RESILIENT CONNECTICUT PHASE III:

EAST HARTFORD

Final Report | September 2025

East Hartford, Connecticut

AECOM

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Acknowledgements

TECHNICAL ADVISORY COMMITTEE MEMBERS

TOWN OF EAST HARTFORD

Steve Hnatuk, Deputy Development Director

Douglas R. Wilson, P.E, Town Engineer/Local Traffic Authority & Designated Agent EH Inland Wetlands – Environment Commission

Julia Mauer, Town's Public Health Emergency Preparedness Coordinator (cooling/heating center expertise)

Brian Jennes, Captain of Emergency Management

Sid Soderholm, Planning and Zoning Member

CONNECTICUT DEPARTMENT OF TRANSPORTATION (CTDOT)

Marissa Pfaffinger, Principal Engineer at CTDOT

Raquel Ocasio, CTDOT Bureau of Policy and Planning

CAPITOL REGION COUNCIL OF GOVERNMENTS (CRCOG)

Sonya Carrizales, Environmental Planner

PROJECT TEAM

CIRCA

Mary Buchanan, Project Lead, Planner

John Truscinski, CFM, Director of Resilience Planning

Nicole Govert, Planner

CONSULTANT TEAM

Geoffrey Morrison-Logan, PM, Lead Urban Planner and Community Outreach

Chayanika Mohan, Contracting Deputy PM Support

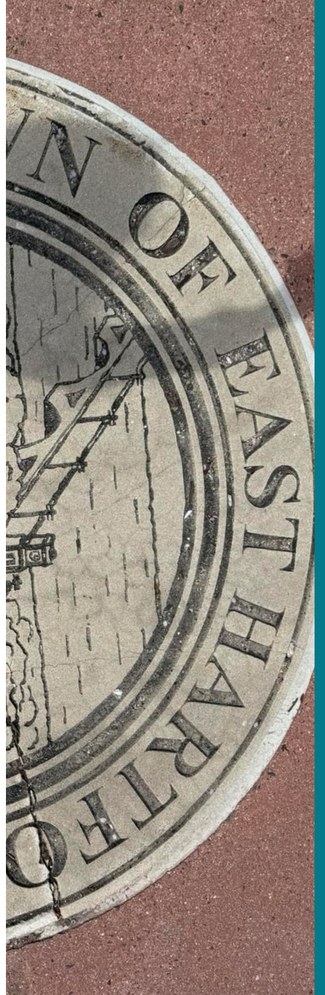
Ellie Peterson, Lead Climate Resilience Planner and Landscape Designer

Brad Sabean, PE, Lead Drainage Engineering

Casey Hardin, PE, Transportation Planning

Anne deBoer, Lead Sustainable Economics

Olivia DAlmeida, Senior Analyst



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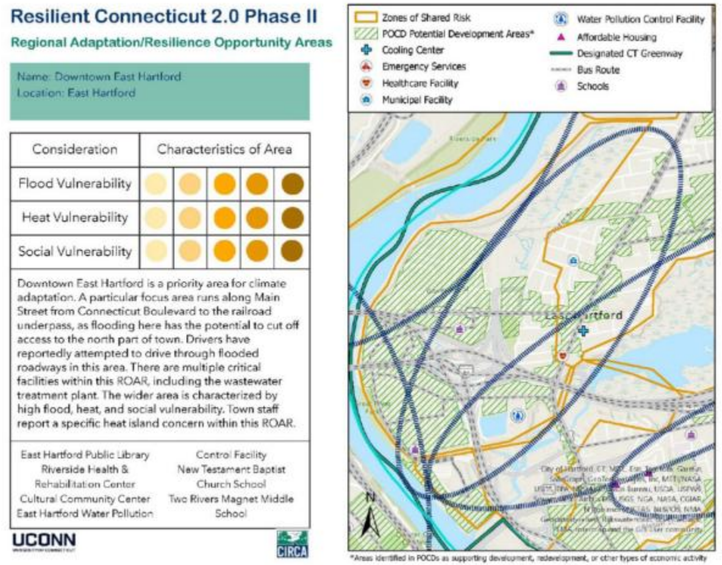
PROJECT INTRODUCTION AND ENGAGEMENT

PRELUDE TO RESILIENT EAST HARTFORD | RESILIENT CONNECTICUT

Resilient East Hartford is one of many selected projects under Phase III of the Resilient Connecticut program developed by the Connecticut Institute for Resilience and Climate Adaptations (CIRCA).

This initiative focuses on developing proactive strategies to reduce the long-term impacts of climate change on East Hartford, with an emphasis on the Main Street corridor in Downtown. While the existing levee system offers some protection from Connecticut River flooding, stormwater flooding remains a major concern. The community is also vulnerable to extreme heat due to dense development, large areas of impervious surfaces, limited green space, and a lack of nearby cooling centers with sufficient capacity.

CIRCA has been instrumental in supporting Connecticut communities in addressing climate-related vulnerabilities. Between 2022 – 2023, Resilient Connecticut Phase II assessed regional risk and vulnerability across Lower Connecticut River Valley (RiverCOG), The Southeastern Connecticut Council of Governments (SECOG), and Capital Region Council of Governments (CRCOG) regions of Connecticut. This assessment was also done in East Hartford and identified the downtown as a priority areas for climate adaptation based on projected heat impacts and stormwater flooding concerns at the railroad underpass on Main Street.



East Hartford ROAR and Selection Criteria

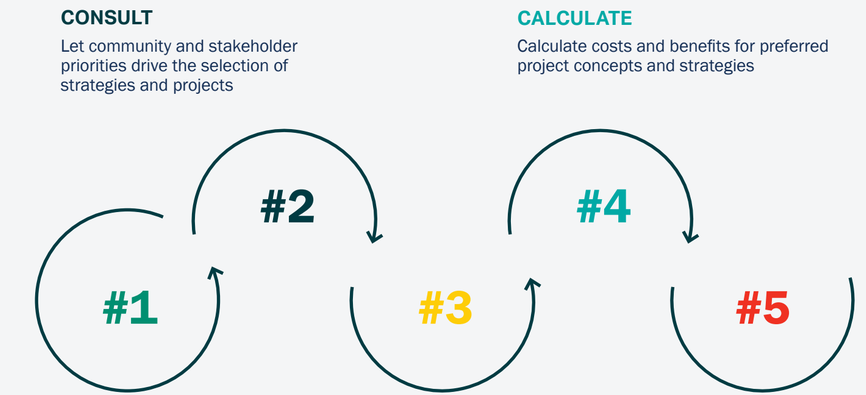
As part of Phase II's regional vulnerability assessment, 114 Resilience Opportunity Areas (ROARs) were identified and mapped across the RiverCOG, SECOG, and CRCOG regions to illustrate the intersection of climate induced flooding and heat risks with vulnerable populations.

The goal of Phase III *(Current Phase)* is to solicit planning level studies to further evaluate and develop strategies to address vulnerabilities in each of the selected communities.

DESIGN OBJECTIVES FOR PHASE III

Building on the key concerns identified in Phase II—such as the vulnerability of Downtown East Hartford to stormwater flooding and extreme heat, especially along the Main Street corridor—Phase III advances the project by focusing on actionable design strategies. This next phase seeks to use future climate projections for 2050 and 2100 to clearly communicate flood and heat risks, while prioritizing the protection of critical Town facilities from these environmental stresses. Community engagement remains central, ensuring that stakeholder priorities guide the selection of strategies and projects. Additionally, Phase III aims to visualize public realm improvements that enhance connectivity and resilience, preparing East Hartford for anticipated long-term climate impacts. A visual summary of the project's goals is provided in **Figure 1** below.

Figure 1. Project Goals - Step by Step



PROJECT TIMELINE & COMMUNITY ENGAGEMENT

As part of the Resilient East Hartford planning process, stakeholder and community engagement played a central role in shaping the selection of strategies and project areas. Over the course of the project, three advisory committee meetings were held with key Town and regional partners—including the Town Engineer, Deputy Director of Development, Planning & Zoning representatives, CRCOG, CTDOT, Public Health and Emergency Preparedness staff, and Emergency Management. These meetings helped identify priority sites such as the East Hartford Library, the Post Office parcels, and the Main Street corridor, and highlighted the need for integrated solutions addressing heat, flooding, and connectivity. In addition, an internal planning workshop and site walk further informed design opportunities by focusing on ground-level challenges such as impervious coverage, underused parking lots, and pedestrian barriers. A final public meeting was held in a hybrid format at Town Hall and online, offering residents and stakeholders a chance to weigh in directly. These engagement sessions ensured that the final design concepts were grounded in local knowledge and aligned with community needs.

For record of meeting notes taken for public engagement, please see **Appendix B**.

2025

JAN. **PROJECT KICK OFF**

Launched the project with CIRCA and Town staff, identifying major climate and infrastructure challenges in downtown East Hartford. Key concerns included stormwater flooding, extreme heat, and fragmented public space.

APR. **ADVISORY MEETING #1**

Shared heat projections for 2050 and 2100 and introduced strategies for cooling on Main St. Received feedback that the Cultural Center is a strong resilience hub candidate but already hosts many public services.

APR. **SITE WALK & TEAM WORKSHOP**

The East Hartford Town Engineer led a walk through of downtown with AECOM, CIRCA, and CRCOG to observe on-the-ground issues. Following the site walk, the team discussed benefits of implementing roundabouts, the need for more shade in public areas, and opportunities to reconfigure underused parking lots.

JUN. **PUBLIC MEETING AT TOWN HALL**

Held in person at East Hartford Town Hall with a virtual option for remote participation, the meeting engaged residents in open discussion. Attendees asked questions about the project scope, heat projections, state funding opportunities, zoning enforcement differences between East Hartford and Hartford, and how the study aligns with ongoing CTDOT Main Street improvements.

JUL. **ADVISORY MEETING #2**

Presented a zoning review comparing East Hartford to neighboring towns and explained the selection of a pilot project focused on reimagining public space on town-owned lots. Feedback included a request to develop cost estimates for the proposed improvements.

AUG. **ADVISORY MEETING #3**

Shared the draft final report for review, including updates to the heat analysis, stormwater modelling, cost estimates, and refined pilot site design. Final comments helped shape the report's recommendations.

INITIAL OBSERVATIONS

During the initial site walk through, AECOM identified key challenges and opportunities throughout downtown East Hartford, with input from Town staff helping to highlight priority areas for further study. The walk began at the East Hartford Library parking area, crossed Main Street toward the Town Green and Cultural Center, continued north to the railroad underpass, and returned along Burnside Avenue back to the Library on the opposite side of the study area. Key observations from this route are summarized below:

1. **Wide Roadway & Minimal Curb Definition** | Streets feature a car-dominated environment with overly wide roadways, excessive paving, and little curb definition.

2. **Walgreens & M&T Bank Shared Parking** | Example of how shared, right-sized parking can seamlessly integrate green infrastructure for both function and sustainability.

3. **Town Green & Cultural Center** | East Hartford's Town Green and Cultural Center already serve as a vital community hub—and with shade, space, and amenities, it's a strong candidate for a heatwave resilience center.

4. **Railroad Underpass on Main St** | The railroad underpass on Main St often floods during heavy rains as the overwhelmed stormwater system fails to drain water effectively.

5. **Burnside Ave Road Diet** | The Burnside Ave road diet has improved safety by calming traffic and protecting cyclists, but would also benefit from more shade trees to provide cyclists and pedestrians with heat relief.

6. **Post Office/Public Library Shared Parking** | East Hartford is evaluating the possibility of acquiring Main Street parcels such as the Post Office. This building could be repurposed to expand library services and could involve a redesign of shared parking lots for better public use.

PROJECT OVERVIEW

Resilient East Hartford focuses on three core subject areas, detailed in Chapters 3, 4, and 5 of this report. These focus areas were shaped by conversations with the Town and community and respond to the most pressing climate and social vulnerabilities: rising temperatures, more frequent and intense rainfall, and fragmented public spaces that leave key areas underused and neighborhoods disconnected. Together, these chapters present science-based, design-driven strategies to help East Hartford create a more vibrant, connected, and climate-resilient downtown.

This report recognizes ongoing projects like the Greater Hartford Mobility Program (GHMP), 99 Founders Plaza redevelopment, and CTDOT's Main Street redesign, which all seek to improve transit connectivity, lower emissions, and enhance public safety. For more on future downtown development, see Chapter 2.

Chapter 3: Urban Heat Relief Planning and Cooling Corridors

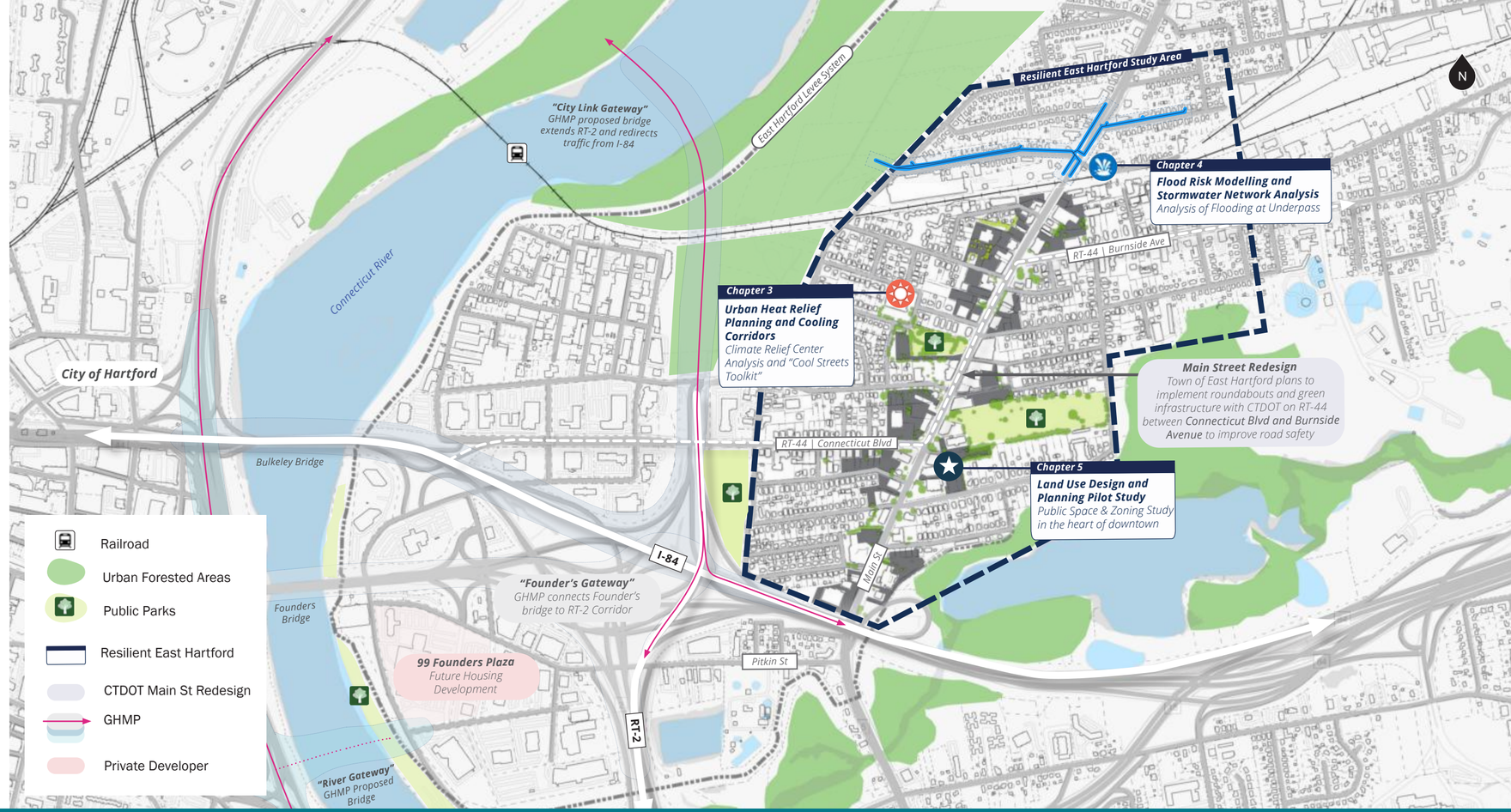
Chapter 3 includes East Hartford's growing vulnerability to extreme heat, with summer highs projected to surpass 90°F more than 70 days a season by 2090. Using CIRCA's Climate Change Vulnerability Index and NOAA's Climate Explorer, the study identifies civic buildings like the Community Cultural Center and Town Hall as potential future Heat Relief Centers. It also introduces strategies for cooling, applied to Main Street, using the Town Green to demonstrate how small-scale interventions can reduce heat, create lower temperature micro-climates, and enhance comfort at the local level.

Chapter 4: Flood Risk Modelling and Stormwater Network Analysis

Chapter 4 includes downtown East Hartford's stormwater and drainage issues, with a focus on the frequently flooded Main Street railroad underpass, where water is projected to pool up to 7 feet during major storms. Using site assessments and rainfall modelling, the study identifies key deficiencies—like undersized pipes, clogged drains, and low curbs—and recommends system-wide upgrades. The study includes a high-level cost estimate and Benefit-Cost Analysis outlining the expected expenses for replacing and upgrading the drainage system. This report determined the drainage upgrades needed, but ineligible for FEMA funding based on current data, and recommends flood warning signage be implemented for public safety and awareness.

Chapter 5: Land Use Design and Planning Pilot Study

Chapter 5 includes East Hartford's zoning policies and presents a pilot project that combines the East Hartford Library, U.S. Post Office lot, and adjacent housing parcels. The pilot study explores how zoning flexibility and town-owned land can be used to redesign and consolidate parking, which can improve efficiency while freeing up space for green infrastructure, recreation, and public gathering areas. The objective of this pilot study is to offer a clear, design-driven model for how climate-forward development can create a more resilient, connected, and vibrant downtown.



RECOMMENDATIONS OVERVIEW

The following text serves as a quick-reference guide, summarizing short- and long-term recommendations from Chapters 3, 4, & 5 of this report and detailing specific actions the Town can implement to enhance resilience, upgrade infrastructure, and support future development.

HEAT IMPACT IMPROVEMENTS

East Hartford experiences high heat vulnerability due to low percentage of urban tree canopy, and high levels of impervious surfaces (non-absorbing pavement types). Combined with the extreme heat future forecasts for the area, it is imperative to prepare for the future now with strategies to increase the number of Resilience Centers and implement the ideas associated with local Cooling Corridors.

Resilience Center Identification: The study identifies two potential locations for future Resilience Centers for the Town and recommends a list of critical services required for climate relief preparedness.

Action Items:

- Use this Study as a guide document when further work is done on developing these identified locations as official Resilience Centers.
- Identify additional locations for future Resilience Centers beyond Main Street

Cooling Corridor Implementation: The study identifies locations that are at high risk for extreme heat impacts on Main Street within the Town of East Hartford.

Action Items:

- Use this Study as an educational template and a reference document for planning future green street improvement projects or future efforts to expand tree canopy, such as canopy studies and tree planting analysis.
- Replicate the cooling corridor strategies applied at the Town Green throughout major streets (such as Main Street) and similar thoroughfares within the Town.

STORMWATER MANAGEMENT IMPROVEMENTS

Despite multiple existing stormwater facilities being in place, flooding remains a persistent challenge in East Hartford, particularly along Main Street. Four key factors contributing to stormwater challenges were identified: frequent flooding at the Main Street railroad underpass, inadequate storm drain maintenance, diminished curb height along roadway, and excessive impervious surfaces.

Data Collection: At present, the Town lacks data to quantify the costs and public hazards caused by stormwater flooding at the existing railway underpass and along Main Street. Future documentation of the rain and flooding events in this area could be an asset when applying for grants as well as future interdepartmental development projects.

Action Items:

- Proactive data collection and documentation of all significant future storm events.

Funding: While the Cost Benefit Analysis (BCA) for stormwater improvements at the railway underpass on Main Street did not demonstrate sufficient cost-effectiveness to qualify for a FEMA grant, there are potentially other funding opportunities that the Town can tap into for future stormwater improvement projects.

Action Items:

- Explore alternative funding sources that include local state and federal grants. (See **Table 1**)

Short-term Interventions: Advance short-term solutions while the Town explores funding opportunities for long-term improvements.

Action Items:

- Coordinate road flooding signage and other public awareness campaigns with CTDOT along state roads.
- Establish inter-agency information sharing protocols to ensure planned projects along Main Street account for flood impacts.

Long-term Recommendations: The future conditions model analysis for the 10-, 50-, and 100-year storm events at the Main St railroad underpass revealed a continuation of the existing backwater and overtopping issues and continued roadway flooding projected.

Action Items:

- Develop conceptual designs and pricing to modify the existing drainage system that are undersized.
- Explore the opportunities to add green infrastructure to absorb and manage stormwater naturally.
- Identify areas to increase tree coverage and reduce impervious surface.
- Review and adjust pavement practices between Connecticut Boulevard and Burnside Avenue to restore curb height and proper drainage into storm drains.
- Improve routine street maintenance of stormwater facilities

LAND USE AND RESILIENCE PLANNING STRATEGIES

The Pilot Study was conducted to demonstrate how targeted redevelopment of fragmented downtown parcels can improve land use efficiency, resilience, and connectivity, while serving as a replicable model for future revitalization across East Hartford.

Zoning Improvements: The Town's newly updated 2024 Zoning Regulations allow for the redevelopment of parcels along the urban core without the requirement for additional parking, which could present a greater opportunity for redevelopment.

Action Items:

- Permanent parking requirement reduction in B-5 could be extended to include new construction and additions to existing buildings.
- Review standard parking minimum requirement of Town and identify opportunities to implement parking maximum vs minimum requirement.
- Reinforce future zoning and land use regulations that support flexible parking space requirements
- Improve zoning allowances for shared-use parking among multiple businesses, sites and properties
- Incentivize green building/ infrastructure practices including the use of pervious pavement, green roofs, rain gardens, and bioswales

State and Local Collaboration: Apart from planning the internal site improvements, the pilot study also focuses on its tie-ins with other planned Town projects, such as the Main Street Redesign project. The draft visualizations from that study indicate the potential for additional improvements that could supplement the Main Street Redesign project, such as the addition of green infrastructure and shade trees along the proposed median and sidewalks lining Main St.

Action Items:

- Coordinate closely with CTDOT during the Main Street Redesign process to evaluate and integrate supplemental improvements identified in this Study, including green infrastructure, shade trees, and expanded sidewalks
- DOT should position the Town as a co-lead in implementation of resilience upgrades and planning for Main St, ensuring that resilient and complete streets strategies are advanced through state-led planning and design efforts

Town Implementation and Future Planning: Building on the state-led Main Street Redesign, the Town should take the lessons from this Pilot Study and apply them through its own capital projects, building improvements, and long-range planning.

Action items:

- Advance complementary Town-led capital and building projects that reinforce resilience objectives, including sidewalk and bike network connections, drainage or stormwater retrofits, and municipal facility upgrades
- Leverage this Pilot Study as a framework for replication, applying Resilience and planning strategies across all Town functions, land use, stormwater management, building design, and public space investments while also using it as a tool to promote awareness and garner support from public stakeholders and private property owners.

Site Improvements: With the parcels on the pilot study being Town-owned, the Town should continue to coordinate internally to identify steps to further development and implement the proposed conceptual plan for the site.

Action Items:

- Information sharing and referencing the site improvements proposed at the Church's Corner Inn/future mixed-used development.
- Information sharing and referencing the site improvements proposed at the Post Office redevelopment, if acquired by the Town.
- Refine costs and implementation steps
- Develop a plan to execute project through design development, and construction administration documentation.

Table 1: Funding Resources

Future Development Recommendations	Short Description	Funding Programs	Eligible Activities	Match Requirements
Resilience Center Implementation	Convert or upgrade identified sites into officially designated Resilience/Cooling Centers (power, HVAC, backup, service areas, outreach)	• **CDBG (Community Development Block Grant)** (Local) • **FEMA Hazard Mitigation Assistance (HMGP/ BRIC/FMA)** (Federal)	• **Facility upgrades** (CDBG) • **Community services** (CDBG) • **Structural or community resilience improvemnets** (BRIC/HMGP)	• **CDBG:** Typically none • **FEMA HMGP/BRIC:** 25% non-federal match
Cooling Corridors & Complete Streets Improvements	Street tree plantings, implementing shade trees, green stromwater infrastructure, pedestrian/bike improvements on Main St and other corridors	• **CT DEEP Urban Forestry/Trees for Communities** (State) • **CTDOT Bicycle, Pedestrian & Complete Streets/ Transportation Rural Improvement Grant (TRIP)** (State) • **Federal Transportation Alternatives (TA via CTDOT and USDOT)** (Federal)	• **Tree planting & Canopy projects** (CT DEEP) • **Transportation Grants for pedestrian/streetscape projects** (CDBG) • **Transportation and Complete streets projects** (TA)	• **CT DEEP Trees for Communities:** 25% local match (cash or in-kind) • **CTDOT/FHWA:** 20% local match
Stormwater System Improvements at Railroad Underpass (Main St)	Engineering, drainage upgrades, green infrastructure, and undersized-drain replacement to reduce roadway flooding/backwater	• **CT DEEP Clean Water Fund/State Funding for Municipal Wastewater/Stormwater Projects** (State) • **EPA Clean Water State Revolving Fund (CWSRF)** (Federal) • **FEMA Hazard Mitigation (HMGP/BRIC)** (Federal)	• **Low Cost Financing via Clean Water Fund** • **Low-cost loans/funding for Green infrastrucutre** (CWSRF) • **Flood mitigation and resilient drainage** (HMGP/BRIC)	• **EPA CWSRF:** State set match
Pilot Project Site Improvements	Small-scale site reconfiguration, shared parking, green infrastructure, improvements to town-owned parcels	• **CT DEEP Urban Green & Community Gardens Grant Programs (UGCG)** (State) • **CT DEEP Urban & Community Forestry Planning Grants** (State) • **USDA Urban & Community Forestry/Forest Service grants** (Federal) • **NOAA Climate Resilience/IRA-funded resilience competitions** (Federal)	• **Urban green-space & green infrastucture improvements** (UGCG) • **Plannng/Implementation of tree/green projects** (CT Deep Urban & Community Forestry Planning) • **Planting and Maintenenance support and technical assistance** (USDA) • **Regionally-scaled resilience/demonstration projects** (NOAA)	• **CT DEEP Urban Green & Communities:** 25% local match • **USDA:** Typicaly 1:1 match (50%)
Data Collection & Storm Event Documentation	Installation of gauges, collecting, surveying and monitoring flood event data	• **CT DEEP Planning or Urban Forestry Planning Funding** (State) • **FEMA Hazard Mitigation planning grants/HMA** (Federal)	• **Funding for monitoring components** (CT DEEP) • **Hazard/Vulnerability Assessments** (FEMA)	
Public awareness and inter-agency coordination	Road flooding and educational signage, outreach campaigns, coordination with CTDOT for state roads	• **CDBG Operating budgets** (Local) • **Regional Council (CRCOG) Planning Assistance** (State) • **FEMA/HMA/NOAA Grant** (Federal)	• **Outreach and minor signage** (CDBG) • **Public Outreach Funding** (FEMA/HMA/NOAA) • **Hazard Mitigation warning signals** (FEMA/HMA)	
Zoning & Land-use changes to support parking redevlopments	Regulatory changes to encourage flexible parking, shared parking and reduce impervious surfaces	• **OPM/Regional Council Assistance Grants** (Local & State) • **HUD CDBG/Economic Development grant** (Federal)	• **Techncal Assistance** (OPM) • **Planning Efforts and Redevelopment Strategies in low/mod neighborhoods** (HUD)	
Improve routine street maintenance of stormwater facilities	Maintenance programs (catch basin cleaning, debris removal, curb height repairs)	• **CT DEEP Urban Forestry/Planning Grants** (State)	• **Municipal operations funding with maintenance line items** (CT DEEP)	

02
CONTEXT AND DOCUMENT REVIEW

CONTEXT

East Hartford sits just 3.6 miles east of Hartford, along the east bank of the Connecticut River. The study area spans Connecticut Boulevard, Pitkin Street, and the northern section of Main Street, where key commercial corridors intersect up to the railroad underpass. This area blends residential, commercial, retail, and municipal uses, with ongoing efforts to boost connectivity and economic vitality.

With a population of 50,588, East Hartford has experienced a gradual decline since the 2000s, largely due to shifting employment opportunities. Once a major industrial hub, the town is best known as the home of Pratt & Whitney, an aerospace manufacturer that played a critical role in the Revolutionary War and World War II. As industry evolved, former industrial sites opened the door for redevelopment and adaptive reuse, setting the stage for economic renewal.

Currently, East Hartford is moving forward with revitalization efforts, particularly along Main Street, with a vision to create a dynamic downtown district. Plans focus on mixed-use development, upgraded public spaces, and economic expansion. Infrastructure improvements, transit-oriented development, and sustainability initiatives are in motion to attract businesses, enhance walkability, and strengthen the town's long-term resilience.

To address environmental challenges, East Hartford is actively engaging in sustainability efforts. The town participates in *Sustainable Connecticut*, a voluntary certification program to recognize thriving and resilient Connecticut municipalities, and collaborated with Resilient Connecticut during Phase II and Phase III. These initiatives aim to enhance public health, protect infrastructure, and future-proof the community against climate change.

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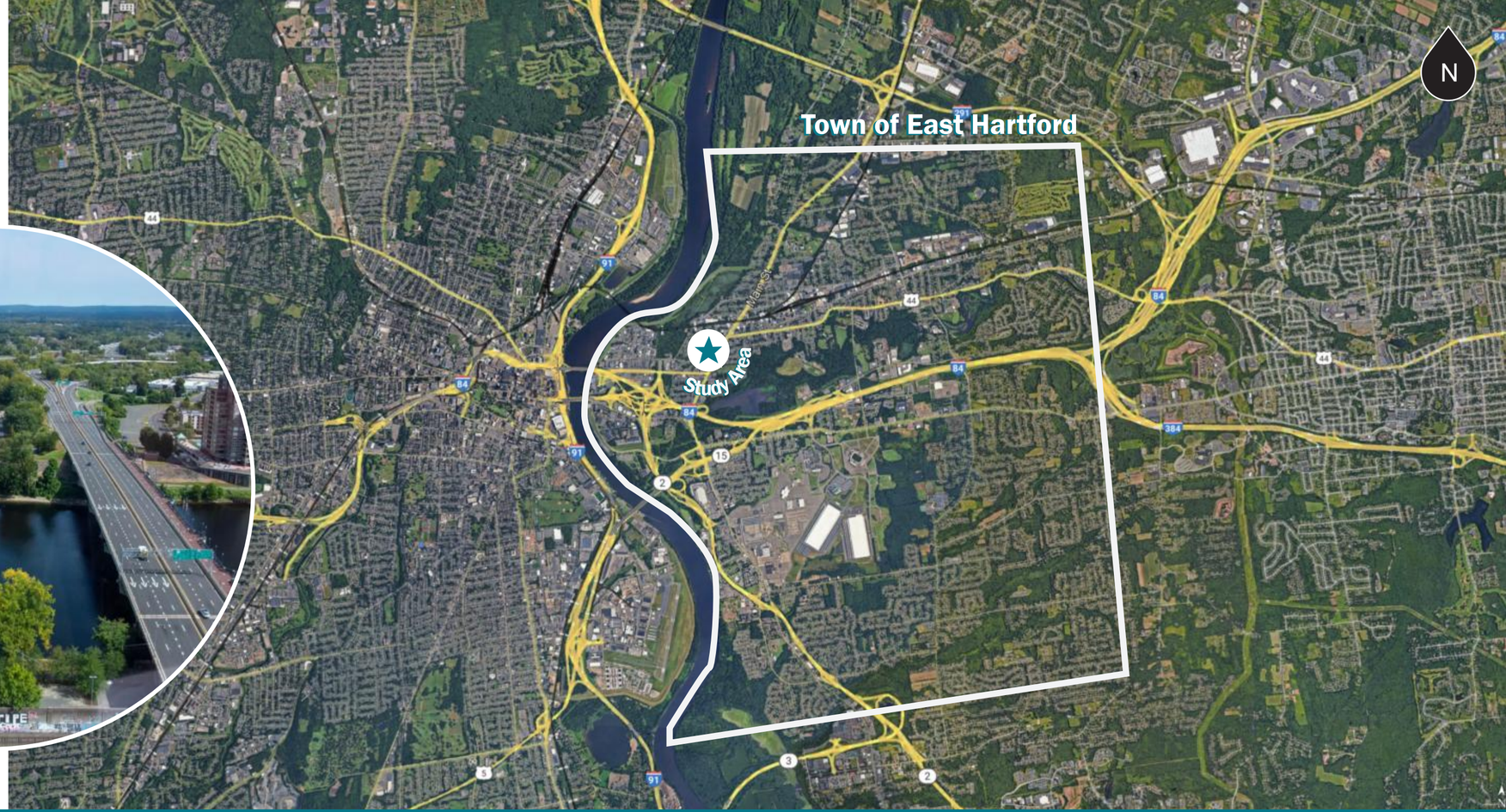


REVIEW OF PREVIOUS TOOLS & PLANS

East Hartford Plan of Conservation and Development, 2025-2035, Adopted: January 2025

The Town of East Hartford, Connecticut Plan of Conservation and Development is a comprehensive planning document outlining various aspects of the town's demographics, land use, housing, transportation and community resources, to serve as a long-range guide to future developments. The Plan of Conservation and Development (POCD) for East Hartford was updated in 2024 and is reviewed every 10 years.

