PORTSMOUTH'S HISTORIC DISTRICT AND SEA LEVEL RISE

Local Advisory Committee Meeting 1 | June 27, 2017

GEI Consultants

LAC MEETING 1 - OUTLINE

- Introduction
- Background
- Purpose
- Methodology
- Tools
- Next steps

INTRODUCTION

- Project
- Team
- The Local Adaptation Committee

BACKGROUND

- CRI 2013 (11.5’ / 13.5’)

City of Portsmouth, New Hampshire

COASTAL RESILIENCE INITIATIVE

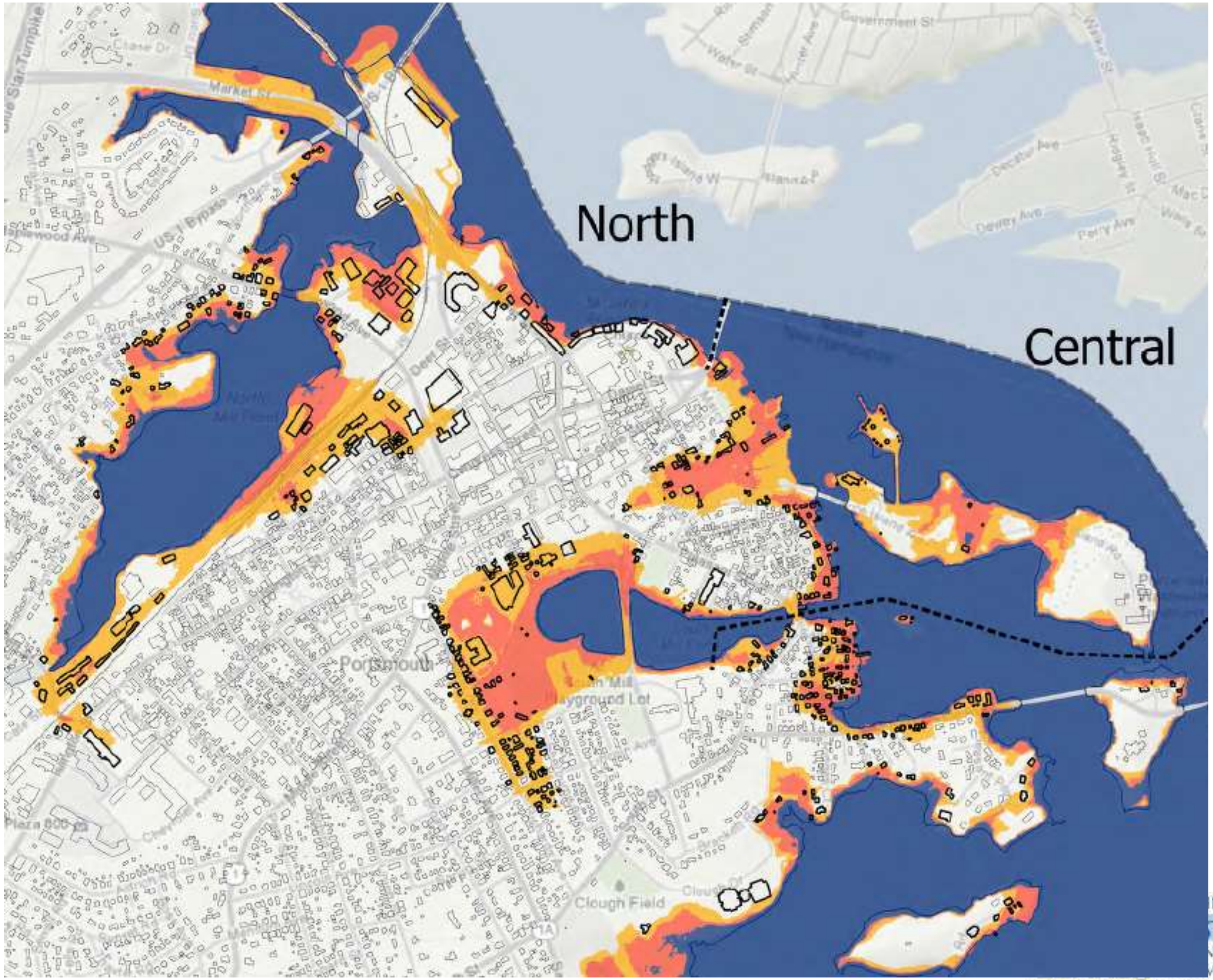
Climate Change Vulnerability Assessment and Adaptation Plan

April 2, 2013

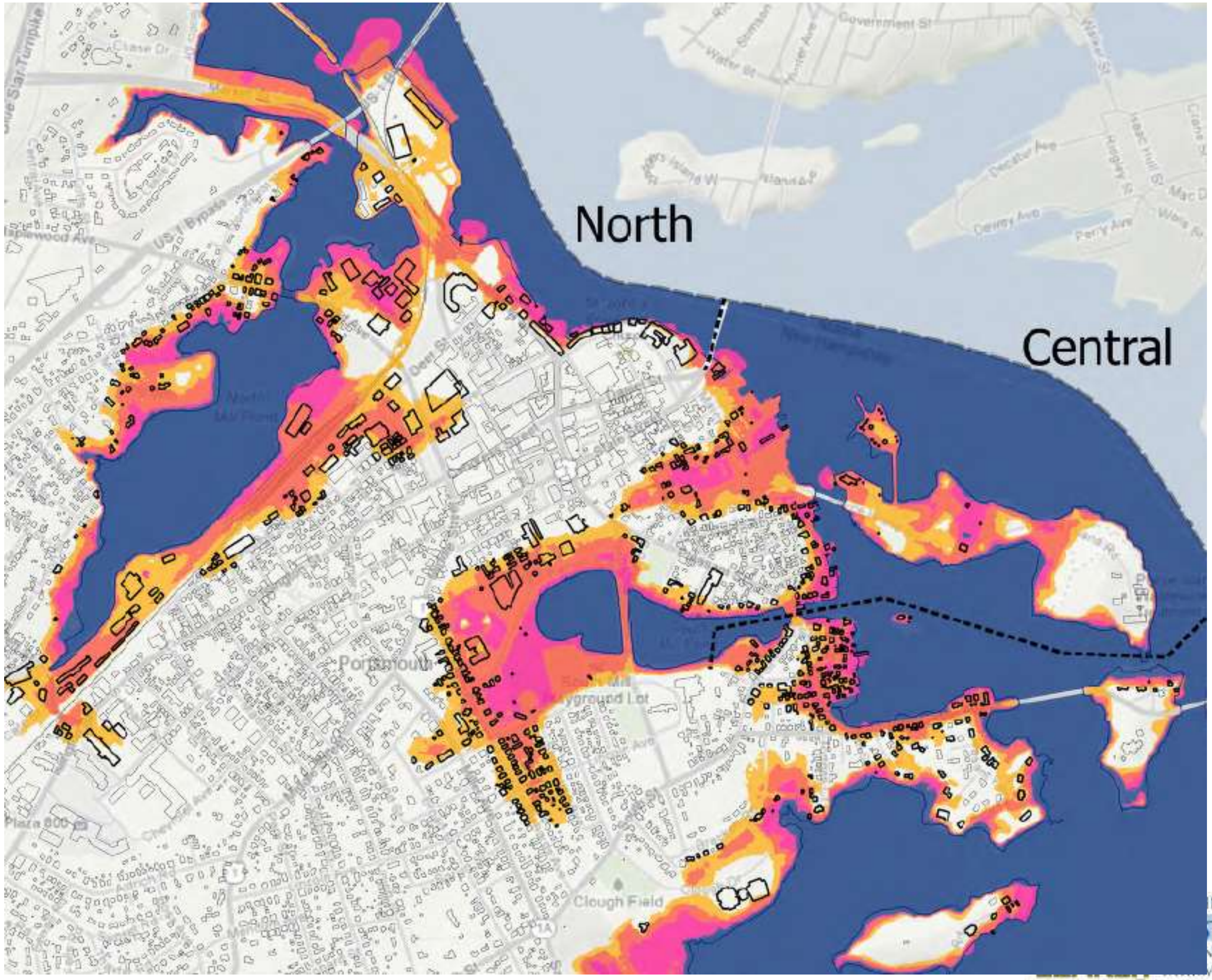
SEARCH ROCKINGHAM PLANNING COMMISSION GEI Consultants

