

Traffic Engineering

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Manchester, CT 06040

Overview

Comm. Giulletti asked about Church trip generation.

The school will generate over 10 times more traffic than a church on a weekly basis.

Comm. Williams asked about safety at the Outer Ridge/Mansfield intersection.

With poor sight lines, the increase in traffic will increase the chances for accidents.

The Applicant's latest presentation.

The 25 mph speed limit is not appropriate to determine Intersection Sight Distance.

Stopping Sight Distance is not a design parameter for an intersection.

The relocated driveway still does not meet intersection sight distance criteria.

The road widening was for vehicle travel, not just sight line.

Commissioner Giulietti asked about the trip generation of the church.

Trip Generation Comparison
Peak Hour of Generator

<u>School</u> ¹	<u>Church</u> ² 72 Seats	<u>Church</u> ² 5040 s.f.
Weekday Morning		
170-192	2 (1-3)	4 (1-13)
Weekday Afternoon		
137-155	4 (0-8)	4 (1-12)
Saturday		
?	32 (3-52)	14 (2-44)
Sunday		
?	39 (4-82)	51 (11-259)

1. From reports by SLR (11/5/20) and FPC (11/20).
2. ITE Trip Generation Manual, 10th Edition, LUC 560, average rates and calculated ranges using Range of Rates and Fitted Curve Equations (if available).

On a Weekly Basis:

School – approximately 1635 trips per week

Church – approximately 123 trips per week

The school greatly increases the chances of vehicle/vehicle and vehicle/pedestrian conflicts.

Commissioner Williams asked about poor sight lines and safety at the Outer Ridge Road/Mansfield Road intersection.



Southbound Outer Ridge approaching Mansfield



Northbound Outer Ridge looking left with Mansfield on right

Outer Ridge Road at Mount Carmel Avenue



Westbound Mount Carmel approaching Outer Ridge



Northbound Outer Ridge looking right to Mount Carmel



Northbound Outer Ridge looking right to Mount Carmel
July 18. 2021

Number of Motor Vehicles: 2
Automobiles, Motorcycles, etc.
 Number of Non-Motorists: 0
Pedestrians, Bicyclists, etc.

CONNECTICUT UNIFORM POLICE CRASH REPORT

Form PR-1 REV October 2018

Crash Summary (Front)

Case Number: 2100014999

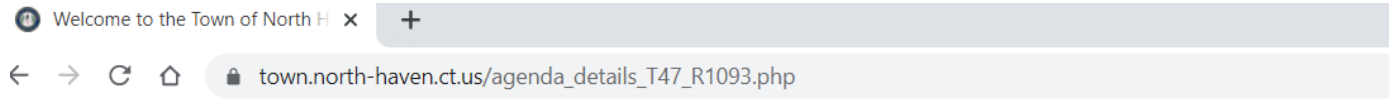
DOT Identifier:
For DOT use only

CRASH DATE, TIME, SEVERITY, AND LOCATION				
Date of Crash (YYYYMMDD) <u>20210718</u>	Time (0000-2359) <u>15:33</u>	Town Name <u>North Haven</u>	Town # <u>101</u>	Crash Severity <input type="radio"/> Fatal <input type="radio"/> Injury <input checked="" type="radio"/> PDO
Latitude <u>41.423125</u>	Crash occurred on (street name or route #) at its intersection with (street name or route #) <u>MOUNT CARMEL AVE</u> at <u>RIDGE RD</u>			
Longitude <u>-72.882122</u>	If not at intersection: distance <input checked="" type="radio"/> Feet <input type="radio"/> Tenths of Mile	N, S, E, W <u>E</u>	name of nearest intersecting road, town line or mile marker <u>Ridge Road</u>	

Operator 1 stated he was traveling Westbound on Mount Carmel Avenue. Operator 1 stated as he was approaching the curve, his vehicle crossed the double yellow line and he struck the driver side door of Vehicle 2 which was traveling Eastbound on Mount Carmel Avenue. Operator 1 declined medical

The applicant submitted new driveway design parameters.

The Applicant's presentation was on the Town's website, but they modified it for the public hearing.



