

1. Agenda

Documents: [AGENDA 5_18_2016.PDF](#)

2. Approve Minutes From April 27

Documents: [DRAFT MINUTES APRIL 27.PDF](#)

3. Discussion Of Improvements To The Solid Waste Program

The City Manager and staff will present recommendations for improvements to the City's solid waste management program and solicit input from the Committee.

4. Sea Level Rise

Documents: [COMMUNICATION TO SUSTAINABILITY COMMITTEE, 5-18-16 \(2\).PDF](#),
[ADAPTATION BACKGROUND, WBN TO SUSTAIN COMM, 5-18-16 \(1\).PDF](#)

5. National League Of Cities Grant

Review the goals of the grant and discuss how they can complement and advance the City's efforts around resiliency.

6. Reports

Update on the 2030 District initiative
Harbor Dredging and Disposal

Documents: [COMMUNICATION TO SUSTAINABILITY COMMITTEE, CAD, 5-18-16.PDF](#)

7. Updated Proposed For Limiting Pesticide Use On City Property

Staff have updated the draft proposal for limiting the use of pesticides on City property and incorporated comments made by committee members during the April meeting.

Staff will note the changes and look for the committee to endorse this approach pending further Council action based on recommendations of the Pesticide and Fertilizer Task Force.

Documents: [PORTLANDOPENSACESPESTICIDEPROPOSAL2016 \(3\).PDF](#)

CITY OF PORTLAND, MAINE

Standing Committee on Energy and Sustainability

Councilor Jon Hinck (A/L), Chair

Councilor Spencer Thibodeau (D2), Vice Chair

Councilor Ed Suslovic (D3)

Agenda

May 18, 2016

5:00 PM

Council Chambers

1. Review and approve minutes from April 27, 2016
2. Improvements to Solid Waste Program
 - Staff will present recommendations to improve and modernize the solid waste program
3. Sea Level Rise
 - Staff will report on the City's efforts related to sea level rise to date and discuss upcoming efforts in Bayside. This item responds to the Committee's request for information on this topic on April 27.
4. National League of Cities Leaders in Community Resilience Grant
 - Staff will update the Committee about the grant that the City Council accepted during their meeting on April 25.
5. Pesticide and Fertilizers
 - At the request of the Committee, City staff has amended the operational plan for the use of pesticides in Parks and Open Spaces presented on April 27. Staff is requesting that the Committee endorse the plan pending any Council action that may result from recommendations by the Pesticide and Fertilizer Task Force.
6. Reports
 - Update on benchmarking and the 2030 District
 - Harbor dredging and disposal of materials (CAD Cell)
7. Other business
8. Adjourn

CITY OF PORTLAND, MAINE

Standing Committee on Transportation, Sustainability and Energy

Councilor Jon Hinck (A/L), Chair

Councilor Spencer Thibodeau (D2), Vice Chair

Councilor Ed Suslovic (D3)

Councilors Present: Councilor Hinck, Councilor Thibodeau, Councilor Suslovic

Staff Present: Troy Moon, Jeff Tarling, Paul Bradbury, Ethan Hipple

Councilor Hinck called the meeting to order and moved to take the energy benchmarking update out of order. Councilor Suslovic joined the meeting shortly thereafter.

Progress Report on Energy Benchmarking

Mr. Moon reported that the project to benchmark energy use by all City buildings is going fairly well. Gathering the data from the utilities has been a little challenging but some key contacts have been helpful. Interns from the Greater Portland Sustainability Council have been assisting the effort by entering the utility data into EPA Portfolio Manager software. Mr. Moon demonstrated the software to the committee and showed reports from several buildings with good data sets. He indicated the goal of the effort is to track energy consumption on an ongoing basis which will allow staff to identify buildings that may need efficiency upgrades and that regular tracking will allow staff to investigate spikes in usage and troubleshoot the causes.

Review and Approve Minutes from March 15, 2016

Motion made to approve the minutes by Councilor Suslovic, seconded by Councilor Thibodeau. All vote in favor.

Jetport Master Plan

Mr. Bradbury briefly summarized the report on the Jetport Master Plan that he offered during March meeting. Councilor Suslovic made a motion to recommend the master plan for adoption by the City Council. Councilor Thibodeau seconded the motion. All were in favor.

Presentation by City Arborist Jeff Tarling on Maintenance Efforts to Maintain the Tree Canopy

Mr. Tarling indicated that staffing for the Forestry program consists of a supervisor and four arborists to take care of more than 19,000 street trees. Their goal is to create a rotation where all trees can be trimmed within 5 – 7 years. With staffing and funding levels this

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hasn't been feasible and the group mostly focuses on complaints and hazards. Parkside, Libbytown, and East Deering are in need of additional trees. He also explained that funds contributed by developers for tree planting are often for neighborhoods where there is not a lot of room for additional trees – such as Munjoy Hill. He is working with Planning to make amendments to address how the funds can be used.

Councilor Thibodeau asked about loss and replacement of mature trees.

Mr. Tarling indicated this is a problem. When a large street tree is lost or removed it is difficult to return a large tree because of space limitations. The tree wells typically allow for the planting of 2" caliper trees.

Councilor Thibodeau followed up with a question about how the Forestry team works with Public Works to incorporate trees into street plans.

Mr. Tarling reported that he works with the engineers during the design phase to think about tree placement. It is challenging to fit the tree wells into the sidewalks given other considerations including ADA requirements. A 4' x 4' tree well is as large as they can normally get.

Councilor Suslovic asked whether there could be a way to plant trees on private property (with the agreement of the homeowner) if the esplanade on a street was too narrow for planting.

Mr. Tarling said this is called "set back planting" and is a good way to address the problem. He added that the current tree replacement budget only allows for the planting of about 20 trees per year. It would be important to develop a more proactive approach.

Councilor Suslovic stated that he feels that it will be important to have integrated planning for City and private developments to insure that we plant healthy trees that will survive. He also stated that Portland residents value trees and want more. He feels the City has not adequately invested in maintaining this part of the City infrastructure. He asked what resources would be required to do this adequately.

Councilor Hinck added that the current approach to maintaining trees is based on a triage approach. He would like a report in advance of next year's budget cycle to assess what funding would be needed to have a more proactive approach. The Council has a strong

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consensus that trees are very important. He requests that the Committee receive this information during the October meeting.

Councilor Suslovic requests that this report include staffing and resource comparisons with comparable cities.

Work Plan

Councilor Thibodeau asked about transportation issues. He is interested in working on creating the first protected bike lane from the East End to the West End. He then excused himself in order to attend the Housing Committee meeting.

Councilor Suslovic expressed concern about the maintenance of existing bike lanes in regards to striping. The striping gets faded and the lines are not redone adequately. He feels we need to make sure we are prepared to take care of infrastructure if we create it. Otherwise, we are not meeting the expectations of our residents.

Mr. Moon indicated that there would be some studies and master plans coming before the committee very soon.

Councilor Hinck asked for an update on the 2030 District initiative.

Mr. Moon reported that he has been in touch with the organizers and they are working with their partners in the business community but are not quite ready to go live. They appreciate the City's enthusiasm for the project and look forward to a formal endorsement when the time comes.

Councilor Suslovic thanked Councilor Hinck for securing the National League of Cities Resiliency Grant. He further requested that staff report back to the committee on efforts related to sea level rise to date. He would like to explore how to use the grant to support ongoing efforts.

Councilor Hinck asked for an update on the solar landfill project. Mr. Moon responded that the solar bill failed when the legislature could not override the governor's veto. Staff are evaluating the options for moving forward.

Councilor Suslovic requested information about converting street lights to LED.

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Mr. Moon told the committee that staff is currently inventorying the lights in preparation for a project. We are also waiting for the PUC to finalize their rules.

Councilor Suslovic then requested that staff bring back the LED Lighting issue at a future meeting in order to inform budget discussions next year. He also requested a discussion of solid waste improvements in the near future.

Pesticides

Director of Parks, Ethan Hipple, presented a proposal by City staff to greatly reduce the use of synthetic pesticide in City parks and open spaces. The goal is to preserve our important assets but to do so in the most environmentally sound manner. The staff team responsible for drafting the plan divided spaces into four categories with a management approach for all of them. In categories 3 and 4, staff would not use synthetic pesticides at all.

Field use in Portland is very high. Best practices call for turf fields to get 200 hours of use per year. In Portland, some fields get over 1000 hours of use. This requires extra measures to keep the fields in good and safe playing condition, including the use of chemical pesticides as necessary. Staff proposes to test completely organic methods on two high use fields and get a sense of how they perform. Field users, staff, and the public would then weigh on how it is working.

At the golf course, staff is recommending an innovative approach to drastically reduce pesticide use. Playing surfaces, other than putting greens, would be treated with organic products two out of every three years. On the third year, chemical pesticides would be used as necessary. Putting greens would be exempt because there is not successful way to maintain the greens without use of chemical pesticides.

Mr. Hipple indicated that staff is looking for the committee to endorse this approach while the Council works on a larger policy.

Councilor Suslovic requestsd that the City put a deadline on achieving Audubon certification by July 1, 2018.

Councilor Hinck mentioned that the plan indicates says that neonicotinoid pesticides will be discontinued at the golf course and asked whether this applies to other spaces as well.

Mr. Hipple indicated that it could and should have been mentioned in the other section of the plan as well.

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Councilor Hinck asked Mr. Hipple about use of Round Up. Mr. Hipple noted that staff uses as little as possible but there are circumstances when it is used. This is particularly around invasive plants and noxious weeds. Mr. Moon added that staff has been using an organic product called Avenger instead of Round Up on curb lines, traffic islands, and horticultural displays.

Councilor Hinck requested that we try to put together a base line of pesticide use in previous years so we can document reductions of use and increases in use of organics. Mr. Hipple agrees to put this together.

Councilor Suslovic asked Mr. Hipple about the costs noted in the report. Mr. Hipple indicated that the approach called out in the plan is an integrated pest management plan that incorporates the use of organic pesticides but does not only use organics. The fully organic approach would be more costly.

