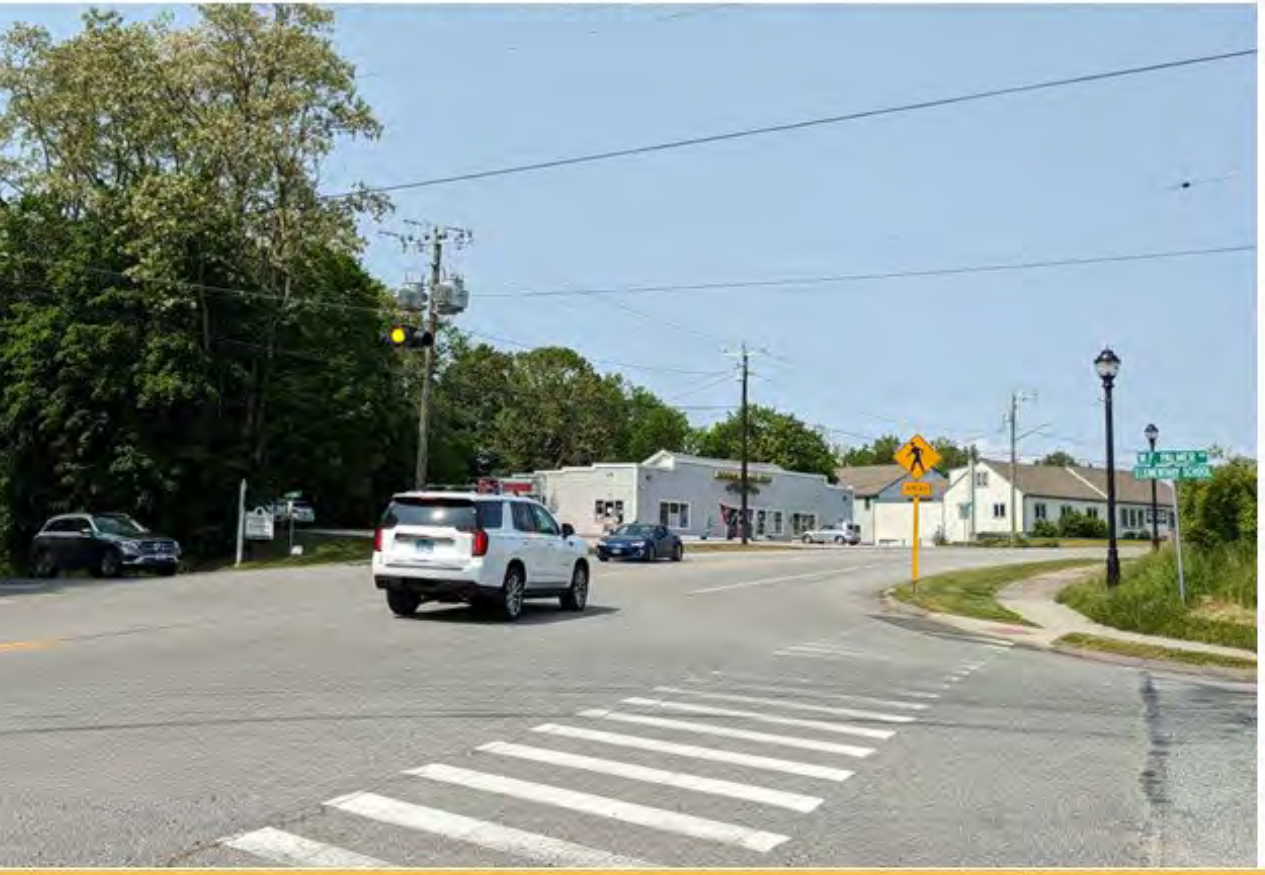
EAST HADDAM ROAD SAFETY AUDIT

Route 149 (East Haddam Moodus Road/ Falls Road) between Grove Street and Great Hillwood Road



COMMUNITY connectivity program

FHI studio

NOVEMBER 2023

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1 COMMUNITY CONNECTIVITY PROGRAM

1.1 Program Background

The Connecticut Department of Transportation (CTDOT) has created a Community Connectivity Program that focuses on improving the state's transportation network for all users. A major component of this program is conducting Road Safety Audits (RSAs) at selected locations. An RSA is a formal safety assessment of the existing roadway. It is a qualitative review by an independent team experienced in traffic, pedestrian, and bicycle operations and design that considers the safety of all road users and proactively assesses mitigation measures to improve the safe operation of the facility by reducing the potential crash risk frequency and/or severity.

The RSA team includes CTDOT staff, municipal officials and staff, municipal police, local stakeholders, FHI Studio staff, and community leaders. The RSA team is established for each municipality based on the requirements of the individual location. They assess and review factors that can promote or obstruct safe walking and bicycling routes. These factors include traffic volumes and speeds, topography, roadway geometrics, crash data, roadway inventory (i.e. signage, curbs, bicycle/pedestrian facilities, amenities, safety components), and sidewalks.

Each RSA is conducted using RSA protocols published by the FHWA. For details on this program, please refer to the CT Connectivity RSA site on the CTDOT webpage.

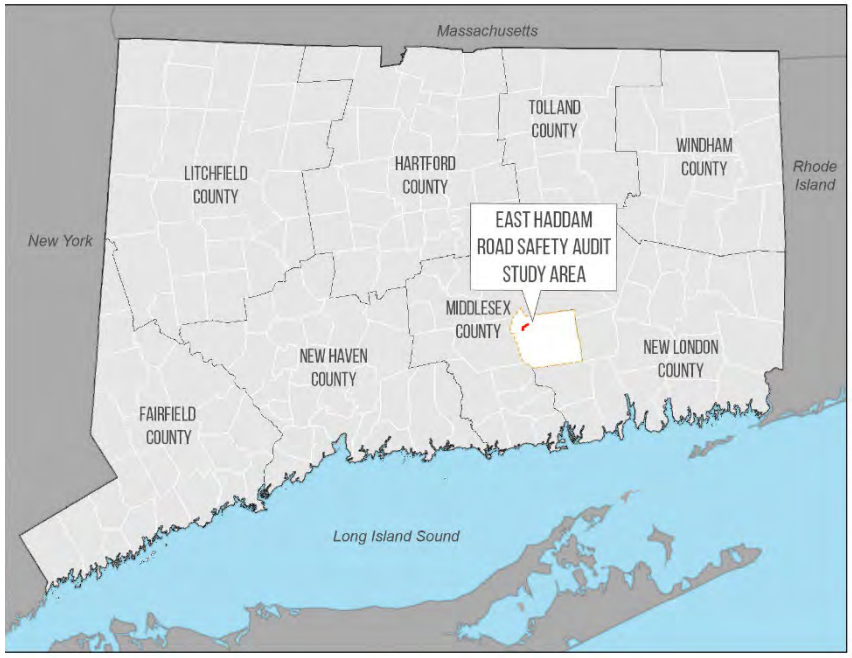
Prior to the site visit, area topography, land use characteristics, intersection sight distance concerns, sidewalk locations, parking, and bicycle facilities are examined using available mapping and imagery. The site visit includes a "Pre-Audit" meeting, the "Field Audit" itself, and a "Post-Audit" meeting to discuss the field observations and formulate recommendations. This procedure and the summary results are discussed in the following sections.

1.2 East Haddam RSA Study Area and Location

CTDOT sponsored an RSA for the Town of East Haddam in the Route 149 (East Haddam Moodus Road/Falls Road) area. The study area encompasses Route 149 (East Haddam Moodus Road/Falls Road) between Grove Street and Great Hillwood Road.

Exhibit 1 shows the study area in context to the State of Connecticut, while Exhibit 2 shows the study area in further detail.

Exhibit 1: East Haddam RSA Regional Location



The purpose of the RSA is to observe any safety concerns while discussing possible safety improvements for pedestrians and bicyclists travelling along the study area corridor. The study area serves many purposes including local residential access, restaurant and commercial business access, service industry uses, civic uses such as the Municipal Campus, Elementary School and High School access, and Library, and pedestrian and bicyclist movement throughout the community. Senior housing as well as the Senior Center are both located in this area as well. See Exhibit 3 for points of interest located along the corridor.

Routes 149 and 151 are collector roadways that provide regional connections to points east and west. The study area has sidewalks and crosswalks throughout but lacks bicycle facilities.

Average Daily Traffic (ADT) in the study area ranges between 1,900 vehicles per day on Route 151 (Moodus Leesville Road), west of Route 149 (East Haddam-Moodus Road) to about 5,700 vehicles per day on Route 149 (Falls Road) between William F Palmer Road/North Moodus Road and Great Hillwood Road.

Exhibit 4 displays daily traffic in the study area All intersections are two-way stop controlled, with Route 149 being the primary route. The intersection of Route 149 (Falls Road) and North Moodus Road and William F. Palmer Road includes a flashing beacon. The other intersections are controlled by stop signs. These intersections are signed as two-way stop control where Route 149 does not stop.

Exhibit 2: East Haddam RSA Study Area

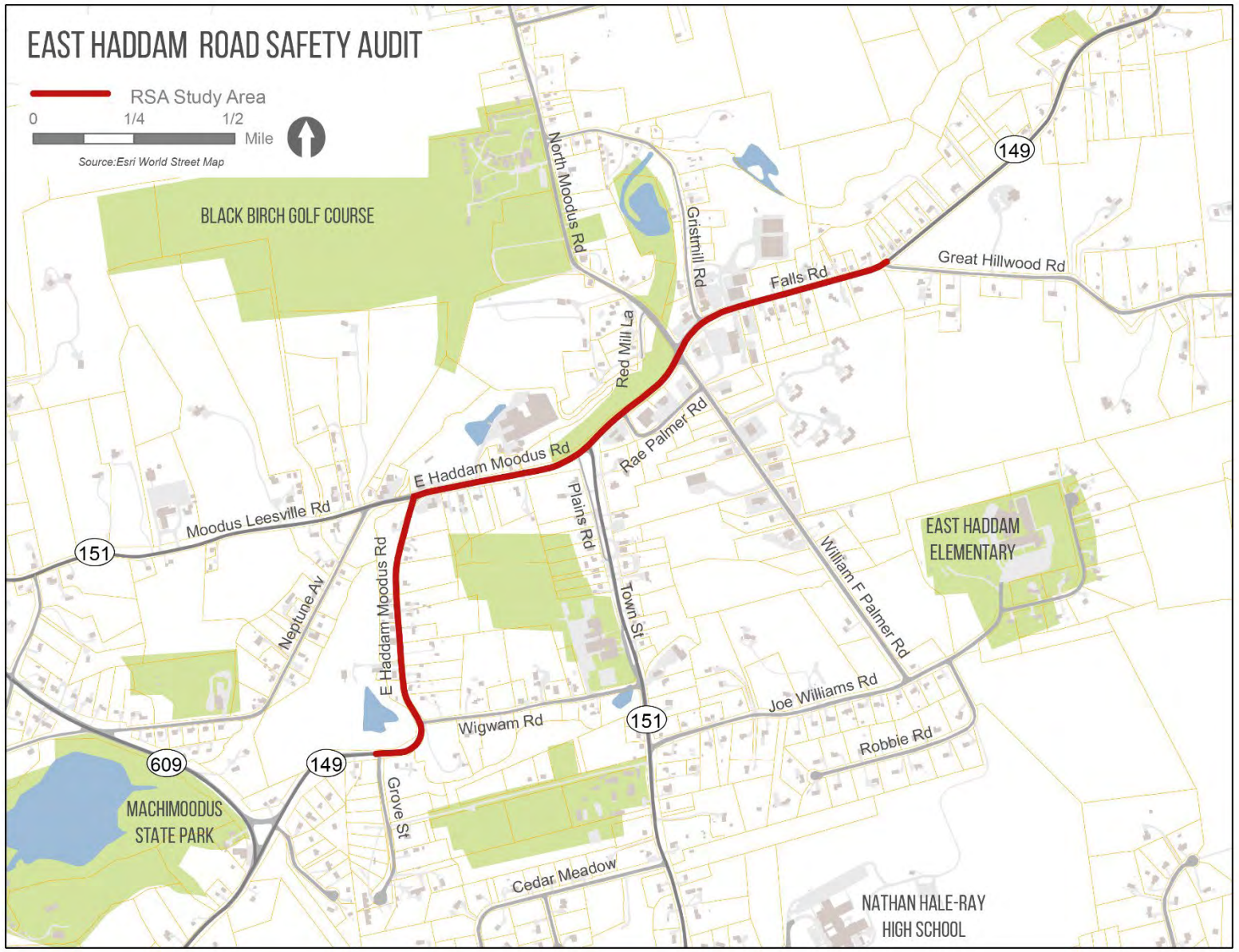


Exhibit 3: Study Area Points of Interest

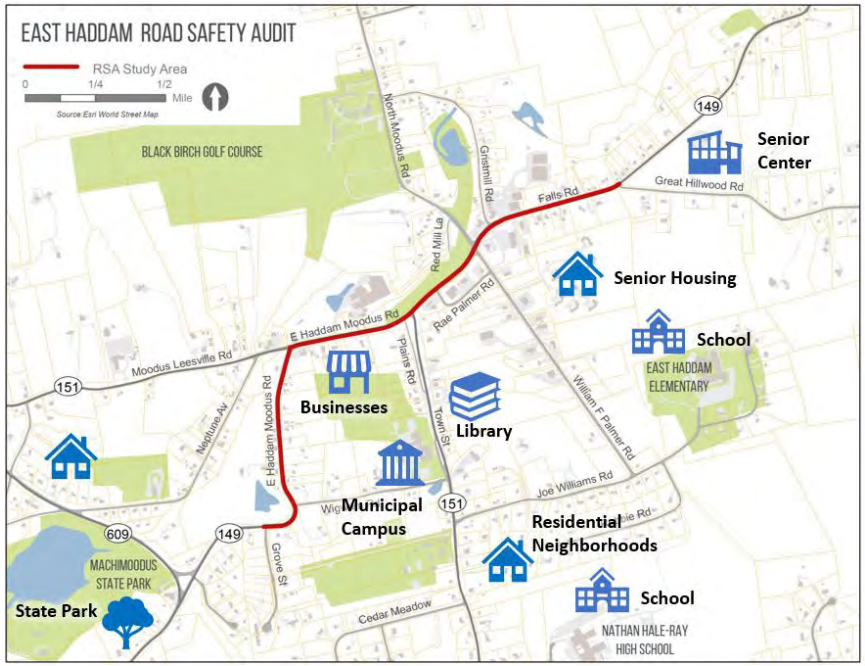


Exhibit 4: Average Daily Traffic Volumes

2 PRIOR EFFORTS IN STUDY AREA

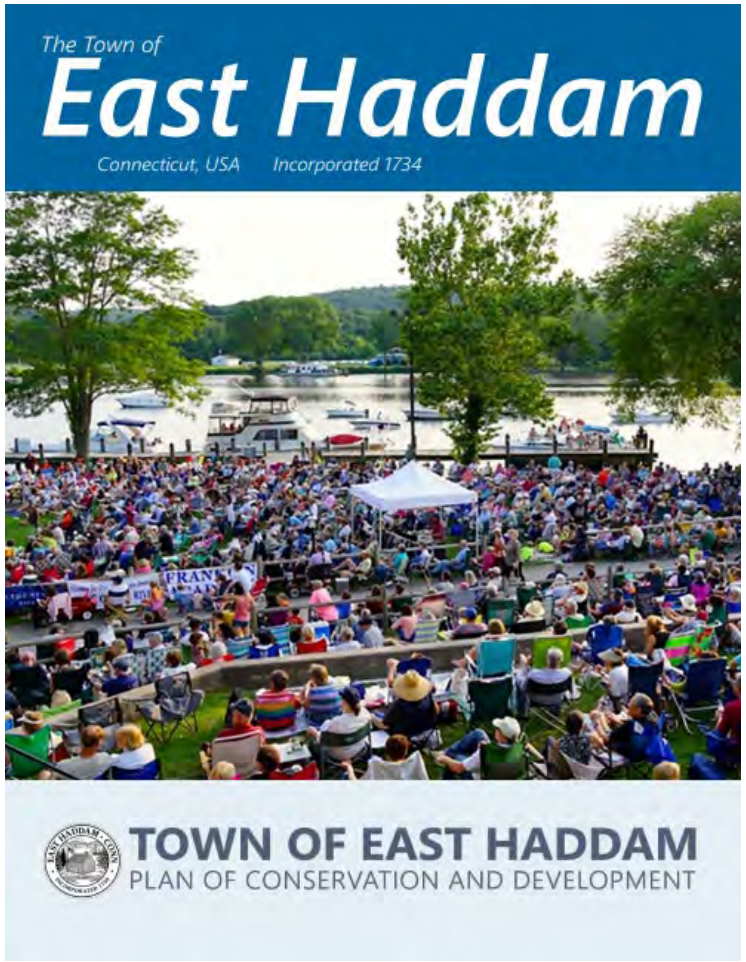
2.1 Poised for Growth

There is the potential for an increase of commercial development and mixed-use development including residential in Moodus Center. Creating a vibrant, walkable Center is a goal of East Haddam's Economic Development Commission, as described in the *New Business Guide to East Haddam* in 2019. Creating a sense of place, where visitors can park once and comfortably walk along the streetfront and patronize Moodus's businesses is a goal of the Commission. Traffic calming, both for safety reasons and for noise control, is desired for this area.

Revisions to East Haddam's Zoning Regulations were adopted in 2023 and provided revisions to Moodus's commercial districts within the Center. The Town's Ten-Year Plan of Conservation and Development was completed in 2019 and highlighted opportunities for economic growth in this area. Exhibit 5 displays East Haddam's Plan of Conservation and Development.

Construction plans have been submitted for the former gas station property at the southeast corner of the intersection of Route 149 (East Haddam Moodus Road) and Route 151 (Moodus Leesville Road). The site plan includes a renovated building with drive-thru access, six fuel pump stations, seven parking spaces and two entrance/egress points as well as an enter only driveway.

