FINAL

BOSTON POST ROAD CORRIDOR PLAN

CONNECTICUT RIVER TO CLINTON WESTERN TOWN BOUNDARY

PART ONE - Phases 1 & 2: Existing Conditions and Corridor Vision
PART TWO - Phases 3 & 4: Recommendations and Implementation

Submitted By:

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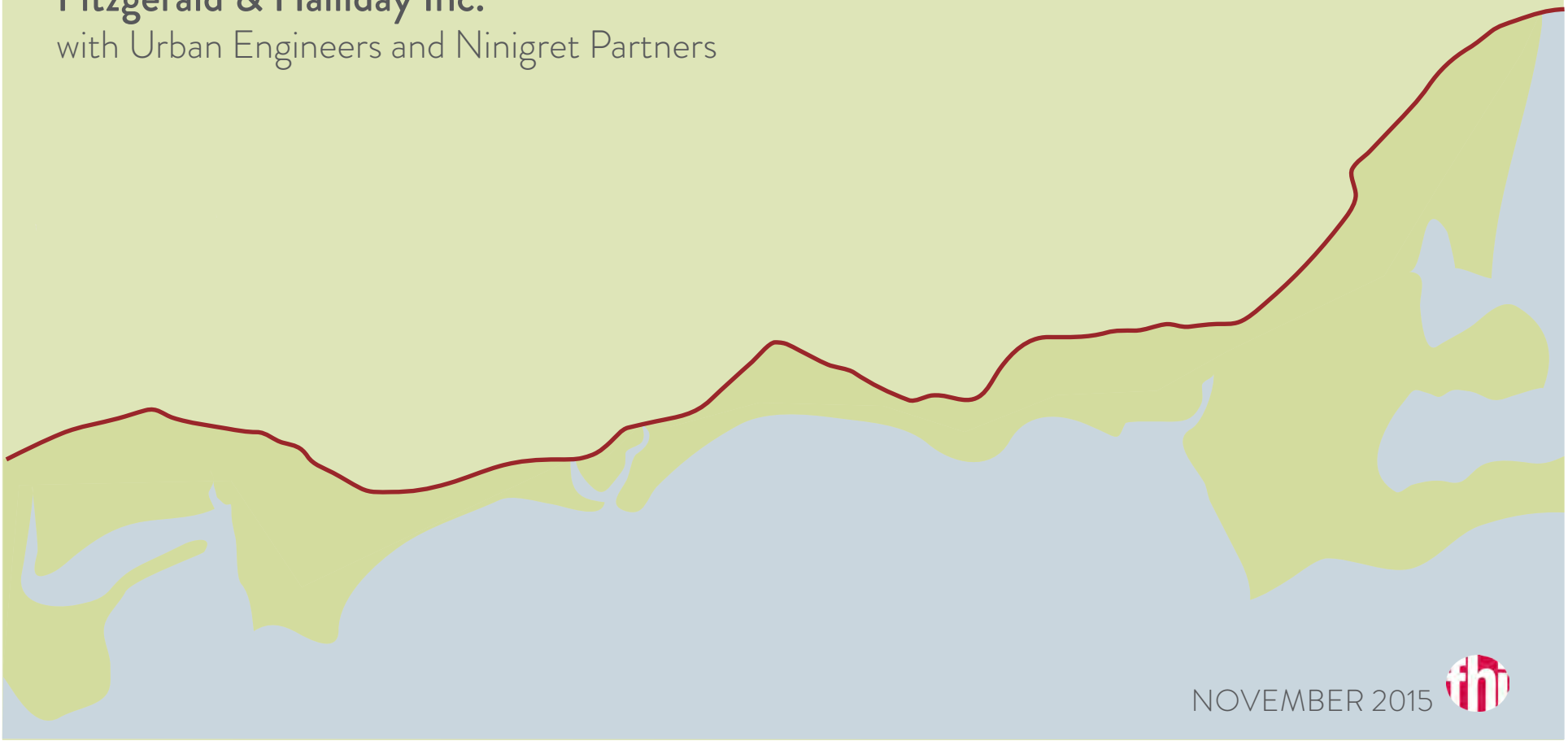
with Urban Engineers and Ninigret Partners



NOVEMBER 2015

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1. Introduction

I. Introduction

A. Background and Purpose

WHAT IS THE PURPOSE OF THE PLAN?

The purpose of the Route 1 Corridor Improvement Plan is to develop a conceptual plan to address current and long-range intermodal travel and community quality of life issues along this route in coastal Connecticut. Based on public and stakeholder input, field data, existing plans, and innovative design options that are acceptable to stakeholders, the plan will serve as a conceptual plan for future design and construction of improvements or projects within the corridor. The plan will also build on opportunities to enhance a seamless intermodal design along the corridor. The study effort will focus on the Boston Post Road within the Towns of Clinton, Westbrook, and Old Saybrook from the Connecticut River south to the western boundary of the Town of Clinton. This study will also result in a coordinated land use and transportation system plan for the Boston Post Road in this study area. Toward this end, the emphasis of the study will be on enhancing the safety, capacity, and multimodal options along the existing Route 1/Boston Post Road, while factoring in smart growth planning, fostering more livable, economically sustainable communities, and complete streets.

The Plan will:

- Establish a *vision* for the corridor – both locally and regionally,
- Evaluate current transportation and land use conditions and investigate opportunities to make improvements ,
- Explore opportunities for continued economic growth using Smart Growth planning principals, and
- Develop recommendations for transportation and land use aimed to achieve the corridor *vision*.

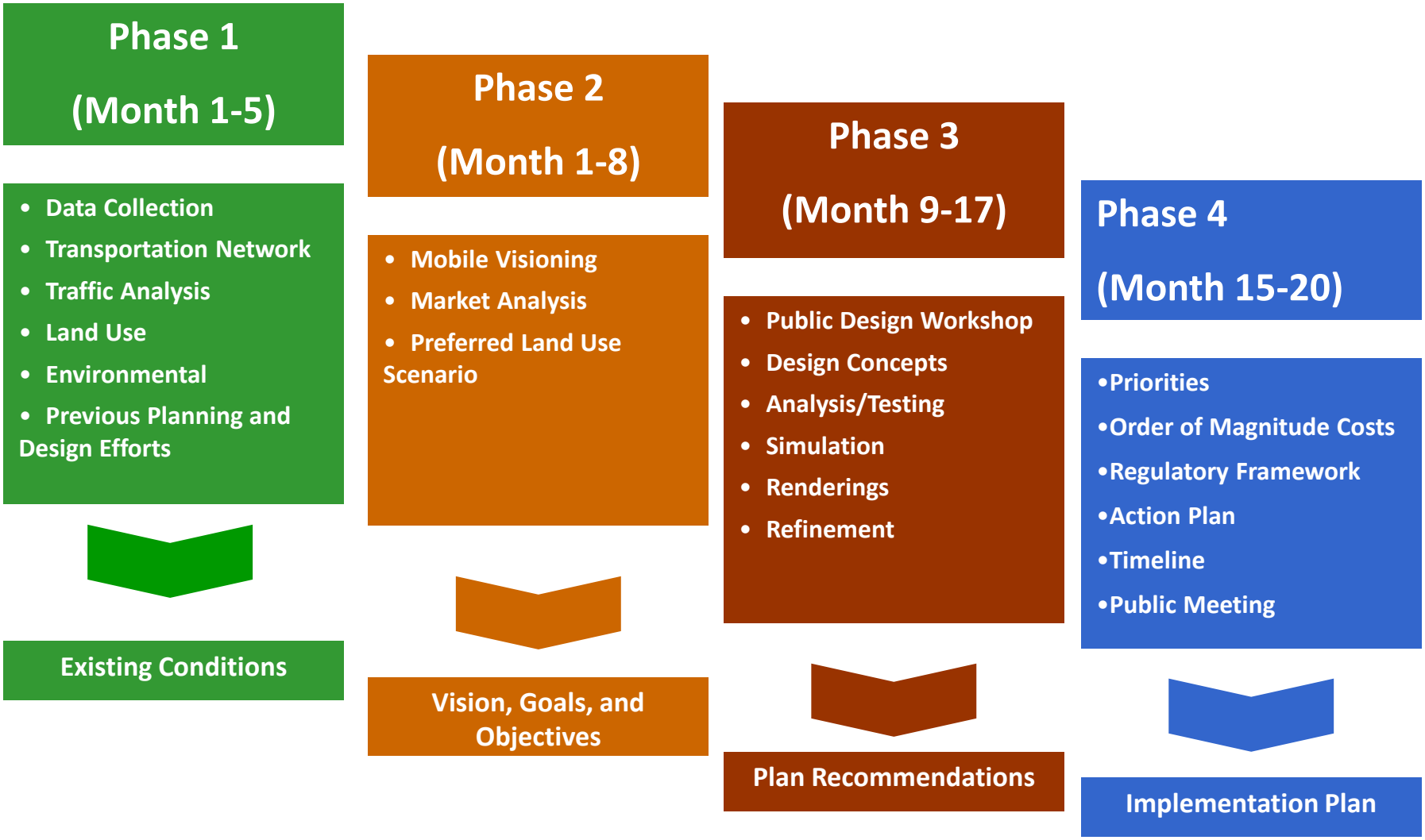
WHO IS RESPONSILE FOR THE PLAN?

The development of this plan is sponsored by the Connecticut Department of Transportation (CTDOT) and is being administered by the Lower Connecticut River Valley Council of Governments (RiverCOG) in partnership with the three towns of Clinton, Westbrook, and Old Saybrook.

HOW IS THE PLAN BEING DEVELOPED?

The plan will be developed in four phases as shown in *Figure 1*:

FIGURE 1: ROUTE 1 STUDY WORK PLAN



Source: Fitzgerald & Halliday, Inc.

Phase 1: Existing Conditions
Phase 2: Vision, Goals, and Objectives
Phase 3: Plan Recommendations
Phase 4: Implementation Plan

This report documents the efforts of the first two phases of the plan development: Existing Conditions and Vision, Goals, and Objectives. Phases 1 and 2 set the stage and framework for development of the corridor plan recommendation and implementation plan. The conclusion of Phase 2 sets a Preferred Land Use Scenario that is based on the broad vision for the corridor in the context of environmental and development constraints. Results of these two phases will illustrate existing issues and opportunities, and will set a vision for the corridor that allows the study team to evaluate the various alternative improvement options to help reach the community's vision.

Throughout the plan development process, a variety of community engagement and stakeholder outreach has been employed to ensure that the plan benefits from the perspective of the variety of users and stakeholders in the corridor.

WHO IS PROVIDING INPUT INTO THE PLAN?

A proactive and comprehensive public involvement plan has been developed and is being implemented to support the development of the Route 1 Corridor Plan. Public involvement takes place at three levels over the course of the study, which together provide for broad interactive community involvement and in-depth stakeholder participation. A broad range of community and stakeholder engagement efforts are being employed including:

Study Advisory Committee

A Study Advisory Committee (SAC) has been formed and consists of representatives from municipal staff from each town, Estuary Transit District, CTDOT, RiverCOG, special interest groups including representatives from the business community, tourist industry, school community, environmental interest, bike/pedestrian interests, and residents.

The role of the SAC is to:

- Offer information and expertise about local conditions and issues
- Provide a broad range of perspectives
- Brainstorm with the project team on solutions
- Review and comment on study recommendations
- Help raise awareness about the Plan efforts to support public events
- Support the consensus of this group within the community

Technical Input Meetings

In addition to the Study Advisory Committee, day-to-day technical input from professionals such as fire, police, ambulance, maintenance, and school transportation providers is helpful in understanding many issues that might not easily show from data or field visits. A series of two rounds of technical input meetings are being held to support this plan development; one to help identify issues and ideas and a second to seek feedback on the plan elements.

Public Engagement

A variety of other public input venues and events support the plan development and include:

- A project webpage hosted on the RiverCOG website: www.Rivercog.org/Route1.html where a variety of study information is posted and updated periodically
- Interactive study visioning booths at large public events around the 2013 winter holiday season
- Study displays in all three towns (Town Halls and Libraries) with handouts providing the address of the project webage
- An on-line visioning survey to help establish long-term communtiy vision and priorities in the corridor
- a full-day public design workshop planned for June 2014

- a final public informational meeting to present the draft plan and receive comments on it's content

B. Study Area

The Route 1 Corridor Plan is being developed for the three towns of Clinton, Westbrook, and Old Saybrook. The corridor spans approximately 12 miles as shown in *Figure 2* and provides access to a wide variety of retail and restaurant establishments, neighborhoods, beach communities, civic buildings and spaces such as town halls and town greens. While considerably different from each other, all three towns are still considered to be relatively small coastal towns that experience a large influx of population and visitors during the summer months. The three towns are comparable in land area at 15 to 16 square miles each. Of them, Old Saybrook has the largest job base and is considered a hub in the region for retail opportunities. While Clinton and Westbrook are less intensely developed, they too have significant regional retail destinations with the Tanger Outlet Mall in Westbrook and the Clinton Crossing Premium Outlet Mall on Route 81 and other significant retail in and just east of the village in Clinton on Route 1. While Route 1 is generally a retail corridor serving local and regional needs, the towns maintain a strong sense of community and pride in the unique coastal character and environmental and recreational resources. There is a significant increase in summer population and activity associated with the shoreline neighborhoods, beaches, and marinas and the region in general is considered an attractive tourist destination.

FIGURE 2: STUDY AREA

Source: GIS Base Map Data provided by Towns of Clinton, Westbrook, and Old Saybrook, 2013.

Some of the key elements that define Route 1 include:

- Town Centers in Clinton and Westbrook, with Old Saybrook's Town Center just south of Route 1 on Main Street
- Each town has a train station providing access to Shoreline East Commuter Rail to New Haven; The Old Saybrook station also provide access to Amtrak intercity passenger rail service
- Town greens in Westbrook and Clinton on Route 1
- A variety of retail establishments from small "mom and pop" stores to plazas with national retailers such as Staples, West Marine, Marshalls, Walmart, and Home Goods
- A thriving marina community with one of the State's largest recreational marinas, Pilot's Point in Westbrook, as well as many smaller recreational marinas and supporting boating industry businesses
- Access to the CT waterways and shoreline beaches in all three towns and a number of significant resorts such as the Water's Edge and the Saybrook Point Inn

With the exception of a short stretch in Old Saybrook, Route 1 is generally a two-lane arterial that meanders along the shoreline and provide direct access to the wide variety of properties along its length. Some sections of Route 1 are much busier than others with Old Saybrook generally characterized by larger-scale retail development; Westbrook generally characterized by smaller retail mixed with residential, civic, and open space; and Clinton generally characterized by a mix of retail on the outskirts of a well-defined Town Center.

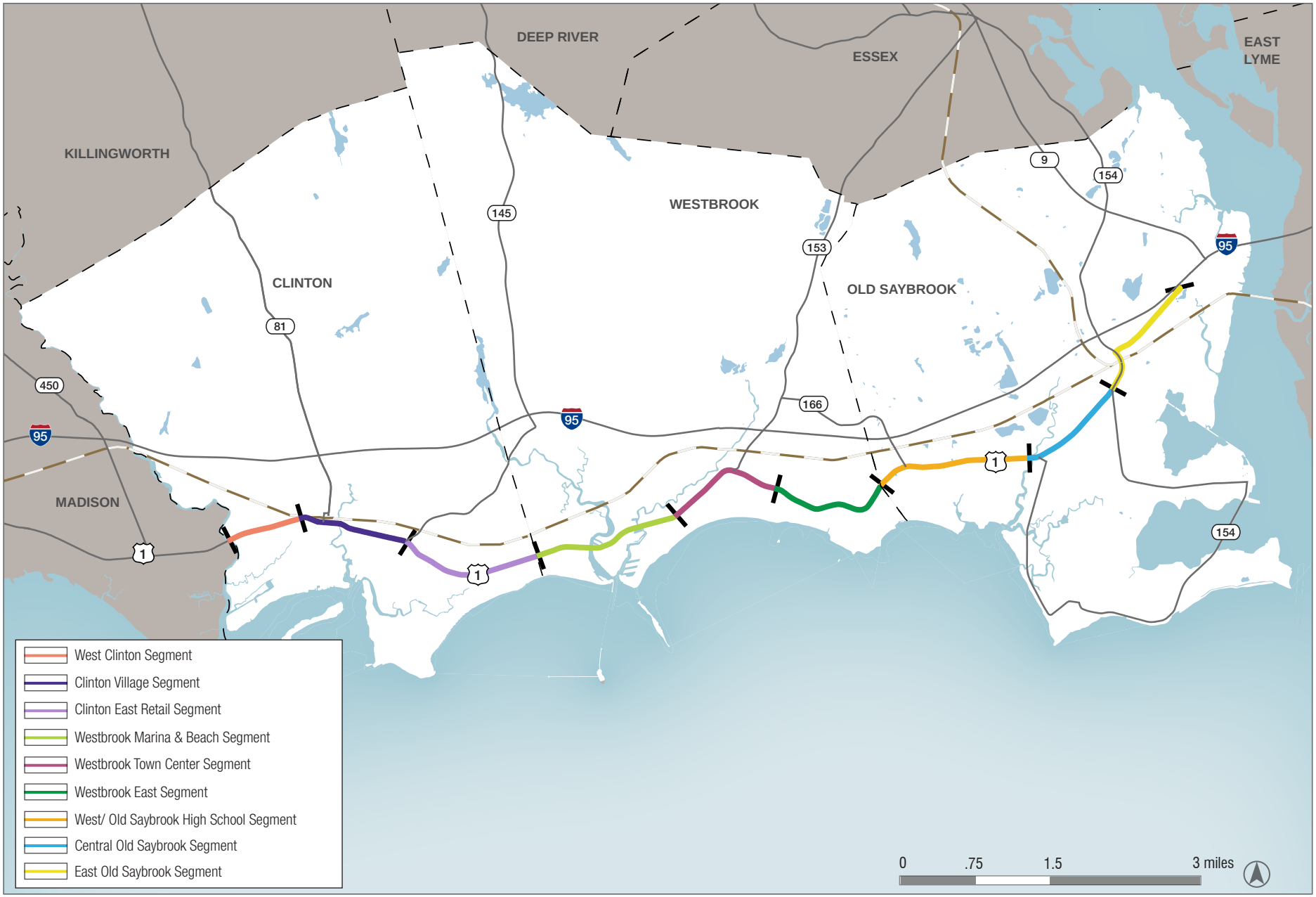
In order to present the variety of existing conditions, the corridor was divided into nine (9) distinct segments as shown in *Figure 3* and summarized in Table 1.

