TECHNICAL ATTACHMENTS

THE LADYBIRD

WASHINGTON, DC

November 22, 2017

GOROVE / SLADE
Transportation Planners and Engineers

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A: SCOPING INFORMATION

Project Name & Applicant Team:
4330 48th Street NW
Applicant: Felipe Serpa, Valor Development LLC
Land Use Counsel: Holland & Knight LLP
Transportation Consultant:
Erwin Andres, Gorove/Slade (202-540-1925), ena@goroveslade.com

Case Type & No. (PUD, LTR, etc.): Design Review, Case No. 16-23

Street Address:
4330 48th Street NW

Current Zoning and/or Overlay District: MU-4

Date of Filing: Summer 2016

Estimated Date of Hearing: January 11, 2018

Description of Project:
The project site is located at 4330 48th Street NW, bounded by Yuma Street NW to the north, 48th Street NW to the east, the American University Administrative to the south, and a public alley to the west. The site for the proposed development is currently home to a surface parking lot and a commercial building with ground-floor retail.

The resulting development will be a mixed-use (residential, retail, and grocery) development with an approximate build-out date of 2021. The development program consists of the following land uses:

- Grocery/Retail –Approximately 16,000 sf of grocery and retail space. Assumed all grocery for more conservative analysis.
- Residential – Approximately 219 multi-family residential dwelling units

According to 2016 DC Zoning Regulations (ZR16) and the development program outlined above, the site is required to provide a minimum of 91 parking spaces. An existing agreement between American University and the site lot requires the proposed development to carry forth 236 parking spaces for the use of American University. The development will provide approximately 370 below-grade parking spaces in three levels of below-grade parking. The first level of parking will contain approximately 85 parking spaces that are intended to be devoted to residential use. The second level of parking will contain approximately 106 parking spaces, of which approximately 49 parking spaces will be devoted to the grocery/retail uses on site. Finally, as required by the agreement with American University, approximately 57 parking spaces on the second level will be shared by the grocery/retail uses on site and the American University Admin Building to the south of the site and approximately 179 parking spaces on the third level will be shared between the residential uses on site and the American University Admin Building. Parking is planned to be priced at the market-rate.

Loading facilities will be provided via one 30-foot berth, two 55-foot berths, and one 20-foot service and delivery space. The loading berths abut the public alley to the west of the site and will be accessible through back-in and front-out maneuvering to and from surrounding streets. The development will exceed

the number of loading facilities required under ZR16. The site plan incorporates improvements to pedestrian facilities adjacent to the site. These improvements are made possible through the widening of the sidewalk and buffer, and the removal of two curb cuts along the perimeter of the site.	
1. Strategic Planning Elements (Planning Documents)	**DDOT Comments/Action Items**
Planning Guidelines: The CTR will address how the proposed development considers the primary city-wide planning documents, as well as localized studies. See Section 3.1 of the CTR guidelines for more information. **Proposed Documents:** The study will address how the proposed development considers the primary planning documents of the District, as well as localized studies. The study will include a section addressing the following documents: o ZR16 (Subtitle C Chapters 7, 8 and 9) o DC Comprehensive Plan o DDOT Comprehensive Transportation Review Guidelines o DDOT Design & Engineering Manual o DC's Transit Future System Plan o Bicycle Master Plan o Pedestrian Master Plan o MoveDC plan o SustainableDC plan	DDOT concurs.
2. Roadway Network, Capacity & Operations	**DDOT Comments/Action Items**
Vehicle Trip Generation Assumptions **Guidelines:** Provide *preliminary* site-generated vehicle trips and mode split assumptions. In addition, provide the assumptions and supporting documentation behind the proposed mode split. See Section 3.2.1 of the CTR guidelines for further information. **Proposed preliminary mode split and supporting documentation:** The proposed multi-modal trip generation methodology uses ITE rates and mode-split assumptions. A detailed breakdown of these assumptions and trip generation calculations is attached to this form. While detailed mode split data from the *Census Transportation Planning Products (CTPP)* is mapped on a graphic and attached to this form, The modal splits are expected to be 90% auto/5% transit/2% bicycle/3% walk for residential uses and 90% auto/0% transit/2% bicycle/8% walk for grocery/retail uses. See discussion in parking section (Section 6) for more information.	DDOT Comment: Note in the scoping CTR that the auto mode share is higher than usual to account for the additional AU parking spaces that are available to residents and grocery customers. G/S: Noted DDOT concurs. DDOT Comment: Trip generation in the table to the left does not include existing AU trips to the garage like in previous versions of trip gen provided to DDOT. These should be included in the total. G/S: The previous versions of the trip generation table did

Mode	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Auto	50 veh/hr	98 veh/hr	148 veh/hr	174 veh/hr	131 veh/hr	305 veh/hr
Transit	1 ppl/hr	5 ppl/hr	6 ppl/hr	5 ppl/hr	3 ppl/hr	8 ppl/hr
Bike	2 ppl/hr	3 ppl/hr	5 ppl/hr	6 ppl/hr	4 ppl/hr	10 ppl/hr
Walk	6 ppl/hr	6 ppl/hr	12 ppl/hr	18 ppl/hr	17 ppl/hr	35 ppl/hr

not include the existing/re-routed trips for the American University overflow parking that is currently on-site. Those trips are accounted for in the CTR as background trips.
DDOT concurs and notes that this assumption should be documented in the CTR with graphics showing the rerouted AU traffic also included.

DDOT Comment: why has vehicle trip generation decreased since the last version of the scoping form even though the auto mode share has increased significantly?
G/S: The previous trip generation included a 60ksf grocery and 230 du. The new development program is for 16ksf grocery and 219 du.
DDOT concurs.

Vehicle Site Access

Guidelines: If vehicle access is needed, at a minimum the CTR will provide locations of access point(s) and desired access controls (full, right-in/right-out, etc.). See Section 3.2.2 of the CTR guidelines for any further requirements.

Access Location(s): The site will be accessed through the public alleys that connect to Yuma Street NW and Massachusetts Avenue NW. Access along 48th Street NW will be provided by a section of existing private alley that then connects to the public alley network abutting the site along the west. The loading facilities and ramp leading to the below-grade parking garage abut the public alley.
Access Control: Unsignalized.
Existing Curb cuts utilized: The site will utilize curb cuts that connect the public alley to the north of the site from Yuma Street NW and the south of the site from Massachusetts Avenue NW. One existing curb cut accessing the private section of the alley network to the east of the site on 48th Street NW will also be utilized.
Existing curb cuts abandoned: A total of two curb cuts are being abandoned. One wide curb cut (that includes a pedestrian refuge) will be abandoned along Yuma Street NW. One curb cut will be abandoned along 48th Street NW.
Proposed curb cuts: None.
Curb cut width and radii: TBD

DDOT concurs.

CTR Triggers for further vehicle analysis (for sections below) **Guidelines:** See Section 3.2.3 of the CTR guidelines to determine if a more comprehensive vehicle analysis is required. If so, completion of the remainder of the *Roadway Network, Capacity & Operation* section of the scoping form is required.	
Development Scenarios **Guidelines:** See Section 3.2.4 of the CTR guidelines for discussion of the required development scenarios. **Proposed Development Scenario:** The proposed CTR will include the following scenarios: o Existing Conditions (2016) o 2021 Future Conditions without the development (2021 Background) o 2021 Future Conditions with the development (2021 Future)	DDOT concurs.
Vehicle Study Area **Guidelines:** See Section 3.2.5 of the CTR guidelines for discussion of the study area. **Proposed Study Area intersections, including access points (attach Figure at end of Scoping Form as needed):** The study area will include intersections where site impacts are most likely to occur. Additional intersections may be appropriate given the projected trip generation of the project. Traditionally, intersections where the site is projected to generate over 10% of future traffic are included. Gorove/Slade assembled the following list of study area intersections based on the preliminary trip generation, trip distribution, and assignment. Our proposed list of study area intersections ended up including 17 intersections: 1. Massachusetts Avenue/50th Street 2. Massachusetts Avenue/Yuma Street (western side of Massachusetts Avenue) 3. Massachusetts Avenue/Yuma Street (eastern side of Massachusetts Avenue) 4. Massachusetts Avenue/49th Street 5. Massachusetts Avenue/Alley 6. Massachusetts Avenue/48th Street/Fordham Road 7. Massachusetts Avenue/Van Ness Street 8. Yuma Street/49th Street 9. Yuma Street/Alley 10. Yuma Street/48th Street	DDOT concurs.

11. Windom Place/48th Street 12. Alley/48th Street 13. Warren Street/48th Street 14. Fordham Road/49th Street 15. Albemarle Street/49th Street 16. Albemarle Street/48th Street 17. Yuma Street/46th Street A figure attached to this scoping form shows the locations of these intersections. Driveway counts will be collected at all the ingress/egress points of the existing parking garage as to determine existing site related trips and the number of existing American University associated trips that will be carried over to the below grade garage. We are assuming that all existing site related trips are AU associated trips.	
Data Collection and Hours of Analysis **Guidelines:** See Section 3.2.6 of the CTR guidelines for discussion of the required data collection and hours of analysis. **Proposed turning movement count intersections:** Typically, the peak hour of commuter traffic is used for both weekday morning and afternoon rush hours. Other hours of analysis may be appropriate given the overall trip generation of the proposed development and the expected hours of vehicular demand to and from the site. Land use may also determine the appropriate hours of analysis as some uses experience their peak demand on weekends and off-peak from the typical uses. Weekday morning and afternoon commuter peak hours will be analyzed using the individual intersection peaks at all study area intersections. Pedestrian and bicycle Turning Movement Counts ("TMCs") were collected from 6:30-9:30 AM and 4:00-7:00 PM on Tuesday, October 18, 2016 and Thursday, October 20, 2016.TMCs were conducted on a "typical weekday" when DC public schools, Congress, and American University were in session.	DDOT concurs.
Roadway Improvements **Guidelines:** The study will account for approved and funded roadway improvement projects within the study area that are expected to begin before the proposal's horizon year. See Section 3.2.7 of the CTR guidelines. **Proposed roadway improvements:** There are no improvements in the study area that are known to be funded and proposed to be completed prior to the full build-out of the site; therefore, the CTR will not incorporate any background improvements into the vehicular capacity analysis.	DDOT concurs.

Background Developments **Guidelines:** The study will account for vehicle trips generated by developments in the study area that have an origin/destination within the study area. See Section 3.2.8 of the CTR guidelines. **Proposed background development:** Gorove/Slade has identified one nearby development: 1. The Spring Valley Shopping Center Expansion 2. American University Parking The expansion of the Spring Valley Shopping center will add approximately 14,000 sf of retail to the existing site. It is expected to open before the 4330 48th Street development and will be included as a background development. Additionally, the analysis will include the existing site related (American University) trips as background trips. This is due to the fact that the existing site trips are associated with the 236 American University parking spaces that will be carried into the future parking garage, regardless of the proposed development.	DDOT Comment: be sure to include background trip generation and site generated trip distributions in appendix. G/S: Noted DDOT concurs.
Background Growth **Guidelines:** The study will account for annual growth or decrease in through traffic on minor and principal arterials that pass through the proposed study area. See Section 3.2.9 of the CTR guidelines. **Proposed annual background growth:** Traffic volumes contained in the MWCOG regional model will be examined to develop an average annual growth rate for study area roadways. A summary of the MWCOG model and AADT volumes and trends for regional roadways in the study area is attached to this scoping form. This methodology is preferred for calculating growth rates since it takes into account all future projects and developments in the MWCOG model, and allows for district growth rates by direction and time of day. Growth rates for this study are based on the differences between the year 2015 and 2020 MWCOG model scenarios. In addition, where the MWCOG model showed negative or minimal growth, a conservative assumption of 0.1% per year minimum growth was used. Based on this methodology, the following is a summary of the growth rates proposed to be used in the study:	

For comparison purposes, the following table represents the historical AADT volumes for the study area.

Roadway	AADT Volumes					Average Annual Growth Rate
	2010	2011	2012	2013	2014	
Massachusetts Ave	16,900	17,000	18,600	18,700	19,000	3.04%
49th St	4,300	4,300	4,300	4,300	N/A	no change
Albemarle St	2,200	2,200	2,200	2,200	N/A	no change
46th St	1,600	1,400	1,400	1,400	1,800	4.02%

As such, we propose the following growth rates:

Road	**Intersections**	**Proposed Annual Growth Rate**		**Total Growth between 2016 and 2021**	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Massachusetts Ave NW – Northbound	1-7	2.00%	0.10%	10.41%	0.50%
Massachusetts Ave NW – Southbound	1-7	0.10%	2.00%	0.30%	10.41%
49th St NW – Northbound	4,8,14,15	0.10%	0.25%	0.50%	1.26%
49th St NW – Southbound	4,8,14,15	0.50%	0.10%	2.53%	0.30%
46th St NW – Northbound	17	1.00%	1.00%	5.10%	5.10%
46th St NW – Southbound	17	1.75%	1.00%	9.06%	5.10%
All Others		0.10%	0.10%	0.30%	0.30%

Please note that the above roads were selected while smaller local streets were omitted because regional growth will affect major corridors and will not impact smaller local streets adjacent to the site.

DDOT Comment: background growth rate should be maxed out at 2% per year. See Mass Ave northbound in AM.
G/S: Noted. See revised growth rates.
DDOT concurs.

Site Trip Distribution & Assignment

Guidelines: Trips generated by the site will be distributed throughout the study area network. See Section 3.2.10 of the CTR guidelines for information in trip distribution and assignment.

Proposed site distribution and assignment (attach Figures, as needed, at end of Scoping Form):
Trip distribution for the site was determined based on: (1) CTPP TAZ flow data, and (2) existing traffic volumes

DDOT concurs.

and travel patterns in the study area. Attached to this scoping form are figures depicting the CTPP TAZ flow data? Separate distributions were developed for the residential and retail/grocery components of the project. The residential trip distribution was influenced significantly by the CTPP TAZ flow data for drivers commuting from the site's TAZ, and adjusted based on traffic volumes and patterns. This flow information showed significant commuting patterns to downtown DC. The retail and grocery distributions were mostly based on locations of other retail centers, with some influence by the WMATA ridership survey for similar sites. Thus, the retail and grocery trip distribution is much more weighted to the east and west relative to the residential trip distribution. The proposed trip distributions are illustrated on an attached graphic. As discussed above, American University will retain access to 236 parking spaces that are present under existing conditions. Existing trips will be rerouted to the future site driveway.	
<u>Analysis Methodology</u> **Guidelines:** Capacity analyses are typically performed using Highway Capacity Manual (HCM) methodologies or a similar industry recognized software. See Section 3.2.11 of the CTR guidelines. **Proposed analysis methodology:** Capacity analyses are typically performed using Highway Capacity Manual (HCM) methodologies using an industry recognized software package. The proposed analysis will be conducted using Synchro 9, with the results in delay and LOS reported using HCM 2000 methodologies. Weekday morning and afternoon commuter peak hours will be analyzed using the individual intersection peaks at all study area intersections. Signal timings for the study area intersections will be obtained from DDOT and incorporated into the Synchro models. The capacity analysis results will show the average delay and the resulting LOS for each approach and for the overall intersection (where available), as well as the queuing results for the average and 95th percentile queue for each movement. We will highlight all LOS E or F conditions per intersection and approach in the existing, background, or future conditions. We will recommend mitigations if any intersection or approach experiences a degradation to LOS E or F in the future scenario where one does not exist in the background scenario, and if any intersection or approach operating under LOS E or F in the background scenario experience an increase in delay greater than 5 seconds.	DDOT concurs.

For each intersection or approach that meets this criteria, potential mitigation measures will be recommended and a discussion on the appropriateness and feasibility of potential improvements will provided. Furthermore, all locations where the 95th percentile queues exceed the length of storage lanes and result in spillback of the queue will be highlighted, and recommended mitigation measures when an increase in the 95th percentile queue length is greater than 150 feet due to the development will be provided, including a discussion on the appropriateness and feasibility of potential improvements. DDOT will be provided Synchro input files along with the study submittal. Field visits will be performed to update existing geometric information into the Synchro models, and update Synchro files with current traffic signal timing plans.	
Vehicle Trip Mitigation **Guidelines:** Proposed mitigation of vehicle impacts, if needed, must not add significant delay to other travel modes. Standard non-urban mitigation often includes geometric re-design which may not fit DDOT's practice of balancing safety and capacity across multiple transportation modes. See Section 3.2.12 of the CTR guidelines. **For Informational purposes only. Mitigation will be documented in the final CTR. No information is required in the scoping form.**	DDOT concurs.
3. Bicycle & Pedestrian Facilities	**DDOT Comments/Action Items**
CTR Triggers for bike and pedestrian mode share **Guidelines:** A CTR is required to include some level analysis of the bike and pedestrian network at a minimum, based on several potential factors. See Section 3.3.1 of the CTR guidelines to determine if a more comprehensive analysis is required. If so, complete the remainder of the *Bicycle & Pedestrian Facilities* section of this scoping form.	DDOT concurs.
CTR Bike and Pedestrian Study area **Guidelines:** See Section 3.3.2 of the CTR guidelines to determine bike and pedestrian study areas. **Proposed bike and pedestrian study areas:** A pedestrian study area that includes pedestrian facilities within a quarter-mile radius of the site is proposed, plus additional walking routes to major destinations, including the American University campus. Internal pedestrian circulation and facilities within the site and the desire lines between the site and adjacent bus stops, including crosswalk locations and building entrances, will also be shown. The bicycle study area focuses on the routes that cyclists will take major bicycle facilities. Internal bicycle	DDOT concurs.

circulation and facilities will also be highlighted.	
Data Collection and Analysis of Bike Network and Facilities **Guidelines:** See Section 3.3.3 of the CTR guidelines for data collection requirements and analysis for bike and pedestrian modes. **Proposed Bike network and facilities analysis:** Pedestrian (external to site): A qualitative analysis of all pedestrian facilities in the pedestrian study area will be provided. This will include maps outlining which routes meet DDOT standards (a green/yellow/red map), and proposing improvements to enhance the pedestrian experiences walking to/from the site. Pedestrian (internal to site): For the internal pedestrian facilities, a review of the internal pedestrian circulation and documentation of all sidewalk widths will be provided. Bicycle (external to site): A review of the quality of the bicycle facilities in the bicycle study area will be conducted, focused on the major cycling routes, and will include suggested improvements as needed to help cyclists to and from major bike facilities. Bicycle (internal to site): The proposed internal bicycle circulation and the general number and location of bicycle racks within the site will be provided. We will include a discussion of how non-auto users will approach and then access the building from each direction.	DDOT concurs.
Mitigation for Bike network **Guidelines:** If deficiencies have been documented in the study area's pedestrian or bike facilities that would preclude the proposed mode split, then mitigation of these deficiencies is required. See Section 3.3.4 of the CTR guidelines for mitigation requirements of the bike network. **For Informational purposes only. Mitigation will be documented in the final CTR. No information required in scoping form.**	DDOT concurs.
4. Transit Service	**DDOT Comments/Action Items**
CTR Triggers for transit mode share **Guidelines:** A CTR is typically required to include some level analysis of the transit network, based on several	DDOT concurs.

potential factors. See Section 3.4.1 of the CTR guidelines to determine the minimum analysis requirements and if a more comprehensive transit analysis is required. If so, completion of the remainder of the *Transit Service* section of this scoping form is required. See Section 3.4.1 of the CTR guidelines	
CTR Transit study area **Guidelines:** If further analysis of the transit network is triggered, see Section 3.4.2 of the CTR guidelines for determining the requisite study area. **Proposed transit study area:** Per CTR guidelines, the transit study area will include an overview of all transit schedules and stops for service provided within a half mile for heavy rail and a quarter mile for bus and streetcar.	DDOT concurs.
Analysis of Transit Network **Guidelines:** Analysis of the transit network will incorporate both a quantitative and qualitative review. See Section 3.4.3 of the CTR guidelines for further information. **Proposed transit analysis:** An outline of the existing and proposed transit facilities that serve the site will be provided, as well as identifying the bus stops that are expected to be used by transit riders. As stated in the "Bicycle & Pedestrian" section above, desire lines between the site and adjacent bus stops, including crosswalk locations and building entrances, will be identified. The site plan's accommodation of transit service, including any changes to bus stops necessary due to development will be discussed. Future transit routes and stops will be examined and recommendations for improvements and/or consolidation of stops will be provided, if necessary. A summary of existing bus service (average headways and spans of service) will be provided, as well as an assessment of the existing condition of all transit stops in the study area (ADA compliance, bus shelters, benches, etc.) using the standards found in WMATA's *Guidelines for the Design and Placement of Transit Stops* (2009).	DDOT concurs.
Transit Trip Mitigation **Guidelines:** Proposed mitigation of transit impacts may be needed, given certain impacts to the network. See Section 3.4.4 of the CTR guidelines for more information. **For Informational purposes only. Mitigation will be documented in the final CTR. No information is required in scoping form.**	
5. Site Access and Loading	**DDOT Comments/Action Items**

Guidelines: At a minimum, the Applicant is required to show site access for vehicles, pedestrians and bicyclists. In addition, DDOT has additional policies for site access and loading as they relate to public space. See Section 3.5 of the CTR guidelines for additional information regarding these policies. ***Freight\Delivery*** The study will identify existing and proposed commercial vehicle access to the site. See Section 3.5.1 of the CTR guidelines. ***Motorcoach*** For developments that will generate significant tourist activity (hotels, museums, etc.) the study will discuss the site plan's accommodation of motorcoach access. See Section 3.5.2 of the CTR guidelines. **Proposed Loading Analysis:** The study will contain access diagrams showing circulation for loading, parking access, and pick-up/drop-off activity for the site. The study will include a discussion of how the access plan was developed and if it meets DDOTs requirements and standards. For freight/delivery trucks, truck routing maps will be included to show how trucks will travel to and from the site. Truck maneuvering diagrams (using AutoTURN) for all site driveways provided loading access will be provided in the application. Detailed truck maneuvering diagrams showing trucks accessing each loading dock for each building will be included in the application, as necessary. In addition, a discussion of loading activity including frequencies and size trucks will be discussed. No motorcoach activity is anticipated **Site Access:** We will include sigh distance evaluation for all proposed driveways per DDOT Design and Engineering Manual requirements.	DDOT Comment: Also include strategies/proposals in CTR for how the alley clean-up/shift/widening will occur. G/S: Noted DDOT concurs.
6. Parking	**DDOT Comments/Action Items**
Guidelines: Minimum requirements exist for documenting parking needs and constraints, regardless of development size. Further requirements may be needed for larger developments. See Section 3.6 **Proposed Parking Analysis:** The study will discuss the amount of parking planned for the site and will review the site's compliance with ZR16 minimum parking requirements.	DDOT Comment: also make note in CTR that there will be nothing separating AU spillover parking from residents and grocery store customers. Or if there is, document how this will work. G/S: Noted

An existing agreement between American University and the site lot requires the proposed development to carry forth 236 parking spaces for the use of American University. The development will provide approximately 370 below-grade parking spaces in three levels of below-grade parking. The first level of parking will contain approximately 85 parking spaces that are intended to be devoted to residential use. The second level of parking will contain approximately 106 parking spaces, of which approximately 49 parking spaces will be devoted to the grocery/retail uses on site. Finally, as required by the agreement with American University, approximately 57 parking spaces on the second level will be shared by the grocery/retail uses on site and the American University Admin Building to the south of the site and approximately 179 parking spaces on the third level will be shared between the residential uses on site and the American University Admin Building. Parking is planned to be priced at the market-rate. The CTR will include a Parking Management Plan. Specifically, the purpose of this PMP is to provide greater detail regarding layout of the garage, parking access and controls, car-share parking, the American University Administrative Building overflow parking agreement considerations, parking rates, bicycle parking, and enforcement.	DDOT concurs.
7. Transportation Demand Management	**DDOT Comments/Action Items**
Triggers for a TDM Plan **Guidelines:** All developments are encouraged to produce TDM plans, regardless of size. See Section 3.7 **Proposed TDM Plan:** The study will include a description of the recommended TDM plan for the overall development, including general recommendations for each land use. The TDM plan components will be compared to those recommended for projects of its size within DDOT's TDM guidelines.	DDOT concurs.
8. Performance Monitoring & Measurement	**DDOT Comments/Action Items**
Guidelines: Developments of a certain size may need to incorporate a performance monitoring element as a condition of zoning approval. See Section 3.8 of the CTR guidelines for more information. **For informational purposes only. Requirements for performance monitoring will be coordinated with the DDOT case manager.**	
9. Safety	**DDOT Comments/Action Items**
Guidelines: The CTR will demonstrate that the site will not create or exacerbate existing safety issues for all modes of travel. See Section 3.9 of the CTR guidelines for further information. **Proposed Safety Analysis:**	DDOT concurs.

Three years of crash data for all intersections within the roadway operations study area will be provided. Crash rates will be calculated per million entering vehicles for all intersections within the study area, and a breakdown of the number of bicycle and pedestrian crashes at these intersections will be provided. Crash data based on the level of detail provided by DDOT will be explored. Any intersection that has a crash rate greater than 1.0/MEV will be further examined for patterns that could indicate reasons why a high crash rate occurs. In addition, a review of each intersection for potential impacts with the development in place, including discussion if/how the development would affect the crash rate will be conducted. There will also be a review of the site access points and discuss how they will impact safety on the surrounding roadways.	
10. Streetscape/Public Realm	**DDOT Comments/Action Items**
Guidelines: DDOT expects new developments to rehabilitate streetscape infrastructure between the curb and property lines. The applicant must work closely with DDOT and OP to ensure that design of the public realm meets current standards. See Section 3.10 of the CTR guidelines for direction on streetscape rehabilitation. **These guidelines are provided to inform that public realm design standards may alter an Applicant's intended use of public space.**	DDOT concurs.
11. Miscellaneous	**DDOT Comments/Action Items**
	DDOT Comment: Include all other graphics and scoping elements from the 12.6.16 version of this form not explicitly called out above. DDOT will review both forms when the CTR is submitted to ensure they are all provided. G/S: Noted DDOT concurs.

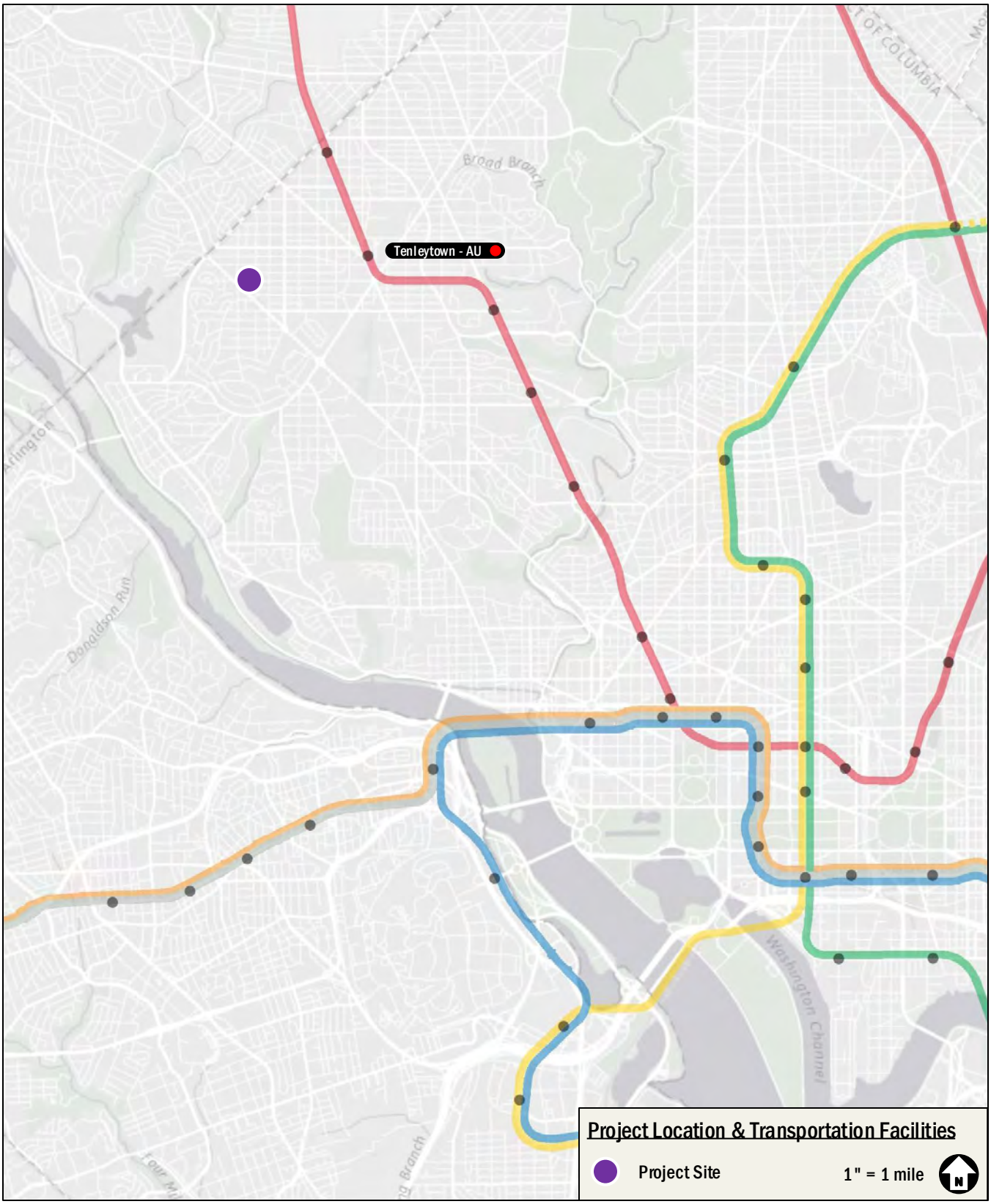
Information/Data Requests (List requested data from DDOT after each field below):

- District planning documents:
- Local planning documents, including small area plans:
- Information on programmed and/or funded roadway improvements in study area:
- Studies for background developments in study area:
- Signal Timings:
- Crash Data:

Proposed Schedule:

- DDOT comments on Scoping Document: November 13, 2017, November 14, 2017
- Transportation Consultant/Applicant responses to comments:
- Phase I Completion:
- Phase II Completion:
- Submission of Report to DDOT:
- Zoning Commission or BZA Hearing Date:

Attach any Figures, Tables, and Appendices here:


Tenleytown - AU
Broad Branch
Donaldson Run
Washington Channel
Project Location & Transportation Facilities
Project Site
1" = 1 mile
N

Alton Pl
49th St
48th St
Yuma St
SITE
Windom Pl
Massachusetts Ave
Massachusetts Ave
Warren St
Fordham Rd
48th Pl
Project Site
N
1" = 200'

Dalecarlia Dr
Wetherill Rd
Butterworth Pl
Butterworth Pl
Butterworth Pl
Albemarle St
Albemarle St
47th St
Massachusetts Ave
Dalecarlia Pkwy
Yuma St
Alton Pl
Alton Pl
48th St
Yuma Pl
Yuma St
Yuma St
SITE
Windom Pl
Windom Pl
46th St
Warren Pl
52nd St
49th St
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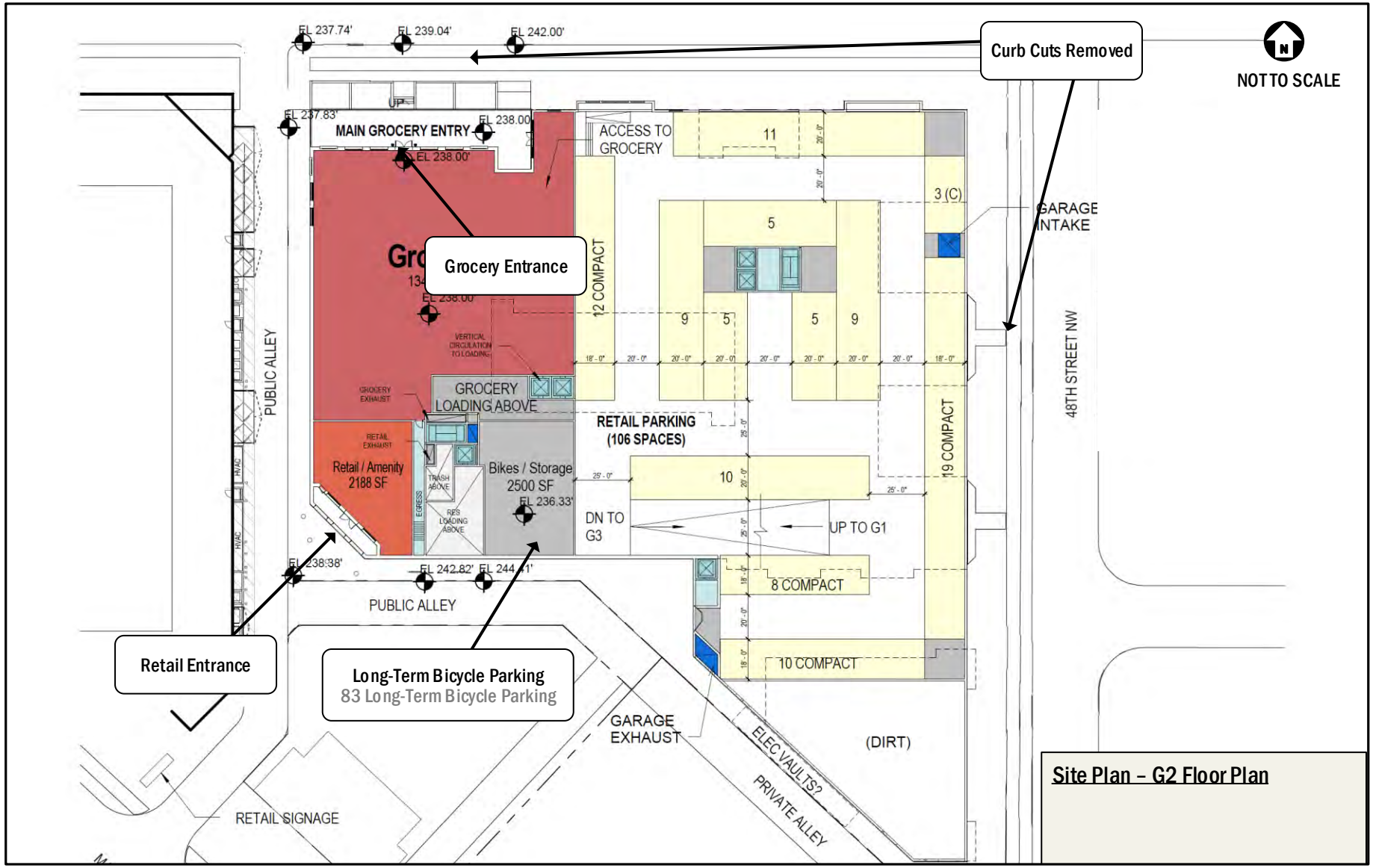
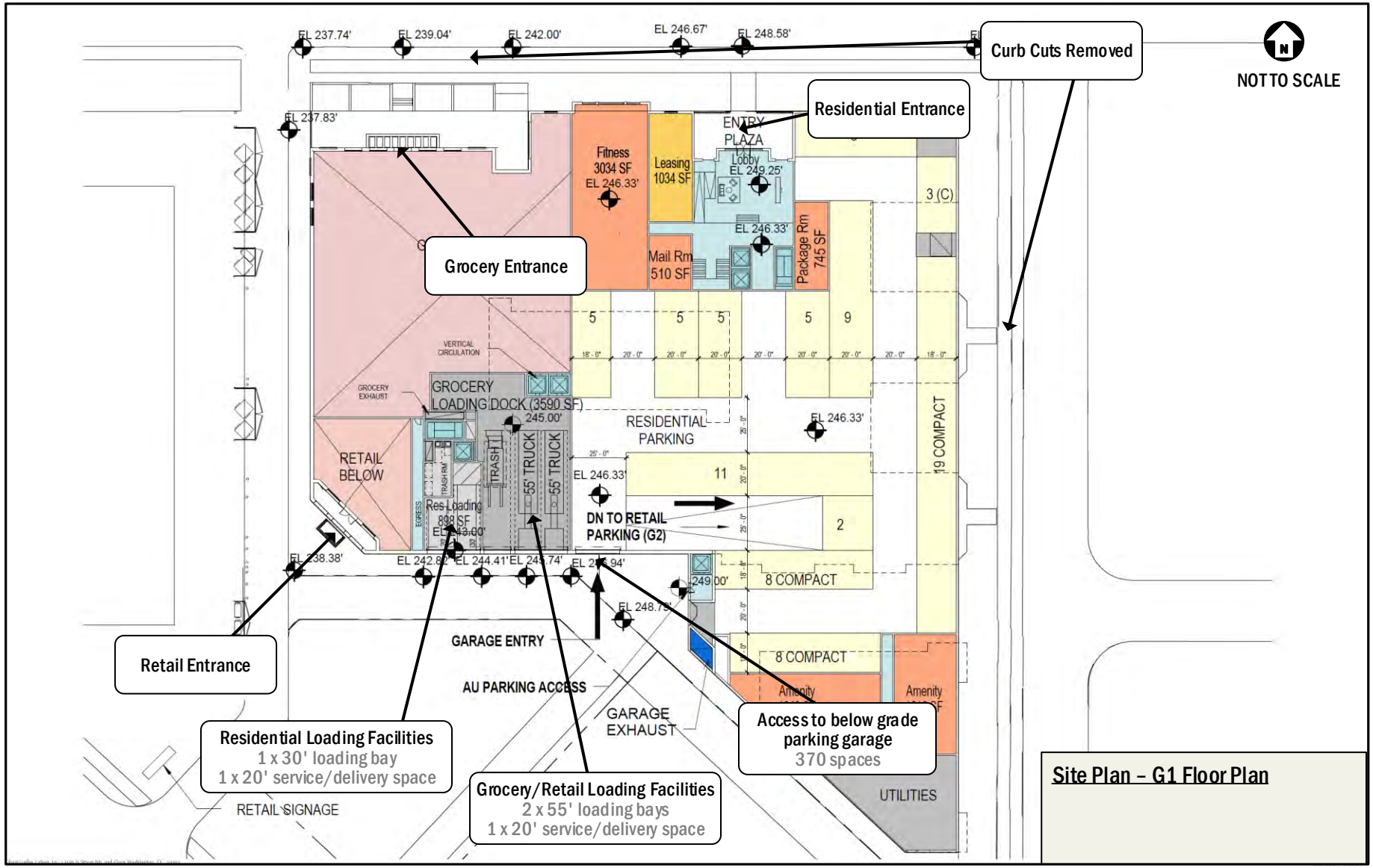
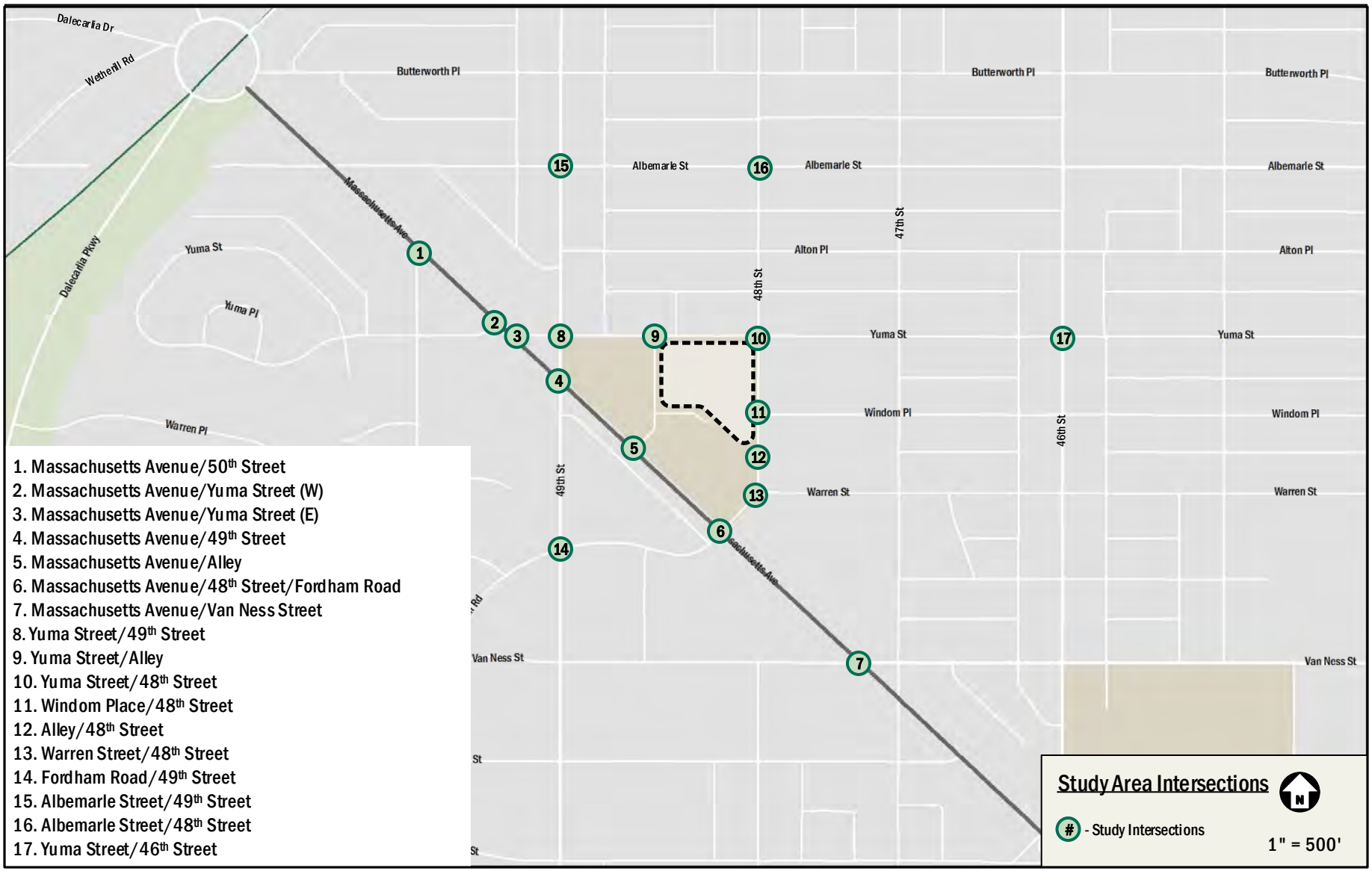
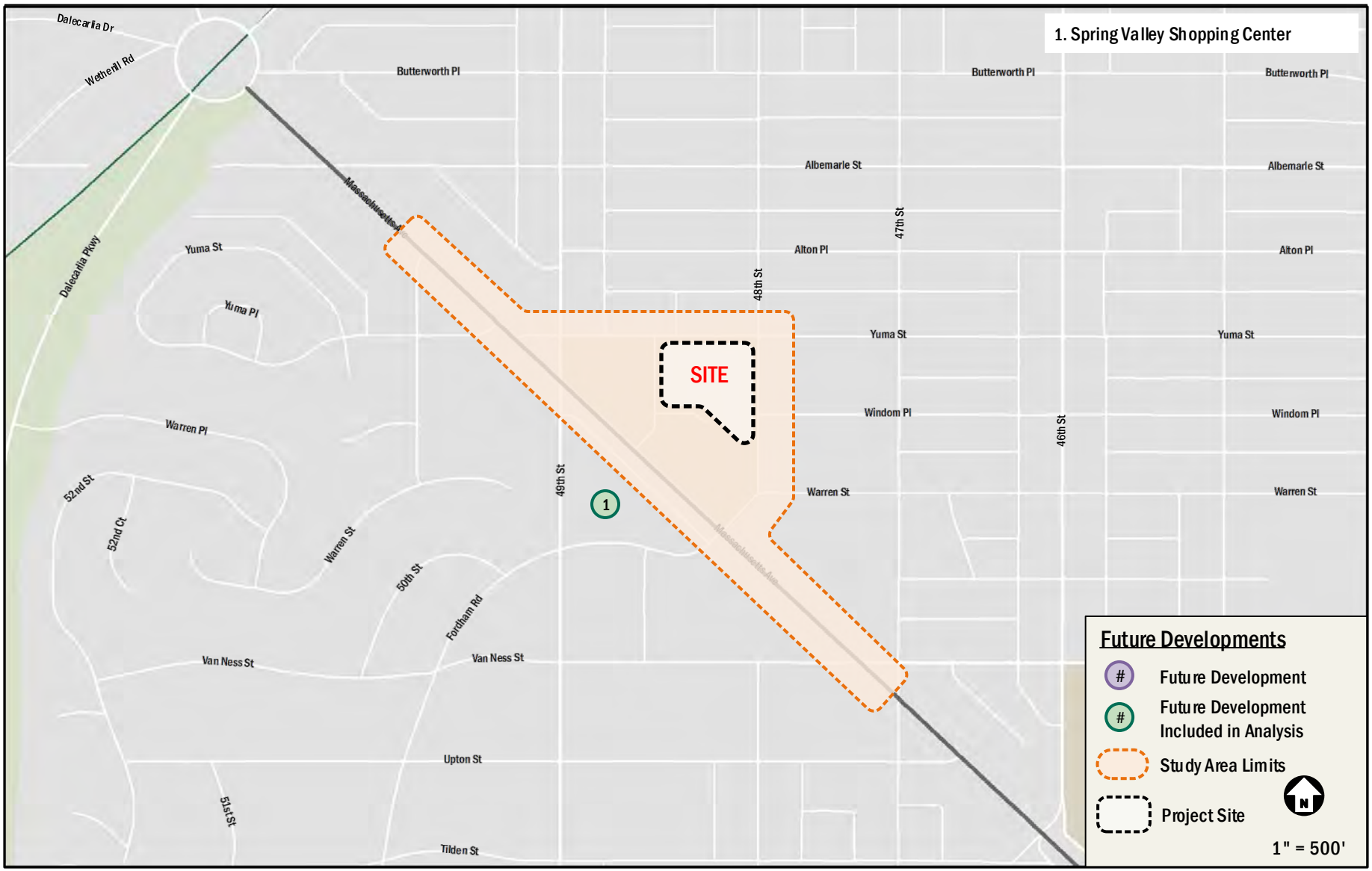
Warren St
52nd Ct
Warren St
Massachusetts Ave
50th St
Fordham Rd
Van Ness St
Van Ness St
Van Ness St
Upton St
Springdale St
45th St
Sedgwick St
Tilden St
Study Area
Project Site
N
1" = 500'

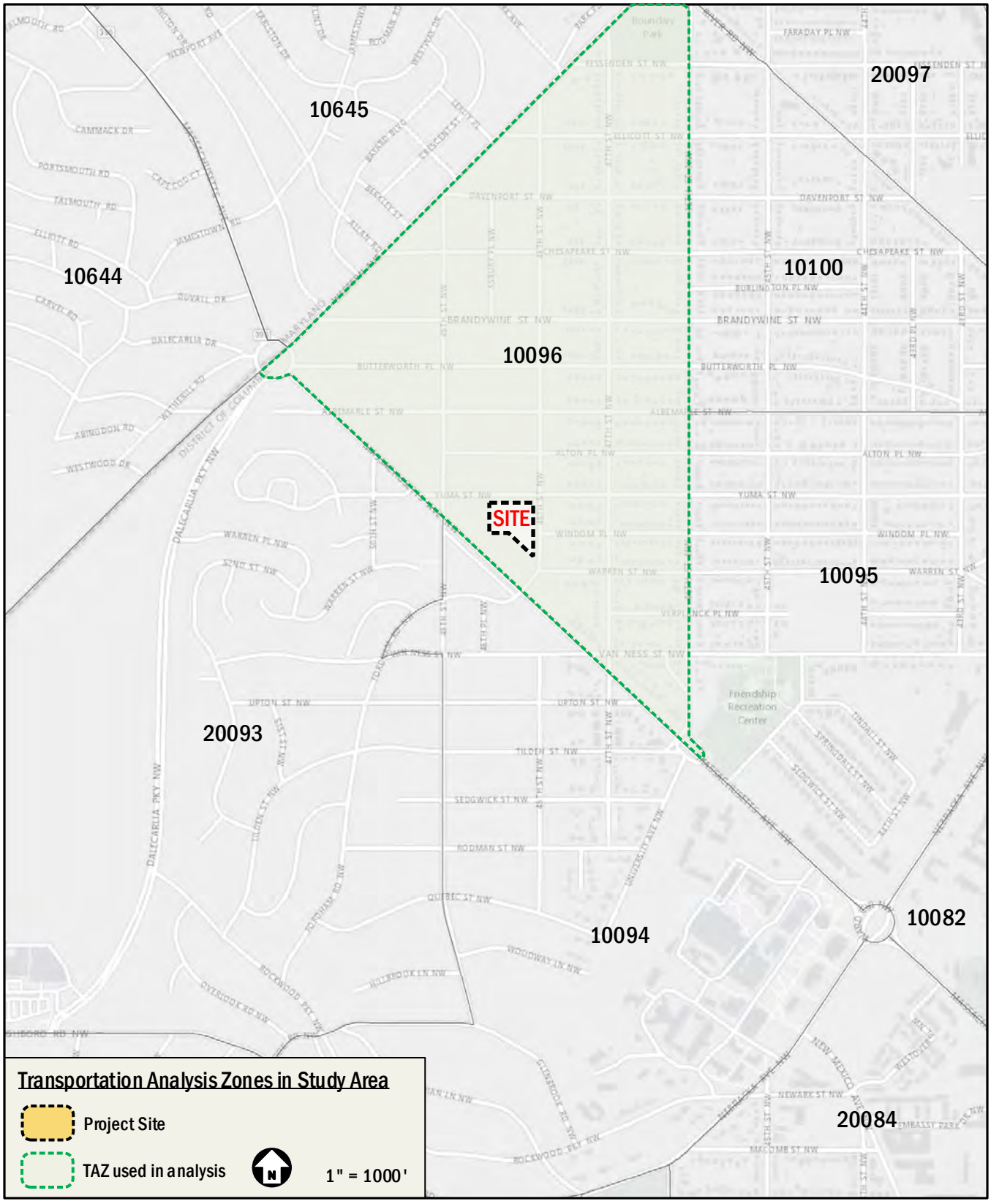

Curb Cuts Removed
NOT TO SCALE
Grocery Entrance
Retail Entrance
Long-Term Bicycle Parking
83 Long-Term Bicycle Parking
MAIN GROCERY ENTRY
ACCESS TO GROCERY
GARAGE INTAKE
GROCERY LOADING ABOVE
RETAIL PARKING (106 SPACES)
Retail / Amenity 2188 SF
Bikes / Storage 2500 SF
DN TO G3
UP TO G1
12 COMPACT
19 COMPACT
8 COMPACT
10 COMPACT
PUBLIC ALLEY
48TH STREET NW
GARAGE EXHAUST
ELEC VAULTS?
PRIVATE ALLEY
(DIRT)
RETAIL SIGNAGE
Site Plan – G2 Floor Plan


Curb Cuts Removed
NOT TO SCALE
Residential Entrance
Grocery Entrance
Retail Entrance
Residential Loading Facilities
1 x 30' loading bay
1 x 20' service/delivery space
Grocery/Retail Loading Facilities
2 x 55' loading bays
1 x 20' service/delivery space
Access to below grade parking garage
370 spaces
Site Plan – G1 Floor Plan
ENTRY PLAZA
Lobby
Fitness 3034 SF
Leasing 1034 SF
Mail Rm 510 SF
Package Rm 745 SF
GROCERY LOADING DOCK (3590 SF)
RESIDENTIAL PARKING
RETAIL BELOW
DN TO RETAIL PARKING (G2)
GARAGE ENTRY
AU PARKING ACCESS
GARAGE EXHAUST
UTILITIES
RETAIL SIGNAGE
8 COMPACT
19 COMPACT
3 (C)
55' TRUCK
TRASH
VERTICAL CIRCULATION
GROCERY EXHAUST
Amenity

Curb Cuts Removed
NOT TO SCALE
Residential Entrance
Grocery Entrance
Residential Entrance
Windom Walk
Retail Entrance
Residential Entrance
Site Plan – First Floor Plan


1. Massachusetts Avenue/50th Street
2. Massachusetts Avenue/Yuma Street (W)
3. Massachusetts Avenue/Yuma Street (E)
4. Massachusetts Avenue/49th Street
5. Massachusetts Avenue/Alley
6. Massachusetts Avenue/48th Street/Fordham Road
7. Massachusetts Avenue/Van Ness Street
8. Yuma Street/49th Street
9. Yuma Street/Alley
10. Yuma Street/48th Street
11. Windom Place/48th Street
12. Alley/48th Street
13. Warren Street/48th Street
14. Fordham Road/49th Street
15. Albemarle Street/49th Street
16. Albemarle Street/48th Street
17. Yuma Street/46th Street
Study Area Intersections
- Study Intersections
1" = 500'
Butterworth Pl
Albemarle St
Alton Pl
Yuma St
Windom Pl
Warren St
Van Ness St
Massachusetts Ave
47th St
48th St
49th St
46th St
Dalecarlia Dr
Wetherill Rd
Dalecarlia Pkwy
Yuma Pl
Warren Pl


1. Spring Valley Shopping Center
Dalecarlia Dr
Wetherill Rd
Butterworth Pl
Butterworth Pl
Butterworth Pl
Albemarle St
Albemarle St
Massachusetts Ave
47th St
Alton Pl
Alton Pl
Dalecarlia Pkwy
Yuma St
48th St
Yuma Pl
Yuma St
Yuma St
SITE
Windom Pl
Windom Pl
Warren Pl
46th St
52nd St
49th St
Warren St
Warren St
1
52nd Ct
Warren St
50th St
Fordham Rd
Van Ness St
Van Ness St
Upton St
51st St
Tilden St
Future Developments
Future Development
Future Development Included in Analysis
Study Area Limits
Project Site
N
1" = 500'


10645
20097
10644
10100
10096
SITE
10095
20093
10094
10082
20084
Transportation Analysis Zones in Study Area
Project Site
TAZ used in analysis
1" = 1000'

Mode Split Assumptions

Residential Component

Description of residential component of project:

Approximately 219 residential units

Pertinent Mode Split data from other sources:

Information Source	Mode						
	SOV	Carpool	Transit	Bike	Walk	Telecommute	Other
Census Data - Census Tract (10.01/9.01)	38%	8%	27%	5%	8%	12%	2%
CTPP - TAZ Residents (10096)	36%	8%	24%	13%	4%	11%	4%
State of the Commute (of District residents)	41%	7%	41%	11%		---	
WMATA Ridership Survey (residential sites Suburban-Inside the Beltway)	39%		49%	14%		---	

Mode Split assumed in TIS:

Land Use	Mode				
	Drive	Transit	Bike	Walk	Telecommute/Other
Residential Mode Split	90%	5%	2%	3%	---

Notes: Data from comparable sites was examined. It was determined that a conservative 90% auto mode split was appropriate based on the number of allocated parking spaces and location of site.

Grocery Component

Description of retail component of project:

Grocery/Retail (16,000 square feet) - All assumed grocery for conservative analysis

Pertinent Mode Split data from other sources:

Information Source	Mode						
	SOV	Carpool	Transit	Bike	Walk	Telecommute	Other
WMATA Ridership Survey (Ballston Common)	43%		30%	27%		---	
WMATA Ridership Survey (Crystal City - Crystal Plaza Shops)	24%		41%	35%		---	
WMATA Ridership Survey (Silver Spring N'hood Center)	67%		19%	14%		---	

Mode Split assumed in TIS:

Information Source	Mode				
	Drive	Transit	Bike	Walk	Telecommute/Other
Grocery Mode Split	90%	0%	2%	8%	---

Notes: Data from comparable sites was examined. It was determined that a conservative 90% auto mode split was appropriate based on the number of allocated parking spaces and location of site.