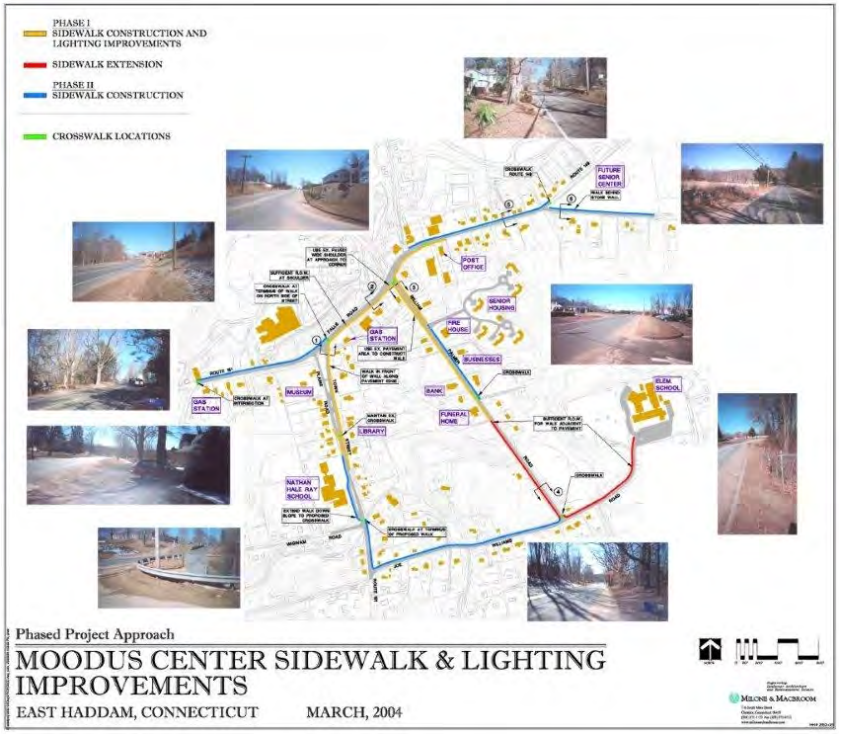
Exhibit 5: East Haddam Plan of Conservation and Development



2.2 Conceptual Sidewalk Plan - 2004

A sidewalk plan was developed for the vicinity of Moodus Center in 2004. The plan, shown in Exhibit 6, identified a phased approach for sidewalk construction and extension throughout the study area. Sidewalk construction and pedestrian scale lighting has been installed along the south side of Route 149 (East Haddam Moodus Road) between Route 151 (Town Street) and the Post Office.

Exhibit 6: Conceptual Sidewalk Plan Developed in 2004



2.3 Moodus Center Urban Renewal – 1968

In 1968, using the Federal Government's urban renewal program, the East Haddam Redevelopment Agency created a new plan for Moodus Center that removed blighted buildings, created a new roadway (William F. Palmer Road) and designed a new shopping center, as shown in Exhibit 7 and Exhibit 8. Much of this plan was completed and altered the character of Moodus Center drastically.

Exhibit 7: Moodus Center Concept Plan – 1968

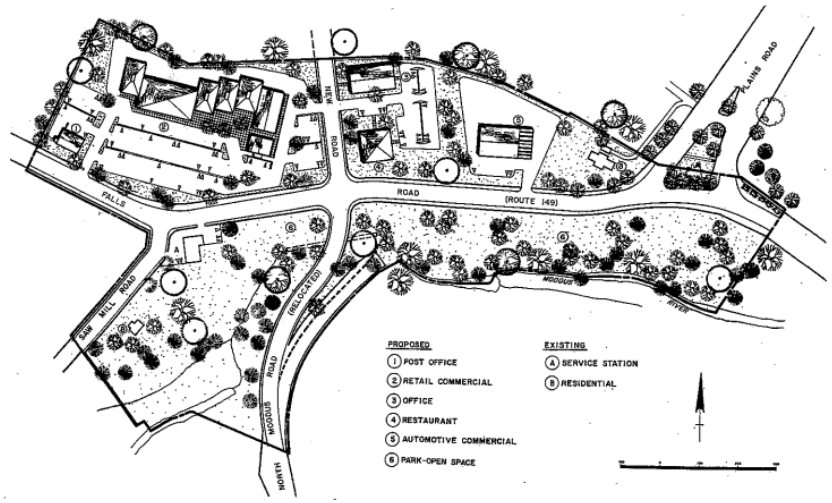
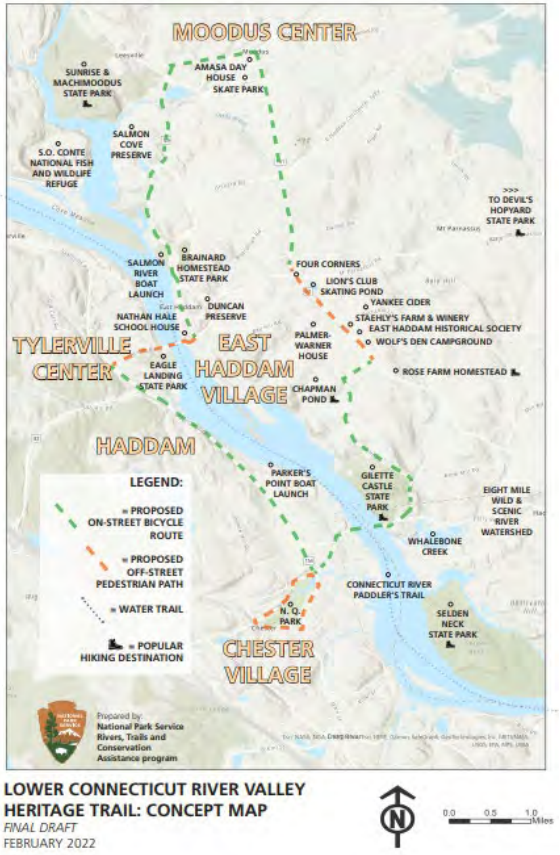


Exhibit 8: Moodus Center in the late 1960's

2.4 Lower Connecticut River Valley Heritage Trail

Moodus Center is included in the National Park Service's Lower Connecticut River Valley Heritage Trail Concept Plan. This plan seeks to connect the Towns of East Haddam, Haddam, and Chester through a combination of on-street bicycle routes, off-road pedestrian paths and water trails, all connecting popular hiking destinations and Village Centers. See Exhibit 9 for a map of the concept plan.

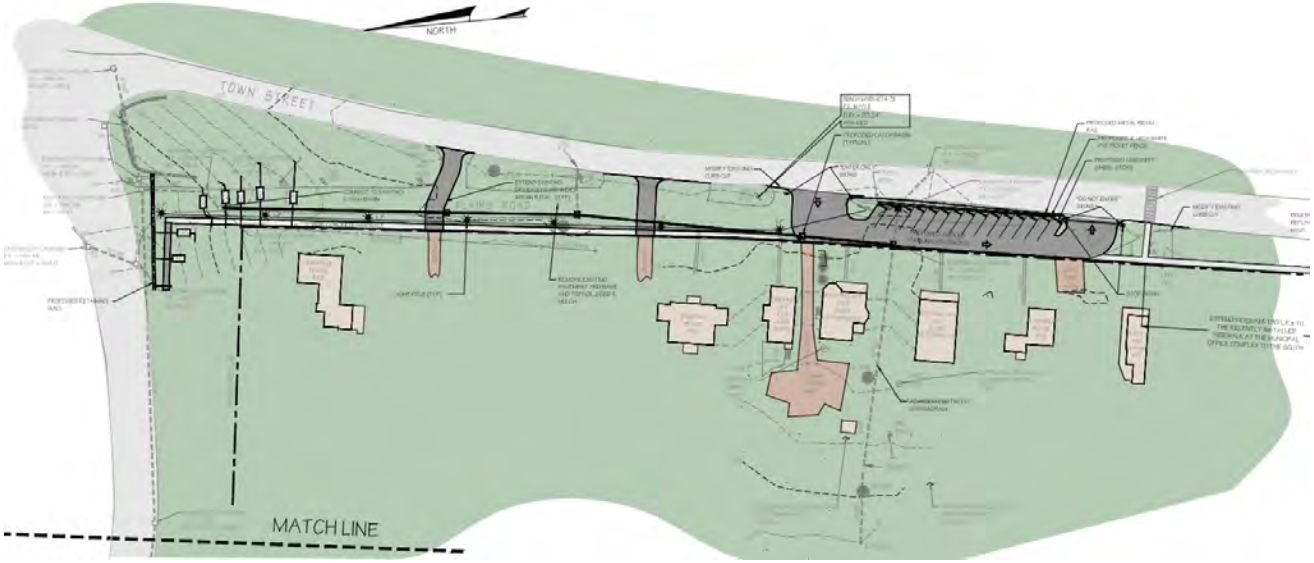
Exhibit 9: Heritage Trail Concept Map



2.5 Plains Road Abandonment

Preliminary conceptual plans have been developed for the abandonment of Plains Road, which runs parallel to Route 151 (Town Street) and intersects Route 149 (East Haddam Moodus Road). Currently, Plains Road serves primarily as residential parking, and the roadway and driveways are undefined. This concept would eliminate Plains Road, maintain residential driveway access, provide a designated parking area for the existing multi-family properties, and create a sidewalk where the roadway once was. Exhibit 10 displays this concept in further detail.

Exhibit 10: Plains Road Abandonment Concept Plan



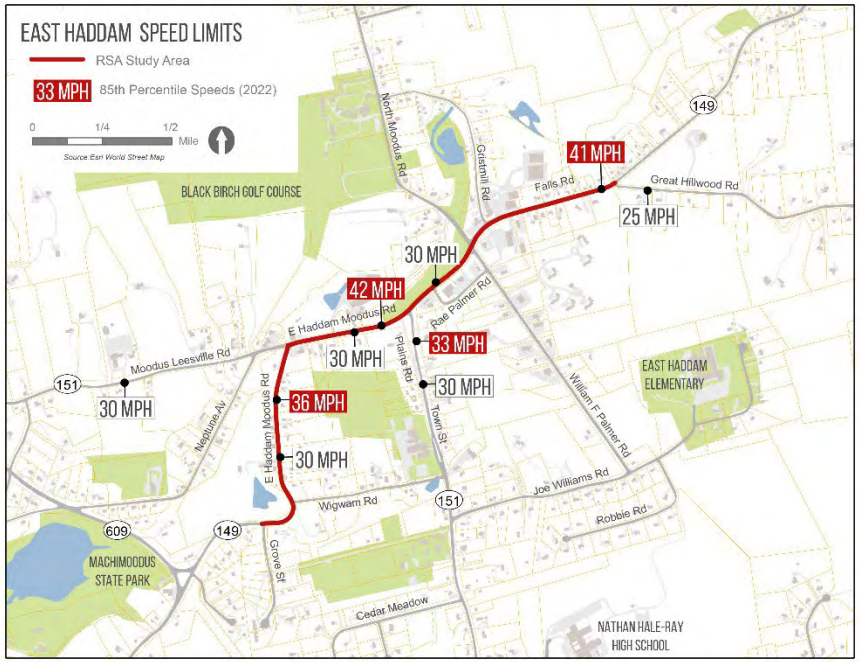
3 PRE-AUDIT MEETING

3.1 Pre-Audit Information

The RSA team conducted a pre-audit meeting in the afternoon of Monday, May 22nd, 2023. The RSA team presented a brief presentation that included an overview of the East Haddam RSA goals and purpose, the study area, and key existing conditions findings. Key themes discussed during the pre-audit meeting are presented below.

Speeds: Speed limits in the study area are 30 miles per hour (MPH) throughout the study area. Local roadways that intersect the study area such as Great Hillwood Road are marked at 25 MPH. Exhibit 11 displays speed limits in the study area.

Exhibit 11: Study Area Speed Limits

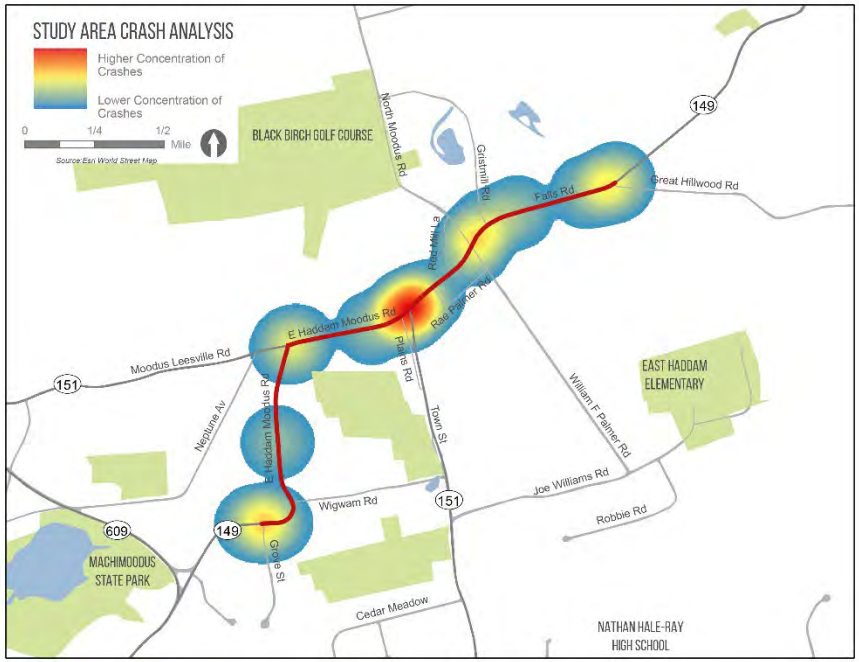


Crashes: Based on data retrieved from the Connecticut Crash Data Repository (CTCDR) for the five-year period between January 2017 through December 2021, there were a total of 19 crashes in the East Haddam RSA study area. Crashes were concentrated in the vicinities of the Route 149 (East Haddam Moodus Road / Route 151 (Town Street) intersection, the intersection of Route 149 (Falls Road) and North Moodus Road and William F. Palmer Road, the intersection of Route 149 (East Haddam Moodus Road) and Moodus Leesville Road, and the intersection of Route 149 (East Haddam Moodus Road) and Grove Street. Exhibit 12 displays the study area crash summary and Exhibit 13 displays a study area crash heatmap.

Exhibit 12: Study Area Crash Summary

Year	Fatality	Serious Injury	Minor Injury	Possible Injury	Property Damage Only	TOTAL
2017	1		1		2	**4**
2018					2	**2**
2019			1		5	**6**
2020					4	**4**
2021					3	**3**
TOTAL	**1**		**2**		**16**	**19**

Exhibit 13: Study Area Crash Heatmap



Crashes by Type: The majority of crashes single vehicle (Not Applicable label) or angle crashes. Single vehicle crashes are indicative of crashes where motorists veered off the road, ran into a fixed object. Angle crashes and sideswipe crashes are common in areas with ingress and egress movements such as business areas. Exhibit 14 and Exhibit 15 display the location and breakdown of crashes by type in the corridor.

Exhibit 14: Crashes by Type

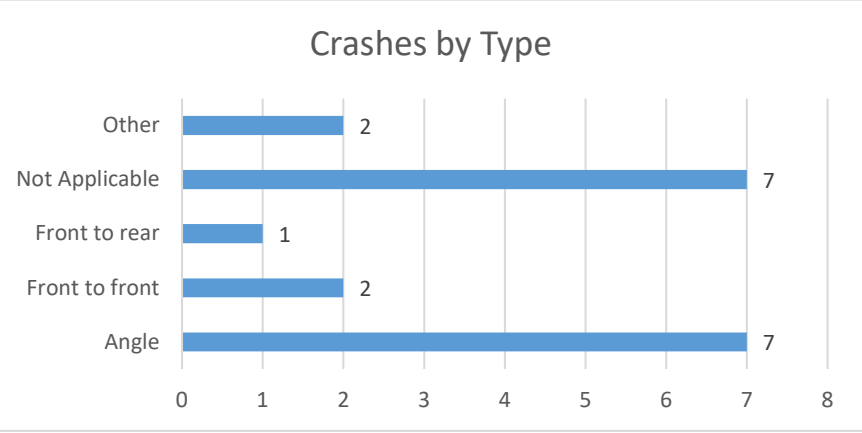
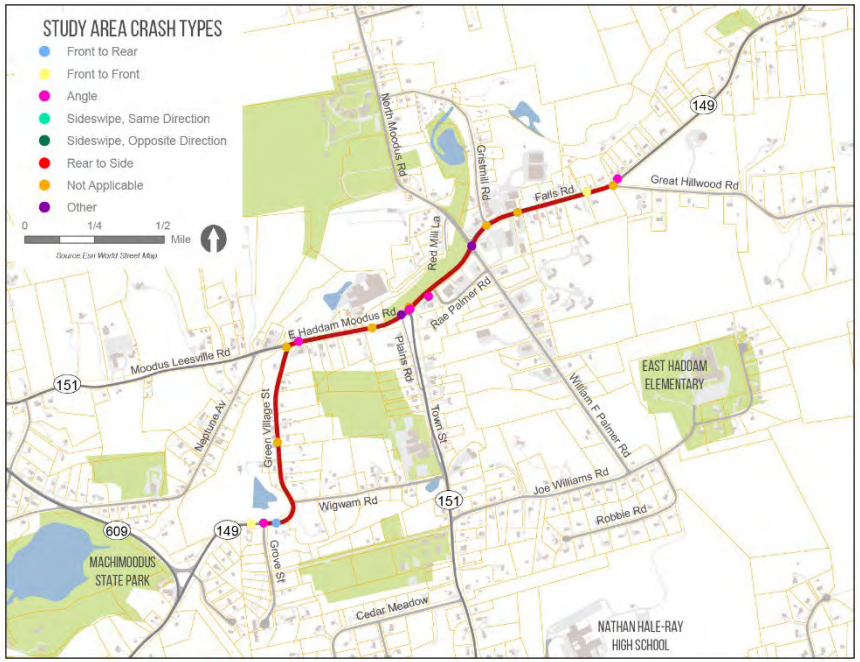


Exhibit 15: Crashes by Type



Crash Severity: The majority of crashes (16) are classified as no apparent injury/property damage only. This is typical for single vehicle crashes that are prevalent in the study area. Suspected minor injuries occurred during two crashes. There was one fatality reported in the past five years. The fatality was a westbound motorcyclist who hit a deer west of North Moodus Road. Exhibit 16 and Exhibit 17 show crash severity by location and a summary of total crashes by severity.

Crashes by Involved Person: There were no crashes involving bicyclists or pedestrians in the study area.