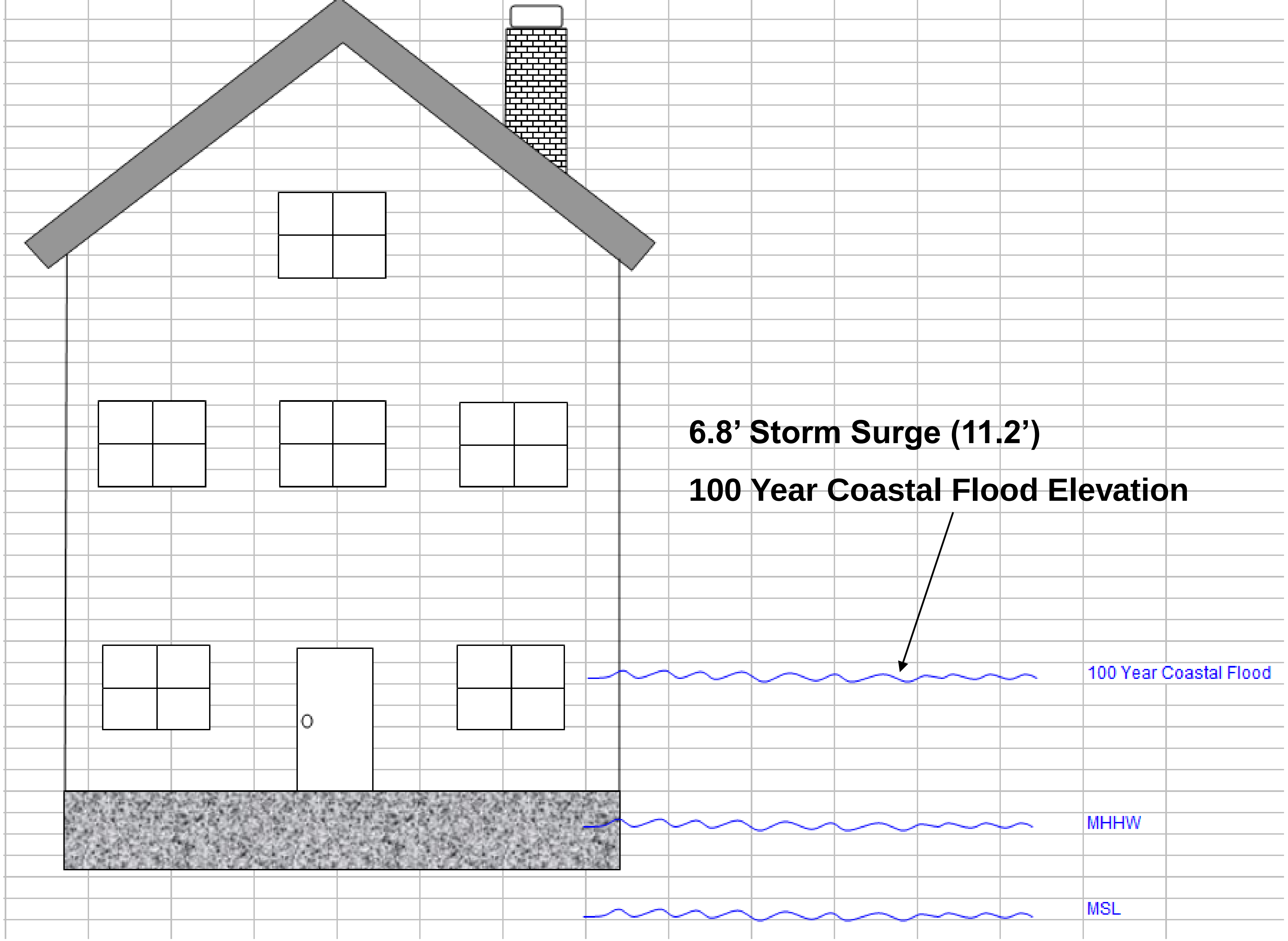
LAC MEETING 1

11.5’ Flooded Building Layer



13.5’ Flooded Building Layer




6.8’ Storm Surge (11.2’)
100 Year Coastal Flood Elevation
100 Year Coastal Flood
MHHW
MSL

BACKGROUND

- CRI 2013 (11.5’ / 13.5’)
- Grant (2016)
- LHD (1975)
- NRHD (2016)

