MEMORANDUM

TO: Cape Elizabeth Planning Board
FROM: Maureen O'Meara, Town Planner
DATE: November 5, 2013
SUBJECT: NHWL Text Amendment

Introduction

At the October 29, 2013 special Planning Board workshop, the Planning Board heard a presentation from Peter Slovinsky, Maine Geological survey, on Sea Level Rise and Storm surge. Information from the presentation was then discussed in light of possible changes to the Normal High Water Line (NHWL) definition referred to the Planning Board by the Town Council.

Discussion Highlights

The Planning Board has considered replacing the current NHWL definition with a definition that relies on the location of highest annual tide (HAT). HAT has been recommended by the Code Enforcement Officer because it is the standard DEP Shoreland Zoning definition and has scientific backing, which should reduce the variability of interpretations of where the NHWL is located. The Code Enforcement Officer would also benefit from DEP technical support in making determinations.

The Code Enforcement Officer has also stated that would support a definition that does not use HAT as long as it promotes consistent interpretations.

Highest Astronomical Tide: At the workshop, the Planning Board learned that the Maine Geological Survey will be recommending to the DEP that the highest annual tide standard (HAT) be replaced with the "Highest Astronomical Tide (HAst)" standard.

Recent recommendation to MeDEP:

For Shoreland Zoning Purposes, instead of using the predicted **Highest Annual Tide** (which changes each year), consider using the ***Highest Astronomical Tide***, which is the highest tide level for the effective 19 year National Tidal Datum Epoch (1983 – 2001, made effective in April 2003). This occurs during the spring tide when the sun and moon are closest to the earth during an 18.6 year tidal cycle which accounts for all significant variations in moon and earth orbits. *The NTDE is recalculated every 20-25 years.*

"The elevation of the highest predicted astronomical tide expected to occur at a specific tide station over the National Tidal Datum Epoch."
http://tidesandcurrents.noaa.gov/datum_options.html#HAT

Comparing HAT with HAstT

Water Level	Portland	Portland Head Light#^		
	MLLW (ft)	MLLW (ft)	1 ft SLR	2 ft SLR
HAT2013*	11.9	11.5	12.5	13.5
HAstT**	12.0	11.6	12.6	13.6

