



Valley Service Road Safety Study

February 2026

Prepared for:

South Central Regional Council of Governments and
Town of North Haven



Prepared by:

AKRF, Inc. and VN Engineers



Table of Contents

Executive Summary	ii
Chapter 1: Introduction.....	3
Chapter 2: Existing Corridor Conditions.....	5
A. Study Corridor and Roadway Characteristics	5
B. Existing Travel Demand	6
C. Crash Analysis.....	8
D. Horizontal Curve Speed Study	9
E. Roadway Geometry Review.....	11
F. Summary of Corridor Deficiencies.....	13
Chapter 3: Public Involvement	14
Chapter 4: Conceptual Corridor Improvements	15
Guiding Principles.....	15
A. Short/Mid-Term Corridor Transportation Improvement Strategies.....	15
Strategy 1: Remove Obstructions to Existing Corridor Signage.....	15
Strategy 2: Enhance Speed Limit Signage.....	18
Strategy 3: Enhance Curve Delineation Signage	19
Strategy 4: Install High Friction Surface Treatment.....	21
Strategy 5: Evaluate Rumble Strips Along the Corridor	22
Strategy 6: Evaluate Speed Tables or Speed Cushions Along the Corridor.....	22
B. Long-Term Corridor Transportation Improvement Strategies	24
Strategy 1: Roadway Realignment	24
Strategy 2: Install Median Islands.....	24
Chapter 5: Implementation Plan	26

Appendices

- Appendix A – Count Data
- Appendix B – Crash Data and Collision Diagrams
- Appendix C – Detailed Curve Speed Data
- Appendix D – Existing Conditions Base Map
- Appendix E – Best-Fit Horizontal Alignment Analysis
- Appendix F – Best-Fit Vertical Alignment Analysis
- Appendix G – Public Information Meeting
- Appendix H – Detailed Cost Estimates
- Appendix I – Speed Table Conceptual Plans

Executive Summary

The South Central Regional Council of Governments (SCRCOG), serving as the Metropolitan Planning Organization (MPO) for the New Haven urbanized area, places strong emphasis on improving transportation safety and reducing crashes across all travel modes — including driving, walking, biking, and transit. To support this mission, SCRCOG commissioned the Valley Service Road Safety Study (the “Study”) to assess current roadway conditions and explore conceptual design improvements aimed at improving safety along the Valley Service Road corridor in the Town of North Haven. The study area, developed in coordination with the Town of North Haven, focused on approximately 1.8 miles of Valley Service Road between Clintonville Road (Route 5 / Route 22) and approximately 950 feet south of the existing perimeter road surrounding the current Amazon Distribution Facility.

The study identified the following transportation improvement strategies that would systemically improve safety along Valley Service Road. Short-/mid-term corridor strategies include:

- Removal of obstructions (i.e. vegetation) to existing signage
- Enhancing speed limit signage
- Enhancing curve delineation signage
- Installation of High Friction Surface Treatment
- Evaluating the installation of rumble strips
- Installation of speed tables or speed cushions

The Study also identified two potential corridor improvement concepts which could be programmed for implementation over a longer period of time. The conceptual intersection improvements can be incorporated into each of the potential corridor improvement concepts identified herein.

The Town of North Haven will use this Study to seek funding to implement the improvements identified herein. In general, short-/mid-term conceptual improvements require relatively modest funding, while long-term improvements require substantially greater investment. Once funding is identified, conceptual corridor safety improvements would be advanced to engineering design and construction.

Additional funding will allow for a Preliminary Engineering study to be performed to confirm project extents, help establish the potential impacts to environmental and natural resources, identify potential property and utility impacts, and help refine the expected project costs.

Once Preliminary Engineering is complete, final design will take place to include all the necessary details that contractors require for construction including grading, signage and striping, work zone, and traffic control plans. Final design culminates with construction documentation to facilitate bidding and construction of the project. If necessary, a right-of-way acquisition process would be conducted to obtain additional property for purposes of the project.

Chapter 1: Introduction

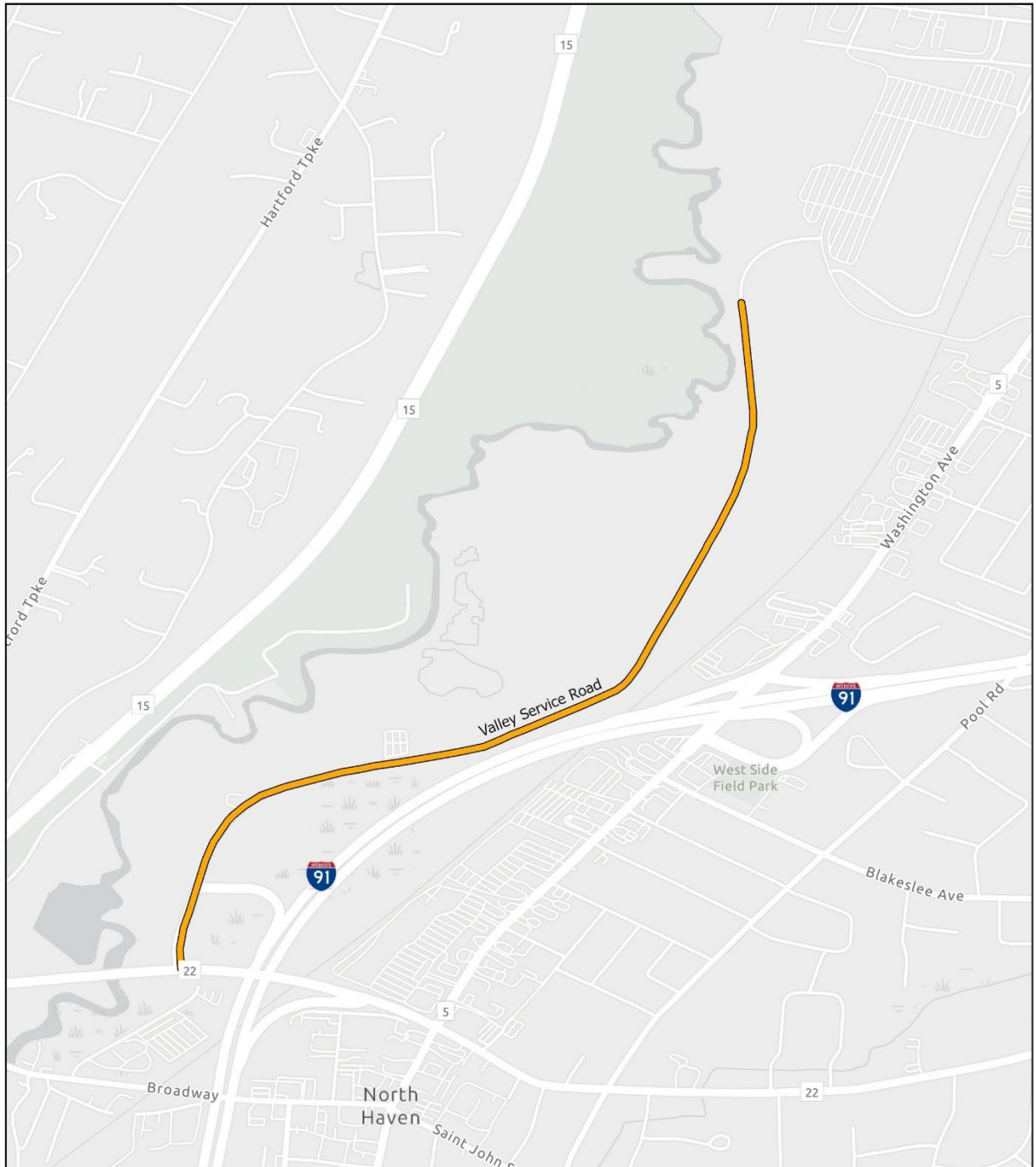
The South Central Regional Council of Governments (SCRCOG), serving as the Metropolitan Planning Organization (MPO) for the New Haven urbanized area, places strong emphasis on improving transportation safety and reducing crashes across all travel modes — including driving, walking, biking, and transit. To support this mission, SCRCOG commissioned the Valley Service Road Safety Study (the “Study”) to assess current roadway conditions and explore conceptual design improvements aimed at improving safety along the Valley Service Road corridor in the Town of North Haven. Valley Service Road is a town owned and maintained roadway, and the corridor is classified as a north/south local roadway by the Connecticut Department of Transportation (CTDOT). The posted speed limit of Valley Service Road is 25 miles per hour (mph) and approximately 3,200 vehicles per day (vpd) utilize the corridor. In 2022, the corridor was extended from a cul-de-sac approximately 9,500 feet to the north of Clintonville Road (the northern study limit) to a perimeter road that connects to the Amazon Distribution Center to improve traffic circulation in the area and reduce congestion along Washington Avenue (Route 5) (**Figure 1**). The section of the perimeter road continuing east of Valley Service Road to Washington Street (Route 5) is also a public roadway.



