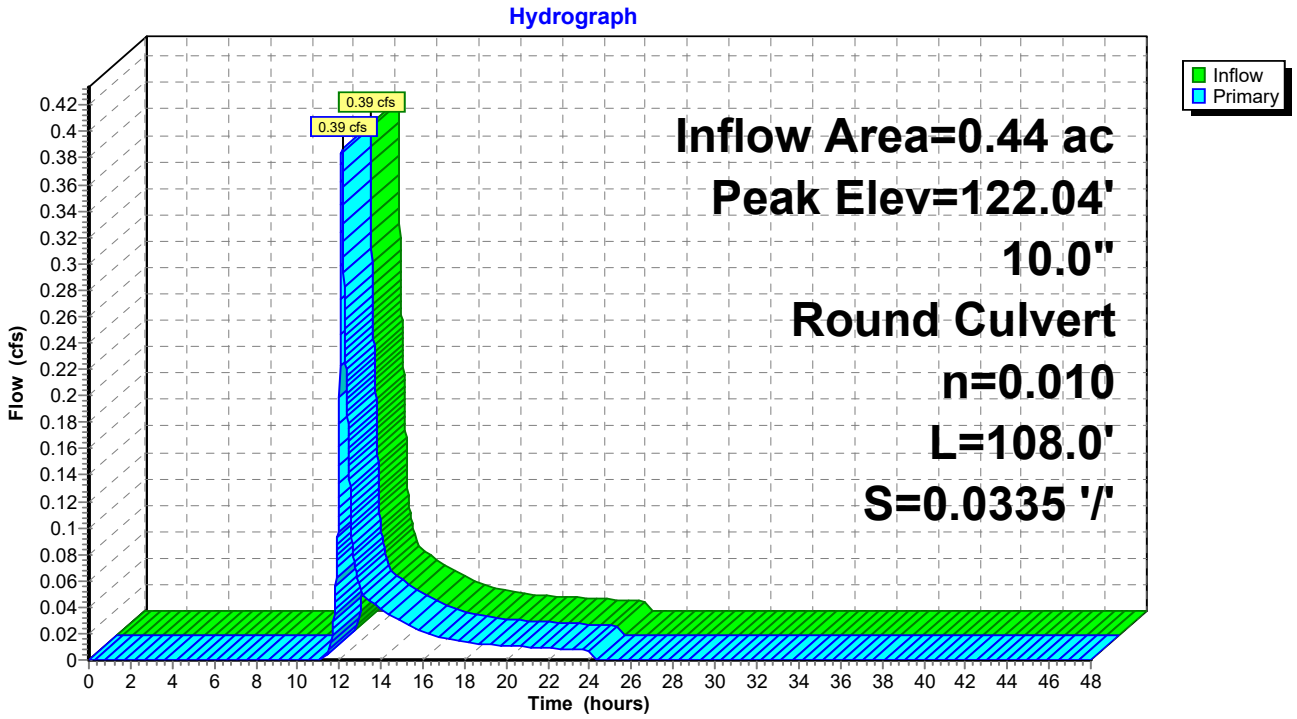
Inflow Area = 0.44 ac, 56.16% Impervious, Inflow Depth = 0.87" for 2-YR event
Inflow = 0.39 cfs @ 12.12 hrs, Volume= 0.032 af
Outflow = 0.39 cfs @ 12.12 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min
Primary = 0.39 cfs @ 12.12 hrs, Volume= 0.032 af
Routed to Pond 230P : Existing DMH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 122.04' @ 12.12 hrs
Flood Elev= 128.47'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.67'	**10.0" Round Culvert** L= 108.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 121.67' / 118.05' S= 0.0335 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.39 cfs @ 12.12 hrs HW=122.04' (Free Discharge)
1=Culvert (Inlet Controls 0.39 cfs @ 1.64 fps)

Pond 220P: Existing DMH



Summary for Pond 230P: Existing DMH

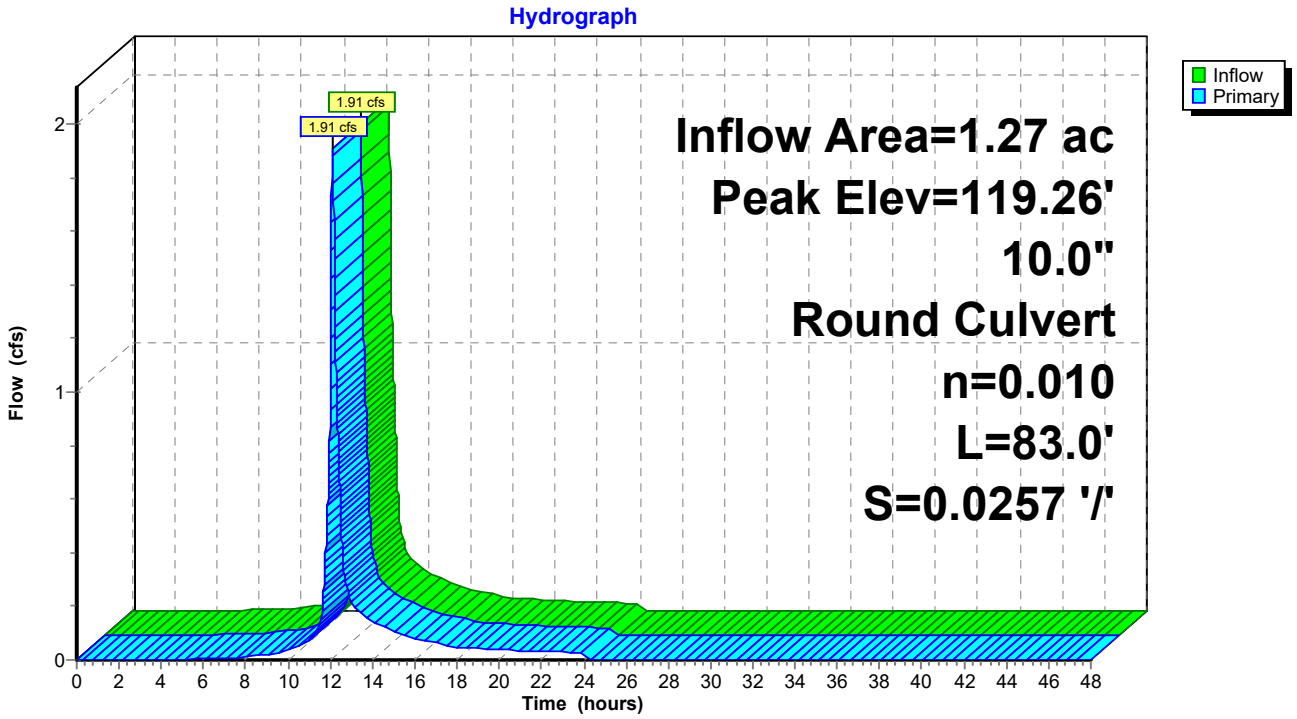
Inflow Area = 1.27 ac, 70.40% Impervious, Inflow Depth = 1.44" for 2-YR event
Inflow = 1.91 cfs @ 12.11 hrs, Volume= 0.152 af
Outflow = 1.91 cfs @ 12.11 hrs, Volume= 0.152 af, Atten= 0%, Lag= 0.0 min
Primary = 1.91 cfs @ 12.11 hrs, Volume= 0.152 af
Routed to Pond DMH7 : Proposed Drop DMH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 119.26' @ 12.11 hrs
Flood Elev= 125.05'

Device	Routing	Invert	Outlet Devices
#1	Primary	118.00'	**10.0" Round Culvert** L= 83.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 118.00' / 115.87' S= 0.0257 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.91 cfs @ 12.11 hrs HW=119.26' (Free Discharge)
1=Culvert (Inlet Controls 1.91 cfs @ 3.49 fps)

Pond 230P: Existing DMH



Summary for Pond 260P: Storage Pipes

Inflow Area = 0.72 ac, 79.29% Impervious, Inflow Depth = 1.80" for 2-YR event
Inflow = 1.52 cfs @ 12.08 hrs, Volume= 0.108 af
Outflow = 1.37 cfs @ 12.11 hrs, Volume= 0.108 af, Atten= 10%, Lag= 2.3 min
Primary = 1.37 cfs @ 12.11 hrs, Volume= 0.108 af
Routed to Pond 230P : Existing DMH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 119.87' @ 12.11 hrs Surf.Area= 564 sf Storage= 164 cf
Flood Elev= 125.26' Storage= 3,468 cf

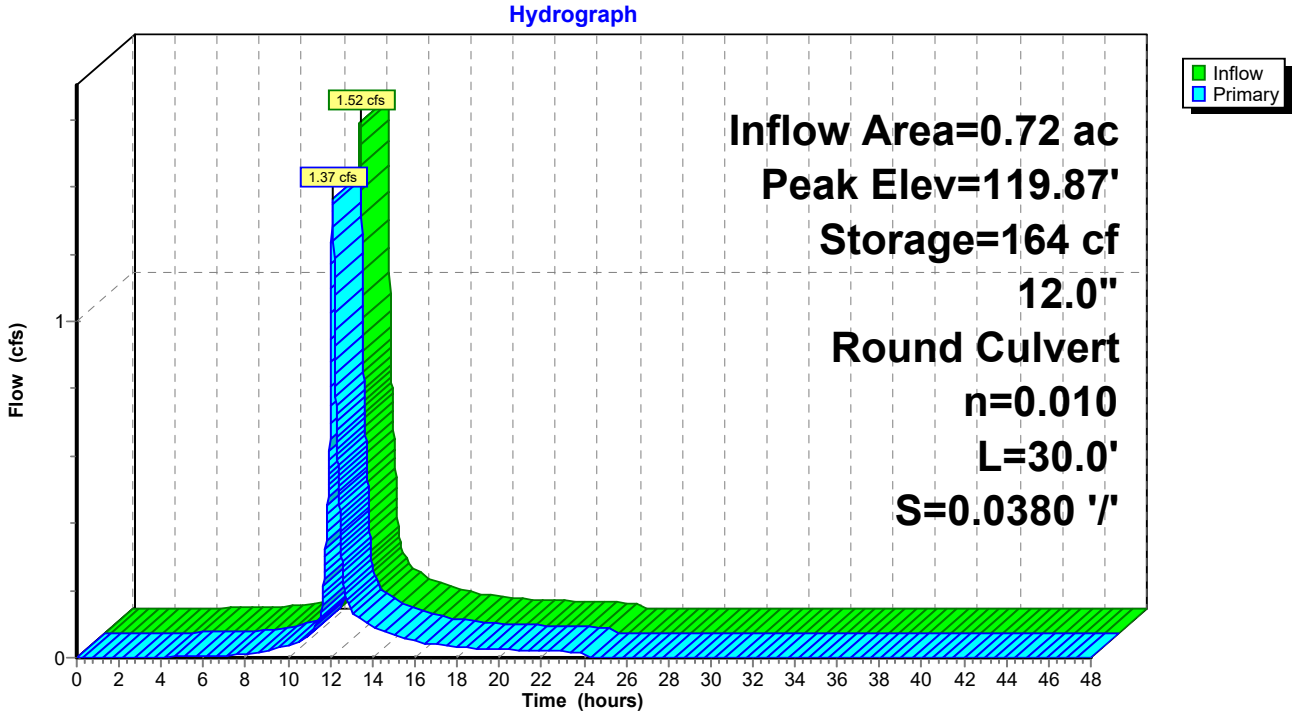
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.1 min (809.2 - 808.1)

Volume	Invert	Avail.Storage	Storage Description
#1	119.16'	3,468 cf	**48.0" Round Pipe Storage** L= 276.0' S= 0.0027 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.16'	**12.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.16' / 118.02' S= 0.0380 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.36 cfs @ 12.11 hrs HW=119.87' (Free Discharge)
1=Culvert (Inlet Controls 1.36 cfs @ 2.27 fps)

Pond 260P: Storage Pipes



Summary for Pond 340P: CB at SW Cor prkng lot

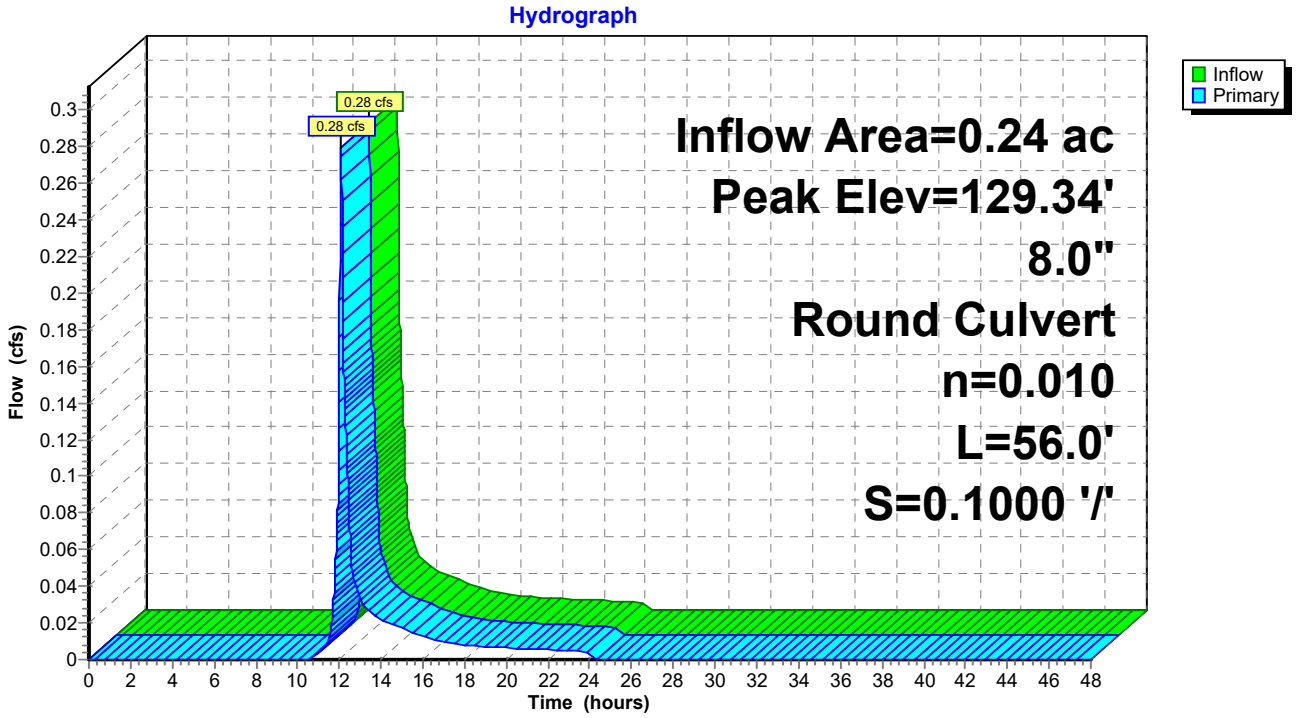
Inflow Area = 0.24 ac, 60.94% Impervious, Inflow Depth = 1.03" for 2-YR event
Inflow = 0.28 cfs @ 12.08 hrs, Volume= 0.020 af
Outflow = 0.28 cfs @ 12.08 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min
Primary = 0.28 cfs @ 12.08 hrs, Volume= 0.020 af
Routed to Pond 260P : Storage Pipes

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 129.34' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	129.00'	**8.0" Round Culvert** L= 56.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 129.00' / 123.40' S= 0.1000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.28 cfs @ 12.08 hrs HW=129.34' (Free Discharge)
1=Culvert (Inlet Controls 0.28 cfs @ 1.57 fps)

Pond 340P: CB at SW Cor prkng lot



Summary for Pond CB4: Proposed DMH

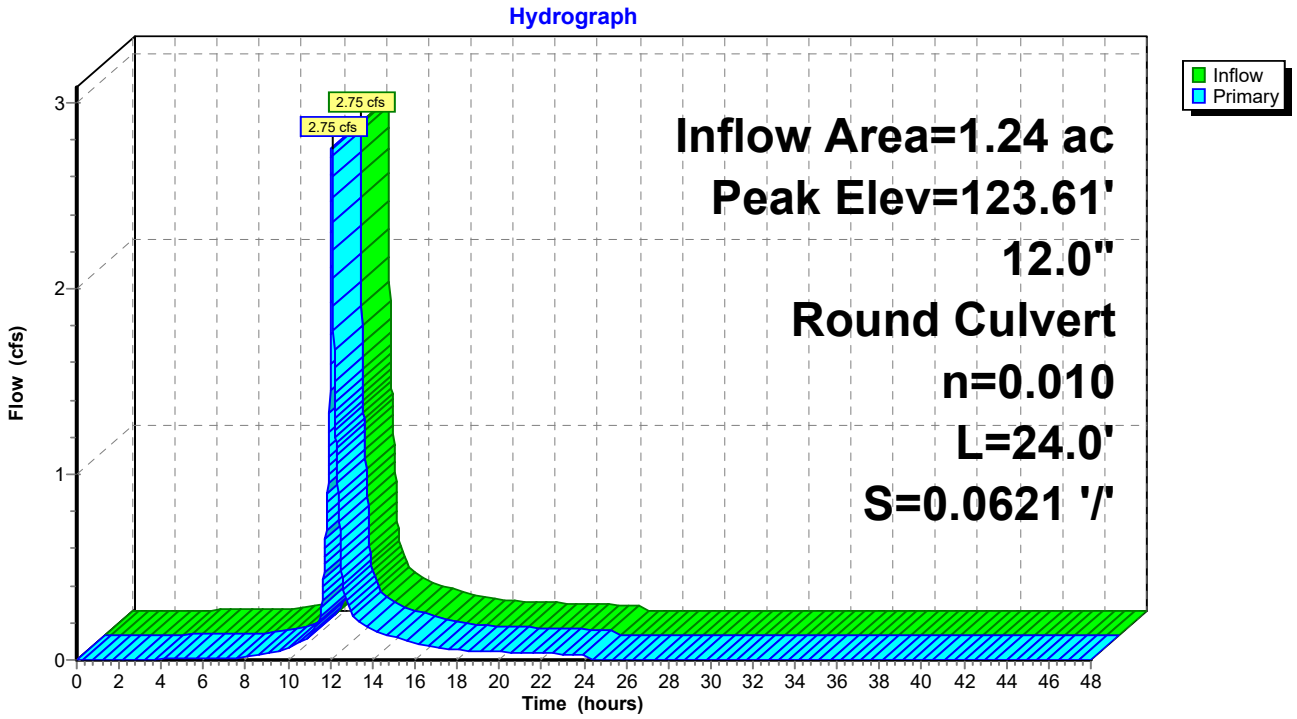
Inflow Area = 1.24 ac, 81.89% Impervious, Inflow Depth = 1.88" for 2-YR event
Inflow = 2.75 cfs @ 12.07 hrs, Volume= 0.194 af
Outflow = 2.75 cfs @ 12.07 hrs, Volume= 0.194 af, Atten= 0%, Lag= 0.0 min
Primary = 2.75 cfs @ 12.07 hrs, Volume= 0.194 af
Routed to Pond DMH6 : Access MH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 123.61' @ 12.07 hrs
Flood Elev= 127.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.26'	**12.0" Round Culvert** L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 122.26' / 120.77' S= 0.0621 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.75 cfs @ 12.07 hrs HW=123.61' (Free Discharge)
1=Culvert (Inlet Controls 2.75 cfs @ 3.50 fps)

Pond CB4: Proposed DMH



Summary for Pond DMH: OCS Bypass

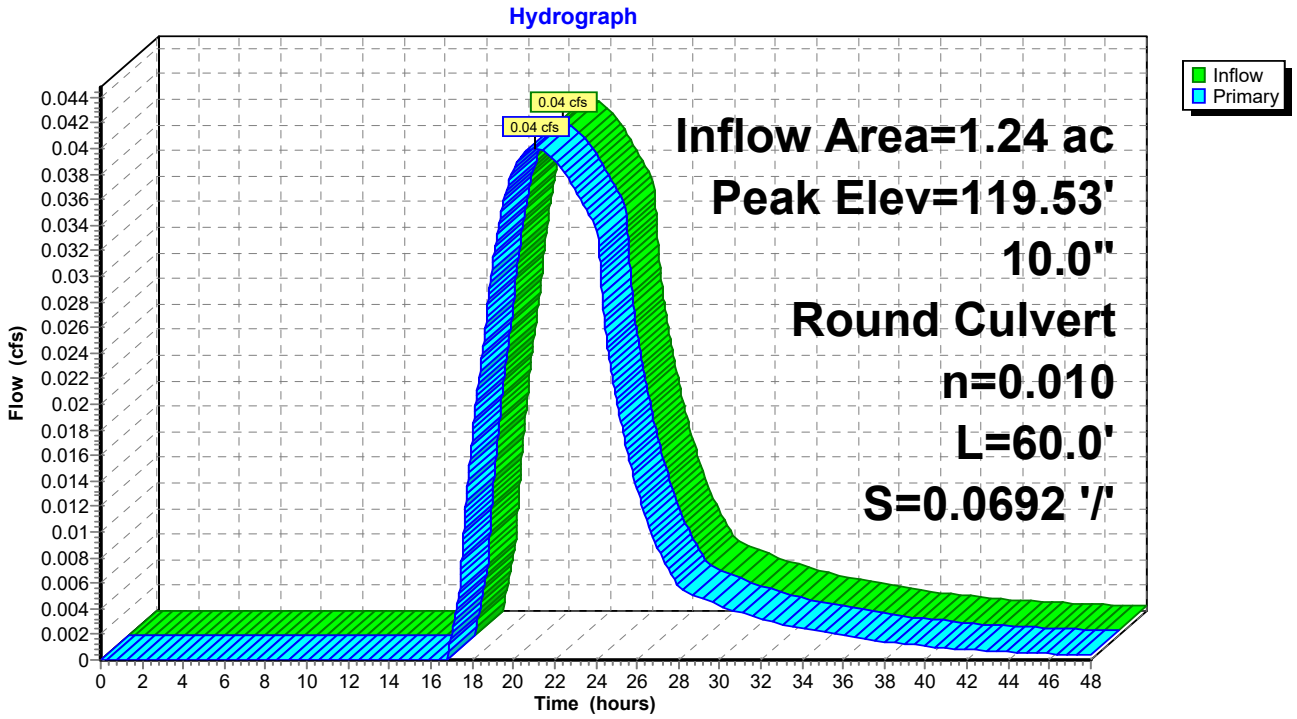
Inflow Area = 1.24 ac, 81.89% Impervious, Inflow Depth > 0.26" for 2-YR event
Inflow = 0.04 cfs @ 21.04 hrs, Volume= 0.026 af
Outflow = 0.04 cfs @ 21.04 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min
Primary = 0.04 cfs @ 21.04 hrs, Volume= 0.026 af
Routed to Pond DMH7 : Proposed Drop DMH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 119.53' @ 21.04 hrs
Flood Elev= 126.48'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.42'	**10.0" Round Culvert** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.42' / 115.27' S= 0.0692 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.04 cfs @ 21.04 hrs HW=119.53' (Free Discharge)
1=Culvert (Inlet Controls 0.04 cfs @ 0.88 fps)

Pond DMH: OCS Bypass



Summary for Pond DMH6: Access MH

Inflow Area = 1.24 ac, 81.89% Impervious, Inflow Depth = 1.88" for 2-YR event
Inflow = 2.75 cfs @ 12.07 hrs, Volume= 0.194 af
Outflow = 2.75 cfs @ 12.07 hrs, Volume= 0.194 af, Atten= 0%, Lag= 0.0 min
Primary = 2.75 cfs @ 12.07 hrs, Volume= 0.194 af
Routed to Pond 1P : USSF
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond DMH : OCS Bypass

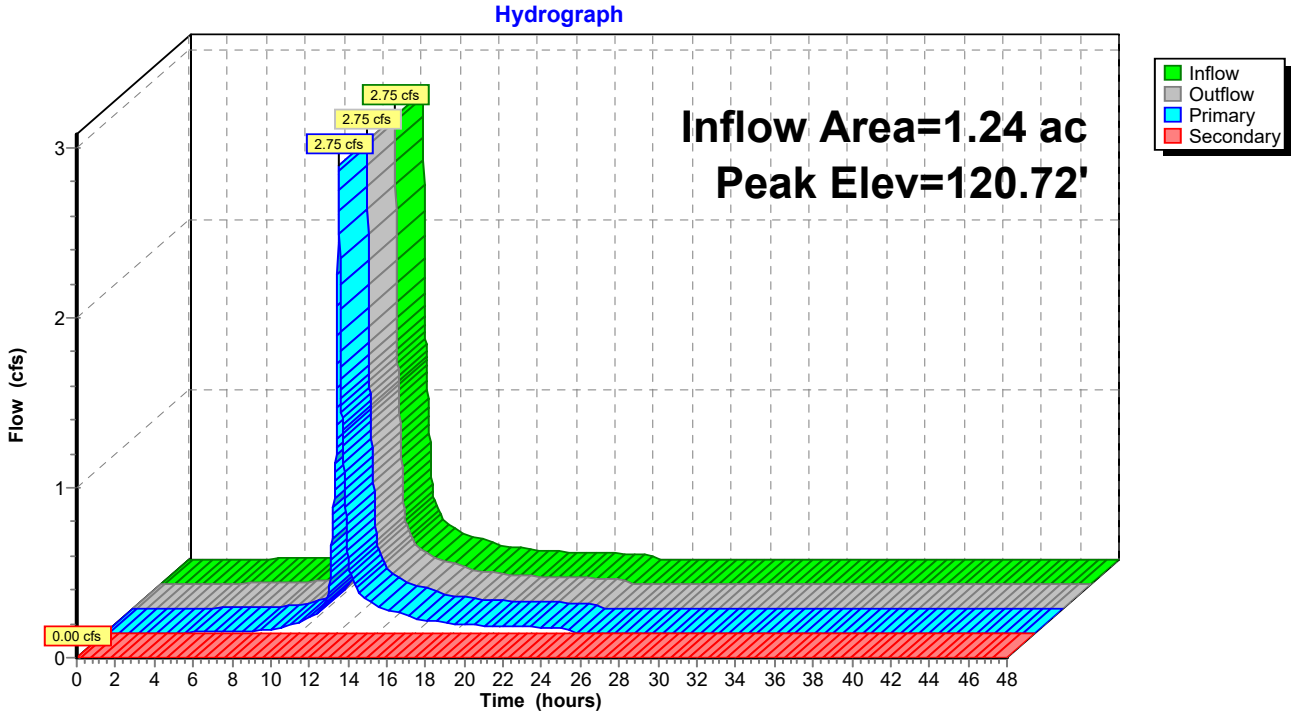
Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 120.72' @ 12.07 hrs
Flood Elev= 126.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.77'	**24.0" Round Culvert** L= 9.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.77' / 119.77' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Secondary	119.77'	**24.0" Round Culvert** L= 2.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.77' / 119.77' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#3	Device 2	123.35'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=2.74 cfs @ 12.07 hrs HW=120.72' (Free Discharge)
└**1=Culvert** (Barrel Controls 2.74 cfs @ 2.73 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=119.77' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond DMH6: Access MH



Summary for Pond DMH7: Proposed Drop DMH

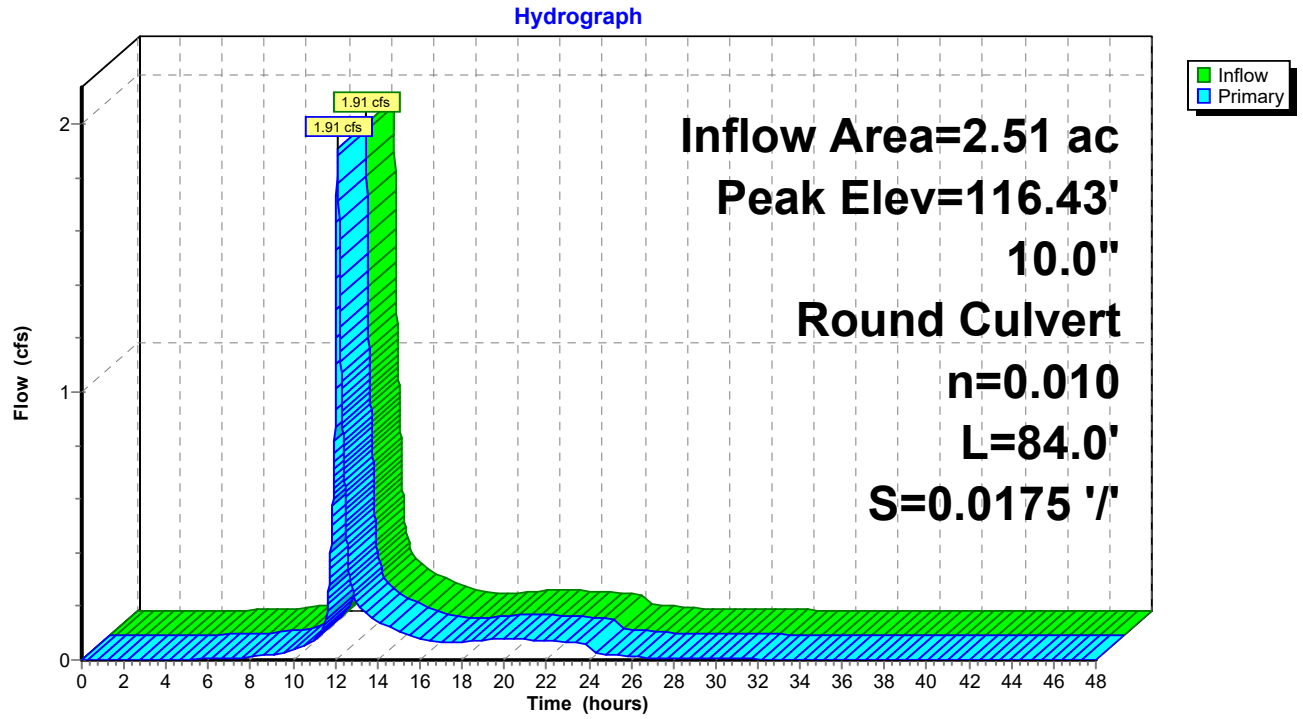
Inflow Area = 2.51 ac, 76.06% Impervious, Inflow Depth > 0.85" for 2-YR event
Inflow = 1.91 cfs @ 12.11 hrs, Volume= 0.179 af
Outflow = 1.91 cfs @ 12.11 hrs, Volume= 0.179 af, Atten= 0%, Lag= 0.0 min
Primary = 1.91 cfs @ 12.11 hrs, Volume= 0.179 af
Routed to Pond DMH8 : Proposed DMH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 116.43' @ 12.11 hrs
Flood Elev= 124.69'

Device	Routing	Invert	Outlet Devices
#1	Primary	115.17'	**10.0" Round Culvert** L= 84.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 115.17' / 113.70' S= 0.0175 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.91 cfs @ 12.11 hrs HW=116.43' (Free Discharge)
1=Culvert (Inlet Controls 1.91 cfs @ 3.49 fps)

Pond DMH7: Proposed Drop DMH



Summary for Pond DMH8: Proposed DMH

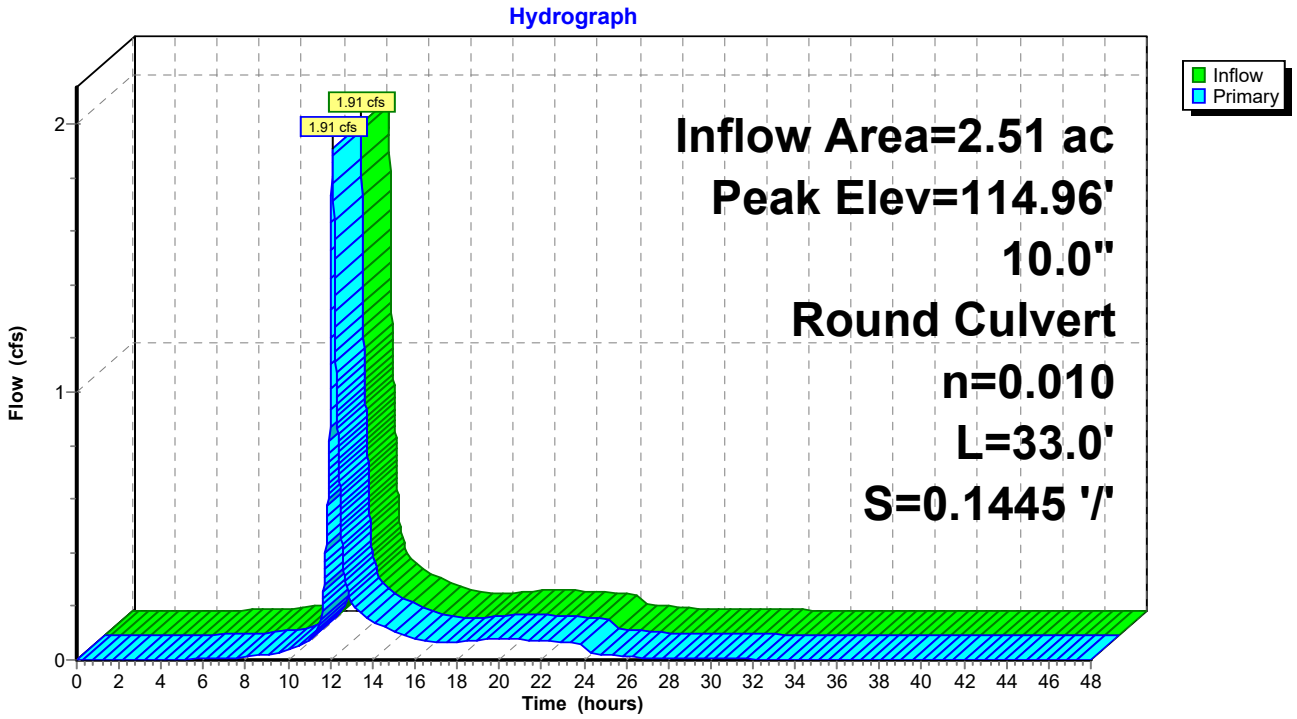
Inflow Area = 2.51 ac, 76.06% Impervious, Inflow Depth > 0.85" for 2-YR event
Inflow = 1.91 cfs @ 12.11 hrs, Volume= 0.179 af
Outflow = 1.91 cfs @ 12.11 hrs, Volume= 0.179 af, Atten= 0%, Lag= 0.0 min
Primary = 1.91 cfs @ 12.11 hrs, Volume= 0.179 af
Routed to Pond 206P : City CB @ Fletcher & Danforth

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 114.96' @ 12.11 hrs
Flood Elev= 123.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	113.70'	**10.0" Round Culvert** L= 33.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 113.70' / 108.93' S= 0.1445 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.91 cfs @ 12.11 hrs HW=114.96' (Free Discharge)
1=Culvert (Inlet Controls 1.91 cfs @ 3.50 fps)

Pond DMH8: Proposed DMH

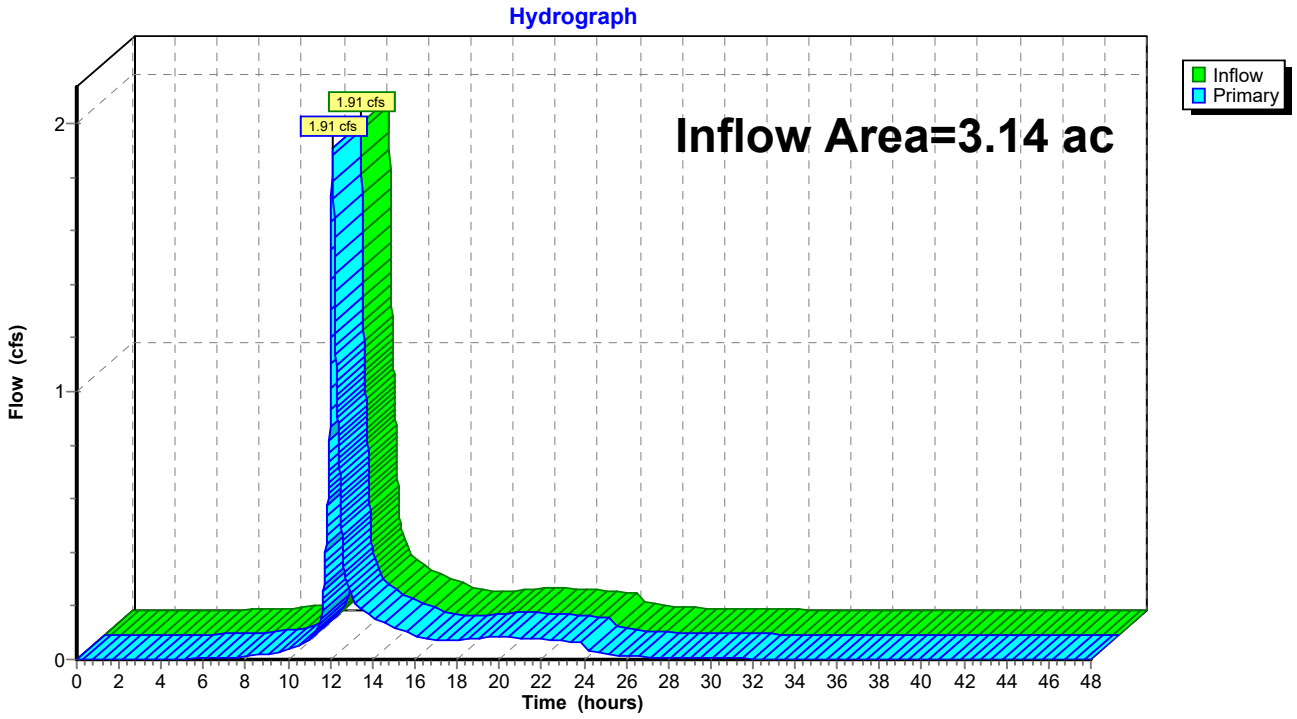


Summary for Link SP1: Existing Combined Sewer in Danforth

Inflow Area = 3.14 ac, 65.83% Impervious, Inflow Depth > 0.72" for 2-YR event
Inflow = 1.91 cfs @ 12.11 hrs, Volume= 0.189 af
Primary = 1.91 cfs @ 12.11 hrs, Volume= 0.189 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link SP1: Existing Combined Sewer in Danforth



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10S: Area draining to Runoff Area=19,254 sf 56.16% Impervious Runoff Depth=1.89"
Flow Length=91' Slope=0.0300 '/' Tc=7.7 min CN=72 Runoff=0.91 cfs 0.070 af

Subcatchment60S: Lawn/Field S of school Runoff Area=16,715 sf 84.98% Impervious Runoff Depth=3.39"
Tc=5.0 min CN=89 Runoff=1.54 cfs 0.108 af

Subcatchment61S: Auditorium Roof Runoff Area=4,485 sf 100.00% Impervious Runoff Depth=4.36"
Tc=5.0 min CN=98 Runoff=0.48 cfs 0.037 af

Subcatchment70S: Thomas & Davies & Runoff Area=44,441 sf 78.03% Impervious Runoff Depth=3.00"
Flow Length=91' Slope=0.1593 '/' Tc=5.0 min CN=85 Runoff=3.69 cfs 0.255 af

Subcatchment80S: FoundersHall Runoff Area=9,466 sf 100.00% Impervious Runoff Depth=4.36"
Tc=5.0 min CN=98 Runoff=1.01 cfs 0.079 af

Subcatchment90S: Playground Runoff Area=27,554 sf 25.26% Impervious Runoff Depth=0.73"
Flow Length=117' Tc=9.2 min CN=54 Runoff=0.34 cfs 0.039 af

Subcatchment91S: Playground Runoff Area=4,688 sf 69.20% Impervious Runoff Depth=2.55"
Tc=5.0 min CN=80 Runoff=0.33 cfs 0.023 af

Subcatchment402S: New Prkng lot Runoff Area=10,240 sf 60.94% Impervious Runoff Depth=2.13"
Tc=5.0 min CN=75 Runoff=0.60 cfs 0.042 af

Reach 161R: roof drain Avg. Flow Depth=0.18' Max Vel=7.42 fps Inflow=0.48 cfs 0.037 af
6.0" Round Pipe n=0.013 L=129.0' S=0.0911 '/' Capacity=1.69 cfs Outflow=0.48 cfs 0.037 af

Pond 1P: USSF Peak Elev=121.50' Storage=8,766 cf Inflow=4.71 cfs 0.334 af
Primary=0.47 cfs 0.166 af Secondary=0.00 cfs 0.000 af Outflow=0.47 cfs 0.166 af

Pond 206P: City CB @ Fletcher & Danforth Peak Elev=109.43' Inflow=3.66 cfs 0.485 af
12.0" Round Culvert n=0.010 L=20.0' S=0.2475 '/' Outflow=3.66 cfs 0.485 af

Pond 210P: Existing FI Peak Elev=132.62' Inflow=0.91 cfs 0.070 af
10.0" Round Culvert n=0.010 L=102.0' S=0.1008 '/' Outflow=0.91 cfs 0.070 af

Pond 220P: Existing DMH Peak Elev=122.28' Inflow=0.91 cfs 0.070 af
10.0" Round Culvert n=0.010 L=108.0' S=0.0335 '/' Outflow=0.91 cfs 0.070 af

Pond 230P: Existing DMH Peak Elev=121.04' Inflow=3.36 cfs 0.280 af
10.0" Round Culvert n=0.010 L=83.0' S=0.0257 '/' Outflow=3.36 cfs 0.280 af

Pond 260P: Storage Pipes Peak Elev=120.18' Storage=377 cf Inflow=2.62 cfs 0.188 af
12.0" Round Culvert n=0.010 L=30.0' S=0.0380 '/' Outflow=2.16 cfs 0.188 af

Pond 340P: CB at SW Cor prkng lot Peak Elev=129.54' Inflow=0.60 cfs 0.042 af
8.0" Round Culvert n=0.010 L=56.0' S=0.1000 '/' Outflow=0.60 cfs 0.042 af

Pond CB4: Proposed DMH Peak Elev=125.24' Inflow=4.71 cfs 0.334 af
12.0" Round Culvert n=0.010 L=24.0' S=0.0621 '/' Outflow=4.71 cfs 0.334 af

Pond DMH: OCS Bypass Peak Elev=119.84' Inflow=0.47 cfs 0.166 af
10.0" Round Culvert n=0.010 L=60.0' S=0.0692 '/' Outflow=0.47 cfs 0.166 af

Pond DMH6: Access MH Peak Elev=121.04' Inflow=4.71 cfs 0.334 af
Primary=4.71 cfs 0.334 af Secondary=0.00 cfs 0.000 af Outflow=4.71 cfs 0.334 af

Pond DMH7: Proposed Drop DMH Peak Elev=118.21' Inflow=3.36 cfs 0.447 af
10.0" Round Culvert n=0.010 L=84.0' S=0.0175 '/' Outflow=3.36 cfs 0.447 af

Pond DMH8: Proposed DMH Peak Elev=116.74' Inflow=3.36 cfs 0.447 af
10.0" Round Culvert n=0.010 L=33.0' S=0.1445 '/' Outflow=3.36 cfs 0.447 af

Link SP1: Existing Combined Sewer in Danforth Inflow=3.66 cfs 0.485 af
Primary=3.66 cfs 0.485 af

Total Runoff Area = 3.14 ac Runoff Volume = 0.653 af Average Runoff Depth = 2.49"
34.17% Pervious = 1.07 ac 65.83% Impervious = 2.07 ac

Summary for Subcatchment 10S: Area draining to Sanctuary

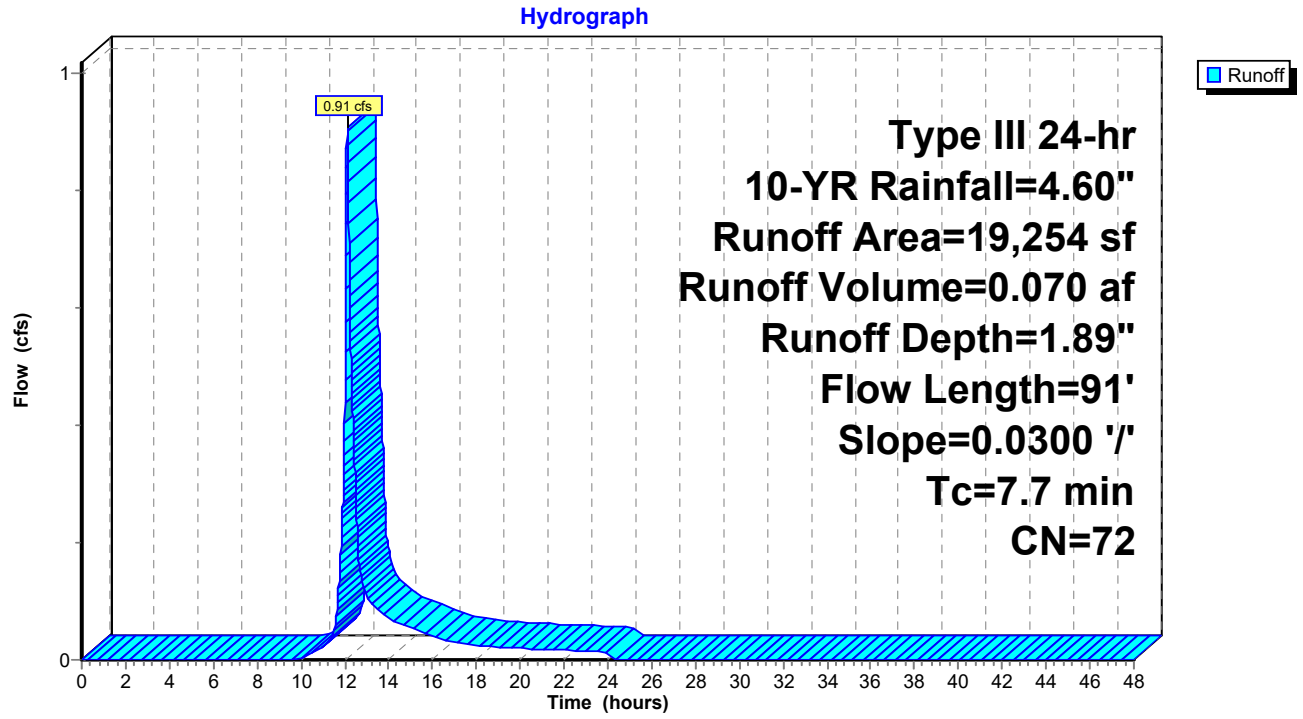
Runoff = 0.91 cfs @ 12.11 hrs, Volume= 0.070 af, Depth= 1.89"
Routed to Pond 210P : Existing FI

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 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	10,813	98	impervious
*	8,441	39	Lawn/field, HSG A
	19,254	72	Weighted Average
	8,441		43.84% Pervious Area
	10,813		56.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	91	0.0300	0.20		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"

Subcatchment 10S: Area draining to Sanctuary



Summary for Subcatchment 60S: Lawn/Field S of school

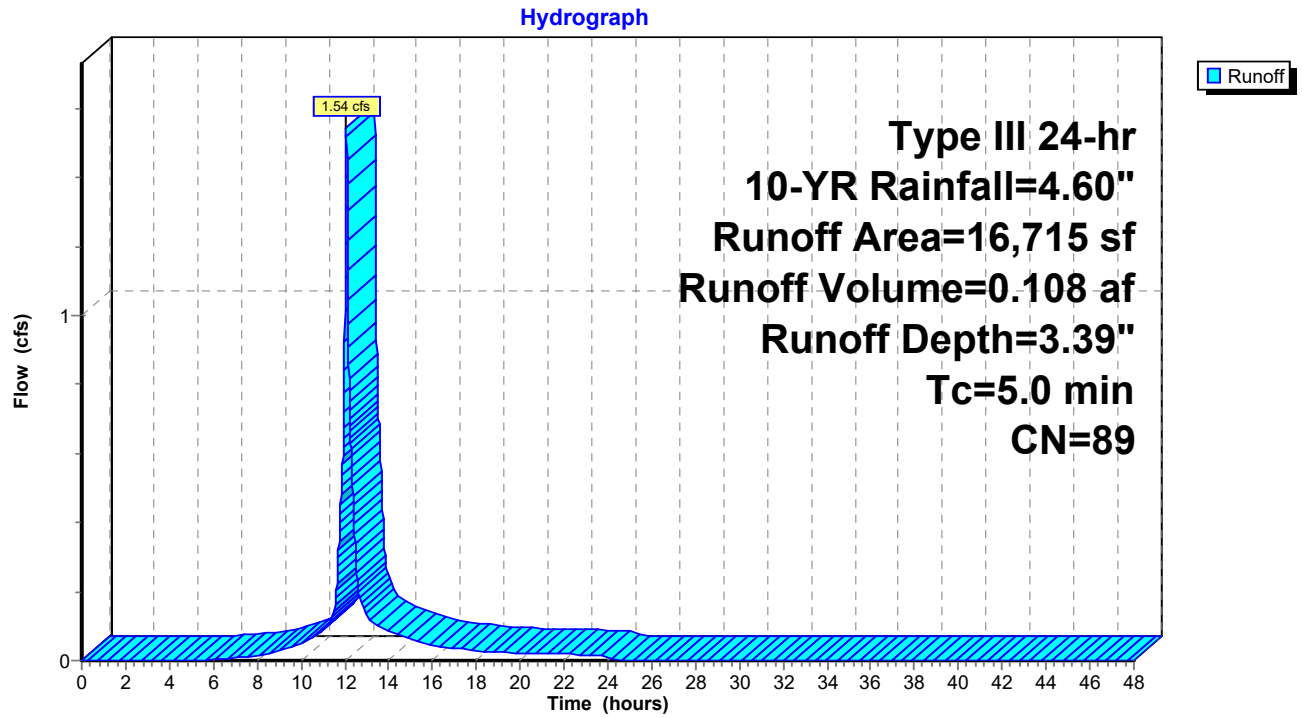
Runoff = 1.54 cfs @ 12.07 hrs, Volume= 0.108 af, Depth= 3.39"
Routed to Pond 260P : Storage Pipes

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 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	14,205	98	impervious
*	2,510	39	Lawn/field, HSG A
	16,715	89	Weighted Average
	2,510		15.02% Pervious Area
	14,205		84.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 60S: Lawn/Field S of school



Summary for Subcatchment 61S: Auditorium Roof

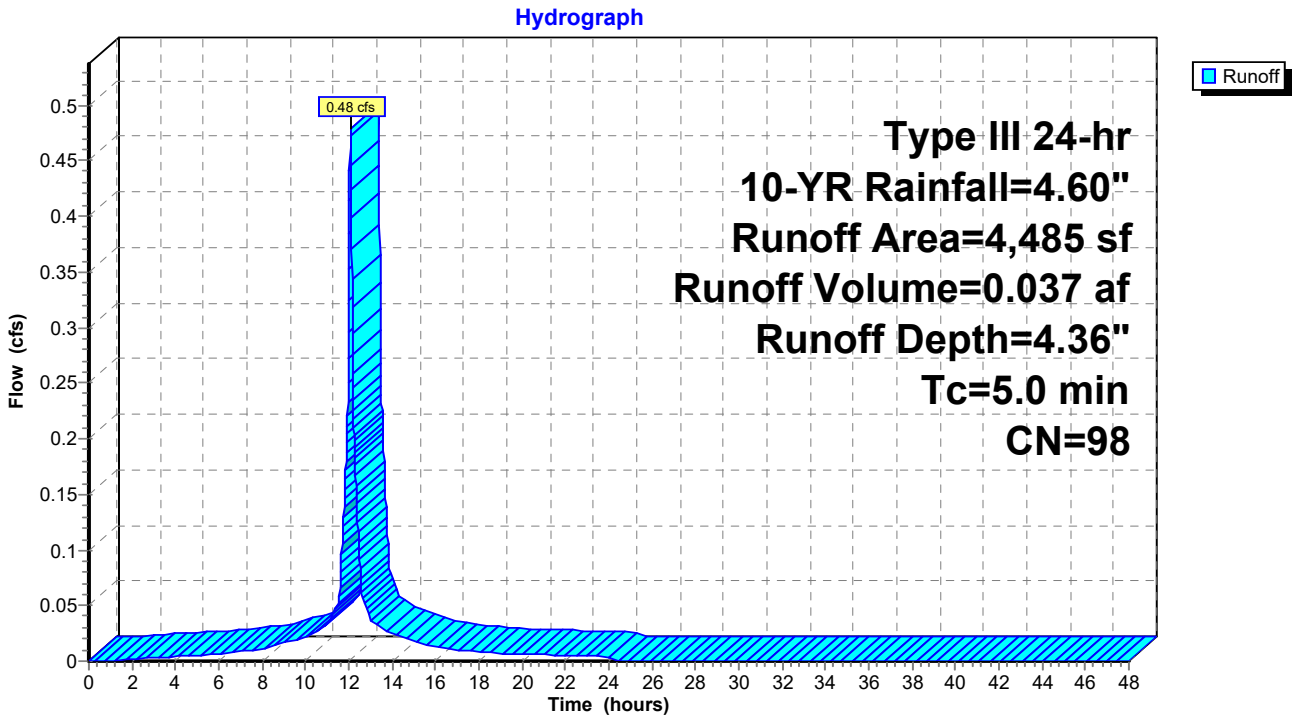
Runoff = 0.48 cfs @ 12.07 hrs, Volume= 0.037 af, Depth= 4.36"
Routed to Reach 161R : roof drain

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 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	4,485	98	Roof runoff
	4,485		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 61S: Auditorium Roof



Summary for Subcatchment 70S: Thomas & Davies & Gym

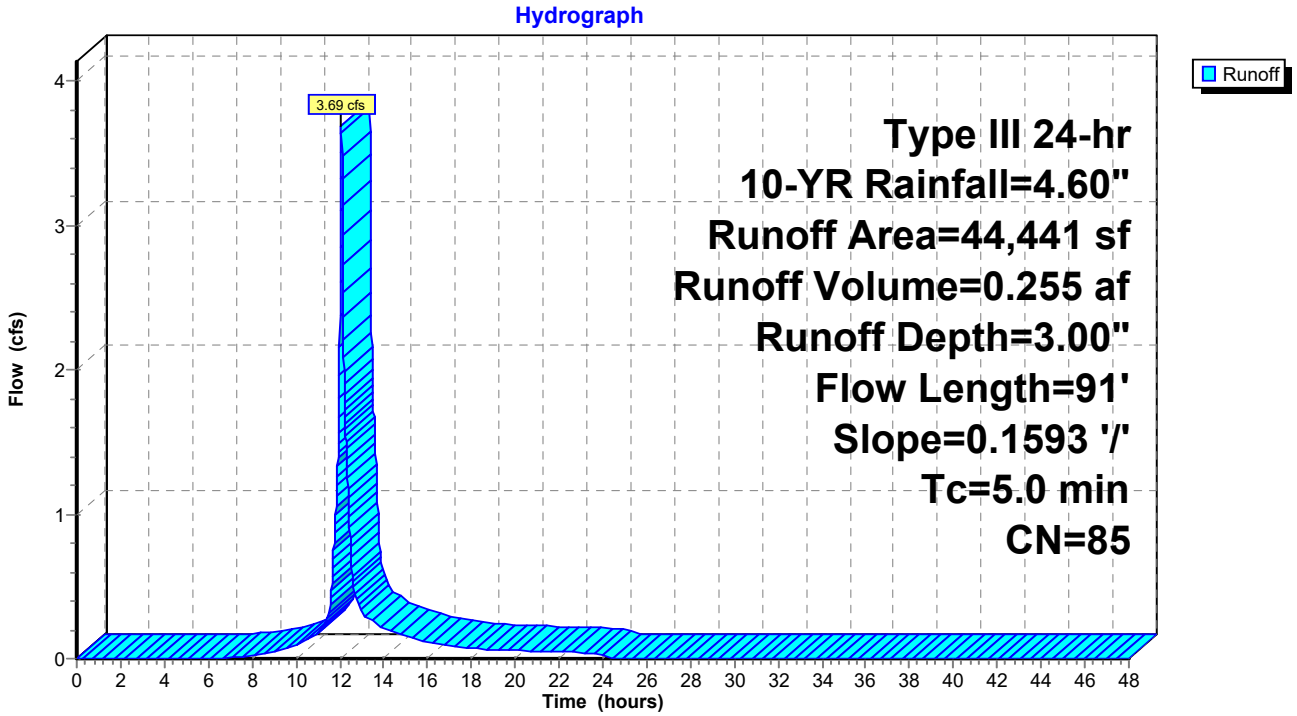
Runoff = 3.69 cfs @ 12.07 hrs, Volume= 0.255 af, Depth= 3.00"
Routed to Pond CB4 : Proposed DMH

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 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	34,676	98	impervious
*	9,765	39	Lawn/field, HSG A
	44,441	85	Weighted Average
	9,765		21.97% Pervious Area
	34,676		78.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	91	0.1593	0.38		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"
4.0	91	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 70S: Thomas & Davies & Gym



Summary for Subcatchment 80S: FoundersHall

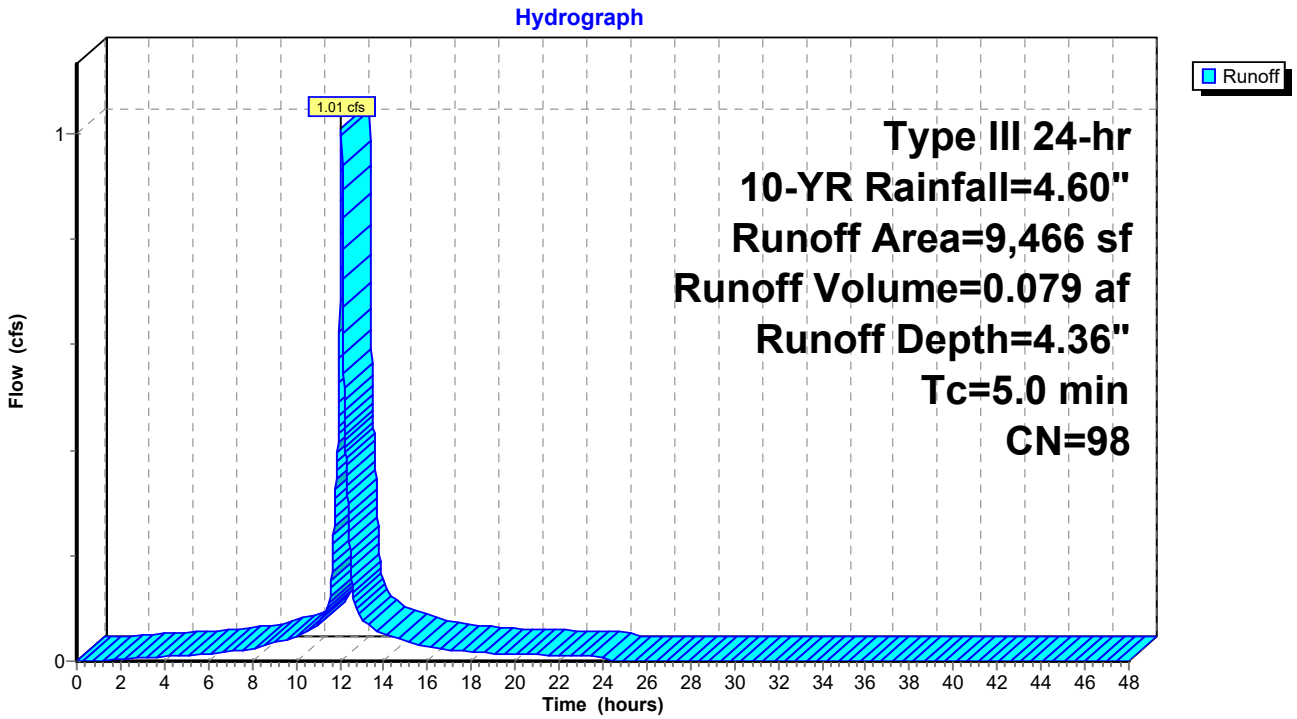
Runoff = 1.01 cfs @ 12.07 hrs, Volume= 0.079 af, Depth= 4.36"
Routed to Pond CB4 : Proposed DMH

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 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	9,466	98	Roof runoff
	9,466		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 80S: FoundersHall