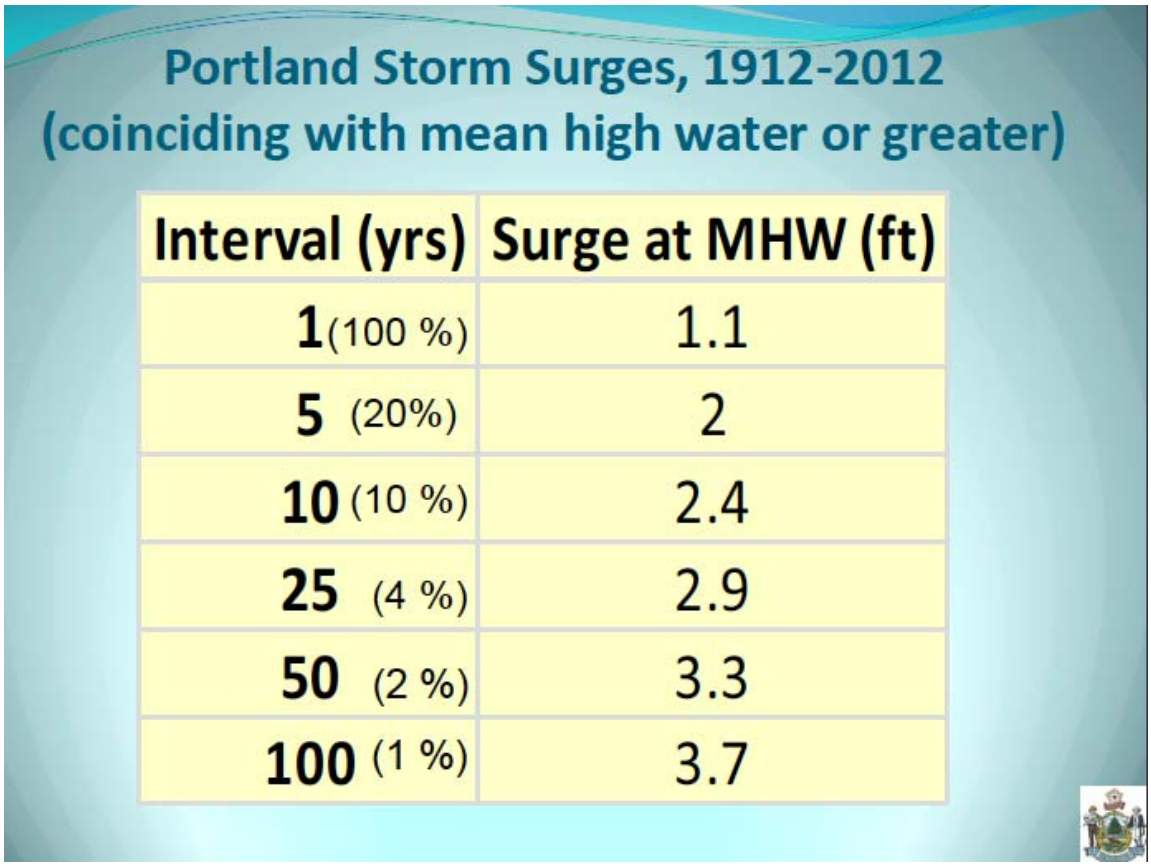
** taken from 6/25/2013 tidal predictions at tides.noaa.gov*
*** taken from Portland Tidal Station benchmark sheet for current NTDE (1983-2001)*
*# adjusted from Portland Tide Station to Portland Head Light using *0.97 at MLLW*
^ the value can be adjusted from MLLW to NAVD88 using VDATUM 3.2

Based on 6/25/2013 predicted HAT of 11.87 ft MLLW
Based on 5/17/1999 predicted HAstT of 11.95 ft MLLW

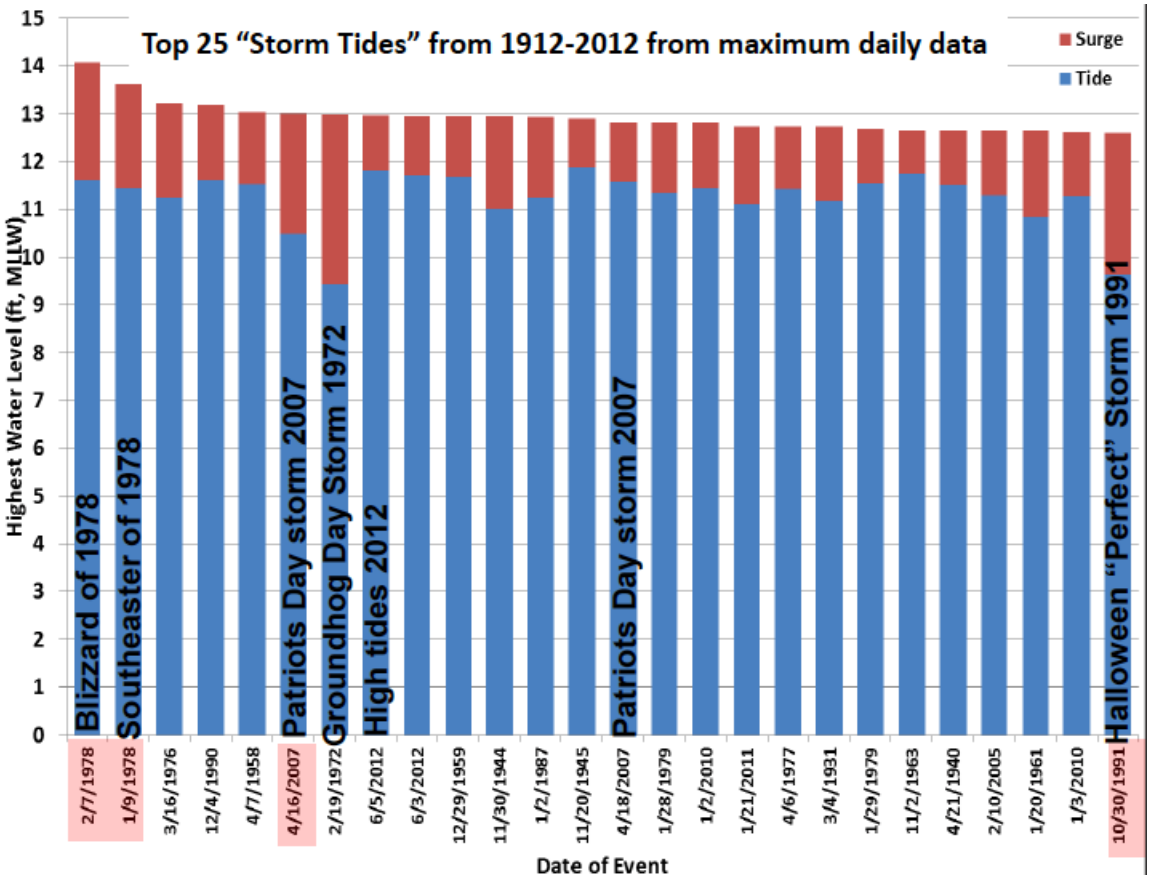
The HAst standard is based on the highest annual tide averaged over a twenty year period. The current HAst was calculated in 2001 and adopted in 2003, so it

