

CRYSTAL LAKE

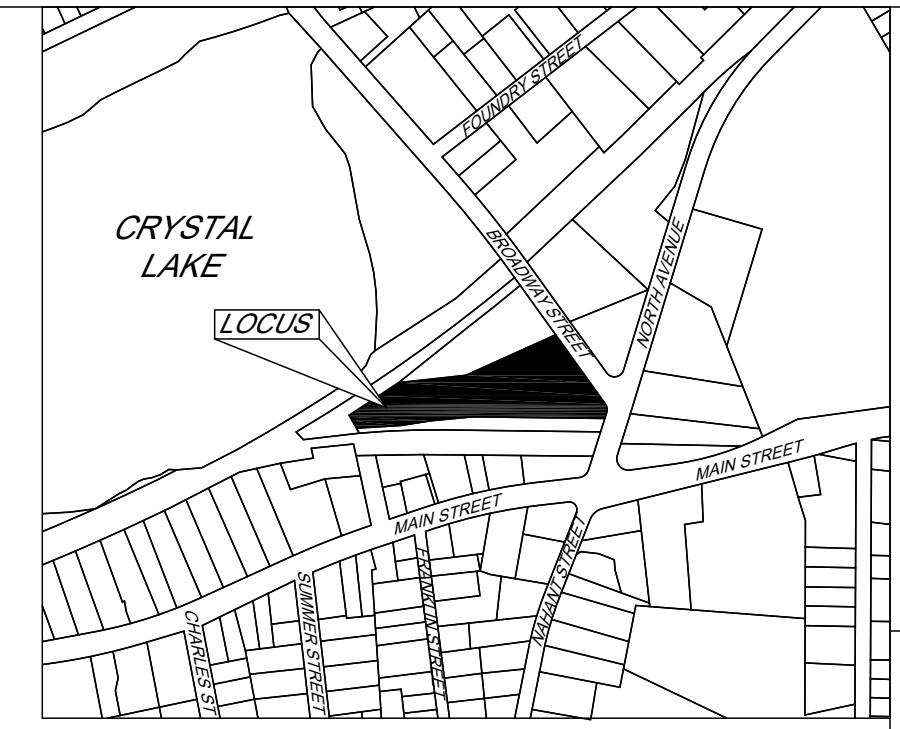
BROADWAY CROSSING, LLC  
ASSESSOR'S PARCEL ID:  
10-036-44AB  
#40-40A-42 BROADWAY

MASSACHUSETTS BAY TRANSPORTATION  
AUTHORITY  
ASSESSOR'S PARCEL ID: 10-037-44A  
MAIN STREET

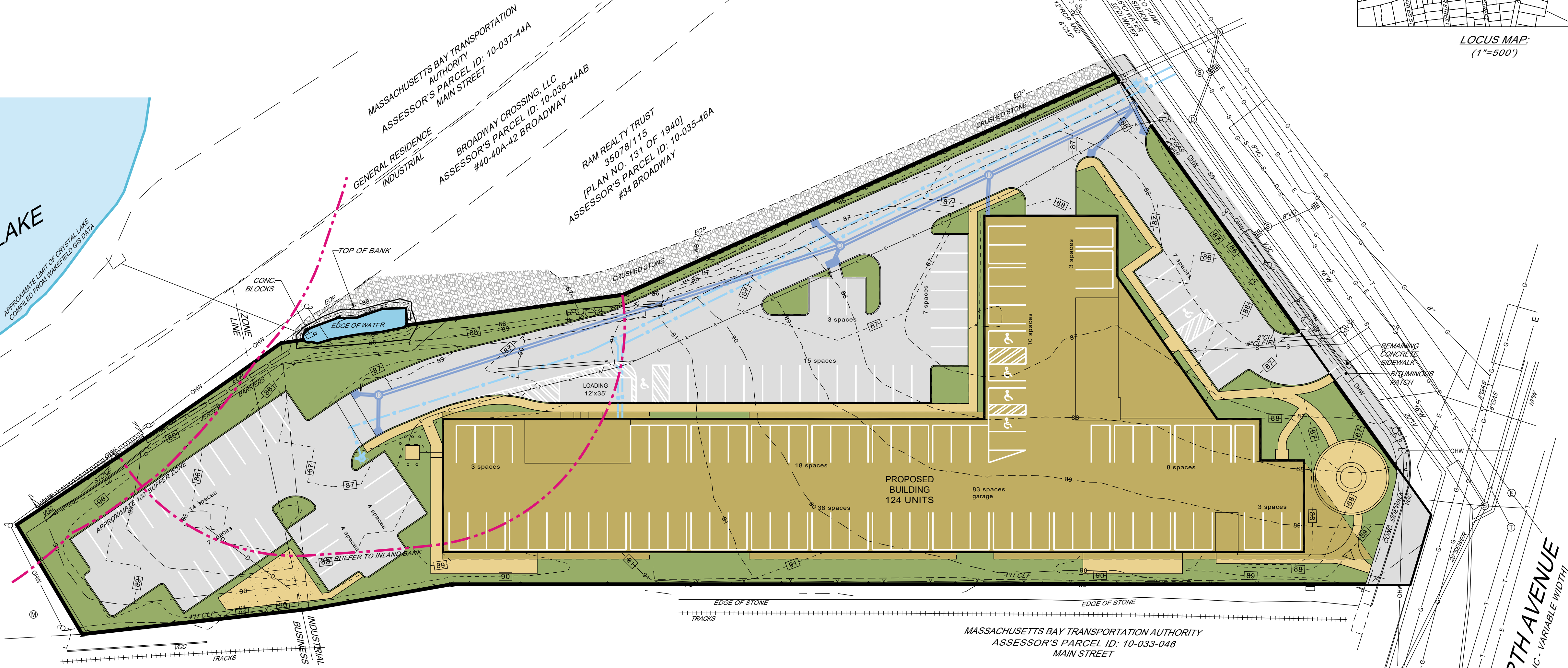
BROADWAY CROSSING, LLC  
ASSESSOR'S PARCEL ID: 10-036-44AB  
#40-40A-42 BROADWAY

RAM REALTY TRUST  
35078/115  
[PLAN NO. 131 OF 1940]  
ASSESSOR'S PARCEL ID: 10-035-46A  
#34 BROADWAY

BROADWAY STREET  
(PUBLIC - 30 FEET WIDE)



LOCUS MAP:  
(1"=500')



MASSACHUSETTS BAY TRANSPORTATION AUTHORITY  
ASSESSOR'S PARCEL ID: 10-033-046  
MAIN STREET

NORTH AVENUE  
(PUBLIC - VARIABLE WIDTH)

ZONING TABLE

ZONE	MID-RISE APARTMENT COMPLEX (190-32)	TABLE 2 DIMENSIONAL REGULATIONS (BUSINESS)	TABLE 2 DIMENSIONAL REGULATIONS (INDUSTRIAL)	PROVIDED
DIMENSIONAL CONTROLS	REQUIRED/ALLOWED	REQUIRED/ALLOWED	REQUIRED/ALLOWED	
MIN. LOT AREA	4,000 s.f.	--	20,000 s.f.	99,372 s.f.
LOT AREA PER DWELLING UNIT	750 s.f. (132 Units)			801 s.f. (4) Studios (72) One bedroom (43) Two Bedrooms (5) Three Bedrooms (124 Total Units)
LOT FRONTAGE	180 ft.	40 ft.	80 ft.	261.78 ft.
LOT WIDTH	180 ft.	40 ft.	80 ft.	126.68 ft.
FLOOR AREA RATIO		1.5	1.5	1.43
FRONT YARD	30 ft. or Height of Building, Whichever is Greater	--	15 ft.	20.6 ft.
SIDE	30 ft. or Height of Building, Whichever is Greater	--	20 ft.	15.1 ft. 12.1 ft. overhang
REAR	30 ft. or Height of Building, Whichever is Greater	--	20 ft.	85.7 ft.
MAXIMUM NUMBER OF STORIES	5	--	--	5
MAXIMUM HEIGHT	50 ft.	60 ft.*	60 ft.	53.33 ft.
MAX. BUILDING COVERAGE	35%	80%	50%	37.3% (16.1% Existing)
MIN. OPEN AREA	30%	10%	20%	27.2%± (8.8%± Existing)

PARKING CALCULATIONS

REQUIRED	
MULTIFAMILY DWELLINGS: 1.5 spaces per dwelling unit (2 bedrooms or fewer) 1.5 X 119 units = 178.5 spaces	179 spaces
MULTIFAMILY DWELLINGS: 2.0 spaces per dwelling unit (3 bedrooms or more) 2.0 X 5 units = 10 spaces	10 spaces
<b>TOTAL Spaces Required</b>	<b>189 spaces</b>
PROVIDED	
83 parking garage 61 surface	144 spaces (9'x18') (6 spaces are handicapped accessible) 1.16 spaces/unit

LEGEND:

- 104 MINOR CONTOUR
- 105 MAJOR CONTOUR
- FENCE
- SPRINKLER CONNECT
- WATER GATE
- HYDRANT
- SEWER LINE
- SEWER MANHOLE
- CLEANOUT
- DRAIN LINE
- DRAIN MANHOLE
- CATCH BASINS
- PAINTED GAS LINE
- GAS GATE
- OVERHEAD WIRE
- UTILITY POLE
- LIGHTPOLE
- MANHOLE
- SIGN
- BOLLARD
- CONCRETE BOUND DRILL HOLE
- 4" H BIT
- CC CONCRETE CURB
- CI CAST IRON
- CLF CHAINLINK FENCE
- CONC. CONCRETE
- CU COPPER
- DI DUCTILE IRON
- DYL DOUBLE YELLOW LINE
- EOP EDGE OF PAVEMENT
- HDPE HIGH DENSITY POLYETHYLENE
- INVERT
- INV POLYVINYL CHLORIDE
- PVC REINFORCED CONCRETE PIPE
- ROP THRESHOLD
- UGE UNDERGROUND ELECTRIC
- VC VITRIFIED CLAY
- VGC VERTICAL GRANITE CURB

Prepared For:  
Kimco Realty Corporation  
Owner: New Creek LLC  
LC Certificate #250159  
LC Plan 29374-A  
Assessor's Parcel: 10-034-46H

Prepared By:  
Hayes Engineering, Inc.  
603 Salem Street  
Wakefield, MA 01880  
Ph: 781.246.2800  
Fax: 781.246.7596  
www.hayeseng.com

Design By: JO  
Drawn By: JO  
Checked By: AMC  
Project File: WAK-0744  
Comp. No: WAK328  
 Issued For Permit  
 Issued For Review  
 Issued For Bid  
 Issued For Construction  
 Not For Construction

No.	Revision	Date
10		
9		
8		
7		
6		
5		
4		
3		
2		
1		

Scale: 1"=30'  
0' 15' 30' 60'  
Date: October 14, 2022

Drawing Title:

SITE PLAN  
10 BROADWAY STREET  
WAKEFIELD, MASS.

Owner: NEW CREEK LLC  
LC CERTIFICATE #250159  
LC PLAN 29374-A  
ASSESSOR PARCEL ID: 10-034-46  
#10 BROADWAY STREET

Seal: Drawing No.:

C3

# Transportation Impact Assessment

Proposed Residential Development  
10 Broadway Street  
Wakefield, Massachusetts

*Prepared for:*

KIMCO Realty  
Jericho, New York

September 2022

*Prepared by:*

 **Vanasse &  
Associates inc**  
Transportation Engineers & Planners

35 New England Business Center Drive  
Suite 140  
Andover, MA 01810



# CONTENTS

---

EXECUTIVE SUMMARY .....	1
INTRODUCTION.....	5
Study Methodology .....	5
EXISTING CONDITIONS .....	6
Geometry .....	6
Existing Traffic Volumes .....	7
Pedestrian and Bicycle Facilities.....	8
Public Transportation .....	9
Safety Analysis.....	9
FUTURE CONDITIONS .....	12
Future Traffic Growth .....	12
General Background Traffic Growth.....	12
Specific Development by Others.....	13
Roadway Improvement Projects.....	13
No-Build Traffic Volumes .....	14
Project-Generated Traffic.....	14
Trip Distribution and Assignment.....	17
Future Traffic Volumes - Build Condition.....	17
Parking Demand.....	18
SIGHT DISTANCE EVALUATION.....	20

**CONTENTS (Continued)**

---

TRAFFIC OPERATIONS ANALYSIS ..... 22

    Methodology ..... 22

    Analysis Results ..... 25

CONCLUSIONS AND RECOMMENDATIONS ..... 29

    Recommendations ..... 29

    Transportation Demand Management (TDM) Plan..... 30

    Conclusions ..... 31

## FIGURES

---

No.	Title
1	Site Location and Study Map
2	Existing Intersection Lane Use, Travel Lane Width, and Pedestrian Facilities
3	2022 Existing Weekday Peak-Hour Traffic Volumes
4	2029 No-Build Weekday Peak-Hour Traffic Volumes
5	Trip Distribution Map
6	Site-Generated Weekday Peak-Hour Traffic Volumes
7	2029 Build Weekday Peak-Hour Traffic Volumes

## TABLES

---

No.	Title
1	Existing Roadway Traffic-Volume Summary
2	Motor Vehicle Crash Data Summary
3	Mode Split Summary
4	Trip-Generation Summary
5	Trip-Generation Comparison
6	Trip-Distribution Summary
7	Peak-Hour Traffic-Volume Increases
8	Weekday Evening Peak-Parking Demand
9	Sight Distance Measurements
10	Level-of-Service Criteria for Signalized Intersections
11	Level-of-Service Criteria for Unsignalized Intersections
12	Signalized Intersection Level-of-Service and Vehicle Queue Summary
13	Unsignalized Intersection Level-of-Service and Vehicle Queue Summary

# **EXECUTIVE SUMMARY**

---

Vanasse & Associates, Inc. (VAI) has prepared this Transportation Impact Assessment (TIA) in order to evaluate potential traffic impacts associated with the proposed residential development to be located at 10 Broadway Street in Wakefield, Massachusetts (the “Project”). This study evaluates the following specific areas as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; and identifies and analyzes existing and future traffic conditions, both with and without the Project.

## **PROJECT DESCRIPTION**

The proposed Project entails construction of a new four-story building with 124 units of multifamily housing. The Project will include the total construction of 137 parking spaces (parking ratio of 1.1 parking spaces per unit), including 85 spaces in a ground-level garage below the residential building and an additional 52 surface parking spaces provided in the rear and west side of the building. At present, the Project site houses one building that is utilized as a fitness center which will be demolished as part of this Project. The Project site is situated on an approximate 2.3±-acre parcel of land and is generally bounded by commercial properties to the north, south, and west, and by North Avenue to the east. As part of this development, a dedicated drop-off area in front of the building will be provided. Access to the Project will remain as it currently exists, through one full-access driveway onto Broadway Street that would provide access to both the surface parking spaces and the drop-off area.

## **EXISTING CONDITION**

A comprehensive field inventory of traffic conditions on the study area roadways was conducted in May 2022. In order to establish base traffic-volume conditions within the study area, manual turning movement counts (TMCs) were conducted in February 2022. In order to develop 2022 Existing traffic-volume conditions, the data collected required adjustments due to the effects of the COVID-19 pandemic and were factored upward by 30 percent during the weekday morning and evening peak periods. Regarding safety, all of the study intersections were found to have a motor vehicle crash rate *below* the Massachusetts Department of Transportation (MassDOT) average for the District in which the Project is located (District 4). No fatalities were reported at any of the study area intersections over the five-year period reviewed.



## **FUTURE CONDITIONS**

Traffic volumes within the study area were projected to 2029, which reflects a seven-year planning horizon consistent with State traffic study guidelines. A 1.0 percent per year compounded annual background traffic growth rate was used in order to account for future traffic growth and presently unforeseen development within the study area.

### **Specific Development by Others**

The Town of Wakefield was contacted in order to determine if there are any planned or approved specific development projects within the area that would have an impact on future traffic volumes at the study intersections. Based on these discussions, three other projects were identified in the immediate area of the Project site. Traffic from these site-specific projects was incorporated into the study.

### **Planned Roadway Improvements**

The Town of Wakefield was contacted in order to determine if there are any planned roadway improvement projects expected to be completed within the study area in the seven-year planning horizon. The Town staff indicated that a number of roadway improvement projects under the Envision Wakefield Downtown program received funding under the MassDOT Complete Streets Program, and accordingly a number of these projects are planned for the area. Currently, only funding for the improvements on Albion Street has been granted through the Complete Streets program. While not having a direct impact on the Project site, construction for these improvements would have a temporary impact on traffic flow in this area.

### **No-Build Traffic Volumes**

The 2029 No-Build weekday morning and evening peak-hour traffic-volume networks were developed by applying the 1.0 percent per year compounded annual background traffic growth rate to the 2022 existing condition peak-hour traffic volumes plus identified background developments.

### **Site-Generated Traffic Volumes and Directional Distribution**

The proposed Project is expected to generate approximately 20 *fewer* vehicle trips (-27 entering and 7 exiting) during the weekday morning peak hour and 30 *fewer* vehicle trips (-8 entering and -22 exiting) during the weekday evening peak hour than the existing fitness center use. The directional distribution of generated trips to and from the Project site was determined based on a review of journey-to-work data and existing traffic patterns within the study area. In summary, 35 percent of the trips are expected to arrive and depart the site to/from the west and 65 percent of the trips are expected to arrive and depart the site to/from the east before dispersing to the other cardinal directions on the local road network.

## **TRAFFIC OPERATIONS ANALYSIS**

In order to assess the impact of the proposed Project on the roadway network, traffic operations analyses were performed at the study intersections under 2022 Existing, 2029 No-Build, and 2029 Build conditions. The addition of site-related traffic will not result in a significant impact on overall operations at the study area intersections.

## **RECOMMENDATIONS**

The following recommendations have been developed as a part of this evaluation and, where applicable, will be completed in conjunction with the Project subject to receipt of all necessary rights, permits, and approvals.

### **Project Access**

Access and egress to the site is proposed by one existing full-access driveway to Broadway Street. The following recommendations are offered with respect to Project access, internal circulation, and parking, many of which are already reflected on the Site Plans for the Project:

- The Project site driveway and internal circulating drives should be a minimum of 24 feet in width where two-way traffic is to be conveyed and designed to accommodate the turning and maneuvering requirements of the largest anticipated responding emergency vehicle as defined by the Wakefield Fire Department;
- Vehicles exiting the Project site should be placed under STOP-sign control with a marked STOP-line provided;
- All signs and pavement markings to be installed within the Project site should conform to the applicable standards of the *Manual on Uniform Traffic Control Devices (MUTCD)*;<sup>1</sup>
- Americans with Disabilities Act (ADA)-compliant wheelchair ramps should be provided at all pedestrian crossings internal to the Project site and for crossing the Project site driveways;
- Signs and landscaping to be installed as a part of the Project within intersection sight triangle areas of the Project site driveways should be designed and maintained so as not to restrict lines of sight;
- Snow windrows within the sight triangle areas of the Project site driveway and at intersections within the Project site should be promptly removed where such accumulations would impede sightlines; and
- A school bus waiting area should be provided at an appropriate location defined in consultation with Wakefield Public Schools.

## **TRANSPORTATION DEMAND MANAGEMENT (TDM) PLAN**

As is the case with many developments, a major focus of the traffic mitigation plan focuses on the reduction of single-occupant vehicles arriving and departing to and from the site. This is predominantly accomplished by developing a comprehensive TDM strategy. In an effort to encourage the use of alternative modes of transportation for single-occupant vehicles, the following TDM measures will be implemented as a part of the Project:

- Information regarding public transportation services, maps, schedules, and fare information should be posted in a central location and/or otherwise made available to residents

---

<sup>1</sup>*Manual on Uniform Traffic Control Devices (MUTCD)*; Federal Highway Administration; Washington, D.C.; 2009.

and employees;

- A “welcome packet” should be provided to residents and employees detailing available public transportation services, bicycle and walking alternatives, and available commuter options;
- Pedestrian accommodations should be incorporated into the Project and consist of sidewalks and ADA-compliant wheelchair ramps at all pedestrian crossings internal to the Project site that will link building entrances to the sidewalk infrastructure along Broadway Street;
- Secure bicycle parking should be provided within the Project site consisting of both exterior and interior (covered) bicycle parking; and
- Consideration should be given to installing accommodations for the charging of electric vehicles by residents of the Project.

## **CONCLUSIONS**

The proposed Project represents a decrease in traffic volumes to and from the existing occupied fitness center and as such, will result in a decrease in delays at most studied intersections. With the implementation of the above recommendations, safe and efficient access will be provided to the planned development and the proposed development can be constructed with minimal impact to the area.

# **INTRODUCTION**

---

Vanasse & Associates, Inc. (VAI) has prepared this Transportation Impact Assessment (TIA) in order to evaluate potential traffic impacts associated with the proposed residential development to be located at 10 Broadway Street in Wakefield, Massachusetts (the “Project”). This study evaluates the following specific areas as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; and identifies and analyzes existing and future traffic conditions, both with and without the Project.

## **STUDY METHODOLOGY**

This study was prepared in consultation with the Town of Wakefield and in accordance with the Massachusetts Department of Transportation (MassDOT) *Transportation Impact Assessment (TIA) Guidelines*; and the standards of the Traffic Engineering and Transportation Planning professions for the preparation of such reports; and was conducted in three distinct stages.

The first stage involved an assessment of existing conditions in the study area and included an inventory of roadway geometrics; pedestrian facilities; observations of traffic flow; review of safety characteristics along area roadways; and collection of daily and peak-period traffic counts.

In the second stage of the study, future traffic conditions were projected and analyzed. Specific travel demand forecasts for the Project were assessed along with future traffic demands due to expected traffic growth independent of the Project. A seven-year time horizon was selected for analyses consistent with State guidelines for the preparation of TIAs. The traffic analysis conducted in stage two identifies existing or projected future roadway capacity, traffic safety, and site access issues.

The third stage of the study presents and evaluates measures to address traffic and safety issues, if any, identified in stage two of the study.

## **EXISTING CONDITIONS**

---

A comprehensive field inventory of traffic conditions on the study area roadways was conducted in May 2022. The field investigation consisted of an inventory of existing roadway geometrics, pedestrian facilities, traffic volumes, and operating characteristics, as well as posted speed limits and land use information for the roadways that provide access to the Project including Broadway Street as well as the intersections which are expected to accommodate the majority of Project-related traffic. The study area for the Project is listed below and graphically depicted in Figure 1.

1. Broadway Street at Foundry Street (unsignalized)
2. North Avenue at Broadway Street (unsignalized)
3. North Avenue at Nahant Street and Main Street (signalized)
4. Site driveway at Broadway Street (unsignalized)

The following describes the study area roadway and intersections:

### **GEOMETRY**

#### **Roadway**

##### **Broadway Street**

Broadway Street is an urban collector local roadway under the jurisdiction of the Town of Wakefield, Massachusetts. Broadway Street is a roadway that runs in an east-west direction from Albion Street to North Avenue. Within the study area, Broadway Street provides one approximate 17-foot wide travel lane in the westbound direction and one approximate 18-foot wide travel lane in the eastbound direction, separated by a double-yellow centerline. Sidewalks are provided along the south side of Broadway Street within the study area between Foundry Street and North Avenue. Illumination is provided by way of streetlights mounted on wooden poles. Land use along this street consists primarily of a mix of commercial and residential properties and the Broadway Water Treatment Facility.

#### **Intersections**

Figure 2 summarizes existing lane use and travel lane widths at the study area intersections as observed in May 2022.



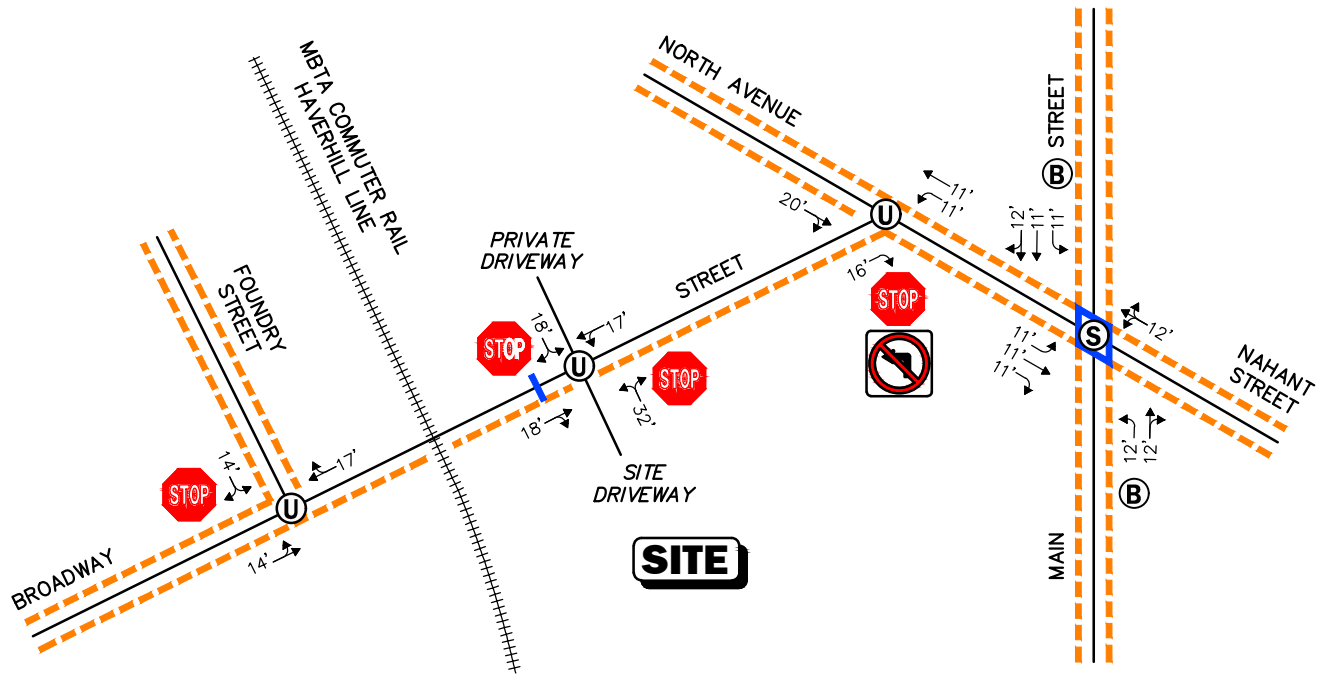
Figure 1  
Site Location and Study Area Map





**Legend:**

- Ⓢ Signalized Intersection
- Ⓤ Unsignalized Intersection
- Ⓑ Bus Stop
- Sidewalk
- Crosswalk
- xx' ↕ Lane Use and Travel Lane Width



**Figure 2**

**Existing Intersection Lane Use, Travel Lane Width, and Pedestrian Facilities**



## **EXISTING TRAFFIC VOLUMES**

In order to establish base traffic-volume conditions within the study area, manual turning movement counts (TMCs) were conducted on Thursday, February 17, 2022. The TMCs were conducted during the weekday morning (7:00 to 9:00 AM) and weekday evening (4:00 to 6:00 PM peak periods). These time periods were selected for analysis purposes as they are representative of the peak-traffic-volume hours for both the Project and the adjacent roadway network. It is important to note that although traffic levels have been steadily increasing over the last several months, available traffic data suggests that traffic conditions have not yet returned to pre-pandemic levels.

### **Traffic Adjustment**

In order to develop 2022 Existing traffic-volume conditions, the data collected required adjustments due to the effects of the COVID-19 pandemic. To achieve this, historic traffic count data conducted in December 2019<sup>2</sup> in the same study area was evaluated. Traffic-volume data collected at the intersection of North Avenue at Nahant Street and Main Street in 2019 was compared to February 2022 traffic volumes collected at the same location. The 2019 traffic volumes were expanded to 2022 (same-year condition) by applying a background traffic growth rate of 1 percent per year (discussion follows) in order to allow for a comparison of the data. Based on this pre- and post-COVID-19 traffic data comparison, the 2022 traffic-volume data that was collected as part of this assessment was adjusted upward by an additional 30 percent during typical weekday morning and evening peak periods, in order to account for the reduced traffic volumes resulting from the pandemic.

### **Seasonal Adjustment**

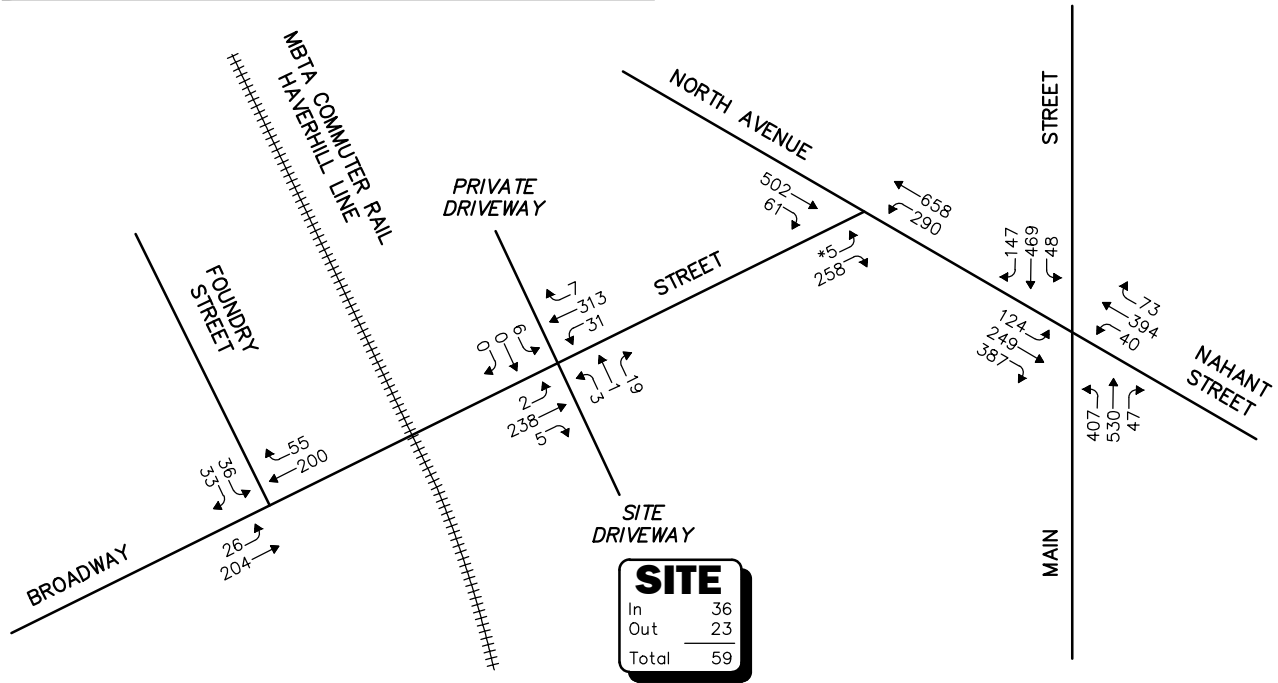
In addition to correction factors for COVID-19, adjustments were made to account for seasonal fluctuations in traffic. The MassDOT permanent count station ID 5099 was used to evaluate the traffic volumes for seasonal fluctuations. Based on this data, it was determined that February traffic volumes are approximately 7 percent below average-month conditions for this station. Therefore, the February traffic volumes were adjusted upward by 7 percent in order to provide a conservative analysis condition.

The 2022 Existing traffic volumes are summarized in Table 1, with the weekday morning and evening peak-hour traffic volumes graphically depicted on Figure 3. It is important to note that the peak-hour traffic volumes presented in Table 1 were obtained from the TMCs and are reflected on the aforementioned figure.

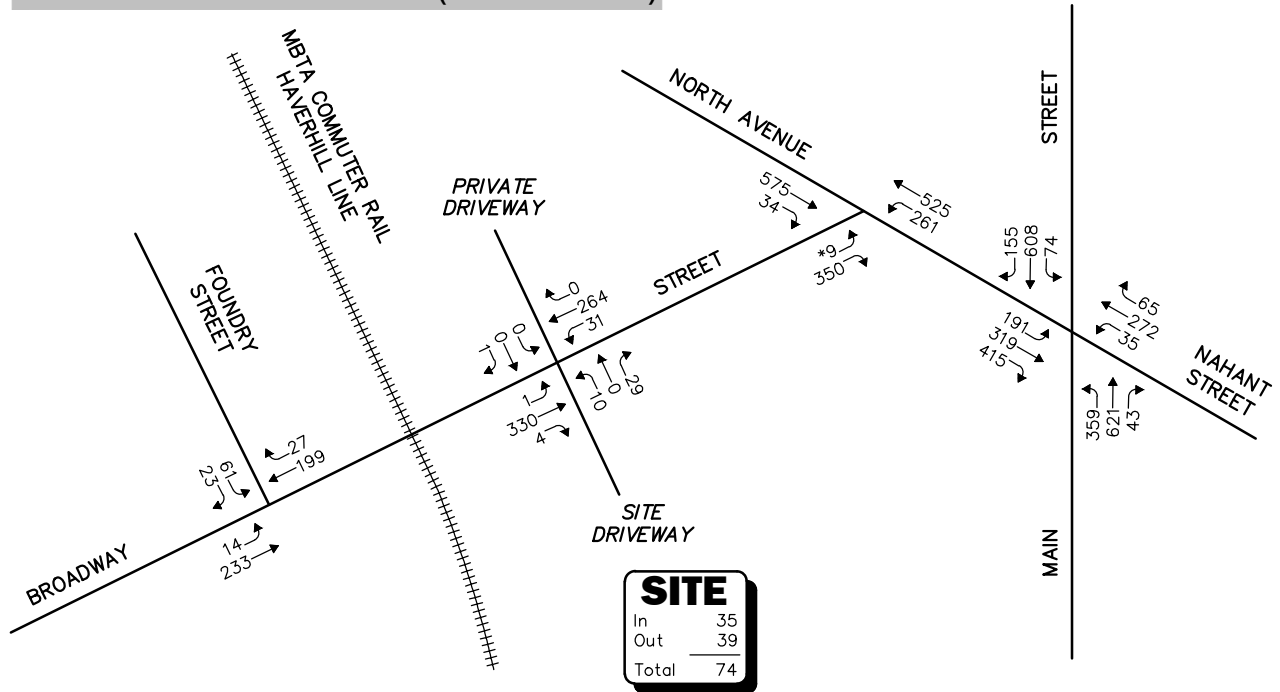
---

<sup>2</sup>Transportation Impact Statement, Proposed Residential Development 62-76 Foundry Street – Wakefield, VAI, April 2021.

WEEKDAY MORNING PEAK HOUR (7:15 - 8:15 AM)



WEEKDAY EVENING PEAK HOUR (4:30 - 5:30 PM)



\* Illegal Movement.

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.



Not to Scale

Figure 3



2021 Existing Condition  
Peak-Hour Traffic Volumes

**Table 1**  
**EXISTING ROADWAY TRAFFIC-VOLUME SUMMARY**

Location	Daily Volume (vpd) <sup>a</sup>	Weekday Morning Peak Hour (7:15 – 8:15 AM)			Weekday Evening Peak Hour (4:30 – 5:30 PM)		
		Volume (vph) <sup>b</sup>	Percent of Daily Traffic <sup>c</sup>	Predominant Flow	Volume (vph)	Percent of Daily Traffic	Predominant Flow
Broadway Street, west of the Site Driveway	6,800	561	8.3	56% WB	610	9.0	55% EB

<sup>a</sup>Two-way daily traffic expressed in vehicles per day; (estimated).

<sup>b</sup>Manual turning movement counts conducted in February 2022 (adjusted).

<sup>c</sup>The percent of daily traffic that occurs during the peak hour.

WB= westbound; EB= eastbound.

As can be seen in Table 1, Broadway Street west of the site driveway was found to accommodate approximately 6,800 vehicles on an average weekday (24-hour, two-way volume), with approximately 561 vehicles per hour (vph) during the weekday morning peak hour and 610 vph during the weekday evening peak hour. The predominant flow on Broadway Street during the weekday morning peak hour is in the westbound direction and during the weekday evening peak hour is in the eastbound direction.

A review of the peak-period traffic counts indicates that the weekday morning peak hour generally occurs between 7:15 and 8:15 AM with the weekday evening peak hour generally occurring between 4:30 and 5:30 PM.

**PEDESTRIAN AND BICYCLE FACILITIES**

A comprehensive field inventory of pedestrian and bicycle facilities within the study area was undertaken in May 2022. The field inventory consisted of a review of the location of sidewalks and pedestrian crossing locations along the study roadway and at the study intersections, as well as the location of existing and planned future bicycle facilities. In general, sidewalks are provided along the south side of Broadway Street within the study area and along both sides of Foundry Street and North Avenue. Painted crosswalks are provided at the intersection of North Avenue at Nahant Street and Main Street. A painted mid-block crosswalk is provided along Broadway Street, west of the site driveway. No formal bicycle facilities were noted in the study area, though the travel width along both directions of Broadway Street provides sufficient width on a continuous basis to accommodate bicycle travel in a shared traveled-way configuration (i.e., bicyclists and motor vehicles sharing the traveled-way).<sup>3</sup>

<sup>3</sup>A minimum combined travel lane and paved shoulder width of 14-feet is required to support bicycle travel in a shared traveled-way condition.

## **PUBLIC TRANSPORTATION**

Public transportation services are provided within the study area by the Massachusetts Bay Transportation Authority (MBTA) for fixed-route bus and commuter rail services. Within the study area, the MBTA operates the following services:

Within the study area, the MBTA operates the following fixed route bus service:

- ***Route 137 – Reading Depot – Malden Center Station*** – The closest bus stop is located at the intersection of Main Street with Nahant Street, which is approximately 1 mile (or approximately 2 minutes walking) from the Project site. Sidewalks and crosswalks exist throughout the route. This line provides connections to the MBTA Orange Line subway system and Reading Purple Line. MBTA bus service is provided Monday through Saturday from approximately 5:00 AM to 1:30 AM. This route generally operates with 10- to 40-minute headways. One-way fares for adults are \$1.70, with a \$0.85 fare for students, senior citizens, and persons with disabilities.

The MBTA operates the following commuter rail services in the vicinity of the Project:

- ***Purple Line – Haverhill Line – Haverhill to North Station*** – The MBTA provides commuter rail service to and from Haverhill to North Station in Boston on the Haverhill Line, with Wakefield Station located 0.4 miles (or approximately 7 minutes walking) north of the Project site. Sidewalks and crosswalks exist throughout the route. Service is provided Monday through Friday from 5:00 AM to 1:00 AM and Saturdays and Sundays from 6:43 to 1:00 AM. Commuter Rail Zones 1A-10 fares are between \$2.40 to \$13.25 one-way and \$426 for a monthly pass.

All MBTA trains are handicapped and wheelchair accessible. Schedule and fare information for the MBTA commuter rail service are provided in the Appendix.

## **SAFETY ANALYSIS**

In order to evaluate whether there are any notable trends that would indicate potential safety deficiencies within the study area, a motor vehicle accident analysis was conducted in accordance with State guidelines as described below.

### **Vehicle Accident Data**

Motor vehicle accident data was acquired from the MassDOT Safety Management/Traffic Operations Unit for the most recent five-year period available (2015 through 2019) in order to examine motor vehicle accident trends occurring within the study area. The data is summarized by intersection, type, and severity, and is presented in Table 2.

**Table 2**  
**MOTOR VEHICLE ACCIDENT DATA SUMMARY<sup>a</sup>**

Scenario	Broadway Street at Foundry Street (Unsignalized)	North Avenue at Broadway Street (Unsignalized)	North Avenue at Nahant Street and Main Street (Signalized)	Site driveway at Broadway Street (Unsignalized)
<i>Year:</i>				
2015	0	3	3	2
2016	1	1	6	1
2017	0	1	0	0
2018	0	0	5	0
<u>2019</u>	<u>2</u>	<u>1</u>	<u>6</u>	<u>0</u>
Total	3	6	20	3
Average <sup>b</sup>	0.60	1.2	4.00	0.60
Crash Rate <sup>c</sup>	0.27	0.17	0.32	0.22
Significant <sup>d</sup>	No	No	No	No
<i>Type:</i>				
Angle	0	4	6	0
Rear-End	2	1	4	1
Head-On	1	1	1	0
Sideswipe	0	0	6	0
Fixed Object	0	0	2	1
Pedestrian	0	0	0	0
Bicyclist	0	0	0	0
<u>Unknown/Other</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>
Total	3	6	20	3
<i>Weather Conditions:</i>				
Clear	1	5	16	3
Cloudy/Rain	2	1	4	0
Snow/Ice	0	0	0	0
Fog	0	0	0	0
<u>Unknown/Other</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	3	6	20	3
<i>Lighting Conditions:</i>				
Daylight	2	3	15	2
Dawn/Dusk	0	0	0	0
Dark (lit)	1	3	5	1
Dark (unlit)	0	0	0	0
<u>Unknown/Other</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	3	6	20	3
<i>Pavement Conditions :</i>				
Dry	2	4	18	3
Wet	1	2	2	0
Snow/Ice	0	0	0	0
<u>Unknown/Other</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	3	6	20	3
<i>Severity:</i>				
Property Damage Only	2	4	17	2
Personal Injury	1	2	2	0
Fatality	0	0	0	0
<u>Unknown/Other</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>
Total	3	6	20	3

<sup>a</sup>Source: MassDOT, 2015 through 2019.

<sup>b</sup>Average crashes over five-year period.

<sup>c</sup>Crash rate per million entering vehicles.

Signalized intersections are significant if rate >0.73 crashes per million vehicles (District 4) or if rate >0.78 crashes per million vehicles (statewide).

Unsignalized intersections are significant if rate >0.57 crashes per million vehicles (District 4) or if rate >0.57 crashes per million vehicles (statewide).

As summarized in Table 2, the intersections of North Avenue at Nahant Street and Main Street experienced the highest frequency of accidents in the study area with a total of 20 accidents over the five-year review period, averaging 4.0 accidents per year. The majority of the accidents at this intersection were angle type collisions (6 out of 20), during the daylight (15 out of 20), and caused property damage only (17 out of 20). The data shows that the Project site driveway experienced 3 accidents over the five-year review period. It is important to note that none of the crashes involved vehicles exiting or entering the Project site. The data indicated that all crashes involved vehicles traveling in the eastbound and westbound directions along Broadway Street.

All study intersections were found to have a motor vehicle crash rate *below* the MassDOT average for the District in which the Project is located (District 4). No fatalities were reported at any of the study area intersections over the five-year period reviewed. In addition, the Highway Safety Improvement Program (HSIP) database was reviewed and none of the study area intersections are listed as HSIP-eligible clusters in the most recent (2017 through 2019) HSIP cluster listing. The detailed MassDOT Crash Rate Worksheets are provided in the Appendix.

## **FUTURE CONDITIONS**

---

Traffic volumes in the study area were projected to the year 2029, which reflects a seven-year planning horizon consistent with State Traffic Study Guidelines. Independent of the Project, traffic volumes on the roadway network in the year 2029 under No-Build conditions include all existing traffic and new traffic resulting from background traffic growth. Anticipated Project-generated traffic volumes superimposed upon this 2029 No-Build traffic network reflect the 2029 Build conditions with the Project.

### **FUTURE TRAFFIC GROWTH**

Future traffic growth is a function of the expected land development in the immediate area and the surrounding region. Several methods can be used to estimate this growth. A procedure frequently employed estimates an annual percentage increase in traffic growth and applies that percentage to all traffic volumes under study. The drawback to such a procedure is that some turning volumes may actually grow at either a higher or a lower rate at particular intersections.

An alternative procedure identifies the location and type of planned development, estimates the traffic to be generated, and assigns it to the area roadway network. This procedure produces a more realistic estimate of growth for local traffic. However, the drawback of this procedure is that the potential growth in population and development external to the study area would not be accounted for in the traffic projections.

To provide a conservative analysis framework, both procedures were used, the salient components of which are described below.

### **GENERAL BACKGROUND TRAFFIC GROWTH**

In order to determine general background traffic growth trends within the study area, MassDOT historical annual traffic growth rates were reviewed. Based on this data, it was determined that traffic volumes from 2015 to 2019 have fluctuated over the past several years. In order to provide a prudent planning condition for the Project and to be consistent with previous traffic studies in the area, a 1 percent per year compounded annual background traffic growth rate was used in order to account for future traffic growth and presently unforeseen development within the study area.

## SPECIFIC DEVELOPMENT BY OTHERS

The Town of Wakefield was contacted in order to determine if there are any planned or approved development projects that are expected to influence future traffic volumes within the study area. Based on these discussions, the following projects were identified for inclusion in this assessment:

- **Harvard Mills – 178 Albion Street** – The existing site at 178 Albion Street includes one four-story building comprised of an east wing and a west wing connected by a one-story loading dock structure. The west wing contains 114,509 square feet (sf) of office space and 22,114 sf of research and development space. The east wing contains 125,907 sf of office space. The project consists of adding three stories to the east wing and constructing 184 apartment units. Parking is to be provided in the existing garage located at 12 Foundry Street, which is located directly across the street from the building and provides approximately 755 parking spaces. The existing site at 7-9 Maple Street consists of a utility building and surface parking for 178 Albion Street. Traffic volumes from the *Transportation Impact Assessment*<sup>4</sup> submitted by Vanasse & Associates, Inc. on February 15, 2019 were added to the future condition networks.
- **69 Foundry Street** – This development entails razing the 7,360 sf industrial use at 69 Foundry Street in Wakefield, Massachusetts and constructing 84 residential units. Access to the site is proposed through two driveways on Foundry Street. Traffic volumes from the *Traffic Assessment*<sup>5</sup> submitted by BETA Group, Inc. on August 10, 2017 were added to the future condition networks.
- **62-76 Foundry Street** – This development consists of removal of the five existing structures and constructing a new five-story building containing a proposed 3,750-sf restaurant and 58 residential units. Parking will be provided for 92 vehicles. Traffic volumes from the *Transportation Impact Assessment*<sup>6</sup> submitted by Vanasse & Associates, Inc. in March 2021 were added to the future condition networks.

No other developments were identified at this time that are expected to result in an increase in traffic within the study area beyond the general background traffic growth rate.

## ROADWAY IMPROVEMENT PROJECTS

The Town of Wakefield was contacted in order to determine if there are any planned roadway improvement projects expected to be completed within the study area in the seven-year planning horizon. Based on these discussions a number of roadway improvement projects under the Wakefield Complete Streets Program are planned for the area. These projects are listed below:

- Broken sidewalk will be repaired on Albion Street.
- Sharrows will be installed on North Avenue and Albion Street.

---

<sup>4</sup>*Transportation Impact Assessment – Proposed Residential Development – Harvard Mills Building; Wakefield, Massachusetts; VAI; February 2019.*

<sup>5</sup>*Traffic Assessment – Proposed Apartment Development Foundry Street, Wakefield, MA; BETA Group, Inc.; August 10, 2017.*

<sup>6</sup>*Transportation Impact Assessment – Proposed Residential Development, Massachusetts; VAI; March 2021.*



- Curb extensions will be installed on North Avenue from Chestnut Street to Albion Street.
- Curb extensions or a pedestrian refuge will be implemented at the intersection of Albion Street at Murray Street and Gould Street.
- Pedestrian timings will be updated to current *Manual on Uniform Traffic Control Devices* (MUTCD)<sup>7</sup> standards at the intersection of North Avenue at Albion Street.
- Crosswalks and curb extension will be provided along Albion Street from North Avenue to Main Street.
- A sidewalk will be installed on the west side of North Avenue from the Galvin Middle School to Broadway Street and a crosswalk will be provided at the intersection of North Avenue and Broadway Street.

Currently, only funding for the improvements on Albion Street has been granted through the Complete Streets program. The funding is specifically for replacing sidewalk and curb on Albion Street from North Avenue to Main Street, installing four new curb extensions, and adding bicycle sharrows pavement markings. The curb extensions are to be located at the intersections of North Avenue with Albion Street and Albion Street with Foster Street and at 110 Albion Street and 73 Albion Street.

In addition to these public improvement projects, there is also the potential for geometric improvements to the intersection of Albion Street with Murray Street and Gould Street that would be performed as mitigation for the 69 Foundry Street development project.

All of these projects would improve pedestrian and bicycle conditions for those user groups in the areas mentioned. No credit was assumed for these improvements in assessing the impacts of the Project.

### **NO-BUILD TRAFFIC VOLUMES**

The 2029 No-Build peak-hour traffic-volume networks were developed by applying the 1 percent per year compounded annual background traffic growth rate to the 2022 Existing peak-hour traffic volumes plus the identified background developments. The resulting 2029 No-Build weekday morning and weekday evening peak-hour traffic-volume networks are shown on Figure 4.

### **PROJECT-GENERATED TRAFFIC**

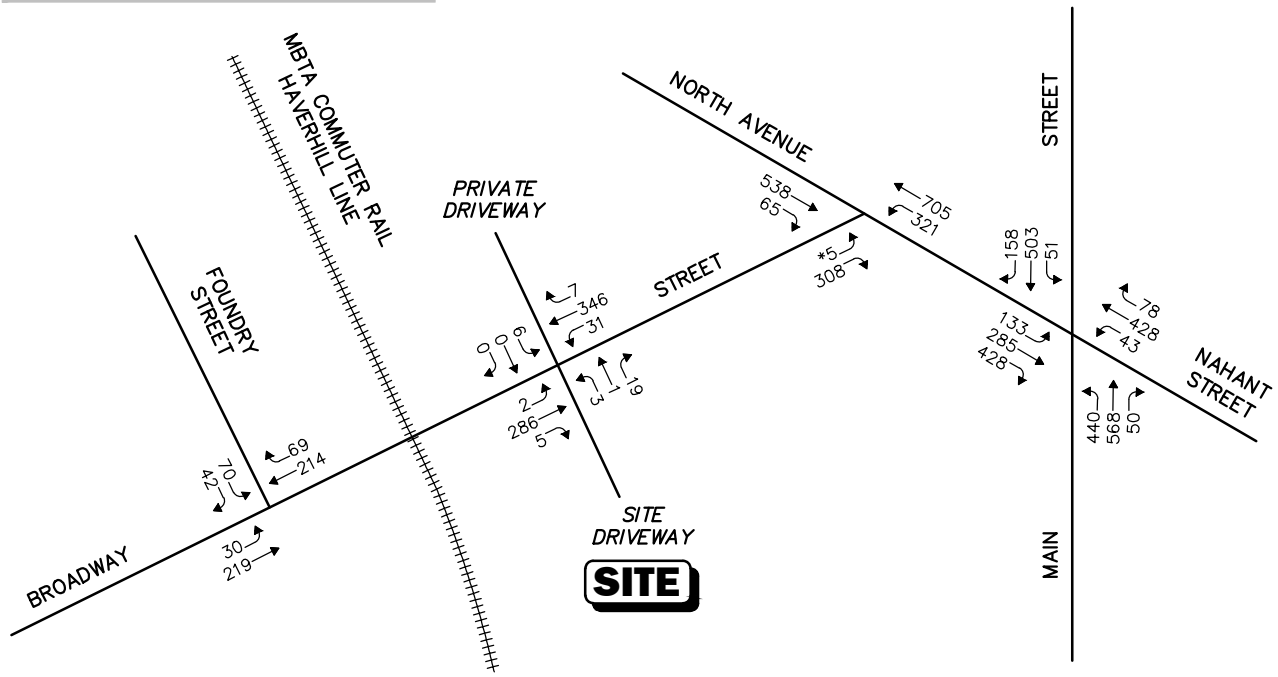
The proposal entails construction of a new six-story building with 124 housing units on the site of an existing fitness center. The fitness center will be removed to construct the residential building. In order to develop the traffic characteristics of this proposal, trip-generation statistics published by the Institute of Transportation Engineers (ITE)<sup>8</sup> for Land Use Code (LUC) 221, *Multifamily Housing (Mid-Rise)* was used to develop the traffic characteristics of the proposal.

---

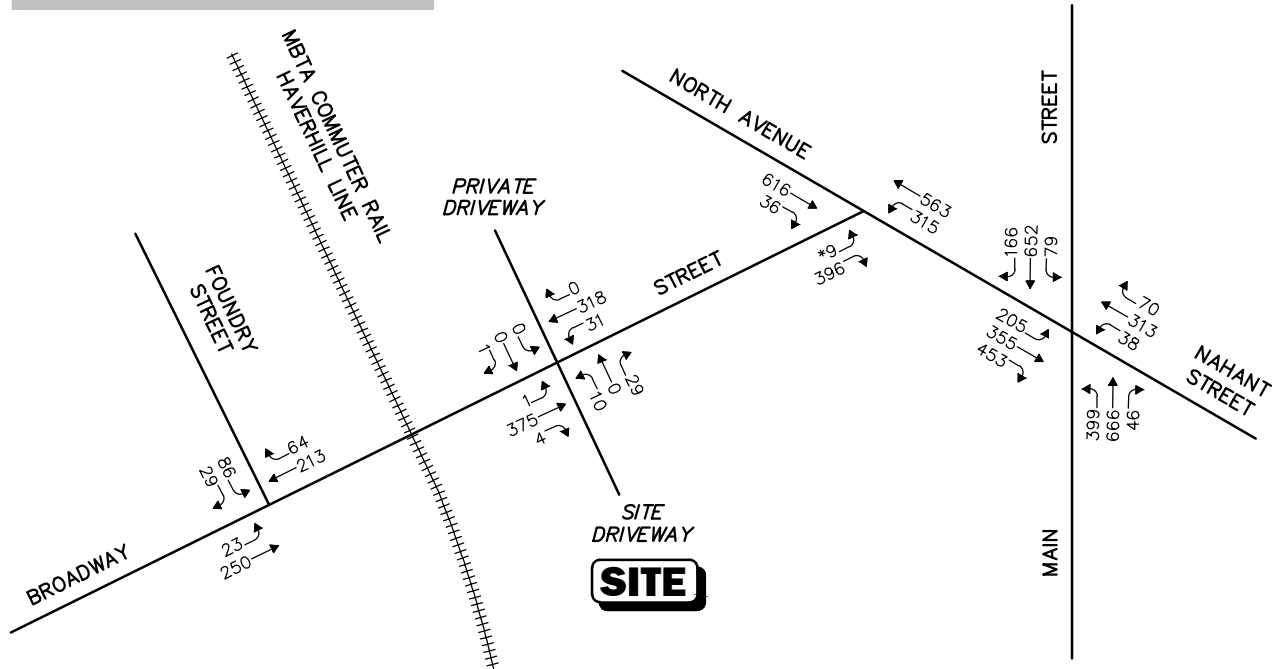
<sup>7</sup>Ibid 1.

<sup>8</sup>*Trip Generation*, 11<sup>th</sup> Edition; Institute of Transportation Engineers; Washington, DC; 2021.

**WEEKDAY MORNING PEAK HOUR**



**WEEKDAY EVENING PEAK HOUR**



Note: \*Illegal Movement.  
Not to Scale



**Figure 4**

**2029 No-Build Condition  
Peak-Hour Traffic Volumes**

## **Mode Split**

Since the Project site is located approximately 0.4 miles the rail commuter station, it is likely that some residents will choose to commute via public transit. Data from the most recent Journey-to-Work U.S. Census<sup>9</sup> for Census Tract 3351 (the tract the Project is located in) was reviewed to determine the mode split characteristics of the immediate area. Table 3 summarizes the mode split obtained from the United States Census Bureau, ACS 2016-2020.

**Table 3**  
**MODE SPLIT SUMMARY**

Mode	Percent
Car/Trucks/Vans	86.0
Drive Alone	80.0
Carpooled	6.0
Public Transit	6.7
Other <sup>b</sup>	7.3
<b>TOTAL</b>	<b>100.0</b>

<sup>a</sup>Based the United States Census Bureau for Census Tract 3351, American Community Survey 2016-2020.

<sup>b</sup>Includes bicycle, walk, and working at home.

As can be seen in Table 3, approximately 14 percent of commuters in this area of Wakefield use other travel modes besides personal vehicles or carpools to commute to work.

## **Transit Trips**

Public transportation services are provided within the study area by the MBTA with a bus stop and a train station within approximately 0.2 and 0.5 miles from the site, respectively. Based on the Commuting Characteristics by Sex of the 2016-2020 American Community Survey 5-Year Estimation, approximately 14 percent of commuters in this area of Wakefield use other travel modes besides personal vehicles or carpools to commute to work. Based on these data, a 10 percent adjustment for alternative transportation use was employed to account for the use of commuting trips not made via personal vehicle.

Trip-generation calculations were performed for a typical weekday, as well as the weekday morning and weekday evening peak hours, the critical time periods for Project-related traffic activity. A summary of the expected vehicle-trip generation is summarized in Table 4.

<sup>9</sup>2013-2017 5-Year American Community Survey; U.S. Census Bureau; Census Tract 3424; 2019.

**Table 4**  
**TRIP-GENERATION SUMMARY**

Time Period/Direction	(A) Proposed Residential Trips (124 Units) <sup>a</sup>	(B=A*1.04) Person Trips <sup>b</sup>	(C=B*10%) Non-Auto Reduction (10%) <sup>b</sup>	(D = B-C) New Person Trips	(E=D/1.04) Net New Vehicle Trips
Weekday Daily	546	568	57	511	492
<i>Weekday Morning Peak Hour:</i>					
Entering	10	10	1	9	9
<u>Exiting</u>	<u>33</u>	<u>34</u>	<u>3</u>	<u>31</u>	<u>30</u>
Total	43	44	4	40	39
<i>Weekday Evening Peak Hour:</i>					
Entering	30	31	3	28	27
<u>Exiting</u>	<u>19</u>	<u>20</u>	<u>2</u>	<u>18</u>	<u>17</u>
Total	49	51	5	46	44

<sup>a</sup>Based on ITE LUC 221, *Multifamily Housing (Mid-Rise)*.

<sup>b</sup>Based on the Commuting Characteristics by Sex of the 2016-2020 American Community Survey 5-Year Estimation – *Workers per car*. Tract 3351

As shown in Table 4, the proposed Project is expected to generate 492 vehicle trips on an average weekday (two-way, 24-hour volume), with 39 vehicle trips (9 entering and 30 exiting) during the weekday morning peak hour and 44 vehicle trips (27 entering and 17 exiting) during the weekday evening peak hour. These are one-hour projections and many trips, including work trips, can occur outside the peak hours.

The proposed Project will eliminate trips from the existing fitness center on-site. Table 5 depicts the net changes in traffic during the peak hours.

**Table 5**  
**TRIP-GENERATION COMPARISON**

Time Period/Direction	Site Existing Trips <sup>a</sup>	Proposed Project Trips (124 units) <sup>b</sup>	Net Change from Existing Trips
<i>Weekday Morning Peak Hour:</i>			
Entering	36	9	-27
<u>Exiting</u>	<u>23</u>	<u>30</u>	<u>7</u>
Total	59	39	-20
<i>Weekday Evening Peak Hour:</i>			
Entering	35	27	-8
<u>Exiting</u>	<u>39</u>	<u>17</u>	<u>-22</u>
Total	74	44	-30

<sup>a</sup>Based on February 2022 traffic counts conducted by VAI.

<sup>b</sup>See Table 4.

As shown in Table 5, the proposed Project is expected to generate approximately 20 *fewer* vehicle trips (-27 entering and 7 exiting) during the weekday morning peak hour and 30 *fewer* vehicle trips (-8 entering and -22 exiting) during the weekday evening peak hour.

**TRIP DISTRIBUTION AND ASSIGNMENT**

The directional distribution of the site-generated trips to and from the proposed development were determined based on a review of the Journey-to-Work data obtained from the United States Census Bureau<sup>10</sup> and existing travel patterns. The vehicle-trip distribution for the Project is summarized in Table 6 and graphically depicted on Figure 5.

**Table 6  
TRIP-DISTRIBUTION SUMMARY**

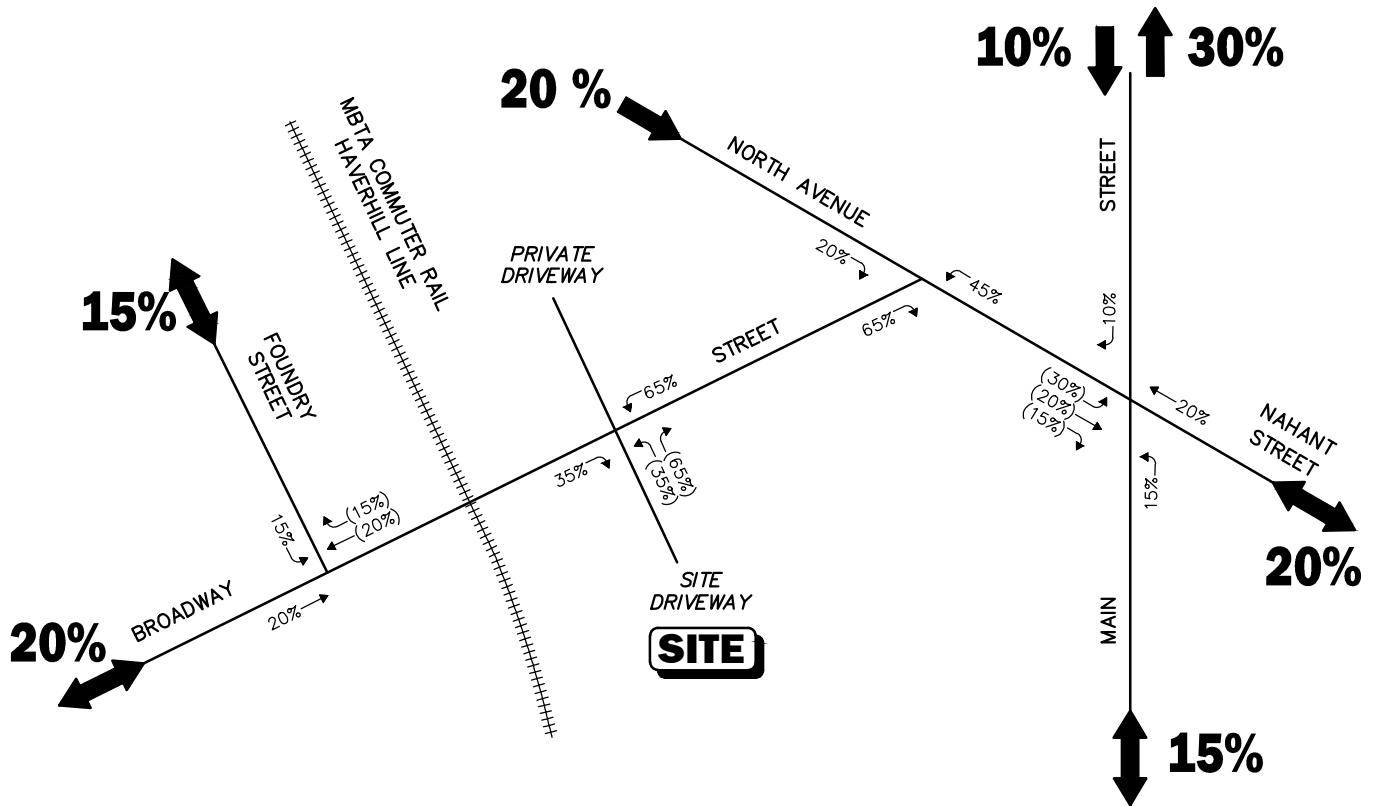
Roadway	Direction (To/From)	trips Percentage (To/From)
Broadway Street	West	20
Foundry Street	North	15
North Avenue	North	0/20
Main Street	North	30/10
Main Street	South	15
<u>Nahant Street</u>	East	<u>20</u>
<b>TOTAL</b>		<b>100</b>

The weekday morning and weekday evening peak-hour traffic volumes expected to be generated by the residential development were assigned on the study area roadway network as shown on Figure 6.

**FUTURE TRAFFIC VOLUMES - BUILD CONDITION**

The 2029 Build condition networks consist of the 2029 No-Build traffic volumes with the proposed site-generated traffic added to them minus the site existing vehicle trips. The 2029 Build weekday morning and weekday evening peak-hour traffic-volume networks are graphically depicted on Figure 7. A summary of peak-hour projected traffic-volume increases external to the study area that is the subject of this assessment is shown in Table 7. These volumes are based on the expected increases from the Project.

<sup>10</sup>Table 3. Residence MCD/County to Workplace MCD/County Commuting Flows for the United States and Puerto Rico Sorted by Residence Geography: 5-Year ACS, 2011-2015.



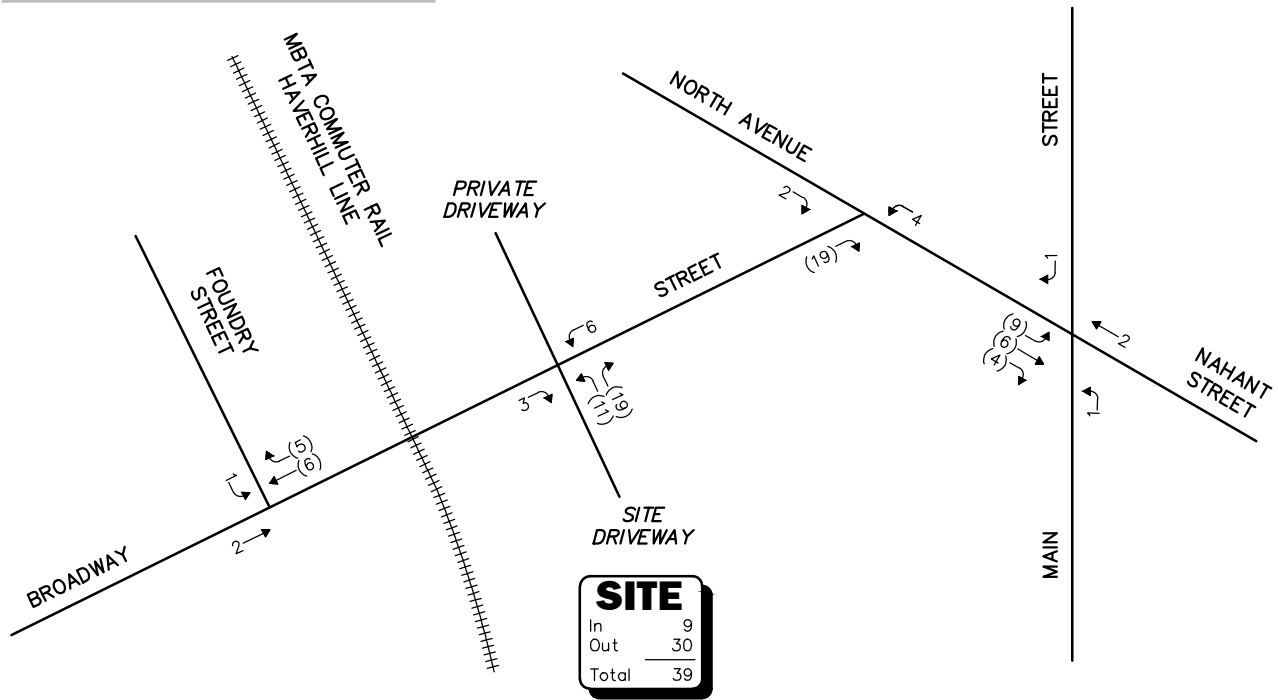
 Not to Scale

Figure 5

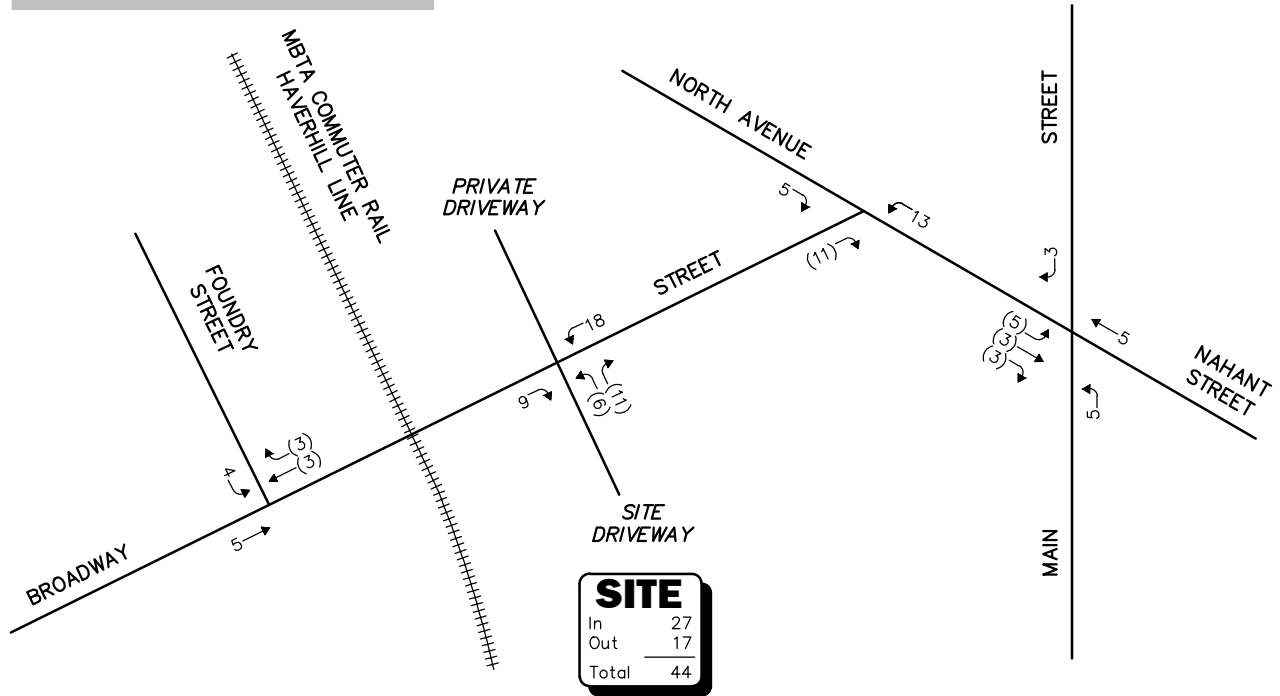
Trip Distribution Map



**WEEKDAY MORNING PEAK HOUR**



**WEEKDAY EVENING PEAK HOUR**

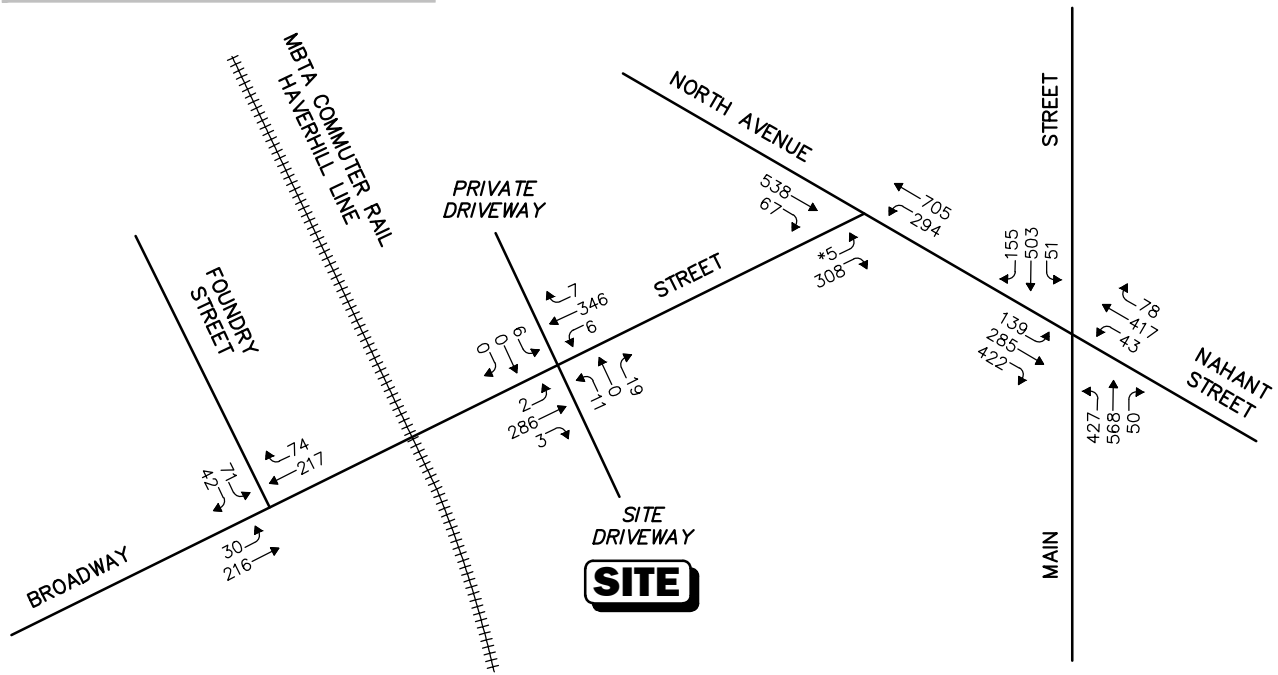


**Figure 6**

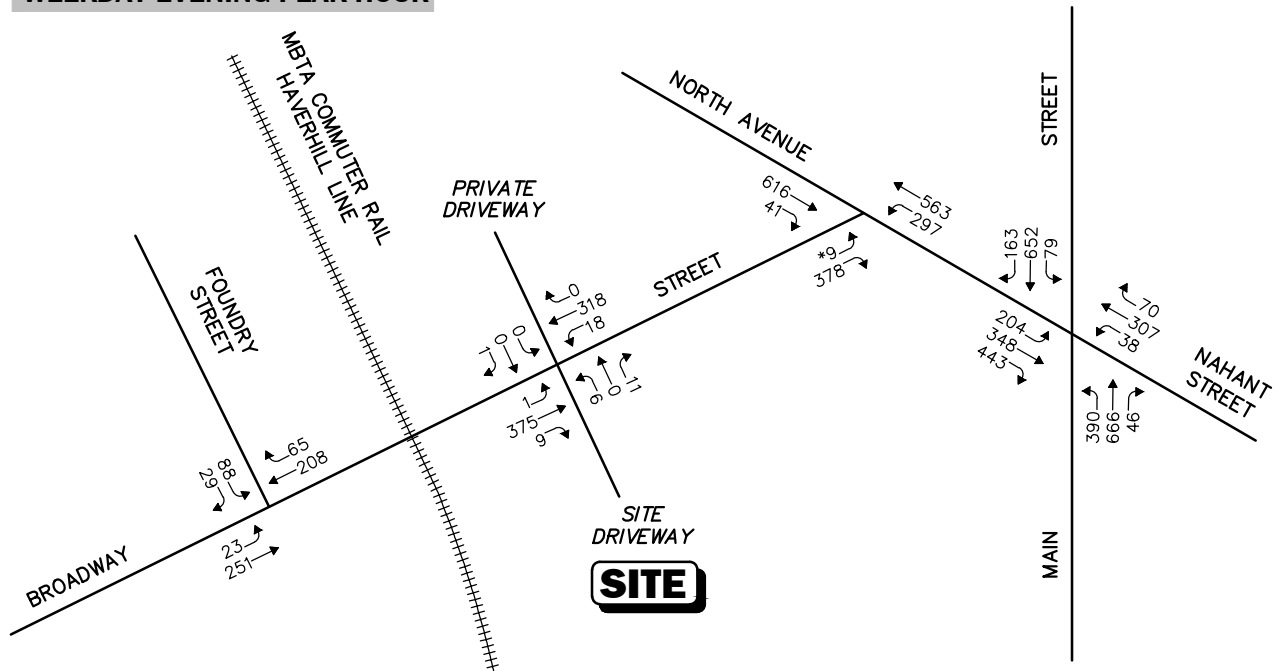
**Project-Generated  
Peak-Hour Traffic Volumes**



**WEEKDAY MORNING PEAK HOUR**



**WEEKDAY EVENING PEAK HOUR**



Note: \*Illegal Movement.  
Not to Scale



**Figure 7**

**2029 Build Condition  
Peak-Hour Traffic Volumes**



**Table 7**  
**PEAK-HOUR TRAFFIC-VOLUME INCREASES<sup>a</sup>**

Location/Peak Hour	2029 No-Build	2029 Build	Traffic-Volume Increase Over No-Build	Percent Increase Over No-Build
<i>Broadway Street, west Foundry Street:</i>				
Weekday Morning	505	505	0	0.0
Weekday Evening	515	511	-4	-0.8
<i>Foundry Street, north of Broadway Street:</i>				
Weekday Morning	211	217	6	2.3
Weekday Evening	202	205	3	1.2
<i>North Avenue, north of Broadway Street:</i>				
Weekday Morning	1,308	1,310	2	0.1
Weekday Evening	1,215	1,220	5	0.4
<i>Main Street, north of North Avenue:</i>				
Weekday Morning	1,491	1,494	3	0.2
Weekday Evening	1,838	1,834	-4	-0.2
<i>Main Street, south of North Avenue:</i>				
Weekday Morning	2,032	2,013	-19	-0.9
Weekday Evening	2,254	2,235	-19	-0.8
<i>Nahant Street, east of Main Street:</i>				
Weekday Morning	935	924	-11	-1.1
Weekday Evening	901	888	-13	-1.4

<sup>a</sup>Vehicles per hour, total of both directions.

As shown in Table 7, in comparison to future No-Build conditions, Project-related traffic increases are projected to range between -19 and 6 vehicles during peak hours, with traffic percent increases ranging between -1.4 and 2.3 percent.

## **PARKING DEMAND**

A parking demand analysis was performed to evaluate whether the proposed parking supply will be adequate to accommodate the anticipated parking demand for the Project. In order to identify the parking demand for this Project, parking demand calculations were performed based on data published by the ITE. The ITE provides parking generation equations for a number of land use codes as part of their *Parking Generation* manual<sup>11</sup> including LUC 221, *Multifamily Housing (Mid-Rise)*. The ITE data includes calculations for sites less than ½ mile from rail transit, which in this case is appropriate for use since the site is approximately 0.4 mile from the nearest commuter rail station. Table 8 summarizes the ITE parking demand data for a residential use.

<sup>11</sup>*Parking Demand, 5<sup>th</sup> Edition*, Institute of Transportation Engineers, Washington D.C., 2019.

**Table 8**  
**WEEKDAY EVENING PEAK-PARKING DEMAND<sup>a</sup>**

Units	Spaces	
	ITE Indicated Parking Demand	Proposed Parking Supply
124	120	137

<sup>a</sup>ITE *Parking Generation Manual* LUC 221, *Multifamily Housing (Mid-Rise, <1/2 mile to rail transit)*.

As shown in Table 7, ITE indicates the weekday evening peak-parking demand for this Project is 120 parking spaces which is below the proposed supply of 137 parking spaces. The proposed parking supply correspond to a parking ratio of 1.10 parking spaces per 1,000 sf. This ratio falls within the ITE range rates (0.55 – 1.45) for this use.

The proposed parking supply does not comply with the minimum parking requirements of Section 190-41, Required Off-Street Parking Spaces,<sup>12</sup> of the Town of Wakefield Zoning Ordinance. However, new publications indicate that a smaller number of parking spaces, below the 1.5-2.0 spaces per residential unit rates are desirable. A recent update to the 2020 Metropolitan Area Planning Council (MAPC) study<sup>13</sup> was performed in four Northshore communities that abut Wakefield. The study indicates that in the Northshore communities during peak demand, only 76 percent of the parking spaces at observed multifamily residential developments (during overnight demand) were occupied. At these properties, the average total parking supply was 1.25 spaces per unit, whereas average parking demand was 0.95 space per unit. It is important to note that the MAPC and Northshore community data is likely more representative of area parking demands than the national data from ITE.

The Project proponent will actively manage the parking to ensure residents and visitors park on-site.

<sup>12</sup>The Town of Wakefield Zoning by Law (Section 190-41.B) requires a parking rate of 1.5 spaces per residential unit for multifamily attached dwellings providing two bedrooms or fewer and 2.0 spaces per residential unit for multifamily attached dwellings providing three bedrooms.

<sup>13</sup>*Perfect Fit Parking Initiative: Phase 3 Update* - Beverly, Danvers, Peabody, and Salem Planning Staff, MAPC, January 21, 2020.

## SIGHT DISTANCE EVALUATION

---

Sight distance measurements were performed at both site driveway intersection with Broadway Street in accordance with MassDOT and American Association of State Highway and Transportation Officials (AASHTO)<sup>14</sup> recommendations. Both stopping sight distance (SSD) and intersection sight distance (ISD) measurements were performed. In brief, SSD is the distance recommended to be provided for a vehicle traveling at the design speed of a roadway, on wet pavement, to stop prior to striking an object in its travel path. ISD or corner sight distance (CSD) is the sight distance recommended to be provided by a driver entering or crossing an intersecting roadway to perceive an on-coming vehicle and safely complete a turning or crossing maneuver with on-coming traffic. ***In accordance with AASHTO standards, if the measured ISD is at least equal to the recommended SSD value for the appropriate design speed, the intersection can operate in a safe manner.*** Table 10 presents the measured SSD and ISD at the subject intersections

---

<sup>14</sup>*A Policy on Geometric Design of Highway and Streets*, 7<sup>th</sup> Edition; American Association of State Highway and Transportation Officials (AASHTO); Washington D.C.; 2018.

**Table 9**  
**SIGHT DISTANCE MEASUREMENTS<sup>a</sup>**

Intersection/Sight Distance Measurement	Recommended Minimum (Feet) <sup>a</sup>	
	(15 mph)	Measured
<b><i>Broadway Street at Site Drive</i></b>		
<i>Stopping Sight Distance:</i>		
Broadway Street approaching from the east	80	154 <sup>d</sup>
Broadway Street approaching from the west	80	371
<i>Intersection Sight Distance:</i>		
Looking to the east from the Project Site Drive	170	154 <sup>d</sup>
Looking to the west from the Project Site Drive	145	468

<sup>a</sup>Recommended minimum values obtained from *A Policy on Geometric Design of Highways and Streets*, 7<sup>th</sup> Edition; American Association of State Highway and Transportation Officials (AASHTO); 2018.

<sup>b</sup>Values shown are the intersection sight distance for a vehicle turning right or left exiting a roadway under STOP control such that motorists approaching the intersection on the major street should not need to adjust their travel speed to less than 70 percent of their initial approach speed.

<sup>c</sup>Value in parentheses is the available dimension if existing tree is removed.

<sup>d</sup>Measured from driveway to Broadway Street intersection with North Avenue.

As can be seen in Table 9, the sight distance at the site driveway was found to exceed the recommended values for SSD in both directions, based on a speed of 15 mph. However, due to the geometry of the roadway, the site driveway did not meet the recommended value for ISD in the east direction for the speed of 15 mph. Although the ISD is not met, the measured ISD is higher than the recommended SSD value, therefore the site driveway can operate in a safe manner.

In order to encourage safe and efficient flow of traffic to and from the site, should any landscaping or signage along the site frontage or the site driveway be proposed or requested by others, these features are recommended to be no higher than 24 inches or be set back sufficiently from the edge of the roadways so as not to inhibit the available sightlines.

# **TRAFFIC OPERATIONS ANALYSIS**

---

Measuring existing and future traffic volumes quantifies traffic flow within the study area. To assess quality of flow, roadway capacity and vehicle queue analyses were conducted under Existing, No-Build, and Build traffic-volume conditions. Capacity analyses provide an indication of how well the roadway facilities serve the traffic demands placed upon them, with vehicle queue analyses providing a secondary measure of the operational characteristics of an intersection or section of roadway under study.

## **METHODOLOGY**

### **Levels of Service**

A primary result of capacity analyses is the assignment of level of service to traffic facilities under various traffic-flow conditions.<sup>15</sup> The concept of level-of-service is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A level-of-service definition provides an index to quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety.

Six levels of service are defined for each type of facility. They are given letter designations from A to F, with level-of-service (LOS) A representing the best operating conditions and LOS F representing congested or constrained operating conditions.

Since the level-of-service of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of levels of service, depending on the time of day, day of week, or period of year.

---

<sup>15</sup>The capacity analysis methodology is based on the concepts and procedures presented in the *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2010.

## Signalized Intersections

The six levels of service for signalized intersections may be described as follows:

- *LOS A* describes operations with very low control delay; most vehicles do not stop at all.
- *LOS B* describes operations with relatively low control delay. However, more vehicles stop than *LOS A*.
- *LOS C* describes operations with higher control delays. Individual cycle failures may begin to appear. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
- *LOS D* describes operations with control delay in the range where the influence of congestion becomes more noticeable. Many vehicles stop, and individual cycle failures are noticeable.
- *LOS E* describes operations with high control delay values. Individual cycle failures are frequent occurrences.
- *LOS F* describes operations with high control delay values that often occur with oversaturation. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Levels of service for signalized intersections were calculated using the Percentile Delay Method implemented as a part of the Synchro™ 10 software as required by MassDOT. The Percentile Delay Method assesses the effects of signal type, timing, phasing, and progression; vehicle mix; and geometrics on “percentile” delay. Level-of-service designations are based on the criterion of percentile delay per vehicle and is a measure of: i) driver discomfort; ii) motorist frustration; and iii) fuel consumption; and includes a uniform delay based on percentile volumes using a Poisson arrival pattern, an initial queue move-up time, and a queue interaction delay that accounts for delays resulting from queues extending from adjacent intersections. Table 10 summarizes the relationship between level-of-service and percentile delay and uses the same numerical delay thresholds as the HCM method. The tabulated percentile delay criterion may be applied in assigning level-of-service designations to individual lane groups, to individual intersection approaches, or to entire intersections.

**Table 10**  
**LEVEL-OF-SERVICE CRITERIA**  
**FOR SIGNALIZED INTERSECTIONS**

Level of Service	Percentile Delay Per Vehicle (Seconds)
A	≤10.0
B	10.1 to 20.0
C	20.1 to 35.0
D	35.1 to 55.0
E	55.1 to 80.0
F	>80.0

## Unsignalized Intersections

The six levels of service for unsignalized intersections may be described as follows:

- *LOS A* represents a condition with little or no control delay to minor street traffic.
- *LOS B* represents a condition with short control delays to minor street traffic.
- *LOS C* represents a condition with average control delays to minor street traffic.
- *LOS D* represents a condition with long control delays to minor street traffic.
- *LOS E* represents operating conditions at or near capacity level, with very long control delays to minor street traffic.
- *LOS F* represents a condition where minor street demand volume exceeds capacity of an approach lane, with extreme control delays resulting.

The levels of service of unsignalized intersections are determined by application of a procedure described in the 2010 *Highway Capacity Manual*.<sup>16</sup> Level of service is measured in terms of average control delay. Mathematically, control delay is a function of the capacity and degree of saturation of the lane group and/or approach under study and is a quantification of motorist delay associated with traffic control devices such as traffic signals and STOP signs. Control delay includes the effects of initial deceleration delay approaching a STOP sign, stopped delay, queue move-up time, and final acceleration delay from a stopped condition. Definitions for level of service at unsignalized intersections are also given in the 2010 *Highway Capacity Manual*. Table 11 summarizes the relationship between level of service and average control delay for two-way STOP-controlled and all-way STOP-controlled intersections.

**Table 11**  
**LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS<sup>a</sup>**

Level-of-Service by Volume-to-Capacity Ratio		Average Control Delay (Seconds Per Vehicle)
$v/c \leq 1.0$	$v/c > 1.0$	
A	F	$\leq 10.0$
B	F	10.1 to 15.0
C	F	15.1 to 25.0
D	F	25.1 to 35.0
E	F	35.1 to 50.0
F	F	$> 50.0$

<sup>a</sup>Source: *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2010; page 19-2.

<sup>16</sup>*Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2010.

## **ANALYSIS RESULTS**

Level-of-service and vehicle queue analyses were conducted for 2022 Existing, 2029 No-Build, and 2029 Build conditions for the intersections within the study area. The results of the intersection capacity and vehicle queue analyses are summarized for signalized and unsignalized intersections in Tables 12 and 13, respectively, with the detailed analysis results presented in the Appendix.

The Project site currently houses one building that is utilized as a fitness center. As identified in the Trip Generation section, this use generates more traffic than the proposed residential use. Overall, the reduction in traffic associated with the proposed residential development will have the net effect of reducing overall traffic delays along North Avenue, specifically at the signalized intersection of North Avenue at Nahant Street and Main Street with immaterial impact on operating conditions for vehicles turning onto Broadway Street from Foundry Street. It can be concluded that ample roadway capacity will be available to support the Project. The following is a summary of the level-of-service and delay analyses for the intersections within the study area:

### **Signalized Intersections**

#### **North Avenue at Nahant Street and Main Street**

Under future Build conditions, capacity analyses indicate that this signalized intersection will continue to operate at overall LOS F during the weekday morning peak hour and at overall LOS E during the weekday evening peak hour. It is noteworthy that the level of service remains the same under future No-Build and Build conditions. With the elimination of the existing use and addition of the residential trips, a decrease in delay of approximately 4 seconds is expected at this intersection.

### **Unsignalized Intersections**

#### **Broadway Street at Foundry Street**

Under existing conditions, the critical movement at this unsignalized intersection will operate at an overall LOS B or better during the weekday morning and evening peak hours. Under future conditions, the movements at this unsignalized intersection will operate at an overall LOS C or better during the weekday morning and evening peak hours, with or without the Project. The addition of the residential trips results in no or negligible increases in delay for vehicles turning from Foundry Street during the peak hours.

#### **North Avenue at Broadway Street**

Under existing conditions, the critical movement (right turn from Broadway Street) at this unsignalized intersection will operate at overall LOS E during the weekday morning peak hour and at overall LOS F during the weekday evening peak hour. Under future conditions, the critical movement (right turn from Broadway Street) at this unsignalized intersection will operate at an overall LOS F or better during both morning and evening peak hours, with or without the Project. With the addition of the residential trips, a delay increase of less than 1 second is expected for vehicles turning from Broadway Street during the weekday morning peak hour with a decrease expected during weekday evening peak period. The vehicle queuing decreases were shown to be up to 1 vehicle over No-Build conditions.



### **Broadway Street at Site Driveway**

Under all conditions, the site driveway movements at this intersection operate at an overall LOS B or better during the weekday morning and evening peak hours, with or without the Project. With the change in use, an immaterial increase in delay of less than 1 second is expected at the site driveway, as more left turns are expected at the site driveway than under current conditions.

**Table 12**  
**SIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY**

Signalized Intersection/ Peak Hour/Movement	2022 Existing Conditions				2029 No-Build Conditions				2029 Build Conditions			
	V/C <sup>a</sup>	Delay <sup>b</sup>	LOS <sup>c</sup>	Queue <sup>d</sup> Avg/95 <sup>th</sup>	V/C <sup>a</sup>	Delay <sup>b</sup>	LOS <sup>c</sup>	Queue <sup>d</sup> Avg/95 <sup>th</sup>	V/C <sup>a</sup>	Delay <sup>b</sup>	LOS <sup>c</sup>	Queue <sup>d</sup> Avg/95 <sup>th</sup>
<b>North Avenue at Nahant Street and Main Street</b>												
<i>Weekday Morning:</i>												
North Avenue SE LT	1.56	326	F	124/302	2.19	602.2	F	152/336	2.17	590	F	158/349
North Avenue SE TH	0.53	35.2	D	143/296	0.62	37.6	D	171/348	0.62	37.6	D	171/348
North Avenue SE RT	0.41	2.6	A	0/37	0.45	2.7	A	0/37	0.44	2.6	A	0/37
Nahant Street NW LTR	1.27	170.5	F	459/849	1.63	322.6	F	601/1020	1.6	309.5	F	585/999
Main Street NE LT	1.11	112	F	310/692	1.24	161.4	F	383/795	1.21	147.9	F	364/769
Main Street NE TH/RT	0.65	22.2	C	243/607	0.7	23.6	C	271/716	0.7	23.6	C	271/716
Main Street SW LT	0.31	40.1	D	27/82	0.34	41.3	D	29/85	0.34	41.3	D	29/85
Main Street SW TH/RT	0.83	45.1	D	203/417	0.89	50.1	D	223/466	0.89	49.7	D	222/462
<b>Overall</b>	--	<b>94.4</b>	<b>F</b>	--	--	<b>126.3</b>	<b>F</b>	--	--	<b>121.8</b>	<b>F</b>	--
<i>Weekday Evening:</i>												
North Avenue SE LT	1.15	148	F	144/395	1.44	262	F	180/442	1.41	248.8	F	177/440
North Avenue SE TH	0.62	37.8	D	175/414	0.73	41.9	D	215/530	0.72	41.3	D	210/515
North Avenue SE RT	0.41	2.6	A	0/56	0.45	2.7	A	0/58	0.44	2.7	A	0/57
Nahant Street NW LTR	0.86	53.4	D	213/564	1.19	141.3	F	316/725	1.15	125.7	F	302/709
Main Street NE LT	0.89	60.4	E	225/576	1	80.5	F	261/663	0.97	75.2	E	253/646
Main Street NE TH/RT	0.70	23.7	C	280/788	0.76	25.6	C	315/885	0.76	25.6	C	315/885
Main Street SW LT	0.49	46.9	D	45/124	0.61	55.3	E	49/153	0.61	55.3	E	49/153
Main Street SW TH/RT	1.06	83.3	F	284/574	1.13	108	F	341/631	1.13	106.3	F	338/628
<b>Overall</b>	--	<b>53.1</b>	<b>D</b>	--	--	<b>78.9</b>	<b>E</b>	--	--	<b>75.4</b>	<b>E</b>	--

<sup>a</sup>Volume-to-capacity ratio.

<sup>b</sup>Control (signal) delay per vehicle in seconds.

<sup>c</sup>Level-of-Service.

<sup>d</sup>Queue length in feet.

SE = southeastbound; NW = northwestbound; NE = northeastbound; SW = southwestbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

**Table 13**  
**UNIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY**

Unsignalized Intersection/Peak Hour/Movement	2022 Existing Conditions			2029 No-Build Conditions			2029 Build Conditions			
	Delay <sup>b</sup>	LOS <sup>c</sup>	Queue <sup>d</sup> Avg/95th	Delay <sup>b</sup>	LOS <sup>c</sup>	Queue <sup>d</sup> Avg/95th	Delay <sup>b</sup>	LOS <sup>c</sup>	Queue <sup>d</sup> Avg/95th	
<b>Site Driveway/Private Driveway &amp; Broadway Street</b>										
<i>Weekday Morning:</i>										
Site Drive NB LT/RT	11.3	B	0.2	12.1	B	0.2	13.5	B	0.3	
Broadway Street EB LT	8.0	A	0.0	8.3	A	0.0	8.1	A	0	
Broadway Street EB TH	0.0	A	-	0.0	A	-	0.0	A	-	
Broadway Street WB LT	8.0	A	0.1	8.1	A	0.1	8.0	A	0.1	
Broadway Street WB TH	0.0	A	-	0.0	A	-	0.0	A	-	
Private Drive SB LT/RT	17.7	C	0.1	20.0	C	0.2	18.2	C	0.1	
<i>Weekday Evening:</i>										
Site Drive NB LT/RT	12.9	B	0.3	14.0	B	0.4	14.0	B	0.2	
Broadway Street EB LT	7.8	A	0.0	7.9	A	0.0	8.0	A	0	
Broadway Street EB TH	0.0	A	-	0.0	A	-	0.0	A	-	
Broadway Street WB LT	8.2	A	0.1	8.3	A	0.1	8.3	A	0.1	
Broadway Street WB TH	0.0	A	-	0.0	A	-	0.0	A	-	
Private Drive SB LT/RT	9.9	A	0.0	10.3	B	0.0	10.3	B	0.0	
<b>North Avenue at Broadway Street</b>										
<i>Weekday Morning:</i>										
North Avenue NW LT	11.6	B	1.8	12.7	B	2.3	12.2	B	2.0	
Broadway Street EB LT/RT	34.9	D	6.5	68.1	F	11.4	69.4	F	11.6	
<i>Weekday Evening:</i>										
North Avenue NW LT	10.4	B	1.3	11.2	B	1.8	11.0	B	1.6	
Broadway Street EB LT/RT	67.3	F	13.3	130.9	F	20.8	112.9	F	18.6	
<b>Broadway Street at Foundry Street</b>										
<i>Weekday Morning:</i>										
Broadway Street EB LT	8.1	A	0.1	8.1	A	0.1	8.4	A	0.1	
Broadway Street EB TH	0.0	A	-	0.0	A	-	0.0	A	-	
Foundry Street SB LT/RT	12.8	B	0.5	15.3	C	1.0	15.4	C	1.0	
<i>Weekday Evening:</i>										
Broadway Street EB LT	7.8	A	0.0	8.0	A	0.1	8.0	A	0.1	
Broadway Street EB TH	0.0	A	-	0.0	A	-	0.0	A	-	
Foundry Street SB LT/RT	13.6	B	0.9	16.6	C	1.7	16.6	C	1.7	

<sup>a</sup>Demand in vehicles per hour.

<sup>b</sup>Control (signal) delay per vehicle in seconds.

<sup>c</sup>Level of service.

<sup>d</sup>Queue length in vehicle.

NB = northbound; EB = eastbound; WB = westbound; SB = southbound; LT = left-turning movements; RT = right-turning movements; TH = through movements.

## **CONCLUSIONS AND RECOMMENDATIONS**

---

Vanasse & Associates, Inc. (VAI) has prepared this TIA in order to evaluate potential traffic impacts associated with the proposed residential development to be located at 10 Broadway Street in Wakefield, Massachusetts (the “Project”). This study was prepared in accordance with the MassDOT *Transportation Impact Assessment (TIA) Guidelines*; and was conducted pursuant to the standards of the Traffic Engineering and Transportation Planning Professions for the preparation of such reports. Based on the results of this study, the following can be concluded:

- The proposed residential development is expected to generate approximately 20 fewer vehicle trips (-27 entering and 7 exiting) during the weekday morning peak hour and 30 fewer vehicle trips (-8 entering and -22 exiting) during the weekday evening peak hour as compared with the existing fitness center use.
- Project-related traffic increases are projected to range between -1.4 and 2.3 percent during peak hours.
- The analysis has indicated that the Project will result in decreases to motorist delays at the studied intersections, as compared with future No-Build conditions.
- No apparent safety deficiencies were noted with respect to the motor vehicle crash history at the study area intersections.
- Lines of sight at the Project site roadway intersections with Broadway Street were found to exceed or could be made to meet or exceed the recommended minimum distance for safe operation based on the appropriate approach speed.

In consideration of the above, we have concluded that the Project can be accommodated within the confines of the existing transportation infrastructure in a safe and efficient manner with the implementation of the following recommendations.

### **RECOMMENDATIONS**

The following recommendations have been developed as a part of this evaluation and, where applicable, will be completed in conjunction with the Project subject to receipt of all necessary rights, permits, and approvals.

## **Project Access**

Access and egress to the site is proposed by one existing full-access driveway off Broadway Street. The following recommendations are offered with respect to Project access, internal circulation, and parking, many of which are already reflected on the Site Plans for the Project:

- The Project site driveway and internal circulating drives should be minimum of 24 feet in width where two-way traffic is to be conveyed, and designed to accommodate the turning and maneuvering requirements of the largest anticipated responding emergency vehicle as defined by the Wakefield Fire Department;
- Vehicles exiting the Project site should be placed under STOP-sign control with a marked STOP-line provided;
- All signs and pavement markings to be installed within the Project site should conform to the applicable standards of the MUTCD;<sup>17</sup>
- Americans with Disabilities Act (ADA)-compliant wheelchair ramps should be provided at all pedestrian crossings internal to the Project site and for crossing the Project site drive-ways;
- Signs and landscaping to be installed as a part of the Project within intersection sight triangle areas of the Project site driveways should be designed and maintained so as not to restrict lines of sight;
- Snow windrows within the sight triangle areas of the Project site driveway and at intersections within the Project site should be promptly removed where such accumulations would impede sightlines; and
- A school bus waiting area should be provided at an appropriate location defined in consultation with Wakefield Public Schools.

## **TRANSPORTATION DEMAND MANAGEMENT (TDM) PLAN**

As is the case with many developments, a major focus of the traffic mitigation plan focuses on the reduction of single-occupant vehicles arriving and departing to and from the site. This is predominantly accomplished by developing a comprehensive TDM strategy. In an effort to encourage the use of alternative modes of transportation to single-occupant vehicles, the following TDM measures will be implemented as a part of the Project:

- Information regarding public transportation services, maps, schedules, and fare information should be posted in a central location and/or otherwise made available to residents and employees;
- A “welcome packet” should be provided to residents and employees detailing available public transportation services, bicycle and walking alternatives, and available commuter options;
- Pedestrian accommodations should be incorporated into the Project and consist of side-

---

<sup>17</sup>Ibid 1.

walks and ADA-compliant wheelchair ramps at all pedestrian crossings internal to the Project site that will link building entrances to the sidewalk infrastructure along Broadway Street;

- Secure bicycle parking should be provided within the Project site consisting of both exterior and interior (covered) bicycle parking; and
- Consideration should be given to installing accommodations for the charging of electric vehicles by residents of the Project.

## **CONCLUSIONS**

The proposed Project represents a decrease in traffic volumes to and from the existing occupied fitness center and as such, will result in a decrease in delays at most studied intersections. With the implementation of the above recommendations, safe and efficient access will be provided to the planned development and the proposed development can be constructed with minimal impact to the area.



## APPENDIX

---

SITE PLAN

TURNING MOVEMENT COUNTS

TRAFFIC ADJUSTMENTS

PUBLIC TRANSPORTATION SCHEDULES

MOTOR VEHICLE CRASH DATA

GROWTH RATE CALCULATIONS

BACKGROUND DEVELOPMENT

TRIP DISTRIBUTION

EXISTING SITE TRIP REDUCTION

US CENSUS

TRIP GENERATION

PARKING ANALYSIS

CAPACITY ANALYSIS







**SITE PLAN**

---

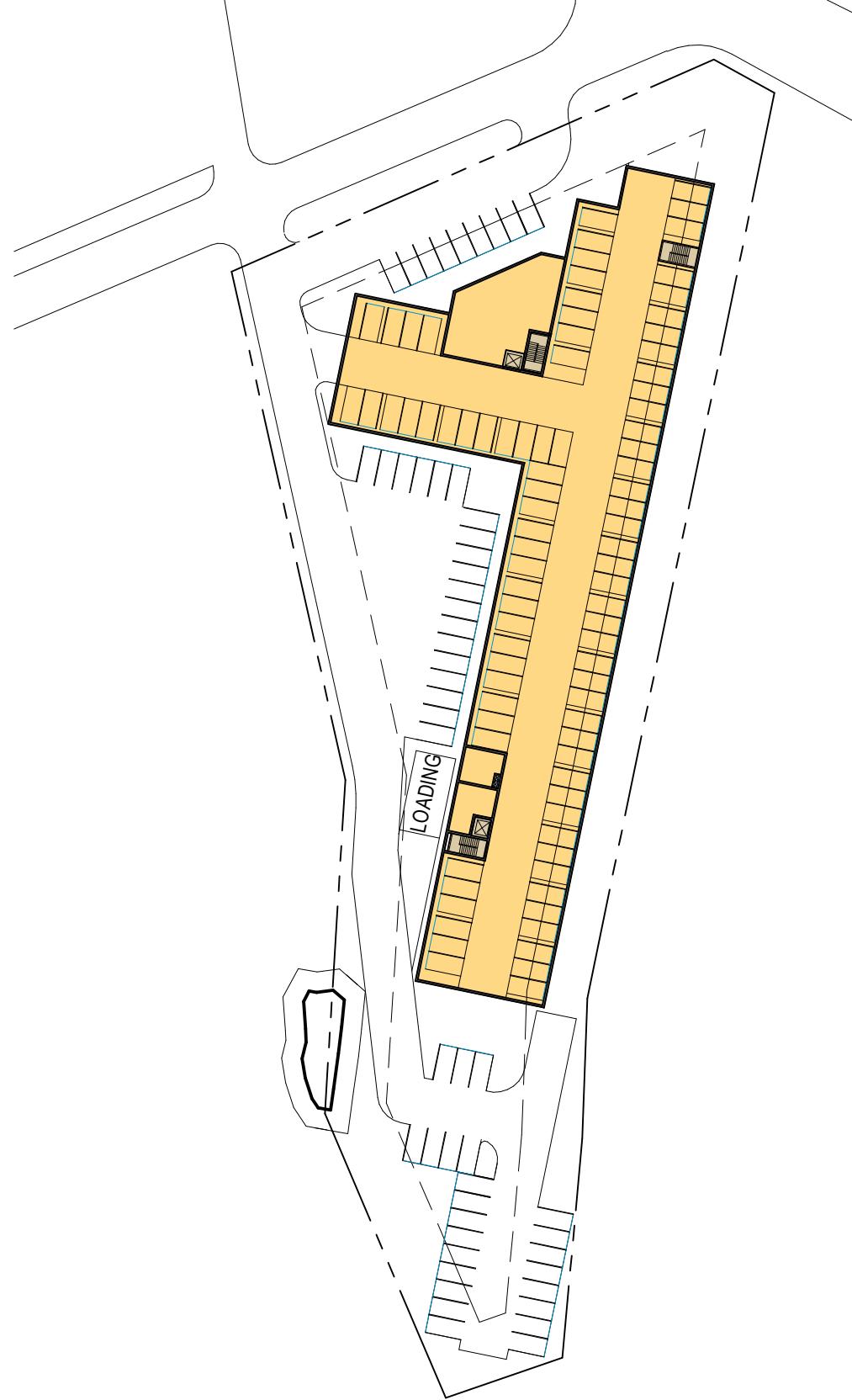




**CONCEPTUAL TEST FIT**  
**4 RESI FLOORS OVER ONE GARAGE FLOOR**  
163,400 GSF

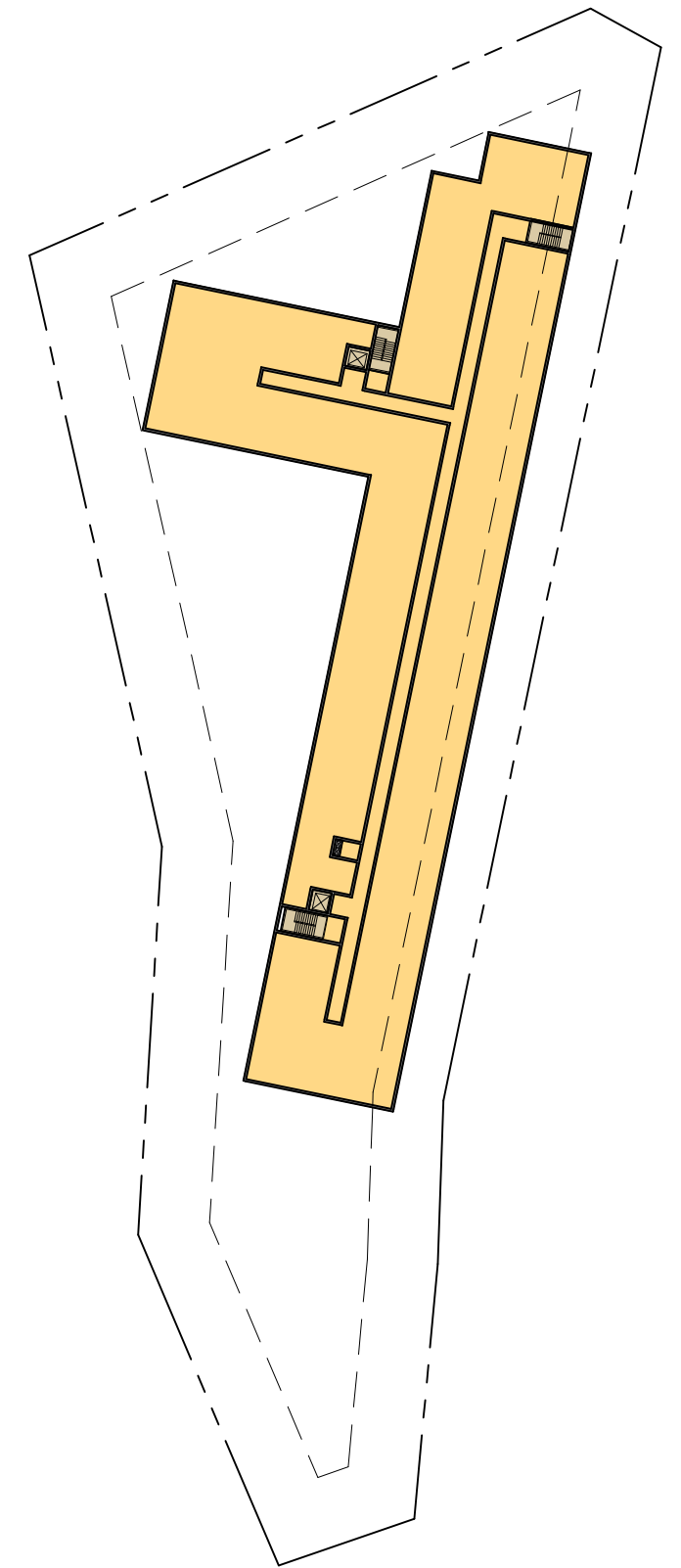
Approx 124 Units (850 Average)  
137 Parking Spaces

1.1 Parking Ratio



**GROUND FLOOR PLAN**

33,800 GSF  
2,150 SF Residential Lobby  
85 Parking Spaces  
52 Surface Parking Spaces



**TYPICAL RESIDENTIAL FLOOR**

32,400 GSF  
(26,550 NRSF / flr at 82% eff.) / 850 Avg Unit NRSF = 31 Units / flr  
4 Typical Floors (100,400 GSF)  
850 Average Unit NRSF  
Approx 124 Units

KIMCO WAKEFIELD  
10 Broadway Street, Wakefield MA

# Conceptual Test Fit

02 June 2022

CUBE 3 Studio LLC | 370 Merrimack Street, Suite 337 | Lawrence, MA 01843 | 978.989.9900 | cube3.com



COPYRIGHT (C) 2021 CUBE 3 STUDIO LLC. ALL RIGHTS RESERVED



## TURNING MOVEMENT COUNTS





# Accurate Counts

978-664-2565

N/S Street : Foundry Street  
 E/W Street : Broadway Street  
 City/State : Wakefield, MA  
 Weather : Clear

File Name : 92510001  
 Site Code : 92510001  
 Start Date : 2/17/2022  
 Page No : 1

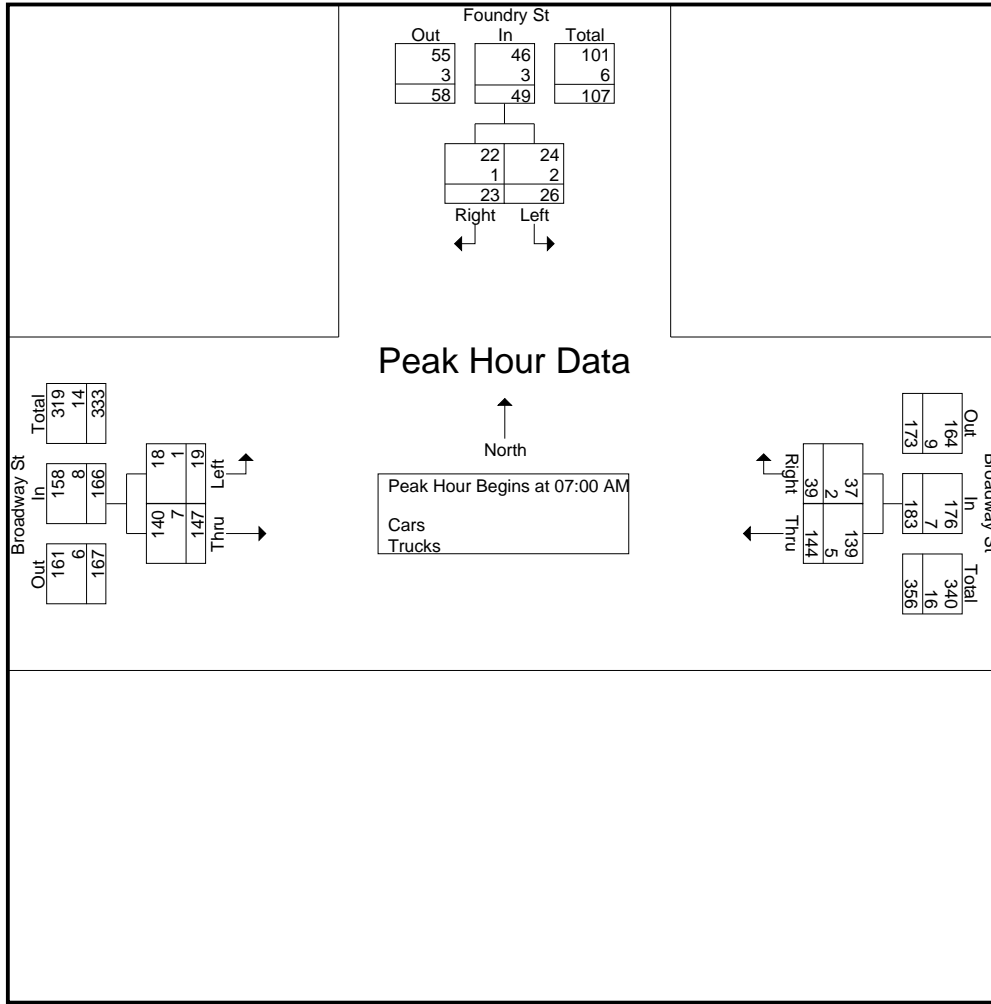
### Groups Printed- Cars - Trucks

Start Time	Foundry St From North		Broadway St From East		Broadway St From West		Int. Total
	Left	Right	Thru	Right	Left	Thru	
07:00 AM	9	3	24	17	6	48	107
07:15 AM	6	6	22	1	1	34	70
07:30 AM	4	8	51	9	7	36	115
07:45 AM	7	6	47	12	5	29	106
<b>Total</b>	<b>26</b>	<b>23</b>	<b>144</b>	<b>39</b>	<b>19</b>	<b>147</b>	<b>398</b>
08:00 AM	5	8	19	9	5	25	71
08:15 AM	6	4	32	8	2	36	88
08:30 AM	3	4	50	11	1	39	108
08:45 AM	5	5	33	13	3	40	99
<b>Total</b>	<b>19</b>	<b>21</b>	<b>134</b>	<b>41</b>	<b>11</b>	<b>140</b>	<b>366</b>
<b>Grand Total</b>	<b>45</b>	<b>44</b>	<b>278</b>	<b>80</b>	<b>30</b>	<b>287</b>	<b>764</b>
Apprch %	50.6	49.4	77.7	22.3	9.5	90.5	
Total %	5.9	5.8	36.4	10.5	3.9	37.6	
Cars	41	43	269	74	29	279	735
% Cars	91.1	97.7	96.8	92.5	96.7	97.2	96.2
Trucks	4	1	9	6	1	8	29
% Trucks	8.9	2.3	3.2	7.5	3.3	2.8	3.8

Start Time	Foundry St From North			Broadway St From East			Broadway St From West			Int. Total
	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	<b>9</b>	3	12	24	<b>17</b>	41	6	<b>48</b>	<b>54</b>	107
07:15 AM	6	6	12	22	1	23	1	34	35	70
07:30 AM	4	<b>8</b>	12	<b>51</b>	9	<b>60</b>	<b>7</b>	36	43	<b>115</b>
07:45 AM	7	6	<b>13</b>	47	12	59	5	29	34	106
Total Volume	26	23	49	144	39	183	19	147	166	398
% App. Total	53.1	46.9		78.7	21.3		11.4	88.6		
PHF	.722	.719	.942	.706	.574	.763	.679	.766	.769	.865
Cars	24	22	46	139	37	176	18	140	158	380
% Cars	92.3	95.7	93.9	96.5	94.9	96.2	94.7	95.2	95.2	95.5
Trucks	2	1	3	5	2	7	1	7	8	18
% Trucks	7.7	4.3	6.1	3.5	5.1	3.8	5.3	4.8	4.8	4.5



N/S Street : Foundry Street  
E/W Street : Broadway Street  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	07:15 AM			07:45 AM			07:00 AM		
+0 mins.	6	6	12	47	<b>12</b>	59	6	<b>48</b>	<b>54</b>
+15 mins.	4	<b>8</b>	12	19	9	28	1	34	35
+30 mins.	<b>7</b>	6	<b>13</b>	32	8	40	<b>7</b>	36	43
+45 mins.	5	8	13	<b>50</b>	11	<b>61</b>	5	29	34
Total Volume	22	28	50	148	40	188	19	147	166
% App. Total	44	56		78.7	21.3		11.4	88.6	
PHF	.786	.875	.962	.740	.833	.770	.679	.766	.769
Cars	21	27	48	144	37	181	18	140	158
% Cars	95.5	96.4	96	97.3	92.5	96.3	94.7	95.2	95.2
Trucks	1	1	2	4	3	7	1	7	8
% Trucks	4.5	3.6	4	2.7	7.5	3.7	5.3	4.8	4.8





**Accurate Counts**  
978-664-2565

N/S Street : Foundry Street  
E/W Street : Broadway Street  
City/State : Wakefield, MA  
Weather : Clear

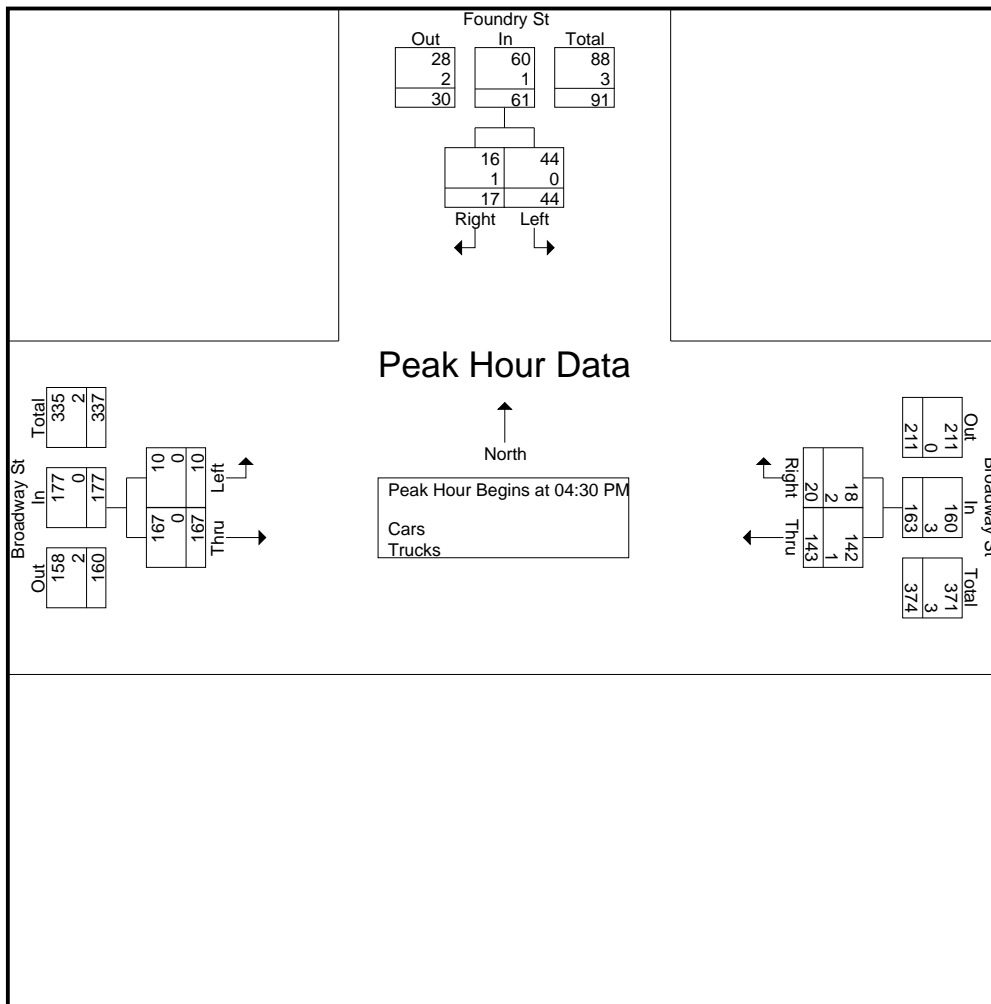
File Name : 92510001  
Site Code : 92510001  
Start Date : 2/17/2022  
Page No : 1

**Groups Printed- Cars - Trucks**

Start Time	Foundry St From North		Broadway St From East		Broadway St From West		Int. Total
	Left	Right	Thru	Right	Left	Thru	
04:00 PM	8	6	42	5	6	38	105
04:15 PM	7	1	33	3	1	27	72
04:30 PM	9	5	41	8	3	38	104
04:45 PM	5	6	35	2	2	38	88
<b>Total</b>	<b>29</b>	<b>18</b>	<b>151</b>	<b>18</b>	<b>12</b>	<b>141</b>	<b>369</b>
05:00 PM	18	6	36	4	1	48	113
05:15 PM	12	0	31	6	4	43	96
05:30 PM	9	2	39	5	1	26	82
05:45 PM	5	1	40	5	1	25	77
<b>Total</b>	<b>44</b>	<b>9</b>	<b>146</b>	<b>20</b>	<b>7</b>	<b>142</b>	<b>368</b>
<b>Grand Total</b>	<b>73</b>	<b>27</b>	<b>297</b>	<b>38</b>	<b>19</b>	<b>283</b>	<b>737</b>
Apprch %	73	27	88.7	11.3	6.3	93.7	
Total %	9.9	3.7	40.3	5.2	2.6	38.4	
Cars	73	26	296	36	19	282	732
% Cars	100	96.3	99.7	94.7	100	99.6	99.3
Trucks	0	1	1	2	0	1	5
% Trucks	0	3.7	0.3	5.3	0	0.4	0.7

Start Time	Foundry St From North			Broadway St From East			Broadway St From West			Int. Total
	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	9	5	14	<b>41</b>	<b>8</b>	<b>49</b>	3	38	41	104
04:45 PM	5	6	11	35	2	37	2	38	40	88
05:00 PM	<b>18</b>	6	<b>24</b>	36	4	40	1	<b>48</b>	<b>49</b>	<b>113</b>
05:15 PM	12	0	12	31	6	37	<b>4</b>	43	47	96
Total Volume	44	17	61	143	20	163	10	167	177	401
% App. Total	72.1	27.9		87.7	12.3		5.6	94.4		
PHF	.611	.708	.635	.872	.625	.832	.625	.870	.903	.887
Cars	44	16	60	142	18	160	10	167	177	397
% Cars	100	94.1	98.4	99.3	90.0	98.2	100	100	100	99.0
Trucks	0	1	1	1	2	3	0	0	0	4
% Trucks	0	5.9	1.6	0.7	10.0	1.8	0	0	0	1.0

N/S Street : Foundry Street  
E/W Street : Broadway Street  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	04:30 PM			04:00 PM			04:30 PM		
+0 mins.	9	5	14	<b>42</b>	5	47	3	38	41
+15 mins.	5	<b>6</b>	11	33	3	36	2	38	40
+30 mins.	<b>18</b>	6	<b>24</b>	41	<b>8</b>	<b>49</b>	1	<b>48</b>	<b>49</b>
+45 mins.	12	0	12	35	2	37	<b>4</b>	43	47
Total Volume	44	17	61	151	18	169	10	167	177
% App. Total	72.1	27.9		89.3	10.7		5.6	94.4	
PHF	.611	.708	.635	.899	.563	.862	.625	.870	.903
Cars	44	16	60	150	18	168	10	167	177
% Cars	100	94.1	98.4	99.3	100	99.4	100	100	100
Trucks	0	1	1	1	0	1	0	0	0
% Trucks	0	5.9	1.6	0.7	0	0.6	0	0	0





**Accurate Counts**  
978-664-2565

File Name : 92510002  
Site Code : 92510002  
Start Date : 2/17/2022  
Page No : 1

N/S Street : North Avenue  
E/W Street : Broadway Street  
City/State : Wakefield, MA  
Weather : Clear

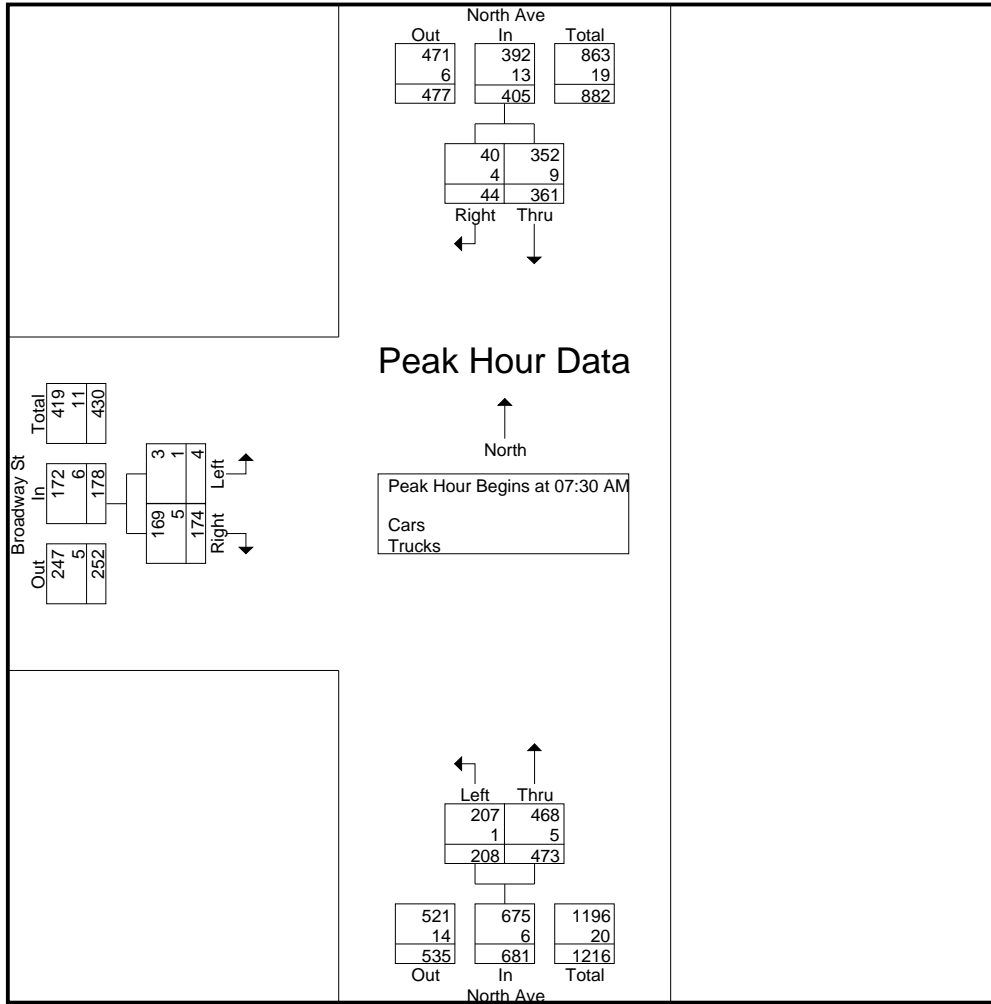
Groups Printed- Cars - Trucks

Start Time	North Ave From North		North Ave From South		Broadway St From West		Int. Total
	Thru	Right	Left	Thru	Left	Right	
07:00 AM	83	10	51	90	0	60	294
07:15 AM	91	2	31	103	0	46	273
07:30 AM	115	16	56	145	2	44	378
07:45 AM	86	17	50	91	2	42	288
<b>Total</b>	<b>375</b>	<b>45</b>	<b>188</b>	<b>429</b>	<b>4</b>	<b>192</b>	<b>1233</b>
08:00 AM	83	5	49	112	0	31	280
08:15 AM	77	6	53	125	0	57	318
08:30 AM	84	1	60	98	3	39	285
08:45 AM	76	3	49	99	1	60	288
<b>Total</b>	<b>320</b>	<b>15</b>	<b>211</b>	<b>434</b>	<b>4</b>	<b>187</b>	<b>1171</b>
<b>Grand Total</b>	<b>695</b>	<b>60</b>	<b>399</b>	<b>863</b>	<b>8</b>	<b>379</b>	<b>2404</b>
Apprch %	92.1	7.9	31.6	68.4	2.1	97.9	
Total %	28.9	2.5	16.6	35.9	0.3	15.8	
Cars	675	54	396	855	7	368	2355
% Cars	97.1	90	99.2	99.1	87.5	97.1	98
Trucks	20	6	3	8	1	11	49
% Trucks	2.9	10	0.8	0.9	12.5	2.9	2

Start Time	North Ave From North			North Ave From South			Broadway St From West			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	<b>115</b>	16	<b>131</b>	<b>56</b>	<b>145</b>	<b>201</b>	<b>2</b>	44	46	<b>378</b>
07:45 AM	86	17	103	50	91	141	2	42	44	288
08:00 AM	83	5	88	49	112	161	0	31	31	280
08:15 AM	77	6	83	53	125	178	0	<b>57</b>	<b>57</b>	318
<b>Total Volume</b>	<b>361</b>	<b>44</b>	<b>405</b>	<b>208</b>	<b>473</b>	<b>681</b>	<b>4</b>	<b>174</b>	<b>178</b>	<b>1264</b>
% App. Total	89.1	10.9		30.5	69.5		2.2	97.8		
PHF	.785	.647	.773	.929	.816	.847	.500	.763	.781	.836
Cars	352	40	392	207	468	675	3	169	172	1239
% Cars	97.5	90.9	96.8	99.5	98.9	99.1	75.0	97.1	96.6	98.0
Trucks	9	4	13	1	5	6	1	5	6	25
% Trucks	2.5	9.1	3.2	0.5	1.1	0.9	25.0	2.9	3.4	2.0



N/S Street : North Avenue  
E/W Street : Broadway Street  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	07:00 AM			07:30 AM			07:00 AM		
+0 mins.	83	10	93	56	145	201	0	60	60
+15 mins.	91	2	93	50	91	141	0	46	46
+30 mins.	115	16	131	49	112	161	2	44	46
+45 mins.	86	17	103	53	125	178	2	42	44
Total Volume	375	45	420	208	473	681	4	192	196
% App. Total	89.3	10.7		30.5	69.5		2	98	
PHF	.815	.662	.802	.929	.816	.847	.500	.800	.817
Cars	366	40	406	207	468	675	3	186	189
% Cars	97.6	88.9	96.7	99.5	98.9	99.1	75	96.9	96.4
Trucks	9	5	14	1	5	6	1	6	7
% Trucks	2.4	11.1	3.3	0.5	1.1	0.9	25	3.1	3.6





**Accurate Counts**  
978-664-2565

File Name : 92510002  
Site Code : 92510002  
Start Date : 2/17/2022  
Page No : 1

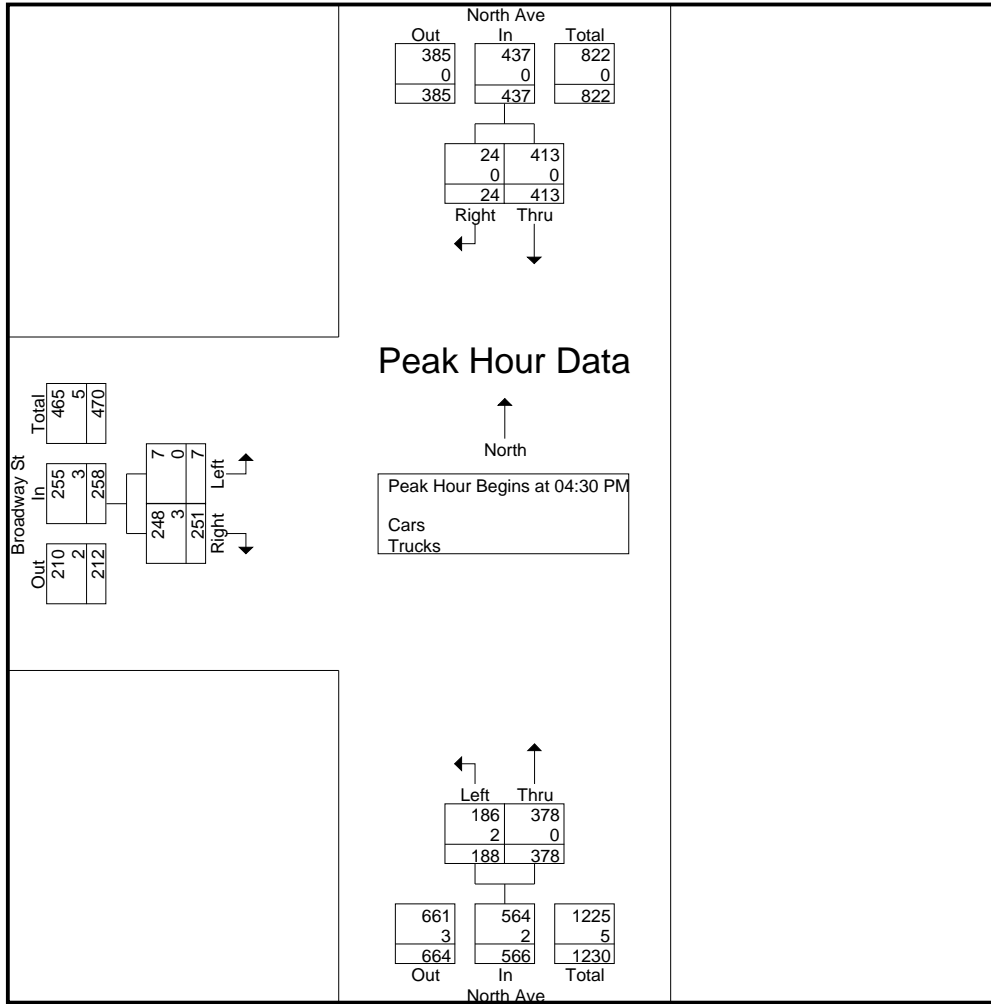
N/S Street : North Avenue  
E/W Street : Broadway Street  
City/State : Wakefield, MA  
Weather : Clear

Groups Printed- Cars - Trucks

Start Time	North Ave From North		North Ave From South		Broadway St From West		Int. Total
	Thru	Right	Left	Thru	Left	Right	
04:00 PM	98	10	50	102	1	61	322
04:15 PM	89	8	39	80	0	49	265
04:30 PM	101	6	57	101	1	58	324
04:45 PM	107	4	43	91	2	52	299
<b>Total</b>	<b>395</b>	<b>28</b>	<b>189</b>	<b>374</b>	<b>4</b>	<b>220</b>	<b>1210</b>
05:00 PM	105	8	41	98	3	85	340
05:15 PM	100	6	47	88	1	56	298
05:30 PM	89	9	51	87	0	47	283
05:45 PM	104	7	48	80	0	48	287
<b>Total</b>	<b>398</b>	<b>30</b>	<b>187</b>	<b>353</b>	<b>4</b>	<b>236</b>	<b>1208</b>
<b>Grand Total</b>	<b>793</b>	<b>58</b>	<b>376</b>	<b>727</b>	<b>8</b>	<b>456</b>	<b>2418</b>
Apprch %	93.2	6.8	34.1	65.9	1.7	98.3	
Total %	32.8	2.4	15.6	30.1	0.3	18.9	
Cars	793	58	372	724	8	451	2406
% Cars	100	100	98.9	99.6	100	98.9	99.5
Trucks	0	0	4	3	0	5	12
% Trucks	0	0	1.1	0.4	0	1.1	0.5

Start Time	North Ave From North			North Ave From South			Broadway St From West			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	101	6	107	<b>57</b>	<b>101</b>	<b>158</b>	1	58	59	324
04:45 PM	<b>107</b>	4	111	43	91	134	2	52	54	299
05:00 PM	105	<b>8</b>	<b>113</b>	41	98	139	<b>3</b>	<b>85</b>	<b>88</b>	<b>340</b>
05:15 PM	100	6	106	47	88	135	1	56	57	298
<b>Total Volume</b>	<b>413</b>	<b>24</b>	<b>437</b>	<b>188</b>	<b>378</b>	<b>566</b>	<b>7</b>	<b>251</b>	<b>258</b>	<b>1261</b>
% App. Total	94.5	5.5		33.2	66.8		2.7	97.3		
PHF	.965	.750	.967	.825	.936	.896	.583	.738	.733	.927
Cars	413	24	437	186	378	564	7	248	255	1256
% Cars	100	100	100	98.9	100	99.6	100	98.8	98.8	99.6
Trucks	0	0	0	2	0	2	0	3	3	5
% Trucks	0	0	0	1.1	0	0.4	0	1.2	1.2	0.4

N/S Street : North Avenue  
E/W Street : Broadway Street  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	04:30 PM			04:30 PM			04:30 PM		
+0 mins.	101	6	107	<b>57</b>	<b>101</b>	<b>158</b>	1	58	59
+15 mins.	<b>107</b>	4	111	43	91	134	2	52	54
+30 mins.	105	<b>8</b>	<b>113</b>	41	98	139	<b>3</b>	<b>85</b>	<b>88</b>
+45 mins.	100	6	106	47	88	135	1	56	57
Total Volume	413	24	437	188	378	566	7	251	258
% App. Total	94.5	5.5		33.2	66.8		2.7	97.3	
PHF	.965	.750	.967	.825	.936	.896	.583	.738	.733
Cars	413	24	437	186	378	564	7	248	255
% Cars	100	100	100	98.9	100	99.6	100	98.8	98.8
Trucks	0	0	0	2	0	2	0	3	3
% Trucks	0	0	0	1.1	0	0.4	0	1.2	1.2





**Accurate Counts**  
978-664-2565

N/S Street : Main Street  
E/W Street : Nahant St / North Ave  
City/State : Wakefield, MA  
Weather : Clear

File Name : 92510003  
Site Code : 92510003  
Start Date : 2/17/2022  
Page No : 1

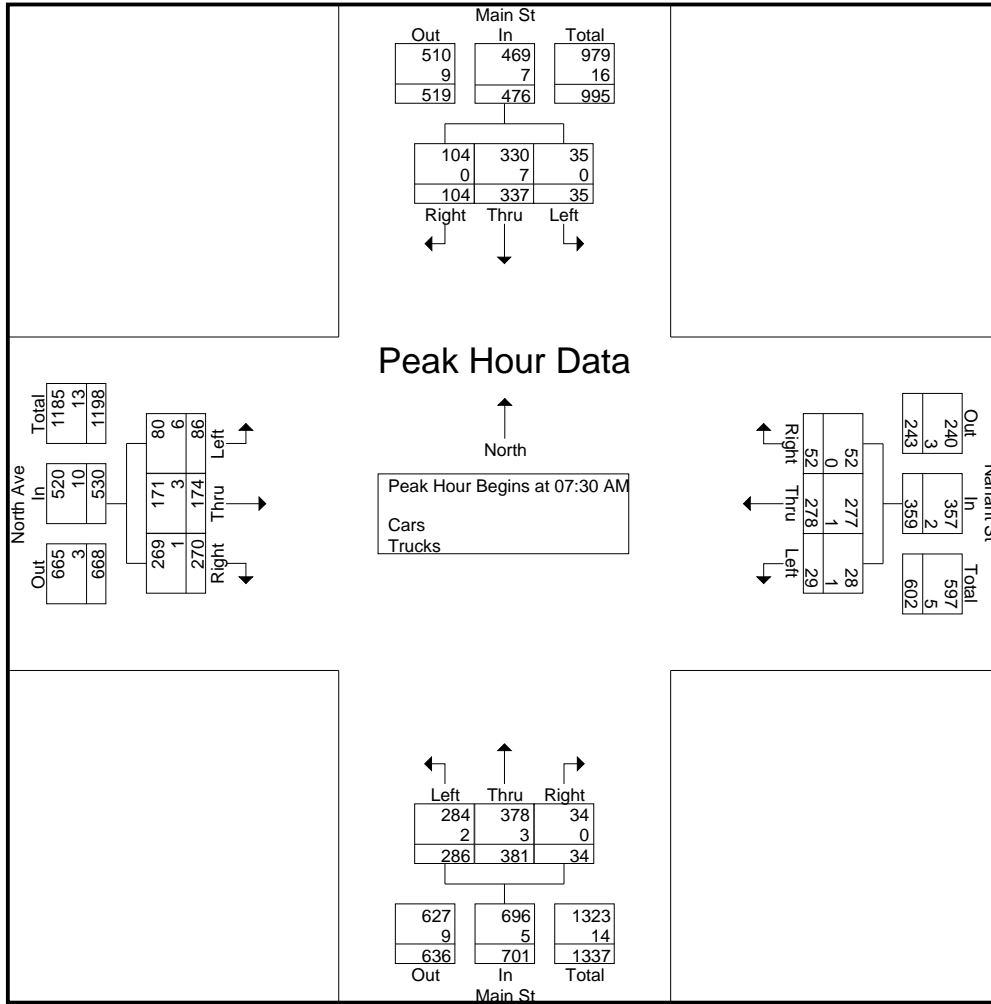
Groups Printed- Cars - Trucks

Start Time	Main St From North			Nahant St From East			Main St From South			North Ave From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	2	57	25	11	62	12	52	53	10	23	69	50	426
07:15 AM	9	102	16	3	64	15	53	85	11	22	60	57	497
07:30 AM	18	89	35	10	76	18	89	111	13	22	45	85	611
07:45 AM	6	84	21	6	63	11	59	101	8	23	37	75	494
<b>Total</b>	<b>35</b>	<b>332</b>	<b>97</b>	<b>30</b>	<b>265</b>	<b>56</b>	<b>253</b>	<b>350</b>	<b>42</b>	<b>90</b>	<b>211</b>	<b>267</b>	<b>2028</b>
08:00 AM	6	83	18	7	74	11	63	81	8	14	36	58	459
08:15 AM	5	81	30	6	65	12	75	88	5	27	56	52	502
08:30 AM	6	90	13	7	80	21	62	108	4	18	33	62	504
08:45 AM	10	95	20	14	54	12	72	91	4	37	30	71	510
<b>Total</b>	<b>27</b>	<b>349</b>	<b>81</b>	<b>34</b>	<b>273</b>	<b>56</b>	<b>272</b>	<b>368</b>	<b>21</b>	<b>96</b>	<b>155</b>	<b>243</b>	<b>1975</b>
<b>Grand Total</b>	<b>62</b>	<b>681</b>	<b>178</b>	<b>64</b>	<b>538</b>	<b>112</b>	<b>525</b>	<b>718</b>	<b>63</b>	<b>186</b>	<b>366</b>	<b>510</b>	<b>4003</b>
Apprch %	6.7	73.9	19.3	9	75.4	15.7	40.2	55	4.8	17.5	34.5	48	
Total %	1.5	17	4.4	1.6	13.4	2.8	13.1	17.9	1.6	4.6	9.1	12.7	
Cars	61	667	177	63	537	112	522	710	62	174	361	505	3951
% Cars	98.4	97.9	99.4	98.4	99.8	100	99.4	98.9	98.4	93.5	98.6	99	98.7
Trucks	1	14	1	1	1	0	3	8	1	12	5	5	52
% Trucks	1.6	2.1	0.6	1.6	0.2	0	0.6	1.1	1.6	6.5	1.4	1	1.3

Start Time	Main St From North				Nahant St From East				Main St From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	<b>18</b>	<b>89</b>	<b>35</b>	<b>142</b>	<b>10</b>	<b>76</b>	<b>18</b>	<b>104</b>	<b>89</b>	<b>111</b>	<b>13</b>	<b>213</b>	22	45	85	152	611
07:45 AM	6	84	21	111	6	63	11	80	59	101	8	168	23	37	75	135	494
08:00 AM	6	83	18	107	7	74	11	92	63	81	8	152	14	36	58	108	459
08:15 AM	5	81	30	116	6	65	12	83	75	88	5	168	<b>27</b>	<b>56</b>	52	135	502
<b>Total Volume</b>	<b>35</b>	<b>337</b>	<b>104</b>	<b>476</b>	<b>29</b>	<b>278</b>	<b>52</b>	<b>359</b>	<b>286</b>	<b>381</b>	<b>34</b>	<b>701</b>	<b>86</b>	<b>174</b>	<b>270</b>	<b>530</b>	<b>2066</b>
% App. Total	7.4	70.8	21.8		8.1	77.4	14.5		40.8	54.4	4.9		16.2	32.8	50.9		
PHF	.486	.947	.743	.838	.725	.914	.722	.863	.803	.858	.654	.823	.796	.777	.794	.872	.845
Cars	35	330	104	469	28	277	52	357	284	378	34	696	80	171	269	520	2042
% Cars	100	97.9	100	98.5	96.6	99.6	100	99.4	99.3	99.2	100	99.3	93.0	98.3	99.6	98.1	98.8
Trucks	0	7	0	7	1	1	0	2	2	3	0	5	6	3	1	10	24
% Trucks	0	2.1	0	1.5	3.4	0.4	0	0.6	0.7	0.8	0	0.7	7.0	1.7	0.4	1.9	1.2



N/S Street : Main Street  
E/W Street : Nahant St / North Ave  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	07:15 AM				07:45 AM				07:30 AM				07:00 AM			
+0 mins.	9	<b>102</b>	16	127	6	63	11	80	<b>89</b>	<b>111</b>	<b>13</b>	<b>213</b>	<b>23</b>	<b>69</b>	50	142
+15 mins.	<b>18</b>	89	<b>35</b>	<b>142</b>	<b>7</b>	74	11	92	59	101	8	168	22	60	57	139
+30 mins.	6	84	21	111	6	<b>65</b>	12	83	63	81	8	152	22	45	<b>85</b>	<b>152</b>
+45 mins.	6	83	18	107	7	<b>80</b>	<b>21</b>	<b>108</b>	75	88	5	168	23	37	75	135
Total Volume	39	358	90	487	26	282	55	363	286	381	34	701	90	211	267	568
% App. Total	8	73.5	18.5		7.2	77.7	15.2		40.8	54.4	4.9		15.8	37.1	47	
PHF	.542	.877	.643	.857	.929	.881	.655	.840	.803	.858	.654	.823	.978	.764	.785	.934
Cars	39	349	90	478	25	282	55	362	284	378	34	696	83	207	264	554
% Cars	100	97.5	100	98.2	96.2	100	100	99.7	99.3	99.2	100	99.3	92.2	98.1	98.9	97.5
Trucks	0	9	0	9	1	0	0	1	2	3	0	5	7	4	3	14
% Trucks	0	2.5	0	1.8	3.8	0	0	0.3	0.7	0.8	0	0.7	7.8	1.9	1.1	2.5

**Accurate Counts**  
978-664-2565

File Name : 92510003  
Site Code : 92510003  
Start Date : 2/17/2022  
Page No : 10

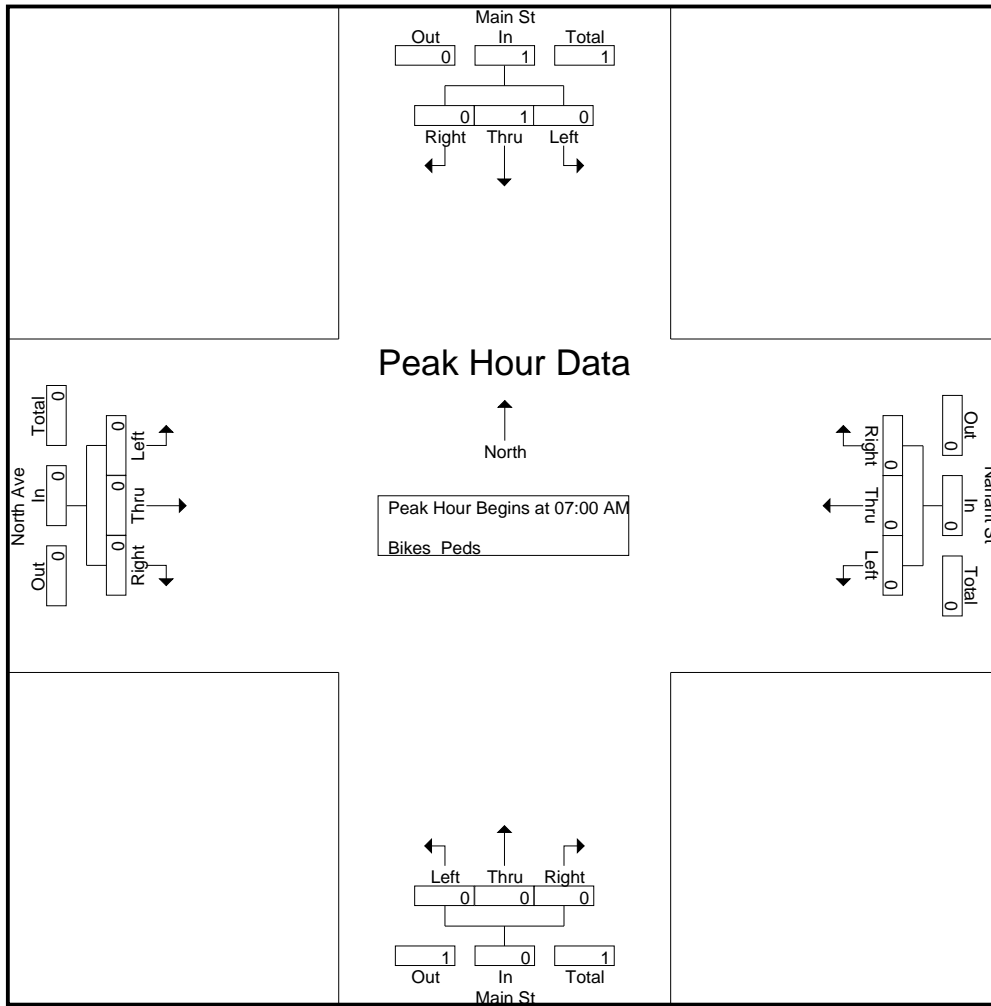
N/S Street : Main Street  
E/W Street : Nahant St / North Ave  
City/State : Wakefield, MA  
Weather : Clear

Groups Printed- Bikes Peds

Start Time	Main St From North				Nahant St From East				Main St From South				North Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00 AM	0	0	0	3	0	0	0	7	0	0	0	1	0	0	0	1	12	0	12
07:15 AM	0	1	0	0	0	0	0	3	0	0	0	1	0	0	0	2	6	1	7
07:30 AM	0	0	0	3	0	0	0	5	0	0	0	0	0	0	0	4	12	0	12
07:45 AM	0	0	0	1	0	0	0	3	0	0	0	1	0	0	0	2	7	0	7
<b>Total</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>18</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9</b>	<b>37</b>	<b>1</b>	<b>38</b>
08:00 AM	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3	0	3
08:15 AM	0	0	0	0	0	0	0	4	0	0	0	3	0	0	0	2	9	0	9
08:30 AM	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	3	0	3
08:45 AM	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	0	4	0	4
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>19</b>	<b>0</b>	<b>19</b>
<b>Grand Total</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>30</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>11</b>	<b>56</b>	<b>1</b>	<b>57</b>
Apprch %	0	100	0		0	0	0		0	0	0		0	0	0				
Total %	0	100	0		0	0	0		0	0	0		0	0	0		98.2	1.8	

Start Time	Main St From North				Nahant St From East				Main St From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total Volume</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>% App. Total</b>	<b>0</b>	<b>100</b>	<b>0</b>		<b>0</b>	<b>0</b>	<b>0</b>		<b>0</b>	<b>0</b>	<b>0</b>		<b>0</b>	<b>0</b>	<b>0</b>		
PHF	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250

N/S Street : Main Street  
E/W Street : Nahant St / North Ave  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

**Accurate Counts**  
978-664-2565

N/S Street : Main Street  
E/W Street : Nahant St / North Ave  
City/State : Wakefield, MA  
Weather : Clear

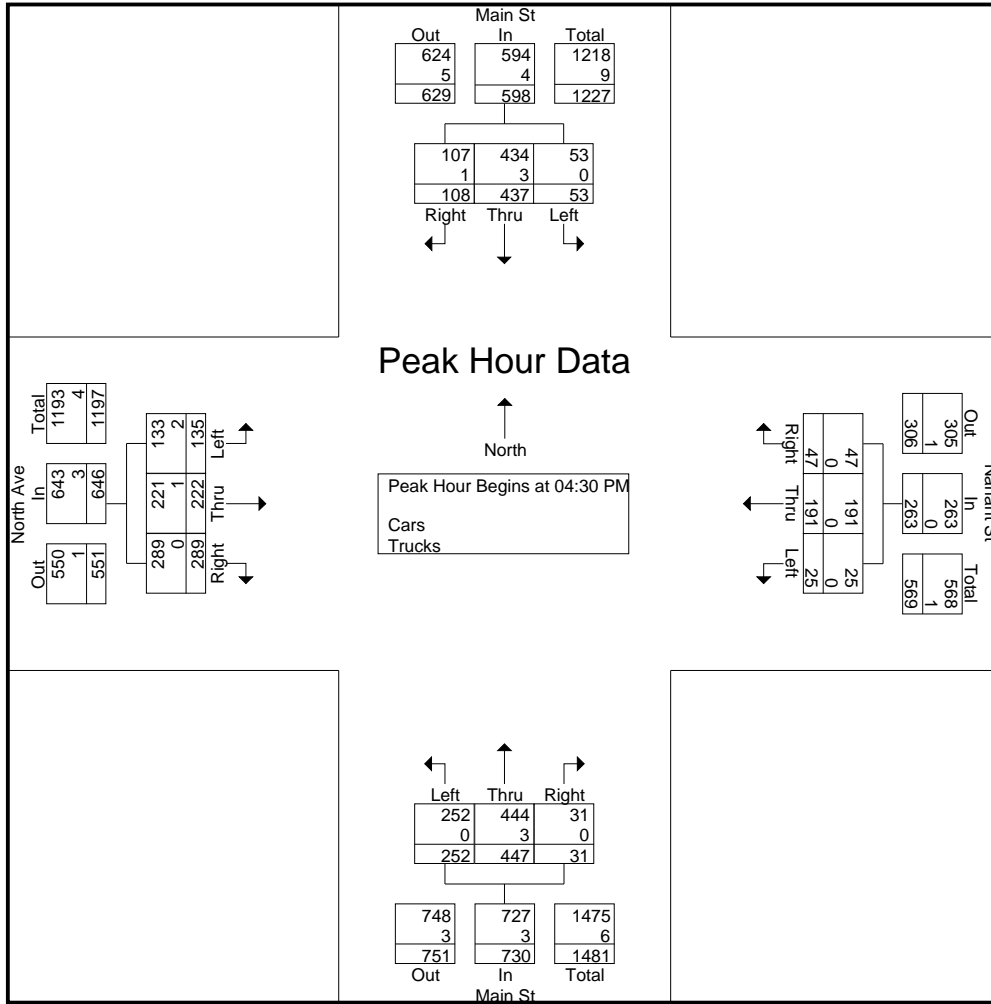
File Name : 92510003  
Site Code : 92510003  
Start Date : 2/17/2022  
Page No : 1