Figure 1
Valley Service Road Before and After the 2022 Corridor Extension
(Source: Google Maps)

The study area (**Figure 2**), developed in coordination with the Town of North Haven, focused on approximately 1.8 miles of Valley Service Road between Clintonville Road (Route 5 / Route 22) and approximately 950 feet south of the existing perimeter road surrounding the current Amazon Distribution Facility.

Roadway safety is a major concern for the Town, surrounding businesses, and motorists who use the corridor. Given the alignment of the roadway and lack of developed land along most of the corridor, motorists travel significantly above the speed limit. Furthermore, prior to mid-2025 roadway lighting was not provided along the entirety of the corridor. A total of 28 crashes have occurred along the corridor since the corridor was extended in 2022, and four of the crashes involved serious injuries. The recommended safety improvements identified herein aim to address the above noted safety deficiencies and to provide a safer corridor for roadway users.



Legend

— Study Corridor

0 775 1,550 Feet

Figure 2
Valley Service Road Safety Study Area

Chapter 2: Existing Corridor Conditions

This section summarizes existing conditions along the Valley Service Road corridor. Travel demand, roadway geometry, and road safety were assessed utilizing the data sources identified herein and were utilized to identify deficiencies and inform the development of corridor safety improvement concepts.

A. STUDY CORRIDOR AND ROADWAY CHARACTERISTICS

Valley Service Road is a town owned and maintained roadway. In addition to being classified as a north/south local roadway by the CTDOT, the corridor serves as an alternative route for north/south travel in the area. The corridor parallels the Washington Avenue corridor and provides access to the Amazon Distribution Center at 409 Washington Avenue.



Figure 3
Valley Service Road

At its southern terminus, Valley Service Road forms a T-intersection with Clintonville Road. The two-way stop-controlled intersection has two and three lanes on the eastbound and westbound Clintonville Road approaches, respectively. A single lane is provided along the stop-controlled approach of Valley Service Road. Continuing to the north, Valley Service Road forms another T-intersection with the southbound Interstate 91 on-ramp, with single lane approaches along both directions of Valley Service Road. The on-ramp to southbound Interstate 91 is a single lane on-ramp.

North of the southbound Interstate 91 off-ramp, Valley Service Road continues north parallel to Washington Avenue towards the Amazon Distribution Center. Valley Service Road is a two-lane roadway that ranges from approximately 28 feet to approximately 34 feet in width, with 11-foot travel lanes and shoulders ranging from 3 feet to 5 feet. There are some areas of bituminous curbing along the edge of road, however most of Valley Service Road has no curbing or accommodations for parking, pedestrians, or cyclists. Utility poles

were recently installed along the corridor with overhead wires and “cobra-head” lighting to illuminate the roadway.

There is limited drainage infrastructure along Valley Service Road. In the areas of bituminous curb toward the southern portion of corridor, there are catch basin inlets that drain via pipe connection to drainage channels and depressions along the east side of the road. For the remainder of the corridor, the stormwater runoff from the roadway sheet flows in the direction of the roadway cross slope toward the vegetated areas along the edges of pavement. There are also several culvert crossings along the corridor that pass watercourses beneath Valley Service Road in an east to west direction toward the Quinnipiac River.

Outside of the limited number of businesses along the western side of Valley Service Road (Q-Tee Driving Range, Select Fence and Guardrail), all the parcels along the corridor are undeveloped. Besides a recently approved trucking facility for 400 Valley Service Road along the northern portion of the corridor, there are no planned developments along the corridor.

B. EXISTING TRAVEL DEMAND

Continuous traffic volume, vehicle classification, and speed data were collected at two locations along Valley Service Road between Monday, April 21, 2025 and Sunday, April 27, 2025 to understand the fluctuation in traffic volumes, composition of vehicles, and travel speeds over a typical week. Each of these travel demand elements are discussed below. Detailed traffic volume, vehicle classification, and speed data are provided in **Appendix A**.

AVERAGE DAILY TRAFFIC VOLUMES

Figure 4 and **Table 1** provide a summary of Average Daily Traffic (ADT) collected along the Valley Service Road corridor. The ADT on Valley Service Road is approximately 3,200 vehicles per day (vpd). A review of the count data indicates a peak in traffic around 5:00 AM, 7:00 AM, and 6:00 PM, likely due to shift changes at the nearby Amazon Distribution Center. In addition, there is a slightly higher distribution of southbound traffic when compared to northbound traffic daily.

