



Town of Essex



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Community Resilience Building Workshop

Summary of Findings

September 2019



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Summary of Findings

Overview

The need for municipalities, academic institutions, regional planning organizations, states and federal agencies to increase resilience and adapt to extreme weather events and a changing climate is strikingly evident amongst the communities of the state of Connecticut. Recent events such as Tropical Storm Irene and Sandy have reinforced this urgency and compelled leading communities like the Town of Essex to proactively collaborate on planning and mitigating risks. Ultimately, this type of leadership is to be commended because it will reduce the vulnerability of municipal residents, infrastructure, and ecosystems and serve as a model for other communities in Connecticut, New England, and the Nation.

In the spring of 2019, the Town of Essex embarked on certification via Sustainable CT. As part of that certification, Sustainable CT and the Nature Conservancy provided the Town with a voluntary process to conduct an assessment of climate change impacts. In August 2019, a municipal-based core team organized a Community Resilience Building Workshop facilitated by the Nature Conservancy in partnership with Sustainable CT. The core directive of this effort was the engagement with and between community stakeholders to facilitate the assessment of climate vulnerabilities and the education, planning, and ultimately implementation of priority adaptation actions for Essex.

The Essex Community Resilience Building Workshop's central objectives were to:

- Define top local natural and climate-related hazards of concern;
- Identify local and regional existing and future vulnerabilities and strengths;
- Develop prioritized actions for the Town of Essex; and
- Identify opportunities to collaboratively advance actions to increase resilience.



For their workshop, the Town of Essex employed a unique “anywhere at any scale”, community-driven process known as Community Resilience Building (CRB) (www.CommunityResilienceBuilding.org). The CRB’s Risk Matrix and various reports, data, and maps were integrated into the workshop process to provide both decision-support and visualization around shared values and priorities across Essex. The Essex Natural Hazard Mitigation Plan Update (2014) where particularly instructive. Using this CRB process, rich with information, experience and dialogue, the participants produced findings which are outlined in this Summary of Findings report. The following report provides an overview of the top hazards, current concerns and challenges, current strengths, and proposed actions to improve Essex’s resilience to natural and climate-related hazards today, and in the future.

Prior to the workshop, an Extreme Weather Preparedness Resident Survey was sent out to residents on the Town’s email contact list. In addition, members of the Sustainable Essex Committee volunteered to obtain input from underrepresented groups such as lower income and handicapped residents at elderly housing and soup kitchen sites. Feedback from these sources was used to identify residents’ main concerns and vulnerabilities in advance of and for use during the Essex Community Resiliency Building workshop.

The summary of findings transcribed in this report, like any that concern the evolving nature of risk assessment and associated action, are proffered for comments, corrections and updates from workshop attendees and additional stakeholders alike. The leadership displayed by the Town of Essex on community resilience building will benefit from the continuous and expanding participation of all those concerned. will reduce the vulnerability of municipal residents, infrastructure, and ecosystems and serve as a model for other communities in Connecticut, New England, and the Nation.



Summary of Findings

Top Hazards and Vulnerable Areas for the Community

During the CRB Workshop, community members were asked to identify the top hazards for the Town of Essex. The hazard of greatest concern to the participants was tidal flooding from the Connecticut River as concerns about increased flooding with accelerating sea level rise. The other hazards discussed included storms such as Nor'easters and winter storms that bring intense and sustained winds, snow and ice. In addition, extreme temperatures both cold snaps and heatwaves were identified as major concerns. These hazards have direct and increasing impacts on Essex's residents and resources such as its neighborhoods, natural areas (river corridors, wetlands, watersheds, parks), roads, bridges, places of employment, residential drinking and wastewater systems, health care facilities, social support services to vulnerable populations, and other critical infrastructure and community assets.



(Credit: en.wikipedia.org)



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Top Hazards and Areas of Concern for the Community

Top Hazards

- Tidal Flooding (Current and with Sea Level Rise)
- Storms (Nor'easters and Winter Snow/Ice Storms)
- Extreme Temperatures (Cold Snaps and Heatwaves)

Areas of Concern in Essex*

Ecosystems: Hazardous Trees (along transportation corridors and municipal-owned property), Gypsy Moth and Drought Stress on Trees across Municipality, Riparian Buffers, Stream Banks, Natural Storm Debris, Falls River, Beavers (flooding adjoining beaver dams), Viney Hill Brook, Thatch Bed Island (loss of area due to increased erosion), South Cove (silting in and lowering depth of harbor), Clean Vessel Act/Pump Outs of Vessels, No Public Swimming Areas, Mud River, Tidal Wetlands Upstream and Downstream of Essex on Connecticut River (i.e. Lords Cove, Meadows, etc.).

Roads, Road Networks, Bridges: Roads/Bridges crossing Falls River, North Main Street, Route 154, Walnut Street, Undersized Culverts, Bridge Abutment Encroachment, Route 9.

Infrastructure: Residential Septic Systems, Drinking Water Wells, Older Housing Stock (w/out AC), Gas Stations, Dams (six privately owned), Local Businesses (securing and maintaining over time), Essex Harbor, Bushy Hill Dam, Clark's Pond Dam, Mill Pond Dam, Ivoryton Pond Dam.

Developments and Neighborhoods: Downtown Village Area (economic center), Marina District, Residential Areas on Connecticut River north and south of Downtown Village Area, Residential Areas on Falls River in Ivoryton, Centerbrook Residential Area, Essex Meadows Senior Housing, Essex Court and Essex Place Affordable Housing.

Vulnerable Populations: Homebound/Isolated Elderly (rapidly aging population), Developmentally Disabled, Non-English Speaking, Low Income, Volunteers (decline over time), Fixed Income Retirees, Homeless Population, Tourists.

*Information above from workshop participants as well as from the Essex NHMP Update (2014).



Current Concerns and Challenges Presented by Hazards

The Town of Essex has several concerns and faces multiple challenges related to the impacts of natural hazards and climate change. In recent years, Essex has experienced a series of highly disruptive and damaging weather events including Tropical Storm Irene (August 2011), Tropical Storm Sandy, (October 2012), winter Nor'easter Nemo (February 2013), and other impactful events in the last eight years. Impacts from Irene included heavy rain-induced riverine and tidal flooding and wind damage. Sandy caused extended power outages across portions of Essex. Winter snow storms drop excessive snow on the Town knocking out power and isolating residents and neighborhoods. The magnitude and intensity of these events and others across Connecticut has increased awareness of natural hazards and climatic change, while motivating communities like Essex to comprehensively improve resilience.

This series of extreme weather events highlights that for Essex the impacts from hazards are diverse; they range from limited riverine and tidal flooding of roads and low-lying areas near rivers and wetlands during intense storms and heavy precipitation events to property damage from trees, wind, snow, and ice. Longer periods of elevated heat, particularly in July and August, and cold snaps have raised concerns about vulnerable segments of the population including the elderly and disabled. The combination of these issues presents a challenge to preparedness, response and mitigation priorities and requires comprehensive yet tailored actions for particular locations and/or areas across Essex.

The workshop participants were generally in agreement that Essex is experiencing more intense and frequent storm events, heat waves, and tidal flooding. The impacts have affected the daily activities of most residents. Additionally, there was a general concern about the challenges of being prepared with contingency plans for worst case scenarios during different times of the year (i.e. major disasters, storms, major hurricanes (Cat-3 or above)) particularly in the fall/winter due to more intense storms.



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Specific Categories of Concerns and Challenges

As in any community, Essex is not uniformly vulnerable to hazards and climate change, and certain locations, resources, and populations have and will be affected to a greater degree than others. Workshop participants identified the following items as their community's key areas of concerns and challenges across three categories - Infrastructure, Societal, and Environmental.

Infrastructure Concerns and Challenges

Roads, Road Networks, Bridges:

- Routine and major flooding of road networks adjacent to tidally and precipitation influenced waterways in select areas of municipality.
- Parking issues and congestion in Village.

Wastewater:

- Chronic flooding of septic systems in select areas and neighborhoods subjected to flooding and seasonal high ground water levels (February - April).
- Unknown common septic systems in Village shared between businesses and residents.
- Concerns regarding upstream combined-sewer overflow systems.

Emergency Management and Preparedness:

- Major hurricane creating unmanageable challenges for current response and recovery staff, resources, and facilities within municipality.
- Need for more business continuity and recovery planning for major events.
- Concerns regarding declines in volunteers for critical services.

Housing:

- Isolation of homes when road network is compromised for extended periods.

Societal Concerns and Challenges

Vulnerable Populations:

- Isolated pockets of residents who live in more rural parts of community.
- Older housing stock including homes without air conditioning.
- Implications on disproportionately disadvantaged populations (i.e. elderly, working poor, fixed income, etc.) due to flooding, winter storms, and heat waves.



Specific Categories of Concerns and Challenges (cont'd)

Societal Concerns and Challenges

Vulnerable Populations:

- Need to improve emergency communications and update information on special needs residents that require additional support during and after major events.
- Need for long-term residents to educate and support new residents on preparedness.
- Growing mobility issues given rapidly aging population.
- Limited availability of and access to proximate, larger grocery stores.

Power:

- Power outages to residential homes and business particularly during the winter months increasing isolation.
- Lack of generators amongst the five gas stations in municipality.

Environmental Concerns and Challenges

River, Watersheds, Aquifers:

- Principal drinking water source provided by two well heads susceptible to surface water flooding and subsequent contamination.

Trees and Forest:

- Increasing impacts to tree health from pests and pathogens resulting in dead and standing trees which pose risk to power lines, people, and property if not managed.

Connecticut River:

- Erosion of Thatch Bed Island and silting in of South Cove and Harbor.
- Long term viability of tidal wetlands upstream and downstream of municipality that store flood water and absorb storm surge currently and as sea level rise accelerates.



Current Strengths and Assets

Because of the recent experiences with extreme weather, the Town of Essex is well acquainted with existing and shared strengths. Reinforcing best practices and enhancing available assets will generate greater benefits to the Town and adjoining communities through increased resiliency to more frequent and intense storms, as well as to long term impacts from increases in flooding, temperatures, precipitation.

- Clearly, the responsive and committed leadership exhibited by officials and staff is a very appreciated strength within the Town of Essex. Ongoing collaboration between the Town, adjoining municipalities (mutual aid agreements), Lower Connecticut River Valley Council of Governments, DEMS Region 2, business community, faith-based organization, Visiting Nurse Association, and NGOs among others on the priorities identified below will help to advance comprehensive, cost-effective approaches to community resilience building.
- The Town has solid, highly experienced, staff with a desire to maintain adequate resources for most emergency situations. The coordination amongst various departments including leadership, Police, Fire, and EMS was cited as an ongoing, and highly valued community strength despite the need to maintain a flow of volunteers over time (i.e. multi-town Community Emergency Response Team).
- Relatively intact tidal wetland systems upstream and downstream of municipality couple with forested watersheds and robust rivers and wetland systems which provide flood storage, enhance public amenities for recreation and gathering, and increase ecological function and biodiversity.
- Network of support facilities to provide sheltering, food, heating/cooling, and charging options for residents regionally in addition to ongoing food pantries.
- Robust harbor facilities, moorings, and base of operations for pump out boats.
- Self-reliant and resilient residents that look out for one another and pride themselves on preparedness.
- Per MS4, mapping and prioritization of 1,200 catchment basins completed with immediate needs addressed and long-term plan for additional needs in place.
- Committed engagement via Health Department that identifies and maintains services for residents in need (i.e. SAFER Essex).
- Attractiveness and desirability of downtown village area and surrounds for tourist that are critically important to the economic vitality of municipality.



Top Recommendations to Improve Resilience

A common thread throughout the workshop discussions was the recognition that Essex needs to be better prepared through longer term community-based, contingency planning across all areas of concern. This need and additional core highlights surfaced by the Workshop participants are addressed below across Infrastructure, Societal, and Environmental categories.

