

CONNECTICUT INSTITUTE FOR RESILIENCE & CLIMATE ADAPTATION (CIRCA)

Resilient Connecticut



LONG-TERM STRATEGY FOR CLIMATE ADAPTATION AND RESILIENCE: RESILIENT CONNECTICUT 2.0

THE NEXT PHASE III PROJECTS

Annual Summit
December 1, 2023

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CONNECTICUT INSTITUTE FOR RESILIENCE & CLIMATE ADAPTATION (CIRCA)

Resilient Connecticut

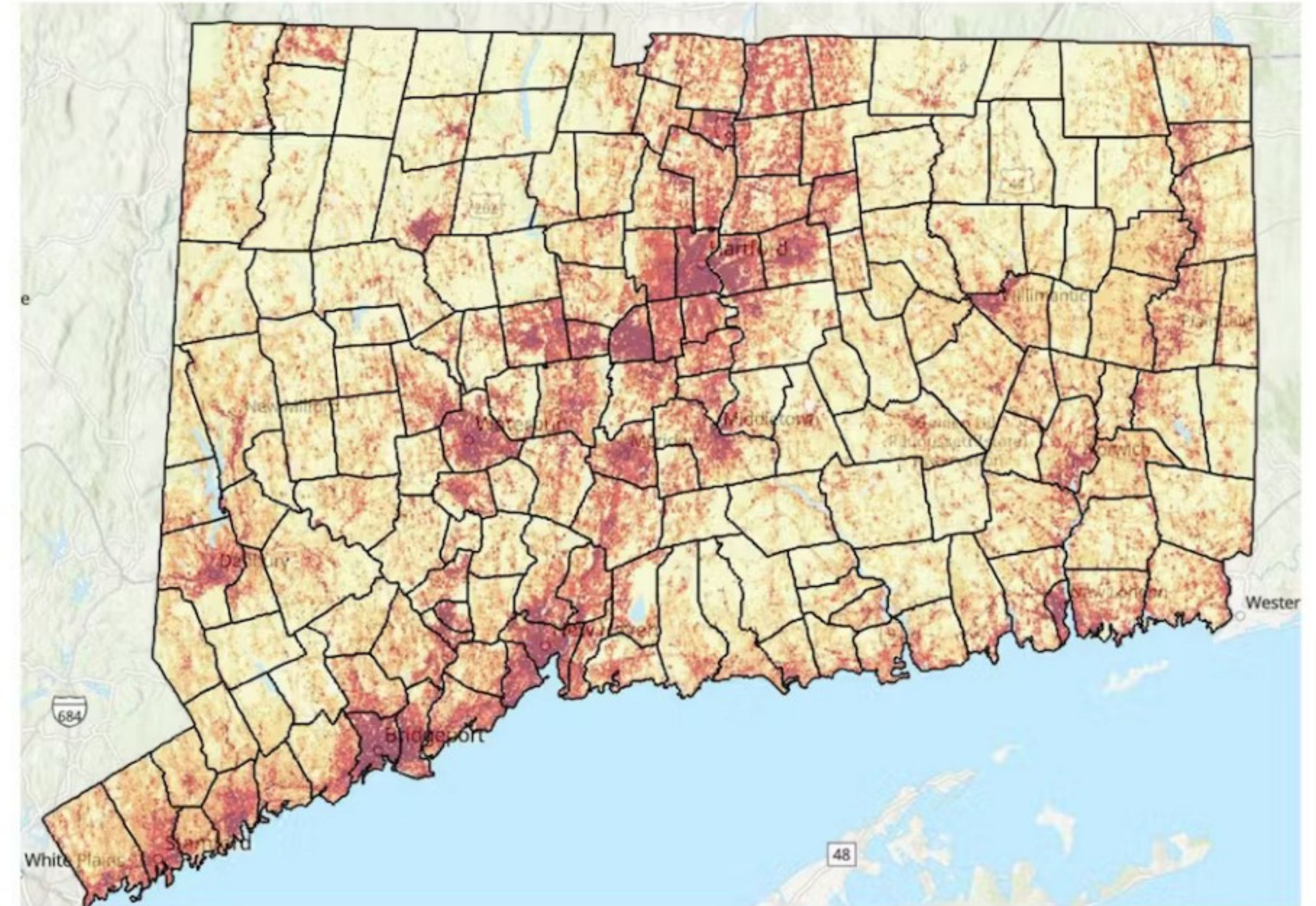


Agenda

- Resilient Connecticut 2.0
 - Lower Connecticut River Area (RiverCOG)
 - Southeastern Connecticut (SCCOG)
- Introduction to Each Proposed Project
 - *Portland*
 - *East Haddam*
 - *Stonington/Mystic*
 - *Jewett City*
- Closing Remarks

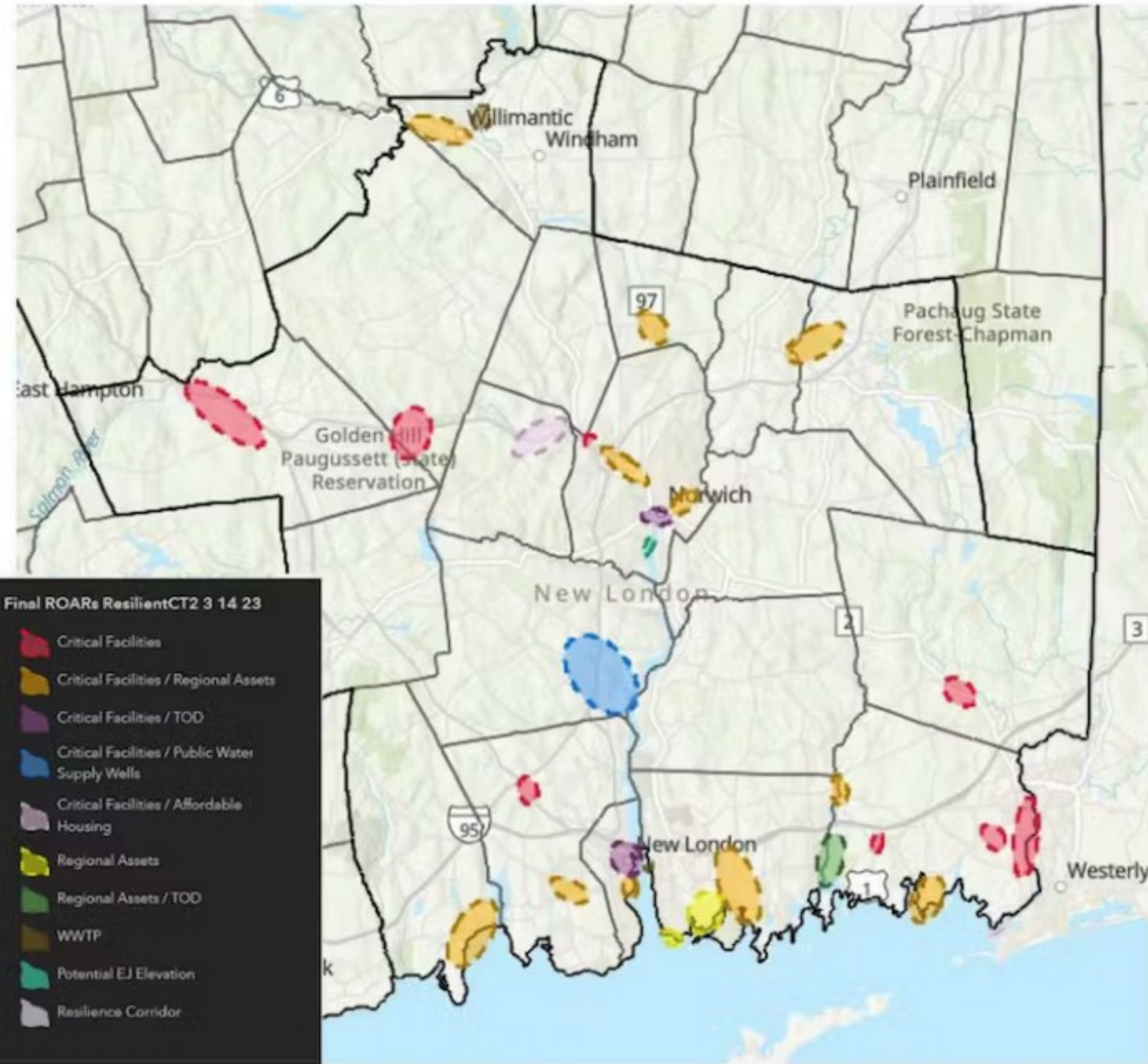
RESILIENT CONNECTICUT 2.0

- CIRCA initiated Resilient Connecticut in Fairfield and New Haven Counties 2018 – 2023.
- Program expanded to New London, Middlesex, Hartford, and Tolland Counties via RiverCOG, SCCOG, and CRCOG in 2022-2023.
- Goals are to continue (1) supporting development of a statewide resilience project pipeline and (2) increasing coordination across municipal, regional, and state planning.
- Data and mapping tools to support project development include a new Statewide Climate Change Vulnerability Index (CCVI) for flooding and heat, additional zones of shared risk, and identification of additional resilience opportunity areas.





RESILIENT CONNECTICUT 2.0



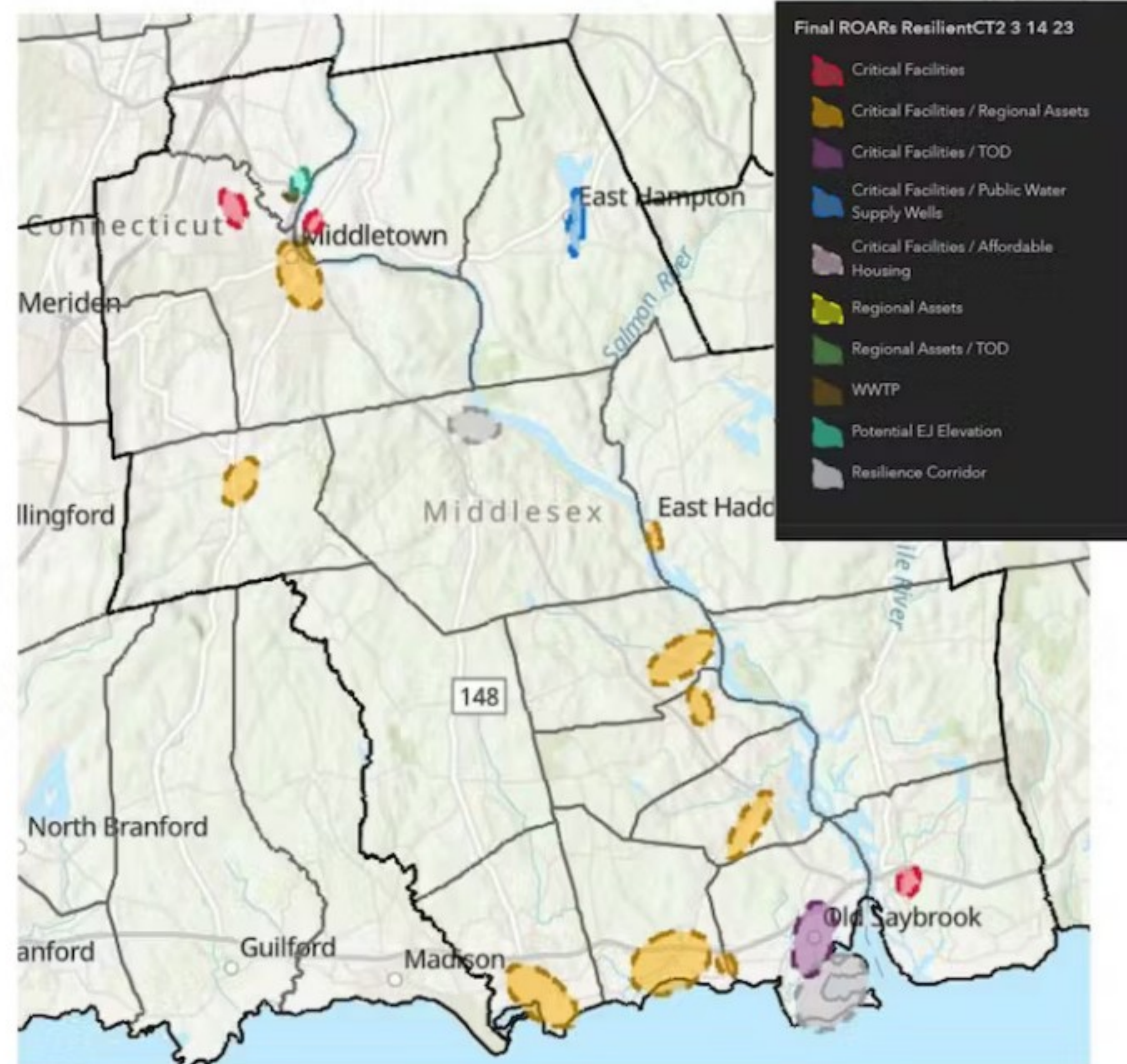
	>10 Critical Facilities or Regional Assets
	6-10 Critical Facilities or Regional Assets
	3-5 Critical Facilities or Regional Assets
	1-2 Critical Facilities or Regional Assets
	Critical Facilities or Regional Assets not present

