

TRANSPORTATION IMPACT ASSESSMENT

PROPOSED RESIDENTIAL DEVELOPMENT
136 WORCESTER STREET (ROUTE 9)
WELLESLEY, MASSACHUSETTS

Prepared for:

BEHREND CONSTRUCTION
Wellesley, Massachusetts

March 2018

Prepared by:

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Dear Reviewer:

This letter shall certify that this *Transportation Impact Assessment* has been prepared under my direct supervision and responsible charge. I am a Registered Professional Engineer (P.E.) in the Commonwealth of Massachusetts (Massachusetts P.E. No. 38871, Civil) and hold Certification as a Professional Traffic Operations Engineer (PTOE) from the Transportation Professional Certification Board, Inc. (TPCB), an affiliate of the Institute of Transportation Engineers (ITE) (PTOE Certificate No. 993). I am also a Fellow of the Institute of Transportation Engineers (FITE).

Sincerely,

VANASSE & ASSOCIATES, INC.

A handwritten signature in black ink that reads 'Jeffrey S. Dirk'. The signature is written in a cursive style with a large, prominent 'J' and 'D'.

Jeffrey S. Dirk, P.E., PTOE, FITE
Principal

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EXECUTIVE SUMMARY

Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Assessment (TIA) in order to determine the potential impacts on the transportation infrastructure associated with the proposed construction of a 65-unit residential apartment community to be located at 136 Worcester Street, in Wellesley, Massachusetts (hereafter referred to as the “Project”).

This assessment was prepared in consultation with the Massachusetts Department of Transportation (MassDOT) and the Town of Wellesley; was performed in accordance with MassDOT’s *Transportation Impact Assessment (TIA) Guidelines* and the Traffic Review standards for a Project of Significant Impact (PSI) as defined in Section XVIA of the Town of Wellesley Zoning Bylaw; and was conducted pursuant to the standards of the Traffic Engineering and Transportation Planning professions for the preparation of such reports. Based on this assessment, we have concluded the following with respect to the Project:

1. Using trip-generation statistics published by the Institute of Transportation Engineers (ITE)¹, the Project is expected to generate approximately 354 trips on an average weekday (two-way, 24-hour volume), with 23 vehicle trips expected during the weekday morning peak-hour and 29 vehicle trips expected during the weekday evening peak-hour;
2. The Project will not have a significant impact (increase) on motorist delays or vehicle queuing over Existing or anticipated future conditions without the Project (No-Build conditions), with the majority of the movements at the study intersections shown to operate at a level-of-service (LOS) D or better under all analysis conditions where an LOS of “D” or better is defined as “acceptable” operating conditions;
3. Independent of the Project, specific movements at the Worcester Street/Sunlife Park/Wellesley Gateway intersection were identified as operating at capacity (defined as LOS “E”) during both the weekday morning and evening peak hours, with Project-related impacts at the intersection defined as an increase in average motorist delay of less than 1.0 seconds and a predicted increase in vehicle queuing of approximately one (1) vehicle;
4. All movements exiting the Project site driveway intersection with Worcester Street are expected to operate at LOS D during the peak hours and a predicted vehicle queue of approximately one (1) vehicle;

¹*Trip Generation*, 9th Edition; Institute of Transportation Engineers; Washington, DC; 2012.

5. The Worcester Street/Sunlife Park/Wellesley Gateway intersection was found to have a motor vehicle crash rate below the MassDOT average crash rate for a signalized intersection, but was included on MassDOT's Highway Safety Improvement Program (HSIP) listing as a high crash cluster location for 2013-2015. This intersection is currently under construction as a part of MassDOT's I-95/Route 128 Add-A-Lane project. In addition, a second right-turn lane will be added to the Sunlife Park driveway that will be constructed by Sunlife. It is expected that the reconstructed intersection and the associated improvements to the adjacent Route 9/I-95/Route 128 interchange (Exit 20) will include specific improvements to enhance safety; and
6. Lines of sight to and from the Project site driveway intersections with Worcester Street were found to exceed or could be made to exceed the required minimum distance for the intersections to function in a safe and efficient manner.

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 implementation of the recommendations that follow.

RECOMMENDATIONS

A detailed transportation improvement program has been developed that is designed to provide safe and efficient access to the Project site and address any deficiencies identified at off-site locations evaluated in conjunction with this study. The following improvements have been recommended 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 to the Project will be provided by way of two driveways that will intersect the south side of Worcester Street adjacent to the east and west property lines, with the east driveway accommodating vehicles both entering and exiting the Project site and the west driveway serving as a one-way entrance driveway. All movements at the Project site driveways are restricted to right turns only to/from Worcester Street due to the concrete median barrier along Worcester Street opposite the driveways. The following recommendations are offered with respect to Project access and internal circulation:

- The two-way Project site driveway should be a minimum of 24-feet in width and the one-way, entrance only driveway should be a minimum of 20-feet in width, with both driveways designed to accommodate the turning and maneuvering requirements of the largest anticipated responding emergency vehicle as defined by the Town of Wellesley Fire Department pursuant to the requirements of NFPA® 1.²
- Vehicles exiting the Project site should be placed under STOP-sign control with a marked STOP-line provided. In addition, appropriate traffic control signs (i.e., "One-Way" "Do Not Enter" and "No Left Turn") should be installed to indicate the one-way direction of travel along the front of the building.

²National Fire Protection Association (NFPA)® 1, *Fire Code*, Seventh Edition; NFPA; Quincy, Massachusetts; 2015; as amended per 527 CMR.

- All signs and pavement markings to be installed within the Project site shall conform to the applicable standards of the *Manual on Uniform Traffic Control Devices (MUTCD)*.³
- A sidewalk should be provided to link the proposed building to Worcester Street.
- A school bus waiting area should be provided at an appropriate location defined in consultation with the Town.
- Signs and landscaping to be installed as a part of the Project within intersection sight triangle areas should be designed and maintained so as not to restrict lines of sight.
- Trees and vegetation located along the Project site frontage should be trimmed or removed in order to provide the necessary line of sight for motorists existing the Project site driveway.
- Snow windrows within sight triangle areas shall be promptly removed where such accumulations would impede sight lines.
- Consideration should be given to installing electric vehicle charging stations within the Project site.

Sidewalk Improvements

As documented as a part of this assessment, sidewalks are not currently provided along Worcester Street in the vicinity of the Project site. As such, the Project proponent will construct a sidewalk along the Project site frontage to include the installation of ADA compliant wheelchair ramps for crossing the Project site driveways.

Transportation Demand Management

Public transportation services are not provided within the immediate study area; however, public transportation services are provided to the Town of Wellesley by the Massachusetts Bay Transportation Authority (MBTA) (Wellesley Square Station on the Framingham/Worcester Line of the commuter rail system) and the Metro-West Regional Transit Authority (MWRTA), and are available to the east of the Project site in the City of Newton (MBTA subway service on the D Branch of the Green Line). In addition, the MWRTA also operates Paratransit Services for passengers who meet ADA requirements and provides transportation services for seniors and the disabled through the Wellesley Council on Aging. In an effort to encourage the use of alternative modes of transportation to single-occupant vehicles, the following Transportation Demand Management (TDM) measures should be implemented as a part of the Project:

- The owner or property manager will contact MassRIDES to obtain information on facilitating and encouraging healthy transportation options for residents 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;
- A “welcome packet” should be provided to residents detailing available public transportation services, bicycle and walking alternatives, and commuter options available

³*Manual on Uniform Traffic Control Devices (MUTCD)*; Federal Highway Administration; Washington, D.C.; 2009.

through MassRIDES' and their NuRide program which rewards individuals that choose to walk, bicycle, carpool, vanpool or that use public transportation to travel to and from work;

- Residents should be made aware of the Emergency Ride Home (ERH) program available through MassRIDES, which reimburses employees of a participating MassRIDES employer partner worksite that is registered for ERH and that carpool, take transit, bicycle, walk or vanpool to work;
- Pedestrian accommodations should be incorporated within the Project site consisting of a sidewalk extending to Worcester Street;
- A mail drop should be provided in a central location; and
- Secure bicycle parking should be provided consisting of weather protected bicycle parking located in a secure area within the building.

With implementation of the above recommendations, safe and efficient vehicular, pedestrian and bicycle access will be provided to the Project site and the Project can be accommodated within the confines of the existing and improved transportation system.

INTRODUCTION

Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Assessment (TIA) in order to determine the potential impacts on the transportation infrastructure associated with the proposed construction of a 65-unit residential apartment community to be located at 136 Worcester Street (Route 9) in Wellesley, Massachusetts (hereafter referred to as 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 traffic conditions and future traffic conditions, both with and without the Project, along Worcester Street and at the following specific intersections: Worcester Street at Dearborn Street and Worcester Street at Sunlife Park/Wellesley Gateway.

PROJECT DESCRIPTION

The Project will entail the construction of a 65-unit residential apartment community to be located at 136 Worcester Street in Wellesley, Massachusetts. The Project site encompasses approximately 0.86± acres of land that is bounded by Worcester Street to the north and residential properties and areas of open and wooded space to the south, east and west. Figure 1 depicts the Project site location in relation to the existing roadway network. At present the Project site is occupied by a single-family home and associated outbuildings and appurtenances that will be removed to accommodate the Project.

Access to the Project will be provided by way of two driveways that will intersect the south side of Worcester Street adjacent to the east and west property lines, with the east driveway accommodating vehicles both entering and exiting the Project site and the west driveway serving as a one-way entrance driveway. All movements at the Project site driveways are restricted to right turns only to/from Worcester Street due to the concrete median barrier along Worcester Street opposite the driveways.

On-site parking will be provided for 100 vehicles consisting of 11 surface parking spaces and 89 spaces in a two-level parking garage located beneath the proposed building,⁴ or a parking ratio of approximately 1.54 spaces per dwelling unit. This parking ratio is within the range of values

⁴Ten (10) of the garage parking spaces will be mechanical lift spaces.



Figure 1
Site Location Map

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Source: Google Earth.

0 200 400 Scale in Feet



documented by the Institute of Transportation Engineers (ITE) for an apartment community in a suburban setting.⁵

STUDY METHODOLOGY

This study was prepared in consultation with the Massachusetts Department of Transportation (MassDOT) and the Town of Wellesley; was performed in accordance with: i) MassDOT's *Transportation Impact Assessment (TIA) Guidelines*; ii) the Traffic Review standards for a Project of Significant Impact (PSI) as defined in Section XVIA of the Town of Wellesley Zoning Bylaw; and iii) 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 and bicycle facilities; on-street parking; public transportation services; observations of traffic flow; and collection of pedestrian, bicycle and vehicle 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 from the existing conditions base year (2017) was selected for analyses consistent with MassDOT's *Transportation Impact Assessment (TIA) Guidelines*. The analysis conducted in stage two identifies existing or projected future capacity, safety, and access issues, as these areas relate to the transportation infrastructure.

The third stage of the study presents and evaluates measures to address deficiencies in the transportation infrastructure, if any, identified in stage two of the study.

⁵*Parking Generation*, 4th Edition; Institute of Transportation Engineers; Washington, D.C.; 2010. Observed parking demand ratios for an apartment community were found to range from 0.59 to 1.94 spaces per dwelling unit, with an average parking demand of 1.23 spaces per dwelling unit and an 85th percentile peak parking demand of 1.94 spaces per dwelling unit.

EXISTING CONDITIONS

A comprehensive field inventory of existing conditions within the study area was conducted in October 2017. The field investigation consisted of an inventory of existing roadway geometrics; pedestrian and bicycle facilities; on-street parking; public transportation services; traffic volumes; and operating characteristics; as well as posted speed limits and land use information within the study area. The study area for the Project was selected to contain the major roadway providing access to the Project site, Worcester Street, as well as the following specific intersections: Worcester Street at Dearborn Street and Worcester Street at Sunlife Park/Wellesley Gateway.

The following describes the study area roadway and intersections as observed in October 2017.

Roadway

Worcester Street (Route 9)

- Four-lane urban principal arterial roadway under MassDOT jurisdiction
- Traverses in a general east-west direction and provides access to Interstate 95 (I-95)/Route 128 to the east of the Project site
- In the vicinity of the Project site provides two 12 to 18-foot wide travel lanes per direction separated by a concrete barrier or raised median and guardrail, with variable width (1 to 7-foot wide) marked shoulders
- Posted speed limit is 45 miles per hour (mph)
- Sidewalks are provided along the north side of the roadway and along the south side east of Dearborn Street and west of Willow Street
- Illumination is provided by way of street lights mounted on wood poles
- Land use within the study area consists of the Project site, residential and commercial uses, and areas of open and wooded space

Intersections

Table 1 and Figure 2 summarize lane use, traffic control, and pedestrian and bicycle accommodations at the study area intersections as observed in October 2017.

Table 1
STUDY AREA INTERSECTION DESCRIPTION

Intersection	Traffic Control Type^a	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
Worcester St./ Dearborn St.	S	3 through lanes and 1 left-turn lane on Worcester St. eastbound; 1 right-turn lane on Dearborn St.	Yes – 1 to 3-feet on Worcester St.	Yes – Sidewalks along the north side of Worcester St. and south side east of Dearborn St., and along east side of Dearborn St.; crosswalk provided for crossing Dearborn St.	No
Worcester St./ Sunlife Pk./ Wellesley Gateway	TS	1 left-turn lane and 3 through lanes on Worcester St. eastbound; 1 left-turn lane, 3 through lanes and a right-turn lane on Worcester St. westbound; 1 left-turn/through lane and 1 right-turn lane on Sunlife Pk.; 1 left-turn lane, 1 through lane and 1 right-turn lane on Wellesley Gateway	Yes – 1 to 5-feet on Worcester St.	Yes – Sidewalks along both sides of Worcester St. and along the east side of Sunlife Pk. and the west side of Wellesley Gateway; crosswalks, traffic signal equipment and phasing provided for crossing Sunlife Pk., Wellesley Gateway and the Worcester St. west leg	No

^aTS = traffic signal control; F = flashing signal/beacon; S = STOP-sign control; NC = no control present.

^bCombined shoulder and travel lane width equal to or exceed 14 feet.

EXISTING TRAFFIC VOLUMES

In order to determine existing traffic-volume demands and flow patterns within the study area, manual turning movement counts (TMCs) and vehicle classification counts were completed in October 2017 while public schools were in regular session. The TMC’s were conducted at the study intersections during the weekday morning (7:00 to 9:00 AM) and evening (2:00 to 6:00 PM) peak periods on October 3rd (Tuesday). 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.

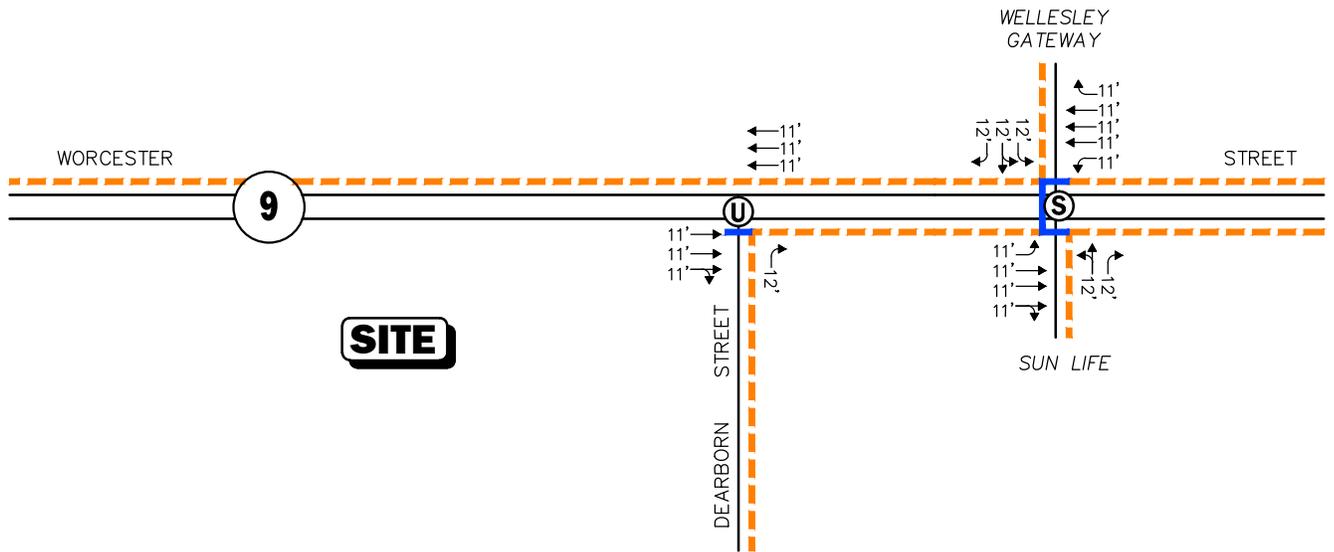
Traffic-Volume Adjustments

In order to evaluate the potential for seasonal fluctuation of traffic volumes within the study area, traffic volume data from MassDOT Continuous Count Station No. H8502 located on I-95 south of Quinobequin Road in Wellesley were reviewed.⁶ Based on a review of this data, it was determined that traffic volumes for the month of October are approximately 7.0 percent above average-month conditions and, therefore, the traffic counts that form the basis of this assessment were not adjusted downward in order to provide a conservative (above-average) analysis condition. The 2017 Existing weekday morning and evening peak-hour traffic volumes graphically depicted on Figure 3.

⁶MassDOT Traffic Volumes for the Commonwealth of Massachusetts; 2017.

Legend:

- Ⓢ Signalized Intersection
- Ⓤ Unsignalized Intersection
- Sidewalk
- Crosswalk
- XX' ↔ Lane Use and Travel Lane Width



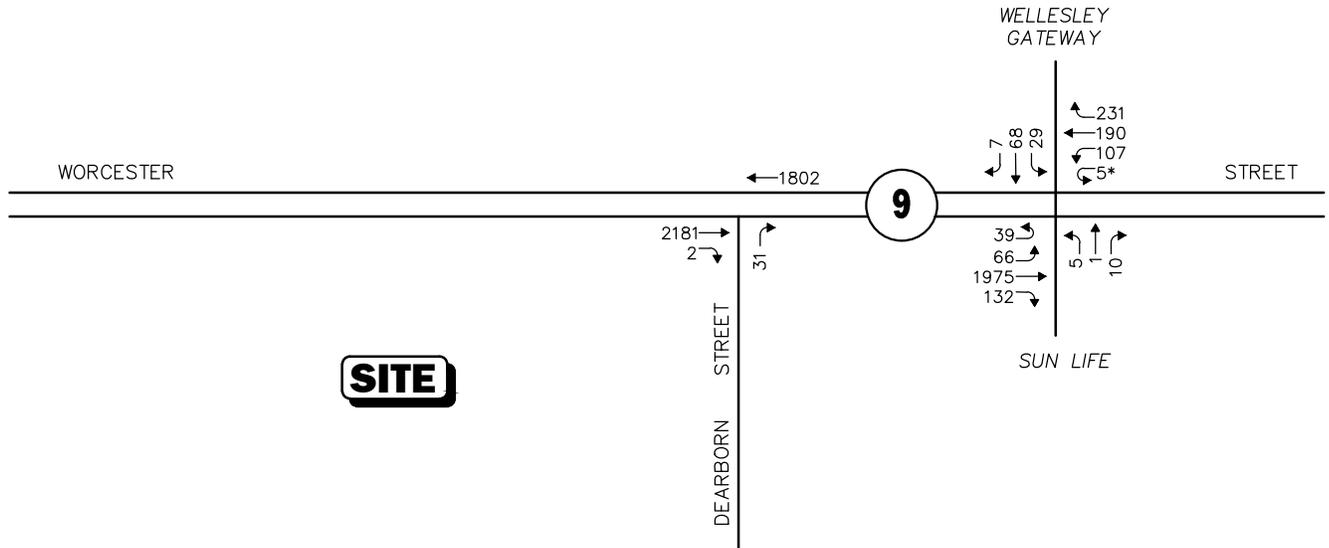
Not To Scale



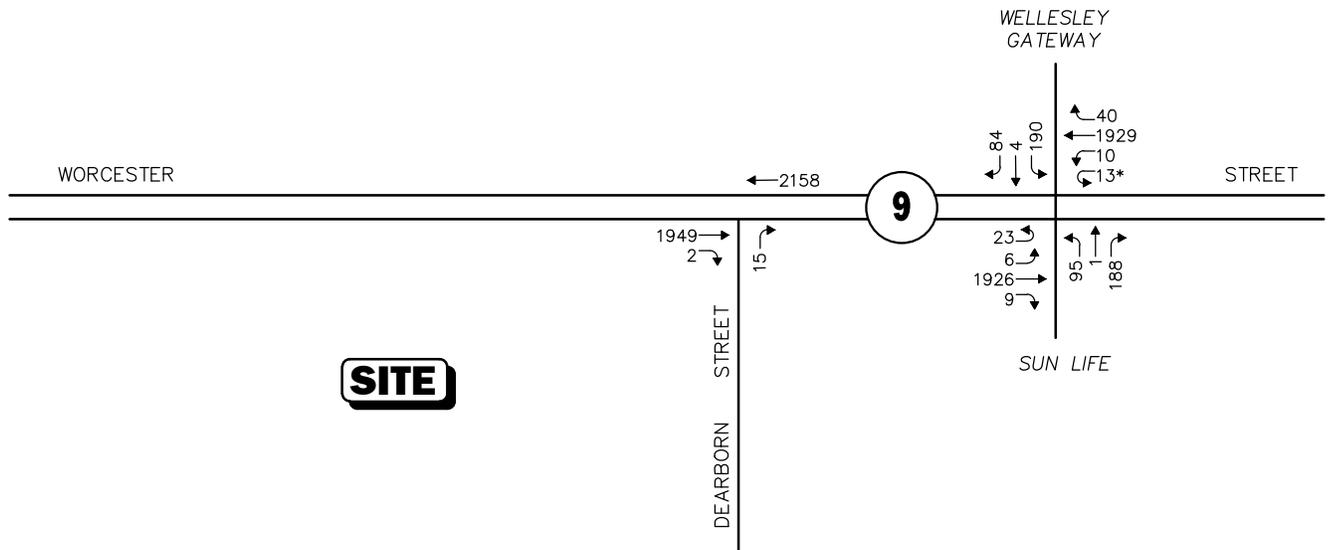
Figure 2

Existing Intersection Lane Use, Travel Lane Width and Pedestrian Facilities

WEEKDAY MORNING PEAK HOUR (8:00 - 9:00AM)



WEEKDAY EVENING PEAK HOUR (4:45 - 5:45PM)



* Illegal movement.
Not To Scale



Figure 3

2017 Existing Peak Hour Traffic Volumes

SPOT SPEED MEASUREMENTS

Vehicle travel speed measurements were performed on Worcester Street in the vicinity of the Project site using a radar speed measuring device. Table 2 summarizes the vehicle travel speed measurements.

Table 2
VEHICLE TRAVEL SPEED MEASUREMENTS

	Worcester Street	
	Eastbound	Westbound
Mean Travel Speed (mph)	45	47
85 th Percentile Speed (mph)	50	53
Posted Speed Limit (mph)	45	45

mph = miles per hour.

As can be seen in Table 2, the mean vehicle travel speed along Worcester Street in the vicinity of the Project site was found to be approximately 45 mph in the eastbound direction and 47 mph westbound. The measured 85th percentile vehicle travel speed, or the speed at which 85 percent of the observed vehicles traveled at or below, was found to be approximately 50 mph in the eastbound direction and 53 mph westbound, which is 5 mph to 8 mph above the posted speed limit (45 mph). The 85th percentile speed is used as the basis of engineering design and in the evaluation of sight distances, and is often used in establishing posted speed limits.

PEDESTRIAN AND BICYCLE FACILITIES

A comprehensive field inventory of pedestrian and bicycle facilities within the study area was undertaken in October 2017. The field inventory consisted of a review of the location of sidewalks and pedestrian crossing locations along the study roadways and at the study intersections, as well as the location of existing and planned future bicycle facilities.

Pedestrian Facilities

As detailed on Figure 2, sidewalks are provided along the north side of Worcester Street and along the south side east of Dearborn Street and west of Willow Street; along the east side of Dearborn Street; along the east side of Sunlife Park; and along the west side of Wellesley Gateway. Marked crosswalks are provided for crossing Dearborn Street, Sunlife Parkway, Wellesley Gateway and the Worcester Street west leg of the Worcester Street/Sunlife Park/Wellesley Gateway intersection. The traffic signal system at the Worcester Street/Sunlife Park/Wellesley Gateway intersection includes pedestrian traffic signal equipment and phasing. A sidewalk is not provided along the south side of Worcester Street between Willow Street and Dearborn Street, a distance of approximately 1,200 linear feet (lf) which includes the Project site frontage.

Bicycle Facilities

Formal bicycle facilities were not identified within the study area and neither the segment of Worcester Street in the vicinity of the Project site nor Dearborn Road provide sufficient width (paved shoulder or combined travel lane and paved shoulder) to support bicycle travel in a shared traveled-way configuration.⁷ It was noted that the traffic signal system at the Worcester Street/Sunlife Park/Wellesley Gateway intersection includes bicycle detection.

PUBLIC TRANSPORTATION

Public transportation services are not provided within the immediate study area; however, public transportation services are provided to the Town of Wellesley by the Massachusetts Bay Transportation Authority (MBTA) (Wellesley Square Station on the Framingham/Worcester Line of the commuter rail system) and the Metro-West Regional Transit Authority (MWRTA), and are available to the east of the Project site in the City of Newton (MBTA subway service on the D Branch of the Green Line). The closest public transportation services to the Project site are available from Eliot Station on the D Branch of the Green Line subway system, with is located off Lincoln Street and within an approximate 6-minute driving distance. The MWRTA also operates Paratransit Services for passengers who meet ADA requirements and provides transportation services for seniors and the disabled through the Wellesley Council on Aging.

The public transportation schedules and fare information are provided in the Appendix.

MOTOR VEHICLE CRASH DATA

Motor vehicle crash information for the study area intersections was provided by the MassDOT Highway Division Safety Management/Traffic Operations Unit for the most recent five-year period available (2011 through 2015, inclusive) in order to examine motor vehicle crash trends occurring within the study area. The data is summarized by intersection, type, severity, roadway and weather conditions, and day of occurrence, and presented in Table 3.

As can be seen in Table 3, the Worcester Street/Dearborn Street intersection experienced an average of less than one (1) reported motor vehicle crash per year over the five-year review period and was found to have a motor vehicle crash rate below both the MassDOT statewide and District average crash rate for an unsignalized intersection for the MassDOT Highway Division District in which the intersection is located (District 6).

The Worcester Street/Sunlife Park/Wellesley Gateway intersection was reported to have experienced a total of 27 crashes over the five-year review period, the majority of which resulted in property damage only; occurred on a weekday, under clear weather and during daylight; and were classified as rear-end type crashes. This intersection was found to have a motor vehicle crash rate that was below both the MassDOT statewide and District average crash rate for a signalized intersection; however, the intersection is included on MassDOT's Highway Safety Improvement Program (HSIP) listing as high crash cluster location for 2013-2015.

⁷A minimum combined travel lane and paved shoulder width of 14-feet is required to support bicycle travel in a shared traveled-way condition.

Table 3
MOTOR VEHICLE CRASH DATA SUMMARY^a

Traffic Control Type: ^b	Worcester Street/ Dearborn Street	Worcester Street/ Sunlife Park/ Wellesley Gateway
	U	TS
<i>Year:</i>		
2011	0	4
2012	0	3
2013	0	11
2014	0	6
<u>2015</u>	<u>1</u>	<u>3</u>
Total	1	27
Average	0.20	5.40
Rate ^c	0.03	0.29
MassDOT Crash Rate: ^d	0.58/0.53	0.77/0.70
Significant? ^e	No	No
<i>Type:</i>		
Angle	0	4
Rear-End	1	18
Head-On	0	0
Sideswipe	0	4
Fixed Object	0	1
Pedestrian/Bicycle	0	0
<u>Unknown/Other</u>	<u>0</u>	<u>0</u>
Total	1	27
<i>Conditions:</i>		
Clear	1	18
Cloudy	0	2
Rain	0	5
<u>Snow/Ice</u>	<u>0</u>	<u>2</u>
Total	1	27
<i>Lighting:</i>		
Daylight	0	22
Dawn/Dusk	0	2
Dark (Road Lit)	1	3
<u>Dark (Road Unlit)</u>	<u>0</u>	<u>0</u>
Total	1	27
<i>Day of Week:</i>		
Monday through Friday	1	21
Saturday	0	4
<u>Sunday</u>	<u>0</u>	<u>2</u>
Total	1	27
<i>Severity:</i>		
Property Damage Only	1	24
Personal Injury	0	3
<u>Fatality</u>	<u>0</u>	<u>0</u>
Total	1	27

^aSource: MassDOT Safety Management/Traffic Operations Unit records, 2011 through 2015.

^bTraffic Control Type: U = unsignalized; TS = traffic signal.

^cCrash rate per million vehicles entering the intersection.

^dStatewide/District crash rate.

^eThe intersection crash rate is significant if it is found to exceed the MassDOT crash rate for the MassDOT Highway Division District in which the Project is located (District 6).

MassDOT defines a HSIP eligible cluster as: *"...a cluster in which the total number of 'equivalent property damage only' crashes is within the top 5 percent of all clusters in that region. 'Equivalent property damage only' is a method of combining the number of crashes with the severity of crashes based on a weighted scale where a fatal crash is worth 10, an injury crash is worth 5 and a property damage only crash is worth 1."* Designation as a HSIP location allows for MassDOT to prioritize funding for safety-related improvements in a specific region of the state. This intersection is currently under construction as a part of MassDOT's I-95/Route 128 Add-A-Lane project. In addition, a second right-turn lane will be added to the Sunlife Park driveway that will be constructed by Sunlife. It is expected that the reconstructed intersection and the associated improvements to the adjacent Route 9/I-95/Route 128 interchange (Exit 20) will include specific improvements to enhance safety.

The detailed MassDOT Crash Rate Worksheets and High Crash Location mapping are provided in the Appendix.

FUTURE CONDITIONS

Traffic volumes in the study area were projected to the year 2024, which reflects a seven-year planning horizon from the existing conditions base year (2017) consistent with MassDOT's *Transportation Impact Assessment (TIA) Guidelines*. Independent of the Project, traffic volumes on the roadway network in the year 2024 under No-Build conditions include all existing traffic and new traffic resulting from background traffic growth. Anticipated Project-generated traffic volumes superimposed upon the 2024 No-Build traffic volumes reflect 2024 Build traffic volume 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, potential population growth and development external to the study area would not be accounted for in the resulting traffic projections.

