March 28, 2024

NEX-2400074.00

Mr. Gary Thomas
Northpoint Construction Management
22 Hampshire Drive
Hudson, NH 03051

SUBJECT: Proposed Dental Office – New Hampshire Center for Comprehensive Dentistry
108 Ponemah Road
Amherst, New Hampshire

Dear Mr. Thomas:

Greenman-Pedersen, Inc. (GPI) has prepared this letter to evaluate the expected trips and site access requirements associated with the proposed dental office to be located at 108 Ponemah Road (NH Route 122) in Amherst, New Hampshire. The site is currently vacant, but was formerly occupied most recently by a Bean Group real estate office. The project consists of razing all existing on-site structures and constructing an 8,900(±) square foot (sf) dental office, the New Hampshire Center for Comprehensive Dentistry, which will relocate from its present location at 71 Amherst Street (NH Route 101A) in Amherst, approximately 1.5 miles away. Access and egress are proposed to the site via the existing full-access driveway on the east side of Ponemah Road, approximately 400-ft south of Standish Way; no new driveways are proposed.

This section of Ponemah Road is under the jurisdiction of the New Hampshire Department of Transportation (NHDOT). Accordingly, in addition to local permits, a NHDOT Driveway Permit will be required for the project.

Existing Conditions

Geometry

Ponemah Road is classified as a major collector, under the jurisdiction of the NHDOT. In the vicinity of the project site Ponemah Road runs in a general north/south direction between its intersection with NH Route 101A to the north, and the Hollis municipal boundary to the south. Ponemah Road provides one 11-foot general purpose travel lane in each direction, with a double-yellow centerline separating directional travel, with variable width (generally 1- to 2-feet) paved and unpaved shoulders on each site of the highway. Neither pedestrian nor bicycle accommodations are present on Ponemah Road. The posted speed limit is 35 miles per hour (mph) in both directions. It should be noted that an advisory speed limit of 30 mph is posted on Ponemah Road in the northbound direction, south of the site, near its intersection with Old Nashua Road. Land uses in the general area primarily consist of commercial and residential properties.

Collisions

Collision data for the 1,100(±) foot section of Ponemah Road from Standish Way to Town Farm Road was obtained from NHDOT for the years of 2013-2017, the most recent five-year period for which data are available. Table 1 summarizes the data. The Town of Amherst Police Department has also been contacted to determine if supplemental crash data are available; however, at the time of this report no additional information has been received.

The segment under study, experienced two collisions during the study period. Both collisions involved property damage only. Based on the documentation available, one collision was a single vehicle collision with a rock/side slope along the side of the road during dawn, while the other collision involved two motor vehicles during daytime. Based on the information from NHDOT, there are no contributing factors to these collisions that could have been rectified by engineering measures.

TABLE 1
Collision Summary

	Number of Collisions		Severity [a]				Percent During	
Location	Total	Average per Year	PD	PI	F	NR	Commuter Peak [b]	Wet/Icy Conditions [c]
Ponemah Road (Route 122) from Standish Way to Town Farm Road	2	0.4	2	--	--	--	0%	0%

Source: NHDOT (2013-2017).
[a] PD = property damage only; PI = personal injury; F = fatality, NR = not reported.
[b] Percent of vehicle incidents that occurred during the weekday AM (7:00 AM-9:00 AM) and weekday PM (4:00 PM -6:00 PM) commuter peak periods.
[c] Represents the percentage of only "known" collisions occurring during inclement weather conditions.

Design Conditions

Sight Distance

To identify potential safety concerns associated with site access and egress, sight distances have been evaluated at the site driveway to determine if the available sight distances for vehicles exiting the site meet or exceed the minimum distances required for approaching vehicles to safely stop. The available sight distances were compared with minimum requirements, as established by the American Association of State Highway and Transportation Officials (AASHTO).[1] AASHTO is the national standard by which vehicle sight distance is calculated, measured, and reported.

