CHESTER ROAD SAFETY AUDIT

ROUTE 154 (MIDDLESEX TURNPIKE) AND ROUTE 148 (FERRY ROAD, WATER STREET, W. MAIN STREET)

CONNECTICUT DEPARTMENT OF TRANSPORTATION 125 1895 - 2020

CHESTER CONNECTICUT

COMMUNITY connectivity program

FHI studio

MARCH 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.

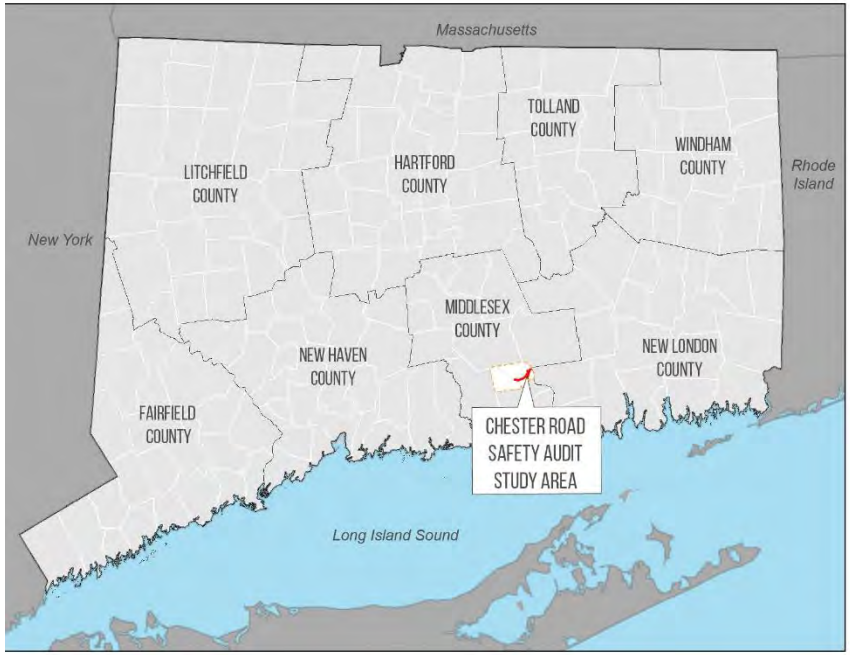
Prior to the site visit, area topography, land use characteristics, intersection sight distance concerns, sidewalk locations, parking, and bicycle facilities are examined using available mapping and imagery. The site visit includes a "Pre-Audit" meeting, the "Field Audit" itself, and a "Post-Audit" meeting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

1.2 Chester RSA Study Area and Location

CTDOT sponsored an RSA for the Town of Chester for Route 154 (also known as the Middlesex Turnpike) between Kings Highway and Main Street and for Route 148 (also known as Ferry Road, Water Street, or West Main Street in the study area) between the Chester-Hadlyme Ferry on the Connecticut River and Hoop Pole Hill Road. The study area also includes a review of the intersection of Route 148 at Route 145 (also known as Winthrop 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: A map of the Chester RSA location in context to the region



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 functions primarily as connector roads for neighboring towns to Route 9, and both Route 154 and Route 148 are classified as collector roadways. Route 148 connects to the town of Lyme via a ferry across the Connecticut River at the southern edge of Gillette Castle State Park. See Exhibit 3 for points of interest located along the corridor.

Route 154 and Route 148 are major collectors in the study area, while Route 9 is classified as an expressway. Route 154 connects Chester to points north and south of the study area, while Route 148 connects Chester to points east and west. The study area has some sidewalks and crosswalks throughout but there exist some gaps in the sidewalk network. These gaps in the pedestrian network are despite RSA participants noting that the study area is utilized by pedestrians in all parts of the study area. There is no designated signage or facilities for cyclists to utilize along study area roadways.

Average Daily Traffic (ADT) in the study area ranges between 4,100 vehicles per day and 5,300 per day along Route 154 and between 200 vehicles per day (near the Connecticut River) and 5,000 vehicles per day (west of Route 9) along Route 148.

Exhibit 4 displays daily traffic in the study area. There are two signalized intersections in the study area, at the intersection of Route 148 and Route 154 and the intersection of Route 154 and Kirtland Terrace at the entrance to the Chester Fairgrounds. There is an all-way stop controlled intersection at the intersection of Route 148 and Main Street in Downtown Chester. All other intersections are two-way stop-controlled with Route 148 or Route 154 having the right-of-way.

Exhibit 2: The Chester RSA study area

Exhibit 3: Study area points of interest

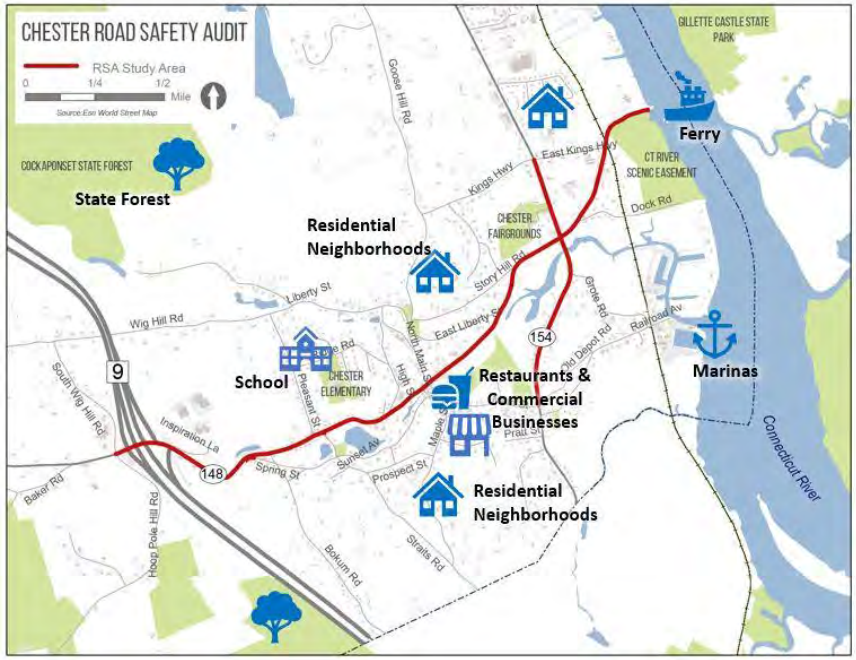
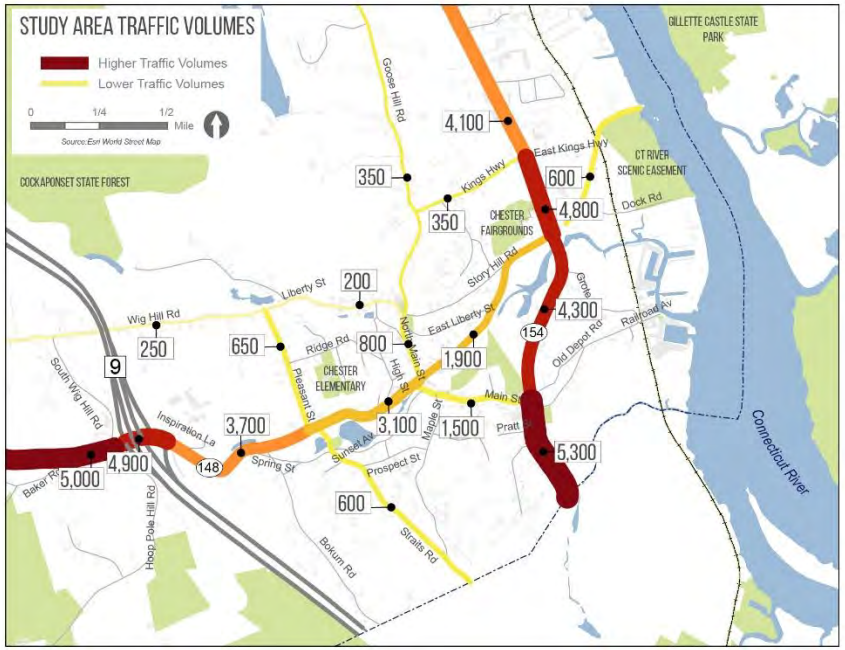


Exhibit 4: Average daily traffic volumes



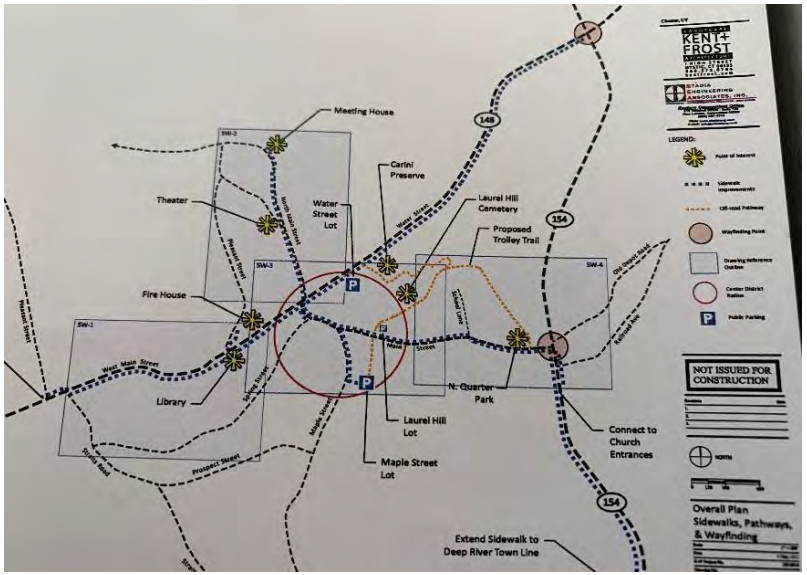
2 PRIOR EFFORTS IN STUDY AREA

2.1 Chester Village and Center District Master Plan

Streetscape improvements have been recently completed in the downtown area as a result of a comprehensive planning effort which culminated in the Chester Village and Center District Master Plan published in 2013. This plan included recommendations for pedestrian facilities through much of the study area in this RSA as well as decorative and wayfinding elements to be included. The Plan recommends sidewalks on Route 148 between Pleasant Street and Route 154; however, these have not been built as of the RSA Audit. Exhibit 5 shows a recently completed section of streetscape in the Village Center as well as original planning documents. Find the plan here: https://www.chesterct.org/sites/g/files/vyhlif8561/f/uploads/chester-master-plan-2013.pdf

Exhibit 5: A photo from downtown Chester showing the streetscape improvements on the left, and a section of the proposed plan on the right

Exhibit 6: Sidewalks Plan for the Chester Village and Center District Master Plan



2.2 RiverCOG Bicycle and Pedestrian Master Plan

The RiverCOG Bicycle and Pedestrian Master Plan, completed by the region in 2022, is a comprehensive look at bicycle and pedestrian needs in the 17-town region. The plan identifies priorities for bicycle and pedestrian infrastructure at a regional level. This plan identified several planning priorities relevant to this RSA, including:

- A proposed regional greenway with river access along the Connecticut River. The plan identifies a potential trail alignment along the Valley Railroad State Park north of Eagle Landing State Park / Route 82 in Haddam. North of this area the railroad is not in active use.
- Connecting the Village with other nearby assets primarily with sidewalks, shared roadways, and advisory shoulders
- Connect Chester and Deep River with a sidewalk on Route 154

Exhibit 7 shows an overview of trail connections proposed in the region. Find the plan here:

https://www.rivercog.org/wp-content/uploads/2022/06/RiverCOG_BikePed_May2022Final.pdf

Exhibit 7: Proposed and existing regional trail connections from the RiverCOG Bicycle and Pedestrian Plan.

Regional Greenways and Trails

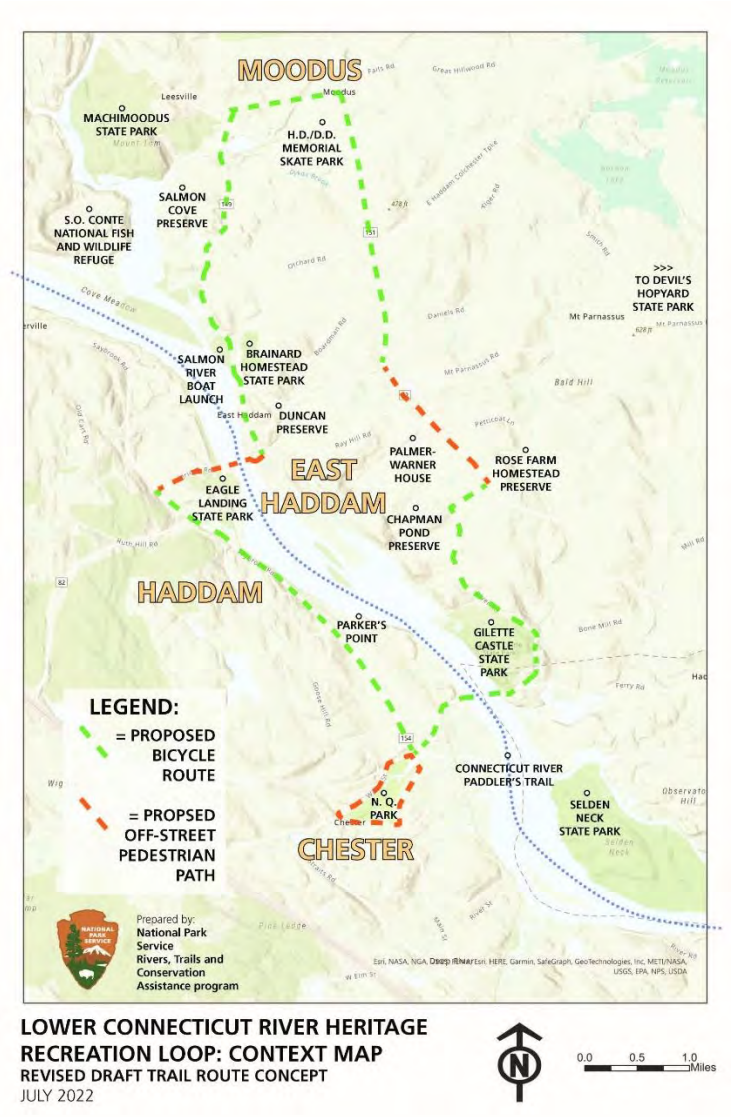
2.3 2022 Chester Town-Wide Bicycle/Pedestrian Path Survey

In 2022, the town of Chester conducted a Bicycle/Pedestrian Path Survey to solicit feedback and opinions on bicycle and pedestrian facilities in Chester. The survey consisted of 23 questions that sought to gauge recreational walking and biking habits in the town of Chester. The survey received 406 on-line responses and 16 paper survey response (totaling 422 responses) and numerous comments and feedback on the state of pedestrian and bicycle facilities, level of comfort, and frequency of use in the town. 83% of respondents stated that they would walk, jog, or run more frequently if sidewalks or pathways in Chester were inter-connected. The survey also found that many respondents would like to see additional crosswalks in many areas included in the RSA study area, with the most respondents desiring a crosswalk between Pleasant Street and Straits Road (44% of survey respondents).

2.4 Lower Connecticut River Heritage Recreation Loop

Recently the Town of Chester has been in coordination with the Towns of East Haddam, Haddam, and Moodus, as well as the Connecticut Landmarks organization and the National Park Service – Rivers, Trails and Conservation Assistance Program to create a vision of an 18-mile pedestrian and biking trail. The vision would include both on-street and off-street sections. Off-street areas identified in this plan include the East Haddam Swing Bridge Project, Route 82 in East Haddam, and a small loop along Route 148 (Water Street), Route 154 (Middlesex Turnpike) and Main Street surrounding the freshwater tidal wetlands in this area and North Quarter Park. A map of the vision of this plan is presented in Exhibit 8. More information here: https://ctlandmarks.org/east-haddam-connectivity-project/

Exhibit 8: An overview map of the proposed Lower Connecticut River Heritage Recreation Loop (Source: Connecticut Landmarks)



2.5 East Haddam Swing Bridge Improvements

Efforts to rehabilitate the East Haddam Swing Bridge are currently underway and expected to be completed by the end of 2024. This bridge is located approximately 3-miles north on Route 154 from the intersection of Route 148. It is expected that there will be several closures during construction. These closures may lead to a temporary shift in traffic patterns in the area and could lead to additional demand for the Chester-Hadlyme Ferry. Additionally, the bridge project will install a new sidewalk cantilevered on the south side of the bridge. More information here: https://easthaddamswingbridgeproject.com/

Exhibit 9: The East Haddam Swing Bridge (Source: CHA Consulting)

3 PRE-AUDIT MEETING

3.1 Pre-Audit Information

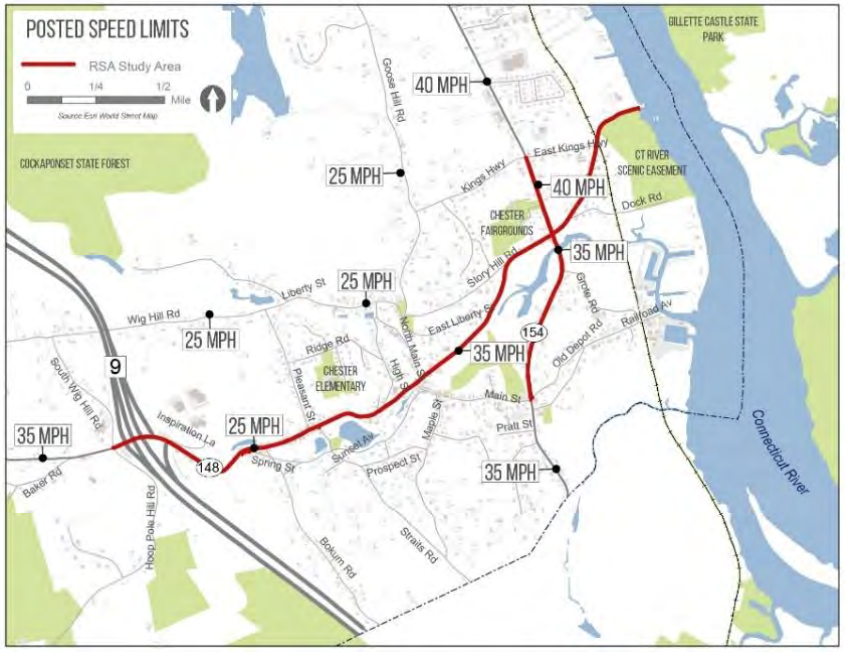
The RSA team conducted a pre-audit meeting in the afternoon of Wednesday, November 2, 2022. The RSA team presented a brief presentation that included an overview of the Chester RSA goals and purpose, the study area, and key existing conditions findings. Key themes discussed during the pre-audit meeting are presented below.

Speeds: Speed limits in the study area range between 35 to 40 miles per hour (mph) along Route 154, and 25 to 35 mph along Route 148. On Route 148, the 25 mph zone is located between the Route 9 northbound exit ramp and Main Street. In the neighboring residential areas, the speed limit is 25 to 30 mph. Exhibit 10 displays speed limits in the study area.

85th percentile speeds vary from 33.8 mph to 53.9 mph on Route 148 within the study area with the highest speeds found near the Route 9 ramps. In this area 85th percentile speeds range from 44.4 mph to 53.9 mph. 85th percentile speeds near Downtown Chester west of Main Street were recorded at 33.8 mph, while 85th percentile speeds between Main Street and Route 154 were recorded at 38.9 mph. Between Route 154 and the Connecticut River, 85th percentile speeds ranged between 34.9 mph and 41.2 mph.

85th percentile speeds for Route 154 were found to be between 43 and 44 mph for all three stations evaluated within the study area.

Exhibit 10: Study area speed limits

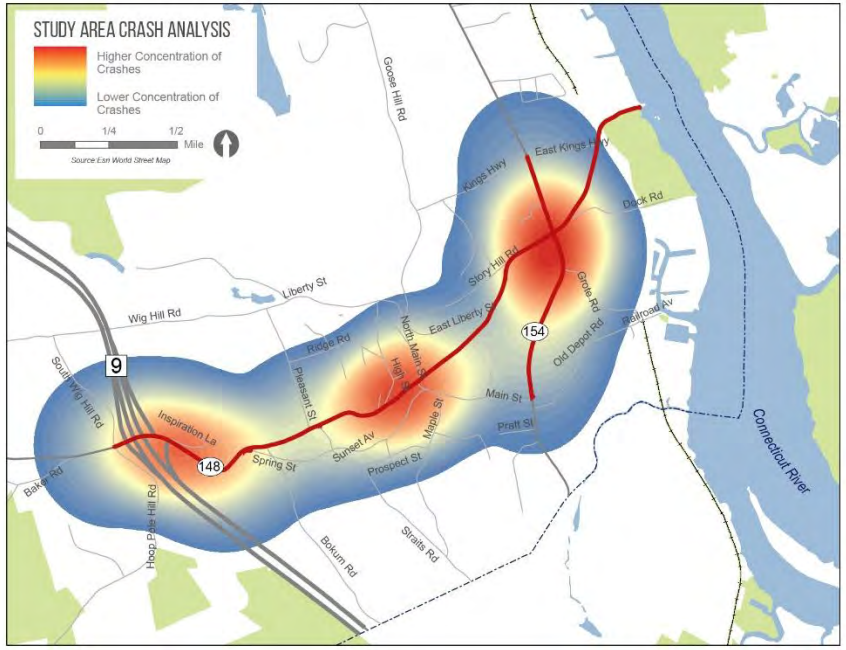


Crashes: Based on data retrieved from the Connecticut Crash Data Repository (CTCDR) for the five-year period between January 2017 through December 2021, there were a total of 39 crashes in the Chester RSA study area. Crashes were concentrated at the intersection of Route 154 and Route 148, on Route 148 between Main Street and High Street, and on Route 148 near the Route 9 interchange and to the area immediately to the east of this interchange. Exhibit 11 displays the study area crash summary and Exhibit 12 displays a study area crash heatmap.

Exhibit 11: Study area crash summary

Year	Fatality	Serious Injury	Minor Injury	Possible Injury	Property Damage Only	TOTAL
2017			1	1	5	**7**
2018			1	3	11	**15**
2019				1	4	**5**
2020			1		4	**5**
2021				1	6	**7**
TOTAL	**0**	**0**	**3**	**6**	**30**	**39**

Exhibit 12: Study area crash heatmap



Crashes by Type: The majority of crashes (16 out of 39) are classified as having a "not applicable" manner of impact, which most commonly indicates single vehicle crashes and are indicative of crashes where motorists veered off the road, ran into a fixed object, etc. The rates of all other crash types were low, with the other 23 crashes being distributed between angle, front to front, sideswipe, and front to rear crashes. Exhibit 13 and Exhibit 14 display the location and breakdown of crashes by type in the corridor.

