

Prescott Hall Drainage Study Project No. 22-012-3

Public Workshop #1
May 12, 2022

Jacobs

Challenging today.
Reinventing tomorrow.



Introductions

- City of Newport
 - Rob Schultz, PE – Director of Utilities
- RIDOT
 - Jody Richards, PE – Pell Bridge Improvements Project Manager
- Jacobs
 - Peter von Zweck, PE – Project Principal
 - McKenzie Banahan, PE – Project Manager
 - Andrea Braga, PE – Water Resources Service Lead
 - Erin O'Shea, EIT – Project Engineer

Agenda

- Project Objective
- Background
- Survey Results
- Prescott Hall Study Area
- Scope of the Current Drainage Study
- Next Steps
- Open Discussion

Project Objective

Project Objective

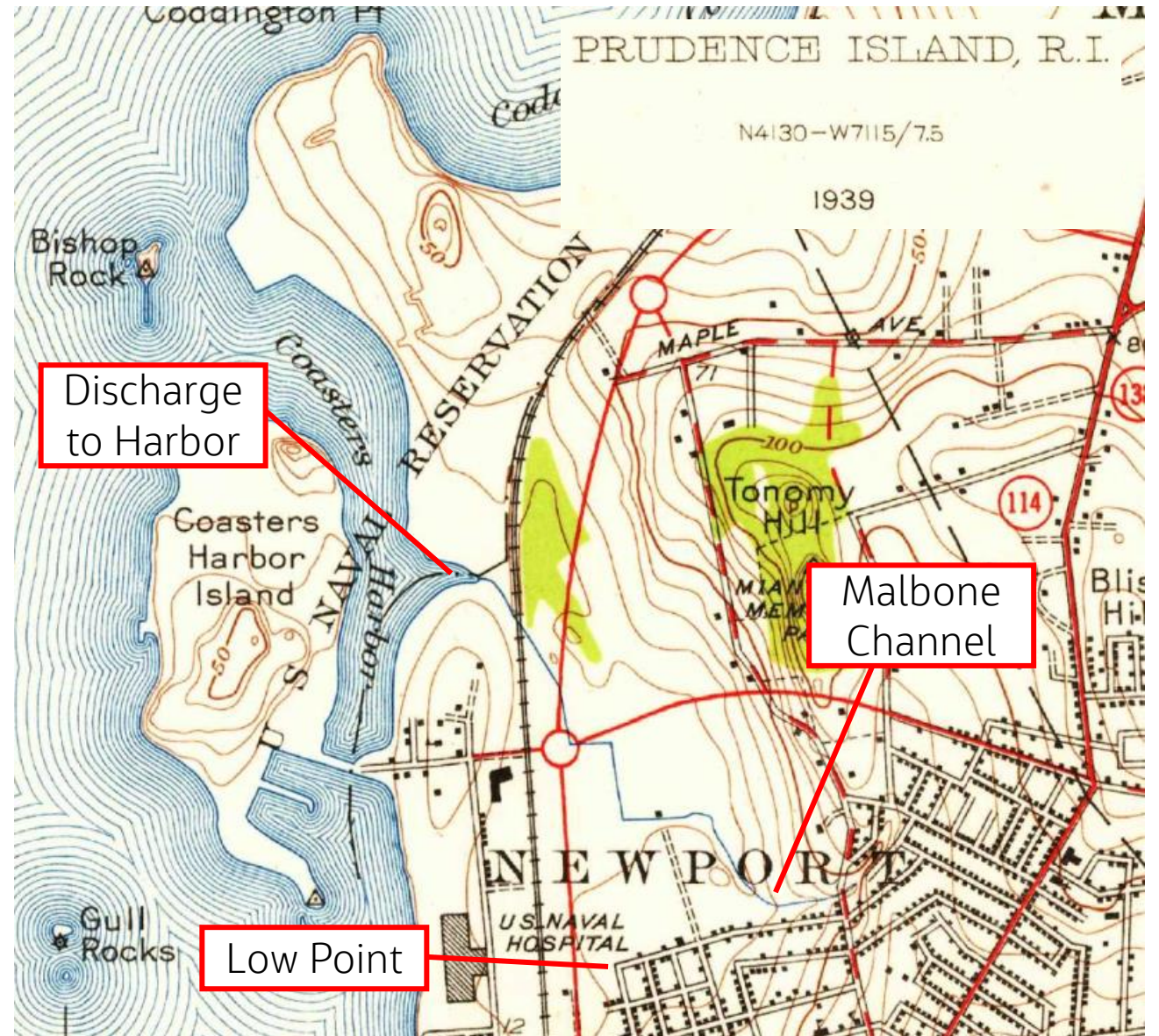
- **Problem:** Historic drainage and flooding issues in the Prescott Hall neighborhood during high intensity rainfall events and extreme high tides
- **Objective:** Identify sources of flooding, evaluate mitigation alternatives, develop recommendations including cost estimates
- **Outcome:** Short-term and long-term control recommendations to reduce the magnitude and frequency of flooding



Background

Watershed History

- Substantial residential development in the upper reaches in 1920s and 1930s
- Includes Malbone and Prescott Hall neighborhoods
- Open channel flow in lower reaches
- Discharge to Coasters Harbor



Watershed History

- Pell Bridge constructed in 1960's combined with other development over the years has disrupted natural overland flow path
- Current storm infrastructure was generally designed ± 50 years ago and is undersized for current conditions
- Historic flooding following precipitation events and coinciding with high tide create a compound problem
- Sea level rise and more intense and frequent storms are already being experienced, more are projected to come



<https://www.dot.ri.gov/projects/pellbridgeramps/>

Past Flooding Events – August 2012

- August 15, 2012
 - 1.25 inches in 0.5 hours
 - 2-year return frequency (50% chance of occurring in any given year)
 - Flood depth reported at Prescott Hall & Garfield St: approximately 3 feet



Garfield St. at Homer St., looking west
August 15, 2012



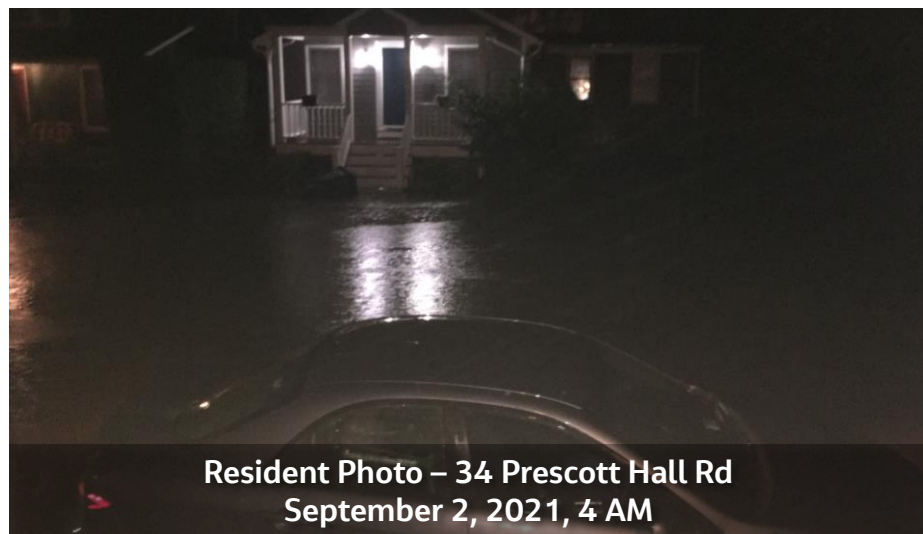
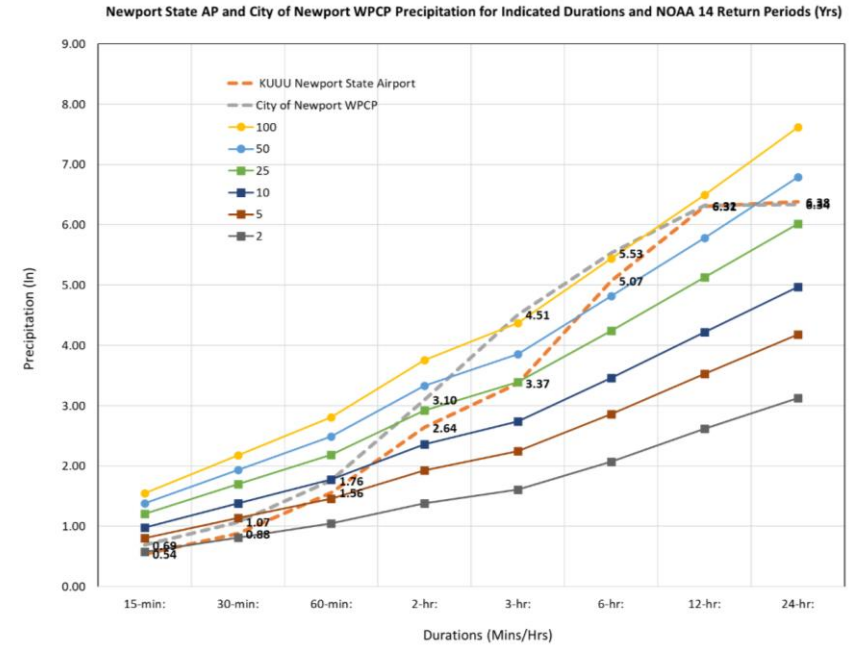
Storm Drain Overflow
Homer St. at Southmayd St., looking north
August 15, 2012