HOME > GOVERNMENT > COMMISSIONS > PLANNING AND ZONING COMMISSION > 2021
HEARING NOTICE

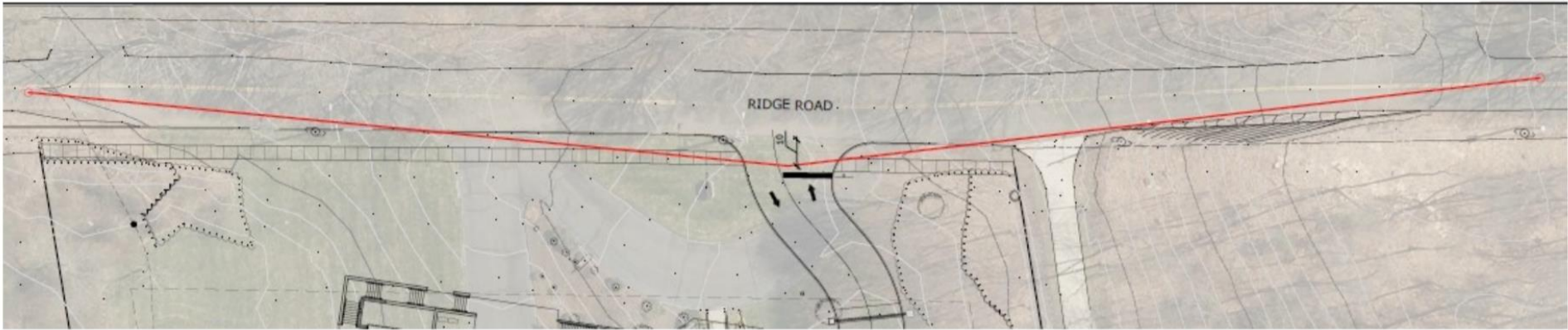
REGULAR MEETING – CLICK MORE FOR PUBLIC HEARING NOTICE

Date: Monday August 02, 2021 (08/02/21)

Documents & Links:

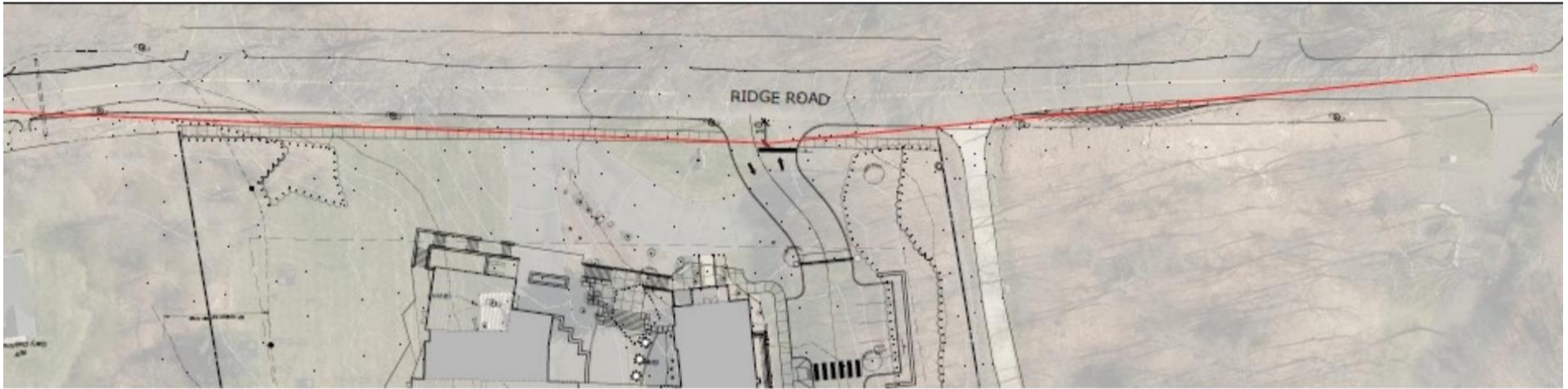
[Monday August 02, 2021 08/02/21 PZ ag 8-2-21 \(Zoom mtg\).](#)

[Agenda Items 1 & 2 – Slate Upper School PZC Presentation 08.02.21](#)