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

Specific Development by Others

The Town of Wellesley Planning Department was contacted in order to determine if there were any projects planned within the study area that would have an impact on future traffic volumes at the study intersections. Based on this discussion, the following projects were identified for inclusion in this assessment:

- ***Sport Complex, 900 Worcester Road, Wellesley Massachusetts.*** This proposed project will entail the construction of a 130,000 square foot (sf) sport complex that will include two (2) regulation-size ice rinks, a synthetic turf field and a 35,000 sf health club with an aquatics center that will feature an Olympic-size swimming pool to be located at 900 Worcester Road in Wellesley, Massachusetts.
- ***Wellesley Square Residences, 8 Delanson Circle, Wellesley, Massachusetts.*** This proposed project consists of the construction of a 95-unit residential apartment community to be located at 8 Delanson Circle in Wellesley, Massachusetts.
- ***16 Sterns Road, Wellesley, Massachusetts.*** This proposed project consists of the construction of a 36-unit residential condominium community to be located at 16 Sterns Road in Wellesley.
- ***680 Worcester Street, Wellesley, Massachusetts.*** This proposed project consists of the construction of a 20-unit residential apartment community to be located at 680 Worcester Street in Wellesley, Massachusetts.
- ***Wellesley Park, 148 Weston Road, Wellesley, Massachusetts.*** This proposed project consists of the construction of a 55-unit residential apartment community to be located at 148 Weston Road in Wellesley, Massachusetts.

Traffic volumes associated with the aforementioned specific development projects by others were obtained from their respective traffic studies or using trip-generation information available from the Institute of Transportation Engineers (ITE)⁸ for the appropriate land use, and were assigned onto the study area roadway network based on existing traffic patterns where no other information was available. 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.

General Background Traffic Growth

Traffic-volume data compiled by MassDOT from Continuous Count Station No. H8502 located on I-95 south of Quinobequin Road in Wellesley were reviewed. Based on a review of this data, it was determined that traffic volumes within the study area have remained relatively stable over the past several years. In order to provide a prudent planning condition for the Project, 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.

Roadway Improvement Projects

The MassDOT and the Town of Wellesley were contacted in order to determine if there were any planned future roadway improvement projects expected to be complete by 2024 within the study area. Based on these discussions, the following roadway improvements were identified:

- ***I-95/Route 128 Bridge Reconstruction (Part of the I-95/Route 128 Add-A-Lane Project) Needham-Wellesley, Massachusetts.*** This project is being undertaken by MassDOT and entails the reconstruction of six (6) along bridges along I-95/Route 128 in Needham and Wellesley in conjunction with the I-95/Route 128 Add-A-Lane Project to

⁸Ibid 1

provide an additional 12-foot wide travel lane and a 10-foot wide shoulder in each direction, as well as the addition of new collector/distributor roads between Highland Avenue and Kendrick Street. In addition, new signalized intersections have been constructed at the intersection of Worcester Street with the I-95 north and southbound ramps which are coordinated with the Worcester Street/Sunlife Park/Wellesley Gateway intersection. This project is expected to be complete by 2019 and is reflected in both the 2024 No-Build and 2024 Build condition analyses.

- ***Sunlife Park Driveway Improvements, Wellesley, Massachusetts.*** This project is being undertaken by Sunlife and entails the construction of a second right-turn lane on the Sunlife Park driveway approach to Worcester Street. In conjunction with the improvements, new traffic signal indications will be provided and pedestrian equipment will be relocated. This project is expected to be complete by 2018 and is reflected in both the 2024 No-Build and 2024 Build condition analyses.
- ***Resurfacing and Related Work on Worcester Street, Wellesley, Massachusetts.*** This project is being undertaken by MassDOT and will entail the resurfacing of Worcester Street from Dearborn Street to the Natick town line (approximately 4.8 miles). The scope of the project will include milling and resurfacing; wheelchair ramp reconstruction; sidewalk repairs and improvements; traffic signal upgrades; and new pavement markings and recessed roadway deflectors. This Project is currently in the preliminary design phase and a construction start date has not yet been established.

No other roadway improvement projects aside from routine maintenance activities were identified to be planned within the study area at this time.

No-Build Traffic Volumes

The 2024 No-Build condition peak-hour traffic-volumes were developed by applying the 1.0 percent per year compounded annual background traffic growth rate to the 2017 Existing peak-hour traffic volumes and then adding the peak-hour traffic volumes associated with the identified specific development projects by others. The resulting 2024 No-Build weekday morning and evening peak-hour traffic volumes are shown on Figure 4.

PROJECT-GENERATED TRAFFIC

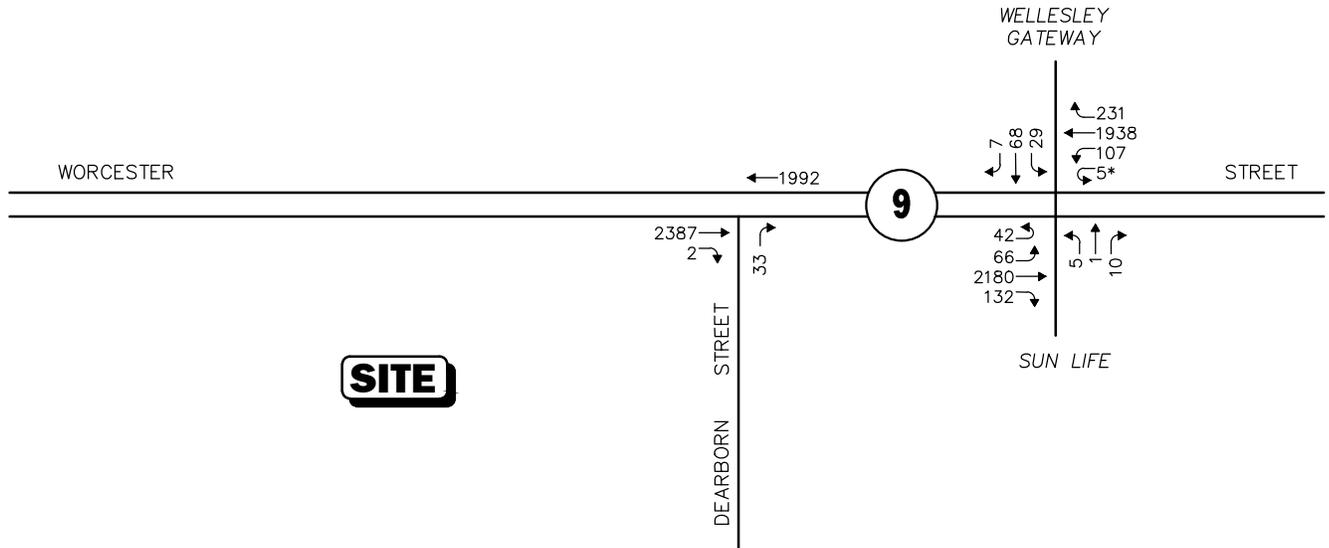
Design year (2024 Build) traffic volumes for the study area roadways were determined by estimating Project-generated traffic volumes and assigning those volumes on the study roadways. The following sections describe the methodology used to develop the anticipated traffic characteristics of the Project.

As proposed, the Project will entail the construction of a 65-unit residential apartment community. In order to develop the traffic characteristics of the Project, trip-generation statistics published by the ITE⁹ for a similar land use as that proposed were used. ITE Land Use Code (LUC) 221, *Multifamily Housing (Mid-Rise)*, was used to develop the base traffic characteristics of the Project.

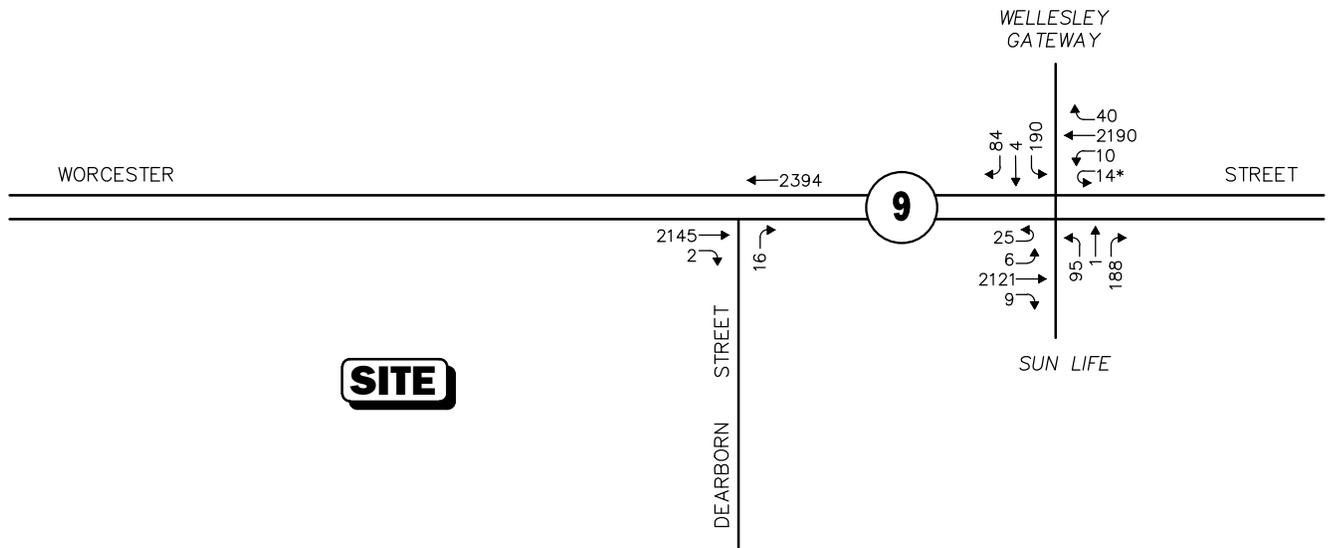
Table 4 summarizes the traffic characteristics of the Project using the above methodology.

⁹Ibid 1.

WEEKDAY MORNING PEAK HOUR (8:00 - 9:00AM)



WEEKDAY EVENING PEAK HOUR (4:45 - 5:45PM)



* Illegal movement.
Not To Scale



Figure 4

2024 No-Build Peak Hour Traffic Volumes

Table 4
TRIP GENERATION SUMMARY

Time Period/Direction	Vehicle Trips
	Proposed Residential Community (65 Units) ^a
<i>Average Weekday Daily:</i>	
Entering	177
<u>Exiting</u>	<u>177</u>
Total	354
<i>Weekday Morning Peak Hour:</i>	
Entering	6
<u>Exiting</u>	<u>17</u>
Total	23
<i>Weekday Evening Peak Hour:</i>	
Entering	18
<u>Exiting</u>	<u>11</u>
Total	29

^aBased on ITE LUC 221, *Multifamily Housing (Mid-Rise)*.

Project-Generated Traffic Volume Summary

As can be seen in Table 4, the Project is expected to generate approximately 354 vehicle trips on an average weekday (two-way, 24-hour volume, or 177 vehicles entering and 177 exiting), with 23 vehicle trips (6 vehicles entering and 17 exiting) expected during the weekday morning peak-hour and 29 vehicle trips (18 vehicles entering and 11 exiting) expected during the weekday evening peak-hour.

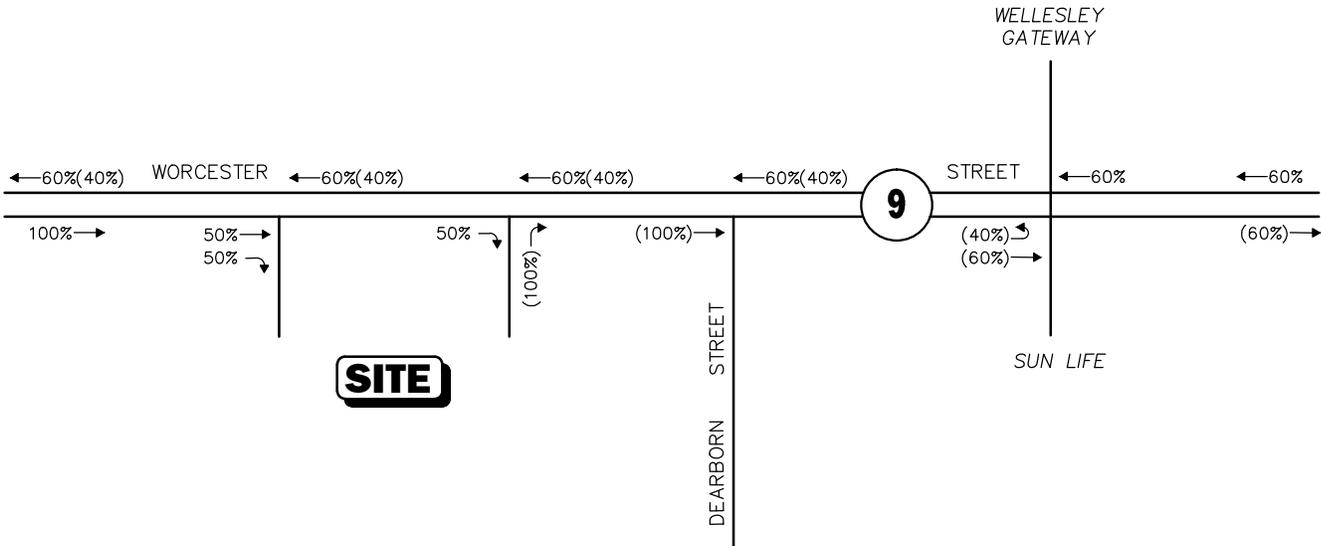
TRIP DISTRIBUTION AND ASSIGNMENT

The directional distribution of generated trips to and from the Project site was determined based on a review of Journey-to-Work data obtained from the U.S. Census for persons residing in the Town of Wellesley, and then refined based on existing traffic patterns within the study area during the commuter peak periods. This methodology is consistent with the residential nature of the Project and commuter traffic patterns during the peak hours. The general trip distribution for the Project is graphically depicted on Figure 5. The additional traffic expected to be generated by the Project was assigned on the study area roadway network as shown on Figure 6.

FUTURE TRAFFIC VOLUMES - BUILD CONDITION

The 2024 Build condition traffic volumes were developed by adding the traffic expected to be generated by the Project to the 2024 No-Build condition traffic volumes. The 2024 Build weekday morning and evening peak-hour traffic-volumes are graphically depicted on Figure 7.

Legend:
 XX Entering Trips
 (XX) Exiting Trips



Not To Scale

Figure 5

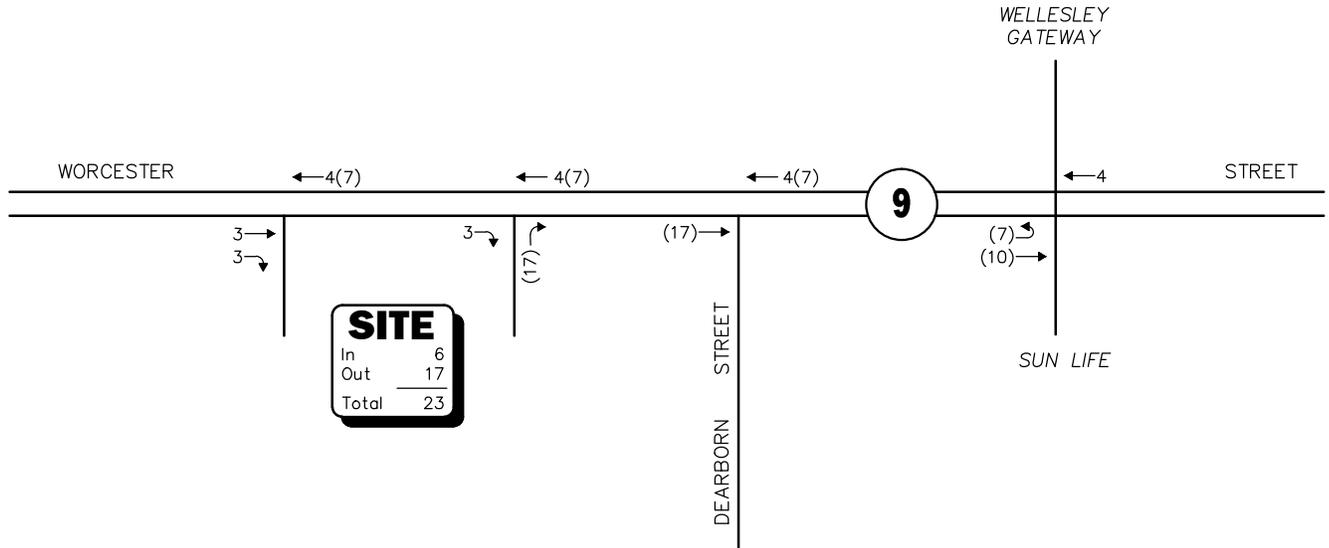


Trip Distribution Map

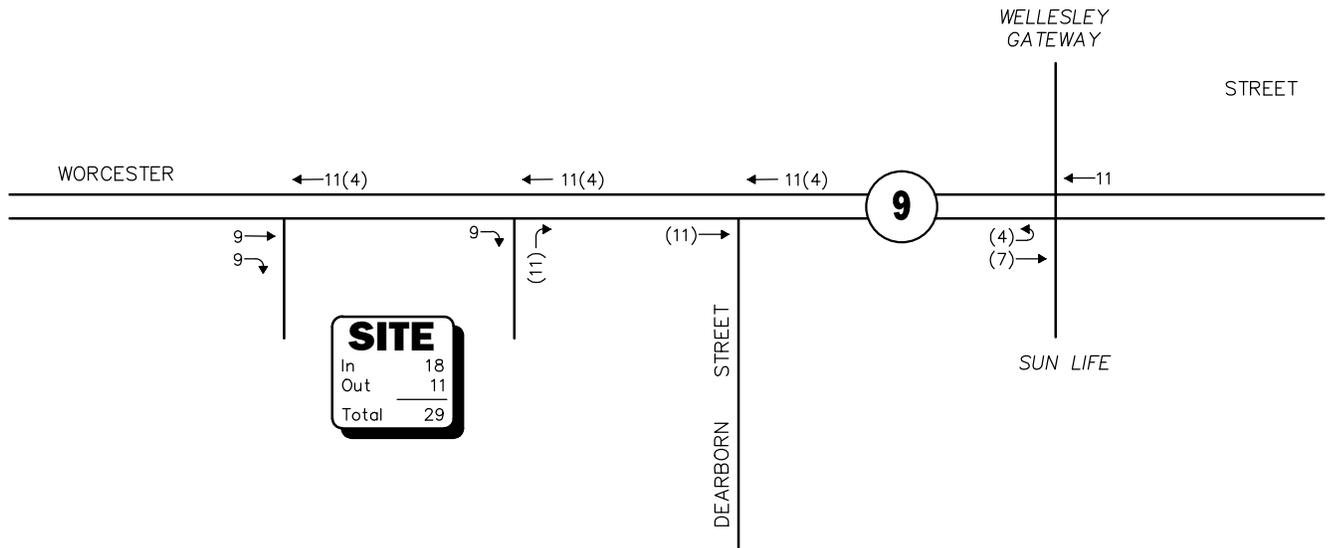
R:\7759\7759trip.dwg, 3/26/2018 11:52:26 AM

WEEKDAY MORNING PEAK HOUR (8:00 - 9:00AM)

Legend:
XX Entering Trips
(XX) Exiting Trips



WEEKDAY EVENING PEAK HOUR (4:45 - 5:45PM)



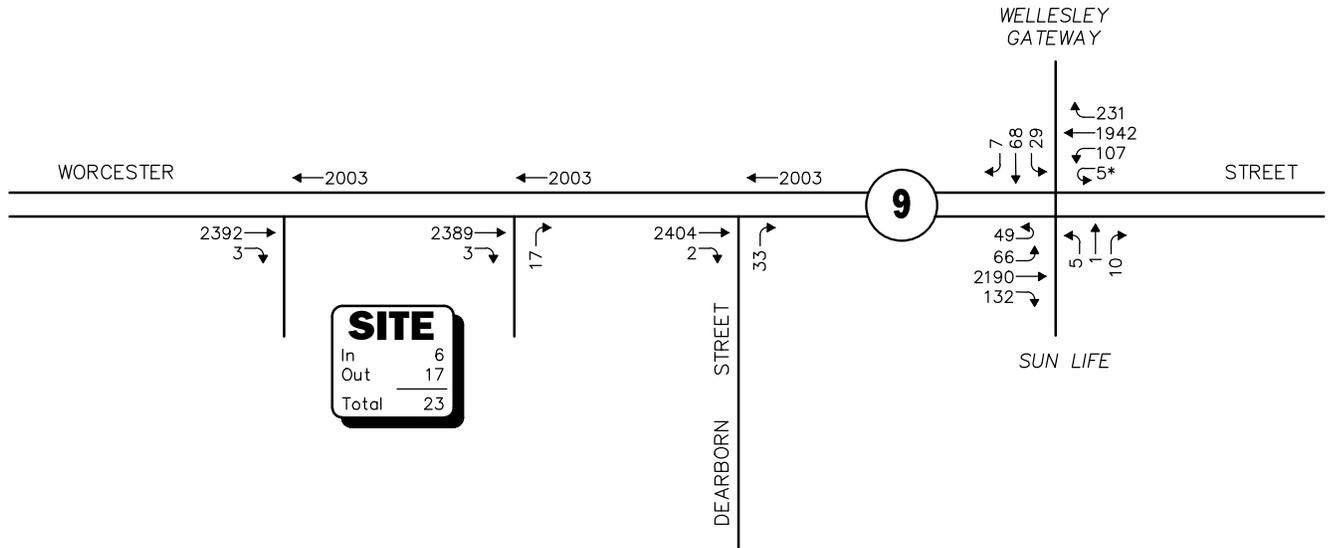
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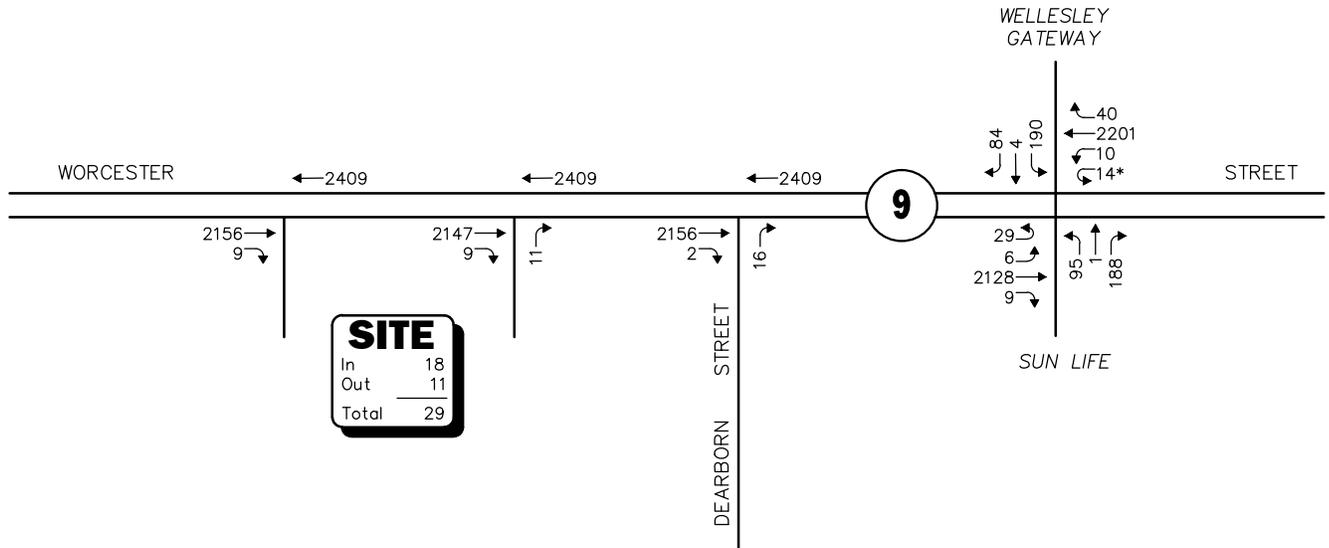
Figure 6

Project-Generated Peak Hour Traffic Volumes

WEEKDAY MORNING PEAK HOUR (8:00 - 9:00AM)



WEEKDAY EVENING PEAK HOUR (4:45 - 5:45PM)



* Illegal movement.
Not To Scale



Figure 7

2024 Build
Peak Hour Traffic Volumes

Note that no adjustment (reduction) was applied to the Build condition traffic volumes to reflect the removal of the existing single-family home that occupies the Project site.

A summary of peak-hour projected traffic-volume increases outside of the study area that is the subject of this assessment is shown in Table 5. These volumes are based on the expected increases from the Project.

Table 5
PEAK-HOUR TRAFFIC-VOLUME INCREASES

Location/Peak Hour	2017 Existing	2024 No-Build	2024 Build	Traffic Volume Increase Over No-Build	Percent Increase Over No-Build
<i>Worcester Street, east of Sunlife Park/ Wellesley Gateway:</i>					
Weekday Morning	4,152	4,505	4,519	14	0.3
Weekday Evening	4,359	4,767	4,785	18	0.4
<i>Worcester Street Eastbound, west of Project Site:</i>					
Weekday Morning	2,183	2,389	2,395	6	0.3
Weekday Evening	1,951	2,147	2,165	18	0.8
<i>Worcester Street Westbound, west of Project Site:</i>					
Weekday Morning	1,802	1,992	2,003	11	0.6
Weekday Evening	2,158	2,394	2,409	15	0.6
<i>Dearborn Street, south of Worcester Street:</i>					
Weekday Morning	31	33	33	0	0.0
Weekday Evening	15	16	16	0	0.0

As shown in Table 5, Project-related traffic-volume increases outside of the study area relative to 2024 No-Build conditions are anticipated to range from 0.0 to 0.8 percent during the peak periods, with vehicle increases shown to range from 0 to 18 vehicles. ***When dispersed over the peak-hour, such increases would not result in a significant impact (increase) on motorist delays or vehicle queuing outside of the immediate study area that is the subject of this assessment.***

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.¹⁰ 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.

¹⁰The capacity analysis methodology is based on the concepts and procedures presented in the *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2010.

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*.¹¹ 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 6 summarizes the relationship between level of service and average control delay for two-way stop controlled and all-way stop controlled intersections.

Table 6
LEVEL-OF-SERVICE CRITERIA FOR
UNSIGNALIZED INTERSECTIONS^a

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	≤ 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

^aSource: *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2010; page 19-2.

¹¹*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 over-saturation. 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™ 8 software as suggested 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. Table 7 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 7
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

Vehicle Queue Analysis

Vehicle queue analyses are a direct measurement of an intersection's ability to process vehicles under various traffic control and volume scenarios and lane use arrangements. The vehicle queue analysis was performed using the Synchro™ intersection capacity analysis software which is based upon the methodology and procedures presented in the 2010 *Highway Capacity Manual*. The Synchro™ vehicle queue analysis methodology is a simulation based model which reports the number of vehicles that experience a delay of six seconds or more at an intersection. For signalized intersections, Synchro™ reports both the average (50th percentile) the 95th percentile vehicle queue. For unsignalized intersections, Synchro™ reports the 95th percentile vehicle queue. Vehicle queue lengths are a function of the capacity of the movement under study and the volume of traffic being processed by the intersection during the analysis period. The 95th percentile vehicle queue is the vehicle queue length that will be exceeded only 5 percent of the time, or approximately three minutes out of 60 minutes during the peak one hour of the day (during the remaining 57 minutes, the vehicle queue length will be less than the 95th percentile queue length).

ANALYSIS RESULTS

Level-of-service and vehicle queue analyses were conducted for 2017 Existing, 2024 No-Build and 2024 Build conditions for the intersections within the study area. The results of the intersection capacity and vehicle queue analyses are summarized in Tables 8 and 9. The detailed analysis results are presented in the Appendix.

The following is a summary of the level-of-service and vehicle queue analyses for the intersections within the study area.

As can be seen in Tables 8 and 9, *the addition of Project-related traffic to the study area intersections is not predicted to result in a change in LOS or a significant increase in vehicle queuing over No-Build conditions*. Project-related impacts at the study area intersections were identified as follows:

Worcester Street/Dearborn Street – No change in LOS or vehicle queuing predicted to occur over No-Build conditions, with Project-related impacts defined as an increase in average motorist delay of less than 1.0 seconds.

Worcester Street/Sunlife Park/Wellesley Gateway – No change in LOS predicted to occur over No-Build conditions, with Project-related impacts defined as an increase in average motorist delay of less than 1.0 seconds and in vehicle queuing of approximately one (1) vehicle.

Worcester Street/East Project Site Driveway – Right-turn movements exiting the Project site driveway were shown to operate at LOS D during both the weekday morning and evening peak hours with predicted vehicle queues of approximately one (1) vehicle. All movements along Worcester Street were shown to operate at LOS A during the peak hours with negligible vehicle queuing predicted.

Worcester Street/West Project Site Driveway – All movements are predicted to operate at LOS A with negligible vehicle queuing.

Table 8
UNSIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Unsignalized Intersection/ Peak Hour/Movement	2017 Existing				2024 No-Build				2024 Build			
	Demand ^a	Delay ^b	LOS ^c	Queue ^d 95 th	Demand	Delay	LOS	Queue 95 th	Demand	Delay	LOS	Queue 95 th
<i>Worcester Street at Dearborn Street</i>												
<i>Weekday Morning:</i>												
Worcester Street EB TH/RT	2,183	0.0	A	0	2,389	0.0	A	0	2,401	0.0	A	0
Dearborn Street NB RT	31	17.5	C	1	33	19.4	C	1	33	19.5	C	1
<i>Weekday Evening:</i>												
Worcester Street EB TH/RT	1,951	0.0	A	0	2,147	0.0	A	0	2,155	0.0	A	0
Dearborn Street NB RT	15	14.9	B	1	16	16.2	C	1	16	16.2	C	1
<i>Worcester Street at the East Project Driveway</i>												
<i>Weekday Morning:</i>												
Worcester Street EB TH/RT	--	--	--	--	--	--	--	--	2,392	0.0	A	0
East Project Site Driveway NB RT	--	--	--	--	--	--	--	--	17	32.0	D	1
<i>Weekday Evening:</i>												
Worcester Street EB TH/RT	--	--	--	--	--	--	--	--	2,156	0.0	A	0
East Project site Driveway NB RT	--	--	--	--	--	--	--	--	11	25.8	D	1
<i>Worcester Street at the West Project Driveway</i>												
<i>Weekday Morning:</i>												
Worcester Street EB TH/RT	--	--	--	--	--	--	--	--	2,395	0.0	A	0
<i>Weekday Evening:</i>												
Worcester Street EB TH/RT	--	--	--	--	--	--	--	--	2,165	0.0	A	0

^aDemand in vehicles per hour.

^bAverage control delay per vehicle (in seconds).

^cLevel-of-Service.

^dQueue length in vehicles.