The 2024 update process began mid-2023 and included 2 public workshops and robust stakeholder involvement, with meetings with various Town boards and commissions. The updated POCD incorporates a new vision statement and goals focusing on revitalization and community input. Founders Plaza will be a key focus of this chapter, envisioning this block as a vibrant, mixed-use waterfront district that is seamlessly integrated with the surrounding community and regional assets. In addition, the Plan aligns with regional frameworks developed by the Capitol Region Council of Governments (CRCOG), reinforcing East Hartford's role as a connected and transit-accessible hub with potential for targeted growth along key corridors.

The East Hartford Plan of Conservation and Development (POCD) continues to recommend the consideration of additional green land use regulations, such as:

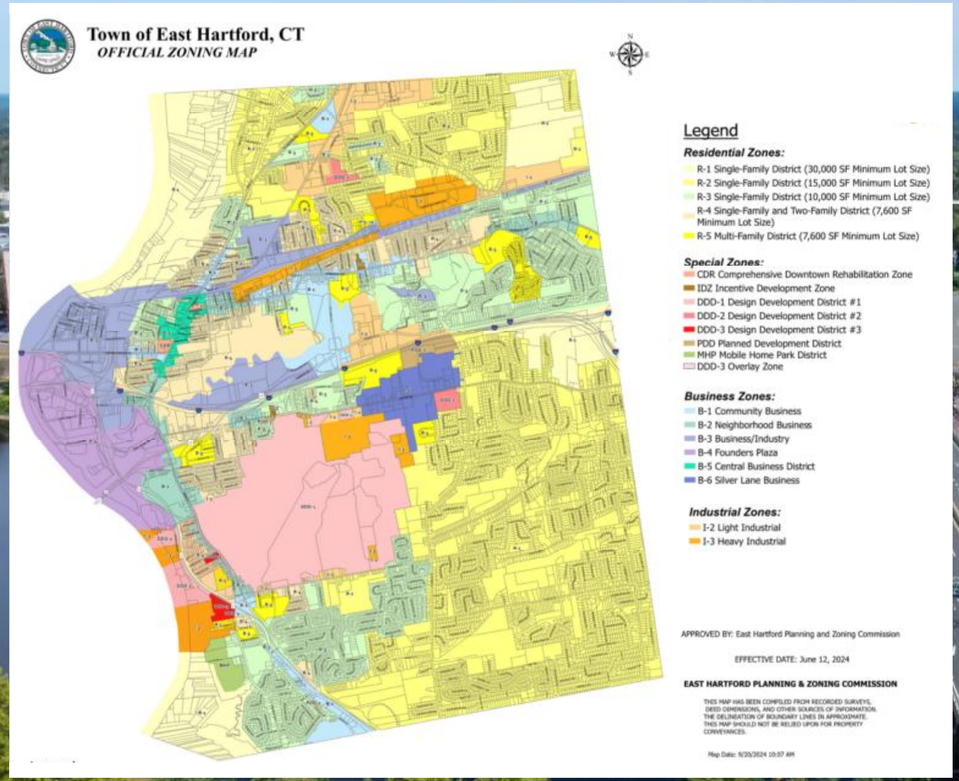
- Reduction of parking minimums as appropriate and/or consideration of parking maximums.
- Implementation of innovative parking solutions such as shared parking.
- Incentivization of green building/ infrastructure practices including the use of pervious pavement, green roofs, rain gardens, and bioswales.
- Establishment of undisturbed buffers and setbacks along the Connecticut River and along large/high functioning wetland areas.

These regulations were consulted in the zoning review in **Chapter 5** of this report.

The Capitol Region Council of Governments (CRCOG) Natural Hazard Mitigation and Climate Adaptation Plan (HMCAP)

The CRCOG HMCAP is a multi-jurisdictional strategy developed in partnership with UConn's Connecticut Institute for Resilience and Climate Adaptation (CIRCA) to reduce or eliminate the long-term impacts of natural hazards on people, property, and resources. This is achieved through preventative policies and adaptive actions addressing climate change. The strategy follows a four-part cycle: prepare to prevent losses, withstand an event, recover from an event, and adapt to reduce future disruptions. In East Hartford, mitigation planning focuses on flood-prone areas like Silver Lane Plaza and parts of the Willow Brook flood zones, guided by state and local flood regulations and building codes. Critical facilities include the Emergency Coordination Center, East Hartford High School (primary shelter), Raymond Library, the new Senior Center, and five fire stations. Raymond Library and the Public Safety Complex lobby currently serve as cooling centers, with efforts underway to expand shelter access due to aging and limited infrastructure. **Chapter 3** of this report looks into additional public buildings in the downtown that could be adapted in the future as heat relief centers.

Additional resilience efforts include a $21 million levee system improvement program, a comprehensive flood control study with the US Army Corps of Engineers, and the Brewer Street Reconstruction Project to raise infrastructure above 100-year flood elevations. The Town also coordinates with Eversource for proactive tree trimming to reduce power outages and is expanding GIS capacity to improve emergency response and track disruptions. East Hartford's five updated HMCAP goals—developed with CIRCA and aligned with Resilient Connecticut—are: ensure resilient critical facilities, address extreme heat risks, reduce flood and erosion vulnerabilities, minimize losses from all hazards, and invest in resilient corridors that maintain access to services during floods.



Town of East Hartford POCD

Published on EastHartfordct.gov in September 2024.

REVIEW OF PREVIOUS TOOLS & PLANS | CONTINUED

USACE Hartford/East Hartford Levee Rehabilitation Section 16 Feasibility Study

The United States Army Corps of Engineers (USACE) Hartford/East Hartford Levee Rehabilitation Section 16 Feasibility Study is an investigative plan analyzing the viability of rehabilitating and upgrading the existing levee system in the town of Hartford and the town of East Hartford. The goal of this study is to reduce risks to life and properties within surrounding communities.

The document addresses schedule dates, cost estimates, and documentation reviews of District Quality Control (DQC), Agency Technical Review (ATR), and Independent External Peer Review (IEPR). Other included reviews are Safety Assurance, Cost Engineering, Public, Policy and Legal Compliance. Hartford and East Hartford's existing levee systems are diagrammed in the study, followed by a problem statement synopsis, that highlights existing flood risks due from outdated systems. The study includes alternative measures, risk assessments, planning, engineer and construction models, in addition to system and cost projections.

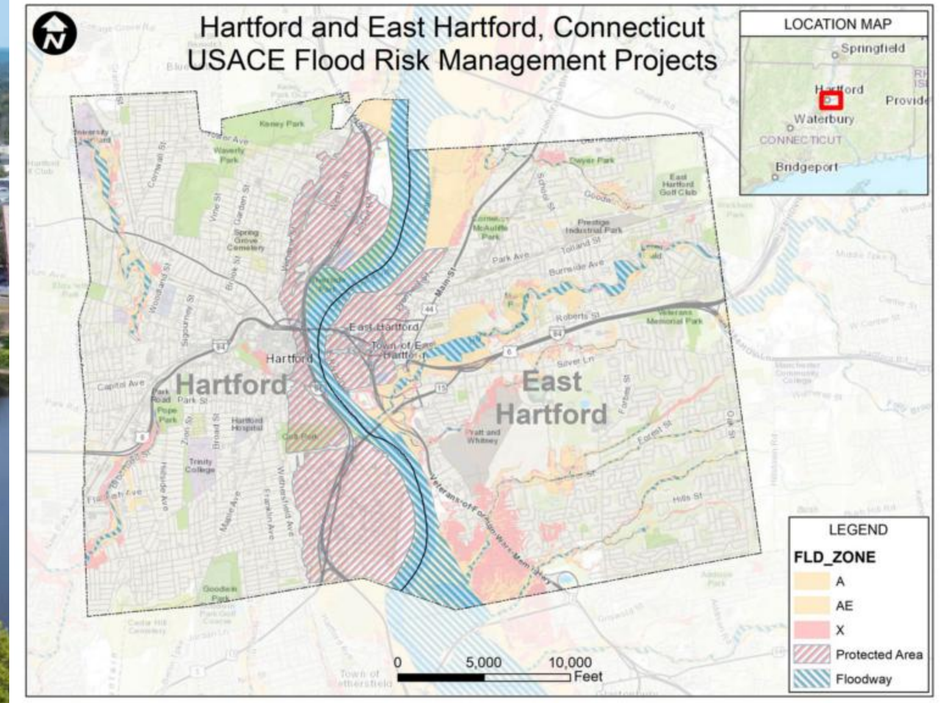
The Federal Emergency Management Agency (FEMA) National Flood Hazard Layer (NFHL)

The NFHL is a database that observes flood hazard data, it analyses currently effective data to understand flood risk and flood types. FEMA provides the data received from NFHL to the National Flood Insurance Program (NFIP) to provide support in reducing flooding risks and protect property owners and businesses.

The FEMA NFHL classification map shows an overview of flood hazard zones in East Hartford, highlighting regions at risk of flooding based on probabilities and conditions. The study outlines different types of inland flooding, and details how FEMA categorizes flood zones based on their risk levels. The flood zone categories include the 1% and 0.2% annual chance flood hazards, regulatory floodways, and areas with undetermined flood risks.

According to FEMA's database, both the Connecticut and Hockanum River are categorized under regulatory flood ways. The map classifies areas surrounding regulated floodway in the 1% and 0.2% annual chance flood hazard zone type, but floodway areas within the levee system are reduced risk. Main Street and its surrounding neighborhoods are categorized under unclassified, potentially due to insufficient or outdated data.

The data that influences FEMA's metric includes Flood Insurance Rate Maps (FIRMs), Topographic and Elevation Data, Hydrologic and Hydraulic Studies, Coastal and Riverine Flooding Data, Levee and Infrastructure Data, Climate and Future Conditions Data, Aerial and Satellite Imagery. In cases, like East Hartford, where vast areas are unclassified or lacking data could be due to data reporting errors, lack of data availability, outdated flood mapping and use of local flood hazard mapping as opposed to FEMA. Nonetheless, the NFHL map highlights the impact of leeves in mitigating flood hazard risks.



USACE Hartford/East Harford Levee Rehabilitation Section 16 Feasibility Study

Published on nae.usace.army.mil in 2023.

FUTURE DEVELOPMENTS IN DOWNTOWN

Within the time horizon of *Resilient East Hartford* other significant projects are proposed within East Hartford, namely the Greater Hartford Mobility Program (GHMP) and the Port Eastside development. These proposed projects will bring about significant changes to the transportation network and land use in the downtown area.

Greater Hartford Mobility Program (GHMP)

The GHMP is a program of small and large projects aimed at improving the way people move in and through the Hartford region. For East Hartford this means a realignment of I-84 to the north over a new multi-modal bridge, a reconfigured Mixmaster (i.e. the Rt 2 and I-84 interchange), new local road connections into Hartford (over reconfigured Founders' and Bulkeley bridges, as well as new bridge to the south), as well as an early action project of renovating Main Street.

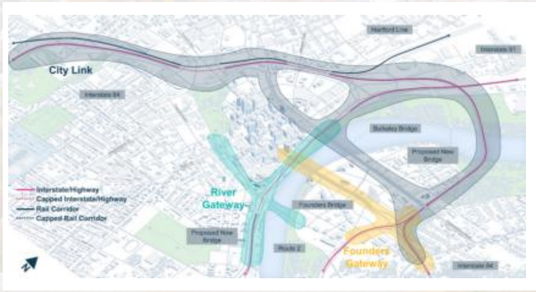
For the larger components of the GHMP occurring in East Hartford the recommended treatments in this plan should serve as a guide for best practices for developing resilient transportation systems. The incorporation of permeable pavements, bio-swales, rain gardens, trees and native vegetation will help better infiltrate storm water and mitigate urban heat island to create a more resilient and livable future network.

Main Street Redesign, CTDOT

The Main St. East Hartford project will have the most immediate overlap with the recommendations of Resilient East Hartford. This project will renovate Main St to potentially include a road diet and configuration of the three signalized intersections to roundabouts as well as improved accommodations for pedestrians and cyclists. The additional space created through the proposed road diet could facilitate the implementation of runoff infiltration improvements and Urban Heat Island (UHI) mitigation strategies recommended in Chapter 3 of this report.

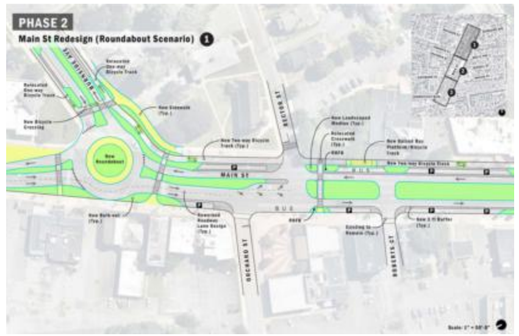
Founders Plaza Redevelopment ("Port Eastside")

A significant portion of East Hartford's waterfront is occupied by highway infrastructure and underutilized office space. The Port Eastside project is a proposed major redevelopment of 28 acres of East Hartford's riverfront with 1,000 planned residential units as well as several hundred thousand square feet of mixed use, retail and entertainment space. The proposed redevelopment is complementary to the goals of the GHMP and the co-benefits of the proposed mitigation strategies proposed by Resilient East Hartford to create a more resilient and livable East Hartford. The Port Eastside project area was specifically excluded from the study area of Resilient East Hartford for this reason. As with the GHMP, the recommended mitigation strategies in Resilient East Hartford should serve as a foundation for implementing effective, sustainable, and resilient practices in future developments such as Founder's Plaza.



Greater Hartford Mobility Program (GHMP)

GHMP Core Components Overview (Source: CTDOT, 2025)



Main Street Redesign, CTDOT

Potential East Hartford Main Street Reconstruction Concept off Burnside Ave (Source: Town of East Hartford)

99 Founders Plaza ("Port Eastside")

Figures above show plans and renderings in development of 99 Founder's plaza (Source: Port Eastside Hartford Regional)

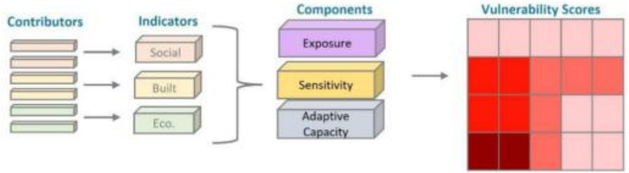
03
URBAN HEAT RELIEF PLANNING

HEAT IMPACTS | CLIMATE CHANGE VULNERABILITY INDEX

Tools developed by CIRCA were used to help identify heat impacts within the project area. One of these tools, the Climate Change Vulnerability Index (CCVI) is an index-based spatial model that identifies community vulnerability to flood and heat-related impacts of climate change. This metric looks beyond mean ground temperature and also considers additional social and public infrastructure factors which can assess how resilient a community is to an extreme climate event. The CCVI characterizes areas based on an equation using sensitivity times exposure, divided by adaptive capacity. The combined score of the exposure, sensitivity, and adaptive capacity datums determines the overall vulnerability score (See figure below for further explanation of CCVI formula).

Based on this analysis, the Main Street corridor in downtown East Hartford is most at risk of experiencing an extreme heat event, which directly impacts the surrounding community. The final score for East Hartford was 0.35, which is in the high midrange, but if the downtown area of East Hartford were considered independently, the overall vulnerability score would be much higher.

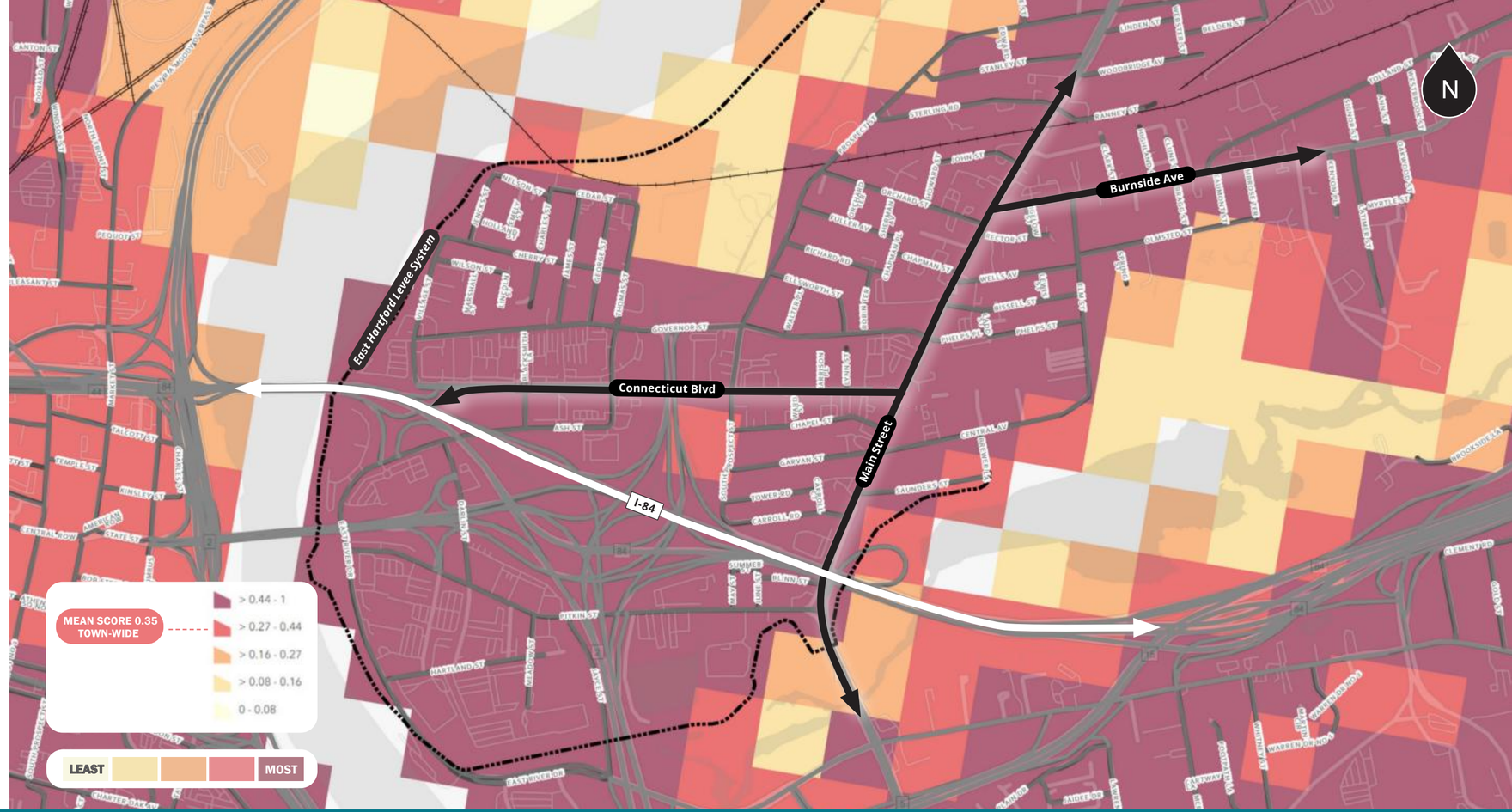
The following page breaks down the CCVI score into each of its components: sensitivity, exposure and adaptive capacity and explores the factors that most greatly generate heat vulnerability for East Hartford.



Calculating the CCVI:

Exposure, Sensitivity, & Adaptive Capacity components are calculated using their own set of unique indicators. Sensitivity, for example, is derived from two distinct indicators—social and built—each assigned its own score based on the average of multiple contributing variables. The overall sensitivity score for a given cell is the average of these two indicators. That value, together with the exposure and adaptive capacity scores, determines the final vulnerability score, resulting in a detailed vulnerability grid across the region.

(CIRCA, Understanding Vulnerability)



HEAT IMPACTS | CLIMATE CHANGE VULNERABILITY INDEX

The Climate Change Vulnerability Index (CCVI) for Heat Vulnerability calculates its score based on three key factors: sensitivity, exposure, and adaptive capacity. Each factor is informed by specific datasets that collectively determine a community's overall vulnerability to extreme heat.

The datasets provide a granular and place-based assessment of vulnerability, considering both environmental and social factors. This combination highlights the intersection between climate stressors and social inequalities, ensuring that historically marginalized communities—often disproportionately affected by extreme heat—are accounted for.

For East Hartford, Connecticut, specific census and environmental data played a crucial role in determining its heat vulnerability score, such as:

Sensitivity Contributing Factors

- High average of asthma emergency visits per population
- Median household income lower than state median
- High population density
- Comparatively high percentage of population living below poverty level

Exposure Contributing factors:

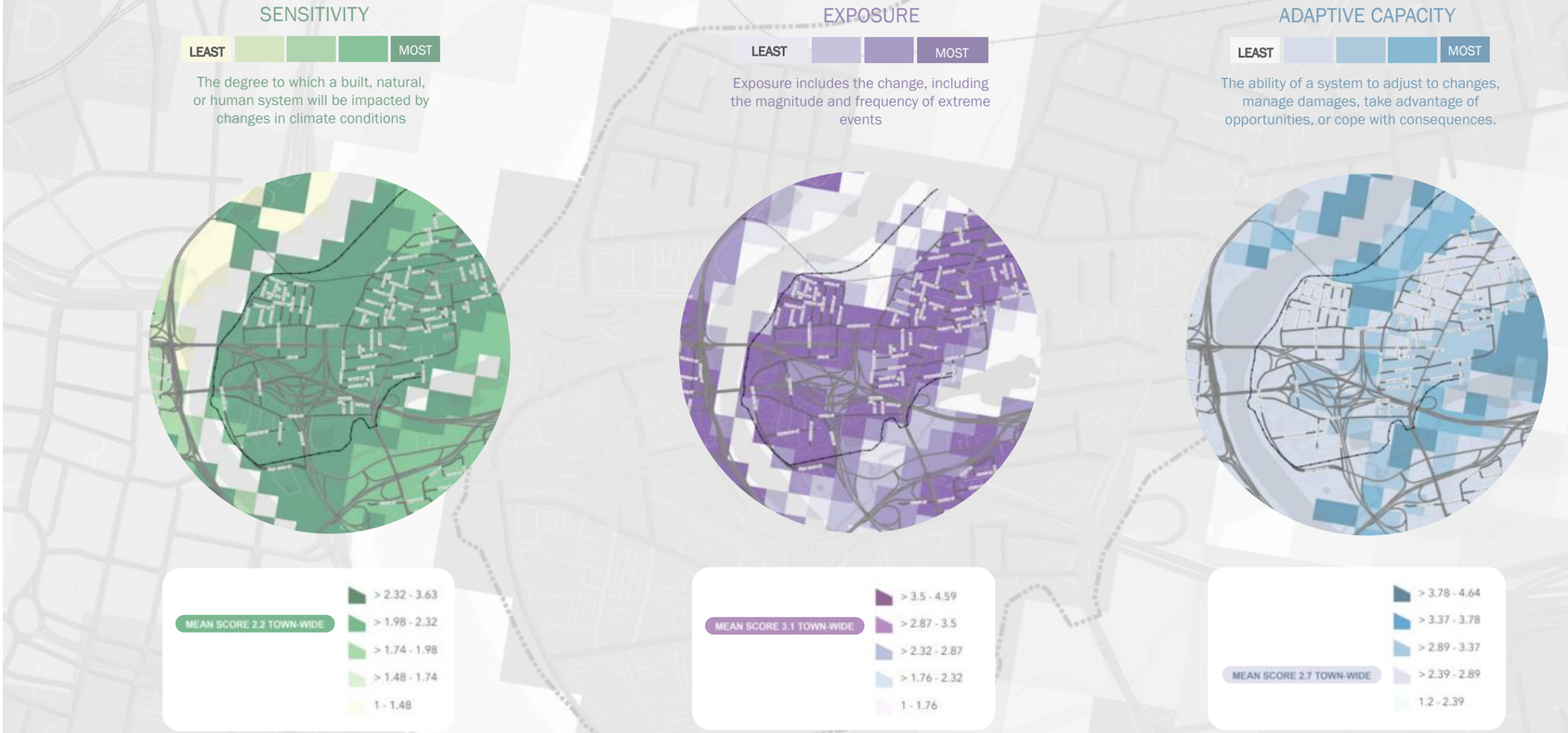
- High land surface temperature in built-up areas
- High emissivity due to traffic & large roadways
- High levels of impervious surfaces

Adaptive Capacity Contributing factors:

- Low percent of tree cover and connectivity
- Greater distance between local indoor cooling centers
- Population of uninsured above state average
- Population of owner-occupied housing below state average

The figure to the right shows the visual breakdown of sensitivity, exposure and adaptive capacity maps for East Hartford. According to the CCVI full reports, the downtown East Hartford scored high vulnerability in all categories, whereas the greater township scored in the mid-high range.

As a comprehensive tool, the combination of these datasets ensures that the index reflects both the immediate risks of heat exposure and the long-term capacity of communities to withstand and adapt to rising temperatures. The index also integrates localized data with broader climate models, allowing for targeted policy responses and interventions. By combining health, environmental, and infrastructure data, CIRCA's index helps inform resilience planning and resource allocation, helping to galvanize the project pipeline and promote more effective planning and adaptation strategies.



HEAT IMPACTS | URBAN TREE CANOPY AND IMPERVIOUS SURFACES

Urban Tree Canopy

East Hartford's urban landscape highlights a pattern of fragmented areas, with predominantly developed land breaking up forests, wetlands and open spaces. The largest continuous green corridors are confined to riverbanks, while many smaller patches of natural land are isolated by roads, buildings, and impervious surfaces. This fragmentation limits wildlife movement, reduces biodiversity, and restricts the natural cooling effect of vegetation.

The land cover map was created by the National Land Cover Database (NLCD) 2016, which provides land cover and imperviousness information at a 30-meter resolution to evaluate. The data highlights the extent of urban development in East Hartford and identifies areas where tree canopy and natural buffers are limited.

The landscape shows an imbalance between development and vegetation, with impervious surfaces dominating roads and dense neighborhoods. Where vegetation exists, it's limited to strips along highways and small pockets within residential blocks, offering little shade for the extensive hardscape.

Impervious Surfaces

Urban sprawl and impervious surfaces significantly contribute to heat vulnerability. Areas with reduced vegetation experience the urban heat island effect, where asphalt, concrete and buildings absorb and retain heat, leading to higher temperatures. The disconnected green spaces in this map indicate that cooling benefits are not evenly distributed, leaving residents and commercial districts susceptible to extreme heat. In contrast, the wetlands and woodland areas near water bodies create relief but are not extensive enough to mitigate widespread heat stress across the town.

Within the project area, the four major public green spaces are Great River Park, Center Park, Town Green Park, and Center Cemetery. These public spaces provide refuge to the community, yet are heavily impacted by surrounding bridges and roads. This impact limits the accessibility, environmental benefits, and heat mitigation strategy of the green spaces.

Great River Park, an important green space along the Connecticut River, is split by Founders Bridge, limiting access and reducing its cooling benefits. Center Park, located beside I-84, has no green buffers, causing rainwater from the highway to drain into nearby wetlands and raise flood risks. Major highways like I-84 and Route 2 further isolate neighborhoods from green spaces, while dense roads and buildings prevent stormwater from soaking into the ground, leading to more runoff and flooding in low-lying areas.

Additionally, the concentration of impervious surfaces near the riverfront, particularly around Founders Bridge and its adjacent infrastructure, restricts the cooling effects of nearby water bodies and accelerates heat retention in developed zones.

HEAT IMPACTS | EXTREME HEAT FUTURE CONDITIONS SUMMARY

The National Oceanic and Atmospheric Administration (NOAA) developed the Climate Explorer toolkit to analyze current climate trends and project future conditions across the United States. This tool allows users to examine climate variables, identify long-term trends, and compare past and projected climate changes over the next several decades. The data is derived from the Coupled Model Inter-comparison Project Phase 5 (CMIP5), which simulates historical temperature, precipitation, and atmospheric conditions worldwide to predict future patterns.

NOAA's Climate Explorer includes a search tool that allows users to zoom into specific counties and assess the impacts of rising temperatures. In Hartford County, projections estimate that the average daily maximum summer temperature will reach 85°F by 2050 and 95°F by 2090. For comparison, between 1961 and 1990, the county's summer temperature averaged 75°F, while East Hartford recorded an average of 91°F on its hottest days. These projections highlight a significant warming trend, particularly under a high emissions scenario.

A high emissions scenario assumes continued reliance on fossil fuels with minimal mitigation efforts, leading to a rapid increase in greenhouse gas emissions. This scenario accelerates global temperature rise, resulting in more frequent and severe climate-related impacts. The Climate Explorer also provides lower emissions projections, which depict a more moderate warming trend.

Under a lower emissions scenario, global efforts to reduce carbon emissions—through renewable energy adoption, energy efficiency improvements, and policy interventions—would help mitigate climate impacts. These efforts could lead to a 2–5°F reduction in projected warming, resulting in less extreme temperature increases and fewer severe climate effects. However, current projections indicate that temperatures are on track to rise significantly, with some estimates suggesting an increase of up to 20°F in the coming decades.

According to the 2018 National Climate Assessment, certain census tracts in Hartford County are more vulnerable to climate change than the county median. These vulnerabilities are assessed using projections from 2035 to 2064 and compared against historical data from 1961 to 1990.

Primary Heat Risk Factors

Extreme Temperatures

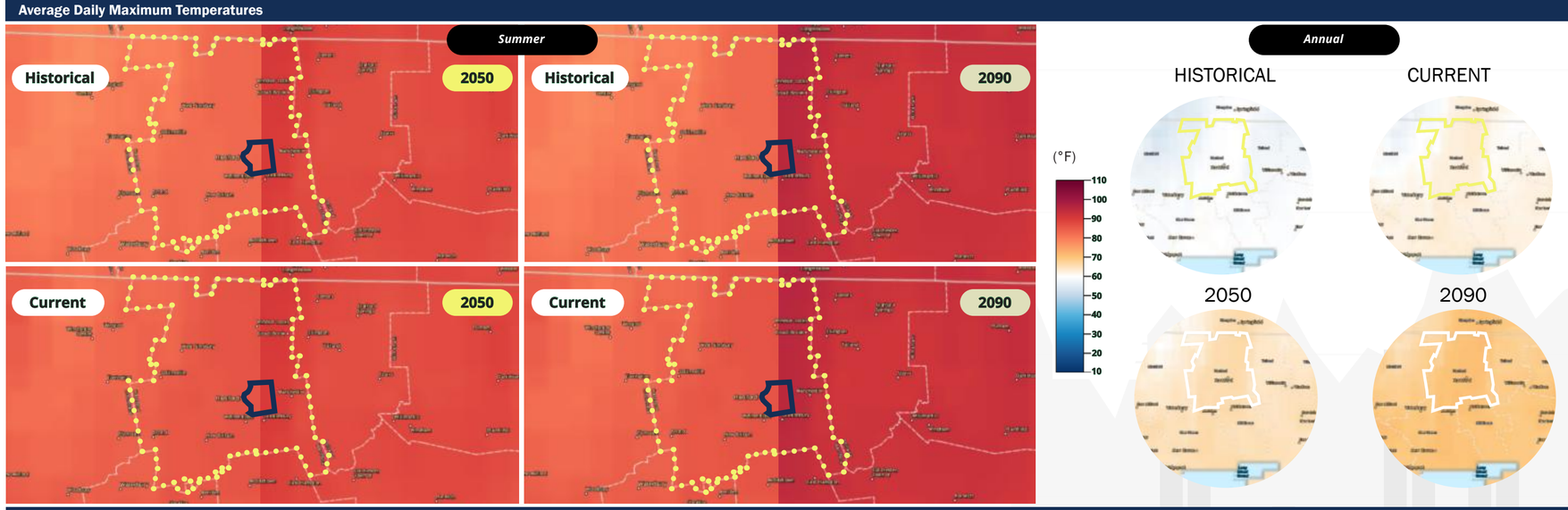
- The hottest days of the year are projected to be 7°F warmer than historical averages.