Councilor Hinck and Councilor Suslovic requested that staff incorporate the suggestions of the committee and bring it back at the next meeting.

Discussion then turned to the establishment of a Pesticide Task Force. Councilors reviewed the draft ordinance prepared by Corporation Counsel.

Councilor Suslovic suggested adding Fertilizer to the scope of the task force. He suggested add a Portland commercial property owner, two Portland residential property owners, and a golf course person to the task force roster. He suggested that the South Portland representative should be a resource but not a member.

Councilor Hinck invited public comment.

James Cohen, on behalf of Mainers for Greener Communities, endorsed having a task force. He recommended a good balance and suggested some trade associations would be good resources. He feels that the task force should take adequate time to have effective dialogue would be helpful.

Jesse O'Brien suggested that staff should do a measure soil health and turf depth in the athletic fields before implementing the experiment with organic pesticides in the high use fields. He added that cooperative extension agents would be good resources for the task force.

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Avery Kamila supported the formation of a task force. She is happy the City is trying to use less pesticide. She asked for clarification that the City will not be using Round Up on curb lines and infrastructure this year. Mr. Moon confirmed that is the case. Ms. Kamila expressed concern about pesticide drift.

Councilors Hinck and Suslovic discussed the language of the draft amendment and agreed to incorporate the additional members suggested by Councilor Suslovic but to include the South Portland person as a member. They also agreed that the task force will report back by July 11 but could request an extension if they feel it is necessary. Councilor Suslovic moved the item and seconded by Councilor Hinck seconded. Both agreed.

Adjourn.

**Memorandum****To:** Chair Jon Hinck and members of the Energy and Sustainability Committee**From:** Bill Needelman, Waterfront Coordinator**Date:** May 10, 2016**Re:** Communication on Climate Change Adaptation Planning – Status and next steps

Introduction

Climate change planning and sea level rise adaptation planning have been topics of civic discussion in Portland for over 10 years. During this time, various processes have engaged with the issues, however, only modest accomplishments have been achieved to date. At the request of the Energy and Sustainability Committee, Economic Development Staff has assembled a brief summary of past city efforts to address climate change related challenges and will outline anticipated next steps.

Background

Previous City of Portland efforts to address climate change and sea level rise adaptation have been largely limited to building partnerships with outside agencies and non-profits groups and evaluating flooding related risks. These processes, as outlined below and to be presented at the May 18 meeting, involved: state and federal agencies; the professional design community (Portland Society for Architecture and the US Green Building Council,) the University of Southern Maine, the New England Environmental Finance Center, the Gulf of Maine Research Institute, Non-profit groups, concerned individuals, and multiple city departments.

Previous Process

2005	Ocean Gateway Infrastructure Planning
2007-2009	Sustainable Portland Report
2009-2010	Maine Climate Change Adaptation Taskforce
2011	City Council Resolution on Sea Level Rise Adaptation
2011	Bayside Vulnerability Assessment: Portland Society for Architecture New England Environmental Finance Center State of Maine Geologic Survey
2013	Commercial Street /Waterfront Vulnerability Assessment

2014	Urban Land Institute - Urban Resiliency Panel
2014	Department of Homeland Security – Regional Resiliency Assessment Program:
2015	Maine Climate Adaptation “Table Top Exercise” pilot
2015	US Green Building Council North East Regional Conference
2015-2016	Flooding Response Protocols – internal staff process
Ongoing	Comprehensive Plan Updates
Ongoing	Gulf of Maine Research Institute: C-Rise Process
Ongoing	Bayside Flooding Adaptation

The list of climate and sea level rise related processes outlined above demonstrates significant progress in recognizing the **risks** facing the City. However, the community still has far to go to identify the particular **vulnerabilities** (impacts) to neighborhoods, infrastructure, development, economic resources, cultural assets, and natural systems. The City is even further removed from identifying **adaptation** approaches that will solve, soften, or accommodate the impacts of climate change and sea level rise.

In short, the primary identified risks identified for the City of Portland are of **increased flooding**: both higher tides due to sea level rise, and increased precipitation occurring during more frequent and intense rain events. Both scenarios can, and do, cause periodic flooding of low lying areas. When intense rains occur in the presence of storm surge or during higher than normal tides, such as experienced in September 2015, the City can see dramatic floods causing damage to buildings, infrastructure, vehicles, and posing risk to human life.

Bayside Adapts

As most observers are aware, the City’s most vulnerable areas are the lower lying portions of the Bayside neighborhood. Lying even lower than most portions of the Waterfront, Bayside currently experiences the worst flooding in the City on the most frequent basis. Recognizing this vulnerability, the City is about to engage in a multi-step process to plan for more water in Bayside: **Bayside Adapts**.

Bayside Adapts, Phase I, is a two staged effort to position the City to move beyond risk and vulnerability recognition (what’s wrong?) and into adaptation planning (what do we do?) The City Manager, and the departments of Economic Development, Planning, and Public Works have all committed to engage in this work. The 2016 budget describes using Bayside TIF funds to engage in adaptation planning.

Next Steps

As a means to uphold City commitments to plan for climate change and sea level rise in the Bayside Neighborhood, city staff has been exploring an opportunity to use the unique talents and abilities of the New England Environmental Finance Center (EFC) to conduct and manage a first phase of a district adaptation planning process on the City’s behalf. Staff is recommending a sole source procurement of services from the EFC to project manage the **Bayside Adapts, Phase I**, process.

Bayside Adapts, Phase I, anticipates two related and simultaneous components: a technical Data Gap Analysis; and, a Public Outreach and Engagement process. The results of Phase I will position the City to confidently enter into ***Bayside Adapts, Phase II: Adaptation Approach Planning***.

The EFC proposes to conduct the proposed scope for a fee of \$26,000. As a component of EFC's current year work plan, they would additionally provide uncompensated person hours as a means to complete the project. The EFC contribution of uncompensated effort reflects their mission to contribute within their host community.

The sole source procurement scope proposed by the EFC and recommended by staff is to *manage* the Data Gap Analysis process, and to *conduct* the Public Engagement Process. Under this arrangement, EFC would assist the City in a *competitive bid process to select a technical consultant* and then act as project manager on the City's behalf. The proposed budget for the Data Gap Analysis would be \$74,000.

A presentation of past Climate Change and Sea Level Rise adaptation processes will be provided at the May 18 meeting

Resiliency Planning in Portland, Maine

Bill Needelman, AICP
City of Portland Waterfront Coordinator

City of Portland Sustainability Committee
May 18, 2016



Actions toward a Resilient Community

- **Government**
Local – State - Federal
- **Advocacy**
- **Not For Profit**
- **Education**
- **Business**
- **Community**

Portland's City Government has tried to leverage the separate efforts of multiple players into a cohesive framework of partnerships

It isn't easy without money

List of Actions and Processes to date

2005 **Ocean Gateway** Infrastructure Planning

2007-2009 **Sustainable Portland** Report

2009-2010 **Maine Climate Change Adaptation Taskforce**

2011 **City Council Resolution** on Sea Level Rise Adaptation

2011 **Bayside Vulnerability** Assessment:
Portland Society for Architecture
New England Environmental Finance Center
State of Maine Geologic Survey

2013 Commercial Street /**Waterfront Vulnerability** Assessment

2014 **Urban Land Institute** - *Urban Resiliency Panel*

2014 **Department of Homeland Security** –
Regional Resiliency Assessment Program:

2015 *Maine Climate Adaptation “Table Top Exercise”* pilot

2015 **US Green Building Council** North East Regional Conference

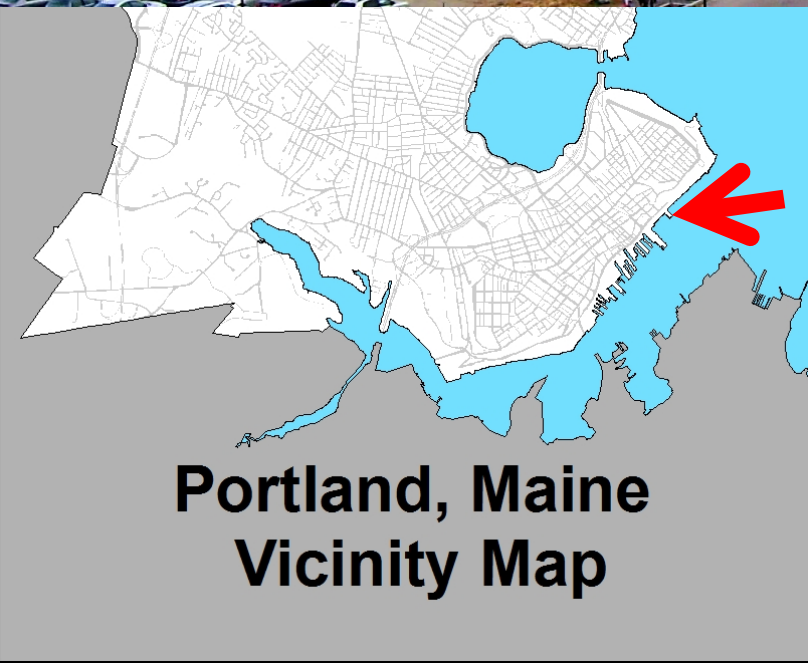
2015 **Comprehensive Plan Updates**

Ongoing **Bayside Flooding Adaptation:**

Big list, modest accomplishments



Ocean Gateway Case Study: 2005-2008



- Existing industrial pier converted to passenger use
- Use wind/wave data to establish the Base Flood Elevation
- Slight elevation of finished floor to accommodate SLR



Ocean Gateway Wave Wall



**7 years later – elevate catwalk
to meet V zone standards**



**Elevated
Infrastructure**

Sustainable
Portland:
2007
Adopted
2009

“Ultimately, ... we must begin the conversation of how to adapt our lower lying neighborhoods and districts to rising sea level, and ... to begin ... to comprehend the magnitude of the financial burden that climate change will place on our City.

Climate change may be the greatest challenge to our City since the re-building after the Great Fire of 1866” .”

