

LOWER EASTWICK HYDROLOGIC & HYDRAULIC STUDY

Executive Summary Presentation

Prepared by:



Prepared for:



Study Supported by:



Presentation Outline

BACKGROUND

- Overview of Flooding by Type and Location
- Watershed Context Map
- Lower Eastwick Public Land Strategy

HYDROLOGIC & HYDRAULIC STUDY

- Objective and Approach
- Findings
- Recommendations

FREQUENTLY ASKED QUESTIONS

Flooding Overview

TERRESTRIAL FLOODING

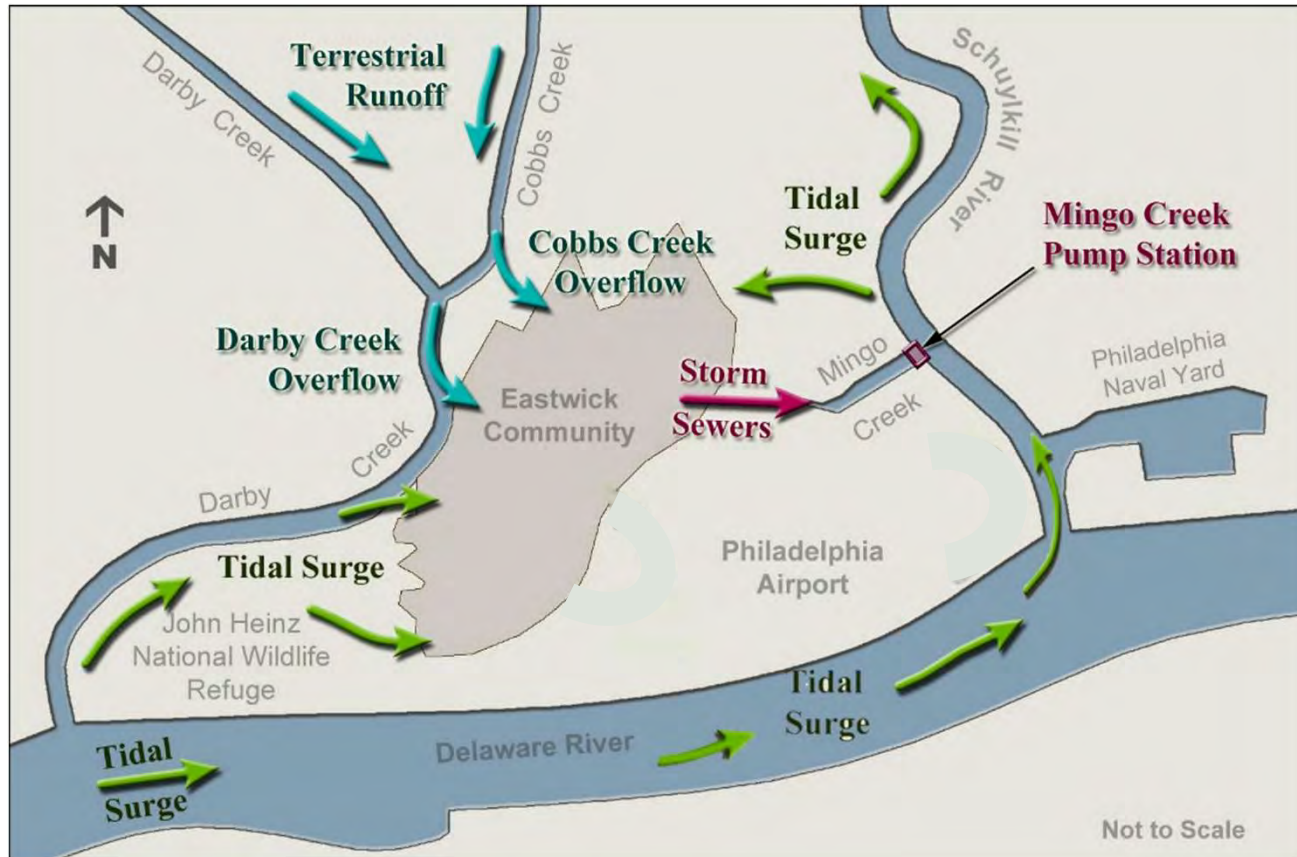
Heavy Rain > Darby & Cobbs Creeks

- 1999 – Hurricane Floyd
- 2011 – Hurricane Irene
- 2011 – Tropical Storm Lee
- 2020 – Tropical Storm Isaias

TIDAL FLOODING

Surge > Delaware & Schuylkill Rivers

- 1903 – Unnamed tropical storm
- 1933 – Chesapeake Bay Hurricane
- 1950 – Great Appalachian Storm
- 2012 – Hurricane Sandy