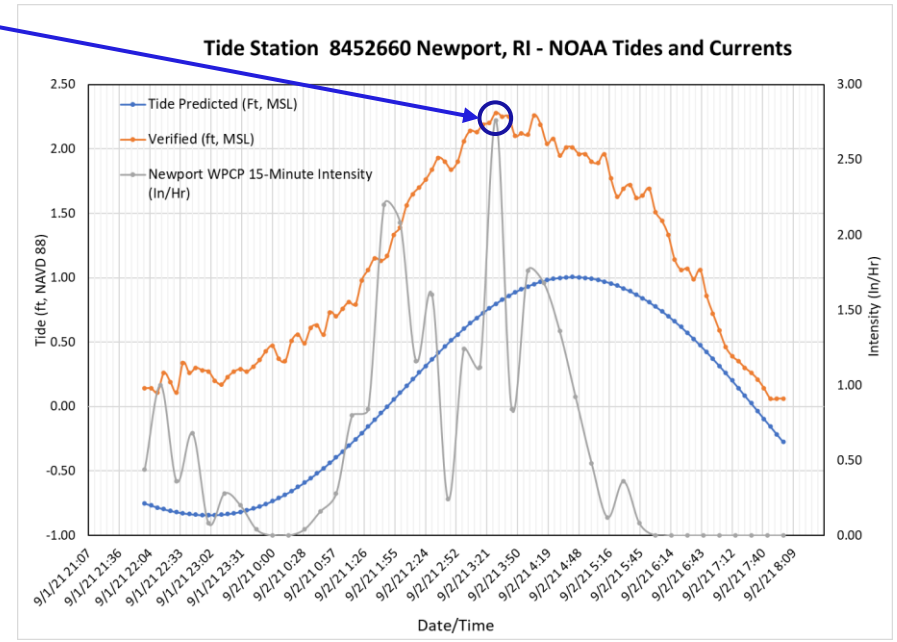
Prescott Hall Rd at Garfield St, looking north
August 15, 2012

Past Flooding Events - Tropical Storm Ida

- September 1-2, 2021
- 6.34 inches rain in 24 hours
- Comparable to 100-yr, 6-hr return frequency (1% chance of occurring in any given year)
- Heaviest rainfall between 1 AM – 5 AM on Sep 2, 2021
 - Peak observed tide coincident with peak precipitation intensity at 3:30 AM



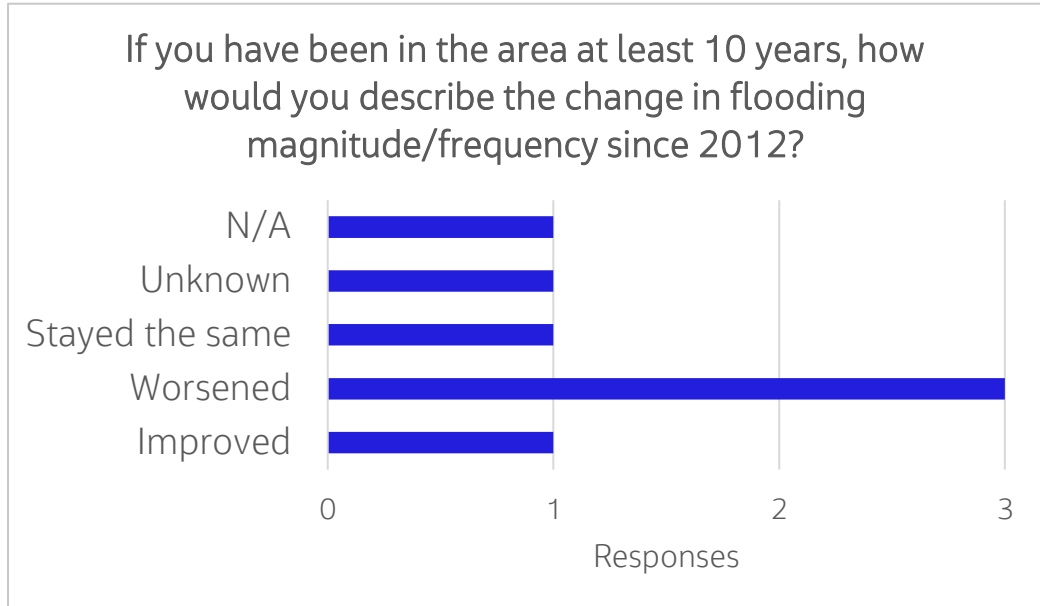
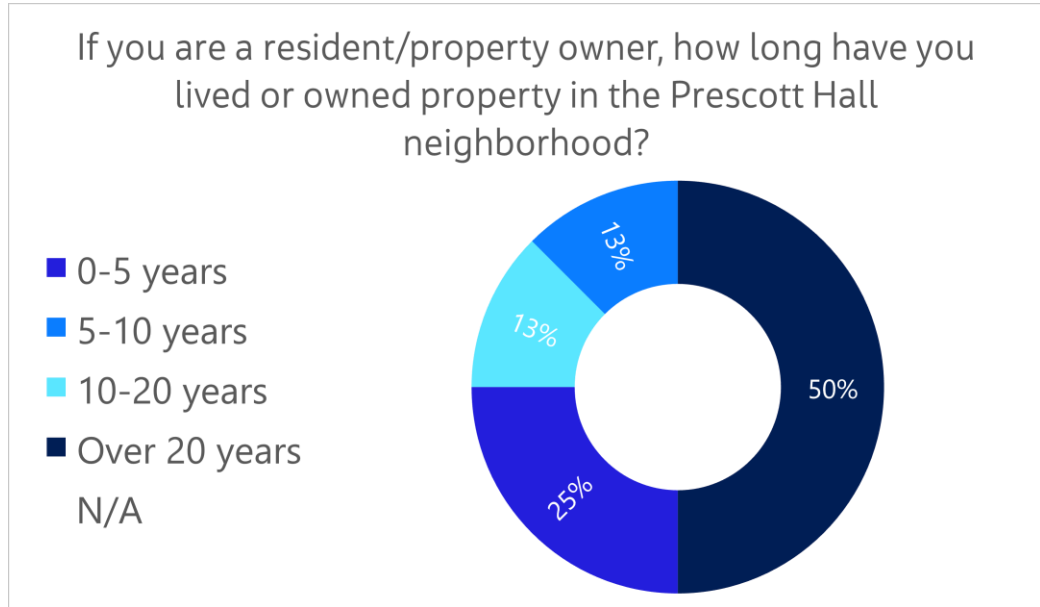
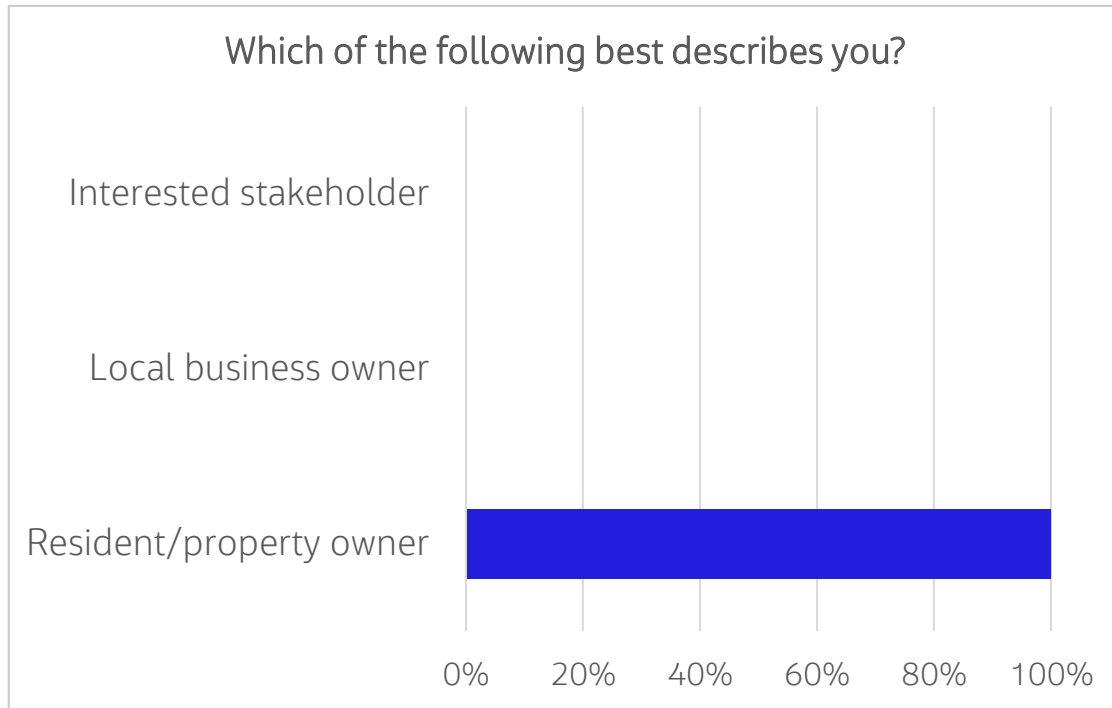
Resident Photo – 34 Prescott Hall Rd
September 2, 2021, 4 AM