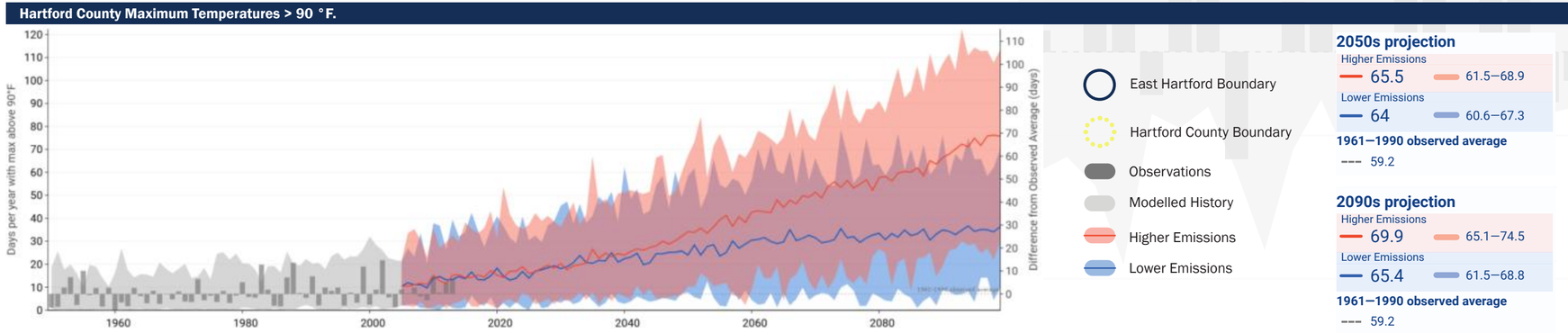
Seasonal Pattern Changes

- Changing climate patterns will alter biodiversity, impacting vegetation health and tree survival.

Intense Rainstorms

- Potential increase to individual storms, raising concerns on flash flooding and overwhelmed drainage systems.





RESILIENCE CENTER | OVERVIEW

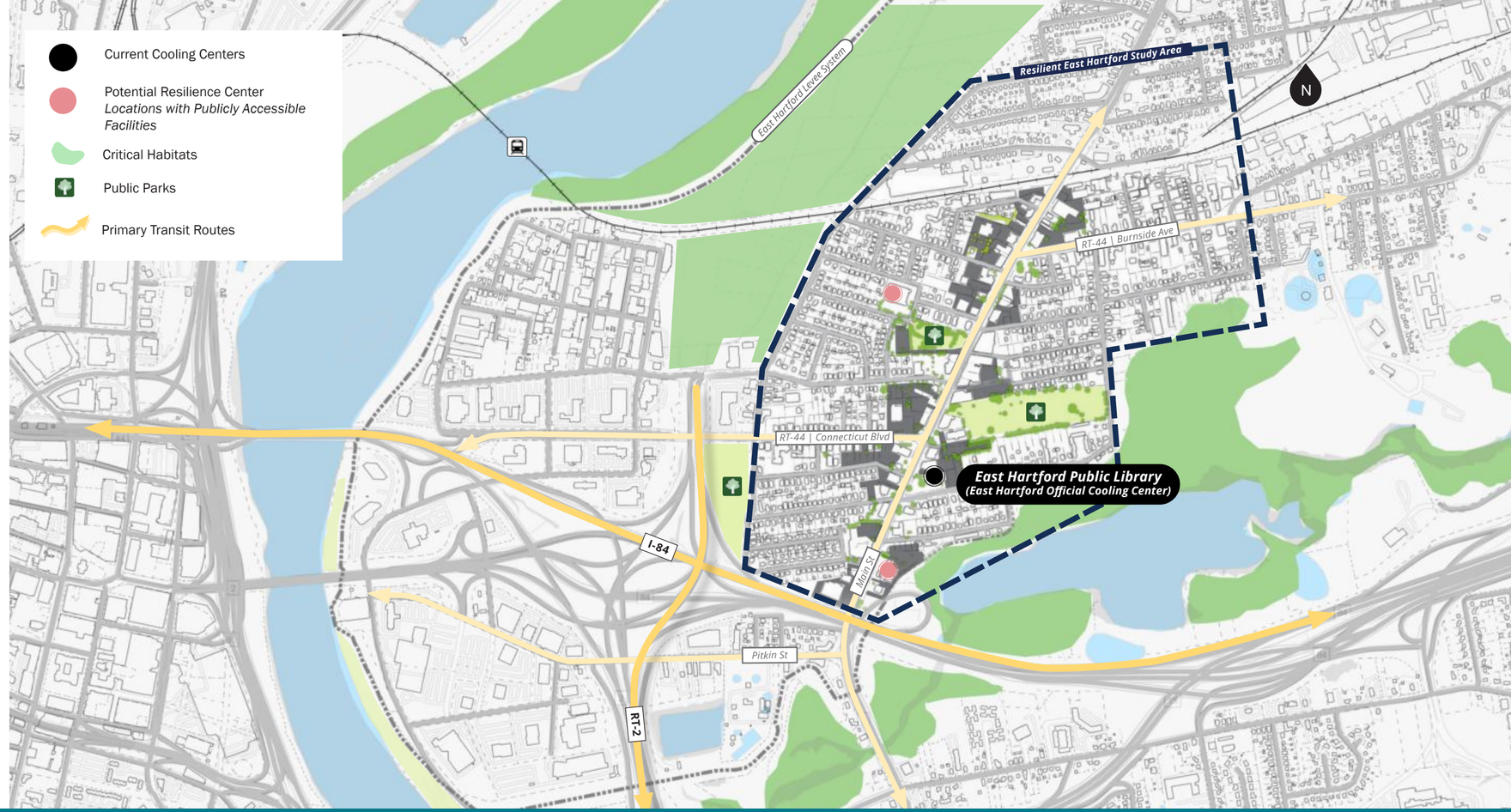
What is a Resilience Center?

A *Resilience Center* is more than just a shelter—it's a community stronghold designed to offer safety, relief, and stability during climate emergencies such as extreme heat, flooding, or hurricanes. The Office of Planning and Research defines resilience as the capacity of any entity *"to prepare for disruptions, to recover from shocks and stresses, and then to adapt and grow from a disruptive experience." (ICARP, Office of Planning & Research).* Resilience Centers embody this by providing essential, short-term support to the most vulnerable residents when disaster strikes, ensuring no one is left behind in the face of climate stress.

Beyond their immediate function, Resilience Centers symbolize a community's long-term commitment to equity and climate adaptation. By officially designating these spaces, local governments signal a public dedication to climate-readiness, embedding resilience into the social fabric. This not only fosters a culture of preparedness and awareness, but also helps lay the groundwork for more coordinated, long-term approaches to community resilience.

Correspondence with town officials indicate that the following buildings in East Hartford have been opened in the past during extreme heat protocols: Town Hall, Public Safety Complex (24/7), Raymond Library, Wickham Library, Senior Center, and Community Cultural Center. While strategically located for central access, these facilities fall short of meeting the potential demand, leaving many vulnerable residents—particularly seniors, low-income families, and those without reliable transportation—without safe, climate-controlled shelter during extreme heat events. As climate change accelerates and heat waves become more frequent and severe, this capacity gap underscores a need for expanded infrastructure and equitable emergency planning.

This study identified two potential locations in East Hartford for future Resilience Centers based on their proximity to critical services, available space, and accessibility. Each site was considered using criteria such as building and parking lot size, distance to the nearest bus stop, local heat vulnerability score according to the CCVI, and public familiarity and current use.



RESILIENCE CENTER | CANDIDATE ANALYSIS

Transit

East Hartford is served by CT Transit, providing extensive bus service that connects downtown to Greater Hartford and other Connecticut municipalities. Major routes, including 82/84, 83, 86/88, 87, 94, 95, 96 and 121, form a well-integrated network that links residential areas, commercial hubs and public facilities.

Within the study area, Route 96 loops along Main Street, offering access to key downtown destinations. Route 87 serves Pitkin Street and South Main Street, while Route 86/88 follows Burnside Avenue, creating essential connections between East Hartford and surrounding communities.

Connecticut Boulevard acts as a primary transit corridor, with most routes passing through it to link major roadways and downtown locations. Bus stops are strategically placed within 2-8 minutes' walking distance of key civic and recreational sites, including the Cultural Center, Town Hall, Fire Station, Town Green, Great River Park, and Fit Core Excercise Parks. The transit network ensures commuters have available options to enhance mobility and access essential services.

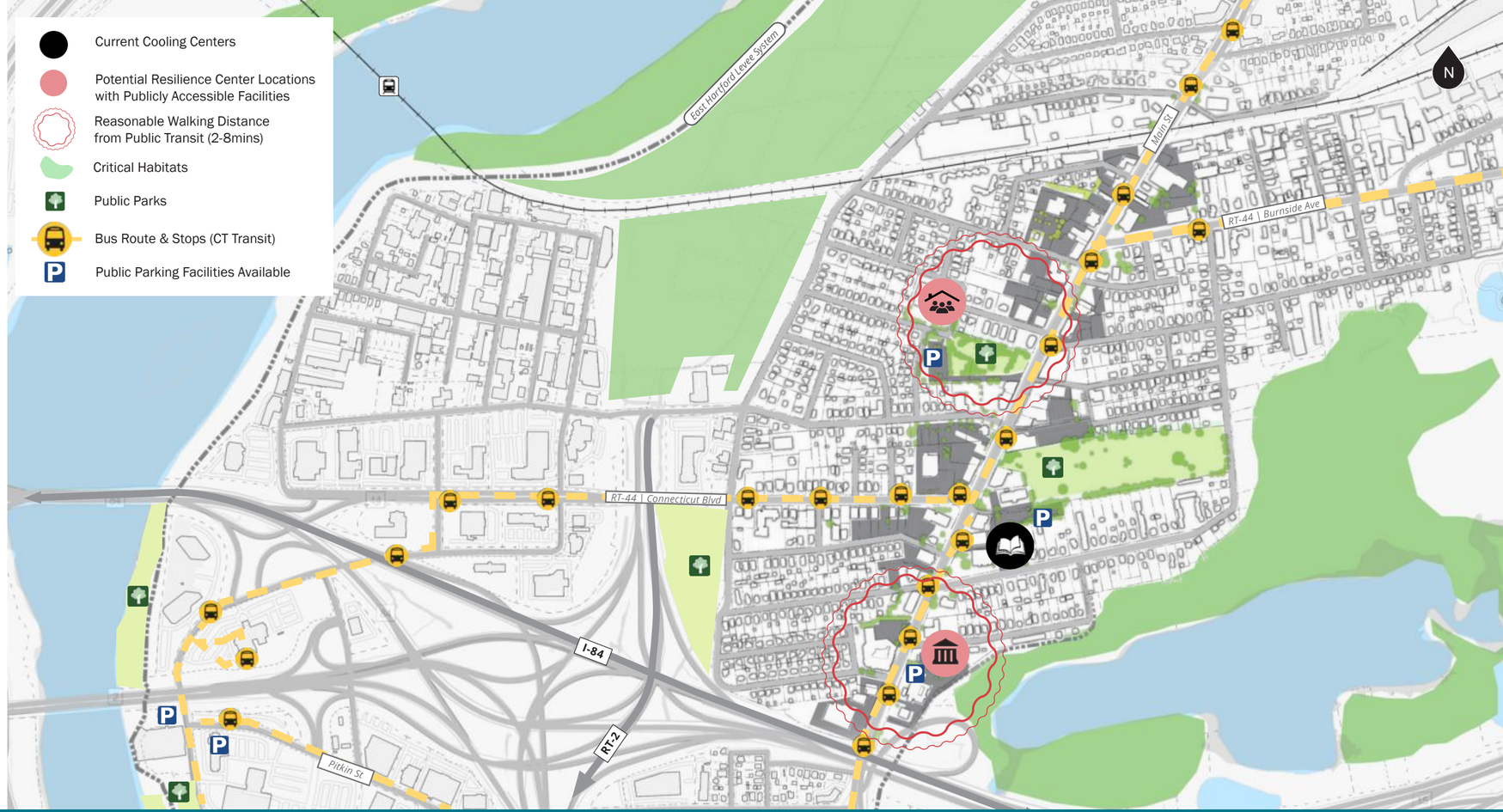
Resilience Center Candidate Locations

Raymond Library is currently the only designated cooling center within the study area. Adding additional locations—such as the Community Cultural Center and Town Hall—would improve access for residents seeking relief from extreme heat. Both sites provide indoor cooling, backup generators, and nearby public parking, and are well known to the community as they host other public programs. After evaluating both options, the East Hartford Cultural Center emerged as the strongest candidate due to its larger indoor space and better facilities.

East Hartford Public Library
East Hartford Current Cooling Center

East Hartford Town Hall

East Hartford Community Center



RESILIENCE CENTER | COMMUNITY CENTER

The East Hartford Community Center stands out as a critical resource for the town. Its indoor public spaces offer a comfortable retreat during extreme heat events, while its proximity to the Town Green offers easy access to outdoor amenities, such as shaded seating areas and a public playground.

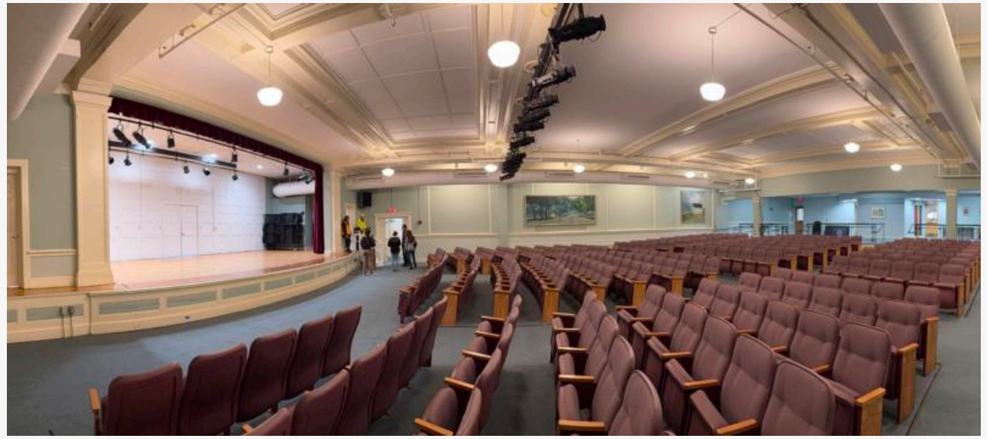
The Community Center offers a range of versatile indoor spaces that make it exceptionally well-suited to serve as a public cooling center. The facility includes a large auditorium with a stage, multiple meeting rooms, and a full gymnasium—each capable of accommodating different community needs during a heat event. These spaces can be used simultaneously to serve various age groups and functions, such as quiet rest areas, community resource distribution, and youth engagement activities. The availability of restrooms, seating, and open floor space makes the building highly functional for emergency use. The presence of an on-site generator also ensures continuity of service in the event of a power outage, adding to the facility's resilience during extreme weather events.

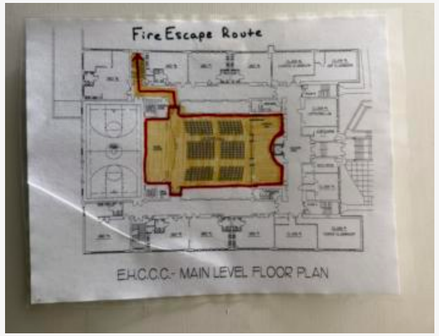
The design team visited the East Hartford Community Center during the site walk and toured the building with the Town Engineer. This visit confirmed not only the scale and condition of the facility but also its readiness to accommodate public use during emergencies. The well-maintained interior, air-conditioned spaces, and accessible layout support the building's potential for emergency operations. Its central location within East Hartford further enhances its accessibility for a wide range of residents, including those living in high-risk heat exposure areas.

In addition to its physical amenities, the Community Center already plays a central role in the life of the community and leveraging this existing familiarity could increase public trust and encourage greater use of the facility during heat emergencies. The center currently houses essential public services including Parks & Recreation, Youth and Social Services, Women, Infants, and Children (WIC), and bilingual services.

A resilience facility is designed to provide immediate relief during crises while strengthening long-term preparedness. At its core, it must offer safe, climate-controlled spaces with essentials such as drinking water, restrooms, showers, charging for phones/medical devices, and backup power. Flexible areas should support medical triage, supply distribution, and quiet rest zones for children, families, and seniors. Accessibility—convenient transit, ADA-compliant design, and multilingual support—ensures equitable use.

Beyond emergency response, resilience facilities serve as year-round hubs. They host preparedness workshops, connect residents with social services, coordinate volunteers, and provide civic and youth programming. By combining essential services with proactive outreach, the East Hartford Community Center becomes more than a shelter—it is a trusted anchor that helps residents adapt, recover, and thrive.





East Hartford Community Cultural Center & Town Green

Photo Credit: AECOM

COOLING CORRIDORS | HEAT IMPACTS

According to the CCVI, Main Street and the surrounding downtown areas of East Hartford are at high risk for extreme heat impacts due to both the built environment and underlying social vulnerabilities.

This study examines key contributing factors applied to a small sample area, the Town Green, located just off Main Street past the Connecticut Boulevard intersection. Many of the conditions at this site illustrate common factors driving heat stress across the area, including:

- Large blocks of impervious pavement absorb heat and increases runoff which leads to lesser water storage and less cooling through evaporation during hot days
- Dark roofs absorb solar heat during the day and release it at night, raising ambient temperatures
- Heavy vehicle traffic that generates waste heat and traps solar radiation, further warming the surrounding air.
- Lack of trees or shade structures creates greater areas of direct heat exposure and less opportunities for relief for people on foot

Heat impacts illustrated in **Figure 2**.

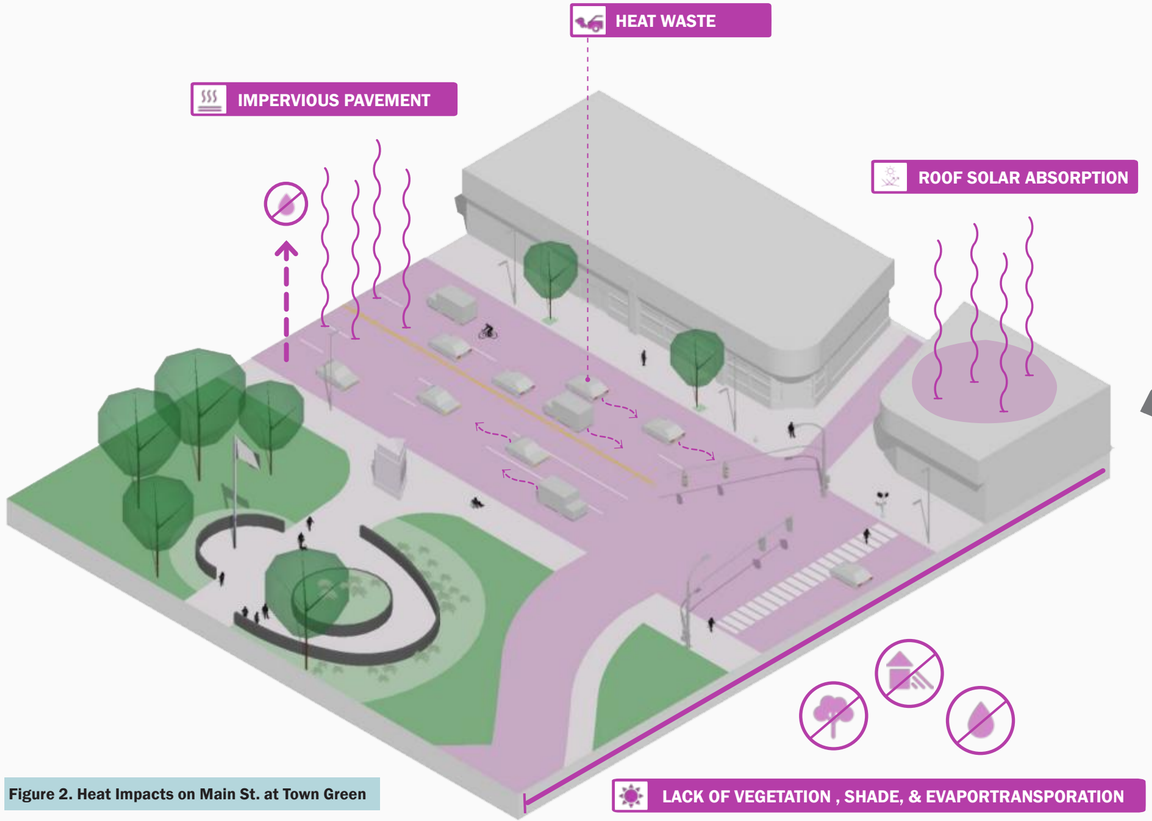
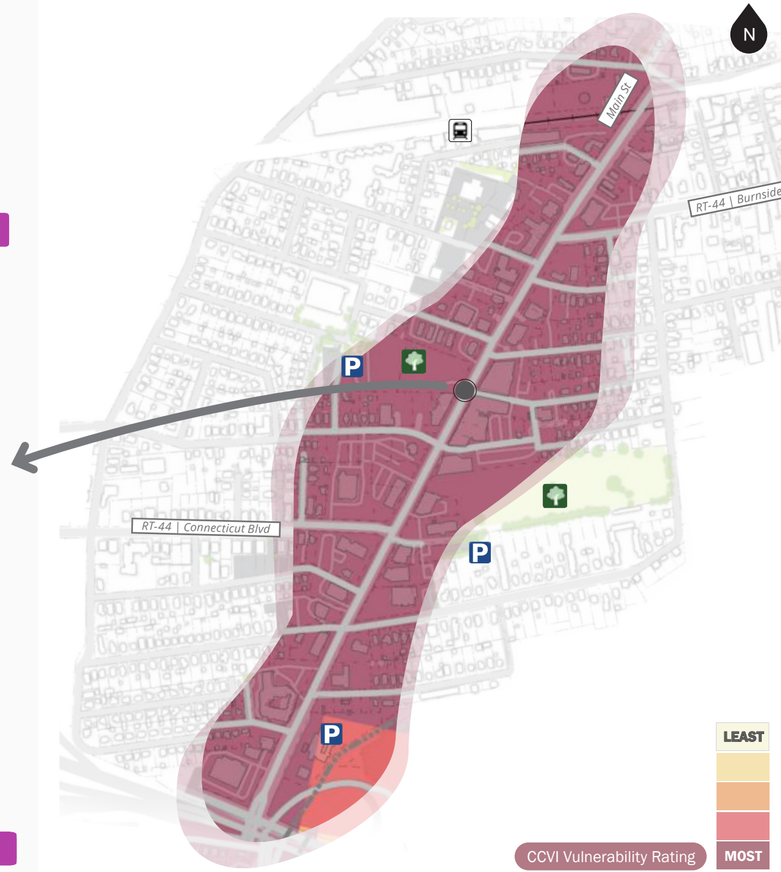


Figure 2. Heat Impacts on Main St. at Town Green



COOLING CORRIDORS | APPLIED STRATEGIES

To combat heat-related challenges along Main Street, there are several strategies that could be implemented at this site—and more broadly across the Main Street corridor—to help reduce heat impacts, improve public comfort, and support long-term resilience. These strategies are described below and illustrated in **Figure 3**.

- Improving access to indoor cooling involves identifying additional public buildings that could serve as heat relief centers and evaluating transit access and walkability to these sites.
- Shade structures reduce direct sun exposure, lowering surface and air temperatures, and providing immediate relief for pedestrians.
- Cool roofs, including green or solar roofs, promote energy efficiency and reduce building temperatures by providing insulation and reflecting solar radiation
- Pervious pavement can help break up large stretches of asphalt. This material absorbs less heat and allows rainwater to filter through, cooling the surrounding microclimate and reducing runoff.
- Flow-through stormwater infrastructure enhances heat resilience by promoting water infiltration and evaporation, which cools the surrounding environment and reduces surface temperatures.
- Expanding tree canopy and green buffers wherever feasible can strengthen ecological connectivity, improve stormwater storage, and offer shade and comfort for pedestrians.
- Targeted public education campaigns can raise awareness about heat risks, especially when tailored to vulnerable populations, helping people take appropriate action during extreme heat events.

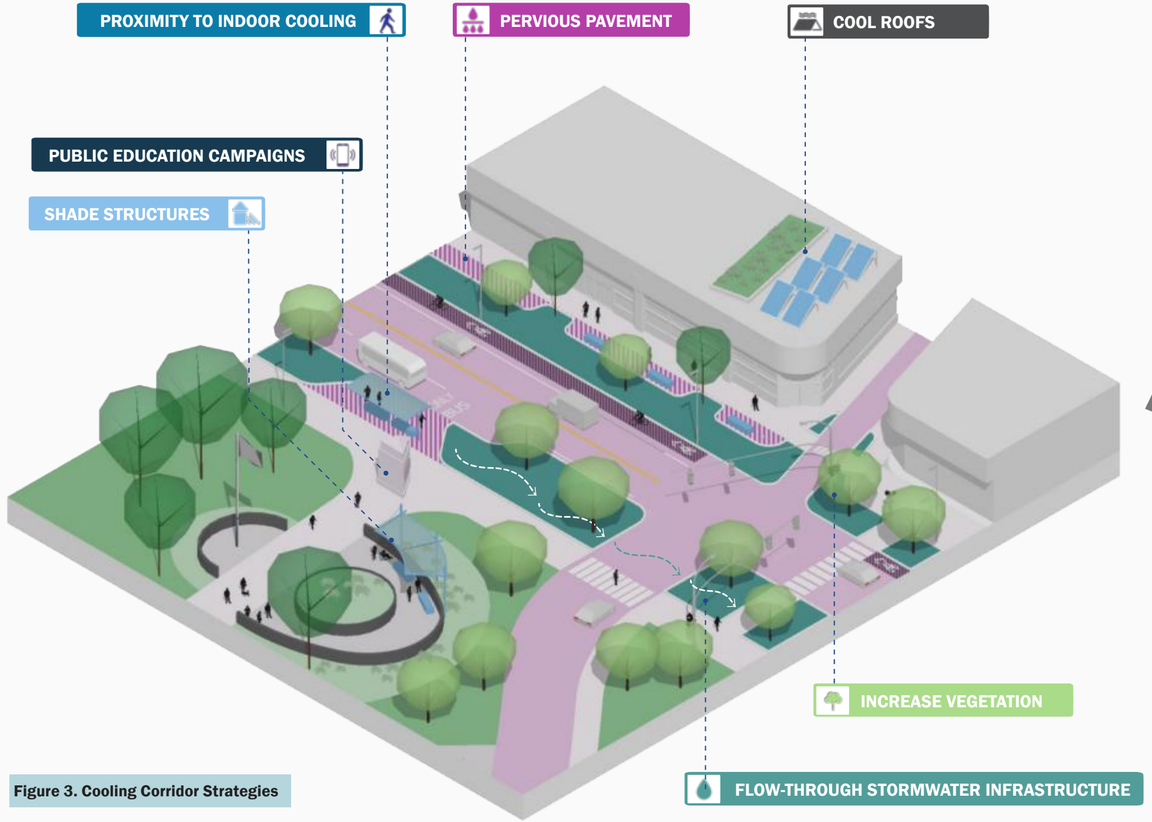


Figure 3. Cooling Corridor Strategies

04

FLOOD MODELLING AND STORMWATER NETWORK ANALYSIS

STORMWATER CONCERNS

Downtown East Hartford's stormwater system plays a critical role in managing heavy rainfall, particularly during increasingly common extreme weather events. The system is supported by several key components, including three major pump stations—Pitkin Street, Cherry Street, and Meadow Hill—which are designed to move stormwater efficiently during peak flows. These pump stations are essential in preventing backup and overflow by directing stormwater away from low-lying areas. In addition, the large stormwater collection pond located near the Metropolitan District Commission's (MDC) East Hartford Water Pollution Control Facility at 65 Pitkin Street serves as a vital buffer. It captures and holds runoff during intense storms, reducing the volume of water entering the sewer system and helping to prevent localized flooding.

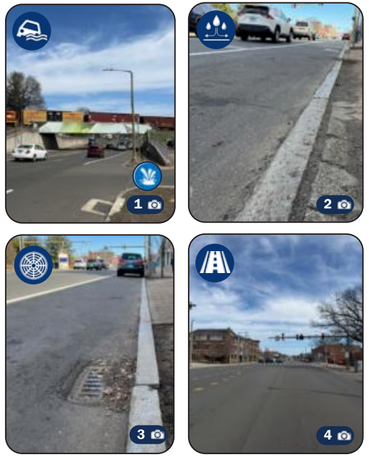
Despite these measures, flooding remains a persistent challenge in East Hartford, particularly along Main Street. During the site walk, four key factors contributing to stormwater challenges were identified: frequent flooding at the Main Street railroad underpass, inadequate storm drain maintenance, diminished curb height along roadway, and excessive impervious surface.

RAILROAD UNDERPASS FREQUENT FLOODING: One of the most frequently impacted areas is the railroad underpass, where flooding may be attributed to undersized stormwater pipes that become overwhelmed by the volume of runoff generated during major rain events. This results in standing water that impedes traffic and creates safety hazards. These conditions were recently exacerbated by several stacked 100-year storm events in January and April 2024, as reported by the Town, where water accumulation disrupted transportation routes and exposed vulnerabilities in stormwater infrastructure (easthartford.gov, "Recent Localized Flooding in East Hartford").

PAVEMENT PRACTICES: Between Connecticut Boulevard and Burnside Avenue, sidewalk curbs appear nearly flush with the roadway—a sign that the street has likely been repaved with a thicker course of asphalt than what was milled. This practice raises the roadway's elevation, reducing curb height and altering natural drainage paths. Water is no longer channelled effectively into storm drains, increasing the risk of runoff-related damage and localized ponding.

STORM DRAIN MAINTENANCE: During recent assessments trash, dirt, leaves, and other debris were observed clogging storm drains and accumulating along roadways, further diminishing the capacity of the system to manage runoff. Blocked inlets prevent water from draining quickly and efficiently, causing it to pool in streets and low points, especially during back-to-back rain events. Regular cleaning and upkeep are essential to ensure the infrastructure functions as intended.

EXCESSIVE IMPERVIOUS SURFACE: The downtown area has minimal vegetation and is dominated by impervious surfaces. The wide roadway corridors and expansive parking lots limit natural absorption of rainfall and accelerate runoff. The scarcity of street trees and green infrastructure further compounds this problem by eliminating opportunities for water interception, shading, and cooling. These design elements not only worsen flooding but also contribute to the urban heat island effect, making East Hartford more vulnerable to climate-related stresses overall. Addressing these issues holistically will be crucial in building a more resilient and liveable downtown.



MODELLING METHODS AND PROCESS

METHODOLOGY

To analyse how the drainage system performs under both current and future weather conditions, a structured approach was used that combined field research, historical records, and computer modelling. The layout and details of the existing drainage network were gathered from as-built plans and verified through a site visit. This ensured that the model accurately reflected what is currently in the ground and how water flows through the system today.