Table 1: Route 1 Corridor Segments

Segment Name	Extends Eastward from…	Through Intersection with
West Clinton Segment	The town border between Madison and Clinton	Grove Street
Clinton Town Center Segment	Grove Street	Old Post Road/ Route 145
Clinton East Retail Segment	Old Post Road/ Route 145	The town border between Clinton and Westbrook
Westbrook Marina and Beach Segment	The town border between Clinton and Westbrook	Eckford Avenue
Westbrook Town Center Segment	Eckford Avenue	Westbrook Heights
Westbrook East Segment	Westbrook Heights	The town border between Westbrook and Old Saybrook
West/ Old Saybrook High School Segment	The town border between Westbrook and Old Saybrook	Ingham Hill Road
Central Old Saybrook Segment	Ingham Hill Road	Main Street
East Old Saybrook Segment	Main Street	The end of the study area

Source: Fitzgerald & Halliday, Inc.

FIGURE 3: ROUTE 1 SEGMENTS



Source: Fitzgerald & Halliday, Inc.

C. Planning Context

The Lower Connecticut River Valley Council of Governments (RiverCOG) initiated this study to take both a local and regional look at the future of the corridor with respect to land use and transportation. All three towns have completed significant planning efforts that provide input and context into the development of this overall regional corridor plan. The state DOT (CTDOT) has also been investing in the train stations. A series of projects, studies, initiatives, and plans have been conducted or are underway including:

Clinton

- Current Unilever Redevelopment Study; ongoing
- Plan of Conservation and Development; 2007
- Safe Routes to School Masterplan; July 2011 including the Abraham Pierson School on the north side of Route 1 on the east side of the village
- The Bike and Pedestrian Alliance of Clinton (BPAC) – Proposal for safer accommodation of bicyclists on State Routes in Clinton
- Commuter rail station upgrades - planned
- Draft – Clinton Natural Hazards Mitigation Plan - 2013
- Town Plan of Conservation and Development; ongoing

Westbrook

- Sidewalk enhancement program; ongoing
- Town Green village plan
- 2011 Plan of Conservation and Development
- Safe Routes to School Plan, Daisy Ingraham School
- Upgrades and expansion to the Shoreline East station; under construction
- Town Center Master Plan – UCONN Community Research and Design Collaborative
- Natural Hazard Mitigation Plan
- Town Sidewalk Improvement Plan
- Town Center Parking Project
- Menunketesuck-Cockaponset Regional Greenway

Old Saybrook

- Mariner's Way – Route 1 East in Old Saybrook – A vision to improve the Route 1 connector between Saybrook Junction's Town Center and Ferry Point's Marina District; August 2013
- Old Saybrook Route 1 Corridor Study – Yale Urban Design Workshop; December 2005
- Old Saybrook Plan of Conservation and Development; February 2006
- North Main Street Sidewalk Plan; January 2012
- Old Saybrook Sidewalk Plan; February 2006
- Upgrades to the Old Saybrook Train Station and additional parking plans; CTDOT
- Old Saybrook Train Station Transit Oriented Development efforts

Just west of the study corridor, the Shoreline Greenway Trail is a project underway with various sections complete of a continuous 25-mile multi-use trail from Lighthouse Point in New Haven, through East Haven, Branford, and Guilford, to Hammonasset State Park in Madison. This project is being led by an all-volunteer organization that recognizes the value of providing off-road multiuse access to the shoreline for recreation. The RiverCOG is also currently developing the regional bicycle and pedestrian plan which will outline the greatest opportunities for biking and walking in the region as well as improvements to the biking and walking network.

These efforts provide the planning context from which this Route 1 Corridor Plan will be developed. The study team will consider all these plans and projects within the larger study corridor context and vision.

II. Existing Transportation Conditions

II. Existing Transportation Conditions

A. Route 1 Overview

INTRODUCTION TO THE TRANSPORTATION SYSTEM

Route 1 is a unique transportation facility as it serves many functions and users. It is geographically situated between I-95 to the north and coastal areas to the south and as such provides direct access to several coastal communities. In fact, Route 1 in many areas is within walking distance to the coast. For this reason, Route 1 is heavily relied on for tourism activity and a large influx of seasonal residents during the summer months. Route 1 serves many purposes including:

- Regional and state tourism
- Recreational activities including boating
- Local and regional truck traffic
- Local residential and shopping access
- Employment commuting
- Bicycle and pedestrian activity
- Local business access
- I-95 diversion route
- Emergency and Security Response

The profile of users varies along the corridor as does the traffic demand. This is evident by nearly 17,000 daily trips along Route 1 in Old Saybrook and approximately 12,000 daily trips in Clinton and Westbrook. The Route 1 corridor is the transportation spine for this region of Connecticut, and as such it must accommodate and continue to plan for a wide array of users with varying trip purposes and travel modes. The needs of all users must be evaluated in a comprehensive manner, thus preserving the integrity of the roadway, as a local and regional transportation asset. The Route 1 Corridor Improvement Plan will 1) consider the integration of all modes and travel choices in the corridor, 2) address any gaps in the transportation system, and 3) suggest a prioritized investment strategy to implement infrastructure projects that align with community goals and objectives.

REGIONAL ACCESS

Route 1 is a major north-south US Highway that serves the east coast of the United States. It runs over 2,300 miles from Key West, Florida, north to the Canadian border in Maine. In Connecticut, Route 1 serves towns and cities as a parallel facility to I-95 making its way along the Long Island Sound. Within the study area, five (5) CT State Highways intersect with Route 1 including Routes 154, 145 and 81 – important corridors with connections to I-95. While Route 1 itself is responsible for the conveyance of people and goods along this busy corridor, a parallel passenger and freight rail line shares the responsibility. Three train stations – one in each town - are situated directly adjacent to Route 1 providing regular service to locations such as New Haven and New York City to the south, and to Providence and Boston to the north. Regional bus service serving destinations throughout New England is also provided on Route 1 with stops located near train stations. *Figure 4* illustrates the regional connectivity of the Route 1 corridor.

FIGURE 4: LOCAL AND REGIONAL TRANSPORTATION ACCESS

Source: Fitzgerald & Halliday, Inc.

FUNCTIONAL CLASSIFICATION/REGIONAL NETWORK

Functional classification is the process by which streets and highways are grouped into classes, or systems, according to the degree of mobility that they are intended to provide and the role they play in the overall roadway network. In many cases, the key word is simply what streets and highways are *intended* to provide. This section will help set the stage for a more in-depth discussion regarding the function of Route 1.

According to the Federal Highway Administration (FHWA), the three general functional systems are arterials, collectors, and local streets. Most state and local agencies adhere to this functional classification system, which is required for allocating federal funding to roads designated as part of the Nation Highway System. Table 2 provides a brief description of each functional system's traffic service they are intended to provide.

Table 2: Three Functional Systems

Arterial	Provides the highest level of service at the greatest speed for the longest uninterrupted distance, with some degree of access control.
Collector	Provides a less highly developed level of service at a lower speed for shorter distances by collecting traffic from local roads and connecting them with arterials.
Local	Consists of all roads not defined as arterials or collectors; primarily provides access to land with little or no through movement.

Source: FHWA

While arterials, collectors, and local roads span the full range of roadway functions, the Federal and at times local functional classification scheme uses additional categories to describe these functions more precisely. Distinctions between access-controlled and full-access roadways; the urban and rural development pattern; and subtleties between "principal" and "minor" sub-classifications are key considerations when determining the Federal functional classification category to which a particular roadway belongs. The process of determining the correct functional classification of a particular roadway is as much art as it is science. While Route 1 formally serves north-south traffic along the east coast of the United States, in the study area, it is characterized as a two- or four-lane arterial that serves east-west traffic between towns within the region. As such, according to the intended description, Route 1 reflects travel characteristics that require the highest level of service at the greatest speed for the longest uninterrupted distance, with some degree of access control. However, in reality Route 1 is more than an inter-regional highway. It also functions as a collector and a local road, depending on the context of the environment in which it serves. *Figure 5* illustrates where Route 1 fits into the federal functional classification system within the region.

FIGURE 5: FEDERAL FUNCTIONAL CLASSIFICATION SYSTEM

Source: Functional Classification Data - Connecticut Department of Energy & Environmental Protection (DEEP), 2013.

Unintended Consequences

The actual function and role of each street is more nuanced than the federal functional classification system used by state Departments of Transportation that seek federal funding for road projects. Often, roadway design standards are tied to functional classification as well, and the prevailing national and local design manuals tend to encourage optimizing the public right-of-way for automobile mobility. These common practices often have unintended consequences such as chronic congestion, increased injuries and fatalities, low pedestrian and bicycle use, decline in human health, poor transit performance, increased noise and emissions, increased street-water runoff, increased parking (and decreased developable space), and a general decrease in the quality of life of a place. Given the unique character of this corridor, this study will be driven largely by local context, rather than the intent of generalized functionality; however, this will be balanced by a recognition of the regional role of the corridor and the ability to acquire federal funding stipulated by such formal classifications.

B. Travel Demand

Travel demand refers to the amount and type of travel people choose under specific conditions. This section will help set the transportation stage for the Corridor Improvement Plan by understanding the historical and existing travel demand context of Route 1.

HISTORICAL TRAFFIC

When analyzing a corridor, it is important to understand the change that has occurred over time in order to better understand current travel demands and anticipated future travel demands The Connecticut Department of Transportation (CTDOT) maintains permanent count recorders embedded within certain roadways throughout the state that continuously monitor traffic conditions. While this permanent data is very useful, it is also limited in its deployment; therefore, only three locations near the study area have permanent count stations with historical data available. Because tourism during the summer months increases demand, both winter and summer weekday average daily traffic (ADT) conditions have been presented. An index of historical traffic volumes was created in Table 3 at each location near the study area where data was available from 2005 through 2012. Demand has increased along the state highway network during winter and summer periods but has decreased along I-95. This may be due to national trends as a result of the economic downtown, which has shown only a nominal recovery in demand along interstate networks throughout the country.

This historical assessment is useful for understanding traffic in the region, but does not provide specific information about Route 1 within this study area. Traffic on Route 1 will ultimately vary from street to

Table 3: Historical Traffic Trends

Location	Count Month	2005	2006	2007	2008	2009	2010	2011	2012	Annual Growth Rate
Route 1 in Lyme	January	3,300	3,100	3,100	3,400	3,100	3,400	3,200	3,500	**0.84%**
	August	4,400	4,300	4,700	4,600	4,900	5,200	5,800	4,900	**1.55%**
Route 81 in Clinton	January	6,400	7,000	7,000	6,900	6,400	6,900	6,400	7,000	**1.29%**
	August	8,600	8,400	8,600	N/A	8,900	8,800	8,600	8,700	**0.17%**
I-95 in Lyme	January	62,300	61,100	63,200	62,200	58,000	60,200	N/A	N/A	**-0.68%**
	August	86,800	85,100	86,800	84,200	84,700	83,200	N/A	N/A	**-0.84%**

N/A: no counts available

Source: CTDOT

street with the highest demand – including development – near major access points. Route 1 has experienced traffic demand fluctuations over time as a result of localized land use changes. By no means will this historical trend guarantee similar outcomes in the future. It attempts to provide regional context to help understand how traffic patterns change over time.

EXISTING TRAFFIC

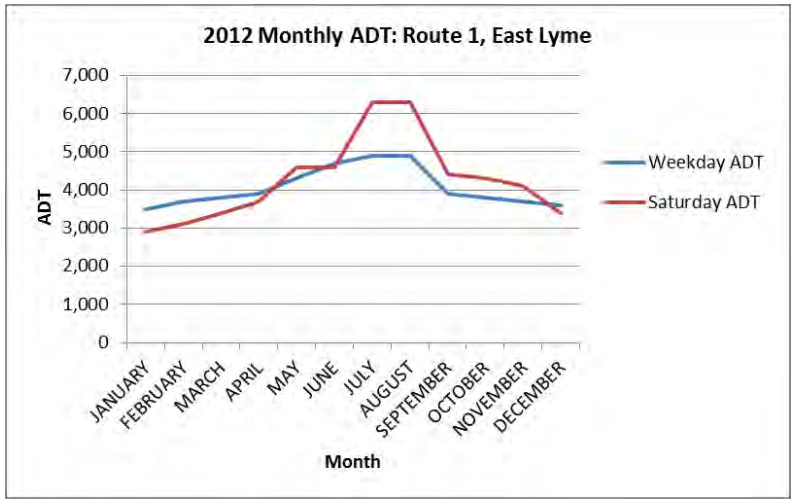
Available traffic counts along Route 1 were assembled from CTDOT's automatic traffic recorder (ATR) database. This database system contains 24-hour traffic counts, usually data collected on a Tuesday, Wednesday, or Thursday, at various locations throughout the state, and were used in the historical assessment. Some counts available through CTDOT's ATR database are several years old; therefore, new 24-hour daily volume counts were collected in August 2013 at concurrent locations to understand existing conditions. The raw data can be found within the *Appendix.*

As counts were generally collected during summer peak conditions, it is important to also understand non-summer, typical-day traffic conditions to avoid overstating traffic demand that may only occur during short periods throughout the year and on summer weekends.

Seasonal Variations

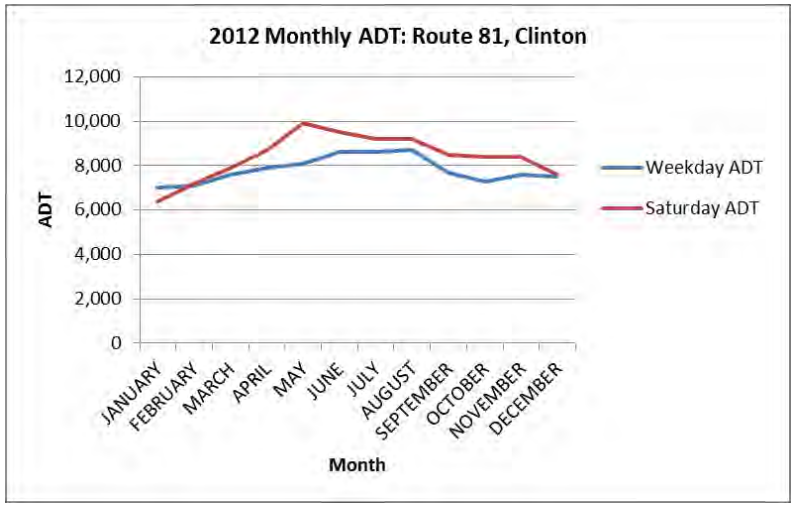
Seasonal variations are important and reflect the changing patterns of recreational and tourist activity, particularly during the summer months. The monthly data from CTDOT's permanent count sites for 2012 are identified at two available locations near the study area. I-95 was not included for the purposes of determining seasonal variations. Exhibits 1 and 2 illustrate the variations in demand over the course of one year.

Exhibit 1: Seasonal Variation in Traffic Demand on Route 1



Source: CTDOT

Exhibit 2: Seasonal Variation in Traffic Demand on Route 81



Source: CTDOT

The summer months reflect the highest demand in the region and a pronounced spike in weekend (Saturday) traffic demand is observed on Route 1 in East Lyme during July and August; otherwise there is little difference between weekday and weekend average traffic volumes during the other months. Because the counts for this study were obtained during August, seasonal variations in traffic demand should be considered when determining non-summer annual conditions along Route 1. Table 4 identifies the weekday and weekend (Saturday) seasonal adjustment factor that may be applied to existing traffic counts to reflect non-summer conditions.

