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PRINCIPALS
Robert J. Michaud, P.E.
Daniel J. Mills, P.E., PTOE

M E M O R A N D U M

DATE: February 26, 2024

TO: Neck Farm, LLC
66 West Street, Ste 1F
Leominster, Massachusetts 01453

FROM: Robert J. Michaud, P.E. – Managing Principal
Daniel A. Dumais, P.E. – Senior Project Manager

RE: **Proposed 40B Residential Development**
13 Neck Road, Lancaster Massachusetts

MDM Transportation Consultants, Inc. (MDM) has prepared this transportation impact statement (TIS) for a proposed residential development to be located along Neck Road in Lancaster, Massachusetts. The location of the Site relative to adjacent roadways is shown in **Figure 1**. This TIS provides a summary of the baseline traffic volumes and travel speeds along the adjacent roadway, provides a safety review of the site driveways and adjacent intersections, estimates projected trip generation, quantifies incremental traffic impacts of the Site development on area roadways, and provides a parking assessment based on industry standard and empirical parking rates.

- *Baseline Traffic Volumes*. Peak hour traffic flow on Neck Road ranges from approximately 26 to 27 vehicles per hour (vph) during the peak hours. Vehicle flow patterns are oriented approximately 65% westbound during the morning peak hour and 74% westbound in the evening peak hour. Peak hour traffic flow on Center Bridge Road ranges from approximately 193 to 242 vehicles per hour (vph) during the peak hours. Vehicle flow patterns are oriented approximately 59% southbound during the morning peak hour and split 50% northbound/southbound during the evening peak hour.

- *Safety Characteristics.* A review of the crash data indicates that the adjacent gateway intersection is a low volume intersection that is not listed as a high crash (HSIP) location with less than one crash per year. Available sight lines at the proposed driveway location exceed the minimum and ideal sight line requirements recommended by the American Association of State Highway and Transportation Officials (AASHTO).

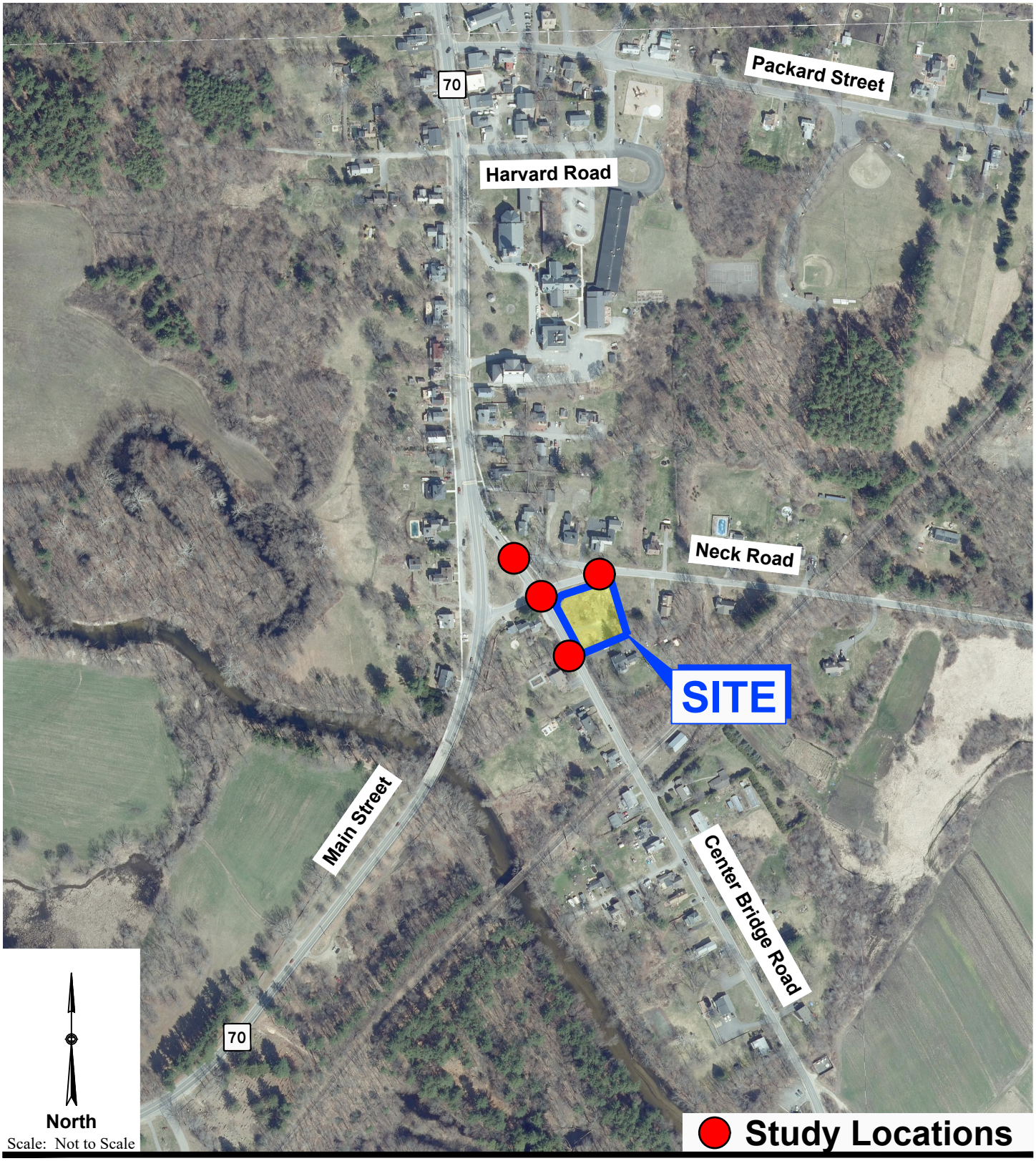

Figure 1

Site Location

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- *Trip Generation.* Based on industry-standard trip rates and methodology published by the Institute of Transportation Engineers (ITE), the proposed development is estimated to generate a modest 4 vehicle trips (1 entering and 3 exiting) during the weekday morning peak hour, 6 vehicle trips (4 entering and 2 exiting) during the weekday evening peak hour, and 74 vehicle trips on a weekday, with 50 percent entering and 50 percent exiting.

- *Qualitative Statement of Impact*. MDM concludes that the relative impact of the proposed residential development w will result in a less than 2% increase in traffic at the relatively low volume gateway study intersection of Neck Road at Center Bridge Road. The increase in trips due to the project is not expected to alter operating conditions compared to Baseline conditions with approximately 1 new total vehicle trip or less every 20 minutes.

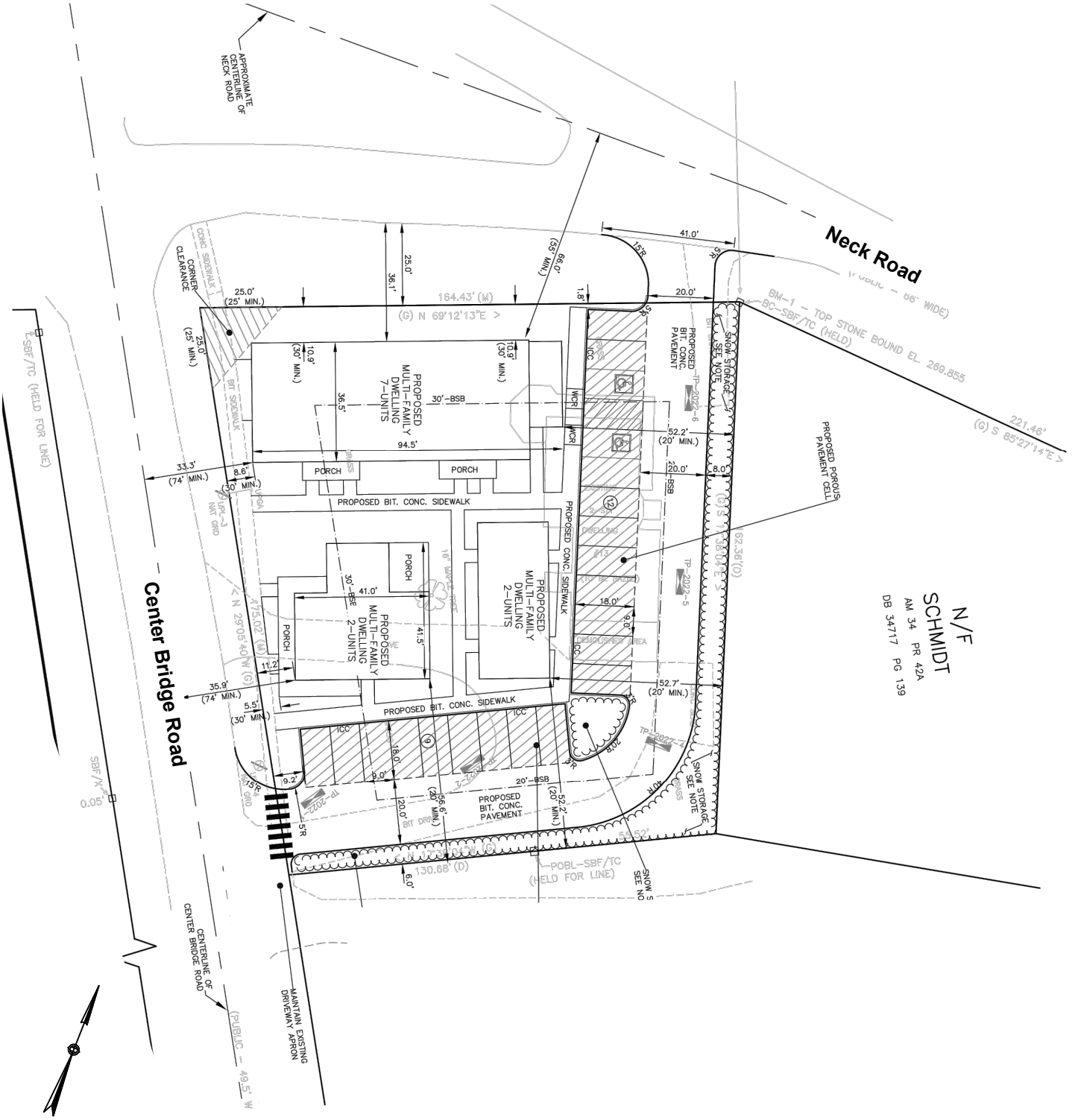
In summary, adequate capacity is available along Neck Road and Center Bridge Road to accommodate the traffic increases that may occur at the Site. The proposed development is estimated to result in a modest generator of traffic with 6 or fewer peak hour trips during the peak hours and 74 vehicle trips on a weekday. As outlined under *Recommendations and Conclusions*, a preliminary list of access/egress improvements, recommend pedestrian and bicycle accommodations, off-site improvements and TDM elements are outlined and recommended to enhance operations, safety, and traffic flow.

PROJECT DESCRIPTION

The project Site is an approximate 0.58-acre tract of land located at 13 Neck Road in Lancaster, Massachusetts. The Site historically has been a single-family home located in the northeast quadrant of the Neck Road at Center Bridge Road intersection. The home has been removed from the property. The project will include a multi-family residential development with eleven (11) units including three (3) affordable units located in three buildings. Access/egress will be provided via two full access driveways: one along the northern side of Center Bridge Road to the east of Neck Road and the second along the northern side of Neck Road to the east of Center Bridge Road. Parking is proposed to include 21± surface parking spaces. A preliminary site plan layout for the project as prepared by Hancock Associates is shown in **Figure 2**.

BASELINE TRAFFIC & SAFETY CHARACTERISTICS

An overview of roadway classification and geometric characteristics is provided below for the adjacent study roadway.



Source: Hancock Associates

Figure 2

Preliminary Site Layout

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Neck Road

Neck Road is generally an east-west roadway within the study area under local jurisdiction and is classified by MassDOT as a local roadway. Neck Road provides a connection from Center Bridge Street and Main Street (Route 70) to the west and Harvard Road to the north. Neck Road provides one travel lane in each direction with marked white edge lines. Sidewalks are not provided along either side of Neck Road within the study area. The posted speed limit on Neck Road in the study area is 30 mph in both travel directions. Land uses along Neck Road in the study area are primarily residential uses.

Center Bridge Road

Center Bridge Road is generally a north-south roadway within the study area under local jurisdiction and is classified by MassDOT as an urban minor arterial roadway. Center Bridge Road provides a connection from Main Street (Route 70) to the north with Route 110 to the south. Center Bridge Road provides one travel lane in each direction with a double yellow centerline and marked white edge lines. Sidewalks are provided along the eastern side of Center Bridge Road from its intersection with Main Street (Route 70) to a railroad crossing approximately 800± feet to the south. The posted speed limit on Center Bridge Road in the study area is 30 mph in both travel directions. Land uses along Center Bridge Road in the study area are primarily residential uses.

Main Street (Route 70)

Main Street (Route 70) is generally a north-south roadway within the study area under local jurisdiction and is classified by MassDOT as an urban minor arterial roadway. Main Street provides a connection from Route 117 to the north and Route 110 and Route 140 to the south. Main Street provides one travel lane in each direction with a double yellow centerline and marked white edge lines with additional turn lanes provided at its major intersections. Sidewalks are provided along both sides of Main Street to the north of Neck Road and along the western side of Main Street to the south of Neck Road. The posted speed limit on Main Street in the study area is 35 mph in both travel directions. Land uses along Main Street in the study area are primarily residential and includes the Nashoba Montessori School and the Lancaster Community Center.

Baseline Traffic Data

Peak Hour Traffic Volumes

Traffic volume data were collected at the study intersections during the weekday morning (7:00 AM - 9:00 AM) and weekday evening (4:00 PM – 6:00 PM) periods to coincide with peak traffic activity of the proposed uses and the adjacent streets. Review of MassDOT permanent count station data indicates that February is a below average traffic month (approximately 9 percent below average month conditions). Therefore, a 9% adjustment for seasonal fluctuations was made to the traffic volume data. The 2024 Baseline weekday morning and weekday evening peak hour traffic volumes for the study intersections are shown in **Figure 3** and **Figure 4**. Traffic count data and MassDOT permanent count station data are provided in the **Attachments**.

Daily Traffic Volumes

Traffic-volume data used in this study were obtained using an automatic traffic recorder (ATR) along Neck Road and Center Bridge Road adjacent to the Site over a 24-hour period in February 2024 and is summarized in **Table 1**.

TABLE 1
BASELINE TRAFFIC VOLUME SUMMARY

Time Period	Daily Volume (vpd)[1]	Percent Daily Traffic[2]	Peak Hour Volume (vph)[3]	Peak Flow Direction[4]	Peak Hour Directional Volume (vph)
Neck Road east of Center Bridge Road					
Weekday Morning Peak Hour	250	10%	26	65% WB	17
Weekday Evening Peak Hour	250	11%	27	74% WB	20
Center Bridge Road south of Neck Road					
Weekday Morning Peak Hour	2,410	10%	242	59% SB	143
Weekday Evening Peak Hour	2,410	8%	193	50% NB	97

[1]Two-way daily traffic expressed in vehicles per day without adjustment.
[2]The percent of daily traffic that occurs during the peak hour.
[3]Two-way peak-hour volume expressed in vehicles per hour.
[4]EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound

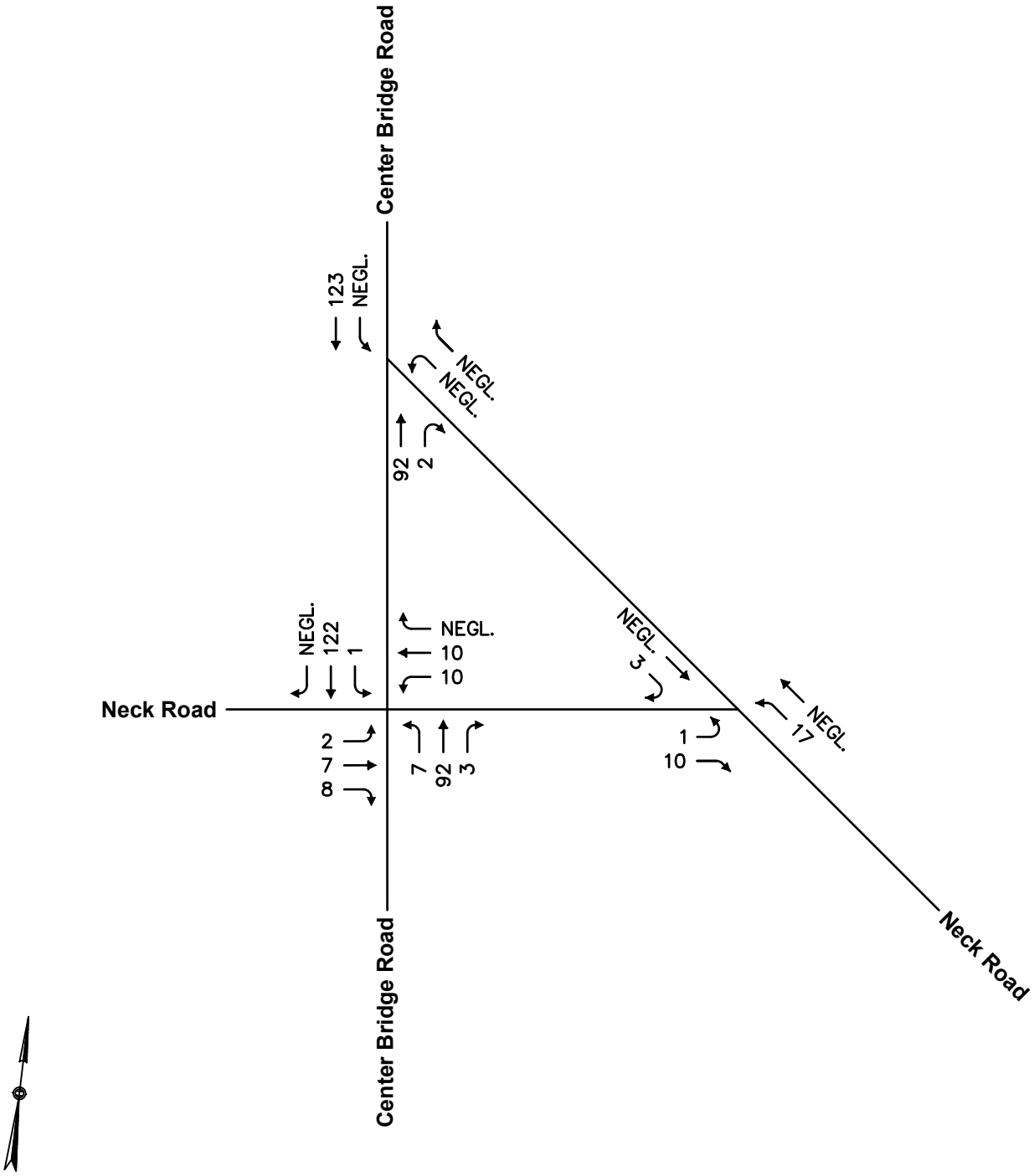

Figure 3

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2024 Baseline Conditions
Weekday Morning Peak Hour Volumes

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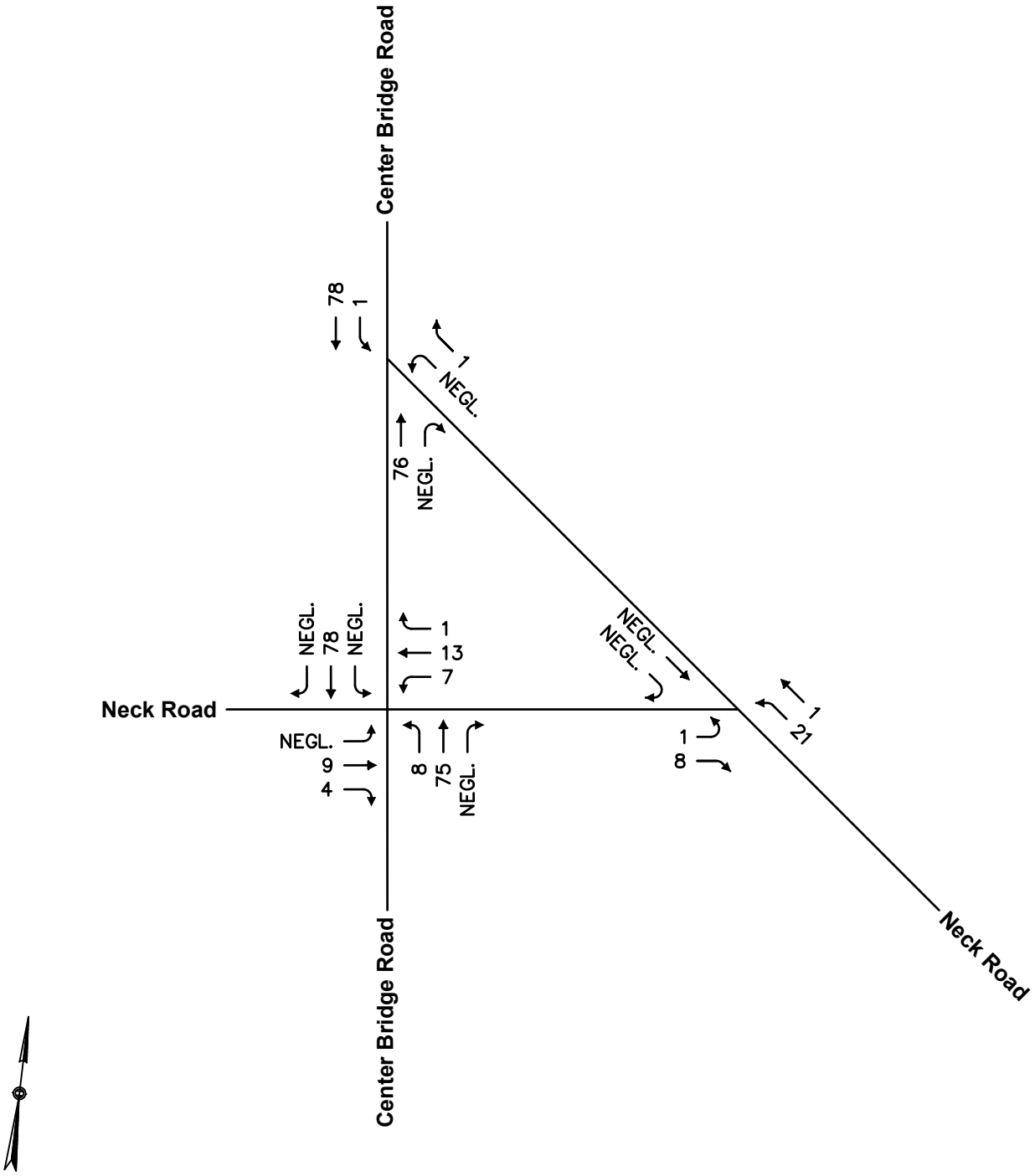

Figure 4

2024 Baseline Conditions
Weekday Evening Peak Hour Volumes

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Date: February 2024
Dwg No. 1341 TM.dwg

As summarized in **Table 1**,

- *Neck Road.* The weekday daily traffic volume on Neck Road east of Center Bridge Road is approximately 250 vehicles per day (vpd) on a weekday. Peak hour traffic flow on Neck Road ranges from approximately 26 to 27 vehicles per hour (vph) representing 10 to 11 percent of daily traffic flow. Vehicle flow patterns are oriented approximately 65% westbound during the morning peak hour and 74% westbound in the evening peak hour.