COMPUTER SOFTWARE

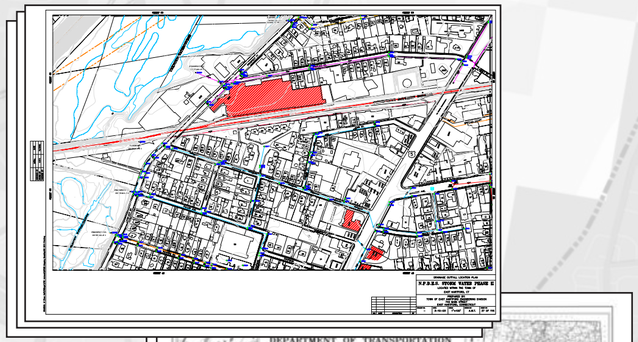
The analysis was completed using Bentley OpenFlows StormCAD 2024, a specialized software tool designed to simulate how stormwater moves through pipes and drains during different rainfall events. To calculate how much water enters the system during storms, the Rational Method was applied. This method estimates runoff based on rainfall intensity, the area of land being drained, and the land use types.

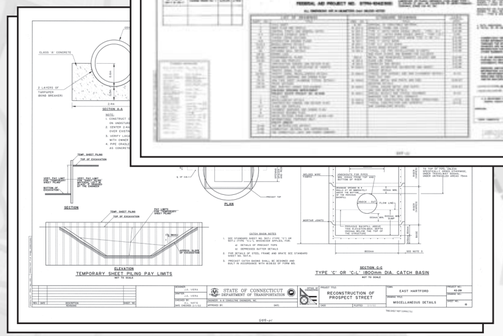
RAINFALL INTENSITIES

For the rainfall data, current storm conditions were based on official records from National Oceanic and Atmospheric Administration (NOAA) Atlas 14, using information specific to the Hartford Brainard Field weather station (Site ID:06-3451). To evaluate how the system will perform in the future, rainfall data was taken from the 2019 Connecticut Physical Climate Science Assessment Report (CT-PCSAR). Modeled flood depths for current and future conditions referenced elevation datum NAVD88. This report provided updated precipitation estimates under high carbon dioxide scenarios for mid- and late-century projections. In both current and future scenarios, storm events with return periods of 10, 50, and 100 years, each lasting 24 hours, were used to represent increasingly severe rainfall.

DESIGN GUIDELINES

All modelling followed the guidelines laid out in the Connecticut Department of Transportation's Drainage Manual (2000), ensuring consistency with State design standards. By comparing how the system performs now with how it's expected to perform in coming decades, the study provides a clear picture of where the system falls short and what upgrades will be needed to keep streets and neighbourhoods safe from flooding.





Reviewed as-built plans and & Town historical records
Reconstruction of Prospect Street Plans, DOT

2000 DRAINAGE MANUAL

Modelling Software and Drainage Standards
CTDOT Drainage Manual (2000) & Bentley Systems

Picture taken during site visit
Photo credit: AECOM

STORMWATER CURRENT CONDITIONS

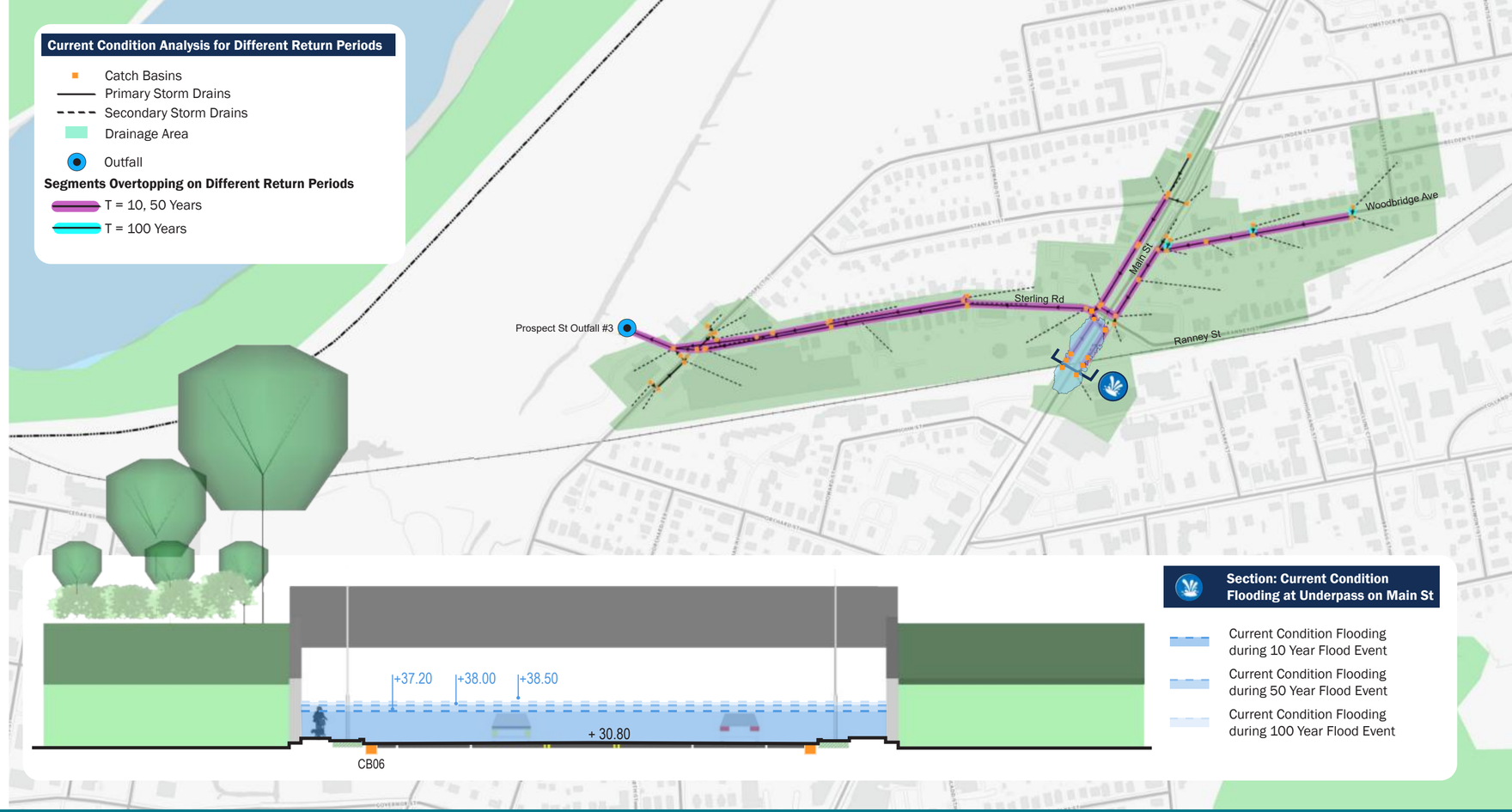
The drainage system under review lies within the Old East Hartford watershed and is responsible for transporting surface runoff from key roads including Woodbridge Avenue, Ranney Street, Main Street, and Sterling Road. This water is ultimately conveyed through a reinforced concrete culvert to an undeveloped area behind 222 Prospect Street. The outlet is situated within a designated drainage right-of-way and benefits from protection provided by the East Hartford levee system.

Hydraulic modelling of the existing system under 10-, 50-, and 100-year storm scenarios revealed that many of the pipes do not have the capacity to convey the contributing runoff. Undersized pipes are not able to handle the water during intense storm events and therefore cause backwater due to the water not being able to flow freely to the outlet. The drainage network becomes overwhelmed, forcing the water to overtop the existing catch basins and flood the adjacent roadway. Even minor storm events lead to surface flooding, and the frequency and severity of flooding are projected to increase noticeably in the future as rainfall intensity increases.

These findings underscore the need to address the system's capacity deficiencies. With portions of the network already overwhelmed by relatively small storms and the potential for deep flooding at critical low-lying locations, improvements to the infrastructure are essential to prevent road flooding, protect property, and ensure the system can safely convey future stormwater volumes.

RAILROAD UNDERPASS FREQUENT FLOODING DURING CURRENT CONDITIONS

A particularly problematic area is the railroad underpass, which sits at a lower elevation. This location experiences ponding during storm events of all modelled frequencies, unlike other areas where water simply overtops catch basins and flows downstream. The flooding at this underpass is severe, with water depths reaching 6.4 feet in a 10-year storm and surging to 7.7 feet in a 100-year event. Though less visually dramatic, overtopping and uncontrolled runoff occur elsewhere in the system along Woodbridge Avenue, Main Street, and Sterling Road before reaching the Prospect Street outfall.



STORMWATER FUTURE CONDITIONS

The future conditions model analysis for the 10-, 50-, and 100-year storm events reveals a continuation of the existing backwater and overtopping issues, with continued roadway flooding projected. This is primarily due to the anticipated 8.5% to 9.5% increase in annual precipitation across Connecticut under high CO2 emission scenarios (CT-PCSAR, Page 4). These future rainfall patterns will place greater stress on the already undersized and overwhelmed drainage infrastructure.

All current and future modelled scenarios are projected to flood during a 10-year storm, highlighting the accelerating impact of climate change on this stormwater system. It is interesting to note that the CT-PSCAR showed that rainfall intensities are higher in 2050 than they are in 2100 and as a result we see worse conditions in the storm network in 2050 than 2100. However, the modelled projections show a clear decline in the system's ability to manage stormwater, with flooding risks growing not only in frequency but in severity, particularly for low-lying and high-traffic areas.

RECOMMENDATIONS

To address these challenges, it is recommended to modify the existing drainage system by replacing the existing pipes that are undersized to eliminate roadway ponding. **Table 2** summarizes the pipes in need of replacement, the total flow for current 10, 50 and 100-year events, the total flow for future 10, 50, and 100-year events in mid-century years (2040-2069) and late century years (2070-2099), the capacity of the current pipe sizes and the capacity of increased pipe sizes. These modifications should accommodate excess runoff impacting the railroad underpass and catch basins along nearby streets.

In the short term, interim measures are recommended to improve public safety and reduce risk prior to full system upgrades. These measures include installing signage to alert the public to roadway flooding hazards and piloting a localized flood alert system. Funding for signage could be sourced from the municipal operating budget.

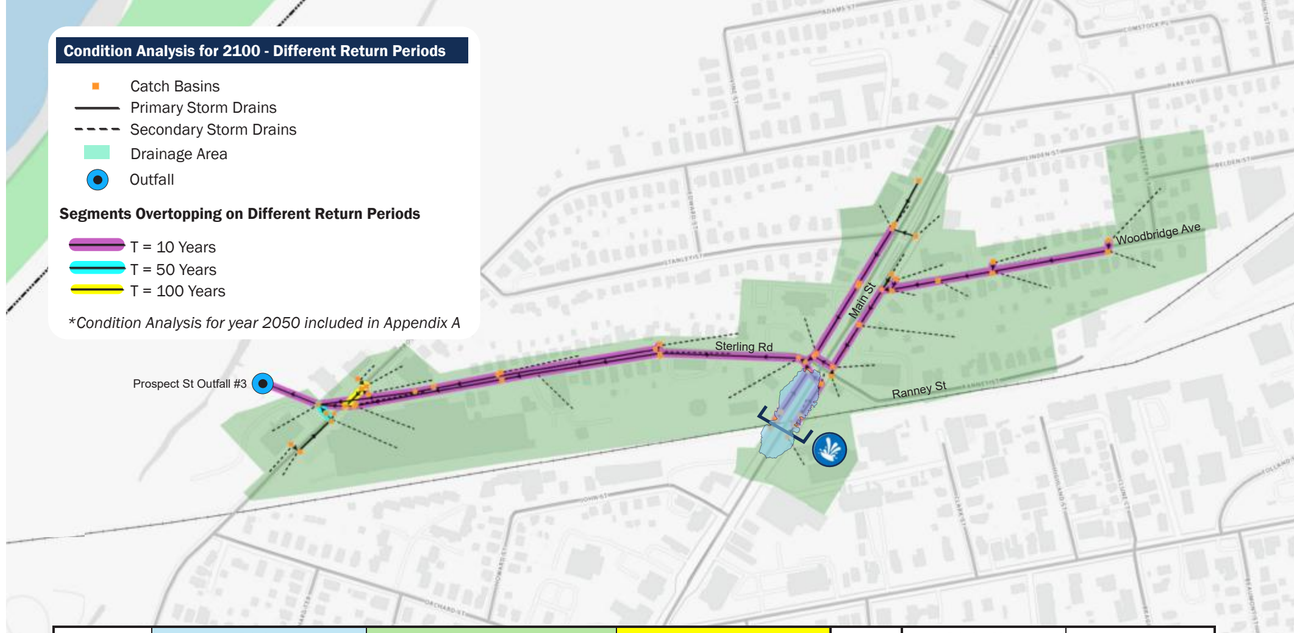
For long-term resilience, the replacement and upsizing of the existing pipes remain the primary strategy to manage increased flood risks. However, securing funding for such improvements poses a challenge. While FEMA funding is sometimes available for drainage improvements, the Benefit-Cost Analysis (BCA) conducted for the underpass pipe replacement did not yield a positive result due to the extensive pipe network and the depth of excavation required. As a result, a FEMA application is unlikely to be successful. Hence, the town may need to explore alternative funding opportunities, such as state-level infrastructure grants (e.g., CTDOT) or other municipal and regional sources.

Beyond infrastructure upgrades, long-term resilience requires addressing environmental and urban design factors that exacerbate runoff. These contributing factors include:

- The absence of **green infrastructure** to absorb and manage stormwater naturally
- The need to **increase tree coverage** to enhance canopy interception and reduce runoff
- The importance of **reducing impervious surfaces** such as asphalt and concrete that prevent water infiltration
- The necessity of **improving routine street maintenance** to prevent debris accumulation that can obstruct drainage systems.

A holistic approach combining structural upgrades, safety measures, and sustainable urban practices will ensure the stormwater system withstands future conditions while promoting healthier, greener streetscapes.

For additional drainage analysis figures produced for this study please refer to **Appendix A** of this report.



	Existing			Mid-Century (2040-2069)			Late-Century (2070-2100)				Existing Pipes		Future Pipes (50-Yr. Capacity)	
	10-year	50-year	100-year	10-year	50-year	100-year	10-year	50-year	100-year					
Location	Total Flow (ft3/s)	Total Flow (ft3/s)	Total Flow (ft3/s)	Total Flow (ft3/s)	Total Flow (ft3/s)	Total Flow (ft3/s)	Total Flow (ft3/s)	Total Flow (ft3/s)	Total Flow (ft3/s)		Diameter (in)	Capacity (Full Flow) (ft^3/s)	Diameter (in)	Capacity (ft3/s)
Main St (S)	12.86	18.58	21.33	16.71	28.86	36.90	14.51	22.68	27.66		21	11.07	30	29.00
Sterling Rd	95.58	135.97	154.06	122.31	204.75	255.71	107.11	163.79	196.05		30	59.60	48	208.16
Main St (NW)	12.58	17.04	19.02	15.62	24.17	29.25	13.90	19.98	23.36		12	6.17	24	39.18
Woodbridge Ave	12.01	15.48	16.92	14.34	20.72	24.21	13.04	17.68	20.08		12	3.58	24	22.62
Main St (NE)	16.98	22.08	24.20	20.40	29.82	35.00	18.48	25.33	28.87		12	3.57	30	41.02

Table 2: Pipe Capacity Comparison

This table summarizes the pipes in need of replacement to accommodate flow from 10, 50 and 100-year events.

05

LAND USE AND RESILIENCE PLANNING STRATEGIES

PILOT STUDY | SITE SELECTION

Initial Observations

Initial converations and site visits with the Town indicated several land use and planning issues in East Hartford's Downtown core. Implementing the necessary solutions would result to a robust redevelopment of the Downtown area. One of the identified issues was inefficient land use, with downtown fragmented by numerous surface parking lots serving retail and business establishments. Most of these lots are fragmented with minimal or no connections amongst them which results in inefficient land use. Issues such as these can be resolved by taking a closer look at the existing land use and zoning regulations, tapping into the provisions that enable efficient downtown growth and vitality, and formulating implementable planning strategies that could improve and enhance parcels usage encouraging long-term land use development patterns and strategies replicable throughout the Downtown area.

Shortlisting the Pilot Study Site

Among the various parking lots that were observed during the site visit, the Town recommended AECOM review four locations that could be potential sites for a conceptual redevelopment and application of resilience adaptation strategies. Among these shortlisted sites, the lots at the corner of Main St and Burnside Ave stood out as preferred choice since the buildings comprising the potential site were all publicly owned properties. Therefore, any conceptual planning updates proposed in this report could potentially be converted into design implementation in the future with minimal restrictions as compared to a site with privately-owned properties. The site identified for the pilot project comprises of the East Hartford Public Library, Post Office, and the now defunct Church's Corner Inn. The parking lot of the Hartford East Apartments, a Town-owned lot that is being leased by the apartment complex, is also considered as a part of the study area.

Potential Accomplished Improvements

The pilot study illustrates how focused lot-level improvements when aligned with broader municipal initiatives—such as the Main Street roundabout study, road diets, and other public realm upgrades can compound the benefits of efficient land use planning, stormwater resilience and climate adaptation. Coordinated design and planning can turn fragmented parcels into unified, resilient, and people-friendly corridors. Targeted interventions within the study area could serve as a replicable model for other areas of East Hartford. This project is an initial step toward transforming Main Street into a more connected, comfortable, and climate-responsive spine for the community.

KEY TAKEAWAYS

- Existing parking lots are large, fragmented, and often underused
- Businesses maintain separate lots with limited connections
- Existing parking lots meet standard minimum parking requirement by usage type, but are underutilized
- Streets are wide with low tree canopy cover

OPPORTUNITIES FOR IMPROVEMENT

- Reconfigure lots to allow shared access and better circulation
- Create opportunities for green stormwater infrastructure and recreational space
- Coordinate lot upgrades with roundabouts, road diets, street trees, wider sidewalks and green stormwater infrastructure stormwater systems for broader benefits

One of the initial steps in the planning process was evaluating the Town's current zoning regulations, particularly the parking requirements for various facility types. While the Town does have minimum parking requirements per facility type, several clauses built into the Town's Zoning Regulations allow for the redevelopment of parcels along the urban core without the requirement for additional parking. Such clauses, as listed below, aid in maximizing the built-up potential of all parcels particularly those in the B-5 Central Business District zone with frontage on Main Street, Connecticut Boulevard, or Burnside Avenue. See **Appendix D** for a comparative analysis of Town of East Hartford and the City of Hartford's standard parking requirements.

Permanent Parking Reduction For Multiple Properties (Section 7.2.F.2)
The Commission may, by Special Permit, reduce the cumulative number of required parking spaces for two or more properties provided that a functional and interconnected parking arrangement is provided within and between the properties, that an agreement for joint access and parking, in perpetuity, acceptable to the Commission is filed on the land records, and further provided the Commission finds one or more of the following based on information provided by the applicant:

- Peak parking demands among uses occur at different hours of the day and this offset results in a lower net peak parking demand;
- Synergistic relationships among uses allow patrons to park once while accessing multiple locations or allow for multiple purpose trips to occur within the development(s); or
- The uses are likely to generate transit, bicycle or pedestrian trips and accommodations have been made to support these alternative forms of transportation.

Permanent Mixed-Use Development Reduction (Section 7.2.F.3)– In a development with mixed-use buildings designed and built in a walkable and pedestrian friendly configuration, the Commission may consider shared parking factors in reviewing a Special Permit application requesting a reduction of the number of parking spaces (the shared parking factor is applied to the sum of the individual parking requirements). See **Appendix D** for table highlighting the Shared Parking Factor applicable to Town of East Hartford.

Temporary Change of Use Exemption (Section 7.2.F.4) – In the event that no new buildings or structures are being established and the land area, structures or permitted uses are simply being changed from one permitted use to another permitted use allowed under these Regulations, no additional parking spaces shall be required provided that:

- The number of spaces that presently exist on the property is at least 90 percent of the cumulative parking requirement for the new use(s) and the other existing use(s) on the property, and
- No "grandfathering" or other exception shall be provided relative to any future use of such premises.

Reduction In B-5 District (Section 7.2.F.6) – It is recognized that many existing buildings within the Central Business District were built prior to the widespread use of automobiles, and thus, were not designed to accommodate parking. It is further recognized that public parking is available in several locations within the district. Therefore, required parking for permitted uses shall be limited to the parking available to existing buildings. All change of uses which are permitted uses shall be deemed to have sufficient parking. Moreover, any building additions, enlargements or new construction shall provide required parking associated with the addition, enlargement or new construction as required by Section 7.2. Permanent reduction in B-5 could be extended to include new construction and additions to existing buildings.

Special zones such as the Comprehensive Downtown Rehabilitation (CDR) Zone, as outlined in East Hartford's Zoning Regulations, are intended to permit greater flexibility and, consequently, more creative and imaginative design for development within the B-5 Zone than generally is possible under conventional zoning. It is further intended to promote more economical and efficient use of the land and adaptive reuse of existing buildings.

Additionally, documents like the current East Hartford Plan of Conservation and Development (POCD) document also outlines various zoning recommendations to improve the utilization of the Town's parcels and properties. The Plan continues to recommend the consideration of additional green land use regulations such as reduction of parking minimums as appropriate and/or consideration of parking maximums and implementation of innovative parking solutions such as shared parking. Incentivization of green building/ infrastructure practices including the use of pervious pavement, green roofs, rain gardens, and bioswales.

The parking analysis also studied other municipalities such as the Town of Hartford's regulations to identify additional standard requirements that could potentially be replicated in East Hartford's zoning regulations.

Future amendments to these regulations and recommendations could permit more flexible and resilient development by not requiring additional parking for new developments in the downtown area.

KEY ZONING RECOMMENDATIONS

- Permanent parking requirement reduction in B-5 could be extended to include new construction and additions to existing buildings.
- Review standard parking minimum requirement of Town and identify opportunities to implement parking maximum vs minimum requirement.
- Reinforce future zoning and land use regulations that support flexible parking space requirements
- Improve zoning allowances for shared-use parking among multiple businesses, sites and properties
- Incentivize green building/ infrastructure practices including the use of pervious pavement, green roofs, rain gardens, and bioswales

PILOT SITE | OPPORTUNITIES AND CONSTRAINTS

The site identified for the pilot project comprises of two town-owned parcels - Raymond Public Library and the now vacant Church's Corner Inn, as well as one potential parcel, the United States Post Office, pending acquisition. The Hartford East Apartment's parking lot is a Town-owned property that is currently being leased by the Apartment. Hence this parking lot has been considered as a part of the pilot site area to be used as a potential shared-used facility. According to the Town, the apartment parking lot, while meeting the parking requirements as per zoning regulations, is underutilized.

To the northeast of the site is the Hartford East Apartments complex. The gross area of the Library is approximately 30,000 SF. As per standard parking requirement the complex is 79 spaces. The post office is approximately 10,400 sf and has 4 designated parking spots plus a large asphalt space in the rear which is used for parking the postal vans. The Inn is approximately 7,700 SF in gross area and has around 12 designated off-street parking spots. All three of the parking lots are fragmented, separated by fencing and without any internal circulation connection. The cumulative pervious surface percentage of the entire pilot study area is approximately 34%. The Town has plans to convert the Church's Corner Inn building into a mixed-use redevelopment comprising of retail and a restaurant on the ground floor with apartments above. This proposed redevelopment would require around 35 parking spaces, as established by the Town. The Post office site has also been identified as a future potential redevelopment.

Currently all of the parcels within the pilot site are fragmented with obstructed flow of movement between the parcels. Large areas of asphalt and low vegetation cover is predominant. Some of the key issues identified at the site are listed below:

Impervious Pavement: The site features a high concentration of impervious surfaces, particularly the parking lot area behind the Post Office and the driveway leading to this lot. The lots are fragmented, with little to no shared access or efficient layout across parcels. This results to a widespread footprint of continuous hardscape with minimal permeability. The Hartford East Apartments also has a large underutilized paved parking lot.

Lack of Vegetation: The site exhibits a noticeable lack of vegetation, particularly in prominent public areas like the public library lawn. Similar lack of urban tree canopy is evident along all of the major streets of the town. Despite having wide streets and pockets of green spaces, there are minimal tree canopies and shaded areas along walkways and seating areas.

Disconnected Lots & Pathways: Adjacent commercial parcels, specifically between the East Hartford Public Library and the Post Office, are divided by fences and barriers that limit both pedestrian and vehicular connectivity. Walkways and driveways rarely align across property lines, creating a disjointed configuration hindering circulation and contributing to inefficient land use.

PILOT SITE | OVERVIEW OF DESIGN

The pilot project focuses on addressing critical spatial and environmental challenges identified along Main Street in East Hartford, with an emphasis on improving fragmented parking lots, enhancing green infrastructure, and strengthening pedestrian connectivity. Reconfiguring disjointed parking areas presents an opportunity to consolidate underutilized lots and promote shared access between adjacent businesses, creating a more seamless and efficient flow of traffic while reducing redundant impervious surfaces.

These reconfigurations not only open the door to improved vehicular circulation but also free up space for stormwater management, recreational amenities, and expanded green zones. Introducing permeable surfaces and strategically placed green infrastructure could significantly reduce runoff and help mitigate localized flooding. In addition, incorporating canopy trees, bioswales, and sidewalk buffers can enhance streetscape comfort while addressing the lack of shade along wide roadways.

An updated layout considers the post office to be re-purposed in the future as a potential community space, and the inn renovated into a potential mixed-use development comprising of first floor retail and three floors of residential units above. The parking lots for all the three parcels were reconfigured into one shared use parking area. The existing driveway between the library and post office building becomes redundant and is replaced with pervious open space. With all the off-street parking interconnected between the usages and seamlessly tucked into the rear of the parcels, such a reconfiguration would not only increase the pervious surface percentage of the site but also improve lot usage and enhance the main street experience when combined with main street improvements such as multi-modal street improvements, tree canopies and stormwater infrastructure.

Some of the key site improvements include reduction of paved surface, reduction in stormwater flow, increased tree cover, addition of green infrastructure amenities, and introduction of community recreational amenities. All of these benefits can be broadly categorized into five Resilience categories: **Access and circulation, stormwater management, heat impact reduction, social benefits, and economic benefits**. Each of these individual benefits are further described in the following pages.

MAP KEY

- Existing Trees
- Proposed Trees
- Driveway and Parking Spaces
- Pathways and Sidewalks
- Proposed Plaza
- Open Green Spaces
- Proposed Bioretention Spaces
- Proposed Shade Structures

PLAN FEATURES

1. NATURE-BASED PLAYGROUND
2. SHADED SEATING PLAZA
3. EXISTING PATHWAYS
4. PROPOSED PATHWAYS
5. FLOODABLE LANDSCAPE
6. GRASS PAVED PARKING
7. SEATING AREAS
8. EDUCATIONAL SIGNAGE
9. BUILDING RETROFITS

PILOT SITE | RESILIENT DESIGN ELEMENTS

ACCESS AND CONNECTIVITY IMPROVEMENTS

1. **Removal of driveway** and addition of pathways aids in the seamless flow of pedestrian traffic and between adjacent properties, increasing walkability of the urban core
2. **Interconnected parking** lots and driveways allow for uninterrupted vehicular movement between adjacent properties. Traffic calming techniques would be implemented to curb high speed vehicular movement through the site.
3. The **improvements along Main St** such as reduced road widths, separated bike lanes, and pedestrian crossings with improved connections to existing sidewalks create seamless accessibility along the entire urban core.

Table 3: Current vs. Future Parking Demand

The pilot site comprises of 3 parcels – the library, the post office, and the now closed Church Corner's Inn. To the northeast of the site is the Hartford East Apartments complex. The gross area of the library is approximately 30,000 SF. As per standard parking requirement the complex needs 57 parking spaces but has a surplus of 79 spaces. The post office is approximately 10,400 sf and has 4 designated parking spots plus a large asphalt space towards the rear of the site. The Inn is approximately 7,700 SF in gross area with 12 designated parking spots. The Hartford East Apartments currently has 120 designated spaces in a parking lot leased from the Town.