Groups Printed- Cars - Trucks

Start Time	Main St From North			Nahant St From East			Main St From South			North Ave From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	11	89	26	8	62	11	60	113	6	28	52	77	543
04:15 PM	14	96	26	5	40	16	54	102	10	38	47	49	497
04:30 PM	14	94	32	8	58	12	67	102	7	38	41	70	543
04:45 PM	13	118	19	9	50	9	60	127	7	35	55	74	576
<b>Total</b>	<b>52</b>	<b>397</b>	<b>103</b>	<b>30</b>	<b>210</b>	<b>48</b>	<b>241</b>	<b>444</b>	<b>30</b>	<b>139</b>	<b>195</b>	<b>270</b>	<b>2159</b>
05:00 PM	13	101	29	5	40	13	62	101	5	34	64	79	546
05:15 PM	13	124	28	3	43	13	63	117	12	28	62	66	572
05:30 PM	13	96	23	10	54	12	60	108	10	21	41	77	525
05:45 PM	20	108	19	5	49	12	61	99	8	31	63	58	533
<b>Total</b>	<b>59</b>	<b>429</b>	<b>99</b>	<b>23</b>	<b>186</b>	<b>50</b>	<b>246</b>	<b>425</b>	<b>35</b>	<b>114</b>	<b>230</b>	<b>280</b>	<b>2176</b>
<b>Grand Total</b>	<b>111</b>	<b>826</b>	<b>202</b>	<b>53</b>	<b>396</b>	<b>98</b>	<b>487</b>	<b>869</b>	<b>65</b>	<b>253</b>	<b>425</b>	<b>550</b>	<b>4335</b>
Apprch %	9.7	72.5	17.7	9.7	72.4	17.9	34.3	61.2	4.6	20.6	34.6	44.8	
Total %	2.6	19.1	4.7	1.2	9.1	2.3	11.2	20	1.5	5.8	9.8	12.7	
Cars	111	819	198	53	396	98	485	861	65	251	423	549	4309
% Cars	100	99.2	98	100	100	100	99.6	99.1	100	99.2	99.5	99.8	99.4
Trucks	0	7	4	0	0	0	2	8	0	2	2	1	26
% Trucks	0	0.8	2	0	0	0	0.4	0.9	0	0.8	0.5	0.2	0.6

Start Time	Main St From North				Nahant St From East				Main St From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	<b>14</b>	94	<b>32</b>	140	8	<b>58</b>	12	<b>78</b>	<b>67</b>	102	7	176	<b>38</b>	41	70	149	543
04:45 PM	13	118	19	150	<b>9</b>	50	9	68	60	<b>127</b>	7	<b>194</b>	35	55	74	164	<b>576</b>
05:00 PM	13	101	29	143	5	40	<b>13</b>	58	62	101	5	168	34	<b>64</b>	<b>79</b>	<b>177</b>	546
05:15 PM	13	<b>124</b>	28	<b>165</b>	3	43	13	59	63	117	<b>12</b>	192	28	62	66	156	572
<b>Total Volume</b>	<b>53</b>	<b>437</b>	<b>108</b>	<b>598</b>	<b>25</b>	<b>191</b>	<b>47</b>	<b>263</b>	<b>252</b>	<b>447</b>	<b>31</b>	<b>730</b>	<b>135</b>	<b>222</b>	<b>289</b>	<b>646</b>	<b>2237</b>
% App. Total	8.9	73.1	18.1		9.5	72.6	17.9		34.5	61.2	4.2		20.9	34.4	44.7		
PHF	.946	.881	.844	.906	.694	.823	.904	.843	.940	.880	.646	.941	.888	.867	.915	.912	.971
Cars	53	434	107	594	25	191	47	263	252	444	31	727	133	221	289	643	2227
% Cars	100	99.3	99.1	99.3	100	100	100	100	100	99.3	100	99.6	98.5	99.5	100	99.5	99.6
Trucks	0	3	1	4	0	0	0	0	0	3	0	3	2	1	0	3	10
% Trucks	0	0.7	0.9	0.7	0	0	0	0	0	0.7	0	0.4	1.5	0.5	0	0.5	0.4

N/S Street : Main Street  
E/W Street : Nahant St / North Ave  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	04:30 PM				04:00 PM				04:45 PM				04:30 PM			
+0 mins.	14	94	32	140	8	62	11	81	60	127	7	194	38	41	70	149
+15 mins.	13	118	19	150	5	40	16	61	62	101	5	168	35	55	74	164
+30 mins.	13	101	29	143	8	58	12	78	63	117	12	192	34	64	79	177
+45 mins.	13	124	28	165	9	50	9	68	60	108	10	178	28	62	66	156
Total Volume	53	437	108	598	30	210	48	288	245	453	34	732	135	222	289	646
% App. Total	8.9	73.1	18.1		10.4	72.9	16.7		33.5	61.9	4.6		20.9	34.4	44.7	
PHF	.946	.881	.844	.906	.833	.847	.750	.889	.972	.892	.708	.943	.888	.867	.915	.912
Cars	53	434	107	594	30	210	48	288	245	448	34	727	133	221	289	643
% Cars	100	99.3	99.1	99.3	100	100	100	100	100	98.9	100	99.3	98.5	99.5	100	99.5
Trucks	0	3	1	4	0	0	0	0	0	5	0	5	2	1	0	3
% Trucks	0	0.7	0.9	0.7	0	0	0	0	0	1.1	0	0.7	1.5	0.5	0	0.5

**Accurate Counts**  
978-664-2565

N/S Street : Main Street  
E/W Street : Nahant St / North Ave  
City/State : Wakefield, MA  
Weather : Clear

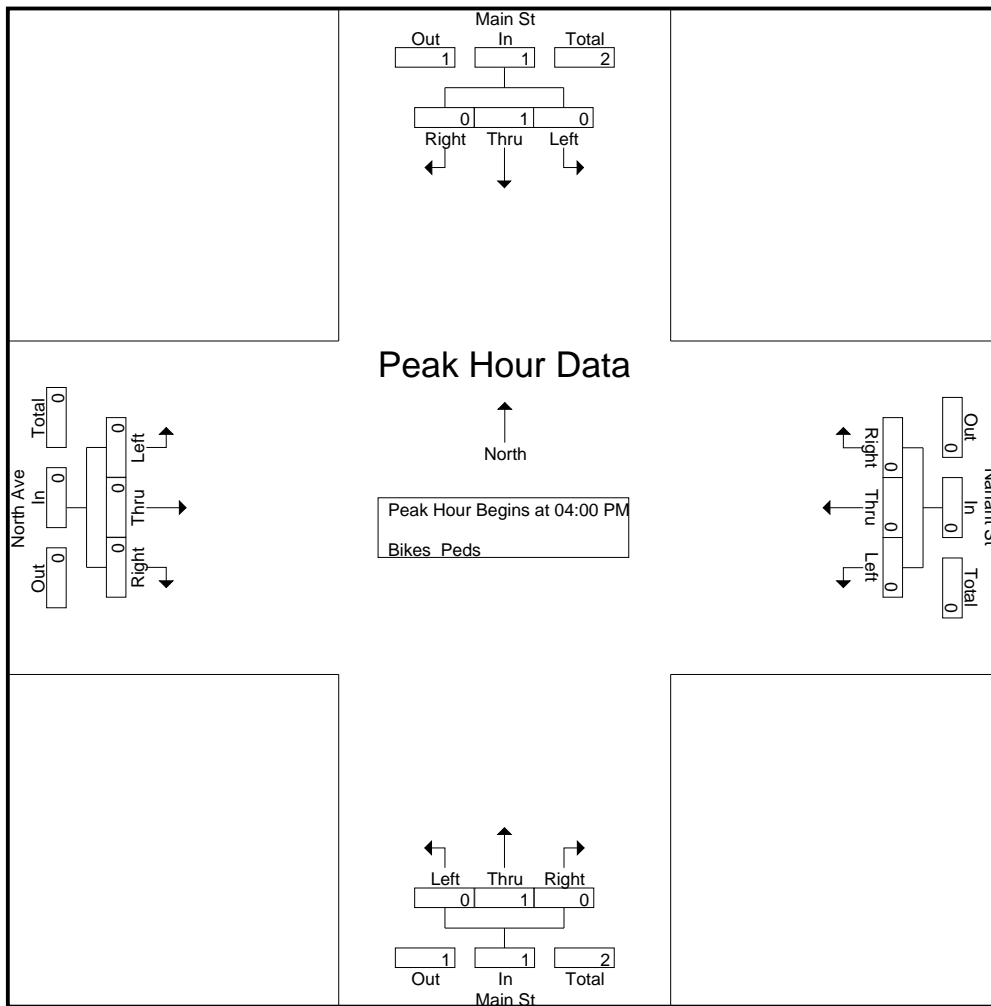
File Name : 92510003  
Site Code : 92510003  
Start Date : 2/17/2022  
Page No : 10

Groups Printed- Bikes Peds

Start Time	Main St From North				Nahant St From East				Main St From South				North Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
04:00 PM	0	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3	1	4
04:15 PM	0	0	0	2	0	0	0	7	0	0	0	0	0	0	0	0	9	0	9
04:30 PM	0	0	0	1	0	0	0	3	0	0	0	0	0	0	0	3	7	0	7
04:45 PM	0	0	0	0	0	0	0	4	0	1	0	2	0	0	0	2	8	1	9
Total	0	1	0	3	0	0	0	17	0	1	0	2	0	0	0	5	27	2	29
05:00 PM	0	0	0	1	0	0	0	2	0	0	0	1	0	0	0	3	7	0	7
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	0	2
05:45 PM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	0	2
Total	0	0	0	1	0	0	0	4	0	0	0	2	0	0	0	5	12	0	12
Grand Total	0	1	0	4	0	0	0	21	0	1	0	4	0	0	0	10	39	2	41
Apprch %	0	100	0		0	0	0		0	100	0		0	0	0				
Total %	0	50	0		0	0	0		0	50	0		0	0	0		95.1	4.9	

Start Time	Main St From North				Nahant St From East				Main St From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
Total Volume	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	2
% App. Total	0	100	0		0	0	0		0	100	0		0	0	0		
PHF	.000	.250	.000	.250	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.500

N/S Street : Main Street  
E/W Street : Nahant St / North Ave  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
Total Volume	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0
% App. Total	0	100	0	0	0	0	0	0	0	100	0	0	0	0	0	0
PHF	.000	.250	.000	.250	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000

**Accurate Counts**  
978-664-2565

N/S Street : Driveway / Site Driveway  
E/W Street : Broadway Street  
City/State : Wakefield, MA  
Weather : Clear

File Name : 92510004  
Site Code : 92510004  
Start Date : 2/17/2022  
Page No : 1

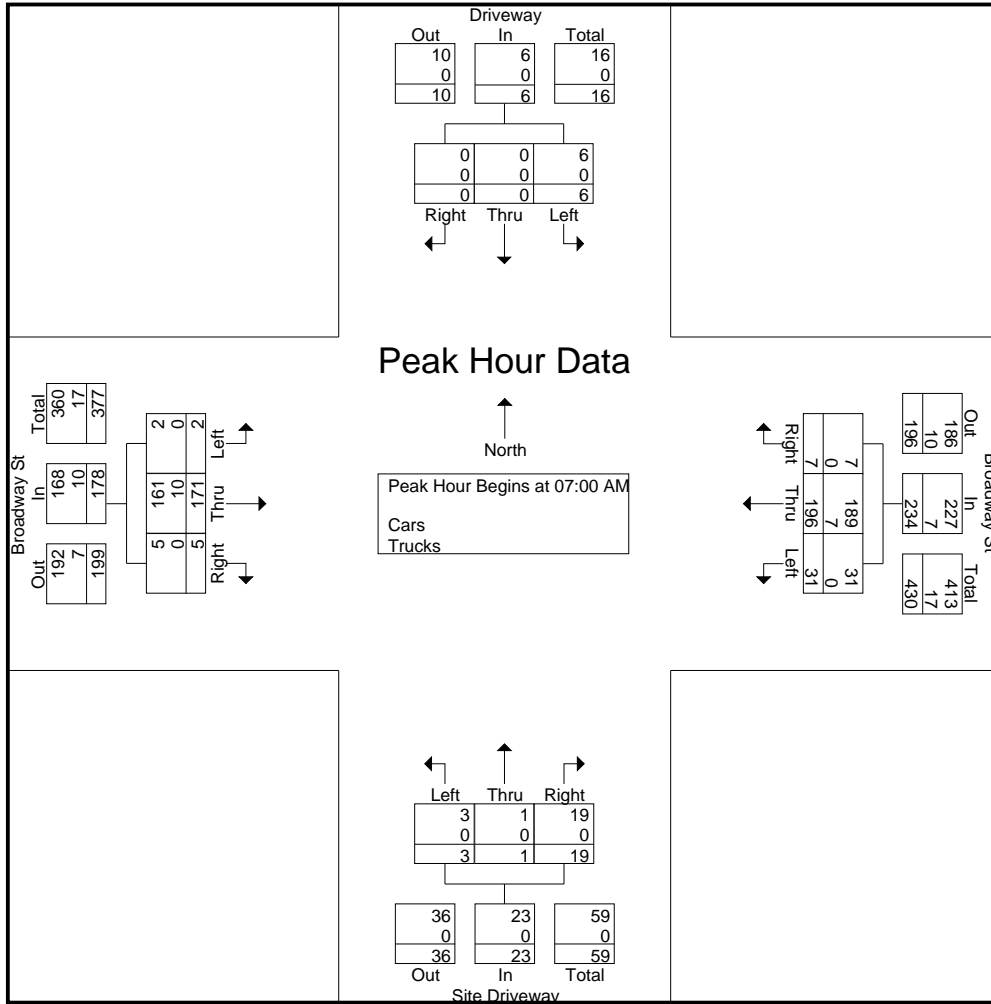
**Groups Printed- Cars - Trucks**

Start Time	Driveway From North			Broadway St From East			Site Driveway From South			Broadway St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	0	0	0	8	51	4	1	0	8	2	54	0	128
07:15 AM	3	0	0	10	23	1	1	0	1	0	41	2	82
07:30 AM	3	0	0	6	63	1	0	1	5	0	39	2	120
07:45 AM	0	0	0	7	59	1	1	0	5	0	37	1	111
<b>Total</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>31</b>	<b>196</b>	<b>7</b>	<b>3</b>	<b>1</b>	<b>19</b>	<b>2</b>	<b>171</b>	<b>5</b>	<b>441</b>
08:00 AM	1	0	0	19	32	0	1	0	1	0	26	3	83
08:15 AM	0	0	0	10	46	2	2	0	13	0	42	2	117
08:30 AM	1	0	0	5	55	2	1	0	6	0	40	2	112
08:45 AM	1	0	0	5	47	0	0	0	8	0	45	5	111
<b>Total</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>39</b>	<b>180</b>	<b>4</b>	<b>4</b>	<b>0</b>	<b>28</b>	<b>0</b>	<b>153</b>	<b>12</b>	<b>423</b>
<b>Grand Total</b>	<b>9</b>	<b>0</b>	<b>0</b>	<b>70</b>	<b>376</b>	<b>11</b>	<b>7</b>	<b>1</b>	<b>47</b>	<b>2</b>	<b>324</b>	<b>17</b>	<b>864</b>
Apprch %	100	0	0	15.3	82.3	2.4	12.7	1.8	85.5	0.6	94.5	5	
Total %	1	0	0	8.1	43.5	1.3	0.8	0.1	5.4	0.2	37.5	2	
Cars	9	0	0	70	365	11	7	1	47	2	309	17	838
% Cars	100	0	0	100	97.1	100	100	100	100	100	95.4	100	97
Trucks	0	0	0	0	11	0	0	0	0	0	15	0	26
% Trucks	0	0	0	0	2.9	0	0	0	0	0	4.6	0	3

Start Time	Driveway From North				Broadway St From East				Site Driveway From South				Broadway St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	8	51	4	63	1	0	8	9	2	54	0	56	128
07:15 AM	3	0	0	3	10	23	1	34	1	0	1	2	0	41	2	43	82
07:30 AM	3	0	0	3	6	63	1	70	0	1	5	6	0	39	2	41	120
07:45 AM	0	0	0	0	7	59	1	67	1	0	5	6	0	37	1	38	111
Total Volume	6	0	0	6	31	196	7	234	3	1	19	23	2	171	5	178	441
% App. Total	100	0	0		13.2	83.8	3		13	4.3	82.6		1.1	96.1	2.8		
PHF	.500	.000	.000	.500	.775	.778	.438	.836	.750	.250	.594	.639	.250	.792	.625	.795	.861
Cars	6	0	0	6	31	189	7	227	3	1	19	23	2	161	5	168	424
% Cars	100	0	0	100	100	96.4	100	97.0	100	100	100	100	100	94.2	100	94.4	96.1
Trucks	0	0	0	0	0	7	0	7	0	0	0	0	0	10	0	10	17
% Trucks	0	0	0	0	0	3.6	0	3.0	0	0	0	0	0	5.8	0	5.6	3.9



N/S Street : Driveway / Site Driveway  
E/W Street : Broadway Street  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	07:15 AM				07:30 AM				08:00 AM				07:00 AM			
+0 mins.	3	0	0	3	6	63	1	70	1	0	1	2	2	54	0	56
+15 mins.	3	0	0	3	7	59	1	67	2	0	13	15	0	41	2	43
+30 mins.	0	0	0	0	19	32	0	51	1	0	6	7	0	39	2	41
+45 mins.	1	0	0	1	10	46	2	58	0	0	8	8	0	37	1	38
Total Volume	7	0	0	7	42	200	4	246	4	0	28	32	2	171	5	178
% App. Total	100	0	0		17.1	81.3	1.6		12.5	0	87.5		1.1	96.1	2.8	
PHF	.583	.000	.000	.583	.553	.794	.500	.879	.500	.000	.538	.533	.250	.792	.625	.795
Cars	7	0	0	7	42	196	4	242	4	0	28	32	2	161	5	168
% Cars	100	0	0	100	100	98	100	98.4	100	0	100	100	100	94.2	100	94.4
Trucks	0	0	0	0	0	4	0	4	0	0	0	0	0	10	0	10
% Trucks	0	0	0	0	0	2	0	1.6	0	0	0	0	0	5.8	0	5.6

**Accurate Counts**  
978-664-2565

N/S Street : Driveway / Site Driveway  
E/W Street : Broadway Street  
City/State : Wakefield, MA  
Weather : Clear

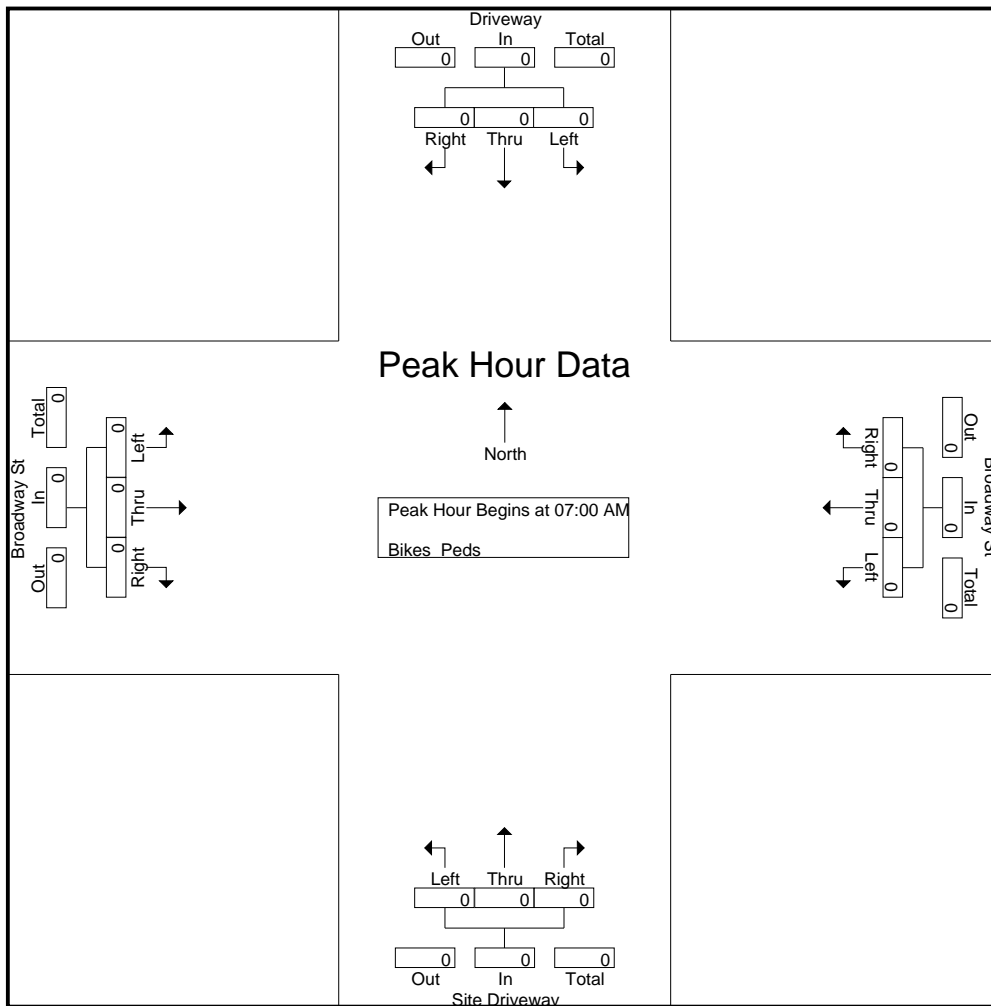
File Name : 92510004  
Site Code : 92510004  
Start Date : 2/17/2022  
Page No : 10

**Groups Printed- Bikes Peds**

Start Time	Driveway From North				Broadway St From East				Site Driveway From South				Broadway St From West				Exclu. Total	Inclu. Total	Int. Total			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds						
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	0	2	2	0	2
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	0	2	2	0	2
08:00 AM	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	2	5	0	5	5	0	5
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	1	0	1
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	1	0	1
Total	0	0	0	0	0	0	0	1	0	0	0	4	0	0	0	2	7	0	7	7	0	7
Grand Total	0	0	0	0	0	0	0	1	0	0	0	5	0	0	0	3	9	0	9	9	0	9
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0							
Total %																	100	0				

Start Time	Driveway From North				Broadway St From East				Site Driveway From South				Broadway St From West				Int. Total	
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total		
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 07:00 AM																		
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0			
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

N/S Street : Driveway / Site Driveway  
E/W Street : Broadway Street  
City/State : Wakefield, MA  
Weather : Clear

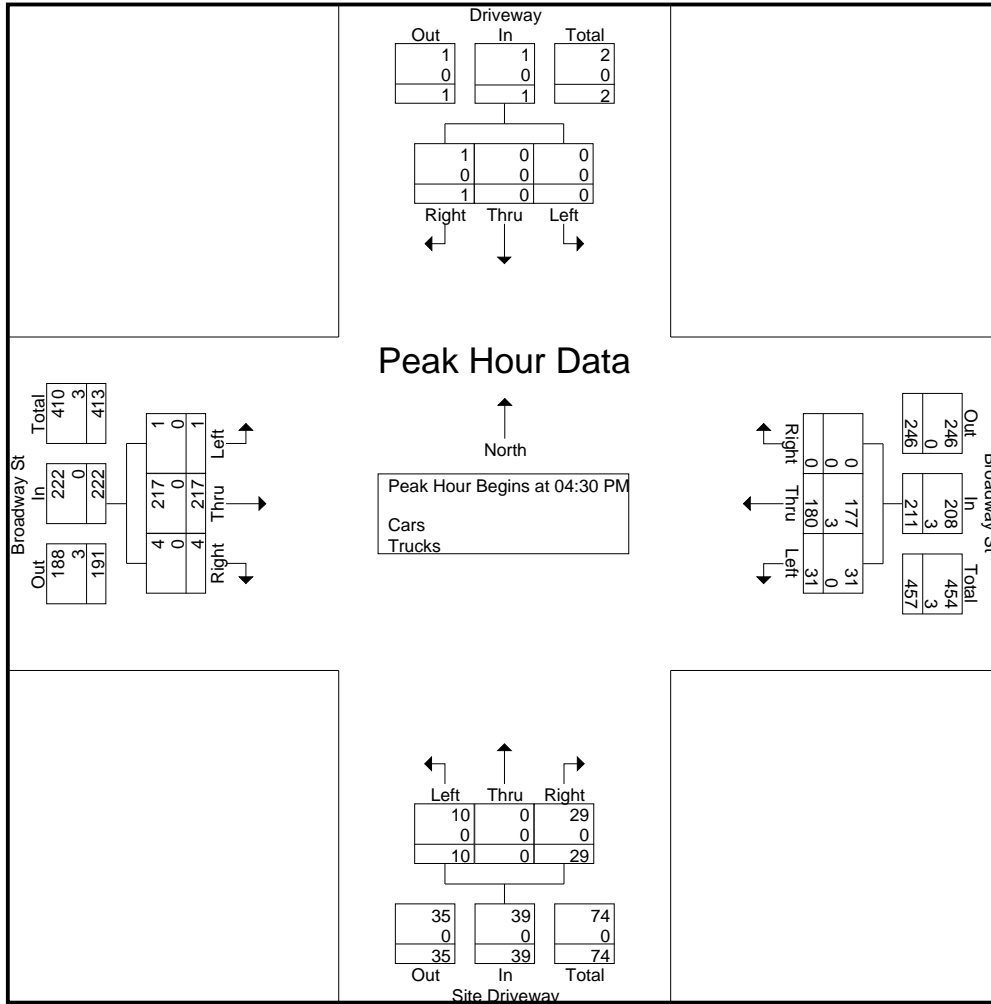


Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



N/S Street : Driveway / Site Driveway  
E/W Street : Broadway Street  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	05:00 PM				04:45 PM				04:00 PM				04:30 PM			
+0 mins.	0	0	0	0	13	47	0	60	2	0	5	7	0	49	1	50
+15 mins.	0	0	1	1	6	41	0	47	3	0	6	9	0	67	0	67
+30 mins.	1	0	1	2	6	49	0	55	2	0	9	11	1	49	1	51
+45 mins.	1	0	0	1	8	45	0	53	4	0	9	13	0	52	2	54
Total Volume	2	0	2	4	33	182	0	215	11	0	29	40	1	217	4	222
% App. Total	50	0	50		15.3	84.7	0		27.5	0	72.5		0.5	97.7	1.8	
PHF	.500	.000	.500	.500	.635	.929	.000	.896	.688	.000	.806	.769	.250	.810	.500	.828
Cars	2	0	2	4	33	180	0	213	11	0	29	40	1	217	4	222
% Cars	100	0	100	100	100	98.9	0	99.1	100	0	100	100	100	100	100	100
Trucks	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	1.1	0	0.9	0	0	0	0	0	0	0	0

**Accurate Counts**  
978-664-2565

N/S Street : Driveway / Site Driveway  
E/W Street : Broadway Street  
City/State : Wakefield, MA  
Weather : Clear

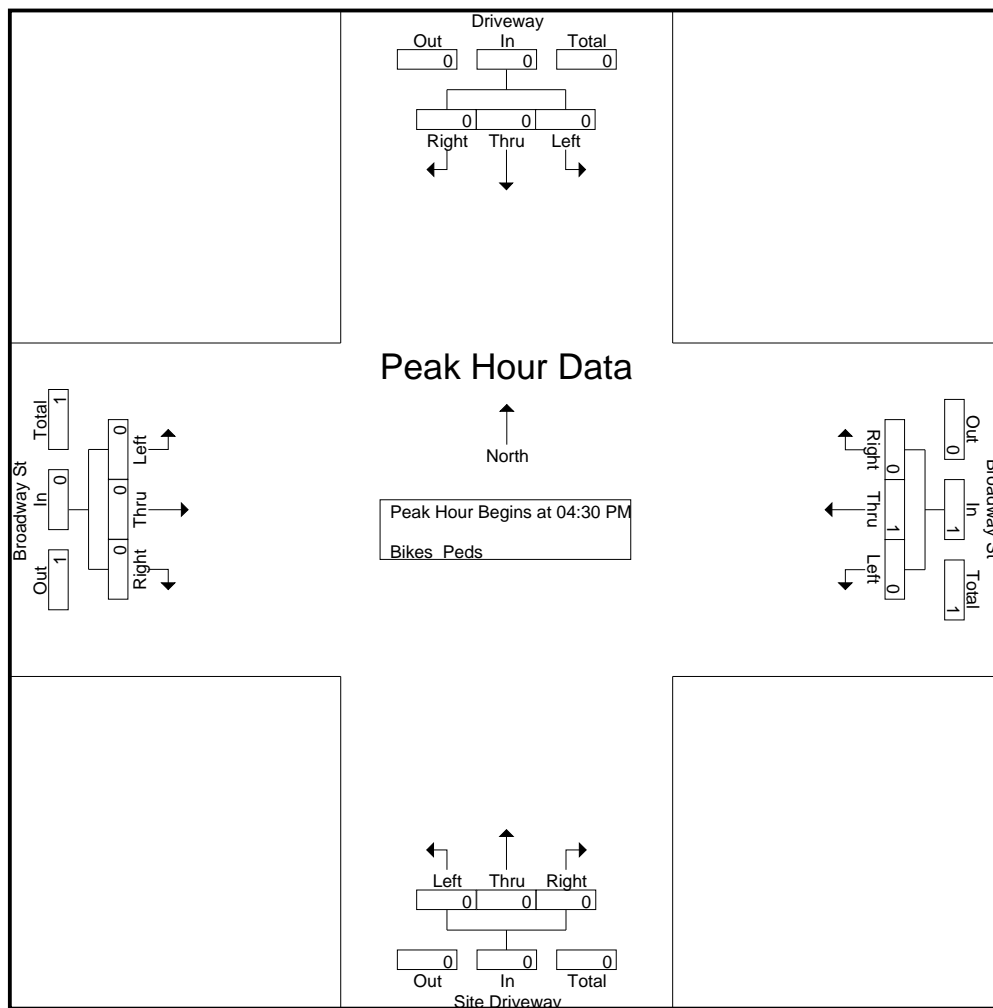
File Name : 92510004  
Site Code : 92510004  
Start Date : 2/17/2022  
Page No : 10

**Groups Printed- Bikes Peds**

Start Time	Driveway From North				Broadway St From East				Site Driveway From South				Broadway St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
04:00 PM	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3	0	3
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	3	0	3
04:30 PM	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	3	0	3
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	0	2
<b>Total</b>	0	0	0	0	0	0	0	4	0	0	0	4	0	0	0	3	11	0	11
05:00 PM	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	2	0	2
05:15 PM	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	2	3	1	4
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
<b>Total</b>	0	0	0	1	0	1	0	1	0	0	0	2	0	0	0	2	6	1	7
<b>Grand Total</b>	0	0	0	1	0	1	0	5	0	0	0	6	0	0	0	5	17	1	18
Apprch %	0	0	0		0	100	0		0	0	0		0	0	0				
Total %	0	0	0		0	100	0		0	0	0		0	0	0		94.4	5.6	

Start Time	Driveway From North				Broadway St From East				Site Driveway From South				Broadway St From West				Int. Total	
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total		
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 04:30 PM																		
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1
<b>Total Volume</b>	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1
<b>% App. Total</b>	0	0	0		0	100	0		0	0	0		0	0	0			
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250

N/S Street : Driveway / Site Driveway  
E/W Street : Broadway Street  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	04:00 PM				04:30 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000

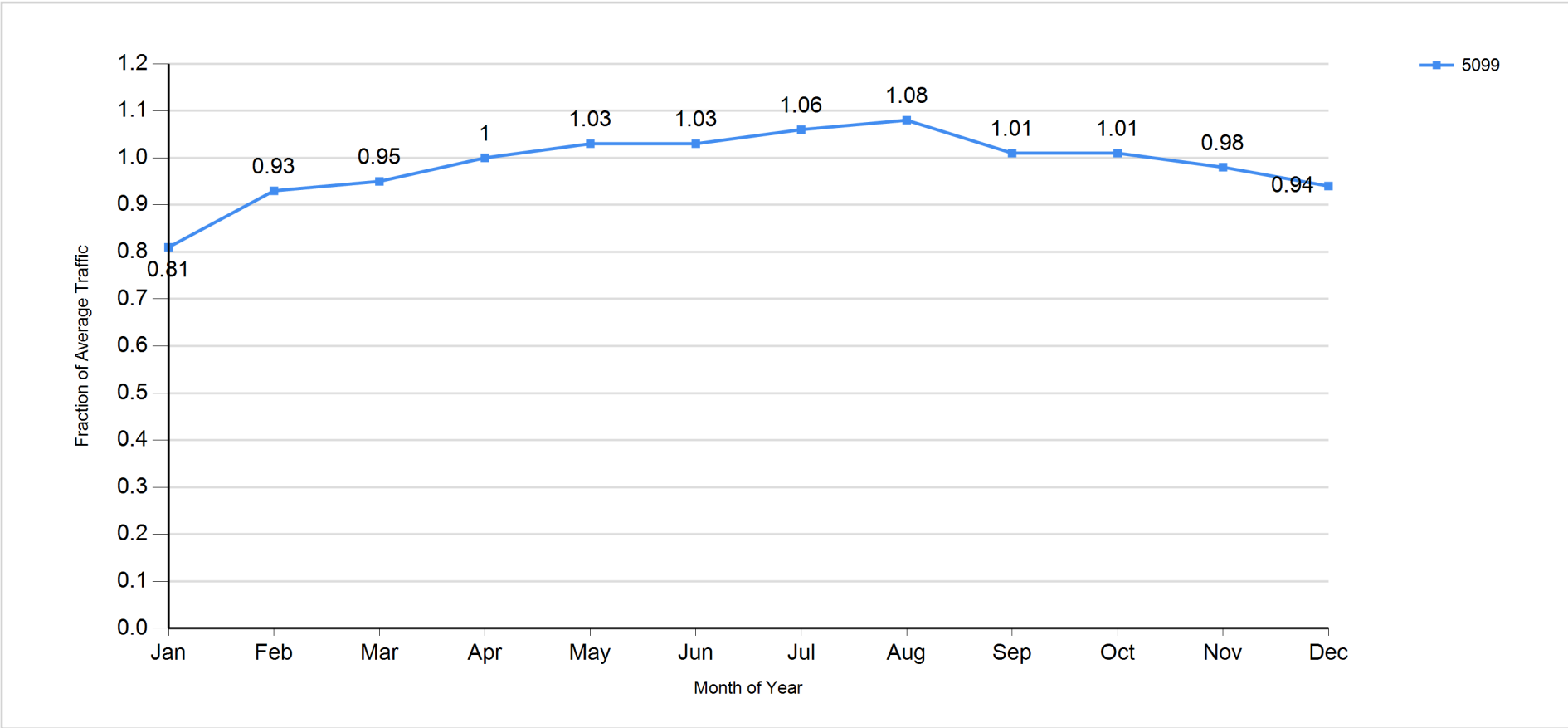
## TRAFFIC ADJUSTMENTS







Traffic Pattern by Month for 1/1/2019 - 12/31/2019  
Criteria: Location ID = 5099, From 1/1/1900 To 12/31/2049 12:00:00 AM



**Main Street (Route 129) at North Avenue/Nahant Street**

**Tuesday, January 8, 2019**

Start Time	Main St			Nahant St			Main St			North St			Total	Peak
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
07:00 AM	10	113	25	6	59	10	42	53	8	15	80	70	491	
07:15 AM	13	136	26	10	101	12	57	90	4	25	57	63	594	
07:30 AM	5	91	41	8	99	6	93	94	5	34	50	81	607	
07:45 AM	9	97	45	8	106	13	64	77	5	19	47	68	558	2250
08:00 AM	8	96	18	7	83	13	80	86	7	22	52	67	539	2298
08:15 AM	12	91	38	5	96	9	90	109	6	14	42	41	553	2257
08:30 AM	9	77	28	6	99	12	74	84	7	20	47	76	539	2189
08:45 AM	8	86	28	9	73	7	100	105	9	29	30	62	546	2177
													4427	2298
													5268	2735
													5428	2818
<b>January Seasonal Adjustment ( 19%)</b>														
<b>2022 Adjusted 1% per year</b>														

04:00 PM	14	82	33	3	58	8	72	149	13	29	83	76	620	
04:15 PM	8	96	25	1	65	14	63	152	8	32	76	81	621	
04:30 PM	19	93	23	8	61	11	63	128	7	55	84	68	620	
04:45 PM	22	86	23	9	52	7	70	138	5	43	91	63	609	2470
05:00 PM	9	83	36	8	64	7	67	126	13	44	89	69	615	2465
05:15 PM	16	61	22	7	59	10	54	132	22	57	97	63	600	2444
05:30 PM	18	63	24	4	83	22	61	126	11	32	109	68	621	2445
05:45 PM	12	73	13	9	50	8	65	145	10	54	93	55	587	2423
													4893	2470
													5823	2939
													5999	3028
<b>January Seasonal Adjustment ( 19%)</b>														
<b>2022 Adjusted 1% per year</b>														

**Thursday, February 17, 2022**

Start Time	Main St			Nahant St			Main St			North Ave			Total	Peak
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
7:00:00 AM	2	57	25	11	62	12	52	53	10	23	69	50	426	
7:15:00 AM	9	102	16	3	64	15	53	85	11	22	60	57	497	
7:30:00 AM	18	89	35	10	76	18	89	111	13	22	45	85	611	
7:45:00 AM	6	84	21	6	63	11	59	101	8	23	37	75	494	2028
8:00:00 AM	6	83	18	7	74	11	63	81	8	14	36	58	459	2061
8:15:00 AM	5	81	30	6	65	12	75	88	5	27	56	52	502	2066
8:30:00 AM	6	90	13	7	80	21	62	108	4	18	33	62	504	1959
8:45:00 AM	10	95	20	14	54	12	72	91	4	37	30	71	510	1975
													4003	2066
													4283	2211
<b>February Seasonal Adjustment ( 7%)</b>														
<b>Comparisson</b>													1.27	1.27
<b>Say COVID Adj</b>													1.30	

4:00:00 PM	11	89	26	8	62	11	60	113	6	28	52	77	543	
4:15:00 PM	14	96	26	5	40	16	54	102	10	38	47	49	497	
4:30:00 PM	14	94	32	8	58	12	67	102	7	38	41	70	543	
4:45:00 PM	13	118	19	9	50	9	60	127	7	35	55	74	576	2159
5:00:00 PM	13	101	29	5	40	13	62	101	5	34	64	79	546	2162
5:15:00 PM	13	124	28	3	43	13	63	117	12	28	62	66	572	2237
5:30:00 PM	13	96	23	10	54	12	60	108	10	21	41	77	525	2219
5:45:00 PM	20	108	19	5	49	12	61	99	8	31	63	58	533	2176
													4335	2237
													4638	2394
<b>February Seasonal Adjustment ( 7%)</b>														
<b>Comparisson</b>													1.29	1.26
<b>Say COVID Adj</b>													1.30	

**Say 30% adjustment for AM and PM Traffic Volumes**

PUBLIC TRANSPORTATION SCHEDULES

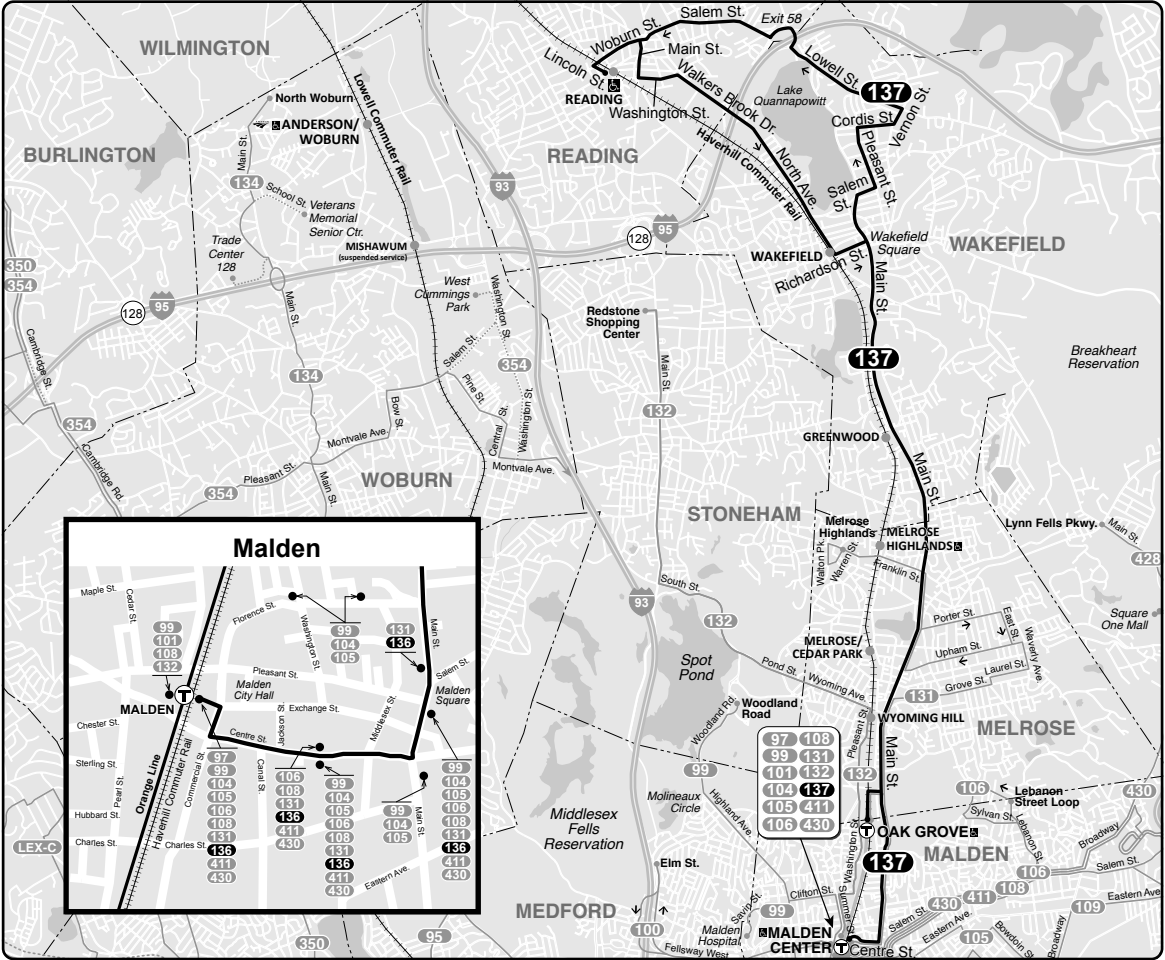






Effective **March 13, 2022**

# 137 Reading Depot – Malden Ctr Sta



## Connections

ORANGE LINE

HAVERRILL LINE



Information **617-222-3200**  
 Lost and Found **617-222-2229**  
 TTY **617-222-5146**

Realtime arrival information, maps, and more

**mbta.com**

- Transfer to bus/subway available on CharlieCard—good for 2 hours, pay fare difference.
- Children 11 & under ride free with a paying customer.
- ♿ All MBTA buses are accessible to people with disabilities.

	CharlieCard	Cash on board	Reduced fare
<b>Bus</b>	<b>\$1.70</b>	<b>\$1.70</b>	<b>\$0.85</b>
<b>Bus + Subway</b>	<b>\$2.40</b>	<b>\$4.10</b>	<b>\$1.10</b>

Complete fare/pass rules and free/reduced fare eligibility:  
[mbta.com/fares](http://mbta.com/fares) or call **617-222-3200**

**Weekday 137**

Inbound				Outbound			
Reading Depot	Wakefield Square	Oak Grove Station	Malden Center Station	Malden Center Station	Oak Grove Station	Wakefield Square	Reading Depot
5:25	5:35	5:50	6:00	4:49	4:55	5:08	5:22
6:05	6:15	6:30	6:40	5:25	5:32	5:48	6:02
6:35	6:45	7:00	-	-	6:02	6:18	6:32
7:00	7:12	7:30	-	-	6:27	6:43	6:57
7:16	7:28	7:46	-	-	6:59	7:15	7:29
7:32	7:44	8:02	-	-	7:11	7:27	7:44
7:48	8:00	8:18	-	-	7:41	7:59	8:17
8:04	8:14	8:32	-	-	7:57	8:15	8:33
8:20	8:30	8:48	-	-	8:16	8:34	8:52
8:36	8:46	9:04	-	-	8:36	8:54	9:12
8:55	9:06	9:23	9:33	-	9:01	9:19	9:37
9:15	9:27	9:44	9:54	-	9:27	9:45	10:02
9:40	9:52	10:09	10:19	9:40	9:50	10:08	10:23
10:05	10:17	10:34	10:48	10:05	10:15	10:35	10:50
10:26	10:39	10:57	11:11	10:30	10:40	11:00	11:15
10:53	11:06	11:24	11:38	10:55	11:05	11:25	11:42
11:18	11:31	11:49	<b>12:03</b>	11:20	11:30	11:50	<b>12:08</b>
11:45	11:58	<b>12:16</b>	<b>12:30</b>	11:45	11:53	<b>12:13</b>	<b>12:31</b>
<b>12:11</b>	<b>12:24</b>	<b>12:42</b>	<b>12:56</b>	<b>12:10</b>	<b>12:18</b>	<b>12:38</b>	<b>12:56</b>
<b>12:34</b>	<b>12:47</b>	<b>1:06</b>	<b>1:17</b>	<b>12:35</b>	<b>12:43</b>	<b>1:03</b>	<b>1:19</b>
<b>12:59</b>	<b>1:14</b>	<b>1:31</b>	<b>1:42</b>	<b>1:00</b>	<b>1:10</b>	<b>1:32</b>	<b>1:48</b>
<b>1:22</b>	<b>1:37</b>	<b>1:54</b>	<b>2:06</b>	<b>1:25</b>	<b>1:35</b>	<b>1:57</b>	<b>2:12</b>
<b>1:50</b>	<b>2:04</b>	<b>2:23</b>	<b>2:36</b>	<b>1:50</b>	<b>2:00</b>	<b>2:21</b>	<b>2:36</b>
<b>2:16</b>	<b>2:29</b>	<b>2:48</b>	<b>3:01</b>	<b>S 2:10</b>	<b>2:19</b>	<b>2:40</b>	-
<b>S 2:39</b>	<b>2:52</b>	<b>3:11</b>	<b>3:24</b>	<b>2:15</b>	<b>2:24</b>	<b>2:45</b>	<b>3:00</b>
<b>3:03</b>	<b>3:16</b>	<b>3:35</b>	<b>3:48</b>	<b>2:40</b>	<b>2:49</b>	<b>3:10</b>	<b>3:25</b>
<b>3:28</b>	<b>3:41</b>	<b>4:00</b>	-	<b>3:05</b>	<b>3:14</b>	<b>3:35</b>	<b>3:50</b>
<b>3:53</b>	<b>4:06</b>	<b>4:25</b>	<b>4:38</b>	-	<b>3:23</b>	<b>3:44</b>	<b>3:59</b>
<b>4:02</b>	<b>4:15</b>	<b>4:33</b>	-	<b>3:30</b>	<b>3:39</b>	<b>4:00</b>	<b>4:15</b>
<b>4:22</b>	<b>4:35</b>	<b>4:52</b>	-	-	<b>4:00</b>	<b>4:22</b>	<b>4:37</b>
<b>4:40</b>	<b>4:54</b>	<b>5:11</b>	-	-	<b>4:20</b>	<b>4:42</b>	<b>4:57</b>
<b>5:00</b>	<b>5:14</b>	<b>5:31</b>	-	-	<b>4:37</b>	<b>4:59</b>	<b>5:14</b>
<b>5:17</b>	<b>5:31</b>	<b>5:48</b>	-	-	<b>4:53</b>	<b>5:15</b>	<b>5:30</b>
<b>5:33</b>	<b>5:47</b>	<b>6:04</b>	-	-	<b>5:09</b>	<b>5:31</b>	<b>5:46</b>
<b>5:49</b>	<b>6:02</b>	<b>6:18</b>	-	-	<b>5:25</b>	<b>5:47</b>	<b>6:02</b>
<b>6:05</b>	<b>6:17</b>	<b>6:33</b>	-	-	<b>5:41</b>	<b>6:02</b>	<b>6:16</b>
<b>6:19</b>	<b>6:31</b>	<b>6:47</b>	-	-	<b>5:57</b>	<b>6:15</b>	<b>6:29</b>
<b>6:32</b>	<b>6:44</b>	<b>7:00</b>	-	-	<b>6:13</b>	<b>6:31</b>	<b>6:45</b>
<b>6:48</b>	<b>7:00</b>	<b>7:16</b>	-	-	<b>6:29</b>	<b>6:47</b>	<b>7:01</b>
<b>7:04</b>	<b>7:16</b>	<b>7:31</b>	-	-	<b>6:45</b>	<b>7:03</b>	<b>7:17</b>
<b>7:20</b>	<b>7:31</b>	<b>7:46</b>	<b>7:57</b>	-	<b>7:05</b>	<b>7:23</b>	<b>7:37</b>
<b>7:40</b>	<b>7:49</b>	<b>8:04</b>	<b>8:15</b>	<b>7:30</b>	<b>7:40</b>	<b>7:58</b>	<b>8:12</b>
<b>8:15</b>	<b>8:24</b>	<b>8:39</b>	<b>8:50</b>	<b>8:10</b>	<b>8:20</b>	<b>8:38</b>	<b>8:52</b>
<b>8:55</b>	<b>9:04</b>	<b>9:19</b>	<b>9:30</b>	<b>8:55</b>	<b>9:05</b>	<b>9:23</b>	<b>9:37</b>
<b>9:40</b>	<b>9:49</b>	<b>10:04</b>	<b>10:15</b>	<b>9:40</b>	<b>9:50</b>	<b>10:08</b>	<b>10:22</b>
<b>10:25</b>	<b>10:34</b>	<b>10:49</b>	<b>11:00</b>				

**Saturday 137**

Inbound				Outbound			
Reading Depot	Wakefield Square	Oak Grove Station	Malden Center Station	Malden Center Station	Oak Grove Station	Wakefield Square	Reading Depot
6:00	6:10	6:25	6:36	6:00	6:08	6:23	6:38
6:41	6:51	7:06	7:17	6:40	6:48	7:03	7:18
7:21	7:31	7:46	7:57	7:25	7:33	7:48	8:03
8:06	8:16	8:31	8:42	8:05	8:13	8:31	8:46
8:49	8:59	9:16	9:27	8:50	8:58	9:18	9:33
9:36	9:48	10:07	10:18	9:35	9:43	10:03	10:18
10:21	10:34	10:55	11:07	10:30	10:38	10:58	11:14
11:17	11:31	11:50	<b>12:02</b>	11:15	11:24	11:50	<b>12:06</b>
<b>12:09</b>	<b>12:23</b>	<b>12:42</b>	<b>12:54</b>	<b>12:10</b>	<b>12:19</b>	<b>12:41</b>	<b>12:56</b>
<b>12:59</b>	<b>1:13</b>	<b>1:32</b>	<b>1:44</b>	<b>1:00</b>	<b>1:09</b>	<b>1:31</b>	<b>1:46</b>
<b>1:49</b>	<b>2:03</b>	<b>2:23</b>	<b>2:34</b>	<b>1:50</b>	<b>1:59</b>	<b>2:21</b>	<b>2:36</b>
<b>2:39</b>	<b>2:53</b>	<b>3:11</b>	<b>3:22</b>	<b>2:40</b>	<b>2:49</b>	<b>3:11</b>	<b>3:26</b>
<b>3:29</b>	<b>3:42</b>	<b>4:00</b>	<b>4:11</b>	<b>3:30</b>	<b>3:39</b>	<b>4:00</b>	<b>4:15</b>
<b>4:18</b>	<b>4:30</b>	<b>4:47</b>	<b>4:58</b>	<b>4:20</b>	<b>4:29</b>	<b>4:50</b>	<b>5:05</b>
<b>5:08</b>	<b>5:20</b>	<b>5:37</b>	<b>5:48</b>	<b>5:05</b>	<b>5:15</b>	<b>5:34</b>	<b>5:49</b>
<b>5:52</b>	<b>6:04</b>	<b>6:21</b>	<b>6:32</b>	<b>5:55</b>	<b>6:05</b>	<b>6:24</b>	<b>6:39</b>
<b>6:42</b>	<b>6:54</b>	<b>7:11</b>	<b>7:22</b>	<b>6:45</b>	<b>6:55</b>	<b>7:14</b>	<b>7:29</b>
<b>7:32</b>	<b>7:44</b>	<b>8:01</b>	<b>8:12</b>	<b>8:30</b>	<b>8:38</b>	<b>8:53</b>	-
-	<b>9:00</b>	<b>9:17</b>	<b>9:28</b>				

**S** runs only on school days

PM times are **bold**

Information in this timetable is subject to change without notice. Traffic and weather may affect running times.

Always check bus destination signs before boarding. Some buses may only serve a part, or skip portions of this route.

**Sunday 137**

Inbound				Outbound			
Reading Depot	Wakefield Square	Oak Grove Station	Malden Center Station	Malden Center Station	Oak Grove Station	Wakefield Square	Reading Depot
8:00	8:11	8:25	8:36	8:40	8:49	9:05	9:19
9:22	9:34	9:50	10:01	10:10	10:19	10:36	10:50
10:53	11:05	11:21	11:34	11:40	11:50	<b>12:07</b>	<b>12:21</b>
<b>12:24</b>	<b>12:36</b>	<b>12:54</b>	<b>1:06</b>	<b>1:20</b>	<b>1:29</b>	<b>1:47</b>	<b>2:01</b>
<b>2:04</b>	<b>2:16</b>	<b>2:32</b>	<b>2:44</b>	<b>2:55</b>	<b>3:05</b>	<b>3:23</b>	<b>3:37</b>
<b>3:40</b>	<b>3:51</b>	<b>4:06</b>	<b>4:17</b>	<b>4:25</b>	<b>4:34</b>	<b>4:52</b>	<b>5:06</b>
<b>5:09</b>	<b>5:20</b>	<b>5:35</b>	<b>5:46</b>				

**2022 Holidays**

**SUN** Memorial Day      **SUN** Christmas Day  
**SUN** Independence Day      **SUN** Christmas Day Observed  
**SUN** Labor Day      **SAT** New Year's Eve  
**SUN** Thanksgiving Day      **SUN** New Year's Day





MOTOR VEHICLE CRASH DATA

---





# MassHighway

## CRASH RATE WORKSHEET

CITY/TOWN : Wakefield COUNT DATE : 2019

DISTRICT : 4 UNSIGNALIZED :  SIGNALIZED :

**MHD USE ONLY**

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Broadway Street

ST #

MINOR STREET(S) : Foundry Street

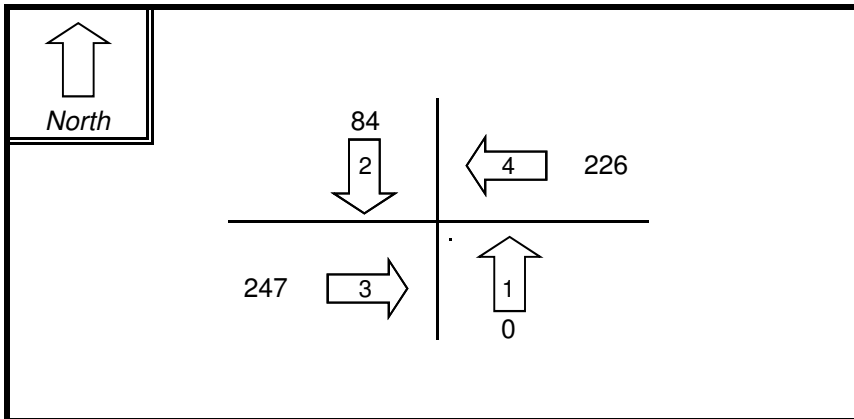
ST #

ST #

ST #

ST #

**INTERSECTION  
DIAGRAM  
(Label Approaches)**



INTERSECTION

REF #

**Peak Hour Volumes**

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :		84	247	226		557

" K " FACTOR :  APPROACH ADT :  ADT = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS :  # OF YEARS :  AVERAGE # OF ACCIDENTS ( A ) :

**CRASH RATE CALCULATION :**  RATE =  $\frac{(A * 1,000,000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73

Accident Rate for District 4 unsignalized intersections = 0.57

# MassHighway

## CRASH RATE WORKSHEET

CITY/TOWN : Wakefield COUNT DATE : 2019

DISTRICT : 4 UNSIGNALIZED :  SIGNALIZED :

**MHD USE ONLY**

Source #

~ INTERSECTION DATA ~

MAJOR STREET : North Avenue

ST #

MINOR STREET(S) : Broadway Street

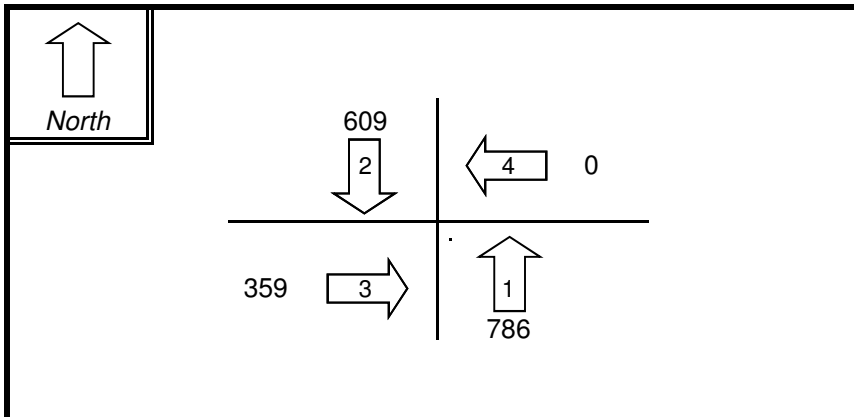
ST #

ST #

ST #

ST #

**INTERSECTION  
DIAGRAM  
(Label Approaches)**



INTERSECTION

REF #

**Peak Hour Volumes**

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	786	609	359			<b>1,754</b>

" K " FACTOR :  APPROACH ADT :  ADT = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS :  # OF YEARS :  AVERAGE # OF ACCIDENTS ( A ) :

**CRASH RATE CALCULATION :**  RATE =  $\frac{(A * 1,000,000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73

Accident Rate for District 4 unsignalized intersections = 0.57

# MassHighway

## CRASH RATE WORKSHEET

CITY/TOWN : Wakefield COUNT DATE : 2019

DISTRICT : 4 UNSIGNALIZED :  SIGNALIZED :

**MHD USE ONLY**

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Main Street

ST #

MINOR STREET(S) : North Avenue

ST #

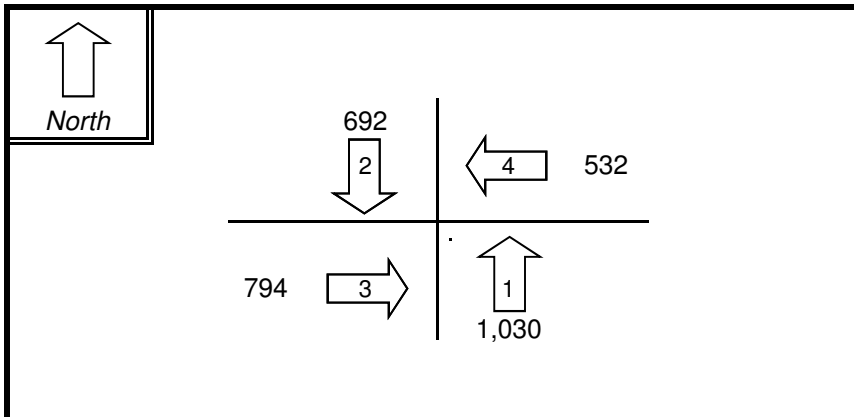
Nahant Street

ST #

ST #

ST #

**INTERSECTION  
DIAGRAM  
(Label Approaches)**



INTERSECTION

REF #

### Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	1,030	692	794	532		<b>3,048</b>

" K " FACTOR :  APPROACH ADT :  ADT = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS :  # OF YEARS :  AVERAGE # OF ACCIDENTS ( A ) :

**CRASH RATE CALCULATION :**  RATE =  $\frac{(A * 1,000,000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73

Accident Rate for District 4 unsignalized intersections = 0.57

# MassHighway

## CRASH RATE WORKSHEET

CITY/TOWN : Wakefield COUNT DATE : 2019

DISTRICT : 4 UNSIGNALIZED :  SIGNALIZED :

**MHD USE ONLY**

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Broadway Street

ST #

MINOR STREET(S) : 10 Broadway Street driveway

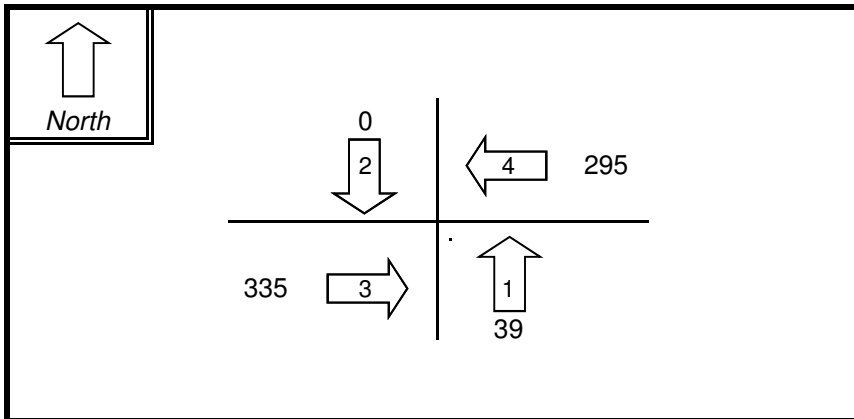
ST #

ST #

ST #

ST #

**INTERSECTION  
DIAGRAM  
(Label Approaches)**



INTERSECTION

REF #

**Peak Hour Volumes**

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	39		335	295		<b>669</b>

" K " FACTOR :  APPROACH ADT :  ADT = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS :  # OF YEARS :  AVERAGE # OF ACCIDENTS ( A ) :

**CRASH RATE CALCULATION :**  RATE =  $\frac{(A * 1,000,000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73

Accident Rate for District 4 unsignalized intersections = 0.57

Crash Number	City Town Name	Crash Date	Crash Severity	Crash Time	Max Injury Severity Reported	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	First Harmful Event	Light Conditions	Manner of Collision	Road Surface Condition	Roadway Junction Type	Total Non-Fatal Injuries	Traffic Control Device Type	Trafficway Description	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Configuration (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Latitude	Longitude	Street Number	Roadway
BROADWAY / FOUNDRY ST																							
4273160	WAKEFIELD	10/31/2016	Non-fatal injury	5:22 PM	Non-fatal injury - Possible	4	D1: (Distracted) / D2: (No improper driving) / D3: (No improper driving) / D4: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Rear-end	Dry	Not at junction	1	No controls	Two-way, divided, unprotected median	V1: Travelling straight ahead / V2: Slowing or stopped in traffic / V3: Slowing or stopped in traffic / V4: Slowing or stopped in traffic	V1:(Passenger car) / V2:(Passenger car) / V3:(Passenger car) / V4:(Passenger car)	V1: E / V2: E / V3: E / V4: E	Clear	42.4970873	-71.0727285		BROADWAY / FOUNDRY ST
4671514	WAKEFIELD	02/28/2019	Property damage only (none injured)	11:47 AM	No Apparent Injury (O)	2	D1: (No improper driving) / D2: (Inattention)	Collision with motor vehicle in traffic	Daylight	Front to Rear	Dry	T-intersection	0	No controls	Two-way, divided, unprotected median	V1: Travelling straight ahead / V2: Backing	V1:(Passenger car) / V2:(Single-unit truck (2-axle, 6-tires))	V1: W / V2: E	Cloudy	42.4970861	-71.0727263		BROADWAY / FOUNDRY STREET
4775615	WAKEFIELD	11/17/2019	Property damage only (none injured)	7:45 PM	No Apparent Injury (O)	2	D1: (Unknown) / D2: (No improper driving)	Collision with motor vehicle in traffic	Dark - lighted roadway	Rear-end	Wet	T-intersection	0	Stop signs	Two-way, not divided	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1:(Passenger car) / V2:(Passenger car)	V1: S / V2: S	Cloudy	42.4970861	-71.0727263		FOUNDRY ST / BROADWAY
NORTH AVE / BROADWAY																							
4055019	WAKEFIELD	06/12/2015	Property damage only (none injured)	7:28 AM	No injury	2	D1: (No improper driving) / D2: (Followed too closely)	Collision with motor vehicle in traffic	Daylight	Rear-end	Dry	Y-intersection	0	Stop signs	Two-way, not divided	V1: Slowing or stopped in traffic / V2: Turning right	V1:(Passenger car) / V2:(Passenger car)	V1: E / V2: E	Clear	42.4980582	-71.0699482	64	NORTH AVE
4073860	WAKEFIELD	08/15/2015	Property damage only (none injured)	11:31 PM	No injury	2	D1: (Failed to yield right of way) / D2: (No improper driving)	Collision with motor vehicle in traffic	Dark - lighted roadway	Angle	Wet	T-intersection	0	Stop signs	Two-way, divided, unprotected median	V1: Entering traffic lane / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: E / V2: S	Rain	42.4980582	-71.0699482		NORTH AVE / BROADWAY
4086497	WAKEFIELD	09/17/2015	Property damage only (none injured)	6:50 AM	No injury	2	D1: (Failed to yield right of way) / D2: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Angle	Dry	Y-intersection	0	Stop signs	Two-way, not divided	V1: Entering traffic lane / V2: Slowing or stopped in traffic	V1:(Passenger car) / V2:(Passenger car)	V1: E / V2: E	Clear	42.4980582	-71.0699482		NORTH AVE / BROADWAY
4302235	WAKEFIELD	12/25/2016	Property damage only (none injured)	8:16 PM	No injury	2	D1: (No improper driving) / D2: (Failed to yield right of way)	Collision with motor vehicle in traffic	Dark - lighted roadway	Angle	Dry	Not at junction	0	No controls	Two-way, not divided	V1: Travelling straight ahead / V2: Turning left	V1:(Passenger car) / V2:(Passenger car)	V1: N / V2: E	Clear	42.4980582	-71.0699482		NORTH AVE / BROADWAY
4395361	WAKEFIELD	07/19/2017	Non-fatal injury	7:27 PM	Non-fatal injury - Non-incapacitating	1	D1: (Glare)	Collision with pedalcycle (bicycle, tricycle, unicycle, pedal car)	Daylight	Angle	Dry	T-intersection	1	No controls	Two-way, divided, unprotected median	V1: Turning left	V1:(Passenger car)	V1: W	Clear	42.4980582	-71.0699482		NORTH AVE / BROADWAY
4674249	WAKEFIELD	03/02/2019	Non-fatal injury	6:50 PM	Possible Injury (C)	3	D1: (No improper driving) / D2: (Failure to keep in proper lane or running off road) / D3: (No improper driving)	Collision with motor vehicle in traffic	Dark - lighted roadway	Head-on	Wet	Y-intersection	0	Stop signs	Two-way, divided, unprotected median	V1: Turning right / V2: Turning left / V3: Slowing or stopped in traffic	V1:(Passenger car) / V2:(Passenger car) / V3:(Passenger car)	V1: E / V2: W / V3: E	Clear	42.4980605	-71.0699524		NORTH AVE / BROADWAY



Crash Number	City Town Name	Crash Date	Crash Severity	Crash Time	Max Injury Severity Reported	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	First Harmful Event	Light Conditions	Manner of Collision	Road Surface Condition	Roadway Junction Type	Total Non-Fatal Injuries	Traffic Control Device Type	Trafficway Description	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Configuration (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Latitude	Longitude	Street Number	Roadway
MAIN STREET / NORTH AVENUE																							
4067092	WAKEFIELD	07/27/2015	Property damage only (none injured)	9:57 AM	No injury	2	D1: (No improper driving) / D2: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Angle	Dry	Four-way intersection	0	Traffic control signal	Two-way, not divided	V1: Changing lanes / V2: Slowing or stopped in traffic	V1:(Passenger car) / V2:(Bus (seats for 9-15 people, including driver))	V1: E / V2: E	Clear	42.4977586	-71.069269		MAIN STREET / NORTH AVENUE
4078925	WAKEFIELD	08/24/2015	Property damage only (none injured)	5:18 PM	No injury	2	D1: (No improper driving) / D2: (Inattention)	Collision with motor vehicle in traffic	Daylight	Rear-end	Dry	Four-way intersection	0	Traffic control signal	Two-way, not divided	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: E / V2: E	Clear	42.4977586	-71.069269		NORTH AVE / MAIN ST
4119343	WAKEFIELD	12/08/2015	Property damage only (none injured)	8:51 PM	No injury	2	D1: (No improper driving) / D2: (Failed to yield right of way)	Collision with motor vehicle in traffic	Dark - lighted roadway	Angle	Dry	Four-way intersection	0	Traffic control signal	Two-way, not divided	V1: Turning left / V2: Turning right	V1:(Passenger car) / V2:(Passenger car)	V1: W / V2: W	Clear	42.4977586	-71.069269		NORTH AVE / MAIN ST
4153556	WAKEFIELD	02/20/2016	Property damage only (none injured)	11:58 PM	No injury	1	D1: (Distracted)	Collision with utility pole	Dark - lighted roadway	Single vehicle crash	Dry	Not at junction	0	No controls	Two-way, not divided	V1: Turning left	V1:(Passenger car)	V1: E	Clear/Other	42.4974796	-71.0692952	618	MAIN ST
4196266	WAKEFIELD	05/16/2016	Property damage only (none injured)	6:45 PM	No injury	2	D1: (No improper driving) / D2: (Other improper action)	Collision with motor vehicle in traffic	Daylight	Rear-end	Dry	Four-way intersection	0	Traffic control signal	Two-way, divided, unprotected median	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: N / V2: N	Clear	42.4977586	-71.069269		NAHANT ST / MAIN ST
4210791	WAKEFIELD	06/29/2016	Property damage only (none injured)	6:32 PM	No injury	2	D1: (No improper driving) / D2: (Inattention)	Collision with motor vehicle in traffic	Daylight	Rear-end	Dry	Four-way intersection	0	Traffic control signal	Two-way, not divided	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic	V1:(Passenger car) / V2:(Passenger car)	V1: E / V2: E	Clear	42.4977586	-71.069269		NORTH AVE / MAIN ST
4239671	WAKEFIELD	08/26/2016	Property damage only (none injured)	10:17 PM	No injury	2	D1: (Failed to yield right of way) / D2: (No improper driving)	Collision with motor vehicle in traffic	Dark - lighted roadway	Angle	Dry	Not at junction	0	Traffic control signal	Two-way, not divided	V1: Entering traffic lane / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: S / V2: E	Clear	42.4976497	-71.0690386	14	NAHANT ST 75 feet E of MAIN STREET
4259473	WAKEFIELD	09/04/2016	Non-fatal injury	7:23 PM	Non-fatal injury - Non-incapacitating	2	D1: (No improper driving) / D2: (Swerving or avoiding due to wind, slippery surface, vehicle, object, non-motorist in roadway, etc)	Collision with motor vehicle in traffic	Dark - lighted roadway	Sideswipe, opposite direction	Dry	Four-way intersection	2	Traffic control signal	Two-way, not divided	V1: Travelling straight ahead / V2: Turning left	V1:(Motorcycle) / V2:(Passenger car)	V1: N / V2: S	Clear	42.4977586	-71.069269		MAIN ST / NORTH AVE
4273159	WAKEFIELD	10/27/2016	Property damage only (none injured)	9:24 PM	No injury	1	D1: (No improper driving)	Collision with motor vehicle in traffic	Dark - lighted roadway	Angle	Wet	Four-way intersection	0	Traffic control signal	Two-way, not divided	V1: Travelling straight ahead	V1:(Passenger car)	V1: E	Rain	42.4977586	-71.069269		NORTH AVE / MAIN ST
4523011	WAKEFIELD	03/30/2018	Property damage only (none injured)	3:51 PM	No injury	2	D1: (Unknown) / D2: (Failed to yield right of way)	Collision with motor vehicle in traffic	Daylight	Angle	Dry	Four-way intersection	0	Traffic control signal	Two-way, divided, unprotected median	V1: Travelling straight ahead / V2: Turning left	V1:(Passenger car) / V2:(Passenger car)	V1: W / V2: N	Cloudy	42.4977586	-71.0692693		MAIN ST / NORTH AVE
4560483	WAKEFIELD	07/03/2018	Unknown	10:19 AM	Not reported	1		Collision with parked motor vehicle	Daylight	Unknown	Dry	Driveway	0	No controls	Unknown	V1: Parked	V1:(Passenger car)	V1: N	Clear	42.4977702	-71.0708409	21	BROADWAY
4571623	WAKEFIELD	07/15/2018	Property damage only (none injured)	3:09 PM	No injury	2	D1: (No improper driving) / D2: (Inattention)	Collision with motor vehicle in traffic	Daylight	Rear-end	Dry	Four-way intersection	0	Traffic control signal	Two-way, divided, unprotected median	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: E / V2: E	Clear	42.4977586	-71.0692693		NORTH AVE / MAIN ST
4580447	WAKEFIELD	08/07/2018	Property damage only (none injured)	1:21 PM	No injury	1	D1: (Unknown)	Collision with motor vehicle in traffic	Daylight	Sideswipe, same direction	Dry	Four-way intersection	0	No controls	Two-way, divided, unprotected median	V1: Travelling straight ahead	V1:(Passenger car)	V1: S	Clear	42.4977586	-71.0692693		MAIN ST / NORTH AVE
4609927	WAKEFIELD	10/10/2018	Property damage only (none injured)	6:48 AM	No injury	2	D1: (No improper driving) / D2: (Unknown)	Collision with motor vehicle in traffic	Daylight	Sideswipe, same direction	Dry	Four-way intersection	0	No controls	Two-way, divided, unprotected median	V1: Travelling straight ahead / V2: Entering traffic lane	V1:(Passenger car) / V2:(Passenger car)	V1: S / V2: S	Clear	42.4977586	-71.0692693		MAIN ST / NORTH AVE
4673574	WAKEFIELD	03/07/2019	Property damage only (none injured)	4:33 PM	No Apparent Injury (O)	2	D1: (No improper driving) / D2: (Disregarded traffic signs, signals, road markings)	Collision with motor vehicle in traffic	Daylight	Angle	Dry	Four-way intersection	0	Traffic control signal	Two-way, divided, unprotected median	V1: Turning left / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: W / V2: S	Clear	42.4977586	-71.0692693		MAIN ST / NAHANT ST / NORTH AVE
4705429	WAKEFIELD	05/14/2019	Property damage only (none injured)	6:08 PM	No Apparent Injury (O)	2	D1: (No improper driving) / D2: (Disregarded traffic signs, signals, road markings),(Distracted)	Collision with motor vehicle in traffic	Daylight	Front to Front	Wet	Four-way intersection	0	Traffic control signal	Two-way, not divided	V1: Travelling straight ahead / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: N / V2: E	Rain/Cloudy	42.4977586	-71.0692693		MAIN ST / NORTH AVE / NAHANT ST
4729037	WAKEFIELD	07/11/2019	Non-fatal injury	1:15 PM	Suspected Minor Injury (B)	1	D1: (Disregarded traffic signs, signals, road markings)	Collision with pedestrian	Daylight	Single vehicle crash W/ Pedestrian	Dry	Four-way intersection	0	Traffic control signal	Two-way, divided, unprotected median	V1: Turning right	V1:(Passenger car)	V1: E	Clear	42.4977586	-71.0692693		NORTH AVE / MAIN ST
4752276	WAKEFIELD	09/18/2019	Property damage only (none injured)	2:43 PM	No Apparent Injury (O)	2	D1: (No improper driving) / D2: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Sideswipe, same direction	Dry	Four-way intersection	0	Traffic control signal	Two-way, not divided	V1: Travelling straight ahead / V2: Changing lanes	V1:(Passenger car) / V2:(Other e.g. farm equipment)	V1: S / V2: S	Clear	42.4977586	-71.0692693		MAIN STREET / NORTH AVENUE
4775613	WAKEFIELD	11/14/2019	Property damage only (none injured)	3:33 PM	No Apparent Injury (O)	2	D1: (No improper driving) / D2: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Sideswipe, same direction	Dry	Four-way intersection	0	Traffic control signal	Two-way, divided, unprotected median	V1: Turning left / V2: Turning right	V1:(Light truck(van, mini-van, pickup, sport utility)) / V2:(Truck/trailer)	V1: N / V2: S	Clear	42.4977586	-71.0692693		NAHANT STREET NEARBY MAIN STREET
4807875	WAKEFIELD	04/17/2019	Property damage only (none injured)	5:30 PM	No Apparent Injury (O)	2	D1: (No improper driving) / D2: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Head-on	Dry	Four-way intersection	0	Traffic control signal	Two-way, not divided	V1: Travelling straight ahead / V2: Turning left	V1:(Passenger car) / V2:(Passenger car)	V1: W / V2: E	Clear	42.4977586	-71.0692693		NORTH AVE / MAIN ST

Crash Number	City Town Name	Crash Date	Crash Severity	Crash Time	Max Injury Severity Reported	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	First Harmful Event	Light Conditions	Manner of Collision	Road Surface Condition	Roadway Junction Type	Total Non-Fatal Injuries	Traffic Control Device Type	Trafficway Description	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Configuration (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Latitude	Longitude	Street Number	Roadway
10 BROADWAY																							
4055020	WAKEFIELD	06/13/2015	Not Reported	2:10 PM	Not reported	2		Collision with parked motor vehicle	Daylight	Rear-end	Dry	Driveway	0	No controls	Unknown	V1: Parked / V2: Other	V1:(Passenger car) / V2:(Light truck{van, mini-van, pickup, sport utility})	V1: E / V2: W	Clear	42.4979248	-71.0703749	10	BROADWAY
4123938	WAKEFIELD	12/15/2015	Property damage only (none injured)	10:42 PM	No injury	1	D1: (Distracted)	Collision with utility pole	Dark - lighted roadway	Single vehicle crash	Dry	Not at junction	0	No controls	Two-way, not divided	V1: Travelling straight ahead	V1:(Passenger car)	V1: E	Clear	42.4979248	-71.0703749	10	BROADWAY
4210024	WAKEFIELD	06/22/2016	Property damage only (none injured)	3:25 PM	No injury	1	D1: (No improper driving)	Collision with parked motor vehicle	Daylight	Unknown	Dry	Not at junction	0	No controls	Unknown	V1: Parked	V1:(Passenger car)	V1: E	Clear	42.4979248	-71.0703749	10	BROADWAY



## GROWTH RATE CALCULATIONS

---





# General Background Traffic Growth - Daily Traffic Volumes from Massachusetts

## Highway Department

AADT Summary By Year for 1/1/2015- 12/31/2020

Community	Counts	Station	Location	2015	2016	2017	2018	2019	2020	Annual
Reading	Continuous	4158	YANKEE DIVISION HIGHWAY	154054	155608	157422	157652	156392	119953	<b>0.43%</b>
Wakefield	Continuous	4121	YANKEE DIVISION HIGHWAY	134579	138422	140727	139400	142046	121808	<b>1.20%</b>
Wakefield	Continuous	4137	YANKEE DIVISION HIGHWAY	129714	134790	140043	140579	137985	124192	<b>1.67%</b>
Wakefield	Continuous	4147	YANKEE DIVISION HIGHWAY	137541	148269	147824	146684	144478	128779	<b>0.98%</b>
Wakefield	Continuous	4423	YANKEE DIVISION HIGHWAY	141707	143419	147386	144627	143036	125903	<b>0.27%</b>

0.91%

**Say 1%**

(Source: MassDOT Transportation Data Management System)

2020 data was not included in the growth calculation



## BACKGROUND DEVELOPMENT

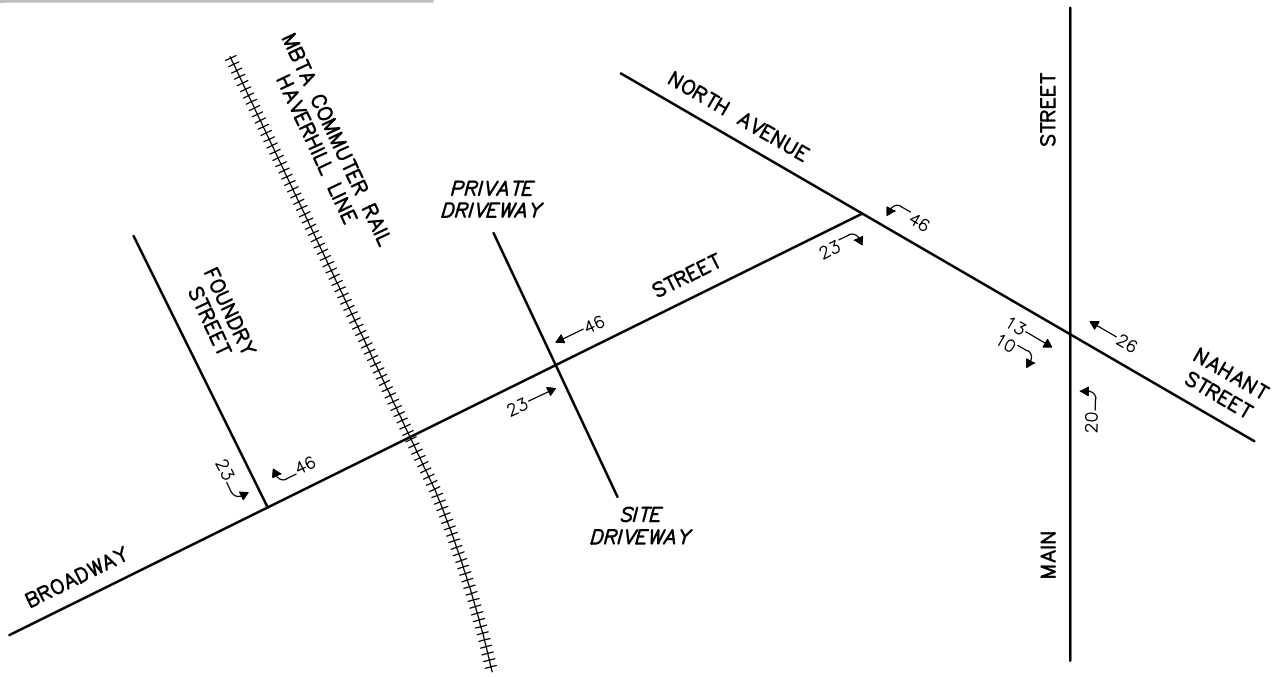
---



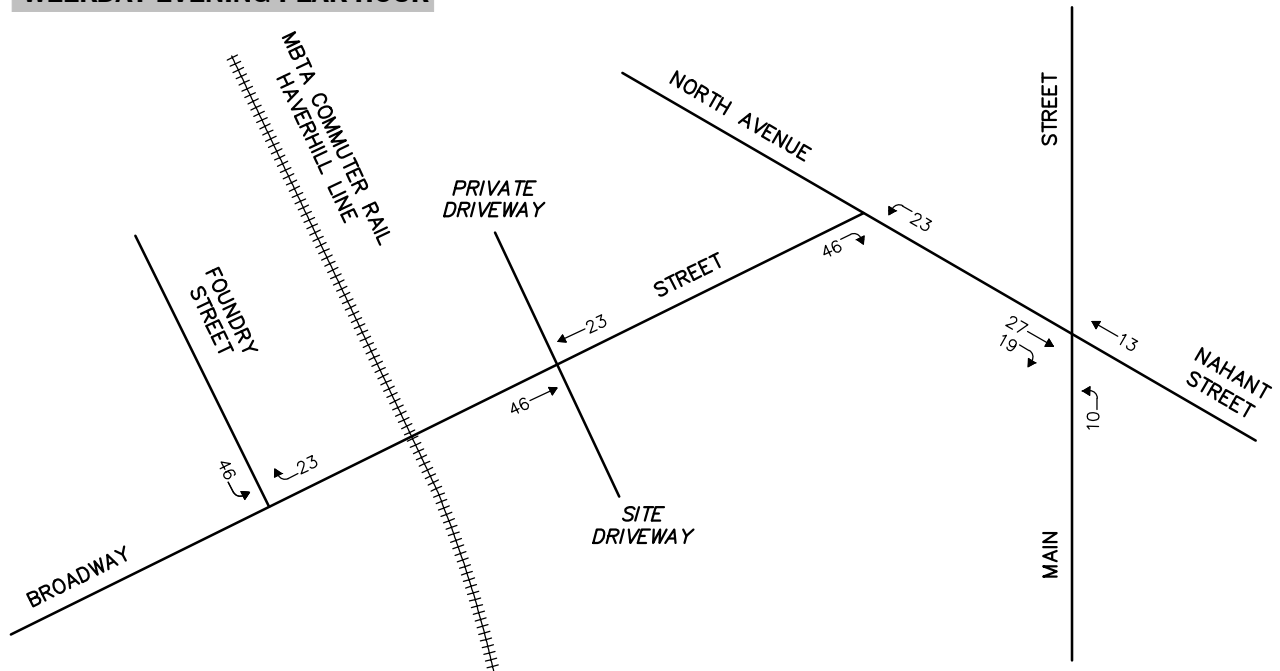




**WEEKDAY MORNING PEAK HOUR**



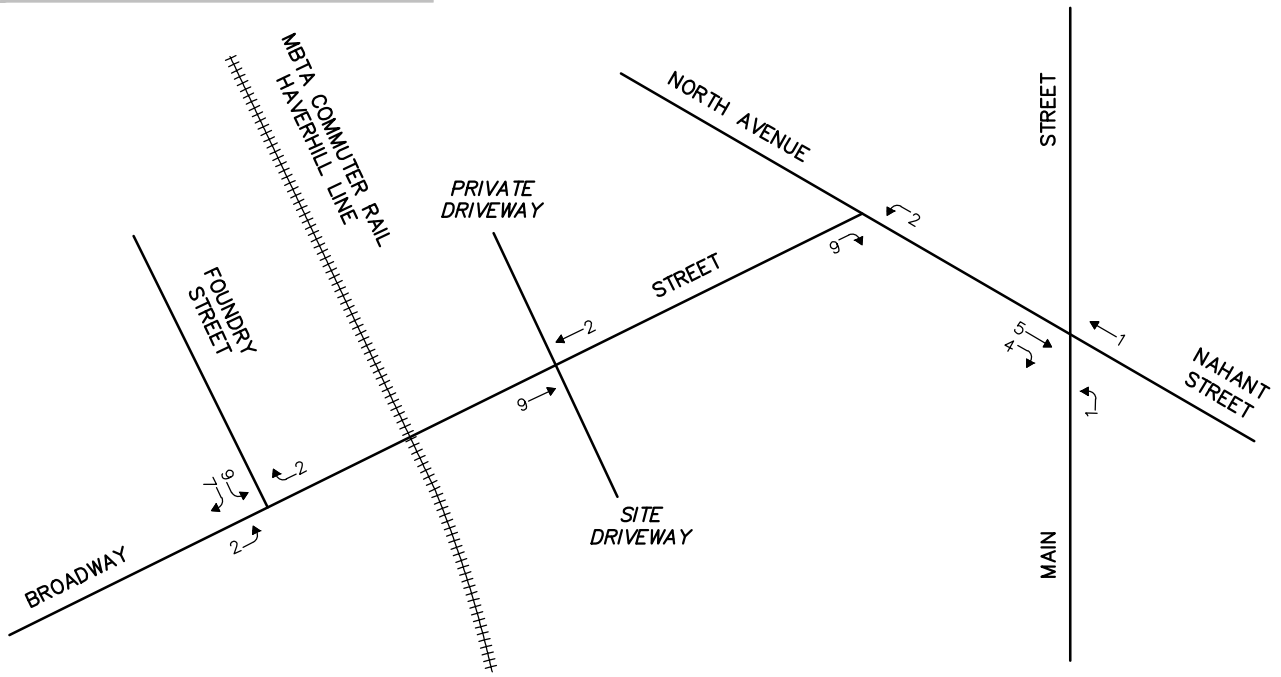
**WEEKDAY EVENING PEAK HOUR**



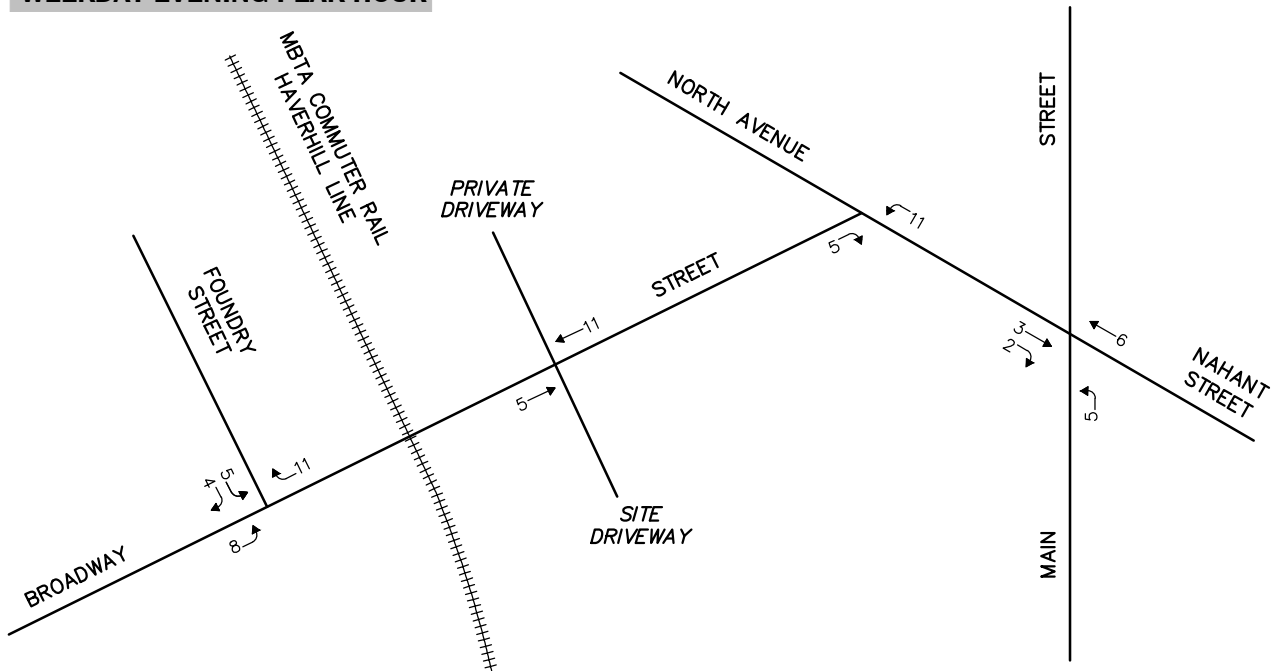
**Figure A1**

**Background Development  
Under Construction  
Harvard Mills  
Residential Development  
178 Albion Street  
Peak-Hour Traffic Volumes**

**WEEKDAY MORNING PEAK HOUR**



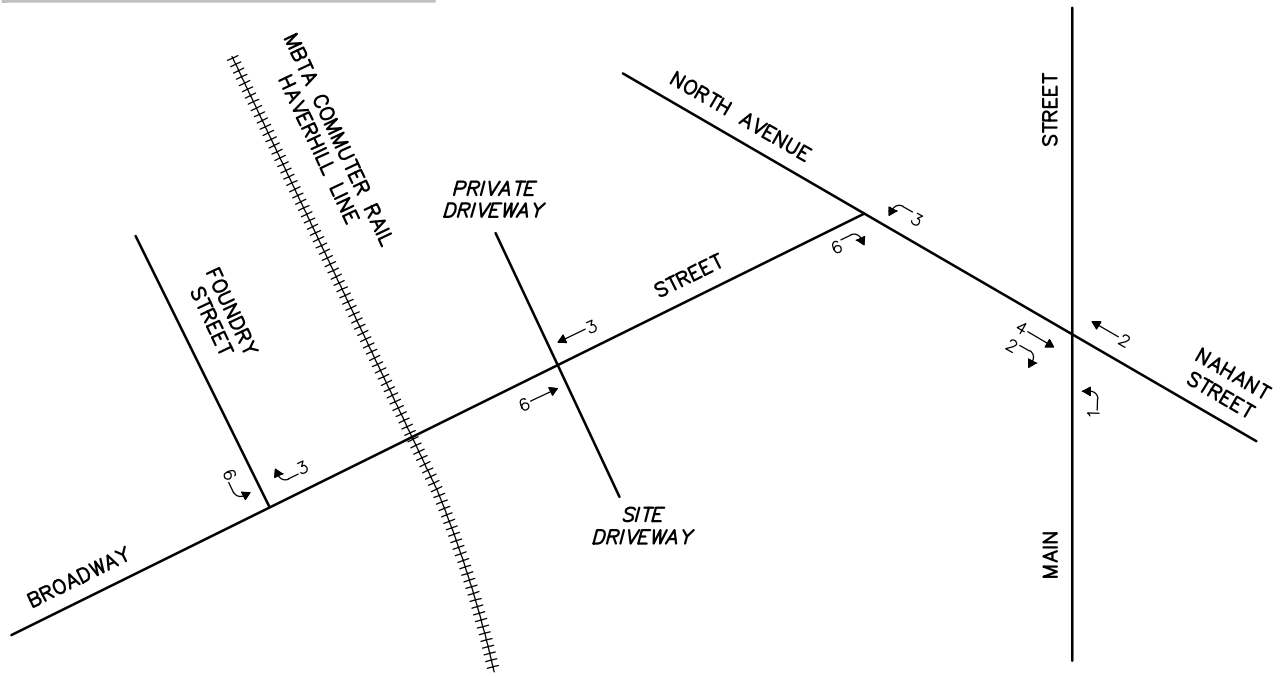
**WEEKDAY EVENING PEAK HOUR**



**Figure A2**

**Background Development Under Construction Residential Development 69 Foundry Street Peak-Hour Traffic Volumes**

WEEKDAY MORNING PEAK HOUR



WEEKDAY EVENING PEAK HOUR

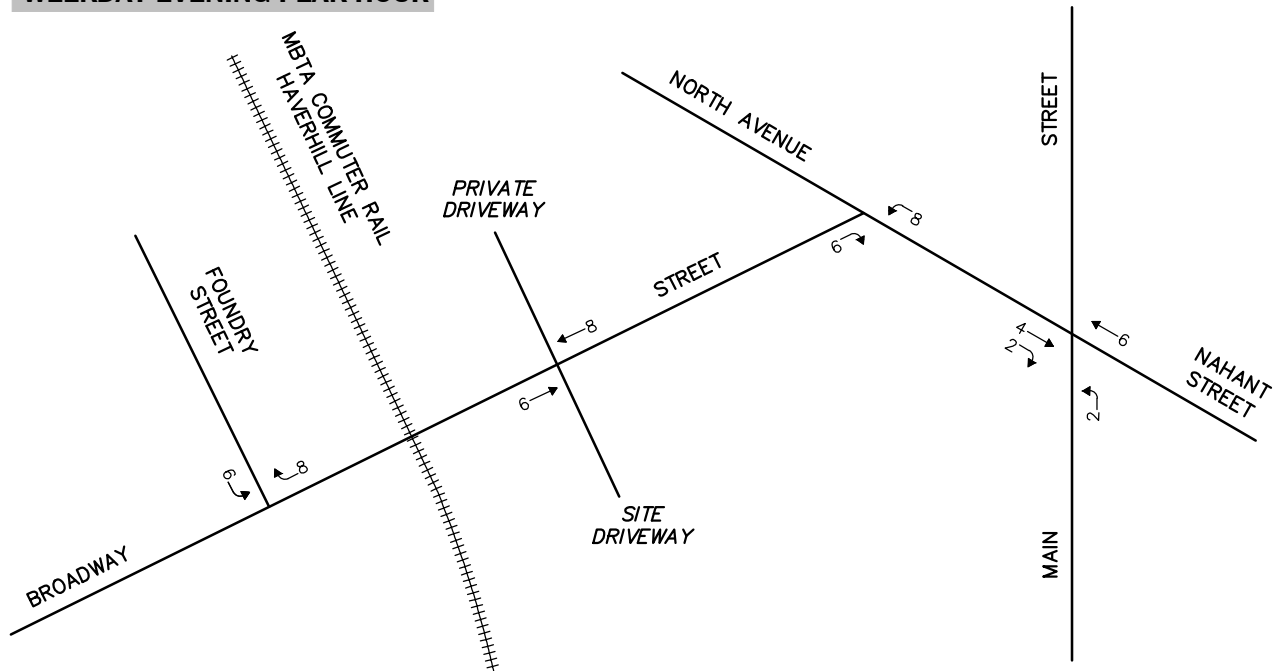


Figure A3

Background Development Under Construction Residential Development 62-76 Foundry Street Peak-Hour Traffic Volumes



## TRIP DISTRIBUTION





Journey to Work: Wakefield MA - Exiting traffic						
Residence in Wakefield						
Town/City/County	Percent	Main Street (North)	Nahant Street (South)	Main Street (South)	Braodway (West)	Foundy Street (North)
Andover town	1.49	1.49				
Beverly city	1.24	0.62	0.62			
Danvers town	1.38	0.69	0.69			
Peabody city	2.03	1.01	1.01			
Salem city	1.05	0.53	0.53			
Saugus town	1.11			1.11		
Bedford town	1.42				0.78	0.64
Burlington town	2.85				1.57	1.28
Cambridge city	5.15		3.99		1.42	1.16
Everett city	1.65			1.65		
Lexington town	1.41				0.78	0.64
Malden city	1.30			1.30		
Medford city	1.72				0.94	0.77
Melrose city	2.24			2.24		
Newton city	1.40	1.40				
Reading town	3.16	3.16				
Somerville city	2.22				1.22	1.00
Stoneham town	2.82				1.55	1.27
Wakefield town	19.00	6.27	3.42	6.65	1.46	1.20
Waltham city	1.64	1.64				
Wilmington town	2.03	2.03				
Winchester town	1.25				0.69	0.56
Woburn city	5.76	4.46			1.58	1.30
Boston city	17.73		8.87		4.88	3.99
Chelsea city	1.00		1.00			
Barnstable County	0.15	0.15				
Bristol County	0.10	0.10				
Essex County	4.48	2.24	2.24			
Middlesex County	7.50	3.75			2.06	1.69
Norfolk County	2.65	2.65				
Plymouth County	0.10	0.10				
Suffolk County	0.54		0.54			
Worcester County	0.42	0.42				
<b>TOTAL</b>	<b>100.00</b>	<b>32.72</b>	<b>22.91</b>	<b>12.95</b>	<b>18.93</b>	<b>15.49</b>
<b>USE</b>	<b>100</b>	<b>30</b>	<b>20</b>	<b>15</b>	<b>20</b>	<b>15</b>

Journey to Work: Wakefield MA - Entering Traffic							
Residence in Wakefield							
Town/City/County	Percent	North Avenue (North)	Main Street (North)	Nahant Street (South)	Main Street (South)	Braodway (West)	Foundy Street (North)
Andover town	1.49	1.49					
Beverly city	1.24	0.41	0.21	0.62			
Danvers town	1.38	0.46	0.23	0.69			
Peabody city	2.03	2.03					
Salem city	1.05	0.35	0.18	0.53			
Saugus town	1.11				1.11		
Bedford town	1.42					0.78	0.64
Burlington town	2.85					1.57	1.28
Cambridge city	5.15			3.99		1.42	1.16
Everett city	1.65				1.65		
Lexington town	1.41					0.78	0.64
Malden city	1.30				1.30		
Medford city	1.72					0.94	0.77
Melrose city	2.24				2.24		
Newton city	1.40	0.93	0.47				
Reading town	3.16	2.10	1.06				
Somerville city	2.22					1.22	1.00
Stoneham town	2.82					1.55	1.27
Wakefield town	19.00	4.46	1.80	3.42	6.65	1.46	1.20
Waltham city	1.64	1.09	0.55				
Wilmington town	2.03	1.35	0.68				
Winchester town	1.25					0.69	0.56
Woburn city	5.76	2.97	1.49			1.58	1.30
Boston city	17.73			13.74		4.88	3.99
Chelsea city	1.00			1.00			
Barnstable County	0.15	0.10	0.05				
Bristol County	0.10	0.07	0.03				
Essex County	4.48	1.49	0.75	3.73			
Middlesex County	7.50	2.50	1.25			2.06	1.69
Norfolk County	2.65	1.77	0.89				
Plymouth County	0.10	0.06	0.03				
Suffolk County	0.54			0.54			
Worcester County	0.42	0.28	0.14				
<b>TOTAL</b>	<b>100.00</b>	<b>23.93</b>	<b>9.80</b>	<b>28.26</b>	<b>12.95</b>	<b>18.93</b>	<b>15.49</b>
<b>USE</b>	<b>65</b>	<b>20</b>	<b>10</b>	<b>20</b>	<b>15</b>	<b>20</b>	<b>15</b>



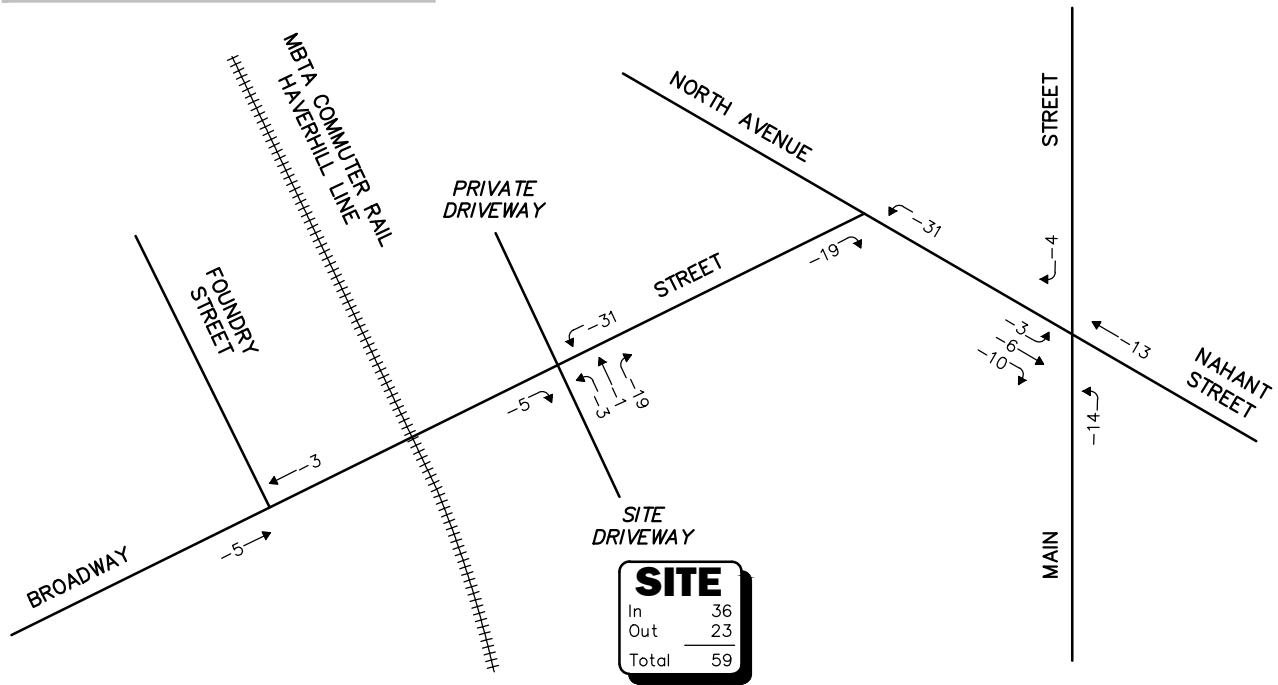


EXISTING SITE TRIP REDUCTION

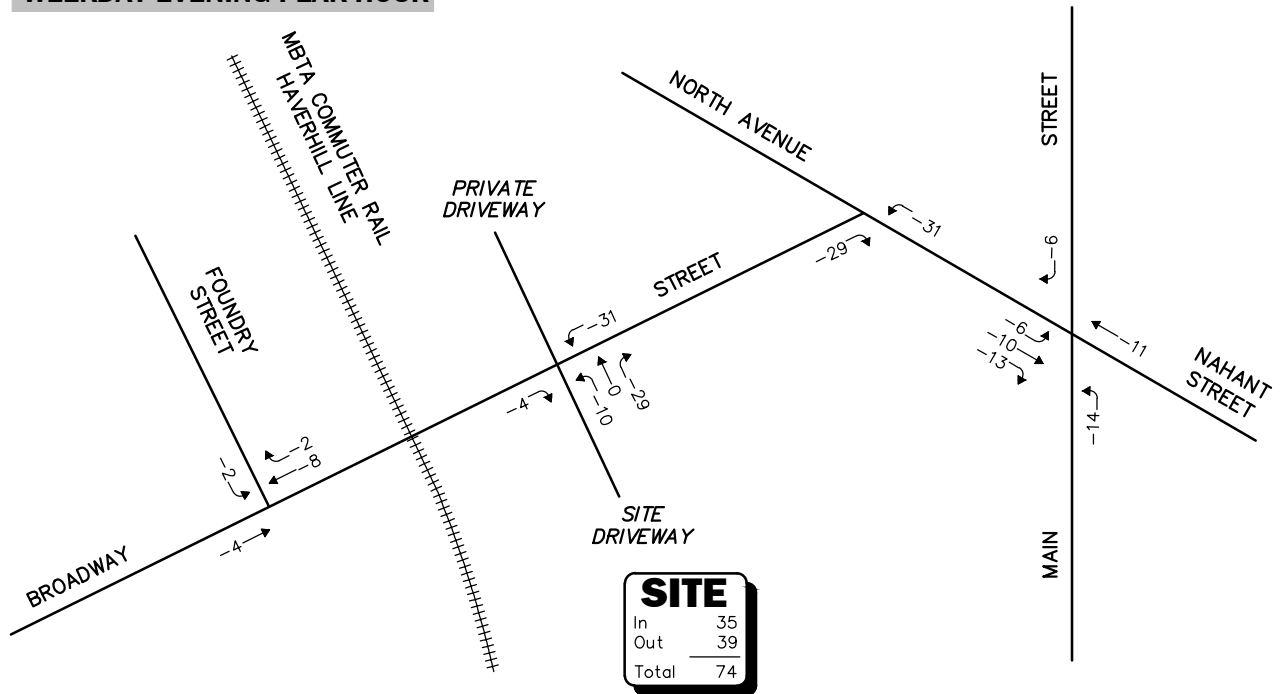




**WEEKDAY MORNING PEAK HOUR**



**WEEKDAY EVENING PEAK HOUR**



**Figure A4**



**Existing Retail Building  
Trip Reduction  
Peak-Hour Traffic Volumes**



US CENSUS

---





# COMMUTING CHARACTERISTICS BY SEX



Note: This is a modified view of the original table produced by the U.S. Census Bureau. This download or printed version may have missing information from the original table.

		Census Tract 3351, Middlesex County, Massachusetts	
		Total	
Label	Estimate	Margin of Error	
Workers 16 years and over	2,963	±336	
MEANS OF TRANSPORTATION TO WORK			
Car, truck, or van	86.0%	±5.4	
Drove alone	79.7%	±6.5	
Carpooled	6.3%	±4.5	
In 2-person carpool	4.5%	±4.3	
In 3-person carpool	1.2%	±1.4	
In 4-or-more person carpool	0.6%	±0.9	
Workers per car, truck, or van	1.04	±0.03	
Public transportation (excluding taxicab)	6.7%	±3.5	
Walked	2.5%	±2.4	
Bicycle	0.0%	±1.3	
Taxicab, motorcycle, or other means	0.0%	±1.3	
Worked from home	4.8%	±2.9	
PLACE OF WORK			
Worked in state of residence	97.9%	±2.0	
Worked in county of residence	59.4%	±8.4	
Worked outside county of residence	38.5%	±8.3	
Worked outside state of residence	2.1%	±2.0	
Living in a place	100.0%	±1.3	
Worked in place of residence	14.4%	±4.4	
Worked outside place of residence	85.6%	±4.4	
Not living in a place	0.0%	±1.3	
Living in 12 selected states	100.0%	±1.3	
Worked in minor civil division of residence	14.4%	±4.4	
Worked outside minor civil division of residence	85.6%	±4.4	
Not living in 12 selected states	0.0%	±1.3	
Workers 16 years and over who did not work from home	2,822	±330	
TIME OF DEPARTURE TO GO TO WORK			
12:00 a.m. to 4:59 a.m.	3.2%	±2.5	
5:00 a.m. to 5:29 a.m.	1.8%	±2.3	
5:30 a.m. to 5:59 a.m.	4.0%	±2.7	
6:00 a.m. to 6:29 a.m.	6.7%	±3.6	
6:30 a.m. to 6:59 a.m.	14.3%	±6.7	
7:00 a.m. to 7:29 a.m.	9.4%	±3.7	
7:30 a.m. to 7:59 a.m.	20.2%	±7.0	
8:00 a.m. to 8:29 a.m.	17.7%	±5.9	
8:30 a.m. to 8:59 a.m.	9.1%	±4.1	
9:00 a.m. to 11:59 p.m.	13.5%	±7.2	
TRAVEL TIME TO WORK			
Less than 10 minutes	11.0%	±4.5	
10 to 14 minutes	5.6%	±3.0	
15 to 19 minutes	14.2%	±6.7	
20 to 24 minutes	11.9%	±5.3	
25 to 29 minutes	4.7%	±2.7	
30 to 34 minutes	19.5%	±6.4	
35 to 44 minutes	10.2%	±4.1	
45 to 59 minutes	8.1%	±3.9	
60 or more minutes	14.7%	±7.6	
Mean travel time to work (minutes)	32.7	±5.5	
VEHICLES AVAILABLE			

## Table Notes



---

## COMMUTING CHARACTERISTICS BY SEX

**Survey/Program:** American Community Survey

**Year:** 2020

**Estimates:** 5-Year

**Table ID:** S0801

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, for 2020, the 2020 Census provides the official counts of the population and housing units for the nation, states, counties, cities, and towns. For 2016 to 2019, the Population Estimates Program provides estimates of the population for the nation, states, counties, cities, and towns and intercensal housing unit estimates for the nation, states, and counties.

Source: U.S. Census Bureau, 2016-2020 American Community Survey 5-Year Estimates

When information is missing or inconsistent, the Census Bureau logically assigns an acceptable value using the response to a related question or questions. If a logical assignment is not possible, data are filled using a statistical process called allocation, which uses a similar individual or household to provide a donor value. The "Allocated" section is the number of respondents who received an allocated value for a particular subject.

2019 ACS data products include updates to several categories of the existing means of transportation question. For more information, see: Change to Means of Transportation.

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see ACS Technical Documentation). The effect of nonsampling error is not represented in these tables.

The 12 selected states are Connecticut, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Wisconsin.

Workers include members of the Armed Forces and civilians who were at work last week.

The 2016-2020 American Community Survey (ACS) data generally reflect the September 2018 Office of Management and Budget (OMB) delineations of metropolitan and micropolitan statistical areas. In certain instances, the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB delineation lists due to differences in the effective dates of the geographic entities.

Estimates of urban and rural populations, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2010 data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Explanation of Symbols:

-

The estimate could not be computed because there were an insufficient number of sample observations. For a ratio of medians estimate, one or both of the median estimates falls in the lowest interval or highest interval of an open-ended distribution.

N

The estimate or margin of error cannot be displayed because there were an insufficient number of sample cases in the selected geographic area.

(X)

The estimate or margin of error is not applicable or not available.

median-

The median falls in the lowest interval of an open-ended distribution (for example "2,500-").

median+

The median falls in the highest interval of an open-ended distribution (for example "250,000+").

\*\*

The margin of error could not be computed because there were an insufficient number of sample observations.

\*\*\*

The margin of error could not be computed because the median falls in the lowest interval or highest interval of an open-ended distribution.

\*\*\*\*\*

A margin of error is not appropriate because the corresponding estimate is controlled to an independent population or housing estimate. Effectively, the corresponding estimate has no sampling error and the margin of error may be treated as zero.

Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Technical Documentation section.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.

## TRIP GENERATION

---





# Multifamily Housing (Mid-Rise) Not Close to Rail Transit (221)

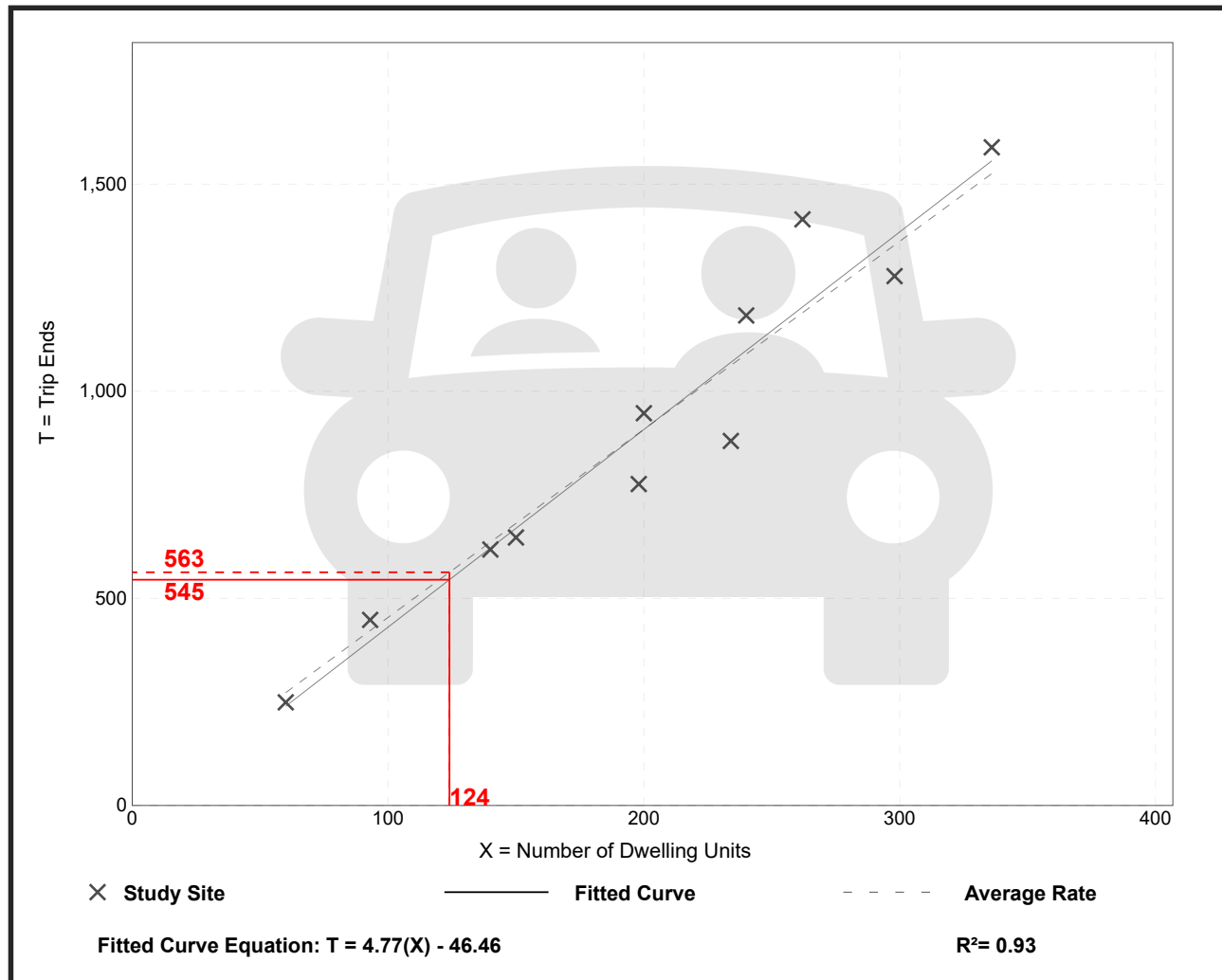
Vehicle Trip Ends vs: Dwelling Units  
On a: Weekday

Setting/Location: General Urban/Suburban  
Number of Studies: 11  
Avg. Num. of Dwelling Units: 201  
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
4.54	3.76 - 5.40	0.51

## Data Plot and Equation



# Multifamily Housing (Mid-Rise) Not Close to Rail Transit (221)

Vehicle Trip Ends vs: Dwelling Units  
 On a: Weekday,  
 Peak Hour of Adjacent Street Traffic,  
 One Hour Between 7 and 9 a.m.

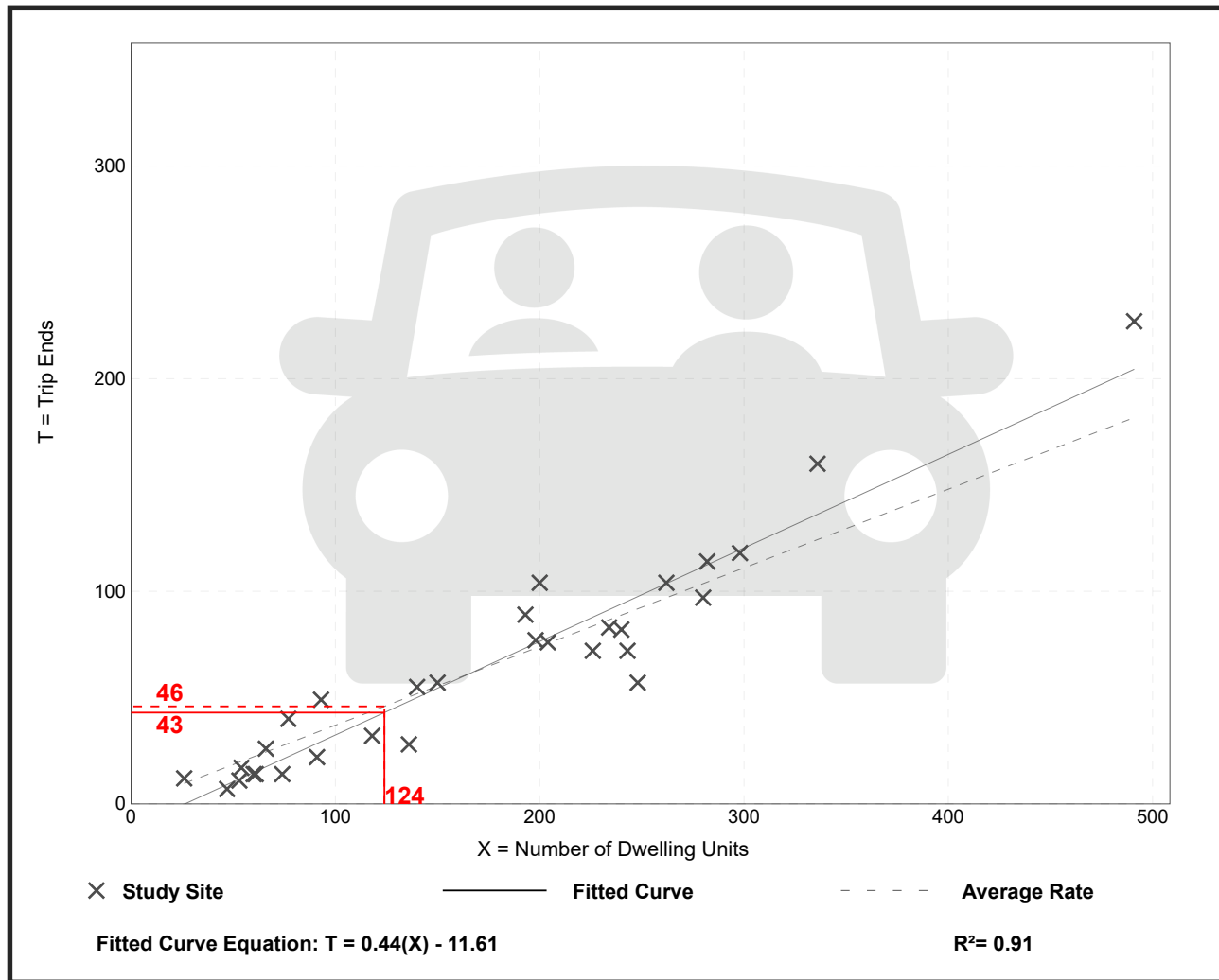
Setting/Location: General Urban/Suburban

Number of Studies: 30  
 Avg. Num. of Dwelling Units: 173  
 Directional Distribution: 23% entering, 77% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.37	0.15 - 0.53	0.09

## Data Plot and Equation



# Multifamily Housing (Mid-Rise) Not Close to Rail Transit (221)

**Vehicle Trip Ends vs: Dwelling Units**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**

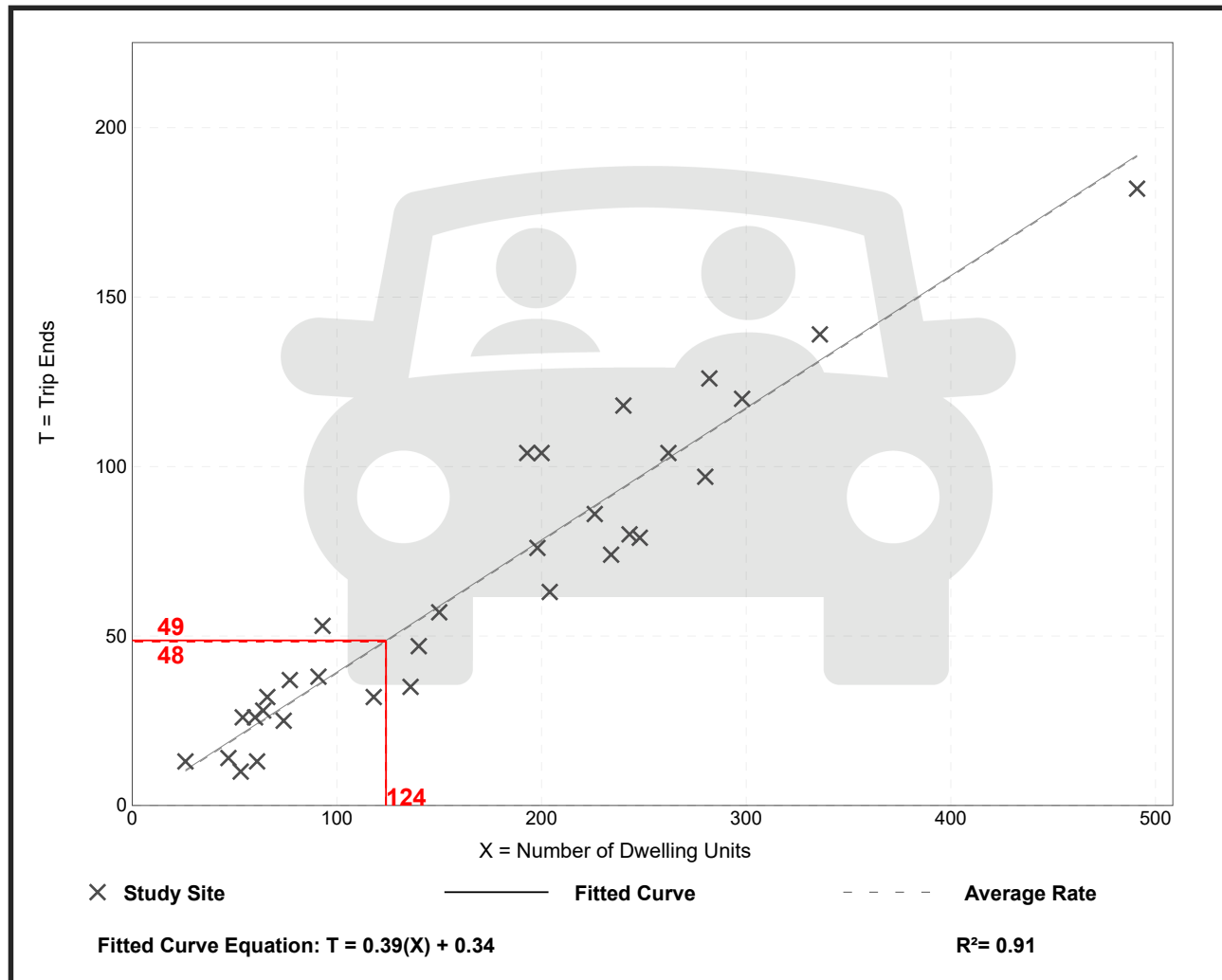
**Setting/Location: General Urban/Suburban**

Number of Studies: 31  
 Avg. Num. of Dwelling Units: 169  
 Directional Distribution: 61% entering, 39% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.39	0.19 - 0.57	0.08

## Data Plot and Equation





## PARKING ANALYSIS







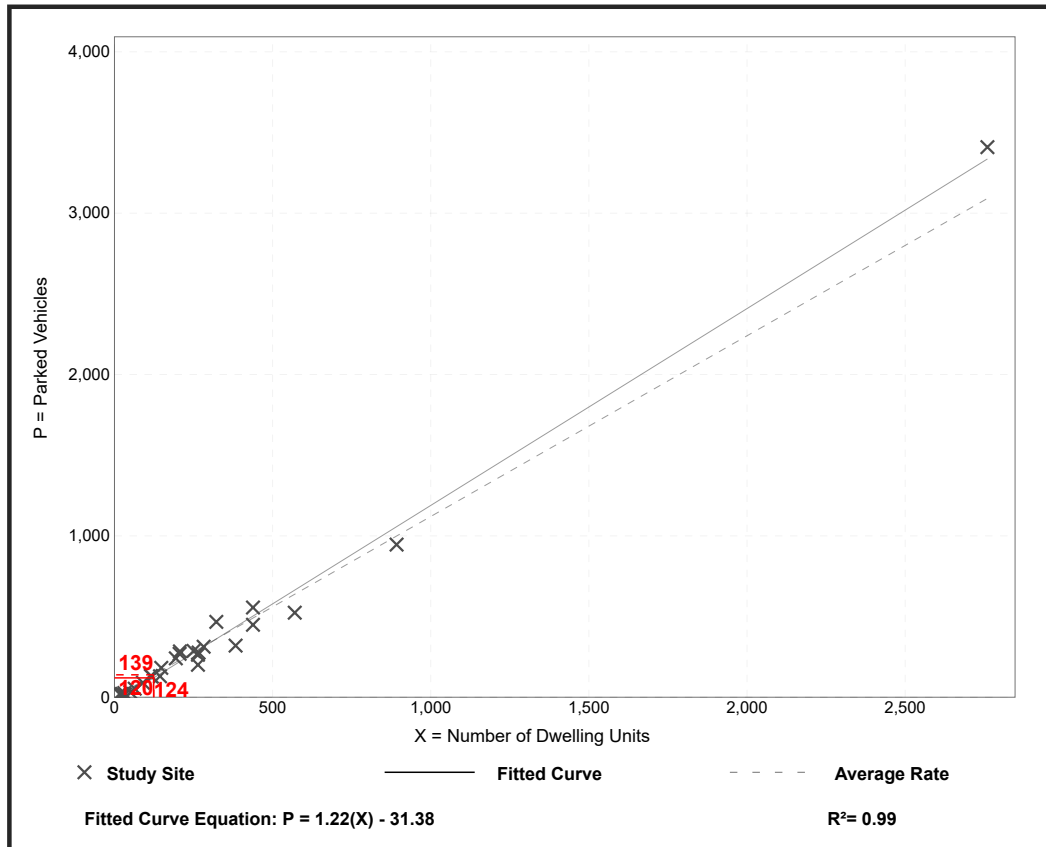
# Multifamily Housing (Mid-Rise) (221)

Peak Period Parking Demand vs: Dwelling Units  
 On a: Weekday (Monday - Friday)  
 Setting/Location: General Urban/Suburban (< 1/2 mile to rail transit)  
 Peak Period of Parking Demand: 10:00 p.m. - 5:00 a.m.  
 Number of Studies: 27  
 Avg. Num. of Dwelling Units: 318

## Peak Period Parking Demand per Dwelling Unit

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
1.12	0.55 - 1.45	0.91 / 1.27	1.06 - 1.18	0.17 (15%)

## Data Plot and Equation



Parking Generation Manual, 5th Edition • Institute of Transportation Engineers



## CAPACITY ANALYSIS

---

Broadway Street at Foundry Street (unsignalized)  
North Avenue at Broadway Street (unsignalized)  
North Avenue at Nahant Street and Main Street (signalized)  
Site driveway at Broadway Street (unsignalized)





Broadway Street at Foundry Street (unsignalized)

---





Intersection						
Int Delay, s/veh	1.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	26	204	200	55	36	33
Future Vol, veh/h	26	204	200	55	36	33
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	79	79	76	73	94	94
Heavy Vehicles, %	5	5	4	5	8	4
Mvmt Flow	33	258	263	75	38	35

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	338	0	-	0	625 301
Stage 1	-	-	-	-	301 -
Stage 2	-	-	-	-	324 -
Critical Hdwy	4.15	-	-	-	6.48 6.24
Critical Hdwy Stg 1	-	-	-	-	5.48 -
Critical Hdwy Stg 2	-	-	-	-	5.48 -
Follow-up Hdwy	2.245	-	-	-	3.572 3.336
Pot Cap-1 Maneuver	1205	-	-	-	439 734
Stage 1	-	-	-	-	737 -
Stage 2	-	-	-	-	720 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1205	-	-	-	425 734
Mov Cap-2 Maneuver	-	-	-	-	425 -
Stage 1	-	-	-	-	713 -
Stage 2	-	-	-	-	720 -

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	12.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1205	-	-	-	532
HCM Lane V/C Ratio	0.027	-	-	-	0.138
HCM Control Delay (s)	8.1	0	-	-	12.8
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.5



Intersection						
Int Delay, s/veh	2.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	14	233	199	27	61	23
Future Vol, veh/h	14	233	199	27	61	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	83	83	64	64
Heavy Vehicles, %	0	0	1	10	0	6
Mvmt Flow	16	259	240	33	95	36

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	273	0	-	0	548 257
Stage 1	-	-	-	-	257 -
Stage 2	-	-	-	-	291 -
Critical Hdwy	4.1	-	-	-	6.4 6.26
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	2.2	-	-	-	3.5 3.354
Pot Cap-1 Maneuver	1302	-	-	-	501 772
Stage 1	-	-	-	-	791 -
Stage 2	-	-	-	-	763 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1302	-	-	-	494 772
Mov Cap-2 Maneuver	-	-	-	-	494 -
Stage 1	-	-	-	-	780 -
Stage 2	-	-	-	-	763 -

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	13.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1302	-	-	-	548
HCM Lane V/C Ratio	0.012	-	-	-	0.24
HCM Control Delay (s)	7.8	0	-	-	13.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.9

Intersection						
Int Delay, s/veh	2.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	30	219	214	110	77	42
Future Vol, veh/h	30	219	214	110	77	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	79	79	76	73	94	94
Heavy Vehicles, %	5	5	4	5	8	4
Mvmt Flow	38	277	282	151	82	45

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	433	0	-	0	711 358
Stage 1	-	-	-	-	358 -
Stage 2	-	-	-	-	353 -
Critical Hdwy	4.15	-	-	-	6.48 6.24
Critical Hdwy Stg 1	-	-	-	-	5.48 -
Critical Hdwy Stg 2	-	-	-	-	5.48 -
Follow-up Hdwy	2.245	-	-	-	3.572 3.336
Pot Cap-1 Maneuver	1111	-	-	-	391 682
Stage 1	-	-	-	-	694 -
Stage 2	-	-	-	-	698 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1111	-	-	-	375 682
Mov Cap-2 Maneuver	-	-	-	-	375 -
Stage 1	-	-	-	-	666 -
Stage 2	-	-	-	-	698 -

Approach	EB	WB	SB
HCM Control Delay, s	1	0	16.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1111	-	-	-	446
HCM Lane V/C Ratio	0.034	-	-	-	0.284
HCM Control Delay (s)	8.4	0	-	-	16.2
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1.2

Intersection						
Int Delay, s/veh	5.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	23	250	213	71	122	29
Future Vol, veh/h	23	250	213	71	122	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	83	83	64	64
Heavy Vehicles, %	0	0	1	10	0	6
Mvmt Flow	26	278	257	86	191	45

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	343	0	-	0	630 300
Stage 1	-	-	-	-	300 -
Stage 2	-	-	-	-	330 -
Critical Hdwy	4.1	-	-	-	6.4 6.26
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	2.2	-	-	-	3.5 3.354
Pot Cap-1 Maneuver	1227	-	-	-	449 730
Stage 1	-	-	-	-	756 -
Stage 2	-	-	-	-	733 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1227	-	-	-	438 730
Mov Cap-2 Maneuver	-	-	-	-	438 -
Stage 1	-	-	-	-	737 -
Stage 2	-	-	-	-	733 -

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	19.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1227	-	-	-	474
HCM Lane V/C Ratio	0.021	-	-	-	0.498
HCM Control Delay (s)	8	0	-	-	19.9
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	2.7

Intersection						
Int Delay, s/veh	2.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	↷
Traffic Vol, veh/h	30	216	217	115	78	42
Future Vol, veh/h	30	216	217	115	78	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	79	79	76	73	94	94
Heavy Vehicles, %	5	5	4	5	8	4
Mvmt Flow	38	273	286	158	83	45

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	444	0	-	0	714 365
Stage 1	-	-	-	-	365 -
Stage 2	-	-	-	-	349 -
Critical Hdwy	4.15	-	-	-	6.48 6.24
Critical Hdwy Stg 1	-	-	-	-	5.48 -
Critical Hdwy Stg 2	-	-	-	-	5.48 -
Follow-up Hdwy	2.245	-	-	-	3.572 3.336
Pot Cap-1 Maneuver	1100	-	-	-	389 676
Stage 1	-	-	-	-	689 -
Stage 2	-	-	-	-	701 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1100	-	-	-	373 676
Mov Cap-2 Maneuver	-	-	-	-	373 -
Stage 1	-	-	-	-	661 -
Stage 2	-	-	-	-	701 -

Approach	EB	WB	SB
HCM Control Delay, s	1	0	16.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1100	-	-	-	442
HCM Lane V/C Ratio	0.035	-	-	-	0.289
HCM Control Delay (s)	8.4	0	-	-	16.4
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1.2

Intersection						
Int Delay, s/veh	5.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	23	251	208	72	124	29
Future Vol, veh/h	23	251	208	72	124	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	83	83	64	64
Heavy Vehicles, %	0	0	1	10	0	6
Mvmt Flow	26	279	251	87	194	45

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	338	0	-	0	626 295
Stage 1	-	-	-	-	295 -
Stage 2	-	-	-	-	331 -
Critical Hdwy	4.1	-	-	-	6.4 6.26
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	2.2	-	-	-	3.5 3.354
Pot Cap-1 Maneuver	1232	-	-	-	451 735
Stage 1	-	-	-	-	760 -
Stage 2	-	-	-	-	732 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1232	-	-	-	440 735
Mov Cap-2 Maneuver	-	-	-	-	440 -
Stage 1	-	-	-	-	741 -
Stage 2	-	-	-	-	732 -

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	20
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1232	-	-	-	476
HCM Lane V/C Ratio	0.021	-	-	-	0.502
HCM Control Delay (s)	8	0	-	-	20
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	2.8

North Avenue at Broadway Street (unsignalized)

---





Intersection						
Int Delay, s/veh	7.2					
Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations		↗	↘		↗	↘
Traffic Vol, veh/h	0	263	502	61	290	658
Future Vol, veh/h	0	263	502	61	290	658
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	77	77	85	85
Heavy Vehicles, %	25	3	2	9	0	1
Mvmt Flow	0	337	652	79	341	774

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	692	0	0	731
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.23	-	-	4.1
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.327	-	-	2.2
Pot Cap-1 Maneuver	0	442	-	-	883
Stage 1	0	-	-	-	-
Stage 2	0	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	-	442	-	-	883
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	SE	NW
HCM Control Delay, s	34.9	0	3.6
HCM LOS	D		

Minor Lane/Major Mvmt	NWL	NWT	EBLn1	SET	SER
Capacity (veh/h)	883	-	442	-	-
HCM Lane V/C Ratio	0.386	-	0.763	-	-
HCM Control Delay (s)	11.6	-	34.9	-	-
HCM Lane LOS	B	-	D	-	-
HCM 95th %tile Q(veh)	1.8	-	6.5	-	-



Intersection						
Int Delay, s/veh	18.1					
Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations		↗	↘		↗	↘
Traffic Vol, veh/h	0	359	575	34	261	525
Future Vol, veh/h	0	359	575	34	261	525
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	73	73	97	97	90	90
Heavy Vehicles, %	0	1	0	0	1	0
Mvmt Flow	0	492	593	35	290	583

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	611	0	0	628
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.21	-	-	4.11
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.309	-	-	2.209
Pot Cap-1 Maneuver	0	496	-	-	959
Stage 1	0	-	-	-	-
Stage 2	0	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	-	496	-	-	959
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	SE	NW
HCM Control Delay, s	67.3	0	3.4
HCM LOS	F		

Minor Lane/Major Mvmt	NWL	NWT	EBLn1	SET	SER
Capacity (veh/h)	959	-	496	-	-
HCM Lane V/C Ratio	0.302	-	0.991	-	-
HCM Control Delay (s)	10.4	-	67.3	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	1.3	-	13.3	-	-

Intersection						
Int Delay, s/veh	14.6					
Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations		↗	↘		↖	↗
Traffic Vol, veh/h	0	320	538	65	362	705
Future Vol, veh/h	0	320	538	65	362	705
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	77	77	85	85
Heavy Vehicles, %	25	3	2	9	0	1
Mvmt Flow	0	410	699	84	426	829

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	741	0	0	783
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.23	-	-	4.1
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.327	-	-	2.2
Pot Cap-1 Maneuver	0	415	-	-	844
Stage 1	0	-	-	-	-
Stage 2	0	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	-	415	-	-	844
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	SE	NW
HCM Control Delay, s	73.3	0	4.6
HCM LOS	F		

Minor Lane/Major Mvmt	NWL	NWT	EBLn1	SET	SER
Capacity (veh/h)	844	-	415	-	-
HCM Lane V/C Ratio	0.505	-	0.989	-	-
HCM Control Delay (s)	13.5	-	73.3	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	2.9	-	12.1	-	-

Intersection						
Int Delay, s/veh	47.7					
Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations		↗	↘		↖	↗
Traffic Vol, veh/h	0	441	616	36	322	563
Future Vol, veh/h	0	441	616	36	322	563
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	73	73	97	97	90	90
Heavy Vehicles, %	0	1	0	0	1	0
Mvmt Flow	0	604	635	37	358	626

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	654	0	0	672
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.21	-	-	4.11
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.309	-	-	2.209
Pot Cap-1 Maneuver	0	~ 468	-	-	923
Stage 1	0	-	-	-	-
Stage 2	0	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	-	~ 468	-	-	923
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	SE	NW
HCM Control Delay, s	171.7	0	4.1
HCM LOS	F		

Minor Lane/Major Mvmt	NWL	NWT	EBLn1	SET	SER
Capacity (veh/h)	923	-	468	-	-
HCM Lane V/C Ratio	0.388	-	1.291	-	-
HCM Control Delay (s)	11.3	-	171.7	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	1.9	-	25.8	-	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection						
Int Delay, s/veh	14.8					
Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations		↗	↘		↗	↘
Traffic Vol, veh/h	0	320	538	67	335	705
Future Vol, veh/h	0	320	538	67	335	705
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	77	77	85	85
Heavy Vehicles, %	25	3	2	9	0	1
Mvmt Flow	0	410	699	87	394	829

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	743	0	0	786
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.23	-	-	4.1
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.327	-	-	2.2
Pot Cap-1 Maneuver	0	413	-	-	842
Stage 1	0	-	-	-	-
Stage 2	0	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	-	413	-	-	842
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	SE	NW
HCM Control Delay, s	74.7	0	4.2
HCM LOS	F		

Minor Lane/Major Mvmt	NWL	NWT	EBLn1	SET	SER
Capacity (veh/h)	842	-	413	-	-
HCM Lane V/C Ratio	0.468	-	0.993	-	-
HCM Control Delay (s)	13	-	74.7	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	2.5	-	12.2	-	-

Intersection						
Int Delay, s/veh	41.4					
Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations		↗	↘		↗	↘
Traffic Vol, veh/h	0	423	616	41	304	563
Future Vol, veh/h	0	423	616	41	304	563
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	73	73	97	97	90	90
Heavy Vehicles, %	0	1	0	0	1	0
Mvmt Flow	0	579	635	42	338	626

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	656	0	0	677
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.21	-	-	4.11
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.309	-	-	2.209
Pot Cap-1 Maneuver	0	~ 467	-	-	919
Stage 1	0	-	-	-	-
Stage 2	0	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	-	~ 467	-	-	919
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	SE	NW
HCM Control Delay, s	152	0	3.9
HCM LOS	F		

Minor Lane/Major Mvmt	NWL	NWT	EBLn1	SET	SER
Capacity (veh/h)	919	-	467	-	-
HCM Lane V/C Ratio	0.368	-	1.241	-	-
HCM Control Delay (s)	11.2	-	152	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	1.7	-	23.4	-	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

North Avenue at Nahant Street and Main Street (signalized)

---


























Lanes, Volumes, Timings  
27: Main Street & Nahant Street /North Avenue

2022 Existing Weekday Morning Peak Hour

07/14/2022

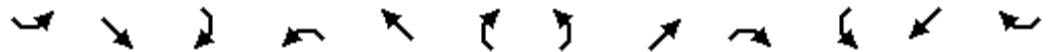
												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	124	249	387	40	394	73	407	530	47	48	469	147
Future Volume (vph)	124	249	387	40	394	73	407	530	47	48	469	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	11	12	12	11	11	12
Storage Length (ft)	0		0	0		0	80		0	60		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Fr <sub>t</sub>			0.850		0.981			0.988			0.964	
Fl <sub>t</sub> Protected	0.950				0.996		0.950			0.950		
Satd. Flow (prot)	1745	1801	1561	0	1841	0	1631	1843	0	1694	3364	0
Fl <sub>t</sub> Permitted	0.167				0.840		0.950			0.413		
Satd. Flow (perm)	307	1801	1561	0	1552	0	1631	1843	0	736	3364	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			461		6			4				29
Link Speed (mph)		30			30			30				30
Link Distance (ft)		345			777			488				839
Travel Time (s)		7.8			17.7			11.1				19.1
Peak Hour Factor	0.84	0.84	0.84	0.82	0.82	0.82	0.87	0.87	0.87	0.86	0.86	0.86
Heavy Vehicles (%)	0%	2%	0%	1%	1%	0%	7%	2%	0%	3%	0%	0%
Adj. Flow (vph)	148	296	461	49	480	89	468	609	54	56	545	171
Shared Lane Traffic (%)												
Lane Group Flow (vph)	148	296	461	0	618	0	468	663	0	56	716	0
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pt+ov	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		6	6 7		2		7	4			8	
Permitted Phases	6			2						8		
Detector Phase	6	6	6 7	2	2		7	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	23.0		23.0	23.0	
Total Split (s)	35.0	35.0		35.0	35.0		30.0	60.0		30.0	30.0	
Total Split (%)	27.6%	27.6%		27.6%	27.6%		23.6%	47.2%		23.6%	23.6%	



Lanes, Volumes, Timings  
27: Main Street & Nahant Street /North Avenue

2022 Existing Weekday Morning Peak Hour

07/14/2022

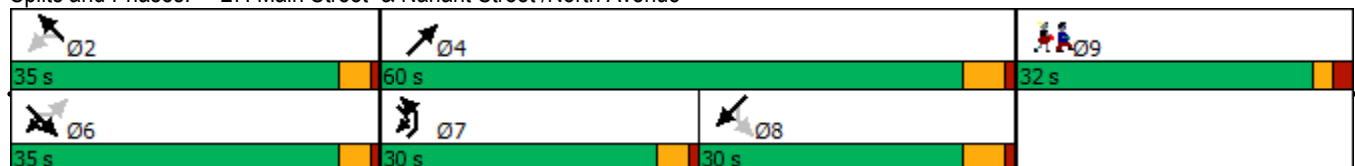


Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Maximum Green (s)	31.0	31.0		31.0	31.0		26.0	55.0		25.0	25.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0			4.0		4.0	5.0		5.0	5.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	31.4	31.4	61.8		31.4		26.4	55.7		25.3	25.3	
Actuated g/C Ratio	0.31	0.31	0.61		0.31		0.26	0.55		0.25	0.25	
v/c Ratio	1.56	0.53	0.41		1.27		1.11	0.65		0.31	0.83	
Control Delay	326.0	35.2	2.6		170.5		112.0	22.2		40.1	45.1	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	326.0	35.2	2.6		170.5		112.0	22.2		40.1	45.1	
LOS	F	D	A		F		F	C		D	D	
Approach Delay		66.2			170.5			59.4			44.8	
Approach LOS		E			F			E			D	
Queue Length 50th (ft)	~124	143	0		~459		~310	243		27	203	
Queue Length 95th (ft)	#302	296	37		#849		#692	607		82	#417	
Internal Link Dist (ft)		265			697			408			759	
Turn Bay Length (ft)							80			60		
Base Capacity (vph)	95	557	1131		485		423	1014		183	862	
Starvation Cap Reductn	0	0	0		0		0	0		0	0	
Spillback Cap Reductn	0	0	0		0		0	0		0	0	
Storage Cap Reductn	0	0	0		0		0	0		0	0	
Reduced v/c Ratio	1.56	0.53	0.41		1.27		1.11	0.65		0.31	0.83	

Intersection Summary

Area Type: Other  
 Cycle Length: 127  
 Actuated Cycle Length: 101.4  
 Natural Cycle: 150  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.56  
 Intersection Signal Delay: 77.9  
 Intersection LOS: E  
 Intersection Capacity Utilization 94.9%  
 ICU Level of Service F  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 27: Main Street & Nahant Street /North Avenue



Lanes, Volumes, Timings  
27: Main Street & Nahant Street /North Avenue

2022 Existing Weekday Evening Peak Hour  
07/08/2022

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	191	319	415	35	272	65	359	621	43	74	608	155
Future Volume (vph)	191	319	415	35	272	65	359	621	43	74	608	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	11	12	12	11	11	12
Storage Length (ft)	0		0	0		0	80		0	60		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Fr <sub>t</sub>			0.850		0.976			0.990				0.969
Fl <sub>t</sub> Protected	0.950				0.995		0.950			0.950		
Satd. Flow (prot)	1745	1818	1546	0	1832	0	1711	1881	0	1745	3381	0
Fl <sub>t</sub> Permitted	0.321				0.794		0.950			0.388		
Satd. Flow (perm)	590	1818	1546	0	1462	0	1711	1881	0	713	3381	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			456		8			3				22
Link Speed (mph)		30			30			30				30
Link Distance (ft)		345			777			488				839
Travel Time (s)		7.8			17.7			11.1				19.1
Peak Hour Factor	0.91	0.91	0.91	0.94	0.94	0.94	0.91	0.91	0.91	0.84	0.84	0.84
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	2%	0%	0%	0%	0%	0%
Adj. Flow (vph)	210	351	456	37	289	69	395	682	47	88	724	185
Shared Lane Traffic (%)												
Lane Group Flow (vph)	210	351	456	0	395	0	395	729	0	88	909	0
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pt+ov	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		6	6 7		2		7	4				8
Permitted Phases	6			2						8		
Detector Phase	6	6	6 7	2	2		7	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	23.0		23.0	23.0	
Total Split (s)	35.0	35.0		35.0	35.0		30.0	60.0		30.0	30.0	
Total Split (%)	27.6%	27.6%		27.6%	27.6%		23.6%	47.2%		23.6%	23.6%	

Lanes, Volumes, Timings  
27: Main Street & Nahant Street /North Avenue

2022 Existing Weekday Evening Peak Hour  
07/08/2022



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Maximum Green (s)	31.0	31.0		31.0	31.0		26.0	55.0		25.0	25.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0			4.0		4.0	5.0		5.0	5.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	31.4	31.4	61.8		31.4		26.4	55.7		25.3	25.3	
Actuated g/C Ratio	0.31	0.31	0.61		0.31		0.26	0.55		0.25	0.25	
v/c Ratio	1.15	0.62	0.41		0.86		0.89	0.70		0.49	1.06	
Control Delay	148.0	37.8	2.6		53.4		60.4	23.7		46.9	83.3	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	148.0	37.8	2.6		53.4		60.4	23.7		46.9	83.3	
LOS	F	D	A		D		E	C		D	F	
Approach Delay		44.7			53.4			36.6			80.1	
Approach LOS		D			D			D			F	
Queue Length 50th (ft)	~144	175	0		213		225	280		45	~284	
Queue Length 95th (ft)	#395	#414	56		#564		#576	#788		#124	#574	
Internal Link Dist (ft)		265			697			408			759	
Turn Bay Length (ft)							80			60		
Base Capacity (vph)	182	563	1120		458		444	1035		178	861	
Starvation Cap Reductn	0	0	0		0		0	0		0	0	
Spillback Cap Reductn	0	0	0		0		0	0		0	0	
Storage Cap Reductn	0	0	0		0		0	0		0	0	
Reduced v/c Ratio	1.15	0.62	0.41		0.86		0.89	0.70		0.49	1.06	

Intersection Summary






















Area Type: Other  
 Cycle Length: 127  
 Actuated Cycle Length: 101.4  
 Natural Cycle: 150  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.15  
 Intersection Signal Delay: 53.1  
 Intersection LOS: D  
 Intersection Capacity Utilization 92.8%  
 ICU Level of Service F  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 27: Main Street & Nahant Street /North Avenue

02 35 s	04 60 s	09 32 s
06 35 s	07 30 s	08 30 s

Lanes, Volumes, Timings  
27: Main Street & Nahant Street /North Avenue

2029 No-Build Weekday Morning Peak Hour  
07/14/2022

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	133	289	431	43	451	78	458	568	50	51	503	158
Future Volume (vph)	133	289	431	43	451	78	458	568	50	51	503	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	11	12	12	11	11	12
Storage Length (ft)	0		0	0		0	80		0	60		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Fr <sub>t</sub>			0.850		0.982			0.988			0.964	
Fl <sub>t</sub> Protected	0.950				0.996		0.950			0.950		
Satd. Flow (prot)	1745	1801	1561	0	1842	0	1631	1843	0	1694	3364	0
Fl <sub>t</sub> Permitted	0.127				0.738		0.950			0.395		
Satd. Flow (perm)	233	1801	1561	0	1365	0	1631	1843	0	704	3364	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			513		6			4			29	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		345			777			488			839	
Travel Time (s)		7.8			17.7			11.1			19.1	
Peak Hour Factor	0.84	0.84	0.84	0.82	0.82	0.82	0.87	0.87	0.87	0.86	0.86	0.86
Heavy Vehicles (%)	0%	2%	0%	1%	1%	0%	7%	2%	0%	3%	0%	0%
Adj. Flow (vph)	158	344	513	52	550	95	526	653	57	59	585	184
Shared Lane Traffic (%)												
Lane Group Flow (vph)	158	344	513	0	697	0	526	710	0	59	769	0
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pt+ov	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		6	6 7		2		7	4			8	
Permitted Phases	6			2						8		
Detector Phase	6	6	6 7	2	2		7	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	23.0		23.0	23.0	
Total Split (s)	35.0	35.0		35.0	35.0		30.0	60.0		30.0	30.0	
Total Split (%)	27.6%	27.6%		27.6%	27.6%		23.6%	47.2%		23.6%	23.6%	

Lanes, Volumes, Timings  
27: Main Street & Nahant Street /North Avenue

2029 No-Build Weekday Morning Peak Hour

07/14/2022

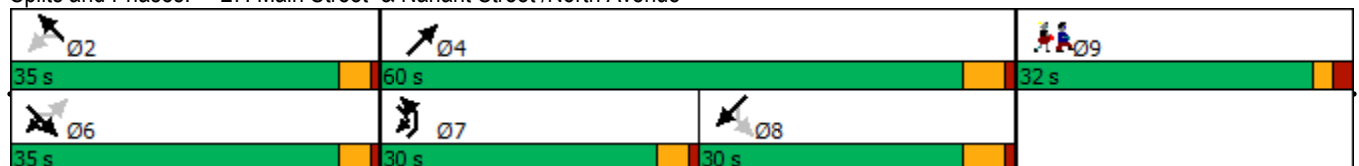


Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Maximum Green (s)	31.0	31.0		31.0	31.0		26.0	55.0		25.0	25.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0			4.0		4.0	5.0		5.0	5.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	31.4	31.4	61.8		31.4		26.4	55.7		25.3	25.3	
Actuated g/C Ratio	0.31	0.31	0.61		0.31		0.26	0.55		0.25	0.25	
v/c Ratio	2.19	0.62	0.45		1.63		1.24	0.70		0.34	0.89	
Control Delay	602.2	37.6	2.7		322.6		161.4	23.6		41.3	50.1	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	602.2	37.6	2.7		322.6		161.4	23.6		41.3	50.1	
LOS	F	D	A		F		F	C		D	D	
Approach Delay		107.8			322.6			82.3			49.5	
Approach LOS		F			F			F			D	
Queue Length 50th (ft)	~152	171	0		~601		~383	271		29	223	
Queue Length 95th (ft)	#336	348	37		#1020		#795	#716		85	#466	
Internal Link Dist (ft)		265			697			408			759	
Turn Bay Length (ft)							80			60		
Base Capacity (vph)	72	557	1151		427		423	1014		176	862	
Starvation Cap Reductn	0	0	0		0		0	0		0	0	
Spillback Cap Reductn	0	0	0		0		0	0		0	0	
Storage Cap Reductn	0	0	0		0		0	0		0	0	
Reduced v/c Ratio	2.19	0.62	0.45		1.63		1.24	0.70		0.34	0.89	

Intersection Summary






















Area Type: Other  
 Cycle Length: 127  
 Actuated Cycle Length: 101.4  
 Natural Cycle: 150  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 2.19  
 Intersection Signal Delay: 126.3  
 Intersection LOS: F  
 Intersection Capacity Utilization 104.6%  
 ICU Level of Service G  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 27: Main Street & Nahant Street /North Avenue