Excerpt from Sustainable Portland Report, Climate Change Sidebar, Page 5. Adopted 2009

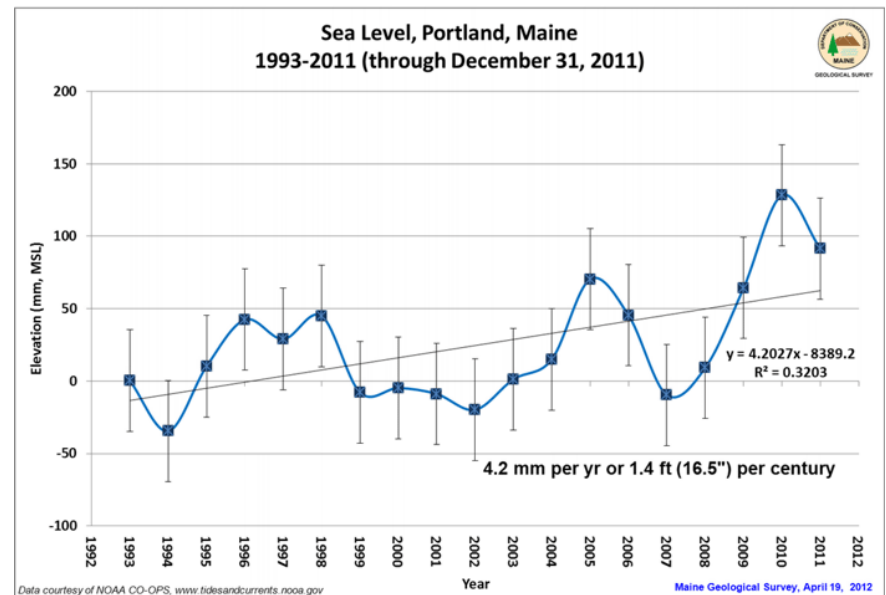
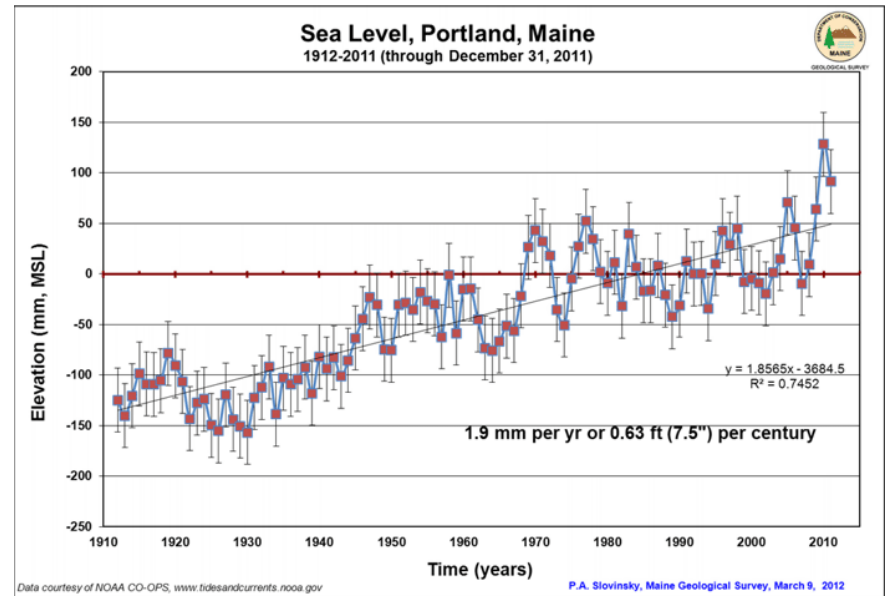
State of Maine Partnerships

100 years of data
from the
Portland Tide Gauge

1.9 mm/year
7.5 inches /century

More Recently

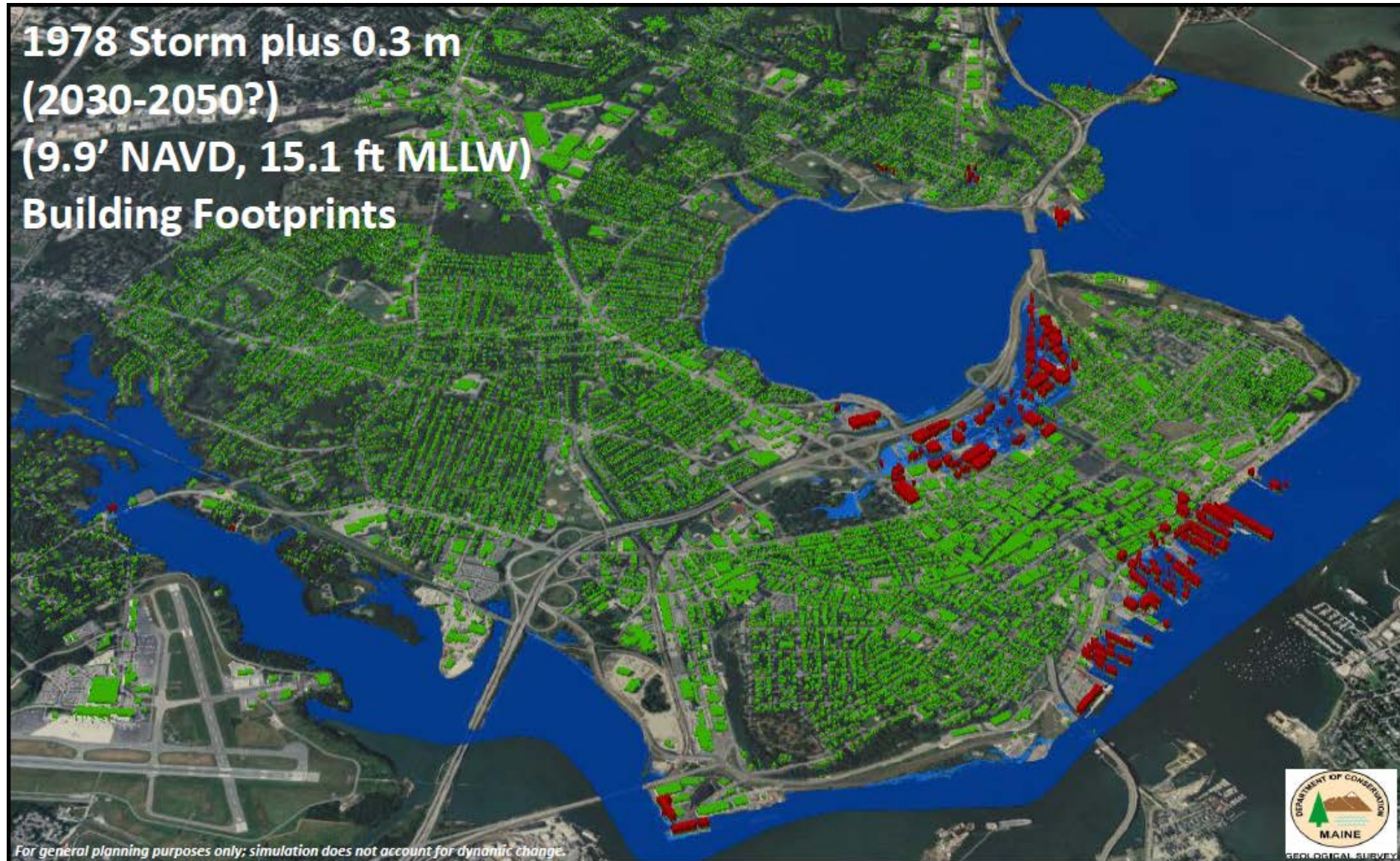
4 mm/year
1.4 feet per century



Source: Peter Slovinsky, Maine Geologic Survey

State of Maine Partnerships

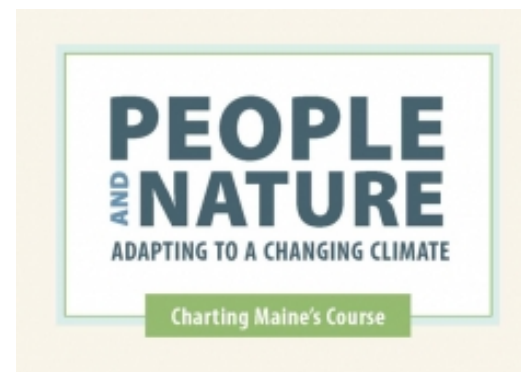
1978 Storm plus 0.3 m
(2030-2050?)
(9.9' NAVD, 15.1 ft MLLW)
Building Footprints



Assistance from the Maine Geological Survey

State of Maine Partnerships

Maine Climate Change Adaptation Taskforce



Area of Concern	Climate Variable(s)	Seasonal Pattern / Occurrence	Impact / Effect on Natural System population and elements	Sensitivity (H,M,L)	Adaptive Capacity (H,M,L)	Vulnerability	Impact / Effect on Human / Built System components	Sensitivity (H,M,L)	Adaptive Capacity (H,M,L)	Vulnerability
Ports and Harbors; Waterways	Sea-level	Incremental increase					Need for increased freeboard for piers and harbors Effects of increased siltation o Dredging costs and increased frequency [may be offset by sea-level rise in some places] For rock-protected harbors, may create a competitive advantage for Maine ports over southern soft coast areas			
	Severe weather	Chronic; episodic					- Structural damage: costs, insurability - o Ports/water facilities - o Related transportation systems	M	M	M
	Change in water, wind circulation patterns	Unknown					May require relocation / redesign of wave-break and harbor jetty infrastructure.			

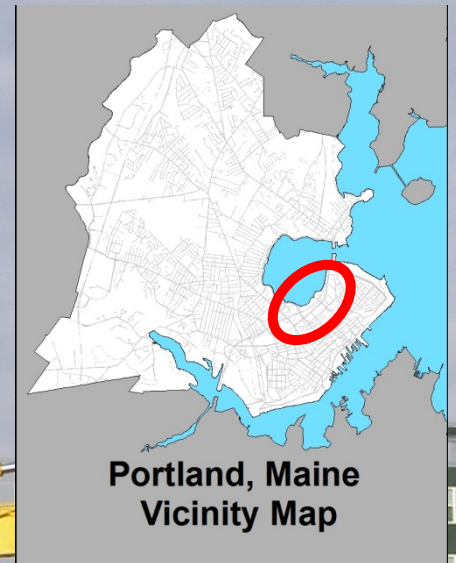
Bayside Case Study

Work with collaborative team

Leverage outside leadership from the

Design Community (PSA)

Academic Community (Muskie School, NEEFC)





Bayside is a filled land redevelopment area that is at significant risk of flooding during intense Rain events at high tide. Rising seas are not going to make these conditions any better.