Pre-Disaster Planning Grants for Historic Properties

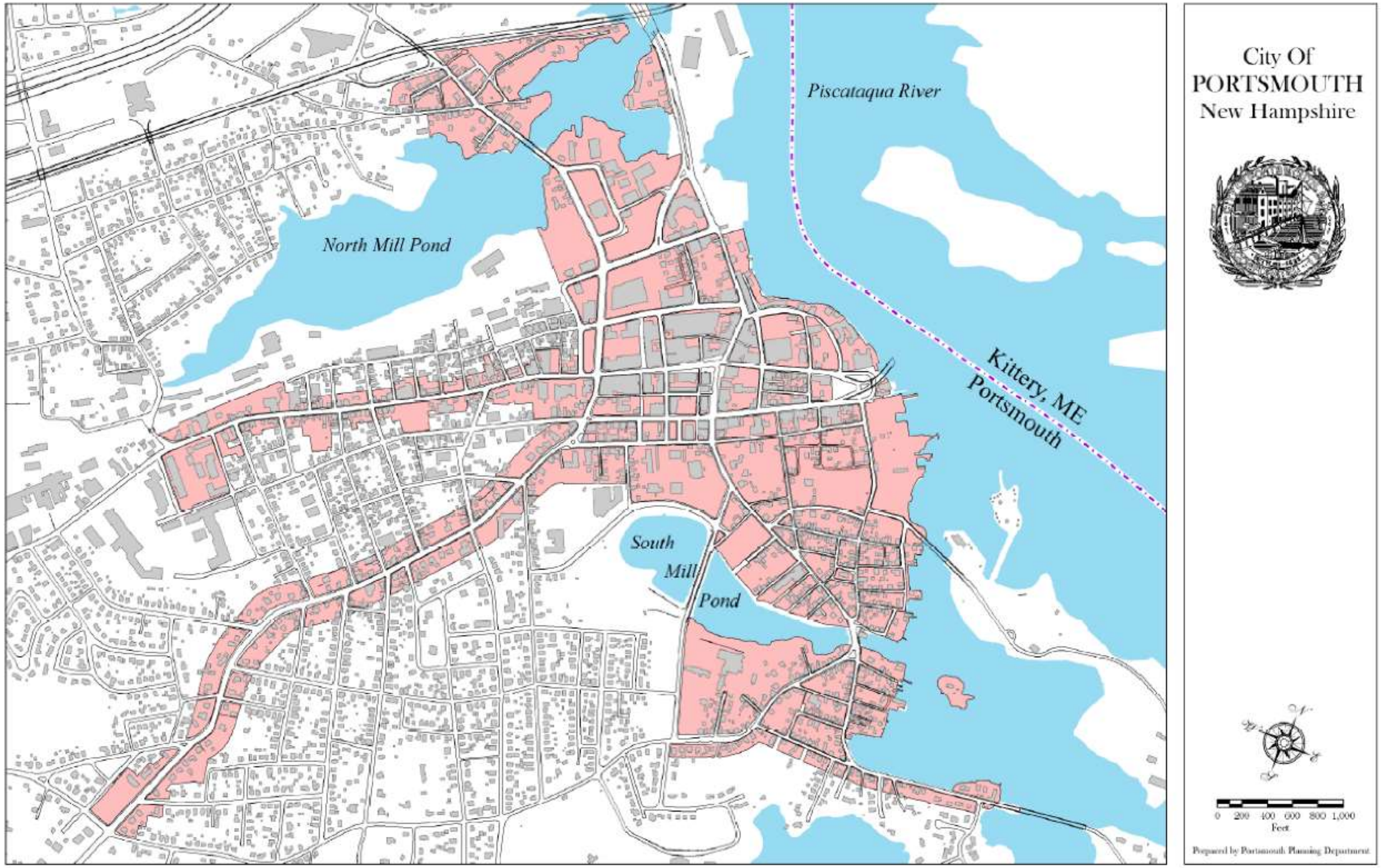
National Park Service

New Hampshire Division of Historical Resources

BACKGROUND

- CRI 2013 (11.5’ / 13.5’)
- Grant (2016)
- LHD (1975)
- NRHD (2016)

BACKGROUND



Piscataqua River
North Mill Pond
Kittery, ME
Portsmouth
South
Mill
Pond
City Of
PORTSMOUTH
New Hampshire
0 200 400 600 800 1,000
Feet
Prepared by Portsmouth Planning Department

BACKGROUND

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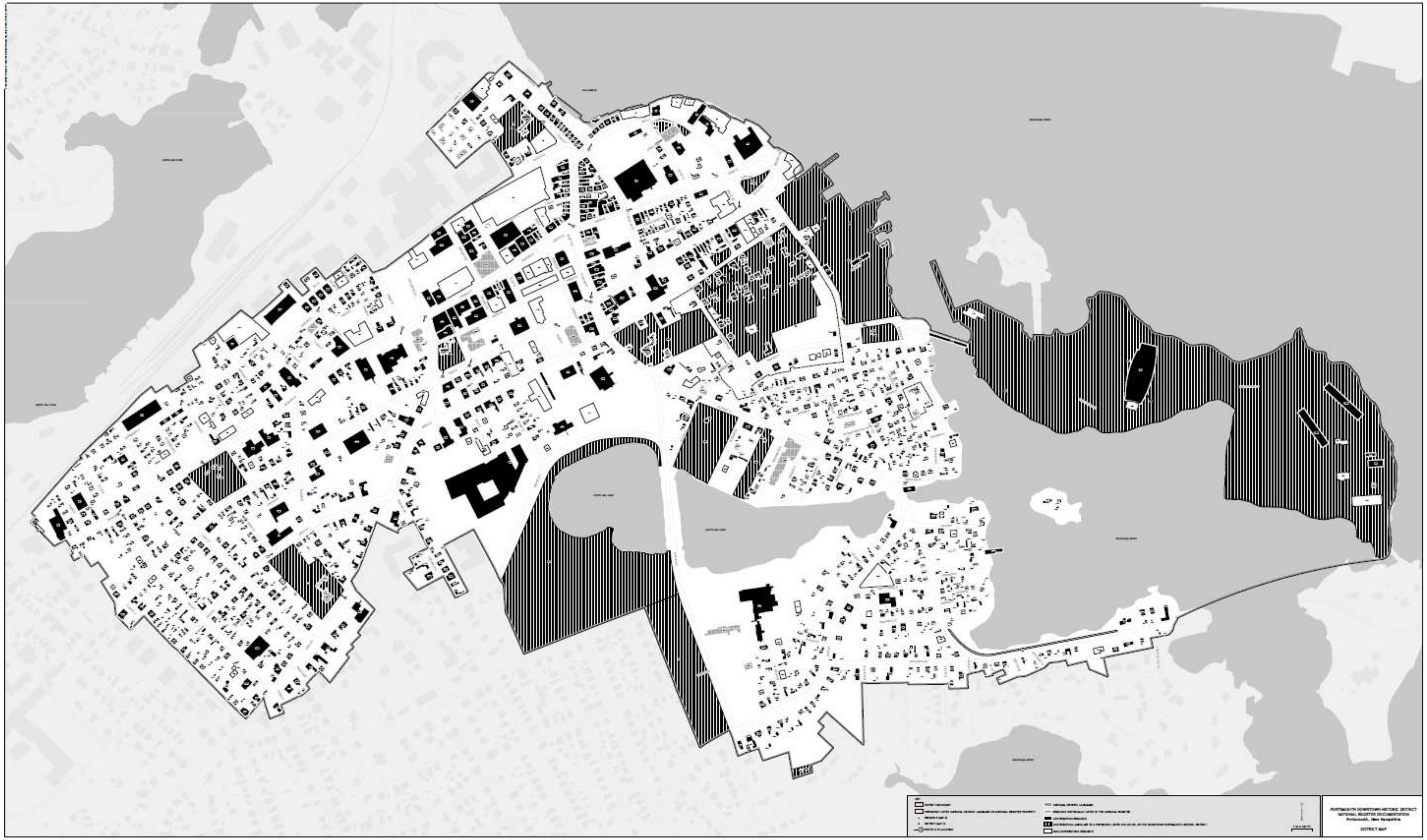
- Grant (2016)
- LHD (1975)
- NRHD (2016)

