Workshop Schedule

- 9:30 – 9:40: Welcome and Logistics
- 9:40 – 10:00: CCVI Presentation (20 minutes)
- 10:00 – 10:30: CCVI Breakouts (30 minutes)
- 10:30 – 10:40: CCVI Report out (10 minutes)
- **10:40 – 11:00: ZSR Presentation (20 minutes)**
- 11:00 – 11:30: ZSR Groups (30 minutes)
- 11:30 – 11:40 ZSR Report Out (10 minutes)
- 11:40 – 12:00 Open discussion forum

Zones of Shared Risk

A Planning Approach for Climate Adaptation

UConn CIRCA Resilient Connecticut

Resilient Connecticut Background

- “The Resilient Connecticut Project aims to establish resilient communities through smart planning that incorporates economic development framed around transit-oriented development, alongside conservation measures and infrastructure improvements. This approach provides a framework for regional, municipal, and site scale planning to tackle the challenges of future storms, sea-level rise, and riverine flooding.”
- **“This planning approach connects zones of shared risk with resilience corridors to link critical facilities and provide greater continuity of service to the lower-lying communities.”**

Resilient Connecticut Background

- "**Zones of Shared Risk** are regions that face common challenges either in existence already or caused by climate change, and therefore risks are shared among or between groups of people that may have different perspectives and priorities for [coastal] resilience. A Zone of Shared Risk includes the houses, land, infrastructure, hydrological, ecological, social, and institutional elements that contribute to the functioning of a place."
- "**Resilience Corridor** utilizes the concept of urban redevelopment corridors as a mechanism to adapt [coastal] urban areas at risk. The resilience corridor supports transportation, utilities, stormwater and habitats, and economic development that connect the upland areas of Connecticut where resources exist (resilience zones) down to shorefront communities."

Guilford Community Coastal Resilience Plan (2012)

- **“<u>Location</u> Zone of Shared Risk”** contains risks primarily derived from a prevalence of low-lying lands within an area. These lands are vulnerable to flooding caused by increasing sea levels or surges associated with strong storms due to their low elevation.
- **“<u>Access</u> Zone of Shared Risk”** contains risks primarily derived from the ability (or lack thereof) to enter or exit an area due to flooding caused by increasing sea levels or surges associated with strong storms.

Guilford Community Coastal Resilience Plan (2012)

- **“<u>Proximity</u> Zone of Shared Risk”** contains risks primarily derived from adjacency to low-lying, vulnerable lands. These lands are vulnerable by being close to areas that will experience more flooding caused by increasing sea levels or surges associated with strong storms and are likely to experience some flooding of their own.
- **“<u>Natural protection</u> Zone of Shared Risk”** contains risks to lands that provide natural flooding protection. These lands can attenuate flooding and damage and flooding from storm surges, contribute to both improved water quantity and quality in non-storm events, and provide valuable habitat.

Guilford Community Coastal Resilience Plan (2012)

Guilford Community Coastal Resilience Plan (2012)

- Spatial scale is conducive to planning for and implementing technical measures such as protective infrastructure and zoning overlays
- Definition as systems that include physical and social attributes may make them more attractive to funding sources, and representative of the dynamic relationship between people and their surrounding environment
- Leverage existing social institutions and community relationships to provide platforms for ongoing citizen involvement in ongoing processes of coastal adaptation.

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Resilient Connecticut

Defining Zones of Shared Risk

Project Description

The goal of this project is to to identify zones of shared risk in New Haven and Fairfield counties.

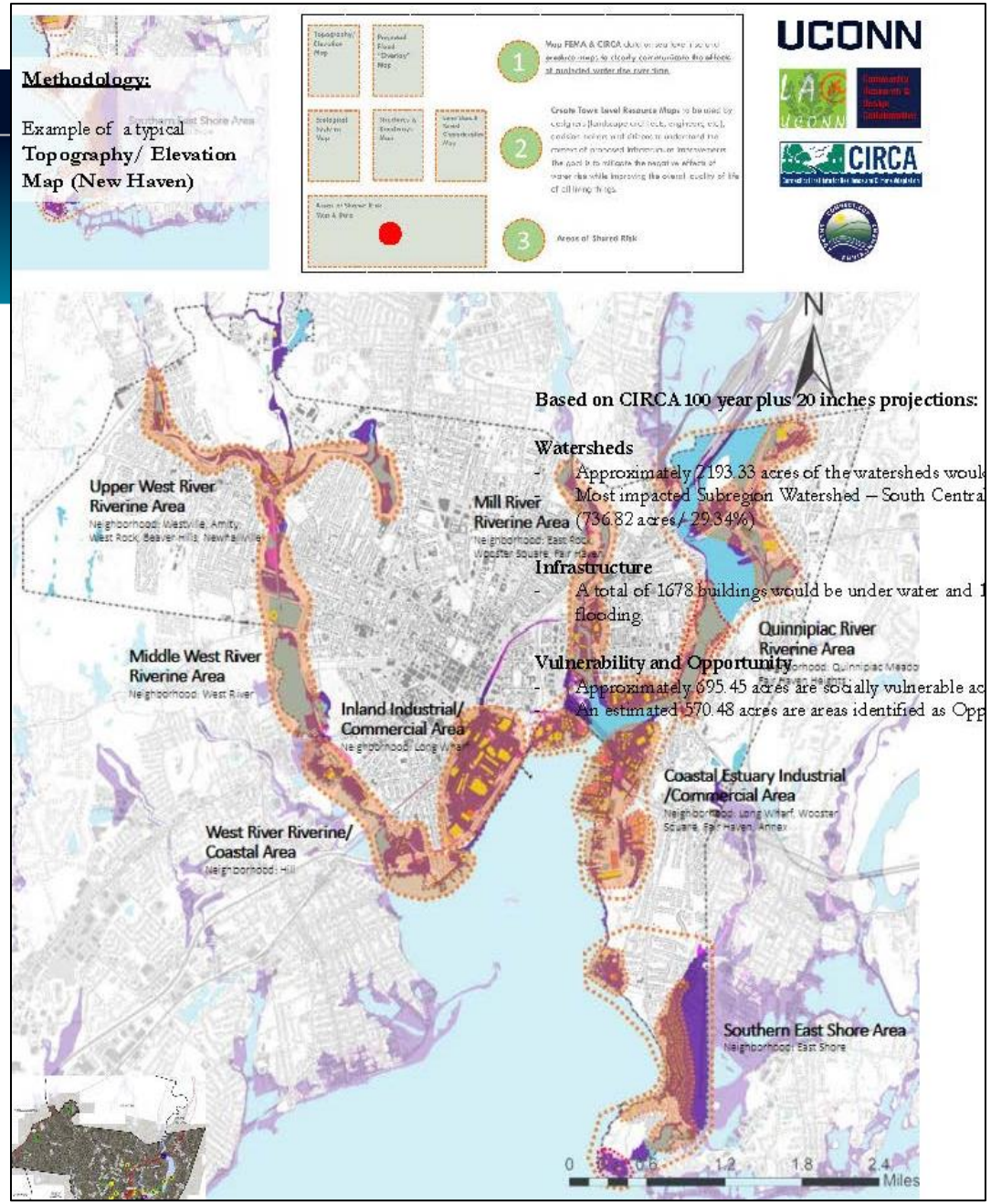
- *Zones of shared risk* are regions that face common challenges either in existence already or caused by climate change, and therefore risks are shared among or between groups of people that may have different perspectives and priorities for coastal resilience. A Zone of Shared Risk includes the houses, land, infrastructure, hydrological, ecological, social, and institutional elements that contribute to the functioning of a place. This project approach connects zones of shared risk with resilience corridors to link critical facilities and provide greater continuity of service to the lower-lying communities.
- A *resilience corridor* uses the concept of urban redevelopment corridors as a strategy to adapt coastal urban areas at risk. The resilience corridor supports transportation, utilities, stormwater, habitats, and economic development by connecting upland areas where supporting infrastructure exists down to shorefront communities.