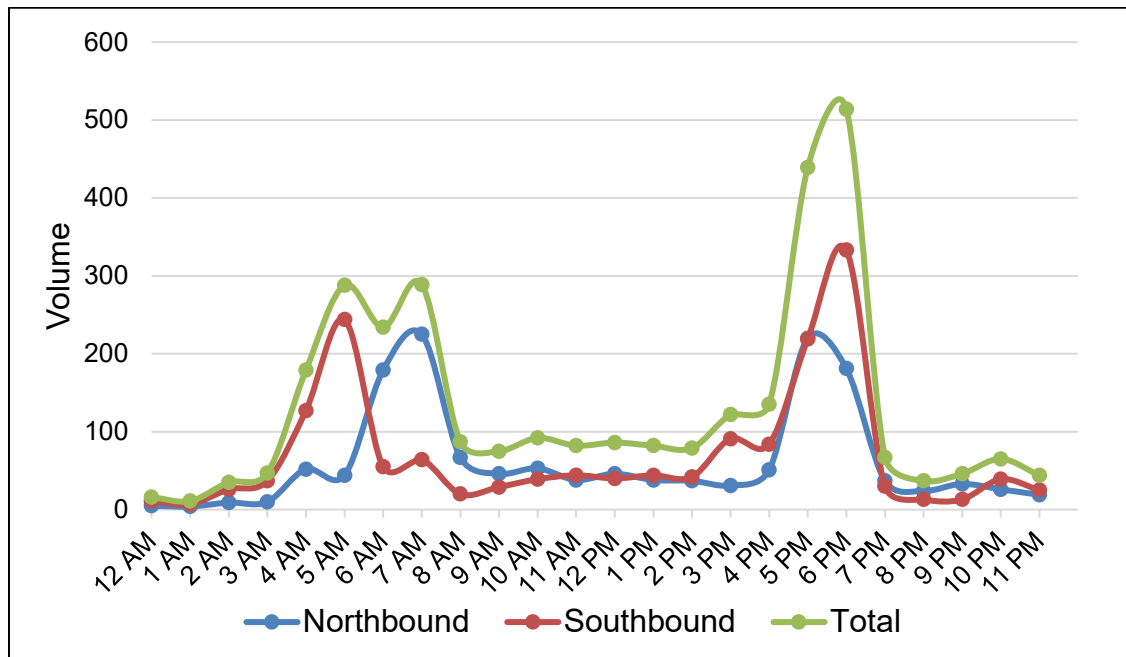


Figure 4
2025 Hourly Traffic Volumes along Valley Service Road

Table 1
2025 Average Daily Traffic – Valley Service Road

Location	Average Daily Traffic (vehicles per day)		
	Northbound	Southbound	Total
Northern Study Limit (approximately 950 feet south of the Amazon Distribution Facility perimeter road)	1,440	1,610	3,050
South of 275 Valley Service Road	1,480	1,680	3,160

Notes: Data collected in April 2025.

DAILY VEHICLE CLASSIFICATIONS

Daily vehicle classification data obtained from April 2025 ATR data indicate there is a minimal number of heavy vehicles (trucks) on the corridor. Heavy vehicles represent a maximum of two percent of all daily traffic in the corridor (see **Table 2**).

Table 2
Daily Heavy Vehicle Percentages – Valley Service Road

Location	Heavy Vehicle Percentage (%)		
	Northbound	Southbound	Total
Northern Study Limit (approximately 950 feet south of the Amazon Distribution Facility perimeter road)	2.2	1.4	1.8
South of 275 Valley Service Road	2.6	1.5	2.0

Notes: Data collected in April 2025.

TRAVEL SPEEDS

Speed data obtained from April 2025 ATR data indicate motorists travel significantly higher than the posted speed limit of 25 miles per hour (mph). As shown in **Table 3** the 85th percentile speed for both directions of Valley Service Road is 50 mph when rounded to the nearest 5 mph, double the posted speed limit for the corridor. The 85th percentile speed indicates the speed at which most (85%) drivers travel at or below. Speeding compromises road safety for all users of the corridor.

Table 3
Travel Speed Summary – Valley Service Road

Location	Direction	Speed Limit (mph)	Average Travel Speed (mph)	85th Percentile Speed (mph)
Northern Study Limit (approximately 950 feet south of the Amazon Distribution Facility perimeter road)	Northbound	25	43	51
	Southbound		44	50
South of 275 Valley Service Road	Northbound	25	41	48
	Southbound		41	49

Notes: Data collected in April 2025.

C. CRASH ANALYSIS

Crash data for a three-year period (January 1, 2022 through December 31, 2024) were obtained from the University of Connecticut’s Crash Data Repository to assess safety along the entire study corridor. In addition, preliminary crash data through April 30, 2025 were also obtained for analysis purposes. The data obtained quantify the total number of reportable crashes (involving fatality, injury, or more than \$1,000 in property damage), fatalities, and injuries during the study period.

Table 4 depicts total crashes by intersection during the analysis period, as well as total crashes by severity. During the January 1, 2022 to April 30, 2025 period, a total of 28 crashes occurred along the Valley Service Road corridor, and a majority of crashes occurred north of the southbound I-91 on-ramp. Of the 28 crashes, 16 crashes involved property damage only (no apparent injury) and 12 crashes involved injuries. Four of the crashes involved serious injuries and none of the crashes involved fatalities.

Table 4
Valley Service Road Corridor Crash Summary

Intersection or Roadway Segment	Crashes by Year					Crashes by Severity			
	2022	2023	2024	2025*	Total	Property Damage Only	Possible or Suspected Minor Injury	Serious Injury	Fatality
Valley Service Road at Clintonville Road	2	2	2	0	6	5	1	0	0
Valley Service Road at Southbound I-91 On-Ramp	0	1	2	0	3	3	0	0	0
Valley Service Road between Southbound I-91 On-Ramp and Northern Study Limit	2	4	12	1	19	8	7	4	0
Grand Total (Valley Service Road Corridor)	4	7	16	1	28	16	8	4	0

Source: UConn Crash Data Repository (January 2022 through April 2025). Data downloaded from the repository May 2025.
* 2025 Data represents preliminary data through April 2025.

As shown in **Table 5**, fixed object, rear-end, and sideswipe crashes account for over 70 percent of all crashes along the corridor. Most of the fixed object crashes occurred north of 275 Valley Service Road. In addition, all the serious injury crashes occurred north of 275 Valley Service Road. It should be noted that 15 of the 28 crashes (approximately 54 percent) occurred in nighttime conditions under unlit conditions. To address deficiencies in lighting along the corridor, “cobra-head” lighting was recently installed to illuminate the roadway.

Table 5
Valley Service Road Corridor Crash Types

Crash Type	Number	Percentage
Fixed Object	10	36%

Rear End	6	21%
Sideswipe	4	14%
Animal	4	14%
Angle	3	11%
Head On	1	4%
Pedestrian/Bicyclist	0	0%
Other	0	0%
Total	28	-

Source: UConn Crash Data Repository (January 2022 through April 2025). Data downloaded from the repository May 2025.

The highest concentration of crashes along the Valley Service Road corridor occurred north of 275 Valley Service Road at or near two existing horizontal curves. A total of 13 crashes occurred along this segment, including all the angled crashes and the sole head-on crash along the corridor. In addition, half of the fixed object crashes occurred along this segment of the corridor. AKRF observed motorists speeding through this segment of the corridor, and speeding may be a contributing factor to some of the crashes along this roadway segment.

Detailed crash data and collision diagrams are provided in **Appendix B**.