	Square Footage	Units	Current Parking Demand	Future Parking Demand
Library	30,000		79	79
Existing Post Office Future Redevelopment	10,400		30	30
Existing Inn/Future Mixed-Use Development	7,700		14	35
Hartford East Apartments (Shared parking)		120	120	120
			Total Current Parking Supply	246
			Total Future Parking Supply	247

MAP KEY

- Existing Trees
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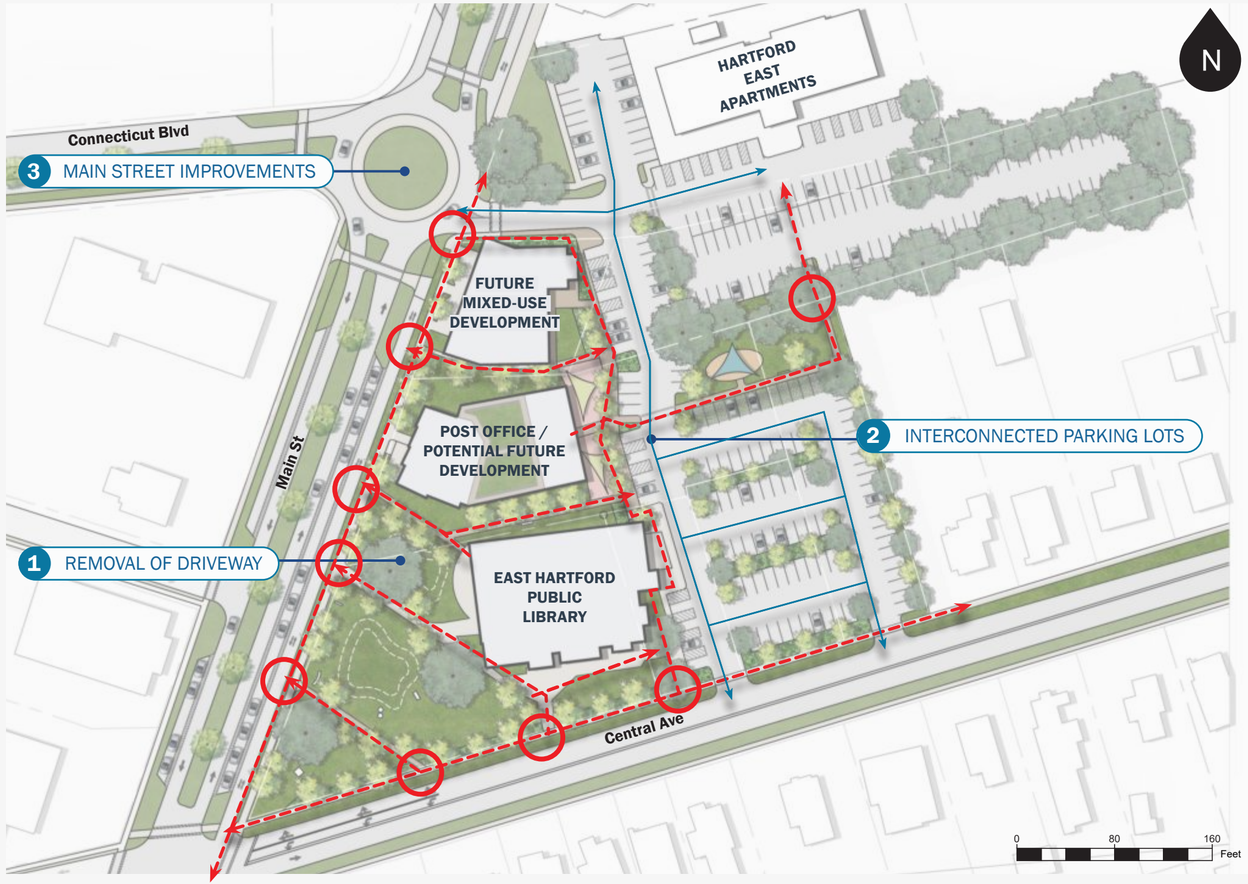
- Proposed Shade Structures

CONNECTIVITY LEGEND

- New Pedestrian Access Point
- New Pedestrian Circulation
- Modified Vehicular Connectivity



PILOT SITE | RESILIENT DESIGN ELEMENTS

STORMWATER MANAGEMENT

1. **Reduced stormwater runoff.**
   - Stormwater runoff reduction by 11%
   - Impervious surface reduction by 13%
2. **Floodable open green space** with incorporated outlet to release captured water
3. **Permeable pathways and plazas**
4. **Rain gardens and bioretention areas** along walkways and in parking lots
   - Approximately 0.75 acre of stormwater management amenities
5. **Nature-based playground**
6. Proposed **median green spaces along Main Street** create additional stormwater management opportunities.
7. **Grass paved parking spaces**
8. Efficient **parking lot reconfiguration** and shared parking use reduces parking space requirements

MAP KEY

- Existing Trees
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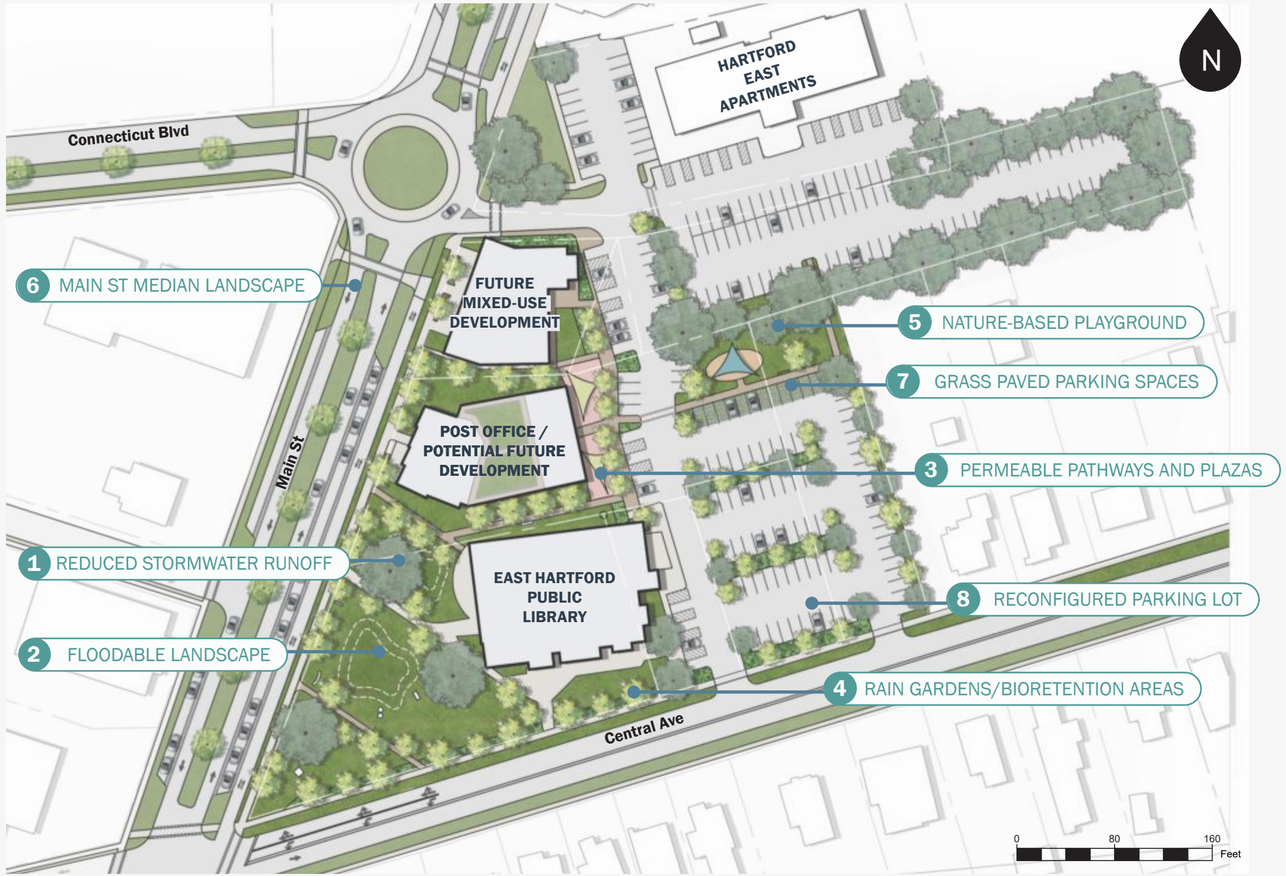

PILOT SITE | RESILIENT DESIGN ELEMENTS

STORMWATER MANAGEMENT

The pilot site introduces several resilience adaptation strategies throughout the pilot site that could potentially improve stormwater management on the site by reducing localized run-off. Some of the green infrastructure components proposed for the site include floodable green spaces, biorentention areas/ rain gardens in the parking lots and along pathways, tree canopy, permeable pathways and plazas, grass-paved parking spaces, nature-based playground, and potential retrofit of the existing buildings with green infrastructure components such as rainwater harvesting, green roofs, cooling roofs, and energy efficient building systems.

The formal open lawn space in the front of the Library, and the new green space in front of the post office building could potentially be converted into floodable green spaces. Floodable green spaces are open spaces that serve the dual purpose of performing as temporary stormwater rentention area during storm events and serving as an open green space amenity during dry times.

By introducing biorentention areas in the parking lot medians, and along pathways can help reduce stormwater runoff, improve water quality of stormwater run-off and also introduce small pockets of biodiversity within the urban core. Such rain gardens can also become an integral part of the improvements proposed along Main Street. The green spaces proposed along the medians and at the roundabouts could be developed into a linear stormwater management system with the strategic addition of bioretention areas and shade trees throughout the length of the proposed street improvements.

The pilot site proposes the use of pervious paving materials in the new pathways and plaza spaces that would not only help reduce the percentage of impervious surface of the site but also improve stormwater management by reducing run-off, promoting groundwater recharge and filtering pollutants. The proposed plan also introduces a playground. Apart from adding to the recreational component of the site, a naturalized playground with a pervious play surface would further add to the stormwater improvements of the site.

Under the proposed plan, a section of the paved parking space would also be converted to grass paved parking. Grass paved parking spaces aid in rainwater discharge thus improving stormwater management. The number of grass parking spaces can be increased in the future based on the utilization rate of the lot where portions of the lot that are underutilized could become grass paved overflow parking spaces.

The buildings on site provide additional opportunities for the introduction of stormwater maangement strategies. The vast roof surfaces, which are traditionally left unused, could become spaces for green roofs with further addition of cooling roof components. Run-off from the roofs can be collected in rainwater harvesting systems on site.

When all of these small improvements are combined, they can produce substantial stormwater management benefits not just at the pilot site level but potentially along the entire stretch of Main Street.


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PILOT SITE | RESILIENT DESIGN ELEMENTS

HEAT IMPACT REDUCTION

1. The improvements along Main St offer opportunities for urban tree canopy expansion **creating cooling corridors**
2. **Shade trees along sidewalks** and parking lots to create cool infrastructure
3. **Existing building retrofits** – cooling roofs, green roofs, rainwater harvesting, energy efficient building systems and materials
4. Shaded seating areas along pathways and social gathering areas **create cooling zones**
   - 3500 sq ft of outdoor shaded seating spaces
5. **Shade structures** around play areas enable year round use of recreational spaces
   - 900 sq ft of shaded playground


1


3


4

MAP KEY

- Existing Trees
- Proposed Trees
- Driveway and Parking Spaces
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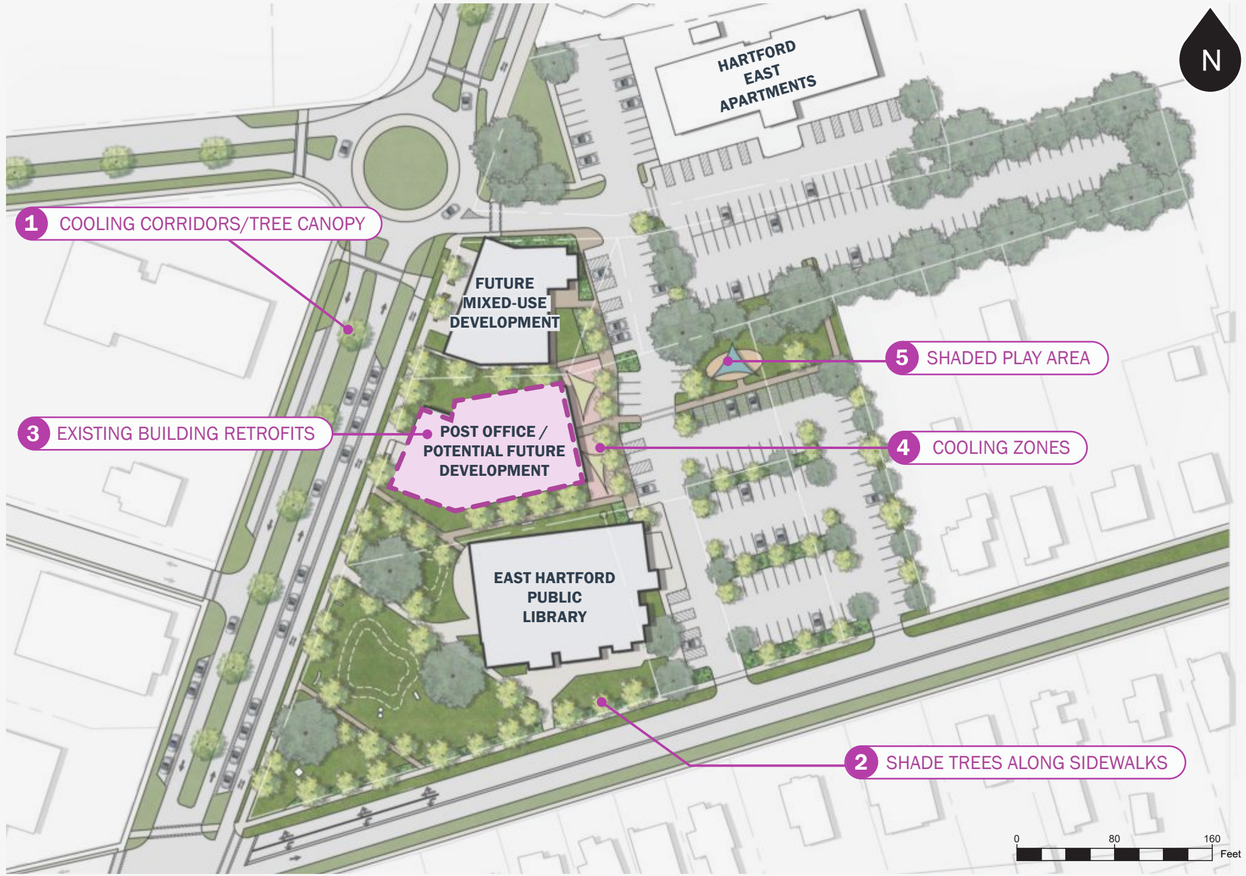


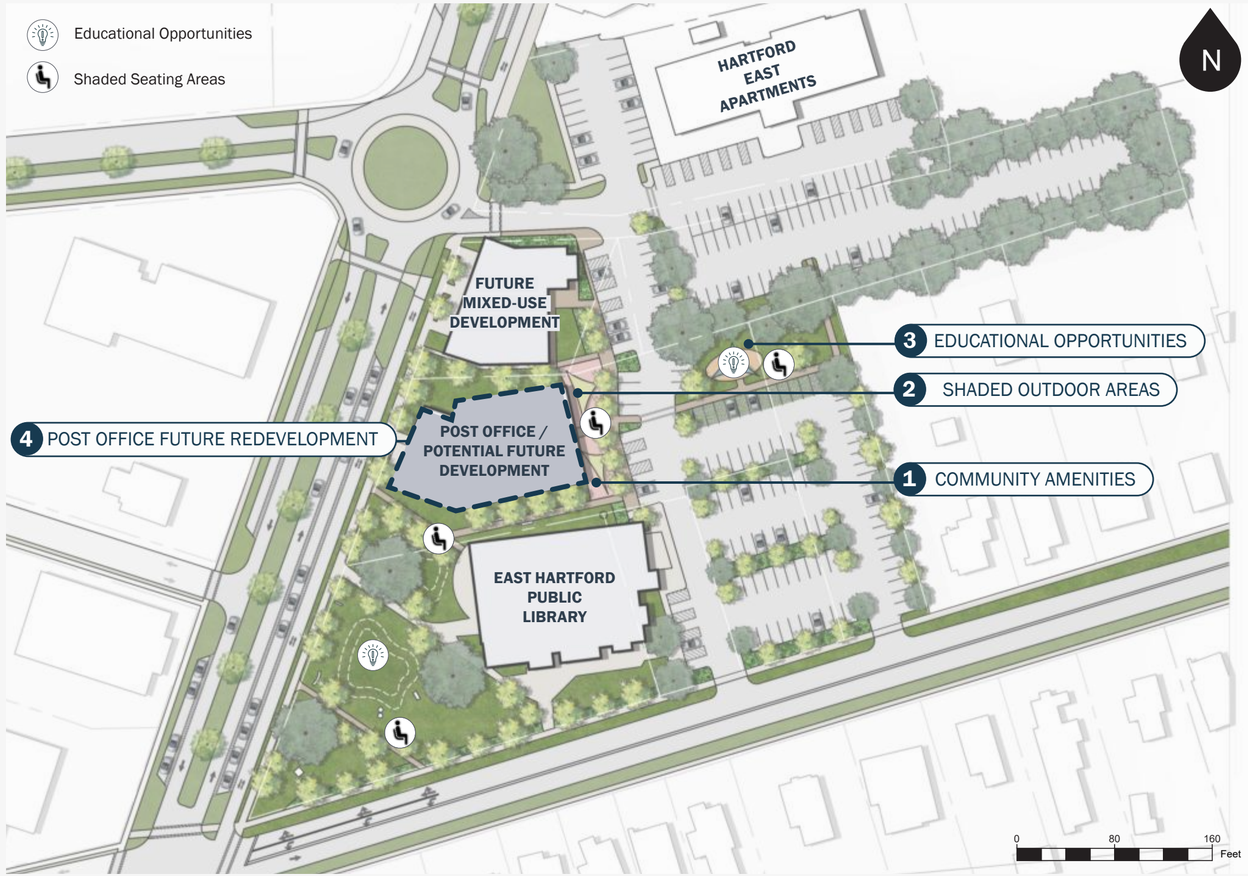
PILOT SITE | RESILIENT DESIGN TOOLKIT

SOCIAL BENEFITS

1. Spatial opportunities for **community amenities** such as a naturalized playground
2. **Shaded outdoor spaces** that can function as cooling zones for rest as well as community recreation zones
3. **Educational opportunities** with signage and artwork incorporated into resilience adaptation strategies
4. **Potential future reuse** of Post Office building as an ancillary community space, in conjunction with the Library, would create additional community recreation facility for the Town.

MAP KEY

- Existing Trees
- Proposed Trees
- Driveway and Parking Spaces
- Pathways and Sidewalks
- Proposed Plaza
- Open Green Spaces
- Proposed Bioretention Spaces
- Proposed Shade Structures
- Educational Opportunities
- Shaded Seating Areas



PILOT SITE | RESILIENT DESIGN TOOLKIT

ECONOMIC BENEFITS

1. **Reduced localized stormwater runoffs** reduces impact on larger stormwater systems.
2. **Improved utilization of parcels** and properties in the urban core.
3. Potential to **earn and monetize resilience credits.**

Real estate in the urban core of any town or city is a premium commodity. A well planned site not only helps maximize the usage of the site but also creates spaces for the introduction of additional elements that were previously unavailable, such as green infrastructure, outdoor gathering spaces and playground in the pilot site. Coupled with the array of proposed resilient adaptation options the pilot site can potentially produce economic benefits for the site. The East Hartford Plan of Conservation and Development (POCD) document recommends incentivization of green building/infrastructure practices including the use of pervious pavement, green roofs, rain gardens, and bioswales. These strategies can also qualify a site for resilience credits, which are incentives earned by incorporating climate-adaptive and sustainable practices into site developments and can be monetized or applied to offset future costs.

Table 4: Stormwater Runoff Reductions Summary

See **Appendix A** for Stormwater runoff analysis and additional figures.

	Existing Square Footage	Proposed Square Footage	Existing Percentage	Proposed Percentage
Pervious Surface	53,745	74,317	34%	47%
Impervious Surface	103,555	82,983	66%	53%
Green Stormwater Infrastructure	–	18,429	–	12%

MAP KEY

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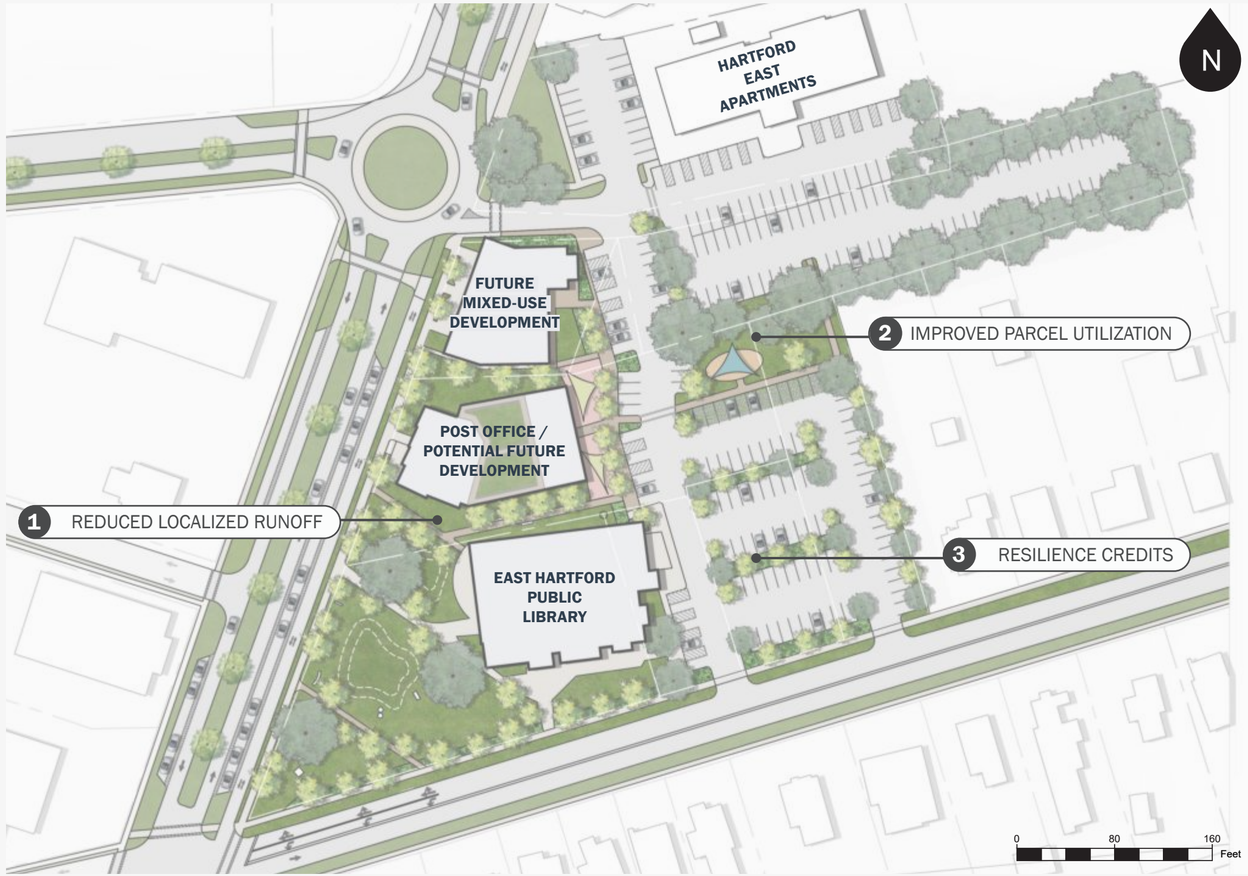

PILOT SITE | RESILIENT DESIGN TOOLKIT

DESIGN TOOLKIT SUMMARY

When the site is previewed with all these proposed adaptation strategies combined, it is evident how even the smallest of site updates could reap in multiple adaptation benefits. Something as simple as reconfiguration of a parking lot can create a ripple effect of stormwater, accessibility, heat impact, social and economic benefits.

Beyond its immediate value, this pilot study offers the Town a transferable model that can be shared with private stakeholders as a reference when planning improvements at other sites throughout the community.

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- Existing Trees
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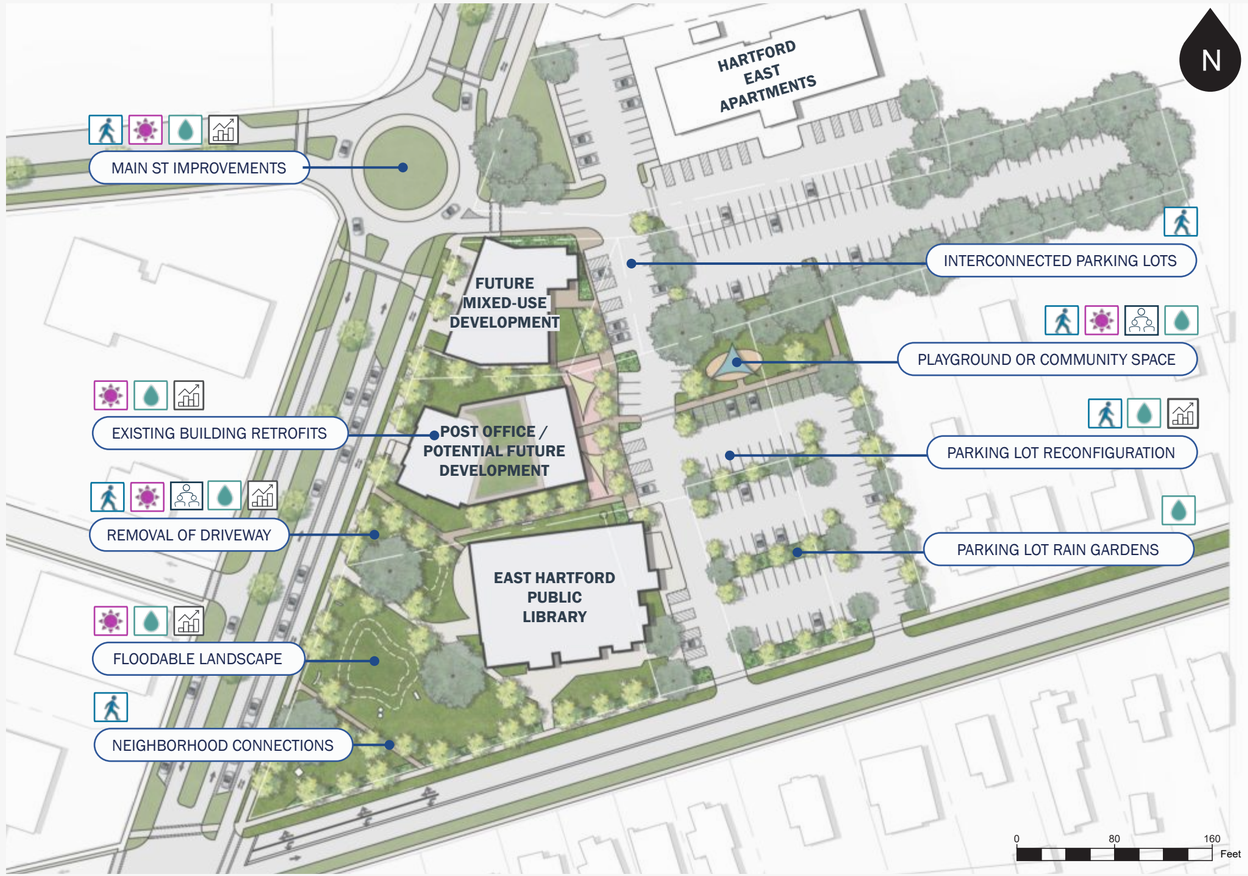
PLAN DEVICES

- ACCESS AND CONNECTIVITY
- STORMWATER MANAGEMENT
- HEAT IMPACT REDUCTION
- SOCIAL BENEFITS
- ECONOMIC BENEFITS



PILOT SITE | VISUALIZATION

The visualization demonstrates how the proposed adaptation strategies collectively enhance connectivity, stormwater management, heat mitigation, and social and economic vitality. Features such as pedestrian connections, shaded gathering areas, multi-purpose green space, raised crossings, reconfigured parking, and rain gardens work together to improve site resilience while supporting safe, accessible, and active use of public space.

A preliminary and order of magnitude cost estimate for these design recommendations is provided in **Appendix C**. The cost estimate considers the square footages of some of the major site improvements to arrive at the estimated cost.

For future project support and implementation, the Town may explore funding opportunities through programs such as the CT DEEP Trees for Communities Grant Program and the Urban Green and Community Garden Grant Program.

Before View & Rendered Area

After View Design Considerations

APPENDIX

GLOSSARY OF APPENDIX

Appendix A: Flood Model Supporting Documentation

Appendix B: Public Workshop & Advisory Committee Meeting Notes

Appendix C: High Level Cost Estimates & Benefit Cost Analysis

Appendix D: Preliminary Comparative Parking Analysis

AECOM

Appendix A: Flood Model Supporting Documentation

September 2025

Delivering a better world

AECOM
500 Enterprise Drive
Rocky Hill, CT 06067
aecom.com

Project name:
CIRCA Phase III- Continuation Work - Resilient East Hartford

Project ref:

To:

From:

CC:

Date:
August 14, 2025

APPENDIX A:

FLOOD MODEL SUPPORTING DOCUMENTATION

Background

This Appendix provides a summary of the current and future conditions analysis of a drainage system along Main Street from Connecticut Boulevard to the railroad underpass in East Hartford Connecticut as analyzed by AECOM Technical Services, Inc

The drainage system carries surface drainage collected from Woodbridge Avenue, Ranney Street, Main Street (CT Route 5) and Sterling Road and ultimately discharges via a reinforced concrete culvert end to an undeveloped area behind #222 Prospect Street. The outlet is located within an existing drainage Right-of-way and the area is protected by the East Hartford levee system.

The drainage system is located within the Old East Hartford watershed.

Existing Conditions Model

Elevation contours derived from LiDAR survey data from 2016 were gathered from the University of Connecticut Environmental Conditions Online (CTECO) platform. These contours were used to delineate drainage areas, as well as estimate rim elevations for some catch basins when the data were not available from existing project plans.

The 2016 contours from LiDAR were referenced to the North American Vertical Datum of 1988 (NAVD88). Existing roadway as-built plans were provided by the Town and gathered from the Connecticut Department of Transportation (CTDOT) database. The CTDOT as-built plans use the NGVD 1929 (NGVD29) datum, and the plans provided by the Town did not identify a datum but were assumed to be on the NGVD29 datum due to their age (1938 – 1961). Where applicable, any rim elevations for existing catch basins estimated from LiDAR contours were converted from NAVD88 to NGVD29.

Drainage Network

The Town of East Hartford provided spatial location for the drainage network from their NPDES GIS database of the network. The GIS network provided catch basin location, pipe sizing and routing of the network but did not contain invert information. Invert information was gathered from the available as-built plans provided by CTDOT and the Town of East Hartford. There was a small gap in as-built coverage between the CTDOT plans, which covered the Main Street (Route 5) area and the Town of East Hartford plans, which covered the Sterling Road area. It was assumed that a consistent pipe slope could be used to model this small gap between known invert elevations. Additionally, two existing catch basins within private property parcels located between Sterling Road and the Railroad were identified in a review of aerial imagery. Based on the existing topography and the constraints that would be associated with discharging across the Railroad, it was assumed that these catch basins were connected to the Sterling Road drainage network and that they were clear of debris.

Figure 1. Sample NPDES Record Data

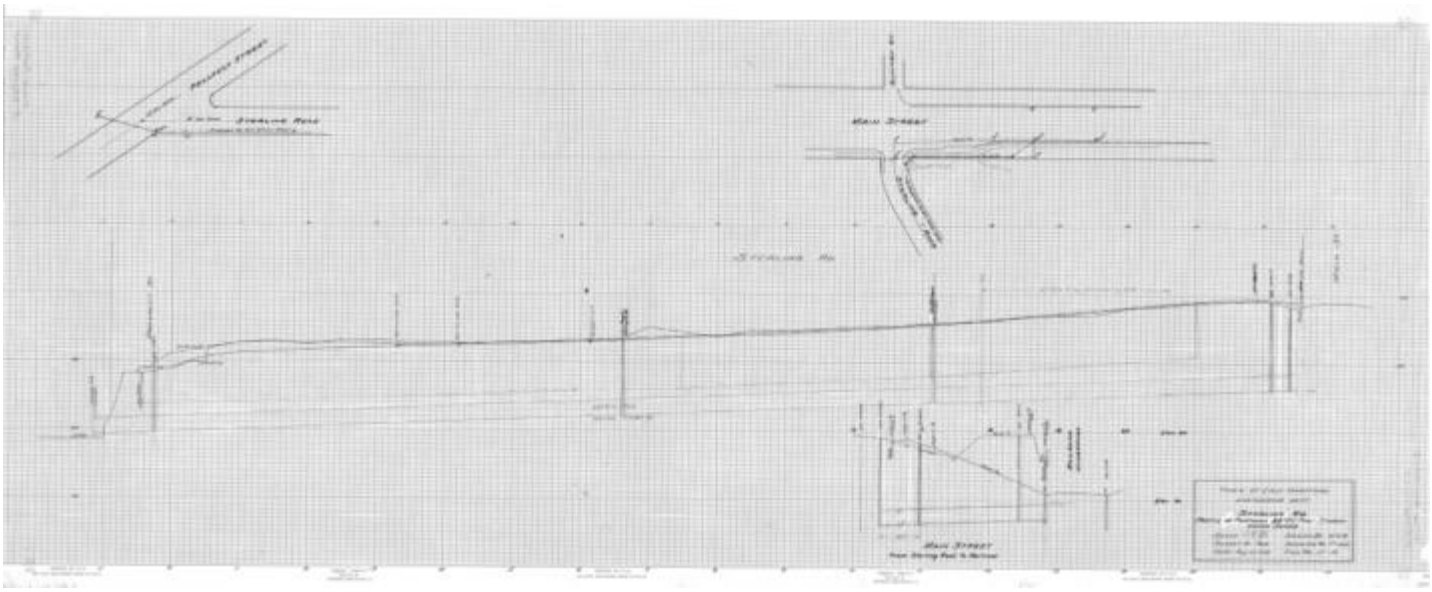


Figure 2. Sterling Road As-Built Plan

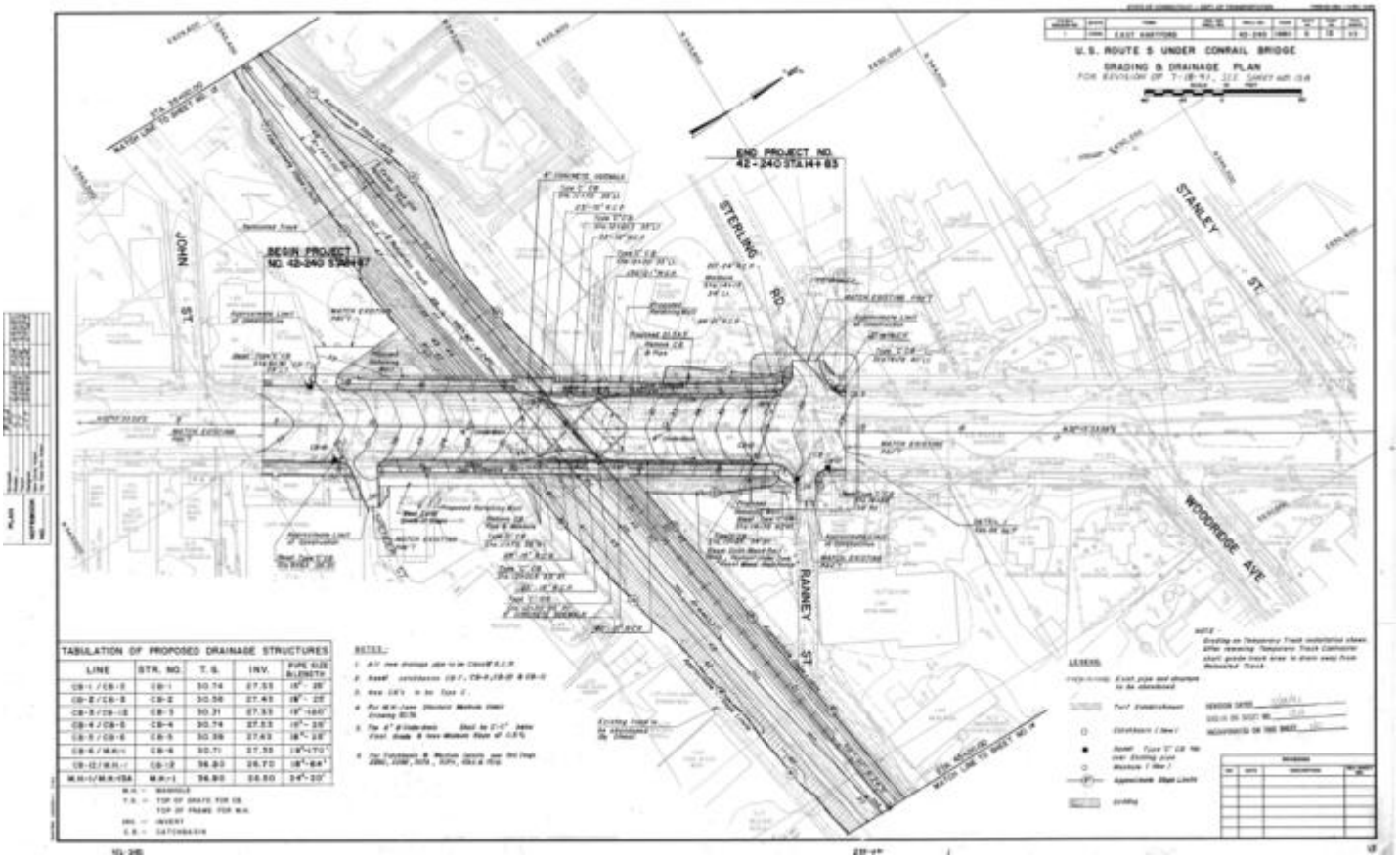


Figure 3. Main Street (Route 5) As-Built Plan

A walking tour of the project site was completed on March 10th, 2025. Field observations including visual inspections of drainage structures from ground surface as well as measurements from top of structure to invert were used to confirm and supplement the as-built plan sources. The data from this variety of sources was used to recreate, to the extent practicable, a representation of the existing drainage network in the project area.