Table 4: Seasonal Adjustments

ID	Location	2012 Weekday Seasonal Factor (August)	2012 Weekend Seasonal Factor (August)
A	Route 1, Lyme	0.83	0.68
B	Route 81, Clinton	0.90	0.91
	Average (A,B)	**0.86**	**0.79**

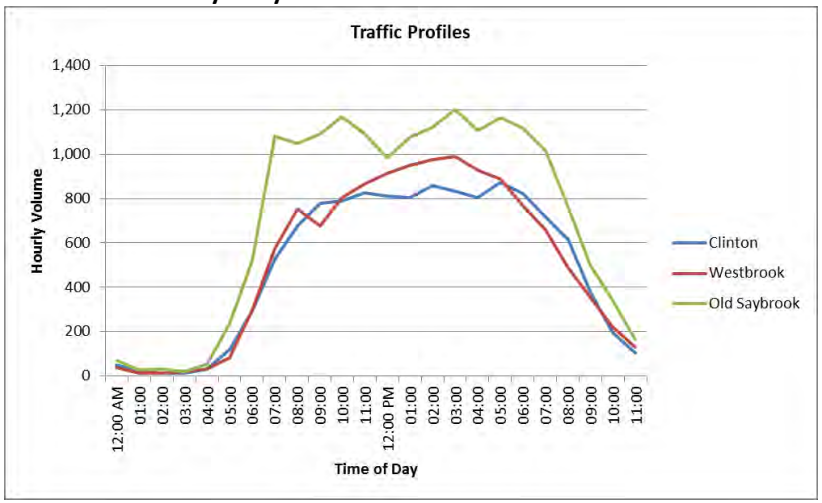
Source: CTDOT permanent count station locations; Fitzgerald & Halliday, Inc.

Since there is no permanent count station located on Route 1 within the study area, seasonal adjustment data from the two available count stations immediately adjacent to the Route 1 corridor were averaged and the results appear reasonable for application to the Route 1 traffic data. Saturday traffic during the summer peak is over 20% higher than Saturday traffic during non-summer conditions. The difference in weekday variations is not as pronounced, which is to be expected given a higher mix of commuter traffic and lower presence of tourist traffic on weekdays. The adjustment factors will be applied to existing traffic volumes obtained in August to reflect a 'typical' condition, or one that exhibits average traffic levels that are typical during about 90% of the total days in the year, for use in the subsequent traffic analysis. (This is an estimate based on average daily traffic that is not influenced by road construction or traffic accidents.)

Route 1 Corridor Daily Traffic Conditions

Route 1 is part of a larger network of roads in the region and the traffic conditions on these surrounding roadways are inextricably linked to conditions along Route 1. For example, an incident on I-95, whether due to highway maintenance or a traffic accident, almost always leads to increased traffic on Route 1. To help understand the existing operational characteristics, it's important to understand daily traffic trends specific to the corridor. Weekday and weekend daily traffic profiles for August from each town are illustrated in Exhibits 3 and 4.

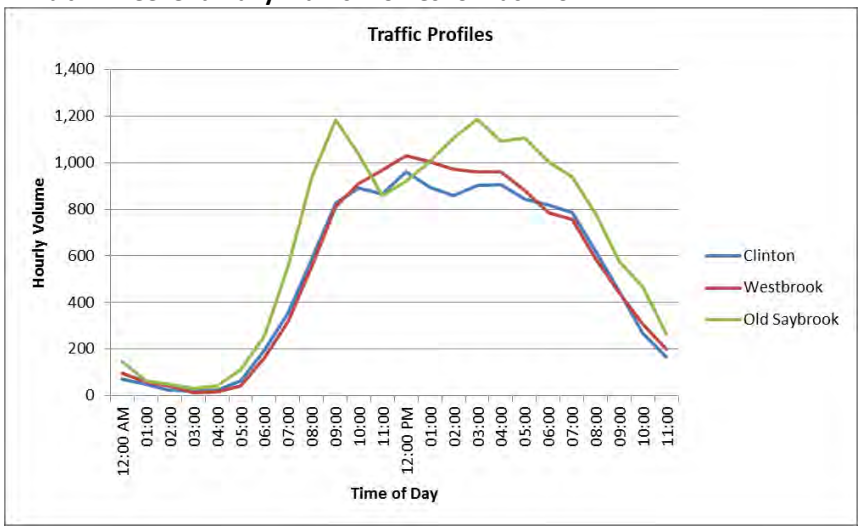
Exhibit 3: Weekday Daily Traffic Profiles for Each Town



Source: August 2013 Traffic Counts, Fitzgerald & Halliday, Inc.

Typically, two pronounced spikes occur during the day, corresponding to the AM and PM peaks, while traffic levels are lower during the mid-day hours. For the Route 1 corridor, traffic volume increases sharply between 6:00 and 7:00 AM; and traffic remains elevated over the day, with no pronounced spikes, which are more typical of commuter routes. Traffic demand for each location generally increases over the day before peaking around 5:00 PM. This reflects a predominantly retail and tourism driven corridor where traffic builds and is maintained over the course of the day.

Exhibit 4: Weekend Daily Traffic Profiles for Each Town



Source: August 2013 Traffic Counts; Fitzgerald & Halliday, Inc.

Weekend, or Saturday, traffic profiles nearly mirror weekday profiles, except the morning spike occurs slightly later. There is also a pronounced reduction in traffic in Old Saybrook during the late morning. Traffic levels are maintained throughout the day which is typical of weekend traffic in most locations across the board. The total daily weekday and weekend volumes are similar; however, hourly peaks during weekend hours show higher measured demand. This is confirmed with the peak hour traffic conditions in the subsequent section.

The profile of users and land use activity varies along the corridor, which is reflected in the traffic demand. This is evident by approximately 17,000 daily trips along Route 1 in Old Saybrook and 12,000 daily trips in Clinton and Westbrook. Because traffic counts were obtained during the summer, they are expected to be about 20% lower during typical non-summer months and about 13,600 daily trips in Old Saybrook and 9,600 daily trips in Clinton and Westbrook.

Route 1 Peak Hour Traffic Conditions

Traffic levels during the weekday morning, afternoon, and weekend mid-day peak hours tend to be higher than other periods throughout the day, which reflects higher percentages of commuter and recreational traffic. Weekday morning (7:00 to 9:00 AM), evening (4:00 to 6:00 PM), and weekend (11:00 AM to 1:00 PM) peak period intersection turning movement counts were collected at the study intersections in August 2013 on a clear day. A total of 21 intersections (19 signalized, 2 unsignalized) were collected as part of this study. As the study progressed and more data was needed, traffic counts were obtained from recently completed traffic studies and compared against the collected counts to ensure consistency.

When it comes to traffic flow in the morning and afternoon peak hours of the day, the directionality of the flow typically fluctuates. For example, one direction of traffic may be higher in the morning and the opposite direction may be higher in the afternoon, at the same location. However, this typical pattern does not characterize the traffic flow of Route 1. In fact, traffic levels during the peak hours are generally consistent by direction, except for the eastern section of the corridor in Old Saybrook near I-95. Here, traffic levels moving northeast along Route 1 are higher in the PM, a result of traffic turning onto Route 1 from Main Street to access I-95 or Route 9. *Figure 6* illustrates the peak period flow of traffic on Route 1 during AM, PM, and Saturday conditions and illustrates where peak period traffic flow is highest. As shown, the busiest areas on Route 1 are located in Old Saybrook near Main Street and the central retail area. Traffic is lighter through Westbrook but gets heavier again in Clinton. This pattern is consistent with the intensity of land uses in these sections and the retail traffic generators.

FIGURE 6: SUMMER BI-DIRECTIONAL PEAK HOUR TRAFFIC VOLUME

Source: Fitzgerald & Halliday, Inc.; 2013 Traffic Count Program

Some general conclusions from the existing travel demand assessment include:

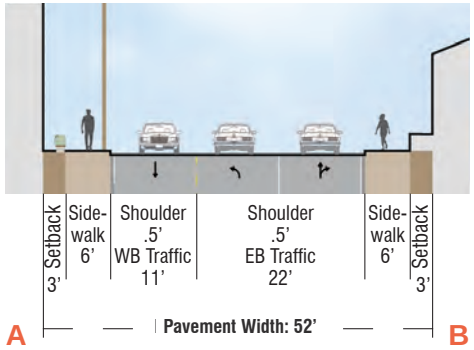
- Seasonal variations in traffic are important to understand when assessing conditions along the corridor. Saturday traffic demand is over 20% higher during the summertime than non-summer times of the year.
- According to the daily traffic counts on Route 1 in the study area, there is little difference in weekday and weekend traffic demand during the summer. However, hourly peaks during the weekend hours show higher measured demand.
- Traffic counts obtained in August 2013 do not reflect conditions during an incident or excessive congestion on I-95.
- A pronounced spike in AM and PM traffic demand does not occur along the Route 1 corridor. Traffic generally steadily increases over the course of the day until it peaks during the evening hours.
- PM peak traffic levels are higher than AM peak traffic levels for most locations along the corridor.
- Most locations along the corridor generally reflect an even directional split in traffic flow.

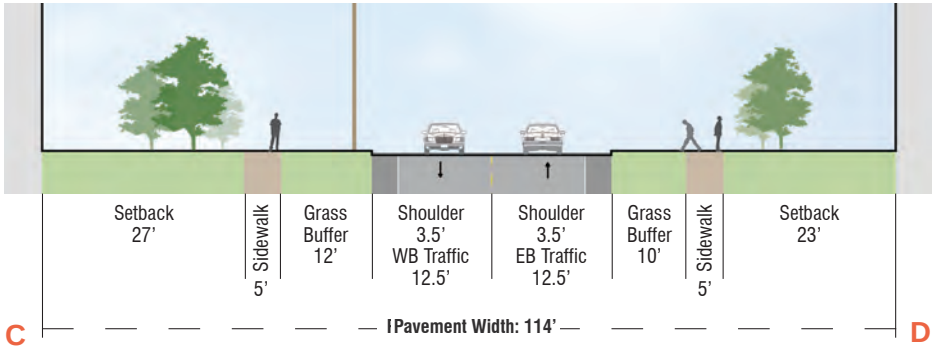
The individual peak hour schematics for each study area intersection and ADT can be found within the *Appendix.*

C. Roadway Description and Geometry

The physical layout, or geometry, of a road contributes to the degree of safety for motorists, bicyclists, and pedestrians. Factors such as number of lanes, lane width, grade, curvature, and intersection type affect traffic volume, capacity, travel speed, congestion, safety, access to property, and driver behavior. This section summarizes Route 1's geometric conditions and will be important when considering the integration of all travel modes and addressing any gaps in the transportation system. *Figure 7* illustrates several roadway cross sections of the Route 1 corridor.

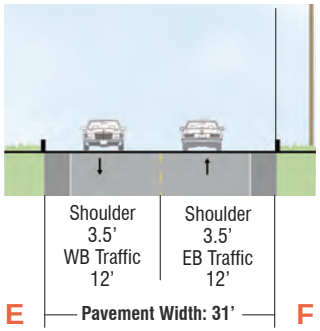
FIGURES 7-1 THROUGH 7-3: ROUTE 1 CROSS SECTIONS

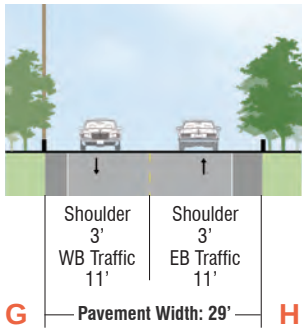


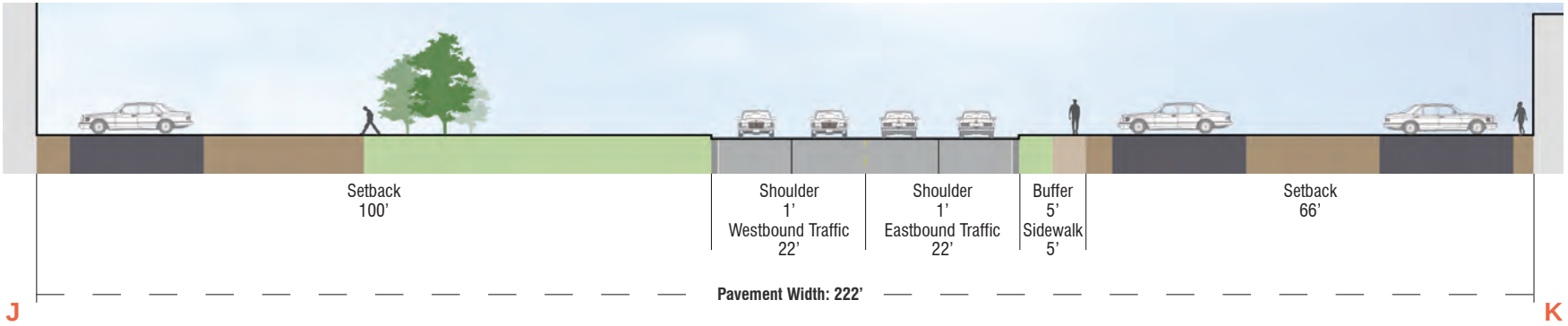


Source: Fitzgerald & Halliday, Inc.

FIGURES 7-4 THROUGH 7-6: ROUTE 1 CROSS SECTIONS







Source: Fitzgerald & Halliday, Inc.

ROADWAY GEOMETRY

Travel Lanes

Route 1 is an arterial highway that begins as two-lanes (one lane per direction) in Clinton and transitions to four-lanes (two lanes per direction) in Old Saybrook. Route 1 serves many functions and users, depending on the context of the environment along the corridor. For example, sections of Route 1 that travel through the Town Centers of Old Saybrook and Clinton are generally characterized by lower speeds, frequent driveways, curb and gutter drainage, and dedicated turn lanes at major intersections. Rural sections in Westbrook are characterized by higher speeds, inconsistent sidewalks, drainage ditches, clustered driveways, and a general lack of dedicated turn lanes.

Daily traffic levels range from 12,000 vehicles per day in Clinton and Westbrook to 17,000 vehicles per day near I-95 in Old Saybrook during the summer months. The posted speed ranges from 35 miles per hour (mph) to 45 mph, except for downtown areas in Westbrook and Clinton, which range from 25 mph to 30 mph. The specific speed zones along the Route 1 corridor are shown in the *Appendix*.

Shoulder Width

Road shoulders serve a number of purposes including emergency vehicle access, breakdown space, and lane separation for bicyclists. According to the CTDOT Design Manual, arterials are typically designed with 4 to 8-foot shoulders. Generally, Route 1 has inconsistent and undersized shoulder widths of less than 4 feet, which cannot effectively accommodate a vehicle and challenges bicycle and pedestrian travel in the corridor. There are several relatively short segments which have shoulder widths that fall within CTDOT's design standards. Cross sections on *Figure 7* illustrate typical shoulder widths along the Route 1 corridor.

Vertical Grade

Highway grade, or hills, can present safety and operational challenges by restricting sight lines and increasing the distance a vehicle needs to safely stop. During inclement weather, road grades can also contribute to the loss of traction between a vehicle's tires and the pavement surface. Route 1 is located near the coast and has stretches that are within wetlands and are relatively flat; therefore, has a very low rolling terrain. The CTDOT Design Manual suggests that a 7% grade should be considered a maximum for an arterial; however, Route 1 has no locations near a 7% grade.

Horizontal Curvature and Sight Distance

The alignment of Route 1 is generally defined by topography. Natural coastal features and significant expanses of wetlands run parallel to the highway. As such, Route 1 is noted for its curvilinear alignment. Horizontal curvature of a road affects a driver's ability to see far enough to be able to stop safely to avoid a collision. Curves can also contribute to a loss of control of a vehicle if speed limits are not adhered to. The CTDOT Design Manual suggests that a stopping sight distance of 425 feet is required for level surfaces with a posted speed limit of 45 mph, which is common along the corridor. Because Route 1 is noted for its curvilinear alignment, poor visibility presents a challenge for the corridor in many locations.

Geometric Observations

The geometric review performed for this study resulted in the formulation of the following observations, which will help set the stage for a more in-depth discussion of issues and opportunities.

- The 45 mph posted speed zone between Clinton and Westbrook, particularly near Grove Beach Road, may not fit within the abutting land use context and is the only 45 mph zone along the Route 1 corridor. Design (and observed) speed in this section is too high for the uses along the road - clustered and wide driveways, narrow shoulders, lack of turn lanes, and limited visibility.
- Traveling west along Route 1 approaching Stage Road after crossing the RR bridge in Old Saybrook, field observations indicated speeds consistently exceeded 45 mph; however, there is only 400 feet of sight distance to the intersection, not including queued vehicles that might be stopped at the light.

Factor in poor weather conditions, and this distance is further reduced.

- Traveling east along Route 1 approaching Old Clinton Road in Westbrook, a curve in the highway limits a driver's view of the approaching intersection to approximately 225 feet, which is below CTDOT standards of at least 300 feet, given the posted speeds.
- From a non-motorized travel perspective, bicycle and pedestrian use in the corridor is limited by the physical geometry of Route 1, including narrow shoulders for much of the corridor and high volume and speed of motorized vehicles. In addition, the high number and concentration of driveways (which is discussed in the next section in more detail) are hazardous to pedestrians as well as bicyclists. Motorists, turning into these driveways, often do not look for bicyclist and pedestrians.
- Periodic roadway maintenance inhibits traffic flow along the corridor as lanes must be blocked. This is also true for other incidents such as motor vehicle crashes.
- There are deficient sidewalk and crossing area amenities for pedestrians, particularly those with disabilities. Intersections are often lacking ramps, detectible warning surfaces, and appropriate sidewalks connecting to push buttons, and are largely underutilized as a result of their condition.
- Poor roadway lighting exists along rural stretches of the Route 1 corridor, particularly west of downtown Clinton and east of Beach Park Road to downtown Westbrook. This exacerbates the existing sight distance challenges along the corridor.