The project identifies zones of shared risk using transportation, health, energy, water, housing, flood risk, and subpopulations that share overlapping issues to identify these vulnerable zones. This project analyses the elevation and topography, projected flood extent, ecological systems, structures, roadways, land uses, and social characteristics for coastal towns of New Haven and Fairfield County. These maps are overlapped to observe the zones of shared risk pockets also considering the historical changes that the town has undergone. The scale of analysis for this project is the individual town boundary.

Project Timeline: May 2019 - February 2021

Project Outcomes

Project leads and the CIRCA team will develop planning analysis on new basemaps that focus on zones of shared risk in New Haven and Fairfield Counties. These maps are to be used for planning meetings with state, COG, municipal staff, consultants and during general engagement events. Products will also be used in the regional climate vulnerability assessment and will be posted here as they are made available.



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A-Z

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Resilient Connecticut

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Defining Zones of Shared Risk

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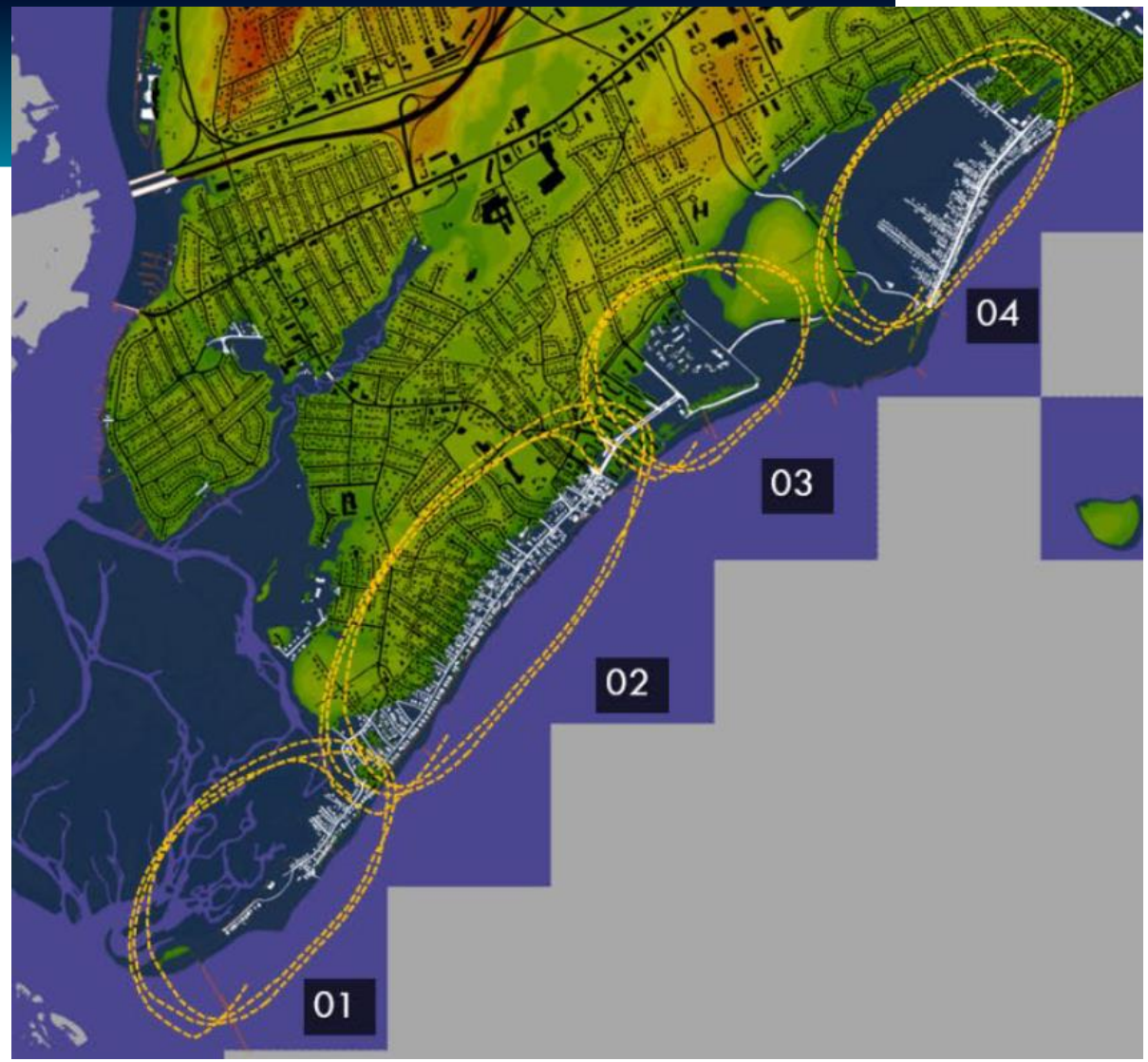
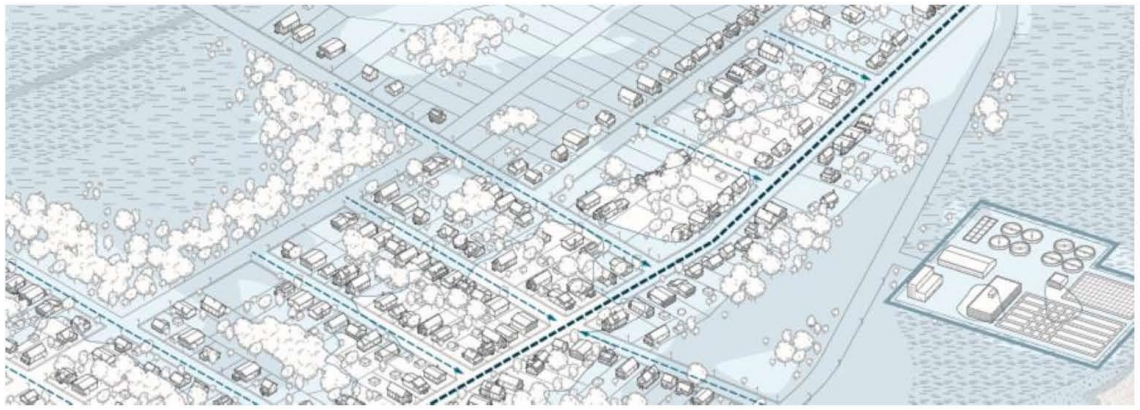