Infrastructure

- Continue to conduct routine and regular upgrades, retrofits, and replacements to the 1200 catchment basins per the existing capital improvement and maintenance plans. Ensure that future precipitation scenarios are factored into future upgrades.
- Explore the costs and benefits of community septic systems or sewer infrastructure to select areas of the municipality via discussions between Planning Department, Economic Development Commission, Health Department, Board of Trade, and Ivoryton Alliance.
- Identify areas across municipality where Low Impact Development (LID) practices along with installation of green stormwater infrastructure could help to minimize localized flooding and improve water quality in adjoining waterbodies.
- Continue to monitor the status of large dams upstream from municipality and update periodically the footprint of downstream flooding due to catastrophic failure.
- Explore the potential options to alleviate traffic congestion for Main Street given current conditions and limitations.
- Advance a comprehensive culvert and bridge upgrade, retrofit, or replacement assessment and implementation plan over next 10-15 years designed for future, more extreme precipitation events.
- Look to replace Old Deep River Road Bridge with incorporation of increase intensity and frequency of precipitation-driven flooding event in associated water course.
- Consider the costs and benefits of installing microgrid(s) and burying power lines in high risk areas.
- Look to incorporate green stormwater infrastructure installation where appropriate into upgrades to storm drains, paving, and general maintenance road. Integrate green stormwater options into Capital Improvement Plan budgets.



Community Resilience Building Workshop Recommendations

Societal

- Continue to seek ways to improve the town-wide promotion of personal safety and responsibility in response to major events as well as a neighbor-helping-neighbor approach to preparedness.
- Include in the Town's Welcome materials for new residents information about how to sign up for Reverse 911 systems.
- Ensure wide distribution of sign-up sheets and info cards for Reverse 911 to residents via realtors, churches, laundry mat, library, and other places where people congregate.
- Consider securing paid language translation services to help assist non-English speakers and look to expand Reverse 911 to provide additional languages.
- Explore educational programming for senior residents with an emphasis on risk reduction and preparedness at the house-hold and community scale.
- Look to increase outreach and engagement with business community to help increase the level and depth of disaster continuity planning via the Board of Trade and Ivoryton Alliance.
- With a rapidly aging population, look to coordinate and increase transportation options to enhance mobility of seniors including access to larger grocery stores.



(Credit: Adam Wheelchel/TNC)

Environmental

- Continue to address dead and standing tree concerns along critical transportation corridors and right of ways to proactively minimize power outages and access issues during and after major events.
- Explore options to establish a public swimming area to help reduce the impacts of heatwaves on residents and their families.
- Identify ecological restoration and funding options to help maintain Thatch Bed Island as a natural buffer to critical harbor and waterfront facilities and infrastructure. In addition, seek ways to increase ecological resilience of riparian corridors.



CRB Workshop Participants: Department/Organization

Town of Essex - First Selectmens Office

Town of Essex - Harbor Management

Town of Essex - Emergency Management

Town of Essex - Administration Office

Town of Essex - Health Department

Town of Essex - Planning

Town of Essex - Economic Development

Town of Essex - Parks and Recreation

Town of Essex - Public Works Department

Town of Essex - Sustainable Essex

Town of Essex - Residents

Lower Connecticut River Valley Council of Governments

CRB Workshop Project Team: Organization and Role

Essex Core Team

Stacy Abbott - Town of Essex - Sustainable Essex

Mackenzie Pias - Sustainable CT

Workshop Facilitation Team

The Nature Conservancy – Adam Whelchel, Ph.D. (Lead Facilitator)

Institute of Sustainable Energy - Jessica LeClair (Support Lead)

Institute of Sustainable Energy - Torin Radicioni (Scribe)

Sustainable CT Fellows - Mackenzie Pias (Scribe)



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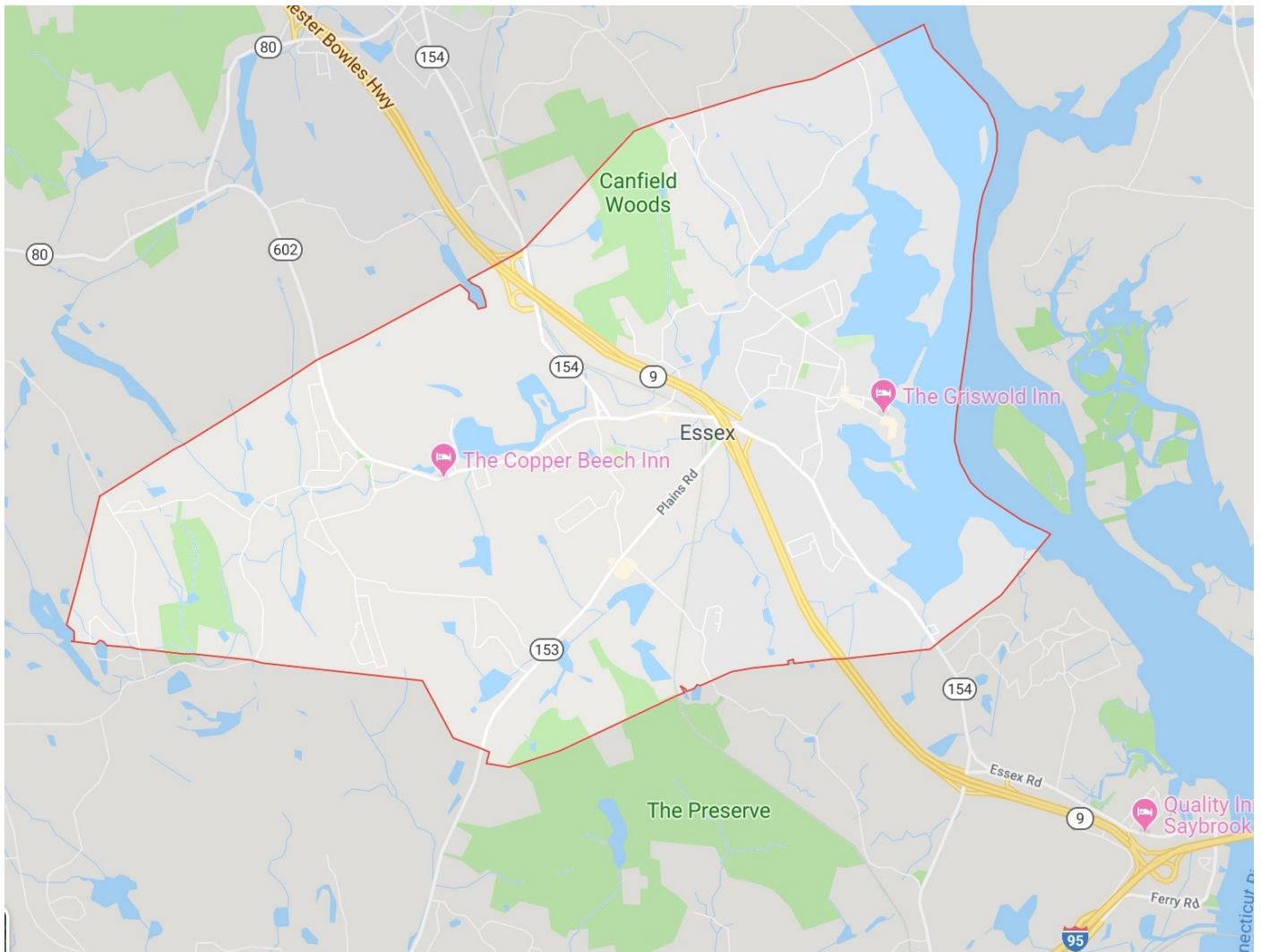
Special thanks to the Town of Essex Selectmen, staff and community members for their willingness to embrace this process in hopes of a more resilient future for Essex, in particular, Norman Needleman (First Selectman), Lisa Fasulo, John Guskowski, Ryan Welch, Jeffrey Going, Maria Lucarelli and Betsy D'Amico. Thank you to Sustainable CT for providing refreshments and food. Finally, thanks to the scribes that recorded the workshop dialogue.

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Appendix

Base Map



Essex Natural Hazard Mitigation Plan (2014)
Comprehensive Mitigation Actions
(Table 22)
Prepared by
Lower Connecticut River Council of Governments



Figure 22: Comprehensive Mitigation Action Items	Natural Hazards							Responsible Party *1	Schedule	Status	Cost ²	Possible Funding Source**	Weighted STAPLEE Criteria							
	Flooding	High Wind and Tornado	Drought and Wildfire	Winter Storm	Earthquake	Hurricane	Extreme Heat						Costs (0)/ Benefits (1)							
													Social	Technical	Administrative	Political	Legal	Economic	Environmental	STAPLEE Total
Local Plans and Regulations																				
Amend Flood Ordinance. Consider adding a "freeboard" – an additional height above the flood level – to add a greater margin of safety. In the case of nonresidential structures, the insurance rates do not go down until a structure is flood proofed at least one (1) foot above the BFE.	X			X		X		ZC, IWC, PC	D	New	\$	OP	1	1	0	0	1	1	1	5
Benefit-Cost Analysis. Evaluate opportunities for public funding of mitigation projects on private property where public benefits exceed the cost for RL properties or for properties otherwise eligible for buy-out.	X	X	X	X	X	X	X	BOF, BOS	C	Occurs with all projects for which grant funding or public funding will be utilized.	\$	OP	1	1	0	1	1	1	1	6
Best Management Practices. Continue to use best management practices (BMPs) as described in the Connecticut DEEP Storm water Management Guidelines on a site-by-site basis as advised by a professional engineer.	X	X	X	X	X	X	X	BOS, PW, LUO, BO	A	In Place, storm water infrastructure cleaning etc.	\$	OP	1	1	1	1	1	1	1	7
Business Recovery Plan. Develop business recovery plan cooperatively with other region towns and distribute to town businesses.	X	X	X	X	X	X	X	BOS	D	No Plan exists to date.	\$\$	OP	1	0	0	1	1	1	1	5
Capital Improvement Program. Use Capital Improvement Program (CIP) to set aside funds for infrastructure improvements to reduce loss of life and property during natural hazard (NH) events.	X	X	X	X	X	X	X	BOF, BOS, PW	C	Occurs Yearly	\$\$	CIP	1	1	1	0	1	0	1	5
Conservation Planning. Educate the public about how the town uses planning, regulation, and ordinances to mitigate NHs via LID, aquifer recharge, riparian buffer, rain gardens, open burning ordinances, house numbering, etc.	X		X	X		X	X	CC	D	New	\$	OP	1	1	0	0	1	1	1	5
Design Standards. Continue to implement State Building/Fire Code and local Flood Code for construction that minimizes loss of life and property damage due to NHs.	X	X	X	X	X	X	X	BO	D	New	\$	CIP	1	0	0	0	0	1	1	3
Immobile Evacuees. Review annually the program to evacuate persons without means of transport, including registration and house numbering.	X	X	X	X	X	X	X	EMD	C	New	\$	CIP, RTP, STIP	0	1	0	1	0	1	1	4
Flood Zone Study. Update flood zone study for the town to incorporate changed conditions upland and within the floodplain.	X							LUO, IWC	D	New Maps Adopted 2008	\$\$	HMPG,PDM	1	1	0	1	1	1	1	6