Lanes, Volumes, Timings  
27: Main Street & Nahant Street /North Avenue

2029 No-Build Weekday Evening Peak Hour  
07/08/2022

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	205	376	468	38	317	70	402	666	46	79	652	166
Future Volume (vph)	205	376	468	38	317	70	402	666	46	79	652	166
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	11	12	12	11	11	12
Storage Length (ft)	0		0	0		0	80		0	60		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Fr <sub>t</sub>			0.850		0.978			0.990				0.970
Fl <sub>t</sub> Protected	0.950				0.996		0.950			0.950		
Satd. Flow (prot)	1745	1818	1546	0	1837	0	1711	1881	0	1745	3385	0
Fl <sub>t</sub> Permitted	0.275				0.656		0.950			0.336		
Satd. Flow (perm)	505	1818	1546	0	1210	0	1711	1881	0	617	3385	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			514		7			3				22
Link Speed (mph)		30			30			30				30
Link Distance (ft)		345			777			488				839
Travel Time (s)		7.8			17.7			11.1				19.1
Peak Hour Factor	0.91	0.91	0.91	0.94	0.94	0.94	0.91	0.91	0.91	0.84	0.84	0.84
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	2%	0%	0%	0%	0%	0%
Adj. Flow (vph)	225	413	514	40	337	74	442	732	51	94	776	198
Shared Lane Traffic (%)												
Lane Group Flow (vph)	225	413	514	0	451	0	442	783	0	94	974	0
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pt+ov	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		6	6 7		2		7	4				8
Permitted Phases	6			2						8		
Detector Phase	6	6	6 7	2	2		7	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	23.0		23.0	23.0	
Total Split (s)	35.0	35.0		35.0	35.0		30.0	60.0		30.0	30.0	
Total Split (%)	27.6%	27.6%		27.6%	27.6%		23.6%	47.2%		23.6%	23.6%	

Lanes, Volumes, Timings  
27: Main Street & Nahant Street /North Avenue

2029 No-Build Weekday Evening Peak Hour  
07/08/2022

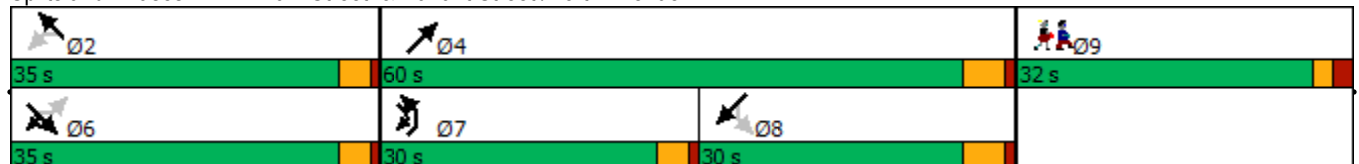


Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Maximum Green (s)	31.0	31.0		31.0	31.0		26.0	55.0		25.0	25.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0			4.0		4.0	5.0		5.0	5.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	31.4	31.4	61.8		31.4		26.4	55.7		25.3	25.3	
Actuated g/C Ratio	0.31	0.31	0.61		0.31		0.26	0.55		0.25	0.25	
v/c Ratio	1.44	0.73	0.45		1.19		1.00	0.76		0.61	1.13	
Control Delay	262.0	41.9	2.7		141.3		80.5	25.6		55.3	108.0	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	262.0	41.9	2.7		141.3		80.5	25.6		55.3	108.0	
LOS	F	D	A		F		F	C		E	F	
Approach Delay		67.4			141.3			45.4			103.4	
Approach LOS		E			F			D			F	
Queue Length 50th (ft)	~180	215	0		~316		261	315		49	~341	
Queue Length 95th (ft)	#442	#530	58		#725		#663	#885		#153	#631	
Internal Link Dist (ft)		265			697			408			759	
Turn Bay Length (ft)							80			60		
Base Capacity (vph)	156	563	1143		379		444	1035		154	862	
Starvation Cap Reductn	0	0	0		0		0	0		0	0	
Spillback Cap Reductn	0	0	0		0		0	0		0	0	
Storage Cap Reductn	0	0	0		0		0	0		0	0	
Reduced v/c Ratio	1.44	0.73	0.45		1.19		1.00	0.76		0.61	1.13	

Intersection Summary






















Area Type: Other  
 Cycle Length: 127  
 Actuated Cycle Length: 101.4  
 Natural Cycle: 150  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.44  
 Intersection Signal Delay: 78.9  
 Intersection LOS: E  
 Intersection Capacity Utilization 102.6%  
 ICU Level of Service G  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 27: Main Street & Nahant Street /North Avenue



Lanes, Volumes, Timings  
27: Main Street & Nahant Street /North Avenue

2029 Build Weekday Morning Peak Hour  
07/14/2022

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	139	289	425	43	440	78	445	568	50	51	503	155
Future Volume (vph)	139	289	425	43	440	78	445	568	50	51	503	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	11	12	12	11	11	12
Storage Length (ft)	0		0	0		0	80		0	60		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Fr <sub>t</sub>			0.850		0.981			0.988				0.965
Fl <sub>t</sub> Protected	0.950				0.996		0.950			0.950		
Satd. Flow (prot)	1745	1801	1561	0	1841	0	1631	1843	0	1694	3368	0
Fl <sub>t</sub> Permitted	0.134				0.738		0.950			0.395		
Satd. Flow (perm)	246	1801	1561	0	1364	0	1631	1843	0	704	3368	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			506		6			4				28
Link Speed (mph)		30			30			30				30
Link Distance (ft)		345			777			488				839
Travel Time (s)		7.8			17.7			11.1				19.1
Peak Hour Factor	0.84	0.84	0.84	0.82	0.82	0.82	0.87	0.87	0.87	0.86	0.86	0.86
Heavy Vehicles (%)	0%	2%	0%	1%	1%	0%	7%	2%	0%	3%	0%	0%
Adj. Flow (vph)	165	344	506	52	537	95	511	653	57	59	585	180
Shared Lane Traffic (%)												
Lane Group Flow (vph)	165	344	506	0	684	0	511	710	0	59	765	0
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pt+ov	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		6	6 7		2		7	4				8
Permitted Phases	6			2						8		
Detector Phase	6	6	6 7	2	2		7	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	23.0		23.0	23.0	
Total Split (s)	35.0	35.0		35.0	35.0		30.0	60.0		30.0	30.0	
Total Split (%)	27.6%	27.6%		27.6%	27.6%		23.6%	47.2%		23.6%	23.6%	



Lanes, Volumes, Timings  
27: Main Street & Nahant Street /North Avenue

2029 Build Weekday Morning Peak Hour  
07/14/2022



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Maximum Green (s)	31.0	31.0		31.0	31.0		26.0	55.0		25.0	25.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0			4.0		4.0	5.0		5.0	5.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	31.4	31.4	61.8		31.4		26.4	55.7		25.3	25.3	
Actuated g/C Ratio	0.31	0.31	0.61		0.31		0.26	0.55		0.25	0.25	
v/c Ratio	2.17	0.62	0.44		1.60		1.21	0.70		0.34	0.89	
Control Delay	590.0	37.6	2.6		309.5		147.9	23.6		41.3	49.7	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	590.0	37.6	2.6		309.5		147.9	23.6		41.3	49.7	
LOS	F	D	A		F		F	C		D	D	
Approach Delay		110.0			309.5			75.6			49.1	
Approach LOS		F			F			E			D	
Queue Length 50th (ft)	~158	171	0		~585		~364	271		29	222	
Queue Length 95th (ft)	#349	348	37		#999		#769	#716		85	#462	
Internal Link Dist (ft)		265			697			408			759	
Turn Bay Length (ft)							80			60		
Base Capacity (vph)	76	557	1149		427		423	1014		176	862	
Starvation Cap Reductn	0	0	0		0		0	0		0	0	
Spillback Cap Reductn	0	0	0		0		0	0		0	0	
Storage Cap Reductn	0	0	0		0		0	0		0	0	
Reduced v/c Ratio	2.17	0.62	0.44		1.60		1.21	0.70		0.34	0.89	

Intersection Summary






















Area Type: Other  
 Cycle Length: 127  
 Actuated Cycle Length: 101.4  
 Natural Cycle: 150  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 2.17  
 Intersection Signal Delay: 121.8  
 Intersection LOS: F  
 Intersection Capacity Utilization 103.2%  
 ICU Level of Service G  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 27: Main Street & Nahant Street /North Avenue

Ø2 35 s	Ø4 60 s	Ø9 32 s
Ø6 35 s	Ø7 30 s	Ø8 30 s

Lanes, Volumes, Timings  
27: Main Street & Nahant Street /North Avenue

2029 Build Weekday Evening Peak Hour  
07/08/2022

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	204	369	458	38	311	70	393	666	46	79	652	163
Future Volume (vph)	204	369	458	38	311	70	393	666	46	79	652	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	11	12	12	11	11	12
Storage Length (ft)	0		0	0		0	80		0	60		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frt			0.850		0.978			0.990				0.970
Flt Protected	0.950				0.996		0.950			0.950		
Satd. Flow (prot)	1745	1818	1546	0	1837	0	1711	1881	0	1745	3385	0
Flt Permitted	0.280				0.671		0.950			0.336		
Satd. Flow (perm)	514	1818	1546	0	1238	0	1711	1881	0	617	3385	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			503		7			3				22
Link Speed (mph)		30			30			30				30
Link Distance (ft)		345			777			488				839
Travel Time (s)		7.8			17.7			11.1				19.1
Peak Hour Factor	0.91	0.91	0.91	0.94	0.94	0.94	0.91	0.91	0.91	0.84	0.84	0.84
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	2%	0%	0%	0%	0%	0%
Adj. Flow (vph)	224	405	503	40	331	74	432	732	51	94	776	194
Shared Lane Traffic (%)												
Lane Group Flow (vph)	224	405	503	0	445	0	432	783	0	94	970	0
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pt+ov	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		6	6 7		2		7	4				8
Permitted Phases	6			2						8		
Detector Phase	6	6	6 7	2	2		7	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	23.0		23.0	23.0	
Total Split (s)	35.0	35.0		35.0	35.0		30.0	60.0		30.0	30.0	
Total Split (%)	27.6%	27.6%		27.6%	27.6%		23.6%	47.2%		23.6%	23.6%	

Lanes, Volumes, Timings  
27: Main Street & Nahant Street /North Avenue

2029 Build Weekday Evening Peak Hour  
07/08/2022



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Maximum Green (s)	31.0	31.0		31.0	31.0		26.0	55.0		25.0	25.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0			4.0		4.0	5.0		5.0	5.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	31.4	31.4	61.8		31.4		26.4	55.7		25.3	25.3	
Actuated g/C Ratio	0.31	0.31	0.61		0.31		0.26	0.55		0.25	0.25	
v/c Ratio	1.41	0.72	0.44		1.15		0.97	0.76		0.61	1.13	
Control Delay	248.8	41.3	2.7		125.7		75.2	25.6		55.3	106.3	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	248.8	41.3	2.7		125.7		75.2	25.6		55.3	106.3	
LOS	F	D	A		F		E	C		E	F	
Approach Delay		65.2			125.7			43.2			101.8	
Approach LOS		E			F			D			F	
Queue Length 50th (ft)	~177	210	0		~302		253	315		49	~338	
Queue Length 95th (ft)	#440	#515	57		#709		#646	#885		#153	#628	
Internal Link Dist (ft)		265			697			408			759	
Turn Bay Length (ft)							80			60		
Base Capacity (vph)	159	563	1138		388		444	1035		154	862	
Starvation Cap Reductn	0	0	0		0		0	0		0	0	
Spillback Cap Reductn	0	0	0		0		0	0		0	0	
Storage Cap Reductn	0	0	0		0		0	0		0	0	
Reduced v/c Ratio	1.41	0.72	0.44		1.15		0.97	0.76		0.61	1.13	

Intersection Summary

Area Type: Other  
 Cycle Length: 127  
 Actuated Cycle Length: 101.4  
 Natural Cycle: 150  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.41  
 Intersection Signal Delay: 75.4  
 Intersection LOS: E  
 Intersection Capacity Utilization 101.3%  
 ICU Level of Service G  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 27: Main Street & Nahant Street /North Avenue

Ø2 35 s	Ø4 60 s	Ø9 32 s
Ø6 35 s	Ø7 30 s	Ø8 30 s

Site driveway at Broadway Street (unsignalized)

---





**Intersection**

Int Delay, s/veh 1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	2	238	5	31	313	7	3	1	19	6	0	0
Future Vol, veh/h	2	238	5	31	313	7	3	1	19	6	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	84	84	84	64	64	64	50	50	50
Heavy Vehicles, %	0	6	0	0	4	0	0	0	0	0	0	0
Mvmt Flow	3	298	6	37	373	8	5	2	30	12	0	0

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	381	0	0	304
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.1	-	-	4.1
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.2
Pot Cap-1 Maneuver	1189	-	-	1268
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1189	-	-	1268
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.7	11.3	17.7
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	603	1189	-	-	1268	-	-	295
HCM Lane V/C Ratio	0.06	0.002	-	-	0.029	-	-	0.041
HCM Control Delay (s)	11.3	8	0	-	7.9	0	-	17.7
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.1

Intersection												
Int Delay, s/veh	1.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	330	4	31	264	0	10	0	29	0	0	1
Future Vol, veh/h	1	330	4	31	264	0	10	0	29	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	88	88	88	75	75	75	25	25	25
Heavy Vehicles, %	0	0	0	0	2	0	0	0	0	0	0	0
Mvmt Flow	1	398	5	35	300	0	13	0	39	0	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	300	0	0	403	0	0	775	773	401	792	775	300
Stage 1	-	-	-	-	-	-	403	403	-	370	370	-
Stage 2	-	-	-	-	-	-	372	370	-	422	405	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1273	-	-	1167	-	-	318	332	653	309	331	744
Stage 1	-	-	-	-	-	-	628	603	-	654	624	-
Stage 2	-	-	-	-	-	-	653	624	-	613	602	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1273	-	-	1167	-	-	308	320	653	282	319	744
Mov Cap-2 Maneuver	-	-	-	-	-	-	308	320	-	282	319	-
Stage 1	-	-	-	-	-	-	627	602	-	653	602	-
Stage 2	-	-	-	-	-	-	626	602	-	576	601	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.9			12.9			9.9		
HCM LOS							B			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	507	1273	-	-	1167	-	-	744
HCM Lane V/C Ratio	0.103	0.001	-	-	0.03	-	-	0.005
HCM Control Delay (s)	12.9	7.8	0	-	8.2	0	-	9.9
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0

**Intersection**

Int Delay, s/veh 1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	2	295	5	31	389	7	3	1	19	6	0	0
Future Vol, veh/h	2	295	5	31	389	7	3	1	19	6	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	84	84	84	64	64	64	50	50	50
Heavy Vehicles, %	0	6	0	0	4	0	0	0	0	0	0	0
Mvmt Flow	3	369	6	37	463	8	5	2	30	12	0	0

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	471	0	0	375
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.1	-	-	4.1
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.2
Pot Cap-1 Maneuver	1101	-	-	1195
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1101	-	-	1195
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.6	12.4	21.7
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	521	1101	-	-	1195	-	-	228
HCM Lane V/C Ratio	0.069	0.002	-	-	0.031	-	-	0.053
HCM Control Delay (s)	12.4	8.3	0	-	8.1	0	-	21.7
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.2



Intersection												
Int Delay, s/veh	1.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	411	4	31	325	0	10	0	29	0	0	1
Future Vol, veh/h	1	411	4	31	325	0	10	0	29	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	88	88	88	75	75	75	25	25	25
Heavy Vehicles, %	0	0	0	0	2	0	0	0	0	0	0	0
Mvmt Flow	1	495	5	35	369	0	13	0	39	0	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	369	0	0	500	0	0	941	939	498	958	941	369
Stage 1	-	-	-	-	-	-	500	500	-	439	439	-
Stage 2	-	-	-	-	-	-	441	439	-	519	502	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1201	-	-	1075	-	-	245	266	576	239	265	681
Stage 1	-	-	-	-	-	-	557	546	-	601	582	-
Stage 2	-	-	-	-	-	-	599	582	-	544	545	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1201	-	-	1075	-	-	236	255	576	216	254	681
Mov Cap-2 Maneuver	-	-	-	-	-	-	236	255	-	216	254	-
Stage 1	-	-	-	-	-	-	556	545	-	600	558	-
Stage 2	-	-	-	-	-	-	571	558	-	507	544	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.7	14.8	10.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	421	1201	-	-	1075	-	-	681
HCM Lane V/C Ratio	0.124	0.001	-	-	0.033	-	-	0.006
HCM Control Delay (s)	14.8	8	0	-	8.5	0	-	10.3
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0	-	-	0.1	-	-	0

Intersection												
Int Delay, s/veh	1.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	2	295	3	6	389	7	11	0	19	6	0	0
Future Vol, veh/h	2	295	3	6	389	7	11	0	19	6	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	84	84	84	64	64	64	50	50	50
Heavy Vehicles, %	0	6	0	0	4	0	0	0	0	0	0	0
Mvmt Flow	3	369	4	7	463	8	17	0	30	12	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	471	0	0	373	0	0	858	862	371	873	860	467
Stage 1	-	-	-	-	-	-	377	377	-	481	481	-
Stage 2	-	-	-	-	-	-	481	485	-	392	379	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1101	-	-	1197	-	-	279	295	679	273	296	600
Stage 1	-	-	-	-	-	-	649	619	-	570	557	-
Stage 2	-	-	-	-	-	-	570	555	-	637	618	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1101	-	-	1197	-	-	277	292	679	259	293	600
Mov Cap-2 Maneuver	-	-	-	-	-	-	277	292	-	259	293	-
Stage 1	-	-	-	-	-	-	647	617	-	568	553	-
Stage 2	-	-	-	-	-	-	565	551	-	607	616	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.1			14.1			19.6		
HCM LOS							B			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	443	1101	-	-	1197	-	-	259
HCM Lane V/C Ratio	0.106	0.002	-	-	0.006	-	-	0.046
HCM Control Delay (s)	14.1	8.3	0	-	8	0	-	19.6
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.1

Intersection												
Int Delay, s/veh	0.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	411	9	18	325	0	6	0	11	0	0	1
Future Vol, veh/h	1	411	9	18	325	0	6	0	11	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	88	88	88	75	75	75	25	25	25
Heavy Vehicles, %	0	0	0	0	2	0	0	0	0	0	0	0
Mvmt Flow	1	495	11	20	369	0	8	0	15	0	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	369	0	0	506	0	0	914	912	501	919	917	369
Stage 1	-	-	-	-	-	-	503	503	-	409	409	-
Stage 2	-	-	-	-	-	-	411	409	-	510	508	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1201	-	-	1069	-	-	256	276	574	254	274	681
Stage 1	-	-	-	-	-	-	555	545	-	623	600	-
Stage 2	-	-	-	-	-	-	622	600	-	550	542	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1201	-	-	1069	-	-	250	269	574	243	267	681
Mov Cap-2 Maneuver	-	-	-	-	-	-	250	269	-	243	267	-
Stage 1	-	-	-	-	-	-	554	544	-	622	586	-
Stage 2	-	-	-	-	-	-	604	586	-	535	541	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.4			14.7			10.3		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	394	1201	-	-	1069	-	-	681
HCM Lane V/C Ratio	0.058	0.001	-	-	0.019	-	-	0.006
HCM Control Delay (s)	14.7	8	0	-	8.4	0	-	10.3
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0

ZONING TABLE -- LOT 11			
ZONE	MID-RISE APARTMENT COMPLEX (190-32)	TABLE 2 DIMENSIONAL REGULATIONS (BUSINESS)	
DIMENSIONAL CONTROLS	REQUIRED/ALLOWED	REQUIRED/ALLOWED	PROVIDED
MIN. LOT AREA	4,000 s.f.	--	22,819 s.f.
LOT AREA PER DWELLING UNIT	1,200 S.F. (19 Units)		(9) One Bedroom Units (10) Two Bedroom Units
LOT FRONTAGE	180 ft.	40 ft.	142.80
LOT WIDTH	180 ft.	40 ft.	138.51
FLOOR AREA RATIO		1.5	0.99
FRONT YARD	30 ft. or Height of Building, Whichever is Greater	--	11.1 ft.
SIDE	30 ft. or Height of Building, Whichever is Greater	---**	3.2 ft.
REAR	30 ft. or Height of Building, Whichever is Greater	---**	61.6 ft.
MAXIMUM NUMBER OF STORIES	5	--	4
MAXIMUM HEIGHT	50 ft.	60 ft.*	45.8 ft.
MAX. BUILDING COVERAGE	35%	80%	38.6%
MIN. OPEN AREA	30%	10%	33.0%
COEFFICIENT OF REGULARITY (r)	Not Lower Than 0.65		1.04

ZONING TABLE -- LOT 12			
ZONE	TABLE 2 DIMENSIONAL REGULATIONS (BUSINESS)	TABLE 2 DIMENSIONAL REGULATIONS (Single Residence)	
DIMENSIONAL CONTROLS	REQUIRED/ALLOWED	REQUIRED/ALLOWED	PROVIDED
MIN. LOT AREA	--	12,000 s.f.	12,776 s.f.
LOT FRONTAGE	40 ft.	100 ft.	40.50 ft.
LOT WIDTH	40 ft.	100 ft.	15.00 ft.
FLOOR AREA RATIO	1.5	--	NA - Single Family
FRONT YARD	--	20 ft.	163.6 ft.
SIDE	---**	15 ft.	11.5 ft.
REAR	---**	25 ft.	26.5 ft.
MAXIMUM NUMBER OF STORIES	--	2.5	2.5
MAXIMUM HEIGHT	60 ft.*	35 ft.	<35 ft.
MAX. BUILDING COVERAGE	80%	30%	10.3%
MIN. OPEN AREA	10%	40%	49.3%
COEFFICIENT OF REGULARITY (r)	Not Lower Than 0.65		0.299

ZONING TABLE -- LOT 13			
ZONE	TABLE 2 DIMENSIONAL REGULATIONS (BUSINESS)	TABLE 2 DIMENSIONAL REGULATIONS (Single Residence)	
DIMENSIONAL CONTROLS	REQUIRED/ALLOWED	REQUIRED/ALLOWED	PROVIDED
MIN. LOT AREA	--	12,000 s.f.	18,478 s.f.
LOT FRONTAGE	40 ft.	100 ft.	40.50 ft.
LOT WIDTH	40 ft.	100 ft.	5.00 ft.
FLOOR AREA RATIO	1.5	--	NA - Single Family
FRONT YARD	--	20 ft.	257.2 ft.
SIDE	---**	15 ft.	10.7 ft.
REAR	---**	25 ft.	99.6 ft.
MAXIMUM NUMBER OF STORIES	--	2.5	2.5
MAXIMUM HEIGHT	60 ft.*	35 ft.	30.4 ft.
MAX. BUILDING COVERAGE	80%	30%	8.2%
MIN. OPEN AREA	10%	40%	86.5%
COEFFICIENT OF REGULARITY (r)	Not Lower Than 0.65		0.230

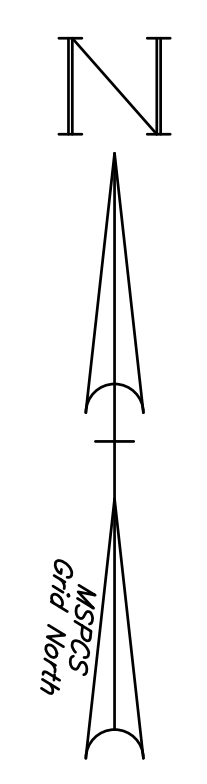
MULTIFAMILY PARKING CALCULATIONS	
REQUIRED	PROVIDED
MULTIFAMILY DWELLINGS: 1.5 spaces per dwelling unit (2 bedrooms or fewer) 1.5 X 19 units = 28.5 spaces	29 spaces (9'x18')
Total Parking Proposed-- Two spaces to be handicapped accessible	33 spaces

\* - BUILDINGS OVER 50 FEET SHALL PROVIDE A FRONT YARD SETBACK OF FIVE FEET PLUS ONE FOOT OF HEIGHT IN EXCESS OF 50 FEET (ZONING TABLE 2 - NOTE 8)  
 \*\* - A MIN. OF 15' ADJACENT TO A RESIDENTIAL DISTRICT 10' OF WHICH SHALL NOT BE PAVED. (ZONING TABLE 2 - NOTE 7)



# SITE PLAN

## #314, #330 & #336



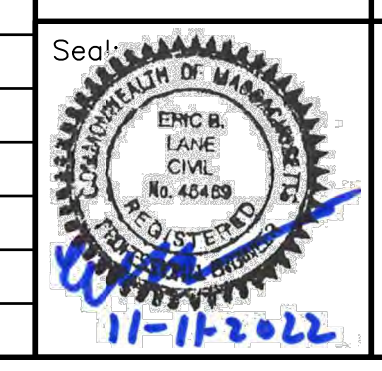
**NOTES:**

- PROPERTY LIES WITHIN THE BUSINESS ZONE AND SINGLE RESIDENCE.
- TOPOGRAPHIC INFORMATION DEPICTED HEREON IS THE RESULT OF AN ACTUAL FIELD SURVEY PERFORMED BY HAYES ENGINEERING, INC. BETWEEN JANUARY 25-28, 2022.
- THE VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), DERIVED FROM GPS OBSERVATIONS.
- HORIZONTAL DATUM IS NORTH AMERICAN DATUM OF 1983 (NAD83), DERIVED FROM GPS OBSERVATIONS.
- THE PROPERTIES ARE NOT LOCATED WITHIN A FLOOD HAZARD ZONE (A or V) AS DEPICTED ON FLOOD INSURANCE RATE MAPS COMMUNITY PANEL NUMBER 25017C0318E EFFECTIVE DATE JUNE 4, 2010.
- PERIMETER INFORMATION FROM ON THE GROUND SURVEYS BY HAYES ENGINEERING, INC.
- THE UNDERGROUND UTILITIES SHOWN HAVE BEEN COMPILED FROM FIELD SURVEY INFORMATION AND AVAILABLE EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. FURTHER, THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES AND DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM THE INFORMATION AVAILABLE.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING AND VERIFYING THE LOCATIONS, SIZES, AND ELEVATIONS OF ALL EXISTING UTILITIES SHOWN OR NOT SHOWN ON THESE PLANS AND SHALL NOTIFY THE ENGINEER IN WRITING OF ANY UTILITIES INTERFERING WITH THE PROPOSED DESIGN AND THE APPROPRIATE REMEDIAL ACTION PRIOR TO PROCEEDING WITH THE WORK.
- THE CONTRACTORS ARE RESPONSIBLE FOR CONTACTING DIG SAFE AT (800) 322-4844 PRIOR TO THE START OF ANY CONSTRUCTION.
- SEE PLAN ENTITLED "PLAN OF LAND ON SALEM STREET" BY HAYES ENGINEERING, INC. DATED MAY 23, 2022 REVISED TO OCTOBER 11, 2022.
- LOTS 11 THROUGH 13 WILL SHARE USE OF A COMMON DRIVEWAY.

NOTE:  
INFORMATION SHOWN ON THIS SHEET WAS TAKEN FROM AN AUTOCAD DRAWING OF THE TOWN OF WAKEFIELD GIS.

**OWNERS:**  
**SALVATORE F. VALENTE & HELEN F. VALENTE**  
 ASSESSOR PARCEL ID: 38-071-16A  
 DEED REFERENCE: BOOK 78923 PAGE 358  
 #314 SALEM ST  
  
 330 SALEM STREET LLC  
 ASSESSOR PARCEL ID: 38-069-17A+  
 DEED REFERENCE: BOOK 78741 PAGE 520  
 #330 SALEM STREET  
  
 SALVATORE F. VALENTE  
 ASSESSOR PARCEL ID: 38-69A-16B  
 DEED REFERENCE: BOOK 48910 PAGE 214  
 #336 SALEM ST

SHEET INDEX	
PLAN TITLE	SHEET DESIGNATION
INDEX	C1
PLAN SHEET	C2
EXISTING CONDITIONS	C3
SITE DEVELOPMENT PLAN	C4
UTILITIES PLAN	C5
LAYOUT & MATERIALS	C6
EROSION CONTROL & DEMO PLAN	C7
DETAIL SHEETS	C8 - C10



Prepared For:  
 Applicant:  
 Ocean City Development LLC  
 200 Delcorrine Street  
 Wakefield, MA 01880

Prepared By:  
 Hayes Engineering, Inc.  
 603 Salem Street  
 Wakefield, MA 01880  
 Ph: 781.246.2800  
 Fax: 781.246.7596  
 www.hayeseng.com

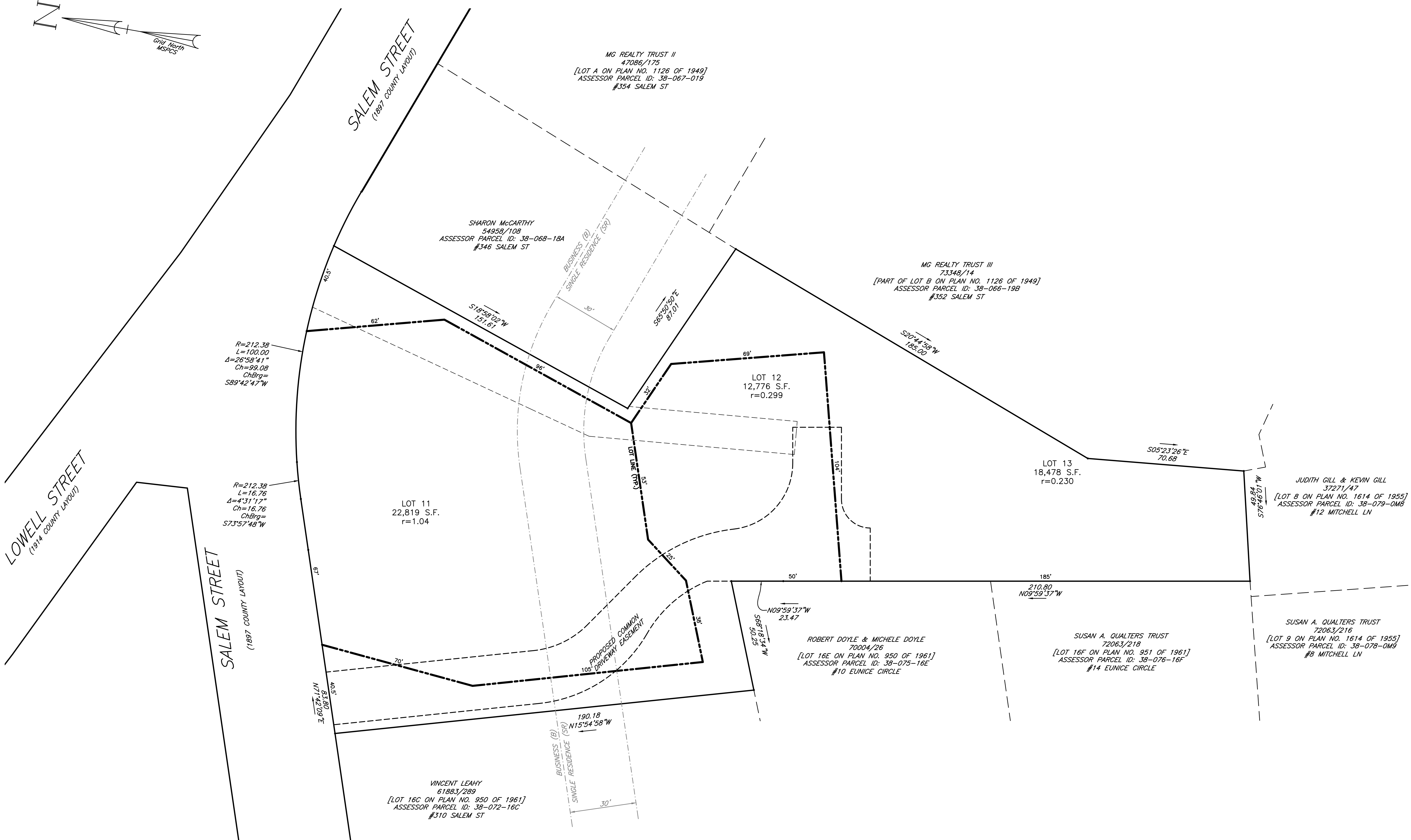
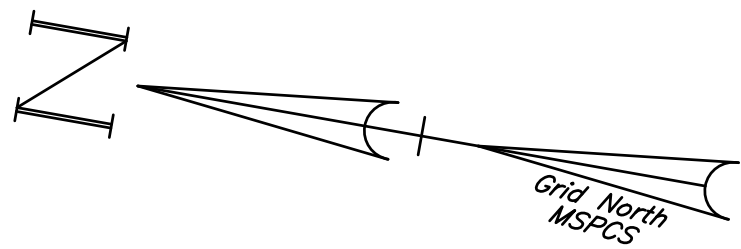
Design By: JO  
 Drawn By: EBL  
 Checked By:  
 Project File: WAK-0496A  
 Comp. No: WAK325  
 Issued For Permit  
 Issued For Review  
 Issued For Bid  
 Issued For Construction  
 Not For Construction

No.	Revision	Date
10		
9		
8		
7		
6		
5		
4		
3		
2		
1		

Scale: 1"=100'  
 0' 50' 100' 200'  
 Date: October 14, 2022

Drawing Title:  
**INDEX PLAN**  
**#314, #330 & #336**  
**SALEM STREET**  
**WAKEFIELD, MASS.**

Drawing No.:  
**C1**  
 SHEET 1 OF 10



Prepared For:  
 Applicant:  
 Ocean City Development LLC  
 20C Delcorinne Street  
 Wakefield, MA 01880

Prepared By:  
 Hayes Engineering, Inc.  
 603 Salem Street  
 Wakefield, MA 01880  
 Ph: 781.246.2800  
 Fax: 781.246.7596  
 www.hayeseng.com

Design By: JO  
 Drawn By: EBL  
 Checked By:  
 Project File: WAK-0496A  
 Comp. No: WAK325  
 Issued For Permit  
 Issued For Review  
 Issued For Bid  
 Issued For Construction  
 Not For Construction

No.	Revision	Date
10		
9		
8		
7		
6		
5		
4		
3		
2		
1		

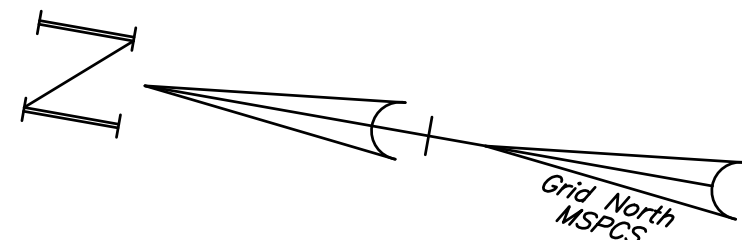
Scale: 1"=20'  
 0' 10' 20' 40'  
 Date: October 14, 2022

Drawing Title:  
**PLAN SHEET  
 #314, #330 & #336  
 SALEM STREET  
 WAKEFIELD, MASS.**

Seal:  
 Drawing No.:  
**C2**  
 SHEET 2 OF 10

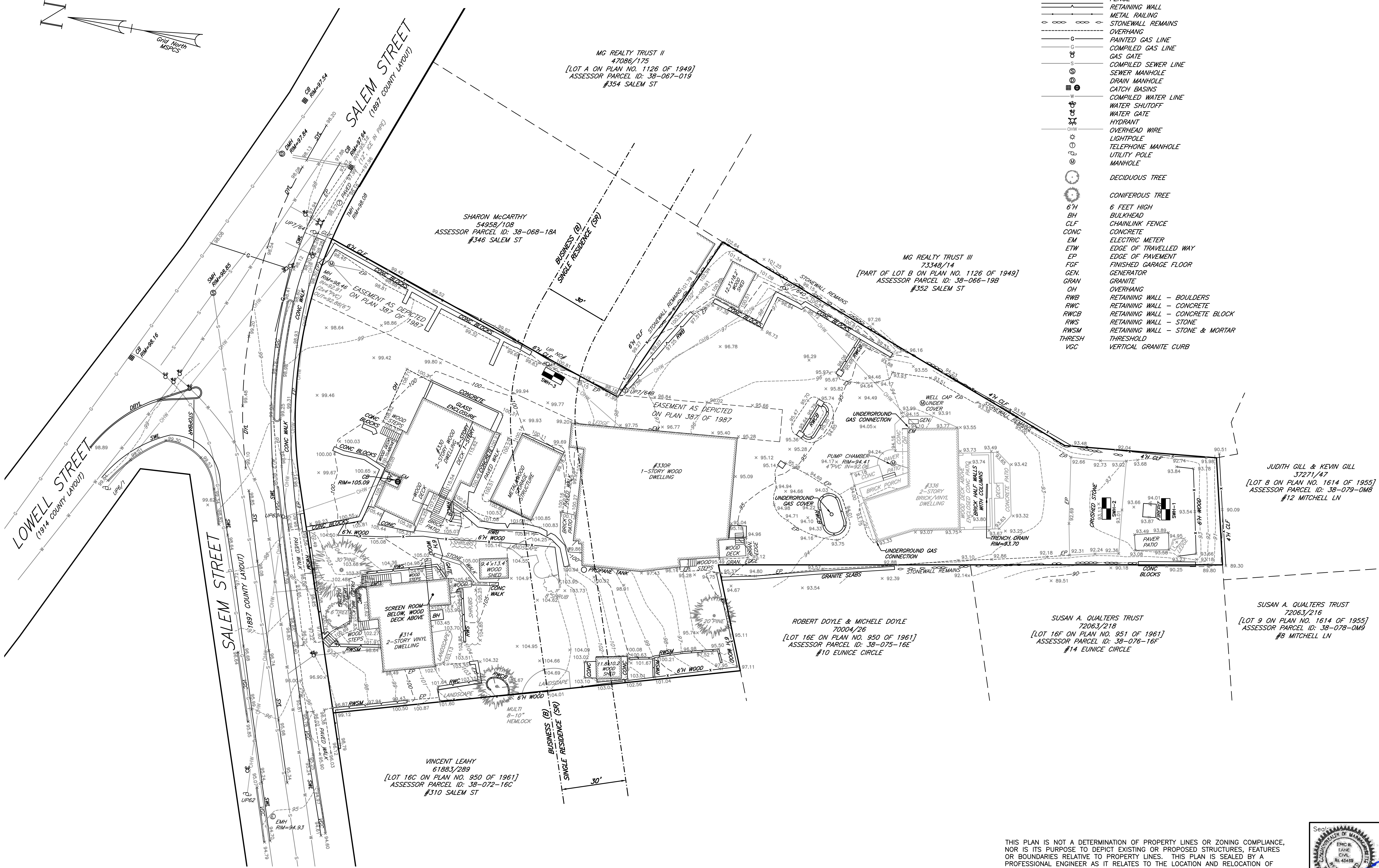
**NOTES:**  
 SEE PLAN ENTITLED "PLAN OF LAND ON SALEM STREET" BY HAYES  
 ENGINEERING, INC. DATED MAY 23, 2022 REVISED TO OCTOBER 11, 2022  
 LOTS 11 THROUGH 13 WILL SHARE USE OF A COMMON DRIVEWAY.

R:\WAK325\SP314-330-336\saalem.dwg, 11/14/2022 10:09:04 AM, EBL



**LEGEND**

- 104--- MINOR CONTOUR
- 105--- MAJOR CONTOUR
- x100.50 SPOT ELEVATION
- FENCE
- RETAINING WALL
- METAL RAILING
- STONEWALL REMAINS
- OVERHANG
- G PAINTED GAS LINE
- G COMPILED GAS LINE
- G GAS GATE
- S COMPILED SEWER LINE
- S SEWER MANHOLE
- S DRAIN MANHOLE
- S CATCH BASIN
- W COMPILED WATER LINE
- W WATER SHUTOFF
- W WATER GATE
- W HYDRANT
- W OVERHEAD WIRE
- W LIGHTPOLE
- W TELEPHONE MANHOLE
- W UTILITY POLE
- W MANHOLE
- DECIDUOUS TREE
- CONIFEROUS TREE
- 6'H 6 FEET HIGH BULKHEAD
- BH BULKHEAD
- CLF CHAINLINK FENCE
- CONC CONCRETE
- EM ELECTRIC METER
- ETW EDGE OF TRAVELLED WAY
- EP EDGE OF PAVEMENT
- FGF FINISHED GARAGE FLOOR
- GEN GENERATOR
- GRAN GRANITE
- OH OVERHANG
- RWB RETAINING WALL - BOULDERS
- RWC RETAINING WALL - CONCRETE
- RWCB RETAINING WALL - CONCRETE BLOCK
- RWS RETAINING WALL - STONE
- RWSM RETAINING WALL - STONE & MORTAR
- THRESH THRESHOLD
- VGC VERTICAL GRANITE CURB



Prepared For:  
Applicant  
Ocean City Development LLC  
20C DeLormaine Street  
Wakefield, MA 01880

Prepared By:  
Hayes Engineering, Inc.  
603 Salem Street  
Wakefield, MA 01880  
Ph: 781.246.2800  
Fax: 781.246.7596  
www.hayeseng.com

Design By: JO  
Drawn By: EBL  
Checked By:  
Project File: WAK-0496A  
Comp. No: WAK325  
 Issued For Permit  
 Issued For Review  
 Issued For Bid  
 Issued For Construction  
 Not For Construction

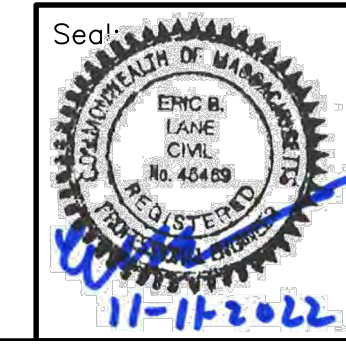
No.	Revision	Date
10		
9		
8		
7		
6		
5		
4		
3		
2		
1		

Scale: 1"=20'  
0' 10' 20' 40'  
Date: October 14, 2022

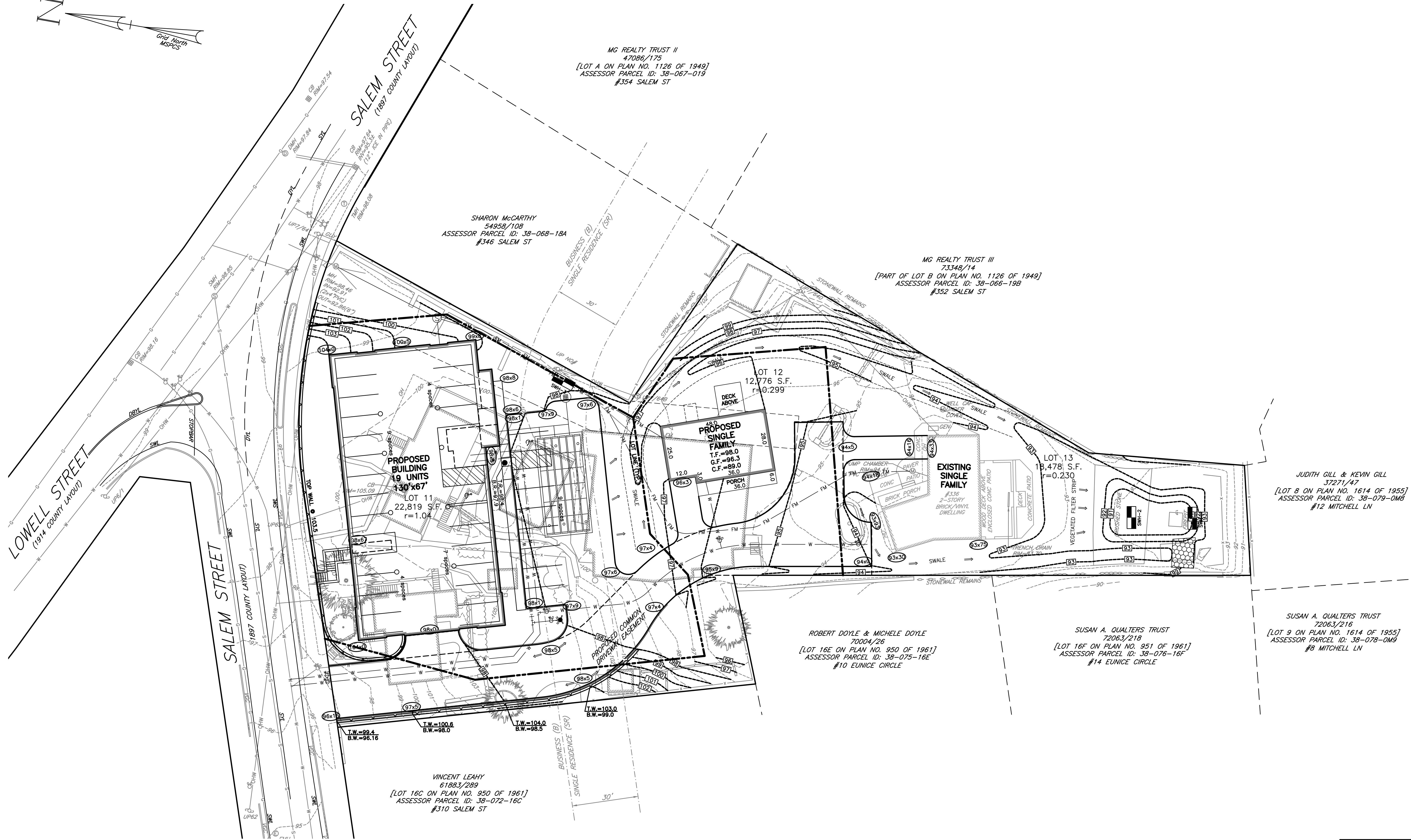
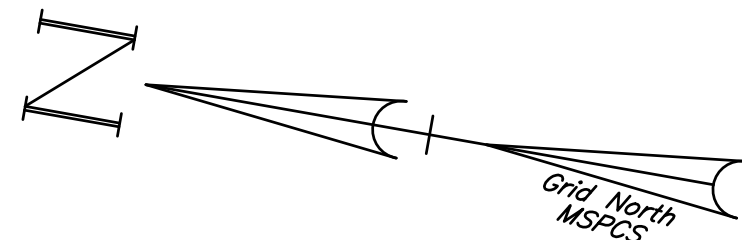
Drawing Title:  
**EXISTING CONDITIONS PLAN  
#314, #330 & #336  
SALEM STREET  
WAKEFIELD, MASS.**

Drawing No.:  
**C3**  
SHEET 3 OF 10

THIS PLAN IS NOT A DETERMINATION OF PROPERTY LINES OR ZONING COMPLIANCE, NOR IS ITS PURPOSE TO DEPICT EXISTING OR PROPOSED STRUCTURES, FEATURES OR BOUNDARIES RELATIVE TO PROPERTY LINES. THIS PLAN IS SEALED BY A PROFESSIONAL ENGINEER AS IT RELATES TO THE LOCATION AND RELOCATION OF FIXED WORKS EMBRACED WITHIN THE PRACTICE OF CIVIL ENGINEERING IN ACCORDANCE WITH THE PROVISIONS OF 250 CMR 5.01(2) ET SEQ.



N:\WAK325\SP14-330-336\stem.dwg, 11/14/2022 10:09:09 AM, EBL



MG REALTY TRUST II  
47086/175  
[LOT A ON PLAN NO. 1126 OF 1949]  
ASSESSOR PARCEL ID: 38-067-019  
#354 SALEM ST

SHARON MCCARTHY  
54958/108  
ASSESSOR PARCEL ID: 38-068-18A  
#346 SALEM ST

MG REALTY TRUST III  
73348/14  
[PART OF LOT B ON PLAN NO. 1126 OF 1949]  
ASSESSOR PARCEL ID: 38-066-19B  
#352 SALEM ST

JUDITH GILL & KEVIN GILL  
37271/47  
[LOT B ON PLAN NO. 1614 OF 1955]  
ASSESSOR PARCEL ID: 38-079-0MB  
#12 MITCHELL LN

ROBERT DOYLE & MICHELE DOYLE  
70004/26  
[LOT 16E ON PLAN NO. 950 OF 1961]  
ASSESSOR PARCEL ID: 38-075-16E  
#10 EUNICE CIRCLE

SUSAN A. QUALTERS TRUST  
72063/218  
[LOT 16F ON PLAN NO. 951 OF 1961]  
ASSESSOR PARCEL ID: 38-076-16F  
#14 EUNICE CIRCLE

SUSAN A. QUALTERS TRUST  
72063/216  
[LOT 9 ON PLAN NO. 1614 OF 1955]  
ASSESSOR PARCEL ID: 38-078-0M9  
#8 MITCHELL LN

VINCENT LEAHY  
61883/289  
[LOT 16C ON PLAN NO. 950 OF 1961]  
ASSESSOR PARCEL ID: 38-072-16C  
#310 SALEM ST

Prepared For:  
Applicant  
Ocean City Development LLC  
200 DeCormine Street  
Wakefield, MA 01880

Prepared By:  
Hayes Engineering, Inc.  
603 Salem Street  
Wakefield, MA 01880  
Ph: 781.246.2800  
Fax: 781.246.7596  
www.hayeseng.com

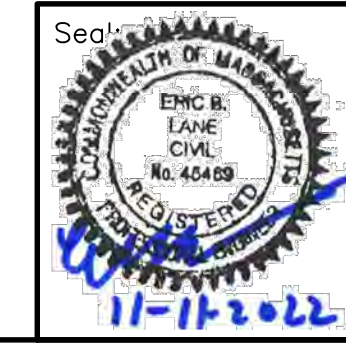
Design By: JO  
Drawn By: EBL  
Checked By:  
Project File: WAK-0496A  
Comp. No: WAK325  
 Issued For Permit  
 Issued For Review  
 Issued For Bid  
 Issued For Construction  
 Not For Construction

No.	Revision	Date
10		
9		
8		
7		
6		
5		
4		
3		
2		
1		

Scale: 1"=20'  
0' 10' 20' 40'  
Date: October 14, 2022

Drawing Title:  
SITE DEVELOPMENT PLAN  
#314, #330 & #336  
SALEM STREET  
WAKEFIELD, MASS.

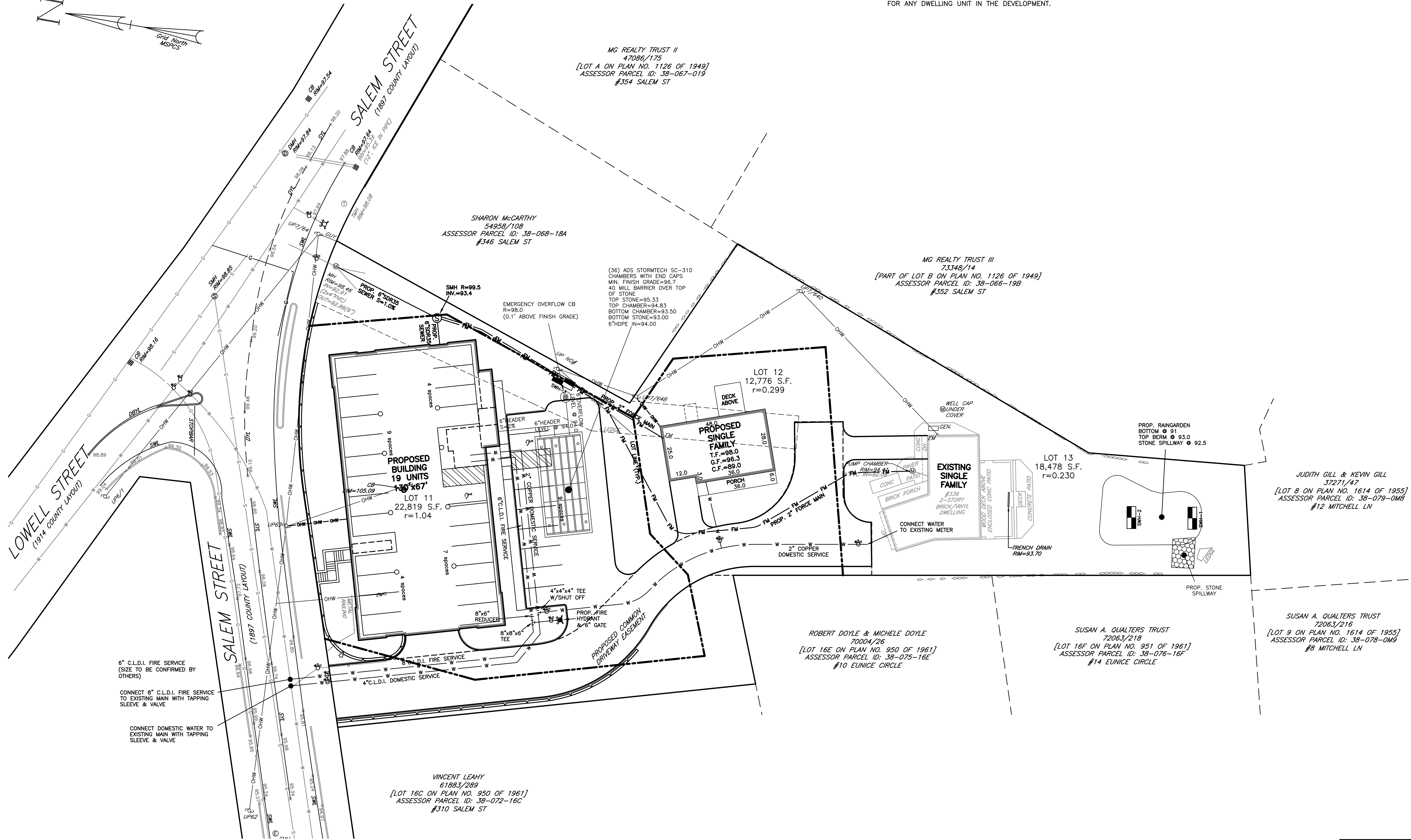
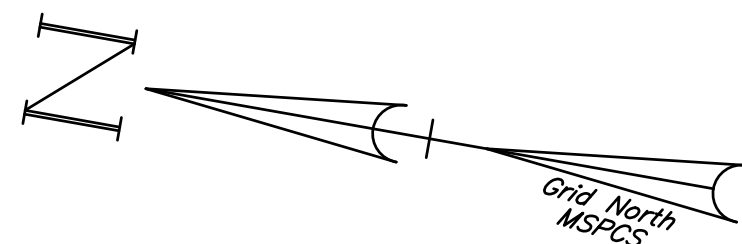
Drawing No.:  
C4  
SHEET 4 OF 10



N:\WAK325\SP314-330-336\shem.dwg, 11/14/2022 10:09:14 AM, EBL

**NOTES:**

1. ALL ABANDONED UTILITY SERVICES ARE TO BE CUT AND CAPPED AT THEIR RESPECTIVE MAINS.
2. ALL ABANDONED WATER SERVICE SHUTOFFS WITHIN AND/OR FEEDING THE SITE ARE TO BE REMOVED.
3. NO SECOND WATER SERVICE OR METER DEDICATED TO OUTSIDE IRRIGATION SYSTEMS WILL BE ALLOWED FOR ANY DWELLING UNIT IN THE DEVELOPMENT.



Prepared For:

Applicant  
Ocean City Development LLC  
200 Deacon Street  
Wakefield, MA 01880

Prepared By:

Hayes Engineering, Inc.  
603 Salem Street  
Wakefield, MA 01880  
Ph: 781.246.2800  
Fax: 781.246.7596  
www.hayeseng.com

Design By: JO  
Drawn By: EBL  
Checked By:  
Project File: WAK-0496A  
Comp. No: WAK325  
 Issued For Permit  
 Issued For Review  
 Issued For Bid  
 Issued For Construction  
 Not For Construction

No.	Revision	Date
10		
9		
8		
7		
6		
5		
4		
3		
2		
1		

Scale: 1"=20'  
0' 10' 20' 40'

Date: October 14, 2022

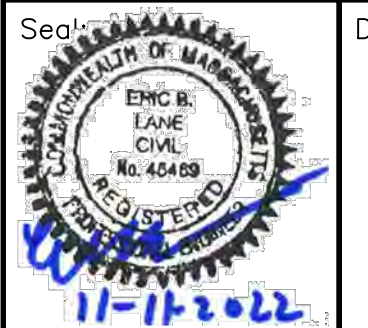
Drawing Title:

UTILITIES PLAN  
#314, #330 & #336  
SALEM STREET  
WAKEFIELD, MASS.

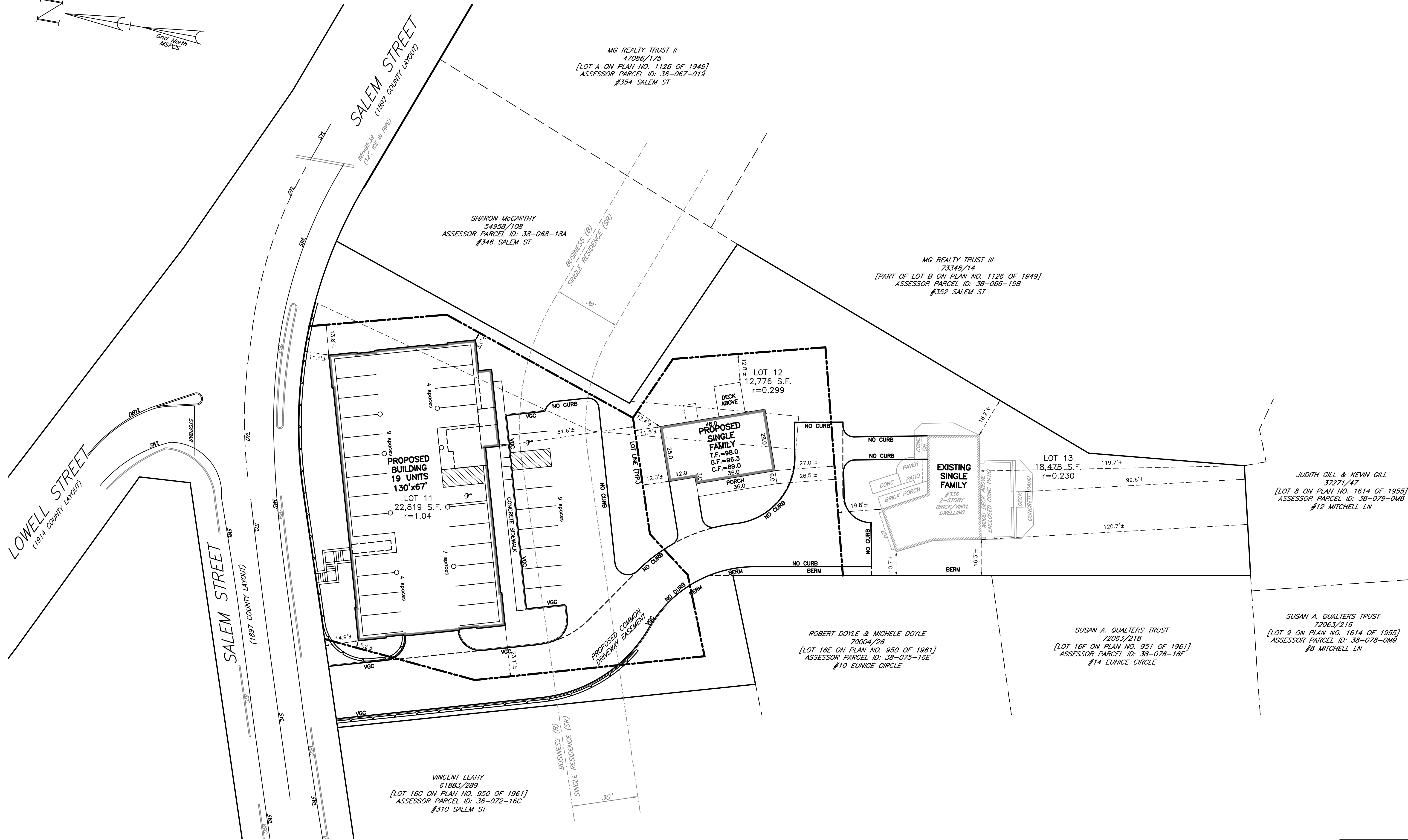
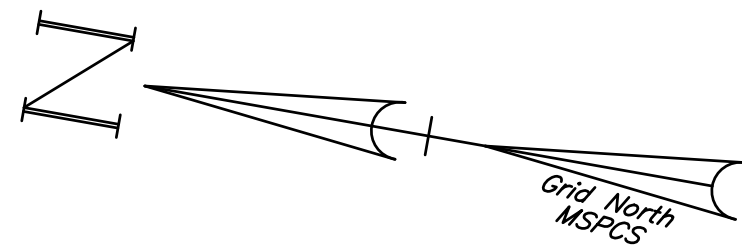
Drawing No.:

C5

SHEET 5 OF 10







MG REALTY TRUST II  
47086/175  
[LOT A ON PLAN NO. 1126 OF 1949]  
ASSESSOR PARCEL ID: 38-067-019  
#354 SALEM ST

SHARON McCARTHY  
54958/108  
ASSESSOR PARCEL ID: 38-068-18A  
#346 SALEM ST

MG REALTY TRUST III  
73348/14  
[PART OF LOT B ON PLAN NO. 1126 OF 1949]  
ASSESSOR PARCEL ID: 38-066-19B  
#352 SALEM ST

LOT 12  
12,776 S.F.  
r=0.299

PROPOSED BUILDING  
19 UNITS  
130'x67'  
LOT 11  
22,819 S.F.  
r=1.04

PROPOSED SINGLE FAMILY  
T.F.=98.0  
C.F.=96.3  
PORCH 36.0

LOT 13  
18,478 S.F.  
r=0.230

EXISTING SINGLE FAMILY  
#336  
2-STORY BRICK/VINYL DWELLING

JUDITH GILL & KEVIN GILL  
37271/47  
[LOT B ON PLAN NO. 1614 OF 1955]  
ASSESSOR PARCEL ID: 38-079-0MB  
#12 MITCHELL LN

ROBERT DOYLE & MICHELE DOYLE  
70004/26  
[LOT 16E ON PLAN NO. 950 OF 1961]  
ASSESSOR PARCEL ID: 38-075-16E  
#10 EUNICE CIRCLE

SUSAN A. QUALTERS TRUST  
72063/218  
[LOT 16F ON PLAN NO. 951 OF 1961]  
ASSESSOR PARCEL ID: 38-076-16F  
#14 EUNICE CIRCLE

SUSAN A. QUALTERS TRUST  
72063/216  
[LOT 9 ON PLAN NO. 1614 OF 1955]  
ASSESSOR PARCEL ID: 38-078-0MB  
#8 MITCHELL LN

VINCENT LEAHY  
61883/289  
[LOT 16C ON PLAN NO. 950 OF 1961]  
ASSESSOR PARCEL ID: 38-072-16C  
#310 SALEM ST

Prepared For:

Applicant  
Ocean City Development LLC  
200 Delcorinne Street  
Wakefield, MA 01880

Prepared By:

Hayes Engineering, Inc.  
Hayes  
603 Salem Street  
Wakefield, MA 01880  
Ph: 781.246.2800  
Fax: 781.246.7596  
www.hayeseng.com

Design By: JO

Drawn By: EBL

Checked By:

Project File: WAK-0496A

Comp. No: WAK325

Issued For Permit

Issued For Review

Issued For Bid

Issued For Construction

Not For Construction

No.	Revision	Date
10		
9		
8		
7		
6		
5		
4		
3		
2		
1		

Scale: 1"=20'  
0' 10' 20' 40'

Date: October 14, 2022

Drawing Title:

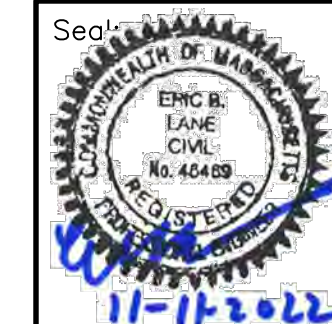
LAYOUT & MATERIALS PLAN  
#314, #330 & #336  
SALEM STREET  
WAKEFIELD, MASS.

Drawing No.:

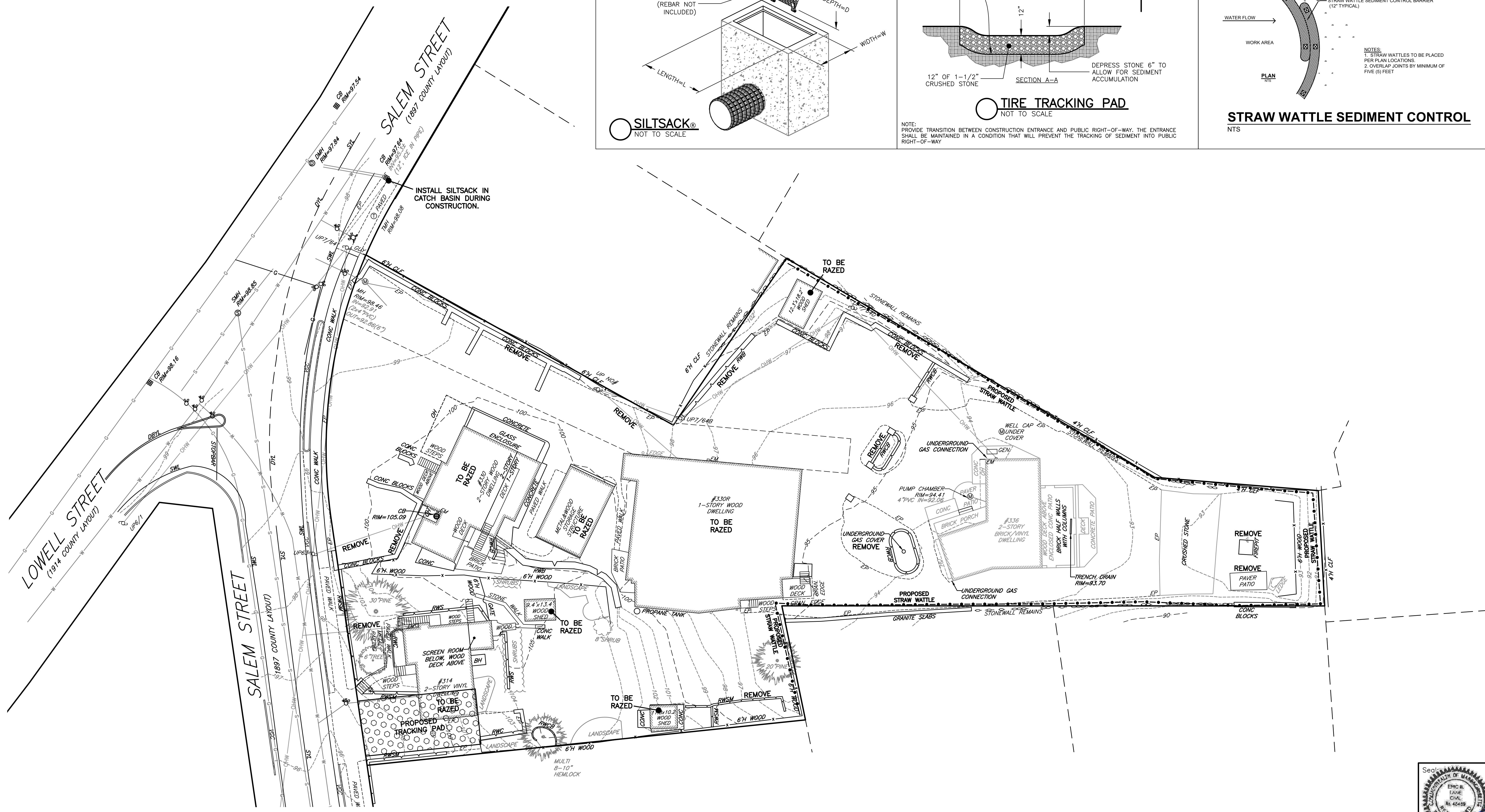
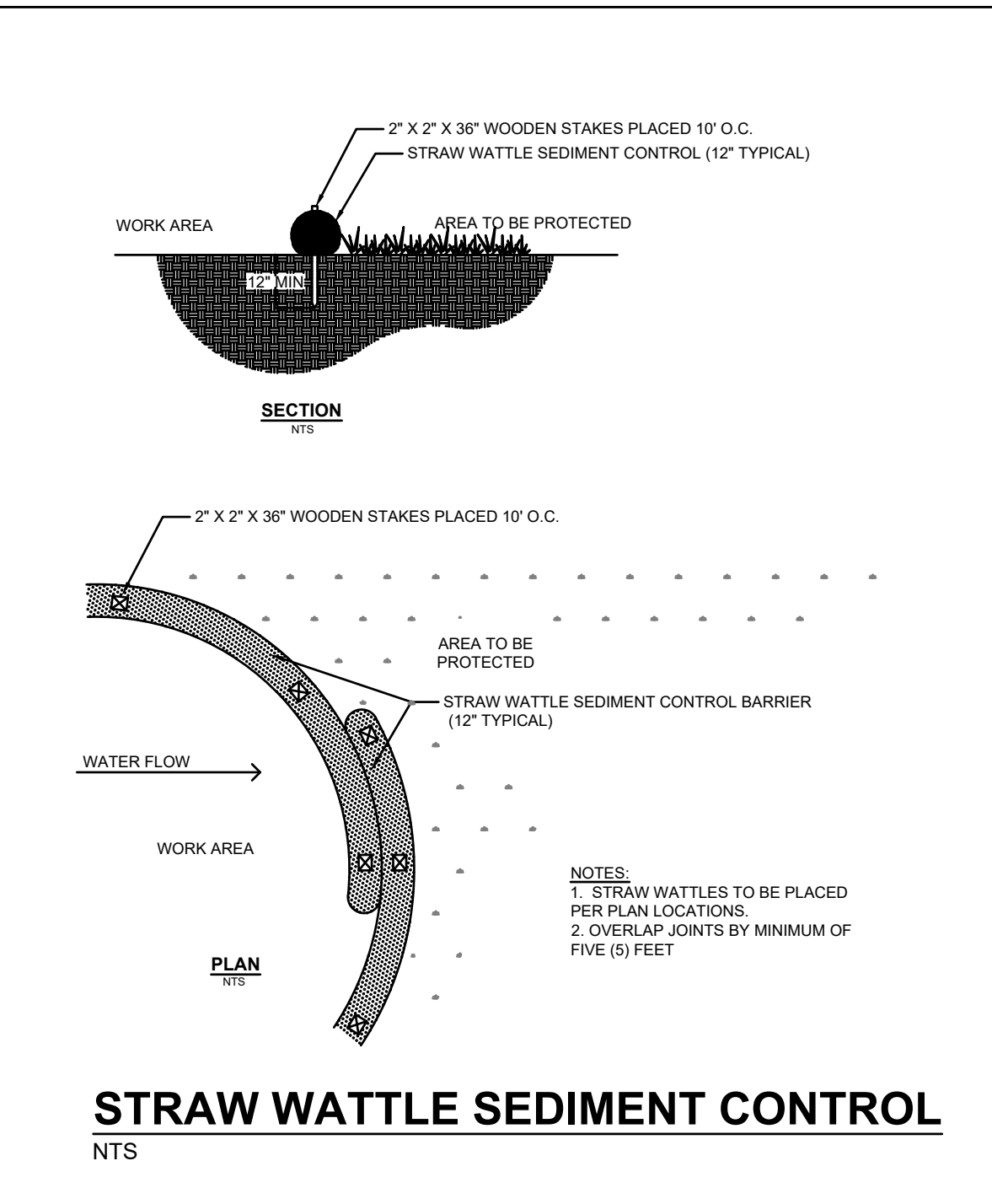
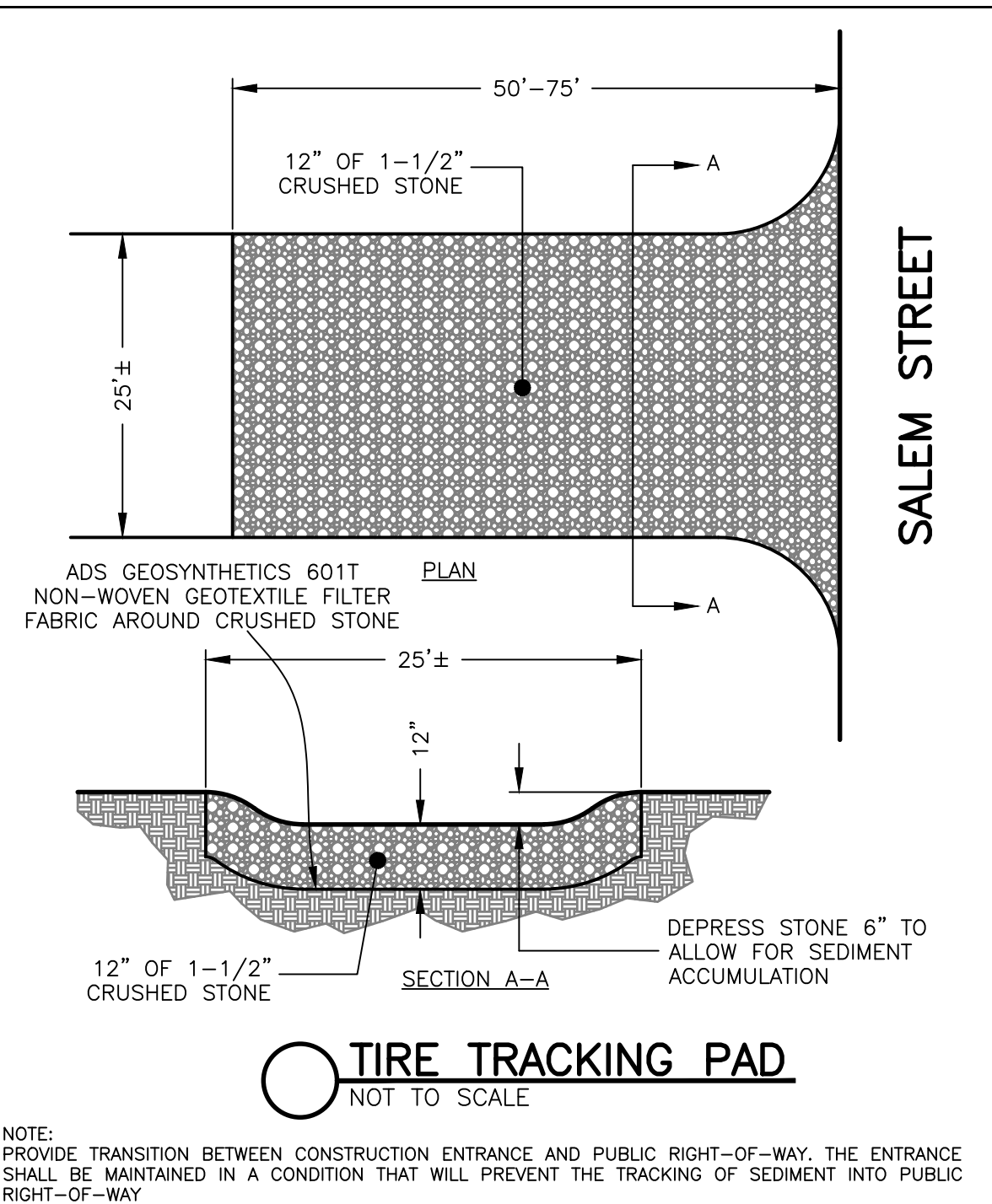
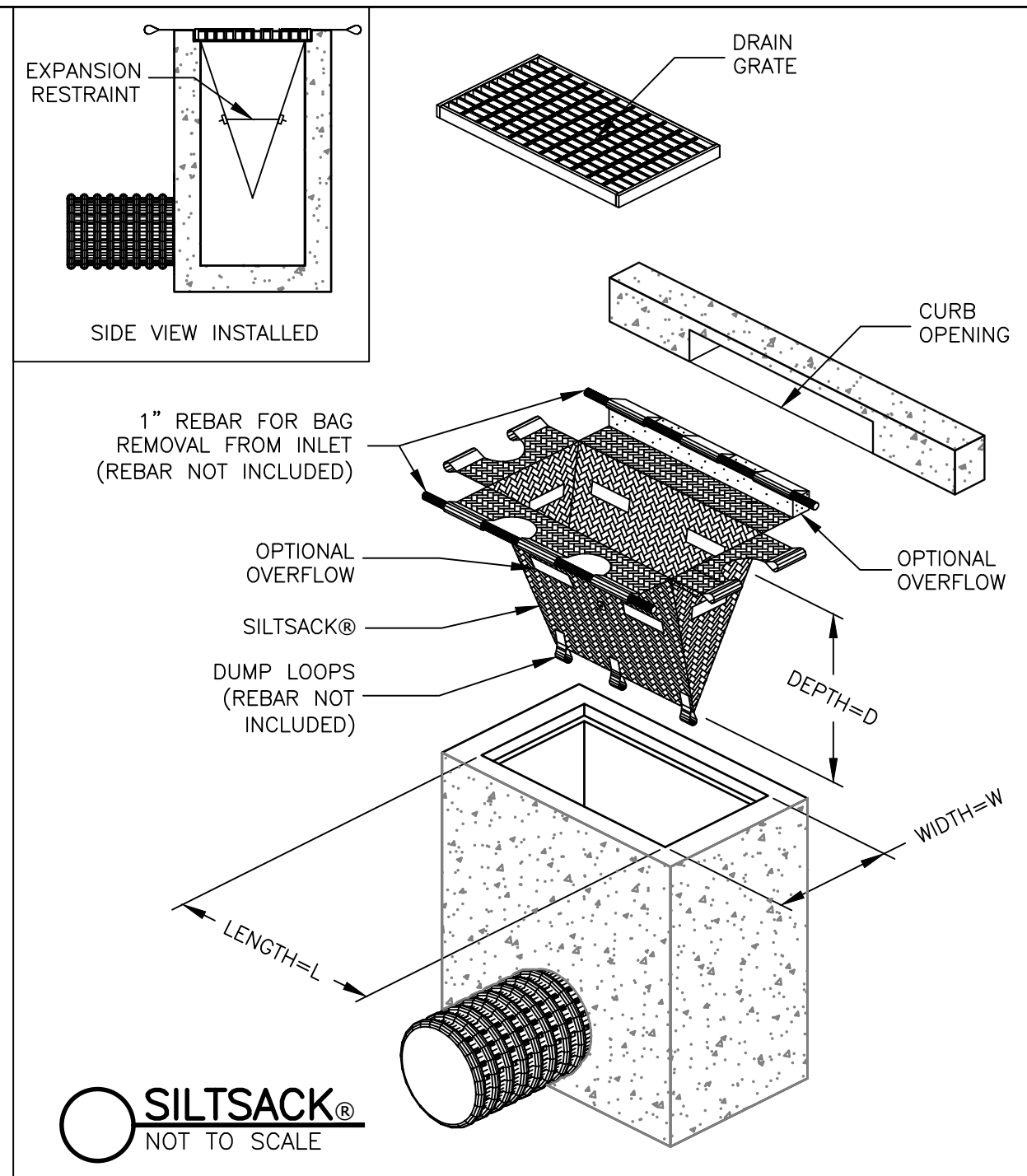
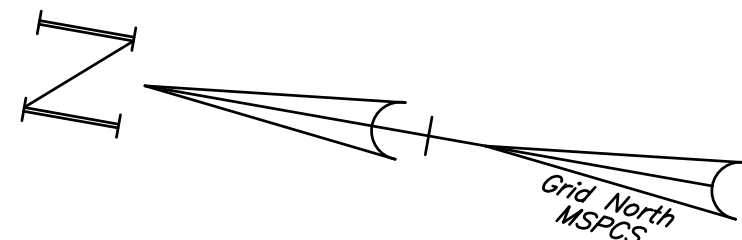
C6

SHEET 6 OF 10

THIS PLAN IS NOT A DETERMINATION OF PROPERTY LINES OR ZONING COMPLIANCE, NOR IS ITS PURPOSE TO DEPICT EXISTING OR PROPOSED STRUCTURES, FEATURES OR BOUNDARIES RELATIVE TO PROPERTY LINES. THIS PLAN IS SEALED BY A PROFESSIONAL ENGINEER AS IT RELATES TO THE LOCATION AND RELOCATION OF FIXED WORKS EMBRACED WITHIN THE PRACTICE OF CIVIL ENGINEERING IN ACCORDANCE WITH THE PROVISIONS OF 250 CMR 5.01(2) ET SEQ.



R:\WAK325\SP314-330-336\plan.dwg, 11/14/2022 10:09:24 AM, EBL



Prepared For:  
 Applicant:  
 Ocean City Development LLC  
 20C DeLoach Street  
 Wakefield, MA 01880

Prepared By:  
 Hayes Engineering, Inc.  
 603 Salem Street  
 Wakefield, MA 01880  
 Ph: 781.246.2800  
 Fax: 781.246.7596  
 www.hayeseng.com

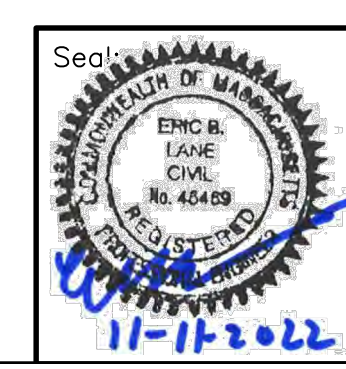
Design By: JO  
 Drawn By: EBL  
 Checked By:  
 Project File: WAK-0496A  
 Comp. No: WAK325  
 Issued For Permit  
 Issued For Review  
 Issued For Bid  
 Issued For Construction  
 Not For Construction

No.	Revision	Date
10		
9		
8		
7		
6		
5		
4		
3		
2		
1		

Scale: 1"=20'  
 0' 10' 20' 40'

Date: October 14, 2022

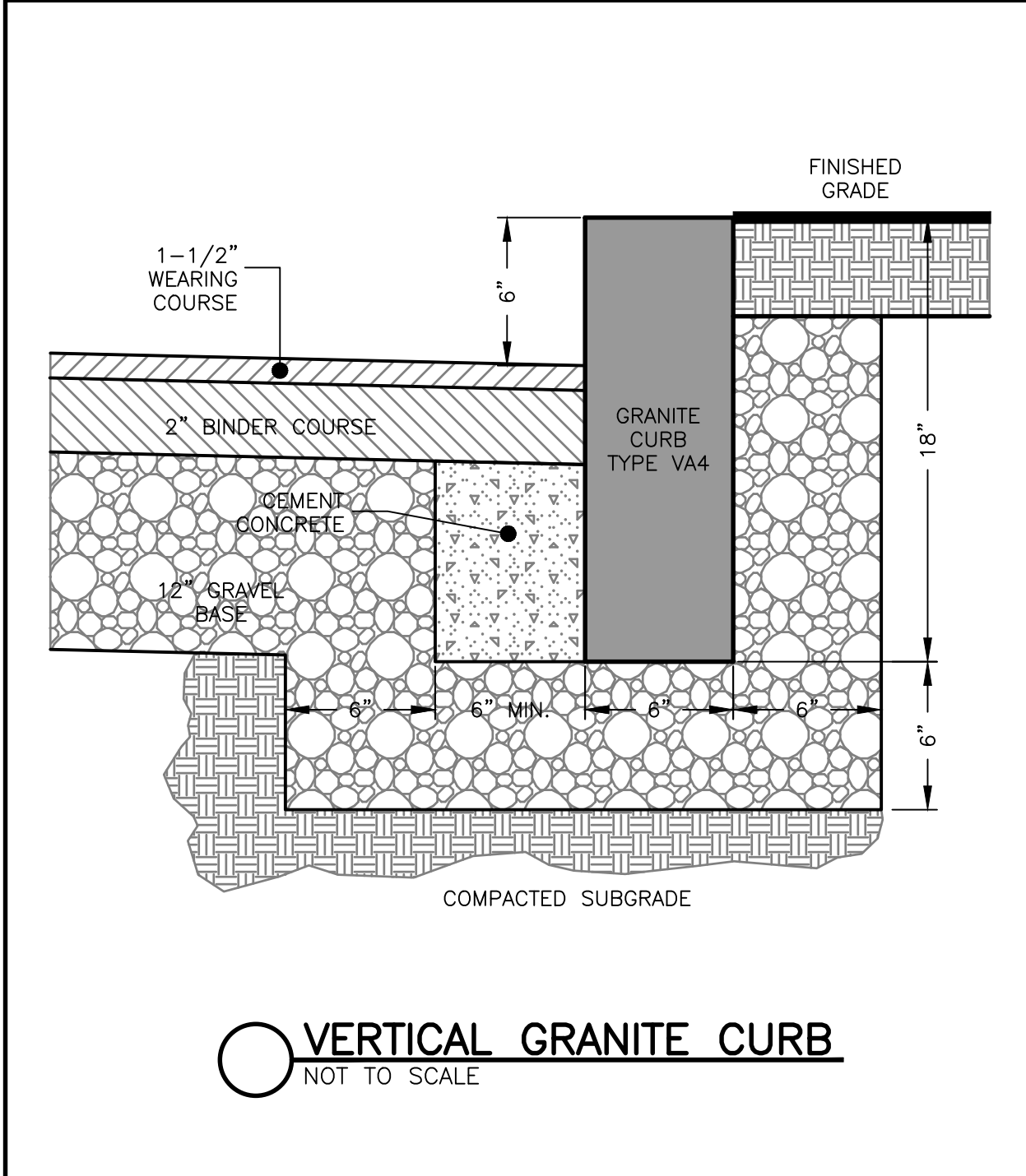
Drawing Title:  
**EROSION CONTROL & DEMO PLAN  
 #314, #330 & #336  
 SALEM STREET  
 WAKEFIELD, MASS.**



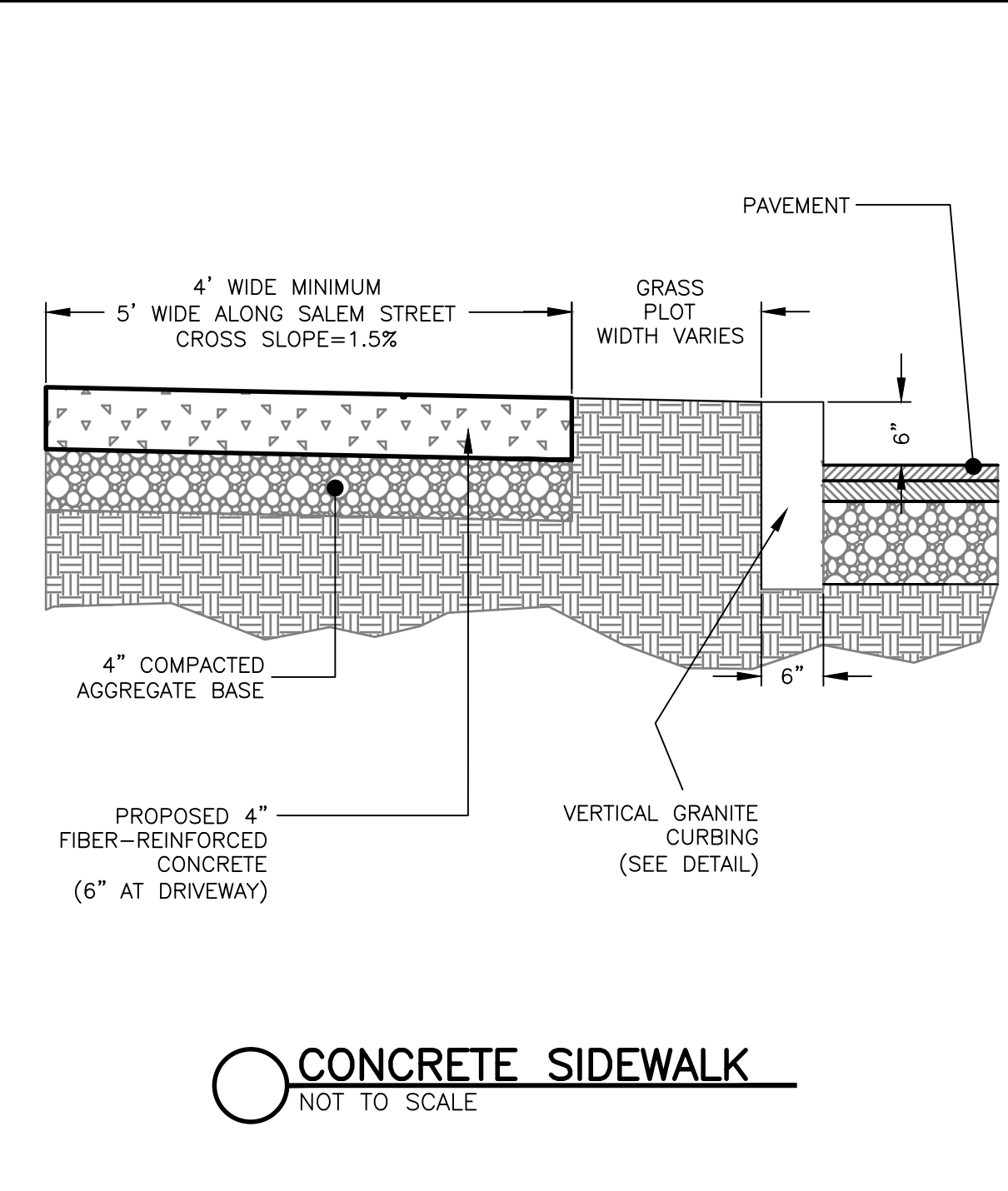
Drawing No.:  
**C7**

SHEET 7 OF 10

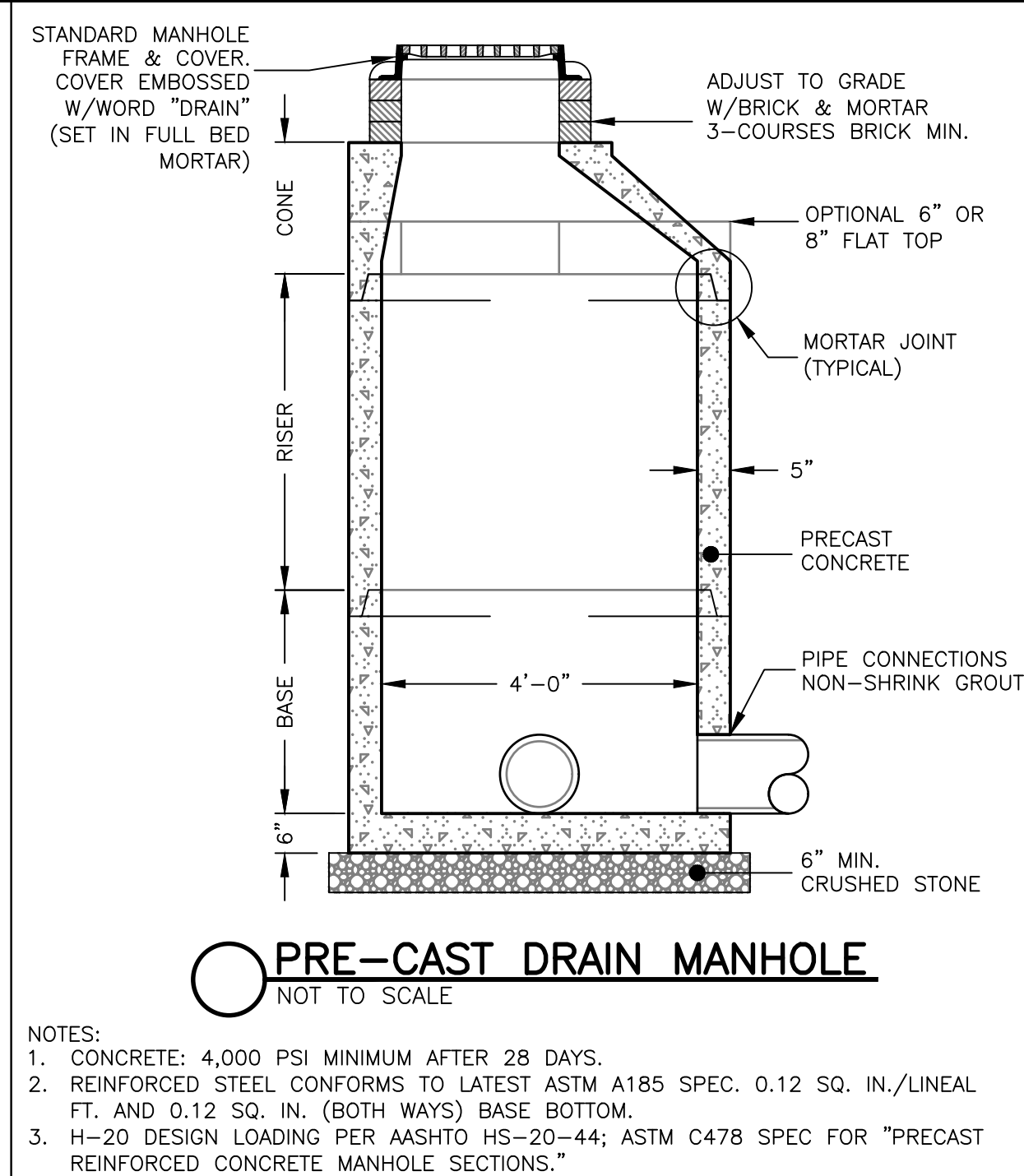
R:\WAK325\SP314-330-336\dem.dwg, 11/14/2022, 10:09:29 AM, EBL



**VERTICAL GRANITE CURB**  
NOT TO SCALE

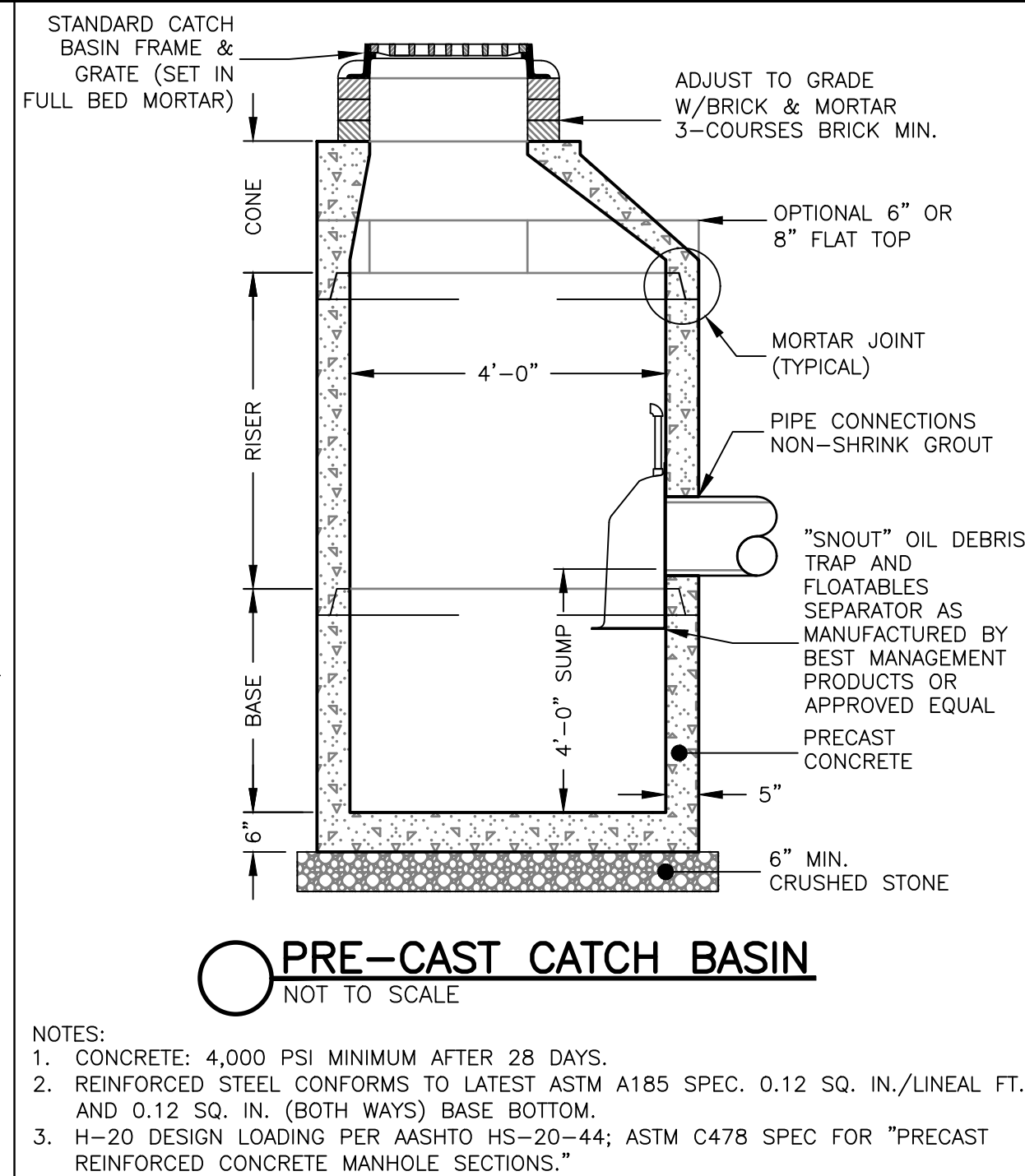


**CONCRETE SIDEWALK**  
NOT TO SCALE



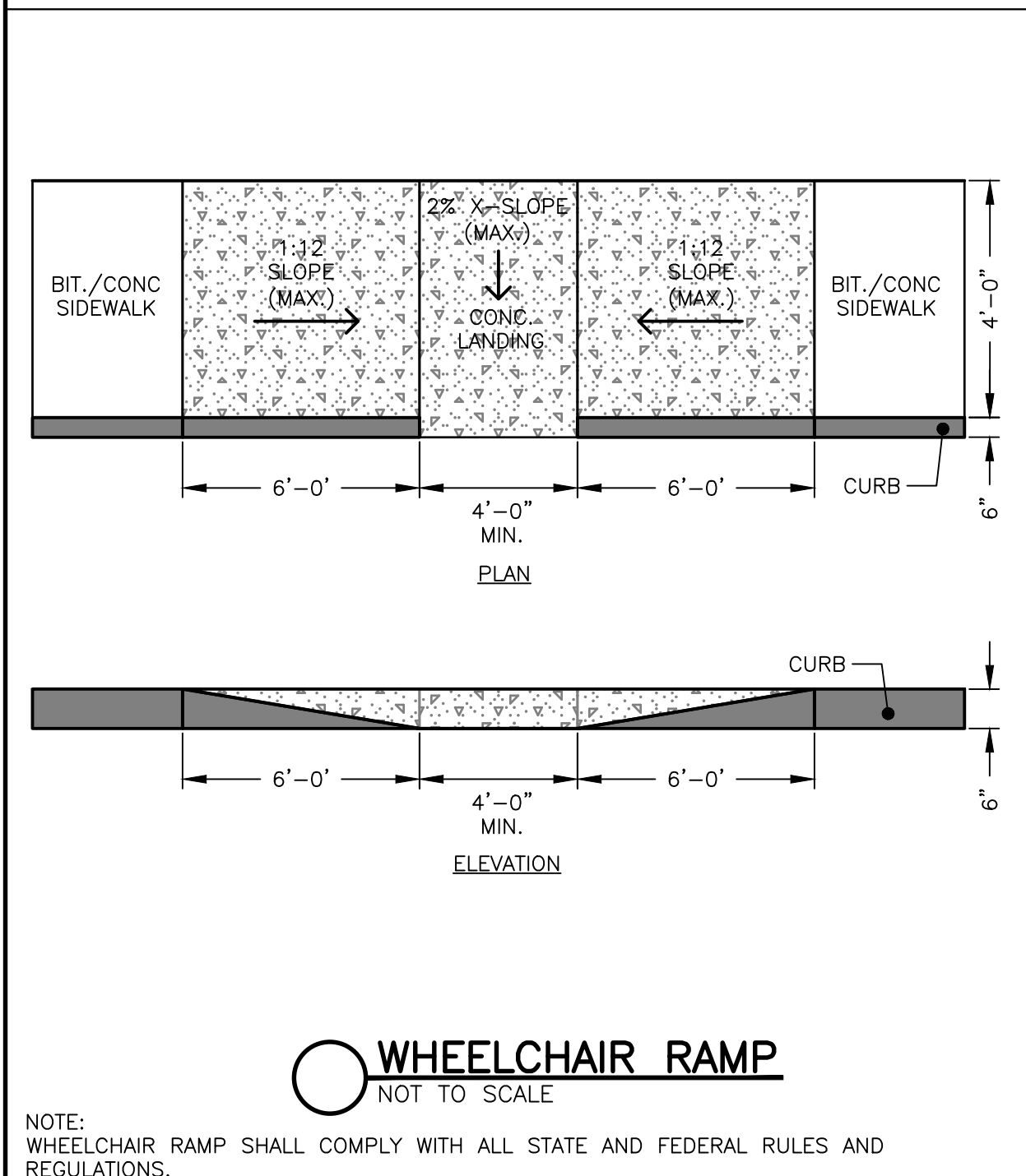
**PRE-CAST DRAIN MANHOLE**  
NOT TO SCALE

NOTES:  
1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.  
2. REINFORCED STEEL CONFORMS TO LATEST ASTM A185 SPEC. 0.12 SQ. IN./LINEAL FT. AND 0.12 SQ. IN. (BOTH WAYS) BASE BOTTOM.  
3. H-20 DESIGN LOADING PER AASHTO HS-20-44; ASTM C478 SPEC FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS."



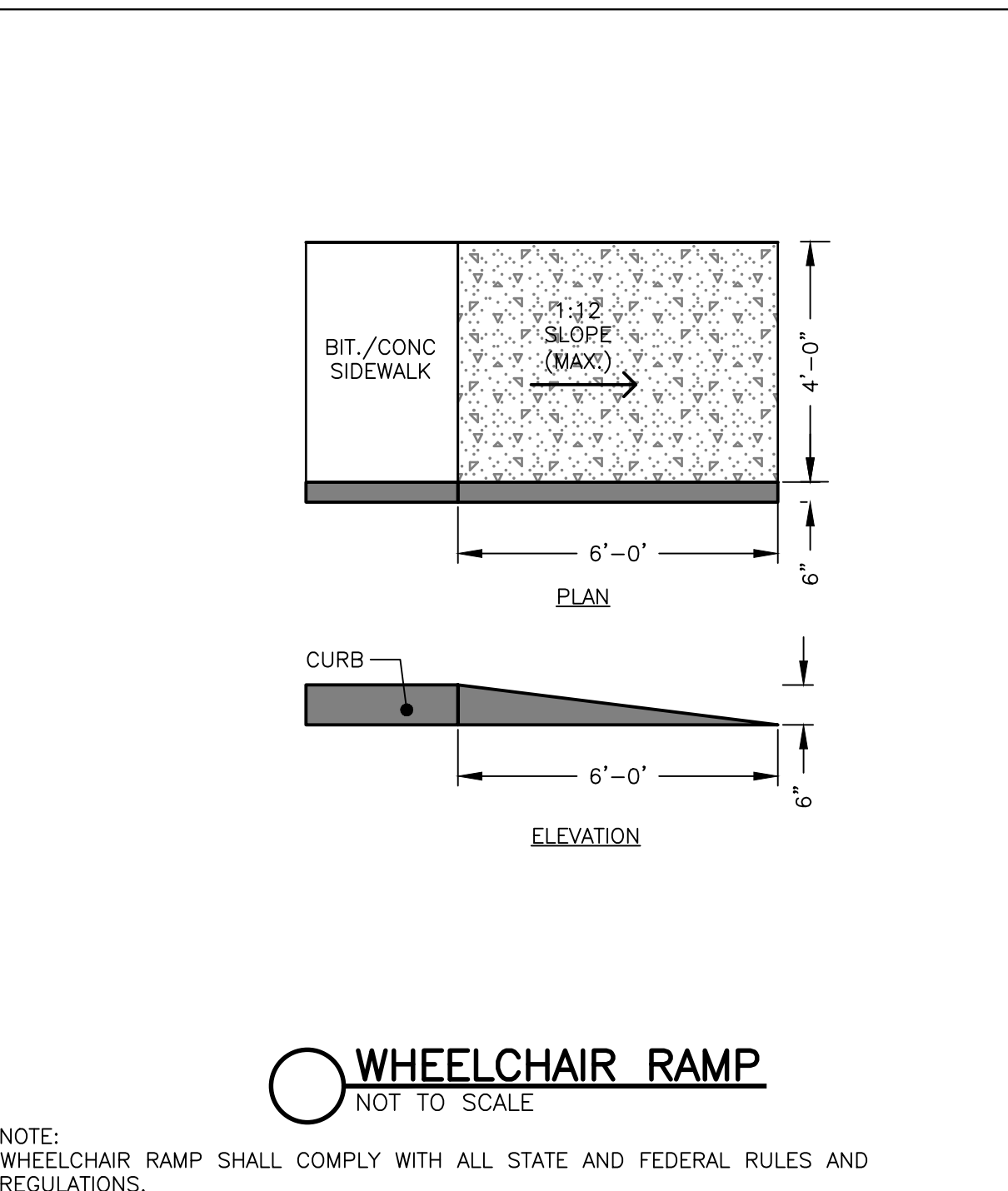
**PRE-CAST CATCH BASIN**  
NOT TO SCALE

NOTES:  
1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.  
2. REINFORCED STEEL CONFORMS TO LATEST ASTM A185 SPEC. 0.12 SQ. IN./LINEAL FT. AND 0.12 SQ. IN. (BOTH WAYS) BASE BOTTOM.  
3. H-20 DESIGN LOADING PER AASHTO HS-20-44; ASTM C478 SPEC FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS."



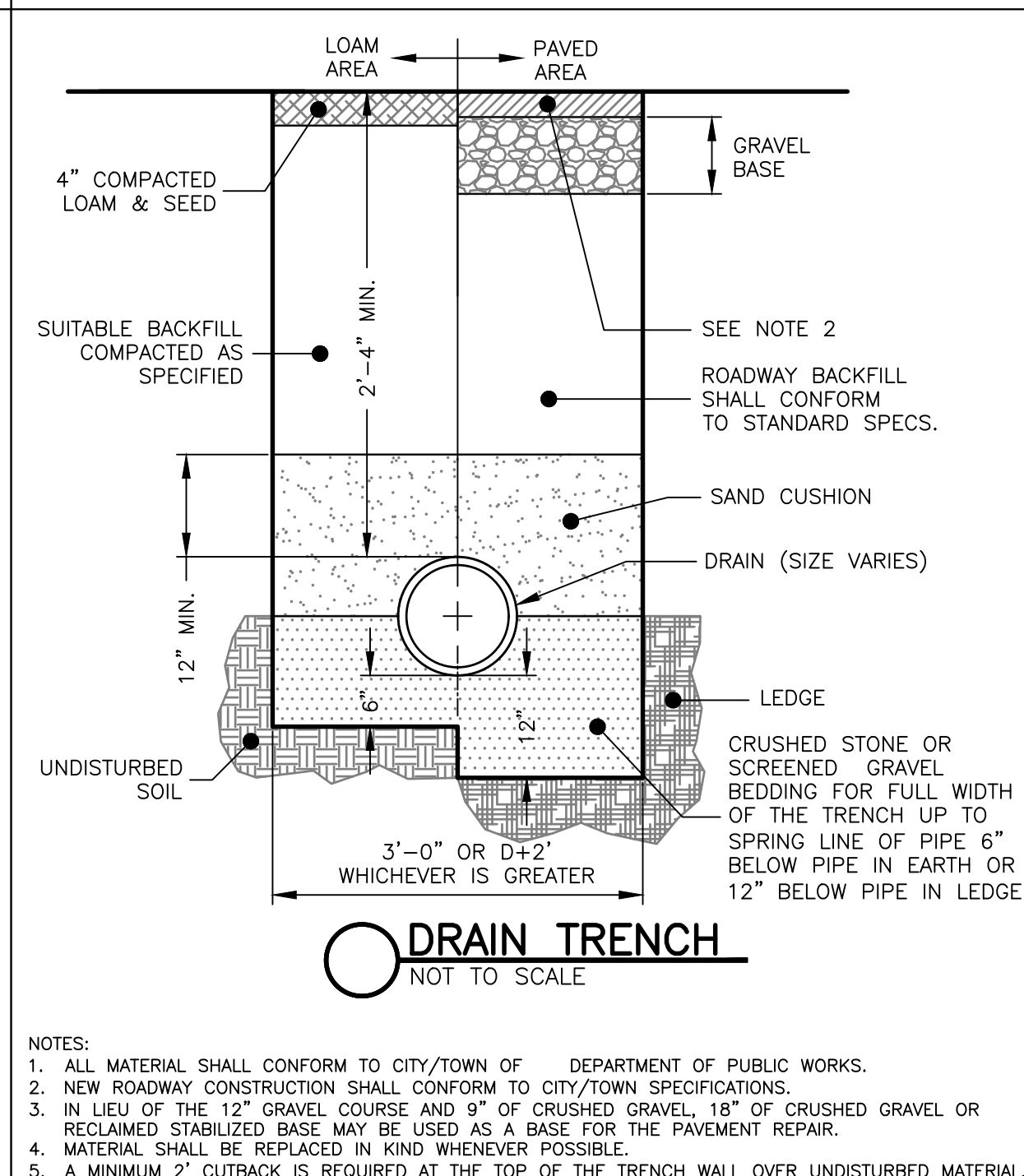
**WHEELCHAIR RAMP**  
NOT TO SCALE

NOTE: WHEELCHAIR RAMP SHALL COMPLY WITH ALL STATE AND FEDERAL RULES AND REGULATIONS.



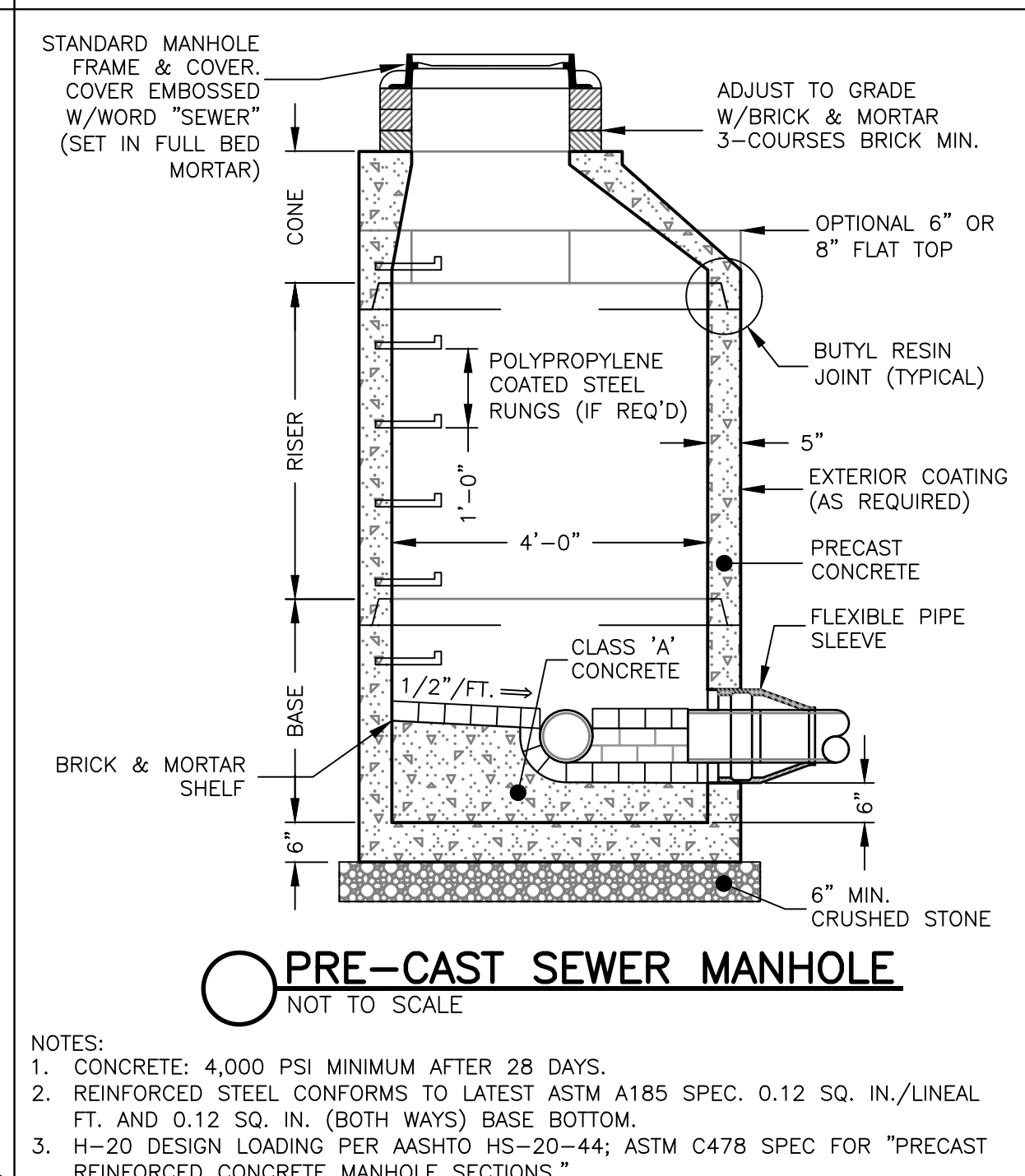
**WHEELCHAIR RAMP**  
NOT TO SCALE

NOTE: WHEELCHAIR RAMP SHALL COMPLY WITH ALL STATE AND FEDERAL RULES AND REGULATIONS.



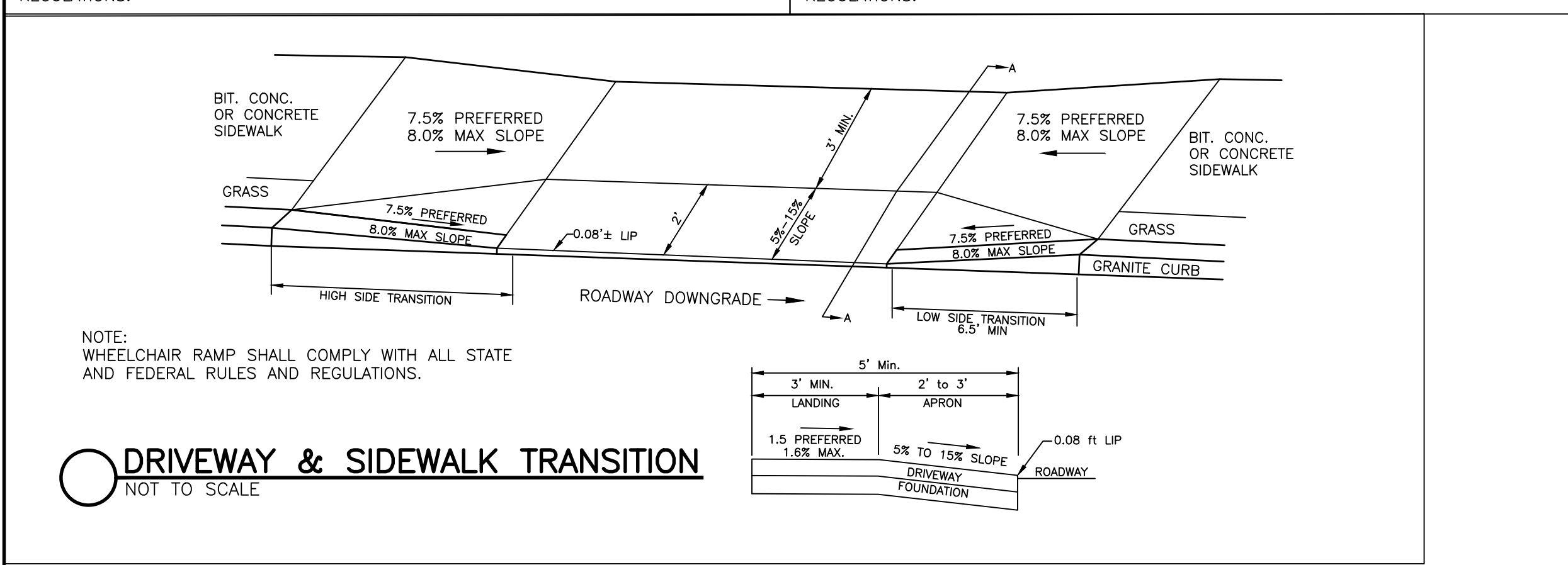
**DRAIN TRENCH**  
NOT TO SCALE

NOTES:  
1. ALL MATERIAL SHALL CONFORM TO CITY/TOWN OF DEPARTMENT OF PUBLIC WORKS.  
2. NEW ROADWAY CONSTRUCTION SHALL CONFORM TO CITY/TOWN SPECIFICATIONS.  
3. IN LIEU OF THE 12" GRAVEL COURSE AND 9" OF CRUSHED GRAVEL OR RECLAIMED STABILIZED BASE MAY BE USED AS A BASE FOR THE PAVEMENT REPAIR.  
4. MATERIAL SHALL BE REPLACED IN KIND WHENEVER POSSIBLE.  
5. A MINIMUM 2' CUTBACK IS REQUIRED AT THE TOP OF THE TRENCH WALL OVER UNDISTURBED MATERIAL.



**PRE-CAST SEWER MANHOLE**  
NOT TO SCALE

NOTES:  
1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.  
2. REINFORCED STEEL CONFORMS TO LATEST ASTM A185 SPEC. 0.12 SQ. IN./LINEAL FT. AND 0.12 SQ. IN. (BOTH WAYS) BASE BOTTOM.  
3. H-20 DESIGN LOADING PER AASHTO HS-20-44; ASTM C478 SPEC FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS."



**DRIVEWAY & SIDEWALK TRANSITION**  
NOT TO SCALE

NOTE: WHEELCHAIR RAMP SHALL COMPLY WITH ALL STATE AND FEDERAL RULES AND REGULATIONS.

Prepared For:  
Ocean City Development LLC  
200 Delcorrine Street  
Wakefield, MA 01880

Prepared By:  
Hayes Engineering, Inc.  
603 Salem Street  
Wakefield, MA 01880  
Ph: 781.246.2800  
Fax: 781.246.7596  
www.hayeseng.com

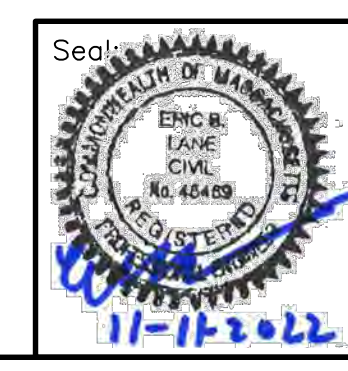
Design By: JO  
Drawn By: EBL  
Checked By:  
Project File: WAK-0496A  
Comp. No: WAK325  
 Issued For Permit  
 Issued For Review  
 Issued For Bid  
 Issued For Construction  
 Not For Construction

No.	Revision	Date
10		
9		
8		
7		
6		
5		
4		
3		
2		
1		

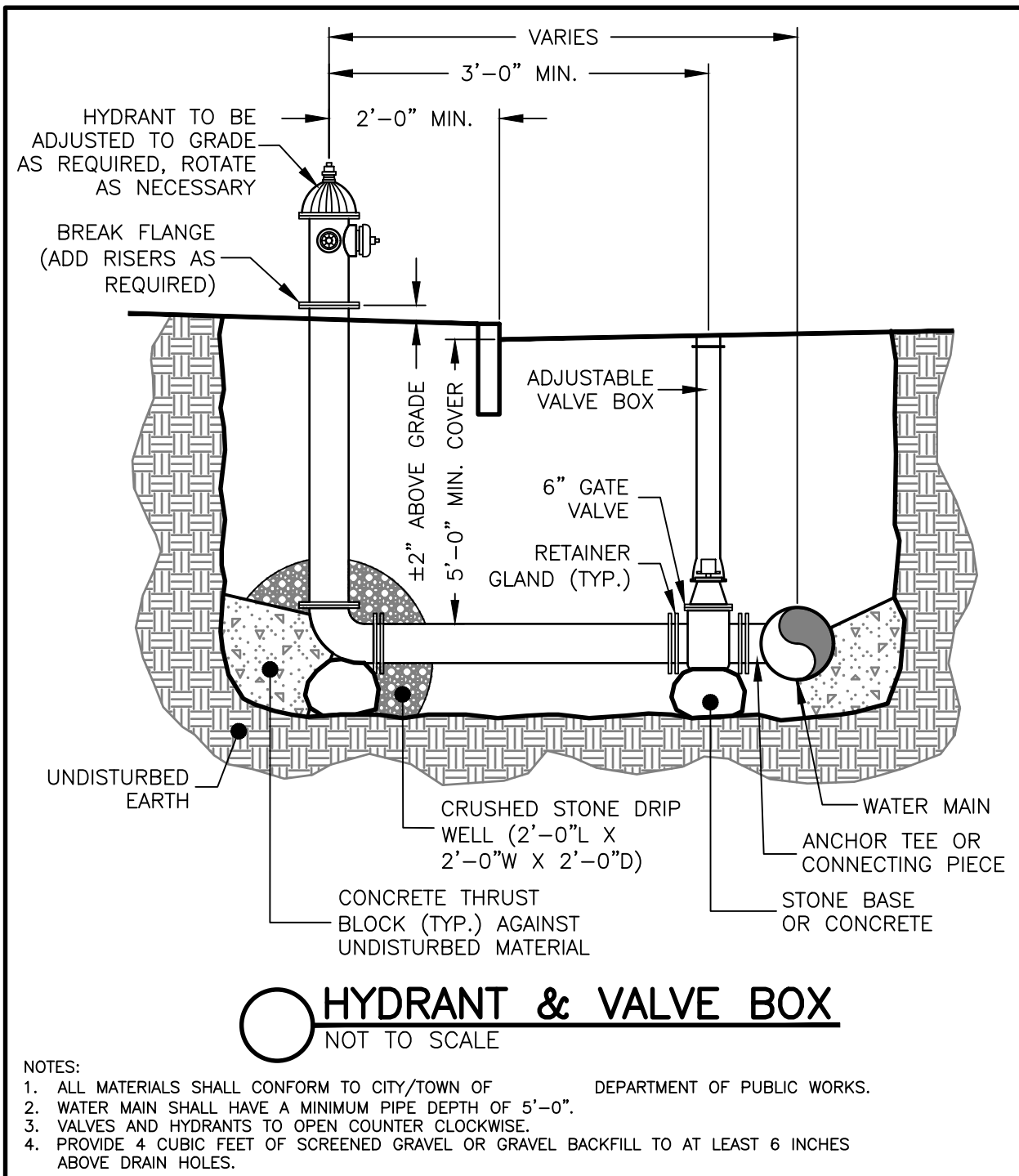
Scale: 1"=N.T.S.  
Date: October 14, 2022

Drawing Title:  
**DETAIL SHEET  
#314, #330 & #336  
SALEM STREET  
WAKEFIELD, MASS.**

Drawing No.:  
**C8**  
SHEET 8 OF 10

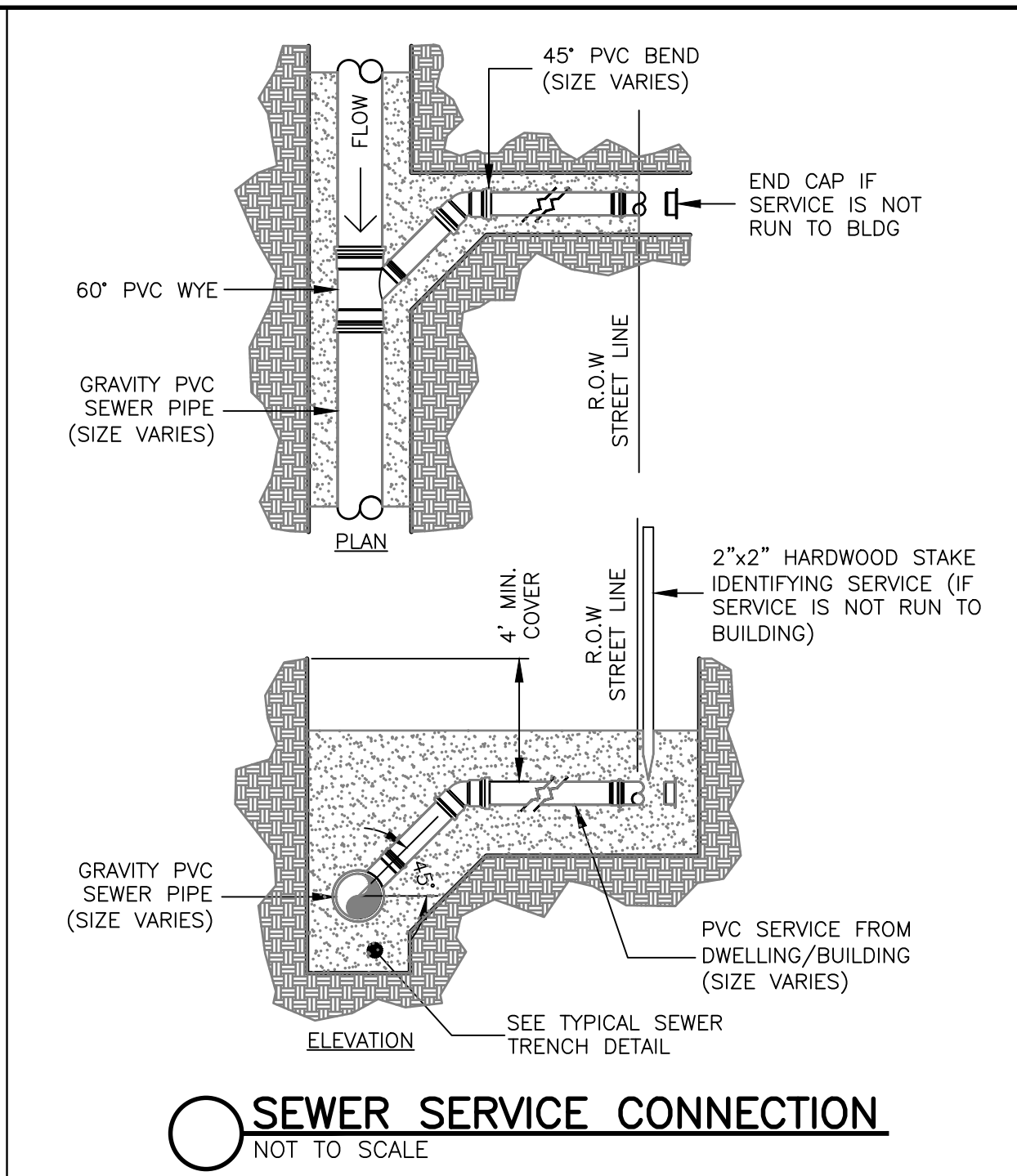


N:\WAK325\SP314-330-336\seam.dwg, 11/14/2022 10:09:34 AM, EBL



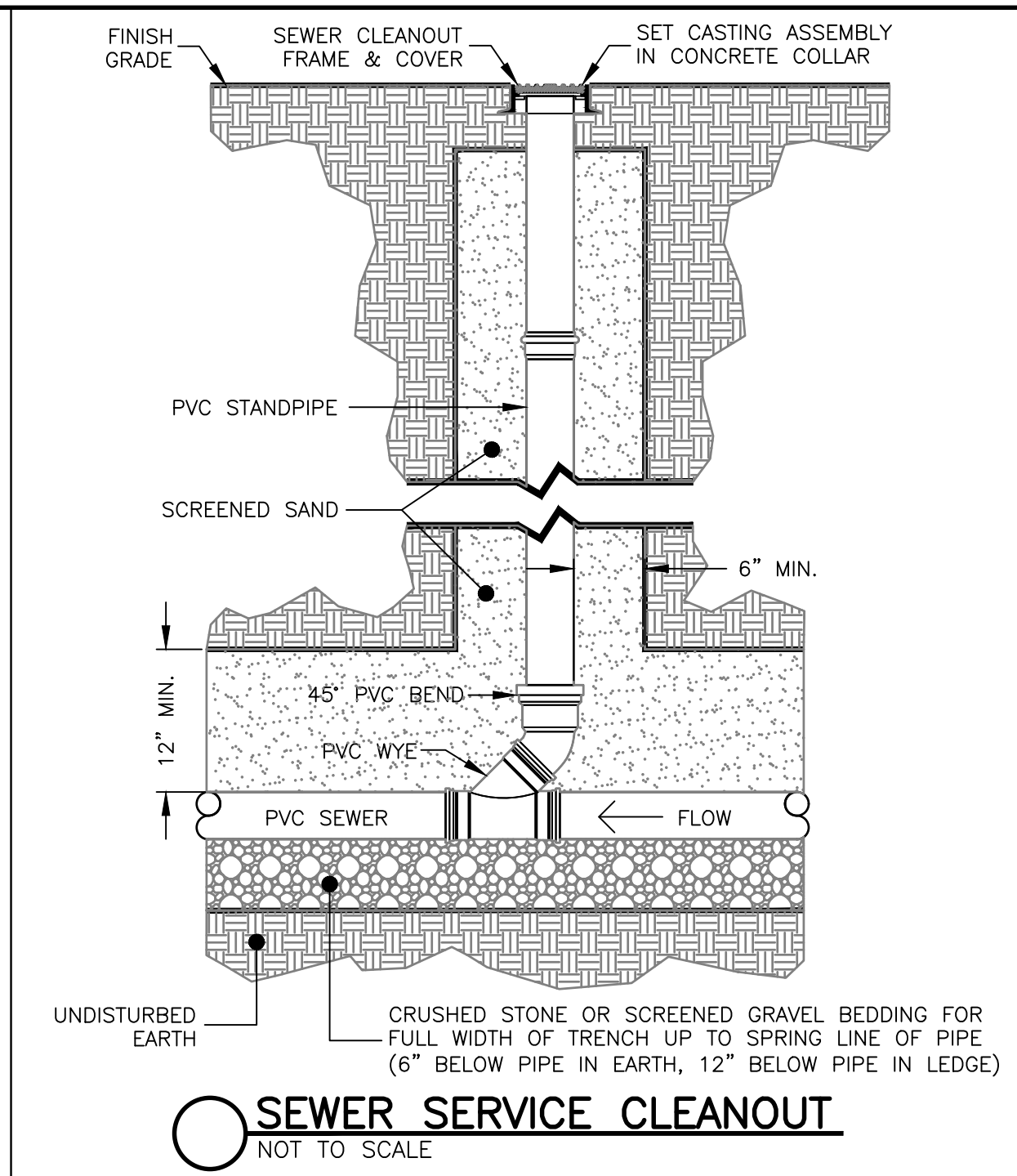
**HYDRANT & VALVE BOX**  
NOT TO SCALE

- NOTES:  
 1. ALL MATERIALS SHALL CONFORM TO CITY/TOWN OF WAKEFIELD DEPARTMENT OF PUBLIC WORKS.  
 2. WATER MAIN SHALL HAVE A MINIMUM PIPE DEPTH OF 5'-0".  
 3. VALVES AND HYDRANTS TO OPEN COUNTER CLOCKWISE.  
 4. PROVIDE 4 CUBIC FEET OF SCREENED GRAVEL OR GRAVEL BACKFILL TO AT LEAST 6 INCHES ABOVE DRAIN HOLES.



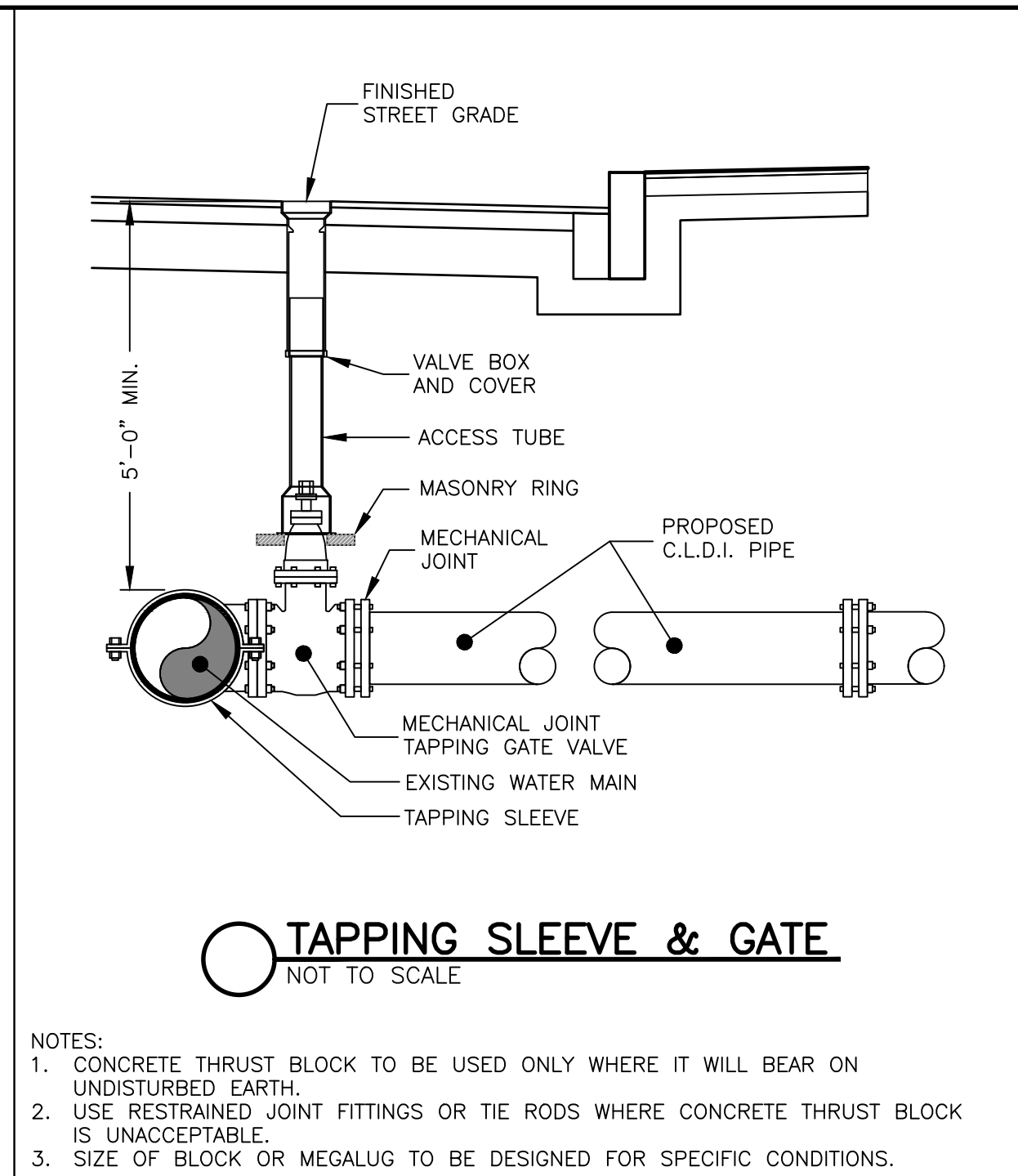
**SEWER SERVICE CONNECTION**  
NOT TO SCALE

- NOTES:  
 1. ALL MATERIALS SHALL CONFORM TO CITY/TOWN OF WAKEFIELD DEPARTMENT OF PUBLIC WORKS.  
 2. WATER MAIN SHALL HAVE A MINIMUM PIPE DEPTH OF 5'-0".  
 3. VALVES AND HYDRANTS TO OPEN COUNTER CLOCKWISE.  
 4. PROVIDE 4 CUBIC FEET OF SCREENED GRAVEL OR GRAVEL BACKFILL TO AT LEAST 6 INCHES ABOVE DRAIN HOLES.



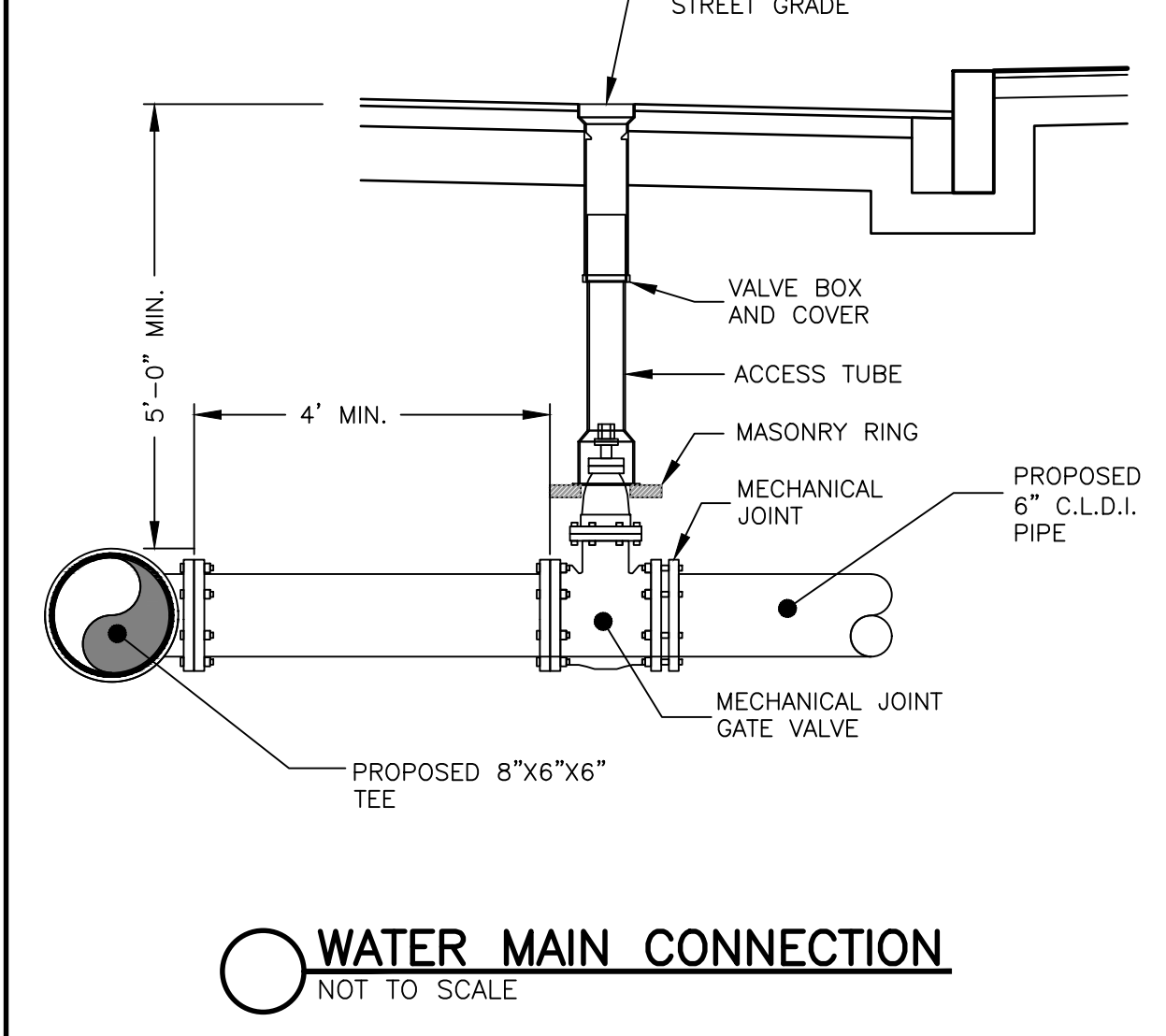
**SEWER SERVICE CLEANOUT**  
NOT TO SCALE

- NOTES:  
 1. ALL MATERIALS SHALL CONFORM TO CITY/TOWN OF WAKEFIELD DEPARTMENT OF PUBLIC WORKS.  
 2. WATER MAIN SHALL HAVE A MINIMUM PIPE DEPTH OF 5'-0".  
 3. VALVES AND HYDRANTS TO OPEN COUNTER CLOCKWISE.  
 4. PROVIDE 4 CUBIC FEET OF SCREENED GRAVEL OR GRAVEL BACKFILL TO AT LEAST 6 INCHES ABOVE DRAIN HOLES.



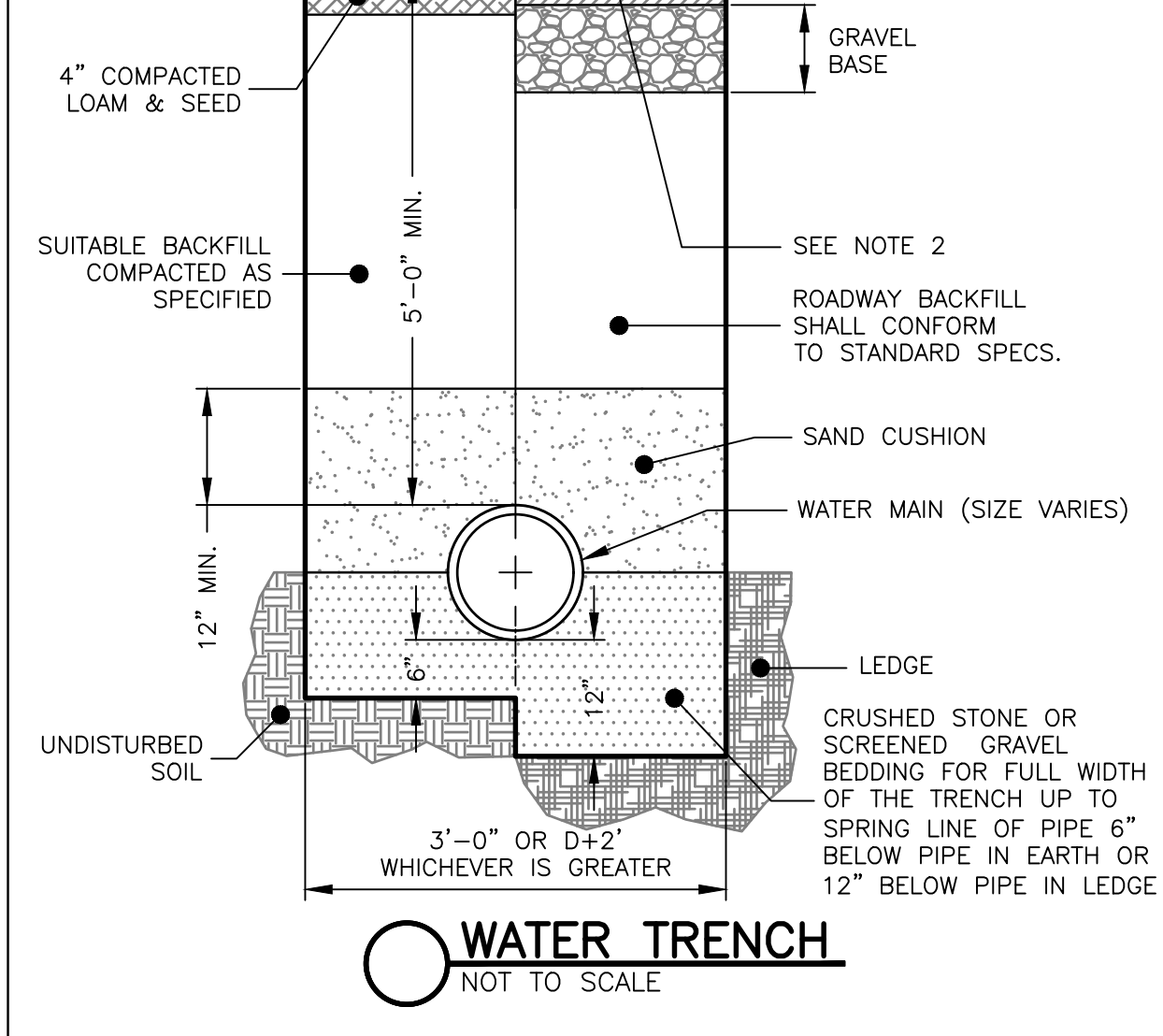
**TAPPING SLEEVE & GATE**  
NOT TO SCALE

- NOTES:  
 1. CONCRETE THRUST BLOCK TO BE USED ONLY WHERE IT WILL BEAR ON UNDISTURBED EARTH.  
 2. USE RESTRAINED JOINT FITTINGS OR THE RODS WHERE CONCRETE THRUST BLOCK IS UNACCEPTABLE.  
 3. SIZE OF BLOCK OR MEGALUG TO BE DESIGNED FOR SPECIFIC CONDITIONS.



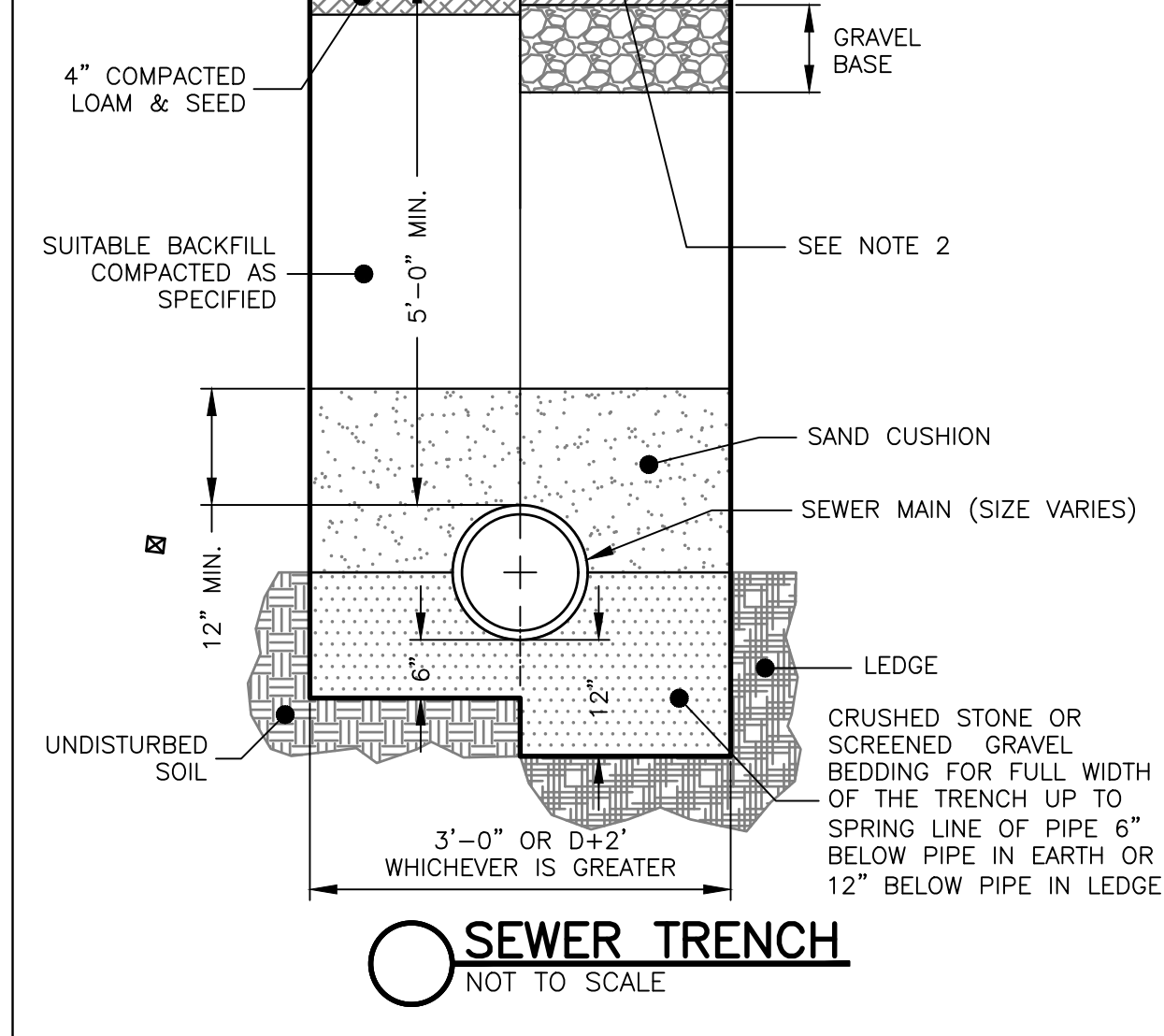
**WATER MAIN CONNECTION**  
NOT TO SCALE

- NOTES:  
 1. CONCRETE THRUST BLOCK TO BE USED ONLY WHERE IT WILL BEAR ON UNDISTURBED EARTH.  
 2. USE RESTRAINED JOINT FITTINGS OR THE RODS WHERE CONCRETE THRUST BLOCK IS UNACCEPTABLE.  
 3. SIZE OF BLOCK OR MEGALUG TO BE DESIGNED FOR SPECIFIC CONDITIONS.



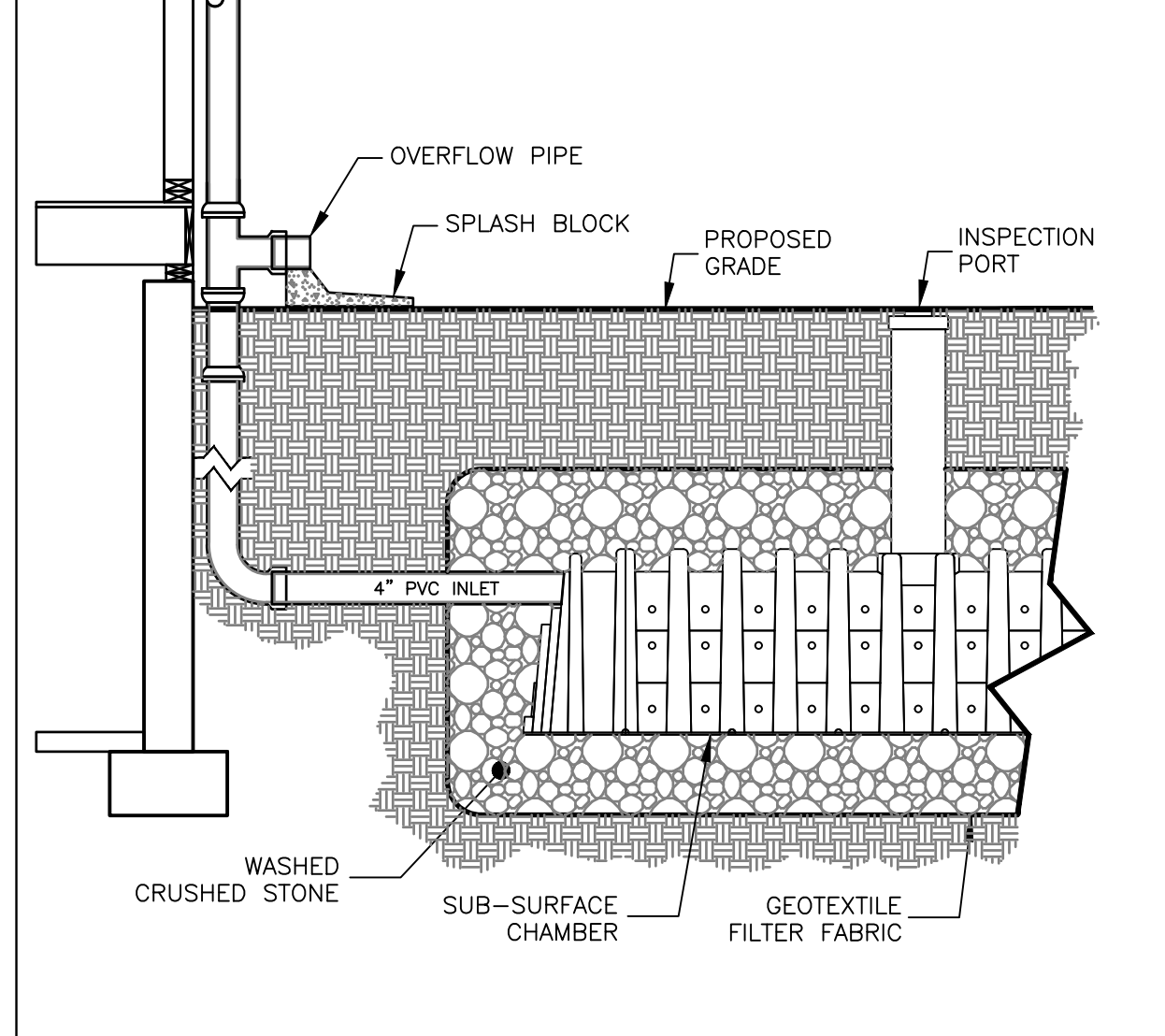
**WATER TRENCH**  
NOT TO SCALE

- NOTES:  
 1. ALL MATERIAL SHALL CONFORM TO CITY/TOWN OF WAKEFIELD DEPARTMENT OF PUBLIC WORKS.  
 2. NEW ROADWAY CONSTRUCTION SHALL CONFORM TO CITY/TOWN SPECIFICATIONS.  
 3. IN LIEU OF THE 12" GRAVEL COURSE AND 9" OF CRUSHED GRAVEL OR RECLAIMED STABILIZED BASE MAY BE USED AS A BASE FOR THE PAVEMENT REPAIR.  
 4. MATERIAL SHALL BE REPLACED IN KIND WHENEVER POSSIBLE.  
 5. A MINIMUM 2' OUTBACK IS REQUIRED AT THE TOP OF THE TRENCH WALL OVER UNDISTURBED MATERIAL.