Survey Results

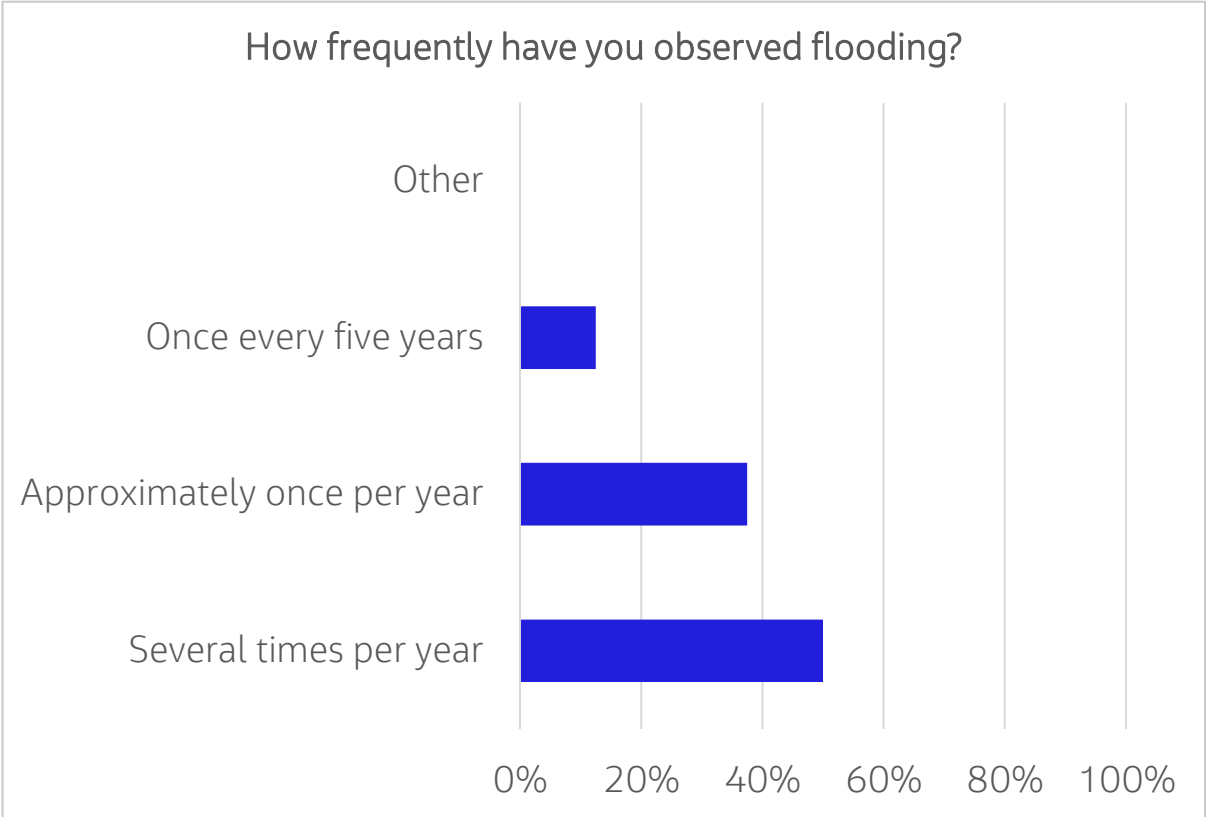
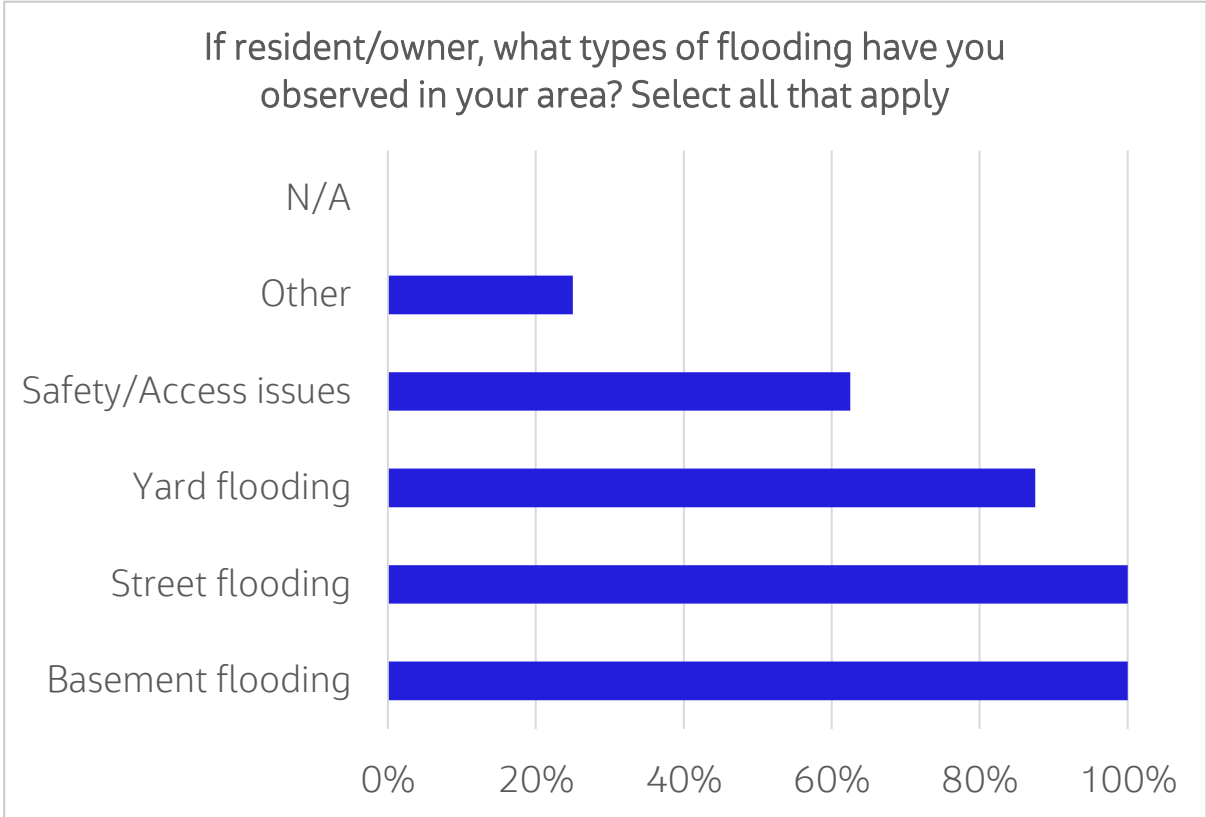
Survey Results

- Total responses as of May 11th: 8



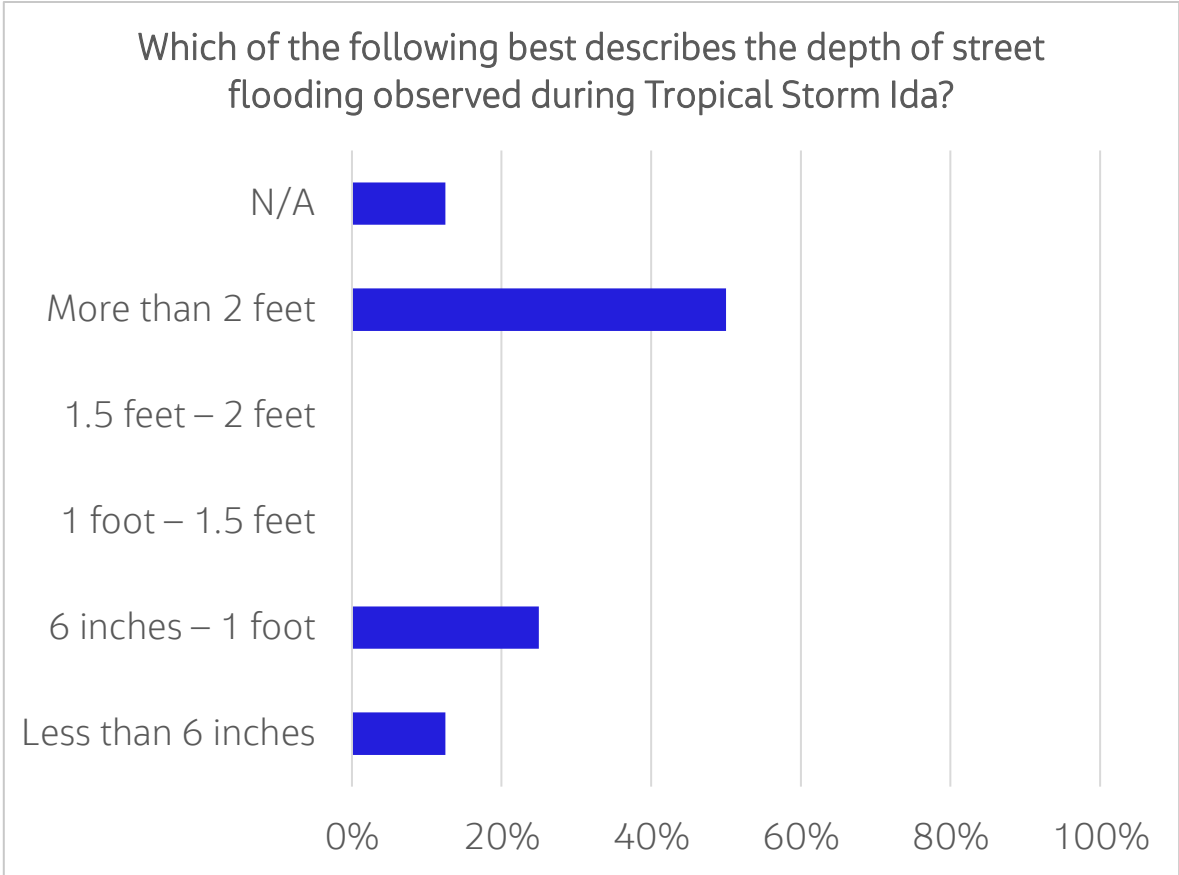
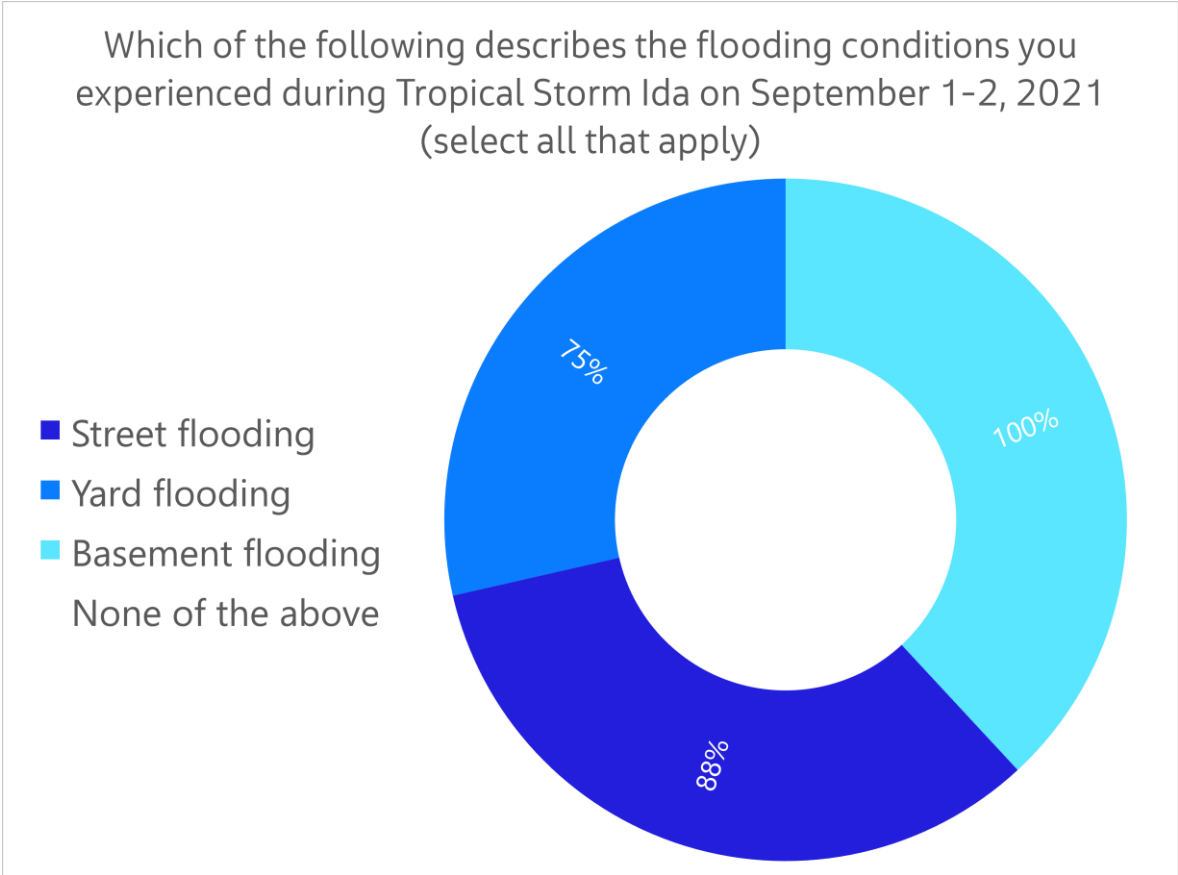
Survey Results