D. HORIZONTAL CURVE SPEED STUDY

A review of crash data indicates clusters of crashes occurred near two horizontal curves north of 275 Valley Service Road (see **Figure 5**, **Figure 6**, and **Figure 7**). A horizontal curve speed study was undertaken to determine the maximum comfortable speed to safely navigate each curve and to determine whether additional measures are needed to improve road safety along this segment of the corridor.



Figure 5
Horizontal Curve Speed Study Locations – Valley Service Road
 (Source: Google Earth)



Figure 6
Valley Service Road – Horizontal Curve Speed Study Curve #1

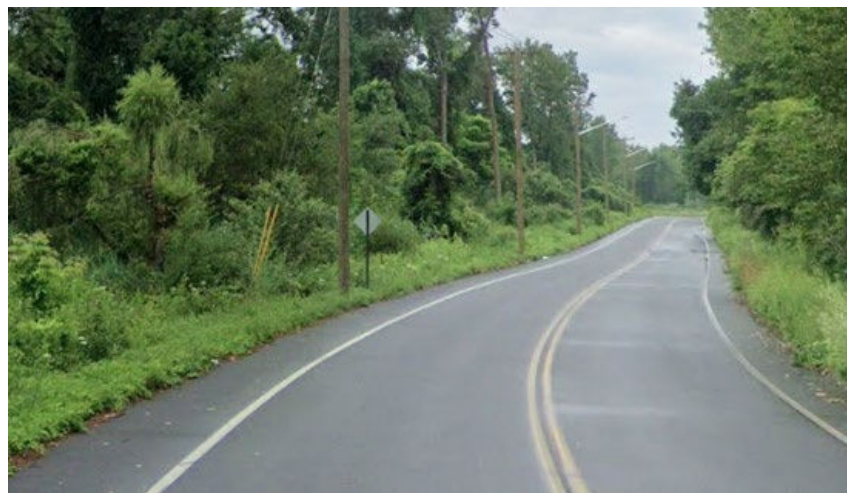


Figure 7
Valley Service Road – Horizontal Curve Speed Study Curve #2

A horizontal curve speed study is performed by driving each curve at 5 mph increments and observing the reading on a ball bank indicator mounted in the vehicle. The study is performed for both directions of the curve and during ideal weather conditions. A ball bank indicator is a steel ball encased with liquid in a curved sealed glass tube and mounted in a metal frame. The tube is bent on the arc of a circle and graduated from zero to 25 degrees, both to the right and left of the zero point. When the vehicle is driven at a steady speed on a curve the vehicle body roll and centrifugal force on the ball cause it to move out to a stable position, which is dependent on the superelevation of the curve.

As summarized in **Table 6**, the recommended advisory speed for the two horizontal curves is higher than the posted speed limit along Valley Service Road. However, the 85th percentile speed of the corridor is greater than the recommended advisory speeds along each of the curved segments. Detailed curve speed data is provided in **Appendix C**.

Table 6
Valley Service Road Curve Speed Study Summary

Curve Location	Recommended Advisory Speed
1	40 mph
2	35 mph

Source: May 2025 Curve Speed Study (VN Engineers).

E. ROADWAY GEOMETRY REVIEW

BASE MAPPING

A combination of high-resolution aerials, parcel data from the CT Geodata portal, 2023 CTECO one-foot LIDAR contour data, utility mapping, and field observations were used to develop the existing conditions base mapping along Valley Service Road. The Existing Conditions base map included in **Appendix D** was prepared to North Atlantic Datum of 1983 (NAD 83) horizontal coordinates with contour data in the North Atlantic Vertical Datum of 1988 (NAVD 88). The base mapping was used to assess the roadway geometry with regard to current design criteria outlined in the CTDOT Highway Design Manual (HDM).

GEOMETRIC ASSESSMENT

To assess the current geometry, best-fit horizontal and vertical alignments were developed along each of the study roadways in proximity to the intersection. Existing horizontal and vertical alignment data along the corridor was reviewed to approximate design speeds for each roadway segment. The horizontal and geometric reviews, summarized below, found that the approximate design speeds for the study corridor notably exceed the corridor’s posted speed limit of 25 mph, which is likely a contributing factor in drivers traveling Valley Service Road at the 85th percentile speeds noted in **Table 3**.

Horizontal Geometric Assessment

The best-fit horizontal alignments were compared to the criteria outlined in Sections 8-3.0 of the CTDOT HDM for Low-Speed Urban Streets to determine the approximate design speed along the approach roadways. Based on the best-fit analysis and assuming a normal crowned roadway cross section with 1.5 percent cross slopes and superelevated cross sections along the larger curves, the horizontal alignment through most of the study corridor is designed for a speed of 40 to 45 mph. Only the curve past the north limits of the study area near the stop-controlled entrance to the Amazon facility was determined to have a lower design speed of approximately 35 mph. A detailed summary of the best-fit horizontal alignment analysis is provided in **Appendix E**.

Vertical Geometric Assessment

The best-fit vertical alignments were compared to the criteria outlined in Sections 9-3.02 and 9-3.03 of the CTDOT HDM for Low-Speed Urban Streets to determine the approximate design speed along the approach roadways. Based on the best-fit analysis, the maximum grade along Valley Service Road was determined to be approximately 5.5 percent just beyond the north limits of the study area. The remainder of Valley Service Road within the study limits is relatively level, ranging from approximately 0.5 to 2.5 percent.

Based on the vertical geometric assessment, the best-fit crest vertical curves are designed for a minimum 45 mph speed with most of the vertical curves being designed for speeds greater than 65 mph. The most restrictive sag vertical curve along Valley Service Road is just beyond the study limits to the north near the stop-controlled driveway for the Amazon facility. This vertical curvature is designed for an approximate 38 mph speed. A detailed summary of the best-fit vertical alignment analysis is provided in **Appendix F**.

DESIGN CRITERIA

Other than typical roadway cross sections for residential, commercial, and industrial roadways, the Town of North Haven does not have town-specific roadway geometric design criteria. As such, any geometric improvements along Valley Service Road should be developed with regard to the design criteria outlined in the CTDOT Highway Design Manual (HDM) based on Valley Service Road’s roadway classification as an Urban Local Roadway. Any improvements to the existing roadway geometry should be assessed with

regard to the design criteria outlined in Chapter 2 of the CTDOT HDM for 3R (resurfacing, restoration, and/or rehabilitation) on non-freeways. The use of Chapter 2 is appropriate because even through there is a relatively wide right-of-way along Valley Service Road, there are environmental and financial constraints that limit the ability to reconstruct the roadway on a different alignment. As such, any potential improvement to Valley Service Road will essentially be limited to the existing alignment and will preserve the number of through lanes before and after the project. The criteria outlined in Chapter 5 of the CTDOT HDM for New Construction/Reconstruction of Urban Highways and Streets should also be referenced to identify if this more restrictive criteria could be implemented within the current constraints.

Design Speed

The design speed for 3R projects is determined using the 85th percentile speeds along a roadway based on Section 2-4.01 of the CTDOT HDM. A summary of the observed speeds, 3R design speed criteria, and recommended design speeds is provided in **Table 7**.