July 01, 2020



ZONES OF SHARED RISK

A Planning Approach for Climate Adaptation

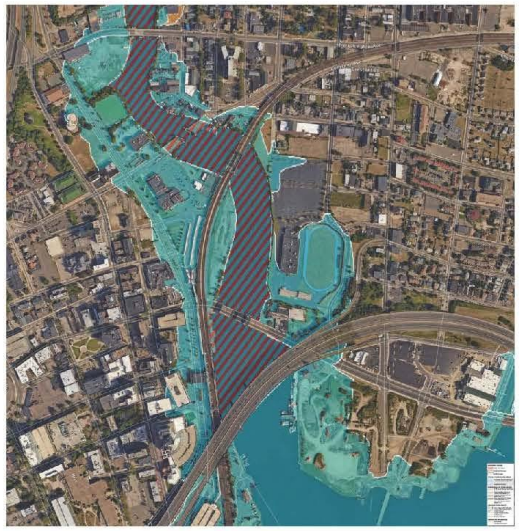
Alexander J. Felson

CONNECTICUT INSTITUTE FOR RESILIENCE AND CLIMATE ADAPTATION

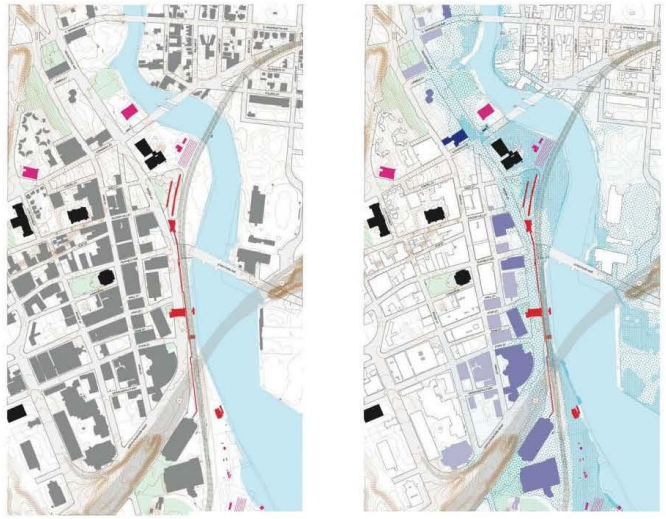
Concise summary of ZSR methodology presented in mid-2020

Examples of ZSRs

Zones of Shared Risk as a spatial planning and design approach



FEMA DFIRM



Current Conditions w/ SLOSH (Surge)

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Circle Beach and Neck Road span the Guilford/Madison line and share limited access

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Are they the same ZSR?
Separate ZSRs?
Nested ZSRs?

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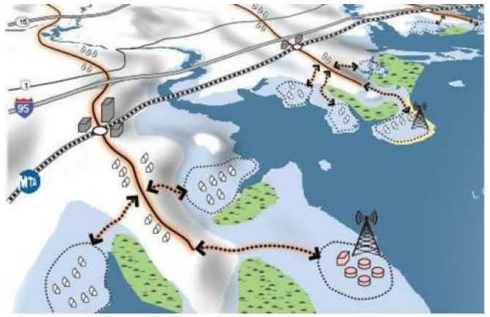
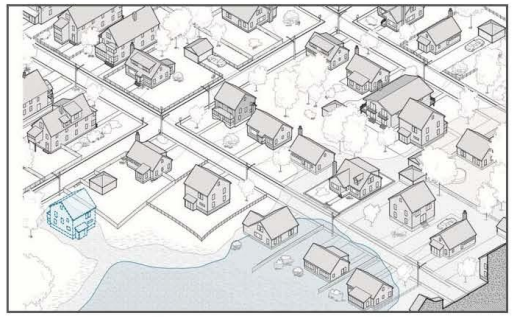
ZSRs – how they work

Tool for Communication



Tool for design and planning
(Watershed, sewershed, schoolshed, shopping/commercial shed)



Financial tool and as a tool for implementation

Tools for communication, project planning, design, and investment planning

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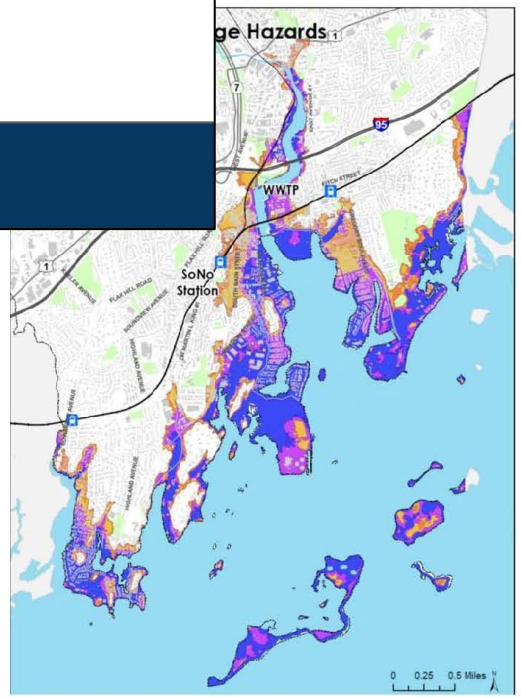
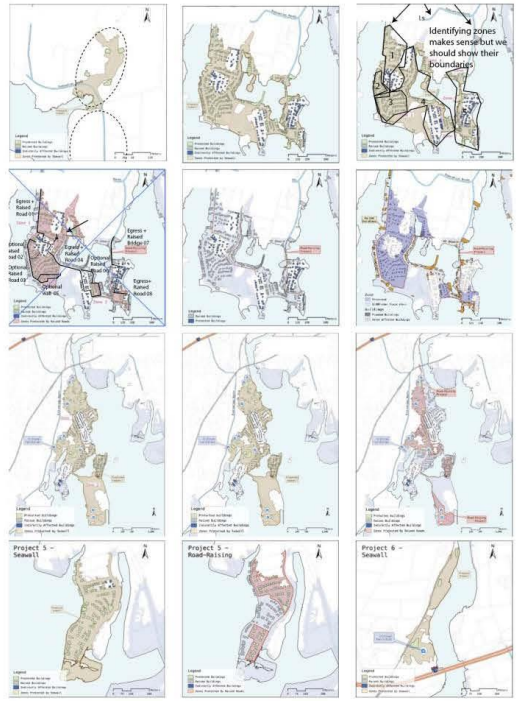
Examples of how to make ZSRs in Norwalk more resilient over the long term