- *Center Bridge Road.* The weekday daily traffic volume on Center Bridge Road south of Neck Road is approximately 2,410 vehicles per day (vpd) on a weekday. Peak hour traffic flow on Center Bridge Road ranges from approximately 193 to 242 vehicles per hour (vph) representing 8 to 10 percent of daily traffic flow. Vehicle flow patterns are oriented approximately 59% southbound during the morning peak hour and split 50% northbound/southbound during the evening peak hour.

Measured Travel Speeds

Vehicle speeds were obtained for Neck Road in the eastbound and westbound travel directions and Center Bridge Road in the northbound and southbound directions by using an ATR machine equipped with speed radar. **Table 2** summarizes the average and 85th percentile speeds for Neck Road east of Center Bridge Road and Center Bridge Road south of Neck Road. The speed data provides a basis for determining appropriate sight line criteria for the site driveways in the subsequent section. Field data are provided in the **Attachments**.

TABLE 2
SPEED STUDY RESULTS

	Travel Speeds		
Travel Direction	**Regulatory[1]**	**Mean[2]**	**85th Percentile[3]**
Neck Road east of Center Bridge Road			
Eastbound	30	25	29
Westbound	30	25	30
Center Bridge Road south of Neck Road			
Northbound	30	32	35
Southbound	30	32	37

[1]Regulatory Speed – Prima Facie (mph)
[2]Arithmetic mean (mph)
[3]The speed at or below which 85 percent of the vehicles are traveling (mph).

As summarized in **Table 2**,

- *Neck Road.* The mean (average) travel speed on Neck Road traveling eastbound is 25 mph and the 85th percentile travel speed is 29 mph. In the westbound direction, the mean travel speed is 25 mph and the 85th percentile travel speed is 30 mph. The observed travel speeds are highly consistent with the regulatory speed limit of 30 mph.

- *Center Bridge Road.* The mean (average) travel speed on Center Bridge Road traveling northbound is 32 mph and the 85th percentile travel speed is 35 mph. In the southbound direction, the mean travel speed is 32 mph and the 85th percentile travel speed is 37 mph. The observed 85th percentile travel speeds in both directions are slightly higher than the regulatory speed limit of 30 mph.

Sight Line Evaluation

An evaluation of sight lines was conducted at the proposed site driveway locations to ensure that minimum recommended sight lines are available at the proposed site driveways on Neck Road and Center Bridge Road. The evaluation documents existing sight lines for vehicles as they relate to Neck Road and Center Bridge Road with comparison to recommended guidelines.

The American Association of State Highway and Transportation Officials' (AASHTO) standards[1] reference two types of sight distance which are relevant at the proposed site driveway intersections: stopping sight distance (SSD) and intersection sight distance (ISD). Sight lines for critical vehicle movements at the proposed site driveway intersections were compared to minimum SSD and ISD recommendations for the travel speeds in the site vicinity.

Stopping Sight Distance

Sight distance is the length of roadway visible to the motorist to a fixed object. The minimum sight distance available on a roadway should be sufficiently long enough to enable a below-average operator, traveling at or near a regulatory speed limit, to stop safely before reaching a stationary object in its path, in this case, a vehicle exiting onto Neck Road and Center Bridge Road. The SSD criteria are defined by AASHTO based on design and operating speeds, anticipated driver behavior and vehicle performance, as well as physical roadway conditions. SSD includes the length of roadway traveled during the perception and reaction time of a driver to an object, and the distance traveled during brake application on wet level pavement. Adjustment factors are applied to account for roadway grades when applicable.

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

SSD was estimated in the field using AASHTO standards for driver's eye (3.5 feet) and object height equivalent to the taillight height of a passenger car (2.0 feet) for the northbound and southbound Center Bridge Road approaches to the proposed site driveway and the eastbound and westbound Neck Road approaches to the proposed site driveway. **Table 3** presents a summary of the available SSD as they relate to Neck Road and Center Bridge Road and AASHTO's recommended SSD.

TABLE 3
STOPPING SIGHT DISTANCE SUMMARY
APPROACHES TO PROPOSED SITE DRIVEWAYS

Approach/ Travel Direction	Available SSD	AASHTO Recommended[1] Regulatory Speed[2]	AASHTO Recommended[1] 85th Percentile Speed[3]
Center Bridge Road Approaches to Proposed Site Driveway			
Northbound	>500 Feet	200 Feet	250 Feet
Southbound	>500 Feet	200 Feet	270 Feet
Neck Road Approaches to Proposed Site Driveway			
Eastbound[4]	380± Feet	80 Feet	80 Feet
Westbound	>500 Feet	200 Feet	200 Feet

[1]Recommended sight distance based on AASHTO, A Policy on Geometric Design of Highways and Streets. Based on driver height of eye of 3.5 feet to object height of 2.0 feet.
[2]Regulatory Speed is 30 mph.
[3]85th Percentile travel speed on Neck Road: 29 mph EB and 30 mph WB and Center Bridge Road: 35 mph NB and 37 mph SB.
[4]Based on 15 mile per hour travel speed for vehicles approaching from the Center Bridge Street intersection.

As summarized in **Table 3**, analysis results indicate that the available sight lines exceed AASHTO's recommended SSD criteria for both travel directions along Neck Road and Center Bridge Road based on the regulatory travel speeds and the observed 85th percentile travel speeds.

Intersection Sight Distance

Clear sight lines provide sufficient sight distance for a stopped driver on a minor-road approach to depart from the intersection and enter or cross the major road. As stated under AASHTO's Intersection Sight Distance (ISD) considerations, "…*If the available sight distance for an entering …vehicle is at least equal to the appropriate stopping sight distance for the major road, then drivers have sufficient sight distance to avoid collisions…To enhance traffic operations, intersection sight distances that exceed stopping sight distances are desirable along the major road*." AASHTO's ISD criteria are defined into several "cases". For the unsignalized site driveway location which is proposed to be under STOP sign control then the ISD in question relates to the ability to turn left or travel straight/turn right from the proposed driveways at Neck Road and Center Bridge Road.

Available ISD was estimated in the field using AASHTO standards for driver's eye (3.5 feet), object height (3.5 feet) and decision point (10 feet from the edge of the travel way) for the eastbound and westbound directions along Neck Road and the northbound and southbound directions along Center Bridge Road. **Table 4** presents a summary of the available ISD for the departure from the site driveways and AASHTO's recommended ISD.

TABLE 4
INTERSECTION SIGHT DISTANCE SUMMARY
SITE DRIVEWAY DEPARTURES

View Direction	Available ISD	AASHTO Minimum[1] 85th Percentile Speed[2]	AASHTO Ideal[1] Regulatory Speed[3]
Proposed Site Driveway Approach to Center Bridge Road			
Looking North	>500 Feet	270 Feet	335 Feet
Looking South	>500 Feet	250 Feet	290 Feet
Proposed Site Driveway Approach to Neck Road			
Looking East	>400 Feet	200 Feet	335 Feet
Looking West[4]	360± Feet	145 Feet	145 Feet

[1]Recommended sight distance based on AASHTO, A Policy on Geometric Design of Highways and Streets. Based on driver height of eye of 3.5 feet and an object height of 3.5 feet and adjustments for roadway grade if required. Minimum value as noted represents SSD per AASHTO guidance.
[2]Regulatory Speed is 30 mph.
[3]85th Percentile travel speed on Neck Road: 29 mph EB and 30 mph WB and Center Bridge Road: 35 mph NB and 37 mph SB.
[4]Based on 15 mile per hour travel speed for vehicles approaching from the Center Bridge Street intersection.

The results of the ISD analysis presented in **Table 4** indicate that with trimming of vegetation and landscaping within the sight line triangles, the available sight lines looking north and south from the site Driveway onto Center Bridge Road and looking east and west from the site Driveway on top Neck Road will exceed the recommended sight line requirements from AASHTO for the posted travel speeds. MDM recommends that any new plantings (shrubs, bushes) or physical landscape features to be located within the Site Driveway sight lines should also be maintained at a height of 2 feet or less to ensure unobstructed lines of sight.

Intersection Crash History

A review of Highway Safety Improvement Project (HSIP) locations was conducted. The study intersection of Neck Road at Center Bridge Road is not listed as HSIP location. Four (4) crashes were reported near the study intersection resulting in a crash rate of 0.90. The crashes involved four (4) angle/sideswipe type collisions. The majority (75%) of the crashes resulted in property damage type collisions with no fatalities reported. Half (50%) occurred during the peak period travel times and the majority (75%) occurred under dry roadway conditions. None of the reported collisions involved pedestrians or bicycles.

Alternative Transportation Facilities and Services

A review of census data for Lancaster indicates an alternative transportation use of 43% for residents of the immediate study area (Census tract 7131). Specifically, transit (1%), walk (1%), bike (6%), carpool (2%), and work at home (33%). A review of alternative transportation facilities within the study area indicates pedestrian facilities are provided along the eastern site of Center Bridge Road and no bicycle facilities provided within the immediate area of the proposed development. Additionally, there are currently no public transportation routes operating within the immediate study area. To remain conservative, no credit (trip reduction) was taken for carpooling or telecommuting.

PROJECTED DESIGN YEAR TRAFFIC VOLUMES

The following sections provide an overview of projects trip generation characteristics, estimated trip distribution patterns, design year traffic volume networks, and a qualitative assessment of project impact.

The trip generation estimates for the proposed development of the Site are provided for the weekday morning and weekday evening periods, which correspond to the critical analysis periods for the proposed use and adjacent street traffic flow. For planning purposes, the new traffic generated by the project was estimated using trip rates published in ITE's *Trip Generation*[2] for the following build-out scenario; Land Use Code (LUC) 220 – Multifamily Housing (Low-Rise). **Table 5** presents a summary of the site trip generation for the proposed use of the Site. To remain conservative, no trip credits (reduction) were taken for alternative transportation modes or telecommuting. Trip generation calculations are provided in the **Attachments.**

TABLE 5
TRIP-GENERATION SUMMARY – ITE BASIS

Peak Hour/Direction	Multi-Family Housing (11 Units)[1]
Weekday Morning Peak Hour:	
Entering	1
Exiting	3
Total	4
Weekday Evening Peak Hour:	
Entering	4
Exiting	2
Total	6
Weekday Daily (24-Hour):	74

Source: ITE *Trip Generation*, 11th Edition; 2021 with no reduction for alternative transportation modes.
[1]Based on ITE Trip Generation 11th Edition trip rates for LUC 220 – Multifamily Housing (Low-Rise) applied to 11 units.

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

As summarized in **Table 5**, the proposed development is estimated to generate a modest 4 vehicle trips (1 entering and 3 exiting) during the weekday morning peak hour, 6 vehicle trips (4 entering and 2 exiting) during the weekday evening peak hour, and 74 vehicle trips on a weekday, with 50 percent entering and 50 percent exiting.

Trip Distribution

As the vast majority of peak hour trip activity will be resident/commuter-related, the distribution for projected traffic for the proposed development is based on Journey to work patterns along the adjacent roadway system and populations of the adjacent communities. The data suggests 50% of trips will occur via Center Bridge Road to/from south, 30% of trips via Main Street (Route 70) to/from north, 15% of trips via Main Street (Route 70) to/from the west and 5% of trips via Neck Road to/from the east. The results are also consistent with the existing travel patterns along Neck Road and Center Bridge Road and the trip distribution is graphically shown in **Figure 5**. The peak hour trip tracings for the project are displayed in **Figure 6** and **Figure 7.** Trip distribution calculations are provided in the **Attachments.**

2024 Design Year Traffic Volume Networks

2024 Design Year condition traffic volumes were arrived at by adding development-specific traffic volumes to the 2024 Baseline conditions. The resulting 2024 Design Year Build condition traffic-volume networks for the weekday morning and weekday evening peak hours are displayed in **Figure 8 and Figure 9**.

Qualitative Statement of Impact

This section provides a qualitative statement of impact and described trip increases associated with the development relative to existing/baseline conditions. A comparison of the total intersection entering volume for the gateway study intersection of Center Bridge Road and Neck Road during the weekday morning peak hour and weekday evening peak hour, are summarized in **Table 6**.

TABLE 6
INTERSECTION TOTAL ENTERING VOLUME

	Peak Hour	Baseline Total Entering Volume[1]	Project Impact # of New Trips (%)
Neck Road at	Weekday AM	262	2 (0.8%)
Center Bridge Road	Weekday PM	195	3 (1.5%)

[1] Volumes based on traffic peak hour turning movement counts conducted in February 2024 w/ seasonal adjustment..

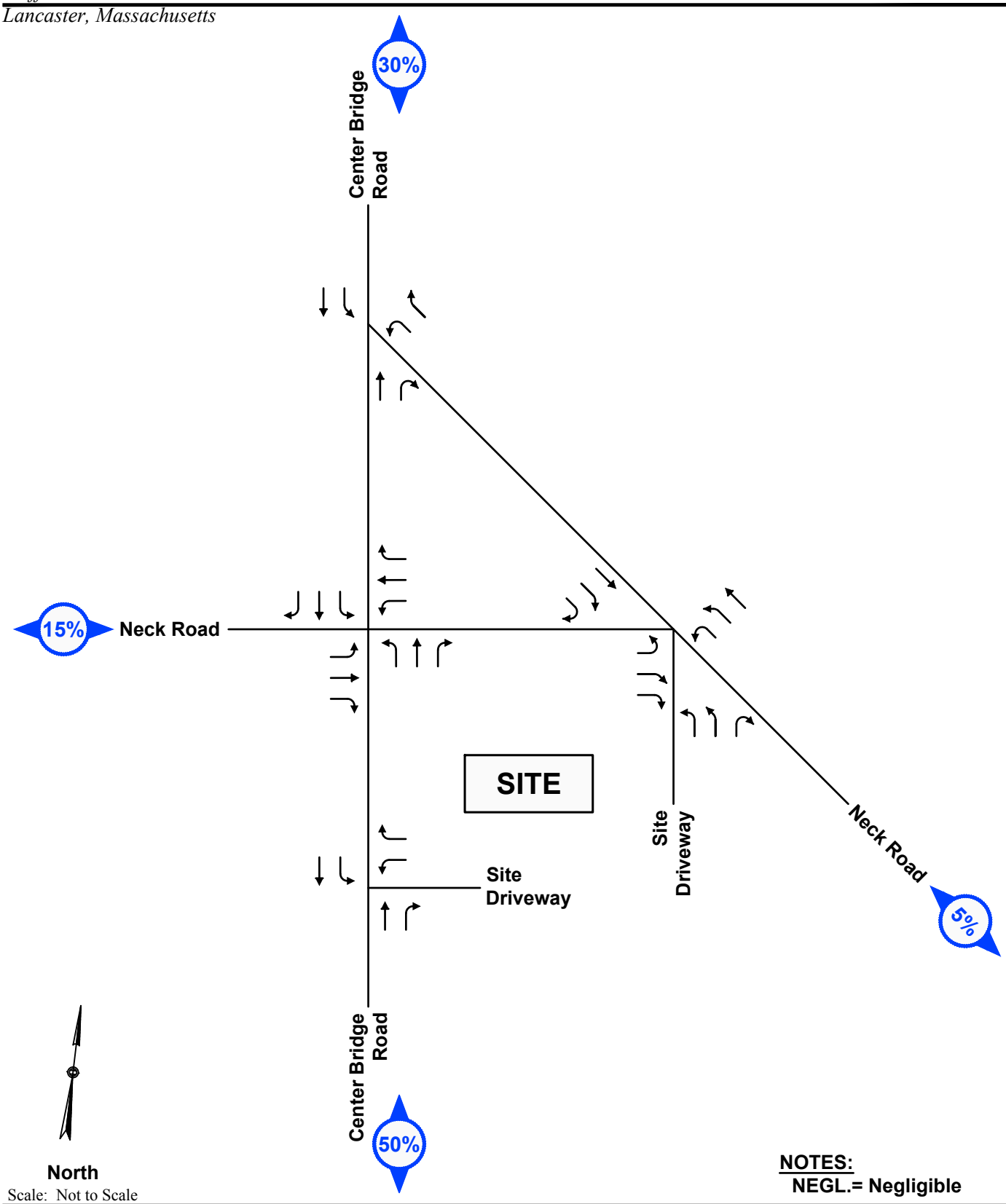

Figure 5

Trip Distribution

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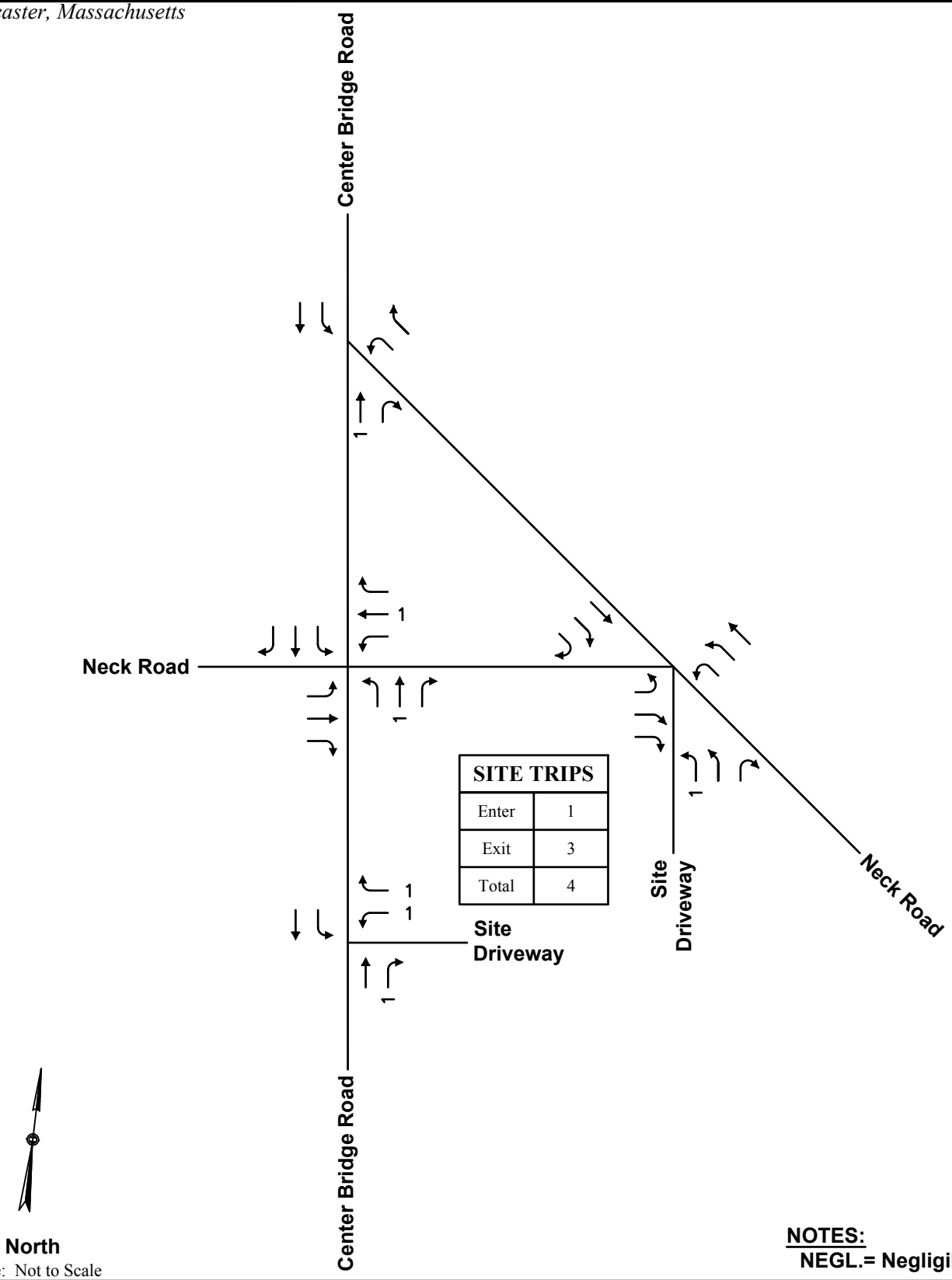