■ Total responses as of May 11th: 8



Survey Results

■ Total responses as of May 11th: 8

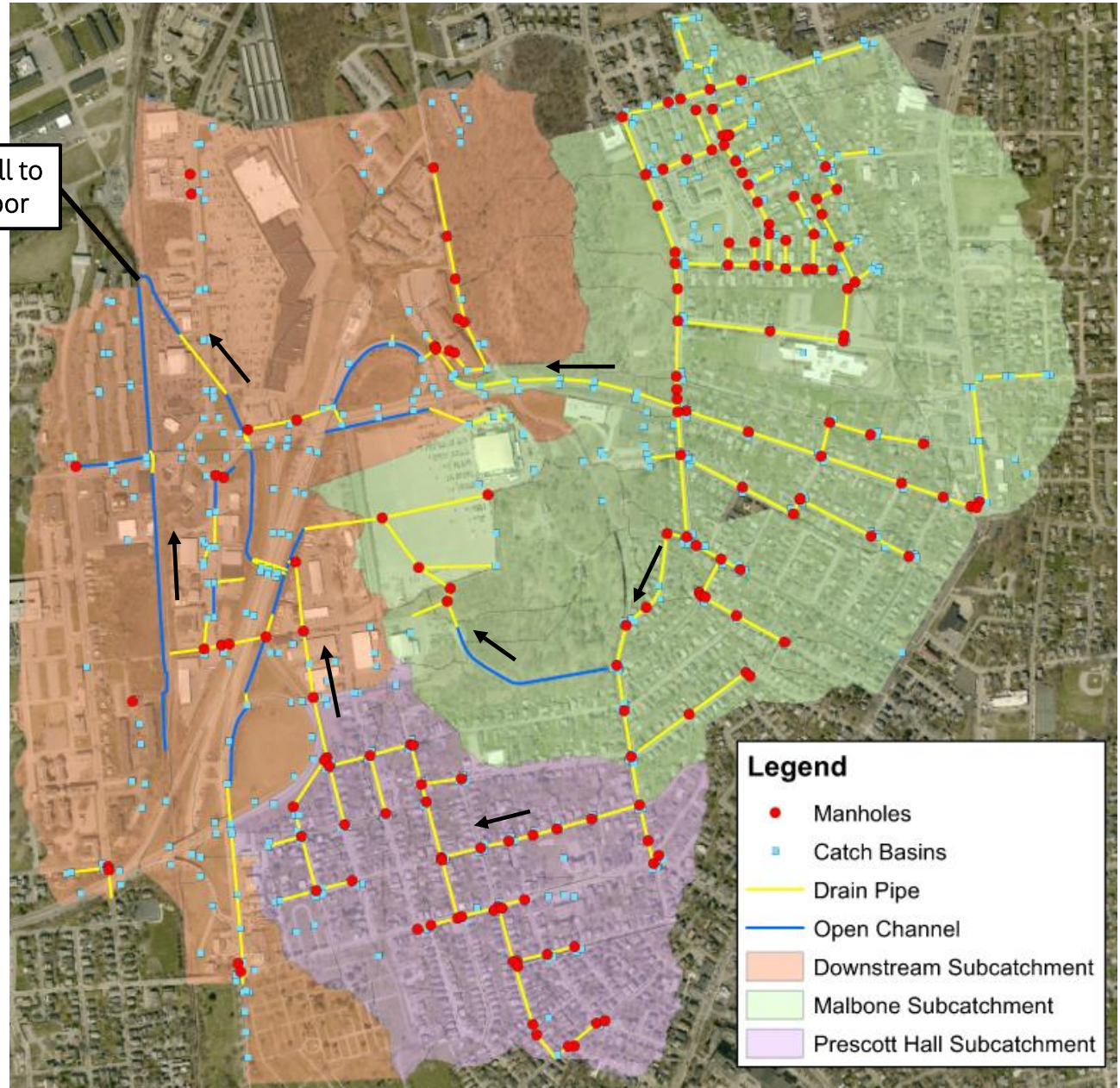


Prescott Hall Study Area

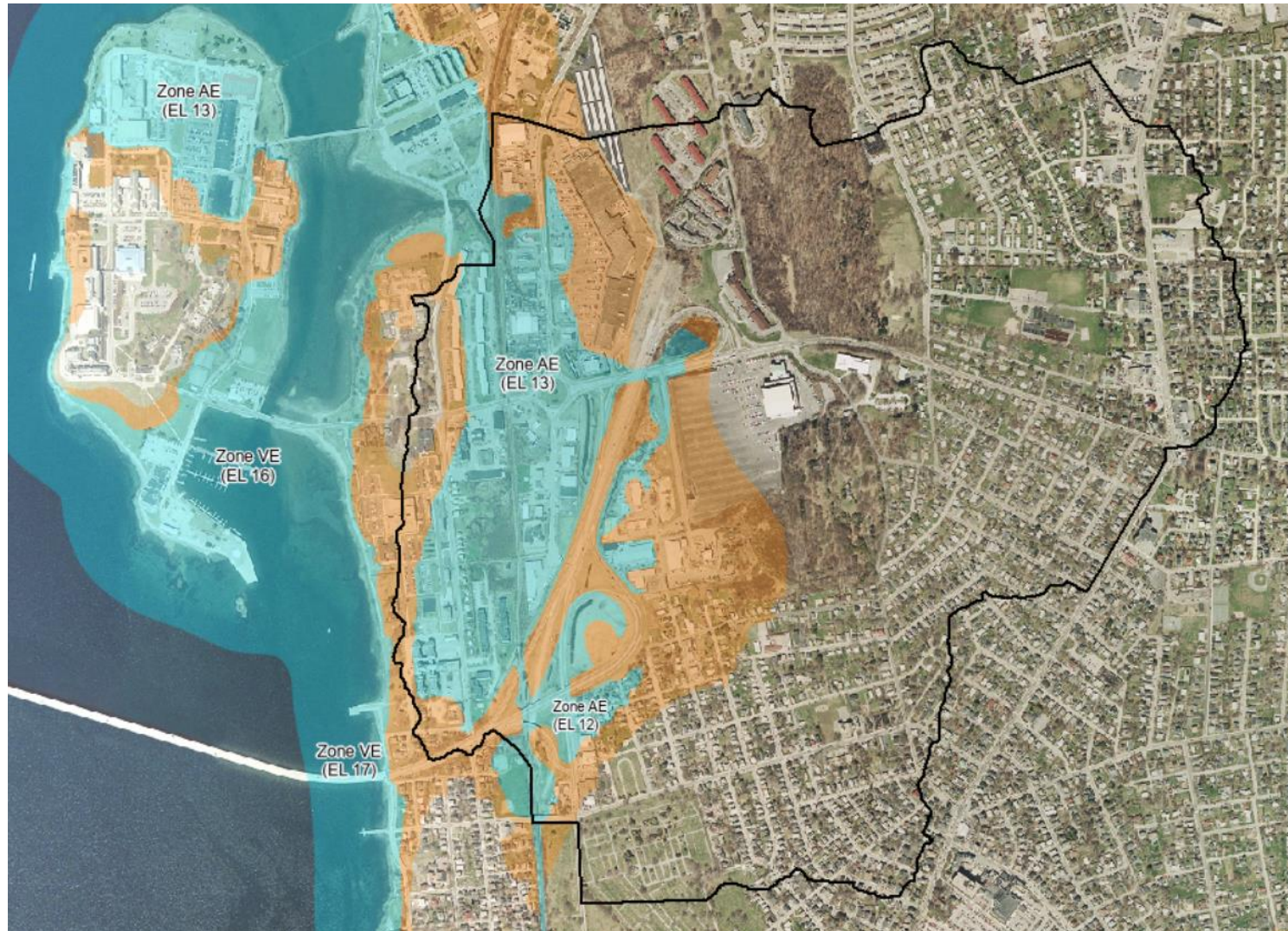
Prescott Hall Study Area




- Watershed boundaries
 - 586 acres
 - 50% impervious cover
 - 6% average slope
 - Max elevation: 157.8 ft
 - Min elevation: 0.8 ft
 - Primarily silty loam and sandy loam soil types
 - Shallow groundwater
- Existing drainage infrastructure
 - City storm drain outlets to RIDOT drainage channels and culverts
 - Outfalls to harbor at elevation 1 ft
 - No tide gates

Outfall to Harbor



FEMA Flood Boundaries



-  100-year Flood Zone (1%)
-  500-year Flood Zone (0.2%)
-  Drainage Area

- Watershed lies within the 100-year and 500-year floodplains
- FEMA map does not take into consideration sea level rise or storm surge

Previous Drainage Study Findings - 2014

- **Study Scope:** drainage analysis and flood assessment of the storm drain system in both the Malbone and Prescott Hall subcatchments
- **Study Findings for Prescott Hall:**
 - Increased maintenance and cleaning of the City and State’s channels and culverts estimated to reduce flooding for design storm by **24%**
 - Other alternatives such as RIDOT channel and culvert upgrades and/or a new Halsey Street culvert estimated to reduce flooding for design storm by **>90%**

Location	Parameter	Existing	Option 1 Baseline Maintenance (BM)	Option 2: BM + Channel and Culvert Upgrades ¹	Option 3A: BM + Only Downstream Channel and Culvert Upgrades + Halsey Culvert ¹	Option 3B: BM + Halsey Culvert ¹
Prescott Hall	Total Flood Volume (MG)	2.75	2.08	0.21	0.18	0.21
	Flood Volume Reduction (%) ²	-	24	92	94	92
	Maximum Flood Duration (Hr)	7.2	5.3	1.3	1.2	1.6