Table 7
Recommended Design Speed – Valley Service Road

Location	Direction	Posted Speed (mph)	85th Percentile Speed ¹ (mph)	3R Design Speed ² (mph)	Recommended Design Speed (mph)
Valley Service Road (approximately 950 feet south of the Amazon Distribution Facility perimeter road)	Northbound	25	51	50/55	45 ³
	Southbound		50		
Valley Service Road (South of 275 Valley Service Road)	Northbound	25	48	45/50	45
	Southbound		49		

Notes:

¹85th Percentile Speed Data obtained from Automated Traffic Recorder (ATR) counts performed in April 2025

²3R Design Speed obtained from Figure 2-4A of the CTDOT HDM.

³Recommended design speed selected for this location based on observed speeds south of 275 Valley Service Road. This lower speed was selected to promote a consistent design speed through the corridor.

If geometric improvements are considered along the Valley Service Road corridor, the design speed selected should be set at the lower range of the criteria outlined in the CTDOT HDM based on the roadway classification and to promote slower travel speeds. Since the observed 85th percentile speeds vary between 48 and 51 miles per hour (mph) at the two data collection points along the corridor, it is recommended that any improvements be designed for a consistent 45 mph speed through the corridor.

The primary challenge promoting slower speeds through the corridor is that, except for a couple locations, the existing horizontal geometry is already largely designed for a 45-mph design speed. Similarly, the vertical geometry is largely designed for at least a 55 to 65 mph speed, except for a few locations. These existing conditions promotes drivers to feel more comfortable driving at the faster speeds observed along Valley Service Road, despite the posted 25-mph speed limit. If slower speeds are desired through geometric improvements, the geometry would need to be more restrictive and less comfortable at these higher speeds to encourage drivers to slow down, which may not be a practical solution for the corridor. Based on these factors, the traffic calming measures and the other strategies outlined in Chapter 4 are the preferred cost-effective solution for improving driver compliance with the posted speed limit along Valley Service Road.

F. SUMMARY OF CORRIDOR DEFICIENCIES

A review of existing conditions along the corridor indicates several safety deficiencies that increase the risk of crashes. The deficiencies are summarized below. It should be noted that roadway lighting was also identified as a safety deficiency given the number of nighttime crashes along the corridor. However, continuous roadway lighting was constructed in mid-2025 and is expected to reduce the frequency of nighttime crashes. In summary, traffic calming and other engineering measures should be considered to reduce travel speeds and improve safety along the corridor.

EXCESSIVE TRAVEL SPEEDS

As previously mentioned, motorists travel at speeds significantly higher than the posted speed limit of 25 mph. This reduces the margin for driver error and increases the likelihood that routine maneuvers such as traveling around a curve or stopping for turning vehicles result in crashes. In addition, the desire of motorists to travel at excessive speeds also results in illegal maneuvers such as tailgating and passing on the left of the two-lane roadway.

SIGNAGE OBSTRUCTIONS

Vegetation partially obscures some of the existing signage along the corridor (see **Figure 8**). Vegetation control helps to preserve the visibility of signage along the corridor along with reducing the risk of physical impacts with vehicles in the travel lane. This is especially important since there is a narrow shoulder between the edge of the travel lane and surrounding foliage and branches.



Figure 8
Obscured Speed Limit Sign on Valley Service Road

SIGN RETROREFLECTIVITY

The existing speed limit and chevron signs appear to have poor retroreflectivity. Although the recent construction of continuous roadway signage improves nighttime visibility, signage should be replaced as needed to improve road safety.

Chapter 3: Public Involvement

Public involvement is key to developing recommendations informed by the community of businesses and other stakeholders who use the Valley Service Road corridor the most.

A stakeholder meeting was held in May 2025 with representatives from Amazon to introduce the study, discuss existing conditions, and discuss potential strategies to improve safety along the corridor.

An in-person public meeting was held on November 13, 2025 at 6:00 PM in Room 2 of the Mildred A. Wakeley Community & Recreation Center. The study team issued a public notice (**Figure 9**) to inform the community of the public meeting. The public notice was marketed to the Town's website ([PUBLIC INFORMATION MEETING Valley Service Road Engineering Safety Study 11/13/25](#)).

ENGINEERING

PUBLIC INFORMATION MEETING

ENGINEERING SAFETY STUDY

VALLEY SERVICE ROAD

The Town of North Haven will be holding a Public Information Meeting to review the preliminary findings of a road safety study at Valley Service Road. This in-person only meeting will be held as follows:

November 13, 2025 @ 6:00 PM
 Mildred A. Wakeley Community and Recreation Center
 7 Linsley Street
 North Haven, CT 06473

This study work is being performed under a grant from Connecticut Department of Transportation (CTDOT) and South Central Regional Council of Government (SCRCOG) to identify safety concerns with the existing roadway geometry and make recommendations as to how to improve safety and reduce speeding. The project's Engineering Consultant, AKRF, will be available to assist in the presentation, and answer questions. Interested residents are encouraged to attend to learn more about the safety and speeding issues that the Town has been experiencing, and the recommended improvements that are being considered for this location.

J. Andrew Bevilacqua, P.E.
 Town Engineer

Figure 9 Public Meeting Notice

The study team was available to introduce the study to community members, reviewed existing conditions, and discussed preliminary thoughts on potential improvements to the Valley Service Road corridor. There were no objections to any of the strategies presented by the study team, though the community expressed concerns with the use of speed bumps along the corridor. The Town noted the proposed use of speed tables provide similar safety benefits to speed bumps while ensuring adequate traffic flow for all types of vehicles, including trucks.

The public meeting presentation is provided in **Appendix G**. No additional questions or comments were submitted to the Town of North Haven Engineering Department after the public meeting was held.

Chapter 4: Conceptual Corridor Improvements

This section of the Study summarizes the improvements developed by the study team based on a review of the existing corridor conditions, identification of corridor needs and deficiencies, guidance from federal and state agencies, and community input. The improvements provided herein can be utilized by the Town of North Haven to improve vehicular mobility and safety along the Valley Service Road corridor. In addition, the below strategies and concepts could also be adopted to other corridors in the Town as appropriate.

Planning-level cost estimates are provided for all of the short-/mid-term improvement recommendations identified herein. The estimates are based on CTDOT 2026 Estimating Guidelines. Preliminary cost estimates are provided in **Appendix H**.

