Resilient Fairfield

Public Workshop #1

March 2, 2023

CIRCA
Connecticut Institute for Resilience and Climate Adaptation

TOWN OF FAIRFIELD SEAL 1639 CONNECTICUT

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PROJECT TEAM

CIRCA

- John Truscinski, CFM, Director of Resilience Planning
- David Murphy, PE, CFM, Director of Resilience Engineering
- Yaprak Onat, Assistant Director of Research

Town of Fairfield

- William Hurley, Engineering Manager
- Emmeline Harrigan, Flood Plain Administrator

AECOM

- Casey Hardin, PE , Project Manager
- Christian Nielsen, Lead Planner
- Edwina Lam, P.E., Lead Stormwater/Green Infrastructure Engineer
- Megan Gibbons, EIT, Civil Engineer

AGENDA

- Project Overview and Background
- Flood Risk
- Drainage System Assessment
- Discussion and MyMaps
- Next Steps

PROJECT OVERVIEW

CIRCA: PROJECT BACKGROUND + OVERVIEW

- **Phase I**
  Resilient Connecticut Planning Framework
  January 2020

- **Phase II**
  Resilient Connecticut Vulnerability Assessment Report
  Fall 2021

- **Phase III**
  RESILIENT FAIRFIELD
  To be Completed in 2023

Resilient Connecticut Phase II

Regional Adaptation/Resilience Opportunity Areas

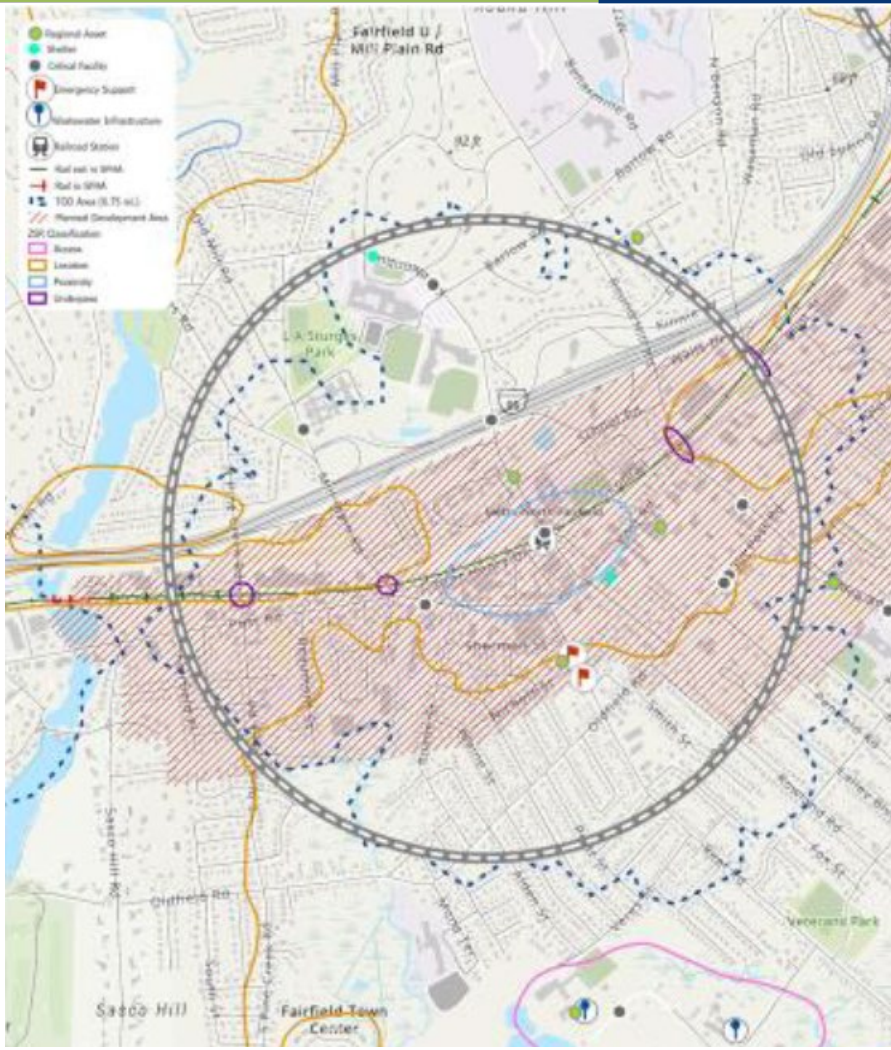
Name: Downtown Fairfield
Location: Fairfield

Considerations	Characteristics of Area
Flood Vulnerability	○ ○ ○ ● ○
Heat Vulnerability	○ ○ ○ ○ ○
Social Vulnerability	○ ○ ○ ○ ○

Zones of shared risk include FEMA flood zones, storm surge risk areas, underpasses that can flood, and the densely developed area near the train station that is flooded by excessive stormwater generation coupled with limited drainage conveyance beneath the Post Road. These zones of shared risk nearly intersect in Fairfield's downtown, which serves as a hub connecting the roads leading from the coastal areas of risk to I-95, Amtrak, and the remainder of the town.

Heat vulnerable areas are primarily residential south of Route 1 and can be attributed to high structure density equating to high heat emittance.

Fairfield Library	Fire Headquarters
Town Hall	Museums
Five Schools, one shelter	Fairfield rail station
Police headquarters/EOC	Convalescent home



CIRCA Resilient Connecticut Study
Phase II Summary

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Why this Project and Project Goals

Create a **resilient** transportation system that ensures **safe travel** for community residents

Understand the project areas current and **future climate vulnerability**.

Assess drainage system to understand possible **choke-points** leading to flooding.

Develop **innovative ideas** and **strategies** to address underpass flooding.