Drainage areas for the network were delineated using LIDAR contour data and observations of aerial imagery. Figure 4 provides a depiction of the modeled network including drainage structures, pipes and drainage areas.

Figure 4. Screenshot of Modeled Drainage Network

Rainfall

Rainfall data for the Bently OpenFlows StormCAD 2024 model were computed based on rainfall data from the NOAA Atlas 14 precipitation depths for Station Hartford Brainard Field (Site ID:06-3451). Rainfall data for 2-year, 10-year, 25-year, 50-year and 100-year events were used in the StormCAD model. Durations ranging from 5-minutes to 24-hours were used to create a full rainfall intensity-duration-frequency (IDF) data set for the model.

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**4.00** (3.16-5.05)	**4.86** (3.83-6.14)	**6.26** (4.92-7.94)	**7.43** (5.80-9.48)	**9.02** (6.82-12.1)	**10.2** (7.56-14.0)	**11.5** (8.23-16.4)	**12.9** (8.75-18.9)	**15.0** (9.72-22.7)	**16.6** (10.5-25.8)
10-min	**2.83** (2.24-3.58)	**3.44** (2.71-4.35)	**4.43** (3.49-5.63)	**5.26** (4.11-6.71)	**6.40** (4.82-8.57)	**7.25** (5.35-9.94)	**8.15** (5.83-11.6)	**9.16** (6.19-13.4)	**10.6** (6.88-16.1)	**11.8** (7.45-18.3)
15-min	**2.22** (1.75-2.80)	**2.70** (2.13-3.41)	**3.48** (2.73-4.42)	**4.12** (3.22-5.27)	**5.02** (3.78-6.72)	**5.69** (4.20-7.80)	**6.39** (4.57-9.12)	**7.18** (4.86-10.5)	**8.31** (5.40-12.6)	**9.24** (5.85-14.3)
30-min	**1.49** (1.17-1.88)	**1.81** (1.43-2.29)	**2.34** (1.84-2.97)	**2.78** (2.17-3.55)	**3.38** (2.55-4.53)	**3.84** (2.83-5.26)	**4.32** (3.09-6.16)	**4.85** (3.28-7.09)	**5.62** (3.64-8.53)	**6.24** (3.95-9.69)
60-min	**0.932** (0.736-1.18)	**1.14** (0.897-1.44)	**1.47** (1.16-1.87)	**1.75** (1.37-2.23)	**2.13** (1.61-2.85)	**2.42** (1.78-3.31)	**2.72** (1.94-3.88)	**3.06** (2.06-4.47)	**3.54** (2.30-5.37)	**3.93** (2.49-6.10)
2-hr	**0.606** (0.482-0.761)	**0.735** (0.583-0.924)	**0.946** (0.748-1.19)	**1.12** (0.881-1.42)	**1.36** (1.04-1.82)	**1.54** (1.15-2.11)	**1.73** (1.25-2.47)	**1.96** (1.33-2.85)	**2.29** (1.49-3.46)	**2.57** (1.63-3.97)
3-hr	**0.465** (0.371-0.582)	**0.564** (0.449-0.706)	**0.724** (0.575-0.911)	**0.858** (0.677-1.08)	**1.04** (0.795-1.39)	**1.18** (0.881-1.61)	**1.32** (0.963-1.89)	**1.50** (1.02-2.18)	**1.77** (1.15-2.66)	**2.00** (1.27-3.06)
6-hr	**0.291** (0.233-0.362)	**0.354** (0.283-0.440)	**0.456** (0.364-0.570)	**0.541** (0.429-0.680)	**0.658** (0.505-0.872)	**0.744** (0.560-1.01)	**0.838** (0.614-1.19)	**0.953** (0.650-1.37)	**1.13** (0.739-1.69)	**1.28** (0.818-1.96)
12-hr	**0.175** (0.141-0.216)	**0.214** (0.173-0.265)	**0.279** (0.224-0.347)	**0.333** (0.266-0.416)	**0.407** (0.314-0.537)	**0.462** (0.349-0.624)	**0.521** (0.384-0.738)	**0.595** (0.407-0.852)	**0.709** (0.465-1.05)	**0.808** (0.517-1.22)
24-hr	**0.102** (0.083-0.125)	**0.127** (0.103-0.156)	**0.168** (0.136-0.207)	**0.202** (0.162-0.251)	**0.249** (0.194-0.327)	**0.283** (0.216-0.383)	**0.321** (0.239-0.456)	**0.370** (0.254-0.527)	**0.447** (0.294-0.660)	**0.514** (0.330-0.775)

Figure 5. NOAA Atlas 14 Rainfall Intensity Data

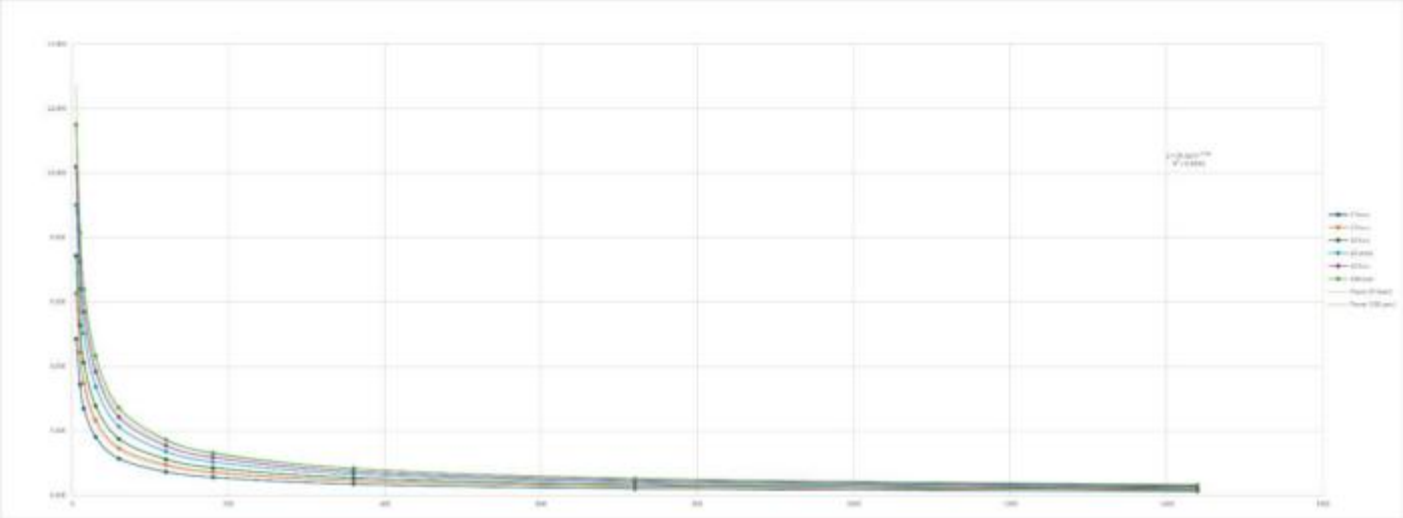


Figure 6. Intensity-Duration-Frequency Curves

The Rational Method was selected for use due to the size of the study area which is less than 200 acres. CTDOT Drainage Manual guidance was used in the selection of Runoff Coefficient values (C-Value) based on Table 6-4 and 6-5 from the Drainage Manual. Time of concentration was calculated using the TR 55 method and Manning's Roughness Coefficient Values from Table C-1 of the CTDOT Drainage Manual. The time of concentration, C-Values, drainage areas and pipe routing were then used to compute flows in StormCAD. Outfall conditions were set to free flow given the end condition of a nearby pump station that was assumed to avoid tailwater problems.

Future rainfall data was modeled based on research presented in the Connecticut Physical Climate Science Assessment Report (CT-PCSAR), 2019. This report provides data regarding a variety of conditions including annual and seasonal rainfall expectations as well as shorter term daily and 5-day rainfall totals. The study area is not prone to long term flooding or riverine impacts due to the presence of an Army Corps of Engineers levee system surrounding the site and a nearby pump station that prevents downstream conditions from controlling. Because of this, the shorter term 1-day rainfall depths were used to develop future rainfall precipitation models in StormCAD. The future changes in daily and 5-day rainfall depths during 10-year, 20-year, 50-year and 100-year events are presented in Table 4.5 of the CT-PCSAR.

Variables	1970-99 Reference	2040-69 Changes	2070-99 Changes
R1d_mean	2.8±0.1	0.7±0.2 (27%)	0.6±0.2 (22%)
R1d_10	4.1±0.2	2.0±0.8 (49%); **3**	1.3±0.8 (31%); **4**
R1d_20	4.7±0.2	2.8±1.3 (59%); **5**	1.7±1.2 (36%); **9**
R1d_50	5.7±0.3	4.3±2.4 (76%); **15**	2.4±2.2 (42%); **27**
R1d_100	6.6±0.4	5.9±3.7 (91%); **42**	3.1±3.2 (49%); **55**
R5d_mean	4.5±0.3	0.9±0.4 (20%)	0.8±0.3 (19%)
R5d_10	6.5±0.6	2.4±1.1 (38%); **3**	1.7±0.5 (27%); **4**
R5d_20	7.3±0.8	3.4±1.7 (46%); **6**	2.2±0.7 (30%); **7**
R5d_50	8.5±1.0	5.2±3.0 (53%); **15**	3.0±1.2 (43%); **26**
R5d_100	9.6±1.2	7.1±4.4 (75%); **38**	3.7±1.7 (39%); **48**

Figure 7. CT-PCSAR Table 4.5 Daily and 5-day Max. Rainfall

The future projections (2040-2069 and 2070-2099) in the CT-PCSAR were calibrated as an expected increase in depth from Reference data from 1970-1999. Because the Existing Conditions model used modern NOAA Atlas 14 Rainfall data from 2025 it was assumed that a portion of that increase has already occurred and is captured in the Existing Conditions model. The difference between NOAA Atlas 14 24-hour rainfall depths in each of the design events was compared to the 24-hour rainfall

depths in the future and reference events from CT-PCSAR. A percentage increase from the NOAA Atlas 14 24-hour events to the future (2040-2069 and 2070-2099) CT-PCSAR events was then calculated. This percentage increase was applied across the entire IDF curve for each storm event to develop IDF curves for the CT-PCSAR future events.

1-day Maximum precipitation								
	1970-99 Reference	NOAA 2025	2040-69 Changes	Difference	%	2070-99 Changes	Difference	%
Rld_mean								
Rld_10	4.10	4.870	6.10	1.23	25.26%	5.40	0.53	10.88%
Rld_20	4.70							
Rld_50	5.70	6.810	10.00	3.19	46.84%	8.10	1.29	18.94%
Rld_100	6.60	7.730	12.50	4.77	61.71%	9.70	1.97	25.49%

Figure 8. Comparison of 24-hour Rainfall Data Between CT-PCSAR and NOAA Atlas 14

	Duration (hr)	Duration (min)	2	5	10	25	50	100
Intensity (inch/hour)	0.08	5			9.31		14.98	18.60
	0.17	10			6.59		10.65	13.18
	0.25	15			5.16		8.36	10.33
	0.50	30			3.48		5.64	6.99
	1.00	60			2.19		3.55	4.40
	2.00	120			1.40		2.26	2.80
	3.00	180			1.07		1.73	2.13
	6.00	360			0.68		1.09	1.36
	12.00	720			0.41		0.68	0.84
	24.00	1440			0.25		0.42	0.52

Figure 9. Projected Intensity-Duration-Frequency Data (2040-2069)

	Duration (hr)	Duration (min)	2	5	10	25	50	100
Intensity (inch/hour)	0.08	5			8.24		12.13	14.43
	0.17	10			5.83		8.62	10.23
	0.25	15			4.57		6.77	8.02
	0.50	30			3.08		4.57	5.42
	1.00	60			1.94		2.88	3.41
	2.00	120			1.24		1.83	2.17
	3.00	180			0.95		1.40	1.66
	6.00	360			0.60		0.88	1.05
	12.00	720			0.37		0.55	0.65
	24.00	1440			0.22		0.34	0.40

Figure 10. Projected Intensity-Duration-Frequency Data (2070-2099)

Table 6-4 Recommended Coefficient Of Runoff Values For Various Selected Land Uses

Description of Area		Runoff Coefficients
Business: Downtown areas		0.70-0.95
Neighborhood areas		0.50-0.70
Residential:	Single-family areas	0.30-0.50
	Multi units, detached	0.40-0.60
	Multi units, attached	0.60-0.75
	Suburban	0.25-0.40
Residential (0.5 ha (1.2 ac) lots or more)		0.30-0.45
Apartment dwelling areas		0.50-0.70
Industrial:	Light areas	0.50-0.80
	Heavy areas	0.60-0.90
Parks, cemeteries		0.10-0.25
Playgrounds		0.20-0.40
Railroad yard areas		0.20-0.40
Unimproved areas		0.10-0.30

December 2003 ConnDOT Drainage Manual

6.9-6 Hydrology

Table 6-5 Coefficients For Composite Runoff Analysis

Surface		Runoff Coefficients
Street:	Asphalt	0.70-0.95
	Concrete	0.80-0.95
Drives and walks		0.75-0.85
Roofs		0.75-0.95

Figure 11. Runoff Coefficient Source Data

n	Surface Description
0.011	Smooth asphalt
0.012	Smooth concrete
0.05	Fallow (no residue)
	Cultivated soils
0.06	Residue cover = 20%
0.17	Residue cover >20%
0.13	Range (natural)
	Grass
0.15	Short grass prairie
0.24	Dense grasses
0.41	Bermuda grass
	Woods**
0.40	Light underbrush
0.80	Dense underbrush

Table C-1 Mannings's Roughness Coefficient (n) for Overland Sheet Flow*

Figure 12. Manning's Roughness Coefficient Source Data

U.S. Department of Agriculture
Natural Resources Conservation Service

FL-ENG-21B
06/04

TR 55 Worksheet 3: Time of Concentration (T_c) or Travel Time (T_t)

Project: CIRCA Designed By: CE Date: 4/8/25

Location: Checked By: Date:

Check one: Present Developed

Check one: ✔ T_c T_t through subarea CB6

NOTES: Space for as many as two segments per flow type can be used for each worksheet. Include a map, schematic, or description of flow segments.

Sheet Flow (Applicable to T_c only)	Segment ID					
1. Surface description (Table 3-1)		Smooth Asphalt				
2. Manning's roughness coeff., n (Table 3-1)		0.01				
3. Flow length, L (total L ≤ 100 ft)	ft	84				
4. Two-year 24-hour rainfall, P_2	in	3.1				
5. Land slope, s	ft/ft	0.040				
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_t	hr	0.01	+		=	0.01
Shallow Concetrated Flow	Segment ID					
7. Surface description (paved or unpaved)		Paved				
8. Flow length, L	ft	183				
9. Watercourse slope, s	ft/ft	0.032				
10. Average velocity, V (Figure 3-1)	ft/s	3.8				
11. $T_t = \frac{L}{3600 V}$ Compute T_t	hr	0.01	+		=	0.01
Channel Flow	Segment ID					
12. Cross sectional flow area, a	ft^2					
13. Wetted perimeter, P_w	ft					
14. Hydraulic radius, $r = \frac{a}{P_w}$ Compute r	ft					
15. Channel Slope, s	ft/ft					
16. Manning's Roughness Coeff., n						
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V	ft/s					
18. Flow length, L	ft					
19. $T_t = \frac{L}{3600 V}$ Compute T_t	hr		+		=	
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19	hr					0.03

Print Form Reset Form Save Form

Figure 13. Sample Time of Concentration Calculation Worksheet

Results

A pipe profile is presented below to visualize the model results in existing conditions. The trunk line pipe run connecting the Main Street underpass to the Prospect Street outfall was found to be over capacity in existing conditions during the 10-year, 50-year and 100-year design storms, resulting in a series of Hydraulic Grade Line (HGL) blowouts throughout the system. HGL blowouts along Sterling Road result in additional overland flow down the roadway gutter to the Prospect Street outfall area, however, there is no overland routing available at the Main Street underpass, as it is in a depressed sag condition. As a result, HGL blowouts at the Main Street underpass area result in inundation of the roadway, a finding that is supported by anecdotal evidence from Town sources who indicated that the road has been impassable multiple times in recent years during heavy rain events. There were not available measurements regarding the rainfall intensity or ponded depths during those events that could be used to calibrate the StormCAD model but the general pattern aligned with the results of the model.

Figure 14. Existing Conditions - 100-year Pipe Profile

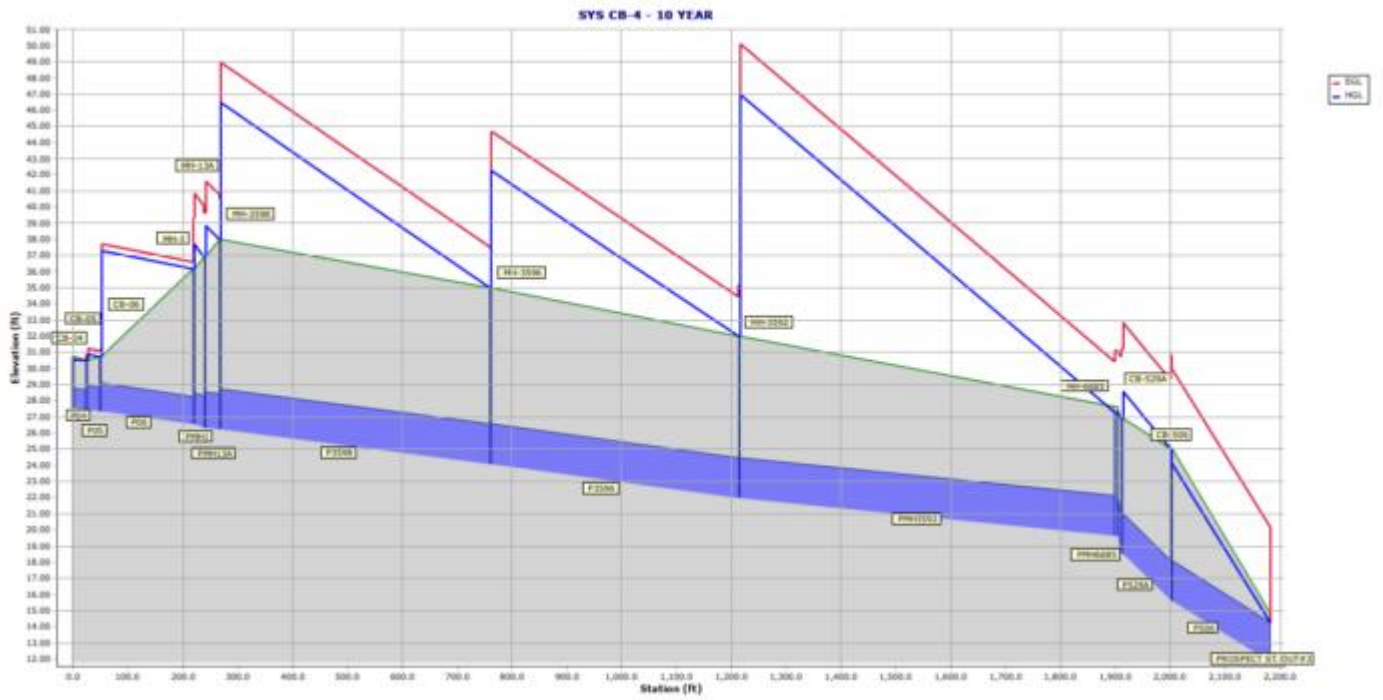


Figure 15. Existing Conditions – 10-Year Pipe Profile

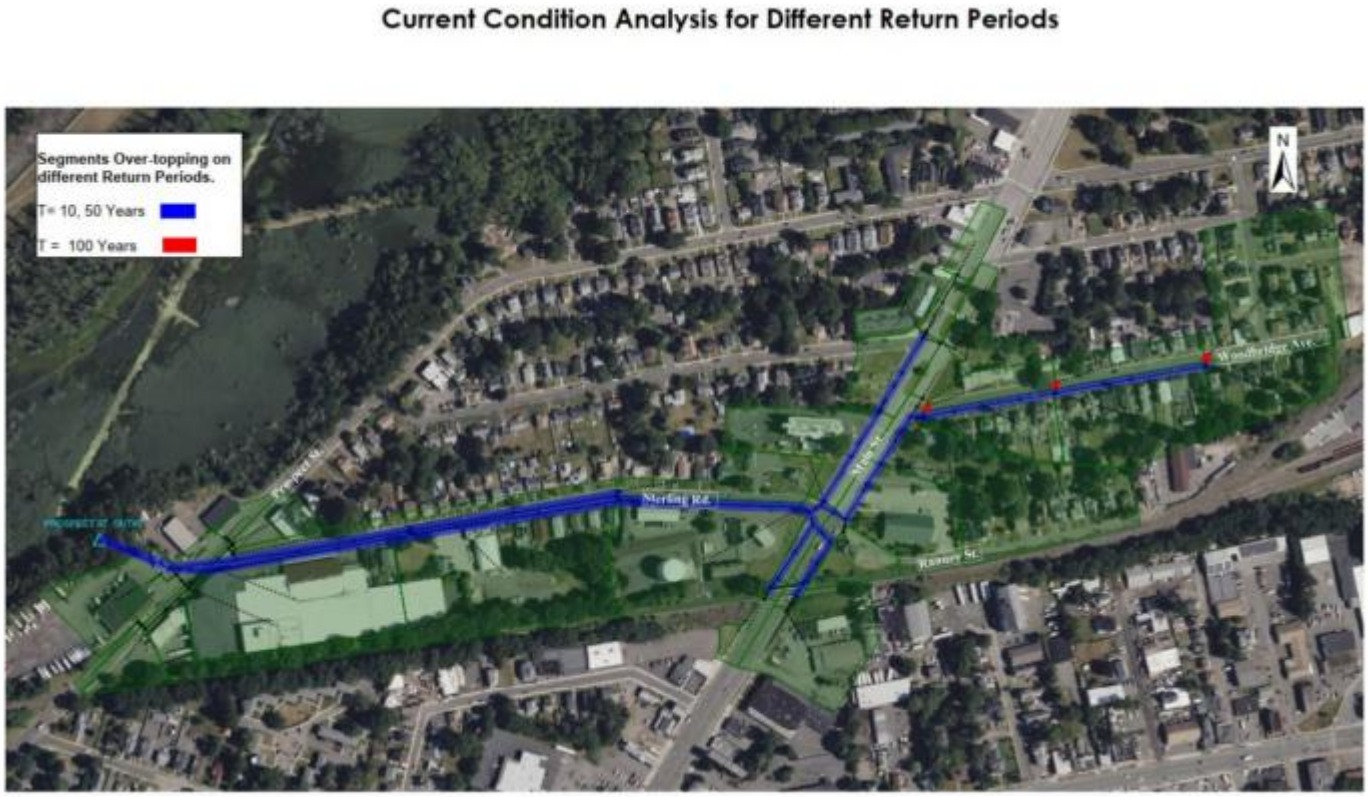


Figure 16. Existing Conditions - Over-topping During Various Storm Events

Projected rainfall intensities were also applied in the StormCAD model to produce similar data for future events (2040-2069 and 2070-2099). The results in the future models are similar to those of the existing conditions model, however the magnitude and frequency of overtopping storms increases slightly from existing conditions to future conditions.

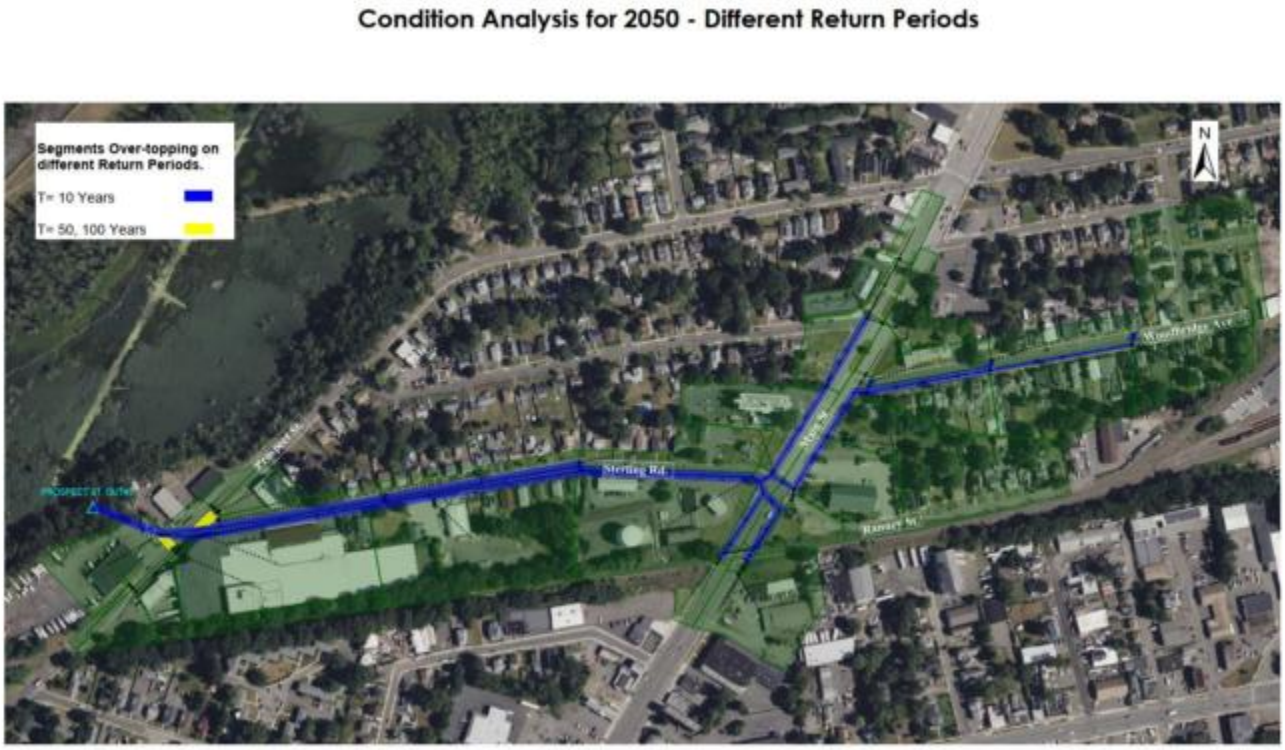


Figure 17. Future Conditions (2040-2069) - Over-topping During Various Storm Events

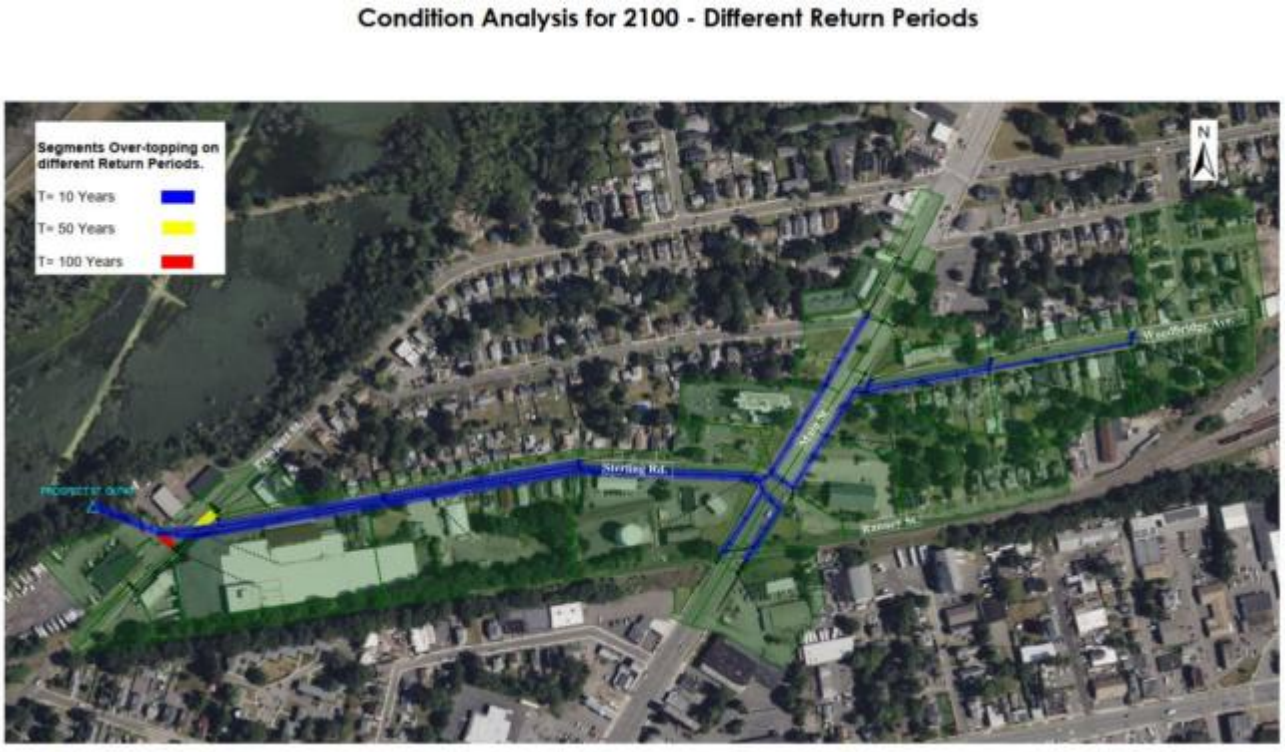


Figure 18. Future Conditions (2070-2099) - Over-topping During Various Storm Events

The existing and future conditions all experienced HGL blowouts due to undersized pipes that were over capacity during design events. Because of this, potential upsizing scenarios were considered to determine the size of trunk line that would be needed to convey the entire design flow in existing and/or future conditions. The CTDOT Drainage Manual identifies a 25-year event as the design storm for depressed roadways such as the Main Street underpass. Because the CT-PCSAR did not provide projections for a 25-year event, the design storm was conservatively considered to be the 50-year future event. Potential proposed pipe sizes were calculated to provide sufficient capacity to convey the 2040-2069 projected 50-year event, which is higher than the projected 2070-2099 50-year event.