Terrestrial Flood Entry Pathway

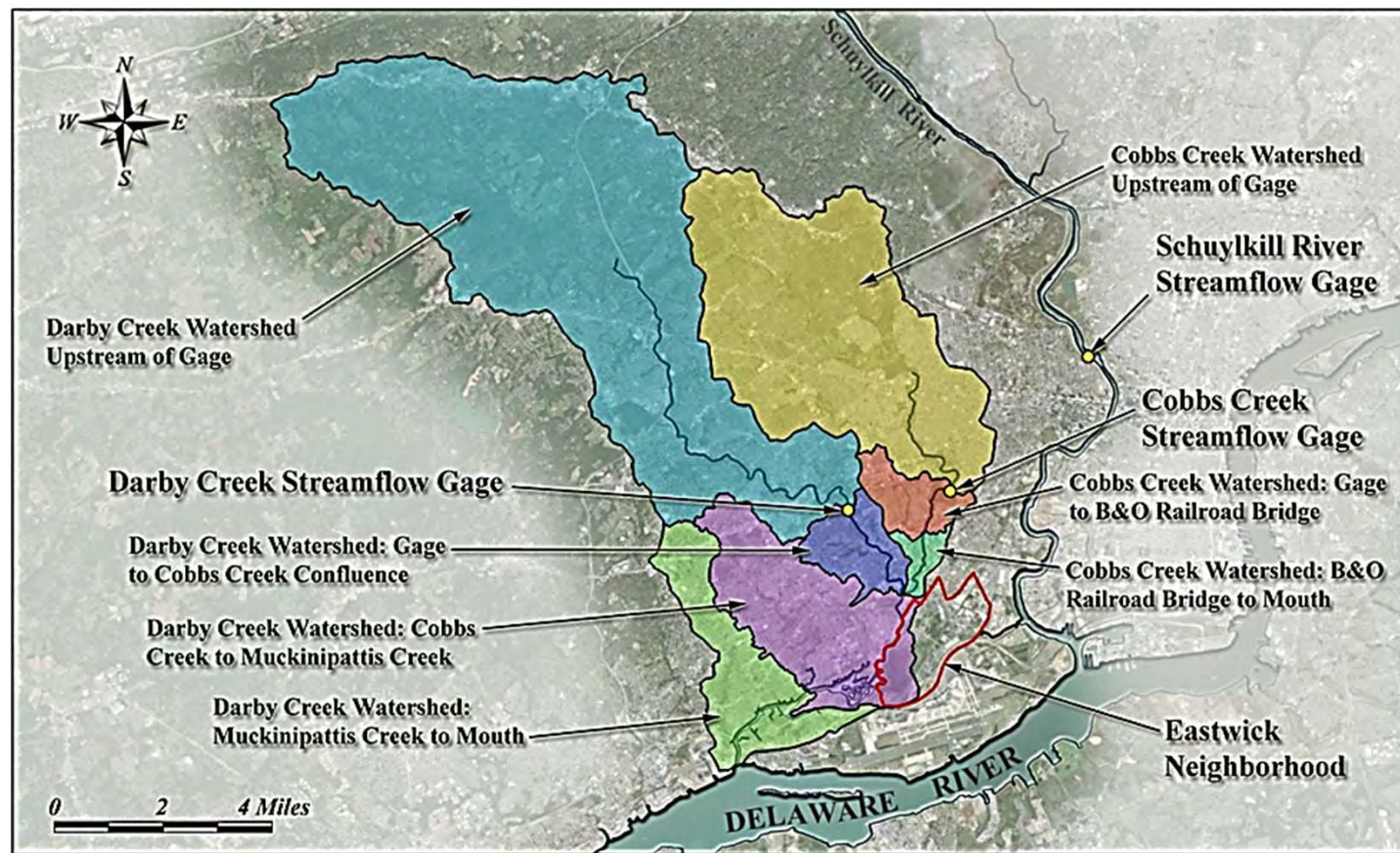


Tidal Flood Entry Pathway



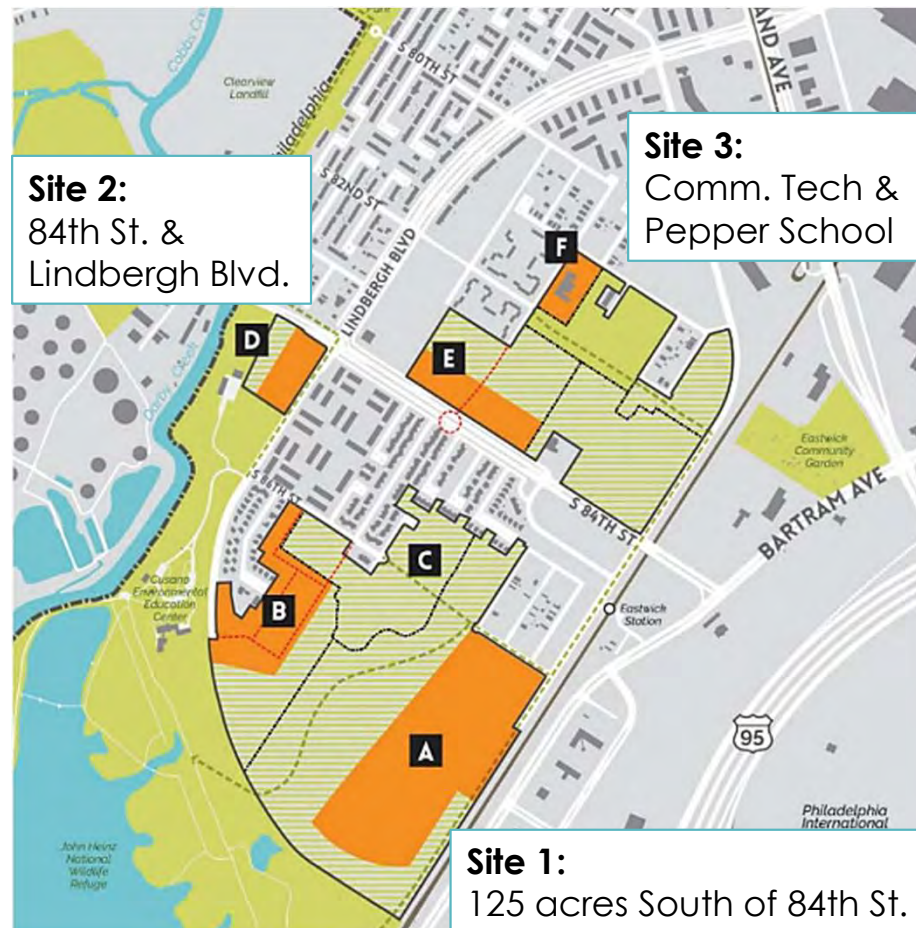
Floodwater Exit Pathway

Watershed Context Map



Lower Eastwick Public Land Strategy

- Developed in coordination with community members and LEPLS steering committee.
- Vision for reuse of publicly-owned land in Eastwick.
- **Key recommendation:** Conduct hydrologic and hydraulic (H&H) study to evaluate potential effects of the LEPLS on flooding in the community.



Objective & Approach of H&H Study

OBJECTIVE

Evaluate flooding for LEPLS recommended uses of vacant land.

APPROACH

- Develop H&H model using best data available.
- Evaluate flooding events incorporating climate change and sea level rise.
- Coordinate with LEPLS Steering Committee and other stakeholders.
- Collaborate and share modeling data for peer review with others working on resiliency initiatives in Eastwick.

Storm Events Analyzed

Terrestrial Flooding

Tropical Storm Isaias
(August 4, 2020)

The 100-year
terrestrial event

The 100-year
terrestrial event
estimated at 2100

Tidal Flooding

Hurricane Sandy
(October 30, 2012)