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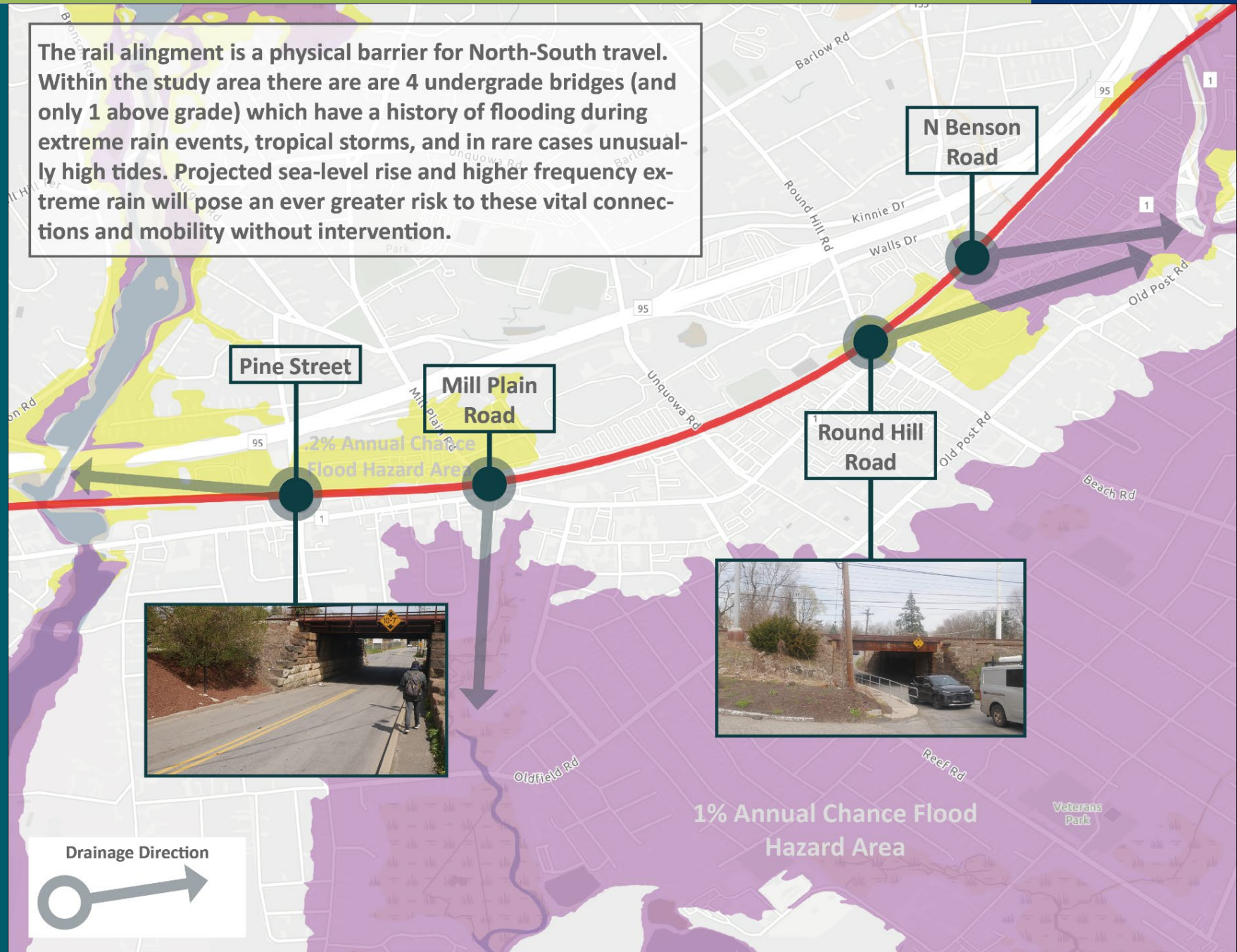
The rail alingment is a physical barrier for North-South travel. Within the study area there are are 4 undergrade bridges (and only 1 above grade) which have a history of flooding during extreme rain events, tropical storms, and in rare cases unusually high tides. Projected sea-level rise and higher frequency extreme rain will pose an ever greater risk to these vital connections and mobility without intervention.



Pilot Project Process

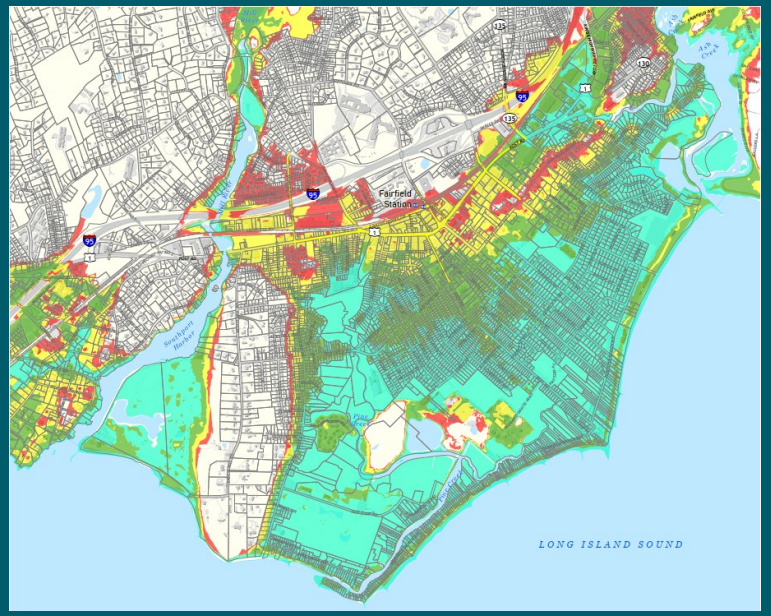
- Current and Future Conditions Analysis
- Adaptation Options and Concept Design
- Benefit Cost Analysis
- Final Report and Recommendations

Public Engagement Throughout

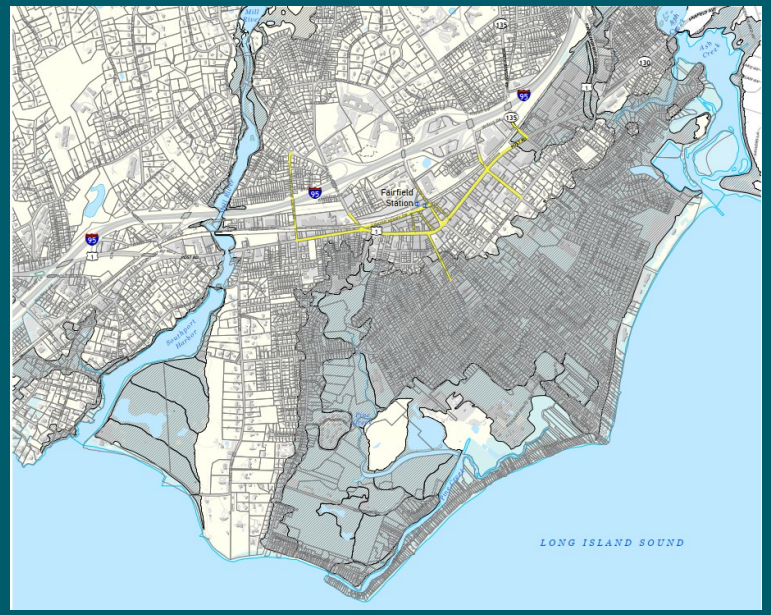
Reviewed Studies/Projects	Date of the Studies/Projects
Downtown Green Infrastructure Study & Plan	July 10, 2018
2019 Natural Hazard Mitigation Plan Update	Adopted July 18, 2019 FEMA Approval August 9, 2019
Fairfield Plan of Conservation and Development	November 15, 2016
US Army Corps of Engineers' Coastal Storm Risk Management Study	June 7, 2019
Faifield Flood & Erosion Board Flood Mitigation Plan	January 2015 Amendment 1 on April 15, 2015

Flood Risk

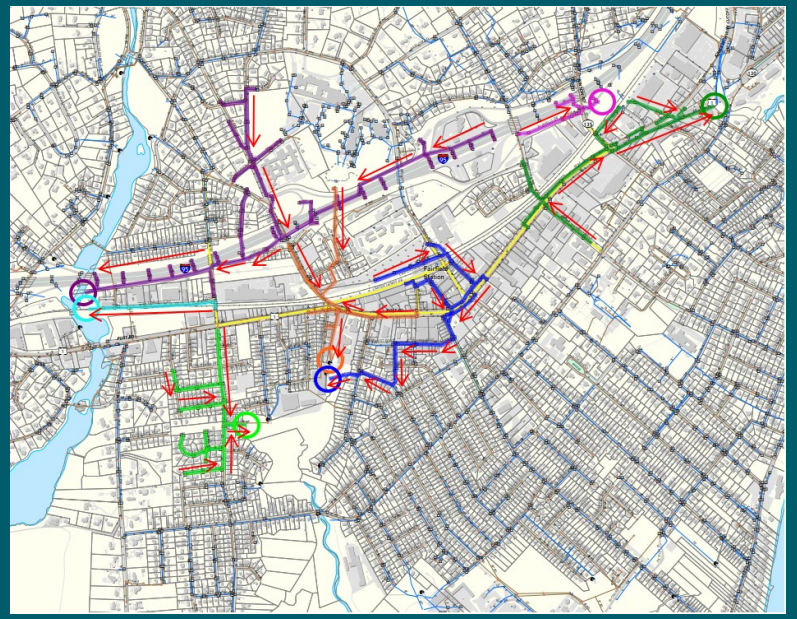
POTENTIAL FLOODING SOURCES:



1) Inland Overflow from Tidal Waters + Storm Surge



2) Extreme Rainfall



3) Stormwater Infrastructure

Affected by: Sea Level Rise > Frequency of Storm Events > Severity of Storm Event

Prediction for 2050 in Connecticut:

- Average precipitation expected to increase about 8.5%
- Sea level will rise 20 inches

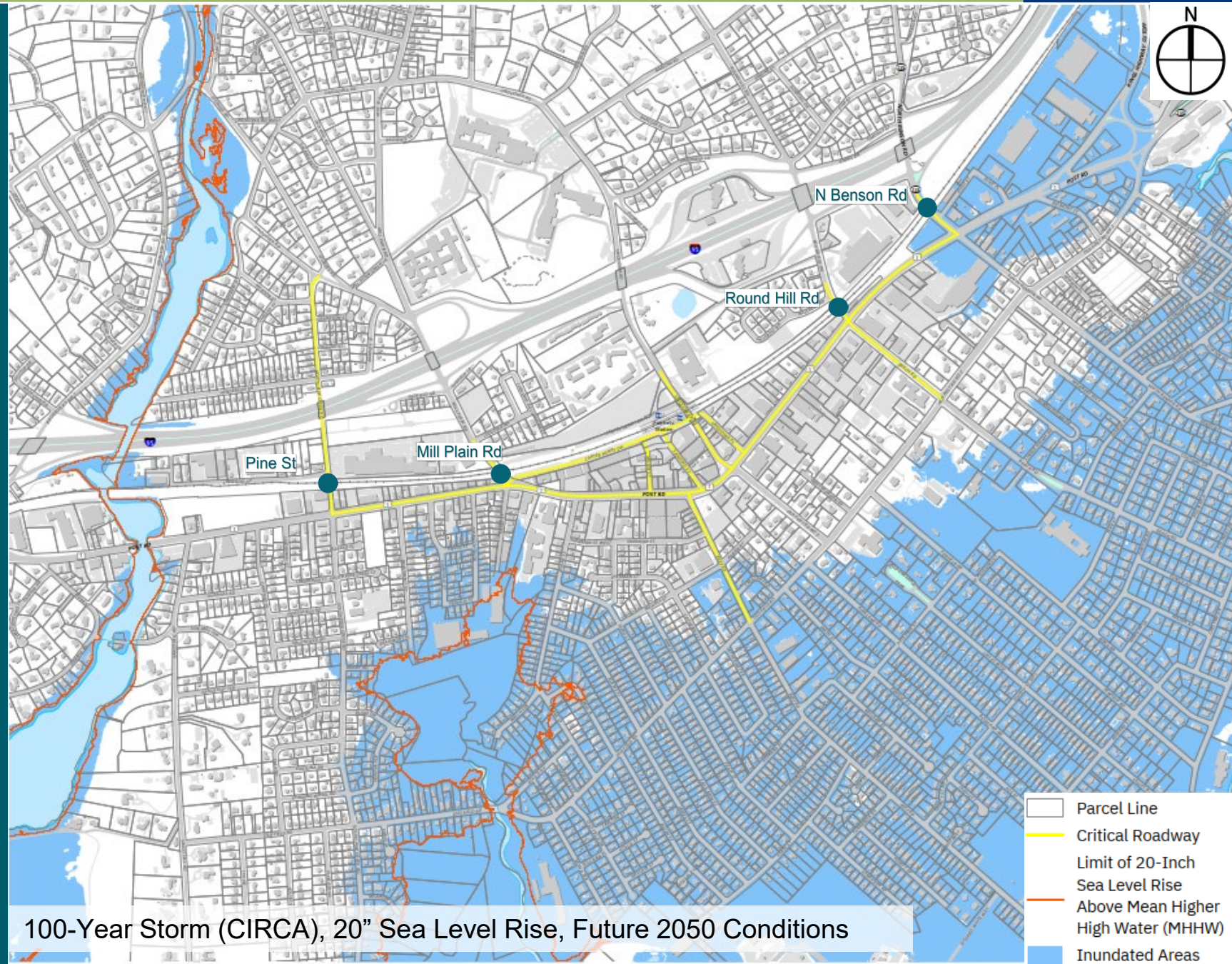
100 YEAR FLOOD

100 Year Flood Limits…

- 1% statistical likelihood chance of annual flood
- Each storm is an individual probability event of 1 out of 100

What does that mean for study area?

- Study incorporated 100-year model limit as a snapshot
- Modeling of flood limits does not take storm drainage issues into consideration



100-Year Storm (CIRCA), 20” Sea Level Rise, Future 2050 Conditions

STORM SURGE IMPACTS

- Storm Surge is the abnormal rise in seawater level during a storm, above normal tide, caused by storm's winds pushing water onshore.
- Air patterns in hurricanes travel counterclockwise
- Water gets pushed into the Long Island Sound where it gets trapped and piles up to move onto normally dry ground