Pipe Capacity Comparison

	Existing			Mid-Century (2040-2069)			Late-Century (2070-2100)			Existing Pipes		Future Pipes (50-Yr. Capacity)	
	10-year	50-year	100-year	10-year	50-year	100-year	10-year	50-year	100-year				
Location	Total Flow (ft3/s)	Total Flow (ft3/s)	Total Flow (ft3/s)	Total Flow (ft3/s)	Total Flow (ft3/s)	Total Flow (ft3/s)	Total Flow (ft3/s)	Total Flow (ft3/s)	Total Flow (ft3/s)	Diameter (in)	Capacity (Full Flow) (ft^3/s)	Diameter (in)	Capacity (ft3/s)
Main St (S)	12.86	18.58	21.33	16.71	28.86	36.90	14.51	22.68	27.66	21	11.07	30	29.00
Sterling Rd	95.58	135.97	154.06	122.31	204.75	255.71	107.11	163.79	196.05	30	59.60	48	208.16
Main St (NW)	12.58	17.04	19.02	15.62	24.17	29.25	13.90	19.98	23.36	12	6.17	24	39.18
Woodbridge Ave	12.01	15.48	16.92	14.34	20.72	24.21	13.04	17.68	20.08	12	3.58	24	22.62
Main St (NE)	16.98	22.08	24.20	20.40	29.82	35.00	18.48	25.33	28.87	12	3.57	30	41.02

Figure 19. Potential Pipe Size Increases to Provide Capacity for Future 50-year Design Storm

Reduction of Peak Stormwater Flow at the Pilot Site

To estimate the impact on the stormwater runoff resulting from the proposed design changes to the pilot site, a simplified hydrologic analysis was performed using the Rational Method. This method is widely used for preliminary drainage assessments and is well-suited for conceptual design stages.

The analysis assumed a time of concentration of five minutes would remain constant in both existing and proposed conditions. Runoff coefficients of 0.9 for impervious surfaces and 0.3 for pervious (green) areas were applied to reflect the expected changes in surface composition.

Surface area measurements were calculated for existing and proposed site layouts, differentiating between impervious and pervious zones. The proposed design incorporates a 13% reduction of impervious surfaces, which led to a calculated 11% decrease in peak stormwater flow. These results demonstrate the potential effectiveness of surface reconfiguration to reduce runoff volume.

EXISTING LAYOUT

Existing Impervious Surface (SF)	103555
Parking & Driveways	62527
Buildings	31775
Pathways	9253
TOTAL	**103555**
Existing Pervious Area (SF)	**53745**
Existing Impervious Surface Percentage	**66%**
Existing Pervious Surface Percentage	**34%**

Figure 20. Existing Impervious and pervious Areas in Current Layout

PROPOSED LAYOUT	
Proposed Impervious Surface (SF)	
Parking & Driveways	43803
Buildings	32665
Pathways	6515
TOTAL	**82983**
Proposed Impervious Surface Percentage	**53%**
Proposed Pervious Surface (SF)	
Total Green Space	**59752**
Pervious Pathways and Plazas	**11705**
Grass Paved Parking	**1960**
Naturalized Playground	**900**
TOTAL	**74317**
Proposed Pervious Surface Percentage	**47%**

Figure 21. Proposed Impervious and Pervious Areas under Prosed Site Layout

					10-Year Flow Rate (cfs)		
	Impervious Area (SF)	**Pervious Area (SF)**	**Weighted C**	**Tc (min)**	**Present**	**2050**	**2100**
Existing Runoff	103555	53745	0.69	5	18.65	23.37	20.68
Proposed Runoff	82983	74317	0.62	5	16.54	20.73	18.35
Change (%)					**-11.29%**	**-11.29%**	**-11.29%**

Figure 22. Hydrologic Impact of Proposed Layout: 10-Year Flow Rate Analysis

The decrease in impervious surfaces yields several stormwater management benefits:

- Enhanced Drainage Performance, reducing impervious areas mitigates localized flooding risks and alleviates pressure on exiting drainage infrastructure.
- Improved Groundwater recharge; Increased pervious facilitate natural infiltration.
- Enhanced water Quality: Pervious areas support natural filtration processes, reducing pollutant loads in stormwater runoff.
- Environmental and Sustainability Gains: The integration of green spaces contributes to ecological enhancement, aligning with sustainability and resilience objectives for the site.

Appendix B: Public Meeting and Advisory Committee Meeting Summaries

September 2025

Delivering a better world

Agenda

Meeting name
CIRCA East Hartford Advisory Committee Meeting #1

Meeting date
04/09/25, 2:00 PM – 3:00 PM

Location
Teams Call

Project Name
Resilient East Hartford

Attendees
Geoffrey Morrison-Logan *(AECOM, Urban Planner)*
Ellie Peterson *(AECOM, Landscape Designer)*
Chayanika Mohan, *(AECOM, Landscape & Project Support)*
Christian Nielsen *(AECOM, Transportation)*
Brad Sabean, *(AECOM, Drainage and Stormwater)*
Mary Buchanan *(CIRCA, Resilience Planner)*
Jon Truscinski *(CIRCA, Director of Planning)*
Nicole Govert, (CIRCA, *Planner*)
Douglas R. Wilson, P.E. *(TOWN, Town Engineer/Local Traffic Authority & Designated Agent EH Inland Wetlands – Environment Commission)*
Steve Hnatuk *(TOWN, Deputy Development Director)*
Julia Mauer *(Town's Public Health Emergency Preparedness Coordinator (cooling/heating center expertise)*
Brian Jennes *(Captain of Emergency Management)*
Sid Soderholm *(Planning and Zoning Member)*
Marissa Pfaffinger *(Principal Engineer at CTDOT)*
Raquel Ocasio *(CTDOT Bureau of Policy and Planning)*
Jennifer Arienti *(CTDOT, Planning Director)*
Cora K. Barber (CTDOT, Energy and Enviornmental Protection)
Rachel Andreucci *(CTCOT, Transportation Planner)*
Eric Runowicz *(CTDOT, Transportation Planner)*
Sonya Carrizales *(CRCOG, Environmental Planner)*

AECOM project number
60741803

Prepared by
Ellie Peterson & Peniel Anifowoshe

Summary of Agenda Items:

- **Introductions**
- **Resilient Connecticut Overview**
  - CIRCA presents background on Resilient Connecticut Resilient Connecticut & Overview of Focus Area
- **Heat Analysis Review – Projected Impacts & Cooling Center Study**
  - AECOM explains how Climate Change Vulnerability Score is calculated using exposure, sensitivity, and adaptive capacity factors. Results for the CCVI demonstrate that the East Hartford downtown area is very vulnerable to heat risks
  - AECOM also shares statistic from the National Oceanic and Atmospheric Administration (NOAA) "Climate Explorer Toolkit" According this this resource, the average daily maximum temperature is expected to rise 7° F by 2050 and days over 90° F in Hartford County expected to increase
  - AECOM presents the Cooling Corridors Toolkit using Main Street by the Town Green as a case study to show how small-scale interventions can help reduce heat at the neighborhood level.
- **Stormwater Site Observations – Initial Findings & Mitigation Strategies**
  - AECOM presents overview of observations during site walk of the Underpass on Main St with Doug Wilson *(Town Engineer)* the previous week.
    i. Surface drainage issues on Main Street and Infrastructure vulnerabilities were observed. Main Street from Connecticut Blvd to Burnside is mostly impervious, causing issues with excessive stormwater runoff.
    ii. The site is selected for further study to determine the level of improvement required to fix flooding concerns.
- **Review of Project Schedule, Questions & Action Items**
  - Project schedule shows that as of April 2025, we are in the first quarter of the project timeline. Upcoming meetings as follows:
    - Site Walk and Team Workshop on April 14th
    - In-person public meeting scheduled for mid-June
    - Three (3) additional advisory committee meetings planned for July, September, and November before the completion of the project.

Discussion Summary:

Discussion Topic #1: Cooling Centers

- Q: Are there any other locations not considered in the downtown?
    - Julia confirmed that, in addition to Raymond Library—already designated as an official cooling and warming center—the Town Hall and Community Cultural Center are strong candidates for future cooling centers. However, public access at Town Hall is limited to a few meeting rooms and the Council Chambers. She also noted two additional centers located outside the study area
- Q: How is a Resilience Center defined?
    - Brian cautions that the Cultural Center is already at capacity hosting many social services and is concerned that it may not be able to provide enough space and resources to the public during a heat emergency.
    - Geoffrey responds that a resilience center should be more than just an air-conditioned indoor space, but also provide access to drinking water, seating, and restrooms to ensure public comfort and safety during extreme heat events. Ideally, it should also be accessible by public transit, ADA-compliant, and equipped with backup power in case of outages. He adds that offering social programming could help increase use of the center by vulnerable members of the community, however the team will be able to confirm if this site is suitable during the site walk.
    - John clarifies that the purpose of this study is also to help the Town understand what steps would be required to pursue the goal of establishing a resilience center, so they can plan effectively for such facilities in the future.

Discussion Topic #2: Public Transit and Accessibility

- Q: Has the project team investigated residential density in project area?
    - Geoffrey responds that although the downtown area is not densely populated with residents, it is well connected to the broader region through key corridors such as Burnside Avenue, Connecticut Boulevard, and I-84. He emphasizes that planning for heat relief in this location is beneficial because its strong public transit access and central location make it accessible to a wide range of people from surrounding neighborhoods. asphalt.

Discussion Topic #3: Drainage & Stormwater Analysis

- Q: Will this study examine the U.S. Army Corps Levee System?
    - Doug explains that a separate study is already underway specifically to evaluate the levee system's performance and identify any maintenance needed to keep it functioning properly
    - He also highlights the benefits of CTDOT's Main Street redesign, which proposes a road diet that includes landscaped medians with green infrastructure and shorter, safer pedestrian crossings
- Q: Will the project team be developing a stormwater model to access flooding projections at the Underpass?
    - Brad confirms that the team has gathered sufficient information during the site visit to begin developing the model. While additional survey data from the Town would help refine the details, the team is confident they have enough to produce accurate projections for the site.

Discussion Topic #4: Coordination

- Is the project coordinating with CT on the Main Street Redesign project?
    - Geoffrey responds that the team is aware of the ongoing work and plans to align their recommendations to complement and support the town's active projects.

Agenda

Meeting name
CIRCA East Hartford Advisory Committee Meeting #2

Meeting date
07/17/25, 2:00 PM – 3:00 PM

Location
Teams Call

Project Name
Resilient East Hartford

Attendees
Geoffrey Morrison-Logan *(AECOM, Urban Planner)*
Ellie Peterson *(AECOM, Landscape Designer)*
Chayanika Mohan, *(AECOM, Landscape & Project Support)*
Brad Sabean, *(AECOM, Drainage and Stormwater)*
Anne Watkins *(AECOM, Cost Estimation)*
Mary Buchanan *(CIRCA, Resilience Planner)*
Jon Truscinski *(CIRCA, Director of Planning)*
Nicole Govert, (CIRCA, *Planner*)
Steve Hnatuk *(TOWN, Deputy Development Director)*
Julia Mauer *(Town's Public Health Emergency Preparedness Coordinator (cooling/heating center expertise)*
Brian Jennes *(Captain of Emergency Management)*
Sid Soderholm *(Planning and Zoning Member)*
Marissa Pfaffinger *(Principal Engineer at CTDOT)*
Raquel Ocasio *(CTDOT Bureau of Policy and Planning)*
Sonya Carrizales *(CRCOG, Environmental Planner)*

AECOM project number
60741803

Prepared by
Ellie Peterson & Peniel Anifowoshe

Summary of Agenda Items:

- **Introductions**
- **Schedule Overview**
  - AECOM presents updated schedule with project set to finish by mid-September
  - Condensed schedule reduced advisory committee meetings to three (3) overall throughout project timeline. Final advisory committee scheduled for August 11st.
- **Cost Assessment Update**
  - AECOM provides update on cost summary of railroad underpass, saying that they have completed a preliminary high-level cost assessment and are working to see if supplemental flooding data from the town can offset anticipated costs of drainage replacements in the Benefit Cost Analysis of this site.
- **Integrating Land Use, Transportation, & Resiliency**
  - Zoning Study and Selection of Pilot Project Site
    - <u>Selection of site:</u> Large parking lots dominate the area and adjacent businesses have separate lots with little to no interconnectivity. While the total parking supply meets zoning requirements, most lots are significantly underutilized.
    - <u>What we can improve:</u>
      1. Reconfigure fragmented parking lots to improve functionality and connectivity.
      2. Encourage shared parking among adjacent businesses to enable smoother traffic flow between lots.
      3. Reconfiguration could free up space for added green infrastructure and recreational areas.
      4. Coordinating lot improvements with Town projects—like roundabouts, road diets, sidewalk canopy trees, and stormwater infrastructure—could lead to broader stormwater benefits along Main Street
  - Pilot Project Site: Updated Drawings & Applied Strategies
    - Adaptation options for Pilot site divided into five (5) key subject areas: Improved Connectivity, Stormwater Relief, Heat Relief, Social Benefits, & Economic Benefits. Significant improvements highlighted at this site include:
      - Parking lot reconfiguration, which opens more free space while maintaining the same number of spaces overall. The revised parking layout **reduces impervious surfaces on site by 13%**.
      - Additional community spaces, including a civic plaza behind the current post office and a multi-purpose green space or play area.
      - Stormwater retention areas in parking lot and floodable green infrastructure, which has the potential to **reduce stormwater runoff by 11%**.
-

Discussion Summary:

Discussion Topic #1: Design Layout & Road Safety Considerations

- Q: How might this layout change vehicle traffic/navigation at this site?
    - Sid mentions he has safety concerns about new proposed layout creating “new street” which could potentially result in vehicles in parking lot traveling at higher speeds, possessing risk to the mobility impaired and children using the lot. Project team responds and acknowledges that this design is still in the beginning planning level phase, however some of these concerns could be resolved with proper signage, speed bumps, and minor layout changes.

Discussion Topic #2: Grant Funding

- Q: How does East Hartford coordinate with CTDOT for stormwater pilot program funding?
    - Marissa clarifies that if the Town of East Hartford wishes to apply for grant funding through the stormwater pilot program, they must submit a letter of support in coordination with CTDOT. For any grant-related coordination, please contact Jennifer Arienti.

Discussion Topic #3: Cost Estimation & Stormwater Calculations

- Q: Could AECOM complete a high-level cost estimate for the pilot site to price out the cost of stormwater improvements?
    - Yes, we are happy to provide an estimate that gives rough magnitude costs to help the town pursue funding for these recommendations in the future.
- Q: Will the stormwater runoff reduction calculations be incorporated into the final report?
    - Yes, it will be included. AECOM also noted that these calculations demonstrate how added green space can provide measurable benefits, which could be applied to other downtown sites with oversized parking lots.

Discussion Topic #4: File Sharing and Project Coordination

- Q: Can the presentation be shared with the group following this meeting?
    - Marissa requested that AECOM share the presentation so she can distribute the graphics—especially those related to the proposed roundabouts on Main Street. She offered to serve as a point of contact to help keep everyone connected as the work progresses. AECOM agreed to share presentation PDF following meeting.

Agenda

Meeting name
CIRCA East Hartford Public Workshop

Meeting date
06/9/25, 6:00 PM – 7:30 PM

Location
East Hartford Public Library and Teams Call Meeting Hybrid

Project name
Resilient East Hartford

Attendees
Geoffrey Morrison-Logan *(AECOM, Urban Planner)*
Ellie Peterson *(AECOM, Landscape Designer)*
Chayanika Mohan, *(AECOM, Landscape & Project Support)*
Christian Nielsen *(AECOM, Transportation)*
Brad Sabean, *(AECOM, Drainage and Stormwater)*
Mary Buchanan *(CIRCA, Resilience Planner)*
Nicole Govert, (CIRCA, Resilience *Planner*)
Douglas R. Wilson, P.E. *(TOWN, Town Engineer/Local Traffic Authority & Designated Agent EH Inland Wetlands – Environment Commission)*
Steve Hnatuk *(TOWN, Deputy Development Director)*

AECOM project number
60741803

Prepared by
Ellie Peterson & Peniel Anifowoshe

Summary of Agenda Items:

- **Project Overview**
  - Background on Resilient Connecticut Resilient Connecticut & Overview of Focus Area
- **Stormwater Assessment**
  - Main St Railroad Underpass Evaluating Stormwater Impacts and Infrastructure Vulnerabilities at the Underpass on Main St
- **Heat Risk Analysis & Resilience Center Study**
  - Understanding Heat Stress in the Town Center and Planning for Relief
- **Resiliency Pilot Project**
  - Road Diet Along Main St and Rethinking Parking Solutions to Support Growth and Resilience
- **Group Discussion and Q & A**

Discussion:

- **How was the scoop defined?**
  - Don Bell – Vice Chair of East Hartford Town Council asked:
    - If considerations are occurring looking into other parts of town with current or proposed economic development, specifically Silver Lane.
    - Potentially looking at the Riverfront and the impact on the adjacent residential areas.
  - Mary Buchanan from CIRCA answered:
    - Addressed the multiple phases of Resilient Connecticut, highlighting how Phase 2 focused on the analysis of the entire CRCOG region, looking for areas with flood and heat vulnerability overlapping with the town's critical facilities and regional assets.
    - Several Resilient Opportunity Areas (ROARs) were identified for the Southeastern and Central Connecticut region, and PERSIST scoring was used to rank each town's resilience strategies and projects, ultimately recognizing East Hartford as an opportunity area.
    - CIRCA then partnered with the Town of East Hartford to identify their priorities and how strategies can intersect with the town's goals.
    - Several meetings were held last year to recognize the ROARs within East Hartford and decide focal areas.
  - Steve Hnatuk from The Town added:
    - The scoring criteria that led to higher vulnerability for this area was also a higher concentration from some of the town's critical infrastructure and facilities.
    - Some ROAR areas observed the Silver Lane corridor – specifically the section intersecting with Main Street, and the Mayberry village area but the current study area scored the highest in those vulnerability considerations.
  - Don appreciated the presentation of the scoring map, stating how the visual aid crystalizes the density of the area.
- **When will the catch basin replacements along Main Steet take place?**
  - Don asked what is the state's timeline for replacing current catch basins on Main Street?
  - Doug Wilson from The Town replied:

        - The state has cleaned some town pipes, specifically in shallow curb areas, leading to a cease in flooding in those locations.
        - Additionally, the state looked at local garage structures with small cast iron inlets and have proposed replacements within the year.
- **Question on State funding programs for sustainability initiatives.**
    - Don asked if there are existing or proposed state level programs to help municipalities cover the cost of replacements over the next couple decades.
    - Doug Wilson answered:
        - Discussed a hazard mitigation grant program as a possible source of funding for Sterling Road Pipe replacement.
        - Hoping to apply for funding in July before the deadline in August.
        - Funding does not have a dollar value but is high in the several million-dollar range, with a possibility of labor being covered.
    - Nicole Govert from CIRCA added:
        - Program is called Hazard Mitigation Grant Program and Connecticut received funds last August, in response to the Southbury and Oxford flooding.
        - The state currently has 10-11 million dollars that can be spent towards infrastructure projects.
        - A program called DEEP Climate Resilience Fund (DCRF) could potentially cover some of the cost share.
        - However, funding programs are currently in flux, so CIRCA is waiting for the announcement of the next round of DCRF.
        - CIRCA aims to continue to work with the town to find funding to implement resiliency projects.
    - Geoffrey Morrison-Logan with AECOM added:
        - Next steps of Phase 3 require renditions to the proposed designs, with a cost benefit analysis specifying implementation costs and its eligibility for future grants.
        - Aspiring to meet granting criteria puts the town as forefront recipients.
- **Question on Daily Maximum Temperature Projections**
    - Don stated:
        - The temperature projections diagram resonated with him.
        - Asked if the projection of 7° daily maximum rise overtime is for the summer or an overall increase.
        - Wonders how that will not only impact the region, but the town's electricity and cooling systems.
    - Ellie Peterson from AECOM answered:
        - Projections were based on 3 summer month periods, highlighting the peak impact of extreme heat conditions.
        - However, expectations present a temperature increase throughout the year, within the next 100 years, vastly fluctuating year to year.
        - Addressed the possibility of decreased heat periods and less drastic temperatures increase if emissions were reduced.
        - Projections show future heat increase in both a low CO2 emissions scenario and a high CO2 emissions scenario
    - Geoffrey added:
        - Coupling the current projections with the existing dynamic of Main Street, i.e. limited tree cover, high impervious surfaces and asphalt, could further impact the heat effects in East Hartford – specifically in the downtown.
        - However, this strategy helps intervene by adding more trees, thinking about pervious strategies and following the sustainability toolbox, which are ultimately positive factors contributing to the town's future.
    - Don addressed:
        - Concerns with low temperature changes from a public health perspective.
        - Discusses the human effects compound when there is not a natural cooling opportunity at night.
    - Nicole replies:
        - The CIRCA research team in partnership with the town plan to deploy heat sensors.
        - 7-8 locations along the corridor have been selected for the installation, which will begin in the summer.
        - The purpose is for data collection, to monitor emerging heat patterns, analyzing the hot spots and addressing how that can be mitigated.
- **Question about Main Street and level of design control**
    - Angela Parkinson – East Hartford Town Council member asked:
        - With Main Street being a state road, how much design control is there.
        - If possible, the people will like shading on Main by implementing a green boulevard median with a row of trees down the middle – referencing the previous trolley design with a row of Elm trees (which were impacted by disease)

    - Doug responded:
        - The hope of the DOT's roundabouts study is to implement 3 large planting islands that will be a pedestrian refuge and help with the cooling of that central space.
        - The current focus of this toolbox is observing parking lots that can be shared and breaking down barriers.
        - Discussed hopes of copying the proposed illustration of the library into other pockets along the buildings of main street.
    - Geoffrey added:
        - The importance of playing with the parcel dynamics and reducing impervious surfaces by sharing, creates room for green spaces, natural shading and urban ecologies.
    - Angela added:
        - Concerns with current bus stop systems having no shading.
        - Discusses an opportunity to add pocket parks around bus stop locations, with seating, shade structures/trees or both.
        - Employed us to think about accessibility and how temperature changes affect those that depend on public transport.
    - Doug stated:
        - DOT is investing in bus shelters all over the state.
        - There is a list of stops within East Hartford that they would be rehabilitating.
        - Discussed the efforts to infuse state money to the bus location with highest ridership (i.e by the Wendy's and the Gib) and get suitable shelter for people who depend on the public transit.
        - The initiative will also include stops along main street, which will align with the roundabout redevelopment strategy.
- **Is semi-pervious asphalt existing and can it be implemented?**
    - Angela wondered:
        - The possibility of switching town's roads to a more permeable and sustainable material.
    - Doug responded:
        - The risks of water absorbing into the road, and the benefits of stormwater draining away from the road into treatment systems.
        - Additionally proposed the inclusions of hydrodynamic separators.
- **Inquiry on more information on green roofs.**
    - Angela highlighted:
        - Potential for pollinator pathways on town owned buildings and food generation opportunities.
    - Geoffrey addressed:
        - The illustration being one of the various design possibilities in public buildings but within private buildings zoning laws will apply.
        - Discussed the need to supplement the bylaws on low impact design, zoning, rooftop standards and best storm water practices at a site scale level.
        - Highlighted that the town are currently making zoning modification to promote sustainability, but recommended circling back to observe other strategies that might be overlooked but can be implemented.
    - Angela inquired:
        - Other cutting-edge designs that can be implemented on a green rooftop, apart from produce growth and pollinator gardens.
    - Geoffrey stated:
        - The importance of material choices on roofs and how that can impact the absorption of heat.
    - Ellie added:
        - That green roofs also act as insulation for buildings, therefore decreasing the cooling cost.
        - Additionally stated that there are a lot of urban agriculture that occur on green roofs, with multiple precedents that can be applied to the town.
- **How does the Tool Kit tie into the D.O.T.'s mobility study?**
    - Awet Tsegai – East Hartford Town Council member asked:
        - Wondered how vehicular traffic, bicycle traffic, parking from the mobility study ties into Resilient East Hartford.
    - Marissa Pfaffinger with Connecticut D.O.T. answered:
        - Her role is to observe the various town and city-oriented initiative studies occurring and see how that ties in with the Greater Hartford mobility study.
        - She addressed the difficulty in knowing all the various initiatives occurring but being brought into the Resilient East Hartford study – despite the study not being within their scope – clarifies where other town initiatives lie.
        - Included that back lot parking, and green roofs are not strategies within their involvement but potentially connects with other ongoing initiatives.

        - Addressed the mobility study's scope is not only focused on car traffic, but creates opportunities for medians, bus shelters and pedestrian pathway improvements, beyond a typical traffic study.
- **Does the town have any land requirements?**
    - Awet asked:
        - If the town have a vegetation requirement in the zoning laws.
    - Steve replied:
        - The town requires a front landscaped area along a roadway in most zoning districts.
        - The landscape area size is in accordance with the approximate front setbacks for a building.
        - There are also requirements for 3-inch caliper shade trees, one per ever 50-feet of road frontage for a development, and that is mandated for every site redevelopment.
        - Additionally, there are minimum stormwater detention requirements on site, requiring people to treat and maintain a minimum amount of their storm water drainage.
    - Doug added:
        - The purpose of the detention is so stormwater does not impact your neighbors.
        - It takes the peak flow and ensures for 10-, 25-, 50- and 100-year storms, more water is not being put out on a flow rate basis.
        - There is an MS4 permit, which requires water quality volume treatment, which was initially based on the first inch of rainfall but has been updated to the first 1.3 inches by the state.
        - Ultimately, the rainfall goes into underground infiltrators and water quality flow structures which are isolated from the rest of the system.
        - Despite the town not having many due to lack of space, low water ponds, which trap stormwater, are system which could work.
        - Hoping that new water quality structures help mitigate pollutants, specifically diesel, from washing into their water bodies.
- **How different are the parking requirements in Hartford vs East Hartford?**
    - Awet asked:
        - Curious to know the extent of parking differences with Hartford being a city, with certain areas being denser than other.
    - Geoffrey answered:
        - The importance of neighbor comparisons to show similarities and differences, and national parking requirements dramatically change depending on location and policies.
    - Chayanika Mohan with AECOM added:
        - Zoning requirements for municipalities have a minimum parking requirement and a major difference is that Hartford has moved on from this requirement and replaced it with a maximum parking requirement.
        - An example being retail spaces, East Hartford have a requirement to have four spaces per thousand square feet of footprint but in Hartford they have a maximum of 6 spaces per parcel.
        - These changes have helped the city of Hartford reduce parking spaces in the urban core and returned more open spaces.
    - Geoffrey added:
        - If a minimum is required even though it is not necessary, there is an influx in overbuilt parking, as opposed to a maximum.
        - However, the town of East Hartford has a shared parking policy which allows mixing uses and sharing parking spaces, instead of creating parking for each individual user in a multi-use footprint.
        - Rebuilding a historical downtown or development highlights that required parking is much greater than the existing. The current parking was built organically overtime, some developments which are overparked can be leveraged for sharing, which are ideas being explored.
        - Additionally thinking of interpersonal connectivity, how to create a vehicular connection within neighboring parcels without having to reenter the main road.
        - Eliminating vehicular movement within parcels also creates opportunities for inter-parcel pathway connections and walkability.
    - Steve added:
        - The policy of a maximum parking is something that the town of East Hartford will potentially look at.
        - It was one of the 10-year recommendations for their Plan of Conservation Development (POCD).
        - Agreed with research on applying parking standards within the downtown area to present locations with excessive parking.
        - Addressed the economic impact of reducing parking spaces, aside from environmental benefits.

        - Minimum parking policies require investments in parking which businesses are not getting back if space is unused, which leads to dead land use within the downtown that could have been reutilized.
- **How does pipe replacements tie into roadway replacement plans?**
    - Awet asked:
        - If there is any tie into the MDC work on maintenance piping.
    - Doug answered:
        - The replacement pipeline is only a drainage line that goes along Sterling.
        - The pipe is currently a 30-inch but will need to be increased to a 48-inch and is located 12 to 15 feet below grade. There the entire road will need to be replaced during that construction.
        - Existing utilities will be destroyed and coordination with utility companies will occur to confirm new sewer, water or gas line implementations.
- **What are the planned actions of the town based on the study trends?**
    - Awet asked:
        - What steps can the town take to prepare for these implementations.
        - Town accommodations for the plans of the Resilient East Hartford scope area and the Main Street-Connecticut Boulevard corridor.
    - Geoffrey answered:
        - The study analysis the potential projects to observe the time frame and costs so it can be placed on an action list.
        - As consultants we propose actions, timelines and cost analysis that should be considered and leave the town to choose how it is implemented.
        - Posed a question to the town on what next steps are after this plan is put in place.
    - Steve answered:
        - First steps will be looking towards the Hazard Mitigation funding.
        - Grant funding requires having a basis of why they need their funding, and these reports provide sufficient evidence.
        - Additionally, looking at town hazard mitigation plans by implementing combined parking strategies, which tie into their redevelopment of the church corner property.
        - Also, using these reports to push forward the goals of the Hartford mobility study, sourcing federal or state funding and opportunities.
    - Doug added:
        - Sourcing a grant to design and build a relief for the railroad.
        - Also taking the sample of the shared/economized parking lots and spreading up the street towards Bissell Street.
        - Adding two-way traffic along Ladd Street, Phelps Streets and east of Bissell Street, with parking lot integration.
        - Inquired about the Board of Ed building and if those spaces could do more sharing, then it could tie in with the parcel redevelopment and connectivity strategies being implemented.
        - Small buildings along Chapel and Connecticut Boulevard could benefit from this study.
        - Tying the outside of these building spaces could diminish the heat island along main street.
        - Then the DOT study in the forefront of the buildings improving pedestrian, bicycle, vehicular and urban green spaces.
        - New buildings being more environmentally friendly and retrofitting older buildings to limit heat island effect.
        - Hoping the new design strategies sets a standard for the neighboring, spreading out beyond out design scope.
    - Awet added:
        - Street lighting and nighttime safety – specifically how more connectivity creates few commutes to and from car when running errands in the evenings.
    - Doug added:
        - Existing poles are getting redone using their existing spacing and location along main street, to be up to standard.
        - DOT design will require new lighting along main street to match their plan.
    - Don added:
        - Next steps should include the importance of having the resilience centers that can accommodate the rising temperatures and potential increase in demand
        - Additionally, hurricane impacts and inland wind damages, with recent examples in Connecticut, i.e Tropical Storm Isaias and 2020/2021 Tropic Storm Irene.
        - Despite most natural disasters being tropical and the last hurricane being in the 90s, as we think of the East Hartford community making sure that there are enough spaces for people to take shelter in a multi-hazard event.

Agenda

Meeting name
CIRCA East Hartford Advisory Committee Meeting #3

Meeting date
08/11/25, 4:00 PM – 5:00 PM

Location
Teams Call

Project Name
Resilient East Hartford

Attendees
Geoffrey Morrison-Logan *(AECOM, Urban Planner)*
Ellie Peterson *(AECOM, Landscape Designer)*
Chayanika Mohan, *(AECOM, Landscape & Project Support)*
Catherine Escobar Verduguez, *(AECOM, Drainage and Stormwater)*
John Jeese Serrano *(AECOM, Cost Estimation)*
Mary Buchanan *(CIRCA, Resilience Planner)*
Douglas R. Wilson, P.E. *(TOWN, Town Engineer/Local Traffic Authority & Designated Agent EH Inland Wetlands – Environment Commission)*
Steve Hnatuk *(TOWN, Deputy Development Director)*
Julia Mauer *(Town's Public Health Emergency Preparedness Coordinator (cooling/heating center expertise)*
Brian Jennes *(Captain of Emergency Management)*
Sid Soderholm *(Planning and Zoning Member)*
Marissa Pfaffinger *(Principal Engineer at CTDOT)*
Raquel Ocasio *(CTDOT Bureau of Policy and Planning)*

AECOM project number
60741803

Prepared by
Ellie Peterson

Summary of Agenda Items:

- **Presentation of Draft Report |** Pausing for Feedback at Chapter 3, 4, & 5
    - **Introduction** (5 min) – Overview of Resilient CT, project goals, engagement timeline, site walk, and downtown focus areas.
    - **Town Context & Urban Heat Relief Planning** (5 min) – Summary of heat risks and proposed cooling strategies for downtown.
      Advisory feedback – 10 min
    - **Stormwater Analysis** (5 min) – Flood risk at Main Street underpass, recommended drainage upgrades, and high-level cost estimate & BCA results.
      Advisory feedback – 10 min
    - **Pilot Project** (5 min) – Redevelopment concept for town-owned land to add green space and climate-resilient design—includes rendered view and high-level cost estimate.
      Advisory feedback – 10 min
    - **Project Schedule & Next Steps**: Breakdown of August/July Schedule Below

Discussion Summary:

Discussion Topic #1: Heat Relief Planning & Resilience Center Study

- Sid mentions to group that the “Community Cultural Center” has been changed to the “Community Center”.
- Geoffrey mentions that AECOM will explore “list of programmatic elements” that ought to be implemented in a resilience center to help the town prepare adequately.
- Q: Could the resiliency strategies for cooling corridors also give some guidelines as to the maintenance pros and cons of permeable paving alternatives?
    - Geoffrey and Ellie respond, yes, the illustrative graphic hints at how permeable paving could be retrofitted into less trafficked areas of existing sidewalks, however we can include language exploring pros and cons of sustainable materials in the report.