Table 1 - Residential Trip Generation

Note: Approximately 219 dwelling units

Step 1: Base trip generation using ITEs' *Trip Generation*

Land Use	Land Use Code	Quantity (x)	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Residential	220	219 du	22 veh/hr	89 veh/hr	111 veh/hr	90 veh/hr	48 veh/hr	138 veh/hr
		Calculation Details:	*20%*	*80%*	*=0.49(x)+3.73*	*65%*	*35%*	*=0.55(x)+17.65*

Step 2: Convert to people per hour, before applying mode splits

Land Use	People/Car (from 2009 NHTS, Table 16)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Residential	1.13 ppl/veh	25 ppl/hr	100 ppl/hr	125 ppl/hr	102 ppl/hr	54 ppl/hr	156 ppl/hr

Step 3: Split between modes, per assumed Mode Splits

Land Use	Mode	Split	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Residential	Auto	90%	23 ppl/hr	90 ppl/hr	113 ppl/hr	92 ppl/hr	48 ppl/hr	140 ppl/hr
Residential	Transit	5%	1 ppl/hr	5 ppl/hr	6 ppl/hr	5 ppl/hr	3 ppl/hr	8 ppl/hr
Residential	Bike	2%	1 ppl/hr	2 ppl/hr	3 ppl/hr	2 ppl/hr	1 ppl/hr	3 ppl/hr
Residential	Walk	3%	1 ppl/hr	3 ppl/hr	4 ppl/hr	3 ppl/hr	2 ppl/hr	5 ppl/hr

Step 4: Convert auto trips back to vehicles/hour

Land Use	People/Car (from 2009 NHTS, Table 16)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Residential	1.13 ppl/veh	20 veh/hr	80 veh/hr	100 veh/hr	81 veh/hr	43 veh/hr	124 veh/hr

Trip Gen Summary for Residential (219 du)

Mode	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Auto	20 veh/hr	80 veh/hr	100 veh/hr	81 veh/hr	43 veh/hr	124 veh/hr
Transit	1 ppl/hr	5 ppl/hr	6 ppl/hr	5 ppl/hr	3 ppl/hr	8 ppl/hr
Bike	1 ppl/hr	2 ppl/hr	3 ppl/hr	2 ppl/hr	1 ppl/hr	3 ppl/hr
Walk	1 ppl/hr	3 ppl/hr	4 ppl/hr	3 ppl/hr	2 ppl/hr	5 ppl/hr

Table 2 - Grocery and Retail Trip Generation

Note: Grocery/Retail (16,000 square feet) - All assumed grocery for conservative analysis

Step 1: Base trip generation using ITEs' *Trip Generation*

Land Use	Land Use Code	Quantity (x)	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Grocery	850	16,000 sf	33 veh/hr	21 veh/hr	54 veh/hr	103 veh/hr	98 veh/hr	201 veh/hr
		Calculation Details:	*62%*	*38%*	*=3.40(x/1000)*	*51%*	*49%*	*=0.74(x/1000)+3.25*

Step 2: Convert to people per hour, before applying mode splits

Land Use	People/Car (from 2009 NHTS, Table 16)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Grocery	1.84 ppl/veh	61 ppl/hr	38 ppl/hr	99 ppl/hr	190 ppl/hr	180 ppl/hr	370 ppl/hr

Step 3: Split between modes, per assumed Mode Splits

Land Use	Mode	Split	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Grocery	Auto	90%	55 ppl/hr	34 ppl/hr	89 ppl/hr	171 ppl/hr	162 ppl/hr	333 ppl/hr
Grocery	Transit	0%	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr
Grocery	Bike	2%	1 ppl/hr	1 ppl/hr	2 ppl/hr	4 ppl/hr	3 ppl/hr	7 ppl/hr
Grocery	Walk	8%	5 ppl/hr	3 ppl/hr	8 ppl/hr	15 ppl/hr	15 ppl/hr	30 ppl/hr

Step 4: Convert auto trips back to vehicles/hour

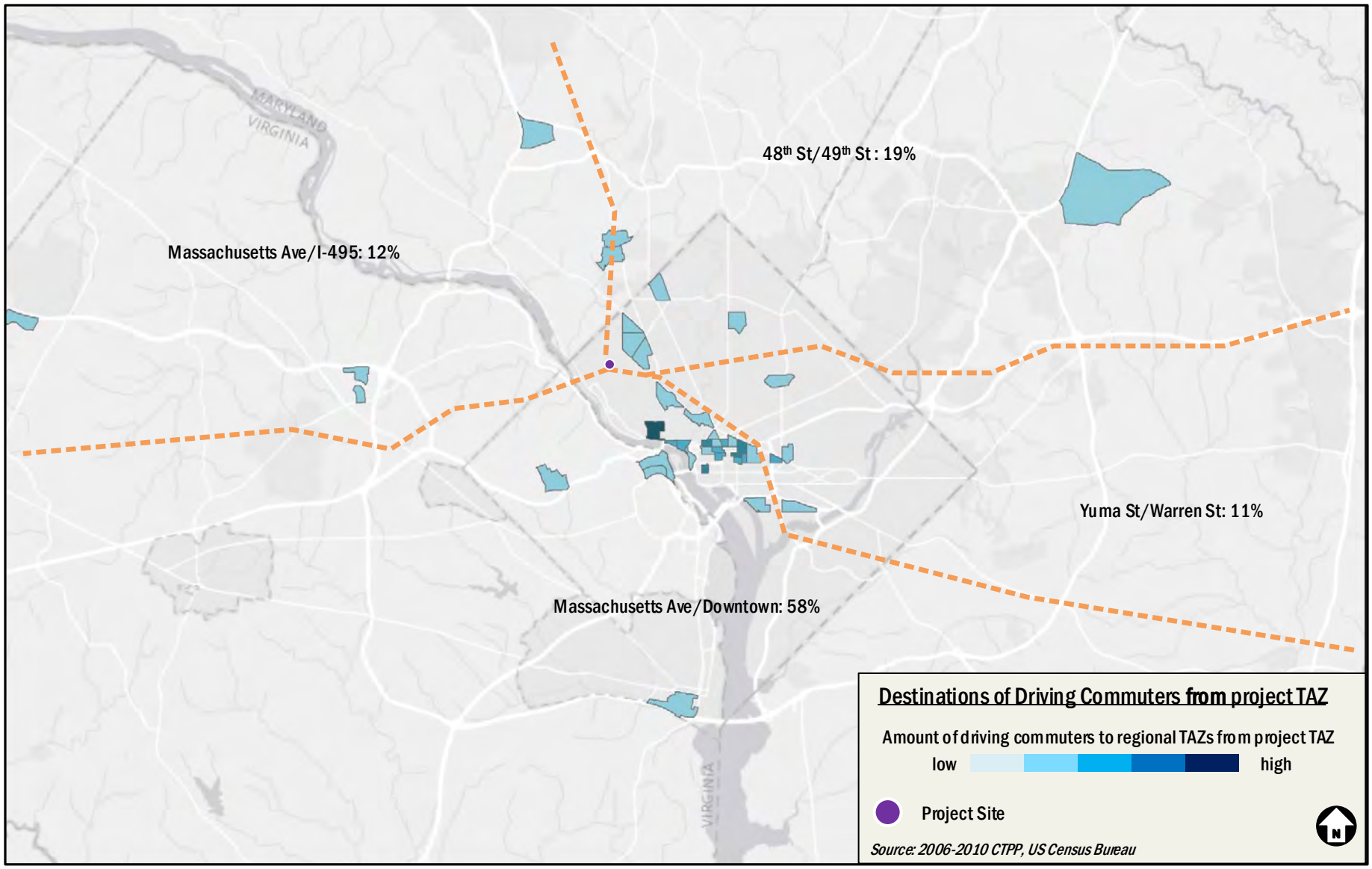
Land Use	People/Car (from 2009 NHTS, Table 16)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Grocery	1.84 ppl/veh	30 veh/hr	18 veh/hr	48 veh/hr	93 veh/hr	88 veh/hr	181 veh/hr

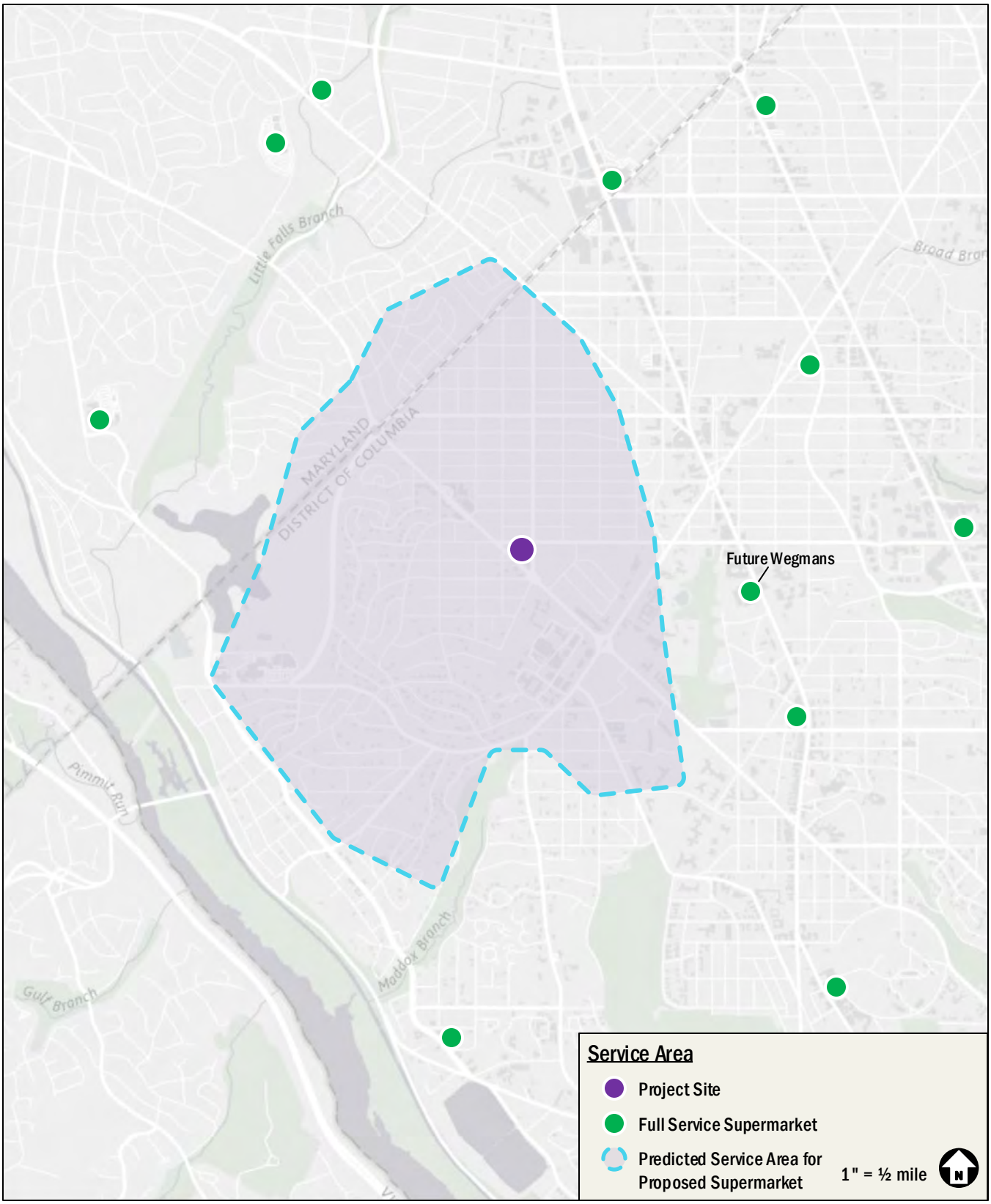
Trip Gen Summary for Grocer (16 ksf)

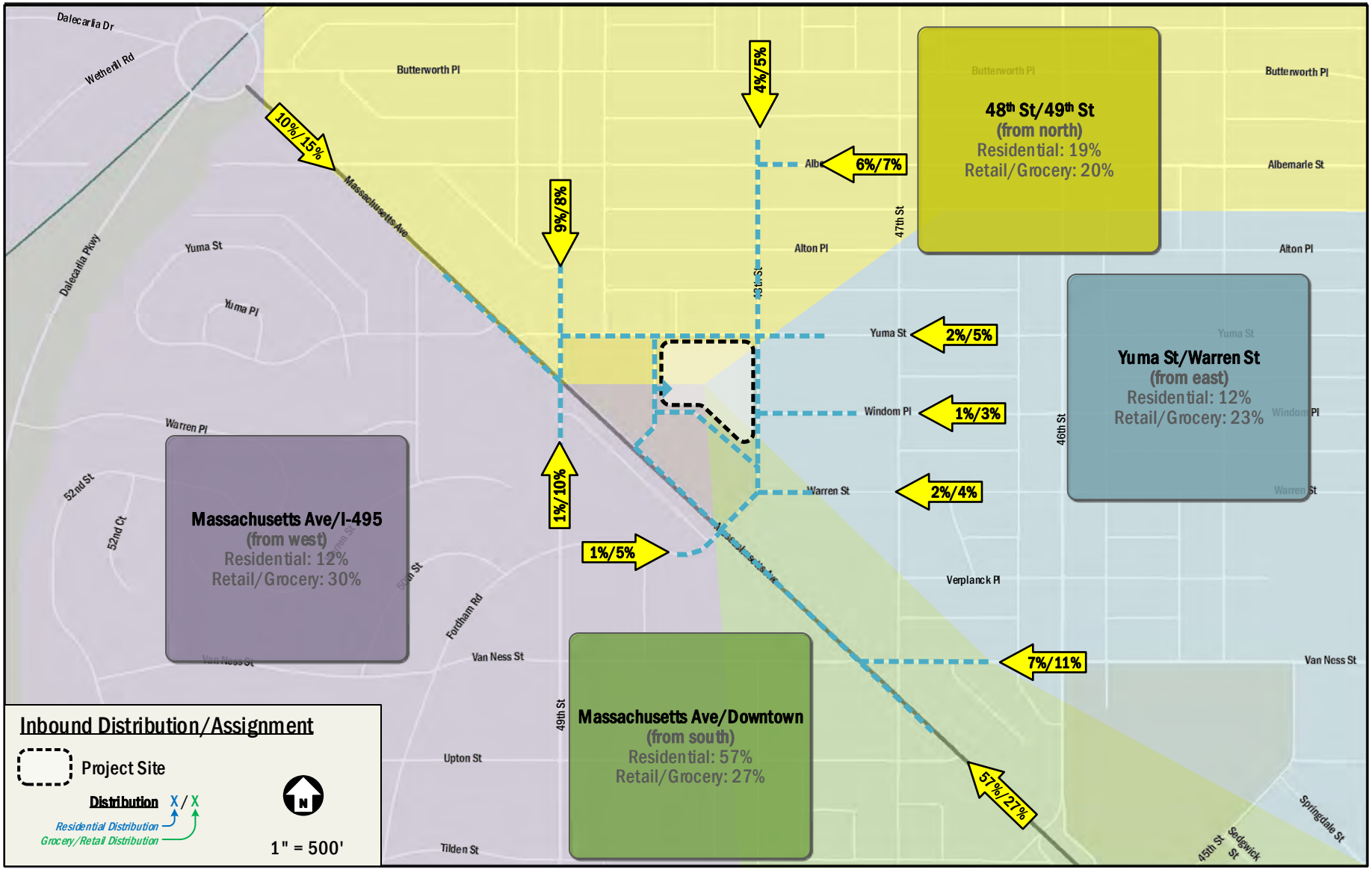
Mode	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Auto	30 veh/hr	18 veh/hr	48 veh/hr	93 veh/hr	88 veh/hr	181 veh/hr
Transit	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr
Bike	1 ppl/hr	1 ppl/hr	2 ppl/hr	4 ppl/hr	3 ppl/hr	7 ppl/hr
Walk	5 ppl/hr	3 ppl/hr	8 ppl/hr	15 ppl/hr	15 ppl/hr	30 ppl/hr

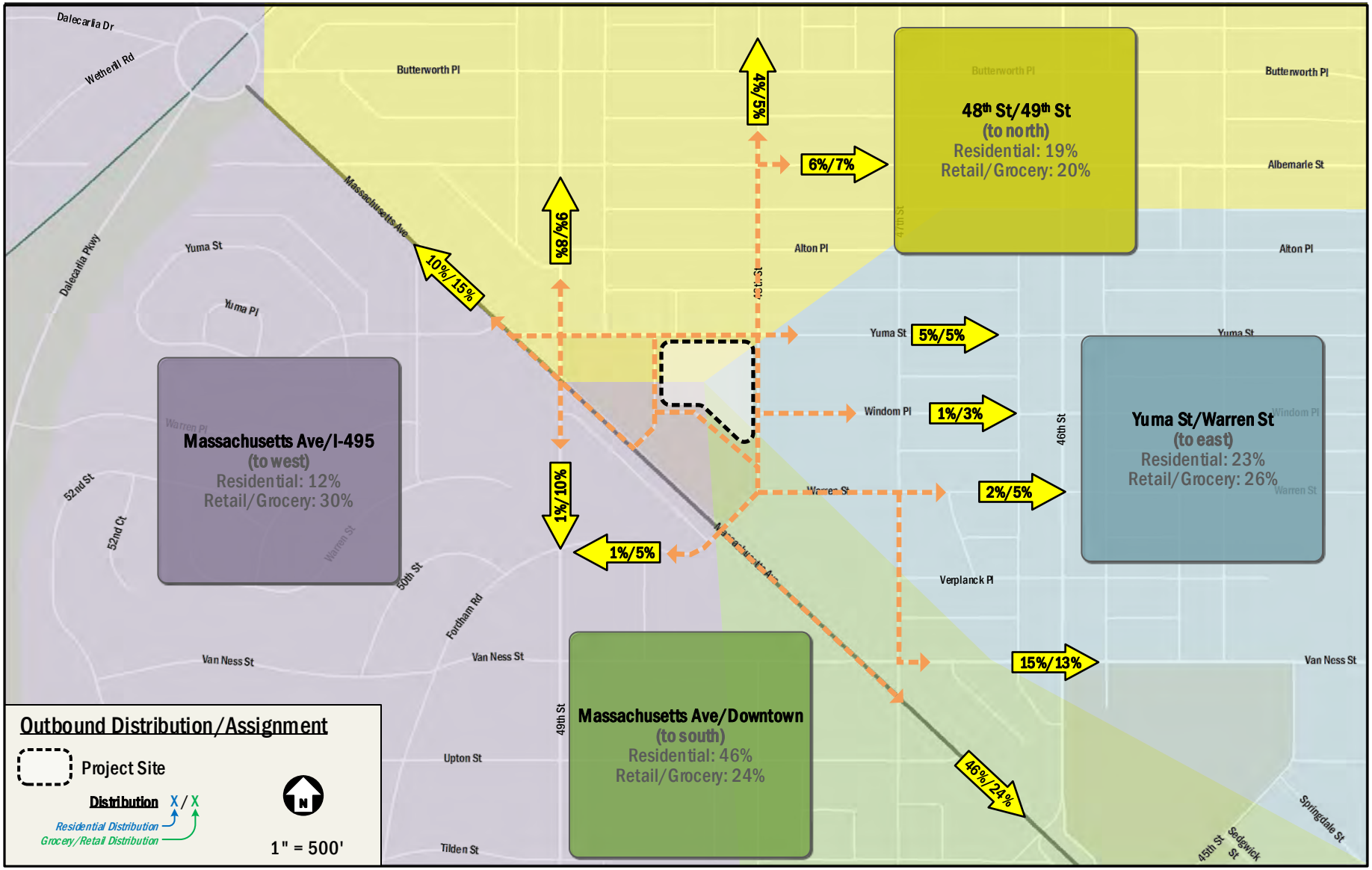
Trip Gen Summary by Land Use/Mode

Mode	Land Use	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Auto	Residential	20 veh/hr	80 veh/hr	100 veh/hr	81 veh/hr	43 veh/hr	124 veh/hr
Auto	Grocery	30 veh/hr	18 veh/hr	48 veh/hr	93 veh/hr	88 veh/hr	181 veh/hr
Auto	**Total**	**50 veh/hr**	**98 veh/hr**	**148 veh/hr**	**174 veh/hr**	**131 veh/hr**	**305 veh/hr**
Transit	Residential	1 ppl/hr	5 ppl/hr	6 ppl/hr	5 ppl/hr	3 ppl/hr	8 ppl/hr
Transit	Grocery	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr
Transit	**Total**	**1 ppl/hr**	**5 ppl/hr**	**6 ppl/hr**	**5 ppl/hr**	**3 ppl/hr**	**8 ppl/hr**
Bike	Residential	1 ppl/hr	2 ppl/hr	3 ppl/hr	2 ppl/hr	1 ppl/hr	3 ppl/hr
Bike	Grocery	1 ppl/hr	1 ppl/hr	2 ppl/hr	4 ppl/hr	3 ppl/hr	7 ppl/hr
Bike	**Total**	**2 ppl/hr**	**3 ppl/hr**	**5 ppl/hr**	**6 ppl/hr**	**4 ppl/hr**	**10 ppl/hr**
Walk	Residential	1 ppl/hr	3 ppl/hr	4 ppl/hr	3 ppl/hr	2 ppl/hr	5 ppl/hr
Walk	Grocery	5 ppl/hr	3 ppl/hr	8 ppl/hr	15 ppl/hr	15 ppl/hr	30 ppl/hr
Walk	**Total**	**6 ppl/hr**	**6 ppl/hr**	**12 ppl/hr**	**18 ppl/hr**	**17 ppl/hr**	**35 ppl/hr**

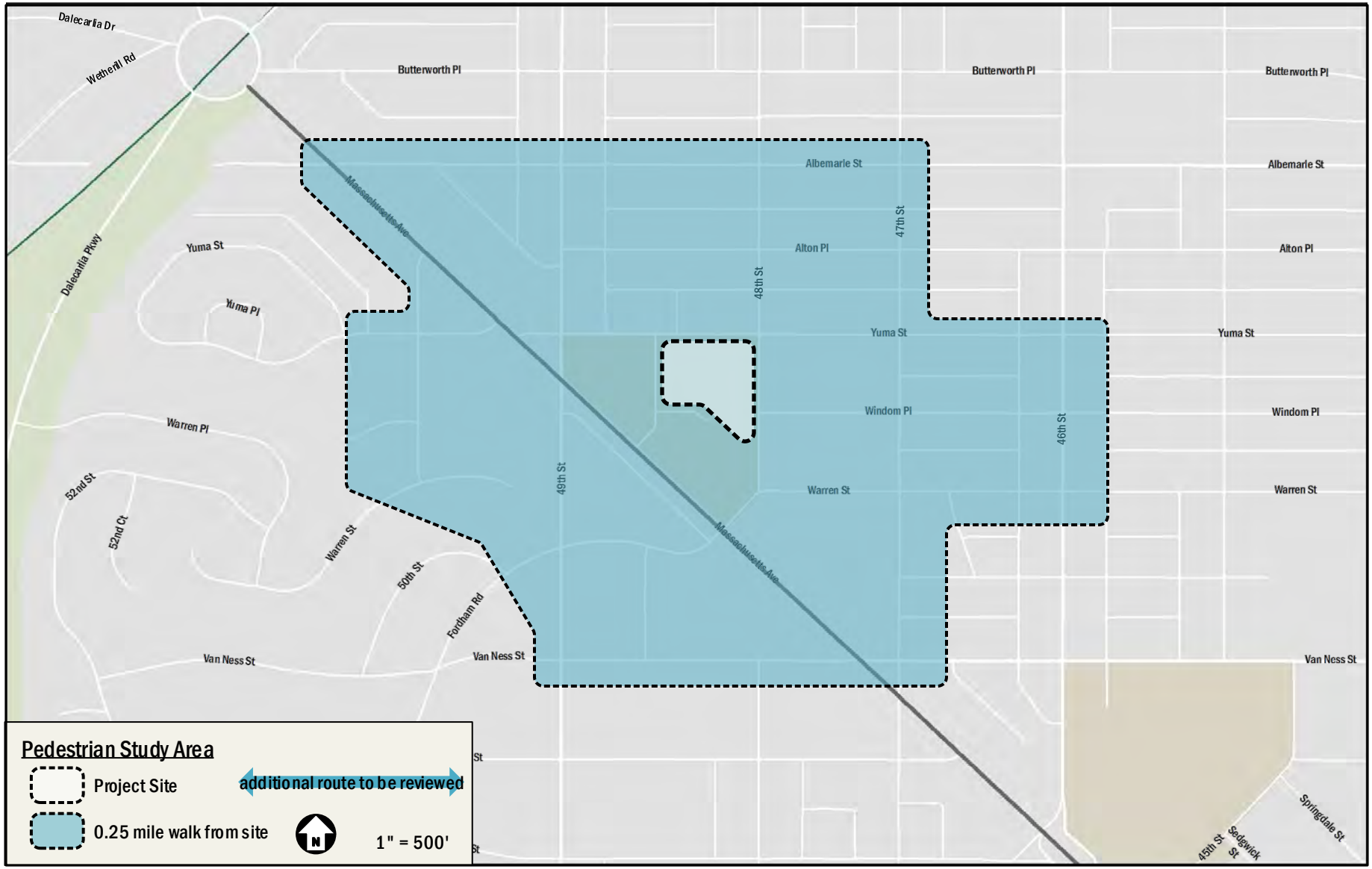

MARYLAND
VIRGINIA
48th St/49th St: 19%
Massachusetts Ave/I-495: 12%
Yuma St/Warren St: 11%
Massachusetts Ave/Downtown: 58%
VIRGINIA
Destinations of Driving Commuters from project TAZ
Amount of driving commuters to regional TAZs from project TAZ
low
high
Project Site
Source: 2006-2010 CTPP, US Census Bureau
N


Little Falls Branch
MARYLAND
DISTRICT OF COLUMBIA
Future Wegmans
Pimmit Run
Gulf Branch
Maddox Branch
Service Area
Project Site
Full Service Supermarket
Predicted Service Area for Proposed Supermarket
1" = ½ mile
N

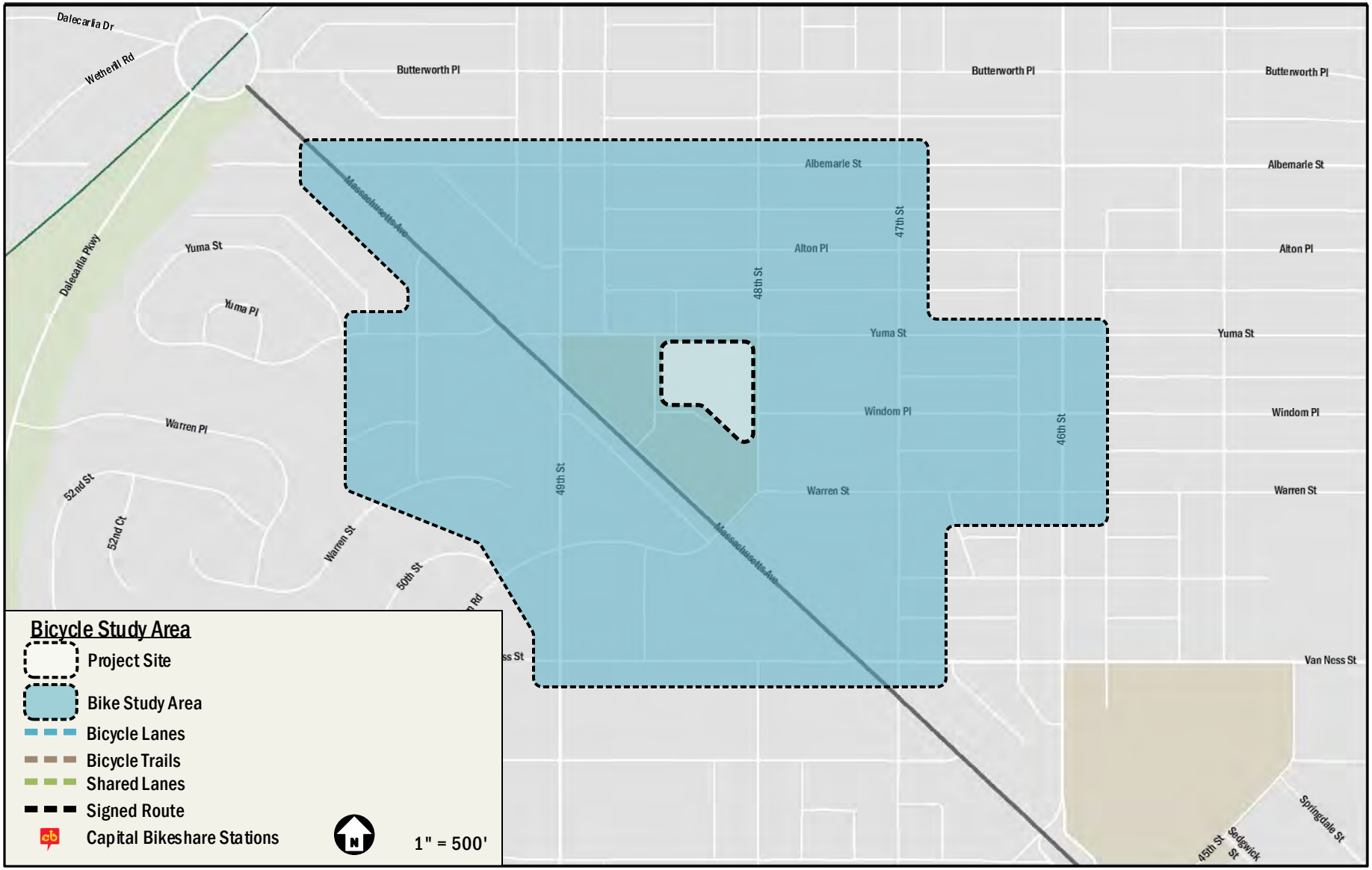

Dalecarlia Dr
Wetherill Rd
Butterworth Pl
10%/15%
Massachusetts Ave
4%/5%
48th St/49th St
(from north)
Residential: 19%
Retail/Grocery: 20%
6%/7%
Albemarle St
9%/8%
Alton Pl
47th St
43rd St
Dalecarlia Pkwy
Yuma St
Yuma Pl
2%/5%
Yuma St/Warren St
(from east)
Residential: 12%
Retail/Grocery: 23%
Windom Pl
1%/3%
46th St
Warren Pl
52nd St
52nd Ct
Massachusetts Ave/I-495
(from west)
Residential: 12%
Retail/Grocery: 30%
1%/10%
Warren St
2%/4%
1%/5%
Verplanck Pl
50th St
Fordham Rd
Van Ness St
7%/11%
49th St
Massachusetts Ave/Downtown
(from south)
Residential: 57%
Retail/Grocery: 27%
Upton St
57%/27%
Springdale St
45th St
Sedgwick St
Tilden St
Inbound Distribution/Assignment
Project Site
Distribution X / X
Residential Distribution
Grocery/Retail Distribution
N
1" = 500'


Dalecarlia Dr
Wetherill Rd
Butterworth Pl
Massachusetts Ave
Dalecarlia Pkwy
Yuma St
Yuma Pl
Alton Pl
Albemarle St
Windom Pl
Warren Pl
Warren St
52nd St
52nd Ct
50th St
Fordham Rd
Van Ness St
49th St
Upton St
Tilden St
46th St
Verplanck Pl
45th St
Sedgwick St
Springdale St
48th St/49th St
(to north)
Residential: 19%
Retail/Grocery: 20%
Massachusetts Ave/I-495
(to west)
Residential: 12%
Retail/Grocery: 30%
Yuma St/Warren St
(to east)
Residential: 23%
Retail/Grocery: 26%
Massachusetts Ave/Downtown
(to south)
Residential: 46%
Retail/Grocery: 24%
4%/5%
6%/7%
8%/6%
10%/15%
5%/5%
1%/3%
2%/5%
1%/10%
1%/5%
15%/13%
46%/24%
Outbound Distribution/Assignment
Project Site
Distribution X / X
Residential Distribution
Grocery/Retail Distribution
N
1" = 500'

CTR Thresholds	Threshold	Project	Met?
General CTR Requirements			
Forecasted person-trips during the peak hour	50	526	Yes
Forecasted parking demand (spaces)	20	370	Yes
Amount of commercial development	5,000 sf	16,000 sf	Yes
Amount of residential development	20 units	219 units	Yes
CTR Trigger for Further Analysis - Vehicular			
Vehicle trips in the peak direction at peak times	25	174	Yes
CTR Trigger for Further Analysis - Bike & Pedestrian			
Amount of residential development	200 units	219 units	Yes
Amount of commercial development	50,000 sf	16,000 sf	No
Site ecompasses more than a small block-grid	Yes	No	No
Combined peak hour ped/bike trip generation	100	45	No
CTR Trigger for Further Analysis - Transit			
Peak hour transit trip generation	50	14	No
Project Transit Mode Split	30%	Varies	No


Dalecarlia Dr
Wetherill Rd
Butterworth Pl
Butterworth Pl
Butterworth Pl
Albemarle St
Albemarle St
Massachusetts Ave
47th St
Alton Pl
Alton Pl
48th St
Dalecarlia Pkwy
Yuma St
Yuma Pl
Yuma St
Yuma St
Windom Pl
Windom Pl
Warren Pl
46th St
52nd St
49th St
Warren St
Warren St
Massachusetts Ave
52nd Ct
Warren St
50th St
Fordham Rd
Van Ness St
Van Ness St
Van Ness St
Springdale St
45th St
Sedgwick St
Pedestrian Study Area
Project Site
additional route to be reviewed
0.25 mile walk from site
N
1" = 500'

Dalecarlia Dr
Wetherill Rd
Butterworth Pl
Butterworth Pl
Butterworth Pl
Albemarle St
Albemarle St
Massachusetts Ave
47th St
Dalecarlia Pkwy
Yuma St
Alton Pl
Alton Pl
Spring Valley Shopping Center
0.1 miles (2 min)
48th St
Yuma Pl
Yuma St
Yuma St
United Bank
0.1 miles (2 min)
SITE
Windom Pl
Windom Pl
Warren Pl
46th St
49th St
American University
0.1 miles (2 min)
Warren St
52nd St
52nd Ct
Spring Valley Shopping Center
0.1 miles (2 min)
Warren St
50th St
Massachusetts Ave
Fordham Rd
Van Ness St
Van Ness St
Van Ness St
Pedestrian Pathways
- Destination
- Development Site
- Pedestrian Route
- Pedestrian Barrier
1" = 1000'
N
Upton St
Friendship Park
0.6 miles (13 min)
Springdale St
45th St
Sedgwick St
Tilden St


Dalecarlia Dr
Wetherill Rd
Butterworth Pl
Butterworth Pl
Butterworth Pl
Albemarle St
Albemarle St
Massachusetts Ave
47th St
Alton Pl
Alton Pl
48th St
Dalecarlia Pkwy
Yuma St
Yuma Pl
Yuma St
Yuma St
Windom Pl
Windom Pl
Warren Pl
46th St
52nd St
49th St
Warren St
Warren St
52nd Ct
Warren St
50th St
Massachusetts Ave
Van Ness St
Springdale St
45th St
Sedgwick St
Bicycle Study Area
Project Site
Bike Study Area
Bicycle Lanes
Bicycle Trails
Shared Lanes
Signed Route
Capital Bikeshare Stations
N
1" = 500'

Background Growth Information & Assumptions **Massachusetts Avenue NW (1 of 3)**

4330 48th Street NW

Project Timeline

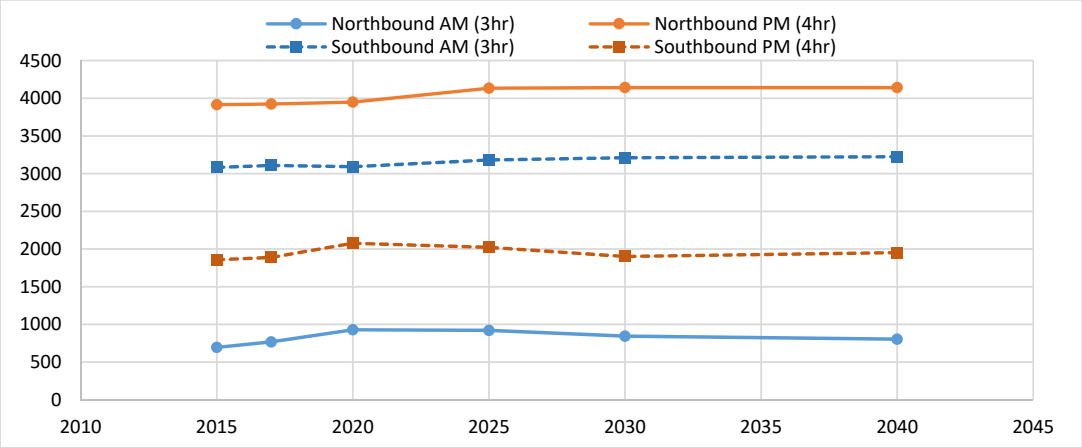
Data Collection: 2016 Project Completion 2021

Background Growth Data

Source 1: MWCOG Model Volumes (version 2.3.57a)

Segment: Massachusetts Avenue NW between 50th Street NW and 49th Street NW

Direction/Period	Modeled Year 2015	2017	2020	2025	2030	2040	Annual Growth: 2015 to 2020
Northbound AM (3hr)	695	767	928	920	843	803	**+5.95%**
Northbound PM (4hr)	3915	3924	3948	4134	4141	4141	**+0.17%**
Southbound AM (3hr)	3082	3109	3092	3180	3210	3224	**+0.06%**
Southbound PM (4hr)	1857	1889	2076	2022	1900	1951	**+2.25%**



Source 2: Historical DDOT AADTs

Segment: Massachusetts Avenue NW between 46th Street and 49th Street

	2011	2012	2013	2014
AADT (in 1000s):	17.0	18.6	18.7	19.0

Annual growth since:	2011	2012	2013	2014
	+3.8%	+1.1%	+1.6%	n/a

Proposed Growth Rates for Use in Study

Direction/Period	Annual Growth: 2016 to 2021	Total Growth: 2016 to 2021
Northbound AM	+6.00%	+33.82%
Northbound PM	+0.25%	+1.26%
Southbound AM	+0.10%	+0.50%
Southbound PM	+2.25%	+11.77%

Background Growth Information & Assumptions **Massachusetts Avenue NW (2 of 3)**

4330 48th Street NW

Project Timeline

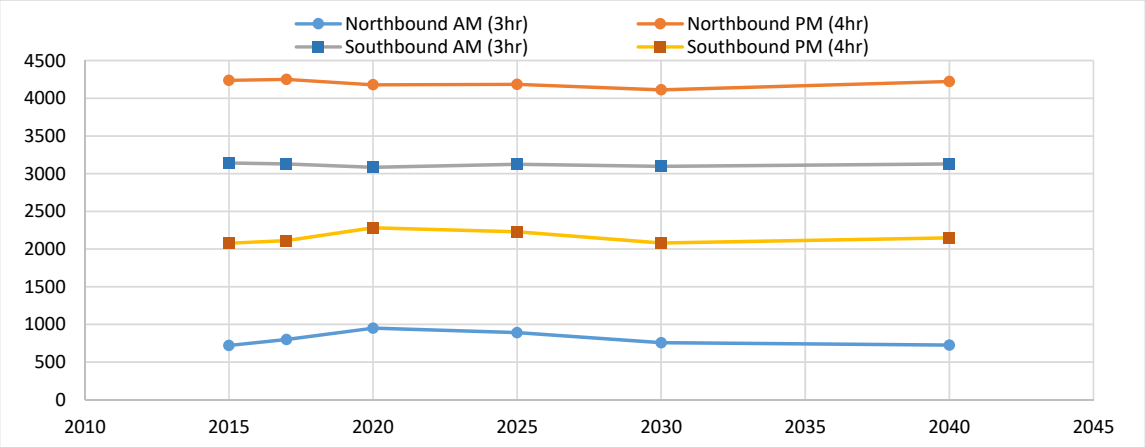
Data Collection: 2016 Project Completion 2021

Background Growth Data

Source 1: MWCOG Model Volumes (version 2.3.57a)

Segment: Massachusetts Avenue NW between 49th Street NW and 48th Street NW

Direction/Period	Modeled Year 2015	2017	2020	2025	2030	2040	Annual Growth: 2015 to 2020
Northbound AM (3hr)	720	799	950	890	756	724	**+5.70%**
Northbound PM (4hr)	4238	4250	4179	4184	4111	4222	**-0.28%**
Southbound AM (3hr)	3141	3127	3084	3123	3095	3128	**-0.37%**
Southbound PM (4hr)	2076	2111	2281	2227	2080	2147	**+1.90%**



Source 2: Historical DDOT AADTs

Segment: Massachusetts Avenue NW between 46th Street and 49th Street

	2011	2012	2013	2014
AADT (in 1000s):	17.0	18.6	18.7	19.0

Annual growth since:	2011	2012	2013	2014
	+3.8%	+1.1%	+1.6%	n/a

Proposed Growth Rates for Use in Study

Direction/Period	Annual Growth: 2016 to 2021	Total Growth: 2016 to 2021
Northbound AM	+5.75%	+32.25%
Northbound PM	+0.10%	+0.50%
Southbound AM	+0.10%	+0.50%
Southbound PM	+2.00%	+10.41%

Background Growth Information & Assumptions **Massachusetts Avenue NW (3 of 3)**

4330 48th Street NW

Project Timeline

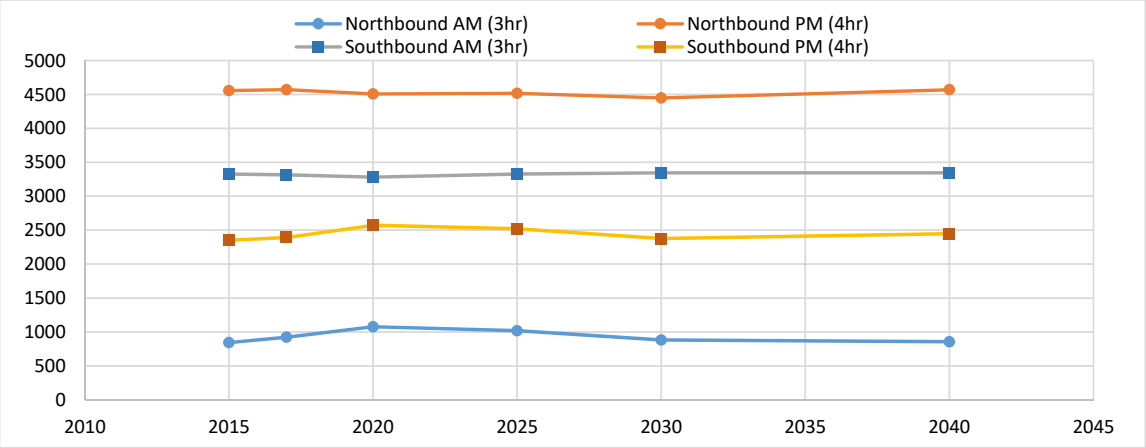
Data Collection: 2016 Project Completion 2021

Background Growth Data

Source 1: MWCOG Model Volumes (version 2.3.57a)

Segment: Massachusetts Avenue NW between 48th Street NW and Nebraska Avenue NW

Direction/Period	Modeled Year 2015	2017	2020	2025	2030	2040	Annual Growth: 2015 to 2020
Northbound AM (3hr)	843	922	1076	1018	880	854	**+5.00%**
Northbound PM (4hr)	4558	4571	4508	4517	4449	4570	**-0.22%**
Southbound AM (3hr)	3327	3314	3281	3326	3345	3345	**-0.28%**
Southbound PM (4hr)	2352	2391	2572	2519	2375	2448	**+1.80%**



Source 2: Historical DDOT AADTs

Segment: Massachusetts Avenue NW between 46th Street and 49th Street

	2011	2012	2013	2014
AADT (in 1000s):	17.0	18.6	18.7	19.0

Annual growth since:	2011	2012	2013	2014
	+3.8%	+1.1%	+1.6%	n/a

Proposed Growth Rates for Use in Study

Direction/Period	Annual Growth: 2016 to 2021	Total Growth: 2016 to 2021
Northbound AM	+5.00%	+27.63%
Northbound PM	+0.10%	+0.50%
Southbound AM	+0.10%	+0.50%
Southbound PM	+1.75%	+9.06%

Background Growth Information & Assumptions **49th Street NW**

4330 48th Street NW

Project Timeline

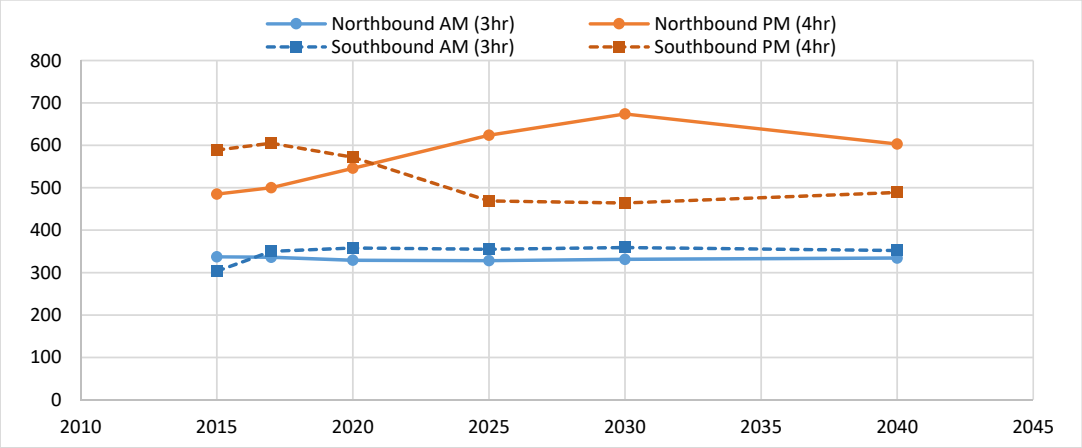
Data Collection: 2016 Project Completion 2021

Background Growth Data

Source 1: MWCOG Model Volumes (version 2.3.57a)

Segment: 49th Street NW between Massachusetts Avenue NW and Tilden Street NW

Direction/Period	Modeled Year 2015	2017	2020	2025	2030	2040	Annual Growth: 2015 to 2020
Northbound AM (3hr)	337	336	329	328	331	334	**-0.48%**
Northbound PM (4hr)	485	500	546	624	674	603	**+2.40%**
Southbound AM (3hr)	303	350	358	355	359	352	**+3.39%**
Southbound PM (4hr)	589	605	572	469	464	489	**-0.58%**



Source 2: Historical DDOT AADTs

Segment: 49th Street between Yuma Street and Van Ness Street

	2011	2012	2013	2014
AADT (in 1000s):	4.3	4.3	4.3	n/a

Annual growth since:	2011	2012	2013	2014
	-even-	-even-	-even-	n/a

Proposed Growth Rates for Use in Study

Direction/Period	Annual Growth: 2016 to 2021	Total Growth: 2016 to 2021
Northbound AM	+0.10%	+0.50%
Northbound PM	+0.25%	+1.26%
Southbound AM	+0.50%	+2.53%
Southbound PM	+0.10%	+0.50%

Background Growth Information & Assumptions **46th Street NW**

4330 48th Street NW

Project Timeline

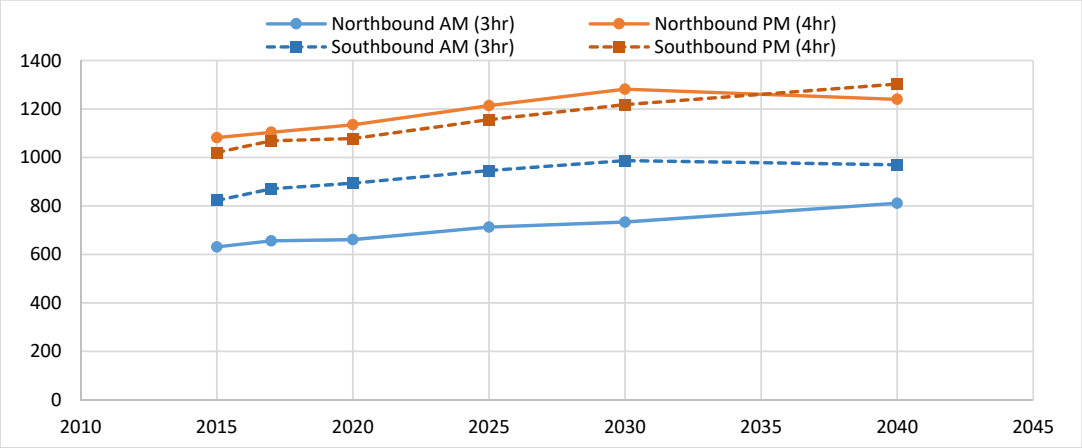
Data Collection: 2016 Project Completion 2021

Background Growth Data

Source 1: MWCOG Model Volumes (version 2.3.57a)

Segment: 46th Street NW between Albemarle Avenue NW and Yuma Street NW

Direction/Period	Modeled Year 2015	2017	2020	2025	2030	2040	Annual Growth: 2015 to 2020
Northbound AM (3hr)	631	656	661	713	733	811	**+0.93%**
Northbound PM (4hr)	1082	1104	1135	1214	1282	1240	**+0.96%**
Southbound AM (3hr)	822	871	894	946	987	970	**+1.69%**
Southbound PM (4hr)	1020	1069	1078	1156	1218	1303	**+1.11%**



Source 2: Historical DDOT AADTs

Segment: 46th Street NW between Massachussets Avenue and Van Ness Street

	2011	2012	2013	2014
AADT (in 1000s):	2.2	2.2	2.2	n/a

Annual growth since:	2011	2012	2013	2014
	-even-	-even-	-even-	n/a

Proposed Growth Rates for Use in Study

Direction/Period	Annual Growth: 2016 to 2021	Total Growth: 2016 to 2021
Northbound AM	+1.00%	+5.10%
Northbound PM	+1.00%	+5.10%
Southbound AM	+1.75%	+9.06%
Southbound PM	+1.00%	+5.10%

Project Name & Applicant Team:
4330 48th Street NW
Applicant: Felipe Serpa, Valor Development LLC
Land Use Counsel: Holland & Knight LLP
Transportation Consultant:
Erwin Andres, Gorove/Slade (202-540-1925), ena@goroveslade.com
Jim Watson, Gorove/Slade (202-296-8628), jww@goroveslade.com

Case Type & No. (PUD, LTR, etc.): Design Review

Street Address:
4330 48th Street NW

Current Zoning and/or Overlay District: MU-4

Date of Filing: Summer 2016

Estimated Date of Hearing: February 2, 2017

Description of Project:
The project site is located at 4330 48th Street NW, bounded by Yuma Street NW to the north, 48th Street NW to the east, the American University College of Law to the south, and a public alley to the west. The site for the proposed development is currently home to a surface parking lot and a commercial building with ground-floor retail.

The resulting development will be a mixed-use (residential, retail, and grocery) development with an approximate build-out date of 2019. The development program consists of the following land uses:

- Retail –Approximately 4,000 sf of ground-floor retail
- Grocery – Approximately 56,000 sf of grocery space
- Residential – Approximately 230 multi-family residential dwelling units

According to 2016 DC Zoning Regulations (ZR16) and the development program outlined above, the site is required to provide a minimum of 151 parking spaces. An existing agreement between American University and the site lot requires the proposed development to carry forth 236 parking spaces for the use of American University. As such, the retail/grocery component will have access to 147 parking spaces, and the residential component will have access to 77 dedicated parking spaces as well as access to the 236 American University parking spaces when they are not in use. A total of 460 parking spaces are proposed to be provided in the parking garage to serve the development and agreed upon American University uses.

Loading facilities will be provided via one 30-foot berth, two 55-foot berths, and one 20-foot service and delivery space. The loading berths abut the public alley to the west of the site and will be accessible through back-in and front-out maneuvering to and from surrounding streets. The development will exceed the number of loading facilities required under ZR16.
The site plan incorporates improvements to pedestrian facilities adjacent to the site. These improvements are made possible through the widening of the

sidewalk and buffer, and the removal of two curb cuts along the perimeter of the site.

1. Strategic Planning Elements (Planning Documents)	DDOT Comments/Action Items
Planning Guidelines: The CTR will address how the proposed development considers the primary city-wide planning documents, as well as localized studies. See Section 3.1 of the CTR guidelines for more information. **Proposed Documents:** The study will address how the proposed development considers the primary planning documents of the District, as well as localized studies. The study will include a section addressing the following documents: o ZR16 (Subtitle C Chapters 7, 8 and 9) o DC Comprehensive Plan o DDOT Comprehensive Transportation Review Guidelines o DDOT Design & Engineering Manual o DC's Transit Future System Plan o Bicycle Master Plan o Pedestrian Master Plan o MoveDC plan o SustainableDC plan	DDOT concurs.
2. Roadway Network, Capacity & Operations	**DDOT Comments/Action Items**
Vehicle Trip Generation Assumptions **Guidelines:** Provide *preliminary* site-generated vehicle trips and mode split assumptions. In addition, provide the assumptions and supporting documentation behind the proposed mode split. See Section 3.2.1 of the CTR guidelines for further information. **Proposed preliminary mode split and supporting documentation:** The proposed multi-modal trip generation methodology uses ITE rates and mode-split assumptions. A detailed breakdown of these assumptions and trip generation calculations is attached to this form. While detailed mode split data from the *Census Transportation Planning Products (CTPP)* is mapped on a graphic and attached to this form, the ~~modal splits are expected to be 50% auto/25% transit/15% bicycle/10% walk for residential uses and 65% auto/10% transit/5% bicycle/20% walk for grocery/retail uses.~~ ~~(11.11.2016) the modal splits are expected to be 50% auto/30% transit/13% bicycle/12% walk for residential uses and 65% auto/10% transit/5% bicycle/20% walk for grocery/retail uses.~~	DDOT suggests the mode splits should be modified as follows: Residential: 50 auto, 30 transit, 12.5 bike, 7.5 walk Grocer: same as proposed. G/S: Noted. G/S (11/18/2016): Per further discussions with DDOT, mode splits and trip generation rates were reexamined based on data collection at comparable sites. See discussion in parking section (Section 6) for more information. This data generally supports the splits and generation proposed.

~~G/S (11/18/2016): the modal splits are expected to be 50% auto/30% transit/13% bicycle/12% walk for residential uses and 55% auto/15% transit/5% bicycle/25% walk for grocery/retail uses. See discussion in parking section (Section 6) for more information.~~

G/S (12/5/2016): The modal splits are expected to be 50% auto/30% transit/13% bicycle/12% walk for residential uses and 65% auto/10% transit/5% bicycle/20% walk for grocery/retail uses. See discussion in parking section (Section 6) for more information.