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

Table 9
SIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Signalized Intersection/Peak-hour/Movement	2017 Existing				2024 No-Build				2024 Build			
	V/C ^a	Delay ^b	LOS ^c	Queue ^d 50 th /95 th	V/C	Delay	LOS	Queue 50 th /95 th	V/C	Delay	LOS	Queue 50 th /95 th
Worcester Street at Sunlife Park and Wellesley Gateway												
<i>Weekday Morning:</i>												
Worcester Street EB UT/LT	0.66	74.5	E	4/8	0.67	74.8	E	4/8	0.69	75.3	E	4/9
Worcester Street EB TH/RT	0.70	15.1	B	15/22	0.76	17.0	B	18/26	0.77	17.1	B	18/26
Worcester Street WB LT	0.67	74.4	E	4/8	0.67	74.4	E	4/8	0.67	74.4	E	4/8
Worcester Street WB TH	0.58	12.4	B	12/16	0.63	13.8	B	14/18	0.63	13.8	B	14/18
Worcester Street WB RT	0.20	0.7	A	0/1	0.20	0.7	A	0/1	0.20	0.7	A	0/1
Sunlife Park NB LT/TH	0.12	60.5	E	1/1	0.12	60.5	E	1/1	0.12	60.5	E	1/1
Sunlife Park NB RT	0.07	0.4	A	0/0	0.05	0.2	A	0/0	0.05	0.2	A	0/0
Wellesley Gateway SB LT	0.26	61.9	E	1/3	0.26	61.9	E	1/3	0.26	61.9	E	1/3
Wellesley Gateway SB LT/TH	0.60	75.3	E	3/5	0.60	75.3	E	3/5	0.60	75.3	E	3/5
Wellesley gateway SB RT	0.02	0.1	A	0/0	0.02	0.1	A	0/0	0.02	0.1	A	0/0
Overall	--	17.5	B	--	--	18.6	B	--	--	18.8	B	--
<i>Weekday Evening:</i>												
Worcester Street EB UT/LT	0.25	62.1	E	1/3	0.27	62.5	E	1/3	0.30	63.4	E	1/3
Worcester Street EB TH/RT	0.69	19.1	B	17/20	0.76	21.1	C	21/23	0.76	21.2	C	21/23
Worcester Street WB LT	0.19	61.1	E	1/2	0.20	61.4	E	1/2	0.20	61.4	E	1/2
Worcester Street WB TH	0.67	18.9	B	17/19	0.74	20.9	C	20/23	0.75	21.0	C	20/23
Worcester Street WB RT	0.04	0.3	A	0/0	0.04	0.3	A	0/0	0.04	0.3	A	0/0
Sunlife Park NB LT/TH	0.66	75.7	E	4/6	0.66	75.7	E	4/6	0.66	75.7	E	4/6
Sunlife Park NB RT	0.53	24.7	C	3/6	0.35	20.5	C	2/3	0.35	20.5	C	2/3
Wellesley Gateway SB LT	0.69	76.9	E	4/7	0.69	76.9	E	4/7	0.69	76.9	E	4/7
Wellesley Gateway SB LT/TH	0.68	76.6	E	4/7	0.68	76.6	E	4/7	0.68	76.6	E	4/7
Wellesley Gateway SB RT	0.23	4.1	A	0/1	0.23	4.1	A	0/1	0.23	4.1	A	0/1
Overall	--	23.4	C	--	--	24.6	C	--	--	24.7	C	--

^aVolume-to-capacity ratio.

^bPercentile delay per vehicle in seconds.

^cLevel-of-Service.

^dQueue length in vehicles.

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

SIGHT DISTANCE EVALUATION

Sight distance measurements were performed at the intersection of Worcester Street at the Project site driveways in accordance with MassDOT and American Association of State Highway and Transportation Officials (AASHTO)¹² requirements. Both stopping sight distance (SSD) and intersection sight distance (ISD) measurements were performed. In brief, SSD is the distance required by 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 required 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 required 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.

¹²*A Policy on Geometric Design of Highway and Streets*, 6th Edition; American Association of State Highway and Transportation Officials (AASHTO); Washington D.C.; 2011.

**Table 10
SIGHT DISTANCE MEASUREMENTS^a**

Intersection/Sight Distance Measurement	Feet		
	Recommended Minimum (SSD)	Desirable (ISD) ^b	Measured
<i>Worcester Street at the East Project Site Driveway</i>			
<i>Stopping Sight Distance:</i>			
Worcester Street approaching from the west	495	--	650+
<i>Intersection Sight Distance:</i>			
Looking to the west from the Project Site Driveway	495	530	173/650+ ^c
<i>Worcester Street at the West Project Site Driveway (Entrance)</i>			
<i>Stopping Sight Distance:</i>			
Worcester Street approaching from the west	495	--	650+

^aRecommended minimum values obtained from: *A Policy on Geometric Design of Highways and Streets*, 6th Edition; American Association of State Highway and Transportation Officials (AASHTO); 2011; and based on an approach speed of 55 mph along Worcester Street.

^bValue shown is the intersection sight distance for a vehicle turning right exiting a roadway or driveway 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.

^cWith the removal of vegetation along the Project site frontage.

As can be seen in Table 10, the available lines of sight at the Project site driveway intersections with Worcester Street were found to exceed or could be made to exceed the required minimum distance to function in a safe (SSD) and efficient (ISD) manner based on a 55 mph approach speed along Worcester Street, which is 10 mph above the posted speed limit (45 mph) and 2 to 5 mph above the measured 85th percentile vehicle travel speed (50-53 mph).

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

VAI has completed a detailed assessment of the potential impacts on the transportation infrastructure associated with the proposed construction of a 65-unit residential apartment community to be located at 136 Worcester Street, in Wellesley, Massachusetts. The following specific areas have been evaluated as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; under existing and future conditions, both with and without the Project. Based on this assessment, we have concluded the following with respect to the Project:

1. Using trip-generation statistics published by the ITE¹³, the Project is expected to generate approximately 354 trips on an average weekday (two-way, 24-hour volume), with 23 vehicle trips expected during the weekday morning peak-hour and 29 vehicle trips expected during the weekday evening peak-hour;
2. The Project will not have a significant impact (increase) on motorist delays or vehicle queuing over Existing or anticipated future conditions without the Project (No-Build conditions), with the majority of the movements at the study intersections shown to operate at LOS D or better under all analysis conditions where an LOS of “D” or better is defined as “acceptable” operating conditions;
3. Independent of the Project, specific movements at the Worcester Street/Sunlife Park/Wellesley Gateway intersection were identified as operating at capacity (defined as LOS “E”) during both the weekday morning and evening peak hours, with Project-related impacts at the intersection defined as an increase in average motorists delay of less than 1.0 seconds and a predicted increase in vehicle queuing of approximately one (1) vehicle;
4. All movements exiting the Project site driveway intersection with Worcester Street are expected to operate at LOS D during the peak hours and a predicted vehicle queue of approximately one (1) vehicle;

¹³Ibid 1.

5. The Worcester Street/Sunlife Park/Wellesley Gateway intersection was found to have a motor vehicle crash rate below the MassDOT average crash rate for a signalized intersection, but was included on MassDOT's Highway Safety Improvement Program (HSIP) listing as a high crash cluster location for 2013-2015. This intersection is currently under construction as a part of MassDOT's I-95/Route 128 Add-A-Lane project. In addition, a second right-turn lane will be added to the Sunlife Park driveway that will be constructed by Sunlife. It is expected that the reconstructed intersection and the associated improvements to the adjacent Route 9/I-95/Route 128 interchange (Exit 20) will include specific improvements to enhance safety; and
6. Lines of sight to and from the Project site driveway intersections with Worcester Street were found to exceed or could be made to exceed the required minimum distance for the intersections to function in a safe and efficient manner.

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 implementation of the recommendations that follow.

RECOMMENDATIONS

A detailed transportation improvement program has been developed that is designed to provide safe and efficient access to the Project site and address any deficiencies identified at off-site locations evaluated in conjunction with this study. The following improvements have been recommended 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 to the Project will be provided by way of two driveways that will intersect the south side of Worcester Street adjacent to the east and west property lines, with the east driveway accommodating vehicles both entering and exiting the Project site and the west driveway serving as a one-way entrance driveway. All movements at the Project site driveways are restricted to right turns only to/from Worcester Street due to the concrete median barrier along Worcester Street opposite the driveways. The following recommendations are offered with respect to Project access and internal circulation:

- The two-way Project site driveway should be a minimum of 24-feet in width and the one-way, entrance only driveway should be a minimum of 20-feet in width, with both driveways designed to accommodate the turning and maneuvering requirements of the largest anticipated responding emergency vehicle as defined by the Town of Wellesley Fire Department pursuant to the requirements of NFPA® 1.¹⁴
- Vehicles exiting the Project site should be placed under STOP-sign control with a marked STOP-line provided. In addition, appropriate traffic control signs (i.e., "One-Way" "Do Not Enter" and "No Left Turn") should be installed to indicate the one-way direction of travel along the front of the building.

¹⁴Ibid 2.

- All signs and pavement markings to be installed within the Project site shall conform to the applicable standards of the *Manual on Uniform Traffic Control Devices* (MUTCD).¹⁵
- A sidewalk should be provided to link the proposed building to Worcester Street.
- A school bus waiting area should be provided at an appropriate location defined in consultation with the Town.
- Signs and landscaping to be installed as a part of the Project within intersection sight triangle areas should be designed and maintained so as not to restrict lines of sight.
- Trees and vegetation located along the Project site frontage should be trimmed or removed in order to provide the necessary line of sight for motorists existing the Project site driveway.
- Snow windrows within sight triangle areas shall be promptly removed where such accumulations would impede sight lines.
- Consideration should be given to installing electric vehicle charging stations within the Project site.

Sidewalk Improvements

As documented as a part of this assessment, sidewalks are not currently provided along Worcester Street in the vicinity of the Project site. As such, the Project proponent will construct a sidewalk along the Project site frontage to include the installation of ADA compliant wheelchair ramps for crossing the Project site driveways.

Transportation Demand Management

Public transportation services are not provided within the immediate study area; however, public transportation services are provided to the Town of Wellesley by the MBTA (Wellesley Square Station on the Framingham/Worcester Line of the commuter rail system) and the MWRTA, and are available to the east of the Project site in the City of Newton (MBTA subway service on the D Branch of the Green Line). In addition, the MWRTA also operates Paratransit Services for passengers who meet ADA requirements and provides transportation services for seniors and the disabled through the Wellesley Council on Aging. In an effort to encourage the use of alternative modes of transportation to single-occupant vehicles, the following Transportation Demand Management (TDM) measures should be implemented as a part of the Project:

- The owner or property manager will contact MassRIDES to obtain information on facilitating and encouraging healthy transportation options for residents 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;
- A “welcome packet” should be provided to residents detailing available public transportation services, bicycle and walking alternatives, and commuter options available through MassRIDES’ and their NuRide program which rewards individuals that choose

¹⁵Ibid 3.

to walk, bicycle, carpool, vanpool or that use public transportation to travel to and from work;

- Residents should be made aware of the Emergency Ride Home (ERH) program available through MassRIDES, which reimburses employees of a participating MassRIDES employer partner worksite that is registered for ERH and that carpool, take transit, bicycle, walk or vanpool to work;
- Pedestrian accommodations should be incorporated within the Project site consisting of a sidewalk extending to Worcester Street;
- A mail drop should be provided in a central location; and
- Secure bicycle parking should be provided consisting of weather protected bicycle parking located in a secure area within the building.

With implementation of the above recommendations, safe and efficient vehicular, pedestrian and bicycle access will be provided to the Project site and the Project can be accommodated within the confines of the existing and improved transportation system.

APPENDIX

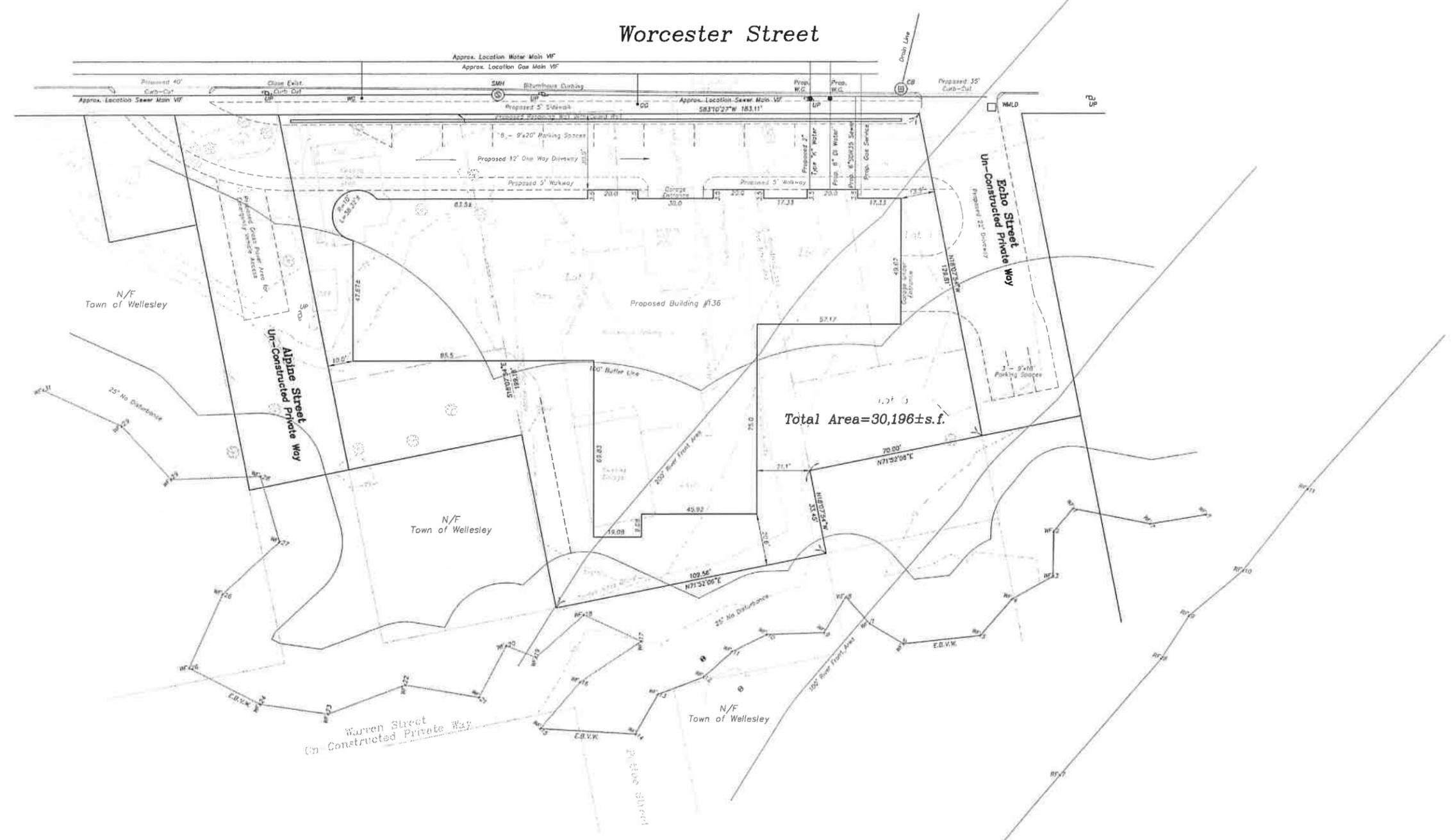
PROJECT SITE PLAN
MANUAL TURNING MOVEMENT COUNT DATA
SEASONAL ADJUSTMENT DATA
PUBLIC TRANSPORTATION SCHEDULES
VEHICLE TRAVEL SPEED DATA
MASSDOT CRASH RATE WORKSHEETS
GENERAL BACKGROUND TRAFFIC GROWTH
BACKGROUND DEVELOPMENT TRAFFIC-VOLUME NETWORKS
TRIP-GENERATION CALCULATIONS
JOURNEY TO WORK TRIP DISTRIBUTION
CAPACITY ANALYSIS WORKSHEETS

PROJECT SITE PLAN

Dig Safe
 Excavators
 Before you dig contact the Dig Safe Center.
 To prevent damage to telephones, gas or electric underground facilities of member utilities, call toll free
 Massachusetts state law requires notification of least three business days before you start digging operations. In an emergency, call immediately.



Worcester Street



NOTE
 UTILITIES SHOWN WERE COMPILED FROM ACTUAL FIELD LOCATIONS,
 CONTRACTORS NOTES, BEST AVAILABLE INFORMATION AND MAY OR MAY NOT
 BE CORRECT. FIELD VERIFY PRIOR TO ANY EXCAVATION.

REVISIONS	
DATE	DESCRIPTION

~Proposed Conditions Plot Plan~

136 Worcester Street
Wellesley, Massachusetts

Scale: 1"=20' March 22, 2018
VERNE T. PORTER Jr, PLS
 Land Surveyors - Civil Engineers
 354 Elliot Street Newton, Massachusetts 02464

Project: 17043
 Checked By: V. Porter Jr.
 Drawn By:

0 20 40 60 80

Sheet 1 of 1

MANUAL TURNING MOVEMENT COUNT DATA

Accurate Counts

978-664-2565

N/S Street : Wellesley Gateway / Sunlife
 E/W Street: Route 9
 City/State : Wellesley, MA
 Weather : Clear

File Name : 77590001
 Site Code : 77590001
 Start Date : 10/3/2017
 Page No : 1

Start Time	Wellesley Gateway Drwy										Sunlife Drwy										Route 9																			
	From North					From East					From South					From West					From North					From East					From South					From West				
	Left	Thru	Right	U-TR	Int. Total	Left	Thru	Right	U-TR	Int. Total	Left	Thru	Right	U-TR	Int. Total	Left	Thru	Right	U-TR	Int. Total	Left	Thru	Right	U-TR	Int. Total	Left	Thru	Right	U-TR	Int. Total	Left	Thru	Right	U-TR	Int. Total					
07:00 AM	13	6	1	3	16	326	23	4	3	354	1	0	0	0	1	5	542	19	8	567	8	21	1	3	24	379	49	6	3	437	0	0	0	0	0	9	527	18	10	605
07:15 AM	8	21	1	3	33	379	49	6	3	437	0	0	0	0	0	9	527	18	10	605	8	12	3	0	23	403	39	1	0	443	8	495	15	12	620					
07:30 AM	8	12	3	0	23	403	39	1	0	443	1	0	1	0	2	8	495	15	12	620	7	17	8	3	35	455	50	2	3	510	9	490	26	5	611					
07:45 AM	7	17	8	3	35	455	50	2	3	510	1	1	2	1	5	9	490	26	5	611	36	56	13	9	114	1563	161	13	9	1837	31	2054	78	35	2468					
Total	36	56	13	9	114	1563	161	13	9	1837	3	1	13	1	18	31	2054	78	35	2468	107	68	7	5	187	1790	231	10	5	2036	66	1975	132	39	2212					
08:00 AM	5	15	1	1	22	426	45	1	1	473	0	0	1	0	1	8	494	19	12	625	24	24	1	1	50	426	45	1	1	473	8	494	19	12	625					
08:15 AM	7	13	3	1	24	435	49	7	1	492	1	0	7	0	8	25	460	40	8	563	34	34	3	1	72	435	49	7	1	492	25	460	40	8	563					
08:30 AM	6	21	2	1	30	442	69	0	1	512	3	0	0	0	3	17	484	32	8	603	24	24	2	1	51	442	69	0	1	512	17	484	32	8	603					
08:45 AM	11	19	1	2	33	487	68	2	2	559	1	1	2	1	5	16	537	41	11	625	25	19	1	2	47	487	68	2	2	559	16	537	41	11	625					
Total	29	68	7	5	109	1790	231	10	5	2036	5	1	10	1	17	66	1975	132	39	2212	107	68	7	5	187	1790	231	10	5	2036	66	1975	132	39	2212					
Grand Total	65	124	20	14	223	3353	392	23	14	3802	8	2	23	2	33	97	4029	210	74	4713	181	181	14	14	310	3353	392	23	14	3802	97	4029	210	74	4713					
Apprch %	31.1	59.3	9.6	0.4	31.1	85.1	9.9	69.7	0.4	85.1	24.2	6.1	69.7	6.1	24.2	2.2	91.4	4.8	1.7	2.2	4.6	59.3	9.6	0.4	4.6	85.1	9.9	69.7	0.4	85.1	2.2	91.4	4.8	1.7	2.2					
Total %	0.8	1.4	0.2	0.2	0.8	39	4.6	0.3	0.2	39	0.1	0	0.3	0	0.1	1.1	46.9	2.4	0.9	1.1	2.1	1.4	0.2	0.2	2.1	39	4.6	0.3	0.2	39	1.1	46.9	2.4	0.9	1.1					
Cars	59	124	15	13	211	3296	386	20	13	3715	8	2	20	2	30	93	3985	210	74	4469	178	178	13	13	384	3296	386	20	13	3715	93	3985	210	74	4469					
% Cars	90.8	100	75	92.9	90.8	98.3	98.5	87	92.9	98.3	100	100	87	100	100	95.9	98.9	100	100	95.9	98.3	98.3	75	92.9	98.3	98.5	98.5	87	92.9	98.5	95.9	98.9	100	100	98.5					
Trucks	6	0	5	1	12	57	6	3	1	67	0	0	3	0	3	4	44	0	0	4	3	3	1	1	7	57	6	3	1	67	4	44	0	0	4					
% Trucks	9.2	0	25	7.1	9.2	1.7	1.5	13	7.1	1.7	0	0	13	0	13	4.1	1.1	0	0	4.1	1.7	0	25	7.1	1.7	1.5	1.5	13	7.1	1.5	1.1	1.1	0	0	1.1					

Accurate Counts

978-664-2565

N/S Street : Wellesley Gateway / Sunlife
 EW Street: Route 9
 City/State : Wellesley, MA
 Weather : Clear

File Name : 77590001
 Site Code : 77590001
 Start Date : 10/3/2017
 Page No : 2

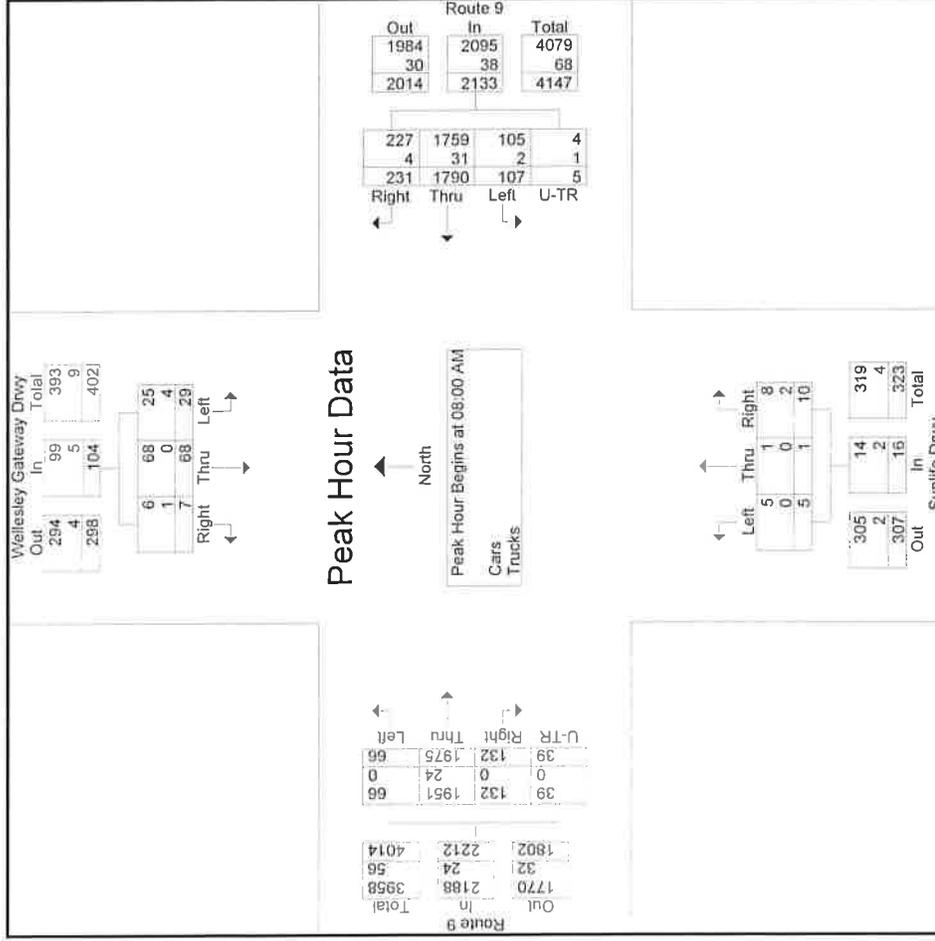
Start Time	Wellesley Gateway Drwy					Route 9					Sunlife Drwy					Route 9							
	From North					From East					From South					From West							
	Left	Thru	Right	App. Total		Left	Thru	Right	U-TR	App. Total		Left	Thru	Right	U-TR	App. Total		Left	Thru	Right	U-TR	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																							
Peak Hour for Entire Intersection Begins at 08:00 AM																							
08:00 AM	5	15	1	21	24	426	45	1	496	0	0	1	1	8	494	19	12	533	1051				
08:15 AM	7	13	3	23	34	435	49	1	519	1	0	7	8	25	460	40	8	533	1083				
08:30 AM	6	21	2	29	24	442	69	1	536	3	0	0	3	17	484	32	8	541	1109				
08:45 AM	11	19	1	31	25	487	68	2	582	1	1	2	4	16	537	41	11	605	1222				
Total Volume	29	68	7	104	107	1790	231	5	2133	5	1	10	16	66	1975	132	39	2212	4465				
% App. Total	27.9	65.4	6.7		5	83.9	10.8	0.2		31.2	6.2	62.5		3	89.3	6	1.8						
PHF	.659	.810	.583	.839	.787	.919	.837	.625	.916	.417	.250	.357	.500	.660	.919	.805	.813	.914	.913				
Cars	25	68	6	99	105	1759	227	4	2095	5	1	8	14	66	1951	132	39	2188	4396				
% Cars	86.2	100	85.7	95.2	98.1	98.3	98.3	80.0	98.2	100	100	80.0	87.5	100	98.8	100	100	98.9	98.5				
Trucks	4	0	1	5	2	31	4	1	38	0	0	2	2	0	24	0	0	24	69				
% Trucks	13.8	0	14.3	4.8	1.9	1.7	1.7	20.0	1.8	0	0	20.0	12.5	0	1.2	0	0	1.1	1.5				

Accurate Counts

978-664-2565

N/S Street : Wellesley Gateway / Sunlife
 EW Street: Route 9
 City/State : Wellesley, MA
 Weather : Clear

File Name : 77590001
 Site Code : 77590001
 Start Date : 10/3/2017
 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:

	07:15 AM				08:00 AM				07:00 AM				08:00 AM									
+0 mins.	8	21	1	30	24	426	45	1	496	1	496	1	1	0	4	4	5	8	494	19	12	533
+15 mins.	8	12	3	23	34	435	49	1	519	0	519	0	0	0	6	6	6	25	460	40	8	533
+30 mins.	7	17	8	32	24	442	69	1	536	1	536	1	0	0	1	1	2	17	484	32	8	541
+45 mins.	5	15	1	21	25	487	68	2	582	1	582	1	1	1	2	2	4	16	537	41	11	605
Total Volume	28	65	13	106	107	1790	231	5	2133	3	2133	3	1	1	13	13	17	66	1975	132	39	2212
% App. Total	26.4	61.3	12.3	12.3	5	83.9	10.8	0.2	17.6	5.9	76.5	6	1.8	0.2	5.9	76.5	6	3	89.3	6	1.8	1.8

Accurate Counts

978-664-2565

N/S Street : Wellesley Gateway / Sunlife
 EW Street: Route 9
 City/State : Wellesley, MA
 Weather : Clear

File Name : 77590001
 Site Code : 77590001
 Start Date : 10/3/2017
 Page No : 1

Groups Printed- Cars

Start Time	Wellesley Gateway Drwy From North				Route 9 From East				Sunlife Drwy From South				Route 9 From West				Int. Total
	Left	Thru	Right	U-TR	Left	Thru	Right	U-TR	Left	Thru	Right	U-TR	Left	Thru	Right	U-TR	
07:00 AM	12	6	0	3	16	325	23	3	1	0	4	3	4	539	19	8	960
07:15 AM	7	21	0	3	14	372	48	3	0	0	6	3	6	523	18	10	1030
07:30 AM	8	12	2	0	20	393	39	0	1	0	1	0	1	490	15	12	1000
07:45 AM	7	17	7	3	23	447	49	3	1	1	1	3	1	482	26	5	1077
Total	34	56	9	9	73	1537	159	9	3	1	12	9	8	2034	78	35	4067
08:00 AM	5	15	0	1	23	420	45	1	0	0	0	1	0	490	19	12	1038
08:15 AM	6	13	3	1	33	430	48	1	1	0	6	1	6	454	40	8	1068
08:30 AM	5	21	2	1	24	428	68	1	3	0	0	1	0	475	32	8	1084
08:45 AM	9	19	1	1	25	481	66	1	1	1	2	1	2	532	41	11	1206
Total	25	68	6	4	105	1759	227	4	5	1	8	4	8	1951	132	39	4396
Grand Total	59	124	15	13	178	3296	386	13	8	2	20	13	20	3985	210	74	8463
Apprch %	29.8	62.6	7.6	0.3	4.6	85.1	10	0.3	26.7	6.7	66.7	0.3	66.7	91.4	4.8	1.7	100.0
Total %	0.7	1.5	0.2	0.2	2.1	38.9	4.6	0.2	0.1	0	0.2	0.2	0.2	47.1	2.5	0.9	100.0

Accurate Counts

978-664-2565

N/S Street : Wellesley Gateway / Sunlife
 E/W Street : Route 9
 City/State : Wellesley, MA
 Weather : Clear

File Name : 77590001
 Site Code : 77590001
 Start Date : 10/3/2017
 Page No : 1

Start Time	Wellesley Gateway Drwy										Groups Printed- Trucks										
	From North					From East					From South					From West					
	Left	Thru	Right	U-TR	Left	Thru	Right	U-TR	Left	Thru	Right	U-TR	Left	Thru	Right	U-TR	Left	Thru	Right	U-TR	Int. Total
07:00 AM	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	7
07:15 AM	1	0	1	0	7	1	0	0	0	0	0	0	0	0	0	0	1	4	0	0	15
07:30 AM	0	0	1	0	10	0	0	0	0	0	0	0	0	0	0	0	1	5	0	0	17
07:45 AM	0	0	1	0	8	1	0	0	0	0	1	0	0	0	0	0	1	8	0	0	21
Total	2	0	4	0	26	2	0	0	0	0	1	0	0	0	0	0	4	20	0	0	60
08:00 AM	0	0	1	0	6	0	0	0	0	0	1	0	0	0	0	0	0	4	0	0	13
08:15 AM	1	0	0	0	5	1	0	0	0	0	1	0	0	0	0	0	0	6	0	0	15
08:30 AM	1	0	0	0	14	1	0	0	0	0	0	0	0	0	0	0	0	9	0	0	25
08:45 AM	2	0	0	0	6	2	1	1	0	0	0	0	0	0	0	0	0	5	0	0	16
Total	4	0	1	0	31	4	1	1	0	0	2	0	0	0	0	0	0	24	0	0	69
Grand Total	6	0	5	0	57	6	1	1	0	0	3	0	0	0	0	0	4	44	0	0	129
Apprch %	54.5	0	45.5	0	85.1	9	1.5	100	0	0	100	0	0	0	0	0	8.3	91.7	0	0	
Total %	4.7	0	3.9	0	44.2	4.7	0.8	2.3	0	0	2.3	0	0	0	0	0	3.1	34.1	0	0	