LAC MEETING 1

BACKGROUND



PURPOSE

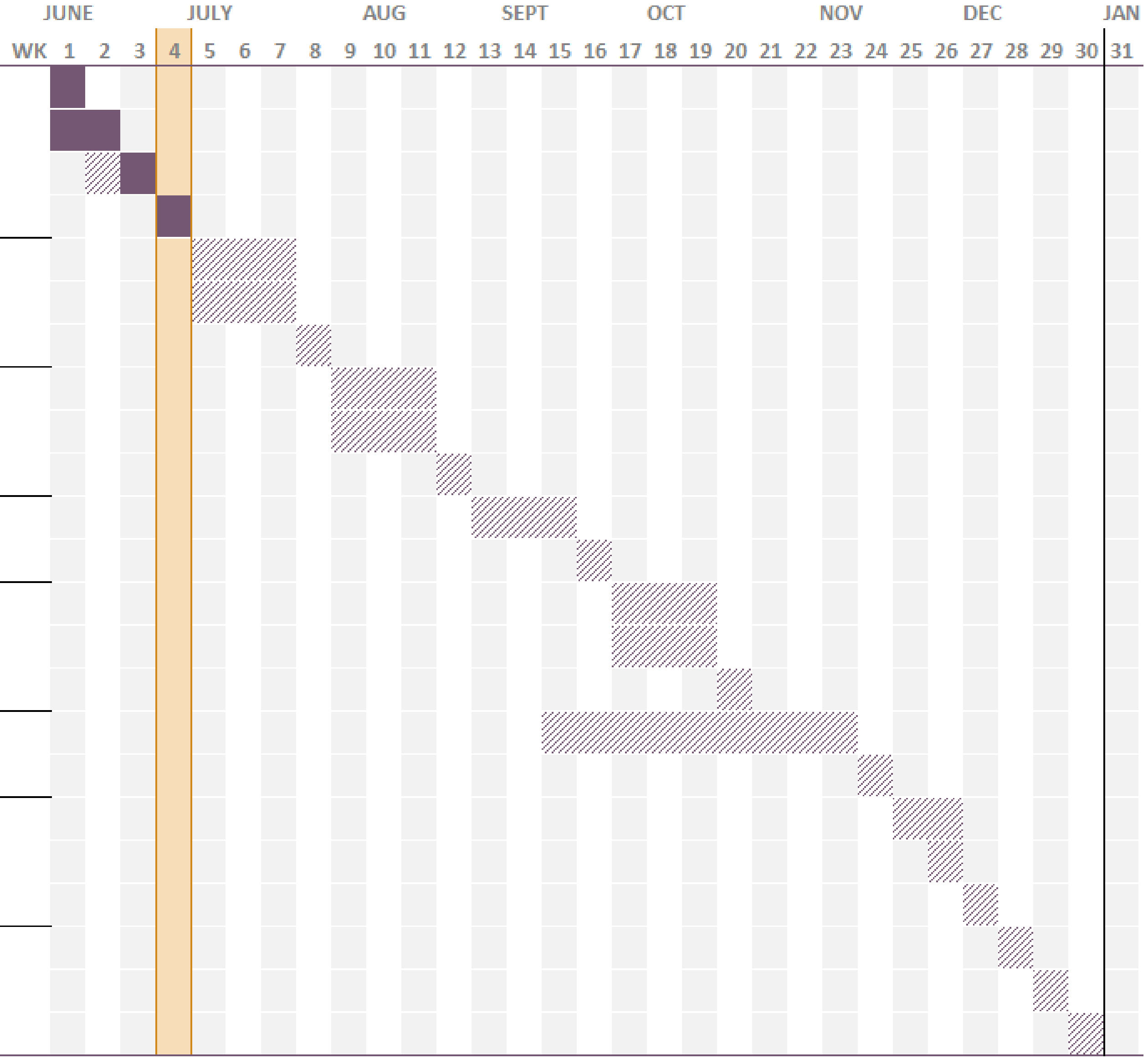
- Goals Objectives
  Valuation & Risk Mapping
  Focus Areas
- Strategies
- Schedule

LAC MEETING 1

SCHEDULE

Vulnerability Assessment Project Plan, 2017

	PLAN START	PLAN DURATION	ACTUAL START	ACTUAL DURATION	PERCENT COMP.
Project launch meeting	1	1	1	1	100%
Confirm LAC members	1	2	1	2	100%
Launch Story Map	2	2	3	1	100%
LAC meeting 1	4	1	4	1	100%
Conduct risk assessment mapping	5	3	0	0	0%
Conduct combined risk scoring	5	3	0	0	0%
LAC meeting 2	8	1	0	0	0%
Develop criteria for site selection	9	3	0	0	0%
Develop candidate sites	9	3	0	0	0%
LAC meeting 3	12	1	0	0	0%
Develop candidate adaptation actions	13	3	0	0	0%
LAC meeting 4	16	1	0	0	0%
Develop draft plan for candidate sites	17	3	0	0	0%
Review EM strategies and plans	17	3	0	0	0%
LAC meeting 5	20	1	0	0	0%
Develop draft deliverables for comment	15	9	0	0	0%
LAC meeting 6	24	1	0	0	0%
Incorporate comments into report	25	2	0	0	0%
Consolidate Story Map input	26	1	0	0	0%
LAC meeting 7	27	1	0	0	0%
Submit complete draft for City review	28	1	0	0	0%
City review	29	1	0	0	0%
Incorporate City review	30	1	0	0	0%



METHODOLOGY

- Inventory
  - Resource valuation and risk mapping
  - Risk assessment map
  - Composite map

METHODOLOGY

- Historic Resource Value Score
  - Each property within the Historic District
  - Architectural Integrity
  - Used in combination with Cultural Resource Value Score

METHODOLOGY

- Cultural Resource Value Score
  - Input from LAC
  - Not necessarily related to architectural value
  - Identify what buildings/sites the Portsmouth community values

METHODOLOGY

- Study areas
  - 4 neighborhoods/areas
  - Future use for LAC

METHODOLOGY

- Adaptation strategies

METHODOLOGY

Climate Change Vulnerability Assessment and Adaptation Plan

April 2, 2013

"… the report shows that the potential flooding impact to buildings alone would be **3 to 4 times** as great as the cost of putting in place adaptation actions. …

SEARCH ROCKINGHAM PLANNING COMMISSION GEI Consultants

METHODOLOGY

Climate Change Vulnerability Assessment and Adaptation Plan

April 2, 2013

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…As a next step in planning for climate change it will be helpful to refine the set of adaptation actions, making them more realistic and have a strong basis of community support.