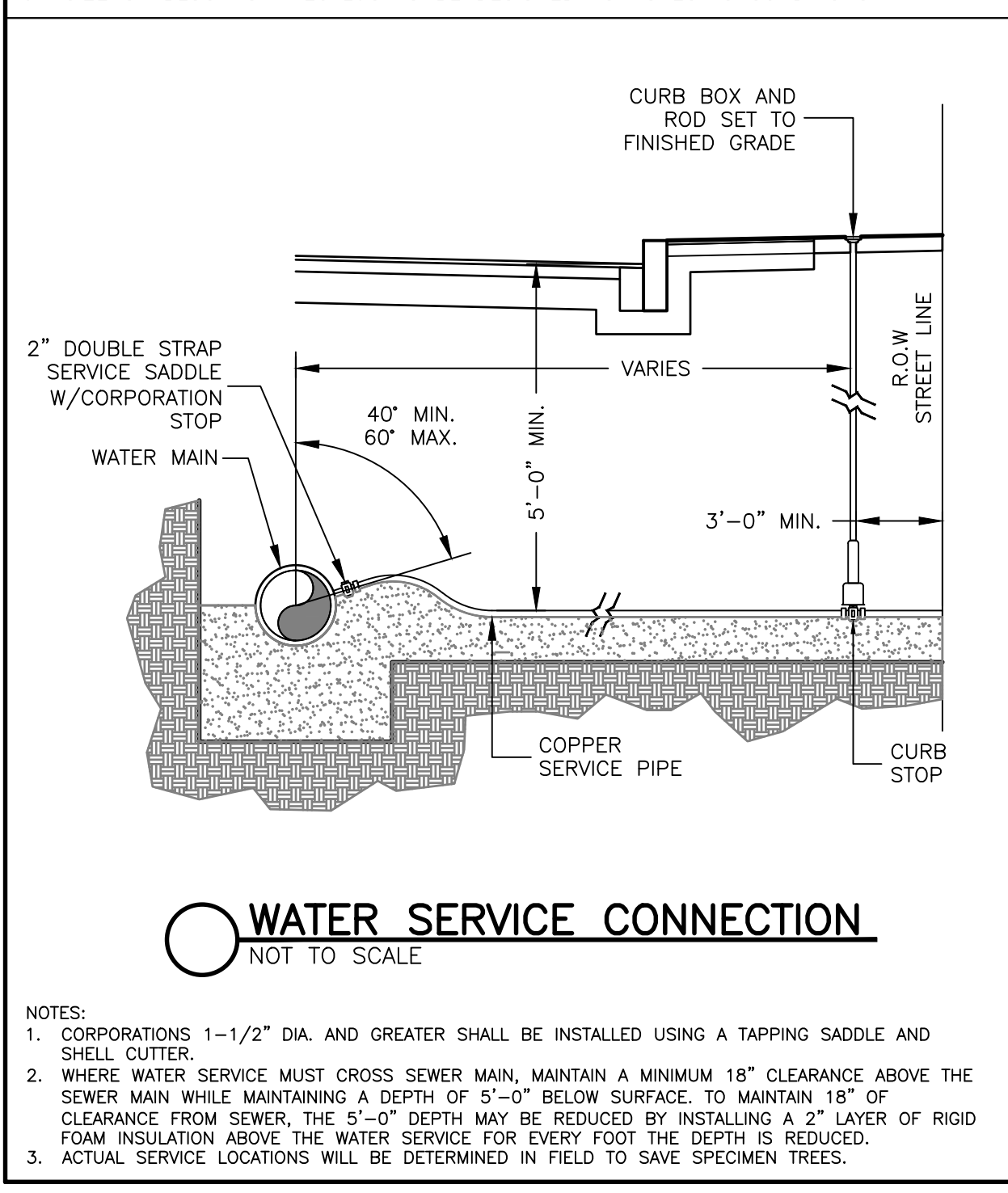
**SEWER TRENCH**  
NOT TO SCALE

- NOTES:  
 1. ALL MATERIAL SHALL CONFORM TO CITY/TOWN OF WAKEFIELD DEPARTMENT OF PUBLIC WORKS.  
 2. NEW ROADWAY CONSTRUCTION SHALL CONFORM TO CITY/TOWN SPECIFICATIONS.  
 3. IN LIEU OF THE 12" GRAVEL COURSE AND 9" OF CRUSHED GRAVEL OR RECLAIMED STABILIZED BASE MAY BE USED AS A BASE FOR THE PAVEMENT REPAIR.  
 4. MATERIAL SHALL BE REPLACED IN KIND WHENEVER POSSIBLE.  
 5. A MINIMUM 2' OUTBACK IS REQUIRED AT THE TOP OF THE TRENCH WALL OVER UNDISTURBED MATERIAL.



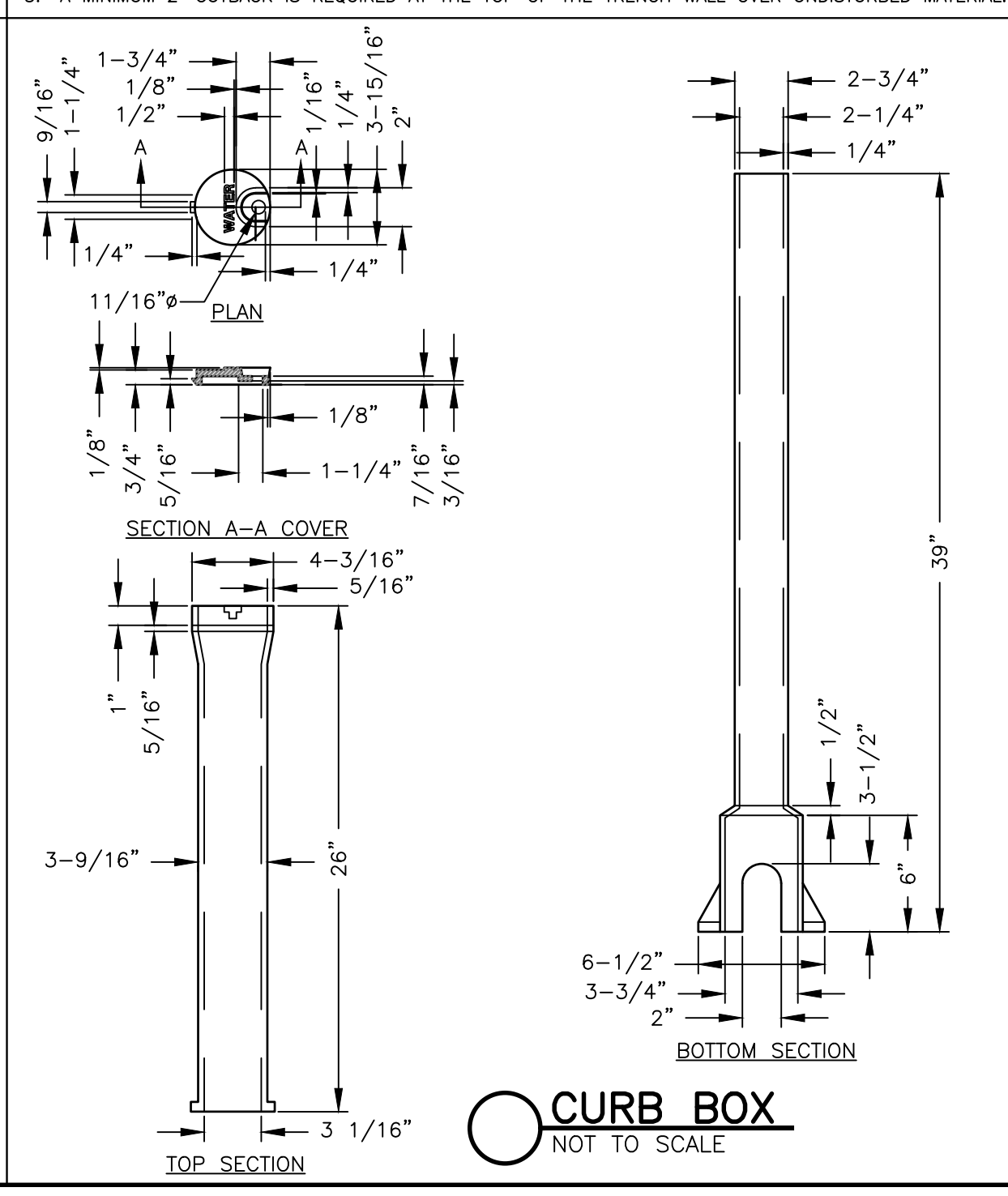
**ROOF DRAIN TO SUB-SURFACE CHAMBER**  
NOT TO SCALE

- NOTE:  
 1. CHAMBERS SHALL BE INSTALLED A MINIMUM OF 10' FROM HOUSE.



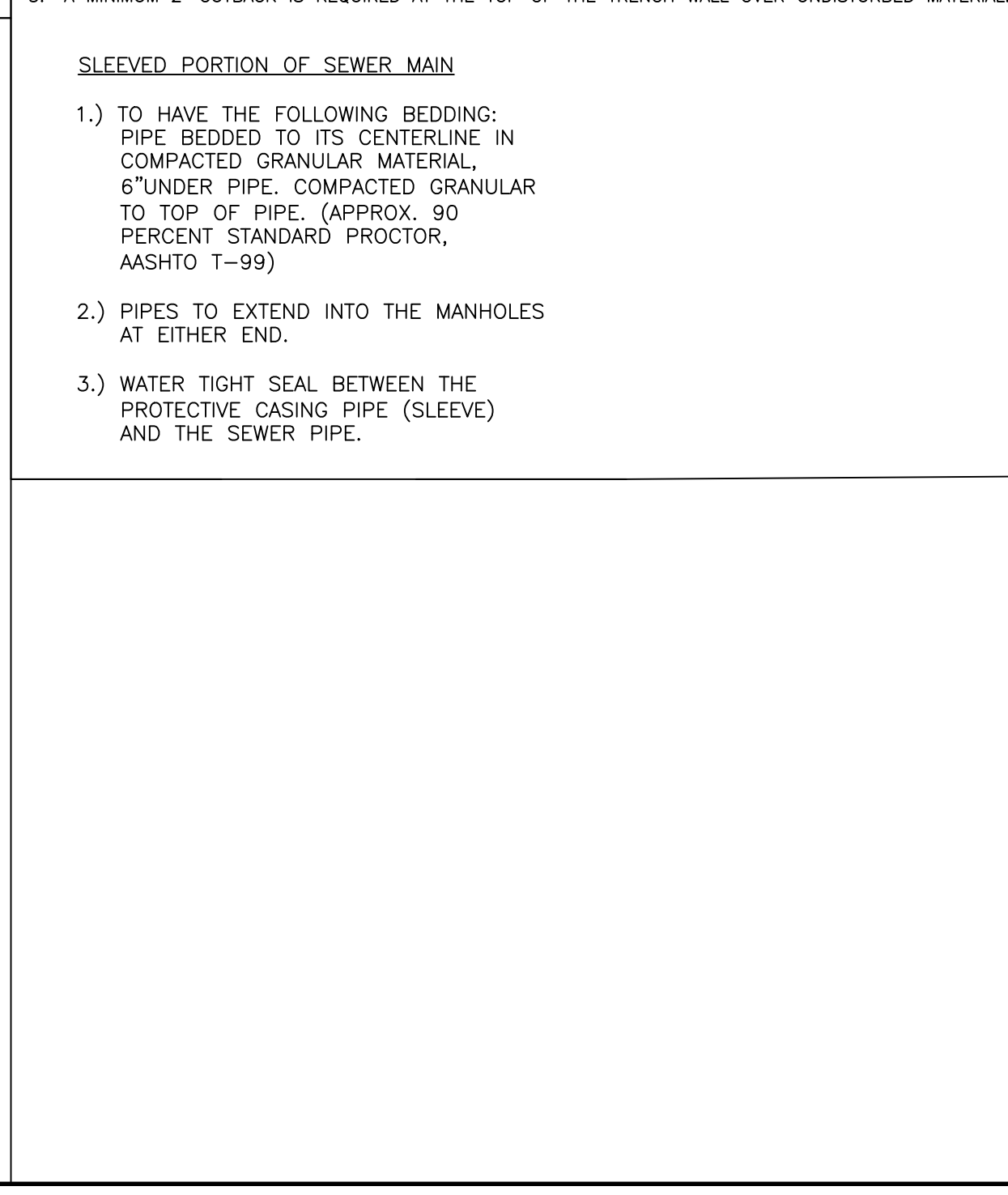
**WATER SERVICE CONNECTION**  
NOT TO SCALE

- NOTES:  
 1. CORPORATIONS 1-1/2" DIA. AND GREATER SHALL BE INSTALLED USING A TAPPING SADDLE AND SHELL CUTTER.  
 2. WHERE WATER SERVICE MUST CROSS SEWER MAIN, MAINTAIN A MINIMUM 18" CLEARANCE ABOVE THE SEWER MAIN WHILE MAINTAINING A DEPTH OF 5'-0" BELOW SURFACE. TO MAINTAIN 18" OF CLEARANCE FROM SEWER, THE 5'-0" DEPTH MAY BE REDUCED BY INSTALLING A 2" LAYER OF RIGID FOAM INSULATION ABOVE THE WATER SERVICE FOR EVERY FOOT THE DEPTH IS REDUCED.  
 3. ACTUAL SERVICE LOCATIONS WILL BE DETERMINED IN FIELD TO SAVE SPECIMEN TREES.



**CURB BOX**  
NOT TO SCALE

- NOTES:  
 1. ALL MATERIAL SHALL CONFORM TO CITY/TOWN OF WAKEFIELD DEPARTMENT OF PUBLIC WORKS.  
 2. NEW ROADWAY CONSTRUCTION SHALL CONFORM TO CITY/TOWN SPECIFICATIONS.  
 3. IN LIEU OF THE 12" GRAVEL COURSE AND 9" OF CRUSHED GRAVEL OR RECLAIMED STABILIZED BASE MAY BE USED AS A BASE FOR THE PAVEMENT REPAIR.  
 4. MATERIAL SHALL BE REPLACED IN KIND WHENEVER POSSIBLE.  
 5. A MINIMUM 2' OUTBACK IS REQUIRED AT THE TOP OF THE TRENCH WALL OVER UNDISTURBED MATERIAL.



**SLEEVED PORTION OF SEWER MAIN**  
NOT TO SCALE

- NOTES:  
 1.) TO HAVE THE FOLLOWING BEDDING: PIPE BEDDED TO ITS CENTERLINE IN COMPACTED GRANULAR MATERIAL, 6" UNDER PIPE. COMPACTED GRANULAR TO TOP OF PIPE. (APPROX. 90 PERCENT STANDARD PROCTOR, AASHTO T-99)  
 2.) PIPES TO EXTEND INTO THE MANHOLES AT EITHER END.  
 3.) WATER TIGHT SEAL BETWEEN THE PROTECTIVE CASING PIPE (SLEEVE) AND THE SEWER PIPE.

Prepared For:  
 Applicant  
 Ocean City Development LLC  
 200 Delcorrine Street  
 Wakefield, MA 01880

Prepared By:  
 Hayes Engineering, Inc.  
 603 Salem Street  
 Wakefield, MA 01880  
 Ph: 781.246.2800  
 Fax: 781.246.7596  
 www.hayeseng.com

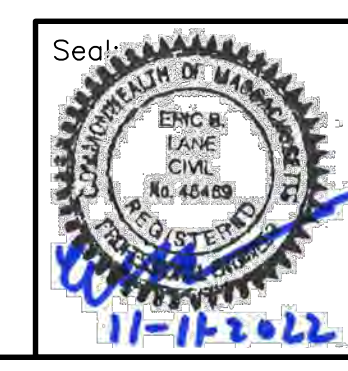
Design By: JO  
 Drawn By: EBL  
 Checked By:  
 Project File: WAK-0496A  
 Comp. No: WAK325  
 Issued For Permit  
 Issued For Review  
 Issued For Bid  
 Issued For Construction  
 Not For Construction

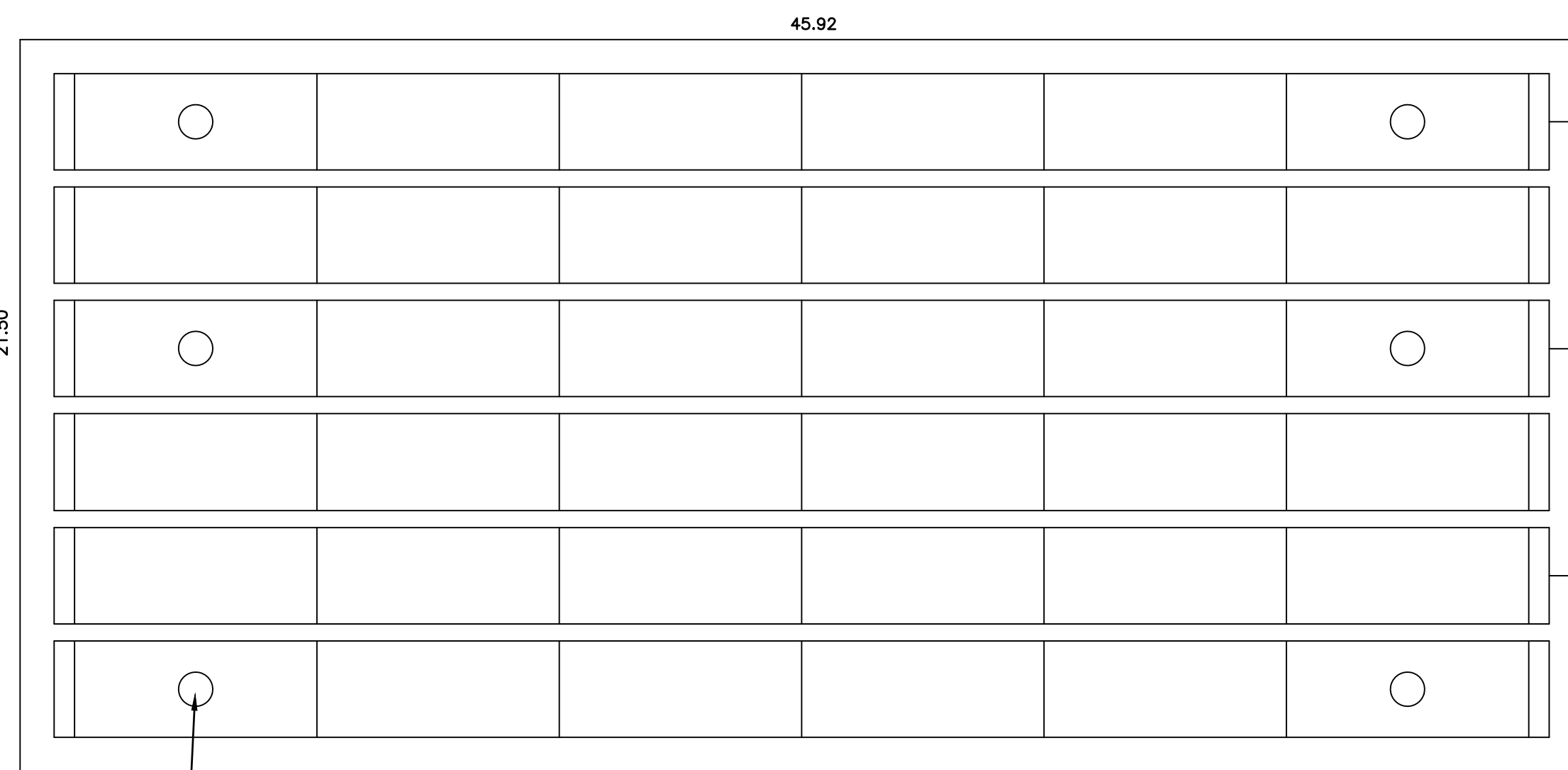
No.	Revision	Date
10		
9		
8		
7		
6		
5		
4		
3		
2		
1		

Scale: 1" = N.T.S.  
 Date: October 14, 2022

Drawing Title:  
**DETAIL SHEET**  
**#314, #330 & #336**  
**SALEM STREET**  
**WAKEFIELD, MASS.**

Drawing No.:  
 C9  
 SHEET 9 OF 10





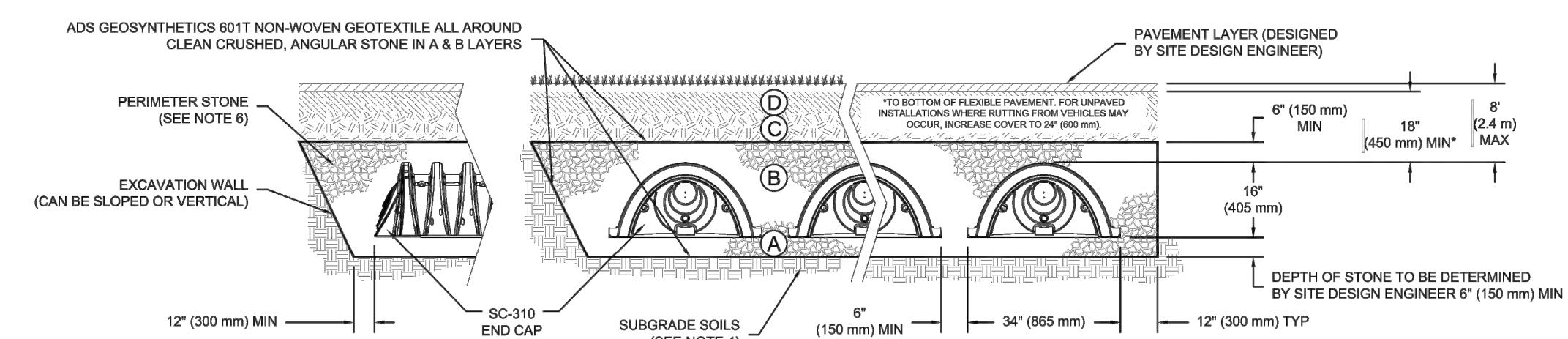
(36) ADS STORMTECH SC-310 CHAMBERS WITH END CAPS  
 MIN. FINISH GRADE=96.7  
 40 MIL BARRIER OVER TOP OF STONE  
 TOP CHAMBER=94.83  
 BOTTOM CHAMBER=93.50  
 BOTTOM STONE=93.00  
 6"HDPE IN=94.00

**INFILTRATION CHAMBER DETAIL**  
 SCALE: 1"=4'

**ACCEPTABLE FILL MATERIALS: STORMTECH SC-310 CHAMBER SYSTEMS**

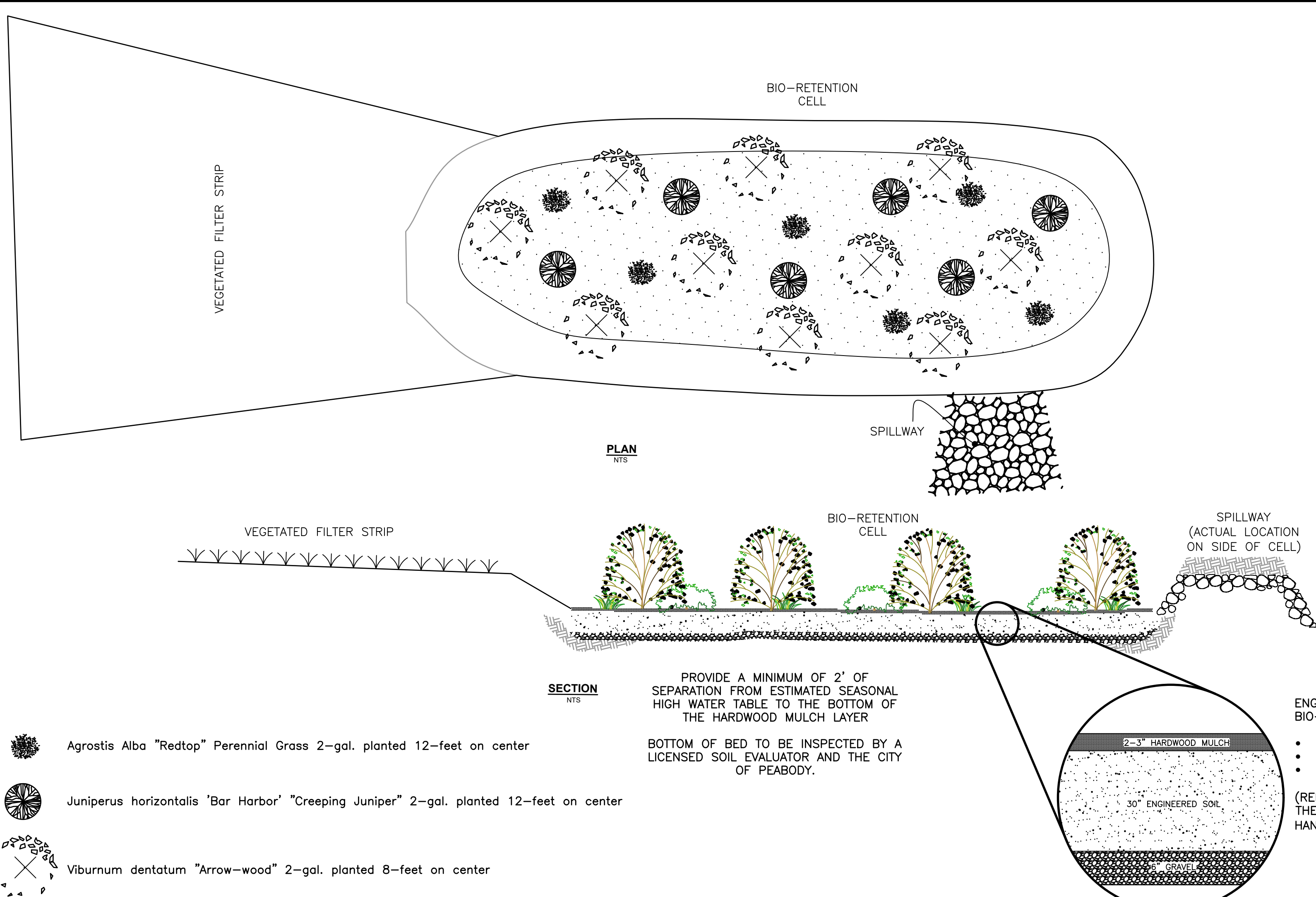
MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A
C	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145 <sup>1</sup> A-1, A-2.4, A-3 OR AASHTO M43 <sup>1</sup> 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43 <sup>1</sup> 3, 357, 4, 467, 5, 56, 57
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43 <sup>1</sup> 3, 357, 4, 467, 5, 56, 57

PLEASE NOTE:  
 1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE"  
 2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) MAX LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.  
 3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.



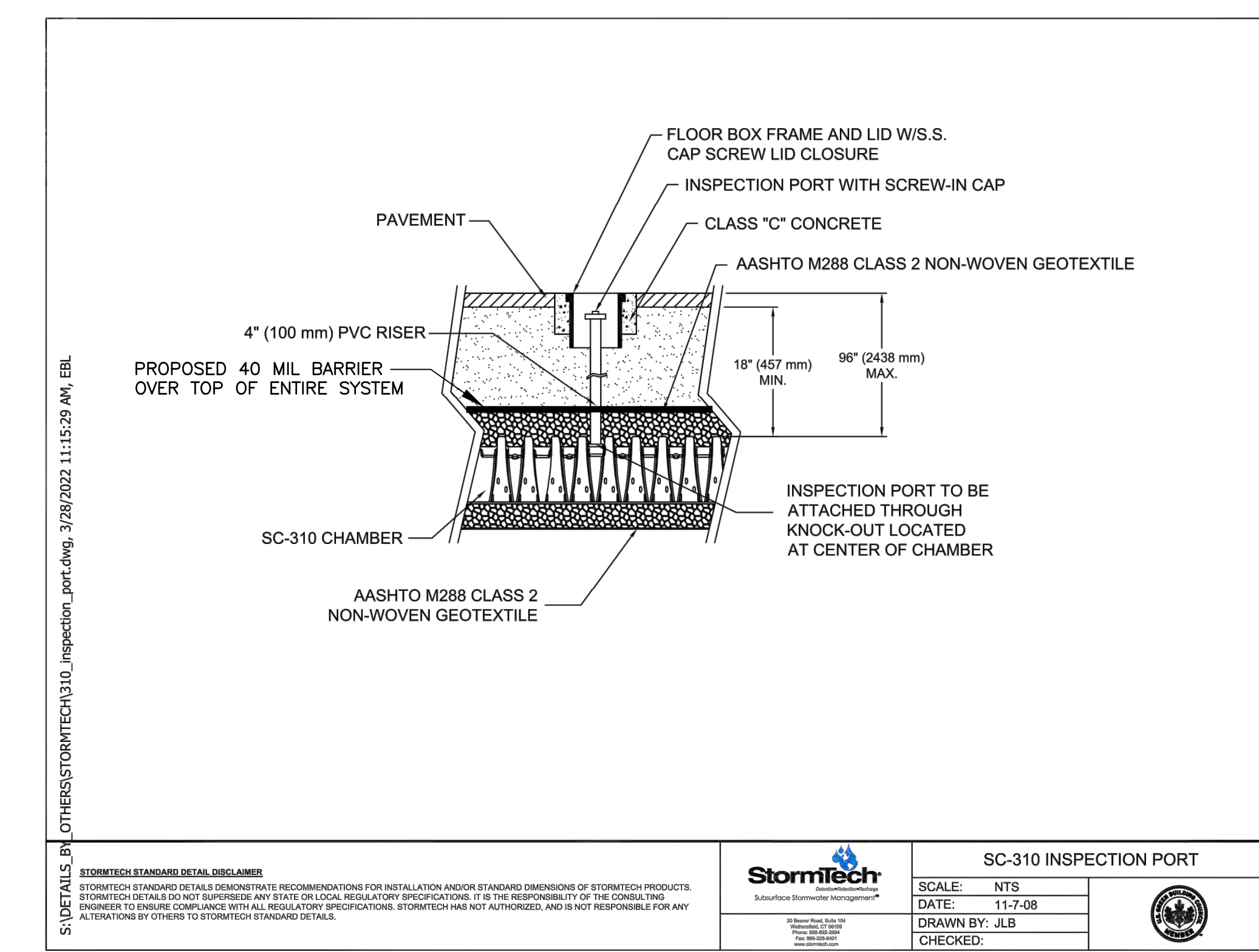
**NOTES:**

- SC-310 CHAMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2418 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS", OR ASTM F2922 "STANDARD SPECIFICATION FOR POLYETHYLENE (PE) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- SC-310 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- "ACCEPTABLE FILL MATERIALS" TABLE ABOVE PROVIDES MATERIAL LOCATIONS, DESCRIPTIONS, GRADATIONS, AND COMPACTION REQUIREMENTS FOR FOUNDATION, EMBEDMENT, AND FILL MATERIALS.
- THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
- PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
- ONCE LAYER 'C' IS PLACED, ANY SOIL MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



- Agrostis Alba "Redtop" Perennial Grass 2-gal. planted 12-feet on center
- Juniperus horizontalis 'Bar Harbor' "Creeping Juniper" 2-gal. planted 12-feet on center
- Viburnum dentatum "Arrow-wood" 2-gal. planted 8-feet on center

**TYPICAL BIO-RETENTION AREA**  
 NOT TO SCALE



**SC-310 INSPECTION PORT**

SCALE: NTS  
 DATE: 11-7-08  
 DRAWN BY: JLB  
 CHECKED:



Prepared For:  
 Applicant:  
 Ocean City Development LLC  
 200 Delcorrine Street  
 Wakefield, MA 01880

Prepared By:  
 Hayes Engineering, Inc.  
 603 Salem Street  
 Wakefield, MA 01880  
 Ph: 781.246.2800  
 Fax: 781.246.7596  
 www.hayeseng.com

Design By: JO  
 Drawn By: EBL  
 Checked By:  
 Project File: WAK-0496A  
 Comp. No: WAK325  
 Issued For Permit  
 Issued For Review  
 Issued For Bid  
 Issued For Construction  
 Not For Construction

No.	Revision	Date
10		
9		
8		
7		
6		
5		
4		
3		
2		
1		

Scale: 1"=As Noted  
 Date: October 14, 2022

Drawing Title:  
**DETAIL SHEET  
 #314, #330 & #336  
 SALEM STREET  
 WAKEFIELD, MASS.**

Drawing No.:  
**C10**  
 SHEET 10 OF 10

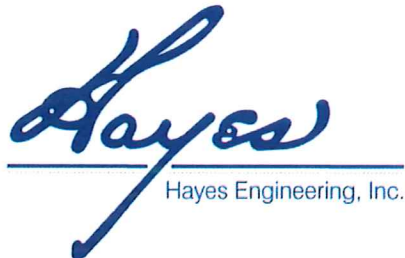
**TRAFFIC IMPACT ASSESSMENT**  
for  
**#314, #330, & #336 Salem Street**

**Wakefield, Massachusetts**

**Date: April 4, 2022**

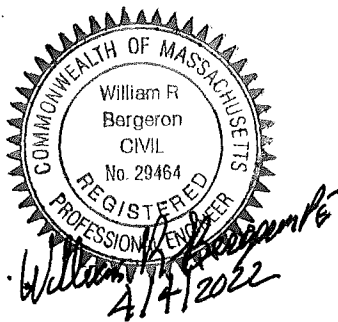
**By: Ocean City Development, LLC.**  
**20C Delcarmine Street**  
**Wakefield, Ma. 01880**

**HAYES ENGINEERING, INC,**



603 Salem Street  
Wakefield, MA 01880

Tel: (781) 246-2800  
Fax : (781) 246-7596



WAK-0496A

**TRAFFIC IMPACT ASSESSMENT**  
**#314, # 330, & #336 Salem Street**  
**Wakefield, Massachusetts**

April 4, 2022

**INTRODUCTION**

The purpose of this report is to identify the potential traffic impacts of the proposed redevelopment of three parcels of land located at #314, #330, and #336 Salem Street. The parcel located at #330 Salem Street operates as an active landscape/nursery facility with approximately 4,458 square feet of area in addition to an upper-level apartment. The rear portion of the site has a two-family residential structure that will be replaced with a new single-family home. The parcel located at #336 consists of an existing single-family home to be retained. The third parcel of land located at #314 Salem Street consists of a two-family home that will be removed under the proposed development plan.

The proposed plan will remove the existing structures located at #330, #330R and #314 Salem Street to construct a 19-unit three story apartment building in addition to a new single-family home located in the vicinity of the previous home at #330R Salem Street. The site locus is shown on the existing and proposed site plans. The existing site parcels have three 30-foot-wide paved access drives. Two of the 30-foot-wide access drives, are for the Willow Farm Garden and Plant Center, are located directly on the intersection of Salem Street and Lowell Street. The proposed site access drive will retain the one located at #314 Salem Street for the entire site and remove the two access drives that service the Nursery (Garden Center) use.

This Traffic Assessment provides information relative to the traffic generation from the proposed change in use of the site, as well as a review of the site access to the new apartment building and single-family homes on Salem Street.

**VEHICLE SPEEDS**

Speed observations were observed on Monday March 22, 2022, around 8:45 to 9:30 AM. There were no abnormal activities related to traffic in either direction during the observations. The observations made consisted of free-flowing vehicle speeds by traffic not encumbered by peak hour traffic and/or platooning effect that can occur. The posted speed limit is 30 MPH for both directions in the vicinity of the existing driveways. The speed survey consisted of recording 50 vehicle speeds in each direction at the driveway to remain. The results of this investigation found the 85<sup>th</sup> percentile for the eastbound traffic to be 29 miles per hour and the 85<sup>th</sup> percentile for the westbound traffic to be 30 miles per hour. The median speed for the eastbound traffic was found to be 25 miles per hour and the westbound median speed was found to be 26 miles per hour.

**PROJECT-RELATED TRAFFIC**

The traffic estimated to be generated by the existing Willow Farm Garden and Plant Center and the five residential structures was obtained by utilizing the technical

information available in "Trip Generation", by the Institute of Transportation Engineers. 10<sup>th</sup> Edition, 2010. The existing traffic was based upon Land Use Code 817 Nursery (Garden Center) and Land Use Code 210, Single-Family Detached Housing. The use of single-family home designation for the two existing duplex units and apartment along with the single-family home were assumed to be the most appropriate designation for the analysis.

The traffic estimated to be generated by the proposed site modifications consists of 19-unit multi-family housing units, one new single-family home and one existing single-family home. The proposed traffic was based upon, Land Use Code: 221 –Multifamily Housing (Mid-Rise) and Land Use Code 210, Single-Family Detached Housing. The proposed traffic generated by the existing and proposed new use data is summarized in **TABLE I**.

The net change in traffic for the proposed reuse of the three combined parcels will result in a decrease of 303 trips on the average weekday daily traffic, with a decrease of 17 vehicle trips during the AM peak hour and a decrease of 32 vehicle trips during the PM peak hour for the 19-unit multi-family and two single family housing use. **TABLE I** outlines the specific changes from the existing to the proposed development options for these combined parcels.

**TABLE I**

ITE Land Use Code	AM (Peak hour)			PM (Peak hour)			ADT*
	IN	OUT	TOTAL	IN	OUT	TOTAL	
817 -Nursery (Garden Center) Building (43000 square feet)	5	5	10	16	15	31	300
210-Single Family Detached Housing	1	3	4	4	2	6	57
Existing Total	6	8	14	20	17	37	357
221 – Multi-Family Housing (Mid-rise / 19 units)	1	3	4	2	1	3	35
210-Single Family Detached Housing	0	1	1	1	1	2	19
Proposed Total	1	4	5	3	2	5	54
Net Change	-5	-4	-9	-17	-15	-32	-303

\* Average Daily Traffic



## STOPPING SIGHT DISTANCE

Sight distance considerations are divided into two criteria: (1) Stopping Sight Distance (SSD) and (2) Intersection Sight Distance (ISD). Approach SSD is the distance required for an approaching vehicle to perceive and react accordingly to a driveway exiting vehicle or object. Stopping sight distances used for design is the sum of two distances: (A) the distance a vehicle travels after the driver sees an object and begins braking, and (B) the distance it travels during braking, as calculated for wet level pavement. When the main roadway is either on an upgrade or downgrade, grade correction factors are applied. The section of Salem Street is level, so no corrections were applied.

ISD is based upon a perception and reaction time, and time required to complete the desired exiting maneuver after the decision to do so have been made. Values for exiting ISD represent time required to turn left or right from a stop condition, to accelerate to the operating speed of the street without causing approaching vehicles to reduce speed by more than 70% of their initial/design speed and, upon turning left, to clear the near half of the street without conflicting with vehicles approaching from the left having to reduce their speed by more than 70% of their initial/design speed. The ISD, therefore, is considered to enhance the operation of the adjacent street traffic over and above the actual needs of the stopping sight distance that is needed for the safe operation of the intersection.

Approach SSD is far more important, as it represents the minimum distance required for safe stopping, while exiting ISD criteria is based only upon acceptable speed reductions to the approaching traffic streams. As noted in ASSHTO, "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". This would be the minimum criteria for the safe operation of an unsignalized intersection.

A site inspection was conducted to identify the potential traffic safety problems that may be associated with the proposed new site driveway relative to available sight distances, as well as review of the existing roadway conditions. The stopping sight distances measured in the field, at Salem Street and the proposed site drive intersection are summarized in **TABLE II** as shown on the attached photos.

**TABLE II**  
**Stopping Sight Distance**  
**(Wet Pavement)**

<u>Location</u>	<u>Posted Design Speed</u>	<u>85<sup>th</sup> Percentile MPH</u> *	<u>Stopping Sight Distance</u>	
			<u>Required SSD</u>	<u>Available SSD</u>
Salem Street @ Site Driveway Eastbound approach	30 mph	29 mph	185 ft	450 ft.
Westbound @ Site Driveway	30 mph	30 mph.	200 ft	225 ft.

\*Source: A Policy on Geometric Design of Highways and Streets, 2004, Fifth Edition (attached) includes brush trimming along the right of way to the easterly property line.

## **CONCLUSIONS**

The multi-family housing and single-family home use has been designed to provide on-site parking and pedestrian movements, as well as the use of the existing #314 driveway access. This will eliminate the existing two 30-foot-wide driveway curb cuts for the busy Willow Farm Garden and Plant Center located at the intersection of Salem Street and Lowell Street.

The site will also allow emergency vehicles access from Salem Street from the driveway along the westerly side of the site.

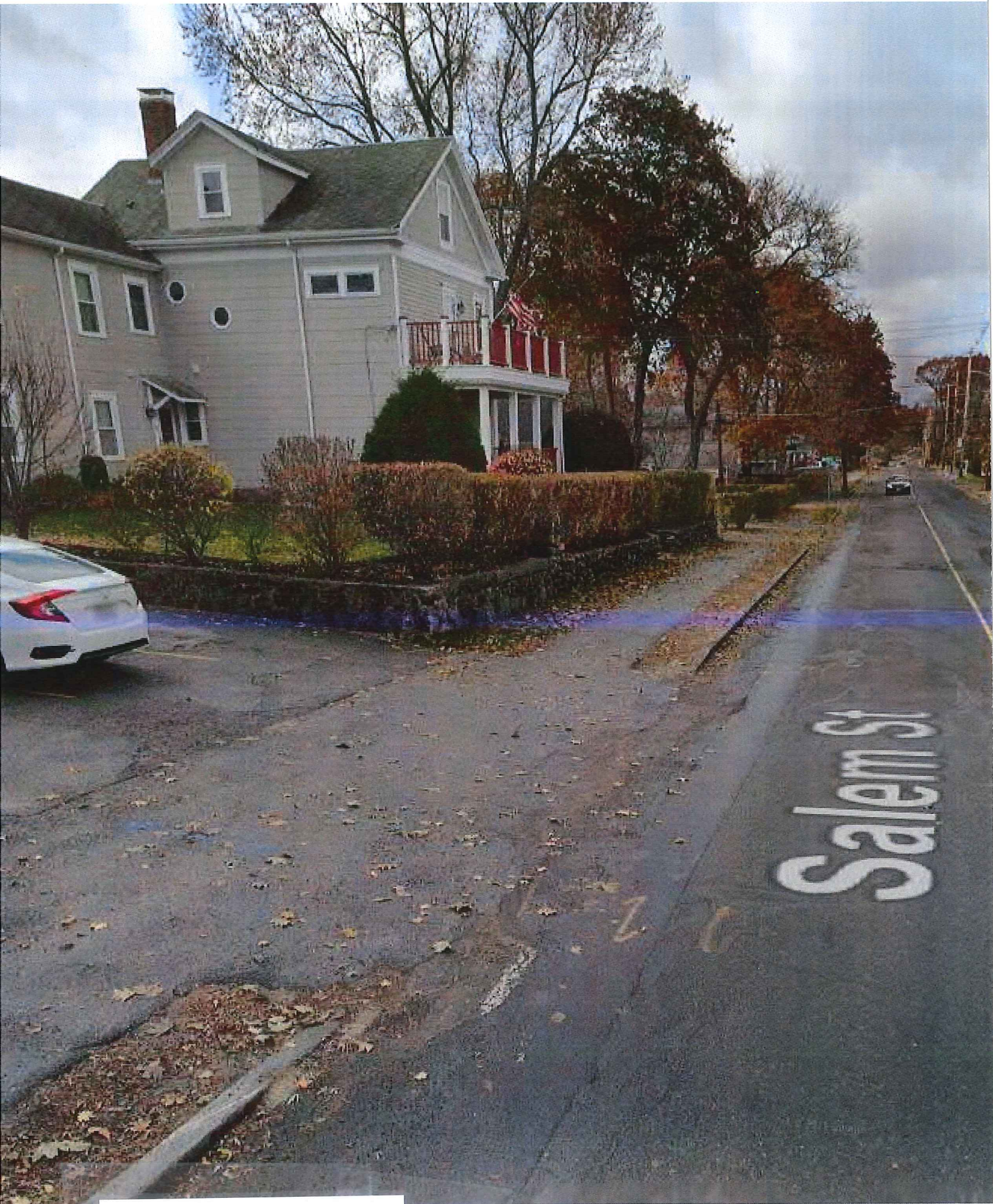
The proposed new use will result in a daily decrease in traffic of approximately 303 vehicles trips. There will be a decrease of approximately 17 vehicle trips in the AM peak hour and a 32 vehicle trips decrease in the PM peak hour traffic based upon utilizing the technical information available in "Trip Generation", by the Institute of Transportation Engineers, (ITE), 10<sup>th</sup> Edition, 2010. Therefore, the proposed project will result in a significant decrease from site generated traffic as well as eliminating two high use driveways near the intersection. The resulting impacts will result in an overall improvement for the adjacent roadways.

The proposed site driveway to #314 Salem Street will be used as full-access, un-signalized driveway movements in and out of the three-parcel combined site. Any delays will be restricted to the site drive.

The available stopping sight distances exceed the required amount of distance needed on the adjacent roadway for the observed 85<sup>th</sup> percentile speeds in both directions based upon the geometry standards required by the American Association of State Highway and Transportation Officials (AASHTO). The existing site drive at Salem Street will provide ample site visibility and will provide safe stopping sight distances. It will also significantly improve the existing conditions by consolidating the driveways and moving the site access to the furthest point from the Salem Street and Lowell Street intersection.

Therefore, based upon the reduction of vehicle trips and the minimal impact for the proposed apartment build condition, it is expected that the adjacent roadways will not experience any significant change, and this will result in no perceptible change within the community.

**PHOTOS**



SITE DRIVE LOOKING WEST



SITE DRIVE LOOKING EAST

# **SPEED STUDY**

## SPEED SURVEY

PROJECT LOCATION: #314, #330 & 336 Salem Street, Wakefield, Ma. 01880

**PREPARED BY:** WRB  
**JOB FILE #:** WAK-0496A  
**DATE:** 28-Mar-22

**DAY OF WEEK:** Monday  
**TIME OF DAY:** 8:45-9:30 A.M.  
**WEATHER:** Sunny 27 F

VEHICLE TRAVEL DIRECTION: WESTBOUND

VEHICLE TRAVEL DIRECTION: EASTBOUND

SPEED MEASUREMENT NUMBER	SPEED* (m.p.h)	SPEED MEASUREMENT NUMBER	SPEED* (m.p.h)	SPEED MEASUREMENT NUMBER	SPEED* (m.p.h)	SPEED MEASUREMENT NUMBER	SPEED* (m.p.h)
1	31	30	24	1	22	26	26
2	32	31	23	2	26	27	26
3	27	32	20	3	26	28	26
4	25	33	25	4	25	29	25
5	26	34	26	23	24	30	23
6	28	35	30	22	23	31	22
7	25	36	28	26	25	32	26
8	23	37	29	24	33	33	24
9	24	38	26	26	24	34	26
10	26	39	26	21	23	35	21
11	30	40	25	20	30	36	20
12	28	41	28	24	20	37	24
13	25	42	23	25	22	38	25
14	27	43	37	22	25	39	22
15	26	44	31	23	29	40	23
16	29	45	26	33	29	41	33
17	33	46	29	28	23	42	28
18	29	47	27	25	23	43	25
19	27	48	25	27	21	44	27
20	25	49	23	27	28	45	27
21	24	50	26	25	24	46	25
22	24	51	28	29	28	47	29
23	28	52	30	24	38	48	24
25	28	53	23	25	31	49	25
29	29	54	27	29	26	50	29
<b>85%TH PERCENTIAL SPEED (MPH)</b>			30	<b>85% PERCRNTIAL SPEED (m.p.h.)</b>			29
<b>ARITHMETRIC MEAN (m.p.h.)</b>			25.1	<b>ARITHMETIC MEAN SPEED (m.p.h.):</b>			26.9
<b>MEDIAN SPEED (m.p.h.):</b>			26	<b>MEDIAN SPEED (m.p.h.):</b>			25

\* SPEED MEASURED WITH HANDHELD RADAR

## **TRAFFIC GENERATION**



# Land Use: 817

## Nursery (Garden Center)

### Description

A nursery or garden center is a free-standing building with an outside storage area for planting or landscape stock. The nurseries surveyed primarily serve the general public. Some have large greenhouses and offer landscaping services. Most have office, storage, and shipping facilities. Nurseries are characterized by seasonal variations in trip characteristics. Nursery (wholesale) (Land Use 818) is a related use.

### Additional Data

Outside storage areas are not included in the overall gross floor area measurements. However, if storage areas are located within the principal outside faces of the exterior walls, they are included in the overall gross floor area of the building.

The sites were surveyed in the 1980s and the 2010s in California and Vermont.

### Source Numbers

205, 240, 926

# Graph Look Up

ITE TripGen Web-based App

Graph Look Up

How to Use ITE TripGen

Add Users

Comments

## Data Plot and Equation

**DATA SOURCE:**  
Trip Generation Manual, 10th Ed  
New data column is available. [Click here](#) to upgrade.

**SEARCH BY LAND USE CODE:**  
817

**LAND USE GROUP:**  
(800-899) Retail

**LAND USE:**  
817 - Nursery (Garden Center)

**LAND USE SUBCATEGORY:**  
All Sites

**SETTING/LOCATION:**  
General Urban/Suburban

**INDEPENDENT VARIABLE (X):**  
1000 Sq. Ft. GFA

**TIME PERIOD:**  
Weekday

**TRIP TYPE:**  
Vehicle

**ENTER IN VALUE TO CALCULATE TRIPS:**  
4.4

**DATA STATISTICS**

**Land Use:** Nursery (Garden Center) (817) [Click for Description and Data Plots](#)

**Independent Variable:** 1000 Sq. Ft. GFA

**Time Period:** Weekday

**Setting/Location:** General Urban/Suburban

**Trip Type:** Vehicle

**Number of Studies:** 10

**Avg. -1000 Sq. Ft. GFA:** 5

**Average Rate:** 68.10

**Range of Rates:** 18.46 - 233.75

**Standard Deviation:** 60.89

**Fitted Curve Equation:** Not Given

**R<sup>2</sup>:** ...

**Directional Distribution:** 50% entering, 50% exiting

**Calculated Trip Ends:** Average Rate: 300 (Total), 150 (Entry), 150 (Exit)

Use the mouse wheel to Zoom Out or Zoom In.  
Hover the mouse pointer on data points to view X and T values.



# Graph Look Up

2/19/2016 3:37 PM Local Time

Graph Look Up

How to Use ITETripGen

Add Trips

Comments

Admins to do notes

My ITETrip Gen

Query Filter

**DATA SOURCE:**  
 Trip Generation Manual, 10th Ed  
New data edition is available. [Click here to upgrade.](#)

**SEARCH BY LAND USE CODE:**

**LAND USE GROUP:**  
 (800-889) Retail

**LAND USE:**  
 817 - Nursery (Garden Center)

**LAND USE SUBCATEGORY:**  
 All Sites

**SETTING/LOCATION:**  
 General Urban/Suburban

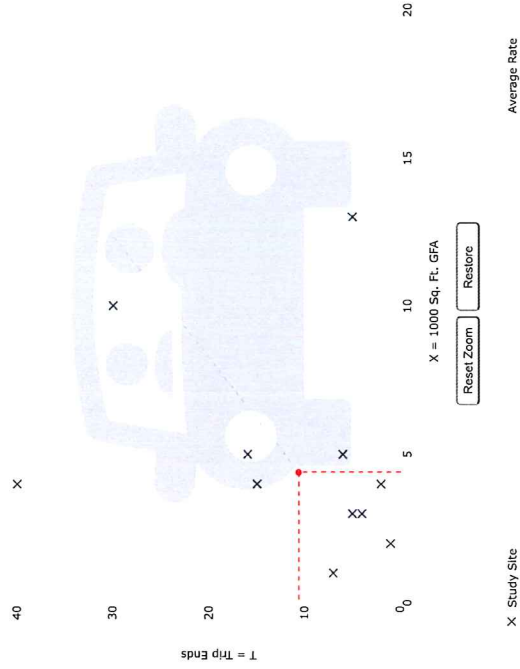
**INDEPENDENT VARIABLE (IV):**  
 1000 Sq. Ft. GFA

**TIME PERIOD:**  
 Weekday, Peak Hour of Adjacent Street Traffic

**TRIP TYPE:**  
 Vehicle

**ENTER IV VALUE TO CALCULATE TRIPS:**

## Data Plot and Equation



## DATA STATISTICS

**Land Use:**  
 Nursery (Garden Center) (817) [Click for Description and Data Plots](#)

**Independent Variable:**  
 1000 Sq. Ft. GFA

**Time Period:**  
 Weekday  
 Peak Hour of Adjacent Street Traffic  
 One Hour Between 7 and 8 a.m.

**Setting/Location:**  
 General Urban/Suburban

**Trip Type:**  
 Vehicle

**Number of Studies:**  
 11

**Avg. 1000 Sq. Ft. GFA:**  
 5

**Average Rate:**  
 2.43

**Range of Rates:**  
 0.38 - 10.00

**Standard Deviation:**  
 2.68

**Fitted Curve Equation:**  
 Not Given

**R<sup>2</sup>:**  
 ....

**Directional Distribution:**  
 Not available

**Calculated Trip Ends:**  
 Average Rate: 11 (Total)

Use the mouse wheel to Zoom Out or Zoom In.  
 Hover the mouse pointer on data points to view X and T values.

# Graph Look Up

Country Filter

DATA SOURCE: Trip Generation Manual, 10th Ed

New data edition is available. [Click here](#) to upgrade.

SEARCH BY LAND USE CODE: 817

LAND USE GROUP: (800-899) Retail

LAND USE: 817 - Nursery (Garden Center)

LAND USE SUBCATEGORY: All Sites

SETTING/LOCATION: General Urban/Suburban

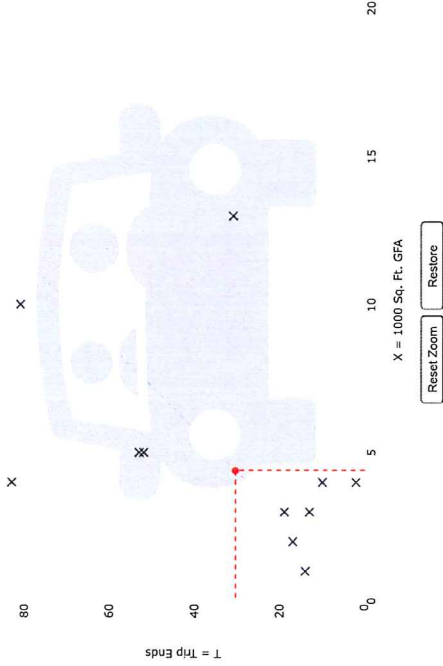
INDEPENDENT VARIABLE (W): 1000 Sq. Ft. GFA

TIME PERIOD: Weekday, Peak Hour of Adjacent Street Traffic

TRIP TYPE: Vehicle

ENTER W VALUE TO CALCULATE TRIPS: 4.4 Calculate

## Data Plot and Equation



## DATA STATISTICS

Land Use: Nursery (Garden Center) (817). [Click for Description and Data File](#)

Independent Variable: 1000 Sq. Ft. GFA

Time Period: Weekday  
Peak Hour of Adjacent Street Traffic  
One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Trip Type: Vehicle

Number of Studies: 11

Avg. 1000 Sq. Ft. GFA: 5

Average Rate: 6.94

Range of Rates: 0.80 - 20.75

Standard Deviation: 5.52

Fitted Curve Equation: Not Given

R<sup>2</sup>: ...

Directional Distribution: Not available

Calculated Trip Ends: Average Rate: 31 (Total)

Use the mouse wheel to Zoom Out or Zoom In.  
Hover the mouse pointer on data points to view X and T values.

# Land Use: 210

## Single-Family Detached Housing

### Description

Single-family detached housing includes all single-family detached homes on individual lots. A typical site surveyed is a suburban subdivision.

### Additional Data

The number of vehicles and residents had a high correlation with average weekday vehicle trip ends. The use of these variables was limited, however, because the number of vehicles and residents was often difficult to obtain or predict. The number of dwelling units was generally used as the independent variable of choice because it was usually readily available, easy to project, and had a high correlation with average weekday vehicle trip ends.

This land use included data from a wide variety of units with different sizes, price ranges, locations, and ages. Consequently, there was a wide variation in trips generated within this category. Other factors, such as geographic location and type of adjacent and nearby development, may also have had an effect on the site trip generation.

Single-family detached units had the highest trip generation rate per dwelling unit of all residential uses because they were the largest units in size and had more residents and more vehicles per unit than other residential land uses; they were generally located farther away from shopping centers, employment areas, and other trip attractors than other residential land uses; and they generally had fewer alternative modes of transportation available because they were typically not as concentrated as other residential land uses.

Time-of-day distribution data for this land use are presented in Appendix A. For the six general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:15 and 8:15 a.m. and 4:00 and 5:00 p.m., respectively. For the two sites with Saturday data, the overall highest vehicle volume was counted between 3:00 and 4:00 p.m. For the one site with Sunday data, the overall highest vehicle volume was counted between 10:15 and 11:15 a.m.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in California, Connecticut, Delaware, Illinois, Indiana, Maryland, Minnesota, Montana, New Jersey, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Vermont, and Virginia.

### Source Numbers

100, 105, 114, 126, 157, 167, 177, 197, 207, 211, 217, 267, 275, 293, 300, 319, 320, 356, 357, 367, 384, 387, 407, 435, 522, 550, 552, 579, 598, 601, 603, 614, 637, 711, 716, 720, 728, 735, 868, 903, 925, 936

# Graph Look Up

ITETripGen Web-based App

Graph Look Up

How to Use ITETripGen

Add Users

Comments

Query File

DATA SOURCE: Trip Generation Manual, 10th Ed

New data edition is available. [Click here to upgrade.](#)

SEARCH BY LAND USE CODE:

210

LAND USE GROUP: (200-299) Residential

LAND USE: 210 - Single-Family Detached Housing

LAND USE SUBCATEGORY: All Sites

SETTING/LOCATION: General Urban/Suburban

INDEPENDENT VARIABLE (IV): Dwelling Units

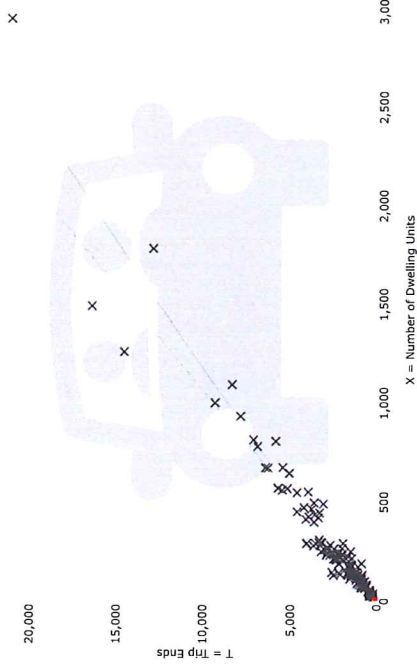
TIME PERIOD: Weekday

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 6

Calculate

## Data Plot and Equation



X = Number of Dwelling Units

Reset Zoom

Restore

Fitted Curve

Study Site

Average Rate

## DATA STATISTICS

Land Use: Single-Family Detached Housing (210) [Click for Description and Data Plots](#)

Independent Variable: Dwelling Units

Time Period: Weekday

Setting/Location: General Urban/Suburban

Trip Type: Vehicle

Number of Studies: 159

Avg. Num. of Dwelling Units: 264

Average Rate: 9.44

Range of Rates: 4.81 - 19.39

Standard Deviation: 2.10

Fitted Curve Equation:  $Lk(T) = 0.02 Ln(X) + 2.71$

R<sup>2</sup>: 0.95

Directional Distribution: 56% entering, 50% exiting

Calculated Trip Ends: Average Rate: 57 (Total), 28 (Entry), 29 (Exit)

Fitted Curve: 78 (Total), 39 (Entry), 39 (Exit)

Use the mouse wheel to Zoom Out or Zoom In.  
Hover the mouse pointer on data points to view X and T values.

Additional details

Try OTISS-PRO



# Graph Look Up

ITETripGen Web-based App

Graph Look Up

How to Use ITETripGen

Add Users

Comments

Query Filter

**DATA SOURCE:**  
 Trip Generation Manual, 10th Ed  
New data edition is available. Click here to upgrade.

**SEARCH BY LAND USE CODE:**

**LAND USE GROUP:**  
 (200-299) Residential

**LAND USE:**  
 210 - Single-Family Detached Housing

**LAND USE SUBCATEGORY:**  
 All Sites

**SETTING/LOCATION:**  
 General Urban/Suburban

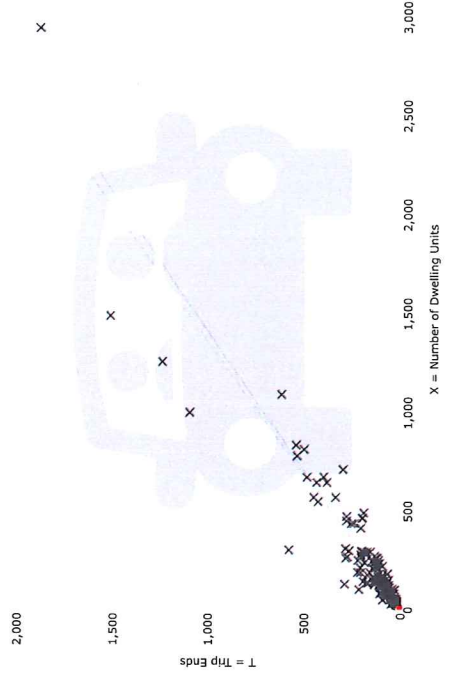
**INDEPENDENT VARIABLE (IV):**  
 Dwelling Units

**TIME PERIOD:**  
 Weekday, Peak Hour of Adjacent Street Traffic

**TRIP TYPE:**  
 Vehicle

**ENTER IV VALUE TO CALCULATE TRIPS:**

## Data Plot and Equation



Reset Zoom Restore

Fitted Curve

Average Rate

## DATA STATISTICS

**Land Use:**  
 Single-Family Detached Housing (210). Click for Description and Data Plots

**Independent Variable:**  
 Dwelling Units

**Time Period:**  
 Weekday  
 Peak Hour of Adjacent Street Traffic  
 One Hour Between 7 and 9 a.m.

**Setting/Location:**  
 General Urban/Suburban

**Trip Type:**  
 Vehicle

**Number of Studies:**  
 173

**Avg. Num. of Dwelling Units:**  
 219

**Average Rate:**  
 0.74

**Range of Rates:**  
 0.33 - 2.27

**Standard Deviation:**  
 0.27

**Fitted Curve Equation:**  
 $T = 0.71(X) + 4.00$

$R^2$   
 0.89

**Directional Distribution:**  
 25% entering, 75% exiting

**Calculated Trip Ends:**  
 Average Rate: 4 (Total), 1 (Entry), 3 (Exit)  
 Filled Curve: 9 (Total), 2 (Entry), 7 (Exit)

Use the mouse wheel to Zoom Out or Zoom In.  
 Hover the mouse pointer on data points to view X and T values.

Authors: as shown

Tri 01158@piv

# Graph Look Up

ITETripGen Web-based App

Graph Look Up

How to Use ITETripGen

Add Users

Comments

City: Filter

DATA SOURCE:

Trip Generation Manual, 10th Ed

New data edition is available. [Click here](#) to upgrade.

SEARCH BY LAND USE CODE:

210

LAND USE GROUP:

(200-299) Residential

LAND USE :

210 - Single-Family Detached Housing

LAND USE SUBCATEGORY:

All Sites

SETTING/LOCATION:

General Urban/Suburban

INDEPENDENT VARIABLE (IV):

Dwelling Units

TIME PERIOD:

Weekday, Peak Hour of Adjacent Street Traffic

TRIP TYPE:

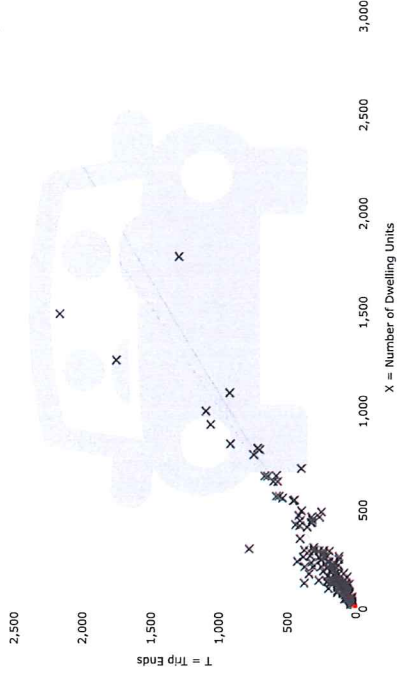
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:

6

Calculate

## Data Plot and Equation



Land Use: Single-Family Detached Housing (210) [Click for Description and Data Plots](#)

Independent Variable: Dwelling Units

Time Period: Weekday

Peak Hour of Adjacent Street Traffic One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Trip Type: Vehicle

Number of Studies: 190

Avg. Num. of Dwelling Units: 242

Average Rate: 0.59

Range of Rates: 0.44 - 2.89

Standard Deviation: 0.31

Fitted Curve Equation:  $Ln(T) = 0.56 Ln(X) + 0.20$

$R^2$ : 0.92

Directional Distribution: 63% entering, 37% exiting

Calculated Trip Ends: Average Rate: 6 (Total), 4 (Entry), 2 (Exit)

Fitted Curve: 7 (Total), 4 (Entry), 3 (Exit)

Use the mouse wheel to Zoom Out or Zoom In.  
Hover the mouse pointer on data points to view X and T values.



# Land Use: 220

## Multifamily Housing (Low-Rise)

### Description

Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have one or two levels (floors). Multifamily housing (mid-rise) (Land Use 221), multifamily housing (high-rise) (Land Use 222), and off-campus student apartment (Land Use 225) are related land uses.

### Additional Data

In prior editions of *Trip Generation Manual*, the low-rise multifamily housing sites were further divided into rental and condominium categories. An investigation of vehicle trip data found no clear differences in trip making patterns between the rental and condominium sites within the ITE database. As more data are compiled for future editions, this land use classification can be reinvestigated.

For the three sites for which both the number of residents and the number of occupied dwelling units were available, there were an average of 2.72 residents per occupied dwelling unit.

For the two sites for which the numbers of both total dwelling units and occupied dwelling units were available, an average of 96.2 percent of the total dwelling units were occupied.

This land use included data from a wide variety of units with different sizes, price ranges, locations, and ages. Consequently, there was a wide variation in trips generated within this category. Other factors, such as geographic location and type of adjacent and nearby development, may also have had an effect on the site trip generation.

Time-of-day distribution data for this land use are presented in Appendix A. For the 10 general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:15 and 8:15 a.m. and 4:45 and 5:45 p.m., respectively. For the one site with Saturday data, the overall highest vehicle volume was counted between 9:45 and 10:45 a.m. For the one site with Sunday data, the overall highest vehicle volume was counted between 11:45 a.m. and 12:45 p.m.

For the one dense multi-use urban site with 24-hour count data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:00 and 8:00 a.m. and 6:15 and 7:15 p.m., respectively.

For the three sites for which data were provided for both occupied dwelling units and residents, there was an average of 2.72 residents per occupied dwelling unit.

The average numbers of person trips per vehicle trip at the five general urban/suburban sites at which both person trip and vehicle trip data were collected were as follows:

- 1.13 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 7 and 9 a.m.
- 1.21 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in British Columbia (CAN), California, District of Columbia, Florida, Georgia, Illinois, Indiana, Maine, Maryland, Minnesota, New Jersey, New York, Ontario, Oregon, Pennsylvania, South Dakota, Tennessee, Texas, Utah, Virginia, and Washington.

***It is expected that the number of bedrooms and number of residents are likely correlated to the number of trips generated by a residential site. Many of the studies included in this land use did not indicate the total number of bedrooms. To assist in the future analysis of this land use, it is important that this information be collected and included in trip generation data submissions.***

### **Source Numbers**

168, 187, 188, 204, 211, 300, 305, 306, 319, 320, 321, 357, 390, 412, 418, 525, 530, 571, 579, 583, 864, 868, 869, 870, 896, 903, 918, 946, 947, 948, 951

# Graph Look Up



ITETripGen v. 1.0.0 - 2/1/2020

Graph Look Up

How to use ITETripGen

Add Users

Comments

Query Filter

### DATA SOURCE:

Trip Generation Manual, 10th Ed

New data edition is available. [Click here to upgrade.](#)

### SEARCH BY LAND USE CODE:

221

### LAND USE GROUP:

(200-299) Residential

### LAND USE:

221 - Multifamily Housing (Mid-Rise)

### LAND USE SUBCATEGORY:

All Sites

### SETTING/LOCATION:

General Urban/Suburban

### INDEPENDENT VARIABLE (IV):

Residents

### TIME PERIOD:

Weekday

### TRIP TYPE:

Vehicle

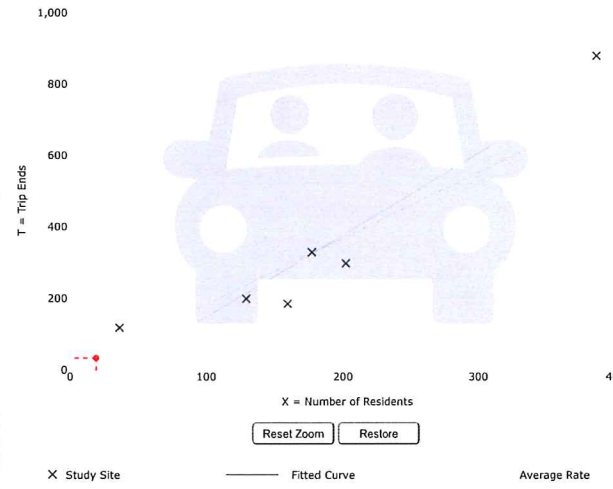
### ENTER IV VALUE TO CALCULATE TRIPS:

19

Calculate

Trip ends are not estimated for some methods as it yields negative values

## Data Plot and Equation



### DATA STATISTICS

**Land Use:**  
Multifamily Housing (Mid-Rise) (221) [Click for Description and Data Plots](#)

**Independent Variable:**  
Residents

**Time Period:**  
Weekday

**Setting/Location:**  
General Urban/Suburban

**Trip Type:**  
Vehicle

**Number of Studies:**  
6

**Avg. Num. of Residents:**  
182

**Average Rate:**  
1.84

**Range of Rates:**  
1.16 - 3.28

**Standard Deviation:**  
0.54

**Fitted Curve Equation:**  
 $T = 2.29(X) - 81.02$

$R^2:$   
0.91

**Directional Distribution:**  
50% entering, 50% exiting

**Calculated Trip Ends:**  
Average Rate: 35 (Total), 17 (Entry), 18 (Exit)  
Fitted Curve: Not Available

Use the mouse wheel to Zoom Out or Zoom In. Hover the mouse pointer on data points to view X and T values.

# Graph Look Up



- Home
- Graph Look Up
- How to Use ITETripGen
- Add Users
- Comments

**DATA SOURCE:**  
Trip Generation Manual, 10th Ed  
New data edition is available. [Click here to upgrade.](#)

**SEARCH BY LAND USE CODE:**

**LAND USE GROUP:**  
(200-299) Residential

**LAND USE:**  
221 - Multifamily Housing (Mid-Rise)

**LAND USE SUBCATEGORY:**  
All Sites

**SETTING/LOCATION:**  
General Urban/Suburban

**INDEPENDENT VARIABLE (IV):**  
Residents

**TIME PERIOD:**  
Weekday, Peak Hour of Adjacent Street Traffic

**TRIP TYPE:**  
Vehicle

**ENTER IV VALUE TO CALCULATE TRIPS:**

### Data Plot and Equation

X = Number of Residents

Study Site

Average Rate

Use the mouse wheel to Zoom Out or Zoom In.  
Hover the mouse pointer on data points to view X and T values.

**Caution – Small Sample Size**

**DATA STATISTICS**

**Land Use:**  
Multifamily Housing (Mid-Rise) (221) [Click for Description and Data Plots](#)

**Independent Variable:**  
Residents

**Time Period:**  
Weekday  
Peak Hour of Adjacent Street Traffic  
One Hour Between 7 and 9 a.m.

**Setting/Location:**  
General Urban/Suburban

**Trip Type:**  
Vehicle

**Number of Studies:**  
2

**Avg. Num. of Residents:**  
294

**Average Rate:**  
0.21

**Range of Rates:**  
0.19 - 0.22

**Standard Deviation:**  
\*\*\*\*

**Fitted Curve Equation:**  
Not Given

**R<sup>2</sup>:**  
\*\*\*\*

**Directional Distribution:**  
26% entering, 74% exiting

**Calculated Trip Ends:**  
Average Rate: 4 (Total), 1 (Entry), 3 (Exit)

# Graph Look Up



Home > Graph Look Up

- Graph Look Up
- How to Use ITETripGen
- Add Users
- Comments

DATA SOURCE: Trip Generation Manual, 10th Ed  
New data edition is available. [Click here to upgrade.](#)

SEARCH BY LAND USE CODE:

LAND USE GROUP: (200-299) Residential

LAND USE: 221 - Multifamily Housing (Mid-Rise)

LAND USE SUBCATEGORY: All Sites

SETTING/LOCATION: General Urban/Suburban

INDEPENDENT VARIABLE (IV): Residents

TIME PERIOD: Weekday, Peak Hour of Adjacent Street Traffic

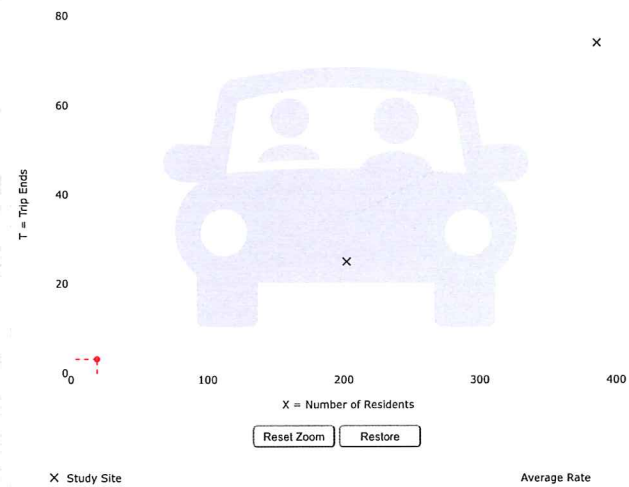
TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:

## Data Plot and Equation

Caution - Small Sample Size

### DATA STATISTICS



**Land Use:** Multifamily Housing (Mid-Rise) (221) [Click for Description and Data Plots](#)

**Independent Variable:** Residents

**Time Period:** Weekday, Peak Hour of Adjacent Street Traffic One Hour Between 4 and 6 p.m.

**Setting/Location:** General Urban/Suburban

**Trip Type:** Vehicle

**Number of Studies:** 2

**Avg. Num. of Residents:** 294

**Average Rate:** 0.17

**Range of Rates:** 0.12 - 0.19

**Standard Deviation:** \*\*\*\*

**Fitted Curve Equation:** Not Given

**R<sup>2</sup>:** \*\*\*\*

**Directional Distribution:** 64% entering, 36% exiting

**Calculated Trip Ends:** Average Rate: 3 (Total), 2 (Entry), 1 (Exit)

Use the mouse wheel to Zoom Out or Zoom In. Hover the mouse pointer on data points to view X and T values.

# Land Use: 210

## Single-Family Detached Housing

### Description

Single-family detached housing includes all single-family detached homes on individual lots. A typical site surveyed is a suburban subdivision.

### Additional Data

The number of vehicles and residents had a high correlation with average weekday vehicle trip ends. The use of these variables was limited, however, because the number of vehicles and residents was often difficult to obtain or predict. The number of dwelling units was generally used as the independent variable of choice because it was usually readily available, easy to project, and had a high correlation with average weekday vehicle trip ends.

This land use included data from a wide variety of units with different sizes, price ranges, locations, and ages. Consequently, there was a wide variation in trips generated within this category. Other factors, such as geographic location and type of adjacent and nearby development, may also have had an effect on the site trip generation.

Single-family detached units had the highest trip generation rate per dwelling unit of all residential uses because they were the largest units in size and had more residents and more vehicles per unit than other residential land uses; they were generally located farther away from shopping centers, employment areas, and other trip attractors than other residential land uses; and they generally had fewer alternative modes of transportation available because they were typically not as concentrated as other residential land uses.

Time-of-day distribution data for this land use are presented in Appendix A. For the six general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:15 and 8:15 a.m. and 4:00 and 5:00 p.m., respectively. For the two sites with Saturday data, the overall highest vehicle volume was counted between 3:00 and 4:00 p.m. For the one site with Sunday data, the overall highest vehicle volume was counted between 10:15 and 11:15 a.m.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in California, Connecticut, Delaware, Illinois, Indiana, Maryland, Minnesota, Montana, New Jersey, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Vermont, and Virginia.

### Source Numbers

100, 105, 114, 126, 157, 167, 177, 197, 207, 211, 217, 267, 275, 293, 300, 319, 320, 356, 357, 367, 384, 387, 407, 435, 522, 550, 552, 579, 598, 601, 603, 614, 637, 711, 716, 720, 728, 735, 868, 903, 925, 936

# Graph Look Up

County:  Files

DATA SOURCE: Trip Generation Manual, 10th Ed

New data edition is available. [Click here](#) to upgrade.

SEARCH BY LAND USE CODE:

LAND USE GROUP: (200-299) Residential

LAND USE: 210 - Single-Family Detached Housing

LAND USE SUBCATEGORY: All Sites

SETTING/LOCATION: General Urban/Suburban

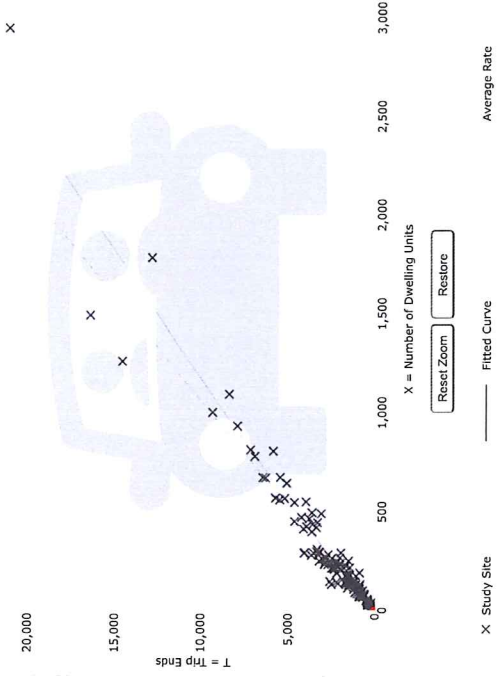
INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Weekday

TRIP TYPE: Vehicle

ENTER N VALUE TO CALCULATE TRIPS:  Calculate

## Data Plot and Equation



## DATA STATISTICS

**Land Use:** Single-Family Detached Housing (210) [Click for Description and Data Plots](#)

**Independent Variable:** Dwelling Units

**Time Period:** Weekday

**Setting/Location:** General Urban/Suburban

**Trip Type:** Vehicle

**Number of Studies:** 159

**Avg. Num. of Dwelling Units:** 254

**Average Rate:** 9.44

**Range of Rates:** 4.81 - 19.39

**Standard Deviation:** 2.10

**Fitted Curve Equations:**  $Ln(T) = 0.92 Ln(X) + 2.71$

**R<sup>2</sup>:** 0.95

**Directional Distributions:** 50% entering, 50% exiting

**Calculated Trip Ends:** Average Rate: 19 (Total), 9 (Entry), 10 (Exit)

**Fitted Curve:** 28 (Total), 14 (Entry), 14 (Exit)

Use the mouse wheel to Zoom Out or Zoom In.  
Hover the mouse pointer on data points to view X and T values.



# Graph Look Up

ITE TripGen Web-based App

Graph Look Up

How to Use ITE TripGen

Ask Users

Comments

Query Filter

DATA SOURCE: Trip Generation Manual, 10th Ed

New data edition is available. [Click here](#) to upgrade.

SEARCH BY LAND USE CODE:

210

LAND USE GROUP: (200-299) Residential

LAND USE: 210 - Single-Family Detached Housing

LAND USE SUBCATEGORY: All Sites

SETTING/LOCATION: General Urban/Suburban

INDEPENDENT VARIABLE (IV): Dwelling Units

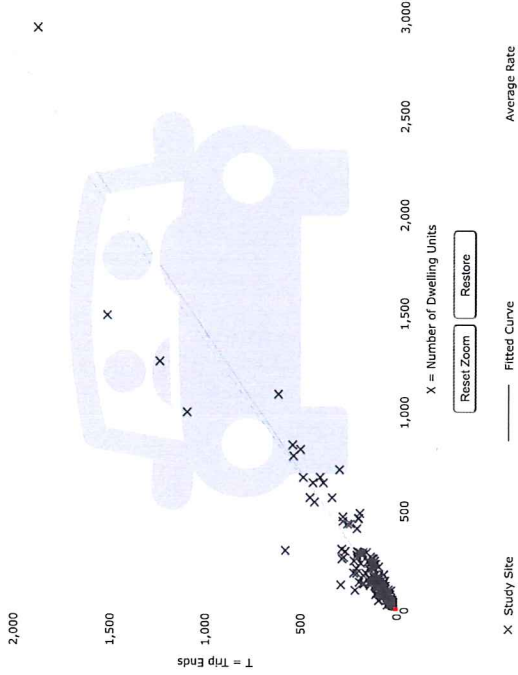
TIME PERIOD: Weekday, Peak Hour of Adjacent Street Traffic

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 2

Calculate

## Data Plot and Equation



## DATA STATISTICS

Land Use: Single-Family Detached Housing (210). [Click for Description and Data Plots](#)

Independent Variable: Dwelling Units

Time Period: Weekday

Peak Hour of Adjacent Street Traffic: One Hour Between 7 and 8 a.m.

Setting/Location: General Urban/Suburban

Trip Type: Vehicle

Number of Studies: 173

Avg. Num. of Dwelling Units: 219

Average Rate: 0.74

Range of Rates: 0.33 - 2.27

Standard Deviation: 0.27

Fitted Curve Equation:  $T = 0.71(X) + 4.80$

R<sup>2</sup>: 0.89

Directional Distribution: 25% entering, 75% exiting

Calculated Trip Ends: Average Rate: 1 (Total), 0 (Entry), 1 (Exit)

Fitted Curve: 6 (Total), 1 (Entry), 5 (Exit)

Use the mouse wheel to Zoom Out or Zoom In. Hover the mouse pointer on data points to view X and T values.



# Graph Look Up

ITETripGen Web-based App

Graph Look Up

How to Use ITETripGen

Add Users

Comments

Add new job items

Try OTISS File

Query Filter

**DATA SOURCE:** Trip Generation Manual, 10th Ed  
New data edition is available. [Click here to upgrade.](#)

**SEARCH BY LAND USE CODE:**

**LAND USE GROUP:** (200-299) Residential

**LAND USE:** 210 - Single-Family Detached Housing

**LAND USE SUBCATEGORY:** All Sites

**SETTING/LOCATION:** General Urban/Suburban

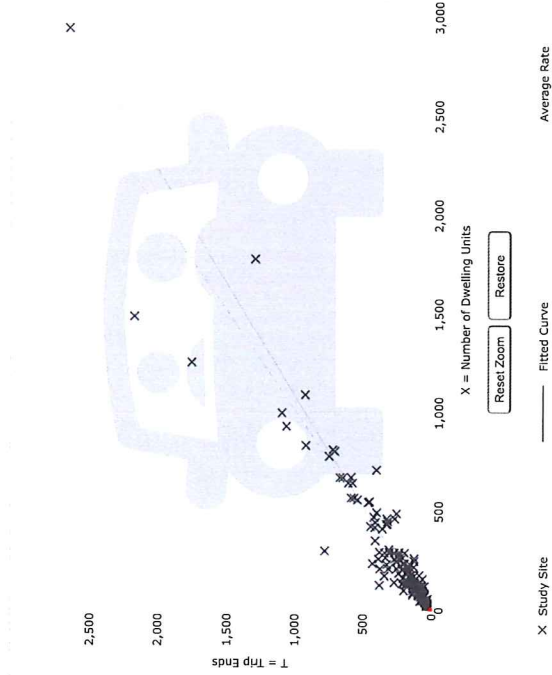
**INDEPENDENT VARIABLE (IV):** Dwelling Units

**TIME PERIOD:** Weekday, Peak Hour of Adjacent Street Traffic

**TRIP TYPE:** Vehicle

**ENTER IV VALUE TO CALCULATE TRIPS:**

## Data Plot and Equation



## DATA STATISTICS

**Land Use:** Single-Family Detached Housing (210) [Click for Description and Data Plots](#)

**Independent Variable:** Dwelling Units

**Time Period:** Weekday  
 Peak Hour of Adjacent Street Traffic  
 One Hour Between 4 and 6 p.m.

**Setting/Location:** General Urban/Suburban

**Trip Type:** Vehicle

**Number of Studies:** 150

**Avg. Num. of Dwelling Units:** 242

**Average Rate:** 0.99

**Range of Rates:** 0.44 - 2.98

**Standard Deviation:** 0.31

**Fitted Curve Equation:**  $Ln(T) = 0.96 Ln(X) + 0.20$

**R<sup>2</sup>:** 0.92

**Directional Distribution:** 63% entering, 37% exiting

**Calculated Trip Ends:** Average Rate: 2 (Total), 1 (Entry), 1 (Exit)  
 Filled Curve: 2 (Total), 1 (Entry), 1 (Exit)

Use the mouse wheel to Zoom Out or Zoom In.  
 Hover the mouse pointer on data points to view X and T values.

ARCHITECTURAL DRAWING LIST		
Sheet Number	Sheet Name	Sheet Issue Date

0-Cover

A-000	COVER SHEET	12/9/2022
-------	-------------	-----------

1-Civil

C-1	EXISTING CONDITIONS PLAN	7/15/2022
C-2	PROPOSED SITE PLAN	7/15/2022

3-Architectural

A-100	FIRST FLOOR PLAN	12/9/2022
A-101	SECOND FLOOR	12/9/2022
A-102	THIRD FLOOR PLANS	12/9/2022
A-103	ROOF PLAN	12/9/2022
A-300	ELEVATIONS	12/9/2022
A-303	SCHEME 1 ELEVATIONS & RENDERING	12/9/2022
A-304	SCHEME 2 ELEVATIONS & RENDERING	12/9/2022
A-305	SCHEME 3 ELEVATIONS & RENDERING	12/9/2022
A-306	SCHEME COMPARISON	12/9/2022
A-307	RENDERING 1	12/9/2022
A-308	RENDERING 2	12/9/2022
A-309	RENDERING 3	12/9/2022
AV-2	AERIAL VIEW	11/11/2022



# PROJECT: 369 MAIN STREET RESIDENCES

PROJECT ADDRESS:  
369 MAIN STREET  
WAKEFIELD, MASSACHUSETTS



### ARCHITECT

KHALSA DESIGN INC.  
ADDRESS:  
17 IVALOO STREET, SUITE 400  
SOMERVILLE, MA 02143

### OWNER

WILLIAM THIBAUT  
ADDRESS:  
85 BOSTON STREET,  
EVERETT, MA 02149

### SURVEY

AMERICAN SURVEYING  
& MAPPING, INC.  
ADDRESS:  
3191 MAGUIRE BLVD, SUITE 200  
ORLANDO, FL 32803

### CIVIL

ENGINEERING ALLIANCE, INC.  
ADDRESS:  
194 CENTRAL STREET  
SAUGUS, MA 01906

**SD SET**  
**12/9/2022**

PROJECT NAME

**369 MAIN STREET  
RESIDENCES**

PROJECT ADDRESS

369 MAIN STREET  
WAKEFIELD MA

CLIENT

**WILLIAM THIBAUT**

ARCHITECT



**KHALSA**

17 IVALOO STREET SUITE 400  
SOMERVILLE, MA 02143  
TELEPHONE: 617-591-8682

CONSULTANTS:

COPYRIGHT KDI © 2022  
THESE DRAWINGS ARE NOW AND DO  
REMAIN THE SOLE PROPERTY OF KHALSA  
DESIGN INC. USE OF THESE PLANS OR ANY  
FORM OF REPRODUCTION OF THIS DESIGN  
IN WHOLE OR IN PART WITHOUT EXPRESS  
WRITTEN CONSENT IS PROHIBITED AND  
SHALL RESULT IN THE FULLEST EXTENT  
OF PROSECUTION UNDER LAW

REGISTRATION



Project number	21078
Date	12/9/2022
Drawn by	MI
Checked by	JSK
Scale	1/8" = 1'-0"

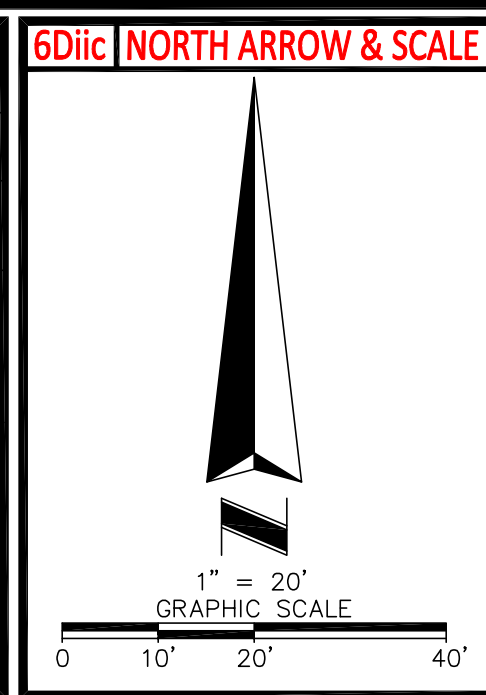
REVISIONS

No.	Description	Date

COVER SHEET

**A-000**

369 MAIN STREET RESIDENCES



- 5Ciii OBSERVED POTENTIAL ENCROACHMENTS**
- Ⓜ BUILDING CROSSES INTO RIGHT-OF-WAY BY 0.6' AT MOST.
  - Ⓜ ASPHALT DUMPSTER AREA CROSSES THE WESTERLY PROPERTY LINE BY 7.9' AT MOST.
  - Ⓜ GRATES AND OVERHANGS CROSS INTO RIGHT-OF-WAY.
  - Ⓜ WINDOW WELL CROSSES ONTO PROPERTY BY 1.8' AT MOST.
  - Ⓜ OVERHEAD UTILITIES CROSS ONTO PROPERTY WITHOUT THE BENEFIT OF AN EASEMENT.
  - Ⓜ ASPHALT PAVING EXTENDS OVER PROPERTY TO BUILDING WITHOUT THE BENEFIT OF AN EASEMENT.
  - Ⓜ TRANSFORMER CONCRETE PAD CROSSES OVER PROPERTY BY 2.3'±.

**3 FLOOD INFORMATION**

BY GRAPHIC PLOTTING ONLY, THIS PROPERTY LIES WITHIN ZONE "X", AS SHOWN ON THE FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 250221 0314 E (MAP NO. 25017C0314E), WHICH BEARS AN EFFECTIVE DATE OF 06/04/2010, AND IS NOT IN A SPECIAL FLOOD HAZARD AREA. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE. ZONE "X" DENOTES AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.

**6Diid LEGEND AND ABBREVIATIONS**

CONCRETE SURFACE	RECOVERED MONUMENT AS NOTED
NO PARKING AREA	FIND 6"x6" STONE BOUND
HANDICAP PARKING	ELECTRIC MANHOLE
PARKING SPACE	LIGHT POLE
X PS	ELECTRIC TRANSFORMER
(R)	STORM MANHOLE
(M)	CATCH BASIN
(C)	WATER VALVE
CA	MANHOLE (UNKNOWN)
CC	TELEPHONE MANHOLE
CRW	GAS VALVE
DA	GAS METER
FE	IGN
FR	BOLLARD
GR	
HH	
WW	

OH ——— OVERHEAD UTILITY LINE

**6Cvii PLATTED SETBACK OR RECORDED BUILDING RESTRICTION LINES**

NONE PROVIDED TO THIS SURVEYOR.

- 5Ei "SCHEDULE B - SECTION 2" ITEMS**
- Ⓜ — RIGHT OF WAY RECORDED WITH THE REGISTRY IN BOOK 4672, PAGE 321. (AFFECTS, AS SHOWN.)
  - Ⓜ — RIGHT OF WAY FILED WITH THE LAND COURT AS DOCUMENT NO. 47950. (AFFECTS, AS SHOWN.)
  - Ⓜ — GRANT OF RIGHT OF WAY FILED WITH THE LAND COURT AS DOCUMENT NO. 79735. (AFFECTS, AS SHOWN.)
  - Ⓜ — RIGHTS OF SANTANDER BANK AS A TENANT UNDER A WRITTEN LEASE WITH S-BNK WAKEFIELD, LLC AS LESSOR, DATED MAY 29, 2020 WITH NO OPTION TO PURCHASE OR RIGHT OF FIRST REFUSAL, ALTHOUGH EXPRESSLY EXCLUDED FROM COVERAGE HEREUNDER, THE FOLLOWING ITEMS ARE NOTED FOR INFORMATIONAL PURPOSES ONLY:
    - (A) SPECIAL PERMIT ISSUED BY THE WAKEFIELD BOARD OF APPEALS RECORDED WITH THE REGISTRY IN BOOK 63763, PAGE 465 AND FILED WITH THE LAND COURT AS DOCUMENT NO. 1673311. (AFFECTS, NOTHING TO PLOT)
    - (B) DECISION OF THE WAKEFIELD BOARD OF APPEALS RECORDED WITH THE REGISTRY IN BOOK 64761, PAGE 33 AND FILED WITH THE LAND COURT AS DOCUMENT NO. 1689472. (AFFECTS, NOTHING TO PLOT)



**ALTA/NSPS LAND TITLE SURVEY IDENTIFICATION TABLE**

2	"TABLE A" PROPERTY ADDRESS	6Bvii	CONTIGUITY STATEMENT	8	"TABLE A" SUBSTANTIAL FEATURES OBSERVED
3	"TABLE A" FLOOD INFORMATION	6Bxii	TITLE COMMITMENT INFORMATION	9	"TABLE A" PARKING SPACES
4	"TABLE A" LAND AREA	6Cvii	REDUCED SETBACKS/RESTRICTIONS PROVIDED BY NSPS	10	"TABLE A" DIVISION/PARTY WALLS
5Biii	ACCESS TO PROPERTY	6Diic	NORTH ARROW & SCALE	11	"TABLE A" UTILITY INFORMATION
5Ciii	SURVEYOR OBSERVED POTENTIAL ENCROACHMENTS	6Diid	LEGEND & ABBREVIATIONS	13	"TABLE A" ADJOINING OWNERS
5Ei	"SCHEDULE B - SECTION 2" ITEMS	6Diie	VICINITY MAP	14	"TABLE A" INTERSECTING STREET
5F	CEMETERY NOTE	6Diif	SURVEYOR'S NOTES	16	"TABLE A" EARTH MOVING NOTE
6	"TABLE A" ZONING INFORMATION	6Diik	TYPE OF SURVEY	17	"TABLE A" RIGHT OF WAY CHANGES
6Bi	TITLE DESCRIPTION	7	SURVEYOR'S CERTIFICATE	18	"TABLE A" OFFSITE EASEMENTS OR SERVITUDES
6Biv	BEARING BASIS	7b	"TABLE A" BUILDING AREA		
		7c	"TABLE A" BUILDING HEIGHT		

**TABLE OF REFERENCES**

LAND COURT PLAN NO. 8796A  
LAND COURT PLAN NO. 19560A

**8 SUBSTANTIAL FEATURES OBSERVED**

SUBSTANTIAL ABOVE GROUND FEATURES THAT WERE OBSERVED ON THE SUBJECT PARCEL, SUCH AS PARKING AREAS, DRIVES, WALKS, PLANTERS/LANDSCAPE AREAS AND OTHER HAVE BEEN LOCATED AS SHOWN HEREON. NOTE: THERE WERE NO OBSERVED SUBSTANTIAL AREAS OF REFUSE ON THE SUBJECT PARCEL PER THE DATE OF THIS SURVEY.

DATE	REVISIONS	TECH	DATE	REVISIONS	TECH	FIELD	JM	DRAWING SCALE	1" = 20'
06/03/21	ADD CERTS	JCT	04/08/21	UPDATE	JN	DRAWN BY	JN	QC BY	TAE 04/15/2021
05/04/21	COMMENTS	JCT	04/21/21	COMMENTS	JCT	DRAWING NAME	2112459 31163 WAKEFIELD MA.DWG		
04/23/21	COMMENTS	JCT	04/21/21	COMMENTS	DLK				

**6Bxi TITLE COMMITMENT INFORMATION**

THE TITLE DESCRIPTION AND SCHEDULE "B" ITEMS HEREON ARE FROM:  
CHICAGO TITLE INSURANCE COMPANY, COMMITMENT NO.: 2121-0088, HAVING AN EFFECTIVE DATE OF MARCH 15, 2021.

**SHEET 1 OF 1**

**6Bi TITLE DESCRIPTION**

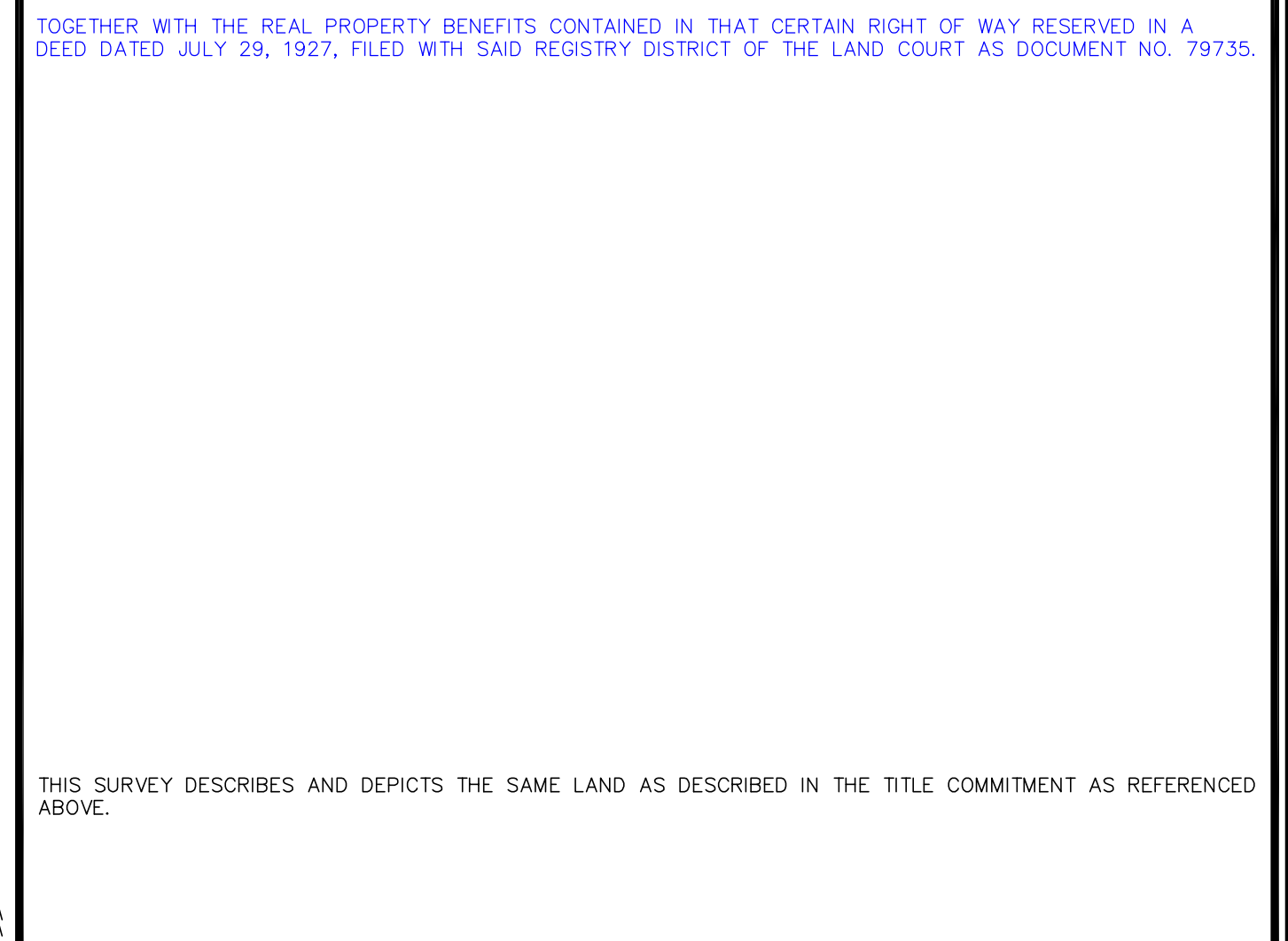
THE LAND AT 369 MAIN STREET, WAKEFIELD, MIDDLESEX COUNTY, MASSACHUSETTS CONSISTING OF THREE PARCELS OF LAND, BOUNDED AND DESCRIBED AS FOLLOWS:

PARCEL 1:  
BEING SHOWN AS LOT C ON LAND COURT PLAN NO. 8796A, DATED APRIL, 1922, A COPY OF WHICH IS FILED WITH THE MIDDLESEX SOUTH REGISTRY DISTRICT OF THE LAND COURT WITH CERTIFICATE OF TITLE NO. 13973.

PARCEL 2:  
BEING SHOWN AS LOT SHOWN ON LAND COURT PLAN NO. 19560A, DATED AUGUST 19, 1945, A COPY OF WHICH IS FILED WITH THE MIDDLESEX SOUTH DISTRICT REGISTRY OF THE LAND COURT WITH CERTIFICATE OF TITLE NO. 58441.

PARCEL 3:  
NORTHERLY BY CHESTNUT STREET, SEVENTY-TWO AND 9/10 (72.9) FEET;  
WESTERLY BY LAND FORMERLY OF NEWCOMB NOW OF CURLEY, SEVENTY-FOUR AND 13/100 (74.13) FEET;  
SOUTHERLY BY LAND OF TREDENNIK, THIRTY AND 8/10 (30.8) FEET;  
EASTERLY BY LAND FORMERLY OF CHADSEY NOW OF ROBINSON, ONE AND 7/10 (1.7) FEET;  
SOUTHERLY AGAIN, BY SAID ROBINSON LAND, TWENTY-SIX AND 8/10 (26.8) FEET;  
EASTERLY AGAIN, BY LAND FORMERLY OF GLE NOW OF SPERO, ABOUT FOUR (4) FEET;  
SOUTHERLY AGAIN, BY SAID SPERO LAND, ABOUT EIGHTEEN (18) FEET;  
EASTERLY BY LAND OF WAKEFIELD TRUST, ET AL, SIXTY-THREE AND 22/100 (63.22) FEET.

TOGETHER WITH THE REAL PROPERTY BENEFITS CONTAINED IN THAT CERTAIN RIGHT OF WAY RESERVED IN A DEED DATED JULY 29, 1927, FILED WITH SAID REGISTRY DISTRICT OF THE LAND COURT AS DOCUMENT NO. 79735.



THIS SURVEY DESCRIBES AND DEPICTS THE SAME LAND AS DESCRIBED IN THE TITLE COMMITMENT AS REFERENCED ABOVE.

- 6Diif SURVEYOR'S NOTES**
- NO UNDERGROUND UTILITIES ARE SHOWN ON THIS SURVEY, ONLY ABOVE GROUND VISIBLE EVIDENCE OF UTILITIES ARE SHOWN.
  - ALL STATEMENTS WITHIN THE CERTIFICATION, AND OTHER REFERENCES LOCATED ELSEWHERE HEREON, RELATED TO: UTILITIES, IMPROVEMENTS, STRUCTURES, BUILDINGS, PARTY WALLS, PARKING, EASEMENTS, SERVITUDES, AND ENCROACHMENTS ARE BASED SOLELY ON ABOVE GROUND, VISIBLE EVIDENCE, UNLESS ANOTHER SOURCE OF INFORMATION IS SPECIFICALLY REFERENCED HEREON.
  - THIS SURVEY MEETS OR EXCEEDS THE SURVEY STANDARDS/STANDARDS OF CARE AS SET FORTH IN SECTION 3 OF THE 2021 ALTA/NSPS SURVEY REQUIREMENTS.
  - ALL PARTS OF THIS SURVEY AND DRAWING HAVE BEEN COMPLETED IN ACCORDANCE WITH THE CURRENT REQUIREMENTS FOR SURVEYING IN THE COMMONWEALTH OF MASSACHUSETTS TO THE BEST OF MY KNOWLEDGE, INFORMATION, AND BELIEF.

**4 LAND AREA** 19,307± SQUARE FEET 0.443± ACRES

**6Biv BEARING BASIS**

BEARINGS SHOWN HEREON ARE BASED ON NORTHERLY LINE OF ALBION STREET, WHICH BEARS S78°29'00"W PER LAND COURT PLAN NO. 19560A.

**5F CEMETERY NOTE**

THERE IS NO VISIBLE EVIDENCE OF CEMETERIES ON SUBJECT PROPERTY.

**9 PARKING SPACES**

REGULAR = 23 HANDICAP = 2 TOTAL = 25

**5Biii ACCESS TO PROPERTY**

THE SUBJECT PROPERTY HAS DIRECT PHYSICAL ACCESS TO CHESTNUT STREET & ALBION STREET, EACH A DEDICATED PUBLIC STREET OR HIGHWAY.

**16 EARTH MOVING NOTE**

THERE IS NO OBSERVABLE EVIDENCE OF EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS WITHIN RECENT MONTHS.

**6Bvii CONTIGUITY STATEMENT**

THE PARCELS CONTAINED IN THE LEGAL DESCRIPTION ARE CONTIGUOUS WITHOUT ANY GAPS, GORES OR OVERLAPS.

**7 SURVEYOR'S CERTIFICATE**

TO: KINGMAN BLOCK, LLC AND CHICAGO TITLE INSURANCE COMPANY:

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2021 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 2, 3, 4, 7(a), 7(b)(1), 7(c), 8, 9, 13, 14, 16, AND 19 OF TABLE A THEREOF.

THE FIELD WORK WAS COMPLETED ON 12/31/2019, UPDATED 04/08/2021.  
DATE OF PLAT OR MAP: 01/09/2020, UPDATED 04/15/2021.

PROFESSIONAL LAND SURVEYOR NO: 46824  
COMMONWEALTH OF MASSACHUSETTS  
PROJECT NO: 2112459 31163

*Kevin Blake* 6/7/21  
KEVIN BLAKE DATE

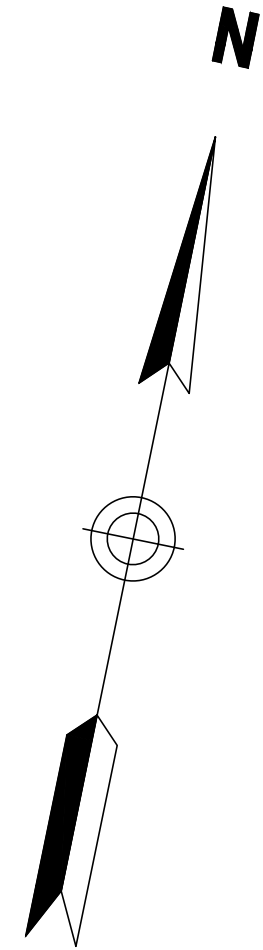
PROFESSIONAL LAND SURVEYOR

AMERICAN SURVEYING & MAPPING, INC.  
3191 MAGUIRE BLVD., SUITE 200  
ORLANDO, FL 32803  
CERTIFICATE OF AUTHORIZATION # 17000  
PHONE: (407) 426-7979  
FAX: (407) 426-9741  
INFO@ASMCORPORATE.COM

NATIONAL DUE DILIGENCE SERVICES  
A DIVISION OF AMERICAN SURVEYING & MAPPING, INC.  
3191 Maguire Blvd., Suite 200, Orlando, FL 32803  
Phone: 407-426-7979 nationaldue@asm.com

ALTA/NSPS LAND TITLE SURVEY  
369 MAIN STREET  
WAKEFIELD, MASSACHUSETTS  
MIDDLESEX COUNTY

LINE TABLE(C)			
LINE #	DIRECTION	LENGTH	LENGTH
L1	N10°57'29"W	1.72'	
L2	S78°24'55"W	27.51'	
L3	S07°15'22"E	5.36'	
L4	S78°57'31"W	30.64'	
L5	S05°09'05"E	1.89'	
L6	S78°57'26"W	26.42'	
L8	S03°41'36"E	2.15'	
L9	S82°10'23"W	31.14'	



**PARKING CALCULATIONS**

COMPONENT	REQUIRED	PROPOSED
PROPOSED BUILDING: 2 BEDROOMS OR FEWER (20 UNITS)	30 SPACES (1.5 spaces per unit) 20 units x 1.5 spaces = 30 Spaces	18 SPACES (Standard) 8 SPACES (Compact)
EXISTING BUILDING (BANK) 1ST FLOOR RESTAURANT (6,357 S.F.)	(1.0 spaces per 4 seats) (1.0 spaces for each 3 employees)	2 SPACES (Accessible) 28 SPACES

NOTE:  
 1A. TOTAL NUMBER OF PARKING SPACES IN PARKING FACILITY: 28 SPACES  
 MINIMUM NUMBER OF ACCESSIBLE PARKING SPACES REQUIRED FOR 28-50 SPACES: 2 SPACES  
 2A. STANDARD SPACES ARE 9'x18'  
 3A. COMPACT SPACES ARE 8'x16' Ⓞ

**SIGN TABLE**

REGULATORY DESCRIPTION	SIGN	SIZE	MOUNTING HEIGHT (LOOKING TO BOTTOM OF SIGN)	DESCRIPTION	REFLECTORIZED
R7-8V		12" X 20"	6' - 0"	GREEN & BLUE ON WHITE	YES
R7-8		12" X 20"	6' - 0"	GREEN & BLUE ON WHITE	YES
R3-2		24" X 24"	7' - 0"	BLACK & RED ON WHITE	YES
R5-1		24" X 24"	7' - 0"	WHITE ON RED	YES
R1-1		24" X 24"	7' - 0"	WHITE ON RED	YES

ALL SIGNS AND PAVEMENT MARKINGS TO BE INSTALLED SHALL CONFORM TO THE APPLICABLE SPECIFICATIONS OF THE CURRENT EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD)

**LAND USAGE TABLE**

ITEM	BUSINESS (B)		
	REQUIRED	EXISTING BLDG & ATM	EXIST. BLDG & PROP. MULTIFAMILY
MINIMUM LOT SIZE	-	19,307 SF	19,307 SF
MINIMUM LOT FRONTAGE (CHESTNUT)	40 FT	257.85 FT	257.85 FT
MINIMUM LOT WIDTH	40 FT	257.85 FT	257.85 FT
FLOOR AREA RATIO	1.5	0.90	1.98
MINIMUM FRONT YARD SETBACK (chestnut)	-	4.1 FT	2.5 FT
MINIMUM SIDE YARD SETBACK (RIGHT)	-	93.2 FT	9.5 FT <sup>(2)</sup>
MINIMUM SIDE YARD SETBACK (LT)	-	1.6 FT	1.6 FT
MINIMUM REAR YARD SETBACK	-	0 FT	0 FT
MAXIMUM STORIES	-	2	4
MAXIMUM HEIGHT	60 FT	35.6 FT	47.0
MAXIMUM BUILDING COVERAGE	80%	33.7%	66.9
MINIMUM OPEN AREA	10%	0.7%	2.2%

(1) EAR CALCULATION

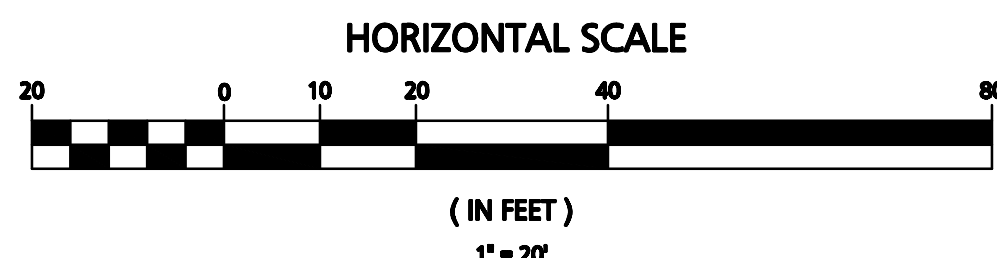
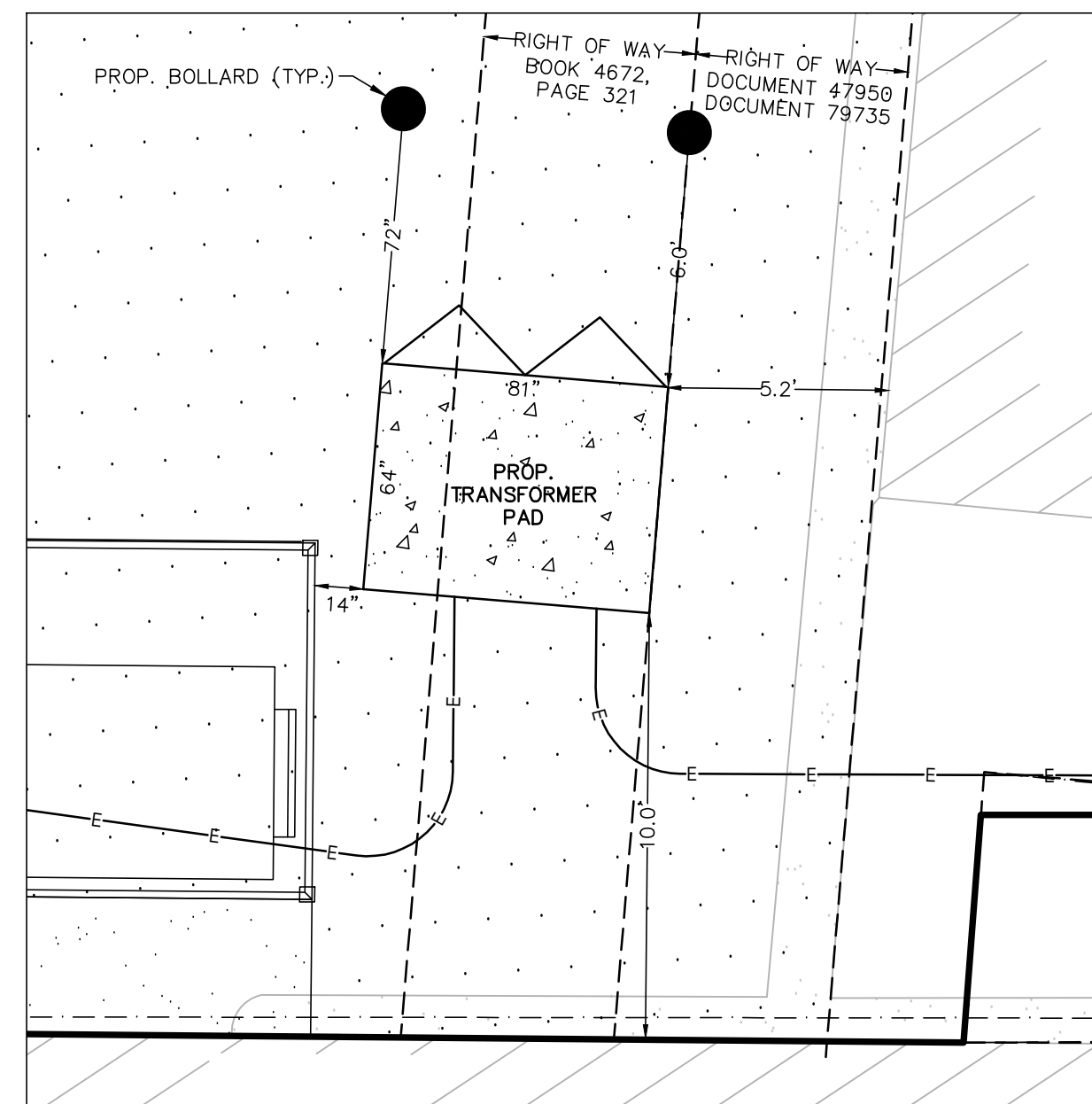
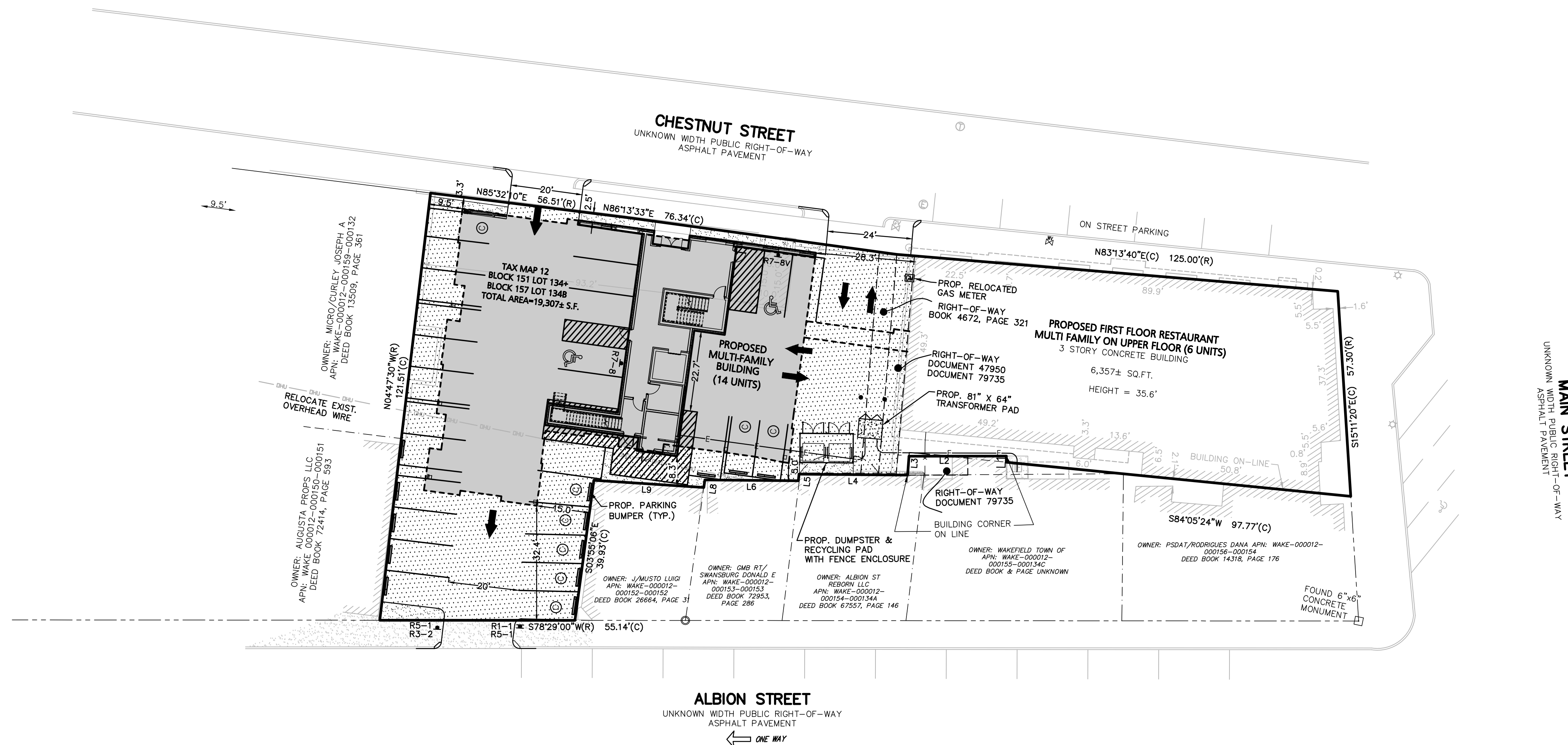
EXISTING BUILDING GROSS FLOOR AREA = 17,140 S.F.  
 PROPOSED BUILDING GROSS FLOOR AREA = 21,012 S.F.  
 TOTAL GROSS FLOOR AREA = 38,152 S.F.  
 $F.A.R. = 38,152 \text{ S.F.} \div 19,307 \text{ S.F.} = 1.98$

(2) A MINIMUM OF 15 FEET ADJACENT TO A RESIDENTIAL DISTRICT, 10 FEET OF WHICH SHALL NOT BE PAVED.

**ZONING TABLE**

ITEM	MULTIFAMILY DWELLING / MIXED USE	
	REQUIRED	PROVIDED
MAXIMUM LOT COVERAGE	35%	66.9%
MINIMUM OPEN AREA	30%	2.2%
LOT FRONTAGE	180 FT	257.85 FT
LOT WIDTH	180 FT	257.85 FT
MAXIMUM HEIGHT	50 FT	47.0 FT
MAXIMUM NUMBER OF STORIES	5	4
MINIMUM FRONT SETBACK (Chestnut Street) <sup>1</sup>	47 FT	2.5 FT
MINIMUM SIDE YARD SETBACK (RIGHT) <sup>1</sup>	47 FT	9.5 FT
MINIMUM SIDE YARD SETBACK (LT) <sup>1</sup>	47 FT	1.6 FT
MINIMUM REAR SETBACK <sup>1</sup>	47 FT	0 FT
MINIMUM LOT AREA	4,000 SF	19,307 SF
DISTANCE BETWEEN UNATTACHED BUILDINGS	50 FT	28.3'

ZONING TABLE NOTE:  
 1. OR HEIGHT OF BUILDING, WHICHEVER IS GREATER



ISSUED WITH SD SET	12-9-22	DATE
MODIFY PER UPDATED ARCHITECTURAL DRAWINGS	11-11-22	DATE
DESCRIPTION OF REVISIONS		

**Engineering Alliance, Inc.**  
 Civil Engineering & Land Planning Consultants  
 194 Central Street  
 Portsmouth, NH 03801  
 Tel: (603) 610-7100  
 Fax: (603) 610-7101

**Proposed Site Development Plans**  
**369&371 Main Street**  
 (Tax Map 12 Blocks 151&157 Lots 134&81348)  
**Wakefield, Massachusetts**

PROJECT #: 20-1340Z  
 SCALE: AS NOTED  
 DESIGN BY: Garrett Anderson

DATE: July 14, 2022  
 DWG FILE NAME: 20-1340Z.dwg  
 CHECKED BY: Richard A. Salvo, P.E.

Professional Engineer for  
 Engineering Alliance, Inc.

**Kingman Block, LLC.**  
 99 East Elm Street  
 Everett, MA 02149

DWG. NO. **C-2**  
 DRAWING TITLE: **Site Layout Plan**

PROJECT NAME

**369 MAIN STREET  
RESIDENCES**

PROJECT ADDRESS

369 MAIN STREET  
WAKEFIELD MA

CLIENT

**WILLIAM THIBAUT**

ARCHITECT



17 IVALOO STREET SUITE 400  
SOMERVILLE, MA 02143  
TELEPHONE: 617-591-8682

CONSULTANTS:

COPYRIGHT KDI © 2022  
THESE DRAWINGS ARE NOW AND DO  
REMAIN THE SOLE PROPERTY OF KHALSA  
DESIGN INC. USE OF THESE PLANS OR ANY  
FORM OF REPRODUCTION OF THIS DESIGN  
IN WHOLE OR IN PART WITHOUT EXPRESS  
WRITTEN CONSENT IS PROHIBITED AND  
SHALL RESULT IN THE FULLEST EXTENT  
OF PROSECUTION UNDER LAW

REGISTRATION



Project number 21078  
Date 12/9/2022  
Drawn by MI  
Checked by JSK  
Scale 3/32" = 1'-0"

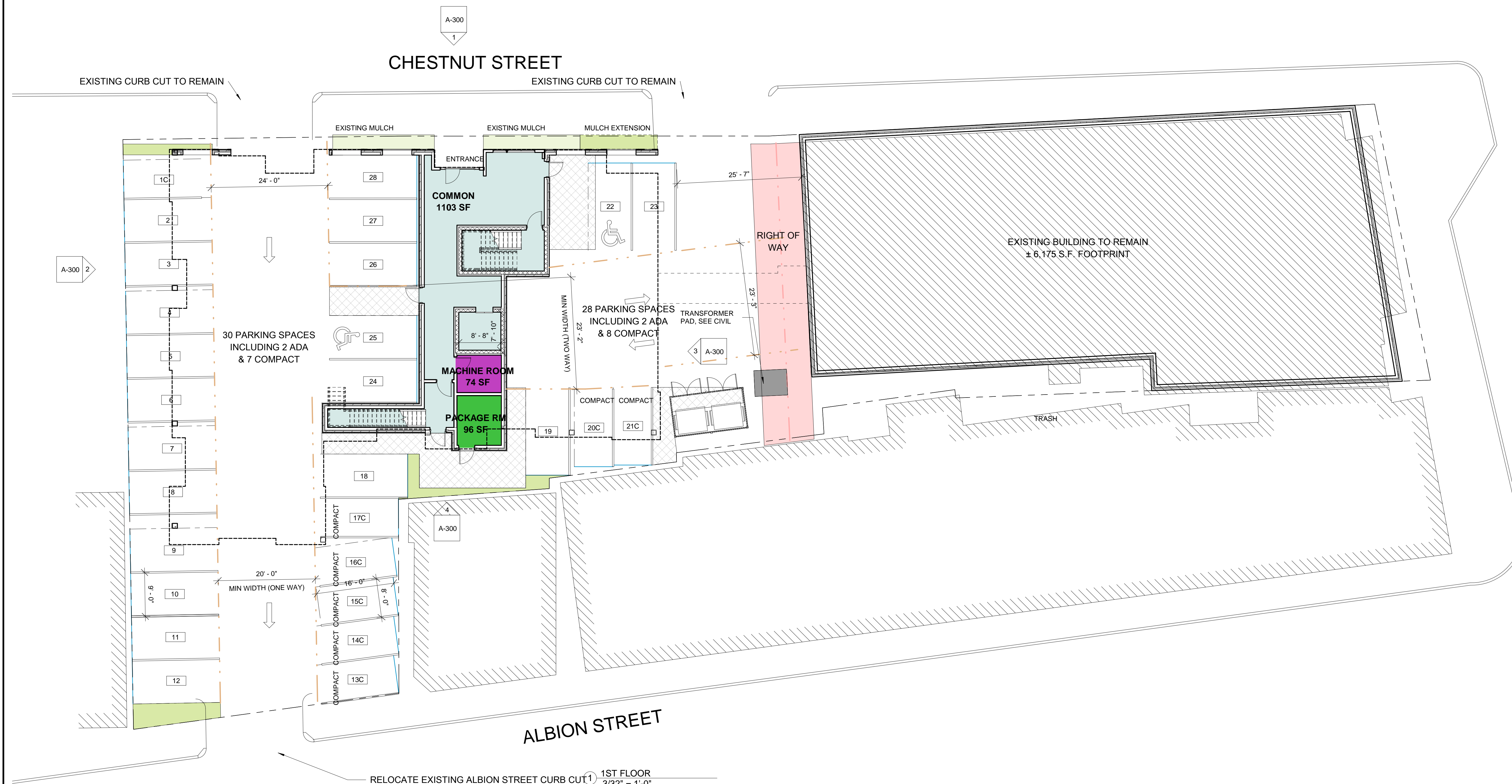
REVISIONS

No.	Description	Date

**FIRST FLOOR  
PLAN**

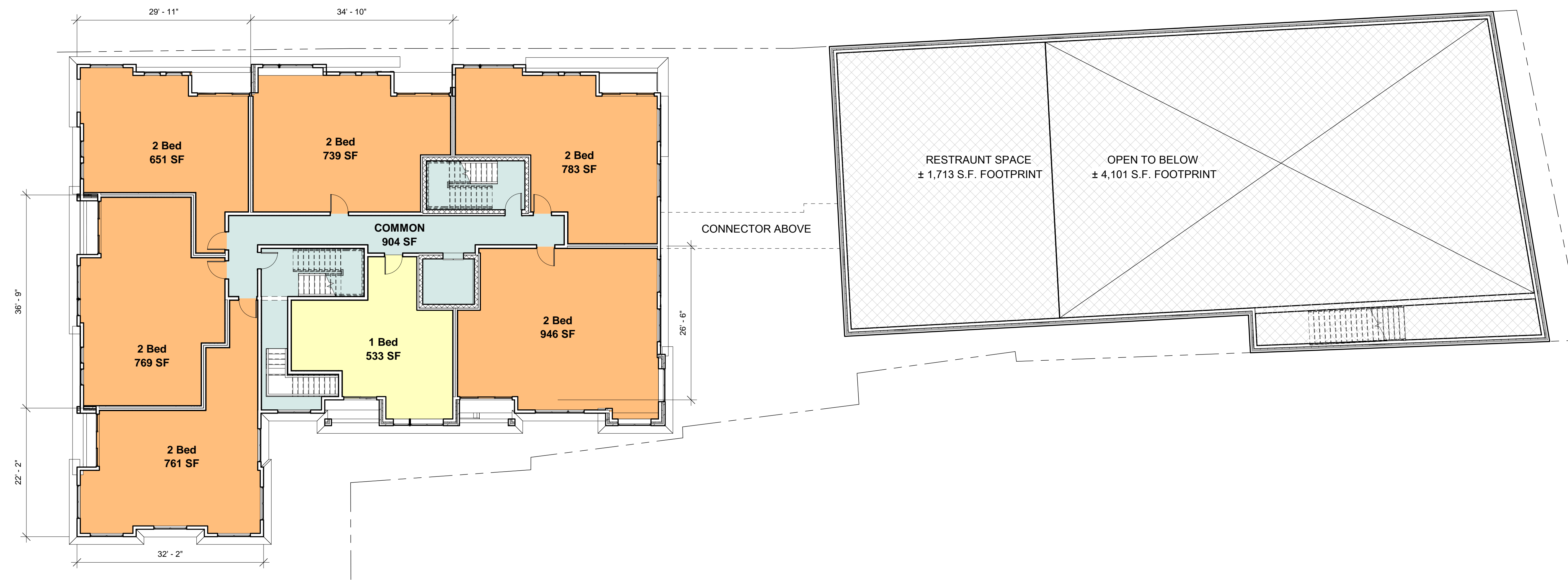
**A-100**

369 MAIN STREET RESIDENCES



RELOCATE EXISTING ALBION STREET CURB CUT 1 1ST FLOOR  
3/32" = 1'-0"

12/9/2022 1:50:41 PM \\ITKG-SERVER\DR\Dan\21078\_Billy\_T\_369 Main St Wakefield\03 Drawings\00\_ARCH\_SD\_DD\369 MAIN ST WAKEFIELD-SD-SCHEME 1.rvt



① 2ND FLOOR  
3/32" = 1'-0"

PROJECT NAME

**369 MAIN STREET  
RESIDENCES**

PROJECT ADDRESS

369 MAIN STREET  
WAKEFIELD MA

CLIENT

**WILLIAM THIBAUT**

ARCHITECT



17 IVALOO STREET SUITE 400  
SOMERVILLE, MA 02143  
TELEPHONE: 617-591-8682

CONSULTANTS:

COPYRIGHT KDI © 2022  
THESE DRAWINGS ARE NOW AND DO  
REMAIN THE SOLE PROPERTY OF KHALSA  
DESIGN INC. USE OF THESE PLANS OR ANY  
FORM OF REPRODUCTION OF THIS DESIGN  
IN WHOLE OR IN PART WITHOUT EXPRESS  
WRITTEN CONSENT IS PROHIBITED AND  
SHALL RESULT IN THE FULLEST EXTENT  
OF PROSECUTION UNDER LAW

REGISTRATION



Project number 21078  
Date 12/9/2022  
Drawn by Author  
Checked by Checker  
Scale 3/32" = 1'-0"

REVISIONS

No.	Description	Date

SECOND FLOOR

**A-101**

369 MAIN STREET RESIDENCES

PROJECT NAME

**369 MAIN STREET RESIDENCES**

PROJECT ADDRESS

369 MAIN STREET  
WAKEFIELD MA

CLIENT

**WILLIAM THIBAUT**

ARCHITECT



17 IVALOO STREET SUITE 400  
SOMERVILLE, MA 02143  
TELEPHONE: 617-591-8682

CONSULTANTS:

COPYRIGHT KDI © 2022  
THESE DRAWINGS ARE NOW AND DO  
REMAIN THE SOLE PROPERTY OF KHALSA  
DESIGN INC. USE OF THESE PLANS OR ANY  
FORM OF REPRODUCTION OF THIS DESIGN  
IN WHOLE OR IN PART WITHOUT EXPRESS  
WRITTEN CONSENT IS PROHIBITED AND  
SHALL RESULT IN THE FULLEST EXTENT  
OF PROSECUTION UNDER LAW

REGISTRATION



Project number 21078  
Date 12/9/2022  
Drawn by MI  
Checked by JSK  
Scale As indicated

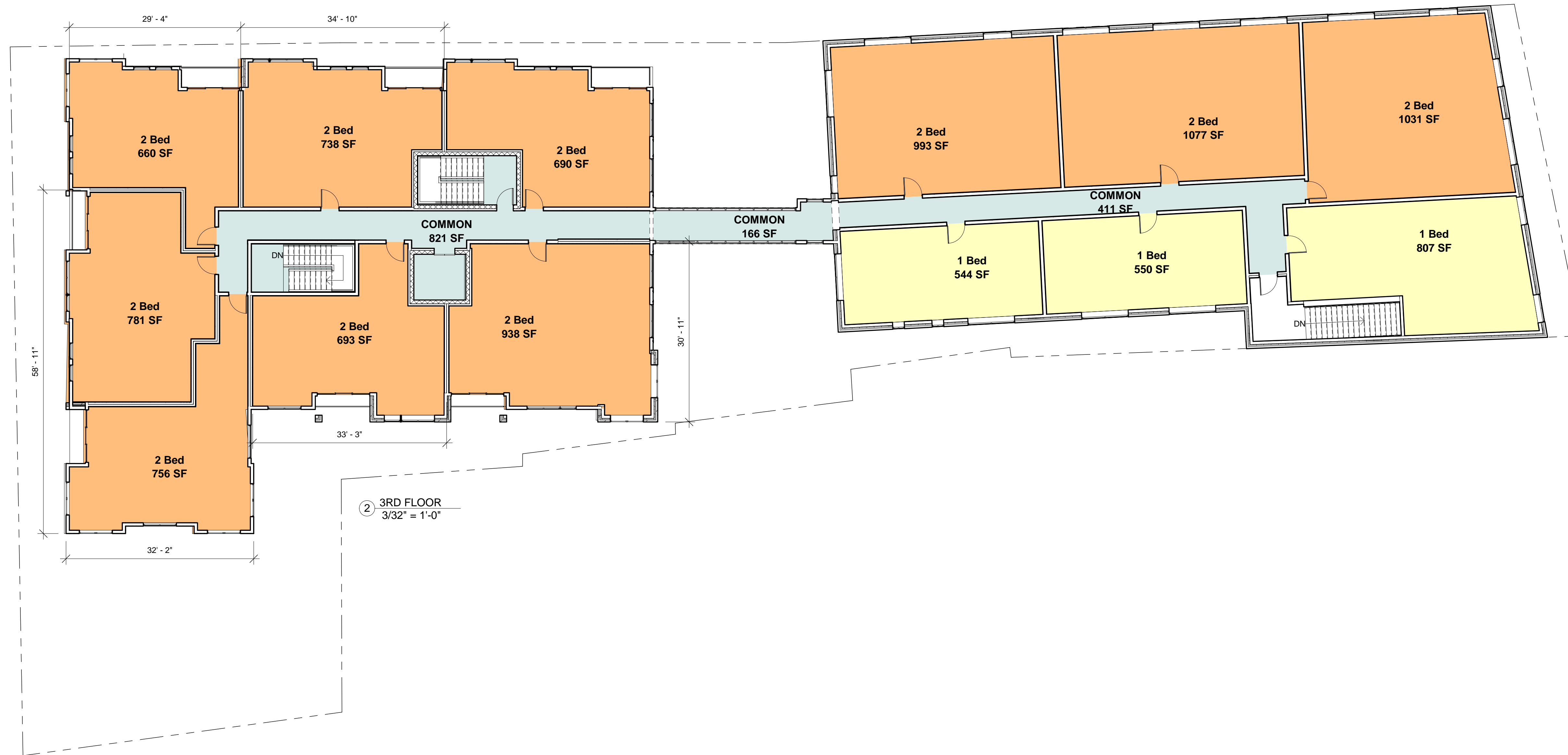
REVISIONS

No.	Description	Date

**THIRD FLOOR PLANS**

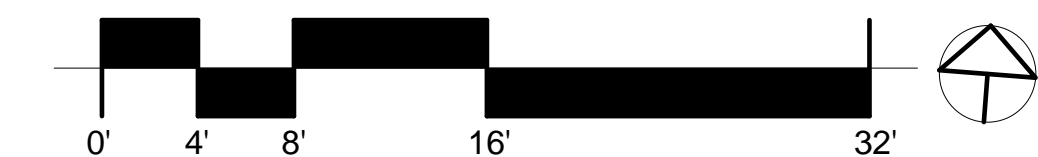
**A-102**

369 MAIN STREET RESIDENCES



UNIT BREAKDOWN BY FLOOR

FLOOR	1 BEDROOM	2 BEDROOM	3 BEDROOM	TOTAL	COMMENTS
2- ADDITION	1	6	0	7	
3- ADDITION	0	7	0	7	
3 EXIST. BUILD.	3	3	0	6	
<b>TOTAL</b>	<b>4 (20%)</b>	<b>16 (80%)</b>	<b>0 (0%)</b>	<b>20</b>	



I:\TKG-SERVER\Drawings\00\_Drawings\00\_ARCH\_SD\_DD\369 MAIN ST WAKEFIELD-SD-SCHEME 1.rvt

12/9/2022 1:50:45 PM

PROJECT NAME

**369 MAIN STREET  
RESIDENCES**

PROJECT ADDRESS

369 MAIN STREET  
WAKEFIELD MA

CLIENT

**WILLIAM THIBAUT**

ARCHITECT



17 IVALOO STREET SUITE 400  
SOMERVILLE, MA 02143  
TELEPHONE: 617-591-8682

CONSULTANTS:

COPYRIGHT KDI © 2022  
THESE DRAWINGS ARE NOW AND DO  
REMAIN THE SOLE PROPERTY OF KHALSA  
DESIGN INC. USE OF THESE PLANS OR ANY  
FORM OF REPRODUCTION OF THIS DESIGN  
IN WHOLE OR IN PART WITHOUT EXPRESS  
WRITTEN CONSENT IS PROHIBITED AND  
SHALL RESULT IN THE FULLEST EXTENT  
OF PROSECUTION UNDER LAW

REGISTRATION



Project number 21078  
Date 12/9/2022  
Drawn by Author  
Checked by Checker  
Scale 3/32" = 1'-0"

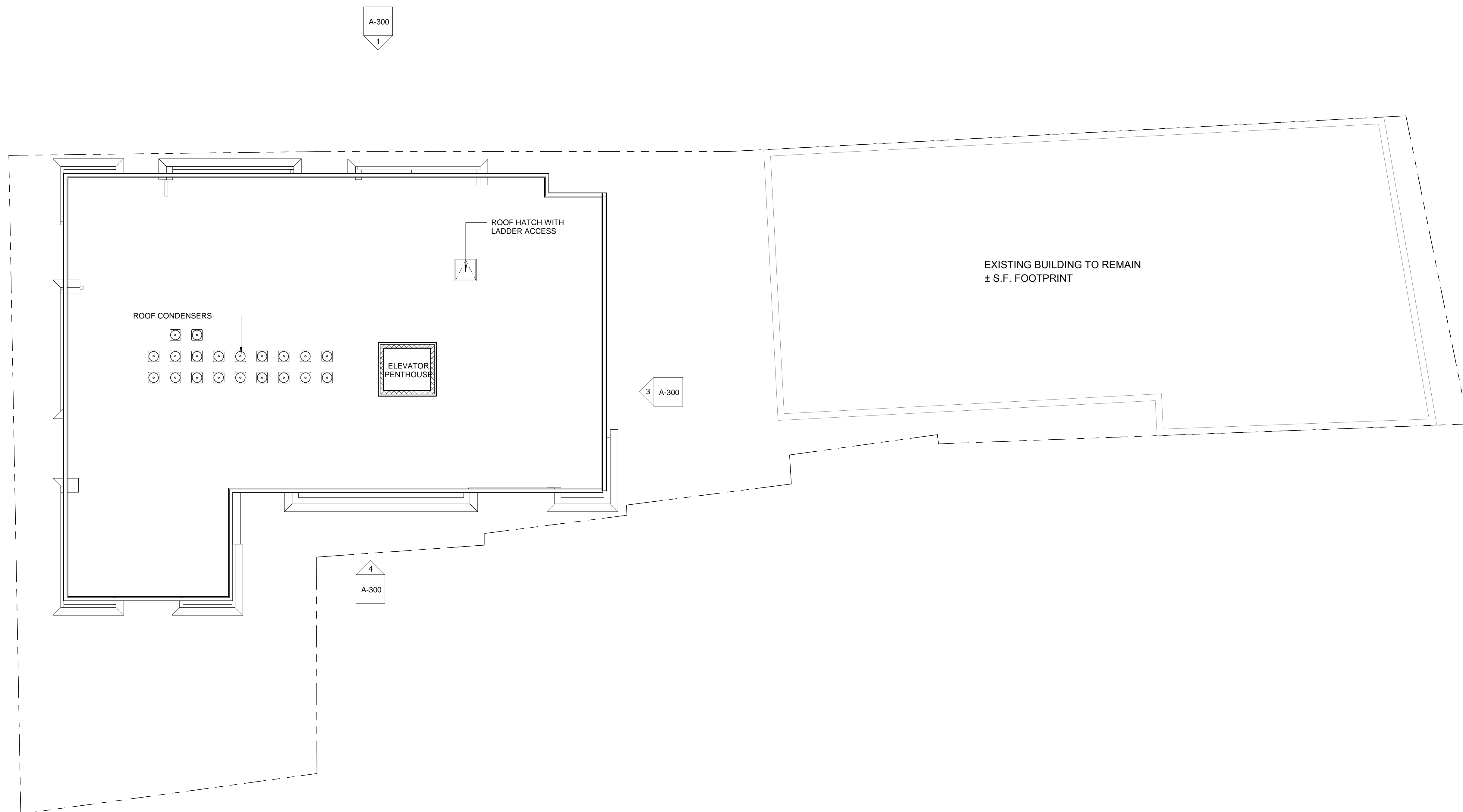
REVISIONS

No.	Description	Date

ROOF PLAN

**A-103**

369 MAIN STREET RESIDENCES



① ROOF  
3/32" = 1'-0"



PROJECT NAME

**369 MAIN STREET  
RESIDENCES**

PROJECT ADDRESS

369 MAIN STREET  
WAKEFIELD MA

CLIENT

**WILLIAM THIBAUT**

ARCHITECT



17 IVALOO STREET SUITE 400  
SOMERVILLE, MA 02143  
TELEPHONE: 617-591-8682

CONSULTANTS:

COPYRIGHT KDI © 2022  
THESE DRAWINGS ARE NOW AND DO  
REMAIN THE SOLE PROPERTY OF KHALSA  
DESIGN INC. USE OF THESE PLANS OR ANY  
FORM OF REPRODUCTION OF THIS DESIGN  
IN WHOLE OR IN PART WITHOUT EXPRESS  
WRITTEN CONSENT IS PROHIBITED AND  
SHALL RESULT IN THE FULLEST EXTENT  
OF PROSECUTION UNDER LAW

REGISTRATION



Project number 21078  
Date 12/9/2022  
Drawn by MI  
Checked by JSK  
Scale 1/8" = 1'-0"

REVISIONS

No.	Description	Date

ELEVATIONS

**A-300**

369 MAIN STREET RESIDENCES



① Front (Chestnut Street) Elevation  
1/8" = 1'-0"



② Right Side Elevation  
1/8" = 1'-0"



④ Rear Elevation  
1/8" = 1'-0"



③ Left Side Elevation  
1/8" = 1'-0"



FRONT ELEVATION RENDERING AT MAIN STREET

# SCHEME 1



FRONT ELEVATION PERSPECTIVE RENDERING AT MAIN STREET



FRONT ELEVATION



LEFT ELEVATION



REAR ELEVATION



RIGHT ELEVATION ELEVATION

PROJECT NAME

**369 MAIN STREET  
RESIDENCES**

PROJECT ADDRESS

369 MAIN STREET  
WAKEFIELD MA

CLIENT

**WILLIAM THIBAUT**

ARCHITECT



**KHALSA**

17 IVALOO STREET SUITE 400  
SOMERVILLE, MA 02143  
TELEPHONE: 617-591-8682

CONSULTANTS:

COPYRIGHT KDI © 2022  
THESE DRAWINGS ARE NOW AND DO  
REMAIN THE SOLE PROPERTY OF KHALSA  
DESIGN INC. USE OF THESE PLANS OR ANY  
FORM OF REPRODUCTION OF THIS DESIGN  
IN WHOLE OR IN PART WITHOUT EXPRESS  
WRITTEN CONSENT IS PROHIBITED AND  
SHALL RESULT IN THE FULLEST EXTENT  
OF PROSECUTION UNDER LAW

REGISTRATION



Project number 21078  
Date 12/9/2022  
Drawn by Author  
Checked by Checker  
Scale

REVISIONS

No.	Description	Date

**SCHEME 1  
ELEVATIONS &  
RENDERING**

**A-303**

369 MAIN STREET RESIDENCES



FRONT ELEVATION RENDERING AT MAIN STREET

# SCHEME 2



FRONT ELEVATION PERSPECTIVE RENDERING AT MAIN STREET



FRONT ELEVATION



LEFT ELEVATION



REAR ELEVATION



RIGHT ELEVATION ELEVATION

PROJECT NAME

**369 MAIN STREET  
RESIDENCES**

PROJECT ADDRESS

369 MAIN STREET  
WAKEFIELD MA

CLIENT

**WILLIAM THIBAUT**

ARCHITECT



17 IVALOO STREET SUITE 400  
SOMERVILLE, MA 02143  
TELEPHONE: 617-591-8682

CONSULTANTS:

COPYRIGHT KDI © 2022  
THESE DRAWINGS ARE NOW AND DO  
REMAIN THE SOLE PROPERTY OF KHALSA  
DESIGN INC. USE OF THESE PLANS OR ANY  
FORM OF REPRODUCTION OF THIS DESIGN  
IN WHOLE OR IN PART WITHOUT EXPRESS  
WRITTEN CONSENT IS PROHIBITED AND  
SHALL RESULT IN THE FULLEST EXTENT  
OF PROSECUTION UNDER LAW

REGISTRATION



Project number	21078
Date	12/9/2022
Drawn by	Author
Checked by	Checker
Scale	

REVISIONS

No.	Description	Date

**SCHEME 2  
ELEVATIONS &  
RENDERING**

**A-304**

369 MAIN STREET RESIDENCES



FRONT ELEVATION RENDERING AT MAIN STREET

# SCHEME 3



FRONT ELEVATION PERSPECTIVE RENDERING AT MAIN STREET



FRONT ELEVATION



LEFT ELEVATION



REAR ELEVATION



RIGHT ELEVATION ELEVATION

PROJECT NAME

**369 MAIN STREET  
RESIDENCES**

PROJECT ADDRESS

369 MAIN STREET  
WAKEFIELD MA

CLIENT

**WILLIAM THIBAUT**

ARCHITECT



17 IVALOO STREET SUITE 400  
SOMERVILLE, MA 02143  
TELEPHONE: 617-591-8682

CONSULTANTS:

COPYRIGHT KDI © 2022  
THESE DRAWINGS ARE NOW AND DO  
REMAIN THE SOLE PROPERTY OF KHALSA  
DESIGN INC. USE OF THESE PLANS OR ANY  
FORM OF REPRODUCTION OF THIS DESIGN  
IN WHOLE OR IN PART WITHOUT EXPRESS  
WRITTEN CONSENT IS PROHIBITED AND  
SHALL RESULT IN THE FULLEST EXTENT  
OF PROSECUTION UNDER LAW

REGISTRATION



Project number	21078
Date	12/9/2022
Drawn by	Author
Checked by	Checker
Scale	

REVISIONS

No.	Description	Date

**SCHEME 3  
ELEVATIONS &  
RENDERING**

**A-305**

369 MAIN STREET RESIDENCES

# PREVIOUS DESIGN



# SCHEME 1



REAR ELEVATION RENDERING AT ALBION ST / FOSTER ST INTERSECTION

# SCHEME 1



# SCHEME 2



# SCHEME 3



PROJECT NAME

**369 MAIN STREET RESIDENCES**

PROJECT ADDRESS

369 MAIN STREET  
WAKEFIELD MA

CLIENT

**WILLIAM THIBAUT**

ARCHITECT



17 IVALOO STREET SUITE 400  
SOMERVILLE, MA 02143  
TELEPHONE: 617-591-8682

CONSULTANTS:

COPYRIGHT KDI © 2022  
THESE DRAWINGS ARE NOW AND DO  
REMAIN THE SOLE PROPERTY OF KHALSA  
DESIGN INC. USE OF THESE PLANS OR ANY  
FORM OF REPRODUCTION OF THIS DESIGN  
IN WHOLE OR IN PART WITHOUT EXPRESS  
WRITTEN CONSENT IS PROHIBITED AND  
SHALL RESULT IN THE FULLEST EXTENT  
OF PROSECUTION UNDER LAW

REGISTRATION



Project number 21078  
Date 12/9/2022  
Drawn by Author  
Checked by Checker  
Scale

REVISIONS

No.	Description	Date

SCHEME  
COMPARISON

**A-306**

369 MAIN STREET RESIDENCES



# SCHEME 1

FRONT ELEVATION PERSPECTIVE RENDERING AT MAIN STREET

**PROJECT NAME**

**369 MAIN STREET  
RESIDENCES**

**PROJECT ADDRESS**

369 MAIN STREET  
WAKEFIELD MA

**CLIENT**

**WILLIAM THIBAUT**

**ARCHITECT**



17 IVALOO STREET SUITE 400  
SOMERVILLE, MA 02143  
TELEPHONE: 617-591-8682

**CONSULTANTS:**

COPYRIGHT KDI © 2022  
THESE DRAWINGS ARE NOW AND DO  
REMAIN THE SOLE PROPERTY OF KHALSA  
DESIGN INC. USE OF THESE PLANS OR ANY  
FORM OF REPRODUCTION OF THIS DESIGN  
IN WHOLE OR IN PART WITHOUT EXPRESS  
WRITTEN CONSENT IS PROHIBITED AND  
SHALL RESULT IN THE FULLEST EXTENT  
OF PROSECUTION UNDER LAW

**REGISTRATION**



Project number 21078  
Date 12/9/2022  
Drawn by Author  
Checked by Checker  
Scale

**REVISIONS**

No.	Description	Date

RENDERING 1

**A-307**

369 MAIN STREET RESIDENCES



# SCHEME 2

FRONT ELEVATION PERSPECTIVE RENDERING AT MAIN STREET

**PROJECT NAME**

**369 MAIN STREET  
RESIDENCES**

**PROJECT ADDRESS**

369 MAIN STREET  
WAKEFIELD MA

**CLIENT**

**WILLIAM THIBAUT**

**ARCHITECT**



17 IVALOO STREET SUITE 400  
SOMERVILLE, MA 02143  
TELEPHONE: 617-591-8682

**CONSULTANTS:**

COPYRIGHT KDI © 2022  
THESE DRAWINGS ARE NOW AND DO  
REMAIN THE SOLE PROPERTY OF KHALSA  
DESIGN INC. USE OF THESE PLANS OR ANY  
FORM OF REPRODUCTION OF THIS DESIGN  
IN WHOLE OR IN PART WITHOUT EXPRESS  
WRITTEN CONSENT IS PROHIBITED AND  
SHALL RESULT IN THE FULLEST EXTENT  
OF PROSECUTION UNDER LAW

**REGISTRATION**



Project number 21078  
Date 12/9/2022  
Drawn by Author  
Checked by Checker  
Scale

**REVISIONS**

No.	Description	Date

RENDERING 2

**A-308**

369 MAIN STREET RESIDENCES



# SCHEME 3

FRONT ELEVATION PERSPECTIVE RENDERING AT MAIN STREET

**PROJECT NAME**

**369 MAIN STREET  
RESIDENCES**

**PROJECT ADDRESS**

369 MAIN STREET  
WAKEFIELD MA

**CLIENT**

**WILLIAM THIBAUT**

**ARCHITECT**



17 IVALOO STREET SUITE 400  
SOMERVILLE, MA 02143  
TELEPHONE: 617-591-8682

**CONSULTANTS:**

COPYRIGHT KDI © 2022  
THESE DRAWINGS ARE NOW AND DO  
REMAIN THE SOLE PROPERTY OF KHALSA  
DESIGN INC. USE OF THESE PLANS OR ANY  
FORM OF REPRODUCTION OF THIS DESIGN  
IN WHOLE OR IN PART WITHOUT EXPRESS  
WRITTEN CONSENT IS PROHIBITED AND  
SHALL RESULT IN THE FULLEST EXTENT  
OF PROSECUTION UNDER LAW

**REGISTRATION**



Project number 21078  
Date 12/9/2022  
Drawn by Author  
Checked by Checker  
Scale

**REVISIONS**

No.	Description	Date

RENDERING 3

**A-309**

369 MAIN STREET RESIDENCES





PROJECT NAME

**369 MAIN STREET  
RESIDENCES**

PROJECT ADDRESS

**369 MAIN STREET  
WAKEFIELD MA**

CLIENT

**WILLIAM THIBAUT**

ARCHITECT



17 IVALOO STREET SUITE 400  
SOMERVILLE, MA 02143  
TELEPHONE: 617-591-8682

CONSULTANTS:

COPYRIGHT KDI © 2022  
THESE DRAWINGS ARE NOW AND DO  
REMAIN THE SOLE PROPERTY OF KHALSA  
DESIGN INC. USE OF THESE PLANS OR ANY  
FORM OF REPRODUCTION OF THIS DESIGN  
IN WHOLE OR IN PART WITHOUT EXPRESS  
WRITTEN CONSENT IS PROHIBITED AND  
SHALL RESULT IN THE FULLEST EXTENT  
OF PROSECUTION UNDER LAW

REGISTRATION



Project number	21078
Date	12/9/2022
Drawn by	MI
Checked by	JSK
Scale	

REVISIONS

No.	Description	Date

AERIAL VIEW

**AV-2**

369 MAIN STREET RESIDENCES

# Transportation Impact Assessment

Proposed Mixed-Use Development  
369 & 371 Main Street  
Wakefield, Massachusetts

*Prepared for:*

Kingman Block, LLC  
Everett, Massachusetts

November 2022

*Prepared by:*



35 New England Business Center Drive  
Suite 140  
Andover, MA 01810



# CONTENTS

---

EXECUTIVE SUMMARY .....	1
INTRODUCTION.....	5
Study Methodology .....	5
EXISTING CONDITIONS .....	6
Geometry .....	6
Existing Traffic Volumes .....	7
Pedestrian and Bicycle Facilities.....	9
Public Transportation .....	9
Safety Analysis.....	10
FUTURE CONDITIONS .....	12
Future Traffic Growth .....	12
General Background Traffic Growth.....	12
Specific Development by Others.....	13
Roadway Improvement Projects.....	14
No-Build Traffic Volumes .....	15
Project-Generated Traffic.....	16
Trip Distribution and Assignment .....	18
Future Traffic Volumes - Build Condition .....	19
Parking Analysis.....	20
SIGHT DISTANCE EVALUATION.....	22

## **CONTENTS (Continued)**

---

TRAFFIC OPERATIONS ANALYSIS .....	24
Methodology .....	24
Analysis Results .....	27
CONCLUSIONS AND RECOMMENDATIONS .....	33
Recommendations .....	33
Conclusions .....	35

## FIGURES

---

No.	Title
1	Site Location and Study Area Map
2	Existing Intersection Lane Use, Travel Lane Width, and Pedestrian Facilities
3	2022 Existing Weekday Morning Peak-Hour Traffic Volumes
4	2022 Existing Weekday Evening Peak-Hour Traffic Volumes
5	2029 No-Build Weekday Morning Peak-Hour Traffic Volumes
6	2029 No-Build Weekday Evening Peak-Hour Traffic Volumes
7	Trip Distribution Map
8	Net New Project-Generated Weekday Morning Peak-Hour Traffic Volumes
9	Net New Project-Generated Weekday Evening Peak-Hour Traffic Volumes
10	2029 Build Weekday Morning Peak-Hour Traffic Volumes
11	2029 Build Weekday Evening Peak-Hour Traffic Volumes
12	Existing On-Street Parking Supply

## **TABLES**

---

No.	Title
1	Existing Roadway Traffic-Volume Summary
2	Motor Vehicle Crash Data Summary
3	Existing Site Trip Generation
4	Project-Generated Trips
5	Net New Project-Generated Trips
6	Trip-Distribution Summary
7	Peak-Hour Traffic-Volume Increases
8	Parking Analysis
9	Sight Distance Measurements
10	Level-of-Service Criteria for Signalized Intersections
11	Level-of-Service Criteria for Unsignalized Intersections
12	Signalized Intersection Level-of-Service and Vehicle Queue Summary
13	Unsignalized Intersection Level-of-Service and Vehicle Queue Summary

## **EXECUTIVE SUMMARY**

---

Vanasse & Associates, Inc. (VAI) has prepared this Transportation Impact Assessment (TIA) in order to evaluate potential traffic impacts associated with the proposed mixed-use development to be located at 369 and 371 Main Street in Wakefield, Massachusetts (the “Project”). This study evaluates the following specific areas as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; and identifies and analyzes existing and future traffic conditions, both with and without the Project.

