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MEMORANDUM

To: Transportation, Sustainability and Energy Committee

From: Ian Houseal, Assistant to the City Manager, Sustainability Coordinator

Date: December 19, 2012

Re: Draft Framework for Approaching Sea-level Rise Adaptation

The intent of this memorandum is to update the Transportation, Sustainability, and Energy Committee on activity taking place in planning for adapting to sea-level rise. It should be recognized that any parties impacted by contemplated policy should be well informed and engaged.

Background

On July 18, 2011 the City Council passed a resolution supporting the development of a sea-level rise adaptation plan. Following the passage of the resolution, the City was supported by the completion of two studies to assess Portland's vulnerability to sea-level rise. The two studies were:

1. Vulnerability Assessment: A comprehensive mapping assessment of all the areas of Portland vulnerable to sea-level rise conducted by Peter Slovinsky of the Maine Geological Survey under multiple sea-level rise scenarios and storm surge events. The vulnerability assessment used Light Detection and Ranging (LIDAR) surveying to very accurately map the highest predicted water level for any given year under multiple sea-level rise scenarios including:
 - One foot of sea-level rise;
 - Two feet of sea-level rise;
 - Three feet, four inches of sea-level rise; and
 - Six feet of sea-level rise

Plus the added impact of a 100 year storm on top of those sea-level rise scenarios.

The assessment was conducted at no cost to the City through a grant managed by the Greater Portland Council of Governments (GPCOG) in partnership with South Portland; and

2. Back Cove Study: A small area study focusing on the Back Cove vicinity conducted by Sam Merrill of the New England Environmental Finance Center (NEEFC) looking at the financial impacts of sea-level rise on real property under a no action scenario and under certain adaptation

scenarios resulting in a mapped and tabulated cost-benefit analysis of adaptive actions. The study explored the public response to undertaking a large public works project to protect Back Cove from projected sea-level rise levels. This study was conducted at no cost to the City through a grant from the Environmental Protection Agency (EPA) to NEEFC.

Question # 1: Sea-level Rise Increase

Translating sea-level rise into a regulatory response will necessitate the establishment of an “official” sea-level increase for regulatory purposes. That level has not been determined and it should be noted that with that determination there will need to be a balance between risk and cost. It should also be noted that Portland is fortunate in its geography as it relates to sea-level rise: having a coastline that can be described as “bold,” defined as sharp drops in elevation along the coast. This benefits Portland because sea-level rise increases do not result in large losses of land as compared to places that have more gradual rises in elevation along the coast.

The impacts to current and future development of sea-level rise increases that may be considered include:

- Two feet of sea-level rise.
- More than Two feet of sea-level rise.

Question # 2: Redefining the Shoreland Zone Boundary

Through the assessment made by Slovinsky, LIDAR data was used to delineate elevation with a high degree of accuracy. Slovinsky recommended using LIDAR elevations to substitute for the existing water’s edge in our GIS database currently used to delineate the City’s shoreland zone. The change did not constitute a large net gain or loss of land area in the shoreland zone. Redefining the shoreland zone may be a change considered as it relates to sea-level rise adaption planning. Property owners in the current and potentially future shoreland zone should be engaged before any changes are made. The Planning Board would also need to be involved.

Question #3: Approaching Back Cove

Under the two feet of sea-level rise scenario the impact of sea-level rise in the Back Cove area is limited to the developed area of Bayside and the athletic fields adjacent to Baxter Boulevard. The impact under other sea-level rise scenarios has not been explored at this time. For the most part, the perimeter of the Cove is not impacted under the two feet of sea-level rise scenario. To adapt, the athletic fields may need to rise in elevation or be abandoned. It is well documented that the fields are regularly impacted by high tides and storms; however, at some point in time, which action to take will need to be decided. It should also be noted that there will also be a loss of wetland habitat in the process of hardening the edge of Back Cove, unless mitigating steps are taken. What those steps may be is unknown.

Under the two feet sea-level rise scenario, in Bayside, it is important to note that the impact of sea-level rise is primarily a result of sea water rising through drains. The I-295 corridor potentially acts as a berm to sea water flowing over land to areas of Bayside, but sea water currently travels and will travel underground through conduits to surface level in the future.

The approach to sea-level rise thus far in Bayside has been primarily been driven by the private sector and the insurance industry building to flood plain levels. New development in Bayside raises the first floor level of buildings above flood levels to meet insurance underwriting requirements. It is expected that this trend will continue; however, the City will need to determine how it will accommodate new development recognizing this trend.

It should also be noted that on the northeast side of the Tukey's Bridge between the bridge and the railroad tracks, developed properties are at risk of losing land area under the two feet of sea-level rise scenario.

Other scenarios for increased sea-level rise carry with them different approaches to addressing risk such as strengthening the I-295 berm or raising roadways and trails. All interested parties should be engaged as these questions are explored in greater detail.

Question #4: Approaching the Waterfront

A number of piers are regularly impacted by high tides today and those same piers will be impacted to a greater degree under the two feet of sea-level rise scenario. One of those piers that may be impacted in the future is the Portland Fish Pier. Under the two feet sea-level rise scenario, Commercial Street is not impacted.

Discussions and engagement with the waterfront community is needed on this topic. Potential approaches to consider may be raising pier elevations as redevelopment occurs or redefining uses on first floors to be "tidal-friendly." Again, it is important to note that the tide regularly rises above the elevation of some piers in the waterfront area at this time, but sea-level rise is a slow process that can accommodate changes to use overtime as reconstruction occurs.

Question #5: Approaching Wetland Impacts

Slovinsky modeled the Fore River losing wetlands as sea-level rise occurred. Given Portland's "bold" coastline, wetland migration would not occur. Geography plays more of a role in limiting wetland migration in Portland than development. Deposition of soil may counter the loss of wetlands, but it is expected that marsh in the Fore River and around Back Cove would be lost. How to approach Portland's natural spaces is a discussion that needs to take place.

Question #6: Approaching Recreation and Park Space

Recreational and Park Space in Portland including the athletic field adjacent to Baxter Boulevard as well as the entirety of the Back Cove trail, East End Boat Launch Area and Beaches, and the eastern promenade trail will be impacted by the two feet of sea-level rise scenario in that those berms or walls that protect these areas may need to be reinforced. It is unknown what the impact would be under other sea-level rise scenarios.