Potential Climate Adaptation and Resilience Opportunity Areas in Southeastern Connecticut Draft: March 15, 2023



ROAR Name	Location	These are some of the assets "counted" to identify ROARs. Many were provided by SCCOG in a GIS later, while some assets and resources were taken from other lists and maps. See the reverse side of this sheet for a key.									
What is a ROAR? A ROAR is a complex climate adaptation and Resilience Opportunity Area with potentially unmet needs related to two climate change threats: flooding and extreme heat. Each of these ROARs is generally positioned where flood vulnerability is moderate to high and heat vulnerability is moderate to high.	These are the primary municipalities where the ROARs are located. Some of the ROARs span two municipalities.	Critical Facilities	Regional Assets	Historic Resources	Wastewater Treatment Plants	Existing Affordable Housing	Transit Oriented Development	Building Elevations in EJ Flood Zones	"Resilient Corridor" Potential	Septic Systems	Public Water Supply Wells
Willimantic Downtown	Windham										
Downtown New London	New London										
Fitchville	Bozrah										
Uncasville	Montville										
Jewett City	Jewett City and Griswold										
Poquonock Bridge	Town of Groton										
Stonington Borough	Stonington Borough										
Civic Triangle	Waterford										
North Stonington	North Stonington										
Baltic	Sprague										
Downtown Norwich	Norwich										
Mystic	Towns of Groton and Stonington										
Norwichtown	Norwich										
High School Area	Town of Stonington										
Niantic	East Lyme										
Pawcatuck	Town of Stonington										
Greenville	Norwich										
Colchester	Colchester										
Southern Lebanon	Lebanon										
Beach and Avery Point	City of Groton										
City of Groton WWTP	City of Groton										
Fort Trumbull	New London										
Airport	Town of Groton										
Old Mystic	Towns of Groton and Stonington										
Yantic	Norwich										
Willimantic WWTP	Windham										
Route 85 and DPW	Waterford										
Aquarion WTP	Town of Stonington										
Thamesville	Norwich										

RESILIENT CONNECTICUT 2.0



	>10 Critical Facilities or Regional Assets
	6-10 Critical Facilities or Regional Assets
	3-5 Critical Facilities or Regional Assets
	1-2 Critical Facilities or Regional Assets
	Critical Facilities or Regional Assets not present

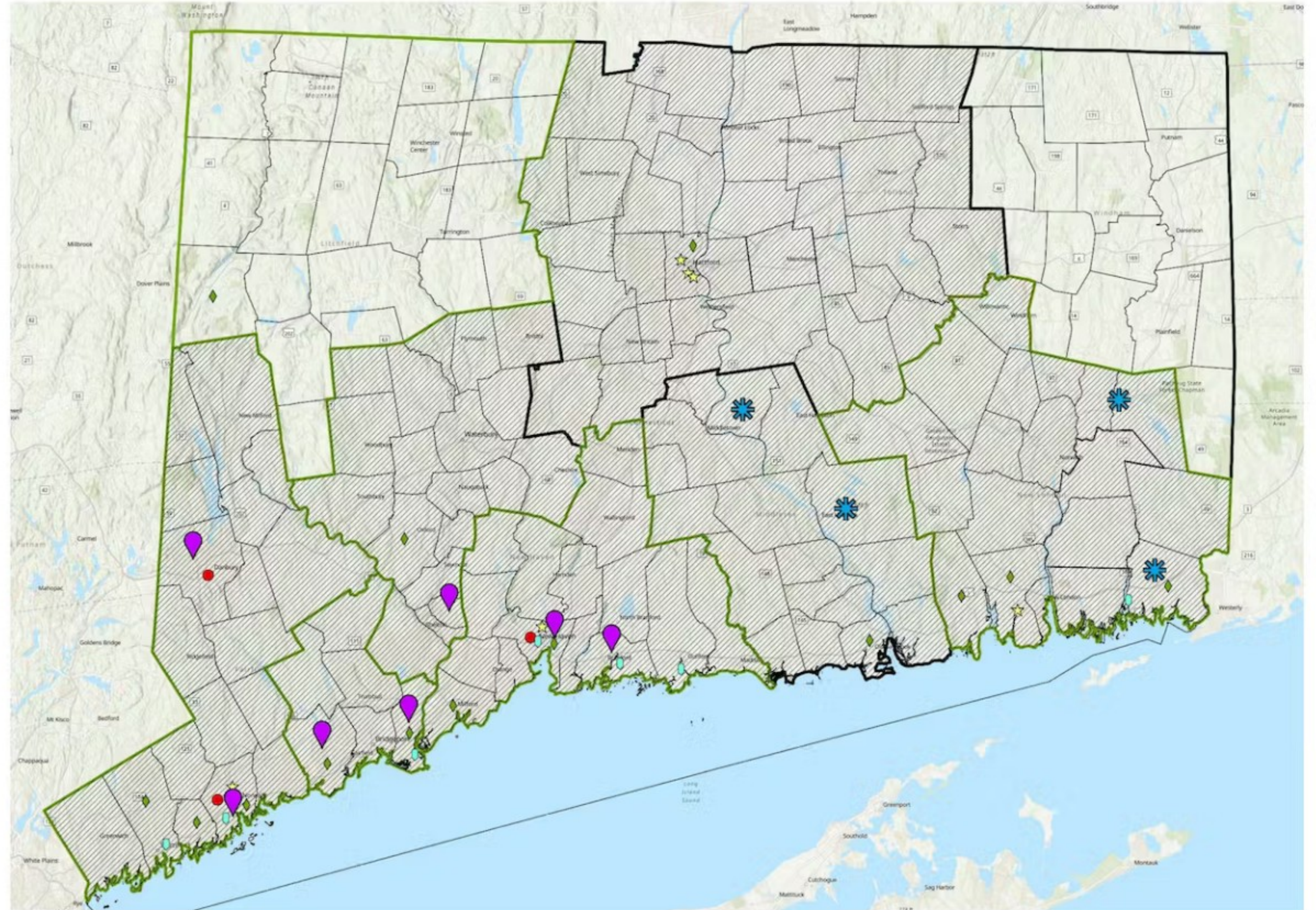
Potential Climate Adaptation and Resilience Opportunity Areas in the Lower Connecticut River Valley Region

Draft: March 29, 2023

ROAR Name	Location	These are some of the assets "counted" to identify ROARs. Many were provided by RiverCOG in a GIS layer, while some assets and resources were taken from other lists and maps. See the reverse side of this sheet for a key.									
What is a ROAR? A ROAR is a complex climate adaptation and Resilience Opportunity Area with potentially unmet needs related to two climate change threats: flooding and extreme heat. Each of these ROARs is generally positioned where flood vulnerability is moderate to high and heat vulnerability is moderate to high.	These are the primary municipalities where the ROARs are located.	Critical Facilities	Regional Assets	Historic Resources	Wastewater Treatment Plants	Existing Affordable Housing	Transit Oriented Development	Building Elevations in EJ Flood Zones	"Resilient Corridor" Potential	Septic Systems	Public Water Supply Wells
Downtown to South Farms	Middletown										
Old Saybrook Center/TOD	Old Saybrook										
Portland Center	Portland										
Pickett Lane Area	Durham										
Clinton Center	Clinton										
Westbrook Center	Westbrook										
Mile Lane	Middletown										
Pocotopaug Creek	East Hampton										
Chester Center	Chester										
East Haddam Center	East Haddam										
Deep River Center	Deep River										
Old Lyme Center	Old Lyme										
Plains Road Corridor	Essex										
Higganum	Haddam										
River Road Area	Cromwell										
Mattabassett District WWTP	Cromwell										
Portland WWTP	Portland										
Route 154 Loop	Old Saybrook										

RESILIENT CONNECTICUT 2.0

- The seven pilot projects (“Phase III”) of Resilient Connecticut 1.0 are the purple icons in southwest Connecticut
- The upcoming projects under Resilient Connecticut 2.0 Phase III are the blue icons in the RiverCOG and SCCOG regions



INTRODUCTION TO EACH PROPOSED PROJECT

- The four projects will attempt to address different kinds of flood risks
- Two of the four will also address extreme heat

	Coastal Flood Adaptation	Riverine Flood Adaptation	Stormwater Flood Adaptation	Extreme Heat Adaptation
Portland			X	X
East Haddam		X		
Mystic/Stonington	X		X	
Jewett City		X		X



How to Participate

RESILIENT PORTLAND

Flood and Heat Risk Reduction

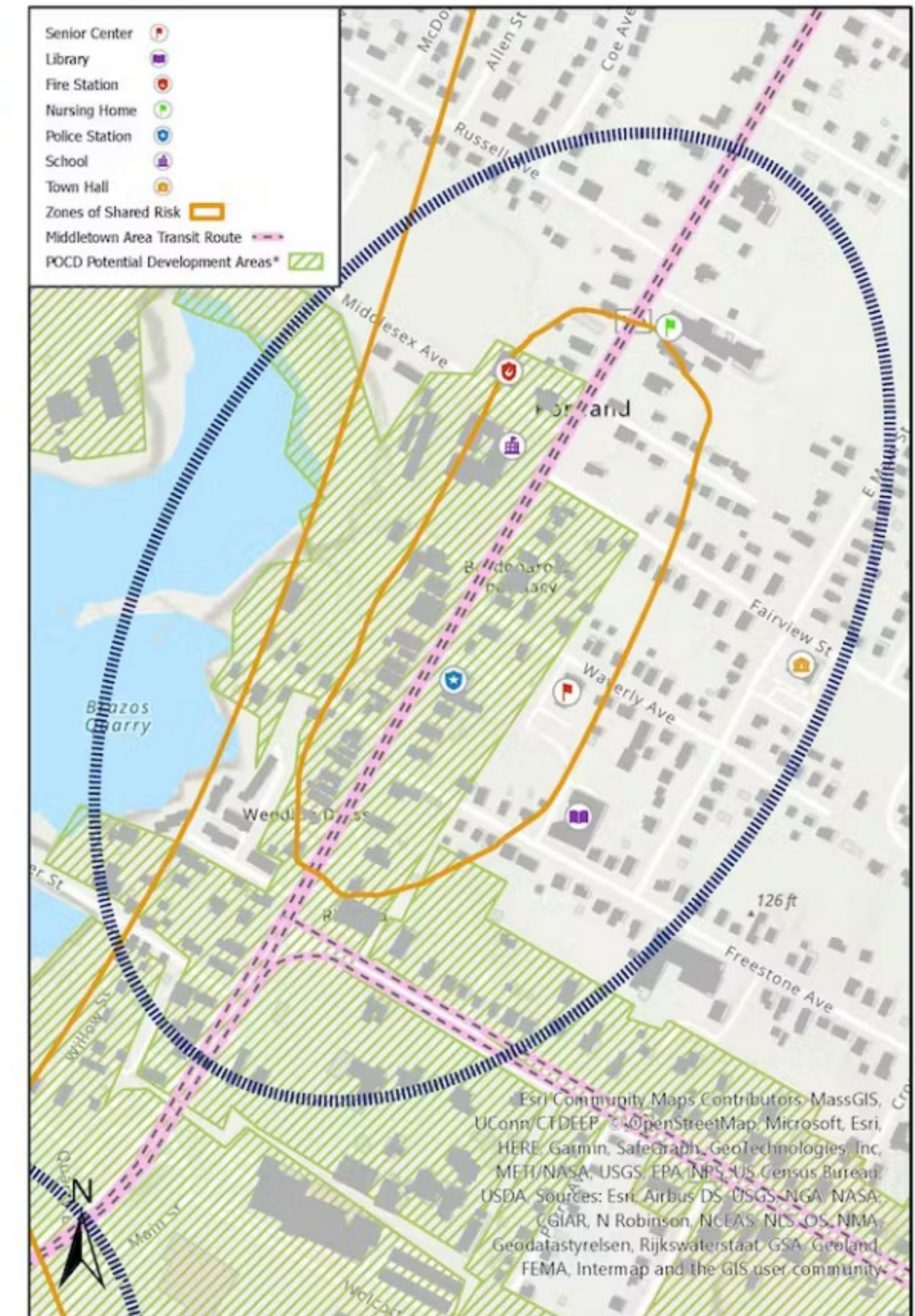
- Three critical facilities are affected by flooding from stormwater – the police station, senior center, and library
- The senior center is the food pantry and the Town's primary cooling center
- Imagine a very intense precipitation event occurring while the cooling center is occupied