Summary for Subcatchment 90S: Playground

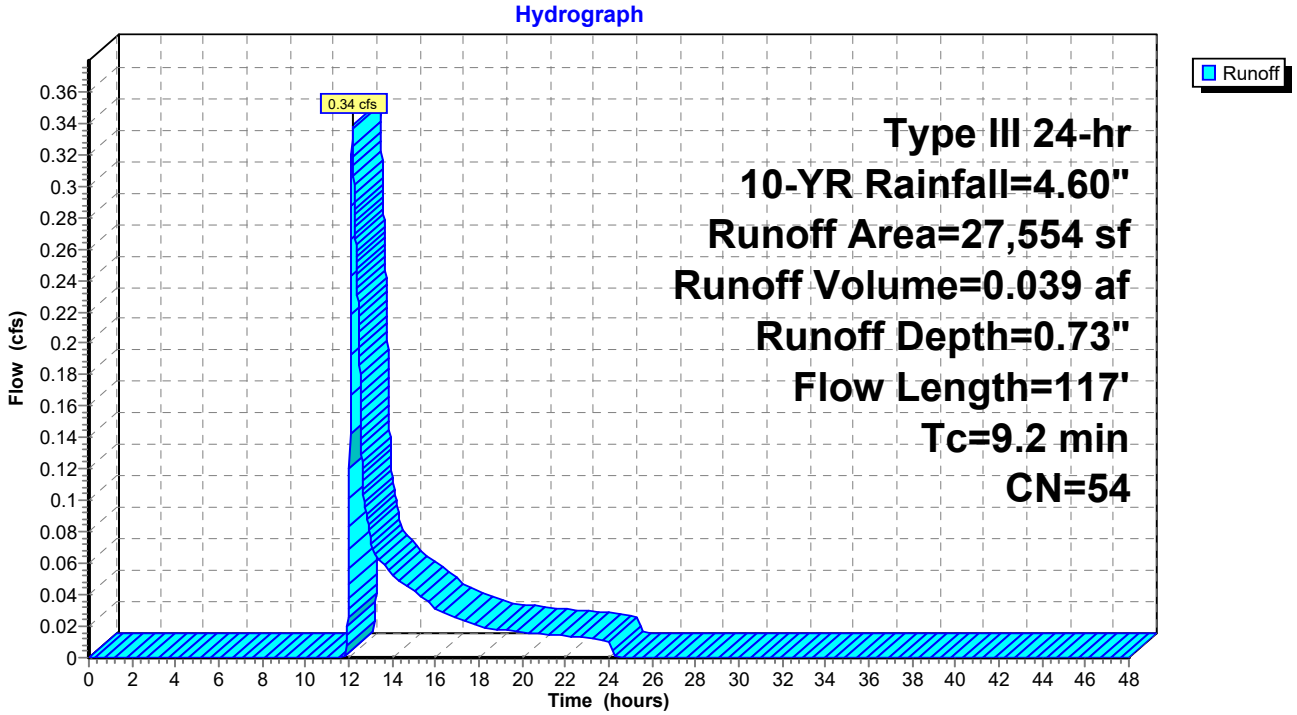
Runoff = 0.34 cfs @ 12.16 hrs, Volume= 0.039 af, Depth= 0.73"
Routed to Pond 206P : City CB @ Fletcher & Danforth

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 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	6,960	98	impervious
*	20,594	39	Lawn/field, HSG A
	27,554	54	Weighted Average
	20,594		74.74% Pervious Area
	6,960		25.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0250	0.19		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"
0.2	17	0.0588	1.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.2	117	Total			

Subcatchment 90S: Playground



Summary for Subcatchment 91S: Playground

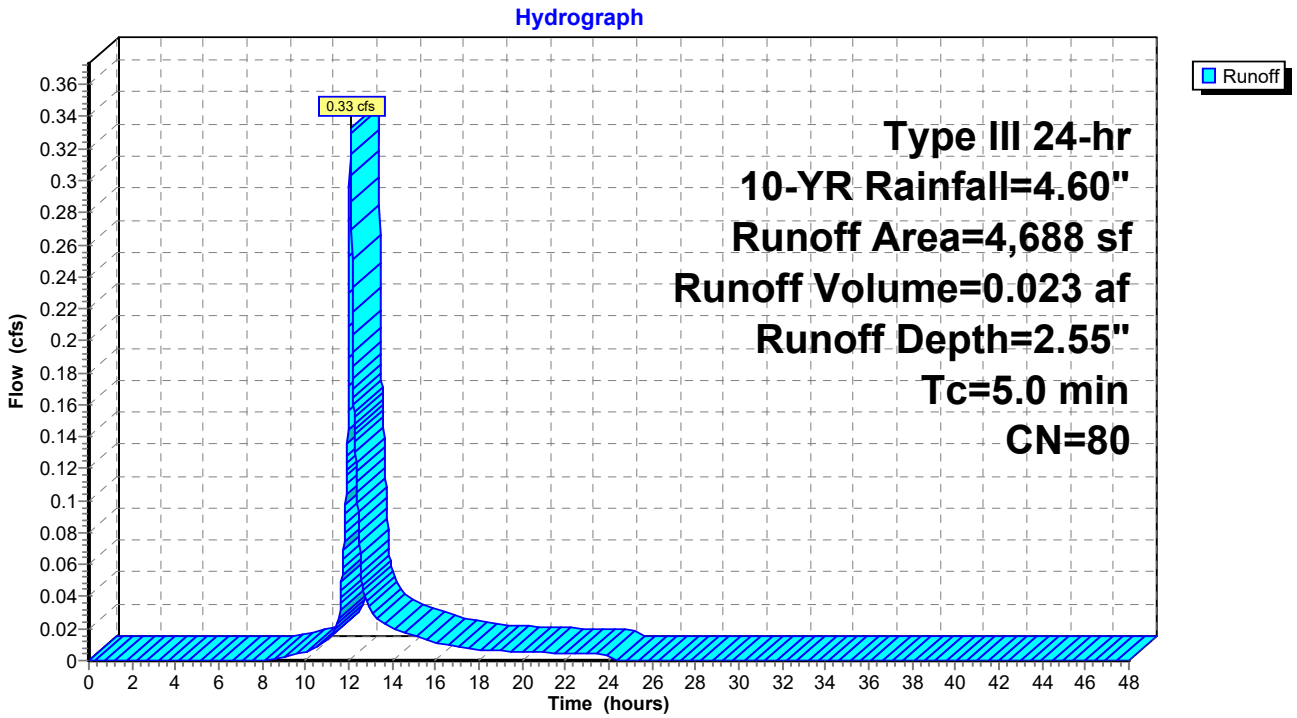
Runoff = 0.33 cfs @ 12.07 hrs, Volume= 0.023 af, Depth= 2.55"
Routed to Pond 230P : Existing DMH

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 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	3,244	98	impervious
*	1,444	39	Lawn/field, HSG A
	4,688	80	Weighted Average
	1,444		30.80% Pervious Area
	3,244		69.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 91S: Playground



Summary for Subcatchment 402S: New Prkng lot

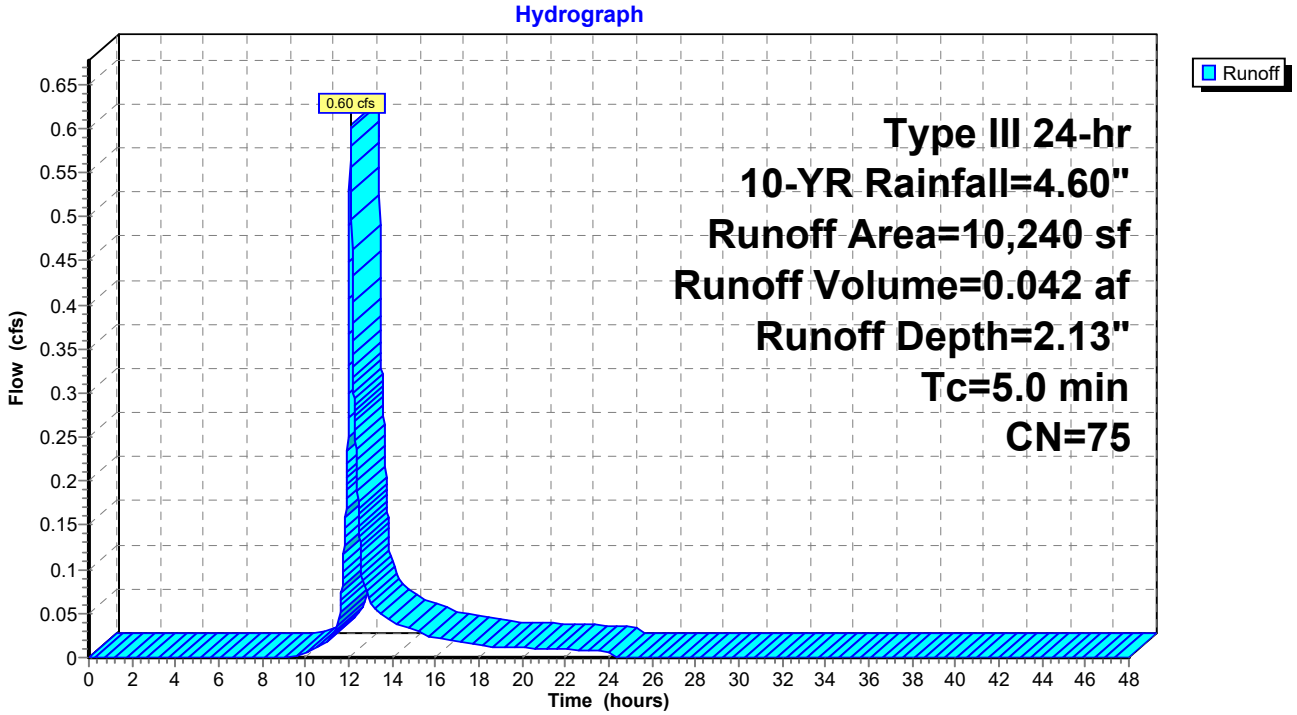
Runoff = 0.60 cfs @ 12.08 hrs, Volume= 0.042 af, Depth= 2.13"
Routed to Pond 340P : CB at SW Cor prkng lot

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 10-YR Rainfall=4.60"

	Area (sf)	CN	Description
*	4,000	39	Pervious
*	6,240	98	Impervious
	10,240	75	Weighted Average
	4,000		39.06% Pervious Area
	6,240		60.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 402S: New Prkng lot



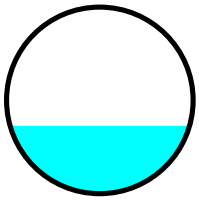
Summary for Reach 161R: roof drain

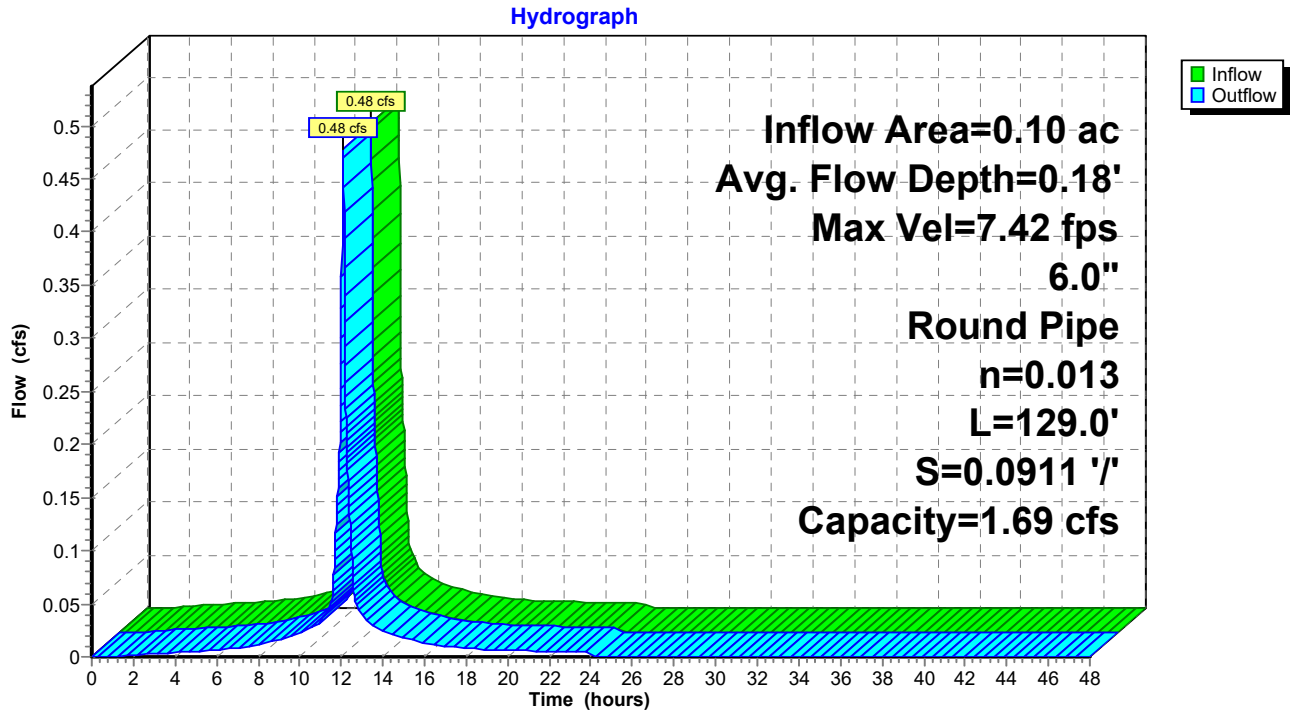
Inflow Area = 0.10 ac,100.00% Impervious, Inflow Depth = 4.36" for 10-YR event
Inflow = 0.48 cfs @ 12.07 hrs, Volume= 0.037 af
Outflow = 0.48 cfs @ 12.08 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.5 min
Routed to Pond 260P : Storage Pipes

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.42 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.44 fps, Avg. Travel Time= 0.9 min

Peak Storage= 8 cf @ 12.07 hrs
Average Depth at Peak Storage= 0.18' , Surface Width= 0.48'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 1.69 cfs

6.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 129.0' Slope= 0.0911 '/'
Inlet Invert= 130.00', Outlet Invert= 118.25'





Summary for Pond 1P: USSF

Inflow Area = 1.24 ac, 81.89% Impervious, Inflow Depth = 3.24" for 10-YR event
Inflow = 4.71 cfs @ 12.07 hrs, Volume= 0.334 af
Outflow = 0.47 cfs @ 12.86 hrs, Volume= 0.166 af, Atten= 90%, Lag= 47.1 min
Primary = 0.47 cfs @ 12.86 hrs, Volume= 0.166 af
Routed to Pond DMH : OCS Bypass
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond DMH7 : Proposed Drop DMH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 121.50' @ 12.86 hrs Surf.Area= 4,717 sf Storage= 8,766 cf
Flood Elev= 126.48' Surf.Area= 4,717 sf Storage= 16,044 cf

Plug-Flow detention time= 324.2 min calculated for 0.166 af (50% of inflow)
Center-of-Mass det. time= 207.1 min (1,002.4 - 795.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	118.85'	6,599 cf	**51.42'W x 91.74'L x 5.50'H Field A** 25,943 cf Overall - 9,445 cf Embedded = 16,499 cf x 40.0% Voids
#2A	119.60'	9,445 cf	**ADS_StormTech MC-3500 d +Cap** x 84 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 84 Chambers in 7 Rows Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf
		16,044 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	119.67'	**8.0" Round Culvert** L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.67' / 119.52' S= 0.0214 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#2	Device 1	123.35'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	121.10'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 5	118.85'	**2.410 in/hr Exfiltration over Surface area above 118.85'** Conductivity to Groundwater Elevation = 113.00' Excluded Surface area = 4,717 sf
#5	Secondary	116.02'	**6.0" Round Culvert** L= 31.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 116.02' / 115.88' S= 0.0045 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.47 cfs @ 12.86 hrs HW=121.50' (Free Discharge)
└─**1=Culvert** (Passes 0.47 cfs of 1.62 cfs potential flow)
  ├─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Orifice Controls 0.47 cfs @ 2.16 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=118.85' (Free Discharge)
└─**5=Culvert** (Passes 0.00 cfs of 1.20 cfs potential flow)
  └─**4=Exfiltration** (Controls 0.00 cfs)

Pond 1P: USSF - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

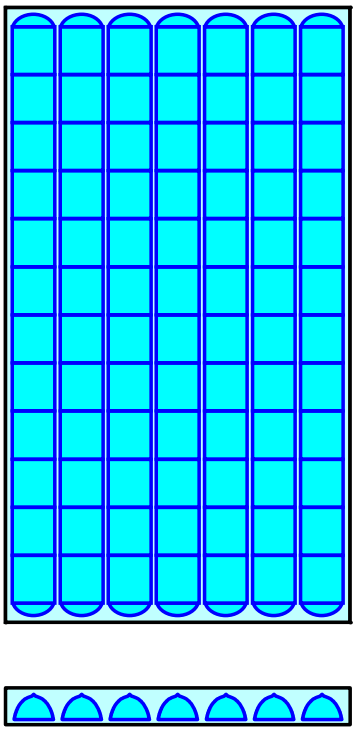
12 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 89.74' Row Length +12.0" End Stone x 2 = 91.74' Base Length
7 Rows x 77.0" Wide + 9.0" Spacing x 6 + 12.0" Side Stone x 2 = 51.42' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

84 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 7 Rows = 9,444.6 cf Chamber Storage

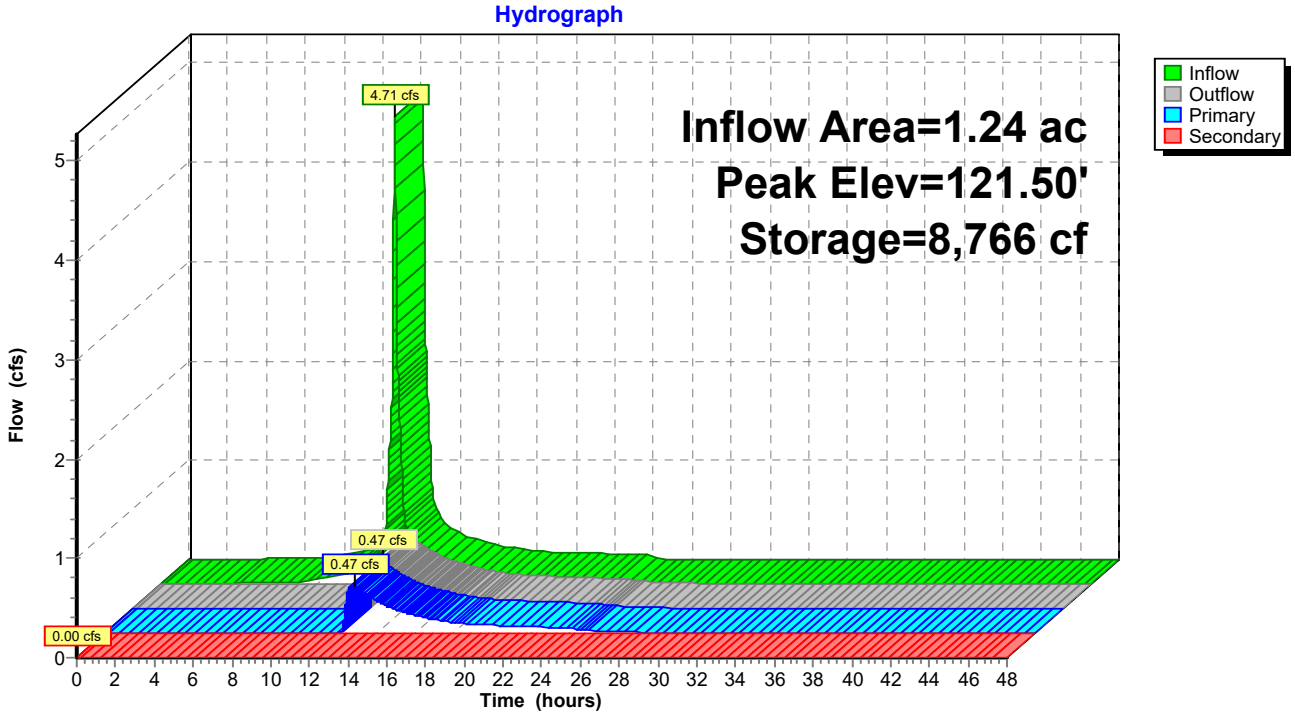
25,943.3 cf Field - 9,444.6 cf Chambers = 16,498.7 cf Stone x 40.0% Voids = 6,599.5 cf Stone Storage

Chamber Storage + Stone Storage = 16,044.1 cf = 0.368 af
Overall Storage Efficiency = 61.8%
Overall System Size = 91.74' x 51.42' x 5.50'

84 Chambers
960.9 cy Field
611.1 cy Stone



Pond 1P: USSF


Hydrograph
Inflow Area=1.24 ac
Peak Elev=121.50'
Storage=8,766 cf
4.71 cfs
0.47 cfs
0.47 cfs
0.00 cfs
Inflow
Outflow
Primary
Secondary
Flow (cfs)
Time (hours)
0 1 2 3 4 5
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48

Summary for Pond 206P: City CB @ Fletcher & Danforth

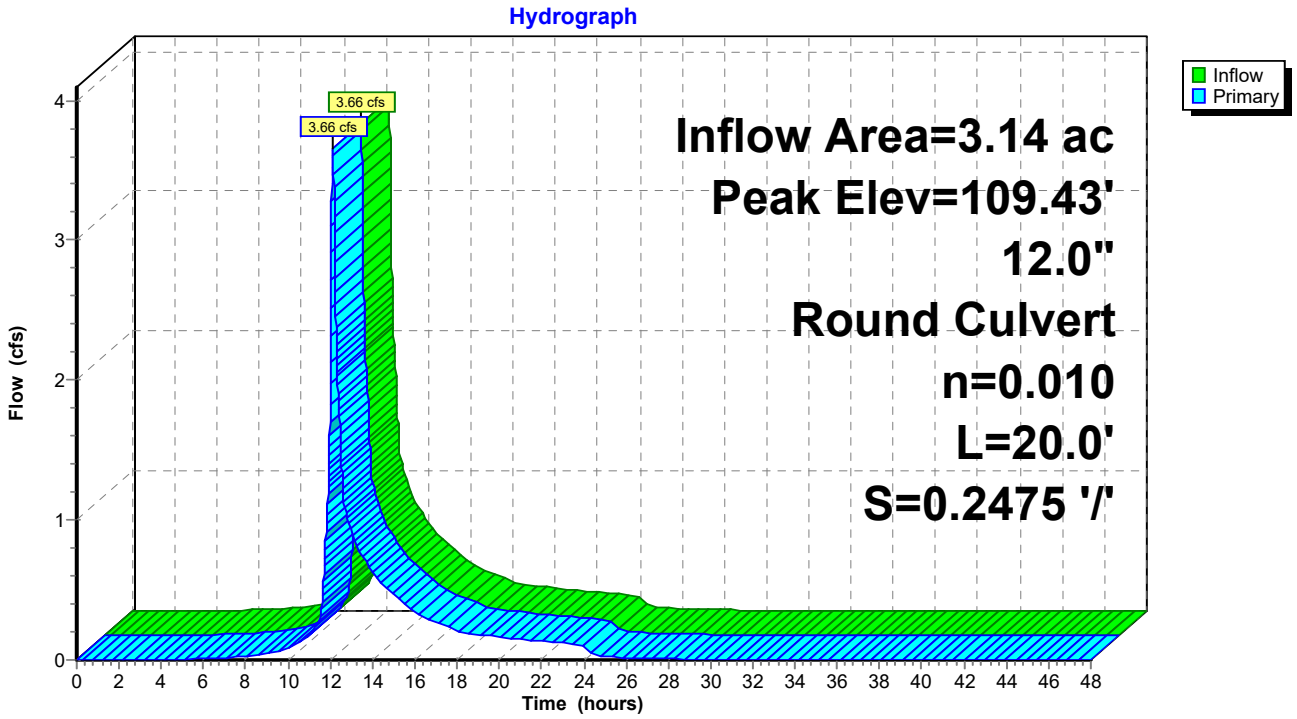
Inflow Area = 3.14 ac, 65.83% Impervious, Inflow Depth > 1.85" for 10-YR event
Inflow = 3.66 cfs @ 12.12 hrs, Volume= 0.485 af
Outflow = 3.66 cfs @ 12.12 hrs, Volume= 0.485 af, Atten= 0%, Lag= 0.0 min
Primary = 3.66 cfs @ 12.12 hrs, Volume= 0.485 af
Routed to Link SP1 : Existing Combined Sewer in Danforth

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 109.43' @ 12.12 hrs
Flood Elev= 111.26'

Device	Routing	Invert	Outlet Devices
#1	Primary	107.43'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 107.43' / 102.48' S= 0.2475 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.66 cfs @ 12.12 hrs HW=109.43' (Free Discharge)
1=Culvert (Inlet Controls 3.66 cfs @ 4.65 fps)

Pond 206P: City CB @ Fletcher & Danforth



Summary for Pond 210P: Existing FI

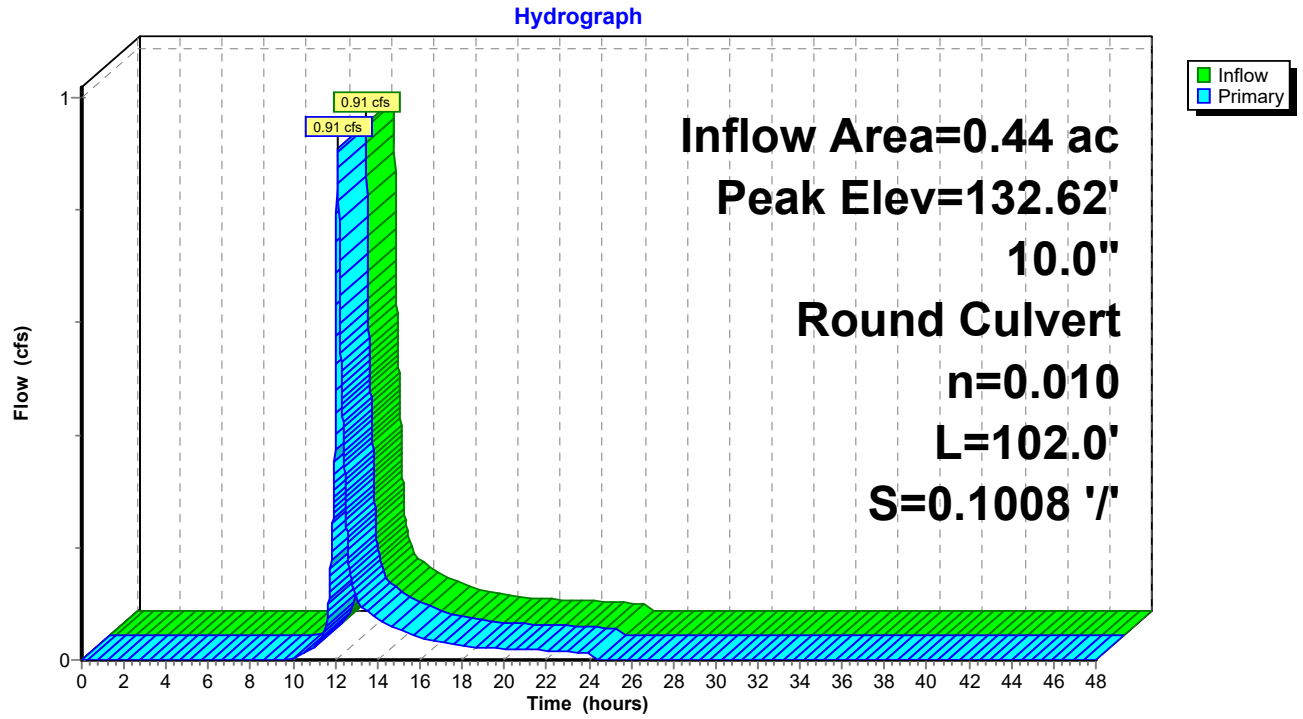
Inflow Area = 0.44 ac, 56.16% Impervious, Inflow Depth = 1.89" for 10-YR event
Inflow = 0.91 cfs @ 12.11 hrs, Volume= 0.070 af
Outflow = 0.91 cfs @ 12.11 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.0 min
Primary = 0.91 cfs @ 12.11 hrs, Volume= 0.070 af
Routed to Pond 220P : Existing DMH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 132.62' @ 12.11 hrs
Flood Elev= 140.41'

Device	Routing	Invert	Outlet Devices
#1	Primary	132.00'	**10.0" Round Culvert** L= 102.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 132.00' / 121.72' S= 0.1008 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.91 cfs @ 12.11 hrs HW=132.61' (Free Discharge)
1=Culvert (Inlet Controls 0.91 cfs @ 2.11 fps)

Pond 210P: Existing FI



Summary for Pond 220P: Existing DMH

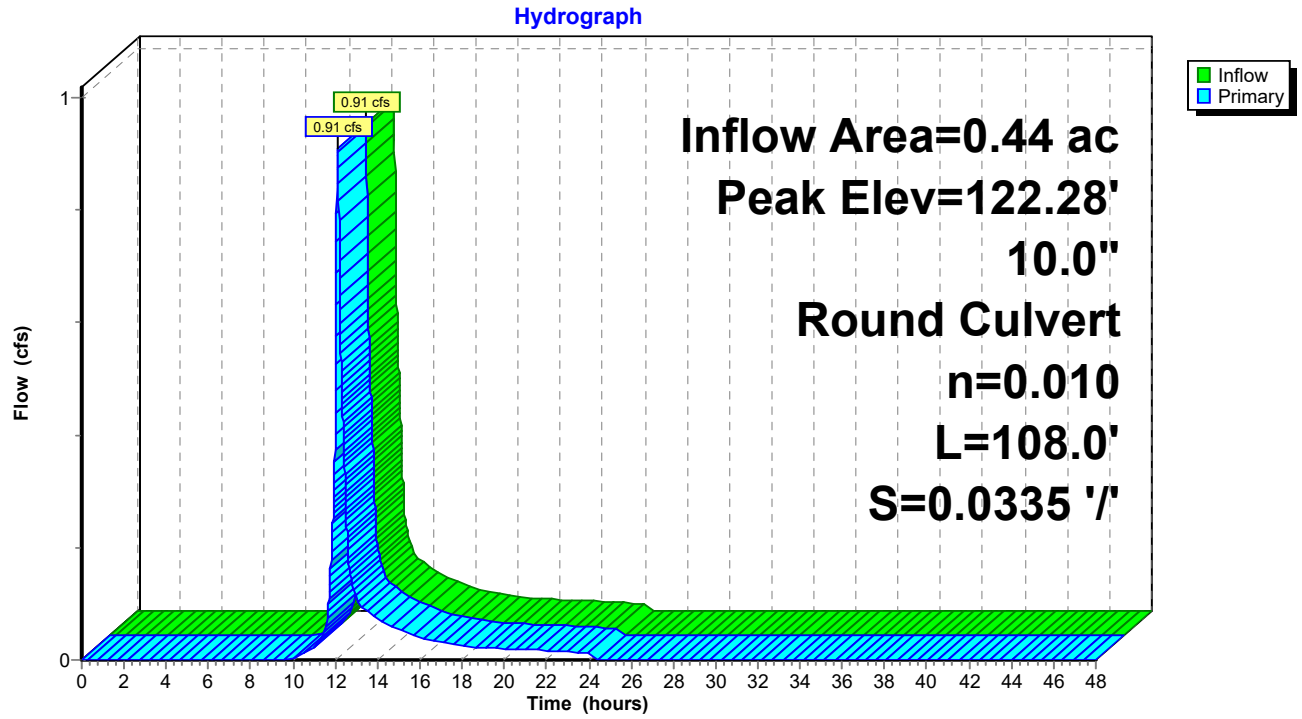
Inflow Area = 0.44 ac, 56.16% Impervious, Inflow Depth = 1.89" for 10-YR event
Inflow = 0.91 cfs @ 12.11 hrs, Volume= 0.070 af
Outflow = 0.91 cfs @ 12.11 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.0 min
Primary = 0.91 cfs @ 12.11 hrs, Volume= 0.070 af
Routed to Pond 230P : Existing DMH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 122.28' @ 12.11 hrs
Flood Elev= 128.47'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.67'	**10.0" Round Culvert** L= 108.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 121.67' / 118.05' S= 0.0335 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.91 cfs @ 12.11 hrs HW=122.28' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 0.91 cfs @ 2.11 fps)

Pond 220P: Existing DMH



Summary for Pond 230P: Existing DMH

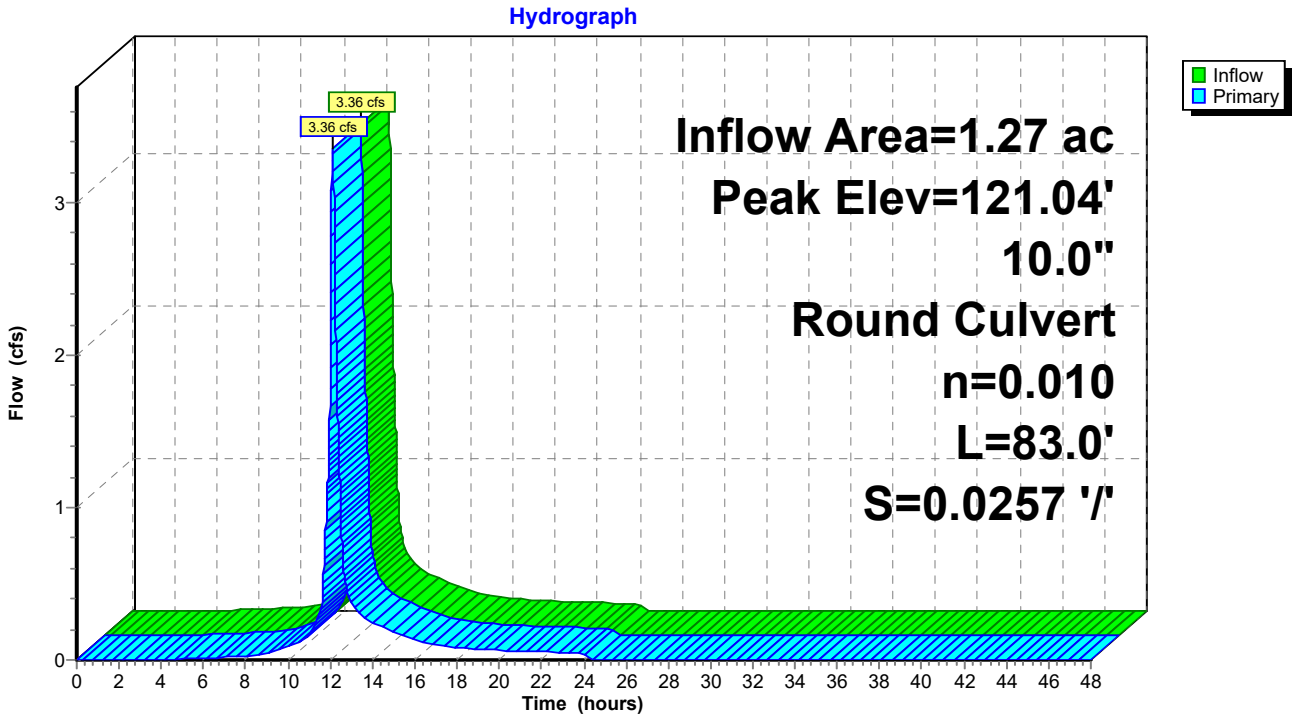
Inflow Area = 1.27 ac, 70.40% Impervious, Inflow Depth = 2.64" for 10-YR event
Inflow = 3.36 cfs @ 12.11 hrs, Volume= 0.280 af
Outflow = 3.36 cfs @ 12.11 hrs, Volume= 0.280 af, Atten= 0%, Lag= 0.0 min
Primary = 3.36 cfs @ 12.11 hrs, Volume= 0.280 af
Routed to Pond DMH7 : Proposed Drop DMH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 121.04' @ 12.11 hrs
Flood Elev= 125.05'

Device	Routing	Invert	Outlet Devices
#1	Primary	118.00'	**10.0" Round Culvert** L= 83.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 118.00' / 115.87' S= 0.0257 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=3.35 cfs @ 12.11 hrs HW=121.03' (Free Discharge)
1=Culvert (Inlet Controls 3.35 cfs @ 6.15 fps)

Pond 230P: Existing DMH



Summary for Pond 260P: Storage Pipes

Inflow Area = 0.72 ac, 79.29% Impervious, Inflow Depth = 3.12" for 10-YR event
Inflow = 2.62 cfs @ 12.07 hrs, Volume= 0.188 af
Outflow = 2.16 cfs @ 12.13 hrs, Volume= 0.188 af, Atten= 18%, Lag= 3.1 min
Primary = 2.16 cfs @ 12.13 hrs, Volume= 0.188 af
Routed to Pond 230P : Existing DMH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 120.18' @ 12.13 hrs Surf.Area= 797 sf Storage= 377 cf
Flood Elev= 125.26' Storage= 3,468 cf

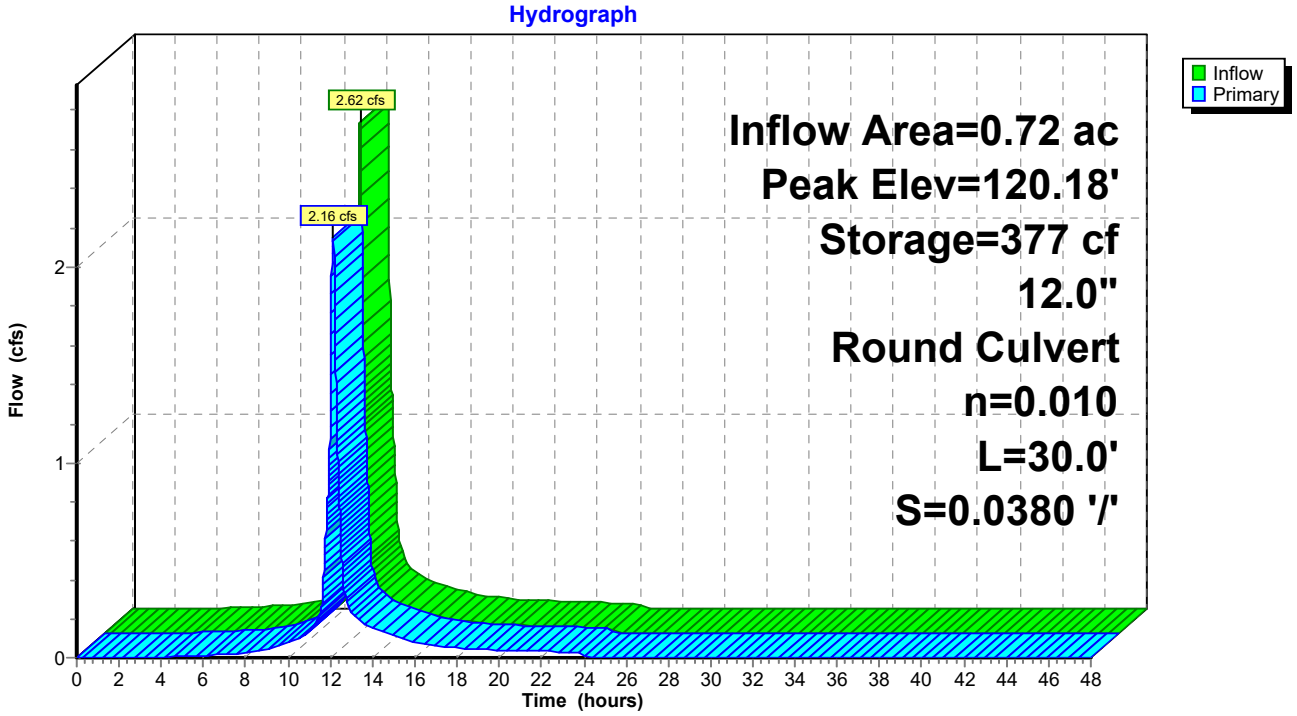
Plug-Flow detention time= 1.4 min calculated for 0.188 af (100% of inflow)
Center-of-Mass det. time= 1.4 min (797.7 - 796.3)

Volume	Invert	Avail.Storage	Storage Description
#1	119.16'	3,468 cf	**48.0" Round Pipe Storage** L= 276.0' S= 0.0027 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.16'	**12.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.16' / 118.02' S= 0.0380 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.15 cfs @ 12.13 hrs HW=120.18' (Free Discharge)
1=Culvert (Inlet Controls 2.15 cfs @ 2.74 fps)

Pond 260P: Storage Pipes



Summary for Pond 340P: CB at SW Cor prkng lot

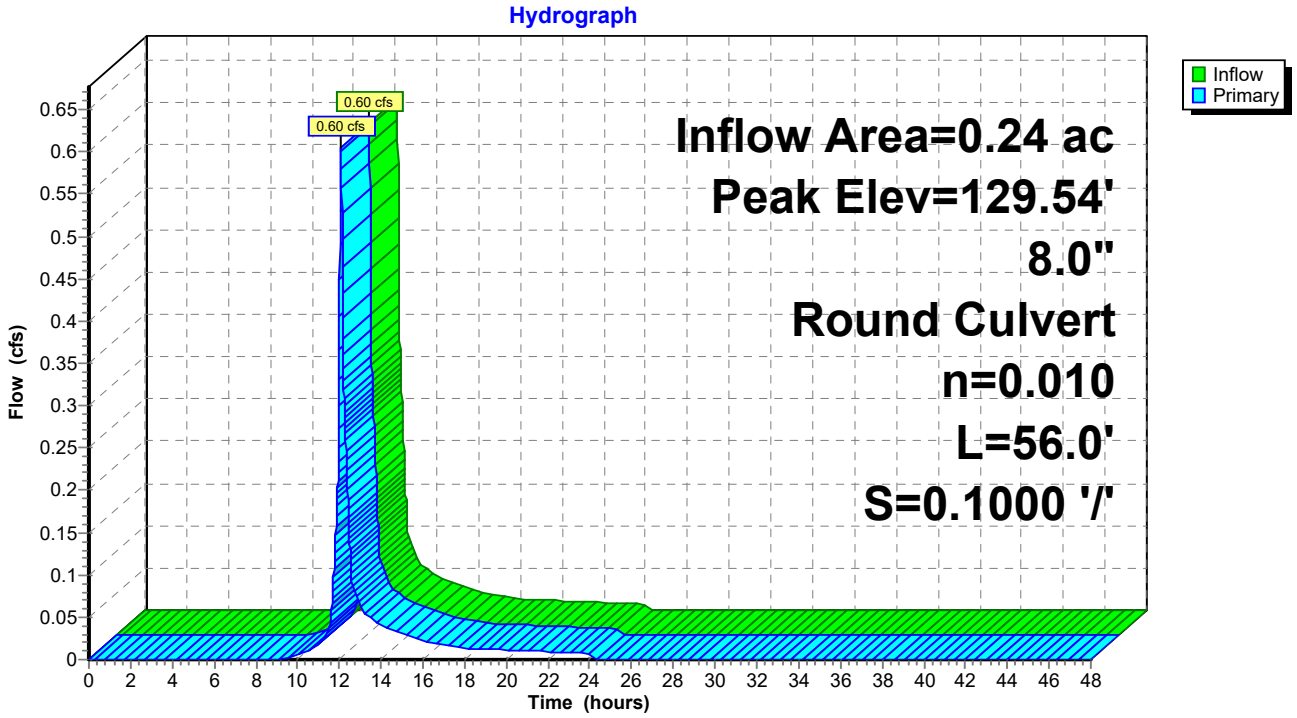
Inflow Area = 0.24 ac, 60.94% Impervious, Inflow Depth = 2.13" for 10-YR event
Inflow = 0.60 cfs @ 12.08 hrs, Volume= 0.042 af
Outflow = 0.60 cfs @ 12.08 hrs, Volume= 0.042 af, Atten= 0%, Lag= 0.0 min
Primary = 0.60 cfs @ 12.08 hrs, Volume= 0.042 af
Routed to Pond 260P : Storage Pipes

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 129.54' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	129.00'	**8.0" Round Culvert** L= 56.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 129.00' / 123.40' S= 0.1000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.60 cfs @ 12.08 hrs HW=129.54' (Free Discharge)
1=Culvert (Inlet Controls 0.60 cfs @ 1.98 fps)

Pond 340P: CB at SW Cor prkng lot



Summary for Pond CB4: Proposed DMH

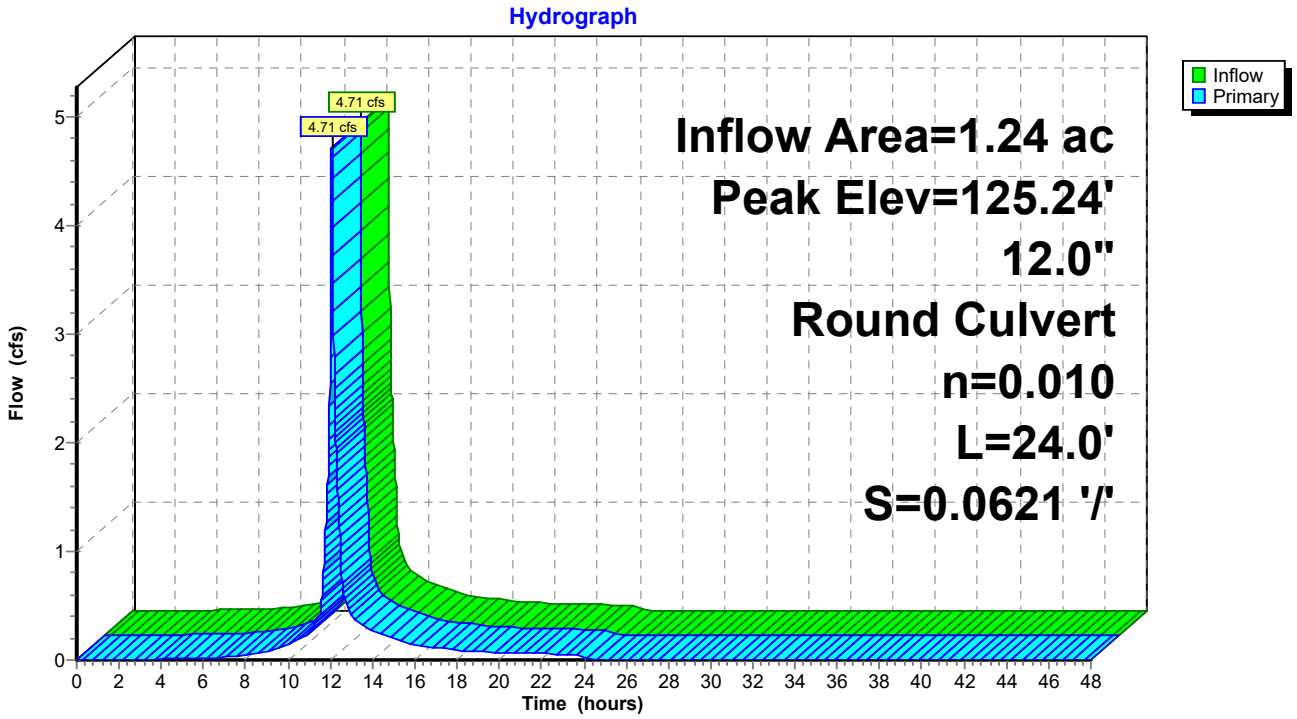
Inflow Area = 1.24 ac, 81.89% Impervious, Inflow Depth = 3.24" for 10-YR event
Inflow = 4.71 cfs @ 12.07 hrs, Volume= 0.334 af
Outflow = 4.71 cfs @ 12.07 hrs, Volume= 0.334 af, Atten= 0%, Lag= 0.0 min
Primary = 4.71 cfs @ 12.07 hrs, Volume= 0.334 af
Routed to Pond DMH6 : Access MH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 125.24' @ 12.07 hrs
Flood Elev= 127.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.26'	**12.0" Round Culvert** L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 122.26' / 120.77' S= 0.0621 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.70 cfs @ 12.07 hrs HW=125.24' (Free Discharge)
1=Culvert (Inlet Controls 4.70 cfs @ 5.98 fps)

Pond CB4: Proposed DMH



Summary for Pond DMH: OCS Bypass

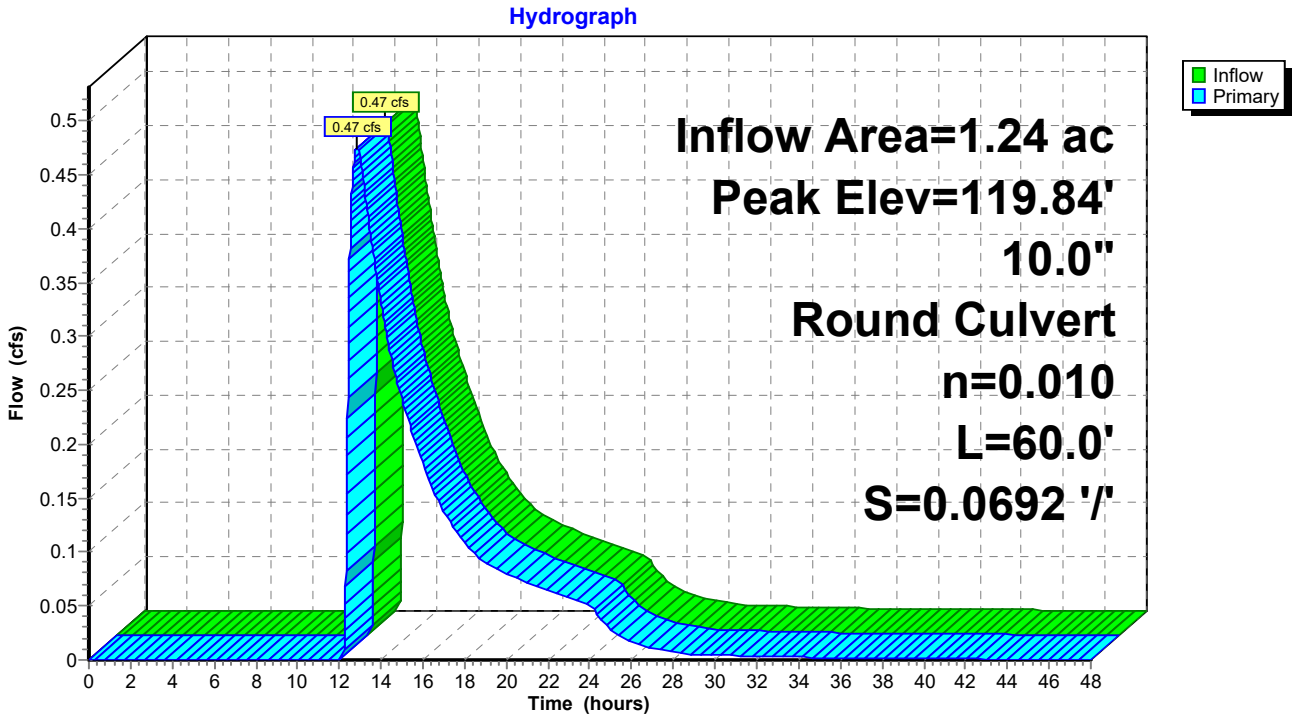
Inflow Area = 1.24 ac, 81.89% Impervious, Inflow Depth > 1.61" for 10-YR event
Inflow = 0.47 cfs @ 12.86 hrs, Volume= 0.166 af
Outflow = 0.47 cfs @ 12.86 hrs, Volume= 0.166 af, Atten= 0%, Lag= 0.0 min
Primary = 0.47 cfs @ 12.86 hrs, Volume= 0.166 af
Routed to Pond DMH7 : Proposed Drop DMH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 119.84' @ 12.86 hrs
Flood Elev= 126.48'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.42'	**10.0" Round Culvert** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.42' / 115.27' S= 0.0692 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.47 cfs @ 12.86 hrs HW=119.84' (Free Discharge)
1=Culvert (Inlet Controls 0.47 cfs @ 1.74 fps)

Pond DMH: OCS Bypass



Summary for Pond DMH6: Access MH

Inflow Area = 1.24 ac, 81.89% Impervious, Inflow Depth = 3.24" for 10-YR event
Inflow = 4.71 cfs @ 12.07 hrs, Volume= 0.334 af
Outflow = 4.71 cfs @ 12.07 hrs, Volume= 0.334 af, Atten= 0%, Lag= 0.0 min
Primary = 4.71 cfs @ 12.07 hrs, Volume= 0.334 af
Routed to Pond 1P : USSF
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond DMH : OCS Bypass

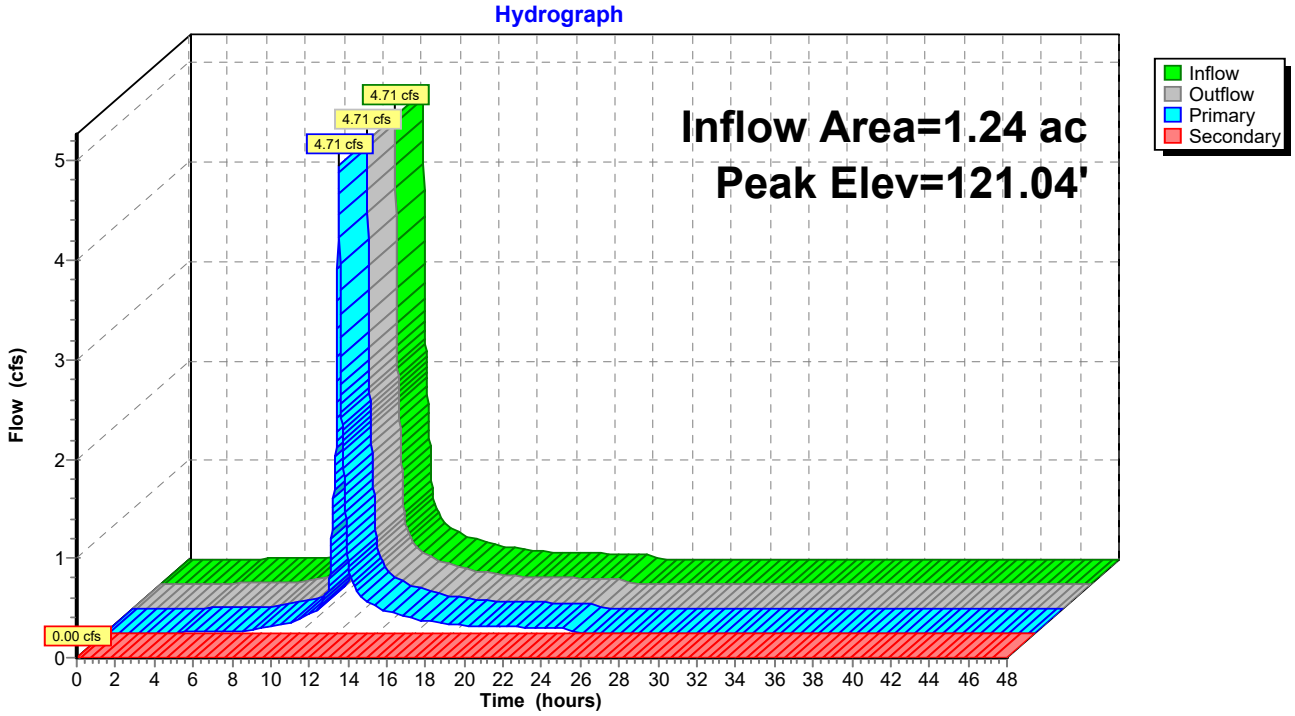
Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 121.04' @ 12.07 hrs
Flood Elev= 126.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.77'	**24.0" Round Culvert** L= 9.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.77' / 119.77' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Secondary	119.77'	**24.0" Round Culvert** L= 2.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.77' / 119.77' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#3	Device 2	123.35'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=4.70 cfs @ 12.07 hrs HW=121.04' (Free Discharge)
└**1=Culvert** (Barrel Controls 4.70 cfs @ 3.18 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=119.77' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond DMH6: Access MH



Summary for Pond DMH7: Proposed Drop DMH

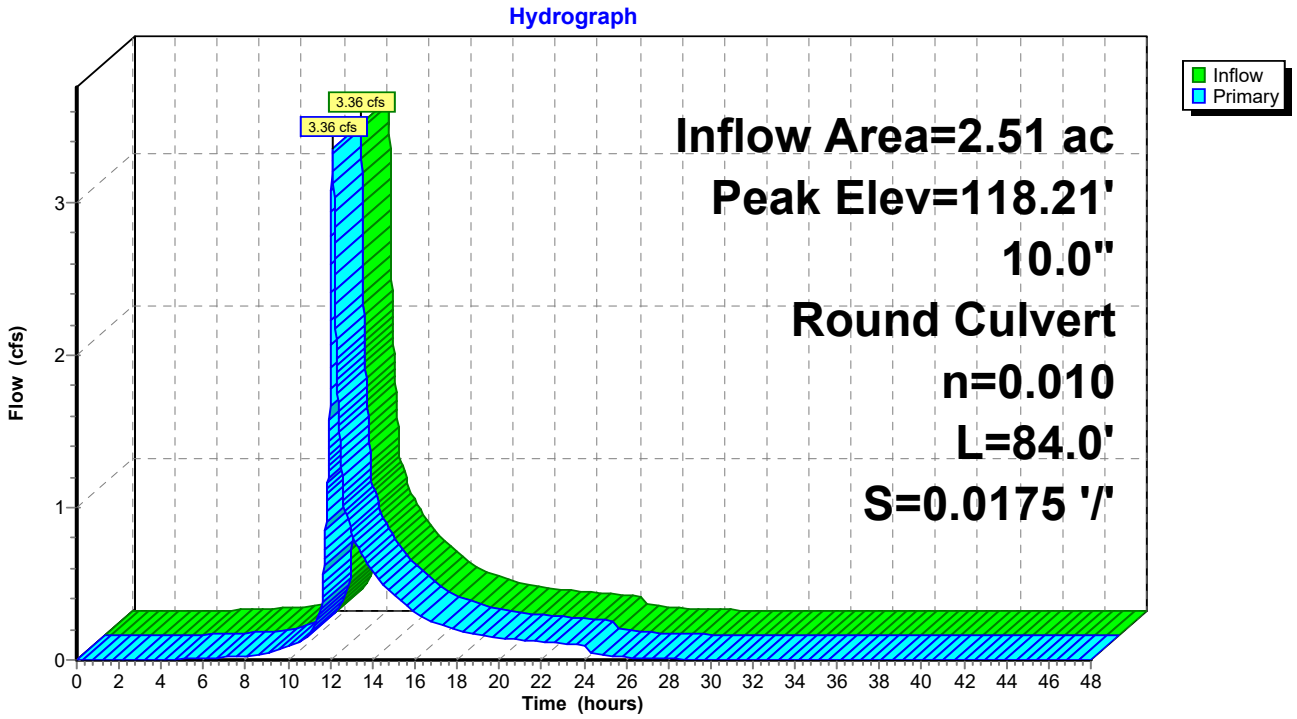
Inflow Area = 2.51 ac, 76.06% Impervious, Inflow Depth > 2.14" for 10-YR event
Inflow = 3.36 cfs @ 12.11 hrs, Volume= 0.447 af
Outflow = 3.36 cfs @ 12.11 hrs, Volume= 0.447 af, Atten= 0%, Lag= 0.0 min
Primary = 3.36 cfs @ 12.11 hrs, Volume= 0.447 af
Routed to Pond DMH8 : Proposed DMH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 118.21' @ 12.11 hrs
Flood Elev= 124.69'

Device	Routing	Invert	Outlet Devices
#1	Primary	115.17'	**10.0" Round Culvert** L= 84.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 115.17' / 113.70' S= 0.0175 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=3.35 cfs @ 12.11 hrs HW=118.20' (Free Discharge)
1=Culvert (Inlet Controls 3.35 cfs @ 6.15 fps)