Exhibit 13: Crashes by type

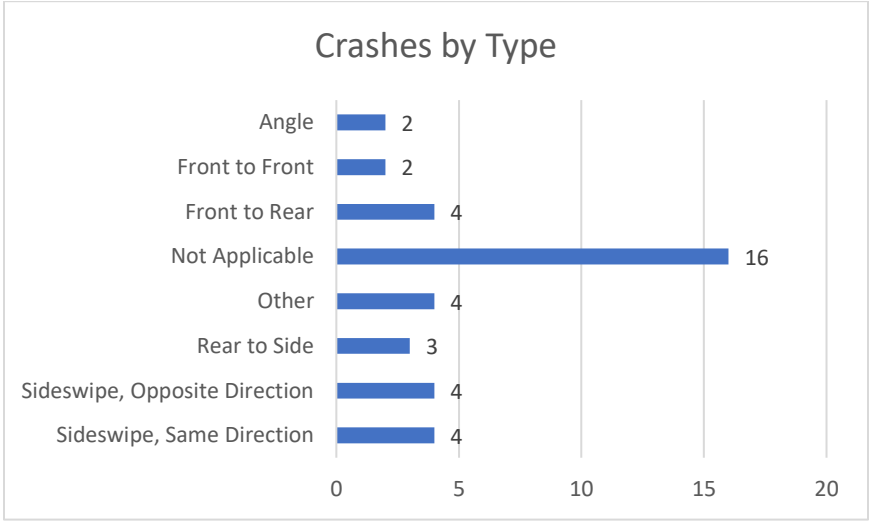
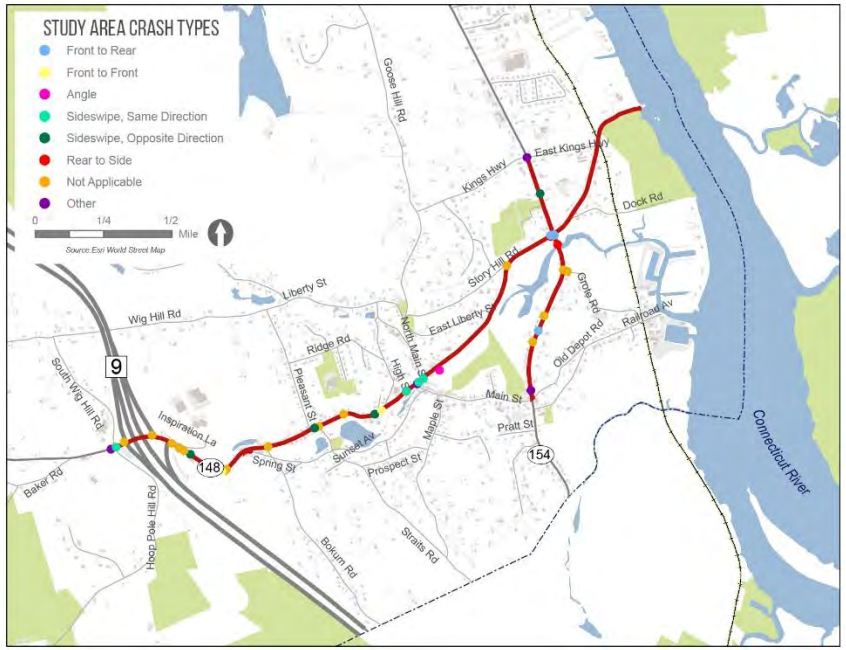


Exhibit 14: Crashes by type by location



Crash Severity: There were nine crashes resulting in injury in the study area, with six possible injuries and three minor injury crashes. Of the 39 crashes, 76 percent (30 out of 39) of crashes resulted in property damage only, which is typical for single vehicle and front to rear crashes that are prevalent in the study area. Four of these crashes which resulted in injury occurred on Route 148 between Hoop Pole Hill Road and Spring Street, while another four crashes resulting in injury occurred on Route 154 between Main Street and Route 148. Exhibit 15 and Exhibit 16 shows a summary of total crashes by severity and crash severity by location.

Exhibit 15: Crash severity summary

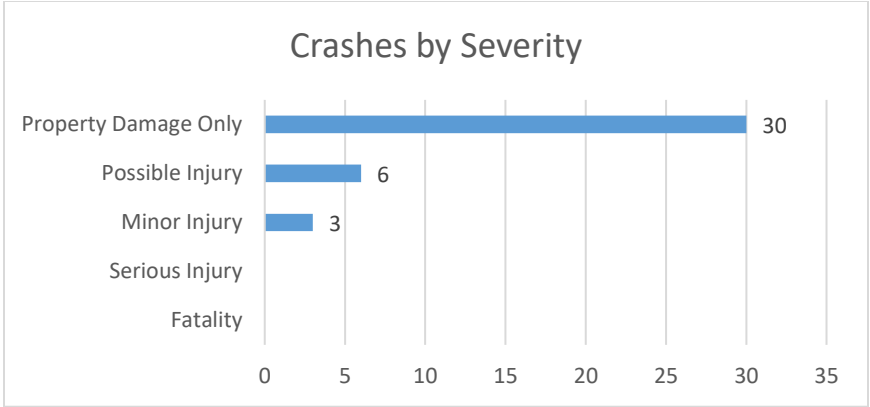
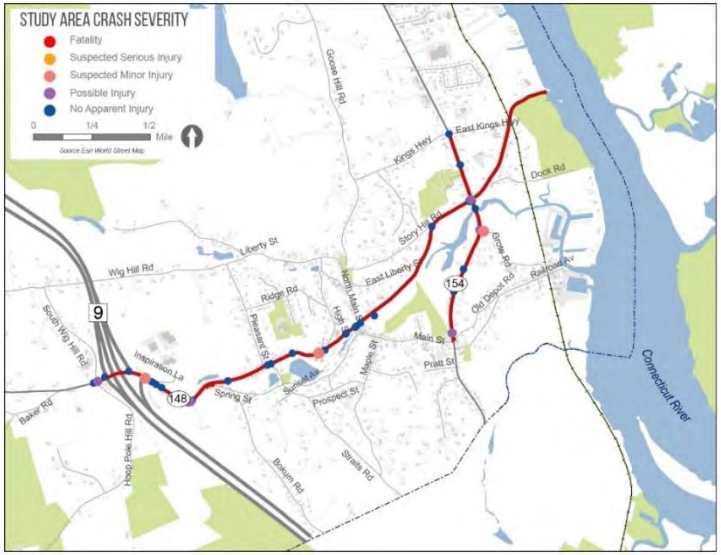


Exhibit 16: Crash severity by location



Crashes by Involved Person: There were no recorded crashes in the Chester RSA study area involving a bicyclist or a pedestrian.

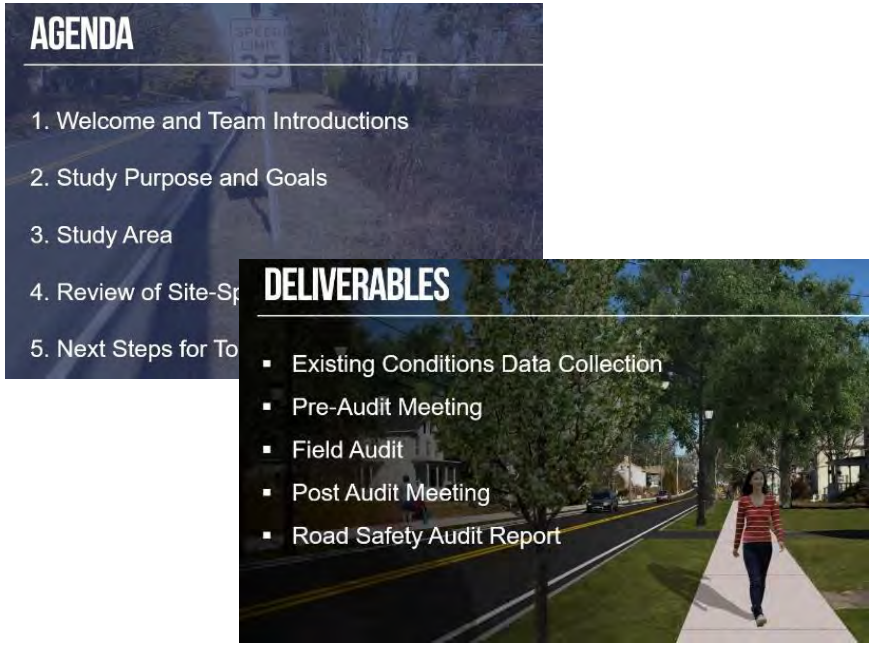
3.2 Pre-Audit Discussion

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

- The Chester Economic Development Commission (EDC) is working with the EDCs in the towns of East Haddam and Haddam, along with the National Park Services, to potentially realize the proposed 18-mile Lower Connecticut River Heritage Recreation Bicycle-Pedestrian Loop (Trail).
- Pedestrian path will be included in the upcoming East Haddam Swing Bridge work. In the meantime, during construction, detour routes will include utilization of the Chester-Hadlyme ferry.
- The 2013 Main Street Master Plan did include plans for sidewalks connecting W. Main St. to Pleasant St. to Ridge Rd. for safe passage for children to the Chester Elementary School, and throughout a large section of the study area as well.

Sample slides from the pre-audit presentation are shown in Exhibit 17.

Exhibit 17: Sample slides from pre-audit presentation



4 RSA ASSESSMENT

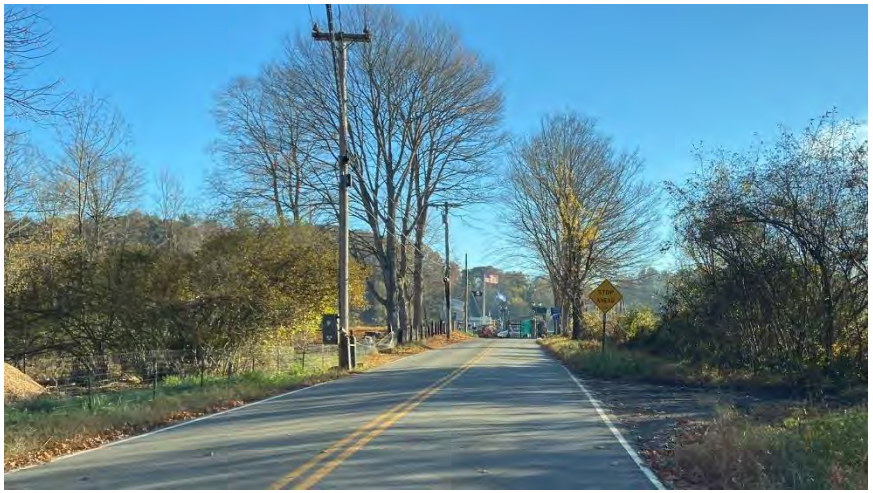
The following summary describes observations and discussion regarding issues and concerns throughout the Chester RSA study area. Exhibit 18 shows RSA participants engaging in conversation during the RSA. Discussions were held at each of the noted locations below.

Exhibit 18: RSA participants during the RSA assessment date

4.1 Route 148 between Route 154 and the Connecticut River

- The RSA team did not tour this area but discussed this segment. This segment connects to the Chester-Hadlyme ferry across the Connecticut River and is well used in summer months by bicyclists and pedestrians. Exhibit 19 shows this area.

Exhibit 19: Route 148 looking east towards the Connecticut River



4.2 Intersection of Route 154 and Route 148

- Traffic signal was upgraded in 2022. Per discussion with RSA attendees, bicycles are not detected when traversing the intersection on Route 148 and requires that bicyclists push the push button. This can be problematic as there is heavy bicycle traffic on Route 148 at times with the ferry.
- Pedestrian push button signals are difficult to access while walking or biking, due to overgrown plants and the presence of a guardrail in front of the push button on the far side. Exhibit 20 shows the pedestrian push buttons in this location.
- Pedestrian landings are missing from this intersection. These could be difficult to install due to tidal wetlands. Additionally, there are no marked crosswalks nor pedestrian countdown signal heads.

- Signal timings should be reevaluated. RSA attendees noted there were extended delays for Route 148 waiting vehicles. Exhibit 21 shows this intersection.

Exhibit 20: Difficult to access pedestrian push buttons

Exhibit 21: Route 154 looking south through the intersection with Route 148

4.3 Route 154 between Route 148 and Main Street

- This stretch of Route 154 is heavily used by recreational cyclists traveling to and from Deep River and Haddam.
- Route 154 shoulder width is narrow as the elevation increases south of Grote Road, making it challenging for cyclists to navigate the hill with traffic. The shoulder width on the downhill side appears wider.
- RSA participants noted that they would like to see a shared use pathway in this area on Route 154. RSA participants expressed interest in a loop via Route 148, Route 154, and Main Street. It was noted that steep elevations and potentially narrow ROW on Route 154 could pose a challenge to the feasibility of such facility. Exhibit 22 shows this area.

Exhibit 22: Route 154 looking south past Grote Road

4.4 Route 154 between Route 148 and Kings Highway

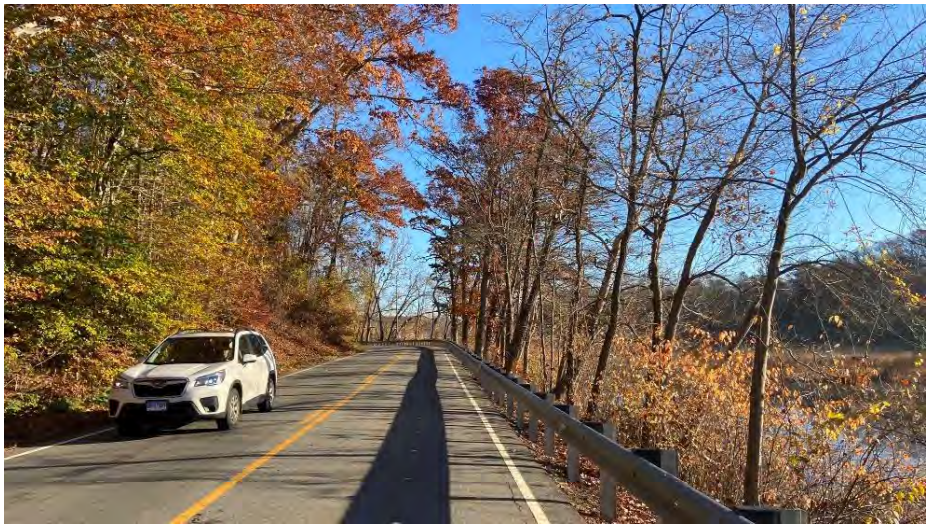
- This area includes a traffic signal at Kirtland Terrace which is used to access the fairgrounds. However, when the fair is not in session, this traffic signal sees limited traffic. Exhibit 23 shows the intersection.
- RSA participants noted that pedestrians sometimes cross at Kings Highway to East Kings Highway for a walking route to the river. This location does not have a signal or a crosswalk, however.

Exhibit 23: Route 154 looking south towards the intersection with Kirtland Terrace

4.5 Route 148 between Route 154 and Main Street

- Route 148 is a collector roadway and provides access from the downtown area and Route 154 and the ferry. In this area it is bounded by wetlands to the south and steep slopes in some sections to the north.
- There are no sidewalks or bike facilities along this stretch of roadway. There are narrow shoulders in this area. Exhibit 24 shows this area.
- Due to limited parking in the downtown area, some people park along Route 148 in this area and walk along the roadway to the downtown area.
- RSA participants noted heavy recreational bicyclist and pedestrian (walkers and runners) traffic in this area and along Route 148 as a whole. This area is very difficult to see bicyclists and pedestrians at times as there are areas with sharp corners. The limited shoulder width also means that bicyclists and pedestrians often travel in the travel lane.
- RSA participants expressed a strong desire to have infrastructure to support safe passage for cyclists and pedestrians in this area between downtown and Route 154.

Exhibit 24: Route 148 between Main Street and Route 154



4.6 Route 148 between Main Street and High Street

- This is a residential area with narrow travel lanes, and sidewalks present in portions of the corridor. The sidewalk between the library and Main Street should be reconstructed and elevated such that it is above roadway grade. See Exhibit 25.
- The existing crosswalk at Chester Public Library should be improved. Currently it has steps on the south side of the crosswalk and leads to a rock wall on the north side of the crosswalk. See Exhibit 26. Potential for pedestrian improvements at High Street, through the installation of RRFB's, sidewalks, and new crosswalks. Exhibit 27 shows the current unsignalized intersection.
- High Street alignment can be confusing and has a utility pole in the middle of the intersection. A utility relocation and intersection realignment could be explored. See Exhibit 27.

Exhibit 25: Sidewalk and curbing in poor condition west of Main Street

Exhibit 26: Existing pedestrian crossing at Chester Public Library

Exhibit 27: The intersection of High Street and Route 148.

4.7 Route 148 between High Street and Straits Road (including the Reverse Curve / S-Curve)

- The sidewalk network ends in this area as it approaches Jennings Pond due to narrow right of way and steep grades, shown in Exhibit 28. This leads to a safety issue for pedestrians walking in this area. Many pedestrians cross from the sidewalk located on the south side to the shoulder on the north side as the north side has more space for pedestrians. This crossing pattern is shown in Exhibit 29. However, this leads to visibility concerns especially for westbound vehicles as they cannot see behind the hill on the inside of the curve. Furthermore, pedestrians do not cross further to the east (closer to High Street) since the shoulder is narrow in front of 30 West Main Street near the curve. Refer to Exhibit 31 for an example of the limited visibility for westbound vehicles and for the limited shoulder on the north side of the roadway.
- Narrow shoulders continue on Route 148 west of Jennings Pond with pedestrians using grassy shoulders walk. Also, residents frequently park in this area as well.

Exhibit 28: End of sidewalk (obscured by leaves) along Route 148 (West Main Street) past the Chester Public Library.

Exhibit 29: Pedestrians frequently cross Route 148 in this area. (Source: Jon Joslow)

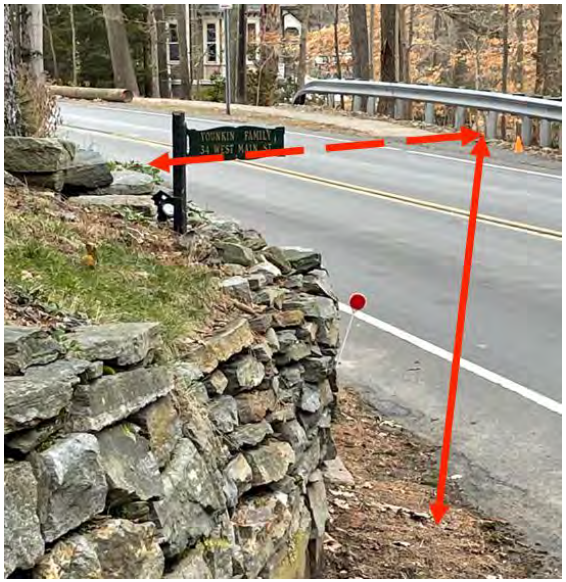


Exhibit 30: View of Route 148 reverse curve looking on Route 148 westbound. Note the limited visibility around the curve, and the limited shoulder width on the northern side of the roadway. (Source: Google Maps)

Exhibit 31: View of the Route 148 reverse curve looking on Route 148 eastbound. Note the better visibility in this direction. (Source: Jon Joslow)

4.8 Route 148 at Straits Road and Pleasant Street

- No pedestrian or bicycle facilities currently exist along this stretch of roadway. RSA participants shared concerns with visibility for bicyclists and pedestrians in some areas of Route 148 with sharp curves. Exhibit 32 shows Route 148 facing east.
- Residents expressed a desire for improved sidewalks in this area to serve as connections to Chester Elementary School to the north on Pleasant Street and additionally west on Route 148 to the entrance of Route 9.
- A safe pedestrian crossing between Pleasant Street and Straits Road would benefit pedestrians traveling north and south on these roadways. Additionally, a crosswalk here could allow for pedestrians on Pleasant Street to access Chester Center via Spring Street while a sidewalk is funded, designed and constructed along Route 148. Spring Street is a lower traffic street and is generally a more comfortable for pedestrians to walk. However, this route would be approximately 600 feet longer than a preferable direct connection with a sidewalk on Route 148 (3,200 feet via Spring Street versus 2,600 feet via Route 148 as measured between Chester Center and the intersection of Route 148 and Straits Road).

Exhibit 32: Route 148 facing eastbound, toward Jennings Pond.

4.9 Route 148 between Pleasant Street and Hoop Pole Hill Road

- The sidewalk on the north side of Route 148 ends about 500 feet to the west of Pleasant Street. Exhibit 33 shows a person walking on Route 148 after the sidewalk ends.
- The S-Curve to the east of Inspiration Lane was revealed in the crash analysis as one of the hot spots in this study area. Horizontal curve signage appears older and can be reviewed. Visibility to some signage is constrained due to vegetation overgrowth. Crossing over the double-yellow centerline in this curve area was observed.
- Travel lanes in the interchange area are wide.
- Crash analysis revealed hot spots in the area of Route 148 and the Route 9 northbound exit ramp. RSA participants noted that vegetation and signage limit the visibility between exiting vehicles and through traffic on Route 148. Refer to Exhibit 34.

Exhibit 33: A person walks west on Route 148 near Bokum Road

Exhibit 34: A view from the Route 9 northbound exit ramp looking west. Note that signage and vegetation could impact visibility between exiting vehicles and through traffic on Route 148. (Source: Google Maps)

4.10 Route 148 at Route 145

- RSA participants noted visibility concerns to stop-signs for motorists approaching this intersection northbound on Route 145, particularly at nighttime. Exhibit 35 shows this approach.
- The southwest corner of this intersection flares out and has a lot of pavement area.

Exhibit 35: Looking northbound on Route 145 towards the intersection of Route 148

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. Additionally, the report presents a conceptual plan for the area of the intersections of Route 148 and Pleasant Street and Straits Road. This location was selected due to the nature of recommendations in this area. Depiction of this area with a conceptual plan does not reduce the importance of other areas identified in this report and does not indicate that this area is of higher priority than other recommendations in this report.

All recommendations for all locations are divided into short-term, medium-term, and long-term recommendations.

- Short-term recommendations: These are improvements that are simpler and could be completed on a quick timeline. These recommendations are low-cost alternatives 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. These projects are defined as those that may be complete within two years.
- Medium-term recommendations: These are improvements that may require more substantial engineering than those generally included as short-term recommendations. These may require establishment of funding in capital improvement plans, or a dedicated funding item. However, these recommendations are generally simpler than long-term recommendations and generally do not include ROW acquisition etc. These projects are defined as those that may be completed in two-to-five years.
- Long-term 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. These projects are defined as those recommendations that may take five years or longer to complete.

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 Chester Local Traffic Authority (Chester First Selectperson).

Exhibit 36 displays the recommendations of the overall study area on a map. Exhibit 43 displays the long-term recommendations for the intersections of Route 148 at Straits Road and Pleasant Street.

LEGEND

- Short-term Recommendation
- Medium-term Recommendation
- Long-term Recommendation

N

Install crosswalk, ADA ramps, and recommended signage at the intersection of Route 154 and Kings Highway

Consider installing crosswalk and pedestrian push buttons on north side if bicycle detection is not feasible.

Consider sidewalks in this area

Install bicycle sharrows

Install bicycle warning sign (W11-1) with "In Lane" plaque (W16-1P (CT))

Request reduction of speed limit to 30 mph from OSTA

Install ADA curb ramp, stripe crosswalk and install countdown pedestrian signal heads with Leading Pedestrian Interval. Reposition pedestrian push buttons as necessary.

Consider limited roadway widening to allow for wider shoulders or bike lane in eastbound direction. Refer to RSA text for dimensions.

Review and retime signal as necessary

Consider adding detection for cyclists on Route 148

Narrow travel lanes to 10-ft. Conduct traffic count to confirm conformance with CTDOT Highway Design Manual. Install bicycle sharrows.

Narrow travel lanes on Route 154 to 11-ft. Provide similar shoulder widths on both sides

Consider sidewalk on Route 148 between Bokum Road and Cedar Lake Road.