### **PROJECT DESCRIPTION**

The proposed Project entails restoration of an existing bank building and construction of a new three-story building that will be located in the current parking lot area behind the bank. Together, the bank building and the new three-story building will contain 20 multifamily residential units. In addition, a portion of the existing bank will be renovated to provide a restaurant.

The Project will include construction of 28 parking spaces which will be used exclusively for Project residents. Given the location of the Project, the proposed restaurant customers are expected to consist primarily of foot traffic with the available public parking being adequate to accommodate the parking demand of this establishment during its peak hours of operation, expected to be evenings and weekends.

The proposed parking spaces will be provided in a ground-level garage below the residential building. The parking area will be divided into two lots. Vehicle access to one lot will be provided via one full-access driveway onto Chestnut Street. Vehicle access to the second lot will be provided via one-way circulation access where the Chestnut Street driveway will be entrance-only and a driveway onto Albion Street will be exit-only.

### **EXISTING CONDITIONS**

The study area for the analysis was determined in coordination with Town officials and the Town’s traffic peer consultant. A comprehensive field inventory of traffic conditions on the study area intersections was conducted in July 2022. In order to establish base traffic-volume conditions within the study area, manual turning movement counts (TMCs) were conducted in June 2022 and obtained from May 2017, December 2019, and February 2022. In order to develop 2022 Existing



traffic-volume conditions, the data collected in 2022 required adjustments due to the effects of the COVID-19 pandemic upward by 30 percent during typical weekday morning and evening peak periods. Traffic volumes obtained from 2017 and 2019 were expanded to 2022 (same year condition) by applying a background traffic growth rate of 1.0 percent per year.

Regarding safety, all of the study intersections were found to have a motor vehicle crash rate *below* the Massachusetts Department of Transportation (MassDOT) average for the District in which the Project is located (District 4). No fatalities were reported at any of the study area intersections over the five-year period reviewed.

## **FUTURE CONDITIONS**

Traffic volumes within the study area were projected to 2029, which reflects a seven-year planning horizon consistent with State traffic study guidelines. A 1.0 percent per year compounded annual background traffic growth rate was used in order to account for future traffic growth and presently unforeseen development within the study area.

### **Specific Development by Others**

The Town of Wakefield was contacted in order to determine if there are any planned or approved specific development projects within the area that would have an impact on future traffic volumes at the study intersections. Based on these discussions, nine other projects were identified in the general vicinity of the Project site. Traffic from these site-specific projects were incorporated into the study.

### **Planned Roadway Improvements**

The Town of Wakefield was also contacted in order to determine if there are any planned roadway improvement projects expected to be completed within the study area in the seven-year planning horizon. The Town staff indicated that a number of roadway improvement projects under the *Envision Wakefield: Downtown Revitalization* program received funding under the *MassDOT Complete Streets Funding Program*, and accordingly a number of these projects are planned for the area. Currently, only funding for the improvements on Albion Street has been granted through the *Complete Streets* program. Albion's Phase One concept is currently completed. Phase Two will include improvements west of North Avenue and lighting upgrades. While not having a direct impact on the Project site, construction period for these improvements could potentially have a temporary impact on traffic flow in this area.

### **No-Build Traffic Volumes**

The 2029 No-Build weekday morning and evening peak-hour traffic-volume networks were developed by applying the 1.0 percent per year compounded annual background traffic growth rate to the 2022 Existing condition peak-hour traffic volumes plus identified background developments.

### **Site-Generated Traffic Volumes and Directional Distribution**

The proposed Project is expected to generate approximately 4 net new vehicle trips (10 less entering and 14 more exiting) during the weekday morning peak hour and 3 net new vehicle trips (7 more entering and 4 less exiting) during the weekday evening peak hour. The directional distribution of

generated trips to and from the Project site was determined based on a review of journey-to-work data and existing traffic patterns within the study area.

## **TRAFFIC OPERATION ANALYSIS**

In order to assess the impact of the proposed Project on the roadway network, traffic operations analyses were performed at the study intersections under 2022 Existing, 2029 No-Build, and 2029 Build conditions. The addition of site-related traffic will not result in a significant impact on overall operations at the study area intersections.

## **RECOMMENDATIONS**

The following recommendations have been developed as a part of this evaluation and, where applicable, will be completed in conjunction with the Project subject to receipt of all necessary rights, permits, and approvals.

### **Project Access**

Vehicle access will be via a one-way driveway with entry from Chestnut Street and exit to Albion Street and a separate full-access driveway onto Chestnut Street. The following recommendations are offered with respect to Project access, internal circulation, and parking, many of which are already reflected on the Site Plans for the Project:

- The Project site driveways and internal circulating drives should be a minimum of 24 feet in width where two-way traffic is to be conveyed. The proposed parking spaces should have direct access to an aisle or driveway to accommodate the turning and maneuvering requirements, having a minimum width of 20 feet for one-way traffic only, as defined by the Wakefield Zoning by law (Section 190-37. D);
- Vehicles exiting the Project site should be placed under STOP-sign control with a marked STOP-line provided;
- All signs and pavement markings to be installed within the Project site should conform to the applicable standards of the *Manual on Uniform Traffic Control Devices (MUTCD)*;<sup>1</sup>
- Americans with Disabilities Act (ADA)-compliant wheelchair ramps should be provided at all pedestrian crossings of the Project site driveways;
- Signs and landscaping to be installed as a part of the Project within intersection sight triangle areas of the Project site driveways should be designed and maintained so as not to restrict lines of sight;
- Snow windrows within the sight triangle areas of the Project site driveways and at intersections within the Project site should be promptly removed where such accumulations would impede sight lines.

---

<sup>1</sup>*Manual on Uniform Traffic Control Devices (MUTCD)*; Federal Highway Administration; Washington, DC; 2009.

### **Transportation Demand Management (TDM) Plan**

As is the case with many developments, a major focus of the traffic mitigation plan focuses on the reduction of single-occupant vehicles arriving and departing to and from the site. This is predominantly accomplished by developing a comprehensive TDM strategy. In an effort to encourage the use of alternative modes of transportation to single-occupant vehicles, the following TDM measures will be implemented as a part of the Project:

- Information regarding public transportation services, maps, schedules, and fare information should be posted in a central location and/or otherwise made available to residents and employees;
- A “welcome packet” should be provided to residents and employees detailing available public transportation services, bicycle and walking alternatives, and available commuter options;
- Consideration should be given to installing accommodations for the charging of electric vehicles by residents of the Project.

### **CONCLUSIONS**

The proposed Project will not have a significant impact on overall operations. With the implementation of the above recommendations, safe and efficient access will be provided to the planned development and the proposed development can be constructed with minimal impact to the area as designed.

# **INTRODUCTION**

---

Vanasse & Associates, Inc. (VAI) has prepared this Transportation Impact Assessment (TIA) in order to evaluate potential traffic impacts associated with the proposed mixed-use development to be located at 369 and 371 Main Street in Wakefield, Massachusetts (the “Project”). This study evaluates the following specific areas as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; and identifies and analyzes existing and future traffic conditions, both with and without the Project.

## **STUDY METHODOLOGY**

This study was prepared in consultation with the Town of Wakefield and in accordance with the Massachusetts Department of Transportation (MassDOT) Guidelines for *Transportation Impact Assessment (TIA) Guideline*; and the standards of the Traffic Engineering and Transportation Planning professions for the preparation of such reports; and was conducted in three distinct stages.

The first stage involved an assessment of existing conditions in the study area and included an inventory of roadway geometrics; pedestrian facilities; observations of traffic flow; review of safety characteristics along area roadways; and collection of daily and peak-period traffic counts.

In the second stage of the study, future traffic conditions were projected and analyzed. Specific travel demand forecasts for the Project were assessed along with future traffic demands due to expected traffic growth independent of the Project. A seven-year time horizon was selected for analyses consistent with State guidelines for the preparation of TIAs. The traffic analysis conducted in stage two identifies existing or projected future roadway capacity, traffic safety, and site access issues.

The third stage of the study presents and evaluates measures to address traffic and safety issues, if any, identified in stage two of the study.

## **EXISTING CONDITIONS**

---

A comprehensive field inventory of traffic conditions on the study area roadways was conducted in July 2022. The field investigation consisted of an inventory of existing roadway geometrics, pedestrian facilities, traffic volumes, and operating characteristics, as well as posted speed limits and land use information for the roadways that provide access to the Project including Chestnut Street and Albion Street as well as the intersections which are expected to accommodate the majority of Project-related traffic. The study area for the Project was established in discussions with Town staff and the Town's peer traffic consultant. The study area is listed below and graphically depicted in Figure 1.

1. Albion Street at site driveway (unsignalized)
2. Chestnut Street at west site driveway (unsignalized)
3. Chestnut Street at east site driveway (unsignalized)
4. Main Street (Route 129) at Chestnut Street/Centre Street (unsignalized)
5. Main Street (Route 129) at Albion Street
6. Main Street (Route 129) at West Water Street/Water Street (Route 129) (signalized)
7. Main Street at Armory Street (unsignalized)
8. North Avenue/Nahant Street at Main Street (signalized)
9. North Avenue at Albion Street (signalized)

The following describes the study area roadway and intersections:

### **GEOMETRY**

#### **Roadways**

##### **Main Street**

Main Street is classified as an urban principal arterial under Town of Wakefield jurisdiction. The surrounding area of Main Street in this study area is classified as a Central Business District. Main Street is a north-south roadway that extends to the south into Melrose and to the north where it terminates at Lowell Street. Main Street north of the intersection with Water Street is Route 129. Main Street varies in width, within study area this street has a cross-sectional width of approximately 68 to 83 feet, including 15- to 16-foot angled on-street parking and 19- to 28-foot wide lanes in each direction separated by a double-yellow pavement marking. Sidewalks are provided on both

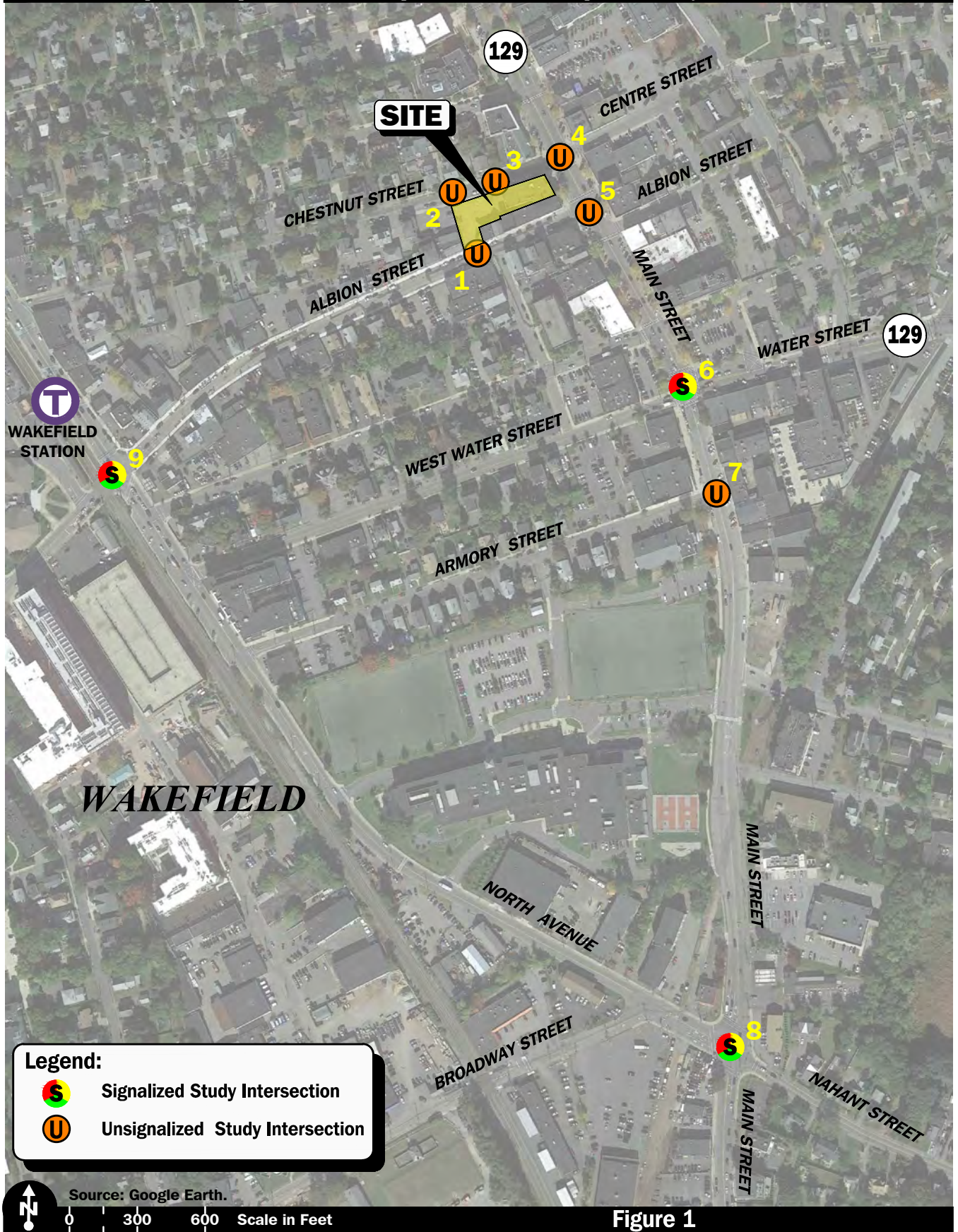


Figure 1

Site Location and Study Area Map

sides of Main Street and crosswalks are provided across all side street approaches. Main Street does not provide bicycle accommodations. Main Street in the study area is designated as a 20 mile per hour (mph) zone. Land use along this street consists primarily of commercial properties.

### **Albion Street**

Albion Street is classified as an urban principal arterial roadway under the jurisdiction of the Town of Wakefield. Within the study area, Albion Street is a one-way roadway that runs in the westbound direction from Main Street to North Avenue. Albion Street generally provides a 19-foot wide travel lane with on-street parking generally allowed along both sides of the street. Land use along Albion Street consists of a mix of residential, commercial, and office uses.

### **Chestnut Street**

Chestnut Street is a local roadway under the jurisdiction of the Town of Wakefield. Within the study area, Chestnut Street generally runs in an east-west direction and generally provides two 15-foot wide travel lanes separated by a double-yellow centerline with no marked shoulders. On-street parking is generally allowed along the eastbound side of the street. Sidewalks are provided along both sides of the street. Land use along this street is primarily residential.

### **Intersections**

Figure 2 summarizes existing lane use and travel lane widths at the study area intersections as observed in July 2022.

## **EXISTING TRAFFIC VOLUMES**

In order to establish base traffic-volume conditions within the study area, manual turning movement counts (TMCs) were conducted on Tuesday, June 14, 2022 and also compiled from previous counts conducted in May 2017,<sup>2</sup> December 2019,<sup>3</sup> and February 2022.<sup>4</sup> The TMCs were conducted during the weekday morning (7:00 to 9:00 AM) and weekday evening (4:00 to 6:00 PM) peak periods. These time periods were selected for analysis purposes as they are representative of the peak-traffic-volume hours for both the Project and the adjacent roadway network. Although traffic levels have been steadily increasing over the last several months, available traffic data suggests that currently traffic conditions have not yet returned to pre-pandemic levels, therefore, adjustment to the 2022 data will be necessary (discussion follows).

### **Traffic Adjustment**

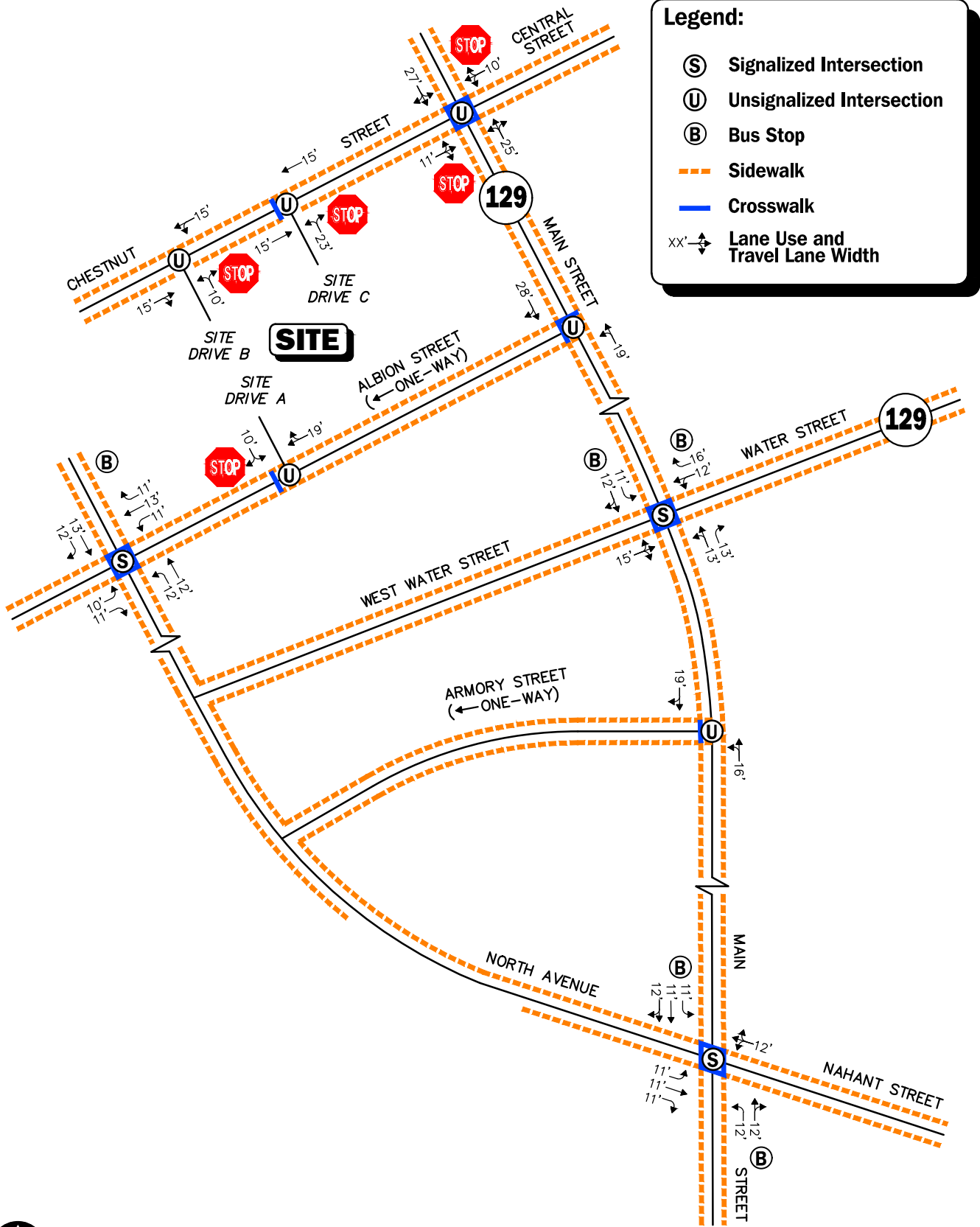
In order to develop 2022 Existing traffic-volume conditions, the data collected in 2022 required adjustments due to the effects of the COVID-19 pandemic. To achieve this, historic traffic count data conducted in 2018 and 2019 in the same study area was evaluated. Traffic-volume data collected at the intersection of North Avenue/Nahant Street with Main Street in 2019 and at the intersections of Main Street at Chestnut Street and Main Street at Albion Street in 2018 were compared

---

<sup>2</sup>*Transportation Impact Statement, Proposed Residential Development Harvard Mills Building – Wakefield, Massachusetts*, VAI, February 2019.

<sup>3</sup>VAI data Base.

<sup>4</sup>*Transportation Impact Statement, Proposed Residential Development 10 Broadway Street – Wakefield, Massachusetts*; VAI, June 2022.



Not To Scale

**Figure 2**  
Existing Intersection Lane Use, Travel Lane Width and Pedestrian Facilities



R:\9378\9378 nt1.dwg, 7/18/2022 6:14:59 PM



to February 2022 traffic volumes that were collected at the same locations. The 2018 and 2019 traffic volumes were expanded to 2022 (same year condition) by applying a background traffic growth rate of 1 percent per year (discussion follows) in order to allow for a comparison of the data. Based on this pre- and post-COVID-19 traffic data comparison, the 2022 traffic-volume data that was collected as a part of this assessment were adjusted upward by an additional 30 percent during typical weekday morning and evening peak periods, in order to account for the reduced traffic volumes resulting from the pandemic.

**Seasonal Adjustment**

In addition to correction factors for COVID-19, adjustments should be made to account for seasonal fluctuations in traffic. The MassDOT permanent count station ID 5099 was used to evaluate the traffic volumes for seasonal fluctuations. Based on this data, it was determined that the months of May and June are approximately 3 percent above average-month conditions for this station. The months of February and December traffic volumes are approximately 7 and 6 percent, respectively, below average-month conditions for this station. Therefore, the February and December traffic volumes were adjusted upward by 7 and 6 percent, respectively, in order to provide a conservative analysis condition.

The 2022 Existing traffic volumes are summarized in Table 1, with the weekday morning and evening peak-hour traffic volumes graphically depicted on Figures 3 and 4. It is important to note that the peak-hour traffic volumes presented in Table 1 were obtained from the TMCs and are reflected on the aforementioned figures.

**Table 1  
EXISTING ROADWAY TRAFFIC-VOLUME SUMMARY**

Location	Daily Volume (vpd) <sup>a</sup>	Weekday Morning Peak Hour (7:30 – 8:30 AM)			Weekday Evening Peak Hour (4:30 – 5:30 PM)		
		Volume (vph) <sup>b</sup>	Percent of Daily Traffic <sup>c</sup>	Predominant Flow	Volume (vph)	Percent of Daily Traffic	Predominant Flow
Chestnut Street, west of Main Street (Route 129)	4,300	381	8.7	76% WB	261	6.1	59% EB
Albion Street, west of Main Street (Route 129)	3,100	275	8.9	100% WB	207	6.8	100% WB

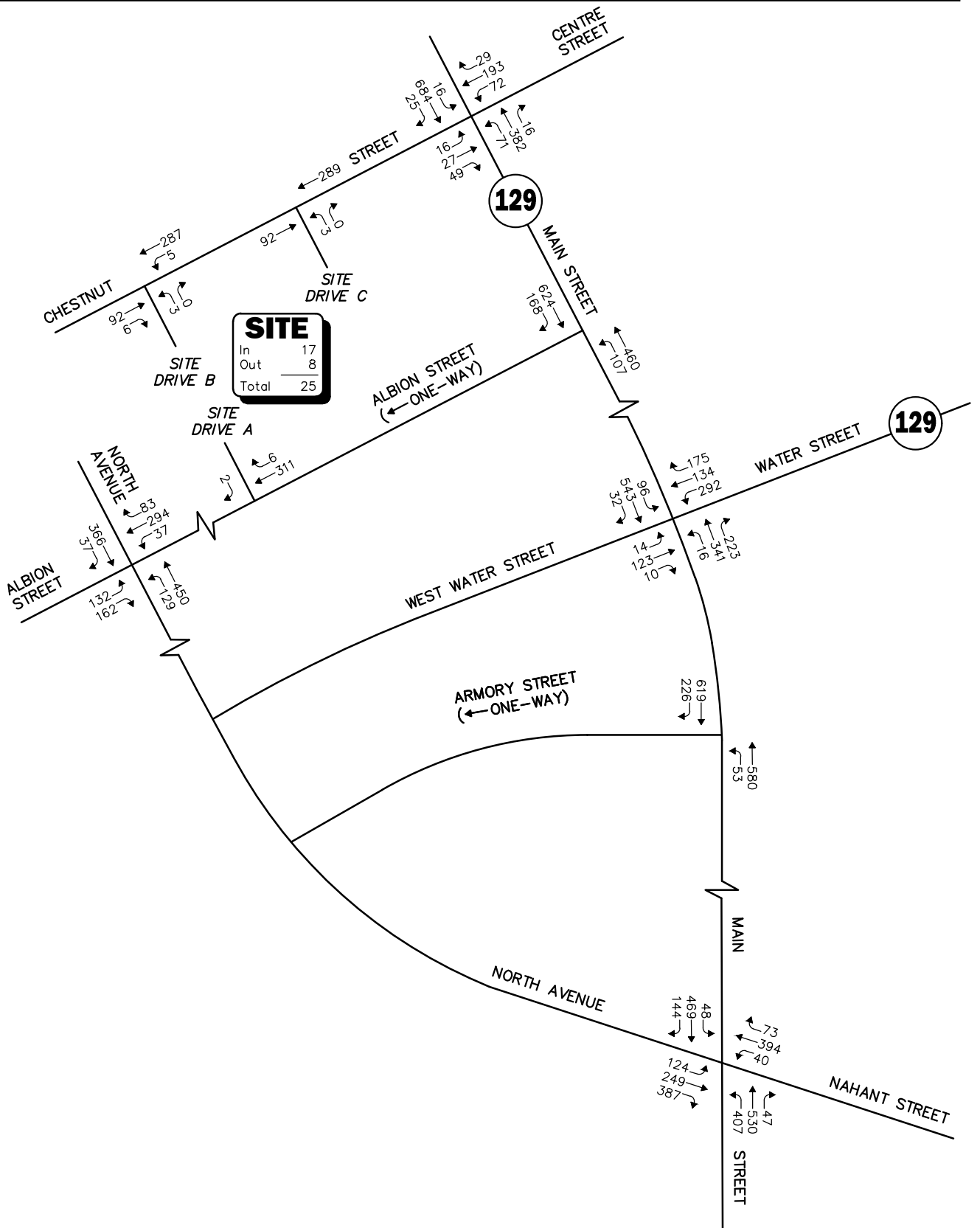
<sup>a</sup>Two-way daily traffic expressed in vehicles per day (estimated).

<sup>b</sup>Manual turning movement counts conducted in June 2022 (adjusted).

<sup>c</sup>The percent of daily traffic that occurs during the peak hour.

WB= westbound; EB= eastbound.

As can be seen in Table 1, Chestnut Street west of Main Street (Route 129) was found to accommodate approximately 4,300 vehicles on an average weekday (24-hour, two-way volume), with approximately 381 vehicles per hour (vph) during the weekday morning peak hour and 261 vph during the weekday evening peak hour. The predominant flow on Chestnut Street during the weekday morning peak hour is in the westbound direction and during the weekday evening peak hour is in the eastbound direction. Albion Street west of Main Street (Route 129) was found to accommodate approximately 3,100 vehicles on an average weekday (24-hour, two-way volume), with



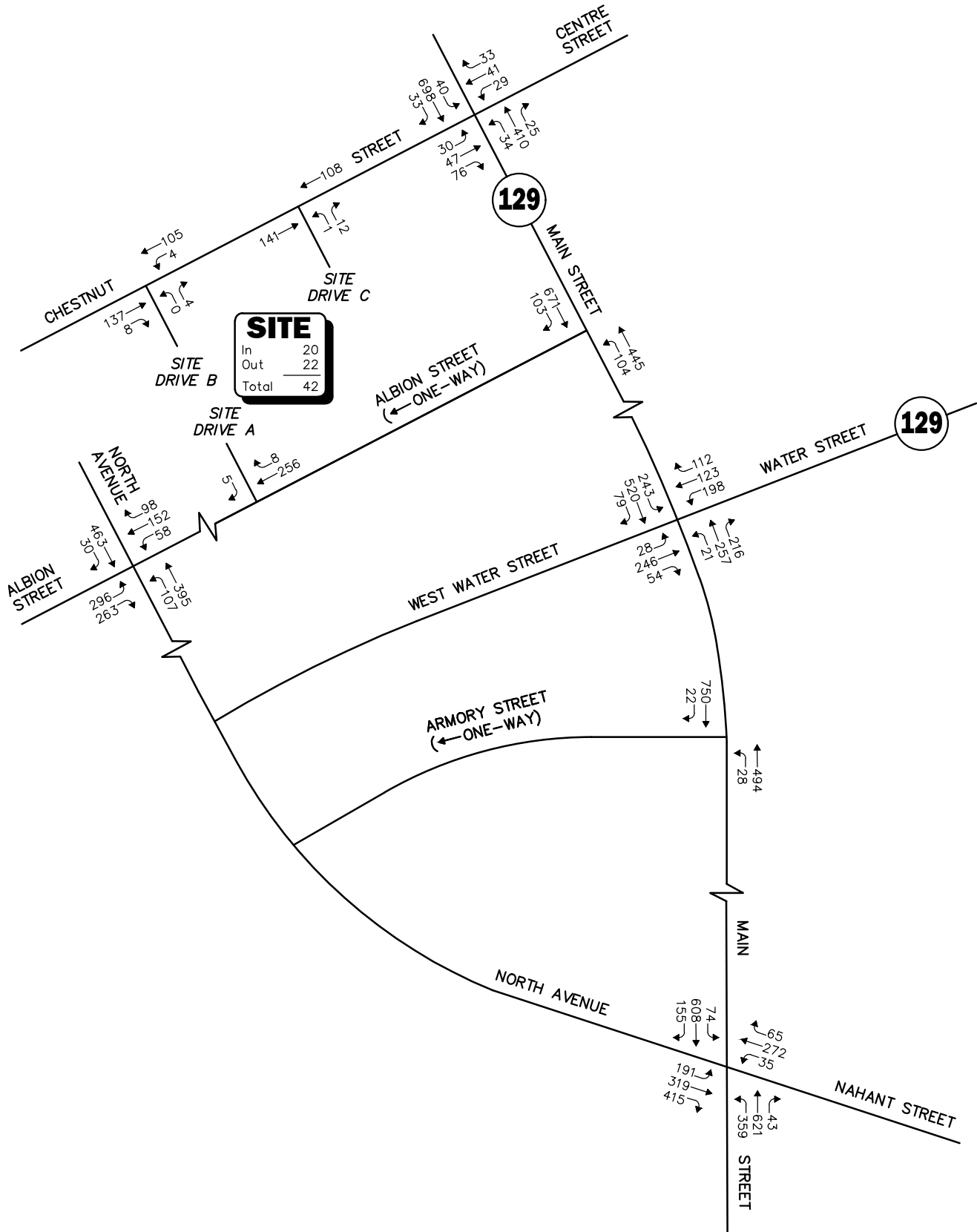
Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 3



2022 Existing Condition  
Weekday Morning  
Peak Hour Traffic Volume  
(7:30 to 8:30 AM)



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.  
 Not To Scale

Figure 4



2022 Existing Condition  
 Weekday Evening  
 Peak Hour Traffic Volume  
 (4:30 to 5:30 PM)

approximately 275 vph during the weekday morning peak hour and 207 vph during the weekday evening peak hour.

A review of the peak-period traffic counts indicates that the weekday morning peak hour generally occurs between 7:30 and 8:30 AM with the weekday evening peak hour generally occurring between 4:30 and 5:30 PM.

## **PEDESTRIAN AND BICYCLE FACILITIES**

A comprehensive field inventory of pedestrian and bicycle facilities within the study area was undertaken in July 2022. The field inventory consisted of a review of the location of sidewalks and pedestrian crossing locations along the study roadway and at the study intersections, as well as the location of existing and planned future bicycle facilities. In general, sidewalks are provided along both sides of Main Street, Chestnut Street, and Albion Street within the study. Painted crosswalks are provided at all study intersections. At present, no formal bicycle facilities were noted in the study area; however, an elevated bike pathway is planned along Main Street, as part of the *Envision Wakefield* revitalization plan.

## **PUBLIC TRANSPORTATION**

Public transportation services are provided within the study area by the Massachusetts Bay Transportation Authority (MBTA) for fixed-route bus and commuter rail services. Within the study area, the MBTA operates the following services:

Within the study area, the MBTA operates the following fixed route bus service:

- ***Route 137 – Reading Depot – Malden Center Station.*** The closest bus stop is located at the intersection of Main Street with Water Street which is approximately 0.2-mile (or approximately 4 minutes walking) from the Project site. Sidewalks and crosswalks exist throughout the route. This line provides connections to the MBTA *Orange Line* subway system and Reading Purple Line. MBTA bus service is provided Monday through Saturday from approximately 5:00 AM to 1:30 AM. This route 7 generally operates with 10 to 40-minute headways. One-way fares for adults are \$1.70, with a \$0.85 fare for students, senior citizens, and persons with disabilities.

The MBTA operates the following commuter rail services in the vicinity of the Project:

- ***Purple Line – Haverhill Line – Haverhill to North Station.*** The MBTA provides commuter rail service to from Haverhill to North Station in Boston on the Haverhill Line, with Wakefield Station located 0.3-mile (or approximately 5 minutes walking) west of the Project site. Sidewalks and crosswalks exist throughout the route. The service is provided Monday through Friday from 5:00 AM to 1:00 AM and Saturdays and Sundays from 6:43 AM to 1:00 AM. Commuter Rail Zones 1A-10, fares are between \$2.40-\$13.25 one-way and \$426 monthly pass.

Schedule and fare information for the MBTA commuter rail service are provided in the Appendix.

## **SAFETY ANALYSIS**

In order to evaluate whether there are any notable trends that would indicate potential safety deficiencies within the study area, a motor vehicle accident analysis was conducted in accordance with State guidelines as described below.

### **Vehicle Accident Data**

Motor vehicle accident data was acquired from the MassDOT Safety Management/Traffic Operations Unit for the most recent five-year period available (2015 through 2019) in order to examine motor vehicle accident trends occurring within the study area. The data is summarized by intersection, type, and severity, and is presented in Table 2.

As summarized in Table 2, the intersection of Main Street at Water Street experienced the highest frequency of accidents in the study area with a total of 25 accidents over the five-year review period, averaging 5.0 accidents per year. The majority of the accidents at this intersection were angle-type collisions (12 out of 25), during the daylight (20 out of 25), and caused property damage only (21 out of 25).

The data shows that the Project site west driveway onto Chestnut Street experienced one accident over the five-year review period. This accident involved a vehicle exiting/entering the Project site. It is important to note that under future conditions, vehicles will not be allowed to exit the parking garage through this driveway.

All study intersections were found to have a motor vehicle crash rate *below* the MassDOT average for the District in which the Project is located (District 4). No fatalities were reported at any of the study area intersections over the five-year period reviewed. In addition, the Highway Safety Improvement Program (HSIP) database was reviewed and within the study area, the intersection of Main Street with Chestnut Street, Main Street with Albion Street, and Main Street with Water street are listed as HSIP-eligible clusters in the most recent (2010 through 2019) HSIP pedestrian cluster listing. However, it should be noted a road safety audit was conducted for this location in April 2019.<sup>5</sup> The detailed MassDOT Crash Rate Worksheets are provided in the Appendix.

---

<sup>5</sup>Road Safety Audit, Main Street (Route 129) Crescent Street to Water Street / W. Water Street Town of Wakefield, prepared for MassDOT by VHB, April 2019

**Table 2**  
**MOTOR VEHICLE ACCIDENT DATA SUMMARY<sup>a</sup>**

Scenario	Chestnut St. at West Site Dwy (unsignalized)	Main St. at Chestnut St./ Centre St. (unsignalized)	Main St. at Albion St. (signalized)	Main St. at Water St. (signalized)	Main St. at Armory St. (unsignalized)	Main St. at North Ave. (signalized)	North Ave. at Albion St. (signalized)
<i>Year:</i>							
2015	0	3	1	6	1	3	4
2016	0	1	2	6	1	6	5
2017	1	2	2	6	0	0	1
2018	0	4	1	7	1	5	3
<u>2019</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>6</u>	<u>3</u>
Total	1	10	6	25	3	20	16
Average <sup>b</sup>	0.20	2.00	1.20	5.00	0.60	4.00	3.20
Crash Rate <sup>c</sup>	0.19	0.33	0.22	0.59	0.11	0.31	0.42
Significant <sup>d</sup>	No	No	No	No	No	No	No
<i>Type:</i>							
Angle	1	6	3	12	1	6	4
Rear-End	0	0	2	5	2	2	5
Head-On	0	0	0	0	0	1	1
Sideswipe	0	2	0	4	0	5	2
Fixed Object	0	1	0	3	0	2	4
Pedestrian	0	0	1	1	0	0	0
Bicyclist	0	0	0	0	0	0	0
<u>Unknown/Other</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	1	10	6	25	3	20	16
<i>Weather Conditions:</i>							
Clear	0	6	4	19	2	16	15
Cloudy/Rain	1	3	2	5	1	4	0
Snow/Ice	0	1	0	1	0	0	0
Fog	0	0	0	0	0	0	0
<u>Unknown/Other</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>
Total	1	10	6	25	3	20	16
<i>Lighting Conditions:</i>							
Daylight	1	6	2	20	3	15	12
Dawn/Dusk	0	2	0	1	0	0	0
Dark (lit)	0	2	4	4	0	5	3
Dark (unlit)	0	0	0	0	0	0	0
<u>Unknown/Other</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>
Total	1	10	6	25	3	20	16
<i>Pavement Conditions:</i>							
Dry	0	6	5	22	3	18	15
Wet	1	3	1	3	0	2	0
Snow/Ice	0	1	0	0	0	0	0
<u>Unknown/Other</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>
Total	1	10	6	25	3	20	16
<i>Severity:</i>							
Property Damage Only	1	7	2	21	2	17	14
Personal Injury	0	2	4	3	1	2	2
Fatality	0	0	0	0	0	0	0
<u>Unknown/Other</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>	<u>0</u>
Total	1	10	6	25	3	20	16

<sup>a</sup>Source: MassDOT, 2015 through 2019.

<sup>b</sup>Average crashes over five-year period.

<sup>c</sup>Crash rate per million entering vehicles.

Signalized intersections are significant if rate >0.73 crashes per million vehicles (District 4) or if rate >0.78 crashes per million vehicles (Statewide). Unsignalized intersections are significant if rate >0.57 crashes per million vehicles (District 4) or if rate >0.57 crashes per million vehicles (Statewide).

## **FUTURE CONDITIONS**

---

Traffic volumes in the study area were projected to the year 2029, which reflects a seven-year planning horizon consistent with State Traffic Study Guidelines. Independent of the Project, traffic volumes on the roadway network in the year 2029 under No-Build conditions include all existing traffic and new traffic resulting from background traffic growth. Anticipated Project-generated traffic volumes superimposed upon this 2029 No-Build traffic network reflect the 2029 Build conditions with the Project.

### **FUTURE TRAFFIC GROWTH**

Future traffic growth is a function of the expected land development in the immediate area and the surrounding region. Several methods can be used to estimate this growth. A procedure frequently employed estimates an annual percentage increase in traffic growth and applies that percentage to all traffic volumes under study. The drawback to such a procedure is that some turning volumes may actually grow at either a higher or a lower rate at particular intersections.

An alternative procedure identifies the location and type of planned development, estimates the traffic to be generated, and assigns it to the area roadway network. This procedure produces a more realistic estimate of growth for local traffic. However, the drawback of this procedure is that the potential growth in population and development external to the study area would not be accounted for in the traffic projections.

To provide a conservative analysis framework, both procedures were used, the salient components of which are described below.

### **GENERAL BACKGROUND TRAFFIC GROWTH**

In order to determine general background traffic growth trends within the study area, MassDOT historical annual traffic growth rates were reviewed. Based on this data, it was determined that traffic volumes from 2015 to 2019 have fluctuated over the past several years. In order to provide a prudent planning condition for the Project and to be consistent with previous traffic studies in the area, a 1 percent per year compounded annual background traffic growth rate was used in order to account for future traffic growth and presently unforeseen development within the study area.

## **SPECIFIC DEVELOPMENT BY OTHERS**

The Town of Wakefield was contacted in order to determine if there are any planned or approved development projects that are expected to influence future traffic volumes within the study area. Based on these discussions, the following projects were identified for inclusion in this assessment:

- ***Proposed Mixed-Use Development – Harvard Mills – 178 Albion Street.*** The existing site at 178 Albion Street includes one four-story building comprised of an east wing and a west wing connected by a one-story loading dock structure. The west wing contains 114,509 square feet (sf) of office space and 22,114 sf of research and development space. The east wing contains 125,907 sf of office space. The Project consists of adding three stories to the east wing and constructing 184 apartment units. Parking is to be provided in the existing garage located at 12 Foundry Street, which is located directly across the street from the building and provides approximately 755 parking spaces. Traffic volumes from the *Transportation Impact Assessment*<sup>6</sup> submitted by VAI dated February 15, 2019 were added to the future condition networks.
- ***Proposed Mixed-Use Development – 62-76 Foundry Street.*** This development consists of razing five existing structures and construction of a new five-story building containing the proposed 3,750 sf restaurant and 58 residential units will be constructed on-site. Parking will be provided for 92 vehicles. Traffic volumes from the *Transportation Impact Assessment*<sup>7</sup> submitted by VAI dated March 2021 were added to the future condition networks.
- ***Proposed Residential Development – 69 Foundry Street.*** This development entails razing the 7,360 sf industrial use at 69 Foundry Street in Wakefield, Massachusetts and constructing 84 residential units. Access to the site is proposed through two driveways on Foundry Street. Traffic volumes from the *Traffic Assessment*<sup>8</sup> submitted by BETA Group, Inc. dated August 10, 2017 were added to the future condition networks.
- ***Proposed Bank Development – 500 Main Street.*** This development consists of razing the existing commercial building to construct a new 2,500+ sf bank with a drive-through ATM. Traffic volumes from the *Transportation Memorandum*<sup>9</sup> submitted by VAI dated December 2020 were added to the future condition networks.
- ***Proposed Residential Development (40B) – 48 Crescent Street.*** This Project entails construction of a 45-unit multifamily residential building to be located at 44-48 Crescent Street in Wakefield, Massachusetts. Traffic volumes from the *Transportation Memorandum*<sup>10</sup> submitted by VAI dated May 2021 were added to the future condition networks.
- ***Proposed Residential Development with Ground-Floor Retail – 99 Water Street.*** The proposed project would replace an existing one-story, two-unit residential building with a proposed three-story building that would accommodate four two-bedroom apartments, as well as 999 sf of ground-level commercial space. The 1.0 percent general background

---

<sup>6</sup>Ibid 3.

<sup>7</sup>*Transportation Impact Assessment – Proposed Residential Development, Wakefield, Massachusetts*; VAI; March 2021.

<sup>8</sup>*Traffic Assessment – Proposed Apartment Development Foundry Street, Wakefield, MA*; BETA Group, Inc.; August 10, 2017.

<sup>9</sup>*Transportation Impact Assessment – Proposed Bank Development, Wakefield, Massachusetts*; VAI; December 16, 2020.

<sup>10</sup>Responses to Traffic Advisory Committee Comments, 44-48 Crescent Street, Wakefield, Massachusetts; VAI; May 14, 2021.



growth rate was assumed to account for the new trips generated by this project.

- ***Proposed Mixed-Use Development – 184 Water Street.*** The project entails construction of a new two-story building containing seven two-bedroom apartments and 999 sf of ground-floor retail space. The 1.0 percent general background growth rate was assumed to account for the new trips generated by this project.
- ***Proposed Mixed-Use Development – 198 Albion Street.*** The project entails construction of a new three-story building containing 10 multifamily residential units and 1,000 sf of ground-floor retail space. The 1.0 percent general background growth rate was assumed to account for the new trips generated by this project.
- ***The Savings Bank Builds Expansion – 347 Main Street, 357 Main Street, and 3 Chestnut Street.*** The project entails construction of a two-story addition to the existing bank to house the Bank’s Commercial Banking, Human Resources, Training, Facilities, and IT departments. The project is currently under construction. Completion and occupancy are expected in early 2023. The 1.0 percent general background growth rate was assumed to account for the new trips generated by this project.

No other developments were identified at this time that are expected to result in an increase in traffic within the study area beyond the general background traffic growth rate.

## **ROADWAY IMPROVEMENT PROJECTS**

The Town of Wakefield was contacted in order to determine if there are any planned roadway improvement projects expected to be completed within the study area in the seven-year planning horizon. Based on these discussions a number of roadway improvement projects under the Wakefield Complete Streets Program are planned for the area. These projects are listed below:

### **Wakefield Envision: Downtown Revitalization Plan**

Residents, merchants, and local organizations have engaged in the *Envision Wakefield: Downtown Revitalization* initiative, conceptualizing a refreshed and improved downtown streetscape. As part of this project, the following is proposed:

- Broken sidewalk will be repaired on Albion Street. (Phase one of this project is completed);
- Sharrows will be installed on North Avenue and Albion Street;
- Curb extensions will be installed on North Avenue from Chestnut Street to Albion Street;
- Curb extensions or a pedestrian refuge will be implemented at the intersection of Albion Street at Murray Street and Gould Street;
- Pedestrian timings will be updated to current *Manual on Uniform Traffic Control Devices* (MUTCD)<sup>11</sup> standards at the intersection of North Avenue at Albion Street;
- Crosswalks and curb extension will be provided along Albion Street from North Avenue

---

<sup>11</sup>Ibid 1.

to Main Street;

- A sidewalk will be installed on the west side of North Avenue from Galvin Middle School to Broadway Street and a crosswalk will be provided at the intersection of North Avenue and Broadway Street; and
- A bicycle pathway will be installed along Main Street including modification of the on-street parking from angled parking to parallel parking.

Currently, only funding for the improvements on Albion Street has been granted through the *Complete Streets* program. These improvements were split into two phases. At present, Phase One is completed, that included replacement of sidewalk and curb on Albion Street from North Avenue to Main Street, installing four new curb extensions, and adding bicycle sharrow pavement markings.

Phase Two is currently under construction and includes geometric improvements to the intersection of Albion Street with Murray Street and Gould Street that would be performed as mitigation for the 69 Foundry Street development project.

All of these projects would improve pedestrian and bicycle conditions for those user groups in the areas mentioned. The *Envision Wakefield* project improvements are at the 25% design phase with the exception of the improvements along Albion Street. The Town Engineer is in the process of revising and phasing the project with MassDOT. According to the Town Engineer, it is expected that the project will start construction in the next year or two.

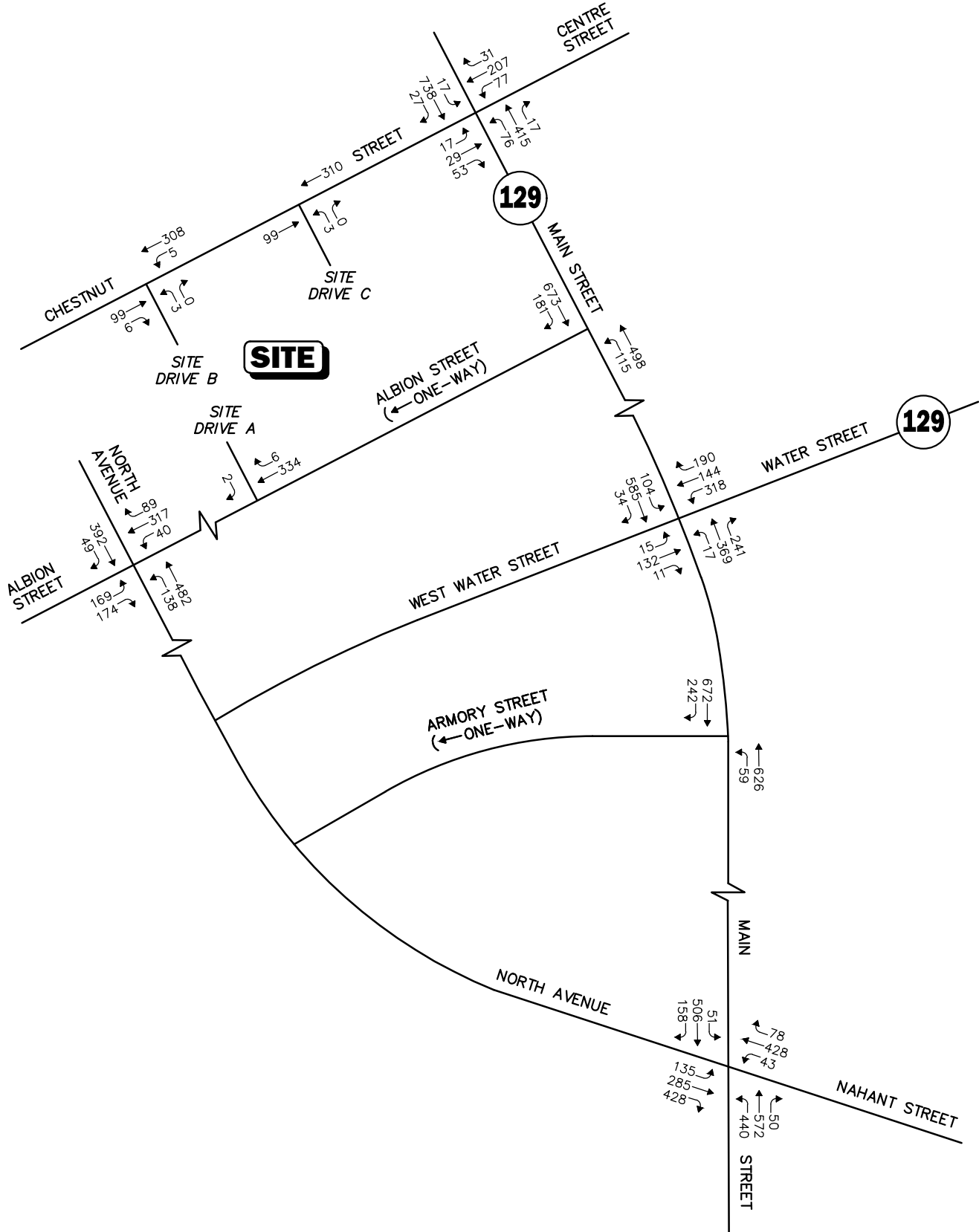
### **Wakefield-Lynnfield Rail Trail**

The *Wakefield-Lynnfield Rail Trail* project was granted partial funding to construct safe street crossings for the paved portion of the *Wakefield-Lynnfield Rail Trail* between Salem Street and Galvin Middle School. This project included installation of a new paved pathway, wheelchair ramps, and crosswalks. This project is still under the design phase and the Town Engineer is working with DCR on the final design. While not having a direct impact on the Project site, the construction period for these improvements would have a temporary impact on traffic flow specifically along Richardson Street and Main Street.

No other road improvements were identified in this area beyond general maintenance.

### **NO-BUILD TRAFFIC VOLUMES**

The 2029 No-Build peak-hour traffic-volume networks were developed by applying the 1 percent per year compounded annual background traffic growth rate to the 2022 Existing peak-hour traffic volumes plus traffic projections of the existing bank (discussion follows) and identified background developments. The resulting 2029 No-Build weekday morning and weekday evening peak-hour traffic-volume networks are shown on Figures 5 and 6.

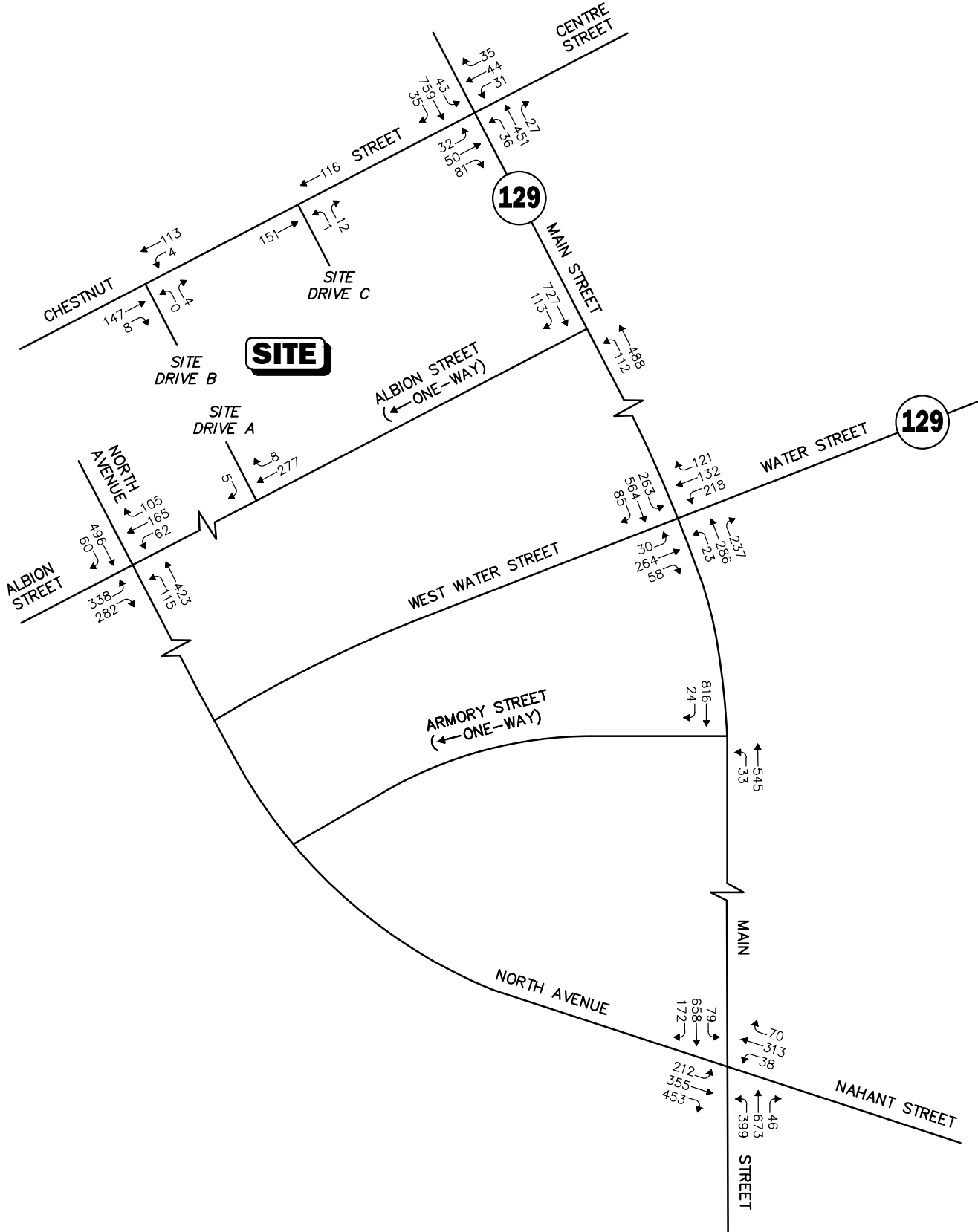


Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.  
 Not To Scale

Figure 5

2029 No-Build Condition  
 Weekday Morning  
 Peak Hour Traffic Volume





Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.  
 Not To Scale **Figure 6**



**2029 No-Build Condition  
 Weekday Evening  
 Peak Hour Traffic Volume**

## **PROJECT-GENERATED TRAFFIC**

### **Existing Site Trip Generation**

The existing site contains a bank building with the first floor utilized for the bank main lobby and the second floor utilized for bank offices. In order to evaluate the existing site traffic generation, TMCs were conducted at the bank parking lot in June 2022 in conjunction with traffic data collection for this study. Table 3 shows the existing site trip-generation.

**Table 3**  
**EXISTING SITE TRIP GENERATION**

<u>Time Period/Direction</u>	<u>Observed Trips at Bank Parking Lot Area June 2022 (17,140 sf)<sup>a</sup></u>
<i>Weekday Morning Peak Hour:</i>	
Entering	17
<u>Exiting</u>	<u>8</u>
Total	25
<i>Weekday Evening Peak Hour:</i>	
Entering	20
<u>Exiting</u>	<u>22</u>
Total	42

<sup>a</sup>Based on traffic counts from June 2022.

Based on traffic volumes from the parking lot, the site is generating approximately 25 vehicle trips (17 entering and 8 exiting) during the weekday morning peak hour and 42 vehicle trips (20 entering and 22 exiting) during the weekday evening peak hour.

It is likely that the traffic volumes shown in Table 3 represent only a portion of the traffic activity associated with the existing site use. This is due to a number of factors, including the existence of public bus routes and the commuter rail located in close proximity of the site. In addition, it is likely that some of the bank customers and staff combine trips by walking between storefronts or other businesses and may park on-street or walk from other downtown areas. However, in order to provide a conservative analysis, no trip credit was considered due to trips outside the parking lot area.

### **Project-Generated Traffic**

The proposal entails restoration of the existing bank building and construction of a new three-story building that will be located in the current parking lot behind the bank. Together the bank building and the new three-story building will contain 20 multifamily residential units. In addition, a portion of the existing bank will be renovated to provide a restaurant. In order to develop the traffic characteristics of this proposal, trip-generation statistics published by the Institute of Transportation

Engineers (ITE)<sup>12</sup> for Land Use Code (LUC) 220, *Multifamily Housing (Low-Rise)* and LUC 932, *High Turnover (Sit-Down) Restaurant* were used.

Trip-generation calculations were performed for a typical weekday, as well as the weekday morning and weekday evening peak hours, the critical time periods for Project-related traffic activity. A non-automobile trip adjustment of 50 percent was applied to the restaurant trips as some of these trips are expected to be made by patrons parking along Main Street or other locations and walking to the site. Although several public transit services are located in close proximity to the Project, no adjustments to trip generation for transit usage were included. A summary of the expected vehicle-trip generation is summarized in Table 4.

**Table 4**  
**PROJECT-GENERATED TRIPS**

Time Period/Direction	(A) Proposed Residential Trips (20 Units) <sup>a</sup>	Proposed Restaurant			(E=A+D) Total Vehicle Trips
		(B) Proposed Restaurant Trips (80 Seats) <sup>b</sup>	(C=B*0.50) Walk Trips (50%) <sup>c</sup>	(D=B-C) Vehicle Trips	
<i>Weekday Morning Peak Hour:</i>					
Entering	7	--	--	--	7
Exiting	<u>22</u>	--	--	--	<u>22</u>
Total	29	--	--	--	29
<i>Weekday Evening Peak Hour:</i>					
Entering	18	18	9	9	27
Exiting	<u>11</u>	<u>13</u>	<u>6</u>	<u>7</u>	<u>18</u>
Total	29	31	15	16	45

<sup>a</sup>Based on ITE LUC 220, *Multifamily Housing (Low-Rise)*.

<sup>b</sup>Based on ITE LUC 932, *High Turnover (Sit-Down) Restaurant*.

<sup>c</sup>Assumption that 50 percent of the restaurant trips will be walking trips.

As shown in Table 4, the proposed Project is expected to generate 29 vehicle trips (7 entering and 22 exiting) during the weekday morning peak hour and 45 vehicle trips (27 entering and 18 exiting) during the weekday evening peak hour. These trip increases were applied to the existing trip observations from Table 3 with Table 5 depicting the net new trips during the peak hours due to the Project.

<sup>12</sup>*Trip Generation*, 11<sup>th</sup> Edition; Institute of Transportation Engineers; Washington, DC; 2021.

**Table 5**  
**NET NEW PROJECT-GENERATED TRIPS**

Time Period/Direction	Observed Site Trips <sup>a</sup>	Proposed Project Trips <sup>b</sup>	Net New Vehicle Trips
<i>Weekday Morning Peak Hour:</i>			
Entering	17	7	-10
<u>Exiting</u>	<u>8</u>	<u>22</u>	<u>14</u>
Total	25	29	4
<i>Weekday Evening Peak Hour:</i>			
Entering	20	27	7
<u>Exiting</u>	<u>22</u>	<u>18</u>	<u>-4</u>
Total	42	45	3

<sup>a</sup>See Table 3.

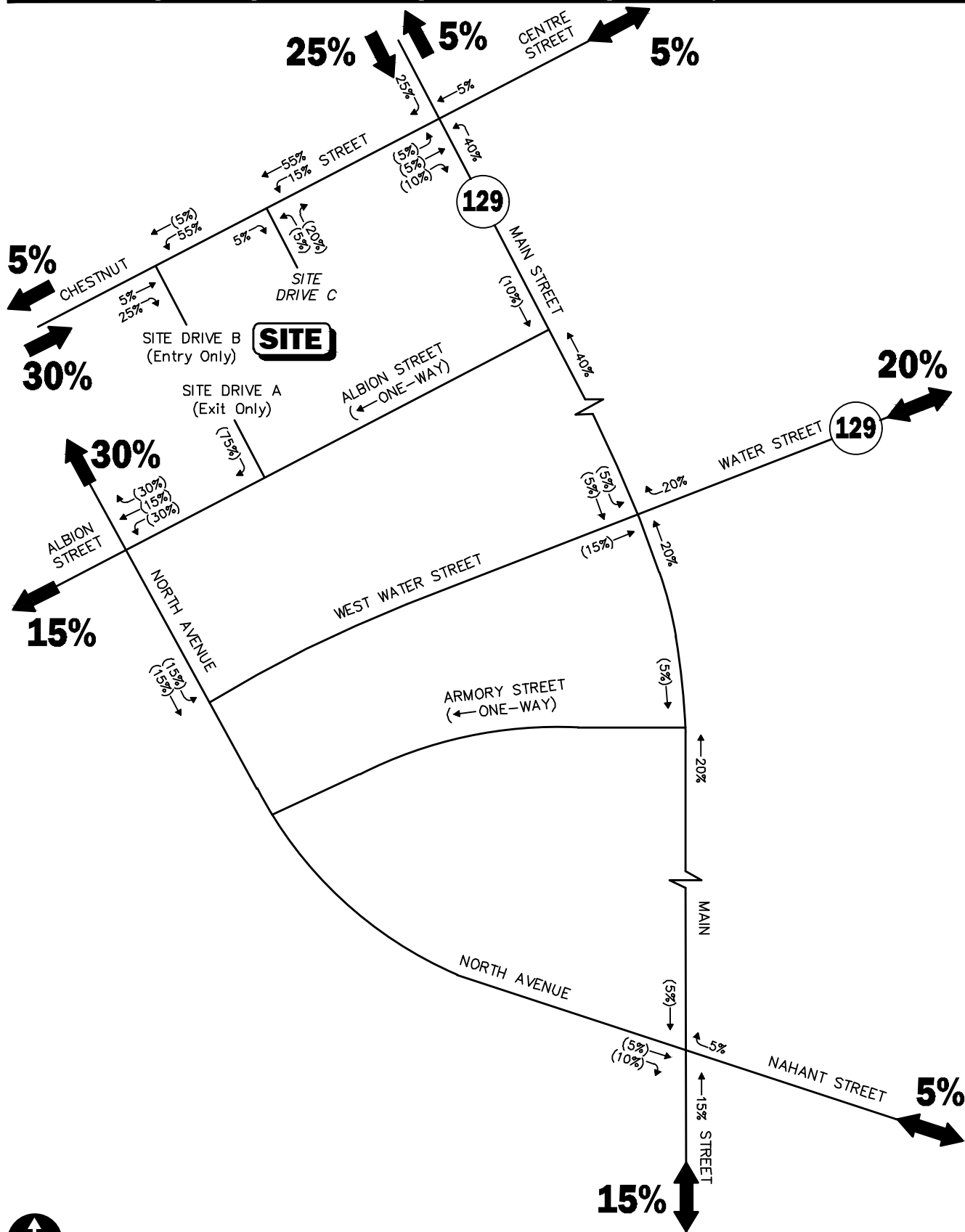
<sup>b</sup>See Table 4.

As shown in Table 5, the proposed Project is expected to generate approximately 4 net new vehicle trips (10 less entering and 14 more exiting) during the weekday morning peak hour and 3 net new vehicle trips (7 more entering and 4 less exiting) during the weekday evening peak hour.

### **TRIP DISTRIBUTION AND ASSIGNMENT**

The directional distribution of the site-generated trips to and from the proposed development were determined based on a review of the Journey-to-Work data obtained from the United States Census Bureau<sup>13</sup> and existing travel patterns. The general trip distribution for the proposal is summarized in Table 6 and graphically depicted on Figure 7.

<sup>13</sup>Table 3. Residence MCD/County to Workplace MCD/County Commuting Flows for the United States and Puerto Rico Sorted by Residence Geography: 5-Year ACS, 2011-2015.



 Not To Scale

**Figure 7**  
Trip Distribution Map



R:\9378\9378NT2.dwg, 11/15/2022 11:29:21 AM



**Table 6**  
**TRIP-DISTRIBUTION SUMMARY**

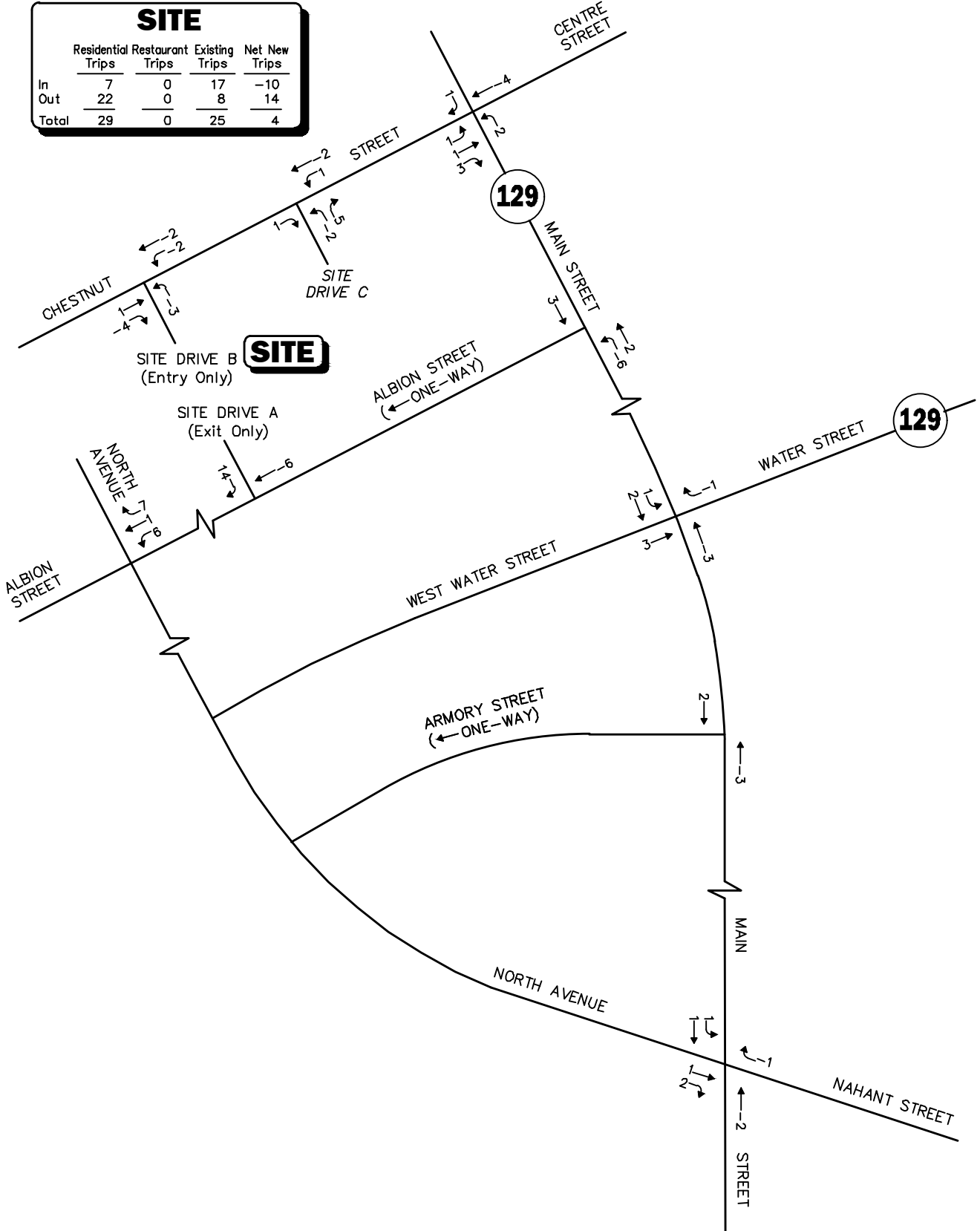
Roadway	Direction (To/From)	Residential Trips Percentage (To/From)
Chestnut Street	West	5/30
Albion Street	West	15/0
North Avenue	North	30/0
Main Street	North	5/25
Centre Street	East	5/5
Water Street	East	20/20
Main Street	South	15/15
<u>Nahant Street</u>	South	<u>5/5</u>
<b>TOTAL</b>		<b>100</b>

The weekday morning and weekday evening peak-hour traffic volumes expected to be generated by the Project were assigned to the study area roadway network as shown on Figures 8 and 9, respectively.

**FUTURE TRAFFIC VOLUMES - BUILD CONDITION**

The 2029 Build condition networks consist of the 2029 No-Build traffic volumes plus the net new Project-generated traffic. The 2029 Build weekday morning and weekday evening peak-hour traffic-volume networks are graphically depicted on Figures 10 and 11. A summary of peak-hour projected traffic-volume increases external to the study area that is the subject of this assessment is shown in Table 7. These volumes are based on the expected increases from the Project.

SITE				
	Residential Trips	Restaurant Trips	Existing Trips	Net New Trips
In	7	0	17	-10
Out	22	0	8	14
Total	29	0	25	4

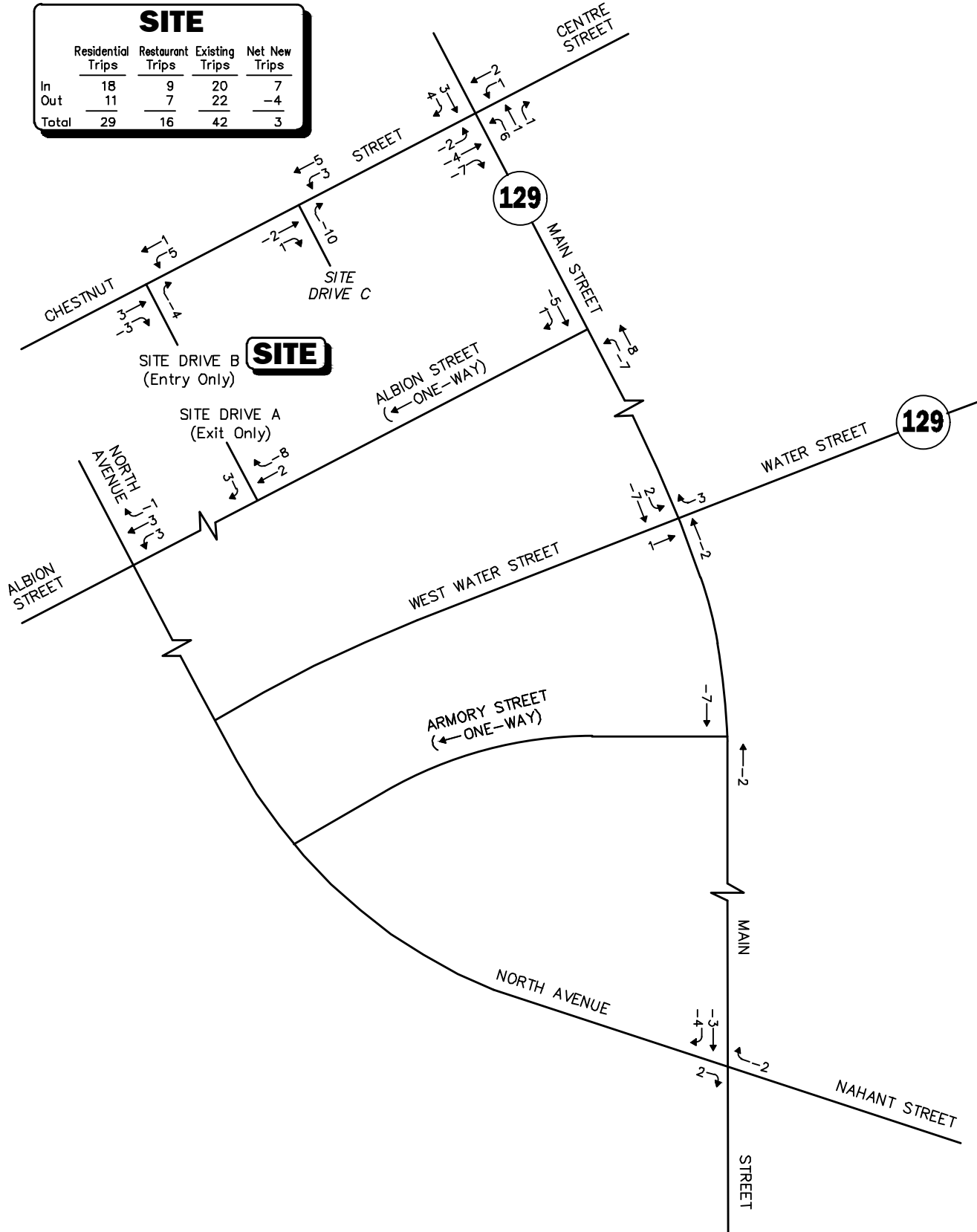


Not To Scale **Figure 8**



**Net New Site Generated  
Weekday Morning  
Peak Hour Traffic Volume**

SITE				
	Residential Trips	Restaurant Trips	Existing Trips	Net New Trips
In	18	9	20	7
Out	11	7	22	-4
Total	29	16	42	3

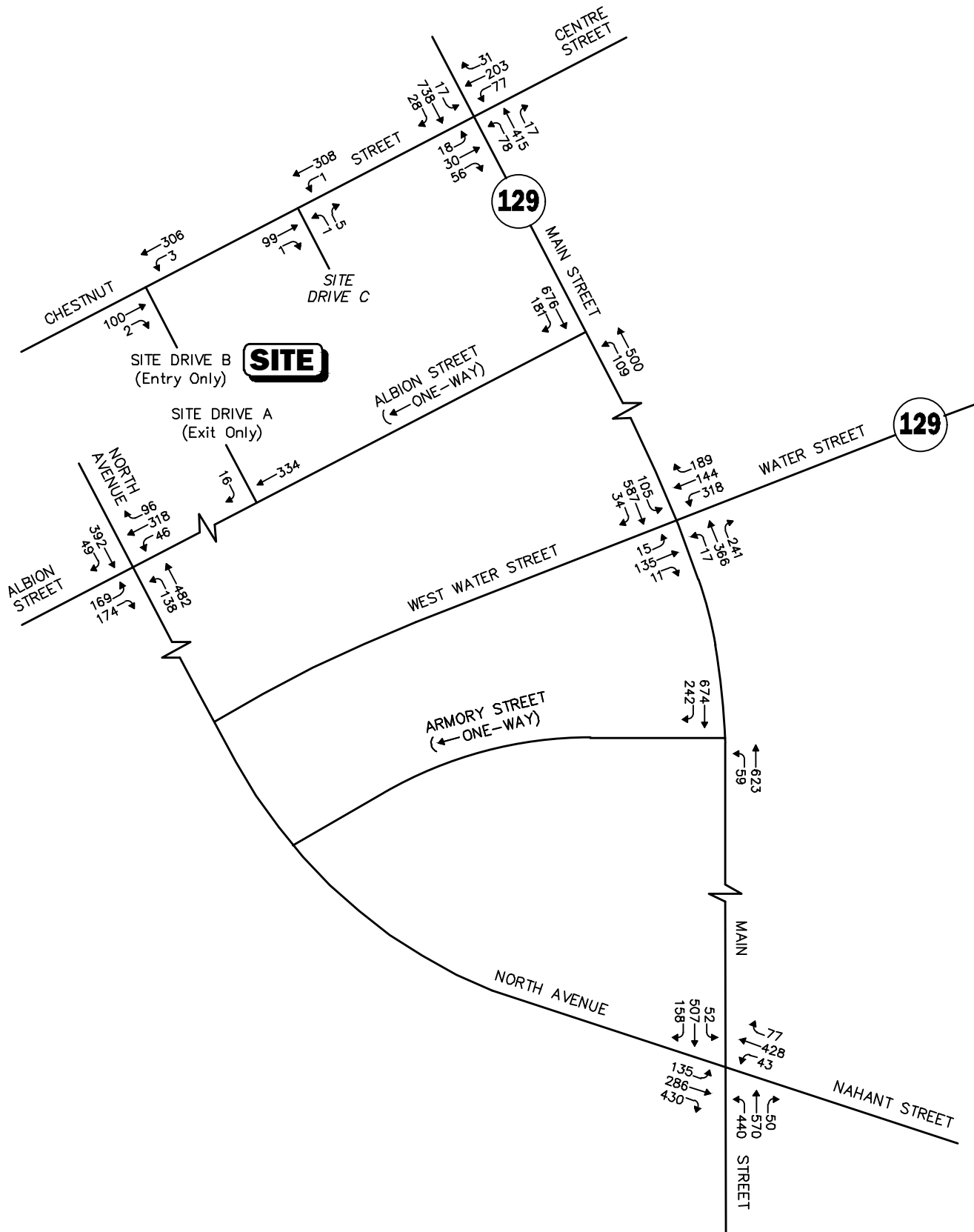


Not To Scale

Figure 9



Net New Site Generated Weekday Evening Peak Hour Traffic Volume

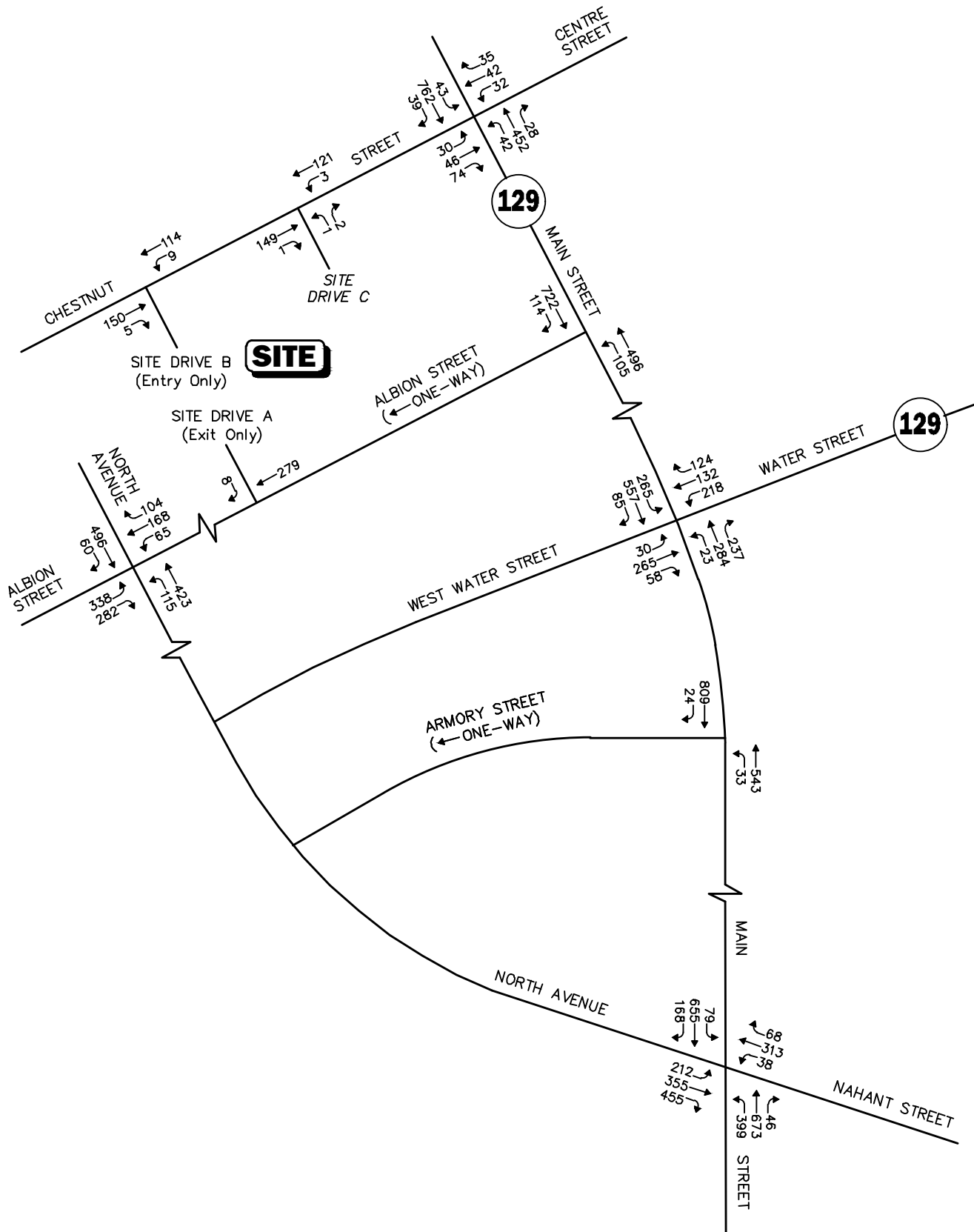


Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.  
 Not To Scale **Figure 10**



**2029 Build Condition  
 Weekday Morning  
 Peak Hour Traffic Volume**

R:\9378\9378\NT2.dwg, 11/15/2022 1:24:30 PM



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.  
 Not To Scale **Figure 11**



2029 Build Condition  
 Weekday Evening  
 Peak Hour Traffic Volume

R:\9378\9378\NT2.dwg, 11/15/2022 1:32:31 PM

**Table 7**  
**PEAK-HOUR TRAFFIC-VOLUME INCREASES<sup>a</sup>**

Location/Peak Hour	2029 No-Build	2029 Build	Traffic-Volume Increase Over No-Build	Percent Increase Over No-Build
<i>Chestnut Street, west of West Site Driveway:</i>				
Weekday Morning	416	408	-8	-1.9
Weekday Evening	268	269	1	0.4
<i>Albion Street, west of North Avenue:</i>				
Weekday Morning	847	848	1	0.1
Weekday Evening	960	963	3	0.3
<i>North Avenue, north of Albion Street:</i>				
Weekday Morning	1,181	1,188	7	0.6
Weekday Evening	1,422	1,421	-1	-0.1
<i>Main Street, north of Chestnut Street:</i>				
Weekday Morning	1,245	1,247	2	0.2
Weekday Evening	1,355	1,361	6	0.4
<i>Centre Street, east of Main Street:</i>				
Weekday Morning	378	375	-3	-0.8
Weekday Evening	230	226	-4	-1.7
<i>Water Street, east of Main Street:</i>				
Weekday Morning	1,129	1,132	3	0.3
Weekday Evening	1,235	1,241	6	0.5
<i>Main Street, south of North Avenue:</i>				
Weekday Morning	2,039	2,040	1	0.1
Weekday Evening	2,267	2,266	-1	-0.1
<i>Nahant Street, east of Main Street:</i>				
Weekday Morning	935	936	1	0.1
Weekday Evening	901	899	-2	-0.2

<sup>a</sup>Vehicles per hour, total of both directions.

As shown in Table 7, in comparison to future No-Build conditions, Project-related traffic increases are projected to range between -8 to 7 vehicles or -1.9 to 0.6 percent during peak hours.

### **PARKING ANALYSIS**

A parking analysis was performed to evaluate whether the proposed parking supply at the site will be adequate to accommodate the anticipated parking demand for the Project. The Town of Wakefield Zoning (Section 190-41.B) requires a parking rate of 1.5 spaces per residential unit for multifamily attached dwellings providing two bedrooms or fewer, and one (1) space per 4 seats and for 3 employees each for restaurants.

The Project will include the total construction of 28 parking spaces which will be for the exclusive use of the Project residents. Given the location of the Project, the proposed restaurant customers are expected to consist of primarily foot traffic with on-street parking used to accommodate the demand of this establishment. Figure 12 graphically depicts available parking regulations within the study area.

In order to identify the parking demand for the restaurant component of the Project, parking demand calculations were performed based on data published by the ITE. The ITE provides parking-generation equations for a number of LUC as part of their *Parking Generation* manual<sup>14</sup> including LUC 220 *Multifamily Housing (Low-Rise)* and LUC 932, *High-Turnover (Sit Down) Restaurant - Family*. Table 8 summarizes the required parking spaces, the proposed parking supply and ITE-projected traffic demand.

**Table 8  
PARKING ANALYSIS**

Land Use	Quantity	Local Zoning Standards Ratio		Proposed Supply	ITE Average Parking Demand
		Parking Ratio	Spaces		
Residential	20 units	1.5 space/1 unit	30	28	13
Restaurant	80 seats 12 employees	1 space/4 seats 1 space/3 employees	20 4	On-Street	26
<b>Total Parking</b>			<b>97</b>	<b>28</b>	

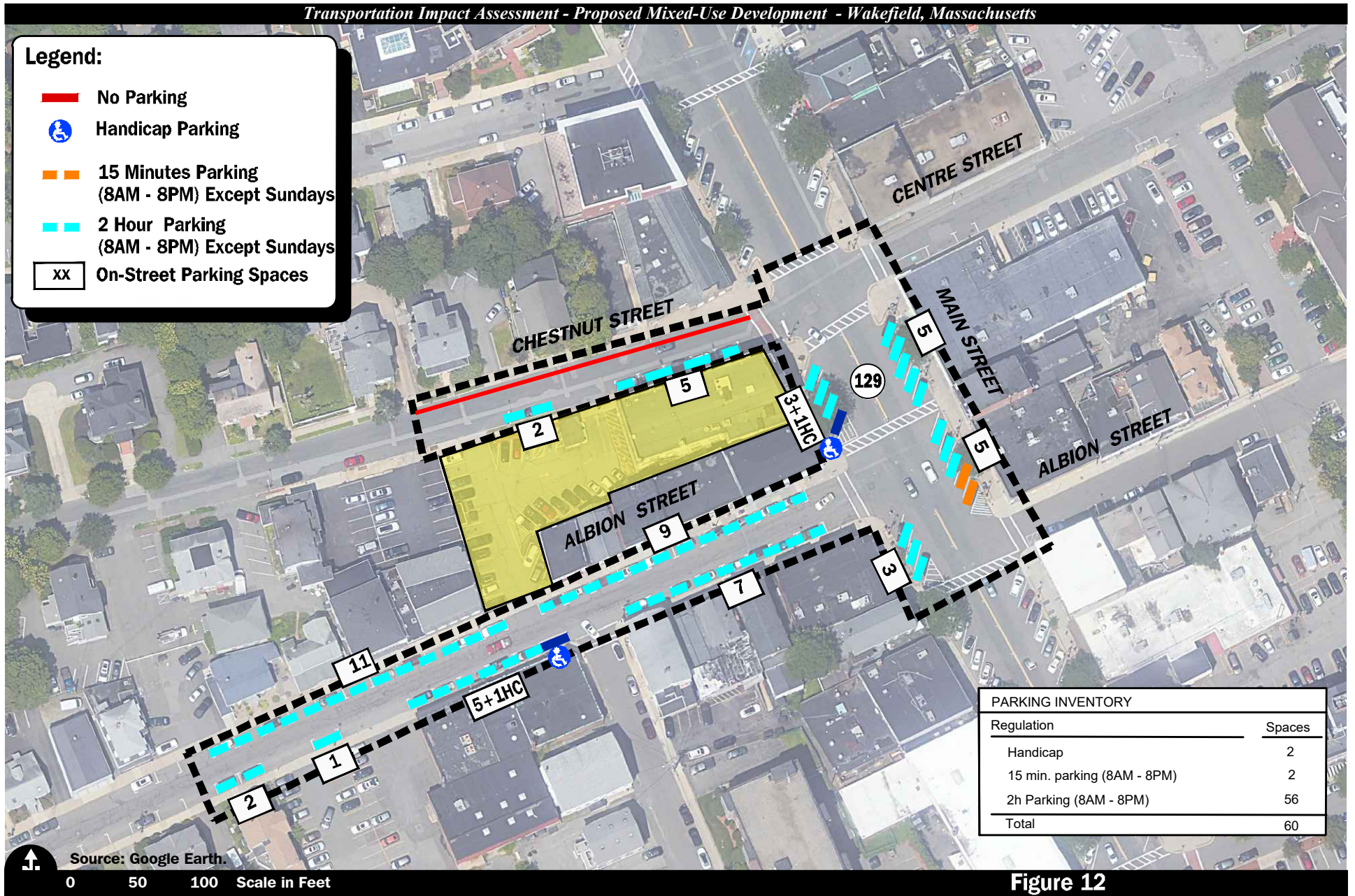
As shown in Table 8, ITE indicates the peak-parking demand for the residential component is 13 parking spaces, which is below the proposed supply of 28 parking spaces.

As mentioned above, restaurant customers driving to the site are expected to use available on-street parking. The ITE data projected that for an 80-seat restaurant, a parking demand of 26 vehicles is expected during a typical weekday. Based upon field inventory and as shown on Figure 12, a total of 60 on-street parking spaces are available on Chestnut Street, Albion Street, and Main Street along the site frontage. Therefore, it is expected that the parking demand for the Project can be accommodated by the combination of the on-site (for residential) and on-street (for restaurant) parking supply.

<sup>14</sup>*Parking Demand, 5<sup>th</sup> Edition*, Institute of Transportation Engineers, Washington D.C., 2019.

**Legend:**

- █ No Parking
- Handicap Parking
- █ 15 Minutes Parking (8AM - 8PM) Except Sundays
- █ 2 Hour Parking (8AM - 8PM) Except Sundays
- XX On-Street Parking Spaces



PARKING INVENTORY	
Regulation	Spaces
Handicap	2
15 min. parking (8AM - 8PM)	2
2h Parking (8AM - 8PM)	56
<b>Total</b>	<b>60</b>

**Figure 12**  
Existing On-Street Parking Supply



## SIGHT DISTANCE EVALUATION

---

Sight distance measurements were performed at both site driveway intersection with Chestnut Street and Albion Street in accordance with MassDOT and American Association of State Highway and Transportation Officials (AASHTO)<sup>15</sup> recommendations. Both stopping sight distance (SSD) and intersection sight distance (ISD) measurements were performed. In brief, SSD is the distance recommended to be provided for a vehicle traveling at the design speed of a roadway, on wet pavement, to stop prior to striking an object in its travel path. ISD or corner sight distance (CSD) is the sight distance recommended to be provided to a driver entering or crossing an intersecting roadway to perceive an on-coming vehicle and safely complete a turning or crossing maneuver with on-coming traffic. ***In accordance with AASHTO standards, if the measured ISD is at least equal to the recommended SSD value for the appropriate design speed, the intersection can operate in a safe manner.*** Table 9 presents the measured SSD and ISD at the subject intersections.

---

<sup>15</sup>A *Policy on Geometric Design of Highway and Streets*, 7<sup>th</sup> Edition; American Association of State Highway and Transportation Officials (AASHTO); Washington D.C.; 2018.

**Table 9  
SIGHT DISTANCE MEASUREMENTS<sup>a</sup>**

Intersection/Sight Distance Measurement	Recommended Minimum (Feet) <sup>a</sup>		
	(15 mph)	(20 mph)	Measured
<b><i>Chestnut Street at East Site Driveway</i></b>			
<i>Stopping Sight Distance:</i>			
Chestnut Street approaching from the east	80	115	150 <sup>c</sup>
Chestnut Street approaching from the west	80	115	406 <sup>d</sup>
<i>Intersection Sight Distance:</i>			
Looking to the east from the East Site Driveway	170	225	150 <sup>c</sup>
Looking to the west from the East Site Driveway	145	195	440 <sup>d</sup>
<b><i>Albion Street at Site Driveway</i></b>			
<i>Stopping Sight Distance:</i>			
Albion Street approaching from the east	80	115	265 <sup>d</sup>
<i>Intersection Sight Distance:</i>			
Looking to the east from the Site Driveway	145	195	265 <sup>d</sup>

<sup>a</sup>Recommended minimum values obtained from *A Policy on Geometric Design of Highways and Streets*, 7<sup>th</sup> Edition; American Association of State Highway and Transportation Officials (AASHTO); 2018.

<sup>b</sup>Values shown are the intersection sight distance for a vehicle turning right or left exiting a roadway under STOP control such that motorists approaching the intersection on the major street should not need to adjust their travel speed to less than 70 percent of their initial approach speed.

<sup>c</sup>Measured from driveway to Main Street intersection with Chestnut Street/Centre Street.

<sup>d</sup>Assumed no vehicles parked on-street.

As can be seen in Table 9, the sight distance at the east site driveway with Chestnut Street was found to exceed the recommended values for SSD in both directions, based on a speed of 20 mph. However, due to the geometry of the roadway, the site driveway did not meet the recommended value for ISD looking to the east for the speed of 15 mph. Although ISD is not met, the measured sight distance is higher than the recommended SSD value, therefore the site driveway can operate in a safe manner. The sight distance at the site driveway with Albion Street was found to exceed the recommended values for SSD and ISD, based on a speed of 20 mph assuming no cars are parked on the north side of the street.

In order to encourage safe and efficient flow of traffic to and from the site, should any landscaping or signage along the site frontage or the site driveway be proposed or requested by others, these features are recommended to be no higher than 24 inches or be set back sufficiently from the edge of the roadways so as not to inhibit the available sightlines.

# **TRAFFIC OPERATIONS ANALYSIS**

---

Measuring existing and future traffic volumes quantify traffic flow within the study area. To assess quality of flow, roadway capacity, and vehicle queue analyses were conducted under Existing, No-Build, and Build traffic-volume conditions. Capacity analyses provide an indication of how well the roadway facilities serve the traffic demands placed upon them, with vehicle queue analyses providing a secondary measure of the operational characteristics of an intersection or section of roadway under study.

## **METHODOLOGY**

### **Levels of Service**

A primary result of capacity analyses is the assignment of level of service to traffic facilities under various traffic-flow conditions.<sup>16</sup> The concept of level of service is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A level-of-service definition provides an index to quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety.

Six levels of service are defined for each type of facility. They are given letter designations from A to F, with level-of-service (LOS) A representing the best-operating conditions and LOS F representing congested or constrained operating conditions.

Since the level of service of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of levels of service, depending on the time of day, day of week, or period of year.

### **Signalized Intersections**

The six levels of service for signalized intersections may be described as follows:

---

<sup>16</sup>The capacity analysis methodology is based on the concepts and procedures presented in the *Highway Capacity Manual 6<sup>th</sup> Edition*; Transportation Research Board; Washington, DC; 2016.

- *LOS A* describes operations with very low control delay; most vehicles do not stop at all.
- *LOS B* describes operations with relatively low control delay. However, more vehicles stop than *LOS A*.
- *LOS C* describes operations with higher control delays. Individual cycle failures may begin to appear. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
- *LOS D* describes operations with control delay in the range where the influence of congestion becomes more noticeable. Many vehicles stop, and individual cycle failures are noticeable.
- *LOS E* describes operations with high control delay values. Individual cycle failures are frequent occurrences.
- *LOS F* describes operations with high control delay values that often occur with oversaturation. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Levels of service for signalized intersections were calculated using the Percentile Delay Method implemented as a part of the Synchro™ 11 software as required by MassDOT. The Percentile Delay Method assesses the effects of signal type, timing, phasing, and progression; vehicle mix; and geometrics on “percentile” delay. Level-of-service designations are based on the criterion of percentile delay per vehicle and are a measure of: i) driver discomfort; ii) motorist frustration; and iii) fuel consumption; and include a uniform delay based on percentile volumes using a Poisson arrival pattern, an initial queue move-up time, and a queue interaction delay that accounts for delays resulting from queues extending from adjacent intersections. Table 10 summarizes the relationship between level-of-service and percentile delay and uses the same numerical delay thresholds as the *Highway Capacity Manual*<sup>17</sup> method. The tabulated percentile delay criterion may be applied in assigning level-of-service designations to individual lane groups, individual intersection approaches, or to entire intersections.

**Table 10**  
**LEVEL-OF-SERVICE CRITERIA**  
**FOR SIGNALIZED INTERSECTIONS**

Level of Service	Percentile Delay Per Vehicle (Seconds)
A	≤10.0
B	10.1 to 20.0
C	20.1 to 35.0
D	35.1 to 55.0
E	55.1 to 80.0
F	>80.0

<sup>17</sup>*Highway Capacity Manual 6<sup>th</sup> Edition*; Transportation Research Board; Washington, DC; 2016.

## Unsignalized Intersections

The six levels of service for unsignalized intersections may be described as follows:

- *LOS A* represents a condition with little or no control delay to minor street traffic.
- *LOS B* represents a condition with short control delays to minor street traffic.
- *LOS C* represents a condition with average control delays to minor street traffic.
- *LOS D* represents a condition with long control delays to minor street traffic.
- *LOS E* represents operating conditions at or near capacity level, with very long control delays to minor street traffic.
- *LOS F* represents a condition where minor street demand volume exceeds capacity of an approach lane, with extreme control delays resulting.

The levels of service of unsignalized intersections are determined by application of a procedure described in the *Highway Capacity Manual 6<sup>th</sup> Edition*. Level of service is measured in terms of average control delay. Mathematically, control delay is a function of the capacity and degree of saturation of the lane group and/or approach under study and is a quantification of motorist delay associated with traffic control devices such as traffic signals and STOP signs. Control delay includes the effects of initial deceleration delay approaching a STOP sign, stopped delay, queue move-up time, and final acceleration delay from a stopped condition. Definitions for level of service at unsignalized intersections are also given in the *Highway Capacity Manual 6<sup>th</sup> Edition*. Table 11 summarizes the relationship between level of service and average control delay for two-way STOP-controlled and all-way STOP-controlled intersections.

**Table 11**  
**LEVEL-OF-SERVICE CRITERIA**  
**FOR UNSIGNALIZED INTERSECTIONS<sup>a</sup>**

Level-of-Service by Volume-to-Capacity Ratio		Average Control Delay (Seconds Per Vehicle)
$v/c \leq 1.0$	$v/c > 1.0$	
A	F	$\leq 10.0$
B	F	10.1 to 15.0
C	F	15.1 to 25.0
D	F	25.1 to 35.0
E	F	35.1 to 50.0
F	F	>50.0

<sup>a</sup>Source: *Highway Capacity Manual 6<sup>th</sup> Edition*; Transportation Research Board; Washington, DC; 2016; page 20-6.

## **ANALYSIS RESULTS**

Level-of-service and vehicle queue analyses were conducted for 2022 Existing, 2029 No-Build, and 2029 Build conditions for the intersections within the study area. The results of the intersection capacity and vehicle queue analyses are summarized for signalized and unsignalized intersections in Tables 12 and 13, respectively, with the detailed analysis results presented in the Appendix.

The following is a summary of the level-of-service and delay analyses for the intersections within the study area:

### **Signalized Intersections**

As can be seen from Table 12, the Project has minimal effect on overall delays with 2029 Build overall delays increasing by a second or less over 2029 No-Build conditions. The overall level of service at the signalized intersections range from LOS D to LOS F, depending on location and peak hour. It should be noted that assumptions for the *Envision Wakefield* traffic signal improvements were incorporated into future conditions analysis, which in some cases resulted in operations degrading due to expanded pedestrian crossing times.

### **Unsignalized Intersections**

As can be seen from Table 13, the Project adds traffic to unsignalized locations within the study area but will not change any levels of service. The site driveway exiting traffic is projected to operate at LOS B or better during the weekday morning and evening peak hours.

**Table 12**  
**SIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY**

Signalized Intersection/Peak Hour/Movement	2022 Existing				2029 No-Build <sup>e</sup>				2029 Build			
	V/C <sup>a</sup>	Delay <sup>b</sup>	LOS <sup>c</sup>	Queue <sup>d</sup> Avg/95 <sup>th</sup>	V/C	Delay	LOS	Queue Avg/95 <sup>th</sup>	V/C	Delay	LOS	Queue Avg/95 <sup>th</sup>
<i>Main Street at West Water Street/Water Street</i>												
<i>Weekday Morning:</i>												
West Water Street EB LT/TH/RT	0.33	27.4	C	55/167	0.28	24.8	C	77/161	0.29	24.9	C	79/164
Water Street WB LT/TH	1.18	>80.0	F	241/688	1.1	>80.0	F	343/702	1.11	>80.0	F	346/705
Water Street WB RT	0.32	17.1	B	32/132	0.29	14.2	B	44/127	0.29	14.2	B	44/125
Main Street NB LT/TH	0.69	27.9	C	163/316	0.99	72.7	E	294/588	0.98	72.6	E	292/586
Main Street NB RT	0.44	15.1	B	56/136	0.51	23.9	C	100/204	0.51	24.0	C	101/205
Main Street SB LT	0.31	12.1	B	22/64	0.44	21.3	C	40/95	0.44	21.4	C	41/96
Main Street SB TH/RT	0.74	20.3	C	200/433	0.84	34	C	374/721	0.84	34.2	C	376/723
<b>Overall</b>	--	<b>43.0</b>	<b>D</b>	--	--	<b>51.2</b>	<b>D</b>	--	--	<b>51.8</b>	<b>D</b>	--
<i>Weekday Evening:</i>												
West Water Street EB LT/TH/RT	0.73	39.8	D	126/436	0.57	30.9	C	181/354	0.57	30.9	C	182/356
Water Street WB LT/TH	1.53	>80.0	F	211/550	1.22	>80.0	F	307/574	1.23	>80.0	F	308/575
Water Street WB RT	0.22	14.6	B	14/71	0.19	10.8	B	19/65	0.20	11.1	B	21/68
Main Street NB LT/TH	0.68	35.9	D	108/262	0.88	63.3	E	197/461	0.85	59.1	E	194/450
Main Street NB RT	0.47	16.5	B	36/128	0.5	24.9	C	79/198	0.50	24.8	C	79/197
Main Street SB LT	0.56	18.2	B	54/150	0.78	40.8	D	105/300	0.78	40.8	D	106/304
Main Street SB TH/RT	0.70	21.4	C	170/431	0.84	39.3	D	343/755	0.83	38.4	D	336/741
<b>Overall</b>	--	<b>68.0</b>	<b>E</b>	--	--	<b>57.3</b>	<b>E</b>	--	--	<b>56.7</b>	<b>E</b>	--

See notes at end of table.

**Table 12 (Continued)**  
**SIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY**

Signalized Intersection/Peak Hour/Movement	2022 Existing				2029 No-Build <sup>e</sup>				2029 Build			
	V/C <sup>a</sup>	Delay <sup>b</sup>	LOS <sup>c</sup>	Queue <sup>d</sup> Avg/95 <sup>th</sup>	V/C	Delay	LOS	Queue Avg/95 <sup>th</sup>	V/C	Delay	LOS	Queue Avg/95 <sup>th</sup>
<i>North Avenue at Albion Street</i>												
<i>Weekday Morning:</i>												
Albion Street EB LT	0.66	61.8	E	118/186	0.78	77.8	E	186/277	0.78	77.7	E	186/277
Albion Street EB RT	0.49	11.1	B	0/56	0.48	11.3	B	0/62	0.48	11.3	B	0/62
Albion Street WB LT	0.25	56.7	E	37/71	0.12	41.6	D	40/66	0.14	41.9	D	46/73
Albion Street WB TH	1.78	>80.0	F	485/606	0.84	63.8	E	388/422	0.84	63.8	E	390/423
Albion Street WB RT	0.39	11.5	B	0/21	0.24	6.8	A	0/21	0.26	8.1	A	0/28
North Avenue NB LT	0.67	63.3	E	123/184	1.01	>80.0	F	199/326	1.01	>80.0	F	199/326
North Avenue NB TH	0.64	30.2	C	360/462	0.87	58.3	E	617/776	0.88	58.5	E	618/776
North Avenue SB TH	0.73	49.5	D	303/535	0.97	>80.0	F	482/752	0.97	>80.0	F	483/752
North Avenue SB RT	0.07	0.3	A	0/0	0.11	0.5	A	0/0	0.11	0.5	A	0/0
<b>Overall</b>	--	<b>105.8</b>	<b>F</b>	--	--	<b>63.7</b>	<b>E</b>	--	--	<b>63.6</b>	<b>E</b>	--
<i>Weekday Evening:</i>												
Albion Street EB LT	0.85	67.3	E	289/420	1.12	>80.0	F	403/634	1.13	>80.0	F	404/637
Albion Street EB RT	0.49	7.4	A	0/71	0.62	20.4	C	65/177	0.62	20.5	C	65/178
Albion Street WB LT	0.39	68.3	E	61/112	0.29	51.2	D	57/98	0.30	51.2	D	60/101
Albion Street WB TH	0.93	>80.0	F	183/335	0.69	63.5	E	162/226	0.69	63.5	E	166/230
Albion Street WB RT	0.44	14.9	B	0/44	0.37	9.5	A	0/37	0.36	9.3	A	0/35
North Avenue NB LT	0.61	70.7	E	109/177	0.73	79.7	E	112/226	0.73	79.9	E	113/227
North Avenue NB TH	0.60	36.6	D	344/473	0.67	39.1	D	359/509	0.67	39.3	D	361/510
North Avenue SB TH	1.08	>80.0	F	597/878	1.19	>80.0	F	621/878	1.20	>80.0	F	623/882
North Avenue SB RT	0.07	0.3	A	0/0	0.14	0.6	A	0/0	0.14	0.6	A	0/0
<b>Overall</b>	--	<b>62.7</b>	<b>E</b>	--	--	<b>79.5</b>	<b>E</b>	--	--	<b>80.0</b>	<b>E</b>	--

See notes at end of table.



**Table 12 (Continued)**  
**SIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY**

Signalized Intersection/Peak Hour/Movement	2022 Existing				2029 No-Build <sup>e</sup>				2029 Build			
	V/C <sup>a</sup>	Delay <sup>b</sup>	LOS <sup>c</sup>	Queue <sup>d</sup> Avg/95 <sup>th</sup>	V/C	Delay	LOS	Queue Avg/95 <sup>th</sup>	V/C	Delay	LOS	Queue Avg/95 <sup>th</sup>
<i>Main Street at North Avenue/Nahant Street:</i>												
<i>Weekday Morning:</i>												
North Avenue EB LT	2.20	>80.0	F	195/320	2.72	>80.0	F	230/324	2.72	>80.0	F	230/324
North Avenue EB TH	0.57	44.0	D	213/299	0.67	49.2	D	262/359	0.67	49.2	D	263/360
North Avenue EB RT	0.43	3.1	A	0/46	0.47	3.3	A	0/49	0.47	3.3	A	0/49
Nahant Street WB LT/TH/RT	1.46	>80.0	F	705/880	1.88	>80.0	F	874/1049	1.89	>80.0	F	873/1048
Main Street NB LT	1.24	>80.0	F	545/667	1.25	162	F	571/692	1.25	162.0	F	571/692
Main Street NB TH/RT	0.77	34.0	C	515/595	0.82	37.7	D	602/685	0.82	37.5	D	598/679
Main Street SB LT	0.39	52.7	D	42/82	0.55	66.5	E	48/105	0.55	66.1	E	49/105
Main Street SB TH/RT	0.96	67.5	E	342/417	0.97	69.8	E	389/462	0.97	70.6	E	392/465
<b>Overall</b>	--	<b>&gt;80.0</b>	<b>F</b>	--	--	<b>&gt;80.0</b>	<b>F</b>	--	--	<b>&gt;80.0</b>	<b>F</b>	--
<i>Weekday Evening:</i>												
North Avenue EB LT	1.75	395.2	F	268/426	2.39	>80.0	F	338/507	2.28	>80.0	F	334/503
North Avenue EB TH	0.70	48.6	D	272/414	0.79	55.3	E	324/504	0.79	55.3	E	324/504
North Avenue EB RT	0.43	3.1	A	0/56	0.47	3.3	A	0/59	0.47	3.3	A	0/59
Nahant Street WB LT/TH/RT	1.27	>80.0	F	492/638	1.8	>80.0	F	681/827	1.78	>80.0	F	667/813
Main Street NB LT	0.94	78.3	E	348/546	0.98	73.4	E	362/574	0.98	73.4	E	362/574
Main Street NB TH/RT	1.12	>80.0	F	1066/1326	0.83	38.2	D	612/879	0.83	38.1	D	611/877
Main Street SB LT	1.27	>80.0	F	90/198	0.83	>80.0	F	74/184	0.82	>80.0	F	74/183
Main Street SB TH/RT	1.10	>80.0	F	443/575	1.12	>80.0	F	511/646	1.11	>80.0	F	501/635
<b>Overall</b>	--	<b>&gt;80.0</b>	<b>F</b>	--	--	<b>&gt;80.0</b>	<b>F</b>	--	--	<b>&gt;80.0</b>	<b>F</b>	--

<sup>a</sup>Volume-to-capacity ratio.

<sup>b</sup>Control (signal) delay per vehicle in seconds.

<sup>c</sup>Level of service.

<sup>d</sup>Queue length in feet.

<sup>e</sup>Includes signal timing modifications under 2029 conditions from the *Envision Wakefield Plan*.

NB = northbound; SB = southbound; EB = eastbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

**Table 13**  
**UNSIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY**

Unsignalized Intersection/ Peak Hour/Movement	2022 Existing				2029 No-Build				2029 Build			
	Demand <sup>a</sup>	Delay <sup>b</sup>	LOS <sup>c</sup>	Queue 95 <sup>th</sup> Percentile	Demand	Delay	LOS	Queue 95 <sup>th</sup> Percentile	Demand	Delay	LOS	Queue 95 <sup>th</sup> Percentile
<b>Albion Street at Site Driveway</b>												
<i>Weekday Morning:</i>												
Site Driveway SB LT /RT	2	10.6	B	0	2	10.8	B	0	16	11.0	B	5
<i>Weekday Evening:</i>												
Site Driveway SB LT /RT	5	9.8	A	0	5	10.0	B	3	8	10.0	B	3
<b>Chestnut Street at West Site Driveway</b>												
<i>Weekday Morning:</i>												
Chestnut Street WB LT	5	7.4	A	0	5	7.4	A	0	3	7.4	A	0
Site Driveway NB LT/RT	3	11.4	B	0	5	11.7	B	0	--	--	--	--
<i>Weekday Evening:</i>												
Chestnut Street WB LT	4	7.5	A	0	4	7.6	A	0	9	7.6	A	0
Site Driveway NB LT/RT	4	9.1	A	0	4	9.2	A	0	--	--	--	--
<b>Chestnut Street at East Site Driveway</b>												
<i>Weekday Morning:</i>												
Chestnut Street WB LT	--	--	--	--	--	--	--	--	1	7.4	A	0
Site Driveway NB LT/RT	3	11.3	B	0	3	11.5	B	0	6	9.3	A	0
<i>Weekday Evening:</i>												
Chestnut Street WB LT	--	--	--	--	--	--	--	--	3	7.6	A	0
Site Driveway NB LT/RT	13	9.3	A	3	13	9.3	A	3	3	9.6	A	0
<b>Main Street at Chestnut Street</b>												
<i>Weekday Morning:</i>												
Chestnut Street EB LT/TH/RT	92	>50.0	F	--	96	>50.0	F	--	104	>50.0	F	--
Centre Street WB LT/TH/RT	294	>50.0	F	250	320	>50.0	F	1,175	311	>50.0	F	1,148
Main Street NB LT	71	10.3	B	10	76	10.8	B	10	78	10.8	B	13
Main Street SB LT	16	8.3	A	3	17	8.5	A	3	17	8.5	A	3
<i>Weekday Evening:</i>												
Centre Street WB LT/TH/RT	153	>50.0	F	348	163	>50.0	F	478	150	>50.0	F	440
Chestnut Street EB LT/TH/RT	103	>50.0	F	288	110	>50.0	F	400	109	>50.0	F	385
Main Street NB LT	34	9.6	A	5	36	9.9	A	5	42	10.0	A	5
Main Street SB LT	40	8.5	A	3	43	8.7	A	3	43	8.7	A	3

See notes at end of table.

**Table 13 (Continued)**  
**UNSIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY**

Unsignalized Intersection/ Peak Hour/Movement	2022 Existing				2029 No-Build				2029 Build			
	Demand <sup>a</sup>	Delay <sup>b</sup>	LOS <sup>c</sup>	Queue 95 <sup>th</sup> Percentile	Demand	Delay	LOS	Queue 95 <sup>th</sup> Percentile	Demand	Delay	LOS	Queue 95 <sup>th</sup> Percentile
<b><i>Main Street at Albion Street</i></b>												
<i>Weekday Morning:</i>												
Main Street NB LT	107	10.9	B	15	115	11.5	B	18	109	11.5	B	18
<i>Weekday Evening:</i>												
Main Street NB LT	104	9.6	A	3	112	11.1	B	18	105	11.0	B	15
<b><i>Main Street at Armory Street</i></b>												
<i>Weekday Morning:</i>												
Main Street NB LT	53	10.3	B	8	59	10.8	B	10	59	10.8	B	10
<i>Weekday Evening:</i>												
Main Street NB LT	28	10.9	B	15	33	9.9	A	3	33	9.9	A	3

<sup>a</sup>Demand in vehicles per hour.

<sup>b</sup>Control (signal) delay per vehicle in seconds.

<sup>c</sup>Level of service.

<sup>d</sup>Queue length in feet.

NB = northbound; SB = southbound; EB = eastbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

## **CONCLUSIONS AND RECOMMENDATIONS**

---

VAI has prepared this TIA in order to evaluate potential traffic impacts associated with the proposed mixed-use development to be located at 369 and 371 Main Street in Wakefield, Massachusetts (the “Project”). This study was prepared in accordance with the MassDOT Guidelines for *Transportation Impact Assessment (TIA) Guidelines*; and was conducted pursuant to the standards of the Traffic Engineering and Transportation Planning Professions for the preparation of such reports. Based on the results of this study, the following can be concluded:

- The proposed Project is expected to generate approximately 4 net new vehicle trips (10 less entering and 14 more exiting) during the weekday morning peak hour and 3 net new vehicle trips (7 more entering and 4 less exiting) during the weekday evening peak hour.
- Project-related traffic increases are projected to range between -8 to 7 vehicles or -1.9 to 0.6 percent during peak hours.
- The analysis has indicated that the Project will result in minimal impact on motorist delays at the study intersections, as compared to future No-Build conditions.
- No apparent safety deficiencies were noted with respect to the motor vehicle crash history at the study area intersections.
- Lines of sight at the Project site roadway intersections with Chestnut Street and Albion Street were found to exceed or could be made to meet or exceed the recommended minimum distance for safe operation based on the appropriate approach speed.

In consideration of the above, we have concluded that the Project can be accommodated within the confines of the existing transportation infrastructure in a safe and efficient manner with the implementation of the following recommendations.

### **RECOMMENDATIONS**

The following recommendations have been developed as a part of this evaluation and, where applicable, will be completed in conjunction with the Project subject to receipt of all necessary rights, permits, and approvals.

## **Project Access**

Vehicle access will be via a one-way driveway with entry from Chestnut Street and exit to Albion Street and a separate full-access driveway onto Chestnut Street. The following recommendations are offered with respect to Project access, internal circulation, and parking, many of which are already reflected on the Site Plans for the Project:

- The Project site driveways and internal circulating drives should be a minimum of 24 feet in width where two-way traffic is to be conveyed. The proposed parking spaces should have direct access to an aisle or driveway to accommodate the turning and maneuvering requirements, having a minimum width of 20 feet for one-way traffic only, as defined by the Wakefield Zoning by law (Section 190-37. D);
- Vehicles exiting the Project site should be placed under STOP-sign control with a marked STOP-line provided;
- All signs and pavement markings to be installed within the Project site should conform to the applicable standards of the MUTCD;<sup>18</sup>
- Americans with Disabilities Act (ADA)-compliant wheelchair ramps should be provided at all pedestrian crossings of the Project site driveways;
- Signs and landscaping to be installed as a part of the Project within intersection sight triangle areas of the Project site driveways should be designed and maintained so as not to restrict lines of sight;
- Snow windrows within the sight triangle areas of the Project site driveways and at intersections within the Project site should be promptly removed where such accumulations would impede sight lines.

## **Transportation Demand Management (TDM) Plan**

As is the case with many developments, a major focus of the traffic mitigation plan focuses on the reduction of single-occupant vehicles arriving and departing to and from the site. This is predominantly accomplished by developing a comprehensive TDM strategy. In an effort to encourage the use of alternative modes of transportation to single-occupant vehicles, the following TDM measures will be implemented as a part of the Project:

- Information regarding public transportation services, maps, schedules, and fare information should be posted in a central location and/or otherwise made available to residents and employees;
- A “welcome packet” should be provided to residents and employees detailing available public transportation services, bicycle and walking alternatives, and available commuter options;
- Consideration should be given to installing accommodations for the charging of electric vehicles by residents of the Project.

---

<sup>18</sup>Ibid 1.

## **CONCLUSIONS**

The proposed Project will not have a significant impact on overall operations. With the implementation of the above recommendations, safe and efficient access will be provided to the planned development and the proposed development can be constructed with minimal impact to the area as designed.

## APPENDIX

---

SITE PLAN  
TURNING MOVEMENT COUNTS  
TRAFFIC ADJUSTMENTS  
PUBLIC TRANSPORTATION SCHEDULES  
MOTOR VEHICLE CRASH DATA  
GROWTH RATE CALCULATIONS  
BACKGROUND DEVELOPMENT  
TRIP DISTRIBUTION  
TRIP GENERATION  
PARKING ANALYSIS  
CAPACITY ANALYSIS



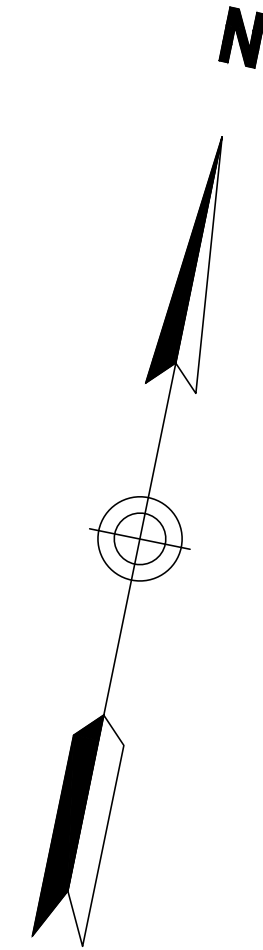
SITE PLAN

---





LINE TABLE(C)			
LINE #	DIRECTION	LENGTH	LENGTH
L1	N10°57'29"W	1.72'	
L2	S78°24'55"W	27.51'	
L3	S07°15'22"E	5.36'	
L4	S78°57'31"W	30.64'	
L5	S05°09'05"E	1.89'	
L6	S78°57'26"W	26.42'	
L8	S03°41'36"E	2.15'	
L9	S82°10'23"W	31.14'	



**PARKING CALCULATIONS**

COMPONENT	REQUIRED	PROPOSED
PROPOSED BUILDING: 2 BEDROOMS OR FEWER (20 UNITS)	30 SPACES (1.5 spaces per unit) 20 units x 1.5 spaces = 30 Spaces	18 SPACES (Standard) 8 SPACES (Compact)
EXISTING BUILDING (BANK) 1ST FLOOR RESTAURANT (6,357 S.F.)	(1.0 spaces per 4 seats) (1.0 spaces for each 3 employees)	2 SPACES (Accessible) 28 SPACES

NOTE:  
 1A. TOTAL NUMBER OF PARKING SPACES IN PARKING FACILITY: 28 SPACES  
 MINIMUM NUMBER OF ACCESSIBLE PARKING SPACES REQUIRED FOR 28-50 SPACES: 2 SPACES  
 2A. STANDARD SPACES ARE 9'x18'  
 3A. COMPACT SPACES ARE 8'x16' Ⓞ

**SIGN TABLE**

REGULATORY DESCRIPTION	SIGN	SIZE	MOUNTING HEIGHT (BASE TO BOTTOM OF SIGN)	DESCRIPTION	REFLECTORIZED
R7-8V		12" X 20"	6' - 0"	GREEN & BLUE ON WHITE	YES
R7-8		12" X 20"	6' - 0"	GREEN & BLUE ON WHITE	YES
R3-2		24" X 24"	7' - 0"	BLACK & RED ON WHITE	YES
R5-1		24" X 24"	7' - 0"	WHITE ON RED	YES
R1-1		24" X 24"	7' - 0"	WHITE ON RED	YES

ALL SIGNS AND PAVEMENT MARKINGS TO BE INSTALLED SHALL CONFORM TO THE APPLICABLE SPECIFICATIONS OF THE CURRENT EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD)

**LAND USAGE TABLE**

ITEM	BUSINESS (B)		
	REQUIRED	EXISTING BLDG & ATM	EXIST. BLDG & PROP. MULTI-FAMILY
MINIMUM LOT SIZE	-	19,307 SF	19,307 SF
MINIMUM LOT FRONTAGE (CHESTNUT)	40 FT	257.85 FT	257.85 FT
MINIMUM LOT WIDTH	40 FT	257.85 FT	257.85 FT
FLOOR AREA RATIO	1.5	0.90	1.98
MINIMUM FRONT YARD SETBACK (chestnut)	-	4.1 FT	2.5 FT
MINIMUM SIDE YARD SETBACK (RIGHT)	-	93.2 FT	9.5 FT <sup>(2)</sup>
MINIMUM SIDE YARD SETBACK (LT)	-	1.6 FT	1.6 FT
MINIMUM REAR YARD SETBACK	-	0 FT	0 FT
MAXIMUM STORIES	-	2	4
MAXIMUM HEIGHT	60 FT	35.6 FT	47.0
MAXIMUM BUILDING COVERAGE	80%	33.7%	66.9
MINIMUM OPEN AREA	10%	0.7%	2.2%

(1) EAR CALCULATION

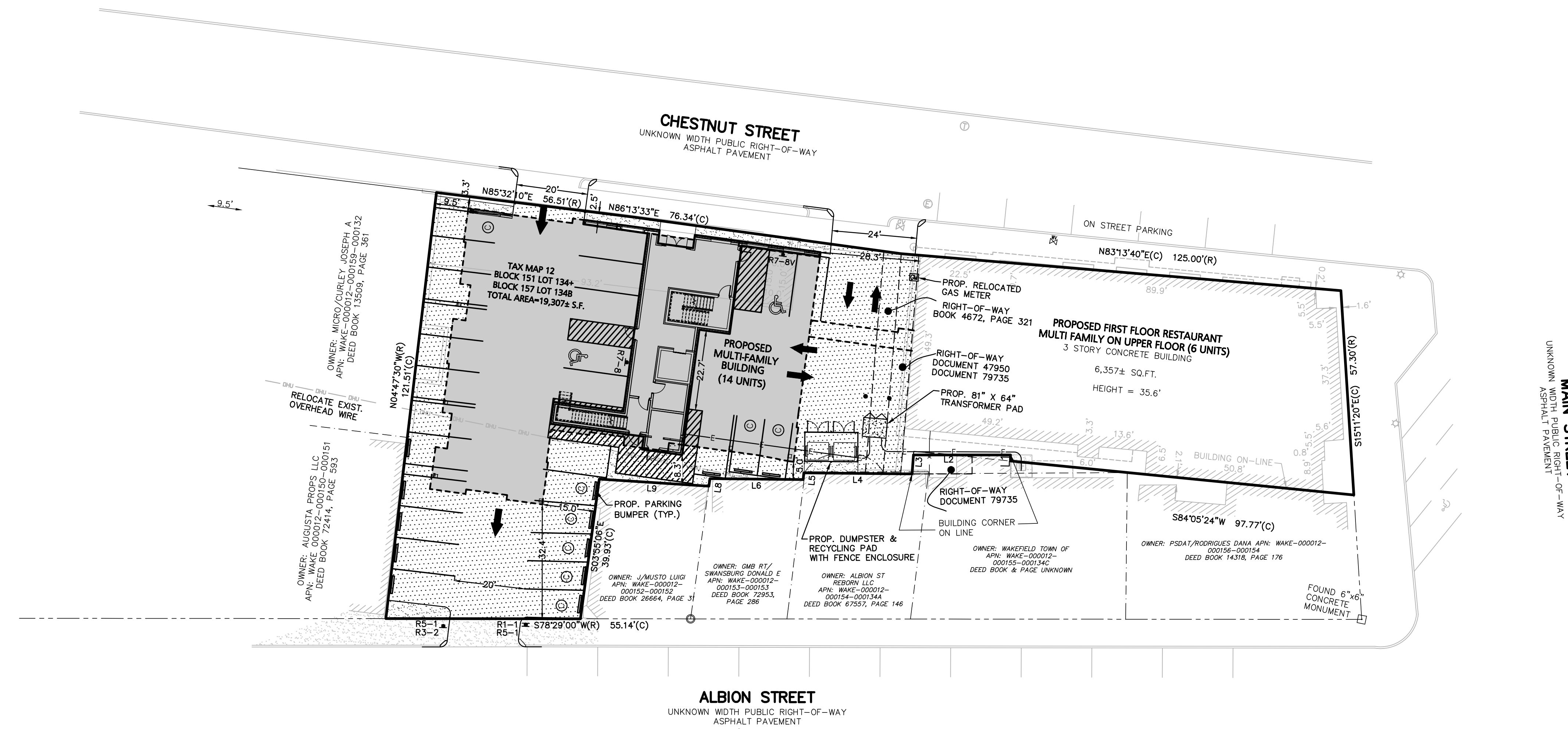
EXISTING BUILDING GROSS FLOOR AREA = 17,140 S.F.  
 PROPOSED BUILDING GROSS FLOOR AREA = 21,012 S.F.  
 TOTAL GROSS FLOOR AREA = 38,152 S.F.  
 F.A.R. = 38,152 S.F. ÷ 19,307 S.F. = 1.98

(2) A MINIMUM OF 15 FEET ADJACENT TO A RESIDENTIAL DISTRICT, 10 FEET OF WHICH SHALL NOT BE PAVED.

**ZONING TABLE**

ITEM	MULTIFAMILY DWELLING / MIXED USE	
	REQUIRED	PROVIDED
MAXIMUM LOT COVERAGE	35%	66.9%
MINIMUM OPEN AREA	30%	2.2%
LOT FRONTAGE	180 FT	257.85 FT
LOT WIDTH	180 FT	257.85 FT
MAXIMUM HEIGHT	50 FT	47.0 FT
MAXIMUM NUMBER OF STORIES	5	4
MINIMUM FRONT SETBACK (Chestnut Street) <sup>1</sup>	47 FT	2.5 FT
MINIMUM SIDE YARD SETBACK (RIGHT) <sup>1</sup>	47 FT	9.5 FT
MINIMUM SIDE YARD SETBACK (LT) <sup>1</sup>	47 FT	1.6 FT
MINIMUM REAR SETBACK <sup>1</sup>	47 FT	0 FT
MINIMUM LOT AREA	4,000 SF	19,307 SF
DISTANCE BETWEEN UNATTACHED BUILDINGS	50 FT	28.3'

ZONING TABLE NOTE:  
 1. OR HEIGHT OF BUILDING, WHICHEVER IS GREATER



UNKNOWN WIDTH PUBLIC RIGHT-OF-WAY ASPHALT PAVEMENT

UNKNOWN WIDTH PUBLIC RIGHT-OF-WAY ASPHALT PAVEMENT

UNKNOWN WIDTH PUBLIC RIGHT-OF-WAY ASPHALT PAVEMENT

UNKNOWN WIDTH PUBLIC RIGHT-OF-WAY ASPHALT PAVEMENT

UNKNOWN WIDTH PUBLIC RIGHT-OF-WAY ASPHALT PAVEMENT

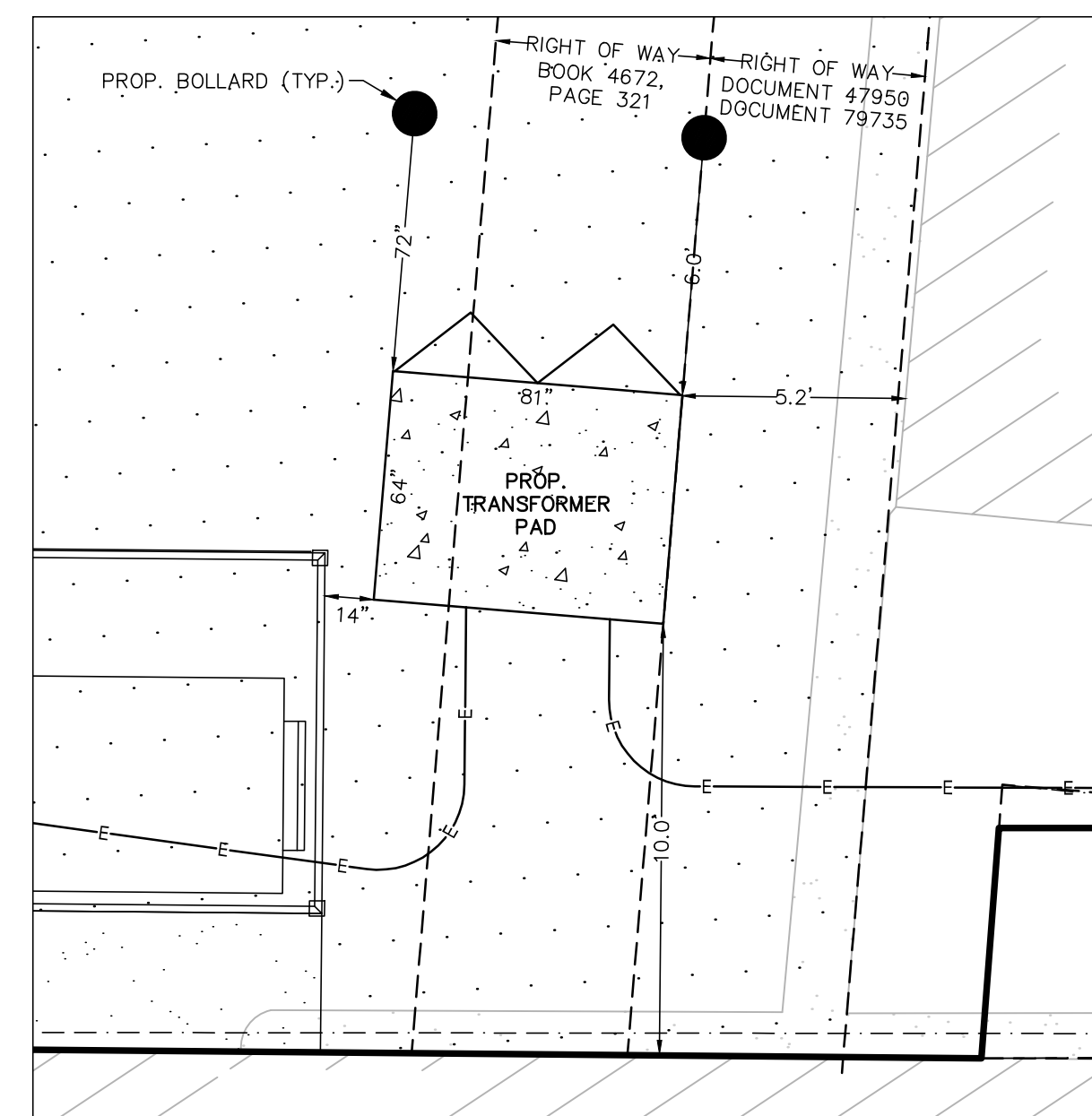
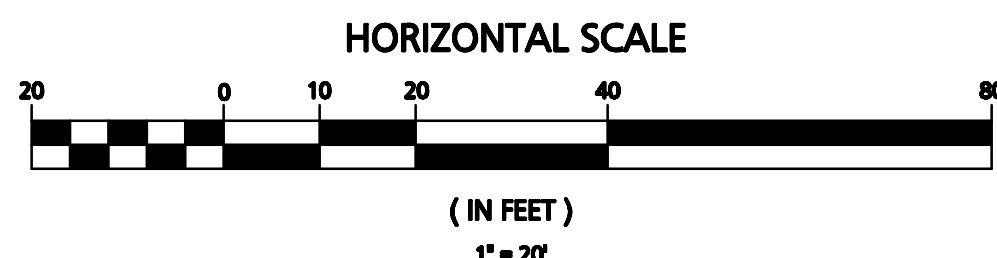
UNKNOWN WIDTH PUBLIC RIGHT-OF-WAY ASPHALT PAVEMENT

UNKNOWN WIDTH PUBLIC RIGHT-OF-WAY ASPHALT PAVEMENT

UNKNOWN WIDTH PUBLIC RIGHT-OF-WAY ASPHALT PAVEMENT

UNKNOWN WIDTH PUBLIC RIGHT-OF-WAY ASPHALT PAVEMENT

UNKNOWN WIDTH PUBLIC RIGHT-OF-WAY ASPHALT PAVEMENT



**TRANSFORMER DETAIL**  
 1"=4'

DWG. NO.	DRAWING TITLE	DATE	DESCRIPTION OF REVISIONS
C-2	Site Layout Plan	11-11-22	MODIFY PER UPDATED ARCHITECTURAL DRAWINGS

**Engineering Alliance, Inc.**  
 Civil Engineering & Land Planning Consultants  
 194 Central Street  
 Portsmouth, NH 03801  
 Tel: (603) 610-7100  
 Fax: (603) 610-7101

**Proposed Site Development Plans**  
 369&371 Main Street  
 (Tax Map 12 Blocks 151&157 Lots 134&81348)  
 Wakefield, Massachusetts

PROJECT #: 20-1340Z  
 DATE: July 14, 2022  
 SCALE: AS NOTED  
 DWG FILE NAME: 20-1340Z.dwg  
 DESIGN BY: Garrett Anderson  
 CHECKED BY: Richard A. Salvo, P.E.

Professional Engineer for  
 Engineering Alliance, Inc.