Bayside Vulnerability Assessment:

City participated with leadership provided by

- Portland Society for Architecture
- New England Environmental Finance Center (Muskie School at USM)



Source: Merrill, S., P. Kirshen, D. Yakovleff, S. Lloyd, C. Keeley, and B. Hill. 2012. COAST in Action: 2012 Projects from New Hampshire and Maine. New England Environmental Finance Center Series Report #12-05. Portland, Maine.

COAST Model Application

Table 1. Adaptation Costs and Cumulative Expected Damages through 2050, Portland, Maine

SLR Scenario	Adaptation	Cost (M)	Real Estate Damage (M)	Percent of damage from	
				Storm surge	SLR
No SLR	No Action	\$0	\$356	100%	0%
	Surge Barrier / Levee	\$103 / \$0	\$0		
Low SLR (7.9")	No Action	\$0	\$407	100%	0%
	Surge Barrier / Levee	\$103 / \$0	\$0		
High SLR (19.7")	No Action	\$0	\$447	100%	0%
	Surge Barrier / Levee	\$103 / \$0	\$0		

Back Cove, Portland, ME

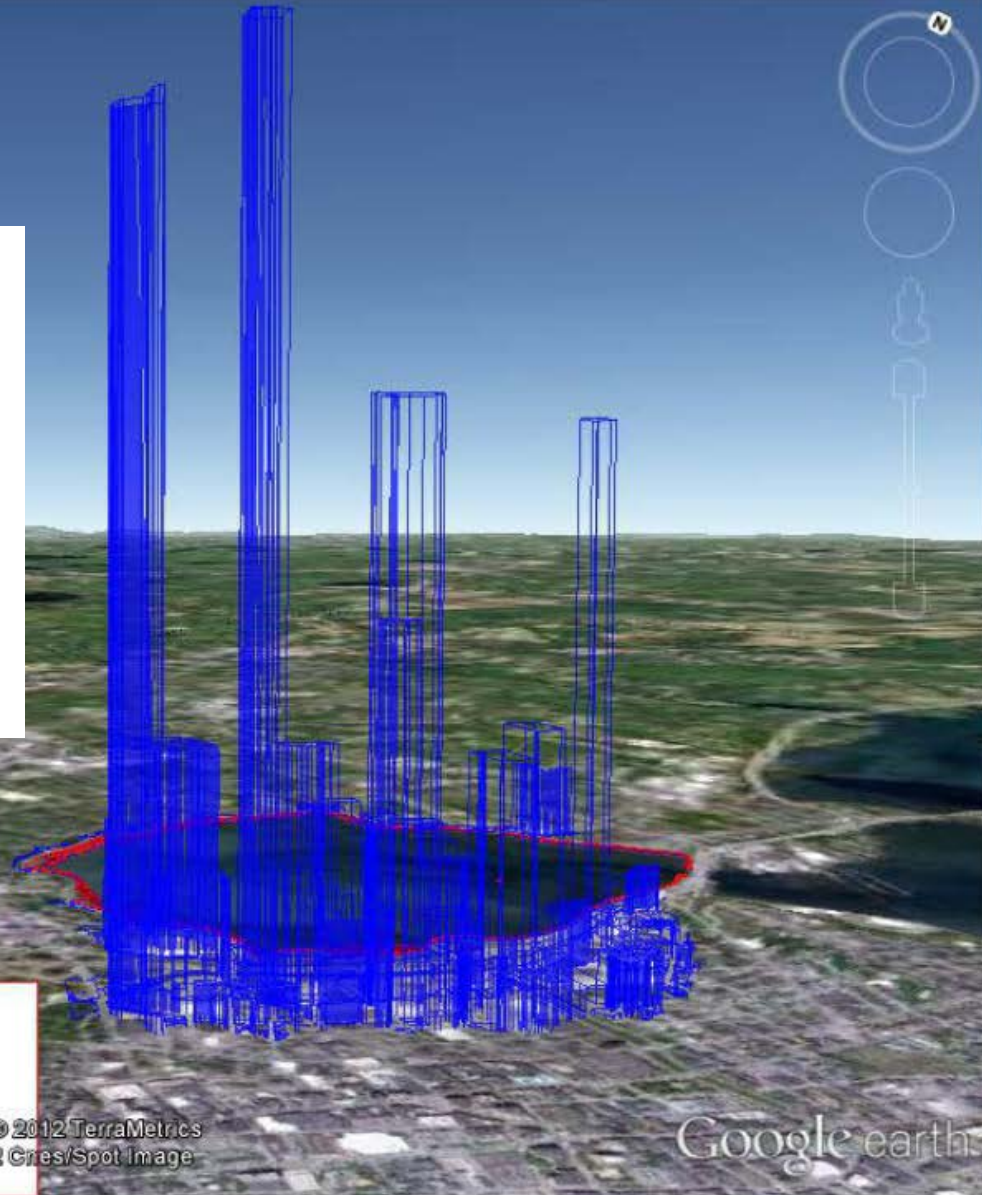
Lost real estate value for scenario: Year 2050, High SLR, 100Y Storm
Financial Scale: Maximum Damage (height) = \$20.2M*

* Includes discounting and anticipated future development.

- Costs from Sea Level Rise and Mean Higher High Water
- Costs from Storm Surge

Image © 2012 TerraMetrics
© 2012 Gres/Spot Image

Google earth



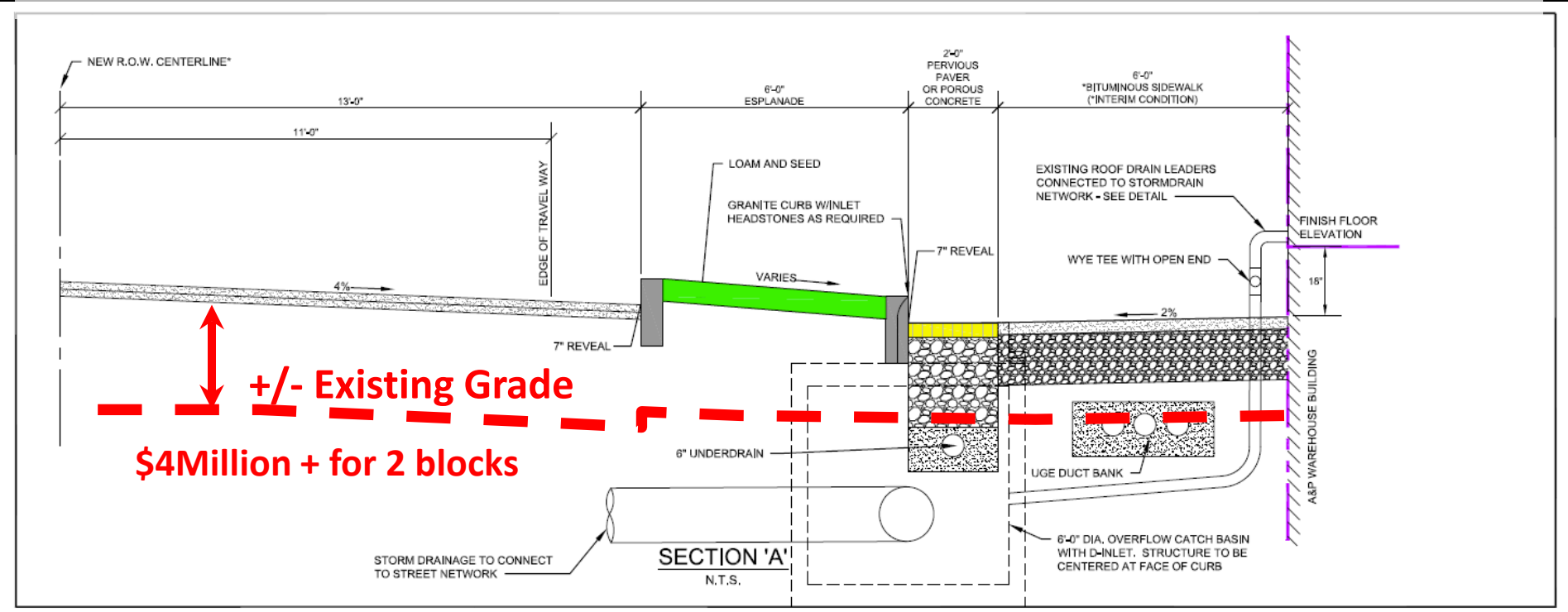


SOUTHEAST VIEW FROM CHESTNUT STREET

Bayside is poised for new development in areas that currently experience sea level-effected flooding during rain at high tide



One solution is to raise critical streets to accommodate new land uses



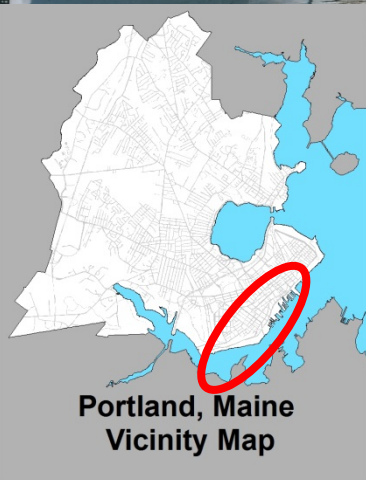
Commercial Street Case Study

Actively participate in PSA Process

Provide the base data and mapping

Provide contacts to the pier owners and encourage participation

Promote participation by staff and elected officials



Portland, Maine
Vicinity Map



Commercial Street is a nationally recognized historic asset – Winner of an American Planning Association “Best Street” award in in 2008