Figure 22

Comprehensive Mitigation Action Items

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Essex, CT

Forest Management Plan. Hire a consulting forester to establish a forest management plan to enable ability of firefighters to access forest fires during periods of drought.			X			X		EMD, Tree Warden	D	New	\$\$	CIP, OP	1	1	1	1	1	0	1	6
Grants. Identify and apply for grants to fund infrastructure improvements and other mitigation tasks identified in this plan.	X	X	X	X	X	X	X	BOF, BOS, LUO	C	Annually	\$	CIP, OP	1	1	0	1	1	1	1	6
Land Use Regulation. Strengthen as appropriate, subdivision and zoning regulations to make safer new roads and lots within flood zones.	X	X	X	X	X	X	X	PC, LUO, ZC	A	Regulations are reviewed yearly and are updated as the Commission sees necessary.	\$	OP	0	1	0	0	0	1	1	3
Landlord Incentives. Research what kind of incentives would motivate land owners to make the additional investment that would reduce potential damages to their properties and loss of life of their tenants.	X	X	X	X	X	X	X	BOS, LUO	D	New	\$	CIP, OP	1	1	0	1	1	1	1	6
Local Social Resources. Identify local resources to assist with those populations (i.e. elderly, disabled, non-English speakers, who may frequent, reside, or work) in Essex. Seek grants to provide funding for developing more detailed data to assist in the social – demographic analysis of how Essex will be affected by natural hazards.	X	X	X	X	X	X	X	BOS, EMD	D	New	\$	OP	0	1	0	1	1	1	1	5
Minimal runoff from development. Require all new development to be built using techniques to minimize run-off.	X		X	X		X		ZC, IWC, LUO	A	Currently required in subdivision regulations.	\$	OP	1	1	1	1	1	1	1	7
Owner Participation. Promote owner participation in mitigation efforts to protect their own properties.	X	X	X	X	X	X	X	LUO, BOS	C	Owners are encouraged to participate such as cutting trees and not building in flood zones, etc.	\$	OP	0	1	0	0	1	1	1	4
Possible Open Space Criteria. The Town Commissions should consider making possible inundation by Storm Surge to its considerations for preserving open space.	X			X		X		ZC, PC, LUO	D	Subdivision Regs. require open space; however, including at-risk areas is not a requirement.	\$\$	HMPG, PDM, CIP	1	1	1	1	1	1	1	7
Post Disaster School Arrangements. Establish reciprocal arrangements with other school districts for getting students back into classes during extended recovery periods.	X	X	X	X	X	X	X	BOE	D	New	\$	CIP, OP	0	1	0	0	1	0	1	3
Potential Financial Impact of Probable Events. Estimate the municipal tax revenue that could potentially be lost in various events to provide the Board of Selectmen and Board of Finance with an idea of how large a "rainy day" fund might be necessary to cover that post disaster period when there would be minimal income and maximum output of public funds at all levels of government.	X	X	X	X	X	X	X	LUO	D	New	\$	OP	1	1	0	0	1	0	1	4
Private Property Funds. Evaluate opportunities for public funding for projects on private property where the benefits exceed the costs.	X	X	X	X	X	X	X	BOS, BOF, LUO	C	Funds are made available as needed based on a CBA.	\$\$	HMPG, FMA, RFC, SRL	1	1	0	0	1	0	1	4
Public Transit Funding. Support regional transportation system (RTD) to facilitate movement of people without means of transportation prior to NH events.	X	X	X	X	X	X	X	BOF, BOS	C	9 Town Transit is available as needed.	\$\$	CIP	1	1	1	1	1	1	1	7

Figure 22

Comprehensive Mitigation Action Items

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Recovery & Reconstruction Plan. Develop a post-disaster recovery and reconstruction plan to re-establish infrastructure and public services, etc. damaged or destroyed by any NH event, including establishment of a "rainy day" fund in case Federal assistance is insufficient or delayed.	X	X	X	X	X	X	X	BOS, EMD, LUO, PC, PW	D	New	\$\$	CIP, HMPG	0	1	0	0	1	0	1	3	
Regulations. Strengthen existing subdivision regulations to either optimally prevent road or house construction within the floodplain, or alternatively raise structures above BFE.	X	X	X	X	X	X	X	IWC, PC, ZC, LUO	D	Current regulations do not allow new structures in those areas.	\$	OP	1	1	1	1	1	1	1	7	
Zoning Map Audit. The town should conduct a comprehensive audit of the zoning map to consider what changes might be advisable so that the free market investing is not misguided back towards areas that are at high risk from natural disasters.	X	X	X	X	X	X	X	ZC, LUO	C	Zoning Map is evaluated yearly.	\$	CIP, OP	1	1	0	0	1	1	1	5	
Structure and Infrastructure Projects																					
Construction Standards. Ensure that flood proof construction standards for roads and structures within the flood plain are strictly enforced.	X			X		X		BO	D	Standards are enforced.	\$	CIP, OP	1	1	0	1	1	1	1	6	
Critical Facilities. Upgrade as necessary all facility mechanicals, such as generators, in municipal and other critical facilities.	X	X	X	X	X	X	X	PW, BOS, BOF	C	Inspected monthly	\$\$	PDM, HMPG, CIP	1	1	0	1	1	0	1	5	
Data for Plans. Use GIS database to develop better mitigation plans.	X	X	X	X	X	X	X	BOF, LUO	D	GIS was used for this Plan update.	\$	OP	1	0	0	1	1	1	1	5	
Dry Hydrants. Continue to require dry hydrants or fire ponds in new developments where water supply is inadequate.			X					LUO, BO, ZC	A	Currently required.	\$	CIP, OP	1	1	1	1	1	0	1	6	
Electronic Records Preservation. Design databases for records keeping. Create a back-up of existing electronic records, including geographic information system (GIS) data.	X	X			X	X		BOS, BOF	D	Several backups are in place.	\$	CIP, HMPG	1	0	0	1	1	1	1	5	
Engineering Reports. Implement strategic enforcement actions to include engineering reports for structural expansion or alterations on properties within the 1% annual chance flood zone.	X			X		X		BO, LUO	D	Currently required for flood zone properties.	\$\$	OP	1	1	0	1	1	1	1	6	
Firefighting Infrastructure Analysis. Evaluate existing firefighting infrastructure to identify needs for improvement to cover gaps in availability.			X					Fire Dept.	D	New	\$\$\$	CIP, HMGP	1	1	1	1	1	1	1	7	
Geographic Information System. Annually review and update as necessary existing town GIS data.	X	X	X	X	X	X	X	LUO	D	GIS is updated regularly.	\$	CIP, HMGP	1	1	1	1	1	0	1	6	
GIS Database. Establish a comprehensive GIS database to better identify and assess areas, structures and populations potentially affected by natural disasters. These data will provide the town with information necessary to assess natural hazard risks and develop plans to mitigate risks to people and property.	X	X	X	X	X	X	X	BOS, BOF, LUO	D	Regular updates, RiverCOG is currently mapping the entire region.	\$	CIP, OP	1	1	1	1	1	1	1	7	
Municipal Buildings Capable of being Shelters. Future investment in municipal structures should include funding for new construction or renovation that will assure the structure is compliant with the standards for use as a shelter, to the extent possible.	X	X	X	X	X	X	X	BOS, BOF, BO	E	New	\$\$\$	HMPG, PDM, CIP	1	1	1	1	1	0	1	6	

Figure 22

Comprehensive Mitigation Action Items

Oblique Imagery. Over the next five (5) years obtain oblique imagery in order to allow for assessment of such factors as extent of fire damage, compliance with building standards, identification of shoreline hardening and shoreline erosion and accretion.	X	X	X	X	X	X		LUO	D	New	\$\$	OP	1	1	0	1	1	0	1	5
Paper Records Preservation. Convert all paper records maintained by the municipality to an electronic format, consistent with any State recommendations, to ensure their survival. Establish protocols for practices going forward.	X	X			X	X		BOS, BOF	D	Paper Records are converted as needed.	\$	OP	1	1	0	1	1	0	1	5
Pet Sheltering. Participate in regional program for sheltering pets during hazard events.	X	X	X	X	X	X	X	BOS, EMD	D	DEMHS Region 2 is in planning stages Region-wide.	\$	CIP, OP	1	1	0	1	1	0	1	5
Promote Self Inspection. Develop a list of techniques for homeowner self-inspection especially for those located in coastal areas.	X	X	X	X	X	X		BOS, LUO, BO	A	New	\$	OP	0	1	1	1	1	1	1	6
Public Works Garage & Transfer Station Generator. Install a generator for back-up power.		X		X		X	X	PW, BOF, BOS	D	New	\$\$	HMPG, CIP	1	1	0	1	1	0	1	5
Risk Reduction. Develop a strategy and funding program to elevate or relocate structures of flood-prone properties or acquire RL properties that request a "buy-out".	X	X	X	X	X	X	X	LUO	E	New	\$\$	OP	0	1	0	0	1	0	1	3
RL and SRL Properties. Encourage property owners of repetitive loss properties to obtain assistance for hazard mitigation funding from DEEP/FEMA for elevation of structures and repairs where applicable.	X	X	X	X	X	X		LUO	D	Information is available through Town Hall for those seeking buyouts. Very few properties in town are eligible.	\$	RLP, HMGP	1	1	0	1	1	1	1	6
Road Evaluation. Evaluate to develop plans, and improve for emergency access and evacuation.	X			X	X	X		PW	E	Yearly	\$\$	CIP, OP	1	1	0	1	1	0	1	5
Road Reconstruction. Develop a priority list for road and bridge reconstruction and elevation for routes which experience frequent flooding or are integral to evacuation such as Pratt Street, Falls River Drive, and others.	X			X	X	X		PW	F	Priority list is on file at DPW. Projects are carried out as funding is available.	\$\$\$	HMPG, FMA, CIP	1	1	0	1	1	0	1	5
Storm water Infrastructure Inventory. Implement mapping and monitoring of catch basins, storm water outfalls and related infrastructure.	X			X		X		PW	D	Inventory is on file at DPW, but not mapped.	\$\$	HMPG, FMA, CIP	1	1	0	1	1	1	1	6
Storm water Infrastructure Maintenance. Provide for annual maintenance of storm water infrastructure, including detention basins.	X			X		X		PW	C	Cleaned yearly or as needed	\$\$	CIP	1	1	0	1	1	0	1	5
Structural Reports. Continue to require structural engineering reports for expansion or alteration of buildings within the flood zones. Evaluate benefits of requiring structural engineering reports for expansion or alteration of buildings within other zones.	X	X			X			BO	A	Required	\$\$	OP	1	1	0	1	1	1	1	6
Telecommunication Tower Generators (Private). Evaluate whether generators are needed for back-up power at telecommunications facilities.		X		X		X	X	Private	D	New	\$\$	OP	1	1	0	0	1	0	1	4
Underground Utilities. Require underground utilities for new development, require retrofitting during redevelopment of existing sites to bury utilities where appropriate to mitigate NHs.		X	X	X	X	X		PC, BOS, BOF, LUO	F	Required in new subdivisions.	\$\$	HMPG, PDM, CIP	1	1	1	1	1	1	1	7