Pond DMH7: Proposed Drop DMH



Summary for Pond DMH8: Proposed DMH

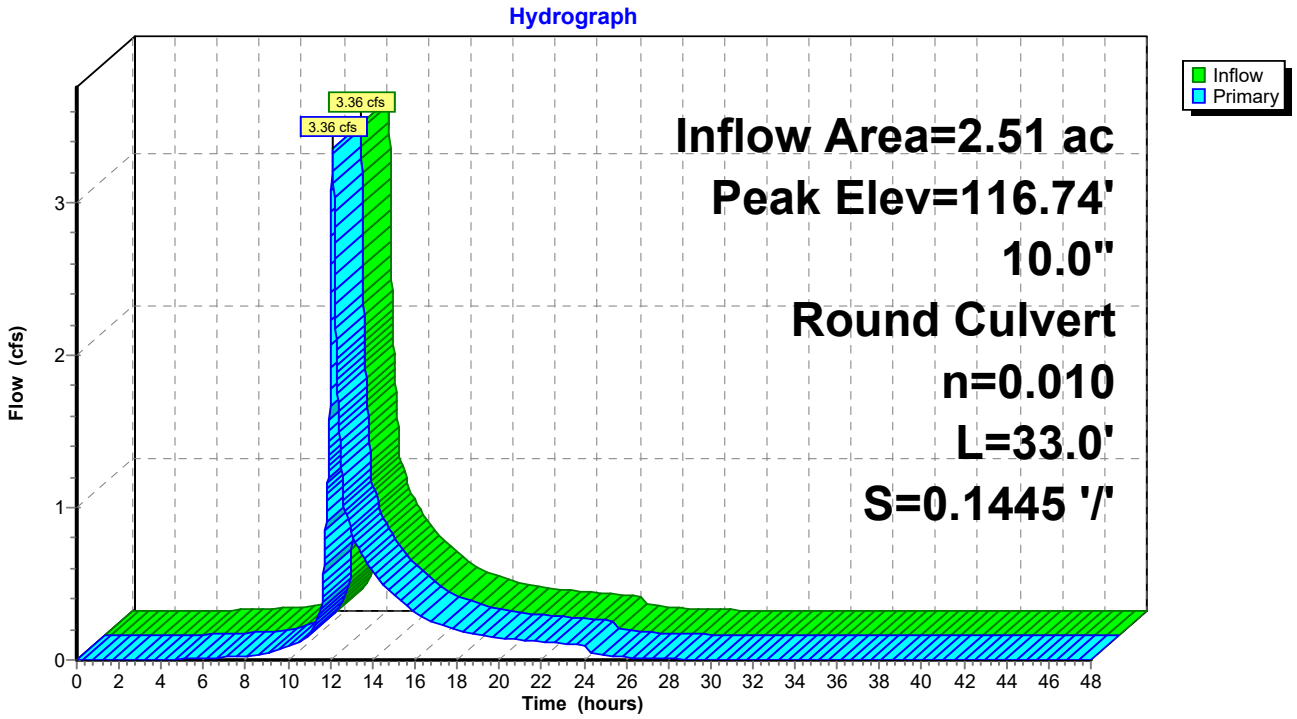
Inflow Area = 2.51 ac, 76.06% Impervious, Inflow Depth > 2.14" for 10-YR event
Inflow = 3.36 cfs @ 12.11 hrs, Volume= 0.447 af
Outflow = 3.36 cfs @ 12.11 hrs, Volume= 0.447 af, Atten= 0%, Lag= 0.0 min
Primary = 3.36 cfs @ 12.11 hrs, Volume= 0.447 af
Routed to Pond 206P : City CB @ Fletcher & Danforth

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 116.74' @ 12.11 hrs
Flood Elev= 123.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	113.70'	**10.0" Round Culvert** L= 33.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 113.70' / 108.93' S= 0.1445 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=3.35 cfs @ 12.11 hrs HW=116.73' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 3.35 cfs @ 6.15 fps)

Pond DMH8: Proposed DMH

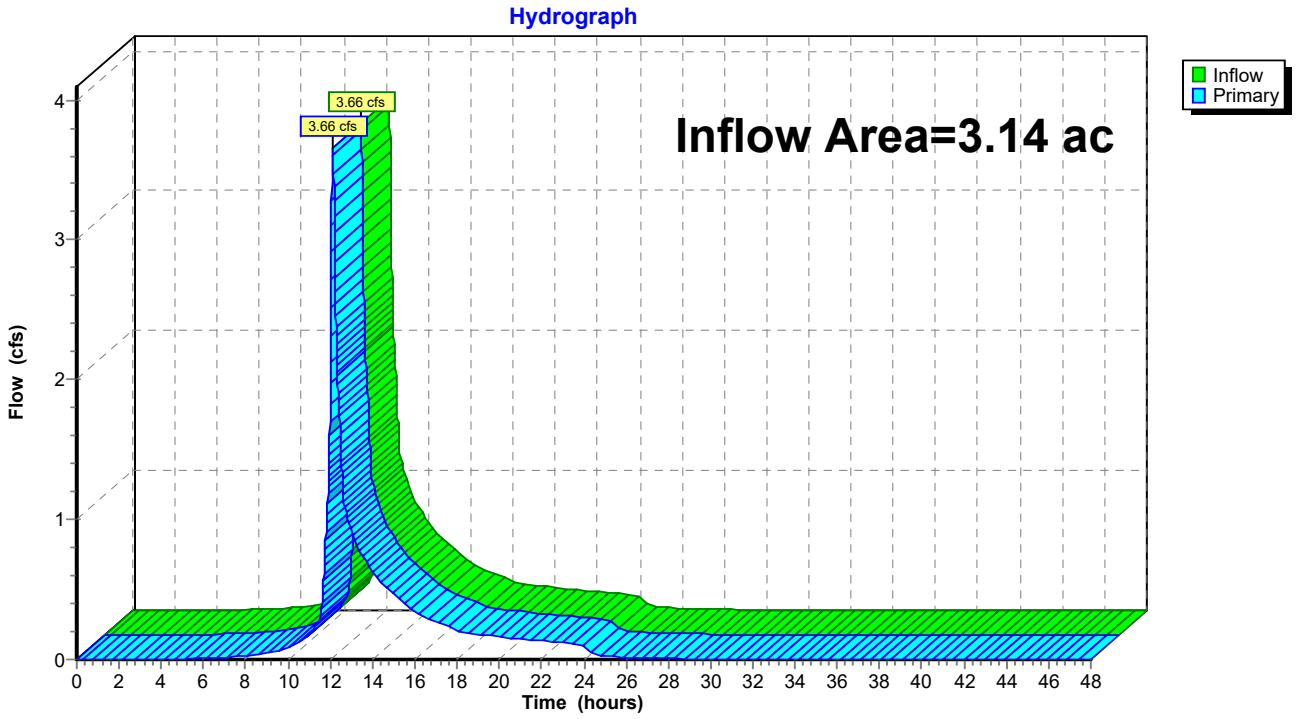


Summary for Link SP1: Existing Combined Sewer in Danforth

Inflow Area = 3.14 ac, 65.83% Impervious, Inflow Depth > 1.85" for 10-YR event
Inflow = 3.66 cfs @ 12.12 hrs, Volume= 0.485 af
Primary = 3.66 cfs @ 12.12 hrs, Volume= 0.485 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link SP1: Existing Combined Sewer in Danforth



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10S: Area draining to Runoff Area=19,254 sf 56.16% Impervious Runoff Depth=2.83"
Flow Length=91' Slope=0.0300 '/' Tc=7.7 min CN=72 Runoff=1.38 cfs 0.104 af

Subcatchment60S: Lawn/Field S of school Runoff Area=16,715 sf 84.98% Impervious Runoff Depth=4.54"
Tc=5.0 min CN=89 Runoff=2.04 cfs 0.145 af

Subcatchment61S: Auditorium Roof Runoff Area=4,485 sf 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=98 Runoff=0.61 cfs 0.048 af

Subcatchment70S: Thomas & Davies & Runoff Area=44,441 sf 78.03% Impervious Runoff Depth=4.11"
Flow Length=91' Slope=0.1593 '/' Tc=5.0 min CN=85 Runoff=5.01 cfs 0.350 af

Subcatchment80S: FoundersHall Runoff Area=9,466 sf 100.00% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=98 Runoff=1.28 cfs 0.101 af

Subcatchment90S: Playground Runoff Area=27,554 sf 25.26% Impervious Runoff Depth=1.33"
Flow Length=117' Tc=9.2 min CN=54 Runoff=0.75 cfs 0.070 af

Subcatchment91S: Playground Runoff Area=4,688 sf 69.20% Impervious Runoff Depth=3.60"
Tc=5.0 min CN=80 Runoff=0.47 cfs 0.032 af

Subcatchment402S: New Prkng lot Runoff Area=10,240 sf 60.94% Impervious Runoff Depth=3.11"
Tc=5.0 min CN=75 Runoff=0.89 cfs 0.061 af

Reach 161R: roof drain Avg. Flow Depth=0.21' Max Vel=7.90 fps Inflow=0.61 cfs 0.048 af
6.0" Round Pipe n=0.013 L=129.0' S=0.0911 '/' Capacity=1.69 cfs Outflow=0.60 cfs 0.048 af

Pond 1P: USSF Peak Elev=122.02' Storage=10,569 cf Inflow=6.29 cfs 0.451 af
Primary=1.29 cfs 0.283 af Secondary=0.00 cfs 0.000 af Outflow=1.29 cfs 0.283 af

Pond 206P: City CB @ Fletcher & Danforth Peak Elev=111.53' Inflow=5.66 cfs 0.743 af
12.0" Round Culvert n=0.010 L=20.0' S=0.2475 '/' Outflow=5.66 cfs 0.743 af

Pond 210P: Existing FI Peak Elev=132.86' Inflow=1.38 cfs 0.104 af
10.0" Round Culvert n=0.010 L=102.0' S=0.1008 '/' Outflow=1.38 cfs 0.104 af

Pond 220P: Existing DMH Peak Elev=122.53' Inflow=1.38 cfs 0.104 af
10.0" Round Culvert n=0.010 L=108.0' S=0.0335 '/' Outflow=1.38 cfs 0.104 af

Pond 230P: Existing DMH Peak Elev=123.02' Inflow=4.45 cfs 0.390 af
10.0" Round Culvert n=0.010 L=83.0' S=0.0257 '/' Outflow=4.45 cfs 0.390 af

Pond 260P: Storage Pipes Peak Elev=120.47' Storage=626 cf Inflow=3.53 cfs 0.254 af
12.0" Round Culvert n=0.010 L=30.0' S=0.0380 '/' Outflow=2.69 cfs 0.254 af

Pond 340P: CB at SW Cor prkng lot Peak Elev=129.78' Inflow=0.89 cfs 0.061 af
8.0" Round Culvert n=0.010 L=56.0' S=0.1000 '/' Outflow=0.89 cfs 0.061 af

Pond CB4: Proposed DMH Peak Elev=127.20' Inflow=6.29 cfs 0.451 af
12.0" Round Culvert n=0.010 L=24.0' S=0.0621 '/' Outflow=6.29 cfs 0.451 af

Pond DMH: OCS Bypass Peak Elev=120.22' Inflow=1.29 cfs 0.283 af
10.0" Round Culvert n=0.010 L=60.0' S=0.0692 '/' Outflow=1.29 cfs 0.283 af

Pond DMH6: Access MH Peak Elev=121.27' Inflow=6.29 cfs 0.451 af
Primary=6.29 cfs 0.451 af Secondary=0.00 cfs 0.000 af Outflow=6.29 cfs 0.451 af

Pond DMH7: Proposed Drop DMH Peak Elev=121.20' Inflow=4.91 cfs 0.673 af
10.0" Round Culvert n=0.010 L=84.0' S=0.0175 '/' Outflow=4.91 cfs 0.673 af

Pond DMH8: Proposed DMH Peak Elev=119.73' Inflow=4.91 cfs 0.673 af
10.0" Round Culvert n=0.010 L=33.0' S=0.1445 '/' Outflow=4.91 cfs 0.673 af

Link SP1: Existing Combined Sewer in Danforth Inflow=5.66 cfs 0.743 af
Primary=5.66 cfs 0.743 af

Total Runoff Area = 3.14 ac Runoff Volume = 0.911 af Average Runoff Depth = 3.48"
34.17% Pervious = 1.07 ac 65.83% Impervious = 2.07 ac

Summary for Subcatchment 10S: Area draining to Sanctuary

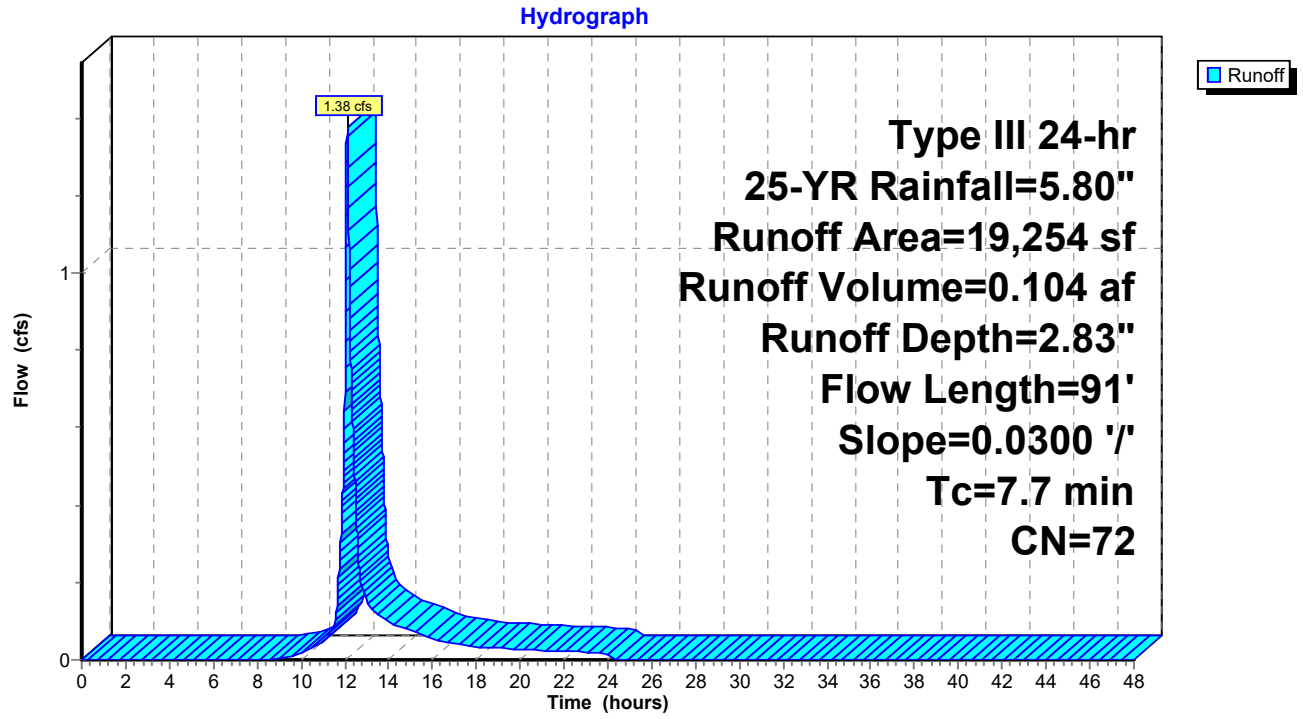
Runoff = 1.38 cfs @ 12.11 hrs, Volume= 0.104 af, Depth= 2.83"
Routed to Pond 210P : Existing FI

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-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	10,813	98	impervious
*	8,441	39	Lawn/field, HSG A
	19,254	72	Weighted Average
	8,441		43.84% Pervious Area
	10,813		56.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	91	0.0300	0.20		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"

Subcatchment 10S: Area draining to Sanctuary



Summary for Subcatchment 60S: Lawn/Field S of school

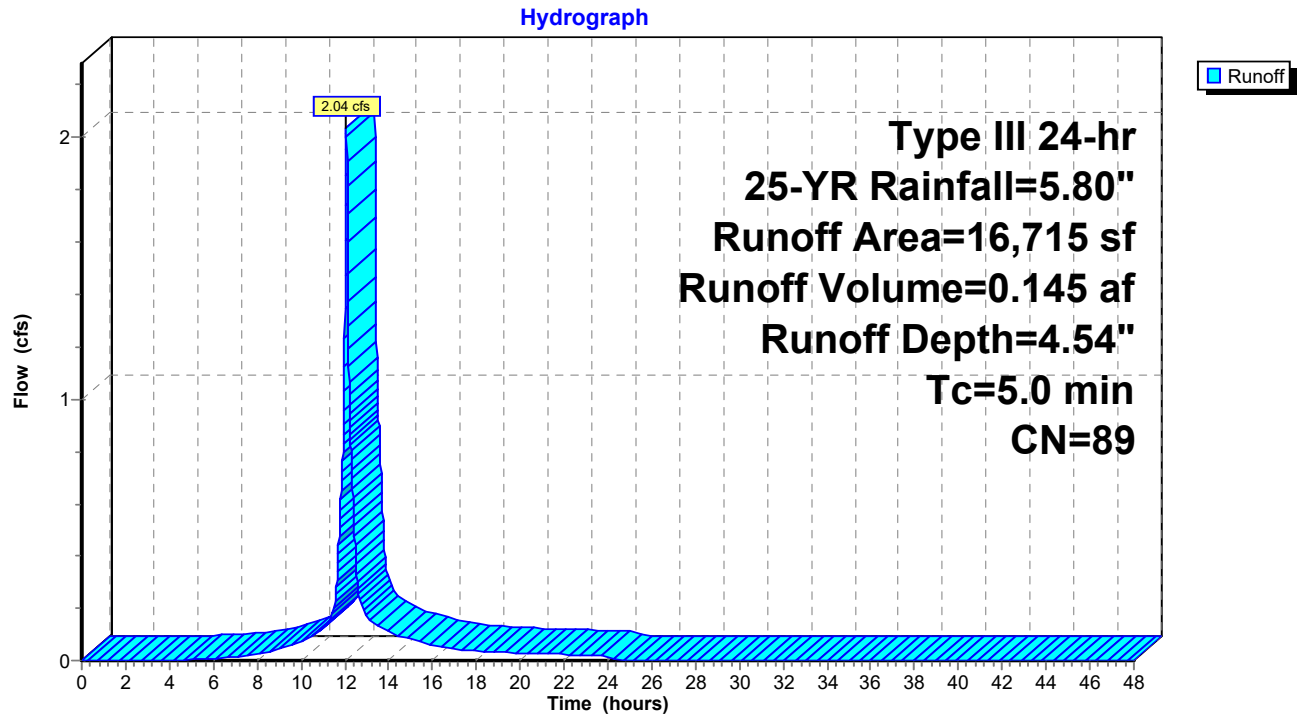
Runoff = 2.04 cfs @ 12.07 hrs, Volume= 0.145 af, Depth= 4.54"
Routed to Pond 260P : Storage Pipes

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-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	14,205	98	impervious
*	2,510	39	Lawn/field, HSG A
	16,715	89	Weighted Average
	2,510		15.02% Pervious Area
	14,205		84.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 60S: Lawn/Field S of school



Summary for Subcatchment 61S: Auditorium Roof

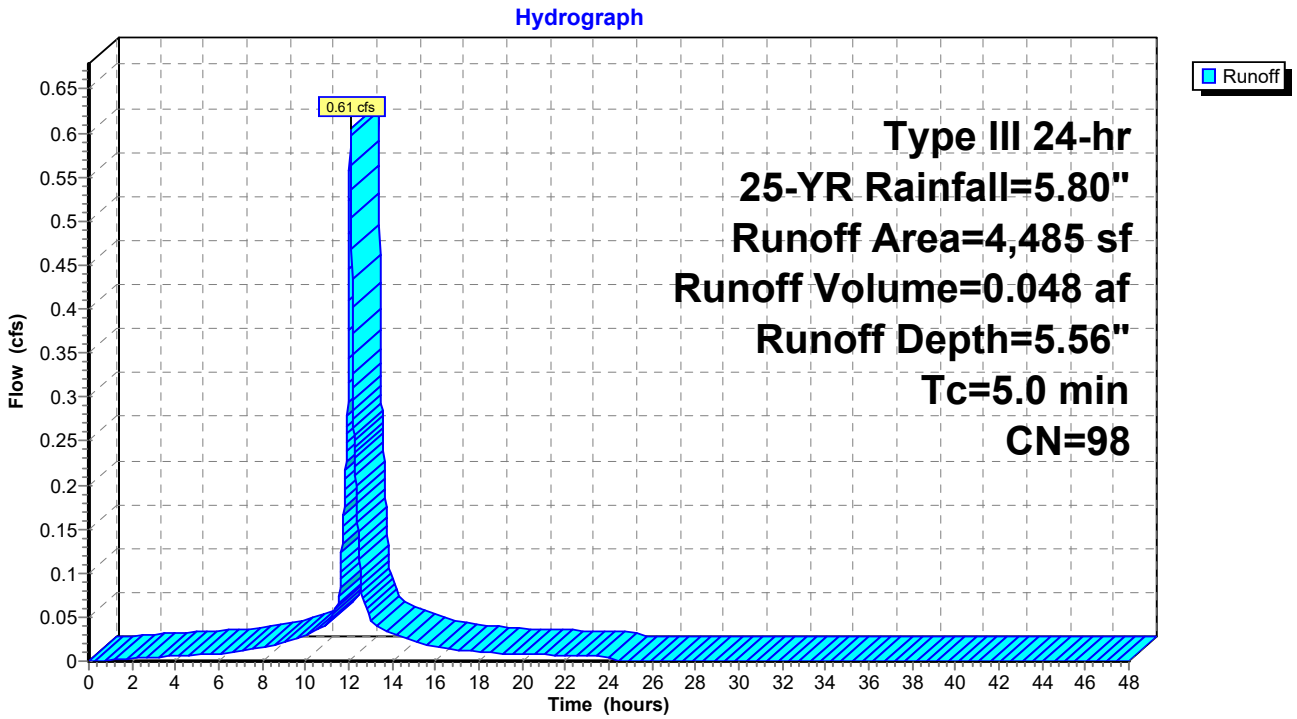
Runoff = 0.61 cfs @ 12.07 hrs, Volume= 0.048 af, Depth= 5.56"
Routed to Reach 161R : roof drain

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-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	4,485	98	Roof runoff
	4,485		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 61S: Auditorium Roof



Summary for Subcatchment 70S: Thomas & Davies & Gym

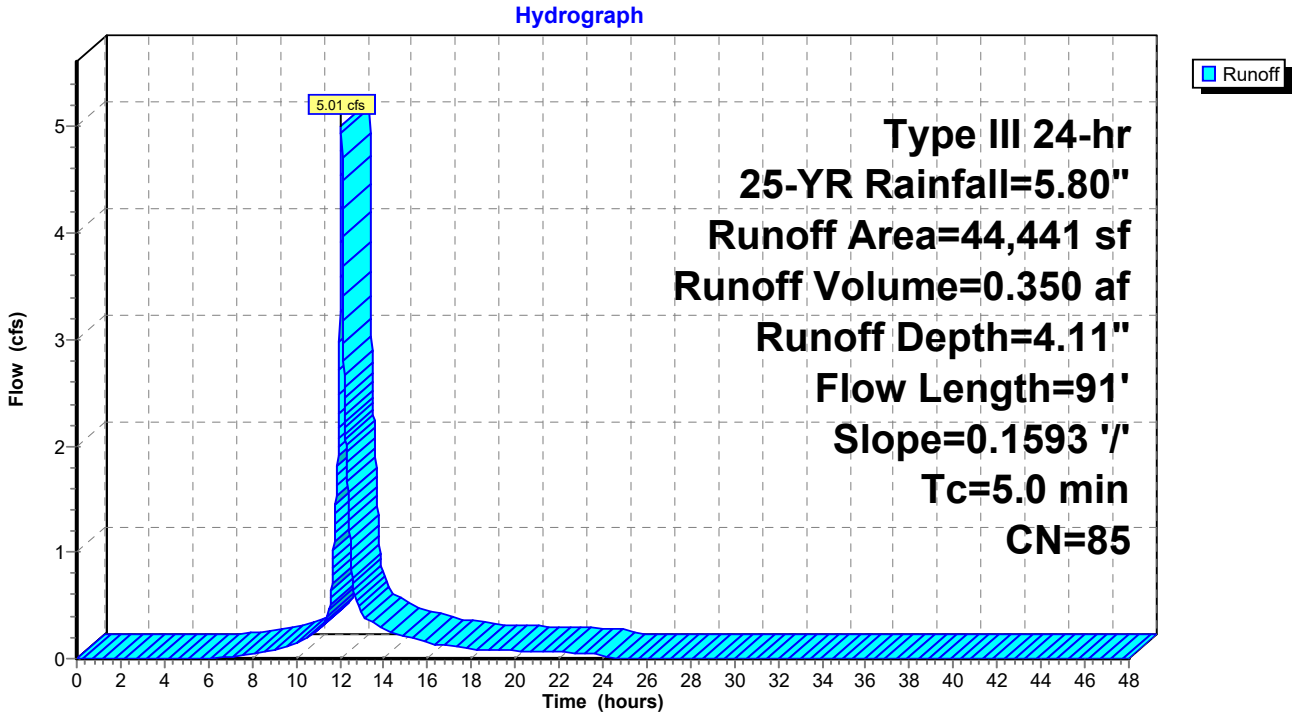
Runoff = 5.01 cfs @ 12.07 hrs, Volume= 0.350 af, Depth= 4.11"
Routed to Pond CB4 : Proposed DMH

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-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	34,676	98	impervious
*	9,765	39	Lawn/field, HSG A
	44,441	85	Weighted Average
	9,765		21.97% Pervious Area
	34,676		78.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	91	0.1593	0.38		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"
4.0	91	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 70S: Thomas & Davies & Gym



Summary for Subcatchment 80S: FoundersHall

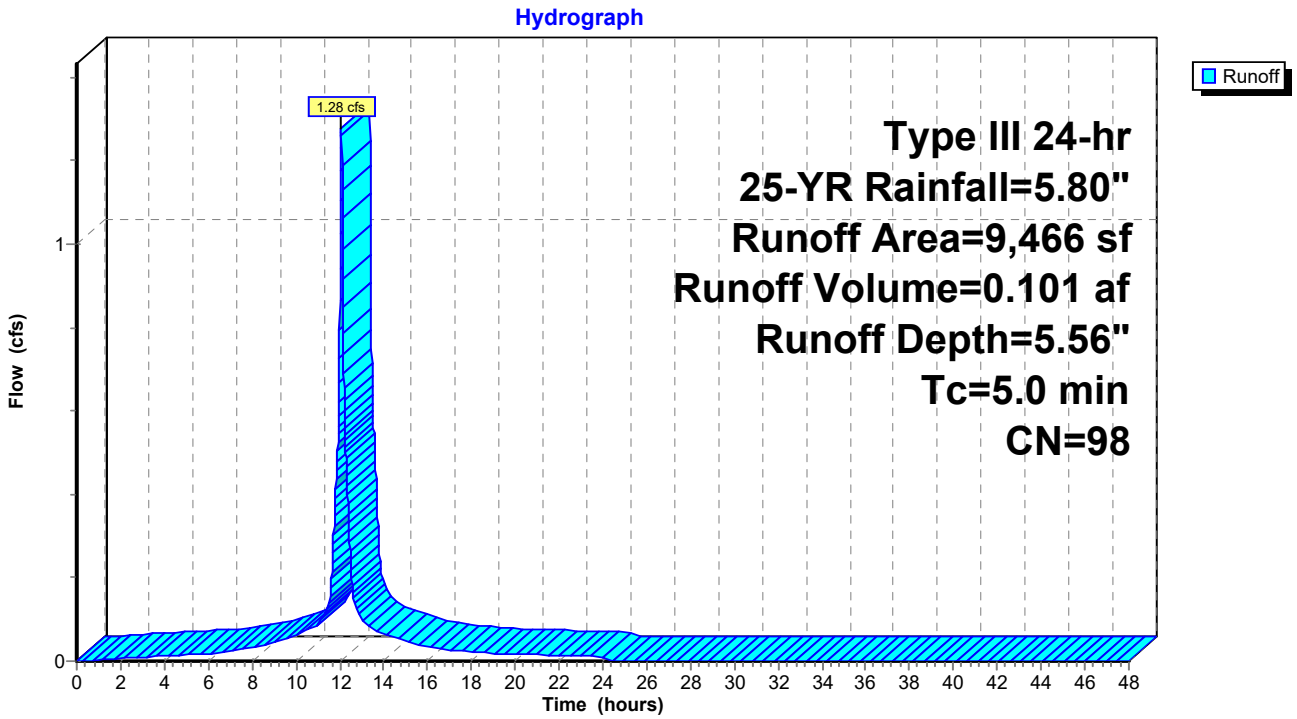
Runoff = 1.28 cfs @ 12.07 hrs, Volume= 0.101 af, Depth= 5.56"
Routed to Pond CB4 : Proposed DMH

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-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	9,466	98	Roof runoff
	9,466		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 80S: FoundersHall



Summary for Subcatchment 90S: Playground

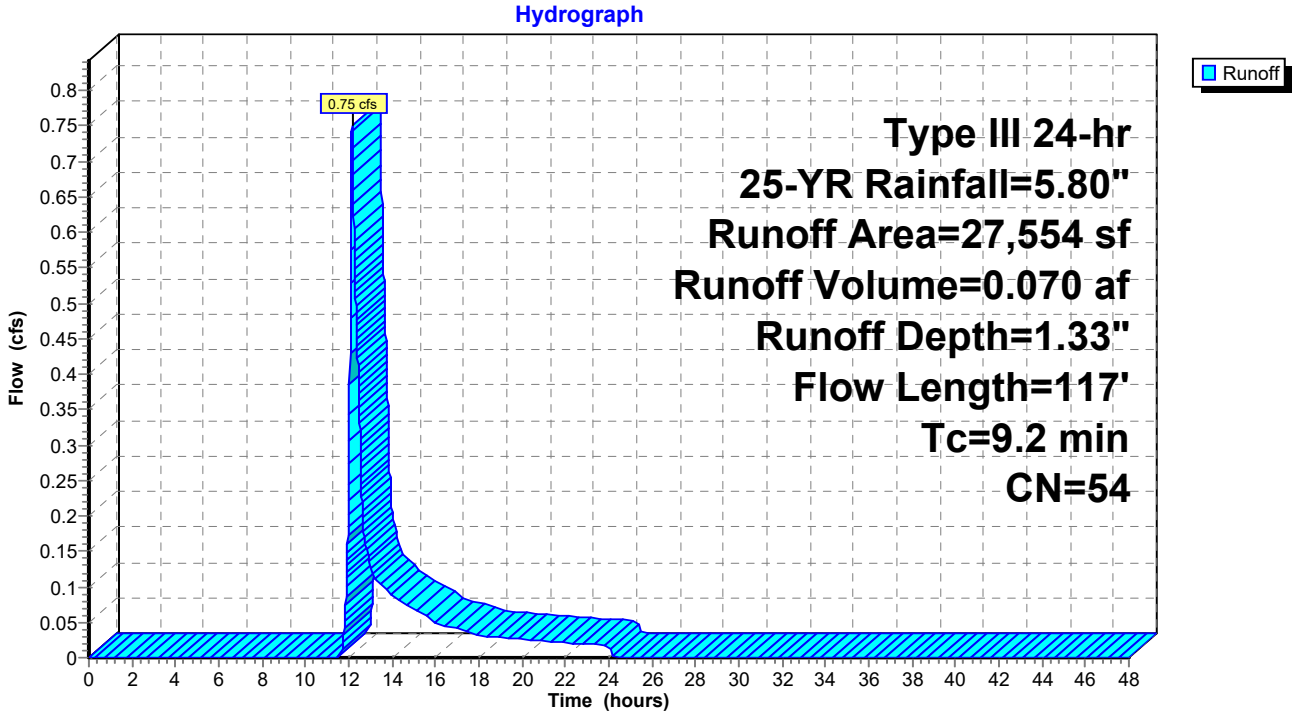
Runoff = 0.75 cfs @ 12.15 hrs, Volume= 0.070 af, Depth= 1.33"
Routed to Pond 206P : City CB @ Fletcher & Danforth

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-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	6,960	98	impervious
*	20,594	39	Lawn/field, HSG A
	27,554	54	Weighted Average
	20,594		74.74% Pervious Area
	6,960		25.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0250	0.19		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"
0.2	17	0.0588	1.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.2	117	Total			

Subcatchment 90S: Playground



Summary for Subcatchment 91S: Playground

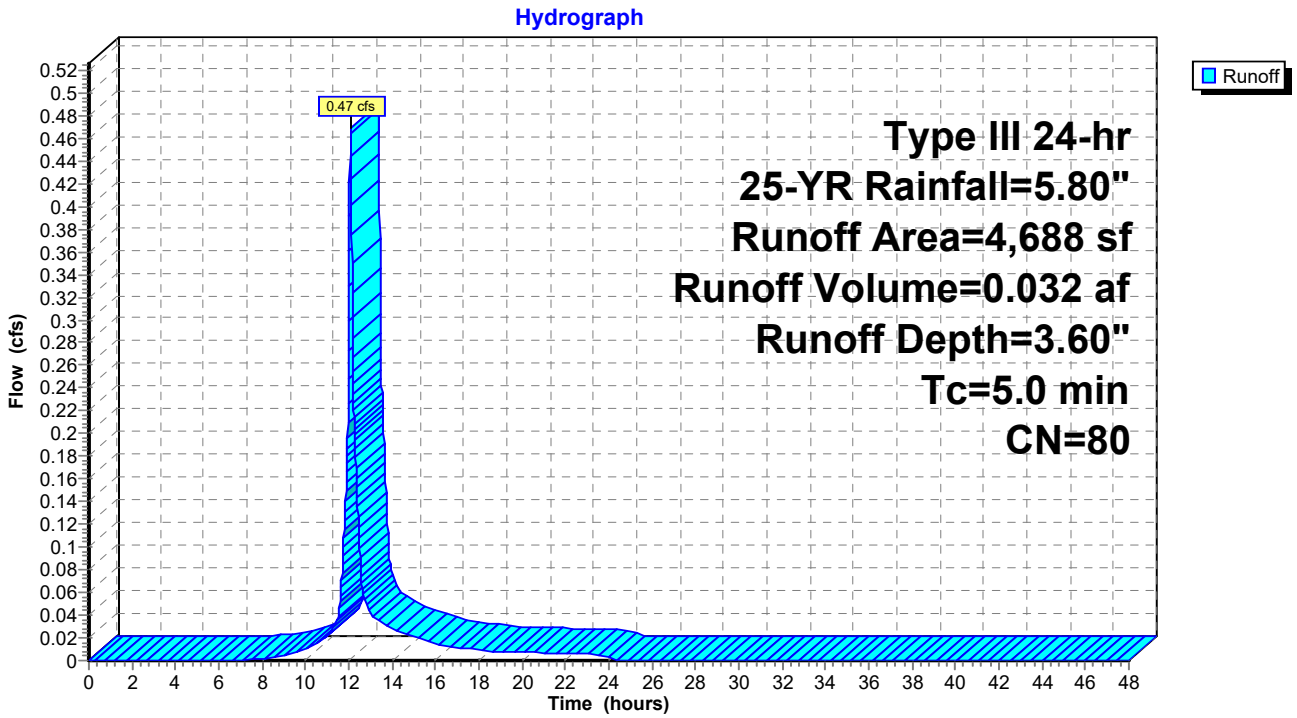
Runoff = 0.47 cfs @ 12.07 hrs, Volume= 0.032 af, Depth= 3.60"
Routed to Pond 230P : Existing DMH

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-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	3,244	98	impervious
*	1,444	39	Lawn/field, HSG A
	4,688	80	Weighted Average
	1,444		30.80% Pervious Area
	3,244		69.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 91S: Playground



Summary for Subcatchment 402S: New Prkng lot

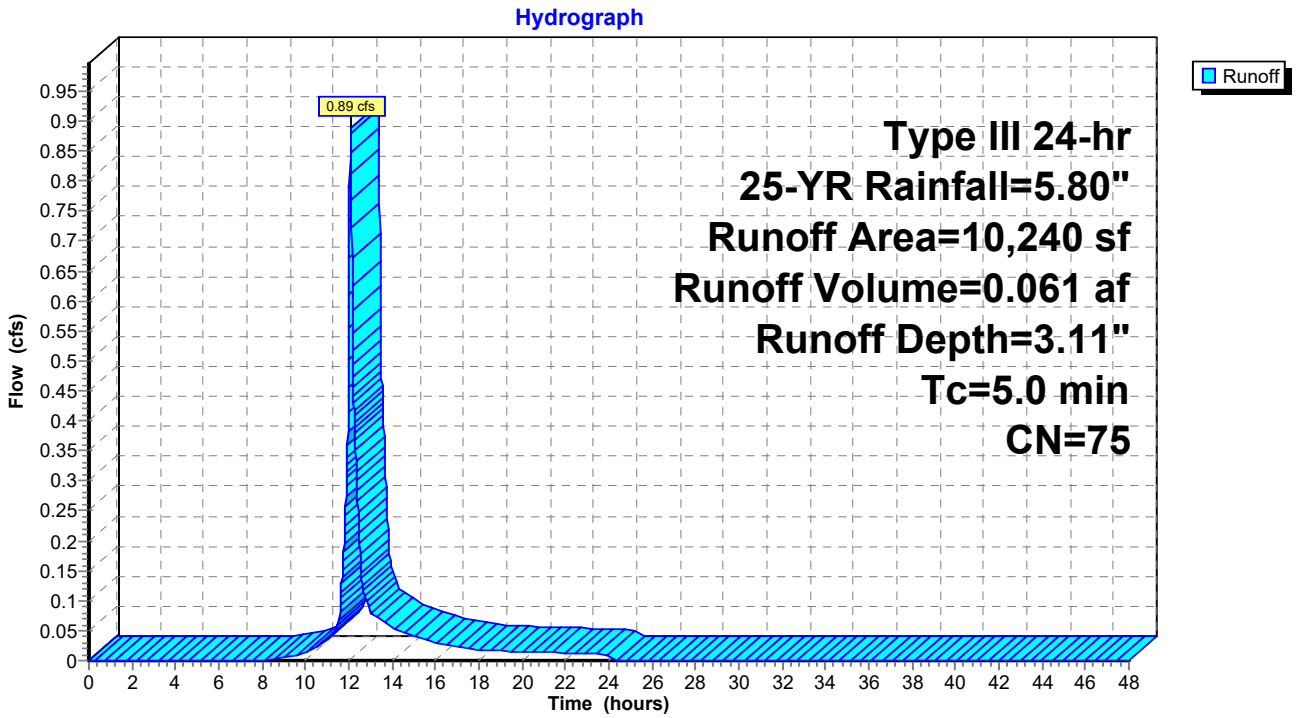
Runoff = 0.89 cfs @ 12.08 hrs, Volume= 0.061 af, Depth= 3.11"
Routed to Pond 340P : CB at SW Cor prkng lot

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-YR Rainfall=5.80"

	Area (sf)	CN	Description
*	4,000	39	Pervious
*	6,240	98	Impervious
	10,240	75	Weighted Average
	4,000		39.06% Pervious Area
	6,240		60.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, direct entry**

Subcatchment 402S: New Prkng lot



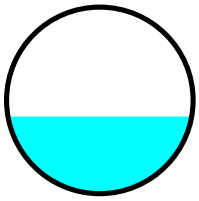
Summary for Reach 161R: roof drain

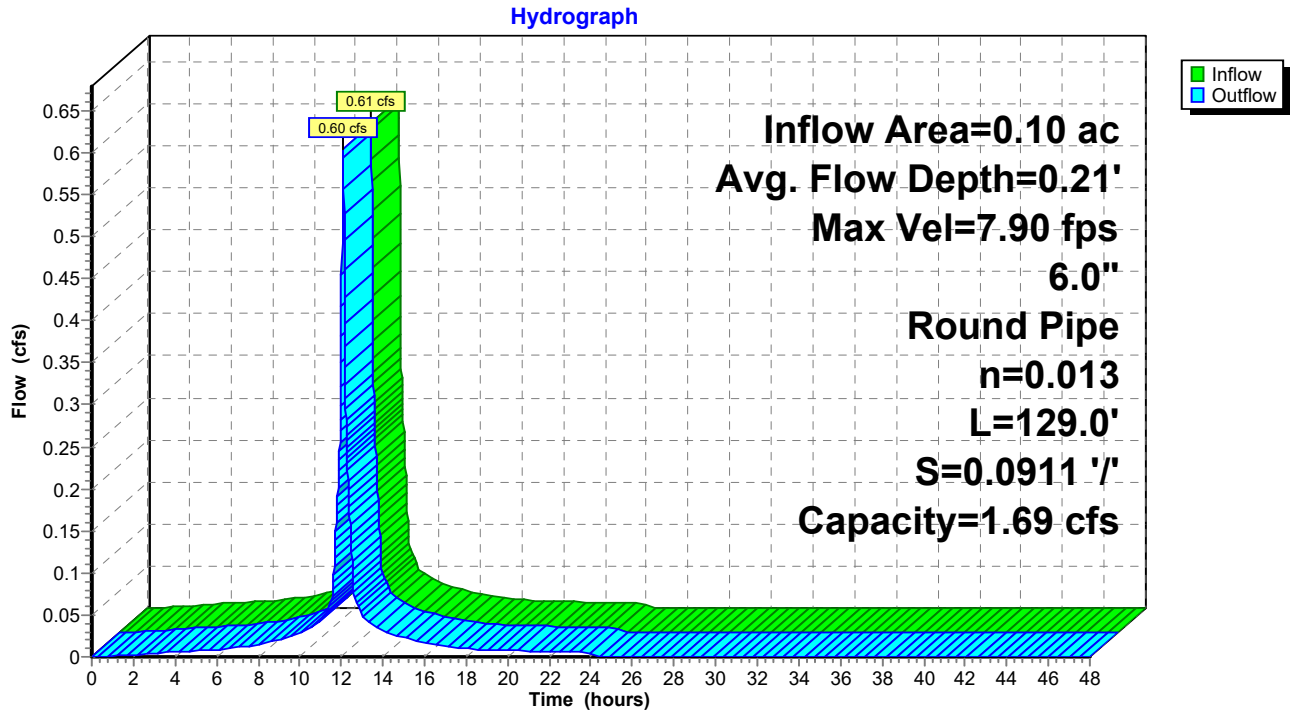
Inflow Area = 0.10 ac,100.00% Impervious, Inflow Depth = 5.56" for 25-YR event
Inflow = 0.61 cfs @ 12.07 hrs, Volume= 0.048 af
Outflow = 0.60 cfs @ 12.08 hrs, Volume= 0.048 af, Atten= 0%, Lag= 0.5 min
Routed to Pond 260P : Storage Pipes

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.90 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.62 fps, Avg. Travel Time= 0.8 min

Peak Storage= 10 cf @ 12.07 hrs
Average Depth at Peak Storage= 0.21' , Surface Width= 0.49'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 1.69 cfs

6.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 129.0' Slope= 0.0911 '/'
Inlet Invert= 130.00', Outlet Invert= 118.25'





Summary for Pond 1P: USSF

Inflow Area = 1.24 ac, 81.89% Impervious, Inflow Depth = 4.37" for 25-YR event
Inflow = 6.29 cfs @ 12.07 hrs, Volume= 0.451 af
Outflow = 1.29 cfs @ 12.49 hrs, Volume= 0.283 af, Atten= 80%, Lag= 25.1 min
Primary = 1.29 cfs @ 12.49 hrs, Volume= 0.283 af
Routed to Pond DMH : OCS Bypass
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond DMH7 : Proposed Drop DMH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 122.02' @ 12.49 hrs Surf.Area= 4,717 sf Storage= 10,569 cf
Flood Elev= 126.48' Surf.Area= 4,717 sf Storage= 16,044 cf

Plug-Flow detention time= 251.5 min calculated for 0.283 af (63% of inflow)
Center-of-Mass det. time= 149.2 min (937.6 - 788.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	118.85'	6,599 cf	**51.42'W x 91.74'L x 5.50'H Field A** 25,943 cf Overall - 9,445 cf Embedded = 16,499 cf x 40.0% Voids
#2A	119.60'	9,445 cf	**ADS_StormTech MC-3500 d +Cap** x 84 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 84 Chambers in 7 Rows Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf
		16,044 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	119.67'	**8.0" Round Culvert** L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.67' / 119.52' S= 0.0214 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#2	Device 1	123.35'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	121.10'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 5	118.85'	**2.410 in/hr Exfiltration over Surface area above 118.85'** Conductivity to Groundwater Elevation = 113.00' Excluded Surface area = 4,717 sf
#5	Secondary	116.02'	**6.0" Round Culvert** L= 31.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 116.02' / 115.88' S= 0.0045 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=1.29 cfs @ 12.49 hrs HW=122.02' (Free Discharge)
└─**1=Culvert** (Passes 1.29 cfs of 1.88 cfs potential flow)
  ├─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Orifice Controls 1.29 cfs @ 3.69 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=118.85' (Free Discharge)
└─**5=Culvert** (Passes 0.00 cfs of 1.20 cfs potential flow)
  └─**4=Exfiltration** (Controls 0.00 cfs)

Pond 1P: USSF - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= 14.9 cf x 2 x 7 rows = 208.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

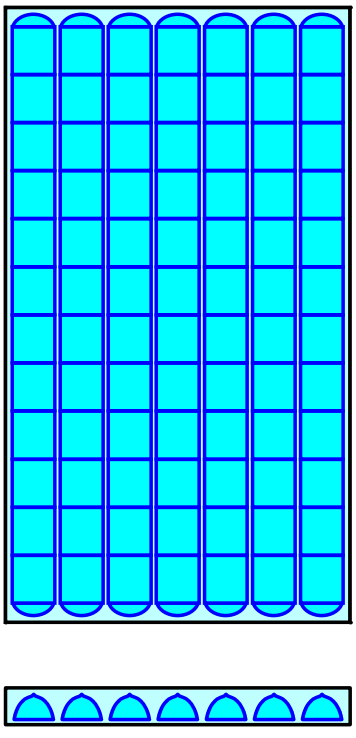
12 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 89.74' Row Length +12.0" End Stone x 2 = 91.74' Base Length
7 Rows x 77.0" Wide + 9.0" Spacing x 6 + 12.0" Side Stone x 2 = 51.42' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

84 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 7 Rows = 9,444.6 cf Chamber Storage

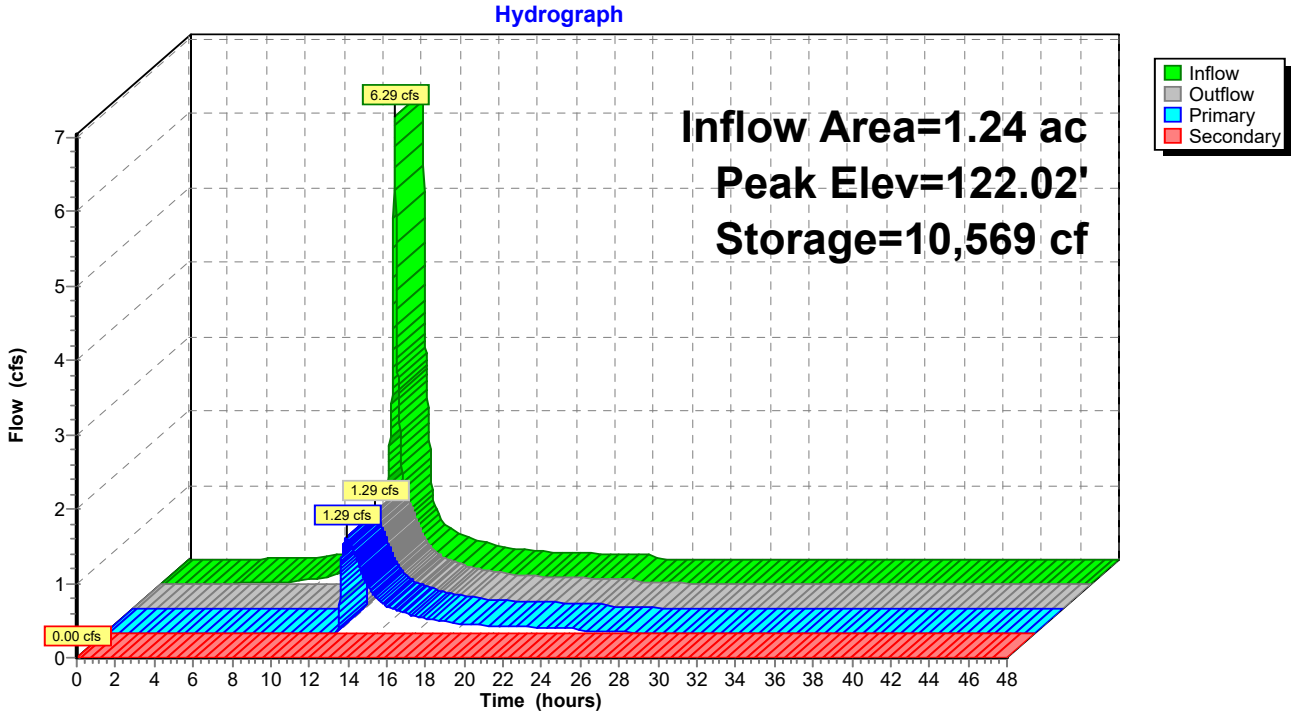
25,943.3 cf Field - 9,444.6 cf Chambers = 16,498.7 cf Stone x 40.0% Voids = 6,599.5 cf Stone Storage

Chamber Storage + Stone Storage = 16,044.1 cf = 0.368 af
Overall Storage Efficiency = 61.8%
Overall System Size = 91.74' x 51.42' x 5.50'

84 Chambers
960.9 cy Field
611.1 cy Stone



Pond 1P: USSF


Hydrograph
Inflow Area=1.24 ac
Peak Elev=122.02'
Storage=10,569 cf
6.29 cfs
1.29 cfs
1.29 cfs
0.00 cfs
Inflow
Outflow
Primary
Secondary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48

Summary for Pond 206P: City CB @ Fletcher & Danforth

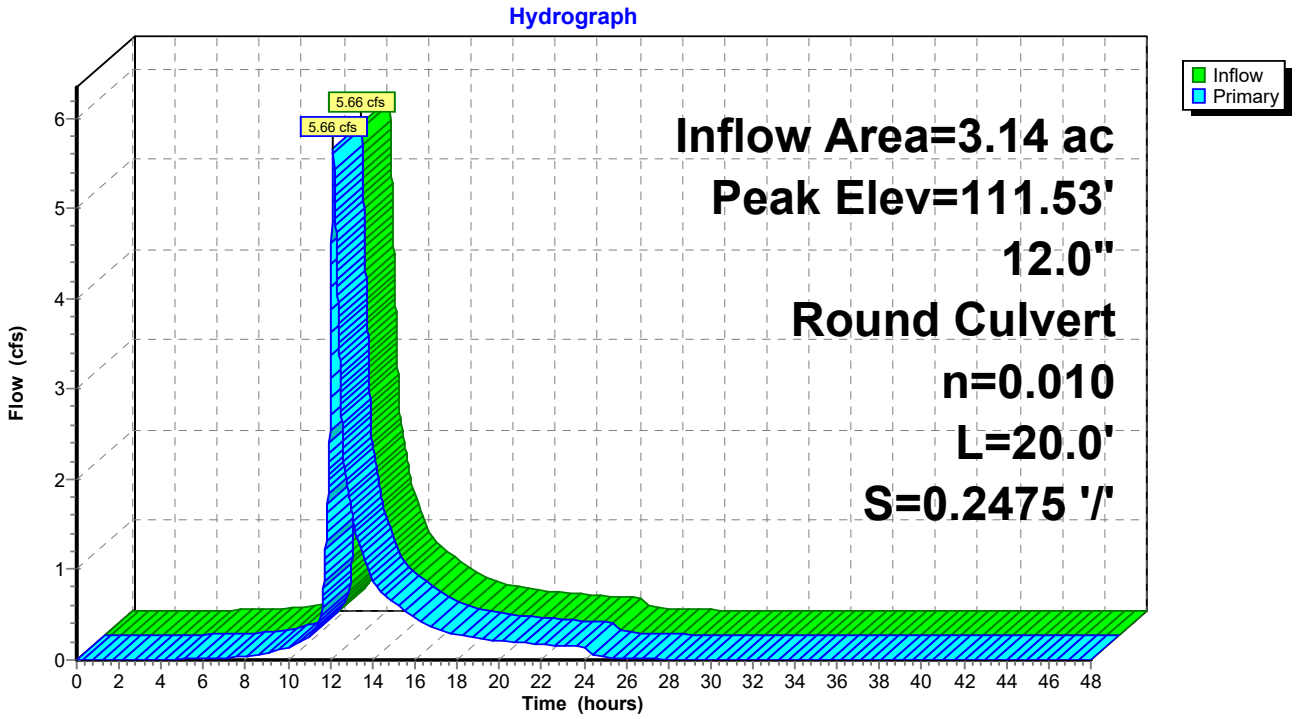
Inflow Area = 3.14 ac, 65.83% Impervious, Inflow Depth = 2.84" for 25-YR event
Inflow = 5.66 cfs @ 12.15 hrs, Volume= 0.743 af
Outflow = 5.66 cfs @ 12.15 hrs, Volume= 0.743 af, Atten= 0%, Lag= 0.0 min
Primary = 5.66 cfs @ 12.15 hrs, Volume= 0.743 af
Routed to Link SP1 : Existing Combined Sewer in Danforth

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 111.53' @ 12.15 hrs
Flood Elev= 111.26'

Device	Routing	Invert	Outlet Devices
#1	Primary	107.43'	**12.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 107.43' / 102.48' S= 0.2475 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=5.66 cfs @ 12.15 hrs HW=111.53' (Free Discharge)
1=Culvert (Inlet Controls 5.66 cfs @ 7.21 fps)

Pond 206P: City CB @ Fletcher & Danforth



Summary for Pond 210P: Existing FI

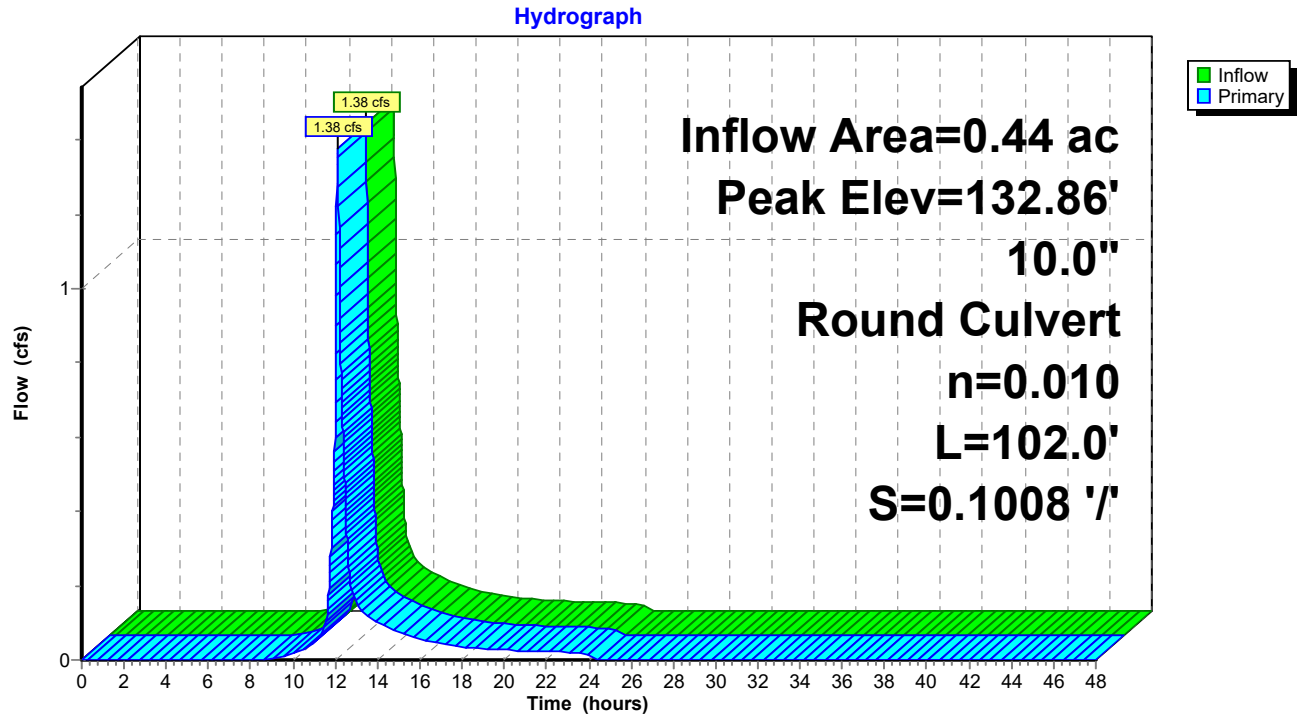
Inflow Area = 0.44 ac, 56.16% Impervious, Inflow Depth = 2.83" for 25-YR event
Inflow = 1.38 cfs @ 12.11 hrs, Volume= 0.104 af
Outflow = 1.38 cfs @ 12.11 hrs, Volume= 0.104 af, Atten= 0%, Lag= 0.0 min
Primary = 1.38 cfs @ 12.11 hrs, Volume= 0.104 af
Routed to Pond 220P : Existing DMH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 132.86' @ 12.11 hrs
Flood Elev= 140.41'

Device	Routing	Invert	Outlet Devices
#1	Primary	132.00'	**10.0" Round Culvert** L= 102.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 132.00' / 121.72' S= 0.1008 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.38 cfs @ 12.11 hrs HW=132.86' (Free Discharge)
1=Culvert (Inlet Controls 1.38 cfs @ 2.53 fps)

Pond 210P: Existing FI



Summary for Pond 220P: Existing DMH

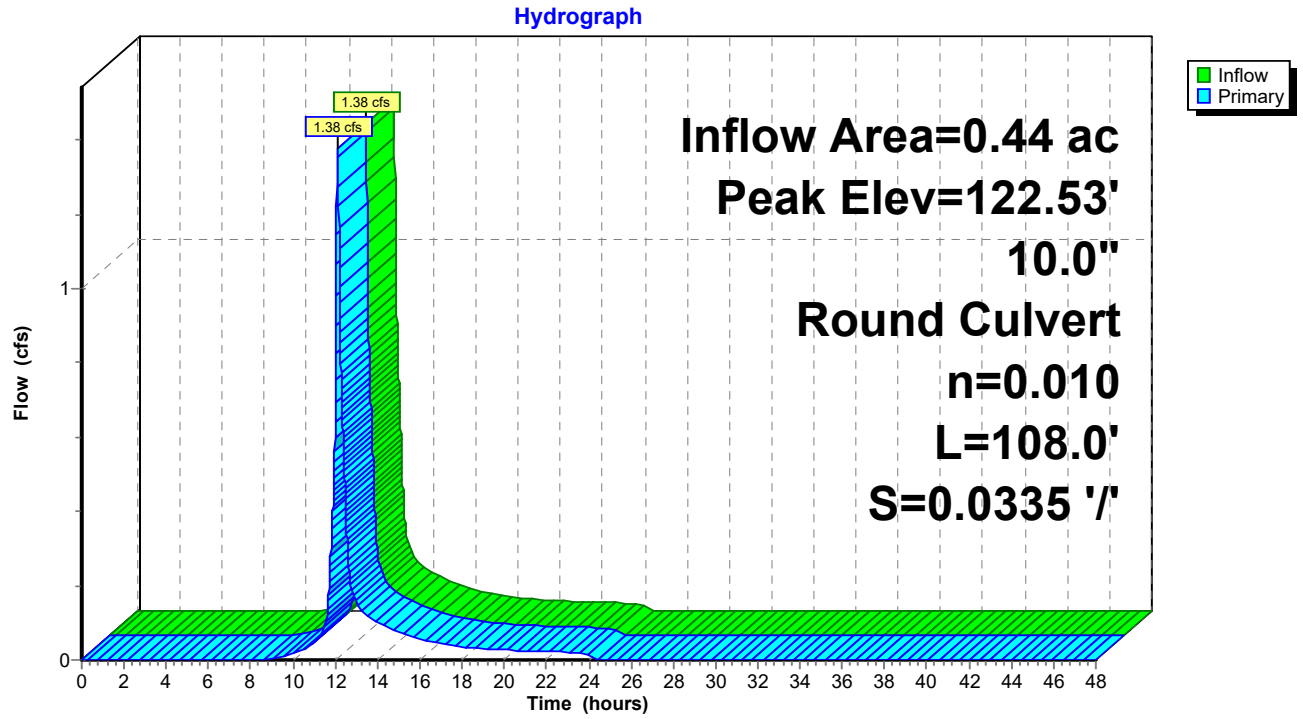
Inflow Area = 0.44 ac, 56.16% Impervious, Inflow Depth = 2.83" for 25-YR event
Inflow = 1.38 cfs @ 12.11 hrs, Volume= 0.104 af
Outflow = 1.38 cfs @ 12.11 hrs, Volume= 0.104 af, Atten= 0%, Lag= 0.0 min
Primary = 1.38 cfs @ 12.11 hrs, Volume= 0.104 af
Routed to Pond 230P : Existing DMH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 122.53' @ 12.11 hrs
Flood Elev= 128.47'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.67'	**10.0" Round Culvert** L= 108.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 121.67' / 118.05' S= 0.0335 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.37 cfs @ 12.11 hrs HW=122.53' (Free Discharge)
1=Culvert (Inlet Controls 1.37 cfs @ 2.52 fps)