METHODOLOGY

Climate Change Vulnerability Assessment and Adaptation Plan

April 2, 2013

"… the report shows that the potential flooding impact to buildings alone would be **3 to 4 times** as great as the cost of putting in place adaptation actions. …

…As a next step in planning for climate change it will be helpful to refine the set of adaptation actions, making them more realistic and have a strong basis of community support.

Then, a feasibility study and realistic cost accounting can be done to determine the benefit of implementing specific adaptation strategies." – p.35

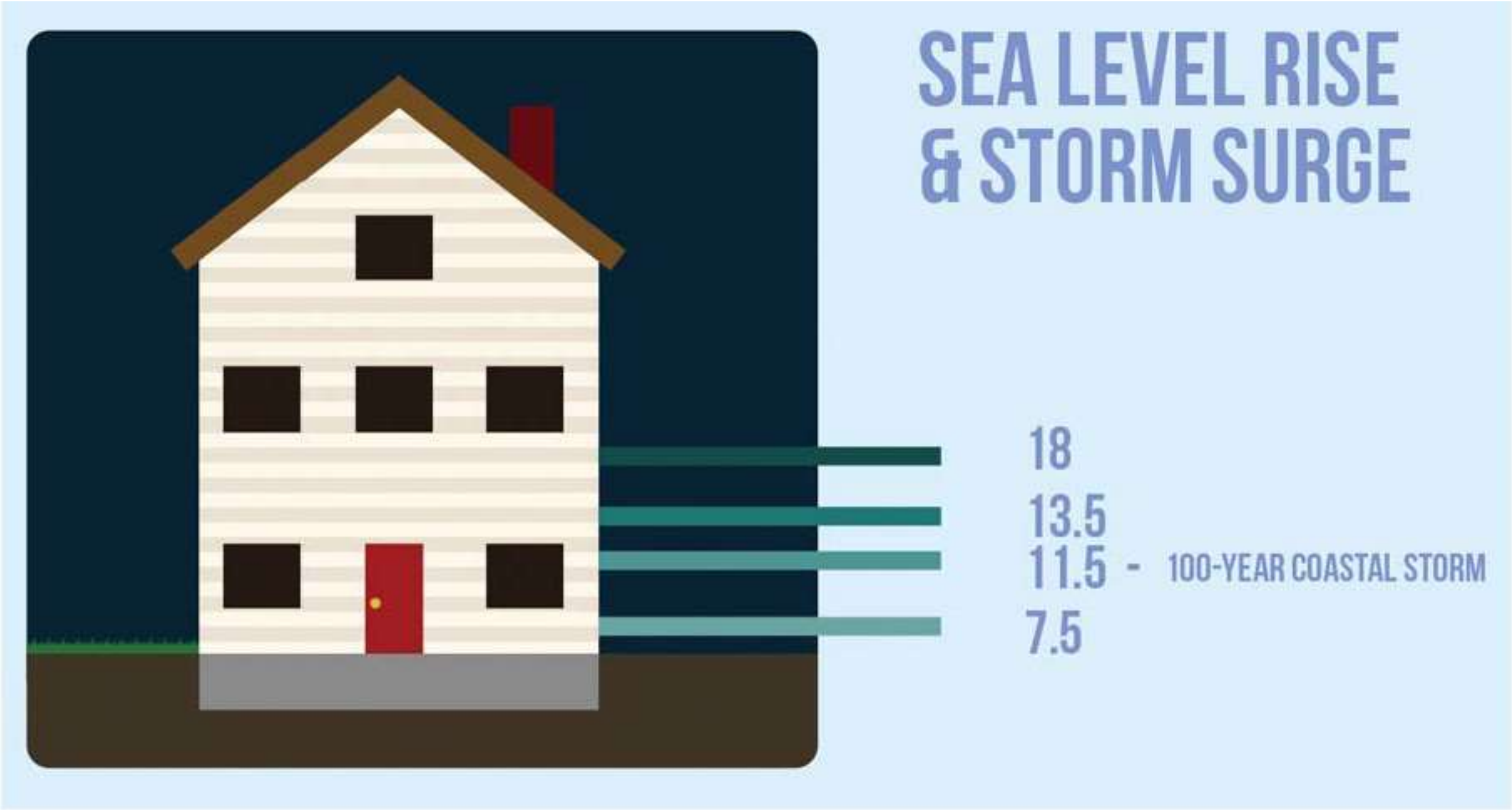
METHODOLOGY

PREPARE.
PROTECT.
PORTSMOUTH.

FULL REPORTVIEW MAPSGET INVOLVED

How will sea level rise and climate change affect Portsmouth?

METHODOLOGY



This Illustration shows the modeled scenarios (all elevations are relative to current mean sea level).

- **7.5 feet** is about 3 feet higher than today's normal high tide and approximates the Mean Higher High Water (MHHW) in 2100 under the best case scenario
- **11.5 feet** is close to the present day 100-year coastal flood at high tide, and also corresponds to the normal high tide in 2100 under the worst case scenario
- **13.5 feet** represents the 2050 100-year storm surge at high tide under the worst case scenario, and the 2100 100-year storm surge at high tide under the best case scenario
- **18 feet** corresponds to the 2100 100-year storm surge at high tide under the worst case scenario

EI Consultants

METHODOLOGY

METHODOLOGY

Consultants

METHODOLOGY

Elevate

Designing for Flood Levels Above the BFE

HOME BUILDER'S GUIDE TO COASTAL CONSTRUCTION — Technical Fact Sheet No. 1.6

Purpose: *To recommend design and construction practices that reduce the likelihood of flood damage in the event that flood levels exceed the Base Flood Elevation (BFE).*