Figure 22

Comprehensive Mitigation Action Items



Natural Systems Protection																			
Assist Property Owners with Buyouts. Develop strategy and program for flood prone property owners who request a buyout.	X	X	X	X	X	X	BOS, BOF, LUO	E	New	\$	FMA, RLP, HMGP	0	1	0	0	0	0	1	2
Below Base Flood Elevation Funding. Encourage property owners whose homes are below BFE to obtain assistance from DEEP and FEMA to acquire hazard mitigation funds to elevate structures where appropriate.	X			X		X	BOS, LUO	D	Information is available, few properties are eligible.	\$	HMPG, PDM, RFC, SRL	0	0	0	1	1	1	1	4
Boats. Identify places where people could store their boats during flooding and hurricane events that would reduce the damage to them and that they cause to the waterfront infrastructure when they break from moorings. Contact boat marinas to ascertain how many boats might need to be removed from docks and moorings.	X			X		X	EMD, PW, HMC	D	New	\$\$	OP	0	1	0	1	1	1	1	5
Dam Inventory. Update inventory of dams and assess downstream risks due to catastrophic failure. Include State, town, and Privately owned dams.	X			X		X	LUO, BOS	D	DEEP continues to regulate Dams	\$\$	HMPG	0	1	0	1	1	1	1	5
Drought Study. Conduct town-wide study of ground- and surface water capacity as it relates to planning for droughts.			X				LUO	D	New	\$\$	HMPG	1	1	0	1	1	0	1	5
Fire Warning. During vulnerable periods, a system of warnings about campfires and open fires should be posted in public locations			X				LUO	A	DEEP currently does this.	\$\$	CIP, HMGP, OP	1	0	0	1	1	0	1	4
FIRMs. Work with Federal Emergency Management Agency (FEMA) to incorporate updated Flood Insurance Rate Maps (FIRMs) into town's planning, outreach and mitigation actions.	X			X		X	LUO, PC	D	New	\$	HMGP, OP	1	1	0	1	1	1	1	6
Flood Enforcement. Enforce through existing zoning, building and flood permitting processes, construction standards to minimize flood risks.	X			X		X	IWC, PC, ZC, LUO	A	Zoning currently enforces standards.	\$	CIP, OP	1	1	0	1	1	1	1	6
Land Acquisition. Advance an assertive land acquisition plan to reserve vacant land subject to NHs.	X		X	X		X	BOS, BOF, CC	D	New	\$\$	FMA, RFC, SRL	1	1	0	1	1	0	1	5
Park Maintainer. Fund a dedicated Park Maintainer to act as steward of public open spaces, including parks, forests, drainage basins, conservation easements, coastal access points, and forests, and to mitigate NHs at town-owned properties.	X	X	X	X	X	X	CC, BOF, BOS	D	New	\$\$	CIP, OP	1	1	1	1	1	0	1	6
Risk Assessment. Use GIS to conduct NH risk assessments that identify potentially affected areas and depicts evacuation routes.	X	X	X	X	X	X	LUO	D	GIS was used for this Plan update.	\$\$	OP	1	0	0	1	1	1	1	5
Storm water Management. Continue to use best management practices (BMPs) as described in the Connecticut DEEP Storm water Management Guidelines on a site-by-site basis as advised by a professional engineer.	X			X		X	PW	D	Currently in place	\$	CIP, OP	1	1	1	1	1	1	1	7
Water Conservation. Recommendations for future land use patterns including recharge into existing aquifers, including site design to encourage water conservation through such techniques as: strict regulation of vegetative buffers for stream and river corridors, rain gardens for site drainage, and prohibition of wetlands alteration.			X				LUO, BOS	D	Currently included in zoning and subdivision n regulations.	\$	OP	1	1	1	1	1	1	1	7
Tree Hazard Management Program. Implement a tree hazard management program to encourage appropriate planting practices to minimize future storm damage to buildings, utilities and streets.	X		X		X		PW	A	Planting recommendations are in Zoning Regulations.	\$\$	CIP, OP	1	1	0	1	1	0	1	5

Figure 22

Comprehensive Mitigation Action Items

Education and Awareness Programs																			
Circulate Existing Literature. Access existing literature prepared by regional groups and the chamber of commerce and FEMA and display for public distribution in the town Hall and Library.	X	X	X	X	X	X	BOS	C	Literature is available.	\$	HMPG, PDM	1	1	0	1	1	1	1	6
Drought Education. Coordinate with Connecticut Water Company on public education and public service announcements during droughts.			X			X	BOF, BOS	C	New	\$	HMPG, PDM	1	1	0	1	1	1	1	6
Educate About Risk Where People Live. Educate residents at high risk due to demographic or social attributes about the risk(s) present in the areas that they live.	X	X	X	X	X	X	LUO	C	New	\$	HMPG, PDM	0	1	0	1	1	1	1	5
Hotline. Publicize emergency "hotline" phone number or website for public information and volunteer support.	X	X	X	X	X	X	BOS	D	Essex Website has extensive information	\$\$	HMPG, PDM	1	1	0	1	1	1	1	6
Incident Notification System. Enlist public participation through public workshops to develop methods for notification of hazard events and emergencies.	X	X	X	X	X	X	BOS	D	Reverse 911 System in place	\$\$	CIP	1	1	0	1	1	1	1	6
Information. Publish materials on additional hazards and encourage additional insurance.	X	X	X	X	X	X	BOS, LUO	C	Newsletters and emails go out throughout the year. Information is available on Town website.	\$	OP	1	1	0	1	1	1	1	6
Interpretation in Shelters. Request information regarding the need for providing non-English language speakers during natural disasters from the District 4 School administration; and coordinate a shared service for non-emergency and emergency operations.	X	X	X	X	X	X	EMD	D	New	\$\$	OP	1	1	0	1	1	1	1	6
Natural Hazard Training. Continue to train and educate emergency responders about mitigating NHs.	X	X	X	X	X	X	LUO	C	New	\$\$	HMPG, PDM	1	0	0	1	1	1	1	5
Outreach. Promote owner participation in mitigation efforts to protect their property.	X	X	X	X	X	X	LUO	C	New	\$	HMPG, PDM	0	1	0	1	1	1	1	5
Pet Sheltering. Distribute hurricane preparedness information including pet sheltering plans.	X	X	X	X	X	X	EMD	C	Information available on Town Website.	\$\$	HMPG, PDM	1	1	0	1	1	1	1	6
Preparedness Webpage. Create a page on the town website with NH preparedness information, including hazard areas, evacuation routes deemed appropriate per NH event and locations of shelters.	X	X	X	X	X	X	EMD	D	Town website has extensive information.	\$\$	CIP	1	1	0	1	1	1	1	6
Proactive Pamphlets. Provide pamphlets and refer to web-based information for property owners for hazards listed in this document to show options for obtaining additional insurance, structural alterations to protect against various hazard damage, and emergency procedures for families during a hazard. Include information for contractors and homeowners on the risks of building in hazard prone areas.	X	X	X	X	X	X	LUO	C	Extensive information is available on Town website.	\$\$	HMPG, PDM	1	1	0	1	1	1	1	6
Public Participation. Enlist public participation through public workshops/ surveys to develop methods for notification of emergencies.	X	X	X	X	X	X	EMD, PC	C	Occurs annually.	\$	OP	1	1	0	1	1	1	1	6
Recovery Webpage. Post on town website information about recovery assistance following NH events.	X	X	X	X	X	X	BOS	C	New	\$\$	HMPG, PDM	1	1	0	1	1	1	1	6

Figure 22

Comprehensive Mitigation Action Items



Reverse 911. Consider establishing reverse 911 alert system or similar alert system.	X	X	X	X	X	X	X	BOS, EMD	D	Complete, Everbridge System	\$\$	CIP	1	1	1	1	1	1	1	7
Schools. Visit schools and educate children about the risks of floods, hurricanes, and other natural hazards and how to prepare for them.	X	X	X	X	X	X	X	BOS	C	Emergency Personnel visit schools annually.	\$	HMPG, PDM	0	1	0	1	1	1	1	5
Social –Demographic Impacts. Seek grants to provide funding for developing more detailed data to assist in the social – demographic analysis of how Essex will be affected by natural hazards.	X	X	X	X	X	X	X	BOS, LUO	D	New	\$	OP	0	1	0	1	1	1	1	5
Tenant Notification. Develop a mechanism for tenants to register for disaster notification.	X	X	X	X	X	X	X	LUO	C	New	\$	HMPG, PDM	1	1	0	1	1	1	1	6
Webpage. Update town webpage with the section on Hazard Preparedness for the public. Include maps of evacuation route, storm surge areas, and shelters. Include options for mitigation for residential structures and business recovery and provide links to FEMA, NOAA, State OEM and RiverCOG websites for additional information.	X	X	X	X	X	X	X	BOS	C	Continual updating of Town website	\$\$	HMPG, PDM	1	1	0	1	1	1	1	6
Wildfire Education. Educate the public about potential hazard of wildfire caused by campfires or open burning.			X					Fire Dept.	C	Information is available on Town and DEEP websites.	\$	HMPG, PDM	1	1	0	1	1	1	1	6

*Responsible Party Code		**Funding Source Code	
BO	Building Official	BOE	Board of Education
BOE	Board of Education	CIP	Capital Improvement Plan
BOF	Board of Finance	FMA	Flood Mitigation Assistance
BOS	Board of Selectmen	HMPG	Hazard Mitigation Grant Program
EMD	Emergency Management Director	OP	Other Program
HMC	Harbor Management Commission	PDM	Pre-Disaster Mitigation
LUO	Land Use Office	RFC	Repetitive Flood Claim
PC	Planning Commission	RTP	Regional Transportation Program
PW	Public Works	SRL	Severe Repetitive Loss
ZC	Zoning Commission	STIP	State Transportation Improvement Project
ZEO	Zoning Enforcement Official		

- Notes:**
 1. Many Action Items include more than once responsible party; however, the first party listed is the primary.
 2. Estimated Costs are defined as: \$ = \$0 to \$50,000; \$\$ = \$50,001 to \$100,000; \$\$\$ = Over \$100,000.