Sight distance is the length of roadway ahead that is visible to the driver. Stopping Sight Distance (SSD) is the minimum distance required for a vehicle traveling at a certain speed to safely stop before reaching a stationary object in its path. The values are based on a driver perception and reaction time of 2.5 seconds and a braking distance calculated for wet, level pavements. When the roadway is either on an upgrade or downgrade, grade correction factors are applied. Stopping sight distance is measured from an eye height of 3.5 feet to an object height of 2 feet above street level, equivalent to the taillight height of a passenger car. The SSD is measured along the centerline of the traveled way of the major road.

Intersection sight distance (ISD) is provided on minor street approaches to allow the drivers of stopped vehicles a sufficient view of the major roadway to decide when to enter the major roadway. By definition, ISD is the minimum distance required for a motorist exiting a minor street to turn onto the major street, without being overtaken by an approaching vehicle reducing its speed from the design speed to 70 percent of the design speed. ISD is measured from an eye height of 3.5 feet to an object height of 3.5 feet above street level. For trucks, the measured eye height is 7.6 feet above street level. The use of an object height equal to the driver

[1] *A Policy on Geometric Design of Highways and Streets, 7th Edition*; American Association of State Highway and Transportation Officials (AASHTO); 2018.

eye height makes intersection sight distances reciprocal (i.e., if one driver can see another vehicle, then the driver of that vehicle can also see the first vehicle). When the minor street is on an upgrade that exceeds 3 percent, grade correction factors are applied.

SSD is generally more important as it represents the minimum distance required for safe stopping while ISD is based only upon acceptable speed reductions to the approaching traffic stream. The ISD, however, must be equal to or greater than the minimum required SSD in order to provide safe operations at the intersection. In accordance with the AASHTO manual, *"If the available sight distance for an entering or crossing vehicle is at least equal to the appropriate stopping sight distance for the major road, then drivers have sufficient sight distance to anticipate and avoid collisions. However, in some cases, this may require a major-road vehicle to stop or slow to accommodate the maneuver by a minor-road vehicle. To enhance traffic operations, intersection sight distances that exceed stopping sight distances are desirable along the major road."* Accordingly, ISD should be at least equal to the distance required to allow a driver approaching the minor road to safely stop.

The available SSD and ISD at the site driveway were measured and compared to minimum requirements as established by AASHTO. Based on the posted and observed speeds in the field, the SSD and ISD requirements were calculated. The sight distance calculations and speed data obtained in the field are attached to this letter. The required minimum sight distances for the site driveway were compared to the available distances, as shown in Table 2.

TABLE 2
Sight Distance Summary

	Stopping Sight Distance (feet)		Intersection Sight Distance (feet)		
Location/Direction	**Measured**	**Minimum Required [a]**	**Measured**	**Minimum Required [b]**	**Desirable [c]**
Ponemah Road at Site Driveway:					
North of driveway (SB)	500+	290	500+	290	390
South of driveway (NB)	330	295	285	295	335

[a] Values based on AASHTO requirements for minimum SSD based on 85th percentile speeds of 40 mph NB and 39 mph SB.
[b] Values based on AASHTO requirements for SSD.
[c] Values based on AASHTO requirements for ISD for the posted speed limit of 35 mph on Ponemah Road.

As shown in Table 2, the available sight distances will exceed the minimum SSD requirements for safe operation. Additionally, the sight distances will exceed the desirable ISD north of the site driveway location. Sight lines south of the site driveway location are somewhat constrained under existing conditions, due to the presence of vegetation on the east side of Ponemah Road. If clearing of vegetation on the subject property south of the site driveway location is possible, it is anticipated that available sight lines will be greatly enhanced.

To ensure the safe and efficient flow of traffic to and from the site, it is recommended that any proposed plantings, vegetation, landscaping, and signing along the site frontage be kept low to the ground (no more than 3.0 feet above street level) or set back sufficiently from Ponemah Road so as not to inhibit the available sight lines.