Resilient Connecticut 2.0 Phase II

Regional Adaptation/Resilience Opportunity Areas

Name: Portland Critical Facilities
Location: Portland

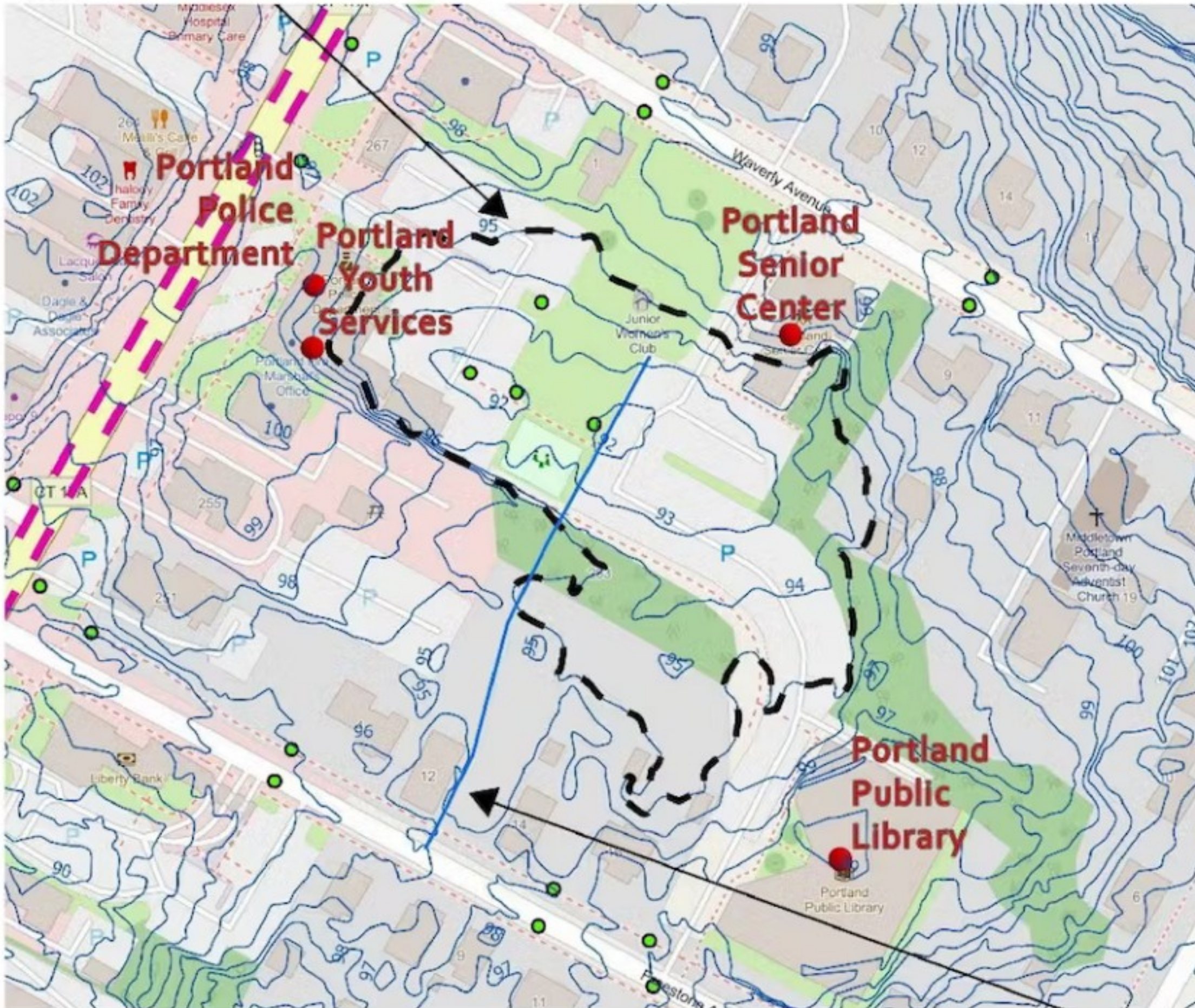
Consideration	Characteristics of Area				
Flood Vulnerability	●	●	●		
Heat Vulnerability	●	●	●	●	●
Social Vulnerability	●	●	●		
<p>Three of Portland's critical facilities and associated parking lots -- the police department, the library, and the senior center -- experience shallow pluvial flooding after intense precipitation events. The senior center is the cooling center, warming center, and public food pantry for Portland. The area that floods is a topographic depression located on the east of Main Street and the south side of Waverly Avenue. Middletown Area Transit bus access is located on Main Street, Route 66, and High Street. Resiliency solutions for the town could have key co-benefits to advance cooling opportunities along the pedestrian accessways from transit lines to the senior center.</p>					
<p>Portland Senior Center Portland Police Department Portland Public Library Portland Town Hall</p>		<p>Portland Care & Rehab Center Portland Company 1 Station Brownstone Intermediate School</p>			



*Areas identified in POCDs as supporting development, redevelopment, or other types of economic activity

RESILIENT PORTLAND

Dashed line is area of flooding



Blue line is a potential buried watercourse heading to the south

RESILIENT PORTLAND



RESILIENT PORTLAND



Typical heavy rain event; photo from Town of Portland

Dashed line is area of flooding



Blue line is a potential buried watercourse heading to the south

RESILIENT PORTLAND



What would you do to make the senior center/food pantry/cooling center more resilient? People may be inside the facility during intense precipitation events.



Please rank the following choices

RESILIENT PORTLAND



1st



Drainage improvements

2nd



Choose a different facility for these important uses

3rd



Flood barriers at openings

4th



Move usable spaces higher inside the building

RESILIENT PORTLAND

What would you do to make the police station more resilient? Police need access during intense precipitation events.



Please rank the following choices

RESILIENT PORTLAND



1st



Drainage improvements

2nd



Flood barriers at openings

3rd



Move the police station

RESILIENT PORTLAND



What would you do to make the library more resilient? People may be inside the facility during intense precipitation events.



Please rank the following choices

RESILIENT PORTLAND



1st



Drainage improvements

2nd



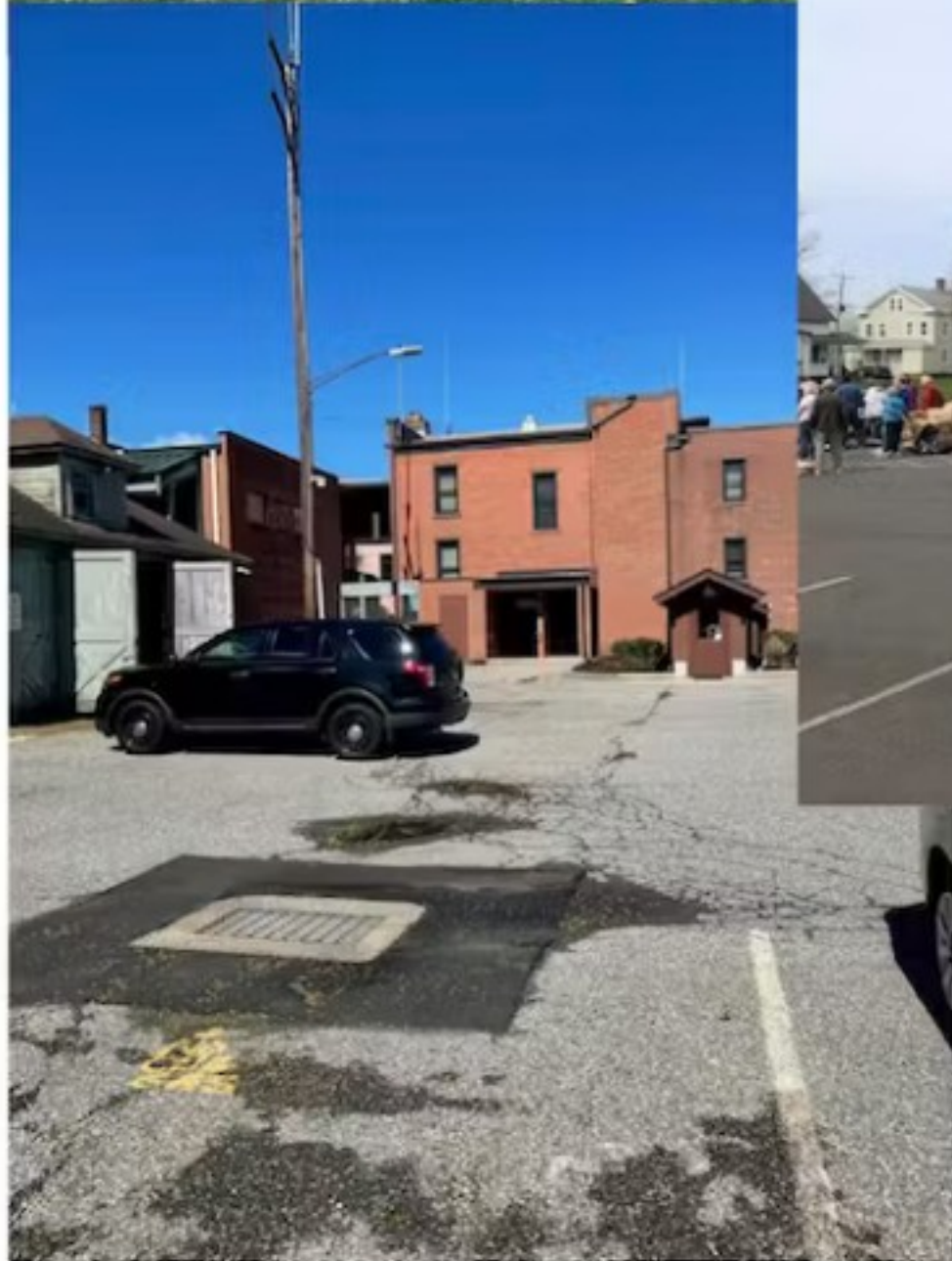
Flood barriers at openings

3rd



Do nothing; this is a library

RESILIENT PORTLAND



Thinking about the three facilities together, what should be done to make them more resilient?

Please rank the following choices

RESILIENT PORTLAND



1st



Drainage improvements

2nd



Floodproof everything

3rd



Move everything

RESILIENT EAST HADDAM







Flood Risk Reduction

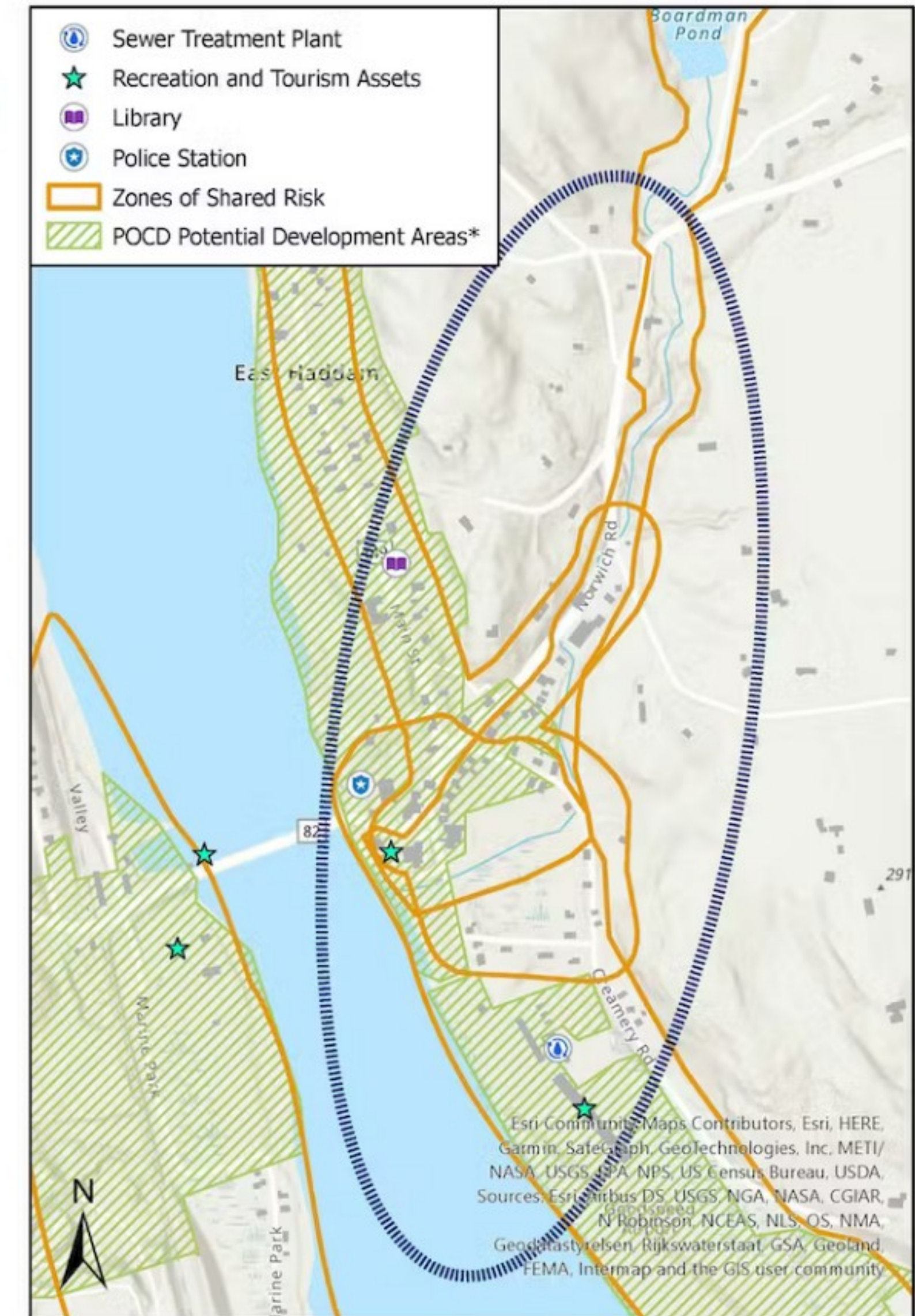
- Succor Brook corridor has a flashy nature and has flooded nonresidential buildings used by Goodspeed
- The Actor Housing development (constructed 2011) has flood risk but has not yet flooded
- The Town's WWTP is at risk of flooding from the Connecticut River