The Great
Appalachian Storm
of 1950 adjusted to
2020

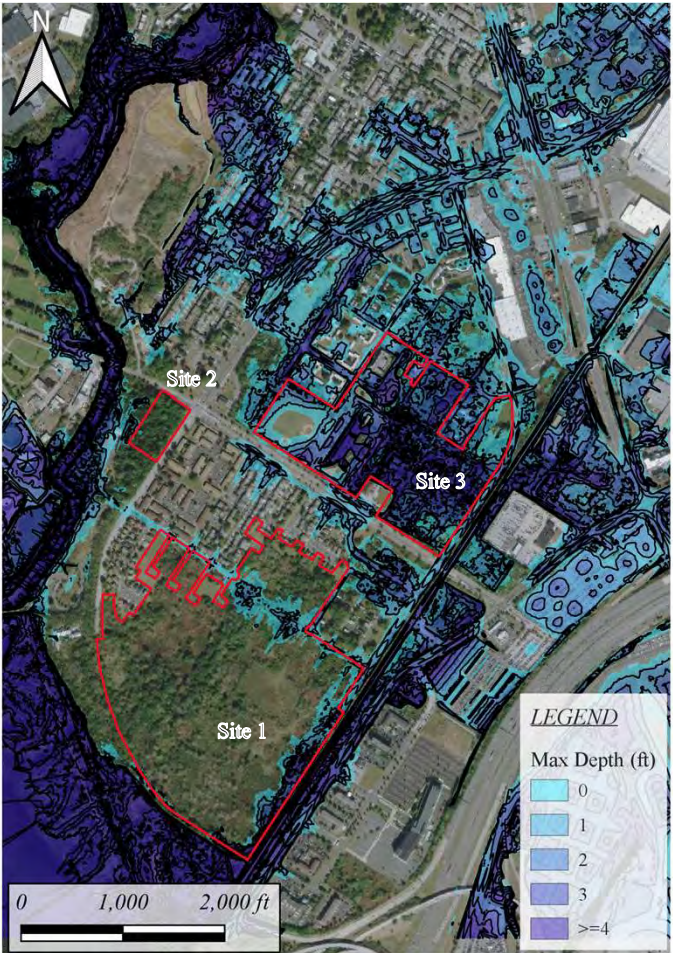
The Great
Appalachian Storm
of 1950 adjusted to
2100

Both

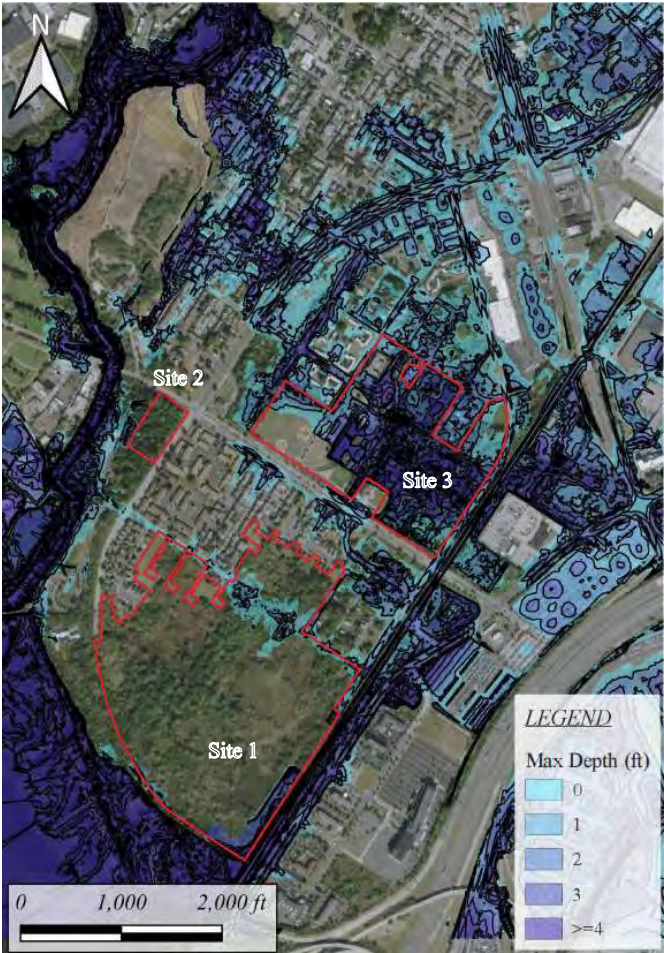
The 100-year
terrestrial event +
10-year tidal event