Key Issues

- BFEs are established at a flood level, including wave effects, that has a 1-percent chance of being equaled or exceeded in any given year, also known as the 100-year flood or base flood. Floods more severe and less frequent than the 1-percent flood can occur in any year.
- Flood levels during some recent storms have exceeded BFEs depicted on the Flood Insurance Rate Maps (FIRMs), sometimes by several feet. In many communities, flooding extended inland, well beyond the 100-year floodplain (Special Flood Hazard Area [SFHA]) shown on the FIRM (see Figure 1).
- Flood damage increases rapidly once the elevation of the flood extends above the lowest floor of a building, especially in areas subject to coastal waves. In V Zones, a coastal flood with a wave crest 3 to 4 feet above the bottom of the floor beam (approximately 1 to 2 feet above the walking surface of the floor) will be sufficient to substantially damage or destroy most light-frame residential and commercial construction (see Figure 2).
- There are design and construction practices that can eliminate or minimize damage to buildings when flood levels exceed the BFE. **The most common approach is to add freeboard to the design (i.e., to elevate the building higher than required by the FIRM).** This practice is outlined in American Society of Civil Engineers (ASCE) 24-05, *Flood Resistant Design and Construction*.
- There are other benefits of designing for flood levels above the BFE: reduced building damage and maintenance, longer building life, reduced flood insurance premiums, reduced period of time in which the building occupants may need to be displaced in the event of a flood disaster (and need for temporary shelter and assistance), reduced job loss, and increased retention of tax base.
- The cost of adding freeboard at the time of home construction is modest, and reduced flood insurance premiums will usually recover the freeboard cost in a few years' time.

Figure 1. Bridge City, Texas, homes were flooded during Hurricane Ike, even though they were constructed outside the SFHA and in Zone B. The flood level was approximately 4' above the closest BFE.

Figure 2. Bolivar Peninsula, Texas, V Zone house constructed with the lowest floor (bottom of floor beam) at the BFE (dashed line). The estimated wave crest level during Hurricane Ike (solid line) was 3' to 4' above the BFE at this location.

METHODOLOGY

P.A. Slovinsky, MGS

METHODOLOGY

Photo 7. The MacPheadris-Warner House, 150 Daniel Street (NHL listed), looking north.

Photo 23. Rundlet-May House, 364 Middle Street (NR listed), looking northwest.

P.A. Slovinsky, MGS

METHODOLOGY

Floodproof

Designing for Flood Levels Above the BFE

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METHODOLOGY

www.smartvent.com

LAC MEETING 1

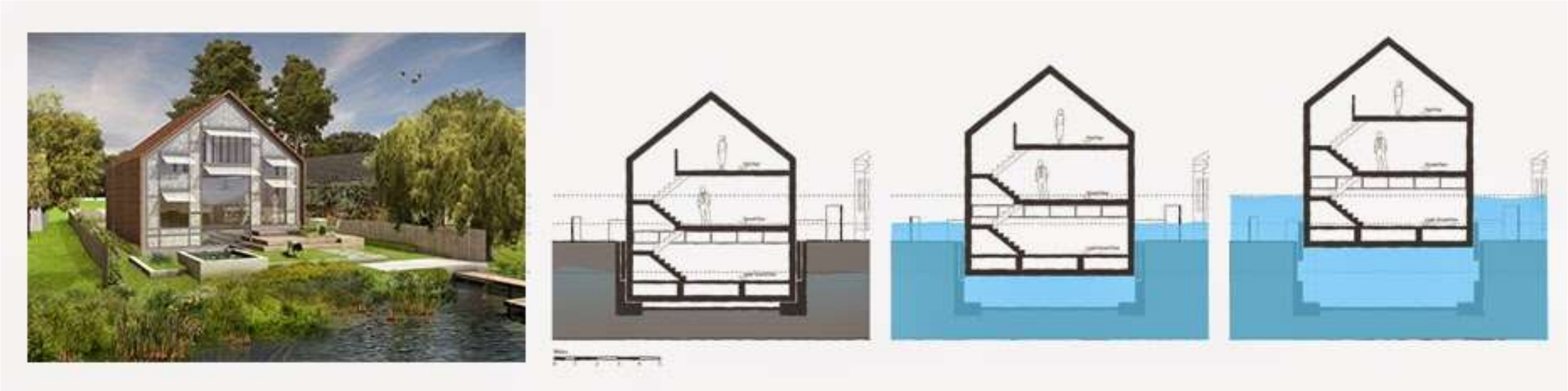
METHODOLOGY

Photo 17. Moffatt-Ladd House, 154 Market Street (NHL listed), looking northwest showing the warehouse to the left of the house and the counting house to the right of the house.

Photo 24. The Pearl Street Baptist Church, 45 Pearl Street (NR listed), looking east.

P.A. Slovinsky, MGS

METHODOLOGY



Amphibious House and concept from the Netherlands

http://2.bp.blogspot.com/-01SCbuZ7Moo/U7GJZAlrK1I/AAAAAAAAArI/enn8MOe3tQk/s1600/106-%5B6%5D-baca-floating+concept+2.jpg

P.A. Slovinsky, MGS

METHODOLOGY

Factor Architecten

Houses sit on hollow concrete foundations attached to six iron piers.
Posts between houses are guides to keep homes in place as they glide up and down.

METHODOLOGY

Amphibious housing in Maasbommel, Netherlands, can rise 18'.

METHODOLOGY

P.A. Slovinsky, MGS

METHODOLOGY

METHODOLOGY

Photo 21. Mechanic Street from Peirce Island, showing (l-r, in the center of frame) the Wentworth-Gardner House (49–56 Mechanic Street, NHL listed) and the Luke M. Laighton House (122 Mechanic Street).

Photo 14. Portsmouth Cottage Hospital, 5 Junkins Avenue (NR listed), looking southeast across South Mill Pond from Parrott Avenue.