Accurate Counts

978-664-2565

N/S Street : Wellesley Gateway / Sunlife
 EW Street: Route 9
 City/State : Wellesley, MA
 Weather : Clear

File Name : 77590001
 Site Code : 77590001
 Start Date : 10/3/2017
 Page No : 2

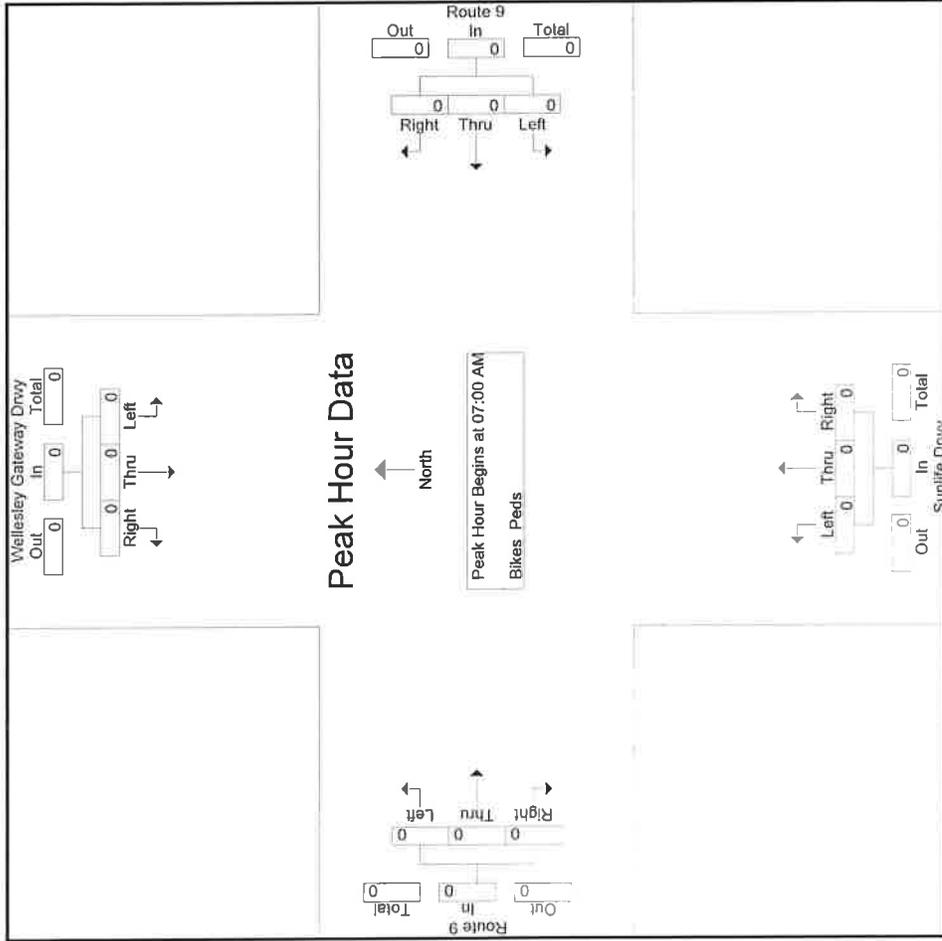
Start Time	Wellesley Gateway Drwy From North				Route 9 From East				Sunlife Drwy From South				Route 9 From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:45 AM	0	0	1	1	1	8	1	10	0	0	1	1	1	1	8	9	21
08:00 AM	0	0	1	1	1	6	0	7	0	0	1	1	0	4	0	4	13
08:15 AM	1	0	0	1	1	5	1	7	0	0	1	1	0	6	0	6	15
08:30 AM	1	0	0	1	0	14	1	15	0	0	0	0	0	9	0	9	25
Total Volume	2	0	2	4	3	33	3	39	0	0	3	3	1	27	0	28	74
% App. Total	50	0	50	100	7.7	84.6	7.7	85.0	0	0	100	7.5	3.6	96.4	0	96.5	
PHF	.500	.000	.500	1.00	.750	.589	.750	.650	.000	.000	.750	.750	.250	.750	.000	.778	.740

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

Accurate Counts
978-664-2565

N/S Street : Wellesley Gateway / Sunlife
 EW Street: Route 9
 City/State : Wellesley, MA
 Weather : Clear

File Name : 77590001
 Site Code : 77590001
 Start Date : 10/3/2017
 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			07:00 AM			07:00 AM		
+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	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0

Accurate Counts

978-664-2565

N/S Street : Wellesley Gateway / Sunlife
 E/W Street: Route 9
 City/State : Wellesley, MA
 Weather : Clear

File Name : 77590001
 Site Code : 77590001
 Start Date : 10/3/2017
 Page No : 1

Start Time	Wellesley Gateway Drwy												Sunlife Drwy						Route 9					
	From North			From East			From South			From West			From North			From South			From East			From West		
	Left	Thru	Right	Left	Thru	Right	U-TR	Left	Thru	Right	Left	Thru	Right	U-TR	Left	Thru	Right	U-TR	Left	Thru	Right	U-TR	Int. Total	
04:00 PM	39	1	11	1	387	15	1	20	0	51	1	462	1	11	1	462	1	11	1	462	1	11	1001	
04:15 PM	25	1	20	1	453	5	2	18	0	32	2	512	0	8	1	512	0	8	1	512	0	8	1078	
04:30 PM	34	0	11	1	439	7	0	19	0	46	0	451	0	9	0	451	1	9	0	451	1	9	1018	
04:45 PM	50	2	22	2	477	8	6	16	0	46	6	445	0	7	4	445	3	7	4	445	3	7	1088	
Total	148	4	64	5	1756	35	9	73	0	175	9	1870	0	35	6	1870	5	35	6	1870	5	35	4185	
05:00 PM	58	0	26	3	503	16	0	29	0	50	0	478	0	4	2	478	4	4	2	478	4	4	1173	
05:15 PM	41	2	22	1	505	7	3	29	1	53	3	516	1	8	0	516	0	8	0	516	0	8	1188	
05:30 PM	41	0	14	4	494	9	4	21	0	39	4	484	0	4	0	484	2	4	0	484	2	4	1116	
05:45 PM	30	2	19	0	460	10	0	11	0	22	0	433	0	5	4	433	1	5	4	433	1	5	997	
Total	170	4	81	8	1962	42	7	90	1	164	7	1911	1	21	6	1911	7	21	6	1911	7	21	4474	
Grand Total	318	8	145	13	3718	77	16	163	1	339	16	3781	1	56	12	3781	12	56	12	3781	12	56	8659	
Approch %	67.5	1.7	30.8	0.3	97.2	2	0.4	32.4	0.2	67.4	0.3	97.9	0.3	1.5	0.3	97.9	0.3	1.5	0.3	97.9	0.3	1.5		
Total %	3.7	0.1	1.7	0.2	42.9	0.9	0.2	1.9	0	3.9	0.1	43.7	0.1	0.6	0.1	43.7	0.1	0.6	0.1	43.7	0.1	0.6		
Cars	318	8	144	13	3692	77	16	163	1	339	16	3750	1	56	11	3750	12	56	11	3750	12	56	8600	
% Cars	100	100	99.3	100	99.3	100	100	100	100	100	100	99.2	100	100	91.7	99.2	100	100	91.7	99.2	100	100	99.3	
Trucks	0	0	1	0	26	0	0	0	0	0	0	31	0	0	1	31	0	0	1	31	0	0	59	
% Trucks	0	0	0.7	0	0.7	0	0	0	0	0	0	0.8	0	0	8.3	0.8	0	0	8.3	0.8	0	0	0.7	

Accurate Counts

978-664-2565

N/S Street : Wellesley Gateway / Sunlife
 E/W Street: Route 9
 City/State : Wellesley, MA
 Weather : Clear

File Name : 77590001
 Site Code : 77590001
 Start Date : 10/3/2017
 Page No : 2

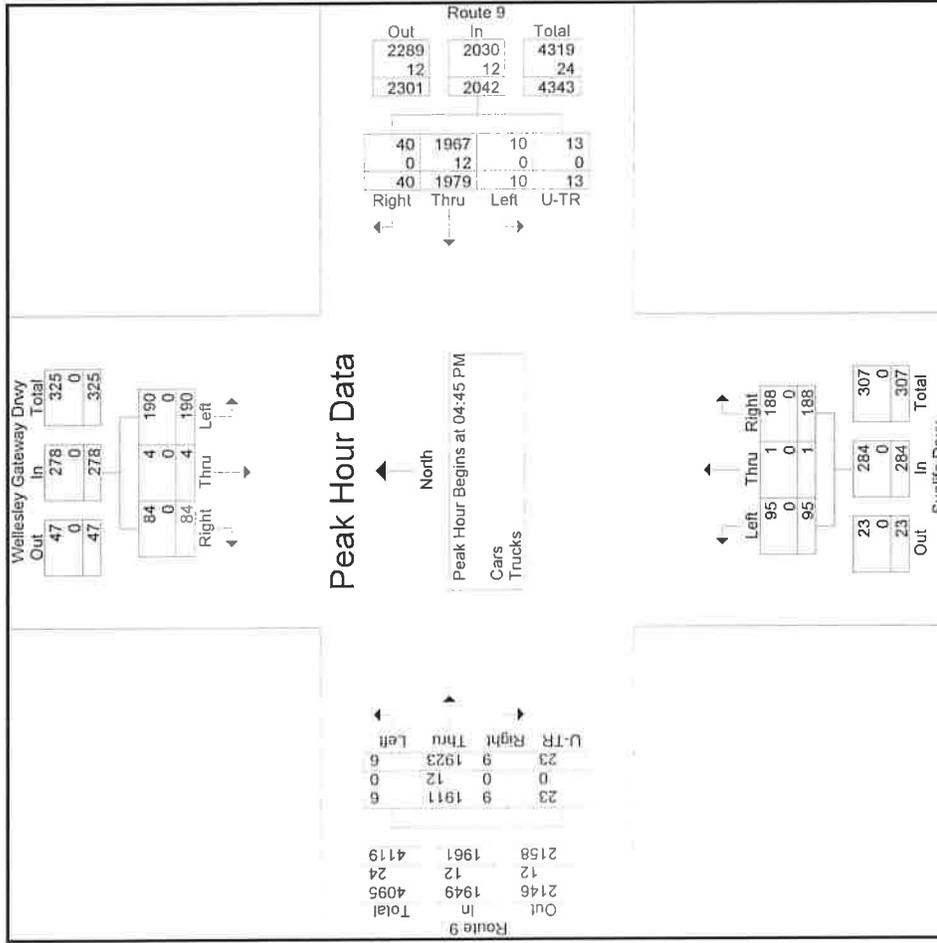
Start Time	Wellesley Gateway Drwy						Route 9						Sunlife Drwy						Route 9																				
	From North			From East			From South			From West			From South			From West			From South			From West																	
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	U-TR	App. Total	U-TR												
04:45 PM	50	2	22	74	2	477	8	6	493	16	0	46	62	4	445	3	7	459	1088	190	4	84	278	10	1979	40	13	2042	95	1	188	284	6	1923	9	23	1961	4565	
05:00 PM	58	0	26	84	3	503	16	0	522	29	0	50	79	2	478	4	4	488	1173	190	4	84	278	10	1979	40	13	2042	95	1	188	284	6	1923	9	23	1961	4565	
05:15 PM	41	2	22	65	1	505	7	3	516	29	1	53	83	0	516	0	8	524	1188	190	4	84	278	10	1979	40	13	2042	95	1	188	284	6	1923	9	23	1961	4565	
05:30 PM	41	0	14	55	4	494	9	4	511	21	0	39	60	0	484	2	4	490	1116	190	4	84	278	10	1979	40	13	2042	95	1	188	284	6	1923	9	23	1961	4565	
Total Volume	190	4	84	278	10	1979	40	13	2042	95	1	188	284	6	1923	9	23	1961	4565	190	4	84	278	10	1979	40	13	2042	95	1	188	284	6	1923	9	23	1961	4565	
% App. Total	68.3	1.4	30.2	82.7	0.5	96.9	2	0.6	97.8	33.5	0.4	66.2	85.5	0.3	98.1	0.5	1.2	93.6	96.1	68.3	1.4	30.2	82.7	0.5	96.9	2	0.6	97.8	33.5	0.4	66.2	85.5	0.3	98.1	0.5	1.2	93.6	96.1	
PHF	.819	.500	.808	.827	.625	.980	.625	.542	.978	.819	.250	.887	.855	.375	.932	.563	.719	.936	.961	.819	.500	.808	.827	.625	.980	.625	.542	.978	.819	.250	.887	.855	.375	.932	.563	.719	.936	.961	
Cars	190	4	84	278	10	1967	40	13	2030	95	1	188	284	6	1911	9	23	1949	4541	190	4	84	278	10	1967	40	13	2030	95	1	188	284	6	1911	9	23	1949	4541	
% Cars	100	100	100	100	100	99.4	100	100	99.4	100	100	100	100	100	99.4	100	100	99.4	99.5	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	99.4	99.5		
Trucks	0	0	0	0	0	12	0	0	12	0	0	0	0	0	12	0	0	12	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	24			
% Trucks	0	0	0	0	0	0.6	0	0	0.6	0	0	0	0	0	0.6	0	0	0.6	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	0.5				

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

Accurate Counts
978-664-2565

File Name : 77590001
Site Code : 77590001
Start Date : 10/3/2017
Page No : 3

N/S Street : Wellesley Gateway / Sunlife
E/W Street: Route 9
City/State : Wellesley, 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				04:45 PM							
+0 mins.	50	2	22	74	8	6	493	19	0	46	65	4	445	3	7	459
+15 mins.	58	0	26	84	16	0	522	16	0	46	62	2	478	4	4	488
+30 mins.	41	2	22	65	7	3	516	29	0	50	79	0	516	0	8	524
+45 mins.	41	0	14	55	9	4	511	29	1	53	83	0	484	2	4	490
Total Volume	190	4	84	278	40	13	2042	93	1	195	289	6	1923	9	23	1961
% App. Total	68.3	1.4	30.2		0.5	0.6		32.2	0.3	67.5		0.3	98.1	0.5	1.2	

Accurate Counts

978-664-2565

N/S Street : Wellesley Gateway / Sunlife
 EW Street: Route 9
 City/State : Wellesley, MA
 Weather : Clear

File Name : 77590001
 Site Code : 77590001
 Start Date : 10/3/2017
 Page No : 1

Start Time	Wellesley Gateway Drwy												Sunlife Drwy				Route 9				Int. Total
	From North				From East				From South				From West								
	Left	Thru	Right	U-TR	Left	Thru	Right	U-TR	Left	Thru	Right	U-TR	Left	Thru	Right	U-TR					
04:00 PM	39	1	10	1	383	15	1	20	0	51	0	11	0	457	1	11	990				
04:15 PM	25	1	20	2	450	5	2	18	0	32	0	8	1	507	0	8	1070				
04:30 PM	34	0	11	0	436	7	0	19	0	46	0	9	0	445	1	9	1009				
04:45 PM	50	2	22	6	475	8	6	16	0	46	0	7	4	439	3	7	1080				
Total	148	4	63	9	1744	35	9	73	0	175	0	35	5	1848	5	35	4149				
05:00 PM	58	0	26	0	500	16	0	29	0	50	0	4	2	477	4	4	1169				
05:15 PM	41	2	22	3	500	7	3	29	1	53	1	8	0	513	0	8	1180				
05:30 PM	41	0	14	4	492	9	4	21	0	39	0	4	0	482	2	4	1112				
05:45 PM	30	2	19	0	456	10	0	11	0	22	0	5	4	430	1	5	990				
Total	170	4	81	7	1948	42	7	90	1	164	1	21	6	1902	7	21	4451				
Grand Total	318	8	144	16	3692	77	16	163	1	339	1	56	11	3750	12	56	8600				
Apprch %	67.7	1.7	30.6	0.4	97.2	2	0.4	32.4	0.2	67.4	0.3	1.5	0.3	97.9	0.3	1.5					
Total %	3.7	0.1	1.7	0.2	42.9	0.9	0.2	1.9	0	3.9	0.1	0.7	0.1	43.6	0.1	0.7					

Accurate Counts
978-664-2565

N/S Street : Wellesley Gateway / Sunlife
 E/W Street: Route 9
 City/State : Wellesley, MA
 Weather : Clear

File Name : 77590001
 Site Code : 77590001
 Start Date : 10/3/2017
 Page No : 2

Start Time	Wellesley Gateway Drwy					Route 9					Sunlife Drwy					Route 9											
	From North					From East					From South					From West											
	Left	Thru	Right	App. Total	Int. Total	Left	Thru	Right	U-TR	App. Total	Left	Thru	Right	U-TR	App. Total	Left	Thru	Right	U-TR	App. Total	Left	Thru	Right	U-TR	App. Total	Int. 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	50	2	22	74		2	475	8	6	491	16	0	46	62	4	439	3	7	453	1080							
05:00 PM	58	0	26	84		3	500	16	0	519	29	0	50	79	2	477	4	4	487	1169							
05:15 PM	41	2	22	65		1	500	7	3	511	29	1	53	83	0	513	0	8	521	1180							
05:30 PM	41	0	14	55		4	492	9	4	509	21	0	39	60	0	482	2	4	488	1112							
Total Volume	190	4	84	278		10	1967	40	13	2030	95	1	188	284	6	1911	9	23	1949	4541							
% App. Total	68.3	1.4	30.2			0.5	96.9	2	0.6		33.5	0.4	66.2		0.3	98.1	0.5	1.2									
PHF	.819	.500	.808	.827		.625	.984	.625	.542	.978	.819	.250	.887	.855	.375	.931	.563	.719	.935	.962							

Accurate Counts

978-664-2565

File Name : 77590001
 Site Code : 77590001
 Start Date : 10/3/2017
 Page No : 1

N/S Street : Wellesley Gateway / Sunlife
 E/W Street: Route 9
 City/State : Wellesley, MA
 Weather : Clear

Start Time	Wellesley Gateway Drwy				Groups Printed- Trucks				Sunlife Drwy				Route 9				Int. Total		
	From North		From East		U-TR		From South		From West		From East		From South		From West				
	Left	Right	Left	Right	U-TR	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	U-TR			
04:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	5	0	0	11
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	8
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	9
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	8
Total	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	22	0	0	36
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	4
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	8
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	4
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	7
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	23
Grand Total	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	31	0	0	59
Apprch %	0	100	0	0	0	0	0	0	0	0	0	0	0	3.1	96.9	0	0	0	0
Total %	0	1.7	0	0	0	0	0	0	0	0	0	0	0	1.7	52.5	0	0	0	0

Accurate Counts

978-664-2565

N/S Street : Wellesley Gateway / Sunlife
 E/W Street: Route 9
 City/State : Wellesley, MA
 Weather : Clear

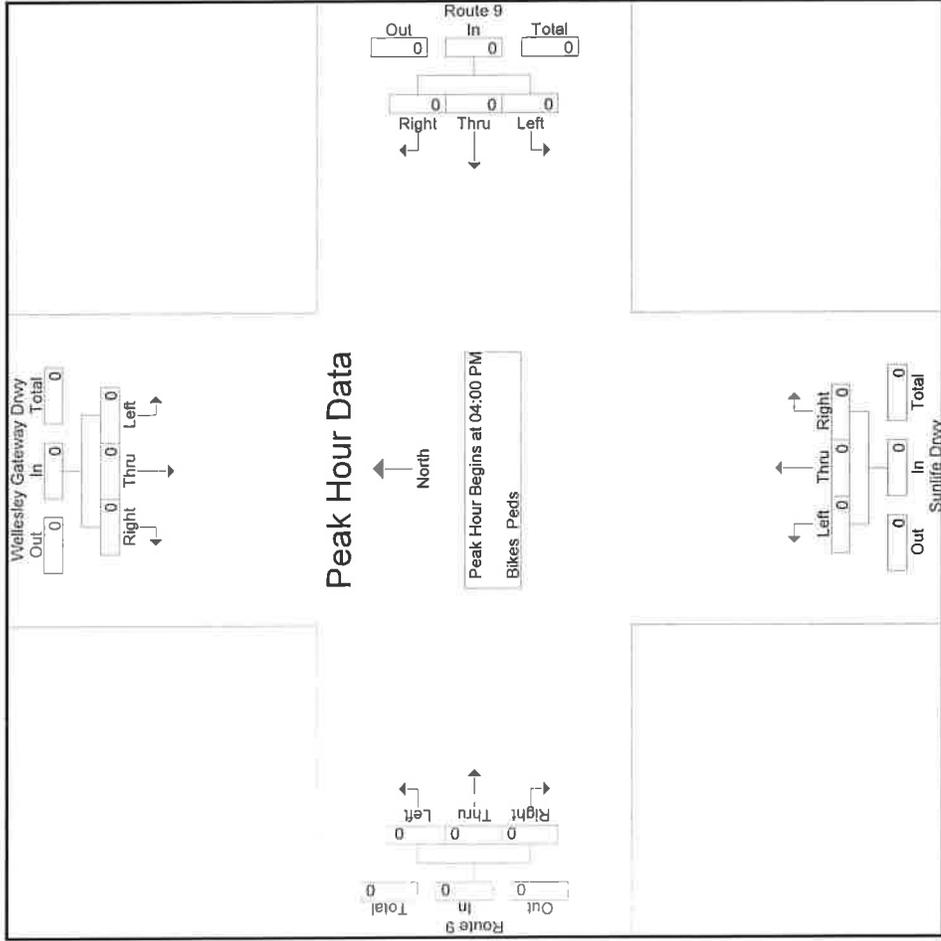
File Name : 77590001
 Site Code : 77590001
 Start Date : 10/3/2017
 Page No : 2

Start Time	Wellesley Gateway Drwy				Route 9				Sunlife Drwy				Route 9				Int. Total		
	From North		From East		From South		From West		From South		From West		From West						
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total		U-TR	
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	0	1	1	0	4	0	4	0	0	0	0	0	0	5	0	0	6	11
04:15 PM	0	0	0	0	0	3	0	3	0	0	0	0	0	0	5	0	0	5	8
04:30 PM	0	0	0	0	0	3	0	3	0	0	0	0	0	6	0	0	0	6	9
04:45 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	6	0	0	0	6	8
Total Volume	0	0	1	1	0	12	0	12	0	0	0	0	0	22	0	0	0	23	36
% App. Total	0	0	100	.250	0	100	0	0	0	0	0	0	0	95.7	0	0	0	.958	.818
PHF	.000	.000	.250	.250	.000	.750	.000	.750	.000	.000	.000	.000	.000	.917	.000	.000	.000	.958	.818

Accurate Counts
978-664-2565

N/S Street : Wellesley Gateway / Sunlife
 E/W Street: Route 9
 City/State : Wellesley, MA
 Weather : Clear

File Name : 77590001
 Site Code : 77590001
 Start Date : 10/3/2017
 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:

	04:00 PM			04:00 PM			04:00 PM			04:00 PM		
+0 mins.	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
+30 mins.	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
Total Volume	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

Accurate Counts
978-664-2565

N/S Street : Dearborn Street
E/W Street : Route 9
City/State : Wellesley, MA
Weather : Clear

File Name : 77590002
Site Code : 77590002
Start Date : 10/3/2017
Page No : 1

Groups Printed- Cars - Trucks

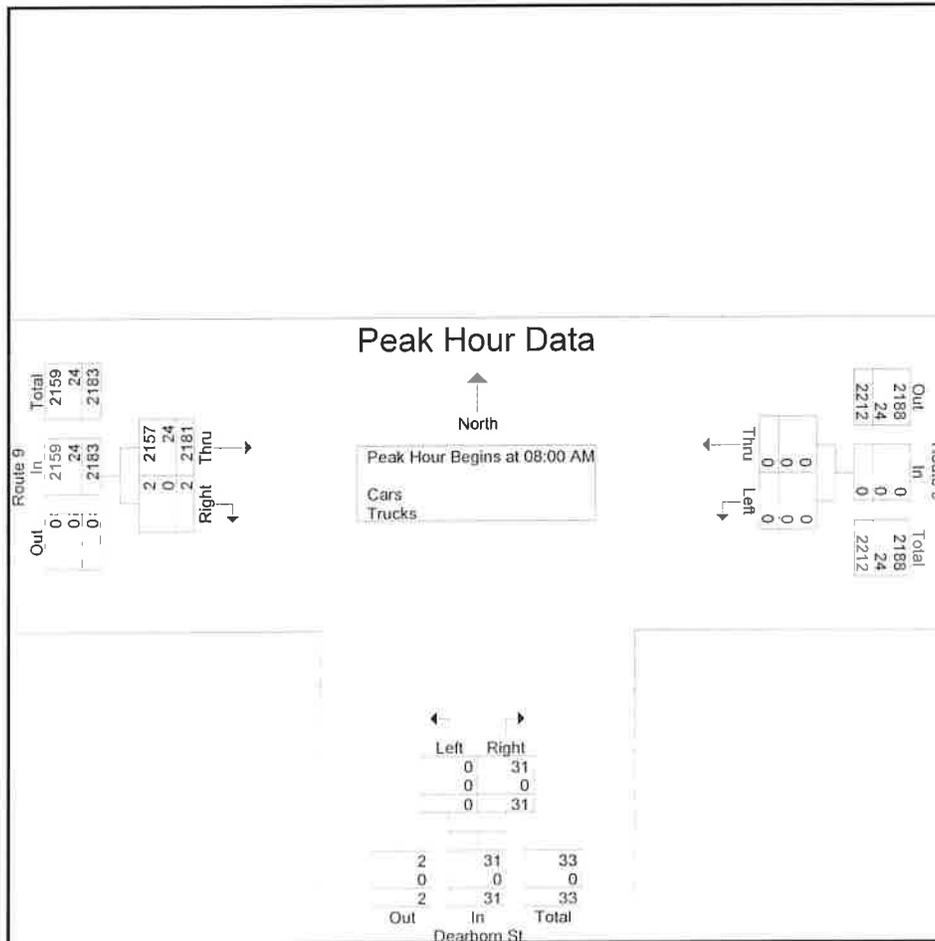
Start Time	Route 9 From East		Dearborn St From South		Route 9 From West		Int. Total
	Left	Thru	Left	Right	Thru	Right	
07:00 AM	0	0	0	11	563	1	575
07:15 AM	0	0	0	12	552	0	564
07:30 AM	0	0	0	10	520	0	530
07:45 AM	0	0	0	9	522	0	531
Total	0	0	0	42	2157	1	2200
08:00 AM	0	0	0	4	529	1	534
08:15 AM	0	0	0	11	522	0	533
08:30 AM	0	0	0	8	533	1	542
08:45 AM	0	0	0	8	597	0	605
Total	0	0	0	31	2181	2	2214
Grand Total	0	0	0	73	4338	3	4414
Apprch %	0	0	0	100	99.9	0.1	
Total %	0	0	0	1.7	98.3	0.1	
Cars	0	0	0	73	4290	3	4366
% Cars	0	0	0	100	98.9	100	98.9
Trucks	0	0	0	0	48	0	48
% Trucks	0	0	0	0	1.1	0	1.1

Accurate Counts
978-664-2565

N/S Street : Dearborn Street
E/W Street : Route 9
City/State : Wellesley, MA
Weather : Clear

File Name : 77590002
Site Code : 77590002
Start Date : 10/3/2017
Page No : 2

Start Time	Route 9 From East			Dearborn St From South			Route 9 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 08:00 AM										
08:00 AM	0	0	0	0	4	4	529	1	530	534
08:15 AM	0	0	0	0	11	11	522	0	522	533
08:30 AM	0	0	0	0	8	8	533	1	534	542
08:45 AM	0	0	0	0	8	8	597	0	597	605
Total Volume	0	0	0	0	31	31	2181	2	2183	2214
% App. Total	0	0	0	0	100	100	99.9	0.1		
PHF	.000	.000	.000	.000	.705	.705	.913	.500	.914	.915
Cars	0	0	0	0	31	31	2157	2	2159	2190
% Cars	0	0	0	0	100	100	98.9	100	98.9	98.9
Trucks	0	0	0	0	0	0	24	0	24	24
% Trucks	0	0	0	0	0	0	1.1	0	1.1	1.1



Accurate Counts
978-664-2565

N/S Street : Dearborn Street
E/W Street : Route 9
City/State : Wellesley, MA
Weather : Clear

File Name : 77590002
Site Code : 77590002
Start Date : 10/3/2017
Page No : 4

Groups Printed- Cars

Start Time	Route 9 From East		Dearborn St From South		Route 9 From West		Int. Total
	Left	Thru	Left	Right	Thru	Right	
07:00 AM	0	0	0	11	559	1	571
07:15 AM	0	0	0	12	547	0	559
07:30 AM	0	0	0	10	514	0	524
07:45 AM	0	0	0	9	513	0	522
Total	0	0	0	42	2133	1	2176
08:00 AM	0	0	0	4	525	1	530
08:15 AM	0	0	0	11	516	0	527
08:30 AM	0	0	0	8	524	1	533
08:45 AM	0	0	0	8	592	0	600
Total	0	0	0	31	2157	2	2190
Grand Total	0	0	0	73	4290	3	4366
Apprch %	0	0	0	100	99.9	0.1	
Total %	0	0	0	1.7	98.3	0.1	

Accurate Counts
978-664-2565

N/S Street : Dearborn Street
E/W Street : Route 9
City/State : Wellesley, MA
Weather : Clear

File Name : 77590002
Site Code : 77590002
Start Date : 10/3/2017
Page No : 7

Groups Printed- Trucks

Start Time	Route 9 From East		Dearborn St From South		Route 9 From West		Int. Total
	Left	Thru	Left	Right	Thru	Right	
07:00 AM	0	0	0	0	4	0	4
07:15 AM	0	0	0	0	5	0	5
07:30 AM	0	0	0	0	6	0	6
07:45 AM	0	0	0	0	9	0	9
Total	0	0	0	0	24	0	24
08:00 AM	0	0	0	0	4	0	4
08:15 AM	0	0	0	0	6	0	6
08:30 AM	0	0	0	0	9	0	9
08:45 AM	0	0	0	0	5	0	5
Total	0	0	0	0	24	0	24
Grand Total	0	0	0	0	48	0	48
Apprch %	0	0	0	0	100	0	
Total %	0	0	0	0	100	0	

Accurate Counts
978-664-2565

N/S Street : Dearborn Street
E/W Street : Route 9
City/State : Wellesley, MA
Weather : Clear