The 10-year
terrestrial + Great
Appalachian Storm
of 1950 adjusted to
2020

Tropical Storm Isaias



Existing Conditions

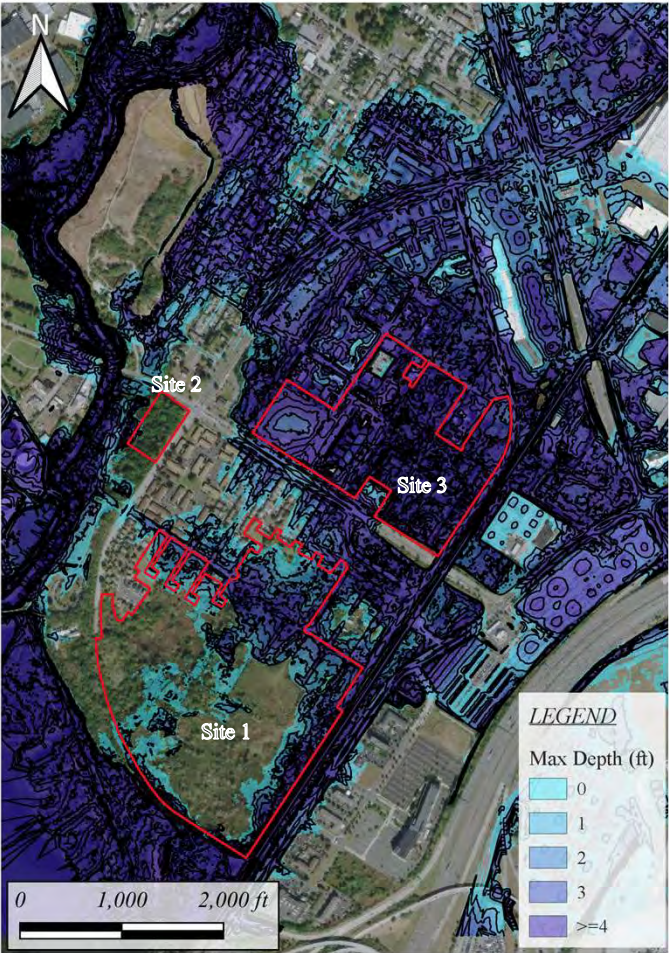


LEPLS Reuse

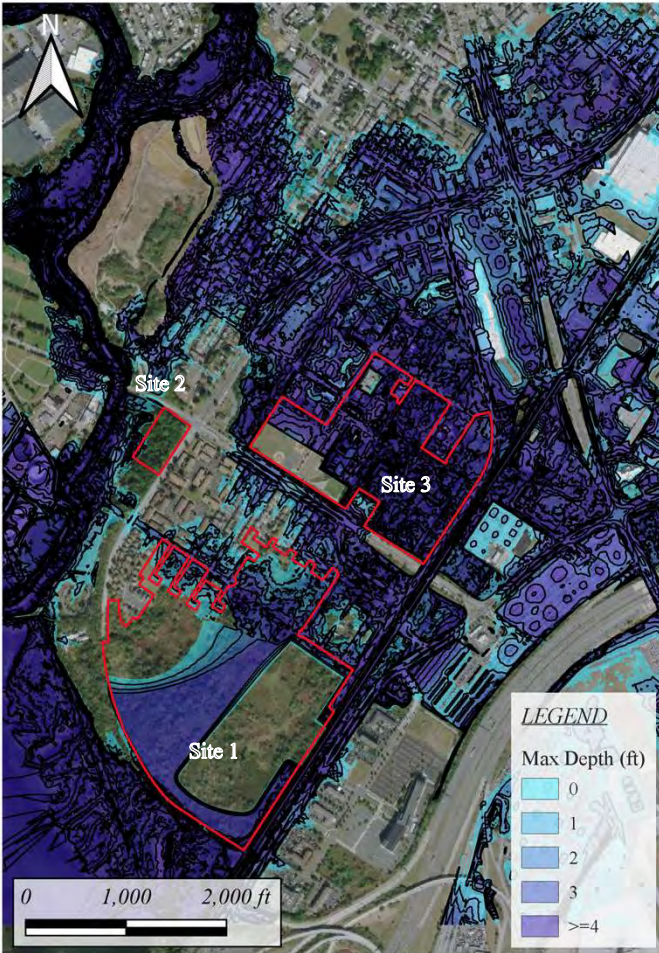


Flooding Depth Change From Existing Conditions to LEPLS Reuse

100-Year Terrestrial Event



Existing Conditions



LEPLS Reuse

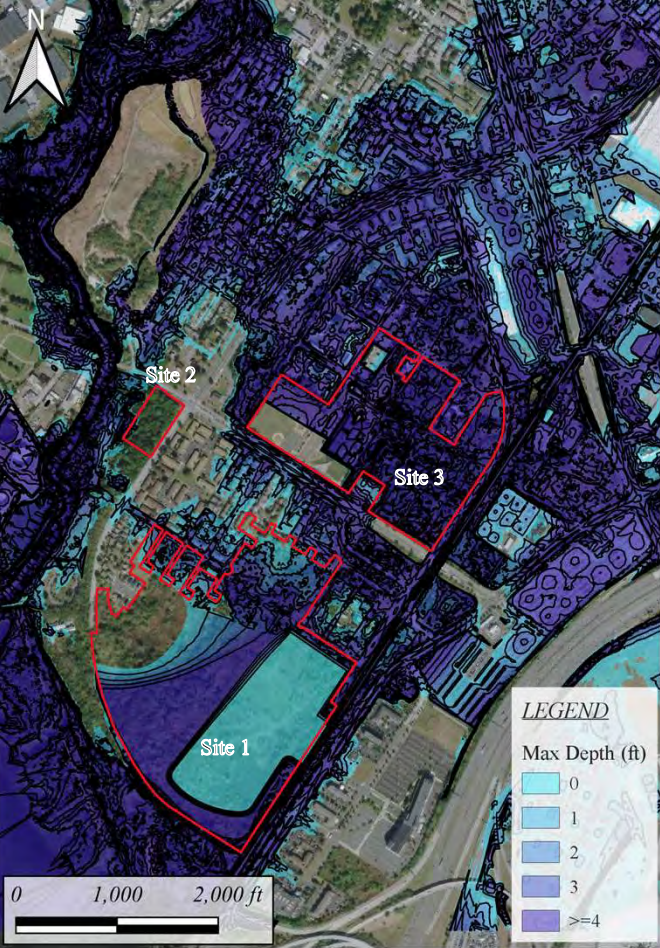