Pond 220P: Existing DMH



Summary for Pond 230P: Existing DMH

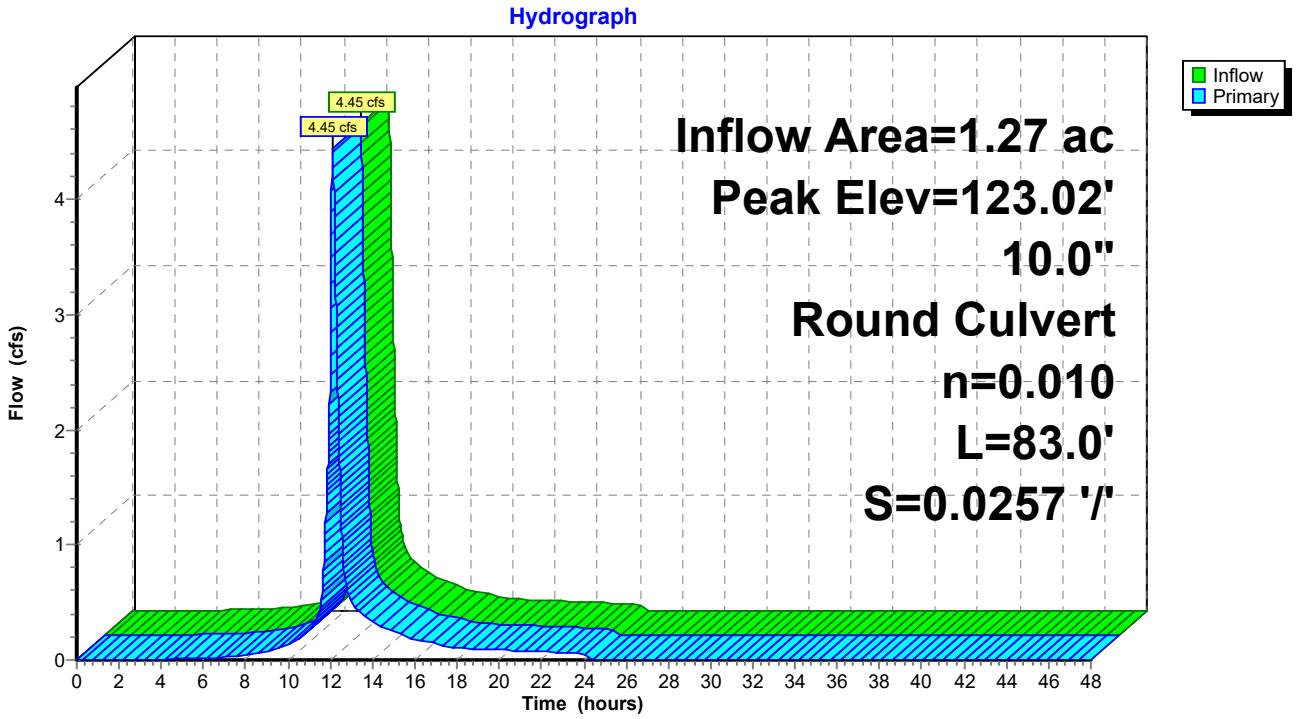
Inflow Area = 1.27 ac, 70.40% Impervious, Inflow Depth = 3.69" for 25-YR event
Inflow = 4.45 cfs @ 12.12 hrs, Volume= 0.390 af
Outflow = 4.45 cfs @ 12.12 hrs, Volume= 0.390 af, Atten= 0%, Lag= 0.0 min
Primary = 4.45 cfs @ 12.12 hrs, Volume= 0.390 af
Routed to Pond DMH7 : Proposed Drop DMH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 123.02' @ 12.12 hrs
Flood Elev= 125.05'

Device	Routing	Invert	Outlet Devices
#1	Primary	118.00'	**10.0" Round Culvert** L= 83.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 118.00' / 115.87' S= 0.0257 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=4.44 cfs @ 12.12 hrs HW=123.01' (Free Discharge)
1=Culvert (Inlet Controls 4.44 cfs @ 8.14 fps)

Pond 230P: Existing DMH



Summary for Pond 260P: Storage Pipes

Inflow Area = 0.72 ac, 79.29% Impervious, Inflow Depth = 4.22" for 25-YR event
Inflow = 3.53 cfs @ 12.07 hrs, Volume= 0.254 af
Outflow = 2.69 cfs @ 12.14 hrs, Volume= 0.254 af, Atten= 24%, Lag= 3.8 min
Primary = 2.69 cfs @ 12.14 hrs, Volume= 0.254 af
Routed to Pond 230P : Existing DMH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 120.47' @ 12.14 hrs Surf.Area= 924 sf Storage= 626 cf
Flood Elev= 125.26' Storage= 3,468 cf

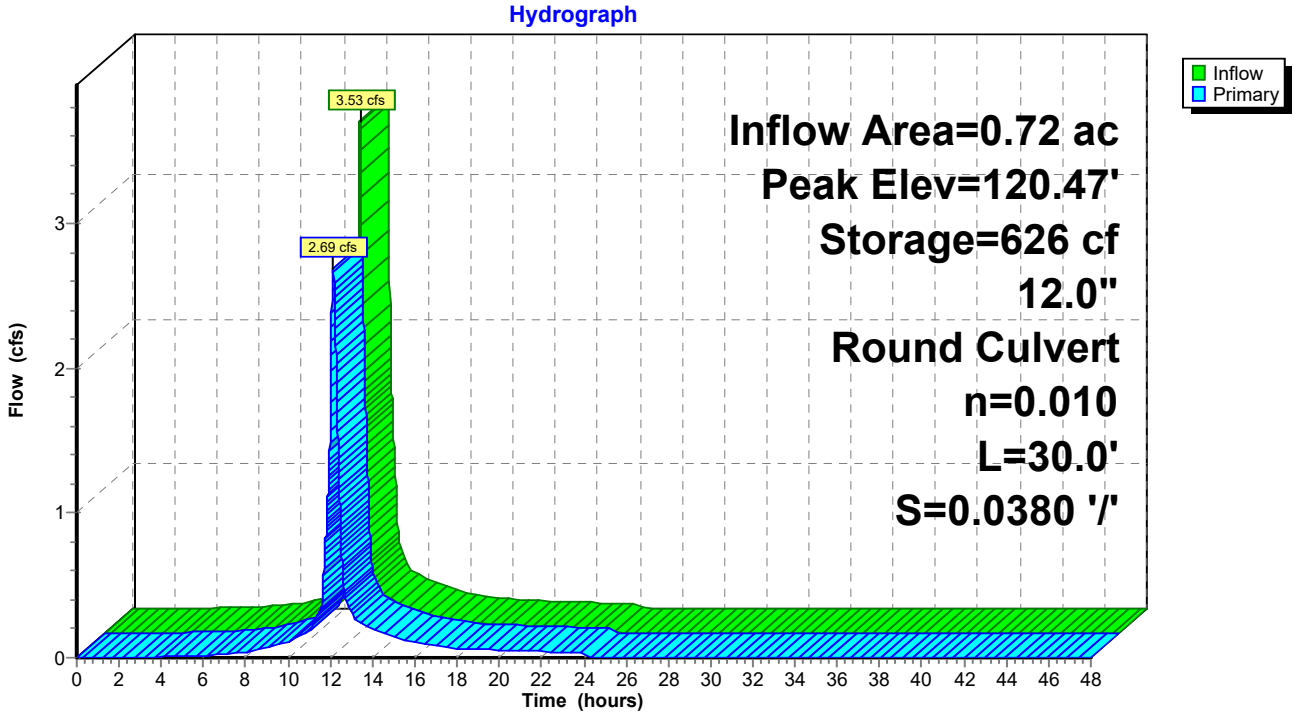
Plug-Flow detention time= 1.6 min calculated for 0.254 af (100% of inflow)
Center-of-Mass det. time= 1.6 min (791.3 - 789.6)

Volume	Invert	Avail.Storage	Storage Description
#1	119.16'	3,468 cf	**48.0" Round Pipe Storage** L= 276.0' S= 0.0027 '/'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.16'	**12.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.16' / 118.02' S= 0.0380 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.68 cfs @ 12.14 hrs HW=120.47' (Free Discharge)
1=Culvert (Inlet Controls 2.68 cfs @ 3.42 fps)

Pond 260P: Storage Pipes



Summary for Pond 340P: CB at SW Cor prkng lot

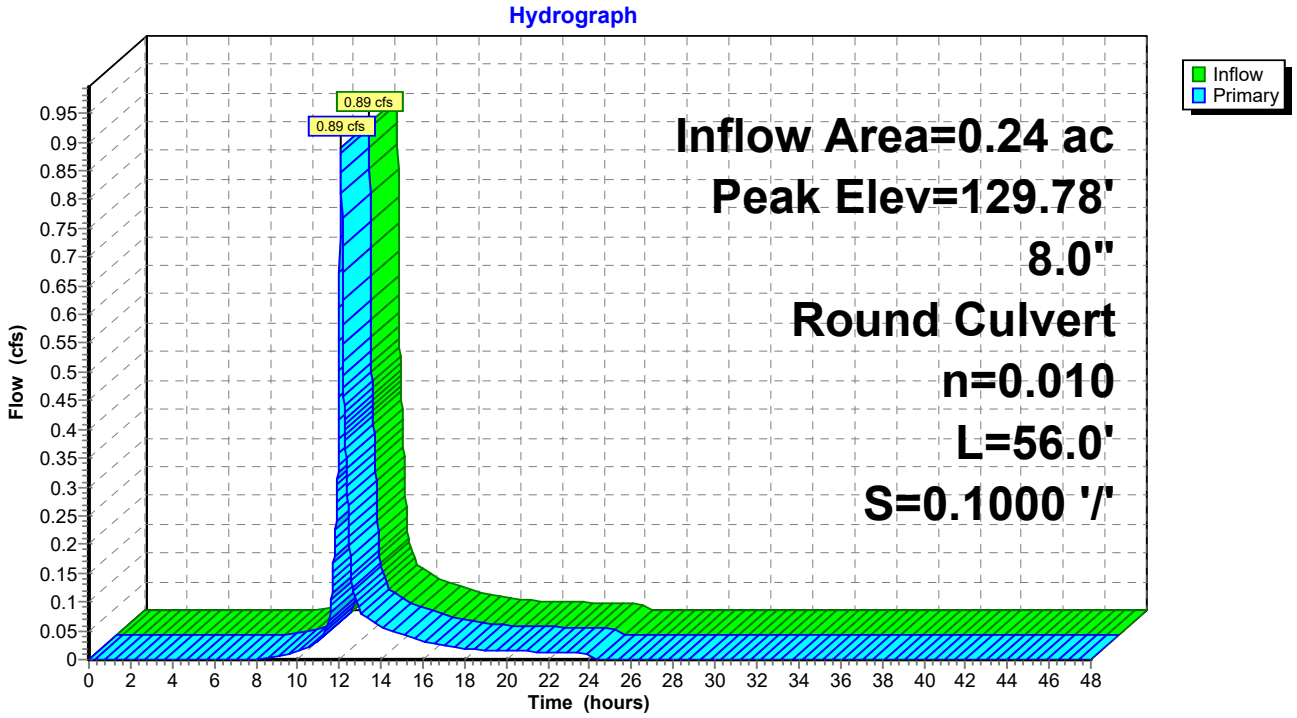
Inflow Area = 0.24 ac, 60.94% Impervious, Inflow Depth = 3.11" for 25-YR event
Inflow = 0.89 cfs @ 12.08 hrs, Volume= 0.061 af
Outflow = 0.89 cfs @ 12.08 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min
Primary = 0.89 cfs @ 12.08 hrs, Volume= 0.061 af
Routed to Pond 260P : Storage Pipes

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 129.78' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	129.00'	**8.0" Round Culvert** L= 56.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 129.00' / 123.40' S= 0.1000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.89 cfs @ 12.08 hrs HW=129.78' (Free Discharge)
1=Culvert (Inlet Controls 0.89 cfs @ 2.54 fps)

Pond 340P: CB at SW Cor prkng lot



Summary for Pond CB4: Proposed DMH

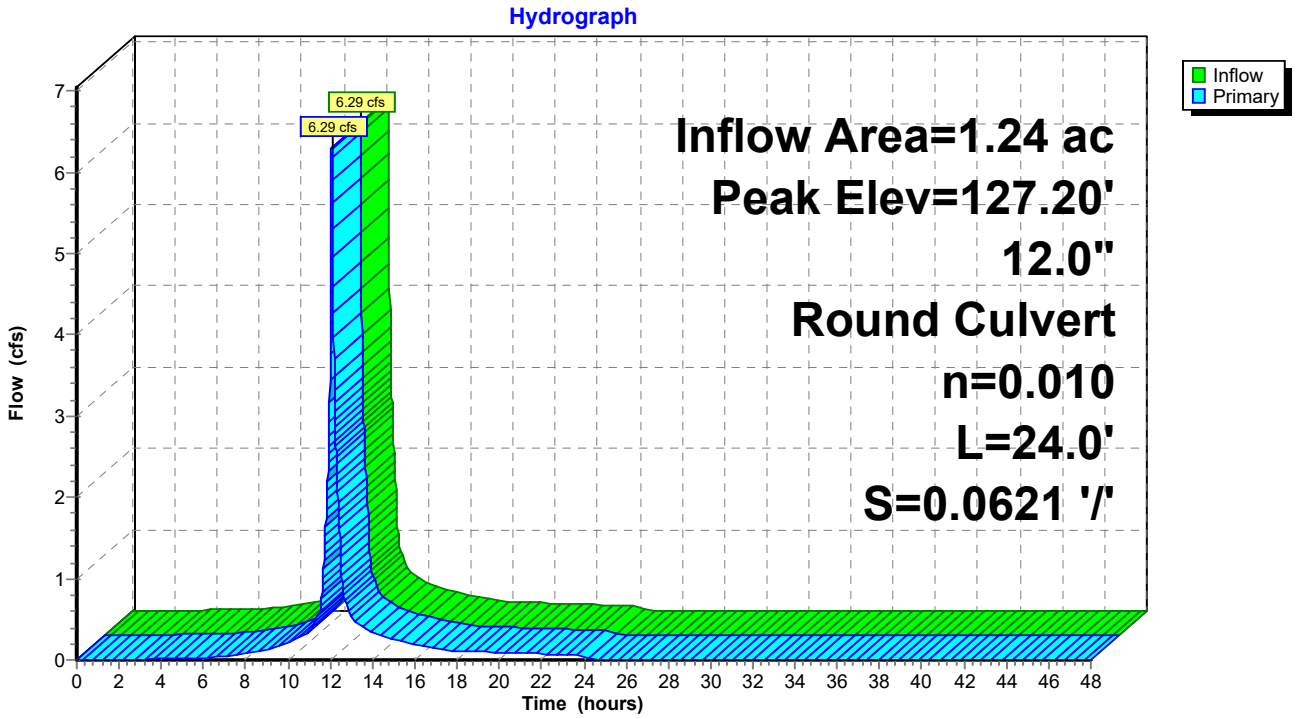
Inflow Area = 1.24 ac, 81.89% Impervious, Inflow Depth = 4.37" for 25-YR event
Inflow = 6.29 cfs @ 12.07 hrs, Volume= 0.451 af
Outflow = 6.29 cfs @ 12.07 hrs, Volume= 0.451 af, Atten= 0%, Lag= 0.0 min
Primary = 6.29 cfs @ 12.07 hrs, Volume= 0.451 af
Routed to Pond DMH6 : Access MH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 127.20' @ 12.07 hrs
Flood Elev= 127.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.26'	**12.0" Round Culvert** L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 122.26' / 120.77' S= 0.0621 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=6.28 cfs @ 12.07 hrs HW=127.19' (Free Discharge)
1=Culvert (Inlet Controls 6.28 cfs @ 8.00 fps)

Pond CB4: Proposed DMH



Summary for Pond DMH: OCS Bypass

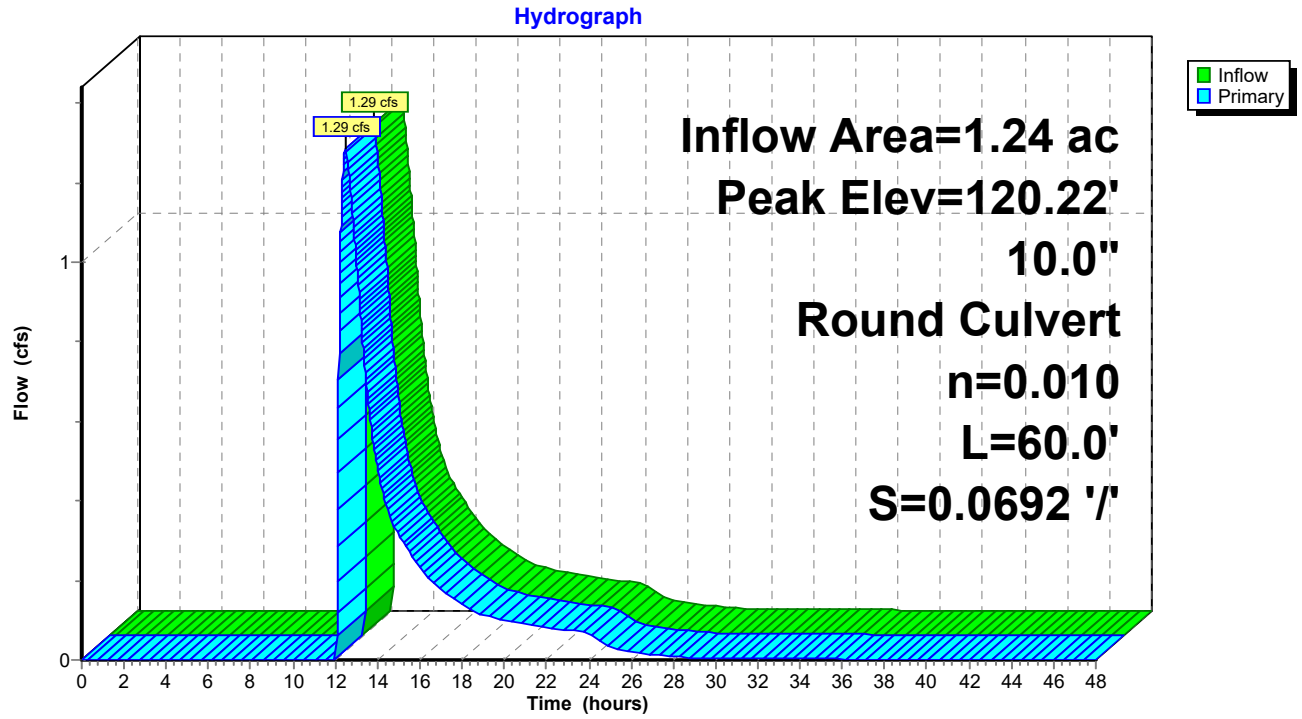
Inflow Area = 1.24 ac, 81.89% Impervious, Inflow Depth > 2.74" for 25-YR event
Inflow = 1.29 cfs @ 12.49 hrs, Volume= 0.283 af
Outflow = 1.29 cfs @ 12.49 hrs, Volume= 0.283 af, Atten= 0%, Lag= 0.0 min
Primary = 1.29 cfs @ 12.49 hrs, Volume= 0.283 af
Routed to Pond DMH7 : Proposed Drop DMH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 120.22' @ 12.49 hrs
Flood Elev= 126.48'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.42'	**10.0" Round Culvert** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.42' / 115.27' S= 0.0692 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.29 cfs @ 12.49 hrs HW=120.22' (Free Discharge)
1=Culvert (Inlet Controls 1.29 cfs @ 2.40 fps)

Pond DMH: OCS Bypass



Summary for Pond DMH6: Access MH

Inflow Area = 1.24 ac, 81.89% Impervious, Inflow Depth = 4.37" for 25-YR event
Inflow = 6.29 cfs @ 12.07 hrs, Volume= 0.451 af
Outflow = 6.29 cfs @ 12.07 hrs, Volume= 0.451 af, Atten= 0%, Lag= 0.0 min
Primary = 6.29 cfs @ 12.07 hrs, Volume= 0.451 af
Routed to Pond 1P : USSF
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond DMH : OCS Bypass

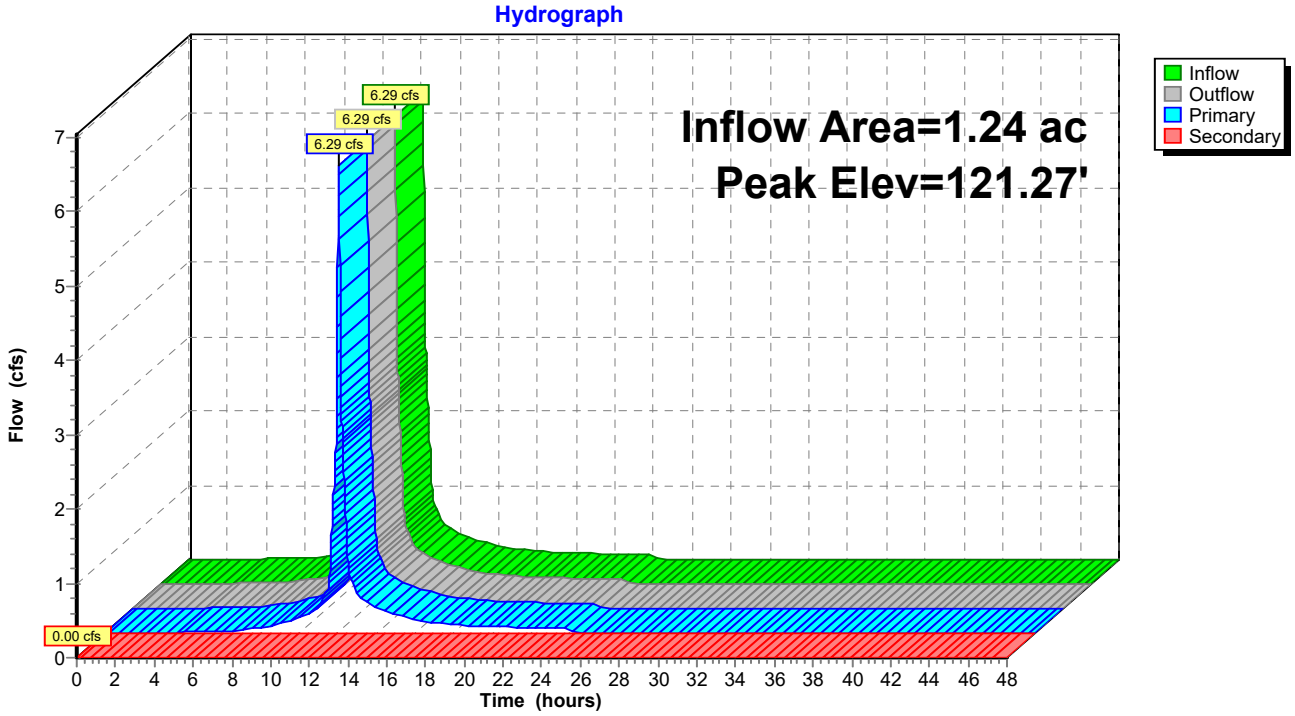
Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 121.27' @ 12.07 hrs
Flood Elev= 126.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.77'	**24.0" Round Culvert** L= 9.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.77' / 119.77' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Secondary	119.77'	**24.0" Round Culvert** L= 2.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 119.77' / 119.77' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#3	Device 2	123.35'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=6.28 cfs @ 12.07 hrs HW=121.26' (Free Discharge)
└**1=Culvert** (Barrel Controls 6.28 cfs @ 3.47 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=119.77' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond DMH6: Access MH



Summary for Pond DMH7: Proposed Drop DMH

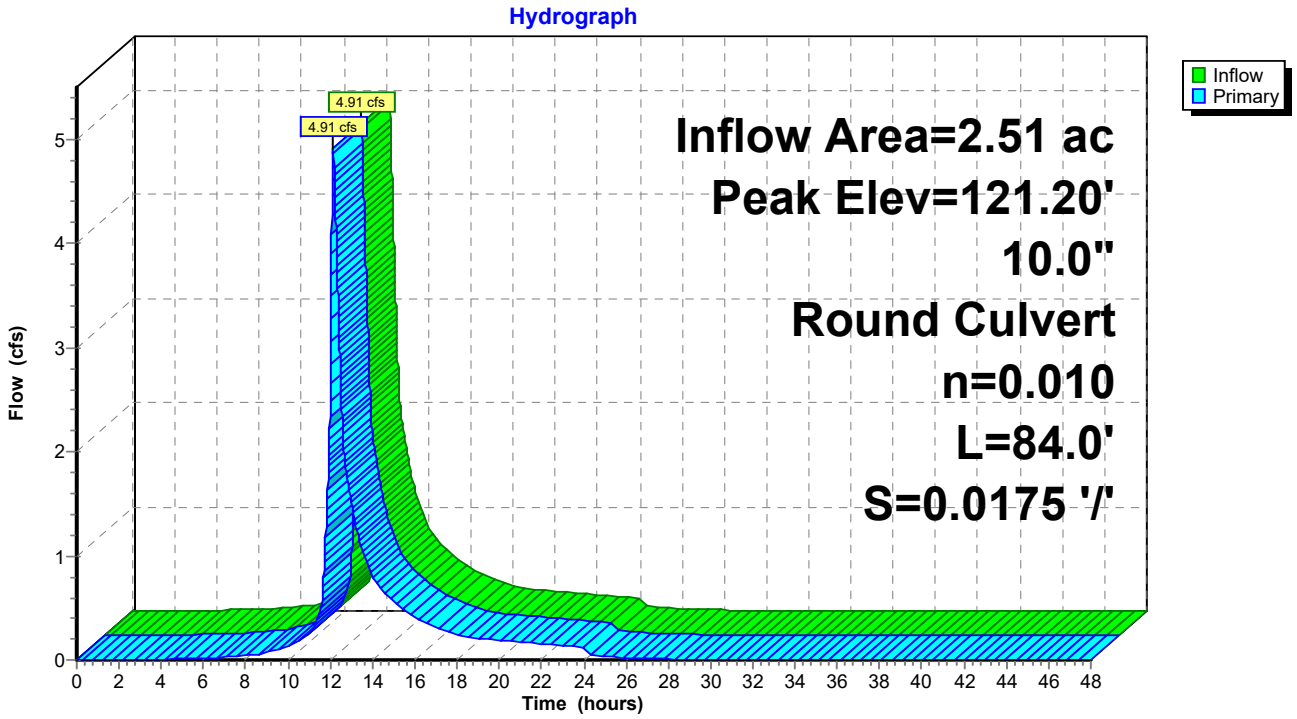
Inflow Area = 2.51 ac, 76.06% Impervious, Inflow Depth = 3.22" for 25-YR event
Inflow = 4.91 cfs @ 12.14 hrs, Volume= 0.673 af
Outflow = 4.91 cfs @ 12.14 hrs, Volume= 0.673 af, Atten= 0%, Lag= 0.0 min
Primary = 4.91 cfs @ 12.14 hrs, Volume= 0.673 af
Routed to Pond DMH8 : Proposed DMH

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 121.20' @ 12.14 hrs
Flood Elev= 124.69'

Device	Routing	Invert	Outlet Devices
#1	Primary	115.17'	**10.0" Round Culvert** L= 84.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 115.17' / 113.70' S= 0.0175 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=4.91 cfs @ 12.14 hrs HW=121.20' (Free Discharge)
1=Culvert (Inlet Controls 4.91 cfs @ 9.00 fps)

Pond DMH7: Proposed Drop DMH



Summary for Pond DMH8: Proposed DMH

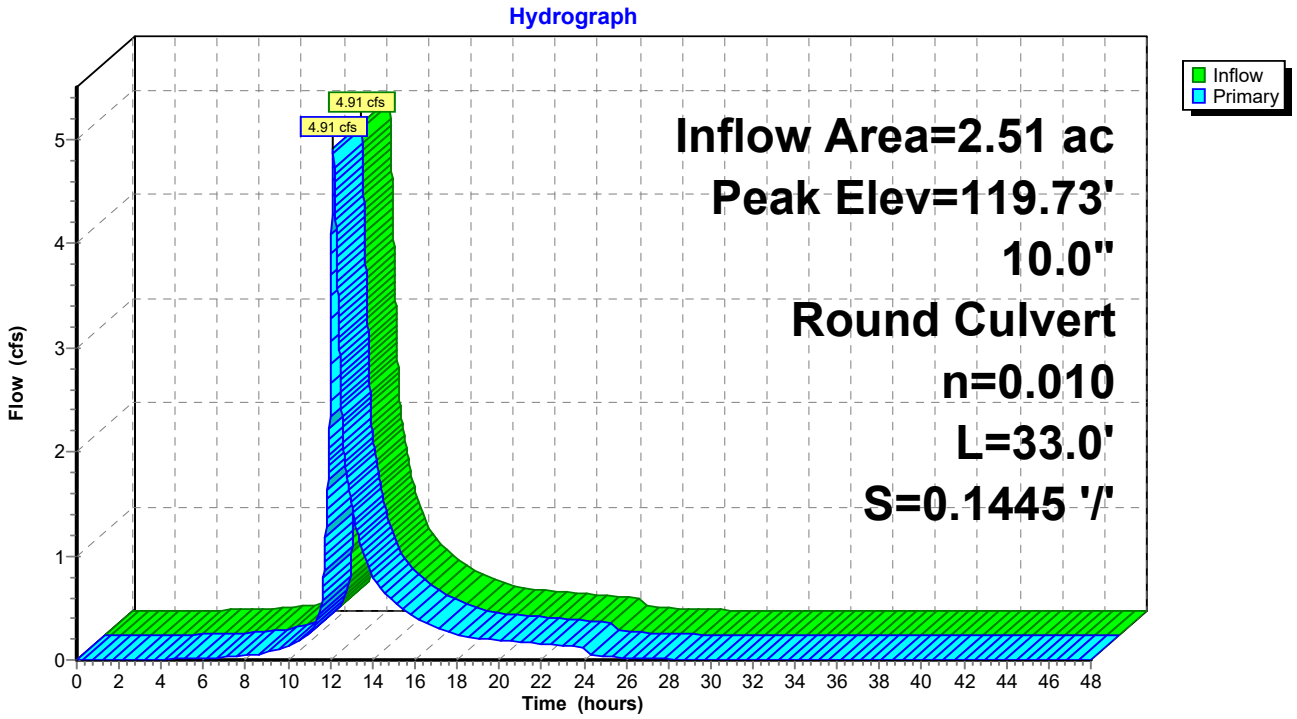
Inflow Area = 2.51 ac, 76.06% Impervious, Inflow Depth = 3.22" for 25-YR event
Inflow = 4.91 cfs @ 12.14 hrs, Volume= 0.673 af
Outflow = 4.91 cfs @ 12.14 hrs, Volume= 0.673 af, Atten= 0%, Lag= 0.0 min
Primary = 4.91 cfs @ 12.14 hrs, Volume= 0.673 af
Routed to Pond 206P : City CB @ Fletcher & Danforth

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 119.73' @ 12.14 hrs
Flood Elev= 123.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	113.70'	**10.0" Round Culvert** L= 33.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 113.70' / 108.93' S= 0.1445 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=4.91 cfs @ 12.14 hrs HW=119.73' (Free Discharge)
1=Culvert (Inlet Controls 4.91 cfs @ 9.00 fps)

Pond DMH8: Proposed DMH

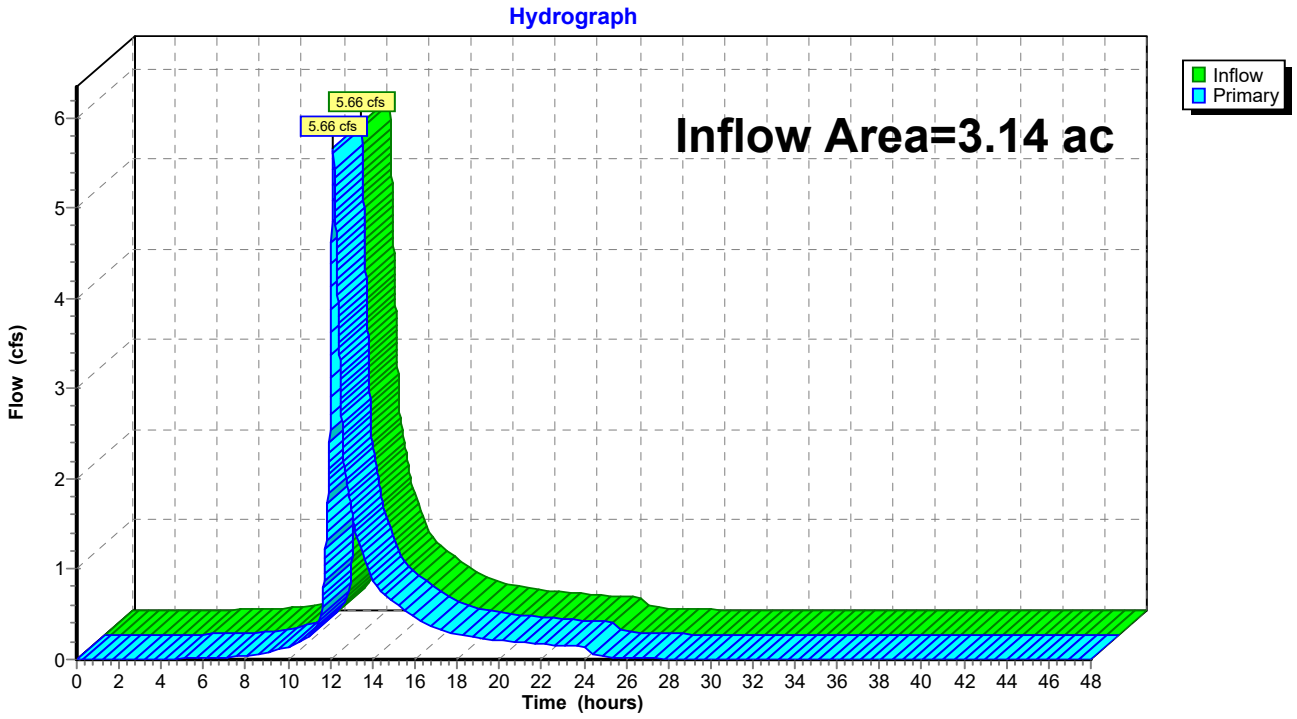


Summary for Link SP1: Existing Combined Sewer in Danforth

Inflow Area = 3.14 ac, 65.83% Impervious, Inflow Depth = 2.84" for 25-YR event
Inflow = 5.66 cfs @ 12.15 hrs, Volume= 0.743 af
Primary = 5.66 cfs @ 12.15 hrs, Volume= 0.743 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

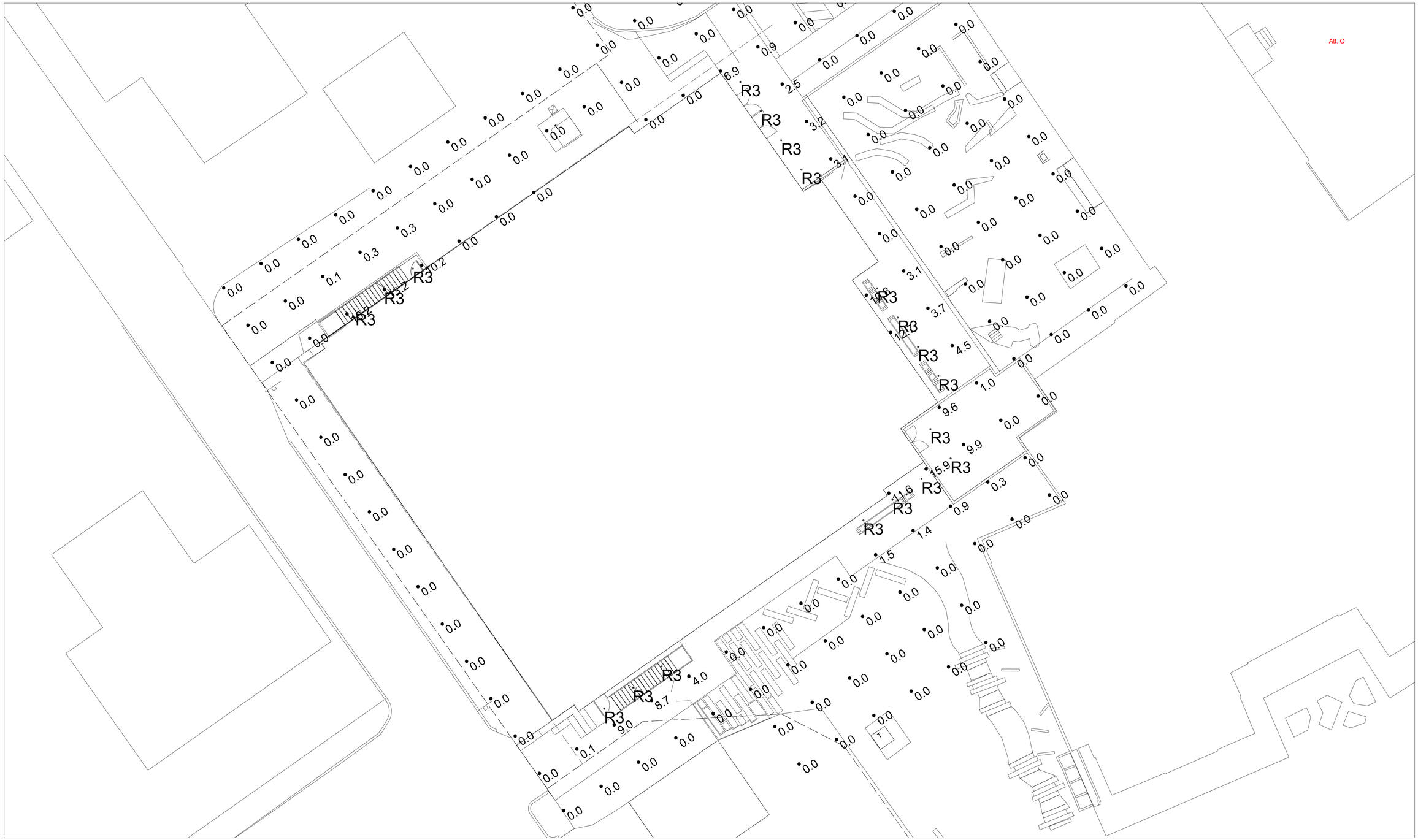
Link SP1: Existing Combined Sewer in Danforth



Luminaire Schedule (note fixture cataloge numbers are not complete)						
Type	**Qty**	**Lum. Lumens**	**LLF**	**Lum. Watts**	**Description**	**Mounting Height**
R3	19	1474	0.880	18.6	LTR-4RD-H-SL15L-DM1_LTR-4RD-T-SL30K8XWS	9

Calculation Summary					
Label	**Avg**	**Max**	**Min**	**Avg/Min**	**Max/Min**
site	0.94	15.9	0.0	N.A.	N.A.

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
WAYNFLETE WELLNESS & ATHLETIC CENTER
PORTLAND, ME
SITE LIGHTING LAYOUT

site ltg 8-20-24.AGI

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

Date:8/20/2024

GENERATED FOR:
SIMONS ARCHITECTS
ACETO LA

SCALE NOT TO SCALE

Page 1 of 1

SWANEY LIGHTING ASSOCIATES, INC.

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prescolite

DATE: LOCATION:

TYPE: PROJECT:

CATALOG #:

LTR-4RD

LITEISTRY 4" ROUND DOWNLIGHT

LITEISTRY

FEATURES

- 4" architectural LED downlight delivering 600 – 4000 lm
- Five beam distributions from 0.3 to 1.2 Spacing Criteria
- Quiet reflector appearance with superior 50° optical cutoff
- 2700K – 5000K, 80+ and 90+ CRI options
- Available for New Construction (non-IC), IC and Chicago Plenum applications
- Variety of dimming protocol options including 0–10V, DALI, DMX, and Lutron EcoSystem
- NX Lighting Controls wired and wireless controls capability available

WET LOCATION · C SA US · ENERGY STAR · BAA (-BAA Option) · TAA (-TAA Option)

IP66** · IK10** · IP69K**

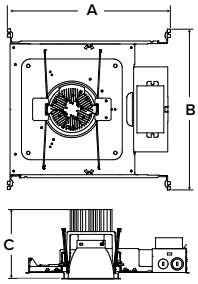
**Select models

SERVICE PROGRAMS

STOCK QS10

CONTROLS TECHNOLOGY

NX WIRELESS · NX WIRED



Typical Dimensions and Weights				
Lumen Package	"A" Length Inches (mm)	"B" Width Inches (mm)	"C" Height Inches (mm)	Weight lbs (kg)
06L - 15L	14.56 (370)	14.36 (365)	4.97 (126)	7.4 (3.3)
20L - 30L	14.56 (370)	14.36 (365)	6.15 (156)	7.8 (3.6)
35L - 40L	14.56 (370)	14.36 (365)	7.33 (186)	8.3 (3.8)

See DIMENSIONS section for complete details

SPECIFICATIONS

CONSTRUCTION

- Standard Non-IC. Chicago Plenum and IC options
- Painted black durable steel platform with pre-installed bar hangers
- Pre-wired junction box with snap-on covers for easy access
- Snap-in connection from driver compartment allows easy installation
- Light Engine connections use plenum rated (CMP) cable

OPTICS

- Visually pleasing 50° cutoff to source and source image
- The light distribution is free of distracting bright spots or pixelation and the perimeter has a smooth transition
- Optical grade silicone lens integral to light engine
- High purity spun aluminum reflector, self-flanged
- Flush Mount flange option with mud-in ring available
- Large selection of anodized finishes and colors
- Painted cones and flange options available

ELECTRICAL

- Chip-on-board LED with 2 SDCM
- Multiple CCTs, 80+ or 90+ CRI
- Long LED life: L90 at >55,000 hours (TM-21)
- Universal voltage 120V–277V driver, 347V optional
- UL Class 2, inherent short circuit and overload protection

ELECTRICAL (CONTINUED)

- Flicker free 0-10V dimming with 1% or <1% performance
- DALI, DMX, and Lutron EcoSystem options
- NX Lighting Controls provides options for standalone and networked functionality with wired or wireless connectivity for NX system deployments
- Lutron Athena control options also available
- Integral and remote emergency controller and battery pack options available
- Refer to additional spec sheets for information on SpectraSync™ Tunable White or Dim-to-Warm solutions

INSTALLATION

- Accommodates ceiling thickness up to 2" (See DIMENSIONS section for details)
- Universal adjustable mounting brackets also accept ½" EMT conduit or 1½" or ¾" lathing channel (by others) or Prescolite accessory bar hangers (B24 or B6)
- Light Engine/Driver fully serviceable from above or below the ceiling

CERTIFICATIONS

- cCSAus certified to UL 1598
- Suitable for wet locations, covered ceiling. EM/ EMR: Suitable for damp locations
- EM/EMR: Certified under UL 924 standard for emergency lighting and power equipment
- EM/EMR: Emergency battery packs are California Energy Commission (CEC) Title 20 Compliant

CERTIFICATIONS (CONTINUED)

- When used with CE Bezel Trim Accessories: IP66/IP69K rating; also meets IK10 per IEC 60068-2-75 impact testing
- Approved for 8 (4 in/4 out) No. 12AWG conductors rated for 90°C through wiring
- ENERGY STAR® certified models available (For list and additional information, visit http://www.energystar.gov)
- For -BAA Option: This product meets federal procurement law requirements under the Buy American Act (FAR 52.225-9) See Buy America(n) Solutions
- For -TAA Option: Product configurations meet federal procurement law requirements under the Trade Agreements Act (FAR 52.225-11) See Buy America(n) Solutions

WARRANTY

- 5 year warranty

KEY DATA	
Lumen Range	600-4000
Wattage Range	8-52
Efficacy Range (LPW)	90-99*
Reported Life (Hours)	L90 / >55,000
Input Current (mA)	65-433 (120V)

*Based on Specular, 35K, 80 CRI

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DATE: LOCATION:

TYPE: PROJECT:

CATALOG #:

LTR-4RD

LITEISTRY 4" ROUND DOWNLIGHT

Gray Shading = Service Program STOCK QS10 Limit of 150 Luminaries

ORDERING GUIDE

Example: LTR–4RD–H–SL10L–DM1–LTR–4RD–T–SL35K8MD–S

CATALOG #

HOUSING

LTR-4RD-H –

Aperture/Shape/Function		Lumen Package		Lumen Output		Driver Options		Control Options		Voltage		Housing Options	
LTR-4RD-H	4" Round Downlight New Construction Housing	SL	Standard Lumen	06L	600	DM1	0-10V Dimming to 1%	NX Lighting Controls		*Standard 120-277V*		CP	Chicago Plenum [7,9]
				10L	1000	DM01	0-10V Dimming to < 1%	Networked Wireless		34	347V [6]	IC	IC rated [8,9]
				15L	1500	DMX	DMX with RDM dimming to < 0.1%	NXW	NX Networked Wireless Radio Module NXRM2 and Bluetooth Programming, without Sensor [3]			EM	7W Emergency Battery Pack (CEC Title 20 Compliant) with integral test switch and indicator light [9]
		ML	Medium Lumen	20L	2000	DALI	DALI Dimming to 1%	Networked Wired				EMR	7W Emergency Battery Pack (CEC Title 20 Compliant) with remote test switch and indicator light [9]
				25L	2500	EDM	Lutron Hi-Lume EcoSystem Dimming to 1% [2]	NXE	NX Wired Dual RJ45 SmartPORTS, without Sensor [3]			DTS	Device Transfer Switch with Dimming Bypass [9,11]
				30L	3000	DM00	Lutron Athena compatible driver [15]	Other Lighting Controls				GTD	Generator Transfer Device [9]
		HL	High Lumen	35L	3500			Networked Wireless				F	Fuse
				40L	4000			AWNR	Lutron Athena Enabled [15]			BAA	Buy American Act (FAR 52.225-9) Compliant
												TAA	Trade Agreements Act (FAR 52.225-11) Compliant

TRIM

LTR-4RD-T –

Aperture/Shape/Function		Lumen Package		CCT		CRI		Distribution	
LTR-4RD-T	4" Round Downlight Light Engine/Trim Assembly	SL	Standard Lumen	27K	2700K	8	80+CRI	VNR	Very Narrow (0.3 SC/20°) [13]
		ML	Medium Lumen	30K	3000K	9	90+CRI	NR	Narrow (0.4 SC/29°)
		HL	High Lumen	35K	3500K			MD	Medium (0.7 SC/44°)
				40K	4000K			WD	Wide (0.9 SC/61°)
				50K	5000K [1]			XW	Extra Wide (1.2 SC/78°)

TRIM CONTINUED

–

Reflector Finish		Reflector Color		Flange Color Options		Lower Trim Options		Reflector Options	
Finish not applicable with painted reflectors (WC or BC)		*Standard Clear*		*Standard matches reflector color*		EM	Pre-punched reflector for EM integral test switch and indicator	AM	Antimicrobial Coating [5]
S	Specular	CG	Champagne Gold	WT	White Flange [4]	FM	Flush Mount Mud-in Ring [10]	BAA	Buy American Act (FAR 52.225-9) Compliant
SS	Semi-Specular	BL	Black	BT	Black Flange [4]	WF	Wide Flange	TAA	Trade Agreements Act (FAR 52.225-11) Compliant
MFC	American Matte™	LW	Light Wheat						
VS	Softglow®	PW	Pewter						
VSS	SoftSheen™	WC	Painted White Cone and Flange						
		BC	Painted Black Cone and Flange						

Accessories	
☐ B24	Set of two (2) 24" bar hangers for T-bar ceilings
☐ B6	Set of two bar hangers for ceiling joist up to 24" centers
☐ FMR4-R	Flush Mount Mud-In Ring Accessory, 4" Round
☐ LiteGear	LiteGear® Inverter, 125VA-250VA
☐ LPS Series	LightPower Micro-Inverter, 20VA-55VA
☐ MOR4-R-WH	Metal Oversized Ring, 4" Round, White (8.25" outside diameter)
☐ MOR4-R-BL	Metal Oversized Ring, 4" Round, Black (8.25" outside diameter)
☐ LTR-SCA4-__	Sloped Ceiling Adapter, 4", White [12]

(See next page for Bezel Trim Accessories for Complex Environments) [14]

Notes:

1 5000K available in 80+ CRI only.
2 EDM, available in 10L-35L.
3 NX requires DM1 driver option.
4 WT not needed for WC, BT not needed for BC.
5 AM available with WC or Specular Clear (S or SWT). Consult factory for other colors.
6 347V available for 06L-30L; requires DM1 driver; not available with Controls, EM, EMR, DTS, GTD or F.
7 CP available up to 35L; not available with DMX, Controls, or EMR options.
8 IC available up to 20L; not available with Controls options.
9 Housing options (except Fuse, BAA/TAA) not available in combination.
10 Flush Mount Flange (FM) requires FMR accessory (sold separately).
11 DTS available with DM1, DM01, DALI, or DM00.
12 Specify slope angle 5°-35° in 5° increments. Not available with EM, WF, or FM options.
13 VNR available up to 30L.
14 See next page for option restrictions when using with bezel trim accessories.
15 DM00 must be selected with AWNR Lutron Athena controls option.

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DATE: LOCATION:

TYPE: PROJECT:

CATALOG #:

LTR-4RD

LITEISTRY 4" ROUND DOWNLIGHT

OTHER LIGHTING CONTROLS

	Control Option Ordering Logic & Description		Control Option Functionality								Control Option Components	
			Networkable	Grouping	Scheduling	Occupancy/ Motion	Daylight Harvesting	0-10V Dimming	On/Off Control	Bluetooth App Programming		
Other	AWNR	The Athena wireless node is a radio frequency (RF) device that enables simple, digital control of individual light fixtures in an Athena control system.[1]	✓	✓	-	-	-	✓	✓	-		A-WN-D01-RF-WH

1 Lutron Athena Hub required to enable Networking, Grouping and Scheduling.

PERFORMANCE DATA TABLE

Performance data provided below is for 3500K, 80 CRI with Specular Clear reflector finish/color

Lumen Package	Nominal Lumens	Distribution	"Delivered Lumens"	Watts	LPW
06L	600	Very Narrow	691	7.6	91
		Narrow	785	7.8	101
		Medium	726	7.8	93
		Wide	664	7.8	85
		Extra Wide	644	7.8	83
10L	1000	Very Narrow	1132	11.8	96
		Narrow	1255	12.0	105
		Medium	1160	12.0	97
		Wide	1062	12.0	89
		Extra Wide	1030	12.0	86
15L	1500	Very Narrow	1623	17.2	94
		Narrow	1795	18.6	97
		Medium	1660	18.6	89
		Wide	1519	18.6	82
		Extra Wide	1474	18.6	79
20L	2000	Very Narrow	2032	22.4	91
		Narrow	2238	22.5	99
		Medium	2152	22.5	96
		Wide	2059	22.5	92
		Extra Wide	2028	22.5	90
25L	2500	Very Narrow	2447	28.6	86
		Narrow	2985	27.8	107
		Medium	2760	27.8	99
		Wide	2526	27.8	91
		Extra Wide	2451	27.8	88
30L	3000	Very Narrow	2855	35.9	80
		Narrow	3583	34.6	104
		Medium	3313	34.6	96
		Wide	3032	34.6	88
		Extra Wide	2941	34.6	85
35L	3500	Narrow	4280	42.9	100
		Medium	3957	42.9	92
		Wide	3622	42.9	84
		Extra Wide	3514	42.9	82
40L	4000	Narrow	4885	51.5	95
		Medium	4517	51.5	88
		Wide	4134	51.5	80
		Extra Wide	4011	51.5	78

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DATE: | LOCATION:

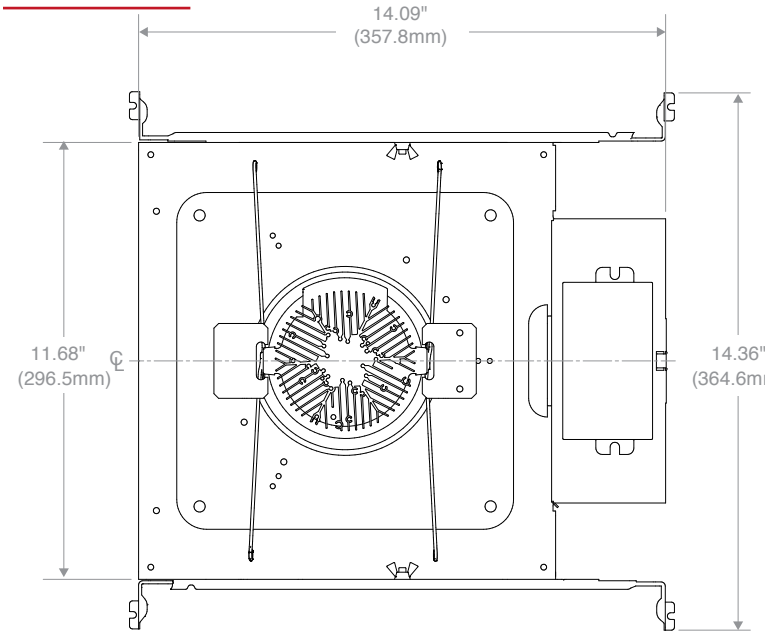
TYPE: | PROJECT:

CATALOG #:

LTR-4RD

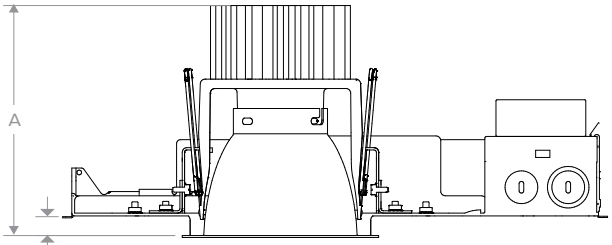
LITEISTRY 4" ROUND DOWNLIGHT

DIMENSIONS



Top View

LTR-4RD-H New Construction

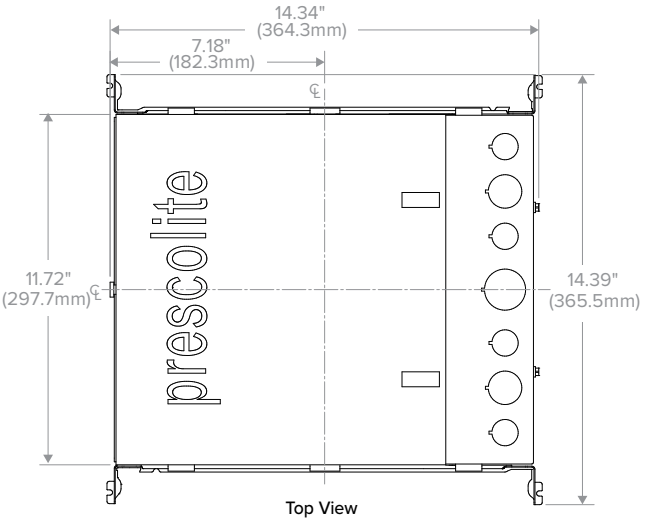


Dimensional Data		
Aperture		4.00" (101.6mm)
Flange:	Standard	5.25" (133.4mm)
	Flush Mount	4.50" (114.3mm)
	With Bezel Trim Accessory**	Ø 7.67" (194.8 mm)
Ceiling Cutout:	Standard	5.00" (127.0mm)
	Flush Mount	5.12" (130.0mm)
	With Bezel Trim Accessory**	Ø 6.50" (165.1 mm)
Ceiling Thickness:	Standard or w/SCA 5-20° slope	0.50" to 2.00" (12.7mm to 50.8mm)
	With SCA 25-35° slope	0.50" to 1.75" (12.7mm to 44.6mm)
	With Bezel Trim Accessory**	0.50" to 2.00" (12.7 mm to 50.8 mm)

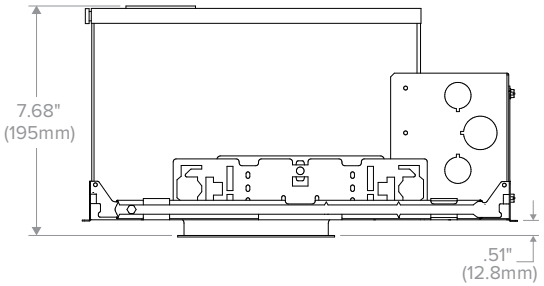
Lumen Package	"A"
06L-15L	4.97" (126.2mm)
20L-30L	6.15" (156.2mm)
35L-40L	7.33" (186.2mm)

SCA Sloped Ceiling Adapter accessory available, see LTR-SCA specification sheet and installation instructions for dimensional data and other details.

** For complete details on Bezel Trim Accessories, see Accessory section on Page 3 and Bezel Trim Installation Instructions on currentlighting.com/prescolite.



Top View



LTR-4RD-H IC/CP

Dimensional Data		
Aperture		4.00" (101.6mm)
Flange:	Standard	5.25" (133.4mm)
	Flush Mount	4.50" (114.3mm)
Ceiling Cutout:	Standard	5.00" (127.0mm)
	Flush Mount	5.12" (130.0mm)
Ceiling Thickness:	Standard or w/ SCA 5-20° slope	0.50" to 2.00" (12.7mm to 50.8mm)
	With SCA 25-35° slope	0.50" to 1.75" (12.7mm to 44.6mm)

SCA Sloped Ceiling Adapter accessory available, see LTR-SCA specification sheet and installation instructions for dimensional data and other details.