Exhibit 16: Crash Severity by Location

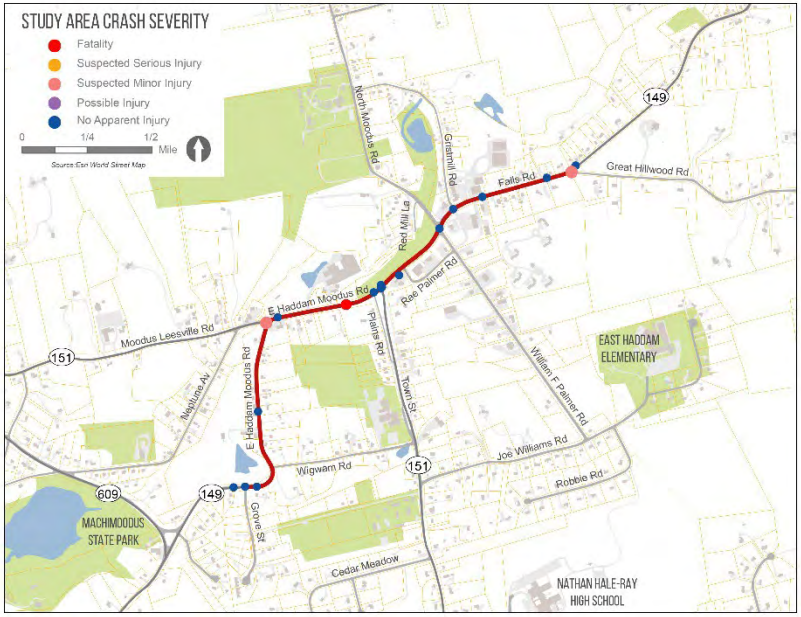
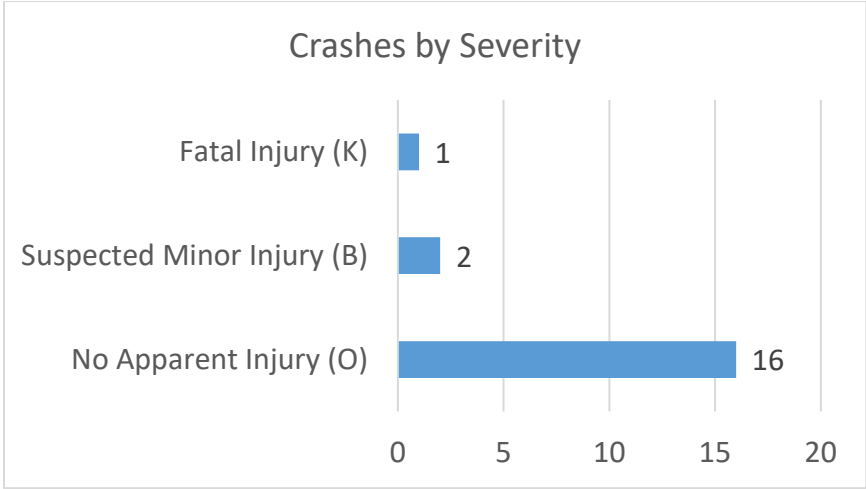


Exhibit 17: Crash Severity Summary



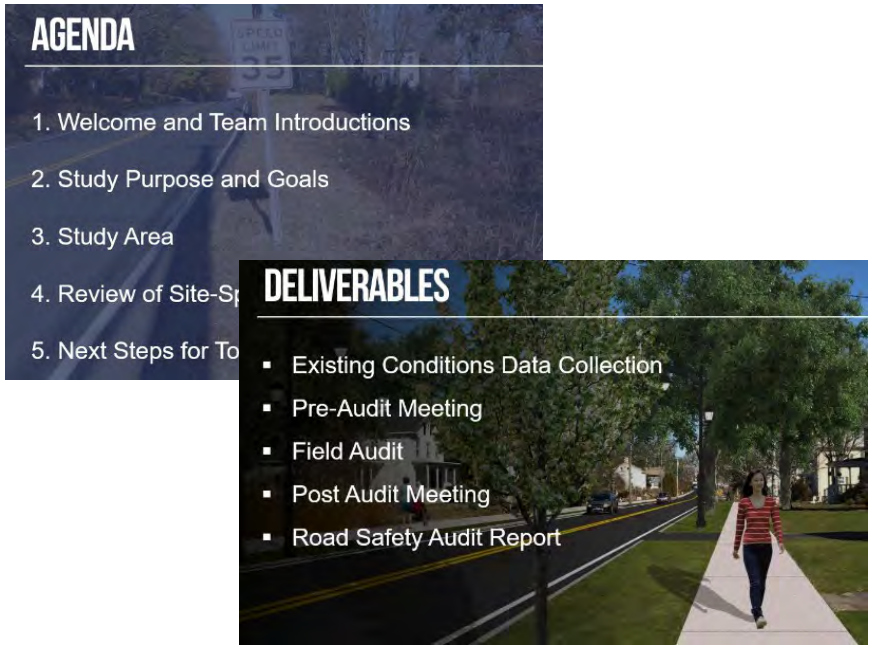
3.2 Pre-Audit Discussion

Immediately following the pre-audit presentation, a discussion followed that highlighted concerns and notes regarding the East Haddam RSA study area. Highlights from this discussion are presented below:

- Town officials feel that traffic speeds are the biggest concern throughout the study area. It is signed for 30 MPH but town officials indicated they perceive traffic speeds well above the speed limit.
- Town officials indicated that the intersection of Route 149 and North Moodus Road and William F. Palmer Road is problematic due to sight lines (slopes on the southeast corner) and speeds.
- There are many seniors who live in the vicinity of the study area. They utilize the sidewalks in the vicinity of the grocery store and Post Office.
- The Economic Development Commission indicated that commercial development is desirable in this area.
- Route 149 west of the Post Office is wide, there is some potential for narrowing or incorporating traffic calming strategies.
- Town officials believe that access management would be beneficial at some of the businesses.
- Participants indicated that the existing concept plan for a bike loop that connects to Haddam and Chester should be considered.
- A streetscape project was completed that added sidewalks and pedestrian scale lighting to the south side of Route 149. Participants feel there is a desire for more streetscape elements and gateway treatments.
- Town residents expressed the desire for Moodus Center to feel more like a downtown, would like it to be more village-like and pedestrian friendly.
- Town officials feel that more sidewalks are needed, they do not all connect and there are gaps in the network.
- William F. Palmer Road is wider than many other roadways in the vicinity.

Sample slides from the pre-audit presentation are shown in Exhibit 18.

Exhibit 18: Sample slides from Pre-Audit Presentation



4 RSA ASSESSMENT

The following summary describes observations and discussion regarding issues and concerns throughout the East Haddam RSA study area. Exhibit 19 shows RSA participants engaging in conversation during the RSA. Discussions were held at each of the noted locations below.

Exhibit 19: RSA participants during the RSA Assessment date

4.1 Route 149 (East Haddam Moodus Road) south of Route 151 (Moodus Leesville Road)

- Town officials generally felt that conditions on Route 149 south of the intersection of Route 151 were good and that the roadway and intersection functioned well.
- Route 151 eastbound is stop controlled at this location, with Route 149 southbound/northbound having the right-of-way. See Exhibit 20 for a picture of this location.

Exhibit 20: View southeast on Route 149

4.2 Route 149 (East Haddam Moodus Road) at Route 151 (Moodus Leesville Road)

- Development plans have been proposed for a new gas station at this property. Plans include a drive-thru, building, fuel pumps, parking spaces, and three entrance/egress locations. See Exhibit 21 for a picture of the site.

Exhibit 21: Former gas station that is slated for redevelopment.

4.3 Route 149 (East Haddam Moodus Road) and Plains Road

- Town officials noted that speeding is an issue in this area, particularly in the westbound direction (downhill).
- The roadway is over 32 feet wide in this area.
- There is an asphalt sidewalk on the north side of Route 149 in this location. It is in poor condition with vegetation encroachment and noticeable heaving. It extends from Dutch Oil Company driveway to just east of Moodus River Road. See Exhibit 22 for a photo of the sidewalk.

Exhibit 22: Route 149 west of Plains Road. View looking west.

4.4 Intersection of Route 149 (East Haddam Moodus Road) and Route 151 (Town Street) and Plains Road

- The intersection generally functions well for vehicular traffic, but it was noted that sight lines can be challenging.
- A concept plan was developed that would abandon Plains Road and convert it to a combination of sidewalk, lawn area and residential driveways.
- Speeding is often observed at this location on Route 149. Speed limit is 30 mph throughout this area, but the downhill grade contributes to increased speeds. 85th percentile speeds are 42 MPH.
- Turning radius onto Route 151 from Route 149 eastbound is wide.
- There is no crosswalk across Route 149 at this location, as shown in Exhibit 23.

Exhibit 23: Intersection of Route 149 and Route 151 and Plains Road

Exhibit 24: Plains Road running parallel to Route 151 (Town Street)

4.5 Intersection of Route 149 (East Haddam Moodus Road) and William F. Palmer Road and North Moodus Road

- Elevation changes, vegetation, and a retaining wall on the southeast corner make the sight lines challenging for vehicles approaching Route 149 from the south and looking at traffic approaching on Route 149 from the east. See Exhibit 25 for a view of the intersection.
- Vehicle speeds are an issue at this location.
- A crosswalk exists at the William F. Palmer Road approach to the intersection. Crossing distances are long at over 100 feet.
- Pedestrian scale lighting and sidewalks are present on the south side of Route 149.
- William F. Palmer Road is very wide (26-feet) and has sidewalks along both sides of the roadway, as shown in Exhibit 26.

Exhibit 25: Crosswalk at the intersection of Route 149 and William F. Palmer and North Moodus Road

Exhibit 26: View south onto William F. Palmer Road

4.6 Route 149 (Falls Road) between North Moodus Road/William F. Palmer Road and Gristmill Road

- Driveways to the business in this area are poorly defined and opportunities exist for access management.
- A sidewalk exists along Route 149 at this location; it is in fair condition.
- Exhibit 27 shows the sidewalk and pedestrian scale lighting at this location.

Exhibit 27: View east on Route 149

4.7 Route 149 (Falls Road) between Gristmill Road and Great Hillwood Road

- Many drivers do not yield to pedestrians at the crosswalk on Route 149 (Falls Road) between Hometown Market and the Nathan Hale Plaza. The roadway is lacking yield line pavement markings. The Town would like to consider installing a raised crosswalk at this location. Exhibit 28 shows the marked crosswalk at this location. The roadway and shoulder is approximately 50 feet here.
- The entrance to the Nathan Hale Plaza is busy in this area.
- Route 149 narrows considerably east of the Post Office. Shoulders are narrow. See Exhibit 29 for a photo of this area.
- There is no sidewalk between the commercial area (Hometown Market, Post Office, Nathan Hale Plaza) and the senior center located on Great Hillwood Road.

Exhibit 28: Pedestrian Crossing on Route 149

Exhibit 29: View of Route 149 looking east towards Great Hillwood Road

5 RECOMMENDATIONS

Based on the findings discussed during the RSA, the RSA team compiled a set of recommendations for the study area. These recommendations are organized by study area location. The report includes two focus areas, the first being at the intersection of Route 149 (East Haddam/Moodus Road) and Route 151 (Town Street), and the second focus area north of this location on Route 149 between William F Palmer Road and 34 Falls Road (Post Office). These locations were selected due to recommended roadway reconfiguration in these areas which were better depicted with conceptual graphics. Selection of these areas as focus area does not reduce the importance of other areas identified in this report and does not indicate that these areas are of higher priority than other recommendations in this report. These areas are provided in further detail with conceptual drawings of potential recommendations in this area.

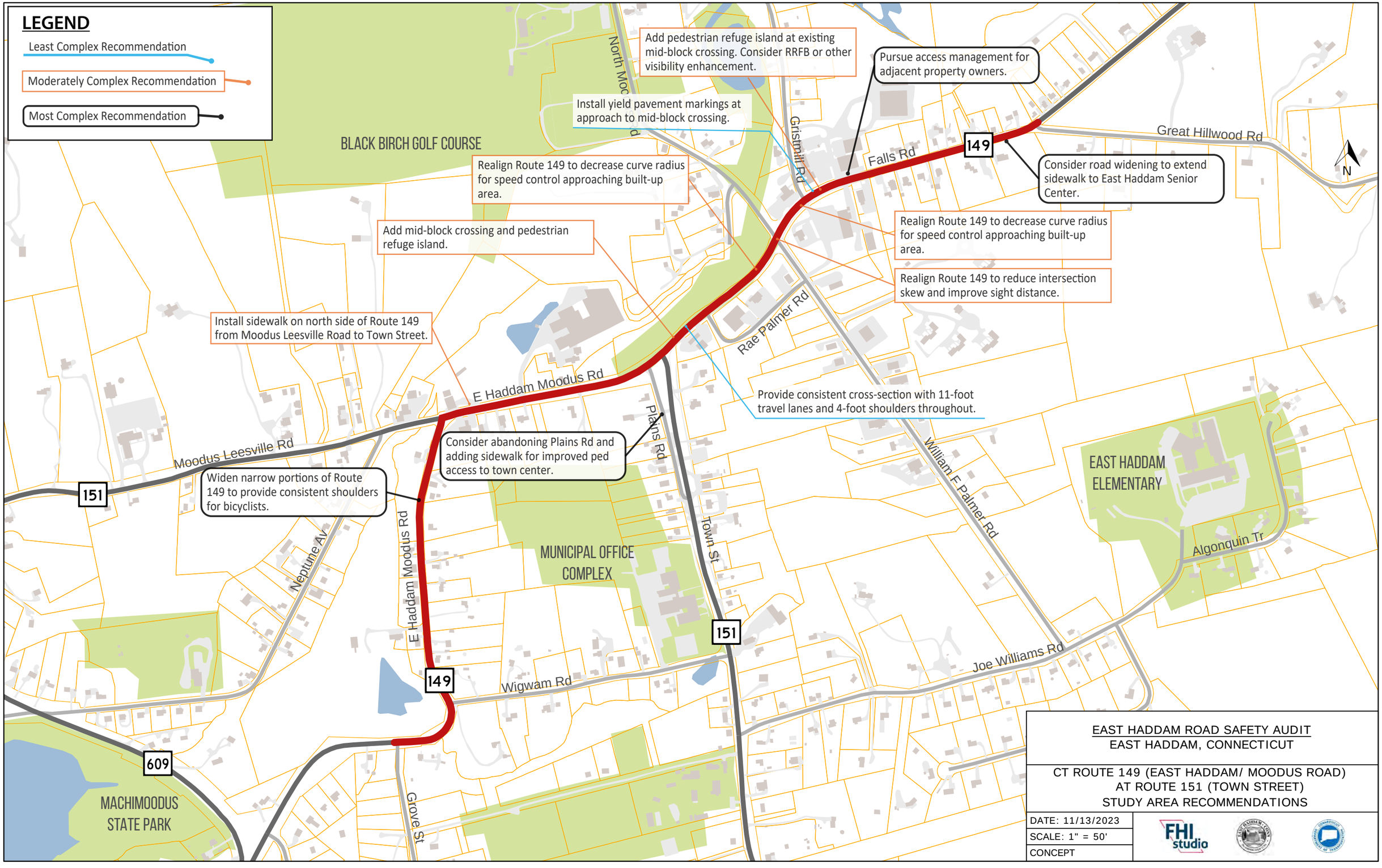
All recommendations for all locations are categorized by their complexity of implementation and are generally categorized as follows.

- Least Complex Recommendations: These recommendations are typically low-cost recommendations such as striping and signage. These recommendations generally do not require extensive engineering or construction costs. More extensive recommendations which have funding previously committed may be included.
- Moderately Complex Recommendations: These are improvements that may require more substantial engineering than those generally included as least complex recommendations. These may require establishment of funding in capital improvement plans, or a dedicated funding item. However, these recommendations fall between the least complex and most complex, requiring some level of design and funding, but typically do not include ROW acquisitions, extensive environmental permitting, etc.
- Most Complex Recommendations: These are improvements that require substantial study and engineering. These recommendations generally require significant funding for implementation and may require several years of planning to budget.

It should be noted that any work within the State ROW to be done by non-State forces will require an encroachment permit from the District 2 Permit Office and/or an official request from the East Haddam Local Traffic Authority.

Exhibit 30 displays the recommendations of the overall study area on a map. Further detail is provided in the sections below, while Exhibit 32 and Exhibit 34 provided conceptual graphics of Route 149 (East Haddam Moodus Road) at Route 151 (Town Street), and Route 149 (East Haddam Moodus Road) at the North Moodus Road/ William F. Palmer Road intersection respectively.

Exhibit 30 - Overall Map



EAST HADDAM ROAD SAFETY AUDIT
EAST HADDAM, CONNECTICUT

CT ROUTE 149 (EAST HADDAM/ MOODUS ROAD)
AT ROUTE 151 (TOWN STREET)
STUDY AREA RECOMMENDATIONS

DATE: 11/13/2023
SCALE: 1" = 50'
CONCEPT

FHI studio

5.1 Route 149 (East Haddam Moodus Road) south of Route 151 (Moodus Leesville Road)

The recommendations in this area are minimal due to lack of expressed concerns. Cyclists often utilize this portion of Route 149, so recommendations seek to provide more consistent shoulders at this location.

Most Complex Recommendations

1) Consider widening narrower portions of Route 149 south of Route 151 to create a consistent shoulder for bicyclists or pedestrians.
    - Next Step: Contact info@rivercog.org for potential funding sources. Check available ROW.

5.2 Route 149 (East Haddam Moodus Road) at Route 151 (Moodus Leesville Road)

The recommendations in this area focus on improving pedestrian safety along Route 149 in this segment of the study area.

Least Complex Recommendations

1) East of the intersection, re-stripe Route 149 to provide a consistent cross-section with 11-foot travel lanes and 4-foot shoulders. This cross-section should accommodate State standards for the facility and encourage more consistent, lower speeds through the study area.
    - Next Step: CTDOT to provide 11" travel lanes with the next resurfacing project. Typical VIP cycles can range between 10 and 20 years. (Identified as CTDOT low-hanging fruit).
2) Re-construct non-compliant curb ramps to be ADA compliant along Route 149 to Route 151.
    - Next Step: Contact Local Traffic Authority (LTA) to send request to DOT.ADATransitionPlan@ct.gov for next repaving project and/or info@rivercog.org for funding if town project through encroachment process.

Most Complex Recommendations

1) South of the intersection, pursue long-term widening of Route 149 to provide sufficient width for comfortable bicycle travel.
    - Next Step: Contact info@rivercog.org for potential funding sources. Check available ROW.

5.3 Route 149 (East Haddam Moodus Road) between Route 151 (Moodus Leesville Road) and Plains Road

Recommendations within this segment have two goals. The first is to maintain consistent and appropriate vehicular speeds, and the second is to improve pedestrian access to the area.

Least Complex Recommendations

1) Re-stripe Route 149 to provide a consistent cross-section with 11-foot travel lanes and 4-foot shoulders. This cross-section should accommodate State standards for the facility and encourage more consistent, lower speeds through the study area.
    - Next Step: CTDOT to provide 11" travel lanes with the next resurfacing project. Typical VIP cycles can range between 10 and 20 years. (Identified as CTDOT low-hanging fruit).

Moderately Complex Recommendations

2) Construct a sidewalk on the north side of Route 149 west of Town Street.
    - **Next Step:** Contact info@rivercog.org for potential funding sources. Check available ROW.

5.4 Intersection of Route 149 (East Haddam Moodus Road) and Route 151 (Town Street) and Plains Road

The recommendations at this intersection are three-fold: first, to extend the pedestrian network along Route 149 and to provide safer pedestrians connections between Route 151 and the existing sidewalks on Route 149 (Main Street), and second, to explore additional redesign options at this intersection which would shorten pedestrian crossing distances on Route 151. Thirdly, by abandoning Plains Road, access is restricted which could reduce vehicle conflict points at the intersection. Finally, a sidewalk can be provided along Plains Road to enhance pedestrian connectivity in the area. These recommendations are show in greater detail in Exhibit 32.

Least Complex Recommendations

1) Re-stripe Route 149 to provide a consistent cross-section with 11-foot travel lanes and 4-foot shoulders. This cross-section meets State standards for the roadway and may encourage more consistent, lower speeds through the study area.
    - **Next Step:** CTDOT to provide 11" travel lanes with the next resurfacing project. Typical VIP cycles can range between 10 and 20 years. (Identified as CTDOT low-hanging fruit).