Flooding Depth Change From Existing Conditions to LEPLS Reuse

100-Year Terrestrial Event Estimated at 2100



Existing Conditions



LEPLS Reuse



Flooding Depth Change From Existing Conditions to LEPLS Reuse

Hurricane Sandy



Existing Conditions

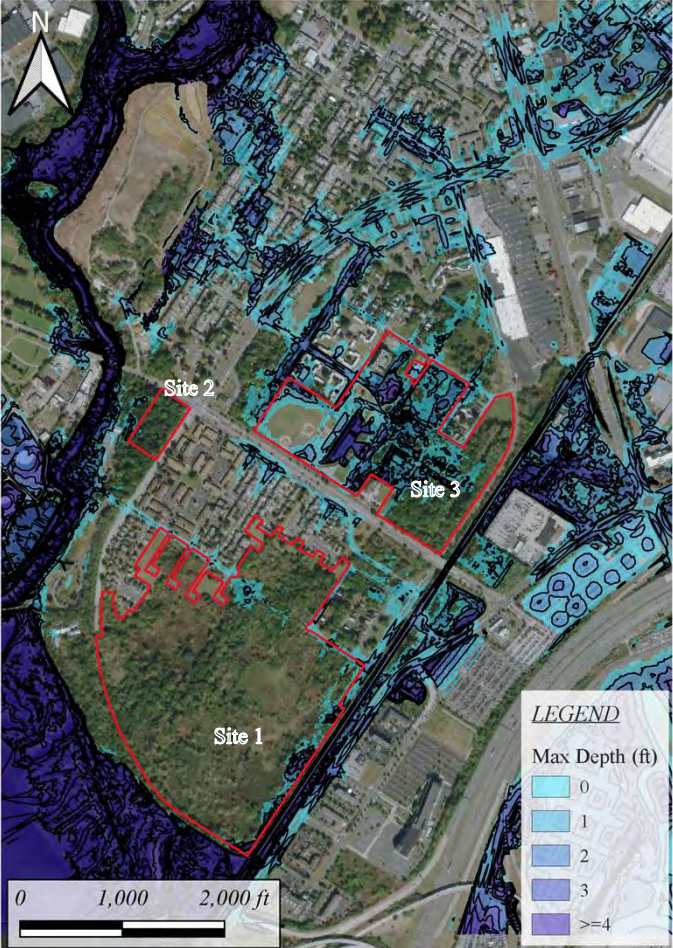


LEPLS Reuse

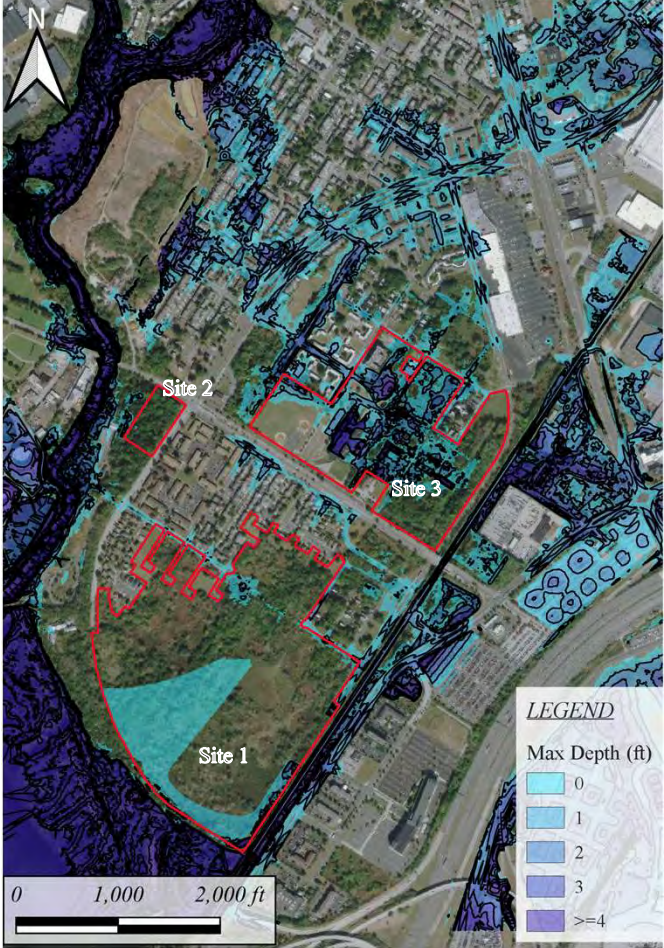