Figure 22

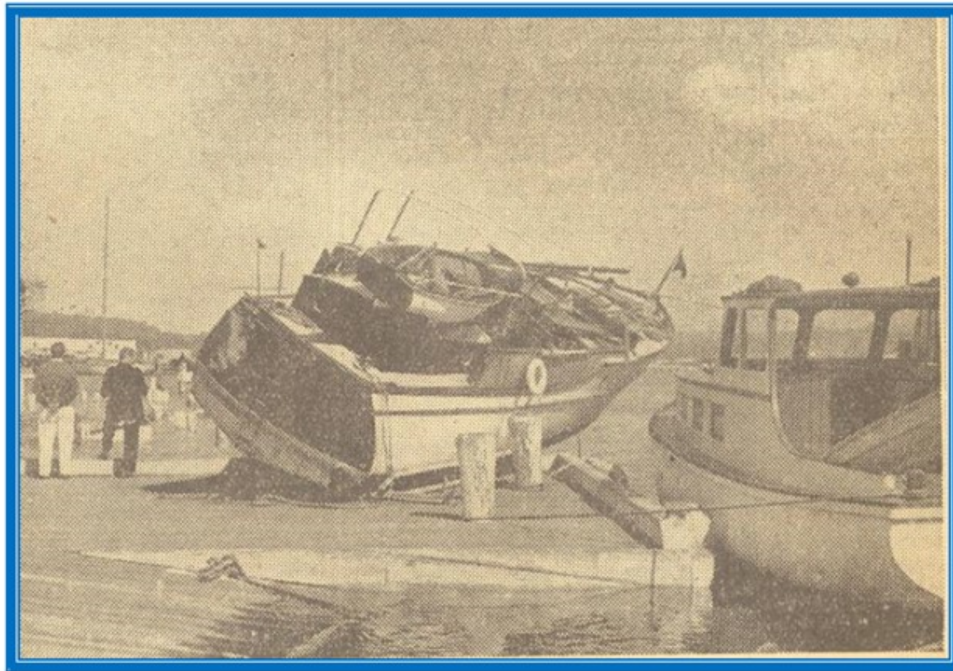
Comprehensive Mitigation Action Items



Resources and Maps Used During Workshop



Essex, Connecticut Natural Hazards Mitigation Plan Update, 2014



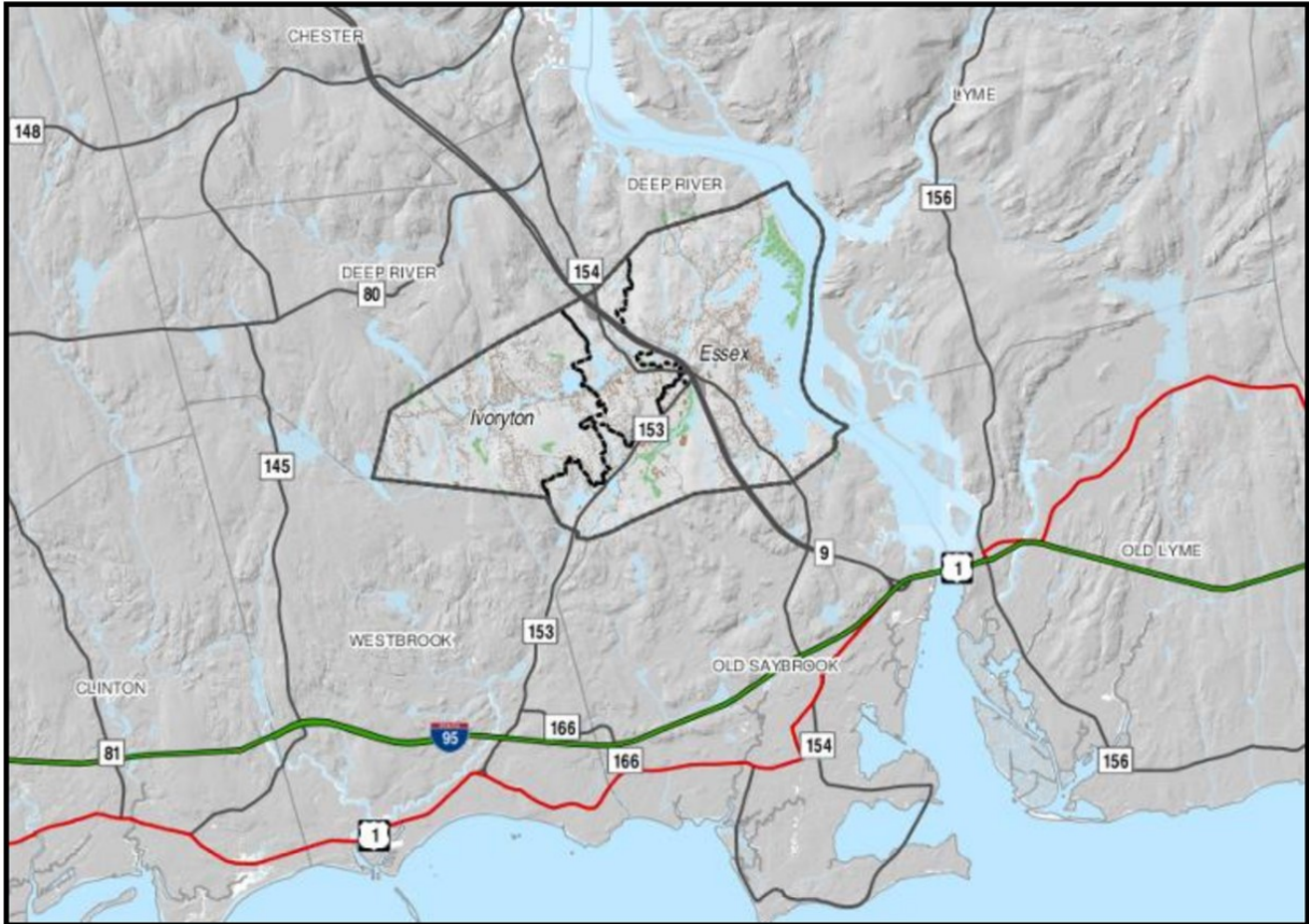
Prepared for
Essex Planning Commission

Adopted by
Town of Essex, Connecticut
June 4, 2014



Prepared by
Lower Connecticut River Valley Council of Governments
145 Dennison Road
Essex, CT 06426
www.rivercog.org

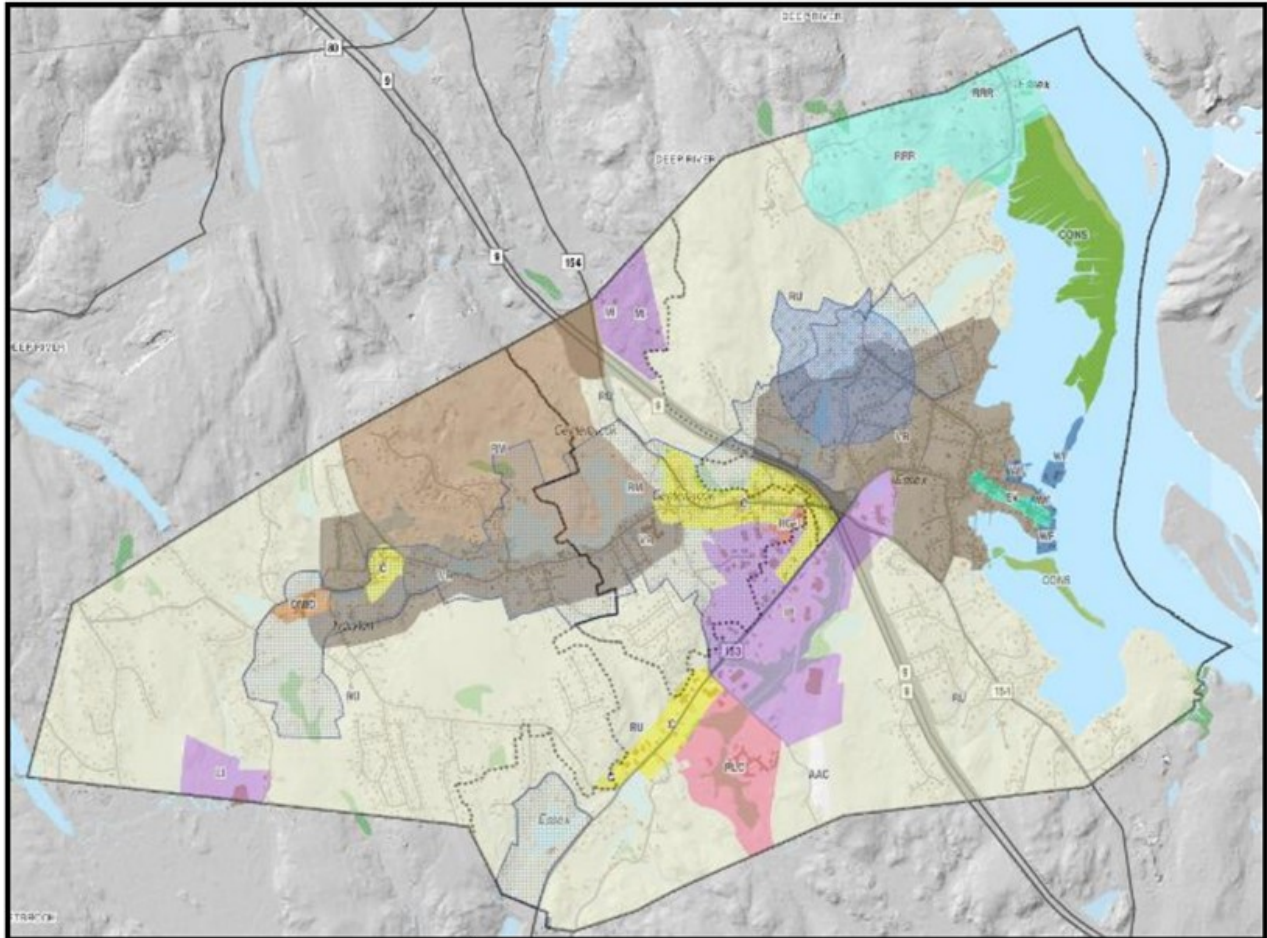
Essex, CT



Map 1: **Essex** and surrounding towns.

This map depicts Essex among surrounding towns. The map also shows Essex's relationship to the Connecticut River as well as major roads.





Zoning Legend

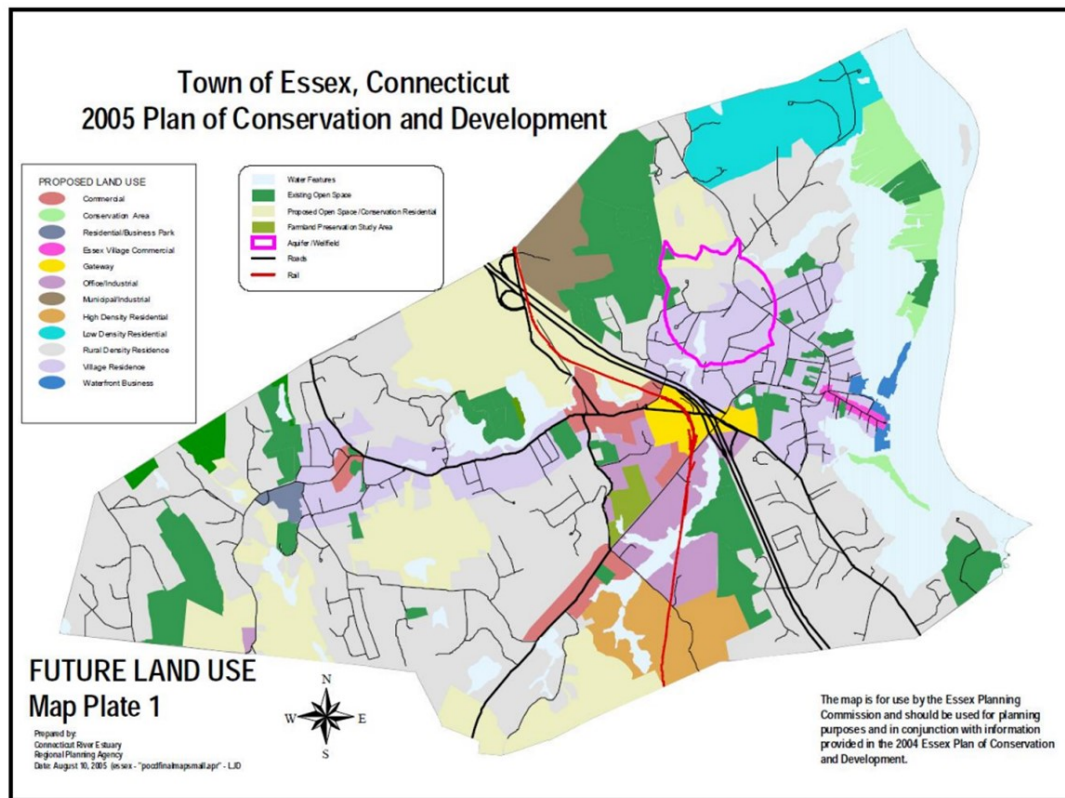
- Commercial District
- Conservation District
- Design Municipal Industrial District
- Essex Village District
- Heritage Gateway
- Limited Industrial District
- Municipal & Industrial Service Zone
- Residential Life Care District
- River Road Residential
- Rural Residential
- Rural Residential-Multi Family
- Village Residence District
- Waterfront Business District
- Active Adult

Map 2: Zoning Districts

This map depicts the relationships among Essex's Zoning Districts.