Upper School
Ridge Road, North Haven

Sight Lines: Site Driveway
Posted Speed Limit



Upper School
Ridge Road, North Haven

Sight Lines: Site Driveway
85th Percentile Speed



Presented at the August 2, 2021, Public Hearing



ite Upper School
) Ridge Road, North Haven

Sight Lines: Site Driveway
 Posted Speed Limit



er School
 ad, North Haven

Stopping Sight Distance: Site Driveway
 85th Percentile Speed





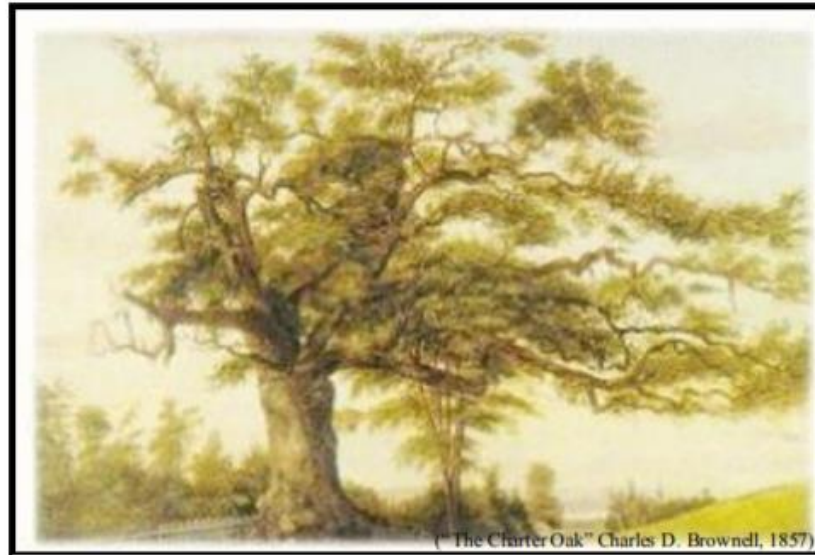
The sight distance is measured 10 feet back instead of 15 feet.
This is not in conformance with ConnDOT guidelines.

Stopping Sight Distance

Intersection Sight Distance

Design Speed vs. 85th Percentile Speed vs. Speed Limit

**CONNECTICUT DEPARTMENT
OF TRANSPORTATION**



**HIGHWAY DESIGN MANUAL
2003 Edition**

(Including Revisions to June 2020)

(U.S. Customary Units)

7-1.0 STOPPING SIGHT DISTANCE

Stopping sight distance (SSD) is the sum of the distance traveled during a driver's perception/reaction (or brake reaction) time and the distance traveled while decelerating to a stop. Figure 7-1A presents the SSD values used in design. The designer is referred to AASHTO

Stopping Sight Distance provides enough distance to stop to avoid a hazard on the road.

You should not have to stop because a car pulls out of a driveway.

SSD is roadway, not an intersection, design parameter.