Moderately Complex Recommendations

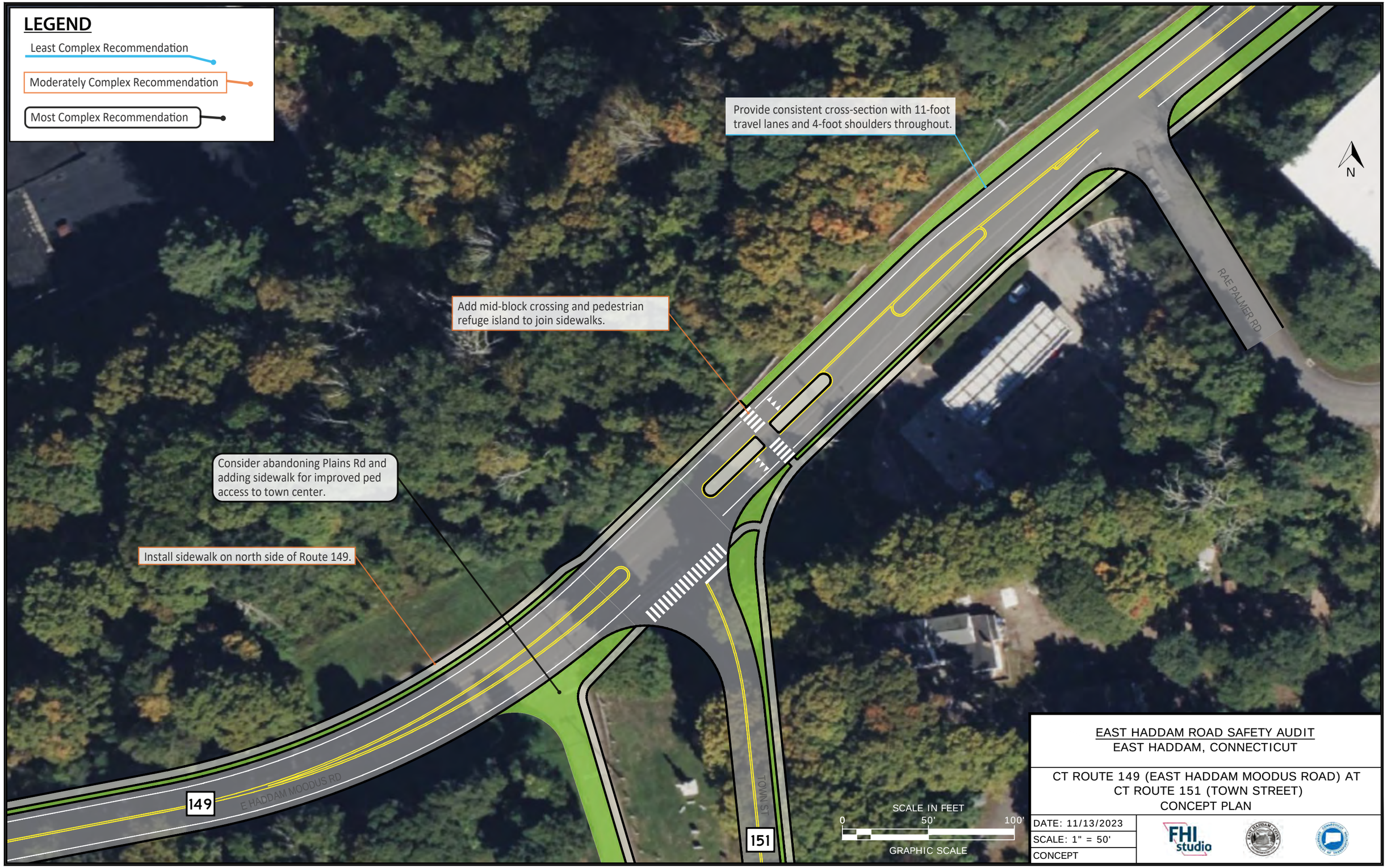
1) Construct a sidewalk on the north side of Route 149 west of Town Street. Near Plains Road there is a vertical drop-off towards the Moodus River which may require the sidewalk to be built adjacent to the roadway.
    - **Next Step:** Contact info@rivercog.org for potential funding sources. Check available ROW and roadside area for feasibility.
2) Add a crosswalk and pedestrian refuge island just east of the Town Street intersection. This would link the existing south-side sidewalk with the proposed north-side sidewalk to the west. The refuge island could improve pedestrian visibility and reduce crossing distance. It could also encourage vehicles to reduce speed due to horizontal deflection to the vehicular travel path. Exhibit 31 shows and example of a crosswalk with pedestrian refuge island in Cheshire, CT.
    - **Next Step:** Contact info@rivercog.org for potential funding sources.

Exhibit 31: A crosswalk with pedestrian refuge island in Cheshire, CT allows pedestrians to cross in two-stages. (Source: Google Maps)

Most Complex Recommendations

1) Consider abandoning Plains Road, eliminating its intersection with Route 149 to reduce conflicts and direct traffic to the adjacent intersection with Town Street. The former roadbed could be replaced by grass and a potential sidewalk connection to serve buildings on the west side of Town Street.
    - **Next Step:** Contact LTA to send request to DOT.TrafficEngineering@ct.gov for next resurfacing project.
    - **Next Step:** Contact info@rivercog.org for funding.

Exhibit 32 - Southern Map



EAST HADDAM ROAD SAFETY AUDIT
EAST HADDAM, CONNECTICUT

CT ROUTE 149 (EAST HADDAM MOODUS ROAD) AT
CT ROUTE 151 (TOWN STREET)
CONCEPT PLAN

DATE: 11/13/2023	
SCALE: 1" = 50'	
CONCEPT	

5.5 Intersection of Route 149 (East Haddam Moodus Road) and William F. Palmer Road and North Moodus Road

Recommendations in this area primarily focus on improving visibility at the intersection by realigning Route 149. Pedestrian improvements to reduce crossing distances at the intersection are part of the realignment. Additionally, access management techniques are utilized to vehicular conflicts near the intersection. Exhibit 33 displays the intersection and crosswalk at this location. Exhibit 34 depicts these recommendations as a conceptual plan.

Least Complex Recommendations

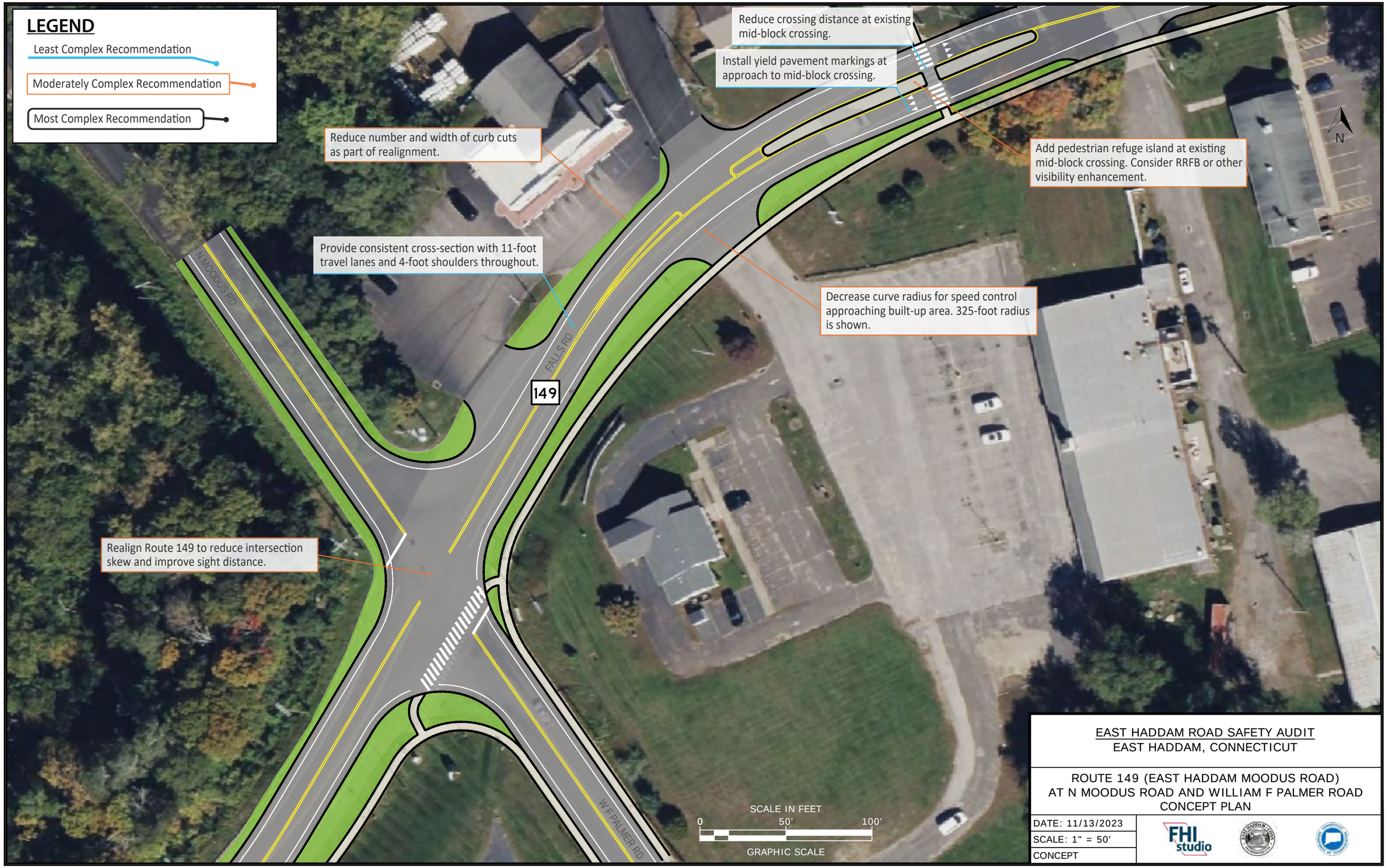
1) Re-stripe Route 149 to provide a consistent cross-section with 11' travel lanes and 4' shoulders. This cross-section should accommodate State standards for the facility and encourage more consistent, lower speeds through the study area.
    - Next Step: CTDOT to provide 11" travel lanes with the next resurfacing project. Typical VIP cycles can range between 10 and 20 years. (Identified as CTDOT low-hanging fruit).

Moderately Complex Recommendations

1) Realign Route 149 to reduce the skew angle at the intersection, thereby improving sight distance and reducing pedestrian crossing distance.
    - Next Step: Contact info@rivercog.org for potential funding sources. Demonstrate that crash data supports initiative.
2) As part of realignment, reduce the radius of curves on Route 149 to match a target speed of 30 mph and pursue access management by reducing the number and width of curb cuts.
    - Next Step: Contact info@rivercog.org for potential funding sources.
    - Next Step: Municipalities will need to initiate and coordinate access management with respected property owners.

Exhibit 33: Intersection of Route 149 and William F. Palmer Road

Exhibit 34 - Northern Map



EAST HADDAM ROAD SAFETY AUDIT
EAST HADDAM, CONNECTICUT

ROUTE 149 (EAST HADDAM MOODUS ROAD)
AT N MOODUS ROAD AND WILLIAM F PALMER ROAD
CONCEPT PLAN

DATE: 11/13/2023	
SCALE: 1" = 50'	
CONCEPT	

5.6 Route 149 (Falls Road) between North Moodus Road/William F. Palmer Road and Gristmill Road

The recommendations included in this section contain recommendations to enhance the streetscape by reducing the roadway cross-section and reducing crossing distances at the existing crossing, both of which could help to lower vehicular speeds. Improving pedestrian facilities in this area could promote economic development by creating a village type environment and destination for the community, while encouraging multi-modal transportation. Access management to existing businesses could improve conditions for all users by reducing confusing.

Least Complex Recommendations

1) Re-stripe Route 149 to provide a consistent cross-section with 11' travel lanes and 4' shoulders. This cross-section should accommodate State standards for the facility and encourage more consistent, lower speeds through the study area.
    - **Next Step:** CTDOT to provide 11" travel lanes with the next resurfacing project. Typical VIP cycles can range between 10 and 20 years. (Identified as CTDOT low-hanging fruit).
2) Reduce pedestrian crossing distance at existing marked mid-block crosswalk.
    - **Next Step**: Contact info@rivercog.org for potential funding sources.

Moderately Complex Recommendations

1) Add a pedestrian refuge island at the existing marked mid-block crosswalk. The refuge island could improve pedestrian visibility and reduce crossing distance. It could also encourage vehicles to reduce speed due to horizontal deflection to the vehicular travel path.
    - **Next Step:** Contact info@rivercog.org for potential funding sources.
2) Consider treatments such as a rectangular rapid-flashing beacon (RRFB) to improve visibility.
    - **Next Step**: Town may install via Encroachment Permit for existing mid-block crosswalk locations. See here for more info: Encroachment Permit (ct.gov)

      For new crosswalk locations with or without RRFB contact DOT.TrafficEngineering@ct.gov

      See here for additional RRFB considerations: Rectangular Rapid Flashing Beacon

Most Complex Recommendations

1) Pursue access management for adjacent property owners.
    - **Next Step:** Responsibility under Town P&Z Land Use Regulations. Contact info.rivercog.org for funding an Access Management Study (corridor study).

Exhibit 35:RRFB in Mansfield, CT

5.7 Route 149 (Falls Road) between Gristmill Road and Great Hillwood Road

The recommendations included here seek to create comfortable accommodations for bicycle and pedestrian travel while improving connections to the East Haddam Senior Center.

Most Complex Recommendations

1) Pursue long-term widening of Route 149 to provide sufficient width for comfortable bicycle travel.
    - Next Step: Contact info@rivercog.org for potential funding sources.
2) Construct a sidewalk on the south side of Route 149 to connect the existing sidewalk network to the East Haddam Senior Center and nearby residences.
    - Next Step: Contact info@rivercog.org for potential funding sources.

6 SUMMARY

This report documents the observations, discussions, and recommendations developed during the completion of the Town of East Haddam's RSA. It provides the Town with an outlined strategy to improve the transportation network for all users in the study area, particularly focusing on pedestrians and cyclists. Moving forward, the Town of East Haddam and CTDOT may use this report to prepare strategies for funding and implementing the improvements. This report provides East Haddam with a toolkit to plan for including these multi-modal recommendations into future development within the study area.

The aforementioned Community Connectivity Program: Road Safety Audit Report is an objective review intended for the municipality use to help assess the existing conditions within a predetermined area of town selected by the municipality. The conclusions of this report are advisory and intended for general planning purposes to help identify bicycle, pedestrian and non-motorized transportation needs that encourage walking and bicycling, as well as assists in developing recommendations to improve the existing conditions. The contents of this report are not intended to be legally binding, but rather offer recommendations to improve safety in the vicinity of the audit location and create a more appealing transportation alternative.

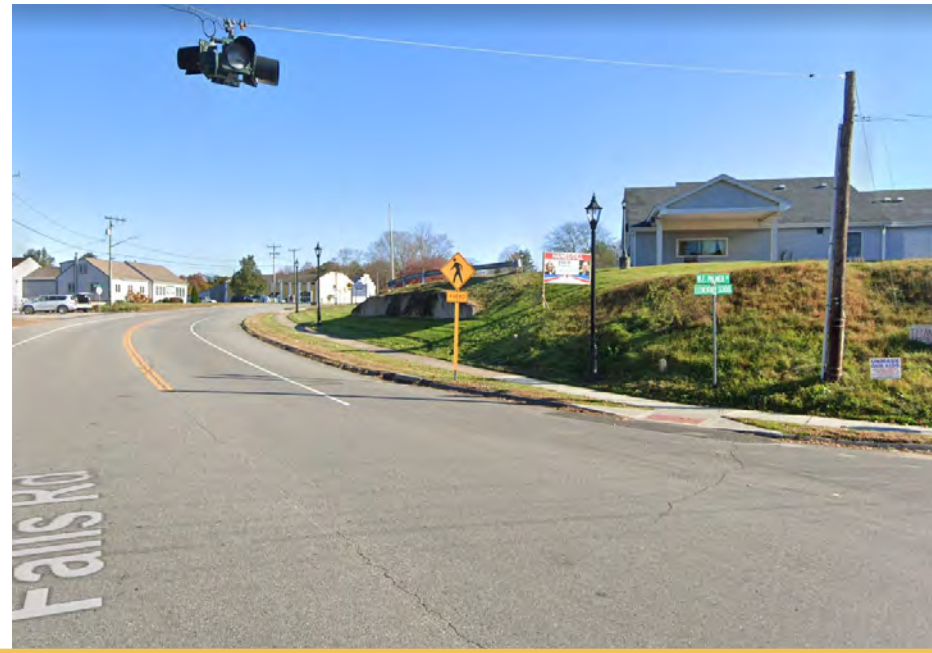
APPENDICES

A: Pre-Audit Presentation

B: Walk Audit Materials

EAST HADDAM ROAD SAFETY AUDIT

Route 149 (East Haddam Moodus Road/Falls Road) between Grove Street and Great Hillwood Road



CONNECTICUT DEPARTMENT OF TRANSPORTATION 125 1895 - 2020

EAST HADDAM · CONN · NATHAN HALE SCHOOL HOUSE · INCORPORATED 1734

COMMUNITY connectivity program

FHI studio

JUNE 2023

INTRODUCTIONS

AGENDA

1. Welcome and Team Introductions
2. Study Purpose and Goals
3. Study Area
4. Review of Site-Specific Data and Issues
5. Next Steps for Tomorrow’s Site Visit Audit

PROJECT TEAM

- Connecticut Department of Transportation (CTDOT) is sponsoring
- Town of East Haddam
- Lower Connecticut River Valley Council of Governments (RiverCOG)
- FHI Studio is conducting the Road Safety Audit reporting

PURPOSE AND GOALS OF THE ROAD SAFETY AUDIT

Safety assessment of existing walking and biking routes

Improve transportation network for all users by making conditions safer and more comfortable for pedestrians and cyclists

Identify the issues that may discourage or prevent walking and bicycling

Identify next steps, evaluate feasibility of proposed improvements, and potential funding sources.