Install bicycle warning sign (W11-1) with "In Lane" plaque (W16-1P (CT))

Consider limited roadway widening on Route 154 to allow for 11-ft travel lane with 5-ft bike lanes in each direction.

Consider rotating dynamic speed feedback sign in this area

Clear vegetation and reposition signage as needed at Route 9 northbound exit ramp to improve sight lines.

Consider removing passing areas on Route 148 (Water Street)

Explore multi-use trail on Route 154 or adjacent north-south corridor between Haddam, Chester, and Deep River

Install bicycle warning sign (W11-1) with "In Lane" plaque (W16-1P (CT))

Stripe stop bar and add stop sign assembly for westbound right-turn to North Main Street.

Narrow travel lanes to standard 11-ft width. Consider installing buffered bike lane in this area in extra shoulder width

Consider realignment of High Street and Pelton Hill Road, particularly if north side sidewalk is pursued.

Consider proposed Trolley Trail in place of path on Route 148.

Review turning volumes and need for auxiliary turn lanes. If recommended, stripe left-turn lanes.

Initiate engineering design to evaluate sidewalk extension between High Street and Pleasant Street. Consider options for both sides of Route 148.

Install crosswalk, ADA ramps, and recommended signage at the intersection of Route 154 and Main Street. Consider RRFB. Construct sidewalk to Railroad Avenue.

Recommendations for intersection of Route 148 and 145 located in text

Recommendations in this area located in separate concept plan

Consider limited roadway widening to allow for 11-ft travel lane with 5-ft bike lanes in each direction.

Consider sidewalk and crosswalk at Bokum Road

Reconstruct sidewalk and curbing

Install bicycle sharrows.
Install signage at strategic locations

Remove steps to crosswalk and install ADA curb ramp. Consider RRFB. Consider constructing sidewalk to fire station.

Consider limited roadway widening to allow for 11-ft travel lane with 5-ft bike lanes in each direction.

Complete missing sidewalk gap between Pratt Street and Deep River town line

Review curvature and review horizontal curve signage and nighttime visibility

Review curvature and review horizontal curve signage and nighttime visibility

Explore additional strategies to transition vehicle speeds to 25 mph zone to east, including roundabout at one or more Route 9 ramps, median islands with horizontal deflection, and additional pavement markings such as optical speed bars or speed limit markings

Consider rotating dynamic speed feedback sign in this location on existing 25 mph speed limit signage in eastbound direction

Consider rotating dynamic speed feedback sign in this location on existing 25 mph speed limit signage in eastbound direction

Clear vegetation blocking existing signage

Coordinate with RiverCOG to initiate corridor study between Main Street and Cedar Lake Road.

Install bicycle sharrows.
Install signage at strategic locations

DEEP HOLLOW ROAD
WIG HILL ROAD
WEST MAIN STREET
HOOP POLE HILL ROAD
EAST KINGS HIGHWAY
MIDDLESEX TURNPIKE
FERRY ROAD
ACONK DRIVE
WATER STREET
STORY HILL ROAD
EAST LIBERTY STREET
NORTH MAIN STREET
HIGH STREET
MAIN STREET
OLD DEPOT ROAD
SPRING STREET
PROSPECT STREET
PRATT STREET
BERT HILL ROAD
RAILROAD AVENUE
9
148
154

CHESTER ROAD SAFETY AUDIT
CHESTER, CONNECTICUT

EXHIBIT 36: ROUTE 154 (MIDDLESEX TPKE) AND ROUTE 148 (FERRY RD/WATER ST/W MAIN ST) STUDY AREA RECOMMENDATIONS

DATE: 3/20/2023
SCALE: NTS
RECOMMENDATIONS

FHI studio

5.1 Route 148 between Route 154 and the Connecticut River

Route 148 is noted as a significant recreational bicycle and pedestrian route in summer months. Vehicular traffic is generally lower in this area of Route 148 compared to points further west in the study area. Traffic volumes could fluctuate in this area in the near-term on a temporary basis during planned closures of the East Haddam Swing Bridge during construction as the Chester-Hadlyme Ferry is a detour route. Bicycle sharrow pavement markings should be explored on this roadway to alert motorists to the higher bicycle activity in this area. In the long-term, sidewalks could be explored in this area.

Short-term

1) Install bicycle sharrow pavement markings at 250-foot intervals. Install markings 4-feet off edge line. See Exhibit 37 for an example of bicycle sharrow markings.

Long-term

1) Consider sidewalks in this area.

Exhibit 37: Bicycle sharrow markings on a rural road in Simsbury, CT (Simsbury Bike)

5.2 Intersection of Route 154 and Route 148

Recommendations at this intersection are focused on providing safe crossing of non-motorized users, as well as a review of signal operations which RSA participants noted that this results in longer vehicle delays for Route 148 vehicles.

Short-term

1) RSA participants noted that Route 148 vehicles wait longer than expected. Review and retime signal as necessary.
2) Consider adding detection for cyclists on Route 148. Currently, RSA participants noted that cyclists are not detected. As a result, bicyclists often either a) proceed through the intersection on the red signal, or b) dismount to push the pedestrian push button which are currently

difficult to access. CTDOT officials noted that cyclist detection may require some adjustments to detection settings.

Medium-term

1) Install ADA curb ramps, stripe crosswalk, and install countdown pedestrian signal heads and concurrent pedestrian phase with a Leading Pedestrian Interval (LPI). A LPI gives pedestrians a 4 second walk interval prior to start of concurrent green signal. Reposition pedestrian push button as necessary.
2) Consider installing pedestrian push buttons and ADA curb ramps and crosswalk on north side of the intersection as well if bicycle detection is not feasible. This addition would allow for westbound cyclists to call for green on Route 148 without needing to cross Route 148 to get to the existing pedestrian button on the southeast corner of the intersection.

5.3 Route 154 between Route 148 and Main Street

Recommendations in this area seek to improve the bicycling and pedestrian environment on this road with a narrowing of the travel lane width to CTDOT standard 11-feet and a redistribution of available shoulder width in both directions. This should be supplemented by further limited roadway widening in the long-term to allow for the installation of a standard 5-foot bike lane. Additionally, town and regional planning efforts have identified this corridor as a potential multi-use trail connection along the Connecticut River. This corridor should be explored as well as adjacent corridors such as the rail corridor, the river corridor among other options.

Short-term

1) Narrow travel lanes to 11-feet. Provide similar shoulder widths on both sides of the roadway.

Medium-term

1) Install crosswalk, ADA ramps, and recommended signage at the intersection of Route 154 and Main Street. Consider an RRFB at this location.

Long-term

1) Consider limited roadway widening to allow for 11-foot travel lane with 5-foot bike lane in each direction.
2) Explore multi-use trail on Route 154 or adjacent north-south corridor between Haddam, Chester, and Deep River. Consider connecting to a potential trail on the rail corridor north of Route 82 in Haddam as identified in the *RiverCOG Bicycle and Pedestrian Plan*. This portion of the rail right-of-way is not active.
3) Continuing to the south of Main Street, it is recommended that Chester and Deep River coordinate to complete a sidewalk on the west side of the roadway between Pratt Street and the existing sidewalk in Deep River just south of the town line.
4) Construct sidewalk on west side of Route 154 connecting recommended crosswalk to Railroad Avenue. Railroad Avenue is used by pedestrians between the marinas and Main Street in Chester.

5.4 Route 154 between Route 148 and Kings Highway

This section of Route 154 is similar to that section to the south. This section does include, however, a traffic signal at Kirtland Terrace which

serves access to the Chester Fairgrounds and a few residences. Throughout much of the year, traffic at Kirtland Terrace is minimal.

Short-term

1) Narrow travel lanes to 11-feet. Provide similar shoulder widths on both sides of the roadway.

Medium-term

1) Install crosswalk, ADA ramps, and recommended signage at the intersection of Route 154 and Kings Highway.

Long-term

1) Consider limited roadway widening to allow for 11-foot travel lane with 5-foot bike lane in each direction.
2) Explore multi-use trail on Route 154 or adjacent north-south corridor between Haddam, Chester, and Deep River. Consider connecting to a potential trail on the rail corridor north of Route 82 in Haddam as identified in the *RiverCOG Bicycle and Pedestrian Plan*. This portion of the rail right-of-way is not active.

5.5 Route 148 between Route 154 and Main Street

This section of Route 148 provides connection between downtown Chester and Route 154 and the Connecticut River Ferry. This section has less traffic than Route 148 closer to Route 9. Traffic volumes could fluctuate in this area in the near-term on a temporary basis during planned closures of the East Haddam Swing Bridge during construction as the Chester-Hadlyme Ferry is a detour route. It is adjacent to scenic freshwater tidal wetlands, and RSA participants noted that there is a desire to improve bicycle and pedestrian facilities in this area to allow more people to safely travel and enjoy the scenic beauty in this area. The suggestion of a multi-use trail was explored with a potential alignment either to the south or north of Route 148, however this suggestion was *not* advanced into the RSA recommendations due to the environmental impacts required for such trail to the south of Route 148 and the steep terrain present north of Route 148 which would likely require tall retaining structure which may not be compatible for the community vision for this area.

Instead, this RSA recommends smaller improvements to increase the visibility and safety of bicyclists and pedestrians in this area with less significant roadway changes such as reduced speed limit, additional signage, lane width narrowing, bicycle sharrow markings, and in the long-term, minor widening to allow for a wider shoulder or bicycle lane(s). In place of a multi-use trail in this section, it is recommended that the Trolley Trail proposed in the *Chester Village and Center District Master Plan* be pursued which would connect to Route 154 via Main Street with a further connection to the Connecticut River via Railroad Avenue.

Short-term

1) Request reduction of speed limit to 30 mph from the Office of State Traffic Administration (OSTA).
2) Consider rotating dynamic speed feedback sign in this area on existing signage west of East Liberty Street. See Exhibit 38 for an example of such signage.
3) Consider removing passing areas on Route 148 in this area

4) Narrow travel lanes to 10-feet and install bicycle sharrows. 10-foot travel lane width are permitted under Figure 2-7A in the CTDOT Highway Design Manual for the traffic volumes in this section (1,900 ADT), existing speed limit (35 mph), and low truck volumes of approximately 3%. Conduct traffic count to confirm traffic conditions during design phase.
5) Install bicycle sharrow pavement markings at 250-foot intervals. Install markings 4-feet off edge line.
6) Install bicycle warning sign (W11-1) with "In Lane" plaque (W16-1P (CT)) in three locations. For eastbound traffic just east of Main Street, for westbound traffic just west of Route 154, and for traffic in both directions in the middle of the roadway section. Refer to Exhibit 39.
7) Stripe stop-bar and add stop sign assembly for westbound right-turn to North Main Street.

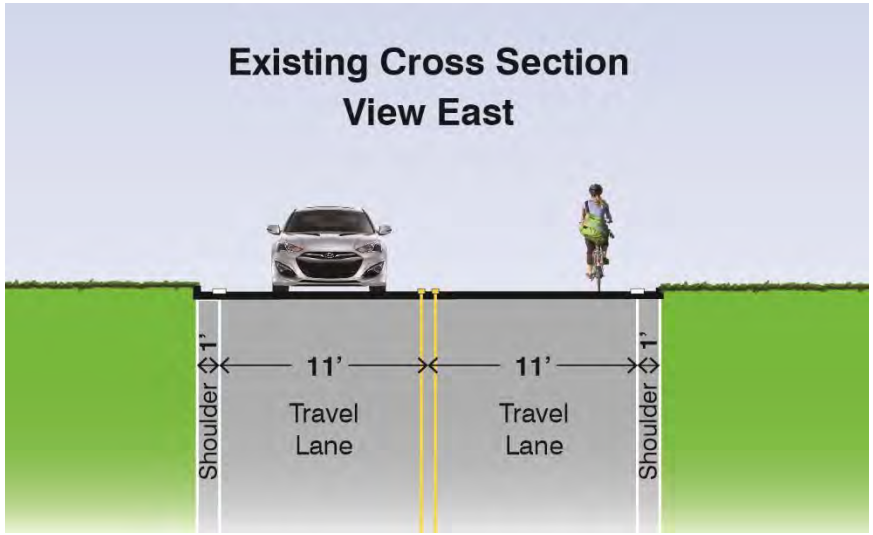
Long-term

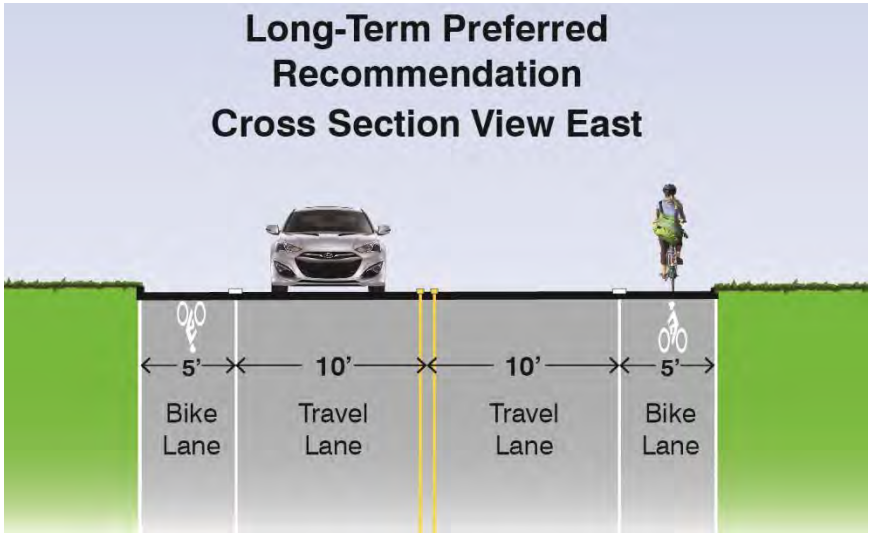
1) Consider two alternatives for minor roadway widening. Refer to Exhibit 40.
    a) Preferred:
        i) Widen roadway 6-feet to allow for 2 x 10-foot travel lanes and 2 x 5-foot bike lanes.
    b) Alternate – Consider only if 6-feet of widening is not feasible:
        i) Widen roadway 2-feet to allow for 2 x 10-foot travel lanes and 1-foot shoulder on westbound (north) side of roadway and 5-foot bike lane on eastbound (south) side of roadway. Mark sharrows in westbound direction.
2) Consider developing a shared-use Trolley Trail as proposed in the *Chester Village and Center District Master Plan*. The Trolley Trail is to connect Downtown Chester to Route 154 and provide recreational access and overlooks to the wetlands to the east. This recommendation takes the place of additional dedicate bicycle and pedestrian infrastructure (e.g. off-road shared use path) on Route 148 due to environmental constraints.

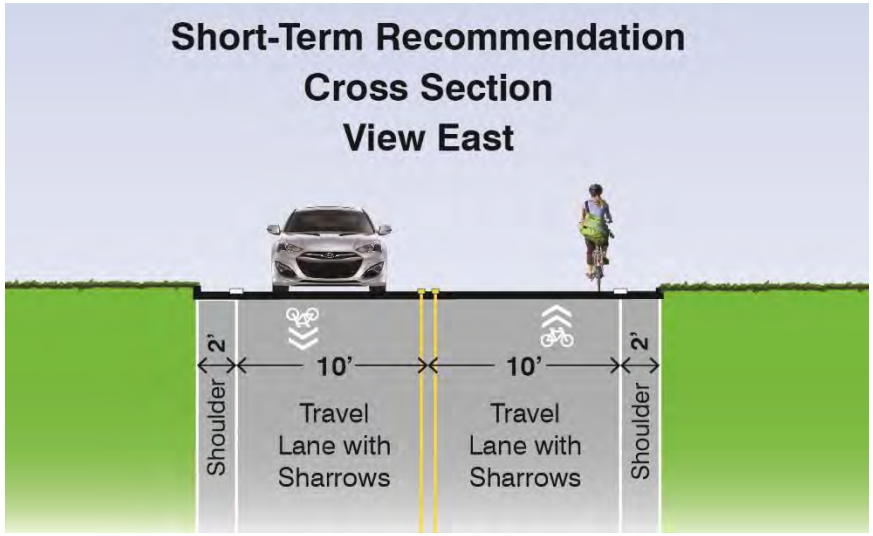
Exhibit 38: A dyanmic speed feedback sign (Source: Sacramento County, CA)

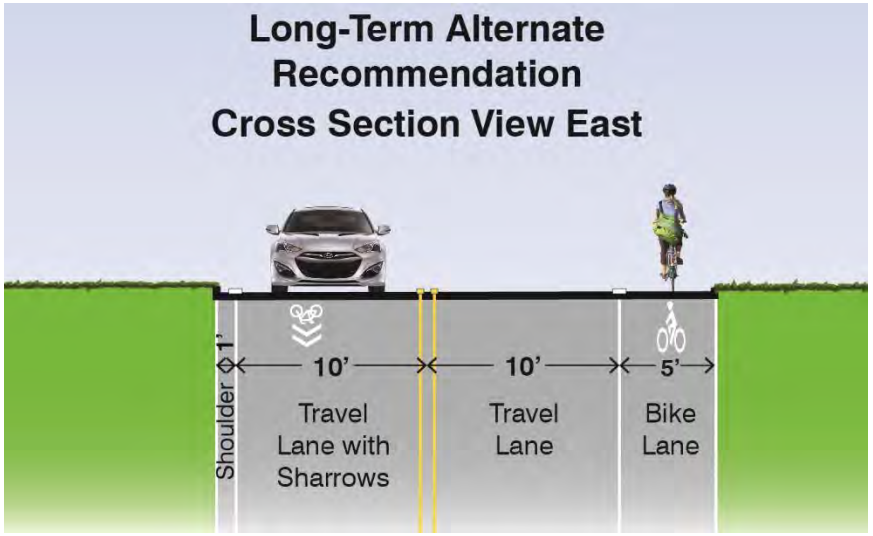
Exhibit 39: Proposed sign assembly for roads recommended for bicycle sharrow pavement markings

Exhibit 40: Existing, short-term, long-term preferred, and long-term alternate cross sections proposed for Route 148 between Main Street and Route 154.









5.6 Route 148 between Main Street and High Street

Route 148 in this area connects Downtown Chester with neighborhoods to the west included those residences on High Street, Pelton Hill Road, and areas further to the west. The recommendations in this report focus on improvement to pedestrian and bicyclist connectivity in this area, as well as a potential realignment to the High Street intersection.

Short-term

1) Install bicycle sharrow pavement markings at 250-foot intervals. Install markings 4-feet off edge line.
2) Install bicycle warning sign (W11-1) with "In Lane" plaque (W16-1P (CT)) at strategic locations at the beginning of shared roadway segments (marked with sharrows) and major intersections.
3) Coordinate with RiverCOG to initiate a corridor study on Route 148 between Main Street and Cedar Lake Road. This corridor study should evaluate these recommendations and others in this area and evaluate traffic operations in the area of Route 9 interchange.

Medium-term

1) Reconstruct sidewalk and curbing west of Main Street. Existing sidewalk and curb is nearly flush with roadway grade. Sidewalk surface needs some rehabilitation.
2) Remove steps at crosswalk near Chester Library and install ADA curb ramp
3) Consider installing RRFB with high-intensity crosswalk lighting at crosswalk in front of library. Refer to Exhibit 41 for an example of an RRFB during the daytime, while Exhibit 42 shows an RRFB system with high-intensity crosswalk lights. Consult with the "Pedestrian Safety Countermeasure Guidance at Marked Uncontrolled Crosswalks" published by CTDOT. For a two-lane roadway between 1,500 and 9,000 ADT, these guidelines recommend an RRFB or a Pedestrian Hybrid Beacon if 85th percentile speeds are in excess of 40 mph. The CTDOT traffic count station closer to Downtown Chester indicates speeds lower than 40 mph, but speeds could be higher in this area.
4) Construct sidewalk between library and fire department parking lot.

Long-term

1) Consider limited roadway widening to allow for 11-foot travel lane with 5-foot bike lane in each direction.
2) Consider realignment of High Street particularly if the north side sidewalk option is pursued. Realignment can reduce crossing distances for north side sidewalk option.

Exhibit 41: An example of RRFB (Source: CTDOT)

Exhibit 42: An example of a crosswalk high intensity light integrated with an RRFB at night in West Hartford, CT. These lights are only activated when utilized by a pedestrian. Note – The yellow flashers are not activated in this photo to demonstrate the crosswalk light.

5.7 Route 148 between High Street and Straits Road (including Reverse Curve / S-Curve)

Short-term

1) Install bicycle sharrow pavement markings at 250-foot intervals. Install markings 4-feet off edge line.
2) Install bicycle warning sign (W11-1) with "In Lane" plaque (W16-1P (CT)) at strategic locations at the beginning of shared roadway segments (marked with sharrows) and major intersections.
3) Consider rotating dynamic speed feedback sign on Route 148 to the east of Straits Road for eastbound traffic entering the town center area.
4) Review curvature and review horizontal curve signage and nighttime visibility.
5) Coordinate with RiverCOG to initiate a corridor study on Route 148 between Main Street and Cedar Lake Road. This corridor study should evaluate these recommendations and others in this area and evaluate traffic operations in the area of Route 9 interchange.
6) Initiate engineering design to evaluate sidewalk extension between High Street and Pleasant Street. Consider options for sidewalk on both south and north sides to evaluate costs and impacts of these options. While a sidewalk on the south side may be preferable, a sidewalk on the north side may be less costly due to steep grades on south side which could require significant construction. If a north side sidewalk is pursued, install directional signage for pedestrians at High Street so pedestrians cross at this location when continuing westward.

Long-term

1) Consider realignment of Pelton Hill Road particularly if the north side sidewalk option is pursued. Realignment can reduce crossing distances for north side sidewalk option.

5.8 Route 148 at Straits Road and Pleasant Street

Recommendations in this area provide a crosswalk between Pleasant Street and Straits Road. A RRFB is suggested at this location to provide additional visibility to pedestrians crossing at this location. This crosswalk provides pedestrians on Pleasant Street with a crosswalk to Straits Road. Straits Road provides more comfortable pedestrian accommodation to Downtown Chester via a shared roadway with lower traffic volumes and speeds versus Route 148. This crossing location should be pursued as a priority prior to the completion of a sidewalk between Straits Road and High Street.