HURRICANE STORM SURGE

Hurricane Surge Inundation

Storm Category

1
2
3
4

Storm Surge Direction

Source: City of Fairfield, CTDEEP, DTECO
Date of Photo: 2019

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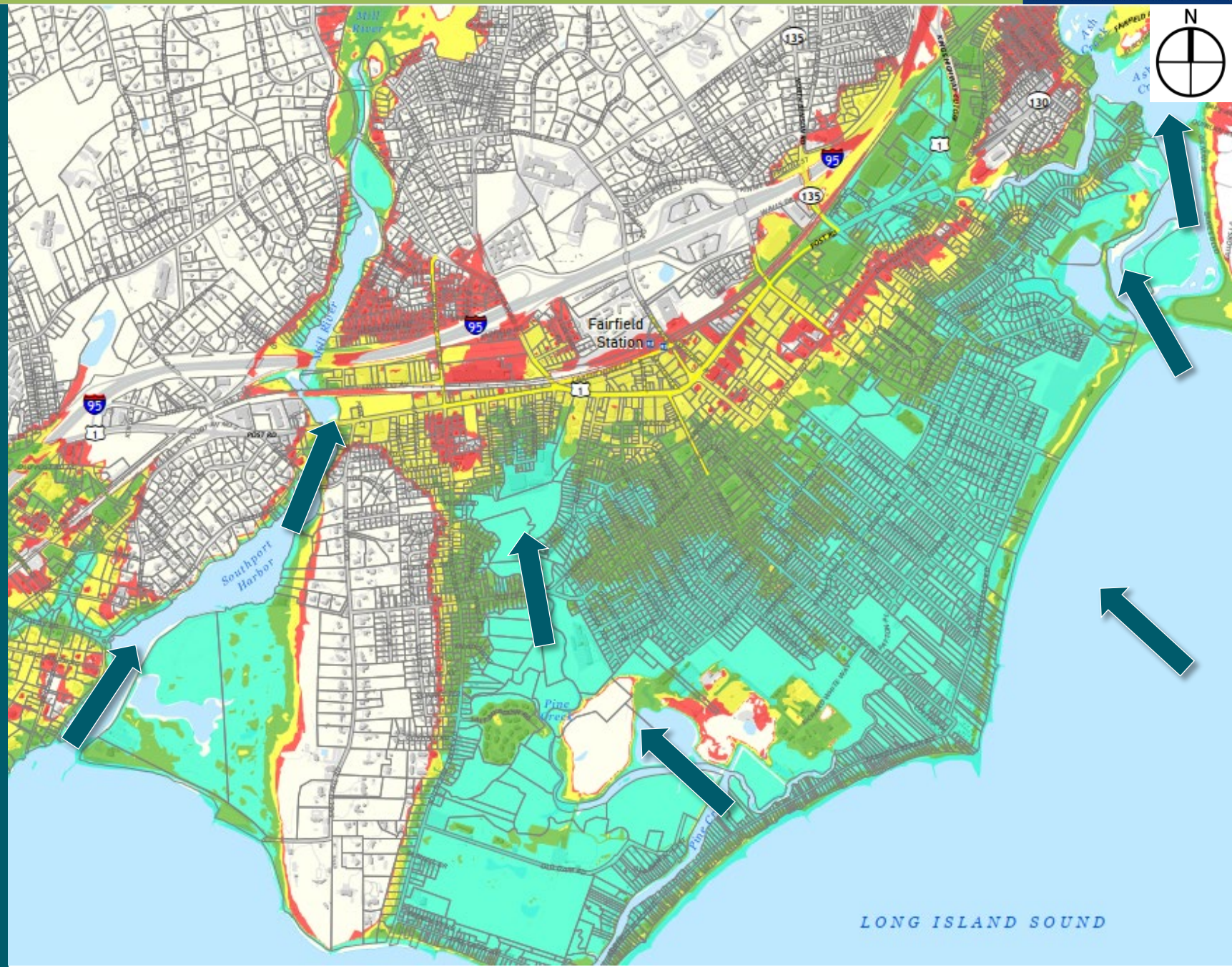


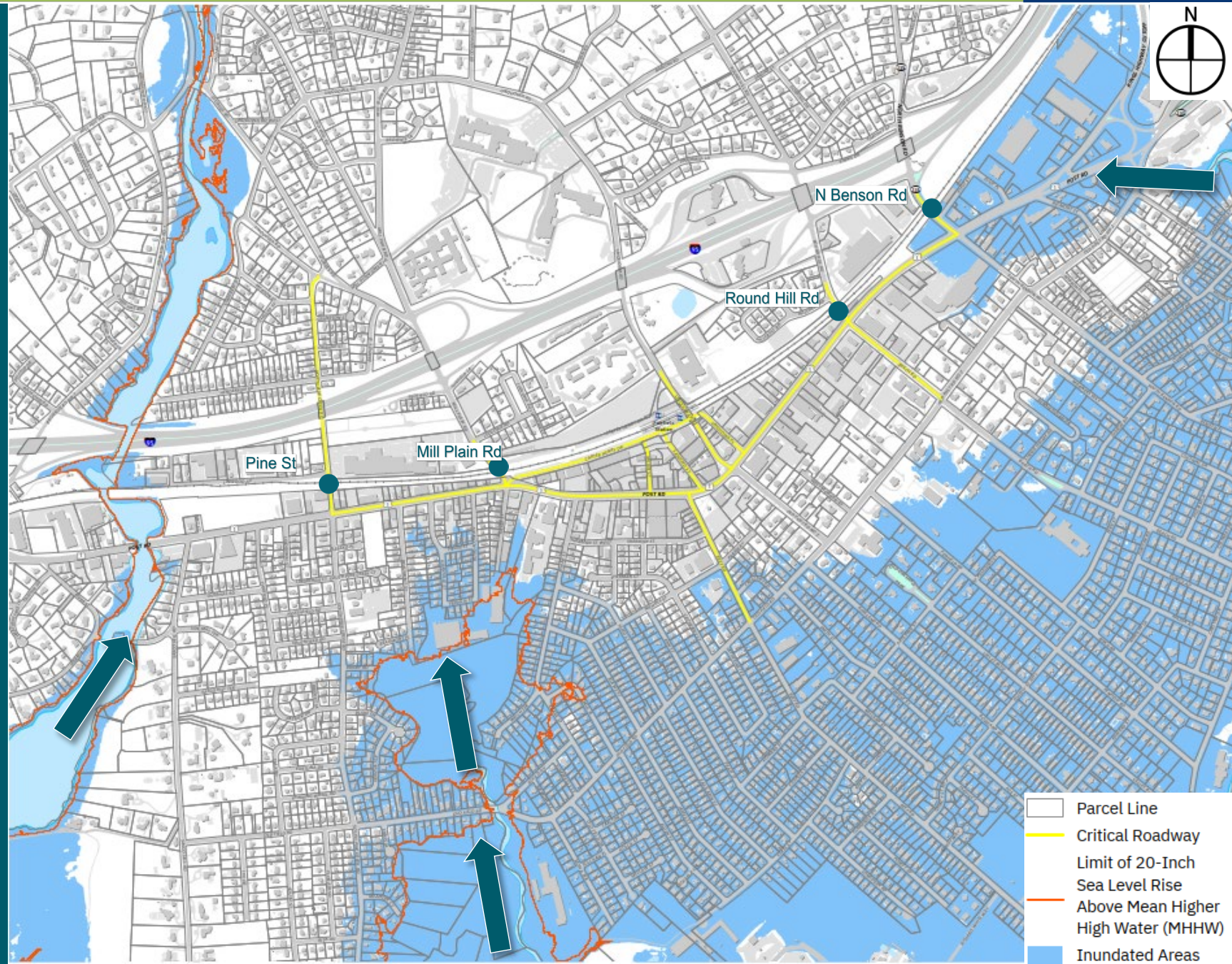
STORM SURGE

- Shape of the coastline affects storm surge
- Inlets in the coastline create pockets to trap water

Study Assumptions:

- 100-Year Storm
- 20" Sea Level Rise
- Future 2050 Conditions

Storm Surge Direction

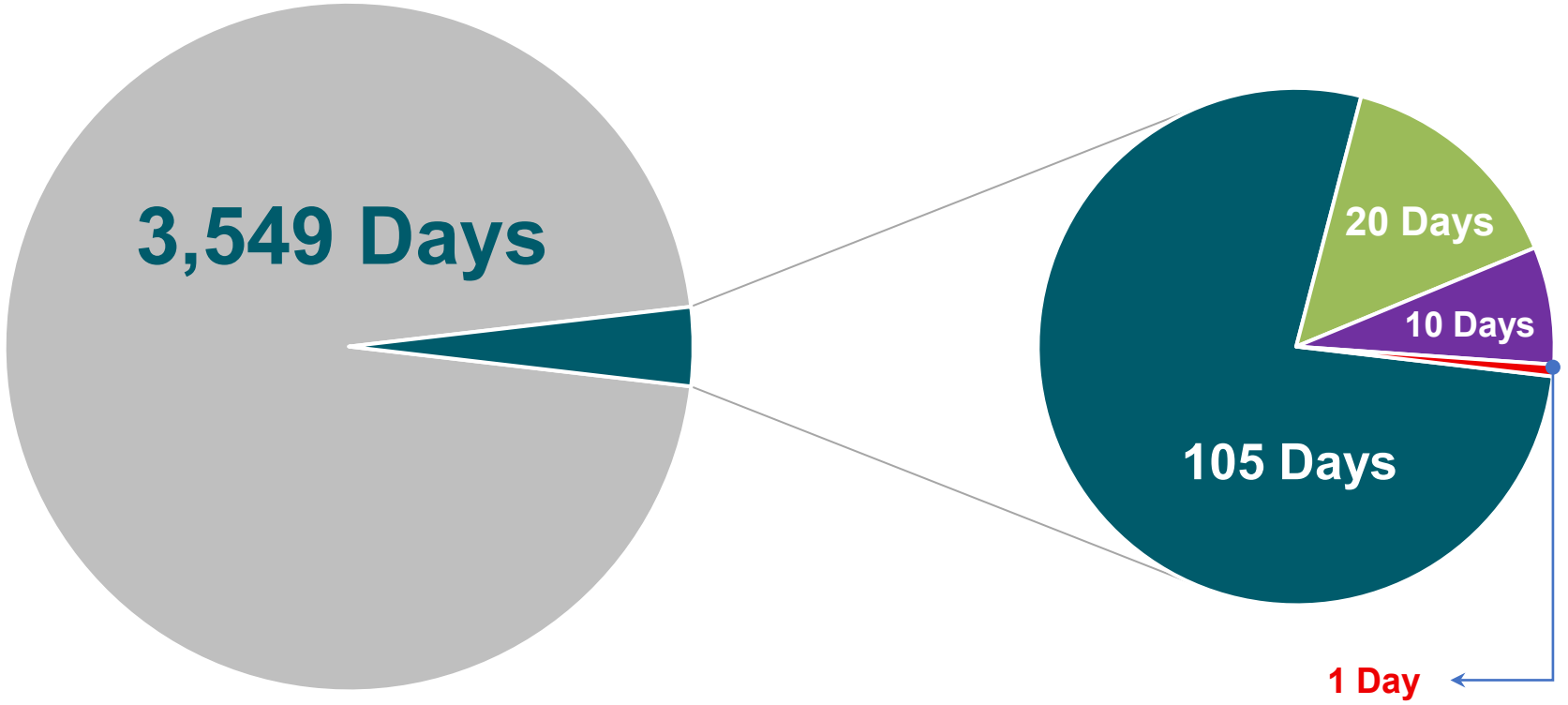


Precipitation

- Precipitation is the primary driver of flooding in downtown Fairfield.
- When the town receives intense rainfall over short periods drainage systems can be overwhelmed.
- This can be exacerbated by high-tides and storm surge events.

20 More days with < 1" of Precipitation by mid-century per year.

Precipitation in Study Area 2012 to 2022



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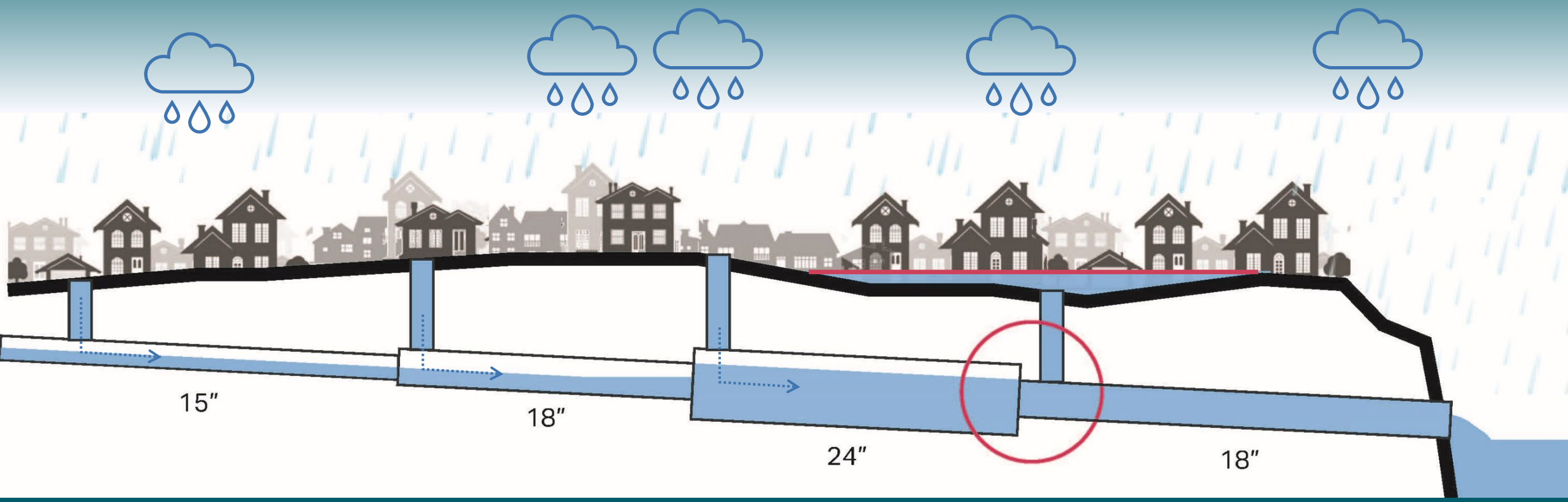
Role of the Drainage System

DRAINAGE INFRASTRUCUTRE



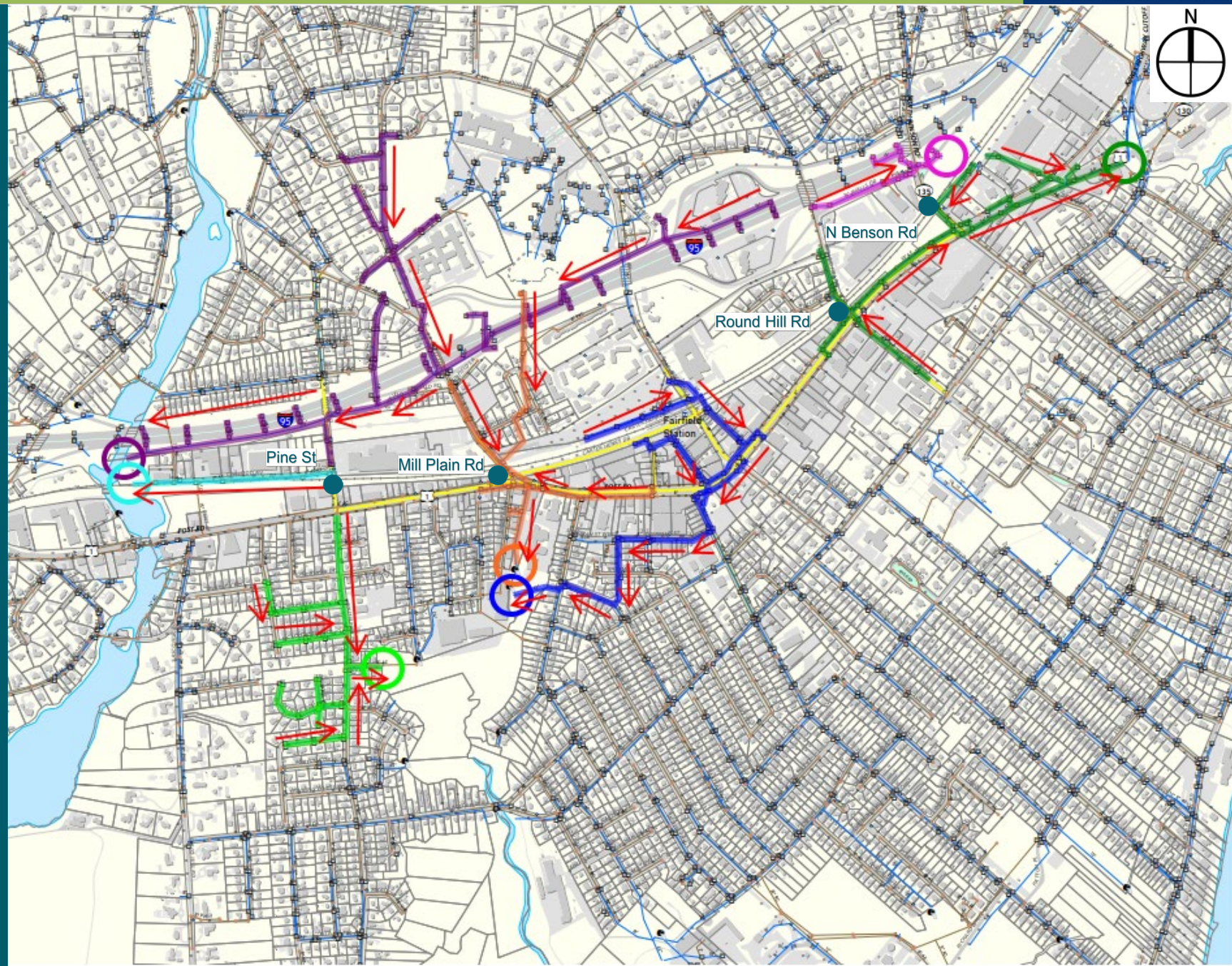
Pipe Capacity: The volume of water that can flow freely through a pipe