D. Traffic Operations and Safety

TRAFFIC CONTROL

Traffic Control Devices

Traffic signals control the flow of traffic on Route 1 and streets that intersect with it. Side streets are controlled by a traffic signal, yield, or stop sign. There are 26 signalized intersections along the corridor and CTDOT operates and maintains these signals.

Traffic flow at signalized intersections is controlled by the signal timing and phasing as well as the overall cycle length (the amount of time given to complete all traffic movements). The cycle length is the total time for a traffic signal to complete one sequence of all movements within an intersection and generally range from 45 seconds to 180 seconds. The larger or more complex an intersection's configuration is, the greater the cycle length will be to accommodate all movements. Changes in traffic demand throughout the day will also result in varying cycle lengths, with longer cycle lengths during peak times and lower during off-peak times. Traffic demand and intersection configurations vary along Route 1 and cycle lengths range from 45 seconds to 145 seconds.

To further manage traffic flow, signals can be actuated; meaning triggered by an approaching vehicle, or set at a fixed time if no detection device has been installed. These detection devices are usually loops located in the travel lane or radar mounted on the span pole extending over the intersection. All signals in the Route 1 study corridor are actuated, even if every movement is not. Signal coordination is another form of traffic control management. This occurs when closely-spaced signals coordinate individual movements so that drivers encounter long streams of green lights. Most signals along the Route 1 corridor are uncoordinated because spacing is too great or traffic flow is interrupted by roadway characteristics making it difficult to coordinate.

The standard practice is to develop time-of-day signal timing plans to account for the fluctuations in traffic that naturally occur throughout the day. The plans are usually made for a "typical" day: however, when traffic conditions change significantly as a result of seasonal fluctuations or incidents, the pre-programmed plans often cannot process traffic efficiently. Other forms of traffic control measures along Route 1 include speed limits and school zones. Temporary traffic control measures can be deployed by officials if an incident has occurred or to

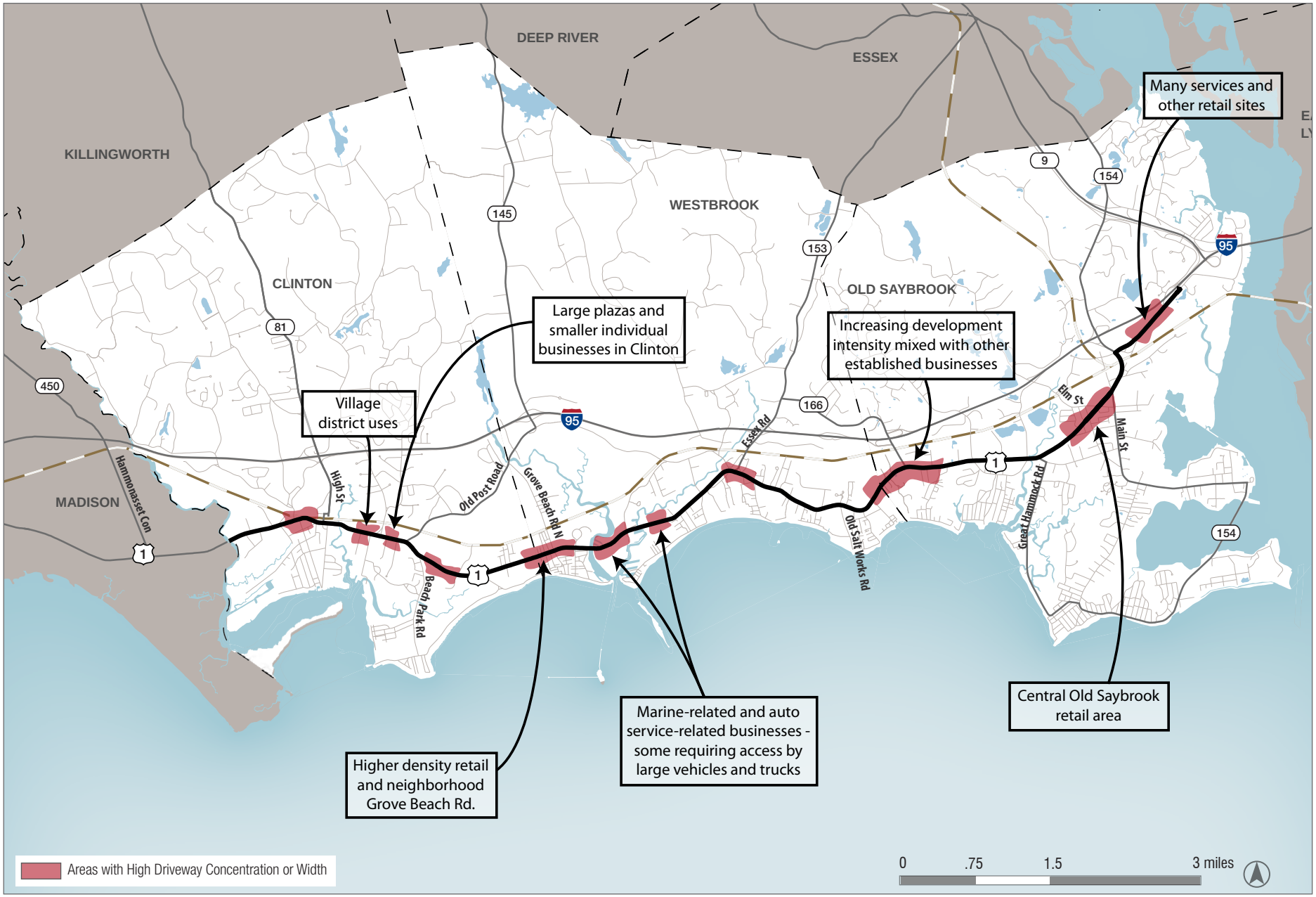
aid construction related activities. An inventory of traffic control elements is summarized in *Appendix #*.

ACCESS AND CIRCULATION

Route 1 Access Management Conditions

Route 1 has 689 driveways total; therefore, approximately 60 driveways per mile along the 11.6 mile corridor resulting in approximately 90 feet between driveways. Overall, driveways along Route 1 are evenly split; therefore, approximately 345 driveways exist by direction which equates to approximately 180 feet between the centerline of each driveway. There are pockets along the Route 1 corridor where driveway density is greater than 60 per mile and segments where driveway density is less. In short, the Route 1 corridor is well below current access management standards. *Figure 8* identifies areas along the Route 1 corridor where an excess of driveways exist and affect the safe and efficient operation of the roadway. This information will play an important role when considering the integration of all modes and travel choices in the corridor, as part of the subsequent concept development stage of the corridor improvement plan.

FIGURE 8: LOCATIONS WITH HIGH NUMBER OF DRIVEWAYS



Source: Fitzgerald & Halliday, Inc.

Access Observations

The following observations set the stage for a more in-depth discussion of issues and opportunities regarding traffic control and access management measures:

- Dense and poorly delineated driveways are frequent throughout the corridor, which is problematic and can be dangerous for motorized and non-motorized travel.
- Cars tend to line up alongside one another at wide driveways attempting to re-enter Route 1 simultaneously, resulting in poor visibility.
- At wide or poorly delineated driveways with parking directly off Route 1, drivers reverse from a parking space when vehicles were exiting Route 1, creating a dangerous conflict zone.
- At Beach Park Road and Elm Street, private driveways exist within the intersection beyond the stop bar with no signal control.
- Deteriorated shoulder conditions are due in part to vehicles maneuvering around a stopped vehicle on Route 1 waiting for a gap in traffic to turn.
- It is recognized that Route 1 serves a variety of users including marine activity. While Route 1 overall has access management problems, it is clear that certain locations should be designed to accommodate the unique types of vehicles that are primarily expected to access the property; including trucks and boat trailers.

LEVEL OF SERVICE

A traffic analysis was conducted for a total of 23 intersections (21 signalized, 2 unsignalized) in order to measure the level of vehicle delay at intersections. Weekday morning and evening peak hour counts and weekend mid-day counts were collected at the study intersections in August 2013 on a clear day with no accidents, road construction, holidays, or weather events. Seasonal adjustment factors have been applied to the existing summer counts to derive non-summer conditions. The key measure of effectiveness for the peak hour traffic analysis is level of service (LOS) at the study area intersections. LOS is a qualitative measure of vehicular delay and takes into account a number of conditions related to intersection design and traffic volume, and the perception of those conditions by motorists. Six levels of service are defined with letter designations from A to F, with LOS A representing the best operating conditions and LOS F representing the worst. Conventional practices point to LOS C, describing a condition of stable traffic flow, as the minimum desirable level for peak traffic flow in rural and suburban areas. LOS D (and sometimes LOS E), with greater vehicle queues and delay, are often considered acceptable for urban areas because of the accessibility benefits and higher pedestrian interactions that result from increased density. Table 5, shown on the following page, summarizes the LOS criteria, as specified by the Highway Capacity Manual.

Table 5: Level of Service Criteria

Level of Service (LOS)	Signalized Intersection Control Delay (seconds/vehicle)	Unsignalized Intersection Control Delay (seconds/vehicle)
A	0-10	0-10
B	>10-20	> 10-15
C	>20-35	>15-25
D	>35-55	>25-35
E	>55-80	>35-50
F	>80	>50

Source: 2000 Highway Capacity Manual (Special Report 209)

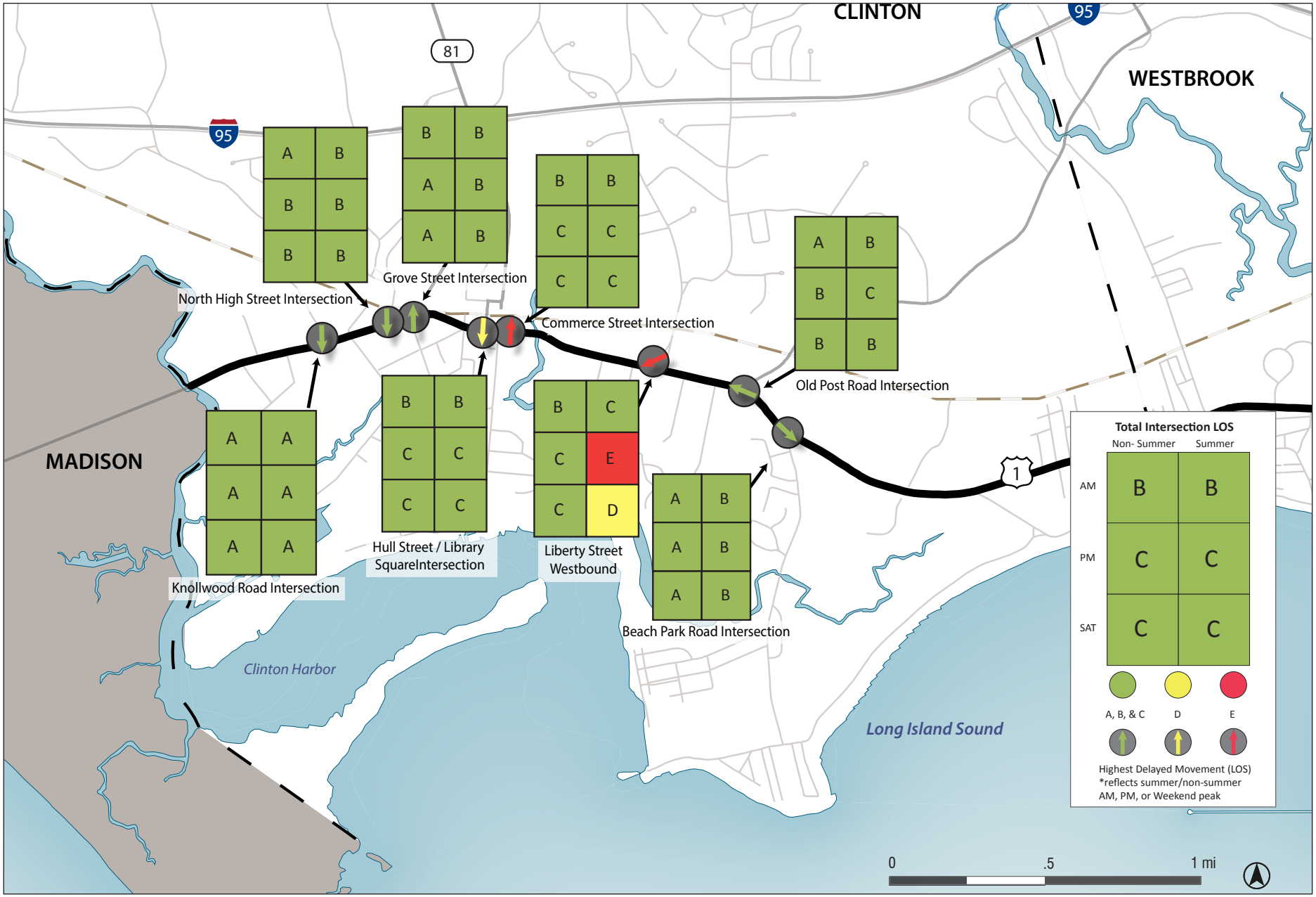
Level of service designation is reported differently for signalized and unsignalized intersections. Thus, the delay ranges differ slightly between unsignalized and signalized intersections due to driver expectations and behavior for each LOS. For signalized intersections, LOS is defined in terms of delay, which is a measure of driver discomfort and frustration, and lost travel time. For unsignalized intersections, the LOS analysis assumes that the traffic on the mainline is not affected by traffic on the side street. The LOS for each movement is calculated by determining

the number of gaps that are available in the conflicting traffic stream. Based on the number of gaps, the capacity of the movement can be calculated. For unsignalized intersections, the highest delayed movement is reported in addition to an overall delay.

Route 1 Level of Service Analysis Results

The traffic analysis for the study intersections was completed using Synchro 8.0, a computer-based intersection operations model, which implements procedures presented in the Highway Capacity Manual (HCM) 2000 and 2010. Synchro is designed to evaluate the performance of arterials, signalized intersections, and unsignalized intersections (two-way stop, all-way stop, and roundabouts). The intersection LOS reported by Synchro reflects the total intersection delay for all movements, and the results for the intersections analyzed along Route 1 have been illustrated in *Figure 9.*

FIGURE 9-1: ROUTE 1 LEVEL OF SERVICE ANALYSIS RESULTS - Clinton

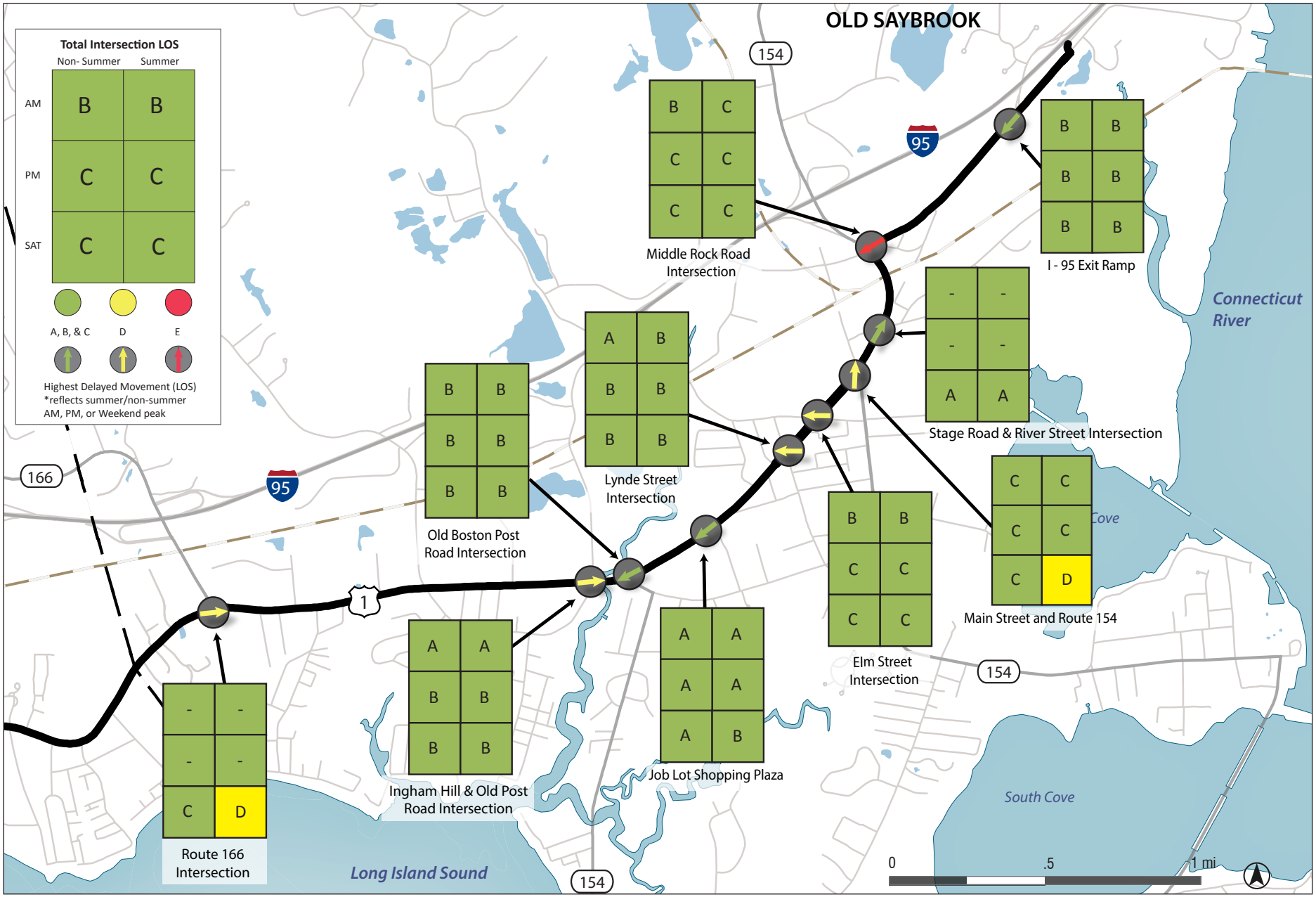


Source: Crash rate data: Connecticut Crash Data Repository (CTCD), 2009 - 2011

FIGURE 9-2: ROUTE 1 LEVEL OF SERVICE ANALYSIS RESULTS - Westbrook

Source: Crash rate data: Connecticut Crash Data Repository (CTCD), 2009 - 2011

FIGURE 9-3: ROUTE 1 LEVEL OF SERVICE ANALYSIS RESULTS - Old Saybrook



Source: Crash rate data: Connecticut Crash Data Repository (CTCD), 2009 - 2011

Results of the traffic analysis indicate that all study intersections operate at LOS C or better during typical weekday and weekend AM and PM peak hours during summer and non-summer conditions, with the exception of Liberty Street in Clinton (LOS E) and Main Street in Old Saybrook (LOS D). The detailed LOS analysis results for each study intersection is located in the *Appendix*. There are occurrences where a specific intersection approach or movement exceeds LOS C, even if the total intersection does not. According to the Synchro model, drivers may experience more extended delays (LOS D or worse) at the following locations in the AM, PM, or Mid-Day peak hour:

- Route 1 approach on Hull Street in Clinton
- Route 1 approach on Commerce Street in Clinton
- Route 1 approach on Liberty Street (West) in Clinton
- Eastbound and westbound approach to Ingham Hill Road on Route 1 in Old Saybrook
- Route 1 approach on Lynde Street and Elm Street in Old Saybrook
- Approaches at the Route 1/Main Street intersection in Old Saybrook

The delays experienced by drivers at these locations are a result of a combination of factors. Closely spaced signals and the addition of traffic on Route 1 from Hull Street increases delay for intersections in downtown Clinton. High peak hour traffic on Route 1 increases side-street wait time at Liberty Street, which is controlled by a stop sign. The eastbound approach to Ingham Hill Road serves high demand prior to traffic turning off Route 1 onto Old Boston Post Road (Route 154). The remaining delays experienced by drivers in Old Saybrook are a result of high peak hour traffic on Route 1 increasing wait time for cross streets. Furthermore, most intersections (including driveways) are not signalized and the delay from those can be high since available gaps (space between cars) in the traffic stream are infrequent. While utilizing computer-based models to assess traffic conditions provides a foundation for the existing conditions assessment, field observations and public input will also help facilitate concept development moving forward. Based on historical traffic trends, demand will likely continue to grow, further increasing delays along the corridor.

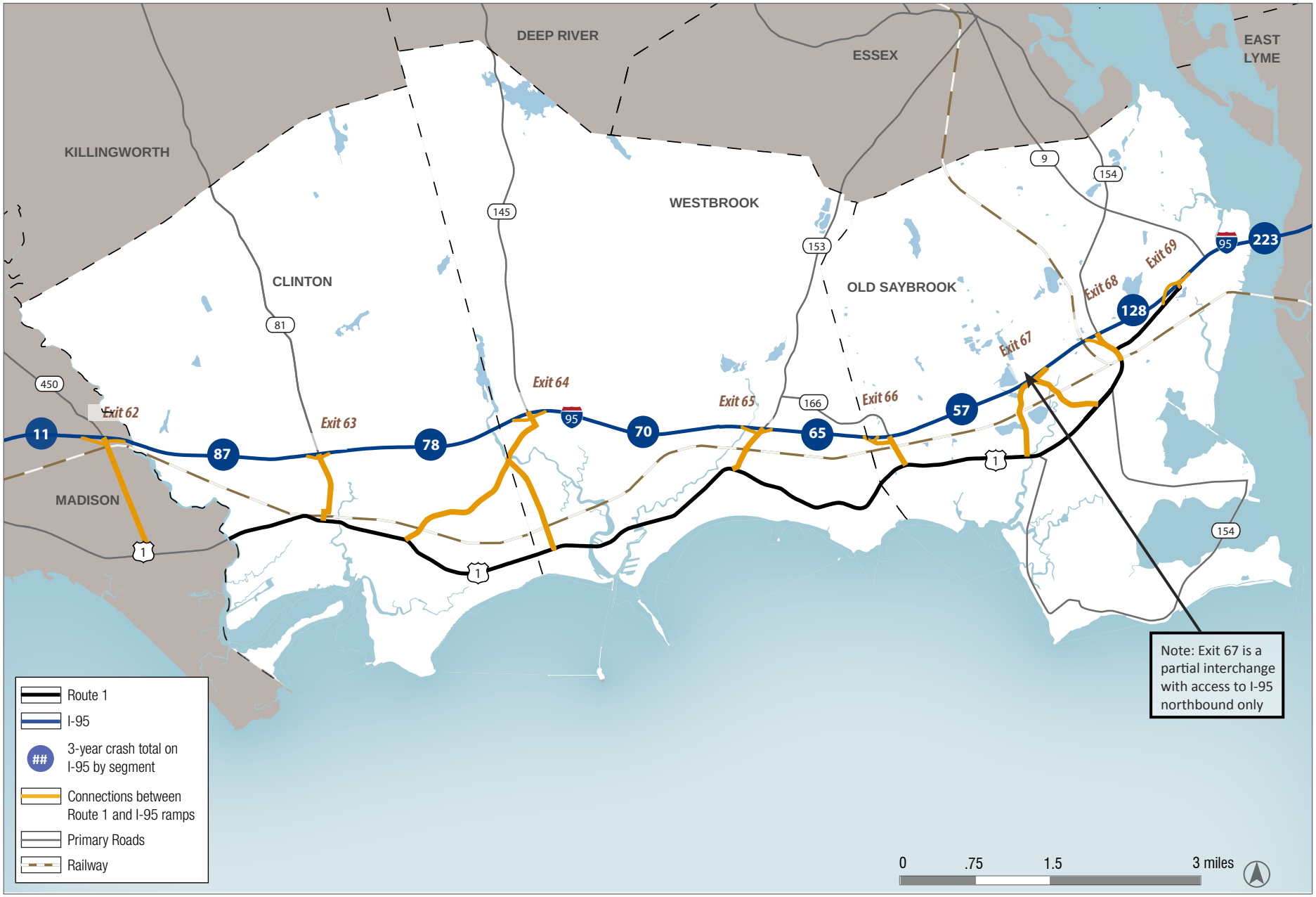
Non-Recurring Congestion from I-95

The public has become increasingly sensitive to the impact congestion has on quality of life, citing delays caused by traffic congestion as top community transportation concerns. The traffic analysis conducted for this study has indicated that overall, intersections manage traffic well, with only isolated locations of congestion occurring on a typical day. According to a FHWA report, approximately 55% of all delays are caused by non-recurring congestion (e.g., traffic incidents, work zones, bad weather, and special events).[1] In Connecticut, Route 1 serves towns and cities as a parallel facility to I-95. When traffic incidents occur on I-95, Route 1 serves as an alternate route and heavy congestion can temporarily delay all users regardless of how traffic control measures are functioning.

To help understand non-recurring congestion on Route 1 caused by traffic incidents on I-95, crash data over the last three years was obtained from the Connecticut Crash Data Repository (CTCDR) for I-95 in Clinton, Westbrook, and Old Saybrook. *Figure 10* illustrates the total number of mainline crashes that have occurred on I-95 over three years. To put these totals in perspective, the crash data was organized to reflect the total number of days crashes occurred on I-95. When averaged over a year, I-95 in the vicinity of the Route 1 corridor experiences approximately 220 days per year where at least one crash occurs. While not every crash will result in traffic diverting to Route 1, each crash does potentially contribute to highway diversions and increased traffic on Route 1. If only half of these crashes divert traffic off I-95 to Route 1, increases in traffic would occur on Route 1 at least twice per week as a result. To note, crash data for the ramps was not included in the analysis, but these incidents may also lead to traffic diversion.

[1] *Traffic Congestion and Reliability: Linking Solutions to Problems*, Federal Highway Administration, July 2004.

FIGURE 10: I-95 CRASH FREQUENCY BETWEEN RAMPS



Source: Crash rate data: Connecticut Crash Data Repository (CTCD), 2009 - 2011

Figure 10 also illustrates which routes drivers may potentially use to bypass incidents along I-95**.** Based on the crash locations, the following interchange exits are likely used more by drivers attempting to bypass a traffic incident on I-95:

- Exit 63 (Route 81) – high relative number of crashes east and west of Exit 63 on I-95.
- Exit 65 and 66 (Routes 153 and 166, respectively) – high concentration of crashes occurred between each exit and Route 1 is within ½ mile of I-95.
- Exit 67 and 68 (Routes 154 and 1, respectively) – high concentration of crashes occurred between each exit and near the Route 9 interchange just east of the study area.

Delays as a result of non-recurring congestion are a contributing factor to the overall congestion experienced by users of Route 1 and becoming a 'normal' event. The implementation of an alternate incident management route plan is a key traffic management strategy for better managing the effect of a non-recurring congestion-causing event on Route 1 and will be explored as part of the overall Corridor Improvement Plan.

Traffic Operations Observations

The traffic analysis conducted for this study resulted in the formulation of the following observations, which set the stage for a more in-depth discussion of traffic related issues and with the public.

- Overall, intersections manage traffic well during a typical day, but there are several pockets of congestion on Route 1. Traveling east along Route 1, queues during the weekday PM peak at Main Street in Old Saybrook extended 250 feet or more - roughly ten vehicles per lane. Traveling west along Route 1 at Main Street in Old Saybrook, queuing throughout the day was observed for left-turning vehicles and the through movement - at times extending back to Stage Road. Queuing was also observed on Main Street approaching Route 1 from the southeast.
- Traffic moving east along Route 1 was queuing between Ingham Hill Road and Donnelley Road in Old Saybrook during the weekday PM peak. Furthermore, three signals are located within a half mile of each other, and appeared to be uncoordinated.
- A pocket of queuing occurs in downtown Clinton, particularly near Hull Street during the AM and PM peak conditions. Hull Street serves over 200 left turns during the PM peak; thereby reducing the amount of time motorists on Route 1 see a green light. Roadway conditions such as narrow lanes, lack of shoulders, and closely spaced signals may also be a contributing factor to increased delays downtown.
- Several intersections along the corridor are influenced by driveway activity near the intersection. For example, a driveway is located within the intersection of Route 1 and Elm Street. Vehicles enter the intersection beyond the stop bar while traffic on Route 1 is stopped. This occurs at Route 1 and Beach Park Road, where a wide driveway extends along the intersection.
- Lack of pedestrian accommodations cause pedestrians to cross Route 1 where no crosswalks exist – or simply bypass them due to their condition or location.
- Non-recurring congestion delays resulting from traffic incidents along I-95 contribute to overall congestion experienced by users on Route 1.
- Congestion that took place was not solely related to traffic demand (typical and non-recurring). The interaction of dense curb cuts, wide driveways, narrow shoulders, lack of turn lanes, and limited visibility contribute to the operational challenges of Route 1.
- The 9 Town Transit service vehicles serve Route 1 and stop whenever a rider requests as an on-demand service. There are no flashing lights on the vehicles and they stop for riders as needed; therefore, potentially creating abrupt interruptions in traffic flow leading to temporary pockets of congestion.

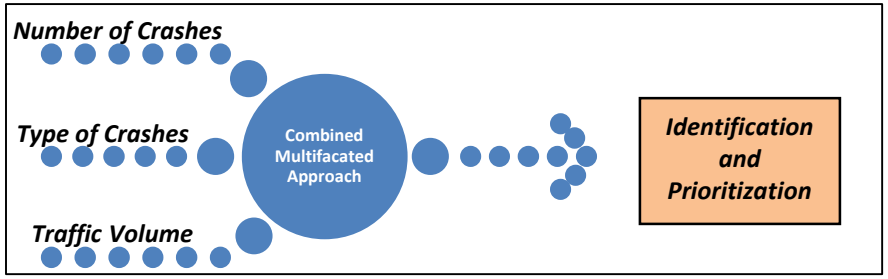
Crash Analysis

A crash analysis was conducted to help understand how road and intersection conditions affect safety. The most recent crash data was obtained from the Connecticut Crash Data Repository (CTCDR) for years 2009 through 2011. The CTCDR is a web-based tool and is comprised of crash data from two separate sources; The Department of Public Safety (DPS) and CTDOT. Because comparing crash data by individual years may distort analysis results, three years of data was analyzed to account for anomalies caused by outside influence such as construction projects. The critical analysis factors identified from CTCDR were:

- Number of Crashes
- Crash Type
- Crash Location
- Traffic Volume

The crash data collected and generated through this assessment were combined to identify and prioritize high crash locations along the corridor. Exhibit 5, shown below, depicts the crash analysis process.

Exhibit 5: Crash Analysis Process



Source: Fitzgerald & Halliday, Inc.

GENERAL CRASH STATISTICS

The crash data obtained from the CTCDR revealed that 650 crashes occurred within the study area over the three year period from 2009 to 2011. The causes of crashes on Route 1 result from a combination of many factors including driver behavior, traffic density, weather and light conditions, and roadway geometry. Approximately 54% of crashes were the result of rear-end collisions and about 24% involved turning vehicles, indicative of a corridor with a lot of driveways and intersections. Table 5 summarizes the corridor crash types.

Table 5: Route 1 Corridor Crash Summary

Crash Type	Corridor	Percent of Total
Angle	14	2.2%
Backing	15	2.3%
Fixed Object	62	9.5%
Head-on	5	0.8%
Miscellaneous	1	0.2%
Moving Object	3	0.5%
Overturn	4	0.6%
Parking	2	0.3%
Pedestrian	6	0.9%
Rear-end	349	53.7%
Sideswipe	36	5.5%
Turning	153	23.5%
Total	650	100.0%

Source: CTCDR, 2009-2011

Crash Rates

In addition to reviewing the number and type of crashes along the Route 1 corridor, crash rates were calculated which account for segment length, average daily traffic (ADT), timeframe, ***and*** number of crashes. This method normalizes the data so that individual segments can be compared, regardless of their respective length, volume, or crash statistics. For this reason, rates are better suited to reflect safety deficient locations than number of crashes alone. The individual crash rates by segment are outlined in Table 6. Red highlights represent higher crash rates while orange and yellow highlights represent lower crash rates, respectively.

Crash rates were found to be highest on Route 1 in Clinton and Old Saybrook. The segments with the highest rates do not necessarily have the highest number of crashes, but rather high concentrations of accidents relative to traffic volume and segment length. For this reason, crash rates provide a tool for use in prioritizing locations for system improvements. *Figure 11* illustrates the corridor crash rates and total crashes over three years for the Route 1 corridor.

The crash rates identified in this analysis where calculated using industry standard methodologies; therefore, they may be used in pursuit of Highway Safety Funds through the Federal Highway Administration (FHWA). While the State of Connecticut does not set thresholds for crash rates, the areas along the Route 1 corridor highlighted in red warrant the most immediate attention.

Table 6: Crash Rates

Segment From/To	Town	3-Year Crash Total	Segment Length (ft)	2011 ADT*	Length (mi)	Crash Rate[1]
River to Grove Street	Clinton	45	3,900	10,000	0.74	**5.56**
Grove Street to Liberty Park Center	Clinton	82	4,339	10,000	0.82	**9.11**
Liberty Park Center to Beach Park Road	Clinton	39	2,463	10,000	0.47	**7.64**
Beach Park Road to Clinton Town Line	Clinton	52	6,600	10,000	1.25	**3.80**
Westbrook Town Line to Eckford Avenue	Westbrook	32	7,698	8,100	1.46	**2.47**
Eckford Avenue to Westbrook Heights	Westbrook	60	6,164	8,100	1.17	**5.79**
Westbrook Heights to Westbrook Town Line	Westbrook	30	6,831	8,100	1.29	**2.61**
OldSaybrook Town Line to Center Road	Old Saybrook	32	3,064	16,000	0.58	**3.15**
Center Road to Ledge Rd	Old Saybrook	101	7,437	16,000	1.41	**4.09**
Ledge Road to Mill Rock Road	Old Saybrook	134	5,724	16,000	1.08	**7.05**
Mill Rock Road to I-95 Interchange	Old Saybrook	43	5,129	16,000	0.97	**2.53**
Route 1 Corridor		650	59,350	11,664	11.24	**4.53**

[1]Crash Rate = Crash Count x Million Milles Traveled / Exposure

Where Exposure = Average Daily Traffic × 365 × 3 × length of segment

**ADT obtained from the CTCDR and averaged by town over three years.*

FIGURE 11-1: ROUTE 1 CRASH FREQUENCY (2009 - 2011) - Clinton

Source: Crash rate data: Connecticut Crash Data Repository (CTCD), 2009 - 2011

FIGURE 11-2: ROUTE 1 CRASH FREQUENCY (2009 - 2011) - Westbrook

Source: Crash rate data: Connecticut Crash Data Repository (CTCD), 2009 - 2011

FIGURE 11-3: ROUTE 1 CRASH FREQUENCY (2009 - 2011) - Old Saybrook

Source: Crash rate data: Connecticut Crash Data Repository (CTCD), 2009 - 2011

Crash Observations

Crash statistics provide a tool for identifying and prioritizing locations on Route 1 and will help set the stage moving forward for a more in-depth discussion of safety issues and opportunities.