Short-term

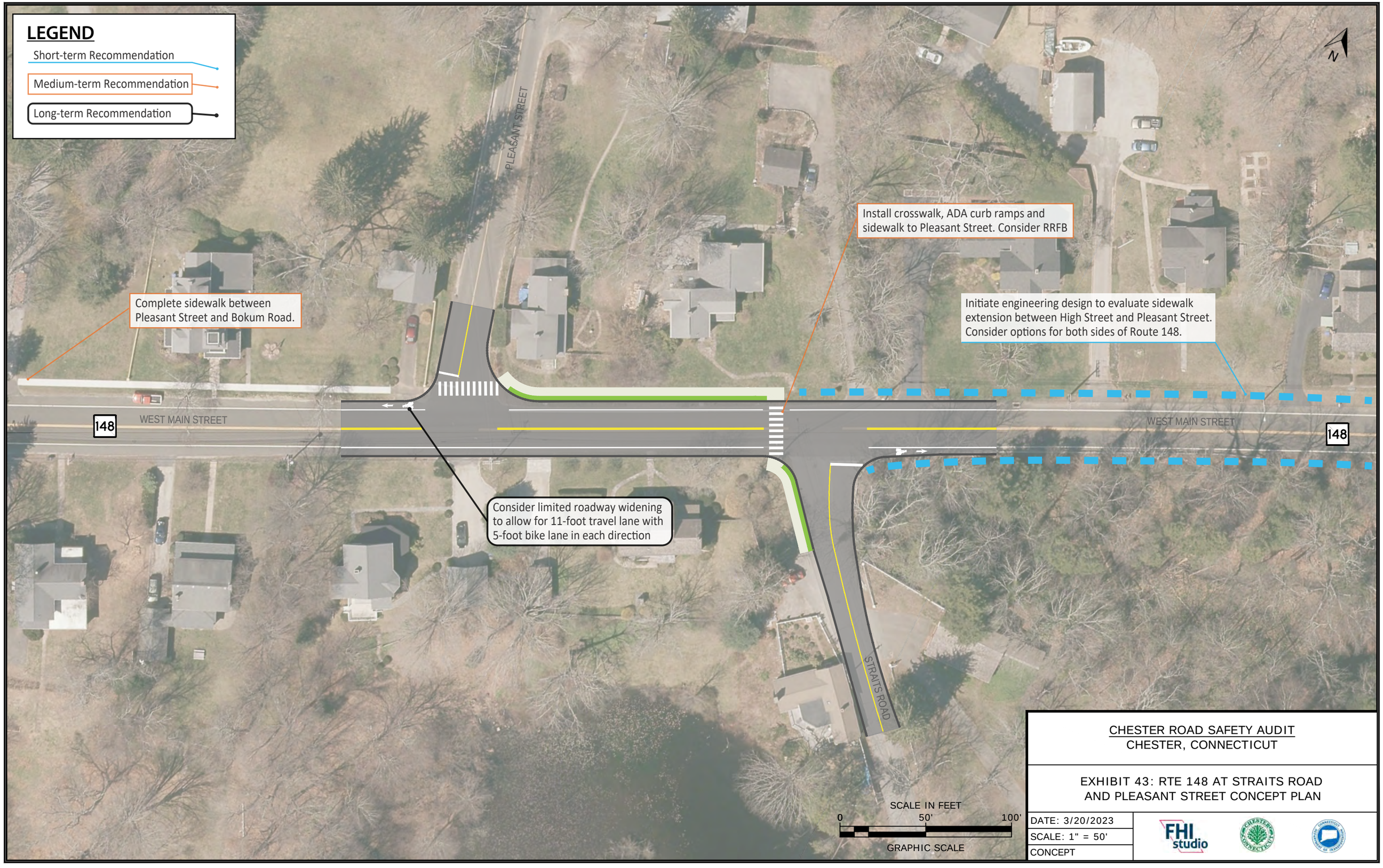
1) Install bicycle sharrow pavement markings at 250-foot intervals. Install markings 4-feet off edge line.
2) Install bicycle warning sign (W11-1) with "In Lane" plaque (W16-1P (CT)) at strategic locations at the beginning of shared roadway segments (marked with sharrows) and major intersections.
3) Coordinate with RiverCOG to initiate a corridor study on Route 148 between Main Street and Cedar Lake Road. This corridor study should evaluate these recommendations and others in this area and evaluate traffic operations in the area of Route 9 interchange.

Medium-term

1) Install crosswalk at the intersection of Route 148 and Straits Road. Install ADA curb ramps and sidewalk connecting to Pleasant Street. Construct short sidewalk segment south on Straits Road to first driveway.
2) Consider installing RRFB with high-intensity crosswalk lighting activated only when used by a pedestrian. Consult with the "Pedestrian Safety Countermeasure Guidance at Marked Uncontrolled Crosswalks" published by CTDOT. For a two-lane roadway between 1,500 and 9,000 ADT, these guidelines recommend an RRFB or a Pedestrian Hybrid Beacon if 85th percentile speeds are in excess of 40 mph. The CTDOT traffic count station on areas to the west show 85th percentile speeds in excess of 40 mph, however speeds could vary at this location.

Long-term

1) Consider limited roadway widening to allow for 11-foot travel lane with 5-foot bike lane in each direction.



CHESTER ROAD SAFETY AUDIT
CHESTER, CONNECTICUT

EXHIBIT 43: RTE 148 AT STRAITS ROAD AND PLEASANT STREET CONCEPT PLAN

DATE: 3/20/2023	
SCALE: 1" = 50'	
CONCEPT	

5.9 Route 148 between Pleasant Street and Hoop Pole Hill Road

Recommendation for this area prioritize extension of the sidewalk network to Bokum Road, extension of the bicycle network on Route 148 to the west, and vehicular safety improvements on the horizontal reverse curves (S-Curves) and in the area of the Route 9 interchange. Long-term, the Route 9 interchange area should be studied for redesign strategies to specifically reduce eastbound travel speeds and safely manage turning movements in this area. Additionally, a sidewalk connection west of Bokum Road to Cedar Lake Road is identified as a possible connection.

Short-term

1) Review curvature and review horizontal curve signage and nighttime visibility at curves located between Spring Street and Inspiration Lane. Recommend that fluorescent yellow chevrons with reflective strips are considered and spaced per MUTCD standards. Refer to Exhibit 44.
2) Clear vegetation blocking existing curve signage
3) Clear vegetation and reposition signage as needed at Route 9 northbound exit ramp to improve sight lines.
4) Consider rotating dynamic speed feedback sign in the eastbound direction immediately to the east of the Route 9 northbound exit ramp on the existing speed limit signage.
5) Install bicycle sharrow pavement markings at 250-foot intervals between Pleasant Street and Inspiration Lane. Install markings 4-feet off edge line.
6) Install bicycle warning sign (W11-1) with "In Lane" plaque (W16-1P (CT)) at strategic locations at the beginning of shared roadway segments (marked with sharrows) and major intersections.
7) Narrow travel lanes in vicinity of Route 9 to standard 11-foot width. Review turning volumes and need for auxiliary turn lanes. If recommended, stripe left-turn lanes. Consider installing buffered bike lane in this area.
8) Coordinate with RiverCOG to initiate a corridor study on Route 148 between Main Street and Cedar Lake Road. This corridor study should evaluate these recommendations and others in this area and evaluate traffic operations in the area of Route 9 interchange.

Medium-term

1) Complete the sidewalk between Pleasant Street and Bokum Road. Consider crosswalk at Bokum Road. Consider packaging this project with a sidewalk and crosswalk between Pleasant Street and Straits Road. This creates a complete pedestrian loop via Spring Street and Straits Road.

Long-term

1) Consider sidewalk on Route 148 between Bokum Road and Cedar Lake Road.
2) Consider limited roadway widening to allow for 11-foot travel lane with 5-foot bike lanes in each direction
3) West of Hoop Pole Hill Road, consider limited roadway widening to allow for 11-foot travel lane with 5-foot bike lanes in each direction.
4) Explore additional strategies to transition vehicle speeds on Route 148 to 25 mph zone to east including:
    a) Roundabout at one or more Route 9 ramps. Consider Route 9 southbound ramp for roundabout due to turning movements here and available right-of-way.
    b) Median Islands with horizontal deflection and/or gateway signage

c) Pavement markings such as optical speed bars or speed limit markings

Exhibit 44: An example of chevron assembly which can be used for horizontal curve delineation

5.10 Route 148 at Route 145

Recommendations in this area feature upgrades to the existing signage to improve night-time visibility. Furthermore, recommendations include geometric redesign to reduce the excess pavement width on Route 145 in this area which can cause driver confusion while still accommodating a WB-62 (semi-truck) vehicle.

Short-term

1) Replace signage as noted below. The following measures are a Federal Highway Administration (FHWA) Proven Safety Countermeasure. The following improvements are found to reduce 15% of nighttime crashes and have a 12:1 benefit-cost ratio even when assuming a conservative 3-year service life of the proposed signage. See Exhibit 45 for an example of this signage from the approach, and Exhibit 46 for an example of the layout of the proposed signage.
    a) Doubled-up (left and right), oversized advance "Stop Ahead" intersection warning signage
    b) Doubled-up (left and right), oversized Stop signs.
    c) Review and reset stop bar as necessary
    d) Oversized double arrow warning sign at stem of T-intersection
    e) Doubled-up intersection warning signs on through approaches with roadway name
    f) Retroreflective sheeting on all signposts
2) Consider rotating dynamic speed feedback sign on Route 148 to the west of Route 145 for eastbound traffic approaching this intersection.

Medium-term

1) Consider a reduction in pavement area in southwest corner with reconstruction of appropriate corner radii while still accommodating WB-62 design vehicle (semi-tuck). This could result in the need to move one utility pole.

Exhibit 45: Example of doubled-up intersection warning signage in South Carolina (Source: FHWA)

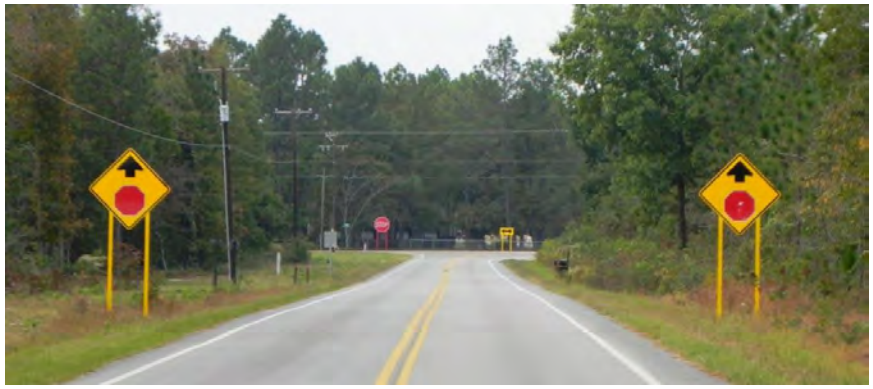
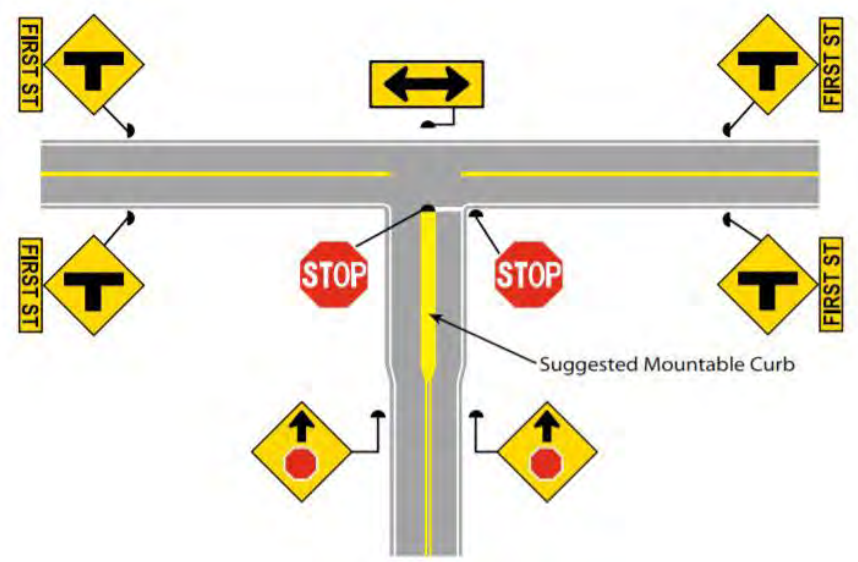


Exhibit 46: Recommended low-cost countermeasures at stop-controlled T-intersection (Source: FHWA)



6 SUMMARY

This report documents the observations, discussions, and recommendations developed during the completion of the Town of Chester'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 Chester and CTDOT may use this report to prepare strategies for funding and implementing the improvements. This report provides Chester 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.

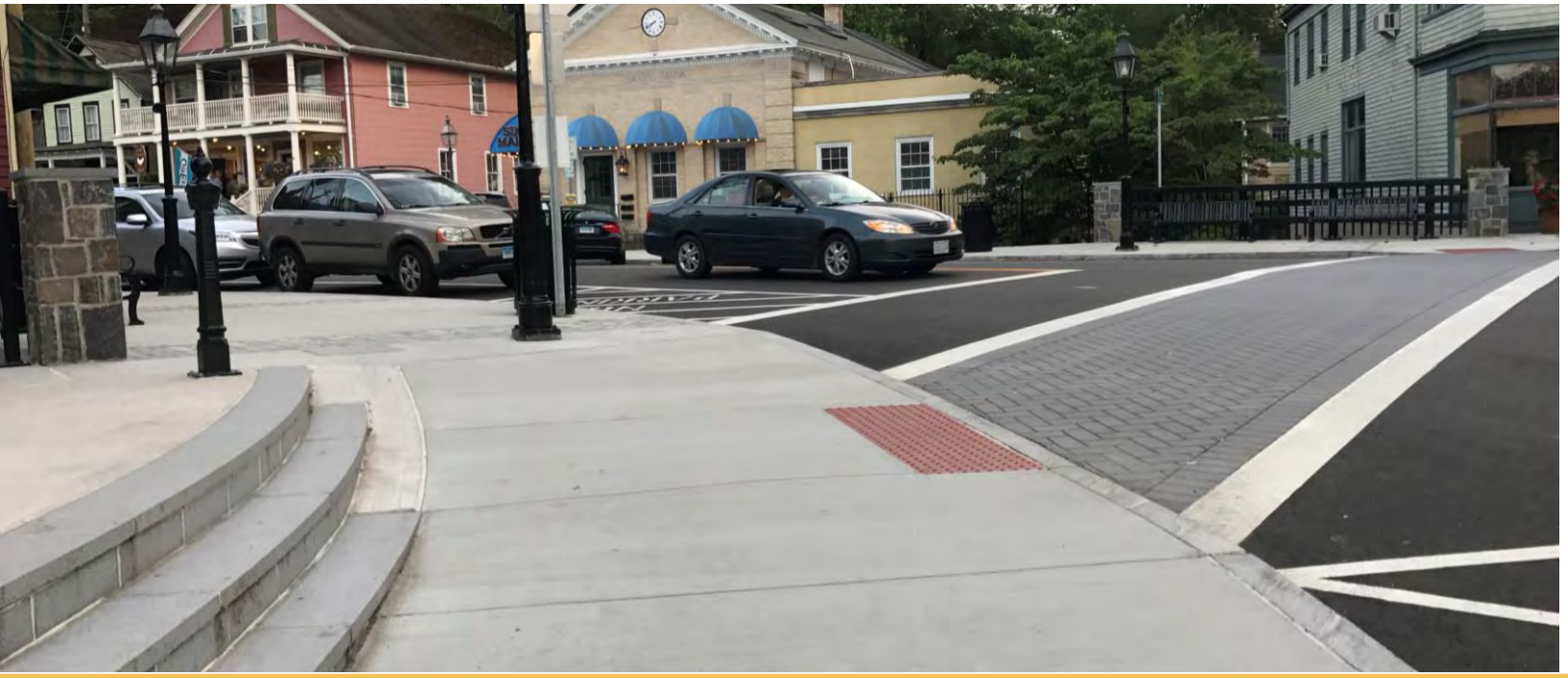
APPENDICES

A: Pre-Audit Presentation

B: Walk Audit Materials

CHESTER ROAD SAFETY AUDIT

ROUTE 154 AND ROUTE 148 IN THE VICINITY OF DOWNTOWN



COMMUNITY connectivity program

FHI studio

NOVEMBER 2022

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 Chester
- 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

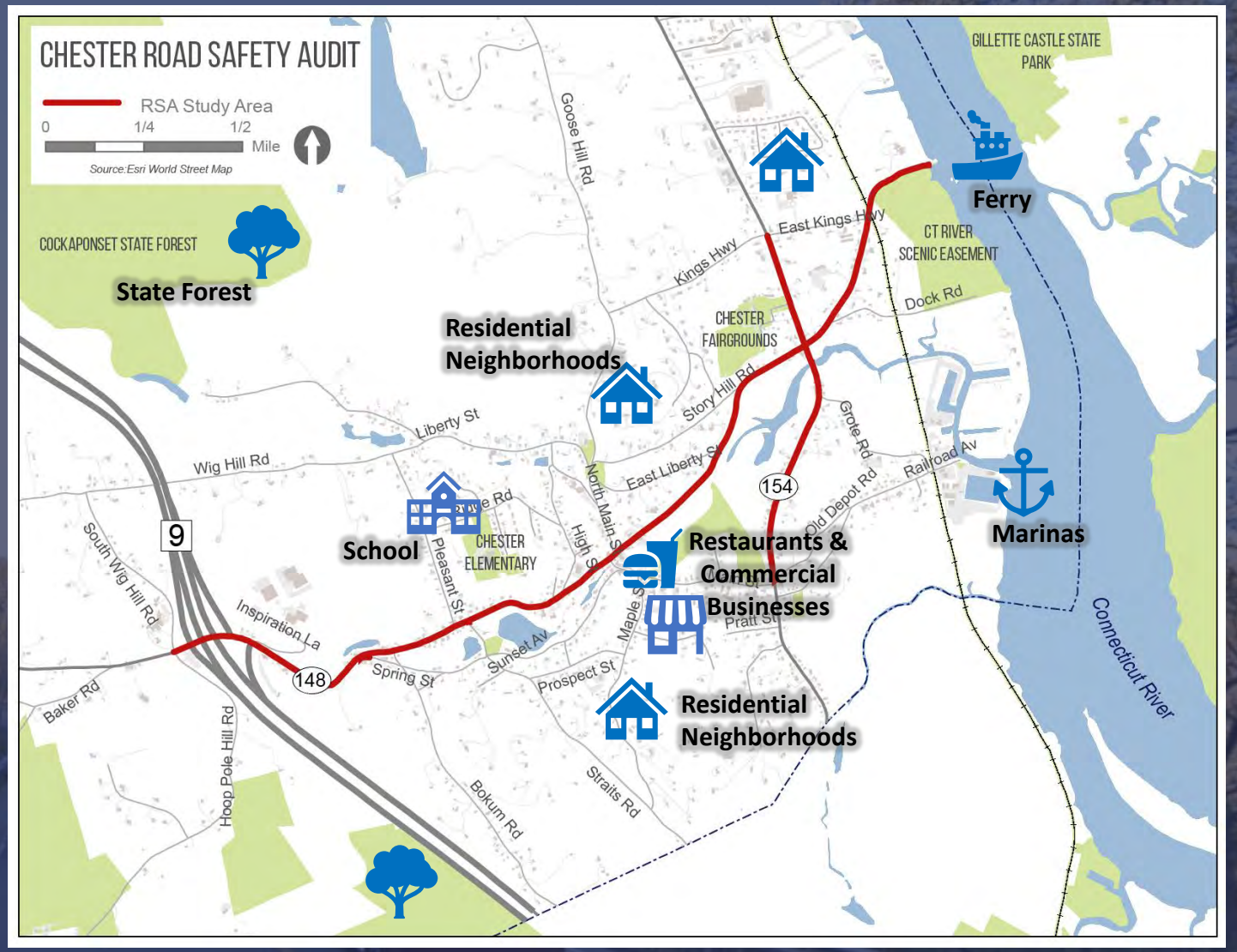
- Existing Conditions Data Collection
- Pre-Audit Meeting
- Field Audit
- Post Audit Meeting
- Road Safety Audit Report

STUDY AREA

- Route 154 between Main Street and Kings Highway
- Route 148 between South Wig Hill/Hoop Pole Hill Road
- Vicinity of Downtown
- Consider Route 148 and Route 145 intersection

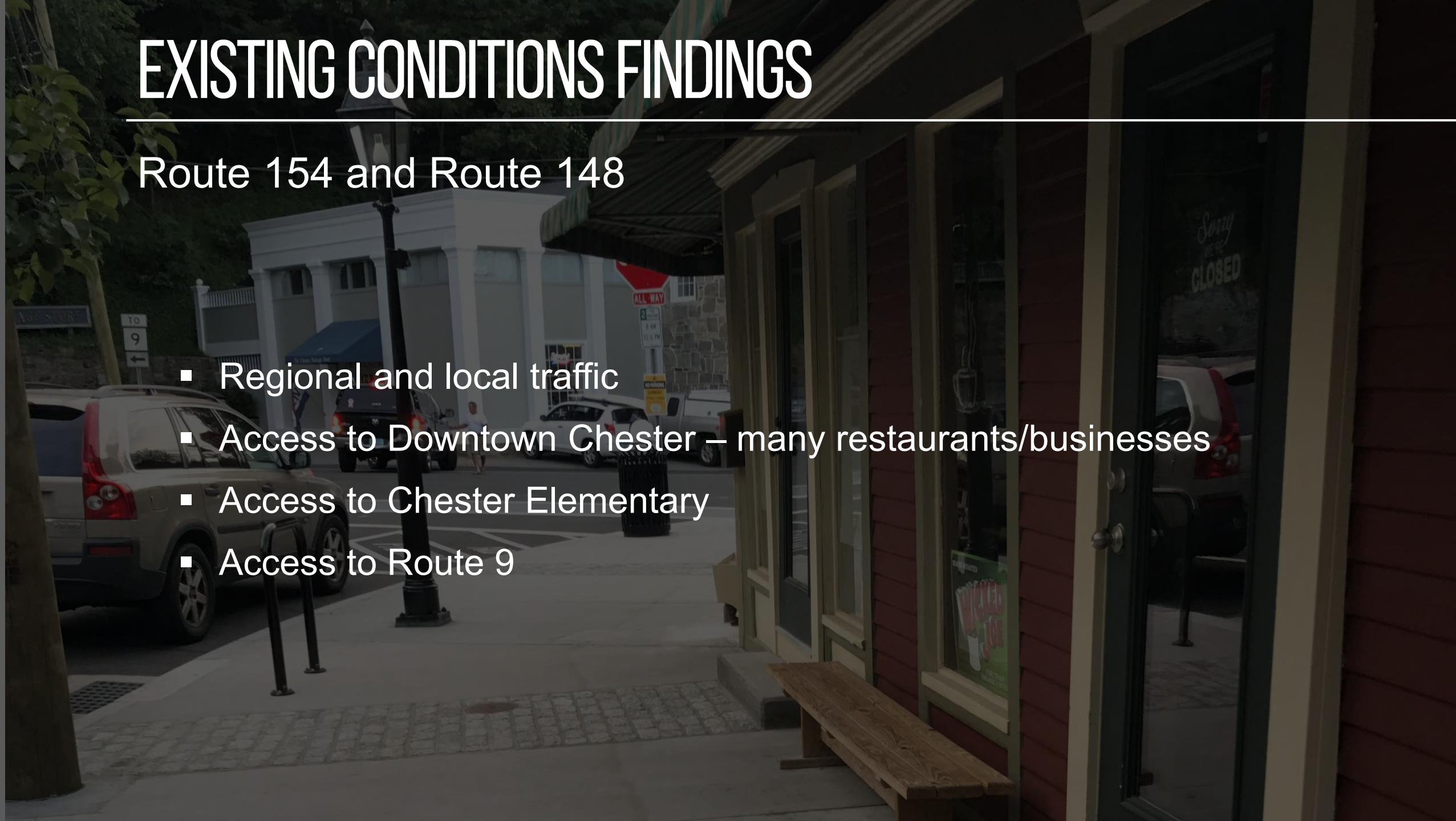
POINTS OF INTEREST

- Restaurants and commercial businesses
- Chester Elementary School
- Chester/Hadlyme Ferry
- Marinas
- Regional and local traffic
- Pedestrian/Bicycle Traffic
- Highway access to Route 9