Mode	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Auto	94 veh/hr	97 veh/hr	191 veh/hr	224 veh/hr	196 veh/hr	420 veh/hr
Transit	31 ppl/hr	46 ppl/hr	77 ppl/hr	82 ppl/hr	65 ppl/hr	147 ppl/hr
Bike	15 ppl/hr	20 ppl/hr	35 ppl/hr	38 ppl/hr	31 ppl/hr	69 ppl/hr
Walk	48 ppl/hr	37 ppl/hr	85 ppl/hr	108 ppl/hr	102 ppl/hr	210 ppl/hr

Vehicle Site Access

Guidelines: If vehicle access is needed, at a minimum the CTR will provide locations of access point(s) and desired access controls (full, right-in/right-out, etc.). See Section 3.2.2 of the CTR guidelines for any further requirements.

Access Location(s): The site will be accessed through the public alleys that connect to Yuma Street NW and Massachusetts Avenue NW. Access along 48th Street NW will be provided by a section of existing private alley that then connects to the public alley network abutting the site along the west. The loading facilities and ramp leading to the below-grade parking garage abut the public alley.
Access Control: Unsignalized.
Existing Curb cuts utilized: The site will utilize curb cuts that connect the public alley to the north of the site from Yuma Street NW and the south of the site from Massachusetts Avenue NW. One existing curb cut accessing the private section of the alley network to the east of the site on 48th Street NW will also be utilized.
Existing curb cuts abandoned: A total of two curb cuts are being abandoned. One wide curb cut (that includes a pedestrian refuge) will be abandoned along Yuma Street NW. One curb cut will be abandoned along 48th Street NW.
Proposed curb cuts: None.
Curb cut width and radii: TBD

DDOT concurs with this vehicular access approach utilizing the alleys. Note that the portion of the alley behind 4801 Mass Ave (AU Washington College of Law) is a private alley. Also note that queuing analysis should be conducted within the alleys. Additionally, any existing access points that will be modified should be highlighted.
G/S: Noted

CTR Triggers for further vehicle analysis (for sections below) **Guidelines:** See Section 3.2.3 of the CTR guidelines to determine if a more comprehensive vehicle analysis is required. If so, completion of the remainder of the *Roadway Network, Capacity & Operation* section of the scoping form is required.	
Development Scenarios **Guidelines:** See Section 3.2.4 of the CTR guidelines for discussion of the required development scenarios. **Proposed Development Scenario:** The proposed CTR will include the following scenarios: o Existing Conditions (2016) o 2019 Future Conditions without the development (2019 Background) o 2019 Future Conditions with the development (2019 Future)	DDOT concurs.
Vehicle Study Area **Guidelines:** See Section 3.2.5 of the CTR guidelines for discussion of the study area. **Proposed Study Area intersections, including access points (attach Figure at end of Scoping Form as needed):** The study area will include intersections where site impacts are most likely to occur. Additional intersections may be appropriate given the projected trip generation of the project. Traditionally, intersections where the site is projected to generate over 10% of future traffic are included. Gorove/Slade assembled the following list of study area intersections based on the preliminary trip generation, trip distribution, and assignment. Our proposed list of study area intersections ended up including 12 intersections: ~~1. Massachusetts Avenue/Albemarle Street~~ ~~2. Massachusetts Avenue/Yuma Street~~ ~~3. Massachusetts Avenue/49th Street (counts collected 4/21/2015)~~ ~~4. Massachusetts Avenue/Alley~~ ~~5. Massachusetts Avenue/48th Street/Fordam Road (counts collected 4/21/2015)~~ ~~6. Massachusetts Avenue/Van Ness Street~~ ~~7. Yuma Street/49th Street~~ ~~8. Yuma Street/Alley~~ ~~9. Yuma Street/48th Street~~ ~~10. Windom Place/48th Street~~ ~~11. Alley/48th Street~~	Additional study area intersections are appropriate to fully capture potential traffic impacts. DDOT would add the following: · 50th & Mass (it is signalized and in between Albermarle and Yuma, which will affect progression on Mass) · 48th & Albermarle (if you are including Mass & Albermarle because of outbound trips, they will likely go up 48th or 49th and turn onto Albermarle to get to Mass; additionally, inbound trips from the neighborhood will often be on Albemarle and turn onto 48th to reach the site; could include 49th/Albemarle also, but we're thinking more traffic will be at 48th; we also note that as we consider the fact Albemarle is one-way for the last block and that it's not signalized, perhaps Albemarle/Mass. may not need to be included. Let us know your thoughts.) · 46th & Yuma (trips from the north will use 46th to Yuma because it is a collector) · 49th & Fordham (trips from the south will converge in this location)

~~12. Warren Street/48th Street~~ (11.11.2016) 1. Massachusetts Avenue/50th Street 2. Massachusetts Avenue/Yuma Street (western side of Massachusetts Avenue) 3. Massachusetts Avenue/Yuma Street (eastern side of Massachusetts Avenue) 4. Massachusetts Avenue/49th Street 5. Massachusetts Avenue/Alley 6. Massachusetts Avenue/48th Street/Fordham Road 7. Massachusetts Avenue/Van Ness Street 8. Yuma Street/49th Street 9. Yuma Street/Alley 10. Yuma Street/48th Street 11. Windom Place/48th Street 12. Alley/48th Street 13. Warren Street/48th Street 14. Fordham Road/49th Street 15. Albemarle Street/49th Street 16. Albemarle Street/48th Street 17. Yuma Street/46th Street A figure attached to this scoping form shows the locations of these intersections. Driveway counts will be collected at all the ingress/egress points of the existing parking garage as to determine existing site related trips and the number of existing American University associated trips that will be carried over to the below grade garage.	G/S: Noted. Please see new list of study intersections. New counts will be conducted at all study intersections.
<u>Data Collection and Hours of Analysis</u> **Guidelines:** See Section 3.2.6 of the CTR guidelines for discussion of the required data collection and hours of analysis. **Proposed turning movement count intersections:** Typically, the peak hour of commuter traffic is used for both weekday morning and afternoon rush hours. Other hours of analysis may be appropriate given the overall trip generation of the proposed development and the expected hours of vehicular demand to and from the site. Land use may also determine the appropriate hours of analysis as some uses experience their peak demand on weekends and off-peak from the typical uses. Weekday morning and afternoon commuter peak hours will be analyzed using the individual intersection peaks at all study area intersections.	DDOT concurs.

Pedestrian and bicycle [define TMCs] ("TMCs") will be collected from 6:30-9:30 AM and 4:00-7:00 PM for 8 of the 10 the intersections noted above (data for 2 intersections was collected 4/21/2015).TMCs will be conducted on a "typical weekday" when DC public schools, Congress, and American University are in session.	
Roadway Improvements **Guidelines:** The study will account for approved and funded roadway improvement projects within the study area that are expected to begin before the proposal's horizon year. See Section 3.2.7 of the CTR guidelines. **Proposed roadway improvements:** There are no improvements in the study area that are known to be funded and proposed to be completed prior to the full build-out of the site; therefore, the CTR will not incorporate any background improvements into the vehicular capacity analysis.	DDOT concurs.
Background Developments **Guidelines:** The study will account for vehicle trips generated by developments in the study area that have an origin/destination within the study area. See Section 3.2.8 of the CTR guidelines. **Proposed background development:** Gorove/Slade has identified one nearby development: 1. The Spring Valley Shopping Center Expansion 2. American University Parking The expansion of the Spring Valley Shopping center will add approximately 14,000 sf of retail to the existing site. It is expected to open before the 4330 48th Street development and will be included as a background development. Additionally, the analysis will include the existing site related (American University) trips as background trips. This is due to the fact that the existing site trips are associated with the 236 American University parking spaces that will be carried into the future parking garage, regardless of the proposed development.	DDOT concurs.
Background Growth **Guidelines:** The study will account for annual growth or decrease in through traffic on minor and principal arterials that pass through the proposed study area. See Section 3.2.9 of the CTR guidelines. **Proposed annual background growth:**	The growth rates for several of these streets are quite high. Please look at recent ADTs to see if these trends are present. We wouldn't want to overstate background growth in comparison to the development traffic. With

Traffic volumes contained in the MWCOG regional model will be examined to develop an average annual growth rate for study area roadways. A summary of the MWCOG model and AADT volumes and trends for regional roadways in the study area is attached to this scoping form. This methodology is preferred for calculating growth rates since it takes into account all future projects and developments in the MWCOG model, and allows for district growth rates by direction and time of day.

Growth rates for this study are based on the differences between the year 2015 and 2020 MWCOG model scenarios. In addition, where the MWCOG model showed negative or minimal growth, a conservative assumption of 0.1% per year minimum growth was used. Based on this methodology, the following is a summary of the growth rates proposed to be used in the study:

~~Road~~	~~Intersections~~	~~Proposed Annual Growth Rate~~		~~Total Growth between 2016 and 2019~~	
		~~AM Peak Hour~~	~~PM Peak Hour~~	~~AM Peak Hour~~	~~PM Peak Hour~~
~~Massachusetts Ave NW – Northbound~~	~~2-5~~	~~3.00%~~	~~0.10%~~	~~15.76%~~	~~0.30%~~
~~Massachusetts Ave NW – Southbound~~	~~2-5~~	~~0.10%~~	~~1.75%~~	~~0.30%~~	~~5.34%~~
~~49th St NW – Northbound~~	~~2,6~~	~~0.10%~~	~~0.25%~~	~~0.30%~~	~~7.69%~~
~~49th St NW – Southbound~~	~~2,6~~	~~0.50%~~	~~0.10%~~	~~10.87%~~	~~0.30%~~
~~46th St NW – Northbound~~	~~2,6~~	~~0.10%~~	~~0.25%~~	~~0.30%~~	~~7.69%~~
~~46th St NW – Southbound~~	~~2,6~~	~~0.50%~~	~~0.10%~~	~~10.87%~~	~~0.30%~~
~~All Others~~	~~7-10~~	~~0.10%~~	~~0.10%~~	~~0.30%~~	~~0.30%~~

Please note that the above roads were selected while smaller local streets were omitted because regional growth will affect major corridors and will not impact smaller local streets adjacent to the site.

(11.11.2016)
For comparison purposes, the following table represents the historical AADT volumes for the study area.

Roadway	AADT Volumes					Average Annual Growth Rate
	2010	2011	2012	2013	2014	
Massachusetts Ave	16,900	17,000	18,600	18,700	19,000	3.04%
49th St	4,300	4,300	4,300	4,300	N/A	no change
Albemarle St	2,200	2,200	2,200	2,200	N/A	no change

that additional information, let's coordinate further on appropriate growth rates.
G/S: We included DDOT historical AADTs for comparison purposes on the left. Growth rates were revised downwards to account for the AADT data and are included on the left

DDOT concurs.

46th St	1,600	1,400	1,400	1,400	1,800	4.02%

As such, we propose the following growth rates:

Road	Intersections	Proposed Annual Growth Rate		Total Growth between 2016 and 2019	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Massachusetts Ave NW – Northbound	1-7	3.00%	0.10%	9.27%	0.30%
Massachusetts Ave NW – Southbound	1-7	0.10%	1.75%	0.30%	5.34%
49th St NW – Northbound	4,8,14,15	0.10%	0.25%	0.30%	0.75%
49th St NW – Southbound	4,8,14,15	0.50%	0.10%	1.51%	0.30%
46th St NW – Northbound	17	1.00%	1.00%	3.03%	3.03%
46th St NW – Southbound	17	1.75%	1.00%	5.34%	3.03%
All Others		0.10%	0.10%	0.30%	0.30%

Site Trip Distribution & Assignment

Guidelines: Trips generated by the site will be distributed throughout the study area network. See Section 3.2.10 of the CTR guidelines for information in trip distribution and assignment.

Proposed site distribution and assignment (attach Figures, as needed, at end of Scoping Form):
Trip distribution for the site was determined based on: (1) CTPP TAZ flow data, and (2) existing traffic volumes and travel patterns in the study area. Attached to this scoping form are figures depicting the CTPP TAZ flow data?

Separate distributions were developed for the residential and retail/grocery components of the project. The residential trip distribution was influenced significantly by the CTPP TAZ flow data for drivers commuting from the site's TAZ, and adjusted based on traffic volumes and patterns. This flow information showed significant commuting patterns to downtown DC.

The retail and grocery distributions were mostly based on locations of other retail centers, with some influence by the WMATA ridership survey for similar sites. Thus, the retail and grocery trip distribution is much more weighted to the east and west relative to the residential trip distribution.

The proposed trip distributions are illustrated on an attached graphic.

Please provide clearer illustration on this graphic and in your description of the streets that are anticipated to carry the traffic from each direction. Based on this, please reexamine the percentages of traffic from each direction. Additionally, label the percent of traffic anticipated coming from Massachusetts both north and south and then any other streets.
G/S: Noted. See attached graphics.

G/S (11/18/2016): See attached graphics depicting new distributions based on conversation with DDOT. This is to account for changes to the assumed area of service for the grocer and increase in traffic distributed towards Bethesda along Massachusetts Avenue.

G/S (12/5/2016): See attached graphics depicting new distributions based on conversation with DDOT.

DDOT concurs with the updated figure.

As discussed above, American University will retain access to 236 parking spaces that are present under existing conditions. Existing trips will be rerouted to the future site driveway.	
Analysis Methodology **Guidelines:** Capacity analyses are typically performed using Highway Capacity Manual (HCM) methodologies or a similar industry recognized software. See Section 3.2.11 of the CTR guidelines. **Proposed analysis methodology:** Capacity analyses are typically performed using Highway Capacity Manual (HCM) methodologies using an industry recognized software package. The proposed analysis will be conducted using Synchro 9, with the results in delay and LOS reported using HCM 2000 methodologies. Weekday morning and afternoon commuter peak hours will be analyzed using the individual intersection peaks at all study area intersections. Signal timings for the study area intersections will be obtained from DDOT and incorporated into the Synchro models. The capacity analysis results will show the average delay and the resulting LOS for each approach and for the overall intersection (where available), as well as the queuing results for the average and 95th percentile queue for each movement. We will highlight all LOS E or F conditions per intersection and approach that exist for a future condition, but not the corresponding background condition. Additionally, all intersections or approaches in which the delay increases by 5 percent or more due to the development will be highlighted. For each intersection or approach that meets this criteria, potential mitigation measures will be recommended and a discussion on the appropriateness and feasibility of potential improvements will provided. Furthermore, all locations where the 95th percentile queues exceed the length of storage lanes and result in spillback of the queue will be highlighted, and recommended mitigation measures when an increase in the 95th percentile queue length is greater than 150 feet due to the development will be provided, including a discussion on the appropriateness and feasibility of potential improvements. DDOT will be provided Synchro input files along with the study submittal. Field visits will be performed to update existing geometric information into the Synchro models, and update Synchro files with current traffic signal timing plans.	DDOT concurs.
Vehicle Trip Mitigation **Guidelines:** Proposed mitigation of vehicle impacts, if needed, must not add significant delay to other travel modes. Standard non-urban mitigation often includes geometric re-design which may not fit DDOT's practice of balancing safety and capacity across multiple transportation modes. See Section 3.2.12 of the CTR guidelines.	

For Informational purposes only. Mitigation will be documented in the final CTR. No information is required in the scoping form.	
3. Bicycle & Pedestrian Facilities	**DDOT Comments/Action Items**
CTR Triggers for bike and pedestrian mode share **Guidelines:** A CTR is required to include some level analysis of the bike and pedestrian network at a minimum, based on several potential factors. See Section 3.3.1 of the CTR guidelines to determine if a more comprehensive analysis is required. If so, complete the remainder of the *Bicycle & Pedestrian Facilities* section of this scoping form.	
CTR Bike and Pedestrian Study area **Guidelines:** See Section 3.3.2 of the CTR guidelines to determine bike and pedestrian study areas. **Proposed bike and pedestrian study areas:** A pedestrian study area that includes pedestrian facilities within a quarter-mile radius of the site is proposed, plus additional walking routes to major destinations, including the American University campus. Internal pedestrian circulation and facilities within the site and the desire lines between the site and adjacent bus stops, including crosswalk locations and building entrances, will also be shown. The bicycle study area focuses on the routes that cyclists will take major bicycle facilities. Internal bicycle circulation and facilities will also be highlighted.	DDOT generally concurs. Please also include routes to major destinations nearby. Maps/figures showing these areas are expected, and so please resubmit before scoping is finalized. G/S: Noted. See attached graphics G/S (11/18/2016): See attached graphics based on conversation with DDOT DDOT generally concurs. Please also include the path to Friendship Park.
Data Collection and Analysis of Bike Network and Facilities **Guidelines:** See Section 3.3.3 of the CTR guidelines for data collection requirements and analysis for bike and pedestrian modes. **Proposed Bike network and facilities analysis:** Pedestrian (external to site): A qualitative analysis of all pedestrian facilities in the pedestrian study area will be provided. This will include maps outlining which routes meet DDOT standards (a green/yellow/red map), and proposing improvements to enhance the pedestrian experiences walking to/from the site. Pedestrian (internal to site): For the internal pedestrian facilities, a review of the internal pedestrian circulation and documentation of all sidewalk widths will be provided. Bicycle (external to site): A review of the quality of the bicycle facilities in the bicycle study area will be conducted, focused on the major cycling routes, and will include suggested improvements as needed to help cyclists to and from major bike facilities.	DDOT generally concurs with what is noted. Overall, please discuss in detail how non-auto users will approach and then access the building from each direction. G/S: Noted Please also note that the proposed development includes alley-facing retail frontage, and how this retail will be accessed by pedestrians should be shown/discussed. A full pedestrian circulation plan should be included. G/S: Noted Additionally, note that there is no current CaBi station in this area. G/S: Noted

Bicycle (internal to site): The proposed internal bicycle circulation and the general number and location of bicycle racks within the site will be provided.	Finally, also note the scoping discussions of a potential HAWK signal on Massachusetts. Please assess and describe this proposal. G/S: Noted
Mitigation for Bike network **Guidelines:** If deficiencies have been documented in the study area's pedestrian or bike facilities that would preclude the proposed mode split, then mitigation of these deficiencies is required. See Section 3.3.4 of the CTR guidelines for mitigation requirements of the bike network. **For Informational purposes only. Mitigation will be documented in the final CTR. No information required in scoping form.**	
4. Transit Service	**DDOT Comments/Action Items**
CTR Triggers for transit mode share **Guidelines:** A CTR is typically required to include some level analysis of the transit network, based on several potential factors. See Section 3.4.1 of the CTR guidelines to determine the minimum analysis requirements and if a more comprehensive transit analysis is required. If so, completion of the remainder of the *Transit Service* section of this scoping form is required. See Section 3.4.1 of the CTR guidelines	
CTR Transit study area **Guidelines:** If further analysis of the transit network is triggered, see Section 3.4.2 of the CTR guidelines for determining the requisite study area. **Proposed transit study area:** Per CTR guidelines, the transit study area will include an overview of all transit schedules and stops for service provided within a half mile for heavy rail and a quarter mile for bus and streetcar.	DDOT concurs.
Analysis of Transit Network **Guidelines:** Analysis of the transit network will incorporate both a quantitative and qualitative review. See Section 3.4.3 of the CTR guidelines for further information. **Proposed transit analysis:** An outline of the existing and proposed transit facilities that serve the site will be provided, as well as identifying the bus stops that are expected to be used by transit riders. As stated in the "Bicycle & Pedestrian" section above, desire lines between the site and adjacent bus stops, including crosswalk locations and building entrances, will be identified.	DDOT concurs.

The site plan's accommodation of transit service, including any changes to bus stops necessary due to development will be discussed. Future transit routes and stops will be examined and recommendations for improvements and/or consolidation of stops will be provided, if necessary. A summary of existing bus service (average headways and spans of service) will be provided, as well as an assessment of the existing condition of all transit stops in the study area (ADA compliance, bus shelters, benches, etc.) using the standards found in WMATA's *Guidelines for the Design and Placement of Transit Stops* (2009).	
Transit Trip Mitigation **Guidelines:** Proposed mitigation of transit impacts may be needed, given certain impacts to the network. See Section 3.4.4 of the CTR guidelines for more information. **For Informational purposes only. Mitigation will be documented in the final CTR. No information is required in scoping form.**	
5. Site Access and Loading	**DDOT Comments/Action Items**
Guidelines: At a minimum, the Applicant is required to show site access for vehicles, pedestrians and bicyclists. In addition, DDOT has additional policies for site access and loading as they relate to public space. See Section 3.5 of the CTR guidelines for additional information regarding these policies. ***Freight\Delivery*** The study will identify existing and proposed commercial vehicle access to the site. See Section 3.5.1 of the CTR guidelines. ***Motorcoach*** For developments that will generate significant tourist activity (hotels, museums, etc.) the study will discuss the site plan's accommodation of motorcoach access. See Section 3.5.2 of the CTR guidelines. **Proposed Loading Analysis:** The study will contain access diagrams showing circulation for loading, parking access, and pick-up/drop-off activity for the site. The study will include a discussion of how the access plan was developed and if it meets DDOTs requirements and standards. For freight/delivery trucks, truck routing maps will be included to show how trucks will travel to and from the site. Truck maneuvering diagrams (using AutoTURN) for all site driveways provided loading access will be provided in the application. Detailed truck maneuvering diagrams showing trucks accessing each loading dock	DDOT generally concurs, and anticipates reviewing the turning diagrams. DDOT notes that the north-south portion of the alley has a significant number of dumpsters and parking spaces for the businesses at 4841-4861 Mass Ave located within the 20' ROW. Vehicles are also parking within the 20' ROW on the public portion of the east-west alley. These obstructions may all need to be removed to ensure access to the proposed development, especially for truck turning movements. Please include discussion of this area. G/S: Noted Additionally, provide sight distance evaluation for all proposed alley/driveways per DDOT Design and Engineering Manual requirements. G/S: Noted Please also include analysis of any modified access points.

for each building will be included in the application, as necessary. In addition, a discussion of loading activity including frequencies and size trucks will be discussed.

No motorcoach activity is anticipated

6. Parking

DDOT Comments/Action Items

Guidelines: Minimum requirements exist for documenting parking needs and constraints, regardless of development size. Further requirements may be needed for larger developments. See Section 3.6

Proposed Parking Analysis:
The study will discuss the amount of parking planned for the site and will review the site's compliance with ZR16 minimum parking requirements.

The following table outlines parking for the proposed development:

Development Plan	Parking Provided	Ratio Provided
Residential – 230 du Retail/Grocery – 60,000 sf	Residential – 77 spaces Retail/Grocery – 147 spaces American University – 236 spaces*	Residential – 0.34 spaces/du Retail/Grocery – 2.45 spaces/ksf

* As discussed above

As a comparison, the Park Right DC Parking Tool recommends providing up to 145 parking spaces for the residential uses of the development (approximately 0.55 spaces/du).

~~G/S (11/18/2016):~~
~~Based on correspondence with DDOT, comparable sites were examined in order to determine whether the amount of parking provided for the retail/grocery would be enough to supply the expected demand of the peak hour trip generation. Using anonymized information provided by DDOT PPSA and by Arlington County DES, it was determined that a 55% auto mode split for the retail/grocery component would be more appropriate. See attached table and accompanying information.~~

G/S (12/5/2016):
Based on correspondence with DDOT, additional comparable sites were examined in order to determine whether the amount of parking provided for the retail/grocery would be enough to supply the expected demand of the peak hour trip generation. Using anonymized information provided by DDOT PPSA and by Arlington

DDOT generally concurs with the parking provision, presuming it is managed well.
G/S: Noted

Will the parking spaces provided for AU be available for use by retail/grocery patrons and/or residents? Or will these spaces be permit-parking only? If permit only, will it be 24/7 or what hours will be posted? How will this be enforced? (The trip generation shows a larger turn-over in parking during the afternoon peak hour than total spaces provided. This will likely lead to parking spillover in the neighborhood.)
G/S: The non-exclusive AU parking will also be available to residents, and not for retail/grocery users. For the retail/grocery uses, zoning would require 76 parking spaces, much less than that proposed. The amount of retail/grocery parking will adequately provide enough parking without spillover into the neighborhood particularly given that patrons are likely to spend less than an hour at the store, thereby allowing the parking spaced to turnover more than once per hour.
DDOT: Noted

Please also include discussion of unbundling the parking spaces, and pricing information for the spaces as applicable.
G/S: Noted

County DES, and additional data collected by G/S, it was determined that the original 65% auto mode split for the retail/grocery component would be more appropriate. See attached table and accompanying information	
7. Transportation Demand Management	**DDOT Comments/Action Items**
Triggers for a TDM Plan **Guidelines:** All developments are encouraged to produce TDM plans, regardless of size. See Section 3.7 **Proposed TDM Plan:** The study will include a description of the recommended TDM plan for the overall development, including general recommendations for each land use. The TDM plan components will be compared to those recommended for projects of its size within DDOT's TDM guidelines.	DDOT looks forward to reviewing the proposed TDM. G/S: Noted
8. Performance Monitoring & Measurement	**DDOT Comments/Action Items**
Guidelines: Developments of a certain size may need to incorporate a performance monitoring element as a condition of zoning approval. See Section 3.8 of the CTR guidelines for more information. **For informational purposes only. Requirements for performance monitoring will be coordinated with the DDOT case manager.**	
9. Safety	**DDOT Comments/Action Items**
Guidelines: The CTR will demonstrate that the site will not create or exacerbate existing safety issues for all modes of travel. See Section 3.9 of the CTR guidelines for further information. **Proposed Safety Analysis:** Three years of crash data for all intersections within the roadway operations study area will be provided. Crash rates will be calculated per million entering vehicles for all intersections within the study area, and a breakdown of the number of bicycle and pedestrian crashes at these intersections will be provided. Crash data based on the level of detail provided by DDOT will be explored. Any intersection that has a crash rate greater than 1.0/MEV will be further examined for patterns that could indicate reasons why a high crash rate occurs. In addition, a review of each intersection for potential impacts with the development in place, including discussion if/how the development would affect the crash rate will be conducted. There will also be a review of the site access points and discuss how they will impact safety on the surrounding roadways.	DDOT concurs.
10. Streetscape/Public Realm	**DDOT Comments/Action Items**

Guidelines: DDOT expects new developments to rehabilitate streetscape infrastructure between the curb and property lines. The applicant must work closely with DDOT and OP to ensure that design of the public realm meets current standards. See Section 3.10 of the CTR guidelines for direction on streetscape rehabilitation. **These guidelines are provided to inform that public realm design standards may alter an Applicant's intended use of public space.**	Please provide a summary overview of the site's treatment of the streetscape/public realm in proximity to this development. Ensure that the proposed site design complies with DDOT Design and Engineering Manual, Public Realm Design Manual, and Transportation Review Guidelines and Standards. G/S: Noted

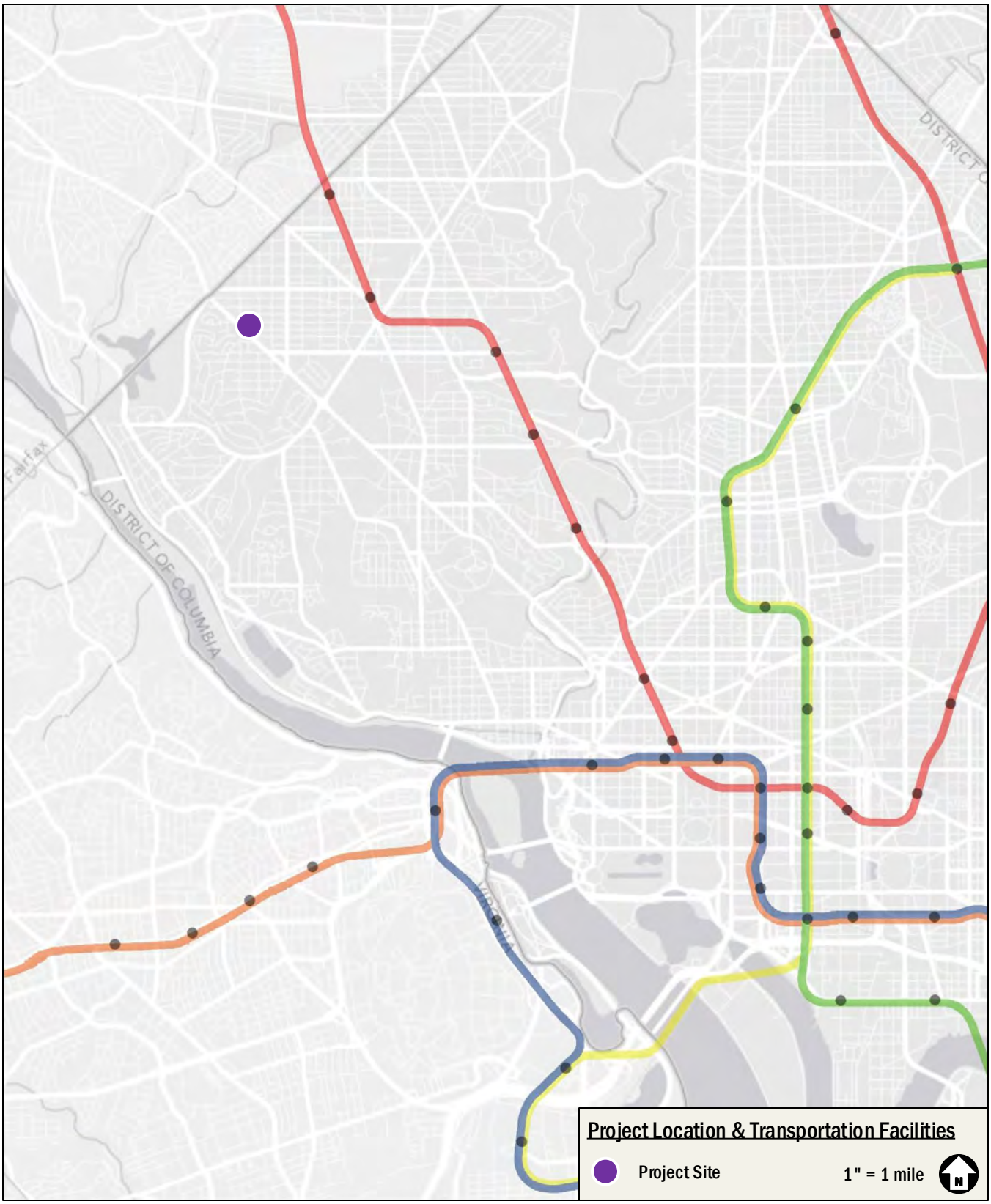
Information/Data Requests (List requested data from DDOT after each field below):

- District planning documents:
- Local planning documents, including small area plans:
- Information on programmed and/or funded roadway improvements in study area:
- Studies for background developments in study area:
- Signal Timings: provided
- Crash Data:

Proposed Schedule:

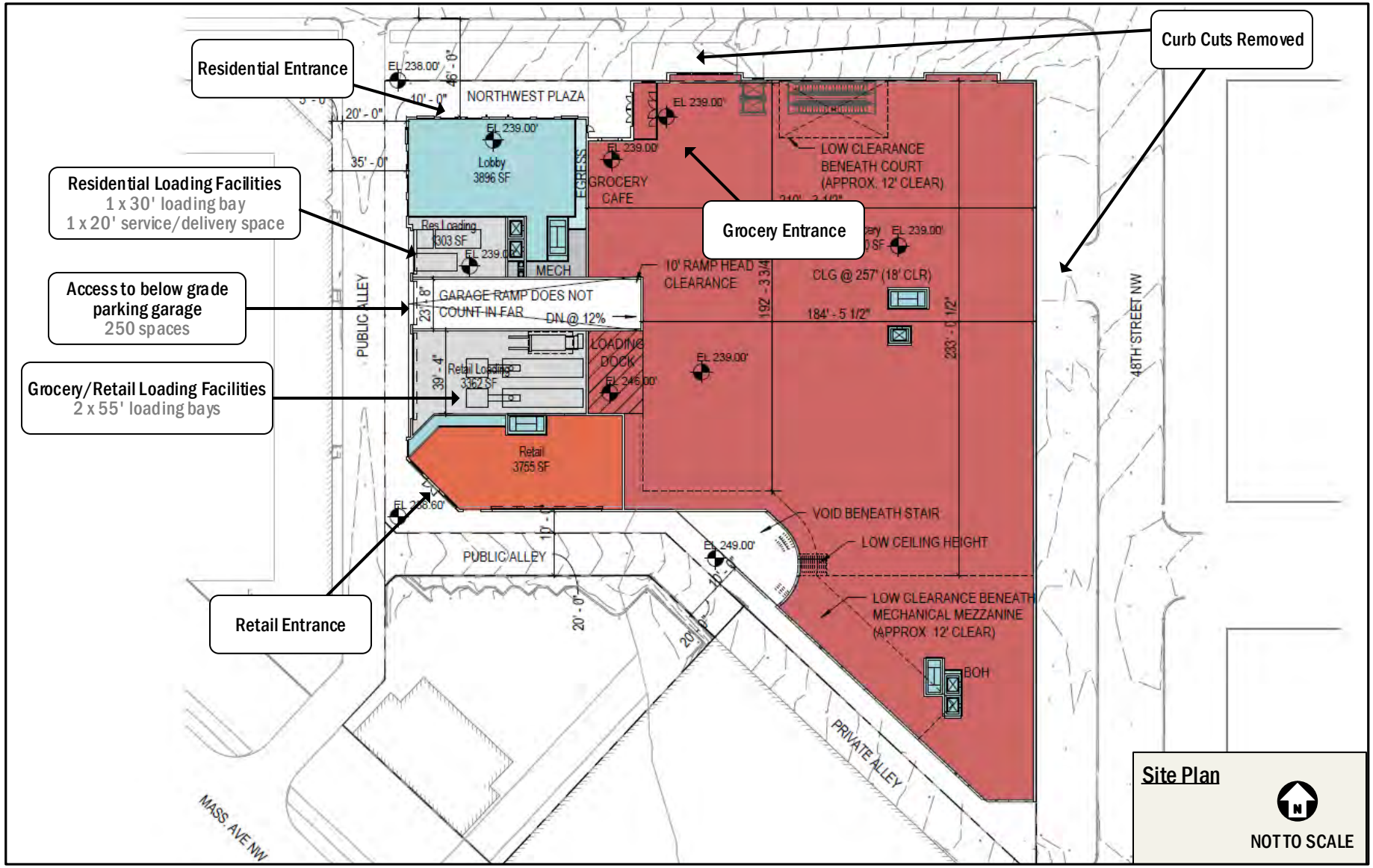
- DDOT comments on Scoping Document: 10/27/16
- Transportation Consultant/Applicant responses to comments: 11/18/16 and 12/5/16
- Phase I Completion:
- Phase II Completion: N/A
- Submission of Report to DDOT:
- Zoning Commission or BZA Hearing Date:

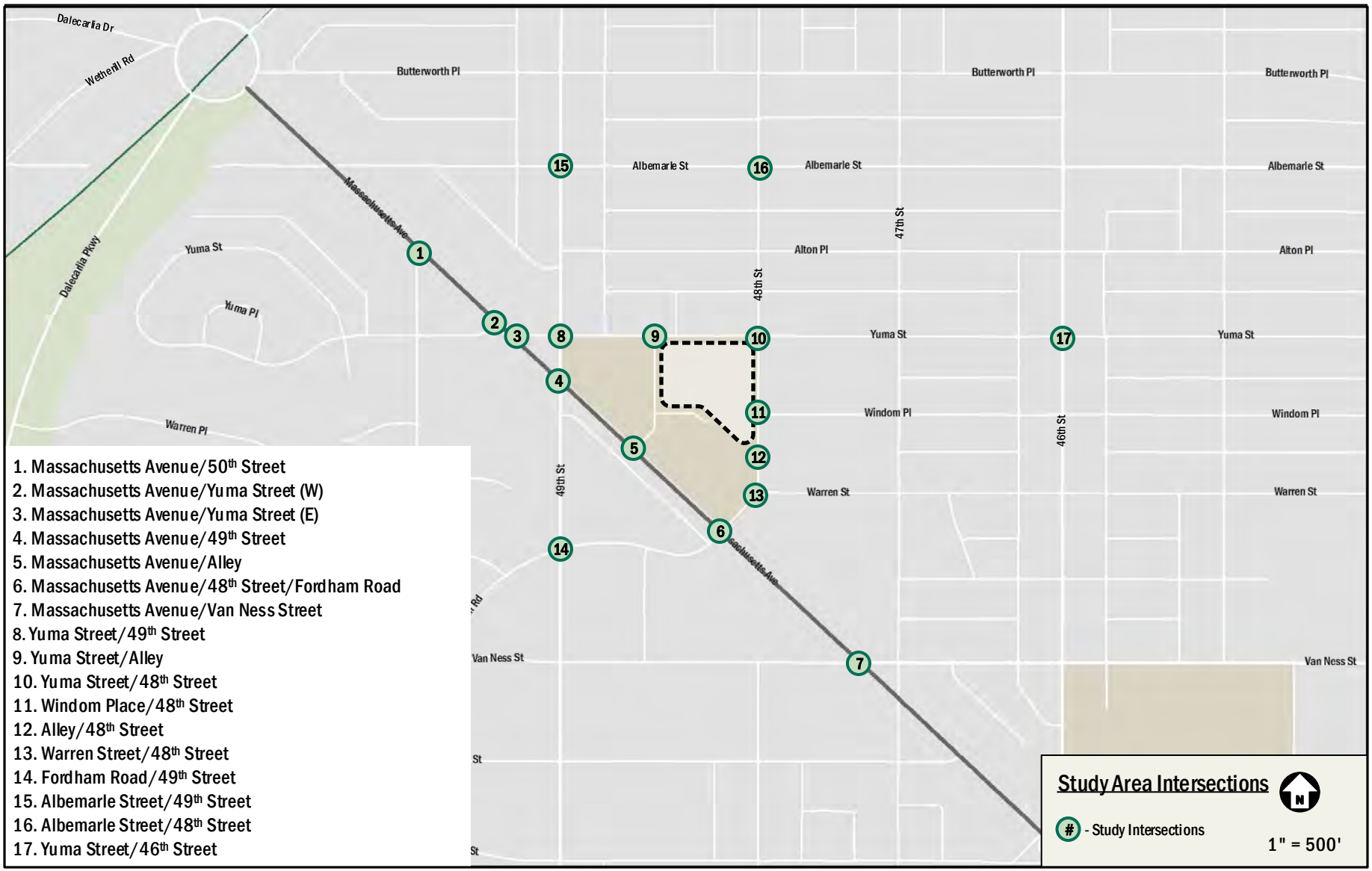
Attach any Figures, Tables, and Appendices here:

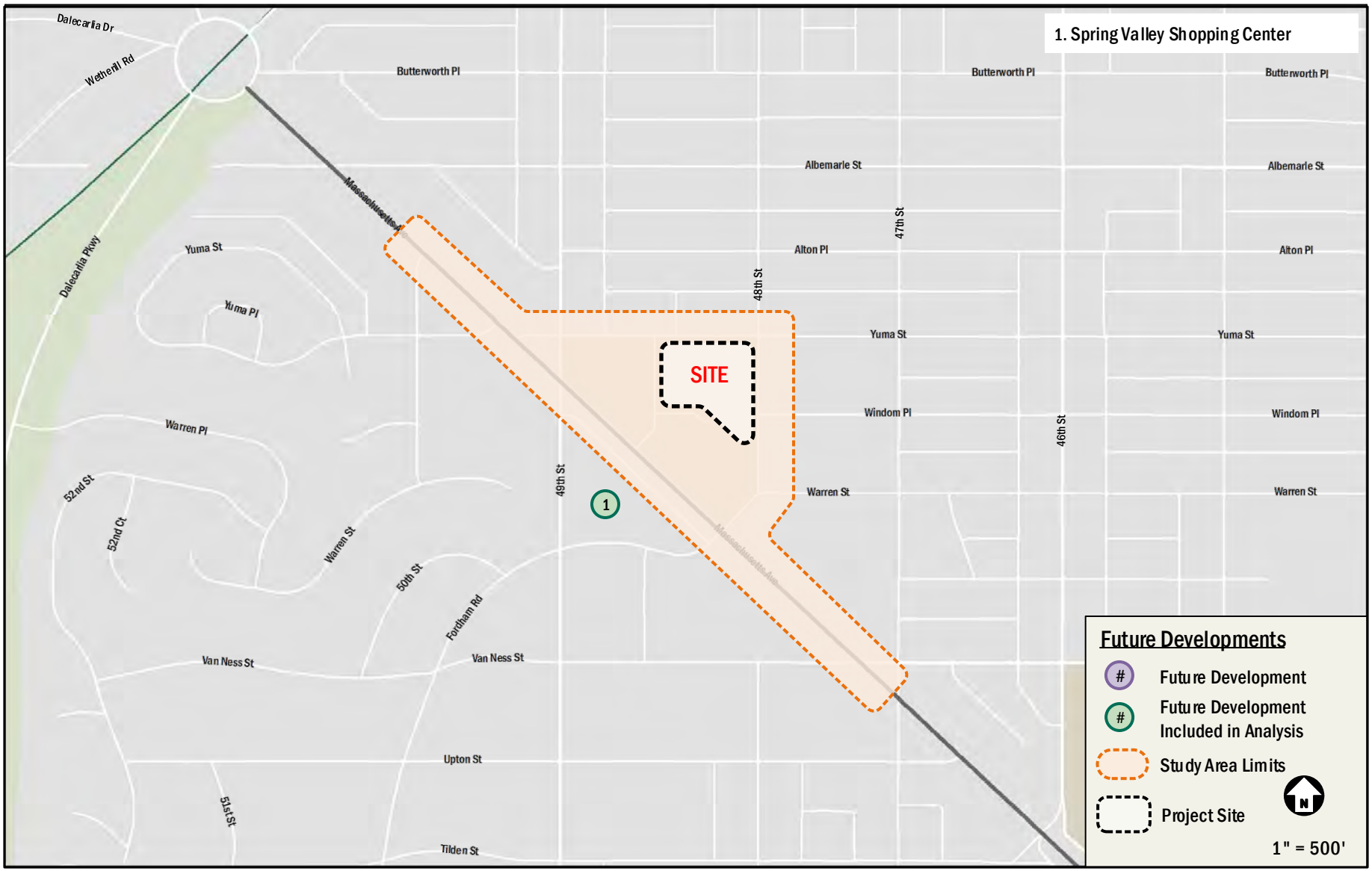

DISTRICT OF COLUMBIA
Project Location & Transportation Facilities
Project Site
1" = 1 mile
N

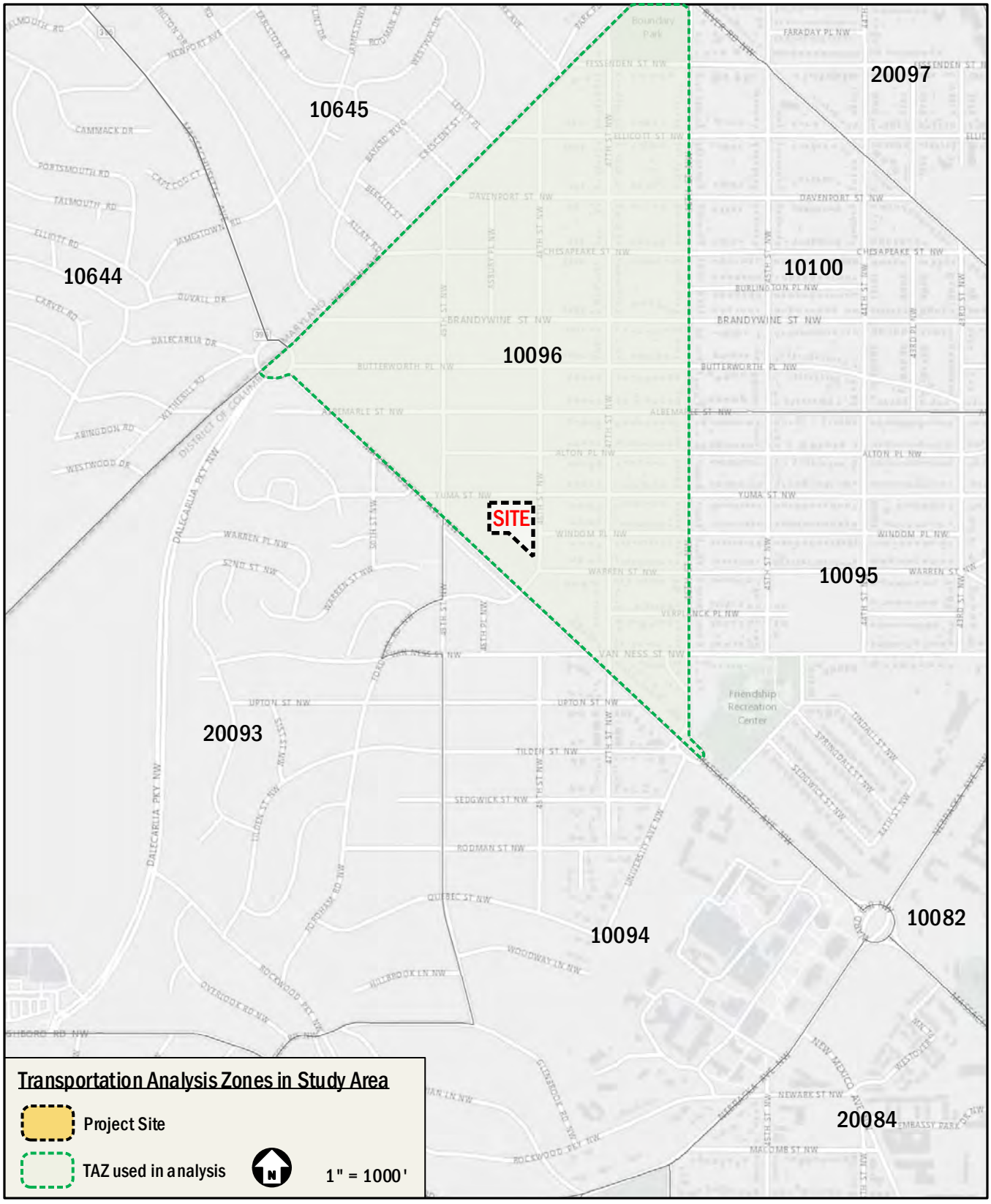
Alton Pl
49th St
48th St
Yuma St
SITE
Windom Pl
Massachusetts Ave
Massachusetts Ave
Warren St
Fordham Rd
48th Pl
Project Site
N
1" = 200'

Dalecarlia Dr
Wetherill Rd
Butterworth Pl
Butterworth Pl
Butterworth Pl
Albemarle St
Albemarle St
47th St
Massachusetts Ave
Dalecarlia Pkwy
Yuma St
Alton Pl
Alton Pl
48th St
Yuma Pl
Yuma St
Yuma St
SITE
Windom Pl
Windom Pl
Warren Pl
46th St
52nd St
49th St
Warren St
Warren St
52nd Ct
Warren St
Massachusetts Ave
50th St
Fordham Rd
Van Ness St
Van Ness St
Van Ness St
Upton St
Springdale St
45th St
Sedgwick St
Tilden St
Study Area
Project Site
N
1" = 500'


Residential Entrance
Curb Cuts Removed
Residential Loading Facilities
1 x 30' loading bay
1 x 20' service/delivery space
Grocery Entrance
Access to below grade parking garage
250 spaces
Grocery/Retail Loading Facilities
2 x 55' loading bays
Retail Entrance
NORTHWEST PLAZA
Lobby
3896 SF
EGRESS
GROCERY CAFE
LOW CLEARANCE BENEATH COURT (APPROX. 12' CLEAR)
Res Loading
303 SF
MECH
10' RAMP HEAD CLEARANCE
CLG @ 257' (18' CLR)
184' - 5 1/2"
GARAGE RAMP DOES NOT COUNT IN FAR
DN @ 12%
LOADING DOCK
Retail Loading
3362 SF
Retail
3755 SF
PUBLIC ALLEY
VOID BENEATH STAIR
LOW CEILING HEIGHT
LOW CLEARANCE BENEATH MECHANICAL MEZZANINE (APPROX. 12' CLEAR)
BOH
48TH STREET NW
MASS AVE NW
PRIVATE ALLEY
Site Plan
NOT TO SCALE


Dalecarlia Dr
Wetherill Rd
Butterworth Pl
Albemarle St
Massachusetts Ave
Dalecarlia Pkwy
Yuma St
Yuma Pl
Warren Pl
Alton Pl
47th St
48th St
Windom Pl
46th St
49th St
Warren St
Van Ness St
1. Massachusetts Avenue/50th Street
2. Massachusetts Avenue/Yuma Street (W)
3. Massachusetts Avenue/Yuma Street (E)
4. Massachusetts Avenue/49th Street
5. Massachusetts Avenue/Alley
6. Massachusetts Avenue/48th Street/Fordham Road
7. Massachusetts Avenue/Van Ness Street
8. Yuma Street/49th Street
9. Yuma Street/Alley
10. Yuma Street/48th Street
11. Windom Place/48th Street
12. Alley/48th Street
13. Warren Street/48th Street
14. Fordham Road/49th Street
15. Albemarle Street/49th Street
16. Albemarle Street/48th Street
17. Yuma Street/46th Street
Study Area Intersections
- Study Intersections
1" = 500'


1. Spring Valley Shopping Center
Dalecarlia Dr
Wetherill Rd
Butterworth Pl
Butterworth Pl
Butterworth Pl
Albemarle St
Albemarle St
Massachusetts Ave
47th St
Dalecarlia Pkwy
Yuma St
Alton Pl
Alton Pl
48th St
Yuma Pl
SITE
Yuma St
Yuma St
Windom Pl
Windom Pl
Warren Pl
46th St
52nd St
49th St
1
Warren St
Warren St
52nd Ct
Warren St
50th St
Fordham Rd
Van Ness St
Van Ness St
Upton St
51st St
Tilden St
Future Developments
Future Development
Future Development Included in Analysis
Study Area Limits
Project Site
N
1" = 500'


10645
20097
10644
10100
10096
SITE
10095
20093
10094
10082
20084
Transportation Analysis Zones in Study Area
Project Site
TAZ used in analysis
1" = 1000'

Mode Split Assumptions

Residential Component

Description of residential component of project:

Approximately 230 residential units

Pertinent Mode Split data from other sources:

Information Source	Mode						
	SOV	Carpool	Transit	Bike	Walk	Telecommute	Other
Census Data - Census Tract (10.01/9.01)	38%	8%	27%	5%	8%	12%	2%
CTPP - TAZ Residents (10096)	36%	8%	24%	13%	4%	11%	4%
State of the Commute (of District residents)	41%	7%	41%	11%		---	
WMATA Ridership Survey (residential sites Suburban-Inside the Beltway)	39%		49%	14%		---	

Mode Split assumed in TIS:

Land Use	Mode				
	Drive	Transit	Bike	Walk	Telecommute/Other
Residential Mode Split	50%	30%	12%	8%	---

Grocery Component

Description of retail component of project:

Grocery (56,000 square feet)/Retail (4,000 square feet) - All assumed grocery for conservative analysis

Pertinent Mode Split data from other sources:

Information Source	Mode						
	SOV	Carpool	Transit	Bike	Walk	Telecommute	Other
WMATA Ridership Survey (Ballston Common)	43%		30%	27%		---	
WMATA Ridership Survey (Crystal City - Crystal Plaza Shops)	24%		41%	35%		---	
WMATA Ridership Survey (Silver Spring N'hood Center)	67%		19%	14%		---	

Mode Split assumed in TIS:

Information Source	Mode				
	Drive	Transit	Bike	Walk	Telecommute/Other
Grocery Mode Split	65%	10%	5%	20%	---

Notes Data from comparable sites was examined. It was determined that a conservative 65% auto mode split was appropriate based on the number of allocated parking spaces and location of site.