**Kingman Block, LLC.**  
 99 East Elm Street  
 Everett, MA 02149

DWG. NO. C-2  
 DRAWING TITLE: Site Layout Plan

TURNING MOVEMENT COUNTS

---



# Accurate Counts

978-664-2565

N/S Street : Santander Bank Driveway  
 E/W Street : Albion Street  
 City/State : Wakefield, MA  
 Weather : Clear

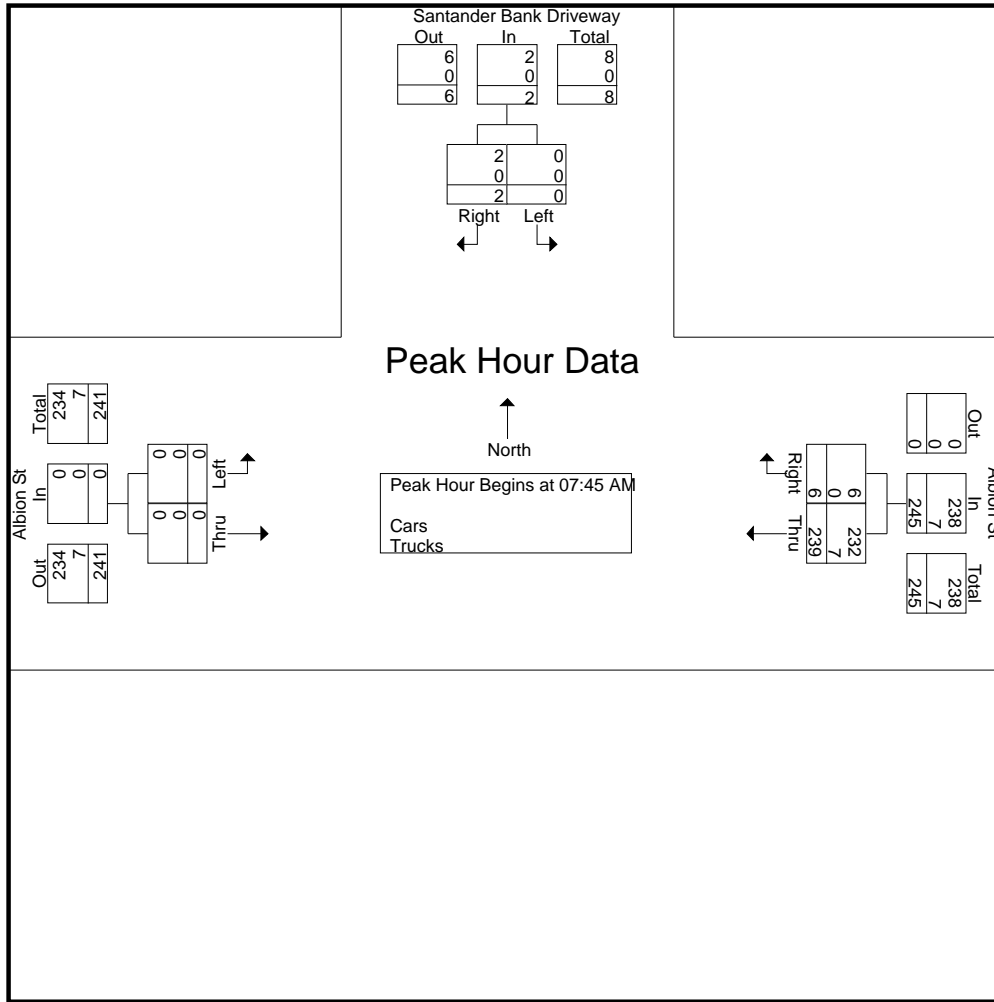
File Name : 93780003  
 Site Code : 93780003  
 Start Date : 6/14/2022  
 Page No : 1

### Groups Printed- Cars - Trucks

Start Time	Santander Bank Driveway From North		Albion St From East		Albion St From West		Int. Total
	Left	Right	Thru	Right	Left	Thru	
07:00 AM	0	1	45	0	0	0	46
07:15 AM	0	2	63	0	0	0	65
07:30 AM	0	3	55	0	0	0	58
07:45 AM	0	0	60	1	0	0	61
<b>Total</b>	<b>0</b>	<b>6</b>	<b>223</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>230</b>
08:00 AM	0	1	51	2	0	0	54
08:15 AM	0	1	51	1	0	0	53
08:30 AM	0	0	77	2	0	0	79
08:45 AM	0	1	50	1	0	0	52
<b>Total</b>	<b>0</b>	<b>3</b>	<b>229</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>238</b>
<b>Grand Total</b>	<b>0</b>	<b>9</b>	<b>452</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>468</b>
Apprch %	0	100	98.5	1.5	0	0	
Total %	0	1.9	96.6	1.5	0	0	
Cars	0	9	432	7	0	0	448
% Cars	0	100	95.6	100	0	0	95.7
Trucks	0	0	20	0	0	0	20
% Trucks	0	0	4.4	0	0	0	4.3

Start Time	Santander Bank Driveway From North			Albion St From East			Albion St From West			Int. Total
	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:45 AM										
07:45 AM	0	0	0	60	1	61	0	0	0	61
08:00 AM	0	1	1	51	2	53	0	0	0	54
08:15 AM	0	1	1	51	1	52	0	0	0	53
08:30 AM	0	0	0	77	2	79	0	0	0	79
<b>Total Volume</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>239</b>	<b>6</b>	<b>245</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>247</b>
<b>% App. Total</b>	<b>0</b>	<b>100</b>	<b>100</b>	<b>97.6</b>	<b>2.4</b>	<b>97.1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>97.2</b>
PHF	.000	.500	.500	.776	.750	.775	.000	.000	.000	.782
Cars	0	2	2	232	6	238	0	0	0	240
% Cars	0	100	100	97.1	100	97.1	0	0	0	97.2
Trucks	0	0	0	7	0	7	0	0	0	7
% Trucks	0	0	0	2.9	0	2.9	0	0	0	2.8

N/S Street : Santander Bank Driveway  
E/W Street : Albion Street  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	07:00 AM			07:45 AM			07:00 AM		
+0 mins.	0	1	1	60	1	61	0	0	0
+15 mins.	0	2	2	51	2	53	0	0	0
+30 mins.	0	3	3	51	1	52	0	0	0
+45 mins.	0	0	0	77	2	79	0	0	0
Total Volume	0	6	6	239	6	245	0	0	0
% App. Total	0	100		97.6	2.4		0	0	
PHF	.000	.500	.500	.776	.750	.775	.000	.000	.000
Cars	0	6	6	232	6	238	0	0	0
% Cars	0	100	100	97.1	100	97.1	0	0	0
Trucks	0	0	0	7	0	7	0	0	0
% Trucks	0	0	0	2.9	0	2.9	0	0	0





# Accurate Counts

978-664-2565

N/S Street : Santander Bank Driveway  
 E/W Street : Albion Street  
 City/State : Wakefield, MA  
 Weather : Clear

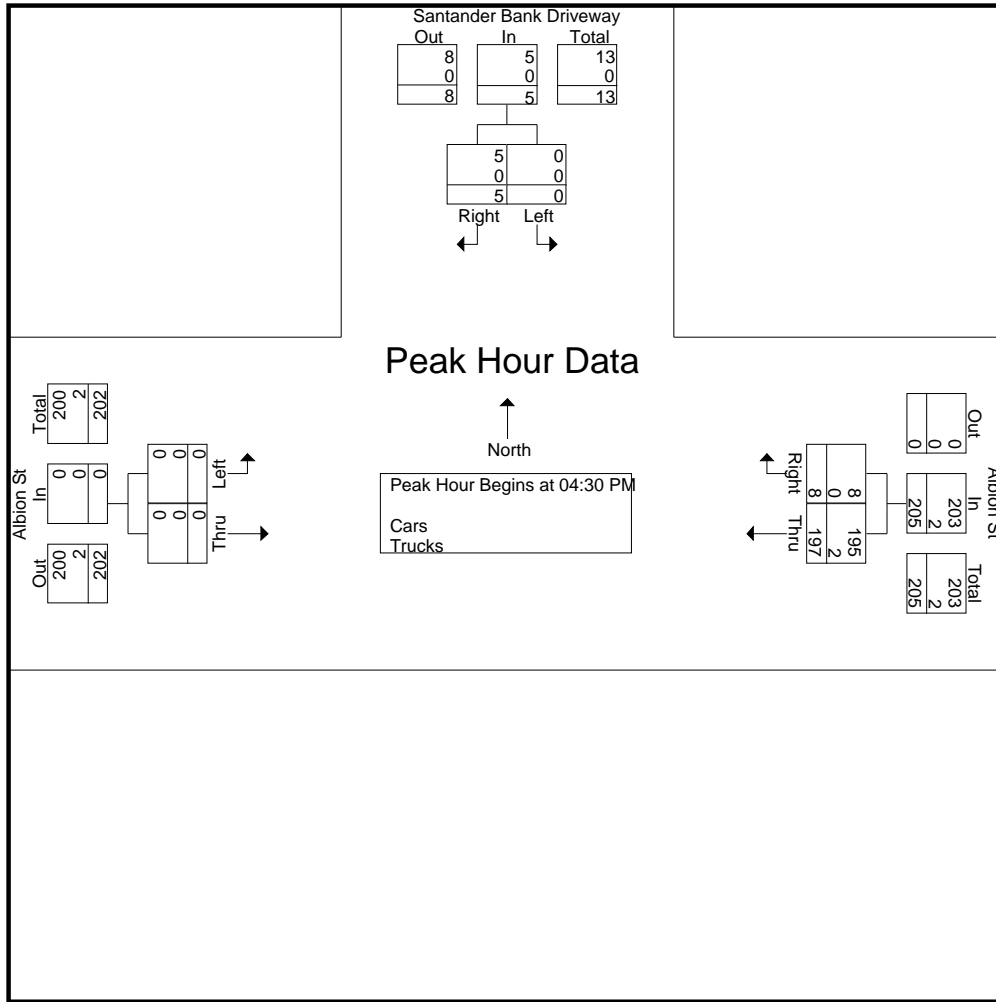
File Name : 93780003  
 Site Code : 93780003  
 Start Date : 6/14/2022  
 Page No : 1

### Groups Printed- Cars - Trucks

Start Time	Santander Bank Driveway From North		Albion St From East		Albion St From West		Int. Total
	Left	Right	Thru	Right	Left	Thru	
04:00 PM	0	5	38	0	0	0	43
04:15 PM	0	2	39	3	0	0	44
04:30 PM	0	2	37	2	0	0	41
04:45 PM	0	0	52	2	0	0	54
<b>Total</b>	<b>0</b>	<b>9</b>	<b>166</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>182</b>
05:00 PM	0	0	54	3	0	0	57
05:15 PM	0	3	54	1	0	0	58
05:30 PM	0	3	37	1	0	0	41
05:45 PM	0	3	36	2	0	0	41
<b>Total</b>	<b>0</b>	<b>9</b>	<b>181</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>197</b>
<b>Grand Total</b>	<b>0</b>	<b>18</b>	<b>347</b>	<b>14</b>	<b>0</b>	<b>0</b>	<b>379</b>
Apprch %	0	100	96.1	3.9	0	0	
Total %	0	4.7	91.6	3.7	0	0	
Cars	0	18	344	14	0	0	376
% Cars	0	100	99.1	100	0	0	99.2
Trucks	0	0	3	0	0	0	3
% Trucks	0	0	0.9	0	0	0	0.8

Start Time	Santander Bank Driveway From North			Albion St From East			Albion St From West			Int. Total
	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	0	2	2	37	2	39	0	0	0	41
04:45 PM	0	0	0	52	2	54	0	0	0	54
05:00 PM	0	0	0	<b>54</b>	<b>3</b>	<b>57</b>	0	0	0	57
05:15 PM	0	<b>3</b>	<b>3</b>	54	1	55	0	0	0	<b>58</b>
<b>Total Volume</b>	<b>0</b>	<b>5</b>	<b>5</b>	<b>197</b>	<b>8</b>	<b>205</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>210</b>
<b>% App. Total</b>	<b>0</b>	<b>100</b>	<b>100</b>	<b>96.1</b>	<b>3.9</b>	<b>99.0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>99.0</b>
PHF	.000	.417	.417	.912	.667	.899	.000	.000	.000	.905
Cars	0	5	5	195	8	203	0	0	0	208
% Cars	0	100	100	99.0	100	99.0	0	0	0	99.0
Trucks	0	0	0	2	0	2	0	0	0	2
% Trucks	0	0	0	1.0	0	1.0	0	0	0	1.0

N/S Street : Santander Bank Driveway  
E/W Street : Albion Street  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	04:00 PM			04:30 PM			04:00 PM		
+0 mins.	0	<b>5</b>	<b>5</b>	37	2	39	0	0	0
+15 mins.	0	2	2	52	2	54	0	0	0
+30 mins.	0	2	2	<b>54</b>	<b>3</b>	<b>57</b>	0	0	0
+45 mins.	0	0	0	54	1	55	0	0	0
Total Volume	0	9	9	197	8	205	0	0	0
% App. Total	0	100		96.1	3.9		0	0	
PHF	.000	.450	.450	.912	.667	.899	.000	.000	.000
Cars	0	9	9	195	8	203	0	0	0
% Cars	0	100	100	99	100	99	0	0	0
Trucks	0	0	0	2	0	2	0	0	0
% Trucks	0	0	0	1	0	1	0	0	0



# Accurate Counts

978-664-2565

N/S Street : Santander Bank Driveway  
 E/W Street : Albion Street  
 City/State : Wakefield, MA  
 Weather : Clear

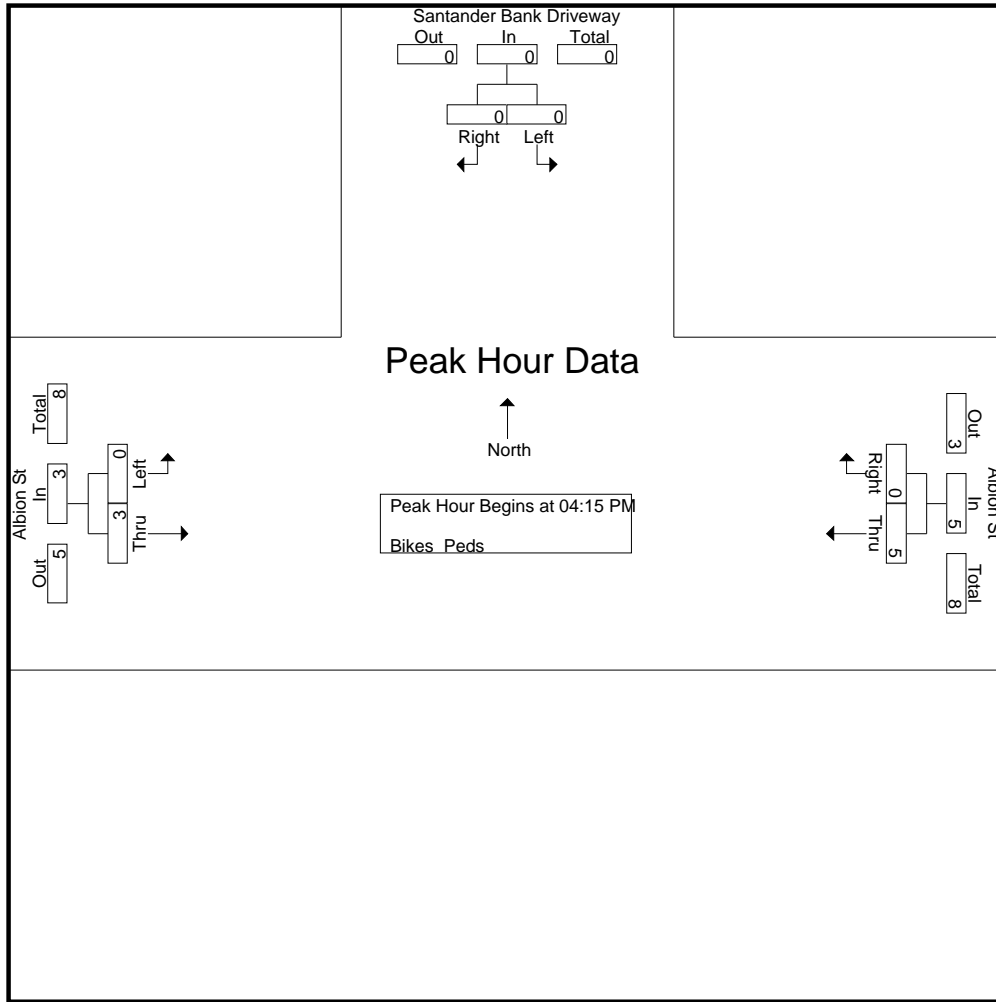
File Name : 93780003  
 Site Code : 93780003  
 Start Date : 6/14/2022  
 Page No : 10

### Groups Printed- Bikes Peds

Start Time	Santander Bank Driveway From North			Albion St From East			Albion St From West			Exclu. Total	Inclu. Total	Int. Total
	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds			
04:00 PM	0	0	1	0	0	0	0	1	1	2	1	3
04:15 PM	0	0	1	1	0	1	0	1	3	5	2	7
04:30 PM	0	0	3	0	0	2	0	1	1	6	1	7
04:45 PM	0	0	0	2	0	5	0	0	2	7	2	9
<b>Total</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>3</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>3</b>	<b>7</b>	<b>20</b>	<b>6</b>	<b>26</b>
05:00 PM	0	0	1	2	0	1	0	1	0	2	3	5
05:15 PM	0	0	2	1	0	1	0	0	0	3	1	4
05:30 PM	0	0	5	0	0	3	0	0	1	9	0	9
05:45 PM	0	0	6	0	0	7	0	1	1	14	1	15
<b>Total</b>	<b>0</b>	<b>0</b>	<b>14</b>	<b>3</b>	<b>0</b>	<b>12</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>28</b>	<b>5</b>	<b>33</b>
<b>Grand Total</b>	<b>0</b>	<b>0</b>	<b>19</b>	<b>6</b>	<b>0</b>	<b>20</b>	<b>0</b>	<b>5</b>	<b>9</b>	<b>48</b>	<b>11</b>	<b>59</b>
Apprch %	0	0		100	0		0	100				
Total %	0	0		54.5	0		0	45.5		81.4	18.6	

Start Time	Santander Bank Driveway From North			Albion St From East			Albion St From West			Int. Total
	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:15 PM										
04:15 PM	0	0	0	1	0	1	0	1	1	2
04:30 PM	0	0	0	0	0	0	0	1	1	1
04:45 PM	0	0	0	2	0	2	0	0	0	2
05:00 PM	0	0	0	2	0	2	0	1	1	3
<b>Total Volume</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>8</b>
<b>% App. Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>100</b>	<b>0</b>	<b>100</b>	<b>0</b>	<b>100</b>	<b>0</b>	<b>0</b>
PHF	.000	.000	.000	.625	.000	.625	.000	.750	.750	.667

N/S Street : Santander Bank Driveway  
E/W Street : Albion Street  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	04:00 PM			04:15 PM			04:00 PM		
+0 mins.	0	0	0	1	0	1	0	1	1
+15 mins.	0	0	0	0	0	0	0	1	1
+30 mins.	0	0	0	2	0	2	0	1	1
+45 mins.	0	0	0	2	0	2	0	0	0
Total Volume	0	0	0	5	0	5	0	3	3
% App. Total	0	0		100	0		0	100	
PHF	.000	.000	.000	.625	.000	.625	.000	.750	.750

# Accurate Counts

978-664-2565

N/S Street : Santander West Driveway  
 E/W Street : Chestnut Street  
 City/State : Wakefield, MA  
 Weather : Clear

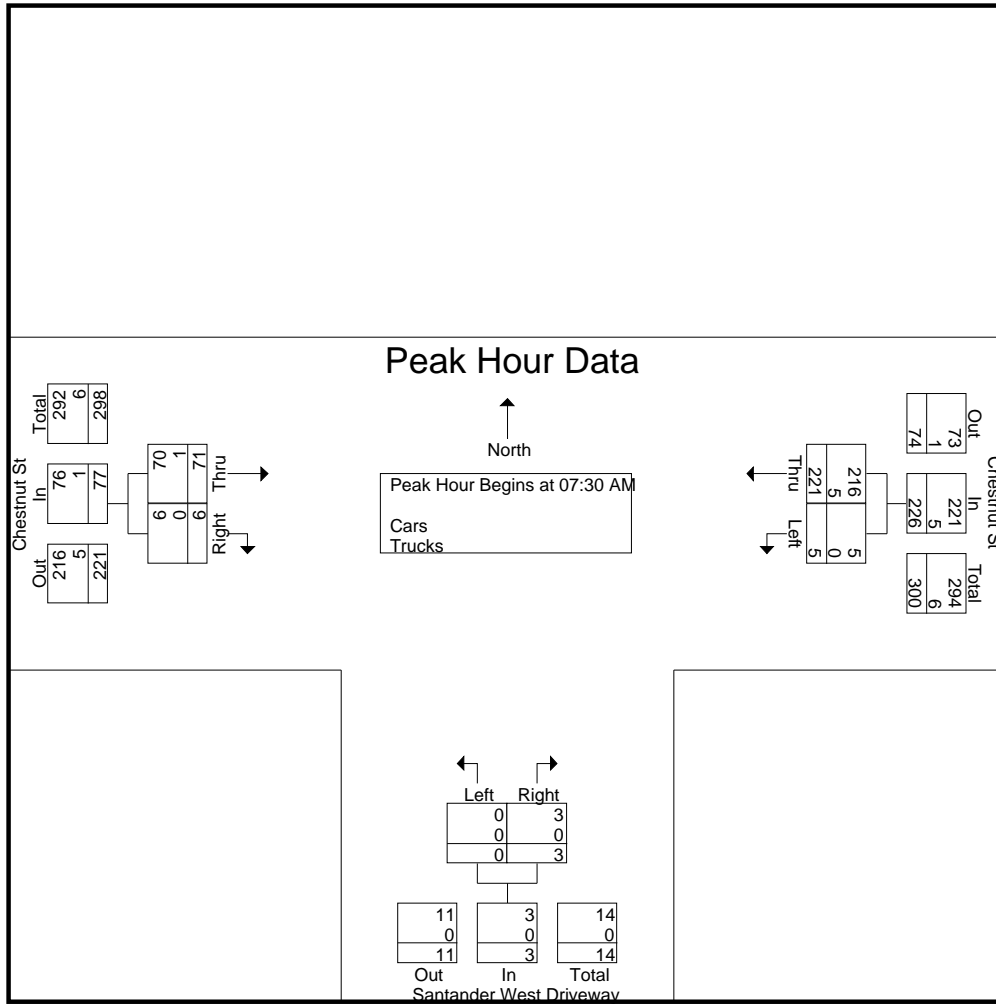
File Name : 93780004  
 Site Code : 93780004  
 Start Date : 6/14/2022  
 Page No : 1

### Groups Printed- Cars - Trucks

Start Time	Chestnut St From East		Santander West Driveway From South		Chestnut St From West		Int. Total
	Left	Thru	Left	Right	Thru	Right	
07:00 AM	0	19	0	0	7	1	27
07:15 AM	0	34	0	0	9	2	45
07:30 AM	1	54	0	0	18	4	77
07:45 AM	1	63	0	1	18	0	83
<b>Total</b>	<b>2</b>	<b>170</b>	<b>0</b>	<b>1</b>	<b>52</b>	<b>7</b>	<b>232</b>
08:00 AM	1	56	0	1	14	0	72
08:15 AM	2	48	0	1	21	2	74
08:30 AM	2	34	1	0	18	0	55
08:45 AM	1	32	0	0	17	1	51
<b>Total</b>	<b>6</b>	<b>170</b>	<b>1</b>	<b>2</b>	<b>70</b>	<b>3</b>	<b>252</b>
<b>Grand Total</b>	<b>8</b>	<b>340</b>	<b>1</b>	<b>3</b>	<b>122</b>	<b>10</b>	<b>484</b>
Apprch %	2.3	97.7	25	75	92.4	7.6	
Total %	1.7	70.2	0.2	0.6	25.2	2.1	
Cars	8	328	1	3	120	10	470
% Cars	100	96.5	100	100	98.4	100	97.1
Trucks	0	12	0	0	2	0	14
% Trucks	0	3.5	0	0	1.6	0	2.9

Start Time	Chestnut St From East			Santander West Driveway From South			Chestnut St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	1	54	55	0	0	0	18	4	22	77
07:45 AM	1	63	64	0	1	1	18	0	18	83
08:00 AM	1	56	57	0	1	1	14	0	14	72
08:15 AM	2	48	50	0	1	1	21	2	23	74
<b>Total Volume</b>	<b>5</b>	<b>221</b>	<b>226</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>71</b>	<b>6</b>	<b>77</b>	<b>306</b>
% App. Total	2.2	97.8		0	100		92.2	7.8		
PHF	.625	.877	.883	.000	.750	.750	.845	.375	.837	.922
Cars	5	216	221	0	3	3	70	6	76	300
% Cars	100	97.7	97.8	0	100	100	98.6	100	98.7	98.0
Trucks	0	5	5	0	0	0	1	0	1	6
% Trucks	0	2.3	2.2	0	0	0	1.4	0	1.3	2.0

N/S Street : Santander West Driveway  
E/W Street : Chestnut Street  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	07:30 AM			07:45 AM			07:30 AM		
+0 mins.	1	54	55	0	1	1	18	4	22
+15 mins.	1	63	64	0	1	1	18	0	18
+30 mins.	1	56	57	0	1	1	14	0	14
+45 mins.	2	48	50	1	0	1	21	2	23
Total Volume	5	221	226	1	3	4	71	6	77
% App. Total	2.2	97.8		25	75		92.2	7.8	
PHF	.625	.877	.883	.250	.750	1.000	.845	.375	.837
Cars	5	216	221	1	3	4	70	6	76
% Cars	100	97.7	97.8	100	100	100	98.6	100	98.7
Trucks	0	5	5	0	0	0	1	0	1
% Trucks	0	2.3	2.2	0	0	0	1.4	0	1.3





# Accurate Counts

978-664-2565

N/S Street : Santander West Driveway  
 E/W Street : Chestnut Street  
 City/State : Wakefield, MA  
 Weather : Clear

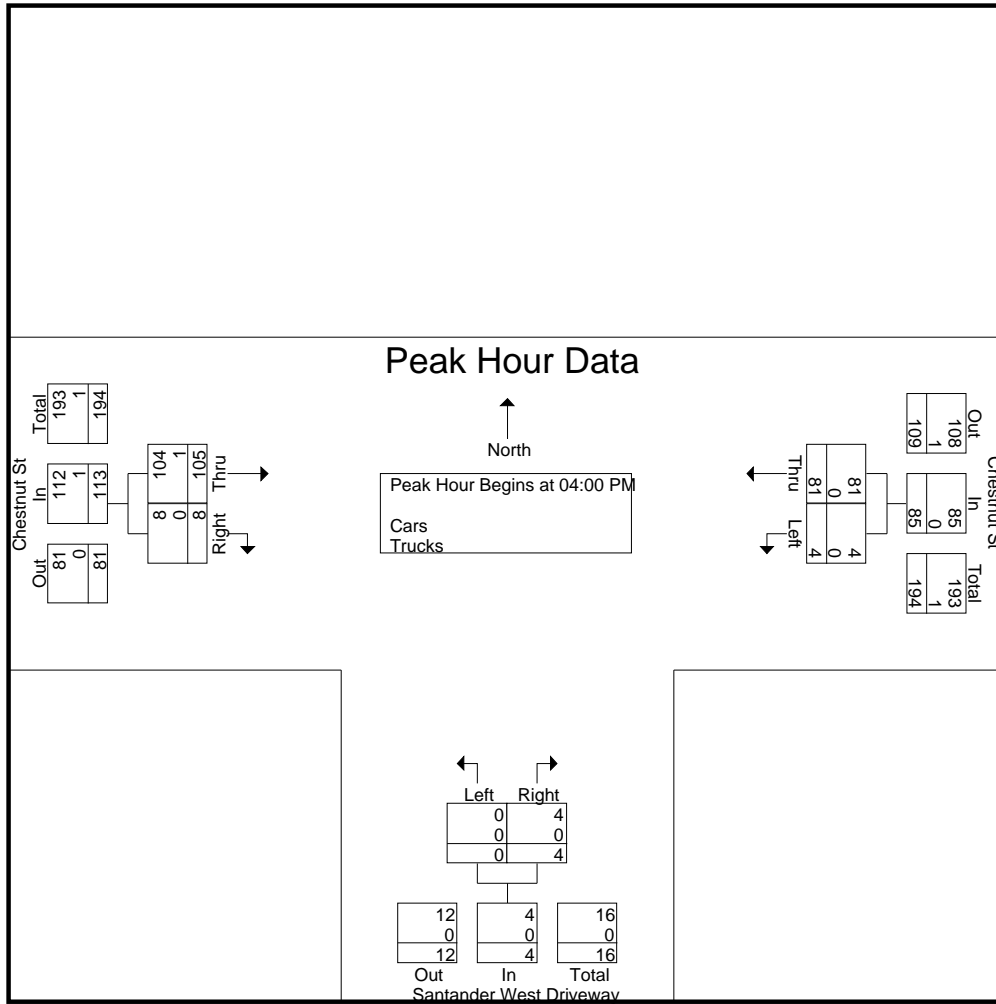
File Name : 93780004  
 Site Code : 93780004  
 Start Date : 6/14/2022  
 Page No : 1

### Groups Printed- Cars - Trucks

Start Time	Chestnut St From East		Santander West Driveway From South		Chestnut St From West		Int. Total
	Left	Thru	Left	Right	Thru	Right	
04:00 PM	1	24	0	0	25	5	55
04:15 PM	0	18	0	2	25	1	46
04:30 PM	2	17	0	1	32	2	54
04:45 PM	1	22	0	1	23	0	47
<b>Total</b>	<b>4</b>	<b>81</b>	<b>0</b>	<b>4</b>	<b>105</b>	<b>8</b>	<b>202</b>
05:00 PM	1	16	1	2	30	1	51
05:15 PM	2	21	1	0	17	3	44
05:30 PM	1	12	0	0	23	3	39
05:45 PM	4	16	1	2	25	2	50
<b>Total</b>	<b>8</b>	<b>65</b>	<b>3</b>	<b>4</b>	<b>95</b>	<b>9</b>	<b>184</b>
<b>Grand Total</b>	<b>12</b>	<b>146</b>	<b>3</b>	<b>8</b>	<b>200</b>	<b>17</b>	<b>386</b>
Apprch %	7.6	92.4	27.3	72.7	92.2	7.8	
Total %	3.1	37.8	0.8	2.1	51.8	4.4	
Cars	12	146	3	8	196	17	382
% Cars	100	100	100	100	98	100	99
Trucks	0	0	0	0	4	0	4
% Trucks	0	0	0	0	2	0	1

Start Time	Chestnut St From East			Santander West Driveway From South			Chestnut St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	1	<b>24</b>	<b>25</b>	0	0	0	25	<b>5</b>	30	<b>55</b>
04:15 PM	0	18	18	0	<b>2</b>	<b>2</b>	25	1	26	46
04:30 PM	<b>2</b>	17	19	0	1	1	<b>32</b>	2	<b>34</b>	54
04:45 PM	1	22	23	0	1	1	23	0	23	47
<b>Total Volume</b>	<b>4</b>	<b>81</b>	<b>85</b>	<b>0</b>	<b>4</b>	<b>4</b>	<b>105</b>	<b>8</b>	<b>113</b>	<b>202</b>
<b>% App. Total</b>	<b>4.7</b>	<b>95.3</b>		<b>0</b>	<b>100</b>		<b>92.9</b>	<b>7.1</b>		
PHF	.500	.844	.850	.000	.500	.500	.820	.400	.831	.918
Cars	4	81	85	0	4	4	104	8	112	201
% Cars	100	100	100	0	100	100	99.0	100	99.1	99.5
Trucks	0	0	0	0	0	0	1	0	1	1
% Trucks	0	0	0	0	0	0	1.0	0	0.9	0.5

N/S Street : Santander West Driveway  
E/W Street : Chestnut Street  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	04:00 PM			04:15 PM			04:15 PM		
+0 mins.	1	24	25	0	2	2	25	1	26
+15 mins.	0	18	18	0	1	1	32	2	34
+30 mins.	2	17	19	0	1	1	23	0	23
+45 mins.	1	22	23	1	2	3	30	1	31
Total Volume	4	81	85	1	6	7	110	4	114
% App. Total	4.7	95.3		14.3	85.7		96.5	3.5	
PHF	.500	.844	.850	.250	.750	.583	.859	.500	.838
Cars	4	81	85	1	6	7	108	4	112
% Cars	100	100	100	100	100	100	98.2	100	98.2
Trucks	0	0	0	0	0	0	2	0	2
% Trucks	0	0	0	0	0	0	1.8	0	1.8



# Accurate Counts

978-664-2565

N/S Street : Santander West Driveway  
 E/W Street : Chestnut Street  
 City/State : Wakefield, MA  
 Weather : Clear

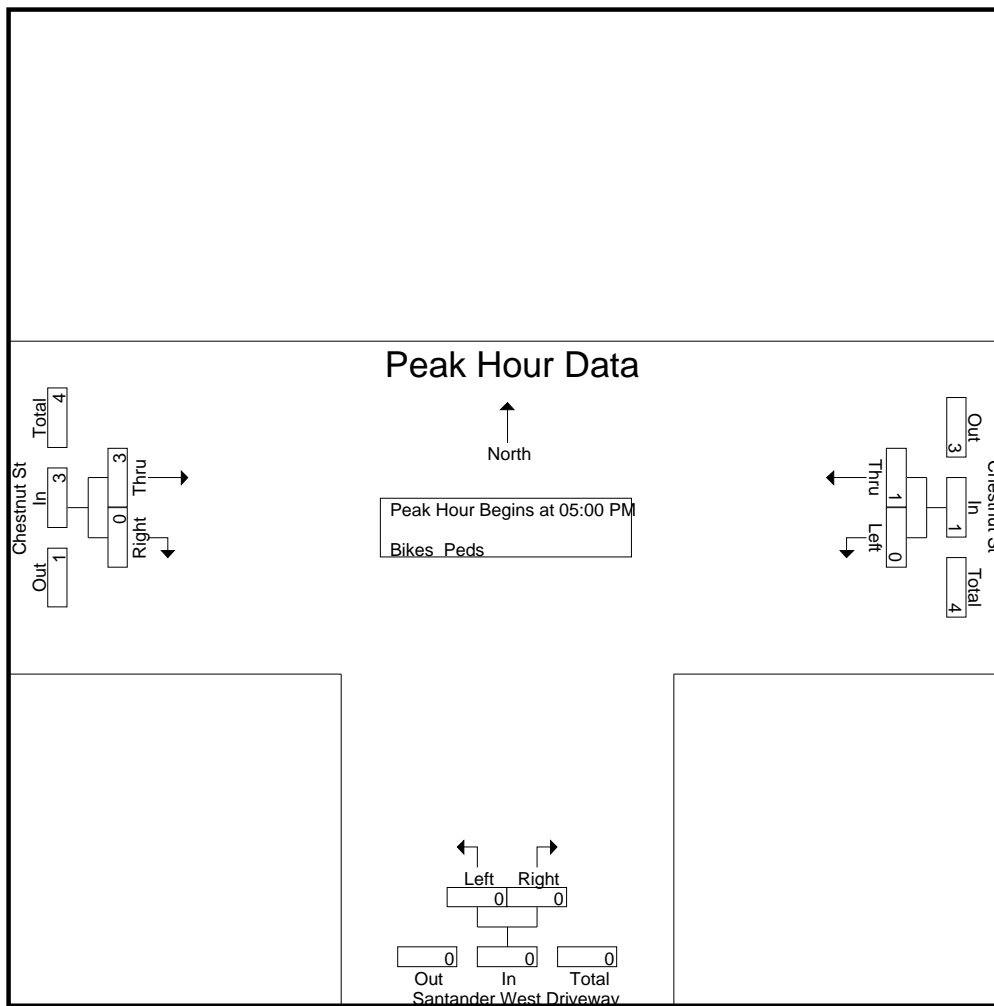
File Name : 93780004  
 Site Code : 93780004  
 Start Date : 6/14/2022  
 Page No : 10

## Groups Printed- Bikes Peds

Start Time	Chestnut St From East			Santander West Driveway From South			Chestnut St From West			Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds			
04:00 PM	0	0	6	0	0	3	0	0	0	9	0	9
04:15 PM	0	0	3	0	0	2	0	0	0	5	0	5
04:30 PM	0	0	1	0	0	0	0	0	0	1	0	1
04:45 PM	0	0	0	0	0	5	0	0	0	5	0	5
<b>Total</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>20</b>	<b>0</b>	<b>20</b>
05:00 PM	0	0	1	0	0	1	0	0	0	2	0	2
05:15 PM	0	0	0	0	0	2	2	0	0	2	2	4
05:30 PM	0	0	3	0	0	3	1	0	1	7	1	8
05:45 PM	0	1	3	0	0	1	0	0	0	4	1	5
<b>Total</b>	<b>0</b>	<b>1</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>15</b>	<b>4</b>	<b>19</b>
<b>Grand Total</b>	<b>0</b>	<b>1</b>	<b>17</b>	<b>0</b>	<b>0</b>	<b>17</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>35</b>	<b>4</b>	<b>39</b>
Apprch %	0	100		0	0		100	0				
Total %	0	25		0	0		75	0		89.7	10.3	

Start Time	Chestnut St From East			Santander West Driveway From South			Chestnut St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	2	0	2	2
05:30 PM	0	0	0	0	0	0	1	0	1	1
05:45 PM	0	1	1	0	0	0	0	0	0	1
<b>Total Volume</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>4</b>
<b>% App. Total</b>	<b>0</b>	<b>100</b>		<b>0</b>	<b>0</b>		<b>100</b>	<b>0</b>		
<b>PHF</b>	<b>.000</b>	<b>.250</b>	<b>.250</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.375</b>	<b>.000</b>	<b>.375</b>	<b>.500</b>

N/S Street : Santander West Driveway  
E/W Street : Chestnut Street  
City/State : Wakefield, MA  
Weather : Clear

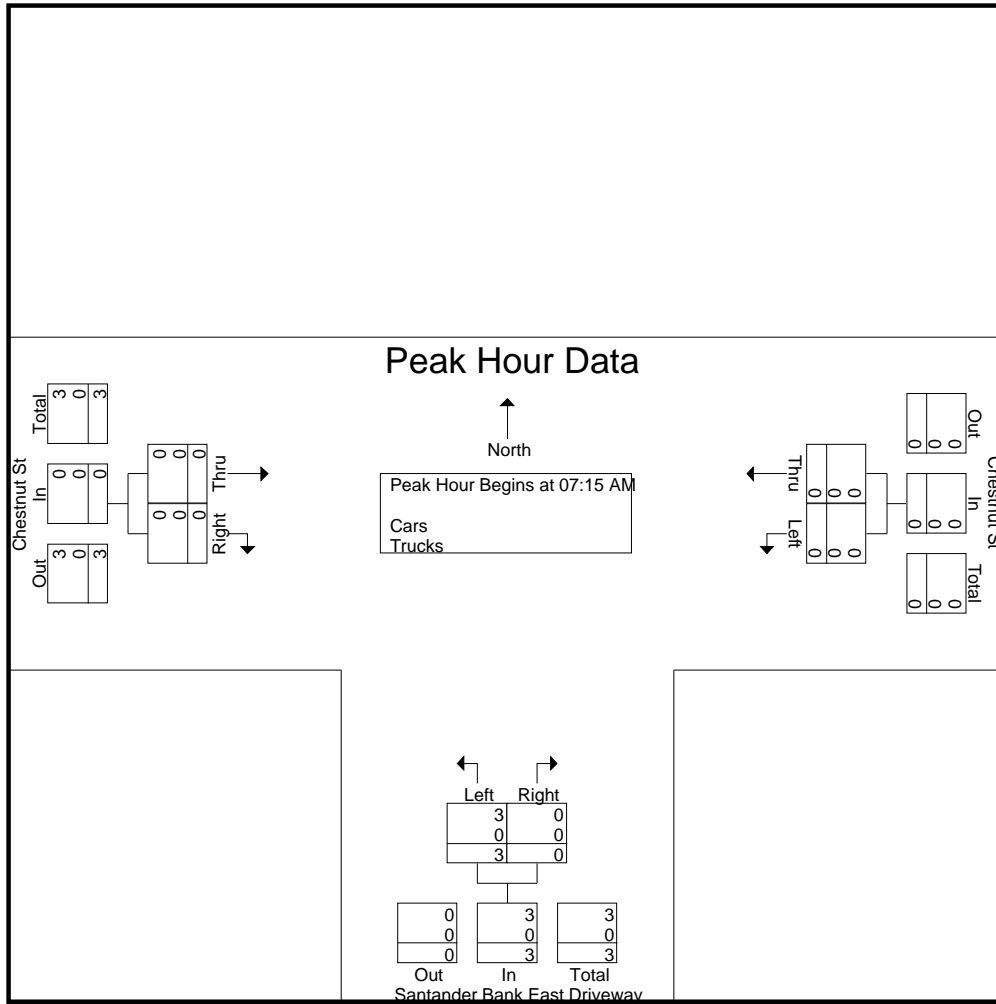


Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	05:00 PM			04:00 PM			04:45 PM		
+0 mins.	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	2	0	2
+45 mins.	0	1	1	0	0	0	1	0	1
Total Volume	0	1	1	0	0	0	3	0	3
% App. Total	0	100		0	0		100	0	
PHF	.000	.250	.250	.000	.000	.000	.375	.000	.375



N/S Street : Santander Bank East Dwy  
E/W Street : Chestnut Street  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

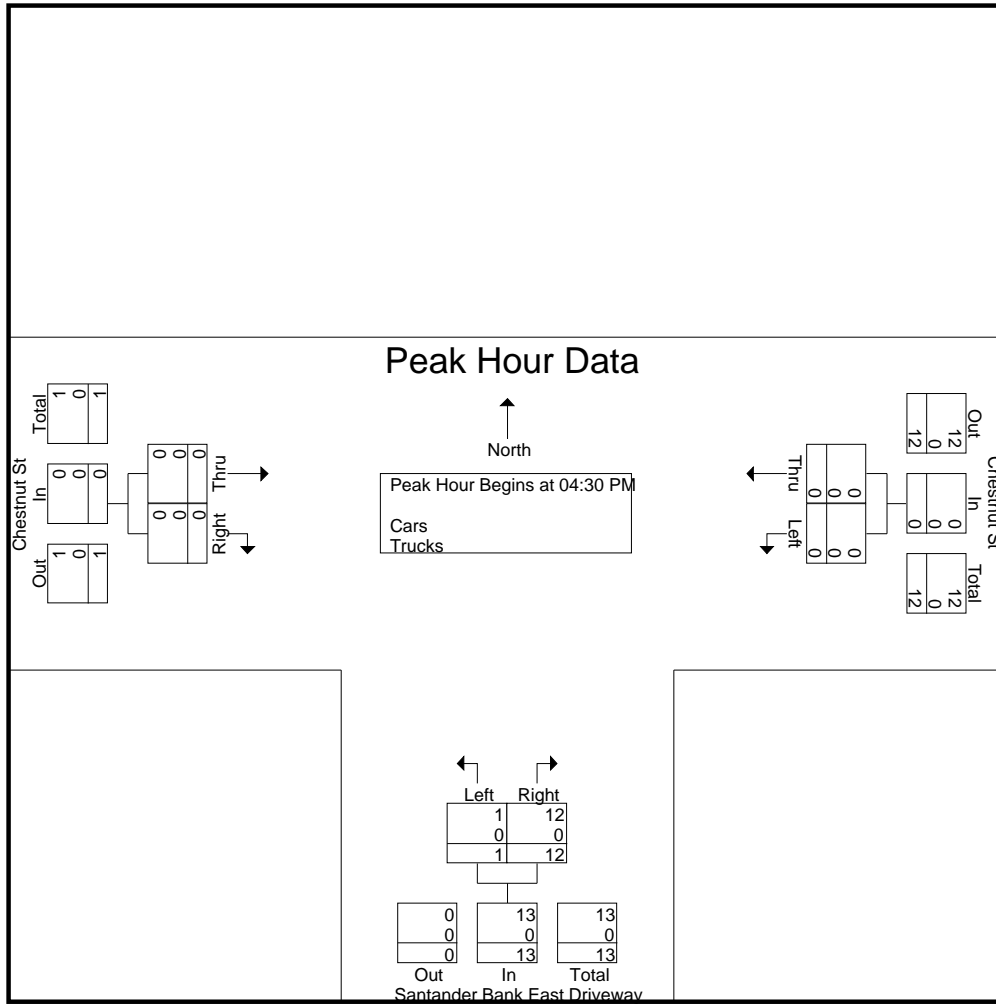
	07:00 AM			07:15 AM			07:00 AM		
+0 mins.	0	0	0	1	0	1	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	1	0	1	0	0	0
+45 mins.	0	0	0	1	0	1	0	0	0
Total Volume	0	0	0	3	0	3	0	0	0
% App. Total	0	0	0	100	0	100	0	0	0
PHF	.000	.000	.000	.750	.000	.750	.000	.000	.000
Cars	0	0	0	3	0	3	0	0	0
% Cars	0	0	0	100	0	100	0	0	0
Trucks	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0







N/S Street : Santander Bank East Dwy  
E/W Street : Chestnut Street  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	04:00 PM			04:30 PM			04:00 PM		
+0 mins.	0	0	0	0	3	3	0	0	0
+15 mins.	0	0	0	1	1	2	0	0	0
+30 mins.	0	0	0	0	4	4	0	0	0
+45 mins.	0	0	0	0	4	4	0	0	0
Total Volume	0	0	0	1	12	13	0	0	0
% App. Total	0	0		7.7	92.3		0	0	
PHF	.000	.000	.000	.250	.750	.813	.000	.000	.000
Cars	0	0	0	1	12	13	0	0	0
% Cars	0	0		100	100	100	0	0	0
Trucks	0	0	0	0	0	0	0	0	0
% Trucks	0	0		0	0	0	0	0	0



**Accurate Counts**  
978-664-2565

N/S Street : Santander Bank East Dwy  
E/W Street : Chestnut Street  
City/State : Wakefield, MA  
Weather : Clear

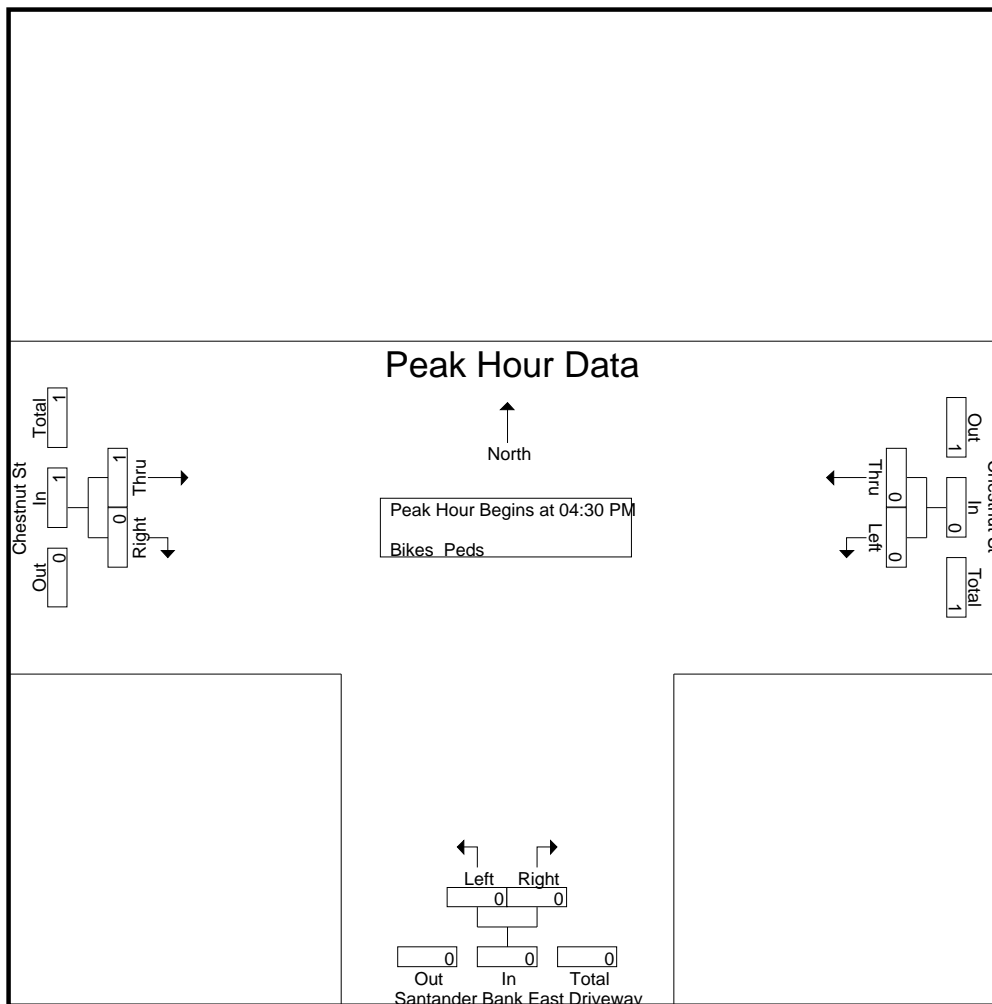
File Name : 93780005  
Site Code : 93780005  
Start Date : 6/14/2022  
Page No : 10

Groups Printed- Bikes Peds

Start Time	Chestnut St From East			Santander Bank East Driveway From South			Chestnut St From West			Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds			
04:00 PM	0	0	1	0	0	4	0	0	2	7	0	7
04:15 PM	0	0	2	0	0	2	0	0	0	4	0	4
04:30 PM	0	0	0	0	0	1	0	0	1	2	0	2
04:45 PM	0	0	0	0	0	4	0	0	0	4	0	4
<b>Total</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>11</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>17</b>	<b>0</b>	<b>17</b>
05:00 PM	0	0	0	0	0	1	0	0	0	1	0	1
05:15 PM	0	0	0	0	0	3	1	0	0	3	1	4
05:30 PM	0	0	1	0	0	4	0	0	0	5	0	5
05:45 PM	0	0	0	0	0	1	0	0	3	4	0	4
<b>Total</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>9</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>13</b>	<b>1</b>	<b>14</b>
<b>Grand Total</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>20</b>	<b>1</b>	<b>0</b>	<b>6</b>	<b>30</b>	<b>1</b>	<b>31</b>
Apprch %	0	0		0	0		100	0				
Total %	0	0		0	0		100	0		96.8	3.2	

Start Time	Chestnut St From East			Santander Bank East Driveway From South			Chestnut St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	1	0	1	1
<b>Total Volume</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>
<b>% App. Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>100</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>PHF</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.250</b>	<b>.000</b>	<b>.250</b>	<b>.250</b>

N/S Street : Santander Bank East Dwy  
E/W Street : Chestnut Street  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	04:00 PM			04:00 PM			04:30 PM		
+0 mins.	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	1	0	1
Total Volume	0	0	0	0	0	0	1	0	1
% App. Total	0	0	0	0	0	0	100	0	100
PHF	.000	.000	.000	.000	.000	.000	.250	.000	.250

# Accurate Counts

978-664-2565

N/S Street : Main Street  
 E/W Street : Centre St / Chestnut St  
 City/State : Wakefield, MA  
 Weather : Clear

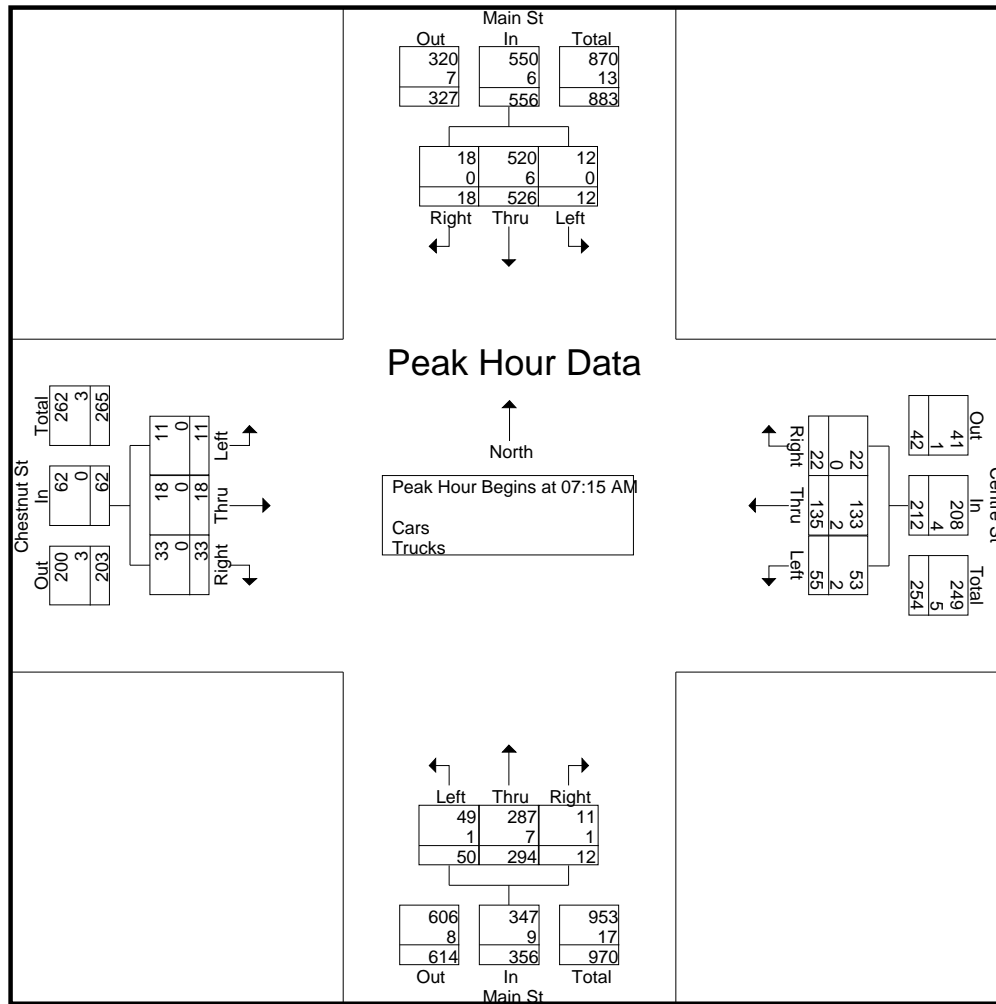
File Name : 93780001  
 Site Code : 93780001  
 Start Date : 6/14/2022  
 Page No : 1

### Groups Printed- Cars - Trucks

Start Time	Main St From North			Centre St From East			Main St From South			Chestnut St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	1	99	2	9	6	0	11	56	0	1	3	3	191
07:15 AM	4	166	3	9	18	3	12	52	4	0	1	8	280
07:30 AM	3	142	5	16	38	5	12	74	2	2	10	8	317
07:45 AM	2	119	3	15	45	7	13	94	3	5	3	11	320
<b>Total</b>	<b>10</b>	<b>526</b>	<b>13</b>	<b>49</b>	<b>107</b>	<b>15</b>	<b>48</b>	<b>276</b>	<b>9</b>	<b>8</b>	<b>17</b>	<b>30</b>	<b>1108</b>
08:00 AM	3	99	7	15	34	7	13	74	3	4	4	6	269
08:15 AM	3	101	3	9	27	10	21	71	1	6	7	10	269
08:30 AM	6	136	7	5	13	3	15	84	4	4	9	4	290
08:45 AM	5	131	4	8	14	4	15	84	1	6	2	11	285
<b>Total</b>	<b>17</b>	<b>467</b>	<b>21</b>	<b>37</b>	<b>88</b>	<b>24</b>	<b>64</b>	<b>313</b>	<b>9</b>	<b>20</b>	<b>22</b>	<b>31</b>	<b>1113</b>
<b>Grand Total</b>	<b>27</b>	<b>993</b>	<b>34</b>	<b>86</b>	<b>195</b>	<b>39</b>	<b>112</b>	<b>589</b>	<b>18</b>	<b>28</b>	<b>39</b>	<b>61</b>	<b>2221</b>
Apprch %	2.6	94.2	3.2	26.9	60.9	12.2	15.6	81.9	2.5	21.9	30.5	47.7	
Total %	1.2	44.7	1.5	3.9	8.8	1.8	5	26.5	0.8	1.3	1.8	2.7	
Cars	27	982	34	84	191	39	109	575	17	28	38	60	2184
% Cars	100	98.9	100	97.7	97.9	100	97.3	97.6	94.4	100	97.4	98.4	98.3
Trucks	0	11	0	2	4	0	3	14	1	0	1	1	37
% Trucks	0	1.1	0	2.3	2.1	0	2.7	2.4	5.6	0	2.6	1.6	1.7

Start Time	Main St From North				Centre St From East				Main St From South				Chestnut St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	<b>4</b>	<b>166</b>	3	<b>173</b>	9	18	3	30	12	52	<b>4</b>	68	0	1	8	9	280
07:30 AM	3	142	5	150	<b>16</b>	38	5	59	12	74	2	88	2	<b>10</b>	8	<b>20</b>	317
07:45 AM	2	119	3	124	15	<b>45</b>	<b>7</b>	<b>67</b>	<b>13</b>	<b>94</b>	3	<b>110</b>	<b>5</b>	3	<b>11</b>	19	<b>320</b>
08:00 AM	3	99	<b>7</b>	109	15	34	7	56	13	74	3	90	4	4	6	14	269
Total Volume	12	526	18	556	55	135	22	212	50	294	12	356	11	18	33	62	1186
% App. Total	2.2	94.6	3.2		25.9	63.7	10.4		14	82.6	3.4		17.7	29	53.2		
PHF	.750	.792	.643	.803	.859	.750	.786	.791	.962	.782	.750	.809	.550	.450	.750	.775	.927
Cars	12	520	18	550	53	133	22	208	49	287	11	347	11	18	33	62	1167
% Cars	100	98.9	100	98.9	96.4	98.5	100	98.1	98.0	97.6	91.7	97.5	100	100	100	100	98.4
Trucks	0	6	0	6	2	2	0	4	1	7	1	9	0	0	0	0	19
% Trucks	0	1.1	0	1.1	3.6	1.5	0	1.9	2.0	2.4	8.3	2.5	0	0	0	0	1.6

N/S Street : Main Street  
E/W Street : Centre St / Chestnut St  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	07:15 AM				07:30 AM				07:45 AM				07:30 AM			
+0 mins.	4	166	3	173	16	38	5	59	13	94	3	110	2	10	8	20
+15 mins.	3	142	5	150	15	45	7	67	13	74	3	90	5	3	11	19
+30 mins.	2	119	3	124	15	34	7	56	21	71	1	93	4	4	6	14
+45 mins.	3	99	7	109	9	27	10	46	15	84	4	103	6	7	10	23
Total Volume	12	526	18	556	55	144	29	228	62	323	11	396	17	24	35	76
% App. Total	2.2	94.6	3.2		24.1	63.2	12.7		15.7	81.6	2.8		22.4	31.6	46.1	
PHF	.750	.792	.643	.803	.859	.800	.725	.851	.738	.859	.688	.900	.708	.600	.795	.826
Cars	12	520	18	550	54	141	29	224	61	317	10	388	17	24	34	75
% Cars	100	98.9	100	98.9	98.2	97.9	100	98.2	98.4	98.1	90.9	98	100	100	97.1	98.7
Trucks	0	6	0	6	1	3	0	4	1	6	1	8	0	0	1	1
% Trucks	0	1.1	0	1.1	1.8	2.1	0	1.8	1.6	1.9	9.1	2	0	0	2.9	1.3

**Accurate Counts**  
978-664-2565

File Name : 93780001  
Site Code : 93780001  
Start Date : 6/14/2022  
Page No : 10

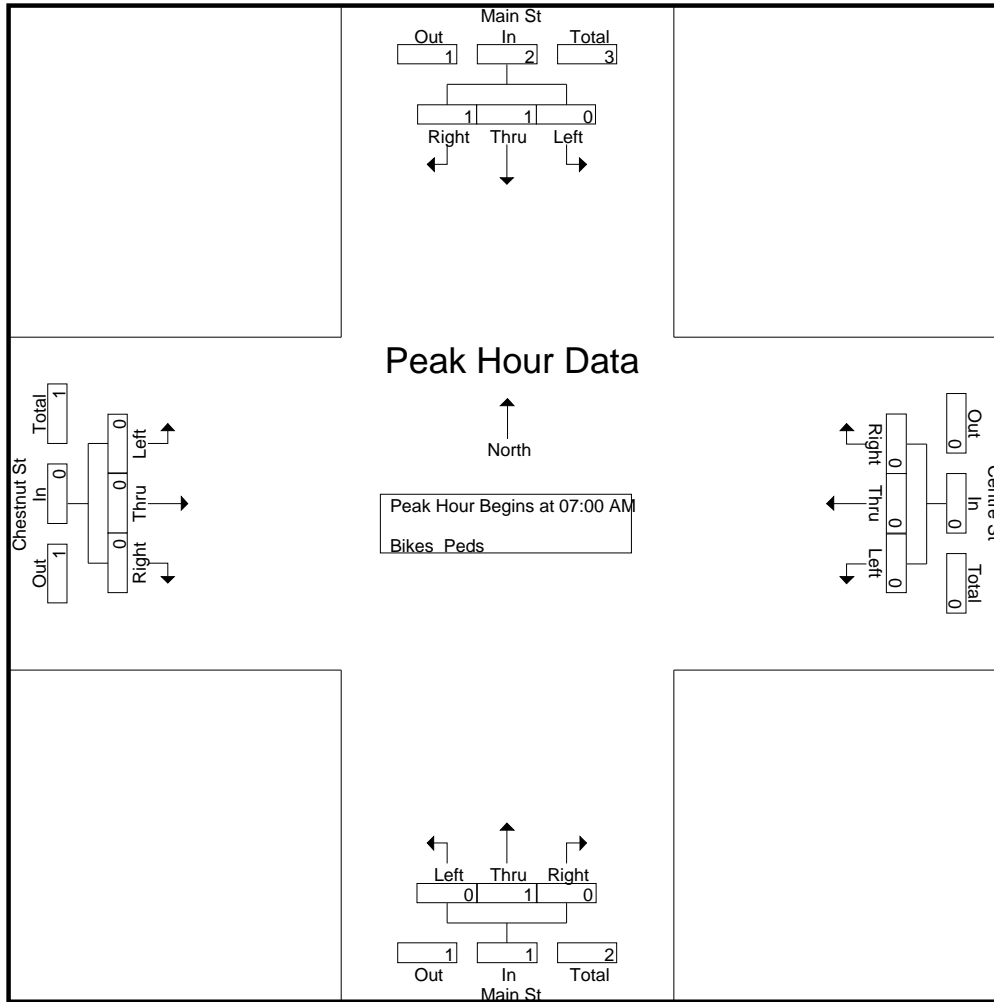
N/S Street : Main Street  
E/W Street : Centre St / Chestnut St  
City/State : Wakefield, MA  
Weather : Clear

Groups Printed- Bikes Peds

Start Time	Main St From North				Centre St From East				Main St From South				Chestnut St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00 AM	0	0	1	1	0	0	0	2	0	0	0	0	0	0	0	2	5	1	6
07:15 AM	0	1	0	0	0	0	0	2	0	0	0	2	0	0	0	4	8	1	9
07:30 AM	0	0	0	2	0	0	0	8	0	1	0	2	0	0	0	5	17	1	18
07:45 AM	0	0	0	3	0	0	0	8	0	0	0	1	0	0	0	5	17	0	17
<b>Total</b>	0	1	1	6	0	0	0	20	0	1	0	5	0	0	0	16	47	3	50
08:00 AM	0	0	0	1	0	0	0	6	0	0	0	0	0	0	0	12	19	0	19
08:15 AM	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	4	6	1	7
08:30 AM	0	0	0	0	0	0	0	7	0	0	0	3	0	0	0	4	14	0	14
08:45 AM	0	0	0	1	0	0	0	8	0	0	0	2	0	0	0	10	21	0	21
<b>Total</b>	0	0	0	2	0	0	0	23	0	1	0	5	0	0	0	30	60	1	61
<b>Grand Total</b>	0	1	1	8	0	0	0	43	0	2	0	10	0	0	0	46	107	4	111
Apprch %	0	50	50		0	0	0		0	100	0		0	0	0				
Total %	0	25	25		0	0	0		0	50	0		0	0	0		96.4	3.6	

Start Time	Main St From North				Centre St From East				Main St From South				Chestnut St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
07:15 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
07:30 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total Volume</b>	0	1	1	2	0	0	0	0	0	1	0	1	0	0	0	0	3
<b>% App. Total</b>	0	50	50		0	0	0		0	100	0		0	0	0		
PHF	.000	.250	.250	.500	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.750

N/S Street : Main Street  
E/W Street : Centre St / Chestnut St  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				07:30 AM				07:00 AM			
+0 mins.	0	0	1	1	0	0	0	0	0	1	0	1	0	0	0	0
+15 mins.	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
Total Volume	0	1	1	2	0	0	0	0	0	2	0	2	0	0	0	0
% App. Total	0	50	50		0	0	0		0	100	0		0	0	0	
PHF	.000	.250	.250	.500	.000	.000	.000	.000	.000	.500	.000	.500	.000	.000	.000	.000

# Accurate Counts

978-664-2565

N/S Street : Main Street  
 E/W Street : Centre St / Chestnut St  
 City/State : Wakefield, MA  
 Weather : Clear

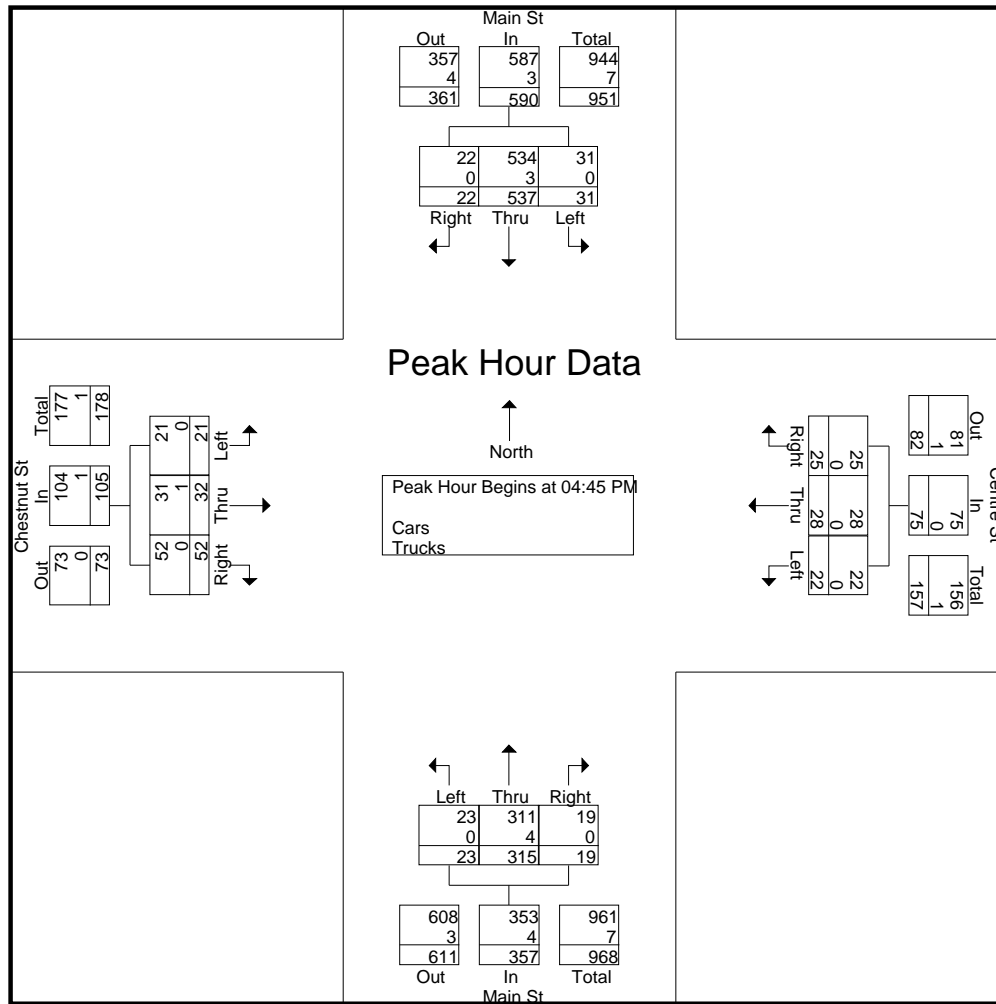
File Name : 93780001  
 Site Code : 93780001  
 Start Date : 6/14/2022  
 Page No : 1

### Groups Printed- Cars - Trucks

Start Time	Main St From North			Centre St From East			Main St From South			Chestnut St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	12	107	13	5	5	9	6	94	4	8	10	12	285
04:15 PM	10	103	9	8	4	8	5	95	5	13	7	10	277
04:30 PM	8	102	7	10	4	5	8	69	5	9	12	13	252
04:45 PM	8	127	9	6	5	7	6	97	3	7	11	8	294
<b>Total</b>	<b>38</b>	<b>439</b>	<b>38</b>	<b>29</b>	<b>18</b>	<b>29</b>	<b>25</b>	<b>355</b>	<b>17</b>	<b>37</b>	<b>40</b>	<b>43</b>	<b>1108</b>
05:00 PM	3	129	5	5	7	6	5	72	4	6	11	16	269
05:15 PM	10	150	6	6	11	8	6	66	5	5	3	15	291
05:30 PM	10	131	2	5	5	4	6	80	7	3	7	13	273
05:45 PM	9	111	4	5	9	10	5	83	5	6	5	17	269
<b>Total</b>	<b>32</b>	<b>521</b>	<b>17</b>	<b>21</b>	<b>32</b>	<b>28</b>	<b>22</b>	<b>301</b>	<b>21</b>	<b>20</b>	<b>26</b>	<b>61</b>	<b>1102</b>
<b>Grand Total</b>	<b>70</b>	<b>960</b>	<b>55</b>	<b>50</b>	<b>50</b>	<b>57</b>	<b>47</b>	<b>656</b>	<b>38</b>	<b>57</b>	<b>66</b>	<b>104</b>	<b>2210</b>
Apprch %	6.5	88.5	5.1	31.8	31.8	36.3	6.3	88.5	5.1	25.1	29.1	45.8	
Total %	3.2	43.4	2.5	2.3	2.3	2.6	2.1	29.7	1.7	2.6	3	4.7	
Cars	69	954	55	50	50	57	47	648	38	57	65	103	2193
% Cars	98.6	99.4	100	100	100	100	100	98.8	100	100	98.5	99	99.2
Trucks	1	6	0	0	0	0	0	8	0	0	1	1	17
% Trucks	1.4	0.6	0	0	0	0	0	1.2	0	0	1.5	1	0.8

Start Time	Main St From North				Centre St From East				Main St From South				Chestnut St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	8	127	<b>9</b>	144	<b>6</b>	5	7	18	<b>6</b>	<b>97</b>	3	<b>106</b>	<b>7</b>	<b>11</b>	8	26	<b>294</b>
05:00 PM	3	129	5	137	5	7	6	18	5	72	4	81	6	11	<b>16</b>	<b>33</b>	269
05:15 PM	<b>10</b>	<b>150</b>	6	<b>166</b>	6	<b>11</b>	<b>8</b>	<b>25</b>	6	66	5	77	5	3	15	23	291
05:30 PM	10	131	2	143	5	5	4	14	6	80	<b>7</b>	93	3	7	13	23	273
Total Volume	31	537	22	590	22	28	25	75	23	315	19	357	21	32	52	105	1127
% App. Total	5.3	91	3.7		29.3	37.3	33.3		6.4	88.2	5.3		20	30.5	49.5		
PHF	.775	.895	.611	.889	.917	.636	.781	.750	.958	.812	.679	.842	.750	.727	.813	.795	.958
Cars	31	534	22	587	22	28	25	75	23	311	19	353	21	31	52	104	1119
% Cars	100	99.4	100	99.5	100	100	100	100	100	98.7	100	98.9	100	96.9	100	99.0	99.3
Trucks	0	3	0	3	0	0	0	0	0	4	0	4	0	1	0	1	8
% Trucks	0	0.6	0	0.5	0	0	0	0	0	1.3	0	1.1	0	3.1	0	1.0	0.7

N/S Street : Main Street  
E/W Street : Centre St / Chestnut St  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	04:45 PM				05:00 PM				04:00 PM				04:15 PM			
+0 mins.	8	127	9	144	5	7	6	18	6	94	4	104	13	7	10	30
+15 mins.	3	129	5	137	6	11	8	25	5	95	5	105	9	12	13	34
+30 mins.	10	150	6	166	5	5	4	14	8	69	5	82	7	11	8	26
+45 mins.	10	131	2	143	5	9	10	24	6	97	3	106	6	11	16	33
Total Volume	31	537	22	590	21	32	28	81	25	355	17	397	35	41	47	123
% App. Total	5.3	91	3.7		25.9	39.5	34.6		6.3	89.4	4.3		28.5	33.3	38.2	
PHF	.775	.895	.611	.889	.875	.727	.700	.810	.781	.915	.850	.936	.673	.854	.734	.904
Cars	31	534	22	587	21	32	28	81	25	351	17	393	35	40	47	122
% Cars	100	99.4	100	99.5	100	100	100	100	100	98.9	100	99	100	97.6	100	99.2
Trucks	0	3	0	3	0	0	0	0	0	4	0	4	0	1	0	1
% Trucks	0	0.6	0	0.5	0	0	0	0	0	1.1	0	1	0	2.4	0	0.8



# Accurate Counts

978-664-2565

N/S Street : Main Street  
 E/W Street : Centre St / Chestnut St  
 City/State : Wakefield, MA  
 Weather : Clear

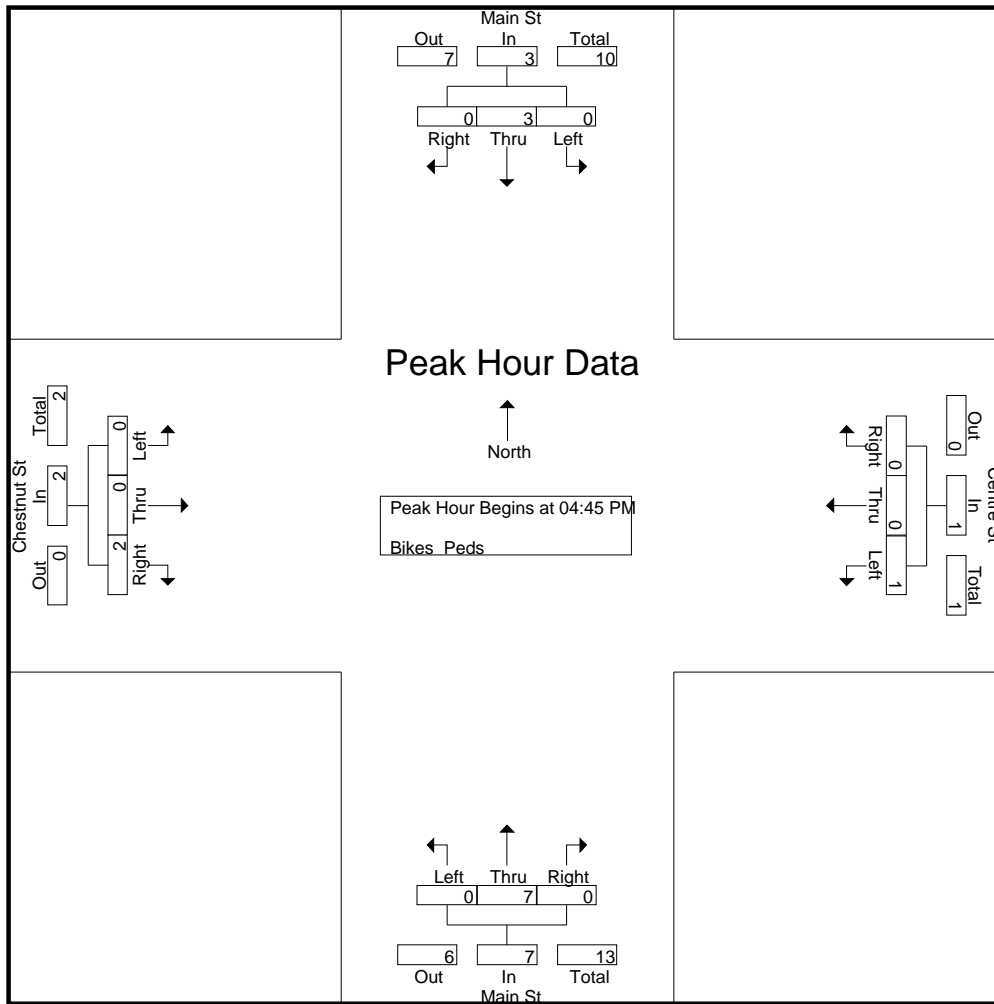
File Name : 93780001  
 Site Code : 93780001  
 Start Date : 6/14/2022  
 Page No : 10

## Groups Printed- Bikes Peds

Start Time	Main St From North				Centre St From East				Main St From South				Chestnut St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
04:00 PM	0	0	0	1	0	0	0	12	0	0	0	0	0	0	0	14	27	0	27
04:15 PM	0	2	0	6	0	0	1	8	0	0	0	1	0	0	0	7	22	3	25
04:30 PM	0	0	0	1	0	0	0	7	0	1	0	3	0	0	0	13	24	1	25
04:45 PM	0	1	0	0	0	0	0	6	0	1	0	3	0	0	0	11	20	2	22
<b>Total</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>33</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>45</b>	<b>93</b>	<b>6</b>	<b>99</b>
05:00 PM	0	1	0	0	0	0	0	8	0	1	0	2	0	0	0	11	21	2	23
05:15 PM	0	0	0	1	1	0	0	8	0	3	0	1	0	0	1	12	22	5	27
05:30 PM	0	1	0	3	0	0	0	9	0	2	0	4	0	0	1	14	30	4	34
05:45 PM	0	0	0	2	0	1	0	10	0	0	0	4	0	0	0	12	28	1	29
<b>Total</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>35</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>11</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>49</b>	<b>101</b>	<b>12</b>	<b>113</b>
<b>Grand Total</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>14</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>68</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>18</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>94</b>	<b>194</b>	<b>18</b>	<b>212</b>
Apprch %	0	100	0		33.3	33.3	33.3		0	100	0		0	0	100				
Total %	0	27.8	0		5.6	5.6	5.6		0	44.4	0		0	0	11.1		91.5	8.5	

Start Time	Main St From North				Centre St From East				Main St From South				Chestnut St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	2
05:00 PM	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	2
05:15 PM	0	0	0	0	1	0	0	1	0	3	0	3	0	0	1	1	5
05:30 PM	0	1	0	1	0	0	0	0	0	2	0	2	0	0	1	1	4
<b>Total Volume</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>13</b>
<b>% App. Total</b>	<b>0</b>	<b>100</b>	<b>0</b>	<b>100</b>	<b>100</b>	<b>0</b>	<b>0</b>	<b>100</b>	<b>0</b>	<b>100</b>	<b>0</b>	<b>100</b>	<b>0</b>	<b>0</b>	<b>100</b>	<b>100</b>	
PHF	.000	.750	.000	.750	.250	.000	.000	.250	.000	.583	.000	.583	.000	.000	.500	.500	.650

N/S Street : Main Street  
E/W Street : Centre St / Chestnut St  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	04:15 PM				05:00 PM				04:45 PM				04:45 PM			
+0 mins.	0	2	0	2	0	0	0	0	0	1	0	1	0	0	0	0
+15 mins.	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0
+30 mins.	0	1	0	1	0	0	0	0	0	3	0	3	0	0	1	1
+45 mins.	0	1	0	1	0	1	0	1	0	2	0	2	0	0	1	1
Total Volume	0	4	0	4	1	1	0	2	0	7	0	7	0	0	2	2
% App. Total	0	100	0		50	50	0		0	100	0		0	0	100	
PHF	.000	.500	.000	.500	.250	.250	.000	.500	.000	.583	.000	.583	.000	.000	.500	.500

# Accurate Counts

978-664-2565

N/S Street : Main Street  
 E/W Street : Albion Street  
 City/State : Wakefield, MA  
 Weather : Clear

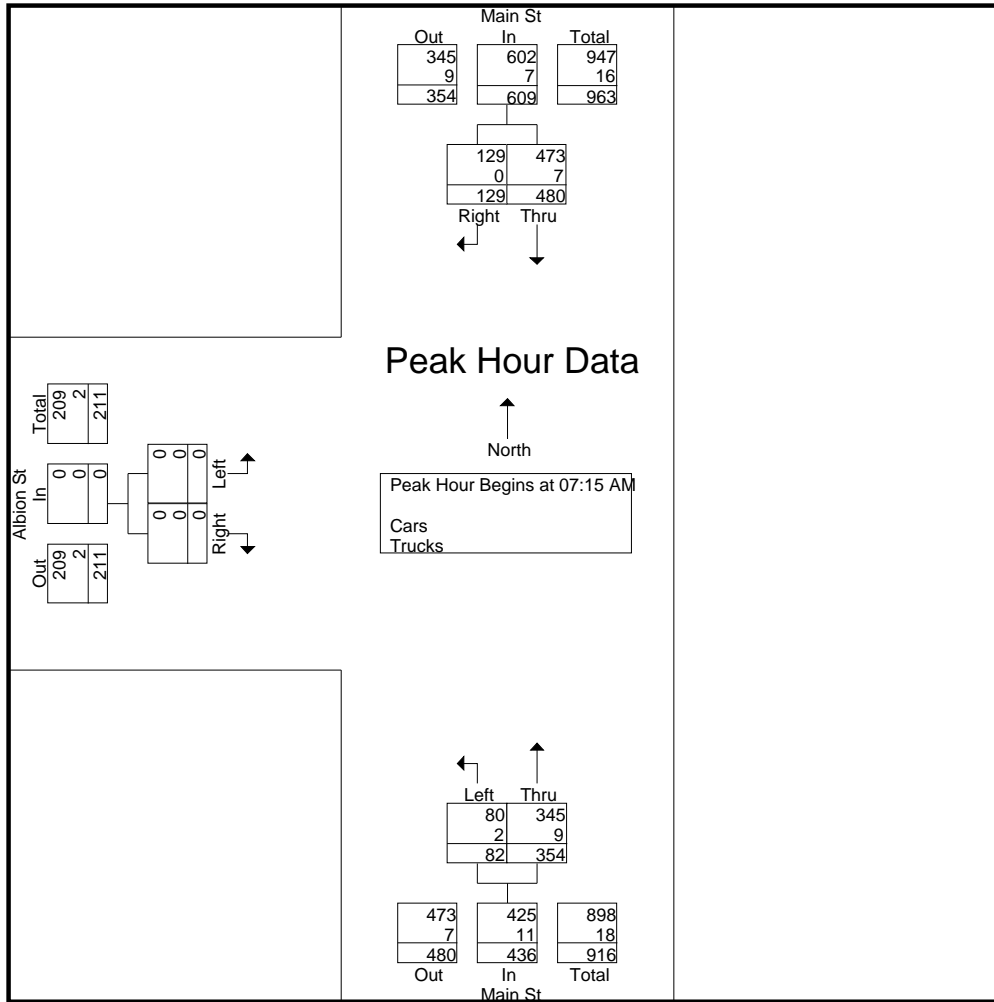
File Name : 93780002  
 Site Code : 93780002  
 Start Date : 6/14/2022  
 Page No : 1

### Groups Printed- Cars - Trucks

Start Time	Main St From North		Main St From South			Albion St From West			Int. Total
	Thru	Right	Left	Thru	Left	Right			
07:00 AM	88	22	21	66	0	0	197		
07:15 AM	148	32	28	70	0	0	278		
07:30 AM	135	28	15	87	0	0	265		
07:45 AM	111	38	19	112	0	0	280		
<b>Total</b>	<b>482</b>	<b>120</b>	<b>83</b>	<b>335</b>	<b>0</b>	<b>0</b>	<b>1020</b>		
08:00 AM	86	31	20	85	0	0	222		
08:15 AM	87	30	11	93	0	0	221		
08:30 AM	106	46	33	101	0	0	286		
08:45 AM	121	31	17	99	0	0	268		
<b>Total</b>	<b>400</b>	<b>138</b>	<b>81</b>	<b>378</b>	<b>0</b>	<b>0</b>	<b>997</b>		
<b>Grand Total</b>	<b>882</b>	<b>258</b>	<b>164</b>	<b>713</b>	<b>0</b>	<b>0</b>	<b>2017</b>		
Apprch %	77.4	22.6	18.7	81.3	0	0			
Total %	43.7	12.8	8.1	35.3	0	0			
Cars	871	256	159	695	0	0	1981		
% Cars	98.8	99.2	97	97.5	0	0	98.2		
Trucks	11	2	5	18	0	0	36		
% Trucks	1.2	0.8	3	2.5	0	0	1.8		

Start Time	Main St From North			Main St From South			Albion St From West			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	
<b>Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1</b>										
<b>Peak Hour for Entire Intersection Begins at 07:15 AM</b>										
07:15 AM	<b>148</b>	32	<b>180</b>	<b>28</b>	70	98	0	0	0	278
07:30 AM	135	28	163	15	87	102	0	0	0	265
07:45 AM	111	<b>38</b>	149	19	<b>112</b>	<b>131</b>	0	0	0	<b>280</b>
08:00 AM	86	31	117	20	85	105	0	0	0	222
<b>Total Volume</b>	<b>480</b>	<b>129</b>	<b>609</b>	<b>82</b>	<b>354</b>	<b>436</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1045</b>
<b>% App. Total</b>	<b>78.8</b>	<b>21.2</b>		<b>18.8</b>	<b>81.2</b>		<b>0</b>	<b>0</b>		
PHF	.811	.849	.846	.732	.790	.832	.000	.000	.000	.933
Cars	473	129	602	80	345	425	0	0	0	1027
% Cars	98.5	100	98.9	97.6	97.5	97.5	0	0	0	98.3
Trucks	7	0	7	2	9	11	0	0	0	18
% Trucks	1.5	0	1.1	2.4	2.5	2.5	0	0	0	1.7

N/S Street : Main Street  
E/W Street : Albion Street  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	07:15 AM			07:45 AM			07:00 AM		
+0 mins.	<b>148</b>	32	<b>180</b>	19	<b>112</b>	131	0	0	0
+15 mins.	135	28	163	20	85	105	0	0	0
+30 mins.	111	<b>38</b>	149	11	93	104	0	0	0
+45 mins.	86	31	117	<b>33</b>	101	<b>134</b>	0	0	0
Total Volume	480	129	609	83	391	474	0	0	0
% App. Total	78.8	21.2		17.5	82.5		0	0	
PHF	.811	.849	.846	.629	.873	.884	.000	.000	.000
Cars	473	129	602	82	383	465	0	0	0
% Cars	98.5	100	98.9	98.8	98	98.1	0	0	0
Trucks	7	0	7	1	8	9	0	0	0
% Trucks	1.5	0	1.1	1.2	2	1.9	0	0	0

**Accurate Counts**  
978-664-2565

File Name : 93780002  
Site Code : 93780002  
Start Date : 6/14/2022  
Page No : 10

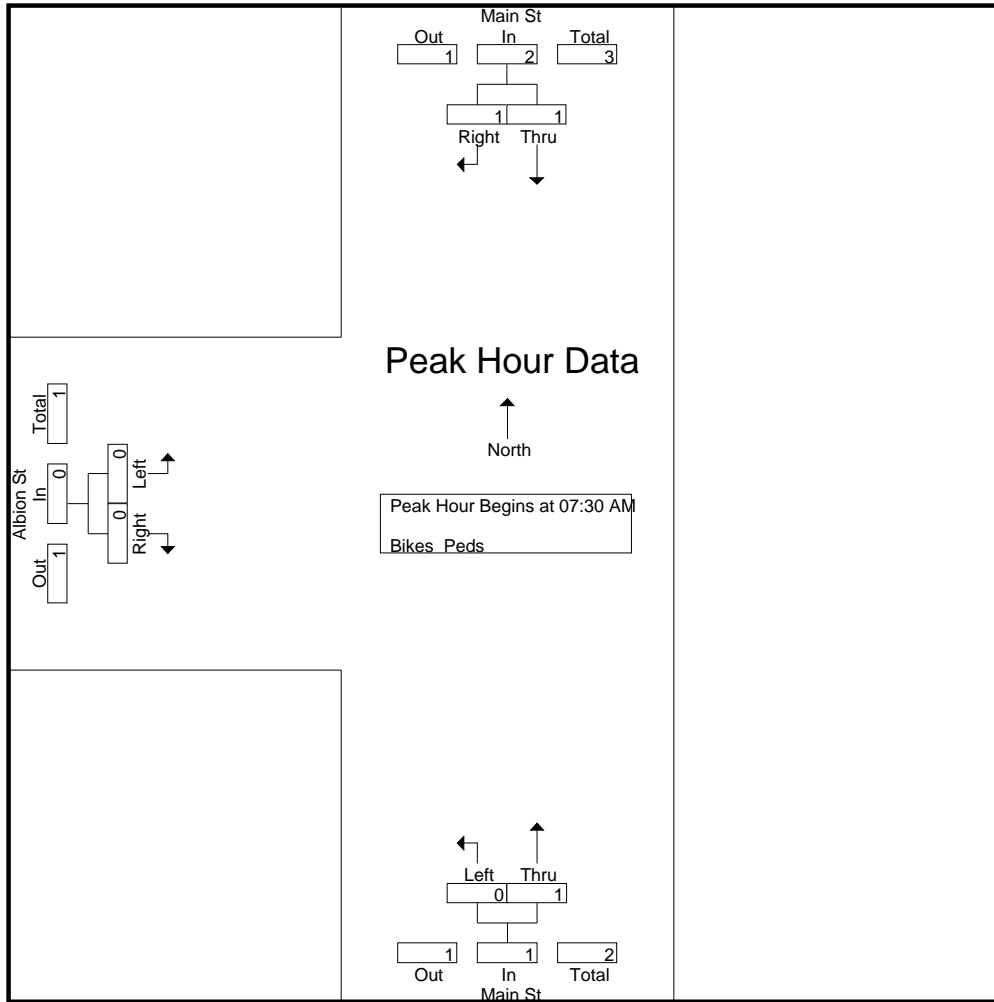
N/S Street : Main Street  
E/W Street : Albion Street  
City/State : Wakefield, MA  
Weather : Clear

Groups Printed- Bikes Peds

Start Time	Main St From North			Main St From South			Albion St From West			Exclu. Total	Inclu. Total	Int. Total
	Thru	Right	Peds	Left	Thru	Peds	Left	Right	Peds			
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	1	0	1	0	0	0	0	0	7	8	1	9
07:30 AM	0	1	5	0	0	0	0	0	6	11	1	12
07:45 AM	0	0	0	0	0	0	0	0	1	1	0	1
Total	1	1	6	0	0	0	0	0	14	20	2	22
08:00 AM	0	0	1	0	0	0	0	0	9	10	0	10
08:15 AM	1	0	0	0	1	0	0	0	6	6	2	8
08:30 AM	0	0	3	0	0	0	0	0	4	7	0	7
08:45 AM	0	0	3	0	0	0	0	0	3	6	0	6
Total	1	0	7	0	1	0	0	0	22	29	2	31
Grand Total	2	1	13	0	1	0	0	0	36	49	4	53
Apprch %	66.7	33.3		0	100		0	0				
Total %	50	25		0	25		0	0		92.5	7.5	

Start Time	Main St From North			Main St From South			Albion St From West			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	0	1	1	0	0	0	0	0	0	1
07:45 AM	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0
08:15 AM	1	0	1	0	1	1	0	0	0	2
Total Volume	1	1	2	0	1	1	0	0	0	3
% App. Total	50	50		0	100		0	0		
PHF	.250	.250	.500	.000	.250	.250	.000	.000	.000	.375

N/S Street : Main Street  
E/W Street : Albion Street  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	07:00 AM			07:30 AM			07:00 AM		
+0 mins.	0	0	0	0	0	0	0	0	0
+15 mins.	1	0	1	0	0	0	0	0	0
+30 mins.	0	1	1	0	0	0	0	0	0
+45 mins.	0	0	0	0	1	1	0	0	0
Total Volume	1	1	2	0	1	1	0	0	0
% App. Total	50	50		0	100		0	0	
PHF	.250	.250	.500	.000	.250	.250	.000	.000	.000

# Accurate Counts

978-664-2565

N/S Street : Main Street  
 E/W Street : Albion Street  
 City/State : Wakefield, MA  
 Weather : Clear

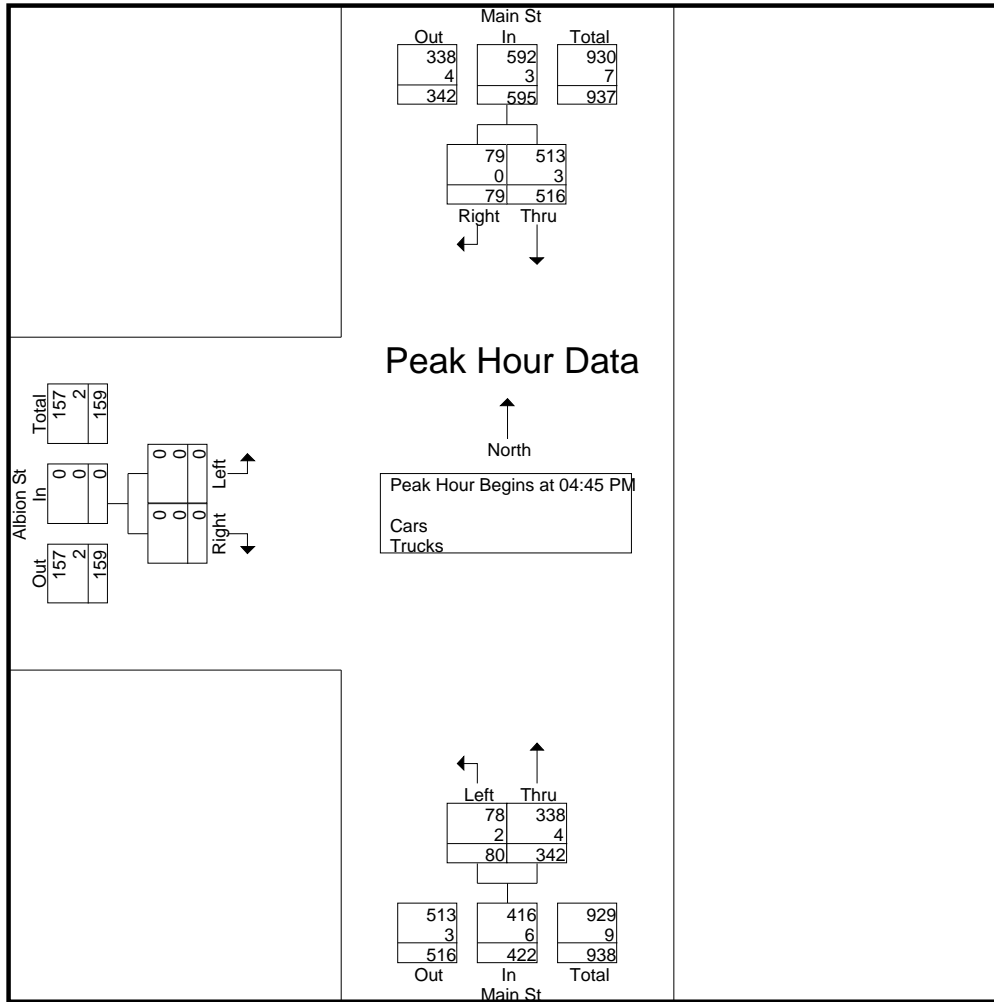
File Name : 93780002  
 Site Code : 93780002  
 Start Date : 6/14/2022  
 Page No : 1

### Groups Printed- Cars - Trucks

Start Time	Main St From North		Main St From South		Albion St From West		Int. Total
	Thru	Right	Left	Thru	Left	Right	
04:00 PM	112	21	15	106	0	0	254
04:15 PM	102	22	13	96	0	0	233
04:30 PM	101	27	15	86	0	0	229
04:45 PM	121	16	19	102	0	0	258
<b>Total</b>	<b>436</b>	<b>86</b>	<b>62</b>	<b>390</b>	<b>0</b>	<b>0</b>	<b>974</b>
05:00 PM	122	26	23	77	0	0	248
05:15 PM	146	23	21	76	0	0	266
05:30 PM	127	14	17	87	0	0	245
05:45 PM	129	10	20	91	0	0	250
<b>Total</b>	<b>524</b>	<b>73</b>	<b>81</b>	<b>331</b>	<b>0</b>	<b>0</b>	<b>1009</b>
<b>Grand Total</b>	<b>960</b>	<b>159</b>	<b>143</b>	<b>721</b>	<b>0</b>	<b>0</b>	<b>1983</b>
Apprch %	85.8	14.2	16.6	83.4	0	0	
Total %	48.4	8	7.2	36.4	0	0	
Cars	955	159	141	713	0	0	1968
% Cars	99.5	100	98.6	98.9	0	0	99.2
Trucks	5	0	2	8	0	0	15
% Trucks	0.5	0	1.4	1.1	0	0	0.8

Start Time	Main St From North			Main St From South			Albion St From West			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	121	16	137	19	<b>102</b>	<b>121</b>	0	0	0	258
05:00 PM	122	<b>26</b>	148	<b>23</b>	77	100	0	0	0	248
05:15 PM	<b>146</b>	23	<b>169</b>	21	76	97	0	0	0	<b>266</b>
05:30 PM	127	14	141	17	87	104	0	0	0	245
Total Volume	516	79	595	80	342	422	0	0	0	1017
% App. Total	86.7	13.3		19	81		0	0		
PHF	.884	.760	.880	.870	.838	.872	.000	.000	.000	.956
Cars	513	79	592	78	338	416	0	0	0	1008
% Cars	99.4	100	99.5	97.5	98.8	98.6	0	0	0	99.1
Trucks	3	0	3	2	4	6	0	0	0	9
% Trucks	0.6	0	0.5	2.5	1.2	1.4	0	0	0	0.9

N/S Street : Main Street  
E/W Street : Albion Street  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	05:00 PM			04:00 PM			04:00 PM		
+0 mins.	122	26	148	15	106	121	0	0	0
+15 mins.	146	23	169	13	96	109	0	0	0
+30 mins.	127	14	141	15	86	101	0	0	0
+45 mins.	129	10	139	19	102	121	0	0	0
Total Volume	524	73	597	62	390	452	0	0	0
% App. Total	87.8	12.2		13.7	86.3		0	0	
PHF	.897	.702	.883	.816	.920	.934	.000	.000	.000
Cars	520	73	593	60	386	446	0	0	0
% Cars	99.2	100	99.3	96.8	99	98.7	0	0	0
Trucks	4	0	4	2	4	6	0	0	0
% Trucks	0.8	0	0.7	3.2	1	1.3	0	0	0



**Accurate Counts**  
978-664-2565

N/S Street : Main Street  
E/W Street : Albion Street  
City/State : Wakefield, MA  
Weather : Clear

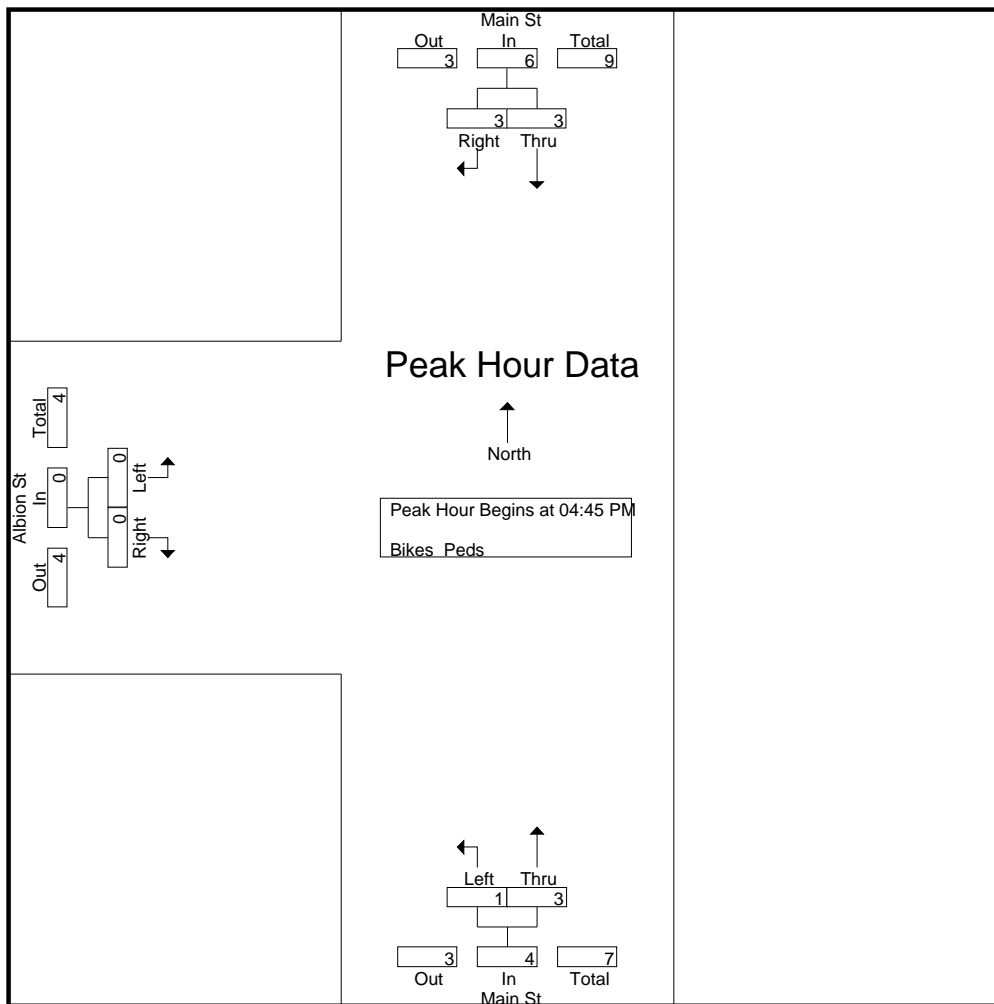
File Name : 93780002  
Site Code : 93780002  
Start Date : 6/14/2022  
Page No : 10

Groups Printed- Bikes Peds

Start Time	Main St From North			Main St From South			Albion St From West			Exclu. Total	Inclu. Total	Int. Total
	Thru	Right	Peds	Left	Thru	Peds	Left	Right	Peds			
04:00 PM	0	0	6	0	0	0	0	0	10	16	0	16
04:15 PM	1	0	6	0	0	1	0	1	8	15	2	17
04:30 PM	0	0	8	0	1	0	0	0	17	25	1	26
04:45 PM	1	0	1	0	1	0	0	0	7	8	2	10
<b>Total</b>	<b>2</b>	<b>0</b>	<b>21</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>42</b>	<b>64</b>	<b>5</b>	<b>69</b>
05:00 PM	1	0	0	1	1	0	0	0	7	7	3	10
05:15 PM	1	1	4	0	1	1	0	0	6	11	3	14
05:30 PM	0	2	3	0	0	1	0	0	15	19	2	21
05:45 PM	0	0	5	0	0	0	0	1	28	33	1	34
<b>Total</b>	<b>2</b>	<b>3</b>	<b>12</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>56</b>	<b>70</b>	<b>9</b>	<b>79</b>
<b>Grand Total</b>	<b>4</b>	<b>3</b>	<b>33</b>	<b>1</b>	<b>4</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>98</b>	<b>134</b>	<b>14</b>	<b>148</b>
Apprch %	57.1	42.9		20	80		0	100				
Total %	28.6	21.4		7.1	28.6		0	14.3		90.5	9.5	

Start Time	Main St From North			Main St From South			Albion St From West			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	1	0	1	0	1	1	0	0	0	2
05:00 PM	1	0	1	1	1	2	0	0	0	3
05:15 PM	1	1	2	0	1	1	0	0	0	3
05:30 PM	0	2	2	0	0	0	0	0	0	2
<b>Total Volume</b>	<b>3</b>	<b>3</b>	<b>6</b>	<b>1</b>	<b>3</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10</b>
<b>% App. Total</b>	<b>50</b>	<b>50</b>		<b>25</b>	<b>75</b>		<b>0</b>	<b>0</b>		
PHF	.750	.375	.750	.250	.750	.500	.000	.000	.000	.833

N/S Street : Main Street  
E/W Street : Albion Street  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	04:45 PM			04:30 PM			04:00 PM		
+0 mins.	1	0	1	0	1	1	0	0	0
+15 mins.	1	0	1	0	1	1	0	1	1
+30 mins.	1	1	2	1	1	2	0	0	0
+45 mins.	0	2	2	0	1	1	0	0	0
Total Volume	3	3	6	1	4	5	0	1	1
% App. Total	50	50		20	80		0	100	
PHF	.750	.375	.750	.250	1.000	.625	.000	.250	.250

# Accurate Counts

978-664-2565

N/S Street : Main Street  
 E/W Street: West Water St / Water St  
 City/State : Wakefield, MA  
 Weather : Clear

File Name : 84900002  
 Site Code : 84900002  
 Start Date : 12/19/2019  
 Page No : 1

## Groups Printed- Cars - Trucks

Start Time	Main St From North			Water St From East			Main St From South			W Water St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	38	98	5	52	33	29	4	39	36	1	34	2	371
07:15 AM	21	136	3	73	28	34	2	55	47	3	24	1	427
07:30 AM	14	115	12	49	37	37	3	73	40	1	38	0	419
07:45 AM	16	69	11	51	31	47	6	85	52	4	26	5	403
Total	89	418	31	225	129	147	15	252	175	9	122	8	1620
08:00 AM	37	94	3	50	27	42	2	52	35	5	24	2	373
08:15 AM	19	76	12	63	33	35	2	44	25	3	23	0	335
08:30 AM	38	89	16	51	30	65	4	54	32	4	24	4	411
08:45 AM	23	82	11	43	44	60	3	73	38	5	26	9	417
Total	117	341	42	207	134	202	11	223	130	17	97	15	1536
Grand Total	206	759	73	432	263	349	26	475	305	26	219	23	3156
Aprch %	19.8	73.1	7	41.4	25.2	33.4	3.2	58.9	37.8	9.7	81.7	8.6	
Total %	6.5	24	2.3	13.7	8.3	11.1	0.8	15.1	9.7	0.8	6.9	0.7	
Cars	205	743	72	429	260	340	26	460	297	26	216	21	3095
% Cars	99.5	97.9	98.6	99.3	98.9	97.4	100	96.8	97.4	100	98.6	91.3	98.1
Trucks	1	16	1	3	3	9	0	15	8	0	3	2	61
% Trucks	0.5	2.1	1.4	0.7	1.1	2.6	0	3.2	2.6	0	1.4	8.7	1.9

# Accurate Counts

978-664-2565

N/S Street : Main Street  
 E/W Street: West Water St / Water St  
 City/State : Wakefield, MA  
 Weather : Clear

File Name : 84900002  
 Site Code : 84900002  
 Start Date : 12/19/2019  
 Page No : 2

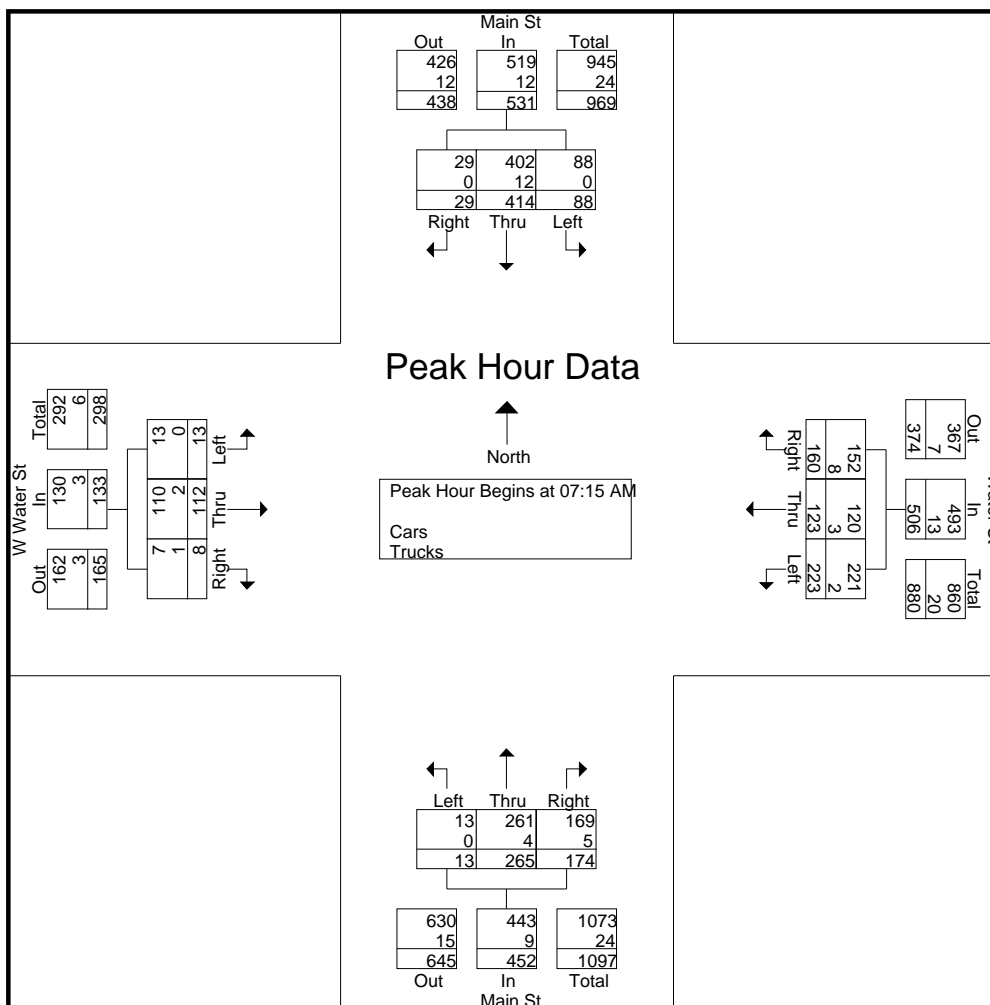
Start Time	Main St From North				Water St From East				Main St From South				W Water St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	21	<b>136</b>	3	<b>160</b>	<b>73</b>	28	34	<b>135</b>	2	55	47	104	3	24	1	28	<b>427</b>
07:30 AM	14	115	<b>12</b>	141	49	<b>37</b>	37	123	3	73	40	116	1	<b>38</b>	0	<b>39</b>	419
07:45 AM	16	69	11	96	51	31	<b>47</b>	129	<b>6</b>	<b>85</b>	<b>52</b>	<b>143</b>	4	26	<b>5</b>	35	403
08:00 AM	<b>37</b>	94	3	134	50	27	42	119	2	52	35	89	<b>5</b>	24	2	31	373
Total Volume	88	414	29	531	223	123	160	506	13	265	174	452	13	112	8	133	1622
% App. Total	16.6	78	5.5		44.1	24.3	31.6		2.9	58.6	38.5		9.8	84.2	6		
PHF	.595	.761	.604	.830	.764	.831	.851	.937	.542	.779	.837	.790	.650	.737	.400	.853	.950
Cars	88	402	29	519	221	120	152	493	13	261	169	443	13	110	7	130	1585
% Cars	100	97.1	100	97.7	99.1	97.6	95.0	97.4	100	98.5	97.1	98.0	100	98.2	87.5	97.7	97.7
Trucks	0	12	0	12	2	3	8	13	0	4	5	9	0	2	1	3	37
% Trucks	0	2.9	0	2.3	0.9	2.4	5.0	2.6	0	1.5	2.9	2.0	0	1.8	12.5	2.3	2.3

# Accurate Counts

978-664-2565

N/S Street : Main Street  
 E/W Street: West Water St / Water St  
 City/State : Wakefield, MA  
 Weather : Clear

File Name : 84900002  
 Site Code : 84900002  
 Start Date : 12/19/2019  
 Page No : 3



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:00 AM				08:00 AM				07:15 AM				07:00 AM			
+0 mins.	<b>38</b>	98	5	141	50	27	42	119	2	55	47	104	1	34	2	37
+15 mins.	21	<b>136</b>	3	<b>160</b>	<b>63</b>	33	35	131	3	73	40	116	3	24	1	28
+30 mins.	14	115	<b>12</b>	141	51	30	<b>65</b>	146	<b>6</b>	<b>85</b>	<b>52</b>	<b>143</b>	1	<b>38</b>	0	<b>39</b>
+45 mins.	16	69	11	96	43	<b>44</b>	60	<b>147</b>	2	52	35	89	<b>4</b>	26	<b>5</b>	35
Total Volume	89	418	31	538	207	134	202	543	13	265	174	452	9	122	8	139

# Accurate Counts

978-664-2565

File Name : 84900002  
 Site Code : 84900002  
 Start Date : 12/19/2019  
 Page No : 13

N/S Street : Main Street  
 E/W Street: West Water St / Water St  
 City/State : Wakefield, MA  
 Weather : Clear

Groups Printed- Bikes Peds

Start Time	Main St From North				Water St From East				Main St From South				W Water St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00 AM	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	4	0	4
07:15 AM	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	3	0	3
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	3
07:45 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	0	0	0	4	0	0	0	0	0	0	0	1	0	0	0	6	11	0	11
08:00 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	2	0	2
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1
08:30 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	2	0	2
08:45 AM	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	1	4	0	4
Total	0	0	0	3	0	0	0	0	0	0	0	2	0	0	0	4	9	0	9
Grand Total	0	0	0	7	0	0	0	0	0	0	0	3	0	0	0	10	20	0	20
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0				
Total %																	100	0	

# Accurate Counts

978-664-2565

File Name : 84900002  
 Site Code : 84900002  
 Start Date : 12/19/2019  
 Page No : 14

N/S Street : Main Street  
 E/W Street: West Water St / Water St  
 City/State : Wakefield, MA  
 Weather : Clear

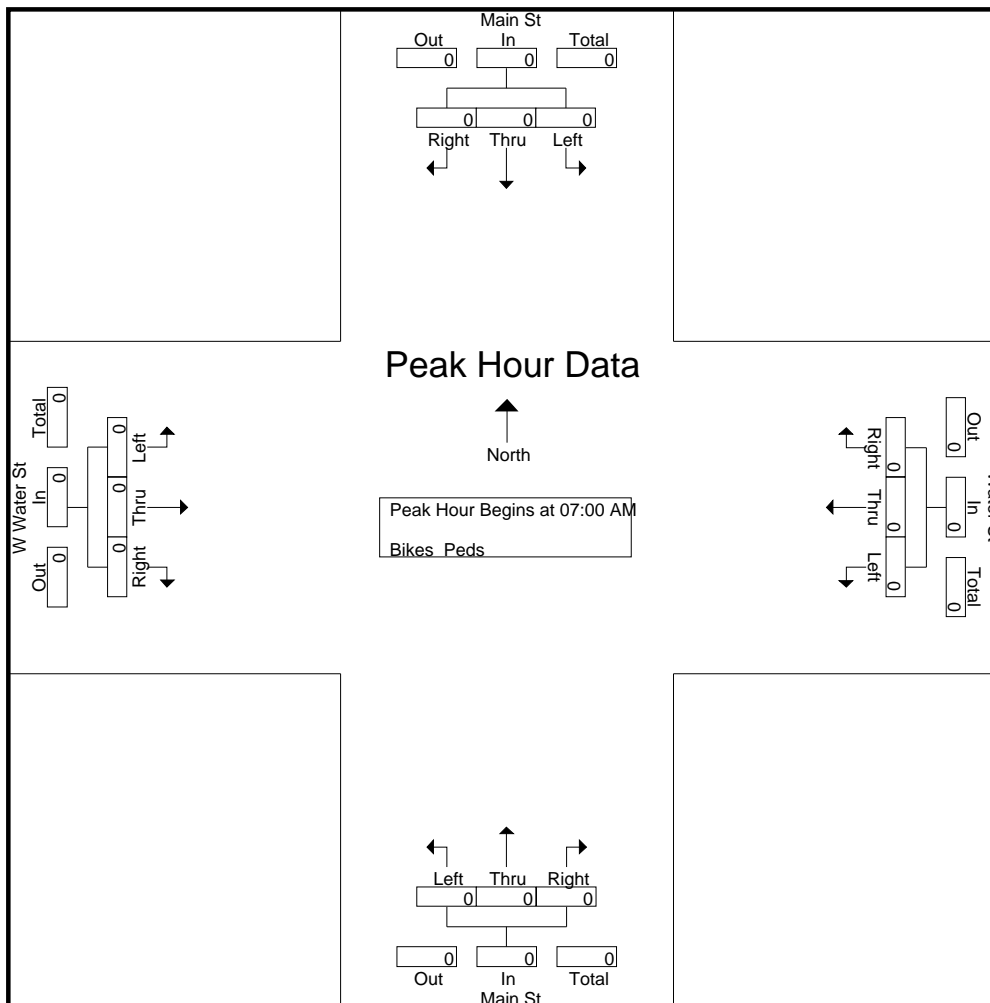
Start Time	Main St From North				Water St From East				Main St From South				W Water St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

# Accurate Counts

978-664-2565

File Name : 84900002  
 Site Code : 84900002  
 Start Date : 12/19/2019  
 Page No : 15

N/S Street : Main Street  
 E/W Street: West Water St / Water St  
 City/State : Wakefield, MA  
 Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



# Accurate Counts

978-664-2565

N/S Street : Main Street  
 E/W Street: West Water St / Water St  
 City/State : Wakefield, MA  
 Weather : Clear

File Name : 84900002  
 Site Code : 84900002  
 Start Date : 12/19/2019  
 Page No : 1

## Groups Printed- Cars - Trucks

Start Time	Main St From North			Water St From East			Main St From South			W Water St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	48	73	36	29	22	27	9	67	47	9	47	5	419
04:15 PM	53	92	18	25	38	32	10	62	36	6	50	4	426
04:30 PM	57	66	25	30	23	25	3	54	46	3	48	7	387
04:45 PM	52	73	24	28	24	29	5	59	33	5	50	6	388
Total	210	304	103	112	107	113	27	242	162	23	195	22	1620
05:00 PM	46	96	24	42	37	23	7	62	55	9	63	6	470
05:15 PM	55	69	16	29	18	23	5	56	52	5	40	11	379
05:30 PM	62	81	14	23	30	29	4	59	51	4	60	5	422
05:45 PM	60	86	19	32	27	28	3	58	40	7	62	13	435
Total	223	332	73	126	112	103	19	235	198	25	225	35	1706
Grand Total	433	636	176	238	219	216	46	477	360	48	420	57	3326
Aprch %	34.8	51.1	14.1	35.4	32.5	32.1	5.2	54	40.8	9.1	80	10.9	
Total %	13	19.1	5.3	7.2	6.6	6.5	1.4	14.3	10.8	1.4	12.6	1.7	
Cars	432	631	176	237	219	216	45	470	358	48	419	57	3308
% Cars	99.8	99.2	100	99.6	100	100	97.8	98.5	99.4	100	99.8	100	99.5
Trucks	1	5	0	1	0	0	1	7	2	0	1	0	18
% Trucks	0.2	0.8	0	0.4	0	0	2.2	1.5	0.6	0	0.2	0	0.5

# Accurate Counts

978-664-2565

N/S Street : Main Street  
 E/W Street: West Water St / Water St  
 City/State : Wakefield, MA  
 Weather : Clear

File Name : 84900002  
 Site Code : 84900002  
 Start Date : 12/19/2019  
 Page No : 2

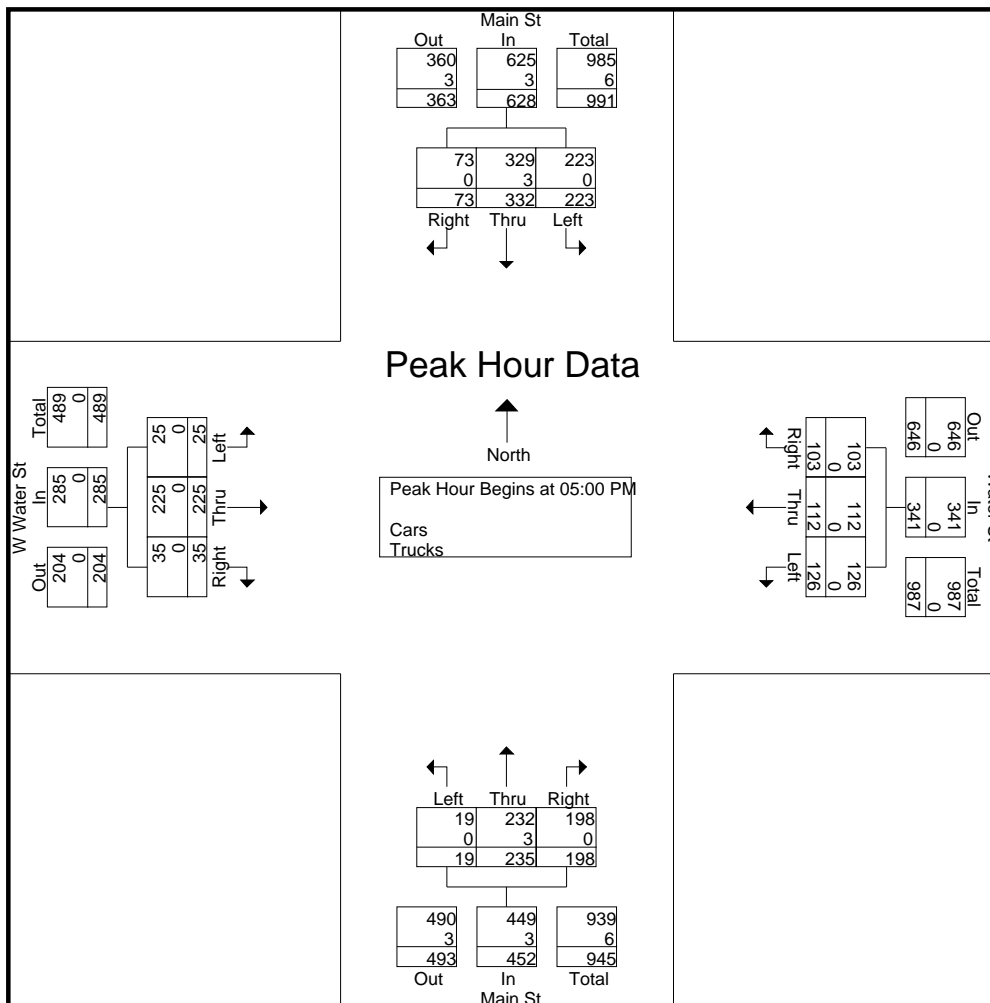
Start Time	Main St From North				Water St From East				Main St From South				W Water St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	46	<b>96</b>	<b>24</b>	<b>166</b>	<b>42</b>	<b>37</b>	23	<b>102</b>	<b>7</b>	<b>62</b>	<b>55</b>	<b>124</b>	<b>9</b>	<b>63</b>	6	78	<b>470</b>
05:15 PM	55	69	16	140	29	18	23	70	5	56	52	113	5	40	11	56	379
05:30 PM	<b>62</b>	81	14	157	23	30	<b>29</b>	82	4	59	51	114	4	60	5	69	422
05:45 PM	60	86	19	165	32	27	28	87	3	58	40	101	7	62	<b>13</b>	<b>82</b>	435
Total Volume	223	332	73	628	126	112	103	341	19	235	198	452	25	225	35	285	1706
% App. Total	35.5	52.9	11.6		37	32.8	30.2		4.2	52	43.8		8.8	78.9	12.3		
PHF	.899	.865	.760	.946	.750	.757	.888	.836	.679	.948	.900	.911	.694	.893	.673	.869	.907
Cars	223	329	73	625	126	112	103	341	19	232	198	449	25	225	35	285	1700
% Cars	100	99.1	100	99.5	100	100	100	100	100	98.7	100	99.3	100	100	100	100	99.6
Trucks	0	3	0	3	0	0	0	0	0	3	0	3	0	0	0	0	6
% Trucks	0	0.9	0	0.5	0	0	0	0	0	1.3	0	0.7	0	0	0	0	0.4

# Accurate Counts

978-664-2565

N/S Street : Main Street  
 E/W Street: West Water St / Water St  
 City/State : Wakefield, MA  
 Weather : Clear

File Name : 84900002  
 Site Code : 84900002  
 Start Date : 12/19/2019  
 Page No : 3



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	05:00 PM				04:15 PM				05:00 PM				05:00 PM			
+0 mins.	46	96	24	166	25	38	32	95	7	62	55	124	9	63	6	78
+15 mins.	55	69	16	140	30	23	25	78	5	56	52	113	5	40	11	56
+30 mins.	62	81	14	157	28	24	29	81	4	59	51	114	4	60	5	69
+45 mins.	60	86	19	165	42	37	23	102	3	58	40	101	7	62	13	82
Total Volume	223	332	73	628	125	122	109	356	19	235	198	452	25	225	35	285

# Accurate Counts

978-664-2565

File Name : 84900002  
 Site Code : 84900002  
 Start Date : 12/19/2019  
 Page No : 13

N/S Street : Main Street  
 E/W Street: West Water St / Water St  
 City/State : Wakefield, MA  
 Weather : Clear

## Groups Printed- Bikes Peds

Start Time	Main St From North				Water St From East				Main St From South				W Water St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
04:00 PM	0	0	0	0	0	1	0	3	0	0	0	2	0	0	0	0	5	1	6
04:15 PM	0	0	0	0	0	0	0	1	0	0	0	11	0	0	0	2	14	0	14
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	3	11	0	11
04:45 PM	0	0	0	1	0	0	0	1	0	0	0	6	0	0	0	2	10	0	10
<b>Total</b>	0	0	0	1	0	1	0	5	0	0	0	27	0	0	0	7	40	1	41
05:00 PM	0	0	0	1	0	0	0	0	0	0	0	5	0	0	0	0	6	0	6
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	0	4
05:30 PM	0	0	0	0	0	0	0	2	0	0	0	3	0	0	0	1	6	0	6
05:45 PM	0	0	0	1	0	0	0	1	0	0	0	2	0	0	0	2	6	0	6
<b>Total</b>	0	0	0	2	0	0	0	3	0	0	0	14	0	0	0	3	22	0	22
<b>Grand Total</b>	0	0	0	3	0	1	0	8	0	0	0	41	0	0	0	10	62	1	63
Apprch %	0	0	0		0	100	0		0	0	0		0	0	0				
Total %	0	0	0		0	100	0		0	0	0		0	0	0		98.4	1.6	

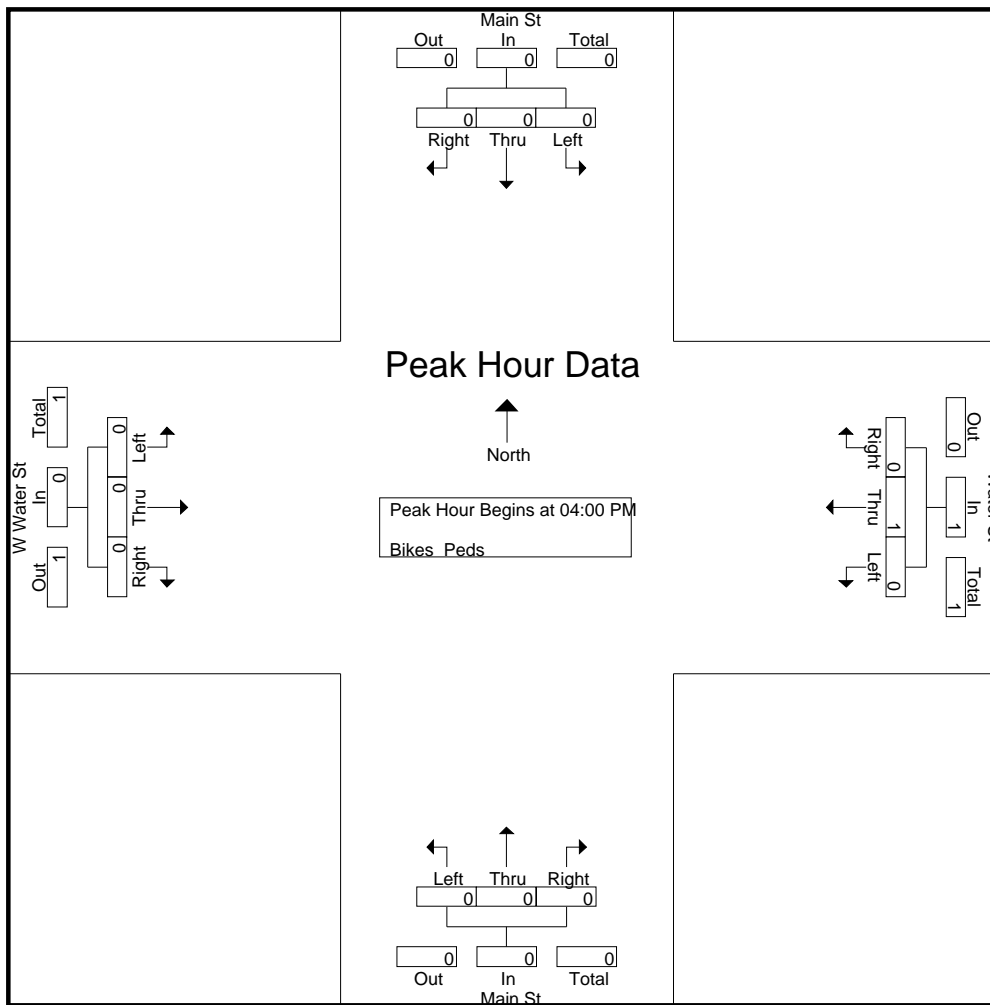


# Accurate Counts

978-664-2565

N/S Street : Main Street  
 E/W Street: West Water St / Water St  
 City/State : Wakefield, MA  
 Weather : Clear

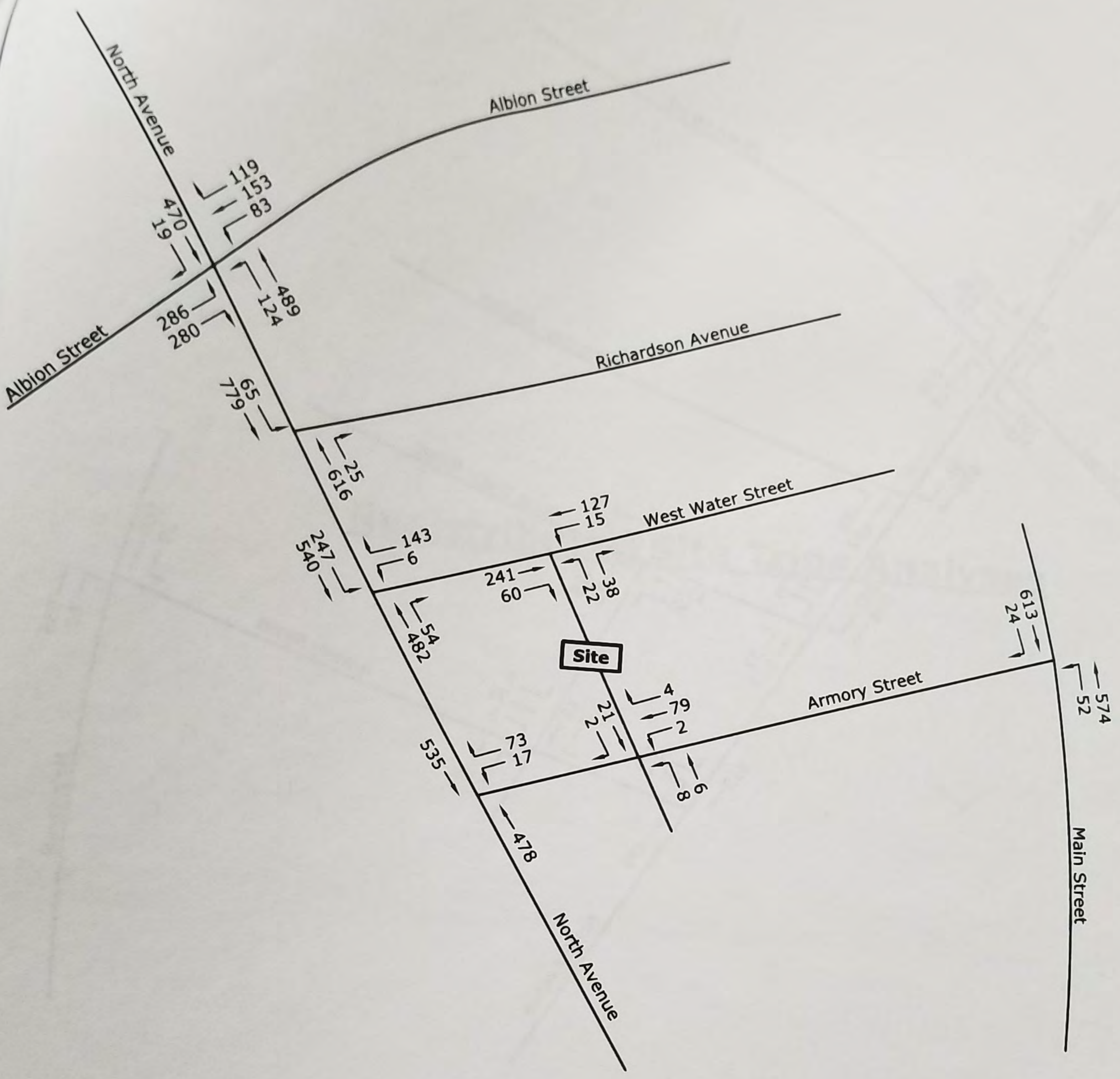
File Name : 84900002  
 Site Code : 84900002  
 Start Date : 12/19/2019  
 Page No : 15



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total Volume</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>



NORTH



Not To Scale

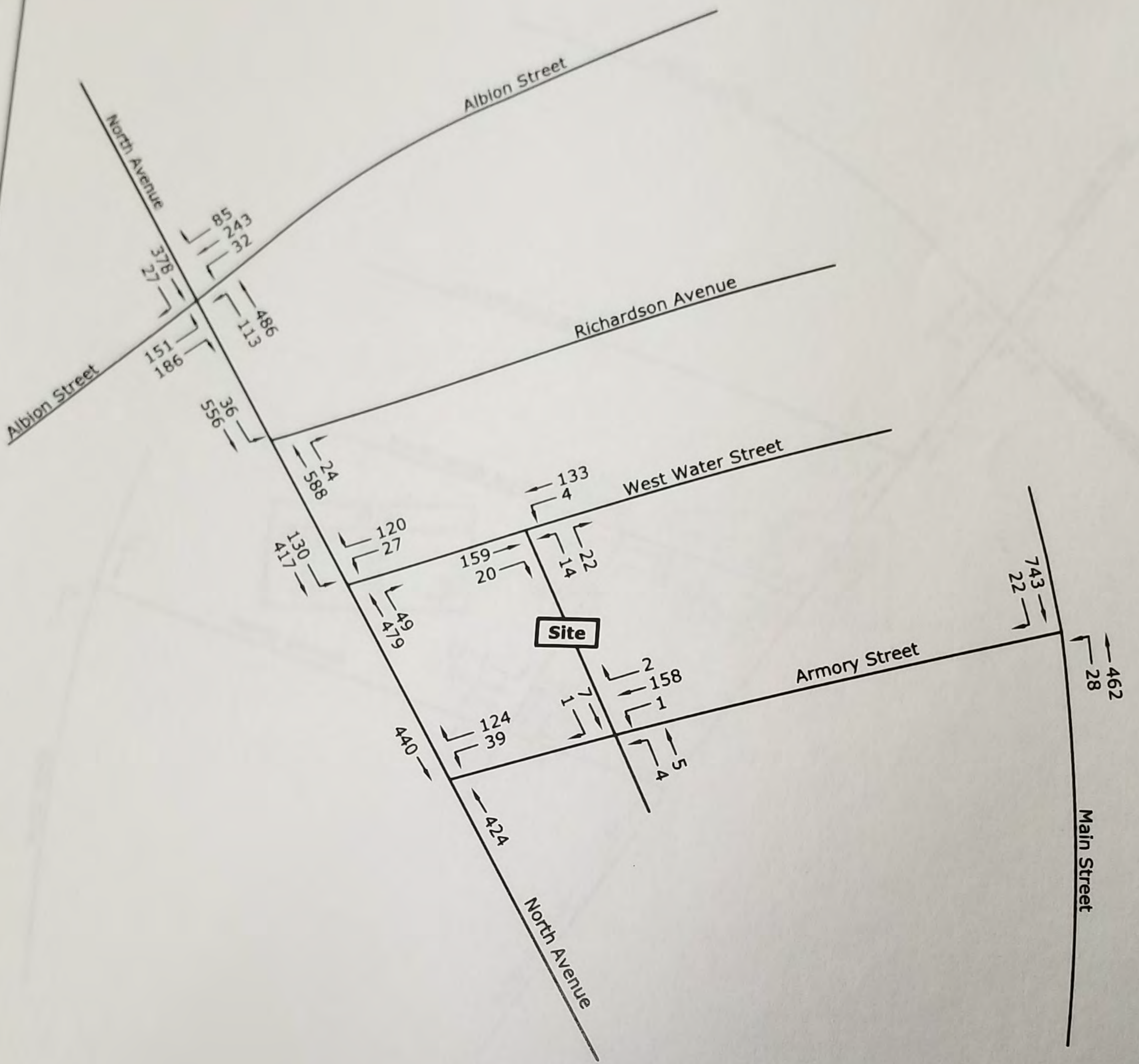
### 2021 Build Weekday PM Peak Hour Traffic Volumes

Wakefield Station  
Wakefield, Massachusetts

Figure S5

TRAFFIC IMPACT ASSESSMENT

Tighe & Bond



2021 Build Weekday AM Peak Hour Traffic Volumes

Wakefield Station

Wakefield, Massachusetts

Figure S4



Not To Scale

Address  
 1 Lafayette Street  
 175 North Ave  
 S Bennett



**Accurate Counts**  
978-664-2565

File Name : 92510003  
Site Code : 92510003  
Start Date : 2/17/2022  
Page No : 1

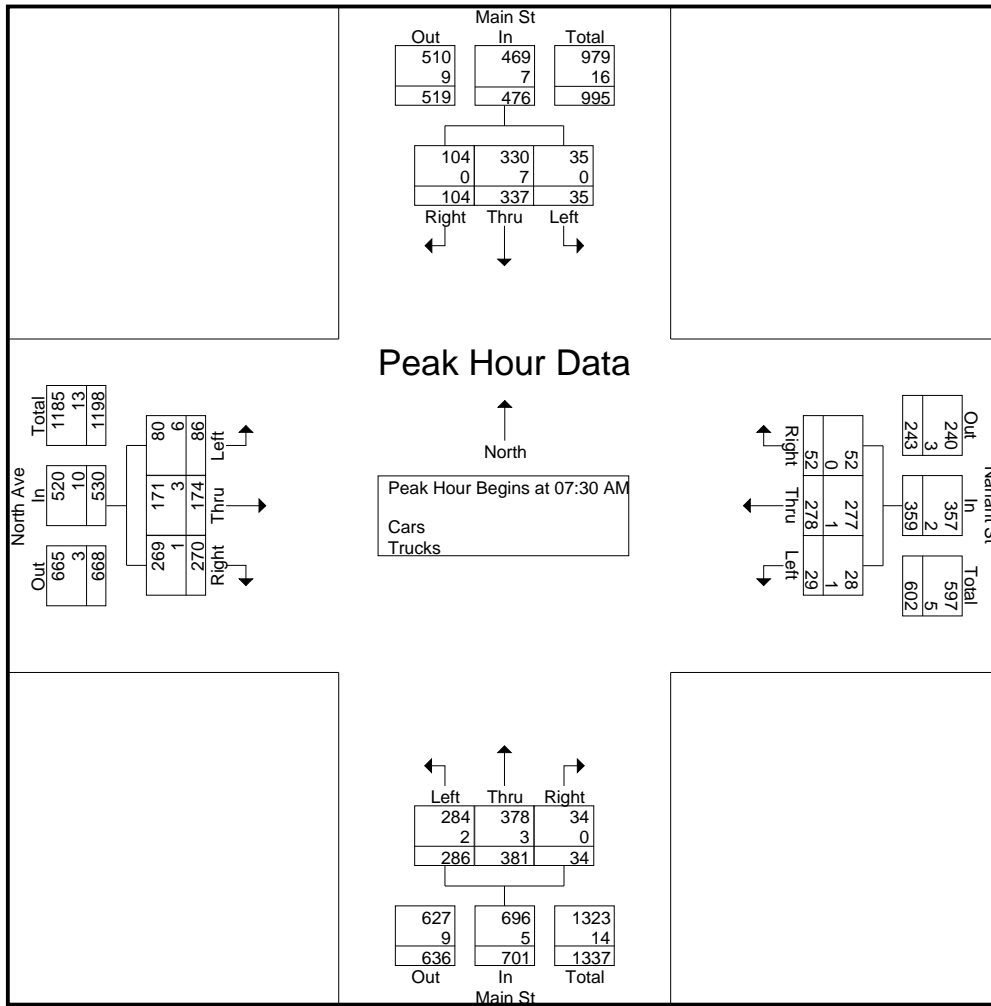
N/S Street : Main Street  
E/W Street : Nahant St / North Ave  
City/State : Wakefield, MA  
Weather : Clear

Groups Printed- Cars - Trucks

Start Time	Main St From North			Nahant St From East			Main St From South			North Ave From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	2	57	25	11	62	12	52	53	10	23	69	50	426
07:15 AM	9	102	16	3	64	15	53	85	11	22	60	57	497
07:30 AM	18	89	35	10	76	18	89	111	13	22	45	85	611
07:45 AM	6	84	21	6	63	11	59	101	8	23	37	75	494
<b>Total</b>	<b>35</b>	<b>332</b>	<b>97</b>	<b>30</b>	<b>265</b>	<b>56</b>	<b>253</b>	<b>350</b>	<b>42</b>	<b>90</b>	<b>211</b>	<b>267</b>	<b>2028</b>
08:00 AM	6	83	18	7	74	11	63	81	8	14	36	58	459
08:15 AM	5	81	30	6	65	12	75	88	5	27	56	52	502
08:30 AM	6	90	13	7	80	21	62	108	4	18	33	62	504
08:45 AM	10	95	20	14	54	12	72	91	4	37	30	71	510
<b>Total</b>	<b>27</b>	<b>349</b>	<b>81</b>	<b>34</b>	<b>273</b>	<b>56</b>	<b>272</b>	<b>368</b>	<b>21</b>	<b>96</b>	<b>155</b>	<b>243</b>	<b>1975</b>
<b>Grand Total</b>	<b>62</b>	<b>681</b>	<b>178</b>	<b>64</b>	<b>538</b>	<b>112</b>	<b>525</b>	<b>718</b>	<b>63</b>	<b>186</b>	<b>366</b>	<b>510</b>	<b>4003</b>
Apprch %	6.7	73.9	19.3	9	75.4	15.7	40.2	55	4.8	17.5	34.5	48	
Total %	1.5	17	4.4	1.6	13.4	2.8	13.1	17.9	1.6	4.6	9.1	12.7	
Cars	61	667	177	63	537	112	522	710	62	174	361	505	3951
% Cars	98.4	97.9	99.4	98.4	99.8	100	99.4	98.9	98.4	93.5	98.6	99	98.7
Trucks	1	14	1	1	1	0	3	8	1	12	5	5	52
% Trucks	1.6	2.1	0.6	1.6	0.2	0	0.6	1.1	1.6	6.5	1.4	1	1.3

Start Time	Main St From North				Nahant St From East				Main St From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	<b>18</b>	<b>89</b>	<b>35</b>	<b>142</b>	<b>10</b>	<b>76</b>	<b>18</b>	<b>104</b>	<b>89</b>	<b>111</b>	<b>13</b>	<b>213</b>	22	45	85	152	611
07:45 AM	6	84	21	111	6	63	11	80	59	101	8	168	23	37	75	135	494
08:00 AM	6	83	18	107	7	74	11	92	63	81	8	152	14	36	58	108	459
08:15 AM	5	81	30	116	6	65	12	83	75	88	5	168	<b>27</b>	<b>56</b>	52	135	502
<b>Total Volume</b>	<b>35</b>	<b>337</b>	<b>104</b>	<b>476</b>	<b>29</b>	<b>278</b>	<b>52</b>	<b>359</b>	<b>286</b>	<b>381</b>	<b>34</b>	<b>701</b>	<b>86</b>	<b>174</b>	<b>270</b>	<b>530</b>	<b>2066</b>
% App. Total	7.4	70.8	21.8		8.1	77.4	14.5		40.8	54.4	4.9		16.2	32.8	50.9		
PHF	.486	.947	.743	.838	.725	.914	.722	.863	.803	.858	.654	.823	.796	.777	.794	.872	.845
Cars	35	330	104	469	28	277	52	357	284	378	34	696	80	171	269	520	2042
% Cars	100	97.9	100	98.5	96.6	99.6	100	99.4	99.3	99.2	100	99.3	93.0	98.3	99.6	98.1	98.8
Trucks	0	7	0	7	1	1	0	2	2	3	0	5	6	3	1	10	24
% Trucks	0	2.1	0	1.5	3.4	0.4	0	0.6	0.7	0.8	0	0.7	7.0	1.7	0.4	1.9	1.2

N/S Street : Main Street  
E/W Street : Nahant St / North Ave  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	07:15 AM				07:45 AM				07:30 AM				07:00 AM			
+0 mins.	9	102	16	127	6	63	11	80	89	111	13	213	23	69	50	142
+15 mins.	18	89	35	142	7	74	11	92	59	101	8	168	22	60	57	139
+30 mins.	6	84	21	111	6	65	12	83	63	81	8	152	22	45	85	152
+45 mins.	6	83	18	107	7	80	21	108	75	88	5	168	23	37	75	135
Total Volume	39	358	90	487	26	282	55	363	286	381	34	701	90	211	267	568
% App. Total	8	73.5	18.5		7.2	77.7	15.2		40.8	54.4	4.9		15.8	37.1	47	
PHF	.542	.877	.643	.857	.929	.881	.655	.840	.803	.858	.654	.823	.978	.764	.785	.934
Cars	39	349	90	478	25	282	55	362	284	378	34	696	83	207	264	554
% Cars	100	97.5	100	98.2	96.2	100	100	99.7	99.3	99.2	100	99.3	92.2	98.1	98.9	97.5
Trucks	0	9	0	9	1	0	0	1	2	3	0	5	7	4	3	14
% Trucks	0	2.5	0	1.8	3.8	0	0	0.3	0.7	0.8	0	0.7	7.8	1.9	1.1	2.5

**Accurate Counts**  
978-664-2565

File Name : 92510003  
Site Code : 92510003  
Start Date : 2/17/2022  
Page No : 10

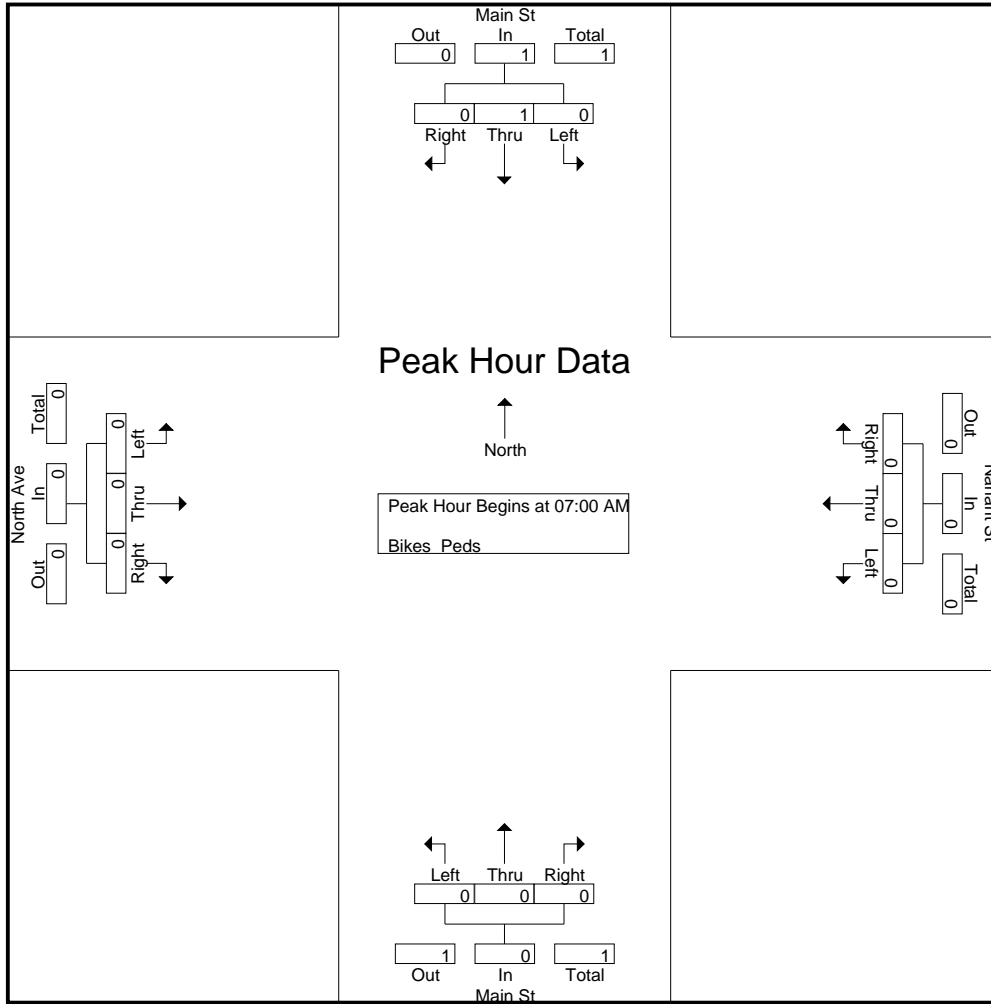
N/S Street : Main Street  
E/W Street : Nahant St / North Ave  
City/State : Wakefield, MA  
Weather : Clear

Groups Printed- Bikes Peds

Start Time	Main St From North				Nahant St From East				Main St From South				North Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00 AM	0	0	0	3	0	0	0	7	0	0	0	1	0	0	0	1	12	0	12
07:15 AM	0	1	0	0	0	0	0	3	0	0	0	1	0	0	0	2	6	1	7
07:30 AM	0	0	0	3	0	0	0	5	0	0	0	0	0	0	0	4	12	0	12
07:45 AM	0	0	0	1	0	0	0	3	0	0	0	1	0	0	0	2	7	0	7
<b>Total</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>18</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9</b>	<b>37</b>	<b>1</b>	<b>38</b>
08:00 AM	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3	0	3
08:15 AM	0	0	0	0	0	0	0	4	0	0	0	3	0	0	0	2	9	0	9
08:30 AM	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	3	0	3
08:45 AM	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	0	4	0	4
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>19</b>	<b>0</b>	<b>19</b>
<b>Grand Total</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>30</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>11</b>	<b>56</b>	<b>1</b>	<b>57</b>
Apprch %	0	100	0		0	0	0		0	0	0		0	0	0				
Total %	0	100	0		0	0	0		0	0	0		0	0	0		98.2	1.8	

Start Time	Main St From North				Nahant St From East				Main St From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total Volume</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>% App. Total</b>	<b>0</b>	<b>100</b>	<b>0</b>		<b>0</b>	<b>0</b>	<b>0</b>		<b>0</b>	<b>0</b>	<b>0</b>		<b>0</b>	<b>0</b>	<b>0</b>		
PHF	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250

N/S Street : Main Street  
E/W Street : Nahant St / North Ave  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

**Accurate Counts**  
978-664-2565

File Name : 92510003  
Site Code : 92510003  
Start Date : 2/17/2022  
Page No : 1

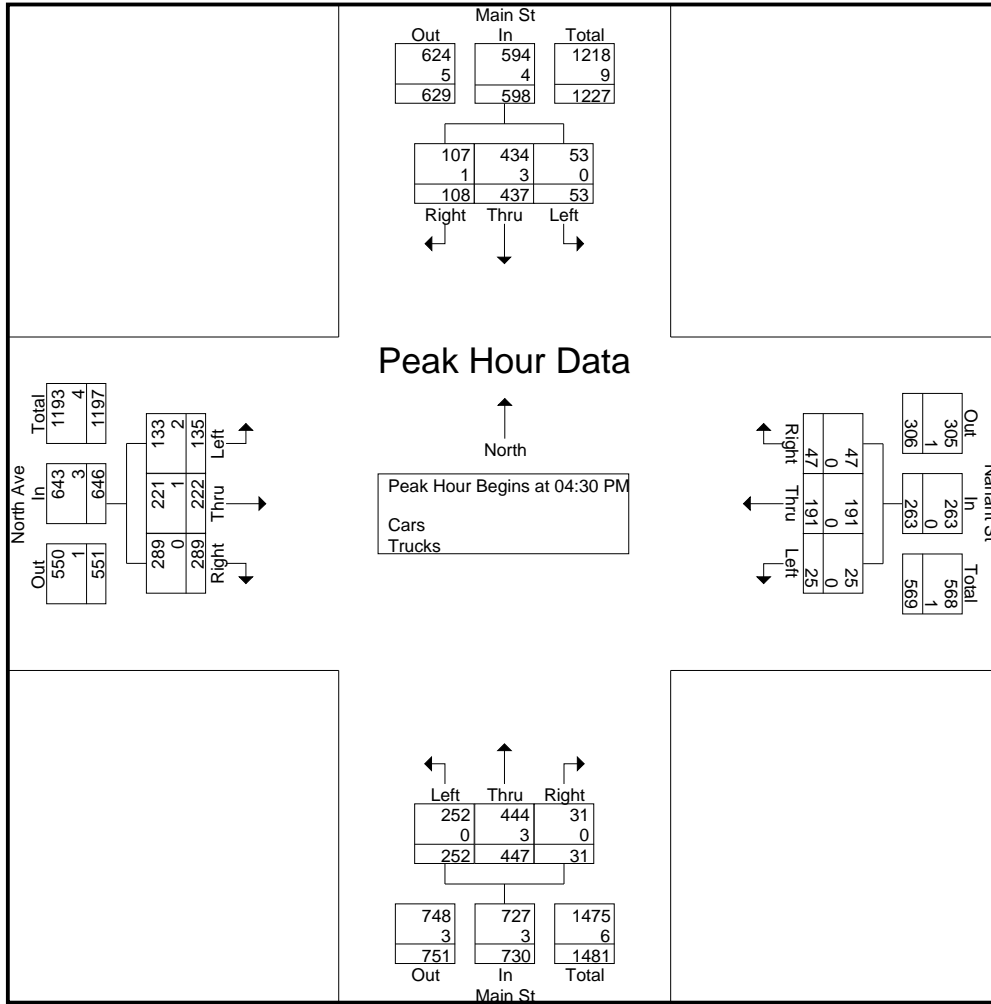
N/S Street : Main Street  
E/W Street : Nahant St / North Ave  
City/State : Wakefield, MA  
Weather : Clear

Groups Printed- Cars - Trucks

Start Time	Main St From North			Nahant St From East			Main St From South			North Ave From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	11	89	26	8	62	11	60	113	6	28	52	77	543
04:15 PM	14	96	26	5	40	16	54	102	10	38	47	49	497
04:30 PM	14	94	32	8	58	12	67	102	7	38	41	70	543
04:45 PM	13	118	19	9	50	9	60	127	7	35	55	74	576
<b>Total</b>	<b>52</b>	<b>397</b>	<b>103</b>	<b>30</b>	<b>210</b>	<b>48</b>	<b>241</b>	<b>444</b>	<b>30</b>	<b>139</b>	<b>195</b>	<b>270</b>	<b>2159</b>
05:00 PM	13	101	29	5	40	13	62	101	5	34	64	79	546
05:15 PM	13	124	28	3	43	13	63	117	12	28	62	66	572
05:30 PM	13	96	23	10	54	12	60	108	10	21	41	77	525
05:45 PM	20	108	19	5	49	12	61	99	8	31	63	58	533
<b>Total</b>	<b>59</b>	<b>429</b>	<b>99</b>	<b>23</b>	<b>186</b>	<b>50</b>	<b>246</b>	<b>425</b>	<b>35</b>	<b>114</b>	<b>230</b>	<b>280</b>	<b>2176</b>
<b>Grand Total</b>	<b>111</b>	<b>826</b>	<b>202</b>	<b>53</b>	<b>396</b>	<b>98</b>	<b>487</b>	<b>869</b>	<b>65</b>	<b>253</b>	<b>425</b>	<b>550</b>	<b>4335</b>
Apprch %	9.7	72.5	17.7	9.7	72.4	17.9	34.3	61.2	4.6	20.6	34.6	44.8	
Total %	2.6	19.1	4.7	1.2	9.1	2.3	11.2	20	1.5	5.8	9.8	12.7	
Cars	111	819	198	53	396	98	485	861	65	251	423	549	4309
% Cars	100	99.2	98	100	100	100	99.6	99.1	100	99.2	99.5	99.8	99.4
Trucks	0	7	4	0	0	0	2	8	0	2	2	1	26
% Trucks	0	0.8	2	0	0	0	0.4	0.9	0	0.8	0.5	0.2	0.6

Start Time	Main St From North				Nahant St From East				Main St From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	<b>14</b>	94	<b>32</b>	140	8	<b>58</b>	12	<b>78</b>	<b>67</b>	102	7	176	<b>38</b>	41	70	149	543
04:45 PM	13	118	19	150	<b>9</b>	50	9	68	60	<b>127</b>	7	<b>194</b>	35	55	74	164	<b>576</b>
05:00 PM	13	101	29	143	5	40	<b>13</b>	58	62	101	5	168	34	<b>64</b>	<b>79</b>	<b>177</b>	546
05:15 PM	13	<b>124</b>	28	<b>165</b>	3	43	13	59	63	117	<b>12</b>	192	28	62	66	156	572
<b>Total Volume</b>	<b>53</b>	<b>437</b>	<b>108</b>	<b>598</b>	<b>25</b>	<b>191</b>	<b>47</b>	<b>263</b>	<b>252</b>	<b>447</b>	<b>31</b>	<b>730</b>	<b>135</b>	<b>222</b>	<b>289</b>	<b>646</b>	<b>2237</b>
% App. Total	8.9	73.1	18.1		9.5	72.6	17.9		34.5	61.2	4.2		20.9	34.4	44.7		
PHF	.946	.881	.844	.906	.694	.823	.904	.843	.940	.880	.646	.941	.888	.867	.915	.912	.971
Cars	53	434	107	594	25	191	47	263	252	444	31	727	133	221	289	643	2227
% Cars	100	99.3	99.1	99.3	100	100	100	100	100	99.3	100	99.6	98.5	99.5	100	99.5	99.6
Trucks	0	3	1	4	0	0	0	0	0	3	0	3	2	1	0	3	10
% Trucks	0	0.7	0.9	0.7	0	0	0	0	0	0.7	0	0.4	1.5	0.5	0	0.5	0.4

N/S Street : Main Street  
E/W Street : Nahant St / North Ave  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	04:30 PM				04:00 PM				04:45 PM				04:30 PM			
+0 mins.	14	94	32	140	8	62	11	81	60	127	7	194	38	41	70	149
+15 mins.	13	118	19	150	5	40	16	61	62	101	5	168	35	55	74	164
+30 mins.	13	101	29	143	8	58	12	78	63	117	12	192	34	64	79	177
+45 mins.	13	124	28	165	9	50	9	68	60	108	10	178	28	62	66	156
Total Volume	53	437	108	598	30	210	48	288	245	453	34	732	135	222	289	646
% App. Total	8.9	73.1	18.1		10.4	72.9	16.7		33.5	61.9	4.6		20.9	34.4	44.7	
PHF	.946	.881	.844	.906	.833	.847	.750	.889	.972	.892	.708	.943	.888	.867	.915	.912
Cars	53	434	107	594	30	210	48	288	245	448	34	727	133	221	289	643
% Cars	100	99.3	99.1	99.3	100	100	100	100	100	98.9	100	99.3	98.5	99.5	100	99.5
Trucks	0	3	1	4	0	0	0	0	0	5	0	5	2	1	0	3
% Trucks	0	0.7	0.9	0.7	0	0	0	0	0	1.1	0	0.7	1.5	0.5	0	0.5

**Accurate Counts**  
978-664-2565

File Name : 92510003  
Site Code : 92510003  
Start Date : 2/17/2022  
Page No : 10

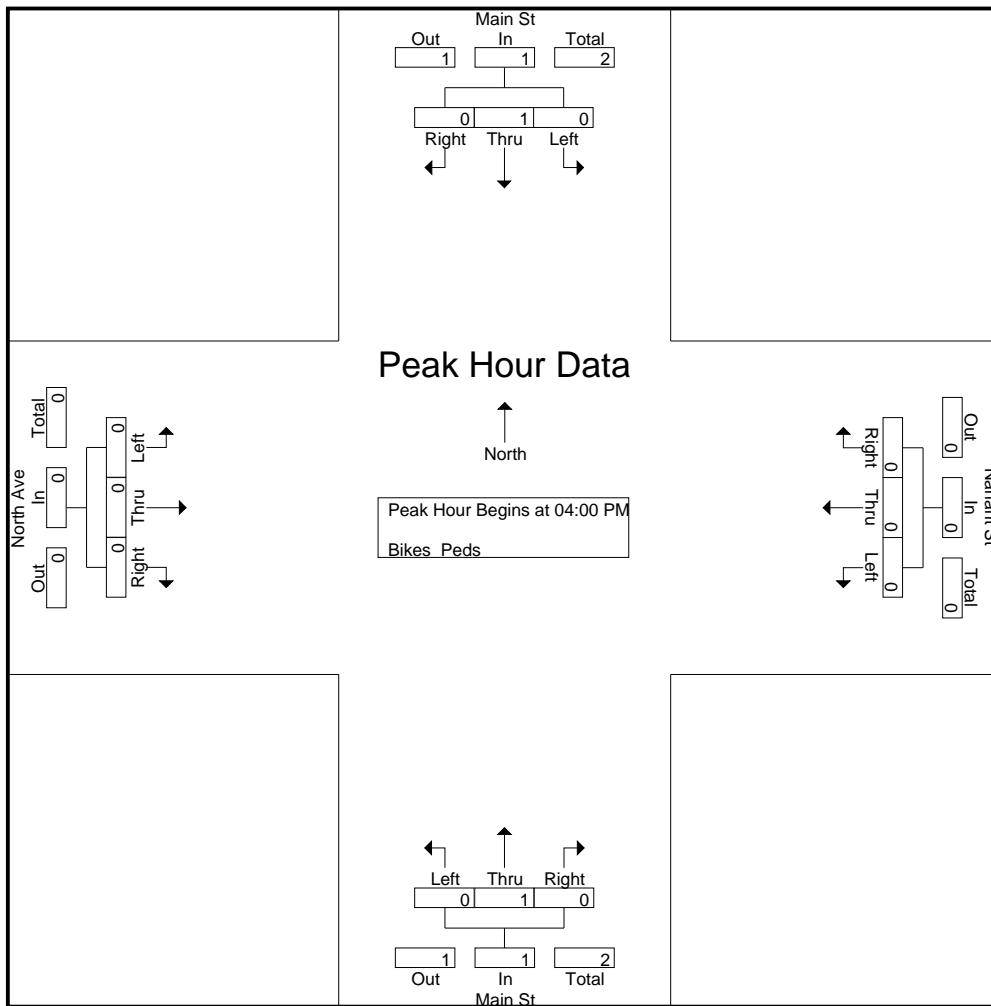
N/S Street : Main Street  
E/W Street : Nahant St / North Ave  
City/State : Wakefield, MA  
Weather : Clear

Groups Printed- Bikes Peds

Start Time	Main St From North				Nahant St From East				Main St From South				North Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
04:00 PM	0	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3	1	4
04:15 PM	0	0	0	2	0	0	0	7	0	0	0	0	0	0	0	0	9	0	9
04:30 PM	0	0	0	1	0	0	0	3	0	0	0	0	0	0	0	3	7	0	7
04:45 PM	0	0	0	0	0	0	0	4	0	1	0	2	0	0	0	2	8	1	9
<b>Total</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>17</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>27</b>	<b>2</b>	<b>29</b>
05:00 PM	0	0	0	1	0	0	0	2	0	0	0	1	0	0	0	3	7	0	7
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	0	2
05:45 PM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	0	2
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>12</b>	<b>0</b>	<b>12</b>
<b>Grand Total</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>21</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>39</b>	<b>2</b>	<b>41</b>
Apprch %	0	100	0		0	0	0		0	100	0		0	0	0				
Total %	0	50	0		0	0	0		0	50	0		0	0	0		95.1	4.9	

Start Time	Main St From North				Nahant St From East				Main St From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
<b>Total Volume</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>% App. Total</b>	<b>0</b>	<b>100</b>	<b>0</b>		<b>0</b>	<b>0</b>	<b>0</b>		<b>0</b>	<b>100</b>	<b>0</b>		<b>0</b>	<b>0</b>	<b>0</b>		
<b>PHF</b>	<b>.000</b>	<b>.250</b>	<b>.000</b>	<b>.250</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.250</b>	<b>.000</b>	<b>.250</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.500</b>

N/S Street : Main Street  
E/W Street : Nahant St / North Ave  
City/State : Wakefield, MA  
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
Total Volume	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0
% App. Total	0	100	0	0	0	0	0	0	0	100	0	0	0	0	0	0
PHF	.000	.250	.000	.250	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000



**Accurate Counts**  
978-664-2565

N/S Street : North Avenue  
E/W Street : Albion Street  
City/State : Wakefield, MA  
Weather : Clear

File Name : 55640001  
Site Code : 55640001  
Start Date : 5/23/2017  
Page No : 1

Groups Printed- Cars - Trucks

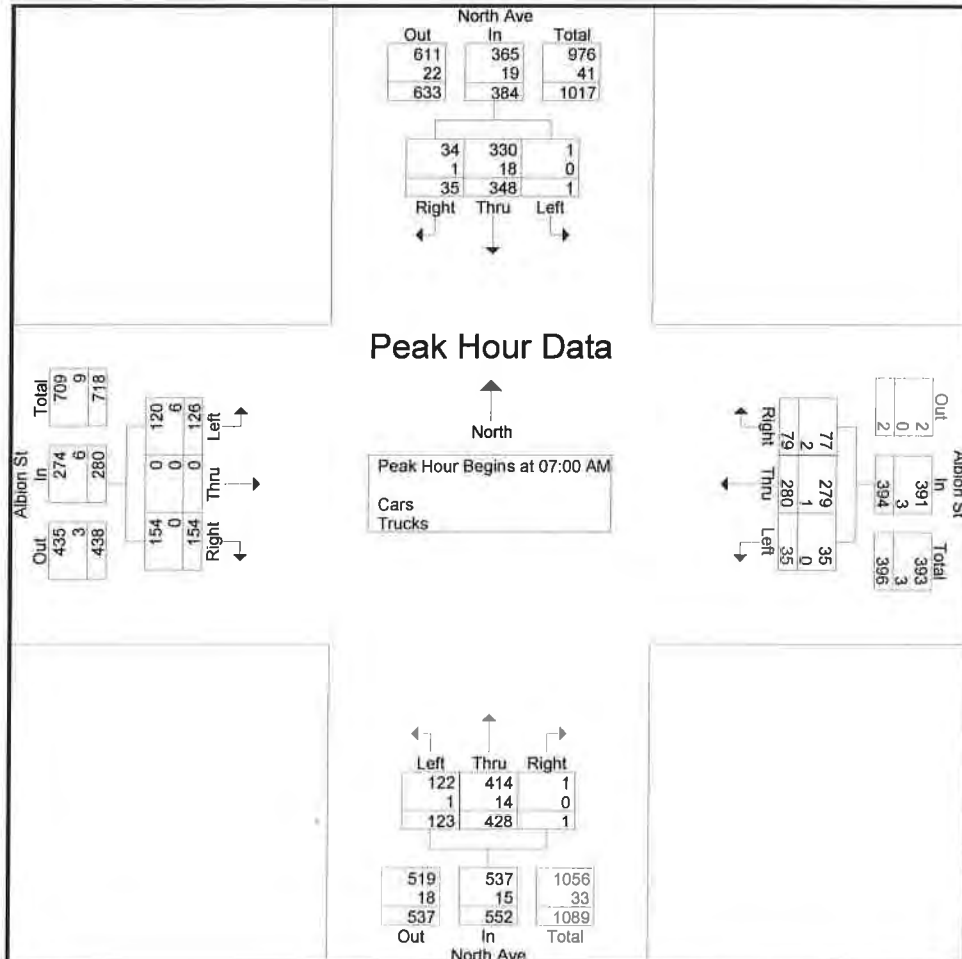
Start Time	North Ave From North			Albion St From East			North Ave From South			Albion St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	0	94	10	8	44	20	33	101	1	28	0	39	378
07:15 AM	0	87	6	13	69	19	18	96	0	35	0	46	389
07:30 AM	0	94	8	8	68	16	25	108	0	31	0	41	399
07:45 AM	1	73	11	6	99	24	47	123	0	32	0	28	444
<b>Total</b>	<b>1</b>	<b>348</b>	<b>35</b>	<b>35</b>	<b>280</b>	<b>79</b>	<b>123</b>	<b>428</b>	<b>1</b>	<b>126</b>	<b>0</b>	<b>154</b>	<b>1610</b>
08:00 AM	0	76	15	3	64	9	16	92	0	31	0	31	337
08:15 AM	0	66	12	4	62	12	26	97	0	37	0	33	349
08:30 AM	0	63	13	5	61	15	29	109	0	25	0	40	360
08:45 AM	0	69	15	10	56	17	34	121	1	35	0	49	407
<b>Total</b>	<b>0</b>	<b>274</b>	<b>55</b>	<b>22</b>	<b>243</b>	<b>53</b>	<b>105</b>	<b>419</b>	<b>1</b>	<b>128</b>	<b>0</b>	<b>153</b>	<b>1453</b>
<b>Grand Total</b>	<b>1</b>	<b>622</b>	<b>90</b>	<b>57</b>	<b>523</b>	<b>132</b>	<b>228</b>	<b>847</b>	<b>2</b>	<b>254</b>	<b>0</b>	<b>307</b>	<b>3063</b>
Apprch %	0.1	87.2	12.6	8	73.5	18.5	21.2	78.6	0.2	45.3	0	54.7	
Total %	0	20.3	2.9	1.9	17.1	4.3	7.4	27.7	0.1	8.3	0	10	
Cars	1	591	86	56	517	127	224	829	2	245	0	303	2981
% Cars	100	95	95.6	98.2	98.9	96.2	98.2	97.9	100	96.5	0	98.7	97.3
Trucks	0	31	4	1	6	5	4	18	0	9	0	4	82
% Trucks	0	5	4.4	1.8	1.1	3.8	1.8	2.1	0	3.5	0	1.3	2.7

**Accurate Counts**  
978-664-2565

N/S Street : North Avenue  
E/W Street : Albion Street  
City/State : Wakefield, MA  
Weather : Clear

File Name : 55640001  
Site Code : 55640001  
Start Date : 5/23/2017  
Page No : 2

Start Time	North Ave From North				Albion St From East				North Ave From South				Albion St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	94	10	104	8	44	20	72	33	101	1	135	28	0	39	67	378
07:15 AM	0	87	6	93	13	69	19	101	18	96	0	114	35	0	46	81	389
07:30 AM	0	94	8	102	8	68	16	92	25	108	0	133	31	0	41	72	399
07:45 AM	1	73	11	85	6	99	24	129	47	123	0	170	32	0	28	60	444
Total Volume	1	348	35	384	35	280	79	394	123	428	1	552	126	0	154	280	1610
% App. Total	0.3	90.6	9.1		8.9	71.1	20.1		22.3	77.5	0.2		45	0	55		
PHF	.250	.926	.795	.923	.673	.707	.823	.764	.654	.870	.250	.812	.900	.000	.837	.864	.907
Cars	1	330	34	365	35	279	77	391	122	414	1	537	120	0	154	274	1567
% Cars	100	94.8	97.1	95.1	100	99.6	97.5	99.2	99.2	96.7	100	97.3	95.2	0	100	97.9	97.3
Trucks	0	18	1	19	0	1	2	3	1	14	0	15	6	0	0	6	43
% Trucks	0	5.2	2.9	4.9	0	0.4	2.5	0.8	0.8	3.3	0	2.7	4.8	0	0	2.1	2.7



**Accurate Counts**  
978-664-2565

N/S Street : North Avenue  
E/W Street : Albion Street  
City/State : Wakefield, MA  
Weather : Clear

File Name : 55640001  
Site Code : 55640001  
Start Date : 5/23/2017  
Page No : 7

Groups Printed- Trucks

Start Time	North Ave From North			Albion St From East			North Ave From South			Albion St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	0	5	1	0	0	0	0	4	0	0	0	0	10
07:15 AM	0	3	0	0	0	1	0	1	0	2	0	0	7
07:30 AM	0	7	0	0	1	0	0	3	0	4	0	0	15
07:45 AM	0	3	0	0	0	1	1	6	0	0	0	0	11
<b>Total</b>	<b>0</b>	<b>18</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>14</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>43</b>
08:00 AM	0	4	0	1	0	1	0	1	0	0	0	1	8
08:15 AM	0	5	2	0	1	0	0	2	0	0	0	1	11
08:30 AM	0	2	0	0	3	0	2	0	0	2	0	1	10
08:45 AM	0	2	1	0	1	2	1	1	0	1	0	1	10
<b>Total</b>	<b>0</b>	<b>13</b>	<b>3</b>	<b>1</b>	<b>5</b>	<b>3</b>	<b>3</b>	<b>4</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>4</b>	<b>39</b>
<b>Grand Total</b>	<b>0</b>	<b>31</b>	<b>4</b>	<b>1</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>18</b>	<b>0</b>	<b>9</b>	<b>0</b>	<b>4</b>	<b>82</b>
<b>Apprch %</b>	<b>0</b>	<b>88.6</b>	<b>11.4</b>	<b>8.3</b>	<b>50</b>	<b>41.7</b>	<b>18.2</b>	<b>81.8</b>	<b>0</b>	<b>69.2</b>	<b>0</b>	<b>30.8</b>	
<b>Total %</b>	<b>0</b>	<b>37.8</b>	<b>4.9</b>	<b>1.2</b>	<b>7.3</b>	<b>6.1</b>	<b>4.9</b>	<b>22</b>	<b>0</b>	<b>11</b>	<b>0</b>	<b>4.9</b>	