EXISTING CONDITIONS FINDINGS

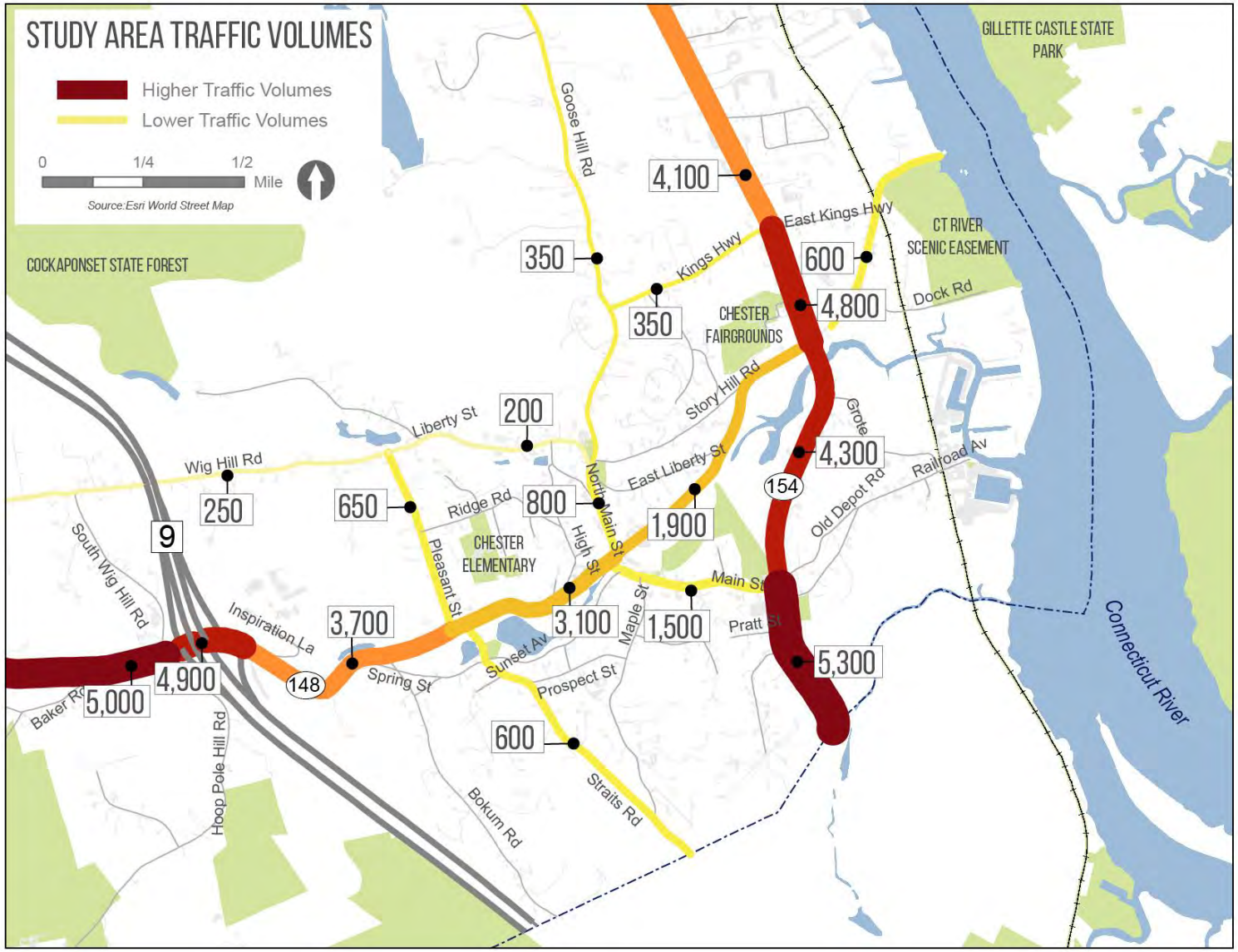
Route 154 and Route 148



- Regional and local traffic
- Access to Downtown Chester – many restaurants/businesses
- Access to Chester Elementary
- Access to Route 9

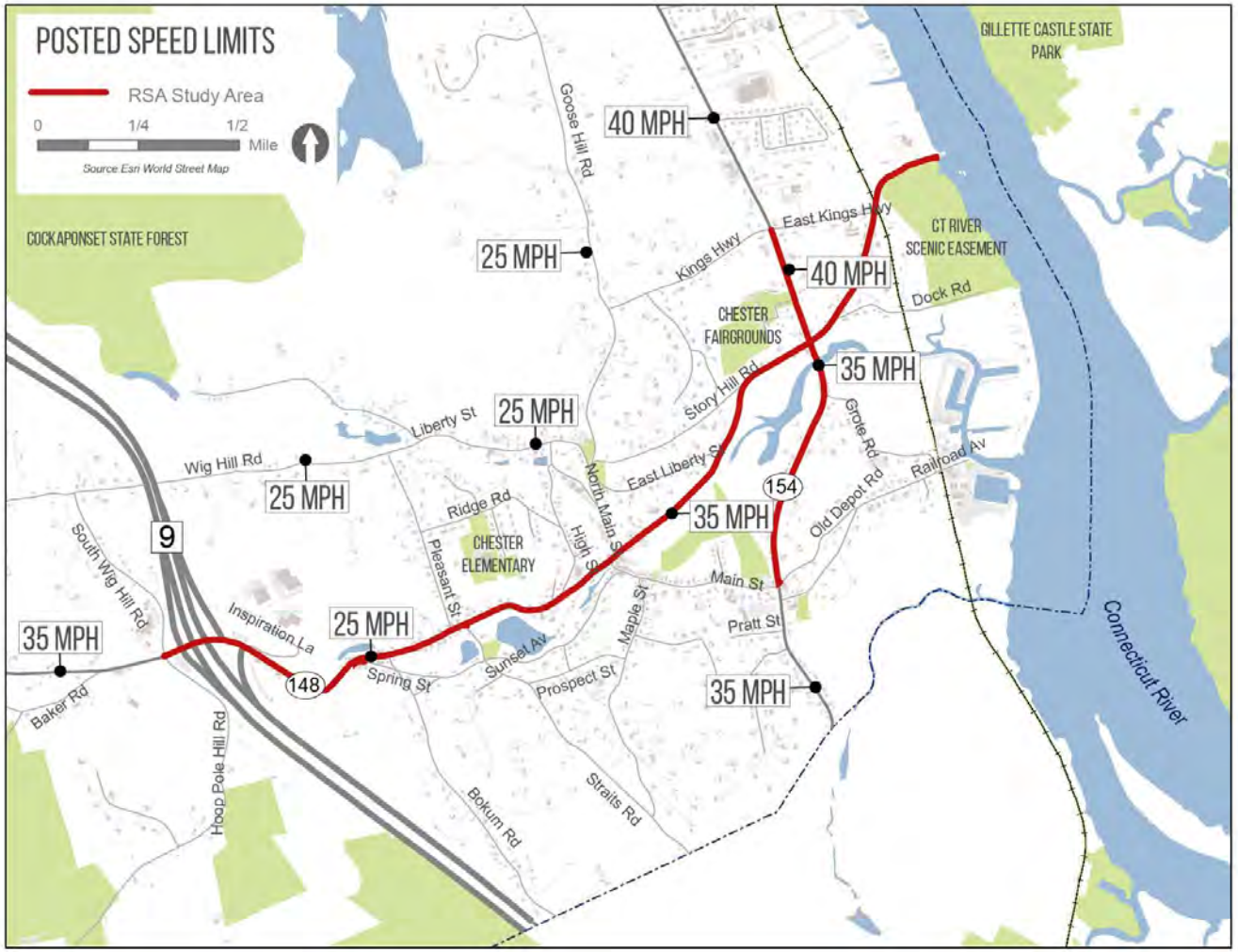
TRAFFIC VOLUMES

- Highest traffic volumes found on Route 154 south of Main Street and Route 148 west of Route 9 interchange
  - On Route 148, east of Route 9, volumes decrease towards downtown- traffic dissipates onto other collector roads
  - Lowest volumes found on local roads leading into downtown



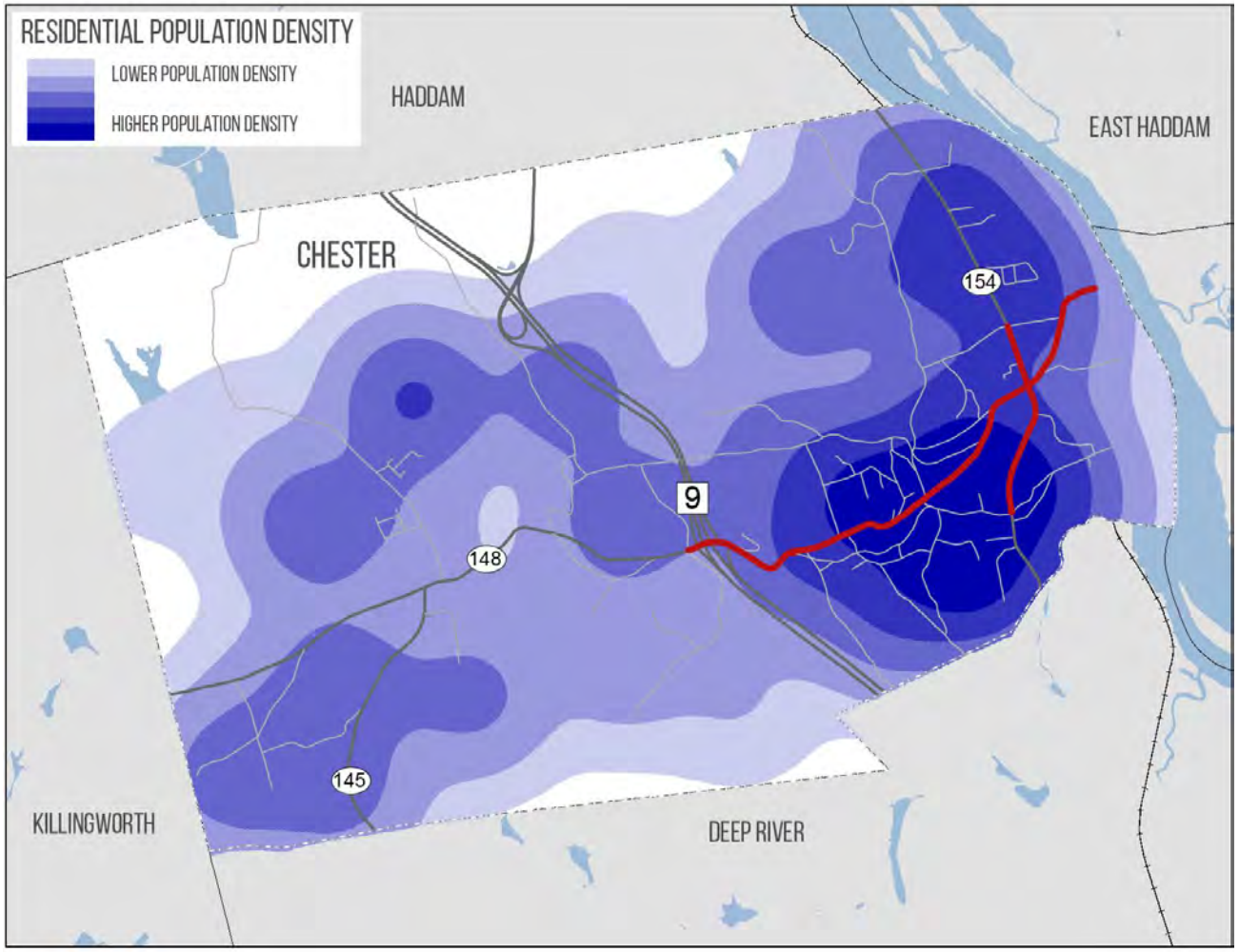
TRAFFIC SPEED LIMITS

- Speed limits range from 25 MPH up to 40 MPH
- Route 154 and Route 148 are posted at 35 MPH in the vicinity of downtown
- Route 154 posted at 40 MPH north of intersection with Route 148



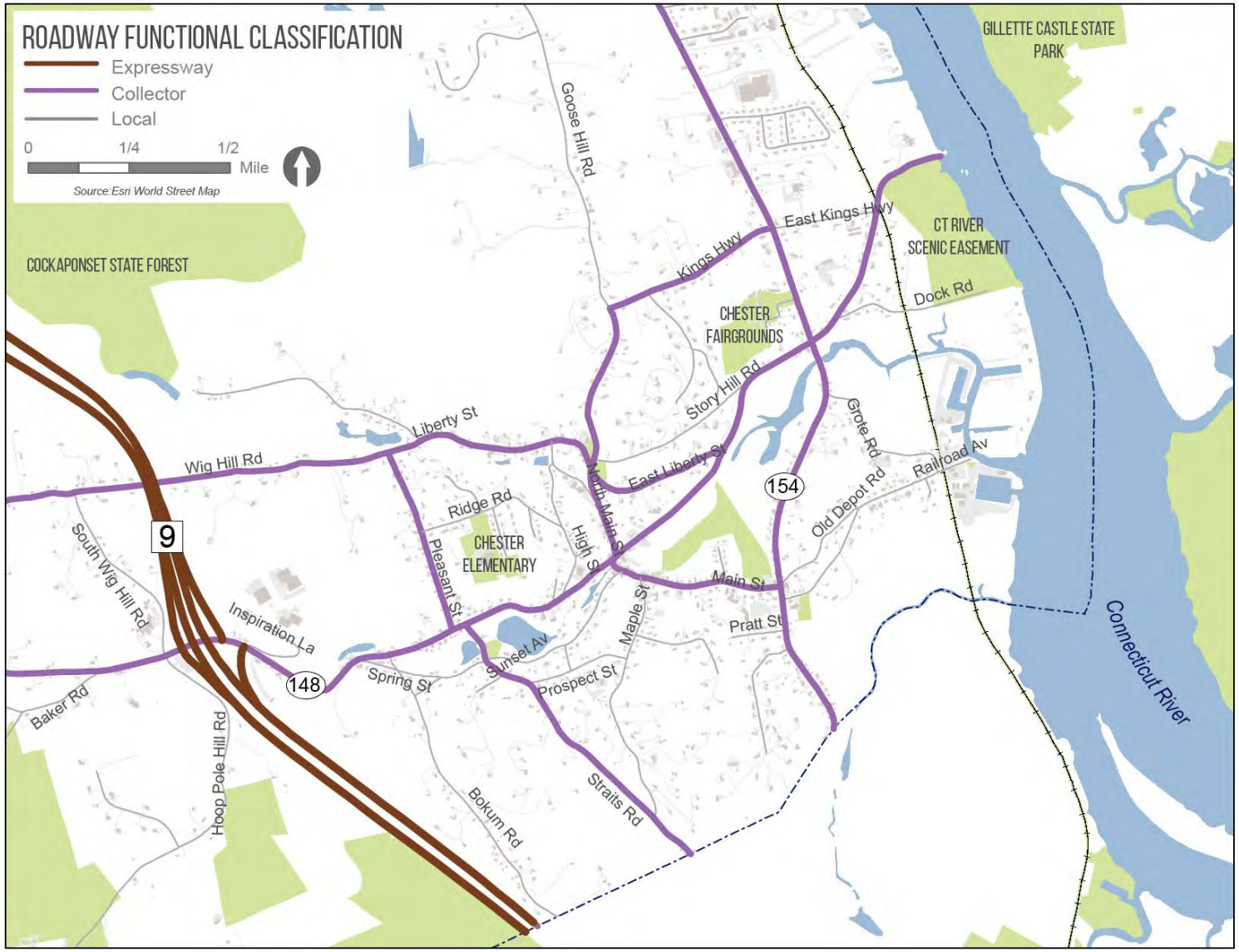
POPULATION DENSITY

- Population density is highest in the vicinity of the Study Area, many residential neighborhoods within walking distance to downtown
- Population density is lower along Route 148 westward towards Killingworth



FUNCTIONAL CLASSIFICATION

- Many roads in the vicinity of the Study Area and Downtown are Collector Roadways
- Route 9 is an expressway



ROADWAY GEOMETRY

Chester River - RSA - Route 148 / Route 154
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	Notes
Route 148	Hope Pole Hill Road	Inspiration Lane	1,200'	EB	1	19'	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7'	
(West Main Street)				WB	1	19'	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8'	
Route 148	Inspiration Lane	Pelton Hill Road	5,100'	EB	1	11'	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2'	Sidewalks on north side in some areas
(West Main Street)				WB	1	11'	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2'	Variable shoulder width, Many horizontal Curves.
Route 148	Pelton Hill Road	Main Street	1,100'	EB	1	11'	Concrete	4'	Fair	No	No	Varies	No	1'	Crosswalk at High Street
(West Main Street)				WB	1	11'	N/A	N/A	N/A	N/A	N/A	Varies	No	2'	
Route 148	Main Street	26 Water Street	600'	EB	1	11'	Concrete	5'	Good	Yes	Yes	Concrete	No	3'	
(Water Street)		(RJ Vickers Herbery)		WB	1	11'	N/A	N/A	N/A	N/A	N/A	Paved	No	3'	
Route 148	26 Water Street	Route 154	4,000'	EB	1	11'	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0'	
(Water Street)	(RJ Vickers Herbery)	(Middlesex Tpke)		WB	1	11'	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0'	
Route 148	Route 154	Connecticut River	3,500'	EB	1	10'	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0'	
(Ferry Lane)	(Middlesex Tpke)			WB	1	10'	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0'	
Route 154	Main Street	Route 148	3,800'	NB	1	12'	N/A	N/A	N/A	N/A	N/A	Varies	N/A	3'	
(Middlesex Tpke)		(Water Street)		SB	1	12'	N/A	N/A	N/A	N/A	N/A	Paved	N/A	3'	
Route 154	Route 148	Kings Highway	1,800'	NB	1	11'	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2'	
(Middlesex Tpke)	(Water Street)			SB	1	11'	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2'	

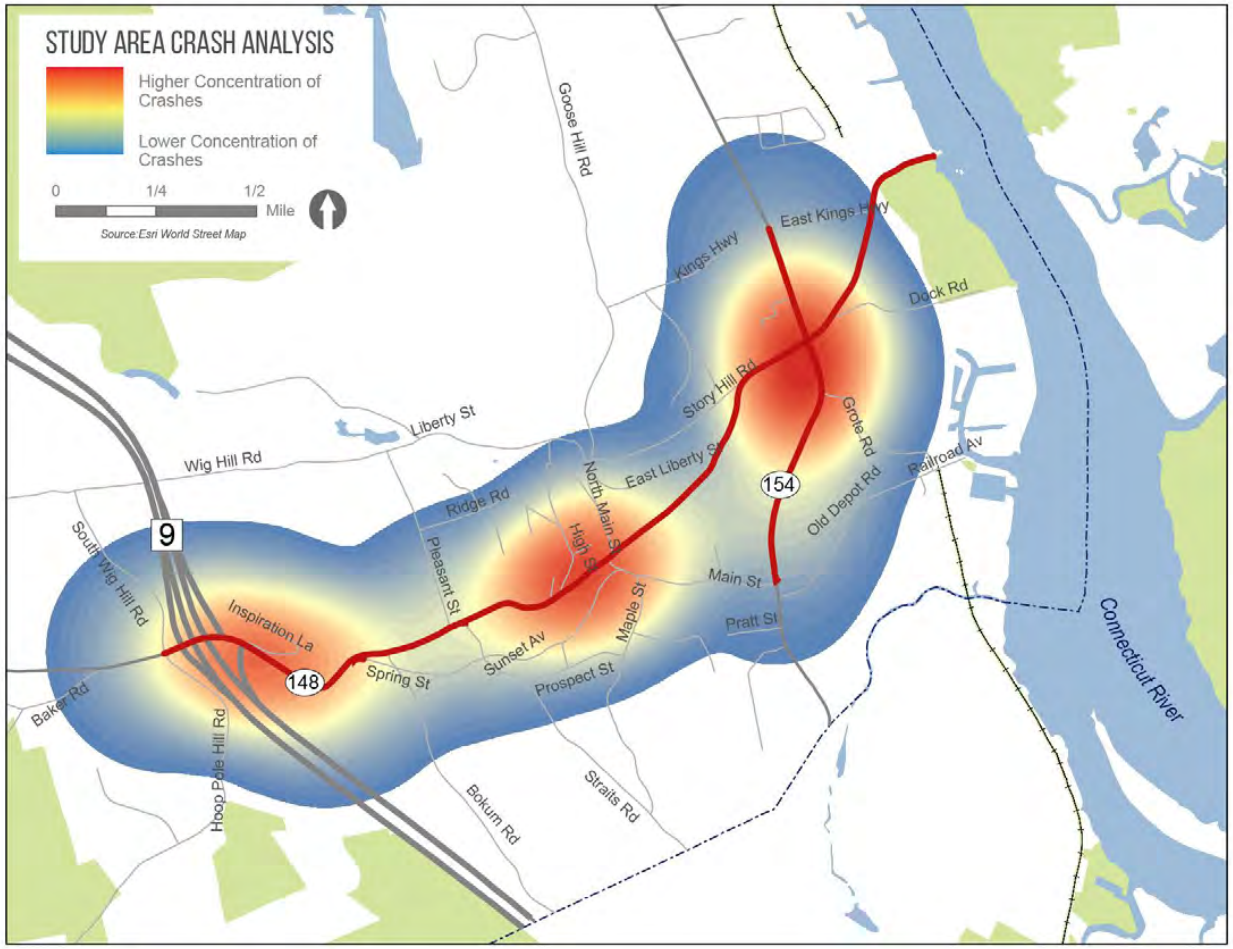
*CONDITION - "Good" is Serviceable Condition that meets current design standards. "Fair" is generally serviceable, but may need minor repairs, or may not completely align with current design standards. "Poor" is not serviceable, and generally inadequate for continued long-term use.