Source: Essex GIS (4/2013)



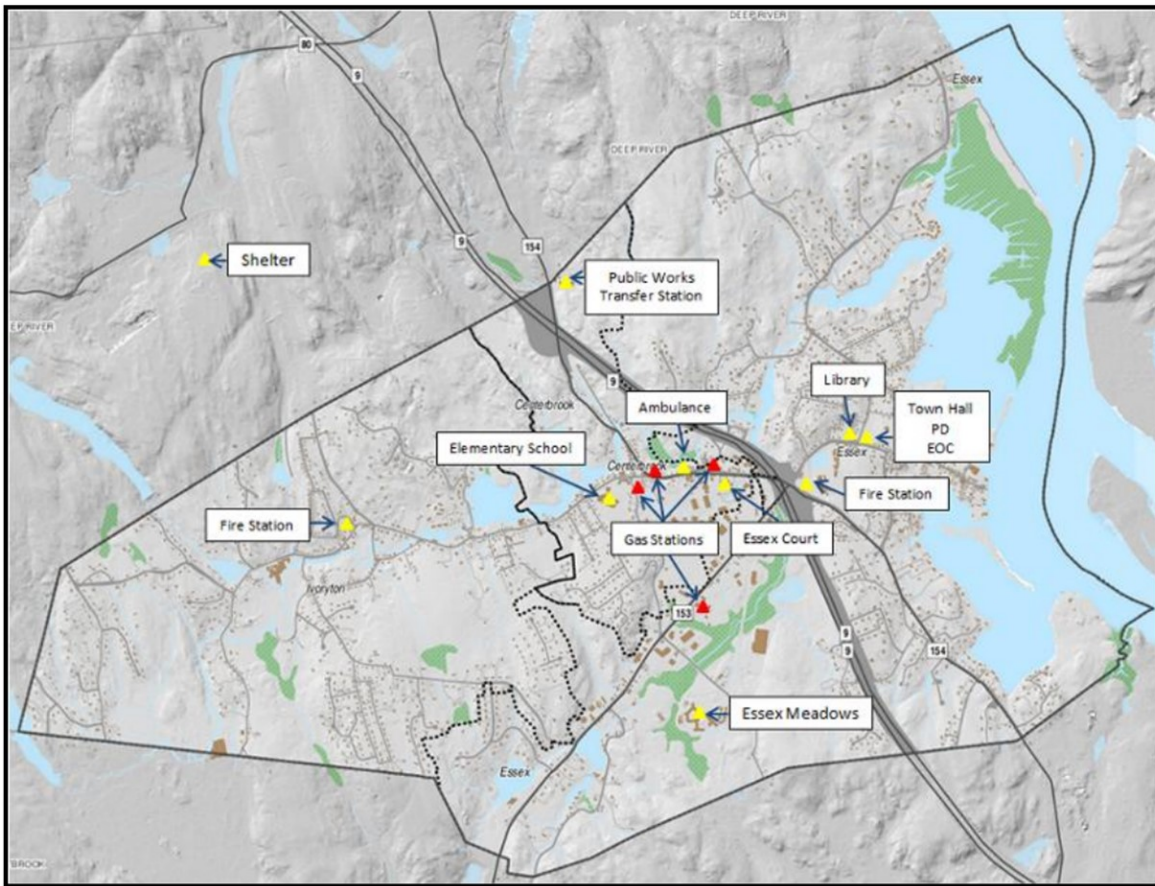


Map 3: **Future Land Use.** This map depicts the future land use throughout the town of Essex based on current Land Use and Zoning Regulations.

Source: Essex POCD, 2005

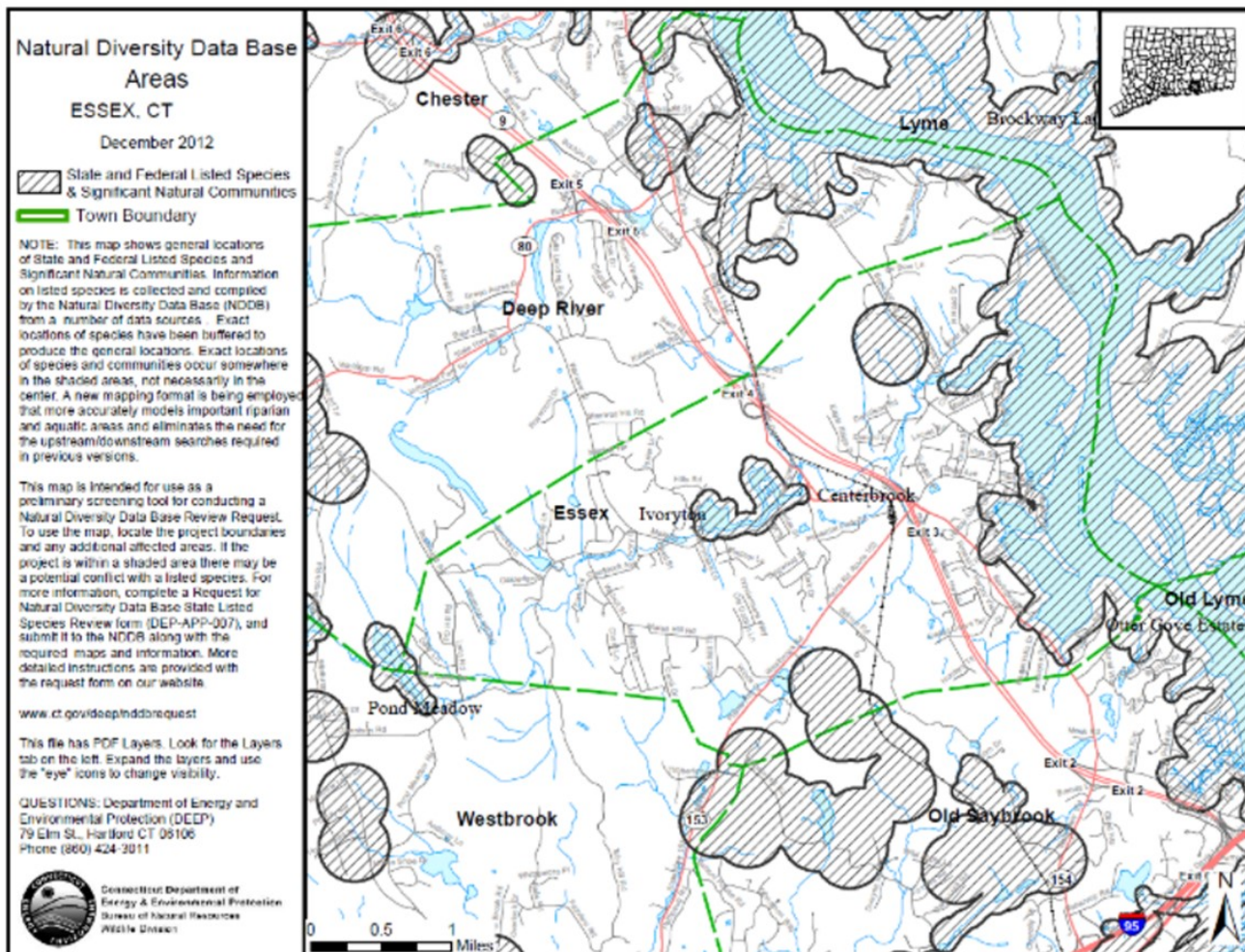


Essex, CT



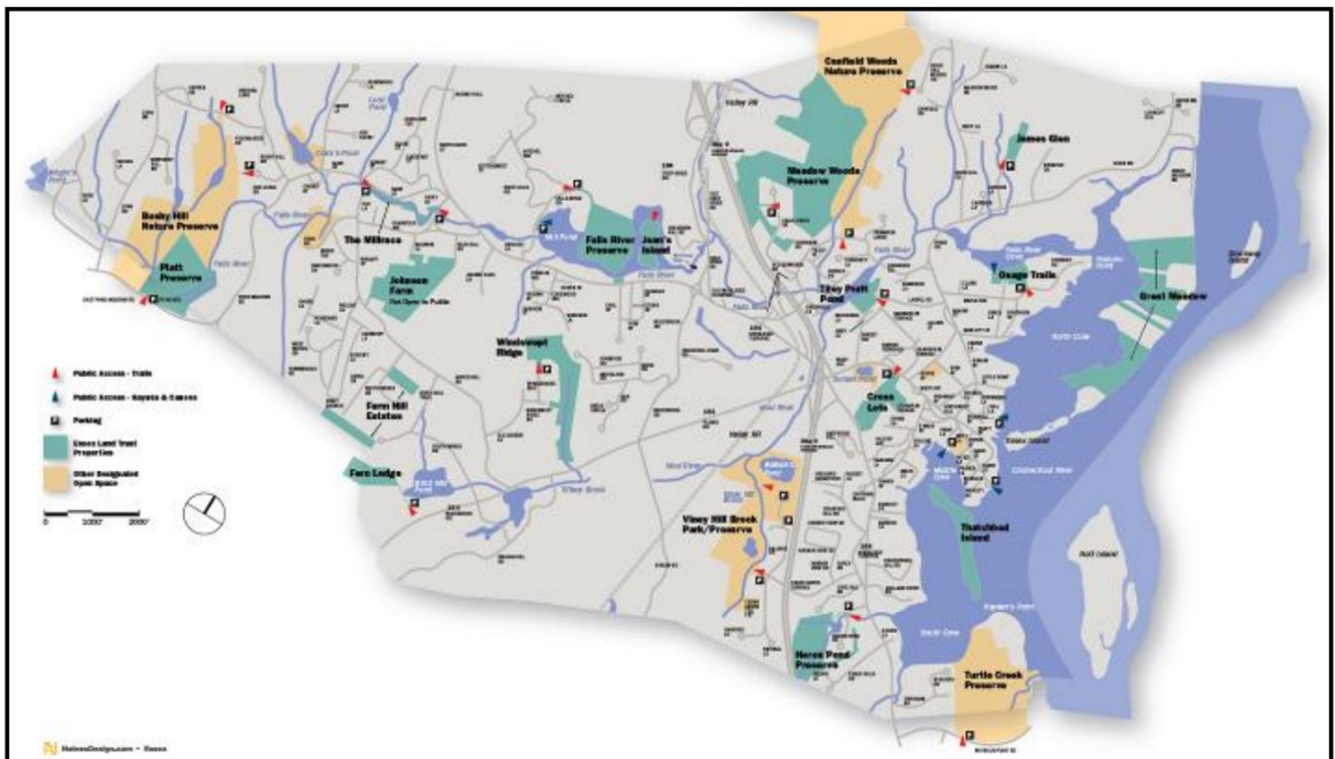
Map 4: **Critical Facilities** throughout Essex.
Source: RiverCOG





Map 5: Natural Diversity Area locations include State and Federally listed species and significant affected natural communities. Information on listed species is collected and compiled by the Natural Diversity Data Base (NDDDB) from a number of data sources. Exact locations of species have been buffered to produce the general locations. Exact locations of species and communities occur somewhere in the shaded areas, not necessarily in the center. Source: DEEP