Figure 6

Site Generated Trips
Weekday Morning Peak Hour Volumes

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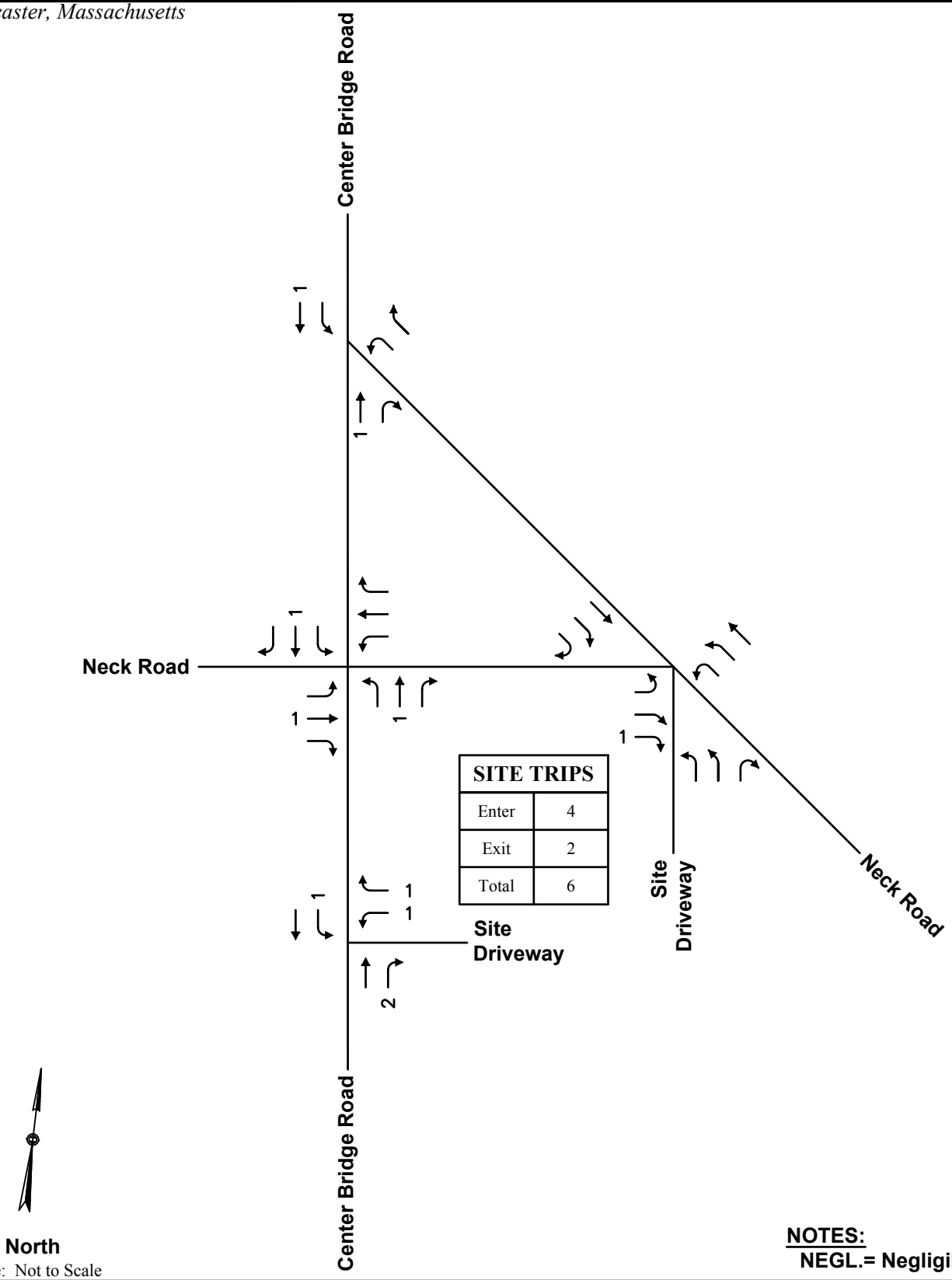

Figure 7

Site Generated Trips
Weekday Evening Peak Hour Volumes

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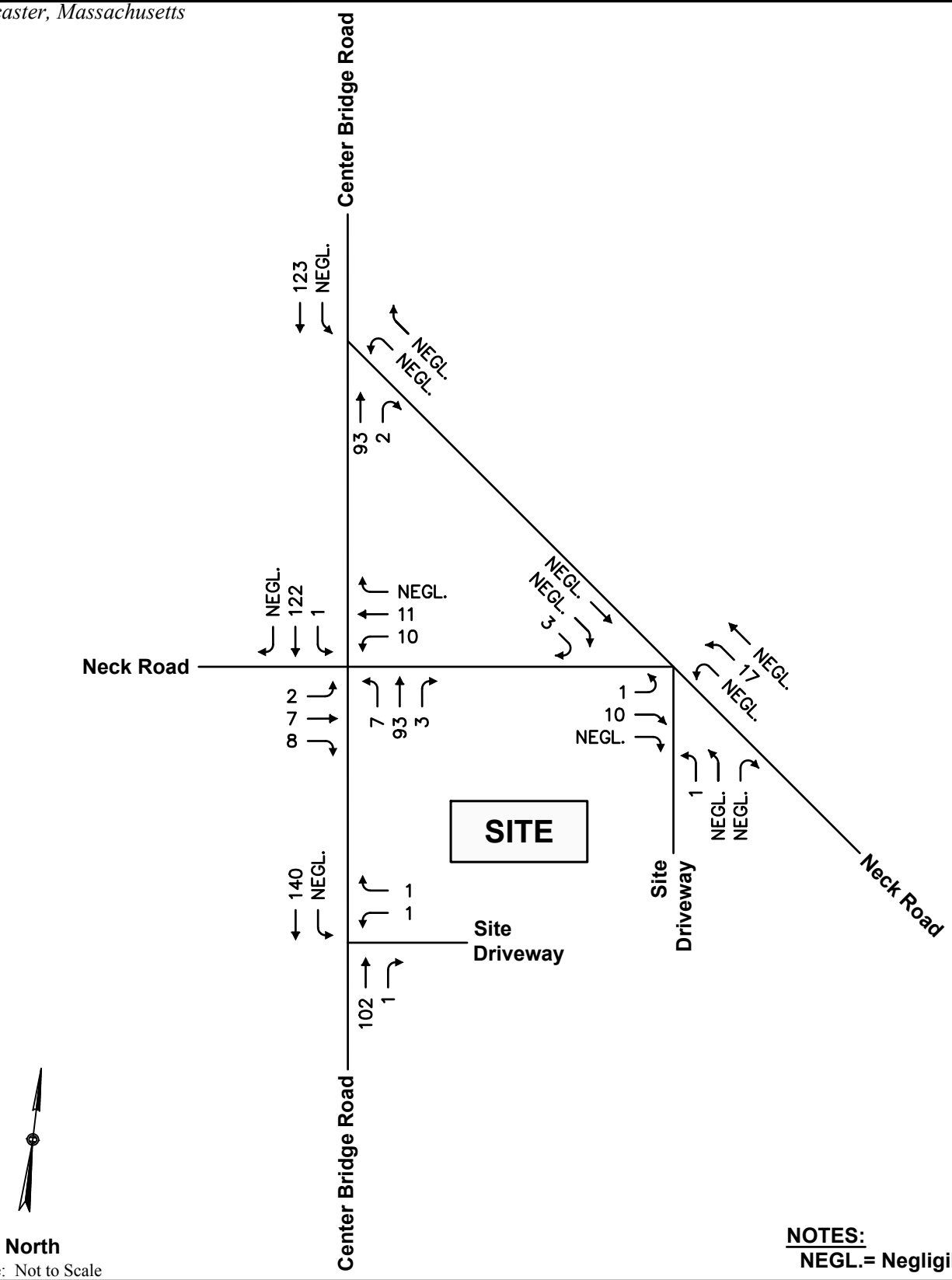

Figure 8

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2024 Design Year Conditions
Weekday Morning Peak Hour Volumes

Date: February 2024
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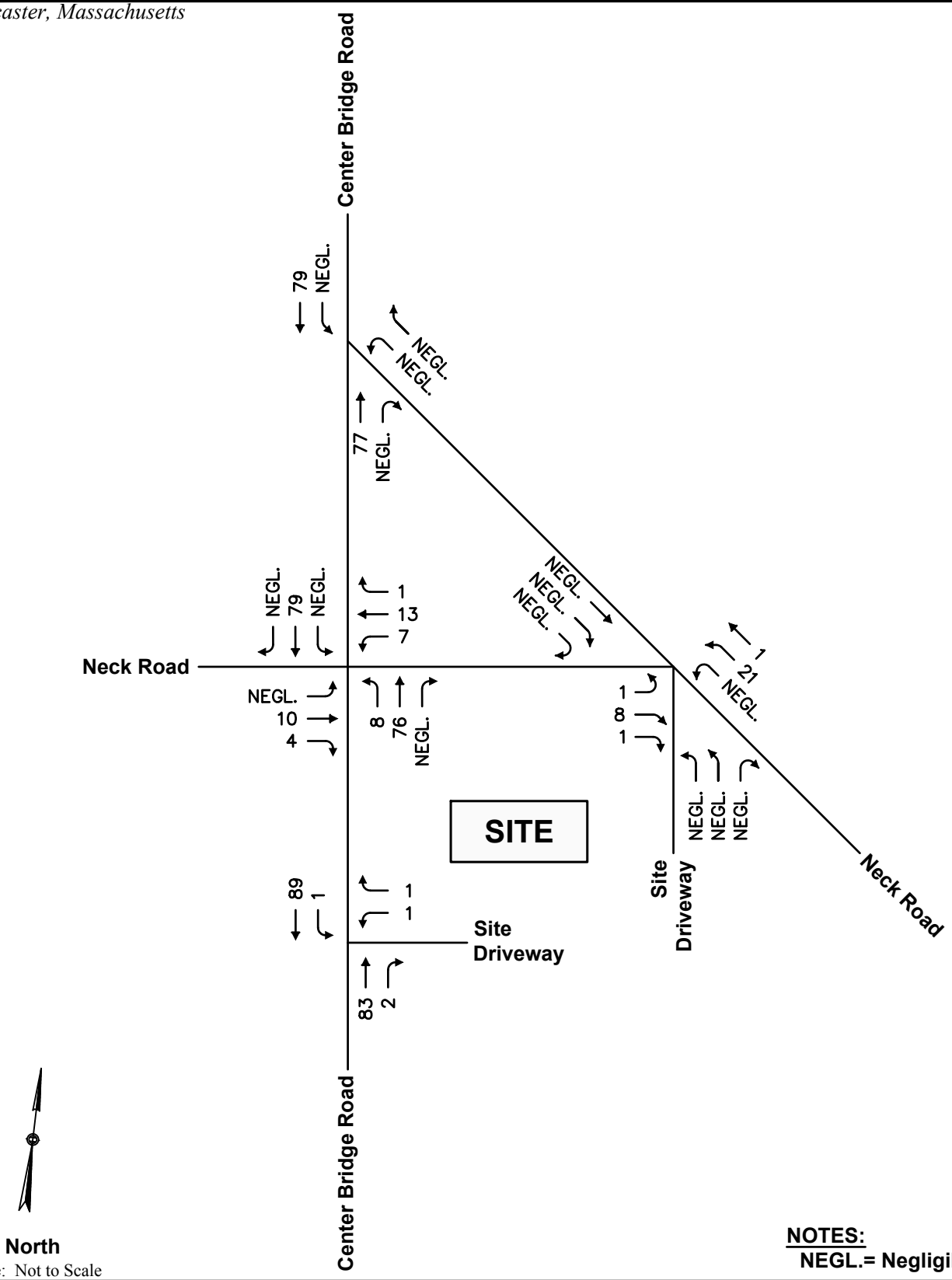

Figure 9

MDM TRANSPORTATION CONSULTANTS, INC.
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2024 Design Year Conditions
Weekday Evening Peak Hour Volumes

Date: February 2024
Dwg No. 1341 TM.dwg

As shown in **Table 6**, the project at full buildout will result in a less than 2% increase in traffic at the relatively low volume gateway study intersection of Neck Road at Center Bridge Road. The increase in trips due to the project is not expected to alter operating conditions compared to Baseline conditions with approximately 1 new total vehicle trip or less every 20 minutes.

PARKING ANALYSIS

Projected peak parking demands at the site are evaluated based on parking rates and methodology published by the Institute of Transportation Engineers (ITE), empirical parking data from suburban multi-family housing projects in the Commonwealth.

Peak Parking Rates – ITE

Peak parking generation rates for residential land uses, including apartment complexes, are published by the Institute of Transportation Engineers (ITE) in *Parking Generation*[3] which provides a basis for identifying parking demand characteristics for residential developments. These parking rates represent peak characteristics for each land use type as "stand-alone" uses that have differing peak parking periods. **Table 7** provides a summary of standard peak parking demands for residential (apartment) uses inclusive of average visitor parking activity.

TABLE 7
PEAK PARKING DEMAND – RESIDENTIAL

Source	Peak Parking Rate	Peak Parking Demand
ITE Average Peak[1]	0.68 (per Bedroom)	14
ITE 95% Confidence[2]	0.71 (per Bedroom)	15
ITE 85th Percentile[3]	0.86 (per Bedroom)	17

[1]Average peak period demand per LUC 220 (Low-Rise Apartment) for a General Urban/Suburban location applied to 20 Bedrooms.
[2]95% Confidence Interval for ITE LUC 220 peak parking generation rate applied to 20 Bedrooms.
[3]85th Percentile Parking Demand for ITE LUC 220 peak parking generation rate applied to 20 Bedrooms.

As summarized in **Table 7**, standard residential peak parking demand for the 11-unit project with 20 bedrooms ranges from 14 to 17 vehicles based on *ITE parking generation* rates with peak demands occurring during the overnight hours. Daytime hour demand (8 AM to 6 PM) will be 35 to 50 percent lower than overnight peak demands based on ITE time-of-day demand statistics. The onsite parking supply of 21 on-site parking spaces will accommodate the peak residential parking demands at the Site with a 19% surplus during peak periods.

[3] *Parking Generation, 6th Edition*, Institute of Transportation Engineers, Washington D.C. October 2023.

Peak Parking Rates – Empirical

Parking observations at six (6) multi-family housing complexes were conducted during the overnight peak period. It is noted that access to garage spaces was restricted for the West Village development at the time of the observations; however, as a conservative measure all garage units were assumed to be fully occupied at the time of the count. Parking activity, residential unit count and associated peak parking rate for each of the multi-family residential complexes are presented in **Table 8** for comparison to the ITE parking rates.

TABLE 8
PEAK PARKING DEMAND – Empirical Data from Area Multi-Family Complexes

Development	City/Town	# Units	Peak Parking Usage	Peak Parking Rate (spaces per unit)
West Village[1]	Mansfield	204	283	1.39
Concord Mews	Concord	350	504	1.44
Cloverleaf	Natick	183	236	1.29
Chapel Hill West	Framingham	168	220	1.31
Chapel Hill East	Framingham	174	225	1.29
Martins Landing	North Reading	97	129	1.33
AVERAGE		208	294	1.34

[1]Access to garage spaces was restricted; as a conservative measure, all garage units were assumed to be occupied at the time of the count. Peak demand includes observed surface parking activity plus all garage units as each garage is assumed to be occupied.

As presented in **Table 8**, peak parking demand rate of 1.34 spaces per unit exhibited by area multi-family housing complexes is highly consistent with ITE peak parking demand data described above. When applied to the proposed 11-unit project the peak parking demand for the proposed residential use is estimated to be approximately 15 spaces which is below the proposed parking supply of 21 marked spaces with an excess parking of approximately 6 spaces (29%).

RECOMMENDATIONS

Based on this traffic impact statement, MDM has identified several mitigation actions that are likely to be required through the local permitting process to support the project or are recommended at the study locations independent of the project. These include (a) access-related improvements, (b) pedestrian and bicycle accommodations, (c) off-site improvements, and (d) a transportation demand management (TDM) program to enhance traffic operations and travel safety:

Access/Egress Improvements

- *Driveway Design and Location*. The final driveway width and curb radii between the site driveways and Neck Road and Center Bridge Road have be designed to accommodate the Town's largest fire apparatus (ladder truck) and delivery vehicles. AutoTurn® simulations are provided in the **Attachments**. Signs and pavement markings that are compliant with the Manual on Uniform Traffic Control Devices (MUTCD) shall also be identified including "STOP" signs (R1-1), STOP line pavement markings.

- *Sight Line Triangles.* With selective clearing and grading as part of the installation of the Site driveway the available sight lines will satisfy the recommended sight line requirements from AASHTO. Plantings (shrubs, bushes) and structures (walls, fences, etc.) shall be maintained at a height of 2 feet or less within the sight lines in vicinity of the Site Driveway intersections with Neck Road and Center Bridge Road to provide unobstructed sight lines.

Pedestrian and Bicycle Accommodations

- *Pedestrian Connections*. The Site Plan incorporates sidewalks that connect the proposed buildings to each other, parking areas, building entrances and the existing sidewalk network along Center Bridge Road.

- *Bicycle Amenities*. The Proponent shall provide bicycle accommodations within the property including covered/secure bike racks for residents and "loop" racks near the buildings entranceways to encourage and facilitate this mode of transportation to/from the Site.

Off-Site Improvements

- *Center Bridge Road at Neck Road - All-Way Stop*. Independent of the project, MDM recommends the Neck Road at Center Bridge Road two-way "STOP" controlled intersection be converted to an all-way "STOP" controlled intersection. The all-way "STOP" control is warranted based on the limited sightlines on the eastbound Neck Road approach. As stated under MUTCD's all-Way stop control considerations *"All-way stop control may be installed at an intersection where an engineering study indicates that sight distance on the minor-road approaches controlled by a STOP sign is not adequate for a vehicle to turn onto or cross the major (uncontrolled road)."* Signs and pavement markings that are compliant with the Manual on Uniform Traffic Control Devices (MUTCD) shall also be installed including STOP signs (R1-1), "All-Way" plaques (R1-3P), advanced "STOP Ahead" signs (W3-1) and STOP line pavement markings. Under an all-way STOP condition, the intersection would continue to operate with minimal delay or queuing (see **Attachments**).

- *Neck Road – STOP signs*. Independent of the project, MDM recommends the Neck Road (northern) approach to Center Bridge Road be placed under "STOP" sign control. Likewise, the Neck Road (northern) approach to Neck Hill Road should be placed under "STOP" sign control. Signs and pavement markings that are compliant with the Manual on Uniform Traffic Control Devices (MUTCD) shall also be installed including "STOP" signs (R1-1) and STOP line pavement markings.

Transportation Demand Management (TDM) Program

A preliminary list of potential TDM program elements may include the following, subject to refinement of the development program and further evaluation by the Proponent:

- *Bicycle Facilities*.
- *Preferential Parking and Incentives for Low-Emission Vehicles.*
- *Electric Vehicle Charging Stations*
- *Unbundled Parking.*
- *On-Site Amenities.*
- *Pedestrian Infrastructure*.