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prescolite

LTR-4RD

LITEISTRY 4" ROUND DOWNLIGHT

DATE: LOCATION:

TYPE: PROJECT:

CATALOG #:

PHOTOMETRY

LTR-4RD-H-ML20L-DM1 / LTR-4RD-T-ML35K8VNR-S

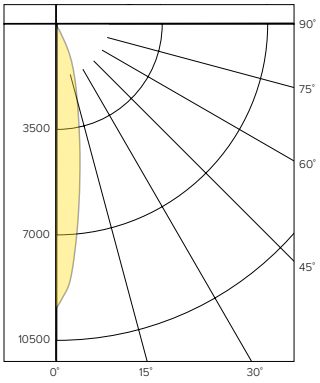
LUMINAIRE DATA

Test No.	**20.01331**
Description	**2000 lm, Very Narrow, 3500K, 80 CRI**
Delivered Lumens	**2032**
Watts	**22.4W**
Efficacy	**91**
Mounting	**Recessed**
Spacing Criterion	**0.3**
Beam Angle (FWHM)	**20**

ZONAL LUMEN SUMMARY

Zone	Lumens	% Luminaire
0-40	2011	99.0
0-60	2032	100.0
0-90	2032	100.0
0-180	2032	100.0

POLAR GRAPH



CANDELA DISTRIBUTION

Degree	Candela
0	9388
5	7360
15	2780
25	1073
35	198
45	20
55	0
65	0
75	0
85	0
90	0

LUMINANCE DATA*

Vertical Angle	Average
45°	3489
55°	0
65°	0
75°	0
85°	0

*Candela/Square Meter

LTR-4RD-H-ML20L-DM1 / LTR-4RD-T-ML35K8NR-S

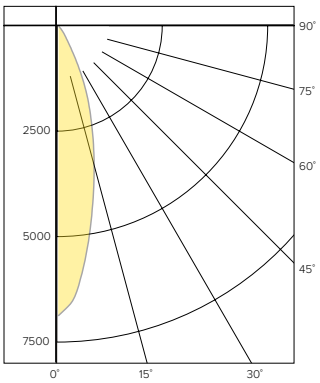
LUMINAIRE DATA

Test No.	**19.00532**
Description	**2000 lm, Narrow, 3500K, 80 CRI**
Delivered Lumens	**2238**
Watts	**22.5W**
Efficacy	**99.3**
Mounting	**Recessed**
Spacing Criterion	**0.4**
Beam Angle (FWHM)	**29**

ZONAL LUMEN SUMMARY

Zone	Lumens	% Luminaire
0-40	2208	98.6
0-60	2237	99.9
0-90	2238	100.0
0-180	2238	100.0

POLAR GRAPH



CANDELA DISTRIBUTION

Degree	Candela
0	6877
5	6035
15	3284
25	1313
35	260
45	26
55	3
65	1
75	0
85	0
90	0

LUMINANCE DATA*

Vertical Angle	Average
45°	4535
55°	645
65°	292
75°	0
85°	0

*Candela/Square Meter

LTR-4RD-H-ML20L-DM1 / LTR-4RD-T-ML35K8MD-S

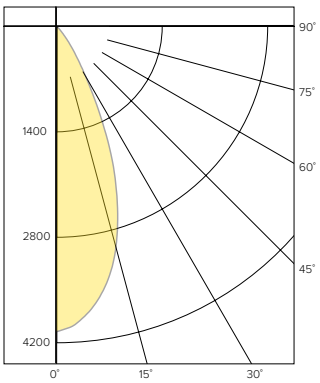
LUMINAIRE DATA

Test No.	**19.00533**
Description	**2000 lm, Medium, 3500K, 80 CRI**
Delivered Lumens	**2152**
Watts	**22.5W**
Efficacy	**95.6**
Mounting	**Recessed**
Spacing Criterion	**0.7**
Beam Angle (FWHM)	**44**

ZONAL LUMEN SUMMARY

Zone	Lumens	% Luminaire
0-40	2113	98.2
0-60	2151	99.9
0-90	2152	100.0
0-180	2152	100.0

POLAR GRAPH



CANDELA DISTRIBUTION

Degree	Candela
0	4053
5	3893
15	3037
25	1493
35	366
45	34
55	3
65	1
75	0
85	0
90	0

LUMINANCE DATA*

Vertical Angle	Average
45°	5931
55°	645
65°	292
75°	0
85°	0

*Candela/Square Meter

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LTR-4RD

LITEISTRY 4" ROUND DOWNLIGHT

PHOTOMETRY CONTINUED

LTR-4RD-H-ML20L-DM1 / LTR-4RD-T-ML35K8WD-S

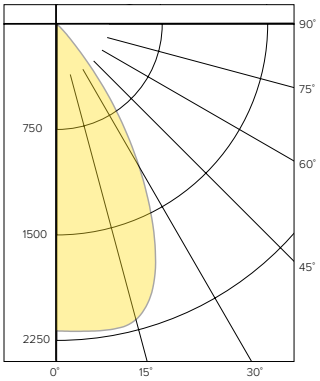
LUMINAIRE DATA

Test No.	**19.00534**
Description	**2000 lm, Wide, 3500K, 80 CRI**
Delivered Lumens	**2059**
Watts	**22.5W**
Efficacy	**91.6**
Mounting	**Recessed**
Spacing Criterion	**0.9**
Beam Angle (FWHM)	**61**

ZONAL LUMEN SUMMARY

Zone	Lumens	% Luminaire
0-40	1983	96.3
0-60	2056	99.8
0-90	2059	100.0
0-180	2059	100.0

POLAR GRAPH



CANDELA DISTRIBUTION

Degree	Candela
0	2201
5	2210
15	2051
25	1504
35	692
45	169
55	10
65	3
75	1
85	0
90	0

LUMINANCE DATA*

Vertical Angle	Average
45°	11338
55°	1075
65°	584
75°	477
85°	0

*Candela/Square Meter

LTR-4RD-H-ML20L-DM1 / LTR-4RD-T-ML35K8XW-S

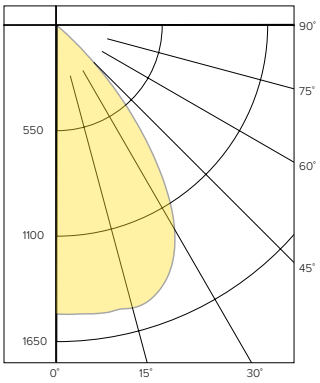
LUMINAIRE DATA

Test No.	**19.00535**
Description	**2000 lm, Extra Wide, 3500K, 80 CRI**
Delivered Lumens	**2028**
Watts	**22.5W**
Efficacy	**90.2**
Mounting	**Recessed**
Spacing Criterion	**1.2**
Beam Angle (FWHM)	**78**

ZONAL LUMEN SUMMARY

Zone	Lumens	% Luminaire
0-40	1794	88.5
0-60	2025	99.8
0-90	2028	100.0
0-180	2028	100.0

POLAR GRAPH



CANDELA DISTRIBUTION

Degree	Candela
0	1235
5	1252
15	1392
25	1454
35	1010
45	256
55	6
65	2
75	1
85	0
90	0

LUMINANCE DATA*

Vertical Angle	Average
45°	44656
55°	1290
65°	584
75°	231
85°	477

*Candela/Square Meter

LUMEN MULTIPLIER

Option	27K8	30K8	35K8	40K8	50K8	27K9	30K9	35K9	40K9
Multiplier	0.94	0.98	1.00	1.01	1.02	0.81	0.84	0.85	0.85

Photometrics are published below at a nominal 3500 Kelvin, 80+ CRI. This table may be used to approximate the lumen values at different Kelvin temperatures. Power consumption would stay the same.

REFLECTOR FINISH MULTIPLIER (Based on Clear (Standard) Color)

Option	Specular (S)	Semi-Specular (SS)	American Matte (MFC)	Softglow (VS)	Softsheen (VSS)
Multiplier	1	1	0.984	0.888	0.938

REFLECTOR COLOR MULTIPLIER (Based on Semi-Specular (SS) Finish)

Option	Clear (Standard)	Champagne Gold (CG)	Black (BL)	Light Wheat (LW)	Pewter (PW)	White Cone (WC)	Black Cone (BC)
Multiplier	1	0.974	0.444	0.861	0.915	0.984	0.442

Multiply FINISH x COLOR to calculate other reflector finish and color combinations. Example: SoftGlow Pewter (VSPW) = 0.888 (VS) x 0.915 (PW) = 0.813

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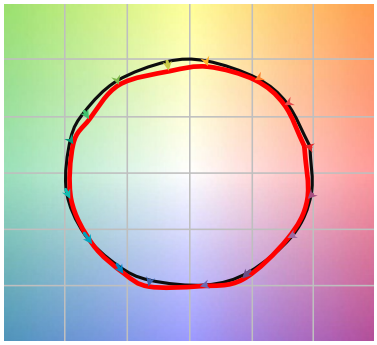
LTR-4RD

LITEISTRY 4" ROUND DOWNLIGHT

TM-30 DATA

COLOR VECTOR GRAPHIC 3500K, 90 CRI

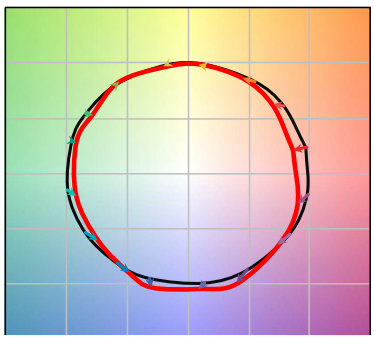


Reference Illuminant — Test Source

COLOR DISTORTION GRAPHIC 3500K, 90 CRI

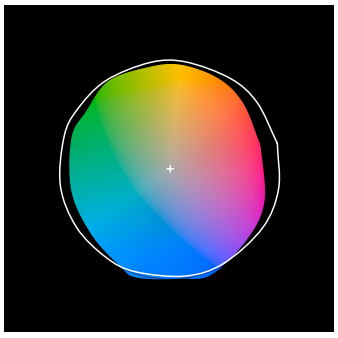
TEST RESULTS - 3500K		
Value	80+ CRI	90+ CRI
R_f	84	88
R_g	95	95
CCT (K)	3411	3419
D_{UV}	0.0015	0.0042
x	0.4120	0.4147
y	0.3974	0.4052
CIE R_a	84	93
CIE R_g	11	62

COLOR VECTOR GRAPHIC 3500K, 80 CRI



Reference Illuminant — Test Source

COLOR DISTORTION GRAPHIC 3500K, 80 CRI



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LTR-4RD

LITEISTRY 4" ROUND DOWNLIGHT

ELECTRICAL DATA

DRIVER DATA		
Input Voltage	120-277 V	347 V
Input Frequency	50/60 Hz	50/60 Hz
Power Factor	≥0.90	≥0.90
THD	<20%	<20%
EMI Filtering (FCC 47 CFR Part 15)	Class A	Class A

* Values for DM1 option shown, values for other dimming options may vary.

ADDITIONAL INFORMATION

Dimming Compatibility
For more details and recommended dimmer list, see Dimming Compatibility Information on currentlighting.com/prescolite.

DMX
See instruction sheet on currentlighting.com/prescolite for connection & installation information.

Central Inverters
For full fixture output in back-up mode, we recommend you visit currentlighting.com/dual-lite.com for your Central Lighting Inverter options. Please contact your local Current representative for any assistance with proper sizing and loading of your inverter selection. Central lighting inverters must be ordered separately.

Bezel Trim Accessories for Complex Environments
See installation instructions on currentlighting.com/prescolite for complete details.

Lumen Output in Emergency Mode
To determine the lumen output in emergency mode multiply the battery pack wattage by the fixture lumens per watt (LPW).
For example, 7W x 120 LPW = 840 lumens in emergency mode.

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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.
City of Portland Land Use Code Section 14.6.1.B.3 Transportation Standards, Access and circulation, Curbs and Sidewalks	a. All development shall provide curb and sidewalks along all frontages, installed to specifications as described in the transportation systems and street design standards of the Technical Manual. c. An applicant may request a waiver from sidewalk installation requirements if they meet two or more applicable waiver criteria.	Applicant is requesting a waiver to provide sidewalk along the property's frontage on Fletcher Street.	This section of Fletcher Street is an existing narrow right-of-way that is not wide enough to accommodate the installation of new sidewalk.

12 Mountfort Street
Portland, Maine 04101
www.woodardcurran.com

T 800.426.4262
T 207.774.2112
F 207.774.6635

Att. Q

10/31/2024

I, Lauren Swett, from Woodard & Curran, acting on behalf of Waynflete, hereby certify that a neighborhood meeting was held on October 30, 2024 at the Klingenstein Library at the Waynflete School at 5:00 pm for the proposed Wellness & Athletic Center project located at the Waynflete School at 360 Spring Street in Portland, Maine.

I also certify that on October 16, 2024, notices 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 (1,000 feet for subdivisions within an industrial zone or industrial zone changes).

2. Residents on the "interested parties" list.

Signed,

Woodard & Curran, Inc.

Lauren Swett

Lauren Swett, P.E.
Technical Manager

Attachments

1. Copy of notice sent
2. Sign-in sheet
3. Record of feedback

Waynflete

360 Spring Street, Portland, ME 04102 | T: 207.774.5721 | waynflete.org

Via Regular US Mail

Wednesday, October 16, 2024

Re: Waynflete Wellness & Athletic Center Neighborhood Meeting

Dear Neighbor:

Waynflete School has submitted a Major Site Plan Application to the City of Portland for the proposed Waynflete Wellness & Athletic Center. This facility will be constructed to replace the existing gymnasium on the Waynflete campus. We invite you to join us and others from the project team for a neighborhood meeting to discuss the project. We will talk about the proposed project plans and will also take your questions.

Meeting Location:	Klingenstein Library, First Floor, Lower School Building Waynflete School, 360 Spring Street, Portland, Maine
Meeting Date:	Wednesday, October 30, 2024
Meeting Time:	5:00pm

The Land Use Code requires that neighboring property owners and residents on an "interested parties list" provided by the City of Portland's Planning and Urban Development Department be invited to participate in this neighborhood meeting. A sign-in sheet will be circulated and a record of the meeting will be taken. Both the sign-in sheet and record will be submitted to the Planning Board as part of the Major Site Plan application process.

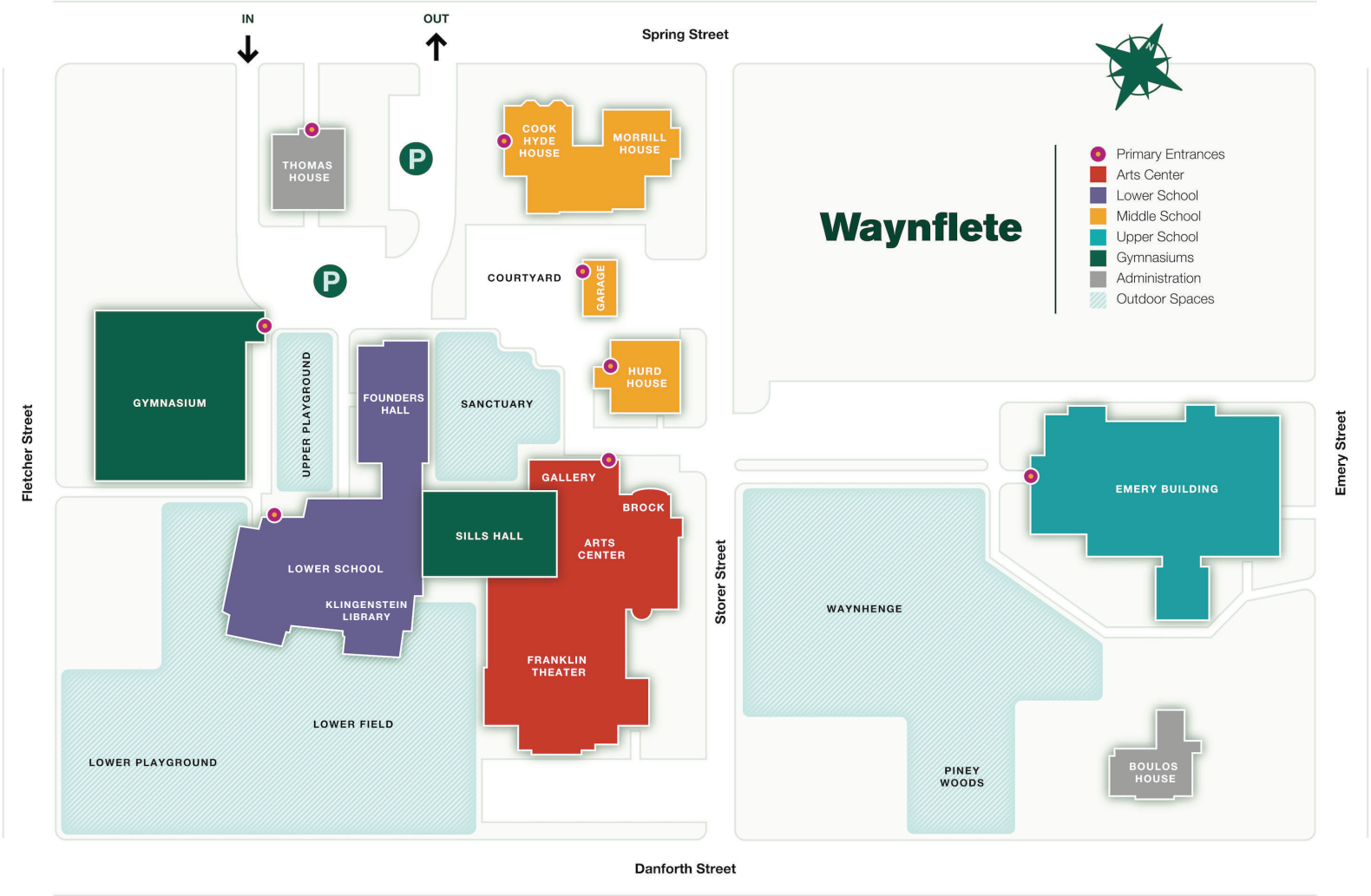
If you have any questions, please call 207-774-5721.

Signed,

Geoff Wagg
Head of School

Note: Under the City of Portland land use code, an applicant for a major site plan, master development plan, subdivision of over five lots, or zoning map amendment is required to hold a neighborhood meeting within 30 days of an application being deemed complete and no less than seven calendar days before a public hearing. Should you wish to offer additional comments on this proposed development, you may forward them by e-mail to planning@portlandmaine.gov or by mail to the Planning and Urban Development Department, Planning Division, 4th Floor, 389 Congress Street Portland, ME 04101.

Printed on 100% postconsumer recycled paper


IN
OUT
Spring Street
Waynflete
Primary Entrances
Arts Center
Lower School
Middle School
Upper School
Gymnasiums
Administration
Outdoor Spaces
THOMAS HOUSE
COOK HYDE HOUSE
MORRILL HOUSE
COURTYARD
GARAGE
GYMNASIUM
UPPER PLAYGROUND
FOUNDERS HALL
SANCTUARY
HURD HOUSE
GALLERY
BROCK
ARTS CENTER
SILLS HALL
LOWER SCHOOL
KLINGENSTEIN LIBRARY
FRANKLIN THEATER
LOWER FIELD
LOWER PLAYGROUND
EMERY BUILDING
WAYNHENGE
PINEY WOODS
BOULOS HOUSE
Fletcher Street
Storer Street
Emery Street
Danforth Street

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F 207.774.6635

NEIGHBORHOOD MEETING

Woodard & Curran

DATE: **October 30, 2024**

RE: **Waynflete Community Wellness Athletic Center**
Neighborhood Meeting Attendance List

Thank you for attending tonight's public Neighborhood Meeting in the Klingenstein Library at the Waynflete School for the proposed development of the Waynflete Community Wellness Athletic Center located on the Waynflete Campus at 360 Spring Street in Portland, Maine. Please sign in below. This attendance list will be provided to the City of Portland as part of the Site Plan Permitting process.

Thank you,
Waynflete Community Wellness Athletic Center Project Team

	Name:	Email Address:
1	Ratelynn Echert	ratelynn.m.echert@gmail.com
2	Jeff McKinnon	jeff.mckinnon@gmail.com
3	Arlene Schwind	apalmers@maine.rr.com
4	W John Funk	wjohnfunk@hotmail.com
5	SONIA ROBERTSON	robertsoneonia@hotmail.com
6	Y. Sivi-Beier	yaelsivi@gmail.com
7	Bill Schwind	

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NEIGHBORHOOD MEETING

Woodard & Curran

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Thank you,
Waynflete Community Wellness Athletic Center Project Team

	Name:	Email Address:
8	Dominique et Landis GABEL.	gabel.dominique@gmail.com
9	YOSH BEIER	ycbeier@gmail.com
10	Christopher Brooks	christopher.lane.brooks@gmail.com

12 Mountfort Street
Portland, Maine 04101
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T 800.426.4262
T 207.774.2112
F 207.774.6635

NEIGHBORHOOD MEETING

DATE: **October 30, 2024**

RE: **Waynflete Community Wellness Athletic Center**
Neighborhood Meeting Notes

The Neighborhood Meeting for the Waynflete Community Wellness Athletic Center was held on October 30, 2024, starting at 5:00 pm. The meeting had ten signed in attendees (see attached sign in sheets) as well as representatives from Waynflete, Scott Simons Architects, Aceto Landscaping, Zachau Construction, and Woodard & Curran.

The meeting was begun by Geoff Wagg, Head of School for Waynflete, who gave a brief presentation that included the following:

- Introduction of project team
- Description of the history of the project
- Description of the proposed design, showing elevation plans, rendered views, and floor plans of the proposed facility
- Description of the construction, with focus on the impacts to Fletcher Street

After the presentation, the project was opened up to questions and open discussion. The following notes provide a summary of the discussion including questions asked, and response provided.

- Where will the students have gym classes during construction?
    - There is a small gym space within the Lower School that will be utilized when possible, but Waynflete will be renting space from SMCC as necessary.
- Will there be a disruption to utilities for the neighborhood?
    - There will be, but it will be isolated and will not take long. This will be coordinated with impacted neighbors.
- Will the Fletcher Street impact be coordinated with the City for services like plowing?
    - Yes, the contractor is coordinating with Public Works.
- Are any temporary facilities anticipated, like the modulars installed for the Lower School Construction?
    - None at this time.
- What are anticipated work hours?

- The full work day will be 7:00 am until 5:00 pm; however most work will be done by 3:30 pm. Saturdays are only anticipated to be used as necessary for makeup work days.

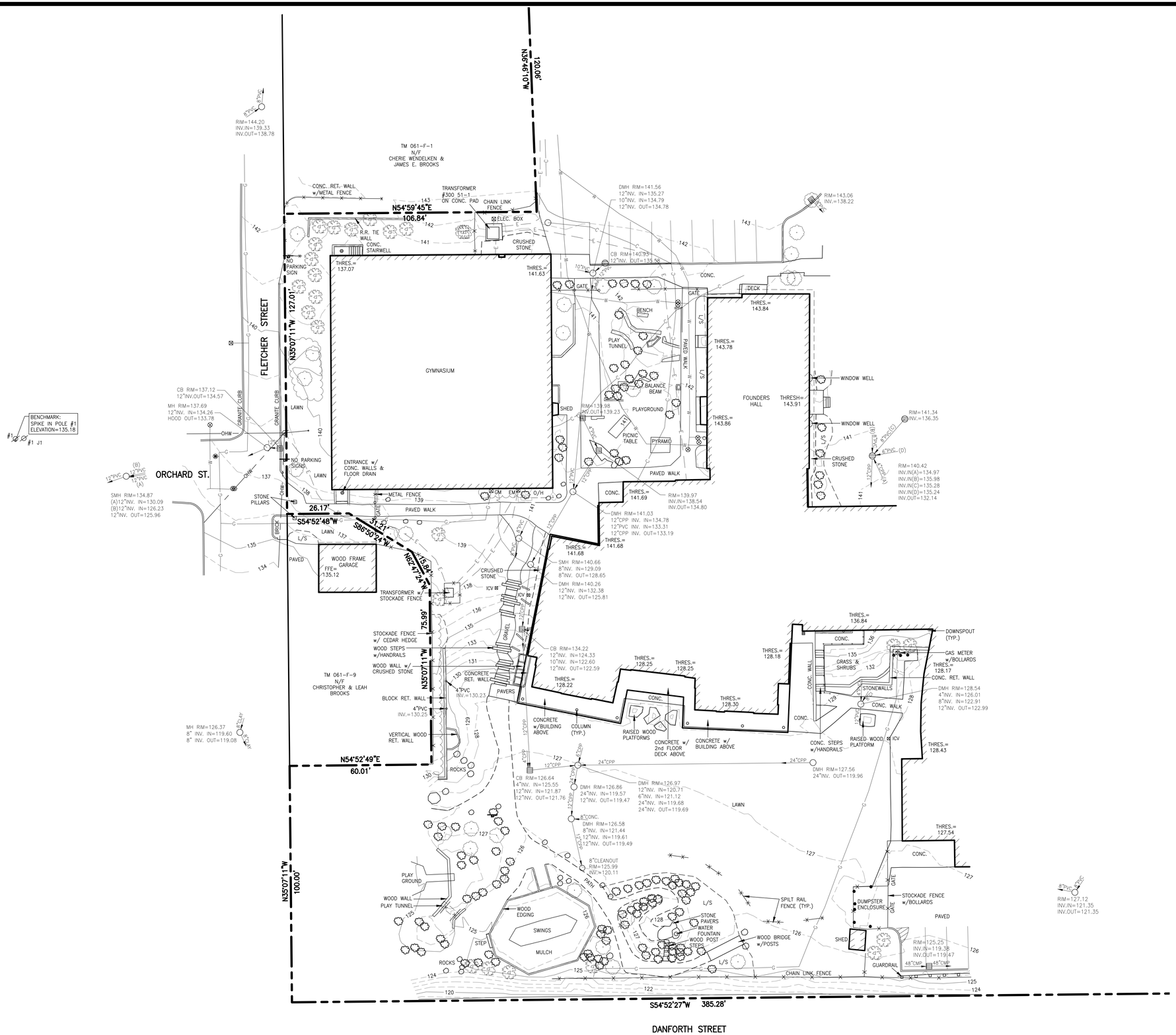
- Will there be any hazardous waste within the building to be disposed of?
    - An analysis was done back in 2016, and repeated now, and none has been found.
- How will dust and air impacts to the neighborhood be managed?
    - The contractor is planning for dust management as is required per standard conditions. The contractor and Waynflete will explore options to work directly with impacted abutters to provide additional measures for dust management or cleaning following construction.
- Electrical utility on Fletcher Street was discussed:
    - Electrical utility pole is anticipated to be more noticeable, how will this be mitigated?
        - With the proposed change to the electrical utility on Fletcher Street, the pole will now be much simpler with a lot fewer connections as much of the utility infrastructure will be underground.
    - Where will the new pole be located?
        - It has been marked in the field and will be at the back of the sidewalk.
    - Could the underground utility be extended another house length?
        - This can be looked at considering costs. What is currently proposed will look much simpler.
    - Will there be a support wire needed for the Pole 3?
        - Yes, a support wire will be provided.
- Where will construction workers park?
    - A parking plan will be developed, but construction workers will not be allowed to park on Danforth Street.
    - There was a general discussion of parking in the Waynflete area. It was noted that the current construction project on Vaughn Street, which is unrelated to Waynflete has been impacting the neighborhood, but this will be done soon.
- What is the permitting process for this work, and is it being re-permitted from 2016?
    - The facility was previously permitted in 2016 with the Lower School. That approval has lapsed, and a new permit application has been submitted for site plan for the updated design. The project will be reviewed for approval by the

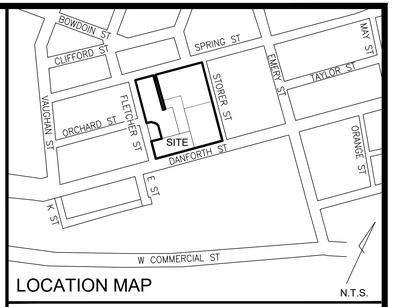
Planning board and the Historic Preservation Board. The Historic Preservation Board will be reviewing the project with the surrounding neighborhood context.

- What is the timeline for deep pile work, and what will the noise impact be?
    - It is anticipated that driven piles will not be used, and drilled shafts will be used instead. This methodology is quieter and results in less vibration. This work will be done in roughly the first three months of construction.
- There were questions about the proposed building height.
    - There is a Waynflete overlay zone, and the building has been designed within the limitations of this zone. The taller portion of the building will be located internal to the site, and along Fletcher Street, the building will be the same height as the existing conditions. There are some existing buildings around the neighborhood that will remain taller.
- What materials are proposed? The white is anticipated to stand out.
    - A metal panel is proposed. The color was selected to match Founder's Hall and the Lower School.

The meeting was closed by Geoff Wagg, who noted that there were four major takeaways from the discussion on neighborhood concerns, and Waynflete and the project team would work to ensure that they are considered appropriately moving towards construction.

- Parking during construction
- Overhead utilities on Fletcher Street
- Construction debris and dust impacts
- Building Height





LOCATION MAP

N.T.S.

LEGEND

UTILITY POLE		FENCE	
MANHOLE		CURB	
EM/GM	ELECTRIC/GAS METER	OHW	OVERHEAD WIRES
ICV	IRRIGATION CONTROL VALVE	E	UNDERGROUND POWER
CATCH BASIN		W	WATER LINE
HYDRANT		G	GAS LINE
WATER VALVE OR SHUTOFF		C	COMMUNICATION LINE
LIGHT POLE		SD	STORM DRAIN
SIGN		SS	SANITARY SEWER
DECIDUOUS TREE		100	1' CONTOUR
		THRES.	THRESHOLD
CONIFEROUS TREE		FFE	FINISHED FLOOR ELEVATION
BUSH / SHRUB		CONC.	CONCRETE
		L/S	LANDSCAPED AREA

PLAN REFERENCES

1. "EXISTING CONDITIONS SURVEY– WAYNFLETE SCHOOL, FLETCHER STREET, PORTLAND, MAINE MADE FOR SCOTT SIMONS ARCHITECTS" DATED JUNE 10, 2015 REV. 3 OCT. 27, 2015 BY TITCOMB ASSOCIATES.

GENERAL NOTES

1. OWNER OF RECORD: THE WAYNFLETE SCHOOL
2. BEARINGS ARE BASED ON MAINE STATE COORDINATE SYSTEM, WEST ZONE NAD83 PER INFORMATION PROVIDED BY THE CLIENT.
3. ELEVATIONS ARE BASED ON CITY DATUM PER PLAN REFERENCE 1.
4. BOUNDARIES SHOWN ARE TAKEN FROM PLAN REFERENCE 1.

UTILITY NOTE

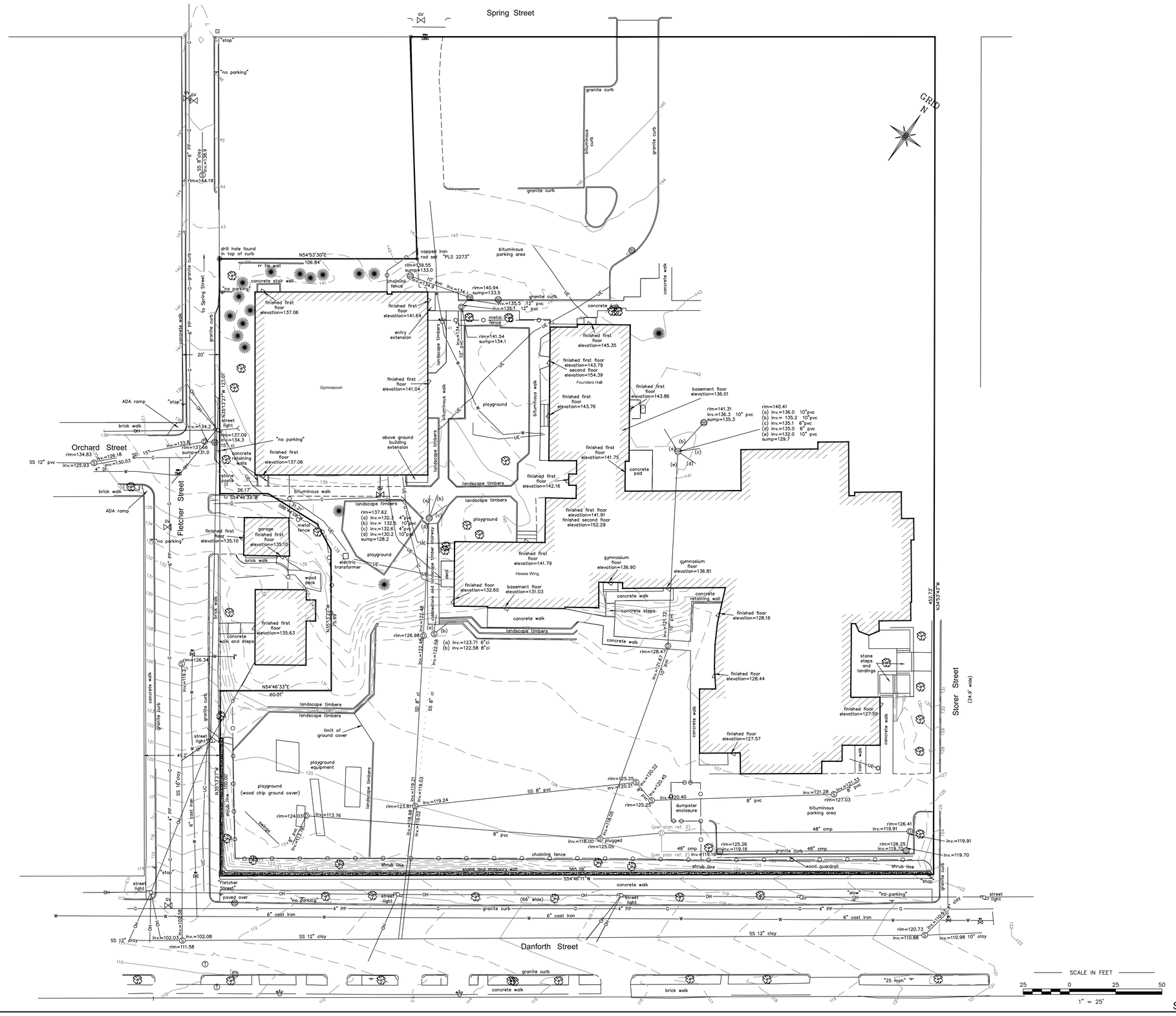
THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEY HAS NOT PHYSICALLY LOCATION 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.

REV.	1	09/05/2024	ADDED UNDERGROUND WATER & ELECTRIC LINES

Existing Conditions Survey
Waynflete School
360 Spring Street, Portland, Maine
Made for
Woodard & Curran
12 Mountfort Street, Portland, Maine

OWEN HASKELL, INC.
PROFESSIONAL LAND SURVEYORS
390 US ROUTE 1, UNIT 10, FALMOUTH, ME 04105 TEL. 207-774-0424

DRAWN BY:	NM / JLW	DATE:	JAN. 17, 2024	JOB NO.	2023-340 P
CHECKED BY:	RRL	SCALE:	1" = 20'	DRWG. NO.	1



NOTES

1) Bearings are referenced to the True North as determined by astronomic observation.

2) Elevations are based on City of Portland datum.

3) Utility information on this plan is approximate, based on location of visible features. DigSafe and/or the appropriate utilities should be contacted prior to any construction.

4) The sewer and drain information depicted as being per reference 2 is approximate, it has not been field verified.

PLAN REFERENCES

1) Standard Boundary Survey, made for The Waynflete School by Titcomb Associates, dated December 21, 1993.

2) Stormwater Layout Plan and Details—Waynflete School Auditorium Addition made by Pinkham and Greer dated Septembe 7, 2007.

CERTIFICATION

This is not a boundary survey.
Certification is to existing conditions only.
See Sheet S1 for boundary survey.

STATE OF MAINE REX CROTEAU 2273 PROFESSIONAL LAND SURVEYOR

Rex J. Croteau, P.L.S. #2273

Rev.3	10/27/15	Expanded survey area	RJC
Rev.2	10/05/15	Drill hole found / iron rod set	RJC
Rev.1	7/10/15	Expanded site / underground utilities	RJC

PLAN OF

Existing Conditions Survey- Waynflete School

Fletcher Street Portland, Maine

MADE FOR

Scott Si□ons Architects

75 York Street Portland, Maine

JOB #93093	DATE: June 10, 2015	SCALE: 1" = 25'
BOOK #884		
93093-2015		
FILE #6831		

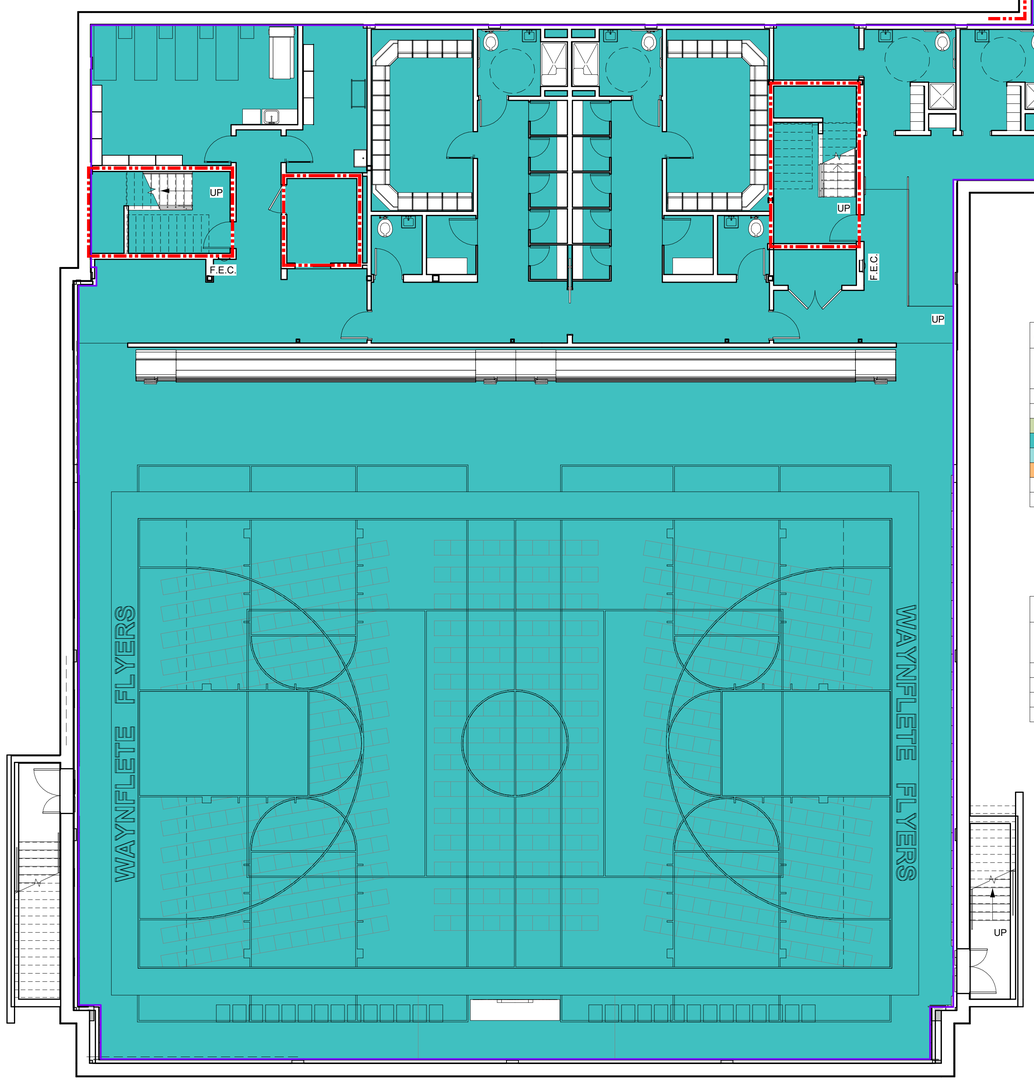
Titcomb Associates
133 Gray Road, Fal□outh, Maine 04105
□207.797-9199 □□□.titco□□survey.co□

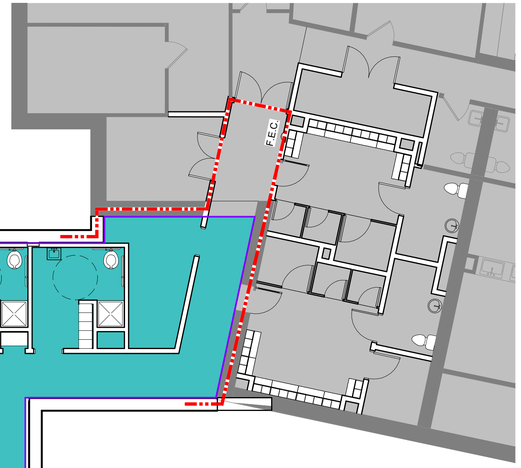
S2

LIFE SAFETY PLAN LEGEND:

- ### / ### OCC / ### SF — USE TYPE (###) DENOTES ACCESSORY USE; OCCUPANTS; ROOM AREA
- ## / ## — OCCUPANT EGRESS LOAD AT DOOR/STAIR; DOOR/STAIR OCCUPANT CAPACITY
- DIRECTION OF EGRESS
- X — EXIT KEY
- X XXX' — DISTANCE TO EXIT
- [XX'-X"] — DIAGONAL / SEPARATION DISTANCE
- (XX'-X") — PATH OF EGRESS (LEG DISTANCE)
- 1-HOUR FIRE RATED SEPARATION WITH 1 HOUR OPENINGS
- 2-HOUR RATING
- SMOKE SEPARATION WITH 20 MINUTE OPENINGS

FE FIRE EXTINGUISHER	K KNOX BOX	FIRE ALARM HORN / STROBE (CEILING MOUNTED)
ILLUMINATED EXIT SIGN (WALL MOUNTED)	P FIRE ALARM PULL STATION	EMERGENCY LIGHT
ILLUMINATED EXIT SIGN (CEILING MOUNTED)	FIRE ALARM STROBE ONLY	COMBINATION EMERGENCY LIGHT / EXIT SIGN
SD SMOKE/FIRE DETECTOR	FIRE ALARM HORN / STROBE	FACP FIRE ALARM CONTROL PANEL





PLUMBING FIXTURE COUNTS
(UPC TABLE 422)

(X OCCUPANTS)	WC	URINALS	LAVS	SHOWERS	SERVICE SINK
MALE (XX OCC)					
FEMALE (*)					
TOTAL REQ'D					
TOTAL ACTUAL					

1. XXX

LIFE SAFETY NOTES:

1. SEE A000 FOR PARTITION TYPES, AND A101 FOR PARTITION TAG LOCATIONS
2. SEE G102 FOR EGRESS PLANS
3. SEE A131 REFLECTED CEILING PLAN FOR PROPOSED LOCATIONS OF SMOKE DETECTORS AND LIGHT FIXTURES, INCLUDING EXIT DEVICES
4. SEE FP AND E SERIES DWGS FOR ADD'L FIRE ALARM AND FIRE PROTECTION SYSTEM INFORMATION, AND OCCUPANCY SENSOR INFORMATION.
5. SEE G002, TYPICAL MOUNTING SHEET, AS WELL AS ENLARGED PLANS AND INTERIOR ELEVATIONS FOR MOUNTING HEIGHTS OF DEVICES
6. SEE E SERIES DWGS FOR DESIGNATION OF LIGHTS ON EMERGENCY CIRCUITS

OCCUPANT LOAD TABLE (IBC, TABLE 1004.1.2)/(NFPA101 TABLE 7.3.1.2)

USE	AREA	SF / OCCUPANT (GROSS/NET SF)	TOTAL OCCUPANTS
ASSEMBLY			
BUSINESS (B)			
LOCKER ROOMS (LR)			
STORAGE (S)			
MECH (S)			
TOTAL (ALLOWABLE)			
TOTAL (OPERATIONAL)			

1. xxx

EGRESS CAPACITY STAIRS / DOORS (IBC 1005.1) (NFPA101 TABLE 07.3.3.1)

TAG	EGRESS WIDTH	CAPACITY		NOTES	LOAD
		FACTOR	MAX		
DOOR A (EX)		.2			
DOOR B (EX)		.2			
DOOR C (EX)		.2			
DOOR D (EX)		.2			

CODE SUMMARY:

APPLICABLE CODES

Maine Uniform Building and Energy Code "MUBEC"
Consists of the following applicable codes:

2015 International Building Code (IBC)
2021 International Energy Conservation Code (IECC) (City of Portland)
2016 ASHRAE 62.1 (Ventilation for Acceptable Indoor Air Quality)
2016 ASHRAE 90.1 - (Energy Standard for Buildings except Low-Rise Residential Buildings) editions without addenda

2021 Uniform Plumbing Code / Maine State Internal Plumbing Code
2015 International Mechanical Code (IMC)
2020 National Electrical Code (NEC)

Fire/ Life Safety:

NFPA Life Safety Code as adopted by the State of Maine
Including but not limited to:

2018 NFPA 001: Fire Code
2018 NFPA 101: Life Safety Code

Accessibility:

2010 ADA Standards for Accessible Design

NOTE: All Codes shall include changes/amendments by the State of Maine

OCCUPANCY CLASSIFICATION
(IBC Sec 302, 303, 304, 311) (NFPA 101)

Assembly	A-4
Business	B
Education	E
Storage	S

AUTOMATIC SUPPRESSION SYSTEM
(NFPA 13)

The building will be fully equiped with an automatic sprinkler system.

GENERAL BUILDING INFORMATION:
ALLOWABLE BUILDING HEIGHTS AND AREA

Proposed Area:
(New Construction):

COURT LEVEL	11,688 SF
FIRST FLOOR	2,918 SF
SECOND FLOOR	4,044 SF
THIRD FLOOR	3,762 SF
	22,412 SF

(Alteration in Lower School):

COURT LEVEL	2,187 SF

Proposed Building Height: 37', 3 Stories above grade (4 total)

Allowable Building Height
(IBC Table 504.3, 504.4 / NFPA Table 12.1.6)

A-4, B, E	75' Maximum
A-4, E	3 Stories

Allowable Building Area
(IBC Table 506.2, 508.1)

	OCCUPANCY (PER IBC)	CONSTRUCTION TYPE (PER IBC)	AREA ALLOWED	AREA ACTUAL
(SINGLE STORY)	A-4	IIB	28,500 sf	11,688 sf
	E	IIB	43,500 sf	included above

REQUIRED OCCUPANCY SEPARATIONS
Per 503.1.2 Buildings on same lot: treated as separate buildings
Primary use spaces assume no separation per IBC 508.3.
Per Table 508.4

A,E to A,E	NO REQUIRED SEPARATION
A,E to S-2	NO REQUIRED SEPARATION
A,E to S-1	1 HR SEPARTION

WALL OPENINGS
Per Table 705.8

10 to 15 ft — 45% ALLOWABLE AREA UNPROTECTED OPENINGS

TYPES OF CONSTRUCTION
(IBC Table 601, Sec 602, Table 706.4) (NFPA 220)
Type IIB (000)

FIRE RESISTIVE RATINGS (IBC Table 601, 602), (NFPA Table A.8.2.1.2)	TYPE IIB
STRUCTURAL FRAME	0
BEARING WALLS, EXTERIOR BEARING WALLS, INTERIOR	0* 0
NON-BEARING WALLS AND PARTITIONS, EXTERIOR NON-BEARING WALLS AND PARTITIONS, INTERIOR	0
FLOOR CONSTRUCTION AND SECONDARY MEMBERS	0
ROOF CONSTRUCTION AND SECONDARY MEMBERS	0

* ABOVE GRADE SEPARATION FROM PROPOSED STRUCTURE AND LOWER SCHOOL IS 13'-10"; 0 HR SEPARATION REQUIRED
- BELOW GRADE, SEPARATION FROM PROPOSED STRUCTURE AND LOWER SCHOOL STRUCTURE IS 0'; 2 HR SEPARATION IS REQUIRED; CAST IN PLACE CONCRETE WALL EXCEEDS 2 HR RATING PER TABLE 722.2.1.1
- PER 705.3, PROJECTION REQUIREMENTS EXCEPTION

OCCUPANCY LOAD
(IBC Table 1004.1.2)/(NFPA 101 Table 7.3.1.2)

Assembly	A-4	7 Net SF per Occupant Bleacher Seating (1/18" length)
Business	B	15 Net SF per Occupant (Stages / Platforms) 100 / 150 Gross SF per Occupant 30 Gross SF (Collaboration Room <450 SF) 15 Gross SF (Collaboration Room <450 SF)
Education	E	20 Net SF per Occupant
Excercie Room	Ex	50 Gross SF per Occupant 15 Gross SF per Occupant (no equipment)
Locker Rooms	LR	50 Gross SF per Occupant
Storage Areas		300 / 500 Gross SF per Occupant
Mechanical Rooms		300 / 500 Gross SF per Occupant

MEANS OF EGRESS
(IBC Chapter 10, NFPA 101 Chapter 7)

EGRESS WIDTH PER OCCUPANT
(IBC 1005.1) (NFPA Table 07.3.3.1)

0.3 Inches per occupant for stairways
0.2 Inches for other egress components

EXIT ACCESS
egress travel distance
(IBC 1017.1,1017.2.2 / NFPA 101 Table A.7.6)
For Assembly 200' max allowed;
For Education 200' max allowed;

common path of travel
(IBC Table 1006.2.1/ NFPA 101 Table A.7.6)
For Assembly <75' max allowed;
For Education <75' (for <30 occupants)

corridor fire resistance
(IBC Table 1020.1)
1 hour where >30 occupants

Corridor Width
(IBC 1020.2)
Not less than 44"
Not less than 36" when <50 occupants

Dead-End Corridor
(IBC 1020.4) (NFPA 101, Table A.7.6)
For Assembly 20'
For Business 20'
For Storage 100'

ZONING NOTES:

PARCEL ID: 061 F004
ZONE: R-4; WAYNFLETE CORE AND EDGE SUBDISTRICT

TRUE

simons architects
designed for human potential

75 York Street
Portland, Maine 04101
simonsarchitects.com
207.772.4656

PROJECT NAME:

WAYNFLETE WELLNESS + ATHLETIC CENTER

360 SPRING ST,
PORTLAND, ME 04102

SEAL:

NOT FOR CONSTRUCTION

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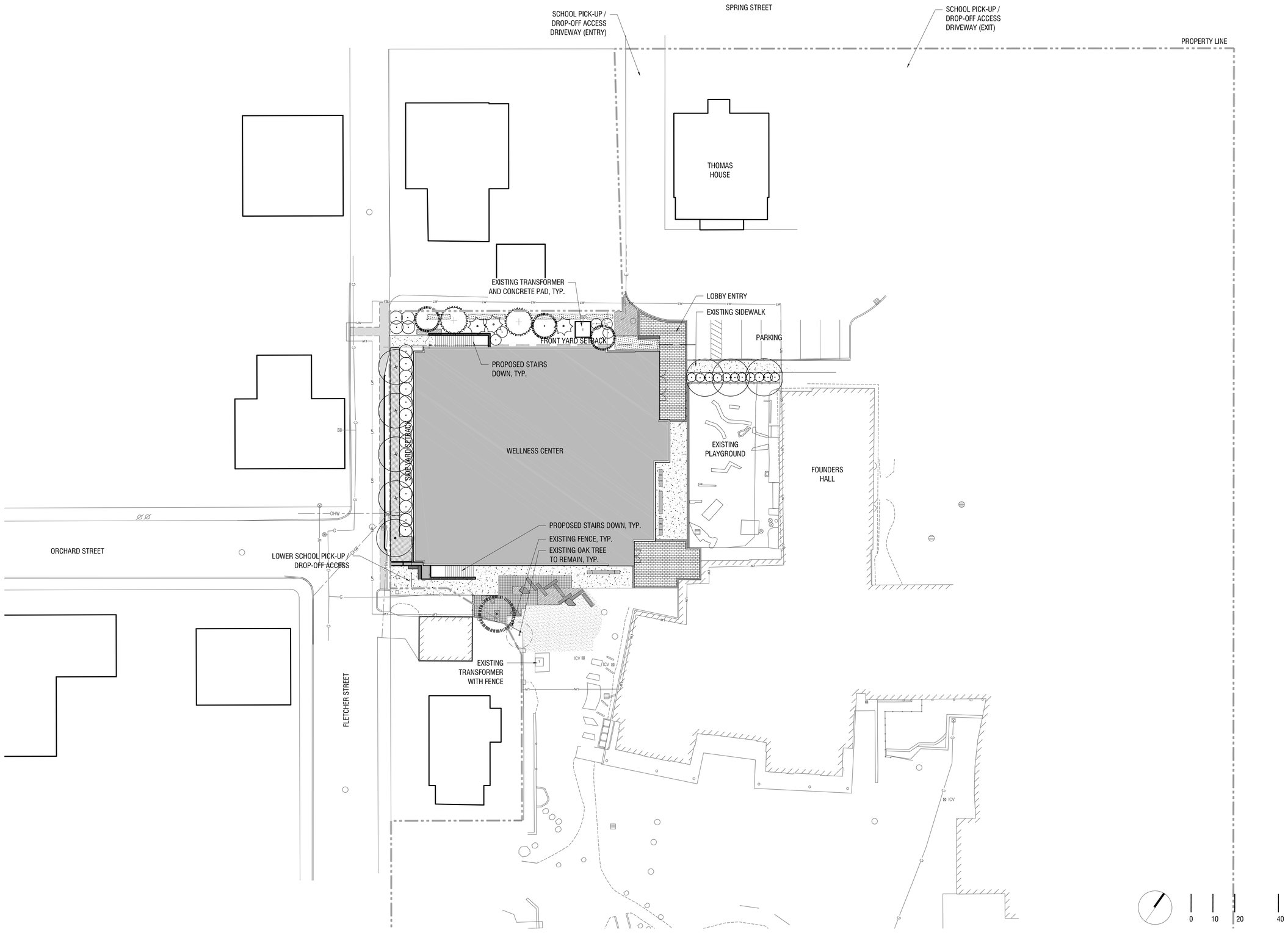
△ REVISIONS

DATE OF ISSUE: AUGUST 23, 2024
PROJECT NUMBER: 2017-0110
STATUS: 100% DESIGN DEVELOPMENT

LIFE SAFETY PLAN + CODE SUMMARY

G101



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designed for human potential

75 York Street
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207 221 3390 | ACETOLA.COM

PROJECT NAME:

SEAL:

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REVISIONS

DATE OF ISSUE:

PROJECT NUMBER:

STATUS:

OVERALL SITE PLAN

L 1-00

NOT FOR CONSTRUCTION

GENERAL NOTES

1. EXISTING CONDITIONS SHOWN HEREON HAVE BEEN PROVIDED FROM A FIELD SURVEY PREPARED BY OWEN HASKELL, INC. TITLED "EXISTING CONDITIONS SURVEY WAYNFLETE SCHOOL", DATED JAN. 12, 2024.
2. ELEVATIONS REFERENCED TO CITY OF PORTLAND VERTICAL DATUM. CITY DATUM IS +0.02 FT NGVD 1929
3. BEARINGS REFERENCED TO MAINE STATE COORDINATE SYSTEM, WEST ZONE OF HORIZONTAL DATUM NAD83.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING AND MAINTAINING ALL CONTROL POINTS AND BENCH MARKS NECESSARY FOR THE WORK.
5. EXISTING UTILITIES SHOWN ON THESE PLANS WERE COMPILED FROM A FIELD SURVEY PREPARED AS NOTED ABOVE. THESE PLANS DO NOT NECESSARILY DEPICT THE EXACT LOCATIONS OF ALL UTILITIES, WHICH MAY EXIST AT THIS TIME WITHIN THE SURVEY LIMITS. THERE MAY BE EXISTING LINES OTHER THAN THOSE INDICATED. THE LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES SHALL BE CONSIDERED APPROXIMATE AND MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO ANY UTILITY CONNECTIONS OR CROSSINGS OF PROPOSED OR EXISTING UTILITIES. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER IN WRITING. THE CONTRACTOR SHALL CONTACT THE RESPECTIVE UTILITY COMPANIES RELATIVE TO THE LOCATIONS AND ELEVATIONS OF THESE LINES. NO SEPARATE OR ADDITIONAL COMPENSATION WILL BE ALLOWED TO THE CONTRACTOR DUE TO ANY VARIANCE BETWEEN THE DATA SHOWN ON THE PLANS AND ACTUAL FIELD CONDITIONS ENCOUNTERED. THE CONTRACTOR IS RESPONSIBLE FOR HIS/HER OWN DETERMINATION AS TO THE TYPE AND LOCATION OF THE EXISTING UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE AND TO FACILITATE THE PROPOSED CONNECTION(S).
6. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL RELOCATIONS THAT CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE SITE DRAWINGS, INCLUDING BUT NOT LIMITED TO ALL UTILITIES, STORM INFRASTRUCTURE, SIGNS, UTILITY POLES, FENCES, ETC. AS REQUIRED. ALL WORK SHALL BE IN ACCORDANCE WITH THE GOVERNING AUTHORITY'S SPECIFICATIONS AND SHALL BE APPROVED BY SUCH. ALL COSTS SHALL BE INCURRED BY THE CONTRACTOR.
7. THE CONTRACTOR SHALL CONTACT DIG SAFE BY CALLING 811 OR ONLINE AT DIGSAFE.COM AT LEAST 72 HOURS PRIOR TO EXCAVATION IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL SAFETY CODES.
8. PRIOR TO CONSTRUCTION, THE ENGINEER AND CONTRACTOR WILL REVIEW THE PERMITTED LIMITS OF WORK.
9. LAND OUTSIDE THE PROPOSED LIMIT OF WORK SHALL NOT BE DISTURBED BY THE CONTRACTOR. UNLESS TEMPORARY CONSTRUCTION EASEMENT IS OBTAINED PRIOR TO THE WORK.
10. THE CONTRACTOR SHALL TAKE ADEQUATE PRECAUTIONS TO PROTECT ALL WALKS, STREETS, PAVEMENTS, CURBING, TREES, PLANTINGS, LAWN, FENCING TO REMAIN ON OR OFF THE PREMISES, AND SHALL REPAIR AND REPLACE AT HIS/HER OWN EXPENSE, AS DIRECTED BY THE ENGINEER, ANY ITEMS DAMAGED AS A RESULT OF THE CONTRACTOR'S WORK.
11. RESTORE ALL AREAS DISTURBED BY CONTRACTOR'S OPERATIONS TO ORIGINAL FINISH (GRAVEL, PAVEMENT, RIPRAP, GRASS, ETC.) UNLESS OTHERWISE NOTED ON PLANS. RESTORATION OF ALL AREAS DAMAGED BY CONTRACTOR SHALL BE INCIDENTAL TO THE PROJECT.
12. ALL SURFACES TO REMAIN THAT ARE DISTURBED BY THIS WORK SHALL BE RESTORED TO THEIR ORIGINAL CONDITION, AS DETAILED, OR AS SPECIFIED BY THE ENGINEER.
13. IF ANY EXISTING STRUCTURES TO REMAIN ARE DAMAGED DURING CONSTRUCTION IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR AND/OR REPLACE THE EXISTING STRUCTURE AS NECESSARY.
14. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL SAFETY CODES, REGULATIONS, LEGAL REQUIREMENTS, PERMIT CONDITIONS, ETC. PERMIT CONDITIONS RELATE TO THOSE OUTLINED IN THE STATE SPECIFICATIONS.
15. THE CONTRACTOR SHALL PROVIDE ADEQUATE BRACING AND SHORING OF ALL EXCAVATIONS IN ACCORDANCE WITH THE REQUIREMENTS OF ALL GOVERNING CODES AND REGULATIONS.
16. SAWCUTS IN EXISTING PAVEMENT SHALL BE SMOOTH AND STRAIGHT.
17. WORK WITHIN PUBLIC RIGHT-OF-WAY SHALL COMPLY WITH APPLICABLE CITY OF PORTLAND AND STATE REQUIREMENTS.
18. ALL CURB DAMAGED DURING CONSTRUCTION SHALL BE REPLACED IN KIND AND SHALL CONFORM TO CITY OF PORTLAND SPECIFICATIONS. COST IS INCIDENTAL TO CONTRACT.
19. ALL FULL DEPTH PAVEMENT REPLACEMENT SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF PORTLAND TECHNICAL STANDARDS.
20. ALL WORK WITHIN THE RIGHT OF WAY OF CITY STREETS SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF THE CITY TRAFFIC ENGINEER. THE CONTRACTOR SHALL SUBMIT A PROPOSED TRAFFIC CONTROL PLAN TO THE TRAFFIC ENGINEER AT LEAST 7 DAYS BEFORE BEGINNING CONSTRUCTION IN ANY STREET. THE PROPOSED TRAFFIC CONTROL PLAN SHALL BE SUBJECT TO APPROVAL BY THE TRAFFIC ENGINEER, WHO MAY ATTACH SPECIAL CONDITIONS TO, OR REQUIRE MODIFICATIONS OF, THE TRAFFIC CONTROL PLAN. WORK SHALL NOT BEGIN UNTIL THE PLAN IS APPROVED BY THE TRAFFIC ENGINEER.
21. THE CONTRACTOR SHALL OBTAIN A CITY STREET OPENING PERMIT BEFORE BEGINNING CONSTRUCTION. THE CONTRACTOR WILL ALSO BE REQUIRED TO HAVE A CURRENT EXCAVATOR'S LICENSE IN THE CITY.
22. ALL WORK IN THE PUBLIC R.O.W. SHALL BE COMPLETED IN ACCORDANCE WITH THE CITY'S TECHNICAL MANUAL ARTICLES VI, VII, AND IX OF CHAPTER 25-STREETS, SIDEWALKS, AND OTHER PUBLIC PLACES OF THE CITY OF PORTLAND CODE OF ORDINANCES.
23. ALL SEWER CONSTRUCTION IN THE PUBLIC WAY SHALL BE COMPLETED IN ACCORDANCE WITH ARTICLE II OF CHAPTER 24-SEWERS OF THE CITY OF PORTLAND CODE OF ORDINANCES.
24. ALL WATER DISTRIBUTION CONSTRUCTION IN THE PUBLIC WAY SHALL BE COMPLETED IN ACCORDANCE WITH PORTLAND WATER DISTRICT STANDARDS.
25. CONTACT CITY OF PORTLAND ARBORIST AND ENGINEER PRIOR TO CUTTING ROOTS, TRIMMING BRANCHES, OR DISTURBING TREES WITHIN THE R.O.W. THAT NOT HAVE BEEN NOTED FOR REMOVAL ON THE PLANS.
26. WORK WITHIN PUBLIC RIGHT-OF-WAY SHALL COMPLY WITH APPLICABLE MUNICIPAL AND STATE REQUIREMENTS.
27. ALL STORMWATER MANAGEMENT AND SOIL EROSION AND SEDIMENT CONTROL FEATURES INCLUDED IN THE PROJECT ARE THE RESPONSIBILITY OF THE CONTRACTOR, THIS INCLUDES, BUT IS NOT LIMITED TO, SILT FENCE, STABILIZED CONSTRUCTION ENTRANCE, WATER QUALITY STRUCTURE, STORM INLET PROTECTION, SUBSURFACE DRAINAGE PIPES AND LAND GRADING.
28. THE PROJECT SHALL COMPLY WITH THE LATEST EROSION AND SEDIMENTATION CONTROL REQUIREMENTS OF THE CITY OF PORTLAND AS DOCUMENTED IN CHAPTER 32 OF THE CITY OF PORTLAND CODE OF ORDINANCES.
29. PROPERLY PROTECT AND DO NOT DISTURB PROPERTY IRONS, MONITORING WELLS, AND MONUMENTS. IF DISTURBED, THE PROPERTY MONUMENT WILL BE RESET AT THE CONTRACTOR'S EXPENSE BY A REGISTERED LAND SURVEYOR APPROVED BY THE ENGINEER.
30. ALL MATERIAL SHALL BE FURNISHED BY CONTRACTOR UNLESS OTHERWISE NOTED.
31. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF ALL DIMENSIONS PRIOR TO START OF CONSTRUCTION.
32. CLEAN AND/OR FLUSH ALL MANHOLES AND SITE PIPING AFTER THE WORK HAS BEEN COMPLETED. NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK.
33. RESTRICT ACCESS TO SITE THROUGH THE USE OF APPROPRIATE SIGNAGE, BARRIERS, FENCES, ETC. SITE SHALL BE LEFT WITH APPROPRIATE SAFETY MEASURES IN PLACE DURING NON-WORKING HOURS. NO TRENCH SHALL BE LEFT OPEN DURING NON-WORKING HOURS. SITE SAFETY IS THE RESPONSIBILITY OF CONTRACTOR, DURING BOTH WORKING AND NON-WORKING HOURS.
34. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL NECESSARY CONSTRUCTION PERMITS. PERMIT APPLICATIONS SHALL BE SUBMITTED WITH ADEQUATE TIME SO AS NOT TO DELAY CONSTRUCTION.
35. CONTRACTOR SHALL SEQUENCE THE WORK SO AS TO MAINTAIN UTILITY SERVICES FOR EXISTING OPERATIONS ON AND ADJACENT TO THE SITE. CONTRACTOR SHALL PROVIDE A PLAN FOR TEMPORARY UTILITY SERVICES OR AS REQUIRED. THE PLAN SHALL BE STAMPED BY A PROFESSIONAL ENGINEER AND SUBMITTED TO OWNER, ENGINEER AND UTILITY FOR ACCEPTANCE A MINIMUM OF 14 DAYS PRIOR TO START OF UTILITY WORK.
36. EXISTING FACILITIES (I.E. SIGNS, POLES, LIGHT POSTS, ETC.) SHALL BE REMOVED AND PROTECTED DURING CONSTRUCTION. OWNER RETAINS RIGHT TO KEEP ANY AND ALL REMOVED FACILITIES. CONTRACTOR SHALL DISPOSE OF ANY REMOVED FACILITY AT THE REQUEST OF CITY AT CONTRACTOR'S EXPENSE.
37. A COMPLETE SET OF "RECORD" DRAWINGS THAT REFLECT ANY AND ALL MODIFICATIONS TO THE SANITARY SEWER SYSTEM, WATER DISTRIBUTION SYSTEM, STORM SEWER SYSTEM AND ANY OTHER UTILITY INSTALLATIONS OR ALTERATIONS WITHIN THE PROJECT LIMITS SHALL BE SUBMITTED TO THE CITY OF PORTLAND. THESE DRAWINGS SHALL BE SUBMITTED IN BOTH DIGITAL (ACAD) AND HARD COPY FORMAT AS DEFINED IN THE SPECIFICATIONS PRIOR TO PAYMENT OF FINAL RETAINAGE.
38. CAPPED PIPE STUB LOCATIONS SHALL BE MARKED WITH EMBEDDED STAKE AND A MINIMUM OF THREE TIES SHALL BE RECORDED. EMBEDDED STAKE SHALL BE 2X4 WITH PK NAIL DRIVEN IN TOP, LENGTH AS REQUIRED TO SPAN FROM TOP OF PIPE TO 6" BELOW GRADE. LOCATION AND ELEVATION OF PIPE STUB SHALL BE PROVIDED. WARNING TAPE AND WIRE SHALL BE INSTALLED OVER PIPE STUBS IN ACCORDANCE WITH SPECIFICATIONS.
39. A DEWATERING PLAN SHALL BE SUBMITTED TO THE CITY OF PORTLAND WATER RESOURCE COMPLIANCE COORDINATOR PRIOR TO ANY EXCAVATION WORK AND DEWATERING ACTIVITIES IN ACCORDANCE WITH CITY OF PORTLAND RULES AND REGULATIONS FOR USE OF THE SEWER SYSTEM CHAPTER 8.