Flooding Depth Change From Existing Conditions to LEPLS Reuse

The Great Appalachian Storm of 1950 adjusted to 2020



Existing Conditions

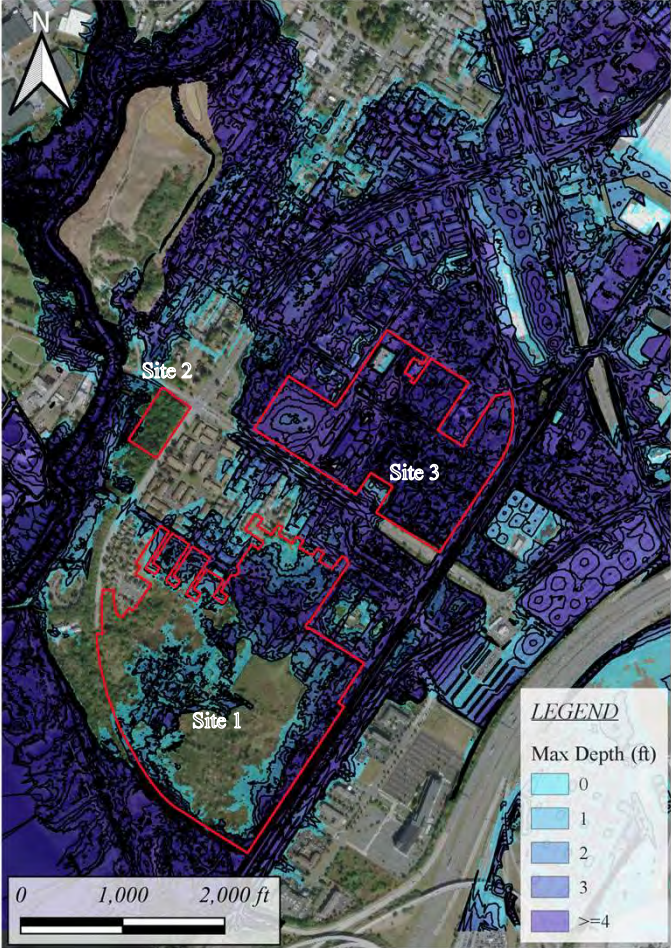


LEPLS Reuse

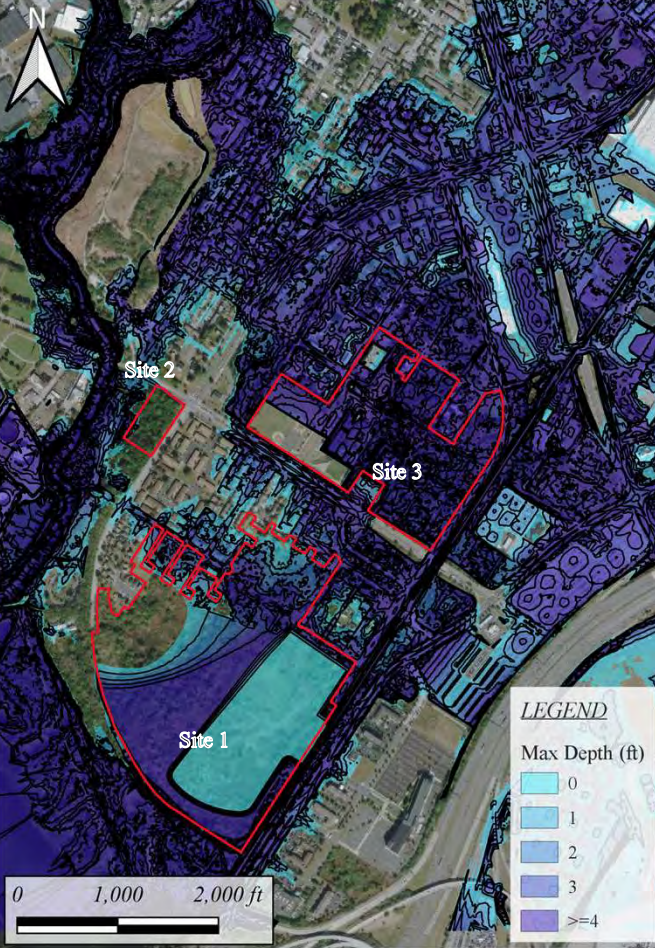


Flooding Depth Change From Existing Conditions to LEPLS Reuse

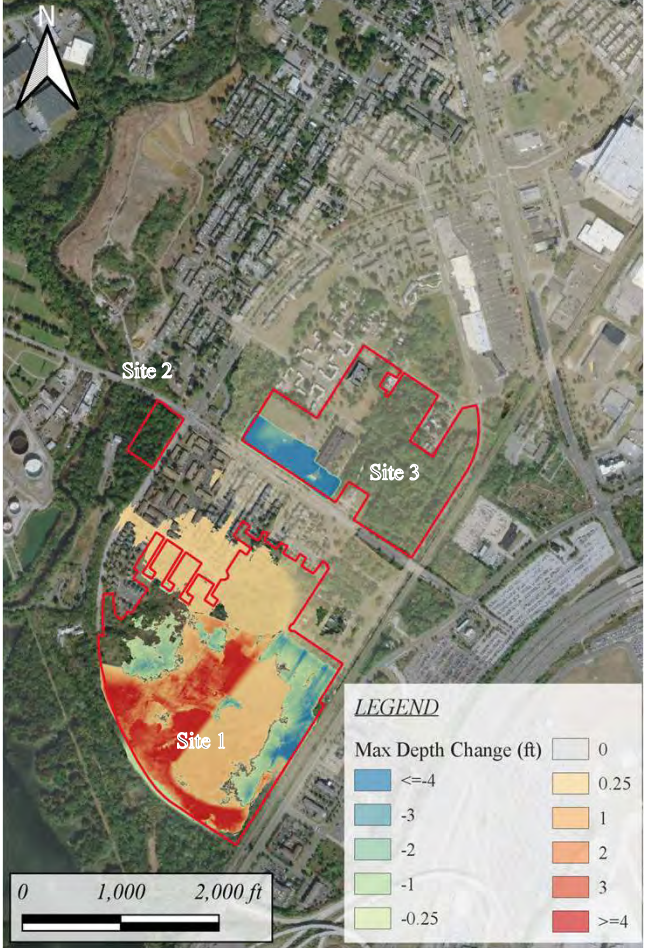
The Great Appalachian Storm of 1950 adjusted to 2100