Commercial Street Case Study



Commercial Street Case Study



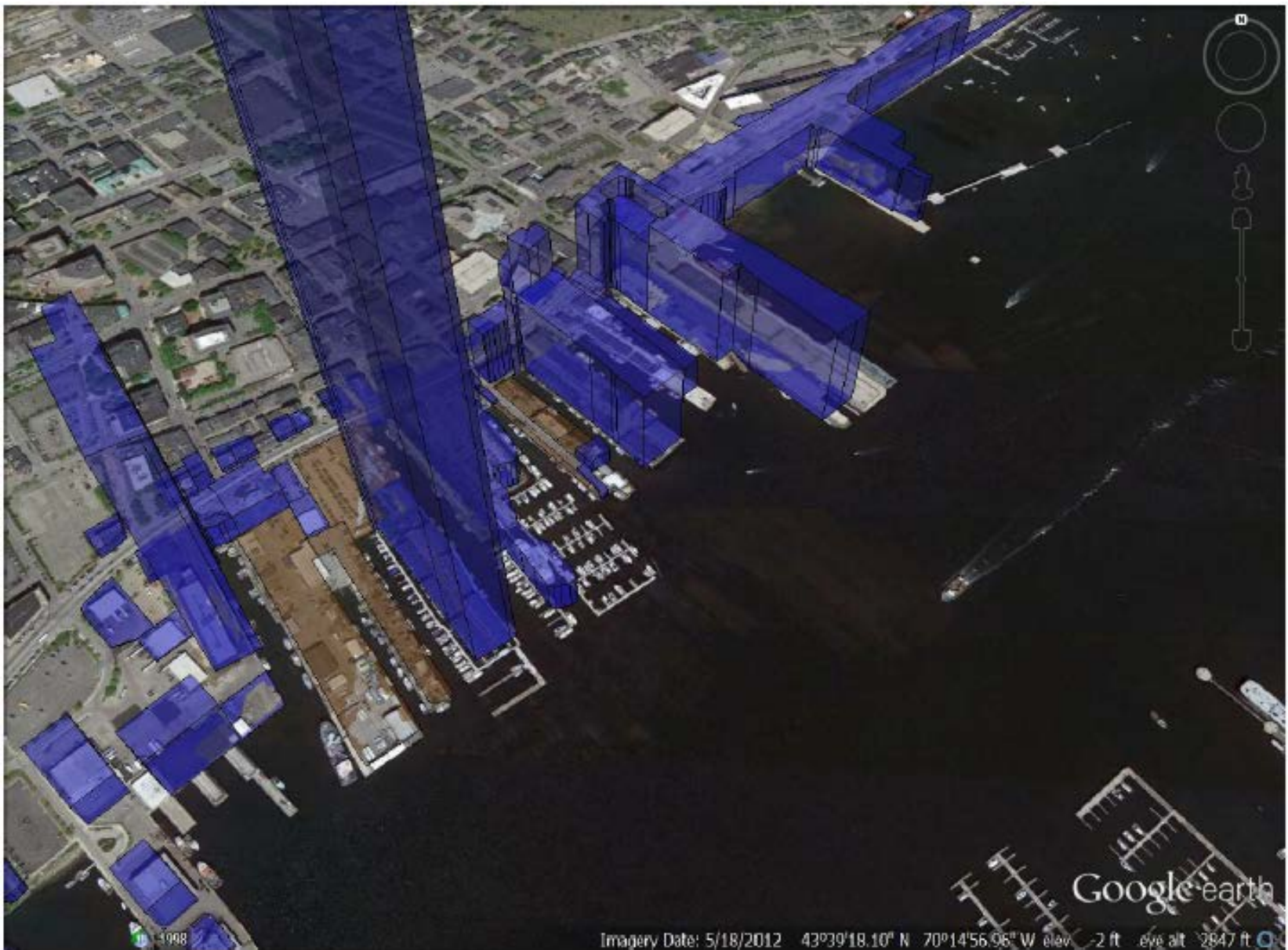
Fig. 1-City of Portland: Commercial Street

COAST Model Results, 100 Year Storm in 2050
Total Elevation of Flooding – 11.5 Feet (NAVD 88)

One-Time Storm Damage for This Event:	\$16.0 Million
Cumulative Damage Up to This Scenario Year:	\$32.9 Million
Value of Buildings on Parcels Lost to Sea Level Rise, by This Scenario Year:	\$8.7 Million

- Buildings Damaged by Storm Surge from this Single Event (Height of Bar indicates relative damage amount)
- Buildings Permanently Inundated due to Sea Level Rise by this Year, if No Action is Taken
- Extent of Flooding from this Event

*Note: Predicted flood depths and dollar damages for all individual affected parcels are available in Google Earth *.kml files.*



Commercial Street Case Study



Jonathan T. Lockman AICP
Vice President of Environmental Planning
Catalysis Adaptation Partners LLC
jtlockman@catalysisadaptation.com
26 July 2013

This project is funded by the
Portland Society for Architecture, in
cooperation with the City of
Portland, ME

Commercial Street Case Study

Process identified building vulnerability up to \$111million in present dollars due to 4 feet of sea level rise



Portland Pier, King Tide, 2014



New Development at Maine Wharf, King Tide 2015

Local Government:



King Tide Staff Walk, November 2012



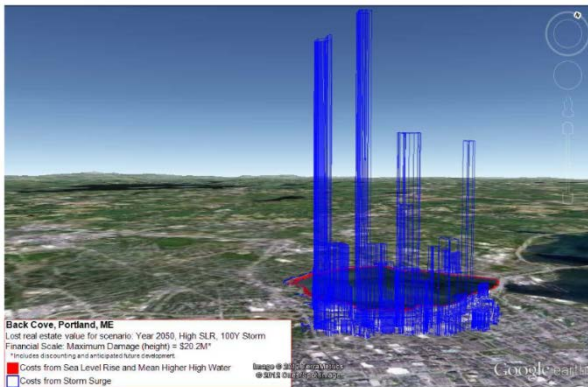
City of Portland 2015 Comprehensive Plan Update

Climate Change

Examples of Work Regarding Portland and Casco Bay Conducted by Other Organizations

The effects of a changing climate, particularly those of increasing frequency and intensity of storms coupled with rising sea levels, has spurred much debate and discussion in and around the Portland region and Casco Bay. Although the City has formed no policy of its own on these effects, the growing body of work conducted by others with concerns for the City and Bay begs the question of whether the City should be forming its own policies in regards to the issues.

Excerpts from *COAST In Action: 2012 Projects from Maine and New Hampshire*, prepared for US EPA's Climate Ready Estuaries Program by the New England Environmental Finance Center/University of Southern Maine



Lost Real Estate Value for the Year 2050, High Sea Level rise, 100-year Storm in Back Cove,

2050		Percent of damage			
SLR Scenario	Adaptation	Cost (M)	Real Estate		SLR
			Damage (M)	Storm surge	
No SLR	No Action	\$0	\$356	100%	0%
Low SLR (7.9")	Surge Barrier / Levee	\$103 / \$0	\$0		
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	No Action	\$0	\$447	100%	0%

Adaptation Costs and Cumulative Expected Damages through 2050



Excerpts from *Preparing Portland for the Potential Impacts of Sea Level Rise*, Maine Geologic Survey, Maine Dept. of Agriculture, Conservation & Forestry, 2012

Using LiDAR to estimate building inundation

Using LiDAR to assess transportation infrastructure impacts

Using LiDAR to estimate marsh migration for Fore River

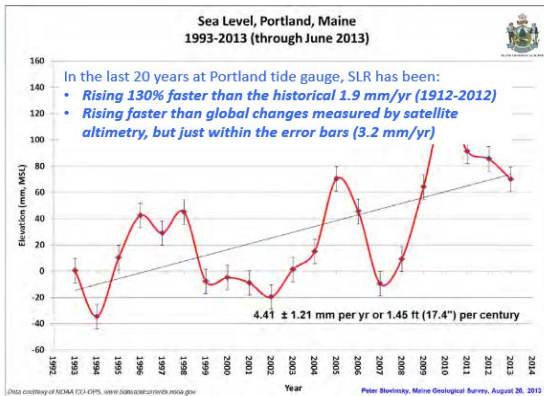


City of Portland 2015 Comprehensive Plan Update

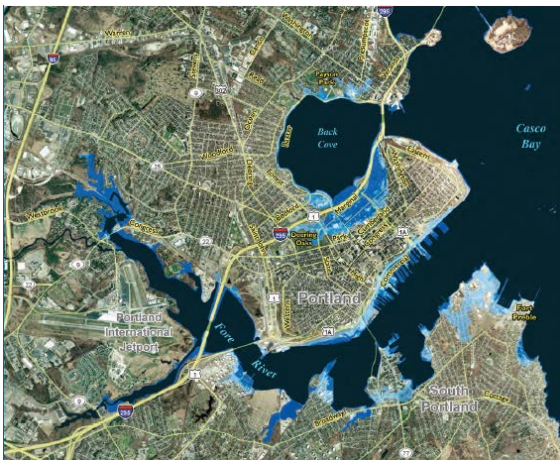
Climate Change

Examples of Work Regarding Portland and Casco Bay Conducted by Other Organizations

Excerpts from *Waterfronts of Portland and South Portland, Maine*, prepared by Urban Land Institute, 2014



NOAA tidal gauge data in Casco Bay for the past 20 years, source Maine Geological Survey



Computer model of land at risk from flooding with sea level rise, source Clean Air Cool Planet

Excerpts from *Resiliency Assessment Interim Briefing: Casco Bay Region Climate Change Adaptation Planning*, US Dept. of Homeland Security, 2015

INTERIM FINDINGS



ENERGY

Increasing temperatures affect seasonal electricity demands (e.g., increased cooling demand in the summer) and power plant output and transmission line capacity, which could cause rolling brown outs if electric infrastructure does not adapt. Coastal electric infrastructure assets are vulnerable to sea-level rise and storm surge, which could lead to local power outages that impact dependent infrastructure systems.

The greater prevalence of invasive species in Maine increases the risk to transmission infrastructure during storms.