UTILITIES NOTES

1. ALL PROPOSED UTILITIES (WATER, ELECTRIC, SANITARY, STORM SEWER, ETC.) AND THEIR CONNECTIONS, DISCONNECTION AND RELOCATION OF EXISTING UTILITIES SHALL BE COMPLETED IN ACCORDANCE WITH THE REQUIREMENTS OF THE UTILITY COMPANY HAVING JURISDICTION. ANY COORDINATION WITH THE MUNICIPALITY AND/OR UTILITY COMPANY, PERMITS OR APPROVALS REQUIRED SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
2. PIPE FOR SANITARY SEWER GRAVITY LINES AND FITTINGS SHALL BE PVC.
3. UNLESS OTHERWISE SPECIFIED, PIPE FOR WATER SUPPLY LINES SHALL BE DUCTILE IRON.
4. THE MINIMUM COVER OVER PROPOSED WATER LINES SHALL BE 4 FEET.
5. THE LOCATION OF ALL EXISTING WATER SERVICE LINES AS SHOWN ARE APPROXIMATE.
6. CONDUIT FOR ELECTRIC LINES SHALL BE WATER-TIGHT IN ADDITION TO CONFORMING TO UTILITY COMPANY REQUIREMENTS.
7. REFER TO ELECTRICAL DRAWINGS FOR ELECTRICAL WIRING DIAGRAMS, SCHEDULES, CONDUIT MATERIAL, POWER CONNECTIONS AND ENERGIZATION AND ALL OTHER APPURTENANCES RELATED TO ELECTRICAL WORK FOR THIS PROJECT.
8. ALL PROPOSED ELECTRICAL AND LIGHTING WORK SHOWN ON THESE CIVIL DRAWINGS SHALL BE COORDINATED WITH THE ELECTRICAL PLANS AND SPECIFICATIONS. IN THE EVENT THERE IS A DISCREPANCY BETWEEN THE CIVIL AND ELECTRICAL DRAWINGS, THE ENGINEER SHALL BE NOTIFIED IN WRITING.
9. PROVIDE END CAPS ON ALL UNDERDRAIN PIPING EXCEPT WHERE DAYLIGHTED, UNLESS OTHERWISE NOTED.
10. INSTALL THRUST BLOCKS AT ALL BENDS IN FORCEMAIN AND WATER MAIN. SEE CIVIL DETAIL.
11. WHEREVER POSSIBLE, PROVIDE 10 FOOT HORIZONTAL SEPARATION BETWEEN WATER AND SEWER LINES. WHEN THIS HORIZONTAL SEPARATION IS NOT POSSIBLE, INSTALL SEWER LINE AT LEAST 18 INCHES BETWEEN BOTTOM OF WATER LINE AND TOP OF SEWER.
12. FOR SEWER LINE CROSSING WATER LINE TRENCHES, PROVIDE AT LEAST 18 INCHES BETWEEN BOTTOM OF WATER LINE AND TOP OF SEWER.
13. INSULATE ALL SEWER, FORCEMAINS AND WATER MAINS WHICH HAVE LESS THAN 4 FEET OF COVER OR WHERE DIRECTED BY THE ENGINEER. RIGID INSULATION REQUIRED: 2" THICK, BY 4' WIDE, UNLESS OTHERWISE NOTED. COSTS ASSOCIATED WITH INSULATION ARE INCIDENTAL TO CONTRACT.
14. BACKFLOW PREVENTERS ARE TO BE PROVIDED AT ALL SEWER SERVICES AND FOUNDATION DRAIN CONNECTIONS

DEMOLITION NOTES

1. PRIOR TO THE START OF DEMOLITION, THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND/OR APPROVALS FROM THE CITY OF PORTLAND, AND ALL OTHER AUTHORITIES HAVING JURISDICTION.
2. CONSTRUCTION/DEMOLITION DEBRIS NOT APPROVED FOR REUSE ON-SITE, SHALL BE REMOVED AND DISPOSED OFF SITE IN ACCORDANCE WITH THE REQUIREMENTS OF ALL AUTHORITIES HAVING JURISDICTION. WASTE MANIFEST FORMS DOCUMENTING PROPER OFF-SITE DISPOSAL SHALL BE PROVIDED TO THE SITE/CIVIL ENGINEER AND THE CITY OF PORTLAND.
3. PRIOR TO THE START OF DEMOLITION, THE CONTRACTOR SHALL VERIFY THE LOCATION OF EXISTING UTILITIES TO BE DEMOLISHED OR TO REMAIN PROTECTED DURING CONSTRUCTION. IF ANY DISCREPANCIES ARE FOUND, THE CONTRACTOR SHALL NOTIFY THE OWNER IN WRITING OF THE CONFLICT.
4. THE CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES TO REMAIN, ANY TEMPORARY SHUT DOWNS REQUIRED TO FACILITATE THE PROPOSED CONSTRUCTION, WHICH MAY AFFECT USES ON ADJACENT PROPERTIES SHALL BE COORDINATED BY THE CONTRACTOR AND THE CITY OF PORTLAND.
5. CONTRACTOR SHALL REPAIR OR REPLACE ANY STRUCTURES OR UTILITIES DAMAGED DURING CONSTRUCTION, THE CONTRACTOR SHALL PROCEED WITH CAUTION WITHIN THE PROPOSED WORK AREA TO PREVENT ANY INTERRUPTION TO EXISTING UTILITY SERVICE.
6. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE A MAINTENANCE AND PROTECTION OF TRAFFIC (MPT) PLAN IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REQUIREMENTS.
7. CONTRACTOR SHALL COVER CONSTRUCTION DUMPSTERS AND ROLL-OFF CONTAINERS, AND STORE ALL CONSTRUCTION CHEMICALS INSIDE THE CONSTRUCTION TRAILER OR UNDER A COVERED AREA DURING PERIODS WHEN CONSTRUCTION CEASES.

LANDSCAPING NOTES

1. ALL PLANT MATERIAL SHALL BE FIRST QUALITY STOCK. PLANT MATERIAL, SIZE, GRADING AND METHODS OF INSTALLATION SHALL COMPLY TO THE LATEST EDITION OF THE AMERICAN NURSERY AND LANDSCAPE ASSOCIATION, AMERICAN STANDARD FOR NURSERY STOCK. REFER TO PROJECT SPECIFICATIONS FOR ADDITIONAL LANDSCAPING INFORMATION.
2. ALL PLANTING BEDS SHALL BE MULCHED WITH 4" OF TYPE MULCH OR AS NOTED ON LANDSCAPE PLANS, MULCH SHALL BE CLEAN, NON-DYED, TOXIC FREE, MATERIAL.
3. AREAS NOT SPECIFIED AS BEING PLANTED WITH TREES, SHRUBS, OR GROUND COVER AND NOT OCCUPIED BY PAVEMENT, CONCRETE OR BUILDING SHALL BE LAWN.
4. ALL STOCK SHALL BE BALLED AND BURLAPPED OR CONTAINER GROWN STOCK, UNLESS OTHERWISE SPECIFIED.
5. CONTRACTOR SHALL USE AN EDGING TOOL TO ENSURE A FINE SEPARATION BETWEEN MULCH AND GRASS.
6. SEE LANDSCAPING PLANS FOR INFORMATION ON ALL PLANTING MATERIALS.

GRADING AND DRAINAGE NOTES

1. CASTINGS FOR EXISTING STRUCTURES TO REMAIN AND PROPOSED STRUCTURES SHALL BE SET TO THE PROPOSED ELEVATIONS SHOWN ON THE DRAWINGS.
2. THE FILLING OF SOIL OVER THE ROOTS OF TREES TO BE PRESERVED IS PROHIBITED.
3. UNSUITABLE FILL AND BACKFILL MATERIALS ARE MATERIALS CONTAINING EXCESSIVE AMOUNT OF WATER, PLASTIC, CLAY, VEGETATION, ORGANIC MATTER, DEBRIS, PAVEMENT, STONES OR BOULDERS OVER 6 INCHES IN GREATEST DIMENSION, FROZEN MATERIAL, AND MATERIAL WHICH, IN THE OPINION OF THE ENGINEER, WILL NOT PROVIDE A SUITABLE FOUNDATION OR SUBGRADE.
4. SUITABLE SOIL SHALL BE PLACED IN LAYERS TO THE REQUIRED ELEVATIONS AS SHOWN ON THE DRAWINGS. FILL, BACKFILL AND COMPACT TO PRODUCE MINIMUM SUBSEQUENT SETTLEMENT OF THE MATERIAL AND PROVIDE ADEQUATE SUPPORT FOR THE SURFACE TREATMENT OR STRUCTURE TO BE PLACED ON THE MATERIAL. PLACE MATERIAL IN APPROXIMATELY HORIZONTAL LAYERS OF BEGINNING AT LOWEST AREA TO BE FILLED. DO NOT IMPAIR DRAINAGE. DO NOT USE ON-SITE TOPSOIL AS FILL MATERIAL.
5. CONTRACTOR SHALL PLACE BACKFILL AND FILL MATERIALS IN LAYERS NOT MORE THAN 12 INCHES IN LOOSE DEPTH FOR MATERIAL COMPACTED BY HEAVY COMPACTION EQUIPMENT, OR BY HAND-OPERATED TAMPERS. DO NOT PLACE BACKFILL OR FILL MATERIAL ON SURFACES THAT ARE MUDDY, FROZEN, OR CONTAIN FROST OR ICE.
6. FOR GROUND SURFACE PREPARATION, CONTRACTOR SHALL REMOVE VEGETATION, DEBRIS, UNSUITABLE SOIL MATERIALS, OBSTRUCTIONS, AND DELETERIOUS MATERIALS FROM GROUND SURFACE PRIOR TO PLACEMENT OF FILL. REMOVE MATERIAL TO THE FULL EXTENT OF ROOT PENETRATION. PROOF-ROLL EXISTING GROUND SURFACE PRIOR TO PLACEMENT OF FILL TO PROVIDE A DENSE, STABLE BASE FOR THE FIRST LIFTS OF THE STRUCTURAL FILL.
7. CONTRACTOR SHALL COMPACT ALL MATERIAL TO THE FOLLOWING MINIMUM MODIFIED PROCTOR DENSITIES:

FILL AND BACKFILL LOCATION	DENSITY
UNDER ROADWAY AND PARKING AREA	95%
LAWN AREAS	95%

8. PRIOR TO THE START OF CONSTRUCTION, CONTRACTOR SHALL DIG TEST PITS TO VERIFY THE LOCATION OF ALL EXISTING UNDERGROUND UTILITIES. CONTRACTOR SHALL VERIFY LOCATION AND ELEVATION OF ALL EXISTING UTILITIES AT PROPOSED UTILITY CROSSINGS, AND ADVISE THE ENGINEER IN WRITING OF ANY DISCREPANCIES.
9. ALL PROPOSED UTILITIES AND THEIR CONNECTIONS, DISCONNECTION AND RELOCATION OF EXISTING UTILITIES SHALL BE COMPLETED IN ACCORDANCE WITH THE REQUIREMENTS OF THE UTILITY COMPANY HAVING JURISDICTION. ANY COORDINATION WITH THE MUNICIPALITY AND/OR UTILITY COMPANY, PERMITS OR APPROVALS REQUIRED SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
10. UNLESS OTHERWISE SPECIFIED, PIPE FOR STORM DRAINS SHALL BE HDPE OR APPROVED EQUAL, WITH WATER TIGHT JOINTS.

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Woodard & Curran

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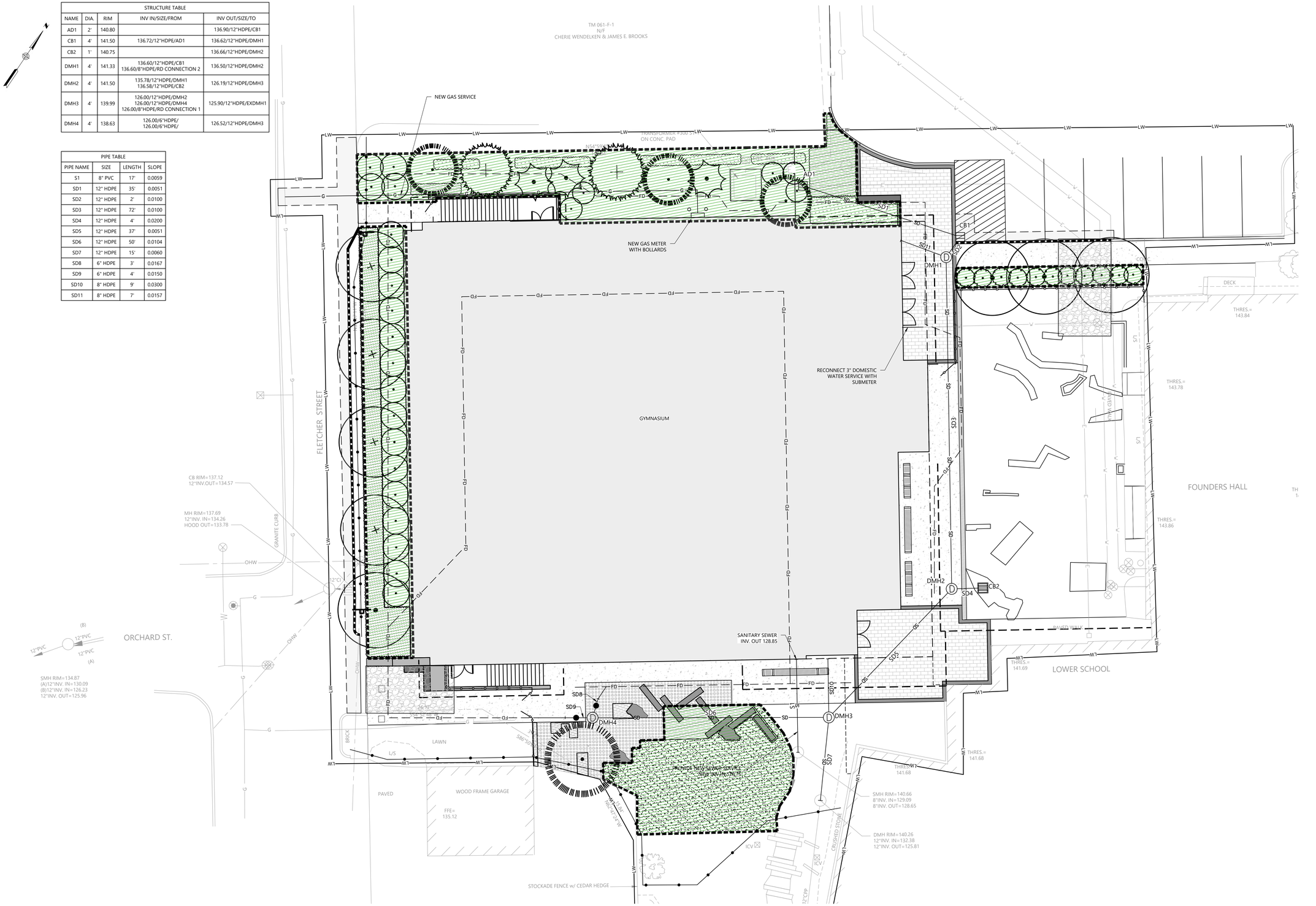
GENERAL NOTES

C-002

STRUCTURE TABLE				
NAME	DIA.	RIM	INV IN/SIZE/FROM	INV OUT/SIZE/TO
AD1	2'	140.80		136.90/12"HDPE/CB1
CB1	4'	141.50	136.72/12"HDPE/AD1	136.62/12"HDPE/DMH1
CB2	1'	140.75		136.66/12"HDPE/DMH2
DMH1	4'	141.33	136.60/12"HDPE/CB1 136.60/8"HDPE/RD CONNECTION 2	136.50/12"HDPE/DMH2
DMH2	4'	141.50	135.78/12"HDPE/DMH1 136.58/12"HDPE/CB2	126.19/12"HDPE/DMH3
DMH3	4'	139.99	126.00/12"HDPE/DMH2 126.00/12"HDPE/DMH4 126.00/8"HDPE/RD CONNECTION 1	125.90/12"HDPE/EXDMH1
DMH4	4'	138.63	126.00/6"HDPE/ 126.00/6"HDPE/	126.52/12"HDPE/DMH3

PIPE TABLE			
PIPE NAME	SIZE	LENGTH	SLOPE
S1	8" PVC	17'	0.0059
SD1	12" HDPE	35'	0.0051
SD2	12" HDPE	2'	0.0100
SD3	12" HDPE	72'	0.0100
SD4	12" HDPE	4'	0.0200
SD5	12" HDPE	37'	0.0051
SD6	12" HDPE	50'	0.0104
SD7	12" HDPE	15'	0.0060
SD8	6" HDPE	3'	0.0167
SD9	6" HDPE	4'	0.0150
SD10	8" HDPE	9'	0.0300
SD11	8" HDPE	7'	0.0157



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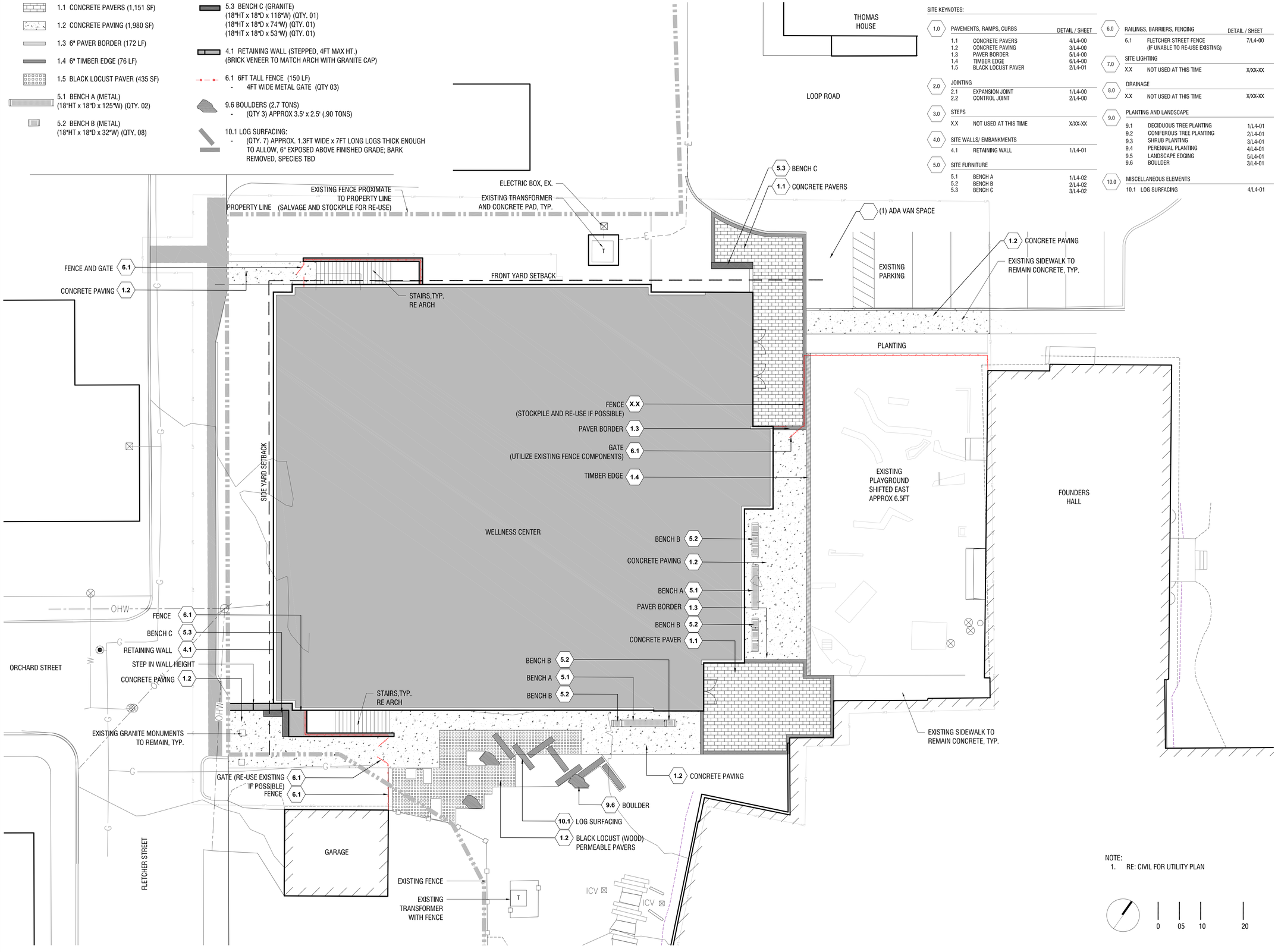
UTILITY PLAN

C-102

MATERIALS LEGEND

- 1.1 CONCRETE PAVERS (1,151 SF)
- 1.2 CONCRETE PAVING (1,980 SF)
- 1.3 6" PAVER BORDER (172 LF)
- 1.4 6" TIMBER EDGE (76 LF)
- 1.5 BLACK LOCUST PAVER (435 SF)
- 5.1 BENCH A (METAL)
  (18"HT x 18"D x 125"W) (QTY. 02)
- 5.2 BENCH B (METAL)
  (18"HT x 18"D x 32"W) (QTY. 08)
- 5.3 BENCH C (GRANITE)
  (18"HT x 18"D x 116"W) (QTY. 01)
  (18"HT x 18"D x 74"W) (QTY. 01)
  (18"HT x 18"D x 53"W) (QTY. 01)
- 4.1 RETAINING WALL (STEPPED, 4FT MAX HT.)
  (BRICK VENEER TO MATCH ARCH WITH GRANITE CAP)
- 6.1 6FT TALL FENCE (150 LF)
  - 4FT WIDE METAL GATE (QTY 03)
- 9.6 BOULDERS (2.7 TONS)
  - (QTY 3) APPROX 3.5' x 2.5' (.90 TONS)
- 10.1 LOG SURFACING:
  - (QTY. 7) APPROX. 1.3FT WIDE x 7FT LONG LOGS THICK ENOUGH TO ALLOW, 6" EXPOSED ABOVE FINISHED GRADE; BARK REMOVED, SPECIES TBD



NOTE:
1. RE: CIVIL FOR UTILITY PLAN

0 05 10 20

SITE KEYNOTES:

			DETAIL / SHEET
1.0	PAVEMENTS, RAMPS, CURBS		
	1.1	CONCRETE PAVERS	4/L4-00
	1.2	CONCRETE PAVING	3/L4-00
	1.3	PAVER BORDER	5/L4-00
	1.4	TIMBER EDGE	6/L4-00
	1.5	BLACK LOCUST PAVER	2/L4-01
2.0	JOINTING		
	2.1	EXPANSION JOINT	1/L4-00
	2.2	CONTROL JOINT	2/L4-00
3.0	STEPS		
	X.X	NOT USED AT THIS TIME	X/XX-XX
4.0	SITE WALLS/ EMBANKMENTS		
	4.1	RETAINING WALL	1/L4-01
5.0	SITE FURNITURE		
	5.1	BENCH A	1/L4-02
	5.2	BENCH B	2/L4-02
	5.3	BENCH C	3/L4-02
6.0	RAILINGS, BARRIERS, FENCING		DETAIL / SHEET
	6.1	FLETCHER STREET FENCE (IF UNABLE TO RE-USE EXISTING)	7/L4-00
7.0	SITE LIGHTING		
	X.X	NOT USED AT THIS TIME	X/XX-XX
8.0	DRAINAGE		
	X.X	NOT USED AT THIS TIME	X/XX-XX
9.0	PLANTING AND LANDSCAPE		
	9.1	DECIDUOUS TREE PLANTING	1/L4-01
	9.2	CONIFEROUS TREE PLANTING	2/L4-01
	9.3	SHRUB PLANTING	3/L4-01
	9.4	PERENNIAL PLANTING	4/L4-01
	9.5	LANDSCAPE EDGING	5/L4-01
	9.6	BOULDER	3/L4-01
10.0	MISCELLANEOUS ELEMENTS		
	10.1	LOG SURFACING	4/L4-01

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MATERIALS PLAN

L 2-00

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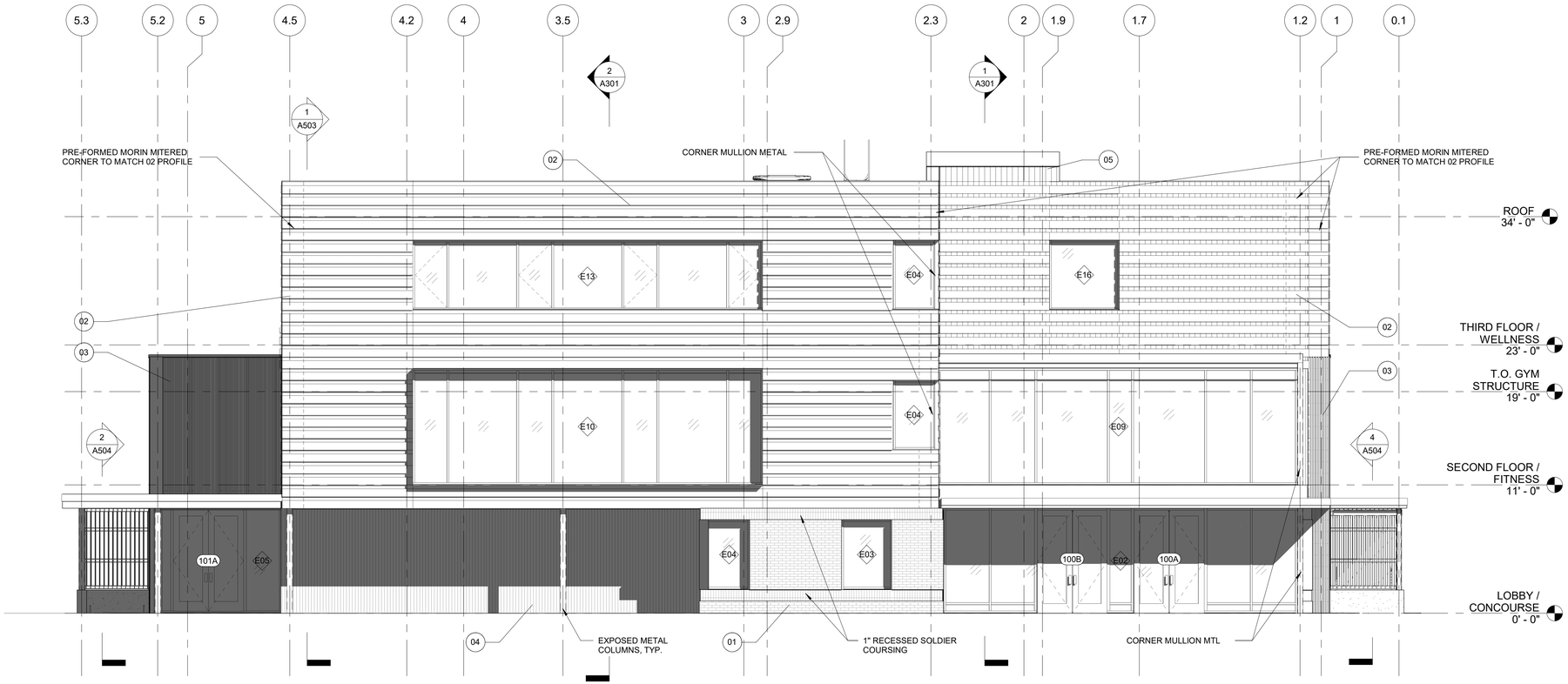
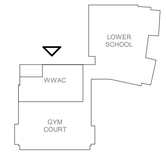


1 NORTH ELEVATION
3/16" = 1'-0"

EXTERIOR MATERIAL SCHEDULE				
NO.	DESCRIPTION/MANUFACTURER	SIZE	COLOR/FINISH	COMMENTS
01	BRICK MASONARY; MORIN BRICK OLD PORT FULL RANGE BLEND	3 5/8" X 3 5/8" X 7 5/8"	OLD PORT FULL BLEND	
02	HORIZONTAL METAL PANEL; MORIN CONCEALED MX-9	12"	BONE WHITE	
03	VERITICAL METAL PANEL; MORIN EXPOSED C-29 PROFILE A	29"	ZINC GRAY	
04	THERMALLY TREATED WOOD SHIPLAP; CAMBIA		UNCOATED NATURAL	
05	FLAT LOCK METAL PANEL; MORIN		ZINC GRAY	

KEY PLAN:



0 1' 5' 11' 21'
GRAPHIC SCALE

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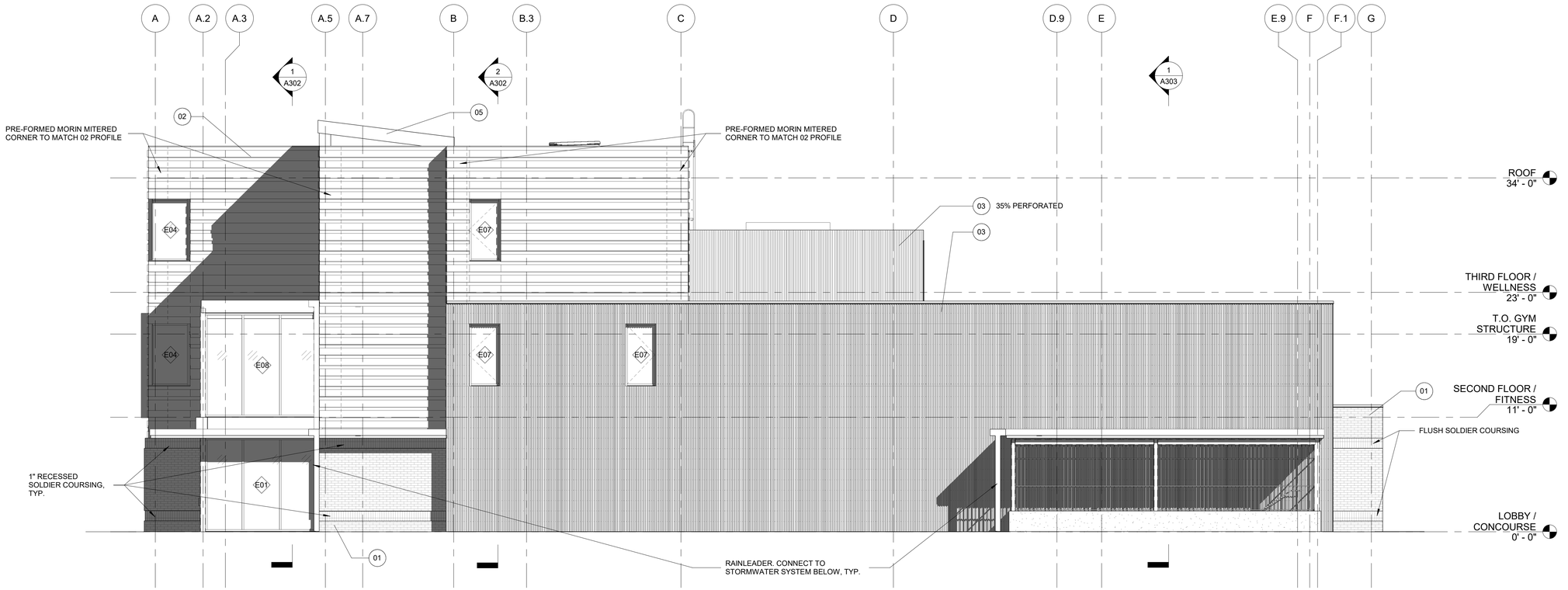
EXTERIOR ELEVATIONS

A201



1 WEST ELEVATION
3/16" = 1'-0"

EXTERIOR MATERIAL SCHEDULE				
NO.	DESCRIPTION/MANUFACTURER	SIZE	COLOR/FINISH	COMMENTS
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03	VERITICAL METAL PANEL; MORIN EXPOSED C-29 PROFILE A	29"	ZINC GRAY	
04	THERMALLY TREATED WOOD SHIPLAP; CAMBIA		UNCOATED NATURAL	
05	FLAT LOCK METAL PANEL; MORIN		ZINC GRAY	

KEY PLAN:

0 1' 5' 11' 21'
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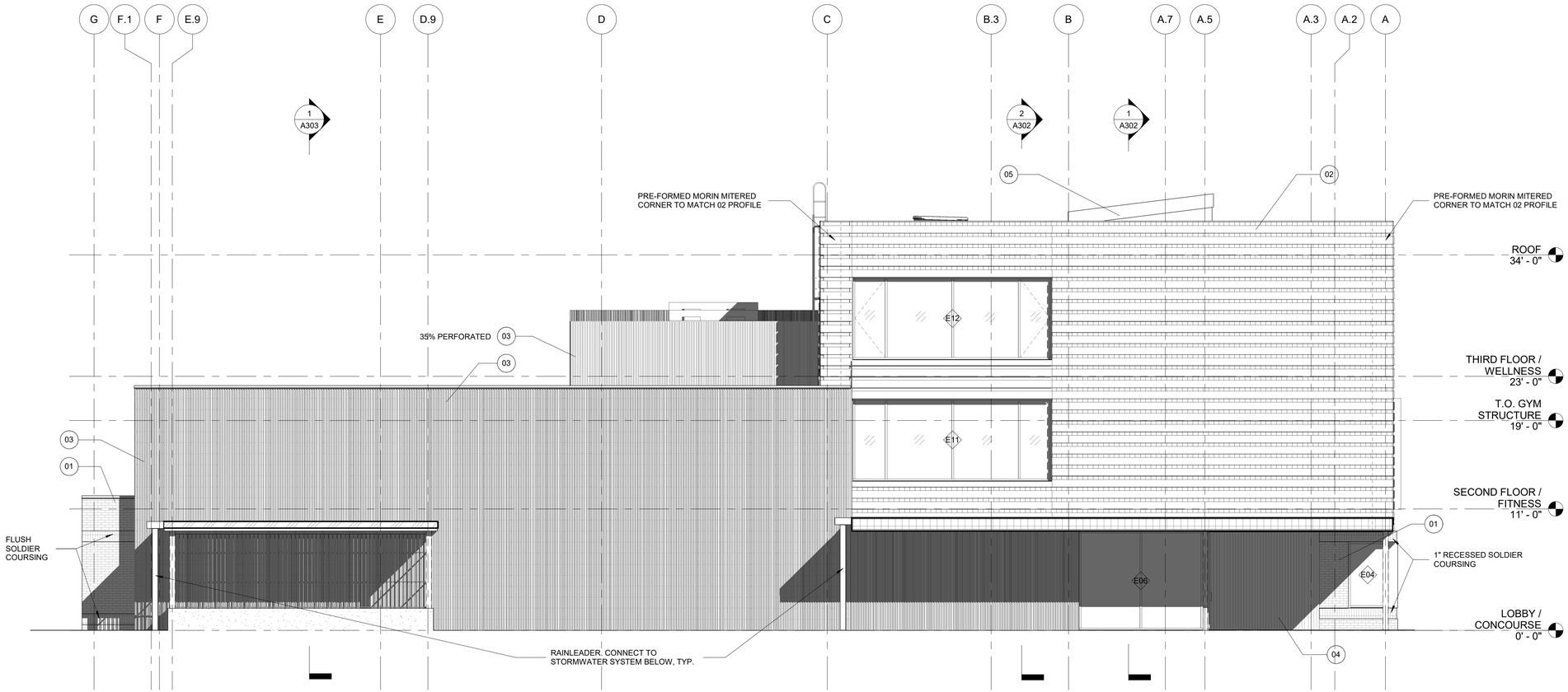
EXTERIOR ELEVATIONS

A202



1 EAST ELEVATION
3/16" = 1'-0"

EXTERIOR MATERIAL SCHEDULE

NO.	DESCRIPTION/MANUFACTURER	SIZE	COLOR/FINISH	COMMENTS
01	BRICK MASONARY; MORIN BRICK OLD PORT FULL RANGE BLEND	3 5/8" X 3 5/8" X 7 5/8"	OLD PORT FULL BLEND	
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04	THERMALLY TREATED WOOD SHIPLAP; CAMBIA		UNCOATED NATURAL	
05	FLAT LOCK METAL PANEL; MORIN		ZINC GRAY	

KEY PLAN:

0 1' 5' 11' 21'
GRAPHIC SCALE

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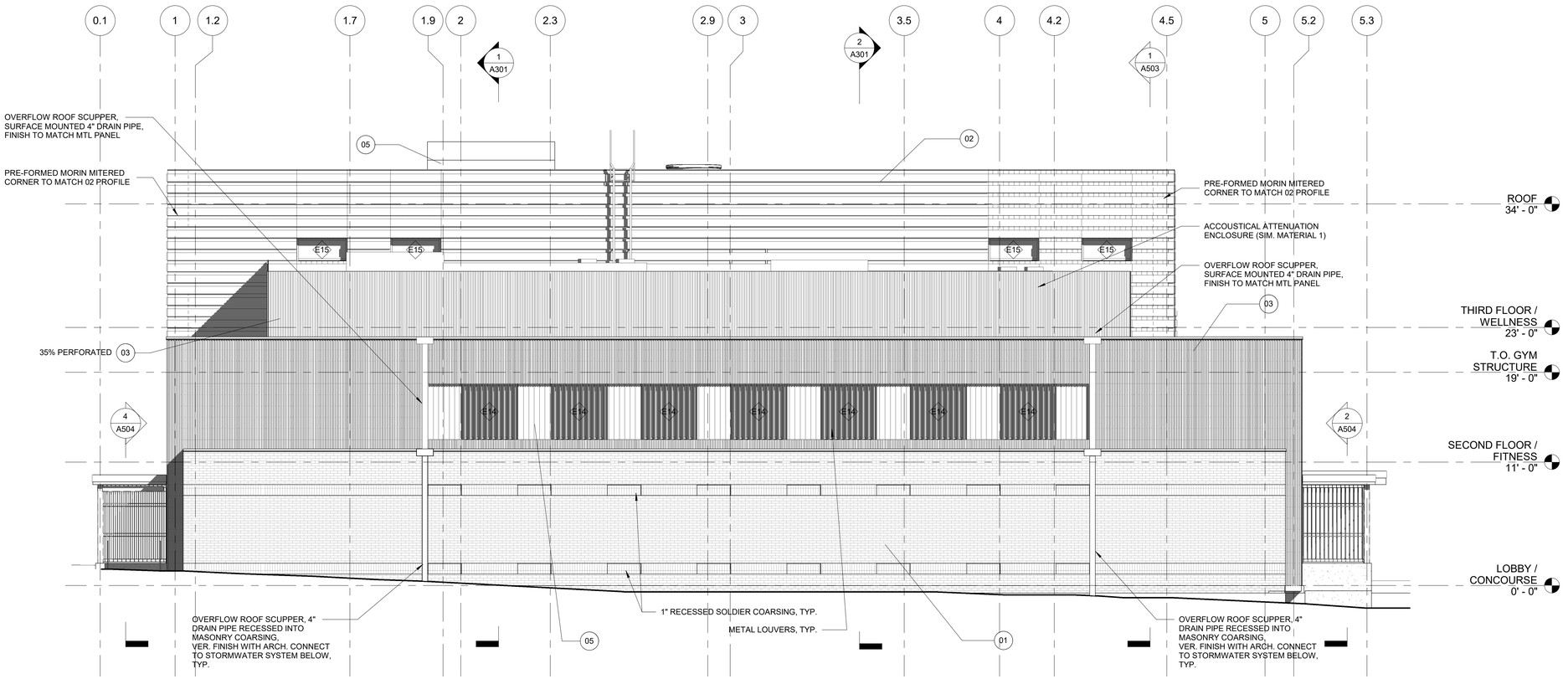
EXTERIOR ELEVATIONS

A203



1 SOUTH ELEVATION
3/16" = 1'-0"

EXTERIOR MATERIAL SCHEDULE				
NO.	DESCRIPTION/MANUFACTURER	SIZE	COLOR/FINISH	COMMENTS
01	BRICK MASONARY; MORIN BRICK OLD PORT FULL RANGE BLEND	3 5/8" X 3 5/8" X 7 5/8"	OLD PORT FULL BLEND	
02	HORIZONTAL METAL PANEL; MORIN CONCEALED MX-9	12"	BONE WHITE	
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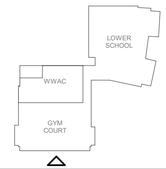
05	FLAT LOCK METAL PANEL; MORIN		ZINC GRAY	

KEY PLAN:



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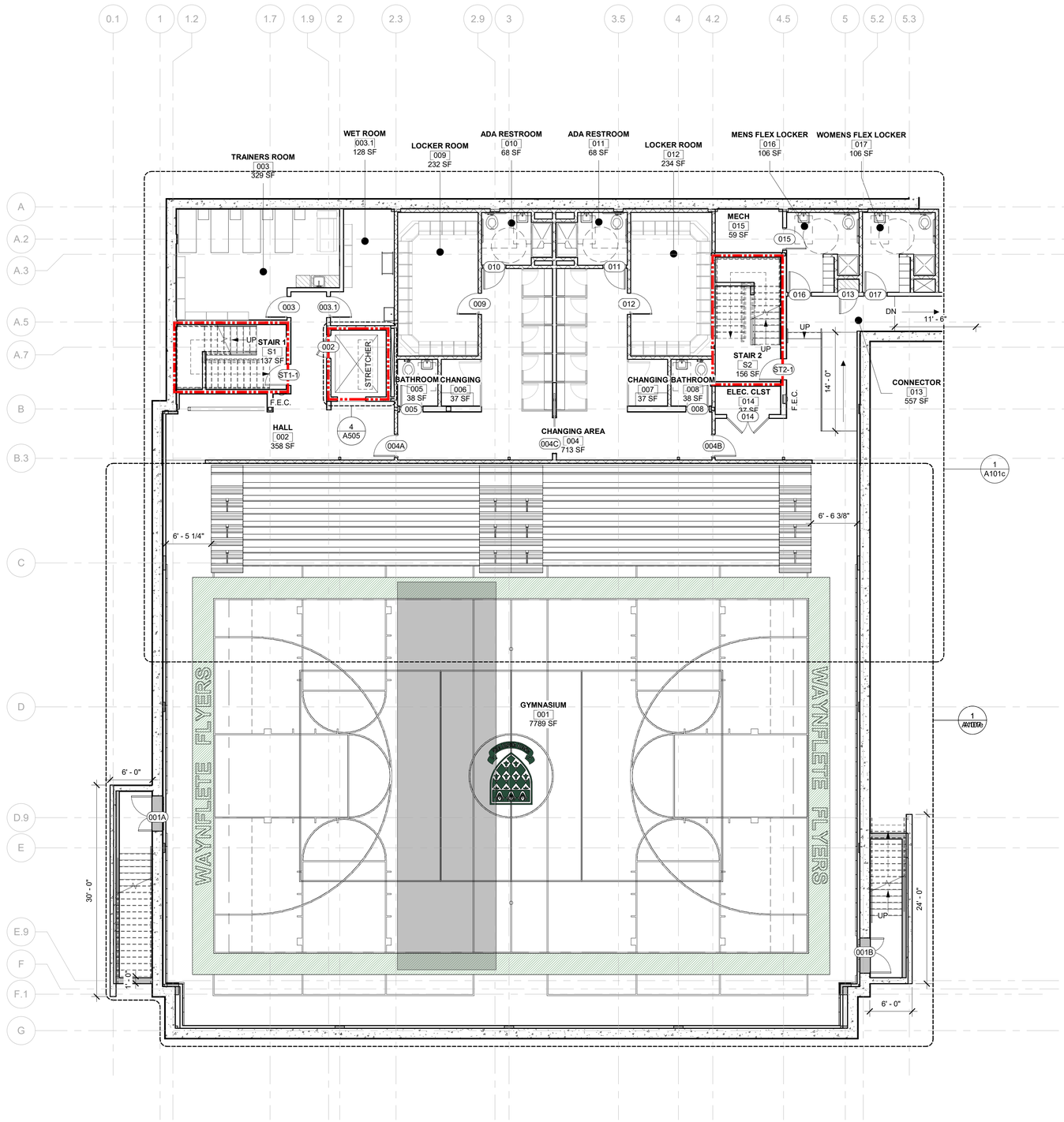
EXTERIOR ELEVATIONS

A204



1 OVERALL GYM FLOOR PLAN
1/8" = 1'-0"

TRUE

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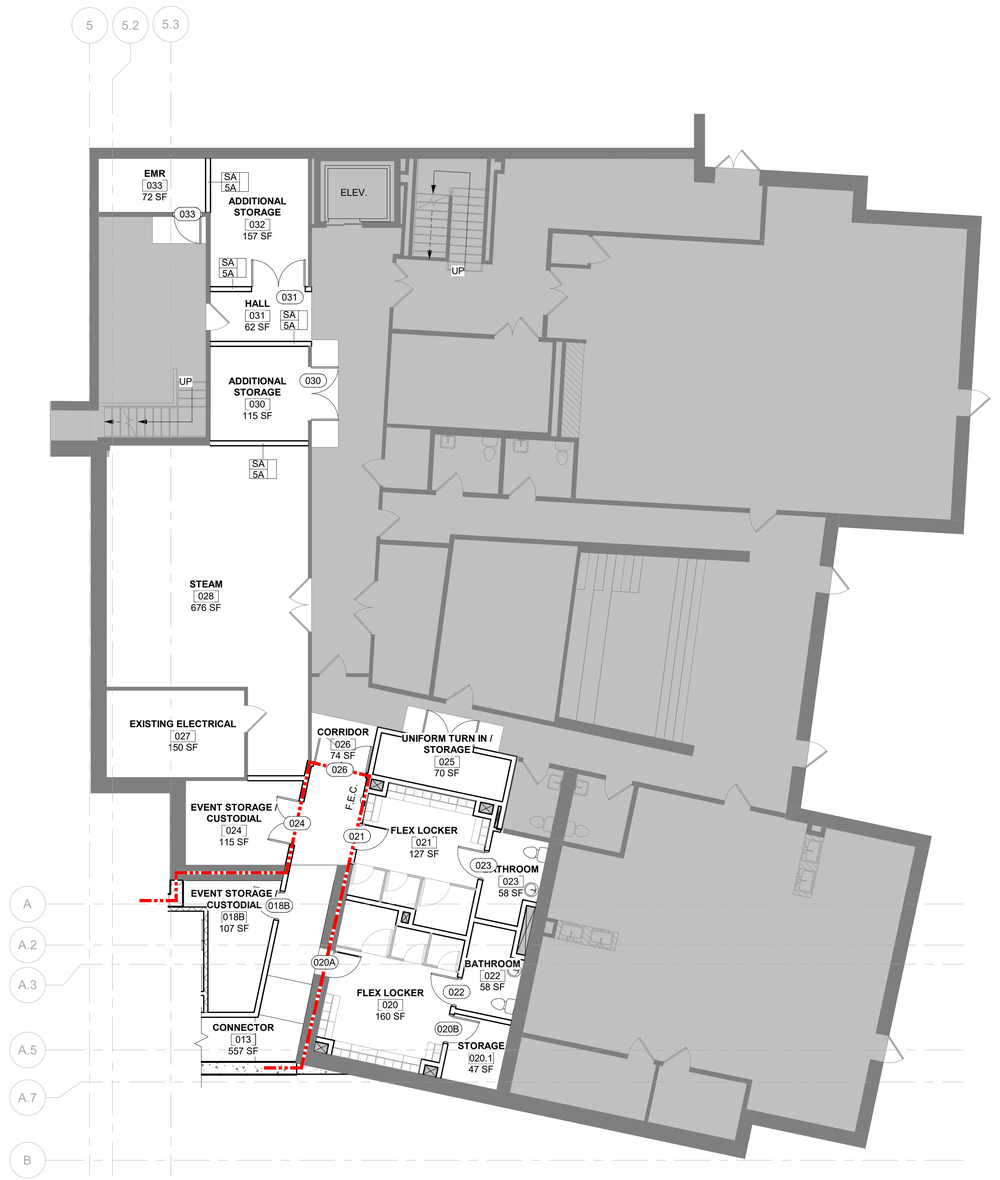
COURT LEVEL - OVERALL PLAN

A101a



1 OVERALL LOWER SCHOOL PLAN
1/8" = 1'-0"

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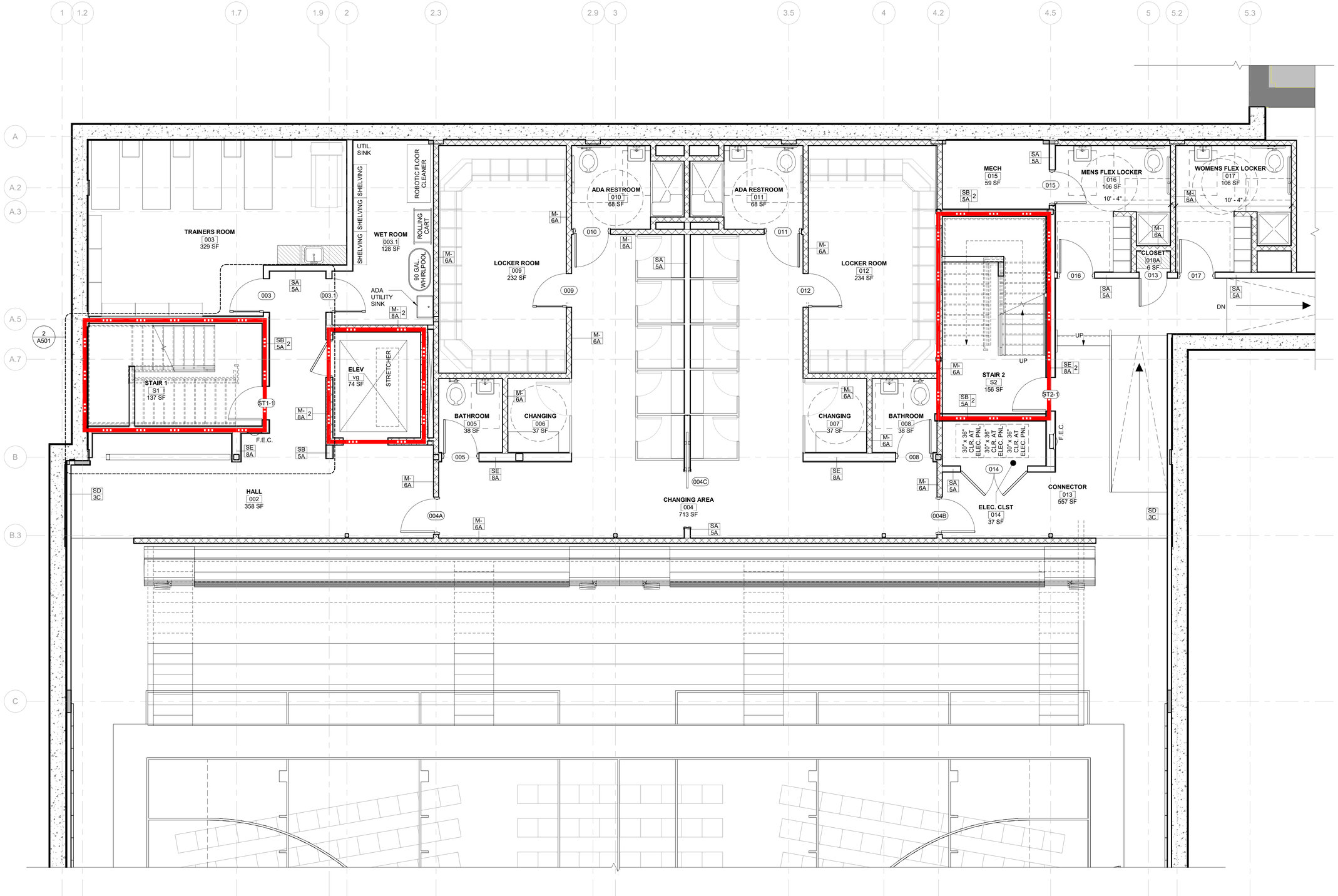
COURT LEVEL - OVERALL LS PLAN

A101b



1 FIRST FLOOR PLAN
1/4" = 1'-0"

GRAPHIC SCALE 0 1' 4' 8' 16'

TRUE

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Portland, Maine 04101
simonsarchitects.com
207.772.4656

PROJECT NAME:

WAYNFLETE WELLNESS + ATHLETIC CENTER

360 SPRING ST,
PORTLAND, ME 04102

SEAL:

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PROJECT NUMBER: 2017-0110
STATUS: 100% DESIGN DEVELOPMENT

COURT LEVEL - SUPPORT SPACES PLAN

A101c

1 FIRST FLOOR PLAN
1/4" = 1'-0"

GRAPHIC SCALE 0 4' 8' 16'

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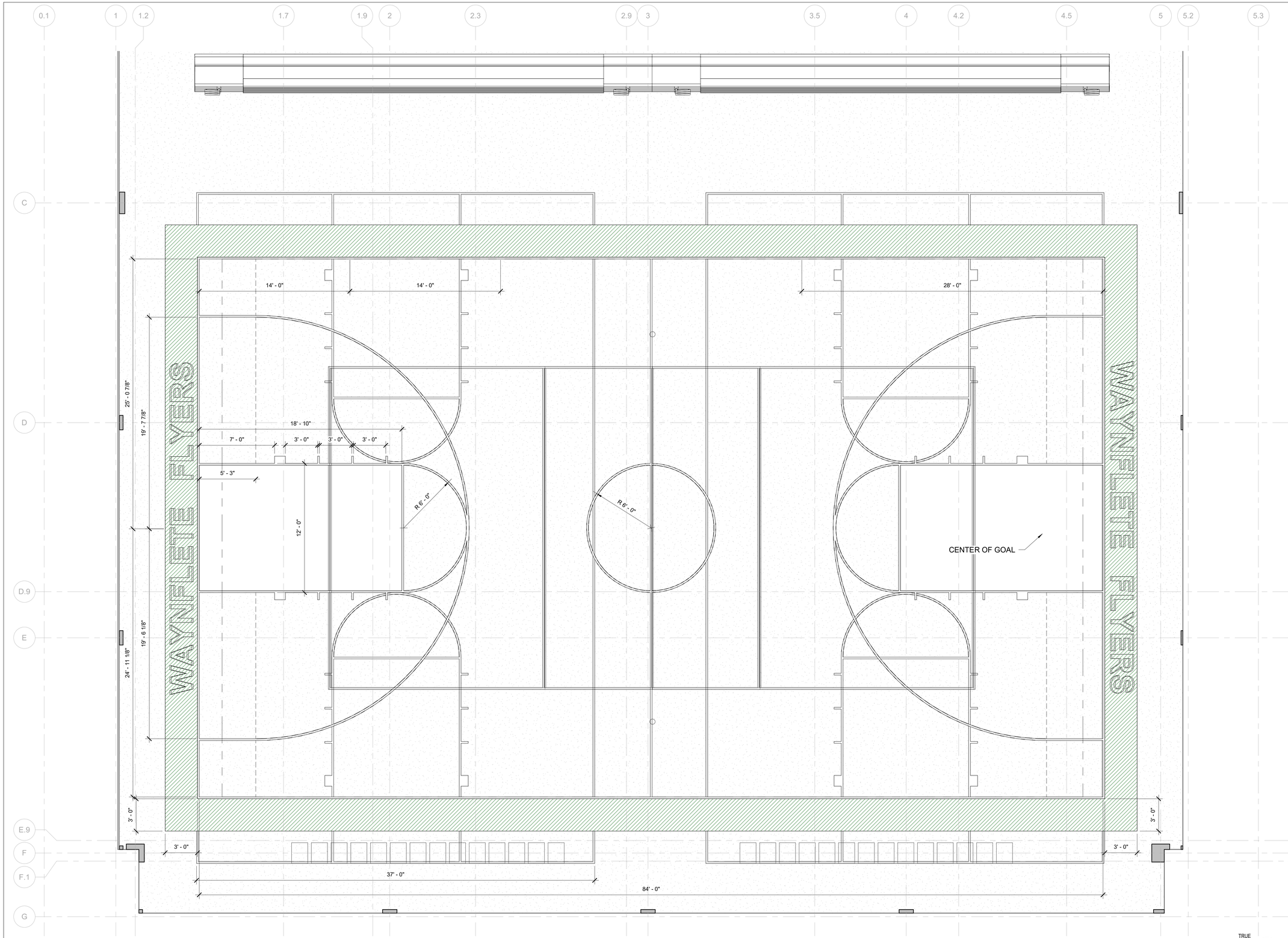
COURT LEVEL - LS CONNECTOR PLAN