DRAINAGE INFRASTRUCTURE

- Pipe diameter and volume of water entering the system affect capacity

Direction of Water Flow

Outfall



Potential Flooding Sources

- Pipe diameter and volume of water entering the system affect capacity

Storm Surge Direction

Outfall

Direction of Water Flow

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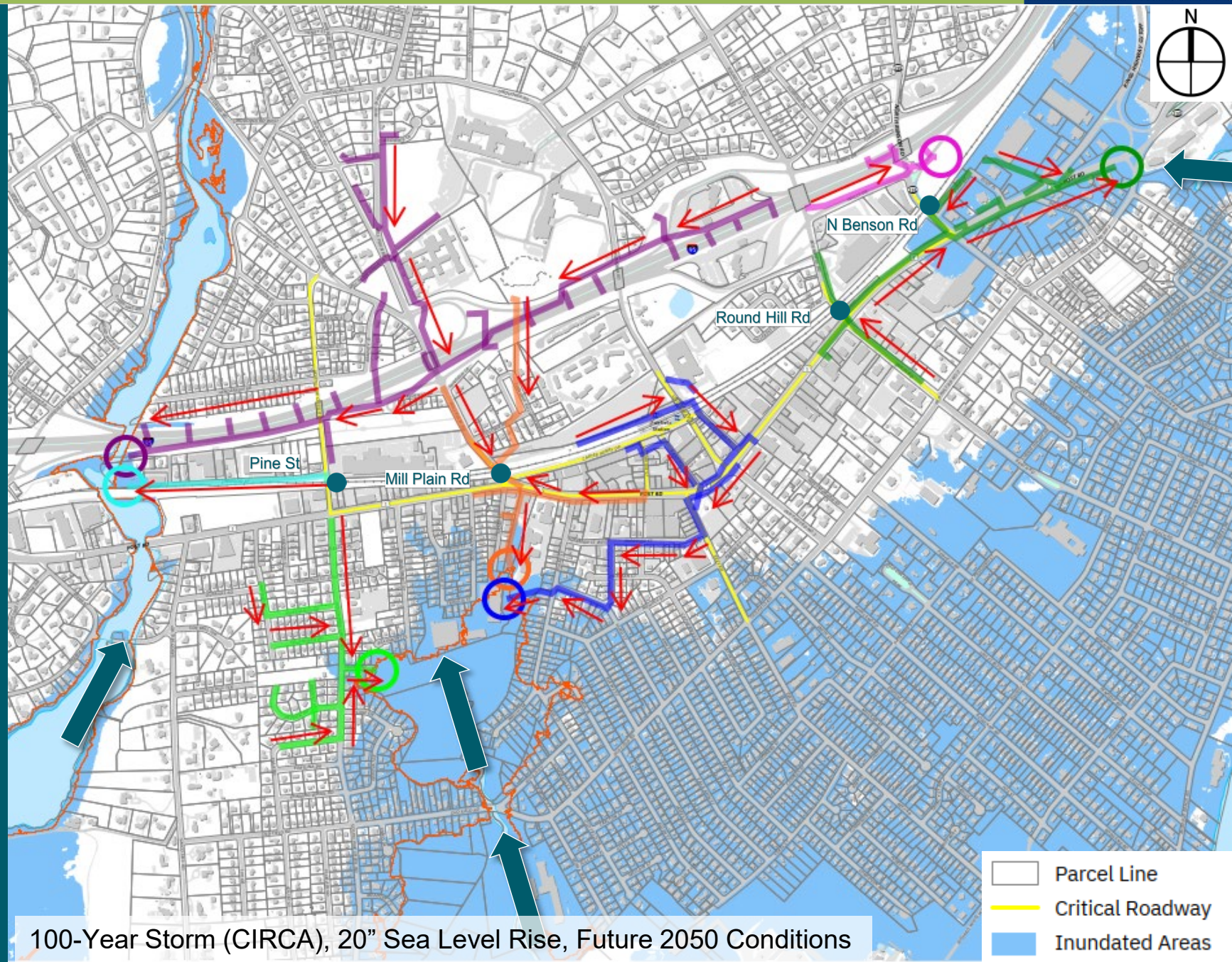
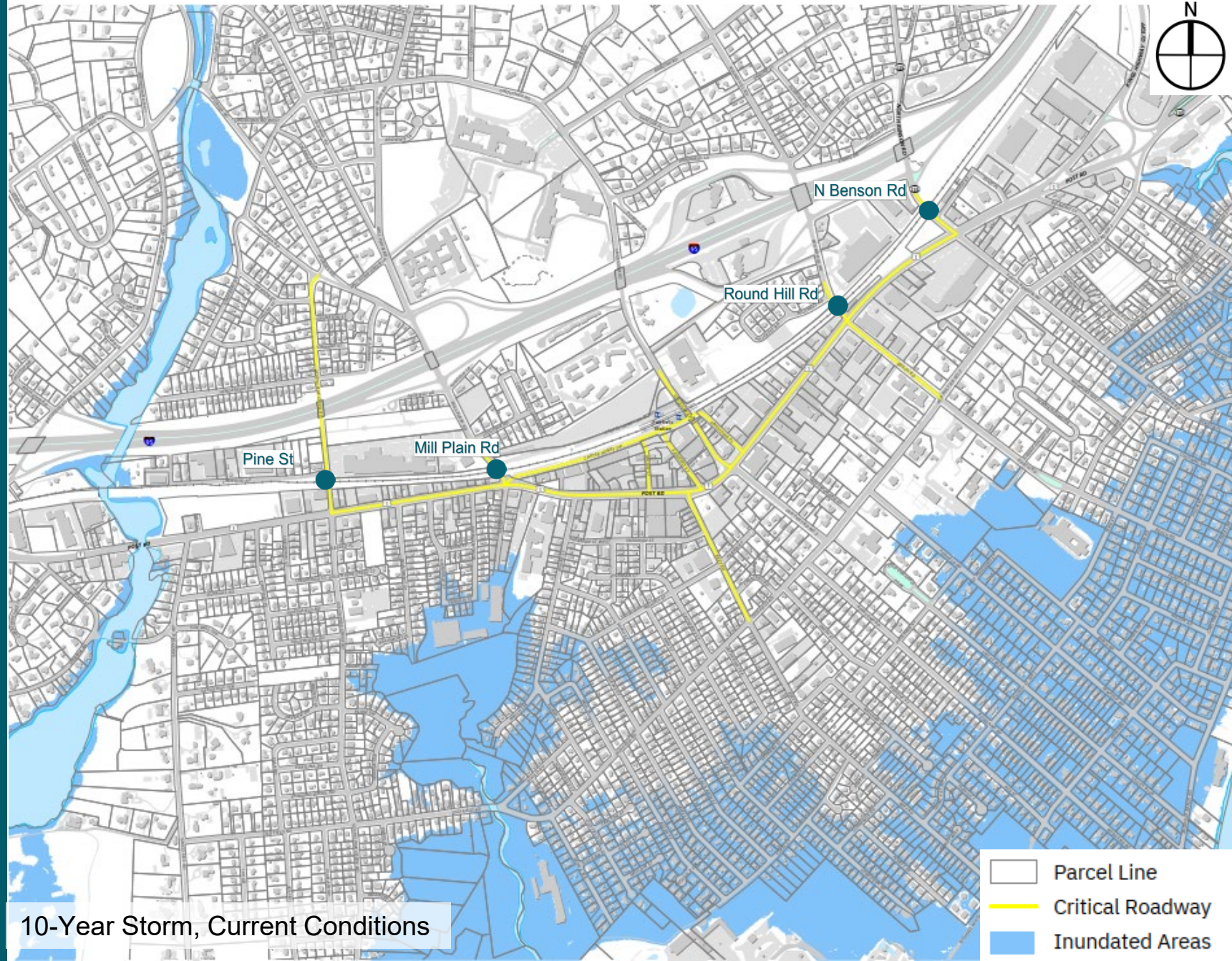