Increased flooding in certain areas has already necessitated the relocation of transmission lines and other electrical power infrastructure.



WATER AND WASTEWATER

Surface runoff into lakes will increase as extreme precipitation events become more common.

Adaptive actions taken without consideration of interdependencies could lead to unintended systemic consequences.

Rising sea levels will increase the salinity of coastal aquifers, which will significantly impact drinking water supply.



TRANSPORTATION

Storm surge could affect low-lying roads and causeways, rail lines, and marine infrastructure, including South Portland marine oil terminals, the International Marine terminal, and ferry terminals.

Locally relevant guidance from the State on what climate impacts to plan for is lacking.

Coordinated regional planning is difficult when individual communities engage in their own local planning (i.e., home-rule).



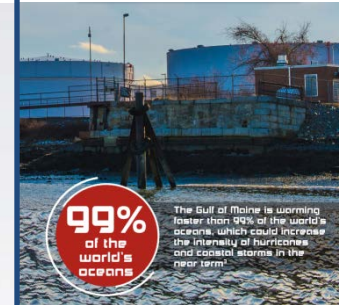
TELECOMMUNICATION

Higher temperatures require greater cooling of wireless and cell tower equipment.

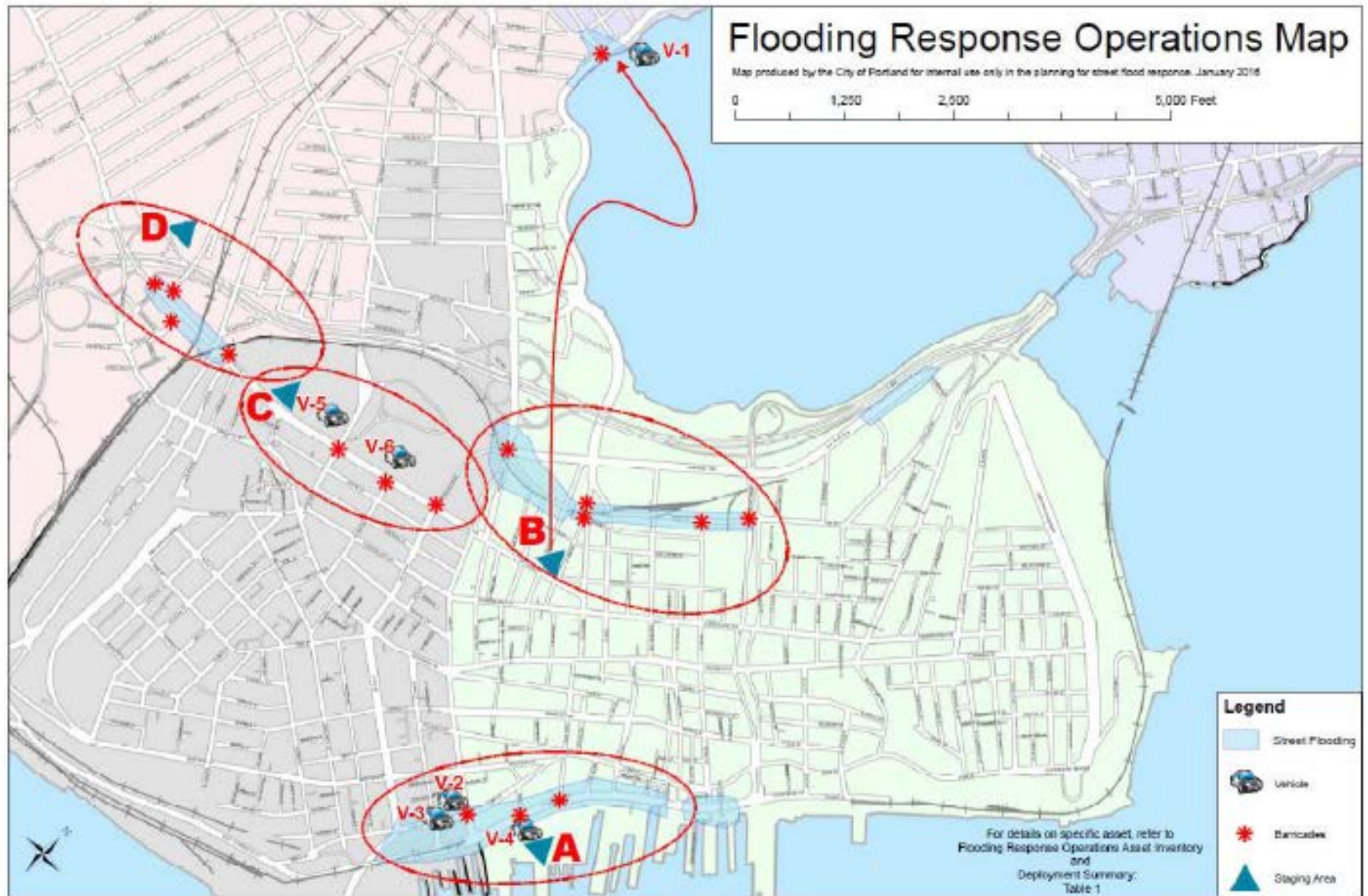
Facilities are susceptible to ice damage, which could affect communications within the region.

Telecommunication infrastructure is frequently co-located on transportation infrastructure.

Heavy precipitation or ice storms could prevent access to sites that are damaged or require fuel for backup power sources.



**Flooding Response Operations Map:
Figure 2**



Federal Partnerships



Dept. Homeland Security *Regional Resiliency Assessment Program* (RRAP) Process



U.S. Climate Resilience Toolkit

Steps to Resilience:

[Step 1: Identify the Problem](#)

[Step 2: Determine Vulnerabilities](#)

[Step 3: Investigate Options](#)

[Step 4: Evaluate Risks & Costs](#)

[Step 5: Take Action](#)

**The relationships are
at least as important
as the outcomes**

Biggest Accomplishments To Date

- Community awareness
- Partnerships

- State
- Federal
- Non-Profit
Advocacy
- Education
- Community



Photo credit: Liz Bieber

Next Steps:

Short Term:

- Bayside Adapts, Phase I
Partner with New England
Environmental Finance Center
 Data Gap Analysis
 Community Engagement
- Participate in NOAA financed
Environmental Literacy process with
Gulf of Maine Research Institute
- "Leadership in Community
Resilience" grant from the
National League of Cities

Longer Term:

- Bayside Adapts, Phase II
 Adaptation approach
 development and
 selection
- Waterfront to follow



Challenges:

Transitioning

from

Vulnerability awareness (Step 2)

to

Options (Step 3)

Local dollars compete
with schools, cops, parks,
.....

Steps to Resilience:

Step 1: Identify the Problem

Step 2: Determine Vulnerabilities

Step 3: Investigate Options

Step 4: Evaluate Risks & Costs

Step 5: Take Action



Questions?

Bill Needelman, AICP
City of Portland Waterfront Coordinator

wbn@portlandmaine.gov



Memorandum

To: Chair Jon Hinck and members of the Energy and Sustainability Committee

From: Bill Needelman, Waterfront Coordinator

Date: May 12, 2016

Re: Communication on Dredging Issues and a Potential Contained Aquatic Disposal (CAD) Cell in Portland Harbor– Status and next steps

Introduction

The City of Portland, with funding from the Maine Department of Transportation and cooperation with the Portland Harbor Commission and the City of South Portland, is beginning the formal process of exploring options for dredging the piers, wharfs, and anchorages of Portland Harbor.

Staff requests an opportunity to introduce the Energy and Sustainability Committee to the issues involved and answer Committee member questions. No City actions are required at this time.

Background

The piers, wharfs, and anchorages of Portland Harbor need dredging. Dredging is a necessary maintenance task for all urban harbors and most private and public vessel berths in Portland Harbor have been filling in for many decades. Natural sedimentation in the Fore River combined with urban street runoff from the storm water sewer system combine to accumulate sediment within the harbor in a continual process.



Over time, once useable dock space becomes too shallow to serve vessels resulting in a loss of economic activity, a loss of revenue for

Lobster Boats at Low Tide
between Custom House Wharf and Portland Pier.
Note loss of berthing

commercial marine properties, and constraints on an already stressed lobster and fishing industry.

While the *channel* of Portland Harbor has benefitted from a maintenance dredge program conducted by the Army Corps of Engineers, the *berths* have not. The “federal dredge” program is in fact *prohibited* from extending to the berthing areas. Individual pier and wharf owners, including the City, are responsible for funding, permitting, and conducting their own dredge projects.

Complicating an already complex issue, the particular sediments found in urban harbors are typically contaminated by legacy industries and street runoff. After extensive testing and permitting, “clean” sediments may be disposed of in the ocean at identified and regulated disposal sites. Urban sediments with contaminants have limited options for disposal, usually on-land, which is prohibitively expensive. As a result, contaminated sediments are not dredged and continually pose a pollution risk in the harbor.

Contained Aquatic Disposal – CAD

As a means to address both the loss of usable dockage and existing pollution in the harbor, the City and harbor stakeholders have for several years been exploring use of Contained Aquatic Disposal, CAD. CAD cells are deep holes dredged in the ocean bottom designed to safely hold and isolate sediments that are not suitable for traditional open water disposal. Used extensively in ports to our south, there are no CAD applications in Maine.

The State of Maine has assisted with this process by providing funds to study, design and permit a CAD cell for Portland Harbor. Using 100% MDOT funding, the City has recently engaged Stantec Engineering to provide support and expertise for a CAD planning process.

Additionally, the Portland Harbor Commission has received an EPA Brownfield Grant to evaluate the sediments along dockage and anchorage sites along the Portland and South Portland shores, providing critical data for the design and permitting of a



Low Tide, between Maine State Pier and Ocean Gateway. The City will be unlikely to be able to maintain or expand berthing for passenger operations without a CAD cell

CAD cell. The Harbor Commission is establishing a steering committee of harbor stakeholders to oversee and inform the process for both the Brownfield and CAD process.