- Over a three year period, 650 crashes were recorded, or approximately four crashes per week somewhere along the corridor. In general, the causes of crashes on Route 1 stem from a combination of many factors including driver behavior, a mix of local and through traffic, weather and light conditions, and roadway geometry – narrow shoulders, poor visibility, dense curb cuts, and lack of dedicated turning lanes.
- When incidents occur on I-95, traffic diverts to Route 1 and non-recurring congestion can reach high levels, which is exacerbated by introducing delayed drivers unfamiliar to Route 1's characteristics. While the number of crashes that have occurred on Route 1 as a result of traffic diverting from I-95 is not known, it is likely to be a contributing factor.
- In Clinton, Route 1 is characterized by high driveway density and above standard driveway widths, particularly near Beach Park Road and Route 145. This section of Route 1 has a lot of turning vehicles in the traffic stream and may contribute to the high percentage of rear-ends when compared against corridor averages. Furthermore, posted speed limits on Route 1 range from 25 mph in downtown Clinton to 45 mph entering Westbrook, while the roadway character remains fairly consistent.
- Route 1 follows a curvilinear alignment in downtown Westbrook and limited sight distance may be a leading factor in the high concentration of crashes relative to traffic volume near downtown.
- In Old Saybrook, congestion occurs along Route 1 near the Old Saybrook High School. Crash data in this area has indicated a high percentage of rear-end collisions, likely associated with inexperienced drivers (new high-school aged drivers), sight distance challenges, and poor roadway geometry.
- Crash data on Route 1 east of Main Street in Old Saybrook documented several head-on collisions and incidents involving pedestrians. The collisions involving pedestrians are likely a result of increased pedestrian traffic generated by the nearby train station, which is exacerbated by deficient pedestrian accommodations at intersections such as crosswalks or pedestrian signals.
- In Old Saybrook, side-swipe collision types are prevalent west of Main Street. These types of collisions are generally a result of lane changes, as a driver may aggressively attempt a last minute lane change to access an abutting land use or maneuver past a slowing or stopped vehicle.
- Left-turns from cross streets, particularly across 4-lane sections in Old Saybrook, are problematic for drivers on Route 1 by limited the number of gaps – space between vehicles, in traffic flow. This is exacerbated by traffic demand that remains high throughout the day.

D. Bicyclist and Pedestrian Environment

INTRODUCTION

Much of Route 1 in the study area has been designed to prioritize the automobile and the emphasis on a singular mode of transportation has largely contributed to the issues regarding safety, congestion, and accessibility along the corridor today. This auto-oriented approach has simultaneously created an environment along the corridor that generally neglects to provide or maintain sufficient facilities for alternative modes of transportation, such as biking and walking.

While these conditions cause much of the corridor within the study area to be intimidating and discouraging for bicyclists and pedestrians today, a significant amount of potential does exist. There has been a growing recognition not only across the state, but across the nation that the key to designing efficient, sustainable, and safe transportation systems is to incorporate multiple modes that are accessible and convenient for all users.

The creation of such a comprehensive pedestrian and bicyclist network is very much in line with the goals and visions as described in all the most recently updated plans for Clinton, Westbrook, and Old Saybrook as well the goals of this Plan. Specifically, a comprehensive, multi-modal network would benefit the communities in these towns in the following ways:

Enhanced Mobility and Safety for All Modes of Transportation

The introduction of alternative modes of transportation would take some motorists off the corridor, thereby reducing congestion. And many of the facilities necessary for a successful pedestrian and bicyclist network would simultaneously serve to slow traffic and improve safety. For example, the introduction of bike lanes would provide a safe space for bikers while signaling to drivers the need to drive more cautiously. Improved and consistent shoulders for biking would also provide space for transit buses to more safely stop at undesignated bus stops (for demand-responsive service) and would provide room for vehicles to move out of the travel lane when emergency response vehicles are on a call. These two issues were highlighted during technical input meetings in all three towns.

Preserve Community Character & Heritage

There is a strong desire to retain the existing character and charm of these three coastal towns that is valued strongly by residents and tourists alike. The creation and enhancement of facilities for bicyclists and pedestrians would allow for opportunities to celebrate the elements that currently define the community while preserving the small-town character that exists today.

Stimulate Economic Activity

By attracting more people to the corridor, Route 1 would no longer be simply a corridor to travel on but a destination to travel to, thereby sparking the potential for increased economic vitality for the community. And places which clearly demonstrate a high level of community pride and vibrancy are much more likely to both be economically strong and to attract tourists. Additionally, the infrastructure that would be required to create and enhance such a multi-modal environment can be designed so as to achieve the maximum benefit for their cost.

Environmentally Sensitive Design

Even a small shift from vehicles to walking or biking can help reduce congestion along the corridor and lead to a reduction in the levels of pollution and greenhouse gas emissions within the study area. Additionally, the encouragement of walking and biking would also promote an energy efficient means of travel.

Improve Quality of Life and Strengthen Community Ties

Facilitating biking and walking would promote a healthier lifestyle and allow people to spend more time enjoying recreational activities. Additionally, increased accessibility and enhanced pedestrian amenities would make the areas along Route 1 more attractive gathering places for the community. An integrated, multi-modal network would further strengthen community ties by creating connections within and between neighborhoods as well as to the Town Centers along Route 1. This community pride and activity is essential to not only preserving the character that makes these places so unique, but celebrating it in order to revitalize the areas along the corridor.

It is for all these reasons that all three towns have noted the need to address the overall lack of pedestrian and bicyclist facilities along the corridor. Additionally, an enhanced multi-modal network would allow these towns to establish key connections with the surrounding area and region. One such opportunity already exists in the Shoreline Greenway Trail, a nonprofit organization committed to the creation of a multi-use, continuous trail from the New Haven harbor to the Hammonasset Beach State Park in Madison. The organizations' stated mission is to "…enhance the livability of each town, and help improve the well-being of people of all ages who love the outdoors…" While much of the trail is still in development, the areas in Madison closest to Clinton have been constructed and are already open to the public. The close proximity of this existing infrastructure in addition to the shared goals and vision present the opportunity to partner with the organization and extend the

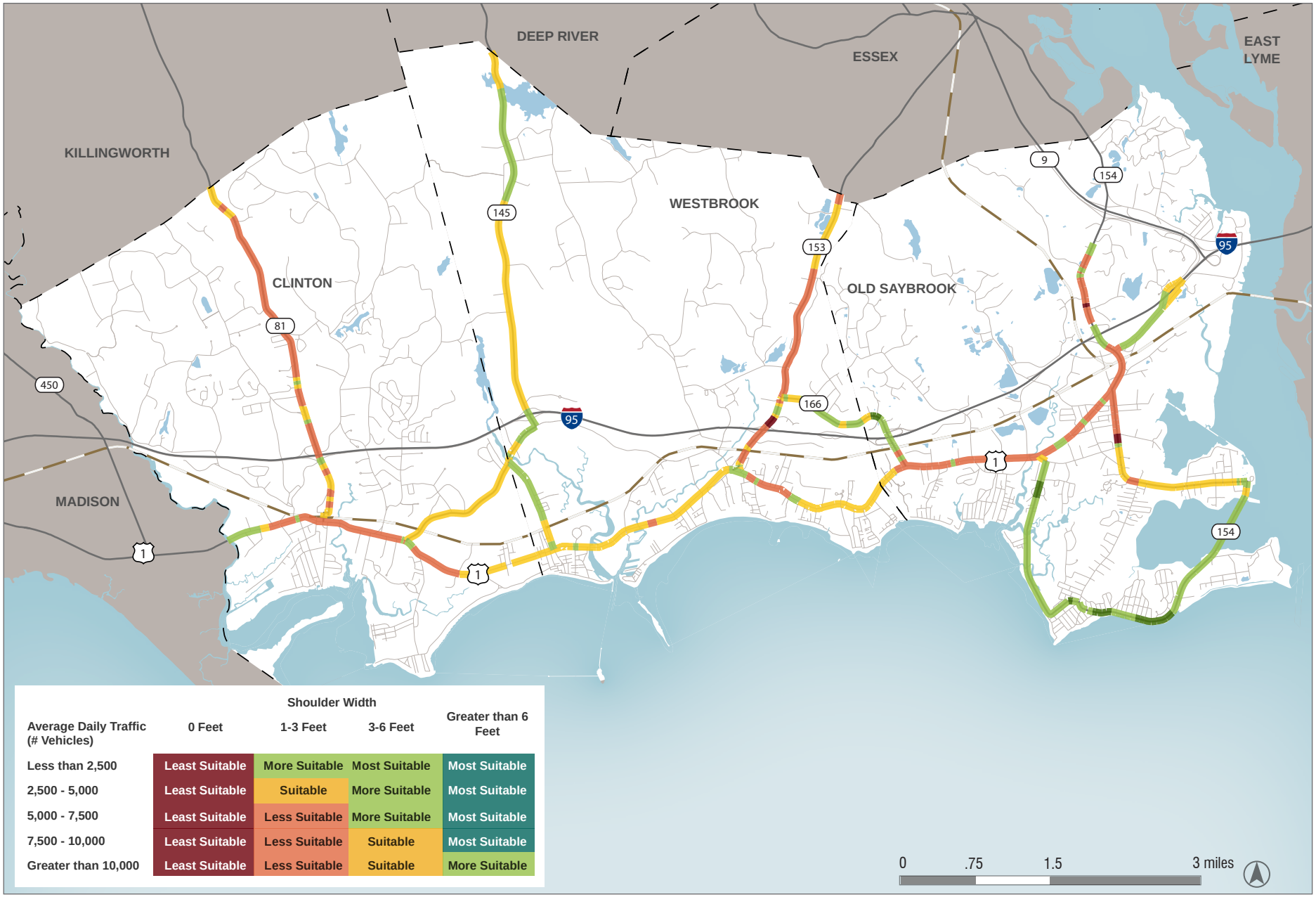
Shoreline Greenway Trail through Old Saybrook. The trail would create a valuable asset for pedestrians and bicyclists within the community and establish strong connections between the three towns in this study as well as four more towns to the west along the shoreline. Additional opportunities to encourage the creation of a strong, multi-modal network can be seen throughout the corridor today.

BICYCLING FACILITIES

While there are currently no separated bike routes, signage, or facilities for bicyclists along Route 1, this mode of transportation has the potential to be well utilized in the study area. Currently, the bicycle environment is less than ideal and characterized by inconsistent shoulders, numerous intersecting roadways and driveways, consistent streams of traffic that sometimes travels at high speeds, and a lack of "share the road" signage or other means that would alert drivers of the potential to encounter a bicyclist. A bicyclist network would be particularly beneficial to the community during the summer season, when the influx of vacationers leads to a surge in the population and more activity along the roadways. Additionally, the climate at that time of year would be well suited for such a transportation choice and the community would have the opportunity to lead more active and healthy lifestyles.

Route 1 is also an ideal corridor to create a friendlier environment for bicyclists because much of the necessary infrastructure already exits. As illustrated in *Figure 12*, approximately half of the corridor in the study area has been deemed to be suitable or better according to the CTDOT's bicycle suitability system. This system calculates how suitable a road is for bicyclists according the average shoulder width in which cyclists can ride and the average daily motorist traffic. While no areas along Route 1 were deemed 'least suitable,' it should be noted that there are many areas that were categorized as "less suitable." Since any successful bicyclist network depends on connectivity, it will be important to address the challenges causing these areas of the road to be less suitable.

FIGURE 12: BIKABILITY INDEX

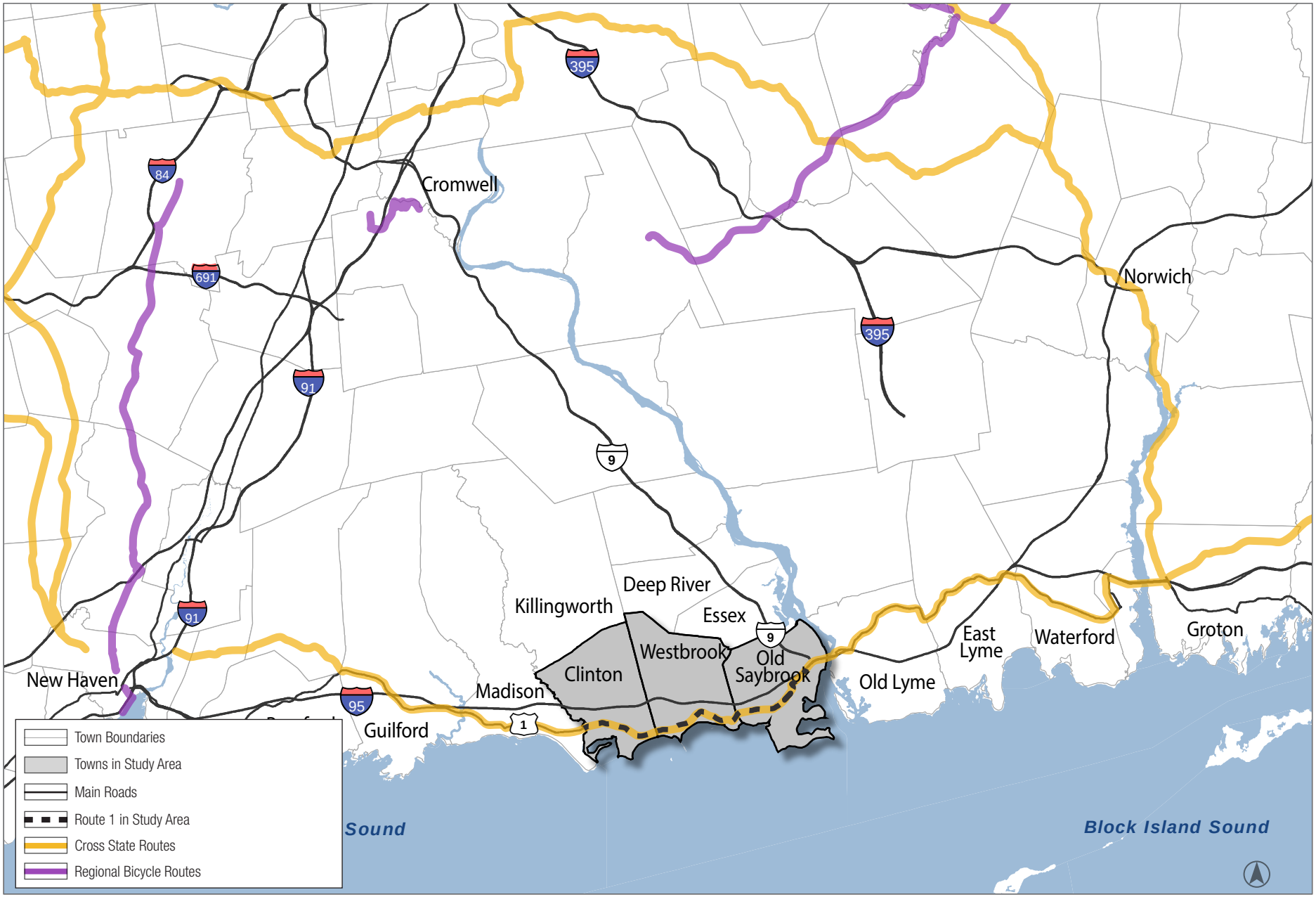


Average Daily Traffic (# Vehicles)	Shoulder Width: 0 Feet	1-3 Feet	3-6 Feet	Greater than 6 Feet
Less than 2,500	Least Suitable	More Suitable	Most Suitable	Most Suitable
2,500 - 5,000	Least Suitable	Suitable	More Suitable	Most Suitable
5,000 - 7,500	Least Suitable	Less Suitable	More Suitable	Most Suitable
7,500 - 10,000	Least Suitable	Less Suitable	Suitable	Most Suitable
Greater than 10,000	Least Suitable	Less Suitable	Suitable	More Suitable

Source: Bikability Index Data - Connecticut Statewide BIcycle Map Website sponsored by CTDOT, 2009.