Discussion Topic #2: Stormwater Network Analysis & BCA Results for Railroad Underpass

- Doug comments that he was not surprised that the benefit cost ratio (BCR) came out negatively for this site as he faced some difficulty retrieving documentation from other departments showing records of previous flooding events and the resources allocated by the Town. He also mentions that the flooding at the underpass technically does not impact an “critical facilities”, because the railroad is elevated above. If critical facilities were impacted by flooding at this location, this may impact the BCR score differently.
- Mary responds, emphasizing that documentation of these events could help reopen an avenue for federal funding in the future.

Discussion Topic #3: Pilot Site Cost Estimate Clarification

- Q: Are site components and square footage calculations referenced in the rendered plan?
    - Geoffrey answers that yes, these estimates are a direct reflection of the plan presented, although some features less essential to design concept have been omitted, such as building retrofits and educational signage. Additionally, the appendix will include a key map that clarifies each line items in the estimate.

Discussion Topic #4: Pilot Project Site Design Recommendations

- Doug comments that rendering can be utilized to help raise greater awareness about how post office could be utilized for public use in future. He is hopeful that this may help him pursue more federal funding in the future to acquire lots for public use, such as the post office.
- Q: How are road safety precautions being considered in the newly configured parking lot at the pilot site?
    - Geoffrey and Ellie respond saying that speed bumps, raised crossings, and green infrastructure “pinch points” could be utilized to ensure cars travel at safe speed

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Appendix C: High-Level Cost Estimate & Benefit-Cost Analysis

September 2025

Delivering a better world

Overview

This memo provides a summary of the high-level cost estimates and benefit-cost analysis (BCA) completed for the Resilient East Hartford project, part of the Connecticut Institute for Resilience and Climate Adaptation's (CIRCA) Resilient Connecticut program.

High-Level Cost Estimates

Stormwater Flooding at Railroad Underpass

AECOM developed a high-level cost estimate to address stormwater flooding at 1351 Main Street, at the railroad underpass in East Hartford. The analysis considered major infrastructure improvements such as excavation, removal and replacement of drainage systems, and installation of large-diameter reinforced concrete pipes. Roadway reconstruction and structural upgrades were also included, resulting in an estimated construction budget of approximately $14–15.2 million. This estimate accounted for unit pricing, quantities, and allowances for general conditions, insurance, bonds, and design fees—reflecting the scale of work needed to address 25- to 50-year storm events.

Pilot Site at East Hartford Library

Another high-level cost estimate was prepared for the pilot site design recommendations proposed in Chapter 5 of this report. The pilot site study area includes the East Hartford Raymond Library, US Post Office, Church Corner's Inn, and East Hartford Apartments. This estimate—approximately $3–5 million—was developed using a comprehensive parametric approach that accounts for a range of green infrastructure, parking lot reconfigurations, and site enhancements to strengthen the urban core. Proposed strategies include a nature-based playground, grass-paved parking spaces, permeable pathways and plazas, and floodable landscapes. The estimate does not currently include building retrofits or the installation of educational signage.

Cost Estimate Qualifications

Both estimates have been prepared according to AACE (Association for Advancement of Cost Engineering) standards for estimate classification as indicated, and thus inherits an expected range of accuracy according to the classifications. AACE Class 5 has been used, also referred to as feasibility and/or rough order of magnitude estimates. They are generally prepared based on limited information and are used for strategic planning purposes, market studies, assessment of initial viability, evaluation of alternate schemes, project location studies and long-range capital planning. Estimate mark-ups are included as indirect cost that are calculated as a percentage of total of the estimated construction cost

AACE Class 5 Estimates are typically based on Planning Stage or Concept Design Stage information and the typical project estimate contingency allowance are 10-30% with level of accuracy from -50% to 100%.

These cost estimates have been prepared based on preliminary design concept September 2025. These estimates are based upon measurement of quantities where possible form the documents issued by the design team. Conceptual estimating methods are used for any remaining scope in conjunction with references from comparable projects recently estimated by AECOM. The unit pricing shown within this estimate reflects AECOM's opinion of fair market value of construction cost of the project and not a prediction of low bid.

Resilient East Hartford, CT
Preliminary High Level Cost Estimate (ROM)
July 17, 2025

Item	Description		Present 25-Year Capacity				Future 50-Year Capacity			
			Qty	Unit	Rate	Total	Qty	Unit	Rate	Total
1	Excavation and backfill		9,028.29	CY	$ 157	$ 1,417,216	10,110.00	CY	$ 157	$ 1,587,017
2	Remove and disposal of existing pavement and pipe		5,890.30	LF	$ 209	$ 1,228,981	5,972.10	LF	$ 209	$ 1,245,378
3	Construction of new pipes									
3.01	18" RCP		2,430.70	LF	$ 157	$ 381,559	2,375.80	LF	$ 157	$ 372,941
3.02	24" RCP		963.20	LF	$ 217	$ 209,352	566.20	LF	$ 217	$ 123,064
3.03	30" RCP		284.60	LF	$ 326	$ 92,787	703.70	LF	$ 326	$ 229,424
3.04	36" RCP		185.00	LF	$ 435	$ 80,420	114.60	LF	$ 435	$ 49,817
3.05	42" RCP		84.00	LF	$ 507	$ 42,601	25.00	LF	$ 507	$ 12,679
3.06	48" RCP		1,942.80	LF	$ 628	$ 1,219,884	180.00	LF	$ 628	$ 113,022
3.07	54" RCP					N/A	91.50	LF	$ 610	$ 55,815
3.08	60" RCP					N/A	1,915.30	LF	$ 730	$ 1,398,169
3.09	Bedding		385	CY	$ 169	$ 65,098	436	CY	$ 169	$ 73,682
4	Protection of existing catch basins, allow		1.00	LS	$ 18,500	$ 18,500	1.00	LS	$ 16,000	$ 16,000
5	Making good, minimal disturbance, allow		1.00	LS	$ 40,000	$ 40,000	1.00	LS	$ 50,000	$ 50,000
6	Structure Replacement		16.00	EA	$ 40,000	$ 640,000	21.00	EA	$ 40,000	$ 840,000
7	Roadway Replacement (24' wide)		141,367	SF	$ 28	$ 3,926,121	143,330	SF	$ 28	$ 3,980,644
8	Green Infrastructure					*Excluded*				*Excluded*
	TOTAL					**$ 9,362,517**				**$ 10,147,651**
	General Conditions/ General Requirements	13.00%				$ 1,217,127				$ 1,319,195
	Overtime / Shift Work (Noisy Work)	0.00%				Excluded				Excluded
	Phasing	0.00%				Excluded				Excluded
	Contractor's Overhead & Profit or Fee	10.00%				$ 1,057,964				$ 1,146,685
	Escalation	0.00%				Excluded				Excluded
	Bonds	1.75%				$ 203,658				$ 220,737
	Police	2.50%				$ 296,032				$ 320,857
	General Liability Insurance	2.75%				$ 333,776				$ 361,766
	ESTIMATED CONSTRUCTION COST					**$ 12,470,000**				**$ 13,520,000**
	Contingency	5.00%				$ 623,500				$ 676,000
	RECOMMENDED CONSTRUCTION COST BUDGET					**$ 13,090,000**				**$ 14,200,000**
	Design Fees	7.00%				$ 916,300				$ 994,000
	Project Management Fees	0.00%				Excluded				Excluded
	Project Expense / Other Direct Cost	0.27%				$ 35,000				$ 38,000
	PROJECT SUMMARY (ROUNDED) JULY 2025					**$ 14,000,000**				**$ 15,200,000**

Assumptions
1. We assumed Class III RCP pipes.
2. All works shall be done during normal hours (8 hours / day).
3. The estimate detail has been priced in 3Q 2025 dollars.
4. We have assumed that there will be clear access to the site.
5. No provision for accelerated schedules.
6. Assumed adequate skilled labor will be locally available.

Exclusions:
1. This estimate only includes work under the scope narratives.
2. Side walk repair/ replacement.
3. Repair/ replacement of other utilities (e.g. Domestic water pipes, Electrical and Communication utilities)
4. Phasing.
5. Escalation.
6. Project Management Fees.
7. Legal Fees.
8. Provision of road closure and permits (By Owner).
9. No contingency for owner-initiated scope and program change.
10. Any unforeseen conditions not stated in the above assumptions.
11. Non-competitive bidding conditions.
12. Sole source specifications of materials or products.
13. Bids delayed beyond the projected schedule.
14. Owner's field inspection costs.
15. Assessments, taxes, finance, legal and development charges.
16. Owner Management Fees.
17. Finance/Interest Costs.
18. Noisy hour limitation.

PILOT SITE ADAPTATION STRATEGIES
Resilient East Hartford, CT
Rough Order of Magnitude High Level Cost Estimate (ROM)
August 8, 2025

Item	Description		PILOT SITE ADAPTATION STRATEGIES			
			Qty	Unit	Rate	TOTAL (Rounded)
	Pilot Site Existing Condition					
	Demo and Site Preparation					
	Driveway removal		1.00	AL	$ 200,000	$ 200,000
	Partial removal of existing parking lot		1.00	AL		incl. above
	Partial removal of existing pathways		1.00	AL	$ 30,000	$ 30,000
	New Site Components					
	Pervious pathways		1,200.00	SF	$ 30	$ 40,000
	Parking Lot Reconfiguration - Paved parking aisles and driveways (minor grading and drainage)		9,940.00	SF	$ 23	$ 229,000
	Parking Lot Reconfiguration - Grass paved parking		1,960.00	SF	$ 50	$ 98,000
	Nature-based Playground					
	Play Structure		1.00	EA	$ 50,000	$ 50,000
	Wood Chips		900.00	SF	$ 10	$ 9,000
	Shade Structure		1.00	EA	$ 40,000	$ 40,000
	Community Plaza					
	Pervious paving		3,000.00	SF	$ 30	$ 90,000
	Seating - Bistro tables with 2 chairs each		6.00	EA	$ 2,500	$ 15,000
	Shade Cloth Structure		2.00	EA	$ 125,000	$ 250,000
	Stormwater Green Infrastructure					
	Floodable Green Space		3,860.00	SF	$ 30	$ 116,000
	Bio-retention area/ rain gardens in parking lot		4,400.00	SF	$ 80	$ 352,000
	Proposed Pedestrian Walkway Green Space		6,300.00	SF	$ 20	$ 126,000
	Retrofitting existing building with resiliency strategies (green roofs, cooling roofs, rainwater harvesting, energy efficient systems, etc)					Excluded
	Seating areas along pathways		1.00	AL	$ 200,000	$ 200,000
	Addition of shade trees and new landscape		1.00	AL	$ 125,000	$ 125,000
	Educational signage					Excluded
	TOTAL					**$ 1,970,000**
	General Conditions/ General Requirements	15.00%				$ 295,500
	Overtime / Shift Work (Noisy Work)	0.00%				Excluded
	Phasing	0.00%				Excluded
	Contractor's Overhead & Profit or Fee	10.00%				$ 226,550
	Escalation	0.00%				Excluded
	Bonds	1.75%				$ 43,611
	Police	0.00%				Excluded
	General Liability Insurance	2.75%				$ 69,731
	ESTIMATED CONSTRUCTION COST					**$ 2,610,000**
	Contingency	20.00%				$ 522,000
	RECOMMENDED CONSTRUCTION COST BUDGET					**$ 3,130,000**
	Design Fees	7.00%				$ 219,100
	Project Management Fees	0.00%				Excluded
	Project Expense / Other Direct Cost	0.32%				$ 10,000
	PROJECT SUMMARY (ROUNDED) AUGUST 2025					**$ 3,400,000**

Notes:
1. This Cost Estimate has been prepared based on a preliminary design concept that was received in July 2025.
2. This is Class 5 level estimate and prepared according to Association for the Advancement of Cost Engineering (AACE) standards
   * Estimate Classification: Class 5 - Rough Order of Magnitude Cost Estimate
   * Similar Industry Terms: Project Concept Screening, Feasibility, Strategic Analysis and Budget Planning
   * Accuracy Range: -50% to 100%
   * Expected Project Contingency: 7%-25%
   * Background Information Used: Few or no design parameters. Pricing based on historical data

APPENDIX C | HIGH LEVEL COST ESTIMATE - PILOT SITE

PILOT SITE ADAPTATION STRATEGIES
Resilient East Hartford, CT
Rough Order of Magnitude High Level Cost Estimate (ROM)
August 8, 2025

AECOM

Item	Description	PILOT SITE ADAPTATION STRATEGIES			
		Qty	Unit	Rate	TOTAL (Rounded)
	Pilot Site Existing Condition				
	Demo and Site Preparation				
	Driveway removal	1.00	AL	$ 200,000	$ 200,000
	Partial removal of existing parking lot	1.00	AL		incl. above
	Partial removal of existing pathways	1.00	AL	$ 30,000	$ 30,000
	New Site Components				
	Pervious pathways	1,200.00	SF	$ 30	$ 40,000
	Parking Lot Reconfiguration - Paved parking aisles and driveways (minor grading and drainage)	9,940.00	SF	$ 23	$ 229,000
	Parking Lot Reconfiguration - Grass paved parking	1,960.00	SF	$ 50	$ 98,000
	Nature-based Playground				
	Play Structure	1.00	EA	$ 50,000	$ 50,000
	Wood Chips	900.00	SF	$ 10	$ 9,000
	Shade Structure	1.00	EA	$ 40,000	$ 40,000
	Community Plaza				
	Pervious paving	3,000.00	SF	$ 30	$ 90,000
	Seating - Bistro tables with 2 chairs each	6.00	EA	$ 2,500	$ 15,000
	Shade Cloth Structure	2.00	EA	$ 125,000	$ 250,000
	Stormwater Green Infrastructure				
	Floodable Green Space	3,860.00	SF	$ 30	$ 116,000
	Bio-retention area/ rain gardens in parking lot	4,400.00	SF	$ 80	$ 352,000
	Proposed Pedestrian Walkway Green Space	6,300.00	SF	$ 20	$ 126,000
	Retrofitting existing building with resiliency strategies (green roofs, cooling roofs, rainwater harvesting, energy efficient systems, etc)				Excluded
	Seating areas along pathways	1.00	AL	$ 200,000	$ 200,000
	Addition of shade trees and new landscape	1.00	AL	$ 125,000	$ 125,000
	Educational signage				Excluded
	TOTAL				**$ 1,970,000**
	General Conditions/ General Requirements	15.00%			$ 295,500
	Overtime / Shift Work (Noisy Work)	0.00%			Excluded
	Phasing	0.00%			Excluded
	Contractor's Overhead & Profit or Fee	10.00%			$ 226,550
	Escalation	0.00%			Excluded
	Bonds	1.75%			$ 43,611
	Police	0.00%			Excluded
	General Liability Insurance	2.75%			$ 69,731
	ESTIMATED CONSTRUCTION COST				**$ 2,610,000**
	Contingency	20.00%			$ 522,000
	RECOMMENDED CONSTRUCTION COST BUDGET				**$ 3,130,000**
	Design Fees	7.00%			$ 219,100
	Project Management Fees	0.00%			Excluded
	Project Expense / Other Direct Cost	0.32%			$ 10,000
	PROJECT SUMMARY (ROUNDED) AUGUST 2025				**$ 3,400,000**

Notes:
1. This Cost Estimate has been prepared based on a preliminary design concept that was received in July 2025.
2. This is Class 5 level estimate and prepared according to Association for the Advancement of Cost Engineering (AACE) standards
   - Estimate Classification: Class 5 - Rough Order of Magnitude Cost Estimate
   - Similar Industry Terms: Project Concept Screening, Feasibility, Strategic Analysis and Budget Planning
   - Accuracy Range: -50% to 100%
   - Expected Project Contingency: 7%-25%
   - Background Information Used: Few or no design parameters. Pricing based on historical data

Benefit Cost Analysis (BCA)

BCA is a method that determines the future risk reduction benefits of a hazard mitigation project and compares those benefits to its costs[1]. This BCA evaluates the benefits of updating the drainage infrastructure at the Main Street railroad underpass.

Grant applications that are submitted to FEMA are required to use the FEMA BCA Toolkit v6.0, available here: https://www.fema.gov/grants/tools/benefit-cost-analysis. A preliminary BCA was conducted using the FEMA BCA Toolkit for the Main Street rail underpass to determine if it is a good candidate project to request FEMA funding.

The existing drainage infrastructure of Main Street and Sterling Road is undersized, resulting in frequent overtopping and associated street flooding. When the street is flooded, vehicular traffic, including cars, trucks, and emergency vehicles, must detour around the underpass. These detours have real costs, which can be calculated and monetized. The reduction in these detour costs represents the benefits of improving the drainage infrastructure to reduce street flooding.

Detour costs are calculated using the daily traffic levels, detour mileage and time, and the frequency and duration of the flooding. The Connecticut DOT Traffic Monitoring Data (https://connecticut-ctdot.opendata.arcgis.com/) indicates daily traffic of 12,400 vehicles on this section of Main Street. Detour mileage and time were estimated at 3 miles and 15 minutes using Google Maps. The detour consists of turning at Burnside Ave, School Street, and Park Ave to return to Main Street.

Based on the daily traffic and detour, the FEMA BCA Toolkit calculates an economic loss per day of loss of function of $139,593.

The frequency and duration of flooding that causes detours were obtained from the stormwater model, which explained in further detail in **Appendix B** of this report. These are shown in Table 1, along with the total detour damages for each recurrence interval as calculated by the FEMA BCA Toolkit.

Table 1: Detour Frequency, Duration, and Damages

Frequency	Duration	Total Damages
2-year	35 minutes/0.02 days	$2,792
10-year	90 minutes/0.06 days	$8,376
25-year	120 minutes/0.1 days	$13,959

When annualized over a 50-year project lifespan and discounted using the OMB discount rate of 7.0%, the project will reduce detour costs by $43,348.

The Benefit-Cost Ratio (BCR) for this project was calculated at 0.0, driven by three main factors: the high construction costs needed to address flooding at this site, the relatively short, estimated flooding duration of 35 minutes based on available precipitation data, and the absence of documented records from the Town of East Hartford on past flood-related damages or costs. Without that information, the analysis could not demonstrate that the project's benefits outweigh its costs. However, lower-cost measures such as flood awareness signage could still offer important public safety and resilience benefits.

[1] FEMA. (2025). *Benefit-Cost Analysis.* Accessed at https://www.fema.gov/grants/tools/benefit-cost-analysis

FEMA

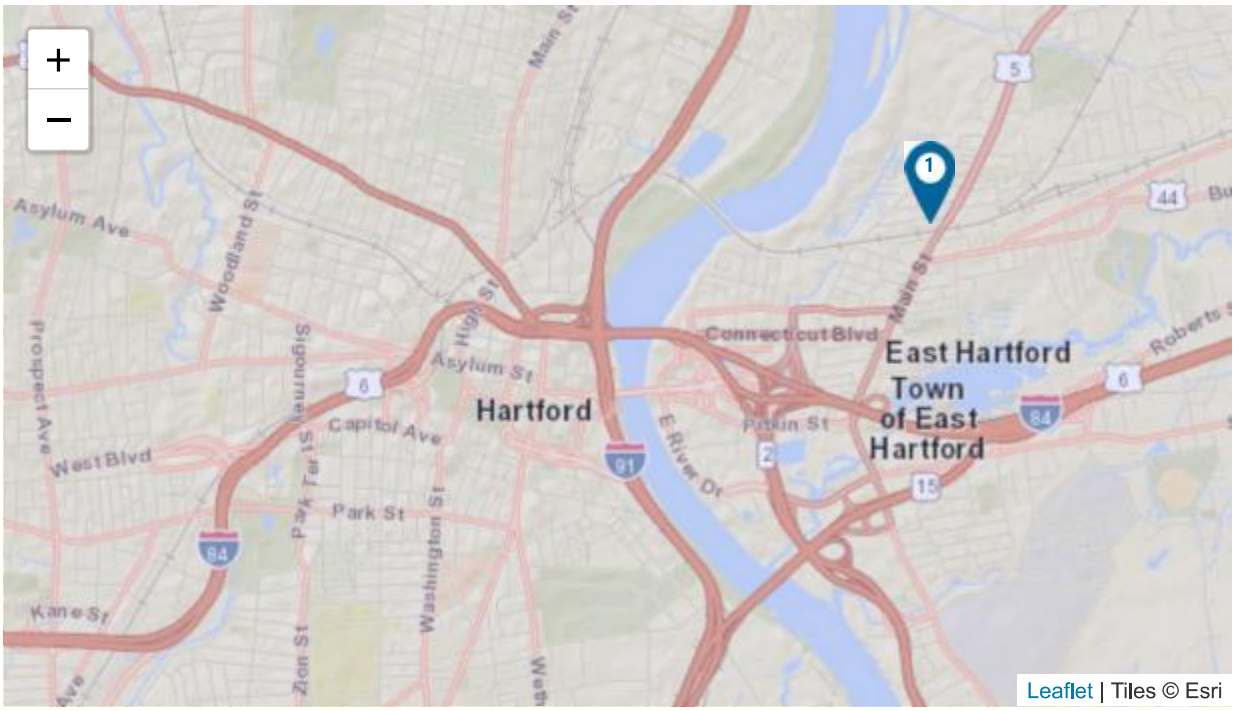
Benefit-Cost Calculator

V.6.0 (Build 20250702.1944 | Release Notes)

DRAFT

Benefit-Cost Analysis

Project Name: Resilient East Hartford



Map Marker ▲	Mitigation Title	Property Type	Hazard	Discount Rate (%)	Benefits (B)	Costs (C)	BCR (B/C)
1	Drainage Improvement @ 1351 Main St, East Hartford, Connecticut, 06108		DFA - Riverine Flood	7.0	$ 43,348	$ 14,000,000	0.00
TOTAL (SELECTED)					**$ 43,348**	**$ 14,000,000**	**0.00**
TOTAL					**$ 43,348**	**$ 14,000,000**	**0.00**

Property Configuration

Property Title:	Drainage Improvement @ 1351 Main St, East Hartford, Connecticut, 06108
Property Location:	06108, Hartford, Connecticut
Property Coordinates:	41.7764140208142, -72.63982396230094
Hazard Type:	Riverine Flood
Mitigation Action Type:	Drainage Improvement
Property Type:	Roads & Bridges
Analysis Method Type:	Professional Expected Damages

Cost Estimation

Drainage Improvement @ 1351 Main St, East Hartford, Connecticut, 06108

Discount Rate (%):	7.0% Use Default:Yes
Project Useful Life (years):	50
Project Cost:	$14,000,000
Number of Maintenance Years:	50 Use Default:Yes
Annual Maintenance Cost:	$0

Damage Analysis Parameters - Damage Frequency Assessment

Drainage Improvement @ 1351 Main St, East Hartford, Connecticut, 06108

Year of Analysis was Conducted:	2025
Year Property was Built:	0
Analysis Duration:	10 Use Default:Yes

Roads and Bridges Properties

Drainage Improvement @ 1351 Main St, East Hartford, Connecticut, 06108

Estimated Number of One-Way Traffic Detour Trips per Day:	12,400
Additional Time per One-Way Detour Trip (minutes):	15
Number of Additional Miles:	3
Federal Rate ($):	0.7 Use Default:Yes
Economic Loss Per Day of Loss of Function ($):	139,593

Professional Expected Damages Before Mitigation

Drainage Improvement @ 1351 Main St, East Hartford, Connecticut, 06108

	ROADS AND BRIDGES	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Impact (days)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
2	0.02	0	0	0	0	0	2,792
10	0.06	0	0	0	0	0	8,376
25	0.1	0	0	0	0	0	13,959

Annualized Damages Before Mitigation

Drainage Improvement @ 1351 Main St, East Hartford, Connecticut, 06108

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
2	2,792	1,934
10	8,376	649
25	13,959	558
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	25,127	3,141

Professional Expected Damages After Mitigation

Drainage Improvement @ 1351 Main St, East Hartford, Connecticut, 06108

	ROADS AND BRIDGES	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Impact (days)	Category 1 ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
0	0	0	0	0	0	0	0

Annualized Damages After Mitigation

Drainage Improvement @ 1351 Main St, East Hartford, Connecticut, 06108

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	0	0

Ecosystem Services Losses Avoided

Drainage Improvement @ 1351 Main St, East Hartford, Connecticut, 06108

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	$0

Benefits-Costs Summary

Drainage Improvement @ 1351 Main St, East Hartford, Connecticut, 06108

Discount Rate (%):	7.0% Use Default:Yes
Total costs:	$14,000,000
Total benefits:	$43,348
Benefit-cost ratio (BCR):	0.00

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Appendix D: Comparative Parking Analysis: Analysis of City of Hartford vs. East Hartford Zoning Regulations

September 2025

Delivering a better world

APPENDIX D:

Preliminary Comparative Parking Analysis: Analysis of Hartford vs. East Hartford Zoning Regulations

Facility Type	Minimum Space Requirement - East Hartford, CT	**Maximum Space Requirement – Hartford, CT**
Residential		
Single Family Dwellings Accessory Dwelling Units (ADUs) • Studio / One-bedroom units • Two+-bedroom units	Two (2) spaces. One (1) space per/ unit Two (2) spaces per units	Maximum 4 spaces per lot For One-Unit Dwelling Building in N-1-1, maximum 6 spaces per lot
Two Family Dwellings / Three Family Dwelling	Two (2) spaces per unit	Maximum 2 spaces per unit
Multi-Family Development • Studio / One-bedroom units • Two+-bedroom units	 One (1) space per unit Two (2) spaces per unit	In accordance with special permit review; guideline is maximum 1.5 spaces per adult resident, or for foster homes and children's homes guideline is maximum 2 spaces per 4 children residents
Mobile Home Parks • Studio / One-bedroom units • Two+-bedroom units	 One (1) space per mobile home Two (2) spaces per mobile home, except that mobile home	
Home Occupation	One (1) space in addition to the required parking for the dwelling	
Retail and Service-Type Uses		
Retail Stores Or Similar Business	4.0 spaces per 1,000 SF of gross floor area.	Maximum 3 spaces per 1,000 square feet net floor area devoted to retail space
Personal Service Shops Or Similar Business	4.0 spaces per 1,000 SF of gross floor area.	Maximum 3 spaces per 1,000 square feet net floor area devoted to retail space
Retail Food Establishment	4.0 spaces per 1,000 SF of gross floor area	Maximum 3 spaces per 1,000 square feet net floor area devoted to retail space
Office-Type Uses		

This preliminary parking analysis is not intended to be a legal interpretation of zoning regulations for The Town of East Hartford or the City of Hartford.

Offices (in other than a B-4 zone)	4.0 spaces per 1,000 SF of gross floor area, except in a Business 4 (B4) zone in which the following office parking formula shall be conformed with:	
Offices (in a B-4 zone) • 0 To 90,000 SF Cumulative Building Gross Floor Area On Site • 90,001 To 280,000 SF Cumulative Building Gross Floor Area On Site • Over 280,001 SF Cumulative Building Gross Floor Area On Site	4.0 spaces per 1,000 SF of gross floor area. 3.6 spaces per 1,000 SF of gross floor area, not less than 360 spaces. 3.3 spaces per 1,000 SF of gross floor area, not less than 1,008 spaces	Maximum 4 spaces per 1,000 square feet
Restaurant-Type Uses		
Full Service Restaurant, Brew Pub	One (1) space for every three (3) legal occupants.	Maximum 3 spaces for every 5 persons based on maximum capacity
Drive-Through Restaurant As A Free Standing Building	10.0 spaces per 1,000 SF of gross floor area or minimum of twenty (20) spaces whichever is greater.	Maximum 3 spaces for every 5 persons based on maximum capacity
Drive-Through Restaurant As Integrated Part of a Shopping Center/Mall	One (1) space for every three (3) legal occupants.	
Quick Service Restaurant	4.0 spaces per 1,000 SF of gross floor area.	
Catering Halls	One (1) space for each three (3) legal occupants.	
Accessory Food Service	No additional parking spaces required	
Vehicle-Type Uses		
Fueling Stations, Service Garages, And Auto Body Repair Shops	Four (4) spaces for each service or work station, i.e., area in which an automobile is fueled or serviced	In accordance with special permit review or, if special permit not required, in accordance with site plan review
Lodging-Type uses		

Hotels, Motels	One (1) space for each room offered for rent.	Maximum 1.5 spaces per guest rooms
Rooming Houses	One (1) space for each room offered for rent.	
Public Assembly-Type Uses		
Houses Of Worship, Commercial Recreation, Theaters, Public Assembly Halls, And Stadiums	One (1) space for every three (3) legal occupants.	In accordance with special permit review
Manufacturing / Industrial		
Manufacturing Plants	1.0 space per 1,000 SF of gross floor area or one (1) space for every 1.5 employees, whichever is greater.	
Storage / Logistics		
Truck Terminals, Wholesale Storage And Warehouses	1.0 space per 1,000 SF of gross floor area OR 4.0 spaces per 1,000 SF of office area and one (1) space for each two (2) employees in the largest shift, whichever is greater.	
Public Storage	1.0 space per 125 storage units but not few than 10 parking spaces	
Institutional-Type Uses		
Museums Operated By A Non-Profit Corporation	1.9 spaces per 1,000 SF of gross square floor area, at least one parking space per 40 total parking spaces dedicated to school buses with a rider capacity of not less than forty-five (45) people.	None
Hospitals	One (1) space for each two (2) patient beds plus one (1) space for each employee on the largest shift.	In accordance with special permit review; guideline is maximum 1 space per bed (excluding bassinets)
Convalescent Homes And Assisted Living Facilities and other licensed long-term care facilities	One (1) space for each three (3) beds, plus one (1) space for each	

	employee on the largest shift.	
Schools With Grades K Through 8	Two (2) spaces for each teaching station.	
Schools With Grades 9 Through 12 And Institutions Of Higher Learning	Five (5) spaces for each teaching station.	
Public Schools With Grades 9 Through 12	Three and three quarters (3.75) spaces for each classroom.	
Other		
Bowling Alleys	Five (5) spaces for each alley	
Financial Institutions	One (1) space for each two hundred and fifty (250) square feet of gross floor area.	In accordance with special permit review
Funeral Homes	One (1) space for each three (3) legal occupants plus three (3) spaces for special vehicles	

Uses Not Listed		
Uses Not Listed	Where a use is not specifically listed, the Commission shall determine the required number of required parking spaces based on information such as: • Institute of Transportation Engineers Parking Generation, as may be amended, and/or • Other parking utilization/ site impact studies.	

East Hartford Shared Parking Factor

	Residential	Lodging	Office	Retail
Residential	100%	-		
Lodging	90%	100%		
Office	70%	60%	100%	
Retail	80%	75%	80%	100%

Sources:

East Hartford Zoning Regulations (Effective Mar 31st, 2025), Section 7.2

Zoning Regulations City of Hartford, Connecticut (Effective Jul. 2, 2025), Section 7.0

This preliminary parking analysis is not intended to be a legal interpretation of zoning regulations for The Town of East Hartford or the City of Hartford.