Table 1 - Residential Trip Generation

Note: Approximately 230 dwelling units

Step 1: Base trip generation using ITEs' *Trip Generation*

Land Use	Land Use Code	Quantity (x)	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Residential	220	230 du	23 veh/hr	93 veh/hr	116 veh/hr	94 veh/hr	50 veh/hr	144 veh/hr
		Calculation Details:	*20%*	*80%*	*=0.49(x)+3.73*	*65%*	*35%*	*=0.55(x)+17.65*

Step 2: Convert to people per hour, before applying mode splits

Land Use	People/Car (from 2009 NHTS, Table 16)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Residential	1.13 ppl/veh	26 ppl/hr	105 ppl/hr	131 ppl/hr	106 ppl/hr	57 ppl/hr	163 ppl/hr

Step 3: Split between modes, per assumed Mode Splits

Land Use	Mode	Split	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Residential	Auto	50%	13 ppl/hr	53 ppl/hr	66 ppl/hr	53 ppl/hr	29 ppl/hr	82 ppl/hr
Residential	Transit	30%	8 ppl/hr	31 ppl/hr	39 ppl/hr	32 ppl/hr	17 ppl/hr	49 ppl/hr
Residential	Bike	12%	3 ppl/hr	13 ppl/hr	16 ppl/hr	13 ppl/hr	7 ppl/hr	20 ppl/hr
Residential	Walk	8%	2 ppl/hr	8 ppl/hr	10 ppl/hr	8 ppl/hr	5 ppl/hr	13 ppl/hr

Step 4: Convert auto trips back to vehicles/hour

Land Use	People/Car (from 2009 NHTS, Table 16)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Residential	1.13 ppl/veh	12 veh/hr	46 veh/hr	58 veh/hr	47 veh/hr	26 veh/hr	73 veh/hr

Trip Gen Summary for Residential

Mode	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Auto	12 veh/hr	46 veh/hr	58 veh/hr	47 veh/hr	26 veh/hr	73 veh/hr
Transit	8 ppl/hr	31 ppl/hr	39 ppl/hr	32 ppl/hr	17 ppl/hr	49 ppl/hr
Bike	3 ppl/hr	13 ppl/hr	16 ppl/hr	13 ppl/hr	7 ppl/hr	20 ppl/hr
Walk	2 ppl/hr	8 ppl/hr	10 ppl/hr	8 ppl/hr	5 ppl/hr	13 ppl/hr

Table 2 - Grocery and Retail Trip Generation

Note: Grocery (56,000 square feet)/Retail (4,000 square feet) - All assumed grocery for conservative analysis

Step 1: Base trip generation using ITEs' *Trip Generation*

Land Use	Land Use Code	Quantity (x)	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Grocery	850	60,000 sf	126 veh/hr	78 veh/hr	204 veh/hr	272 veh/hr	262 veh/hr	534 veh/hr
		Calculation Details:	*62%*	*38%*	*=3.40(x/1000)*	*51%*	*49%*	*=0.74(x/1000)+3.25*

Step 2: Convert to people per hour, before applying mode splits

Land Use	People/Car (from 2009 NHTS, Table 16)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Grocery	1.84 ppl/veh	232 ppl/hr	143 ppl/hr	375 ppl/hr	500 ppl/hr	483 ppl/hr	983 ppl/hr

Step 3: Split between modes, per assumed Mode Splits

Land Use	Mode	Split	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Grocery	Auto	65%	151 ppl/hr	93 ppl/hr	244 ppl/hr	325 ppl/hr	314 ppl/hr	639 ppl/hr
Grocery	Transit	10%	23 ppl/hr	15 ppl/hr	38 ppl/hr	50 ppl/hr	48 ppl/hr	98 ppl/hr
Grocery	Bike	5%	12 ppl/hr	7 ppl/hr	19 ppl/hr	25 ppl/hr	24 ppl/hr	49 ppl/hr
Grocery	Walk	20%	46 ppl/hr	29 ppl/hr	75 ppl/hr	100 ppl/hr	97 ppl/hr	197 ppl/hr

Step 4: Convert auto trips back to vehicles/hour

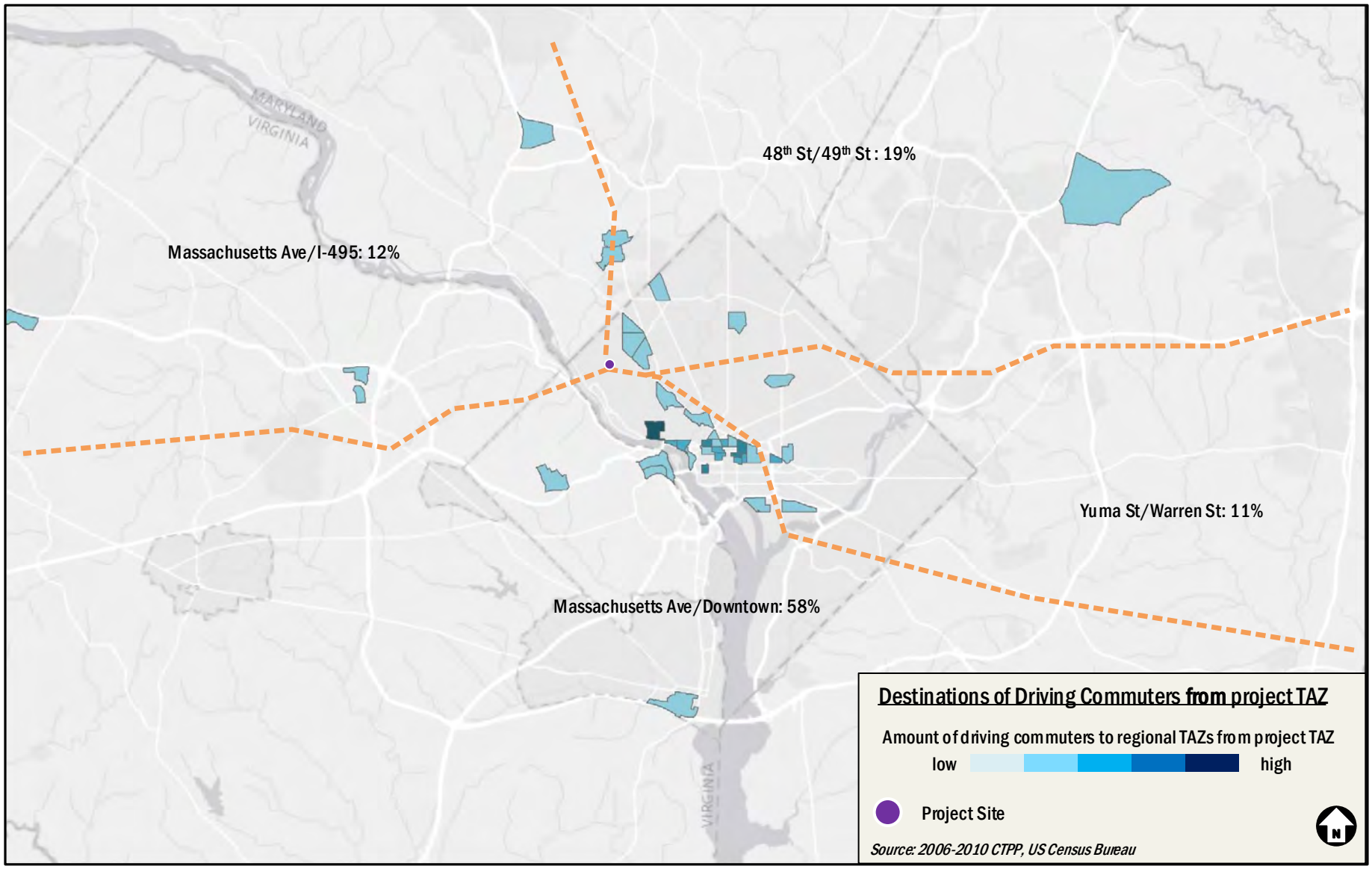
Land Use	People/Car (from 2009 NHTS, Table 16)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Grocery	1.84 ppl/veh	82 veh/hr	51 veh/hr	133 veh/hr	177 veh/hr	170 veh/hr	347 veh/hr

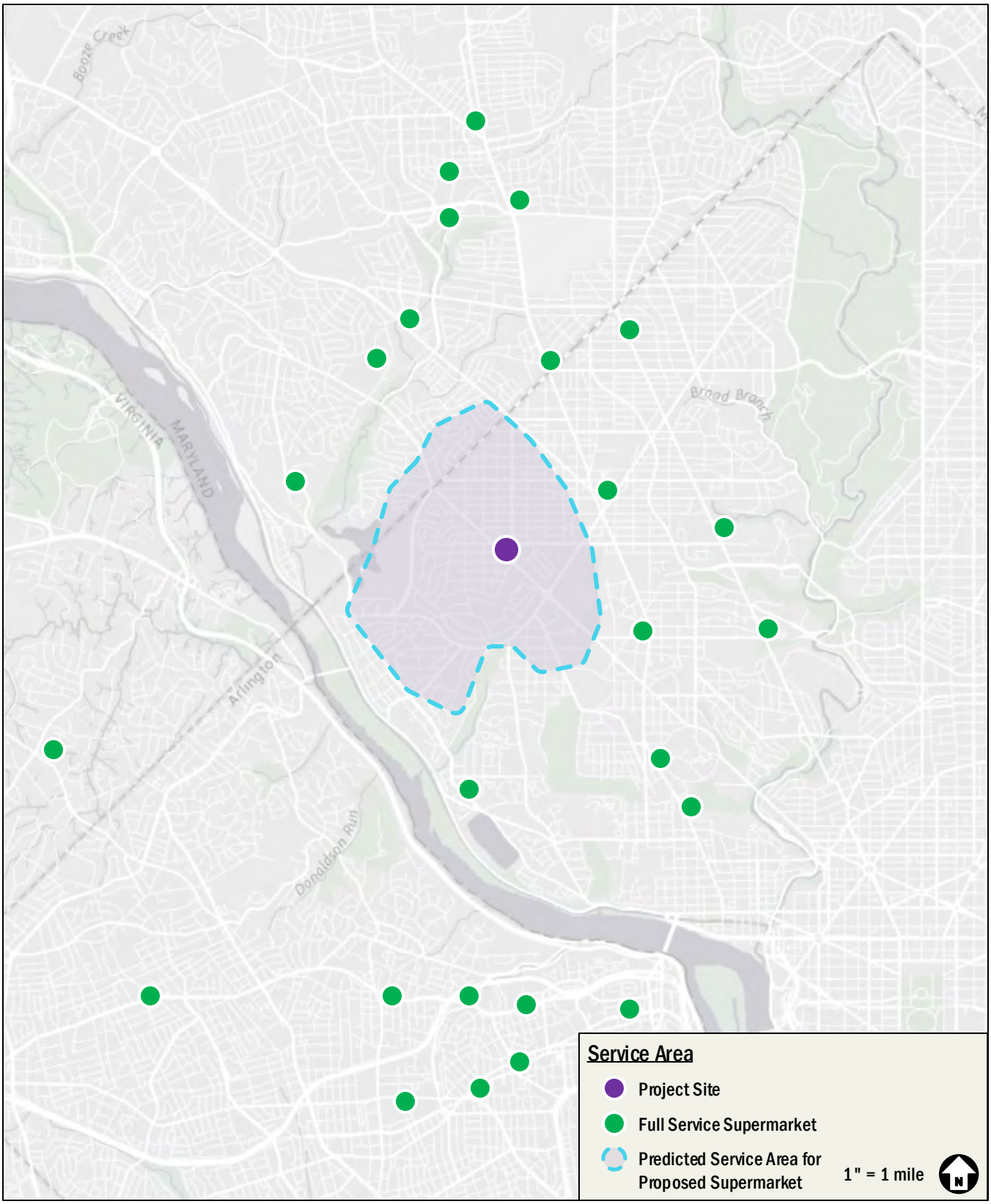
Trip Gen Summary for Grocer

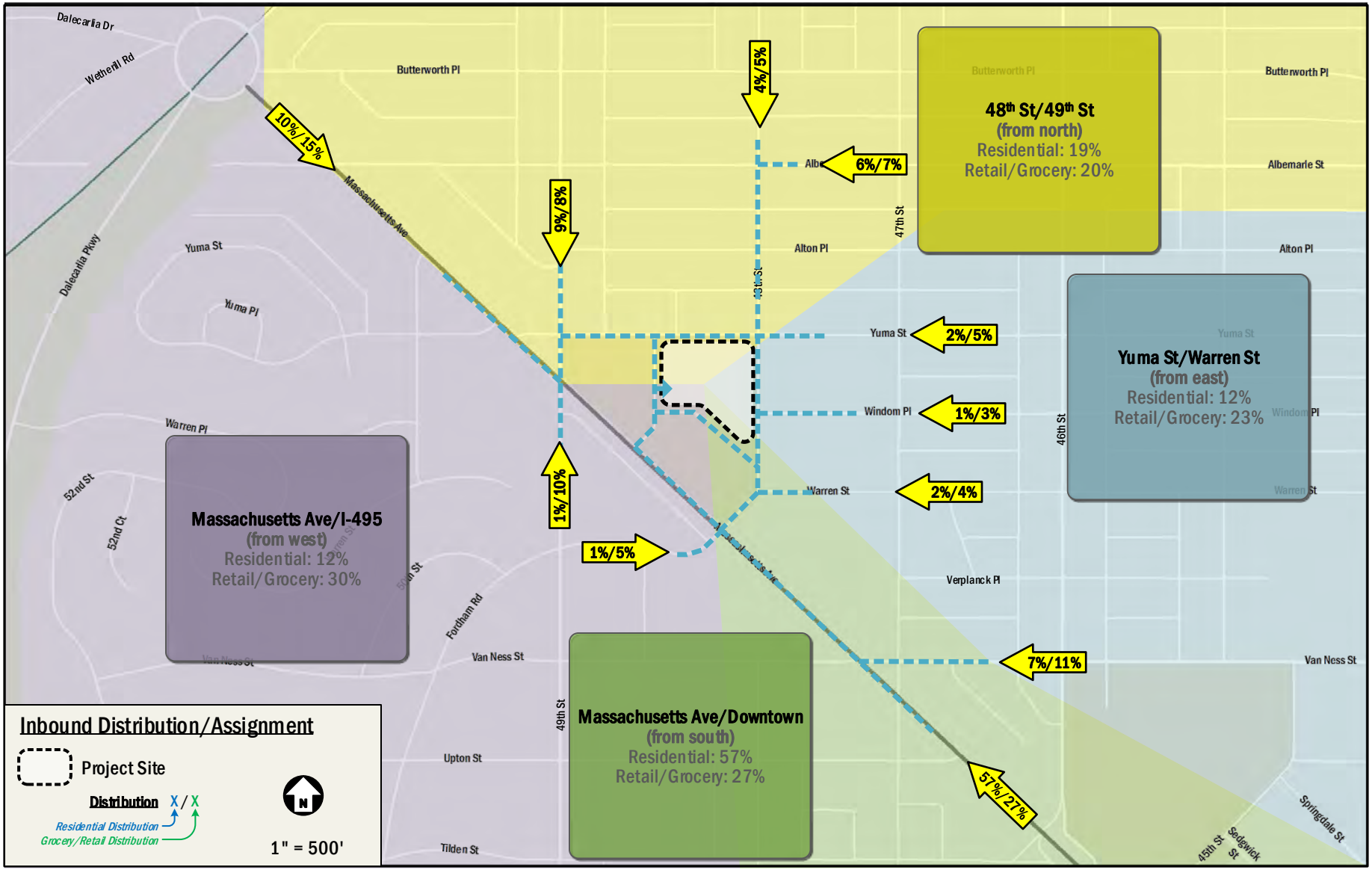
Mode	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Auto	82 veh/hr	51 veh/hr	133 veh/hr	177 veh/hr	170 veh/hr	347 veh/hr
Transit	23 ppl/hr	15 ppl/hr	38 ppl/hr	50 ppl/hr	48 ppl/hr	98 ppl/hr
Bike	12 ppl/hr	7 ppl/hr	19 ppl/hr	25 ppl/hr	24 ppl/hr	49 ppl/hr
Walk	46 ppl/hr	29 ppl/hr	75 ppl/hr	100 ppl/hr	97 ppl/hr	197 ppl/hr

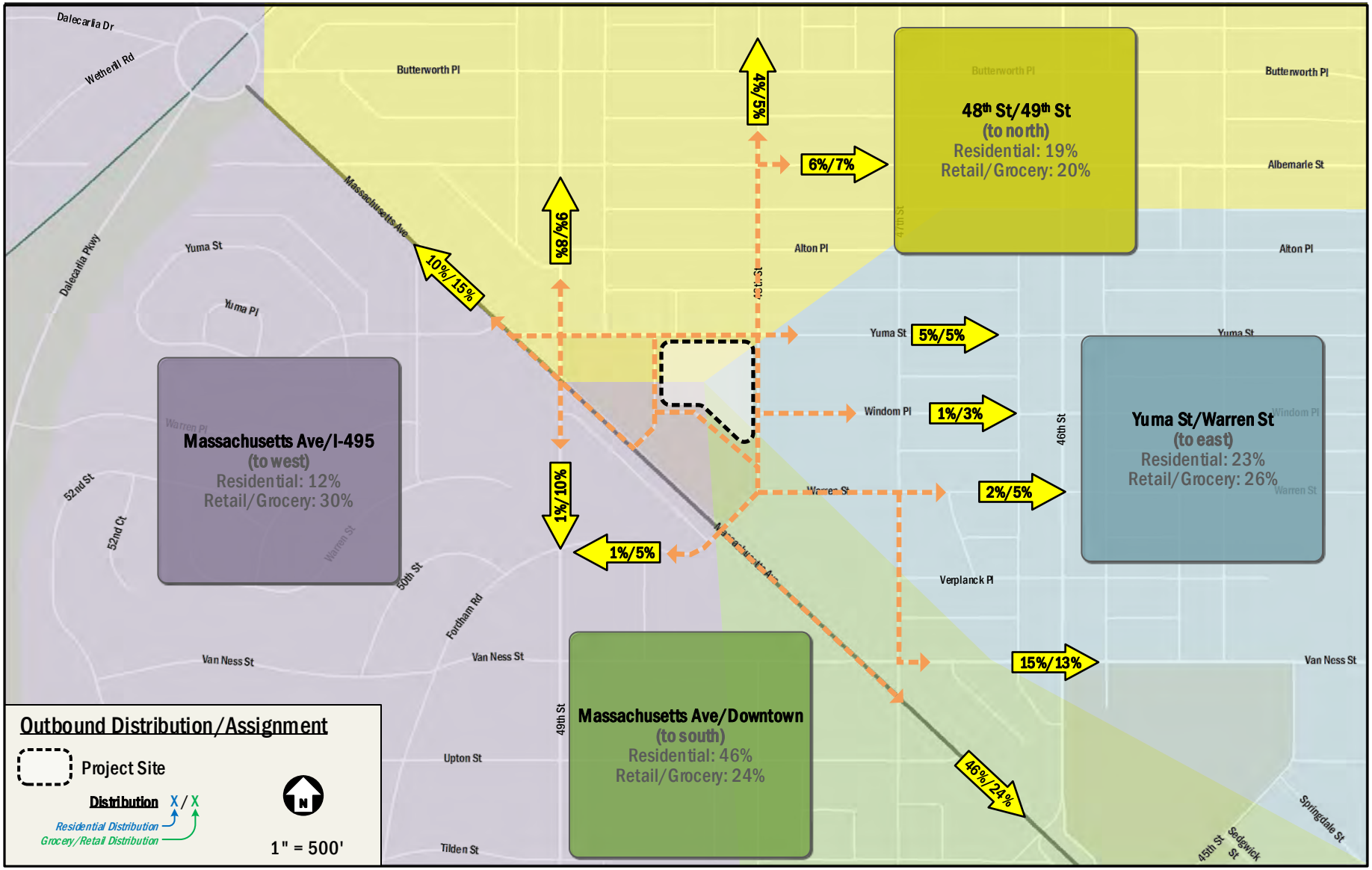
Trip Gen Summary by Land Use/Mode

Mode	Land Use	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Auto	Residential	12 veh/hr	46 veh/hr	58 veh/hr	47 veh/hr	26 veh/hr	73 veh/hr
Auto	Grocery	82 veh/hr	51 veh/hr	133 veh/hr	177 veh/hr	170 veh/hr	347 veh/hr
Auto	**Total**	**94 veh/hr**	**97 veh/hr**	**191 veh/hr**	**224 veh/hr**	**196 veh/hr**	**420 veh/hr**
Transit	Residential	8 ppl/hr	31 ppl/hr	39 ppl/hr	32 ppl/hr	17 ppl/hr	49 ppl/hr
Transit	Grocery	23 ppl/hr	15 ppl/hr	38 ppl/hr	50 ppl/hr	48 ppl/hr	98 ppl/hr
Transit	**Total**	**31 ppl/hr**	**46 ppl/hr**	**77 ppl/hr**	**82 ppl/hr**	**65 ppl/hr**	**147 ppl/hr**
Bike	Residential	3 ppl/hr	13 ppl/hr	16 ppl/hr	13 ppl/hr	7 ppl/hr	20 ppl/hr
Bike	Grocery	12 ppl/hr	7 ppl/hr	19 ppl/hr	25 ppl/hr	24 ppl/hr	49 ppl/hr
Bike	**Total**	**15 ppl/hr**	**20 ppl/hr**	**35 ppl/hr**	**38 ppl/hr**	**31 ppl/hr**	**69 ppl/hr**
Walk	Residential	2 ppl/hr	8 ppl/hr	10 ppl/hr	8 ppl/hr	5 ppl/hr	13 ppl/hr
Walk	Grocery	46 ppl/hr	29 ppl/hr	75 ppl/hr	100 ppl/hr	97 ppl/hr	197 ppl/hr
Walk	**Total**	**48 ppl/hr**	**37 ppl/hr**	**85 ppl/hr**	**108 ppl/hr**	**102 ppl/hr**	**210 ppl/hr**


MARYLAND
VIRGINIA
48th St/49th St: 19%
Massachusetts Ave/I-495: 12%
Yuma St/Warren St: 11%
Massachusetts Ave/Downtown: 58%
VIRGINIA
Destinations of Driving Commuters from project TAZ
Amount of driving commuters to regional TAZs from project TAZ
low
high
Project Site
Source: 2006-2010 CTPP, US Census Bureau
N

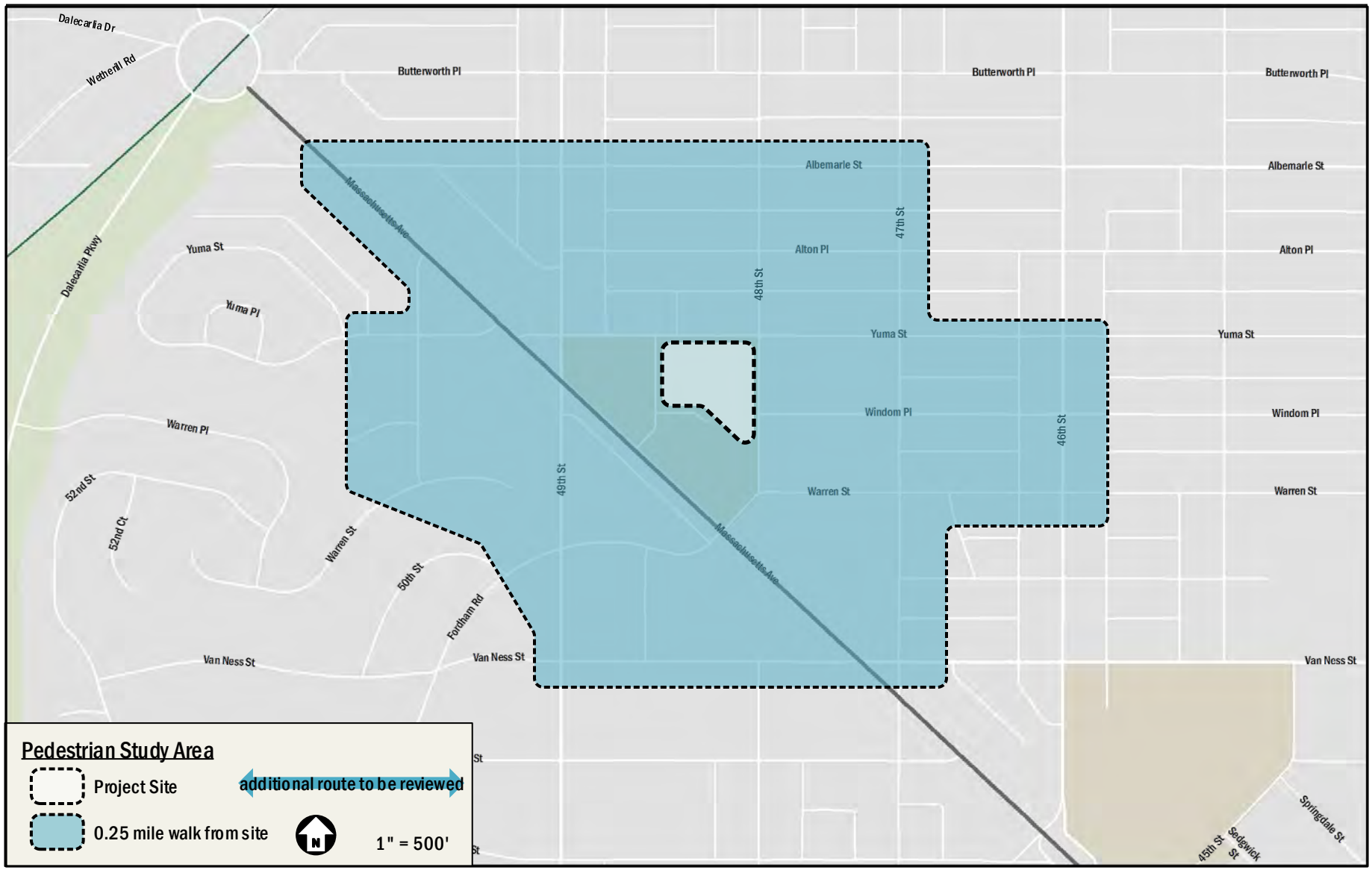

Booze Creek
VIRGINIA
MARYLAND
Broad Branch
Arlington
Donaldson Run
Service Area
Project Site
Full Service Supermarket
Predicted Service Area for Proposed Supermarket
1" = 1 mile
N


Dalecarlia Dr
Wetherill Rd
Butterworth Pl
10%/15%
Massachusetts Ave
4%/5%
48th St/49th St
(from north)
Residential: 19%
Retail/Grocery: 20%
6%/7%
Albemarle St
9%/8%
Alton Pl
47th St
43rd St
Dalecarlia Pkwy
Yuma St
Yuma Pl
2%/5%
Yuma St/Warren St
(from east)
Residential: 12%
Retail/Grocery: 23%
Windom Pl
1%/3%
46th St
Warren Pl
52nd St
52nd Ct
Massachusetts Ave/I-495
(from west)
Residential: 12%
Retail/Grocery: 30%
1%/10%
Warren St
2%/4%
1%/5%
Verplanck Pl
50th St
Fordham Rd
Van Ness St
7%/11%
49th St
Massachusetts Ave/Downtown
(from south)
Residential: 57%
Retail/Grocery: 27%
Upton St
57%/27%
Springdale St
45th St
Sedgwick St
Tilden St
Inbound Distribution/Assignment
Project Site
Distribution X / X
Residential Distribution
Grocery/Retail Distribution
N
1" = 500'

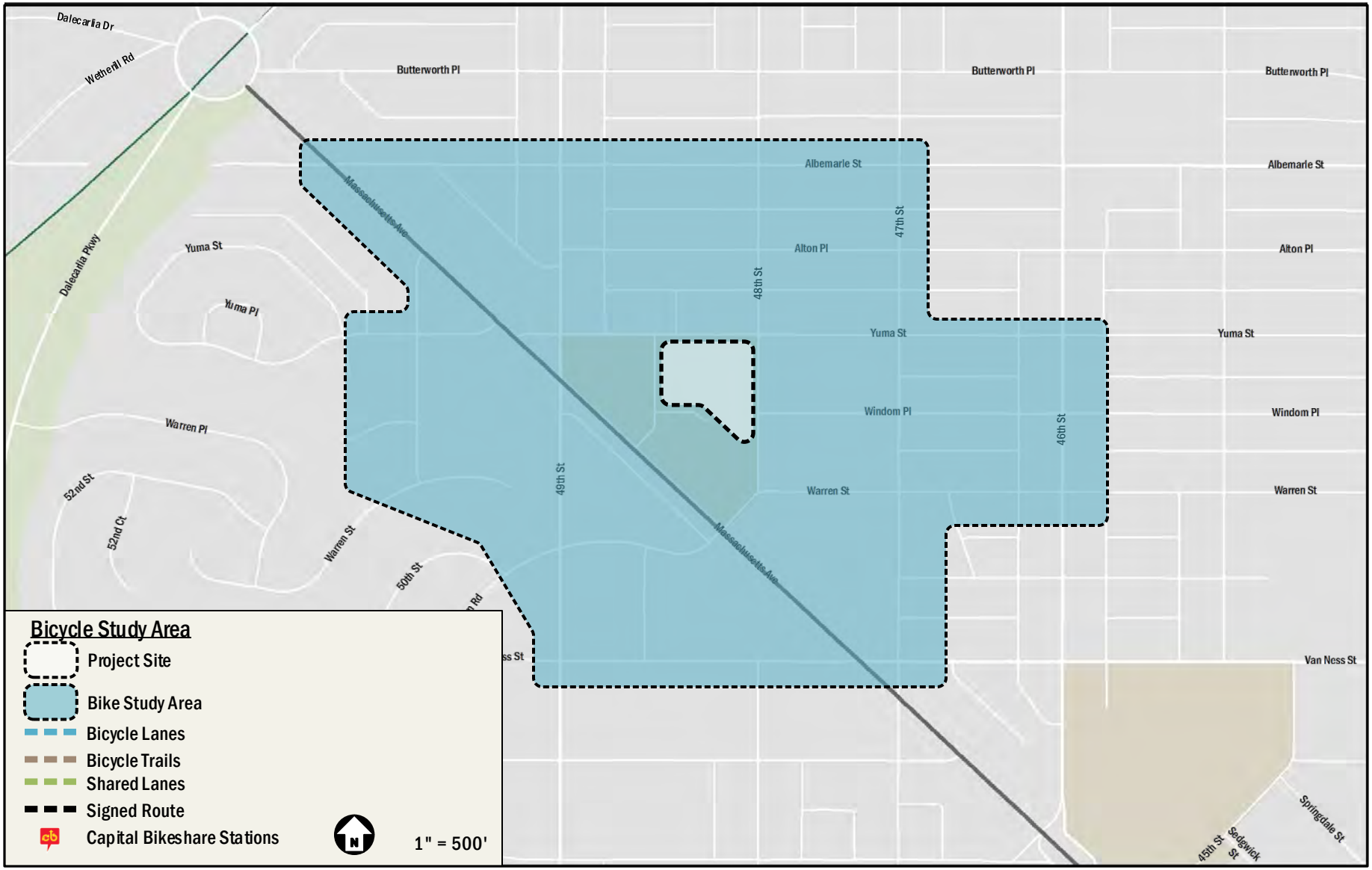

Dalecarlia Dr
Wetherill Rd
Butterworth Pl
Massachusetts Ave
Dalecarlia Pkwy
Yuma St
Yuma Pl
Alton Pl
Albemarle St
47th St
48th St
Windom Pl
46th St
Warren St
52nd St
52nd Ct
50th St
Fordham Rd
Van Ness St
49th St
Upton St
Tilden St
Verplanck Pl
Springdale St
45th St
Sedgwick St
48th St/49th St
(to north)
Residential: 19%
Retail/Grocery: 20%
Yuma St/Warren St
(to east)
Residential: 23%
Retail/Grocery: 26%
Massachusetts Ave/I-495
(to west)
Residential: 12%
Retail/Grocery: 30%
Massachusetts Ave/Downtown
(to south)
Residential: 46%
Retail/Grocery: 24%
4%/5%
6%/7%
8%/6%
10%/15%
5%/5%
1%/3%
2%/5%
1%/10%
1%/5%
15%/13%
46%/24%
Outbound Distribution/Assignment
Project Site
Distribution X / X
Residential Distribution
Grocery/Retail Distribution
N
1" = 500'

Preliminary Trip Distribution								
AM Peak Hour								
Inbound	**48th St/49th St**		**Yuma St/Warren St**		**Mass Ave/Downtown**		**Mass Ave/I-495**	
	Percentage	Trips	Percentage	Trips	Percentage	Trips	Percentage	Trips
Residential	19%	2	12%	1	57%	7	12%	1
Grocery	20%	16	23%	19	27%	22	30%	25
Inbound Total	19.9%	19	21.6%	20	30.8%	29	27.7%	26
Outbound	**48th St/49th St**		**Yuma St/Warren St**		**Mass Ave/Downtown**		**Mass Ave/I-495**	
	Percentage	Trips	Percentage	Trips	Percentage	Trips	Percentage	Trips
Residential	19%	9	23%	11	46%	21	12%	6
Grocery	20%	10	26%	13	24%	12	30%	15
Outbound Total	19.5%	19	24.6%	24	34.4%	33	21.5%	21
PM Peak Hour								
Inbound	**48th St/49th St**		**Yuma St/Warren St**		**Mass Ave/Downtown**		**Mass Ave/I-495**	
	Percentage	Trips	Percentage	Trips	Percentage	Trips	Percentage	Trips
Residential	19%	9	12%	6	57%	27	12%	6
Grocery	20%	35	23%	41	27%	48	30%	53
Inbound Total	19.8%	44	20.7%	46	33.3%	75	26.2%	59
Outbound	**48th St/49th St**		**Yuma St/Warren St**		**Mass Ave/Downtown**		**Mass Ave/I-495**	
	Percentage	Trips	Percentage	Trips	Percentage	Trips	Percentage	Trips
Residential	19%	5	23%	6	46%	12	12%	3
Grocery	20%	34	26%	44	24%	41	30%	51
Outbound Total	19.9%	39	25.6%	50	26.9%	53	27.6%	54

CTR Thresholds	Threshold	Project	Met?
General CTR Requirements			
Forecasted person-trips during the peak hour	50	1146	Yes
Forecasted parking demand (spaces)	20	224	Yes
Amount of commercial development	5,000 sf	60,000 sf	Yes
Amount of residential development	20 units	230 units	Yes
CTR Trigger for Further Analysis - Vehicular			
Vehicle trips in the peak direction at peak times	25	224	Yes
CTR Trigger for Further Analysis - Bike & Pedestrian			
Amount of residential development	200 units	230 units	Yes
Amount of commercial development	50,000 sf	60,000 sf	Yes
Site ecompasses more than a small block-grid	Yes	No	No
Combined peak hour ped/bike trip generation	100	279	Yes
CTR Trigger for Further Analysis - Transit			
Peak hour transit trip generation	50	147	Yes
Project Transit Mode Split	30%	Varies	No


Dalecarlia Dr
Wetherill Rd
Butterworth Pl
Butterworth Pl
Butterworth Pl
Albemarle St
Albemarle St
Massachusetts Ave
47th St
Alton Pl
Alton Pl
48th St
Dalecarlia Pkwy
Yuma St
Yuma Pl
Yuma St
Yuma St
Windom Pl
Windom Pl
Warren Pl
46th St
52nd St
49th St
Warren St
Warren St
52nd Ct
Massachusetts Ave
Warren St
50th St
Fordham Rd
Van Ness St
Van Ness St
Van Ness St
Springdale St
45th St
Sedgwick St
Pedestrian Study Area
Project Site
additional route to be reviewed
0.25 mile walk from site
N
1" = 500'

Dalecarlia Dr
Wetherill Rd
Butterworth Pl
Butterworth Pl
Butterworth Pl
Albemarle St
Albemarle St
Massachusetts Ave
47th St
Dalecarlia Pkwy
Yuma St
Alton Pl
Alton Pl
Spring Valley Shopping Center
0.1 miles (2 min)
48th St
Yuma Pl
Yuma St
Yuma St
United Bank
0.1 miles (2 min)
SITE
Windom Pl
Windom Pl
Warren Pl
46th St
49th St
American University
0.1 miles (2 min)
Warren St
52nd St
52nd Ct
Spring Valley Shopping Center
0.1 miles (2 min)
Warren St
50th St
Massachusetts Ave
Fordham Rd
Van Ness St
Van Ness St
Van Ness St
Pedestrian Pathways
- Destination
- Development Site
- Pedestrian Route
- Pedestrian Barrier
1" = 1000'
N
Upton St
Friendship Park
0.6 miles (13 min)
Springdale St
45th St
Sedgwick St
Tilden St


Dalecarlia Dr
Wetherill Rd
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Butterworth Pl
Albemarle St
Albemarle St
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47th St
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Yuma St
Yuma St
Windom Pl
Windom Pl
46th St
Warren Pl
52nd St
52nd Ct
49th St
Warren St
Warren St
Warren St
50th St
Massachusetts Ave
Van Ness St
45th St
Sedgwick St
Springdale St
Bicycle Study Area
Project Site
Bike Study Area
Bicycle Lanes
Bicycle Trails
Shared Lanes
Signed Route
Capital Bikeshare Stations
N
1" = 500'

Background Growth Information & Assumptions **Massachusetts Avenue NW (1 of 3)**

4330 48th Street NW

Project Timeline

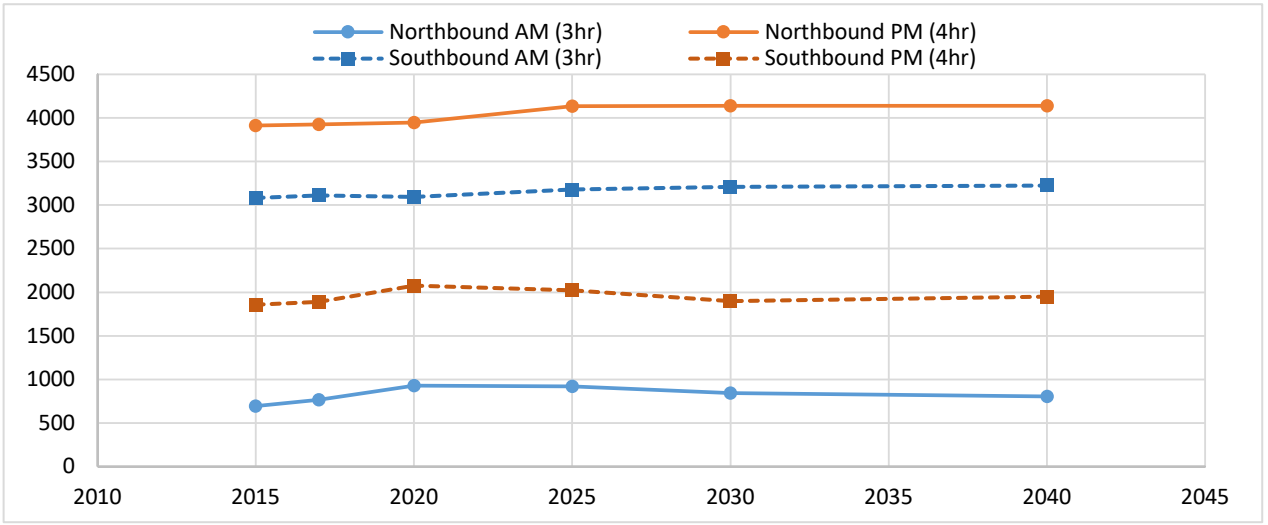
Data Collection: 2016 Project Completion 2019

Background Growth Data

Source 1: MWCOG Model Volumes (version 2.3.57a)

Segment: Massachusetts Avenue NW between 50th Street NW and 49th Street NW

Direction/Period	Modeled Year 2015	2017	2020	2025	2030	2040	Annual Growth: 2015 to 2020
Northbound AM (3hr)	695	767	928	920	843	803	**+5.95%**
Northbound PM (4hr)	3915	3924	3948	4134	4141	4141	**+0.17%**
Southbound AM (3hr)	3082	3109	3092	3180	3210	3224	**+0.06%**
Southbound PM (4hr)	1857	1889	2076	2022	1900	1951	**+2.25%**



Source 2: Historical DDOT AADTs

Segment: Massachusetts Avenue NW between 46th Street and 49th Street

	2011	2012	2013	2014
AADT (in 1000s):	17.0	18.6	18.7	19.0

Annual growth since:	2011	2012	2013	2014
	+3.8%	+1.1%	+1.6%	n/a

Proposed Growth Rates for Use in Study

Direction/Period	Annual Growth: 2016 to 2019	Total Growth: 2016 to 2019
Northbound AM	+6.00%	+19.10%
Northbound PM	+0.25%	+0.75%
Southbound AM	+0.10%	+0.30%
Southbound PM	+2.25%	+6.90%

Background Growth Information & Assumptions **Massachusetts Avenue NW (2 of 3)**

4330 48th Street NW

Project Timeline

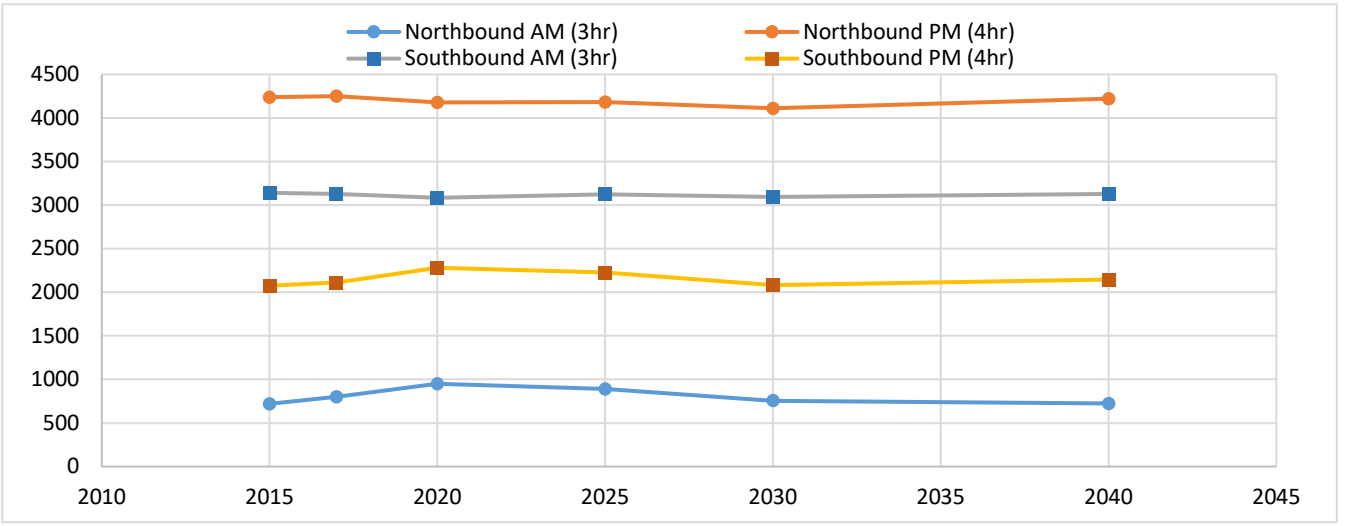
Data Collection: 2016 Project Completion 2019

Background Growth Data

Source 1: MWCOG Model Volumes (version 2.3.57a)

Segment: Massachusetts Avenue NW between 49th Street NW and 48th Street NW

Direction/Period	Modeled Year 2015	2017	2020	2025	2030	2040	Annual Growth: 2015 to 2020
Northbound AM (3hr)	720	799	950	890	756	724	**+5.70%**
Northbound PM (4hr)	4238	4250	4179	4184	4111	4222	**-0.28%**
Southbound AM (3hr)	3141	3127	3084	3123	3095	3128	**-0.37%**
Southbound PM (4hr)	2076	2111	2281	2227	2080	2147	**+1.90%**



Source 2: Historical DDOT AADTs

Segment: Massachusetts Avenue NW between 46th Street and 49th Street

	2011	2012	2013	2014
AADT (in 1000s):	17.0	18.6	18.7	19.0

Annual growth since:	2011	2012	2013	2014
	+3.8%	+1.1%	+1.6%	n/a

Proposed Growth Rates for Use in Study

Direction/Period	Annual Growth: 2016 to 2019	Total Growth: 2016 to 2019
Northbound AM	+5.75%	+18.26%
Northbound PM	+0.10%	+0.30%
Southbound AM	+0.10%	+0.30%
Southbound PM	+2.00%	+6.12%

Background Growth Information & Assumptions **Massachusetts Avenue NW (3 of 3)**

4330 48th Street NW

Project Timeline

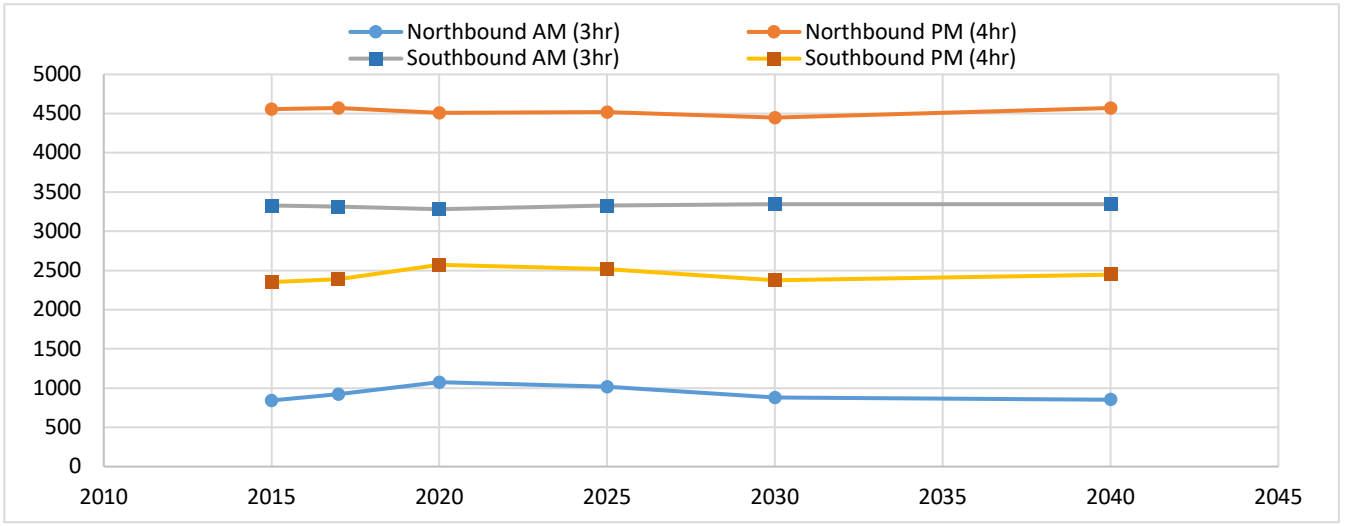
Data Collection: 2016 Project Completion 2019

Background Growth Data

Source 1: MWCOG Model Volumes (version 2.3.57a)

Segment: Massachusetts Avenue NW between 48th Street NW and Nebraska Avenue NW

Direction/Period	Modeled Year 2015	2017	2020	2025	2030	2040	Annual Growth: 2015 to 2020
Northbound AM (3hr)	843	922	1076	1018	880	854	**+5.00%**
Northbound PM (4hr)	4558	4571	4508	4517	4449	4570	**-0.22%**
Southbound AM (3hr)	3327	3314	3281	3326	3345	3345	**-0.28%**
Southbound PM (4hr)	2352	2391	2572	2519	2375	2448	**+1.80%**



Source 2: Historical DDOT AADTs

Segment: Massachusetts Avenue NW between 46th Street and 49th Street

	2011	2012	2013	2014
AADT (in 1000s):	17.0	18.6	18.7	19.0

Annual growth since:	2011	2012	2013	2014
	+3.8%	+1.1%	+1.6%	n/a

Proposed Growth Rates for Use in Study

Direction/Period	Annual Growth: 2016 to 2019	Total Growth: 2016 to 2019
Northbound AM	+5.00%	+15.76%
Northbound PM	+0.10%	+0.30%
Southbound AM	+0.10%	+0.30%
Southbound PM	+1.75%	+5.34%

Background Growth Information & Assumptions **49th Street NW**

4330 48th Street NW

Project Timeline

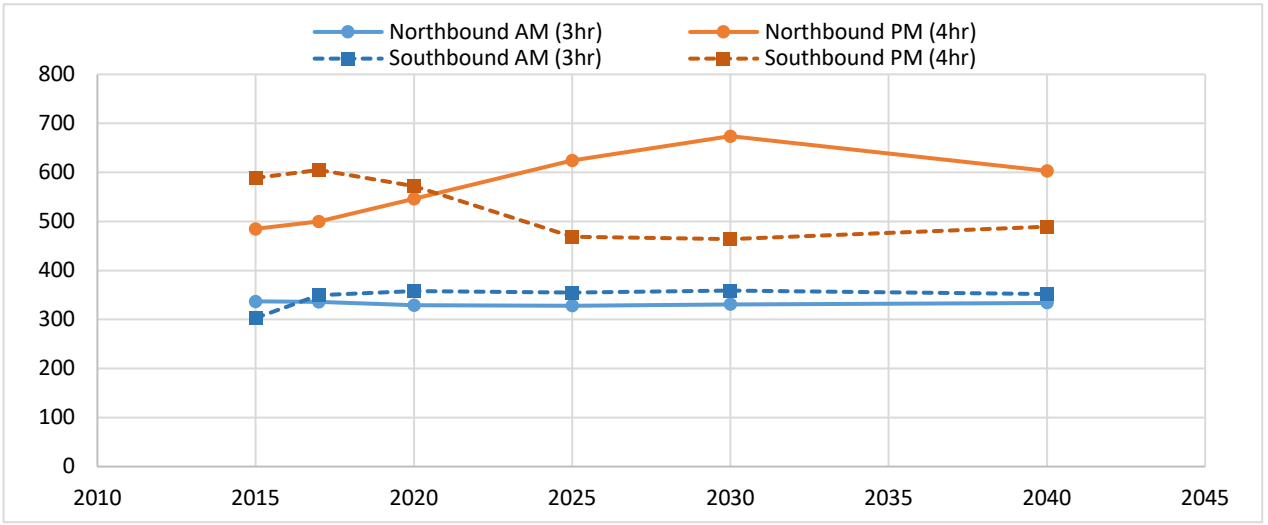
Data Collection: 2016 Project Completion 2019

Background Growth Data

Source 1: MWCOG Model Volumes (version 2.3.57a)

Segment: 49th Street NW between Massachusetts Avenue NW and Tilden Street NW

Direction/Period	Modeled Year 2015	2017	2020	2025	2030	2040	Annual Growth: 2015 to 2020
Northbound AM (3hr)	337	336	329	328	331	334	**-0.48%**
Northbound PM (4hr)	485	500	546	624	674	603	**+2.40%**
Southbound AM (3hr)	303	350	358	355	359	352	**+3.39%**
Southbound PM (4hr)	589	605	572	469	464	489	**-0.58%**



Source 2: Historical DDOT AADTs

Segment: 49th Street between Yuma Street and Van Ness Street

	2011	2012	2013	2014
AADT (in 1000s):	4.3	4.3	4.3	n/a

Annual growth since:	2011	2012	2013	2014
	-even-	-even-	-even-	n/a

Proposed Growth Rates for Use in Study

Direction/Period	Annual Growth: 2016 to 2019	Total Growth: 2016 to 2019
Northbound AM	+0.10%	+0.30%
Northbound PM	+2.50%	+7.69%
Southbound AM	+3.50%	+10.87%
Southbound PM	+0.10%	+0.30%

Background Growth Information & Assumptions **46th Street NW**

4330 48th Street NW

Project Timeline

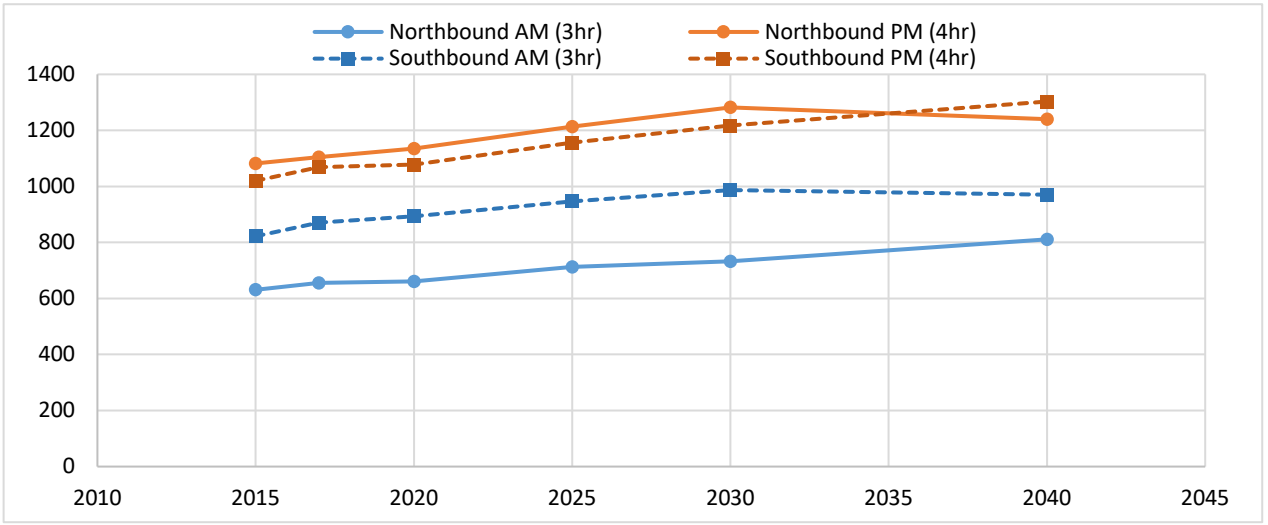
Data Collection: 2016 Project Completion 2019

Background Growth Data

Source 1: MWCOG Model Volumes (version 2.3.57a)

Segment: 46th Street NW between Albemarle Avenue NW and Yuma Street NW

Direction/Period	Modeled Year 2015	2017	2020	2025	2030	2040	Annual Growth: 2015 to 2020
Northbound AM (3hr)	631	656	661	713	733	811	**+0.93%**
Northbound PM (4hr)	1082	1104	1135	1214	1282	1240	**+0.96%**
Southbound AM (3hr)	822	871	894	946	987	970	**+1.69%**
Southbound PM (4hr)	1020	1069	1078	1156	1218	1303	**+1.11%**



Source 2: Historical DDOT AADTs

Segment: 46th Street NW between Massachussets Avenue and Van Ness Street

	2011	2012	2013	2014
AADT (in 1000s):	2.2	2.2	2.2	n/a

Annual growth since:	2011	2012	2013	2014
	-even-	-even-	-even-	n/a

Proposed Growth Rates for Use in Study

Direction/Period	Annual Growth: 2016 to 2019	Total Growth: 2016 to 2019
Northbound AM	+1.00%	+3.03%
Northbound PM	+1.00%	+3.03%
Southbound AM	+1.75%	+5.34%
Southbound PM	+1.00%	+3.03%

OBSERVED TRIP GENERATION IN MIXED-USE DEVELOPMENTS WITH GROCER

WASHINGTON, DC, ARLINGTON, VA, AND BETHESDA, MD

Site	Jurisdiction	Distance to Metro	Walk Score®	Transit Score®	Bike Score®	Land Use	ITE Code	Size/Units	Observed Vehicular Trips*		# of Parking Spaces	Peak Hour Trips per Space	
									AM	PM		AM	PM
1	DC	2.3 mile	70-89 (Very Walkable)	25-49 (Some Transit)	70-89 (Very Bikeable)	Grocery	850	20 kSF	166	275	92	1.80	2.99
2	DC	0.2 mile	90-100 (Walker's Paradise)	70-89 (Excellent Transit)	90-100 (Biker's Paradise)	Grocery Retail Residential	850 820 220	15 kSF 8 kSF 215 du	44 none 6	95 none 12	44 none 108	1.00 0.06	2.16 0.11
3	DC	0.5 mile	90-100 (Walker's Paradise)	70-89 (Excellent Transit)	90-100 (Biker's Paradise)	Grocery Retail Residential	850 820 220	43 kSF 2 kSF 215 du	63	143	124 none 146	0.23	0.53
4	DC	0.3 mile	90-100 (Walker's Paradise)	90-100 (Rider's Paradise)	70-89 (Very Bikeable)	Grocery Retail Residential	850 820 220	50 kSF 30 kSF 225 du	71 33	177 23	180 167	0.39 0.20	0.98 0.14
5	DC	<0.1 mile	90-100 (Walker's Paradise)	70-89 (Excellent Transit)	90-100 (Biker's Paradise)	Grocery Residential	850 220	63 kSF 218 du	62 14	98 6	84 134	0.74 0.10	1.17 0.04
6	VA	<0.1 mile	90-100 (Walker's Paradise)	50-69 (Good Transit)	70-89 (Very Bikeable)	Grocery Retail Office Residential	850 820 710 220	13 kSF 29 kSF 76 kSF 244 du	104	259	458	0.23	0.57
7	VA	1.7 miles	70-89 (Very Walkable)	50-69 (Good Transit)	70-89 (Very Bikeable)	Grocery Retail Residential	850 820 220	57 kSF 42 kSF 299 du	111	459	428 326	0.15	0.61
8	MD	0.6 mile	90-100 (Walker's Paradise)	50-69 (Good Transit)	N/A	Grocery	850	40 kSF	144	221	161	0.89	1.37

									Forecasted Vehicular Trips**		# of Parking Spaces	Peak Hour Trips per Space	
									AM	PM		AM	PM
The Lady Bird	DC	0.8 mile	78 (Very Walkable)	42 (Some Transit)	65 (Bikeable)	Grocery Retail Residential	850 820 220	56 kSF 4 kSF 230 du	133 58	347 73	147 77	0.90 0.75	2.36 0.95

* Vehicular trips include both inbound and outbound trips **Assumes 65% auto mode split for grocer and 50% auto mode split for residents

WASHINGTON, DC

Data provided by DDOT-PPSA
Contact – Jamie Henson (jamie.henson@dc.gov)

Site #1 (Data collected October 2013)
Grocery Store GSF 20,000

Location/Access: 2.3 miles to Metrorail station, Walk Score® = 70-89 (Very Walkable), Transit Score® = 25-49 (Some Transit), Bike Score® = 70-89 (Very Bikeable)
Parking: 92 parking spaces serve grocer.

- The volume during the **weekday morning peak hour** was 166 vehicles (7:45AM-8:45AM)
- The volume during the **weekday evening peak hour** was 275 vehicles (5:00PM-6:00PM)

Site #2 (Data collected April 2015)
Grocery Store GSF 15,000
Retail GSF 8,100
Residential Units 268

Location/Access: 0.2 mile to Metrorail station, Walk Score® = 90-100 (Walker's Paradise), Transit Score® = 70-89 (Excellent Transit), Bike Score® = 90-100 (Biker's Paradise)
Parking: 44 parking spaces in garage serve grocery and retail components and 108 spaces serve the residential component.