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Putting it All Together
Making New ZSRs

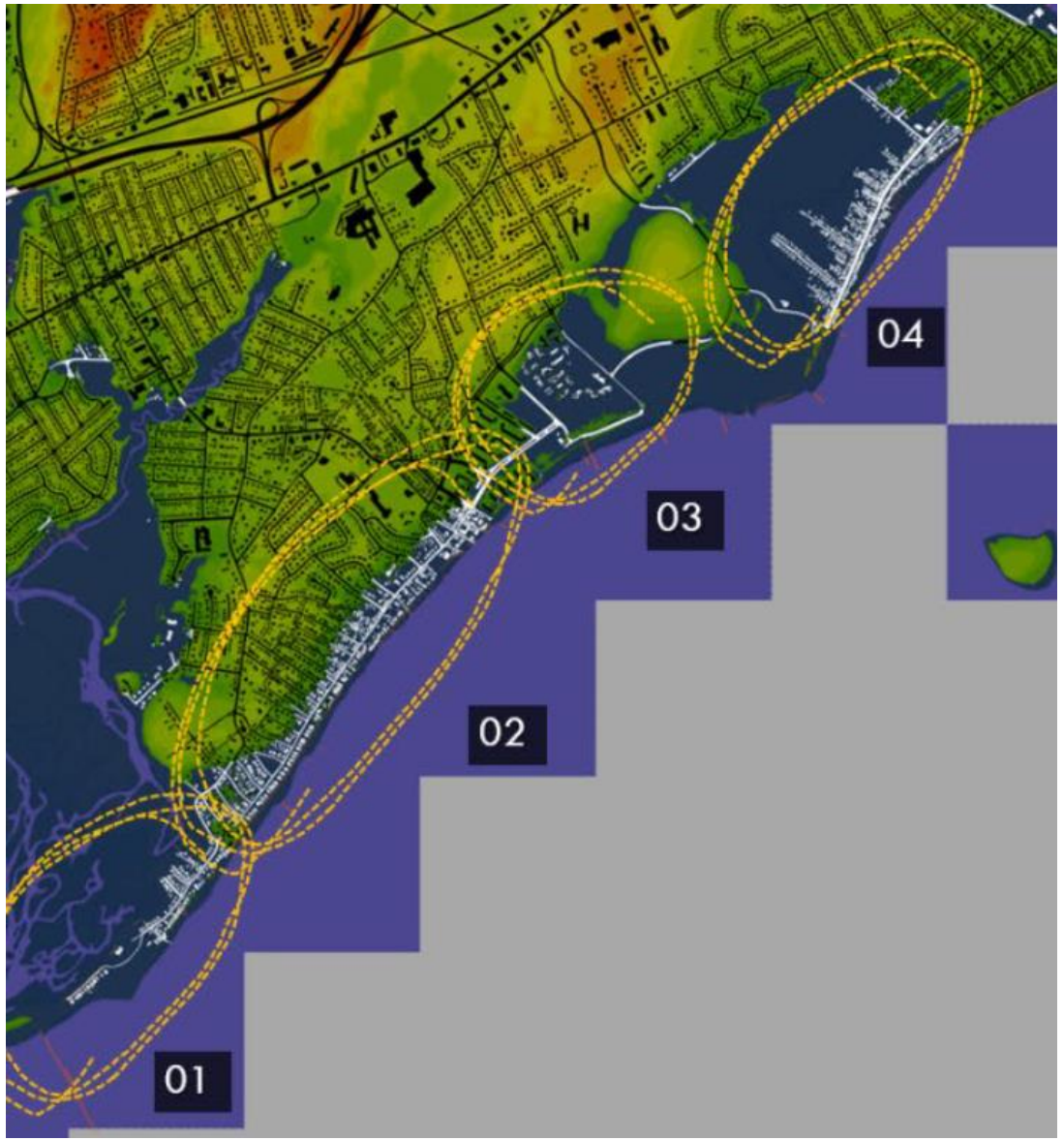
- Consistent with the work already completed by Yale, UConn, and CIRCA
- Effective in areas of coastal flood risk as well as areas of riverine flood risk
- Repeatable across the target municipalities of the two counties
- Result in delineating ZSRs somewhat blind relative to social vulnerabilities mapped in the underlying census tracts
- Some ZSRs should consider climate-related hazards unrelated to flooding such as heat and wind

Putting it All Together
Making New ZSRs

- Review of automated GIS methods for delineating ZSRs has underscored the challenges of this mapping
- Although sophisticated tools for evaluating transportation networks are available such as Network Analyst, these programs cannot take into account the nuances associated with Connecticut's geography and community characteristics
- The ZSR approach must be guided through **user knowledge** (i.e., existing hazard mitigation plans) and aided by **stakeholder engagement**