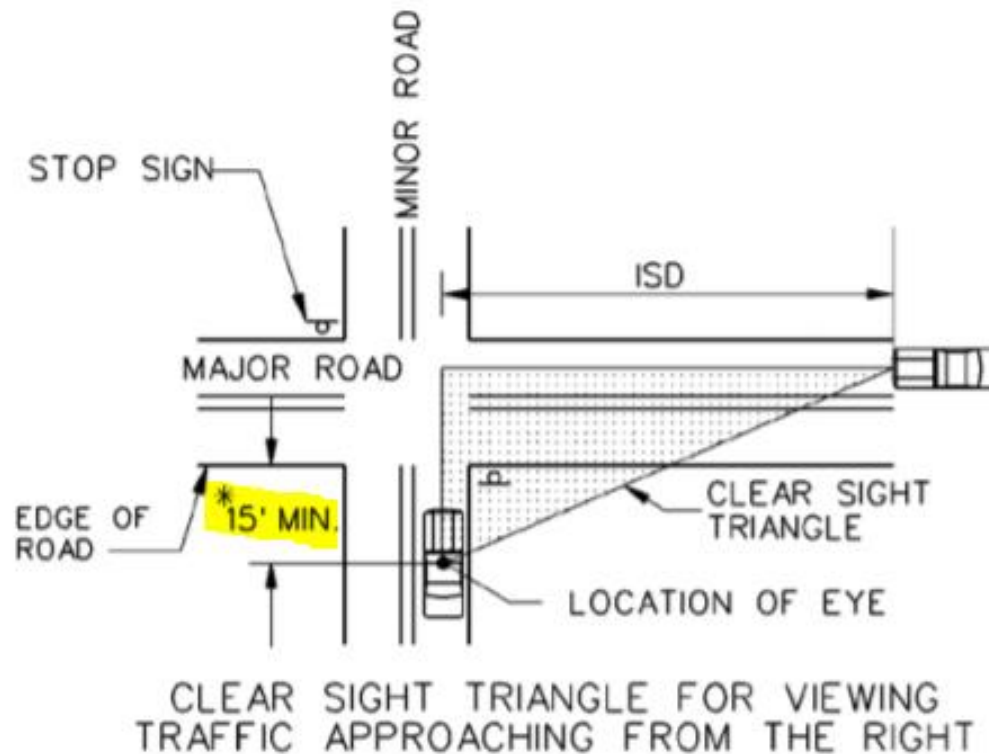
11-2.0 INTERSECTION SIGHT DISTANCE (ISD)

11-2.01 General

movements and turning left across oncoming traffic for each intersection. At each intersection, ensure that sufficient sight distance is provided for a driver to perceive potential conflicts and to perform the actions needed to negotiate the intersection safely. The additional costs and impacts to achieve this sight distance are often justified based on the safety and operational considerations.

Intersection Sight Distance provides enough distance for a driver to leave a driveway without impeding traffic flow on the main road.

ISD is the proper design parameter for the driveway.



* Desirably measured from the edge of road. However, can be measured from edge of traveled way where restrictions limit offset.

CLEAR SIGHT TRIANGLES (STOP-CONTROLLED) INTERSECTIONS

Figure 11-2A

11-2.02 Design Procedures

2. Major Road. The length of the sight triangle leg or ISD along the major road is determined using the following equation:

$$\text{ISD} = 1.47 V_{\text{major}} t_g \quad (\text{Equation 11-2.1})$$

Where:

ISD	=	length of sight triangle leg along major road (ft)
V_{major}	=	design speed of major road (mph)
t_g	=	time gap for entering the major road (sec)

6-2.0 SPEED

6-2.01 Definitions

1. Design Speed. Design speed is a selected speed used to determine the various geometric design features of the roadway. A design speed is selected for each project, which will establish criteria for several design elements including horizontal and vertical curvature, superelevation and sight distance.

6. Posted Speed Limit. For all new construction/major reconstruction projects, the selected design speed should equal or exceed the anticipated posted or regulatory speed limit of the completed facility. This requirement recognizes the important relationship between likely travel speeds and the highway design. It also recognizes that a posted speed limit creates a definite driver expectation of safe operating speed. The design speeds in

7. 85th-Percentile Speed. The 85th-percentile speed is the speed below which 85 percent of vehicles travel on a given highway. The most common application of the value is its use as one of the factors, and usually the most important factor, for determining the posted, regulatory speed limit of a highway section. In most cases, field measurements for the 85th-percentile speed will be conducted during off-peak hours when drivers are free to select their desired speed.

Figure 2-3C
RURAL COLLECTOR ROADS
(3R Projects)

Design Element		*	Manual Section	Design Values (by Type of Roadside Development)			
				Open	Moderate Density	High Density	
Design Controls	Typical Number of Access Points/Mile/Side		6-1.03	0 – 15	15 – 30	>30	
	Design Forecast Year		2-4.02	Current – 10 years	Current – 10 years	Current – 10 years	
	Design Speed	AADT < 400	x	2-4.01	Posted Legal Speed Limit	Posted Legal Speed Limit	Posted Legal Speed Limit
		AADT: 400 – 2000			40 – 50 mph	40 – 50 mph	40 – 50 mph
		AADT > 2000			See Section 2-4.01	See Section 2-4.01	See Section 2-4.01
	Control of Access		6-4.0	Control by Regulation	Control by Regulation	Control by Regulation	
Level of Service		6-3.0	C – D	C – D	C – D		