DELIVERABLES

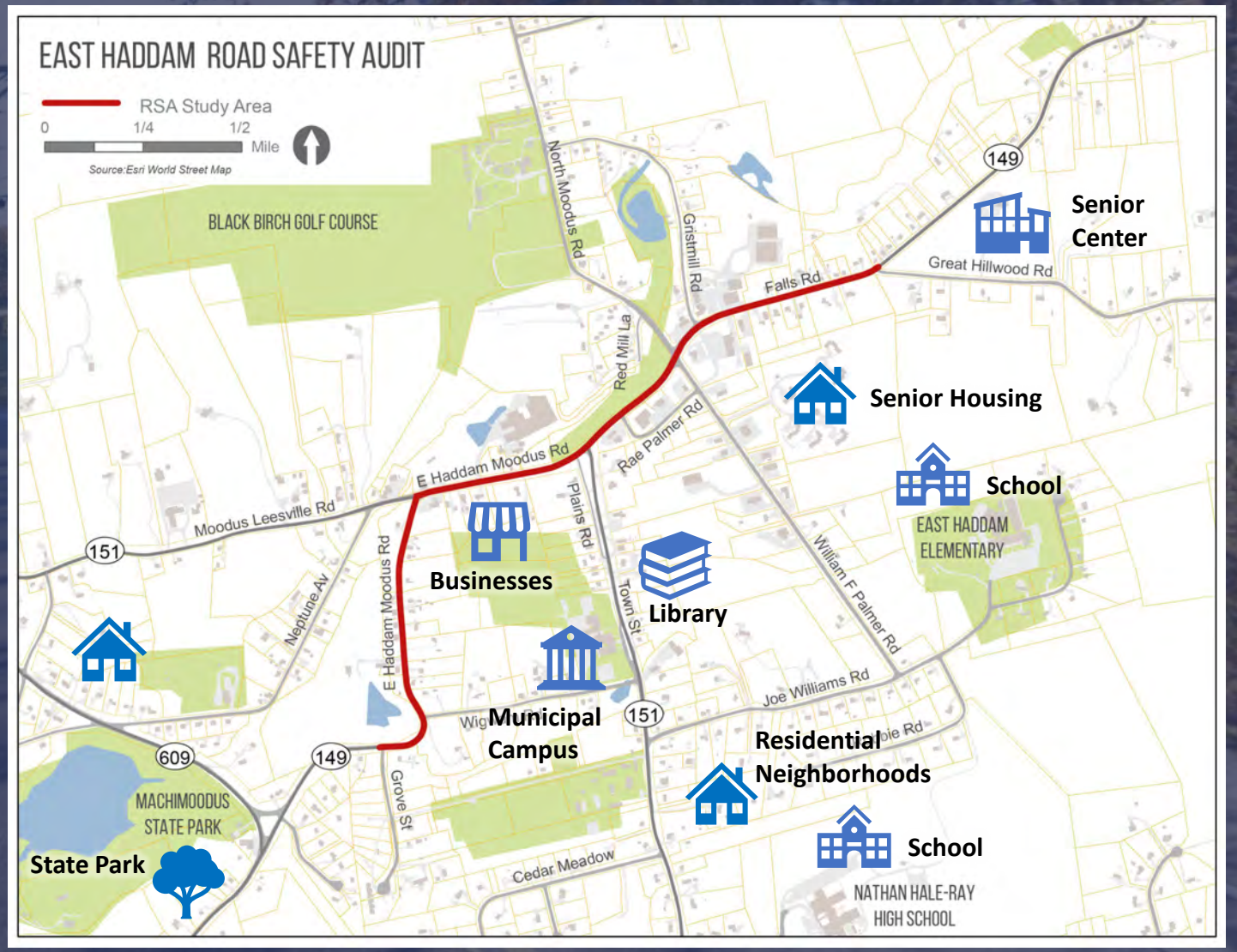
- Existing Conditions Data Collection
- Pre-Audit Meeting
- Field Audit
- Post Audit Meeting
- Road Safety Audit Report

STUDY AREA

- Route 149 between Grove Street and Great Hillwood Road
- Vicinity of Moodus Center

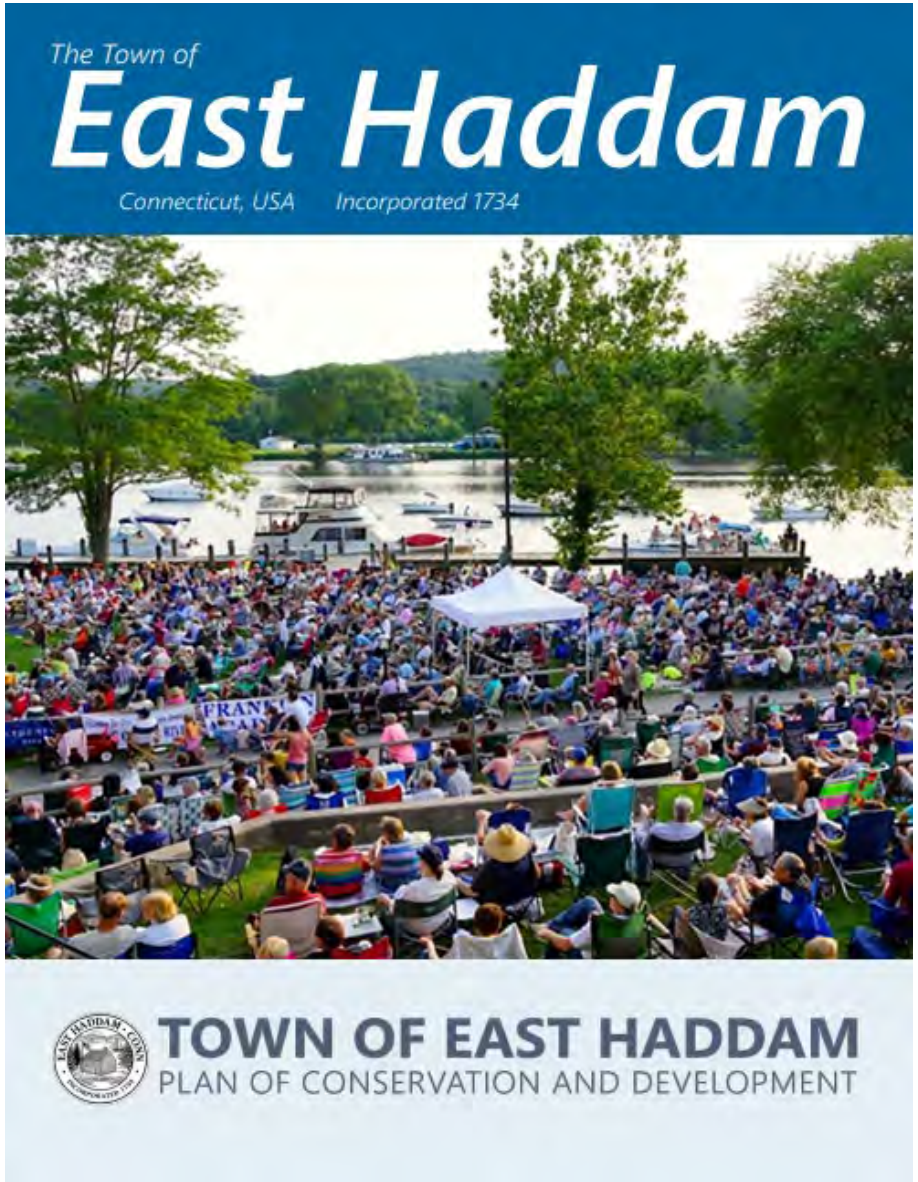
POINTS OF INTEREST

- Municipal Campus
- East Haddam Elementary School/ Hale-Ray High School
- Library
- Senior Center and Senior Housing
- Businesses
- Regional and local traffic
- Pedestrian/Bicycle Traffic



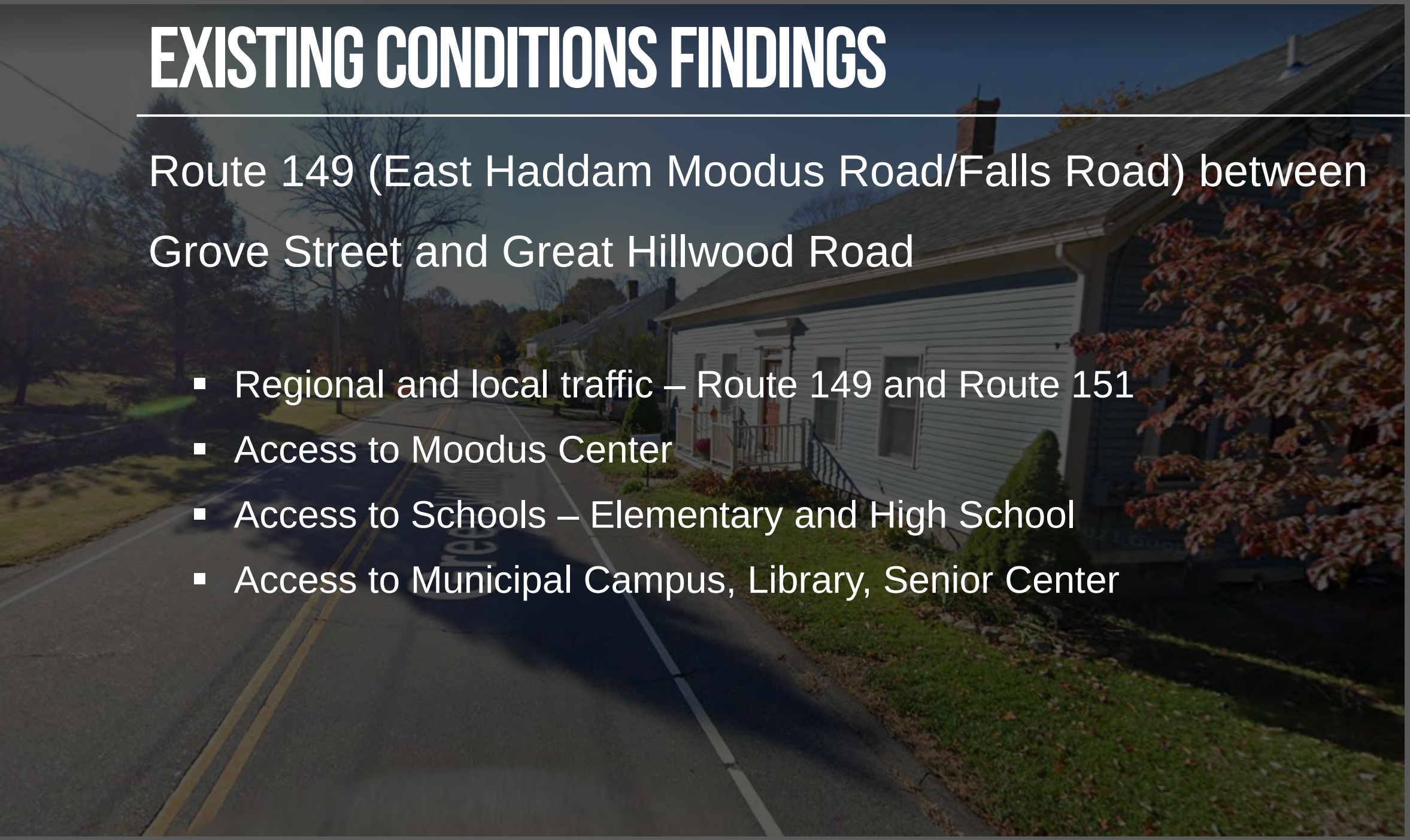
REVIEW OF PAST/CURRENT WORK

- Potential for more commercial development and mixed use residential in Moodus Center
- Revisions to Zoning Regulations in April 2023
- Plan of Conservation and Development completed in 2019
- New Business Guide to East Haddam - 2019



HISTORICAL BUSINESS CENTER

EXISTING CONDITIONS FINDINGS



Route 149 (East Haddam Moodus Road/Falls Road) between Grove Street and Great Hillwood Road

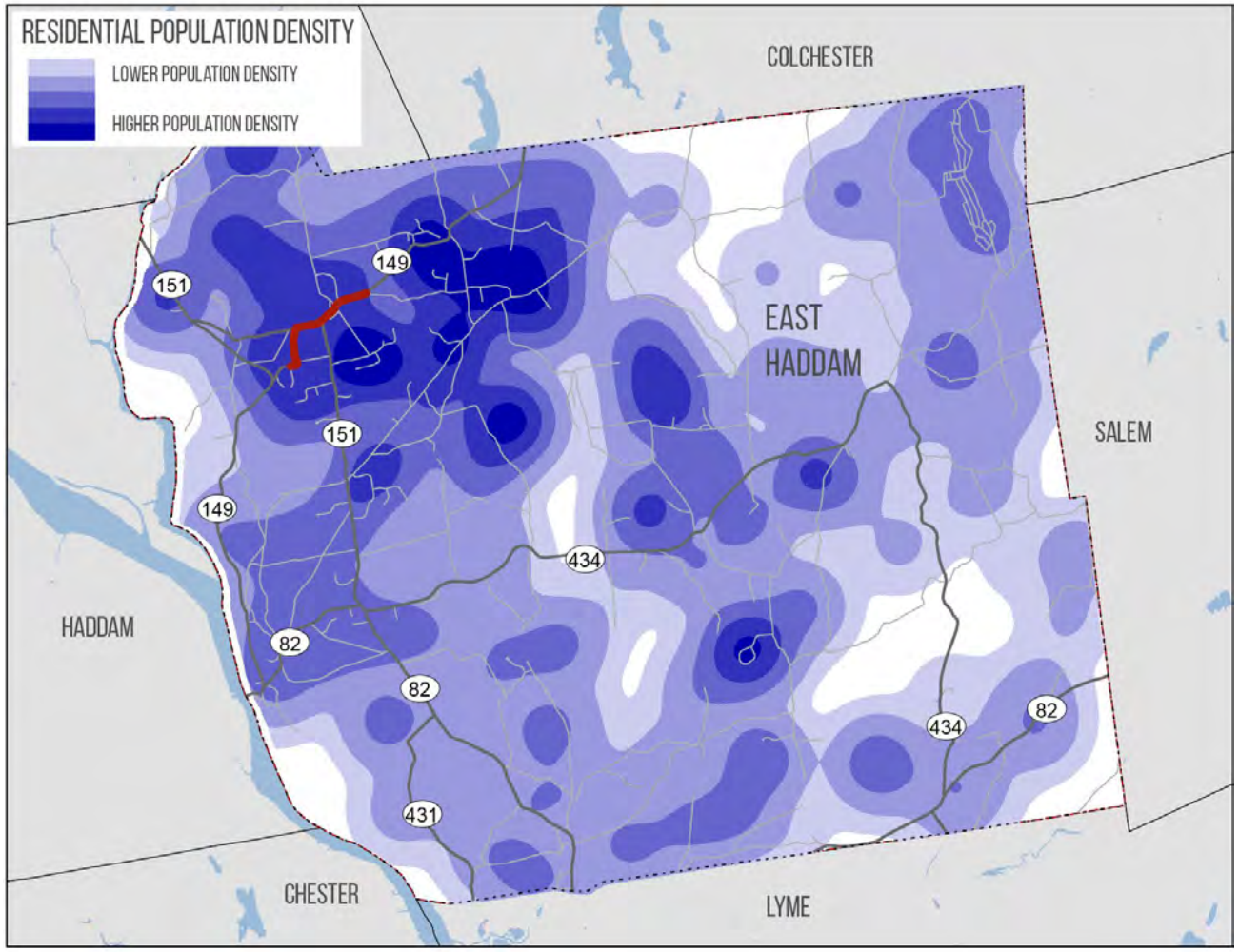
- Regional and local traffic – Route 149 and Route 151
- Access to Moodus Center
- Access to Schools – Elementary and High School
- Access to Municipal Campus, Library, Senior Center

TRAFFIC VOLUMES

- Highest traffic volumes found on Route 149 between North Moodus Road/William F. Palmer Road intersection and Great Hillwood Road
  - Wigam Road appears to be a cut-thru between Route 149 and Route 151
  - Lowest volumes found on Route 149 east of Leesville Road

POPULATION DENSITY

- Population density is highest in the vicinity of the Study Area, many residential neighborhoods within walking distance to Moodus Center



FUNCTIONAL CLASSIFICATION

- Many roads in the vicinity of the Study Area and Moodus Center are Collector Roadways

ROADWAY GEOMETRY

East Haddam - RSA - Route 149
Street Inventory

Road	From	To	Distance	Direction	Lanes	Lane Width	Sidewalk Type	Sidewalk Width	Sidewalk Condtion	ADA Ramps Present	ADA Ramps Compliant	Curb	Parking	Shoulder	On DOT Bike Network	Notes
Route 149	Grove Street	Moodus Leesville Road	2,200'	EB	1	11'	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2'	Yes	Sharp turn east of Grove Street
(East Haddam Moodus Road)				WB	1	11'	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2'	Yes	
Route 149	Moodus Leesville Road	Route 151	1,300'	EB	1	12'	N/A	N/A	N/A	N/A	N/A	Varies	N/A	6'	Yes	Sections of sidewalk in various conditions
(East Haddam Moodus Road)				WB	1	12'	N/A	N/A	N/A	N/A	N/A	Varies	N/A	6'	Yes	Uphill in eastbound direction
Route 149	Route 151	North Moodus Road	1,000'	EB	1	12'	Concrete	5'	Good	Yes	Yes	Paved	No	6'	Yes	Uphill in eastbound direction
(East Haddam Moodus Road)				WB	1	12'	N/A	N/A	N/A	N/A	N/A	Paved	No	6'	Yes	Check sightlines on southeast corner
Route 149	North Moodus Road	800 ft E/O	800'	EB	1	13'	Concrete	5'	Good	Yes	Yes	Paved	No	11'	Yes	Midblock crossing in this area
(Falls Road)		North Moodus Road		WB	1	13'	N/A	N/A	N/A	N/A	N/A	Paved	No	11'	Yes	
Route 149	800 ft E/O	Great Hillwood Road	900'	EB	1	11'	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0'	Yes	
(Falls Road)	North Moodus Road			WB	1	11'	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0'	Yes	

*CONDITION - "Good" is Serviceable Condition that meets current design standards. "Fair" is generally serviceable, but may need minor repairs, or may not completely align with current design standards. "Poor" is not serviceable, and generally inadequate for continued long-term use.

Highlighted cells indicate values which may warrant further investigation

ROADWAY GEOMETRY

Figure 4D

RURAL COLLECTOR ROADS
New Construction/Major Reconstruction

Design Element			*	Manual Section	Design Values (by Type of Roadside Development)		
					Open	Moderate Density	High Density
Design Controls	Typical Number of Access Points/Mile/Side			6-1.03	0 – 15	15 – 30	>30
	Design Forecast Year			6-3.02	20 Years	20 Years	20 Years
	Design Speed	AADT < 400	x	6-2.02	30 – 35 mph	N/A	N/A
		AADT: 400 – 2000			35 – 50 mph	35 – 45 mph	N/A
		AADT > 2000			50 mph	45 – 50 mph	35 – 45 mph
	Control of Access			6-4.0	Control by Regulation	Control by Regulation	Control by Regulation
	Level of Service			6-3.0	C – D	C – D	C – D
Cross Section Elements	Travel Lane Width	AADT < 400	x	10-1.01	10′	N/A	N/A
		AADT: 400 – 1500			11′ (V≥35); 10′ (V≤30)	11′ (V≥35); 10′ (V≤30)	N/A
		AADT: 1500 – 2000			11′	11′	N/A
		AADT > 2000			12′	12′	12′
	Shoulder Width	AADT ≤ 1500	x	10-1.02	2′ – 8′	2′ – 8′	N/A
		AADT > 1500			4′ – 8′	4′ – 8′	4′ – 8′
	Typical Cross Slope	Travel Lane	x	10-1.01	1.5 – 2.0%	1.5 – 2.0%	1.5 – 2.0%
		Shoulder	x	10-1.02	4%	Uncurbed: 4% Curbed: 6%	Uncurbed: 4% Curbed: 6%
	Turn Lanes	Lane Width	x	10-1.03	1′ Less than Travel Lane Width — Same as Travel Lane		
		Shoulder Width	x		2′ – 4′		
	Bicycle Lane	Width		15-4.0	5′ or Shoulder Width, whichever is greater		
		Cross Slope			2%		
	Bridge Width/Cross Slope **(1)**		x	10-4.01	Meet Approach Roadway Width and Cross Slope		Sidewalk Width: 5′-6″
	Underpass Width			10-4.02	Meet Approach Roadway Width Plus Clear Zones		
	Right-of-Way Width			10-5.0	Project-by-Project Basis		
	Roadside Clear Zones		x	13-2.0	See Section 13-2.0		
	Fill/Cut Slopes			10-2.02	See Figure 4G		

* Controlling design criteria (see Section 6-6.0).