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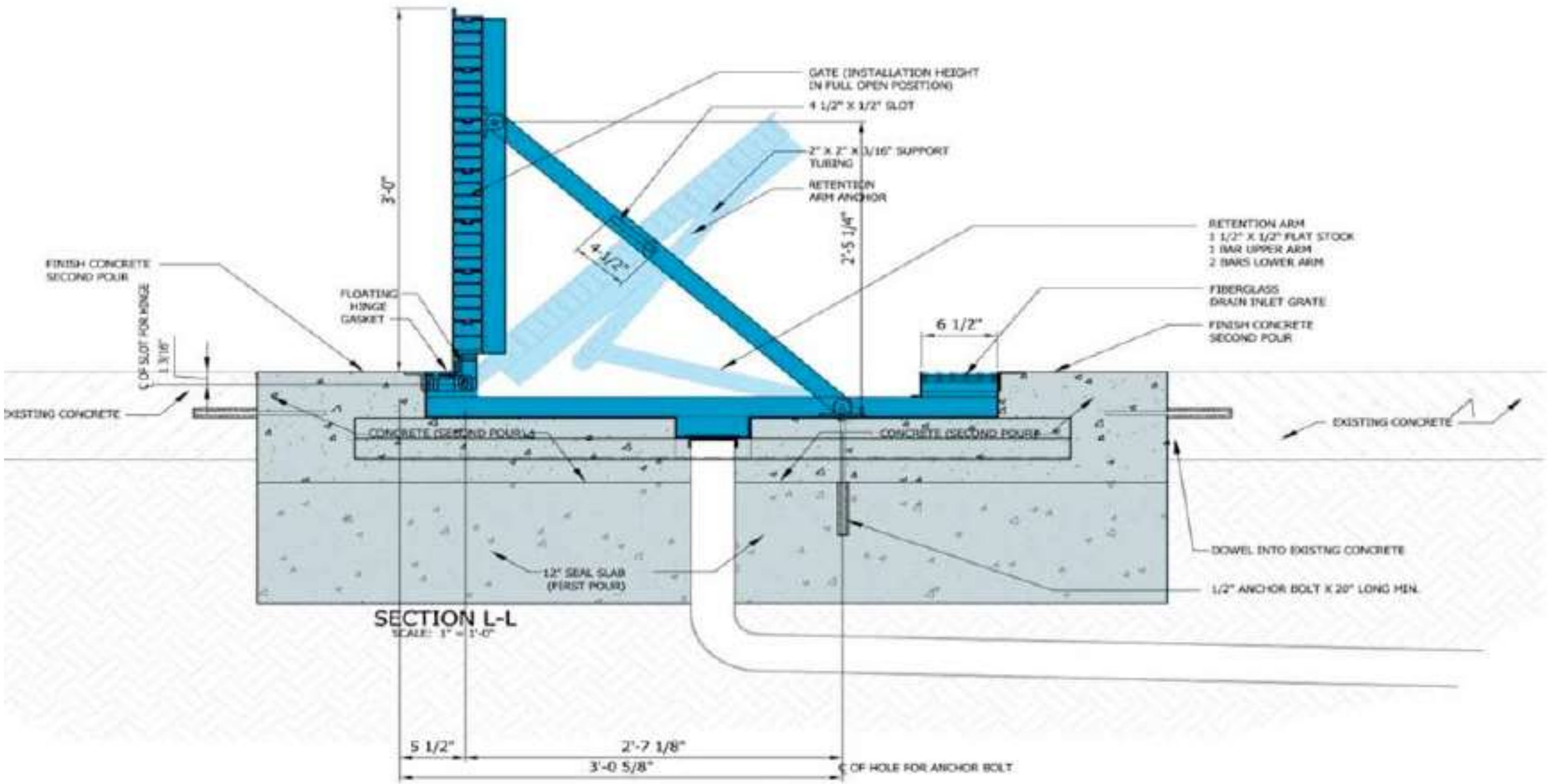
METHODOLOGY

Pea Patch Island, DE (Delaware River)

METHODOLOGY

METHODOLOGY



METHODOLOGY

METHODOLOGY

LAC MEETING 1

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METHODOLOGY

Floodwalls with removable aluminum or steel gates.
Cologne, Germany (Rhine).

METHODOLOGY

Planning tool evaluation, e.g.

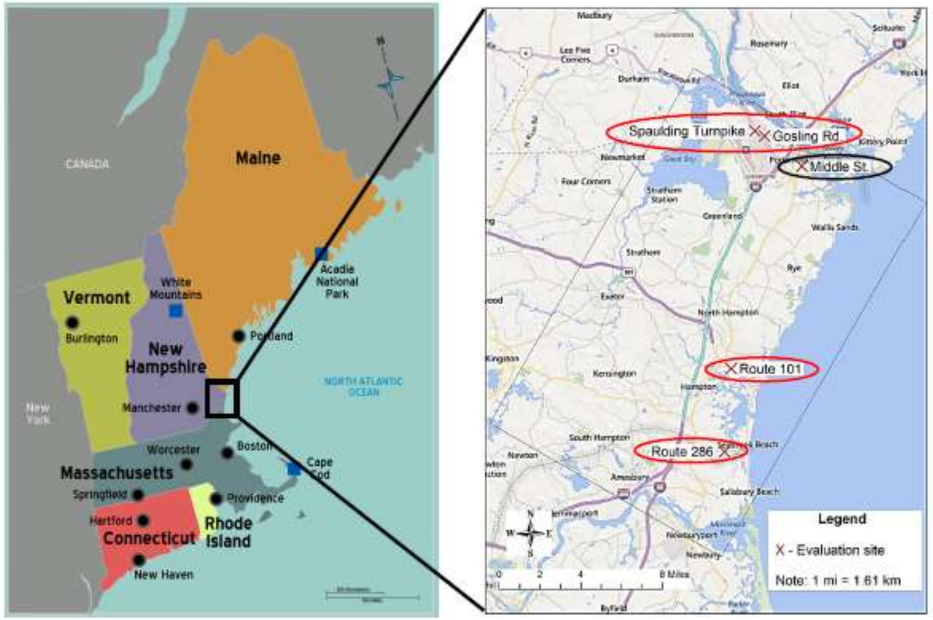
- Building code updates
- Incentives to upgrade or move buildings
- Zoning in relation to properties at risk (to address building location/size/transfer of dvp. rights)