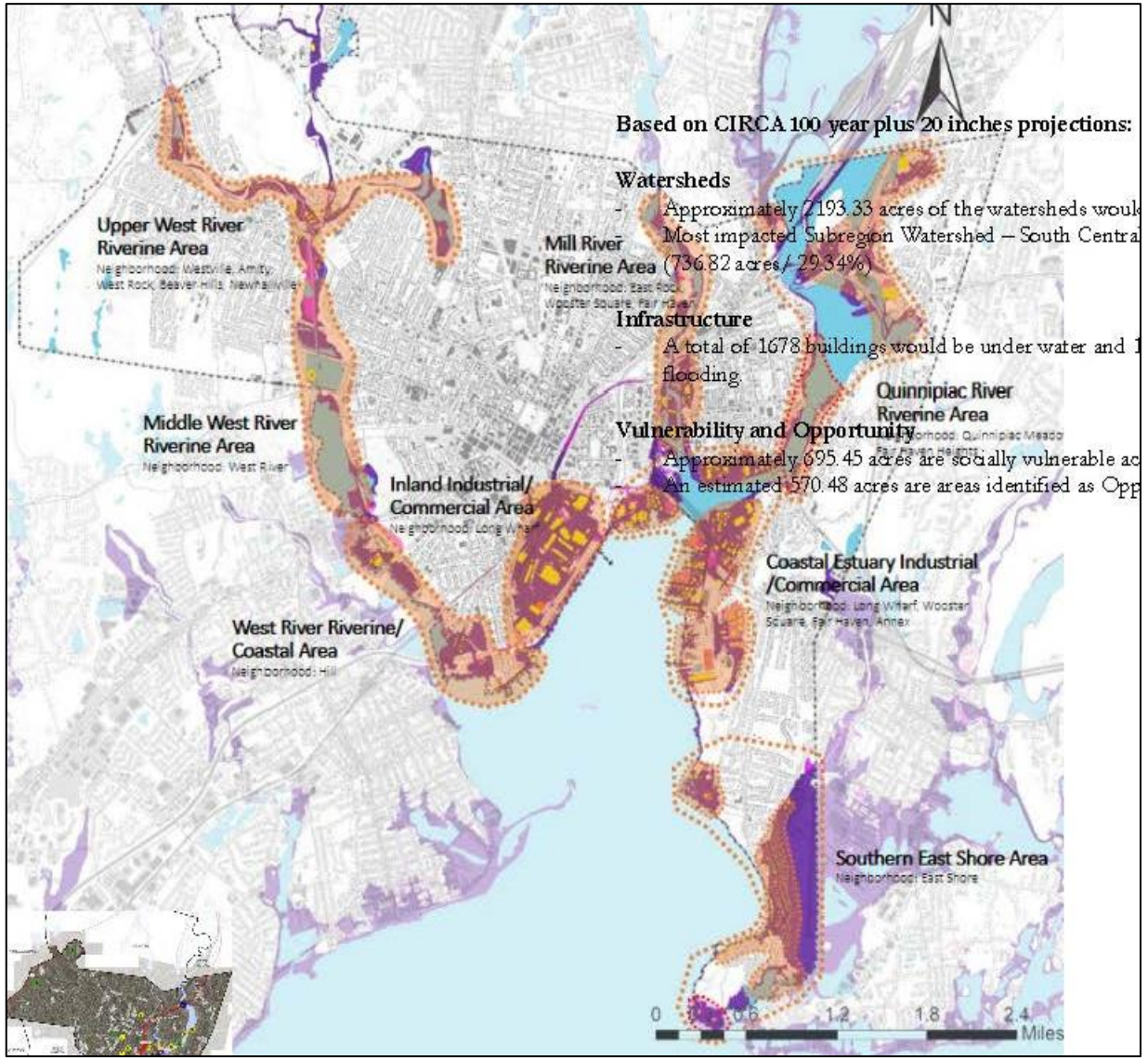
Potential Flood-Based Criteria for a ZSR

- A ZSR should include one of the following within or adjacent to an area of current or future flood risk:
  - Several buildings
  - A critical facility
  - A segment of collector/arterial roadway
- A ZSR may include community capacity commonalities such as:
  - Shared shelter or lack thereof
  - Shared heating/cooling center or lack thereof
  - Shared medical facilities or lack thereof



Potential Flood-Based Criteria for a ZSR

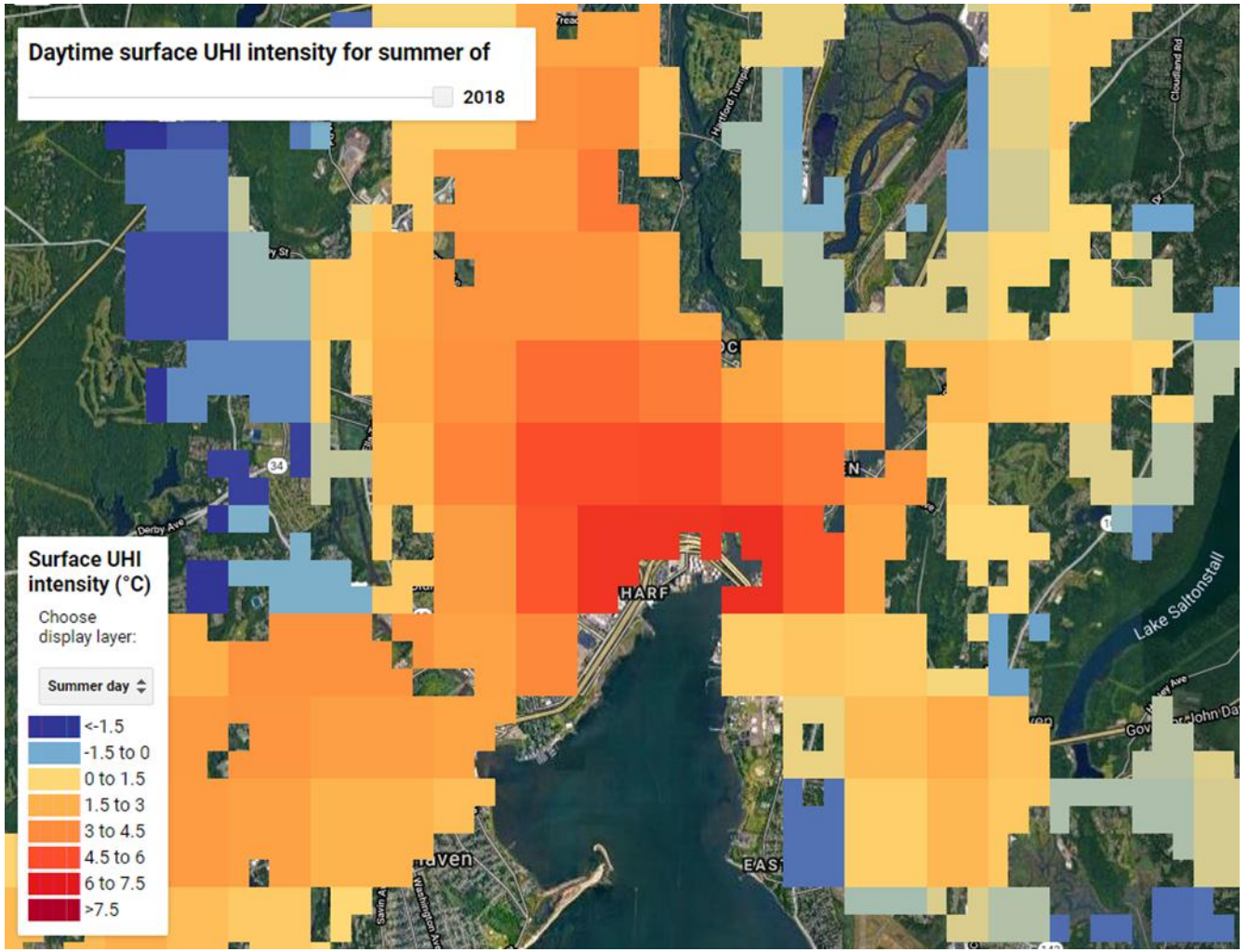
- A ZSR may include power utility commonalities such as:
  - Vulnerable transmission and distribution
  - Lack of redundancy
  - Lack of generators for standby power
  - History of frequent outages
- A ZSR may include water and wastewater commonalities such as:
  - Shared water utility
  - Use of private wells
  - Shared sewer utility
  - Use of septic systems