Footnote:

(1) *Bridge Width. See Section 3-2.04 for local bridge projects.*

ROADWAY GEOMETRY

Figure 4D (Continued)

RURAL COLLECTOR ROADS
New Construction/Major Reconstruction

	Design Element		*	Manual Section	Design Values (Based on Design Speed)			
					50 mph	45 mph	35 mph	30 mph
Alignment Elements	Stopping Sight Distance		x	7-1.0	425′	360′	250′	200′
	Decision Sight Distance	Maneuver		7-2.0	750′	675′	525′	450′
		Stop			465′	395′	275′	220′
	Minimum Radius (e = 6.0%)		x	8-2.02	840′	665′	385′	275′
	Superelevation	e_{max}		8-2.02	6.0%	6.0%	6.0%	6.0%
		Rate	x		See Figure 8-2A			
	Horizontal Sight Distance			8-2.04	See Section 8-2.04			
	Maximum Grade		x	9-2.03	7%	8%	8%	9%
	Minimum Grade			9-2.03	0.5%			
	Vertical Curvature (K-Value)	Crest		9-3.02	84	61	29	19
		Sag		9-3.03	96	79	49	37
	Minimum Vertical Clearance: Collector Under …	New Highway Bridge	x	9-4.0	14′-6″			
		Existing Highway Bridge	x		14′-3″			
	Minimum Vertical Clearance (Collector over Railroad)		x	9-4.0	Electrified: 22′-6″ All Others: 20′-6″			

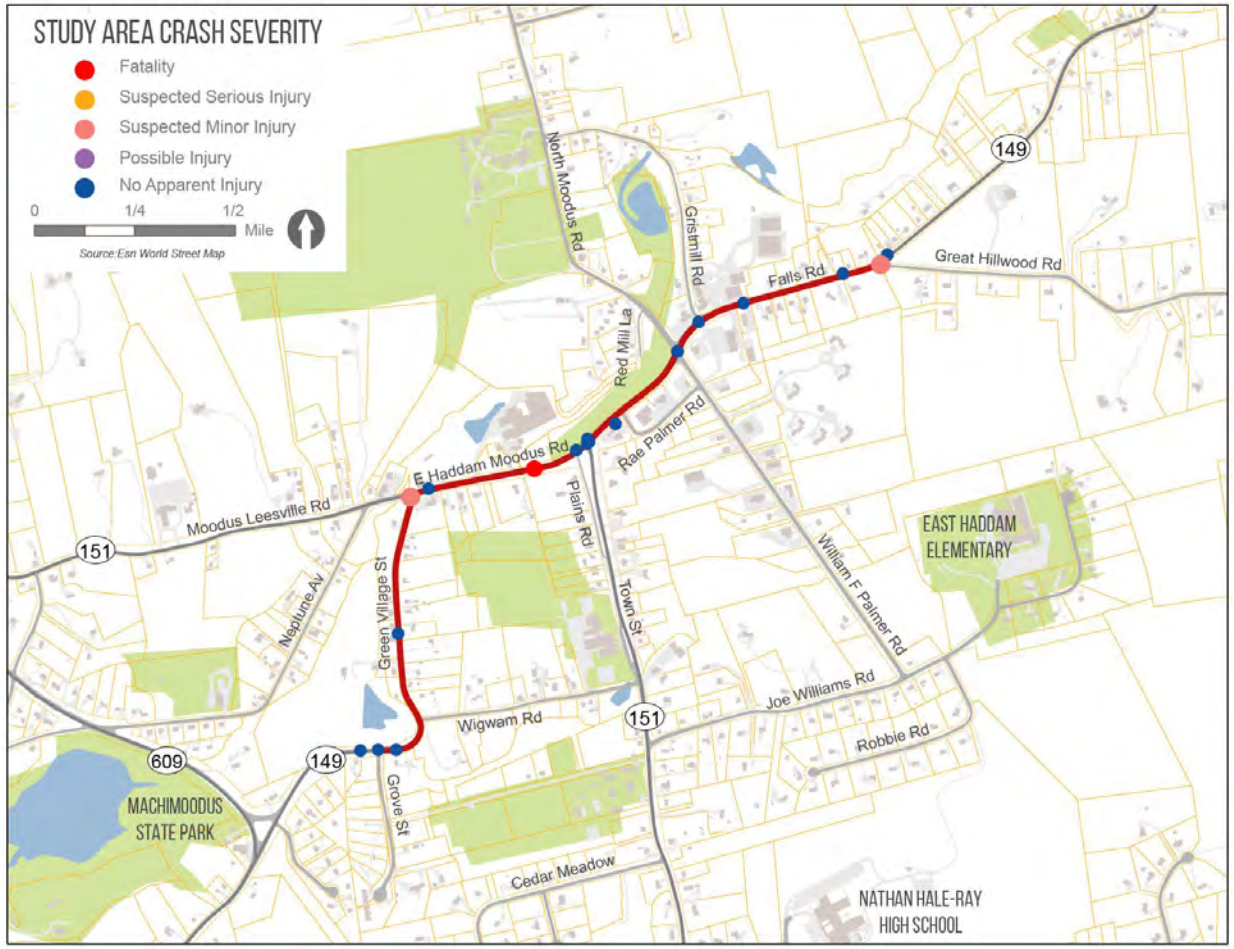
* Controlling design criteria (see Section 6-6.0).

CRASH ANALYSIS

2017 - 2021

Year	Fatality	Serious Injury	Minor Injury	Possible Injury	Property Damage Only	TOTAL
2017	1		1		2	**4**
2018					2	**2**
2019			1		5	**6**
2020					4	**4**
2021					3	**3**
TOTAL	**1**		**2**		**16**	**19**

Note – Fatality was westbound motorcyclists who hit deer west of North Moodus Road



CRASH ANALYSIS

2017 - 2021

Crash Severity

	Fatality	Serious Injury	Minor Injury	Possible Injury	Property Damage Only	TOTAL
Angle					7	7
Front to front					2	2
Front to rear					1	1
Single Vehicle / Not Applicable	1		2		6	9
TOTAL	1		2		16	19
Crashes Involving Pedestrians	0	0	0	0	0	0
Crashes Involving Bicyclists	0	0	0	0	0	0

CRASH ANALYSIS

Crash Hotspots (5 Year Crash Total approx.)
19 Crashes Total

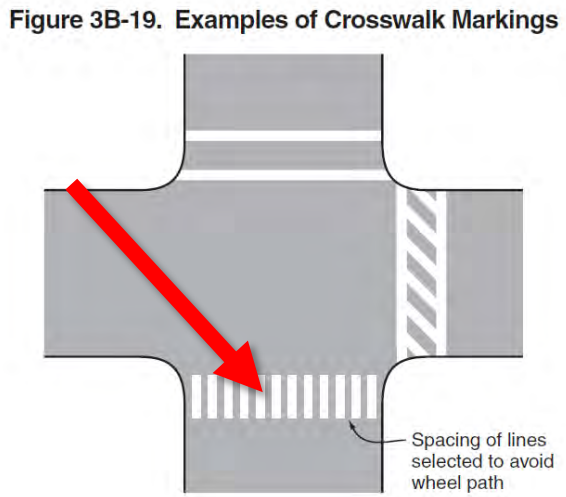
- Approximately 4 crashes in the vicinity of Route 149 / North Moodus Road
- Approximately 3 crashes in the vicinity of Route 149 / Grove Street
- Approximately 3 crashes in the vicinity of Route 149 / Great Hillwood Road

SAMPLE IMPROVEMENTS TO IMPROVE SAFETY IN THE STUDY AREA

Some countermeasures may not be appropriate on certain facilities

PEDESTRIAN COUNTER MEASURES

Sidewalks



Crosswalks

RRFB

Pedestrian Refuge Islands

Raised Crosswalks

Sidepaths

BICYCLIST COUNTER MEASURES

Sharrows

Bike Lanes

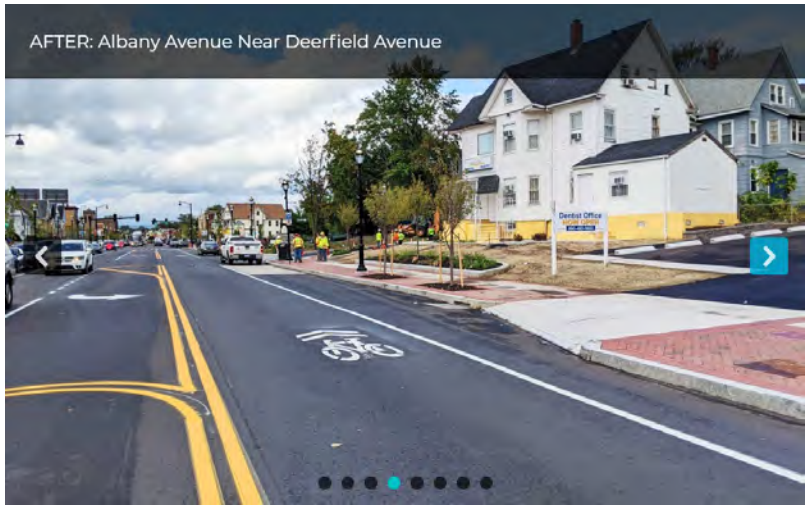
Buffered Bike Lanes

Sidepaths

SPEED REDUCTION – CROSS SECTION AND OTHER

Lane Narrowing

On Street Parking



Streetscape

Median Island

Street Trees

Dynamic Speed Signs

SPEED REDUCTION – HORIZONTAL TREATMENTS

Short Medians /
Lateral Shift

Roundabout

DISCUSSION ON ISSUES IN THE STUDY AREA AND OPPORTUNITIES

TOMORROW'S WALK AUDIT

- Review safety protocols, reflective vests, etc.
- Meeting Location
- Walk the Study Area corridor and assess existing conditions and identify areas for improvement
- Post Audit discussion immediately following

THANK YOU!

East Haddam Road Safety Audit

Meeting Location: Virtual Meeting

Date and Time: May 22nd, 3:00 PM – 4:00 PM

Agenda

1. **Welcome and Introductions**
2. **Pre-Audit Presentation and Discussion**
    - Definition of Study Area
    - Review Site Specific Data
        - Average Daily Traffic
        - Crash Data
        - Geometrics
3. **Walk Audit Procedures and Safety**

Notes for Participants

- All participants will be actively involved in the process throughout. Participants are encouraged to come with thoughts and ideas, as stakeholders' opinions are key elements to the success of the overall RSA process.
- After the RSA meeting, participants will be asked to comment and respond to the document materials to assure it is reflective of the RSA completed by the multidisciplinary team.

East Haddam Road Safety Audit

Meeting Location: East Haddam Town Hall? Library?

Address: 1 Plains Road, Moodus

Date and Time: May 23rd, 2:00 PM

Agenda

4. **Welcome and Introductions**
5. **Review of Road Safety Audit Route**
6. **Audit**
    - Visit Study Area
    - Complete Audit Checklist
    - Identify issues and opportunities for improvements
7. **Post-Audit Discussion**
    - Discussion observations and finalize findings
    - Discuss potential improvements and final recommendations
    - Next Steps

Notes for Participants

- All participants will be actively involved in the process throughout. Participants are encouraged to come with thoughts and ideas, as stakeholders' opinions are key elements to the success of the overall RSA process.
- After the RSA meeting, participants will be asked to comment and respond to the document materials to assure it is reflective of the RSA completed by the multidisciplinary team.

East Haddam Audit Checklist

Pedestrians and Bicycles	Comment

Pedestrian Crossings
• Sufficient time to cross (signal)
• Signage
• Pavement Markings
• Detectable warning devices (signal)
• Adequate sight distance
• Wheelchair accessible ramps
  o Grades
  o Orientation
  o Tactile Warning Strips
• Pedestrian refuge at islands
• Other	

Pedestrian Facilities
• Sidewalk
  o Width
  o Grade
  o Materials/Condition
  o Drainage
  o Buffer
• Pedestrian lighting
• Pedestrian amenities (benches, trash receptacles)
• Other	

Bicycles • Bicycle facilities/design • Separation from traffic • Conflicts with on-street parking • Pedestrian Conflicts • Bicycle signal detection • Visibility • Roadway speed limit • Bicycle signage/markings • Shared Lane Width • Shoulder condition/width • Traffic volume • Heavy vehicles • Pavement condition • Other	

Roadway & Vehicles	
• Speed-related issues o Alignment; o Driver compliance with speed limits o Sight distance adequacy o Safe passing opportunities	
• Geometry o Road width (lanes, shoulders, medians); o Access points; o Drainage o Tapers and lane shifts o Roadside clear zone /slopes o Guide rails / protection systems	

• Intersections o Geometrics o Sight Distance o Traffic control devices o Safe storage for turning vehicles o Capacity Issues	

• Pavement
  o Pavement Condition (excessive roughness or rutting, potholes, loose material)
  o Edge drop-offs
  o Drainage issues
• Lighting Adequacy	

• Signing
  • Correct use of signing
  • Clear Message
  • Good placement for visibility
  • Adequate retroreflectivity
  • Proper support	

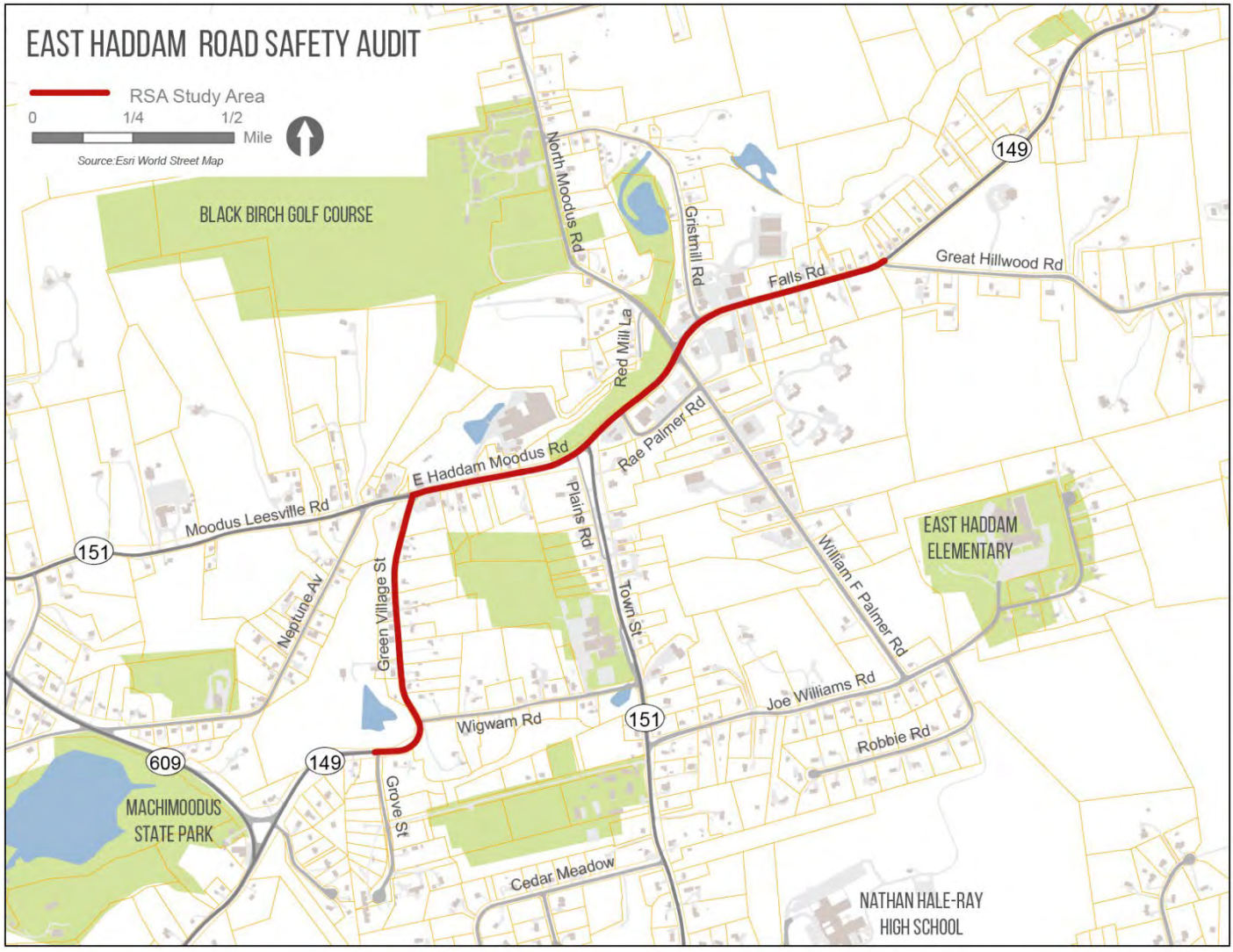
• Signals
  o Proper visibility
  o Proper operation
  o Efficient operation
  o Safe placement of equipment
  o Proper sight distance
  o Adequate capacity	

• Pavement Markings
  o Correct and consistent with MUTCD
  o Adequate visibility
  o Condition
  o Edgelines provided	

• Miscellaneous
  o Weather conditions impact on design features.
  o Snow storage	

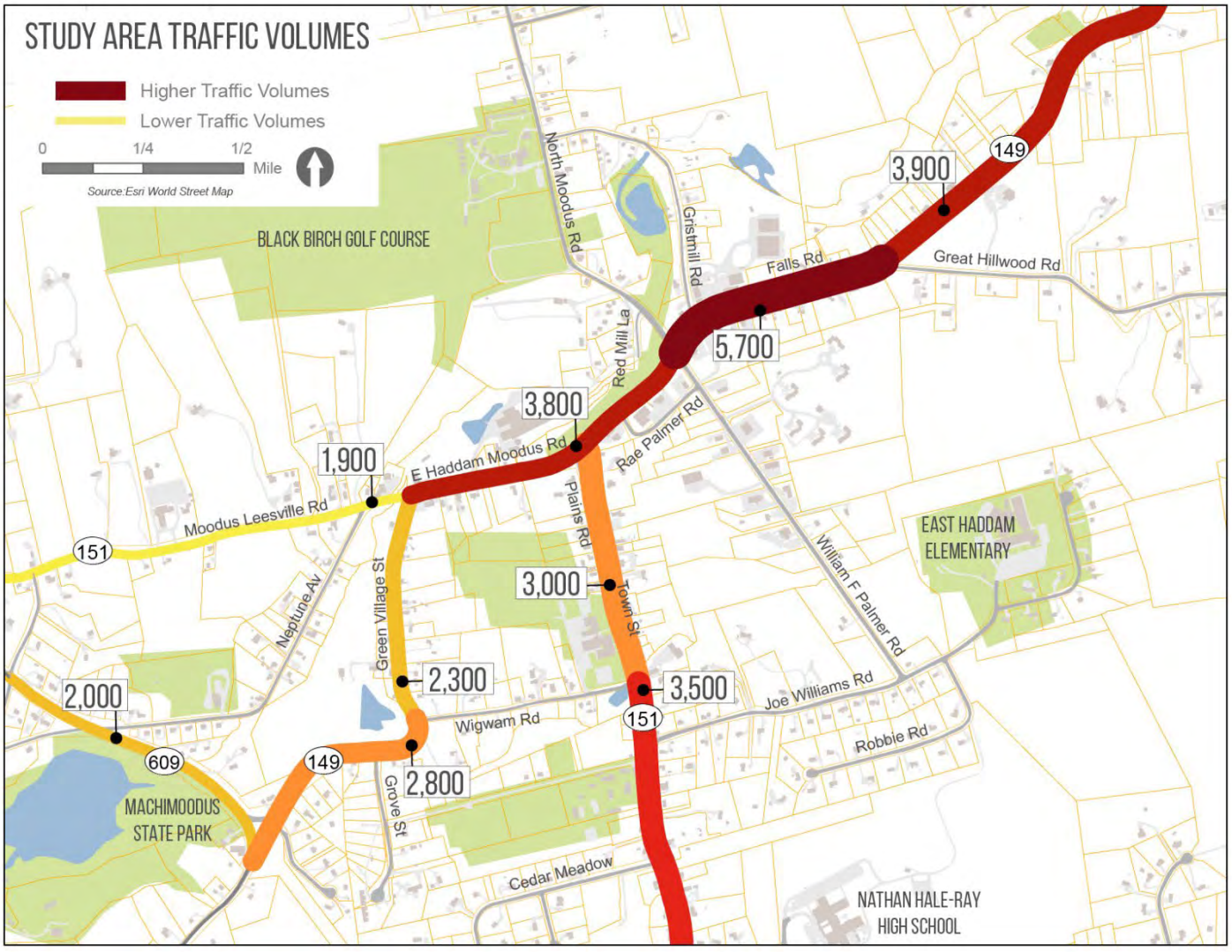
East Haddam Road Safety Audit - Study Area