Trip Generation

To estimate the volume of traffic to be generated by the proposed development trip rates published by the ITE *Trip Generation Manual*[2] were researched. Land Use Code (LUC) 720 (Medical-Dental Office Building), based on 8,900 sf was used to estimate the proposed trip characteristics of the site redevelopment. For comparative purposes, the trip generation characteristics of the former real estate office were developed by utilizing LUC 712 (Small Office Building), based on 1,900 sf. Table 3 summarizes the results of the trip-generation estimates and demonstrates the comparative trip characteristics of the both the proposed and former uses.

As shown in Table 3 below, the proposed dental office is expected to generate 27 vehicle trips (21 entering and 6 exiting) during the weekday AM peak hour, and 33 vehicle trips (10 entering and 23 exiting) during the weekday PM peak hour. On a daily basis, the proposed development is expected to generate 320 vehicle trips per day on a weekday.

By way of comparison with the former real estate office, the proposed dental office redevelopment is expected to generate 24 *additional* vehicle trips during the weekday AM peak hour, and 29 *additional* vehicle trips during the weekday PM peak hour. On a daily basis, the proposed redevelopment is expected to generate 292 *additional* vehicle trips per day on a weekday.

TABLE 3
Trip Generation Summary

Time Period/Direction	Proposed Trips [a]	Former Use Trips [b]	Trip Increase [c]
Weekday Daily	320	28	292
Weekday AM Peak Hour:			
Enter	21	2	19
Exit	6	1	5
Total	27	3	24
Weekday PM Peak Hour:			
Enter	10	1	9
Exit	23	3	20
Total	33	4	29

[a] ITE LUC 720 (Medical-Dental Office Building) for 8.9 ksf.
[b] ITE LUC 912 (Small Office Building) for 1.9 ksf.
[a] Proposed Trips minus Former Use Trips.

Trip Distribution

Having estimated project-generated vehicle trips, the next step is to determine the distribution of project traffic and assign these trips to the local roadway network. The distribution of proposed dental office site traffic on the area roadways is based on United States Census Bureau 2011-2015 Journey-to-Work information. Accordingly, 80-percent of the site traffic is expected to/from the north along Ponemah Road, and 20-percent of site traffic is expected to/from the south on Ponemah Road.

2 ITE *Trip Generation Manual, 11th Edition.* Institute of Transportation Engineers; Washington, DC; 2021.

Traffic Increases

Traffic-volume increases on Ponemah Road associated with the site redevelopment beyond the site driveway during the peak hours are expected to be in the range of 5 to 23 vehicle trips. These increases represent one additional vehicle trip approximately every 2.6 to 12 minutes during the peak hours. Traffic volume increases of this magnitude are expected to have a negligible impact on prevailing traffic operations. Further, it should also be noted that trips associated with the site redevelopment on Ponemah Road will largely be redistributed from the existing New Hampshire Center for Comprehensive Dentistry facility on Amherst Street.

Based on the information provided, it is anticipated that overall impacts on traffic operations in the immediate vicinity of the subject site will be negligible, and will have no adverse impacts to the surrounding roadway network. Further, no project specific mitigation is required.

Should you have any questions, or require additional information, please feel free to contact me at 603-766-5229 or bbollinger@gpinet.com.

Sincerely,

GREENMAN-PEDERSEN, INC.