What About Heat?

https://yceo.yale.edu/research/global-surface-uhi-explorer

- Summer day UHI intensity layer
- Darker reds represent >4.5 degrees C
- Greenwich, Stamford, Norwalk, Bridgeport, New Haven, Wallingford, Meriden, Waterbury, and Danbury



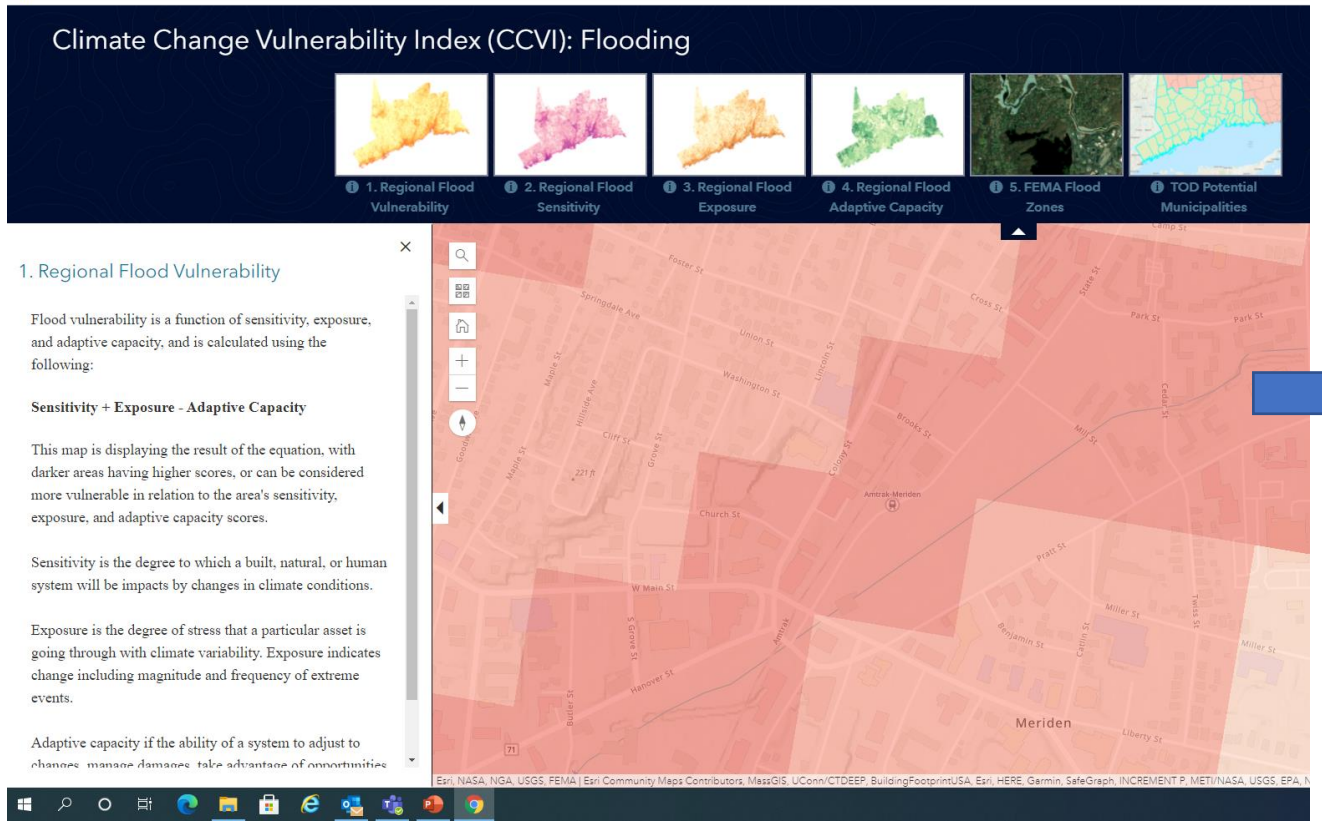
What About Wind?

Spatial wind damage text from Hazard Mitigation Plans

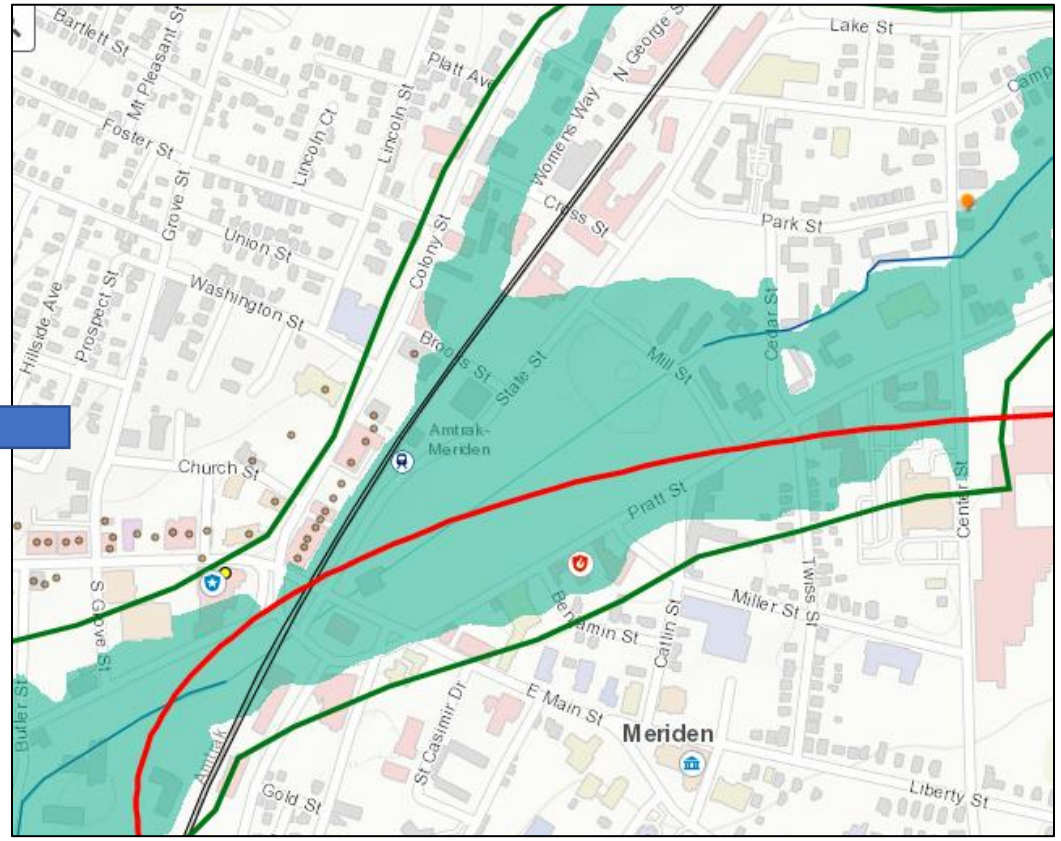
Milford	None mentioned
Orange	None mentioned
West Haven	None mentioned
New Haven	None mentioned
East Haven	None mentioned
Branford	None mentioned
Guilford	None mentioned; however, in 2010 the Town said "The area of 377 Mulberry Point Road is highly susceptible to downed limb damage, along with the entire road perhaps having greater susceptibility than the rest of the Town."
Madison	None mentioned
North Haven	None mentioned
Wallingford	None mentioned
Meriden	None mentioned