CAD Site Selection

A critical step in the CAD process will be to select the appropriate location in the Harbor to site the CAD cell. During the preliminary process leading to the MDOT funding, a working group of interested parties, led by the City, identified several sites for consideration. The Non-Federal Dredge (NFD) Workgroup conducted an inclusive process to identify a preferred site. The NFD included participation from the State DEP, pier owners, the City of South Portland, the Harbor Commission, the Friends of Casco Bay, the Casco Bay Estuary Partnership, EPA, the Army Corps of Engineers, and a local lobster fisherman. As a starting point, the NFD identified a preferred site located off Fort Allen Park, but this site has since been identified by members of the Maine Lobsterman's Union as unacceptable.

Next Steps

Moving forward, the City and the Harbor Commission and the steering committee (which will have Lobster Union representation) will work to find a location that meets the technical, financial, and environmental goals of the process. Public outreach, with emphasis on harbor users including lobstermen, will be critical to finding the appropriate CAD cell site. City staff will continue to inform the Energy and Sustainability Committee of the project progress and findings at key process milestones. The Waterfront Coordinator will be available at the May 18 meeting to answer Committee questions.

Portland Open Spaces

Integrated Pest Management Proposal 2016

Prepared by:

- *Ethan Hipple, Recreation Director*
- *Ethan Owens, Athletic Facilities Manager*
- *Jeff Tarling, City Arborist*
- *Gene Pierotti, Golf Course Superintendent*
- *Troy Moon, Sustainability Coordinator*

Guiding Principles

- City staff take a precautionary, incremental, and science-based approach to minimizing public exposure to pesticides on City Property.
- Pesticide use (organic or synthetic) on City property should be strongly regulated, with clear guidelines (such as this document) for staff managing public lands.
- City staff support continuing the “no-pesticide” policy on certain properties, eliminating pesticides use in certain areas, and reducing them in other areas, depending on the property classification.
- Certain areas within the Riverside Golf Course would be exempted, while pesticides could be eliminated or reduced in other areas of the golf course.
- City staff will continue to follow Integrated Pest Management principles, utilizing pesticides in limited areas as simply one tool to control pests, along with other effective measures such as maintaining turf and plant health by aeration, overseeding, irrigation, cutting height, etc...
- Follow the *Precautionary Principle* in reducing and regulating all pesticide use (organic and synthetic) whenever possible.
 - Definition of “Precautionary Principle”: *When human activities may lead to morally unacceptable harm that is scientifically plausible but uncertain, actions shall be taken to avoid or diminish that harm. (Source: UNESCO 2015, United Nations Educational, Scientific, and Cultural Organization)*
- The term “organic” or “non-synthetic” does not mean that products are tested and safe for the public. City staff will follow the science and guidelines from Environmental Protection Agency and Maine Board of Pesticide Control before using *any* product.
 - The International Agency for Research on Cancer (IARC) lists many naturally-occurring and organic substances that are *possibly* carcinogenic in humans: sodium nitrates, coffee, bracken fern, tobacco, aflatoxins in fungi, areca nuts, coal tar, betel quid, and wood dust are prominent examples (<http://monographs.iarc.fr/ENG/Classification>). The science tells us that the organic nature of a substance does not necessarily make it safe for humans, nor does the synthetic nature of a substance make it unsafe for humans.
- City staff will utilize the following science-based guidelines to minimize public exposure to all pesticides:
 - Follow Best Management Practices as developed by Maine Board of Pesticides Control (adopted 2/24/2012)
 - All pesticides (organic and synthetic) used on City property must be Environmental Protection Agency tested and listed.
 - Additional City Practices and Procedures as detailed in this document
- Only State Licensed Applicators may apply pesticides (organic or synthetic) on City property.

Action Plan Summary

- Continue following State of Maine Best Management Practices as defined by Maine Board of Pesticide Control.
- Continue practice of requiring that all City employees who apply pesticides carry Commercial Applicator Licenses and that they attend required continuing education classes.
- Reduce or eliminate total amount of pesticides (organic and synthetic) used on city properties according to plan below.
- Develop 2 test sites on City Athletic Fields where we can completely eliminate pesticide use on half of field and compare results to areas treated with pesticides. These tests would occur over a 3 year period. These test sites would allow the testing of various techniques and would allow us to gauge the public's willingness to live with a higher percentage of weeds, insect pests, and exposed earth on their playing fields. Details below.

Training and Certification

- Any City staff member who will apply any pesticide (organic or synthetic) shall maintain a State Applicator License.
 - The city currently employs
 - 2 Master Applicators (Golf Course Superintendent and City Arborist)
 - 4 Commercial Applicator Licensees (Athletic Field Maintenance Departments).
 - 8 Commercial Applicators in Parks and Cemeteries Division
- Staff shall continue to keep certifications current and attend continuing education sessions.
- In order to receive a Commercial Applicator License, individuals must go through extensive training in Best Management Practices, Integrated Pest Management.

City of Portland Pesticide Plan

Staff have categorized city open space properties into 4 categories. On some lower level properties such as playgrounds, right of ways, etc... (Levels 3 and 4), staff and the public can tolerate a higher level of weeds and insects and pesticide use will be eliminated entirely. On higher priority levels (Levels 1 and 2) such as high-use and varsity playing fields, synthetic pesticide use will continue according to State of Maine Board of Pesticide Control Best Management Practices.

- **Level 1**—Highest care areas, e.g., Hadlock Field, some varsity playing fields, high-use fields that get excessive wear and tear.
- **Level 2**—High care areas, e.g., practice fields or multipurpose fields. May include varsity fields or high visibility lawn areas depending on the school.
- **Level 3**—Moderate care areas, e.g., playgrounds, low-use areas, common areas. May include practice fields and some lawn areas depending on the school
- **Level 4**—Lowest care areas, e.g., most park lawn areas, natural areas, fence lines, property edges, slopes, utility areas, ditches or trails

Test Sites: All-Organic Playing Surfaces

In the calendar year 2016, two organic/synthetic test sites will be created, observed, and documented. These are Level 1 sites that otherwise would have continued to receive synthetic pesticides under this proposal.

We propose to treat and monitor these sites for 3 years to test results and collect feedback about the public's willingness to live with more pests, insect infestations, and exposed earth on public playing fields. It generally

takes two or three years for turf to decrease dependence on pesticides. Staff will monitor for this length of time to ensure that organic methods have a chance to work.

Because of differences between sites in soil composition, sunlight, drainage, and level of use, we propose to test organic and synthetic products side by side at the same site so that those variables are equalized. Organic products will be used on half of the field, and synthetic products will be used on the other half of the field. Extensive before and after documentation will occur, as well as a written plan documenting the test parameters and guidelines. All test sites will continue to receive Best Management Practices of high-mowing, mulching, aeration, topdressing with compost and sand, and overseeding. The findings will be recorded and put into a report form on an annual basis.

- Site 1: Quinn Field at Deering Oaks Park
- Site 2: Payson Softball Field B (not varsity field)

Low-Use Fields (Levels 3 and 4)

- Discontinue synthetic pesticide use
- Continue to follow BMPs for total turf health: high-mowing, mulching, aeration, topdressing, overseeding.

Because of lower use at these fields, the turf is able to rest and recover following use. Because of lower use, we can maintain higher grass height, which creates a healthier turf that can naturally outgrow pest species such as crabgrass and dandelions. Fields in this category include Breakwater Field, Payson Park Fields, Riverton Field Complex.

Hadlock Field, Varsity, and High-Use Athletic Fields (Levels 1 and 2)

- Continue to use pesticides following State of Maine Best Management Practices until 3-year report on Test Sites (detailed above) is complete.
- Continue to follow BMPs for total turf health: high-mowing, mulching, aeration, topdressing, overseeding.

For optimal turf health, facility managers try to limit use of grass fields to between 200-500 hours of activity per year. Because of Portland's energetic and recreation-minded population, and a limited number of fields, use of our athletic fields is extremely high--upwards of 1,000 hours per year--at certain fields such as Deering Oaks Fields, Dougherty Field Complex, and Deering High School Fields.

The turf on these fields sees continual use throughout the growing season with cleats, tackling, sliding, running, and other high-impact uses. Because of such high wear and tear on these fields, the turf takes a beating and needs continual irrigation, over-seeding, mulching, aeration, deep-tining, top dressing with compost, and the occasional use of pesticides and fertilizers. These practices encourage turf growth and health in an environment where grass will not naturally grow and thrive.

Pesticides are not just used for aesthetics, but to decrease weeds which compete with turf grasses for nutrients, water, and sunlight. They also eliminate pests such as grubs and other harmful insects which can literally turn a field into a dirt patch within a couple weeks. Pesticides prolong the life of high-use fields and reduce the need for complete field turf replacement every 5-7 years. Encouraging grass growth through use of pesticides also prevents exposing bare earth, which creates sediment runoff which is detrimental to water quality.

Weeds are problematic at Athletic Fields not just because they out-compete the natural grasses, but they create a bumpy and irregular playing surface for games such as soccer and baseball. For sports that are under increasing scrutiny to decrease injuries and concussions, providing a level and safe playing surface is a priority for the City and the organizations that run youth and adult sports leagues.

Another alternative exists to maintain high use fields without the use of synthetic pesticides. That is to simply replace the turf every 5-7 years when it becomes unusable due to high use, weeds, grubs, and other pests.

The City has 55 fields in the Level 1 and 2 categories. The estimated cost for one varsity level field replacement is \$167,700 to \$222,200, depending on the size of the field (see attachment for breakdown of cost). The extraordinarily high cost of field turf replacement every 5-7 years will be a significant burden on taxpayers and will likely have a chilling effect on many other improvements and backlogged maintenance to our public spaces since so much money and labor will be funneled into turf replacement.

Staff are very concerned that an immediate pesticide ban on Athletic Fields will cause an unknown amount of damage to the City's assets. We do not yet know what the outcome would be of such an action, and other communities that have placed similar bans on their properties are struggling to continue to maintain their assets.

Staff propose to instead develop Test Sites (detailed above) to develop Best Management Practices using organic products, observe results, and collect feedback from users and residents. By taking a reasoned approach, we can strike a balance between reducing overall pesticide use and maintaining our well-loved and heavily-used City assets.