ATTACHMENTS

- □ Traffic Volume Data
- □ Seasonal/Yearly Growth Data
- □ Speed Data
- □ Sight Line Analysis
- □ Crash Data
- □ Census Data
- □ Trip Generation
- □ Trip Distribution Calculations
- □ Parking Analysis
- □ AutoTURN® Analysis

- Traffic Volume Data

MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA, 01752

N/S: Center Bridge Road
South of Proposed Site Driveway
Lancaster, MA

Site Code: 1341
Station ID:
1341

Start Time	01-Feb-24 Thu	Northbound Morning	Northbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Southbound Morning	Southbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		0	30			1	21				
12:15		2	29			2	31				
12:30		1	17			4	18				
12:45		1	22	4	98	2	13	9	83	13	181
01:00		0	16			0	20				
01:15		0	19			0	15				
01:30		0	19			1	17				
01:45		1	15	1	69	0	23	1	75	2	144
02:00		1	25			1	19				
02:15		0	21			1	18				
02:30		0	14			0	24				
02:45		0	23	1	83	0	26	2	87	3	170
03:00		0	27			0	24				
03:15		1	27			1	49				
03:30		0	18			0	26				
03:45		1	21	2	93	0	22	1	121	3	214
04:00		0	39			0	23				
04:15		0	16			0	18				
04:30		1	18			2	29				
04:45		4	24	5	97	0	26	2	96	7	193
05:00		3	20			2	19				
05:15		1	25			3	9				
05:30		6	20			2	22				
05:45		5	21	15	86	5	15	12	65	27	151
06:00		7	27			4	21				
06:15		6	18			12	13				
06:30		15	15			18	19				
06:45		12	9	40	69	22	16	56	69	96	138
07:00		15	9			26	12				
07:15		11	9			23	15				
07:30		25	9			38	7				
07:45		25	2	76	29	43	16	130	50	206	79
08:00		23	15			35	12				
08:15		26	7			27	14				
08:30		29	7			26	7				
08:45		21	4	99	33	28	5	116	38	215	71
09:00		15	3			34	1				
09:15		13	5			13	7				
09:30		19	3			22	3				
09:45		17	3	64	14	12	2	81	13	145	27
10:00		19	4			17	3				
10:15		16	3			20	3				
10:30		17	4			17	1				
10:45		21	2	73	13	18	4	72	11	145	24
11:00		22	0			12	6				
11:15		24	4			15	2				
11:30		11	2			12	3				
11:45		19	2	76	8	20	4	59	15	135	23
Total		456	692			541	723			997	1415
Percent		39.7%	60.3%			42.8%	57.2%			41.3%	58.7%
Total		456	692			541	723			997	1415
Percent		39.7%	60.3%			42.8%	57.2%			41.3%	58.7%
Combined Total		1148				1264				2412	

MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA, 01752

E/W: Neck Road
East of Proposed Site Driveway
Lancaster, MA

Site Code: 1341
Station ID:
1341

Start Time	01-Feb-24 Thu	Westbound Morning	Westbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Eastbound Morning	Eastbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		0	4			0	3				
12:15		0	3			0	3				
12:30		0	3			0	2				
12:45		0	3	0	13	0	6	0	14	0	27
01:00		0	4			0	2				
01:15		0	3			0	3				
01:30		0	1			0	1				
01:45		0	2	0	10	0	4	0	10	0	20
02:00		0	4			0	2				
02:15		0	5			0	1				
02:30		0	1			0	1				
02:45		0	3	0	13	0	2	0	6	0	19
03:00		0	1			0	1				
03:15		0	5			0	3				
03:30		0	1			0	2				
03:45		0	1	0	8	0	3	0	9	0	17
04:00		1	3			0	1				
04:15		0	6			1	2				
04:30		1	5			0	2				
04:45		1	6	3	20	0	2	1	7	4	27
05:00		0	0			0	2				
05:15		0	2			0	3				
05:30		0	2			0	1				
05:45		0	2	0	6	0	2	0	8	0	14
06:00		1	4			1	5				
06:15		2	0			0	0				
06:30		2	4			0	2				
06:45		1	0	6	8	0	4	1	11	7	19
07:00		1	1			1	2				
07:15		2	2			2	1				
07:30		8	0			4	1				
07:45		3	0	14	3	2	0	9	4	23	7
08:00		3	0			1	1				
08:15		3	0			2	0				
08:30		0	1			0	0				
08:45		1	0	7	1	1	1	4	2	11	3
09:00		2	0			0	2				
09:15		1	0			0	1				
09:30		0	2			3	0				
09:45		3	1	6	3	2	0	5	3	11	6
10:00		2	0			1	0				
10:15		6	0			2	0				
10:30		1	0			2	0				
10:45		1	0	10	0	0	0	5	0	15	0
11:00		1	0			1	0				
11:15		3	0			6	1				
11:30		3	0			2	0				
11:45		3	0	10	0	1	0	10	1	20	1
Total		56	85			35	75			91	160
Percent		39.7%	60.3%			31.8%	68.2%			36.3%	63.7%
Total		56	85			35	75			91	160
Percent		39.7%	60.3%			31.8%	68.2%			36.3%	63.7%
Combined Total		141				110				251	

MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA, 01752

E/W: Neck Road
N/S: Center Bridge Road
Lancaster, MA

File Name : 1341_Center_Bridge_at_Neck_02-01-2024
Site Code : 1341
Start Date : 2/1/2024
Page No : 1

Groups Printed- Lights - Mediums - Articulated Trucks - Bicycles on Road

	Center Bridge Road From North					Neck Road From East					Center Bridge Road From South					Neck Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	22	0	0	22	0	0	2	1	3	0	9	0	0	9	0	0	0	0	0	34
07:15 AM	0	25	0	0	25	0	4	6	0	10	2	18	2	0	22	1	4	0	0	5	62
07:30 AM	0	34	0	0	34	0	1	1	0	2	1	23	2	0	26	2	1	0	0	3	65
07:45 AM	0	31	1	0	32	0	2	1	0	3	0	22	1	0	23	3	0	2	0	5	63
Total	0	112	1	0	113	0	7	10	1	18	3	72	5	0	80	6	5	2	0	13	224
08:00 AM	0	22	0	0	22	0	2	1	0	3	0	21	1	0	22	1	1	0	0	2	49
08:15 AM	0	22	0	0	22	0	0	0	0	0	1	31	1	0	33	1	0	0	0	1	56
08:30 AM	0	29	0	0	29	1	0	1	0	2	0	20	0	0	20	1	0	0	0	1	52
08:45 AM	0	23	0	0	23	2	1	1	0	4	0	21	1	0	22	0	1	0	0	1	50
Total	0	96	0	0	96	3	3	3	0	9	1	93	3	0	97	3	2	0	0	5	207
04:00 PM	0	19	0	0	19	0	5	2	0	7	0	18	2	0	20	1	2	0	0	3	49
04:15 PM	0	18	0	0	18	0	4	1	0	5	0	15	1	0	16	1	3	0	0	4	43
04:30 PM	0	18	0	0	18	1	3	3	0	7	0	24	2	0	26	1	1	0	0	2	53
04:45 PM	0	17	0	0	17	0	0	0	0	0	0	12	2	0	14	1	2	0	0	3	34
Total	0	72	0	0	72	1	12	6	0	19	0	69	7	0	76	4	8	0	0	12	179
05:00 PM	0	13	0	0	13	0	2	0	0	2	1	30	0	0	31	0	2	0	0	2	48
05:15 PM	0	12	0	0	12	0	2	0	0	2	0	18	2	0	20	2	1	0	0	3	37
05:30 PM	0	17	1	0	18	0	1	1	0	2	0	17	1	0	18	2	1	0	0	3	41
05:45 PM	0	11	0	0	11	0	2	1	0	3	1	25	4	0	30	0	4	0	0	4	48
Total	0	53	1	0	54	0	7	2	0	9	2	90	7	0	99	4	8	0	0	12	174
Grand Total	0	333	2	0	335	4	29	21	1	55	6	324	22	0	352	17	23	2	0	42	784
Apprch %	0	99.4	0.6	0		7.3	52.7	38.2	1.8		1.7	92	6.2	0		40.5	54.8	4.8	0		
Total %	0	42.5	0.3	0	42.7	0.5	3.7	2.7	0.1	7	0.8	41.3	2.8	0	44.9	2.2	2.9	0.3	0	5.4	
Lights	0	322	2	0	324	3	27	20	1	51	6	319	20	0	345	16	23	1	0	40	760
% Lights	0	96.7	100	0	96.7	75	93.1	95.2	100	92.7	100	98.5	90.9	0	98	94.1	100	50	0	95.2	96.9
Mediums	0	11	0	0	11	1	2	1	0	4	0	4	2	0	6	1	0	1	0	2	23
% Mediums	0	3.3	0	0	3.3	25	6.9	4.8	0	7.3	0	1.2	9.1	0	1.7	5.9	0	50	0	4.8	2.9
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0.3	0	0	0.3	0	0	0	0	0	0.1
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

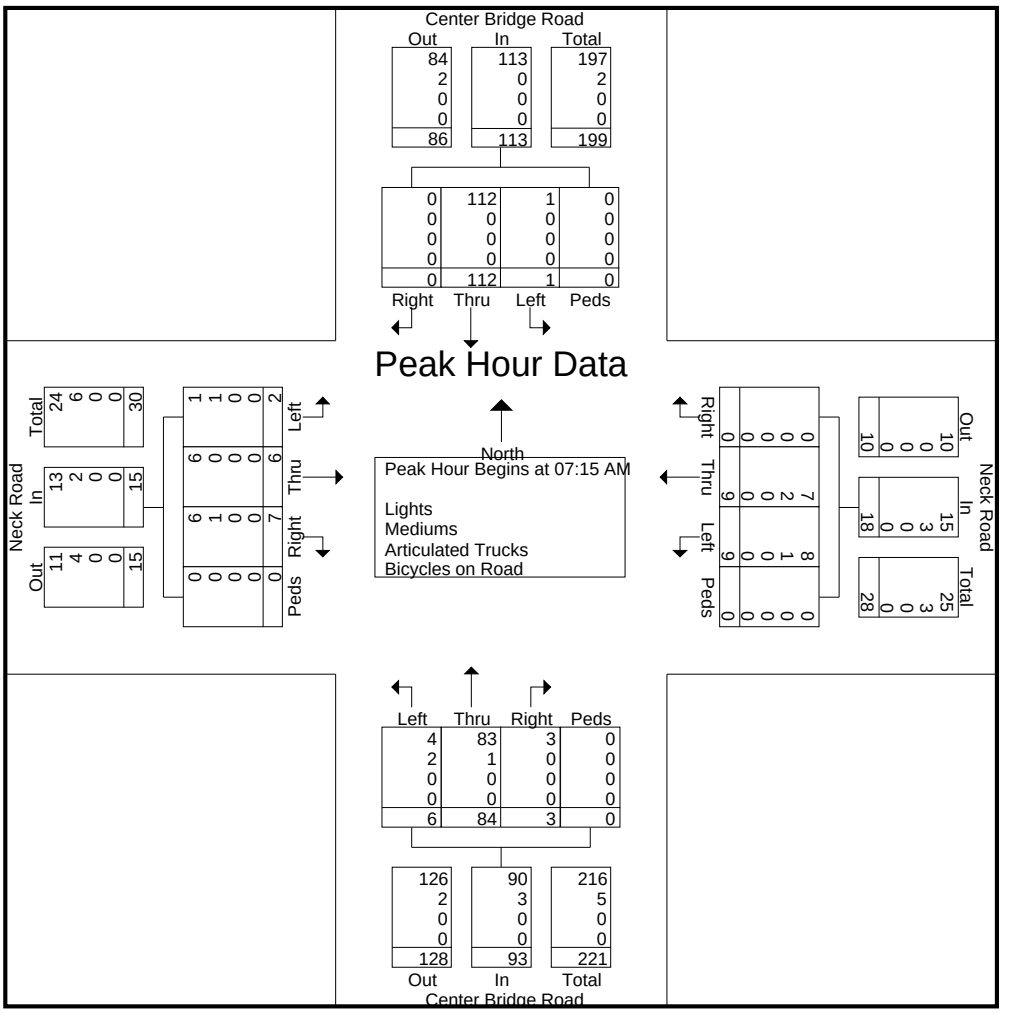
MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA, 01752

E/W: Neck Road
N/S: Center Bridge Road
Lancaster, MA

File Name : 1341_Center_Bridge_at_Neck_02-01-2024
Site Code : 1341
Start Date : 2/1/2024
Page No : 2

	Center Bridge Road From North					Neck Road From East					Center Bridge Road From South					Neck Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	25	0	0	25	0	**4**	**6**	0	**10**	**2**	18	**2**	0	22	1	**4**	0	0	**5**	62
07:30 AM	0	**34**	0	0	**34**	0	1	1	0	2	1	**23**	2	0	**26**	2	1	0	0	3	**65**
07:45 AM	0	31	**1**	0	32	0	2	1	0	3	0	22	1	0	23	**3**	0	**2**	0	5	63
08:00 AM	0	22	0	0	22	0	2	1	0	3	0	21	1	0	22	1	1	0	0	2	49
Total Volume	0	112	1	0	113	0	9	9	0	18	3	84	6	0	93	7	6	2	0	15	239
% App. Total	0	99.1	0.9	0		0	50	50	0		3.2	90.3	6.5	0		46.7	40	13.3	0		
PHF	.000	.824	.250	.000	.831	.000	.563	.375	.000	.450	.375	.913	.750	.000	.894	.583	.375	.250	.000	.750	.919
Lights	0	112	1	0	113	0	7	8	0	15	3	83	4	0	90	6	6	1	0	13	231
% Lights	0	100	100	0	100	0	77.8	88.9	0	83.3	100	98.8	66.7	0	96.8	85.7	100	50.0	0	86.7	96.7
Mediums	0	0	0	0	0	0	2	1	0	3	0	1	2	0	3	1	0	1	0	2	8
% Mediums	0	0	0	0	0	0	22.2	11.1	0	16.7	0	1.2	33.3	0	3.2	14.3	0	50.0	0	13.3	3.3
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



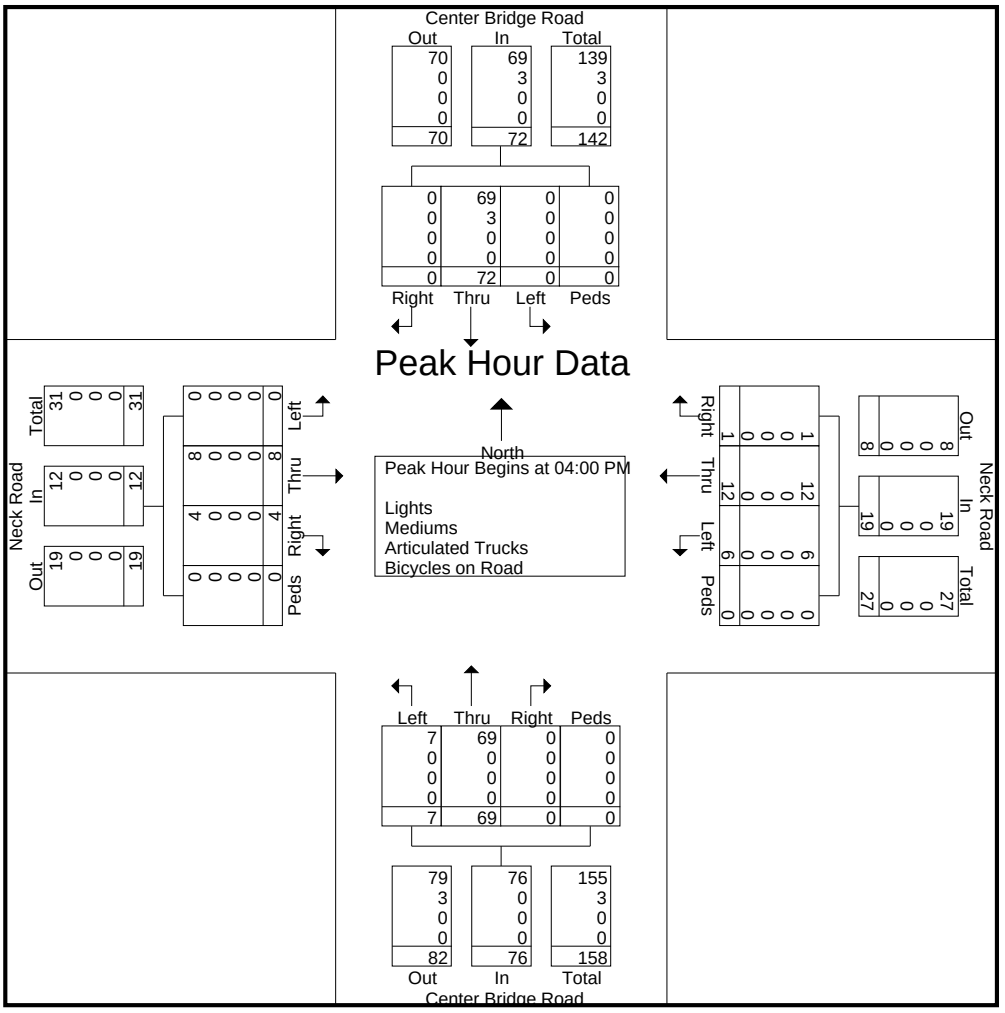
MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA, 01752

E/W: Neck Road
N/S: Center Bridge Road
Lancaster, MA

File Name : 1341_Center_Bridge_at_Neck_02-01-2024
Site Code : 1341
Start Date : 2/1/2024
Page No : 3

	Center Bridge Road From North					Neck Road From East					Center Bridge Road From South					Neck Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	**19**	0	0	**19**	0	**5**	2	0	**7**	0	18	**2**	0	20	**1**	2	0	0	3	49
04:15 PM	0	18	0	0	18	0	4	1	0	5	0	15	1	0	16	1	**3**	0	0	**4**	43
04:30 PM	0	18	0	0	18	**1**	3	**3**	0	7	0	**24**	2	0	**26**	1	1	0	0	2	**53**
04:45 PM	0	17	0	0	17	0	0	0	0	0	0	12	2	0	14	1	2	0	0	3	34
Total Volume	0	72	0	0	72	1	12	6	0	19	0	69	7	0	76	4	8	0	0	12	179
% App. Total	0	100	0	0		5.3	63.2	31.6	0		0	90.8	9.2	0		33.3	66.7	0	0		
PHF	.000	.947	.000	.000	.947	.250	.600	.500	.000	.679	.000	.719	.875	.000	.731	1.00	.667	.000	.000	.750	.844
Lights	0	69	0	0	69	1	12	6	0	19	0	69	7	0	76	4	8	0	0	12	176
% Lights	0	95.8	0	0	95.8	100	100	100	0	100	0	100	100	0	100	100	100	0	0	100	98.3
Mediums	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
% Mediums	0	4.2	0	0	4.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.7
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



□ Seasonal/Yearly Growth Data

STATION 4172 - ACTON - RTE.2 - WEST OF RTE.27

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
17	40,070	38,912	42,339	44,194	*44,611*	*46,127*	*42,176*	44,987	44,910	45,920	43,815	41,833	43,325
	-2%	7%	1%	1%	3%	1%	1%	-1%	1%	2%	0%	2%	2%
18	39,119	41,721	42,570	44,443	*45,806*	*46,688*	*42,717*	44,315	45,419	46,930	44,012	42,510	44,070
	7%	2%	4%	3%	3%	2%	2%	2%	3%	2%	2%	-5%	2%
19	41,751	42,515	44,328	45,841	47,210	*47,670*	*43,546*	45,395	46,706	47,681	44,902	40,322	44,822
	-17%	-19%	-7%	-9%	-9%	-9%	-6%	-7%	-8%	-7%	-8%	-3%	-8%
21	34,514	34,225	41,177	41,688	42,828	*43,587*	*41,114*	42,310	42,982	44,317	41,329	39,244	41,043
	13%	15%	4%	4%	7%	5%	2%	7%	4%	5%	7%	5%	6%
23	38,847	39,222	42,828	43,407	45,773	*45,870*	*42,128*	45,213	44,593	46,662	44,148	41,302	43,333
Seasonal Adjustment Factor	1.12	1.11	1.02	0.99	0.96	0.94	1.02	0.97	0.96	0.94	0.99	1.06	
(to average month)												**Growth**	**1.2%**

STATION 307 - WESTBOROUGH - RTE.9 - EAST OF NORTHBOROUGH T.L.