A101d



1 GYMNASIUM LAYOUT PLAN
1/4" = 1'-0"

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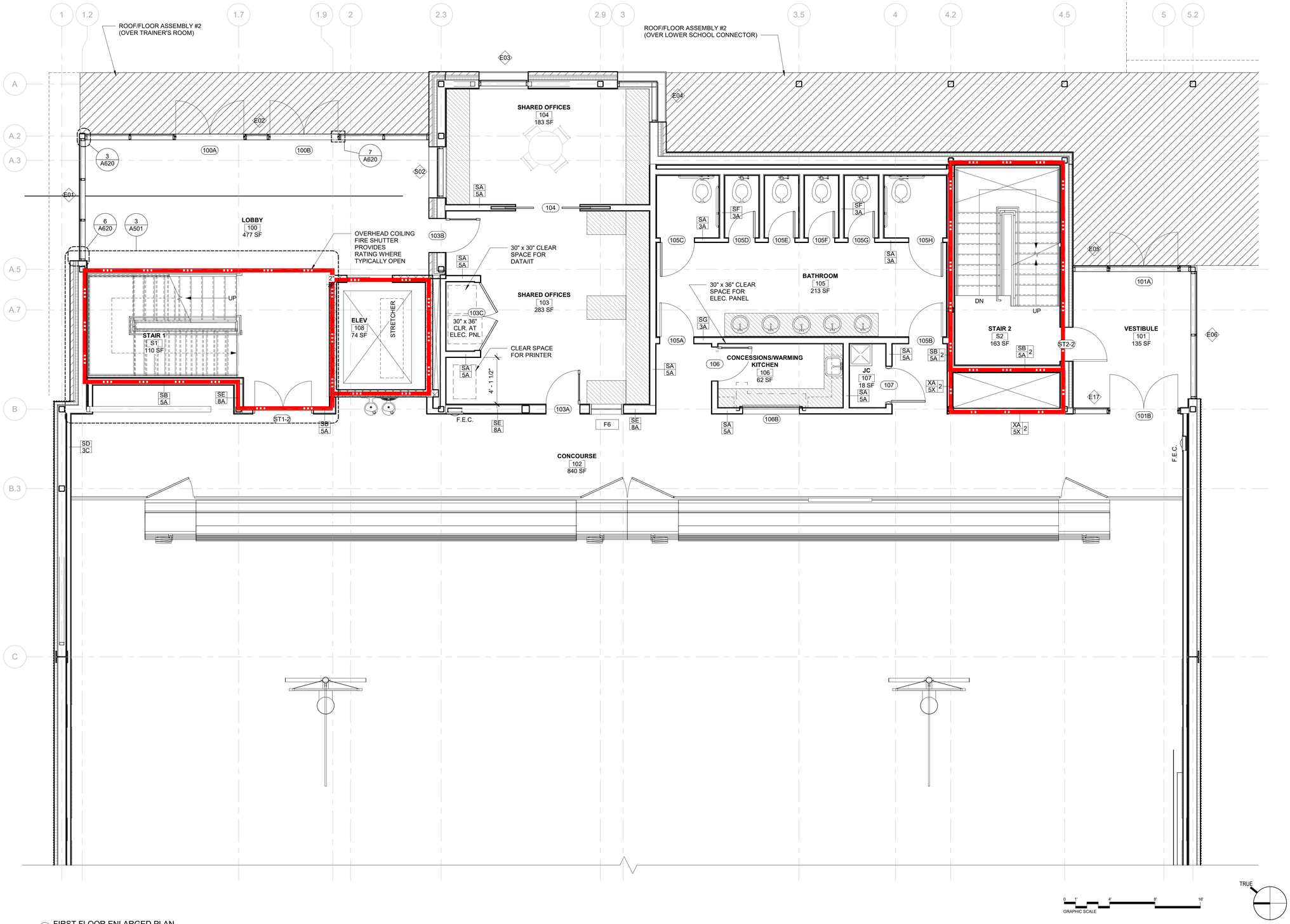
COURT LEVEL - COURT LAYOUT PLAN

A101e



1 FIRST FLOOR ENLARGED PLAN
1/4" = 1'-0"

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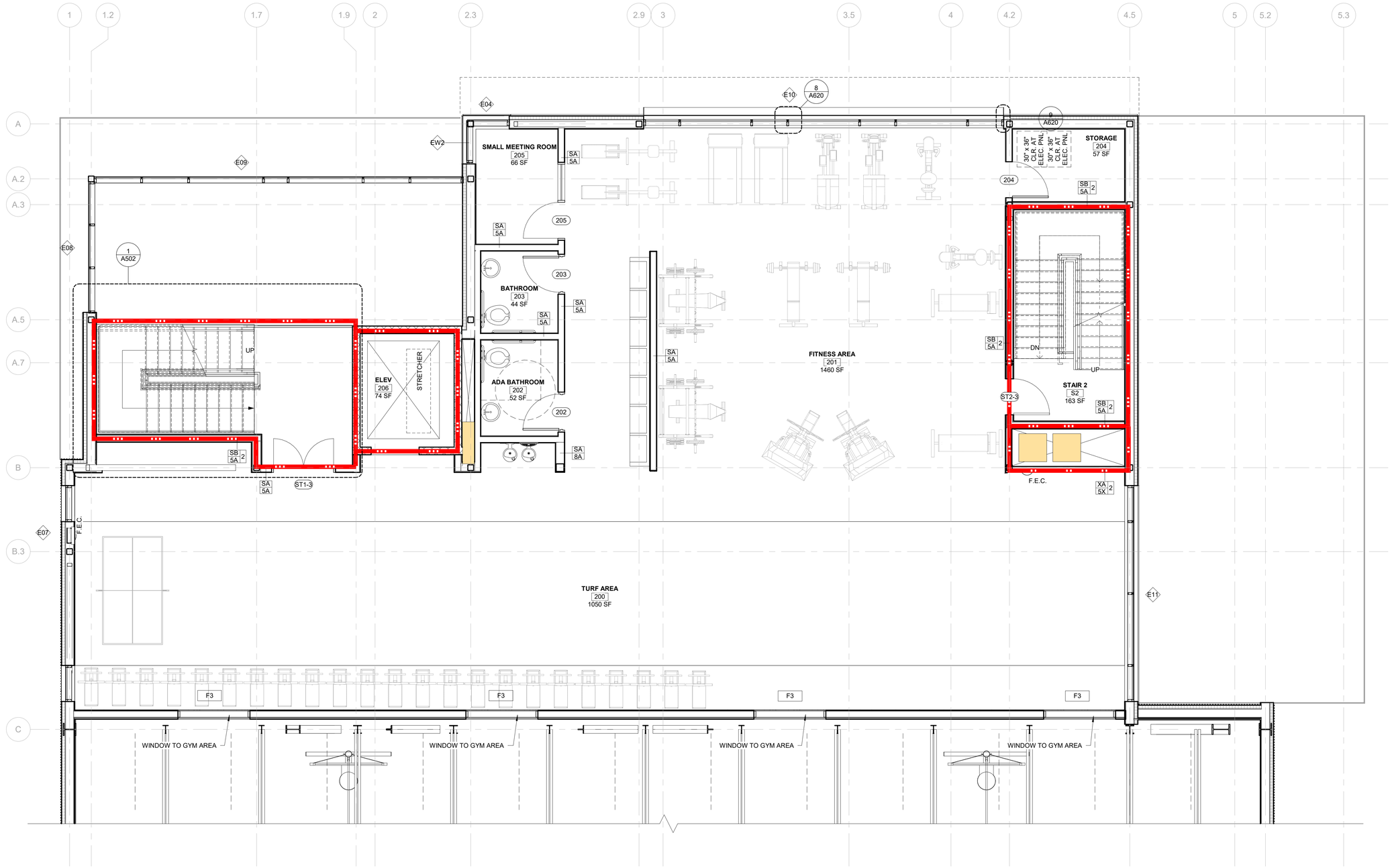
FIRST FLOOR - PLAN

A102



1 SECOND FLOOR PLAN
1/4" = 1'-0"

GRAPHIC SCALE 0 1' 4' 8' 16'

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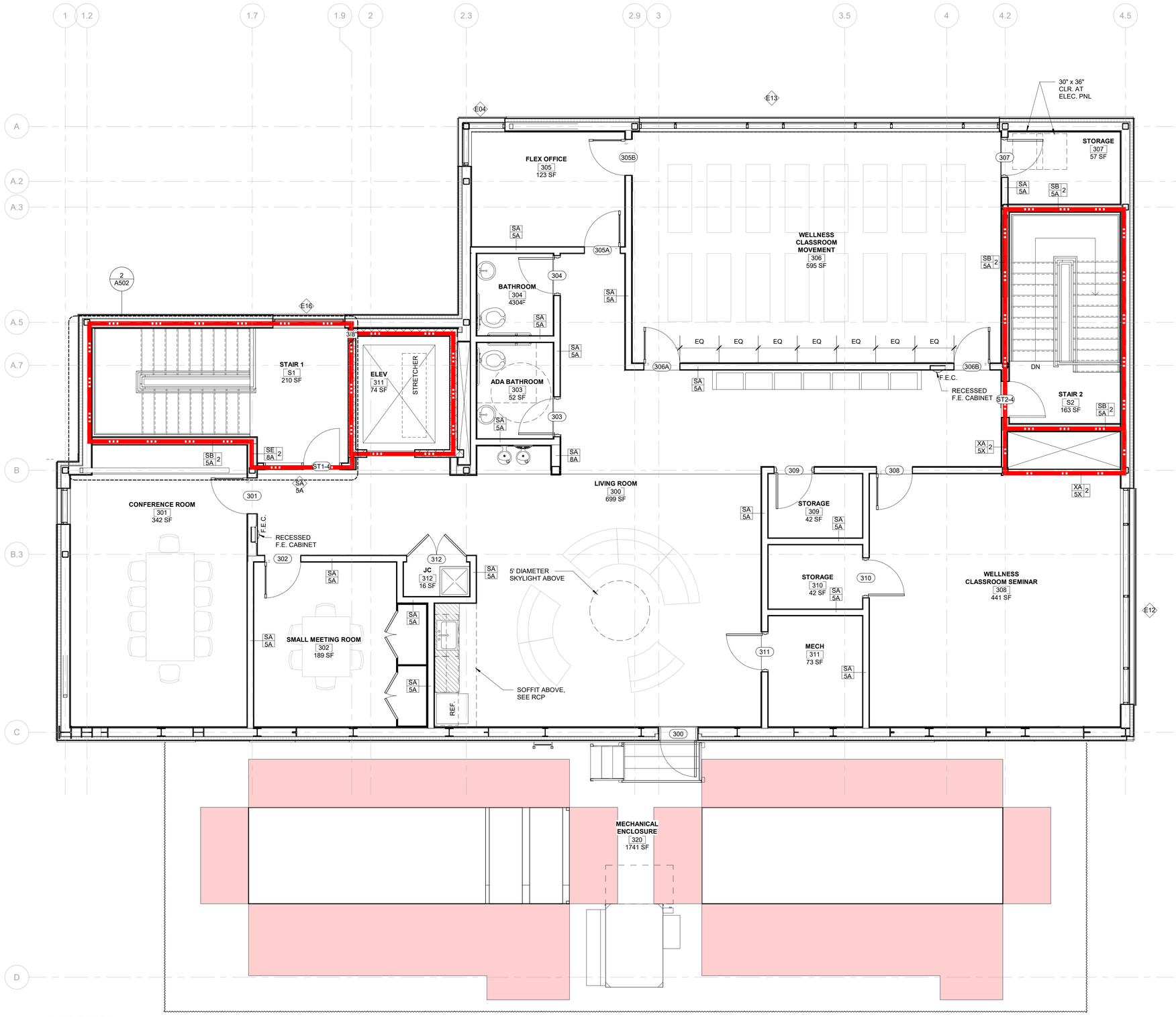
SECOND FLOOR - PLAN

A103



1 THIRD FLOOR PLAN
1/4" = 1'-0"

GRAPHIC SCALE 0 1' 4' 8' 16'

TRUE

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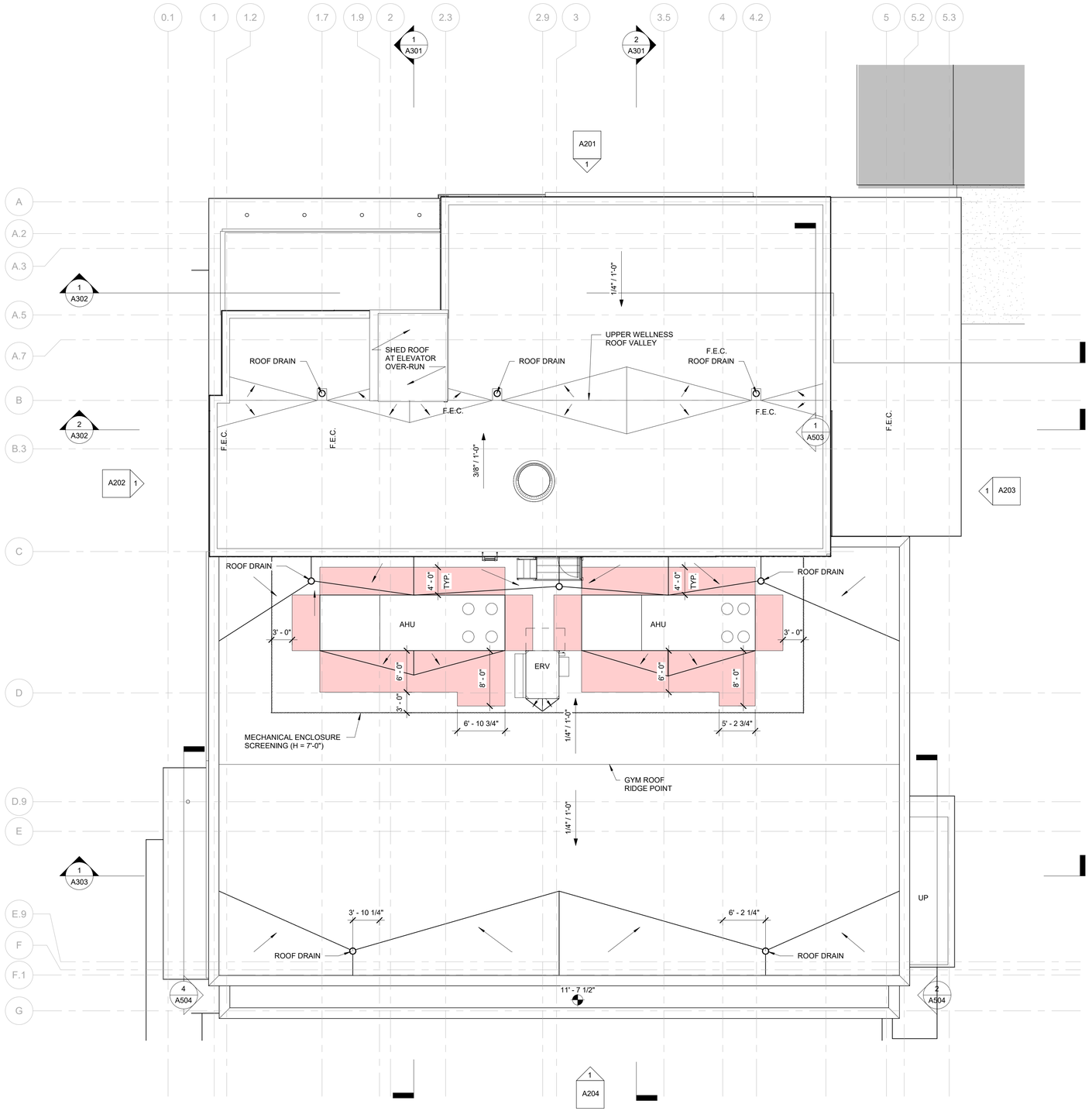
THIRD FLOOR - PLAN

A104



1 ROOF PLAN
1/8" = 1'-0"

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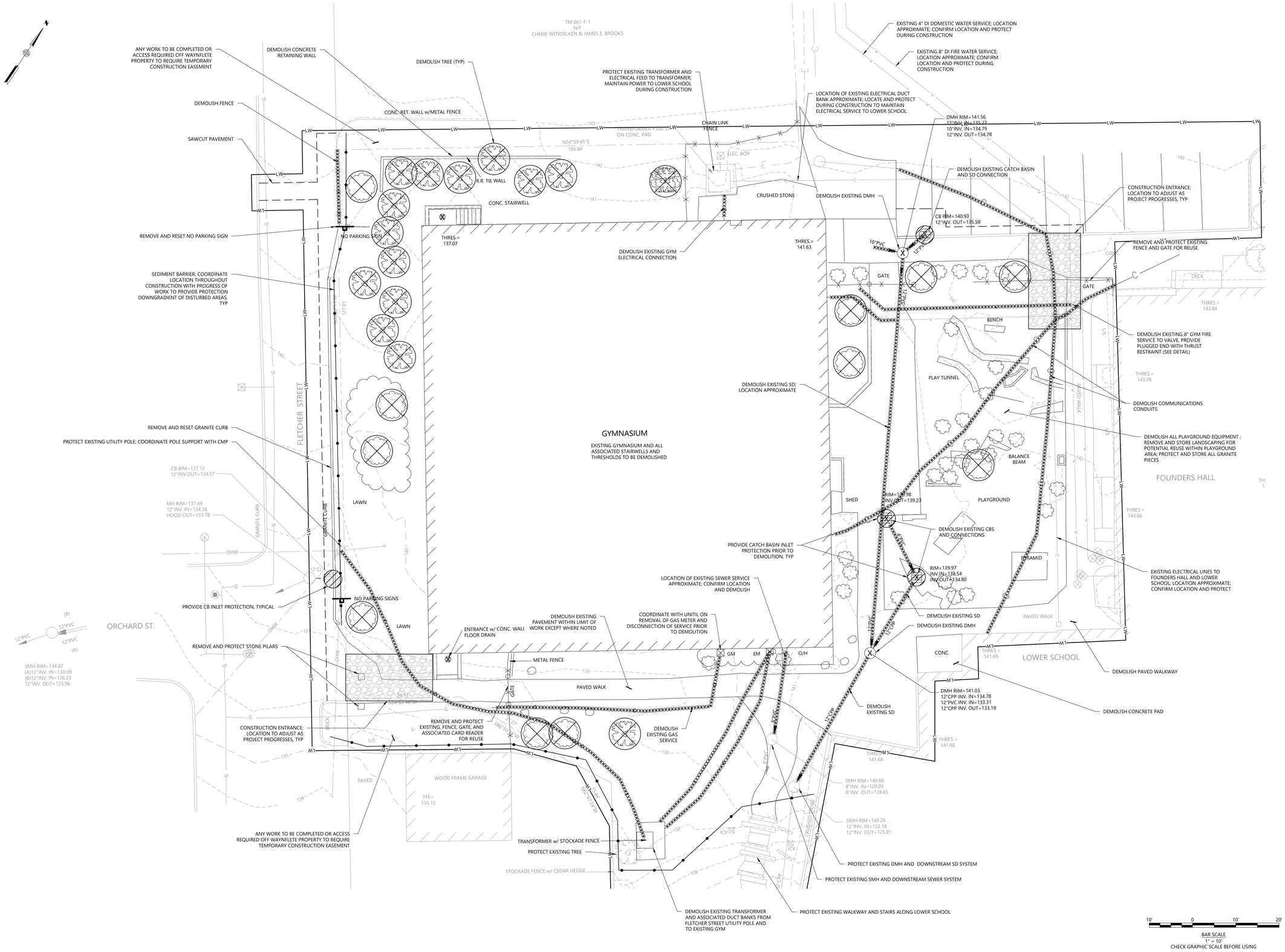
ROOF PLAN - OVERALL PLAN

A105

TRUE



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Woodard & Curran

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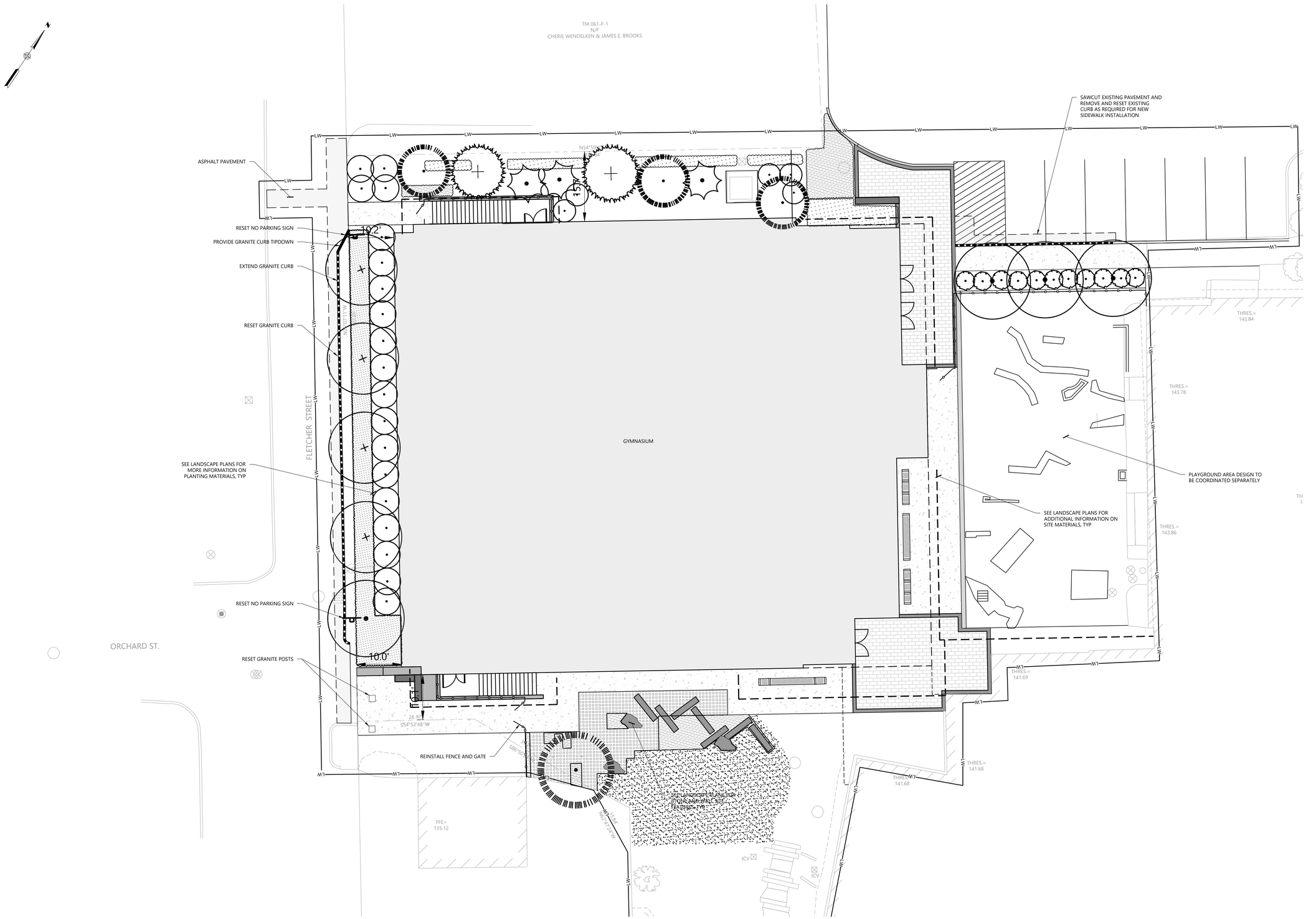
EXISTING CONDITIONS & DEMOLITION PLAN

C-003



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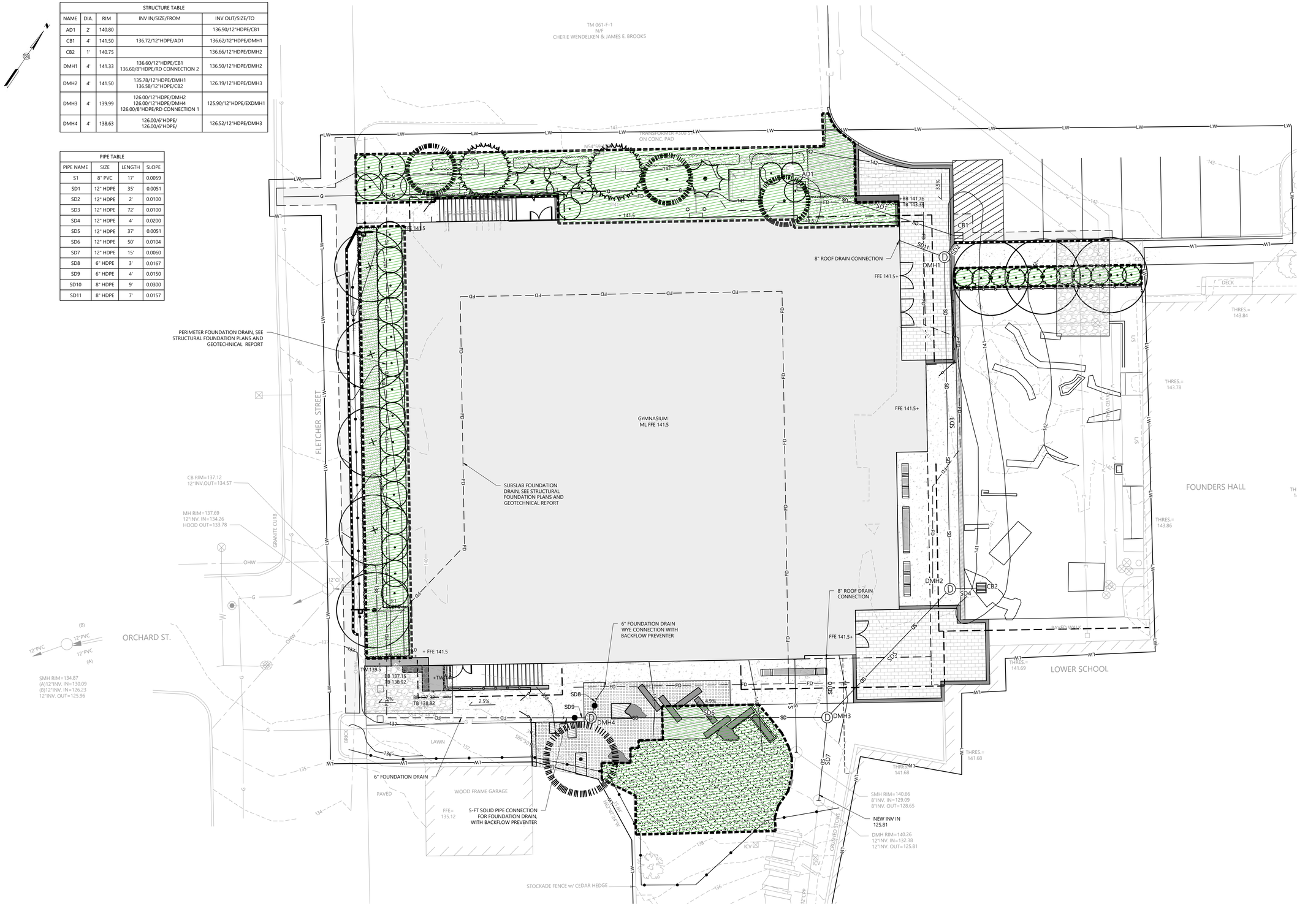
SITE PLAN

C-100

STRUCTURE TABLE				
NAME	DIA.	RIM	INV IN/SIZE/FROM	INV OUT/SIZE/TO
AD1	2'	140.80		136.90/12"HDPE/CB1
CB1	4'	141.50	136.72/12"HDPE/AD1	136.62/12"HDPE/DMH1
CB2	1'	140.75		136.66/12"HDPE/DMH2
DMH1	4'	141.33	136.60/12"HDPE/CB1 136.60/8"HDPE/RD CONNECTION 2	136.50/12"HDPE/DMH2
DMH2	4'	141.50	135.78/12"HDPE/DMH1 136.58/12"HDPE/CB2	126.19/12"HDPE/DMH3
DMH3	4'	139.99	126.00/12"HDPE/DMH2 126.00/12"HDPE/DMH4 126.00/8"HDPE/RD CONNECTION 1	125.90/12"HDPE/EXDMH1
DMH4	4'	138.63	126.00/6"HDPE/ 126.00/6"HDPE/	126.52/12"HDPE/DMH3

PIPE TABLE			
PIPE NAME	SIZE	LENGTH	SLOPE
S1	8" PVC	17'	0.0059
SD1	12" HDPE	35'	0.0051
SD2	12" HDPE	2'	0.0100
SD3	12" HDPE	72'	0.0100
SD4	12" HDPE	4'	0.0200
SD5	12" HDPE	37'	0.0051
SD6	12" HDPE	50'	0.0104
SD7	12" HDPE	15'	0.0060
SD8	6" HDPE	3'	0.0167
SD9	6" HDPE	4'	0.0150
SD10	8" HDPE	9'	0.0300
SD11	8" HDPE	7'	0.0157



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GRADING & DRAINAGE PLAN

C-101

EROSION AND SEDIMENT CONTROL NOTES

TEMPORARY EROSION CONTROL MEASURES MAY INCLUDE THE USE OF STABILIZED CONSTRUCTION ENTRANCES, HYDRAULIC MULCH, HAY AND STRAW MULCH, EROSION CONTROL BLANKET, TURF REINFORCED MATTING, RIPRAP AND TEMPORARY SEEDING. TEMPORARY SEDIMENT CONTROL MEASURES INCLUDE THE USE OF SEDIMENT BARRIER LIKE SILT SOCK, SILT FENCE, AND EROSION CONTROL MIX BERMS, CATCHBASIN TEMPORARY INLET PROTECT AND GEOTEXTILE FILTER BAGS. PERMANENT MEASURES INCLUDE PERMANENT VEGETATION OR PAVING.

GENERAL

A. THE PROJECT SHALL CONFORM WITH THE STANDARDS OF THE MAINE CONSTRUCTION GENERAL PERMIT.

B. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE MAINE EROSION AND SEDIMENT CONTROL BMPS HANDBOOK PUBLISHED BY THE MAINE DEP UNLESS OTHERWISE NOTED IN THESE PLANS. HTTP://MAINE.GOV/DEP/BLWQ/DOCSTAND/ESCBMPS/

C. ANY ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES DEEMED NECESSARY BY THE OWNER'S REPRESENTATIVE, DEPARTMENT OF ENVIRONMENTAL PROTECTION, AND/OR MUNICIPAL OFFICIALS SHALL BE INSTALLED BY THE CONTRACTOR.

D. THE CONTRACTOR IS RESPONSIBLE FOR ALL FINES RESULTING FROM EROSION OR SEDIMENTATION FROM THE SITE TO SURROUNDING PROPERTIES, WATER BODIES, OR WETLANDS AS A RESULT OF THIS PROJECT.

E. THE CONTRACTOR SHALL MINIMIZE DISTURBANCE TO THE SITE WHENEVER POSSIBLE WHILE ALLOWING PROPER SITE DEVELOPMENT.

F. CONSTRUCTION STAGING SHALL BE CONDUCTED IN A WAY TO MINIMIZE THE POTENTIAL FOR STORMWATER RUN-ON TO DISTURBED AREAS. SEDIMENT BARRIER AND ANY OTHER RELEVANT EROSION CONTROL MEASURES SHALL BE MOVED AND/OR ADDED TO, TO ACCOUNT FOR CHANGES IN DISTURBED AREA DUE TO CONSTRUCTION STAGING..

G. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR/REPLACEMENT/MAINTENANCE OF ALL EROSION CONTROL MEASURES UNTIL ALL DISTURBED AREAS ARE STABILIZED TO THE SATISFACTION OF THE ABOVE PERSONNEL. DESCRIPTIONS OF PERMANENT STABILIZATION FOR VARIOUS COVER TYPES FOLLOWS:

i. FOR SEEDED AREAS, PERMANENT STABILIZATION MEANS THAT 90% OF THE DISTURBED AREA IS COVERED WITH REASONABLY THICK UNIFORM STAND OF PERMANENT SEEDED SPECIES, FREE FROM SIZABLE THIN OR BARE SPOTS AND PERNICIOUS WEEDS.
ii. FOR SODDED AREAS, PERMANENT STABILIZATION MEANS THAT COMPLETE BINDING OF THE SOD ROOTS INTO THE UNDERLYING SOIL WITH NO SLUMPING OF THE SOD OR DIE OFF.
iii. FOR MULCHED AREAS, PERMANENT STABILIZATION MEANS TOTAL COVERAGE OF THE EXPOSED AREA WITH AN APPROVED MULCH MATERIAL.
iv. FOR PAVED AREAS, PERMANENT STABILIZATION MEANS THE PLACEMENT OF THE ASPHALT BINDER COURSE.

H. FOR ANY AND ALL SEEDING REQUIREMENTS, REFER TO SECTION 329222 NATIVE MEADOW SEEDING SPECIFICATIONS.

I. PROTECT ALL TEMPORARY SEEDED AREAS WITH MULCH OR RECP IN AREAS OF SHEET OR CONCENTRATED FLOWS. MULCH ALL TEMPORARY SEEDED AREAS SO THAT SOIL IS NOT VISIBLE THROUGH THE MULCH REGARDLESS OF THE APPLICATION RATE. MULCH SHALL NOT BE USED WITH PERMANENT SEEDING, BUT RECP MAY BE USED. SCHEDULE SEEDING OR SODDING TO AVOID FAILURE DUE TO SUMMER DROUGHT AND FALL FROST. NEWLY SEEDED AREAS SHOULD BE PROTECTED FROM VEHICLE TRAFFIC, PEDESTRIAN TRAFFIC AND CONCENTRATED RUNOFF UNTIL THE VEGETATION IS WELL ESTABLISHED. AREAS MUST BE REWORKED AND RESTABILIZED IF GERMINATION IS SPARSE OR SURFACE EROSION IS EVIDENT.

J. EROSION CONTROL BLANKET SHALL BE INSTALLED ON ALL PERMANENT SLOPES STEEPER THAN 3:1 OR AS OTHERWISE NOTED, EROSION CONTROL BLANKET SHALL BE EAST COAST EROSION CONTROL EC-47 400 GRAM COIR MAT OR APPROVED EQUAL. EROSION CONTROL BLANKET SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

K. THE CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF ALL TEMPORARY EROSION CONTROL MEASURE UPON STABILIZATION OF PROJECT AREA & COST SHALL BE INCIDENTAL TO CONTRACT.

WINTER CONDITIONS

A. WINTER CONSTRUCTION IS CONSTRUCTION ACTIVITY PERFORMED DURING THE PERIOD FROM NOVEMBER 1 THROUGH APRIL 15. IF AREAS WITHIN THE CONSTRUCTION AREA ARE NOT STABILIZED WITH TEMPORARY OR PERMANENT MEASURES OUTLINED ABOVE BY NOVEMBER 1 THEN THE SITE MUST BE PROTECTED WITH ADDITIONAL STABILIZATION MEASURES THAT ARE SPECIFIC TO WINTER CONDITIONS.

GOOD HOUSEKEEPING AND POLLUTION PREVENTION

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 RUNOFF AND APPROPRIATE SPILL PREVENTION, CONTAINMENT AND RESPONSE PLANNING AND IMPLEMENTATION.

B. DURING CONSTRUCTION, PETROLEUM PRODUCTS AND OTHER HAZARDOUS MATERIALS WITH THE POTENTIAL TO CONTAMINATE GROUND OR SURFACE WATERS MAY NOT BE STORED OR HANDLED IN AREAS OF THE SITE DRAINING TO INFILTRATION AREAS, AN "INFILTRATION AREA" IS ANY ARE OF THE SITE THAT BY DESIGN, OR AS A RESULTS OF SOIL AND TOPOGRAPHY, ACCUMULATES RUNOFF THAT INFILTRATES IN THE SOIL. DIKES, BERMS, SUMPS AND OTHER FORMS OF TEMPORARY 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. LOCATE ALL MATERIAL STOCKPILES WITH CONSIDERATION FOR STORMWATER DRAINAGE PATTERNS AND INFRASTRUCTURE.

D. TAKE ALL REASONABLE MEASURES TO MINIMIZE DUST RESULTING FROM THE PROJECT. OIL MAY NOT BE USED FOR DUST CONTROL.

E. LOCATE ALL LITTER, CONSTRUCTION DEBRIS AND CONSTRUCTION CHEMICALS WITH CONSIDERATION FOR STORMWATER DRAINAGE PATTERNS AND INFRASTRUCTURE.

F. TRENCH OR FOUNDATION DE-WATERING MUST BE SPREAD THROUGH SUFFICIENT NATURAL BUFFERS THAT HAVE CAPACITY TO INFILTRATE THE PUMPED WATER OR SHOULD BE PUMPED TO DESIGNED CONSTRUCTION DEWATERING DEVICES AS DESCRIBED IN THE MAINE EROSION AND SEDIMENT CONTROL BMPS HANDBOOK.

G. SEDIMENTS AND SOIL MATERIALS SHOULD BE SWEPT FROM PAVED SURFACES AT THE END OF EACH WORKDAY OR PRIOR TO RAIN EVENTS, WHENEVER POSSIBLE.

INSPECTION AND MAINTENANCE

A. A PERSON WITH KNOWLEDGE OF EROSION AND STORMWATER CONTROLS, INCLUDING THE STANDARDS IN THE MAINE CONSTRUCTION GENERAL PERMIT, THE MAINE EROSION AND SEDIMENT CONTROL BMPS HANDBOOK OR ANY MUNICIPAL REQUIREMENTS MUST CONDUCT THE INSPECTION. THIS PERSON MUST BE IDENTIFIED IN THE INSPECTION LOG. IF ADDITIONAL BMPS OR MODIFICATIONS TO BMPS ARE NECESSARY, THE MODIFICATIONS MUST BE IMPLEMENTED WITH 7 CALENDAR DAYS OR PRIOR TO ANY PRECIPITATION EVENT. ALL MEASURES MUST BE MAINTAINED IN EFFECTIVE OPERATING CONDITION UNTIL AREAS ARE PERMANENTLY STABILIZED.

B. AN INSPECTION AND MAINTENANCE LOG MUST BE KEPT BY THE CONTRACTOR, SUMMARIZING THE SCOPE OF THE INSPECTION, DATE, AND MAJOR OBSERVATIONS RELATING TO THE OPERATION OF EROSION AND SEDIMENT CONTROL BMPS, MATERIAL STORAGE AREAS, AND VEHICLE ACCESS POINTS TO THE CONSTRUCTION AREA. THE INSPECTION LOG SHOULD BE DELIVERED TO THE PROPERTY OWNER OR RESPONSIBLE CONTRACTING ENTITY UPON COMPLETION OF THE PROJECT.

NON STORMWATER DISCHARGES

A. PER MAINEDEP CHAPTER 500, THE FOLLOWING NON-STORMWATER DISCHARGES ARE ALLOWED AND STEPS SHOULD BE TAKEN TO ENSURE IMPLEMENTATION OF APPROPRIATE POLLUTION PREFENTION MEASURES FOR THE NON-STORMWATER COMPONENTS OF THE DISCHARGE.

1. DISCHARGES FROM FIREFIGHTING ACTIVITY;
2. FIRE HYDRANT FLUSHINGS;
3. VEHICLE WASHWATER IF DETERGENTS ARE NOT USED AND WASHING IS LIMITED TO THE EXTERIOR OF VEHICLES (ENGINE, UNDERCARRIAGE AND TRANSMISSION WASHING IS PROHIBITED);
4. DUST CONTROL RUNOFF IN ACCORDANCE WITH MAINEDEP CHAPTER 500 REQUIREMENTS;
5. ROUTINE EXTERNAL BUILDING WASHDOWN, NOT INCLUDING SURFACE PAINT REMOVAL, THAT DOES NOT INVOLVE DETERGENTS;
6. 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;
7. UNCONTAMINATED AIR CONDITIONING OR COMPRESSOR CONDENSATE;
8. UNCONTAMINATED GROUNDWATER OR SPRING WATER;
9. FOUNDATION OR FOOTER DRAIN-WATER WHERE FLOWS ARE NOT CONTAMINATED;
10. UNCONTAMINATED EXCAVATION DEWATERING IN ACCORDANCE WITH MAINEDEP CHAPTER 500 REQUIREMENTS;
11. POTABLE WATER SOURCES INCLUDING WATERLINE FLUSHINGS; AND LANDSCAPE IRRIGATION.

B. PER MAINEDEP CHAPTER 500 THE FOLLOWING NON-STORMWATER DISCHARGES ARE NOT ALLOWED.

1. WASTEWATER FROM THE WASHOUT OR CLEANOUT OF CONCRETE, STUCCO, PAINT, FORM RELEASE OILS, CURING COMPOUNDS OR OTHER CONSTRUCTION MATERIALS;
2. FUELS, OILS OR OTHER POLLUTANTS USED IN VEHICLE AND EQUIPMENT OPERATION AND MAINTENANCE;
3. SOAPS, SOLVENTS, OR DETERGENTS USED IN VEHICLE AND EQUIPMENT WASHING; AND
4. TOXIC OR HAZARDOUS SUBSTANCES FROM A SPILL OR OTHER RELEASE.

EROSION AND SEDIMENT CONTROL NOTES

TEMPORARY EROSION CONTROL

CONTRACTOR SHALL PREPARE AND SUBMIT A SOIL EROSION AND WATER POLLUTION CONTROL PLAN TO ENGINEER. ANY TEMPORARY SEEDED VEGETATION, MULCH MATERIALS, OR EROSION CONTROL BLANKETS MUST BE REMOVED PRIOR TO INSTALLATION OF PERMANENT MEADOW SEED.

MEASURE	DATES FOR USE	TIMING, ACTIVITY, AND LOCATION
SEDIMENT BARRIER	ALL	BEFORE SOIL DISTURBANCE, INSTALL DOWNHILL OF AREAS TO BE DISTURBED AND AROUND MATERIAL STOCKPILES.
UP-SLOPE DIVERSION	ALL	BEFORE SOIL DISTURBANCE, INSTALL UPHILL OF AREAS TO BE DISTURBED AND MATERIAL STOCKPILES.
CATCH BASIN PROTECTION	ALL	BEFORE SOIL OR PAVEMENT DISTURBANCE, INSTALL ACF ENVIRONMENTAL INC. HIGH FLOW SILTSACK, SILTSAVER INLET FILTER, OR EQUAL, INSTALLED PER MANUFACTURER'S REQUIREMENTS.
DUST CONTROL	ALL	DURING DRY WEATHER, APPLY WATER AND CALCIUM CHLORIDE TO CONTROL DUST.
TEMPORARY SEEDING	APRIL 15 TO OCT. 1	SOIL STOCKPILES THAT ARE NOT COVERED AND DISTURBED AREAS THAT WILL NOT BE DISTURBED AGAIN WITHIN 14 DAYS. IF GRASS GROWTH PROVIDES LESS THAN 95% SOIL COVERAGE BY NOV. 1, APPLY MULCH AND ANCHOR WITH EROSION CONTROL BLANKET.
MULCH	APRIL 15 TO SEPT. 15	ON ALL AREAS OF EXPOSED SOIL PRIOR TO RAIN EVENTS OR EVERY 7 DAYS, APPLY 100-150 LBS (2.5 BALES) PER 1,000 SQ FT. BY MECHANICAL BLOWER.
WINTER MULCH	SEPT. 16 TO OCT. 31	ON ALL AREAS OF EXPOSED SOIL PRIOR TO PRECIPITATION OR EVERY 7 DAYS, APPLY 150 TO 170 LBS. MULCH (4 BALES) PER 1,000 SQ. FT. BY MECHANICAL BLOWER. EROSION CONTROL BLANKET MAY BE USED AS A SUBSTITUTE FOR WINTER MULCH.
	NOV. 1 TO APRIL 14	ON ALL AREAS OF EXPOSED SOIL, APPLY 150 TO 170 LBS. MULCH (4 BALES) PER 1,000 SQ. FT. AND ANCHOR WITH NETTING AT THE END OF EACH WORKING DAY. EROSION CONTROL BLANKET MAY BE USED AS A SUBSTITUTE FOR WINTER MULCH.
INSPECTIONS	UNTIL SITE IS PERMANENTLY STABILIZED	INSPECT THE EROSION AND SEDIMENTATION CONTROL MEASURES DAILY, AND MAINTAIN AND REPAIR AS NECESSARY.

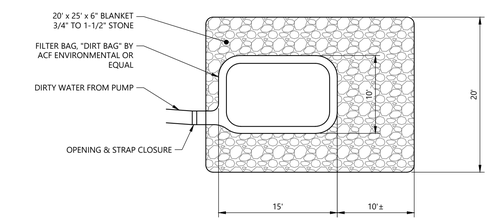
PERMANENT EROSION CONTROL:

MEASURE	DATES FOR USE	TIMING, ACTIVITY, AND LOCATION
PAVEMENT BASE COURSE FINAL COURSE	WHEN NO FROST IS IN GROUND	INSTALL ONLY IN AREAS SHOWN ON THE PLAN, SHORTLY AFTER PAVEMENT BASE IS BROUGHT TO FINAL GRADE. INSTALL NEAR COMPLETION OF PROJECT.
PERMANENT SEEDING	JUNE 1 TO AUG. 15	ON FINAL GRADE AREAS, WITHIN 7 DAYS OF GRADE PREPARATION. PREPARE SOIL PER SOIL SPECIFICATIONS AND DRAWINGS, FOLLOWED BY SEED AND RECP ON SLOPES GREATER THAN 3:1 SLOPE. REFER TO SECTION 329222 NATIVE MEADOW SEEDING SPECIFICATIONS FOR ANY AND ALL SITE PREPARATION, SEEDING AND SEEDING ESTABLISHMENT REQUIREMENTS.
DORMANT SEEDING	NOV. 15 TO DEC. 15	ON FINAL GRADE AREAS, WITH PREPARED TOPSOIL. APPLY SEED, AND FOLLOW WITH AN APPLICATION OF RECP. REFER TO SECTION 329222 NATIVE MEADOW SEEDING SPECIFICATIONS FOR ANY AND ALL SITE PREPARATION, SEEDING AND SEEDING ESTABLISHMENT REQUIREMENTS.
OUT OF SEEDING SEASON	AUG. 16 - NOV. 14 DEC. 16 - MAY 31	REFER TO SECTION 329222 NATIVE MEADOW SEEDING SPECIFICATIONS FOR ANY AND ALL SITE PREPARATION, SEEDING AND SEEDING ESTABLISHMENT REQUIREMENTS.
GROUND COVER, TREES, SHRUBS	APRIL 15 TO NOV. 1	INSTALL WITH FINAL LANDSCAPING.

INSPECTIONS:

REGULAR INSPECTIONS OF ALL EROSION AND SEDIMENTATION CONTROLS SHALL BE MADE AT LEAST WEEKLY AND PRIOR TO AND FOLLOWING STORM EVENTS. MINIMUM INSPECTIONS SHALL BE MADE AS LISTED IN THE TABLE BELOW.

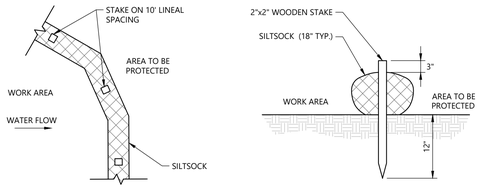
INSPECTED ITEM	LOOK FOR
MULCHED SURFACES	THIN MULCH OR INADEQUATE APPLICATION. WIND MOVEMENT.
SEEDED SURFACES	POOR SEED GERMINATION. LOSS OF MULCH. DEVELOPMENT OF RIVULETS. REFER TO SECTION 329222 NATIVE MEADOW SEEDING FOR SEEDING ESTABLISHMENT REQUIREMENTS.
SEDIMENT BARRIER	SEDIMENT BUILD-UP TO ONE HALF THE HEIGHT OF THE BARRIER. UNDERMINING OF THE BARRIER. SUPPORTING STAKES LOOSE, TOPPLED, OR UNMARKED. BREAKS IN BARRIER.
PERIMETER DIVERSION	DISCHARGE IS TO STABILIZED AREA. EROSION OR BREAKS IN BARRIER. SUPPORTING STAKES LOOSE, TOPPLED OR UNMARKED.
CATCH BASIN PROTECTION	SEDIMENT BUILD-UP AND STRUCTURE BLOCKAGES. SLOW FLOW/PONDING WATER. BREAKS IN FABRIC OR VOIDS IN BARRIER.
DEWATERING FILTER	BREAKS IN FABRIC OR SUPPORTING STRUCTURE. SLOW FLOW, INDICATING HIGH SEDIMENT BUILD-UP.
CONSTRUCTION ENTRANCE	SEDIMENTATION OF ROADWAYS. OFF-SITE DUST COMPLAINTS.



DEWATERING DISCHARGE SEDIMENT CONTROL DEVICE

N.T.S.

1. LOCATE DISCHARGE SITE ON FLAT UPLAND AREAS AS FAR AWAY AS POSSIBLE FROM STREAMS, WETLANDS, OTHER RESOURCES AND POINTS OF CONCENTRATED FLOW.
2. DISCHARGE NOT PERMITTED WITHIN 100' OF A NATURAL RESOURCE.
3. DOWNGRADIENT RECEIVING AREA MUST BE WELL VEGETATED OR OTHERWISE STABLE FROM EROSION, I.E. FOREST FLOOR OR COARSE GRAVEL/STONE.
4. NEVER DISCHARGE TO AREAS THAT ARE BARE OR NEWLY VEGETATED.
5. DIRT BAG MATERIAL BASED ON PARTICLE SIZE IN DIRTY WATER, I.E., FOR COARSE PARTICLES A WOVEN MATERIAL; FOR SILTS/CLAYS A NON-WOVEN MATERIAL.
6. DO NOT OVER PRESSURIZE DIRT BAG OR USE BEYOND CAPACITY.
7. CHANNELS DUG FOR DISCHARGING WATER FROM THE EXCAVATED AREA NEED TO BE STABLE. IF FLOW VELOCITIES CAUSE EROSION WITHIN THE CHANNEL THEN A DITCH LINING SHOULD BE USED.
8. BUCKETED WATER SHOULD BE DISCHARGED IN A STABLE MANNER TO THE SEDIMENT REMOVAL AREA. A SPLASH PAD OF RIPRAP UNDERLAIN WITH GEOTEXTILE MAY BE NECESSARY TO PREVENT SCOURING OF SOIL.
9. DEWATERING IN PERIODS OF INTENSE, HEAVY RAIN, WHEN THE INFILTRATIVE CAPACITY OF THE SOIL IS EXCEEDED, SHOULD BE AVOIDED.
10. INSTALL DIVERSION DITCHES OR BERMS TO MINIMIZE THE AMOUNT OF CLEAN STORMWATER RUNOFF ALLOWED INTO THE EXCAVATED AREA.
11. DURING THE ACTIVE DEWATERING PROCESS, INSPECTION OF THE DEWATERING FACILITY SHOULD BE REVIEWED FREQUENTLY. SPECIAL ATTENTION SHOULD BE PAID TO THE BUFFER AREA FOR ANY SIGN OF EROSION AND CONCENTRATION OF FLOW THAT MAY COMPROMISE THE BUFFER AREA. OBSERVE WHERE POSSIBLE THE VISUAL QUALITY OF THE EFFLUENT AND DETERMINE IF ADDITIONAL TREATMENT CAN BE PROVIDED.
12. EROSION CONTROL BARRIERS ARE REQUIRED AROUND DEWATERING DISCHARGE SEDIMENT CONTROL DEVICE.

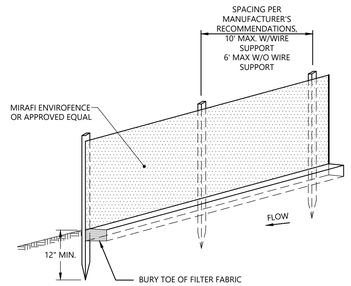


NOTE:

1. WHEN STAKING IS NOT POSSIBLE, HEAVY CONCRETE BLOCKS SHALL BE USED BEHIND THE SEDIMENT BARRIER TO HELP STABILIZE DURING RAINFALL/RUNOFF EVENTS.

SEDIMENT BARRIER - SILT SOCK

N.T.S.



NOTES:

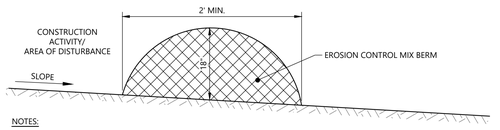
- INSTALL FABRIC ON UPHILL SIDE OF SUPPORT POSTS
- INSTALL SILT FENCE ACROSS SLOPES
- SILT FENCE SHALL NOT BE USED IN DRAINAGE WAYS

MAINTENANCE: INSPECT FOR TEARS IN THE FABRIC OR DAMAGE TO SUPPORTS. REPAIR AS NECESSARY. REMOVE ACCUMULATED SEDIMENT WHEN IT REACHES A DEPTH OF SIX-INCHES OR LESS.

REMOVAL: WHEN UPSLOPE AREAS ARE STABILIZED, THE STRUCTURE AND ANY ACCUMULATED SEDIMENT WILL BE REMOVED.

SEDIMENT BARRIER - SILTATION FENCE DETAIL

N.T.S.

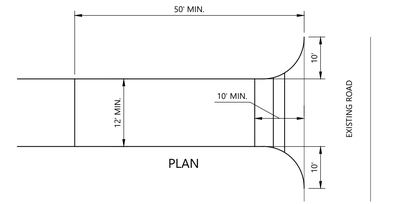


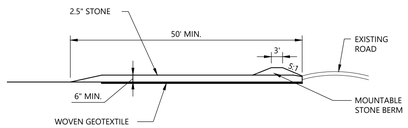
NOTES:

1. EROSION CONTROL MIX CAN BE MANUFACTURED ON OR OFF THE PROJECT SITE. IT MUST CONSIST PRIMARILY OF ORGANIC MATERIAL AND MAY INCLUDE: SHREDDED BARK, STUMP GRINDINGS, COMPOSTED BARK, OR ACCEPTABLE MANUFACTURED PRODUCTS. WOOD AND BARK CHIPS, GROUND CONSTRUCTION DEBRIS OR REPROCESSED WOOD PRODUCTS WILL NOT BE ACCEPTABLE AS THE ORGANIC COMPONENT OF THE MIX.
2. EROSION CONTROL MIX SHALL CONTAIN A WELL-GRADED MIXTURE OF PARTICLE SIZES AND 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.
   - THE PH SHOULD FALL BETWEEN 5.0 AND 8.0.

SEDIMENT BARRIER - EROSION CONTROL MIX BERM

N.T.S.





NOTES:

- CONSTRUCTION ENTRANCES MAY BE RELOCATED AS CONSTRUCTION PROGRESSES.
- WHEEL WASH PITS MAY ALSO BE USED, IF APPROVED.

MAINTENANCE: INSPECT FOR EFFECTIVE REMOVAL OF SOIL FROM VEHICLES PRIOR TO LEAVING THE SITE. SWEEP ANY SOIL FROM ADJACENT ROADWAYS.

REMOVAL: AT LEAST ONE CONSTRUCTION ENTRANCE SHALL BE MAINTAINED UNTIL ALL AREAS OF THE SITE ARE STABILIZED.

STABILIZED CONSTRUCTION ENTRANCE DETAIL

N.T.S.

NOTES:

CATCH BASIN PROTECTION TO BE "SILTSACK" (BY ACF ENVIRONMENTAL) OR "STREAM GUARD" (BY FOSS ENVIRONMENTAL SERVICES).

INSERT TO BE EMPTIED IN AN APPROVED MANNER WHEN IT IS 1/2 FULL OF SEDIMENT.

INSPECT INSERT AFTER ALL RAINFALL EVENTS, REPAIR AND MAINTAIN AS REQUIRED.

TEMPORARY INLET PROTECTION

N.T.S.

simons architects
designed for human potential

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Woodard & Curran

PROJECT NAME:

WAYNFLETE WELLNESS + ATHLETIC CENTER

360 SPRING ST.
PORTLAND, ME 04102

SEAL:

NOT FOR CONSTRUCTION

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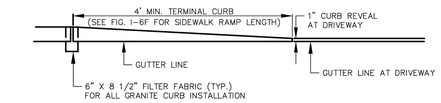
1

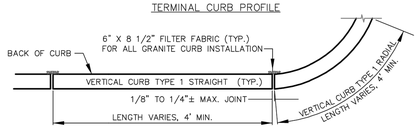
DATE OF ISSUE: AUGUST 23, 2024
PROJECT NUMBER: 2017-0110
STATUS: 100% DESIGN DEVELOPMENT

CIVIL DETAILS - 1

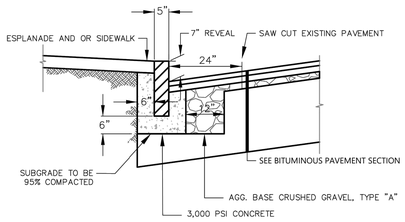
C-200



TERMINAL CURB PROFILE



VERTICAL GRANITE CURB PLAN VIEW

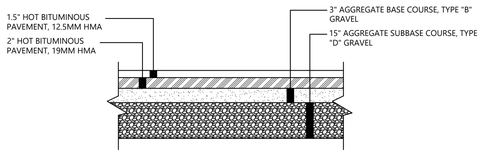


VERTICAL GRANITE CURB CROSS SECTION

NOTES:
1. INDIVIDUAL PIECES OF CURB SHORTER THAN 4 L.F. ARE NOT ALLOWED, WITH THE EXCEPTION OF RADIAL CURB.
2. THE MINIMUM HEIGHT OF THE CONCRETE BACKING SHALL BE 10-INCHES OR TO THE BOTTOM OF THE HOT MIX ASPHALT PAVEMENT, WHICHEVER IS GREATER, MEASURED FROM THE BOTTOM OF CURB.
3. CURBING SHALL BE SET IN A 6-INCH BED OF POURED IN PLACE 3,000 PSI CONCRETE MIX.
4. WOODEN SHIMS MAY BE USED TO SET CURB.

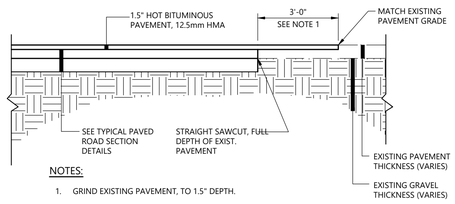
VERTICAL GRANITE CURB (IN CITY RIGHT-OF-WAY)

N.T.S.



BITUMINOUS PAVEMENT SECTION (IN CITY RIGHT-OF-WAY)

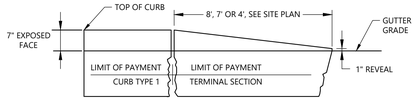
N.T.S.



NOTES:
1. GRIND EXISTING PAVEMENT, TO 1.5" DEPTH.
2. PROVIDE BITUMINOUS TACK COAT ON VERTICAL AND HORIZONTAL SURFACES PRIOR TO PAVING.
3. DETAIL APPLICABLE TO PAVEMENT BUTT JOINTS AT ROADWAY WORK LIMITS. REFER TO PIPE INSTALLATION DTL. OR PAVED ROAD SECTION DTLS. FOR TRENCH REPAIR REQUIREMENTS.

PAVEMENT BUTT JOINT DETAIL

N.T.S.