In spite of these challenges, Route 1 has consistently been recognized for its potential to create strong links between communities and the region through the creation of a bicyclist transportation network. For example, it is identified as the only area to receive the highest funding priority with regards to potential pedestrian/ bicyclist priority funding areas in Westbrook. This funding would provide improvements such as on-road bike lanes, off-road bike paths, sharrows, and/ or 'share-the-road' signs. Additionally, it has been identified by CTDOT as a Cross State Route, which means it is a suggested route on which cyclists can cross the state in order to better connect the region. In fact, Route 1 could fill an existing gap in Connecticut's Regional Bicyclists Routes. As shown in *Figure 13*, the majority of the Regional Bicyclist Routes are North-South so Route 1 could serve a significant need as an official East-West route for bicyclists.

FIGURE 13: CROSS STATE ROUTES & REGIONAL BIKE ROUTES



Source: Biking Route Data - Connecticut Statewide BIcycle Map Website sponsored by CTDOT, 2009.

PEDESTRIAN FACILITIES

Key Elements

The pedestrian realm is lacking in a majority of places along the corridor, thus creating a largely unwelcoming environment to those on foot. While there are many factors that have contributed to the development of this environment, five key elements have been identified for the significant role they play in defining the pedestrian realm today. These elements have been used to frame the evaluation of the existing pedestrian environment and a brief description of each and how it relates to our study area is described below.

1. Sidewalk Quantity and Quality

Sidewalks are vital in any pedestrian environment as they play not only a key role in delineating a safe zone for the pedestrian to walk between destinations, but also in the creation of a sense of vibrancy. Sidewalks are a space where those within the community can easily come into contact with another, thereby enlivening the streetscape overall.

While the existence of sidewalks is lacking along much of Route 1, it is important to note that some areas along the corridor do not contain any destinations that would attract pedestrian traffic while there are other areas with no sidewalks in spite of demand or where there are frequent gaps within the sidewalk network. While the majority of the sidewalks that do exist are in good condition like those highlighted in *Figure 14-1,* one-third are in average or poor condition due to minimal or lack of maintenance. In order for the existing sidewalks to effectively serve pedestrians and provide walkable, safe pathways between destinations, they must be of sufficient quality and well maintained.

FIGURE 14-1 THROUGH 14-7: ASSETS FOR THE PEDESTRIAN ENVIRONMENT

Source: Fitzgerald & Halliday, Inc.

2. Pedestrian-Oriented Built Environment

Sidewalks often work directly with pedestrian-oriented buildings in order to create a vibrant and active street life. A pedestrian-oriented built environment is one which has been designed at a human scale and in which the pedestrians feel a sense of connectivity with these surroundings. Elements such as building massing, building setback, parking placement, ground floor uses, and architectural qualities can all be designed to encourage a pedestrian environment.

As previously stated, the majority of Route 1 has been designed to prioritize the automobile and as a result, much of the development along the corridor has also been designed to be auto-oriented. One clear example is the lack of pedestrian-friendly liner buildings, which usually contribute to an interesting and lively streetscape while allowing for a direct connection with pedestrians. Alternatively, buildings with a large setback, such as those illustrated in *Figure 15-2*, inhibit engagement with the pedestrian. These large setbacks are often utilized to place parking in front of the building, further heightening the degree to which the built environment is oriented towards the automobile as opposed to the pedestrian. Furthermore, surface parking lots create a vast, unapproachable space along the streetscape that severely devalues attempts at placemaking.

Maximum and minimum setback requirements within towns' zoning codes are one tool though which towns can control the distance between a building and the public realm. But upon examination of the zoning codes along Route 1 within the study area, the average minimum setback is 27' and the majority of areas have no maximum setback. This creates a wide gap between the pedestrian and the built environment, decreasing the convenience of walking between such establishments and any feeling of security or enclosure that might have otherwise existed. Additionally, parking is placed at the front of the building for the vast majority of the buildings along the corridor, such as those highlighted in *Figure 15-1*, which discourages pedestrian accessibility.

FIGURE 15-1 THROUGH 15-3: OBSTACLES TO THE PEDESTRIAN ENVIRONMENT

Source: Fitzgerald & Halliday, Inc.

3. Pedestrian Amenities

Pedestrian amenities present another opportunity for the surrounding area to express their character and heritage through the design of such amenities, which include things such as signage and signalization, pedestrian seating, lighting, landscape plantings, and utilities. These amenities should support a variety of activities in order to create a high quality pedestrian environment that can attract people to the street as a pathway and as a destination. Pedestrian amenities can also be utilized to establish a sense of continuity through the network overall. Within the study area, pedestrian amenities are generally clustered within the Town Centers along Route 1, as shown in Westbrook's Town Green in *Figure 14-2,* with few such amenities in the areas in between.

4. Continuous Pedestrian Network

A walkable environment is dependent on not just the presence of sporadic pedestrian facilities and streetscape design elements, but on the *continuous* presence of these elements. The pedestrian network should provide its users with continuous pathways by which to conveniently connect to various key destinations, and this consistency is critical in creating a smooth flow of pedestrian movement. Additionally, the repetition of these elements along the pedestrian network allow for a uniform appearance that will help to establish this area as a pedestrian friendly environment. There is also an opportunity to uniquely design these repeating facilities in a way that imbues the surrounding area's character and creates a sense of place.

In the areas along Route 1 where pedestrian facilities do exist, there is often a high level of inconsistency in their presence and quality, which leads to gaps in the overall network and make it difficult for users to navigate. For example, *Figure 15-2* demonstrates how some sidewalks along the corridor end suddenly, leaving the pedestrian with no way to safety continue along their path and disrupting the network.

Driveways are another element that cause breaks in the pedestrian network and there are a significant number of them along Route 1 that are spaced fairly unevenly, leaving certain areas of the sidewalk extremely disjointed. This is problematic because the number of vehicle-pedestrian conflicts increases with the number of driveways. And although pedestrians legally have the right-of-way when crossing private driveways, this is not well known or observed and pedestrians and motorists often become confused at driveway crossings, increasing the likelihood of a conflict.

5. Pedestrian Safety

While listed last, safety is one of the most important elements that make for a pedestrian-friendly environment. Various types of crosswalks are one of the most commonly used tools to increase pedestrian safety. These types include traditional white painted crossings, crossings that utilize specialized paving, or crossings that clearly mark the entire intersection using white stripes. Another element often utilized is signalized crossings which more formally regulate the interactions between the pedestrian and the motorist.

About a third of the intersections along Route 1 include crosswalks or signalized crosswalks. While many of these crosswalks are located in areas with higher levels of pedestrian traffic, there were a total of seven crashes involving pedestrians between 2009 and 2011, many of which were in those high pedestrian traffic areas. This indicates that pedestrian safety is an issue along the corridor. In addition to the real danger that exists, many potential pedestrians can be intimidated by the perceived danger along the corridor and choose not to walk. For example, many pedestrian are intimidated by the wide intersections like the example shown in *Figure 15-3*, regardless of whether or not there are crosswalks. The areas of perceived fear and those that present a real danger both need to be addressed in order to create a sense of comfort and safety for pedestrians.

Segments

When examining the pedestrian realm along the corridor it's important to note the connection between land use and pedestrian activity. While there are some areas with land use patterns and destinations that generate high levels of pedestrian activity or have the potential to do so in the future, there are also areas where land use patterns do not create any significant pedestrian demand.

In accordance with the relationship between land use and the pedestrian realm, this section will be organized according to the nine segments of the corridor described in the Introduction of this report. Additionally, the pedestrian environment is best evaluated at the segment's smaller scale in order to identify key features.

A Bicycle-Pedestrian Field Inventory was conducted for this study to identify the location and condition of sidewalks as well as the location of pedestrian amenities, crosswalks, and driveways. Pedestrian amenities were defined as street furnishings (such as benches, trash cans, and bus shelters) and pedestrian signage. The below discussion and the Pedestrian Environment (PE) Matrix, as shown in *Figure 16*, has been based upon the data collected during this field and its subsequent analysis. More information can be found in *Appendix #,* which contains detailed maps illustrating the fieldwork results and a thorough explanation of how the data was then quantified and analyzed.

FIGURE 16: PEDESTRIAN ENVIRONMENT (PE) MATRIX

SEGMENT (west to east)	West Clinton Segment	Clinton Village Segment	Clinton East Retail Segment	Westbrook Marina & Beach Segment	Westbrook Town Center Segment	Westbrook East Segment	West/ Old Saybrook High School Segment	Central Old Saybrook Segment	East Old Saybrook Segment
LENGTH	3,880 ft .73 mi	5,789 ft 1.1 mi	7,6145 ft 1.44 mi	7,776 ft 1.47mi	6,389 ft 1.21 mi	6,531 ft 1.24 mi	8,185 ft 1.55 mi	5,883 ft 1.11 mi	8,028 ft 1.52 mi
SIDEWALK CONDITION Percent of total available sidewalk area within each segment (segment length x 2) = Good Condition = Average Condition = Poor Condition = No Sidewalk									
SIDEWALK MATERIAL Percent of total existing sidewalk area within each segment (segment length x 2) = Concrete = Other Material									
PEDESTRIAN AMENITIES (Benches, Bus Shelters, Pedestrian Signage, Trashcans) Few amenities → Many amenities	0	26	0	0	13	4	2	5	0
PEDESTRIAN SAFETY # = Total crashes betweeen 2009 - 2011 that involved pedestrians	0	0	1	0	2	0	0	3	0
CONNECTIVITY = Total intersecting roads along road's edge = Total driveways along road's edge = Uninterrupted road's edge Total road's edge: Short → Total road's edge: Long	31%	31%	26%	31%	26%	26%	27%	37%	26%

Source: Fitzgerald & Halliday, Inc.

West Clinton Segment

This segment of the corridor is one which should act as a gateway into the town of Clinton from the west, from Madison and the Hammonassett Beach Connector. It should welcome home residents and present a positive first impression for new visitors of the town. While a strong pedestrian environment can create the type of vibrant street environment that would leave such an impression, the area has very little pedestrian accommodations or amenities. As illustrated in the PE Matrix, there are sidewalks along only about 20% of the road's edge in this area. The lack of a pedestrian environment as one approaches Clinton from the west creates an unwelcoming and slightly intimidating environment not only to those on foot, but also to motorists since there is no indication that you are about to enter the Town Center. There are few key attraction points in this area so there might not be a high demand for pedestrian facilities along this segment until you are closer to the approach to the Town Center.

Clinton Town Center Segment

Unlike the western approach to the town of Clinton, the Clinton Town Center District is a highly walkable with a very comfortable and friendly pedestrian environment. The segment includes almost 6 pedestrian amenities for every ¼ of a mile, which is more than any other segment along the entire study corridor. The PE Matrix emphasizes the fact that the segment which had the next highest number of pedestrian amenities was Route 1 East/ Westbrook Town Green with 1.73 pedestrian amenities for every ¼ mile.

The high prevalence of pedestrian amenities allows for continuity in the pedestrian network which is rare along much of Route 1. This continuity is further enforced by the fact that sidewalk exists along almost 75%of the road's edge, the large majority of which is in good condition. Another element which makes this segment especially unique within the study area is that this is the only place where the majority of the built environment along the corridor is pedestrian-oriented with liner buildings and parking placed in the rear of the lot. While there are a few other blocks where this occurs along the corridor, there is no other place where the sidewalk and the built environment work together to create such a comfortable sense of enclosure as well as a keen sense of place, as the photographs depicted below.

As its name suggests, this segment largely exists within Clinton's Town Center, which includes a traditional downtown shopping area, the train station, and many of the town's civic activities. This explains the very comfortable pedestrian environment along this segment, which is necessary because of the large amount of foot traffic along with the high volume of automobiles that travels along this segment. The Town has ensured that these two modes coincide safely with one another by investing in infrastructure such as painted crosswalks and signalized crosswalks. So while there has been a fairly high frequency of small crashes within the segment, there have been none involving a pedestrian.

Clinton East Retail Segment

It's immediately clear from the PE Matrix that similar to the first segment in Clinton, this third and final segment has very limited pedestrian facilities. Less than 20% of its intersections have crosswalks, and only 9% of the road's edge contains sidewalks. The pedestrian environment within this segment is highly intimidating and threatening and the built environment is oriented to the automobile. For example, although there are two main shopping plazas, they have been designed with minimal architectural detail and have large setbacks with parking lots lining the right-of-way.

The differences between these three segments highlights a challenge described in Clinton's Master Plan, which is that the construction of the sidewalks in town has occurred without providing a more complete network for all of Route 1 in Clinton. However, the quality of the pedestrian network in the Clinton Town Center provides a great opportunity to continue to build the network and design stronger transitions and gateways from both directions.

Westbrook Marina and Beach Segment

This segment serves as a key gateway into the Westbrook Town Center and contains many boating businesses, recreational boating marinas,

restaurants, and beach communities. While Westbrook has a proactive sidewalk program and a strong desire to improve walkability in town, the pedestrian environment is currently poor as this segment is representative of the original auto-centric design of the corridor. There are no pedestrian facilities as defined by the survey work and over 80% of the road's edge lacks sidewalks of any kind.

The sidewalks that do exist are sporadically located in bits and pieces as opposed to along a continuous network. Yet there are also many key areas and attractions, such as the marina and beaches, which could attract significant foot traffic. The growing desire to walk between destinations in this segment can already be seen in clues such as worn pathways in grassed areas and indicate the strong pedestrian demand that already exists in areas lacking facilities.

Westbrook Town Center Segment

This segment includes Westbrook's Town Center as well as the sections leading into and out of this activity node. One central feature of the Town Center is the town green, which is a triangular, landscaped area located between Route 1 and Essex Street. This area is extremely pedestrian friendly as it creates a welcoming public space that attracts pedestrians on a day-to-day basis as well for community gatherings and celebrations, such as the Annual Christmas Tree Lighting in December, craft fairs, and regular concerts in the summer. The landscaping elements and the flexible nature of the space significantly contribute to its success as a focal point of this walkable area for the community.

While this area does present a strong pedestrian environment and crosswalks exist at almost half of the intersections, as illustrated in the PE Matrix, there is an issue of safety that is evident in the two auto accidents that involved pedestrians between 2009 and 2011. Recent reconstruction of the roadway and parking configuration around the green, including crosswalk locations, have resulted in some concerns for pedestrian safety crossing Route 1 to the green and at the intersection of Old Clinton Road. Efforts are underway to address these issues, including a recent Safe Routes to School study supports efforts to enhance the sidewalk network so children can safely walk and bike to and from school, such as the Daisy Ingraham School which is located just to the east of the town green. Overall, the pedestrian environment in this corridor is one with a significant amount of potential, many drivers of pedestrian traffic and an adequate amount of facilities already in place.

Westbrook East Segment

As one travels along this segment and towards the boundary between Westbrook and Old Saybrook, the pedestrian environment begins to deteriorate. The similarities between this segment and the Westbrook Marina and Beach Segment are highlighted in the PE Matrix as the majority of the road's edge in this segment also lacks sidewalks and there are no pedestrian facilities. One key difference, though, is that this segment is mainly comprised of neighborhoods and there are not as many drivers of foot traffic. While the demand for improvements in the pedestrian environment isn't quite as strong in this segment, the gaps in the sidewalk network should still be addressed in order to truly create a continuous pathway for those on foot.

Improvements in the pedestrian environment are evolving over time as Westbrook requires all new developments to provide sidewalks within the site and along road frontages. Additionally, the town has developed a number of potential sidewalk standards. These standards include sidewalks along Route 1 on both sides at a width of at least five feet, with wider sidewalks in areas with expected increased pedestrian activity.

West/ Old Saybrook High School Segment

This district is the western portion of Route 1 in Old Saybrook and it contains the Town's high school, the Town Center Plaza shopping center, and the Oyster River shopping center. While the majority of this segment is located in a "Pedestrian Node" according to its definition in Section 9 of Old Saybrook's Zoning Regulations, the current pedestrian environment is lacking. Pedestrian nodes have been identified by the town as any portion of land lying within the business districts and within 1500' lineal feet of the following intersections with Route 1: Oyster River, North Main Street, Spencer Plain Road, and School House Road.

The existing facilities in this segment currently do not support a strong pedestrian-friendly environment, as emphasized by the PE Matrix Sidewalks cover slightly under a third of the road's edge, and there are minimal pedestrian amenities and crosswalks. Additionally, much of the built environment is very oriented to the automobile with large areas of parking in front of the buildings.

Central Old Saybrook Segment

This segment includes a wide variety of retail and service businesses, some larger shopping plazas, as well as the main intersection that provides access to the Old Saybrook train station (on North Main Street) and the vibrant village center on Main Street. These uses create a significant amount of both pedestrian and automobile traffic, and therefore create the need to manage conflicts between the two modes to ensure safety. The number of driveways along this segment further increases these potential conflicts as the segment has the highest number of curb cuts created by driveways and roadway intersections within the study corridor. Driveways are spaced closely with an average distance of under 100' between driveways. There were three reported crashes involving pedestrians between 2009 and 2011, and this segment of the corridor is considered dangerous for walkers.

Sidewalks currently exist along about a third of the corridor in this segment, however, the Town has proposed to adding sidewalks in almost all the places where none currently exist, as seen in the PE Matrix. Most of sidewalks that do exist are in good condition.