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
07	47,505	47,283	49,268	49,136	*50,000*	*52,000*	*53,000*	52,322	49,031	50,571	49,662	47,007	49,732
	-4%	-2%	-3%	1%	1%	-4%	-8%	-7%	-1%	-3%	-4%	-1%	-3%
08	45,614	46,112	47,829	49,816	*50,518*	*49,936*	*48,629*	48,759	48,531	49,009	47,490	46,696	48,245
	-3%	1%	-3%	-2%	-2%	0%	-2%	-3%	-2%	-1%	0%	2%	-1%
09	44,103	46,434	46,455	49,049	*49,474*	*49,934*	*47,638*	47,056	47,762	48,663	47,379	47,564	47,626
	-1%	0%	2%	0%	0%	1%	-1%	1%	1%	1%	2%	2%	1%
11	43,244	46,150	48,016	48,943	*49,781*	*50,525*	*46,812*	48,234	48,825	49,198	49,151	49,888	48,231
	7%	2%	1%	-1%	1%	-1%	3%	4%	0%	2%	2%	-5%	1%
12	46,381	46,883	48,608	48,662	*50,126*	*49,961*	*48,380*	49,941	48,882	50,056	50,015	47,600	48,791
	0%	-1%	-2%	1%	1%	-9%	3%	-1%	2%	0%	-1%	2%	0%
13	46,393	46,220	47,421	49,359	*50,657*	*45,623*	*49,797*	49,223	49,935	50,021	49,651	48,441	48,562
	2%	3%	6%	3%	3%	17%	0%	3%	0%	2%	4%	4%	4%
16	47,447	47,570	50,342	50,977	52,259	53,476	49,724	50,789	50,057	51,035	51,749	50,442	50,489
	-16%	-16%	-11%	-10%	-8%	-7%	-3%	-4%	-4%	-5%	-8%	-8%	-8%
21	40,006	39,803	44,885	45,750	48,215	49,961	48,025	48,827	47,939	48,532	47,814	46,502	46,355
	9%	9%	2%	4%	2%	-1%	-2%	-1%	-1%	-1%	0%	0%	2%
23	43,754	43,487	45,855	47,741	49,238	49,643	47,280	48,283	47,363	48,242	47,582	46,694	47,097
Seasonal Adjustment Factor	1.07	1.05	1.01	0.99	0.97	0.97	1.00	0.99	0.99	0.98	0.99	1.01	
(to average month)												**Growth**	**-0.35%**

STATION 34 - LANCASTER - RTE.2

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
17	50,035	54,020	55,217	56,618	58,849	60,612	58,376	60,920	58,463	58,537	56,809	53,921	56,865
	8%	0%	0%	3%	2%	5%	5%	5%	6%	12%	-1%	-1%	4%
18	54,149	54,063	55,064	58,141	60,177	63,843	61,128	63,771	62,139	65,668	56,469	53,581	59,295
	-6%	-9%	-4%	-8%	-7%	-5%	-3%	-4%	-3%	-8%	0%	-1%	-4%
21	50,965	49,143	52,851	53,516	56,055	60,720	59,099	61,080	60,359	60,122	56,594	52,787	56,828
	3%	11%	9%	12%	14%	6%	7%	9%	3%	6%	4%	5%	6%
23	52,749	54,562	57,634	59,680	64,095	64,199	62,985	66,297	61,906	63,493	59,138	55,463	60,183
Seasonal Adjustment Factor	1.12	1.10	1.06	1.02	0.98	0.94	0.97	0.93	0.96	0.94	1.02	1.08	
(to average month)												**Growth**	**1.62%**
	1.10	1.09	1.03	1.00	0.97	0.95	1.00	0.96	0.97	0.95	1.00	1.05	

Average Yearly Growth Calculated 0.8%

Yearly Growth Factor Used 1.0%

ITALICS = ESTIMATED DATA

MADT

- □ Speed Data

MDM Transportation Consultants, Inc.
28 Lord Road, Suite 280
Marlborough, MA, 01752

N/S: Center Bridge Road
South of Proposed Driveway Location
Lancaster, MA

Site Code: 1341
Station ID:
1341

Northbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent
01/31/24	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	1	0	6	32	49	8	1	0	0	0	0	0	0	0	97	34
16:00	0	0	6	31	53	8	0	0	0	0	0	0	0	0	98	34
17:00	0	1	5	24	41	16	0	0	0	0	0	0	0	0	87	35
18:00	0	0	1	16	42	6	1	0	0	0	0	0	0	0	66	34
19:00	0	0	2	11	14	8	3	0	0	0	0	0	0	0	38	38
20:00	0	0	0	5	9	6	1	0	0	0	0	0	0	0	21	38
21:00	0	0	0	3	6	1	0	0	0	0	0	0	0	0	10	34
22:00	0	1	0	3	5	0	0	0	0	0	0	0	0	0	9	33
23:00	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4	34

MDM Transportation Consultants, Inc.
28 Lord Road, Suite 280
Marlborough, MA, 01752

N/S: Center Bridge Road
South of Proposed Driveway Location
Lancaster, MA

Site Code: 1341
Station ID:
1341

Northbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent
02/01/24	0	1	0	2	1	0	0	0	0	0	0	0	0	0	4	32
01:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	44
02:00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	49
03:00	0	0	0	1	0	1	0	0	0	0	0	0	0	0	2	38
04:00	0	0	0	0	3	2	0	0	0	0	0	0	0	0	5	38
05:00	0	0	0	5	4	5	1	0	0	0	0	0	0	0	15	38
06:00	2	0	2	12	17	6	1	0	0	0	0	0	0	0	40	35
07:00	0	1	2	16	41	15	1	0	0	0	0	0	0	0	76	36
08:00	0	0	0	20	52	23	4	0	0	0	0	0	0	0	99	37
09:00	2	0	2	21	27	11	1	0	0	0	0	0	0	0	64	36
10:00	1	0	5	17	36	12	2	0	0	0	0	0	0	0	73	36
11:00	0	0	2	23	42	8	1	0	0	0	0	0	0	0	76	34
12 PM	0	1	16	35	37	9	0	0	0	0	0	0	0	0	98	34
13:00	0	0	4	13	37	14	1	0	0	0	0	0	0	0	69	36
14:00	1	0	3	27	42	10	0	0	0	0	0	0	0	0	83	34
15:00	0	0	8	29	44	10	1	1	0	0	0	0	0	0	93	34
16:00	0	0	4	25	53	14	1	0	0	0	0	0	0	0	97	35
17:00	0	0	7	25	42	11	1	0	0	0	0	0	0	0	86	34
18:00	0	0	1	25	31	12	0	0	0	0	0	0	0	0	69	35
19:00	0	0	2	12	8	7	0	0	0	0	0	0	0	0	29	36
20:00	0	0	0	10	14	7	2	0	0	0	0	0	0	0	33	37
21:00	1	0	1	5	5	2	0	0	0	0	0	0	0	0	14	34
22:00	0	0	0	5	4	4	0	0	0	0	0	0	0	0	13	37
23:00	0	0	0	3	5	0	0	0	0	0	0	0	0	0	8	33

MDM Transportation Consultants, Inc.
28 Lord Road, Suite 280
Marlborough, MA, 01752

N/S: Center Bridge Road
South of Proposed Driveway Location
Lancaster, MA

Site Code: 1341
Station ID:
1341

Northbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent
02/02/24	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	29
01:00	0	0	0	2	1	0	0	1	0	0	0	0	0	0	4	47
02:00	0	0	1	0	1	0	0	0	0	0	0	0	0	0	2	33
03:00	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2	33
04:00	0	0	0	1	2	2	0	0	0	0	0	0	0	0	5	38
05:00	0	0	1	2	6	1	1	0	0	0	0	0	0	0	11	36
06:00	1	0	1	6	17	3	1	0	0	0	0	0	0	0	29	34
07:00	0	0	1	14	41	8	0	0	0	0	0	0	0	0	64	34
08:00	0	1	8	27	42	15	4	0	0	0	0	0	0	0	97	36
09:00	2	0	11	22	25	7	1	0	0	0	0	0	0	0	68	34
10:00	1	1	3	25	27	7	0	0	0	0	0	0	0	0	64	34
11:00	0	0	4	22	23	8	0	0	0	0	0	0	0	0	57	34
12 PM	0	0	4	41	33	12	0	0	0	0	0	0	0	0	90	34
13:00	0	0	4	13	29	10	0	0	0	0	0	0	0	0	56	35
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

	15th Percentile :	26 MPH
	50th Percentile :	31 MPH
	85th Percentile :	35 MPH
	95th Percentile :	38 MPH
Statistics	10 MPH Pace Speed :	26-35 MPH
	Number in Pace :	1649
	Percent in Pace :	77.5%
	Number of Vehicles > 30 MPH :	1359
	Percent of Vehicles > 30 MPH :	63.9%
	Mean Speed(Average) :	32 MPH

MDM Transportation Consultants, Inc.
28 Lord Road, Suite 280
Marlborough, MA, 01752

N/S: Center Bridge Road
South of Proposed Driveway Location
Lancaster, MA

Site Code: 1341
Station ID:
1341

Southbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent
01/31/24	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	3	1	4	33	64	12	4	2	0	0	0	0	0	0	123	34
16:00	0	0	3	12	41	27	3	1	0	0	0	0	0	0	87	38
17:00	1	1	5	24	35	13	2	0	0	0	0	0	0	0	81	36
18:00	0	0	1	24	28	5	1	0	0	0	0	0	0	0	59	34
19:00	0	0	2	16	26	3	1	0	0	0	0	0	0	0	48	34
20:00	0	0	3	11	10	2	0	0	0	0	0	0	0	0	26	34
21:00	0	0	0	3	10	5	0	0	0	0	0	0	0	0	18	37
22:00	0	0	0	6	4	4	0	0	0	0	0	0	0	0	14	37
23:00	0	0	3	1	1	3	0	0	0	0	0	0	0	0	8	38

MDM Transportation Consultants, Inc.
28 Lord Road, Suite 280
Marlborough, MA, 01752

N/S: Center Bridge Road
South of Proposed Driveway Location
Lancaster, MA

Site Code: 1341
Station ID:
1341

Southbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent
02/01/24	0	0	4	3	1	1	0	0	0	0	0	0	0	0	9	33
01:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	44
02:00	0	1	0	0	1	0	0	0	0	0	0	0	0	0	2	33
03:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	34
04:00	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	29
05:00	0	0	0	1	6	4	1	0	0	0	0	0	0	0	12	38
06:00	1	1	3	10	24	15	2	0	0	0	0	0	0	0	56	37
07:00	2	1	1	18	64	36	7	1	0	0	0	0	0	0	130	38
08:00	0	0	2	27	52	26	8	1	0	0	0	0	0	0	116	38
09:00	1	0	5	24	35	15	1	0	0	0	0	0	0	0	81	36
10:00	2	1	2	17	26	21	2	0	1	0	0	0	0	0	72	38
11:00	0	0	5	14	26	12	2	0	0	0	0	0	0	0	59	37
12 PM	1	2	7	24	31	13	5	0	0	0	0	0	0	0	83	37
13:00	0	0	1	21	31	17	4	1	0	0	0	0	0	0	75	38
14:00	2	0	2	33	37	10	3	0	0	0	0	0	0	0	87	34
15:00	3	6	5	32	48	24	3	0	0	0	0	0	0	0	121	36
16:00	0	1	2	20	54	17	1	1	0	0	0	0	0	0	96	36
17:00	1	0	3	13	39	8	1	0	0	0	0	0	0	0	65	34
18:00	0	0	3	31	29	6	0	0	0	0	0	0	0	0	69	34
19:00	0	0	3	11	24	12	0	0	0	0	0	0	0	0	50	36
20:00	0	2	2	17	13	3	1	0	0	0	0	0	0	0	38	34
21:00	1	0	2	1	6	3	0	0	0	0	0	0	0	0	13	36
22:00	0	0	0	1	7	3	0	0	0	0	0	0	0	0	11	37
23:00	0	1	1	1	6	5	1	0	0	0	0	0	0	0	15	38

MDM Transportation Consultants, Inc.
28 Lord Road, Suite 280
Marlborough, MA, 01752

N/S: Center Bridge Road
South of Proposed Driveway Location
Lancaster, MA

Site Code: 1341
Station ID:
1341

Southbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent
02/02/24	0	0	1	1	2	1	1	0	0	0	0	0	0	0	6	40
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
02:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	24
03:00	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	34
04:00	0	0	2	2	0	0	0	0	0	0	0	0	0	0	4	28
05:00	0	0	0	2	4	2	0	0	0	0	0	0	0	0	8	37
06:00	0	0	7	14	22	4	0	0	0	0	0	0	0	0	47	34
07:00	2	0	6	21	48	27	6	0	3	0	0	0	0	0	113	38
08:00	0	2	4	25	48	26	12	1	0	0	0	0	0	0	118	39
09:00	1	2	3	9	28	20	2	0	0	0	0	0	0	0	65	38
10:00	0	2	0	16	20	16	1	0	0	0	0	0	0	0	55	37
11:00	2	4	13	23	32	23	3	0	0	0	0	0	0	0	100	37
12 PM	2	1	8	32	43	14	0	0	0	0	0	0	0	0	100	34
13:00	0	0	0	13	17	12	3	1	0	0	0	0	0	0	46	38
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

	15th Percentile :	26 MPH
	50th Percentile :	31 MPH
	85th Percentile :	37 MPH
	95th Percentile :	39 MPH
Statistics	10 MPH Pace Speed :	26-35 MPH
	Number in Pace :	1656
	Percent in Pace :	69.2%
	Number of Vehicles > 30 MPH :	1612
	Percent of Vehicles > 30 MPH :	67.3%
	Mean Speed(Average) :	32 MPH

MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA, 01752

E/W: Neck Road
East of Proposed Driveway Location
Lancaster, MA

Site Code: 1341
Station ID:
1341

Westbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent
01/31/24	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	0	0	2	6	1	1	0	0	0	0	0	0	0	0	10	32
16:00	1	1	4	2	3	1	0	0	0	0	0	0	0	0	12	33
17:00	0	5	1	3	2	0	0	0	0	0	0	0	0	0	11	30
18:00	0	1	2	1	0	0	0	0	0	0	0	0	0	0	4	27
19:00	0	1	2	1	0	0	0	0	0	0	0	0	0	0	4	27
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*

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28 Lord Road, Suite 280
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E/W: Neck Road
East of Proposed Driveway Location
Lancaster, MA

Site Code: 1341
Station ID:
1341

Westbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent
02/01/24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
04:00	0	0	1	2	0	0	0	0	0	0	0	0	0	0	3	28
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
06:00	0	1	1	2	1	1	0	0	0	0	0	0	0	0	6	35
07:00	0	2	3	5	3	1	0	0	0	0	0	0	0	0	14	33
08:00	0	1	4	1	1	0	0	0	0	0	0	0	0	0	7	29
09:00	0	0	0	6	0	0	0	0	0	0	0	0	0	0	6	29
10:00	1	1	5	2	1	0	0	0	0	0	0	0	0	0	10	28
11:00	1	2	2	5	0	0	0	0	0	0	0	0	0	0	10	28
12 PM	0	3	6	3	1	0	0	0	0	0	0	0	0	0	13	28
13:00	0	2	2	6	0	0	0	0	0	0	0	0	0	0	10	28
14:00	1	2	6	3	1	0	0	0	0	0	0	0	0	0	13	28
15:00	0	1	4	2	1	0	0	0	0	0	0	0	0	0	8	29
16:00	0	3	7	9	1	0	0	0	0	0	0	0	0	0	20	28
17:00	0	0	1	2	3	0	0	0	0	0	0	0	0	0	6	33
18:00	0	2	4	1	1	0	0	0	0	0	0	0	0	0	8	28
19:00	0	1	0	1	1	0	0	0	0	0	0	0	0	0	3	32
20:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	24
21:00	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3	24
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*

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Westbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent
02/02/24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
03:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	24
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
05:00	0	0	1	2	0	0	0	0	0	0	0	0	0	0	3	28
06:00	0	0	0	2	0	2	0	0	0	0	0	0	0	0	4	38
07:00	1	0	3	2	1	0	0	0	0	0	0	0	0	0	7	29
08:00	0	2	3	2	2	1	0	0	0	0	0	0	0	0	10	33
09:00	0	1	1	1	1	0	0	0	0	0	0	0	0	0	4	32
10:00	1	3	0	2	3	0	0	0	0	0	0	0	0	0	9	32
11:00	0	1	1	3	2	0	0	0	0	0	0	0	0	0	7	32
12 PM	1	2	3	3	0	0	0	0	0	0	0	0	0	0	9	27
13:00	0	0	2	2	1	0	0	0	0	0	0	0	0	0	5	31
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

	15th Percentile :	18 MPH
	50th Percentile :	24 MPH
	85th Percentile :	30 MPH
	95th Percentile :	34 MPH
Statistics	10 MPH Pace Speed :	21-30 MPH
	Number in Pace :	158
	Percent in Pace :	65.6%
	Number of Vehicles > 25 MPH :	120
	Percent of Vehicles > 25 MPH :	49.8%
	Mean Speed(Average) :	25 MPH

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Eastbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent
01/31/24	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	0	0	1	5	0	0	0	0	0	0	0	0	0	0	6	29
16:00	1	0	2	3	2	0	0	0	0	0	0	0	0	0	8	32
17:00	0	1	5	4	3	0	0	0	0	0	0	0	0	0	13	31
18:00	0	1	2	3	1	1	0	0	0	0	0	0	0	0	8	33
19:00	0	1	3	2	1	0	0	0	0	0	0	0	0	0	7	29
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
21:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	24
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*

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Eastbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent
02/01/24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
04:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	34
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
06:00	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	29
07:00	0	1	4	2	1	0	1	0	0	0	0	0	0	0	9	33
08:00	0	1	1	2	0	0	0	0	0	0	0	0	0	0	4	28
09:00	0	2	0	2	1	0	0	0	0	0	0	0	0	0	5	31
10:00	0	1	3	1	0	0	0	0	0	0	0	0	0	0	5	26
11:00	2	3	4	0	1	0	0	0	0	0	0	0	0	0	10	24
12 PM	0	5	4	3	2	0	0	0	0	0	0	0	0	0	14	29
13:00	0	1	2	4	2	1	0	0	0	0	0	0	0	0	10	33
14:00	1	0	2	2	1	0	0	0	0	0	0	0	0	0	6	30
15:00	0	1	3	4	1	0	0	0	0	0	0	0	0	0	9	29
16:00	0	1	3	2	1	0	0	0	0	0	0	0	0	0	7	29
17:00	0	1	3	4	0	0	0	0	0	0	0	0	0	0	8	28
18:00	0	1	4	6	0	0	0	0	0	0	0	0	0	0	11	28
19:00	0	1	2	1	0	0	0	0	0	0	0	0	0	0	4	27
20:00	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	24
21:00	0	0	1	2	0	0	0	0	0	0	0	0	0	0	3	28
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
23:00	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	29

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Site Code: 1341
Station ID:
1341

Eastbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	85th Percent
02/02/24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
03:00	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	29
04:00	0	0	0	1	0	1	0	0	0	0	0	0	0	0	2	38
05:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	19
06:00	0	0	1	2	0	0	0	0	0	0	0	0	0	0	3	28
07:00	0	2	2	0	1	1	0	0	0	0	0	0	0	0	6	35
08:00	0	0	0	2	3	0	0	0	0	0	0	0	0	0	5	33
09:00	1	2	1	2	0	0	0	0	0	0	0	0	0	0	6	27
10:00	0	3	1	4	0	0	0	0	0	0	0	0	0	0	8	28
11:00	1	1	2	2	0	0	0	0	0	0	0	0	0	0	6	27
12 PM	1	0	2	7	1	0	0	0	0	0	0	0	0	0	11	29
13:00	0	2	2	5	3	0	0	0	0	0	0	0	0	0	12	32
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

	15th Percentile :	18 MPH
	50th Percentile :	25 MPH
	85th Percentile :	29 MPH
	95th Percentile :	33 MPH
Statistics	10 MPH Pace Speed :	21-30 MPH
	Number in Pace :	143
	Percent in Pace :	66.8%
	Number of Vehicles > 25 MPH :	111
	Percent of Vehicles > 25 MPH :	51.9%
	Mean Speed(Average) :	25 MPH

- Sight Line Analysis

Stopping Sight Distance - Posted Travel Speed

Center Bridge Road

		SPEED (MPH)	BRAKE REACTION DISTANCE (FT)	BRAKING DISTANCE (FT)	CALCULATED STOPPING SIGHT DISTANCE (FT)
Direction 1	NB	30	110.25	86.3	196.5
Direction 2	SB	30	110.25	86.3	196.5

INPUTS	Direction 1	Direction 2
Travel Direction	NB	SB
Speed	30	30
Grade	0	0
t	2.5	2.5
a	11.2	11.2

Stopping Sight Distance (SSD) - Source: AASHTO

SSD = Reaction Distance + Brake Distance

Reaction Distance = 1.47 x t x V

Brake Distance = V^2 / (30 x ((a/32.2)+G))

Where:
t = reaction time (sec)
V = travel speed (mph)
G= roadway grade
a - deceleration rate (ft/sec^2)

Stopping Sight Distance - 85th Percentile Travel Speed

Center Bridge Road

		SPEED (MPH)	BRAKE REACTION DISTANCE (FT)	BRAKING DISTANCE (FT)	CALCULATED STOPPING SIGHT DISTANCE (FT)
Direction 1	NB	35	128.625	117.4	246.0
Direction 2	SB	37	135.975	131.2	267.2

INPUTS	Direction 1	Direction 2
Travel Direction	NB	SB
Speed	35	37
Grade	0	0
t	2.5	2.5
a	11.2	11.2

Stopping Sight Distance (SSD) - Source: AASHTO

SSD = Reaction Distance + Brake Distance

Reaction Distance = 1.47 x t x V

Brake Distance = V^2 / (30 x ((a/32.2)+G))

Where:
t = reaction time (sec)
V = travel speed (mph)
G= roadway grade
a - deceleration rate (ft/sec^2)

Stopping Sight Distance - Posted Travel Speed

Neck Road

		SPEED (MPH)	BRAKE REACTION DISTANCE (FT)	BRAKING DISTANCE (FT)	CALCULATED STOPPING SIGHT DISTANCE (FT)
Direction 1	EB	15	55.125	21.6	76.7
Direction 2	WB	30	110.25	86.3	196.5

INPUTS	Direction 1	Direction 2
Travel Direction	EB	WB
Speed	15	30
Grade	0	0
t	2.5	2.5
a	11.2	11.2

Stopping Sight Distance (SSD) - Source: AASHTO

SSD = Reaction Distance + Brake Distance

Reaction Distance = 1.47 x t x V

Brake Distance = V^2 / (30 x ((a/32.2)+G))

Where:
t = reaction time (sec)
V = travel speed (mph)
G= roadway grade
a - deceleration rate (ft/sec^2)

Stopping Sight Distance - 50th Percentile Travel Speed

Neck Road

		SPEED (MPH)	BRAKE REACTION DISTANCE (FT)	BRAKING DISTANCE (FT)	CALCULATED STOPPING SIGHT DISTANCE (FT)
Direction 1	EB	15	55.125	21.6	76.7
Direction 2	WB	30	110.25	86.3	196.5

INPUTS	Direction 1	Direction 2
Travel Direction	EB	WB
Speed	15	30
Grade	0	0
t	2.5	2.5
a	11.2	11.2

Stopping Sight Distance (SSD) - Source: AASHTO

SSD = Reaction Distance + Brake Distance

Reaction Distance = 1.47 x t x V

Brake Distance = V^2 / (30 x ((a/32.2)+G))

Where:
t = reaction time (sec)
V = travel speed (mph)
G= roadway grade
a - deceleration rate (ft/sec^2)

Intersection Sight Distance Calculations

Source: *A Policy on Geometric Design of Highways and Street, 6th Edition;* AASHTO; 2011.