**Flood reduction results shown are for 10-year, 6-hour design storm*

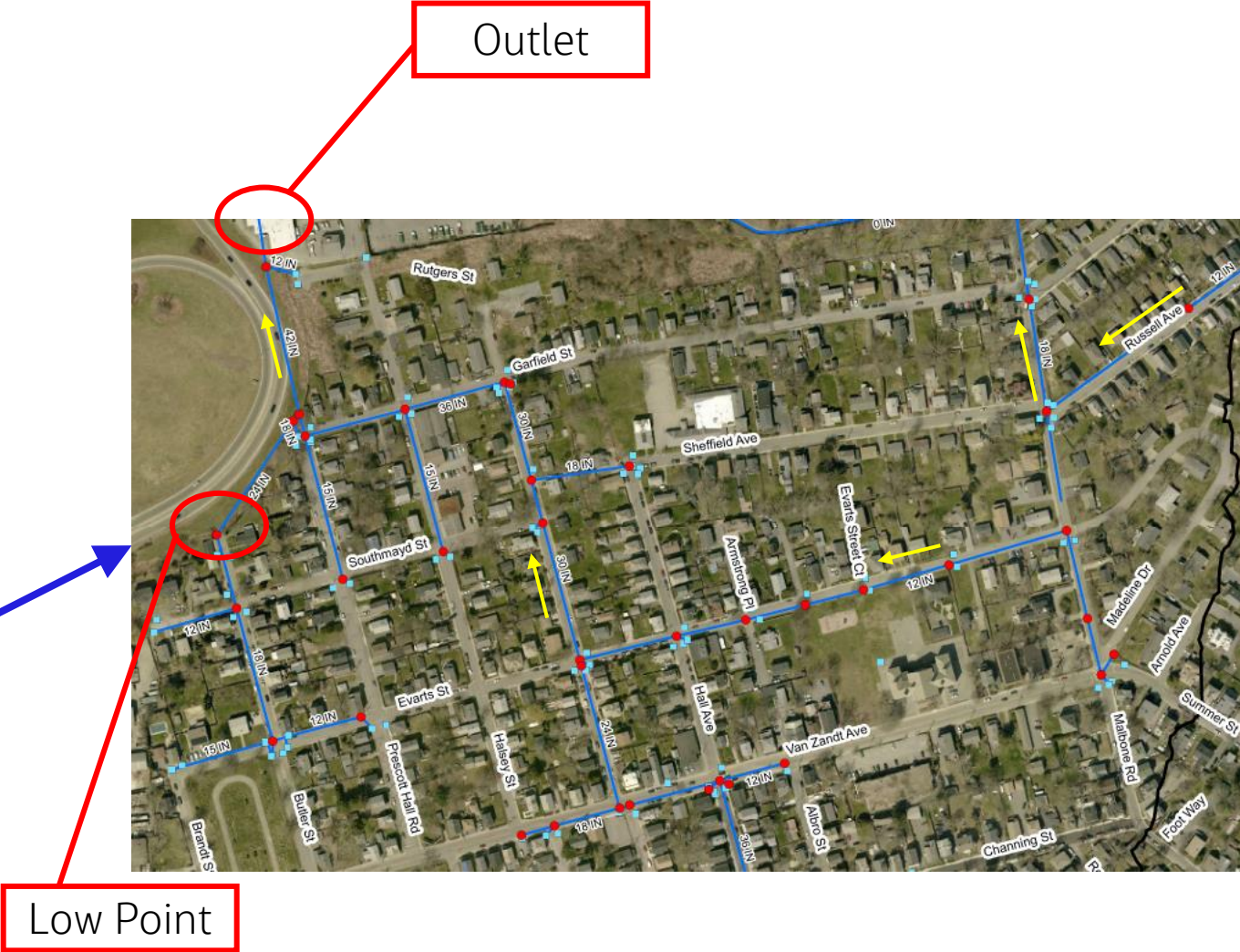
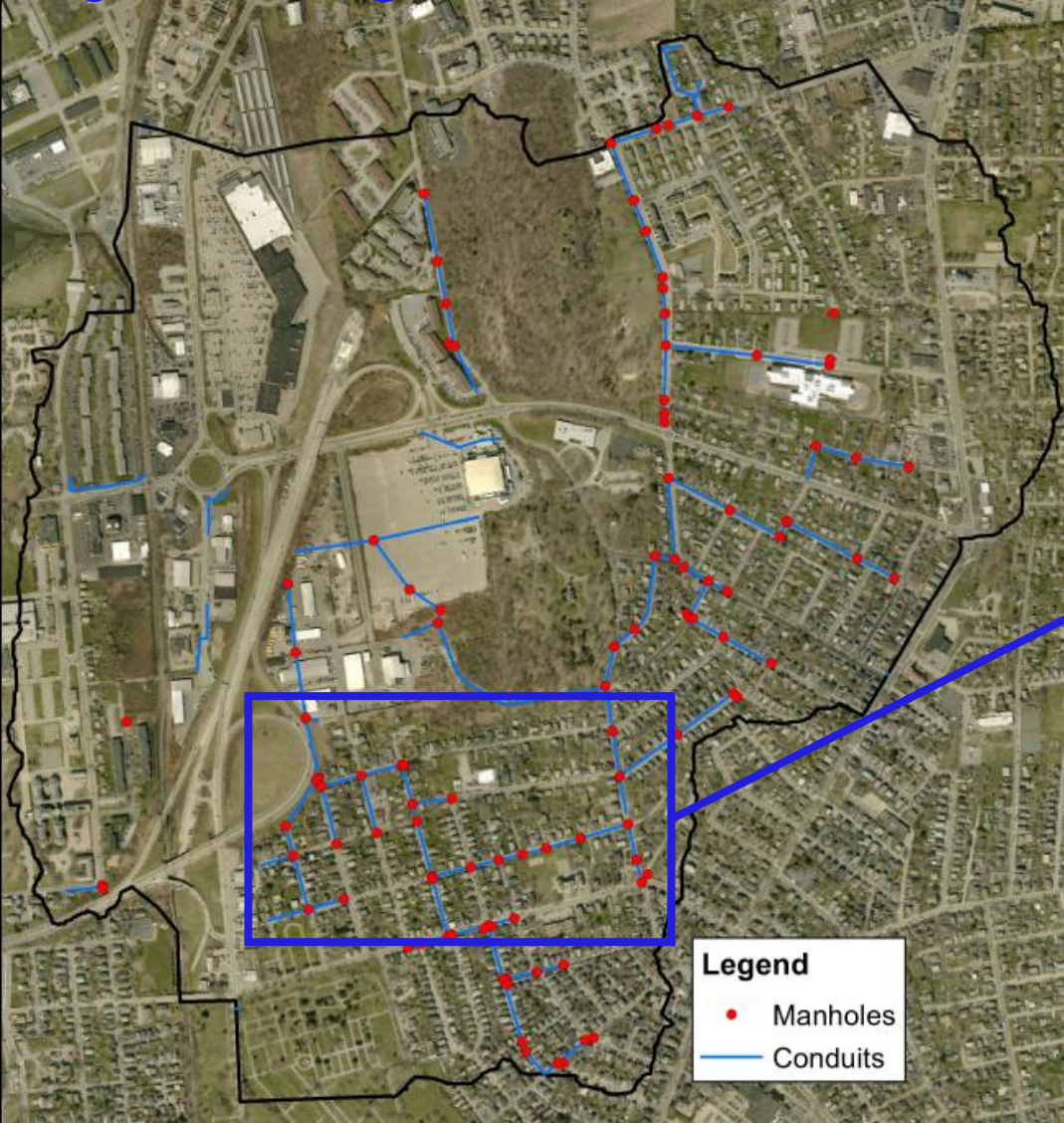
Previous Drainage Study Findings - 2014

City's Actions

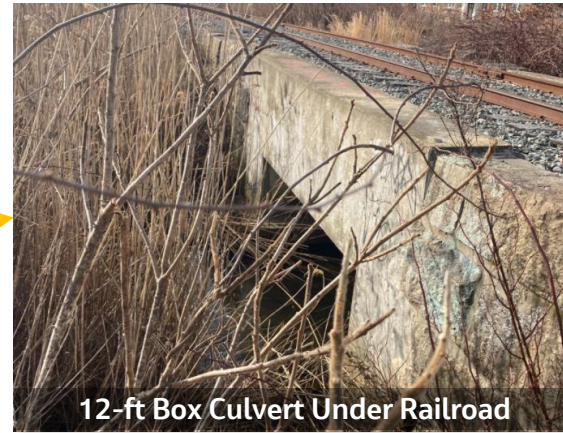
- Malbone Channel cleared out in 2017
- 42" storm drain from Prescott Hall Road inspected and cleaned as needed
- 48" storm drain from Malbone Channel outlet inspected and cleaned as needed
- All catch basins are inspected at least once annually; catch basins prone to clogging inspected more frequently prior to significant events
- Several catch basins replaced in the Prescott Hall area since 2014



City Drainage Infrastructure



RIDOT Drainage Infrastructure



12-ft Box Culvert Under Railroad

RIDOT Drainage Channels and Culverts; photos taken February 2022



Twin 60" Culverts Under JT Connell Hwy



Twin 60" Culverts Under Admiral Kalbfus



Drainage Channel Along RI-238

Scope of Current Drainage Study

Project Approach

- Develop detailed understanding of the contributing factors to flooding
- Detail limits of contributing existing storm drain infrastructure
- 2D hydraulic modeling of study area
- Development of potential mitigation alternatives
 - Short-term (1-3 years)/RIDOT Pell Bridge Improvements project
 - Long-term (3+ years)
 - Conceptual designs
 - Levels of control
 - Cost estimates
 - Implementation schedules
- Public involvement throughout, including development and selection of mitigation alternatives

Key Priorities and Issues

- Improve conveyance
- Reduce magnitude and frequency of flooding
- Improve public health and safety
- Adapt for climate change and sea level rise
- Synergy with ongoing Pell Bridge Improvements Project