TERMINAL SECTION TYPE "1"

TERMINAL CURB SECTION

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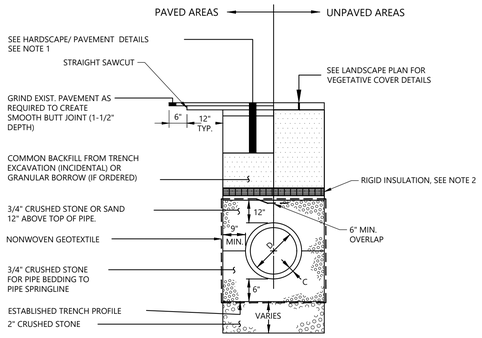
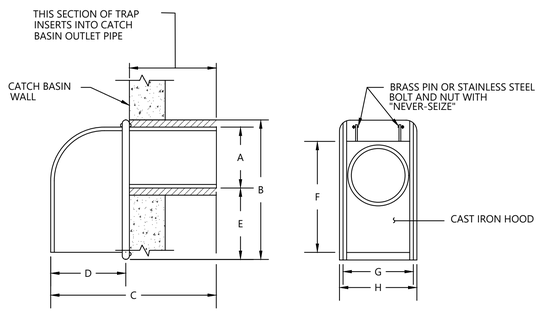


NOTES:
1. DEPTH AND TYPE OF PAVEMENT AND AGGREGATE COURSES SHALL BE PER PLANS. SEE CIVIL & LANDSCAPING PAVEMENT DETAILS.
2. PROVIDE RIGID INSULATION WHERE COVER OVER PIPE IS LESS THAN 4 FEET. THE THICKNESS OF THE RIGID INSULATION SHALL BE SUFFICIENT TO PROVIDE AN EQUIVALENT OF 4'-0" OF SOIL ABOVE THE PIPE. ONE INCH OF RIGID INSULATION SHALL BE EQUIVALENT TO ONE FOOT OF SOIL. INSULATION SHALL EXTEND A MINIMUM 9" FROM OUTSIDE EDGE OF PIPE, BUT SHALL NOT EXCEED TRENCH WIDTH.
3. STORM DRAIN IN THE SHERWOOD STREET RIGHT-OF-WAY SHALL MEET THE MATERIAL SPECIFICATIONS IN SECTION 2 OF THE CITY OF PORTLAND TECHNICAL MANUAL.

TYPICAL STORMDRAIN/ SEWER PIPE TRENCH

N.T.S.

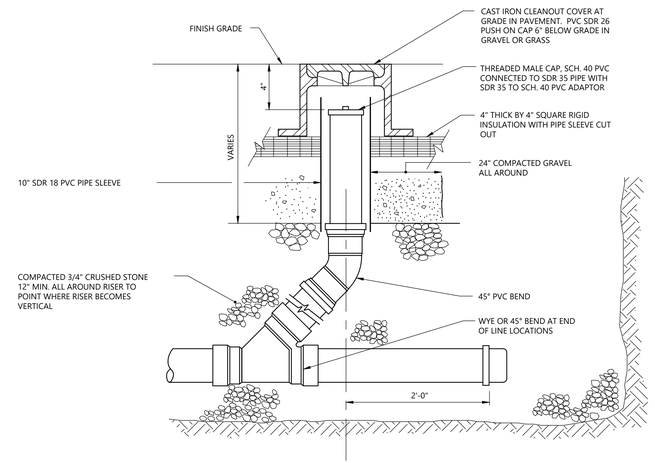


SIDE VIEW FRONT VIEW

SIZE	A	B	C	D	E	F	G	H
6 in.	5 1/2"	13 3/8"	13 3/4"	5 3/8"	5 7/8"	11 5/8"	6 1/2"	7 1/4"
8 in.	7 1/2"	15"	15 3/8"	5 1/2"	5 3/8"	13 3/4"	8 3/4"	9 3/8"
10 in.	9 1/2"	16"	16 1/4"	6"	4 1/2"	14 1/8"	11 1/2"	12 3/8"
12 in.	11 1/2"	17"	22"	8"	3 1/2"	17"	12 1/2"	13 3/8"

CATCH BASIN HOOD

N.T.S.



CLEANOUT

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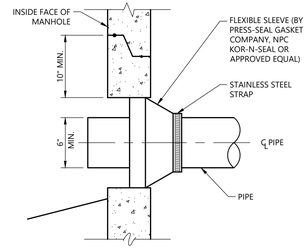
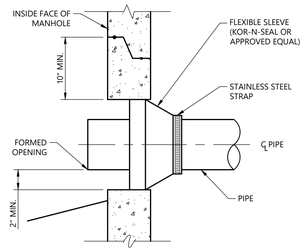


NEW PIPE TO NEW STRUCTURE CONNECTION DETAIL

N.T.S.

NOTE:
1. CONNECTION TO EXISTING PORTLAND WATER DISTRICT MANHOLE; ALL NEW PENETRATIONS INTO EXISTING MANHOLES SHALL BE INSPECTED BY PORTLAND WATER DISTRICT CREWS. TO SCHEDULE WORK, CONTACT THE DISTRICT'S WASTEWATER OPERATIONS DIVISION AT LEAST TWO WORKING DAYS PRIOR TO THE DATE THE WORK IS TO BE PERFORMED.



NOTE: CONNECTIONS MADE INTO EXISTING MANHOLES ARE TO BE CORED AND NOT DRILLED/ CHISELED

NEW PIPE TO EXISTING STRUCTURE CONNECTION DETAIL - 4" TO 24"

N.T.S.

simons architects
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Woodard & Curran

PROJECT NAME:

WAYNFLETE WELLNESS + ATHLETIC CENTER

360 SPRING ST,
PORTLAND, ME 04102

SEAL:

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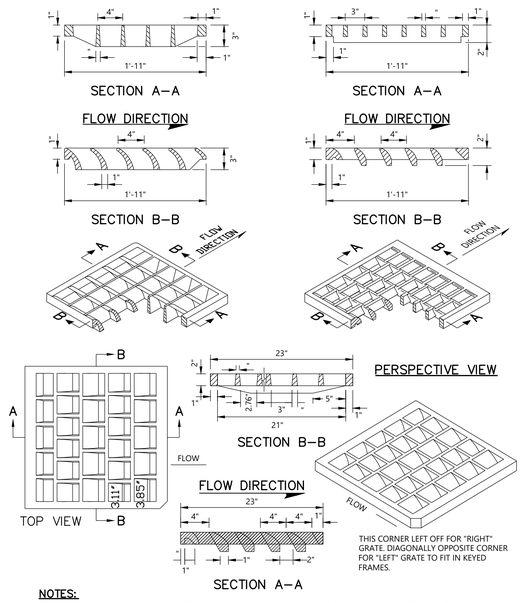
1

DATE OF ISSUE: AUGUST 23, 2024
PROJECT NUMBER: 2017-0110
STATUS: 100% DESIGN DEVELOPMENT

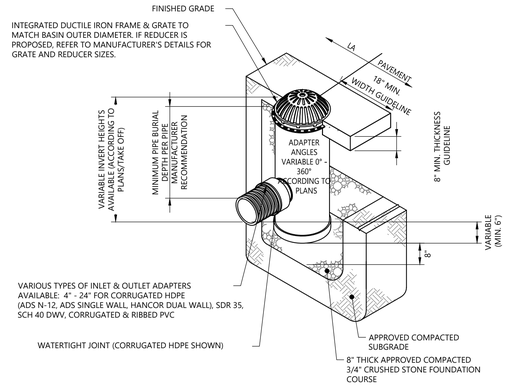
CIVIL DETAILS - 2

C-201



NOTES:
TO BE USED WHERE PARALLEL BAR GRATES WOULD PRESENT A HAZARD TO BICYCLE TRAFFIC. FOR USE ON CATCH BASIN TYPES: A1-C, A2-C, A5-C, B1-C, B2-C, B5-C, F3-C, F4-C, F5-C, F6-C.

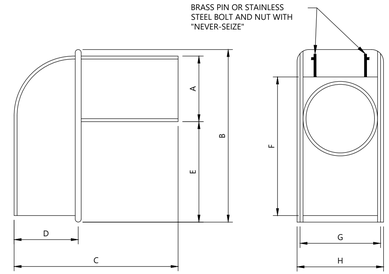
"CASCADE-TYPE" GRATES
N.T.S.



NOTES:

1. INSTALL BASIN IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS
2. PRODUCT SHALL BE NYLOPLAST DRAIN BASIN MANUFACTURED BY ADVANCED DRAINAGE SYSTEMS (ADS) OR APPROVED EQUAL.
3. GRATES/SOLID COVER SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.
4. FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.
5. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS. RISERS ARE NEEDED FOR BASINS OVER 84" DUE TO SHIPPING RESTORATIONS.
6. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC.
7. ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0° TO 360°.

AREA DRAIN
N.T.S.

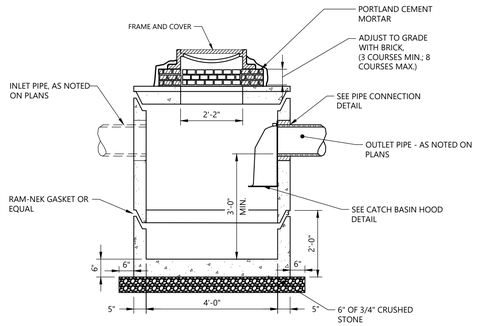


SIZE	A	B	C	D	E	F	G	H
10"	9 1/2"	16"	16 1/4"	6"	4 1/2"	14 1/8"	11 1/2"	12 3/8"
15"	14 1/2"	22 1/2"	23"	10 1/4"	5 3/4"	21"	14 1/2"	15 3/4"

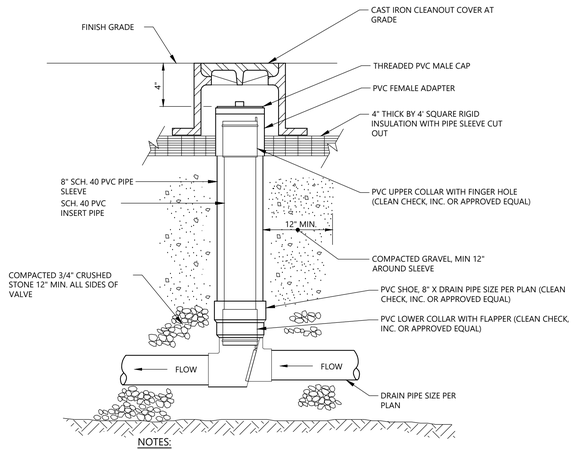
NOTE:

1. CASCO TRAP SHALL BE CAST IRON CASCO TRAP BY ETHERIDGE FOUNDRY OR APPROVED EQUAL.
2. BOLT AND NUT REQUIRED WHERE HOOD WILL NOT OPEN COMPLETELY.
3. CASCO TRAP SHALL BE INSTALLED ON ALL CATCH BASIN OUTLET PIPES, INCIDENTAL TO COST OF CATCH BASIN

CATCH BASIN HOOD
N.T.S.



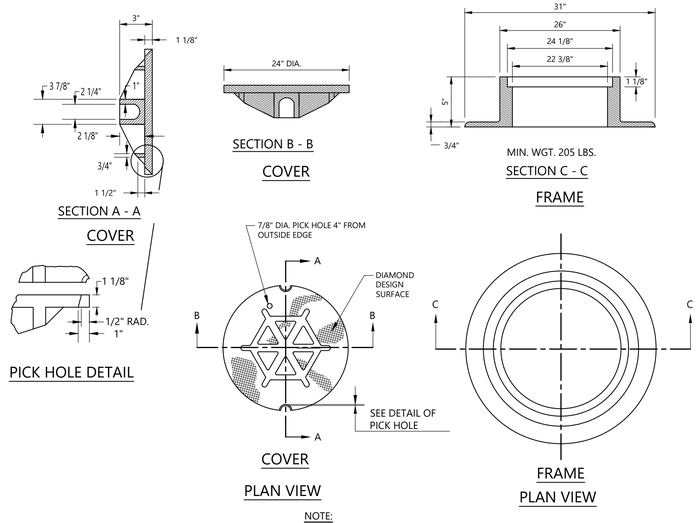
PRECAST CONCRETE CATCH BASIN
N.T.S.



NOTES:

1. MATERIALS AND INSTALLATION PER MANUFACTURER'S INSTRUCTIONS.

BACKFLOW PREVENTER
N.T.S.



NOTE:
FOR ALL CROSS COUNTRY MANHOLES (LAWN AREAS), USE PAM REXUS MANHOLE COVERS BY CERTAINTEED.

TYPE "A" CAST IRON MANHOLE COVER AND FRAME
N.T.S.

GENERAL NOTES FOR MANHOLES AND CATCH BASINS

1. ALL CONCRETE SHALL BE CLASS "A" AND HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 4000 LBS. PER SQ. INCH AT THE END OF 28 DAYS, UNLESS OTHERWISE NOTED.
2. PRECAST REINFORCED CONE BARREL MANUFACTURED PER ASTM SPEC. C-478.
3. ALL MANHOLES SHALL HAVE A BITUMINOUS WATERPROOFING APPLIED TO THE EXTERIOR SURFACE. IF CONSTRUCTED OF BRICK MASONRY, SURFACE SHALL BE PLASTERED WITH A SMOOTH MORTAR FINISH 3/8" THICK. AFTER THE MORTAR HAS SET, THE SURFACE SHALL BE WATERPROOFED AS REQUIRED BY SUPPLEMENTAL SPECIFICATIONS SECTION 604.
4. CASTINGS SHALL CONFORM TO ASTM DESIGNATION A48-CLASS 35. ALL PARTS OF CASTINGS, EXCEPT FINISHED SURFACE, SHALL RECEIVE A COAT OF COAL TAR PITCH VARNISH OR ASPHALTUM PAINT WHICH SHALL BE SMOOTH AND TOUGH BUT NOT BRITTLE.
5. MANHOLES MAY BE CONSTRUCTED OF MASONRY, PRECAST REINFORCED CONCRETE, OR CAST IN PLACE.
6. CONTRACTOR SHALL SUBMIT ANTIFLOATATION CALCULATIONS FOR ALL MANHOLE AND CATCH BASIN STRUCTURES.
7. ALL PRECAST MANHOLES AND CATCH BASINS SHALL BE IDENTIFIED BY STATION, OFFSET, AND STRUCTURE ID PAINTED ON THE SIDE OF THE STRUCTURE BY THE MANUFACTURER.
8. STORM AND SEWER MANHOLES SHALL HAVE SOLID COVERS WITH ONE DRILLED PICK HOLE.
9. EXISTING MANHOLES, CATCH BASINS, FRAMES, AND COVERS WITHIN CITY RIGHT-OF-WAY SHALL BE SALVAGED BY THE CONTRACTOR, AND SHALL REMAIN THE PROPERTY OF THE CITY OF PORTLAND.
10. WHEN THE FLOW CHANGES DIRECTION IN A MANHOLE, THE CHANNEL ALIGNMENT SHALL FOLLOW A SMOOTH RADIUS. CHANNELS SHALL BE FORMED TO ACCEPT ALL INLET PIPES.
11. ON STORM AND SEWER MANHOLES, THE SHELF AND CHANNEL SHALL BE FORMED BY BRICK SET IN CEMENT MORTAR OR BY FACTORY PRE-CAST CONCRETE. SUCH PRE-CAST CONCRETE SHALL BE EPOXY COATED AND THE SHELF SHALL HAVE A PERMANENT NON-SKID SURFACE.

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207.772.4656

Woodard & Curran

PROJECT NAME:
WAYNFLETE WELLNESS + ATHLETIC CENTER
360 SPRING ST,
PORTLAND, ME 04102

SEAL:

NOT FOR CONSTRUCTION

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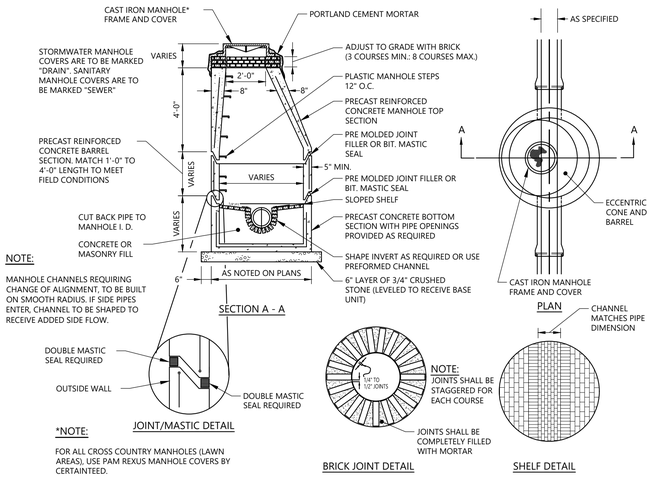
1

DATE OF ISSUE: AUGUST 23, 2024
PROJECT NUMBER: 2017-0110
STATUS: 100% DESIGN DEVELOPMENT

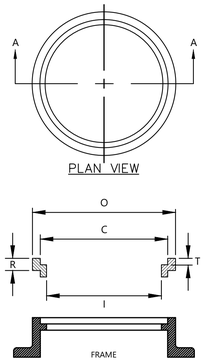
CIVIL DETAILS - 3

C-202



PRECAST CONCRETE MANHOLE

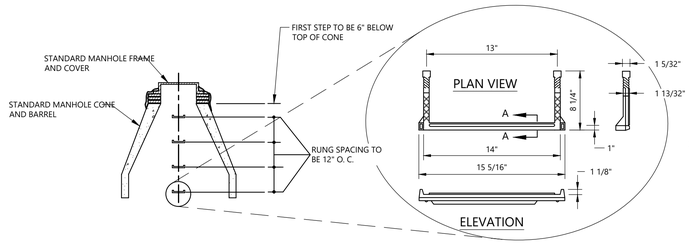
N.T.S.



SIZE	C	R	T	O	I	Wt.
R241 1/2	24	1 1/2	1 1/8	26 1/4	22 1/2	60
R242	24	2	1 1/8	26 1/4	22 1/2	80
R242 1/2	24	2 1/2	1 1/8	26 1/4	22	100
R243	24	3	1 1/8	26 1/4	22	120

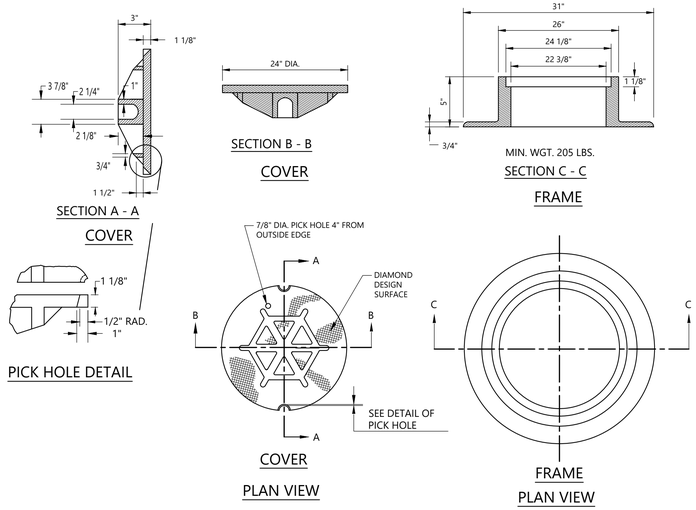
MANHOLE RISER RING

N.T.S.



PLASTIC MANHOLE STEPS

N.T.S.

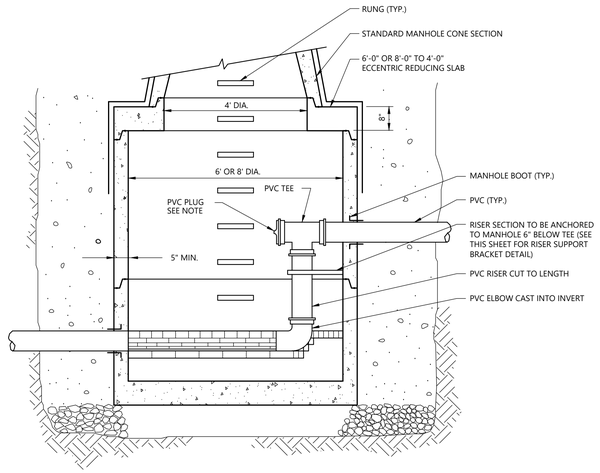


NOTE:

FOR ALL CROSS COUNTRY MANHOLES (LAWN AREAS), USE PAM REXUS MANHOLE COVERS BY CERTAINTEED.

TYPE "A" CAST IRON MANHOLE COVER AND FRAME

N.T.S.



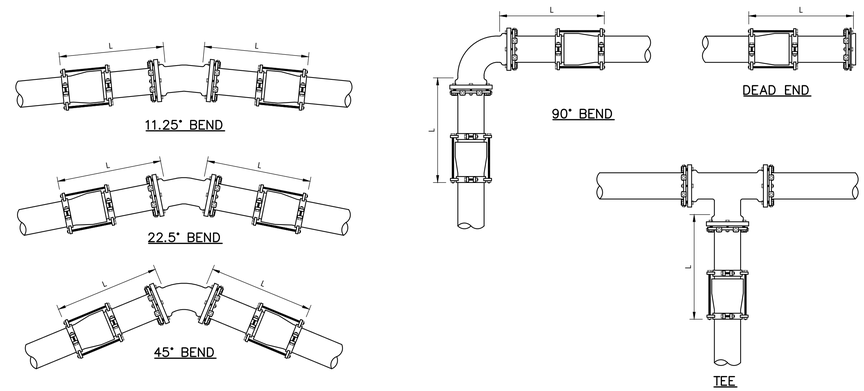
NOTES:

- SEE PRECAST MANHOLE SECTION FOR TYPICAL MANHOLE INFORMATION, INCLUDING NOTES.

  PROVIDE DROP PIPE FOR ALL INVERT DIFFERENTIALS GREATER THAN TWO (2) FEET.
- CUT OFF TOP 1/3 OF PIPE PLUG.
- INSTALL PVC TEE AND PLUG FACING UP AT INSIDE DROP INSTALLATION AT EXISTING MANHOLE LOCATED ON WEST STREET.

PRECAST DROP MANHOLE

N.T.S.



DIAMETER	REQUIRED LENGTH OF RESTRAINED JOINT PIPE ON BOTH SIDES OF FITTING				REQUIRED LENGTH OF RESTRAINED JOINT PIPE
	HORIZONTAL BEND				
	11.25°	22.5°	45°	TEE/90°	DEAD END
6"	2'	4'	9'	21'	51'
8"	3'	6'	11'	27'	67'
10"	4'	7'	14'	32'	81'
12"	4'	8'	16'	38'	96'
16"	5'	10'	20'	48'	123'

ASSUMED PARAMETERS:	
LAYING CONDITION	TYPE 5
SOIL DESIGNATION	SILT 1
DEPTH COVER	5 FT
DESIGN PRESSURE	200 PSI
SAFETY FACTOR	1.5

NOTES:

1. RESTRAINED JOINTS SHALL BE MECHANICAL JOINT OR PUSH-ON RESTRAINED JOINT AS SPECIFIED IN SECTION 33 14 11.01.

THRUST RESTRAINT DETAIL

N.T.S.

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Woodard & Curran

PROJECT NAME:

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360 SPRING ST,
PORTLAND, ME 04102

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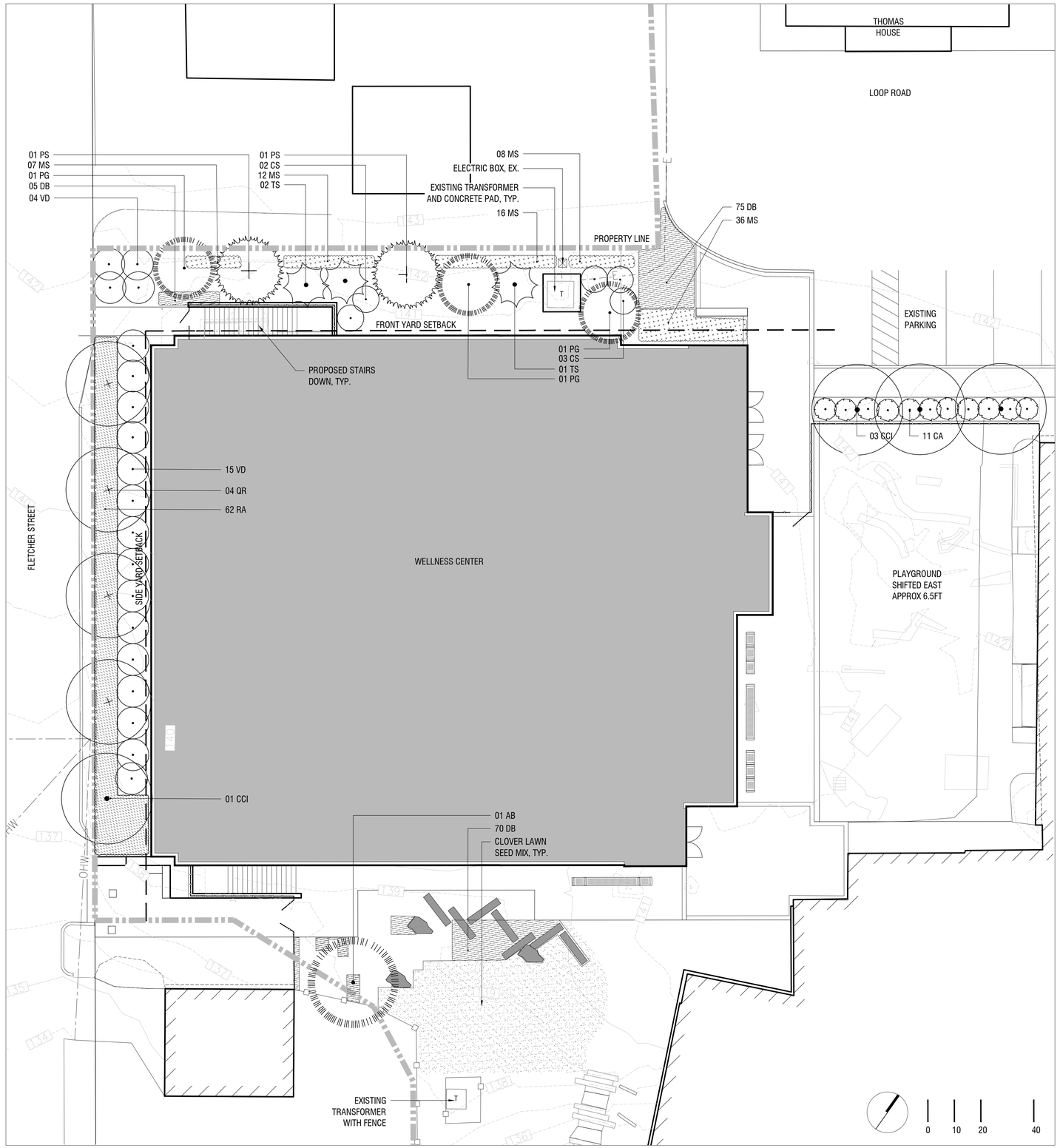
DATE OF ISSUE: AUGUST 23, 2024
PROJECT NUMBER: 2017-0110
STATUS: 100% DESIGN DEVELOPMENT

CIVIL DETAILS - 4

C-203



PLANT LIST

SYMB.	BOTANICAL NAME	COMMON NAME	QTY.	SIZE	SPACING
TREES (16 TOTAL)					
AB	ABIES BALSAMEA	BALSAM FIR	01	7-8'	PER PLAN
PG	PICEA GLAUCA	WHITE SPRUCE	03	7-8'	PER PLAN
PS	PINUS STROBUS	WHITE PINE	02	7-8'	PER PLAN
TS	THUJA STANDISHII x PLICATA 'GREEN GIANT'	GREEN GIANT ARBORVITAE	03	7-8'	PER PLAN
QR	QUERCUS ROBUR x BICOLOR 'LONG'	REGAL PRINCE OAK	04	2.5" CAL. MIN.	PER PLAN
CCI	CRATAEGUS CRUS-GALLI VAR. INERMIS	THORNLESS COCKSPUR HAWTHORN	04	2" CAL.	PER PLAN
SHRUBS (56 TOTAL)					
CS	CORNUS SERICEA 'ARCTIC FIRE'	RED TWIG DOGWOOD	05	#5	6'-0" O.C.
CA	CLETHRA ALNIFOLIA	COASTAL SWEET PEPPERBUSH	11	#5	10'-0" O.C.
RA	RHUS AROMATICA 'GRO-LOW'	FRAGRANT SUMAC	62	#2	3'-0" O.C.
VD	VIBURNUM DENTATUM	ARROWWOOD VIBURNUM	19	#3	6'-0" O.C.
PERENNIALS AND ORNAMENTAL GRASSES (163 TOTAL)					
DB	DENNSTAEDTIA PUNCTILOBULA	HAYSCENTED FERN	150	#1	18" O.C.
MS	MATTEUCCIA STRUTHIOPTERIS	OSTRICH FERN	80	#1	24" O.C.

817 SF WHITE DUTCH CLOVER LAWN (SEED MIX) (FEDCO-SEEDS)*

TRIFOLIUM REPENS PERENNIAL LEGUME. UP TO 4-8". THE LOWEST-GROWING CLOVER. SHADE AND TRAFFIC - TOLERANT PERENNIAL. SEED AT 10-15 LB/ACRE, ½ LB /1,000 SF

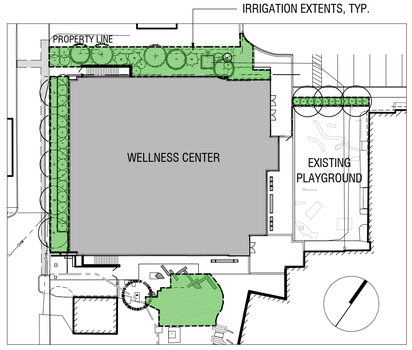
*OR APPROVED EQUAL

PLANTING NOTES

1. **CONTRACTOR IS RESPONSIBLE FOR INSTALLING PLANTING SOIL TO THE SPECIFIED DEPTH, GRADING IT, DEFINING PLANTING BED EDGES (TO BE REVIEWED AND APPROVED BY LANDSCAPE ARCHITECT) AND SEEDING, AS NOTED ON THE PLAN. TREE, SHRUB AND PERENNIAL INSTALLATION, STAKES AND MULCH INSTALLATION IS "BY OTHERS".**
2. CONTACT UTILITY COMPANIES AS REQUIRED BY STATE AND LOCAL REGULATIONS BEFORE DIGGING. LOCATE AND MARK EXISTING UTILITIES.
3. REFER TO CIVIL ENGINEER'S GRADING PLANS FOR FINAL GRADING AND UTILITY LOCATIONS.
4. THE CONTRACTOR SHALL OBTAIN ALL PERMITS WHICH ARE NECESSARY TO PERFORM THE PROPOSED WORK.
5. FINISH GRADE OF PLANTING BEDS SHALL BE ONE (1) INCH BELOW ADJACENT PAVER OR HEADER, UNLESS OTHERWISE SPECIFIED.
6. PRESERVE & PROTECT ALL EXISTING VEGETATION INDICATED TO REMAIN AT ALL TIMES.
7. REFER TO THE ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN FOR THE TREATMENT OF EXISTING TOPSOIL. REFER TO SECTION 3.7 'ON-SITE SOIL MANAGEMENT AND PLACEMENT.'
8. ALL DISTURBED AREAS ARE TO BE REVEGETATED. REFER TO THE ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN. REFER TO SECTION 3.7 'ON-SITE SOIL MANAGEMENT AND PLACEMENT.'
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREVENTING THE SPREAD OF EXISTING OF THE INTRODUCTION OF NEW INVASIVE SPECIES ON SITE, AS IDENTIFIED IN 4.7.4 OF THE CITY OF PORTLAND, ME TECHNICAL MANUAL.
10. NO PLANT SHALL BE MOVED AFTER THE BUD BREAK UNLESS AUTHORIZED BY THE CITY ARBORIST OR LANDSCAPE ARCHITECT. PLANTING PERIOD ARE BETWEEN APRIL 1ST TO JULY 1ST AND SEPTEMBER 1ST TO NOVEMBER 1ST.
11. EXISTING TREES/VEGETATION THAT SHOW SIGNS OF CONSTRUCTION DAMAGE WITHIN A ONE YEAR PERIOD FOLLOWING CONSTRUCTION, INCLUDING BUT NOT LIMITED TO BARK DAMAGE OR EXCESSIVE ROOT DAMAGE, GRADE CHANGES OTHER THAN THOSE ORIGINALLY INDICATED IN THE APPROVED GRADING PLAN, SOIL COMPACTION DUE TO HEAVY EQUIPMENT TRAVERSING CLOSELY, OR GENERAL DECLINE DUE TO MECHANICAL OR NATURAL CONDITIONS SHALL BE REPLACED BY THE CONTRACTOR.

SEEDING NOTES

1. REVEGETATED AREAS ARE TO BE HYRO-SEEDED, FOLLOWED BY THE APPLICATION OF STRAW MULCH.
2. APPLY STRAW MULCH AT A MINIMUM RATE OF 1.5 TONS PER ACRE OF AIR DRY MATERIAL. SPREAD STRAW MULCH UNIFORMLY OVER THE AREA WITH MECHANICAL MULCH SPREADER/CRIMPER. DO NOT MULCH WHEN WIND VELOCITY EXCEEDS 10 MPH.
3. IMMEDIATELY UPON COMPLETION OF THE MULCHING AND BINDING OPERATION, THE SEEDED AREAS SHALL BE IRRIGATED, KEEPING THE TOP 2 INCHES OF SOIL EVENLY MOIST UNTIL SEED HAS UNIFORMLY GERMINATED AND GROWN TO A HEIGHT OF 2 INCHES.
4. WATERING APPLICATION SHALL BE DONE IN A MANNER WHICH WILL PROVIDE UNIFORM COVERAGE BUT WHICH WILL NOT CAUSE EROSION, MOVEMENT, OR DAMAGE TO THE FINISHED SURFACE.



IRRIGATION EXTENTS

0 20 40 80

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ACETO LANDSCAPE ARCHITECTS
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PROJECT NAME:

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DATE OF ISSUE:

PROJECT NUMBER:

STATUS:

PLANTING PLAN

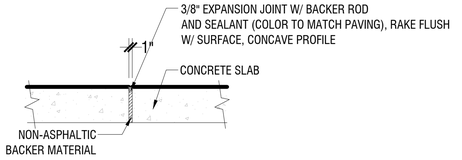
L 3-00

NOT FOR CONSTRUCTION

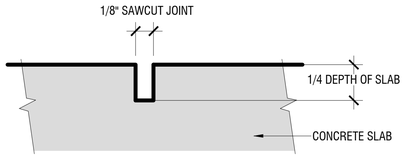
SITE KEYNOTES:

			DETAIL / SHEET
1.0	PAVEMENTS, RAMPS, CURBS		
	1.1	CONCRETE PAVERS	4/L4-00
	1.2	CONCRETE PAVING	3/L4-00
	1.3	PAVER BORDER	5/L4-00
	1.4	TIMBER EDGE	6/L4-00
	1.5	BLACK LOCUST PAVER	2/L4-01
2.0	JOINTING		
	2.1	EXPANSION JOINT	1/L4-00
	2.2	CONTROL JOINT	2/L4-00
3.0	STEPS		
	X.X	NOT USED AT THIS TIME	X/XX-XX
4.0	SITE WALLS/ EMBANKMENTS		
	4.1	RETAINING WALL	1/L4-01
5.0	SITE FURNITURE		
	5.1	BENCH A	1/L4-02
	5.2	BENCH B	2/L4-02
	5.3	BENCH C	3/L4-02

			DETAIL / SHEET
6.0	RAILINGS, BARRIERS, FENCING		
	6.1	FLETCHER STREET FENCE (IF UNABLE TO RE-USE EXISTING)	7/L4-00
7.0	SITE LIGHTING		
	X.X	NOT USED AT THIS TIME	X/XX-XX
8.0	DRAINAGE		
	X.X	NOT USED AT THIS TIME	X/XX-XX
9.0	PLANTING AND LANDSCAPE		
	9.1	DECIDUOUS TREE PLANTING	1/L4-01
	9.2	CONIFEROUS TREE PLANTING	2/L4-01
	9.3	SHRUB PLANTING	3/L4-01
	9.4	PERENNIAL PLANTING	4/L4-01
	9.5	LANDSCAPE EDGING	5/L4-01
	9.6	BOULDER	3/L4-01
10.0	MISCELLANEOUS ELEMENTS		
	10.1	LOG SURFACING	4/L4-01

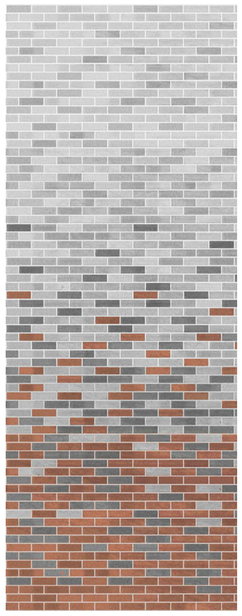


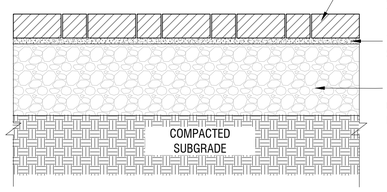
1 EXPANSION JOINT
1":1'-0"



2 CONTROL JOINT
1":1'-0"

RUNNING BOND LAYOUT WITH
GRADIENT PAVER PATTERN:

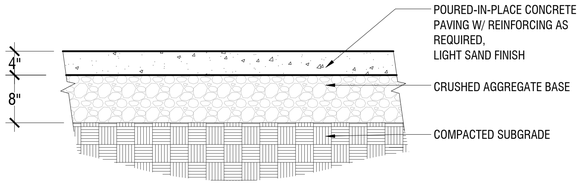




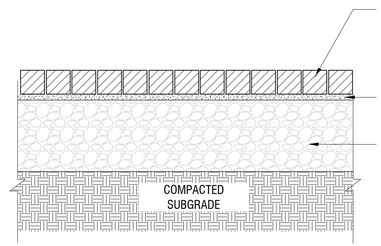
MANUFACTURER: TECHO BLOC OR APPROVED EQUAL
PRODUCT/MODEL: WESMOUNT PAVER OR APPROVED EQUAL
COLORS/FINISH: 52% MERLOT, 43% SHALE GREY, 5% ONYX BLACK OR APPROVED
QUANTITY: 1,151 SF
LAYOUT PATTERN: RUNNING BOND OR APPROVED EQUAL

FOR ORDERING INFORMATION:
TECHO-BLOC CORP
852 W PENNSYLVANIA AVE
PEN ARGYL, PA, USA 18072
EMAIL: CARLTON.COOPER@TECHO-BLOC.COM
TEL: 857-286-9828

4 CONCRETE PAVER
1":1'-0"



3 C.I.P, CONCRETE
1":1'-0"



MANUFACTURER: TECHO BLOC OR APPROVED EQUAL
PRODUCT/MODEL: WESMOUNT PAVER OR APPROVED EQUAL
COLORS/FINISH: SHALE GREY
QUANTITY: 172 LF

FOR ORDERING INFORMATION:
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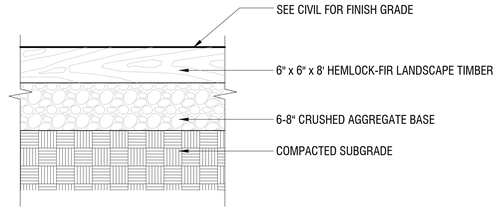
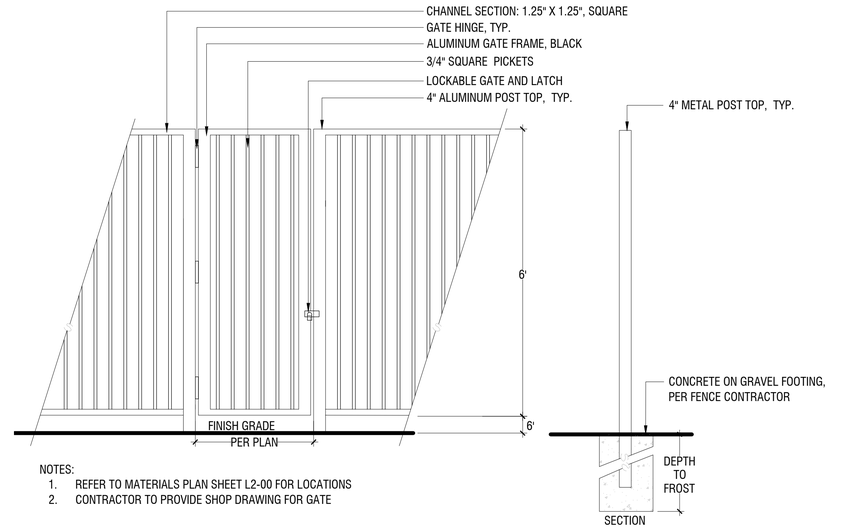
852 W PENNSYLVANIA AVE
PEN ARGYL, PA, USA 18072
EMAIL: CARLTON.COOPER@TECHO-BLOC.COM
TEL: 857-286-9828

5 PAVER BORDER
1":1'-0"



6 TIMBER EDGE
1":1'-0"



NOTES:
1. REFER TO MATERIALS PLAN SHEET L2-00 FOR LOCATIONS
2. CONTRACTOR TO PROVIDE SHOP DRAWING FOR GATE

7 FLETCHER STREET FENCE (IF UNABLE TO RE-USE EXISTING)
1":1'-0"

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REVISIONS

DATE OF ISSUE:

PROJECT NUMBER:

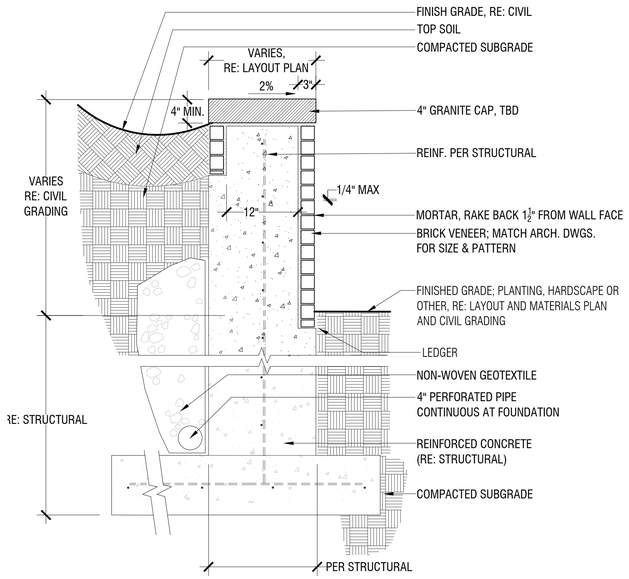
STATUS: LANDSCAPE DETAILS

L 4-00

NOT FOR CONSTRUCTION

SITE KEYNOTES:

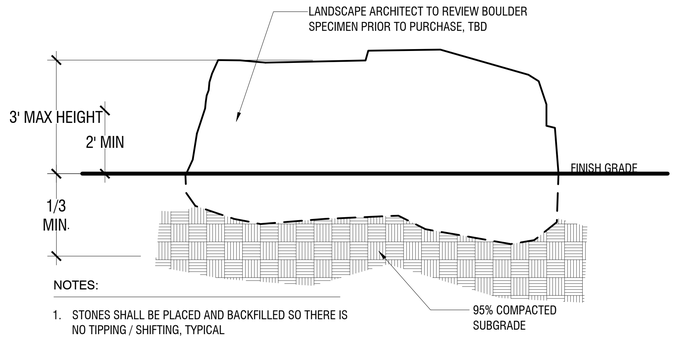
			DETAIL / SHEET
1.0	PAVEMENTS, RAMPS, CURBS		
	1.1	CONCRETE PAVERS	4/L4-00
	1.2	CONCRETE PAVING	3/L4-00
	1.3	PAVER BORDER	5/L4-00
	1.4	TIMBER EDGE	6/L4-00
	1.5	BLACK LOCUST PAVER	2/L4-01
2.0	JOINTING		
	2.1	EXPANSION JOINT	1/L4-00
	2.2	CONTROL JOINT	2/L4-00
3.0	STEPS		
	X.X	NOT USED AT THIS TIME	X/XX-XX
4.0	SITE WALLS/ EMBANKMENTS		
	4.1	RETAINING WALL	1/L4-01
5.0	SITE FURNITURE		
	5.1	BENCH A	1/L4-02
	5.2	BENCH B	2/L4-02
	5.3	BENCH C	3/L4-02
6.0	RAILINGS, BARRIERS, FENCING		DETAIL / SHEET
	6.1	FLETCHER STREET FENCE (IF UNABLE TO RE-USE EXISTING)	7/L4-00
7.0	SITE LIGHTING		
	X.X	NOT USED AT THIS TIME	X/XX-XX
8.0	DRAINAGE		
	X.X	NOT USED AT THIS TIME	X/XX-XX
9.0	PLANTING AND LANDSCAPE		
	9.1	DECIDUOUS TREE PLANTING	1/L4-01
	9.2	CONIFEROUS TREE PLANTING	2/L4-01
	9.3	SHRUB PLANTING	3/L4-01
	9.4	PERENNIAL PLANTING	4/L4-01
	9.5	LANDSCAPE EDGING	5/L4-01
	9.6	BOULDER	3/L4-01
10.0	MISCELLANEOUS ELEMENTS		
	10.1	LOG SURFACING	4/L4-01



1 RETAINING WALL

4.1

1":1'-0"



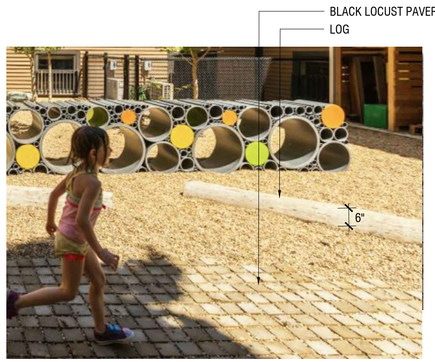
NOTES:

1. STONES SHALL BE PLACED AND BACKFILLED SO THERE IS NO TIPPING / SHIFTING, TYPICAL

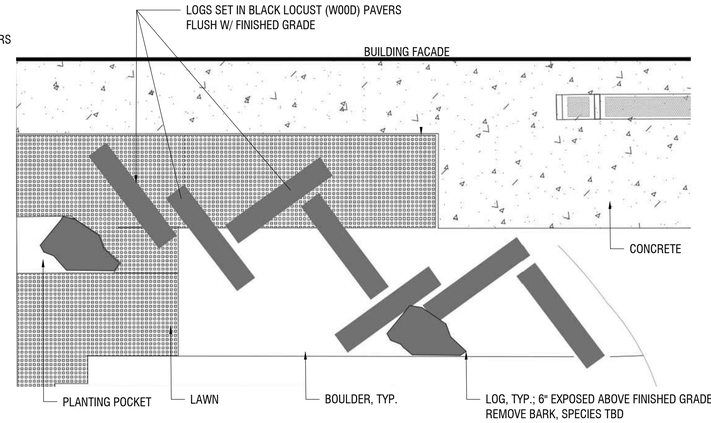
3 BOULDER

9.6

1":1'-0"



CHARACTER IMAGE LOG AND BLACK LOCUST PAVERS

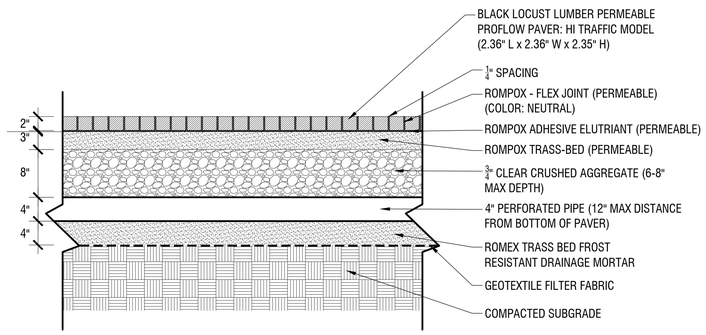


PLAN VIEW

4 LOG SURFACING

10.1

1":1'-0"



2 BLACK LOCUST PERMEABLE PAVERS

1.5

1":1'-0"

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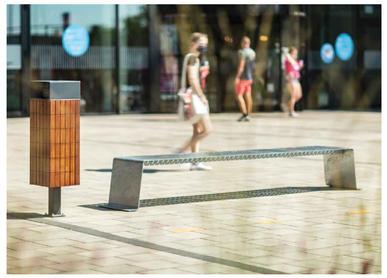
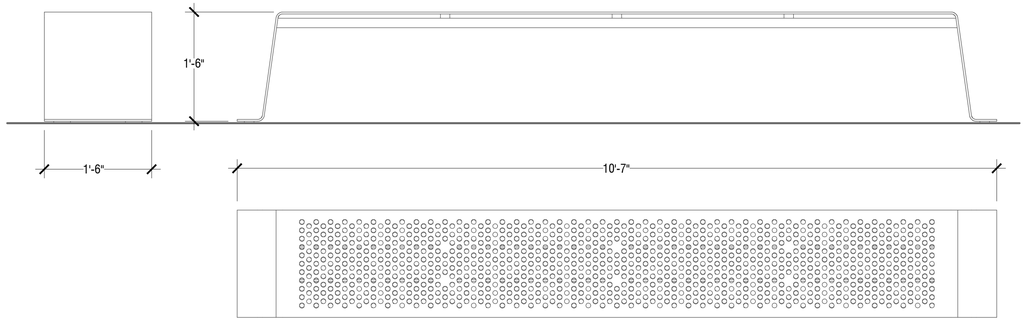
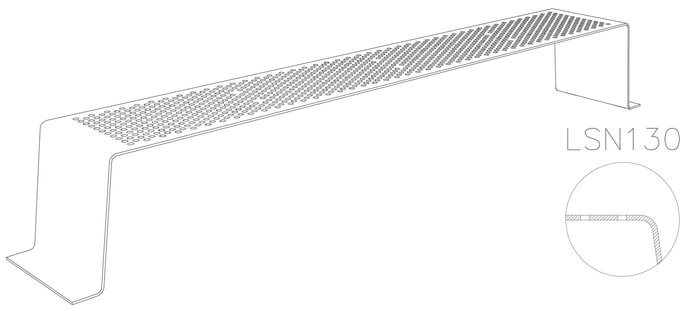
SITE KEYNOTES:

			DETAIL / SHEET
1.0	PAVEMENTS, RAMPS, CURBS		
	1.1	CONCRETE PAVERS	4/L4-00
	1.2	CONCRETE PAVING	3/L4-00
	1.3	PAVER BORDER	5/L4-00
	1.4	TIMBER EDGE	6/L4-00
	1.5	BLACK LOCUST PAVER	2/L4-01
2.0	JOINTING		
	2.1	EXPANSION JOINT	1/L4-00
	2.2	CONTROL JOINT	2/L4-00
3.0	STEPS		
	X.X	NOT USED AT THIS TIME	X/XX-XX
4.0	SITE WALLS/ EMBANKMENTS		
	4.1	RETAINING WALL	1/L4-01
5.0	SITE FURNITURE		
	5.1	BENCH A	1/L4-02
	5.2	BENCH B	2/L4-02
	5.3	BENCH C	3/L4-02
6.0	RAILINGS, BARRIERS, FENCING		DETAIL / SHEET
	6.1	FLETCHER STREET FENCE (IF UNABLE TO RE-USE EXISTING)	7/L4-00
7.0	SITE LIGHTING		
	X.X	NOT USED AT THIS TIME	X/XX-XX
8.0	DRAINAGE		
	X.X	NOT USED AT THIS TIME	X/XX-XX
9.0	PLANTING AND LANDSCAPE		
	9.1	DECIDUOUS TREE PLANTING	1/L4-01
	9.2	CONIFEROUS TREE PLANTING	2/L4-01
	9.3	SHRUB PLANTING	3/L4-01
	9.4	PERENNIAL PLANTING	4/L4-01
	9.5	LANDSCAPE EDGING	5/L4-01
	9.6	BOULDER	3/L4-01
10.0	MISCELLANEOUS ELEMENTS		
	10.1	LOG SURFACING	4/L4-01



RAL 7016
anthracite grey





MANUFACTURER: MMCITE
PRODUCT: SINUS, OR APPROVED EQUAL
MODEL: LSN130 PARK BENCH, OR APPROVED EQUAL
MATERIAL: STEEL STRUCTURE, SEAT MADE OF PERFORATED STEEL SHEET OR APPROVED EQUAL
COLOR/FINISH: RAL 7016 ANTHRACITE GREY OR APPROVED EQUAL
QTY: 02

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SPECIFICATION SALES- APEX LIGHTING AND BUILDING SOLUTIONS
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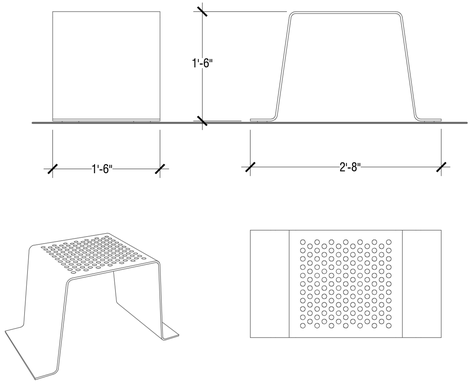
MOBILE: 207-595-4307
TCARROLL@APEXLTG.COM

1 BENCH A
1":1'-0"
5.1

RAL 7016
anthracite grey



MANUFACTURER: MMCITE
PRODUCT: SINUS, OR APPROVED EQUAL
MODEL: LSN110 SEATING ELEMENT/STOOL, OR APPROVED EQUAL
MATERIAL: STEEL STRUCTURE, SEAT MADE OF PERFORATED STEEL SHEET OR APPROVED EQUAL
COLOR/FINISH: RAL 7016 ANTHRACITE GREY OR APPROVED EQUAL
QTY: 08

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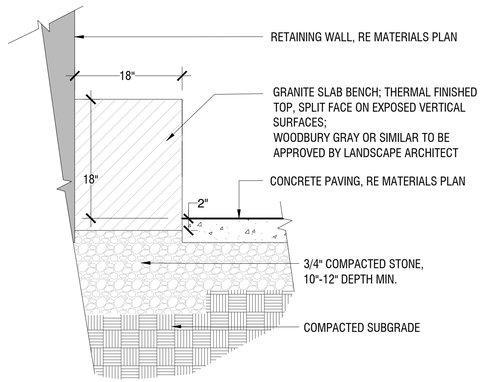
2 BENCH B
1":1'-0"
5.2



3 BENCH C
1":1'-0"
5.3

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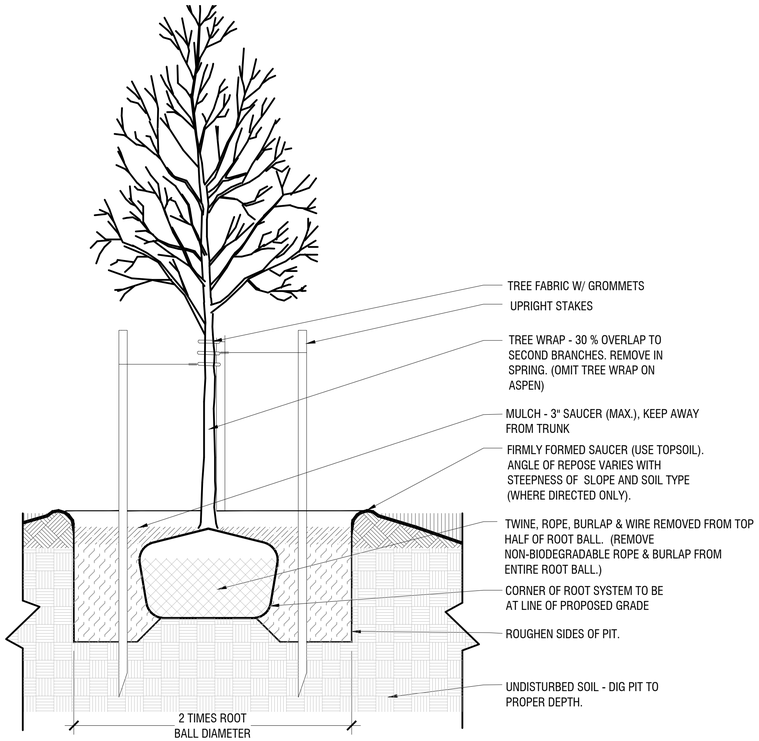
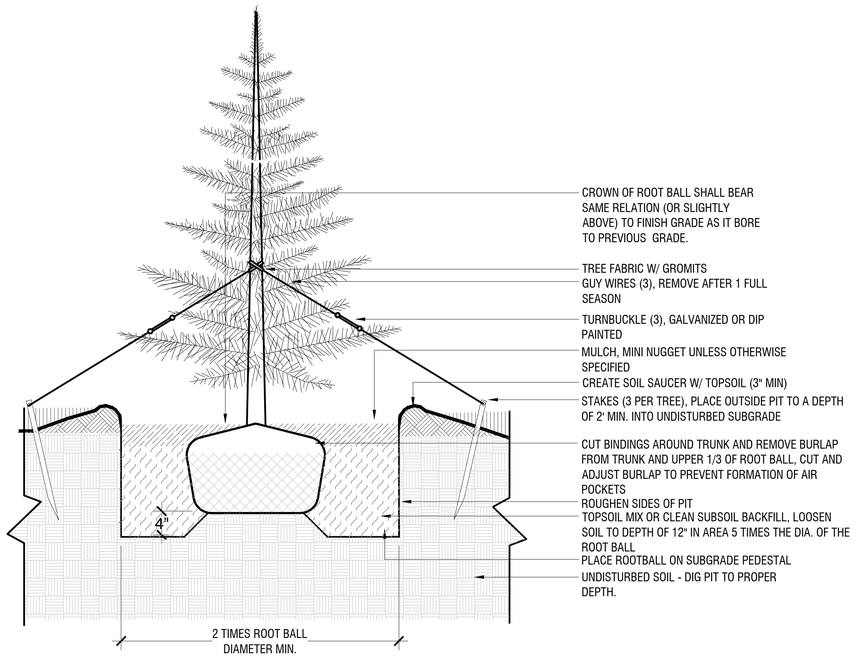


1 DECIDUOUS TREE PLANTING

1":1'-0"

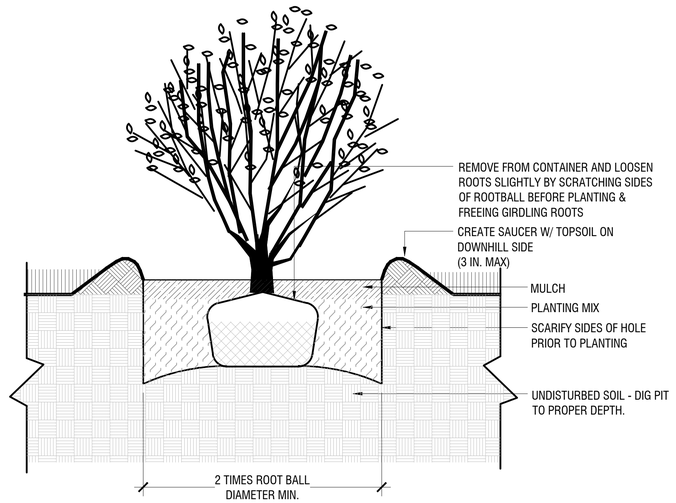
9.1



2 CONIFER TREE PLANTING

1":1'-0"

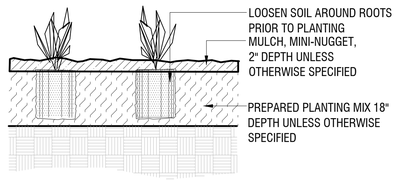
9.2



3 SHRUB PLANTING

1":1'-0"

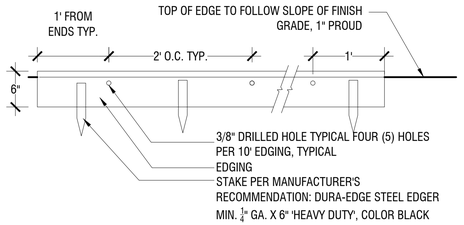
9.3



4 PERENNIAL & GRASS PLANTING

1":1'-0"

9.4



5 STEEL EDGING

1":1'-0"

9.5

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	X.X	NOT USED AT THIS TIME	X/XX-XX
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	4.1	RETAINING WALL	1/L4-01
5.0	SITE FURNITURE		
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	10.1	LOG SURFACING	4/L4-01

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