- The volume during the **weekday morning peak hour** was 50 vehicles (9:00AM-10:00AM)
- The volume during the **weekday evening peak hour** was 107 vehicles (4:00PM-5:00PM)

Site #3 (Data collected May 2015)
Grocery Store GSF 43,390
Retail GSF 2,065
Residential Units 215

Location/Access: 0.5 mile to Metrorail Station, Walk Score® = 90-100 (Walker's Paradise), Transit Score® = 70-89 (Excellent Transit), Bike Score® = 90-100 (Biker's Paradise)
Parking: 124 parking spaces in garage serve grocery and retail components and 146 spaces serve the residential component.

- The volume during the **weekday morning peak hour** was 63 vehicles (7:30AM-8:30AM)
- The volume during the **weekday evening peak hour** was 143 vehicles (6:00PM-7:00PM)

Site #4 (Data collected May 2015)

Grocery Store GSF	50,000
Retail GSF	30,000
Residential Units	225

Location/Access: 0.3 mile to Metrorail station, Walk Score® = 90-100 (Walker's Paradise), Transit Score® = 90-100 (Rider's Paradise), Bike Score® = 70-89 (Very Bikeable)
Parking: 180 parking spaces for retail (exact grocery number unknown) and 167 spaces serve the residential component.

- The volume during the **weekday morning peak hour** was 104 vehicles (8:00AM-9:00AM)
- The volume during the **weekday evening peak hour** was 200 vehicles (5:15PM-6:15PM)

Site #5 (Data collected April 2015)

Grocery Store GSF	63,125
Residential Units	218

Location/Access: <.1 mile to Metrorail station, Walk Score® = 90-100 (Walker's Paradise), Transit Score® = 70-89 (Excellent Transit), Bike Score® = 90-100 (Biker's Paradise)
Parking: 84 parking spaces in garage serve grocery component and 134 spaces serve the residential component.

- The volume during the **weekday morning peak hour** was 76 vehicles (8:15AM-9:15AM)
- The volume during the **weekday evening peak hour** was 104 vehicles (4:30PM-5:30PM)

ARLINGTON, VA

Data provided by Arlington County DES
Contact – Melissa McMahon (mmcmahon@arlingtonva.us)

Site #6 (Data collected December 2014)

Grocery Store GSF	13,000
Residential Units	244
Retail GSF	29,000
Office	76,000

Location/Access: <.1 mile to Metrorail station, Walk Score® = 90-100 (Walker's Paradise), Transit Score® = 50-69 (Good Transit), Bike Score® = 70-89 (Very Bikeable)
Parking: 458 spaces in garage serve all uses. Depending on time of day between 93 and 213 spaces are available for retail or grocery uses.

- The volume during the **weekday morning peak hour** was 104 vehicles (10:15AM-11:15AM)
- The volume during the **weekday evening peak hour** was 259 vehicles (5:30PM-6:30PM)

Site #7 (Data collected November 2014)

Grocery Store GSF	57,000
Retail GSF	42,000
Residential Units	299

Location/Access: 1.7 mile to Metrorail Station, Walk Score® = 70-89 (Very Walkable), Transit Score® = 50-69 (Good Transit), Bike Score® = 70-89 (Very Bikeable)
Parking: 428 parking spaces in garage serve grocery and retail components and 326 spaces serve the residential component.

- The volume during the **weekday morning peak hour** was 111 vehicles (11:45AM-12:45PM)
- The volume during the **weekday evening peak hour** was 459 vehicles (5:30PM-6:30PM)

BETHESDA, MD

Data collected by Gorove/Slade
Contact – Jim Watson (jim.watson@goroveslade.com)

Site #8 (Data collected December 2013)
Grocery Store GSF 40,000

Location/Access: 0.6 mile to Metrorail station, Walk Score® = 90-100 (Walker's Paradise), Transit Score® = 50-69 (Good Transit), Bike Score® = N/A
Parking: 161 spaces in garage serve grocer.

- The volume during the **weekday morning peak hour** was 144 vehicles (8:30AM-9:30AM)
- The volume during the **weekday evening peak hour** was 221 vehicles (5:00PM-6:00PM)

B: Detailed Trip Generation and Mode Split Information

Mode Split Assumptions

Residential Component

Description of residential component of project:

Approximately 219 residential units

Pertinent Mode Split data from other sources:

Information Source	Mode						
	SOV	Carpool	Transit	Bike	Walk	Telecommute	Other
Census Data - Census Tract (10.01/9.01)	38%	8%	27%	5%	8%	12%	2%
CTPP - TAZ Residents (10096)	36%	8%	24%	13%	4%	11%	4%
State of the Commute (of District residents)	41%	7%	41%	11%		---	
WMATA Ridership Survey (residential sites Suburban-Inside the Beltway)	39%		49%	14%		---	

Mode Split assumed in TIS:

Land Use	Mode				
	Drive	Transit	Bike	Walk	Telecommute/Other
Residential Mode Split	90%	5%	2%	3%	---

Notes: Data from comparable sites was examined. It was determined that a conservative 90% auto mode split was appropriate based on the number of allocated parking spaces and location of site.

Grocery Component

Description of retail component of project:

Grocery/Retail (16,000 square feet) - All assumed grocery for conservative analysis

Pertinent Mode Split data from other sources:

Information Source	Mode						
	SOV	Carpool	Transit	Bike	Walk	Telecommute	Other
WMATA Ridership Survey (Ballston Common)	43%		30%	27%		---	
WMATA Ridership Survey (Crystal City - Crystal Plaza Shops)	24%		41%	35%		---	
WMATA Ridership Survey (Silver Spring N'hood Center)	67%		19%	14%		---	

Mode Split assumed in TIS:

Information Source	Mode				
	Drive	Transit	Bike	Walk	Telecommute/Other
Grocery Mode Split	90%	0%	2%	8%	---

Notes: Data from comparable sites was examined. It was determined that a conservative 90% auto mode split was appropriate based on the number of allocated parking spaces and location of site.

Table 1 - Residential Trip Generation

Note: Approximately 219 dwelling units

Step 1: Base trip generation using ITEs' *Trip Generation*

Land Use	Land Use Code	Quantity (x)	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Residential	220	219 du	22 veh/hr	89 veh/hr	111 veh/hr	90 veh/hr	48 veh/hr	138 veh/hr
		Calculation Details:	*20%*	*80%*	*=0.49(x)+3.73*	*65%*	*35%*	*=0.55(x)+17.65*

Step 2: Convert to people per hour, before applying mode splits

Land Use	People/Car (from 2009 NHTS, Table 16)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Residential	1.13 ppl/veh	25 ppl/hr	100 ppl/hr	125 ppl/hr	102 ppl/hr	54 ppl/hr	156 ppl/hr

Step 3: Split between modes, per assumed Mode Splits

Land Use	Mode	Split	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Residential	Auto	90%	23 ppl/hr	90 ppl/hr	113 ppl/hr	92 ppl/hr	48 ppl/hr	140 ppl/hr
Residential	Transit	5%	1 ppl/hr	5 ppl/hr	6 ppl/hr	5 ppl/hr	3 ppl/hr	8 ppl/hr
Residential	Bike	2%	1 ppl/hr	2 ppl/hr	3 ppl/hr	2 ppl/hr	1 ppl/hr	3 ppl/hr
Residential	Walk	3%	1 ppl/hr	3 ppl/hr	4 ppl/hr	3 ppl/hr	2 ppl/hr	5 ppl/hr

Step 4: Convert auto trips back to vehicles/hour

Land Use	People/Car (from 2009 NHTS, Table 16)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Residential	1.13 ppl/veh	20 veh/hr	80 veh/hr	100 veh/hr	81 veh/hr	43 veh/hr	124 veh/hr

Trip Gen Summary for Residential (219 du)

Mode	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Auto	20 veh/hr	80 veh/hr	100 veh/hr	81 veh/hr	43 veh/hr	124 veh/hr
Transit	1 ppl/hr	5 ppl/hr	6 ppl/hr	5 ppl/hr	3 ppl/hr	8 ppl/hr
Bike	1 ppl/hr	2 ppl/hr	3 ppl/hr	2 ppl/hr	1 ppl/hr	3 ppl/hr
Walk	1 ppl/hr	3 ppl/hr	4 ppl/hr	3 ppl/hr	2 ppl/hr	5 ppl/hr

Table 2 - Grocery and Retail Trip Generation

Note: Grocery/Retail (16,000 square feet) - All assumed grocery for conservative analysis

Step 1: Base trip generation using ITEs' *Trip Generation*

Land Use	Land Use Code	Quantity (x)	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Grocery	850	16,000 sf	33 veh/hr	21 veh/hr	54 veh/hr	103 veh/hr	98 veh/hr	201 veh/hr
		Calculation Details:	*62%*	*38%*	*=3.40(x/1000)*	*51%*	*49%*	*=0.74(x/1000)+3.25*

Step 2: Convert to people per hour, before applying mode splits

Land Use	People/Car (from 2009 NHTS, Table 16)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Grocery	1.84 ppl/veh	61 ppl/hr	38 ppl/hr	99 ppl/hr	190 ppl/hr	180 ppl/hr	370 ppl/hr

Step 3: Split between modes, per assumed Mode Splits

Land Use	Mode	Split	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Grocery	Auto	90%	55 ppl/hr	34 ppl/hr	89 ppl/hr	171 ppl/hr	162 ppl/hr	333 ppl/hr
Grocery	Transit	0%	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr
Grocery	Bike	2%	1 ppl/hr	1 ppl/hr	2 ppl/hr	4 ppl/hr	3 ppl/hr	7 ppl/hr
Grocery	Walk	8%	5 ppl/hr	3 ppl/hr	8 ppl/hr	15 ppl/hr	15 ppl/hr	30 ppl/hr

Step 4: Convert auto trips back to vehicles/hour

Land Use	People/Car (from 2009 NHTS, Table 16)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Grocery	1.84 ppl/veh	30 veh/hr	18 veh/hr	48 veh/hr	93 veh/hr	88 veh/hr	181 veh/hr

Trip Gen Summary for Grocer (16 ksf)

Mode	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Auto	30 veh/hr	18 veh/hr	48 veh/hr	93 veh/hr	88 veh/hr	181 veh/hr
Transit	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr
Bike	1 ppl/hr	1 ppl/hr	2 ppl/hr	4 ppl/hr	3 ppl/hr	7 ppl/hr
Walk	5 ppl/hr	3 ppl/hr	8 ppl/hr	15 ppl/hr	15 ppl/hr	30 ppl/hr

Trip Gen Summary by Land Use/Mode

Mode	Land Use	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Auto	Residential	20 veh/hr	80 veh/hr	100 veh/hr	81 veh/hr	43 veh/hr	124 veh/hr
Auto	Grocery	30 veh/hr	18 veh/hr	48 veh/hr	93 veh/hr	88 veh/hr	181 veh/hr
Auto	**Total**	**50 veh/hr**	**98 veh/hr**	**148 veh/hr**	**174 veh/hr**	**131 veh/hr**	**305 veh/hr**
Transit	Residential	1 ppl/hr	5 ppl/hr	6 ppl/hr	5 ppl/hr	3 ppl/hr	8 ppl/hr
Transit	Grocery	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr
Transit	**Total**	**1 ppl/hr**	**5 ppl/hr**	**6 ppl/hr**	**5 ppl/hr**	**3 ppl/hr**	**8 ppl/hr**
Bike	Residential	1 ppl/hr	2 ppl/hr	3 ppl/hr	2 ppl/hr	1 ppl/hr	3 ppl/hr
Bike	Grocery	1 ppl/hr	1 ppl/hr	2 ppl/hr	4 ppl/hr	3 ppl/hr	7 ppl/hr
Bike	**Total**	**2 ppl/hr**	**3 ppl/hr**	**5 ppl/hr**	**6 ppl/hr**	**4 ppl/hr**	**10 ppl/hr**
Walk	Residential	1 ppl/hr	3 ppl/hr	4 ppl/hr	3 ppl/hr	2 ppl/hr	5 ppl/hr
Walk	Grocery	5 ppl/hr	3 ppl/hr	8 ppl/hr	15 ppl/hr	15 ppl/hr	30 ppl/hr
Walk	**Total**	**6 ppl/hr**	**6 ppl/hr**	**12 ppl/hr**	**18 ppl/hr**	**17 ppl/hr**	**35 ppl/hr**

C: TRUCK MANEUVERING DIAGRAMS

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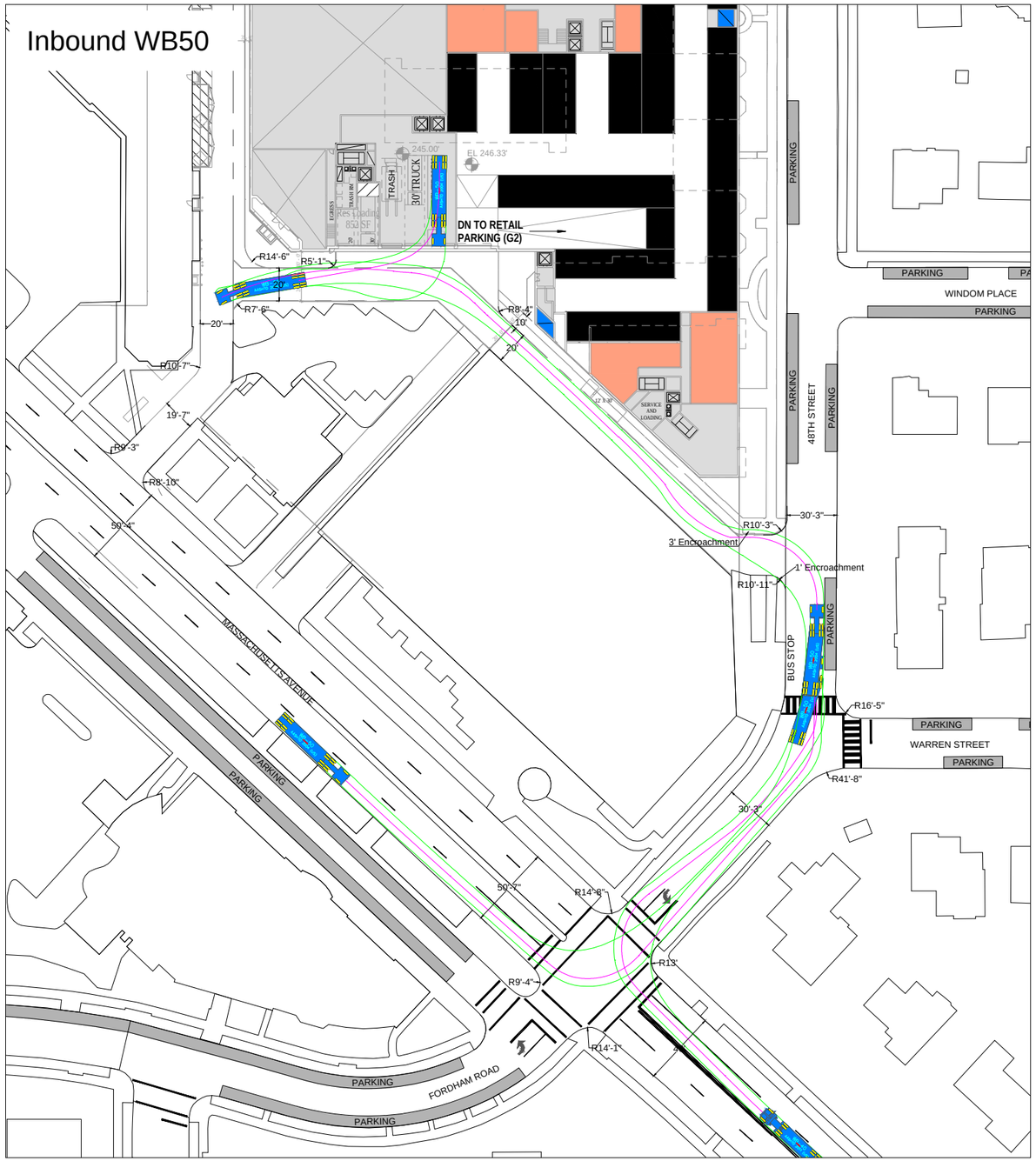

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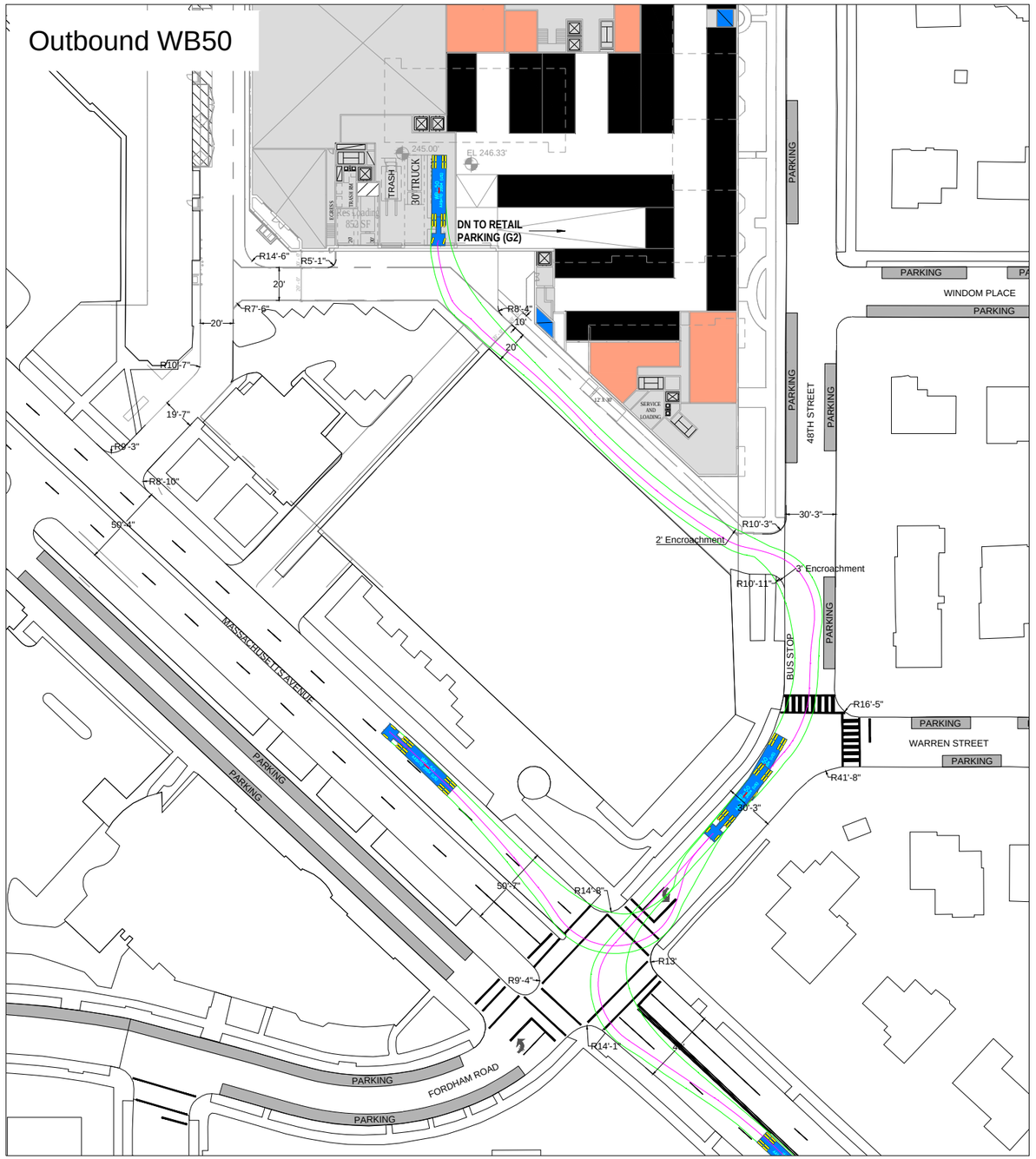

GOROVE / SLADE
Transportation Planners and Engineers

The Ladybird: AutoTURN Movements

Valor Development

11.21.2017

Sheet 1 of 4

Washington, DC

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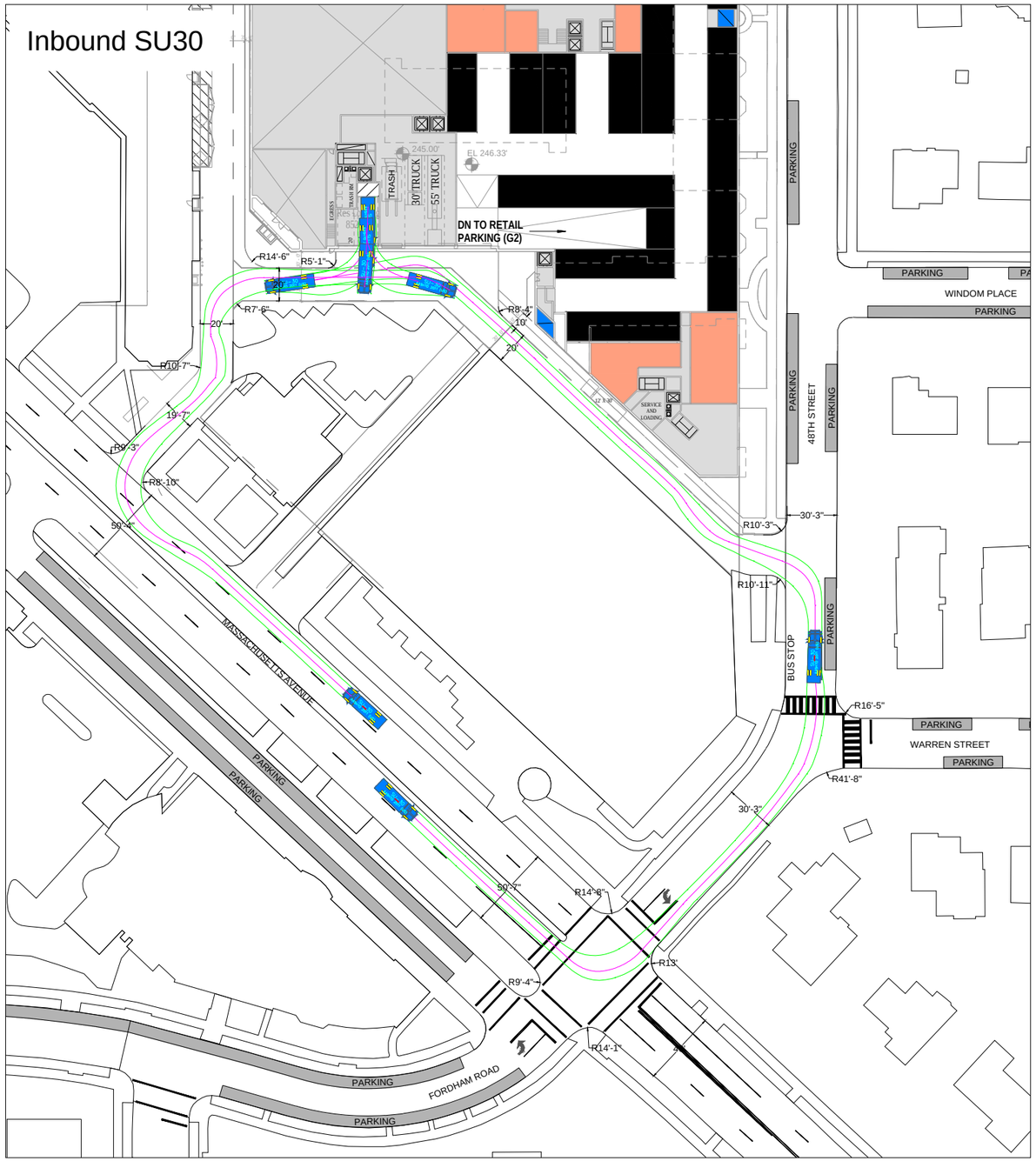

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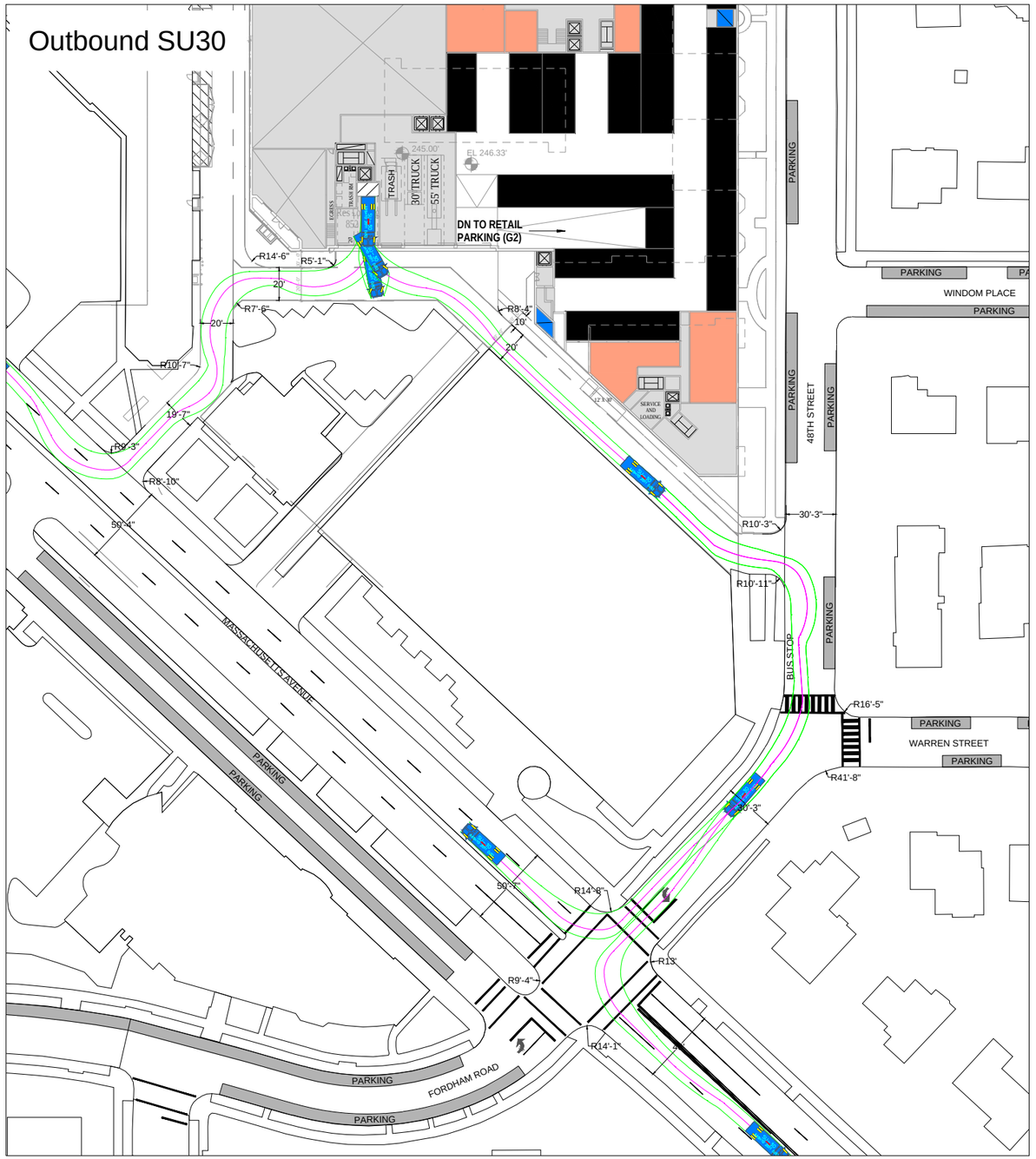

GOROVE / SLADE
Transportation Planners and Engineers

The Ladybird: AutoTURN Movements

Valor Development

11.21.2017

Sheet 2 of 4

Washington, DC

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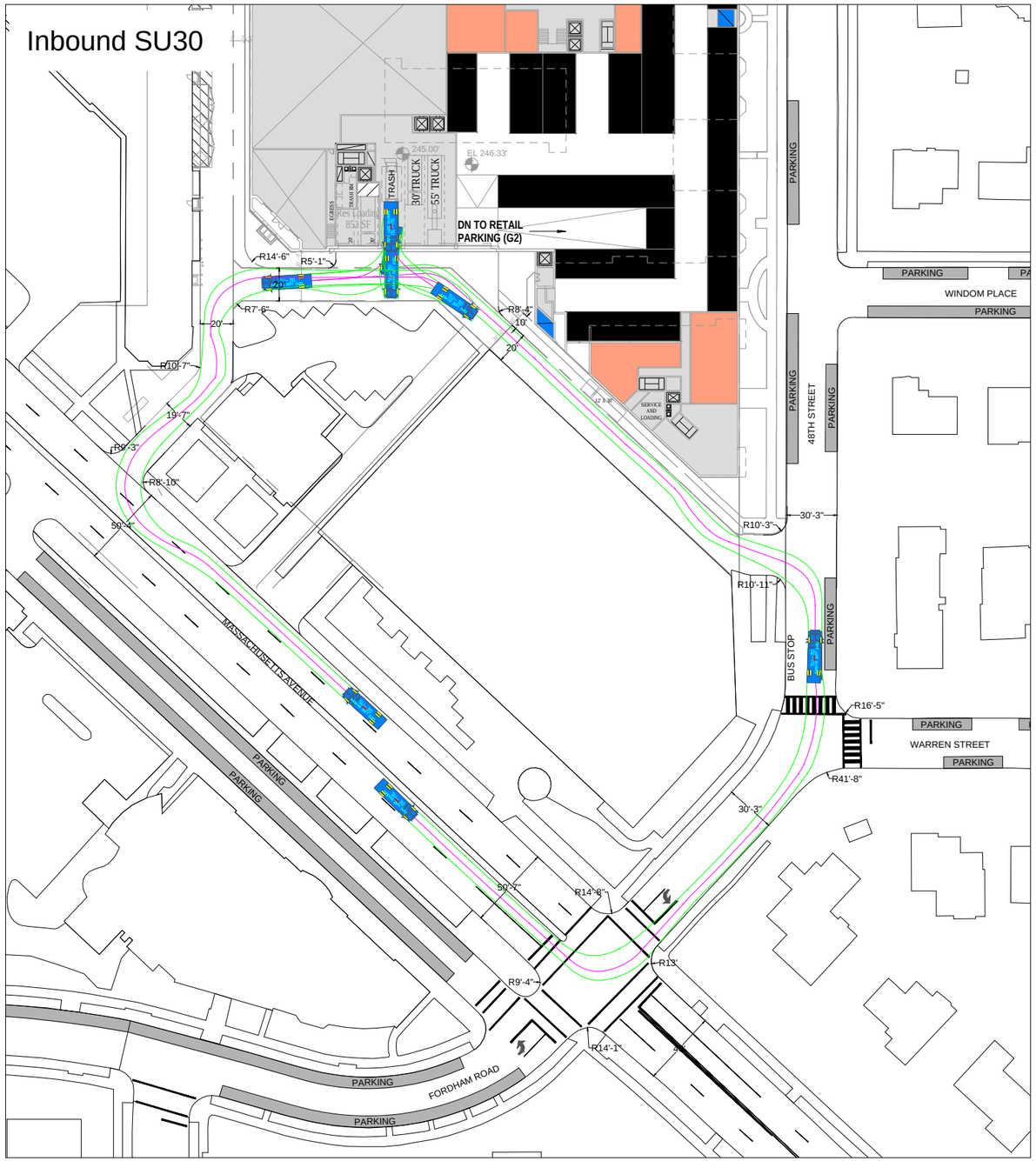

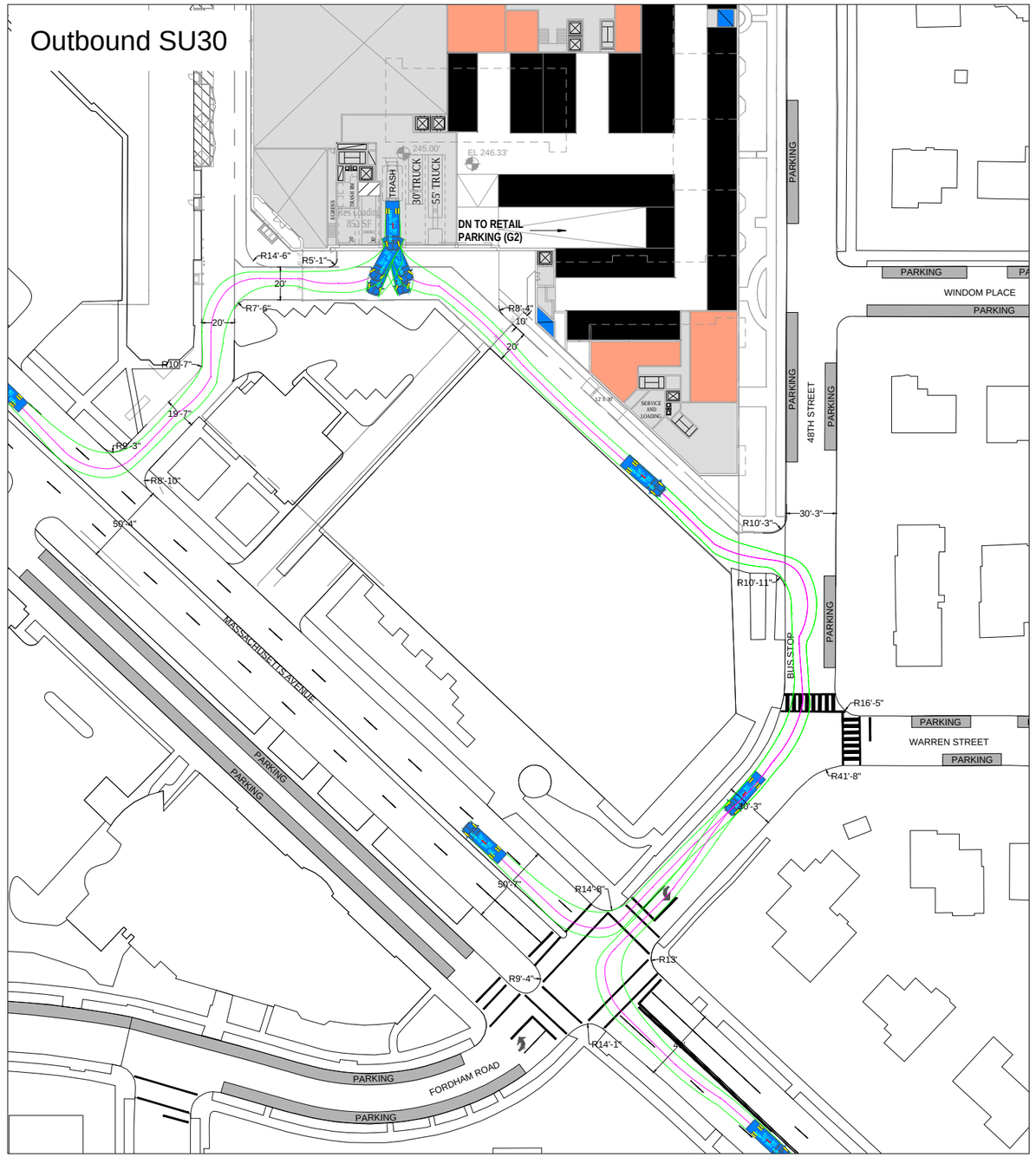

GOROVE / SLADE
Transportation Planners and Engineers

The Ladybird: AutoTURN Movements

Valor Development

11.21.2017

Sheet 3 of 4

Washington, DC

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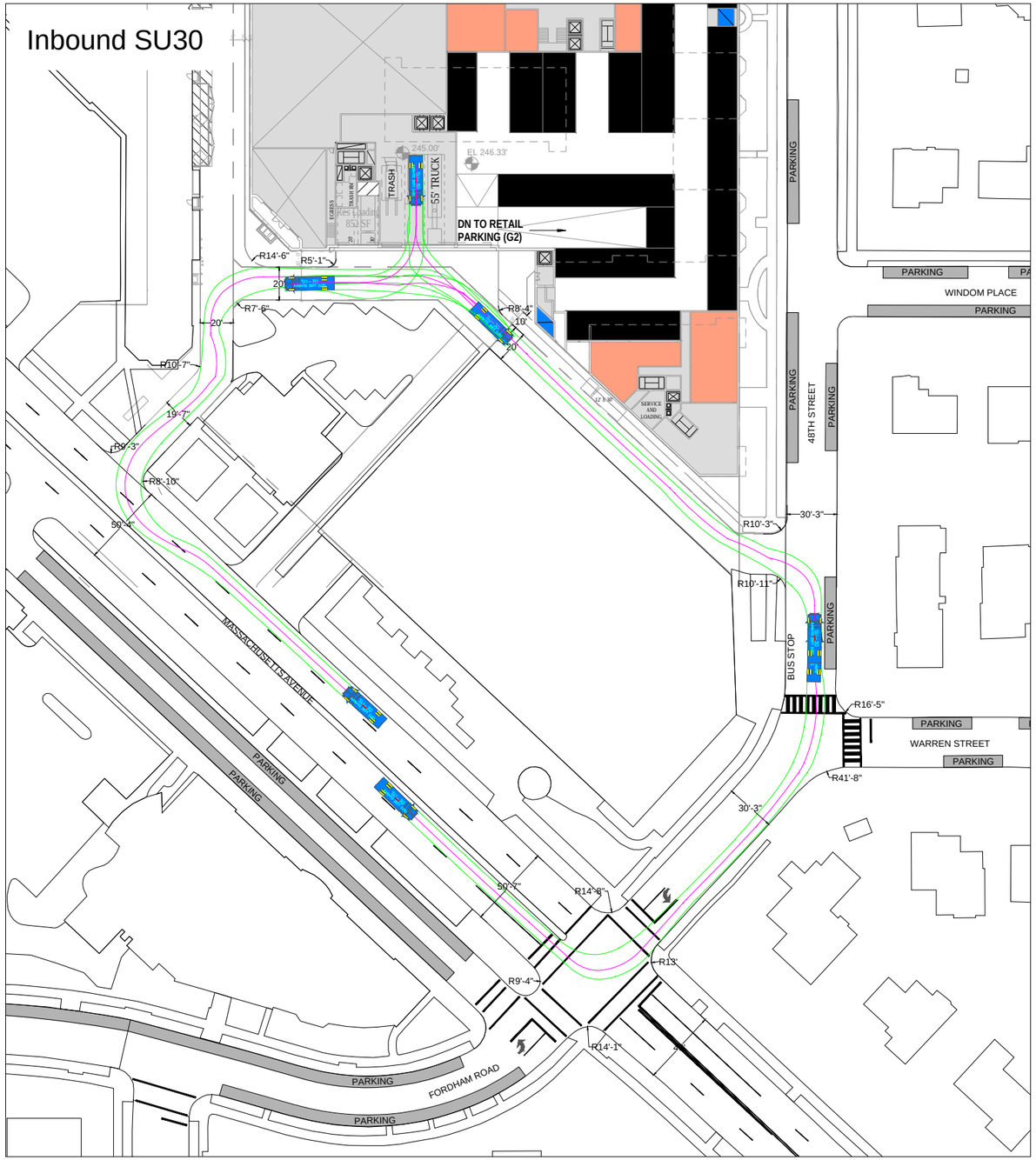

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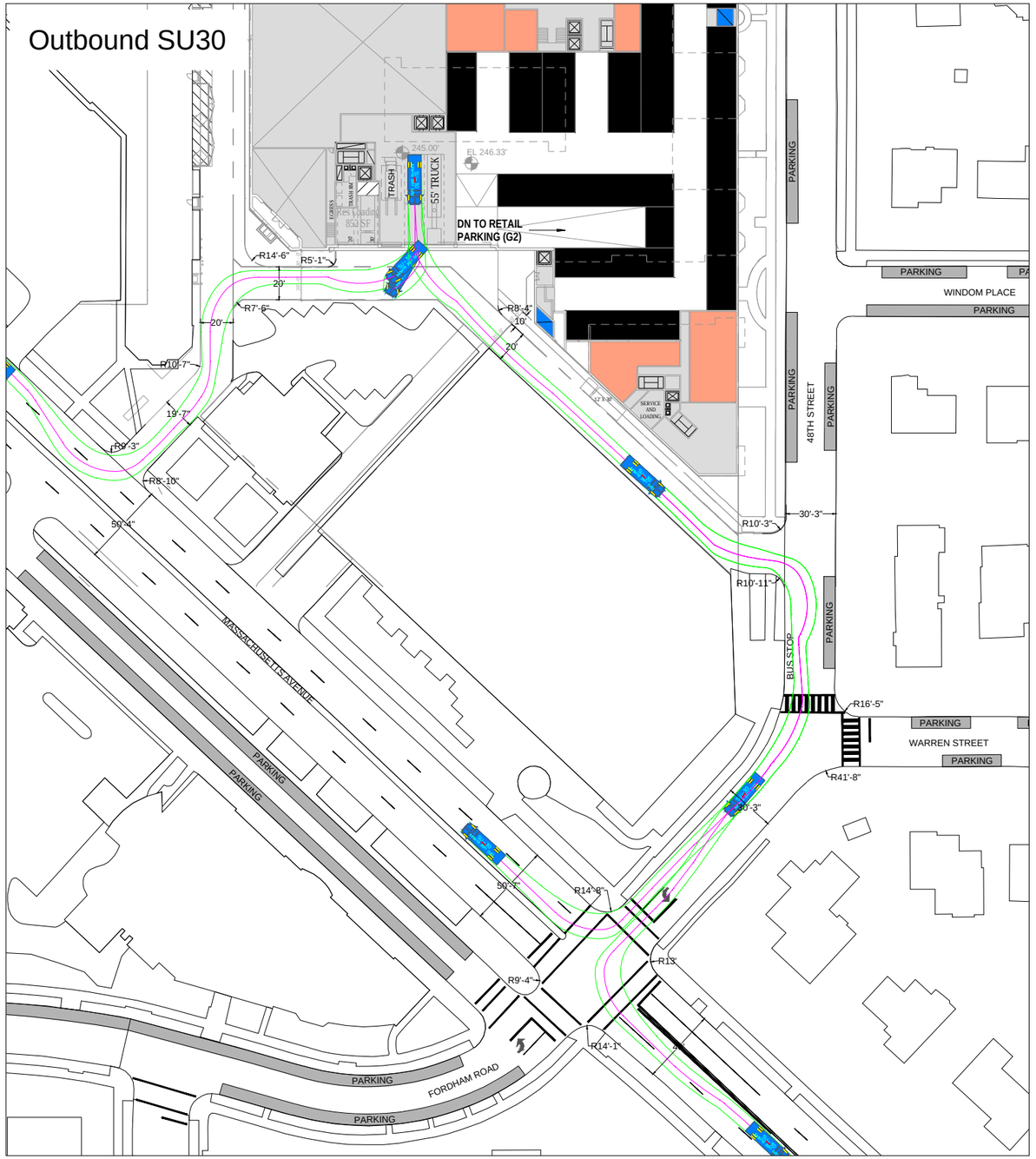

GOROVE / SLADE
Transportation Planners and Engineers

The Ladybird: AutoTURN Movements

Valor Development

11.21.2017

Sheet 4 of 4

Washington, DC

N

1"=80'

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D: Draft Parking Management Plan

GOROVE / SLADE

1140 Connecticut Avenue NW
Suite 600
Washington, DC 20036
202.296.8625

TECHNICAL MEMORANDUM

To: Jonathan Bender
Amy Hall
Jonathan McHugh
Tom Quinn

ANC 3E

Cc: Will Lansing

Valor Development

From: Daniel Solomon
Erwin Andres

DRAFT

Date: August 8, 2017

Subject: The Ladybird
Parking Management Plan

This Parking Management Plan (PMP) is supplemental to the Comprehensive Transportation Report (CTR) for the Ladybird Design Review Application. Specifically, the purpose of this PMP is to provide greater detail regarding layout of the garage, parking access and controls, car-share parking, the American University Administrative Building overflow parking agreement considerations, parking rates, bicycle parking, and enforcement.

Garage Layout

The proposed Ladybird parking garage will be divided into three (3) levels as follows:

Level	Parking Spaces	User Group(s)
G1	85	Residential
G2	49	Grocery/Retail
	57	Shared non-exclusive AU* and Grocery/Retail
G3	179	Shared non-exclusive AU* and Residential
Total	**370**	

**non-exclusive overflow parking for pass holders from the American University Administrative Building during weekday business hours (Monday to Friday, 9:00am to 5:00pm)*

The garage plans are attached to this memo.

Access and Garage Controls

Vehicular access to the parking garage will be from the east-west alley abutting the Ladybird development to the south on the G1 Level. A rolling garage door will control access to the below-grade parking garage. The door will be open during the grocer/retail hours of operation and closed outside of those hours, with access still possible to those in possession of a transponder.

G1 Level – Access to residential parking, located on the G1 Level and containing 85 parking spaces, will be controlled via a gate arm using a transponder which will be provided to each resident that chooses to lease a guaranteed parking space. The 85 parking spaces on the G1 Level are only available to residents of the development, and each parking space is guaranteed to the resident that leases that specific parking space.

G2 Level - Access to the G2 Level will be controlled by a fare gate with entry station/terminal (ticket dispenser) at the bottom of the ramp leading to the G2 Level from the G1 Level. The G2 Level of parking will contain 106 parking spaces, which will primarily serve the grocery/retail component of the development. Up to four (4) of the 106 parking spaces on the G2 Level will be dedicated for car-sharing services to use, with right of first refusal. As these car-sharing spaces will be available to the wider public, their location needs to be in a publicly accessible location.

G3 Level – Access to the G3 Level will be controlled via a transponder and gate system similar to the one on the G1 Level. Only those that have leased a non-guaranteed residential parking space, or have been provided a parking pass from the American University Administrative Building will have access to the 179 parking spaces on the G3 Level. The transponder that will allow access to the G3 Level will allow vehicles to pass through the G2 Level fare gates without payment.

American University Administrative Building Overflow Parking Agreement Considerations

An existing agreement between American University and the site lot requires the Ladybird development to carry forth 236 non-exclusive parking spaces for the use of the AU Administrative Building. The 236 parking spaces are intended to act as overflow parking in addition to the 269 parking spaces already available in the below-grade parking garage belonging to the AU Administrative Building. Those wishing to access the 236 non-exclusive parking spaces (57 on the G2 Level and 179 on the G3 Level), will be required to pick up a non-transferable pass/transponder from the AU Administrative Building. In addition, motorists that receive a parking pass/transponder from the AU Administrative Building will be instructed to park in the G3 Level. If the G3 Level is full, motorists will be allowed to park in the G2 Level. This is to ensure that parking spaces on the G2 Level will be as available as possible to grocery/retail patrons, as they do not have the option of parking in the G3 Level.

Parking Rates

The parking rate structure for the parking garage will be determined and reviewed regularly by the developer. Parking is planned to be priced at the market-rate (within 0.25 miles).

There will be two (2) tiers of residential parking passes, both costing the same amount. The first will be for a guaranteed parking spaces in the residential only parking garage on the G1 Level, which will be available to the first 85 residents that choose to lease a monthly parking space. Any resident wishing to lease a monthly parking space after the 85 parking spaces on the G1 Level have been leased will be able to lease a monthly parking space on the G3 Level, which is shard with the non-exclusive American University Admin Building overflow parking. As the G3 Level is shared with the American University Administrative Building, residential parking spaces on the G3 Level will not be guaranteed to be available during weekday business hours (Monday to Friday, 9:00am to 5:00pm).

Residents leasing a parking space on the G3 Level will be placed on a first-come, first-serve waitlist for a residential only parking space on the G1 Level.

Enforcement

The building owner and/or property management company will have a contract with a towing company to remove improperly parked vehicles from the site, such as unauthorized vehicle parking in an ADA or improper parking space.

Bicycle Parking

The plans identify a total of 83 long-term spaces in two separate areas located in the G2 Level of the below-grade parking garage. The first storage and maintenance space will house 77 long-term bicycle spaces for residents of the proposed development. The second storage space will house six (6) long-term bicycle spaces for use of the grocery/retail employees so that they may store their bicycles securely.