100-Year Storm (CIRCA), 20” Sea Level Rise, Future 2050 Conditions

10 YEAR FLOOD LIMITS

STUDY AREA

- 10 Year Flood Limits
- Current Conditions



10-Year Storm, Current Conditions

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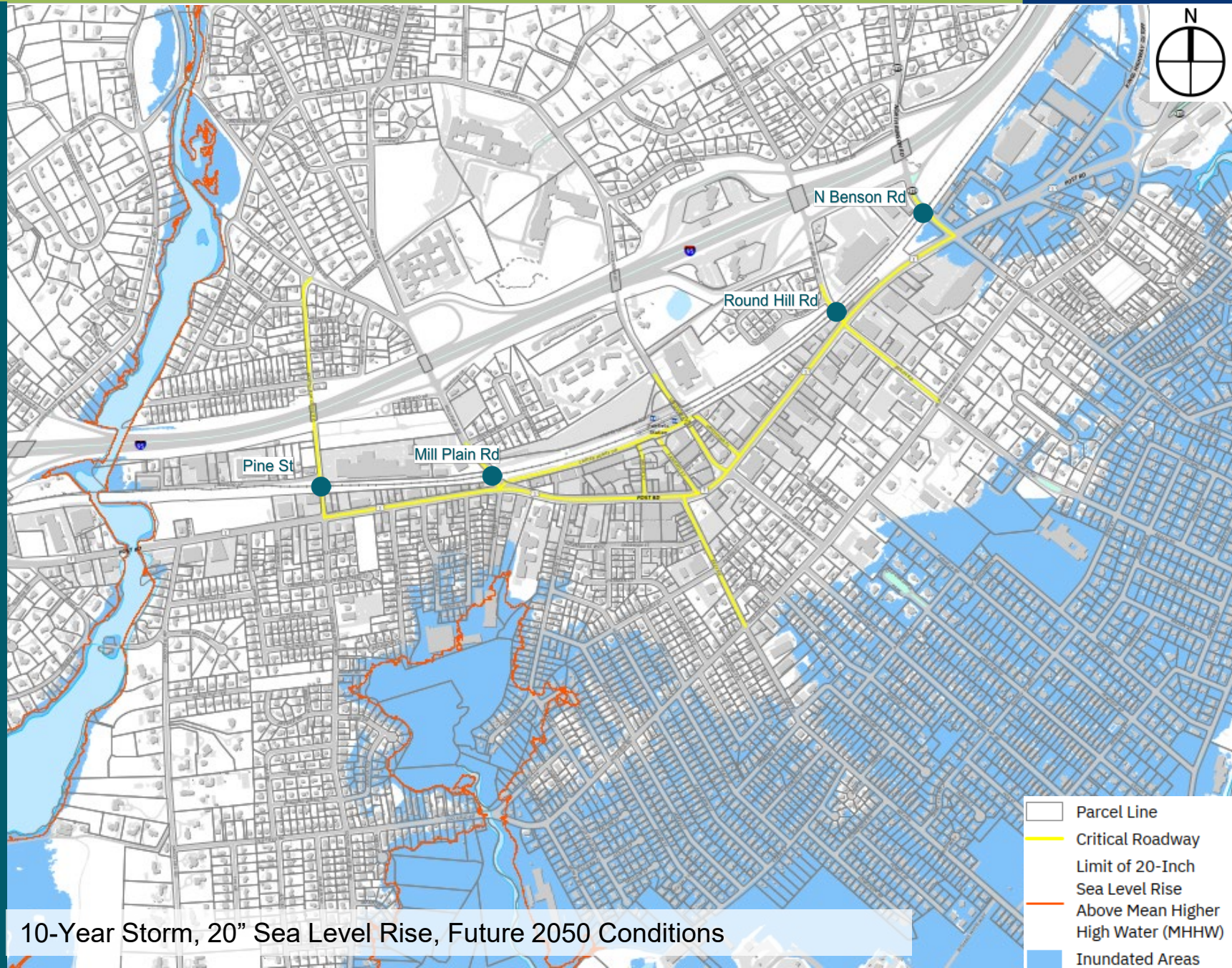