Highlighted cells indicate values which may warrant further investigation

CRASH ANALYSIS

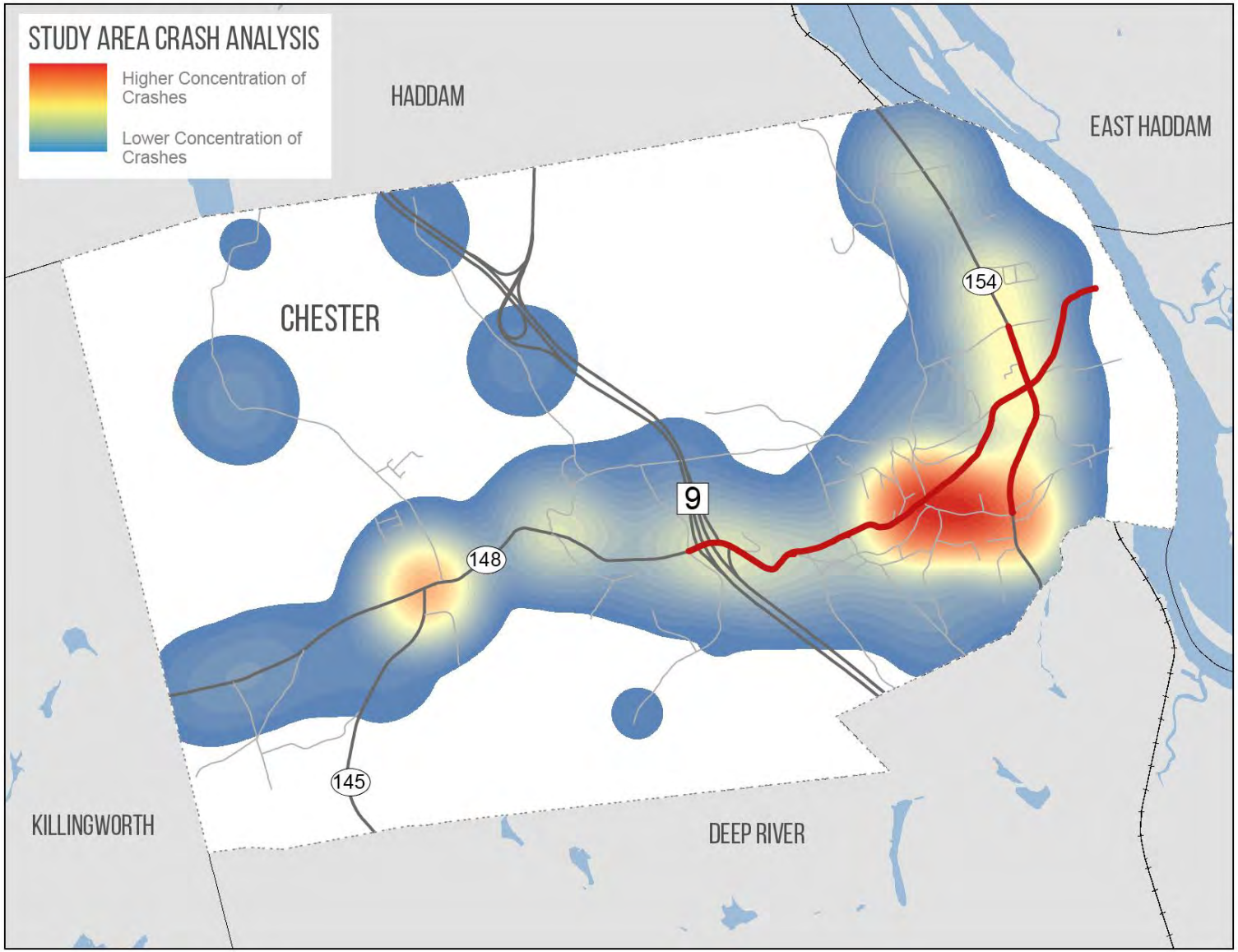
2017 - 2021

Year	Fatality	Serious Injury	Minor Injury	Possible Injury	Property Damage Only	TOTAL
2017			1	1	5	**7**
2018			1	3	11	**15**
2019				1	4	**5**
2020			1		4	**5**
2021				1	6	**7**
TOTAL	**0**	**0**	**3**	**6**	**30**	**39**



CRASH ANALYSIS

2017 - 2021

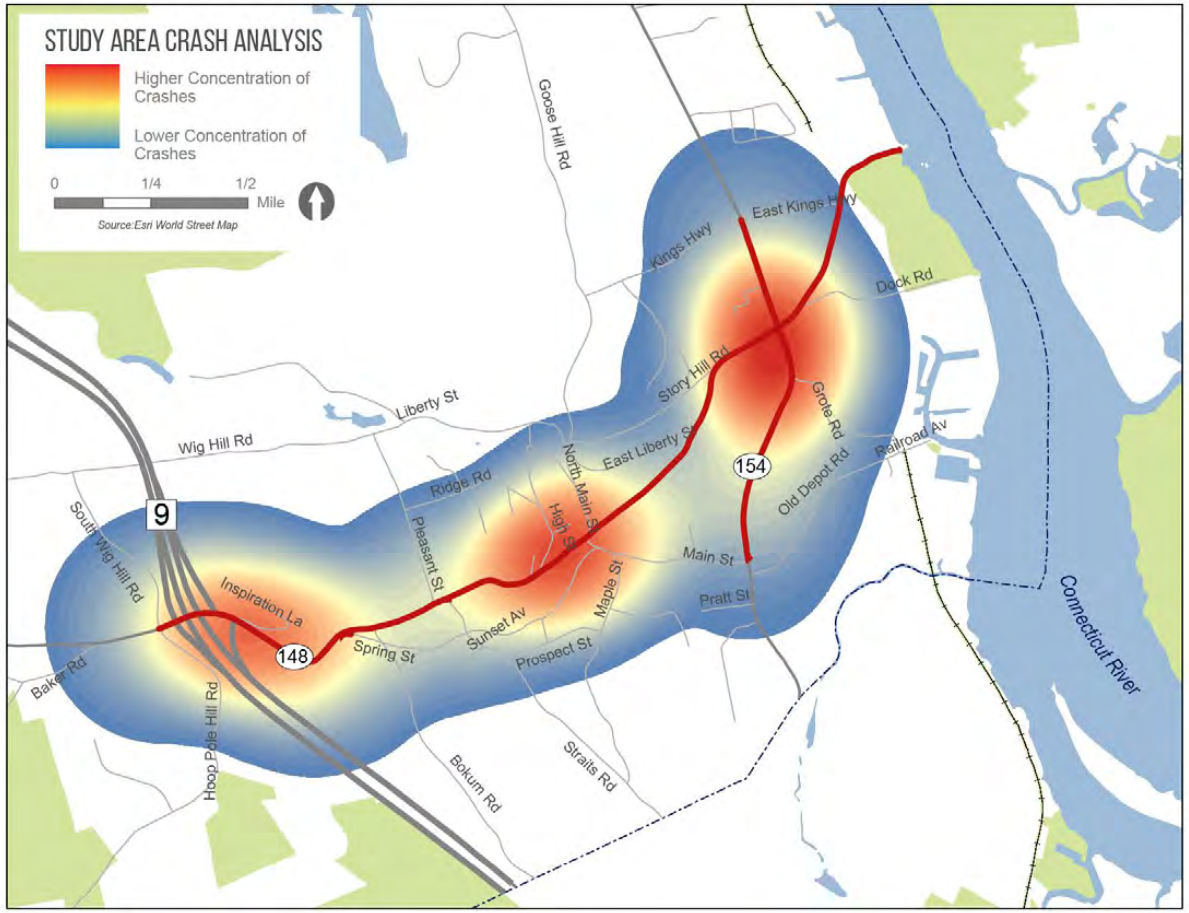


CRASH ANALYSIS

2017 - 2021

Crash Severity

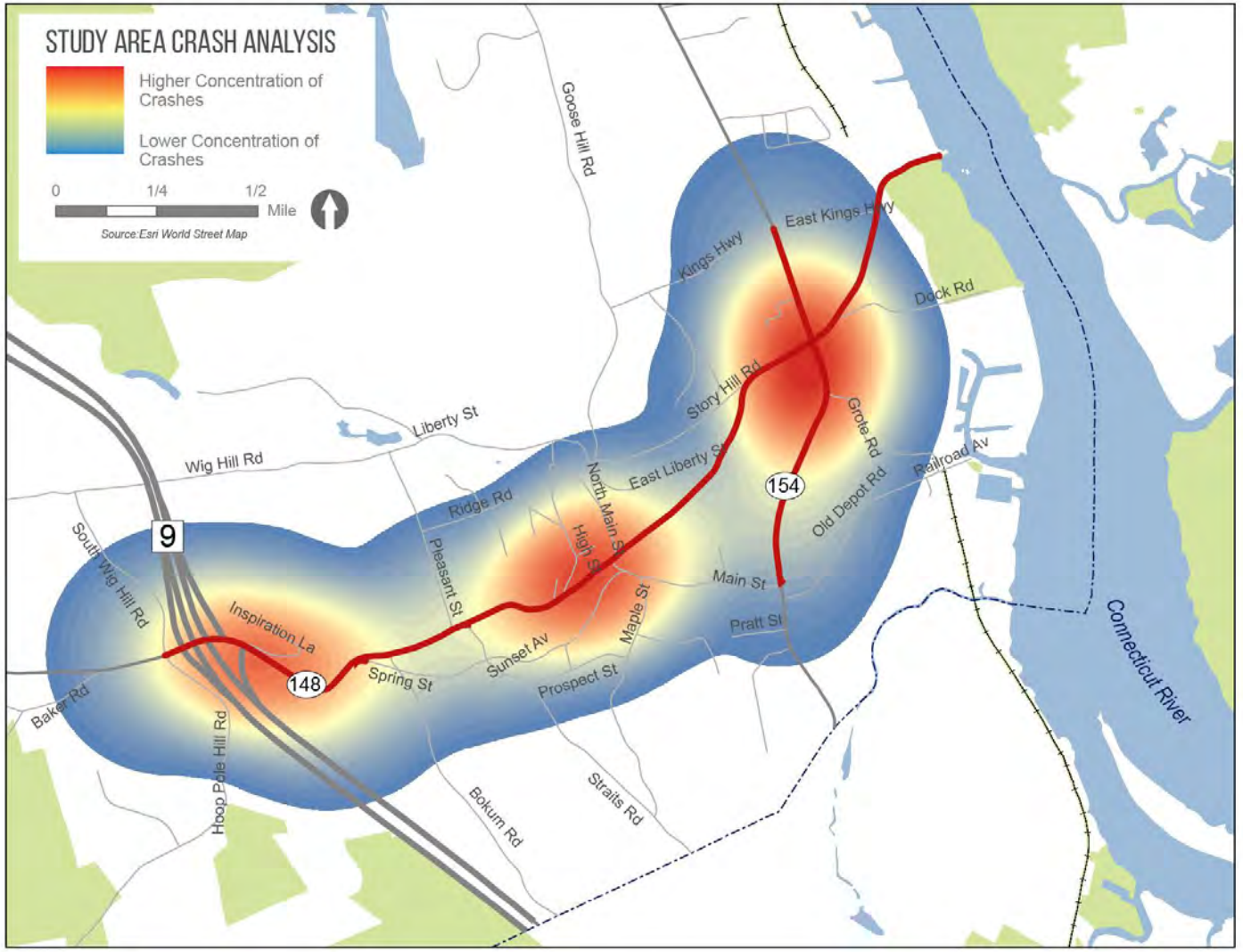
	Fatality	Serious Injury	Minor Injury	Possible Injury	Property Damage Only	TOTAL
Angle				1	1	2
Front to front				1	1	2
Front to rear					4	4
Sideswipe, opposite direction			1		3	4
Sideswipe, same direction				1	3	4
Rear to Side					3	3
Rear to Rear						0
Not Applicable			2	2	12	16
Other				1	3	4
TOTAL			3	6	30	39
Crashes Involving Pedestrians	0	0	0	0	0	0
Crashes Involving Bicyclists	0	0	0	0	0	0



CRASH ANALYSIS

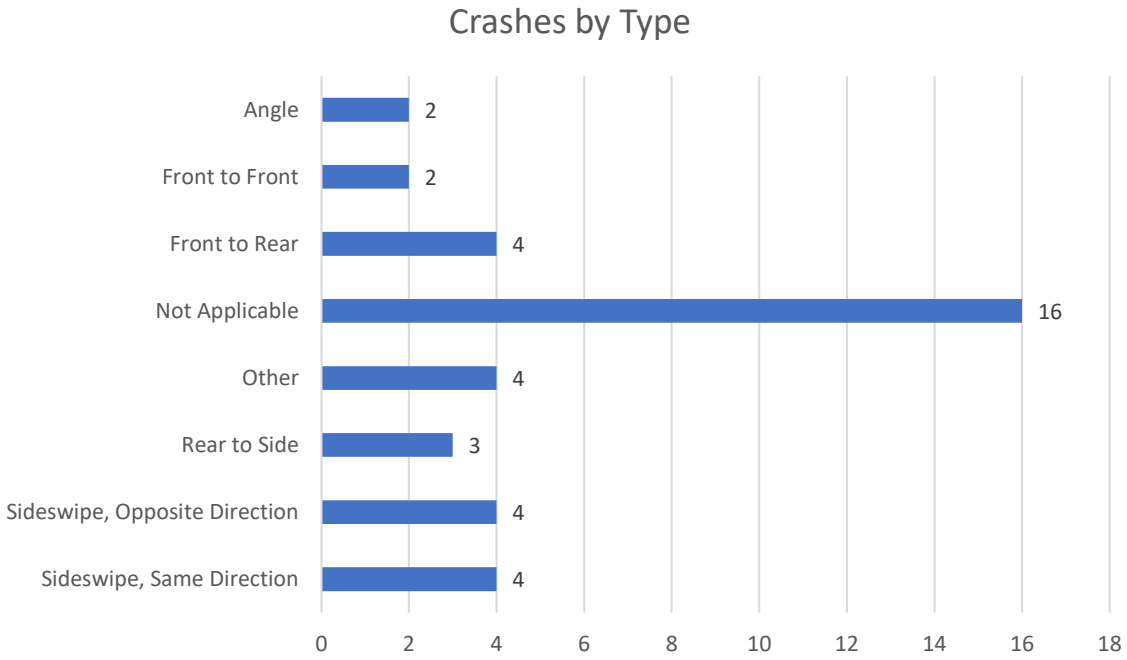
Crash Hotspots (5 Year Crash Total approx.)
39 Crashes Total

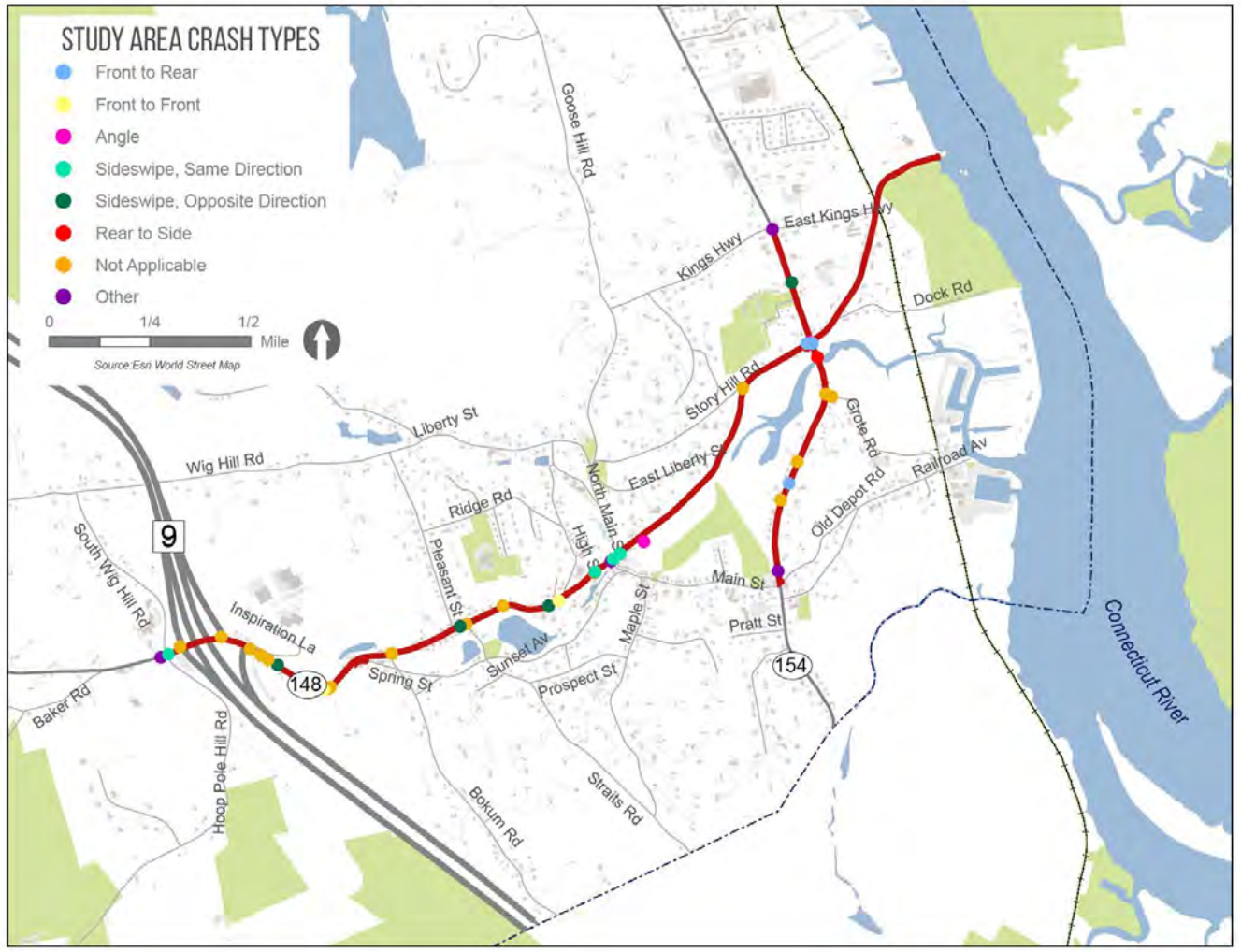
- Approximately 8 crashes in the vicinity of Route 154/Route 148 intersection
- Approximately 10 crashes on Route 148 near downtown- narrow, curvy road
- Approximately 8 crashes in the vicinity of Route 148 and Route 9 interchanges



CRASH TYPE

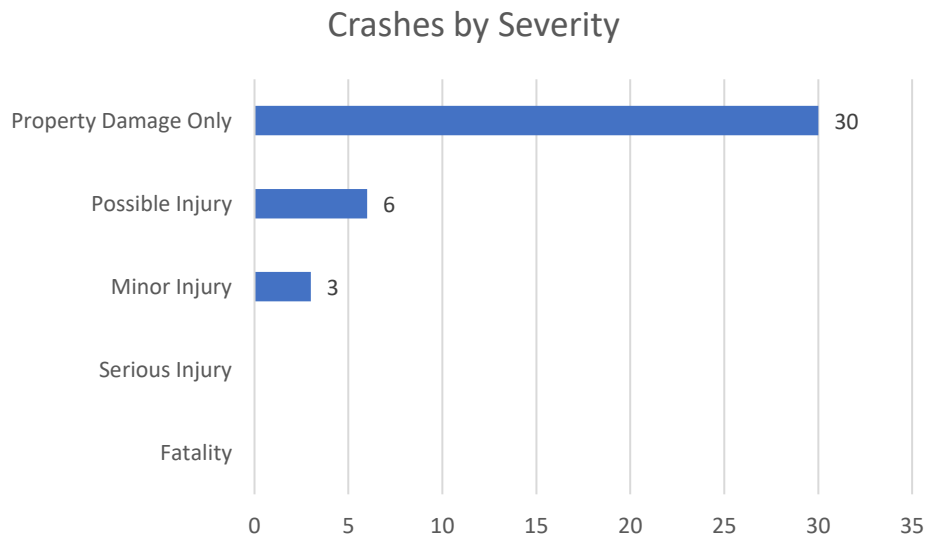
- Majority of crashes are not applicable, indicating crashes were the result of a collision with a fixed object

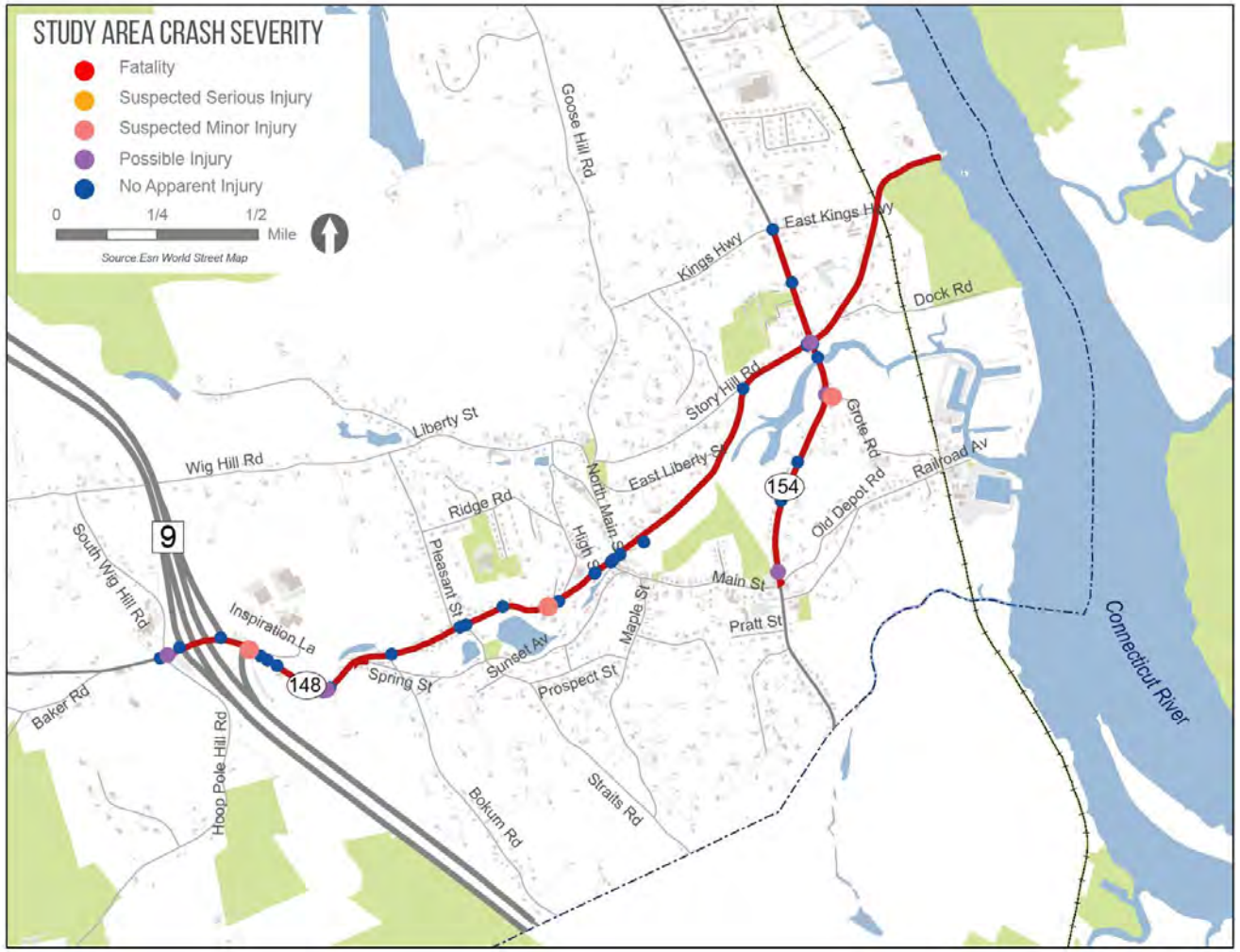




CRASH SEVERITY

- Majority of crashes (30) are classified as No Apparent Injury- Property Damage Only
- There were 6 crashes resulting in a possible injury and 3 minor injury crashes
- No fatalities or serious injury crashes were reported in the past 5 years





REVIEW OF PAST/CURRENT WORK

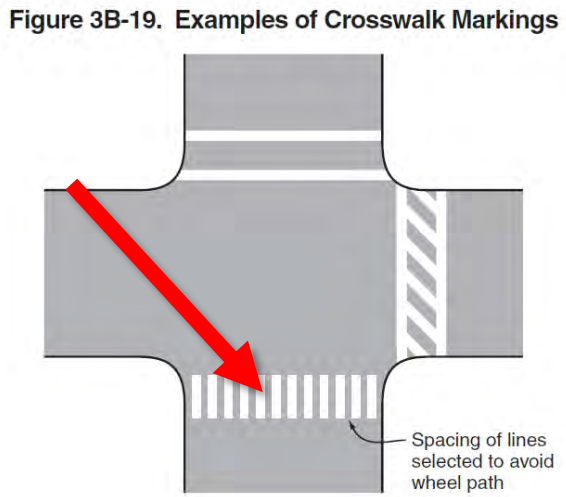
- Streetscape improvements in the Downtown
  - Sidewalks, crosswalks, decorative curbing and cobblestones, bike racks, street trees
  - Plans for additional sidewalks to connect to Elementary school were created but did not materialize

- Route 154 sidewalk connection to Deep River identified in RiverCOG's Bicycle and Pedestrian Master Plan
- 2022 Chester Town-Wide Bike/Ped Path Survey

SAMPLE IMPROVEMENTS TO IMPROVE SAFETY IN THE STUDY AREA

PEDESTRIAN COUNTER MEASURES

Sidewalks



Crosswalks

RRFB

Pedestrian Refuge Islands

Raised Crosswalks

Sidepaths

BICYCLIST COUNTER MEASURES

Sharrows

Bike Lanes

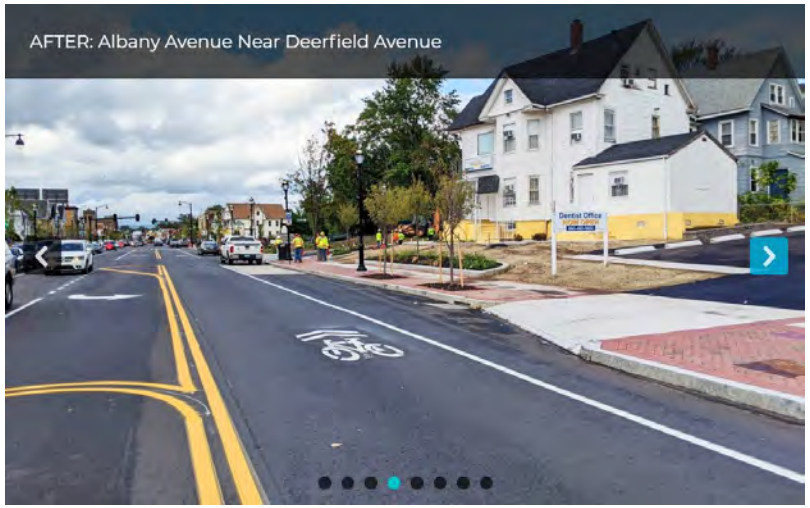
Buffered Bike Lanes

Sidepaths

SPEED REDUCTION – CROSS SECTION AND OTHER

Lane Narrowing

On Street Parking



Streetscape

Median Island

Street Trees

Dynamic Speed Signs

SPEED REDUCTION – HORIZONTAL TREATMENTS

Lateral Shift

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!