**Accurate Counts**  
978-664-2565

N/S Street : North Avenue  
E/W Street : Albion Street  
City/State : Wakefield, MA  
Weather : Clear

File Name : 55640001  
Site Code : 55640001  
Start Date : 5/23/2017  
Page No : 10

Groups Printed- Bikes Peds

Start Time	North Ave From North				Albion St From East				North Ave From South				Albion St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00 AM	0	0	0	2	0	0	0	9	0	0	0	0	0	0	1	0	11	1	12
07:15 AM	0	2	0	14	0	0	0	8	0	0	0	6	0	0	0	9	37	2	39
07:30 AM	0	0	0	6	0	0	0	16	0	0	0	29	0	1	0	7	58	1	59
07:45 AM	0	0	0	8	0	0	0	3	0	0	0	2	0	0	0	2	15	0	15
<b>Total</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>30</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>36</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>37</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>18</b>	<b>121</b>	<b>4</b>	<b>125</b>
08:00 AM	0	1	0	13	0	0	0	3	0	1	0	4	0	0	1	9	29	3	32
08:15 AM	0	0	0	6	0	0	0	5	0	0	0	1	0	0	0	3	15	0	15
08:30 AM	0	1	0	3	0	0	0	3	0	0	0	1	0	0	0	5	12	1	13
08:45 AM	0	0	0	2	0	0	0	3	0	0	0	6	0	0	0	0	11	0	11
<b>Total</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>24</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>14</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>17</b>	<b>67</b>	<b>4</b>	<b>71</b>
<b>Grand Total</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>54</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>50</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>49</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>35</b>	<b>188</b>	<b>8</b>	<b>196</b>
Apprch %	0	100	0		0	0	0		0	100	0		0	33.3	66.7				
Total %	0	50	0		0	0	0		0	12.5	0		0	12.5	25		95.9	4.1	

**Accurate Counts**  
978-664-2565

N/S Street : North Avenue  
E/W Street : Albion Street  
City/State : Wakefield, MA  
Weather : Clear

File Name : 55640001  
Site Code : 55640001  
Start Date : 5/23/2017  
Page No : 1

Groups Printed- Cars - Trucks

Start Time	North Ave From North			Albion St From East			North Ave From South			Albion St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	0	96	6	14	35	31	22	92	0	44	0	60	400
04:15 PM	0	104	9	9	23	25	27	85	0	50	0	64	396
04:30 PM	0	90	13	10	21	31	17	97	0	69	0	50	398
04:45 PM	0	103	8	13	33	23	28	92	0	55	0	47	402
<b>Total</b>	<b>0</b>	<b>393</b>	<b>36</b>	<b>46</b>	<b>112</b>	<b>110</b>	<b>94</b>	<b>366</b>	<b>0</b>	<b>218</b>	<b>0</b>	<b>221</b>	<b>1596</b>
05:00 PM	0	105	3	20	37	30	30	93	0	70	0	57	445
05:15 PM	0	124	10	14	38	23	34	103	0	84	0	62	492
05:30 PM	0	104	8	10	36	19	23	102	0	55	0	55	412
05:45 PM	0	108	8	11	34	21	15	78	0	73	0	76	424
<b>Total</b>	<b>0</b>	<b>441</b>	<b>29</b>	<b>55</b>	<b>145</b>	<b>93</b>	<b>102</b>	<b>376</b>	<b>0</b>	<b>282</b>	<b>0</b>	<b>250</b>	<b>1773</b>
<b>Grand Total</b>	<b>0</b>	<b>834</b>	<b>65</b>	<b>101</b>	<b>257</b>	<b>203</b>	<b>196</b>	<b>742</b>	<b>0</b>	<b>500</b>	<b>0</b>	<b>471</b>	<b>3369</b>
Apprch %	0	92.8	7.2	18	45.8	36.2	20.9	79.1	0	51.5	0	48.5	
Total %	0	24.8	1.9	3	7.6	6	5.8	22	0	14.8	0	14	
Cars	0	823	63	101	255	201	196	735	0	496	0	468	3338
% Cars	0	98.7	96.9	100	99.2	99	100	99.1	0	99.2	0	99.4	99.1
Trucks	0	11	2	0	2	2	0	7	0	4	0	3	31
% Trucks	0	1.3	3.1	0	0.8	1	0	0.9	0	0.8	0	0.6	0.9

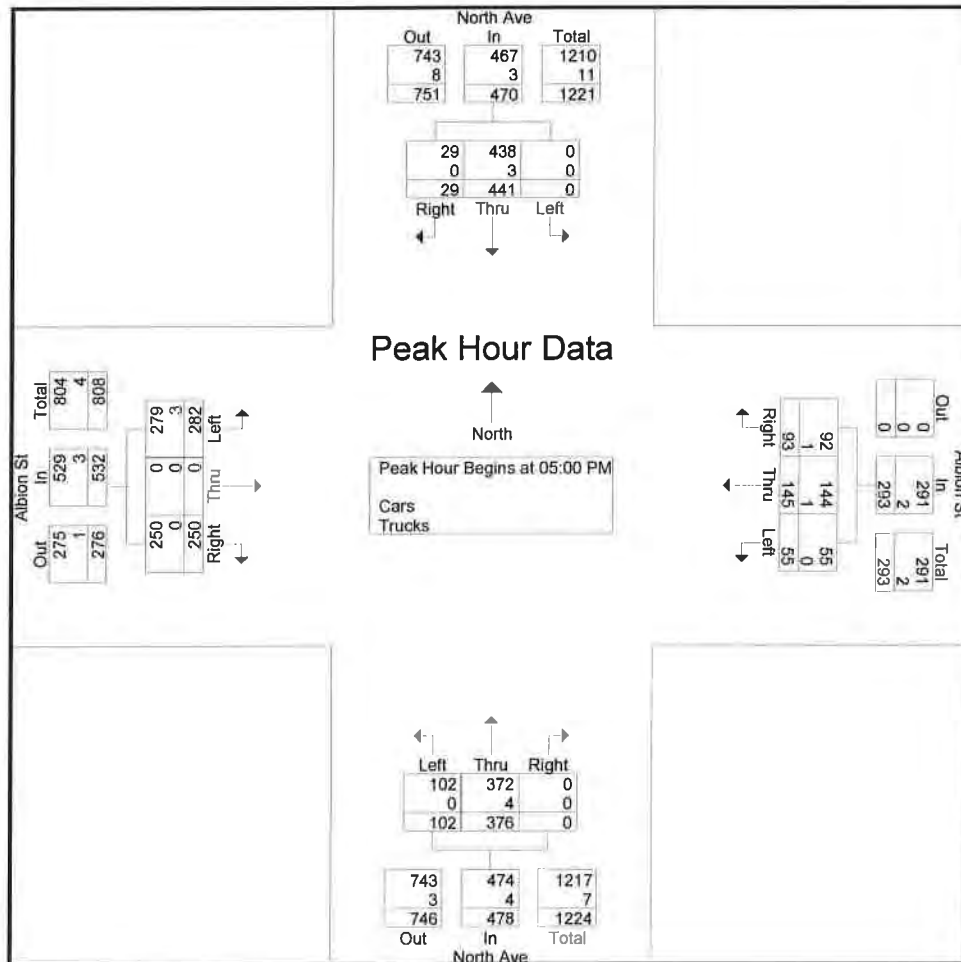
# Accurate Counts

978-664-2565

N/S Street : North Avenue  
 E/W Street : Albion Street  
 City/State : Wakefield, MA  
 Weather : Clear

File Name : 55640001  
 Site Code : 55640001  
 Start Date : 5/23/2017  
 Page No : 2

Start Time	North Ave From North				Albion St From East				North Ave From South				Albion St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	105	3	108	20	37	30	87	30	93	0	123	70	0	57	127	445
05:15 PM	0	124	10	134	14	38	23	75	34	103	0	137	84	0	62	146	492
05:30 PM	0	104	8	112	10	36	19	65	23	102	0	125	55	0	55	110	412
05:45 PM	0	108	8	116	11	34	21	66	15	78	0	93	73	0	76	149	424
Total Volume	0	441	29	470	55	145	93	293	102	376	0	478	282	0	250	532	1773
% App. Total	0	93.8	6.2		18.8	49.5	31.7		21.3	78.7	0		53	0	47		
PHF	.000	.889	.725	.877	.688	.954	.775	.842	.750	.913	.000	.872	.839	.000	.822	.893	.901
Cars	0	438	29	467	55	144	92	291	102	372	0	474	279	0	250	529	1761
% Cars	0	99.3	100	99.4	100	99.3	98.9	99.3	100	98.9	0	99.2	98.9	0	100	99.4	99.3
Trucks	0	3	0	3	0	1	1	2	0	4	0	4	3	0	0	3	12
% Trucks	0	0.7	0	0.6	0	0.7	1.1	0.7	0	1.1	0	0.8	1.1	0	0	0.6	0.7



**Accurate Counts**  
978-664-2565

N/S Street : North Avenue  
E/W Street : Albion Street  
City/State : Wakefield, MA  
Weather : Clear

File Name : 55640001  
Site Code : 55640001  
Start Date : 5/23/2017  
Page No : 7

Groups Printed- Trucks

Start Time	North Ave From North			Albion St From East			North Ave From South			Albion St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	0	4	0	0	0	0	0	0	0	0	0	0	4
04:15 PM	0	2	1	0	0	0	0	1	0	1	0	1	6
04:30 PM	0	2	0	0	0	1	0	0	0	0	0	1	4
04:45 PM	0	0	1	0	1	0	0	2	0	0	0	1	5
<b>Total</b>	<b>0</b>	<b>8</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>19</b>
05:00 PM	0	0	0	0	0	0	0	2	0	0	0	0	2
05:15 PM	0	0	0	0	0	0	0	0	0	2	0	0	2
05:30 PM	0	2	0	0	1	1	0	0	0	0	0	0	4
05:45 PM	0	1	0	0	0	0	0	2	0	1	0	0	4
<b>Total</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>12</b>
<b>Grand Total</b>	<b>0</b>	<b>11</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>3</b>	<b>31</b>
<b>Apprch %</b>	<b>0</b>	<b>84.6</b>	<b>15.4</b>	<b>0</b>	<b>50</b>	<b>50</b>	<b>0</b>	<b>100</b>	<b>0</b>	<b>57.1</b>	<b>0</b>	<b>42.9</b>	
<b>Total %</b>	<b>0</b>	<b>35.5</b>	<b>6.5</b>	<b>0</b>	<b>6.5</b>	<b>6.5</b>	<b>0</b>	<b>22.6</b>	<b>0</b>	<b>12.9</b>	<b>0</b>	<b>9.7</b>	

**Accurate Counts**  
978-664-2565

N/S Street : North Avenue  
E/W Street : Albion Street  
City/State : Wakefield, MA  
Weather : Clear

File Name : 55640001  
Site Code : 55640001  
Start Date : 5/23/2017  
Page No : 10

Groups Printed- Bikes Peds

Start Time	North Ave From North				Albion St From East				North Ave From South				Albion St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
04:00 PM	0	0	0	2	0	1	0	3	0	0	0	1	0	0	0	0	6	1	7
04:15 PM	0	0	0	1	0	0	0	9	0	0	0	1	0	0	0	3	14	0	14
04:30 PM	0	0	0	2	0	0	0	4	3	0	0	1	0	0	0	2	9	3	12
04:45 PM	0	0	0	7	0	0	0	1	1	3	0	1	0	0	0	0	9	4	13
<b>Total</b>	0	0	0	12	0	1	0	17	4	3	0	4	0	0	0	5	38	8	46
05:00 PM	0	0	0	2	0	0	0	2	0	0	0	1	0	0	0	9	14	0	14
05:15 PM	0	0	0	2	0	0	0	1	0	0	0	1	0	0	4	4	8	4	12
05:30 PM	0	0	0	2	0	0	0	2	0	0	0	3	0	0	0	13	20	0	20
05:45 PM	0	0	0	0	0	0	0	1	0	0	0	3	0	0	2	0	4	2	6
<b>Total</b>	0	0	0	6	0	0	0	6	0	0	0	8	0	0	6	26	46	6	52
<b>Grand Total</b>	0	0	0	18	0	1	0	23	4	3	0	12	0	0	6	31	84	14	98
Apprch %	0	0	0		0	100	0		57.1	42.9	0		0	0	100				
Total %	0	0	0		0	7.1	0		28.6	21.4	0		0	0	42.9		85.7	14.3	

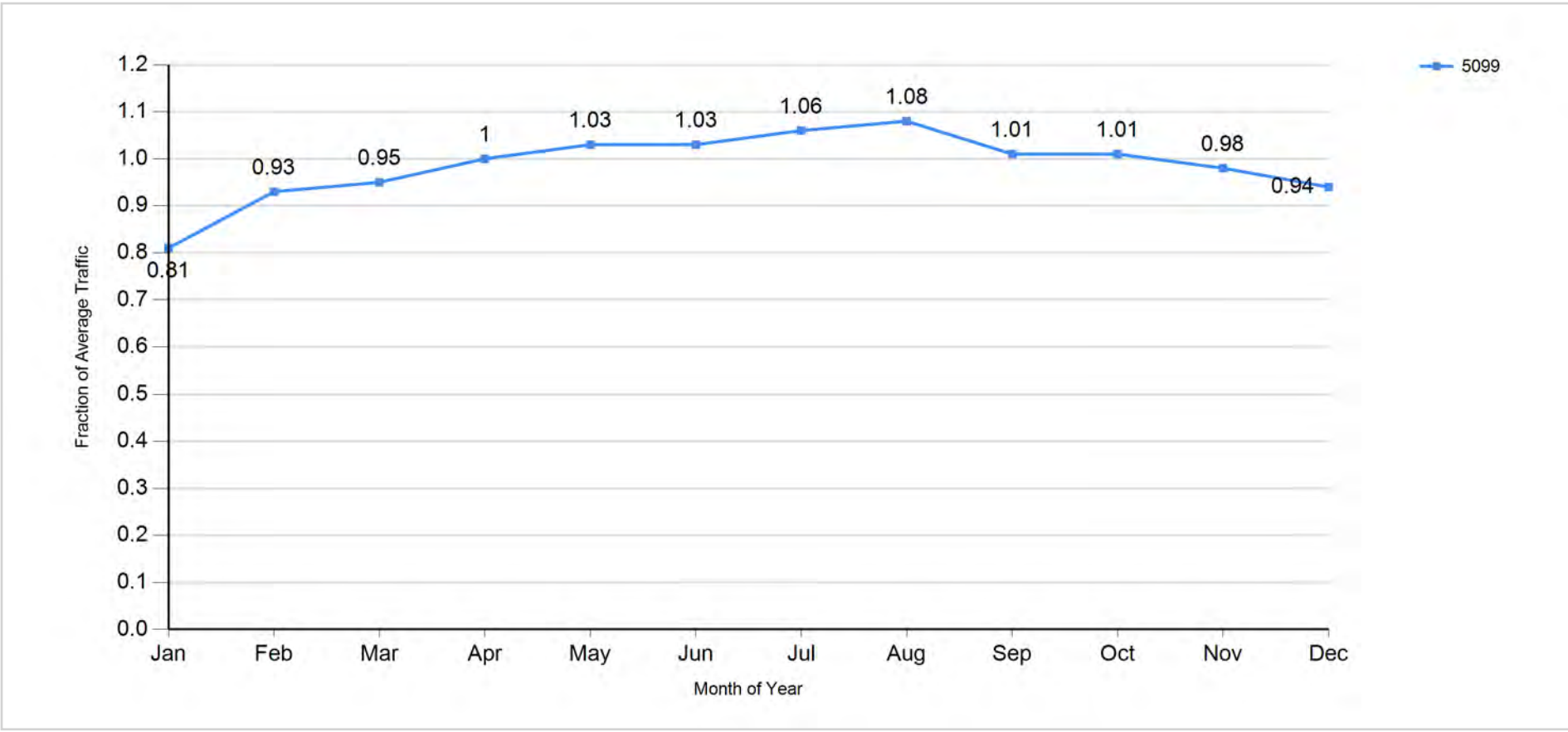


TRAFFIC ADJUSTMENTS

---



Traffic Pattern by Month for 1/1/2019 - 12/31/2019  
Criteria: Location ID = 5099, From 1/1/1900 To 12/31/2049 12:00:00 AM



**Main Street (Route 129) at Chestnut Stree/Centre Street**

**Thursday, November 29, 2018**

Start Time	Main St			Centre St			Main St			Chestnut St			Total	Peak
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
7:00:00 AM	4	208	7	18	28	6	31	50	0	2	3	9	366	
7:15:00 AM	4	207	17	22	20	10	15	80	1	2	1	4	383	
7:30:00 AM	3	167	10	20	35	13	21	87	1	4	5	9	375	
7:45:00 AM	2	143	14	11	26	10	7	97	0	9	3	8	330	1454
8:00:00 AM	1	146	5	0	0	0	29	93	2	7	0	12	295	1383
8:15:00 AM	0	148	20	1	0	0	23	86	0	6	0	11	295	1295
8:30:00 AM	1	173	20	0	0	1	18	96	0	5	0	14	328	1248
8:45:00 AM	0	143	17	0	0	1	17	99	0	7	0	10	294	1212
												2666	1454	
<b>November Seasonal Adjustment ( 2%)</b>												2719	1483	
<b>2022 Adjusted 1% per year</b>												2829	1543	
4:00:00 PM	7	109	7	5	1	8	1	89	6	10	7	13	263	
4:15:00 PM	17	129	8	5	3	11	1	103	9	10	13	12	321	
4:30:00 PM	5	128	8	5	2	10	2	95	4	9	13	16	297	
4:45:00 PM	4	130	13	12	7	7	6	104	13	7	6	17	326	1207
5:00:00 PM	12	149	14	4	3	9	8	90	11	9	8	20	337	1281
5:15:00 PM	12	149	10	4	7	7	5	99	10	14	21	14	352	1312
5:30:00 PM	16	139	15	5	3	12	5	75	10	10	10	36	336	1351
5:45:00 PM	16	144	9	10	7	7	5	95	13	9	8	23	346	1371
												2578	1371	
<b>November Seasonal Adjustment ( 2%)</b>												2630	1398	
<b>2022 Adjusted 1% per year</b>												2737	1455	

**Tuesday, June 14, 2022**

Start Time	Main St			Centre St			Main St			Chestnut St			Total	Peak
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
7:00:00 AM	1	99	2	9	6	0	11	56	0	1	3	3	191	
7:15:00 AM	4	166	3	9	18	3	12	52	4	0	1	8	280	
7:30:00 AM	3	142	5	16	38	5	12	74	2	2	10	8	317	
7:45:00 AM	2	119	3	15	45	7	13	94	3	5	3	11	320	1108
8:00:00 AM	3	99	7	15	34	7	13	74	3	4	4	6	269	1186
8:15:00 AM	3	101	3	9	27	10	21	71	1	6	7	10	269	1175
8:30:00 AM	6	136	7	5	13	3	15	84	4	4	9	4	290	1148
8:45:00 AM	5	131	4	8	14	4	15	84	1	6	2	11	285	1113
												2221	1186	
<b>June Seasonal Adjustment (above no adjut 1.03)</b>												2221	1186	
<b>Comparison</b>												1.27	1.30	
<b>Say COVID Adj</b>												30 percent		
4:00:00 PM	12	107	13	5	5	9	6	94	4	8	10	12	285	
4:15:00 PM	10	103	9	8	4	8	5	95	5	13	7	10	277	
4:30:00 PM	8	102	7	10	4	5	8	69	5	9	12	13	252	
4:45:00 PM	8	127	9	6	5	7	6	97	3	7	11	8	294	1108
5:00:00 PM	3	129	5	5	7	6	5	72	4	6	11	16	269	1092
5:15:00 PM	10	150	6	6	11	8	6	66	5	5	3	15	291	1106
5:30:00 PM	10	131	2	5	5	4	6	80	7	3	7	13	273	1127
5:45:00 PM	9	111	4	5	9	10	5	83	5	6	5	17	269	1102
												2210	1127	
<b>June Seasonal Adjustment (above no adjut 1.03)</b>												2210	1127	
<b>Comparison</b>												1.24	1.29	
<b>Say COVID Adj</b>												30 percent		

**Main Street (Route 129) at Albion Street**

Thursday, November 29, 2018

Tuesday, June 14, 2022

Start Time	Main St From North		Main St From South		Total	Peak
	Thru	Right	Left	Thru		
7:00:00 AM	162	75	26	76	339	
7:15:00 AM	160	77	28	88	353	
7:30:00 AM	138	58	27	96	319	
7:45:00 AM	86	73	31	95	285	1296
8:00:00 AM	115	45	16	104	280	1237
8:15:00 AM	100	55	40	97	292	1176
8:30:00 AM	118	64	24	109	315	1172
8:45:00 AM	104	48	29	99	280	1167
					2463	1296
<b>November Seasonal Adjustment ( 2%)</b>					2512	1322
<b>2022 Adjusted 1% per year</b>					2614	1376
					235	
4:00:00 PM	103	19	20	93	279	
4:15:00 PM	118	28	25	108	279	
4:30:00 PM	121	32	23	99	275	
4:45:00 PM	123	29	19	119	290	1079
5:00:00 PM	134	30	17	102	283	1127
5:15:00 PM	135	32	15	108	290	1138
5:30:00 PM	140	38	13	89	280	1143
5:45:00 PM	145	31	22	95	293	1146
					2225	1146
<b>November Seasonal Adjustment ( 2%)</b>					2270	1169
<b>2022 Adjusted 1% per year</b>					2362	1216

Start Time	Main St From North		Main St From South		Total	Peak
	Thru	Right	Left	Thru		
7:00:00 AM	88	22	21	66	197	
7:15:00 AM	148	32	28	70	278	
7:30:00 AM	135	28	15	87	265	
7:45:00 AM	111	38	19	112	280	1020
8:00:00 AM	86	31	20	85	222	1045
8:15:00 AM	87	30	11	93	221	988
8:30:00 AM	106	46	33	101	286	1009
8:45:00 AM	121	31	17	99	268	997
					2017	1045
<b>June Seasonal Adjustment (above no adjut 1.03)</b>					1.30	1.32
					30 percent	
					254	
4:00:00 PM	112	21	15	106	233	
4:15:00 PM	102	22	13	96	229	
4:30:00 PM	101	27	15	86	258	974
4:45:00 PM	121	16	19	102	248	968
5:00:00 PM	122	26	23	77	266	1001
5:15:00 PM	146	23	21	76	245	1017
5:30:00 PM	127	14	17	87	250	1009
5:45:00 PM	129	10	20	91	1983	1017
					1.19	1.20
<b>June Seasonal Adjustment (above no adjut 1.03)</b>					20 Percent	

**Main Street (Route 129) at North Avenue/Nahant Street**

Tuesday, January 8, 2019														
Start Time	Main St			Nahant St			Main St			North St			Total	Peak
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
07:00 AM	10	113	25	6	59	10	42	53	8	15	80	70	491	
07:15 AM	13	136	26	10	101	12	57	90	4	25	57	63	594	
07:30 AM	5	91	41	8	99	6	93	94	5	34	50	81	607	
07:45 AM	9	97	45	8	106	13	64	77	5	19	47	68	558	2250
08:00 AM	8	96	18	7	83	13	80	86	7	22	52	67	539	2298
08:15 AM	12	91	38	5	96	9	90	109	6	14	42	41	553	2257
08:30 AM	9	77	28	6	99	12	74	84	7	20	47	76	539	2189
08:45 AM	8	86	28	9	73	7	100	105	9	29	30	62	546	2177
													4427	2298
<b>January Seasonal Adjustment ( 19%)</b>													5268	2735
<b>2022 Adjusted 1% per year</b>													5428	2818
04:00 PM	14	82	33	3	58	8	72	149	13	29	83	76	620	
04:15 PM	8	96	25	1	65	14	63	152	8	32	76	81	621	
04:30 PM	19	93	23	8	61	11	63	128	7	55	84	68	620	
04:45 PM	22	86	23	9	52	7	70	138	5	43	91	63	609	2470
05:00 PM	9	83	36	8	64	7	67	126	13	44	89	69	615	2465
05:15 PM	16	61	22	7	59	10	54	132	22	57	97	63	600	2444
05:30 PM	18	63	24	4	83	22	61	126	11	32	109	68	621	2445
05:45 PM	12	73	13	9	50	8	65	145	10	54	93	55	587	2423
													4893	2470
<b>January Seasonal Adjustment ( 19%)</b>													5823	2939
<b>2022 Adjusted 1% per year</b>													5999	3028

Thursday, February 17, 2022														
Start Time	Main St			Nahant St			Main St			North Ave			Total	Peak
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
7:00:00 AM	2	57	25	11	62	12	52	53	10	23	69	50	426	
7:15:00 AM	9	102	16	3	64	15	53	85	11	22	60	57	497	
7:30:00 AM	18	89	35	10	76	18	89	111	13	22	45	85	611	
7:45:00 AM	6	84	21	6	63	11	59	101	8	23	37	75	494	2028
8:00:00 AM	6	83	18	7	74	11	63	81	8	14	36	58	459	2061
8:15:00 AM	5	81	30	6	65	12	75	88	5	27	56	52	502	2066
8:30:00 AM	6	90	13	7	80	21	62	108	4	18	33	62	504	1959
8:45:00 AM	10	95	20	14	54	12	72	91	4	37	30	71	510	1975
													4003	2066
<b>February Seasonal Adjustment ( 7%)</b>													4283	2211
Comparisson													1.27	1.27
Say COVID Adj													1.30	
4:00:00 PM	11	89	26	8	62	11	60	113	6	28	52	77	543	
4:15:00 PM	14	96	26	5	40	16	54	102	10	38	47	49	497	
4:30:00 PM	14	94	32	8	58	12	67	102	7	38	41	70	543	
4:45:00 PM	13	118	19	9	50	9	60	127	7	35	55	74	576	2159
5:00:00 PM	13	101	29	5	40	13	62	101	5	34	64	79	546	2162
5:15:00 PM	13	124	28	3	43	13	63	117	12	28	62	66	572	2237
5:30:00 PM	13	96	23	10	54	12	60	108	10	21	41	77	525	2219
5:45:00 PM	20	108	19	5	49	12	61	99	8	31	63	58	533	2176
													4335	2237
<b>February Seasonal Adjustment ( 7%)</b>													4638	2394
Comparisson													1.29	1.26
Say COVID Adj													1.30	

**Say 30% adjustment for AM and PM Traffic Volumes**

PUBLIC TRANSPORTATION SCHEDULES

---



# HAVERHILL LINE

## 2021 Fall/Winter Schedule Effective October 11, 2021

Monday to Friday (except when Storm Service is operating)

### Inbound to Boston

ZONE	STATION	TRAIN #	AM											PM											
			280	200	202	282	204	284	206	286	208	288	210	290	212	292	214	294	216	218	296	298	220	222	224
	Bikes Allowed																								
7	Haverhill	Ⓜ	-	5:27	6:12	-	7:25	-	8:27	-	9:57	-	11:27	-	12:57	-	2:27	-	3:57	5:20	-	-	6:57	8:12	9:27
7	Bradford	Ⓜ	-	5:29	6:14	-	7:27	-	8:29	-	<b>f 9:59</b>	-	<b>f 11:29</b>	-	<b>f 12:59</b>	-	<b>f 2:29</b>	-	<b>f 3:59</b>	<b>f 5:22</b>	-	-	<b>f 6:59</b>	<b>f 8:14</b>	<b>f 9:29</b>
6	Lawrence	Ⓜ	-	5:36	6:21	-	7:34	-	8:36	-	10:06	-	11:36	-	1:06	-	2:36	-	4:06	5:29	-	-	7:06	8:21	9:36
5	Andover	Ⓜ	-	5:43	6:28	-	7:41	-	8:43	-	<b>f 10:13</b>	-	<b>f 11:43</b>	-	<b>f 1:13</b>	-	<b>f 2:43</b>	-	<b>f 4:13</b>	<b>f 5:36</b>	-	-	<b>f 7:13</b>	<b>f 8:28</b>	<b>f 9:43</b>
4	Ballardvale	Ⓜ	-	5:48	6:33	-	7:46	-	8:48	-	<b>f 10:18</b>	-	<b>f 11:48</b>	-	<b>f 1:18</b>	-	<b>f 2:48</b>	-	<b>f 4:18</b>	<b>f 5:41</b>	-	-	<b>f 7:18</b>	<b>f 8:33</b>	<b>f 9:48</b>
3	North Wilmington		-	5:56	6:41	-	-	-	8:56	-	<b>f 10:26</b>	-	<b>f 11:56</b>	-	<b>f 1:26</b>	-	<b>f 2:56</b>	-	<b>f 4:26</b>	-	-	-	<b>f 7:26</b>	<b>f 8:41</b>	<b>f 9:55</b>
2	Reading	Ⓜ	5:18	6:03	6:48	7:33	-	8:18	9:03	9:48	10:33	11:18	12:03	12:48	1:33	2:18	3:03	3:48	4:33	-	6:03	6:48	7:33	8:48	10:02
2	Wakefield		5:24	6:09	6:54	7:39	-	8:24	9:09	9:54	10:39	11:24	12:09	12:54	1:39	2:24	3:09	3:54	4:39	-	<b>f 6:09</b>	<b>f 6:54</b>	<b>f 7:39</b>	<b>f 8:54</b>	<b>f 10:08</b>
2	Greenwood		5:27	6:12	6:57	7:42	-	8:27	9:12	<b>f 9:57</b>	<b>f 10:42</b>	<b>f 11:27</b>	<b>f 12:12</b>	<b>f 12:57</b>	<b>f 1:42</b>	<b>f 2:27</b>	<b>f 3:12</b>	<b>f 3:57</b>	<b>f 4:42</b>	-	<b>f 6:12</b>	<b>f 6:57</b>	<b>f 7:42</b>	<b>f 8:57</b>	<b>f 10:11</b>
1	Melrose Highlands	Ⓜ	5:29	6:14	6:59	7:44	-	8:29	9:14	9:59	10:44	11:29	12:14	12:59	1:44	2:29	3:14	3:59	4:44	-	<b>f 6:14</b>	<b>f 6:59</b>	<b>f 7:44</b>	<b>f 8:59</b>	<b>f 10:13</b>
1	Melrose/Cedar Park		5:31	6:16	7:01	7:46	-	8:31	9:16	<b>f 10:01</b>	<b>f 10:46</b>	<b>f 11:31</b>	<b>f 12:16</b>	<b>f 1:01</b>	<b>f 1:46</b>	<b>f 2:31</b>	<b>f 3:16</b>	<b>f 4:01</b>	<b>f 4:46</b>	-	<b>f 6:16</b>	<b>f 7:01</b>	<b>f 7:46</b>	<b>f 9:01</b>	<b>f 10:15</b>
1	Wyoming Hill		5:33	6:18	7:03	7:48	-	8:33	9:18	<b>f 10:03</b>	<b>f 10:48</b>	<b>f 11:33</b>	<b>f 12:18</b>	<b>f 1:03</b>	<b>f 1:48</b>	<b>f 2:33</b>	<b>f 3:18</b>	<b>f 4:03</b>	<b>f 4:48</b>	-	<b>f 6:18</b>	<b>f 7:03</b>	<b>f 7:48</b>	<b>f 9:03</b>	<b>f 10:17</b>
1A	Malden Center	Ⓜ	<b>L 5:37</b>	<b>L 6:22</b>	<b>L 7:07</b>	<b>L 7:52</b>	-	<b>L 8:37</b>	<b>L 9:22</b>	<b>L 10:07</b>	<b>L 10:52</b>	<b>L 11:37</b>	<b>L 12:22</b>	<b>L 1:07</b>	<b>L 1:52</b>	<b>L 2:37</b>	<b>L 3:22</b>	<b>L 4:07</b>	<b>L 4:52</b>	-	<b>L 6:22</b>	<b>L 7:07</b>	<b>L 7:52</b>	<b>L 9:07</b>	<b>L 10:21</b>
1A	North Station	Ⓜ	5:51	6:38	7:23	8:07	8:24	8:52	9:37	10:21	11:06	11:51	12:36	1:21	2:06	2:51	3:36	4:21	5:06	6:18	6:36	7:21	8:06	9:21	10:35

Monday to Friday (except when Storm Service is operating)

### Outbound from Boston

ZONE	STATION	TRAIN #	AM											PM										
			201	281	283	203	285	205	287	207	289	209	291	211	293	213	215	295	217	297	219	221	223	225
	Bikes Allowed																							
1A	North Station	Ⓜ	5:55	6:40	7:25	8:10	8:55	9:40	10:25	11:10	11:55	12:40	1:25	2:10	2:55	3:40	4:25	5:10	5:40	5:55	6:40	7:55	9:35	10:55
1A	Malden Center	Ⓜ	<b>f 6:06</b>	<b>f 6:51</b>	<b>f 7:36</b>	<b>f 8:21</b>	<b>f 9:06</b>	<b>f 9:51</b>	<b>f 10:36</b>	<b>f 11:21</b>	<b>f 12:06</b>	<b>f 12:51</b>	<b>f 1:36</b>	<b>f 2:21</b>	<b>f 3:06</b>	3:51	4:36	5:21	-	6:06	6:51	<b>f 8:06</b>	<b>f 9:46</b>	<b>f 11:06</b>
1	Wyoming Hill		<b>f 6:09</b>	<b>f 6:54</b>	<b>f 7:39</b>	<b>f 8:24</b>	<b>f 9:09</b>	<b>f 9:54</b>	<b>f 10:39</b>	<b>f 11:24</b>	<b>f 12:09</b>	<b>f 12:54</b>	<b>f 1:39</b>	<b>f 2:24</b>	<b>f 3:09</b>	3:54	4:39	5:24	-	6:09	6:54	<b>f 8:09</b>	<b>f 9:49</b>	<b>f 11:09</b>
1	Melrose/Cedar Park		<b>f 6:11</b>	<b>f 6:56</b>	<b>f 7:41</b>	<b>f 8:26</b>	<b>f 9:11</b>	<b>f 9:56</b>	<b>f 10:41</b>	<b>f 11:26</b>	<b>f 12:11</b>	<b>f 12:56</b>	<b>f 1:41</b>	<b>f 2:26</b>	<b>f 3:11</b>	3:56	4:41	5:26	-	6:11	6:56	<b>f 8:11</b>	<b>f 9:51</b>	<b>f 11:11</b>
1	Melrose Highlands	Ⓜ	<b>f 6:14</b>	<b>f 6:59</b>	<b>f 7:44</b>	<b>f 8:29</b>	<b>f 9:14</b>	9:59	10:44	11:29	12:14	12:59	1:44	2:29	3:14	3:59	4:44	5:29	-	6:14	6:59	8:14	<b>f 9:54</b>	<b>f 11:14</b>
2	Greenwood		<b>f 6:17</b>	<b>f 7:02</b>	<b>f 7:47</b>	<b>f 8:32</b>	<b>f 9:17</b>	<b>f 10:02</b>	<b>f 10:47</b>	<b>f 11:32</b>	<b>f 12:17</b>	<b>f 1:02</b>	<b>f 1:47</b>	<b>f 2:32</b>	<b>f 3:17</b>	4:02	4:47	5:32	-	6:17	7:02	<b>f 8:17</b>	<b>f 9:57</b>	<b>f 11:17</b>
2	Wakefield		<b>f 6:21</b>	<b>f 7:06</b>	<b>f 7:51</b>	<b>f 8:36</b>	<b>f 9:21</b>	10:06	10:51	11:36	12:21	1:06	1:51	2:36	3:21	4:06	4:51	5:36	-	6:21	7:06	8:21	<b>f 10:01</b>	<b>f 11:21</b>
2	Reading	Ⓜ	6:27	7:12	7:57	8:42	9:27	10:12	10:57	11:42	12:27	1:12	1:57	2:42	3:27	4:12	4:58	5:43	-	6:28	7:12	8:27	10:07	11:27
3	North Wilmington		<b>f 6:33</b>	-	-	<b>f 8:48</b>	-	<b>f 10:18</b>	-	<b>f 11:48</b>	-	<b>f 1:18</b>	-	<b>f 2:48</b>	-	4:18	5:04	-	-	-	7:18	<b>f 8:33</b>	<b>f 10:13</b>	<b>f 11:33</b>
4	Ballardvale	Ⓜ	<b>f 6:41</b>	-	-	<b>f 8:56</b>	-	<b>f 10:26</b>	-	<b>f 11:56</b>	-	<b>f 1:26</b>	-	<b>f 2:56</b>	-	4:26	5:12	-	6:12	-	7:26	8:41	<b>f 10:20</b>	<b>f 11:40</b>
5	Andover	Ⓜ	<b>f 6:46</b>	-	-	<b>f 9:01</b>	-	<b>f 10:31</b>	-	<b>f 12:01</b>	-	<b>f 1:31</b>	-	<b>f 3:01</b>	-	4:31	5:17	-	6:17	-	7:31	8:46	<b>f 10:25</b>	<b>f 11:45</b>
6	Lawrence	Ⓜ	6:53	-	-	9:08	-	10:38	-	12:08	-	1:38	-	3:08	-	4:38	5:24	-	6:24	-	7:38	8:53	10:32	11:52
7	Bradford	Ⓜ	<b>f 7:01</b>	-	-	<b>f 9:16</b>	-	<b>f 10:46</b>	-	<b>f 12:16</b>	-	<b>L 1:48</b>	-	<b>L 3:18</b>	-	<b>L 4:49</b>	<b>L 5:36</b>	-	<b>L 6:36</b>	-	<b>L 7:49</b>	<b>L 9:03</b>	<b>f 10:40</b>	<b>f 12:00</b>
7	Haverhill	Ⓜ	7:05	-	-	9:20	-	10:50	-	12:20	-	1:50	-	3:20	-	4:52	5:39	-	6:39	-	7:52	9:05	10:44	12:04

### Weekend & Storm Service

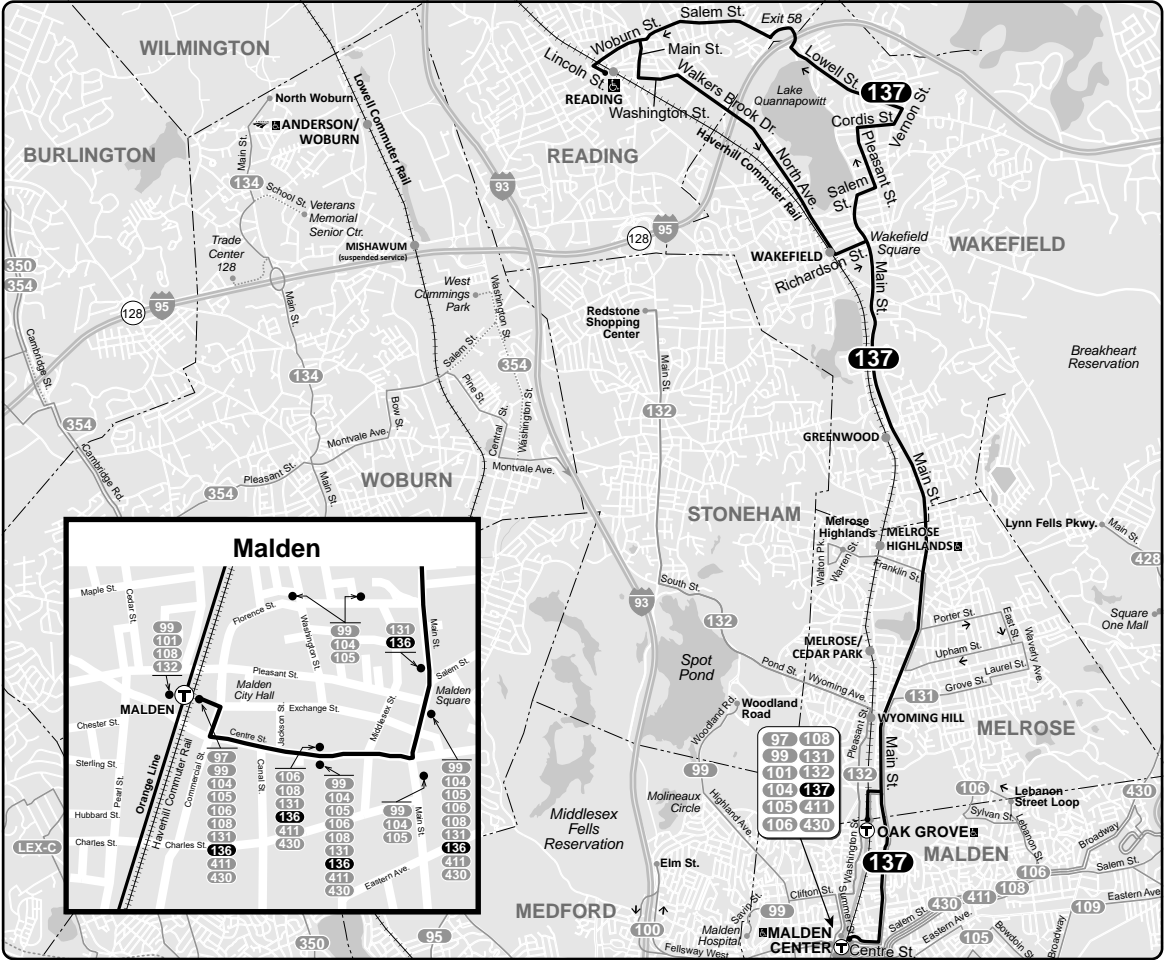
ZONE	STATION	SATURDAY TRAIN #	SUNDAY TRAIN #	AM				PM				
				1200	1202	1204	1206	1208	1210	1212	1214	
	Bikes Allowed											
7	Haverhill	Ⓜ	5:35	8:35	10:35	12:35	2:35	4:35	6:35	8:35	9:35	
7	Bradford	Ⓜ	5:37	8:37	10:37	12:37	2:37	4:37	6:37	8:37	9:37	
6	Lawrence	Ⓜ	5:44	8:44	10:44	12:44	2:44	4:44	6:44	8:44	9:44	
5	Andover	Ⓜ	<b>f 5:51</b>	<b>f 8:51</b>	<b>f 10:51</b>	<b>f 12:51</b>	<b>f 2:51</b>	<b>f 4:51</b>	<b>f 6:51</b>	<b>f 8:51</b>	<b>f 9:51</b>	
4	Ballardvale	Ⓜ	<b>f 5:56</b>	<b>f 8:56</b>	<b>f 10:56</b>	<b>f 12:56</b>	<b>f 2:56</b>	<b>f 4:56</b>	<b>f 6:56</b>	<b>f 8:56</b>	<b>f 9:56</b>	
3	North Wilmington		<b>f 6:03</b>	<b>f 9:03</b>	<b>f 11:03</b>	<b>f 1:03</b>	<b>f 3:03</b>	<b>f 5:03</b>	<b>f 7:03</b>	<b>f 9:03</b>	<b>f 10:03</b>	
2	Reading	Ⓜ	6:10	9:10	11:10	1:10	3:10	5:10	7:10	9:10	10:10	
2	Wakefield		6:16	9:16	11:16	1:16	3:16	5:16	7:16	9:16	10:16	
2	Greenwood		<b>f 6:19</b>	<b>f 9:19</b>	<b>f 11:19</b>	<b>f 1:19</b>	<b>f 3:19</b>	<b>f 5:19</b>	<b>f 7:19</b>	<b>f 9:19</b>	<b>f 10:19</b>	
1	Melrose Highlands	Ⓜ	6:21	9:21	11:21	1:21	3:21	5:21	7:21	9:21	10:21	
1	Melrose/Cedar Park		<b>f 6:23</b>	<b>f 9:23</b>	<b>f 11:23</b>	<b>f 1:23</b>	<b>f 3:23</b>	<b>f 5:23</b>	<b>f 7:23</b>	<b>f 9:23</b>	<b>f 10:23</b>	
1	Wyoming Hill		<b>f 6:25</b>	<b>f 9:25</b>	<b>f 11:25</b>	<b>f 1:25</b>	<b>f 3:25</b>	<b>f 5:25</b>	<b>f 7:25</b>	<b>f 9:25</b>	<b>f 10:25</b>	
1A	Malden Center	Ⓜ	<b>L 6:29</b>	<b>L 9:29</b>	<b>L 11:29</b>	<b>L 1:29</b>	<b>L 3:29</b>	<b>L 5:29</b>	<b>L 7:29</b>	<b>L 9:29</b>	<b>L 10:29</b>	
1A	North Station	Ⓜ	6:43	9:43	11:43	1:43	3:43	5:43	7:43	9:43	10:43	

### Weekend & Storm Service

ZONE	STATION	SATURDAY TRAIN #	SUNDAY TRAIN #	AM				PM				
				1201	1203	1205	1207	1209	1211	1213	1215	
	Bikes Allowed											
1A	North Station	Ⓜ	7:00	9:00	11:00	1:00	3:00	5:00	8:00	10:55		
1A	Malden Center	Ⓜ	<b>f 7:11</b>	<b>f 9:11</b>	<b>f 11:11</b>	<b>f 1:11</b>	<b>f 3:11</b>	<b>f 5:11</b>	<b>f 8:11</b>	<b>f 11:06</b>		
1	Wyoming Hill		<b>f 7:14</b>	<b>f 9:14</b>	<b>f 11:14</b>	<b>f 1:14</b>	<b>f 3:14</b>	<b>f 5:14</b>	<b>f 8:14</b>	<b>f 11:09</b>		
1	Melrose/Cedar Park		<b>f 7:16</b>	<b>f 9:16</b>	<b>f 11:16</b>	<b>f 1:16</b>	<b>f 3:16</b>	<b>f 5:16</b>	<b>f 8:16</b>	<b>f 11:11</b>		
1	Melrose Highlands	Ⓜ	7:19	9:19	11:19	1:19	3:19	5:19	8:19	11:14		
2	Greenwood		<b>f 7:22</b>	<b>f 9:22</b>	<b>f 11:22</b>	<b>f 1:22</b>	<b>f 3:22</b>	<b>f 5:22</b>	<b>f 8:22</b>	<b>f 11:17</b>		
2	Wakefield		7:26	9:26	11:26	1:26	3:26	5:26	8:26	11:21		
2	Reading	Ⓜ	7:32	9:32	11:32	1:32	3:32	5:32	8:32	11:27		
3	North Wilmington		<b>f 7:38</b>	<b>f 9:38</b>	<b>f 11:38</b>	<						

Effective **March 13, 2022**

# 137 Reading Depot – Malden Ctr Sta



## Connections

ORANGE LINE

HAVERRILL LINE



Information **617-222-3200**  
 Lost and Found **617-222-2229**  
 TTY **617-222-5146**

Realtime arrival information, maps, and more

**mbta.com**

- Transfer to bus/subway available on CharlieCard—good for 2 hours, pay fare difference.
- Children 11 & under ride free with a paying customer.
- ♿ All MBTA buses are accessible to people with disabilities.

	CharlieCard	Cash on board	Reduced fare
<b>Bus</b>	<b>\$1.70</b>	<b>\$1.70</b>	<b>\$0.85</b>
<b>Bus + Subway</b>	<b>\$2.40</b>	<b>\$4.10</b>	<b>\$1.10</b>

Complete fare/pass rules and free/reduced fare eligibility:  
[mbta.com/fares](http://mbta.com/fares) or call **617-222-3200**



**Weekday 137**

Inbound				Outbound			
Reading Depot	Wakefield Square	Oak Grove Station	Malden Center Station	Malden Center Station	Oak Grove Station	Wakefield Square	Reading Depot
5:25	5:35	5:50	6:00	4:49	4:55	5:08	5:22
6:05	6:15	6:30	6:40	5:25	5:32	5:48	6:02
6:35	6:45	7:00	-	-	6:02	6:18	6:32
7:00	7:12	7:30	-	-	6:27	6:43	6:57
7:16	7:28	7:46	-	-	6:59	7:15	7:29
7:32	7:44	8:02	-	-	7:11	7:27	7:44
7:48	8:00	8:18	-	-	7:41	7:59	8:17
8:04	8:14	8:32	-	-	7:57	8:15	8:33
8:20	8:30	8:48	-	-	8:16	8:34	8:52
8:36	8:46	9:04	-	-	8:36	8:54	9:12
8:55	9:06	9:23	9:33	-	9:01	9:19	9:37
9:15	9:27	9:44	9:54	-	9:27	9:45	10:02
9:40	9:52	10:09	10:19	9:40	9:50	10:08	10:23
10:05	10:17	10:34	10:48	10:05	10:15	10:35	10:50
10:26	10:39	10:57	11:11	10:30	10:40	11:00	11:15
10:53	11:06	11:24	11:38	10:55	11:05	11:25	11:42
11:18	11:31	11:49	<b>12:03</b>	11:20	11:30	11:50	<b>12:08</b>
11:45	11:58	<b>12:16</b>	<b>12:30</b>	11:45	11:53	<b>12:13</b>	<b>12:31</b>
<b>12:11</b>	<b>12:24</b>	<b>12:42</b>	<b>12:56</b>	<b>12:10</b>	<b>12:18</b>	<b>12:38</b>	<b>12:56</b>
<b>12:34</b>	<b>12:47</b>	<b>1:06</b>	<b>1:17</b>	<b>12:35</b>	<b>12:43</b>	<b>1:03</b>	<b>1:19</b>
<b>12:59</b>	<b>1:14</b>	<b>1:31</b>	<b>1:42</b>	<b>1:00</b>	<b>1:10</b>	<b>1:32</b>	<b>1:48</b>
<b>1:22</b>	<b>1:37</b>	<b>1:54</b>	<b>2:06</b>	<b>1:25</b>	<b>1:35</b>	<b>1:57</b>	<b>2:12</b>
<b>1:50</b>	<b>2:04</b>	<b>2:23</b>	<b>2:36</b>	<b>1:50</b>	<b>2:00</b>	<b>2:21</b>	<b>2:36</b>
<b>2:16</b>	<b>2:29</b>	<b>2:48</b>	<b>3:01</b>	<b>S 2:10</b>	<b>2:19</b>	<b>2:40</b>	-
<b>S 2:39</b>	<b>2:52</b>	<b>3:11</b>	<b>3:24</b>	<b>2:15</b>	<b>2:24</b>	<b>2:45</b>	<b>3:00</b>
<b>3:03</b>	<b>3:16</b>	<b>3:35</b>	<b>3:48</b>	<b>2:40</b>	<b>2:49</b>	<b>3:10</b>	<b>3:25</b>
<b>3:28</b>	<b>3:41</b>	<b>4:00</b>	-	<b>3:05</b>	<b>3:14</b>	<b>3:35</b>	<b>3:50</b>
<b>3:53</b>	<b>4:06</b>	<b>4:25</b>	<b>4:38</b>	-	<b>3:23</b>	<b>3:44</b>	<b>3:59</b>
<b>4:02</b>	<b>4:15</b>	<b>4:33</b>	-	<b>3:30</b>	<b>3:39</b>	<b>4:00</b>	<b>4:15</b>
<b>4:22</b>	<b>4:35</b>	<b>4:52</b>	-	-	<b>4:00</b>	<b>4:22</b>	<b>4:37</b>
<b>4:40</b>	<b>4:54</b>	<b>5:11</b>	-	-	<b>4:20</b>	<b>4:42</b>	<b>4:57</b>
<b>5:00</b>	<b>5:14</b>	<b>5:31</b>	-	-	<b>4:37</b>	<b>4:59</b>	<b>5:14</b>
<b>5:17</b>	<b>5:31</b>	<b>5:48</b>	-	-	<b>4:53</b>	<b>5:15</b>	<b>5:30</b>
<b>5:33</b>	<b>5:47</b>	<b>6:04</b>	-	-	<b>5:09</b>	<b>5:31</b>	<b>5:46</b>
<b>5:49</b>	<b>6:02</b>	<b>6:18</b>	-	-	<b>5:25</b>	<b>5:47</b>	<b>6:02</b>
<b>6:05</b>	<b>6:17</b>	<b>6:33</b>	-	-	<b>5:41</b>	<b>6:02</b>	<b>6:16</b>
<b>6:19</b>	<b>6:31</b>	<b>6:47</b>	-	-	<b>5:57</b>	<b>6:15</b>	<b>6:29</b>
<b>6:32</b>	<b>6:44</b>	<b>7:00</b>	-	-	<b>6:13</b>	<b>6:31</b>	<b>6:45</b>
<b>6:48</b>	<b>7:00</b>	<b>7:16</b>	-	-	<b>6:29</b>	<b>6:47</b>	<b>7:01</b>
<b>7:04</b>	<b>7:16</b>	<b>7:31</b>	-	-	<b>6:45</b>	<b>7:03</b>	<b>7:17</b>
<b>7:20</b>	<b>7:31</b>	<b>7:46</b>	<b>7:57</b>	-	<b>7:05</b>	<b>7:23</b>	<b>7:37</b>
<b>7:40</b>	<b>7:49</b>	<b>8:04</b>	<b>8:15</b>	<b>7:30</b>	<b>7:40</b>	<b>7:58</b>	<b>8:12</b>
<b>8:15</b>	<b>8:24</b>	<b>8:39</b>	<b>8:50</b>	<b>8:10</b>	<b>8:20</b>	<b>8:38</b>	<b>8:52</b>
<b>8:55</b>	<b>9:04</b>	<b>9:19</b>	<b>9:30</b>	<b>8:55</b>	<b>9:05</b>	<b>9:23</b>	<b>9:37</b>
<b>9:40</b>	<b>9:49</b>	<b>10:04</b>	<b>10:15</b>	<b>9:40</b>	<b>9:50</b>	<b>10:08</b>	<b>10:22</b>
<b>10:25</b>	<b>10:34</b>	<b>10:49</b>	<b>11:00</b>				

**Saturday 137**

Inbound				Outbound			
Reading Depot	Wakefield Square	Oak Grove Station	Malden Center Station	Malden Center Station	Oak Grove Station	Wakefield Square	Reading Depot
6:00	6:10	6:25	6:36	6:00	6:08	6:23	6:38
6:41	6:51	7:06	7:17	6:40	6:48	7:03	7:18
7:21	7:31	7:46	7:57	7:25	7:33	7:48	8:03
8:06	8:16	8:31	8:42	8:05	8:13	8:31	8:46
8:49	8:59	9:16	9:27	8:50	8:58	9:18	9:33
9:36	9:48	10:07	10:18	9:35	9:43	10:03	10:18
10:21	10:34	10:55	11:07	10:30	10:38	10:58	11:14
11:17	11:31	11:50	<b>12:02</b>	11:15	11:24	11:50	<b>12:06</b>
<b>12:09</b>	<b>12:23</b>	<b>12:42</b>	<b>12:54</b>	<b>12:10</b>	<b>12:19</b>	<b>12:41</b>	<b>12:56</b>
<b>12:59</b>	<b>1:13</b>	<b>1:32</b>	<b>1:44</b>	<b>1:00</b>	<b>1:09</b>	<b>1:31</b>	<b>1:46</b>
<b>1:49</b>	<b>2:03</b>	<b>2:23</b>	<b>2:34</b>	<b>1:50</b>	<b>1:59</b>	<b>2:21</b>	<b>2:36</b>
<b>2:39</b>	<b>2:53</b>	<b>3:11</b>	<b>3:22</b>	<b>2:40</b>	<b>2:49</b>	<b>3:11</b>	<b>3:26</b>
<b>3:29</b>	<b>3:42</b>	<b>4:00</b>	<b>4:11</b>	<b>3:30</b>	<b>3:39</b>	<b>4:00</b>	<b>4:15</b>
<b>4:18</b>	<b>4:30</b>	<b>4:47</b>	<b>4:58</b>	<b>4:20</b>	<b>4:29</b>	<b>4:50</b>	<b>5:05</b>
<b>5:08</b>	<b>5:20</b>	<b>5:37</b>	<b>5:48</b>	<b>5:05</b>	<b>5:15</b>	<b>5:34</b>	<b>5:49</b>
<b>5:52</b>	<b>6:04</b>	<b>6:21</b>	<b>6:32</b>	<b>5:55</b>	<b>6:05</b>	<b>6:24</b>	<b>6:39</b>
<b>6:42</b>	<b>6:54</b>	<b>7:11</b>	<b>7:22</b>	<b>6:45</b>	<b>6:55</b>	<b>7:14</b>	<b>7:29</b>
<b>7:32</b>	<b>7:44</b>	<b>8:01</b>	<b>8:12</b>	<b>8:30</b>	<b>8:38</b>	<b>8:53</b>	-
-	<b>9:00</b>	<b>9:17</b>	<b>9:28</b>				

**S** runs only on school days

PM times are **bold**

Information in this timetable is subject to change without notice. Traffic and weather may affect running times.

Always check bus destination signs before boarding. Some buses may only serve a part, or skip portions of this route.

**Sunday 137**

Inbound				Outbound			
Reading Depot	Wakefield Square	Oak Grove Station	Malden Center Station	Malden Center Station	Oak Grove Station	Wakefield Square	Reading Depot
8:00	8:11	8:25	8:36	8:40	8:49	9:05	9:19
9:22	9:34	9:50	10:01	10:10	10:19	10:36	10:50
10:53	11:05	11:21	11:34	11:40	11:50	<b>12:07</b>	<b>12:21</b>
<b>12:24</b>	<b>12:36</b>	<b>12:54</b>	<b>1:06</b>	<b>1:20</b>	<b>1:29</b>	<b>1:47</b>	<b>2:01</b>
<b>2:04</b>	<b>2:16</b>	<b>2:32</b>	<b>2:44</b>	<b>2:55</b>	<b>3:05</b>	<b>3:23</b>	<b>3:37</b>
<b>3:40</b>	<b>3:51</b>	<b>4:06</b>	<b>4:17</b>	<b>4:25</b>	<b>4:34</b>	<b>4:52</b>	<b>5:06</b>
<b>5:09</b>	<b>5:20</b>	<b>5:35</b>	<b>5:46</b>				

**2022 Holidays**

**SUN** Memorial Day      **SUN** Christmas Day  
**SUN** Independence Day      **SUN** Christmas Day Observed  
**SUN** Labor Day      **SAT** New Year's Eve  
**SUN** Thanksgiving Day      **SUN** New Year's Day

MOTOR VEHICLE CRASH DATA

---



Crash Number	City Town Name	Crash Date	Crash Severity	Crash Time	Max Injury Severity Reported	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	First Harmful Event	Light Conditions	Manner of Collision	Road Surface Condition	Roadway Junction Type	Total Non-Fatal Injuries	Traffic Control Device Type	Trafficway Description	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Configuration (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Geocoding Method	Road Contributing Circumstance	Latitude	Longitude	Street Number	Roadway
Chestnut Street at West Site driveway																									
4373758	WAKEFIELD	06/06/2017	Property damage only (none injured)	12:00 PM	No injury		D1: (No improper driving) / D2: (Failed to yield right of way)	Collision with motor vehicle in traffic	Daylight	Angle	Wet	Not at junction	0	No controls	Two-way, not divided	V1: Travelling straight ahead / V2: Turning right	V1:(Passenger car) / V2:(Light truck(van, mini-van, pickup, sport utility))	V1: E / V2: N	Rain	At Address	None	42.50375485	-71.07183172	7	CHESTNUT ST
Main Street at Chestnut Street/centre street																									
4010505	WAKEFIELD	02/09/2015	Property damage only (none injured)	3:33 PM	No injury		D1: (Unknown) / D2: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Single vehicle crash	Snow	Not at junction	0	No controls	Two-way, not divided	V1: Making U-turn / V2: Travelling straight ahead	V1:(Single-unit truck (2-axle, 6-tires)) / V2:(Passenger car)	V1: S / V2: S	Snow/Blowing sand, snow	Off Intersection	Not reported	42.50401225	-71.07084446	317	MAIN STREET near CHESTNUT STREET
4079649	WAKEFIELD	05/23/2015	Property damage only (none injured)	10:17 PM	No injury		D1: (Failed to yield right of way) / D2: (No improper driving)	Collision with motor vehicle in traffic	Dark - lighted roadway	Angle	Dry	T-intersection	0	No controls	Two-way, divided, unprotected median	V1: Travelling straight ahead / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: W / V2: N	Clear	At Intersection	Not reported	42.50401225	-71.07084446		MAIN ST / CENTRE ST
4328005	WAKEFIELD	02/14/2017	Property damage only (none injured)	5:39 PM	No injury		D1: (Inattention),(Failed to yield right of way) / D2: (No improper driving)	Collision with motor vehicle in traffic	Dusk	Angle	Wet	Four-way intersection	0	Stop signs	Two-way, divided, unprotected median	V1: Entering traffic lane / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: W / V2: S	Clear	At Intersection	None	42.50401225	-71.07084446		MAIN ST / CENTRE ST
4382883	WAKEFIELD	06/20/2017	Property damage only (none injured)	7:09 AM	No injury		D1: (No improper driving) / D2: (Failed to yield right of way)	Collision with motor vehicle in traffic	Daylight	Angle	Wet	Four-way intersection	0	Stop signs	Two-way, divided, unprotected median	V1: Travelling straight ahead / V2: Entering traffic lane	V1:(Passenger car) / V2:(Passenger car)	V1: S / V2: W	Cloudy	At Intersection	None	42.50401225	-71.07084446		MAIN ST / CENTRE ST
4505485	WAKEFIELD	02/21/2018	Property damage only (none injured)	5:09 PM	No injury		D1: (No improper driving) / D2: (No improper driving)	Collision with motor vehicle in traffic	Dusk	Sideswipe, same direction	Dry	T-intersection	0	No controls	Two-way, not divided	V1: Travelling straight ahead / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Bus (seats for 16 or more, including driver))	V1: S / V2: S	Clear	At Intersection	None	42.50401001	-71.07084695		MAIN ST / CHESTNUT ST
4537875	WAKEFIELD	05/10/2018	Property damage only (none injured)	8:33 AM	No injury		D1: (Unknown) / D2: (Inattention)	Collision with motor vehicle in traffic	Daylight	Angle	Dry	Four-way intersection	0	Stop signs	Two-way, divided, unprotected median	V1: Travelling straight ahead / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: E / V2: N	Cloudy	At Intersection	None	42.50401001	-71.07084695		MAIN ST / CHESTNUT ST
4625920	WAKEFIELD	11/19/2018	Non-fatal injury	7:42 AM	Non-fatal injury - Non-incapacitating		D1: (Failure to keep in proper lane or running off road) / D2: (Unknown)	Collision with motor vehicle in traffic	Daylight	Angle	Wet	Four-way intersection	1	No controls	Two-way, not divided	V1: Overtaking/passing / V2: Travelling straight ahead	V1:(Light truck(van, mini-van, pickup, sport utility)) / V2:(Passenger car)	V1: S / V2: W	Rain/Cloudy	At Intersection	None	42.50401001	-71.07084695		CHESTNUT ST / MAIN ST
4635698	WAKEFIELD	12/11/2018	Unknown	11:22 AM	Not reported	1		Collision with motor vehicle in traffic	Dark - lighted roadway	Unknown	Dry	Four-way intersection	0	No controls	Two-way, not divided	V1: Parked	V1:(Passenger car)	V1: Not Reported	Clear	At Intersection	None	42.50401001	-71.07084695		CENTRE ST / MAIN ST
4250906	WAKEFIELD	09/09/2016	Property damage only (none injured)	3:54 PM	No injury		D1: (Inattention) / D2: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Sideswipe, opposite direction	Dry	Not at junction	0	No controls	Two-way, divided, unprotected median	V1: Backing / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: E / V2: S	Clear	At Address	None	42.5040935	-71.07090474	364	MAIN ST
4080963	WAKEFIELD	09/03/2015	Non-fatal injury	5:27 PM	Non-fatal injury - Non-incapacitating		D1: (No improper driving) / D2: (Failed to yield right of way)	Collision with motor vehicle in traffic	Daylight	Angle	Dry	Four-way intersection	1	Stop signs	Two-way, not divided	V1: Travelling straight ahead / V2: Travelling straight ahead	V1:(Motorcycle) / V2:(Passenger car)	V1: N / V2: E	Clear	At Address	Not reported	42.5040574	-71.07088065	366	MAIN ST

Crash Number	City Town Name	Crash Date	Crash Severity	Crash Time	Max Injury Severity Reported	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	First Harmful Event	Light Conditions	Manner of Collision	Road Surface Condition	Roadway Junction Type	Total Non-Fatal Injuries	Traffic Control Device Type	Trafficway Description	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Configuration (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Geocoding Method	Road Contributing Circumstance	Latitude	Longitude	Street Number	Roadway
Main Street at Albion Street																									
4106912	WAKEFIELD	11/04/2015	Property damage only (none injured)	11:32 AM	No injury	2	D2: (Unknown)	Collision with parked motor vehicle	Daylight	Rear-end	Dry	T-intersection	0	No controls	One-way, not divided	V1: Parked / V2: Turning left	V1:(Passenger car) / V2:(Passenger car)	V1: W / V2: W	Clear	At Address	Not reported	42.5035976	-71.07070128	3	ALBION ST
4470214	WAKEFIELD	12/18/2017	Property damage only (none injured)	5:02 PM	No injury	2	D1: (Unknown) / D2: (No improper driving)	Collision with motor vehicle in traffic	Dark - lighted roadway	Rear-end	Dry	Not at junction	0	No controls	Two-way, not divided	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1:(Passenger car) / V2:(Passenger car)	V1: N / V2: N	Clear	At Address		42.50373245	-71.0706517	384	MAIN ST
4605664	WAKEFIELD	09/26/2018	Non-fatal injury	9:32 PM	Non-fatal injury - Possible	2	D1: (No improper driving) / D2: (Other improper action)	Collision with motor vehicle in traffic	Dark - lighted roadway	Angle	Dry	Not at junction	2	No controls	Two-way, divided, unprotected median	V1: Travelling straight ahead / V2: Backing	V1:(Passenger car) / V2:(Passenger car)	V1: N / V2: W	Clear	At Address	None	42.50361332	-71.07055808	384	MAIN ST
4310028	WAKEFIELD	01/11/2017	Non-fatal injury	6:45 AM	Non-fatal injury - Non-incapacitating	2	D1: (Illness),(Failure to keep in proper lane or running off road)	Collision with motor vehicle in traffic	Daylight	Angle	Wet	Not at junction	1	No controls	Two-way, not divided	V1: Travelling straight ahead / V2: Parked	V1:(Passenger car) / V2:(Passenger car)	V1: N / V2: Not Reported	Cloudy	Off Intersection	None	42.50347061	-71.07044664	390	MAIN STREET near PRINCESS STREET
4257114	WAKEFIELD	10/04/2016	Non-fatal injury	12:09 AM	Non-fatal injury - Non-incapacitating	2	D1: (No improper driving) / D2: (Inattention)	Collision with motor vehicle in traffic	Dark - lighted roadway	Angle	Dry	Four-way intersection	2	No controls	Two-way, divided, unprotected median	V1: Travelling straight ahead / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: S / V2: W	Cloudy	At Intersection	None	42.50363316	-71.07057937		ALBION ST / MAIN ST
4134286	WAKEFIELD	01/11/2016	Non-fatal injury	5:57 AM	Non-fatal injury - Incapacitating	1	D1: (Other improper action)	Collision with pedestrian	Dark - lighted roadway	Single vehicle crash / P2: Walking, running or cycling/ P2: Marked crosswalk at intersection / P2: Pedestrian	Dry	T-intersection	1	Warning signs	Two-way, not divided	V1: Travelling straight ahead	V1:(Passenger car)	V1: S	Clear	At Intersection	None	42.50363316	-71.07057937		MAIN ST / ALBION ST
Main Street at Water Street/Water Street																									
4228412	WAKEFIELD	08/05/2016	Property damage only (none injured)	9:06 AM	No injury	2	D1: (Failure to keep in proper lane or running off road),(Inattention) / D2: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Sideswipe, same direction	Dry	Four-way intersection	0	Traffic control signal	Two-way, divided, unprotected median	V1: Turning right / V2: Turning right	V1:(Light truck(van, mini-van, pickup, sport utility)) / V2:(Light truck(van, mini-van, pickup, sport utility))	V1: N / V2: N	Clear	At Intersection	None	42.50232432	-71.06965146		MAIN ST / WATER ST
4258528	WAKEFIELD	10/05/2016	Property damage only (none injured)	5:44 PM	No injury	2	D1: (No improper driving) / D2: (Glare),(Followed too closely)	Collision with motor vehicle in traffic	Daylight	Rear-end	Dry	T-intersection	0	No controls	Two-way, divided, unprotected median	V1: Travelling straight ahead / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: W / V2: W	Clear	At Intersection	Traffic congestion related	42.50251087	-71.06898103		WATER ST / SMITH ST
4342136	WAKEFIELD	03/23/2017	Property damage only (none injured)	7:30 AM	No injury	2	D1: (No improper driving) / D2: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Rear-end	Dry	Four-way intersection	0	Traffic control signal	Two-way, not divided	V1: Turning right / V2: Turning right	V1:(Unknown heavy truck, cannot classify) / V2:(Passenger car)	V1: E / V2: E	Clear	At Intersection	None	42.50232432	-71.06965146		MAIN ST / WATER ST
4440404	WAKEFIELD	10/17/2017	Property damage only (none injured)	9:33 AM	No injury	2	D1: (No improper driving) / D2: (Failure to keep in proper lane or running off road)	Collision with motor vehicle in traffic	Daylight	Sideswipe, same direction	Dry	Four-way intersection	0	Traffic control signal	Two-way, divided, unprotected median	V1: Turning right / V2: Turning right	V1:(Passenger car) / V2:(Passenger car)	V1: N / V2: N	Clear	At Intersection	None	42.50232432	-71.06965146		MAIN ST / WATER ST
4461908	WAKEFIELD	11/28/2017	Non-fatal injury	3:25 PM	Non-fatal injury - Non-incapacitating	1	D1: (No improper driving)	Collision with pedestrian	Daylight	Sideswipe, opposite direction/ P2: Entering or crossing specified location / P2: In roadway/ P2: Pedestrian	Dry	Not at junction	1	No controls	Two-way, not divided	V1: Travelling straight ahead	V1:(Passenger car)	V1: W	Clear	At Intersection	None	42.50232432	-71.06965146		WEST WATER ST / MAIN ST

Crash Number	City Town Name	Crash Date	Crash Severity	Crash Time	Max Injury Severity Reported	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	First Harmful Event	Light Conditions	Manner of Collision	Road Surface Condition	Roadway Junction Type	Total Non-Fatal Injuries	Traffic Control Device Type	Trafficway Description	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Configuration (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Geocoding Method	Road Contributing Circumstance	Latitude	Longitude	Street Number	Roadway
4465832	WAKEFIELD	12/08/2017	Property damage only (none injured)	6:00 PM	No injury		D1: (No improper driving) / D2: (Unknown)	Collision with motor vehicle in traffic	Dark - lighted roadway	Rear-end	Dry	Four-way intersection		Traffic control signal	Two-way, not divided	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: S / V2: S	Clear	At Intersection	None	42.50232432	-71.06965146		MAIN ST / WATER ST
4466499	WAKEFIELD	12/09/2017	Not Reported	10:47 AM	Not reported	1		Collision with motor vehicle in traffic	Daylight	Angle	Wet	Not at junction		No controls	Two-way, not divided	V1: Parked	V1:(Passenger car)	V1: Not Reported	Snow	At Address	None	42.50191867	-71.06950823	450	MAIN ST
4499292	WAKEFIELD	02/12/2018	Property damage only (none injured)	3:24 PM	No injury	1	D1: (No improper driving)	Collision with curb	Daylight	Single vehicle crash	Dry	Not at junction		No controls	Two-way, not divided	V1: Travelling straight ahead	V1:(Passenger car)	V1: N	Clear	At Address	None	42.50186825	-71.06948678	451	MAIN ST
4532907	WAKEFIELD	05/02/2018	Property damage only (none injured)	3:53 PM	No injury	1	D1: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Rear-end	Dry	Not at junction		No controls	Unknown	V1: Slowing or stopped in traffic	V1:(Passenger car)	V1: E	Clear	At Address	None	42.50197254	-71.06952374	445	MAIN ST
4541019	WAKEFIELD	05/18/2018	Property damage only (none injured)	6:28 PM	No injury	2	D1: (No improper driving) / D2: (Inattention)	Collision with motor vehicle in traffic	Daylight	Angle	Dry	Not at junction		No controls	Two-way, not divided	V1: Travelling straight ahead / V2: Entering traffic lane	V1:(Passenger car) / V2:(Passenger car)	V1: S / V2: S	Clear	At Intersection	None	42.50232487	-71.0696486		MAIN ST / WEST WATER ST
4543373	WAKEFIELD	05/22/2018	Property damage only (none injured)	12:33 PM	No injury	2	D1: (Unknown) / D2: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Sideswipe, same direction	Dry	Four-way intersection		Traffic control signal	Two-way, not divided	V1: Turning right / V2: Turning right	V1:(Passenger car) / V2:(Truck/trailer)	V1: S / V2: S	Clear	At Intersection	None	42.50232487	-71.0696486		MAIN STREET / WATER STREET
4571421	WAKEFIELD	07/05/2018	Property damage only (none injured)	2:33 PM	No injury	2	D1: (Inattention) / D2: (Inattention)	Collision with motor vehicle in traffic	Daylight	Angle	Dry	Not at junction		No controls	One-way, not divided	V1: Backing / V2: Backing	V1:(Passenger car) / V2:(Passenger car)	V1: Not Reported / V2: W	Clear	At Address	None	42.50251425	-71.06976521	415	MAIN ST
4483968	WAKEFIELD	01/13/2018	Property damage only (none injured)	2:51 PM	No injury	1	D1: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Rear-end	Dry	Not at junction		No controls	Two-way, divided, unprotected median	V1: Travelling straight ahead	V1:(Passenger car)	V1: N	Cloudy/Clear	At Address		42.50186825	-71.06948678	451	MAIN ST
4483915	WAKEFIELD	01/12/2018	Property damage only (none injured)	10:06 PM	No injury	2	D1: (No improper driving) / D2: (Unknown)	Collision with motor vehicle in traffic	Dark - lighted roadway	Angle	Wet	Four-way intersection		Traffic control signal	Two-way, divided, unprotected median	V1: Travelling straight ahead / V2: Turning left	V1:(Passenger car) / V2:(Passenger car)	V1: S / V2: N	Rain/Cloudy	At Intersection		42.50232487	-71.0696486		MAIN ST / WEST WATER ST
4395638	WAKEFIELD	07/19/2017	Property damage only (none injured)	3:13 PM	No injury	2	D1: (Unknown) / D2: (Unknown)	Collision with motor vehicle in traffic	Daylight	Angle	Dry	Not at junction		No controls	Two-way, divided, unprotected median	V1: Travelling straight ahead / V2: Backing	V1:(Passenger car) / V2:(Truck/trailer)	V1: E / V2: N	Clear	At Address	None	42.50250214	-71.06905409	13	WATER ST
4291078	WAKEFIELD	11/17/2016	Property damage only (none injured)	2:28 PM	No injury	2	D1: (Unknown) / D2: (Unknown)	Collision with motor vehicle in traffic	Daylight	Angle	Dry	Not at junction		No controls	Two-way, not divided	V1: Travelling straight ahead / V2: Backing	V1:(Passenger car) / V2:(Passenger car)	V1: E / V2: N	Clear	At Address	None	42.50251969	-71.0689323	17	WATER ST
4268328	WAKEFIELD	10/24/2016	Non-fatal injury	5:20 PM	Non-fatal injury - Non-incapacitating	2	D1: (Failed to yield right of way),(Visibility obstructed) / D2: (Swerving or avoiding due to wind, slippery surface, vehicle, object, non-motorist in roadway, etc)	Collision with motor vehicle in traffic	Dawn	Angle	Dry	Four-way intersection		Traffic control signal	Two-way, not divided	V1: Turning left / V2: Overtaking/passing	V1:(Passenger car) / V2:(Motorcycle)	V1: N / V2: S	Clear	At Intersection	Traffic congestion related	42.50232432	-71.06965146		MAIN ST / WEST WATER ST
4256388	WAKEFIELD	10/03/2016	Property damage only (none injured)	6:03 PM	No injury	1	D1: (Inattention)	Collision with other	Daylight	Single vehicle crash	Dry	Not at junction		No controls	Unknown	V1: Travelling straight ahead	V1:(Passenger car)	V1: W	Cloudy	At Address	None	42.50249573	-71.06974762	415	MAIN ST
4234699	WAKEFIELD	08/18/2016	Property damage only (none injured)	10:09 AM	No injury	2	D1: (No improper driving) / D2: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Angle	Dry	Four-way intersection		Traffic control signal	Two-way, not divided	V1: Turning left / V2: Slowing or stopped in traffic	V1:(Passenger car) / V2:(Tractor/semi-trailer)	V1: S / V2: S	Clear	At Address	None	42.50249573	-71.06974762	415	MAIN STREET
4121856	WAKEFIELD	11/26/2015	Non-fatal injury	11:52 AM	Non-fatal injury - Non-incapacitating	2	D1: (Unknown) / D2: (Unknown)	Collision with motor vehicle in traffic	Daylight	Angle	Dry	Four-way intersection		Traffic control signal	Two-way, not divided	V1: Travelling straight ahead / V2: Turning left	V1:(Motorcycle) / V2:(Passenger car)	V1: N / V2: E	Clear	At Intersection	Not reported	42.50232432	-71.06965146		MAIN ST / WATER ST
4117033	WAKEFIELD	12/02/2015	Property damage only (none injured)	6:38 PM	No injury	2	D1: (No improper driving) / D2: (No improper driving)	Collision with motor vehicle in traffic	Dark - lighted roadway	Angle	Wet	Four-way intersection		Traffic control signal	Two-way, not divided	V1: Turning right / V2: Backing	V1:(Passenger car) / V2:(Passenger car)	V1: E / V2: N	Rain	At Intersection	Not reported	42.50232432	-71.06965146		MAIN ST / WATER ST

Crash Number	City Town Name	Crash Date	Crash Severity	Crash Time	Max Injury Severity Reported	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	First Harmful Event	Light Conditions	Manner of Collision	Road Surface Condition	Roadway Junction Type	Total Non-Fatal Injuries	Traffic Control Device Type	Trafficway Description	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Configuration (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Geocoding Method	Road Contributing Circumstance	Latitude	Longitude	Street Number	Roadway	
4058626	WAKEFIELD	07/04/2015	Property damage only (none injured)	10:36 PM	No injury		D1: (No improper driving) / D2: (No improper driving)	Collision with parked motor vehicle	Dark - lighted roadway	Angle	Dry	Not at junction	0	No controls	Unknown	V1: Parked / V2: Backing	V1:(Passenger car) / V2:(Passenger car)	V1: S / V2: S	Clear/Cloudy	At Address	Not reported	42.50197273	-71.06952003	445	MAIN ST	
4049649	WAKEFIELD	05/30/2015	Property damage only (none injured)	11:40 AM	No injury	2	D1: (Unknown) / D2: (Unknown)	Collision with motor vehicle in traffic	Daylight	Angle	Dry	Four-way intersection	0	Traffic control signal	Two-way, not divided	V1: Travelling straight ahead / V2: Turning left	V1:(Passenger car) / V2:(Passenger car)	V1: E / V2: S	Clear	At Intersection	Not reported	42.50232432	-71.06965146		WATER ST / MAIN ST	
4033643	WAKEFIELD	04/17/2015	Property damage only (none injured)	4:14 PM	No injury	2	D1: (Unknown) / D2: (No improper driving),(No improper driving)	Collision with motor vehicle in traffic	Daylight	Sideswipe, same direction	Dry	Not at junction	0	No controls	Two-way, not divided	V1: Turning right / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: E / V2: E	Clear	At Intersection	Not reported	42.50232432	-71.06965146		WEST WATER ST / MAIN ST	
4019507	WAKEFIELD	03/05/2015	Property damage only (none injured)	2:23 PM	No injury	1	D1: (Unknown)	Collision with other	Daylight	Single vehicle crash	Dry	Not at junction	0	No controls	Two-way, not divided	V1: Parked	V1:(Passenger car)	V1: E	Clear	At Address	Not reported	42.50181951	-71.0694724	454	MAIN ST	
Main Street at Armory Street																										
4517996	WAKEFIELD	03/23/2018	Property damage only (none injured)	1:30 PM	No injury	2	D1: (Inattention) / D2: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Angle	Dry	Not at junction	0	No controls	Two-way, not divided	V1: Backing / V2: Slowing or stopped in traffic	V1:(Passenger car) / V2:(Light truck(van, mini-van, pickup, sport utility))	V1: W / V2: N	Clear	At Address	None	42.50167458	-71.06941814	460	MAIN ST	
4267309	WAKEFIELD	10/05/2016	Non-fatal injury	12:09 PM	Non-fatal injury - Possible	2	D1: (Inattention),(Distracted) / D2: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Rear-end	Dry	Not at junction	2	No controls	Two-way, divided, unprotected median	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1:(Passenger car) / V2:(Passenger car)	V1: S / V2: S	Clear/Cloudy	At Address	None	42.50172935	-71.06943652	459	MAIN ST	
4113166	WAKEFIELD	11/20/2015	Property damage only (none injured)	12:38 PM	No injury	2	D1: (No improper driving) / D2: (Inattention)	Collision with motor vehicle in traffic	Daylight	Rear-end	Dry	Not at junction	0	No controls	Two-way, divided, unprotected median	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: N / V2: N	Clear	At Address	Not reported	42.50150397	-71.06935289	468	MAIN ST	
Main Street at North Avenue/NAHANT STREET																										
4067092	WAKEFIELD	07/27/2015	Property damage only (none injured)	9:57 AM	No injury	2	D1: (No improper driving) / D2: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Angle	Dry	Four-way intersection	0	Traffic control signal	Two-way, not divided	V1: Changing lanes / V2: Slowing or stopped in traffic	V1:(Passenger car) / V2:(Bus (seats for 9-15 people, including driver))	V1: E / V2: E	Clear	At Intersection	Not reported	42.49775858	-71.06926896		MAIN STREET / NORTH AVENUE	
4078925	WAKEFIELD	08/24/2015	Property damage only (none injured)	5:18 PM	No injury	2	D1: (No improper driving) / D2: (Inattention)	Collision with motor vehicle in traffic	Daylight	Rear-end	Dry	Four-way intersection	0	Traffic control signal	Two-way, not divided	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: E / V2: E	Clear	At Intersection	Not reported	42.49775858	-71.06926896		NORTH AVE / MAIN ST	
4119343	WAKEFIELD	12/08/2015	Property damage only (none injured)	8:51 PM	No injury	2	D1: (No improper driving) / D2: (Failed to yield right of way)	Collision with motor vehicle in traffic	Dark - lighted roadway	Angle	Dry	Four-way intersection	0	Traffic control signal	Two-way, not divided	V1: Turning left / V2: Turning right	V1:(Passenger car) / V2:(Passenger car)	V1: W / V2: W	Clear	At Intersection	Not reported	42.49775858	-71.06926896		NORTH AVE / MAIN ST	
4153556	WAKEFIELD	02/20/2016	Property damage only (none injured)	11:58 PM	No injury	1	D1: (Distracted)	Collision with utility pole	Dark - lighted roadway	Single vehicle crash	Dry	Not at junction	0	No controls	Two-way, not divided	V1: Turning left	V1:(Passenger car)	V1: E	Clear/Other	At Address	None	42.4974796	-71.06929519	618	MAIN ST	
4196266	WAKEFIELD	05/16/2016	Property damage only (none injured)	6:45 PM	No injury	2	D1: (No improper driving) / D2: (Other improper action)	Collision with motor vehicle in traffic	Daylight	Rear-end	Dry	Four-way intersection	0	Traffic control signal	Two-way, divided, unprotected median	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: N / V2: N	Clear	At Intersection	None	42.49775858	-71.06926896		NAHANT ST / MAIN ST	
4210791	WAKEFIELD	06/29/2016	Property damage only (none injured)	6:32 PM	No injury	2	D1: (No improper driving) / D2: (Inattention)	Collision with motor vehicle in traffic	Daylight	Rear-end	Dry	Four-way intersection	0	Traffic control signal	Two-way, not divided	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic	V1:(Passenger car) / V2:(Passenger car)	V1: E / V2: E	Clear	At Intersection	None	42.49775858	-71.06926896		NORTH AVE / MAIN ST	
4239671	WAKEFIELD	08/26/2016	Property damage only (none injured)	10:17 PM	No injury	2	D1: (Failed to yield right of way) / D2: (No improper driving)	Collision with motor vehicle in traffic	Dark - lighted roadway	Angle	Dry	Not at junction	0	Traffic control signal	Two-way, not divided	V1: Entering traffic lane / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: S / V2: E	Clear	Off Intersection	Traffic congestion related	42.49764969	-71.06903856	14	NAHANT ST75 feet E of MAIN STREET	

Crash Number	City Town Name	Crash Date	Crash Severity	Crash Time	Max Injury Severity Reported	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	First Harmful Event	Light Conditions	Manner of Collision	Road Surface Condition	Roadway Junction Type	Total Non-Fatal Injuries	Traffic Control Device Type	Trafficway Description	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Configuration (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Geocoding Method	Road Contributing Circumstance	Latitude	Longitude	Street Number	Roadway
4259473	WAKEFIELD	09/04/2016	Non-fatal injury	7:23 PM	Non-fatal injury - Non-incapacitating	2	D1: (No improper driving) / D2: (Swerving or avoiding due to wind, slippery surface, vehicle, object, non-motorist in roadway, etc)	Collision with motor vehicle in traffic	Dark - lighted roadway	Sideswipe, opposite direction	Dry	Four-way intersection	0	Traffic control signal	Two-way, not divided	V1: Travelling straight ahead / V2: Turning left	V1:(Motorcycle) / V2:(Passenger car)	V1: N / V2: S	Clear	At Intersection	None	42.49775858	-71.06926896		MAIN ST / NORTH AVE
4273159	WAKEFIELD	10/27/2016	Property damage only (none injured)	9:24 PM	No injury	1	D1: (No improper driving)	Collision with motor vehicle in traffic	Dark - lighted roadway	Angle	Wet	Four-way intersection	0	Traffic control signal	Two-way, not divided	V1: Travelling straight ahead	V1:(Passenger car)	V1: E	Rain	At Intersection	Unknown	42.49775858	-71.06926896		NORTH AVE / MAIN ST
4523011	WAKEFIELD	03/30/2018	Property damage only (none injured)	3:51 PM	No injury	2	D1: (Unknown) / D2: (Failed to yield right of way)	Collision with motor vehicle in traffic	Daylight	Angle	Dry	Four-way intersection	0	Traffic control signal	Two-way, divided, unprotected median	V1: Travelling straight ahead / V2: Turning left	V1:(Passenger car) / V2:(Passenger car)	V1: W / V2: N	Cloudy	At Intersection	None	42.49775858	-71.06926934		MAIN ST / NORTH AVE
4560483	WAKEFIELD	07/03/2018	Unknown	10:19 AM	Not reported	1		Collision with parked motor vehicle	Daylight	Unknown	Dry	Driveway	0	No controls	Unknown	V1: Parked	V1:(Passenger car)	V1: N	Clear	At Address	Traffic congestion related	42.49777024	-71.0708409	21	BROADWAY
4571623	WAKEFIELD	07/15/2018	Property damage only (none injured)	3:09 PM	No injury	2	D1: (No improper driving) / D2: (Inattention)	Collision with motor vehicle in traffic	Daylight	Rear-end	Dry	Four-way intersection	0	Traffic control signal	Two-way, divided, unprotected median	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: E / V2: E	Clear	At Intersection	None	42.49775858	-71.06926934		NORTH AVE / MAIN ST
4580447	WAKEFIELD	08/07/2018	Property damage only (none injured)	1:21 PM	No injury	1	D1: (Unknown)	Collision with motor vehicle in traffic	Daylight	Sideswipe, same direction	Dry	Four-way intersection	0	No controls	Two-way, divided, unprotected median	V1: Travelling straight ahead	V1:(Passenger car)	V1: S	Clear	At Intersection	None	42.49775858	-71.06926934		MAIN ST / NORTH AVE
4609927	WAKEFIELD	10/10/2018	Property damage only (none injured)	6:48 AM	No injury	2	D1: (No improper driving) / D2: (Unknown)	Collision with motor vehicle in traffic	Daylight	Sideswipe, same direction	Dry	Four-way intersection	0	No controls	Two-way, divided, unprotected median	V1: Travelling straight ahead / V2: Entering traffic lane	V1:(Passenger car) / V2:(Passenger car)	V1: S / V2: S	Clear	At Intersection	None	42.49775858	-71.06926934		MAIN ST / NORTH AVE
4673574	WAKEFIELD	03/07/2019	Property damage only (none injured)	4:33 PM	No Apparent Injury (O)	2	D1: (No improper driving) / D2: (Disregarded traffic signs, signals, road markings)	Collision with motor vehicle in traffic	Daylight	Angle	Dry	Four-way intersection	0	Traffic control signal	Two-way, divided, unprotected median	V1: Turning left / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: W / V2: S	Clear	At Intersection	None	42.49775858	-71.06926934		MAIN ST / NAHANT ST / NORTH AVE
4705429	WAKEFIELD	05/14/2019	Property damage only (none injured)	6:08 PM	No Apparent Injury (O)	2	D1: (No improper driving) / D2: (Disregarded traffic signs, signals, road markings),(Distracted)	Collision with motor vehicle in traffic	Daylight	Front to Front	Wet	Four-way intersection	0	Traffic control signal	Two-way, not divided	V1: Travelling straight ahead / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: N / V2: E	Rain/Cloudy	At Intersection		42.49775858	-71.06926934		MAIN ST / NORTH AVE / NAHANT ST
4729037	WAKEFIELD	07/11/2019	Non-fatal injury	1:15 PM	Suspected Minor Injury (B)	1	D1: (Disregarded traffic signs, signals, road markings)	Collision with pedestrian	Daylight	Single vehicle crash	Dry	Four-way intersection	0	Traffic control signal	Two-way, divided, unprotected median	V1: Turning right	V1:(Passenger car)	V1: E	Clear	At Intersection		42.49775858	-71.06926934		NORTH AVE / MAIN ST
4752276	WAKEFIELD	09/18/2019	Property damage only (none injured)	2:43 PM	No Apparent Injury (O)	2	D1: (No improper driving) / D2: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Sideswipe, same direction	Dry	Four-way intersection	0	Traffic control signal	Two-way, not divided	V1: Travelling straight ahead / V2: Changing lanes	V1:(Passenger car) / V2:(Other e.g. farm equipment)	V1: S / V2: S	Clear	At Intersection	None	42.49775858	-71.06926934		MAIN STREET / NORTH AVENUE
4775613	WAKEFIELD	11/14/2019	Property damage only (none injured)	3:33 PM	No Apparent Injury (O)	2	D1: (No improper driving) / D2: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Sideswipe, same direction	Dry	Four-way intersection	0	Traffic control signal	Two-way, divided, unprotected median	V1: Turning left / V2: Turning right	V1:(Light truck(van, mini-van, pickup, sport utility)) / V2:(Truck/trailer)	V1: N / V2: S	Clear	Off Intersection	None	42.49775858	-71.06926934		NAHANT STREET near MAIN STREET
4807875	WAKEFIELD	04/17/2019	Property damage only (none injured)	5:30 PM	No Apparent Injury (O)	2	D1: (No improper driving) / D2: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Head-on	Dry	Four-way intersection	0	Traffic control signal	Two-way, not divided	V1: Travelling straight ahead / V2: Turning left	V1:(Passenger car) / V2:(Passenger car)	V1: W / V2: E	Clear	At Intersection	None	42.49775858	-71.06926934		NORTH AVE / MAIN STA4:AA33

Crash Number	City Town Name	Crash Date	Crash Severity	Crash Time	Max Injury Severity Reported	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	First Harmful Event	Light Conditions	Manner of Collision	Road Surface Condition	Roadway Junction Type	Total Non-Fatal Injuries	Traffic Control Device Type	Trafficway Description	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Configuration (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Geocoding Method	Road Contributing Circumstance	Latitude	Longitude	Street Number	Roadway										
										NORTH AVE / ALBION ST																									
4055025	WAKEFIELD	06/18/2015	Property damage only (none injured)	12:11 PM	No injury	3	D1: (No improper driving) / D2: (Inattention) / D3: (Inattention)	Collision with motor vehicle in traffic	Daylight	Rear-end	Dry	Four-way intersection	0	Traffic control signal	Two-way, divided, unprotected median	V1: Slowing or stopped in traffic / V2: Travelling straight ahead / V3: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car) / V3:(Passenger car)	V1: S / V2: S / V3: S	Clear	At Intersection	Not reported	42.50184005	-71.07500796			NORTH AVE / ALBION ST									
4072109	WAKEFIELD	08/08/2015	Property damage only (none injured)	10:37 AM	No injury	4	D1: (Unknown)	Collision with parked motor vehicle	Daylight	Sideswipe, same direction	Dry	Not at junction	0	No controls	Two-way, not divided	V1: Travelling straight ahead / V2: Parked / V3: Parked / V4: Parked	V1:(Truck/trailer) / V2:(Passenger car) / V3:(Passenger car) / V4:(Passenger car)	V1: S / V2: S / V3: S / V4: S	Clear	At Address	Not reported	42.50190334	-71.07508054	225		NORTH AVENUE									
4088281	WAKEFIELD	09/22/2015	Property damage only (none injured)	4:20 PM	No injury	2	D1: (No improper driving) / D2: (Followed too closely)	Collision with motor vehicle in traffic	Daylight	Rear-end	Dry	Four-way intersection	0	Traffic control signal	Two-way, divided, unprotected median	V1: Travelling straight ahead / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: N / V2: N	Clear	At Intersection	Not reported	42.50184005	-71.07500796			NORTH AVE / ALBION ST									
4090709	WAKEFIELD	09/16/2015	Property damage only (none injured)	10:08 AM	No injury	2	D1: (No improper driving) / D2: (Failed to yield right of way)	Collision with motor vehicle in traffic	Daylight	Angle	Dry	T- intersection	0	Stop signs	Two-way, not divided	V1: Travelling straight ahead / V2: Turning left	V1:(Passenger car) / V2:(Passenger car)	V1: S / V2: W	Clear	At Address	Not reported	42.50132534	-71.07458561	200		NORTH AVE									
4190240	WAKEFIELD	04/14/2016	Property damage only (none injured)	9:51 AM	No injury	1	D1: (No improper driving)	Collision with other movable object	Daylight	Single vehicle crash	Dry	Railway grade crossing	0	Railway crossing device	Two-way, not divided	V1: Turning right	V1:(Truck/trailer)	V1: W	Clear	At Intersection	None	42.50184005	-71.07500796			ALBION ST / NORTH AVE									
4221791	WAKEFIELD	07/20/2016	Property damage only (none injured)	8:49 AM	No injury	1	D1: (No improper driving)	Collision with parked motor vehicle	Unknown	Rear-to-rear	Unknown	Unknown	0	No controls	Unknown	V1: Parked	V1:(Passenger car)	V1: N	Unknown	At Address	None	42.50190334	-71.07508054	225		NORTH AVE									
4229121	WAKEFIELD	07/22/2016	Property damage only (none injured)	1:21 PM	No injury	2	D1: (Failure to keep in proper lane or running off road) / D2: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Angle	Dry	Four-way intersection	0	Traffic control signal	Two-way, not divided	V1: Overtaking/passing / V2: Turning right	V1:(Passenger car) / V2:(Passenger car)	V1: E / V2: E	Clear	At Intersection	None	42.50184005	-71.07500796			NORTH AVE / ALBION ST									
4241638	WAKEFIELD	09/02/2016	Property damage only (none injured)	9:50 PM	No injury	1	D1: (Inattention)	Collision with other movable object	Dark - lighted roadway	Single vehicle crash	Dry	Four-way intersection	0	Railway crossing device	Two-way, not divided	V1: Turning right	V1:(Passenger car)	V1: W	Clear	Operator Designated	None	42.50174147	-71.07513029			ALBION STREET / NORTH AVENUE									
4291077	WAKEFIELD	11/17/2016	Property damage only (none injured)	9:25 AM	No injury	1	D1: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Angle	Dry	Not at junction	0	No controls	Two-way, not divided	V1: Parked	V1:(Passenger car)	V1: N	Clear	At Address	None	42.50190334	-71.07508054	225		NORTH AVE									
4472524	WAKEFIELD	12/15/2017	Property damage only (none injured)	6:01 AM	No injury	1	D1: (Disregarded traffic signs, signals, road markings)	Collision with other movable object	Dark - lighted roadway	Single vehicle crash	Dry	Four-way intersection	0	Traffic control signal	Two-way, divided, unprotected median	V1: Turning right	V1:(Tractor/semi-trailer)	V1: W	Clear	At Intersection	None	42.50184005	-71.07500796			NORTH AVE / ALBION ST									
4596298	WAKEFIELD	09/14/2018	Property damage only (none injured)	7:09 AM	No injury	2	D1: (Failure to keep in proper lane or running off road) / D2: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Sideswipe, same direction	Dry	Not at junction	0	No controls	Two-way, divided, unprotected median	V1: Overtaking/passing / V2: Entering traffic lane	V1:(Passenger car) / V2:(Passenger car)	V1: N / V2: N	Clear	At Address	None	42.50193092	-71.07511402	225		NORTH AVE									
4634906	WAKEFIELD	12/10/2018	Property damage only (none injured)	4:41 PM	No injury	2	D1: (No improper driving) / D2: (Followed too closely)	Collision with motor vehicle in traffic	Dark - lighted roadway	Rear-end	Dry	Four-way intersection	0	Traffic control signal	Two-way, divided, unprotected median	V1: Travelling straight ahead / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: S / V2: S	Clear	At Intersection	None	42.50184004	-71.07500416			NORTH AVE / ALBION ST									
4651221	WAKEFIELD	12/27/2018	Non-fatal injury	9:29 AM	Non-fatal injury - Non-incapacitating	1	D1: (Unknown)	Collision with other	Daylight	Single vehicle crash	Dry	Not at junction	1	No controls	Two-way, not divided	V1: Travelling straight ahead	V1:(Passenger car)	V1: W	Clear	At Address	None	42.50193092	-71.07511402	225		NORTH AVE									
4675277	WAKEFIELD	03/11/2019	Property damage only (none injured)	9:28 AM	No Apparent Injury (O)	2	D1: (Inattention) / D2: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Angle	Dry	Four-way intersection	0	Traffic control signal	Two-way, not divided	V1: Travelling straight ahead / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Passenger car)	V1: S / V2: W	Clear	At Intersection	None	42.50184004	-71.07500416			NORTH AVE / ALBION ST									
4680096	WAKEFIELD	03/13/2019	Property damage only (none injured)	9:00 AM	No Apparent Injury (O)	2	D1: (Inattention) / D2: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Rear-end	Dry	Not at junction	0	No controls	Unknown	V1: Backing / V2: Travelling straight ahead	V1:(Light truck(van, mini-van, pickup, sport utility)) / V2:(Passenger car)	V1: N / V2: N	Clear	At Intersection	None	42.50184004	-71.07500416			ALBION ST / NORTH AVE									
4737158	WAKEFIELD	08/14/2019	Non-fatal injury	12:31 PM	Suspected Serious Injury (A)	2	D1: (History heart/epilepsy/fainting) / D2: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Head-on	Dry	Not at junction	0	No controls	Two-way, divided, unprotected median	V1: Travelling straight ahead / V2: Travelling straight ahead	V1:(Passenger car) / V2:(Truck/trailer)	V1: S / V2: N	Clear	At Address	None	42.50230246	-71.07547731	239		NORTH AVENUE									



# MassHighway

## CRASH RATE WORKSHEET

CITY/TOWN : Wakefield COUNT DATE : 2019

DISTRICT : 4 UNSIGNALIZED :  SIGNALIZED :

**MHD USE ONLY**

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Chestnut Street

ST #

MINOR STREET(S) : West Site Drive

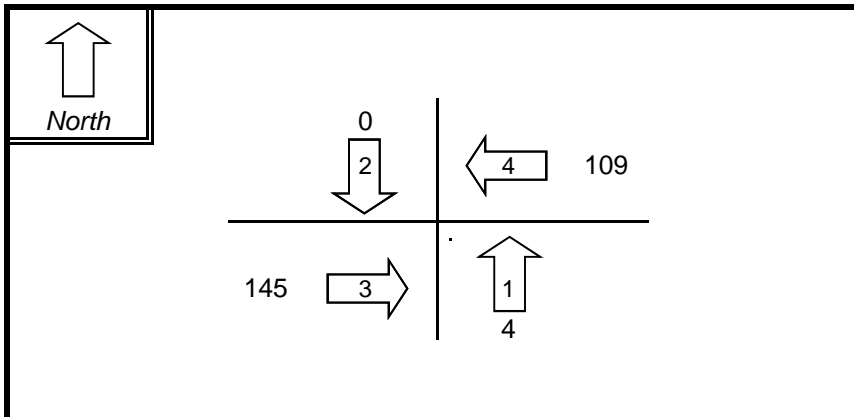
ST #

ST #

ST #

ST #

**INTERSECTION  
DIAGRAM  
(Label Approaches)**



INTERSECTION

REF #

**Peak Hour Volumes**

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	4		145	109		<b>258</b>

" K " FACTOR :  APPROACH ADT :  ADT = TOTAL VOL/"K" FACT.

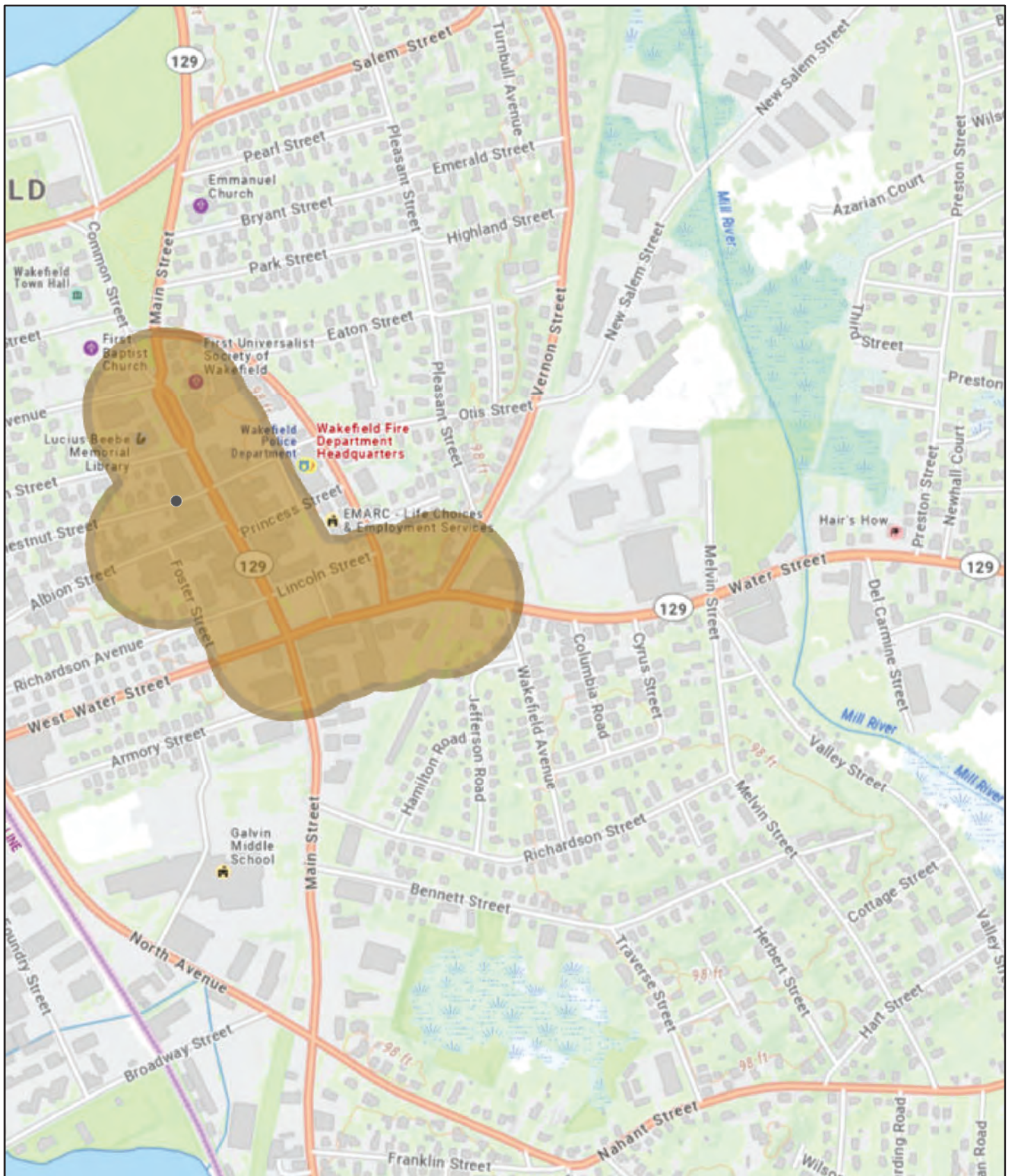
TOTAL # OF ACCIDENTS :  # OF YEARS :  AVERAGE # OF ACCIDENTS ( A ) :

**CRASH RATE CALCULATION :**  RATE =  $\frac{(A * 1,000,000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73

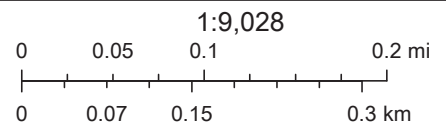
Accident Rate for District 4 unsignalized intersections = 0.57

# MassDOT Top Crash Locations



7/18/2022, 12:29:15 PM

 2010-2019 HSIP Pedestrian Cluster



# ROAD SAFETY AUDIT

Main Street (Route 129) Crescent Street to Water Street  
/ W. Water Street

Town of Wakefield

April 2019

Prepared For:  
MassDOT



Prepared By:  
VHB, Inc.  
101 Walnut Street  
Watertown, MA 02473



## GROWTH RATE CALCULATIONS

---



# General Background Traffic Growth - Daily Traffic Volumes from Massachusetts

## Highway Department

AADT Summary By Year for 1/1/2015- 12/31/2020

Community	Counts	Station	Location	2015	2016	2017	2018	2019	2020	Annual
Reading	Continuous	4158	YANKEE DIVISION HIGHWAY	154054	155608	157422	157652	156392	119953	<b>0.43%</b>
Wakefield	Continuous	4121	YANKEE DIVISION HIGHWAY	134579	138422	140727	139400	142046	121808	<b>1.20%</b>
Wakefield	Continuous	4137	YANKEE DIVISION HIGHWAY	129714	134790	140043	140579	137985	124192	<b>1.67%</b>
Wakefield	Continuous	4147	YANKEE DIVISION HIGHWAY	137541	148269	147824	146684	144478	128779	<b>0.98%</b>
Wakefield	Continuous	4423	YANKEE DIVISION HIGHWAY	141707	143419	147386	144627	143036	125903	<b>0.27%</b>

0.91%

**Say 1%**

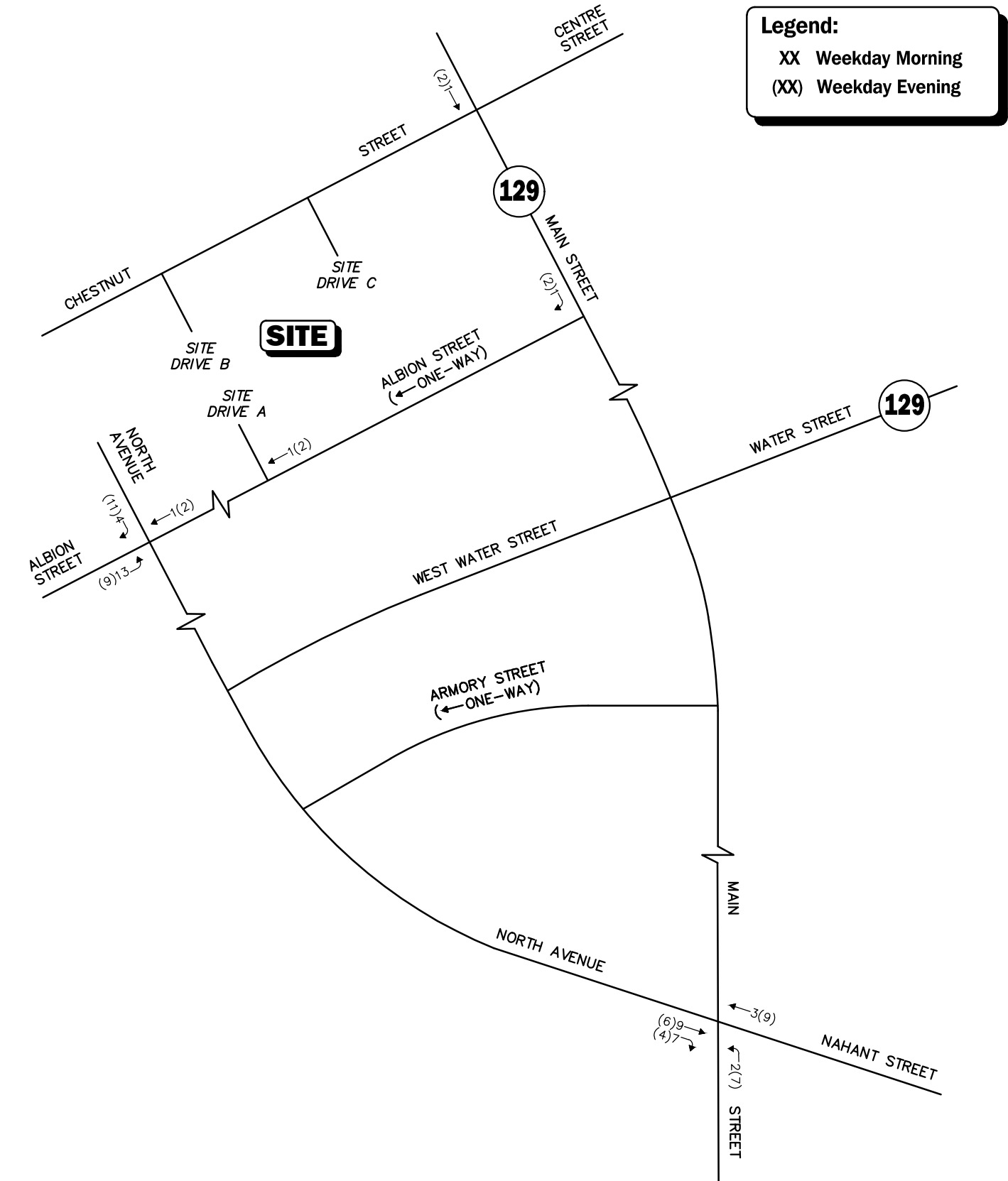
(Source: MassDOT Transportation Data Management System)

2020 data was not included in the growth calculation

## BACKGROUND DEVELOPMET

---





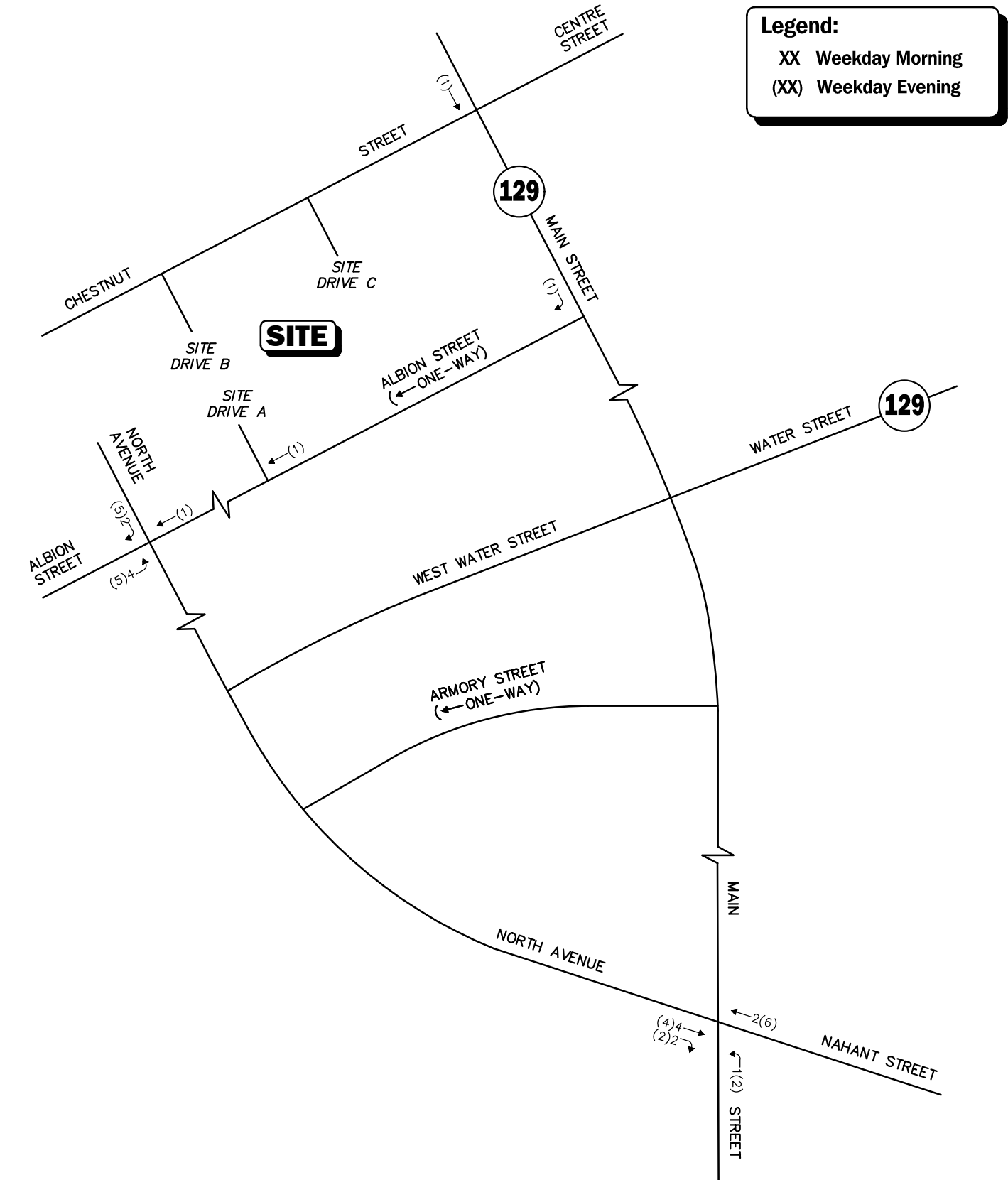
Not To Scale

**Figure A1**



Mixed-Use Development  
 Harvard Mills  
 178 Albion Street  
 Peak Hour Traffic Volume

R:\9378\9378 nt1.dwg, 7/18/2022 9:23:14 AM



Not To Scale

**Figure A2**

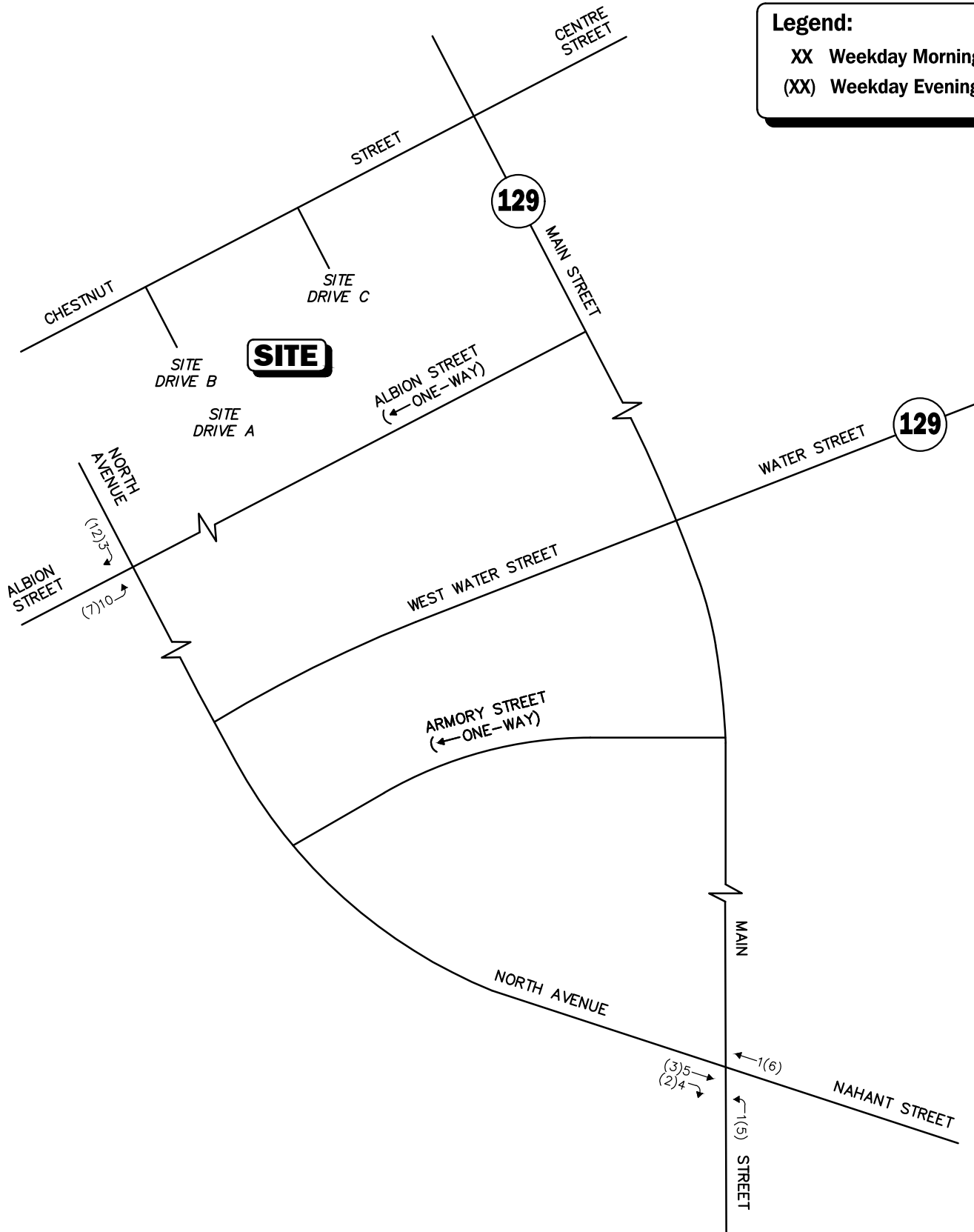


**Residential Development  
 62-76 Foundry Street  
 Peak Hour Traffic Volume**

R:\9378\9378 nt1.dwg, 7/18/2022 9:23:23 AM



**Legend:**  
 XX Weekday Morning  
 (XX) Weekday Evening



Not To Scale

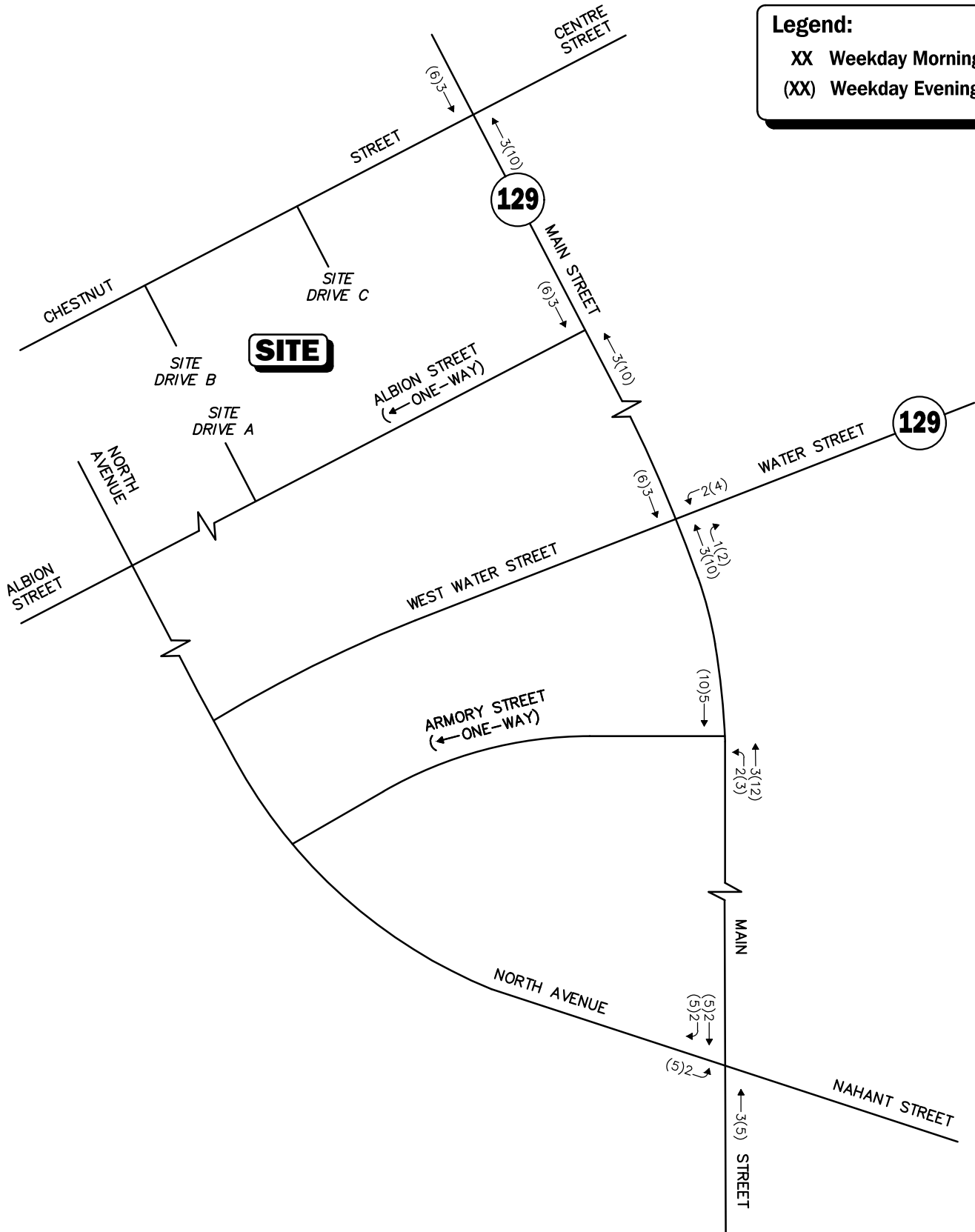
Figure A3



Residential Development  
 69 Foundry Street  
 Peak Hour Traffic Volume

R:\9378\9378 nt1.dwg, 7/18/2022 9:23:31 AM

**Legend:**  
 XX Weekday Morning  
 (XX) Weekday Evening



Not To Scale

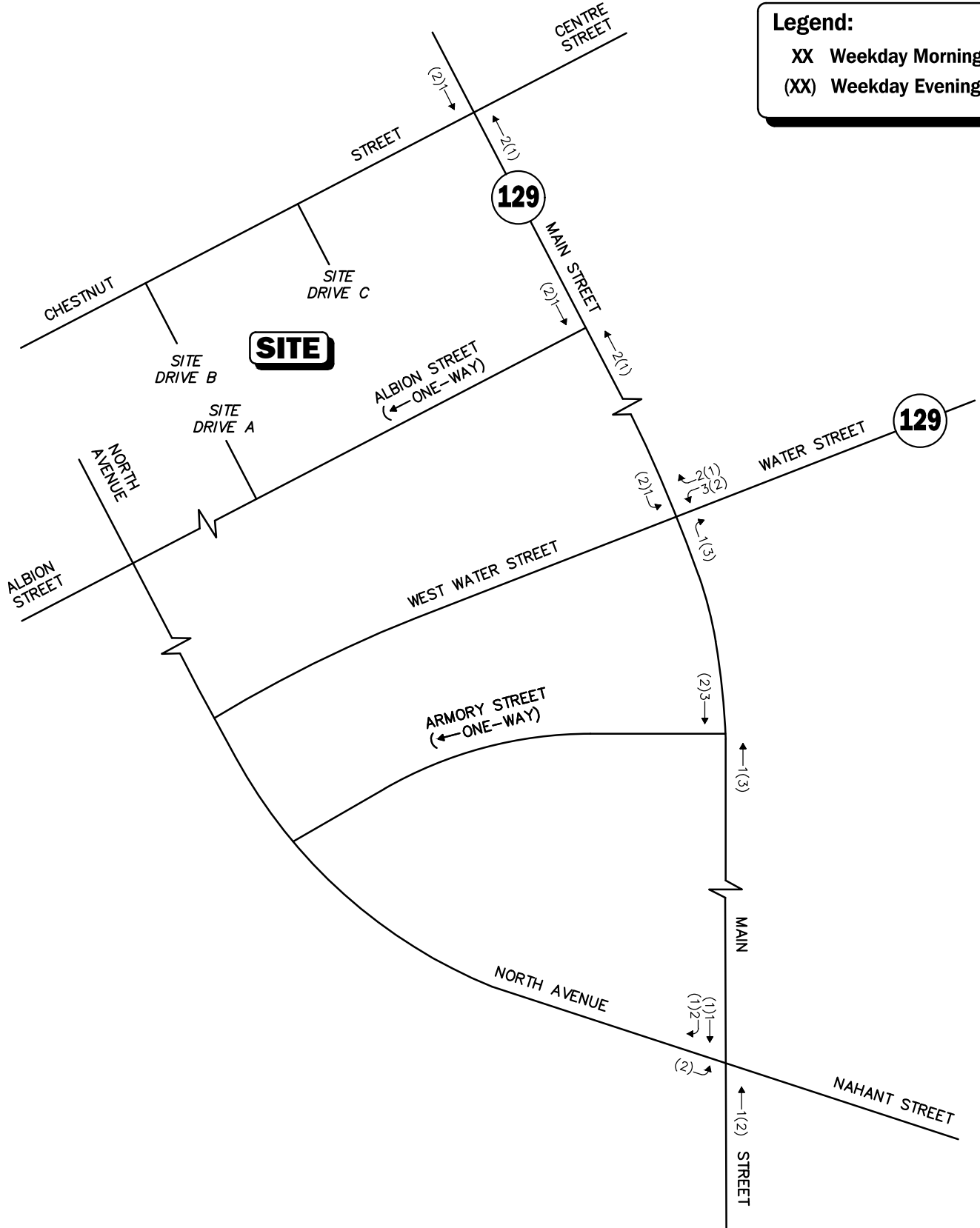
Figure A4



**Bank Development  
 500 Main Street  
 Peak Hour Traffic Volume**

R:\9378\9378 nt1.dwg, 7/18/2022 9:23:39 AM

**Legend:**  
 XX Weekday Morning  
 (XX) Weekday Evening



Not To Scale

**Figure A5**

**Residential Development  
 48 Crescent Street  
 Peak Hour Traffic Volume**



This page is left blank intentionally.

## TRIP DISTRIBUTION

---



Journey to Work: Wakefield MA - Exiting traffic									
Residence in Wakefield									
Town/City/County	Percent	North Avenue (North)	Main Street (North)	Chestnut street (West)	Albion Street (West)	Centre Street (East)	Water Street (East)	Nahant Street	Main Street (South)
Andover town	1.49	1.05	0.30	0.07	0.07				
Beverly city	1.24		0.12			0.50	0.62		
Danvers town	1.38		0.14			0.55	0.69		
Peabody city	2.03		0.20			0.81	1.01		
Salem city	1.05		0.11			0.42	0.53		
Saugus town	1.11						0.39	0.28	0.44
Bedford town	1.42	0.85	0.14	0.14	0.28				
Burlington town	2.85	1.71	0.28	0.28	0.57				
Cambridge city	5.15	2.58	0.52				2.06		
Everett city	1.65						0.58	0.41	0.66
Lexington town	1.41	0.85	0.14	0.14	0.28				
Malden city	1.30			0.13	0.13				1.04
Medford city	1.72	1.03	0.17	0.17	0.34				
Melrose city	2.24			0.22	0.22				1.79
Newton city	1.40	0.77	0.42	0.07	0.14				
Reading town	3.16	0.95	0.95	0.63	0.63				
Somerville city	2.22	1.11	0.44				0.66		
Stoneham town	2.82			1.13	1.69				
Wakefield town	19.00	7.60	1.90	3.80	5.70				
Waltham city	1.64	0.82	0.16	0.16	0.49				
Wilmington town	2.03	0.61	0.61	0.41	0.41				
Winchester town	1.25	0.25		0.25	0.75				
Woburn city	5.76	2.88	0.58	0.58	1.73				
Boston city	17.73	8.87	1.77				7.09		
Chelsea city	1.00	0.25					0.75		
Barnstable County	0.15	0.07	0.01				0.06		
Bristol County	0.10	0.05	0.01				0.04		
Essex County	4.48	1.12	0.22			1.79	1.34		
Middlesex County	7.50	3.75	0.75	0.75	2.25				
Norfolk County	2.65	1.33	0.27				1.06		
Plymouth County	0.10	0.05	0.01				0.04		
Suffolk County	0.54	0.27	0.05				0.22		
Worcester County	0.42	0.21	0.04	0.04	0.13				
<b>TOTAL</b>	<b>100.00</b>	<b>39.01</b>	<b>10.33</b>	<b>8.99</b>	<b>15.83</b>	<b>4.07</b>	<b>17.14</b>	<b>0.69</b>	<b>3.94</b>
<b>USE</b>	<b>100</b>	<b>30</b>	<b>5</b>	<b>5</b>	<b>15</b>	<b>5</b>	<b>20</b>	<b>5</b>	<b>15</b>

Ajadjusted based on other projects in the area

Journey to Work: Wakefield MA - Entering traffic							
Residence in Wakefield							
Town/City/County	Percent	Chestnut street (West)	Main Street (North)	Centre Street (East)	Water Street (East)	Nahant Street	Main Street (South)
Andover town	1.49	1.12	0.37				
Beverly city	1.24		0.19	0.44	0.62		
Danvers town	1.38		0.21	0.48	0.69		
Peabody city	2.03		0.30	0.71	1.01		
Salem city	1.05		0.16	0.37	0.53		
Saugus town	1.11				0.56	0.28	0.28
Bedford town	1.42	0.85	0.57				
Burlington town	2.85	1.71	1.14				
Cambridge city	5.15	1.55	1.03		2.58		
Everett city	1.65				0.82	0.41	0.41
Lexington town	1.41	0.85	0.57				
Malden city	1.30	0.13	0.52				0.65
Medford city	1.72	1.03	0.69				
Melrose city	2.24	0.22	0.90				1.12
Newton city	1.40	0.84	0.56				
Reading town	3.16	1.58	1.58				
Somerville city	2.22	0.66	0.44		1.11		
Stoneham town	2.82	1.13	1.69				
Wakefield town	19.00	9.50	9.50				
Waltham city	1.64	0.99	0.66				
Wilmington town	2.03	1.02	1.02				
Winchester town	1.25	0.50	0.75				
Woburn city	5.76	3.46	2.30				
Boston city	17.73	5.32	3.55		8.87		
Chelsea city	1.00	0.25	0.25		0.50		
Barnstable County	0.15	0.04	0.03		0.07		
Bristol County	0.10	0.03	0.02		0.05		
Essex County	4.48	1.12	0.45	2.46	0.45		
Middlesex County	7.50	4.50	3.00				
Norfolk County	2.65	0.80	0.53		1.33		
Plymouth County	0.10	0.03	0.02		0.05		
Suffolk County	0.54	0.16	0.11		0.27		
Worcester County	0.42	0.25	0.17				
<b>TOTAL</b>	<b>100.00</b>	<b>39.63</b>	<b>33.26</b>	<b>4.46</b>	<b>19.50</b>	<b>0.69</b>	<b>2.46</b>
<b>USE</b>	<b>100</b>	<b>30</b>	<b>25</b>	<b>5</b>	<b>20</b>	<b>5</b>	<b>15</b>

Ajadjusted based on other projects in the area

Journey to Work: Wakefiled MA - Exiting Traffic									
Workplace in Wakefield									
Town/City/County	Percent	North Avenue (North)	Main Street (North)	Chestnut street (West)	Albion Street (West)	Centre Street (East)	Water Street (East)	Nahant Street	Main Street (South)
Andover town	1.19	0.83	0.24	0.06	0.06				
Beverly city	1.57		0.16			0.63	0.79		
Danvers town	1.48		0.15			0.59	0.74		
Haverhill city	1.22	0.85	0.24	0.06	0.06				
Lynn city	5.07						1.78	1.27	2.03
Lynnfield town	3.31	0.99	0.99	0.66	0.66				
Methuen Town city	1.28	0.90	0.26	0.06	0.06				
Peabody city	4.28		0.12			0.49	0.61		
Salem city	1.32		0.51			2.03	2.54		
Saugus town	3.62						1.16	0.83	1.32
Burlington town	1.97	2.57	0.43	0.43	0.86				
Chelmsford town	1.03	0.62	0.10	0.10	0.21				
Everett city	1.57						1.27	0.90	1.45
Framingham town	1.04	0.52	0.10	0.10	0.31				
Lowell city	1.36	0.82	0.14	0.14	0.27				
Malden city	1.52			0.10	0.10				0.83
Medford city	1.44	0.94	0.16	0.16	0.31				
Melrose city	2.96			0.10	0.10				0.83
North Reading town	1.73								
Reading town	2.67	0.46	0.46	0.30	0.30				
Somerville city	1.84	0.72	0.29				0.43		
Stoneham town	3.80			1.18	1.77				
Tewksbury town	1.80	1.08	0.18	0.18	0.36				
Wakefield town	22.18	1.34	0.27	0.27	0.80				
Waltham city	1.01	0.55	0.55	0.37	0.37				
Wilmington town	1.22	0.76		0.76	2.28				
Woburn city	2.30	0.90	0.18	0.18	0.54				
Boston city	2.71	11.09	2.22				8.87		
Barnstable County	0.31	0.61	0.12				0.49		
Bristol County	0.56	1.15	0.23				0.92		
Essex County	6.68	0.68	0.14			1.08	0.81		
Hampden County	0.21	0.14	0.04	0.01	0.01				
Hampshire County	0.14	0.10	0.03	0.01	0.01				
Middlesex County	7.29	0.15	0.03	0.03	0.09				
Norfolk County	2.91	0.28	0.06				0.22		
Plymouth County	1.01	3.34	0.67				2.67		
Suffolk County	1.31	0.10	0.02				0.08		
Worcester County	1.11	0.07	0.01	0.01	0.04				
<b>TOTAL</b>	<b>100.00</b>	<b>32.56</b>	<b>9.08</b>	<b>5.29</b>	<b>9.59</b>	<b>4.82</b>	<b>23.37</b>	<b>3.00</b>	<b>6.46</b>
<b>USE</b>	<b>100</b>	<b>35</b>	<b>10</b>	<b>5</b>	<b>10</b>	<b>5</b>	<b>25</b>	<b>5</b>	<b>5</b>

Journey to Work: Wakefiled MA - Entering							
Workplace in Wakefield							
Town/City/County	Percent	Chestnut street (West)	Main Street (North)	Centre Street (East)	Water Street (East)	Nahant Street	Main Street (South)
Andover town	1.19	0.89	0.30				
Beverly city	1.57		0.39	0.39	0.79		
Danvers town	1.48		0.37	0.37	0.74		
Haverhill city	1.22	0.92	0.31				
Lynn city	5.07				2.54	1.27	1.27
Lynnfield town	3.31	1.66	1.66				
Methuen Town city	1.28	0.96	0.32				
Peabody city	4.28		0.31	0.31	0.61		
Salem city	1.32		1.27	1.27	2.54		
Saugus town	3.62				1.66	0.83	0.83
Burlington town	1.97	2.57	1.71				
Chelmsford town	1.03						
Everett city	1.57				1.81	0.90	0.90
Framingham town	1.04	0.62	0.42				
Lowell city	1.36	0.82	0.54				
Malden city	1.52	0.10	0.41				0.52
Medford city	1.44	0.94	0.63				
Melrose city	2.96	0.10	0.42				0.52
North Reading town	1.73	0.52	0.52	0.35	0.35		
Reading town	2.67	0.76	0.76				
Somerville city	1.84	0.43	0.29		0.72		
Stoneham town	3.80	1.18	1.77				
Tewksbury town	1.80	1.08	0.72				
Wakefield town	22.18	1.60	1.07				
Waltham city	1.01	0.92	0.92				
Wilmington town	1.22	1.52	2.28				
Woburn city	2.30	1.08	0.72				
Boston city	2.71	6.65	4.44		11.09		
Barnstable County	0.31	0.37	0.24		0.61		
Bristol County	0.56	0.69	0.46		1.15		
Essex County	6.68	0.68	0.68	1.08	0.27		
Hampden County	0.21	0.15	0.05				
Hampshire County	0.14	0.10	0.03				
Middlesex County	7.29	0.19	0.12				
Norfolk County	2.91	0.17	0.11		0.28		
Plymouth County	1.01	2.00	1.34		3.34		
Suffolk County	1.31	0.06	0.04		0.10		
Worcester County	1.11	0.08	0.06				
<b>TOTAL</b>	<b>100.00</b>	<b>29.82</b>	<b>25.66</b>	<b>3.77</b>	<b>28.58</b>	<b>3.00</b>	<b>4.04</b>
<b>USE</b>	<b>100</b>	<b>30</b>	<b>30</b>	<b>5</b>	<b>25</b>	<b>5</b>	<b>5</b>

## TRIP GENERATION

---





# Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

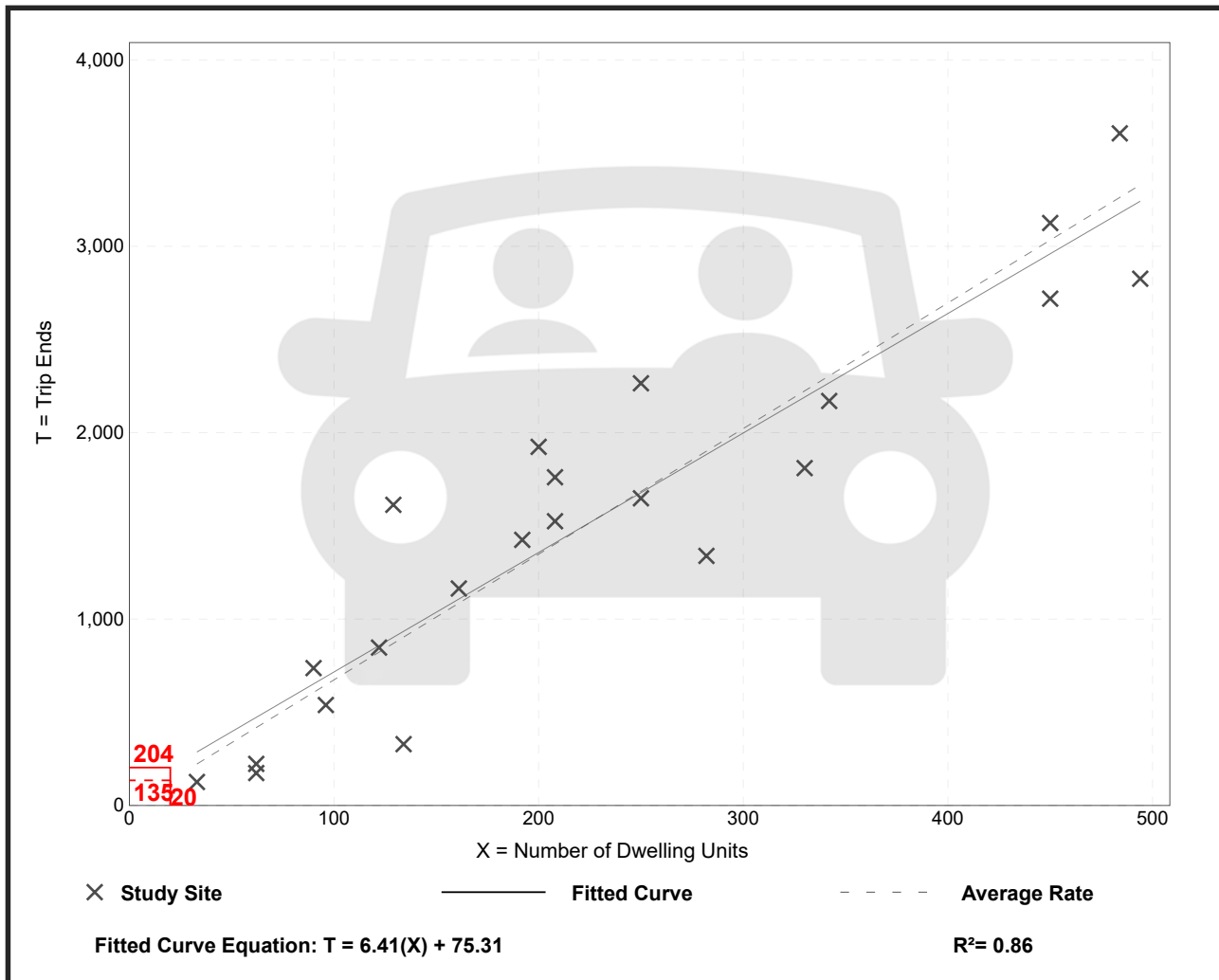
Vehicle Trip Ends vs: Dwelling Units  
On a: Weekday

Setting/Location: General Urban/Suburban  
Number of Studies: 22  
Avg. Num. of Dwelling Units: 229  
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
6.74	2.46 - 12.50	1.79

## Data Plot and Equation



# Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units  
On a: Weekday,  
Peak Hour of Adjacent Street Traffic,  
One Hour Between 7 and 9 a.m.

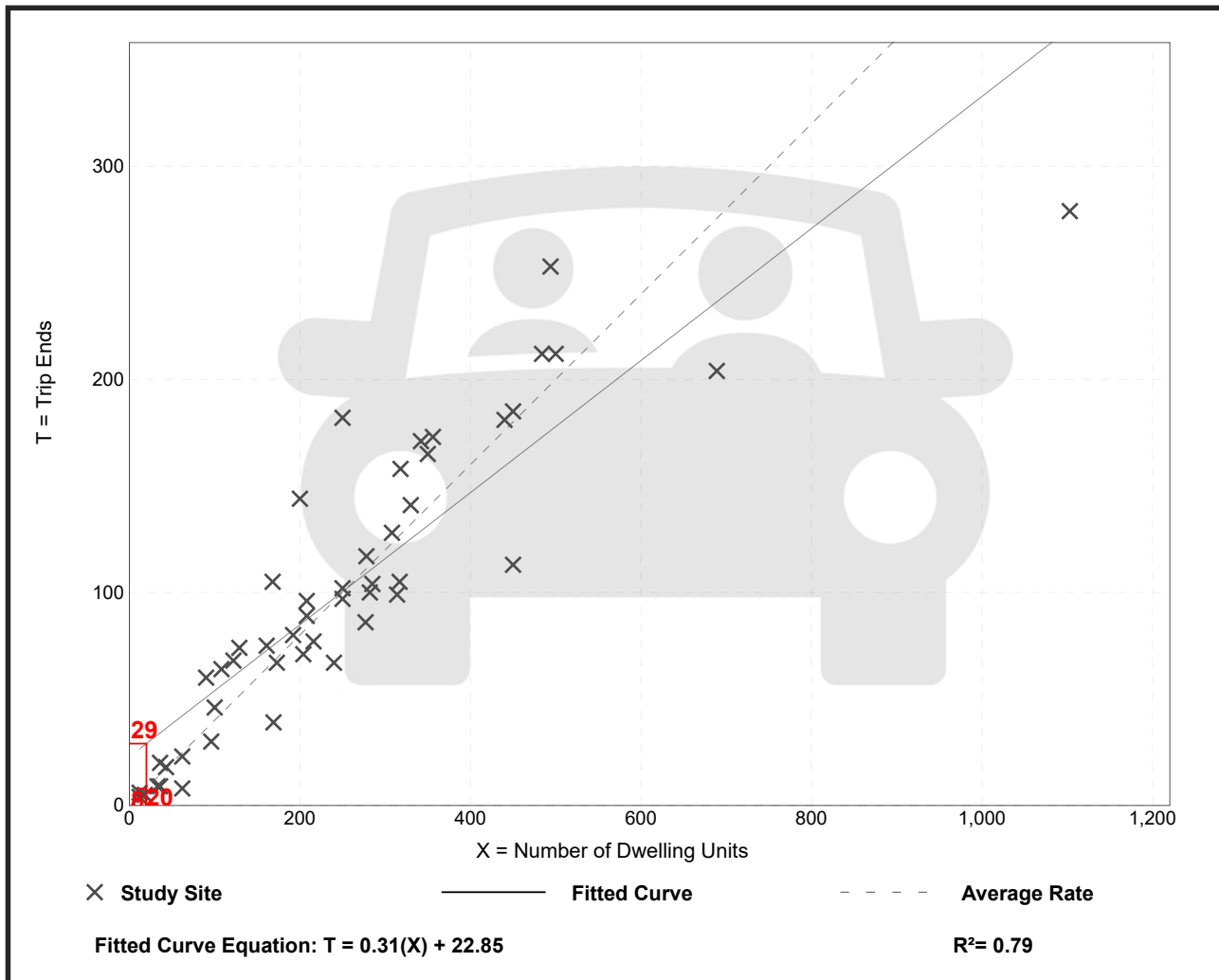
Setting/Location: General Urban/Suburban

Number of Studies: 49  
Avg. Num. of Dwelling Units: 249  
Directional Distribution: 24% entering, 76% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.40	0.13 - 0.73	0.12

## Data Plot and Equation



# Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units  
On a: Weekday,  
Peak Hour of Adjacent Street Traffic,  
One Hour Between 4 and 6 p.m.