E: Detailed Bus Stop Inventory

Location	Stop ID	Buses Served	Type of Service	Site Condition
Massachusetts Ave NW & Albemarle St NW - NB	1002480	N4, N6	Basic	Sign, ADA clearance, acceptable sidewalk clearance, street lighting, information case, no seating, no shelter, trash receptacle
Massachusetts Ave NW & 50th St NW - SB	1002473	N4, N6	Basic	Sign, ADA clearance, acceptable sidewalk clearance, poor lighting, information case, no seating, no shelter, trash receptacle
Massachusetts Ave NW & Yuma St NW - NB	1002443	N4, N6	Basic	Sign, ADA clearance, acceptable sidewalk clearance, poor street lighting, no information case, seating, shelter, system map, trash receptacle
Massachusetts Ave NW & 49th St NW - SB	1002432	N4, N6	Basic	Sign, ADA clearance, acceptable sidewalk clearance, poor lighting, no information case, no seating, no shelter, trash receptacle
Massachusetts Ave NW & 48th St - NB	1002407	N4, N6	Basic	Sign, ADA clearance, acceptable sidewalk clearance, poor street lighting, no information case, no seating, no shelter, trash receptacle
Massachusetts Ave NW & Fordham - SB	1002411	N4, N6	Basic	Sign, ADA clearance, acceptable sidewalk clearance, street lighting, information case, seating, shelter, system map, trash receptacle
Massachusetts Ave NW & Van Ness St - NB	1002387	N4, N6	Basic	Sign, ADA clearance, acceptable sidewalk clearance, street lighting, information case, no seating, no shelter
Massachusetts Ave NW & Van Ness St - SB	1002388	N4, N6	Basic	Sign, ADA clearance, acceptable sidewalk clearance, street lighting, information case, no seating, no shelter, trash receptacle

F: VEHICULAR DATA COLLECTION

Type of peak hour being reported: Intersection Peak

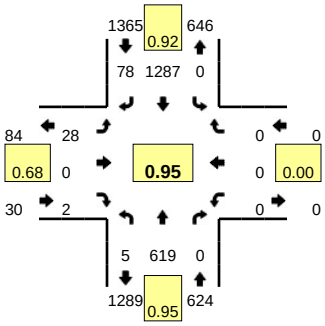
Method for determining peak hour: Total Entering Volume

LOCATION: Massachusetts Ave NW -- 50th St NW

CITY/STATE: Washington, DC

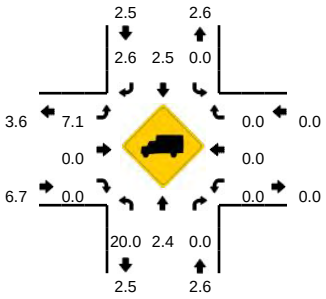
QC JOB #: 13931801

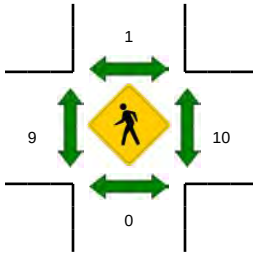
DATE: Tue, Oct 18 2016

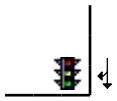


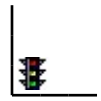
Peak-Hour: 8:15 AM -- 9:15 AM

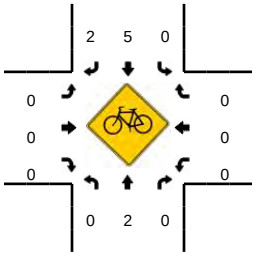
Peak 15-Min: 8:45 AM -- 9:00 AM

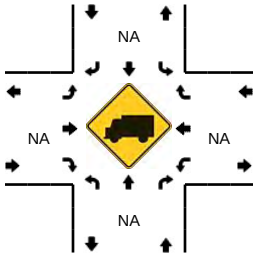


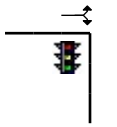


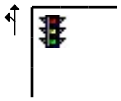


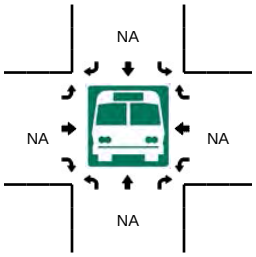












15-Min Count Period Beginning At	Massachusetts Ave NW (Northbound)				Massachusetts Ave NW (Southbound)				50th St NW (Eastbound)				50th St NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	0	31	0	0	0	125	3	0	2	0	0	0	0	0	0	0	161	
6:45 AM	1	50	0	0	0	164	3	0	3	0	0	0	0	0	0	0	221	
7:00 AM	0	81	0	0	0	261	5	0	0	0	0	0	0	0	0	0	347	
7:15 AM	0	107	0	0	0	327	17	0	8	0	0	0	0	0	0	0	459	1188
7:30 AM	1	110	0	0	0	337	12	0	6	0	0	0	0	0	0	0	466	1493
7:45 AM	4	141	0	0	0	332	17	0	6	0	0	0	0	0	0	0	500	1772
8:00 AM	1	170	0	0	0	295	18	0	7	0	0	0	0	0	0	0	491	1916
8:15 AM	2	160	0	0	0	294	15	0	6	0	1	0	0	0	0	0	478	1935
8:30 AM	1	158	0	0	0	327	20	0	8	0	0	1	0	0	0	0	515	1984
8:45 AM	2	159	0	0	0	348	22	0	3	0	0	0	0	0	0	0	534	2018
9:00 AM	0	142	0	0	0	318	21	0	10	0	1	0	0	0	0	0	492	2019
9:15 AM	1	107	0	0	0	291	19	0	2	0	0	0	0	0	0	0	420	1961

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	8	636	0	0	0	1392	88	0	12	0	0	0	0	0	0	0	2136
Heavy Trucks	0	20	0		0	36	4		0	0	0		0	0	0		60
Pedestrians		0				0				8				4			12
Bicycles	0	1	0		0	2	0		0	0	0		0	0	0		3
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

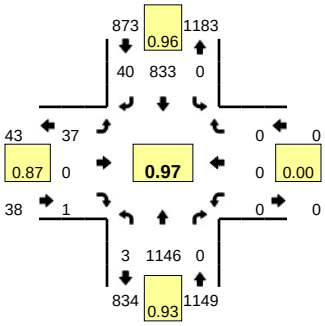
Method for determining peak hour: Total Entering Volume

LOCATION: Massachusetts Ave NW -- 50th St NW

CITY/STATE: Washington, DC

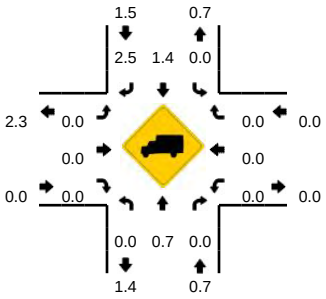
QC JOB #: 13931802

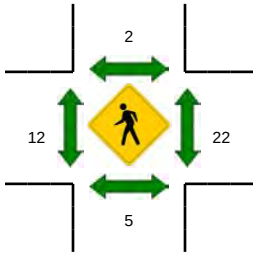
DATE: Tue, Oct 18 2016

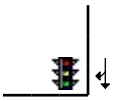


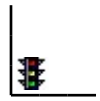
Peak-Hour: 5:30 PM -- 6:30 PM

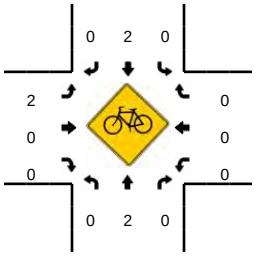
Peak 15-Min: 5:45 PM -- 6:00 PM

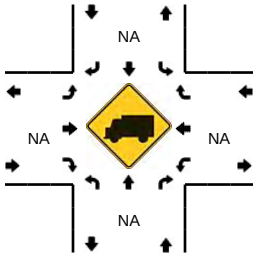


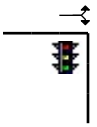


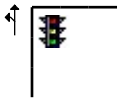


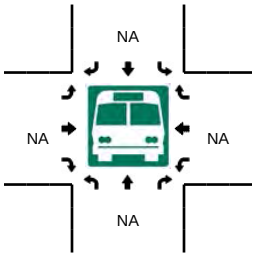












15-Min Count Period Beginning At	Massachusetts Ave NW (Northbound)				Massachusetts Ave NW (Southbound)				50th St NW (Eastbound)				50th St NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	222	0	0	0	160	10	0	22	0	0	0	0	0	0	0	414	
4:15 PM	0	278	0	0	0	154	10	0	5	0	0	0	0	0	0	0	447	
4:30 PM	1	250	0	0	0	164	9	0	16	0	0	0	0	0	0	0	440	
4:45 PM	1	276	0	0	0	184	5	0	8	0	0	0	0	0	0	0	474	1775
5:00 PM	0	256	0	0	0	147	10	0	16	0	1	0	0	0	0	0	430	1791
5:15 PM	1	267	0	0	0	189	7	0	16	0	0	0	0	0	0	0	480	1824
5:30 PM	2	274	0	0	0	209	7	0	14	0	1	0	0	0	0	0	507	1891
5:45 PM	1	308	0	0	0	198	11	0	11	0	0	0	0	0	0	0	529	1946
6:00 PM	0	263	0	0	0	219	9	0	10	0	0	0	0	0	0	0	501	2017
6:15 PM	0	301	0	0	0	207	13	0	2	0	0	0	0	0	0	0	523	2060
6:30 PM	1	259	0	0	0	213	8	0	5	0	1	0	0	0	0	0	487	2040
6:45 PM	0	278	0	1	0	169	8	0	11	0	2	0	0	0	0	0	469	1980

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	1232	0	0	0	792	44	0	44	0	0	0	0	0	0	0	2116
Heavy Trucks	0	0	0		0	12	0		0	0	0		0	0	0		12
Pedestrians		8				8				0				12			28
Bicycles	0	0	0		0	0	0		1	0	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

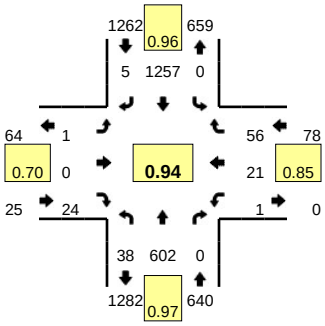
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

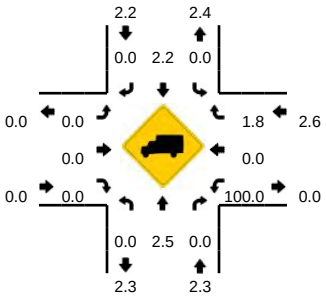
Method for determining peak hour: Total Entering Volume

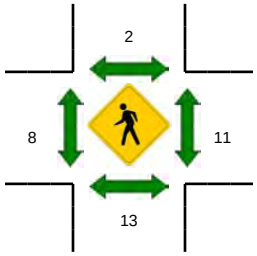
LOCATION: Massachusetts Ave NW -- Yuma St NW
CITY/STATE: Washington, DC

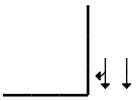
QC JOB #: 13931803
DATE: Tue, Oct 18 2016

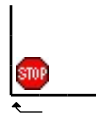


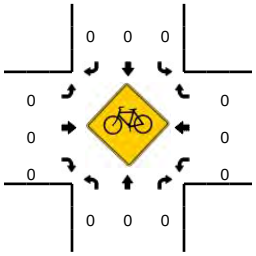
Peak-Hour: 8:00 AM -- 9:00 AM
Peak 15-Min: 8:45 AM -- 9:00 AM

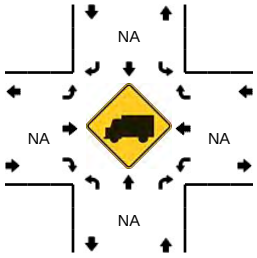


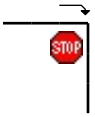


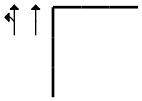


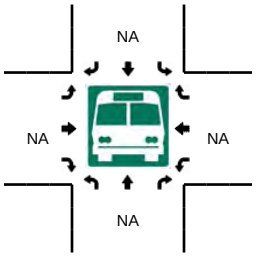












15-Min Count Period Beginning At	Massachusetts Ave NW (Northbound)				Massachusetts Ave NW (Southbound)				Yuma St NW (Eastbound)				Yuma St NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	1	29	0	0	0	124	0	0	1	0	0	0	1	1	4	0	161	
6:45 AM	1	47	0	0	0	156	2	0	1	0	5	0	1	1	3	0	217	
7:00 AM	5	75	0	0	0	259	1	0	2	0	12	0	1	2	3	0	360	
7:15 AM	7	100	0	0	0	326	0	0	0	0	8	0	0	2	9	0	452	1190
7:30 AM	9	106	0	0	0	340	0	0	1	0	9	0	0	5	8	0	478	1507
7:45 AM	10	138	0	0	0	336	1	0	0	0	7	0	0	3	9	0	504	1794
8:00 AM	10	155	0	0	0	295	1	0	1	0	5	0	0	4	14	0	485	1919
8:15 AM	8	154	0	0	0	290	2	0	0	0	7	0	0	2	13	0	476	1943
8:30 AM	10	146	0	0	0	323	2	0	0	0	8	0	1	6	15	0	511	1976
8:45 AM	10	147	0	0	0	349	0	0	0	0	4	0	0	9	14	0	533	2005
9:00 AM	12	133	0	0	0	311	2	0	2	0	7	0	0	3	15	0	485	2005
9:15 AM	12	104	0	0	0	291	1	0	2	0	4	0	1	3	3	0	421	1950

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	40	588	0	0	0	1396	0	0	0	0	16	0	0	36	56	0	2132
Heavy Trucks	0	16	0		0	36	0		0	0	0		0	0	0		52
Pedestrians		12				0				8				12			32
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

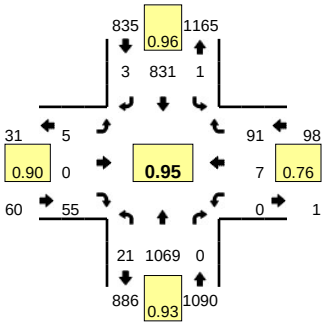
Method for determining peak hour: Total Entering Volume

LOCATION: Massachusetts Ave NW -- Yuma St NW

CITY/STATE: Washington, DC

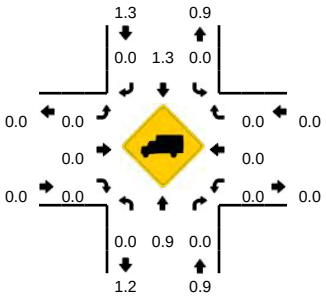
QC JOB #: 13931804

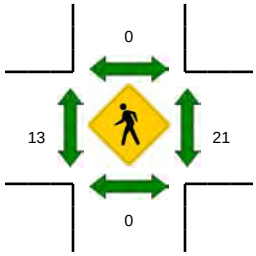
DATE: Tue, Oct 18 2016

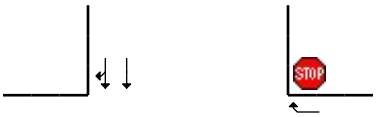


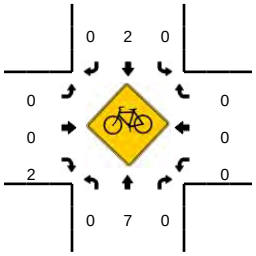
Peak-Hour: 5:30 PM -- 6:30 PM

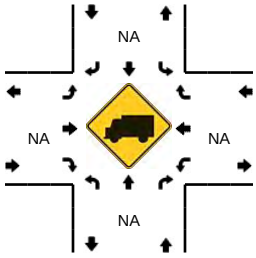
Peak 15-Min: 5:45 PM -- 6:00 PM

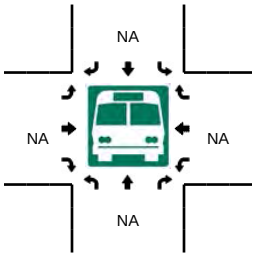












15-Min Count Period Beginning At	Massachusetts Ave NW (Northbound)				Massachusetts Ave NW (Southbound)				Yuma St NW (Eastbound)				Yuma St NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	11	215	0	0	0	159	0	0	2	0	22	0	2	0	13	0	424	
4:15 PM	6	256	0	0	0	157	0	0	2	0	12	0	1	1	19	0	454	
4:30 PM	8	239	0	0	0	164	0	0	1	0	7	0	1	0	17	0	437	
4:45 PM	7	247	0	0	0	186	1	0	2	0	19	0	1	2	21	0	486	1801
5:00 PM	7	240	0	0	0	150	0	0	0	1	21	0	1	0	29	0	449	1826
5:15 PM	8	236	0	0	0	190	0	0	2	0	18	0	0	7	36	0	497	1869
5:30 PM	7	259	0	0	0	209	0	0	2	0	16	0	0	0	27	0	520	1952
5:45 PM	7	287	0	0	0	198	2	0	2	0	21	0	0	5	25	0	547	2013
6:00 PM	3	247	0	0	1	219	0	0	0	0	12	0	0	1	16	0	499	2063
6:15 PM	4	276	0	0	0	205	1	0	1	0	6	0	0	1	23	0	517	2083
6:30 PM	2	243	0	0	0	216	0	0	0	0	8	0	1	1	20	0	491	2054
6:45 PM	5	248	0	0	0	173	0	0	0	0	5	0	0	1	21	0	453	1960

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	28	1148	0	0	0	792	8	0	8	0	84	0	0	20	100	0	2188
Heavy Trucks	0	4	0		0	12	0		0	0	0		0	0	0		16
Pedestrians		0				0				4				16			20
Bicycles	0	2	0		0	0	0		0	0	0		0	0	0		2
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

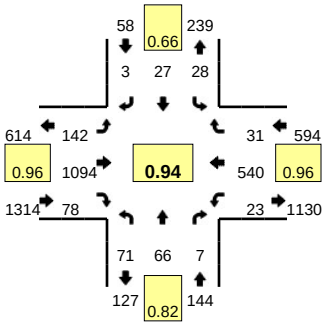
Method for determining peak hour: Total Entering Volume

LOCATION: 49th St NW -- Massachusetts Ave NW

CITY/STATE: Washington, DC

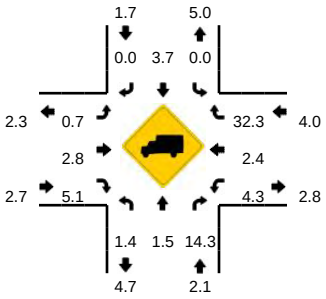
QC JOB #: 13931805

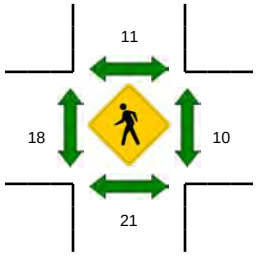
DATE: Tue, Oct 18 2016

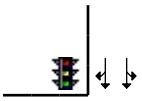


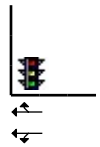
Peak-Hour: 8:15 AM -- 9:15 AM

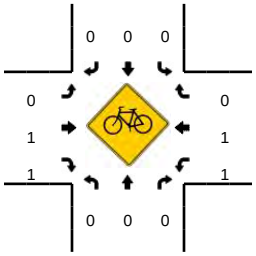
Peak 15-Min: 8:45 AM -- 9:00 AM

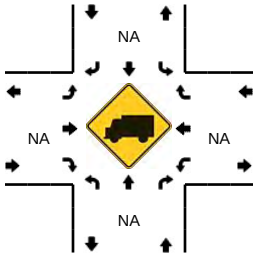


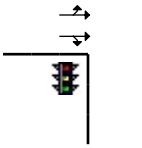


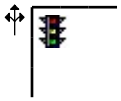


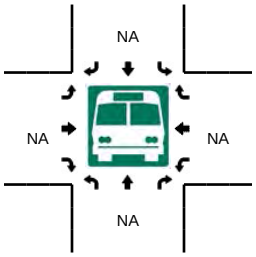












15-Min Count Period Beginning At	49th St NW (Northbound)				49th St NW (Southbound)				Massachusetts Ave NW (Eastbound)				Massachusetts Ave NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	2	3	1	0	3	3	0	0	4	118	4	0	5	27	3	0	173	
6:45 AM	3	2	1	0	1	2	0	0	7	143	15	0	5	49	6	0	234	
7:00 AM	10	11	1	0	4	1	0	0	17	236	14	0	2	67	2	0	365	
7:15 AM	12	11	1	0	15	6	1	0	25	296	16	0	7	94	11	0	495	1267
7:30 AM	16	12	2	0	13	3	0	1	30	307	10	0	6	96	9	0	505	1599
7:45 AM	13	18	1	0	5	1	0	0	32	294	16	0	5	137	11	0	533	1898
8:00 AM	16	18	0	0	3	10	0	0	28	258	16	0	4	148	7	0	508	2041
8:15 AM	17	21	0	0	9	4	1	0	43	252	12	0	8	142	11	1	521	2067
8:30 AM	16	12	1	0	6	8	2	0	24	278	23	0	6	135	5	0	516	2078
8:45 AM	14	15	4	0	6	9	0	0	44	301	19	0	4	143	4	0	563	2108
9:00 AM	24	18	2	0	7	6	0	0	31	263	24	0	4	120	11	0	510	2110
9:15 AM	15	19	1	0	4	7	0	0	38	249	18	0	8	102	12	0	473	2062

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	56	60	16	0	24	36	0	0	176	1204	76	0	16	572	16	0	2252
Heavy Trucks	0	0	4		0	0	0		0	36	4		0	16	4		64
Pedestrians		28				12				24				16			80
Bicycles	0	0	0		0	0	0		0	0	0		0	1	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

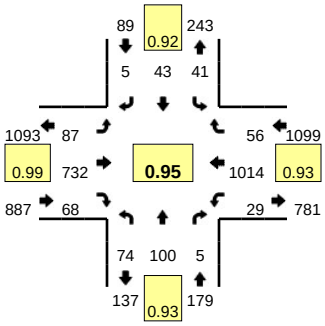
Method for determining peak hour: Total Entering Volume

LOCATION: 49th St NW -- Massachusetts Ave NW

QC JOB #: 13931806

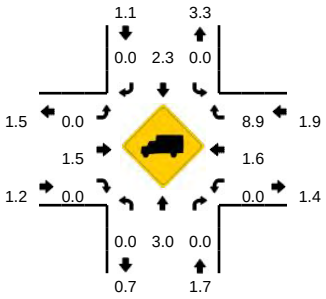
CITY/STATE: Washington, DC

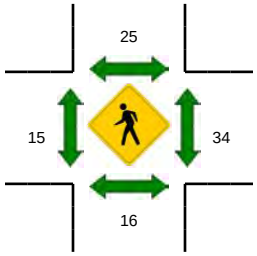
DATE: Tue, Oct 18 2016

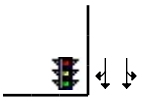


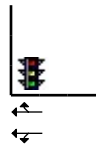
Peak-Hour: 5:30 PM -- 6:30 PM

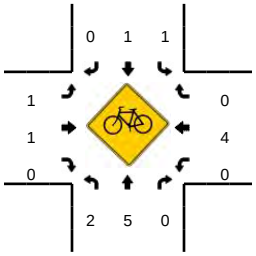
Peak 15-Min: 5:45 PM -- 6:00 PM

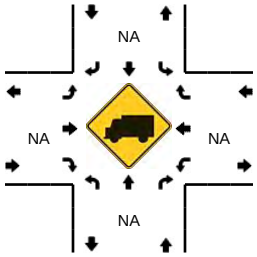


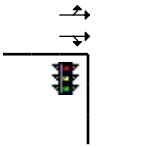


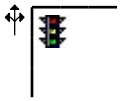


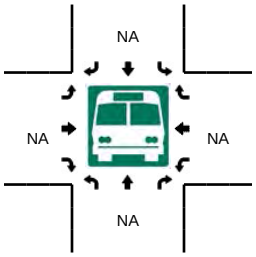












15-Min Count Period Beginning At	49th St NW (Northbound)				49th St NW (Southbound)				Massachusetts Ave NW (Eastbound)				Massachusetts Ave NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	21	16	1	0	6	9	1	0	22	130	17	0	10	203	18	2	456	
4:15 PM	14	24	5	0	6	8	1	0	29	128	19	0	15	243	9	1	502	
4:30 PM	18	23	2	0	6	11	0	0	23	134	14	0	7	227	12	0	477	
4:45 PM	19	17	6	0	10	10	3	0	26	166	21	0	7	237	8	0	530	1965
5:00 PM	24	20	2	0	7	14	0	0	24	125	21	0	11	222	24	1	495	2004
5:15 PM	22	21	0	0	12	13	1	0	22	178	7	0	9	222	17	0	524	2026
5:30 PM	22	25	3	0	11	12	1	0	22	181	21	0	5	243	15	0	561	2110
5:45 PM	20	30	1	0	17	4	4	0	21	191	11	0	5	271	19	0	594	2174
6:00 PM	20	17	0	0	9	11	0	0	20	186	17	0	12	229	13	3	537	2216
6:15 PM	12	28	1	0	4	16	0	0	24	174	19	0	4	271	9	0	562	2254
6:30 PM	8	10	2	0	5	7	1	0	25	183	15	0	5	238	9	1	509	2202
6:45 PM	11	18	1	0	4	10	1	0	24	146	11	0	4	246	7	1	484	2092

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	80	120	4	0	68	16	16	0	84	764	44	0	20	1084	76	0	2376
Heavy Trucks	0	0	0		0	0	0		0	12	0		0	4	4		20
Pedestrians		4				36				12				24			76
Bicycles	1	1	0		1	1	0		0	0	0		0	1	0		5
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Location: Massachusetts Ave NW-Service Rd -- Alley
Start Date: 10/18/2016
Start Time: 6:30:00 AM
Site Code: 13931807

	Massachusetts Ave NW Southbound			Alley Westbound		Massachusetts Ave NW Northbound			Alley Eastbound		Service Rd Southeastbound		
Start Time	Right	Thru	U-Turns	Right	U-Turns	Right	Thru	U-Turns	Right	U-Turns	Thru	Thru to Massachusetts Ave NW	U-Turns
06:30 AM	0	114	0	1	0	1	35	0	0	0	21	0	0
06:45 AM	1	141	0	2	0	0	57	0	0	0	12	0	0
07:00 AM	4	230	0	0	0	0	80	0	2	0	22	0	0
07:15 AM	3	296	0	1	0	0	110	0	1	0	16	0	0
07:30 AM	3	312	0	1	0	1	118	0	1	0	21	0	0
07:45 AM	2	283	0	2	0	0	148	0	0	0	16	0	0
08:00 AM	2	254	0	0	0	1	165	0	0	0	13	0	0
08:15 AM	3	249	0	1	0	0	154	0	0	0	14	0	0
08:30 AM	6	276	0	1	0	1	156	0	3	0	19	1	0
08:45 AM	3	299	0	0	0	1	145	0	0	0	18	0	0
09:00 AM	1	275	0	1	0	0	139	0	3	0	9	2	0
09:15 AM	1	235	0	0	0	0	114	0	2	0	16	0	0
Total	**29**	**2964**	**0**	**10**	**0**	**5**	**1421**	**0**	**12**	**0**	**197**	**3**	**0**

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Location: Massachusetts Ave NW-Service Rd -- Alley
Start Date: 10/18/2016
Start Time: 6:30:00 AM
Site Code: 13931807

	Massachusetts Ave NW Southbound			Alley Westbound		Massachusetts Ave NW Northbound			Alley Eastbound		Service Rd Southeastbound		
Start Time	Right	Thru	U-Turns	Right	U-Turns	Right	Thru	U-Turns	Right	U-Turns	Thru	Thru to Massachusetts Ave NW	U-Turns
06:30 AM	0	112	0	1	0	1	34	0	0	0	21	0	0
06:45 AM	1	139	0	1	0	0	56	0	0	0	12	0	0
07:00 AM	4	225	0	0	0	0	78	0	1	0	22	0	0
07:15 AM	3	295	0	1	0	0	101	0	1	0	16	0	0
07:30 AM	3	307	0	1	0	1	116	0	1	0	21	0	0
07:45 AM	2	282	0	1	0	0	145	0	0	0	16	0	0
08:00 AM	2	249	0	0	0	1	159	0	0	0	13	0	0
08:15 AM	3	244	0	0	0	0	148	0	0	0	14	0	0
08:30 AM	6	270	0	1	0	1	150	0	3	0	19	1	0
08:45 AM	3	291	0	0	0	0	140	0	0	0	18	0	0
09:00 AM	1	266	0	1	0	0	132	0	3	0	8	1	0
09:15 AM	1	232	0	0	0	0	106	0	2	0	16	0	0
Total	**29**	**2912**	**0**	**7**	**0**	**4**	**1365**	**0**	**11**	**0**	**196**	**2**	**0**

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Location: Massachusetts Ave NW-Service Rd -- Alley
Start Date: 10/18/2016
Start Time: 6:30:00 AM
Site Code: 13931807

	Massachusetts Ave NW Southbound			Alley Westbound		Massachusetts Ave NW Northbound			Alley Eastbound		Service Rd Southeastbound		
Start Time	Right	Thru		Right		Right	Thru		Right		Thru	Thru to Massachusetts Ave NW	
06:30 AM	0	2	0	0	0	0	1	0	0	0	0	0	0
06:45 AM	0	2	0	1	0	0	1	0	0	0	0	0	0
07:00 AM	0	5	0	0	0	0	2	0	1	0	0	0	0
07:15 AM	0	1	0	0	0	0	9	0	0	0	0	0	0
07:30 AM	0	5	0	0	0	0	2	0	0	0	0	0	0
07:45 AM	0	1	0	1	0	0	3	0	0	0	0	0	0
08:00 AM	0	5	0	0	0	0	6	0	0	0	0	0	0
08:15 AM	0	5	0	1	0	0	6	0	0	0	0	0	0
08:30 AM	0	6	0	0	0	0	6	0	0	0	0	0	0
08:45 AM	0	8	0	0	0	1	5	0	0	0	0	0	0
09:00 AM	0	9	0	0	0	0	7	0	0	0	1	1	0
09:15 AM	0	3	0	0	0	0	8	0	0	0	0	0	0
Total	**0**	**52**	**0**	**3**	**0**	**1**	**56**	**0**	**1**	**0**	**1**	**1**	**0**

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Location: Massachusetts Ave NW-Service Rd -- Alley
Start Date: 10/18/2016
Start Time: 6:30:00 AM
Site Code: 13931807

	Massachusetts Ave NW Southbound			Alley Westbound		Massachusetts Ave NW Northbound			Alley Eastbound		Service Rd Southeastbound		
Start Time	Right	Thru	Peds	Right	Peds	Right	Thru	Peds	Right	Peds	Thru	Thru to Massachusetts Ave NW	Peds
06:30 AM	0	0	0	0	8	0	0	1	0	0	0	0	1
06:45 AM	0	0	1	0	4	0	0	1	0	0	0	0	1
07:00 AM	0	0	0	0	4	0	0	0	0	0	0	0	1
07:15 AM	0	1	0	0	2	0	0	0	0	1	0	0	0
07:30 AM	0	0	1	0	1	0	1	0	0	1	0	0	0
07:45 AM	0	0	2	0	11	0	0	2	0	2	0	0	0
08:00 AM	0	1	0	0	10	0	0	0	0	0	0	0	0
08:15 AM	0	0	1	0	4	0	0	1	0	1	0	0	1
08:30 AM	0	0	1	0	9	0	0	1	0	2	0	0	1
08:45 AM	0	0	1	0	11	0	1	1	0	0	0	0	1
09:00 AM	0	0	2	0	9	0	0	1	0	1	0	0	0
09:15 AM	0	0	2	0	17	0	0	3	0	3	1	0	0
Total	**0**	**2**	**11**	**0**	**90**	**0**	**2**	**11**	**0**	**11**	**1**	**0**	**6**

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Location: Massachusetts Ave NW-Service Rd -- Alley
Start Date: 10/18/2016
Start Time: 4:00:00 PM
Site Code: 13931808

	Massachusetts Ave NW Southbound			Alley Westbound		Massachusetts Ave NW Northbound			Alley Eastbound		Service Rd Southeastbound		
Start Time	Right	Thru	U-Turns	Right	U-Turns	Right	Thru	U-Turns	Right	U-Turns	Thru	Thru to Massachusetts Ave NW	U-Turns
04:00 PM	1	141	0	1	0	0	242	0	4	0	9	4	0
04:15 PM	1	138	0	0	0	0	262	0	1	0	7	0	0
04:30 PM	3	139	0	1	0	0	251	0	1	0	9	1	0
04:45 PM	2	177	0	4	0	0	237	0	1	0	7	1	0
05:00 PM	2	135	0	2	0	0	279	0	2	0	6	2	0
05:15 PM	3	188	0	3	0	0	241	0	1	0	9	0	0
05:30 PM	1	190	0	1	0	0	281	0	2	0	7	0	0
05:45 PM	2	204	0	2	0	0	287	0	0	0	12	0	0
06:00 PM	1	195	0	1	0	0	273	0	0	0	11	0	0
06:15 PM	1	173	0	1	0	0	267	0	3	0	3	2	0
06:30 PM	1	190	0	3	0	1	274	0	0	0	8	0	0
06:45 PM	2	148	0	3	0	0	235	0	2	0	3	0	0
Total	**20**	**2018**	**0**	**22**	**0**	**1**	**3129**	**0**	**17**	**0**	**91**	**10**	**0**

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Location: Massachusetts Ave NW-Service Rd -- Alley
Start Date: 10/18/2016
Start Time: 4:00:00 PM
Site Code: 13931808

	Massachusetts Ave NW Southbound			Alley Westbound		Massachusetts Ave NW Northbound			Alley Eastbound		Service Rd Southeastbound		
Start Time	Right	Thru	U-Turns	Right	U-Turns	Right	Thru	U-Turns	Right	U-Turns	Thru	Thru to Massachusetts Ave NW	U-Turns
04:00 PM	1	135	0	1	0	0	237	0	4	0	9	3	0
04:15 PM	1	134	0	0	0	0	260	0	1	0	7	0	0
04:30 PM	3	134	0	1	0	0	245	0	1	0	9	1	0
04:45 PM	2	175	0	4	0	0	231	0	1	0	7	1	0
05:00 PM	2	132	0	2	0	0	277	0	2	0	6	2	0
05:15 PM	3	184	0	3	0	0	234	0	1	0	9	0	0
05:30 PM	1	188	0	1	0	0	278	0	2	0	7	0	0
05:45 PM	2	201	0	2	0	0	285	0	0	0	12	0	0
06:00 PM	1	192	0	1	0	0	268	0	0	0	11	0	0
06:15 PM	1	171	0	1	0	0	260	0	3	0	3	2	0
06:30 PM	1	189	0	3	0	1	271	0	0	0	8	0	0
06:45 PM	2	146	0	3	0	0	232	0	2	0	3	0	0
Total	**20**	**1981**	**0**	**22**	**0**	**1**	**3078**	**0**	**17**	**0**	**91**	**9**	**0**

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Location: Massachusetts Ave NW-Service Rd -- Alley
Start Date: 10/18/2016
Start Time: 4:00:00 PM
Site Code: 13931808

	Massachusetts Ave NW Southbound			Alley Westbound		Massachusetts Ave NW Northbound			Alley Eastbound		Service Rd Southeastbound		
Start Time	Right	Thru		Right		Right	Thru		Right		Thru	Thru to Massachusetts Ave NW	
04:00 PM	0	6	0	0	0	0	5	0	0	0	0	1	0
04:15 PM	0	4	0	0	0	0	2	0	0	0	0	0	0
04:30 PM	0	5	0	0	0	0	6	0	0	0	0	0	0
04:45 PM	0	2	0	0	0	0	6	0	0	0	0	0	0
05:00 PM	0	3	0	0	0	0	2	0	0	0	0	0	0
05:15 PM	0	4	0	0	0	0	7	0	0	0	0	0	0
05:30 PM	0	2	0	0	0	0	3	0	0	0	0	0	0
05:45 PM	0	3	0	0	0	0	2	0	0	0	0	0	0
06:00 PM	0	3	0	0	0	0	5	0	0	0	0	0	0
06:15 PM	0	2	0	0	0	0	7	0	0	0	0	0	0
06:30 PM	0	1	0	0	0	0	3	0	0	0	0	0	0
06:45 PM	0	2	0	0	0	0	3	0	0	0	0	0	0
Total	**0**	**37**	**0**	**0**	**0**	**0**	**51**	**0**	**0**	**0**	**0**	**1**	**0**

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Location: Massachusetts Ave NW-Service Rd -- Alley
Start Date: 10/18/2016
Start Time: 4:00:00 PM
Site Code: 13931808

	Massachusetts Ave NW Southbound			Alley Westbound		Massachusetts Ave NW Northbound			Alley Eastbound		Service Rd Southeastbound		
Start Time	Right	Thru	Peds	Right	Peds	Right	Thru	Peds	Right	Peds	Thru	Thru to Massachusetts Ave NW	Peds
04:00 PM	0	0	0	0	13	0	0	2	0	1	0	0	3
04:15 PM	0	0	0	0	8	0	0	3	0	1	0	0	0
04:30 PM	0	0	0	0	5	0	0	0	0	4	0	0	2
04:45 PM	0	0	0	0	17	0	1	3	0	2	0	0	2
05:00 PM	0	0	0	0	3	0	1	0	0	3	0	0	0
05:15 PM	0	0	1	0	6	0	0	1	0	2	0	0	1
05:30 PM	0	0	1	0	5	0	0	1	0	2	0	0	0
05:45 PM	0	0	1	0	12	0	0	1	0	1	0	0	2
06:00 PM	0	0	0	0	11	0	1	0	0	0	0	0	0
06:15 PM	0	0	0	0	13	0	1	0	0	6	0	0	0
06:30 PM	0	0	0	0	8	0	0	0	0	5	0	0	2
06:45 PM	0	0	0	0	5	0	0	1	0	0	0	0	0
Total	**0**	**0**	**3**	**0**	**106**	**0**	**4**	**12**	**0**	**27**	**0**	**0**	**12**

Type of peak hour being reported: Intersection Peak

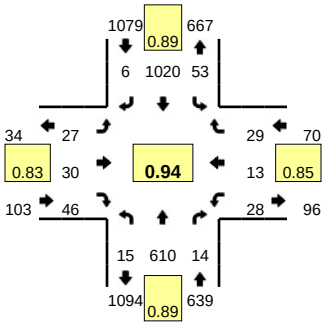
Method for determining peak hour: Total Entering Volume

LOCATION: Massachusetts Ave NW -- 48th St NW/Fordham Rd NW

QC JOB #: 13931809

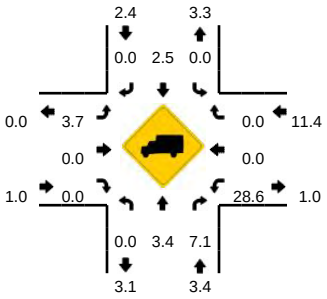
CITY/STATE: Washington, DC

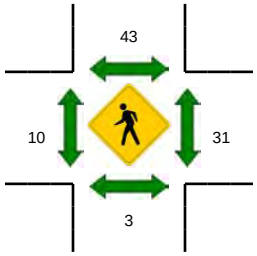
DATE: Tue, Oct 18 2016

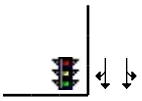


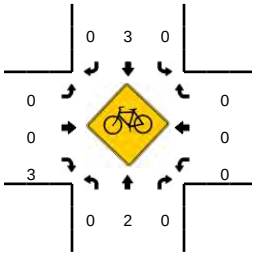
Peak-Hour: 8:00 AM -- 9:00 AM

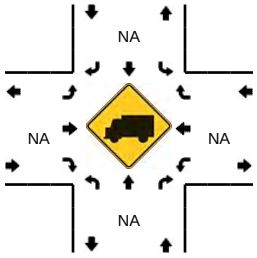
Peak 15-Min: 8:30 AM -- 8:45 AM

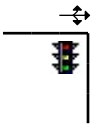


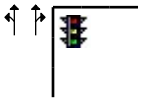


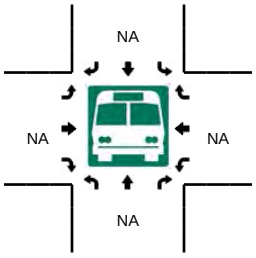












15-Min Count Period Beginning At	Massachusetts Ave NW (Northbound)				Massachusetts Ave NW (Southbound)				48th St NW/Fordham Rd NW (Eastbound)				48th St NW/Fordham Rd NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	2	39	2	0	0	109	0	0	3	2	11	0	5	0	0	0	173	
6:45 AM	0	49	1	0	1	142	0	0	1	2	5	0	4	1	2	0	208	
7:00 AM	2	78	2	0	2	234	1	0	5	4	13	0	2	2	5	0	350	
7:15 AM	2	103	2	0	9	280	2	0	9	8	9	0	6	7	5	0	442	1173
7:30 AM	0	117	0	0	13	310	1	0	5	7	11	0	7	3	3	0	477	1477
7:45 AM	2	145	2	0	17	261	1	0	5	10	11	0	6	2	4	0	466	1735
8:00 AM	4	172	6	0	13	251	1	0	5	7	14	0	5	5	8	0	491	1876
8:15 AM	3	138	1	0	6	230	2	0	7	5	10	0	7	2	10	0	421	1855
8:30 AM	3	168	2	0	11	275	2	1	5	6	14	0	8	1	5	0	501	1879
8:45 AM	5	132	5	0	22	264	1	0	10	12	8	0	8	5	6	0	478	1891
9:00 AM	7	141	1	0	17	267	1	0	11	11	9	2	10	2	8	0	487	1887
9:15 AM	4	118	1	0	10	220	0	0	4	7	9	0	4	4	14	0	395	1861

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	672	8	0	44	1100	8	4	20	24	56	0	32	4	20	0	2004
Heavy Trucks	0	24	0		0	20	0		0	0	0		8	0	0		52
Pedestrians		0				24				16				20			60
Bicycles	0	1	0		0	0	0		0	0	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

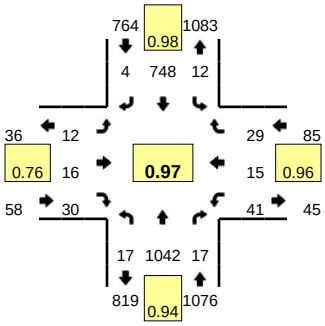
Method for determining peak hour: Total Entering Volume

LOCATION: Massachusetts Ave NW -- 48th St NW/Fordham Rd NW

QC JOB #: 13931810

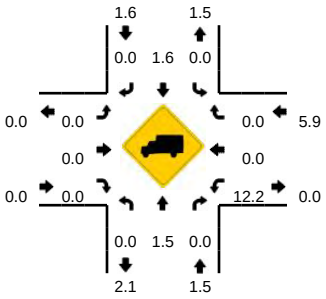
CITY/STATE: Washington, DC

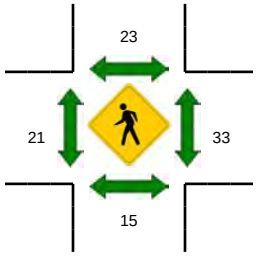
DATE: Tue, Oct 18 2016

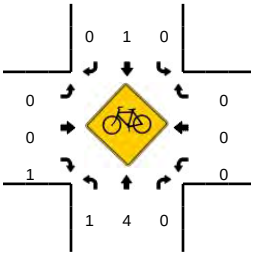


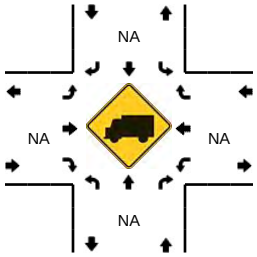
Peak-Hour: 5:30 PM -- 6:30 PM

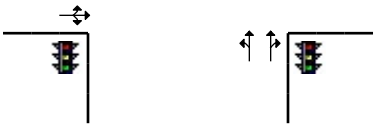
Peak 15-Min: 5:45 PM -- 6:00 PM

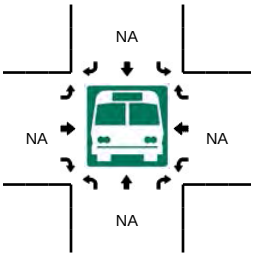












15-Min Count Period Beginning At	Massachusetts Ave NW (Northbound)				Massachusetts Ave NW (Southbound)				48th St NW/Fordham Rd NW (Eastbound)				48th St NW/Fordham Rd NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	3	208	3	0	2	145	2	0	5	3	8	0	12	0	4	0	395	
4:15 PM	3	256	4	1	2	124	2	0	7	4	6	0	4	5	3	0	421	
4:30 PM	3	228	2	0	0	139	0	0	7	5	11	0	7	4	4	0	410	
4:45 PM	3	225	1	0	5	171	0	0	4	3	7	0	10	5	8	0	442	1668
5:00 PM	5	245	1	0	3	133	1	0	4	1	3	0	21	4	3	0	424	1697
5:15 PM	3	227	6	0	1	183	1	0	5	1	5	0	14	5	9	0	460	1736
5:30 PM	2	243	4	0	5	189	1	0	4	2	7	0	12	4	12	0	485	1811
5:45 PM	2	282	5	0	1	195	1	0	2	2	9	0	7	4	2	0	512	1881
6:00 PM	7	259	4	0	2	196	0	0	0	4	4	0	11	4	8	0	499	1956
6:15 PM	6	258	4	0	4	168	2	0	6	8	10	0	11	3	7	0	487	1983
6:30 PM	3	258	1	0	1	186	0	0	5	3	2	0	5	2	5	0	471	1969
6:45 PM	1	225	3	0	4	145	2	0	4	7	8	0	8	4	5	0	416	1873

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	8	1128	20	0	4	780	4	0	8	8	36	0	28	16	8	0	2048
Heavy Trucks	0	8	0		0	12	0		0	0	0		4	0	0		24
Pedestrians		36				28				28				48			140
Bicycles	1	1	0		0	0	0		0	0	0		0	0	0		2
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Massachusetts Ave NW -- Van Ness St NW

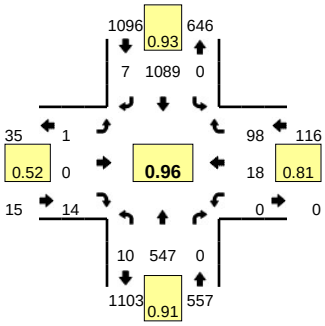
CITY/STATE: Washington, DC

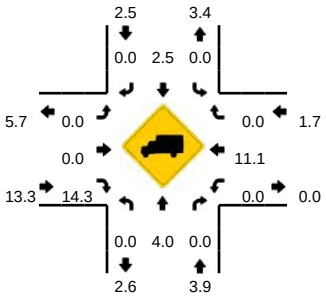
QC JOB #: 13931811

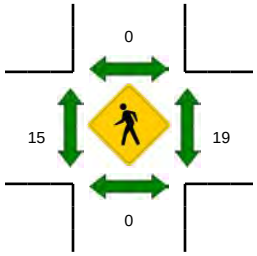
DATE: Tue, Oct 18 2016

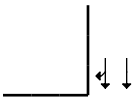
Peak-Hour: 7:45 AM -- 8:45 AM

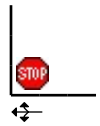
Peak 15-Min: 8:30 AM -- 8:45 AM

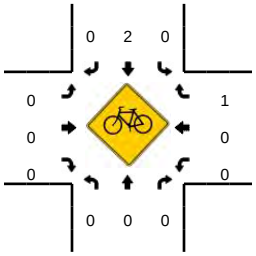


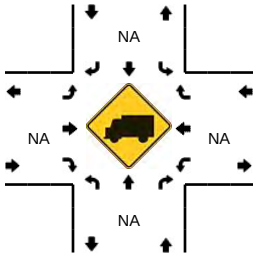


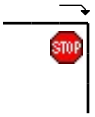


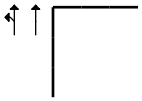


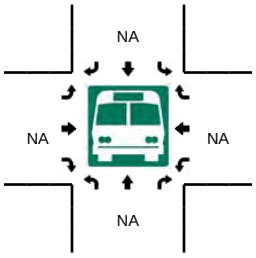












15-Min Count Period Beginning At	Massachusetts Ave NW (Northbound)				Massachusetts Ave NW (Southbound)				Van Ness St NW (Eastbound)				Van Ness St NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	1	36	0	0	0	125	1	0	0	0	3	0	0	1	5	0	172	
6:45 AM	3	47	0	0	0	145	0	0	0	0	0	0	0	3	4	0	202	
7:00 AM	3	74	0	0	0	246	1	0	1	0	2	0	1	2	6	0	336	
7:15 AM	1	101	0	0	0	310	1	0	0	0	3	0	1	2	7	0	426	1136
7:30 AM	2	112	0	0	0	315	1	0	0	1	10	0	0	4	6	0	451	1415
7:45 AM	3	125	0	0	0	280	2	0	1	0	3	0	0	4	27	0	445	1658
8:00 AM	2	149	0	0	0	263	2	0	0	0	5	0	0	2	29	0	452	1774
8:15 AM	4	120	0	0	0	256	3	0	0	0	2	0	0	11	25	0	421	1769
8:30 AM	1	153	0	0	0	290	0	0	0	0	4	0	0	1	17	0	466	1784
8:45 AM	0	129	0	0	0	291	1	0	0	0	2	0	0	1	18	0	442	1781
9:00 AM	3	135	0	0	0	274	0	0	1	0	7	0	0	4	10	0	434	1763
9:15 AM	4	106	0	0	0	245	0	0	0	0	0	0	0	2	21	0	378	1720

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	612	0	0	0	1160	0	0	0	0	16	0	0	4	68	0	1864
Heavy Trucks	0	24	0		0	36	0		0	0	8		0	0	0		68
Pedestrians		0				0				12				12			24
Bicycles	0	0	0		0	0	0		0	0	0		0	0	1		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Massachusetts Ave NW -- Van Ness St NW

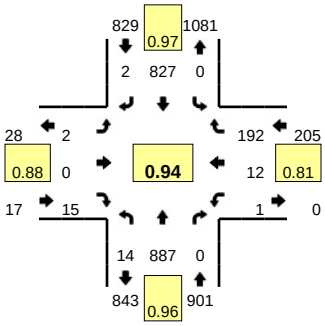
QC JOB #: 13931812

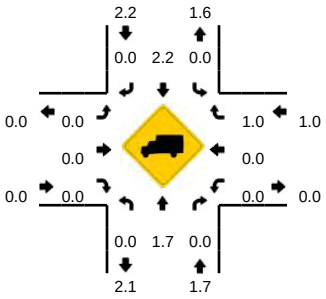
CITY/STATE: Washington, DC

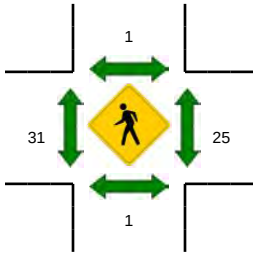
DATE: Tue, Oct 18 2016

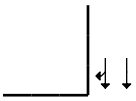
Peak-Hour: 5:30 PM -- 6:30 PM

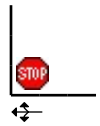
Peak 15-Min: 5:45 PM -- 6:00 PM

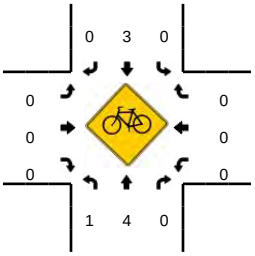


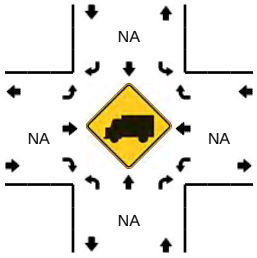


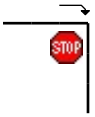


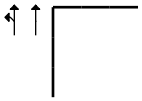


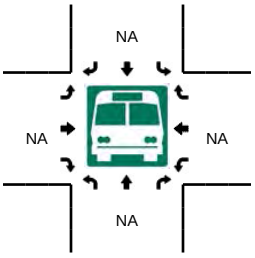












15-Min Count Period Beginning At	Massachusetts Ave NW (Northbound)				Massachusetts Ave NW (Southbound)				Van Ness St NW (Eastbound)				Van Ness St NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	5	190	0	0	0	161	1	0	0	0	4	0	2	2	26	0	391	
4:15 PM	3	227	0	0	0	146	0	0	0	0	3	0	0	1	40	0	420	
4:30 PM	3	213	0	0	0	156	0	0	1	0	3	0	0	2	30	0	408	
4:45 PM	4	207	0	0	0	189	0	0	0	0	5	0	0	4	27	0	436	1655
5:00 PM	3	210	0	0	0	156	0	0	0	0	6	0	0	3	44	0	422	1686
5:15 PM	1	193	0	0	0	196	1	0	1	0	4	0	0	3	41	0	440	1706
5:30 PM	3	210	0	0	0	216	0	0	2	0	3	0	0	3	39	0	476	1774
5:45 PM	4	236	0	0	0	213	0	0	0	0	1	0	0	4	59	0	517	1855
6:00 PM	2	216	0	0	0	209	1	0	0	0	2	0	0	4	50	0	484	1917
6:15 PM	5	225	0	0	0	189	1	0	0	0	9	0	1	1	44	0	475	1952
6:30 PM	3	238	0	0	0	195	0	0	0	0	7	0	0	3	27	0	473	1949
6:45 PM	1	212	0	0	0	162	2	0	0	0	0	0	0	9	19	0	405	1837

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	16	944	0	0	0	852	0	0	0	0	4	0	0	16	236	0	2068
Heavy Trucks	0	8	0		0	16	0		0	0	0		0	0	0		24
Pedestrians		0				0				44				24			68
Bicycles	1	2	0		0	1	0		0	0	0		0	0	0		4
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

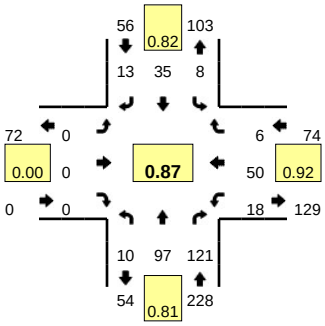
Method for determining peak hour: Total Entering Volume

LOCATION: 49th St NW -- Yuma St NW

CITY/STATE: Washington, DC

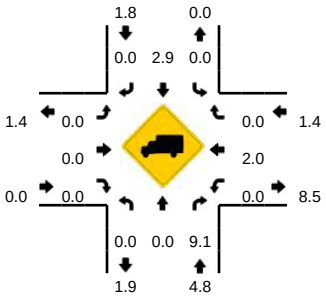
QC JOB #: 13931813

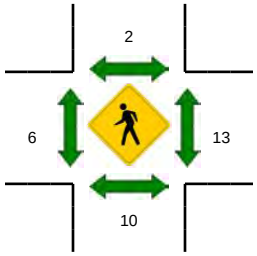
DATE: Tue, Oct 18 2016

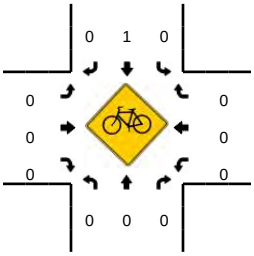


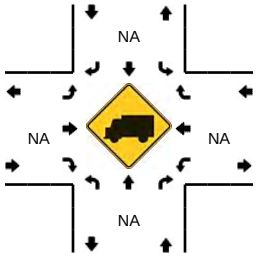
Peak-Hour: 8:15 AM -- 9:15 AM

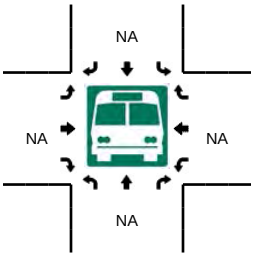
Peak 15-Min: 8:15 AM -- 8:30 AM











15-Min Count Period Beginning At	49th St NW (Northbound)				49th St NW (Southbound)				Yuma St NW (Eastbound)				Yuma St NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	1	6	3	0	0	5	0	0	0	0	0	0	0	4	0	0	19	
6:45 AM	1	10	3	0	0	3	0	0	0	0	0	0	1	3	1	0	22	
7:00 AM	3	9	14	0	2	2	0	0	0	0	0	0	0	3	3	0	36	
7:15 AM	2	17	22	0	1	11	2	0	0	0	0	0	2	8	1	0	66	143
7:30 AM	0	19	25	0	0	7	2	0	0	0	0	0	4	6	1	0	64	188
7:45 AM	2	31	25	0	0	3	2	0	0	0	0	0	2	8	2	0	75	241
8:00 AM	5	18	32	0	0	5	2	0	0	0	0	0	4	14	1	0	81	286
8:15 AM	2	32	36	0	3	9	1	0	0	0	0	0	6	13	1	0	103	323
8:30 AM	3	15	23	1	1	8	4	0	0	0	0	0	6	13	1	0	75	334
8:45 AM	3	20	36	0	3	10	4	0	0	0	0	0	3	17	2	0	98	357
9:00 AM	1	30	26	0	1	8	4	0	0	0	0	0	3	7	2	0	82	358
9:15 AM	1	26	35	0	1	6	2	0	0	0	0	0	5	5	1	0	82	337

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	8	128	144	0	12	36	4	0	0	0	0	0	24	52	4	0	412
Heavy Trucks	0	0	16		0	0	0		0	0	0		0	4	0		20
Pedestrians		4				4				0				12			20
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

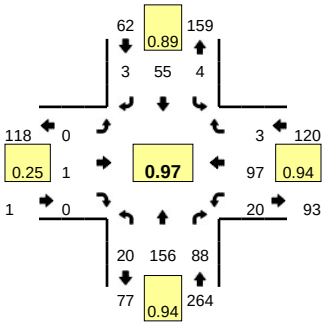
LOCATION: 49th St NW -- Yuma St NW

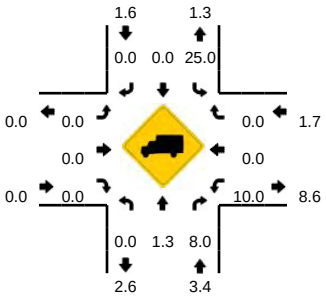
QC JOB #: 13931814

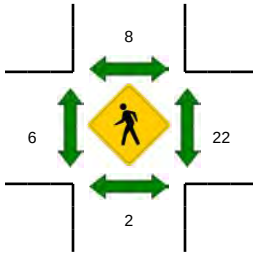
CITY/STATE: Washington, DC

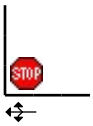
DATE: Tue, Oct 18 2016

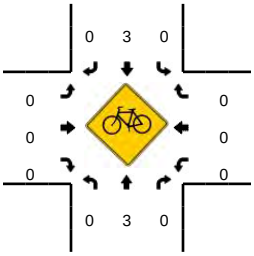
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

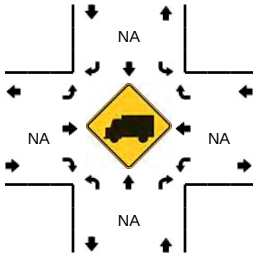


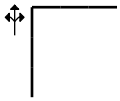


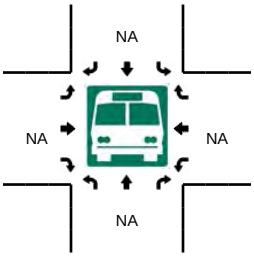












15-Min Count Period Beginning At	49th St NW (Northbound)				49th St NW (Southbound)				Yuma St NW (Eastbound)				Yuma St NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	7	31	18	0	4	5	1	0	0	0	0	0	6	9	0	0	81	
4:15 PM	5	32	23	0	1	10	1	0	0	0	0	0	8	13	3	0	96	
4:30 PM	6	34	20	0	1	9	0	0	0	0	0	0	5	12	1	0	88	
4:45 PM	7	25	19	0	3	10	1	0	0	0	0	0	5	17	2	0	89	354
5:00 PM	4	36	30	0	1	12	0	0	0	1	0	0	5	26	0	0	115	388
5:15 PM	5	35	24	1	1	15	1	0	0	0	0	0	5	25	2	0	114	406
5:30 PM	4	43	19	1	1	16	0	0	0	0	0	0	3	25	1	0	113	431
5:45 PM	5	42	15	0	1	12	2	0	0	0	0	0	7	21	0	0	105	447
6:00 PM	3	31	17	1	0	18	1	0	1	0	0	0	6	13	1	0	92	424
6:15 PM	6	31	23	0	0	12	1	0	0	0	0	0	3	14	3	0	93	403
6:30 PM	9	18	21	0	2	8	2	0	0	0	0	0	2	11	0	0	73	363
6:45 PM	7	20	18	1	0	10	3	0	0	0	0	0	4	14	2	0	79	337

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	16	144	120	0	4	48	0	0	0	4	0	0	20	104	0	0	460
Heavy Trucks	0	4	8		0	0	0		0	0	0		0	0	0		12
Pedestrians		4				0				4				4			12
Bicycles	0	2	0		0	1	0		0	0	0		0	0	0		3
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

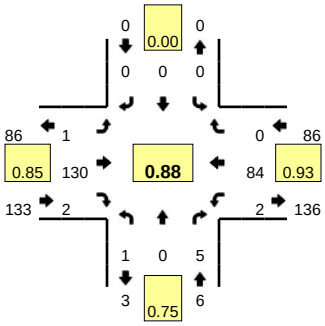
Type of peak hour being reported: Intersection Peak

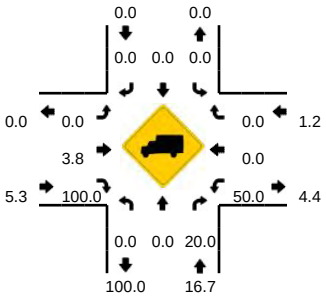
Method for determining peak hour: Total Entering Volume

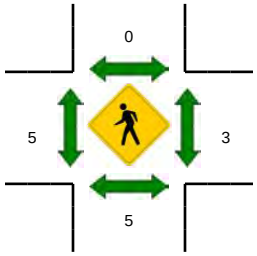
LOCATION: Alley -- Yuma St NW
CITY/STATE: Washington, DC

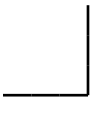
QC JOB #: 13931815
DATE: Tue, Oct 18 2016

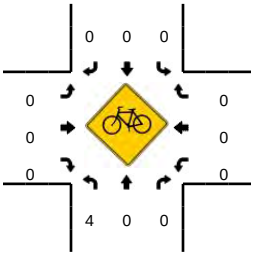
Peak-Hour: 8:00 AM -- 9:00 AM
Peak 15-Min: 8:45 AM -- 9:00 AM