- Route 149 (East Haddam Moodus Road/Falls Road) between Grove Street and Great Hillwood Road



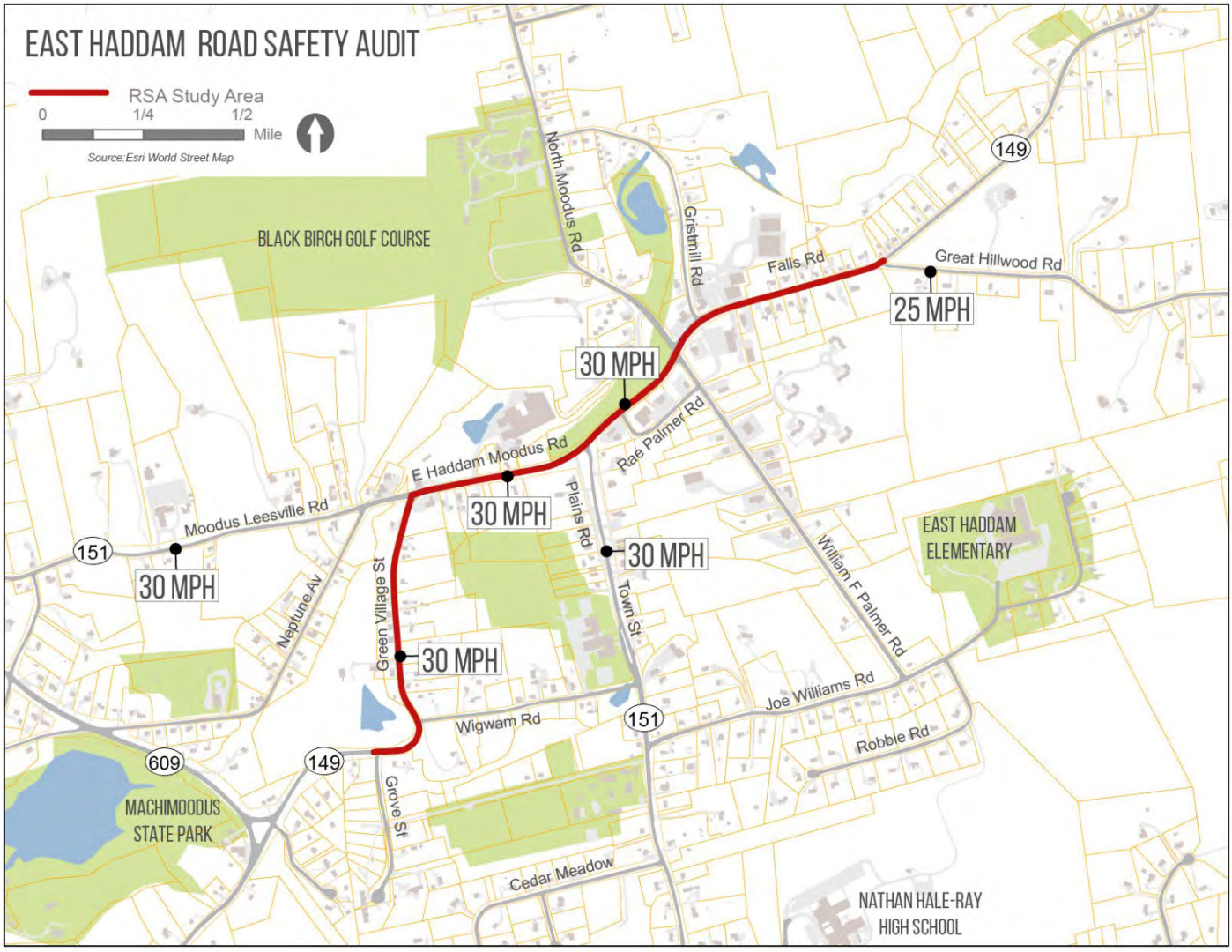
East Haddam Road Safety Audit - Average Daily Traffic Volumes in 2021

- Highest traffic volumes found on Route 149 between North Moodus Road/William F. Palmer Road intersection and Great Hillwood Road
- Lowest volumes found on Route 149 east of Green Village Street
- Wigam Road appears to be a cut-thru between Route 149 and Route 151

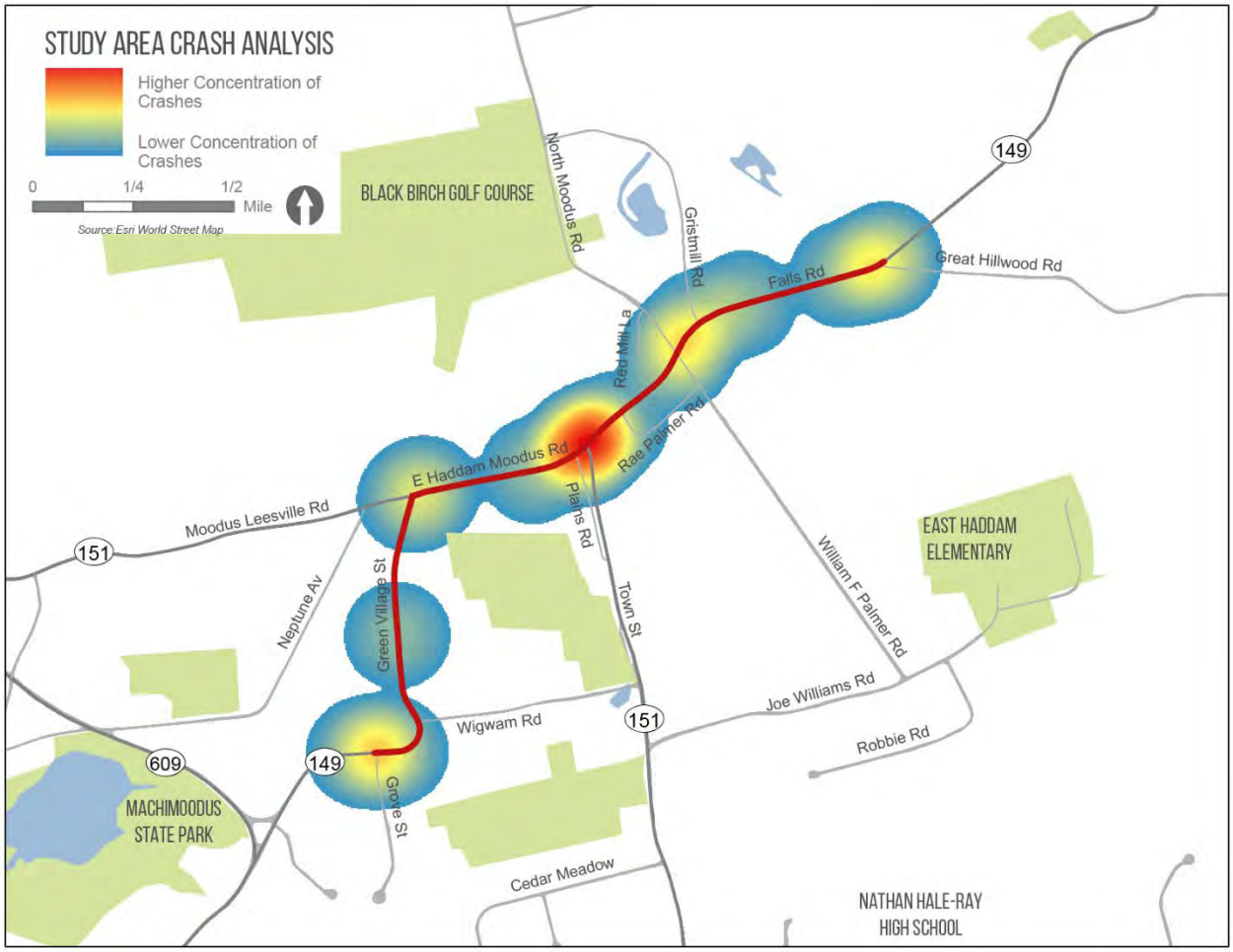


East Haddam Road Safety Audit – Posted Speed Limits

- Speed limits are 30 MPH on Route 149 and Route 151
- Local streets are 25 MPH



East Haddam Road Safety Audit - Crash Summary Heat Map



East Haddam Road Safety Audit - Crash Summary

Years: 2017 - 2021

Crash Severity

	Fatality	Serious Injury	Minor Injury	Possible Injury	Property Damage Only	**TOTAL**
Angle					7	7
Front to front					2	2
Front to rear					1	1
Not Applicable / Other	1		2		6	9
TOTAL	1		2		16	19
Crashes Involving Pedestrians	0	0	0	0	0	0
Crashes Involving Bicyclists	0	0	0	0	0	0

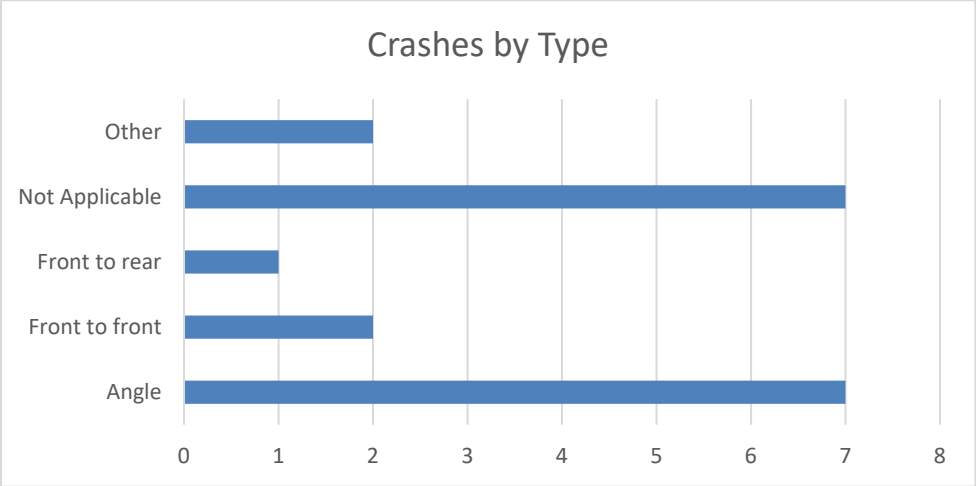
Summary Analysis:

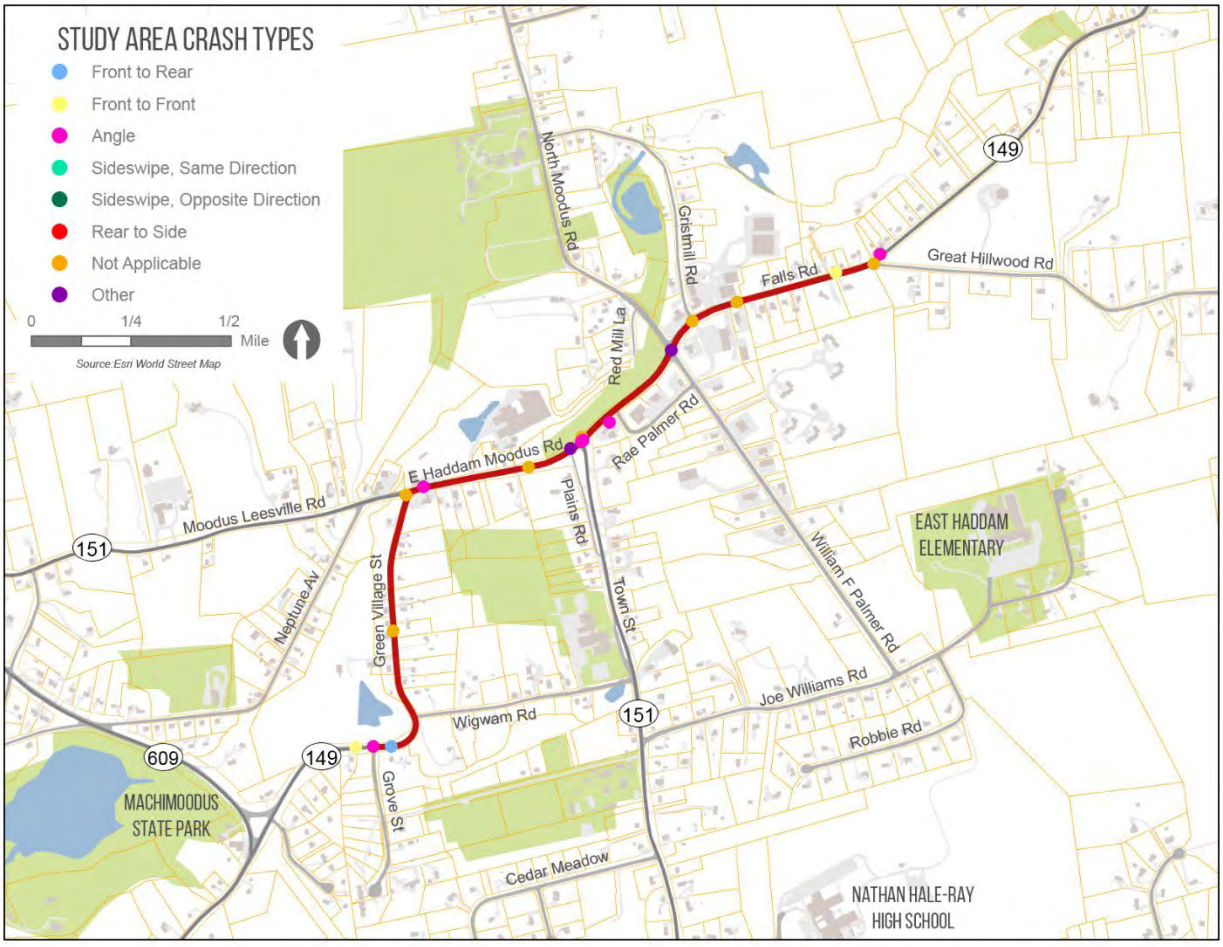
Crash Hotspots (5 Year Crash Total approx.) 19 Crashes Total

- Approximately 4 crashes in the vicinity of Route 149 / North Moodus Road
- Approximately 3 crashes in the vicinity of Route 149 / Grove Street
- Approximately 3 crashes in the vicinity of Route 149 / Great Hillwood Road

East Haddam Road Safety Audit Crash Summary - Crashes by Type

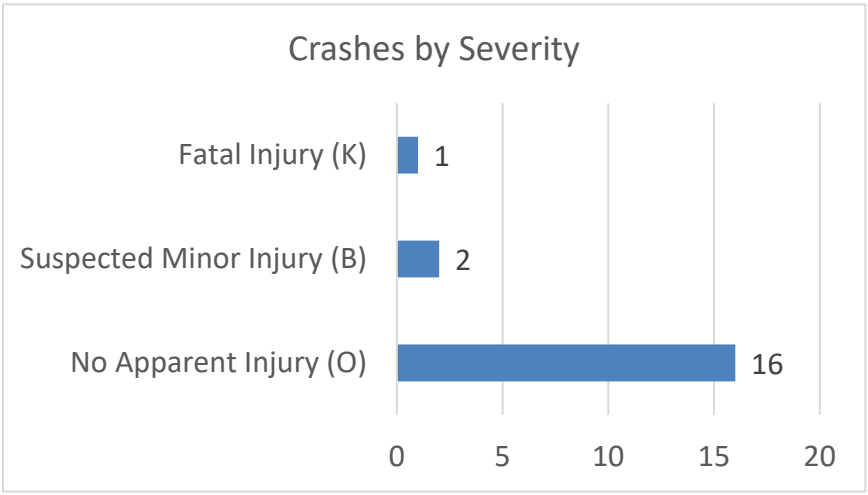
- Majority of crashes are not applicable or angle, indicating crashes were the result of a collision with a fixed object

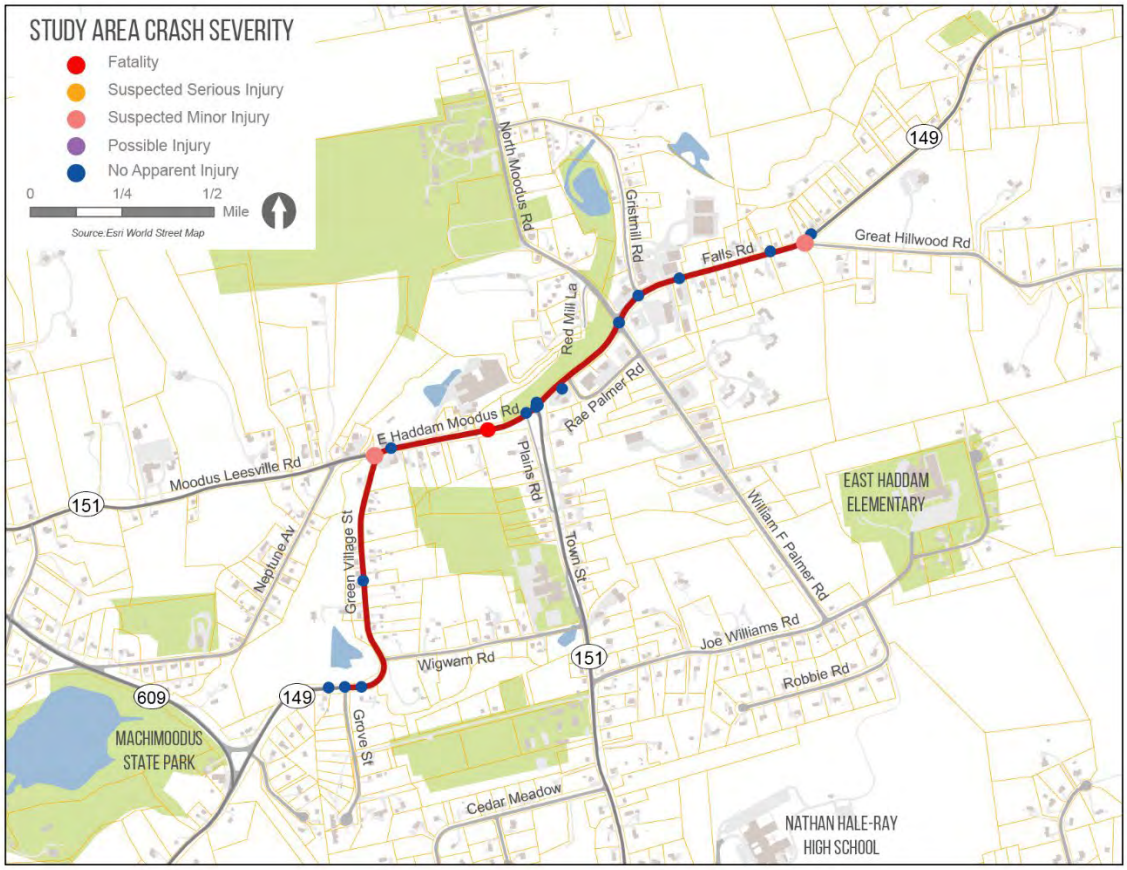




East Haddam Road Safety Audit Crash Summary - Crash Severity

- Majority of crashes (16) are classified as No Apparent Injury- Property Damage Only
- There were 2 crashes resulting in a minor injury
  - 1 fatality was reported in the past 5 years, Note – Fatality was westbound motorcyclists who hit deer west of North Moodus Road





