KRISTEN CLARKE P.E.
20 RISINGWOOD DRIVE
BOW, NEW HAMPSHIRE 03304

April 2, 2024

Hand Delivered
Anne Thurlow, Chairman
Town of East Lyme Zoning Commission
108 Pennsylvania Avenue
Niantic, CT 06357

Re: Conceptual Site Plan Application
91 Boston Post Road

Dear Chairman Thurlow,

Please accept this correspondence as my response to the Commission's questions regarding traffic and access to the above referenced property and its intended use. For purposes of this response, I will address comments made during the public hearings held on the above reference application as such are identified in the meetings minutes posted online.

Intersection Sight Distance Analysis

Intersection sight distance is based on travel speeds and time gap. The time gap variable (tg) represents the time a stopped driver will accept to accelerate and complete a turning maneuver into traffic. The intersection of the proposed private road and the Boston Post road has adequate intersection sight distance for left and right turns. Contrary to the statement by Commissioner Foley that " ..he noted that because the exit is shown to be right only turn, the applicant must recognize that a left turn would be dangerous.." is incorrect. The purpose for the right turn only is intended for added safety of people having to look both ways to find adequate gaps in both directions to make the left turn out.

Intersection sight distance is based upon design speed and not operational/85th percentile speeds as described in the AASHTO 'A Policy on Geometric Design of Highways and Streets' and the Connecticut High Design Manual, 2023 edition.

$ISD = 1.47\ V_{major}\ t_g$ (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)

Based upon the Connecticut Highway Design Manual 2023 edition, Figure 2-4A shown below:

- 35 mph Design speed, which is the posted speed limit, could be selected based upon the 85th percentile speed between 30-40 mph.
- 40 mph design speed could be selected for the 85th percentile between 35-45 mph

85th Percentile "V" (mph)	Design Speed (mph)
0 ≤ V ≤ 20	20
20 ≤ V ≤ 25	20/25
25 ≤ V ≤ 30	25/30
30 ≤ V ≤ 35	30/35
35 ≤ V ≤ 40	35/40
40 ≤ V ≤ 45	40/45
45 ≤ V ≤ 50	45/50
50 ≤ V ≤ 55	50/55
55 ≤ V ≤ 60	55/60
V > 60	60/70

DESIGN SPEEDS FOR 3R PROJECTS
(Based on 85th Percentile Speeds)

Figure 2-4A

Posted speed limit, as described in the 'Guidelines for Establishing Speed Limits in the State of Connecticut', published in 2021 is determined based upon a variety of factors, including but not limited to, vertical and horizontal curvature, functional classification, lane widths, roadside development, crash history, sight distance, and the 85% and 50% speed. That data is reviewed and approved by the Connecticut Department of Transportation, Office of the State Traffic Administration (OSTA).

The speed limit for the area beginning on Boston Post Road in Waterford at Oswegatchie Hills Road and continuing until Lovers Lane in East Lyme is 35 mph (https://portal.ct.gov/-/media/dot/documents/dstc/postedspeeds.pdf), which was approved by OSTA on 11/21/1978.

1	B	91.15 93.57	2.42	EAST LYME	35	LOVERS LANE OSWEGATCHIE ROAD, WATERFORD	11/21/1978	170-7807-01	APPROVED 35 MPH.

Since the design speed is used to determine geometric features of the roadway and speed limits are typically set based on safe and reasonable speed for road and traffic conditions, the sight distance drawing was prepared using 35 mph and 40 mph design speeds to provide a conservative estimate of sight distance needed for assumed range of possible design speeds. If exceeding speed limit is a consistent issue, enforcement should be considered.