will be a stable number for about another 10 years. Both numbers are based on scientific data and result in higher predictability when applied by different individuals in different locations. The HAst standard has the added benefit of being slightly higher because it is calculated on the highest tide each year. (The HAT standard is based on several of the highest tides each year and is recalculated annually.) More stability in the NHWL location is preferred because building setbacks are measured from this line and a building that was permitted as conforming can become non-conforming one year later.

Sea Level Rise/storm surge factor: The presentation included comprehensive information on the trend of sea level rise globally, and along the Cape Elizabeth coastline. It also included data on storm surge, which when coupled with sea level rise, increases the areas along the Cape Elizabeth coast that may be subject to inundation and/or storm driven water. The Planning Board noted that the current definition of NHWL, and how that definition has been tested in the courts, includes the concept of establishing a line that could be the extreme limit of the effect of the tides during a storm event. Establishing that line using the current definition does not create the predictability of consistent interpretations that is a goal of this zoning amendment effort. As an alternative, the Planning Board discussed supplementing the HAst line with a standard elevation increase.



The Planning Board suggested a standard of using HAst plus 3' vertical feet, which closely approximates the 1% storm, upon which the 100 year floodplain is based. Mr. Slovinsky noted that 3' puts the total elevation at 14.6 feet, which is 0.5 feet higher than the current 1% stillwater elevation recorded at Portland for the 1978 storm event.



Top of Bank: The Planning Board noted that the current definition includes both a movement of water concept ("extreme limit of the effect of the tides") and a geological element ("the top of the bank"). The Board has discussed incorporating the "top of the bank" concept into the definition. No satisfactory methodology has been discovered that includes the "predictability" element desired in a new NHWL definition. Wave prediction methodology was discussed. It was noted that the rocky coastline is less vulnerable to storm events than the sandy, flatter coastline and that adding 3' may compensate for not including the "top of bank" concept in the definition.

<u>Next Steps</u>

The Planning Board has asked for additional mapping information depicting how this standard applies to the Cape Elizabeth coast line. The board may want to revise the earlier draft amendment to the definition. Once there is consensus with the new draft definition, the Board should consider moving the zoning amendment to a regular Planning Board meeting agenda and scheduling another public hearing.

Note: All charts are from the presentation prepared by Peter Slovinsky, Maine Geological Survey and shown at the October 29, 2013 Planning Board workshop. A copy of the entire presentation is posted on the town website under the 10-29-2013 Planning Board workshop supplemental materials.