East Haddam Road Safety Audit - Post Audit Discussion Guide

Safety Issues:

- Confirmation of safety issues identified during the pre-audit meeting and the walk audit

Potential Recommendations to Address Issues:

- **Short Term Recommendations**

- **Medium Term Recommendations**

- **Long Term Recommendations**

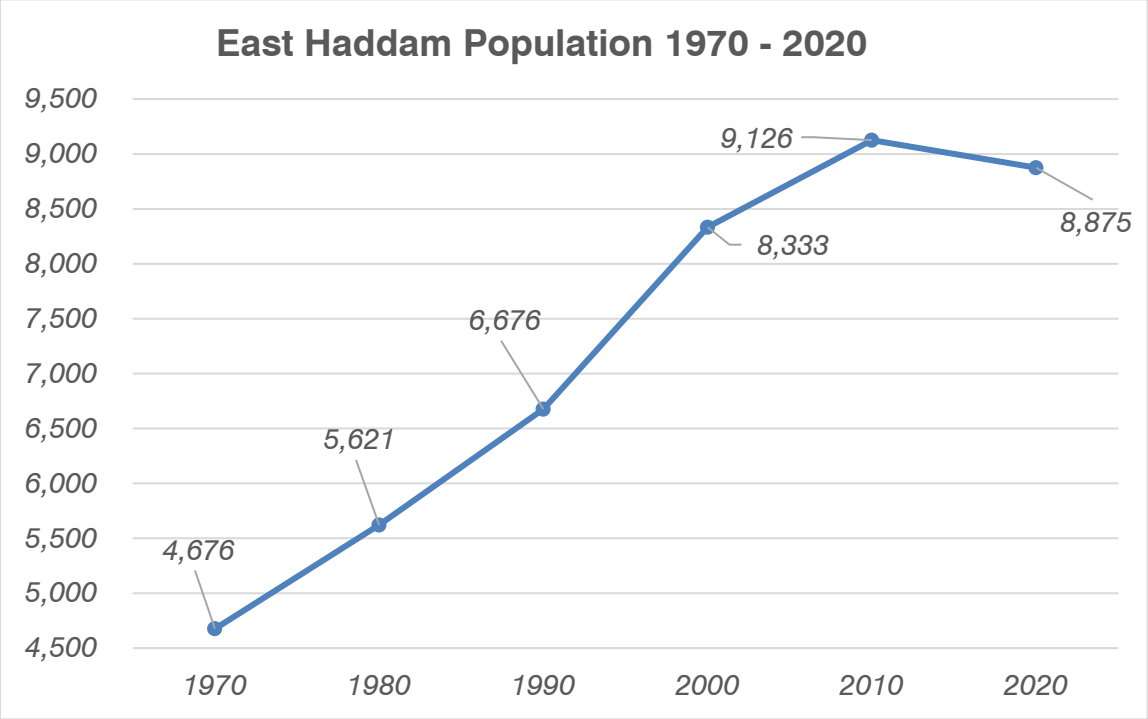
Next Steps

- Discussion involving implementation strategies and responsibilities and funding sources

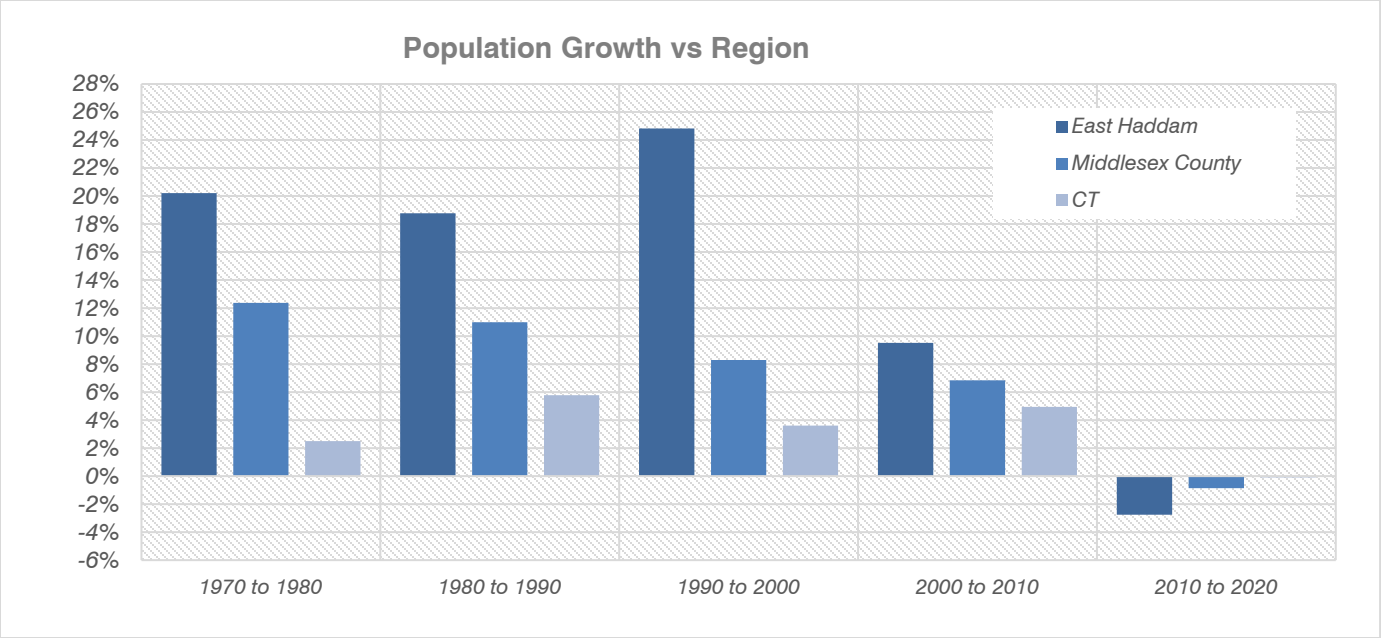
East Haddam Road Safety Audit – East Haddam Fact Sheet

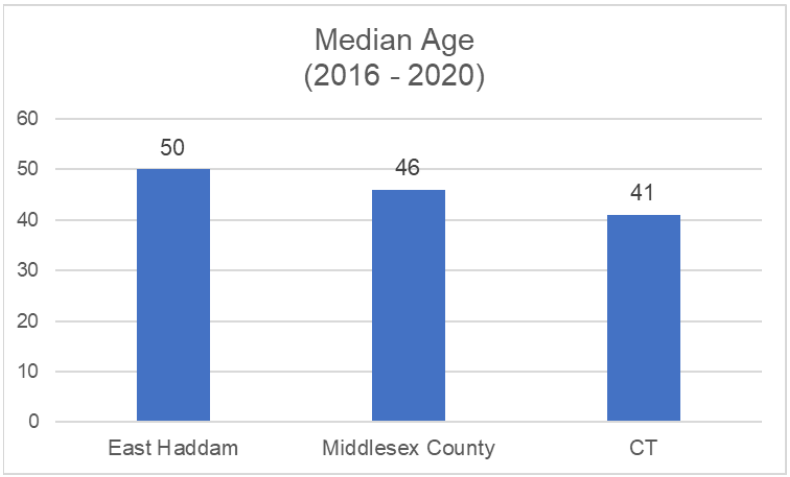
Demographic Highlights[1]:

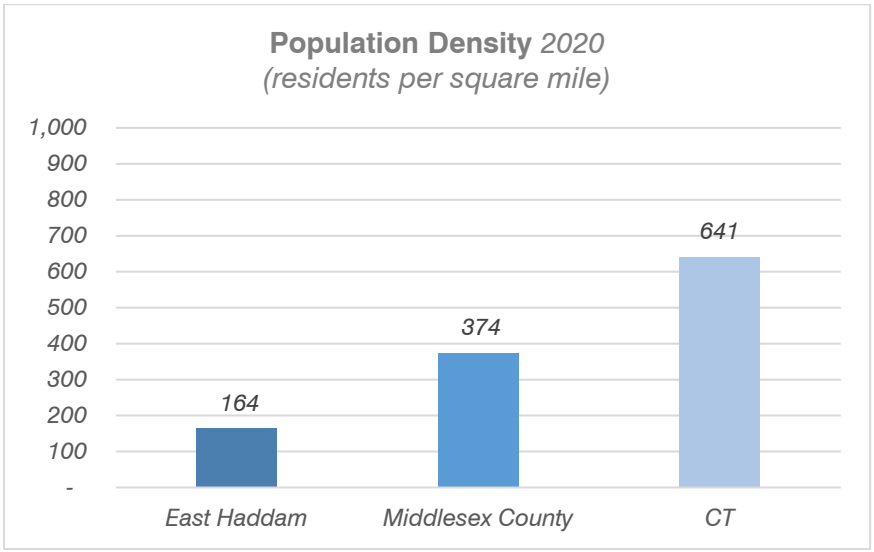
- Total population in East Haddam is 8,875
- East Haddam saw growth between 1970 and 2010. East Haddam, Middlesex County, and the State all declined in population between 2010 and 2020.
- There are approximately 164 residents per square mile in East Haddam, making it less densely developed than Middlesex County and much less dense than the State as a whole.
- The median age in East Haddam is 50. Middlesex County's median age is 46 and the State's is 41 years old.



[1] 2020 Decennial Census and 2016- 2021 American Community Survey, 5- year estimate table DP05, Accessed on 05/19/2023 at https://data.census.gov/cedsci/


Population Growth vs Region
28%
26%
24%
22%
20%
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
-2%
-4%
-6%
East Haddam
Middlesex County
CT
1970 to 1980
1980 to 1990
1990 to 2000
2000 to 2010
2010 to 2020

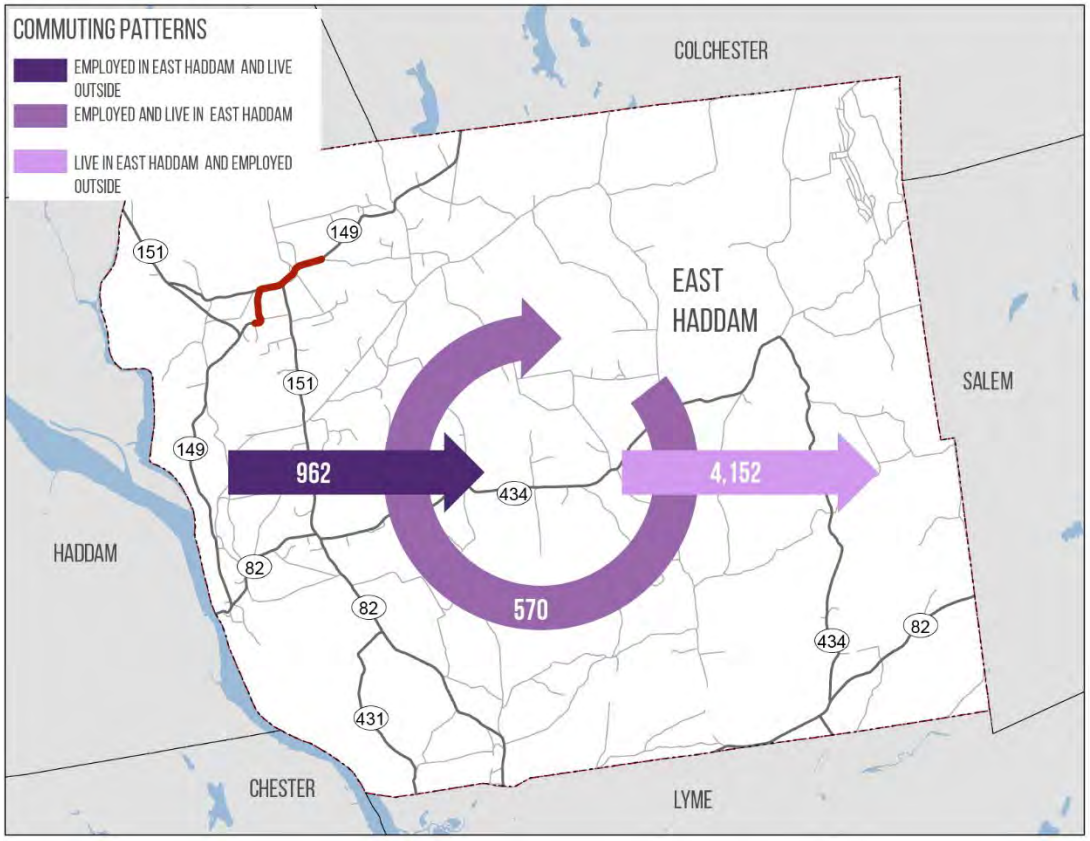

Median Age
(2016 - 2020)
60
50
40
30
20
10
0
50
46
41
East Haddam
Middlesex County
CT


Population Density 2020
(residents per square mile)
1,000
900
800
700
600
500
400
300
200
100
-
164
374
641
East Haddam
Middlesex County
CT

East Haddam Road Safety Audit – East Haddam Fact Sheet

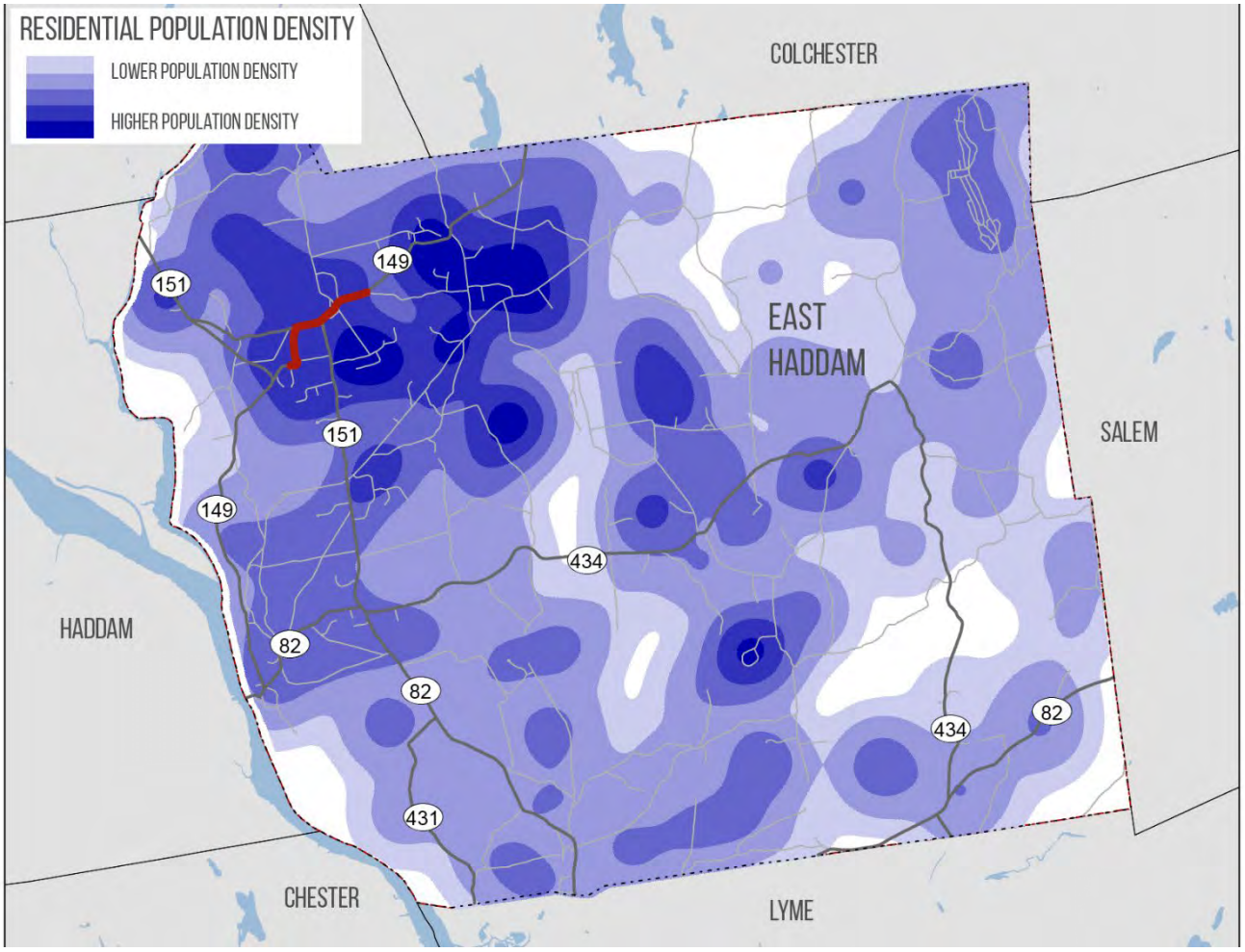
Employment Highlights[2]:

- There were approximately 962 workers commuting into East Haddam for employment in 2019. Approximately 570 residents of East Haddam are also employed in East Haddam and 4,152 East Haddam residents commuted out of town for employment. (2019)
- The top five employment destinations for East Haddam's residents include:
    - Hartford
    - Middletown
    - East Hartford
    - New Haven
    - Groton
- The Study Area and surrounding neighborhoods have a medium population density. The Study Area is home to a variety of uses including residential neighborhoods, commercial uses, East Haddam's municipal campus, access to the High School and Elementary School



[2] U.S. Census Bureau. (2021). LEHD Origin-Destination Employment Statistics (2002-2019) All Jobs. Washington, DC: U.S. Census Bureau, Longitudinal-Employer Household Dynamics Program, accessed on May 19, 2023 at https://onthemap.ces.census.gov. LODES 7.5

Residential Population Density



East Haddam Road Safety Audit – Roadway Functional Classification

- State roadways in the Study Area are collector roadways