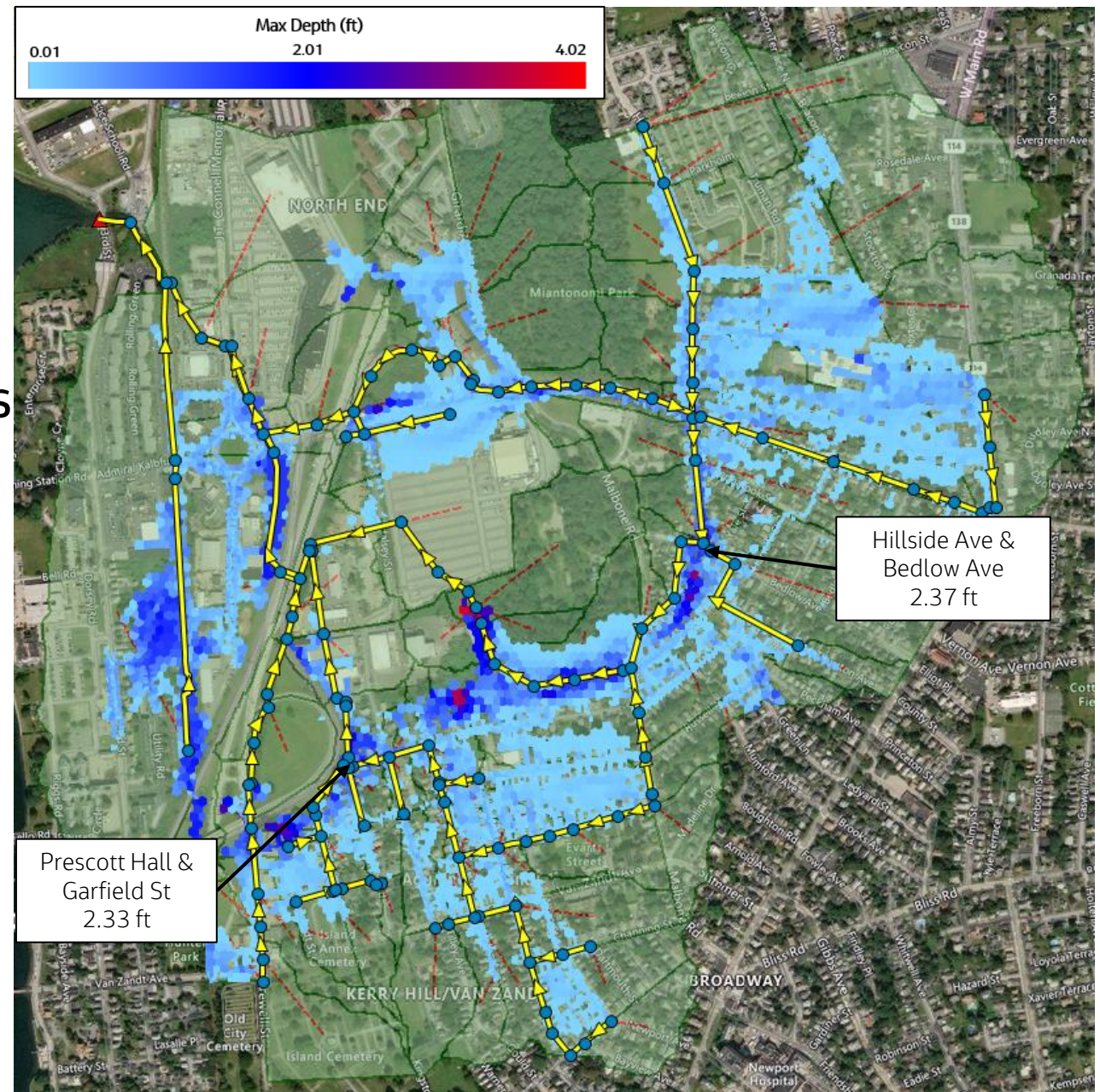
Hydrologic and Hydraulic Modeling

- Tool utilized to simulate rainfall runoff and predict extent of flooding
- Key components and inputs:
 - storm drain infrastructure
 - topography (elevation) data
 - site-specific soil and infiltration data
 - precipitation and tidal data
- Model is first validated against past events to confirm predictions match reality
- Potential improvements are then added to the model to test the effectiveness of different alternatives and identify the most cost-efficient solution



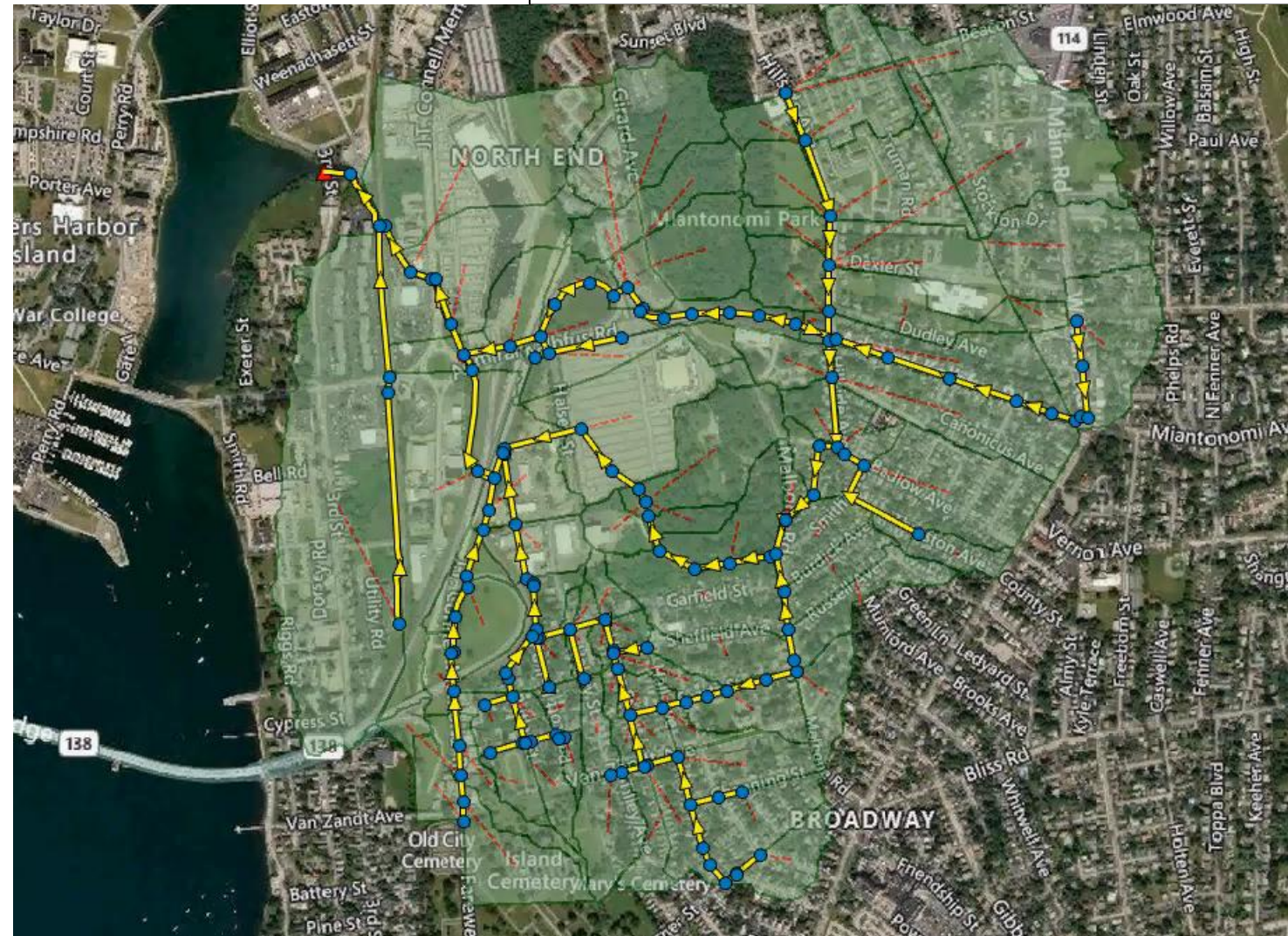
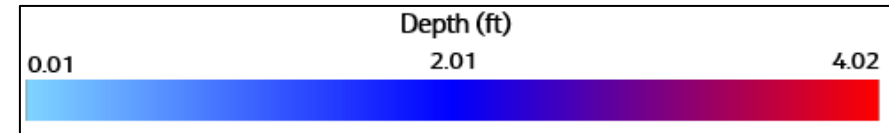
Existing Conditions Model Results

- August 15, 2012 storm event
- Cells are sized at an average of 900 ft²
- Maximum ponding depth in each cell is shown