Existing Conditions

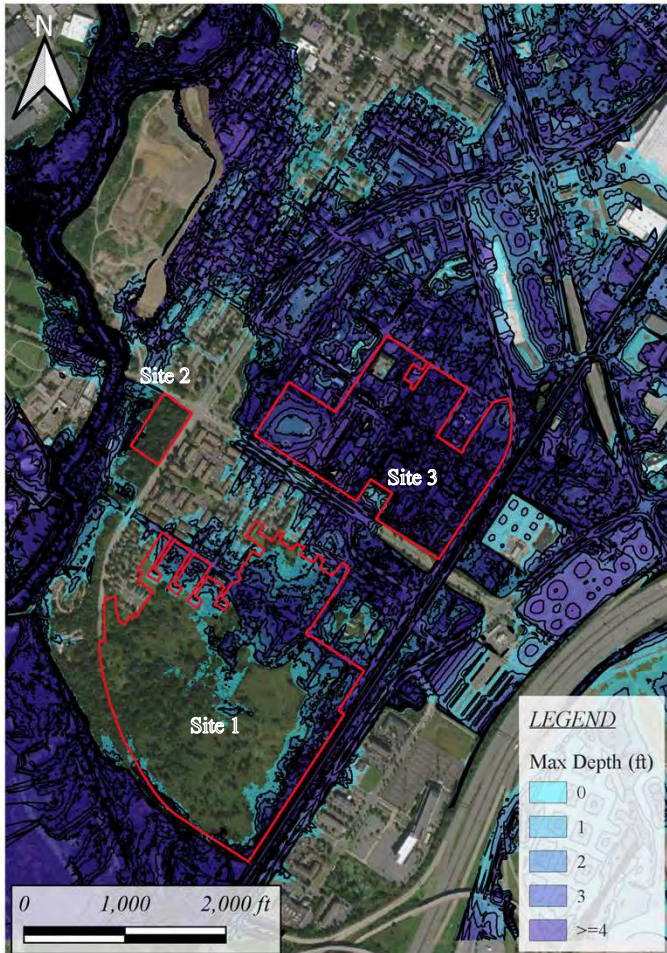


LEPLS Reuse



Flooding Depth Change From Existing Conditions to LEPLS Reuse

100-year terrestrial event + 10-year tidal event



Existing Conditions

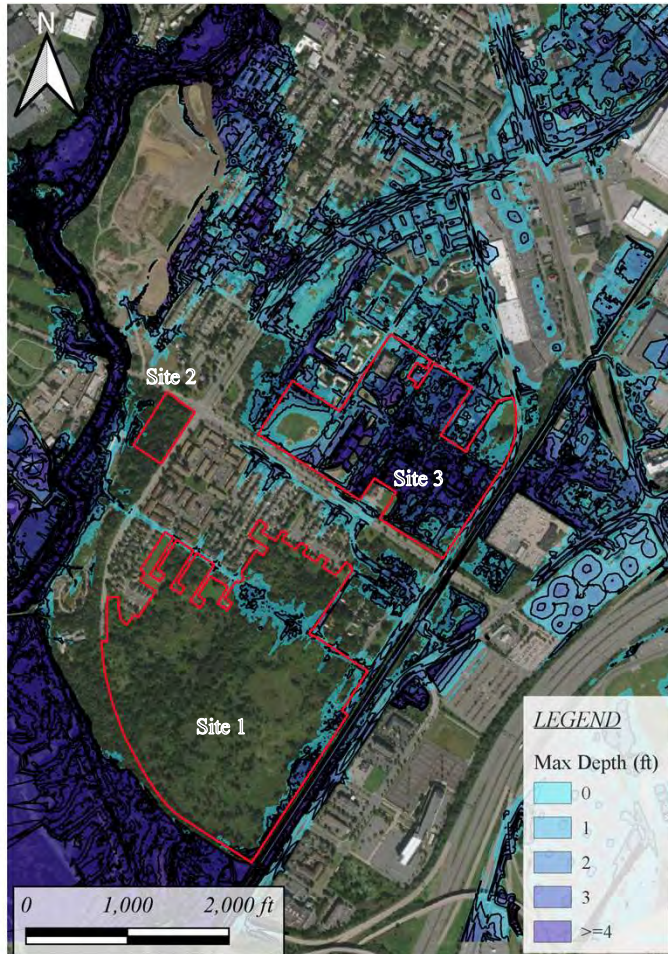


LEPLS Reuse

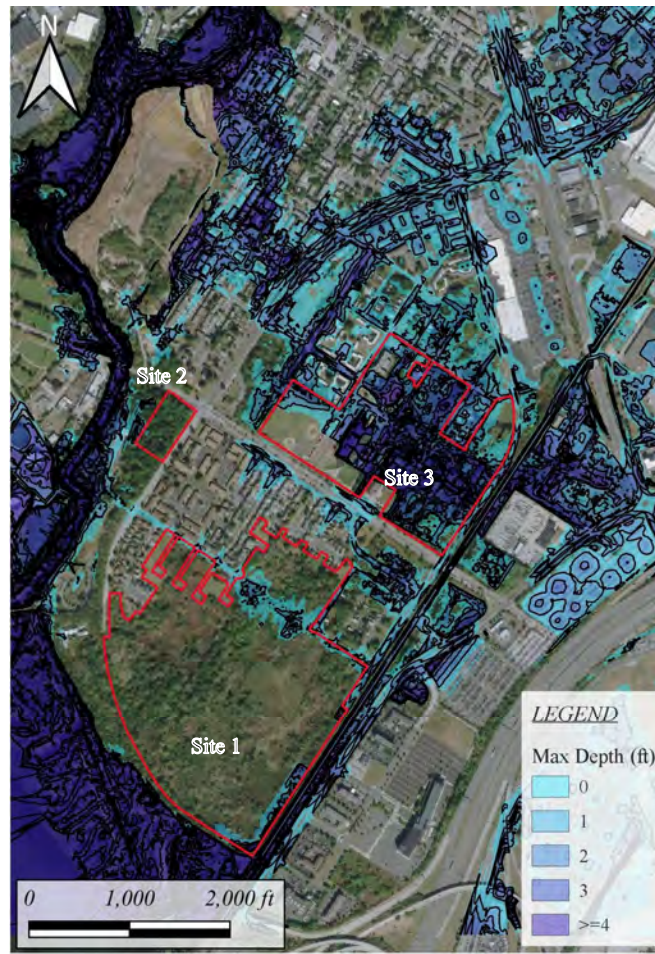


Flooding Depth Change
From Existing Conditions to LEPLS Reuse

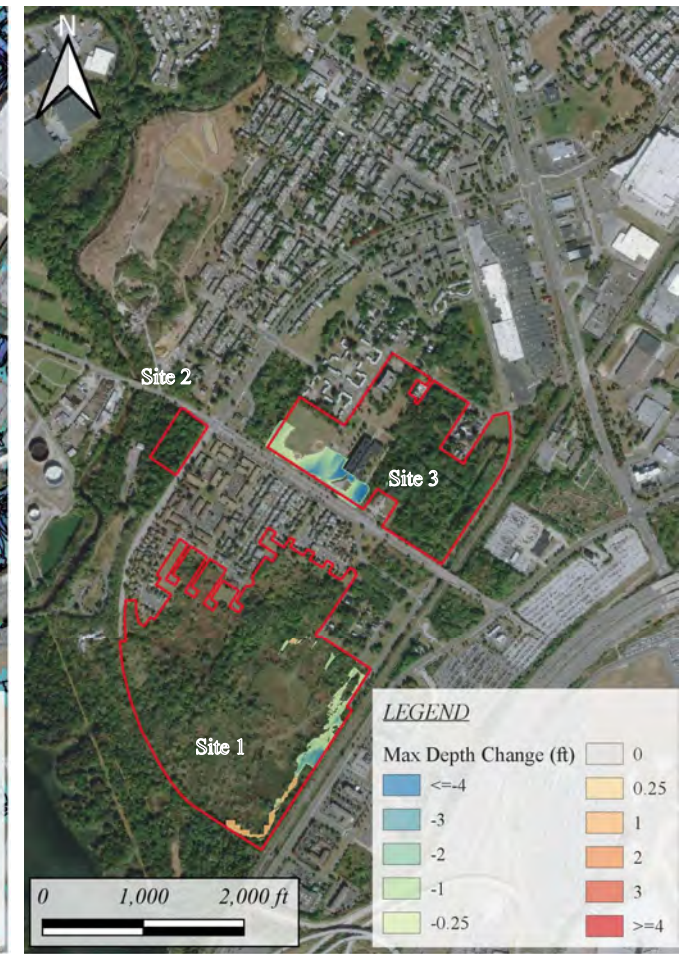
10-year terrestrial + Great Appalachian Storm of 1950 adjusted to 2020



Existing Conditions



LEPLS Reuse



Flooding Depth Change
From Existing Conditions to LEPLS Reuse

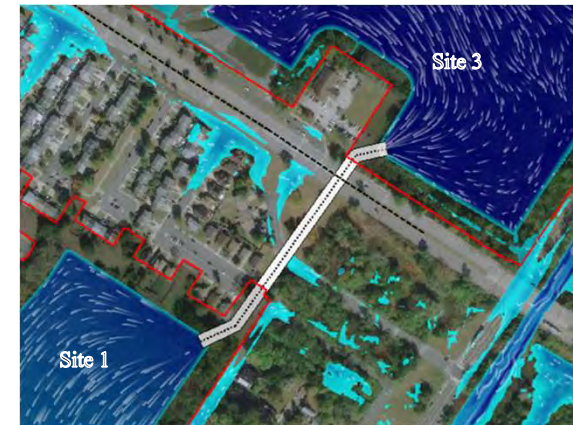
Additional Analysis – Ecological Restoration Scenario