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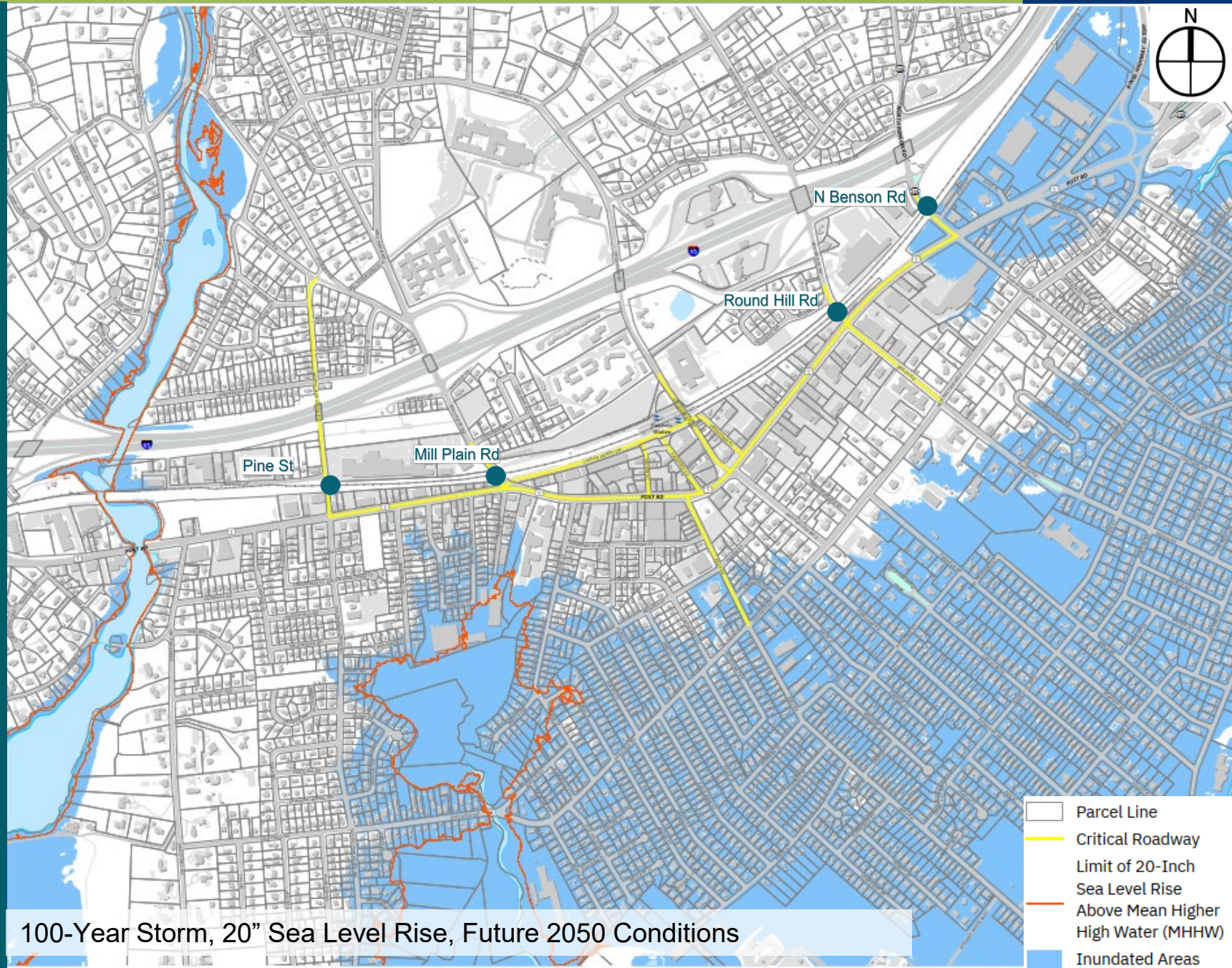
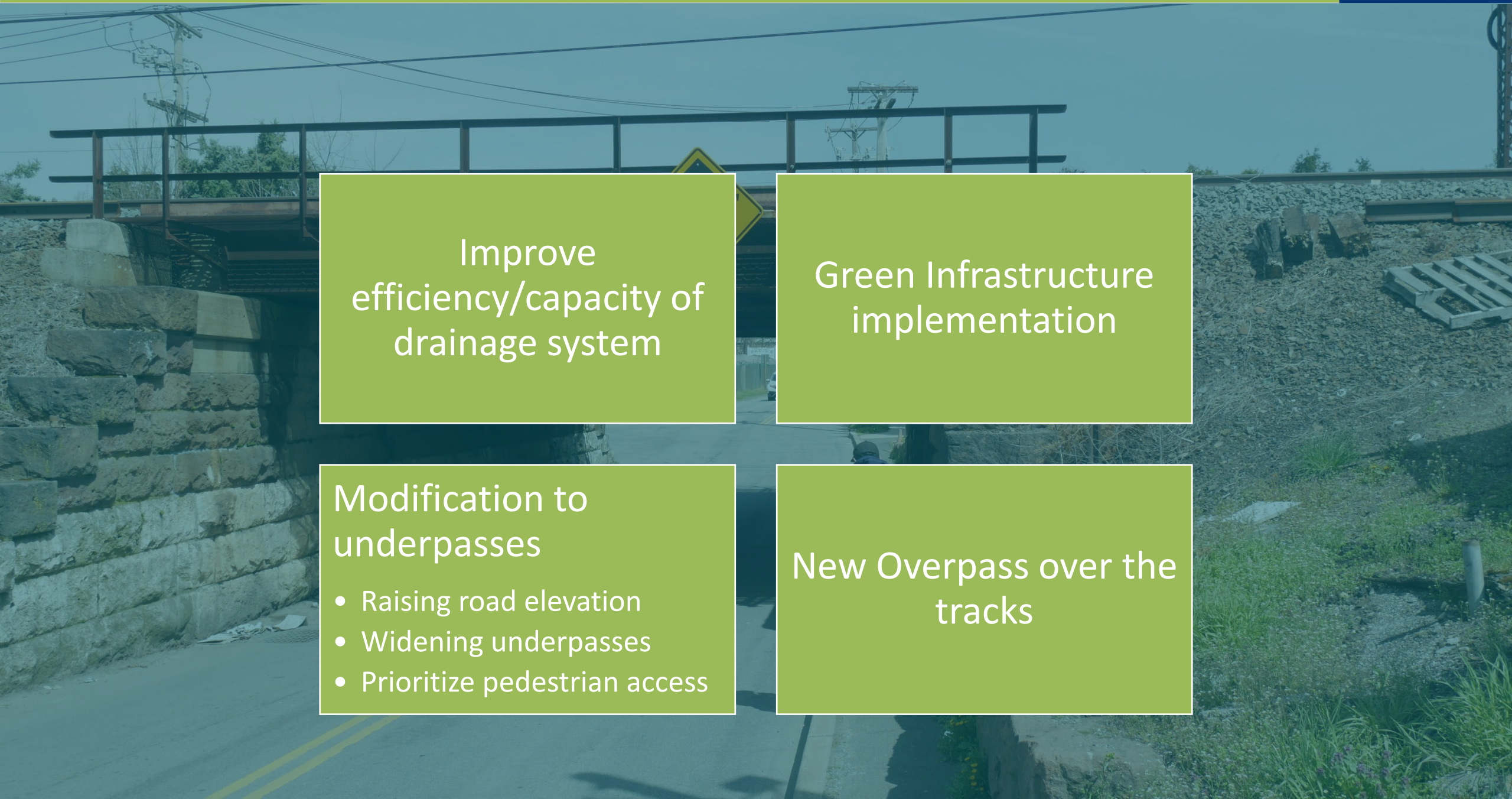


100-Year Storm, 20” Sea Level Rise, Future 2050 Conditions

Some of our Preliminary Ideas for Addressing Flooding



Improve efficiency/capacity of drainage system

Green Infrastructure implementation

Modification to underpasses

- Raising road elevation
- Widening underpasses
- Prioritize pedestrian access

New Overpass over the tracks

Discussion and MyMaps

Discussion Questions

How many times in the past year have you experienced flooding at one of these underpasses or in downtown?

What do you do when your travel is impacted by flooding (i.e. what is your reroute)?

Have you noticed a change in flooding/road closure frequency in your lifetime?

MyMaps Link

Next Steps for Study Team

- Review comments, feedback and MyMaps annotations
- Share draft existing conditions report

Next Public Touch Points

- Flooding Experience Survey
- Public Workshop Alternatives Discussion

THANK YOU!