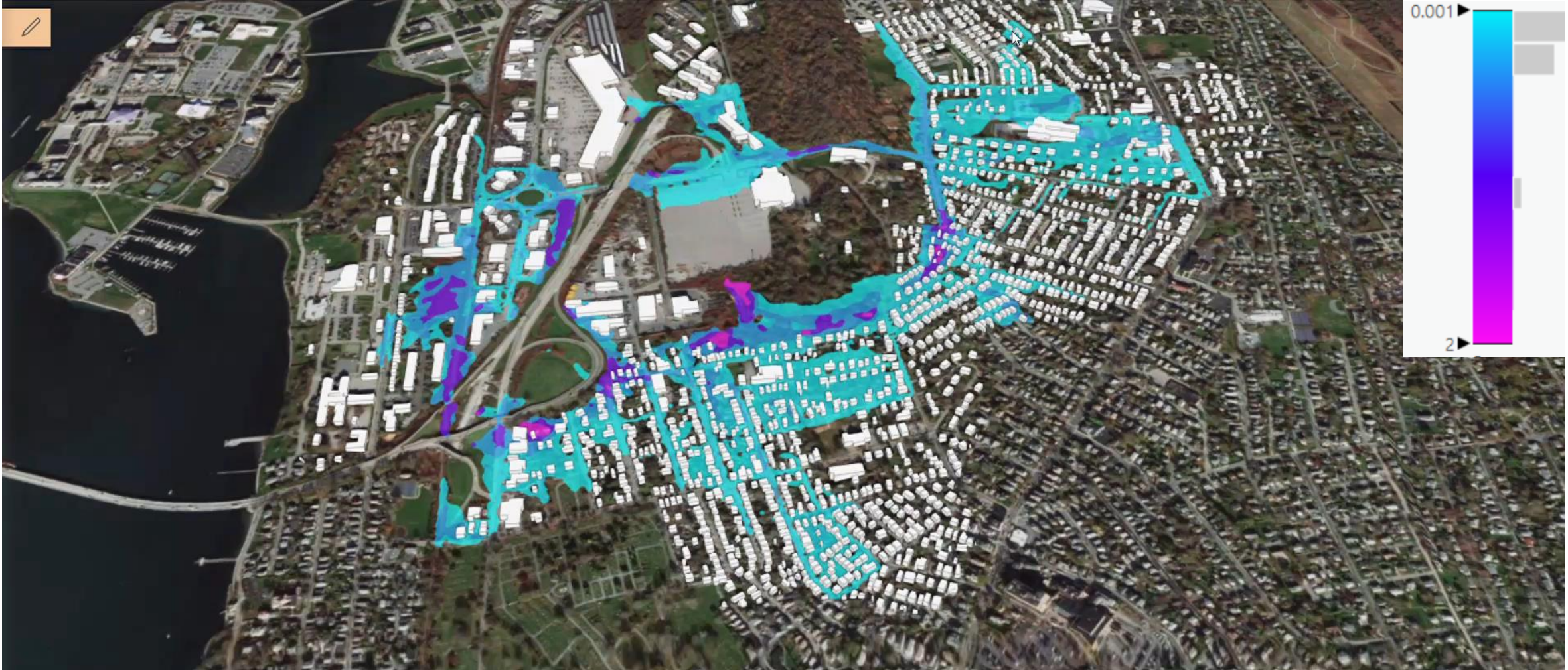


Existing Conditions Model Results

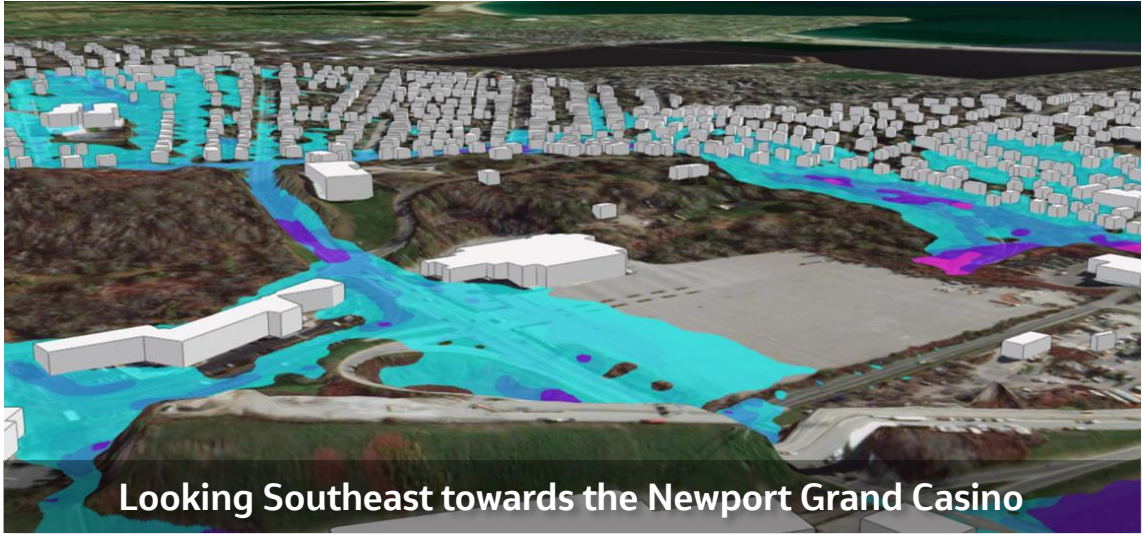
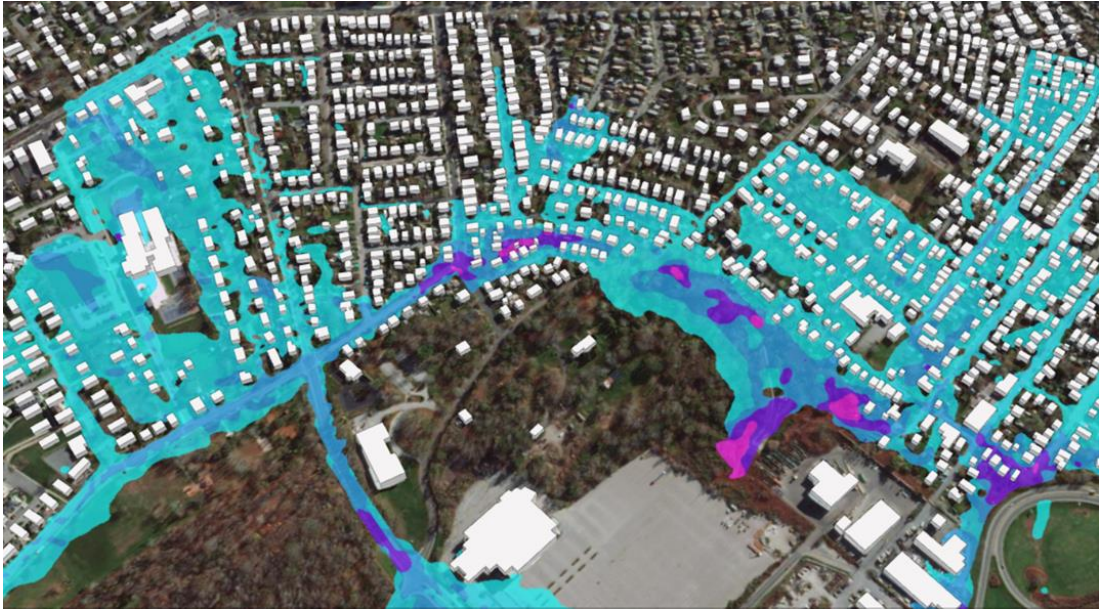
- Conditions shown from 8/15/2012 7:00 AM to 8/16/2012 12:00 AM



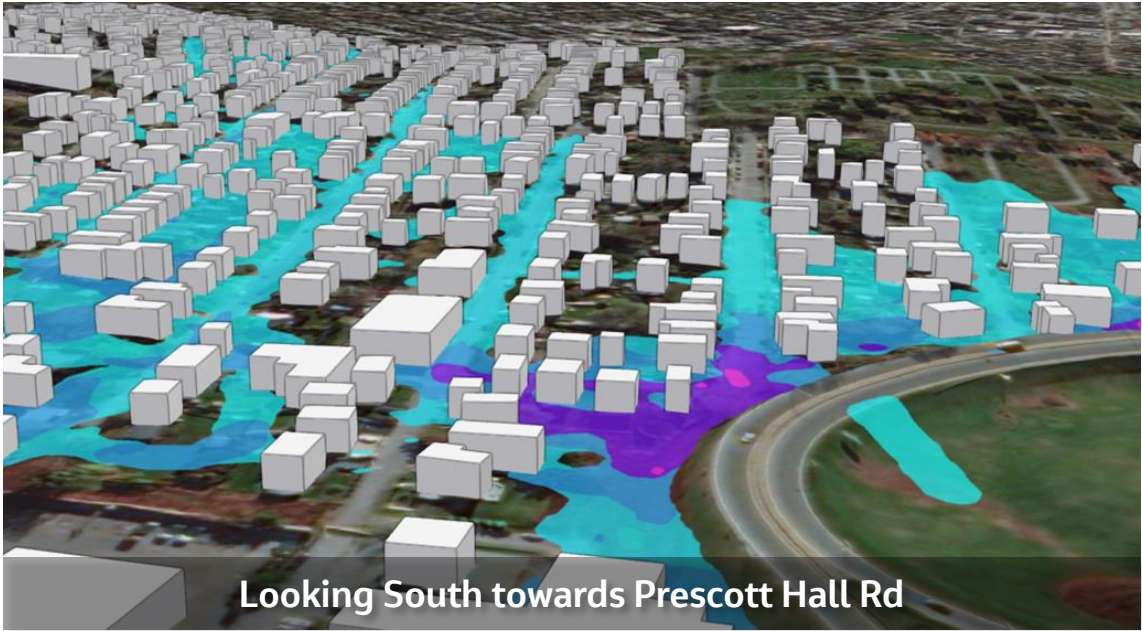
Existing Conditions Model Results



Existing Conditions Model Results

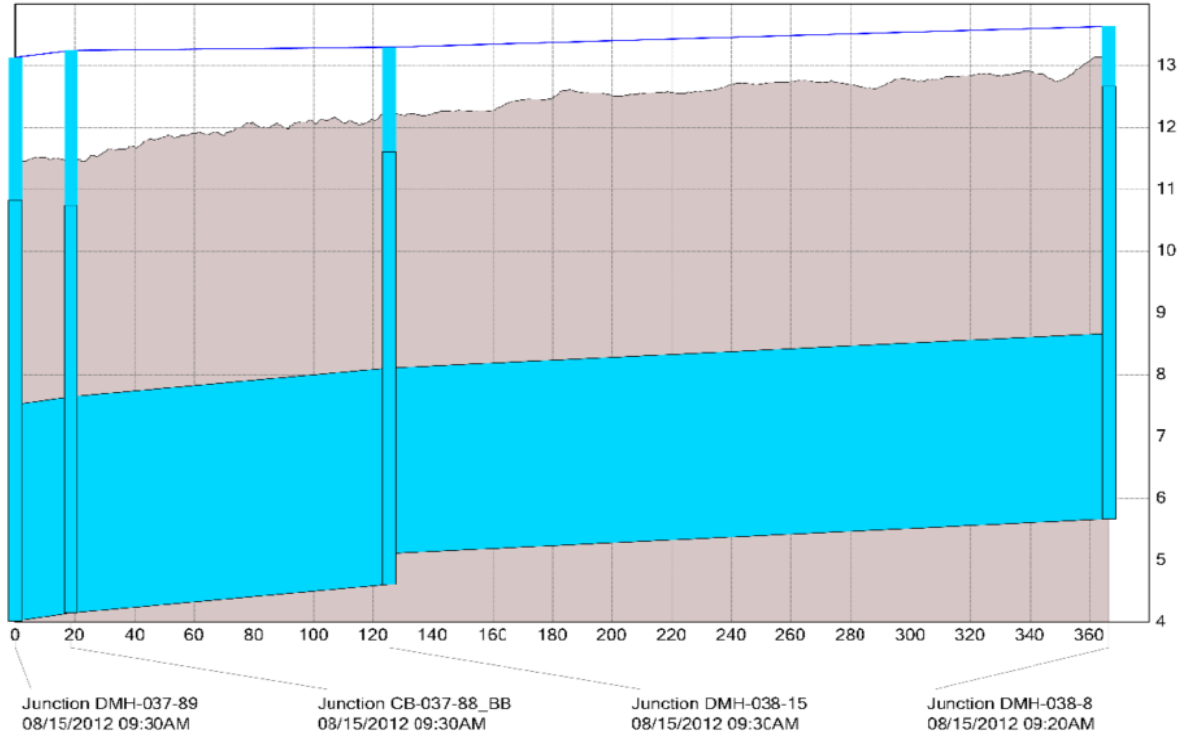
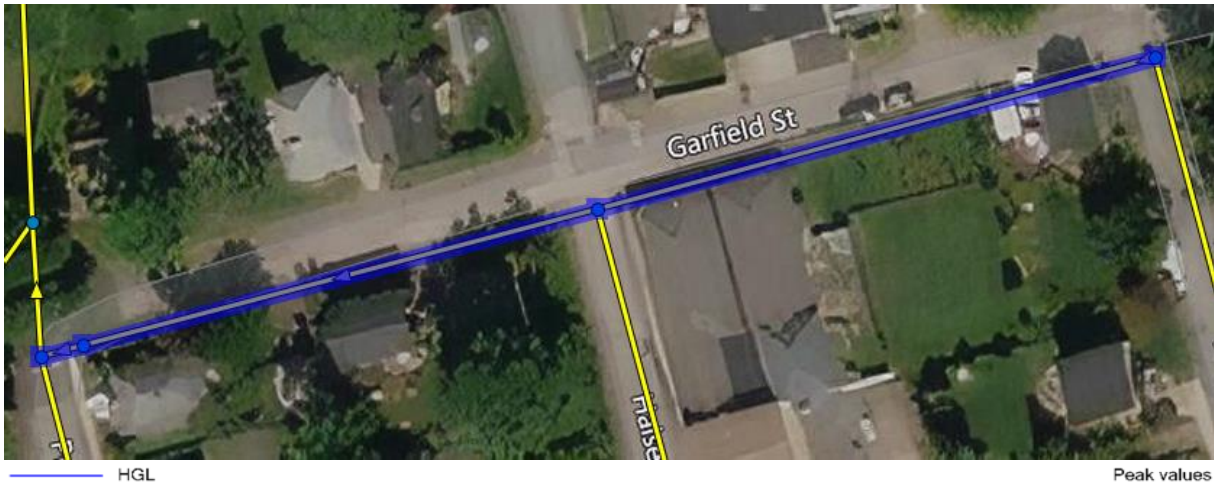