GUIDING PRINCIPLES

The strategies and concepts developed to address the identified deficiencies are based on the following guiding principles:

- [Federal Highway Administration \(FHWA\) Safe System Approach](#): The Safe System Approach recognizes that people will make mistakes and are physically vulnerable, so transportation systems must be designed to prevent mistakes from leading to fatal or serious injury crashes. This approach emphasizes shared responsibility and multiple layers of protection for road users to move towards zero deaths, including safe roads, safe speeds, safe vehicles, safe users, and post-crash care.
- [Connecticut Strategic Highway Safety Plan](#): Guided by the FHWA Safe System Approach, this statewide plan establishes a data-driven framework to reduce fatalities and serious injuries.
- Town of North Haven and CTDOT Highway Design Criteria
- Community and key stakeholder input

A. SHORT/MID-TERM CORRIDOR TRANSPORTATION IMPROVEMENT STRATEGIES

STRATEGY 1: REMOVE OBSTRUCTIONS TO EXISTING CORRIDOR SIGNAGE

Roadway signage is crucial in notifying motorists of posted speed limits, upcoming changes in roadway alignment, and other warning signs essential for traversing the roadway safely. Several undeveloped areas along the Valley Service Road study area contain overgrown vegetation that may partially or fully obscure existing signage throughout the year. As shown in **Figure 10**, the following locations have been identified in which vegetative removal or pruning is recommended to improve corridor signage visibility year-round:

1. Posted speed limit sign located to the north of the southbound Interstate 91 on-ramp in the northbound direction (see **Figure 11**).
2. Billboard located within Horizontal Curve #1 in the southbound direction (see **Figure 12**).
3. Chevron alignment signage located around Horizontal Curve #2 in both directions of travel (see **Figure 13** and **Figure 14**).
4. Posted speed limit sign located at the northern study limit in the southbound direction (see **Figure 15**).

It is recommended that the Town of North Haven develop a strategy to inspect the corridor on an annual basis to ensure vegetation is maintained and routinely pruned.



Figure 10
Locations Identified for Vegetative Removal or Pruning
(Source: Google Earth)



Figure 11
Vegetative Removal or Pruning Location 1 – Speed Limit Sign in Northbound Direction



Figure 12
Vegetative Removal or Pruning Location 2 – Billboard in Southbound Direction

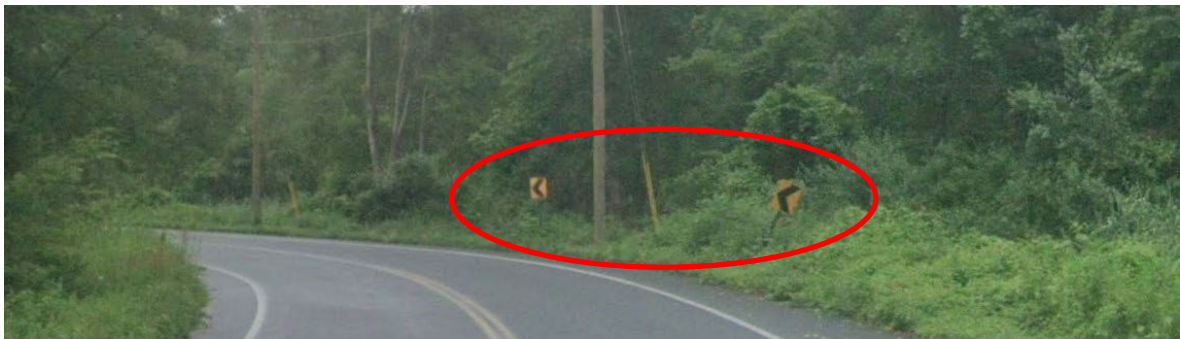


Figure 13
Vegetative Removal or Pruning Location 3 – Chevron Alignment Signage in Northbound Direction



Figure 14
Vegetative Removal or Pruning Location 3 – Chevron Sign in Southbound Direction



Figure 15

Vegetative Removal or Pruning Location 4 – Speed Limit Sign in Southbound Direction

STRATEGY 2: ENHANCE SPEED LIMIT SIGNAGE

A review of the existing speed limit signage along the Valley Service Road corridor indicates current signs measure 24 inches by 30 inches (five square feet) as recommended by the Manual on Uniform Traffic Control Devices (MUTCD) for single lane non-interstate roadways. In order to improve sign visibility, the Town of North Haven should consider increasing the size of the signs to 30 inches by 36 inches (7.5 square feet). Speed limit signs measuring 7.5 square feet are typically recommended by MUTCD for multi-lane non-interstate roadways but can also be utilized along single lane roadways as “oversized” signage to ensure visibility. Increasing the size of the signs may also decrease the frequency of vegetative pruning within the vicinity of the signs as overgrown vegetation is less likely to fully obscure larger signage.

Per recent observations of the study corridor from February 2026, AKRF noticed the installation of additional speed limits signs within the middle portion of the roadway prior to Horizontal Curve #2 in both directions of travel. It is recommended that the Town of North Haven continue to maintain those signs. If the signs are temporary installations, it is recommended that the Town of North Haven permanently install one speed limit sign for each direction of travel prior to Horizontal Curve #2 as pictured in **Figure 16** below. Speed limit signage installed in this manner may act as ancillary warning signage reminding motorists to slow down prior to the curve.

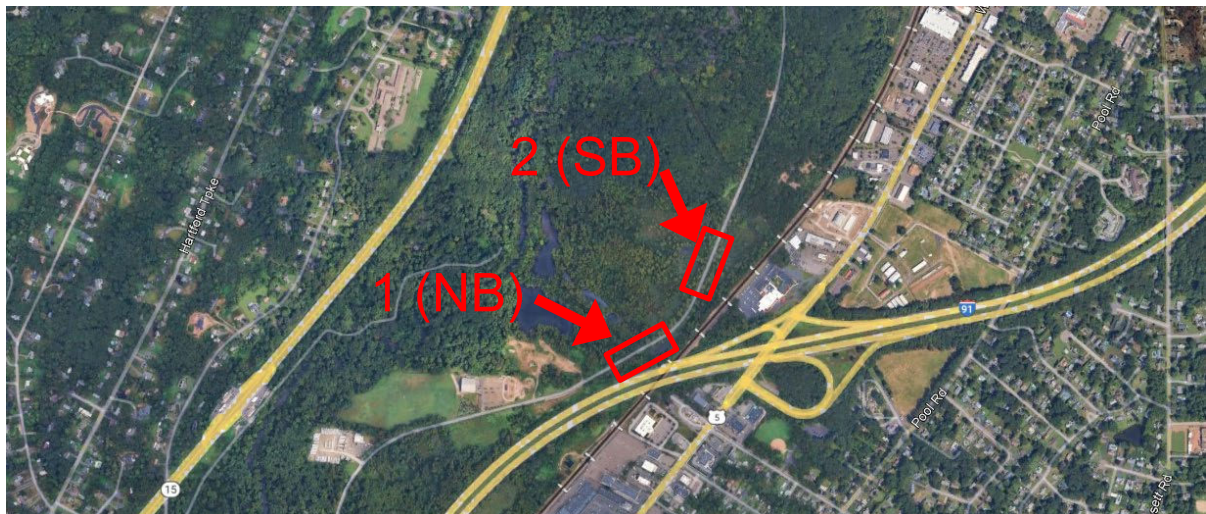


Figure 16

Potential Locations for Installing Additional Speed Limit Signage (Source: Google Earth)

Furthermore, AKRF observed digital speed feedback signs mounted along with the speed limit signs within the vicinity of Horizontal Curve #2. The Town of North Haven should consider maintaining the vehicle feedback signs or making them permanent installations to assist in reducing operative speeds along the curve. The vehicle feedback signs may be mounted directly below posted speed limit signage per MUTCD guidance, as pictured in **Figure 17** below. Digital speed feedback signs may be used in conjunction with additional LEDs to flash lights when motorists reach speeds exceeding pre-programmed thresholds, such as 10 mph over the posted speed limit.