Passenger Car
ISD = 1.47 * V * t

V = speed
t = time gap

t = 7.5 s for a passenger car for Left Turn from a Stop
t = 6.5 s for a passenger car for Right Turn from a Stop

Center Bridge Road

		Average Speed		Ideal ISD	SAY
Looking North (left-turn from a stop)	ISD = 1.47*	30	* 7.5 =	330.75	**335 feet**
Looking South (right-turn from a stop)	ISD = 1.47*	30	* 6.5 =	286.65	**290 feet**

Neck Road

		Average Speed		Ideal ISD	SAY
Looking East (left-turn from a stop)	ISD = 1.47*	30	* 7.5 =	330.75	**335 feet**
Looking West (right-turn from a stop)	ISD = 1.47*	15	* 6.5 =	143.325	**145 feet**

- Crash Data

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Lancater, MA COUNT DATE : Feb-24

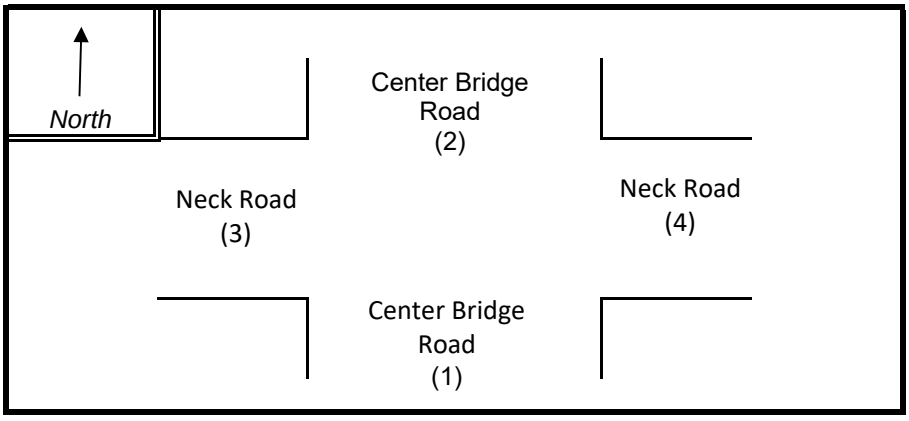
DISTRICT : 3 UNSIGNALIZED : X SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Center Bridge Road

MINOR STREET(S) : Neck Road

INTERSECTION DIAGRAM (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NB	SB	EB	WB		
PEAK HOURLY VOLUMES (PM) :	83	78	13	21		195

" K " FACTOR : 0.080

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : 2,438

TOTAL # OF CRASHES : 4

OF YEARS : 5

AVERAGE # OF CRASHES PER YEAR (**A**) : 0.80

CRASH RATE CALCULATION : 0.90

RATE = $\frac{(A * 1{,}000{,}000)}{(V * 365)}$

Comments : MassDOT District 4 Avg: Signalized = 0.73; Unsignalized = 0.57

Project Title & Date: 1304 - Danvers

Crash Number	Crash Date	Crash Severity	Crash Time	Number of Vehicles	Light Conditions	Manner of Collision	Road Surface Condition	Total Fatalities	Total Non-Fatal Injuries	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Configuration (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Most Harmful Event (All Vehicles)	X	Y	Roadway
4894975	10/26/2020	Property damage only (none injured)	3:16 PM	2	Daylight	Angle	Wet	0	0	V1: Travelling straight ahead / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: S / V2: W	Cloudy	V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic)	185791.6876	911364.8125	CENTER BRIDGE ROAD / NECK RD
5001354	07/07/2021	Non-fatal injury	8:43 AM	2	Daylight	Angle	Dry	0	1	V1: Travelling straight ahead / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: S / V2: W	Clear	V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic)	185791.6876	911364.8125	NECK RD / CENTER BRIDGE ROAD
5181946	11/22/2022	Property damage only (none injured)	1:19 PM	2	Daylight	Angle	Dry	0	0	V1: Travelling straight ahead / V2: Entering traffic lane	V1:(Passenger car) / V2:(Passenger car)	V1: S / V2: W	Clear	V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic)	185791.6876	911364.8125	CENTER BRIDGE ROAD / NECK RD
5262291	05/06/2023	Property damage only (none injured)	8:53 AM	2	Daylight	Angle	Dry	0	0	V1: Travelling straight ahead / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: E / V2: N	Clear	V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic)	185791.6876	911364.8125	CENTER BRIDGE ROAD Rte / NECK RD Rte

- Census Data

Means of Transportation to Work by Vehicles Available

United States Census Bureau

Note: The table shown may have bee	
DATA NOTES	
TABLE ID:	B08141
SURVEY/PROGRAM:	American Community Survey
VINTAGE:	2022
DATASET:	ACSDT5Y2022
PRODUCT:	ACS 5-Year Estimates Detailed Tables
UNIVERSE:	Workers 16 years and over in households
MLA:	U.S. Census Bureau. "Means of Transportation to Work by Vehicles Available." American Community Survey, ACS 5-Year Estimates Detailed Tables, Table B08141, 2022,
FTP URL:	None
API URL:	https://api.census.gov/data/2022/acs/acs5
USER SELECTIONS	
TOPICS	Transportation
GEOS	Census Tract 7131; Worcester County; Massachusetts

	Census Tract 7131; Worcester County; Massachusetts		
Label	**Estimate**	**Margin of Error**	
Total:	3,851	±479	
Car, truck, or van - drove alone:	2,189	±449	57%
Car, truck, or van - carpooled:	90	±77	2%
Public transportation (excluding taxicab):	38	±46	1%
Walked:	55	±59	1%
Taxicab, motorcycle, bicycle, or other means:	213	±146	6%
Worked from home:	1,266	±393	33%

- Trip Generation

Institute of Transportation Engineers (ITE) 11th Edition
Land Use Code (LUC) 220 - Multifamily Housing (Low-Rise)

Average Vehicle Trips Ends vs: Dwelling Units
Independent Variable (X): 11

AVERAGE WEEKDAY DAILY

T = 6.74 * X
T = 6.74 * 11
T = 74.14
T = 74 vehicle trips
with 50% (**37** vpd) entering and 50% (**37** vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 0.40 * X
T = 0.40 * 11
T = 4.40
T = 4 vehicle trips
with 23% (**1** vph) entering and 77% (**3** vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 0.51 * X
T = 0.51 * 11
T = 5.61
T = 6 vehicle trips
with 63% (**4** vph) entering and 37% (**2** vph) exiting.

SATURDAY DAILY

T = 4.55 * X
T = 4.55 * 11
T = 50.05
T = 50 vehicle trips
with 50% (**25** vpd) entering and 50% (**25** vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

T = 0.41 * X
T = 0.41 * 11
T = 4.51
T = 5 vehicle trips
with 49% (**2** vph) entering and 51% (**3** vph) exiting.

- Trip Distribution

Journey-to-Work Distribution

US Census Journey-to-Work Data

Residence Town Name	Workplace Town Name	All Workers	% of Total Rounded
Lancaster town	Clinton town	517	13.8%
Lancaster town	Lancaster town	496	13.2%
Lancaster town	Leominster city	300	8.0%
Lancaster town	Bolton town	228	6.1%
Lancaster town	Worcester city	183	4.9%
Lancaster town	Marlborough city	177	4.7%
Lancaster town	Westborough town	162	4.3%
Lancaster town	Boston city	152	4.1%
Lancaster town	Acton town	108	2.9%
Lancaster town	Harvard town	89	2.4%
Lancaster town	Fitchburg city	88	2.3%
Lancaster town	Wellesley town	70	1.9%
Lancaster town	Concord town	61	1.6%
Lancaster town	Newton city	52	1.4%
Lancaster town	Framingham town	51	1.4%
Lancaster town	Southborough town	50	1.3%
Lancaster town	Waltham city	49	1.3%
Lancaster town	West Boylston town	49	1.3%
Lancaster town	Natick town	45	1.2%
Lancaster town	Holyoke city	43	1.1%
Lancaster town	Hudson town	42	1.1%
Lancaster town	Bellingham town	41	1.1%
Lancaster town	Danvers town	40	1.1%
Lancaster town	Ayer town	39	1.0%
Lancaster town	Billerica town	37	1.0%
Lancaster town	Sudbury town	32	0.9%
Lancaster town	Auburn town	31	0.8%
Lancaster town	Northborough town	30	0.8%
Lancaster town	Shirley town	29	0.8%
Lancaster town	Shrewsbury town	28	0.7%
Lancaster town	Milford town	27	0.7%
Lancaster town	Andover town	24	0.6%
Lancaster town	Westford town	24	0.6%
Lancaster town	Franklin Town city	24	0.6%
Lancaster town	Oxford town	23	0.6%
Lancaster town	Boylston town	21	0.6%
Lancaster town	Somerville city	19	0.5%
Lancaster town	Spencer town	17	0.5%
Lancaster town	Westminster town	17	0.5%
	Sub-Total	**3,515**	**94%**
	Other	237	6%
	Total	**3,752**	**100%**

	To/From Routes								
	Route 70		Center Bridge Road		Neck Road		Route 70		
Workplace	(To/From North)		(To/From South)		(To/From East)		(To/From West)		Total
Clinton town		0.0%	50%	6.9%		0.0%	50%	6.9%	13.8%
Lancaster town	85%	11.2%	5%	0.7%	5%	0.7%	5%	0.7%	13.2%
Leominster city	100%	8.0%		0.0%		0.0%		0.0%	8.0%
Bolton town		0.0%	80%	4.9%	20%	1.2%		0.0%	6.1%
Worcester city		0.0%	25%	1.2%		0.0%	75%	3.7%	4.9%
Marlborough city		0.0%	100%	4.7%		0.0%		0.0%	4.7%
Westborough town		0.0%	100%	4.3%		0.0%		0.0%	4.3%
Boston city		0.0%	100%	4.1%		0.0%		0.0%	4.1%
Acton town	25%	0.7%	75%	2.2%		0.0%		0.0%	2.9%
Harvard town		0.0%	50%	1.2%	50%	1.2%		0.0%	2.4%
Fitchburg city	100%	2.3%		0.0%		0.0%		0.0%	2.3%
Wellesley town		0.0%	100%	1.9%		0.0%		0.0%	1.9%
Concord town	25%	0.4%	75%	1.2%		0.0%		0.0%	1.6%
Newton city		0.0%	100%	1.4%		0.0%		0.0%	1.4%
Framingham town		0.0%	100%	1.4%		0.0%		0.0%	1.4%
Southborough town		0.0%	100%	1.3%		0.0%		0.0%	1.3%
Waltham city	25%	0.3%	75%	1.0%		0.0%		0.0%	1.3%
West Boylston town		0.0%		0.0%		0.0%	100%	1.3%	1.3%
Natick town		0.0%	100%	1.2%		0.0%		0.0%	1.2%
Holyoke city		0.0%		0.0%		0.0%	100%	1.1%	1.1%
Hudson town		0.0%	100%	1.1%		0.0%		0.0%	1.1%
Bellingham town		0.0%	100%	1.1%		0.0%		0.0%	1.1%
Danvers town		0.0%	100%	1.1%		0.0%		0.0%	1.1%
Ayer town	75%	0.8%	20%	0.2%	5%	0.1%		0.0%	1.0%
Billerica town	25%	0.2%	75%	0.7%		0.0%		0.0%	1.0%
Sudbury town		0.0%	100%	0.9%		0.0%		0.0%	0.9%
Auburn town		0.0%		0.0%		0.0%	100%	0.8%	0.8%
Northborough town		0.0%	100%	0.8%		0.0%		0.0%	0.8%
Shirley town	100%	0.8%		0.0%		0.0%		0.0%	0.8%
Shrewsbury town		0.0%	100%	0.7%		0.0%		0.0%	0.7%
Milford town		0.0%	100%	0.7%		0.0%		0.0%	0.7%
Andover town	25%	0.2%	75%	0.5%		0.0%		0.0%	0.6%
Westford town	25%	0.2%	75%	0.5%		0.0%		0.0%	0.6%
Franklin Town city		0.0%	100%	0.6%		0.0%		0.0%	0.6%
Oxford town		0.0%		0.0%		0.0%	100%	0.6%	0.6%
Boylston town		0.0%	50%	0.3%		0.0%	50%	0.3%	0.6%
Somerville city	25%	0.1%	75%	0.4%		0.0%		0.0%	0.5%
Spencer town		0.0%		0.0%		0.0%	100%	0.5%	0.5%
Westminster town	100%	0.5%		0.0%		0.0%		0.0%	0.5%
Sub-Total		25.7%		49.0%		3.1%		15.8%	93.7%
Other		1.7%		3.3%		0.2%		1.1%	6.3%
Total		27.5%		52.3%		3.3%		16.9%	100.0%
SAY		30%		50%		5%		15%	100%

- Parking Analysis

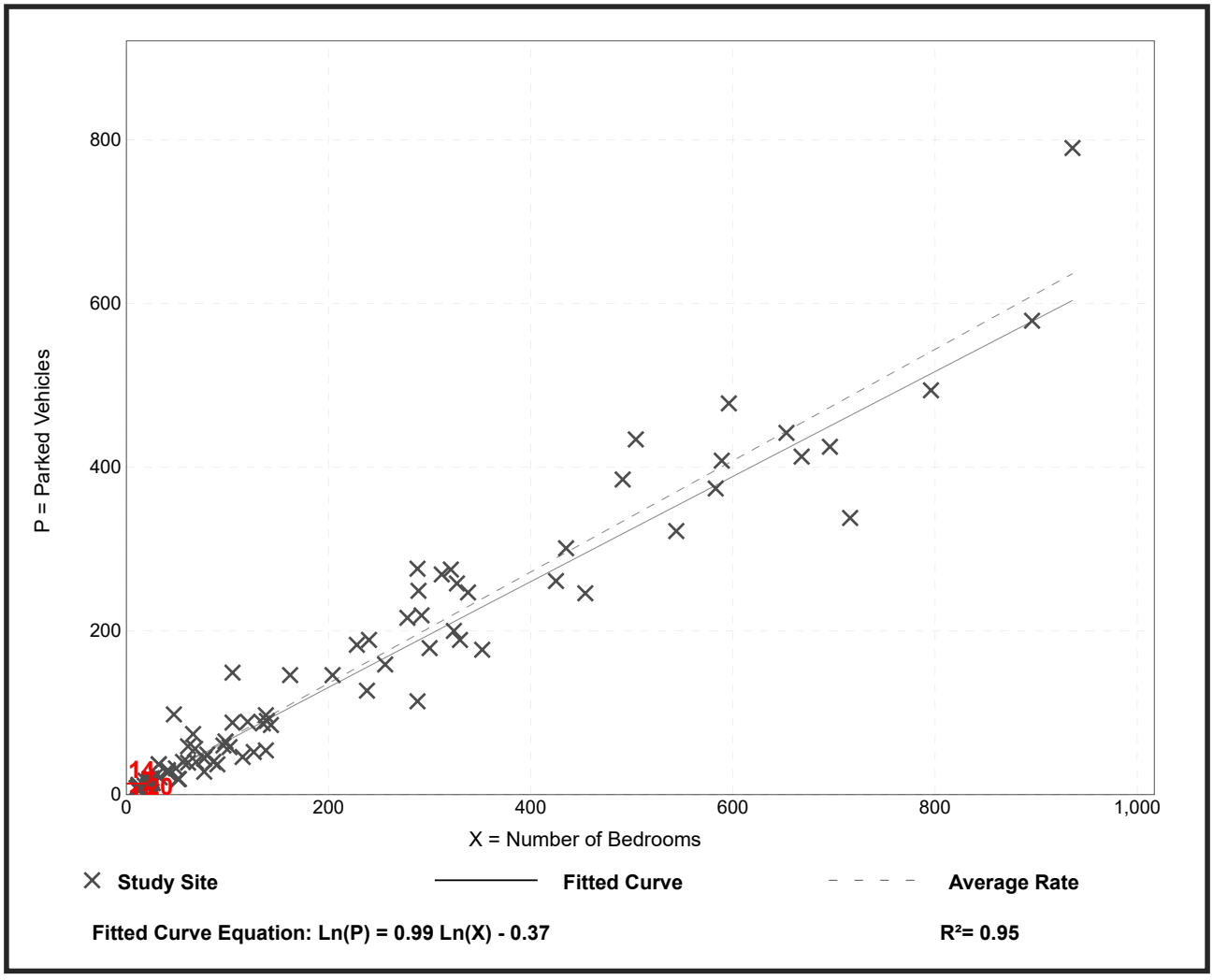
Multifamily Housing - 2+ BR (Low-Rise) - Not Close to Rail Transit
(220)

Peak Period Parking Demand vs: **Bedrooms**
On a: **Weekday (Monday - Friday)**
Setting/Location: **General Urban/Suburban**
Number of Studies: 97
Avg. Num. of Bedrooms: 192

Peak Period Parking Demand per Bedroom

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
0.68	0.36 - 2.09	0.61 / 0.86	0.65 - 0.71	0.16 (24%)

Data Plot and Equation



Car & Garage Count based on site visit and surface car counts between 4:45am & 6:00am on Thursday March 7th, 2013
03.07.13

Source: Thorndike Development

Development	City / Town	# Units	# Beds (Approx.)	# Garages (Attached & Detached)/1	Peak # Cars (Surface)	Total # Garages + Peak Car Count	Per Unit	Per Bed
West Village	Mansfield	204	333	62	221	283	1.39	0.85
Lodge at Foxborough	Foxborough	250	387	122	258	380	1.52	0.98
Chestnut Farms	Raynham	240	456	72	297	369	1.54	0.81
Average:		231	392	85	259	344	1.48	0.88

Notes:

1/ Access to garages was restricted; as a conservative measure, all garage units assumed to be fully occupied at time of counts

Concord Mews Observations

Table A1
Concord Mews Parking Accumulation

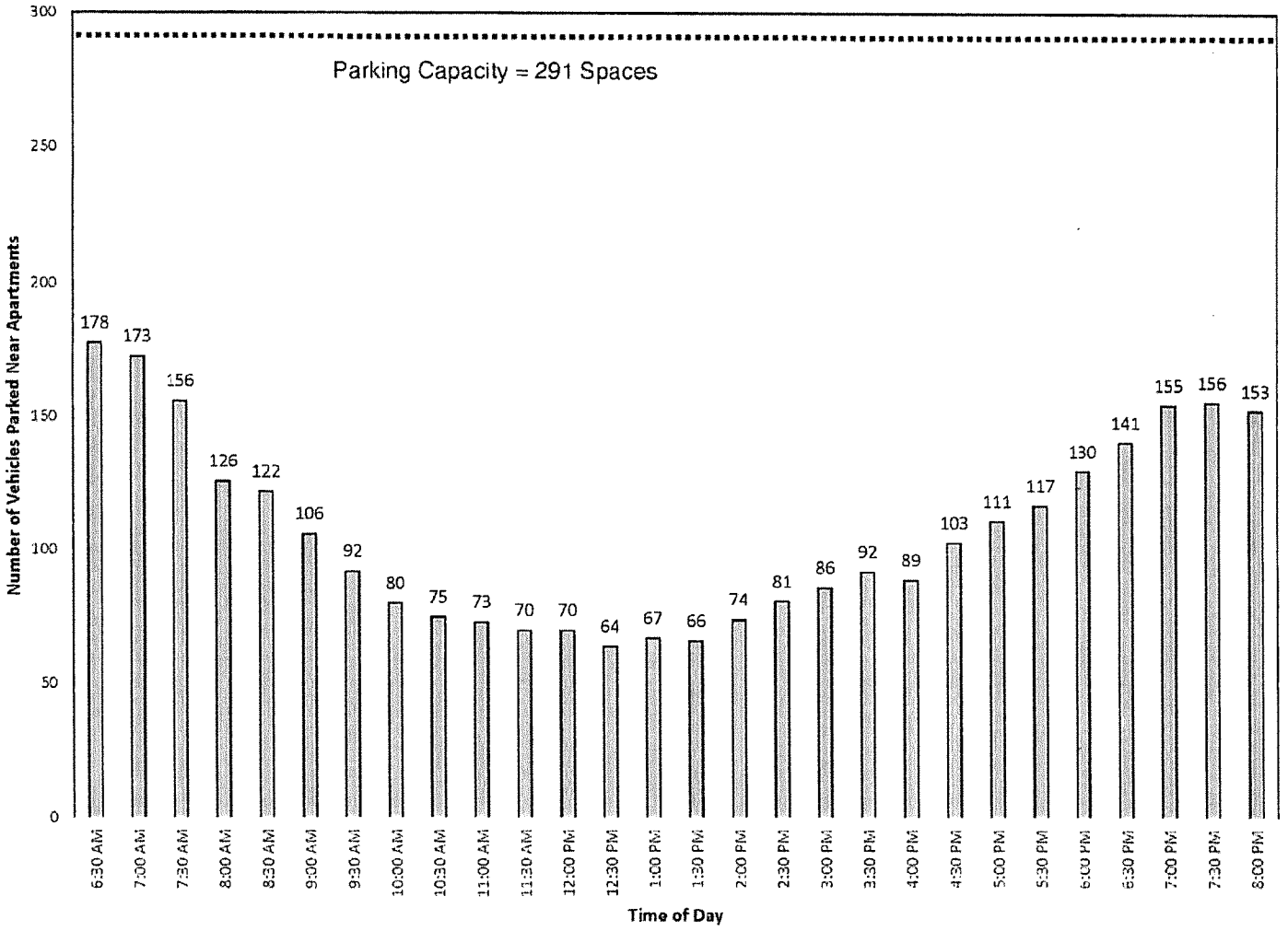
Parking Type	Parking Supply	# Occupied Spaces[1]	% Occupied
Surface Spaces	452	327	72%
Garage Spaces	124	124[2]	100%
Tandem Spaces	124	53	43%
Total	700	504	72%

[1]Observations conducted at 350-unit Concord Mews at full occupancy in Concord, MA on September 3, 2014 at approximately 10 PM.