Looking Southeast towards the Newport Grand Casino

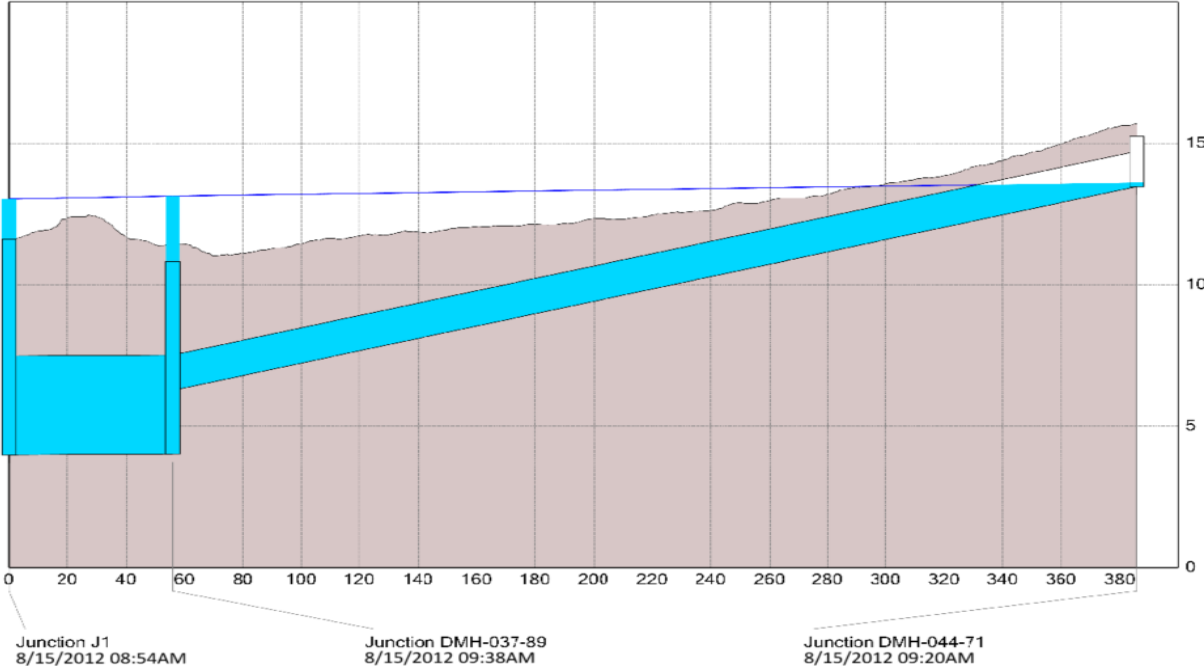


Looking South towards Prescott Hall Rd

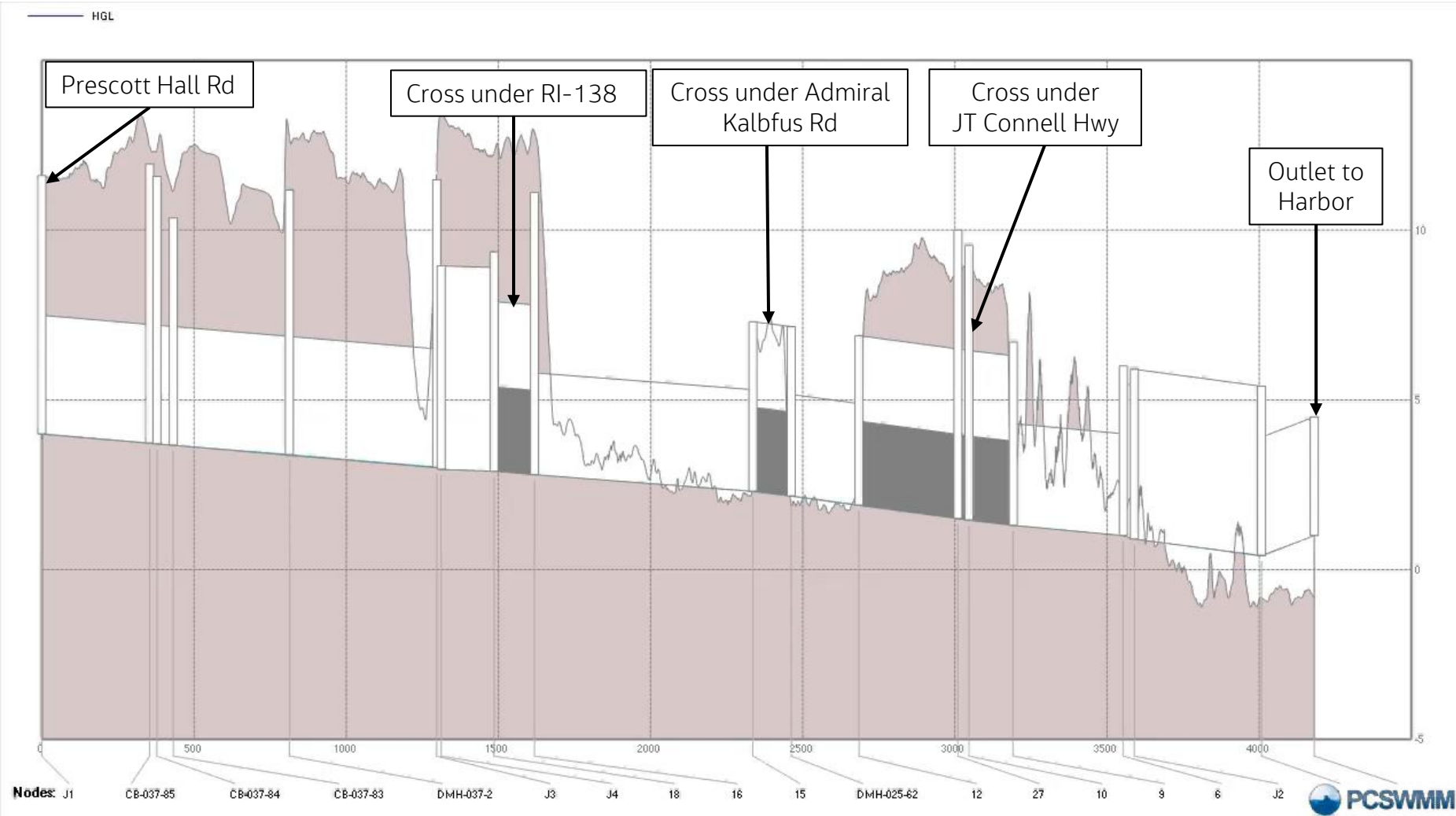
Garfield Street Flood Profile



Prescott Hall Road Flood Profile



Prescott Hall Road to Harbor Profile



Next Steps

Pell Bridge Approach Improvements

Images from: Reconstruction of the Pell Bridge Approaches presentation dated 10/27/20
<https://www.dot.ri.gov/projects/pellbridgeramps/>



- Improved Circulation and Safety
- Pedestrian and Bicycle Improvements
- Land Use

Next Steps

- May-June 2022
 - Validate hydraulic model with Tropical Storm Ida (**we need your input!**)
 - Develop baseline “proposed conditions” model to include Pell Bridge improvements
 - Develop potential mitigation alternatives for discussion
 - Hold second public workshop on June 23, 2022 to review model results and discuss mitigation measures
- July-August 2022
 - Evaluate potential mitigation alternatives using model
 - Develop conceptual cost estimates
 - Hold third public workshop in August 2022 to review model results and obtain feedback on recommended mitigation alternatives

Additional Opportunities for Stakeholder Involvement

- If you haven't already, please complete the survey at:
<https://www.surveymonkey.com/r/5TYBZ32>
- Additional photos and information can be sent to Erin O'Shea at
erin.oshea@jacobs.com
- Public Workshop #2 on June 23, 2022
- Public Workshop #3 in August 2022
- Thank you for the information provided so far!

Stakeholder Discussion

- Any key concerns and/or priorities not captured?
- Any additional dates of significant flooding to be used in the study?
- Additional comments?

Thank you!

Jacobs

Challenging today.
Reinventing tomorrow.