File Name : 77590002
Site Code : 77590002
Start Date : 10/3/2017
Page No : 10

Groups Printed- Bikes Peds

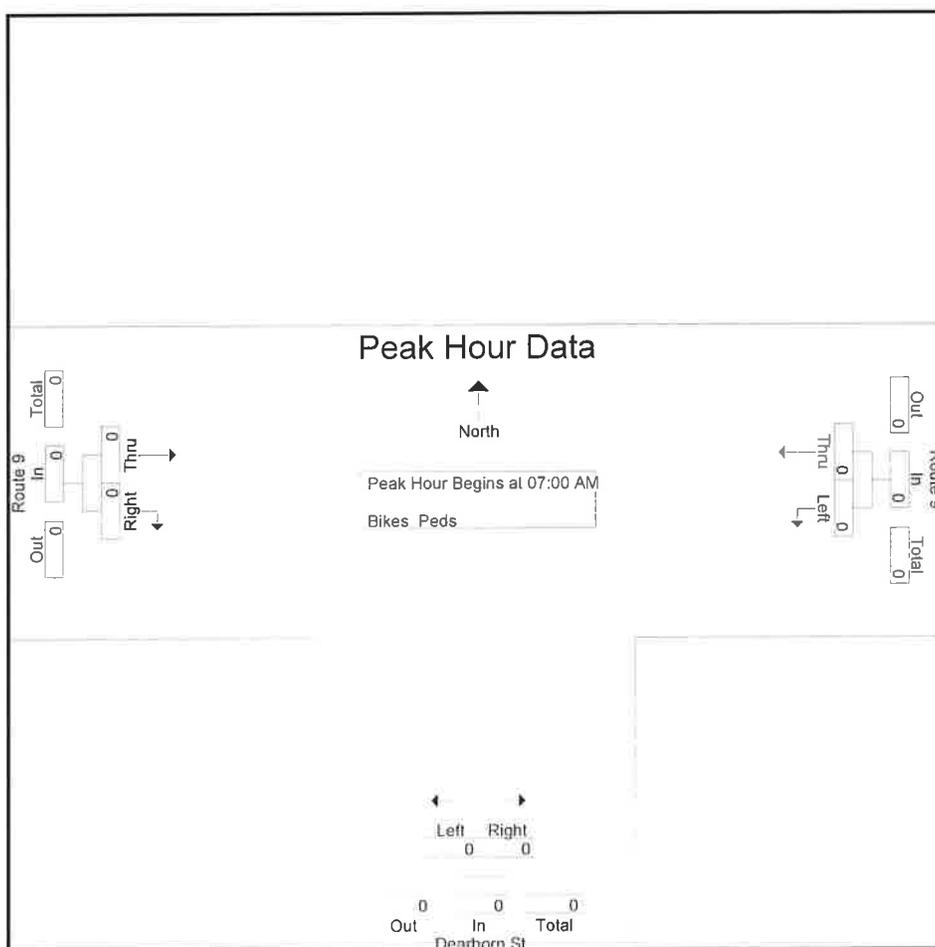
Start Time	Route 9 From East			Dearborn St From South			Route 9 From West			Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds			
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	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	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0
Approch %	0	0		0	0		0	0		0	0	
Total %										0	0	

Accurate Counts
978-664-2565

N/S Street : Dearborn Street
E/W Street : Route 9
City/State : Wellesley, MA
Weather : Clear

File Name : 77590002
Site Code : 77590002
Start Date : 10/3/2017
Page No : 11

Start Time	Route 9 From East			Dearborn St From South			Route 9 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 07:00 AM										
07:00 AM	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



Accurate Counts
978-664-2565

N/S Street : Dearborn Street
E/W Street : Route 9
City/State : Wellesley, MA
Weather : Clear

File Name : 77590002
Site Code : 77590002
Start Date : 10/3/2017
Page No : 1

Groups Printed- Cars - Trucks

Start Time	Route 9 From East		Dearborn St From South		Route 9 From West		Int. Total
	Left	Thru	Left	Right	Thru	Right	
04:00 PM	0	0	0	3	472	2	477
04:15 PM	0	0	0	2	519	1	522
04:30 PM	0	0	0	3	458	3	464
04:45 PM	0	0	0	4	456	0	460
Total	0	0	0	12	1905	6	1923
05:00 PM	0	0	0	6	483	0	489
05:15 PM	0	0	0	1	523	0	524
05:30 PM	0	0	0	4	487	2	493
05:45 PM	0	0	0	2	441	0	443
Total	0	0	0	13	1934	2	1949
Grand Total	0	0	0	25	3839	8	3872
Apprch %	0	0	0	100	99.8	0.2	
Total %	0	0	0	0.6	99.1	0.2	
Cars	0	0	0	25	3807	8	3840
% Cars	0	0	0	100	99.2	100	99.2
Trucks	0	0	0	0	32	0	32
% Trucks	0	0	0	0	0.8	0	0.8

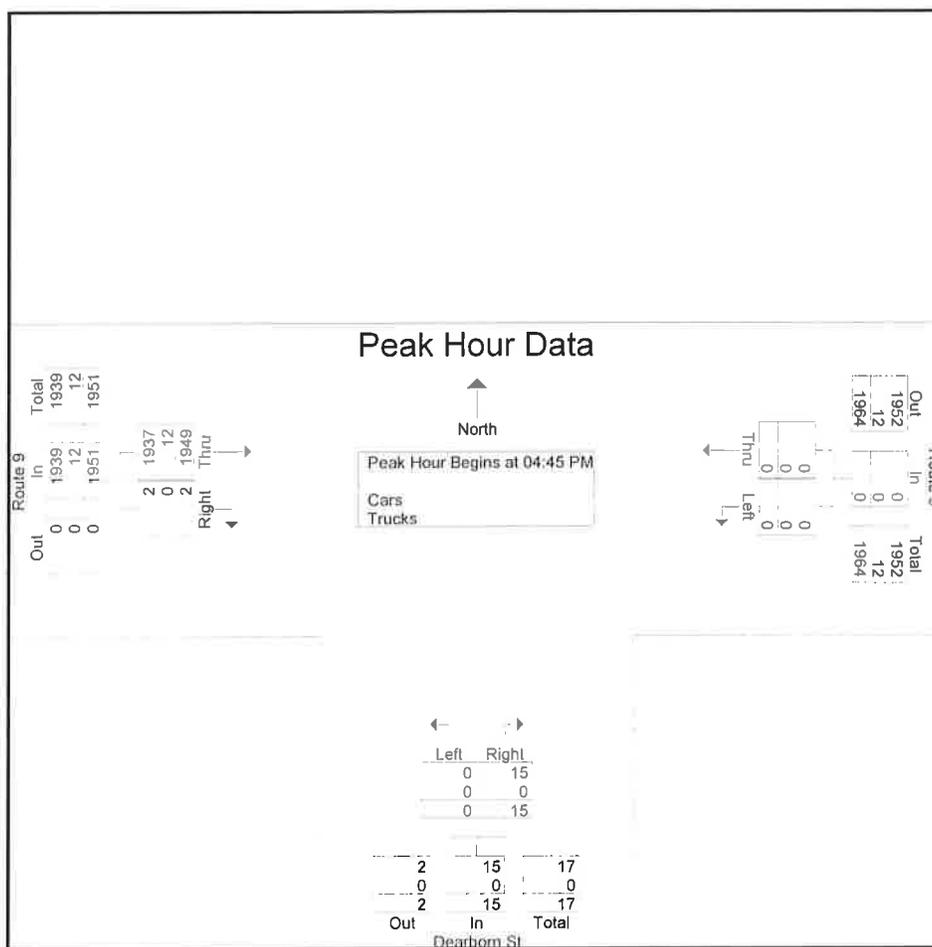
Accurate Counts

978-664-2565

N/S Street : Dearborn Street
 E/W Street : Route 9
 City/State : Wellesley, MA
 Weather : Clear

File Name : 77590002
 Site Code : 77590002
 Start Date : 10/3/2017
 Page No : 2

Start Time	Route 9 From East			Dearborn St From South			Route 9 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 04:45 PM										
04:45 PM	0	0	0	0	4	4	456	0	456	460
05:00 PM	0	0	0	0	6	6	483	0	483	489
05:15 PM	0	0	0	0	1	1	523	0	523	524
05:30 PM	0	0	0	0	4	4	487	2	489	493
Total Volume	0	0	0	0	15	15	1949	2	1951	1966
% App. Total	0	0		0	100		99.9	0.1		
PHF	.000	.000	.000	.000	.625	.625	.932	.250	.933	.938
Cars	0	0	0	0	15	15	1937	2	1939	1954
% Cars	0	0		0	100	100	99.4	100	99.4	99.4
Trucks	0	0	0	0	0	0	12	0	12	12
% Trucks	0	0		0	0	0	0.6	0	0.6	0.6



Accurate Counts
978-664-2565

N/S Street : Dearborn Street
E/W Street : Route 9
City/State : Wellesley, MA
Weather : Clear

File Name : 77590002
Site Code : 77590002
Start Date : 10/3/2017
Page No : 4

Groups Printed- Cars

Start Time	Route 9 From East		Dearborn St From South		Route 9 From West		Int. Total
	Left	Thru	Left	Right	Thru	Right	
04:00 PM	0	0	0	3	466	2	471
04:15 PM	0	0	0	2	514	1	517
04:30 PM	0	0	0	3	452	3	458
04:45 PM	0	0	0	4	450	0	454
Total	0	0	0	12	1882	6	1900
05:00 PM	0	0	0	6	482	0	488
05:15 PM	0	0	0	1	520	0	521
05:30 PM	0	0	0	4	485	2	491
05:45 PM	0	0	0	2	438	0	440
Total	0	0	0	13	1925	2	1940
Grand Total	0	0	0	25	3807	8	3840
Approch %	0	0	0	100	99.8	0.2	
Total %	0	0	0	0.7	99.1	0.2	

Accurate Counts
978-664-2565

N/S Street : Dearborn Street
E/W Street : Route 9
City/State : Wellesley, MA
Weather : Clear

File Name : 77590002
Site Code : 77590002
Start Date : 10/3/2017
Page No : 7

Groups Printed- Trucks

Start Time	Route 9 From East		Dearborn St From South		Route 9 From West		Int. Total
	Left	Thru	Left	Right	Thru	Right	
04:00 PM	0	0	0	0	6	0	6
04:15 PM	0	0	0	0	5	0	5
04:30 PM	0	0	0	0	6	0	6
04:45 PM	0	0	0	0	6	0	6
Total	0	0	0	0	23	0	23
05:00 PM	0	0	0	0	1	0	1
05:15 PM	0	0	0	0	3	0	3
05:30 PM	0	0	0	0	2	0	2
05:45 PM	0	0	0	0	3	0	3
Total	0	0	0	0	9	0	9
Grand Total	0	0	0	0	32	0	32
Apprch %	0	0	0	0	100	0	
Total %	0	0	0	0	100	0	

Accurate Counts
978-664-2565

N/S Street : Dearborn Street
E/W Street : Route 9
City/State : Wellesley, MA
Weather : Clear

File Name : 77590002
Site Code : 77590002
Start Date : 10/3/2017
Page No : 10

Groups Printed- Bikes Peds

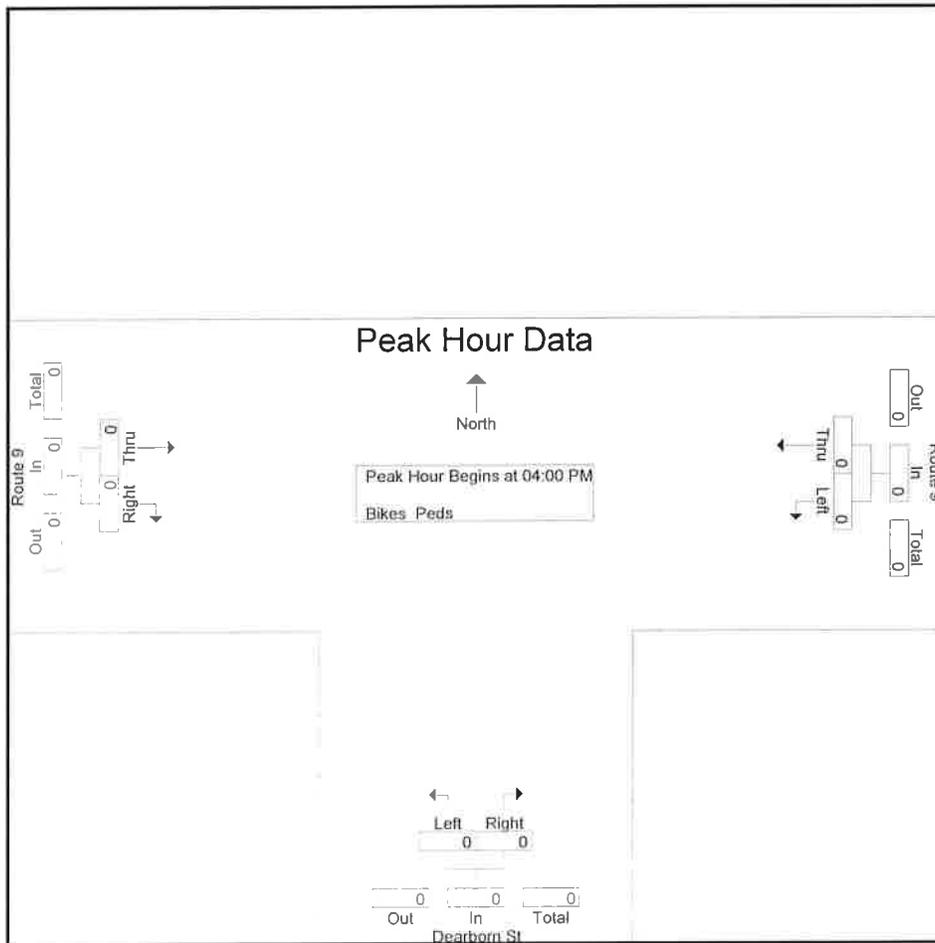
Start Time	Route 9 From East			Dearborn St From South			Route 9 From West			Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds			
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	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
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	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	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0
Approch %	0	0		0	0		0	0				
Total %										0	0	

Accurate Counts
978-664-2565

N/S Street : Dearborn Street
E/W Street : Route 9
City/State : Wellesley, MA
Weather : Clear

File Name : 77590002
Site Code : 77590002
Start Date : 10/3/2017
Page No : 11

Start Time	Route 9 From East			Dearborn St From South			Route 9 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	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0
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
Total Volume	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



SEASONAL ADJUSTMENT DATA

Massachusetts Highway Department H8502: Monthly Hourly Volume for October 2016

Location:	H8502		U1-Boston																								TOTAL	
	County:	NORFOLK	U1-Boston																									
		Functional Class	1	U1-Boston																								
			I-95	U1-Boston																								
Location:	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	24:00			
1	1433	825	562	478	560	1240	2115	3276	4514	5319	5352	6256	6242	6411	7089	7716	7533	5899	4459	3743	3602	3979	2921	97216				
2	1442	934	643	426	396	717	1442	2468	4174	5819	6617	7947	9056	8759	8364	7871	8592	8697	7668	6316	5288	3918	2661	1648	111863			
3	841	619	465	743	1356	4827	9421	12017	12560	9333	8998	8580	8417	8742	10190	9095	8892	10141	8407	6407	4403	3520	2522	1567	152063			
4	1036	665	631	742	1451	4965	9502	12228	12053	11618	9106	8806	7604	8797	9406	8878	9363	10764	9554	7132	4901	3603	2498	1785	157088			
5	973	651	637	872	1550	5033	9404	12027	12633	12319	9714	9497	9260	9334	8737	9016	9657	10319	10009	7993	5442	4095	2864	1804	163840			
6	1116	696	567	857	1629	5211	9564	12040	13218	10478	8874	9309	9191	9359	9028	8769	9332	10698	9519	7503	5577	4201	3019	2096	161851			
7	1253	857	637	847	1504	5000	9703	11191	10806	9748	9390	9217	9827	8837	8473	11064	11778	11564	9145	7858	5559	4300	3780	3185	165523			
8	1688	1066	759	692	817	1586	3407	4982	6554	8128	9408	10026	9518	9740	9364	9148	9042	8610	7557	5818	4672	4395	3762	2834	133573			
9	1634	954	658	434	391	646	1473	1583	2628	4023	4973	6215	6623	6477	5509	5661	5901	5737	5146	4170	3602	2530	1995	1614	80577			
10	903	579	474	560	943	2979	6314	7641	7712	8107	8905	9680	9774	9673	9435	8962	9183	10004	9059	7598	5672	3916	3075	1973	143121			
11	1058	662	525	705	1450	5148	10035	12684	12489	12352	9368	9242	9398	9530	8466	8897	9300	9939	9844	7235	4826	3320	2495	1628	160596			
12	973	695	534	753	1476	5111	9737	12249	12337	9926	8215	9017	8918	9012	8904	8682	9595	10418	9882	7110	5303	3885	2701	1797	157230			
13	1033	716	582	753	1510	5069	9818	12808	13222	11598	9892	9508	9155	9402	9327	9430	9313	9237	8662	7265	5397	4220	2897	1896	162710			
14	1206	791	666	859	1533	4923	9673	11964	9048	9511	9834	9495	9868	9911	8397	8979	8914	9738	9076	7626	5404	4312	3592	2592	157912			
15	1593	1069	748	641	819	1760	3603	5591	7369	8800	9722	10166	10497	10361	9103	8236	9247	9634	9051	7298	5527	4915	4317	3141	143208			
16	1798	1130	702	509	426	867	1963	3734	5980	8274	9332	9741	9562	9158	8447	8429	9168	9159	8713	7533	4914	4146	2295	1589	127569			
17	881	590	453	660	1397	5089	9925	13552	12629	13067	9079	8784	8348	8885	9312	9096	9783	10340	9331	6406	4077	3194	2294	1534	158706			
18	906	729	508	654	1195	4347	8660	11702	11479	11995	10568	8773	8940	9247	9242	8862	9938	9740	9831	7169	4841	3809	2606	1752	157493			
19	1016	676	557	783	1471	5128	9752	12957	12480	12344	9658	9016	9511	9445	8974	8760	9525	9982	9617	7608	5215	3871	2724	2050	163120			
20	1120	707	668	807	1647	5017	10129	12179	12855	12480	9655	9376	9546	9296	8556	9056	9473	9692	9433	7146	5151	4064	2759	1703	162515			
21	961	668	503	649	1265	4086	8287	10337	11901	9107	8448	9221	9609	9950	8597	8976	9132	8297	8150	5494	4010	3462	2890	1733	145733			
22	1172	803	561	470	627	1366	2603	4070	5723	6842	8435	8254	8727	7888	7559	8222	9165	9112	8413	5944	4863	4495	4150	3283	122747			
23	1954	1062	718	507	429	743	1676	3121	4998	6389	8004	9288	9832	9905	9515	9113	9221	8395	7078	6250	5346	3722	2480	1454	121200			
24	856	557	508	657	1451	4966	9590	11815	12341	11213	8869	8669	8474	9039	9950	8867	10013	10743	9646	6420	4446	3543	2266	1563	156462			
25	960	697	606	796	1539	5124	10046	12399	12595	11358	9923	9190	9158	9428	9773	9509	10092	10534	7700	6905	4846	4068	2835	1836	161917			
26	932	674	617	745	1498	5241	10101	12679	12514	12068	9758	9604	9562	9838	9882	9214	9861	10046	9968	7087	4944	3931	2838	1838	165440			
27	1021	764	560	781	1528	5008	10026	12232	12694	10961	9334	8983	9077	9505	8694	8567	7807	7914	8055	6666	4316	3529	2415	1493	151930			
28	963	662	492	577	1115	3499	7241	9235	10146	10476	8991	9147	9670	7868	6872	7236	8298	8527	8695	6569	4572	3872	3291	2485	140499			
29	1518	999	803	625	732	1547	3376	5082	6146	7490	8791	9403	9853	9345	9368	9522	9068	8749	8063	6196	4656	4041	3938	3315	132646			
30	2023	1282	798	639	413	679	1676	2763	3878	3665	6817	8138	9300	8639	7606	7683	7909	7653	6288	4354	3585	2483	1928	1313	103439			
31	860	569	431	610	1281	5118	9878	12408	11439	9565	8941	9810	9210	8887	8552	7457	4578	3756	3110	2209	1647	145254						

Average = 139348

Yearly Average = 128990

128990/139348 = 0.93

PUBLIC TRANSPORTATION SCHEDULES

Home > Schedules & Maps > Subway > Green Line

Green Line

 **Station Issue:** Access to the east entrance of North Station is available through a covered walkway. Legends Way is closed to pedestrian access.  **VIEW**

Schedule	Info and Maps
----------	---------------

Schedule for: Today 	Direction of your trip: Eastbound → Lechmere • 
---	--

Departing from:

Arriving at: (optional)

Eliot hours and frequencies
for today

OPEN - 9:00A	Every
First Departure at 05:01A	5-12 mins
9:00A - 3:30P	Every 5-8 mins
3:30P - 6:30P	Every 5-6 mins
6:30P - 8:00P	Every 7-9 mins
8:00P - CLOSE	Every 10- 11 mins

Last Departure at
12:11A

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Fares and Passes > Bus and Subway

Bus and Subway Fares

People aged 12 years or older who do not qualify for reduced fares will be charged the standard adult fare. If you are a student, senior, or someone with disabilities who qualifies for reduced fares, click on the correct category below to see applicable fares. People aged 11 and younger ride on MBTA services for free.

Adult	Student	Senior & Disabilities
-------	---------	-----------------------

Tip: If you would like information on purchasing more than one trip, click on the “Passes” tab below.

One Way	Passes
<p>Subway One Way</p> <p>CharlieCard \$2.25</p>	<p>Local Bus One Way</p> <p>CharlieCard \$1.70</p>

Valid for all Subway lines (includes Routes SL1 and SL2). Free transfers to Subway and Local Bus. Transfer to Inner Express Bus: \$1.75. Transfer to Outer Express Bus: \$3.00. Must be done within 2 hours of your original ride.

**CharlieTicket
or Cash
\$2.75**

Free transfer to Subway, Route SL4, and Route SL5 when done within 2 hours of purchasing a ticket.



Inner Express Bus

Valid for the Local Bus (includes Route SL4 and SL5). Free transfers to Local Bus. Transfer to Subway: \$0.55. Transfer to Inner Express Bus: \$2.30. Transfer to Outer Express Bus: \$3.55. Must be done within 2 hours of your original ride.

**CharlieTicket
or Cash
\$2.00**

Free transfer to one additional Local Bus included.



Outer Express Bus

VEHICLE TRAVEL SPEED DATA



Job
 Location
 Calculated By:
 Checked By:

Wellesley, MA
W of Site Drive
S.R.F.

Job # 7759
 Date 10/26/2017

Street: **Route 9 Eastbound**
 Direction: **Eastbound**

Speed Limit: **45**
 Time of Day **2:00 p.m.**
 Observations **100**

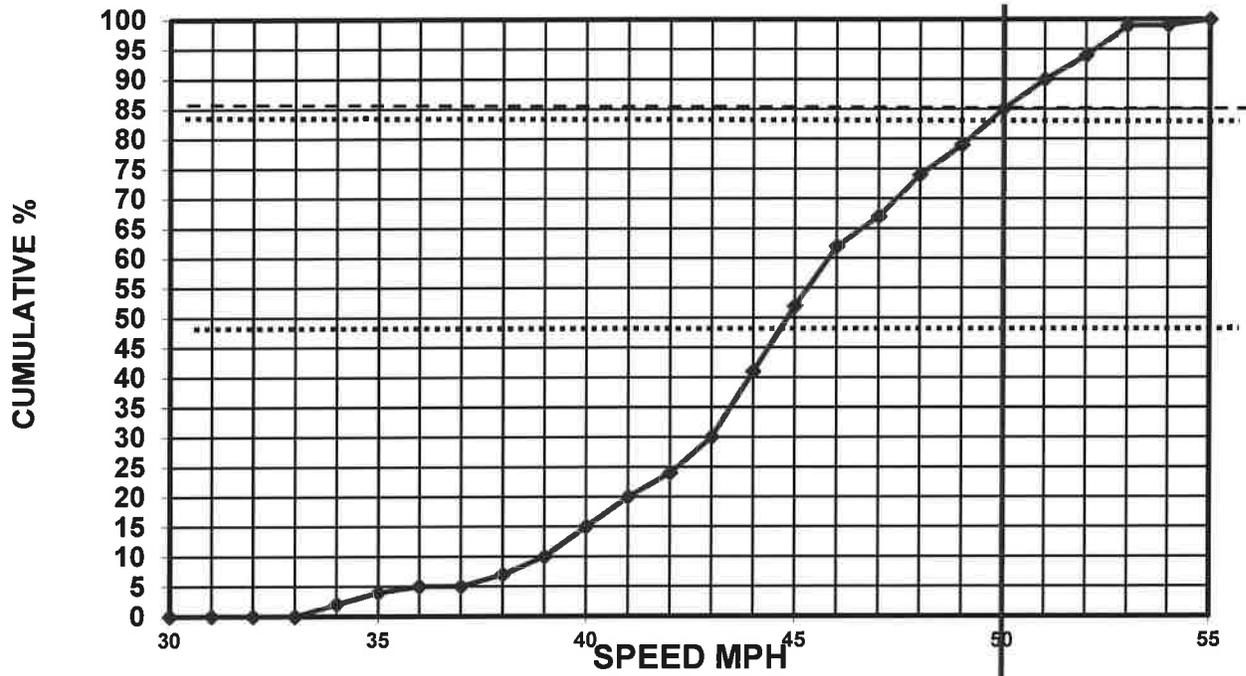
Speed	# of Observation	CUM. # Of OBS	% OF TOTAL OBS	CUM %
55	1	1	1	100
54	0	1	0	99
53	5	6	5	99
52	4	10	4	94
51	5	15	5	90
50	6	21	6	85
49	5	26	5	79
48	7	33	7	74
47	5	38	5	67
46	10	48	10	62
45	11	59	11	52
44	11	70	11	41
43	6	76	6	30
42	4	80	4	24
41	5	85	5	20
40	5	90	5	15
39	3	93	3	10
38	2	95	2	7
37	0	95	0	5
36	1	96	1	5
35	2	98	2	4
34	2	100	2	2
33				
32				
31				
30				
29				
28				
27				
26				
25				
24				
23				
22				
21				
20				

Average: **45.36**
 Comments: **85% = 50.0 m.p.h.**

Street: Route 9 Eastbound
Direction: Eastbound

Job # 7759
Date 10/26/2017

SPEED GRAPH





Job
Location
Calculated By:
Checked By:

Wellesey, MA
W of Site Drive
S.R.F.

Job # 7759
Date 10/26/2017

Street: **Route 9 Westbound**
Direction: **Westbound**

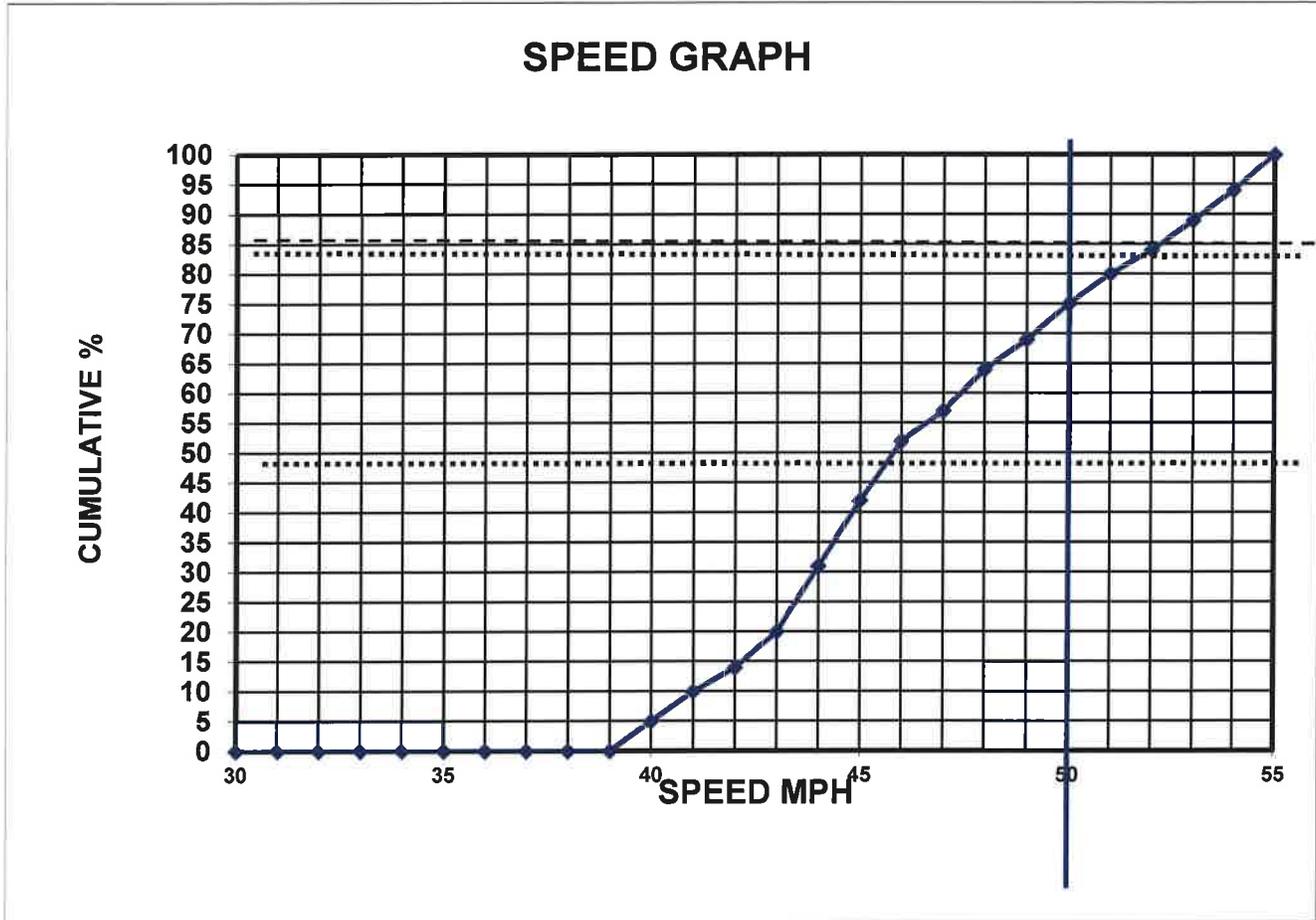
Speed Limit: **45**
Time of Day **2:00 p.m.**
Observations **100**

Speed	# of Observation	CUM. # Of OBS	% OF TOTAL OBS	CUM %
55	6	1	6	100
54	5	6	5	94
53	5	11	5	89
52	4	15	4	84
51	5	20	5	80
50	6	26	6	75
49	5	31	5	69
48	7	38	7	64
47	5	43	5	57
46	10	53	10	52
45	11	64	11	42
44	11	75	11	31
43	6	81	6	20
42	4	85	4	14
41	5	90	5	10
40	5	95	5	5
39	0	95	0	0
38	0	95	0	0
37	0	95	0	0
36	0	95	0	0
35	0	95	0	0
34	0	95	0	0
33				
32				
31				
30				
29				
28				
27				
26				
25				
24				
23				
22				
21				
20				

Average: 47.14
Comments: 85% = 53.0 m.p.h.