East Old Saybrook Segment

This segment runs from the intersection of North Main Street to that with I-95, which is the primary gateway into Old Saybrook for the many motorists who enter the town via I-95 and from the east and north. This segment has been developed with a prioritization on the automobile with essentially no pedestrian amenities and few intersections with crosswalks. Sidewalks exist along only about ¼ of the road's edge. However, the Town has proposed to add sidewalks along the majority of the places in this segment where none currently exist. Many of the buildings and uses along this segment are oriented towards motorists who have just pulled off the highway and thus, this area is likely to have less pedestrian demand than other parts of Old Saybrook.

E. Public Transportation System

The three main public transportation services that currently exist along Route 1 are 9 Town Transit, Shore Line East, and Amtrak. These three systems work together to provide a transit system that is highly utilized by the study area's residents with ridership levels that have been experiencing steady growth. This growth is especially important to take into consideration with regards to Route 1 because the transit services all have facilities either adjacent to or in close proximity of the corridor. While 9 Town Transit and Shore Line East both have facilities in all three towns in the study area, Amtrak's Regional line stops only in Old Saybrook. These transit services are a strong transportation resource for the study area for both local and regional travel.

9 TOWN TRANSIT SYSTEM

Overview

9 Town Transit was formed in 1981 by the Estuary Transit District (ETD), which still operates the system today based on the founding mission to provide "local, coordinated public transportation for residents of the area." Originally, service focused solely on the 9 towns within the Connecticut River Estuary Region, which include Clinton, Chester, Deep River, Essex, Killingworth, Lyme, Old Lyme, Old Saybrook, and Westbrook, but limited services have been extended to recently to Haddam and East Haddam under contracts with the towns.

ETD is governed by a Board of Directors comprised of one elected member from each of the 9 towns. The Board sets policy, oversees finances, and appoints both an Executive Director and a Transit Advisory Committee (TAC) through a system by which each Director's vote is weighted according to town population. The Executive Director manages day-to-day operations with the assistance of a professional transit management company. The TAC focuses on improving public

involvement and provides the board with insight from the public's perspective.

The system operates with a $1.5 million annual budget, which includes funding sources from fare revenue, the Federal Transit Administration (FTA), CTDOT, and the nine member towns. Additionally, ETD receives a Title III grant which allows senior citizens in the area to ride any of the services it operates, including 9 Town Transit, on a donation only basis.

9 Town Transit serves its transit users through two main services: four flexible bus routes and a demand response service, known as Dial-A-Ride, both of which are illustrated in *Figure 17*.

FIGURE 17: TRANSIT SYSTEM MAP

Source:

Services

Buses

Thirteen buses operate along 9 Town Transit's four flexible bus routes, which provide service seven days a week for a fare of $1.50. These four bus routes offer the services as described below:

Table 7: Transit system – 9 town transit

Bus Route	Connecting Towns	Days of Service	Areas served	Connections and free transfers to:
Shoreline Shuttle	Old Saybrook to Madison	Weekdays & Saturdays	Old Saybrook, Westbrook, Clinton, Madison	New Haven via CT Transit S-Route
Riverside Shuttle	Old Saybrook to Chester	Weekdays	Chester, Deep River, Essex, Old Saybrook	-New Haven via Shoreline East Rail Service
Southeast Shuttle	Old Saybrook to New London	Weekdays	Old Saybrook, Old Lyme, New London	-New Haven via Shoreline East Rail Service -New London/ Norwich via South East Area Transit (SEAT)
Mid-Shore Express	Old Saybrook to Middletown		Middletown, Haddam, Chester, Deep River, Essex, Old Saybrook	-New Haven via Shoreline East Rail Service -Middletown via Middletown Area Transit (MAT) -Hartford via CT Transit Route 55 from Middletown

Source: 9 Town Transit website, http://www.estuarytransit.org/

It is important to note that because these buses operate along flexible bus routes, also known as deviated fixed routes, they often deviate from the established route that's illustrated in *Figure 17* to provide service to the surrounding area upon request. This service is offered in order to fill in the gaps within the transportation system, yet it can also often negatively impact the ability to stay on schedule. This has become increasingly problematic as ridership has continued to grow in recent years, especially along the Old Saybrook to Madison Shoreline Shuttle Route.

DIAL-A-RIDE

Dial-A-Ride is 9 Town Transit's demand response service which provides door-to-door transit service between 6 AM – 6 PM on weekdays a fare of $3.00 per trip. The service is open to the general public for any trip purpose, although users are required to make a reservation at least one day in advance.

This service is very well utilized and has resulted in 550,000 miles travelled annually. Its primary users are those located in the towns' rural areas, those with disabilities that require door-to-door service, and those who are travelling to or from somewhere that is not served by one of the bus routes. It is especially useful in further eliminating any gaps that exist in the bus shuttle service.

Existing and Future Trends

9 Town Transit's ridership levels are strong with 100,000 passenger trips made annually, which is a 90% increase since 2009. However, as illustrated in Exhibit 6 below, there are large differences between each of the services' ridership levels.

Exhibit 6: 9 Town Transit Ridership Levels

Source: 9 Town Transit

All the shuttle routes and Dial-A-Ride have actually maintained fairly consistent ridership levels with the exception of the Shoreline Shuttle, which has experienced an enormous increase in its ridership. In fact, its ridership has nearly doubled since January 2008. This is especially significant since the Shoreline Shuttle travels along Route 1 for much of its route, including almost the entire study area. Additionally, one of the most frequently used stations for both boarding and alighting is within the study area at the intersection with S. Main Street in Old Saybrook. It will be important to enhance the transitions that occur in this area between modes and ensure maximum efficiency and safety for all the users of the road.

Today, the majority of those using the Shoreline Shuttle, and all of 9 Town Transit's services, are under 60 years old as the majority of trips were employment related and many people over 60 are no longer in the work force. This trend is consistent with a growing preference among the younger generations for public transit as opposed to automobile ownership.

While it is likely that the younger generation will continue to use 9 Town Transit's services with frequency, it is possible there will also be a surge in ridership among senior citizens as the elderly population across the nation, and in the study corridor, increases. The implications of such an increase should be considered when assessing 9 Town Transit's future growth and public transportation needs of the area's residents.

Because the ridership on the Shoreline Shuttle is expected to grow, it will be important to consider how the service might need to be updated to accommodate additional riders. This could mean changes to the service itself as well as additional and improved facilities, including more buses, increased frequency, and enhanced and additional bus stops.

COMMUTER RAIL – SHORELINE EAST SERVICE

Shoreline East Service (SLE) is a commuter rail service along the Northeast Corridor in Southeastern CT. While it's a fully-owned subsidiary of CTDOT, the National Railroad Passenger Corporation (Amtrak) operates the service between New London and New Haven seven days a week. Additionally, SLE offers limited service to Bridgeport and Stamford, and provides connections to NYC via Metro-North Railroad's New Haven Line.

SLE ridership has grown considerable over the years and continues to grow, however, it had originally been conceived as a temporary measure to reduce congestion in the area during construction on I-95 in the 1990s. The service quickly became popular and drew large ridership numbers and thus, it was decided to retain the service and to make further investments into the commuter rail stations along the line. Today, the SLE's popularity has continued and it has experienced growing ridership levels since 2004 at an annual rate of approximately 4% without factoring any service expansion, according to CTDOT's Statewide Travel Model. A 2005 survey by CTDOT of SLE riders found that 94% were satisfied with the overall service in the past year on the SLE. The same survey also found that slightly under half of SLE passengers transfer to the New Haven Line in order to continue travelling to New York City, Stamford, or Bridgeport.

Efforts have continually been made to upgrade the service as the SLE's popularity and ridership continued to grow. These efforts were increased in the early 2000s when the State increased its focus on the need for improved mass transportation. As a result of this focus, CTDOT published a report entitled "Expanding Rail Service on Shore Line East" in January of 2007 that identified obstacles to improving SLE service and recommended phases through which to implement improved service. In 2008, Phase One added weekend train service at the six SLE stops from New Haven to Old Saybrook. Phase Two was implemented after funding was secured in July 2012, thereby extending SLE service to New London and satisfying many community members who had strongly advocated for such an extension.

Although the extension of SLE to New London relieved some of the parking demand for the Old Saybrook Shore Line East Railroad Station because it is no longer the final stop for those travelling northbound, Old Saybrook has continued to struggle with parking availability. Many

people still drive to Old Saybrook to park and board the train, especially because the station is the only one in the study area to offer Amtrak service. As a result, there is a significant shortage in parking at the station and a resulting proposed project to expand parking with the addition of a new, 200-space commuter lot on the south side of the railway tracks. While this proposed project is only at the preliminary stages, it has already sparked some controversy within the community due to concerns about traffic impacts. The current parking shortfall, and need for an expanded lot, could likely be relieved if regular SLE service were further extended past New London and should be further investigated.

INTERCITY RAIL - AMTRAK

The train station in Old Saybrook is busy and has heavy parking demand because it is one of the last northbound regular stops on the Shore Line East commuter rail line. It's also very busy because it provides service to Amtrak's Northeast Regional Train. Amtrak's high-speed Acela service does not stop at the station and there are currently no planned changes to these lines that would affect Old Saybrook. However, potential plans related to the Northeast Corridor Future project could impact the station and the rail service. The NEC Future is a planning effort by the Federal Railroad Administration (FRA) that is currently investigating alternatives for more robust high-speed rail service between Washington to Boston. The NEC Future project has the potential to have a long-term impact on the various rail services within the study corridor.

F. Other Transportation Systems

FREIGHT

Route 1 is a major north-south US Highway that extends over 2,300 miles from Key West, Florida, north to the Canadian border in Maine. In Connecticut, Route 1 serves towns and cities as a parallel facility to I-95 making its way along the Long Island Sound. Along with I-95, Route 1 plays an important role in the movement of freight in and out of the region and to the shoreline towns. Route 1 also serves as a bypass to I-95, if an incident were to occur. Within the study area, Route 1 shares the movement of freight with an active freight rail line. Trucks and rail provide regular service to and from port locations in New Haven and New York City to the south, and New London, Providence, and Boston to the north. While there is no active freight rail loading zone adjacent to the corridor, local and regional truck activity is prevalent. Truck generators along the corridor include the following:

- Commercial development along the corridor
- Industrial warehousing in Westbrook, particularly off Route 145
- Marine activity in Westbrook and Clinton
- Local construction activities

According to recent traffic counts, truck traffic along the Route 1 corridor ranges from 2% to 4%of daily traffic. Another unique aspect of the corridor is the presence of boat trailers, given the corridor's access to multiple marina facilities and marine-related businesses. The marine industry is vital to the local economy and during peak summer periods, the presence of vehicles towing trailers is prevalent.

In general, most trucks or vehicles towing a trailer turning at intersections encroach on either the roadway shoulder or adjacent lanes. For example, the turning path of a truck turning right is controlled by the curb while the path of a truck turning left may be constrained by a median or other traffic lanes. At times, intersections with skewed alignments in the study area may not safely accommodate a five-axle tractor trailer combination. Intersection and driveways should be designed to accommodate the types of vehicles that are primarily expected to access the property (i.e. commercial vehicles and boat trailers). It is important to understand both the everyday large vehicle needs (business deliveries and emergency vehicle access) and the unique design needs associated with the marine industry and boat trailering when considering any geometric modifications to the roadway.

G. Conclusion: Transportation Issues and Opportunities

SUMMARY OF EXISTING TRANSPORTATION CONDITIONS

The Route 1 corridor (including I-95 and the Shoreline east Railroad) is the transportation spine for the southeast region of Connecticut, and as such it must accommodate and continue to plan for a wide array of users with varying trip purposes and travel modes. The Transportation Conditions assessment for the Route 1 Corridor Improvement Plan included a multifaceted approach that consisted of 1) data collection, 2) feedback from the project stakeholders, and 3) analysis of existing conditions documented in detail within this chapter. The stakeholders spoke to a wide range of corridor issues with the goal of establishing an overall vision for the corridor, along with goals and objectives for protecting, promoting, and enhancing the corridor's qualities. Part of the visioning process included identifying existing transportation issues along the Route 1 corridor. The most pressing raised have been summarized below:

- Pockets of routine congestion on Route 1
- Diversion of traffic from I-95 leading to frequent congestion
- Limited connectivity from train stations to Route 1 and other mobility options
- No bike lanes and generally dangerous conditions for bicycle travel
- High speeds along some segments of the corridor
- Frequent driveways that are challenging to pull out of
- Lack of pedestrian accommodations and connectivity along corridor

While the visioning exercise will be used to help the project team determine priorities and an overall vision for the corridor in the future, issues raised help frame the existing transportation characteristics that challenge the corridor. The following section provides a brief summary of the transportation findings detailed in this Chapter, setting the stage for subsequent planning focused on infrastructure modifications to address deficiencies and enhance efficient and safe travel options and quality of life.

System Gaps and Opportunities

- Traffic demand on Route 1 is heavily influenced by tourism activity during the summer months – May through August. In general, summer traffic levels increase by more than 20 % when compared against non-summer months. While traffic levels vary throughout the year, they fluctuate little throughout the week. Weekday traffic increases steadily over the course of the day until it peaks in the evening hours, as commuter traffic mixes with shopping and other trip purposes to create sustained traffic levels, rather than more typical pronounced spikes during AM and PM peak commuter periods. Weekend traffic patterns mirror the weekday except that higher tourism traffic mixes with shopping and other trip purposes, rather than commuter traffic.

- Overall, the traffic operations analysis indicated signalized intersections manage traffic well during 'typical' summer and non-summer conditions, but there are isolated locations or "pockets" of congestion on Route 1 which was both measured and confirmed by field observations. This congestion is generally limited to the evening hours in downtown Clinton and Old Saybrook at Ingham Hill Road and Main Street intersections, when traffic demand is highest.

- Safety along the Route 1 corridor is a concern, both from a human injury standpoint as well as a contributor to traffic congestion. Over a three-year period, 650 crashes were recorded, or approximately four crashes per week along the corridor. In general, the causes of crashes on Route 1 stem from a combination of many factors including driver behavior, a mix of local and through traffic, weather and light conditions, and roadway geometry – narrow shoulders, poor visibility, and dense curb cuts.

- Route 1 is currently not well suited for bicycle and pedestrian travel. The physical geometry of Route 1, including narrow shoulders and inconsistent sidewalks for much of the corridor. The high volume and speed of motorized vehicles limits non-motorized forms of travel by creating unsafe walking and biking conditions. In addition, numerous driveways are hazardous to pedestrians as well as bicyclists. Deficient pedestrian accommodations cause pedestrians to cross Route 1 where no crosswalks exist – or simply bypass them due to their condition or location.
- While dense and poorly delineated driveways are problematic and can be dangerous for motorized and non-motorized forms of travel, it is clear that certain locations should be designed to accommodate the types of vehicles that are primarily expected to access properties adjacent to route 1. The marine industry is vital to the local economy and during peak summer conditions the presence of vehicles towing boat trailers is prevalent and needs to be safely accommodated.
- A parallel rail line and regional bus system along Route 1 provide passenger service along this busy corridor. National trends as well as ridership growth indicate increasing demand and a need for continued investment in the public transportation system. The aging of the local population, the rising preference for transit among young people, and the increased focus on rail service in the state along with associated higher-density development around stations points to the need to strengthen transit opportunities in the corridor.
- Delays as a result of non-recurring congestion (e.g., traffic incidents, work zones, bad weather, and special events) are a contributing factor to the overall congestion experienced by motorists on Route 1. When incidents occur on I-95, traffic diverts to Route 1 and congestion can reach high levels. The same is true for the frequent accidents reported on Route 1 itself. Furthermore, periodic roadway maintenance – pot holes or tree trimming, adds to congestion because a travel lane typically needs to be closed to accommodate equipment.

CONCLUSIONS AND NEXT STEPS

This Chapter of the Route 1 Corridor Improvement Plan has identified deficiencies in the transportation system, considerate of all travel modes in the corridor, and confirms some of the most pressing issues raised by corridor stakeholders. Through a multifaceted approach, several conclusions about the transportation system in the Route 1 corridor were made. Congestion that occurs is not solely related to Route 1 traffic demand, but often the result of regular traffic diversions by long-distance travelers on I-95. The interaction of dense and wide driveways, narrow shoulders, periodic roadway maintenance, lack of turn lanes at some intersections, and limited visibility all contribute to the operational challenges of Route 1. Considering the number of crashes that have occurred, it is clear that the safety of the corridor should be a key focal point in future planning. Furthermore, while bike facilities are essentially not provided along Route 1, outreach initiatives have concluded latent demand for biking, if such facilities were provided. The same is true for deficient or inconsistent pedestrian accommodations.

The needs of all users must be evaluated in a comprehensive manner, thus preserving the integrity of the roadway, as a local as well as regional transportation asset. In practice, Route 1 is more than an inter-regional highway. It functions as a collector and a local road, depending on the context of the environment in which it serves, and that role will continue to evolve over time. From a transportation perspective, 1) addressing safety concerns 2) integrating and enhancing non-motorized forms of travel in the corridor, and 3) managing non-recurring congestion, will lead to a successful investment strategy to implement infrastructure projects that align with community goals and objectives. Collectively, this assessment sets the stage for the next stage of the study which will explore and recommend transportation improvements within the corridor.