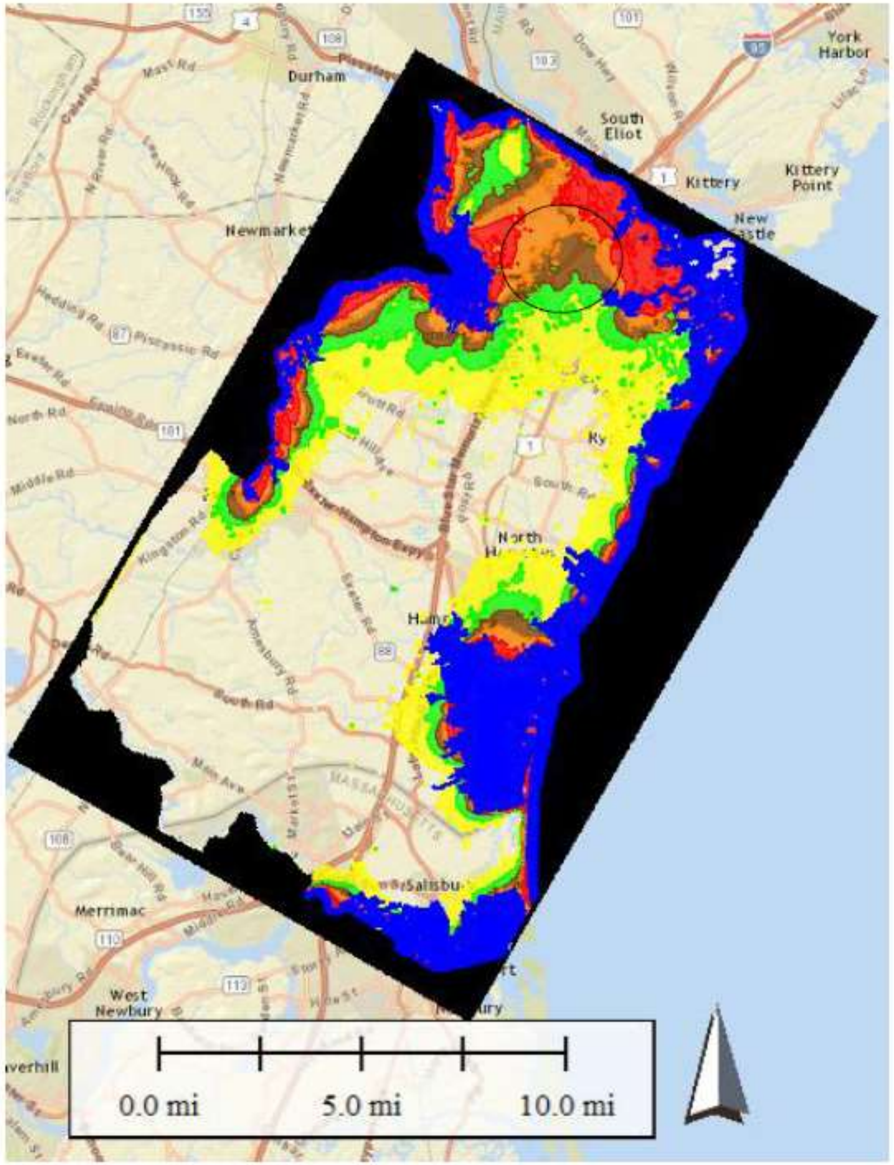
P.A. Slovinsky, MGS

METHODOLOGY

- Groundwater evaluations

METHODOLOGY





J. Knott, UNH

Groundwater rise is predicted to occur further inland than surface water flooding.

Rising groundwater will inundate the ground surface in some areas.

METHODOLOGY

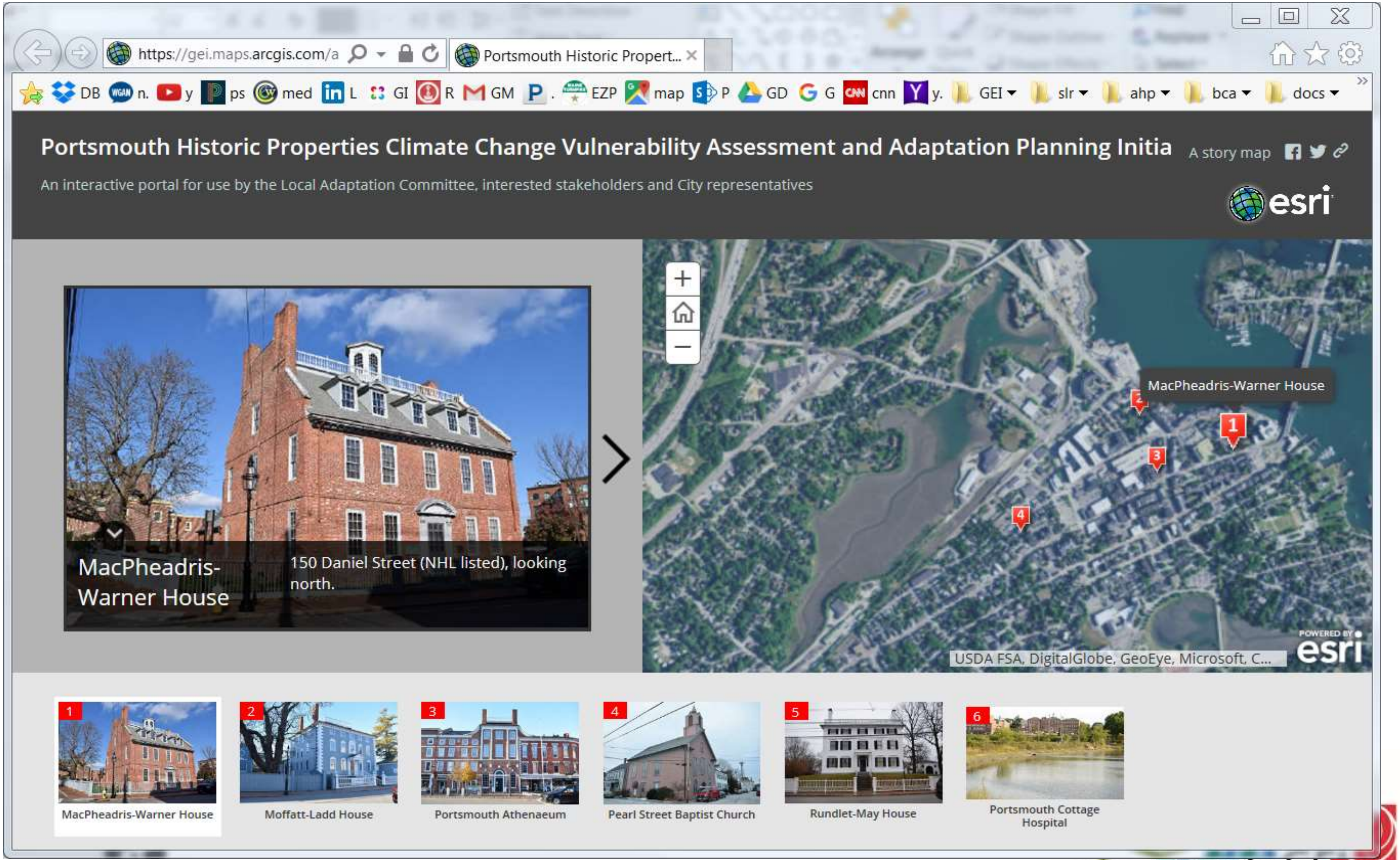
- LAC conversations are critical!

TOOLS

- ESRI Story Map

LAC MEETING 1

LAC MEETING 1



http://arcg.is/2rYAMoH

METHODOLOGY

- Adaptation plan

TOOLS

- 3D Model
- Studies (Strawberry Banke)

NEXT STEPS

Vulnerability Assessment Project Plan, 2017

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