Street: Route 9 Westbound
Direction: Westbound

Job # 7759
Date 10/26/2017



MASSDOT CRASH RATE WORKSHEETS

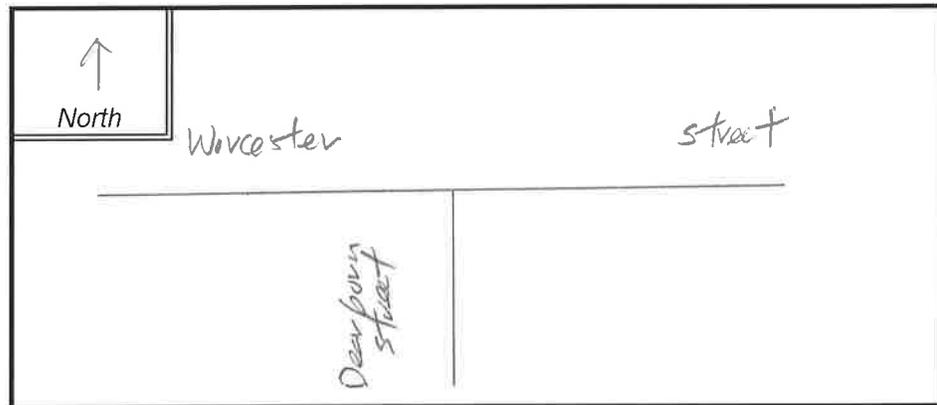
INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Wellesley COUNT DATE : Oct-17
 DISTRICT : 6 UNSIGNALIZED : SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Worcester Street
 MINOR STREET(S) : Dearborn Street

**INTERSECTION
 DIAGRAM**
 (Label Approaches)



PEAK HOUR VOLUMES

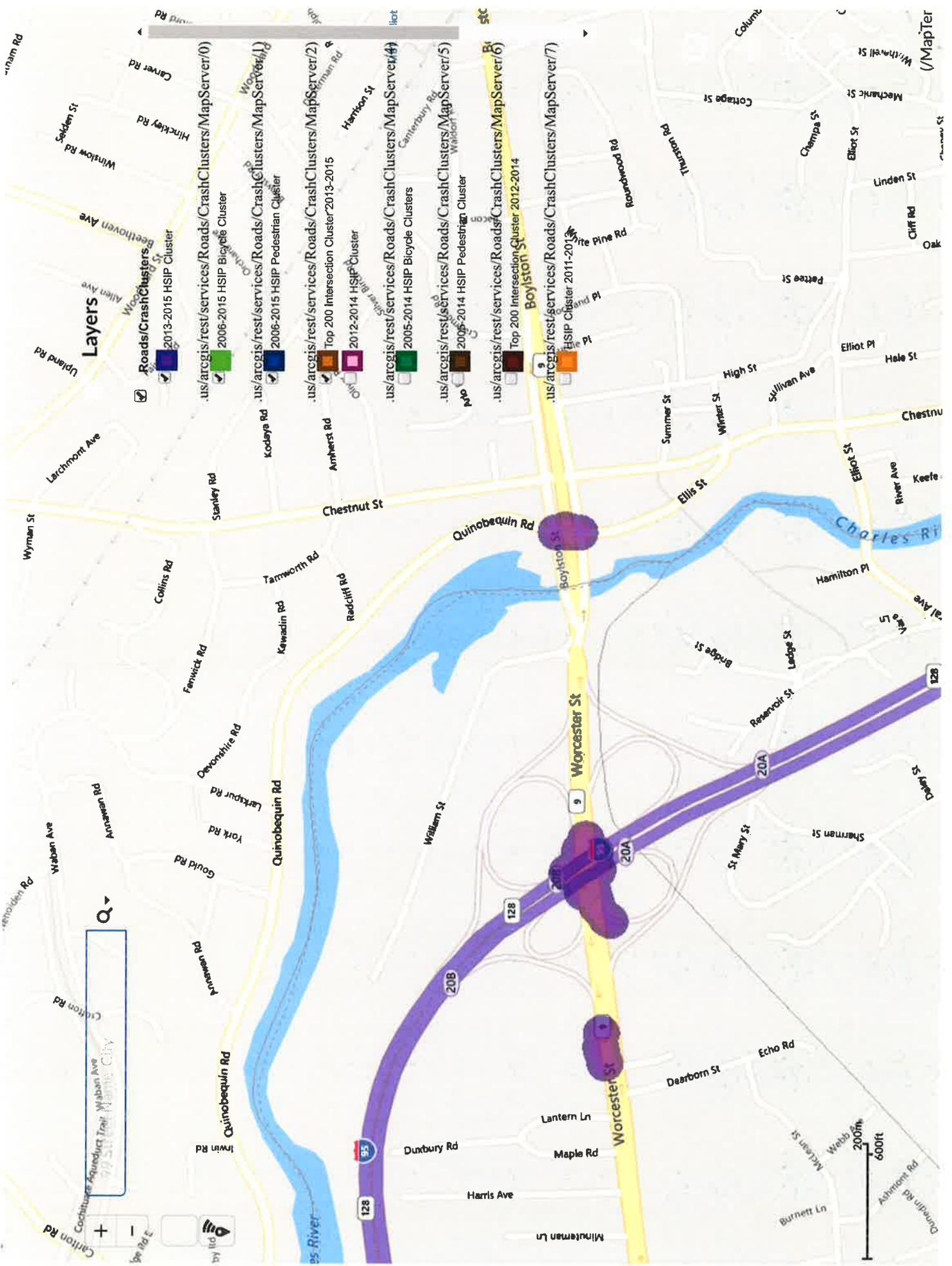
APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	NB	SB		
PEAK HOURLY VOLUMES (PM) :	1,951		15			1,966

" K " FACTOR : INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME :

TOTAL # OF CRASHES : # OF YEARS : AVERAGE # OF CRASHES PER YEAR (A) :

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

Comments : Below MassDOT District 6 crash rate
 Project Title & Date: Proposed Residential Development October 2017



Layers

- Roads/CrashClusters
- 2013-2015 HSIP Cluster
- 2006-2015 HSIP Bicycle Cluster
- 2006-2015 HSIP Pedestrian Cluster
- Top 200 Intersection Cluster 2013-2015
- 2012-2014 HSIP Cluster
- 2005-2014 HSIP Bicycle Clusters
- 2005-2014 HSIP Pedestrian Clusters
- Top 200 Intersection Cluster 2012-2014
- HSIP Cluster 2011-2013

Q

Codcutture Aqueduct Trail Waban Ave
77 State Street
Worcester, MA 01608

200ft
600ft

(MapTer

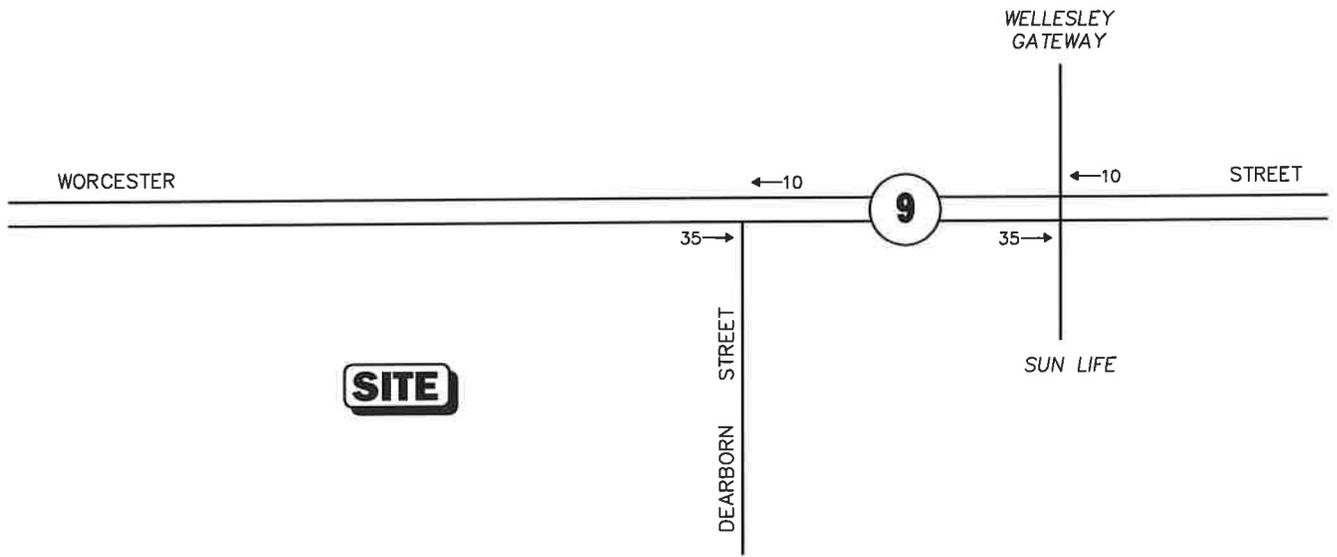
GENERAL BACKGROUND TRAFFIC GROWTH

General Background Traffic Growth - Daily Traffic Volumes

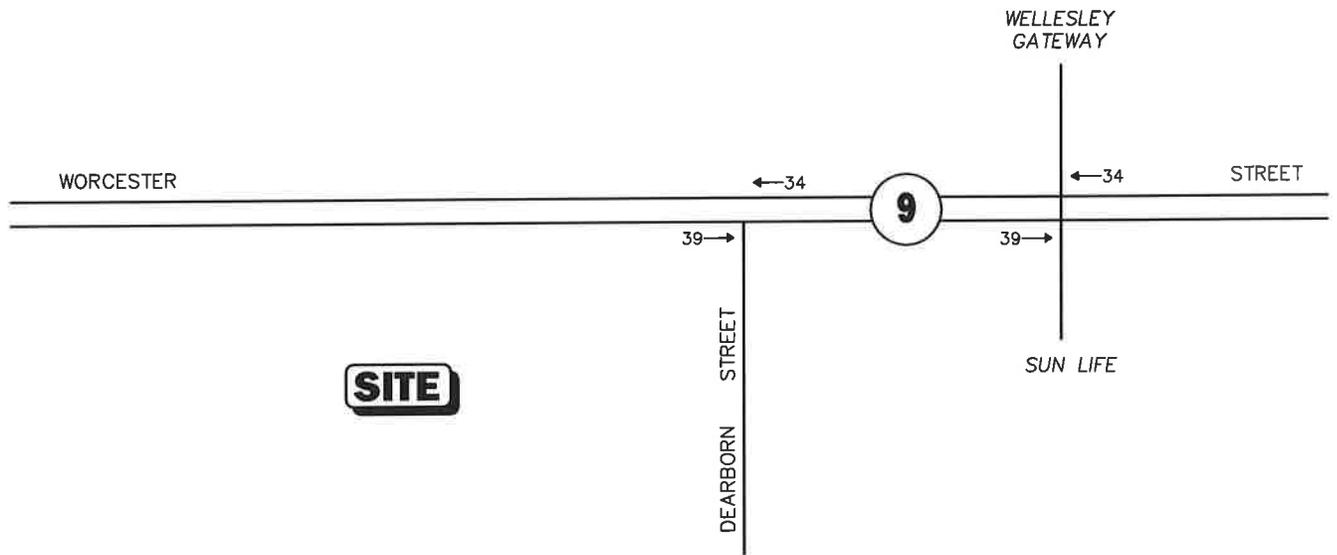
CITY/TOWN	ROUTE/STREET	LOCATION	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average Annual
Wellesley	I-95 (Sta. H18502)	0.5 mile south of Quinobequin Road				140,103	142,637	138,622	137,065	146,696	135,694	133,634	128,990	-1.49%

BACKGROUND DEVELOPMENT TRAFFIC-VOLUME NETWORKS

WEEKDAY MORNING PEAK HOUR (8:00 - 9:00AM)



WEEKDAY EVENING PEAK HOUR (4:45 - 5:45PM)



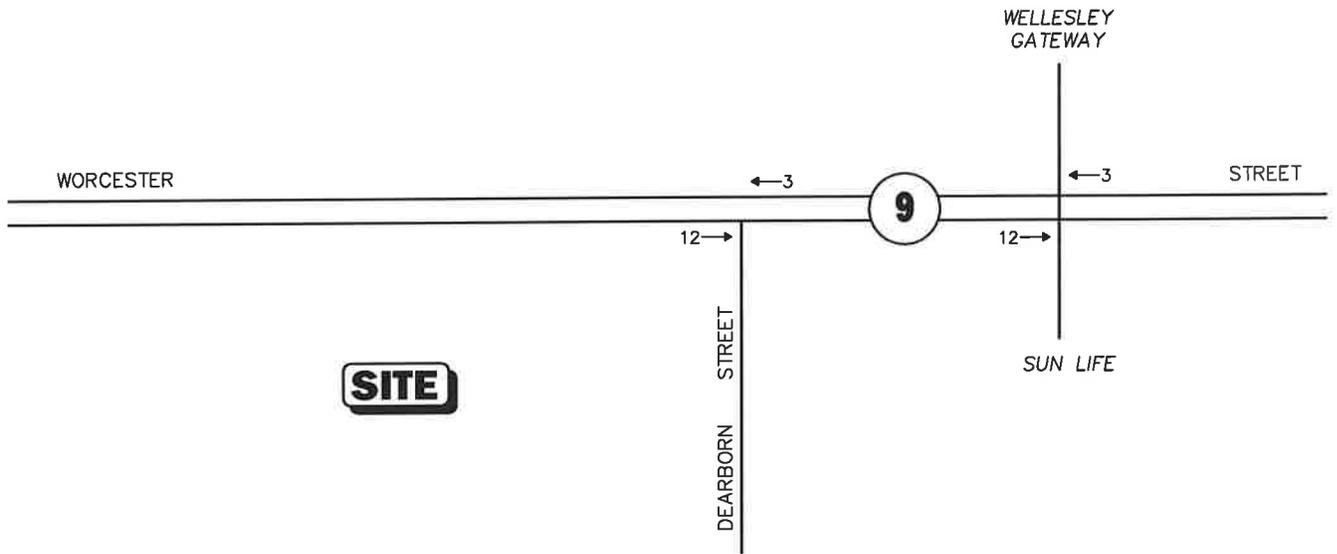
Not To Scale



Figure A-1

Proposed Sports Complex
900 Worcester Street
Weekday
Peak Hour Traffic Volumes

WEEKDAY MORNING PEAK HOUR (8:00 - 9:00AM)



WEEKDAY EVENING PEAK HOUR (4:45 - 5:45PM)

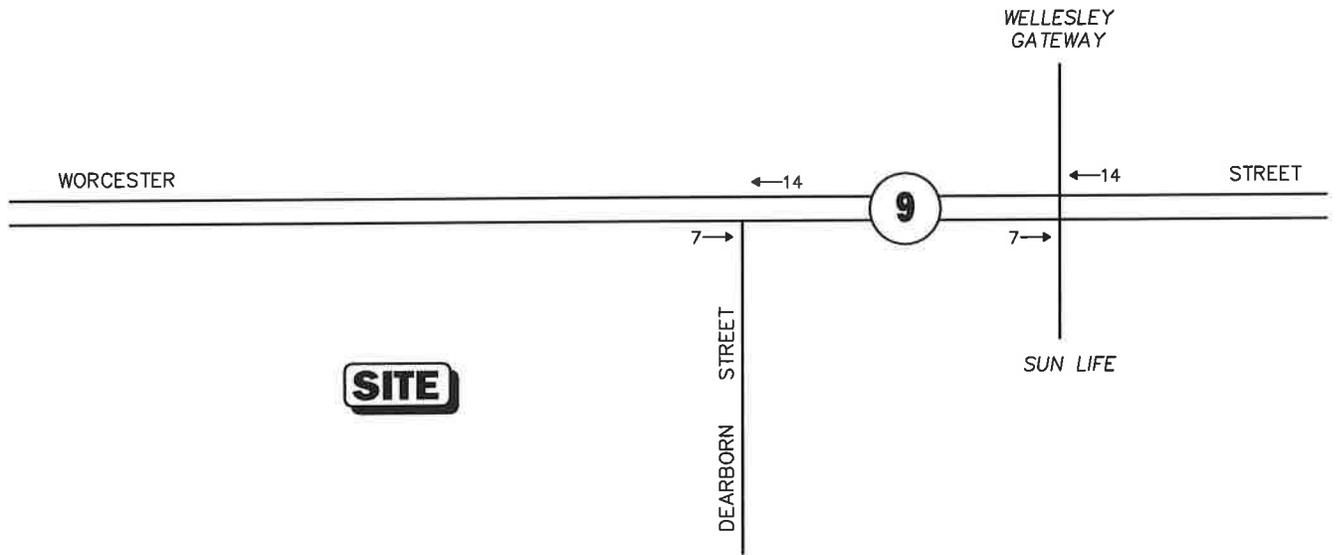
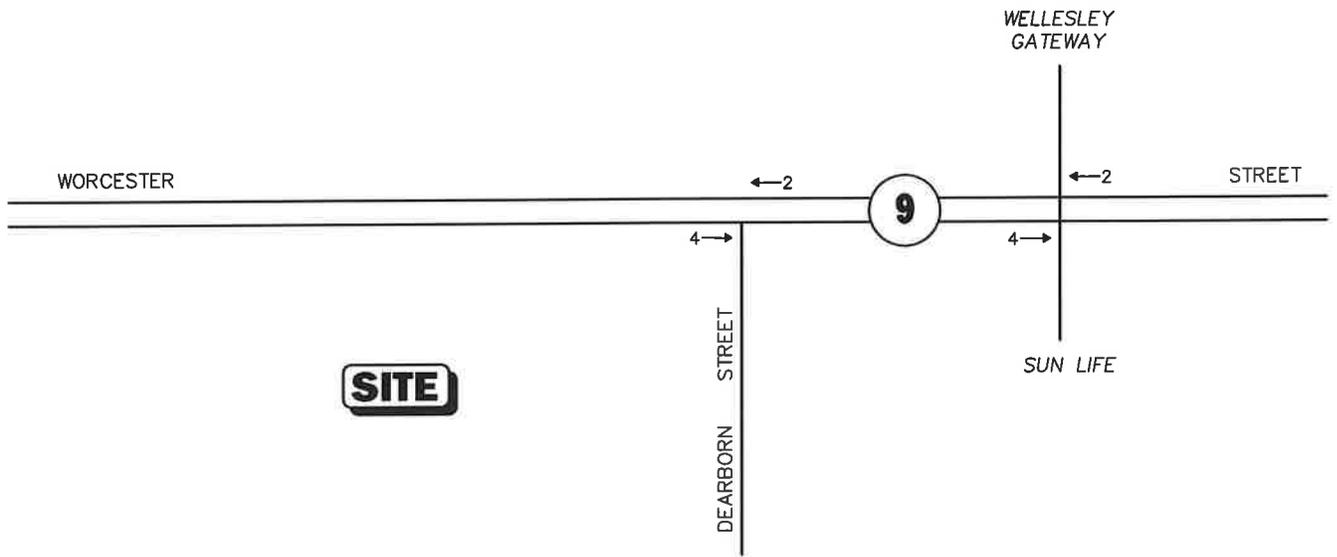


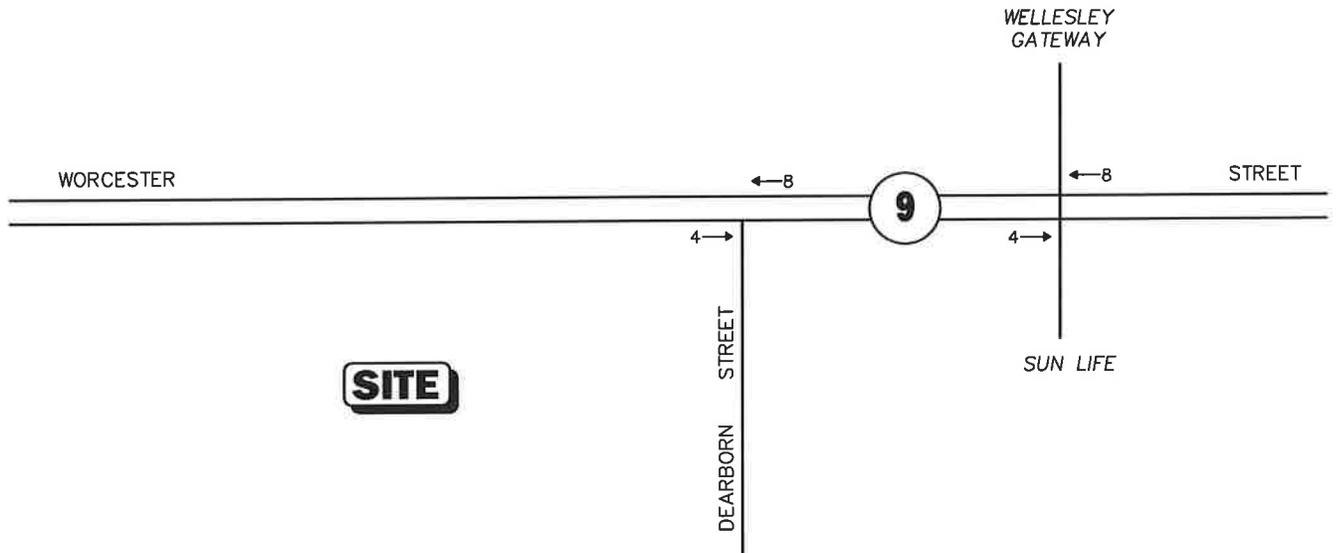
Figure A-2

**Proposed Wellesley Square Residences
Weekday
Peak Hour Traffic Volumes**

WEEKDAY MORNING PEAK HOUR (8:00 - 9:00AM)



WEEKDAY EVENING PEAK HOUR (4:45 - 5:45PM)



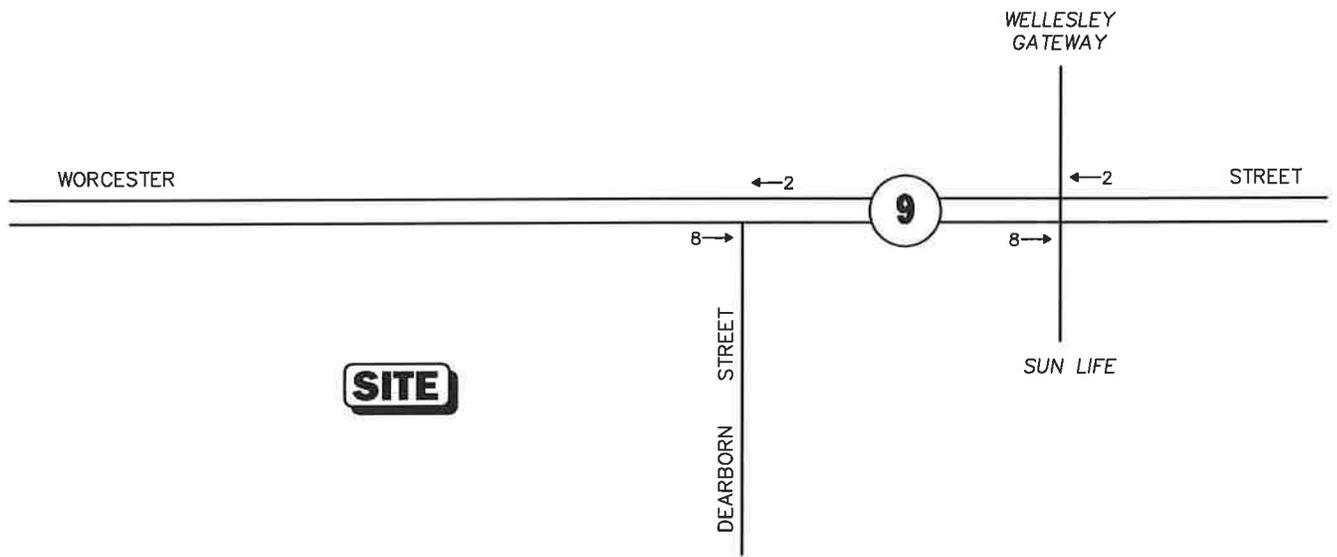
Not To Scale



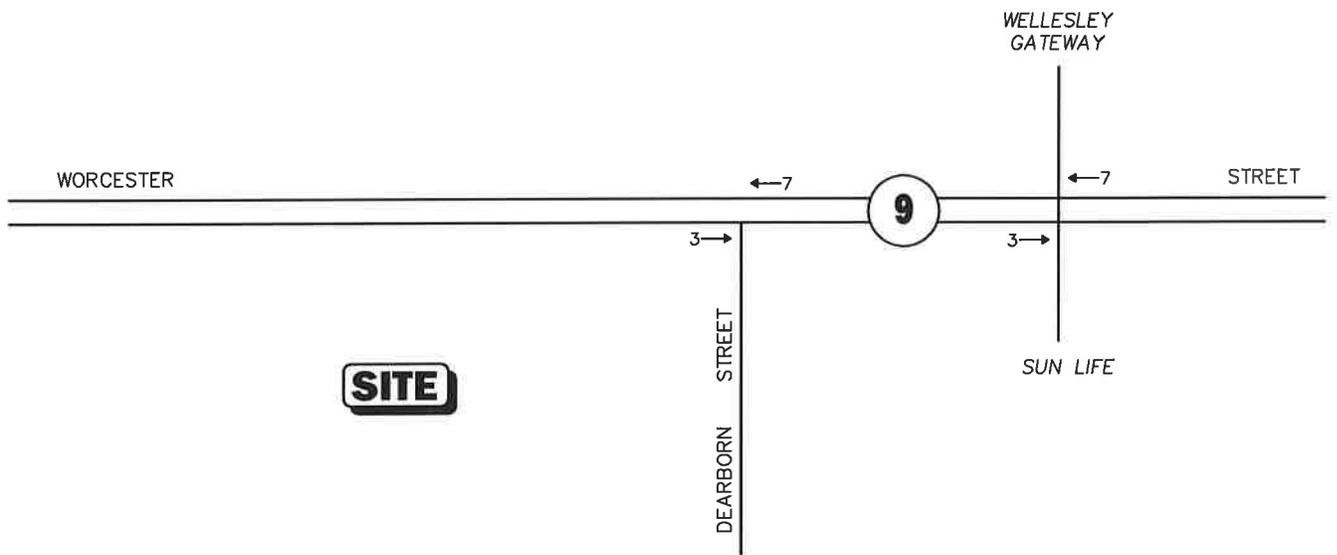
Figure A-3

**Proposed Residential Development
680 Worcester Street
Weekday
Peak Hour Traffic Volumes**

WEEKDAY MORNING PEAK HOUR (8:00 - 9:00AM)



WEEKDAY EVENING PEAK HOUR (4:45 - 5:45PM)



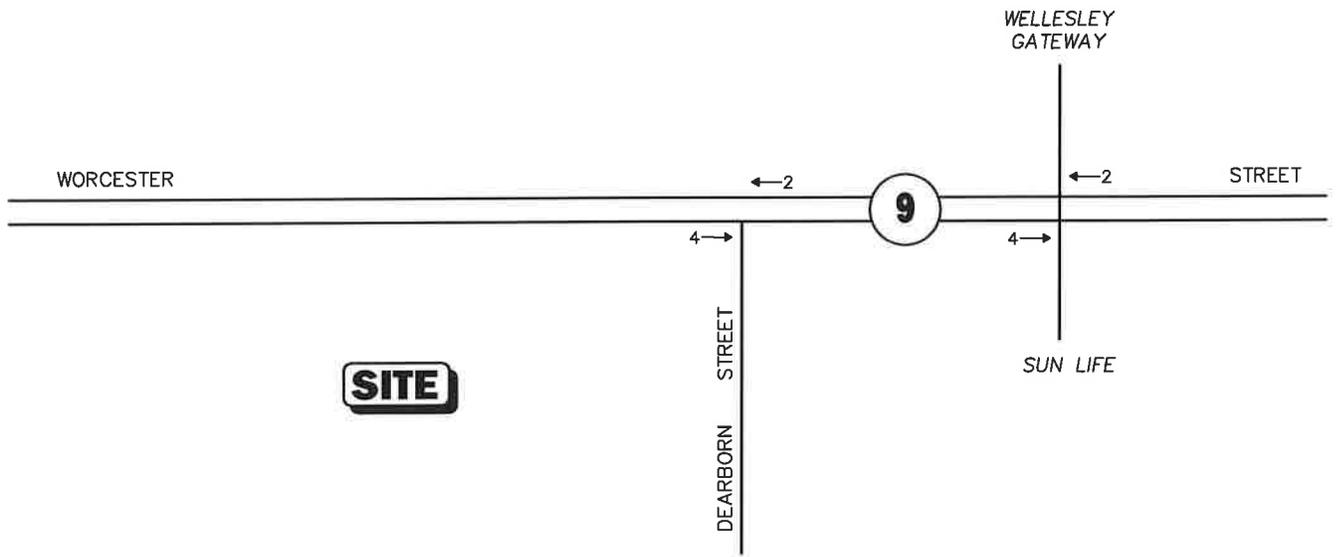
Not To Scale

WAI Vanasse & Associates, Inc.
Transportation Engineers & Planners

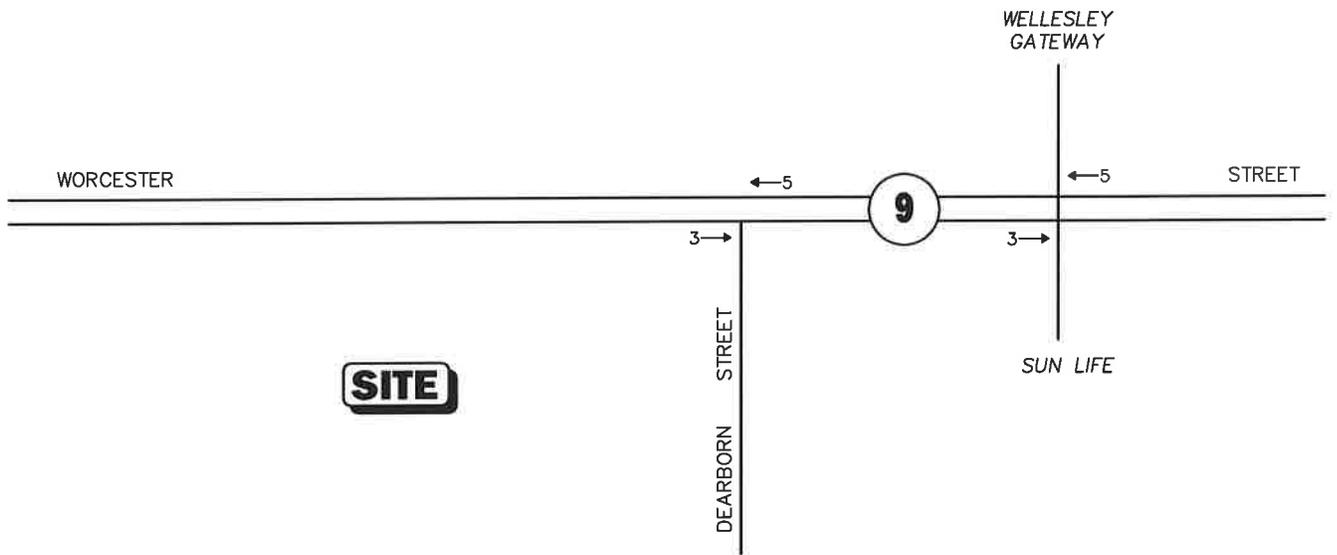
Figure A-4

Proposed Stearns Road
Residences
Weekday
Peak Hour Traffic Volumes

WEEKDAY MORNING PEAK HOUR (8:00 - 9:00AM)