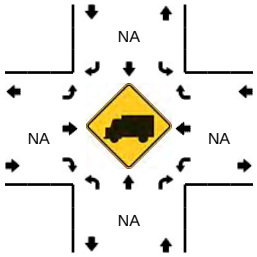


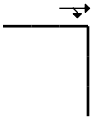


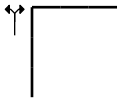


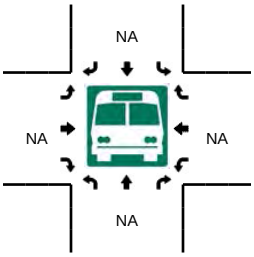












15-Min Count Period Beginning At	Alley (Northbound)				Alley (Southbound)				Yuma St NW (Eastbound)				Yuma St NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	0	0	0	0	0	0	0	0	0	3	0	0	0	5	0	0	8	
6:45 AM	0	0	0	0	0	0	0	0	0	3	0	0	0	6	0	0	9	
7:00 AM	0	0	0	0	0	0	0	0	0	14	0	0	1	11	0	0	26	
7:15 AM	0	0	0	0	0	0	0	0	0	24	1	0	1	5	0	0	31	74
7:30 AM	0	0	0	0	0	0	0	0	0	25	0	0	0	10	0	0	35	101
7:45 AM	1	0	0	0	0	0	0	0	0	24	1	0	0	13	0	0	39	131
8:00 AM	1	0	1	0	0	0	0	0	0	32	0	0	0	21	0	0	55	160
8:15 AM	0	0	2	0	0	0	0	0	0	36	2	1	1	19	0	1	62	191
8:30 AM	0	0	0	0	0	0	0	0	0	23	0	0	0	21	0	0	44	200
8:45 AM	0	0	2	0	0	0	0	0	0	39	0	0	0	23	0	0	64	225
9:00 AM	0	0	2	0	0	0	0	0	0	23	0	0	0	14	0	0	39	209
9:15 AM	1	0	0	0	0	0	0	0	0	37	1	1	1	10	0	0	51	198

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	8	0	0	0	0	0	0	156	0	0	0	92	0	0	256
Heavy Trucks	0	0	4		0	0	0		0	4	0		0	0	0		8
Pedestrians		12				0				12				8			32
Bicycles	2	0	0		0	0	0		0	0	0		0	0	0		2
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

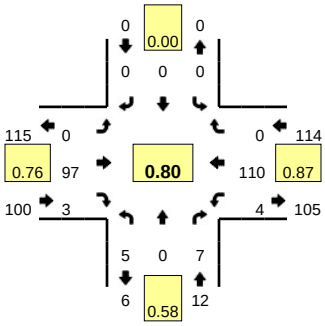
Type of peak hour being reported: Intersection Peak

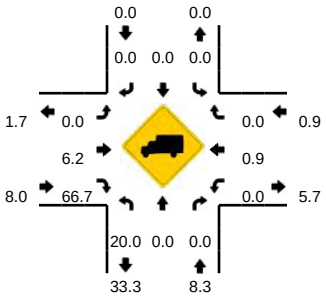
Method for determining peak hour: Total Entering Volume

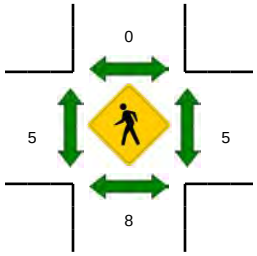
LOCATION: Alley -- Yuma St NW
CITY/STATE: Washington, DC

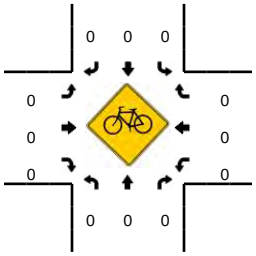
QC JOB #: 13931816
DATE: Tue, Oct 18 2016

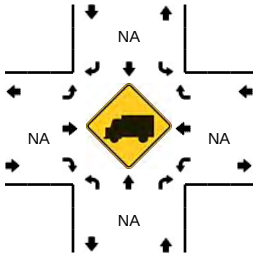
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

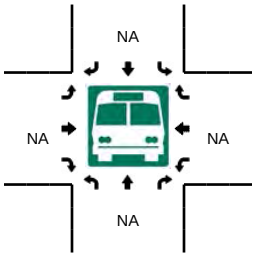












15-Min Count Period Beginning At	Alley (Northbound)				Alley (Southbound)				Yuma St NW (Eastbound)				Yuma St NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	3	0	0	0	0	0	0	21	0	1	0	14	0	0	39	
4:15 PM	0	0	1	0	0	0	0	0	0	21	2	1	0	22	0	0	47	
4:30 PM	0	0	2	0	0	0	0	0	0	18	2	0	0	18	0	1	41	
4:45 PM	2	0	1	0	0	0	0	0	0	21	2	0	2	19	0	0	47	174
5:00 PM	0	0	3	0	0	0	0	0	0	33	0	0	0	34	0	1	71	206
5:15 PM	3	0	3	0	0	0	0	0	0	23	1	0	0	27	0	0	57	216
5:30 PM	0	0	0	0	0	0	0	0	0	20	0	0	1	30	0	0	51	226
5:45 PM	0	0	0	0	0	0	0	0	0	15	2	0	1	28	0	0	46	225
6:00 PM	0	0	1	0	0	0	0	0	0	15	0	2	0	21	0	0	39	193
6:15 PM	0	0	0	0	0	0	0	0	0	18	3	0	0	18	0	0	39	175
6:30 PM	2	0	1	0	0	0	0	0	0	16	4	3	0	11	0	0	37	161
6:45 PM	0	0	0	0	0	0	0	0	0	17	1	0	0	18	0	0	36	151

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	12	0	0	0	0	0	0	132	0	0	0	136	0	4	284
Heavy Trucks	0	0	0		0	0	0		0	8	0		0	0	0		8
Pedestrians		0				0				4				4			8
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

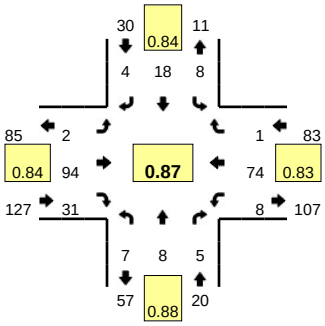
Method for determining peak hour: Total Entering Volume

LOCATION: 48th St NW -- Yuma St NW

CITY/STATE: Washington, DC

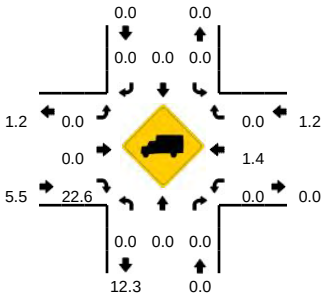
QC JOB #: 13931817

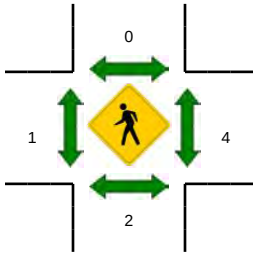
DATE: Tue, Oct 18 2016

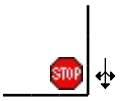


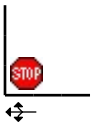
Peak-Hour: 8:00 AM -- 9:00 AM

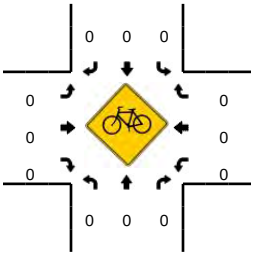
Peak 15-Min: 8:45 AM -- 9:00 AM

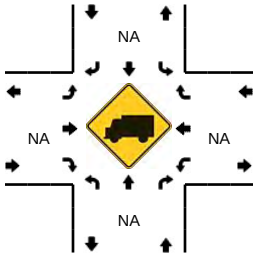


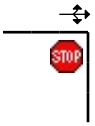


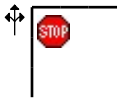


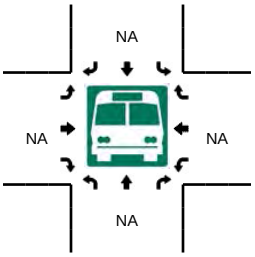












15-Min Count Period Beginning At	48th St NW (Northbound)				48th St NW (Southbound)				Yuma St NW (Eastbound)				Yuma St NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	1	0	1	0	0	1	0	0	0	3	1	0	1	4	0	0	12	
6:45 AM	1	0	1	0	0	4	3	0	0	2	1	0	1	3	0	0	16	
7:00 AM	3	1	0	0	0	2	2	0	0	6	4	0	2	11	0	0	31	
7:15 AM	0	5	1	0	0	2	0	0	0	10	14	0	0	7	0	0	39	98
7:30 AM	2	2	0	0	0	6	0	0	1	18	5	0	2	8	0	0	44	130
7:45 AM	2	4	0	0	1	8	0	0	0	22	3	0	2	11	2	0	55	169
8:00 AM	2	2	1	0	0	4	0	0	0	22	10	0	3	15	0	0	59	197
8:15 AM	0	2	1	0	5	4	1	0	2	30	6	0	4	19	0	0	74	232
8:30 AM	1	1	3	0	2	5	1	0	0	16	6	0	0	17	0	0	52	240
8:45 AM	4	3	0	0	1	5	2	0	0	26	9	0	1	23	1	0	75	260
9:00 AM	1	0	2	0	1	7	3	0	1	16	9	0	4	11	1	0	56	257
9:15 AM	0	2	0	0	1	4	2	0	2	16	16	1	6	7	2	0	59	242

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	16	12	0	0	4	20	8	0	0	104	36	0	4	92	4	0	300
Heavy Trucks	0	0	0		0	0	0		0	0	8		0	0	0		8
Pedestrians		4				0				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

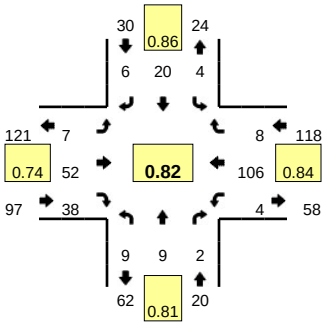
LOCATION: 48th St NW -- Yuma St NW

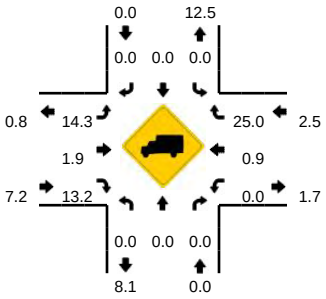
QC JOB #: 13931818

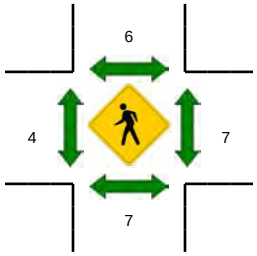
CITY/STATE: Washington, DC

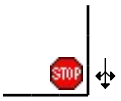
DATE: Tue, Oct 18 2016

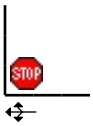
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

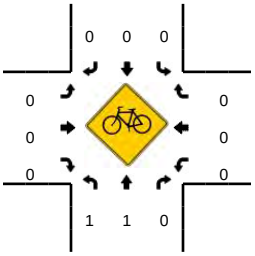


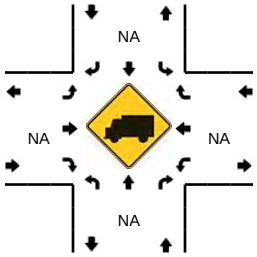


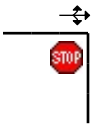


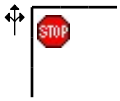


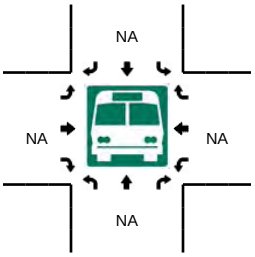












15-Min Count Period Beginning At	48th St NW (Northbound)				48th St NW (Southbound)				Yuma St NW (Eastbound)				Yuma St NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	1	2	0	0	0	6	3	0	0	14	10	1	1	10	1	0	49	
4:15 PM	3	3	2	0	0	1	3	0	0	18	6	0	1	15	1	0	53	
4:30 PM	1	3	0	0	2	4	3	0	3	15	4	0	2	16	0	0	53	
4:45 PM	4	2	1	0	0	7	0	0	4	11	8	0	1	13	1	0	52	207
5:00 PM	2	0	0	0	0	7	1	0	1	21	14	0	0	32	3	0	81	239
5:15 PM	1	3	0	0	1	6	0	0	4	7	14	0	3	24	0	0	63	249
5:30 PM	3	3	2	0	1	4	3	0	1	13	6	0	1	25	3	0	65	261
5:45 PM	3	3	0	0	2	3	2	0	1	11	4	0	0	25	2	0	56	265
6:00 PM	0	1	3	0	0	6	0	0	0	8	9	0	3	19	1	0	50	234
6:15 PM	3	5	0	0	0	5	2	0	0	11	7	0	2	15	0	0	50	221
6:30 PM	2	3	0	0	0	0	1	0	1	11	4	0	0	9	0	0	31	187
6:45 PM	1	3	1	0	1	5	4	0	0	12	4	0	2	14	2	0	49	180

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	8	0	0	0	0	28	4	0	4	84	56	0	0	128	12	0	324
Heavy Trucks	0	0	0		0	0	0		0	0	8		0	0	0		8
Pedestrians		4				4				4				4			16
Bicycles	0	1	0		0	0	0		0	0	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

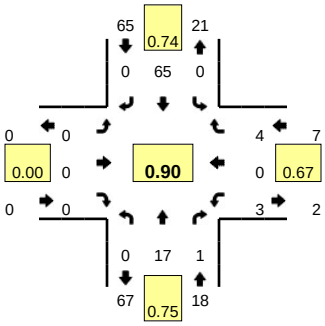
LOCATION: 48th St NW -- Windom Pl NW

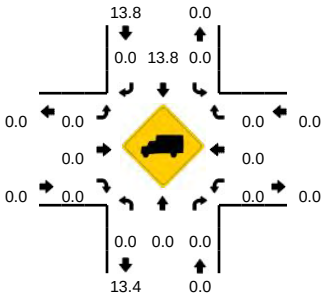
CITY/STATE: Washington, DC

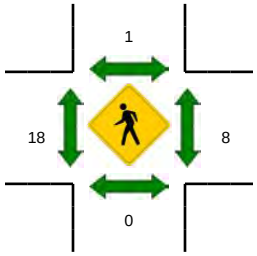
QC JOB #: 13931819

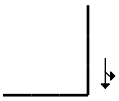
DATE: Tue, Oct 18 2016

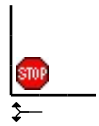
Peak-Hour: 8:30 AM -- 9:30 AM
Peak 15-Min: 9:15 AM -- 9:30 AM

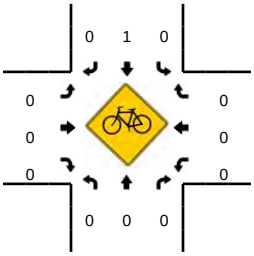


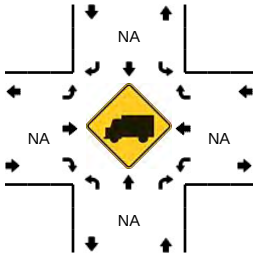


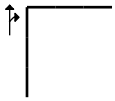


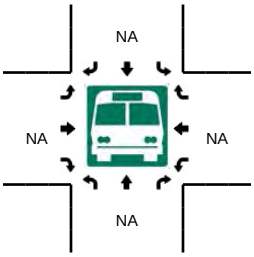












15-Min Count Period Beginning At	48th St NW (Northbound)				48th St NW (Southbound)				Windom Pl NW (Eastbound)				Windom Pl NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	0	3	0	0	0	4	0	0	0	0	0	0	0	0	1	0	8	
6:45 AM	0	2	0	0	0	4	0	0	0	0	0	0	0	0	0	0	6	
7:00 AM	0	3	0	0	0	8	0	0	0	0	0	0	1	0	0	0	12	
7:15 AM	0	6	0	0	0	17	0	0	0	0	0	0	0	0	0	0	23	49
7:30 AM	0	2	1	0	1	10	0	0	0	0	0	0	1	0	1	0	16	57
7:45 AM	0	4	1	0	0	12	0	1	0	0	0	0	2	0	1	0	21	72
8:00 AM	0	4	0	0	1	15	0	0	0	0	0	0	0	0	0	0	20	80
8:15 AM	0	3	0	0	0	15	0	0	0	0	0	0	1	0	0	0	19	76
8:30 AM	0	5	0	0	0	11	0	0	0	0	0	0	0	0	2	0	18	78
8:45 AM	0	6	0	0	0	15	0	0	0	0	0	0	0	0	2	1	24	81
9:00 AM	0	3	1	0	0	17	0	0	0	0	0	0	2	0	0	0	23	84
9:15 AM	0	3	0	0	0	22	0	0	0	0	0	0	0	0	0	0	25	90

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	12	0	0	0	88	0	0	0	0	0	0	0	0	0	0	100
Heavy Trucks	0	0	0		0	12	0		0	0	0		0	0	0		12
Pedestrians		0				4				40				16			60
Bicycles	0	0	0		0	1	0		0	0	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

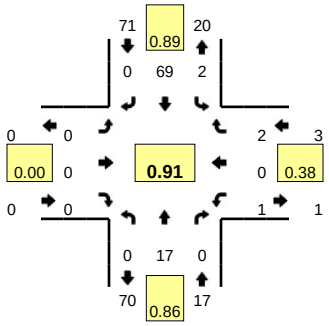
Method for determining peak hour: Total Entering Volume

LOCATION: 48th St NW -- Windom Pl NW

CITY/STATE: Washington, DC

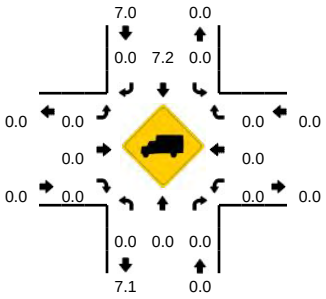
QC JOB #: 13931820

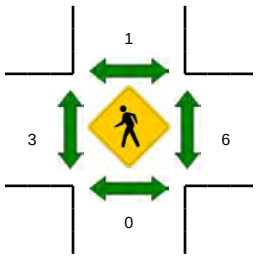
DATE: Tue, Oct 18 2016

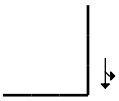


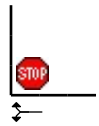
Peak-Hour: 4:45 PM -- 5:45 PM

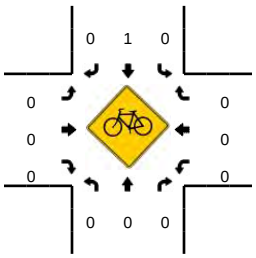
Peak 15-Min: 4:45 PM -- 5:00 PM

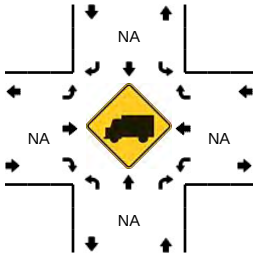


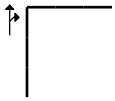


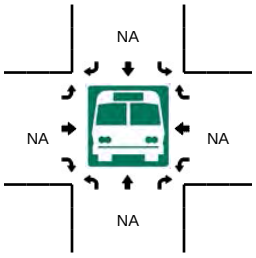












15-Min Count Period Beginning At	48th St NW (Northbound)				48th St NW (Southbound)				Windom Pl NW (Eastbound)				Windom Pl NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	3	0	0	2	17	0	0	0	0	0	0	0	0	0	0	22	
4:15 PM	0	7	1	0	0	7	0	0	0	0	0	0	0	0	1	0	16	
4:30 PM	0	4	0	0	1	9	0	0	0	0	0	0	0	0	0	0	14	
4:45 PM	0	7	0	0	0	17	0	1	0	0	0	0	0	0	0	0	25	77
5:00 PM	0	2	0	0	0	20	0	0	0	0	0	0	1	0	0	0	23	78
5:15 PM	0	2	0	0	1	18	0	0	0	0	0	0	0	0	2	0	23	85
5:30 PM	0	6	0	0	0	14	0	0	0	0	0	0	0	0	0	0	20	91
5:45 PM	0	5	2	0	0	8	0	0	0	0	0	0	0	0	1	0	16	82
6:00 PM	0	4	0	1	1	16	0	0	0	0	0	0	0	0	0	0	22	81
6:15 PM	0	6	0	0	2	13	0	0	0	0	0	0	3	0	1	0	25	83
6:30 PM	0	4	0	0	0	4	0	0	0	0	0	0	0	0	1	0	9	72
6:45 PM	0	5	0	0	0	11	0	0	0	0	0	0	0	0	0	0	16	72

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	28	0	0	0	68	0	4	0	0	0	0	0	0	0	0	100
Heavy Trucks	0	0	0		0	4	0		0	0	0		0	0	0		4
Pedestrians		0				0				0				8			8
Bicycles	0	0	0		0	1	0		0	0	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: 48th St NW -- Warren St NW

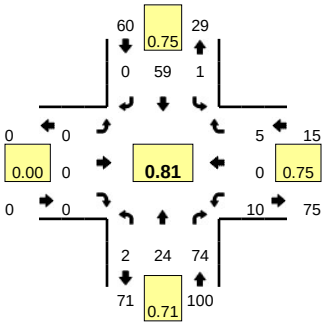
CITY/STATE: Washington, DC

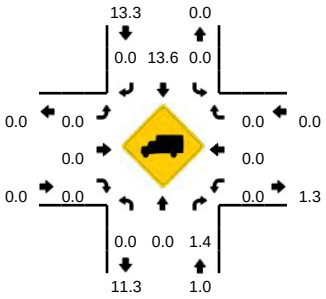
QC JOB #: 13931821

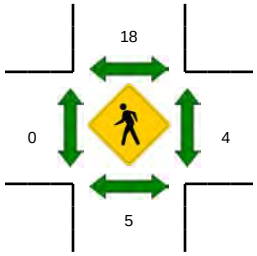
DATE: Tue, Oct 18 2016

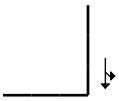
Peak-Hour: 8:30 AM -- 9:30 AM

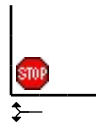
Peak 15-Min: 8:45 AM -- 9:00 AM

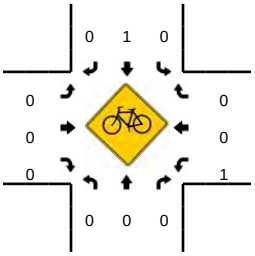


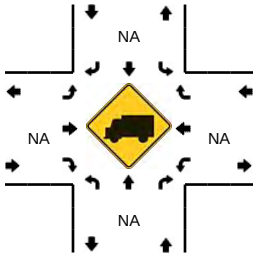


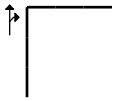


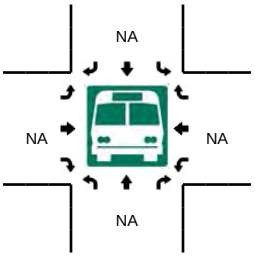












15-Min Count Period Beginning At	48th St NW (Northbound)				48th St NW (Southbound)				Warren St NW (Eastbound)				Warren St NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	0	3	1	0	0	5	0	0	0	0	0	0	0	0	0	0	9	
6:45 AM	0	3	0	1	1	3	0	0	0	0	0	0	2	0	0	0	10	
7:00 AM	0	3	5	0	1	5	0	0	0	0	0	0	4	0	0	0	18	
7:15 AM	0	6	11	0	2	16	0	0	0	0	0	0	3	0	0	0	38	75
7:30 AM	0	2	17	0	0	12	0	0	0	0	0	0	2	0	1	0	34	100
7:45 AM	0	7	25	0	3	10	0	0	0	0	0	0	1	0	1	0	47	137
8:00 AM	0	5	20	0	2	14	0	0	0	0	0	0	4	0	1	0	46	165
8:15 AM	0	3	10	0	1	16	0	0	0	0	0	0	3	0	0	0	33	160
8:30 AM	0	6	12	1	0	10	0	0	0	0	0	0	2	0	2	0	33	159
8:45 AM	0	7	28	0	0	13	0	0	0	0	0	0	5	0	1	0	54	166
9:00 AM	0	6	20	0	0	17	0	0	0	0	0	0	3	0	1	0	47	167
9:15 AM	0	5	14	1	1	19	0	0	0	0	0	0	0	0	1	0	41	175

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	28	112	0	0	52	0	0	0	0	0	0	20	0	4	0	216
Heavy Trucks	0	0	0		0	12	0		0	0	0		0	0	0		12
Pedestrians		4				16				0				0			20
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: 48th St NW -- Warren St NW

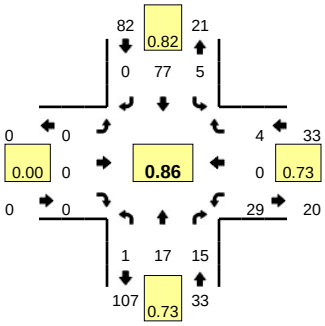
CITY/STATE: Washington, DC

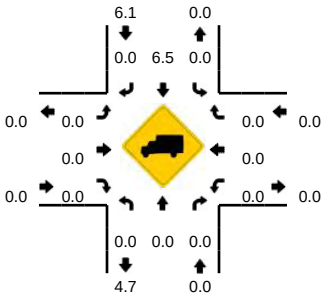
QC JOB #: 13931822

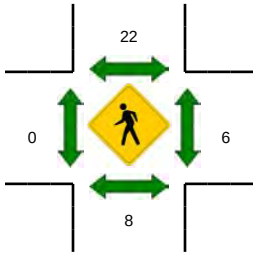
DATE: Tue, Oct 18 2016

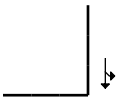
Peak-Hour: 4:45 PM -- 5:45 PM

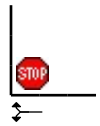
Peak 15-Min: 5:30 PM -- 5:45 PM

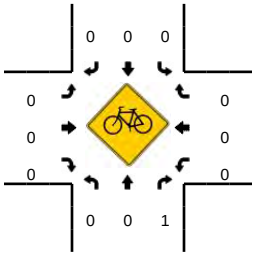


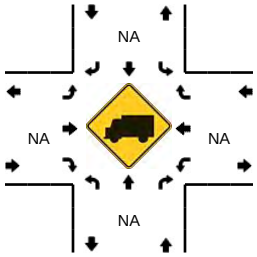


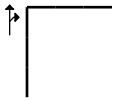


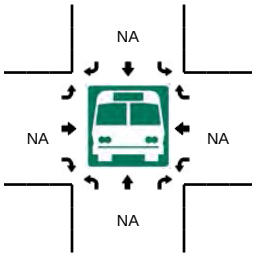












15-Min Count Period Beginning At	48th St NW (Northbound)				48th St NW (Southbound)				Warren St NW (Eastbound)				Warren St NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	3	2	0	1	18	0	0	0	0	0	0	2	0	1	0	27	
4:15 PM	0	8	4	0	0	6	0	0	0	0	0	0	3	0	0	0	21	
4:30 PM	0	4	3	1	1	12	0	0	0	0	0	0	3	0	0	0	24	
4:45 PM	0	6	3	0	1	18	0	0	0	0	0	0	5	0	0	0	33	105
5:00 PM	0	1	3	0	1	24	0	0	0	0	0	0	4	0	2	0	35	113
5:15 PM	0	4	4	0	0	19	0	0	0	0	0	0	9	0	1	0	37	129
5:30 PM	0	6	5	1	3	16	0	0	0	0	0	0	11	0	1	0	43	148
5:45 PM	0	5	4	0	1	6	0	0	0	0	0	0	6	0	1	0	23	138
6:00 PM	0	6	3	1	1	17	0	0	0	0	0	0	6	0	0	0	34	137
6:15 PM	0	8	8	0	1	17	0	0	0	0	0	0	4	0	0	0	38	138
6:30 PM	0	3	4	0	0	8	0	0	0	0	0	0	5	0	1	0	21	116
6:45 PM	0	4	6	0	1	9	0	0	0	0	0	0	4	0	0	0	24	117

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	24	20	4	12	64	0	0	0	0	0	0	44	0	4	0	172
Heavy Trucks	0	0	0		0	8	0		0	0	0		0	0	0		8
Pedestrians		4				20				0				0			24
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

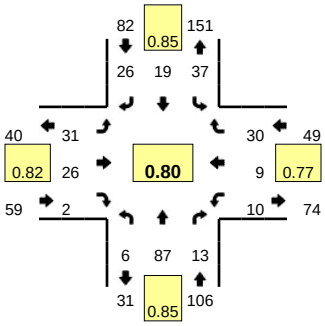
LOCATION: 49th St NW -- Fordham Rd NW

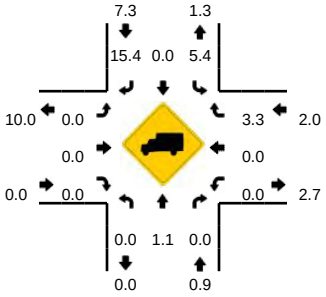
QC JOB #: 13931823

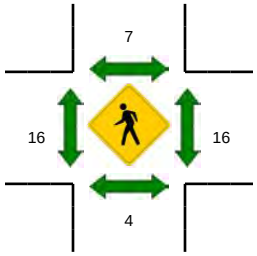
CITY/STATE: Washington, DC

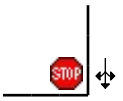
DATE: Tue, Oct 18 2016

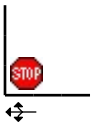
Peak-Hour: 8:30 AM -- 9:30 AM
Peak 15-Min: 9:00 AM -- 9:15 AM

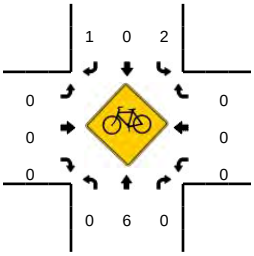


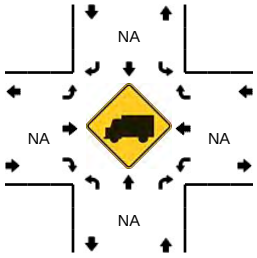


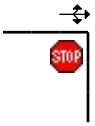


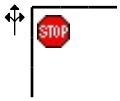


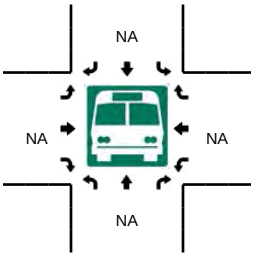












15-Min Count Period Beginning At	49th St NW (Northbound)				49th St NW (Southbound)				Fordham Rd NW (Eastbound)				Fordham Rd NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	0	1	0	0	0	3	3	0	3	1	0	0	1	0	6	1	19	
6:45 AM	0	3	2	0	1	9	2	0	2	3	0	0	2	1	2	0	27	
7:00 AM	1	16	2	0	3	8	3	0	9	5	1	0	2	0	2	2	54	
7:15 AM	0	15	5	0	8	7	3	0	9	3	1	0	4	2	9	0	66	166
7:30 AM	2	21	1	0	6	3	6	0	6	2	0	0	1	0	8	0	56	203
7:45 AM	0	29	5	0	6	5	4	0	7	5	0	0	0	3	4	0	68	244
8:00 AM	0	21	3	0	13	9	5	0	10	3	0	0	2	1	11	0	78	268
8:15 AM	0	30	2	1	5	4	2	0	6	3	0	0	2	3	1	0	59	261
8:30 AM	0	18	3	1	11	2	5	0	10	4	1	0	3	1	4	0	63	268
8:45 AM	0	19	2	0	10	4	7	1	4	13	1	0	2	4	8	1	76	276
9:00 AM	3	31	5	0	7	7	9	1	6	7	0	1	2	3	10	1	93	291
9:15 AM	1	19	3	1	5	6	5	2	10	2	0	0	1	1	8	0	64	296

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	124	20	0	28	28	36	4	24	28	0	4	8	12	40	4	372
Heavy Trucks	0	4	0		0	0	4		0	0	0		0	0	4		12
Pedestrians		8				4				28				40			80
Bicycles	0	0	0		0	0	1		0	0	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

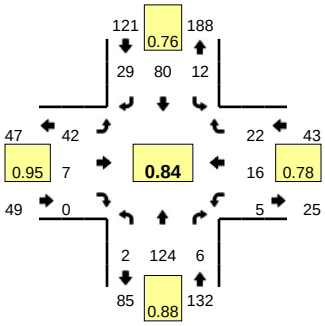
Method for determining peak hour: Total Entering Volume

LOCATION: 49th St NW -- Fordham Rd NW

CITY/STATE: Washington, DC

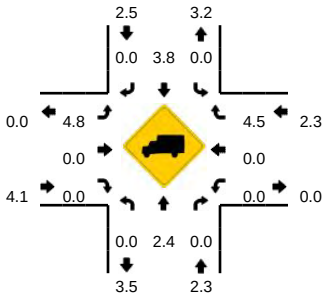
QC JOB #: 13931824

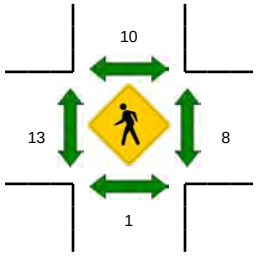
DATE: Tue, Oct 18 2016

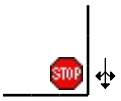


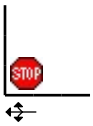
Peak-Hour: 4:45 PM -- 5:45 PM

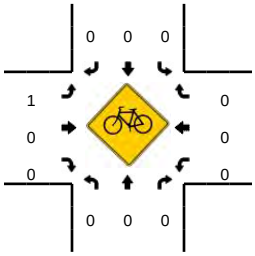
Peak 15-Min: 5:00 PM -- 5:15 PM

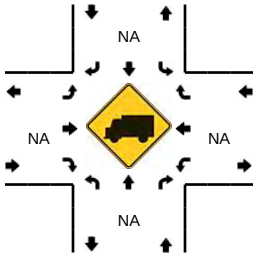


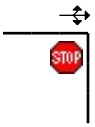


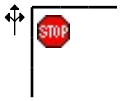


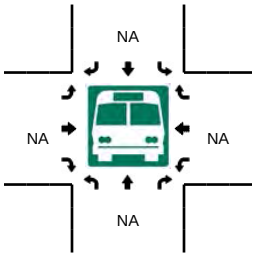












15-Min Count Period Beginning At	49th St NW (Northbound)				49th St NW (Southbound)				Fordham Rd NW (Eastbound)				Fordham Rd NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	1	26	0	0	7	18	7	0	11	2	0	0	2	2	5	0	81	
4:15 PM	0	29	2	0	6	17	6	0	10	3	0	0	3	4	6	0	86	
4:30 PM	1	29	3	0	2	11	12	0	11	3	0	0	2	3	0	0	77	
4:45 PM	0	27	0	0	2	16	9	0	12	1	0	0	0	4	5	0	76	320
5:00 PM	1	34	3	0	3	29	8	0	11	2	0	0	2	5	5	0	103	342
5:15 PM	1	32	2	0	2	15	7	0	6	1	0	0	1	6	7	0	80	336
5:30 PM	0	31	1	0	5	20	5	0	13	3	0	0	2	1	5	0	86	345
5:45 PM	0	28	1	0	0	9	4	2	7	2	0	0	7	3	4	0	67	336
6:00 PM	0	29	1	0	1	20	13	0	2	0	0	0	4	4	3	0	77	310
6:15 PM	0	27	3	0	1	19	11	1	8	1	0	0	5	7	4	0	87	317
6:30 PM	0	16	3	0	1	18	4	0	3	0	1	0	3	1	5	0	55	286
6:45 PM	0	23	0	0	2	14	6	1	4	3	0	0	1	2	4	0	60	279

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	136	12	0	12	116	32	0	44	8	0	0	8	20	20	0	412
Heavy Trucks	0	0	0		0	8	0		4	0	0		0	0	0		12
Pedestrians		0				12				24				8			44
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

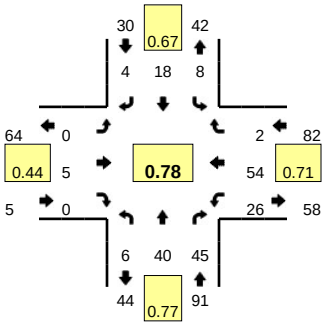
Method for determining peak hour: Total Entering Volume

LOCATION: 49th St NW -- Albemarle St NW

QC JOB #: 13931825

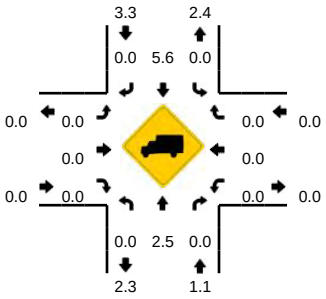
CITY/STATE: Washington, DC

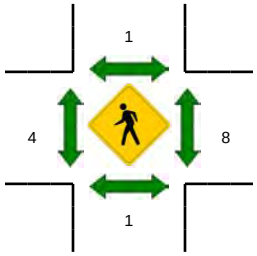
DATE: Tue, Oct 18 2016

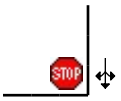


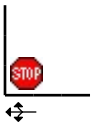
Peak-Hour: 8:00 AM -- 9:00 AM

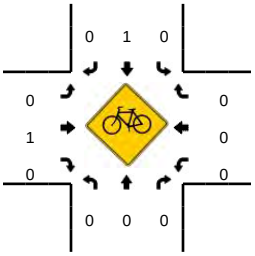
Peak 15-Min: 8:15 AM -- 8:30 AM

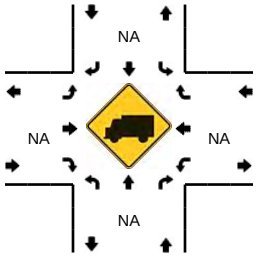


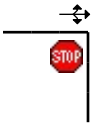


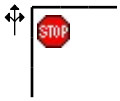


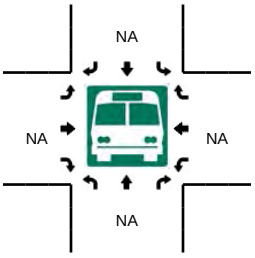












15-Min Count Period Beginning At	49th St NW (Northbound)				49th St NW (Southbound)				Albemarle St NW (Eastbound)				Albemarle St NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	1	5	0	0	1	3	0	0	0	1	0	0	1	3	0	0	15	
6:45 AM	1	5	2	0	0	2	0	0	0	0	1	0	0	1	0	0	12	
7:00 AM	1	4	2	0	1	0	1	0	0	1	1	0	1	8	0	0	20	
7:15 AM	2	9	7	0	2	8	2	0	0	0	0	0	3	7	0	0	40	87
7:30 AM	3	8	7	0	1	6	1	0	0	2	0	0	3	6	0	0	37	109
7:45 AM	4	13	16	0	2	1	0	0	0	1	0	0	2	13	1	0	53	150
8:00 AM	2	9	9	0	2	4	3	0	0	0	0	0	5	11	2	0	47	177
8:15 AM	2	17	15	0	5	6	1	0	0	4	0	0	4	13	0	0	67	204
8:30 AM	1	6	8	0	1	4	0	0	0	1	0	0	6	12	0	0	39	206
8:45 AM	1	8	13	0	0	4	0	0	0	0	0	0	11	18	0	0	55	208
9:00 AM	0	15	9	0	1	4	1	0	0	0	0	0	4	6	0	0	40	201
9:15 AM	1	9	12	0	0	1	0	0	0	0	0	0	6	12	0	0	41	175

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	8	68	60	0	20	24	4	0	0	16	0	0	16	52	0	0	268
Heavy Trucks	0	4	0		0	0	0		0	0	0		0	0	0		4
Pedestrians		0				0				0				4			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: 49th St NW -- Albemarle St NW

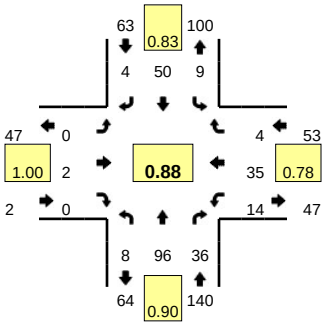
QC JOB #: 13931826

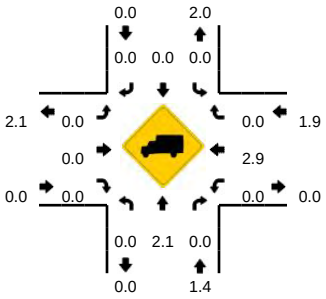
CITY/STATE: Washington, DC

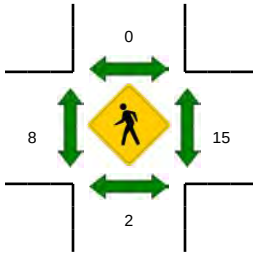
DATE: Tue, Oct 18 2016

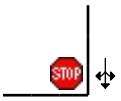
Peak-Hour: 5:15 PM -- 6:15 PM

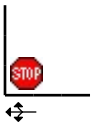
Peak 15-Min: 5:30 PM -- 5:45 PM

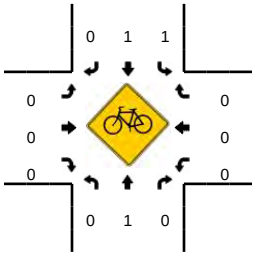


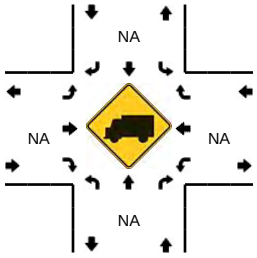


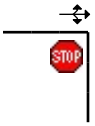


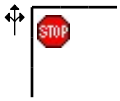


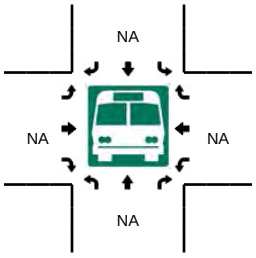












15-Min Count Period Beginning At	49th St NW (Northbound)				49th St NW (Southbound)				Albemarle St NW (Eastbound)				Albemarle St NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	3	15	9	0	1	5	0	0	0	0	1	0	2	9	0	0	45	
4:15 PM	1	17	10	0	2	5	0	0	0	1	0	0	4	9	1	0	50	
4:30 PM	3	24	7	0	3	9	1	0	0	1	0	0	2	8	1	0	59	
4:45 PM	0	14	12	0	1	7	1	0	0	1	0	0	2	9	4	0	51	205
5:00 PM	2	25	7	1	1	8	1	0	1	0	0	0	3	8	1	0	58	218
5:15 PM	1	21	9	0	3	16	0	0	0	0	0	0	1	9	0	0	60	228
5:30 PM	6	23	12	0	1	11	2	0	0	1	0	0	3	14	0	0	73	242
5:45 PM	1	31	8	0	3	11	0	0	0	1	0	0	3	4	1	0	63	254
6:00 PM	0	21	7	0	2	12	2	0	0	0	0	0	7	8	3	0	62	258
6:15 PM	1	20	11	0	3	8	0	0	0	0	0	0	4	9	0	0	56	254
6:30 PM	0	9	7	0	0	7	1	0	0	0	0	0	4	4	0	0	32	213
6:45 PM	1	20	6	0	1	11	0	0	0	0	0	0	2	4	1	0	46	196

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	24	92	48	0	4	44	8	0	0	4	0	0	12	56	0	0	292
Heavy Trucks	0	4	0		0	0	0		0	0	0		0	4	0		8
Pedestrians		0				0				16				20			36
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

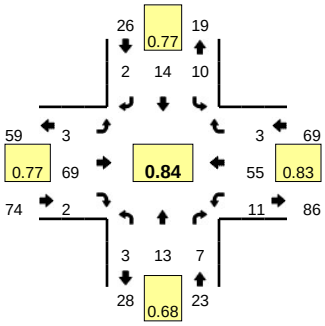
Method for determining peak hour: Total Entering Volume

LOCATION: 48th St NW -- Albemarle St NW

CITY/STATE: Washington, DC

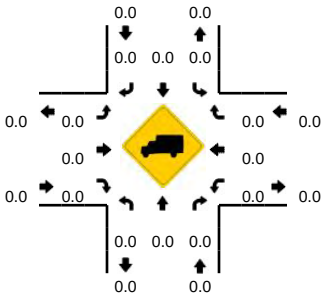
QC JOB #: 13931827

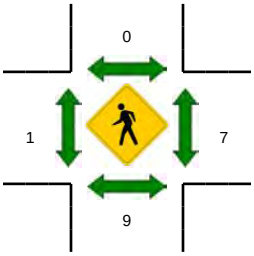
DATE: Thu, Oct 20 2016

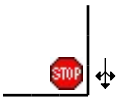


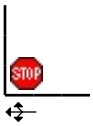
Peak-Hour: 8:00 AM -- 9:00 AM

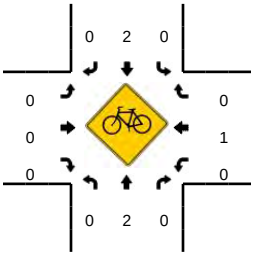
Peak 15-Min: 8:15 AM -- 8:30 AM

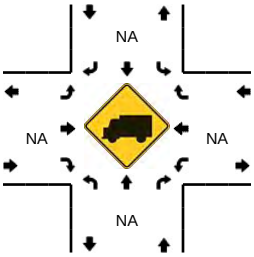


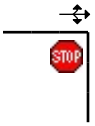


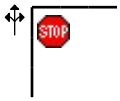


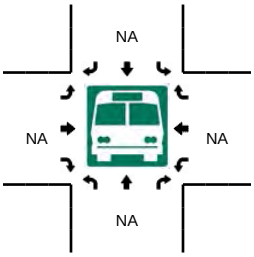












15-Min Count Period Beginning At	48th St NW (Northbound)				48th St NW (Southbound)				Albemarle St NW (Eastbound)				Albemarle St NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	1	2	0	0	0	2	0	0	0	1	0	0	0	3	0	0	9	
6:45 AM	0	2	0	0	0	1	1	0	0	3	0	0	1	6	0	0	14	
7:00 AM	1	0	0	0	1	7	0	0	1	6	0	0	1	7	0	0	24	
7:15 AM	1	1	1	0	1	5	2	0	0	8	0	0	0	10	0	0	29	76
7:30 AM	0	4	1	0	2	5	0	0	0	8	1	0	2	11	1	1	36	103
7:45 AM	1	5	3	0	2	9	0	0	1	12	0	0	2	11	1	0	47	136
8:00 AM	1	1	1	0	0	4	1	0	0	17	2	0	3	12	1	0	43	155
8:15 AM	1	6	3	0	6	2	0	0	1	23	0	0	0	14	1	0	57	183
8:30 AM	0	3	1	0	2	7	1	0	1	11	0	0	3	11	1	0	41	188
8:45 AM	0	3	2	1	2	1	0	0	1	18	0	0	5	18	0	0	51	192
9:00 AM	0	5	0	0	0	3	0	0	1	10	0	0	2	20	2	0	43	192
9:15 AM	0	3	0	0	0	9	0	0	0	12	1	0	2	15	1	0	43	178

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	24	12	0	24	8	0	0	4	92	0	0	0	56	4	0	228
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		16				0				4				4			24
Bicycles	0	0	0		0	1	0		0	0	0		0	1	0		2
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

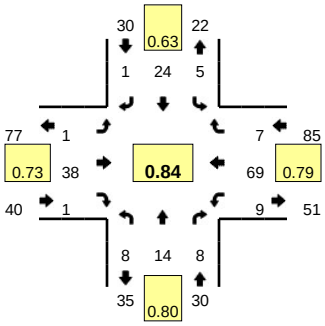
LOCATION: 48th St NW -- Albemarle St NW

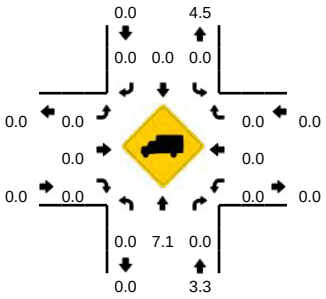
QC JOB #: 13931828

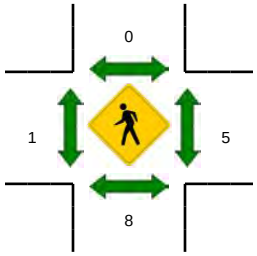
CITY/STATE: Washington, DC

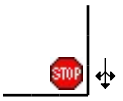
DATE: Thu, Oct 20 2016

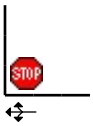
Peak-Hour: 5:15 PM -- 6:15 PM
Peak 15-Min: 6:00 PM -- 6:15 PM

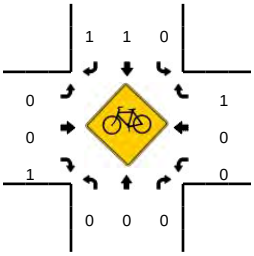


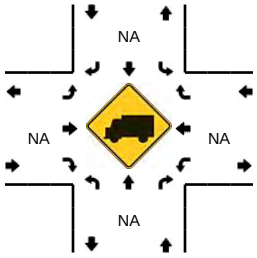


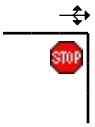


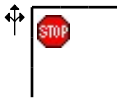


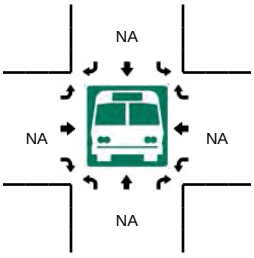












15-Min Count Period Beginning At	48th St NW (Northbound)				48th St NW (Southbound)				Albemarle St NW (Eastbound)				Albemarle St NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	2	1	0	0	1	0	0	1	8	0	1	1	17	0	0	32	
4:15 PM	1	3	2	0	1	3	1	0	1	4	0	0	0	14	1	1	32	
4:30 PM	2	3	0	0	2	2	1	0	2	6	0	0	1	10	2	0	31	
4:45 PM	0	5	4	0	0	7	0	0	2	11	1	0	2	12	2	0	46	141
5:00 PM	0	5	1	0	1	4	1	0	0	7	0	0	2	11	0	0	32	141
5:15 PM	0	4	1	0	2	9	1	0	0	7	1	0	2	20	1	0	48	157
5:30 PM	2	5	2	0	1	4	0	0	0	15	0	0	2	9	2	0	42	168
5:45 PM	1	3	2	0	1	2	0	0	1	8	0	0	2	18	2	0	40	162
6:00 PM	4	2	3	1	1	9	0	0	0	8	0	0	3	22	2	0	55	185
6:15 PM	0	6	1	0	1	3	1	0	0	8	1	0	3	19	0	0	43	180
6:30 PM	0	6	1	0	2	4	0	0	1	10	2	0	3	6	1	0	36	174
6:45 PM	0	6	2	0	2	4	2	0	0	4	0	0	2	7	0	0	29	163

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	16	8	12	4	4	36	0	0	0	32	0	0	12	88	8	0	220
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		8				0				0				8			16
Bicycles	0	0	0		0	0	0		0	0	1		0	0	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

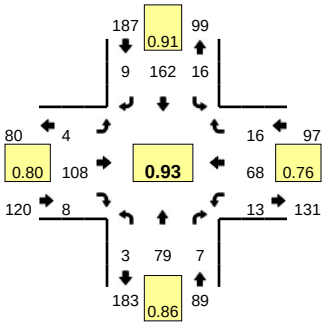
Method for determining peak hour: Total Entering Volume

LOCATION: 46th St NW -- Yuma St NW

QC JOB #: 13931829

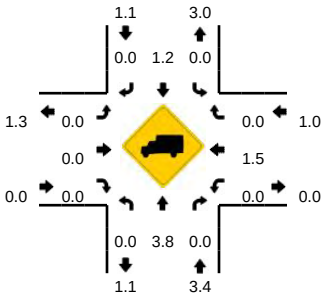
CITY/STATE: Washington, DC

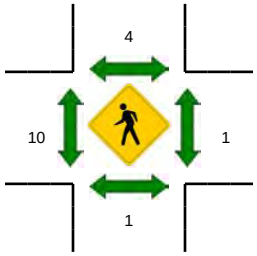
DATE: Tue, Oct 18 2016

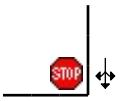


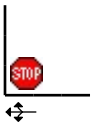
Peak-Hour: 8:00 AM -- 9:00 AM

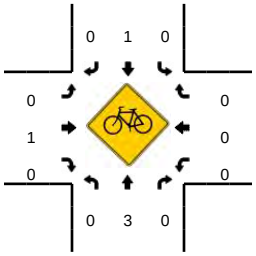
Peak 15-Min: 8:15 AM -- 8:30 AM

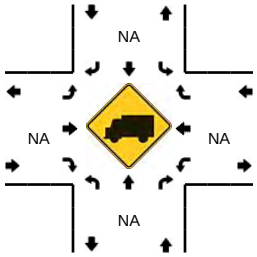


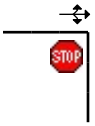


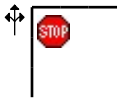


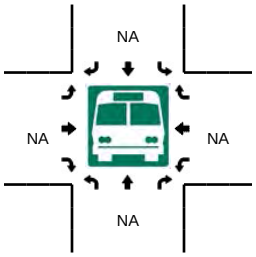












15-Min Count Period Beginning At	46th St NW (Northbound)				46th St NW (Southbound)				Yuma St NW (Eastbound)				Yuma St NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	1	5	0	0	1	12	1	0	0	3	0	0	0	3	0	0	26	
6:45 AM	0	7	0	0	1	17	0	0	1	1	2	0	1	4	1	0	35	
7:00 AM	2	9	0	0	0	13	0	0	1	6	0	0	2	12	0	0	45	
7:15 AM	0	8	2	0	3	25	0	0	0	8	2	0	1	3	2	0	54	160
7:30 AM	0	13	1	0	2	35	3	0	1	15	1	0	0	7	1	0	79	213
7:45 AM	1	10	2	0	7	37	0	0	0	31	4	0	3	13	2	0	110	288
8:00 AM	3	23	0	0	1	40	1	0	1	23	2	0	4	15	3	0	116	359
8:15 AM	0	18	5	0	6	44	3	0	1	36	1	0	0	18	0	0	132	437
8:30 AM	0	17	1	0	8	44	1	0	2	20	1	0	5	18	9	0	126	484
8:45 AM	0	21	1	0	1	34	4	0	0	29	4	0	4	17	4	0	119	493
9:00 AM	0	18	1	0	1	38	3	0	0	20	4	0	0	11	0	0	96	473
9:15 AM	0	16	0	0	1	34	1	0	1	14	4	0	2	11	3	0	87	428

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	72	20	0	24	176	12	0	4	144	4	0	0	72	0	0	528
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	4	0		4
Pedestrians		0				4				16				0			20
Bicycles	0	3	0		0	0	0		0	0	0		0	0	0		3
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: 46th St NW -- Yuma St NW