Right Turn out of Driveway;

The Intersection Sight Distance Map dated 30 March 2024 provided together with this correspondence provides three sight distances in response to Commissioner Pivo's questioning;

1) AASHTO-Table 9-8 Case B2, Right Turn from Stop
   35 MPH Design Speed- 335 FEET

2) CT DOT HIGHWAY DESIGN MANUEL- FIGURE 11-2B
   35 MPH Design Speed- 390 FEET

3) CT DOT HIGHWAY DESIGN MANUEL- FIGURE 11-2B
   40 MPH Design Speed- 445 FEET

The Connecticut Highway Design Manual uses a higher time gap variable compared to the AASHTO guide, resulting in longer sight distance requirements. As evidenced by the attached map, 445 feet of sight line can be achieved with minor clearing of vegetation.

Stopping Sight Distance Analysis

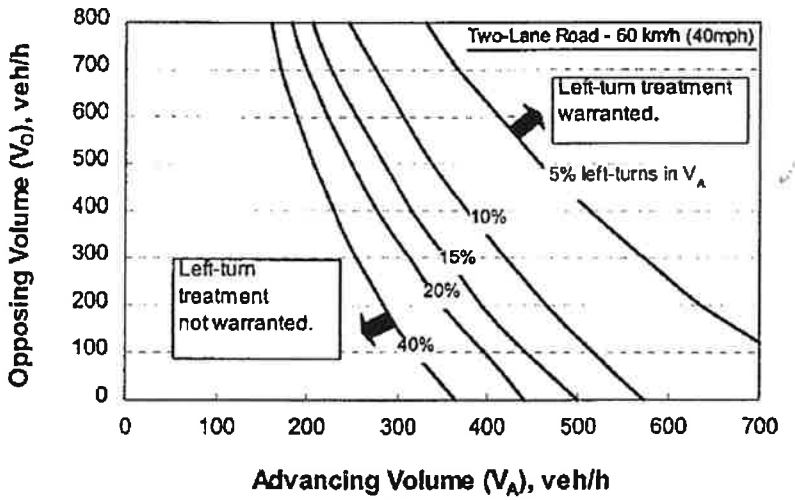
To address concerns regarding left turns into the driveway, Stopping Sight Distance (SSD) was evaluated. SSD is the distance traveled during the two phases of stopping a vehicle: perception-reaction time (PRT), and maneuver time (MT). Perception-reaction time is the time it takes for a road user to realize that a reaction is needed due to a road condition, decide what maneuver is appropriate (in this case, stopping the vehicle), and start the maneuver (taking the foot off the accelerator and depressing the brake pedal). Maneuver time is the time it takes to complete the maneuver (decelerating and coming to a stop). The distance driven during perception-reaction time and maneuver time is the sight distance needed. Based on the Connecticut Highway Design Manual, Section 7-1.0, the following SSD is required for a driver to see an object in the road and come to a stop:

35 mph Design Speed-250 FEET

40 mph Design Speed- 305 FEET

With the straight geometry, there is sufficient SSD for vehicles traveling from the signal at Flanders Road (approximately 610 feet away) to see traffic turning into the private road and stop without causing a rear end collision.

Additionally, National Cooperative Highway Research Program (NCHRP) 457 "Evaluating Intersection Improvements: An Engineering Study Guide" is a guide to determine if and when left or right turns are warranted. This guide demonstrates that the trips generated by the subject site would not meet warrant criteria to need left turn treatment, as projected left turn volume (advancing volume) is well below thresholds shown in NCHRP Figure 2-5 below.



(a)

Weekend or Summer Traffic-

It was noted that traffic analysis was not completed on weekends or summer when traffic volumes are heavier on surrounding roads. As sight distance it based on design speed, adequate sight distance is still provided regardless of volume or operational speed. The private road traffic must yield to traffic on Boston Post Road, so any added delay will be to the private road and not impact operations on Boston Post Road.

Respectfully submitted,

Kristen Clarke

Kristen Clarke P.E., PTOE
Conn. PEN # 29724

NO.	DATE	APPL.	REVISIONS

91 Boston Post Road

Received
APR 03 2024
Town of East Lyme
Land Use

Intersection Sight Distance

SCALE:
HORZ. 1"= 20'
VERT. N/A

DATE: MARCH 2024

SHEET 1 OF 1