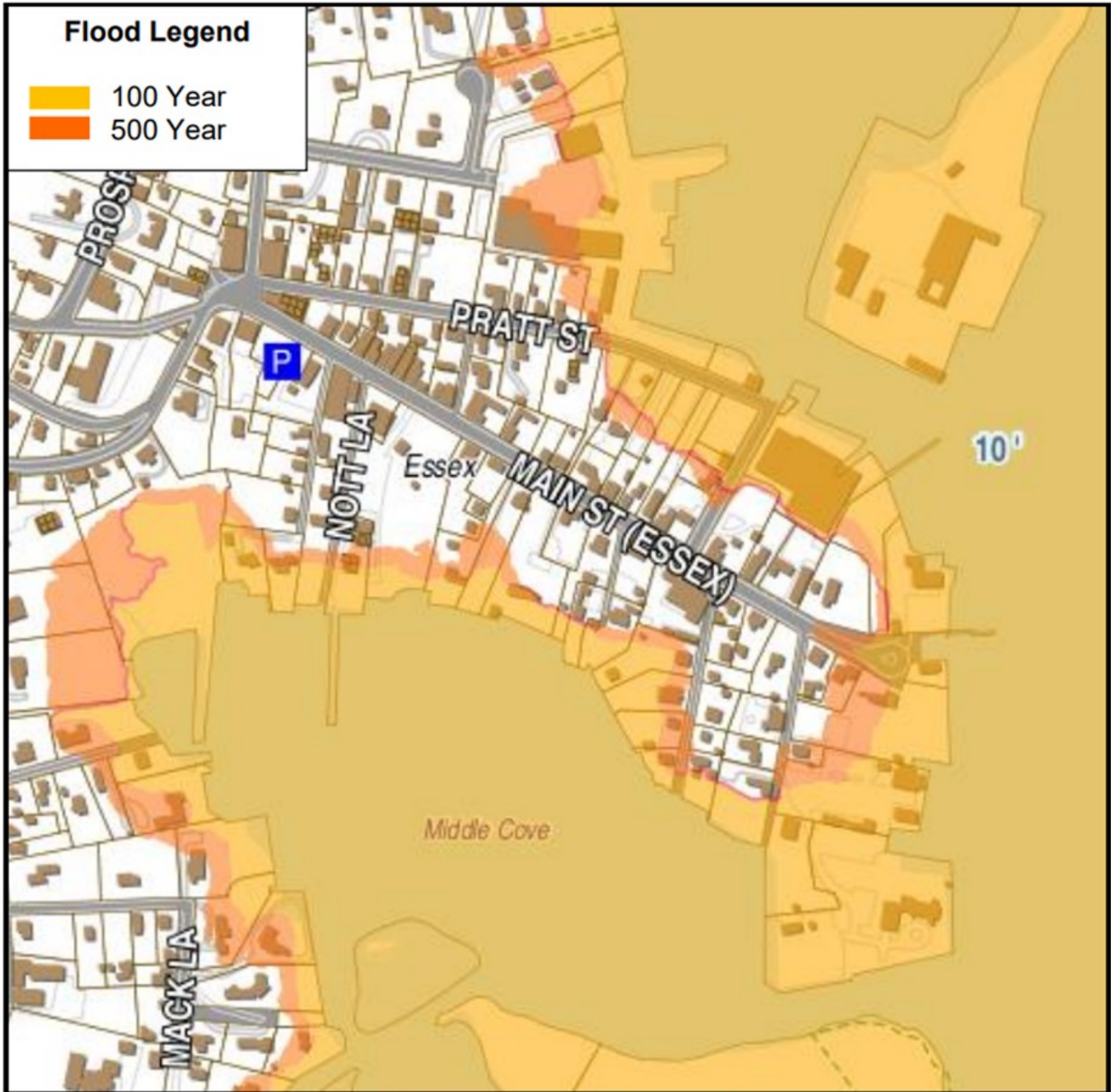




Map 6: Essex Open Space

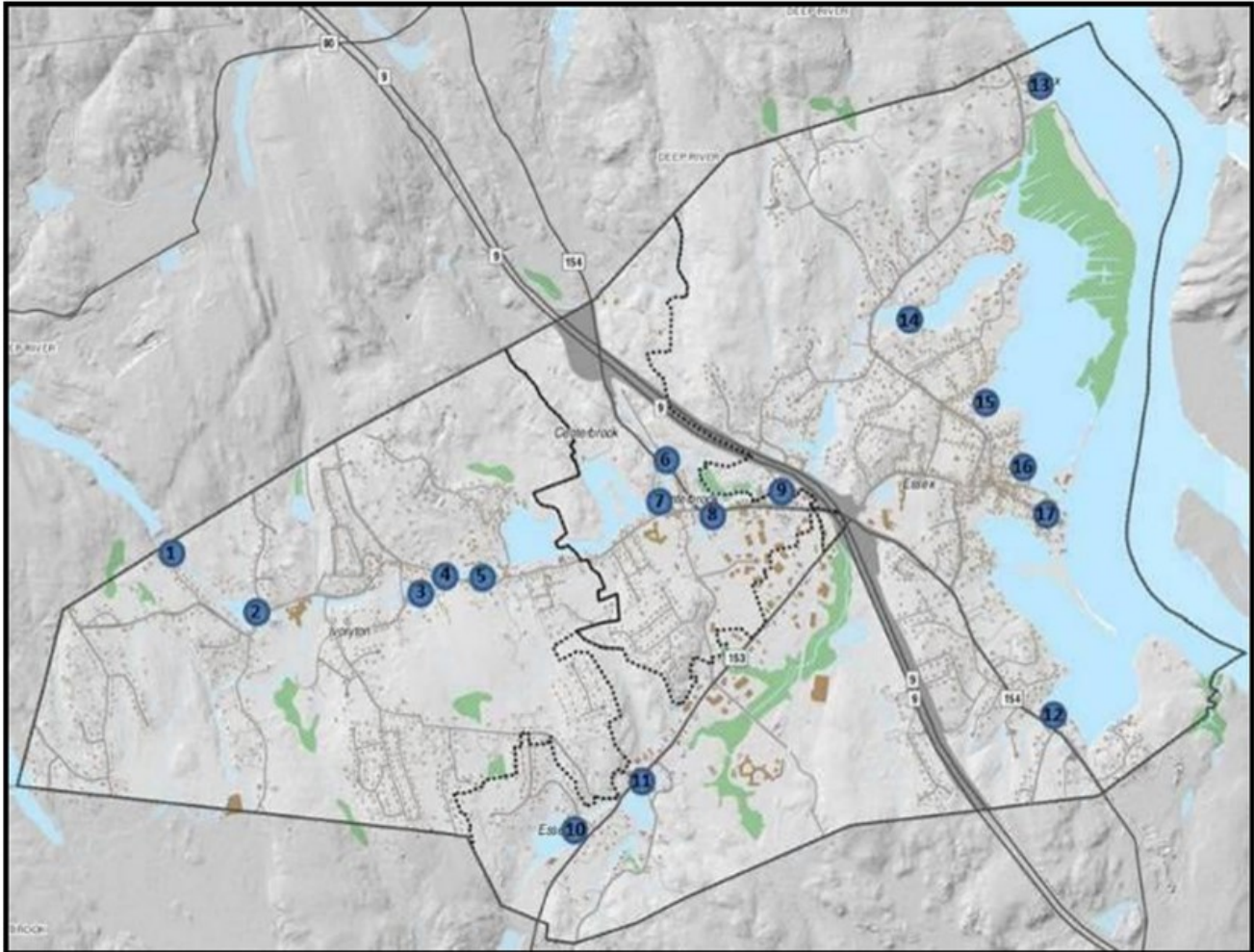
This map shows designated open space throughout Essex, both lands owned by the Essex Land Trust and lands owned by other entities designated as open space.

Source: Essex Land Trust (4/2013)



Map 7: **Special Flood Hazard Area** surrounding Essex Village Center.

This map shows the flood zone that runs through Essex's economic center. Visible is the extent of the downtown property that lies within the flood zone. This map is based on the latest FIRM, adopted August 28, 2008.



Hazard Legend

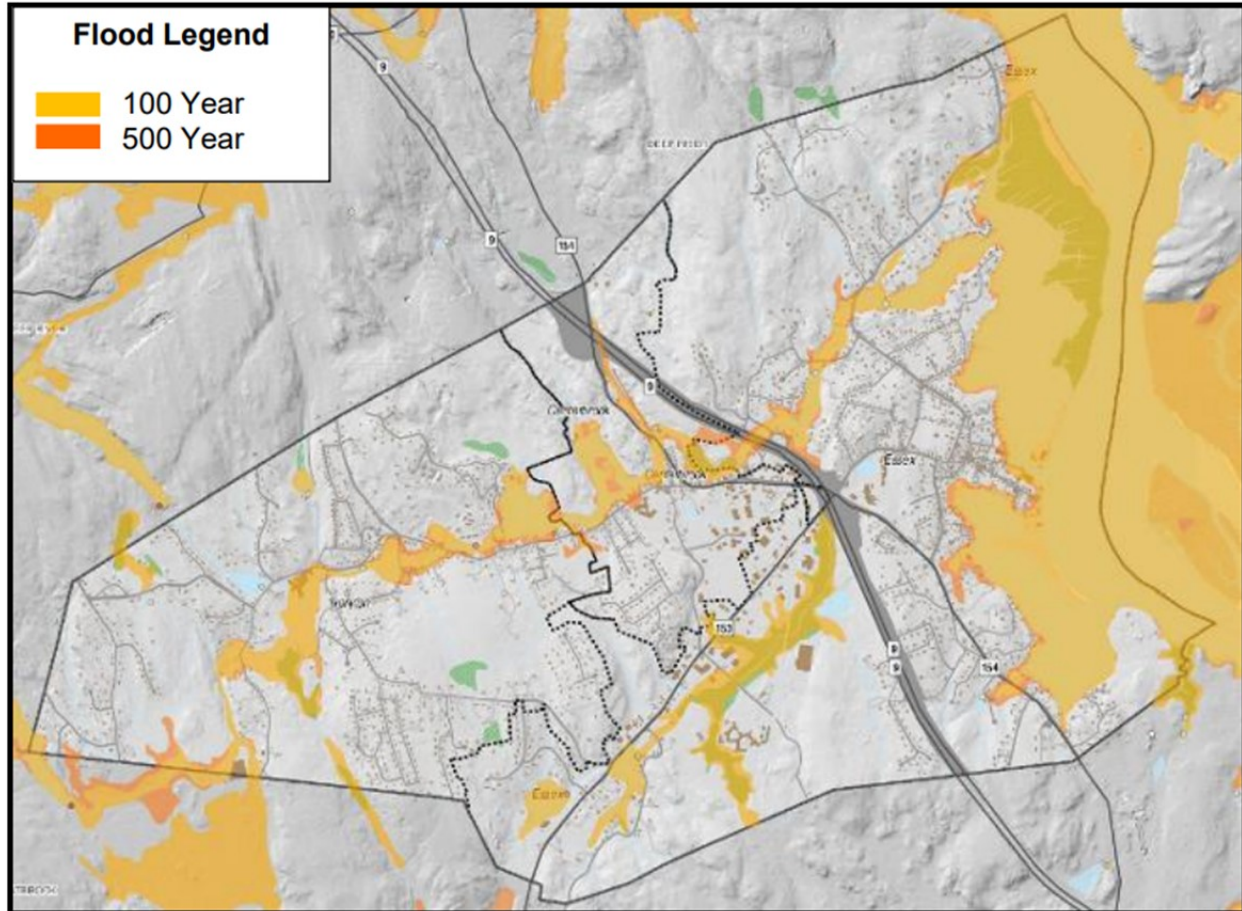
1. Bushy Hill Dam – Private Owner in Deep River
2. Clarks' Pond Dam – Private Owner
3. Residential Area – Density w/in flood plain
4. Commercial Flooding – Density w/in flood plain
5. Ivoryton Pond Dam – Private Owner
6. Dam Maintenance
7. Mill Pond Dam – Private Owner
8. Centerbrook Commercial and Residential Flooding
9. Flooding Under Route 9
10. Dam Maintenance - Private
11. Dam Maintenance - Private
12. Residential Area – Storm Surge and River Flooding
13. Residential Area – Storm Surge and River Flooding
14. Residential Area – Storm Surge and River Flooding
15. Residential Area – Storm Surge and River Flooding
16. Marina District – Storm Surge and River Flooding
17. Village Commercial and Residential Flooding

Map 8: Infrastructure Hazard Areas

This map depicts areas that are prone to nuisance and storm flooding, as well as other hazards, throughout town. Areas are based on a review completed by the Town for the 2006 NHMP.