Figure 4D
RURAL COLLECTOR ROADS
New Construction/Major Reconstruction

Design Element		*	Manual Section	Design Values (by Type of Roadside Development)			
				Open	Moderate Density	High Density	
Design Controls	Typical Number of Access Points/Mile/Side		6-1.03	0 – 15	15 – 30	>30	
	Design Forecast Year		6-3.02	20 Years	20 Years	20 Years	
	Design Speed	AADT < 400	x	6-2.02	30 – 35 mph	N/A	N/A
		AADT: 400 – 2000			35 – 50 mph	35 – 45 mph	N/A
		AADT > 2000			50 mph	45 – 50 mph	35 – 45 mph
	Control of Access		6-4.0	Control by Regulation	Control by Regulation	Control by Regulation	
Level of Service		6-3.0	C – D	C – D	C – D		

3-2.0 SPOT IMPROVEMENTS (NON-FREEWAYS)

3-2.01 Objectives

Spot improvements are intended to correct an identified deficiency at an isolated location on non-freeways. Occasionally, more than one location is included in a project for design or

3-2.02 Approach

The Department has adopted a flexible approach to the geometric design of spot improvement projects. The following summarizes the approach:

2. Design Speed. The design speed of the adjacent sections should be used for the spot improvement; however, a speed less than the posted speed should not be used. The selection of the applicable design speed will be left to the judgment of the designer. Some factors that may be considered include:
 - a. the results from a speed study by the Division of Traffic Engineering, if requested;
 - b. the design speeds for new construction in Chapters Four and Five; and
 - c. the posted/legal speed limit (this will be a minimum).

4. Design Exceptions. The following will apply:
 - a. ISD is a ConnDOT controlling criteria at all signalized and un-signalized intersections which connect to State highways.
 - b. Commercial drives and multi-residential drives shall meet the same ISD standards as street intersections. An exception to standards is required when ISD requirements are not met.

The proper Design Speed is the 85th percentile speed.

The applicant has built in a design exception and proposes a deficient sight distance.

Using 10 feet back from the edge of the road instead of the 15 foot minimum.

The project is not a safety improvement to the roadway but introduces more traffic to a roadway with deficient sight distances, increasing the chances for collisions.

Until the previous public hearing the Applicant had exclusively cited Intersection Sight Distance and the 85th percentile speed as the design parameter (including for the Slate School), albeit using the wrong setback distance.

Driveway Sight Distance Chronology (problem underlined)

- 1 Intersection Sight Distance, 85th percentile, road widening (without details)
- 2 Intersection Sight Distance, 85th percentile, 7.5 foot setback, road widening (too steep)
- 3 Intersection Sight Distance, Speed Limit, 10 foot setback, no road widening
- 4 Stopping Sight Distance, 85th percentile, no road widening
- 5 Relocate driveway, 85th percentile speed, 10 foot setback, no road widening

The proper design parameters are Intersection Sight Distance, the 85th percentile speed and a 15 foot setback.



November 5, 2020

Ms. Jennifer Staple-Clark
7 Woodmere Circle
North Haven, CT 06473

RE: Traffic Study
Slate Upper School
5100 Outer Ridge Road
North Haven, Connecticut
MMI #6156-03-01

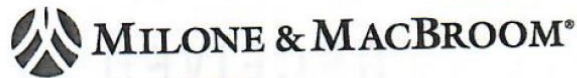
Site access is to be provided to and from the site via a new stop-controlled driveway at Outer Ridge Road, approximately 40 feet north of the southern portion of the existing horseshoe driveway. Sight distances were reviewed for a motorist egressing the proposed driveway onto Outer Ridge Road. Looking to the left from the proposed driveway location, the sight line is ample, meeting the Connecticut Department of Transportation (CTDOT) requirement of 370 feet for the 85th percentile speed on Outer Ridge Road of 32 mph. Looking to the right, the sight distance for the 85th percentile speed is also achievable.