Meriden Green Example

CCVI



ZSR



Meriden Green Example

Zones of Shared Risk

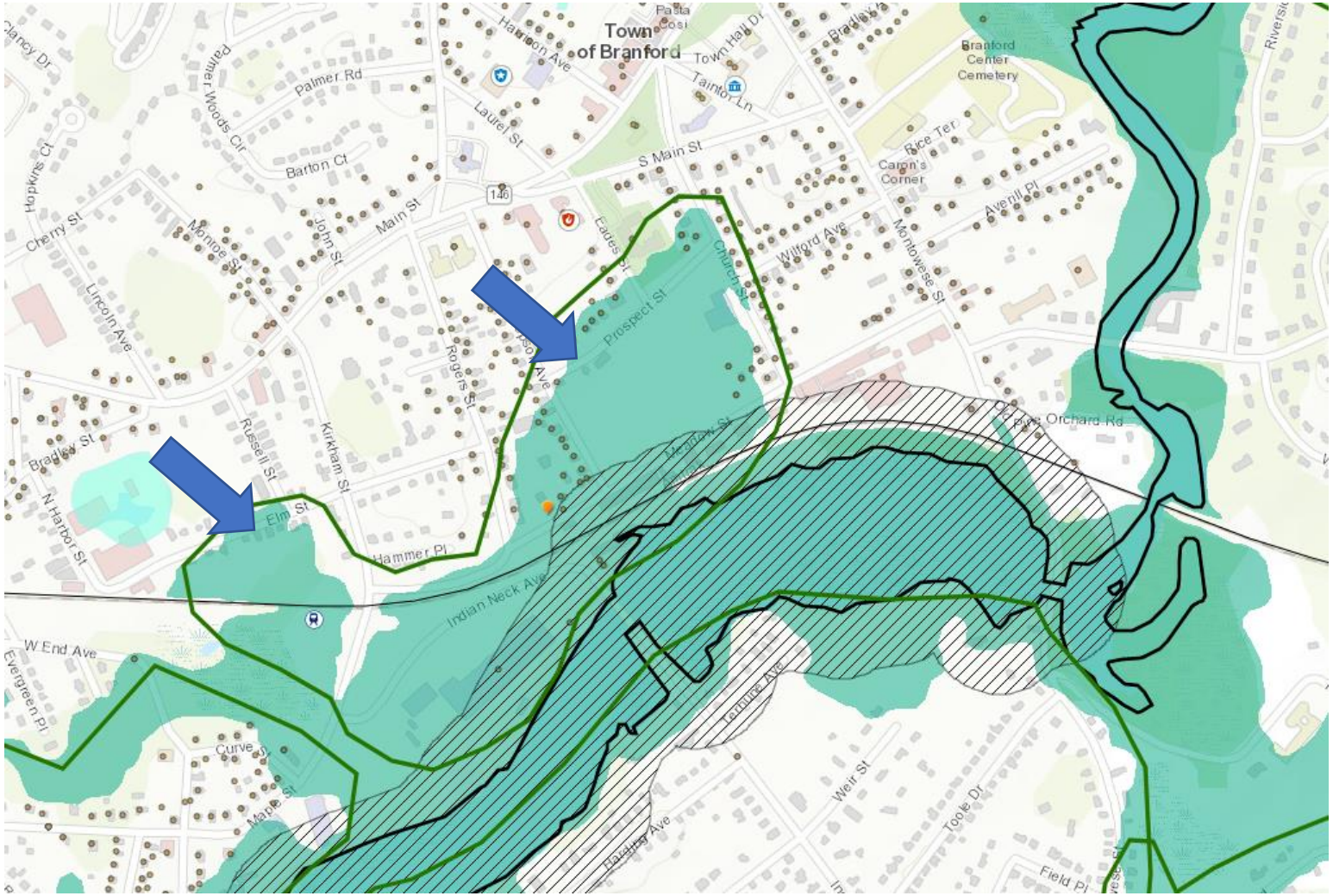
A Planning Approach for Climate Adaptation

Viewer Tool

UConn CIRCA Resilient Connecticut

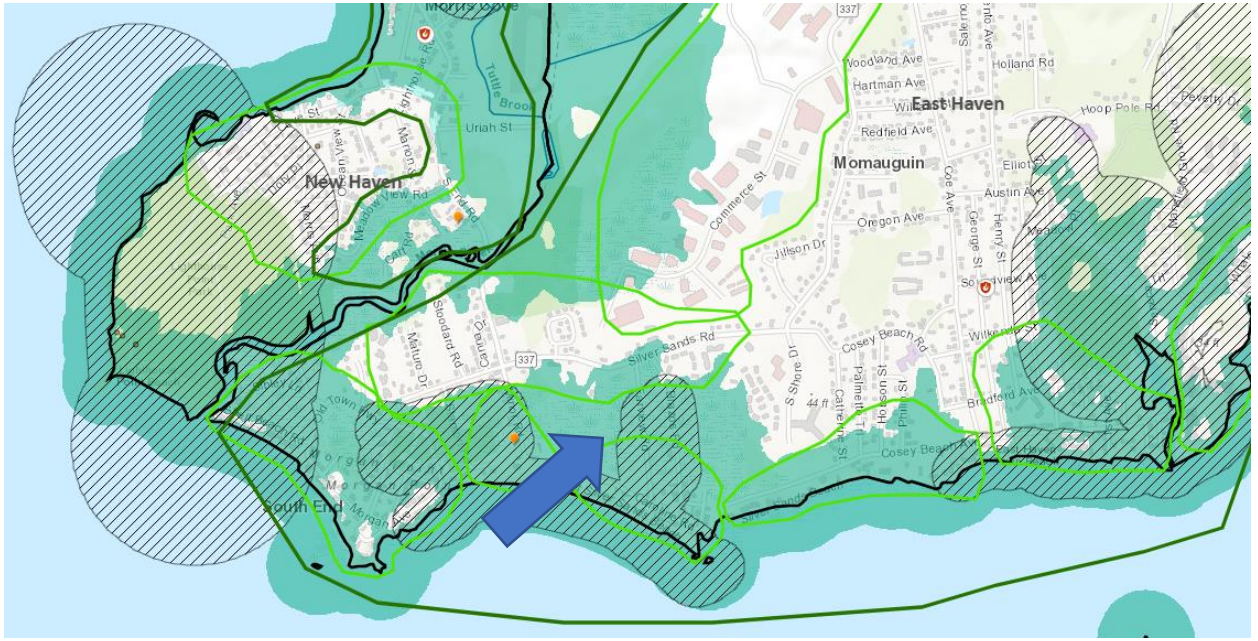
Location ZSR

Risks from a prevalence of low-lying lands within an area; vulnerable to flooding caused by increasing sea levels, surges associated with strong storms, riverine floods, and other floods.