Riverside Golf Course (Level 1)

- Cornell University and the State of New York are conducting a long-range study with the intent of developing practices to reduce pesticide use at Golf Courses. They are currently 9 years into the study and have made many findings on Best Management Practices that are being implemented at courses throughout the region. However, after 9 years of study, they have determined that it is not yet possible to maintain a playable surface without at least minimal use of synthetic pesticides as part of an Integrated Pest Management plan.
- Because there is no known organic product(s) that will maintain the high-quality turf required for a quality putting green, all putting greens will continue to be managed using Integrated Pest Management. This will include the use of synthetic pesticides.
- On areas other than putting greens, switch to a 3 year rotation in which we divide the course up into three 9-hole zones. Synthetic pesticides will only be applied to one of the 9-hole zones each year, leaving the other two zones synthetic pesticide-free for 2 years.
- Not only will this reduce our synthetic pesticide use from current levels, it will allow golfers with sensitivities to pesticides to choose to golf in an area that has not been treated in that current year.
- Neonicotinoids are known to have a negative impact on pollinator populations and therefore they shall not be used anywhere upon the facility. There is a product (Acelepryn) that works as well as any neonicotinoid.
- Continue to seek certification as a National Audubon Society Golf Course Sanctuary.
- As the Cornell--New York State study publishes findings, adapt their recommendations for use at Riverside Golf Course.
- Continue to follow Maine State BMPs for total turf health: high-mowing, mulching, aeration, topdressing, overseeding.
- Complete Integrated Pest Management Plan for Riverside Golf Course attached.
- FB Environmental has been contracted to provide third party monitoring and reporting of pesticide practices and complete National Audubon Society Sanctuary Golf Course certification.

- Staff will complete certification as a National Audubon Society Sanctuary Golf Course by July 2018. This certification requires reducing, but not eliminating, use of synthetic pesticides. The program consists of:
 - Environmental Planning
 - Wildlife and Habitat Management
 - Chemical Use Reduction and Safety
 - Water Conservation
 - Water Quality Management
 - Outreach and Education

The Vineyard Golf Club on Martha's Vineyard is currently the only golf course in the US known to have switched to strictly organic pesticides.

Their maintenance routine involves involves labor-intensive and expensive methods such as the following (source: http://www.nytimes.com/2010/08/17/sports/golf/17vineyard.html?_r=0):

- Staff manually remove dew from the grass each morning with a whip-like device to reduce fungal disease
- Staff fly in roundworms from Iowa on dry ice to combat grubs
- Staff wash the shoes of the members to keep unwanted seeds and soils from entering their facility.
- Staff have regularly torn out and replaced their turf, tees, and greens in order to maintain a playable surface using only organic pesticides.

Operating a luxury golf course with expensive maintenance costs such as these has made The Vineyard Golf Club only accessible to the ultra-wealthy: membership fees currently consist of a \$350,000 initiation fee followed by a \$12,000 annual membership fee.

The Riverside Golf Course prides itself on providing affordable golf to all Portland residents and visitors. Until better and more cost-effective organic methods are developed, providing an adequate playing surface is only feasible by utilizing an Integrated Pest Management plan (including pesticides on a limited basis).

Please see attached complete Integrated Pest Management Plan for Riverside Golf Course.

Playgrounds (Level 3)

- Continue current practice of no synthetic pesticide use.

In order to minimize children's exposure to pesticides, the public can accept a higher level of pests in their playgrounds and within a 25-foot buffer zone surrounding the playground. No synthetic pesticides will be applied in these areas, with a minimal number of exemptions for dangerous plants and stinging/biting insects (see "Exemptions" below).

Open Spaces (Level 4)

- Continue current practice of no synthetic pesticide use

The staff and the public can accept a higher level of pests in these areas including most park lawn areas, natural areas, fence lines, property edges, slopes, utility areas, ditches or trails. No synthetic pesticides will be applied in these areas, with a minimal number of exemptions for dangerous plants and stinging/biting insects (see "Exemptions" below).

Cemeteries (Level 3)

- Continue current practice of no synthetic pesticide use

The staff and the public can accept a higher level of pests in these areas that are often used as recreational areas. No synthetic pesticides will be applied in these areas, with a minimal number of exemptions for dangerous plants and stinging/biting insects (see “Exemptions” below).

City Trees (Adapted from 2009 Ontario Provincial ban on pesticides)

Since trees are important to protecting our climate, Commercially Licensed Applicators can use synthetic or organic pesticides with the written opinion of a tree care professional that states that the use of the pesticide is necessary to protect the health of the tree. Homeowners and licensed exterminators can also buy and use biopesticides and lower risk pesticides (e.g., *Btk* - a biopesticide sprayed over Ontario cities for Gypsy moth control) to care for trees without requiring an opinion from a tree care professional.

Trees & forests are important environmental assets for our community. Their long term health may require protection from invasive pests, like Dutch Elm Disease, Hemlock Wooley Adelgid, Emerald Ash Borer and Asian Longhorn Beetle. We also can experience outbreaks of insect pests like Browntail Moth that favor coastal climates and effect trees along with causing a risk to public health. In all cases we opt to use the best response possible with the lowest environmental impact. Two recent pest outbreaks in Portland include Hemlock Wooley Adelgid (HWA) & Winter Moth our response has included biological control using parasitic flies which feed exclusively on the target pest. Portland's response to Dutch Elm Disease includes preventive fungicide treatments injected into the trunk vs spraying foliage. We urge residents to contact licensed Maine Arborist firms to evaluate and plan the proper approach to tree pests.

Exemptions (*applies to all properties within City limits*)

- Dangerous Plants: Poison Ivy, etc...
- Invasive Plants: Plants listed on the state list
http://www.maine.gov/dacf/mnap/features/invasive_plants/inv sheets.htm of known invasive plants.
Includes Japanese knotweed, purple loosestrife, etc...
- Biting or stinging insects within 25 feet of human activity: Hornets, Wasps, etc...
- Swimming Pools
- Pet Supplies
- Disinfectants
- Rodent control
- Insect repellents
- Paints, stains and wood preservatives

Waivers (adapted from South Portland Ordinance)

In cases that threaten the public health and safety by creating a hazardous situation, individuals and/or companies may apply for a waiver from the provisions of this plan. These waivers would apply to situations not already addressed in this document.

The Integrated Pest Management Committee shall meet monthly and review and decide whether to issue waivers. The Committee shall be made up of:

- City Parks, Recreation, and Facilities Director or their designee
- City Stormwater Coordinator
- City Arborist (Master Applicator License)
- Private Landscaping Professional (must hold Maine Board of Pesticide Control Master Applicator License), appointed by the City Manager
- Citizen at Large, appointed by the City Council

A waiver application is a public record stating the proposed location(s), and timing of the use, substance(s), and amounts to be applied, the date(s) of application, and the reason for requesting use of a synthetic pesticide. The Integrated Pest Management Committee shall decide whether to issue a waiver, and for what duration. The Integrated Pest Management Committee must find all three of the following conditions exist in order to approve a waiver for the application of a prohibited pesticide:

1. That natural and organic methods have proven unsuccessful
2. The application of pesticides will not occur within 25 feet of a tributary, creek, stream, river, lake, or drainage ditch.
3. That the granting of the waiver will not result in material damage to other properties in the vicinity nor be detrimental to the public health, safety or welfare

Annual Financial Impact

The table below illustrates the annual cost of Integrated Pest Management methods (including organic, synthetic and biological controls) VS organic-only pesticides. Also includes labor required to apply the products. Does not include fertilizer costs.

	Integrated Pest Management <i>(Current practice includes use of organic, biological, and synthetic methods)</i>			Organic Pest Management <i>(Alternative practice would only consist of organic and biological methods)</i>		
	Labor	Materials	Notes	Labor	Materials	Notes
Athletic Fields	\$500	\$5,000	20 worker hours x \$25/hour. Integrated Pest Management promotes turf health by top-dressing with compost, high-mowing, mulching, aerating, and limited pesticide use.	\$1,500	\$18,750	Organic material is 25% more expensive per unit, and needs to be applied 3x instead of 1x. Increased labor for multiple applications.
Golf Course	\$3,718	\$24,000	145 worker hours x \$25.64/hour. Integrated Pest Management promotes turf health by top-dressing with compost, high-mowing, mulching, aerating, and limited pesticide use. Increased Cost of non-Neonicotinoids	\$11,154	\$90,000	Organic material is 25% more expensive per unit, and needs to be applied 3x instead of 1x. Increased labor for multiple applications. NOTE: multiple studies have shown that golf playing surfaces are not sustainable using only organic products, no matter the cost.
Tree Care and Horticulture	\$500	\$2,325	20 hours x 1 worker x \$25/hour. Dutch Elm Disease Injections, Horticultural Bed treatments. Biological treatments are often used instead of pesticides.	\$500	\$2,906	Material is 25% more expensive per unit. Labor stays the same for horticulture since workers are visiting the garden beds 3x weekly regardless.
Parks	\$0	\$0	No pesticides routinely applied in parks	\$0	\$0	
Playgrounds	\$0	\$0	No pesticides routinely applied in playgrounds	\$0	\$0	
Cemeteries	\$0	\$0	No pesticides routinely applied in cemeteries.	\$0	\$0	

Sub Totals	\$4,718	\$31,325		\$13,154	\$111,656	
Grand Total	\$35,043			\$124,810		

Benchmarking Current Synthetic Pesticide Use

Current use of Synthetic pesticides across all city properties. Below are amounts used for 2015 growing season (April—October). These are only applied at Golf Course, Level 1 and 2 Athletic Fields, and selectively on invasive species.

- Ballfields
 - 5 gallons of Roundup for infield prep, invasive species
 - 2,000 lbs of weed and feed (active ingredient 2, 4-D variety)
- Forestry
 - 2.5 gallons of Roundup for invasive species
- Golf Course
 - 98 gallons fungicides
 - 26 gallons herbicides
 - 27 gallons growth regulators
 - 12 gallons insecticides