Chester Road Safety Audit

Meeting Location: Virtual Meeting

Date and Time: November 2nd, 2:00 PM – 3:00 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.

Chester Road Safety Audit

Meeting Location: Chester Town Hall? Maple Street Parking lot?

Address: 203 Middlesex Turnpike

Date and Time: November 3rd, 9:00 AM

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.

Chester 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	

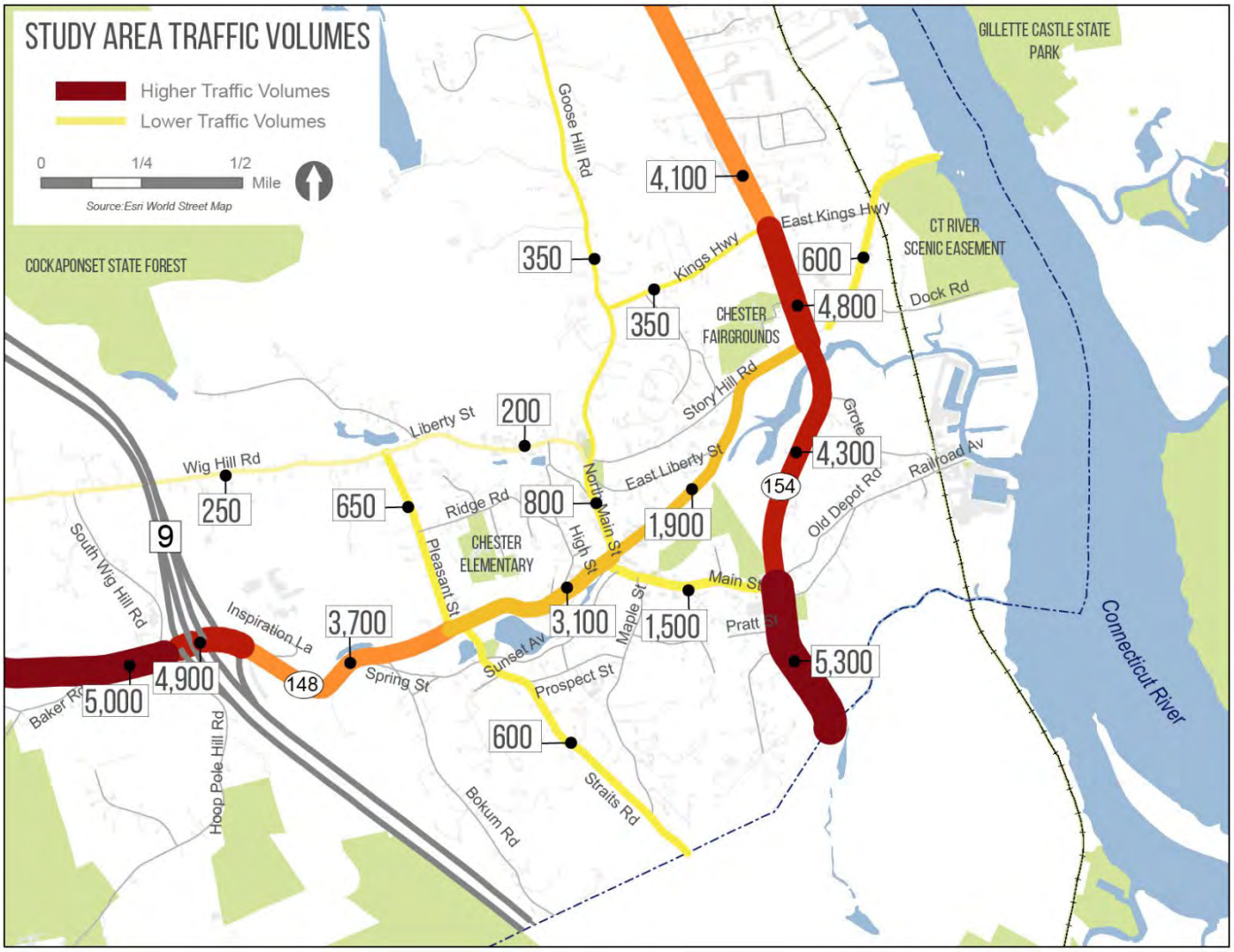
• Miscellaneous
  o Weather conditions impact on design features.
  o Snow storage	

Chester Road Safety Audit - Study Area

- Route 154 between Main Street and Kings Highway
- Route 148 between South Wig Hill/Hoop Pole Hill Road
- Vicinity of Downtown

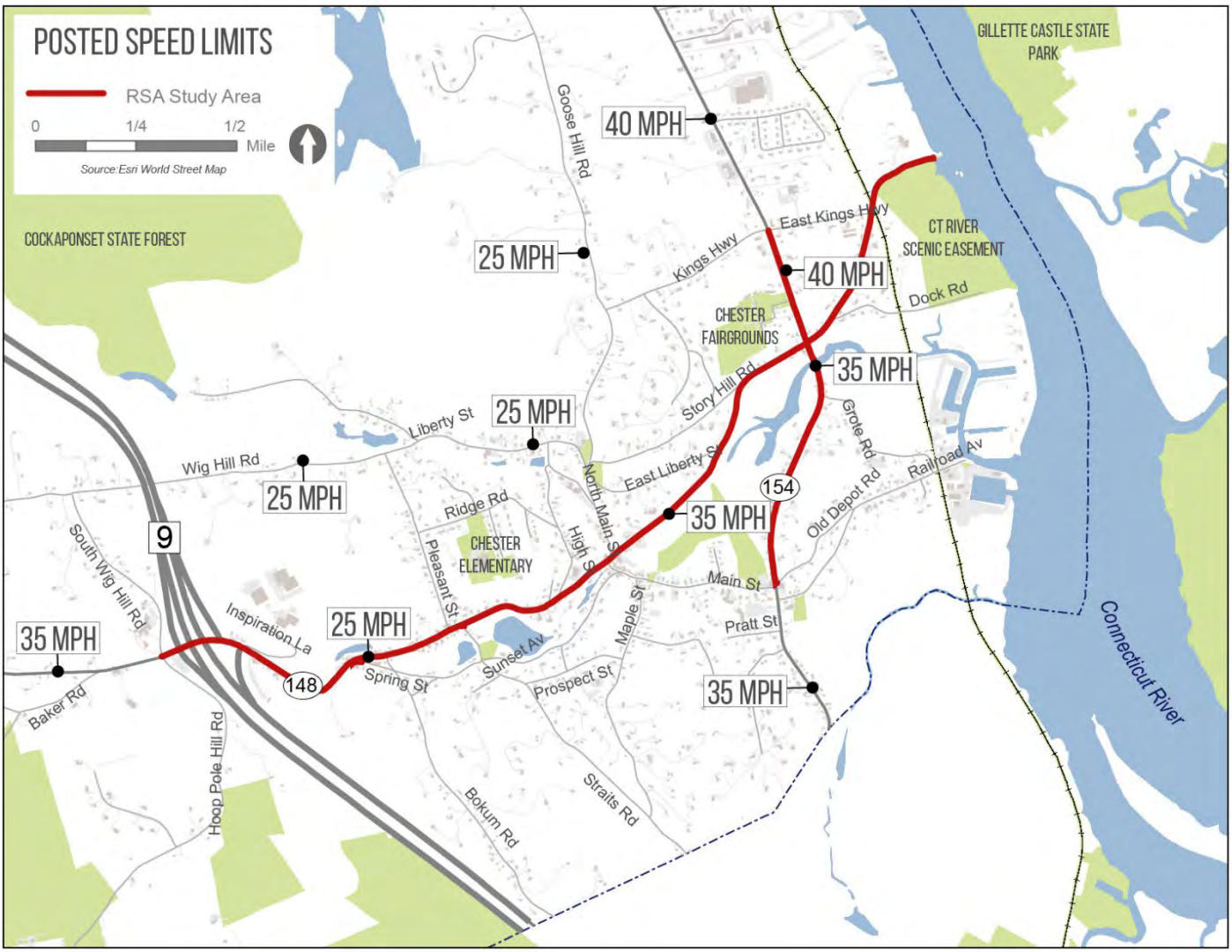
Chester Road Safety Audit - Average Daily Traffic Volumes in 2019

- Highest traffic volumes on Route 154 south of Main Street and Route 148 west of the Route 9 interchange
- On Route 148, east of Route 9, volumes decrease towards the downtown
- Lowest volumes found on local roads

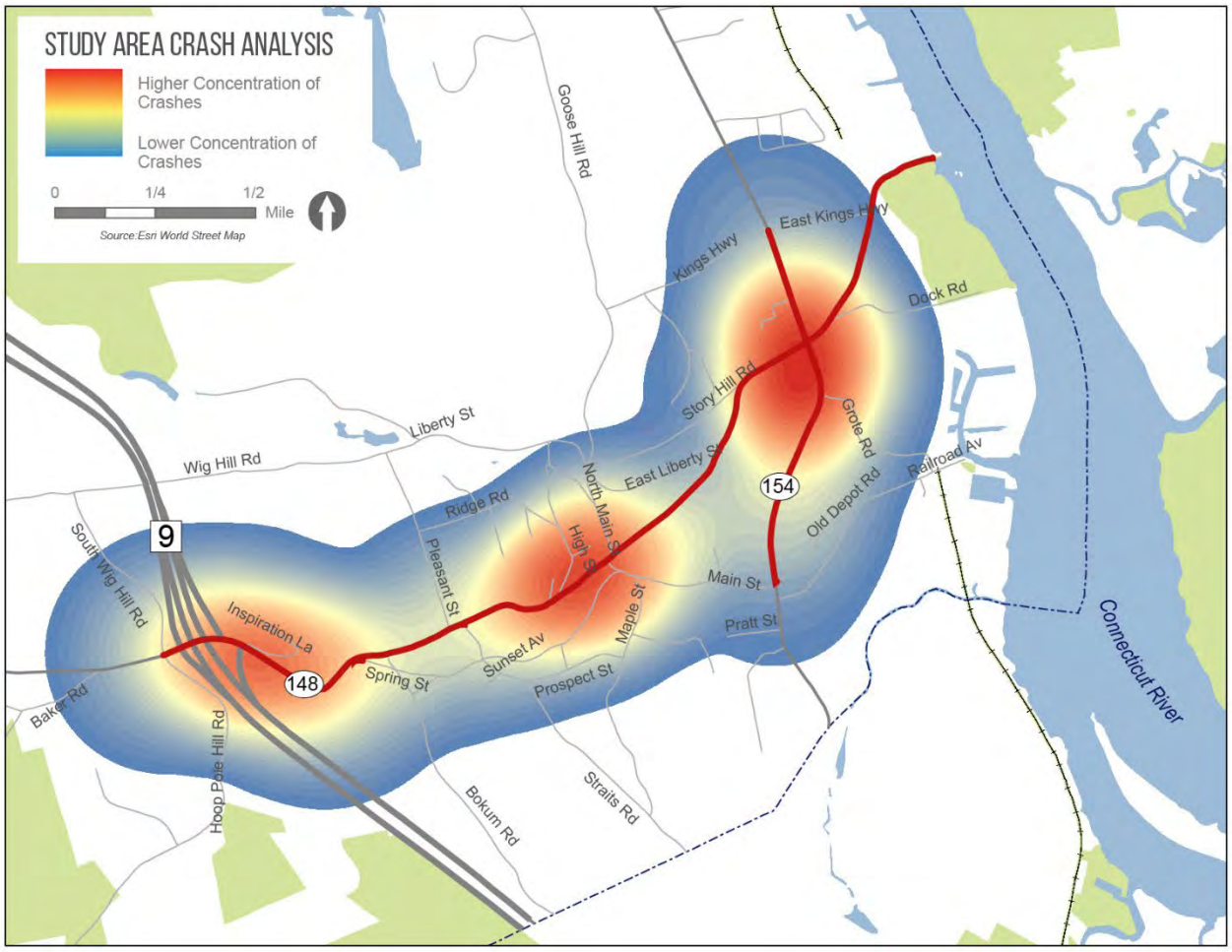


Chester Road Safety Audit – Posted Speed Limits

- Speed limits range from 25 MPH up to 40 MPH
- Route 154 and Route 148 are posted at 35 MPH in the vicinity of downtown
- Route 154 posted at 40 MPH north of intersection with Route 148



Chester Road Safety Audit - Crash Summary Heat Map



Chester Road Safety Audit - Crash Summary

Years: 2017 - 2021

	Crash Severity					
	Fatality	Serious Injury	Minor Injury	Possible Injury	Property Damage Only	**TOTAL**
Angle				1	1	2
Front to front				1	1	2
Front to rear					4	4
Sideswipe, opposite direction			1		3	4
Sideswipe, same direction				1	3	4
Rear to Side					3	3
Rear to Rear						0
Not Applicable			2	2	12	16
Other				1	3	4
TOTAL			3	6	30	39
Crashes Involving Pedestrians	0	0	0	0	0	0
Crashes Involving Bicyclists	0	0	0	0	0	0

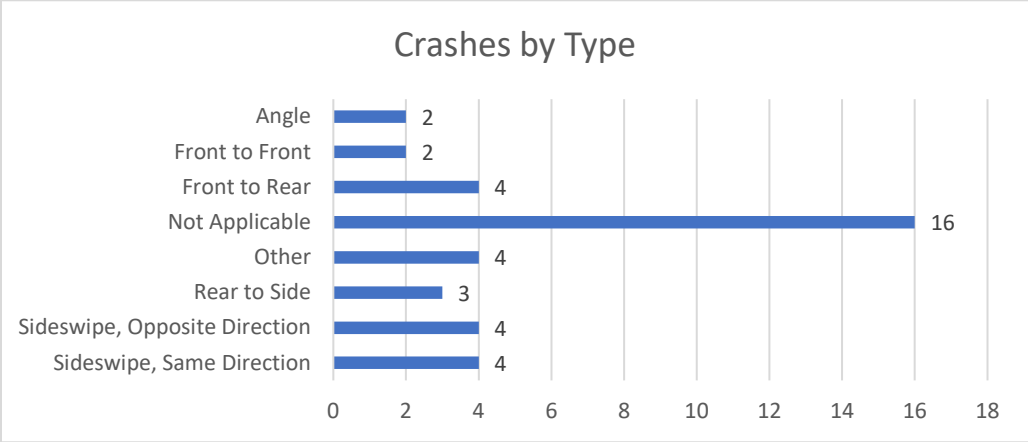
Summary Analysis:

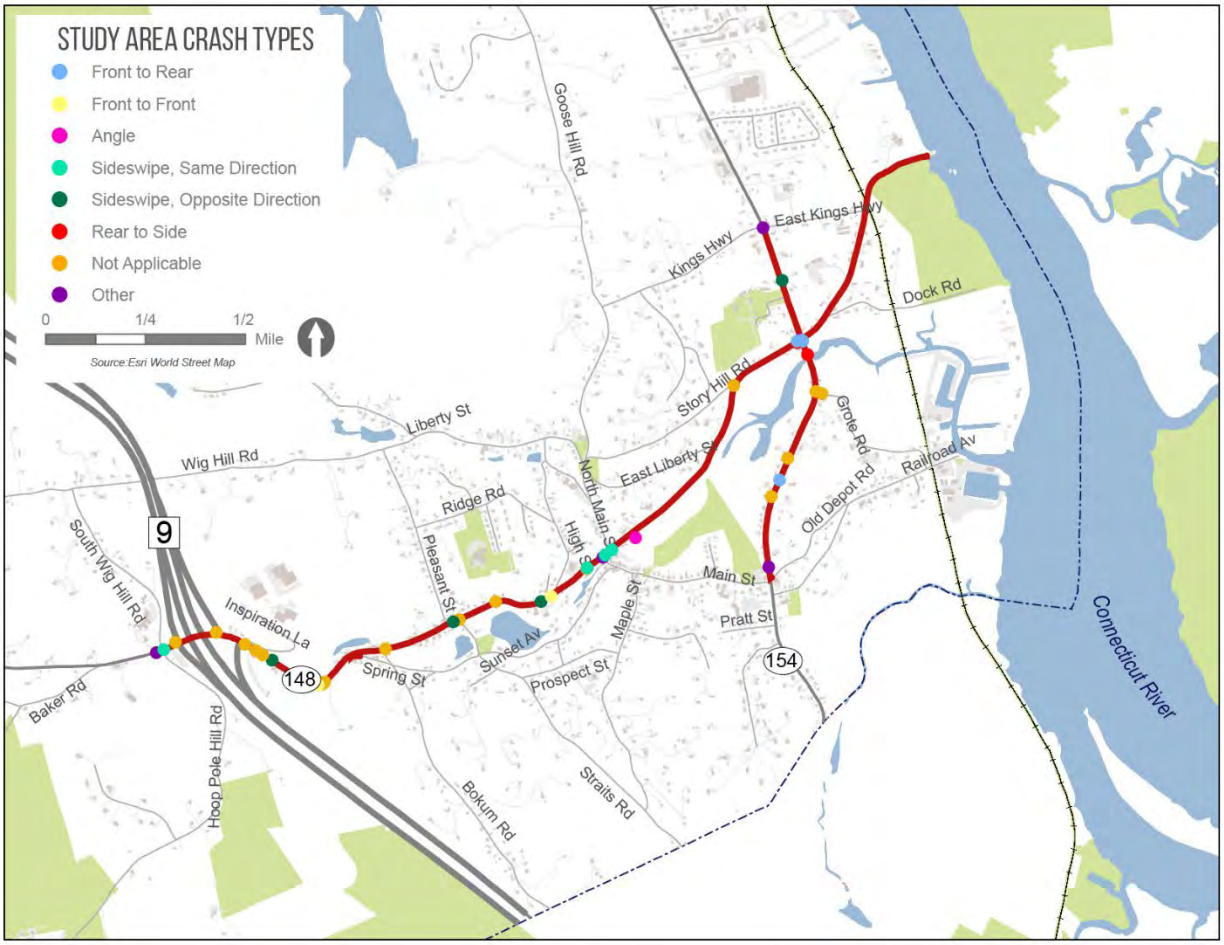
Crash Hotspots (5 Year Crash Total approx.) 39 Crashes Total

- Approximately 8 crashes in the vicinity of Route 154/Route 148 intersection
- Approximately 10 crashes on Route 148 near downtown- narrow, curvy road
- Approximately 8 crashes in the vicinity of Route 148 and Route 9 interchanges

Chester Road Safety Audit Crash Summary - Crashes by Type

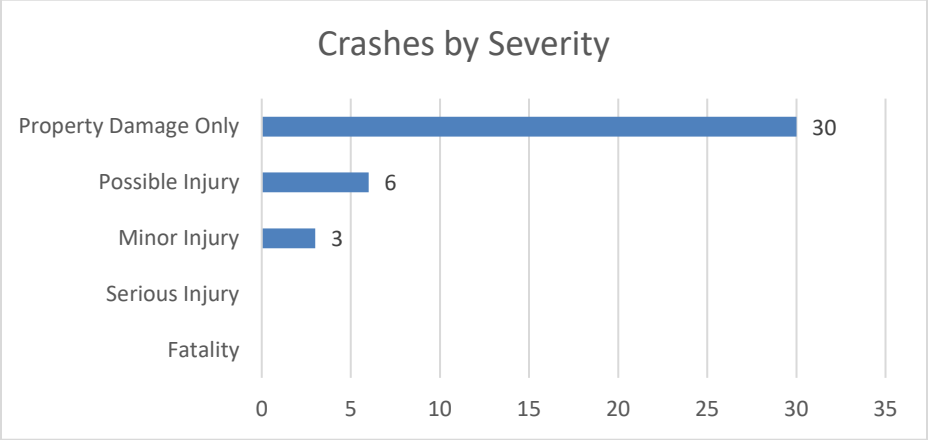
- Majority of crashes are not applicable, indicating crashes were the result of a collision with a fixed object