Resilient Connecticut 2.0 Phase II

Regional Adaptation/Resilience Opportunity Areas

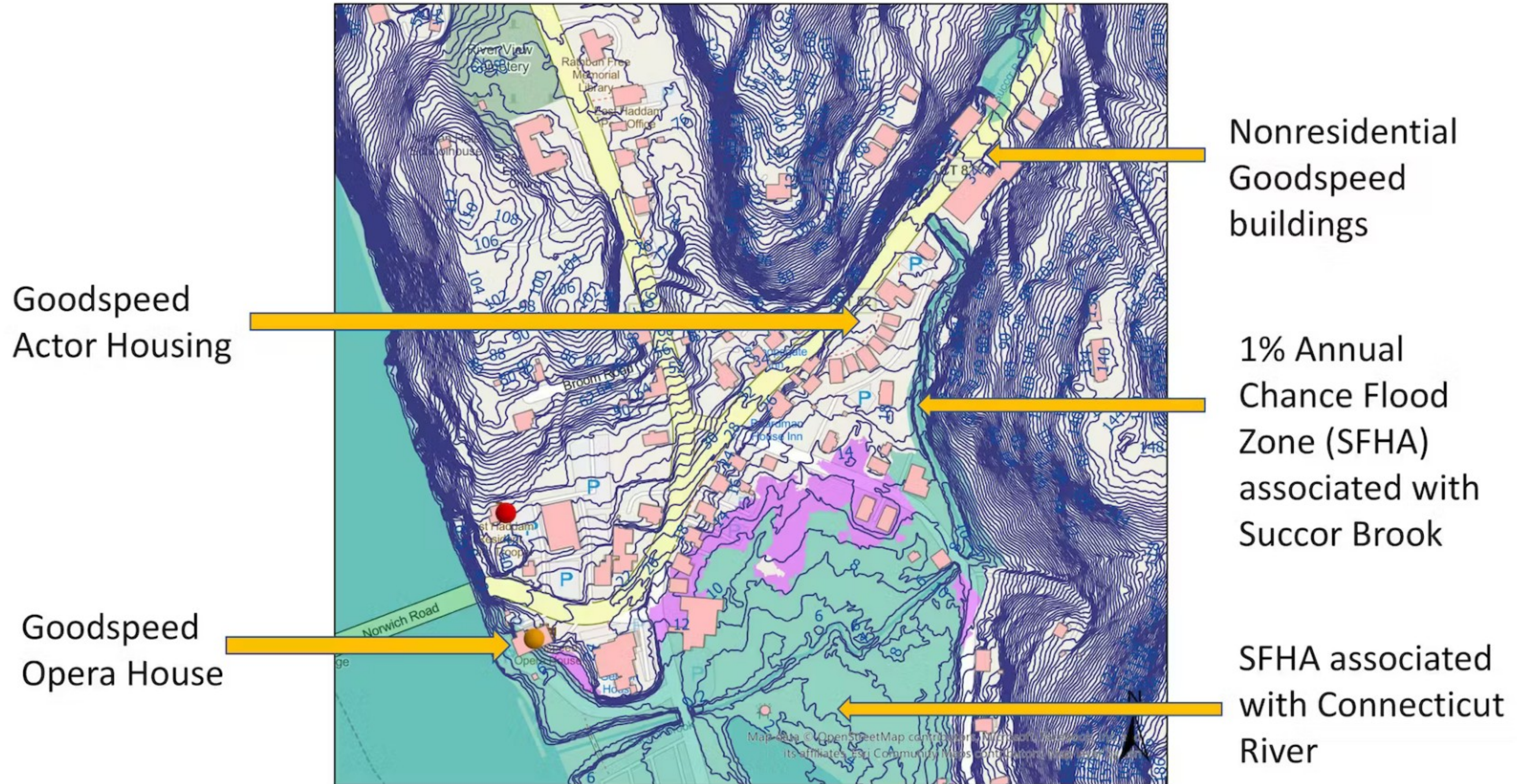
Name: Goodspeed / Succor Brook
Location: East Haddam

Consideration	Characteristics of Area				
Flood Vulnerability					
Heat Vulnerability					
Social Vulnerability					
<p>East Haddam residents have identified flooding from Succor Brook as a persistent concern for the center of town. This brook periodically overtops its banks, and past flash floods have impacted structures associated with the Goodspeed Opera House, including the actor housing, library of musical theater, and rehearsal studio. The Goodspeed is a regional asset that brings 80,000 - 100,000 visitors to East Haddam every year. Additional community assets in this area include the town's police department, sewer treatment plant, and public library, the latter of which can be used as a cooling center when needed.</p>					
Goodspeed Opera House Goodspeed Airport East Haddam Police Department		Rathbun Free Memorial Library East Haddam Sewer Treatment Plant			



*Areas identified in POCDs as supporting development, redevelopment, or other types of economic activity

RESILIENT EAST HADDAM



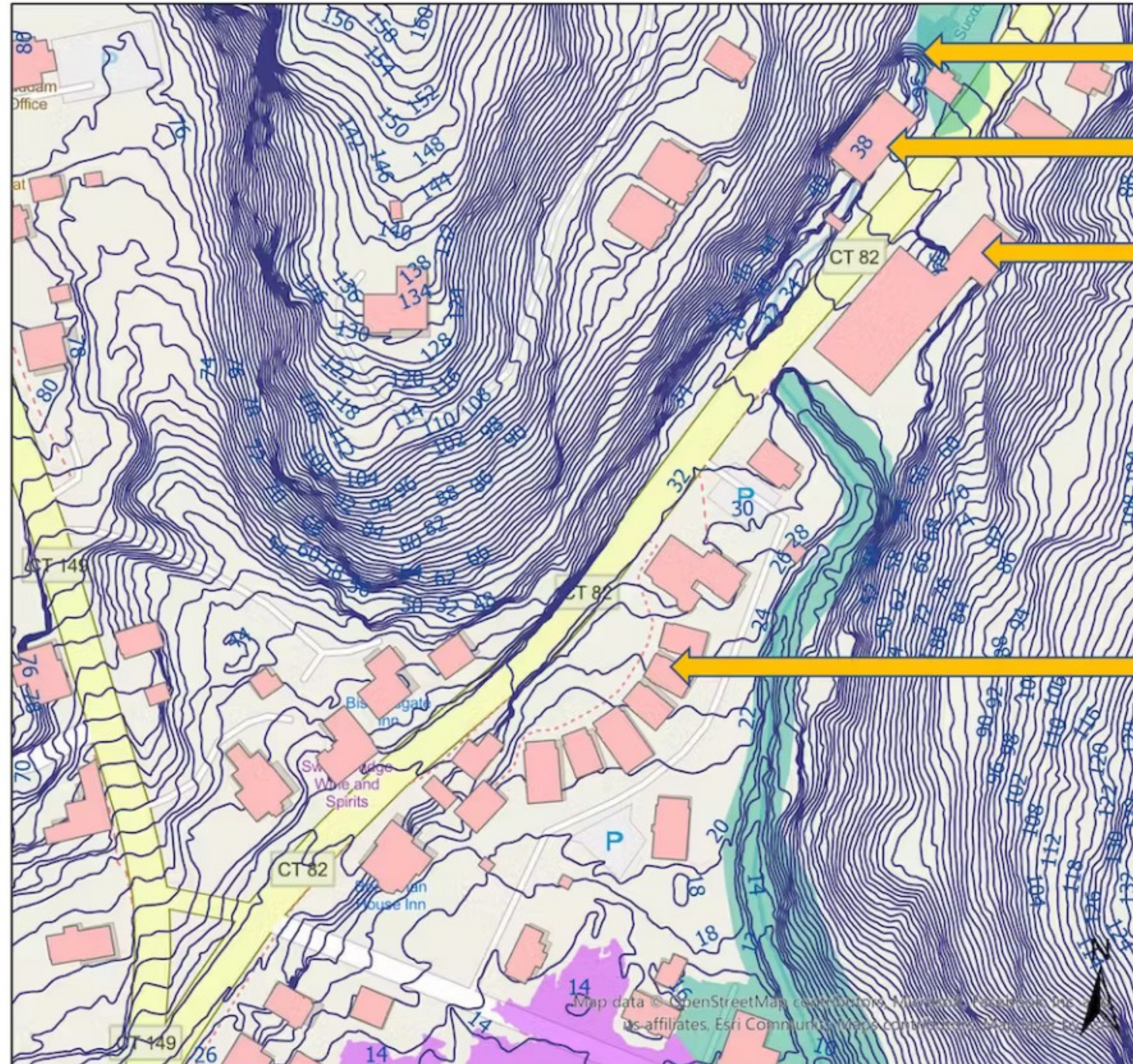
RESILIENT EAST HADDAM

Did you know...

- Actors' unions set maximum distances between performing spaces, housing, and rehearsal spaces?

and

- East Haddam center doesn't have much excess space!