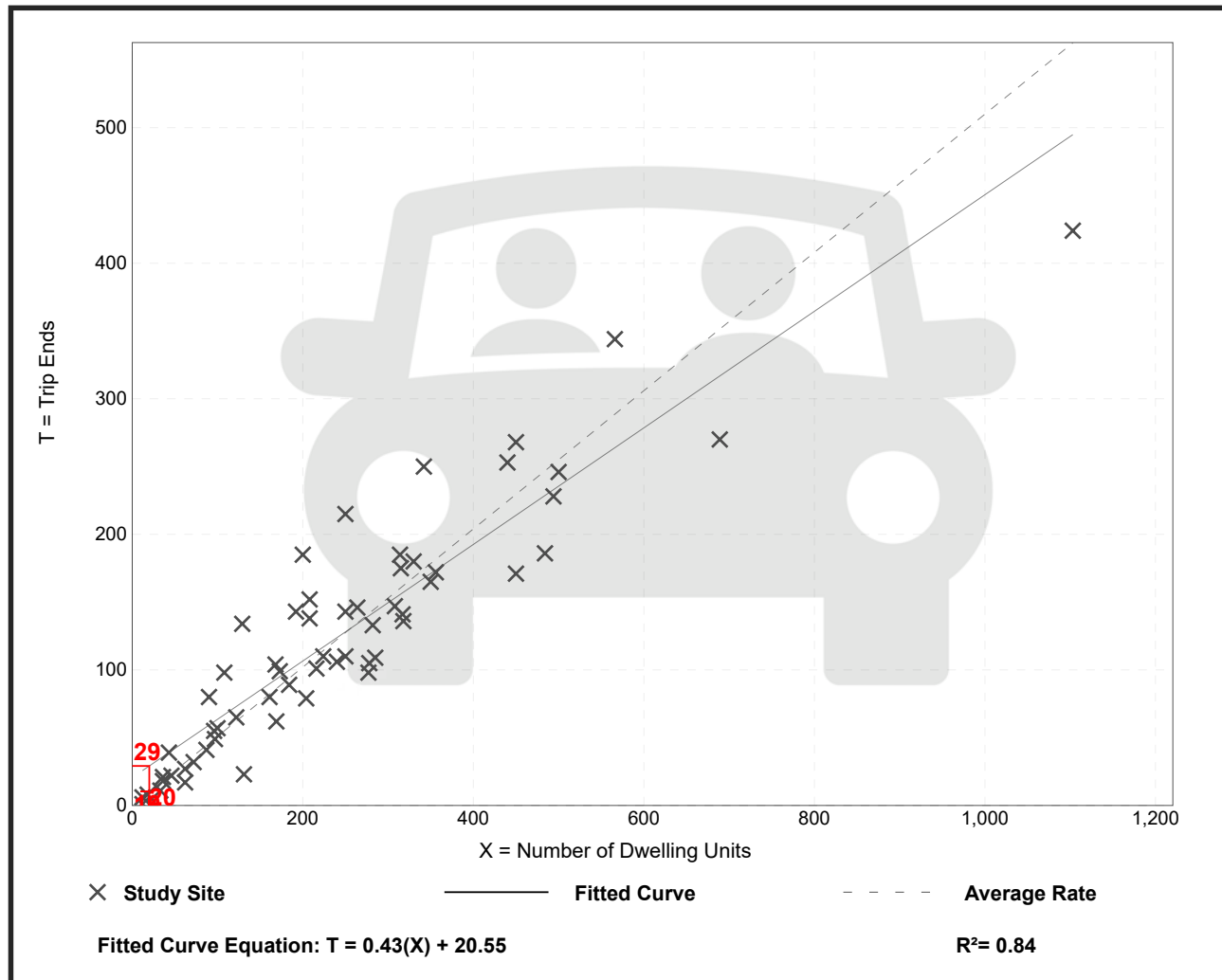
Setting/Location: General Urban/Suburban

Number of Studies: 59  
Avg. Num. of Dwelling Units: 241  
Directional Distribution: 63% entering, 37% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.51	0.08 - 1.04	0.15

## Data Plot and Equation



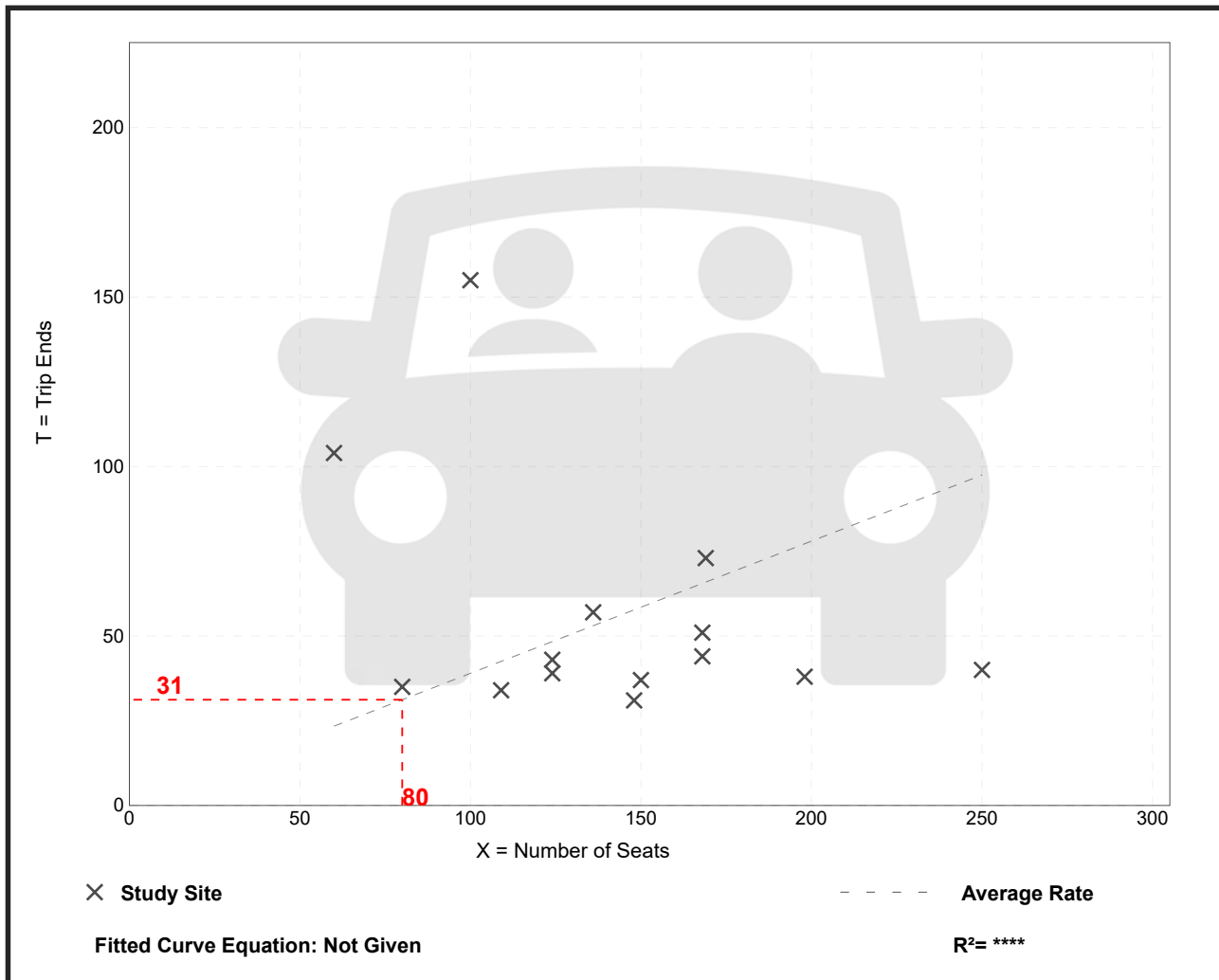
# High-Turnover (Sit-Down) Restaurant (932)

**Vehicle Trip Ends vs: Seats**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**  
**Setting/Location: General Urban/Suburban**  
 Number of Studies: 14  
 Avg. Num. of Seats: 142  
 Directional Distribution: 57% entering, 43% exiting

## Vehicle Trip Generation per Seat

Average Rate	Range of Rates	Standard Deviation
0.39	0.16 - 1.73	0.39

## Data Plot and Equation



# High-Turnover (Sit-Down) Restaurant (932)

Vehicle Trip Ends vs: **Seats**  
On a: **Weekday**

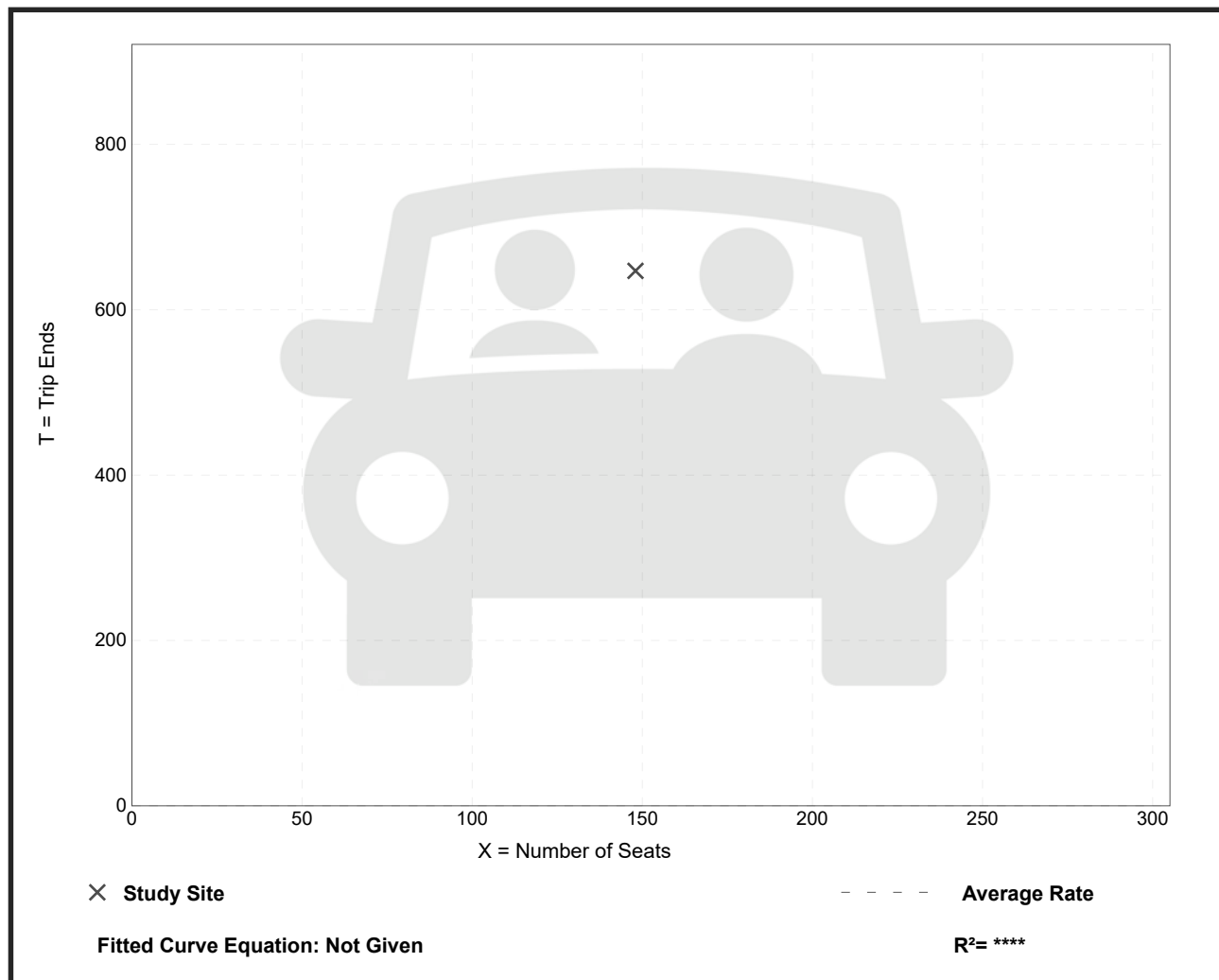
Setting/Location: **General Urban/Suburban**  
Number of Studies: 1  
Avg. Num. of Seats: 148  
Directional Distribution: 50% entering, 50% exiting

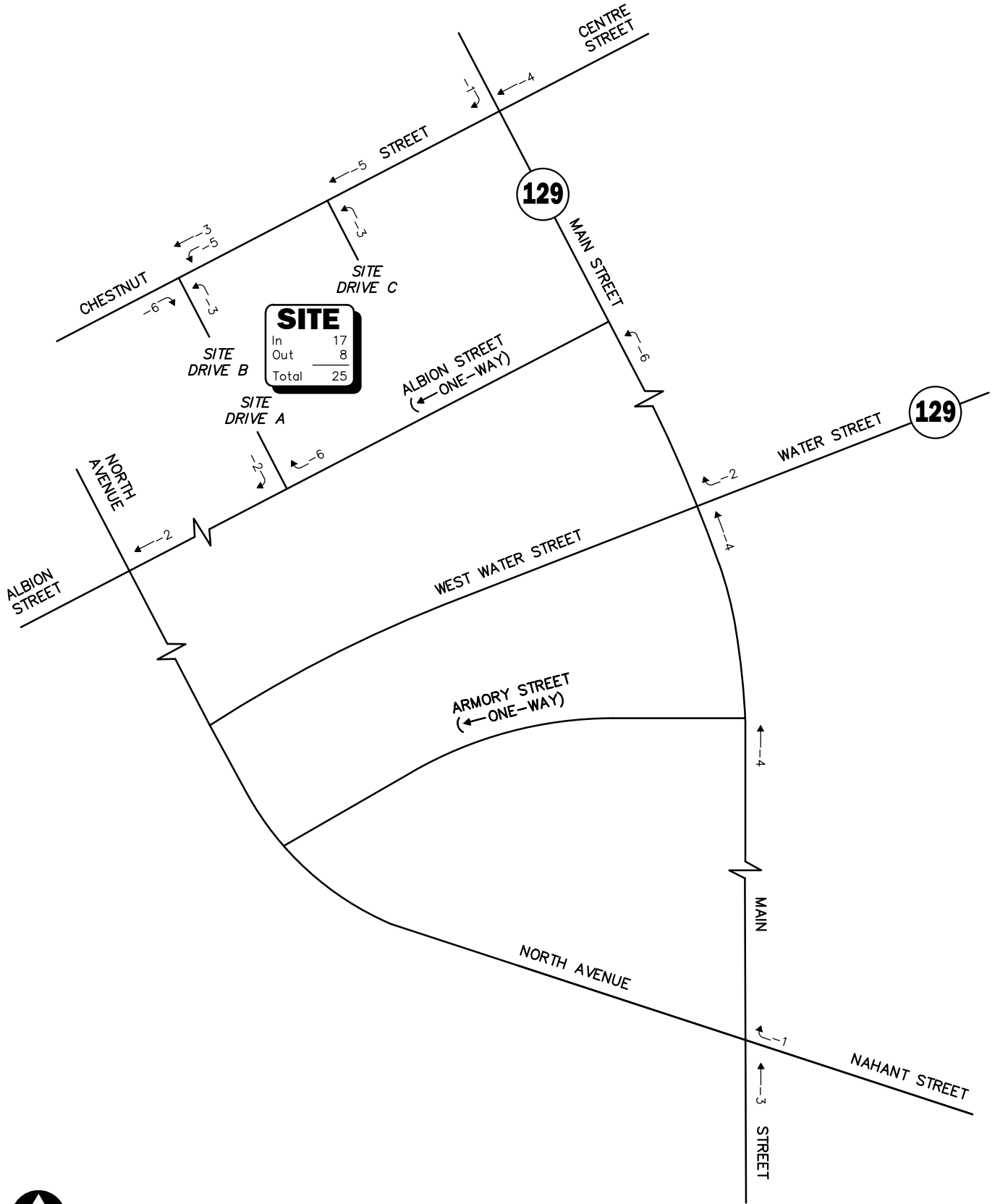
## Vehicle Trip Generation per Seat

Average Rate	Range of Rates	Standard Deviation
4.37	4.37 - 4.37	*

## Data Plot and Equation

*Caution – Small Sample Size*



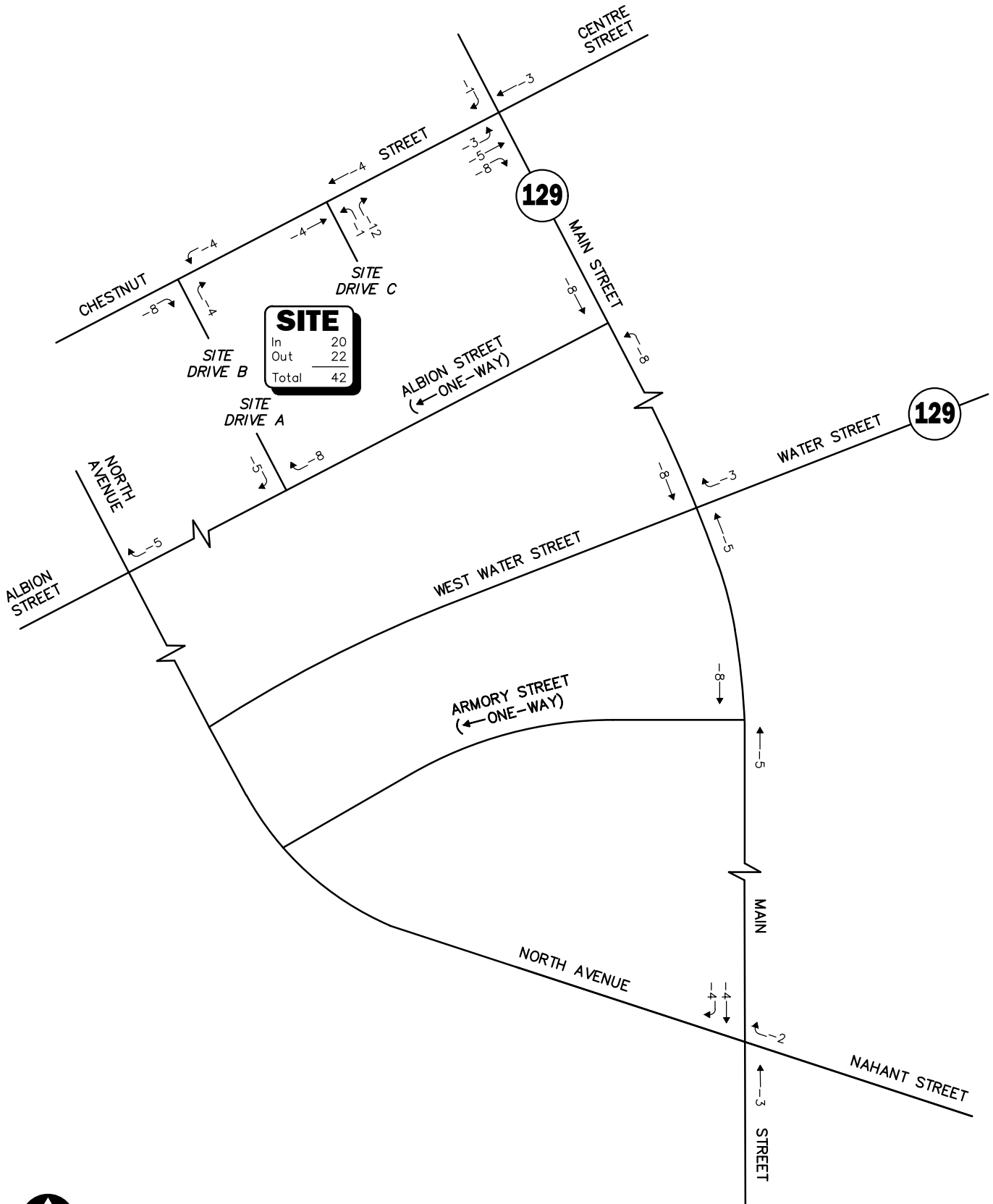


Not To Scale

**Figure A6**  
**Existing Site Trip Deduction**  
**Weekday Morning**  
**Peak Hour Traffic Volume**



R:\9378\9378 nt1.dwg, 7/29/2022 11:47:10 AM



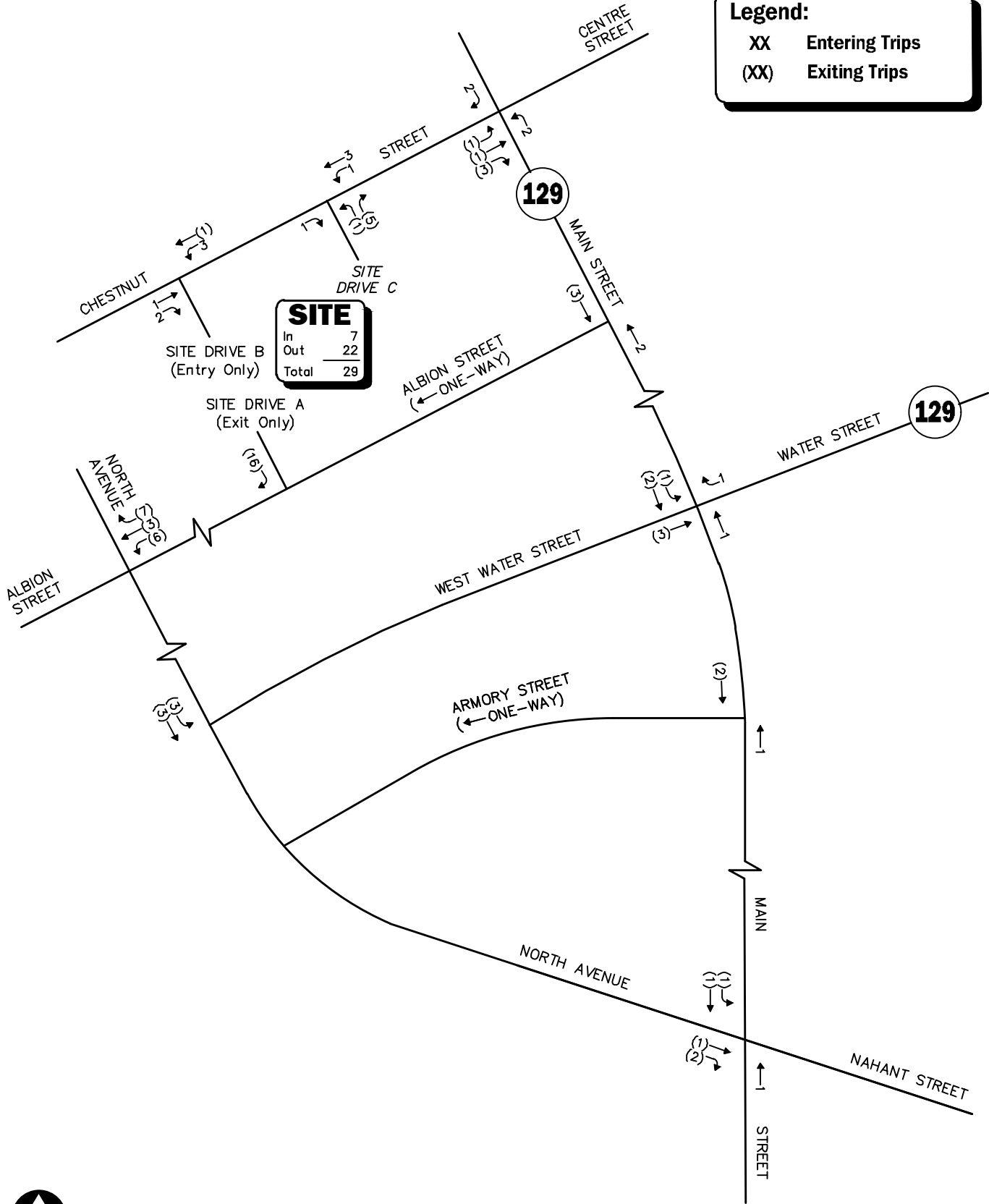
Not To Scale

Figure A7



Existing Site Trip Deduction  
Weekday Evening  
Peak Hour Traffic Volume

**Legend:**  
**XX** Entering Trips  
**(XX)** Exiting Trips



 Not To Scale

**Figure A8**



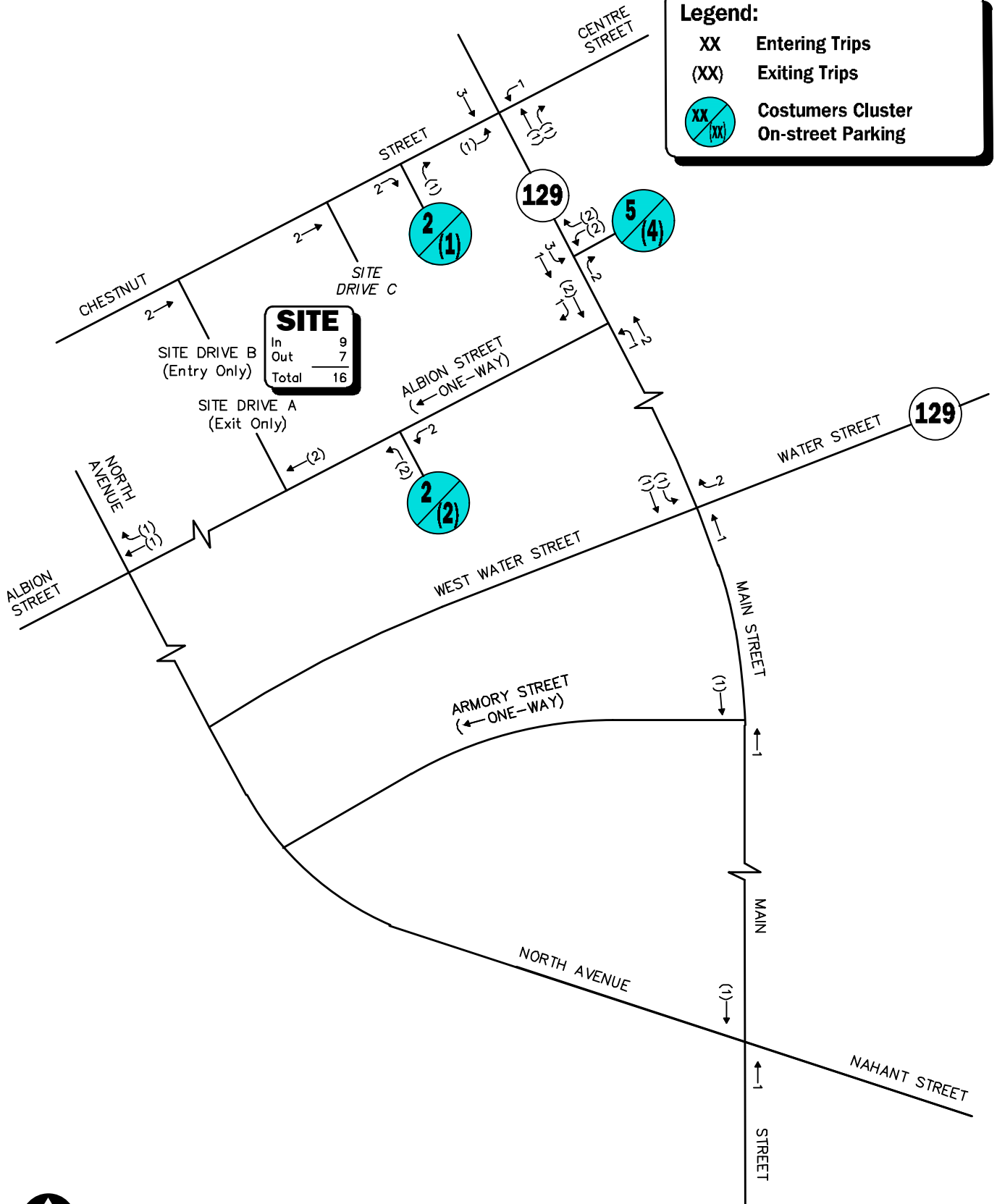
**Project Generated  
 Residential Component  
 Weekday Morning  
 Peak Hour Traffic Volume**





**Legend:**

- XX** Entering Trips
- (XX)** Exiting Trips
- XX/XX** Customers Cluster On-street Parking



 Not To Scale

**Figure A10**



**Project Generated  
Restaurant Component  
Weekday Evening  
Peak Hour Traffic Volume**

## PARKING ANALYSIS

---



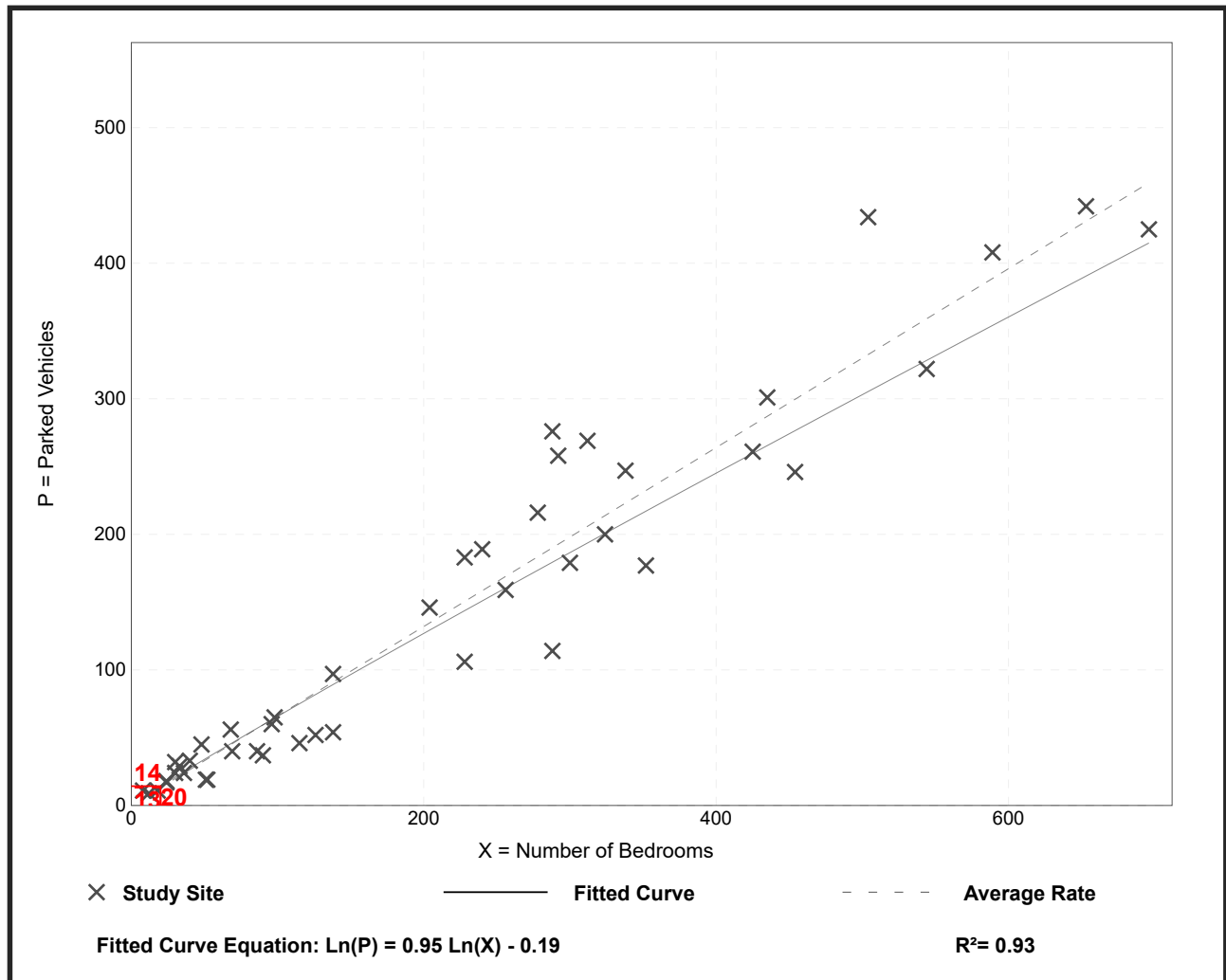
# Multifamily Housing (Low-Rise) (220)

**Peak Period Parking Demand vs: Bedrooms**  
**On a: Weekday (Monday - Friday)**  
**Setting/Location: General Urban/Suburban (no nearby rail transit)**  
**Peak Period of Parking Demand: 11:00 p.m. - 6:00 a.m.**  
 Number of Studies: 45  
 Avg. Num. of Bedrooms: 215

## Peak Period Parking Demand per Bedroom

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
0.66	0.37 - 1.38	0.61 / 0.86	0.62 - 0.70	0.15 (23%)

## Data Plot and Equation



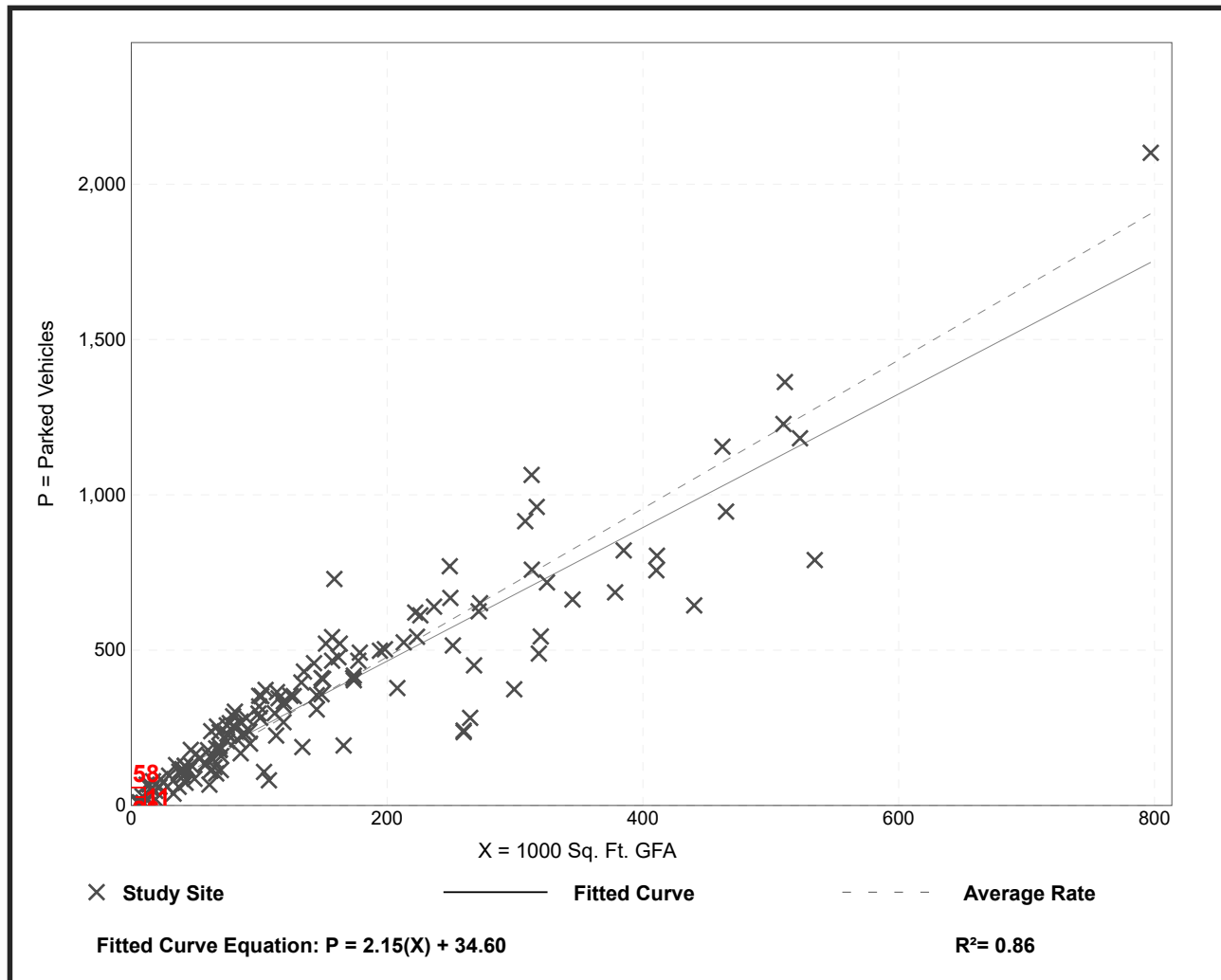
# General Office Building (710)

**Peak Period Parking Demand vs: 1000 Sq. Ft. GFA**  
**On a: Weekday (Monday - Friday)**  
**Setting/Location: General Urban/Suburban**  
**Peak Period of Parking Demand: 9:00 a.m. - 3:00 p.m.**  
 Number of Studies: 148  
 Avg. 1000 Sq. Ft. GFA: 145

## Peak Period Parking Demand per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
2.39	0.50 - 5.58	2.30 / 3.30	2.28 - 2.50	0.69 (29%)

## Data Plot and Equation



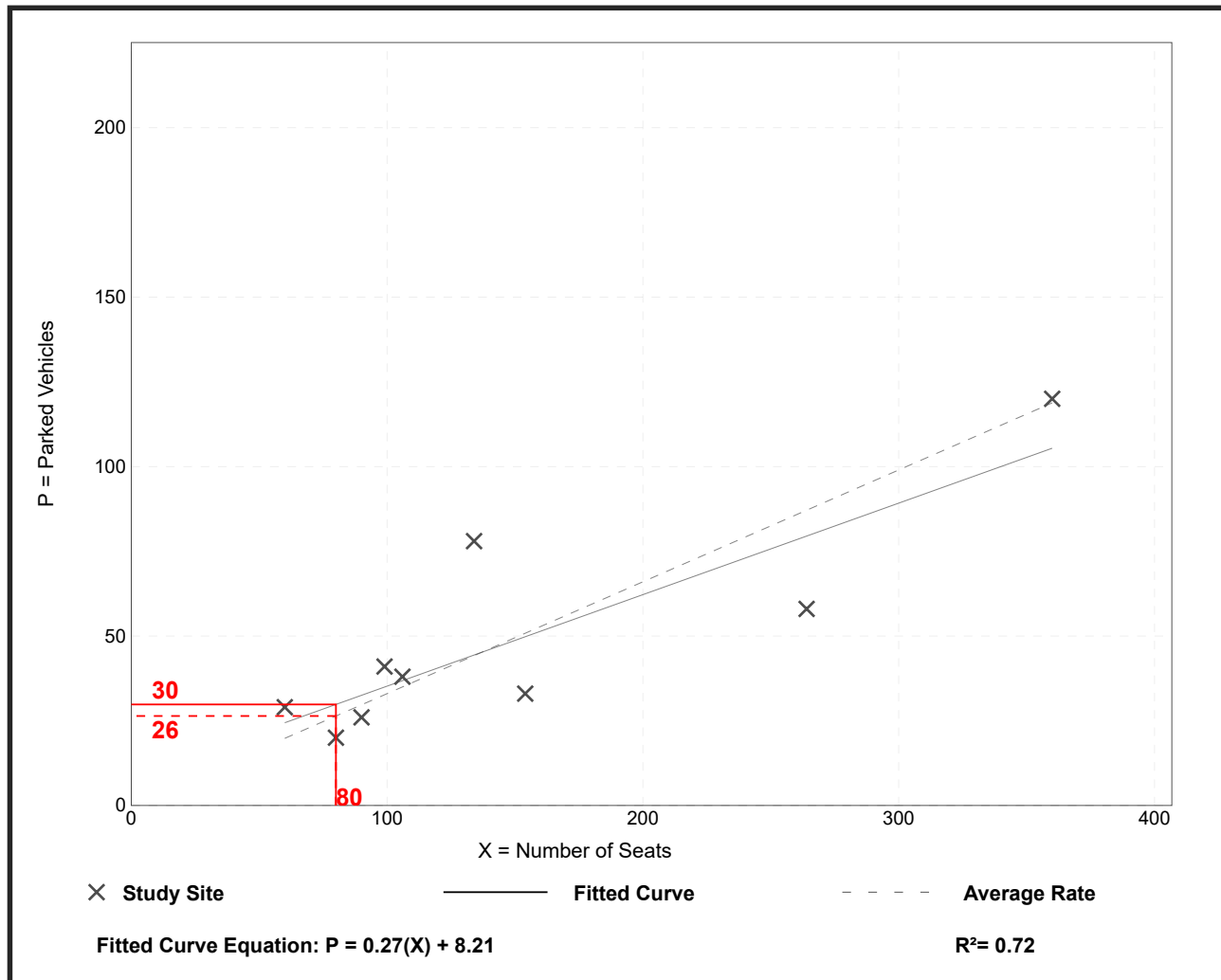
# High-Turnover (Sit Down) Restaurant - Family (932)

**Peak Period Parking Demand vs: Seats**  
**On a: Weekday (Monday - Thursday)**  
**Setting/Location: General Urban/Suburban**  
**Peak Period of Parking Demand: 12:00 - 1:00 p.m.; 6:00 - 8:00 p.m.**  
 Number of Studies: 9  
 Avg. Num. of Seats: 150

## Peak Period Parking Demand per Seat

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
0.33	0.21 - 0.58	0.26 / 0.53	***	0.12 (36%)

## Data Plot and Equation



## CAPACITY ANALYSIS

---

2022 Existing Weekday Morning Peak Hour  
2022 Existing Weekday Evening Peak Hour  
2029 No-Build Weekday Morning Peak Hour  
2029 No-Build Weekday Evening Peak Hour  
2029 Build Weekday Morning Peak Hour  
2029 Build Weekday Evening Peak Hour



2022 Existing Weekday Morning Peak Hour

---

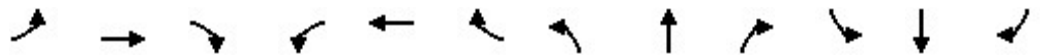




Lanes, Volumes, Timings

2022 Existing Weekday Morning Peak Hour

12: Main Street /Main Street (Route 129) & West Water Street/Water Street (Route 129) 07/18/2022

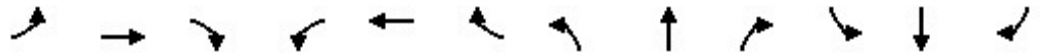


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔		↔	↔	↔	↔	
Traffic Volume (vph)	14	123	10	292	134	175	16	341	223	96	543	32
Future Volume (vph)	14	123	10	292	134	175	16	341	223	96	543	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	12	12	11	15	12	12	12	11	12	12
Storage Length (ft)	0		0	0		115	0		65	90		0
Storage Lanes	0		0	0		1	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991				0.850			0.850		0.992	
Flt Protected		0.995			0.967			0.998		0.950		
Satd. Flow (prot)	0	2009	0	0	1753	1692	0	1860	1568	1745	1833	0
Flt Permitted		0.833			0.677			0.958		0.246		
Satd. Flow (perm)	0	1682	0	0	1227	1692	0	1785	1568	452	1833	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				84			97			3
Link Speed (mph)		30			30			30				30
Link Distance (ft)		863			474			313				440
Travel Time (s)		19.6			10.8			7.1				10.0
Peak Hour Factor	0.85	0.85	0.85	0.94	0.94	0.94	0.79	0.79	0.79	0.83	0.83	0.83
Heavy Vehicles (%)	0%	2%	13%	1%	2%	5%	1%	2%	3%	0%	3%	0%
Adj. Flow (vph)	16	145	12	311	143	186	20	432	282	116	654	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	173	0	0	454	186	0	452	282	116	693	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	0.88	1.00	1.00	1.04	0.88	1.00	1.00	1.00	1.04	1.00	1.00
Turning Speed (mph)	60		60	60		60	60		60	60		60
Number of Detectors	1	2		1	2	1	1	2	1	1		2
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	

Lanes, Volumes, Timings

2022 Existing Weekday Morning Peak Hour

12: Main Street /Main Street (Route 129) & West Water Street/Water Street (Route 129) 7/18/2022

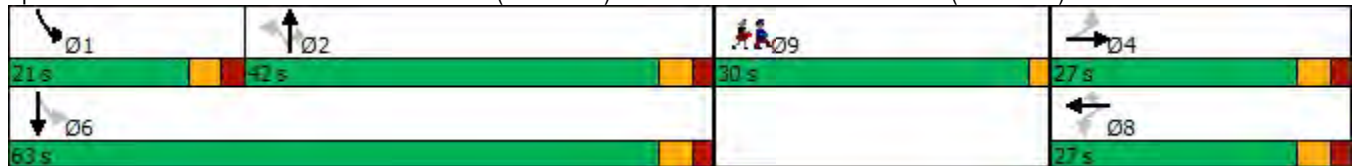


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	10.0	22.5	
Total Split (s)	27.0	27.0		27.0	27.0	27.0	42.0	42.0	42.0	21.0	63.0	
Total Split (%)	22.5%	22.5%		22.5%	22.5%	22.5%	35.0%	35.0%	35.0%	17.5%	52.5%	
Maximum Green (s)	22.0	22.0		22.0	22.0	22.0	37.0	37.0	37.0	16.0	58.0	
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	5.0	5.0	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	Min	Min	Min	None	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		23.4			23.4	23.4		27.4	27.4	37.8	37.8	
Actuated g/C Ratio		0.31			0.31	0.31		0.37	0.37	0.51	0.51	
v/c Ratio		0.33			1.18	0.32		0.69	0.44	0.31	0.74	
Control Delay		27.4			134.3	17.1		27.9	15.1	12.1	20.3	
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		27.4			134.3	17.1		27.9	15.1	12.1	20.3	
LOS		C			F	B		C	B	B	C	
Approach Delay		27.4			100.2			23.0			19.1	
Approach LOS		C			F			C			B	

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	74.5
Natural Cycle:	150
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.18
Intersection Signal Delay:	43.0
Intersection LOS:	D
Intersection Capacity Utilization:	97.1%
ICU Level of Service:	F
Analysis Period (min):	15

Splits and Phases: 12: Main Street /Main Street (Route 129) & West Water Street/Water Street (Route 129)



Queues

2022 Existing Weekday Morning Peak Hour

12: Main Street /Main Street (Route 129) & West Water Street/Water Street (Route 129) 7/18/2022
























Lane Group	EBT	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	173	454	186	452	282	116	693
v/c Ratio	0.33	1.18	0.32	0.69	0.44	0.31	0.74
Control Delay	27.4	134.3	17.1	27.9	15.1	12.1	20.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.4	134.3	17.1	27.9	15.1	12.1	20.3
Queue Length 50th (ft)	55	~241	32	163	56	22	200
Queue Length 95th (ft)	167	#688	132	316	136	64	433
Internal Link Dist (ft)	783	394		233			360
Turn Bay Length (ft)			115		65	90	
Base Capacity (vph)	529	385	588	954	883	524	1470
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	1.18	0.32	0.47	0.32	0.22	0.47

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Lanes, Volumes, Timings  
22: North Avenue & Albion Street

2022 Existing Weekday Morning Peak Hour  
07/18/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	132	0	162	37	294	83	129	450	0	0	366	37
Future Volume (vph)	132	0	162	37	294	83	129	450	0	0	366	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	11	11	13	11	12	12	12	12	13	12
Storage Length (ft)	0		0	90		90	160		0	0		100
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850						0.850
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1604	0	1561	1745	1944	1516	1787	1845	0	0	1870	1568
Flt Permitted	0.950			0.950			0.950					
Satd. Flow (perm)	1604	0	1561	1745	1944	1516	1787	1845	0	0	1870	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			188			124						124
Link Speed (mph)		30			30			30				30
Link Distance (ft)		444			778			489				370
Travel Time (s)		10.1			17.7			11.1				8.4
Peak Hour Factor	0.86	0.86	0.86	0.76	0.76	0.76	0.81	0.81	0.81	0.92	0.92	0.92
Heavy Vehicles (%)	5%	0%	0%	0%	1%	3%	1%	3%	0%	0%	5%	3%
Adj. Flow (vph)	153	0	188	49	387	109	159	556	0	0	398	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	153	0	188	49	387	109	159	556	0	0	398	40
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.09	1.00	1.04	1.04	0.96	1.04	1.00	1.00	1.00	1.00	0.96	1.00
Turning Speed (mph)	60		60	60		60	60		60	60		60
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)	20		20	20	100	20	20	100			100	20
Trailing Detector (ft)	0		0	0	0	0	0	0			0	0
Detector 1 Position(ft)	0		0	0	0	0	0	0			0	0
Detector 1 Size(ft)	20		20	20	6	20	20	6			6	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94				94
Detector 2 Size(ft)					6			6				6
Detector 2 Type					Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				0.0
Turn Type	Prot		Prot	Split	NA	Prot	Prot	NA			NA	Perm

Lanes, Volumes, Timings  
22: North Avenue & Albion Street

2022 Existing Weekday Morning Peak Hour  
07/18/2022

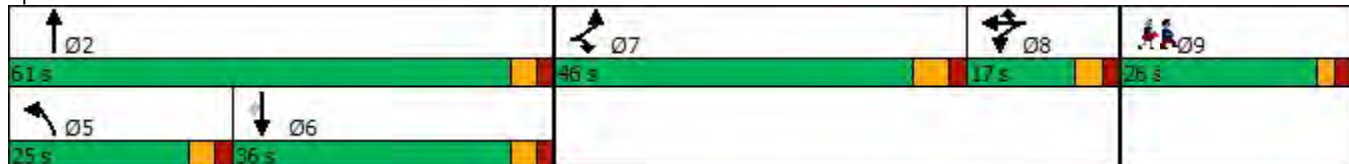


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7		7	8	8	8	5	2			6	
Permitted Phases												6
Detector Phase	7		7	8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Minimum Split (s)	22.5		22.5	17.0	17.0	17.0	10.0	22.5			22.5	22.5
Total Split (s)	46.0		46.0	17.0	17.0	17.0	25.0	61.0			36.0	36.0
Total Split (%)	30.7%		30.7%	11.3%	11.3%	11.3%	16.7%	40.7%			24.0%	24.0%
Maximum Green (s)	40.0		40.0	12.0	12.0	12.0	20.0	56.0			31.0	31.0
Yellow Time (s)	4.0		4.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)	6.0		6.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag	Lead		Lead	Lag	Lag	Lag	Lead				Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes				Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode	None		None	None	None	None	None	Min			Min	Min
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	16.2		16.2	12.5	12.5	12.5	14.9	52.5			32.3	32.3
Actuated g/C Ratio	0.15		0.15	0.11	0.11	0.11	0.13	0.47			0.29	0.29
v/c Ratio	0.66		0.49	0.25	1.78	0.39	0.67	0.64			0.73	0.07
Control Delay	61.8		11.1	56.7	396.9	11.5	63.3	30.2			49.5	0.3
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	61.8		11.1	56.7	396.9	11.5	63.3	30.2			49.5	0.3
LOS	E		B	E	F	B	E	C			D	A
Approach Delay		33.8			289.2			37.5			45.0	
Approach LOS		C			F			D			D	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	111.4
Natural Cycle:	130
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.78
Intersection Signal Delay:	105.8
Intersection LOS:	F
Intersection Capacity Utilization:	65.0%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 22: North Avenue & Albion Street



Queues  
22: North Avenue & Albion Street

2022 Existing Weekday Morning Peak Hour  
07/18/2022



Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	153	188	49	387	109	159	556	398	40
v/c Ratio	0.66	0.49	0.25	1.78	0.39	0.67	0.64	0.73	0.07
Control Delay	61.8	11.1	56.7	396.9	11.5	63.3	30.2	49.5	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.8	11.1	56.7	396.9	11.5	63.3	30.2	49.5	0.3
Queue Length 50th (ft)	118	0	37	~485	0	123	360	303	0
Queue Length 95th (ft)	186	56	71	#606	21	184	462	#535	0
Internal Link Dist (ft)				698			409	290	
Turn Bay Length (ft)			90		90	160			100
Base Capacity (vph)	601	702	196	218	280	334	967	543	543
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.27	0.25	1.78	0.39	0.48	0.57	0.73	0.07

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Lanes, Volumes, Timings  
27: Main Street & North Avenue/Nahant Street

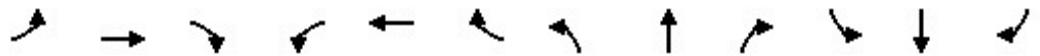
2022 Existing Weekday Morning Peak Hour  
07/18/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	124	249	387	40	394	73	407	530	47	48	469	144
Future Volume (vph)	124	249	387	40	394	73	407	530	47	48	469	144
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	11	12	12	11	11	12
Storage Length (ft)	0		0	0		0	80		0	60		100
Storage Lanes	1		1	0		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frt			0.850		0.981			0.988			0.965	
Flt Protected	0.950				0.996		0.950			0.950		
Satd. Flow (prot)	1631	1801	1546	0	1838	0	1728	1860	0	1745	3317	0
Flt Permitted	0.138				0.785		0.950			0.355		
Satd. Flow (perm)	237	1801	1546	0	1448	0	1728	1860	0	652	3317	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			445		6			4				28
Link Speed (mph)		30			30			30				30
Link Distance (ft)		311			845			622				1355
Travel Time (s)		7.1			19.2			14.1				30.8
Peak Hour Factor	0.87	0.87	0.87	0.86	0.86	0.86	0.82	0.82	0.82	0.84	0.84	0.84
Heavy Vehicles (%)	7%	2%	1%	3%	1%	0%	1%	1%	0%	0%	2%	0%
Adj. Flow (vph)	143	286	445	47	458	85	496	646	57	57	558	171
Shared Lane Traffic (%)												
Lane Group Flow (vph)	143	286	445	0	590	0	496	703	0	57	729	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			11				11
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.00	1.00	1.00	1.04	1.00	1.00	1.04	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA	pt+ov	Perm	NA		Prot	NA		Perm	NA	

Lanes, Volumes, Timings  
27: Main Street & North Avenue/Nahant Street

2022 Existing Weekday Morning Peak Hour  
07/18/2022

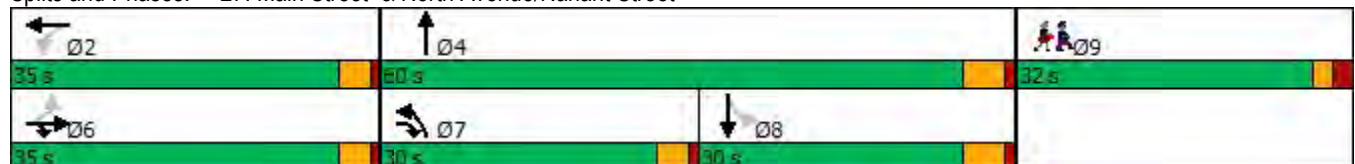


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		6	6 7		2		7	4				8
Permitted Phases	6			2						8		
Detector Phase	6	6	6 7	2	2		7	4		8		8
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0		5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	23.0		23.0		23.0
Total Split (s)	35.0	35.0		35.0	35.0		30.0	60.0		30.0		30.0
Total Split (%)	27.6%	27.6%		27.6%	27.6%		23.6%	47.2%		23.6%		23.6%
Maximum Green (s)	31.0	31.0		31.0	31.0		26.0	55.0		25.0		25.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	4.0		4.0		4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0		1.0
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0		0.0
Total Lost Time (s)	4.0	4.0			4.0		4.0	5.0		5.0		5.0
Lead/Lag							Lead			Lag		Lag
Lead-Lag Optimize?							Yes			Yes		Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0		3.0
Recall Mode	Max	Max		Max	Max		None	None		None		None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	31.6	31.6	62.2		31.6		26.5	56.1		25.5		25.5
Actuated g/C Ratio	0.28	0.28	0.54		0.28		0.23	0.49		0.22		0.22
v/c Ratio	2.20	0.57	0.43		1.46		1.24	0.77		0.39		0.96
Control Delay	610.2	44.0	3.1		251.3		165.2	34.0		52.7		67.5
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0		0.0
Total Delay	610.2	44.0	3.1		251.3		165.2	34.0		52.7		67.5
LOS	F	D	A		F		F	C		D		E
Approach Delay		115.8			251.3			88.2				66.4
Approach LOS		F			F			F				E

Intersection Summary

Area Type:	Other
Cycle Length:	127
Actuated Cycle Length:	114.2
Natural Cycle:	150
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	2.20
Intersection Signal Delay:	118.2
Intersection LOS:	F
Intersection Capacity Utilization:	94.8%
ICU Level of Service:	F
Analysis Period (min):	15

Splits and Phases: 27: Main Street & North Avenue/Nahant Street

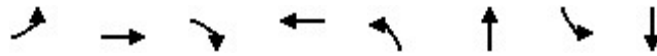




Queues  
27: Main Street & North Avenue/Nahant Street

2022 Existing Weekday Morning Peak Hour

07/18/2022



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	143	286	445	590	496	703	57	729
v/c Ratio	2.20	0.57	0.43	1.46	1.24	0.77	0.39	0.96
Control Delay	610.2	44.0	3.1	251.3	165.2	34.0	52.7	67.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	610.2	44.0	3.1	251.3	165.2	34.0	52.7	67.5
Queue Length 50th (ft)	~195	213	0	~705	~545	515	42	~342
Queue Length 95th (ft)	#320	299	46	#880	#667	595	82	#417
Internal Link Dist (ft)		231		765		542		1275
Turn Bay Length (ft)					80		60	
Base Capacity (vph)	65	498	1044	405	401	915	145	762
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	2.20	0.57	0.43	1.46	1.24	0.77	0.39	0.96

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	92	0	0	289	3	0
Future Vol, veh/h	92	0	0	289	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	88	88	75	75
Heavy Vehicles, %	1	0	0	2	0	0
Mvmt Flow	110	0	0	328	4	0

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	-	-	-	438 110
Stage 1	-	-	-	-	110 -
Stage 2	-	-	-	-	328 -
Critical Hdwy	-	-	-	-	6.4 6.2
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	-	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	-	0	0	-	580 949
Stage 1	-	0	0	-	920 -
Stage 2	-	0	0	-	734 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	580 949
Mov Cap-2 Maneuver	-	-	-	-	580 -
Stage 1	-	-	-	-	920 -
Stage 2	-	-	-	-	734 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	580	-	-
HCM Lane V/C Ratio	0.007	-	-
HCM Control Delay (s)	11.3	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0	-	-

HCM 6th TWSC  
 7: Main Street (Route 129) & Chestnut Street/Centre Street

2022 Existing Weekday Morning Peak Hour

07/18/2022

Intersection												
Int Delay, s/veh	369.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	16	27	49	72	193	29	71	382	16	16	684	25
Future Vol, veh/h	16	27	49	72	193	29	71	382	16	16	684	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	79	79	79	81	81	81	80	80	80
Heavy Vehicles, %	0	0	0	4	2	0	2	2	8	0	1	0
Mvmt Flow	21	35	63	91	244	37	88	472	20	20	855	31

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1710	1579	871	1618	1584	482	886	0	0	492	0	0
Stage 1	911	911	-	658	658	-	-	-	-	-	-	-
Stage 2	799	668	-	960	926	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.14	6.52	6.2	4.12	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.14	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.14	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.536	4.018	3.3	2.218	-	-	2.2	-	-
Pot Cap-1 Maneuver	72	110	353	~ 82	~ 108	588	764	-	-	1082	-	-
Stage 1	331	356	-	450	461	-	-	-	-	-	-	-
Stage 2	382	459	-	306	347	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	-	89	353	~ 41	~ 87	588	764	-	-	1082	-	-
Mov Cap-2 Maneuver	-	89	-	~ 41	~ 87	-	-	-	-	-	-	-
Stage 1	278	343	-	378	388	-	-	-	-	-	-	-
Stage 2	112	386	-	218	334	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s		\$ 1957.8	1.6	0.2
HCM LOS	-	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	764	-	-	-	73	1082	-
HCM Lane V/C Ratio	0.115	-	-	-	5.098	0.018	-
HCM Control Delay (s)	10.3	0	-	\$ 1957.8	8.4	0	-
HCM Lane LOS	B	A	-	-	F	A	A
HCM 95th %tile Q(veh)	0.4	-	-	-	40.8	0.1	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		T
Traffic Vol, veh/h	0	0	107	460	624	168
Future Vol, veh/h	0	0	107	460	624	168
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	83	83	85	85
Heavy Vehicles, %	2	2	2	3	2	0
Mvmt Flow	0	0	129	554	734	198

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1645	833	932	0	-	0
Stage 1	833	-	-	-	-	-
Stage 2	812	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	109	369	734	-	-	-
Stage 1	427	-	-	-	-	-
Stage 2	437	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	81	369	734	-	-	-
Mov Cap-2 Maneuver	81	-	-	-	-	-
Stage 1	319	-	-	-	-	-
Stage 2	437	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	2.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	734	-	-	-	-
HCM Lane V/C Ratio	0.176	-	-	-	-
HCM Control Delay (s)	10.9	0	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0.6	-	-	-	-

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	0	0	53	580	619	226
Future Vol, veh/h	0	0	53	580	619	226
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	79	79	92	92
Heavy Vehicles, %	2	2	2	2	3	2
Mvmt Flow	0	0	67	734	673	246

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1664	796	919	0	-	0
Stage 1	796	-	-	-	-	-
Stage 2	868	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	107	387	743	-	-	-
Stage 1	444	-	-	-	-	-
Stage 2	411	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	91	387	743	-	-	-
Mov Cap-2 Maneuver	91	-	-	-	-	-
Stage 1	377	-	-	-	-	-
Stage 2	411	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	743	-	-	-	-
HCM Lane V/C Ratio	0.09	-	-	-	-
HCM Control Delay (s)	10.3	0	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	-	-

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	92	6	5	287	3	0
Future Vol, veh/h	92	6	5	287	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	88	88	75	75
Heavy Vehicles, %	1	0	0	2	0	0
Mvmt Flow	110	7	6	326	4	0

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	117	0	452
Stage 1	-	-	-	-	114
Stage 2	-	-	-	-	338
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	1484	-	569
Stage 1	-	-	-	-	916
Stage 2	-	-	-	-	727
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1484	-	566
Mov Cap-2 Maneuver	-	-	-	-	566
Stage 1	-	-	-	-	916
Stage 2	-	-	-	-	723

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	11.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	566	-	-	1484	-
HCM Lane V/C Ratio	0.007	-	-	0.004	-
HCM Control Delay (s)	11.4	-	-	7.4	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			↑
Traffic Vol, veh/h	0	0	311	6	0	2
Future Vol, veh/h	0	0	311	6	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	78	78	50	50
Heavy Vehicles, %	2	2	3	0	0	0
Mvmt Flow	0	0	399	8	0	4

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	-	0	-
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	-
Pot Cap-1 Maneuver	0	-	-
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	652
HCM Lane V/C Ratio	-	-	-	0.006
HCM Control Delay (s)	-	-	-	10.6
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0

2022 Existing Weekday Evening Peak Hour

---

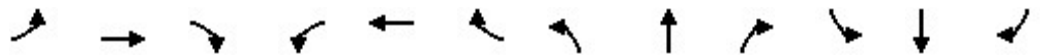




Lanes, Volumes, Timings

2022 Existing Weekday Evening Peak Hour

12: Main Street /Main Street (Route 129) & West Water Street/Water Street (Route 129) 07/18/2022

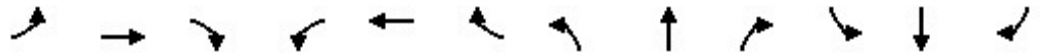


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕	↕		↕	↕	↕	↕	
Traffic Volume (vph)	28	246	54	198	123	112	21	257	216	243	520	79
Future Volume (vph)	28	246	54	198	123	112	21	257	216	243	520	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	12	12	11	15	12	12	12	11	12	12
Storage Length (ft)	0		0	0		115	0		65	90		0
Storage Lanes	0		0	0		1	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.978				0.850			0.850		0.980	
Flt Protected		0.996			0.970			0.996		0.950		
Satd. Flow (prot)	0	2036	0	0	1782	1777	0	1875	1615	1745	1846	0
Flt Permitted		0.826			0.452			0.927		0.305		
Satd. Flow (perm)	0	1688	0	0	830	1777	0	1745	1615	560	1846	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				82			121			9
Link Speed (mph)		30			30			30				30
Link Distance (ft)		863			474			313				440
Travel Time (s)		19.6			10.8			7.1				10.0
Peak Hour Factor	0.87	0.87	0.87	0.84	0.84	0.84	0.91	0.91	0.91	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	32	283	62	236	146	133	23	282	237	256	547	83
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	377	0	0	382	133	0	305	237	256	630	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	0.88	1.00	1.00	1.04	0.88	1.00	1.00	1.00	1.04	1.00	1.00
Turning Speed (mph)	60		60	60		60	60		60	60		60
Number of Detectors	1	2		1	2	1	1	2	1	1		2
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	

Lanes, Volumes, Timings

2022 Existing Weekday Evening Peak Hour

12: Main Street /Main Street (Route 129) & West Water Street/Water Street (Route 129) 07/18/2022

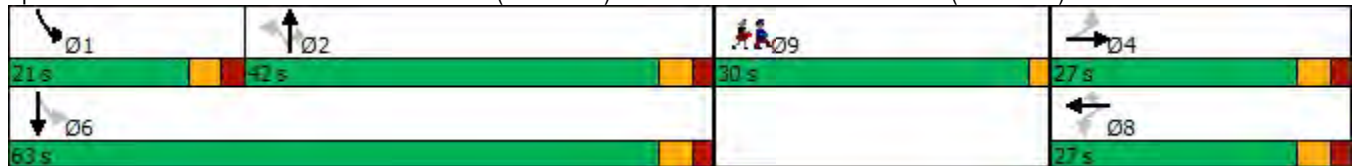


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	10.0	22.5	
Total Split (s)	27.0	27.0		27.0	27.0	27.0	42.0	42.0	42.0	21.0	63.0	
Total Split (%)	22.5%	22.5%		22.5%	22.5%	22.5%	35.0%	35.0%	35.0%	17.5%	52.5%	
Maximum Green (s)	22.0	22.0		22.0	22.0	22.0	37.0	37.0	37.0	16.0	58.0	
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	5.0	5.0	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	Min	Min	Min	None	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		23.5			23.5	23.5		20.0	20.0	37.5	37.5	
Actuated g/C Ratio		0.30			0.30	0.30		0.26	0.26	0.48	0.48	
v/c Ratio		0.73			1.53	0.22		0.68	0.47	0.56	0.70	
Control Delay		39.8			282.1	14.6		35.9	16.5	18.2	21.4	
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		39.8			282.1	14.6		35.9	16.5	18.2	21.4	
LOS		D			F	B		D	B	B	C	
Approach Delay		39.8			213.0			27.4			20.5	
Approach LOS		D			F			C			C	

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	77.8
Natural Cycle:	140
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.53
Intersection Signal Delay:	68.0
Intersection LOS:	E
Intersection Capacity Utilization:	98.7%
ICU Level of Service:	F
Analysis Period (min):	15

Splits and Phases: 12: Main Street /Main Street (Route 129) & West Water Street/Water Street (Route 129)



Queues

2022 Existing Weekday Evening Peak Hour

12: Main Street /Main Street (Route 129) & West Water Street/Water Street (Route 129) 07/18/2022



Lane Group	EBT	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	377	382	133	305	237	256	630
v/c Ratio	0.73	1.53	0.22	0.68	0.47	0.56	0.70
Control Delay	39.8	282.1	14.6	35.9	16.5	18.2	21.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.8	282.1	14.6	35.9	16.5	18.2	21.4
Queue Length 50th (ft)	126	~211	14	108	36	54	170
Queue Length 95th (ft)	#436	#550	71	262	128	150	431
Internal Link Dist (ft)	783	394		233			360
Turn Bay Length (ft)			115		65	90	
Base Capacity (vph)	514	250	593	886	879	530	1462
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	1.53	0.22	0.34	0.27	0.48	0.43

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.






















Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Lanes, Volumes, Timings  
22: North Avenue & Albion Street

2022 Existing Weekday Evening Peak Hour  
07/18/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	296	0	263	58	152	98	107	395	0	0	463	30
Future Volume (vph)	296	0	263	58	152	98	107	395	0	0	463	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	11	11	13	11	12	12	12	12	13	12
Storage Length (ft)	0		0	90		90	160		0	0		100
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850						0.850
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1604	0	1561	1745	1944	1516	1787	1845	0	0	1870	1568
Flt Permitted	0.950			0.950			0.950					
Satd. Flow (perm)	1604	0	1561	1745	1944	1516	1787	1845	0	0	1870	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			296			124						124
Link Speed (mph)		30			30			30				30
Link Distance (ft)		444			778			489				370
Travel Time (s)		10.1			17.7			11.1				8.4
Peak Hour Factor	0.89	0.89	0.89	0.84	0.84	0.84	0.87	0.87	0.87	0.88	0.88	0.88
Heavy Vehicles (%)	5%	0%	0%	0%	1%	3%	1%	3%	0%	0%	5%	3%
Adj. Flow (vph)	333	0	296	69	181	117	123	454	0	0	526	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	333	0	296	69	181	117	123	454	0	0	526	34
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.09	1.00	1.04	1.04	0.96	1.04	1.00	1.00	1.00	1.00	0.96	1.00
Turning Speed (mph)	60		60	60		60	60		60	60		60
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)	20		20	20	100	20	20	100			100	20
Trailing Detector (ft)	0		0	0	0	0	0	0			0	0
Detector 1 Position(ft)	0		0	0	0	0	0	0			0	0
Detector 1 Size(ft)	20		20	20	6	20	20	6			6	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94				94
Detector 2 Size(ft)					6			6				6
Detector 2 Type					Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				0.0
Turn Type	Prot		Prot	Split	NA	Prot	Prot	NA			NA	Perm

Lanes, Volumes, Timings  
22: North Avenue & Albion Street

2022 Existing Weekday Evening Peak Hour  
07/18/2022

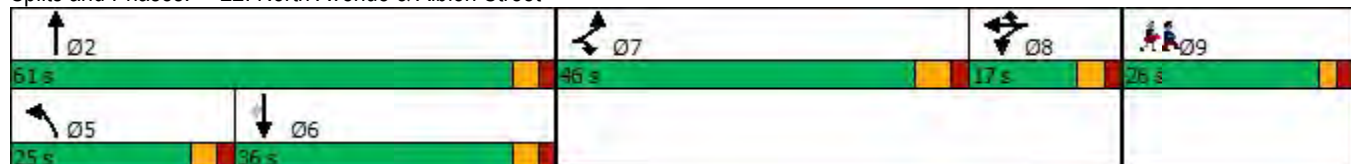


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7		7	8	8	8	5	2			6	
Permitted Phases												6
Detector Phase	7		7	8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Minimum Split (s)	22.5		22.5	17.0	17.0	17.0	10.0	22.5			22.5	22.5
Total Split (s)	46.0		46.0	17.0	17.0	17.0	25.0	61.0			36.0	36.0
Total Split (%)	30.7%		30.7%	11.3%	11.3%	11.3%	16.7%	40.7%			24.0%	24.0%
Maximum Green (s)	40.0		40.0	12.0	12.0	12.0	20.0	56.0			31.0	31.0
Yellow Time (s)	4.0		4.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)	6.0		6.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag	Lead		Lead	Lag	Lag	Lag	Lead				Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes				Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode	None		None	None	None	None	None	Min			Min	Min
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	30.5		30.5	12.6	12.6	12.6	14.1	51.8			32.5	32.5
Actuated g/C Ratio	0.24		0.24	0.10	0.10	0.10	0.11	0.41			0.26	0.26
v/c Ratio	0.85		0.49	0.39	0.93	0.44	0.61	0.60			1.08	0.07
Control Delay	67.3		7.4	68.3	106.8	14.9	70.7	36.6			110.4	0.3
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	67.3		7.4	68.3	106.8	14.9	70.7	36.6			110.4	0.3
LOS	E		A	E	F	B	E	D			F	A
Approach Delay		39.1			70.3			43.9			103.7	
Approach LOS		D			E			D			F	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	125.1
Natural Cycle:	140
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.08
Intersection Signal Delay:	62.7
Intersection Capacity Utilization	70.5%
Analysis Period (min)	15
Intersection LOS:	E
ICU Level of Service	C

Splits and Phases: 22: North Avenue & Albion Street



Queues  
22: North Avenue & Albion Street

2022 Existing Weekday Evening Peak Hour  
07/18/2022



Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	333	296	69	181	117	123	454	526	34
v/c Ratio	0.85	0.49	0.39	0.93	0.44	0.61	0.60	1.08	0.07
Control Delay	67.3	7.4	68.3	106.8	14.9	70.7	36.6	110.4	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.3	7.4	68.3	106.8	14.9	70.7	36.6	110.4	0.3
Queue Length 50th (ft)	289	0	61	~183	0	109	344	~597	0
Queue Length 95th (ft)	420	71	112	#335	44	177	473	#878	0
Internal Link Dist (ft)				698			409	290	
Turn Bay Length (ft)			90		90	160			100
Base Capacity (vph)	537	719	175	195	264	299	865	485	499
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.41	0.39	0.93	0.44	0.41	0.52	1.08	0.07

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Lanes, Volumes, Timings  
27: Main Street & North Avenue/Nahant Street

2022 Existing Weekday Evening Peak Hour  
07/18/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	191	319	415	35	272	65	359	921	43	74	608	155
Future Volume (vph)	191	319	415	35	272	65	359	921	43	74	608	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	11	12	12	11	11	12
Storage Length (ft)	0		0	0		0	80		0	60		100
Storage Lanes	1		1	0		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frt			0.850		0.977			0.993			0.970	
Flt Protected	0.950				0.995		0.950			0.950		
Satd. Flow (prot)	1711	1818	1561	0	1847	0	1745	1869	0	1745	3351	0
Flt Permitted	0.243				0.667		0.950			0.156		
Satd. Flow (perm)	438	1818	1561	0	1238	0	1745	1869	0	287	3351	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			456		8			2			22	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		311			845			622			1355	
Travel Time (s)		7.1			19.2			14.1			30.8	
Peak Hour Factor	0.91	0.91	0.91	0.84	0.84	0.84	0.94	0.94	0.94	0.91	0.91	0.91
Heavy Vehicles (%)	2%	1%	0%	0%	0%	0%	0%	1%	0%	0%	1%	1%
Adj. Flow (vph)	210	351	456	42	324	77	382	980	46	81	668	170
Shared Lane Traffic (%)												
Lane Group Flow (vph)	210	351	456	0	443	0	382	1026	0	81	838	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.00	1.00	1.00	1.04	1.00	1.00	1.04	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pt+ov	Perm	NA		Prot	NA		Perm	NA	

Lanes, Volumes, Timings  
27: Main Street & North Avenue/Nahant Street

2022 Existing Weekday Evening Peak Hour  
07/18/2022

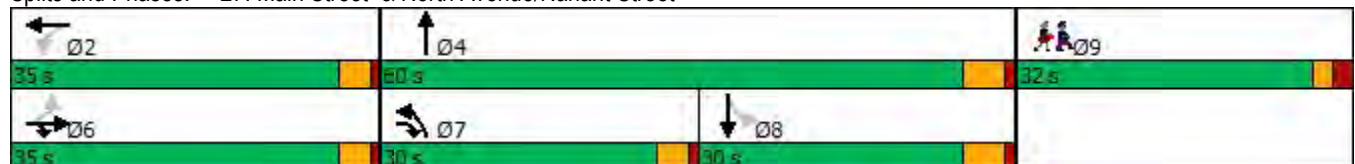


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		6	6 7		2		7	4			8	
Permitted Phases	6			2						8		
Detector Phase	6	6	6 7	2	2		7	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	23.0		23.0	23.0	
Total Split (s)	35.0	35.0		35.0	35.0		30.0	60.0		30.0	30.0	
Total Split (%)	27.6%	27.6%		27.6%	27.6%		23.6%	47.2%		23.6%	23.6%	
Maximum Green (s)	31.0	31.0		31.0	31.0		26.0	55.0		25.0	25.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0			4.0		4.0	5.0		5.0	5.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	31.6	31.6	62.2		31.6		26.5	56.1		25.5	25.5	
Actuated g/C Ratio	0.28	0.28	0.54		0.28		0.23	0.49		0.22	0.22	
v/c Ratio	1.75	0.70	0.43		1.27		0.94	1.12		1.27	1.10	
Control Delay	395.2	48.6	3.1		178.3		78.3	97.3		243.4	102.9	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	395.2	48.6	3.1		178.3		78.3	97.3		243.4	102.9	
LOS	F	D	A		F		E	F		F	F	
Approach Delay		99.7			178.3			92.1			115.3	
Approach LOS		F			F			F			F	

Intersection Summary

Area Type:	Other
Cycle Length:	127
Actuated Cycle Length:	114.2
Natural Cycle:	150
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.75
Intersection Signal Delay:	109.9
Intersection LOS:	F
Intersection Capacity Utilization:	107.2%
ICU Level of Service:	G
Analysis Period (min):	15

Splits and Phases: 27: Main Street & North Avenue/Nahant Street

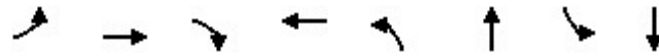




Queues  
27: Main Street & North Avenue/Nahant Street

2022 Existing Weekday Evening Peak Hour

07/18/2022



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	210	351	456	443	382	1026	81	838
v/c Ratio	1.75	0.70	0.43	1.27	0.94	1.12	1.27	1.10
Control Delay	395.2	48.6	3.1	178.3	78.3	97.3	243.4	102.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	395.2	48.6	3.1	178.3	78.3	97.3	243.4	102.9
Queue Length 50th (ft)	~268	272	0	~492	~348	~1066	~90	~443
Queue Length 95th (ft)	#426	#414	56	#638	#546	#1326	#198	#575
Internal Link Dist (ft)		231		765		542		1275
Turn Bay Length (ft)					80		60	
Base Capacity (vph)	120	503	1058	348	405	919	64	765
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.75	0.70	0.43	1.27	0.94	1.12	1.27	1.10

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	141	0	0	108	1	12
Future Vol, veh/h	141	0	0	108	1	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	85	85	81	81
Heavy Vehicles, %	1	0	0	0	0	0
Mvmt Flow	170	0	0	127	1	15

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	-	-	-	297 170
Stage 1	-	-	-	-	170 -
Stage 2	-	-	-	-	127 -
Critical Hdwy	-	-	-	-	6.4 6.2
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	-	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	-	0	0	-	698 879
Stage 1	-	0	0	-	865 -
Stage 2	-	0	0	-	904 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	698 879
Mov Cap-2 Maneuver	-	-	-	-	698 -
Stage 1	-	-	-	-	865 -
Stage 2	-	-	-	-	904 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	862	-	-
HCM Lane V/C Ratio	0.019	-	-
HCM Control Delay (s)	9.3	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-

HCM 6th TWSC  
7: Main Street (Route 129) & Chestnut Street/Centre Street

2022 Existing Weekday Evening Peak Hour

07/18/2022

Intersection												
Int Delay, s/veh	74.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	30	47	76	29	41	33	34	410	25	40	698	33
Future Vol, veh/h	30	47	76	29	41	33	34	410	25	40	698	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	75	75	75	84	84	84	89	89	89
Heavy Vehicles, %	0	3	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	38	59	95	39	55	44	40	488	30	45	784	37

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1526	1491	803	1553	1494	503	821	0	0	518	0	0
Stage 1	893	893	-	583	583	-	-	-	-	-	-	-
Stage 2	633	598	-	970	911	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.53	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.53	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.53	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.027	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	97	123	387	93	124	573	817	-	-	1058	-	-
Stage 1	339	359	-	502	502	-	-	-	-	-	-	-
Stage 2	471	489	-	307	356	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	48	105	387	~ 35	106	573	817	-	-	1058	-	-
Mov Cap-2 Maneuver	48	105	-	~ 35	106	-	-	-	-	-	-	-
Stage 1	316	331	-	467	467	-	-	-	-	-	-	-
Stage 2	357	455	-	175	328	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	\$ 360.9		\$ 447.6		0.7		0.4	
HCM LOS	F		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	817	-	-	121	81	1058	-	-
HCM Lane V/C Ratio	0.05	-	-	1.581	1.695	0.042	-	-
HCM Control Delay (s)	9.6	0	-	\$ 360.9	\$ 447.6	8.6	0	-
HCM Lane LOS	A	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	13.9	11.5	0.1	-	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		T
Traffic Vol, veh/h	0	0	104	445	671	103
Future Vol, veh/h	0	0	104	445	671	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	87	87	88	88
Heavy Vehicles, %	2	2	3	1	1	0
Mvmt Flow	0	0	120	511	763	117

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1573	822	880	0	-	0
Stage 1	822	-	-	-	-	-
Stage 2	751	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.13	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.227	-	-	-
Pot Cap-1 Maneuver	121	374	764	-	-	-
Stage 1	432	-	-	-	-	-
Stage 2	466	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	95	374	764	-	-	-
Mov Cap-2 Maneuver	95	-	-	-	-	-
Stage 1	337	-	-	-	-	-
Stage 2	466	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	764	-	-	-	-
HCM Lane V/C Ratio	0.156	-	-	-	-
HCM Control Delay (s)	10.6	0	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0.6	-	-	-	-

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			L		T
Traffic Vol, veh/h	0	0	28	494	750	22
Future Vol, veh/h	0	0	28	494	750	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	91	91	95	95
Heavy Vehicles, %	2	2	2	1	1	2
Mvmt Flow	0	0	31	543	789	23

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1406	801	812	0	-	0
Stage 1	801	-	-	-	-	-
Stage 2	605	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	153	384	814	-	-	-
Stage 1	442	-	-	-	-	-
Stage 2	545	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	145	384	814	-	-	-
Mov Cap-2 Maneuver	145	-	-	-	-	-
Stage 1	418	-	-	-	-	-
Stage 2	545	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	814	-	-	-	-
HCM Lane V/C Ratio	0.038	-	-	-	-
HCM Control Delay (s)	9.6	0	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-	-

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	137	8	4	105	0	4
Future Vol, veh/h	137	8	4	105	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	85	85	50	50
Heavy Vehicles, %	1	0	0	0	0	0
Mvmt Flow	165	10	5	124	0	8

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	175	0	304
Stage 1	-	-	-	-	170
Stage 2	-	-	-	-	134
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	1414	-	692
Stage 1	-	-	-	-	865
Stage 2	-	-	-	-	897
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1414	-	689
Mov Cap-2 Maneuver	-	-	-	-	689
Stage 1	-	-	-	-	865
Stage 2	-	-	-	-	893

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	879	-	-	1414	-
HCM Lane V/C Ratio	0.009	-	-	0.003	-
HCM Control Delay (s)	9.1	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			↑
Traffic Vol, veh/h	0	0	256	8	0	5
Future Vol, veh/h	0	0	256	8	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	90	90	42	42
Heavy Vehicles, %	2	2	1	0	0	0
Mvmt Flow	0	0	284	9	0	12

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	-	0	-
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	-
Pot Cap-1 Maneuver	0	-	-
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	755
HCM Lane V/C Ratio	-	-	-	0.016
HCM Control Delay (s)	-	-	-	9.8
HCM Lane LOS	-	-	-	A
HCM 95th %tile Q(veh)	-	-	-	0

2029 No-Build Weekday Morning Peak Hour

---





Lanes, Volumes, Timings

2029 No-Build Weekday Morning Peak Hour

12: Main Street /Main Street (Route 129) & West Water Street/Water Street (Route 129) 07/29/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕	↕		↕	↕	↕	↕	
Traffic Volume (vph)	15	132	11	318	144	190	17	369	241	104	585	34
Future Volume (vph)	15	132	11	318	144	190	17	369	241	104	585	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	12	12	11	15	12	12	12	11	12	12
Storage Length (ft)	0		0	0		115	0		65	90		0
Storage Lanes	0		0	0		1	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		0.991				0.850			0.850		0.992	
Fl <sub>t</sub> Protected		0.995			0.967			0.998		0.950		
Satd. Flow (prot)	0	2009	0	0	1753	1692	0	1860	1568	1745	1833	0
Fl <sub>t</sub> Permitted		0.864			0.647			0.775		0.168		
Satd. Flow (perm)	0	1745	0	0	1173	1692	0	1444	1568	309	1833	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				92			92			3
Link Speed (mph)		30			30			30				30
Link Distance (ft)		863			474			313				440
Travel Time (s)		19.6			10.8			7.1				10.0
Peak Hour Factor	0.85	0.85	0.85	0.94	0.94	0.94	0.79	0.79	0.79	0.83	0.83	0.83
Heavy Vehicles (%)	0%	2%	13%	1%	2%	5%	1%	2%	3%	0%	3%	0%
Adj. Flow (vph)	18	155	13	338	153	202	22	467	305	125	705	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	186	0	0	491	202	0	489	305	125	746	0
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Prot	pm+pt	NA	
Protected Phases		4			8			2	2	1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	10.0	22.5	
Total Split (s)	44.0	44.0		44.0	44.0	44.0	35.0	35.0	35.0	20.0	55.0	
Total Split (%)	33.8%	33.8%		33.8%	33.8%	33.8%	26.9%	26.9%	26.9%	15.4%	42.3%	

Lanes, Volumes, Timings

2029 No-Build Weekday Morning Peak Hour

12: Main Street /Main Street (Route 129) & West Water Street/Water Street (Route 129) 07/29/2022

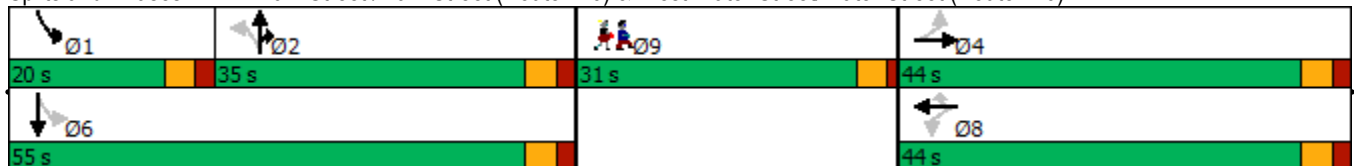


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	39.0	39.0		39.0	39.0	39.0	30.0	30.0	30.0	15.0	50.0	
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	5.0	5.0	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	Min	Min	Min	None	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		39.3			39.3	39.3		35.6	35.6	50.3	50.3	
Actuated g/C Ratio		0.38			0.38	0.38		0.34	0.34	0.49	0.49	
v/c Ratio		0.28			1.10	0.29		0.99	0.51	0.44	0.84	
Control Delay		24.8			105.9	14.2		72.7	23.9	21.3	34.0	
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		24.8			105.9	14.2		72.7	23.9	21.3	34.0	
LOS		C			F	B		E	C	C	C	
Approach Delay		24.8			79.2			54.0			32.2	
Approach LOS		C			E			D			C	
Queue Length 50th (ft)		77			~343	44		294	100	40	374	
Queue Length 95th (ft)		161			#702	127		#588	204	95	#721	
Internal Link Dist (ft)		783			394			233			360	
Turn Bay Length (ft)						115			65	90		
Base Capacity (vph)		664			445	699		496	599	359	893	
Starvation Cap Reductn		0			0	0		0	0	0	0	
Spillback Cap Reductn		0			0	0		0	0	0	0	
Storage Cap Reductn		0			0	0		0	0	0	0	
Reduced v/c Ratio		0.28			1.10	0.29		0.99	0.51	0.35	0.84	

Intersection Summary

Area Type: Other  
 Cycle Length: 130  
 Actuated Cycle Length: 103.4  
 Natural Cycle: 150  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.10  
 Intersection Signal Delay: 51.2  
 Intersection LOS: D  
 Intersection Capacity Utilization 103.5%  
 ICU Level of Service G  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.






















Splits and Phases: 12: Main Street /Main Street (Route 129) & West Water Street/Water Street (Route 129)



Lanes, Volumes, Timings  
22: North Avenue & Albion Street

2029 No-Build Weekday Morning Peak Hour

07/29/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	169	0	174	40	317	89	138	482	0	0	392	49
Future Volume (vph)	169	0	174	40	317	89	138	482	0	0	392	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	11	11	13	11	12	12	12	12	13	12
Storage Length (ft)	0		0	90		90	160		0	0		100
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>			0.850			0.850						0.850
Fl <sub>t</sub> Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1604	0	1561	1745	1944	1516	1787	1845	0	0	1870	1568
Fl <sub>t</sub> Permitted	0.950			0.950			0.950					
Satd. Flow (perm)	1604	0	1561	1745	1944	1516	1787	1845	0	0	1870	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			202			126						126
Link Speed (mph)		30			30			30				30
Link Distance (ft)		444			778			489				370
Travel Time (s)		10.1			17.7			11.1				8.4
Peak Hour Factor	0.86	0.86	0.86	0.76	0.76	0.76	0.81	0.81	0.81	0.92	0.92	0.92
Heavy Vehicles (%)	5%	0%	0%	0%	1%	3%	1%	3%	0%	0%	5%	3%
Adj. Flow (vph)	197	0	202	53	417	117	170	595	0	0	426	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	197	0	202	53	417	117	170	595	0	0	426	53
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)	20		20	20	100	20	20	100			100	20
Trailing Detector (ft)	0		0	0	0	0	0	0			0	0
Detector 1 Position(ft)	0		0	0	0	0	0	0			0	0
Detector 1 Size(ft)	20		20	20	6	20	20	6			6	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94				94
Detector 2 Size(ft)					6			6				6
Detector 2 Type					Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				0.0
Turn Type	Prot		Prot	Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases	8		8	4	4		1	6			2	
Permitted Phases						4						2
Detector Phase	8		8	4	4	4	1	6			2	2
Switch Phase												
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Minimum Split (s)	17.0		17.0	17.0	17.0	17.0	10.0	22.5			22.5	22.5
Total Split (s)	31.0		31.0	50.0	50.0	50.0	17.0	52.0			35.0	35.0
Total Split (%)	18.9%		18.9%	30.5%	30.5%	30.5%	10.4%	31.7%			21.3%	21.3%

Lanes, Volumes, Timings  
22: North Avenue & Albion Street

2029 No-Build Weekday Morning Peak Hour  
07/29/2022

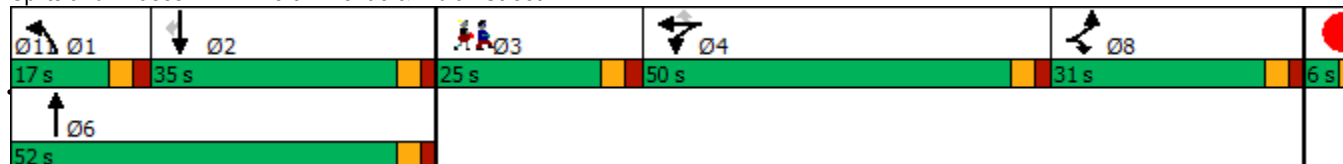


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	26.0		26.0	45.0	45.0	45.0	12.0	47.0			30.0	30.0
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag				Lag	Lag	Lag	Lead				Lag	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes				Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode	None		None	None	None	None	None	Min			Min	Min
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	21.2		21.2	34.2	34.2	34.2	12.6	49.2			31.4	31.4
Actuated g/C Ratio	0.16		0.16	0.26	0.26	0.26	0.09	0.37			0.24	0.24
v/c Ratio	0.78		0.48	0.12	0.84	0.24	1.01	0.87			0.97	0.11
Control Delay	77.8		11.3	41.6	63.8	6.8	133.4	58.3			87.7	0.5
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	77.8		11.3	41.6	63.8	6.8	133.4	58.3			87.7	0.5
LOS	E		B	D	E	A	F	E			F	A
Approach Delay		44.1			50.4			75.0			78.1	
Approach LOS		D			D			E			E	
Queue Length 50th (ft)	186		0	40	388	0	~199	~617			~482	0
Queue Length 95th (ft)	#277		62	66	422	21	#326	#776			#752	0
Internal Link Dist (ft)		364			698			409			290	
Turn Bay Length (ft)				90		90	160					100
Base Capacity (vph)	327		479	617	687	617	168	681			441	466
Starvation Cap Reductn	0		0	0	0	0	0	0			0	0
Spillback Cap Reductn	0		0	0	0	0	0	0			0	0
Storage Cap Reductn	0		0	0	0	0	0	0			0	0
Reduced v/c Ratio	0.60		0.42	0.09	0.61	0.19	1.01	0.87			0.97	0.11

Intersection Summary

Area Type: Other  
 Cycle Length: 164  
 Actuated Cycle Length: 133.2  
 Natural Cycle: 150  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.01  
 Intersection Signal Delay: 63.7  
 Intersection LOS: E  
 Intersection Capacity Utilization 70.2%  
 ICU Level of Service C  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 22: North Avenue & Albion Street



Lanes, Volumes, Timings  
27: Main Street & North Avenue/Nahant Street

2029 No-Build Weekday Morning Peak Hour  
07/29/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	285	428	43	428	78	440	572	50	51	506	158
Future Volume (vph)	135	285	428	43	428	78	440	572	50	51	506	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	11	12	12	11	11	12
Storage Length (ft)	0		0	0		0	80		0	60		100
Storage Lanes	1		1	0		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Fr <sub>t</sub>			0.850		0.981			0.988			0.964	
Fl <sub>t</sub> Protected	0.950				0.996		0.950			0.950		
Satd. Flow (prot)	1631	1801	1546	0	1838	0	1728	1860	0	1745	3314	0
Fl <sub>t</sub> Permitted	0.123				0.663		0.119			0.251		
Satd. Flow (perm)	211	1801	1546	0	1223	0	216	1860	0	461	3314	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			492		6			4				29
Link Speed (mph)		30			30			30				30
Link Distance (ft)		311			845			622				1355
Travel Time (s)		7.1			19.2			14.1				30.8
Peak Hour Factor	0.87	0.87	0.87	0.86	0.86	0.86	0.82	0.82	0.82	0.84	0.84	0.84
Heavy Vehicles (%)	7%	2%	1%	3%	1%	0%	1%	1%	0%	0%	2%	0%
Adj. Flow (vph)	155	328	492	50	498	91	537	698	61	61	602	188
Shared Lane Traffic (%)												
Lane Group Flow (vph)	155	328	492	0	639	0	537	759	0	61	790	0
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2	3		6		3	8			4	
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	3	6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5	10.0	22.5	22.5		10.0	23.0		23.0	23.0	
Total Split (s)	37.0	37.0	30.0	37.0	37.0		30.0	63.0		33.0	33.0	
Total Split (%)	28.0%	28.0%	22.7%	28.0%	28.0%		22.7%	47.7%		25.0%	25.0%	

Lanes, Volumes, Timings  
27: Main Street & North Avenue/Nahant Street

2029 No-Build Weekday Morning Peak Hour  
07/29/2022

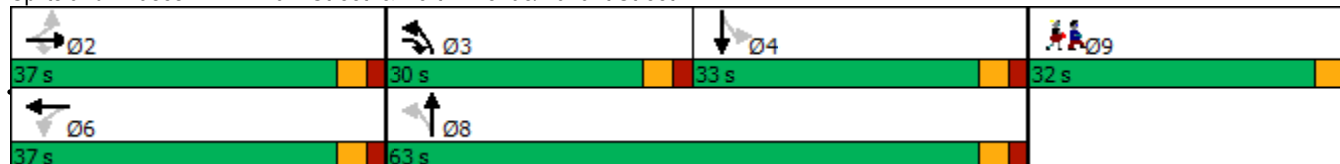


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	32.0	32.0	25.0	32.0	32.0		25.0	58.0		28.0	28.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0		5.0		5.0	5.0		5.0	5.0	
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min	None	Min	Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	32.6	32.6	63.2		32.6		59.1	59.1		28.5	28.5	
Actuated g/C Ratio	0.27	0.27	0.53		0.27		0.50	0.50		0.24	0.24	
v/c Ratio	2.72	0.67	0.47		1.88		1.25	0.82		0.55	0.97	
Control Delay	831.9	49.2	3.3		436.8		162.0	37.7		66.5	69.8	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	831.9	49.2	3.3		436.8		162.0	37.7		66.5	69.8	
LOS	F	D	A		F		F	D		E	E	
Approach Delay		150.5			436.8			89.2			69.6	
Approach LOS		F			F			F			E	
Queue Length 50th (ft)	~230	262	0		~874		~571	602		48	~389	
Queue Length 95th (ft)	#324	359	49		#1049		#692	685		#105	#462	
Internal Link Dist (ft)		231			765			542			1275	
Turn Bay Length (ft)							80			60		
Base Capacity (vph)	57	492	1050		339		430	923		110	814	
Starvation Cap Reductn	0	0	0		0		0	0		0	0	
Spillback Cap Reductn	0	0	0		0		0	0		0	0	
Storage Cap Reductn	0	0	0		0		0	0		0	0	
Reduced v/c Ratio	2.72	0.67	0.47		1.88		1.25	0.82		0.55	0.97	

Intersection Summary

Area Type: Other  
 Cycle Length: 132  
 Actuated Cycle Length: 119.2  
 Natural Cycle: 150  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 2.72  
 Intersection Signal Delay: 159.7  
 Intersection LOS: F  
 Intersection Capacity Utilization 104.7%  
 ICU Level of Service G  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 27: Main Street & North Avenue/Nahant Street



Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	99	0	0	310	3	0
Future Vol, veh/h	99	0	0	310	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	88	88	75	75
Heavy Vehicles, %	1	0	0	2	0	0
Mvmt Flow	118	0	0	352	4	0

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	-	-	-	470 118
Stage 1	-	-	-	-	118 -
Stage 2	-	-	-	-	352 -
Critical Hdwy	-	-	-	-	6.4 6.2
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	-	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	-	0	0	-	556 939
Stage 1	-	0	0	-	912 -
Stage 2	-	0	0	-	716 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	556 939
Mov Cap-2 Maneuver	-	-	-	-	556 -
Stage 1	-	-	-	-	912 -
Stage 2	-	-	-	-	716 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	556	-	-
HCM Lane V/C Ratio	0.007	-	-
HCM Control Delay (s)	11.5	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0	-	-

HCM 6th TWSC  
7: Main Street (Route 129) & Chestnut Street/Centre Street

2029 No-Build Weekday Morning Peak Hour

07/29/2022

Intersection												
Int Delay, s/veh	571.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	26	53	77	212	31	76	416	17	17	738	27
Future Vol, veh/h	17	26	53	77	212	31	76	416	17	17	738	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	79	79	79	81	81	81	80	80	80
Heavy Vehicles, %	0	0	0	4	2	0	2	2	8	0	1	0
Mvmt Flow	22	33	68	97	268	39	94	514	21	21	923	34

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1848	1705	940	1746	1712	525	957	0	0	535	0	0
Stage 1	982	982	-	713	713	-	-	-	-	-	-	-
Stage 2	866	723	-	1033	999	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.14	6.52	6.2	4.12	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.14	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.14	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.536	4.018	3.3	2.218	-	-	2.2	-	-
Pot Cap-1 Maneuver	58	92	322	~67	~90	556	719	-	-	1043	-	-
Stage 1	302	330	-	420	435	-	-	-	-	-	-	-
Stage 2	351	434	-	278	321	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	-	72	322	~28	~70	556	719	-	-	1043	-	-
Mov Cap-2 Maneuver	-	72	-	~28	~70	-	-	-	-	-	-	-
Stage 1	246	316	-	341	354	-	-	-	-	-	-	-
Stage 2	64	353	-	188	307	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s		\$ 3008.4	1.6	0.2
HCM LOS	-	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	719	-	-	-	55	1043	-
HCM Lane V/C Ratio	0.13	-	-	-	7.365	0.02	-
HCM Control Delay (s)	10.8	0	-	-	\$ 3008.4	8.5	0
HCM Lane LOS	B	A	-	-	F	A	A
HCM 95th %tile Q(veh)	0.4	-	-	-	47	0.1	-

Notes  
~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon



Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	0	0	115	498	674	181
Future Vol, veh/h	0	0	115	498	674	181
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	83	83	85	85
Heavy Vehicles, %	2	2	2	3	2	0
Mvmt Flow	0	0	139	600	793	213

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1778	900	1006	0	-	0
Stage 1	900	-	-	-	-	-
Stage 2	878	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	91	337	689	-	-	-
Stage 1	397	-	-	-	-	-
Stage 2	406	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	63	337	689	-	-	-
Mov Cap-2 Maneuver	63	-	-	-	-	-
Stage 1	277	-	-	-	-	-
Stage 2	406	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	2.2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	689	-	-	-	-
HCM Lane V/C Ratio	0.201	-	-	-	-
HCM Control Delay (s)	11.5	0	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0.7	-	-	-	-

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		T
Traffic Vol, veh/h	0	0	59	626	672	242
Future Vol, veh/h	0	0	59	626	672	242
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	79	79	92	92
Heavy Vehicles, %	2	2	2	2	3	2
Mvmt Flow	0	0	75	792	730	263

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1804	862	993	0	-	0
Stage 1	862	-	-	-	-	-
Stage 2	942	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	87	355	696	-	-	-
Stage 1	414	-	-	-	-	-
Stage 2	379	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	70	355	696	-	-	-
Mov Cap-2 Maneuver	70	-	-	-	-	-
Stage 1	334	-	-	-	-	-
Stage 2	379	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	696	-	-	-	-
HCM Lane V/C Ratio	0.107	-	-	-	-
HCM Control Delay (s)	10.8	0	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	-	-

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	99	6	5	308	5	0
Future Vol, veh/h	99	6	5	308	5	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	88	88	75	75
Heavy Vehicles, %	1	0	0	2	0	0
Mvmt Flow	118	7	6	350	7	0

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	125	0	484
Stage 1	-	-	-	-	122
Stage 2	-	-	-	-	362
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	1474	-	545
Stage 1	-	-	-	-	908
Stage 2	-	-	-	-	709
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1474	-	542
Mov Cap-2 Maneuver	-	-	-	-	542
Stage 1	-	-	-	-	908
Stage 2	-	-	-	-	705

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	11.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	542	-	-	1474	-
HCM Lane V/C Ratio	0.012	-	-	0.004	-
HCM Control Delay (s)	11.7	-	-	7.5	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			↑
Traffic Vol, veh/h	0	0	334	6	0	2
Future Vol, veh/h	0	0	334	6	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	78	78	50	50
Heavy Vehicles, %	2	2	3	0	0	0
Mvmt Flow	0	0	428	8	0	4

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	-	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	6.2
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	3.3
Pot Cap-1 Maneuver	0	-	0
Stage 1	0	-	0
Stage 2	0	-	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	628
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.8
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	628
HCM Lane V/C Ratio	-	-	-	0.006
HCM Control Delay (s)	-	-	-	10.8
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0

2029 No-Build Weekday Evening Peak Hour

---



Lanes, Volumes, Timings

2029 No-Build Weekday Evening Peak Hour

12: Main Street /Main Street (Route 129) & West Water Street/Water Street (Route 129) 07/29/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔		↔	↔	↔	↔	
Traffic Volume (vph)	30	264	58	218	132	121	23	286	237	263	564	85
Future Volume (vph)	30	264	58	218	132	121	23	286	237	263	564	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	12	12	11	15	12	12	12	11	12	12
Storage Length (ft)	0		0	0		115	0		65	90		0
Storage Lanes	0		0	0		1	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		0.978				0.850			0.850		0.980	
Fl <sub>t</sub> Protected		0.996			0.970			0.996		0.950		
Satd. Flow (prot)	0	2036	0	0	1782	1777	0	1875	1615	1745	1846	0
Fl <sub>t</sub> Permitted		0.876			0.473			0.730		0.265		
Satd. Flow (perm)	0	1791	0	0	869	1777	0	1374	1615	487	1846	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8				92			99			6
Link Speed (mph)		30			30			30				30
Link Distance (ft)		863			474			313				440
Travel Time (s)		19.6			10.8			7.1				10.0
Peak Hour Factor	0.87	0.87	0.87	0.84	0.84	0.84	0.91	0.91	0.91	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	34	303	67	260	157	144	25	314	260	277	594	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	404	0	0	417	144	0	339	260	277	683	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	0.88	1.00	1.00	1.04	0.88	1.00	1.00	1.00	1.04	1.00	1.00
Turning Speed (mph)	60		60	60		60	60		60	60		60
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Prot	pm+pt	NA	

Lanes, Volumes, Timings

2029 No-Build Weekday Evening Peak Hour

12: Main Street /Main Street (Route 129) & West Water Street/Water Street (Route 129) 07/29/2022

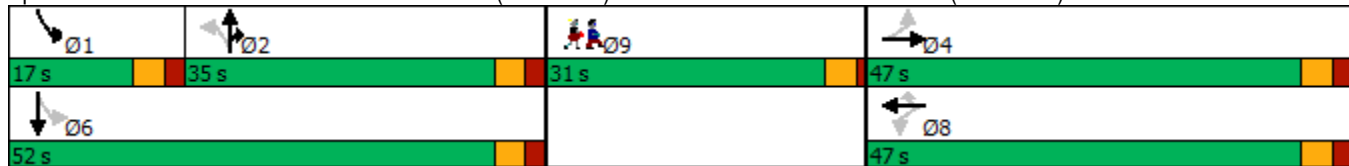


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2	2	1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	10.0	22.5	
Total Split (s)	47.0	47.0		47.0	47.0	47.0	35.0	35.0	35.0	17.0	52.0	
Total Split (%)	36.2%	36.2%		36.2%	36.2%	36.2%	26.9%	26.9%	26.9%	13.1%	40.0%	
Maximum Green (s)	42.0	42.0		42.0	42.0	42.0	30.0	30.0	30.0	12.0	47.0	
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	5.0	5.0	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	Min	Min	Min	None	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		42.4		42.4	42.4		30.3	30.3	47.5	47.5		
Actuated g/C Ratio		0.39		0.39	0.39		0.28	0.28	0.44	0.44		
v/c Ratio		0.57		1.22	0.19		0.88	0.50	0.78	0.84		
Control Delay		30.9		154.8	10.8		63.3	24.9	40.8	39.3		
Queue Delay		0.0		0.0	0.0		0.0	0.0	0.0	0.0		
Total Delay		30.9		154.8	10.8		63.3	24.9	40.8	39.3		
LOS		C		F	B		E	C	D	D		
Approach Delay		30.9		117.8			46.7			39.7		
Approach LOS		C		F			D			D		

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	107.8
Natural Cycle:	140
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.22
Intersection Signal Delay:	57.3
Intersection LOS:	E
Intersection Capacity Utilization	105.9%
ICU Level of Service	G
Analysis Period (min)	15

Splits and Phases: 12: Main Street /Main Street (Route 129) & West Water Street/Water Street (Route 129)



Lanes, Volumes, Timings  
22: North Avenue & Albion Street

2029 No-Build Weekday Evening Peak Hour  
07/29/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	338	0	282	62	165	105	115	423	0	0	496	60
Future Volume (vph)	338	0	282	62	165	105	115	423	0	0	496	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	11	11	13	11	12	12	12	12	13	12
Storage Length (ft)	0		0	90		90	160		0	0		100
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>			0.850			0.850						0.850
Fl <sub>t</sub> Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1604	0	1561	1745	1944	1516	1787	1845	0	0	1870	1568
Fl <sub>t</sub> Permitted	0.950			0.950			0.950					
Satd. Flow (perm)	1604	0	1561	1745	1944	1516	1787	1845	0	0	1870	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			229			136						136
Link Speed (mph)		30			30			30				30
Link Distance (ft)		444			778			489				370
Travel Time (s)		10.1			17.7			11.1				8.4
Peak Hour Factor	0.89	0.89	0.89	0.84	0.84	0.84	0.87	0.87	0.87	0.88	0.88	0.88
Heavy Vehicles (%)	5%	0%	0%	0%	1%	3%	1%	3%	0%	0%	5%	3%
Adj. Flow (vph)	380	0	317	74	196	125	132	486	0	0	564	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	380	0	317	74	196	125	132	486	0	0	564	68
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.09	1.00	1.04	1.04	0.96	1.04	1.00	1.00	1.00	1.00	0.96	1.00
Turning Speed (mph)	60		60	60		60	60		60	60		60
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)	20		20	20	100	20	20	100			100	20
Trailing Detector (ft)	0		0	0	0	0	0	0			0	0
Detector 1 Position(ft)	0		0	0	0	0	0	0			0	0
Detector 1 Size(ft)	20		20	20	6	20	20	6			6	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94				94
Detector 2 Size(ft)					6			6				6
Detector 2 Type					Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				0.0
Turn Type	Prot		Prot	Split	NA	Perm	Prot	NA			NA	Perm



Lanes, Volumes, Timings  
22: North Avenue & Albion Street

2029 No-Build Weekday Evening Peak Hour  
07/29/2022

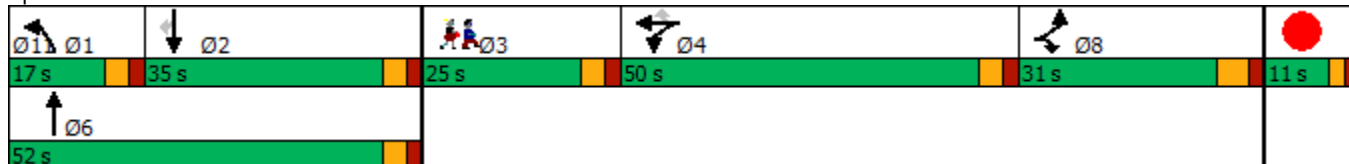


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	8		8	4	4		1	6			2	
Permitted Phases						4						2
Detector Phase	8		8	4	4	4	1	6			2	2
Switch Phase												
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Minimum Split (s)	17.0		17.0	17.0	17.0	17.0	10.0	22.5			22.5	22.5
Total Split (s)	31.0		31.0	50.0	50.0	50.0	17.0	52.0			35.0	35.0
Total Split (%)	18.3%		18.3%	29.6%	29.6%	29.6%	10.1%	30.8%			20.7%	20.7%
Maximum Green (s)	25.0		25.0	45.0	45.0	45.0	12.0	47.0			30.0	30.0
Yellow Time (s)	4.0		4.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)	6.0		6.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag				Lag	Lag	Lag	Lead				Lag	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes				Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode	None		None	None	None	None	None	Min			Min	Min
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	25.5		25.5	17.8	17.8	17.8	12.3	48.0			30.7	30.7
Actuated g/C Ratio	0.21		0.21	0.15	0.15	0.15	0.10	0.40			0.25	0.25
v/c Ratio	1.12		0.62	0.29	0.69	0.37	0.73	0.67			1.19	0.14
Control Delay	131.7		20.4	51.2	63.5	9.5	79.7	39.1			146.7	0.6
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	131.7		20.4	51.2	63.5	9.5	79.7	39.1			146.7	0.6
LOS	F		C	D	E	A	E	D			F	A
Approach Delay		81.1			44.1			47.7			131.0	
Approach LOS		F			D			D			F	

Intersection Summary

Area Type:	Other
Cycle Length:	169
Actuated Cycle Length:	121.2
Natural Cycle:	145
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.19
Intersection Signal Delay:	79.5
Intersection LOS:	E
Intersection Capacity Utilization:	75.7%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 22: North Avenue & Albion Street



Lanes, Volumes, Timings  
27: Main Street & North Avenue/Nahant Street

2029 No-Build Weekday Evening Peak Hour  
07/29/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	213	355	453	38	318	70	399	674	46	79	661	174
Future Volume (vph)	213	355	453	38	318	70	399	674	46	79	661	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	11	12	12	11	11	12
Storage Length (ft)	0		0	0		0	80		0	60		100
Storage Lanes	1		1	0		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frt			0.850		0.978			0.990			0.969	
Flt Protected	0.950				0.996		0.950			0.950		
Satd. Flow (prot)	1711	1818	1561	0	1851	0	1745	1864	0	1745	3348	0
Flt Permitted	0.201				0.544		0.119			0.240		
Satd. Flow (perm)	362	1818	1561	0	1011	0	219	1864	0	441	3348	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			498		7			3				23
Link Speed (mph)		30			30			30				30
Link Distance (ft)		311			845			622				1355
Travel Time (s)		7.1			19.2			14.1				30.8
Peak Hour Factor	0.91	0.91	0.91	0.84	0.84	0.84	0.94	0.94	0.94	0.91	0.91	0.91
Heavy Vehicles (%)	2%	1%	0%	0%	0%	0%	0%	1%	0%	0%	1%	1%
Adj. Flow (vph)	234	390	498	45	379	83	424	717	49	87	726	191
Shared Lane Traffic (%)												
Lane Group Flow (vph)	234	390	498	0	507	0	424	766	0	87	917	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.00	1.00	1.00	1.04	1.00	1.00	1.04	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	

Lanes, Volumes, Timings  
27: Main Street & North Avenue/Nahant Street

2029 No-Build Weekday Evening Peak Hour  
07/29/2022

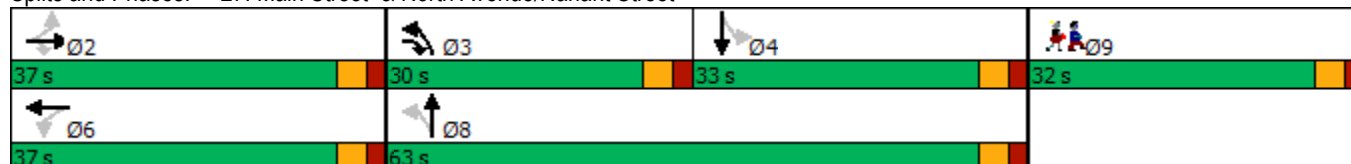


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		2	3		6		3	8				4
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	3	6	6		3	8		4		4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0		5.0
Minimum Split (s)	22.5	22.5	10.0	22.5	22.5		10.0	23.0		23.0		23.0
Total Split (s)	37.0	37.0	30.0	37.0	37.0		30.0	63.0		33.0		33.0
Total Split (%)	28.0%	28.0%	22.7%	28.0%	28.0%		22.7%	47.7%		25.0%		25.0%
Maximum Green (s)	32.0	32.0	25.0	32.0	32.0		25.0	58.0		28.0		28.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0		3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0		0.0
Total Lost Time (s)	5.0	5.0	5.0		5.0		5.0	5.0		5.0		5.0
Lead/Lag			Lead				Lead			Lag		Lag
Lead-Lag Optimize?			Yes				Yes			Yes		Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0		3.0
Recall Mode	Min	Min	None	Min	Min		None	None		None		None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	32.6	32.6	63.2		32.6		59.1	59.1		28.5		28.5
Actuated g/C Ratio	0.27	0.27	0.53		0.27		0.50	0.50		0.24		0.24
v/c Ratio	2.39	0.79	0.47		1.80		0.98	0.83		0.83		1.12
Control Delay	674.4	55.3	3.3		402.7		73.4	38.2		99.4		111.2
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0		0.0
Total Delay	674.4	55.3	3.3		402.7		73.4	38.2		99.4		111.2
LOS	F	E	A		F		E	D		F		F
Approach Delay		161.3			402.7			50.7				110.2
Approach LOS		F			F			D				F

Intersection Summary

Area Type:	Other
Cycle Length:	132
Actuated Cycle Length:	119.2
Natural Cycle:	150
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	2.39
Intersection Signal Delay:	145.5
Intersection LOS:	F
Intersection Capacity Utilization:	104.4%
ICU Level of Service:	G
Analysis Period (min):	15

Splits and Phases: 27: Main Street & North Avenue/Nahant Street



Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	↑
Traffic Vol, veh/h	151	0	0	116	1	12
Future Vol, veh/h	151	0	0	116	1	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	85	85	81	81
Heavy Vehicles, %	1	0	0	0	0	0
Mvmt Flow	182	0	0	136	1	15

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	-	-	-	318 182
Stage 1	-	-	-	-	182 -
Stage 2	-	-	-	-	136 -
Critical Hdwy	-	-	-	-	6.4 6.2
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	-	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	-	0	0	-	679 866
Stage 1	-	0	0	-	854 -
Stage 2	-	0	0	-	895 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	679 866
Mov Cap-2 Maneuver	-	-	-	-	679 -
Stage 1	-	-	-	-	854 -
Stage 2	-	-	-	-	895 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	848	-	-
HCM Lane V/C Ratio	0.019	-	-
HCM Control Delay (s)	9.3	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-

HCM 6th TWSC  
7: Main Street (Route 129) & Chestnut Street/Centre Street

2029 No-Build Weekday Evening Peak Hour

07/29/2022

Intersection												
Int Delay, s/veh	163.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	32	50	81	31	44	35	36	451	27	43	759	35
Future Vol, veh/h	32	50	81	31	44	35	36	451	27	43	759	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	75	75	75	84	84	84	89	89	89
Heavy Vehicles, %	0	3	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	40	63	101	41	59	47	43	537	32	48	853	39

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1661	1624	873	1690	1627	553	892	0	0	569	0	0
Stage 1	969	969	-	639	639	-	-	-	-	-	-	-
Stage 2	692	655	-	1051	988	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.53	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.53	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.53	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.027	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	78	102	352	75	103	537	769	-	-	1013	-	-
Stage 1	307	331	-	468	474	-	-	-	-	-	-	-
Stage 2	437	461	-	277	328	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	~ 28	85	352	~ 19	86	537	769	-	-	1013	-	-
Mov Cap-2 Maneuver	~ 28	85	-	~ 19	86	-	-	-	-	-	-	-
Stage 1	282	300	-	430	435	-	-	-	-	-	-	-
Stage 2	317	423	-	141	297	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	\$ 769.5		\$ 1045.2		0.7		0.4	
HCM LOS	F		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	769	-	-	83	50	1013	-	-
HCM Lane V/C Ratio	0.056	-	-	2.455	2.933	0.048	-	-
HCM Control Delay (s)	10	0	-	\$ 769	\$ 1045.2	8.7	0	-
HCM Lane LOS	A	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	19.1	15.6	0.1	-	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		T
Traffic Vol, veh/h	0	0	112	488	727	113
Future Vol, veh/h	0	0	112	488	727	113
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	87	87	88	88
Heavy Vehicles, %	2	2	3	1	1	0
Mvmt Flow	0	0	129	561	826	128

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1709	890	954	0	-	0
Stage 1	890	-	-	-	-	-
Stage 2	819	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.13	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.227	-	-	-
Pot Cap-1 Maneuver	100	342	716	-	-	-
Stage 1	401	-	-	-	-	-
Stage 2	433	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	74	342	716	-	-	-
Mov Cap-2 Maneuver	74	-	-	-	-	-
Stage 1	296	-	-	-	-	-
Stage 2	433	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	2.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	716	-	-	-	-
HCM Lane V/C Ratio	0.18	-	-	-	-
HCM Control Delay (s)	11.1	0	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0.7	-	-	-	-

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		T
Traffic Vol, veh/h	0	0	33	545	816	24
Future Vol, veh/h	0	0	33	545	816	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	91	91	95	95
Heavy Vehicles, %	2	2	2	1	1	2
Mvmt Flow	0	0	36	599	859	25

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1543	872	884	0	-	0
Stage 1	872	-	-	-	-	-
Stage 2	671	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	126	350	765	-	-	-
Stage 1	409	-	-	-	-	-
Stage 2	508	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	117	350	765	-	-	-
Mov Cap-2 Maneuver	117	-	-	-	-	-
Stage 1	380	-	-	-	-	-
Stage 2	508	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	765	-	-	-	-
HCM Lane V/C Ratio	0.047	-	-	-	-
HCM Control Delay (s)	9.9	0	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-	-

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	147	8	4	113	0	4
Future Vol, veh/h	147	8	4	113	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	85	85	50	50
Heavy Vehicles, %	1	0	0	0	0	0
Mvmt Flow	177	10	5	133	0	8

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	187	0	325
Stage 1	-	-	-	-	182
Stage 2	-	-	-	-	143
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	1399	-	673
Stage 1	-	-	-	-	854
Stage 2	-	-	-	-	889
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1399	-	670
Mov Cap-2 Maneuver	-	-	-	-	670
Stage 1	-	-	-	-	854
Stage 2	-	-	-	-	885

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	866	-	-	1399	-
HCM Lane V/C Ratio	0.009	-	-	0.003	-
HCM Control Delay (s)	9.2	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-



Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			↑
Traffic Vol, veh/h	0	0	277	8	0	5
Future Vol, veh/h	0	0	277	8	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	90	90	42	42
Heavy Vehicles, %	2	2	1	0	0	0
Mvmt Flow	0	0	308	9	0	12

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	-	0	-	0	313
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	-	-	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	-	0 732
Stage 1	0	-	-	-	0 -
Stage 2	0	-	-	-	0 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	732
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	732
HCM Lane V/C Ratio	-	-	-	0.016
HCM Control Delay (s)	-	-	-	10
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.1

2029 Build Weekday Morning Peak Hour

---



Lanes, Volumes, Timings

2029 Build Weekday Morning Peak Hour

12: Main Street /Main Street (Route 129) & West Water Street/Water Street (Route 129) 01/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕	↕		↕	↕	↕	↕	
Traffic Volume (vph)	15	135	11	318	144	189	17	366	241	105	587	34
Future Volume (vph)	15	135	11	318	144	189	17	366	241	105	587	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	12	12	11	15	12	12	12	11	12	12
Storage Length (ft)	0		0	0		115	0		65	90		0
Storage Lanes	0		0	0		1	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991				0.850			0.850		0.992	
Flt Protected		0.995			0.967			0.998		0.950		
Satd. Flow (prot)	0	2009	0	0	1753	1692	0	1860	1568	1745	1833	0
Flt Permitted		0.865			0.642			0.771		0.171		
Satd. Flow (perm)	0	1747	0	0	1164	1692	0	1437	1568	314	1833	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				92			92			3
Link Speed (mph)		30			30			30				30
Link Distance (ft)		863			474			313				440
Travel Time (s)		19.6			10.8			7.1				10.0
Peak Hour Factor	0.85	0.85	0.85	0.94	0.94	0.94	0.79	0.79	0.79	0.83	0.83	0.83
Heavy Vehicles (%)	0%	2%	13%	1%	2%	5%	1%	2%	3%	0%	3%	0%
Adj. Flow (vph)	18	159	13	338	153	201	22	463	305	127	707	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	190	0	0	491	201	0	485	305	127	748	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	0.88	1.00	1.00	1.04	0.88	1.00	1.00	1.00	1.04	1.00	1.00
Turning Speed (mph)	60		60	60		60	60		60	60		60
Number of Detectors	1	2		1	2	1	1	2	1	1		2
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Prot	pm+pt	NA	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lanes, Volumes, Timings

2029 Build Weekday Morning Peak Hour

12: Main Street /Main Street (Route 129) & West Water Street/Water Street (Route 129) 01/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2	2	1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	10.0	22.5	
Total Split (s)	44.0	44.0		44.0	44.0	44.0	35.0	35.0	35.0	20.0	55.0	
Total Split (%)	33.8%	33.8%		33.8%	33.8%	33.8%	26.9%	26.9%	26.9%	15.4%	42.3%	
Maximum Green (s)	39.0	39.0		39.0	39.0	39.0	30.0	30.0	30.0	15.0	50.0	
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	5.0	5.0	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	Min	Min	Min	None	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		39.3		39.3	39.3		35.5	35.5	50.3	50.3		
Actuated g/C Ratio		0.38		0.38	0.38		0.34	0.34	0.49	0.49		
v/c Ratio		0.29		1.11	0.29		0.98	0.51	0.44	0.84		
Control Delay		24.9		109.2	14.2		72.6	24.0	21.4	34.2		
Queue Delay		0.0		0.0	0.0		0.0	0.0	0.0	0.0		
Total Delay		24.9		109.2	14.2		72.6	24.0	21.4	34.2		
LOS		C		F	B		E	C	C	C		
Approach Delay		24.9		81.6			53.8			32.3		
Approach LOS		C		F			D			C		

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	103.4
Natural Cycle:	150
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.11
Intersection Signal Delay:	51.8
Intersection LOS:	D
Intersection Capacity Utilization	103.6%
ICU Level of Service	G
Analysis Period (min)	15

Splits and Phases: 12: Main Street /Main Street (Route 129) & West Water Street/Water Street (Route 129)



Lane Group	Ø9
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	22.5
Total Split (s)	31.0
Total Split (%)	24%
Maximum Green (s)	27.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	9
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

Queues

2029 Build Weekday Morning Peak Hour

12: Main Street /Main Street (Route 129) & West Water Street/Water Street (Route 129) 1/14/2022



Lane Group	EBT	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	190	491	201	485	305	127	748
v/c Ratio	0.29	1.11	0.29	0.98	0.51	0.44	0.84
Control Delay	24.9	109.2	14.2	72.6	24.0	21.4	34.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.9	109.2	14.2	72.6	24.0	21.4	34.2
Queue Length 50th (ft)	79	~346	44	292	101	41	376
Queue Length 95th (ft)	164	#705	125	#586	205	96	#723
Internal Link Dist (ft)	783	394		233			360
Turn Bay Length (ft)			115		65	90	
Base Capacity (vph)	665	441	699	493	598	361	893
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	1.11	0.29	0.98	0.51	0.35	0.84






















Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Lanes, Volumes, Timings  
22: North Avenue & Albion Street

2029 Build Weekday Morning Peak Hour

11/14/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	169	0	174	46	318	96	138	482	0	0	392	49
Future Volume (vph)	169	0	174	46	318	96	138	482	0	0	392	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	11	11	13	11	12	12	12	12	13	12
Storage Length (ft)	0		0	90		90	160		0	0		100
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850						0.850
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1604	0	1561	1745	1944	1516	1787	1845	0	0	1870	1568
Flt Permitted	0.950			0.950			0.950					
Satd. Flow (perm)	1604	0	1561	1745	1944	1516	1787	1845	0	0	1870	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			202			126						126
Link Speed (mph)		30			30			30				30
Link Distance (ft)		444			506			489				370
Travel Time (s)		10.1			11.5			11.1				8.4
Peak Hour Factor	0.86	0.86	0.86	0.76	0.76	0.76	0.81	0.81	0.81	0.92	0.92	0.92
Heavy Vehicles (%)	5%	0%	0%	0%	1%	3%	1%	3%	0%	0%	5%	3%
Adj. Flow (vph)	197	0	202	61	418	126	170	595	0	0	426	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	197	0	202	61	418	126	170	595	0	0	426	53
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.09	1.00	1.04	1.04	0.96	1.04	1.00	1.00	1.00	1.00	0.96	1.00
Turning Speed (mph)	60		60	60		60	60		60	60		60
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)	20		20	20	100	20	20	100			100	20
Trailing Detector (ft)	0		0	0	0	0	0	0			0	0
Detector 1 Position(ft)	0		0	0	0	0	0	0			0	0
Detector 1 Size(ft)	20		20	20	6	20	20	6			6	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94				94
Detector 2 Size(ft)					6			6				6
Detector 2 Type					Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				0.0
Turn Type	Prot		Prot	Split	NA	Perm	Prot	NA			NA	Perm



Lane Group	Ø3	Ø11
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		

Lanes, Volumes, Timings  
22: North Avenue & Albion Street

2029 Build Weekday Morning Peak Hour  
11/14/2022

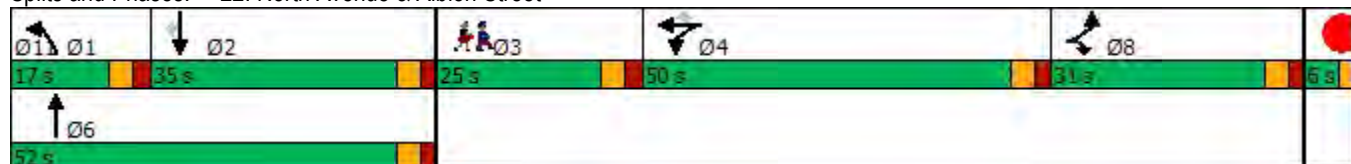


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	8		8	4	4		1	6			2	
Permitted Phases						4						2
Detector Phase	8		8	4	4	4	1	6			2	2
Switch Phase												
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Minimum Split (s)	17.0		17.0	17.0	17.0	17.0	10.0	22.5			22.5	22.5
Total Split (s)	31.0		31.0	50.0	50.0	50.0	17.0	52.0			35.0	35.0
Total Split (%)	18.9%		18.9%	30.5%	30.5%	30.5%	10.4%	31.7%			21.3%	21.3%
Maximum Green (s)	26.0		26.0	45.0	45.0	45.0	12.0	47.0			30.0	30.0
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag				Lag	Lag	Lag	Lead				Lag	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes				Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode	None		None	None	None	None	None	Min			Min	Min
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	21.2		21.2	34.3	34.3	34.3	12.6	49.2			31.4	31.4
Actuated g/C Ratio	0.16		0.16	0.26	0.26	0.26	0.09	0.37			0.24	0.24
v/c Ratio	0.78		0.48	0.14	0.84	0.26	1.01	0.88			0.97	0.11
Control Delay	77.7		11.3	41.9	63.8	8.1	133.7	58.5			88.1	0.5
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	77.7		11.3	41.9	63.8	8.1	133.7	58.5			88.1	0.5
LOS	E		B	D	E	A	F	E			F	A
Approach Delay		44.1				50.0		75.2			78.4	
Approach LOS		D				D		E			E	

Intersection Summary

Area Type:	Other
Cycle Length:	164
Actuated Cycle Length:	133.3
Natural Cycle:	150
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.01
Intersection Signal Delay:	63.6
Intersection LOS:	E
Intersection Capacity Utilization:	70.2%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 22: North Avenue & Albion Street



Lane Group	Ø3	Ø11
Protected Phases	3	11
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	4.0
Minimum Split (s)	25.0	6.0
Total Split (s)	25.0	6.0
Total Split (%)	15%	4%
Maximum Green (s)	20.0	4.0
Yellow Time (s)	3.0	2.0
All-Red Time (s)	2.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	7.0	
Flash Dont Walk (s)	13.0	
Pedestrian Calls (#/hr)	24	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Queues  
22: North Avenue & Albion Street

2029 Build Weekday Morning Peak Hour

11/14/2022



Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	197	202	61	418	126	170	595	426	53
v/c Ratio	0.78	0.48	0.14	0.84	0.26	1.01	0.88	0.97	0.11
Control Delay	77.7	11.3	41.9	63.8	8.1	133.7	58.5	88.1	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.7	11.3	41.9	63.8	8.1	133.7	58.5	88.1	0.5
Queue Length 50th (ft)	186	0	46	390	0	~199	~618	~483	0
Queue Length 95th (ft)	#277	62	73	423	28	#326	#776	#752	0
Internal Link Dist (ft)				426			409	290	
Turn Bay Length (ft)			90		90	160			100
Base Capacity (vph)	327	479	616	686	616	168	680	440	465
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.42	0.10	0.61	0.20	1.01	0.88	0.97	0.11

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.






















# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Lanes, Volumes, Timings  
27: Main Street & North Avenue/Nahant Street

2029 Build Weekday Morning Peak Hour

11/14/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	286	430	43	428	77	440	570	50	52	507	158
Future Volume (vph)	135	286	430	43	428	77	440	570	50	52	507	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	11	12	12	11	11	12
Storage Length (ft)	0		0	0		0	80		0	60		100
Storage Lanes	1		1	0		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frt			0.850		0.981			0.988			0.964	
Flt Protected	0.950				0.996		0.950			0.950		
Satd. Flow (prot)	1631	1801	1546	0	1838	0	1728	1860	0	1745	3313	0
Flt Permitted	0.123				0.660		0.119			0.256		
Satd. Flow (perm)	211	1801	1546	0	1218	0	216	1860	0	470	3313	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			494		6			4			28	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		311			845			622			1355	
Travel Time (s)		7.1			19.2			14.1			30.8	
Peak Hour Factor	0.87	0.87	0.87	0.86	0.86	0.86	0.82	0.82	0.82	0.84	0.84	0.84
Heavy Vehicles (%)	7%	2%	1%	3%	1%	0%	1%	1%	0%	0%	2%	0%
Adj. Flow (vph)	155	329	494	50	498	90	537	695	61	62	604	188
Shared Lane Traffic (%)												
Lane Group Flow (vph)	155	329	494	0	638	0	537	756	0	62	792	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.00	1.00	1.00	1.04	1.00	1.00	1.04	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lanes, Volumes, Timings  
27: Main Street & North Avenue/Nahant Street

2029 Build Weekday Morning Peak Hour

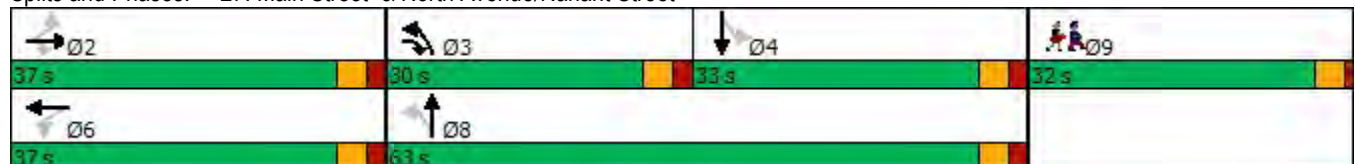
11/14/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		2	3		6		3	8			4	
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	3	6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5	10.0	22.5	22.5		10.0	23.0		23.0	23.0	
Total Split (s)	37.0	37.0	30.0	37.0	37.0		30.0	63.0		33.0	33.0	
Total Split (%)	28.0%	28.0%	22.7%	28.0%	28.0%		22.7%	47.7%		25.0%	25.0%	
Maximum Green (s)	32.0	32.0	25.0	32.0	32.0		25.0	58.0		28.0	28.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0		5.0		5.0	5.0		5.0	5.0	
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min	None	Min	Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	32.6	32.6	63.2		32.6		59.1	59.1		28.5	28.5	
Actuated g/C Ratio	0.27	0.27	0.53		0.27		0.50	0.50		0.24	0.24	
v/c Ratio	2.72	0.67	0.47		1.89		1.25	0.82		0.55	0.97	
Control Delay	831.9	49.2	3.3		440.5		162.0	37.5		66.1	70.6	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	831.9	49.2	3.3		440.5		162.0	37.5		66.1	70.6	
LOS	F	D	A		F		F	D		E	E	
Approach Delay		150.1			440.5			89.2			70.3	
Approach LOS		F			F			F			E	

Intersection Summary

Area Type:	Other
Cycle Length:	132
Actuated Cycle Length:	119.2
Natural Cycle:	150
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	2.72
Intersection Signal Delay:	160.3
Intersection LOS:	F
Intersection Capacity Utilization:	104.7%
ICU Level of Service:	G
Analysis Period (min):	15

Splits and Phases: 27: Main Street & North Avenue/Nahant Street



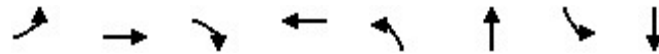
Lane Group	Ø9
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	32.0
Total Split (s)	32.0
Total Split (%)	24%
Maximum Green (s)	28.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	21.0
Pedestrian Calls (#/hr)	29
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	



Queues  
27: Main Street & North Avenue/Nahant Street

2029 Build Weekday Morning Peak Hour

11/14/2022



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	155	329	494	638	537	756	62	792
v/c Ratio	2.72	0.67	0.47	1.89	1.25	0.82	0.55	0.97
Control Delay	831.9	49.2	3.3	440.5	162.0	37.5	66.1	70.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	831.9	49.2	3.3	440.5	162.0	37.5	66.1	70.6
Queue Length 50th (ft)	~230	263	0	~873	~571	598	49	~392
Queue Length 95th (ft)	#324	360	49	#1048	#692	679	#105	#465
Internal Link Dist (ft)		231		765		542		1275
Turn Bay Length (ft)					80		60	
Base Capacity (vph)	57	492	1051	337	430	923	112	813
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	2.72	0.67	0.47	1.89	1.25	0.82	0.55	0.97

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	99	1	1	308	1	5
Future Vol, veh/h	99	1	1	308	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	88	88	75	75
Heavy Vehicles, %	1	0	0	2	0	0
Mvmt Flow	118	1	1	350	1	7

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	119	0	471
Stage 1	-	-	-	-	119
Stage 2	-	-	-	-	352
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	1482	-	555
Stage 1	-	-	-	-	911
Stage 2	-	-	-	-	716
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1482	-	554
Mov Cap-2 Maneuver	-	-	-	-	554
Stage 1	-	-	-	-	911
Stage 2	-	-	-	-	715

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	841	-	-	1482	-
HCM Lane V/C Ratio	0.01	-	-	0.001	-
HCM Control Delay (s)	9.3	-	-	7.4	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

HCM 6th TWSC  
 7: Main Street (Route 129) & Chestnut Street/Centre Street

2029 Build Weekday Morning Peak Hour

11/14/2022

Intersection												
Int Delay, s/veh	573.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	18	30	56	77	203	31	78	415	17	17	738	28
Future Vol, veh/h	18	30	56	77	203	31	78	415	17	17	738	28
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	79	79	79	81	81	81	80	80	80
Heavy Vehicles, %	0	0	0	4	2	0	2	2	8	0	1	0
Mvmt Flow	23	38	72	97	257	39	96	512	21	21	923	35

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1846	1708	941	1753	1715	523	958	0	0	533	0	0
Stage 1	983	983	-	715	715	-	-	-	-	-	-	-
Stage 2	863	725	-	1038	1000	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.14	6.52	6.2	4.12	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.14	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.14	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.536	4.018	3.3	2.218	-	-	2.2	-	-
Pot Cap-1 Maneuver	58	92	322	~66	~90	558	718	-	-	1045	-	-
Stage 1	302	329	-	419	434	-	-	-	-	-	-	-
Stage 2	352	433	-	276	321	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	-	71	322	~25	~70	558	718	-	-	1045	-	-
Mov Cap-2 Maneuver	-	71	-	~25	~70	-	-	-	-	-	-	-
Stage 1	244	315	-	339	351	-	-	-	-	-	-	-
Stage 2	71	350	-	180	307	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s		\$ 3108.7	1.7	0.2
HCM LOS	-	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	718	-	-	-	52	1045	-
HCM Lane V/C Ratio	0.134	-	-	-	7.571	0.02	-
HCM Control Delay (s)	10.8	0	-	-	\$ 3108.7	8.5	0
HCM Lane LOS	B	A	-	-	F	A	A
HCM 95th %tile Q(veh)	0.5	-	-	-	45.9	0.1	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		T
Traffic Vol, veh/h	0	0	109	500	676	181
Future Vol, veh/h	0	0	109	500	676	181
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	83	83	85	85
Heavy Vehicles, %	2	2	2	3	2	0
Mvmt Flow	0	0	131	602	795	213

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1766	902	1008	0	-	0
Stage 1	902	-	-	-	-	-
Stage 2	864	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	92	336	687	-	-	-
Stage 1	396	-	-	-	-	-
Stage 2	413	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	66	336	687	-	-	-
Mov Cap-2 Maneuver	66	-	-	-	-	-
Stage 1	282	-	-	-	-	-
Stage 2	413	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	2.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	687	-	-	-	-
HCM Lane V/C Ratio	0.191	-	-	-	-
HCM Control Delay (s)	11.5	0	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0.7	-	-	-	-

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		T
Traffic Vol, veh/h	0	0	59	623	674	242
Future Vol, veh/h	0	0	59	623	674	242
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	79	79	92	92
Heavy Vehicles, %	2	2	2	2	3	2
Mvmt Flow	0	0	75	789	733	263

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1804	865	996	0	-	0
Stage 1	865	-	-	-	-	-
Stage 2	939	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	87	353	695	-	-	-
Stage 1	412	-	-	-	-	-
Stage 2	380	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	70	353	695	-	-	-
Mov Cap-2 Maneuver	70	-	-	-	-	-
Stage 1	333	-	-	-	-	-
Stage 2	380	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	695	-	-	-	-
HCM Lane V/C Ratio	0.107	-	-	-	-
HCM Control Delay (s)	10.8	0	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	-	-

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	100	2	3	306	0	0
Future Vol, veh/h	100	2	3	306	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	88	88	75	75
Heavy Vehicles, %	1	0	0	2	0	0
Mvmt Flow	119	2	3	348	0	0

Major/Minor	Major1	Major2	Minor1	Minor2		
Conflicting Flow All	0	0	121	0	474	120
Stage 1	-	-	-	-	120	-
Stage 2	-	-	-	-	354	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1479	-	553	937
Stage 1	-	-	-	-	910	-
Stage 2	-	-	-	-	715	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1479	-	551	937
Mov Cap-2 Maneuver	-	-	-	-	551	-
Stage 1	-	-	-	-	910	-
Stage 2	-	-	-	-	713	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1479	-
HCM Lane V/C Ratio	-	-	-	0.002	-
HCM Control Delay (s)	0	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			↑
Traffic Vol, veh/h	0	0	334	0	0	16
Future Vol, veh/h	0	0	334	0	0	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	78	78	50	50
Heavy Vehicles, %	2	2	3	0	0	0
Mvmt Flow	0	0	428	0	0	32

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	-	0	- 0 - 428
Stage 1	-	-	- - -
Stage 2	-	-	- - -
Critical Hdwy	-	-	- - 6.2
Critical Hdwy Stg 1	-	-	- - -
Critical Hdwy Stg 2	-	-	- - -
Follow-up Hdwy	-	-	- - 3.3
Pot Cap-1 Maneuver	0	-	- 0 631
Stage 1	0	-	- 0 -
Stage 2	0	-	- 0 -
Platoon blocked, %	-	-	- - -
Mov Cap-1 Maneuver	-	-	- - 631
Mov Cap-2 Maneuver	-	-	- - -
Stage 1	-	-	- - -
Stage 2	-	-	- - -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	631
HCM Lane V/C Ratio	-	-	-	0.051
HCM Control Delay (s)	-	-	-	11
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.2

2029 Build Weekday Evening Peak Hour

---





Lanes, Volumes, Timings

2029 Build Weekday Evening Peak Hour

12: Main Street /Main Street (Route 129) & West Water Street/Water Street (Route 129) 01/14/2022



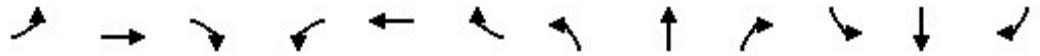
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕	↕		↕	↕	↕	↕	
Traffic Volume (vph)	30	265	58	218	132	124	23	284	237	265	557	85
Future Volume (vph)	30	265	58	218	132	124	23	284	237	265	557	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	12	12	11	15	12	12	12	11	12	12
Storage Length (ft)	0		0	0		115	0		65	90		0
Storage Lanes	0		0	0		1	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.978				0.850			0.850		0.980	
Flt Protected		0.996			0.970			0.996		0.950		
Satd. Flow (prot)	0	2036	0	0	1782	1777	0	1875	1615	1745	1846	0
Flt Permitted		0.877			0.472			0.751		0.268		
Satd. Flow (perm)	0	1793	0	0	867	1777	0	1414	1615	492	1846	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8				92			100			7
Link Speed (mph)		30			30			30				30
Link Distance (ft)		863			474			313				440
Travel Time (s)		19.6			10.8			7.1				10.0
Peak Hour Factor	0.87	0.87	0.87	0.84	0.84	0.84	0.91	0.91	0.91	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	34	305	67	260	157	148	25	312	260	279	586	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	406	0	0	417	148	0	337	260	279	675	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	0.88	1.00	1.00	1.04	0.88	1.00	1.00	1.00	1.04	1.00	1.00
Turning Speed (mph)	60		60	60		60	60		60	60		60
Number of Detectors	1	2		1	2	1	1	2	1	1		2
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Prot	pm+pt	NA	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Fr <sub>t</sub>	
Fl <sub>t</sub> Protected	
Satd. Flow (prot)	
Fl <sub>t</sub> Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lanes, Volumes, Timings

2029 Build Weekday Evening Peak Hour

12: Main Street /Main Street (Route 129) & West Water Street/Water Street (Route 129) 01/14/2022

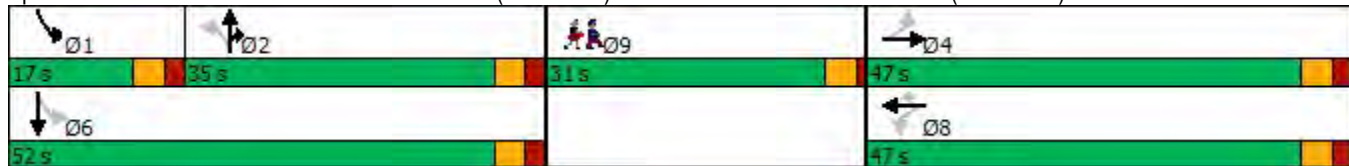


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		4			8			2	2	1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	10.0	22.5	
Total Split (s)	47.0	47.0		47.0	47.0	47.0	35.0	35.0	35.0	17.0	52.0	
Total Split (%)	36.2%	36.2%		36.2%	36.2%	36.2%	26.9%	26.9%	26.9%	13.1%	40.0%	
Maximum Green (s)	42.0	42.0		42.0	42.0	42.0	30.0	30.0	30.0	12.0	47.0	
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	5.0	5.0	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	Min	Min	Min	None	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		42.4		42.4	42.4		30.3	30.3	47.5	47.5		
Actuated g/C Ratio		0.39		0.39	0.39		0.28	0.28	0.44	0.44		
v/c Ratio		0.57		1.23	0.20		0.85	0.50	0.78	0.83		
Control Delay		30.9		156.2	11.1		59.1	24.8	40.8	38.4		
Queue Delay		0.0		0.0	0.0		0.0	0.0	0.0	0.0		
Total Delay		30.9		156.2	11.1		59.1	24.8	40.8	38.4		
LOS		C		F	B		E	C	D	D		
Approach Delay		30.9		118.2			44.2			39.1		
Approach LOS		C		F			D			D		

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	107.8
Natural Cycle:	150
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.23
Intersection Signal Delay:	56.7
Intersection LOS:	E
Intersection Capacity Utilization:	105.5%
ICU Level of Service:	G
Analysis Period (min):	15

Splits and Phases: 12: Main Street /Main Street (Route 129) & West Water Street/Water Street (Route 129)



Lane Group	Ø9
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	22.5
Total Split (s)	31.0
Total Split (%)	24%
Maximum Green (s)	27.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	22
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

Queues

2029 Build Weekday Evening Peak Hour

12: Main Street /Main Street (Route 129) & West Water Street/Water Street (Route 129) 01/14/2022
























Lane Group	EBT	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	406	417	148	337	260	279	675
v/c Ratio	0.57	1.23	0.20	0.85	0.50	0.78	0.83
Control Delay	30.9	156.2	11.1	59.1	24.8	40.8	38.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.9	156.2	11.1	59.1	24.8	40.8	38.4
Queue Length 50th (ft)	182	~308	21	194	79	106	336
Queue Length 95th (ft)	356	#575	68	#450	197	#304	#741
Internal Link Dist (ft)	783	394		233			360
Turn Bay Length (ft)			115		65	90	
Base Capacity (vph)	710	340	754	397	525	357	816
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	1.23	0.20	0.85	0.50	0.78	0.83

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Lanes, Volumes, Timings  
22: North Avenue & Albion Street

2029 Build Weekday Evening Peak Hour  
11/14/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	338	0	282	65	168	104	115	423	0	0	496	60
Future Volume (vph)	338	0	282	65	168	104	115	423	0	0	496	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	11	11	13	11	12	12	12	12	13	12
Storage Length (ft)	0		0	90		90	160		0	0		100
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850						0.850
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1604	0	1561	1745	1944	1516	1787	1845	0	0	1870	1568
Flt Permitted	0.950			0.950			0.950					
Satd. Flow (perm)	1604	0	1561	1745	1944	1516	1787	1845	0	0	1870	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			229			136						136
Link Speed (mph)		30			30			30				30
Link Distance (ft)		444			506			489				370
Travel Time (s)		10.1			11.5			11.1				8.4
Peak Hour Factor	0.89	0.89	0.89	0.84	0.84	0.84	0.87	0.87	0.87	0.88	0.88	0.88
Heavy Vehicles (%)	5%	0%	0%	0%	1%	3%	1%	3%	0%	0%	5%	3%
Adj. Flow (vph)	380	0	317	77	200	124	132	486	0	0	564	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	380	0	317	77	200	124	132	486	0	0	564	68
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.09	1.00	1.04	1.04	0.96	1.04	1.00	1.00	1.00	1.00	0.96	1.00
Turning Speed (mph)	60		60	60		60	60		60	60		60
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)	20		20	20	100	20	20	100			100	20
Trailing Detector (ft)	0		0	0	0	0	0	0			0	0
Detector 1 Position(ft)	0		0	0	0	0	0	0			0	0
Detector 1 Size(ft)	20		20	20	6	20	20	6			6	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94				94
Detector 2 Size(ft)					6			6				6
Detector 2 Type					Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				0.0
Turn Type	Prot		Prot	Split	NA	Perm	Prot	NA			NA	Perm

Lane Group	Ø3	Ø11
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		

Lanes, Volumes, Timings  
22: North Avenue & Albion Street

2029 Build Weekday Evening Peak Hour  
11/14/2022

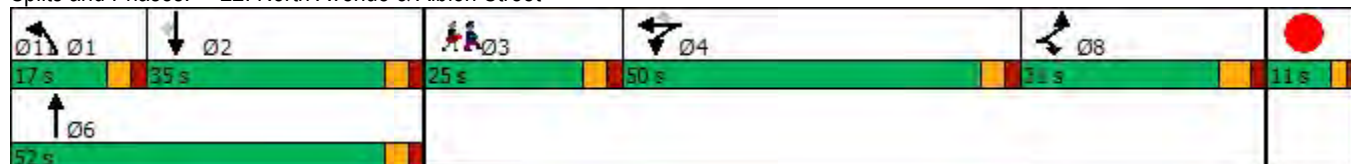


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	8		8	4	4		1	6			2	
Permitted Phases						4						2
Detector Phase	8		8	4	4	4	1	6			2	2
Switch Phase												
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Minimum Split (s)	17.0		17.0	17.0	17.0	17.0	10.0	22.5			22.5	22.5
Total Split (s)	31.0		31.0	50.0	50.0	50.0	17.0	52.0			35.0	35.0
Total Split (%)	18.3%		18.3%	29.6%	29.6%	29.6%	10.1%	30.8%			20.7%	20.7%
Maximum Green (s)	25.0		25.0	45.0	45.0	45.0	12.0	47.0			30.0	30.0
Yellow Time (s)	4.0		4.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)	6.0		6.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag				Lag	Lag	Lag	Lead				Lag	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes				Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode	None		None	None	None	None	None	Min			Min	Min
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	25.6		25.6	18.1	18.1	18.1	12.3	48.0			30.7	30.7
Actuated g/C Ratio	0.21		0.21	0.15	0.15	0.15	0.10	0.40			0.25	0.25
v/c Ratio	1.13		0.62	0.30	0.69	0.36	0.73	0.67			1.20	0.14
Control Delay	132.7		20.5	51.2	63.5	9.3	79.9	39.3			147.7	0.6
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	132.7		20.5	51.2	63.5	9.3	79.9	39.3			147.7	0.6
LOS	F		C	D	E	A	E	D			F	A
Approach Delay		81.7			44.4			48.0			131.9	
Approach LOS		F			D			D			F	

Intersection Summary

Area Type:	Other
Cycle Length:	169
Actuated Cycle Length:	121.5
Natural Cycle:	145
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.20
Intersection Signal Delay:	80.0
Intersection Capacity Utilization:	75.9%
Analysis Period (min):	15
Intersection LOS:	E
ICU Level of Service:	D

Splits and Phases: 22: North Avenue & Albion Street





Lane Group	Ø3	Ø11
Protected Phases	3	11
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	5.0
Minimum Split (s)	25.0	9.5
Total Split (s)	25.0	11.0
Total Split (%)	15%	7%
Maximum Green (s)	20.0	8.0
Yellow Time (s)	3.0	2.0
All-Red Time (s)	2.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	7.0	
Flash Dont Walk (s)	13.0	
Pedestrian Calls (#/hr)	24	
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Queues  
22: North Avenue & Albion Street

2029 Build Weekday Evening Peak Hour

11/14/2022



Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	380	317	77	200	124	132	486	564	68
v/c Ratio	1.13	0.62	0.30	0.69	0.36	0.73	0.67	1.20	0.14
Control Delay	132.7	20.5	51.2	63.5	9.3	79.9	39.3	147.7	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	132.7	20.5	51.2	63.5	9.3	79.9	39.3	147.7	0.6
Queue Length 50th (ft)	~404	65	60	166	0	113	361	~623	0
Queue Length 95th (ft)	#637	178	101	230	35	#227	510	#882	0
Internal Link Dist (ft)				426			409	290	
Turn Bay Length (ft)			90		90	160			100
Base Capacity (vph)	337	509	660	735	658	180	729	471	497
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.13	0.62	0.12	0.27	0.19	0.73	0.67	1.20	0.14

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Lanes, Volumes, Timings  
27: Main Street & North Avenue/Nahant Street

2029 Build Weekday Evening Peak Hour  
11/14/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	212	355	455	38	313	68	399	673	46	79	655	168
Future Volume (vph)	212	355	455	38	313	68	399	673	46	79	655	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	11	12	12	11	11	12
Storage Length (ft)	0		0	0		0	80		0	60		100
Storage Lanes	1		1	0		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frt			0.850		0.978			0.990			0.969	
Flt Protected	0.950				0.996		0.950			0.950		
Satd. Flow (prot)	1711	1818	1561	0	1851	0	1745	1864	0	1745	3348	0
Flt Permitted	0.207				0.543		0.119			0.242		
Satd. Flow (perm)	373	1818	1561	0	1009	0	219	1864	0	444	3348	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			500		7			3			22	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		311			845			622			1355	
Travel Time (s)		7.1			19.2			14.1			30.8	
Peak Hour Factor	0.91	0.91	0.91	0.84	0.84	0.84	0.94	0.94	0.94	0.91	0.91	0.91
Heavy Vehicles (%)	2%	1%	0%	0%	0%	0%	0%	1%	0%	0%	1%	1%
Adj. Flow (vph)	233	390	500	45	373	81	424	716	49	87	720	185
Shared Lane Traffic (%)												
Lane Group Flow (vph)	233	390	500	0	499	0	424	765	0	87	905	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.00	1.00	1.00	1.04	1.00	1.00	1.04	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lanes, Volumes, Timings  
27: Main Street & North Avenue/Nahant Street

2029 Build Weekday Evening Peak Hour

11/14/2022

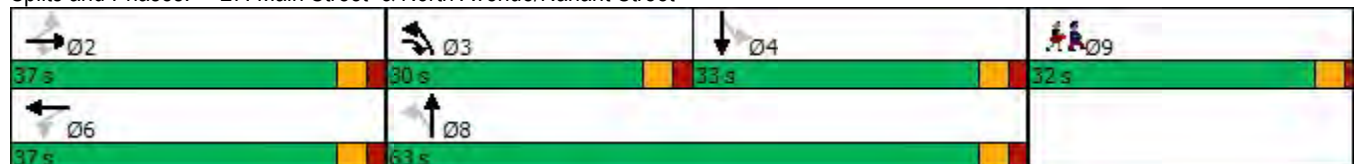


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		2	3		6		3	8				4
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	3	6	6		3	8		4		4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0		5.0
Minimum Split (s)	22.5	22.5	10.0	22.5	22.5		10.0	23.0		23.0		23.0
Total Split (s)	37.0	37.0	30.0	37.0	37.0		30.0	63.0		33.0		33.0
Total Split (%)	28.0%	28.0%	22.7%	28.0%	28.0%		22.7%	47.7%		25.0%		25.0%
Maximum Green (s)	32.0	32.0	25.0	32.0	32.0		25.0	58.0		28.0		28.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0		3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0		0.0
Total Lost Time (s)	5.0	5.0	5.0		5.0		5.0	5.0		5.0		5.0
Lead/Lag			Lead				Lead			Lag		Lag
Lead-Lag Optimize?			Yes				Yes			Yes		Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0		3.0
Recall Mode	Min	Min	None	Min	Min		None	None		None		None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	32.6	32.6	63.2		32.6		59.1	59.1		28.5		28.5
Actuated g/C Ratio	0.27	0.27	0.53		0.27		0.50	0.50		0.24		0.24
v/c Ratio	2.28	0.79	0.47		1.78		0.98	0.83		0.82		1.11
Control Delay	634.6	55.3	3.3		393.2		73.4	38.1		97.8		106.7
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0		0.0
Total Delay	634.6	55.3	3.3		393.2		73.4	38.1		97.8		106.7
LOS	F	E	A		F		E	D		F		F
Approach Delay		152.3			393.2			50.7				105.9
Approach LOS		F			F			D				F

Intersection Summary

Area Type:	Other
Cycle Length:	132
Actuated Cycle Length:	119.2
Natural Cycle:	150
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	2.28
Intersection Signal Delay:	140.1
Intersection LOS:	F
Intersection Capacity Utilization:	103.6%
ICU Level of Service:	G
Analysis Period (min):	15

Splits and Phases: 27: Main Street & North Avenue/Nahant Street

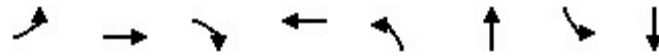


Lane Group	Ø9
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	32.0
Total Split (s)	32.0
Total Split (%)	24%
Maximum Green (s)	28.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	21.0
Pedestrian Calls (#/hr)	23
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

Queues  
27: Main Street & North Avenue/Nahant Street

2029 Build Weekday Evening Peak Hour

11/14/2022



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	233	390	500	499	424	765	87	905
v/c Ratio	2.28	0.79	0.47	1.78	0.98	0.83	0.82	1.11
Control Delay	634.6	55.3	3.3	393.2	73.4	38.1	97.8	106.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	634.6	55.3	3.3	393.2	73.4	38.1	97.8	106.7
Queue Length 50th (ft)	~334	324	0	~667	~362	611	74	~501
Queue Length 95th (ft)	#503	#504	59	#813	#574	#877	#183	#635
Internal Link Dist (ft)		231		765		542		1275
Turn Bay Length (ft)					80		60	
Base Capacity (vph)	102	496	1062	280	434	925	106	817
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	2.28	0.79	0.47	1.78	0.98	0.83	0.82	1.11

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	149	1	3	121	1	2
Future Vol, veh/h	149	1	3	121	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	85	85	81	81
Heavy Vehicles, %	1	0	0	0	0	0
Mvmt Flow	180	1	4	142	1	2

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	181	0	331
Stage 1	-	-	-	-	181
Stage 2	-	-	-	-	150
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	1407	-	668
Stage 1	-	-	-	-	855
Stage 2	-	-	-	-	883
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1407	-	666
Mov Cap-2 Maneuver	-	-	-	-	666
Stage 1	-	-	-	-	855
Stage 2	-	-	-	-	880

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	788	-	-	1407	-
HCM Lane V/C Ratio	0.005	-	-	0.003	-
HCM Control Delay (s)	9.6	-	-	7.6	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-



HCM 6th TWSC  
 7: Main Street (Route 129) & Chestnut Street/Centre Street

2029 Build Weekday Evening Peak Hour

11/14/2022

Intersection												
Int Delay, s/veh	152.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	30	46	74	32	42	35	42	452	28	43	762	39
Future Vol, veh/h	30	46	74	32	42	35	42	452	28	43	762	39
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	75	75	75	84	84	84	89	89	89
Heavy Vehicles, %	0	3	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	38	58	93	43	56	47	50	538	33	48	856	44

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1680	1645	878	1705	1651	555	900	0	0	571	0	0
Stage 1	974	974	-	655	655	-	-	-	-	-	-	-
Stage 2	706	671	-	1050	996	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.53	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.53	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.53	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.027	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	76	99	350	73	100	535	763	-	-	1012	-	-
Stage 1	305	329	-	458	466	-	-	-	-	-	-	-
Stage 2	430	453	-	277	325	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	~ 27	81	350	~ 20	82	535	763	-	-	1012	-	-
Mov Cap-2 Maneuver	~ 27	81	-	~ 20	82	-	-	-	-	-	-	-
Stage 1	275	297	-	414	421	-	-	-	-	-	-	-
Stage 2	307	409	-	149	294	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	\$ 739.3		\$ 1033.5		0.8		0.4	
HCM LOS	F		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	763	-	-	79	50	1012	-	-
HCM Lane V/C Ratio	0.066	-	-	2.373	2.907	0.048	-	-
HCM Control Delay (s)	10	0	-	\$ 739.3	\$ 1033.5	8.7	0	-
HCM Lane LOS	B	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	17.6	15.4	0.1	-	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		T
Traffic Vol, veh/h	0	0	105	496	722	114
Future Vol, veh/h	0	0	105	496	722	114
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	87	87	88	88
Heavy Vehicles, %	2	2	3	1	1	0
Mvmt Flow	0	0	121	570	820	130

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1697	885	950	0	-	0
Stage 1	885	-	-	-	-	-
Stage 2	812	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.13	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.227	-	-	-
Pot Cap-1 Maneuver	102	344	719	-	-	-
Stage 1	403	-	-	-	-	-
Stage 2	437	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	77	344	719	-	-	-
Mov Cap-2 Maneuver	77	-	-	-	-	-
Stage 1	304	-	-	-	-	-
Stage 2	437	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	1.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	719	-	-	-	-
HCM Lane V/C Ratio	0.168	-	-	-	-
HCM Control Delay (s)	11	0	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0.6	-	-	-	-

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		T
Traffic Vol, veh/h	0	0	33	543	809	24
Future Vol, veh/h	0	0	33	543	809	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	91	91	95	95
Heavy Vehicles, %	2	2	2	1	1	2
Mvmt Flow	0	0	36	597	852	25

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1534	865	877	0	-	0
Stage 1	865	-	-	-	-	-
Stage 2	669	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	128	353	770	-	-	-
Stage 1	412	-	-	-	-	-
Stage 2	509	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	119	353	770	-	-	-
Mov Cap-2 Maneuver	119	-	-	-	-	-
Stage 1	383	-	-	-	-	-
Stage 2	509	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	770	-	-	-	-
HCM Lane V/C Ratio	0.047	-	-	-	-
HCM Control Delay (s)	9.9	0	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-	-

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	150	5	9	114	0	0
Future Vol, veh/h	150	5	9	114	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	85	85	50	50
Heavy Vehicles, %	1	0	0	0	0	0
Mvmt Flow	181	6	11	134	0	0

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	187	0	340
Stage 1	-	-	-	-	184
Stage 2	-	-	-	-	156
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	1399	-	660
Stage 1	-	-	-	-	852
Stage 2	-	-	-	-	877
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1399	-	655
Mov Cap-2 Maneuver	-	-	-	-	655
Stage 1	-	-	-	-	852
Stage 2	-	-	-	-	870

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1399	-
HCM Lane V/C Ratio	-	-	-	0.008	-
HCM Control Delay (s)	0	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			↑
Traffic Vol, veh/h	0	0	279	0	0	8
Future Vol, veh/h	0	0	279	0	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	90	90	42	42
Heavy Vehicles, %	2	2	1	0	0	0
Mvmt Flow	0	0	310	0	0	19

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	-	0	-
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	-
Pot Cap-1 Maneuver	0	-	-
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	735
HCM Lane V/C Ratio	-	-	-	0.026
HCM Control Delay (s)	-	-	-	10
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.1