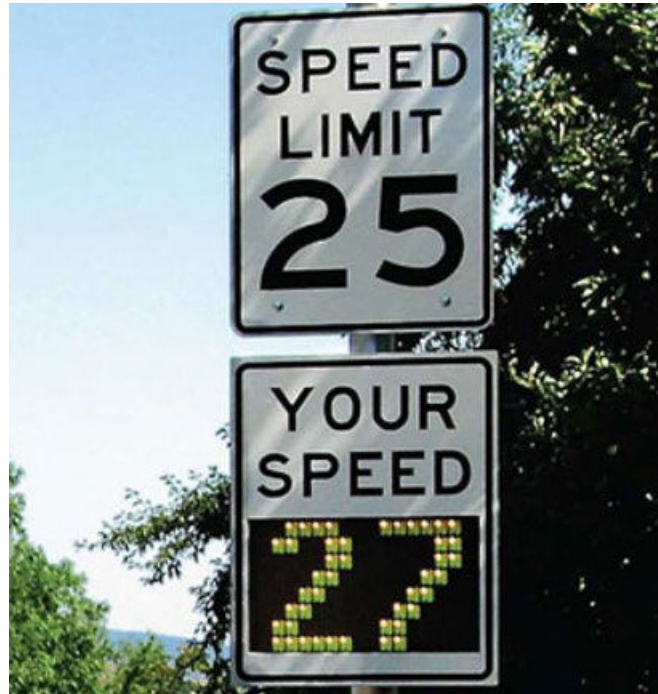


Figure 17
Speed Limit Sign with Vehicle Speed Feedback Sign
(Source: FHWA)

The Town should consider the use of speed enforcement cameras as a strategy to reduce operating speeds along the corridor in conjunction with enhanced speed limit signage.

STRATEGY 3: ENHANCE CURVE DELINEATION SIGNAGE

Signage around horizontal curves are crucial in notifying motorists of upcoming changes in roadway alignment, especially at night, in rain, or other weather conditions that may hinder visibility. The two horizontal curves pictured in **Figure 5** earlier in the report are of particular concern due to the large percentage of crashes that occurred along the segment at or near the curves (13 of 28 crashes). A majority of the 13 crashes occurred at night (eight crashes or approximately 62 percent) with five of the 13 crashes having occurred in rain or snow (approximately 38 percent). To address the high percentage of crashes in conditions of low visibility, the Town should consider upgrading the existing chevron alignment signage along the second horizontal curve by adding retroreflective sheeting to the signposts as shown in **Figure 18**.



Figure 18
Chevron Alignment Signage with Retroreflective Sheeting
(Source: FHWA)

The Town may want to consider installing additional chevron alignment signs around Horizontal Curve #2 in conjunction with installing retroreflective sheeting along the signposts to improve visibility around the entirety of the curve in accordance with MUTCD guidance. Per MUTCD for curves with a posted speed limit between 20 mph and 30 mph, chevron alignment signs are recommended to be spaced 80 feet apart along the entirety of the curve. Horizontal Curve #2, which has a length of 474 feet, is recommended to contain six evenly spaced chevron alignment signs in both directions of travel for a total of 12 signs. The approximate location for the additional signs is shown in **Figure 19**.



Figure 19
Approximate Location for Additional Chevron Alignment Signage
(Source: Google Earth Pro)

Note that neither chevron nor horizontal alignment signage currently exists around Horizontal Curve #1. However, it is recommended that the Town investigate other methods of improving visibility, such as installing retroreflective delineators along both sides of the roadway.

STRATEGY 4: INSTALL HIGH FRICTION SURFACE TREATMENT

The crash analysis along the Valley Service Road corridor indicated that one-fourth of the crashes occurred in slippery pavement conditions (rain, snow, ice, etc.), with a significant portion of these instances occurring around the two horizontal curves and largely resulted in vehicles running off the road. This is often due to a loss of traction while vehicles brake or steer. It is recommended that the Town of North Haven investigate installing High Friction Surface Treatment (HFST) around the horizontal curves within the Valley Service Road corridor. HFST is a proven safety countermeasure recommended by the FHWA, which involves the application of a thin layer of polymer binder that adheres high-quality aggregate to existing pavement (see **Figure 20**). HFST improves vehicular traction in all weather conditions, and it has been estimated to reduce crashes on slippery pavement by up to 83 percent and the total number of crashes by as much as 57 percent¹.



Figure 20
High Friction Surface Treatment Application
(Source: FHWA)

¹ Source: [High Friction Surface Treatments \(HFST\) | FHWA](#)

STRATEGY 5: EVALUATE RUMBLE STRIPS ALONG THE CORRIDOR

Based on a review of the crash data, the Valley Service Road corridor experienced 10 fixed object crashes and one head on crash, which accounts for approximately 40 percent of all crashes along the corridor. In these cases, vehicles failed to stay on the roadway or within the travel lane. Most of the crashes occurred around curved portions of the corridor, with the head on crash having occurred around a slight horizontal curve located within the vicinity of 400 Valley Service Road.

Rumble strips are raised or milled elements of pavement which alert drivers through vibration and sound that their vehicle is leaving the travel lane. Longitudinal rumble strips along the shoulders or centerline (see **Figure 21**) reduce the potential for vehicles running off the road or veering into the opposing travel lane, respectively. Transverse rumble strips may be installed within the travel lane and may be used to reduce motorist speeds. The Town should also investigate the systemic installation of rumble strips along other corridors in the Town which have a significant history of fixed object crashes.



Figure 21
Rumble Strips (Centerline and Shoulder)
(Source: FHWA)

STRATEGY 6: EVALUATE SPEED TABLES OR SPEED CUSHIONS ALONG THE CORRIDOR

The Town should evaluate installation of speed tables or speed cushions along the Valley Service Road corridor to reduce operating speeds. Speed tables are slightly raised platforms with tapered ends and flat tops that are elongated to span the entire roadway width. Speed cushions are similar to speed tables but are segmented, typically into three smaller sections, which allows wide enough gaps for emergency vehicles, trucks, and other large vehicles to traverse without being significantly impeded. Examples of speed tables and speed cushions are pictured in **Figure 22** and **Figure 23**, respectively.



Figure 22
Speed Table
(Source: FHWA)



Figure 23
Speed Cushion
(Source: FHWA)

Speed tables/cushions reduce operating speeds by creating small vertical deflections that drivers slow down for. In contrast, speed bumps and speed humps create large vertical deflections that are typically more abrupt which causes wear on heavy vehicles, increases driver discomfort, and forces emergency vehicles to slow which delays response times. Due to the presence of heavy vehicles that access the Valley Service Road corridor, it is not recommended to install speed bumps or speed humps along the corridor.

Based on discussions with the Town, speed tables were recommended. A conceptual plan depicting potential locations of speed tables along the Valley Service Road corridor are indicated in **Appendix I**. A total of seven speed tables are recommended as part of the conceptual plan.