WEEKDAY EVENING PEAK HOUR (4:45 - 5:45PM)



Not To Scale



Figure A-5

Proposed Wellesley Park Residential Development
Weekday
Peak Hour Traffic Volumes

TRIP-GENERATION CALCULATIONS

Multifamily Housing (Mid-Rise) (221)

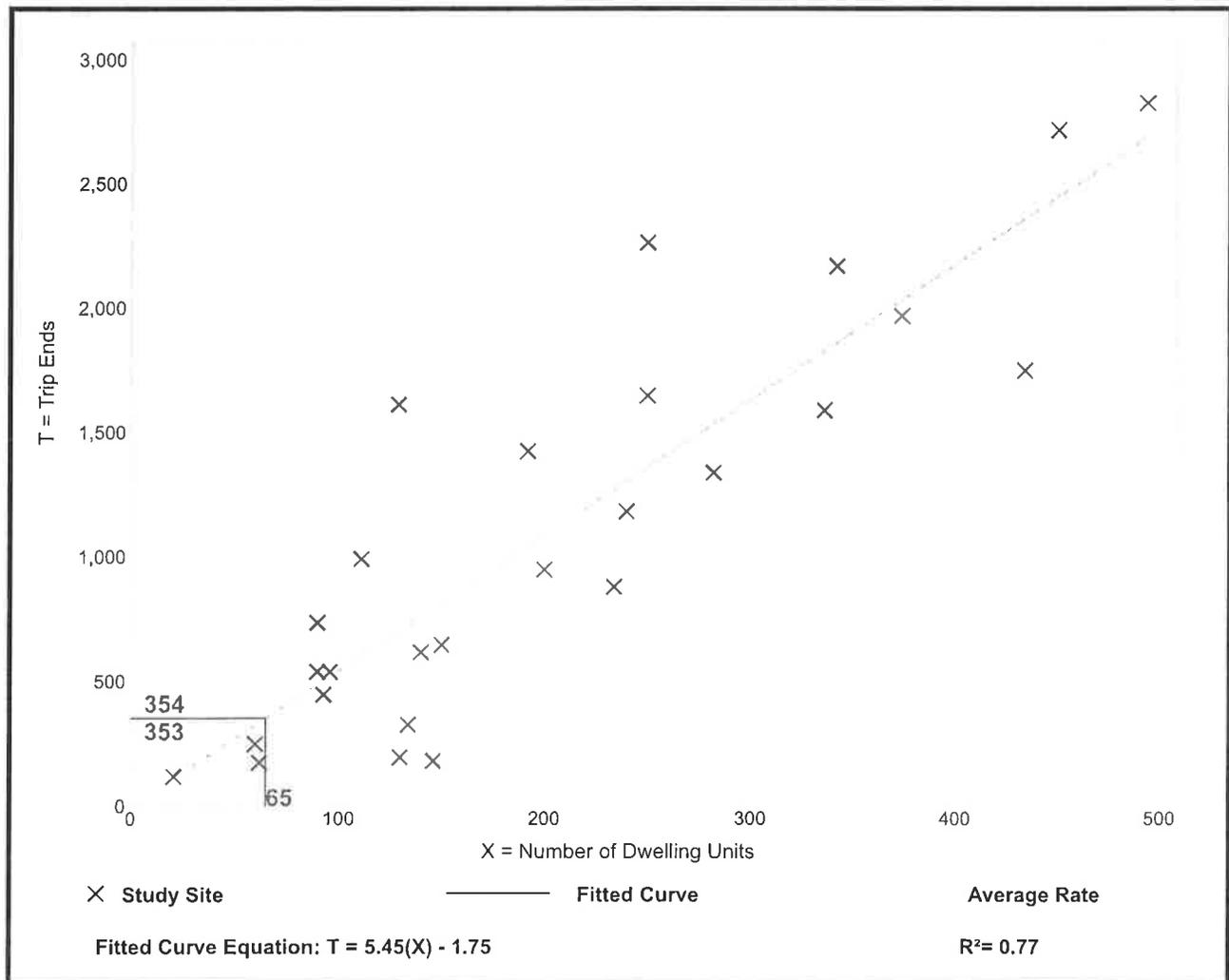
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 27
Avg. Num. of Dwelling Units: 205
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
5.44	1.27 - 12.50	2.03

Data Plot and Equation



Multifamily Housing (Mid-Rise) (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: 53

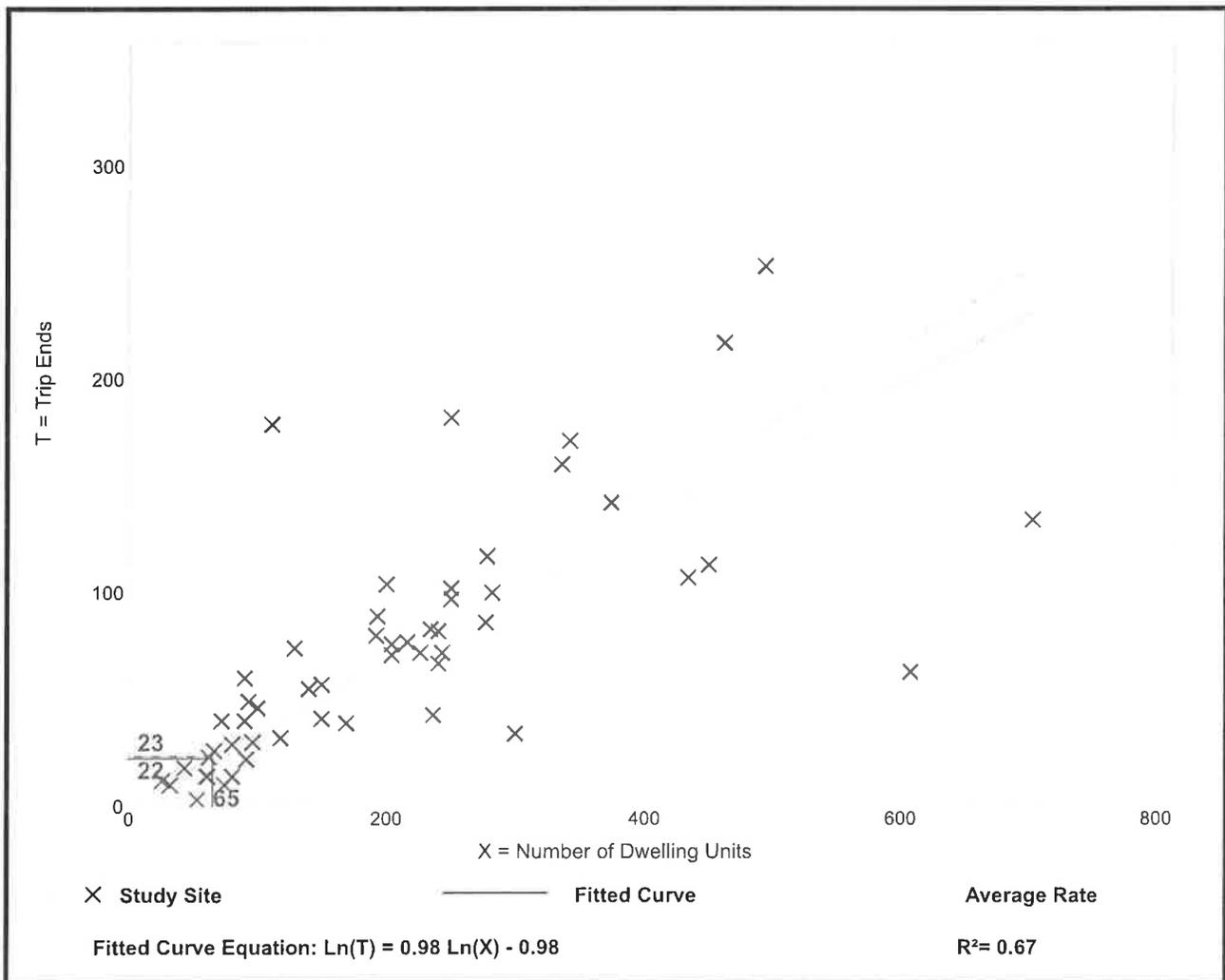
Avg. Num. of Dwelling Units: 207

Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.36	0.06 - 1.61	0.19

Data Plot and Equation



Multifamily Housing (Mid-Rise) (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: 60

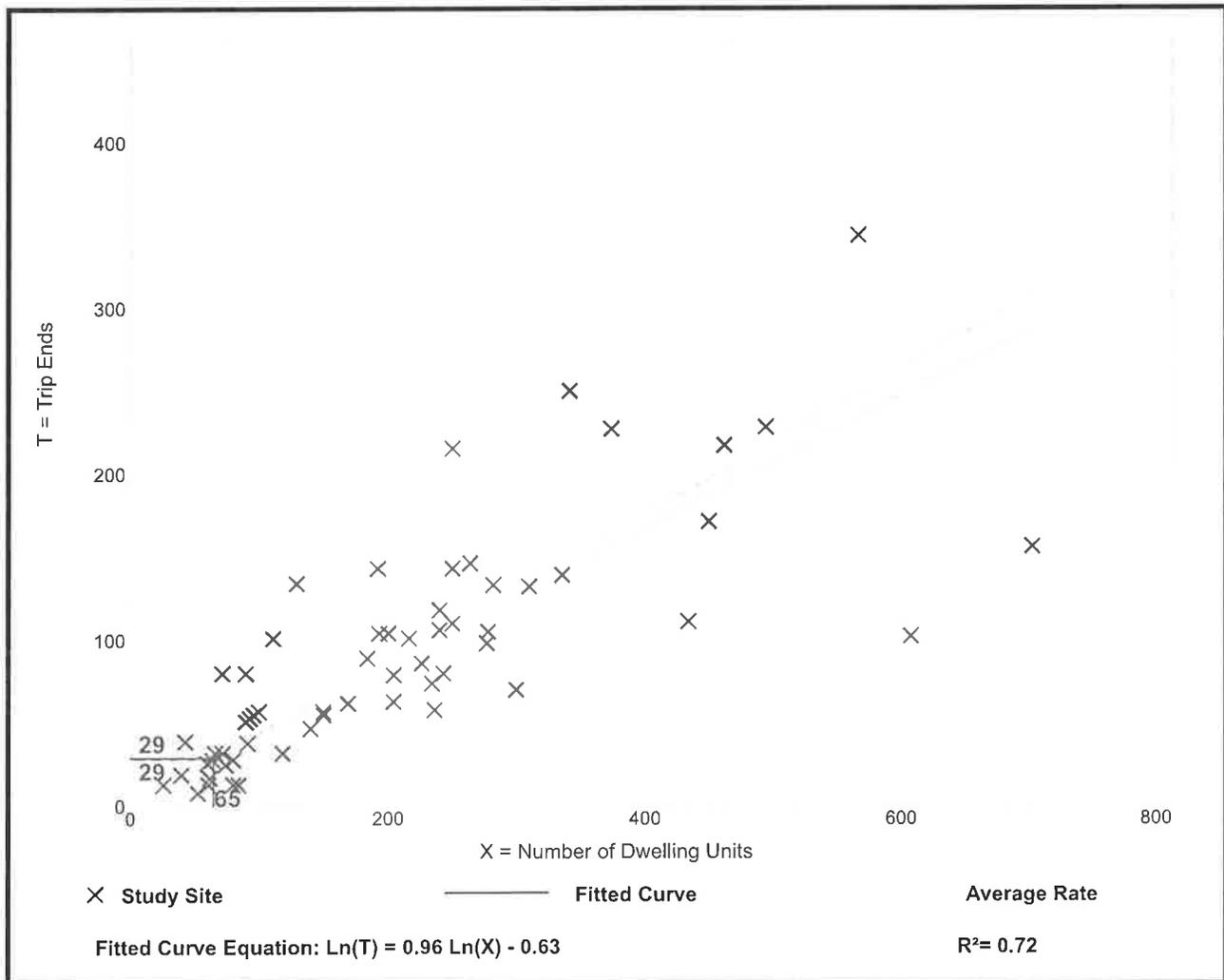
Avg. Num. of Dwelling Units: 208

Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.44	0.15 - 1.11	0.19

Data Plot and Equation



JOURNEY TO WORK TRIP DISTRIBUTION

Proposed Residential Development- Wellesley, MA

Residence		Workplace		Worcester Street (East)	Worcester Street (West)
Massachusetts	Wellesley town	Wellesley town		1177	3532
Massachusetts	Wellesley town	Boston city		2193	
Massachusetts	Wellesley town	Cambridge city		616	
Massachusetts	Wellesley town	Newton city		474	
Massachusetts	Wellesley town	Needham town		276	
Massachusetts	Wellesley town	Waltham city		265	
Massachusetts	Wellesley town	Framingham town		238	238
Massachusetts	Wellesley town	Brookline town		224	
Massachusetts	Wellesley town	Weston town		223	223
Massachusetts	Wellesley town	Natick town		199	199
Massachusetts	Wellesley town	Marlborough city		128	128
Massachusetts	Wellesley town	Westwood town		105	
Massachusetts	Wellesley town	Worcester city		101	101
Massachusetts	Wellesley town	Braintree Town city		99	
Massachusetts	Wellesley town	Weymouth Town city		84	
Massachusetts	Wellesley town	Watertown Town city		77	
Massachusetts	Wellesley town	Norwood town		64	
Massachusetts	Wellesley town	Lexington town		60	
Massachusetts	Wellesley town	Billerica town		55	
Massachusetts	Wellesley town	Lowell city		54	
Massachusetts	Wellesley town	Quincy city		54	
Massachusetts	Wellesley town	Foxborough town		52	
Massachusetts	Wellesley town	Dedham town		50	
Massachusetts	Wellesley town	Franklin Town city		49	
		10,449	6,015	4,421	

SAY 58% 42%
60% 40%

CAPACITY ANALYSIS WORKSHEETS

- Worcester Street at Sunlife Park and Wellesley Gateway
- Worcester Street at Dearborn Street
- Worcester Street at the East Project Site Driveway
- Worcester Street at the West Project Site driveway

Worcester Street at Sunlife Park and Wellesley Gateway

2017 Existing Wkdy AM

1: Sunlife Park/Wellesley Gateway & Worcester Street

10/27/2017

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	39	66	1975	132	112	1790	231	5	1	10	29	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	12	11	11	11	12	12	12	12	12
Storage Length (ft)		250		0	210		210	0		275	110	
Storage Lanes		1		0	1		1	0		1	1	
Taper Length (ft)		25			25			25			25	
Satd. Flow (prot)	0	1745	4923	0	1694	4916	1546	0	1824	1346	1504	1790
Flt Permitted		0.950			0.950				0.960		0.950	0.998
Satd. Flow (perm)	0	1745	4923	0	1694	4916	1546	0	1824	1346	1504	1790
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)			15				251			126		
Link Speed (mph)			30			30			30			30
Link Distance (ft)			201			1147			598			289
Travel Time (s)			4.6			26.1			13.6			6.6
Peak Hour Factor	0.91	0.91	0.91	0.91	0.92	0.92	0.92	0.50	0.50	0.50	0.84	0.84
Heavy Vehicles (%)	0%	0%	1%	0%	3%	2%	1%	0%	0%	20%	14%	0%
Shared Lane Traffic (%)											10%	
Lane Group Flow (vph)	0	116	2315	0	122	1946	251	0	12	20	31	85
Turn Type	Prot	Prot	NA		Prot	NA	pm+ov	Split	NA	pm+ov	Split	NA
Protected Phases	7!	7	4		3	8	6	2	2	3	6	6
Permitted Phases							8			2		
Detector Phase	7	7	4		3	8	6	2	2	3	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	23.0		10.0	23.0	21.0	21.0	21.0	10.0	21.0	21.0
Total Split (s)	16.0	16.0	86.0		18.0	88.0	14.0	12.0	12.0	18.0	14.0	14.0
Total Split (%)	12.3%	12.3%	66.2%		13.8%	67.7%	10.8%	9.2%	9.2%	13.8%	10.8%	10.8%
Yellow Time (s)	4.0	4.0	5.0		4.0	5.0	3.0	3.0	3.0	4.0	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	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-1.0		-1.0	-2.0	-1.0	-1.0
Total Lost Time (s)		4.0	5.0		4.0	5.0	4.0		4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lead		Lag	Lag				Lag		
Lead-Lag Optimize?												
Recall Mode	None	None	C-Max		None	C-Max	None	None	None	None	None	None
Act Effct Green (s)		13.1	87.8		14.0	88.7	102.5		7.3	18.8	10.4	10.4
Actuated g/C Ratio		0.10	0.68		0.11	0.68	0.79		0.06	0.14	0.08	0.08
v/c Ratio		0.66	0.70		0.67	0.58	0.20		0.12	0.07	0.26	0.60
Control Delay		74.5	15.1		74.4	12.4	0.7		60.5	0.4	61.9	75.3
Queue Delay		0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay		74.5	15.1		74.4	12.4	0.7		60.5	0.4	61.9	75.3
LOS		E	B		E	B	A		E	A	E	E
Approach Delay			17.9			14.4			22.9			67.1
Approach LOS			B			B			C			E
Queue Length 50th (ft)		93	372		100	295	0		10	0	26	72
Queue Length 95th (ft)		#188	534		#184	381	10		17	0	57	#127
Internal Link Dist (ft)			121			1067			518			209
Turn Bay Length (ft)		250			210		210			275	110	
Base Capacity (vph)		179	3330		182	3353	1274		112	302	123	147

2017 Existing Wkdy AM

1: Sunlife Park/Wellesley Gateway & Worcester Street

10/27/2017



Lane Group	SBR
Lane Configurations	7
Volume (vph)	7
Ideal Flow (vphpl)	1900
Lane Width (ft)	12
Storage Length (ft)	110
Storage Lanes	1
Taper Length (ft)	
Satd. Flow (prot)	1417
Flt Permitted	
Satd. Flow (perm)	1417
Right Turn on Red	Yes
Satd. Flow (RTOR)	134
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.84
Heavy Vehicles (%)	14%
Shared Lane Traffic (%)	
Lane Group Flow (vph)	8
Turn Type	pm+ov
Protected Phases	7!
Permitted Phases	6
Detector Phase	7
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	10.0
Total Split (s)	16.0
Total Split (%)	12.3%
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	-2.0
Total Lost Time (s)	4.0
Lead/Lag	Lead
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	27.5
Actuated g/C Ratio	0.21
v/c Ratio	0.02
Control Delay	0.1
Queue Delay	0.0
Total Delay	0.1
LOS	A
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	
Turn Bay Length (ft)	110
Base Capacity (vph)	407

2017 Existing Wkdy AM

1: Sunlife Park/Wellesley Gateway & Worcester Street

10/27/2017

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
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		0.65	0.70		0.67	0.58	0.20		0.11	0.07	0.25	0.58

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 113 (87%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 17.5

Intersection LOS: B

Intersection Capacity Utilization 67.4%

ICU Level of Service C

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

! Phase conflict between lane groups.

Splits and Phases: 1: Sunlife Park/Wellesley Gateway & Worcester Street

02	06	04 (R)	03
12 s	14 s	86 s	18 s
	07	08 (R)	
	16 s	88 s	

2017 Existing Wkdy PM

1: Sunlife Park/Wellesley Gateway & Worcester Street

10/27/2017

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	23	6	1926	9	23	1979	40	95	1	188	190	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	12	11	11	11	12	12	12	12	12
Storage Length (ft)		250		0	210		210	0		275	110	
Storage Lanes		1		0	1		1	0		1	1	
Taper Length (ft)		25			25			25			25	
Satd. Flow (prot)	0	1745	4960	0	1745	4964	1561	0	1811	1615	1715	1722
Flt Permitted		0.950			0.950				0.953		0.950	0.954
Satd. Flow (perm)	0	1745	4960	0	1745	4964	1561	0	1811	1615	1715	1722
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)			1				67			126		
Link Speed (mph)			30			30			30			30
Link Distance (ft)			201			1147			598			289
Travel Time (s)			4.6			26.1			13.6			6.6
Peak Hour Factor	0.93	0.93	0.93	0.93	0.98	0.98	0.98	0.86	0.86	0.86	0.83	0.83
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)											49%	
Lane Group Flow (vph)	0	31	2081	0	23	2019	41	0	111	219	117	117
Turn Type	Prot	Prot	NA		Prot	NA	pm+ov	Split	NA	pm+ov	Split	NA
Protected Phases	7!	7	4		3	8	6	2	2	3	6	6
Permitted Phases							8			2		
Detector Phase	7	7	4		3	8	6	2	2	3	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	23.0		10.0	23.0	21.0	21.0	21.0	10.0	21.0	21.0
Total Split (s)	14.0	14.0	82.0		13.0	81.0	18.0	17.0	17.0	13.0	18.0	18.0
Total Split (%)	10.8%	10.8%	63.1%		10.0%	62.3%	13.8%	13.1%	13.1%	10.0%	13.8%	13.8%
Yellow Time (s)	4.0	4.0	5.0		4.0	5.0	3.0	3.0	3.0	4.0	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	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-1.0		-1.0	-2.0	-1.0	-1.0
Total Lost Time (s)		4.0	5.0		4.0	5.0	4.0		4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lead		Lag	Lag				Lag		
Lead-Lag Optimize?												
Recall Mode	None	None	C-Max		None	C-Max	None	None	None	None	None	None
Act Effct Green (s)		9.2	78.9		9.0	78.8	92.7		12.1	25.1	13.0	13.0
Actuated g/C Ratio		0.07	0.61		0.07	0.61	0.71		0.09	0.19	0.10	0.10
v/c Ratio		0.25	0.69		0.19	0.67	0.04		0.66	0.53	0.69	0.68
Control Delay		62.1	19.1		61.1	18.9	0.3		75.7	24.7	76.9	76.6
Queue Delay		0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay		62.1	19.1		61.1	18.9	0.3		75.7	24.7	76.9	76.6
LOS		E	B		E	B	A		E	C	E	E
Approach Delay			19.8			19.0			41.8			54.9
Approach LOS			B			B			D			D
Queue Length 50th (ft)		25	428		19	413	0		91	67	101	101
Queue Length 95th (ft)		59	484		49	469	2		149	137	156	156
Internal Link Dist (ft)			121			1067			518			209
Turn Bay Length (ft)		250			210		210			275	110	
Base Capacity (vph)		134	3012		120	3008	1144		181	413	184	185

Lane Group	SBR
Lane Configurations	7
Volume (vph)	84
Ideal Flow (vphpl)	1900
Lane Width (ft)	12
Storage Length (ft)	110
Storage Lanes	1
Taper Length (ft)	
Satd. Flow (prot)	1615
Flt Permitted	
Satd. Flow (perm)	1615
Right Turn on Red	Yes
Satd. Flow (RTOR)	134
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.83
Heavy Vehicles (%)	0%
Shared Lane Traffic (%)	
Lane Group Flow (vph)	101
Turn Type	pm+ov
Protected Phases	7!
Permitted Phases	6
Detector Phase	7
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	10.0
Total Split (s)	14.0
Total Split (%)	10.8%
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	-2.0
Total Lost Time (s)	4.0
Lead/Lag	Lead
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	26.1
Actuated g/C Ratio	0.20
v/c Ratio	0.23
Control Delay	4.1
Queue Delay	0.0
Total Delay	4.1
LOS	A
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	0
Queue Length 95th (ft)	15
Internal Link Dist (ft)	
Turn Bay Length (ft)	110
Base Capacity (vph)	440

2017 Existing Wkdy PM

1: Sunlife Park/Wellesley Gateway & Worcester Street

10/27/2017

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
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		0.23	0.69		0.19	0.67	0.04		0.61	0.53	0.64	0.63

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 128 (98%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 23.4

Intersection LOS: C

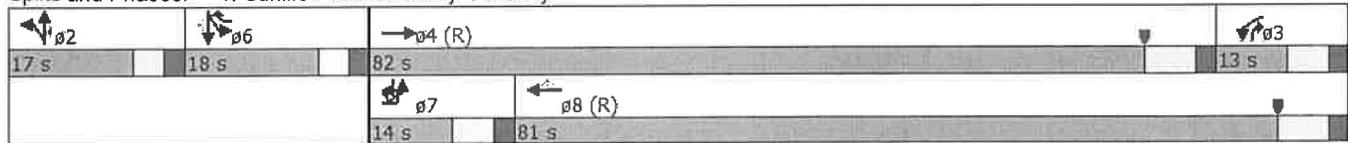
Intersection Capacity Utilization 65.3%

ICU Level of Service C

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 1: Sunlife Park/Wellesley Gateway & Worcester Street



2024 No-Build Wkdy AM

1: Sunlife Park/Wellesley Gateway & Worcester Street

10/27/2017

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	42	66	2180	132	112	1938	231	5	1	10	29	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	12	11	11	11	12	12	11	12	12
Storage Length (ft)		250		0	210		210	0		275	110	
Storage Lanes		1		0	1		1	0		2	1	
Taper Length (ft)		25			25			25			25	
Satd. Flow (prot)	0	1745	4923	0	1694	4916	1546	0	1824	2290	1504	1790
Flt Permitted		0.950			0.950				0.960		0.950	0.998
Satd. Flow (perm)	0	1745	4923	0	1694	4916	1546	0	1824	2290	1504	1790
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)			14				251			126		
Link Speed (mph)			30			30			30			30
Link Distance (ft)			201			1147			598			289
Travel Time (s)			4.6			26.1			13.6			6.6
Peak Hour Factor	0.91	0.91	0.91	0.91	0.92	0.92	0.92	0.50	0.50	0.50	0.84	0.84
Heavy Vehicles (%)	0%	0%	1%	0%	3%	2%	1%	0%	0%	20%	14%	0%
Shared Lane Traffic (%)											10%	
Lane Group Flow (vph)	0	119	2541	0	122	2107	251	0	12	20	31	85
Turn Type	Prot	Prot	NA		Prot	NA	pm+ov	Split	NA	pm+ov	Split	NA
Protected Phases	7!	7	4		3	8	6	2	2	3	6	6
Permitted Phases							8			2		
Detector Phase	7	7	4		3	8	6	2	2	3	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	23.0		10.0	23.0	21.0	21.0	21.0	10.0	21.0	21.0
Total Split (s)	16.0	16.0	86.0		18.0	88.0	14.0	12.0	12.0	18.0	14.0	14.0
Total Split (%)	12.3%	12.3%	66.2%		13.8%	67.7%	10.8%	9.2%	9.2%	13.8%	10.8%	10.8%
Yellow Time (s)	4.0	4.0	5.0		4.0	5.0	3.0	3.0	3.0	4.0	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	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-1.0		-1.0	-2.0	-1.0	-1.0
Total Lost Time (s)		4.0	5.0		4.0	5.0	4.0		4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lead		Lag	Lag				Lag		
Lead-Lag Optimize?												
Recall Mode	None	None	C-Max		None	C-Max	None	None	None	None	None	None
Act Effct Green (s)		13.3	87.8		14.0	88.5	102.3		7.3	18.8	10.4	10.4
Actuated g/C Ratio		0.10	0.68		0.11	0.68	0.79		0.06	0.14	0.08	0.08
v/c Ratio		0.67	0.76		0.67	0.63	0.20		0.12	0.05	0.26	0.60
Control Delay		74.8	17.0		74.4	13.3	0.7		60.5	0.2	61.9	75.3
Queue Delay		0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay		74.8	17.0		74.4	13.3	0.7		60.5	0.2	61.9	75.3
LOS		E	B		E	B	A		E	A	E	E
Approach Delay			19.5			15.1			22.8			67.1
Approach LOS			B			B			C			E
Queue Length 50th (ft)		95	447		100	341	0		10	0	26	72
Queue Length 95th (ft)		#195	639		#184	434	10		17	0	57	#127
Internal Link Dist (ft)			121			1067			518			209
Turn Bay Length (ft)		250			210		210			275	110	
Base Capacity (vph)		180	3330		182	3347	1273		112	439	123	147

Lane Group	SBR
Lane Configurations	7
Volume (vph)	7
Ideal Flow (vphpl)	1900
Lane Width (ft)	12
Storage Length (ft)	110
Storage Lanes	1
Taper Length (ft)	
Satd. Flow (prot)	1417
Flt Permitted	
Satd. Flow (perm)	1417
Right Turn on Red	Yes
Satd. Flow (RTOR)	134
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.84
Heavy Vehicles (%)	14%
Shared Lane Traffic (%)	
Lane Group Flow (vph)	8
Turn Type	pm+ov
Protected Phases	7!
Permitted Phases	6
Detector Phase	7
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	10.0
Total Split (s)	16.0
Total Split (%)	12.3%
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	-2.0
Total Lost Time (s)	4.0
Lead/Lag	Lead
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	27.7
Actuated g/C Ratio	0.21
v/c Ratio	0.02
Control Delay	0.1
Queue Delay	0.0
Total Delay	0.1
LOS	A
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	
Turn Bay Length (ft)	110
Base Capacity (vph)	408

2024 No-Build Wkdy AM

1: Sunlife Park/Wellesley Gateway & Worcester Street

10/27/2017

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
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		0.66	0.76		0.67	0.63	0.20		0.11	0.05	0.25	0.58

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 113 (87%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 18.6 Intersection LOS: B
 Intersection Capacity Utilization 71.4% ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 ! Phase conflict between lane groups.