Old dam

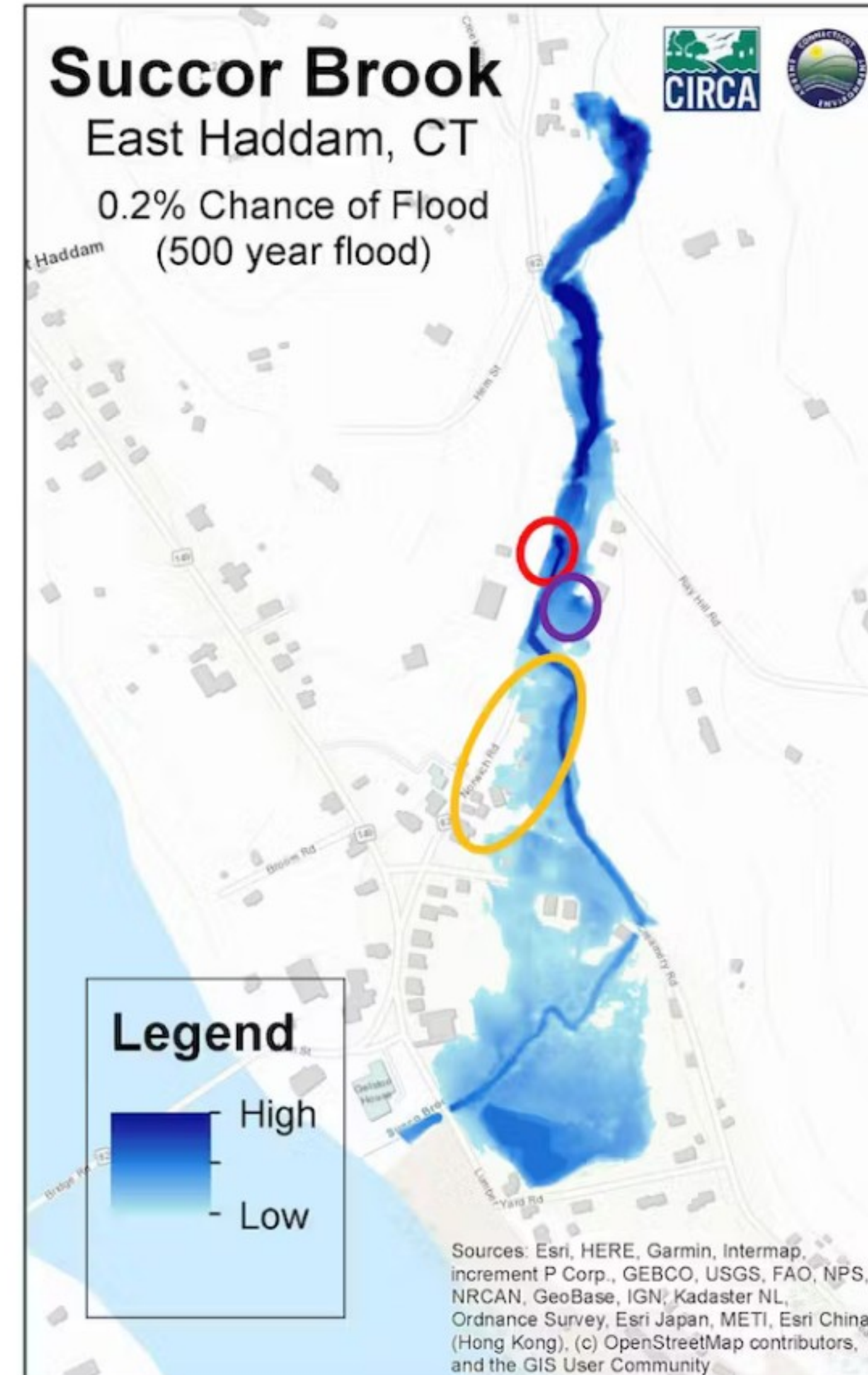
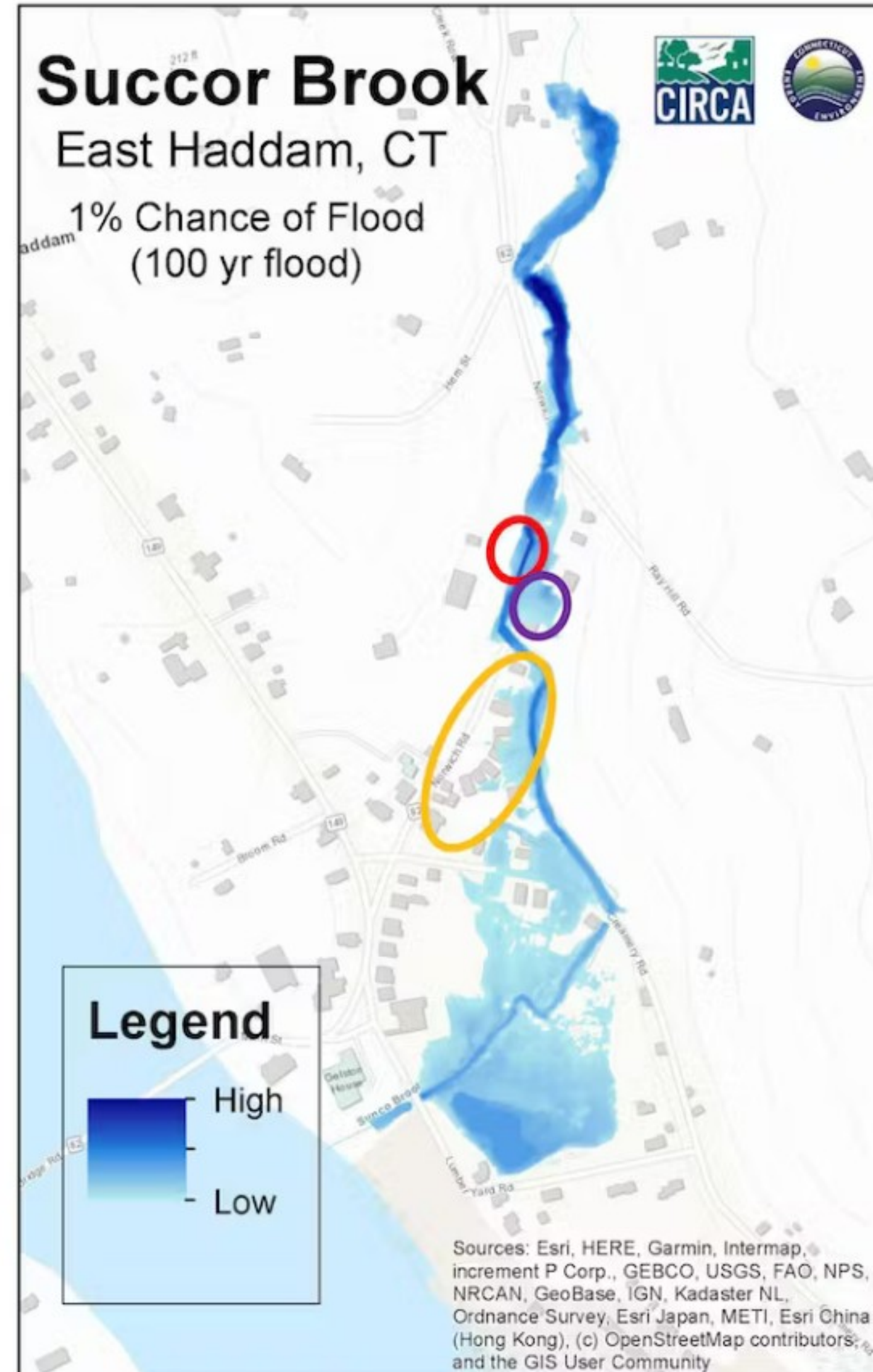
Nonresidential
Goodspeed
buildings

Goodspeed
Actor Housing

RESILIENT EAST HADDAM

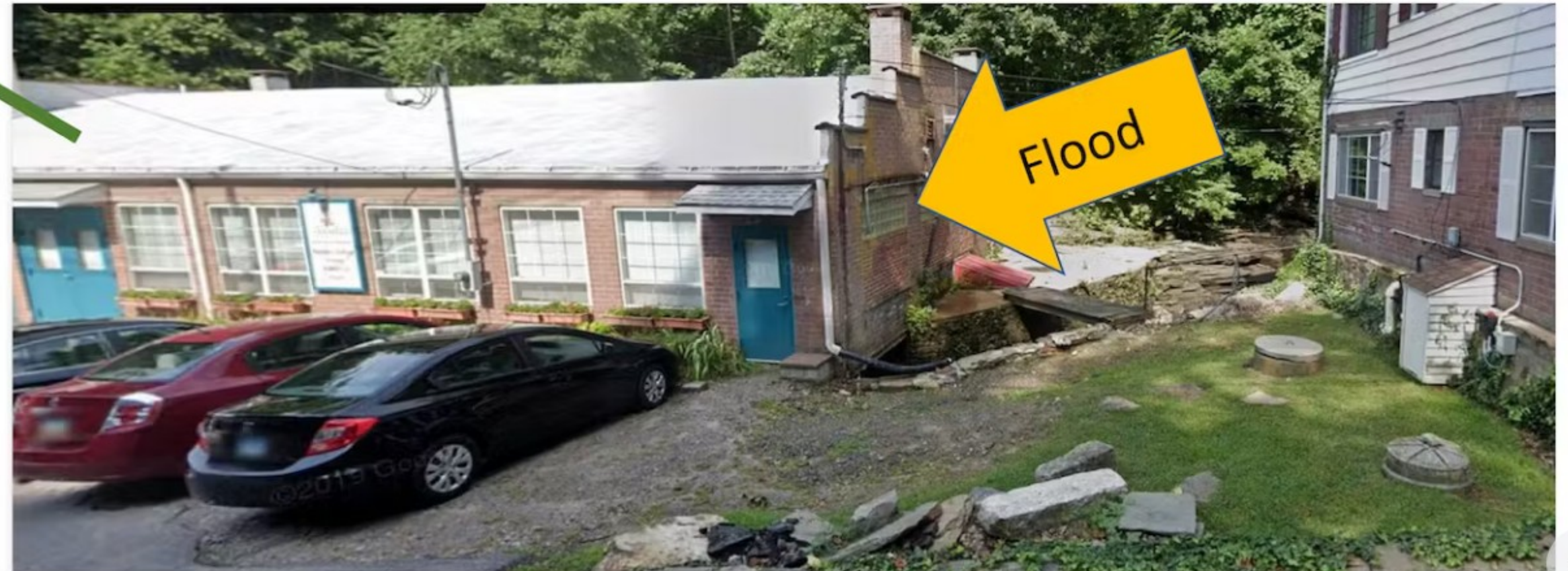
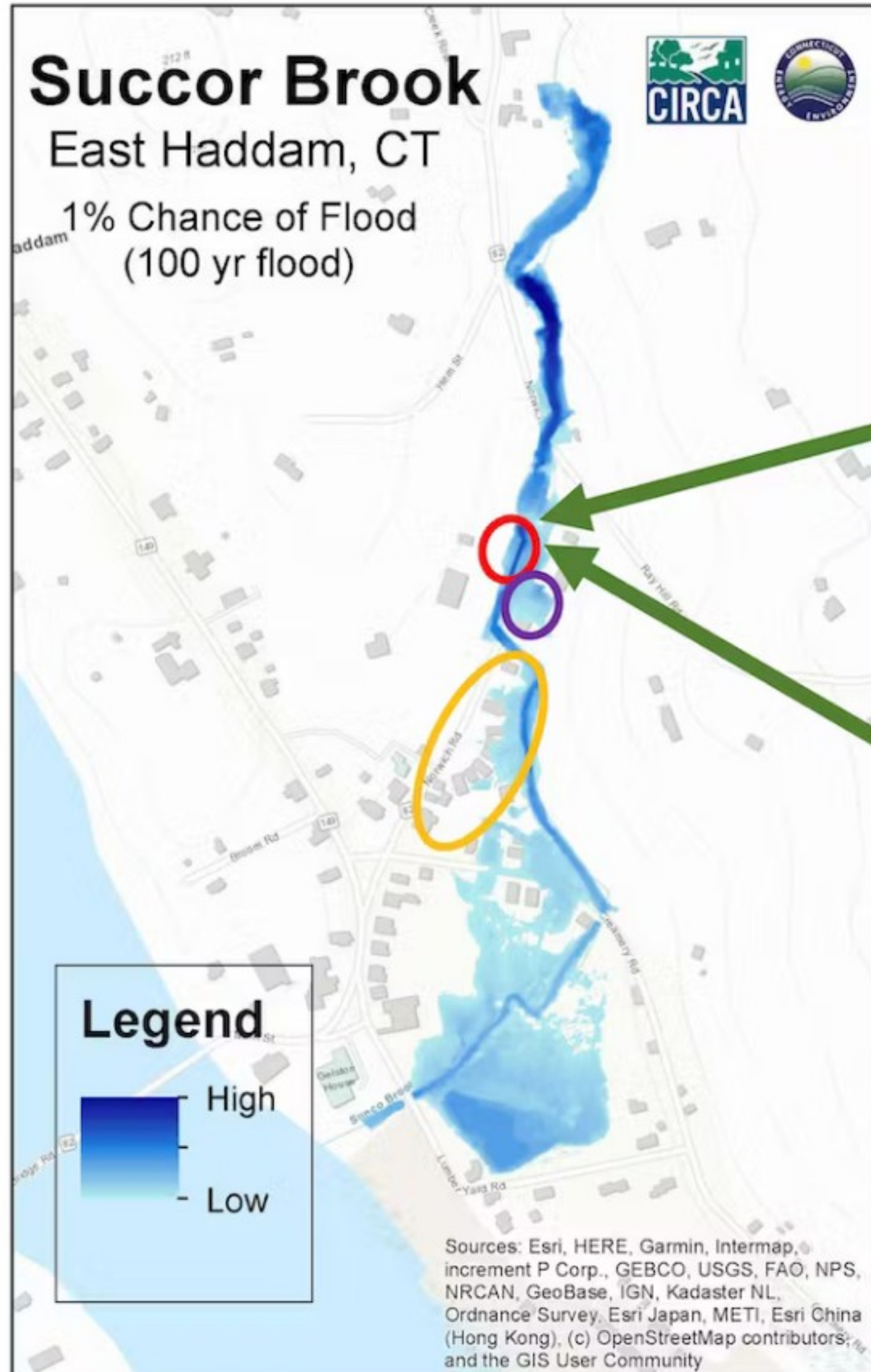
Buildings that have flooded or nearly flooded in recent years:

- Rehearsal Hall 
- Offices and Administration 
- Housing 



- CIRCA developed HEC-RAS modeling and inundation mapping for Succor Brook, since the SFHA is an A zone
- The lateral extent of flood risk is not significantly different when comparing the 1% to the 0.2% chance flood events

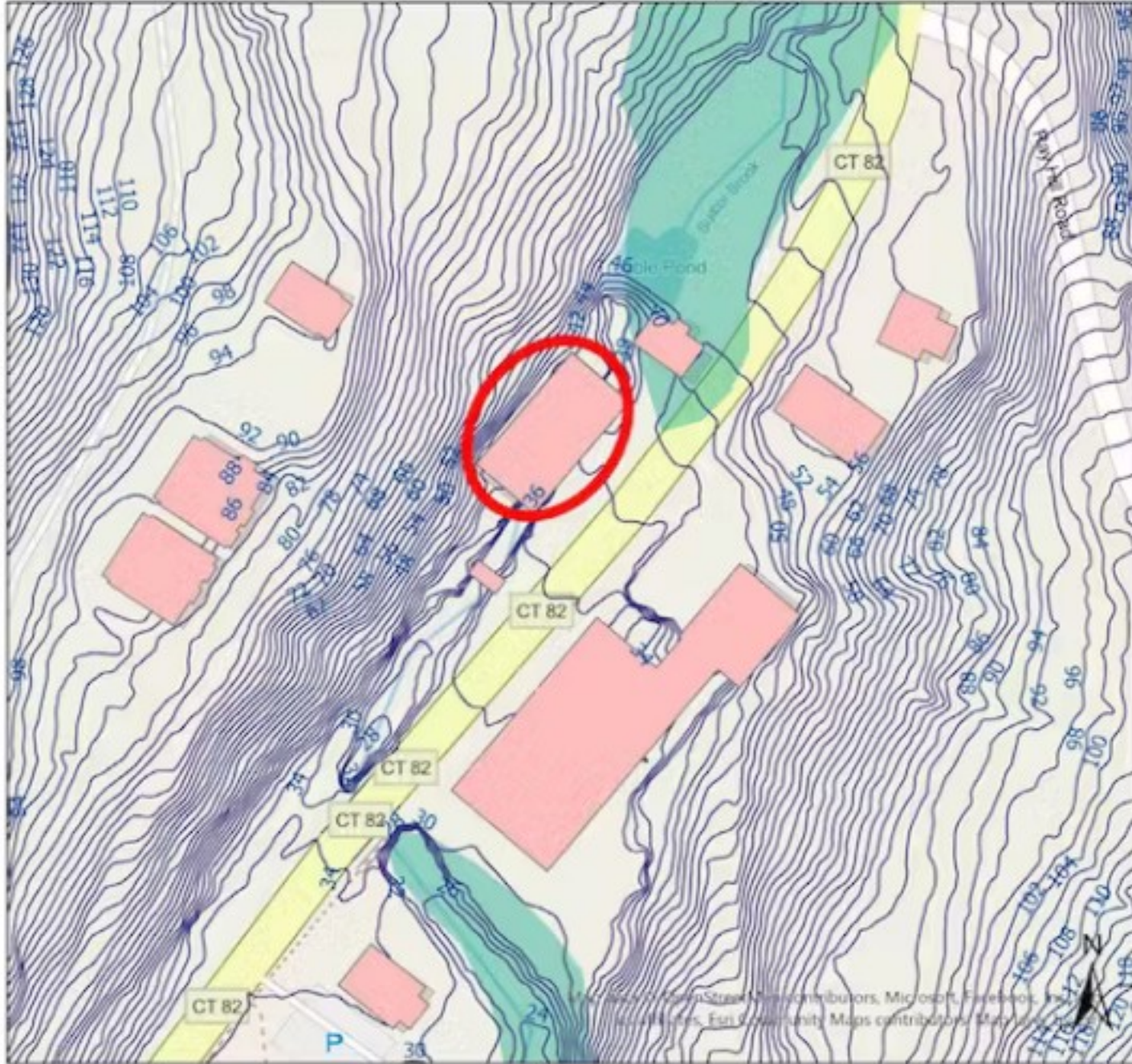
RESILIENT EAST HADDAM



RESILIENT EAST HADDAM



RESILIENT EAST HADDAM

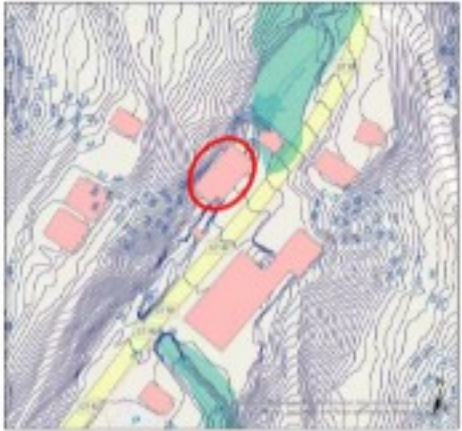


What would you do to make the rehearsal hall more resilient, or make the use (rehearsing) more resilient? The actors cannot walk further than their union contracts allow.



Please rank the following choices

RESILIENT EAST HADDAM



1st



Acquire and demolish the building while finding a new rehearsal space

2nd



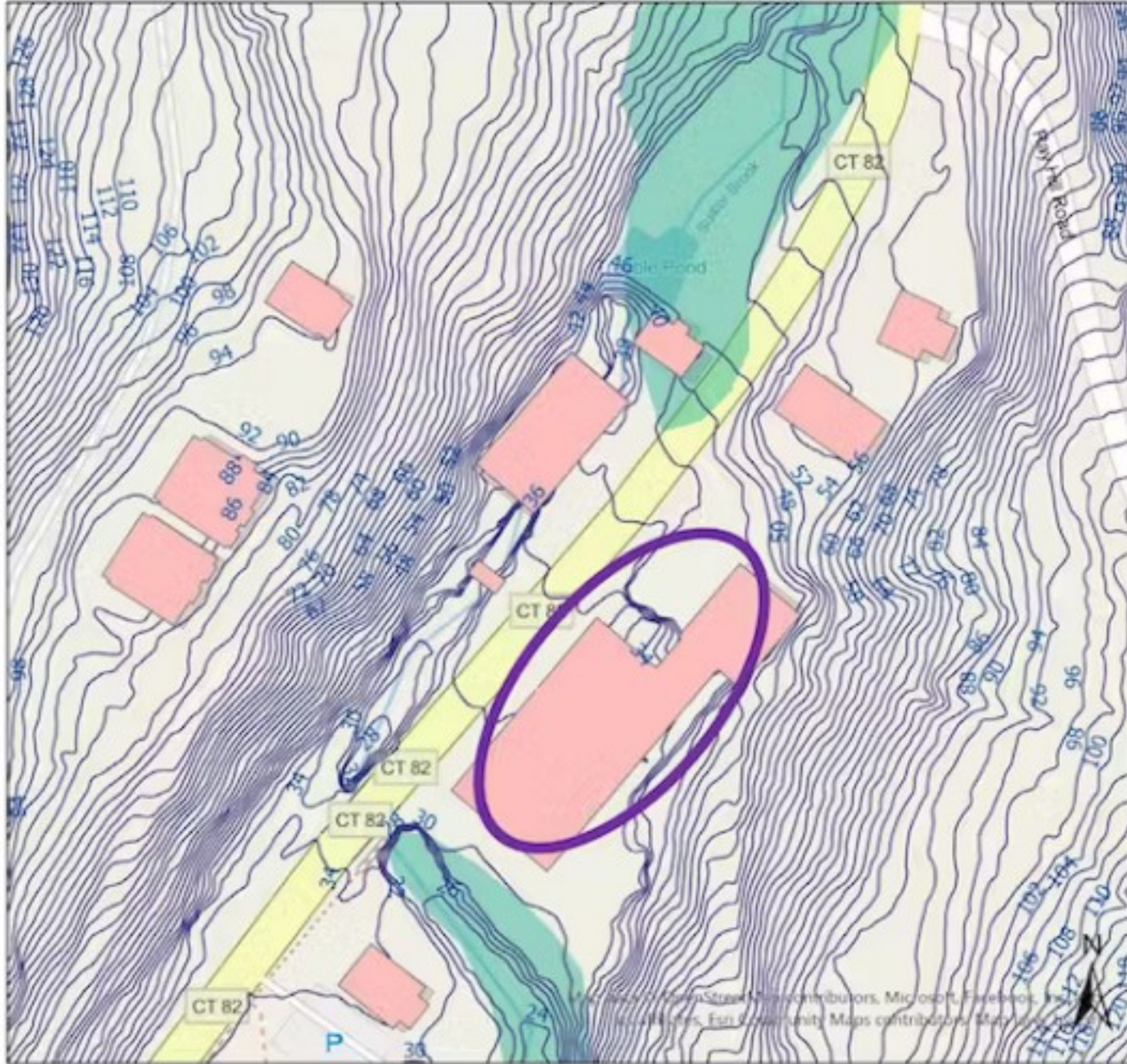
Floodproof the entire building

3rd



Do nothing; musicals are not my thing

RESILIENT EAST HADDAM

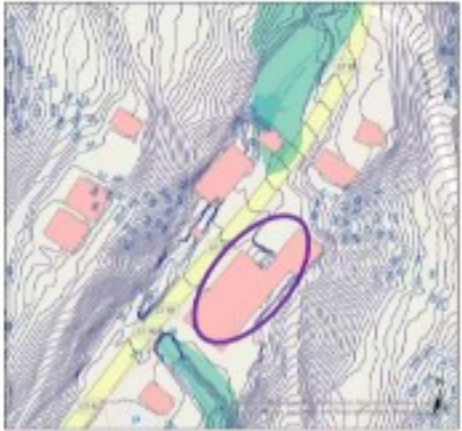


What would you do to make the office building more resilient, or make the uses (administration, facilities management) more resilient?



Please rank the following choices

RESILIENT EAST HADDAM



1st



Combination of grading and floodproofing

2nd



Regrade the area

3rd



Flood barriers at openings

RESILIENT EAST HADDAM



What would you do to make the actor housing more resilient? The actors cannot walk further than their union contracts allow.



Please rank the following choices

RESILIENT EAST HADDAM



1st



Create floodplain enhancements to reduce flood elevations

2nd



A combination

3rd



Elevate the cottages

4th



Move the cottages

RESILIENT MYSTIC/STONINGTON

Flood Risk Reduction

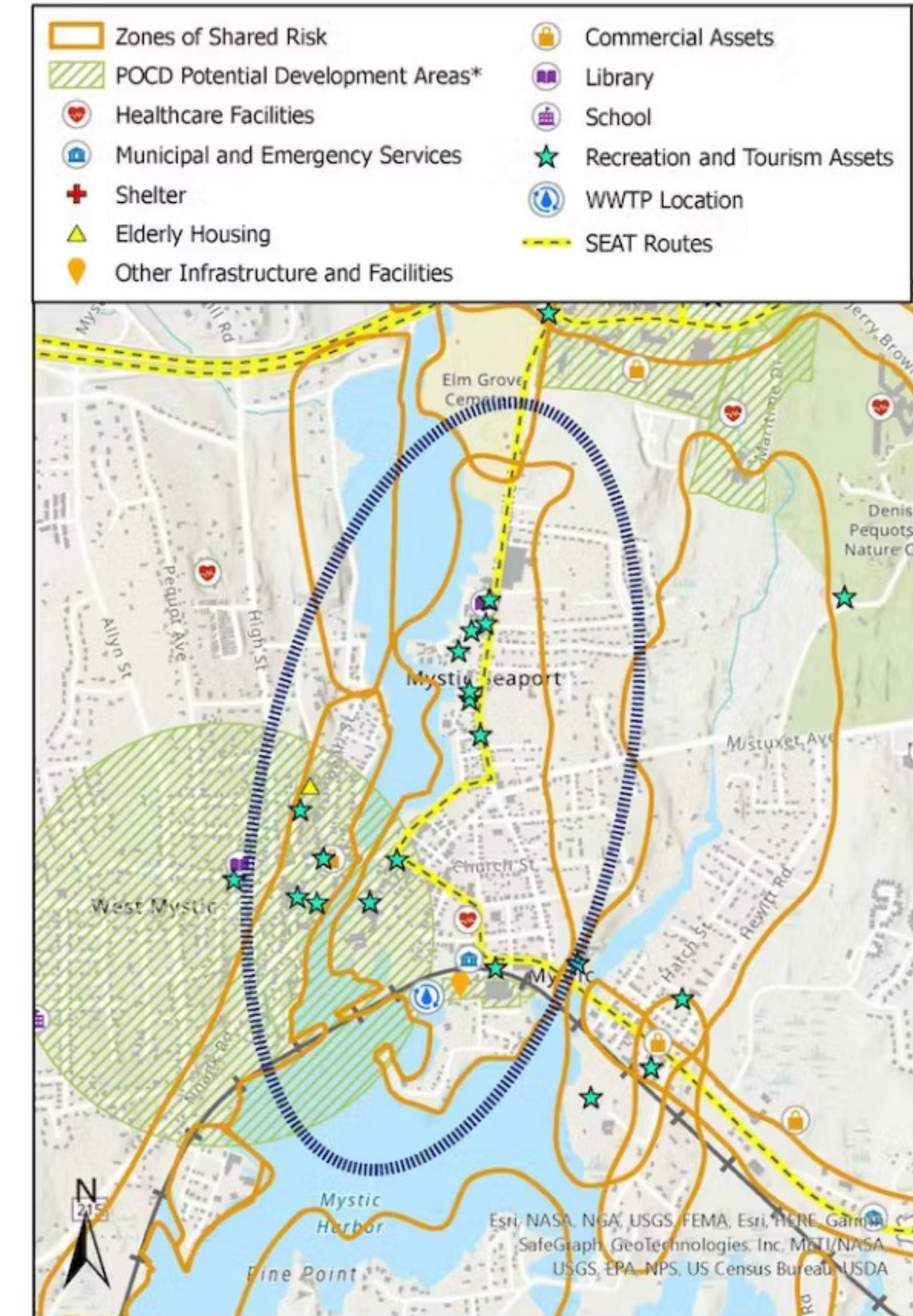
- Numerous regional assets, critical facilities, key roads, and historic and cultural resources have coastal flood risk; these include:
 - Mystic Seaport*
 - Mystic Fire Company*
 - Town WWTP*
 - Train Station*
- Sea level rise will increase the incidence and depth of flooding