Robert E. Bollinger, P.E., PTOE
Traffic Engineering Department Head
116 S. River Road, Bldg. B, Suite 1
Bedford, NH 03110

Enclosure(s)

1. Sight Distance Calculations and Speed Observations
2. Trip Generation Calculations
3. Journey-to-Work Data

Cc: T. Zajac, Hayner/Swanson, Inc.
H. Monticup, GPI

AASHTO Recommended Sight Distance Summary
(Passenger Vehicles)

LOCATION: Ponemah Road (NH Route 122) at Site Driveway

Side Street Direction:	WB
Number of Lanes on Mainline =	2
Median Width (Feet) =	0

STOPPING SIGHT DISTANCE

Mainline Direction:	NB	
85th Percentile Speed (V) =	40	MPH
Grade (G) =	2.0%	
Apply Grade Adjustment	Yes	
Brake Reaction Time (T) =	2.5	seconds
Deceleration Rate (A) =	11.2	ft/s^2
SSD = 1.47 V * T +1.075 V^2/A =	292	FT
SSD =	**295**	**FT**

Mainline Direction:	SB	
85th Percentile Speed (V) =	39	MPH
Grade (G) =	1.0%	
Apply Grade Adjustment	No	
Brake Reaction Time (T) =	2.5	seconds
Deceleration Rate (A) =	11.2	ft/s^2
SSD = 1.47 V * T +1.075 V^2/A =	286	FT
SSD =	**290**	**FT**

INTERSECTION SIGHT DISTANCE

RIGHT TURN FROM STOP:	South	of Driveway
Posted Speed (V) =	35	MPH
Minor Street Approach Grade (G) =	0.0%	
Apply Grade Adjustment	No	
Time Gap (t_g) =	6.5	seconds
ISD (Right Turn from Stop) = 1.47 * t_g * V =	335	FT
ISD (Right Turn from Stop) =	**335**	**FT**

LEFT TURN FROM STOP:	North	of Driveway
Posted Speed (V) =	35	MPH
Minor Street Approach Grade (G) =	0.0%	
Apply Grade Adjustment	No	
Time Gap (t_g) =	7.5	seconds
ISD (Left Turn from Stop) = 1.47 * t_g * V =	386	FT
ISD (Left Turn from Stop) =	**390**	**FT**

VEHICLE SPEED CALCULATION WORKSHEET

Location:	**108 Ponemah Road, Amherst, NH**	Date:	3/22/2024
Project:	Amherst, NH - Dental Office	Time:	9:00
Weather:	Sunny - 24 Degrees (F)	Job #:	2400074

Northbound Speed (mph)	Southbound Speed (mph)	
39	39	
31	33	
39	35	
32	36	
37	40	
39	34	
35	36	
38	36	
40	35	
37	37	
33	36	
34	37	
34	43	
45	39	
41	30	
44	38	
36	34	
33	38	
35	31	
40	36	
36	42	
37	39	
39	35	
33	36	
34	35	
37	36	= Average Speeds
40	39	= 85th Percentile Speeds

Institute of Transportation Engineers (ITE)

Land Use Code (LUC) 720 - Medical-Dental Office Building

General Urban/Suburban

Average Vehicle Trips Ends vs: 1000 Sq. Feet Gross Floor Area

Independent Variable (X): 8.900

AVERAGE WEEKDAY DAILY

T = 36.00 * (X)

T = 36.00 * 8.900

T = 320.40

T = 320 vehicle trips

with 50% (160 vph) entering and 50% (160 vph) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

Ln(T) = 0.90 Ln (X) + 1.34

Ln(T) = 0.90 Ln (8.900) + 1.34

Ln(T) = 3.31

T = 27.32

T = 27 vehicle trips

with 79% (21 vph) entering and 21% (6 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 4.07 * (X) - 3.17

T = 4.07 * 8.900 - 3.17

T = 33.05

T = 33 vehicle trips

with 30% (10 vph) entering and 70% (23 vph) exiting.

SATURDAY DAILY

T = 13.78 * (X)

T = 13.78 * 8.900

T = 122.64

T = 122 vehicle trips

with 50% (61 vph) entering and 50% (61 vph) exiting.

SATURDAY PEAK HOUR OF GENERATOR

T = 3.02 * (X)

T = 3.02 * 8.900

T = 26.88

T = 27 vehicle trips

with 57% (15 vph) entering and 43% (12 vph) exiting.