Splits and Phases: 1: Sunlife Park/Wellesley Gateway & Worcester Street

02	06	04 (R)	03
12 s	14 s	86 s	18 s
	07	08 (R)	
	16 s	88 s	

2024 No-Build Wkdy PM

1: Sunlife Park/Wellesley Gateway & Worcester Street

10/27/2017

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	25	6	2121	9	24	2190	40	95	1	188	190	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	12	11	11	11	12	12	11	12	12
Storage Length (ft)		250		0	210		210	0		275	110	
Storage Lanes		1		0	1		1	0		2	1	
Taper Length (ft)		25			25			25			25	
Satd. Flow (prot)	0	1745	4960	0	1745	4964	1561	0	1811	2748	1715	1722
Flt Permitted		0.950			0.950				0.953		0.950	0.954
Satd. Flow (perm)	0	1745	4960	0	1745	4964	1561	0	1811	2748	1715	1722
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)			1				67			126		
Link Speed (mph)			30			30			30			30
Link Distance (ft)			201			1147			598			289
Travel Time (s)			4.6			26.1			13.6			6.6
Peak Hour Factor	0.93	0.93	0.93	0.93	0.98	0.98	0.98	0.86	0.86	0.86	0.83	0.83
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)											49%	
Lane Group Flow (vph)	0	33	2291	0	24	2235	41	0	111	219	117	117
Turn Type	Prot	Prot	NA		Prot	NA	pm+ov	Split	NA	pm+ov	Split	NA
Protected Phases	7!	7	4		3	8	6	2	2	3	6	6
Permitted Phases							8			2		
Detector Phase	7	7	4		3	8	6	2	2	3	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	23.0		10.0	23.0	21.0	21.0	21.0	10.0	21.0	21.0
Total Split (s)	14.0	14.0	82.0		13.0	81.0	18.0	17.0	17.0	13.0	18.0	18.0
Total Split (%)	10.8%	10.8%	63.1%		10.0%	62.3%	13.8%	13.1%	13.1%	10.0%	13.8%	13.8%
Yellow Time (s)	4.0	4.0	5.0		4.0	5.0	3.0	3.0	3.0	4.0	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	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-1.0		-1.0	-2.0	-1.0	-1.0
Total Lost Time (s)		4.0	5.0		4.0	5.0	4.0		4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lead		Lag	Lag				Lag		
Lead-Lag Optimize?												
Recall Mode	None	None	C-Max		None	C-Max	None	None	None	None	None	None
Act Effct Green (s)		9.2	78.9		9.0	78.7	92.7		12.1	25.1	13.0	13.0
Actuated g/C Ratio		0.07	0.61		0.07	0.61	0.71		0.09	0.19	0.10	0.10
v/c Ratio		0.27	0.76		0.20	0.74	0.04		0.66	0.35	0.69	0.68
Control Delay		62.5	21.1		61.4	20.9	0.3		75.7	20.5	76.9	76.6
Queue Delay		0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay		62.5	21.1		61.4	20.9	0.3		75.7	20.5	76.9	76.6
LOS		E	C		E	C	A		E	C	E	E
Approach Delay			21.7			20.9			39.1			54.9
Approach LOS			C			C			D			D
Queue Length 50th (ft)		27	508		19	495	0		91	37	101	101
Queue Length 95th (ft)		62	571		49	558	2		149	71	156	156
Internal Link Dist (ft)			121			1067			518			209
Turn Bay Length (ft)		250			210		210			275	110	
Base Capacity (vph)		134	3012		120	3006	1143		181	632	184	185

Lane Group	SBR
Lane Configurations	7
Volume (vph)	84
Ideal Flow (vphpl)	1900
Lane Width (ft)	12
Storage Length (ft)	110
Storage Lanes	1
Taper Length (ft)	
Satd. Flow (prot)	1615
Flt Permitted	
Satd. Flow (perm)	1615
Right Turn on Red	Yes
Satd. Flow (RTOR)	134
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.83
Heavy Vehicles (%)	0%
Shared Lane Traffic (%)	
Lane Group Flow (vph)	101
Turn Type	pm+ov
Protected Phases	7!
Permitted Phases	6
Detector Phase	7
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	10.0
Total Split (s)	14.0
Total Split (%)	10.8%
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	-2.0
Total Lost Time (s)	4.0
Lead/Lag	Lead
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	26.2
Actuated g/C Ratio	0.20
v/c Ratio	0.23
Control Delay	4.1
Queue Delay	0.0
Total Delay	4.1
LOS	A
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	0
Queue Length 95th (ft)	15
Internal Link Dist (ft)	
Turn Bay Length (ft)	110
Base Capacity (vph)	440

2024 No-Build Wkdy PM

1: Sunlife Park/Wellesley Gateway & Worcester Street

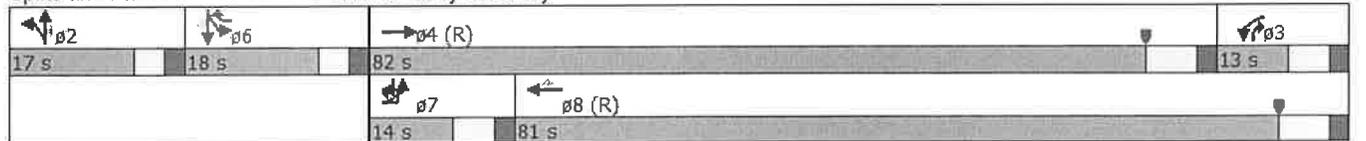
10/27/2017

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
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	0.76		0.20	0.74	0.04		0.61	0.35	0.64	0.63

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 128 (98%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 24.6
 Intersection Capacity Utilization 64.0%
 Analysis Period (min) 15
 ! Phase conflict between lane groups.

Splits and Phases: 1: Sunlife Park/Wellesley Gateway & Worcester Street



2024 Build Wkdy AM

1: Sunlife Park/Wellesley Gateway & Worcester Street

3/26/2018

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	49	66	2190	132	112	1942	231	5	1	10	29	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	12	11	11	11	12	12	11	12	12
Storage Length (ft)		250		0	210		210	0		275	110	
Storage Lanes		1		0	1		1	0		2	1	
Taper Length (ft)		25			25			25			25	
Satd. Flow (prot)	0	1745	4923	0	1694	4916	1546	0	1824	2290	1504	1790
Flt Permitted		0.950			0.950				0.960		0.950	0.998
Satd. Flow (perm)	0	1745	4923	0	1694	4916	1546	0	1824	2290	1504	1790
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)			13				251			126		
Link Speed (mph)			30			30			30			30
Link Distance (ft)			201			1147			598			289
Travel Time (s)			4.6			26.1			13.6			6.6
Peak Hour Factor	0.91	0.91	0.91	0.91	0.92	0.92	0.92	0.50	0.50	0.50	0.84	0.84
Heavy Vehicles (%)	0%	0%	1%	0%	3%	2%	1%	0%	0%	20%	14%	0%
Shared Lane Traffic (%)											10%	
Lane Group Flow (vph)	0	127	2552	0	122	2111	251	0	12	20	31	85
Turn Type	Prot	Prot	NA		Prot	NA	pm+ov	Split	NA	pm+ov	Split	NA
Protected Phases	7!	7	4		3	8	6	2	2	3	6	6
Permitted Phases							8			2		
Detector Phase	7	7	4		3	8	6	2	2	3	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	23.0		10.0	23.0	21.0	21.0	21.0	10.0	21.0	21.0
Total Split (s)	16.0	16.0	86.0		18.0	88.0	14.0	12.0	12.0	18.0	14.0	14.0
Total Split (%)	12.3%	12.3%	66.2%		13.8%	67.7%	10.8%	9.2%	9.2%	13.8%	10.8%	10.8%
Yellow Time (s)	4.0	4.0	5.0		4.0	5.0	3.0	3.0	3.0	4.0	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	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-1.0		-1.0	-2.0	-1.0	-1.0
Total Lost Time (s)		4.0	5.0		4.0	5.0	4.0		4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lead		Lag	Lag				Lag		
Lead-Lag Optimize?												
Recall Mode	None	None	C-Max		None	C-Max	None	None	None	None	None	None
Act Effct Green (s)		13.8	87.8		14.0	88.0	101.8		7.3	18.8	10.4	10.4
Actuated g/C Ratio		0.11	0.68		0.11	0.68	0.78		0.06	0.14	0.08	0.08
v/c Ratio		0.69	0.77		0.67	0.63	0.20		0.12	0.05	0.26	0.60
Control Delay		75.3	17.1		74.4	13.6	0.7		60.5	0.2	61.9	75.3
Queue Delay		0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay		75.3	17.1		74.4	13.6	0.7		60.5	0.2	61.9	75.3
LOS		E	B		E	B	A		E	A	E	E
Approach Delay			19.8			15.3			22.8			67.1
Approach LOS			B			B			C			E
Queue Length 50th (ft)		101	452		100	350	0		10	0	26	72
Queue Length 95th (ft)		#214	646		#184	436	10		17	0	57	#127
Internal Link Dist (ft)			121			1067			518			209
Turn Bay Length (ft)		250			210		210			275	110	
Base Capacity (vph)		185	3329		182	3327	1268		112	439	123	147

Lane Group	SBR
Lane Configurations	7
Volume (vph)	7
Ideal Flow (vphpl)	1900
Lane Width (ft)	12
Storage Length (ft)	110
Storage Lanes	1
Taper Length (ft)	
Satd. Flow (prot)	1417
Flt Permitted	
Satd. Flow (perm)	1417
Right Turn on Red	Yes
Satd. Flow (RTOR)	134
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.84
Heavy Vehicles (%)	14%
Shared Lane Traffic (%)	
Lane Group Flow (vph)	8
Turn Type	pm+ov
Protected Phases	7!
Permitted Phases	6
Detector Phase	7
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	10.0
Total Split (s)	16.0
Total Split (%)	12.3%
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	-2.0
Total Lost Time (s)	4.0
Lead/Lag	Lead
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	28.2
Actuated g/C Ratio	0.22
v/c Ratio	0.02
Control Delay	0.1
Queue Delay	0.0
Total Delay	0.1
LOS	A
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	
Turn Bay Length (ft)	110
Base Capacity (vph)	412

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
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		0.69	0.77		0.67	0.63	0.20		0.11	0.05	0.25	0.58

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 113 (87%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow

Natural Cycle: 120

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 18.8

Intersection LOS: B

Intersection Capacity Utilization 71.5%

ICU Level of Service C

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

! Phase conflict between lane groups.

Splits and Phases: 1: Sunlife Park/Wellesley Gateway & Worcester Street

02	06	04 (R)	03
12 s	14 s	86 s	18 s
	07	08 (R)	
	16 s	88 s	

2024 Build Wkdy PM

1: Sunlife Park/Wellesley Gateway & Worcester Street

3/26/2018

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (vph)	29	6	2128	9	24	2201	40	95	1	188	190	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	12	11	11	11	12	12	11	12	12
Storage Length (ft)		250		0	210		210	0		275	110	
Storage Lanes		1		0	1		1	0		2	1	
Taper Length (ft)		25			25			25			25	
Satd. Flow (prot)	0	1745	4960	0	1745	4964	1561	0	1811	2748	1715	1722
Flt Permitted		0.950			0.950				0.953		0.950	0.954
Satd. Flow (perm)	0	1745	4960	0	1745	4964	1561	0	1811	2748	1715	1722
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)			1				67			126		
Link Speed (mph)			30			30			30			30
Link Distance (ft)			201			1147			598			289
Travel Time (s)			4.6			26.1			13.6			6.6
Peak Hour Factor	0.93	0.93	0.93	0.93	0.98	0.98	0.98	0.86	0.86	0.86	0.83	0.83
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)											49%	
Lane Group Flow (vph)	0	37	2298	0	24	2246	41	0	111	219	117	117
Turn Type	Prot	Prot	NA		Prot	NA	pm+ov	Split	NA	pm+ov	Split	NA
Protected Phases	7!	7	4		3	8	6	2	2	3	6	6
Permitted Phases							8			2		
Detector Phase	7	7	4		3	8	6	2	2	3	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	23.0		10.0	23.0	21.0	21.0	21.0	10.0	21.0	21.0
Total Split (s)	14.0	14.0	82.0		13.0	81.0	18.0	17.0	17.0	13.0	18.0	18.0
Total Split (%)	10.8%	10.8%	63.1%		10.0%	62.3%	13.8%	13.1%	13.1%	10.0%	13.8%	13.8%
Yellow Time (s)	4.0	4.0	5.0		4.0	5.0	3.0	3.0	3.0	4.0	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	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-1.0		-1.0	-2.0	-1.0	-1.0
Total Lost Time (s)		4.0	5.0		4.0	5.0	4.0		4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lead	Lead		Lag	Lag				Lag		
Lead-Lag Optimize?												
Recall Mode	None	None	C-Max		None	C-Max	None	None	None	None	None	None
Act Effct Green (s)		9.3	78.9		9.0	78.7	92.6		12.1	25.1	13.0	13.0
Actuated g/C Ratio		0.07	0.61		0.07	0.61	0.71		0.09	0.19	0.10	0.10
v/c Ratio		0.30	0.76		0.20	0.75	0.04		0.66	0.35	0.69	0.68
Control Delay		63.4	21.2		61.4	21.0	0.3		75.7	20.5	76.9	76.6
Queue Delay		0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay		63.4	21.2		61.4	21.0	0.3		75.7	20.5	76.9	76.6
LOS		E	C		E	C	A		E	C	E	E
Approach Delay			21.9			21.1			39.1			54.9
Approach LOS			C			C			D			D
Queue Length 50th (ft)		30	512		19	501	0		91	37	101	101
Queue Length 95th (ft)		67	574		49	563	2		149	71	156	156
Internal Link Dist (ft)			121			1067			518			209
Turn Bay Length (ft)		250			210		210			275	110	
Base Capacity (vph)		134	3012		120	3003	1143		181	632	184	185

Lane Group	SBR
Lane Configurations	7
Volume (vph)	84
Ideal Flow (vphpl)	1900
Lane Width (ft)	12
Storage Length (ft)	110
Storage Lanes	1
Taper Length (ft)	
Satd. Flow (prot)	1615
Flt Permitted	
Satd. Flow (perm)	1615
Right Turn on Red	Yes
Satd. Flow (RTOR)	134
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.83
Heavy Vehicles (%)	0%
Shared Lane Traffic (%)	
Lane Group Flow (vph)	101
Turn Type	pm+ov
Protected Phases	7
Permitted Phases	6
Detector Phase	7
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	10.0
Total Split (s)	14.0
Total Split (%)	10.8%
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	-2.0
Total Lost Time (s)	4.0
Lead/Lag	Lead
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	26.2
Actuated g/C Ratio	0.20
v/c Ratio	0.23
Control Delay	4.1
Queue Delay	0.0
Total Delay	4.1
LOS	A
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	0
Queue Length 95th (ft)	15
Internal Link Dist (ft)	
Turn Bay Length (ft)	110
Base Capacity (vph)	440



Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
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		0.28	0.76		0.20	0.75	0.04		0.61	0.35	0.64	0.63

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 128 (98%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 24.7

Intersection LOS: C

Intersection Capacity Utilization 64.1%

ICU Level of Service C

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 1: Sunlife Park/Wellesley Gateway & Worcester Street

ø2 17 s	ø6 18 s	ø4 (R) 82 s	ø3 13 s
	ø7 14 s	ø8 (R) 81 s	

Worcester Street at Dearborn Street

2017 Existing Wkdy AM
 2: Dearborn Street & Worcester Street

10/27/2017

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑↑		↗
Volume (vph)	2181	2	0	0	0	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	11	12	12
Satd. Flow (prot)	4964	0	0	4916	0	1644
Flt Permitted						
Satd. Flow (perm)	4964	0	0	4916	0	1644
Link Speed (mph)	30			30	30	
Link Distance (ft)	995			201	161	
Travel Time (s)	22.6			4.6	3.7	
Peak Hour Factor	0.91	0.91	0.92	0.92	0.71	0.71
Heavy Vehicles (%)	1%	0%	2%	2%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2399	0	0	0	0	44
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 52.2% ICU Level of Service A
 Analysis Period (min) 15

2017 Existing Wkdy AM
2: Dearborn Street & Worcester Street

10/27/2017

	→	↘	↙	←	↖	↗	
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	↑↑↑			↑↑↑		↗	
Volume (veh/h)	2181	2	0	0	0	31	
Sign Control	Free			Free	Stop		
Grade	0%			0%	0%		
Peak Hour Factor	0.91	0.91	0.92	0.92	0.71	0.71	
Hourly flow rate (vph)	2397	2	0	0	0	44	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None			None			
Median storage (veh)							
Upstream signal (ft)				201			
pX, platoon unblocked							
vC, conflicting volume			2399		2398	800	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			2399		2398	800	
tC, single (s)			4.1		6.8	6.9	
tC, 2 stage (s)							
tF (s)			2.2		3.5	3.3	
p0 queue free %			100		100	87	
cM capacity (veh/h)			197		29	332	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	959	959	482	0	0	0	44
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	2	0	0	0	44
cSH	1700	1700	1700	1700	1700	1700	332
Volume to Capacity	0.56	0.56	0.28	0.00	0.00	0.00	0.13
Queue Length 95th (ft)	0	0	0	0	0	0	11
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	17.5
Lane LOS							C
Approach Delay (s)	0.0			0.0			17.5
Approach LOS							C
Intersection Summary							
Average Delay			0.3				
Intersection Capacity Utilization			52.2%		ICU Level of Service		A
Analysis Period (min)			15				

2017 Existing Wkdy PM
 2: Dearborn Street & Worcester Street

10/27/2017

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑↑		↗
Volume (vph)	1949	2	0	0	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	11	12	12
Satd. Flow (prot)	4965	0	0	4916	0	1644
Flt Permitted						
Satd. Flow (perm)	4965	0	0	4916	0	1644
Link Speed (mph)	30			30	30	
Link Distance (ft)	995			201	161	
Travel Time (s)	22.6			4.6	3.7	
Peak Hour Factor	0.93	0.93	0.92	0.92	0.63	0.63
Heavy Vehicles (%)	1%	0%	2%	2%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2098	0	0	0	0	24
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 47.7% ICU Level of Service A
 Analysis Period (min) 15

2017 Existing Wkdy PM
2: Dearborn Street & Worcester Street

10/27/2017

	→	↘	↙	←	↖	↗	
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	↑↑↑			↑↑↑		↗	
Volume (veh/h)	1949	2	0	0	0	15	
Sign Control	Free			Free	Stop		
Grade	0%			0%	0%		
Peak Hour Factor	0.93	0.93	0.92	0.92	0.63	0.63	
Hourly flow rate (vph)	2096	2	0	0	0	24	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None			None			
Median storage (veh)							
Upstream signal (ft)				201			
pX, platoon unblocked							
vC, conflicting volume			2098		2097	700	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			2098		2097	700	
tC, single (s)			4.1		6.8	6.9	
tC, 2 stage (s)							
tF (s)			2.2		3.5	3.3	
p0 queue free %			100		100	94	
cM capacity (veh/h)			259		46	387	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	838	838	421	0	0	0	24
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	2	0	0	0	24
cSH	1700	1700	1700	1700	1700	1700	387
Volume to Capacity	0.49	0.49	0.25	0.00	0.00	0.00	0.06
Queue Length 95th (ft)	0	0	0	0	0	0	5
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	14.9
Lane LOS							B
Approach Delay (s)	0.0			0.0			14.9
Approach LOS							B
Intersection Summary							
Average Delay			0.2				
Intersection Capacity Utilization			47.7%		ICU Level of Service		A
Analysis Period (min)			15				

2024 No-Build Wkdy AM
 2: Dearborn Street & Worcester Street

10/27/2017

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑↑		↗
Volume (vph)	2387	2	0	0	0	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	11	12	12
Satd. Flow (prot)	4964	0	0	4916	0	1644
Flt Permitted						
Satd. Flow (perm)	4964	0	0	4916	0	1644
Link Speed (mph)	30			30	30	
Link Distance (ft)	995			201	161	
Travel Time (s)	22.6			4.6	3.7	
Peak Hour Factor	0.91	0.91	0.92	0.92	0.71	0.71
Heavy Vehicles (%)	1%	0%	2%	2%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2625	0	0	0	0	46
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 56.2% ICU Level of Service B

Analysis Period (min) 15

2024 No-Build Wkdy AM
2: Dearborn Street & Worcester Street

10/27/2017

Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	↑↑↑			↑↑↑		↑	
Volume (veh/h)	2387	2	0	0	0	33	
Sign Control	Free			Free	Stop		
Grade	0%			0%	0%		
Peak Hour Factor	0.91	0.91	0.92	0.92	0.71	0.71	
Hourly flow rate (vph)	2623	2	0	0	0	46	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None			None			
Median storage veh)							
Upstream signal (ft)				201			
pX, platoon unblocked							
vC, conflicting volume			2625			2624	875
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			2625			2624	875
tC, single (s)			4.1			6.8	6.9
tC, 2 stage (s)							
tF (s)			2.2			3.5	3.3
p0 queue free %			100			100	84
cM capacity (veh/h)			160			20	296

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	1049	1049	527	0	0	0	46
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	2	0	0	0	46
cSH	1700	1700	1700	1700	1700	1700	296
Volume to Capacity	0.62	0.62	0.31	0.00	0.00	0.00	0.16
Queue Length 95th (ft)	0	0	0	0	0	0	14
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	19.4
Lane LOS							
Approach Delay (s)	0.0			0.0			19.4
Approach LOS							

Intersection Summary							
Average Delay			0.3				
Intersection Capacity Utilization			56.2%	ICU Level of Service		B	
Analysis Period (min)			15				

2024 No-Build Wkdy PM
 2: Dearborn Street & Worcester Street

10/27/2017

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑↑		↗
Volume (vph)	2145	2	0	0	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	11	12	12
Satd. Flow (prot)	4964	0	0	4916	0	1644
Flt Permitted						
Satd. Flow (perm)	4964	0	0	4916	0	1644
Link Speed (mph)	30			30	30	
Link Distance (ft)	995			201	161	
Travel Time (s)	22.6			4.6	3.7	
Peak Hour Factor	0.93	0.93	0.92	0.92	0.63	0.63
Heavy Vehicles (%)	1%	0%	2%	2%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2308	0	0	0	0	25
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	51.5%
Analysis Period (min)	15
	ICU Level of Service A

2024 No-Build Wkdy PM
2: Dearborn Street & Worcester Street

10/27/2017

Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	↑↑↑			↑↑↑		↑	
Volume (veh/h)	2145	2	0	0	0	16	
Sign Control	Free			Free	Stop		
Grade	0%			0%	0%		
Peak Hour Factor	0.93	0.93	0.92	0.92	0.63	0.63	
Hourly flow rate (vph)	2306	2	0	0	0	25	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None			None			
Median storage veh							
Upstream signal (ft)				201			
pX, platoon unblocked							
vC, conflicting volume			2309			2308	770
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			2309			2308	770
tC, single (s)			4.1			6.8	6.9
tC, 2 stage (s)							
tF (s)			2.2			3.5	3.3
p0 queue free %			100			100	93
cM capacity (veh/h)			214			33	348
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	923	923	463	0	0	0	25
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	2	0	0	0	25
cSH	1700	1700	1700	1700	1700	1700	348
Volume to Capacity	0.54	0.54	0.27	0.00	0.00	0.00	0.07
Queue Length 95th (ft)	0	0	0	0	0	0	6
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	16.2
Lane LOS							
Approach Delay (s)	0.0		0.0				16.2
Approach LOS							
Intersection Summary							
Average Delay			0.2				
Intersection Capacity Utilization			51.5%		ICU Level of Service		A
Analysis Period (min)			15				

2024 Build Wkdy AM
 2: Dearborn Street & Worcester Street

3/26/2018

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑↑		↑
Volume (vph)	2404	2	0	2003	0	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	11	12	12
Satd. Flow (prot)	4964	0	0	4916	0	1644
Flt Permitted						
Satd. Flow (perm)	4964	0	0	4916	0	1644
Link Speed (mph)	30			30	30	
Link Distance (ft)	370			201	161	
Travel Time (s)	8.4			4.6	3.7	
Peak Hour Factor	0.91	0.91	0.92	0.92	0.71	0.71
Heavy Vehicles (%)	1%	0%	2%	2%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2644	0	0	2177	0	46
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 56.5% ICU Level of Service B
 Analysis Period (min) 15

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑↑		↗
Volume (veh/h)	2404	2	0	2003	0	33
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.92	0.92	0.71	0.71
Hourly flow rate (vph)	2642	2	0	2177	0	46
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (ft)	201					
pX, platoon unblocked					0.74	
vC, conflicting volume			2644		3369	882
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			2644		2965	882
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	84
cM capacity (veh/h)			157		9	294

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	1057	1057	531	726	726	726	46
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	2	0	0	0	46
cSH	1700	1700	1700	1700	1700	1700	294
Volume to Capacity	0.62	0.62	0.31	0.43	0.43	0.43	0.16
Queue Length 95th (ft)	0	0	0	0	0	0	14
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	19.6
Lane LOS							C
Approach Delay (s)	0.0			0.0			19.6
Approach LOS							C

Intersection Summary							
Average Delay			0.2				
Intersection Capacity Utilization			56.5%	ICU Level of Service	B		
Analysis Period (min)			15				

2024 Build Wkdy PM
 2: Dearborn Street & Worcester Street

3/26/2018

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑↑		↑
Volume (vph)	2156	2	0	2409	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	11	12	12
Satd. Flow (prot)	4964	0	0	4916	0	1644
Flt Permitted						
Satd. Flow (perm)	4964	0	0	4916	0	1644
Link Speed (mph)	30			30	30	
Link Distance (ft)	430			201	161	
Travel Time (s)	9.8			4.6	3.7	
Peak Hour Factor	0.93	0.93	0.92	0.92	0.63	0.63
Heavy Vehicles (%)	1%	0%	2%	2%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2320	0	0	2618	0	25
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 51.7% ICU Level of Service A
 Analysis Period (min) 15

2024 Build Wkdy PM
2: Dearborn Street & Worcester Street

3/26/2018

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑↑		↗
Volume (veh/h)	2156	2	0	2409	0	16
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.92	0.92	0.63	0.63
Hourly flow rate (vph)	2318	2	0	2618	0	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)				201		
pX, platoon unblocked					0.67	
vC, conflicting volume			2320		3192	774
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			2320		2545	774
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	93
cM capacity (veh/h)			212		15	346

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	927	927	466	873	873	873	25
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	2	0	0	0	25
cSH	1700	1700	1700	1700	1700	1700	346
Volume to Capacity	0.55	0.55	0.27	0.51	0.51	0.51	0.07
Queue Length 95th (ft)	0	0	0	0	0	0	6
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	16.2
Lane LOS							C
Approach Delay (s)	0.0			0.0			16.2
Approach LOS							C

Intersection Summary							
Average Delay			0.1				
Intersection Capacity Utilization			51.7%	ICU Level of Service			A
Analysis Period (min)			15				

Worcester Street at the East Project Site Driveway

2024 Build Wkdy AM
 3: East Site Drive & Worcester Street

3/26/2018

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑↑		↑
Volume (vph)	2389	3	0	2003	0	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	11	12	12
Satd. Flow (prot)	3421	0	0	4916	0	1611
Flt Permitted						
Satd. Flow (perm)	3421	0	0	4916	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	162			370	153	
Travel Time (s)	3.7			8.4	3.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2600	0	0	2177	0	18
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 76.1% ICU Level of Service D
 Analysis Period (min) 15

2024 Build Wkdy AM
3: East Site Drive & Worcester Street

3/26/2018

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑↑		↗
Volume (veh/h)	2389	3	0	2003	0	17
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2597	3	0	2177	0	18
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)				571		
pX, platoon unblocked					0.73	
vC, conflicting volume			2600		3324	1300
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			2600		2897	1300
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	88
cM capacity (veh/h)			164		9	152
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	1731	869	726	726	726	18
Volume Left	0	0	0	0	0	0
Volume Right	0	3	0	0	0	18
cSH	1700	1700	1700	1700	1700	152
Volume to Capacity	1.02	0.51	0.43	0.43	0.43	0.12
Queue Length 95th (ft)	0	0	0	0	0	10
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	32.0
Lane LOS						D
Approach Delay (s)	0.0		0.0			32.0
Approach LOS						D
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			76.1%		ICU Level of Service	D
Analysis Period (min)			15			

2024 Build Wkdy PM
 3: east Site Drive & Worcester Street

3/26/2018

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑↑		↗
Volume (vph)	2147	9	0	2409	0	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	11	12	12
Satd. Flow (prot)	3418	0	0	4916	0	1611
Flt Permitted						
Satd. Flow (perm)	3418	0	0	4916	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	180			430	130	
Travel Time (s)	4.1			9.8	3.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2344	0	0	2618	0	12
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	69.6%
Analysis Period (min)	15
	ICU Level of Service C

2024 Build Wkdy PM
3: east Site Drive & Worcester Street

3/26/2018

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑↑		↗
Volume (veh/h)	2147	9	0	2409	0	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2334	10	0	2618	0	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)				631		
pX, platoon unblocked					0.66	
vC, conflicting volume			2343		3211	1172
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			2343		2553	1172
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	94
cM capacity (veh/h)			207		14	185
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	1556	788	873	873	873	12
Volume Left	0	0	0	0	0	0
Volume Right	0	10	0	0	0	12
cSH	1700	1700	1700	1700	1700	185
Volume to Capacity	0.92	0.46	0.51	0.51	0.51	0.06
Queue Length 95th (ft)	0	0	0	0	0	5
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	25.8
Lane LOS						D
Approach Delay (s)	0.0		0.0			25.8
Approach LOS						D
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			69.6%		ICU Level of Service	C
Analysis Period (min)			15			

Worcester Street at the West Project Site Driveway

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑↑		↗
Volume (vph)	2392	3	0	2003	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	11	12	12
Satd. Flow (prot)	3421	0	0	4916	0	1863
Flt Permitted						
Satd. Flow (perm)	3421	0	0	4916	0	1863
Link Speed (mph)	30			30	30	
Link Distance (ft)	476			162	125	
Travel Time (s)	10.8			3.7	2.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2603	0	0	2177	0	0
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 69.5% ICU Level of Service C
 Analysis Period (min) 15

2024 Build Wkdy AM
4: West Site Drive & Worcester Street

3/26/2018

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑↑		↗
Volume (veh/h)	2392	3	0	2003	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2600	3	0	2177	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (ft)				733		
pX, platoon unblocked					0.73	
vC, conflicting volume			2603		3327	1302
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			2603		2899	1302
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			163		9	151
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	1733	870	726	726	726	0
Volume Left	0	0	0	0	0	0
Volume Right	0	3	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	1.02	0.51	0.43	0.43	0.43	0.00
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						A
Approach Delay (s)	0.0		0.0			0.0
Approach LOS						A
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			69.5%		ICU Level of Service	C
Analysis Period (min)			15			

2024 Build Wkdy PM
 4: West Site Drive & Worcester Street

3/26/2018

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑↑		↗
Volume (vph)	2156	9	0	2409	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	11	12	12
Satd. Flow (prot)	3418	0	0	4916	0	1863
Flt Permitted						
Satd. Flow (perm)	3418	0	0	4916	0	1863
Link Speed (mph)	30			30	30	
Link Distance (ft)	385			180	102	
Travel Time (s)	8.8			4.1	2.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2353	0	0	2618	0	0
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 63.2% ICU Level of Service B
 Analysis Period (min) 15

2024 Build Wkdy PM
4: West Site Drive & Worcester Street

3/26/2018

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↔			↑↑↑		↗
Volume (veh/h)	2156	9	0	2409	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2343	10	0	2618	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (ft)				811		
pX, platoon unblocked					0.66	
vC, conflicting volume			2353		3221	1177
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			2353		2559	1177
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			205		14	184
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	1562	791	873	873	873	0
Volume Left	0	0	0	0	0	0
Volume Right	0	10	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.92	0.47	0.51	0.51	0.51	0.00
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						A
Approach Delay (s)	0.0		0.0			0.0
Approach LOS						A
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			63.2%		ICU Level of Service	B
Analysis Period (min)			15			