B. LONG-TERM CORRIDOR TRANSPORTATION IMPROVEMENT STRATEGIES

There were two conceptual corridor improvement options identified to improve vehicular mobility and safety along Valley Service Road. Potential benefits and disadvantages associated with each conceptual corridor improvement option are identified herein. The options are considered long-term improvements and would require public engagement with adjacent property owners and other key stakeholders to identify the appropriate corridor improvement option for each segment of the corridor.

The conceptual corridor improvements may be strategies to be implemented should further financial development occur along the corridor. The short/mid-term strategies previously identified are anticipated to be sufficient for the existing vehicular traffic but may not fully mitigate corridor deficiencies of potential future planned developments. The future planned developments, should they occur, can provide fair share costs to assist in the implementation of any of the identified conceptual corridor improvements. These improvements can be evaluated further in the future through a separate effort.

STRATEGY 1: ROADWAY REALIGNMENT

This conceptual corridor improvement option proposes to smooth out the successive horizontal curves north of 275 Valley Service Road as illustrated in **Figure 24**. This option would result in a single, longer curve with an easier transition for improved vehicular maneuverability. Travel efficiency should be improved from less frequent braking and steering maneuvers, which especially benefits emergency vehicles, heavy vehicles, or other large vehicles. The consistent geometry of the curve would reduce the number of conflict points along the roadway as well as the potential for vehicles running off the road while improving the sight distance for drivers leading to enhanced reaction times.

This option would require significant reconstruction of the roadway, including relocation of drainage facilities and utilities. Permanent sliver acquisitions of adjacent properties may be required to extend the current right-of-way. Environmental permitting may be necessary as the realignment would require the clearing of trees within potential wetlands areas. The realigned roadway would improve travel efficiency but may increase design speeds, which may encourage speeding if not properly managed with other design measures or sufficient signage.

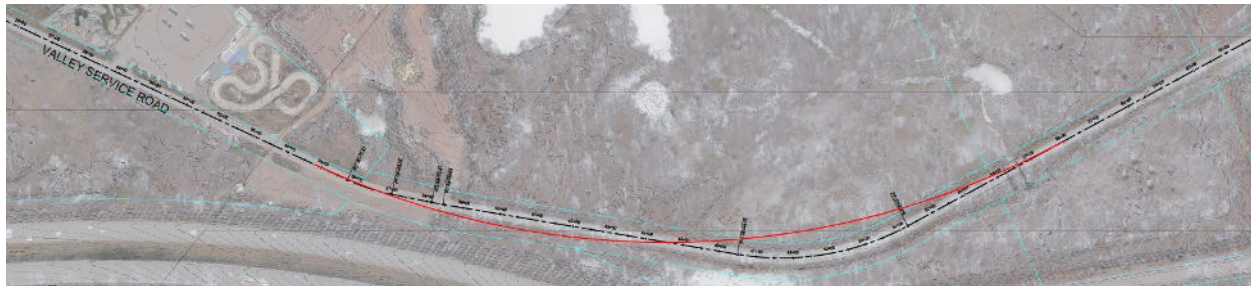


Figure 24
Strategy 1 – Roadway Realignment

STRATEGY 2: INSTALL MEDIAN ISLANDS

This conceptual corridor improvement option proposes installing median islands along the Valley Service Road corridor. Median islands are FHWA-recommended traffic calming measures intended to encourage lower travel speeds by providing a raised median along the centerline of a roadway to narrow lane widths at that location. Median islands also act as physical barriers between opposing travel lanes to reduce the potential for head on crashes. Median islands vary in design and size, anywhere from a striped area that prevents vehicular use to an island with raised curbs and landscaping that narrow lanes away from the centerline, as depicted in **Figure 25**. Cost estimates were not provided for this strategy given the uncertainty of where the median islands would be installed, however, the average cost of median islands was estimated to be approximately \$500 to \$600 per linear foot. This is assuming a four-foot-wide concrete median with 6-inch curb reveal, two-foot-wide left shoulders, 11-foot-wide lanes, and two-foot-wide right shoulders to fit

within the existing pavement width with no roadway widening. Median islands should be especially considered should the corridor experience commercial, office, or residential redevelopment as they improve mid-block pedestrian safety by providing an area of refuge for crossing pedestrians. Median islands may also be used to limit unsafe or prohibited turning movements and typically fit into the existing right-of-way. Based on Chapter 10 of the CTDOT Highway Design Manual, raised median islands are recommended to have a minimum width of four feet with two-foot shoulders on each side of the island (for a total of eight feet).

Median islands are not recommended to improve safety for areas experiencing geometric deficiencies, such as within the vicinity of the two successive horizontal curves. Emergency and heavy vehicles often have difficulties maneuvering along narrower roadways. As such, it is not recommended that the Town install chokers (also known as curb extensions) along the roadway or median islands exceeding the minimum width recommended by the CTDOT Highway Design Manual. Installation of median islands may narrow adjacent travel lanes to substandard widths. The Town should subsequently evaluate the placement of median islands and consider restriping roadway shoulders to ensure compliance with minimum lane width requirements. Finally, FHWA acknowledges that the installation of median islands has minor effects on traffic speeds (reductions between one and five mph) rather than significant impacts on travel speeds (reduction greater than 5 mph)². To effectively reduce operating speeds along the Valley Service Road corridor, the Town should view the installation of median islands to be used in conjunction with other traffic calming measures.



Figure 25
Raised Median Island
(Source: FHWA)

² Source: [Module 3: Toolbox of Individual Traffic Calming Measures Part 3 | FHWA](#)

Chapter 5: Implementation Plan

It is recommended the Town prioritize the implementation of all short-/mid-term conceptual corridor improvements identified herein. Long-term conceptual corridor improvements can be implemented should there be significant changes to travel demand or development along the corridor. All the strategies presented herein can be implemented by the Town with local funds or programs.

Once a conceptual improvement concept looks to advance to implementation by the Town of North Haven, funding is secured and the project proceeds into engineering design and construction. A Preliminary Engineering study will need to be performed to confirm project extents, help establish the potential impacts to environmental and natural resources, identify potential property and utility impacts, and help define the expected costs to complete the project.

Once Preliminary Engineering is complete and the decision is made to continue to advance the project, final design will take place to include all the necessary details needed for construction including grading, drainage, lighting, signage and striping, and work zone traffic control plans. Detailed design will need to address any existing deficiencies of the roadway and existing infrastructure conflicts with the proposed design such as utility conflicts and possible relocations. Final design culminates with construction documentation to facilitate bidding and construction of the project. Although right of way acquisition is not anticipated, if necessary, additional property would be obtained via the Town's right of way acquisition process to allow for construction of the project. Generally, projects that are identified as having a low level of complexity can be designed within 12-18 months from initiation of the project. As complexity grows including the requirements of the design and construction funding sources, so does the timeframe required to complete the design phase. The design process for projects identified as highly complex, such as the long-term conceptual improvements, may last three years or more.