Essex, CT

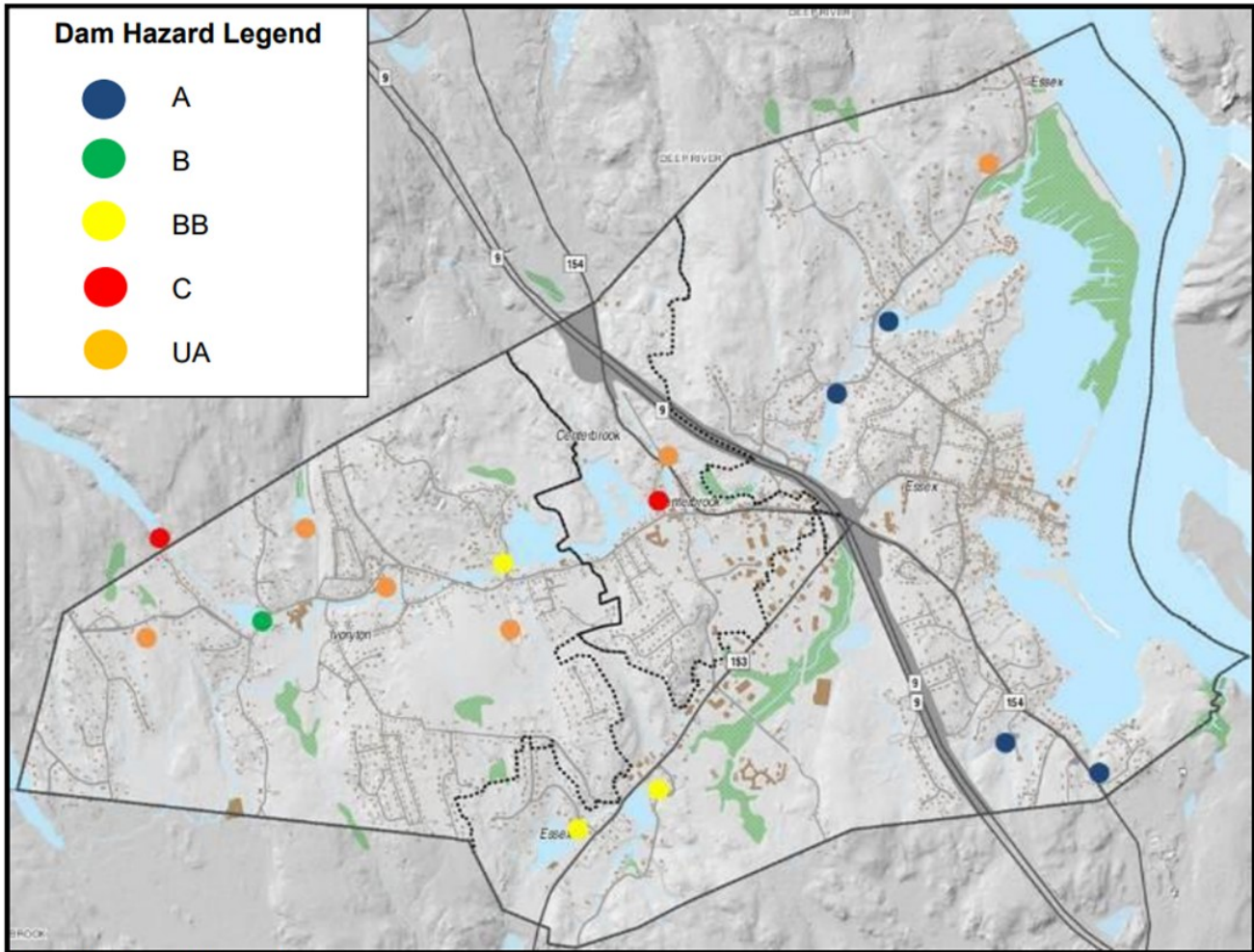


Map 9: **Flood Zones** in Essex.

This map depicts flood zones through Essex. Much of the flood zone occurs along the Connecticut River with a length along the Falls River (north) and the Mud River (south).

Source: Essex GIS (4/2013) Based on August 28, 2008 FIRM

Essex, CT

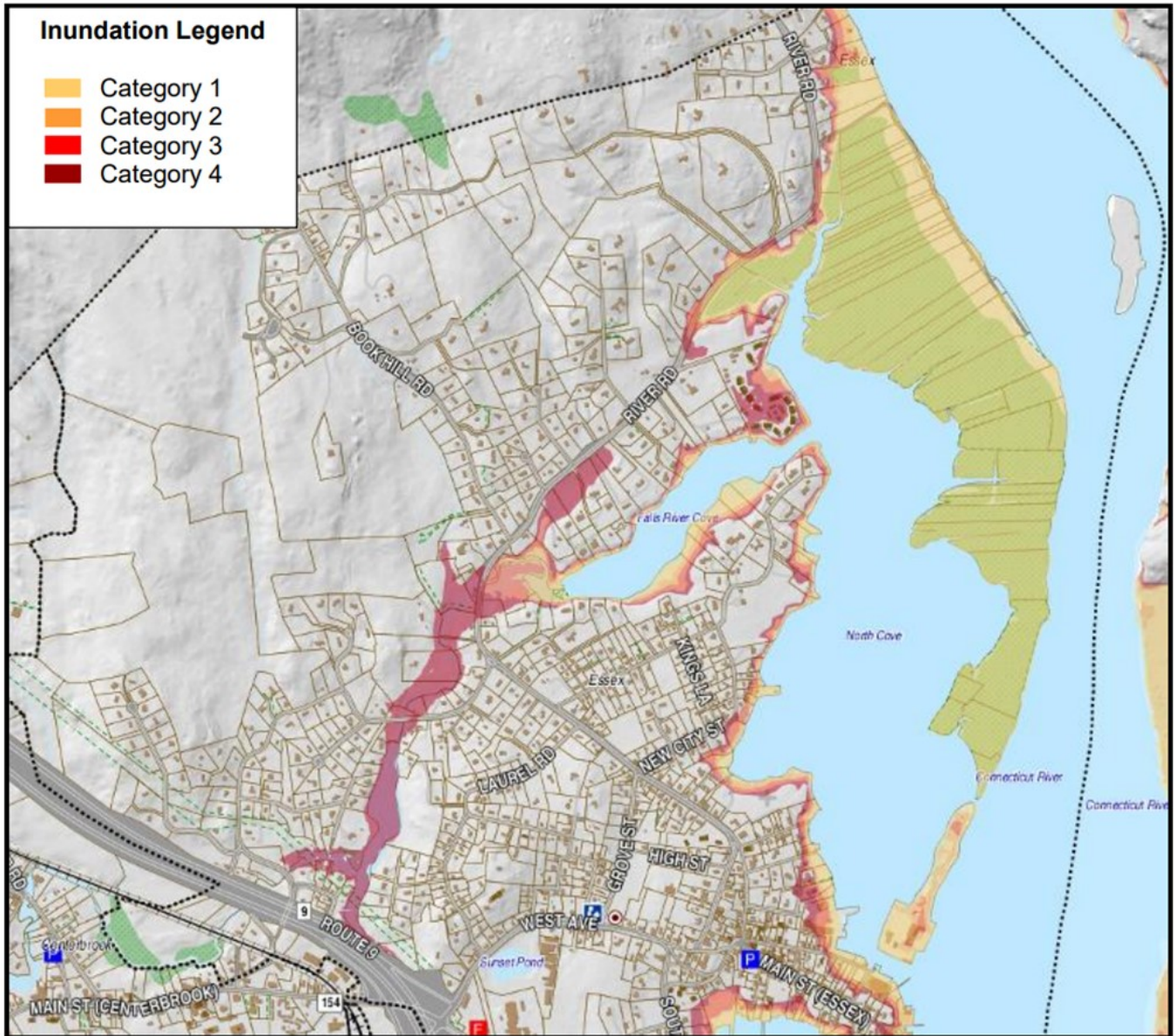


Map 10: **Dam Hazards**

This map depicts the locations of dams and flood zones in Essex and indicates their hazard potential classification. Note that the Bushy Hill Dam, the only High Hazard Dam is located in neighboring Deep River, though water flowing over the dam proceeds into Essex, approximately 350 feet downstream.

Source: Essex GIS (4/2013)

Essex, CT

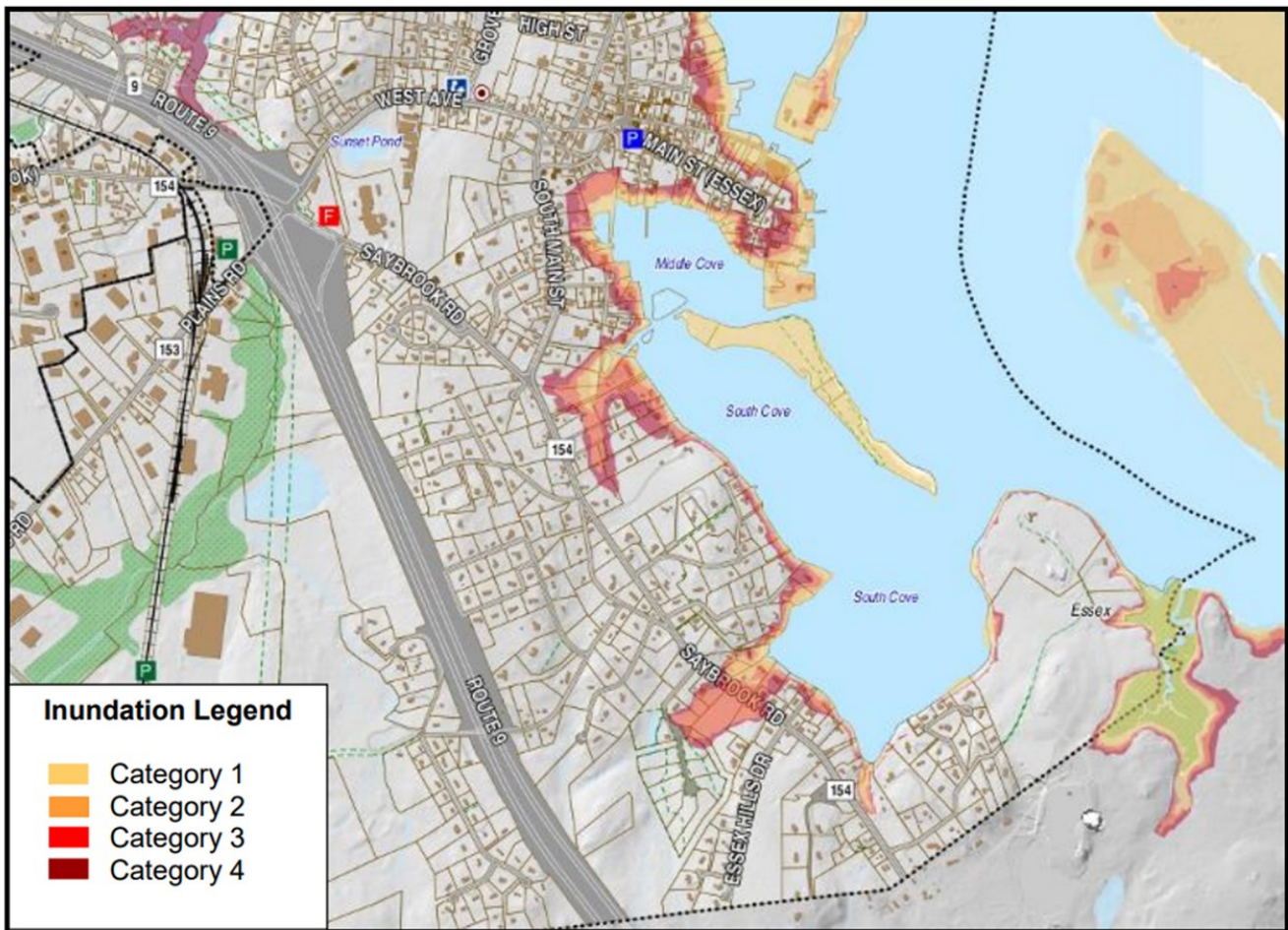


Map 11: **Hurricane Inundation** in the Northeastern part of town. Visible is the extent of the Falls River that would be affected by a Category 4 Hurricane.

Source: Essex GIS (4/2013)



Essex, CT



Map 12: **Hurricane Inundation** in the Southeastern Portion of Essex.

Source: Essex GIS (4/2013)



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