[2]As a conservative measure, it was assumed that all garage spaces were occupied.

Parking Ratio Calculations:

Peak Parking Demand Ratio = 504 occupied spaces/350 units = 1.44 occupied spaces/unit

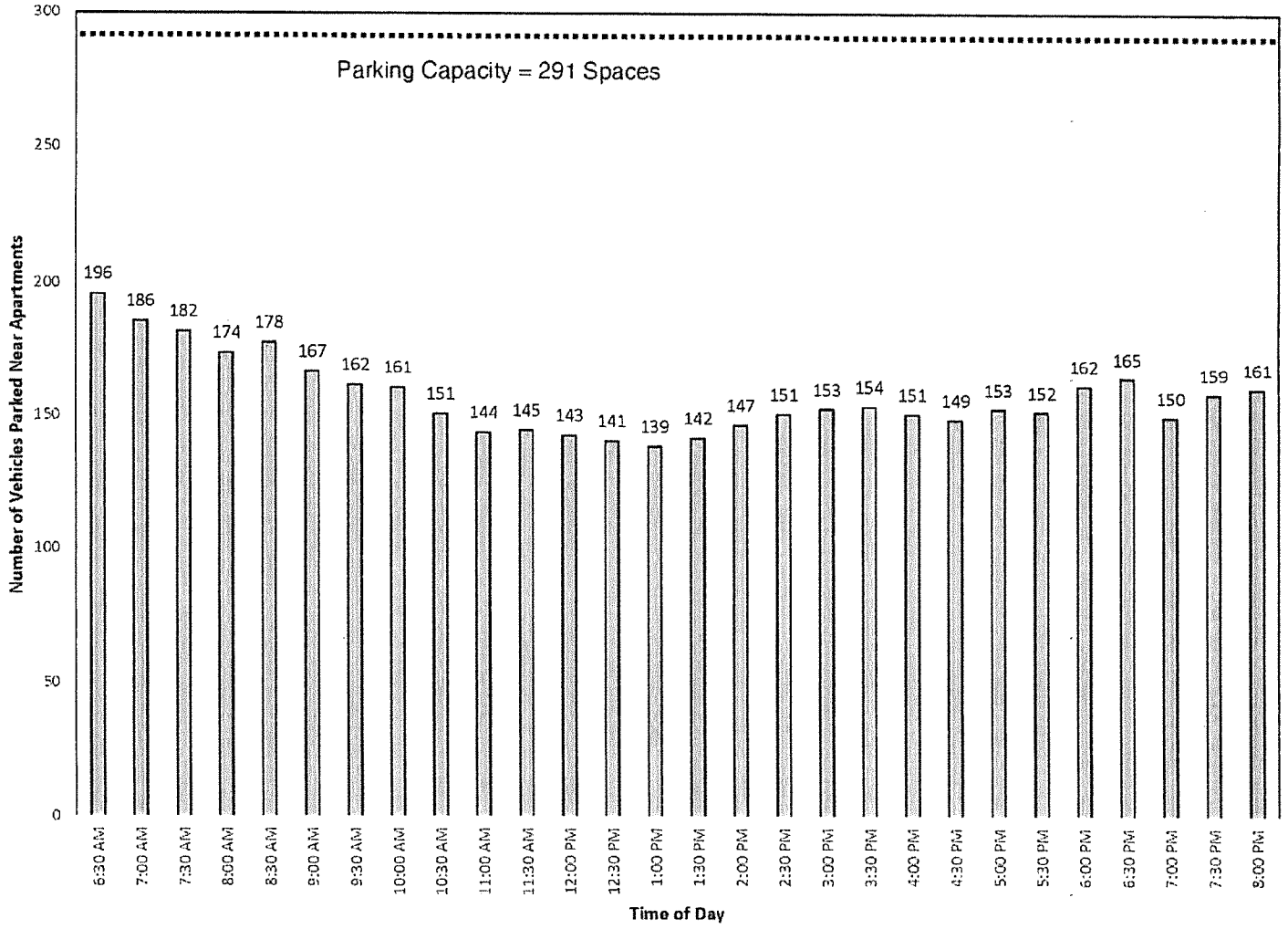


MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

Attachments

Weekday Parking Demand
(Existing Cloverleaf Apartments - 183 Units)

Date: November 2017
Dwg No. 932 MR02.dwg

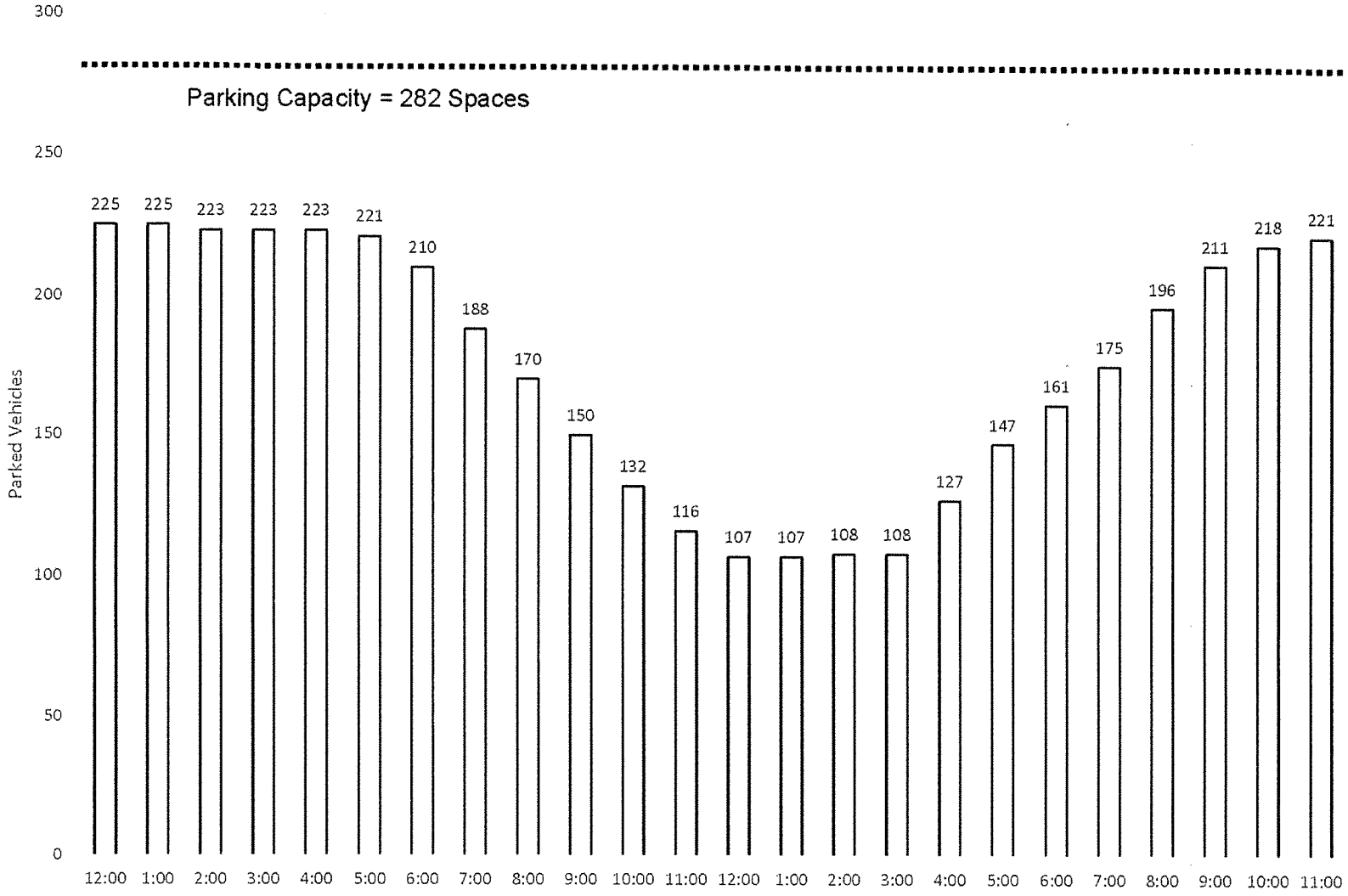


MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

Attachments

Saturday Parking Demand
(Existing Cloverleaf Apartments - 183 Units)

Date: November 2017
Dwg No. 932 MR02.dwg

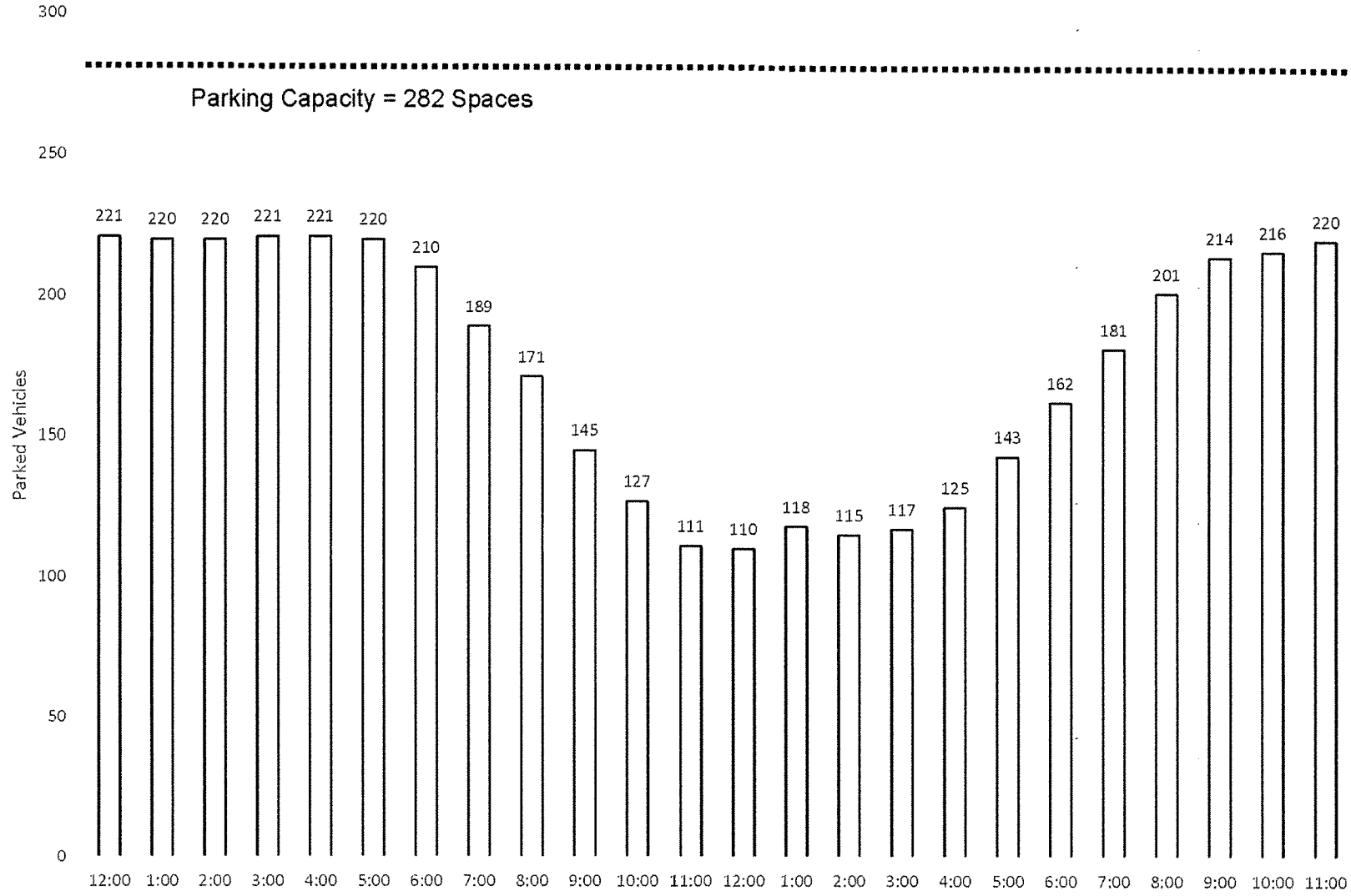


MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

Attachment

Hourly Weekday Demand
Wednesday, May 15, 2019
(Chapel Hill East - 1500 Worcester Road)

Date: May 2019
Dwg No. 1036 MR01.dwg

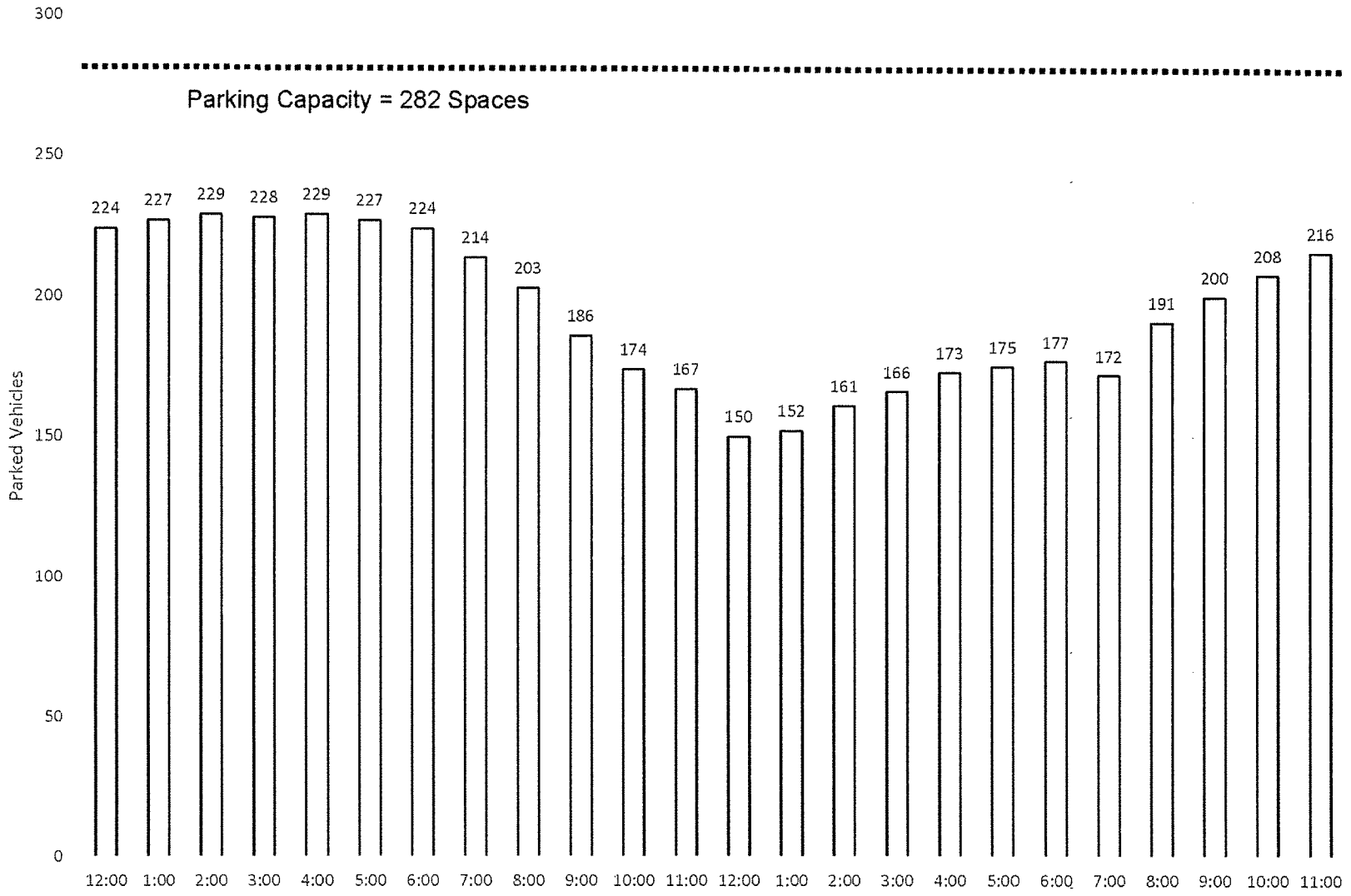


MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

Attachment

Hourly Weekday Demand
Thursday, May 16, 2019
(Chapel Hill East - 1500 Worcester Road)

Date: May 2019
Dwg No. 1036 MR01.dwg

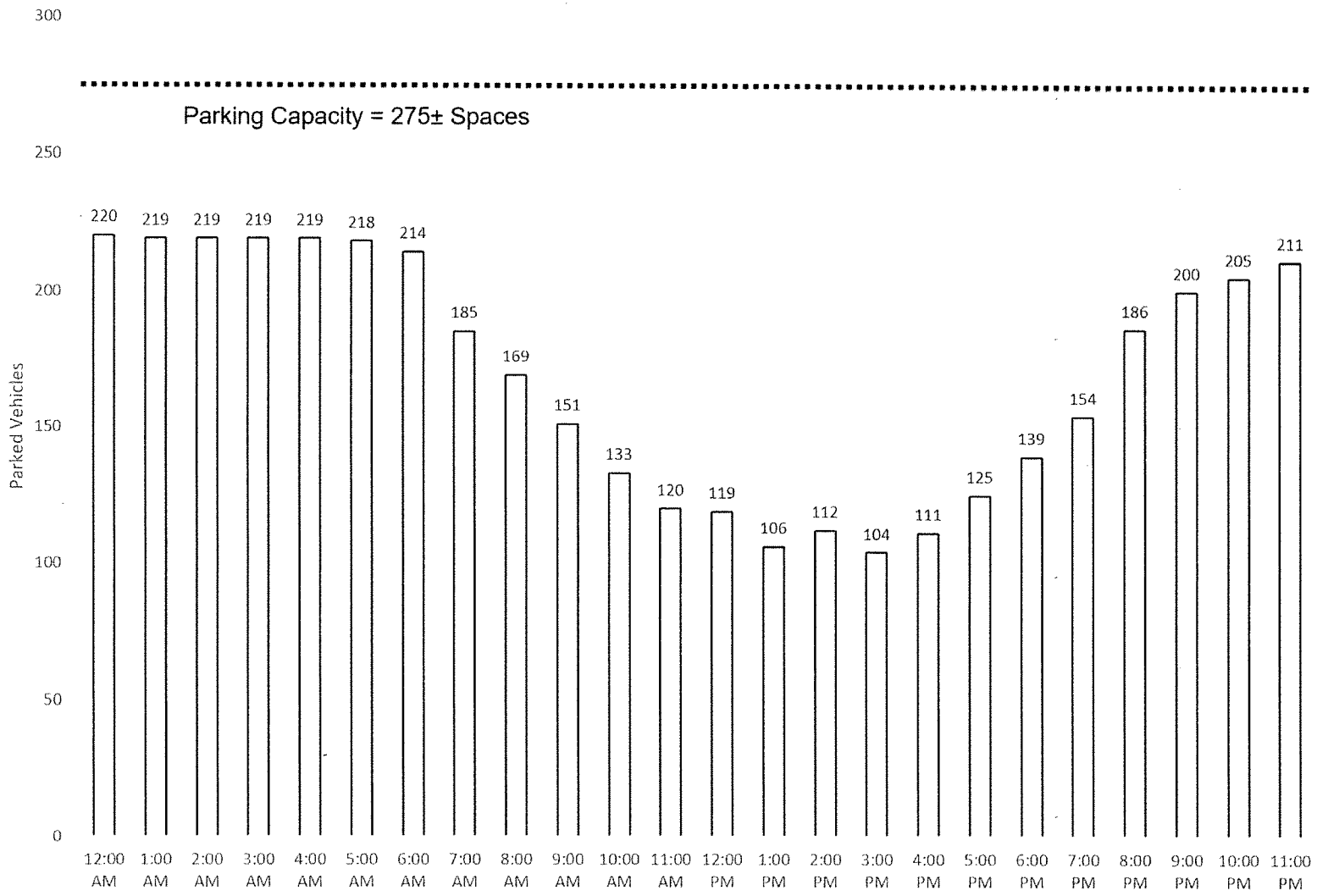


Attachment

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

Hourly Weekday Demand
Saturday, May 18, 2019
(Chapel Hill East - 1500 Worcester Road)

Date: May 2019
Dwg No. 1036 MR01.dwg



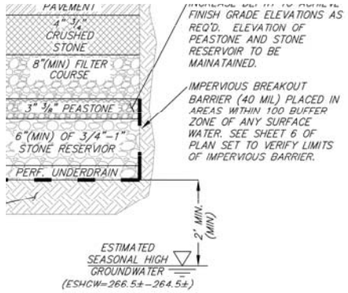
Attachment

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

Hourly Weekday Demand
Wednesday, May 15, 2019
(Chapel Hill West - 1550 Worcester Road)