Existing Conditions

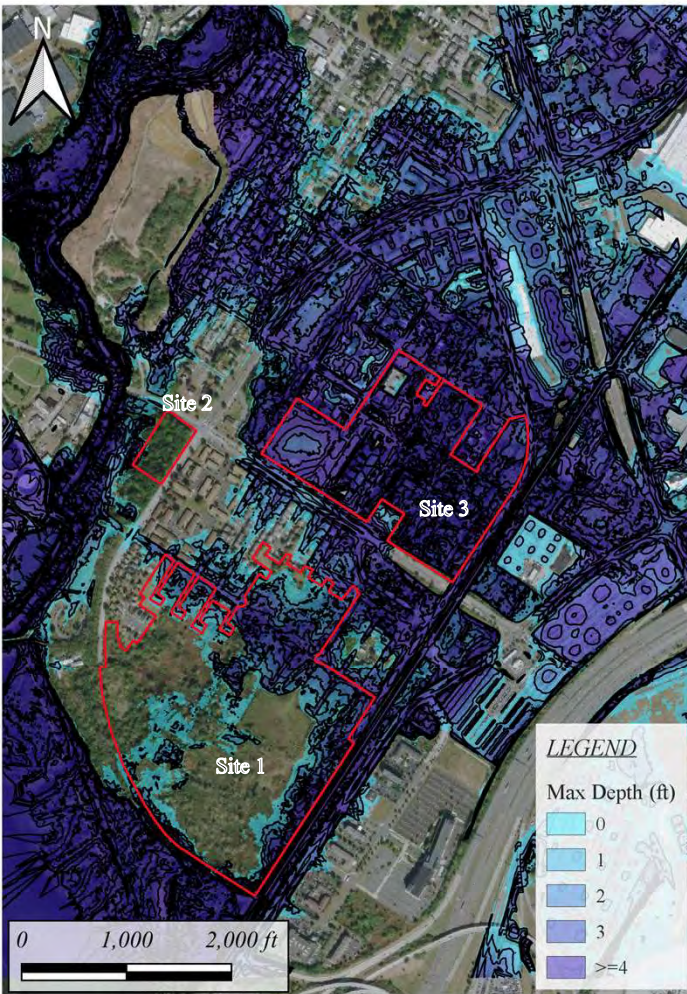


Maximum Ecological Restoration Scenario

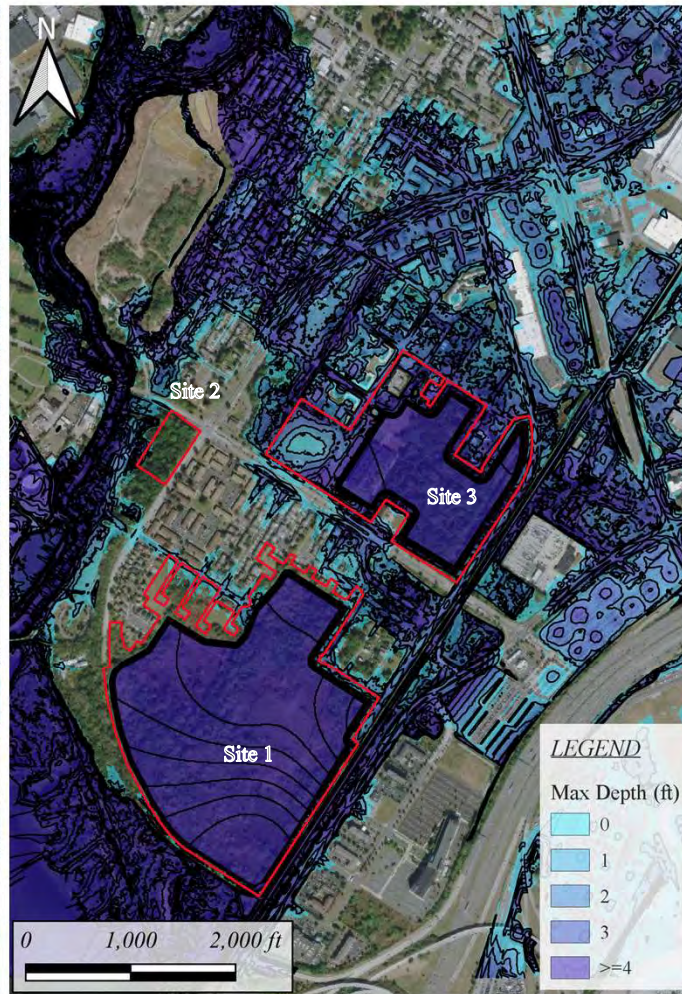


Model Schematic:
Culvert Conveyance
under 84th Street

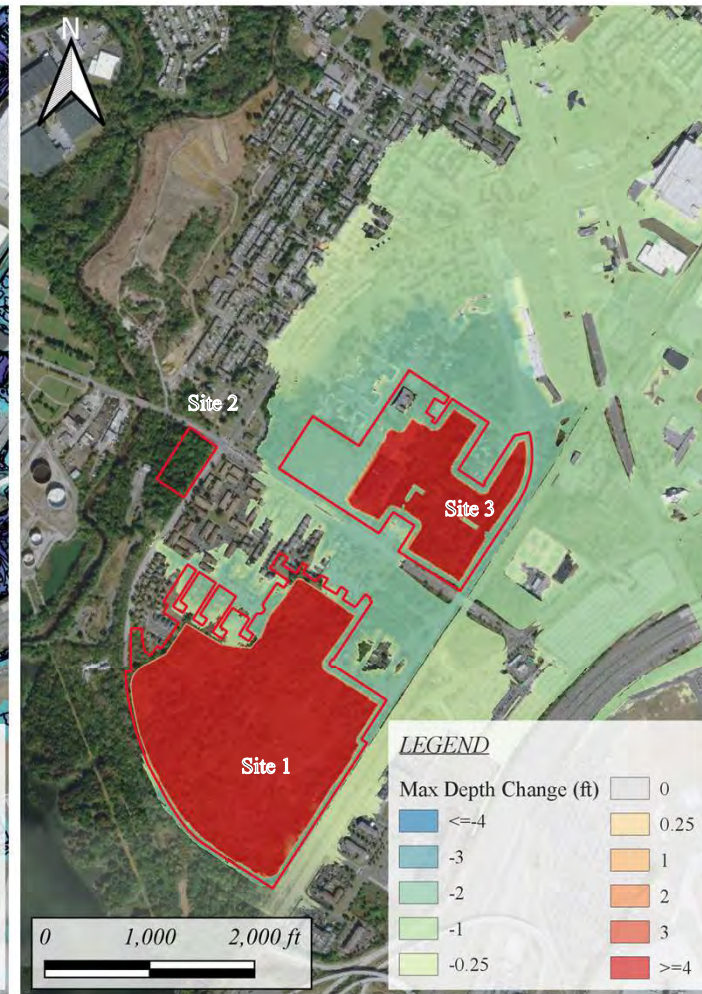
100-Year Terrestrial Event



Existing Conditions



Maximum Ecological Restoration Scenario



Flooding Depth Change
From Existing Cond. to Max. Eco Restoration¹⁷

Findings

LEPLS

- The Recommendations in the LEPLS would not result in increases to flooding in Eastwick for 7 of 8 modeled flood events.
- Emergency access to all sites is impacted during all modeled flood events.

WIDER CONTEXT

- H&H model illustrates significant impacts of flood events on the community.
- Modeling data and tools developed for this study can be used to help understand flood mitigation and adaptation scenarios for the surrounding community.

Recommendations

- Share study results with the community to facilitate planning and improve future flood preparation.
- Develop site-specific emergency access plans for any future redevelopment.
- Consider further evaluation of hybrid reuse scenarios in coordination with other mitigation strategies.
- Maintain City coordination and extend to neighboring jurisdictions.
- Evaluate value and viability of additional data collection / monitoring to improve flood planning and response efforts.

Frequently Asked Questions – 1 of 2

Q1: What is the difference between Terrestrial Flooding and Tidal Flooding?

A1: Terrestrial flooding occurs when water levels rise over the top of river or stream banks due to excessive precipitation. In Eastwick – this is flooding from water overtopping the banks of Darby Creek and/or Cobbs Creek. Tidal flooding is caused by higher-than-average high tide and worsened by heavy rainfall and onshore winds (i.e., wind blowing landward from the ocean) Tidal flooding effects coastal and estuarine areas. In Eastwick – this is flooding from tidal signals propagating from the Atlantic Ocean to the Delaware and Schuylkill Rivers and then into the creeks and streams.

Q2: Where can I find more information regarding the Lower Eastwick Public Land Strategy (LEPLS)?

A2: Information regarding the LEPLS can be found at :

<https://phdcphila.org/community-investment/improving-communities/lower-eastwick-public-land-strategy/>

Q3: Is redevelopment planned for the vacant land as proposed by the LEPLS?

A3: There are no immediate plans for redevelopment of these sites as of March 2022.

Frequently Asked Questions – 2 of 2

Q4: How were the storm events and model scenarios for the study determined?

A4: Storm events and model scenarios were selected to evaluate a range of tidal and terrestrial flooding conditions, including projections of future conditions. See report Attachment A and Attachment B for the extensive analysis completed to support the determinations. The storm events and model scenarios were also reviewed by the technical working group prior to completing model runs and drawing conclusions for this study.

Q5: Where did funding for this study come from?

A5: The study was funded by a USEPA Brownfields Assessment Grant awarded to the Philadelphia Redevelopment Authority.

Q6: So, what do we do with the model tool now? Is this 'just another study' that sits on the shelf?

A6: Modeling data and tools developed for this study have already been shared with other technical teams working on resilience initiatives for the community. The model was built with flexibility in mind and can be adjusted with any updated reuse proposals for the vacant land. The tool was meant to inform and help further the planning process but also continues to be available to the community to assist with decision making.