TRAFFIC ACCESS AND IMPACT STUDY

**Slate Upper School
5100 Outer Ridge Road
North Haven, Connecticut**

The Applicant's Traffic Consultant has conducted Speed Studies to determine the appropriate and necessary ISD needed at the proposed new access drive. Based on Studies conducted with a posted speed limit of 25 miles per hour on Outer Ridge Road and actual Speed Studies conducted **determined the actual 85th percentile speed of motorists traveling in Outer Ridge Road** was determined that northbound traffic was traveling at 33.7 miles per hour and southbound traffic was traveling at 33.1 miles per hour. This data is obtained on the use of an ATR machine to measure both volume and speed collected in mid-February 2020. **Based on profiles completed by the Applicant's Traffic Consultant 370 feet is available in both directions and meet the standards for the required ISD of 372 feet to the south and 365 feet to the north.**

*Engineering, Planning,
Landscape Architecture
and Environmental Science*



May 23, 2017

Ms. Jennifer Staple-Clark
7 Woodmere Circle
North Haven, CT 06473

RE: Traffic Evaluation
Proposed Slate School
124 Mansfield Road
North Haven, Connecticut
MMI #6156-01-04

MMI reviewed the visibility based on the 85th percentile speeds in order to determine the proper site driveway location on Mansfield Road. The 85th percentile speed on Mansfield Road is approximately 40 miles per hour traveling eastbound and 38.6 miles per hour traveling westbound. CTDOT guidelines suggest 445 feet of visibility for the speed of 40 miles per hour and 430 feet of visibility for the speed of 38.6 miles per hour looking in both directions for a two-lane highway. The site driveway is proposed to be located approximately 140 feet to the northwest of the existing access drive to ensure adequate intersection sight distances (ISD) based on the CTDOT guidelines for the speeds on Mansfield Road. The sight line profile is enclosed in this letter.



Engineering, Planning,
Landscape Architecture
and Environmental Science

June 30, 2017

Ms. Jennifer Staple-Clark
7 Woodmere Circle
North Haven, CT 06473

RE: Traffic Evaluation
Proposed Slate School
124 Mansfield Road
North Haven, Connecticut
MMI #6156-01-04

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The road widening was not just for intersection sight distance.



November 5, 2020

Ms. Jennifer Staple-Clark
7 Woodmere Circle
North Haven, CT 06473

**RE: Traffic Study
Slate Upper School
5100 Outer Ridge Road
North Haven, Connecticut
MMI #6156-03-01**

Generally, Outer Ridge Road is more than 22 feet in width near the site and on the approaches to the site except for two small sections close to the site. South of the driveway for about 200 feet, there is an outcropping on the west side of Outer Ridge Road that narrows the road width to around 18 to 20 feet. Some clearing of the brush, regrading of the shoulder, and widening of the road in this area to 22 feet are recommended to eliminate this bottleneck that exists close to the school driveway. North of the site driveway, a drainage area on the west side of Outer Ridge Road narrows the road width to around 18 feet. Some regrading of the shoulder and widening of the road to 22 feet, which will also require the relocation of an existing utility pole, are recommended. The widening concepts are depicted in **Figures 6 and 7** for the southern and northern locations, respectively.

TRAFFIC ACCESS AND IMPACT STUDY

Slate Upper School 5100 Outer Ridge Road North Haven, Connecticut

To accommodate the proposed site access drive, which will be located north of the southerly property line to Outer Ridge Road, is placed at a location to maximize intersection sight distance (ISD) to both north and south. Further, the Applicant proposes to provide a minor widening of Outer Ridge Road to provide and maintain a consistent 24-foot wide pavement to the immediate north and immediate south of the site frontage on this roadway. This road measures 24 feet in width along the entire site frontage and the minor widening will compliment this roadway condition.

In Conclusion

The traffic generated by the school will increase the likelihood of accidents on a roadway that already has deficient sight distances. The Applicant has not addressed this issue despite it being raised from the beginning.

The sight driveway does not meet Intersection Sight Distance in accordance with the cited design criteria, with no explanation for the reduced setback.

The proposed road widening has been removed from the project, with no explanation as to why it is no longer necessary.