Date: May 2019
Dwg No. 1036 MR01.dwg

□ AutoTURN® Analysis



L POROUS PAVEMENT

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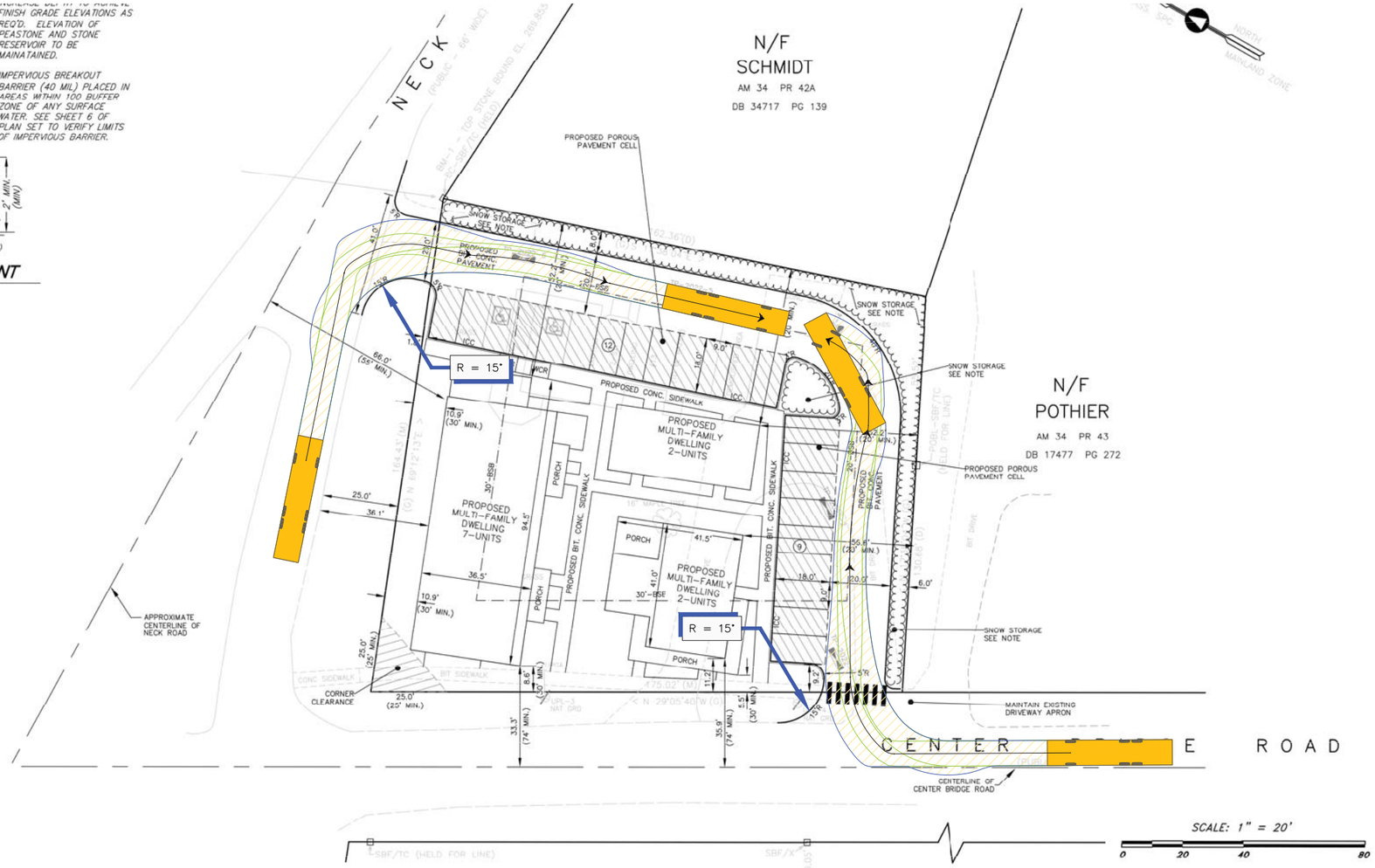

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34 CHELMSFORD STREET
VOICE (978) 244-011
WWW.HANCOCK

NO.	BY	APP	DATE	IS
6	RT	JP	2/20/24	
5	RT	JP	1/18/24	
4	RT	JP	10/9/23	N
3	RT	JP	9/22/23	R
2	RT	JP	4/19/23	R
1	RT	JP	11/15/22	R

DATE: 6/24/22
SCALE: AS SHOWN
CHECK BY: JP

LAYOU
MATERIA

DWG: 24939-eng.dwg
LAYOUT: LM
SHEET: 3 OF 5
JOB NO.: 24939

NOTES

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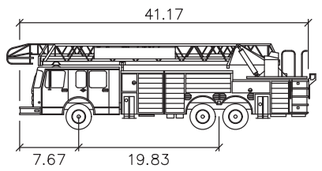
3. PROPERTY LINES AND ACCESS LINE LOCATIONS ARE APPROXIMATE ONLY AND ARE SUBJECT TO DEED AND TITLE RECORDS.
4. BASE PLAN SOURCE: HANCOCK ASSOCIATES.



Lancaster KME 109' RMA

	feet
Width	: 8.33
Track	: 8.33
Lock to Lock Time	: 6.0
Steering Angle	: 40.6

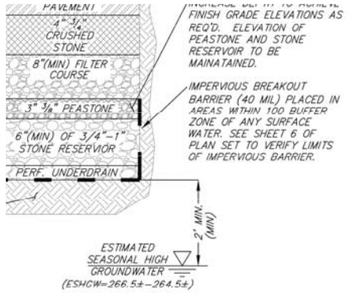
SCALE
0 10 20 40 60 FEET

AutoTurn Analysis - Fire Truck

AutoTurn Analysis
13 NECK ROAD
LANCASTER, MASSACHUSETTS
PREPARED FOR:
NECK FARM, LLC
66 WEST STREET, SUITE 1F
LEOMINSTER, MA 01453

MDM TRANSPORTATION CONSULTANTS, INC.
PLANNERS & ENGINEERS
28 Lord Road, Suite 280
Marlborough, MA 01752
Tel: (508) 303-0370
Fax: (508) 303-0371

DATE: February 2024	File: 1341 Autoturn.dwg	
PROJECT No. 1341	Scale: As Noted	Sheet 1 of 1



L POROUS PAVEMENT

SS SECTION

57
NSION JOINT EVERY 50 LF.

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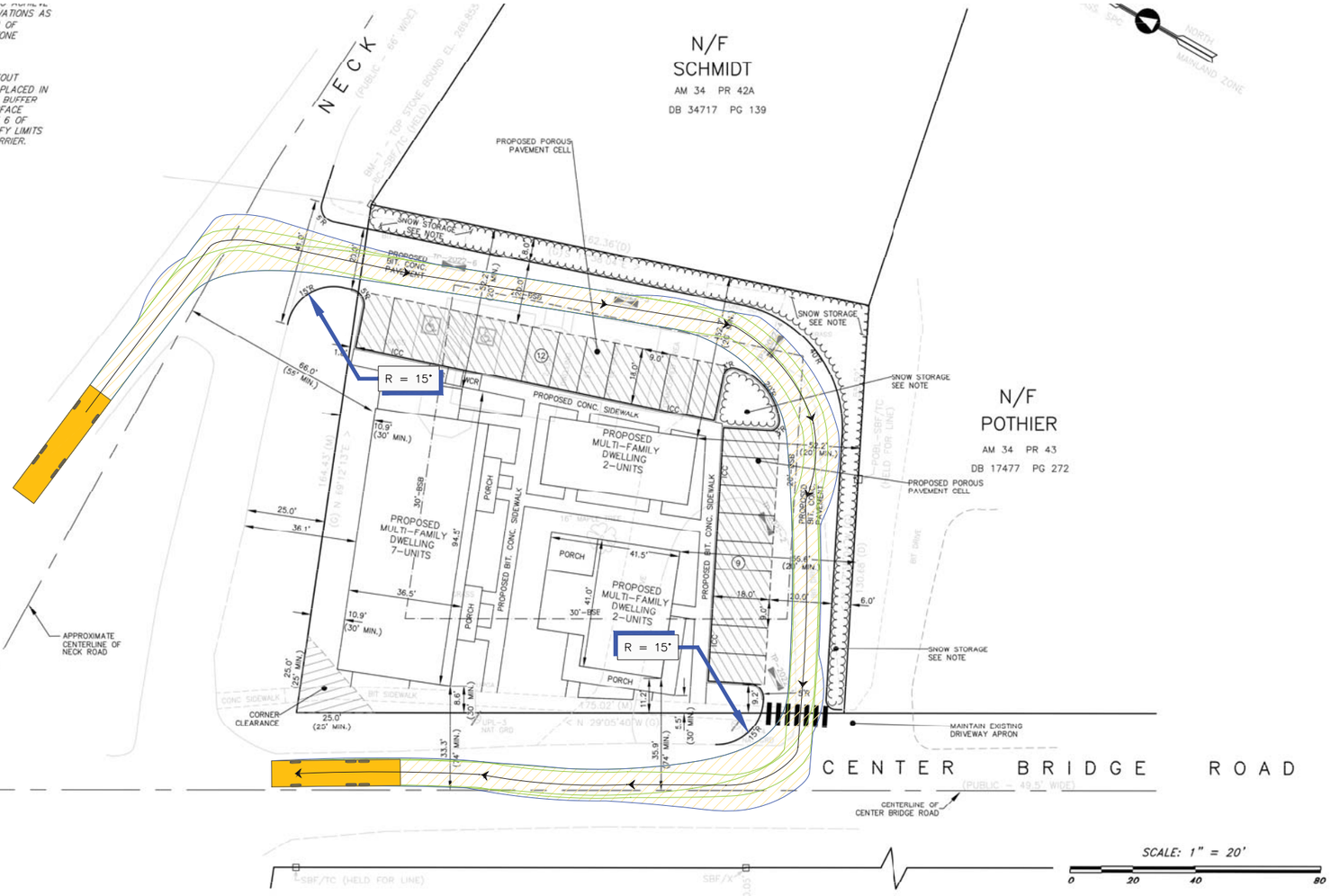

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34 CHELMSFORD STREET
VOICE (978) 244-011
WWW.HANCOCK

NO.	BY	APP	DATE	IS
6	RT	JP	2/20/24	
5	RT	JP	1/18/24	
4	RT	JP	10/9/23	N
3	RT	JP	9/22/23	R
2	RT	JP	4/19/23	R
1	RT	JP	11/15/22	R

DATE: 6/24/22
SCALE: AS SHOWN
CHECK BY: JP

LAYOU
MATERIA

DWG: 24939-eng.dwg
LAYOUT: LM
SHEET: 3 OF 5
JOB NO.: 24939

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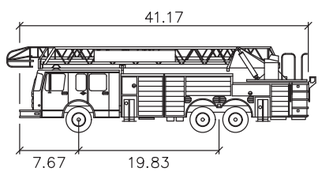

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Lock to Lock Time	: 6.0
Steering Angle	: 40.6

SCALE
0 10 20 40 60 FEET

AutoTurn Analysis - Fire Truck

AutoTurn Analysis
13 NECK ROAD
LANCASTER, MASSACHUSETTS
PREPARED FOR:
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66 WEST STREET, SUITE 1F
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DATE: February 2024	File: 1341 Autoturn.dwg	
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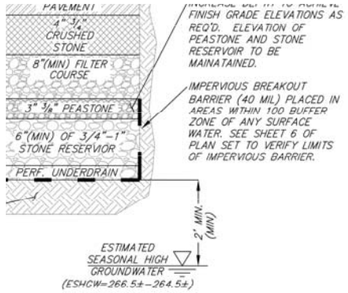

FINISH GRADE ELEVATIONS AS REQ'D. ELEVATION OF PEASTONE AND STONE RESERVOIR TO BE MAINATAINED.

IMPERVIOUS BREAKOUT BARRIER (40 MIL) PLACED IN AREAS WITHIN 100 BUFFER ZONE OF ANY SURFACE WATER. SEE SHEET 6 OF PLAN SET TO VERIFY LIMITS OF IMPERVIOUS BARRIER.

L POROUS PAVEMENT

SS SECTION

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NSION JOINT EVERY 50 LF.

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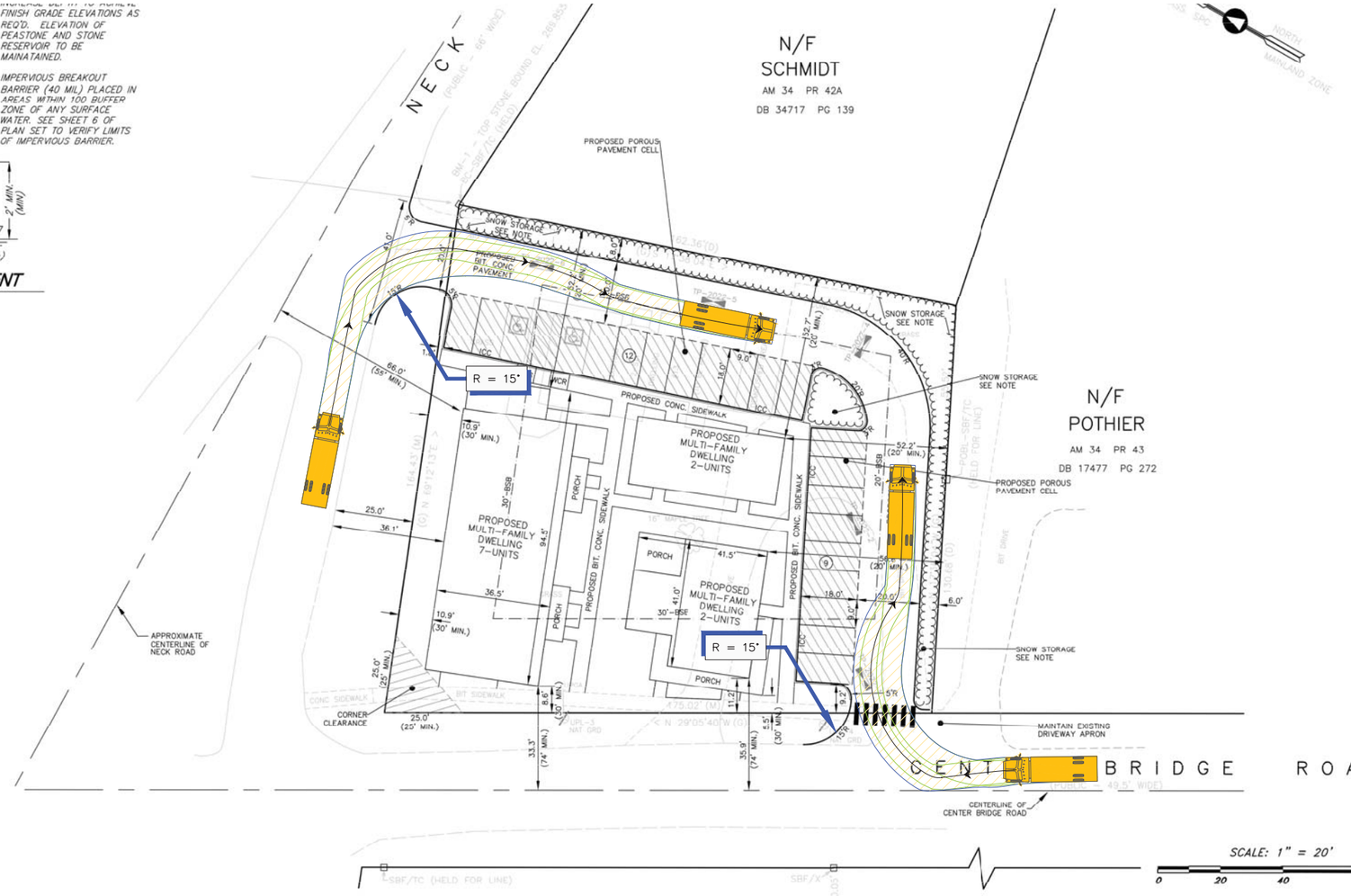


HANC
ASSOC
Civil I
Land S
Enviro
Cons
34 CHELMSFORD STREET
VOICE (978) 244-011
WWW.HANCOCK

NO.	BY	APP	DATE	IS
6	RT	JP	2/20/24	
5	RT	JP	1/18/24	
4	RT	JP	10/9/23	N
3	RT	JP	9/22/23	R
2	RT	JP	4/19/23	R
1	RT	JP	11/15/22	R

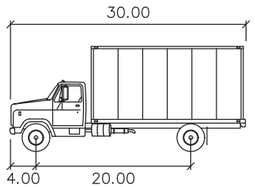
DATE: 6/24/22
SCALE: AS SHOWN
CHECK BY: JP

LAYOU
MATERIA

DWG: 24939-eng.dwg
LAYOUT: LM
SHEET: 3 OF 5
JOB NO.: 24939

NOTES

1. THIS PLAN INTENDED FOR DISCUSSION PURPOSES ONLY; IT IS NOT FOR CONSTRUCTION.
2. FINAL DESIGN IS SUBJECT TO FIELD SURVEY BY OTHERS.
3. PROPERTY LINES AND ACCESS LINE LOCATIONS ARE APPROXIMATE ONLY AND ARE SUBJECT TO DEED AND TITLE RECORDS.
4. BASE PLAN SOURCE: HANCOCK ASSOCIATES.



SU-30

	feet
Width	: 8.00
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 31.8

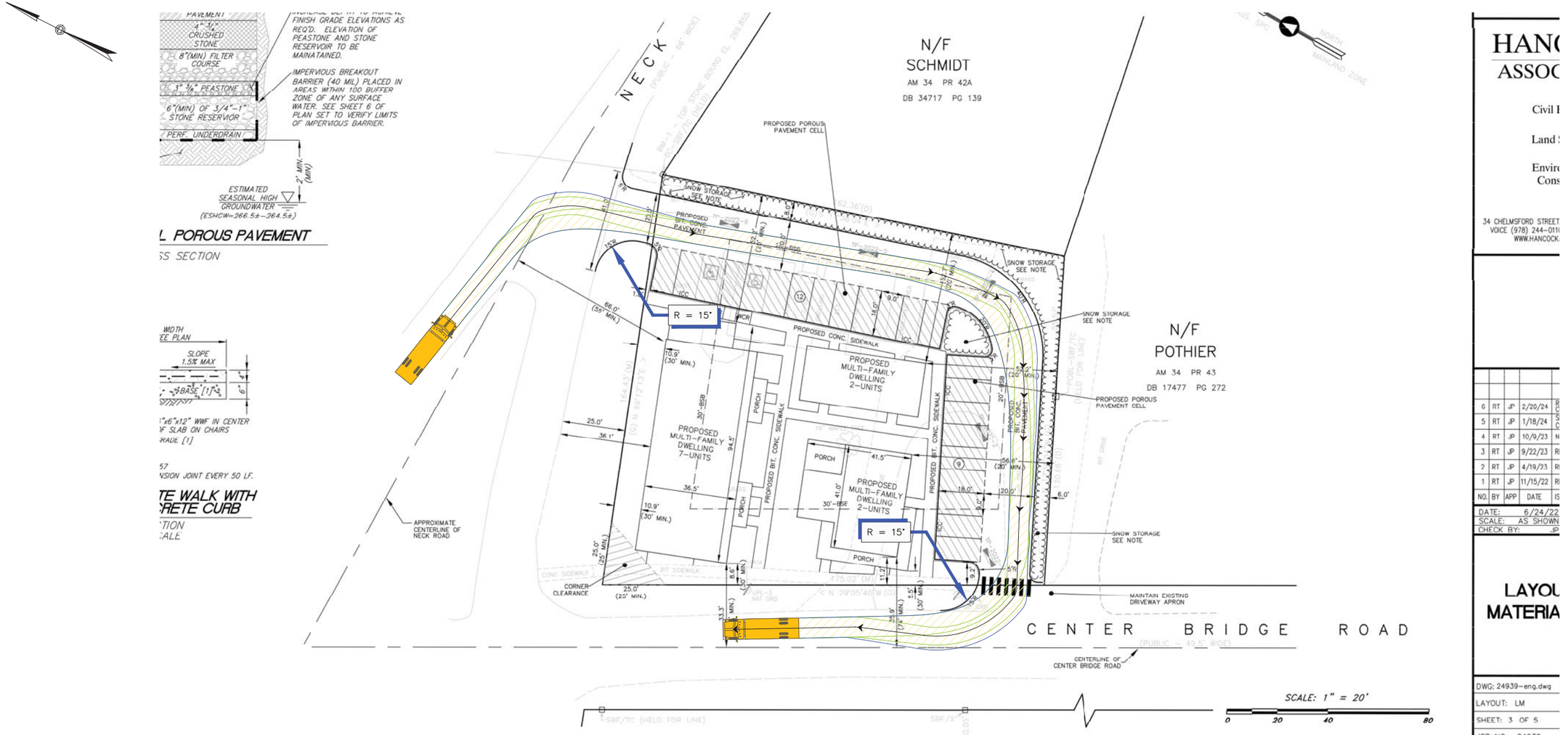
SCALE
0 10 20 40 60 FEET

AutoTurn Analysis - SU-30

AutoTurn Analysis
13 NECK ROAD
LANCASTER, MASSACHUSETTS
PREPARED FOR:
NECK FARM, LLC
66 WEST STREET, SUITE 1F
LEOMINSTER, MA 01453

MDM TRANSPORTATION CONSULTANTS, INC.
PLANNERS & ENGINEERS
28 Lord Road, Suite 280
Marlborough, MA 01752
Tel: (508) 303-0370
Fax: (508) 303-0371

DATE: February 2024	File: 1341 Autoturn.dwg	
PROJECT No. 1341	Scale: As Noted	Sheet 1 of 1



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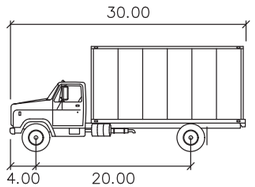

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