Resilient Connecticut 2.0 Phase II

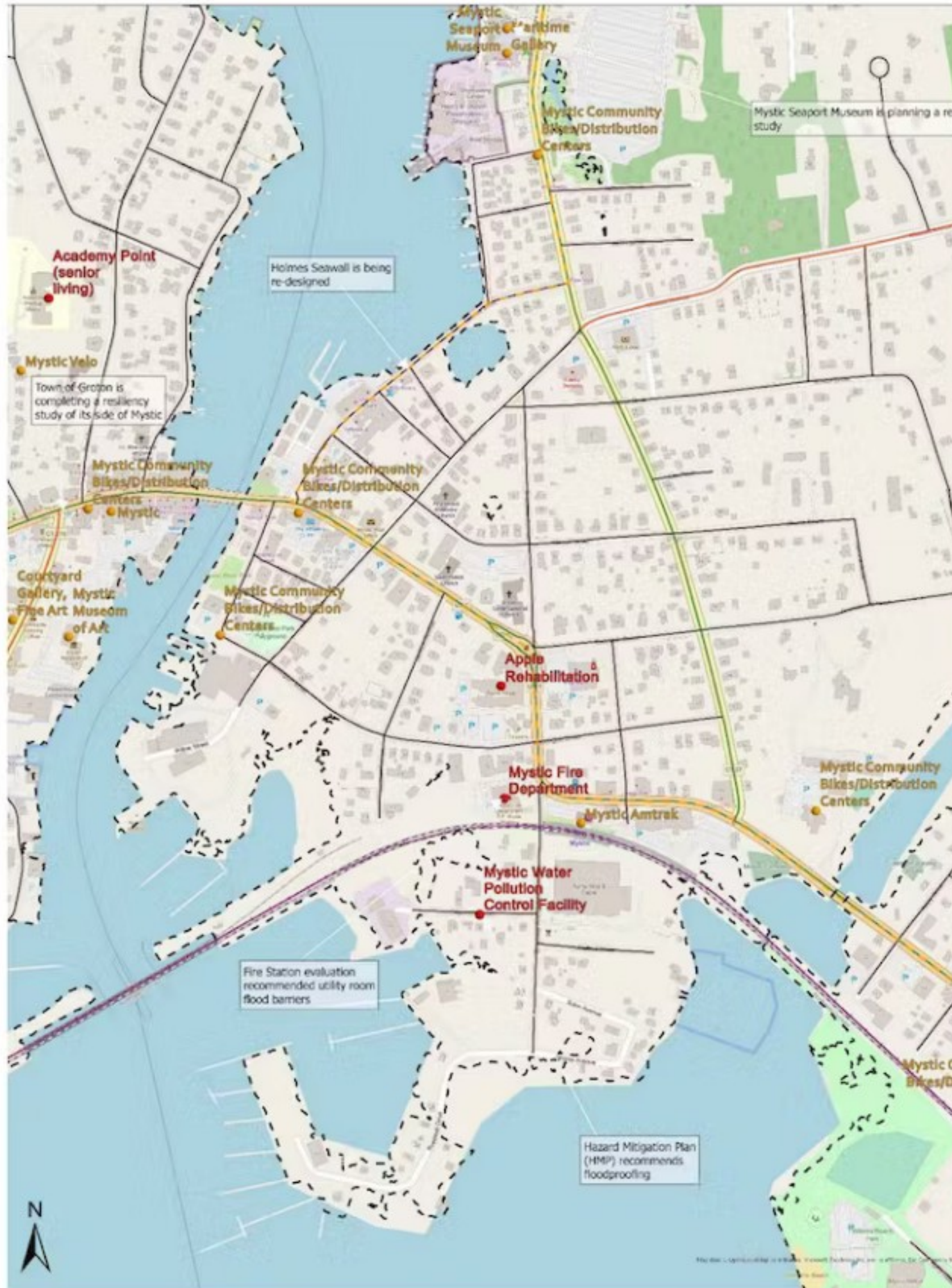
Regional Adaptation/Resilience Opportunity Areas

Name: Mystic
Location: Stonington

Consideration	Characteristics of Area				
Flood Vulnerability					
Heat Vulnerability					
Social Vulnerability					
<p>The Mystic section of Stonington experiences coastal flood inundation from king tides and storm surges. Over time, flooding is expected to increase in frequency and duration. Inundation has impacted and/or isolated private and public properties, transportation infrastructure, transit lines, critical facilities such as the Mystic Fire Company, historic and cultural resources, and major economic assets such as Mystic Seaport Museum. Inherent challenges include the fact that historic structures may be impossible to elevate, the geometry of the road network may complicate elevations of individual road surfaces, and critical facilities such as the Mystic Fire Company and the wastewater treatment plant could become isolated in a flood. Meanwhile, new developments are elevated or floodproofed, making them relatively resilient without addressing isolation risks. Extreme heat management is a concern in Mystic. The cooling centers for the Town of Stonington are in the high school and police station, several miles from Mystic. If cooling centers are needed during a flood event, roads may be impassable and people may not be able to reach them. Options for extreme heat management in Mystic may be limited, and the community may wish to consider methods of reducing the causes of heating as well as methods of providing respite from heat.</p>					
<p>Mystic Seaport Museum Mystic Seaport Museum Library Mystic Museum of Art</p> <p>Mystic Velo Mystic Amtrak Station Water Pollution Control Facility</p> <p>Academy Point Senior Living Mystic Fire Department Apple Rehab</p>					



RESILIENT MYSTIC/STONINGTON



Pink = 0.2%
flood (FEMA)

Light blue = 1%
flood (FEMA)

Green = 1% flood
(shallow) (CIRCA
flood analysis)

Dark blue = 1% flood
(deep) (CIRCA flood
analysis)

RESILIENT MYSTIC/STONINGTON



12/22/23 Coastal Flood
Event; photos from
CIRCA



RESILIENT MYSTIC/STONINGTON



What would you do to make privately owned buildings more resilient?



Please rank the following choices

RESILIENT MYSTIC/STONINGTON



RESILIENT MYSTIC/STONINGTON



What would you do to make the
Mystic Fire Company Station
more resilient?



Please rank the following choices

RESILIENT MYSTIC/STONINGTON



1st



Flood barriers for internal utility rooms

2nd



Move the Fire Company

3rd



Flood barriers at buildings openings

RESILIENT MYSTIC/STONINGTON



What would you do to make important historic and cultural resources more resilient?



Photos from Mystic Seaport Museum



Please rank the following choices

RESILIENT MYSTIC/STONINGTON



Photos from Mystic Seaport Museum

1st



Combinations of elevations and floodproofing

2nd



Rearrange buildings to take advantage of differences in grade

3rd



All of the above

4th



Tolerate flooding of historic and cultural resources

RESILIENT MYSTIC/STONINGTON



What would you
do to make the
wastewater
treatment plant
more resilient?

Please rank the following choices

RESILIENT MYSTIC/STONINGTON



1st



Flood protection system around the property

2nd



Floodproof individual components

3rd



Eliminate the facility by expanding either the Borough or Pawcatuck treatment facility

4th



Relocate the facility

RESILIENT JEWETT CITY

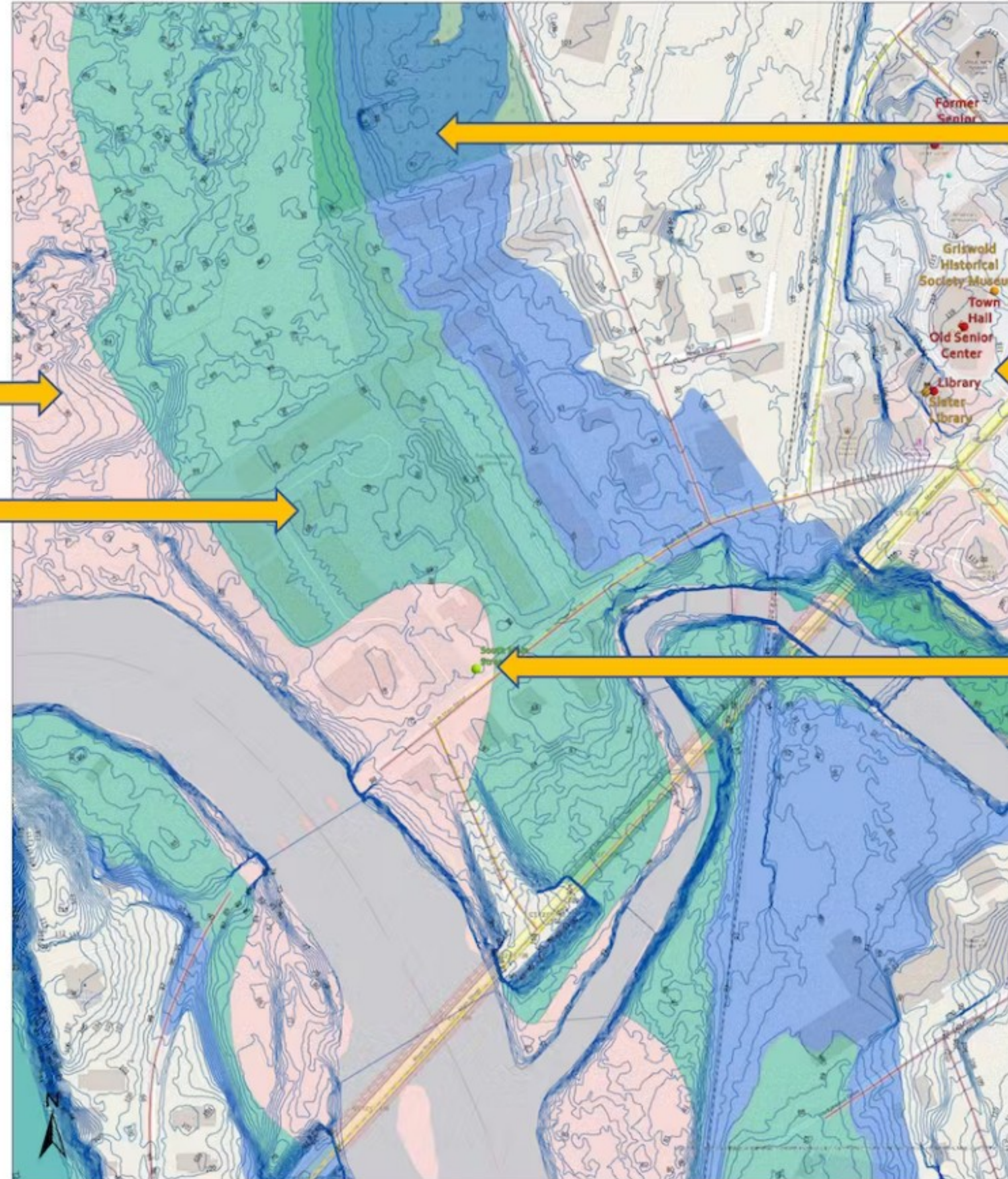
Floodway (pink)