Institute of Transportation Engineers (ITE)

Land Use Code (LUC) 712 - Small Office Building

General Urban/Suburban

Average Vehicle Trips Ends vs: 1000 Sq. Feet Gross Floor Area

Independent Variable (X): 1.900

AVERAGE WEEKDAY DAILY

T = 14.39 * (X)
T = 14.39 * 1.900
T = 27.34
T = 28 vehicle trips
with 50% (14 vpd) entering and 50% (14 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 1.67 * (X)
T = 1.67 * 1.900
T = 3.17
T = 3 vehicle trips
with 82% (2 vph) entering and 18% (1 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 2.16* (X)
T = 2.16 * 1.900
T = 4.10
T = 4 vehicle trips
with 34% (1 vph) entering and 66% (3 vph) exiting.

SATURDAY DAILY

$$\frac{\text{ITE LUC 710 Saturday Daily Trip Rate}}{\text{ITE LUC 710 Weekday Daily Trip Rate}} = \frac{\text{ITE LUC 712 Saturday Daily Trip Rate}}{\text{ITE LUC 712 Weekday Daily Trip Rate}}$$

$$\frac{2.21}{10.84} = \frac{(Y)}{14.39} = 2.93$$

T = Y * 1.900
T = 5.57
T = 6 vehicle trips
with 50% (3 vpd) entering and 50% (3 vpd) exiting.

(same distribution split as ITE LUC 710 during the Saturday Daily)

SATURDAY PEAK HOUR OF GENERATOR

$$\frac{\text{ITE LUC 710 Saturday Peak Hour Trip Rate}}{\text{ITE LUC 710 PM Peak Hour Trip Rate}} = \frac{\text{ITE LUC 712 Saturday Peak Hour Trip Rate}}{\text{ITE LUC 712 PM Peak Hour Trip Rate}}$$

$$\frac{0.53}{1.44} = \frac{(Y)}{2.16} = 0.80$$

T = Y * 1.900
T = 1.52
T = 2 vehicle trips
with 54% (1 vpd) entering and 46% (1 vpd) exiting.

(same distribution split as ITE LUC 710 during the Saturday Peak Hour)

Residence		Place of Work		Commuting Flow	To/From North	To/From South	To/From North	To/From South
State Name	**Minor Civil Division Name**	**State Name**	**Minor Civil Division Name**	**Workers in Commuting Flow**	Route 122	Route 122	Route 122	Route 122
New Hampshire	Amherst town	New Hampshire	Amherst town	1,088	95%	5%	1034	54
New Hampshire	Nashua city	New Hampshire	Amherst town	753	50%	50%	377	377
New Hampshire	Milford town	New Hampshire	Amherst town	503	100%	0%	503	0
New Hampshire	Merrimack town	New Hampshire	Amherst town	298	100%	0%	298	0
New Hampshire	Manchester city	New Hampshire	Amherst town	288	50%	50%	144	144
New Hampshire	Bedford town	New Hampshire	Amherst town	138	80%	20%	110	28
New Hampshire	Hollis town	New Hampshire	Amherst town	120	0%	100%	0	120
New Hampshire	Goffstown town	New Hampshire	Amherst town	113	100%	0%	113	0
New Hampshire	Litchfield town	New Hampshire	Amherst town	107	100%	0%	107	0
New Hampshire	Wilton town	New Hampshire	Amherst town	95	100%	0%	95	0
New Hampshire	Hudson town	New Hampshire	Amherst town	84	100%	0%	84	0
New Hampshire	Mont Vernon town	New Hampshire	Amherst town	82	100%	0%	82	0
New Hampshire	Brookline town	New Hampshire	Amherst town	75	50%	50%	38	38
New Hampshire	Bow town	New Hampshire	Amherst town	67	100%	0%	67	0
New Hampshire	New Boston town	New Hampshire	Amherst town	51	100%	0%	51	0
							3102	760
							80%	20%
						Use	80%	20%