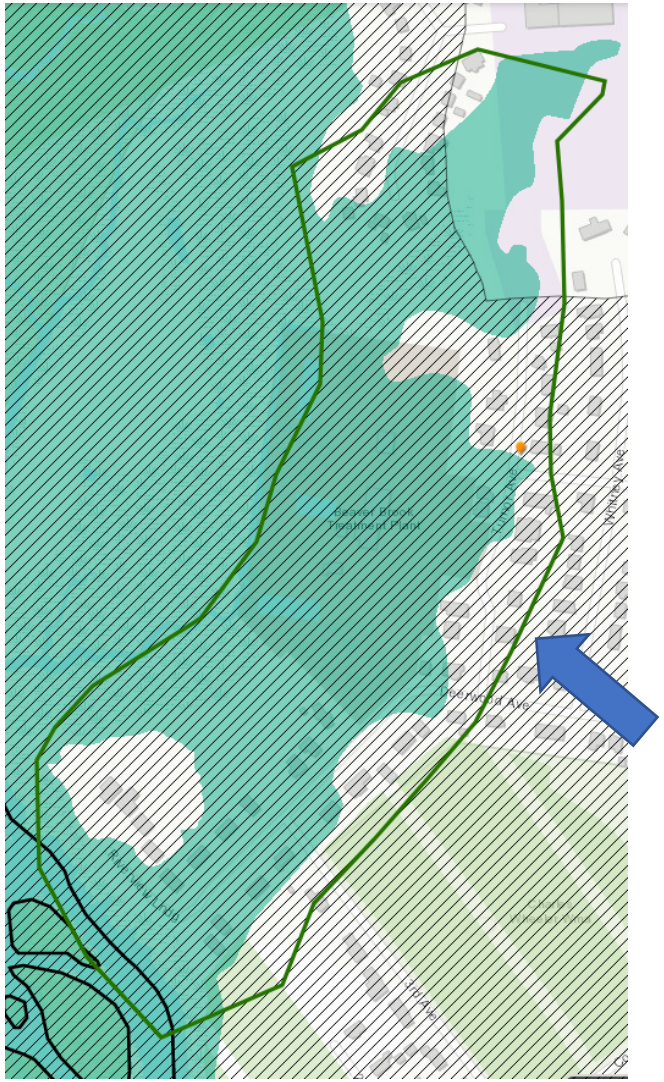
Access ZSR

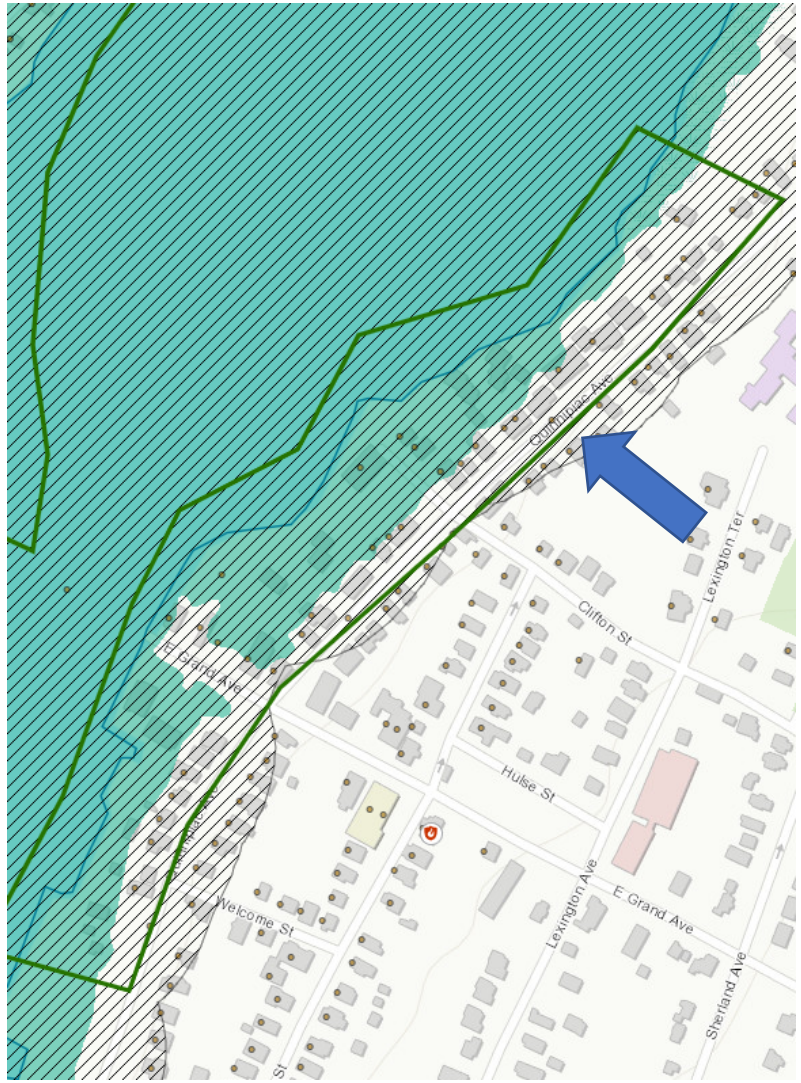
Risks from the ability (or lack thereof) to enter or exit an area due to flooding caused by increasing sea levels, surges associated with strong storms, riverine floods, and other floods.



Proximity ZSR

Risks from adjacency to low-lying, vulnerable lands; vulnerable by being close to areas that will experience more flooding caused by increasing sea levels, surges associated with strong storms, riverine floods, and other floods; and are likely to experience some flooding of their own.





Natural Protection ZSR

Risks to lands that provide natural flood protection. These lands can attenuate flooding, contribute to improved water quantity and quality in non-storm events, and provide valuable habitat.