1% Annual
Chance Flood
Zone (SFHA) (teal)

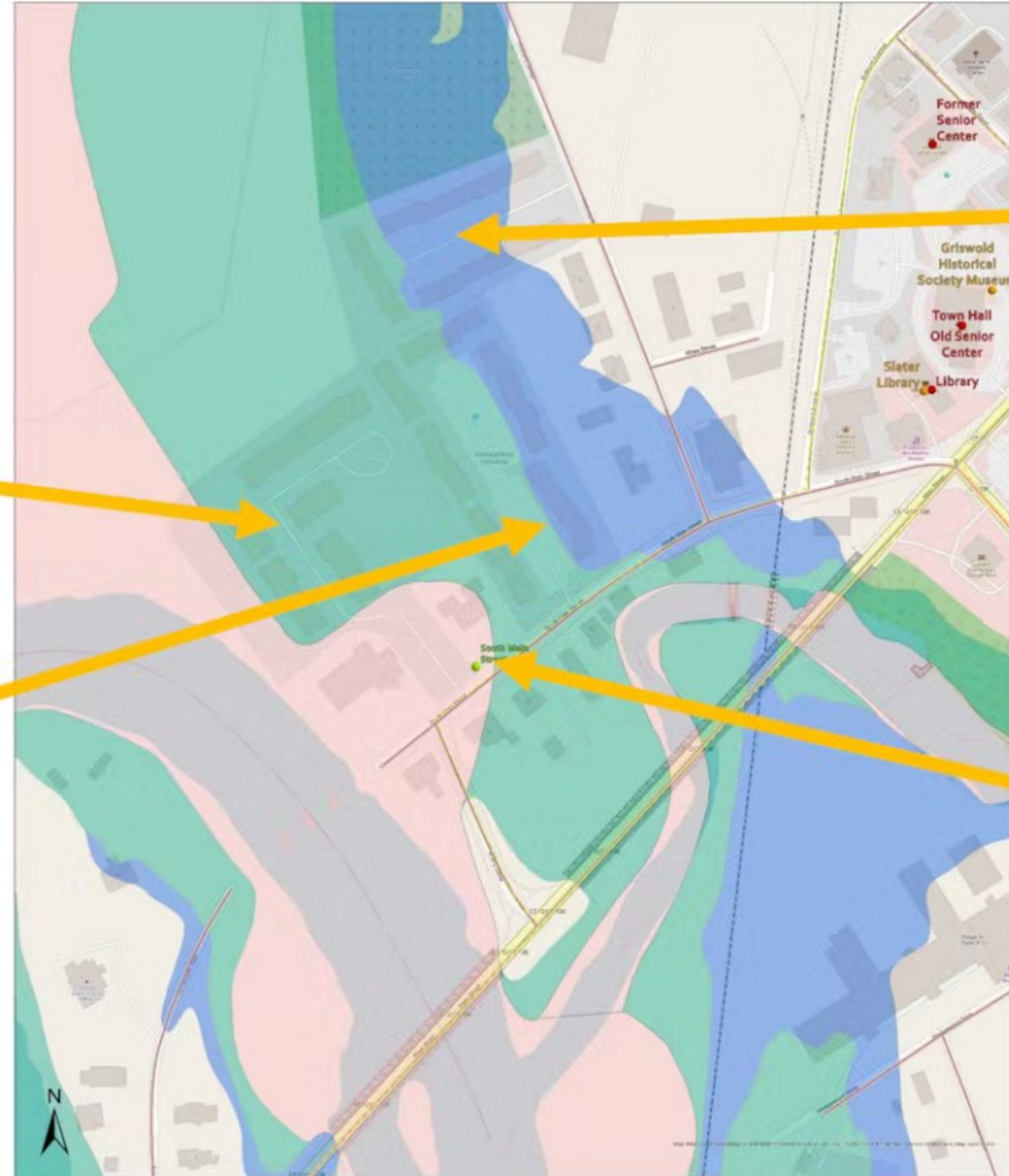
0.2% Annual
Chance Flood Zone
(500-yr) (blue)

Critical facilities
in the Borough

Sewer pumping
station



RESILIENT JEWETT CITY



RESILIENT JEWETT CITY

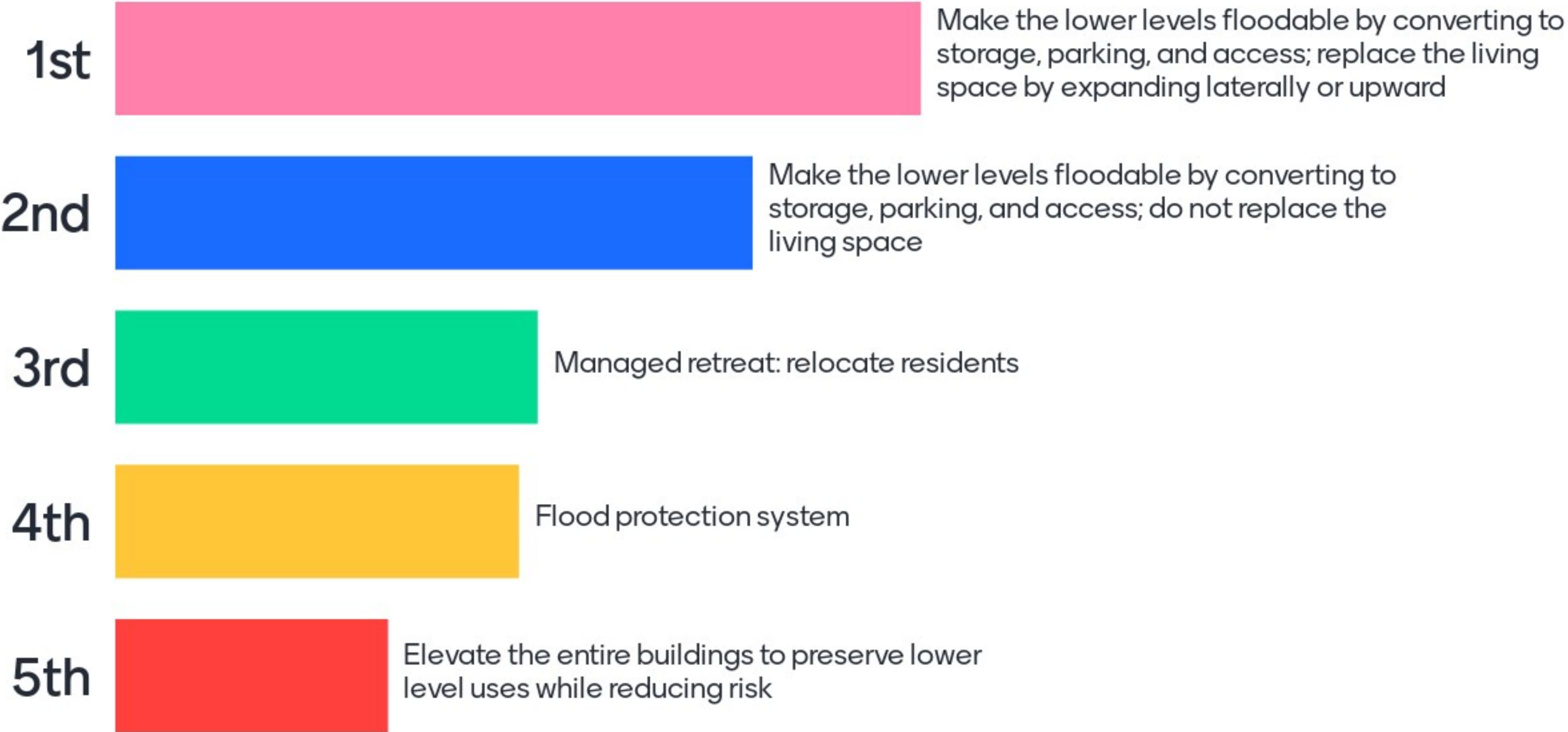


What would you do to make these condominium units more resilient? It looks like the lower levels were initially designed to flood.



Please rank the following choices

RESILIENT JEWETT CITY



RESILIENT JEWETT CITY



What would you do to make these condominium units more resilient? It looks like the lower levels were not initially designed to flood.



Please rank the following choices

RESILIENT JEWETT CITY



RESILIENT JEWETT CITY



What would you do to make these condominium units more resilient?
Information about the lower levels is not clear.

Please rank the following choices

RESILIENT JEWETT CITY



1st



Some combination
of elevations and
relocation

2nd



Flood protection
system

3rd



I'm ready for the
break

RESILIENT JEWETT CITY



What would you do to make the sewer pumping station more resilient?



Please rank the following choices

RESILIENT JEWETT CITY



1st



Elevate

2nd



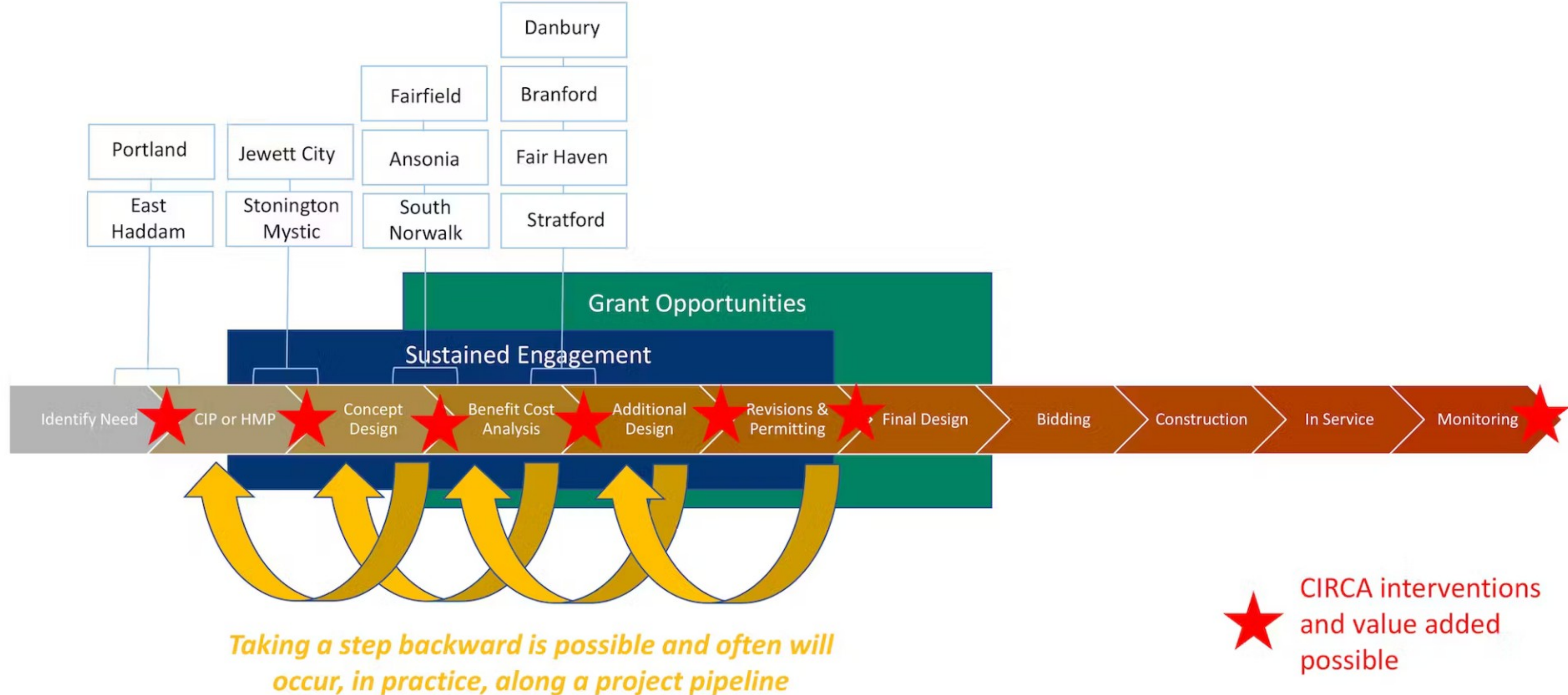
Floodproof

3rd



Relocate

RESILIENT CONNECTICUT AND THE PROJECT PIPELINE



CLOSING REMARKS

- Coordination with Hazard Mitigation Plan updates was beneficial for the SCCOG and CRCOG municipalities
 - We asked “what are the challenges?”
- The *Resilient Connecticut* approach allows CIRCA to develop concepts that the municipalities are not advancing to a study phase on their own
 - Where can we help solve complex challenges?
- Adaptation planning takes time
 - Planning support needed for next 20-30 years
 - Innovative approaches are needed
 - Coordination with economic activity, redevelopment, and housing needs
 - We all need to help municipalities win federal funds