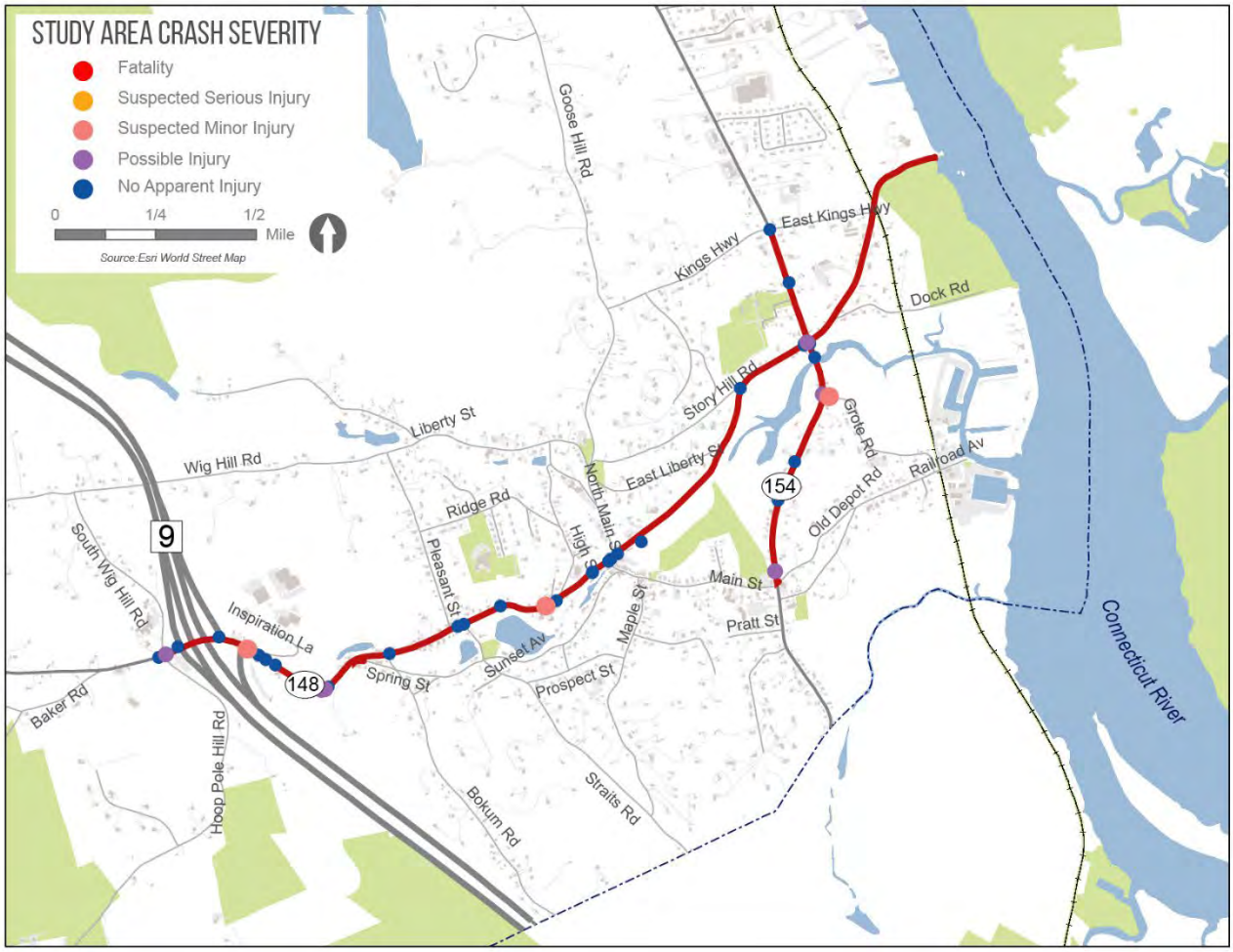




Chester Road Safety Audit Crash Summary - Crash Severity

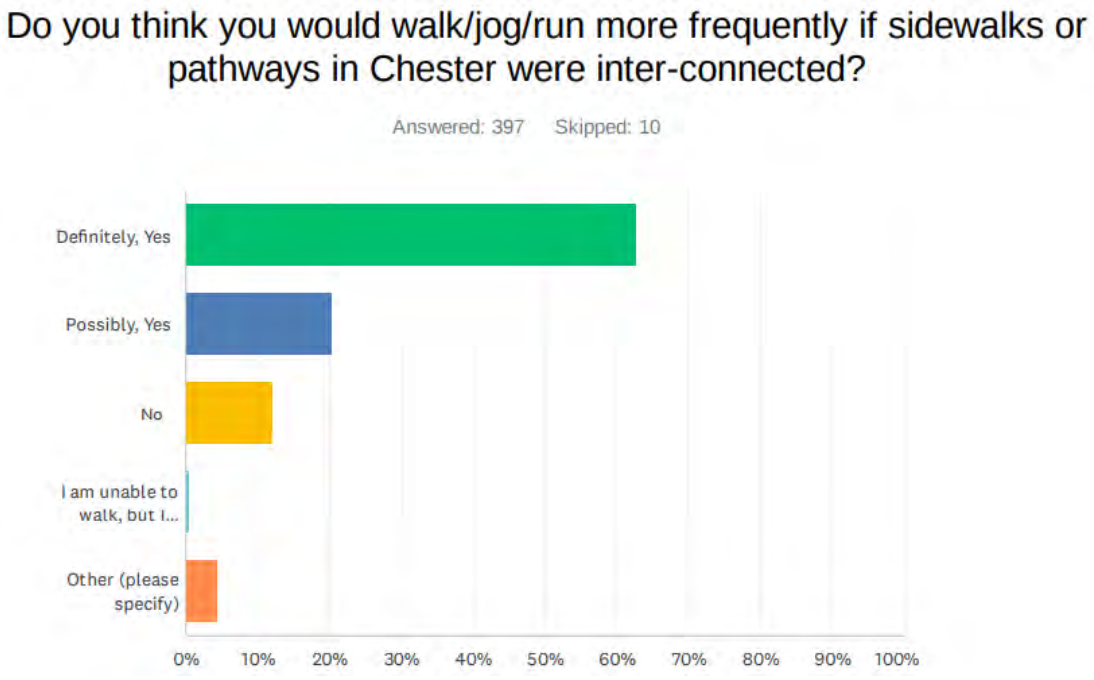
- Majority of crashes (30) are classified as No Apparent Injury- Property Damage Only
- There were 6 crashes resulting in a possible injury and 3 minor injury crashes
- No fatalities or serious injury crashes were reported in the past 5 years




STUDY AREA CRASH SEVERITY
Fatality
Suspected Serious Injury
Suspected Minor Injury
Possible Injury
No Apparent Injury
0
1/4
1/2
Mile
Source:Esri World Street Map
Goose Hill Rd
Kings Hwy
East Kings Hwy
Dock Rd
Story Hill Rd
Liberty St
Wig Hill Rd
East Liberty St
Grote Rd
Railroad Av
Old Depot Rd
154
Ridge Rd
North Main St
High St
Pleasant St
9
South Wig Hill Rd
Main St
Maple St
Pratt St
Inspiration La
148
Spring St
Sunset Av
Prospect St
Baker Rd
Hoop Pole Hill Rd
Bokum Rd
Straits Rd
Connecticut River

Chester Road Safety Audit – Review of Past and Current Work

- Streetscape improvements in the Downtown, 2019
- Sidewalks, crosswalks, decorative curbing and cobblestones, bike racks, street trees
- Plans for additional sidewalks to connect to Elementary School were created but did not materialize
- Route 154 sidewalk connection to Deep River identified in RiverCOG's Bicycle and Pedestrian Master Plan, 2022
- 2022 Chester Town-Wide Bike/Ped Path Survey



Source: Town of Chester Town-Wide Bike/Ped Path Survey, 2022

Chester 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**

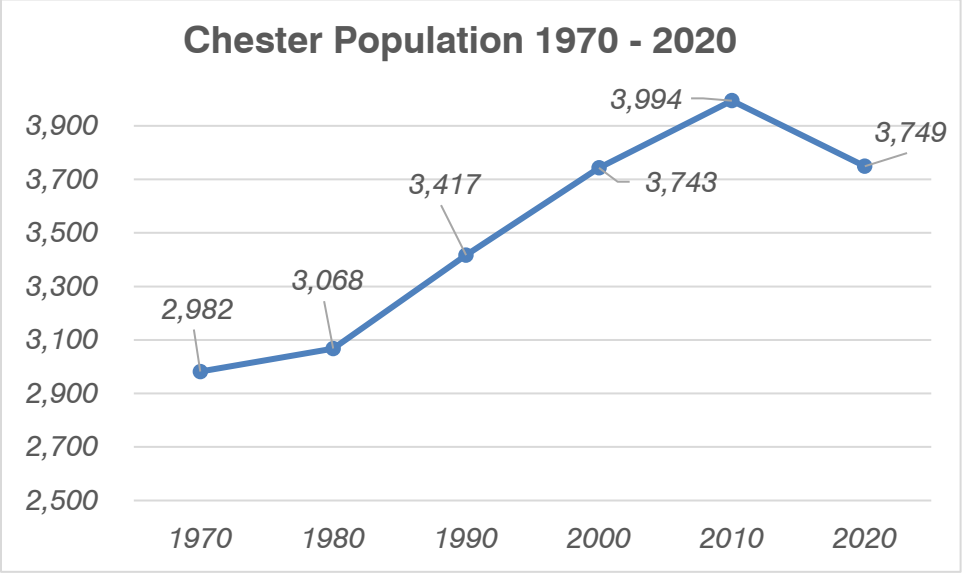
Next Steps

- Discussion involving implementation strategies and responsibilities and funding sources

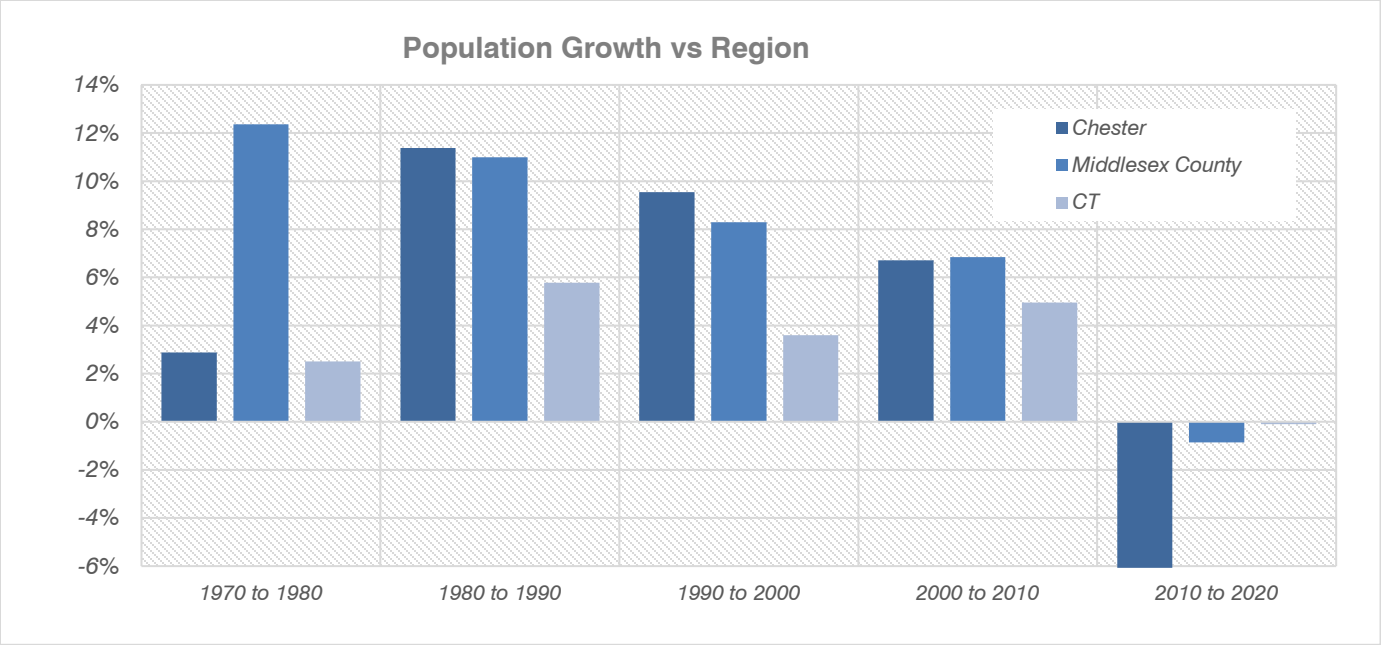
Chester Road Safety Audit – Chester Fact Sheet

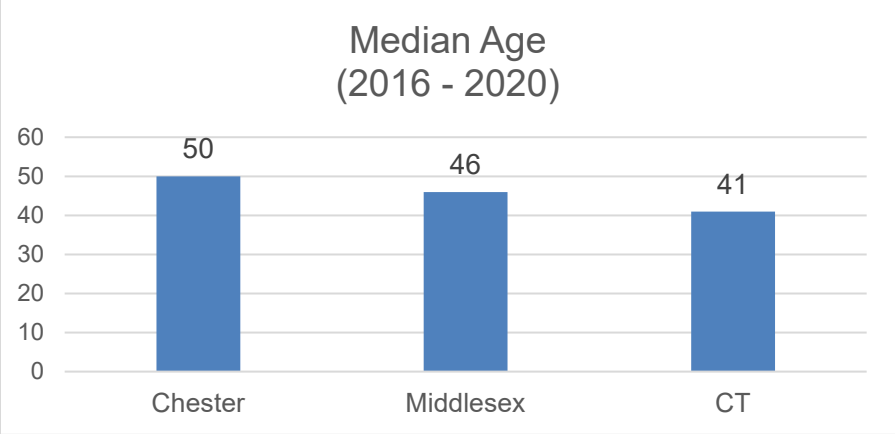
Demographic Highlights[1]:

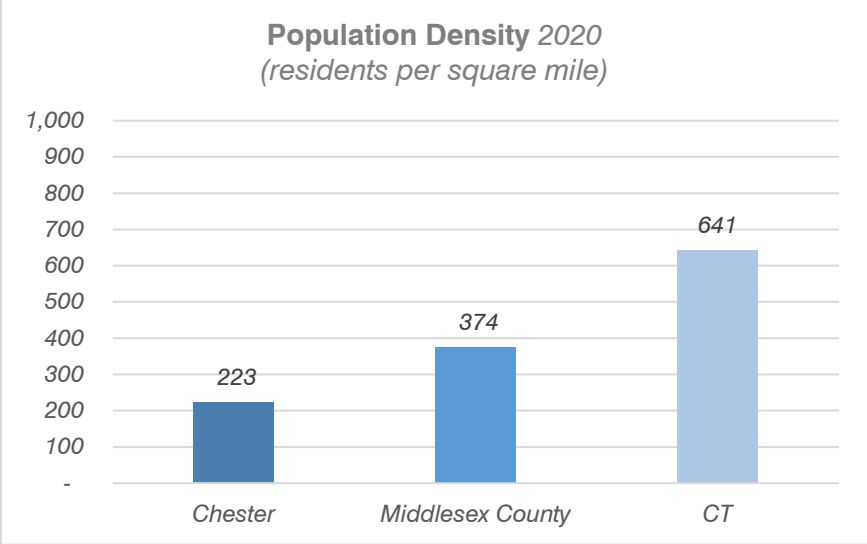
- Total population in Chester is 3,749.
- Chester saw growth between 1970 and 2010. Chester, Middlesex County, and the State all declined in population between 2010 and 2020.
- There are approximately 223 residents per square mile in Chester, making it less densely developed than Middlesex County and much less dense than the State as a whole.
- The median age in Chester is 50. Middlesex County's median age is 46 and the State's is 41 years old.



[1] 2020 Decennial Census and 2016- 2020 American Community Survey, 5- year estimate table DP05, Accessed on 10/31/2022 at https://data.census.gov/cedsci/


Population Growth vs Region
14%
12%
10%
8%
6%
4%
2%
0%
-2%
-4%
-6%
Chester
Middlesex County
CT
1970 to 1980
1980 to 1990
1990 to 2000
2000 to 2010
2010 to 2020

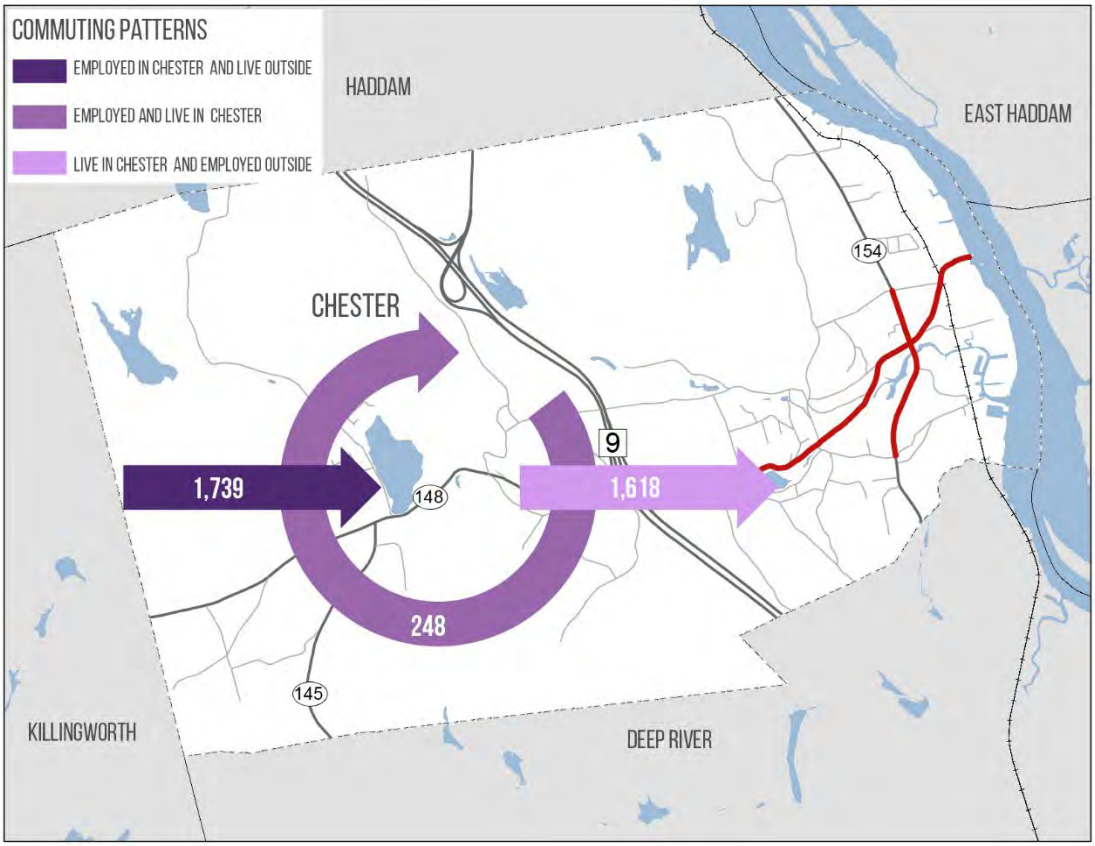

Median Age
(2016 - 2020)
60
50
40
30
20
10
0
50
46
41
Chester
Middlesex
CT


Population Density 2020
(residents per square mile)
1,000
900
800
700
600
500
400
300
200
100
-
641
374
223
Chester
Middlesex County
CT

Chester Road Safety Audit – Chester Fact Sheet

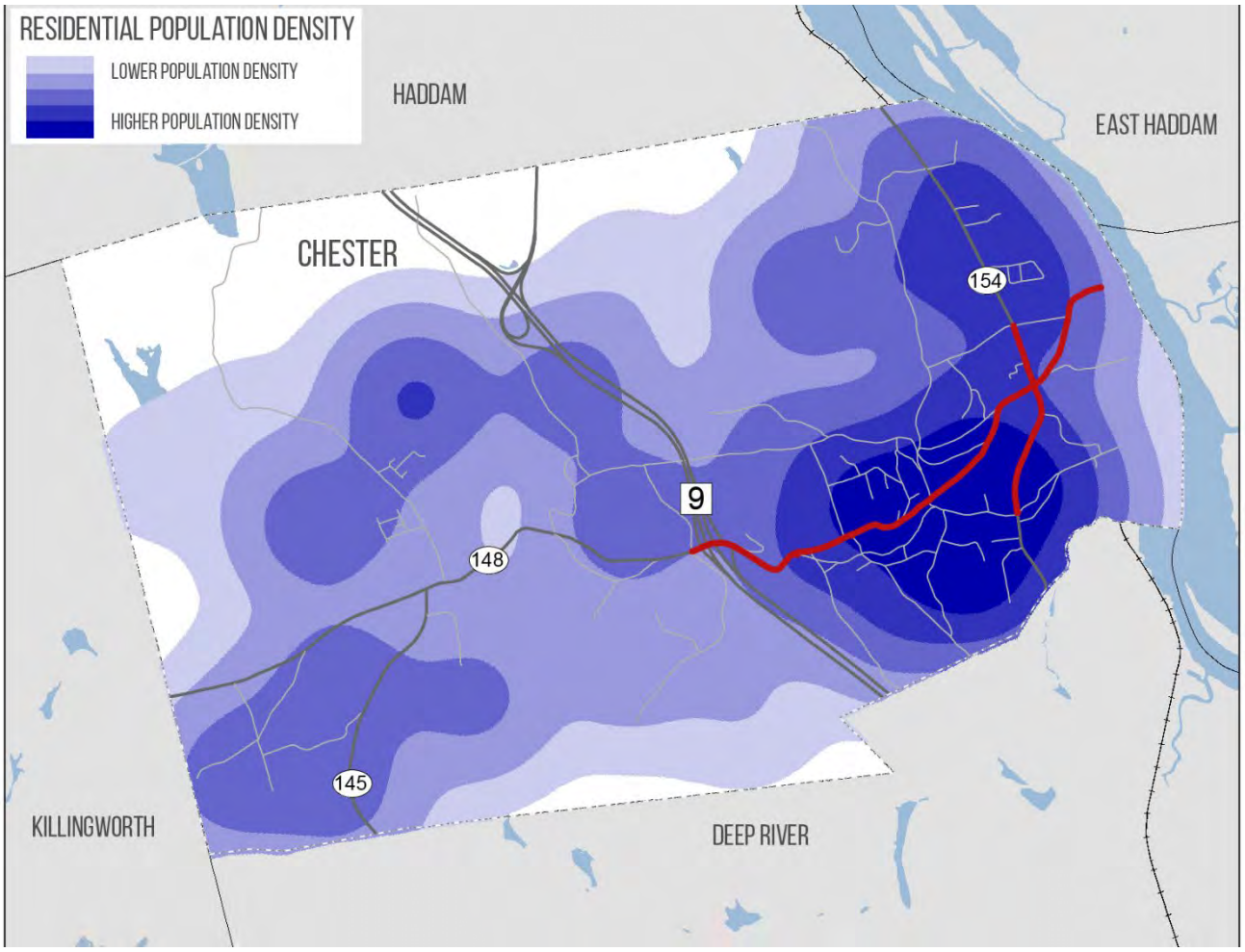
Employment Highlights[2]:

- There were approximately 1,739 workers commuting into Chester for employment in 2019. Approximately 248 residents of Chester are also employed in Chester and 1,618 Chester residents commuted out of town for employment. (2019)
- The top five employment destinations for Chester's residents include:
    - Middletown
    - Hartford
    - New Haven
    - East Hartford
    - Chester
- 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 and restaurant uses, the Chester Elementary School, access to the Chester/Hadlyme Ferry, access to parks and open space



[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 October 29, 2022 at https://onthemap.ces.census.gov. LODES 7.5

Residential Population Density



Chester Road Safety Audit – Roadway Functional Classification

- Route 154 is a Minor and Route 148 are Collector Roadways
- Many other roadways that intersect the Study Area are also Collectors