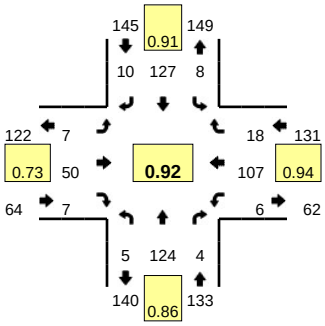
CITY/STATE: Washington, DC

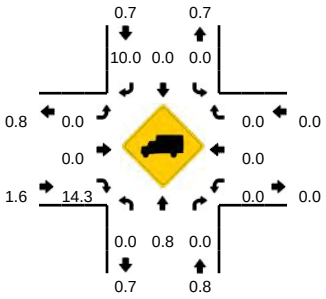
QC JOB #: 13931830

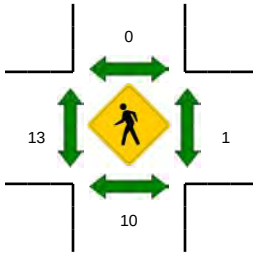
DATE: Tue, Oct 18 2016

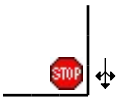
Peak-Hour: 5:00 PM -- 6:00 PM

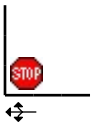
Peak 15-Min: 5:00 PM -- 5:15 PM

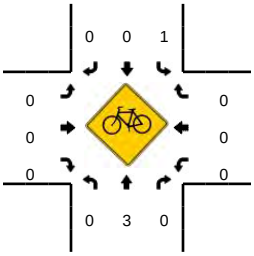


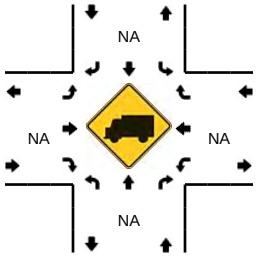


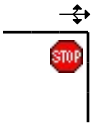


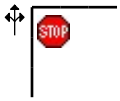


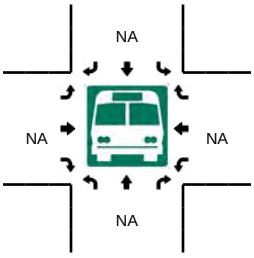












15-Min Count Period Beginning At	46th St NW (Northbound)				46th St NW (Southbound)				Yuma St NW (Eastbound)				Yuma St NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	1	21	4	0	2	29	2	1	3	8	1	0	3	7	2	0	84	
4:15 PM	3	22	0	0	3	15	1	0	1	13	1	0	1	11	3	0	74	
4:30 PM	3	34	2	0	0	29	2	0	3	10	2	0	4	16	3	0	108	
4:45 PM	0	26	1	0	1	26	1	0	0	11	1	0	1	16	5	0	89	355
5:00 PM	2	31	0	0	5	31	2	0	2	17	3	0	0	33	2	0	128	399
5:15 PM	1	25	4	0	0	32	2	0	2	6	1	0	3	26	4	0	106	431
5:30 PM	2	37	0	0	0	30	3	0	1	18	0	0	2	25	8	0	126	449
5:45 PM	0	31	0	0	3	34	3	0	2	9	3	0	1	23	4	0	113	473
6:00 PM	1	40	0	0	1	35	1	0	0	9	1	0	2	21	6	1	118	463
6:15 PM	0	27	1	0	1	31	1	0	2	9	1	0	1	17	1	0	92	449
6:30 PM	0	25	1	0	3	26	5	0	2	9	3	0	2	9	1	0	86	409
6:45 PM	3	21	3	0	0	23	3	0	2	5	2	0	3	15	1	0	81	377

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	8	124	0	0	20	124	8	0	8	68	12	0	0	132	8	0	512
Heavy Trucks	0	4	0		0	0	0		0	0	0		0	0	0		4
Pedestrians		8				0				20				0			28
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: 48th St NW -- Northern Parking Lot

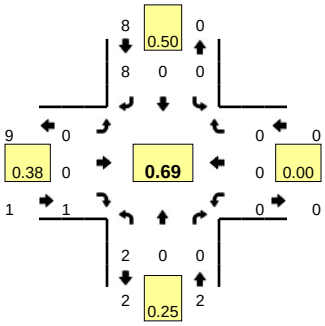
CITY/STATE: Washington, DC

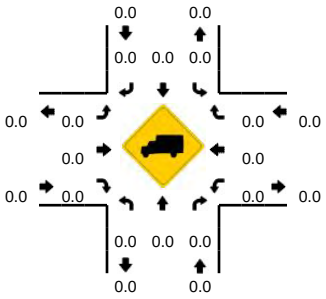
QC JOB #: 13931831

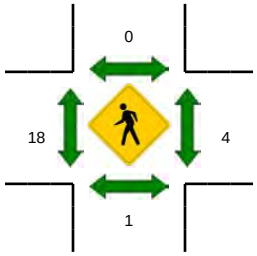
DATE: Tue, Oct 18 2016

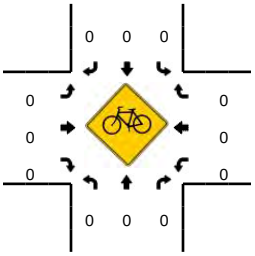
Peak-Hour: 8:30 AM -- 9:30 AM

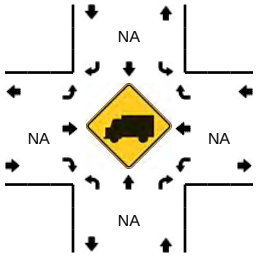
Peak 15-Min: 9:15 AM -- 9:30 AM

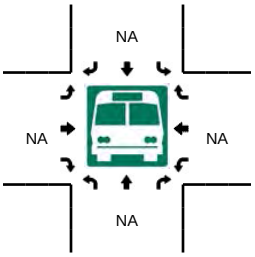












15-Min Count Period Beginning At	48th St NW (Northbound)				48th St NW (Southbound)				Northern Parking Lot (Eastbound)				Northern Parking Lot (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	3	
6:45 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	
7:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
7:30 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	3
7:45 AM	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	3	5
8:00 AM	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2	6
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
8:30 AM	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	3	8
8:45 AM	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2	7
9:00 AM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	7
9:15 AM	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4	11

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	16
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				40				8			48
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

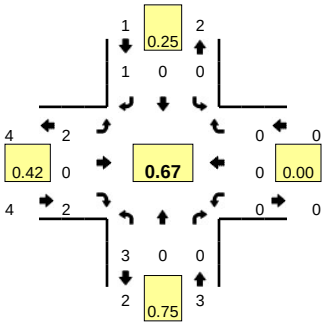
Method for determining peak hour: Total Entering Volume

LOCATION: 48th St NW -- Northern Parking Lot

CITY/STATE: Washington, DC

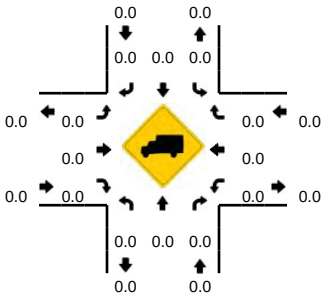
QC JOB #: 13931832

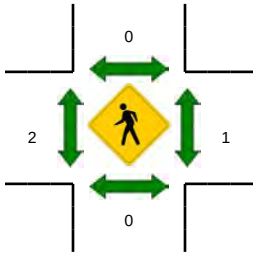
DATE: Tue, Oct 18 2016

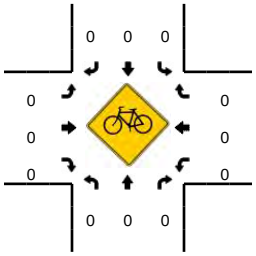


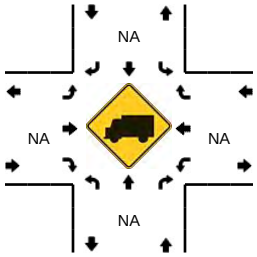
Peak-Hour: 4:00 PM -- 5:00 PM

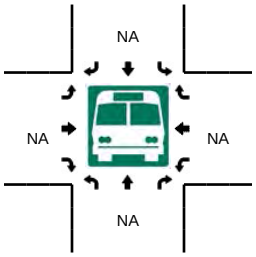
Peak 15-Min: 4:00 PM -- 4:15 PM











15-Min Count Period Beginning At	48th St NW (Northbound)				48th St NW (Southbound)				Northern Parking Lot (Eastbound)				Northern Parking Lot (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	3	
4:15 PM	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	3	
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:45 PM	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	8
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
5:15 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	4
5:30 PM	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	3	7
5:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	6
6:00 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	7
6:15 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	6
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	0	0	0	0	0	0	0	4	0	4	0	0	0	0	0	12
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				8				0			8
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Dwy -- Yuma St NW

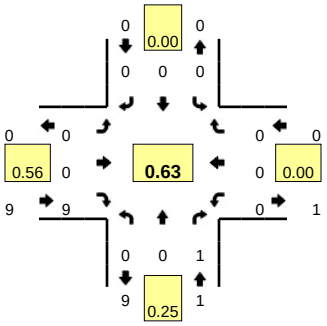
CITY/STATE: Washington, DC

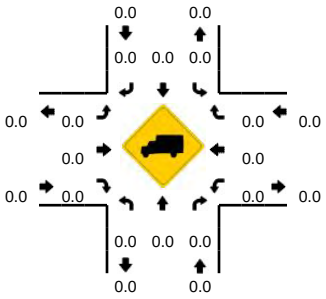
QC JOB #: 13931833

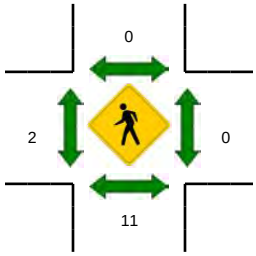
DATE: Tue, Oct 18 2016

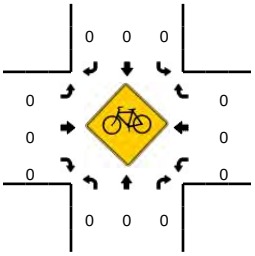
Peak-Hour: 8:00 AM -- 9:00 AM

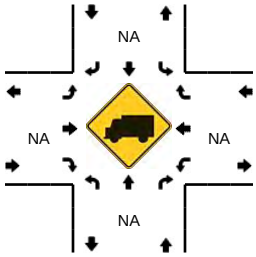
Peak 15-Min: 8:45 AM -- 9:00 AM

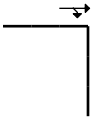


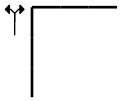


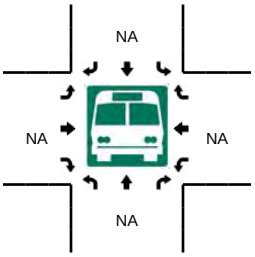












15-Min Count Period Beginning At	Dwy (Northbound)				Dwy (Southbound)				Yuma St NW (Eastbound)				Yuma St NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:00 AM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	
7:15 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3
7:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	4
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
8:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	3
8:15 AM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	4
8:30 AM	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	3	6
8:45 AM	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4	10
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
9:15 AM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	9

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	16
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		24				0				0				0			24
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

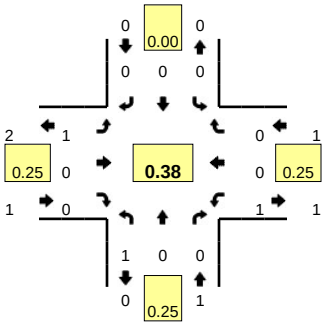
Type of peak hour being reported: Intersection Peak

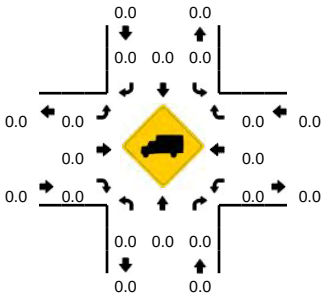
Method for determining peak hour: Total Entering Volume

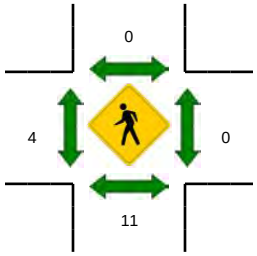
LOCATION: Dwy -- Yuma St NW
CITY/STATE: Washington, DC

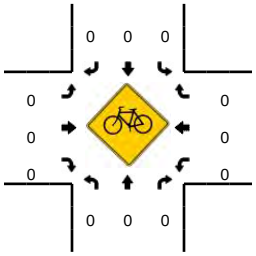
QC JOB #: 13931834
DATE: Tue, Oct 18 2016

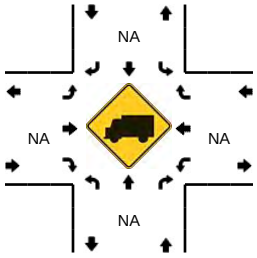
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:30 PM -- 5:45 PM

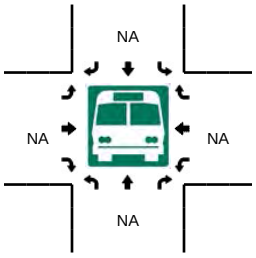












15-Min Count Period Beginning At	Dwy (Northbound)				Dwy (Southbound)				Yuma St NW (Eastbound)				Yuma St NW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:30 PM	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	3
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	8
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		8				0				8				0			16
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

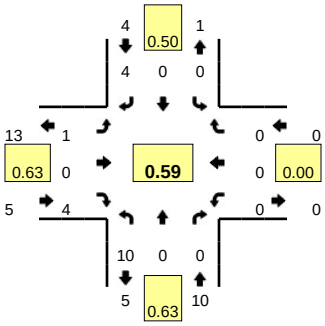
Type of peak hour being reported: Intersection Peak

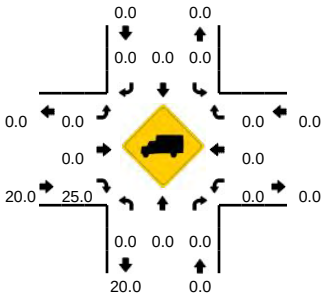
Method for determining peak hour: Total Entering Volume

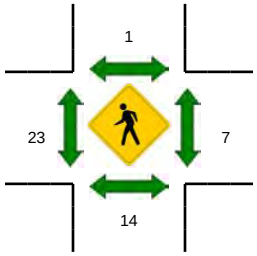
LOCATION: 48th St NW -- Alley
CITY/STATE: Washington, DC

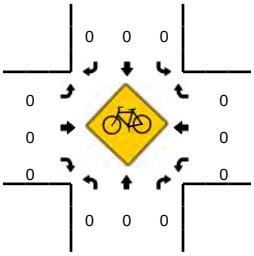
QC JOB #: 13931835
DATE: Tue, Oct 18 2016

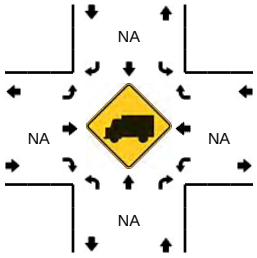
Peak-Hour: 8:30 AM -- 9:30 AM
Peak 15-Min: 8:30 AM -- 8:45 AM

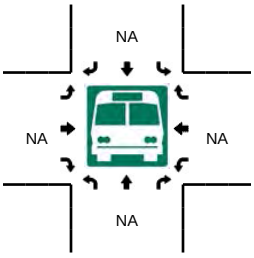












15-Min Count Period Beginning At	48th St NW (Northbound)				48th St NW (Southbound)				Alley (Eastbound)				Alley (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	4	
6:45 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
7:30 AM	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2	3
7:45 AM	3	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	5	7
8:00 AM	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	10
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
8:30 AM	3	0	0	1	0	0	2	0	0	0	2	0	0	0	0	0	8	16
8:45 AM	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	3	14
9:00 AM	3	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	5	16
9:15 AM	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	19

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	0	0	4	0	0	8	0	0	0	8	0	0	0	0	0	32
Heavy Trucks	0	0	0		0	0	0		0	0	4		0	0	0		4
Pedestrians		12				0				12				4			28
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

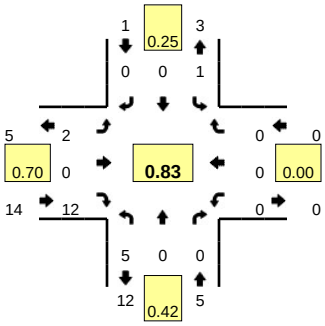
Type of peak hour being reported: Intersection Peak

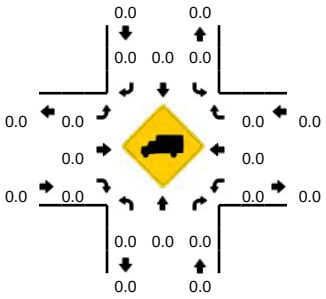
Method for determining peak hour: Total Entering Volume

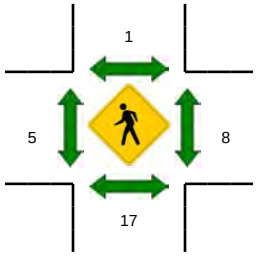
LOCATION: 48th St NW -- Alley
CITY/STATE: Washington, DC

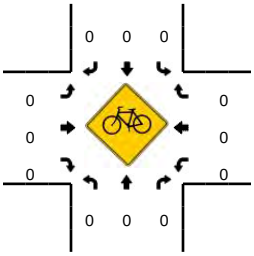
QC JOB #: 13931836
DATE: Tue, Oct 18 2016

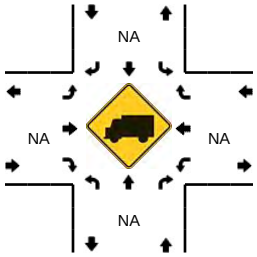
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 4:45 PM -- 5:00 PM

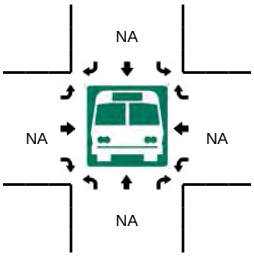












15-Min Count Period Beginning At	48th St NW (Northbound)				48th St NW (Southbound)				Alley (Eastbound)				Alley (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	2	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	4	
4:15 PM	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	
4:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	
4:45 PM	1	0	0	0	0	0	0	0	1	0	4	0	0	0	0	0	6	13
5:00 PM	0	0	0	0	0	0	0	1	0	0	5	0	0	0	0	0	6	15
5:15 PM	3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	4	17
5:30 PM	1	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	4	20
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
6:00 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	9
6:15 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	7
6:30 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	5
6:45 PM	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2	7

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	0	0	0	0	0	0	0	4	0	16	0	0	0	0	0	24
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		4				4				0				4			12
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:50 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

G: Background Growth Volume Graphics

Inherent Background Growth Volumes (2021)

(#) Study Intersection

→ Turning Movement

1234/5678 AM / PM Peak Hour Volume

1

Massachusetts Ave: ← 64/6, 0/0 ↙
50th St: 6/87 →, 0/0 ↘
Massachusetts Ave: 0/0 ↖, 0/0 ↑

2

Yuma St: 0/0 ↖, 78/6 ↓
Massachusetts Ave: 0/0 ↑, 0/0 ↓
Massachusetts Ave: 0/0 ↑, 9/89 ↑

3

Massachusetts Ave: 26/9 ↓
Massachusetts Ave: 0/0 ↑, 0/0 ↓
Yuma St: 5/79 ↑

4

Massachusetts Ave: 0/0 ↖, 0/1 ↓, 0/0 ↗
49th St: 0/0 ↑, 56/5 ←, 0/0 ↓
49th St: 0/0 ↖, 5/76 →, 0/0 ↓
Massachusetts Ave: 0/0 ↑, 1/0 ↑, 0/0 ↑

5

Massachusetts Ave: 0/0 ↖
Alley: 0/0 ↑, 65/6 ←
Massachusetts Ave: 5/80 →

6

Massachusetts Ave: 0/0 ↖, 0/0 ↓, 0/0 ↗
48th St: 0/0 ↑, 64/5 ←, 0/0 ↓
Fordham Rd: 0/0 ↖, 5/78 →, 0/0 ↓
Massachusetts Ave: 0/0 ↑, 0/0 ↑, 0/0 ↑

7

Van Ness St: 0/0 ↖, 5/86 ↓
Massachusetts Ave: 0/1 ↑, 0/0 ↓, 0/0 ↓
Massachusetts Ave: 0/0 ↖, 0/0 ↓
Van Ness St: 0/0 ↑, 4/57 ↑

8

Yuma St: 0/0 ↖, 1/0 ↓, 0/0 ↗
49th St: 0/0 ↑, 0/0 ←, 0/0 ↓
49th St
Yuma St: 0/0 ↑, 0/2 ↑, 0/0 ↑

9

Yuma St: ← 0/1, 0/0 ↙
Alley: 1/0 →, 0/0 ↘
Yuma St: 0/0 ↖, 0/0 ↑

10

Yuma St: 0/0 ↖, 0/0 ↓, 0/0 ↗
48th St: 0/0 ↑, 0/1 ←, 0/0 ↓
48th St: 0/0 ↖, 0/0 →, 0/0 ↓
Yuma St: 0/0 ↑, 0/0 ↑, 0/0 ↑

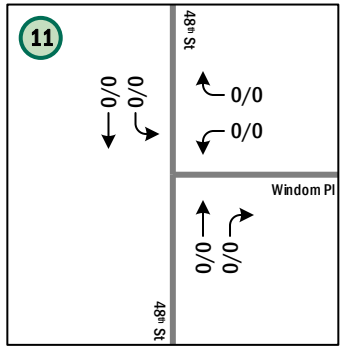
Inherent Background Growth Volumes (2021)

(#) Study Intersection

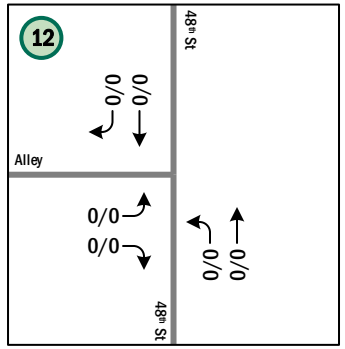
→ Turning Movement

1234/5678 AM / PM Peak Hour Volume

11



12



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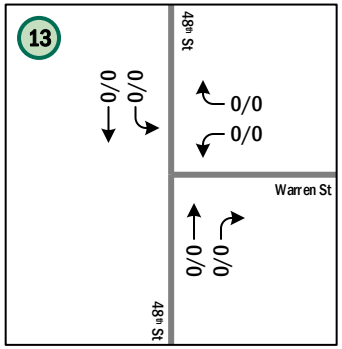

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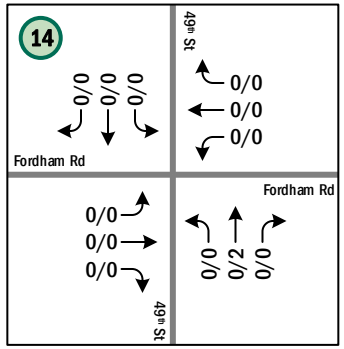

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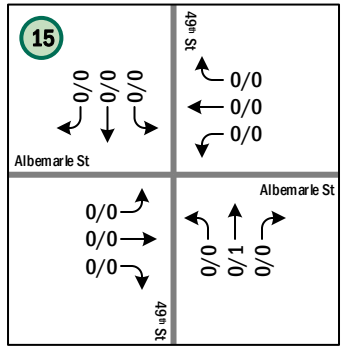

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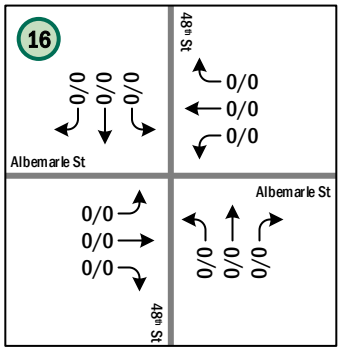

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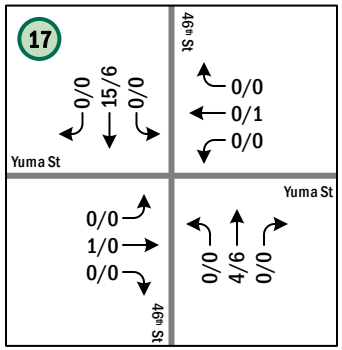

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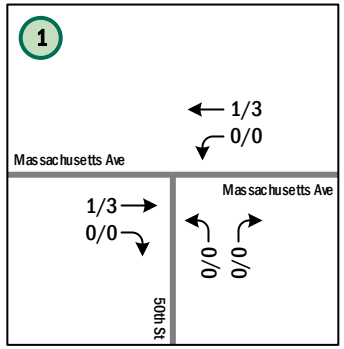
Intentionally Left Blank

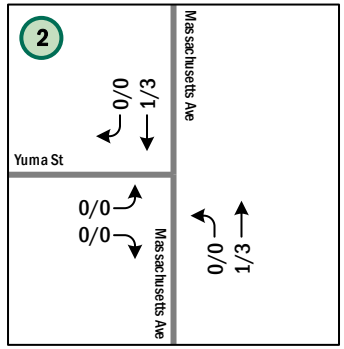
Intentionally Left Blank

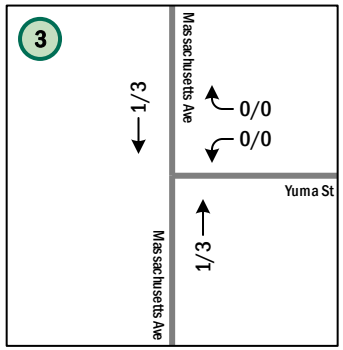
H: Background Development Volume Graphics

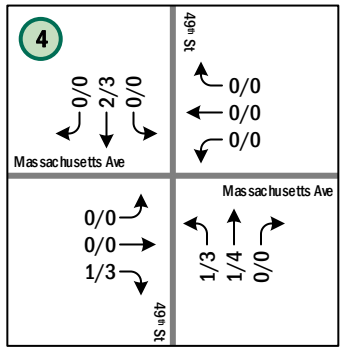
Spring Valley Expansion Volumes (2021)

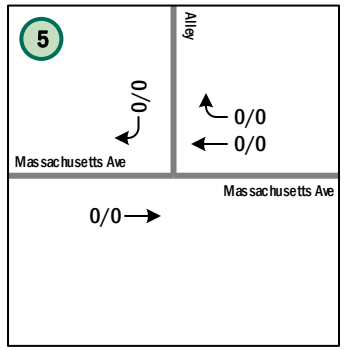
- (#) Study Intersection
- → Turning Movement
- 1234/5678 AM / PM Peak Hour Volume

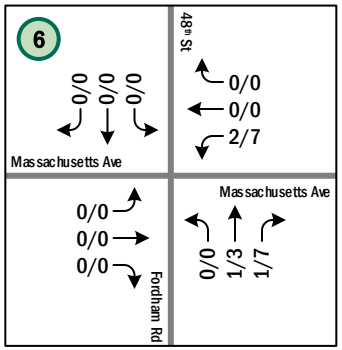


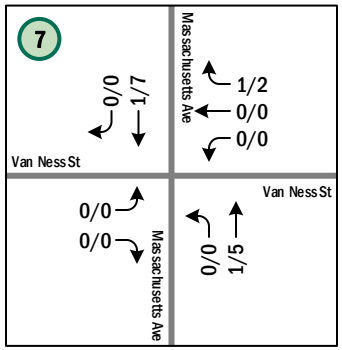


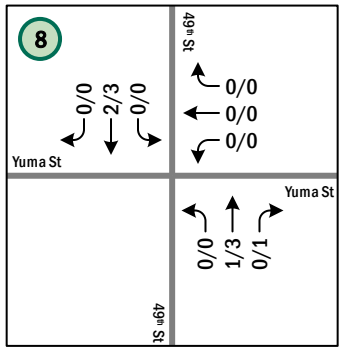


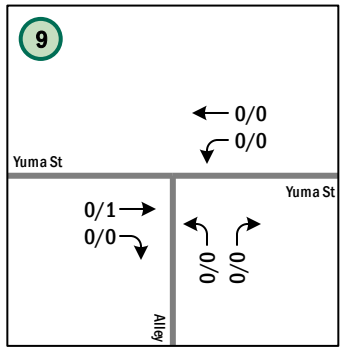


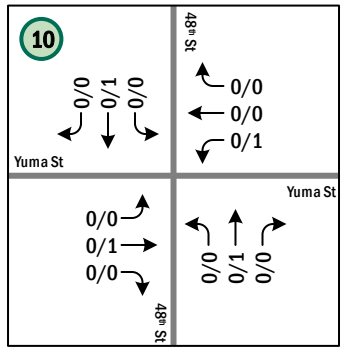










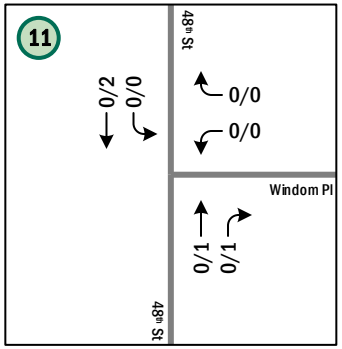


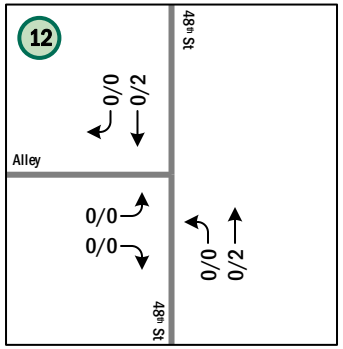
Spring Valley Expansion Volumes (2021)

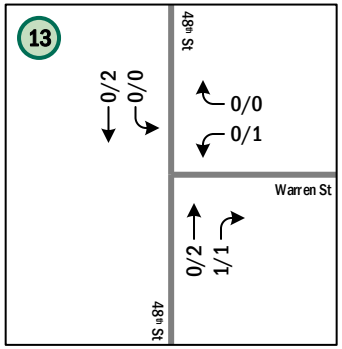
(#) Study Intersection

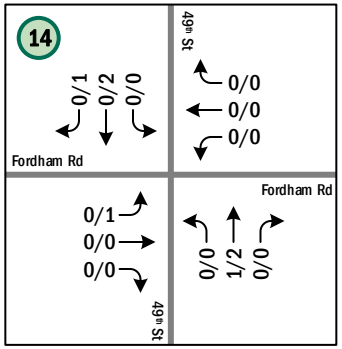
→ Turning Movement

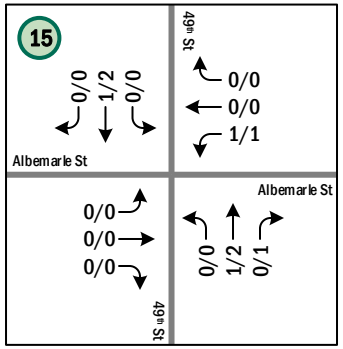
1234/5678 AM / PM Peak Hour Volume

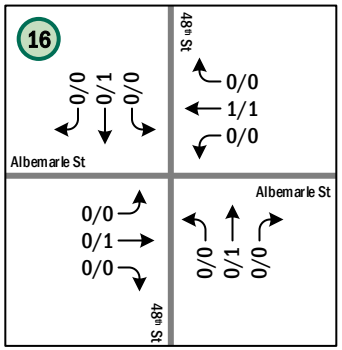


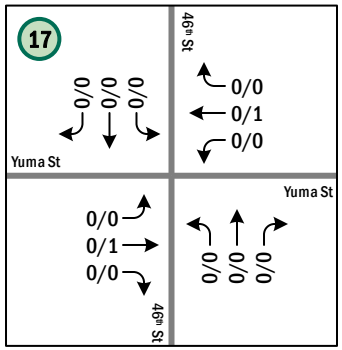












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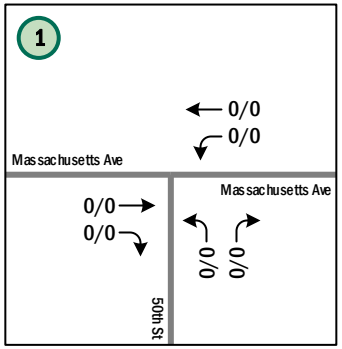
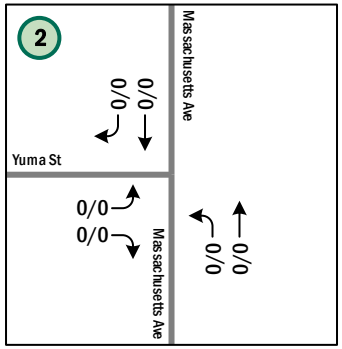
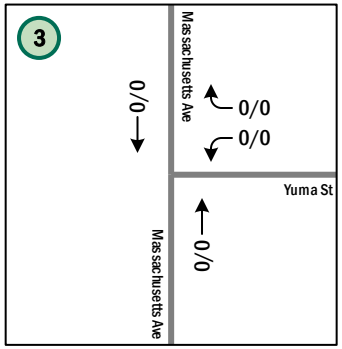
I: Rerouted Existing American University Trips Volume Graphics

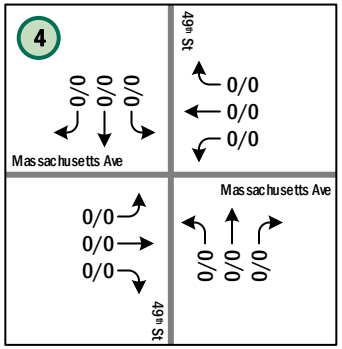
AU Reroute Volumes (2021)

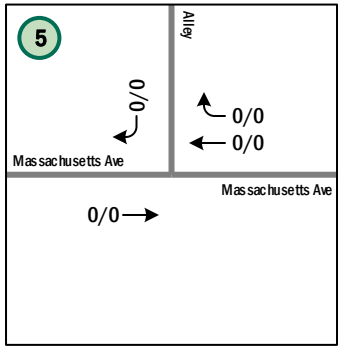
- (#) Study Intersection
- → Turning Movement
- 1234/5678 AM / PM Peak Hour Volume

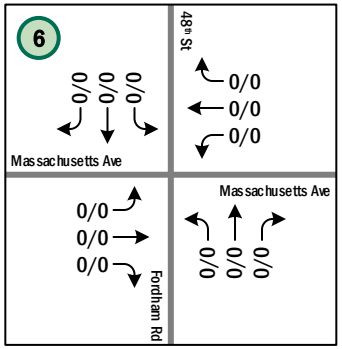


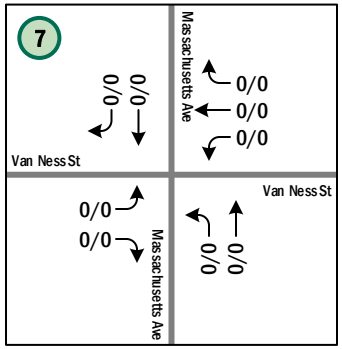


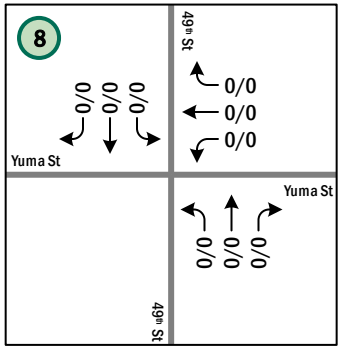


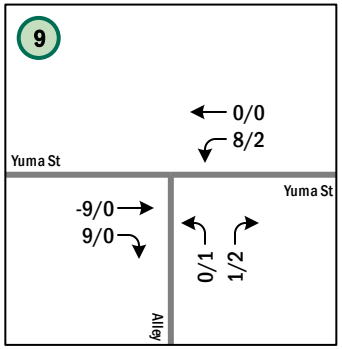


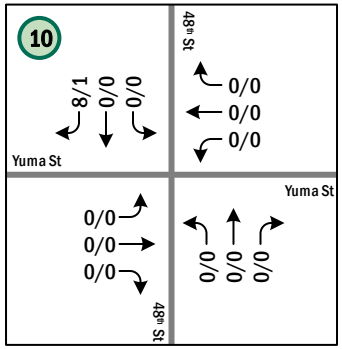










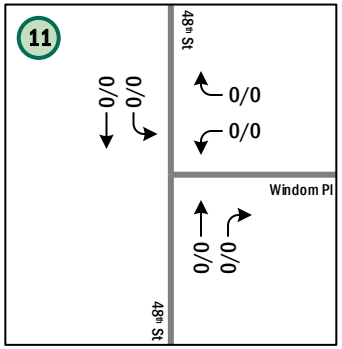


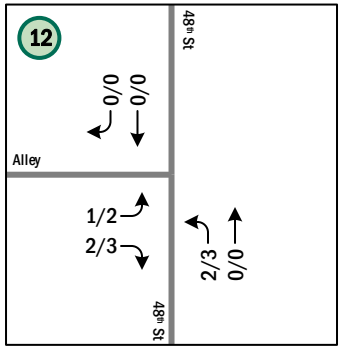
AU Reroute Volumes (2021)

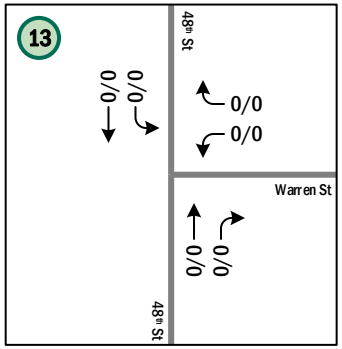
(#) Study Intersection

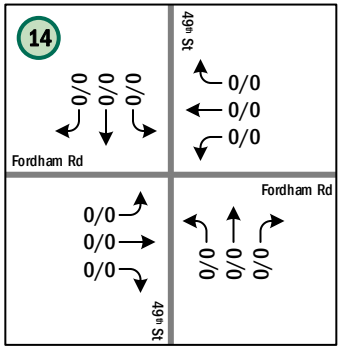
→ Turning Movement

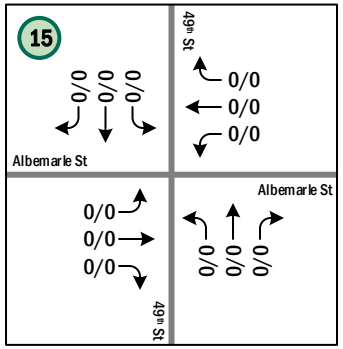
1234/5678 AM / PM Peak Hour Volume

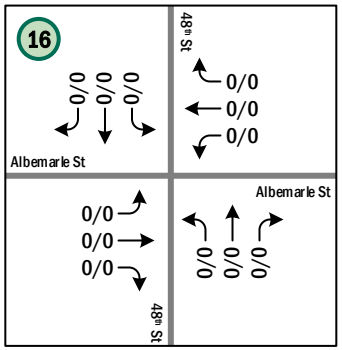


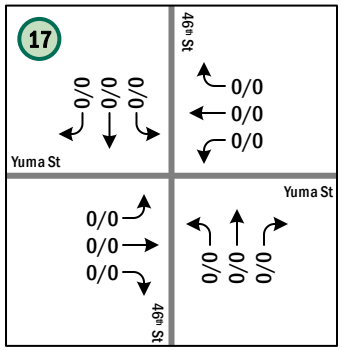












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J: Vehicular Level of Service Definitions

All capacity analyses are based on the procedures specified by the Transportation Research Board, Special Report 209: Highway Capacity Manual (HCM), 2000. Levels of service (LOS) range from A to F. A brief description of each level of service for signalized and unsignalized intersections is provided below.

Signalized Intersections

Level of service is based upon the traffic volume present in each lane on the roadway, the capacity of each lane at the intersection and the delay associated with each directional movement. The levels of service for signalized intersections are defined below:

- **LOS A** describes operations with very low average delay per vehicle, i.e., less than 10.0 seconds. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop. Short signal cycle lengths may also contribute to low delay.

- **LOS B** describes operations with average delay in the range of 10.1 to 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.

- **LOS C** describes operations with delay in the range of 20.1 to 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level although many still pass through the intersection without stopping. This is generally considered the lower end of the range of the acceptable level of service in rural areas.

- **LOS D** describes operations with delay in the range of 35.1 to 55.0 seconds per vehicle. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, and/or high traffic volumes as compared to the roadway capacity. Many vehicles are required to stop and the number of vehicles that do not have to stop declines. Individual signal cycle failures, where all waiting vehicles do not clear the intersection during a single green time, are noticeable. This is generally considered the lower end of the range of the acceptable level of service in urban areas.

- **LOS E** describes operations with delay in the range of 55.1 to 80.0 seconds per vehicle. These higher delay values generally indicate poor progression, long cycle lengths, and high traffic volumes. Individual cycle failures are frequent occurrences. LOS E has been set as the limit of acceptable conditions.

- **LOS F** describes operations with average delay in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over-saturation, i.e., when traffic arrives at a flow rate that exceeds the capacity of the intersection. It may also occur at high volumes with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such delays.

Unsignalized Intersections

At an unsignalized intersection, the major street through traffic and right turns are assumed to operate unimpeded and therefore receive no level of service rating. The level of service for the minor street and the major street left turn traffic is dependent on the volume and capacity of the available lanes, and, the number and frequency of acceptable gaps in the major street traffic to make a conflicting turn.

The level of service grade is provided for each conflicting movement at an unsignalized intersection and is based on the total average delay experienced by each vehicle. The delay includes the time it takes a vehicle to move from the back of a queue through the intersection.

The unsignalized intersection level of service analysis does not account for variations in driver behavior or the effects of nearby traffic signals. Therefore, the results from this analysis usually indicate worse levels of service than may be experienced in the field. The unsignalized intersection level of service descriptions are provided below:

- **LOS A** describes operations where there is very little to no conflicting traffic for a minor side street movement, i.e., an average total delay of less than 10.0 seconds per vehicle.
- **LOS B** describes operations with average total delay in the range of 10.1 to 15.0 seconds per vehicle.
- **LOS C** describes operations with average total delay in the range of 15.1 to 25.0 second per vehicle.
- **LOS D** describes operations with average total delay in the range of 25.1 to 35.0 seconds per vehicle.
- **LOS E** describes operations with average total delay in the range of 35.1 to 50.0 seconds per vehicle.
- **LOS F** describes operations with average total delay of 50 seconds per vehicle. LOS F exists when there are insufficient gaps of suitable size to allow a side street demand to cross safely through or enter a major street traffic stream. This level of service is generally evident from extremely long total delays experienced by side street traffic and by queuing on the minor approaches. It is important to note that LOS F may not always result in long queues but may result in adjustments to normal driver behavior.

K: Existing Vehicular Capacity and Queuing Analysis Worksheets

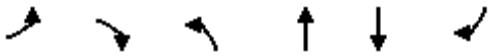
Queues
1: 50th St & Massachusetts Ave

Lane Group	NBL	SET	NWT
Lane Group Flow (vph)	35	1484	657
v/c Ratio	0.11	0.75	0.51
Control Delay	33.2	19.1	12.2
Queue Delay	0.0	0.0	0.0
Total Delay	33.2	19.1	12.2
Queue Length 50th (ft)	18	348	221
Queue Length 95th (ft)	42	437	236
Internal Link Dist (ft)	174	579	255
Turn Bay Length (ft)			
Base Capacity (vph)	321	1979	1291
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.11	0.75	0.51

Intersection Summary

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Volume (vph)	28	2	1287	78	5	619
Future Volume (vph)	28	2	1287	78	5	619
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		6.0			6.0
Lane Util. Factor	1.00		0.95			1.00
Frpb, ped/bikes	1.00		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.99		0.99			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	1683		3466			1860
Flt Permitted	0.95		1.00			0.99
Satd. Flow (perm)	1683		3466			1844
Peak-hour factor, PHF	0.85	0.85	0.92	0.92	0.95	0.95
Adj. Flow (vph)	33	2	1399	85	5	652
RTOR Reduction (vph)	2	0	4	0	0	0
Lane Group Flow (vph)	33	0	1480	0	0	657
Confl. Peds. (#/hr)	1			9	9	
Heavy Vehicles (%)	7%	2%	3%	3%	20%	2%
Turn Type	Perm		NA		pm+pt	NA
Protected Phases			6		5	2
Permitted Phases	4				2	
Actuated Green, G (s)	19.0		57.0			70.0
Effective Green, g (s)	19.0		57.0			70.0
Actuated g/C Ratio	0.19		0.57			0.70
Clearance Time (s)	5.0		6.0			6.0
Lane Grp Cap (vph)	319		1975			1291
v/s Ratio Prot			c0.43			c0.04
v/s Ratio Perm	c0.02					0.32
v/c Ratio	0.10		0.75			0.51
Uniform Delay, d1	33.5		16.1			7.0
Progression Factor	1.00		1.00			1.50
Incremental Delay, d2	0.7		2.7			1.4
Delay (s)	34.1		18.8			11.8
Level of Service	C		B			B
Approach Delay (s)	34.1		18.8			11.8
Approach LOS	C		B			B

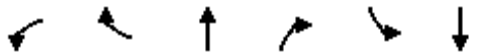
Intersection Summary			
HCM 2000 Control Delay	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	53.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	24	59	658	1257	5
Future Volume (Veh/h)	1	24	59	658	1257	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.97	0.97	0.96	0.96
Hourly flow rate (vph)	1	28	61	678	1309	5
Pedestrians	8					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				343	335	
pX, platoon unblocked	0.77	0.68	0.68			
vC, conflicting volume	2120	665	1322			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1165	0	536			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	96	91			
cM capacity (veh/h)	130	733	690			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	29	739	873	441
Volume Left	1	61	0	0
Volume Right	28	0	0	5
cSH	632	690	1700	1700
Volume to Capacity	0.05	0.09	0.51	0.26
Queue Length 95th (ft)	4	7	0	0
Control Delay (s)	11.0	2.3	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	11.0	2.3	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	77	640	0	0	1281
Future Volume (Veh/h)	1	77	640	0	0	1281
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.97	0.97	0.96	0.96
Hourly flow rate (vph)	1	91	660	0	0	1334
Pedestrians	11		13			
Lane Width (ft)	12.0		12.0			
Walking Speed (ft/s)	3.5		3.5			
Percent Blockage	1		1			
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			248			430
pX, platoon unblocked	0.74	0.89			0.89	
vC, conflicting volume	1351	341			671	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	97	16			386	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	90			100	
cM capacity (veh/h)	642	934			1031	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	1	91	330	330	667	667
Volume Left	1	0	0	0	0	0
Volume Right	0	91	0	0	0	0
cSH	642	934	1700	1700	1700	1700
Volume to Capacity	0.00	0.10	0.19	0.19	0.39	0.39
Queue Length 95th (ft)	0	8	0	0	0	0
Control Delay (s)	10.6	9.3	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	9.3		0.0		0.0	
Approach LOS	A					

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	NBL	NBT	SBL	SBT	SET	NWT
Lane Group Flow (vph)	84	86	33	36	1369	619
v/c Ratio	0.30	0.22	0.12	0.09	0.77	0.45
Control Delay	36.8	32.6	33.5	30.0	13.9	20.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.8	32.6	33.5	30.0	13.9	20.1
Queue Length 50th (ft)	45	43	17	17	106	115
Queue Length 95th (ft)	84	81	42	41	177	186
Internal Link Dist (ft)		489		90	168	265
Turn Bay Length (ft)						
Base Capacity (vph)	280	384	270	379	1785	1375
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.22	0.12	0.09	0.77	0.45

Intersection Summary

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	71	66	7	28	27	3	142	1094	78	23	540	31
Future Volume (vph)	71	66	7	28	27	3	142	1094	78	23	540	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Flpb, ped/bikes	0.98	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			1.00	
Satd. Flow (prot)	1726	1812		1747	1793			3433			3438	
Flt Permitted	0.73	1.00		0.70	1.00			0.70			0.86	
Satd. Flow (perm)	1333	1812		1290	1793			2401			2952	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	84	78	8	33	32	4	148	1140	81	24	562	32
RTOR Reduction (vph)	0	4	0	0	3	0	0	5	0	0	4	0
Lane Group Flow (vph)	84	82	0	33	33	0	0	1364	0	0	615	0
Confl. Peds. (#/hr)	18		10	10		18	11		21	21		11
Heavy Vehicles (%)	2%	2%	14%	2%	4%	2%	2%	3%	5%	4%	2%	32%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			4		5	2			6	
Permitted Phases	4			4			2			6		
Actuated Green, G (s)	21.0	21.0		21.0	21.0			67.5			46.5	
Effective Green, g (s)	21.0	21.0		21.0	21.0			67.5			46.5	
Actuated g/C Ratio	0.21	0.21		0.21	0.21			0.68			0.46	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Grp Cap (vph)	279	380		270	376			1785			1372	
v/s Ratio Prot		0.05			0.02			c0.12				
v/s Ratio Perm	c0.06			0.03				c0.39			0.21	
v/c Ratio	0.30	0.22		0.12	0.09			0.76			0.45	
Uniform Delay, d1	33.3	32.7		32.0	31.8			10.9			18.1	
Progression Factor	1.00	1.00		1.00	1.00			1.24			1.05	
Incremental Delay, d2	2.8	1.3		0.9	0.5			2.2			1.0	
Delay (s)	36.1	34.0		33.0	32.2			15.8			20.0	
Level of Service	D	C		C	C			B			C	
Approach Delay (s)		35.0			32.6			15.8			20.0	
Approach LOS		D			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	0	1092	620	3	0	2
Future Volume (Veh/h)	0	1092	620	3	0	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.94	0.94	0.85	0.85
Hourly flow rate (vph)	0	1213	660	3	0	2
Pedestrians					34	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					3.5	
Percent Blockage					3	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		345	417			
pX, platoon unblocked	0.93				0.83	0.93
vC, conflicting volume	697				1302	366
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	515				568	157
tC, single (s)	4.1				6.9	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	939				362	772

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	SW 1
Volume Total	606	606	440	223	2
Volume Left	0	0	0	0	0
Volume Right	0	0	0	3	2
cSH	1700	1700	1700	1700	772
Volume to Capacity	0.36	0.36	0.26	0.13	0.00
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	9.7
Lane LOS					A
Approach Delay (s)	0.0		0.0		9.7
Approach LOS					A

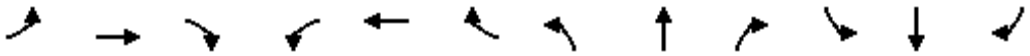
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	33.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	SET	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	1213	718	32	89	33	49
v/c Ratio	0.62	0.35	0.10	0.19	0.13	0.12
Control Delay	9.1	8.9	29.7	14.9	30.3	14.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.1	8.9	29.7	14.9	30.3	14.5
Queue Length 50th (ft)	147	101	16	17	16	7
Queue Length 95th (ft)	355	131	38	51	40	33
Internal Link Dist (ft)	337	584		513		115
Turn Bay Length (ft)						
Base Capacity (vph)	1963	2032	318	467	263	426
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.35	0.10	0.19	0.13	0.12

Intersection Summary

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	53	1020	6	15	610	14	27	30	46	28	13	29
Future Volume (vph)	53	1020	6	15	610	14	27	30	46	28	13	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0		5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00		1.00	0.99		1.00	0.94	
Flpb, ped/bikes		1.00			1.00		0.93	1.00		1.00	1.00	
Frt		1.00			1.00		1.00	0.91		1.00	0.90	
Flt Protected		1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3522			3478		1635	1676		1404	1574	
Flt Permitted		0.87			0.91		0.73	1.00		0.70	1.00	
Satd. Flow (perm)		3067			3172		1248	1676		1033	1574	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	60	1146	7	17	685	16	32	35	54	33	15	34
RTOR Reduction (vph)	0	0	0	0	1	0	0	40	0	0	25	0
Lane Group Flow (vph)	0	1213	0	0	717	0	32	49	0	33	24	0
Confl. Peds. (#/hr)	31		10	10		31	43		3	3		43
Heavy Vehicles (%)	2%	2%	2%	2%	3%	7%	3%	2%	2%	28%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		64.0			64.0		25.5	25.5		25.5	25.5	
Effective Green, g (s)		64.0			64.0		25.5	25.5		25.5	25.5	
Actuated g/C Ratio		0.64			0.64		0.26	0.26		0.26	0.26	
Clearance Time (s)		5.0			5.0		5.5	5.5		5.5	5.5	
Lane Grp Cap (vph)		1962			2030		318	427		263	401	
v/s Ratio Prot								0.03			0.02	
v/s Ratio Perm		c0.40			0.23		0.03			c0.03		
v/c Ratio		0.62			0.35		0.10	0.11		0.13	0.06	
Uniform Delay, d1		10.7			8.4		28.5	28.6		28.7	28.2	
Progression Factor		0.74			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.0			0.5		0.6	0.5		1.0	0.3	
Delay (s)		8.9			8.9		29.1	29.1		29.6	28.5	
Level of Service		A			A		C	C		C	C	
Approach Delay (s)		8.9			8.9			29.1			28.9	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	14	0	18	98	10	547	0	0	1089	7
Future Volume (Veh/h)	1	0	14	0	18	98	10	547	0	0	1089	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.91	0.91	0.91	0.93	0.93	0.93
Hourly flow rate (vph)	1	0	16	0	21	115	11	601	0	0	1171	8
Pedestrians		19			15							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		3.5			3.5							
Percent Blockage		2			1							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											664	
pX, platoon unblocked	0.82	0.82	0.82	0.82	0.82		0.82					
vC, conflicting volume	1642	1832	608	1240	1836	316	1198			616		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1342	1574	79	850	1579	316	799			616		
tC, single (s)	7.5	6.5	7.2	7.5	6.7	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.1	3.3	2.2			2.2		
p0 queue free %	98	100	98	100	73	83	98			100		
cM capacity (veh/h)	56	85	746	193	77	671	659			946		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	17	21	115	211	401	781	398
Volume Left	1	0	0	11	0	0	0
Volume Right	16	0	115	0	0	0	8
cSH	433	77	671	659	1700	1700	1700
Volume to Capacity	0.04	0.27	0.17	0.02	0.24	0.46	0.23
Queue Length 95th (ft)	3	25	15	1	0	0	0
Control Delay (s)	13.7	68.0	11.5	0.7	0.0	0.0	0.0
Lane LOS	B	F	B	A			
Approach Delay (s)	13.7	20.2		0.3		0.0	
Approach LOS	B	C					

Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	40.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	18	50	6	10	97	121	8	35	13
Future Volume (Veh/h)	0	0	0	18	50	6	10	97	121	8	35	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	0	0	20	54	7	12	114	142	9	41	15
Pedestrians		6			13			10			2	
Lane Width (ft)		0.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		0			1			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								170				
pX, platoon unblocked	0.97	0.97		0.97	0.97	0.97				0.97		
vC, conflicting volume	318	366	64	298	302	200	62			269		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	279	328	64	259	263	158	62			229		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	97	91	99	99			99		
cM capacity (veh/h)	589	556	990	644	605	848	1541			1281		

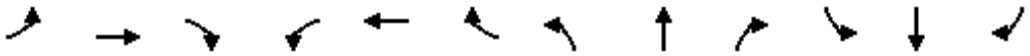
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	81	268	65
Volume Left	20	12	9
Volume Right	7	142	15
cSH	630	1541	1281
Volume to Capacity	0.13	0.01	0.01
Queue Length 95th (ft)	11	1	1
Control Delay (s)	11.6	0.4	1.1
Lane LOS	B	A	A
Approach Delay (s)	11.6	0.4	1.1
Approach LOS	B		

Intersection Summary				
Average Delay	2.7			
Intersection Capacity Utilization	32.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	131	2	2	84	1	5
Future Volume (Veh/h)	131	2	2	84	1	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.93	0.93	0.85	0.85
Hourly flow rate (vph)	154	2	2	90	1	6
Pedestrians	5			3	5	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			161		259	163
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			161		259	163
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1411		722	875

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	156	92	7
Volume Left	0	2	1
Volume Right	2	0	6
cSH	1700	1411	849
Volume to Capacity	0.09	0.00	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.2	9.3
Lane LOS		A	A
Approach Delay (s)	0.0	0.2	9.3
Approach LOS			A

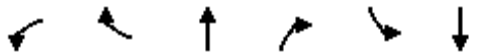
Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	18.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	2	94	31	8	74	1	7	8	5	8	18	4
Future Volume (vph)	2	94	31	8	74	1	7	8	5	8	18	4
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.88	0.88	0.88	0.85	0.85	0.85
Hourly flow rate (vph)	2	111	36	9	87	1	8	9	6	9	21	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	149	97	23	35
Volume Left (vph)	2	9	8	9
Volume Right (vph)	36	1	6	5
Hadj (s)	-0.03	0.05	-0.05	0.00
Departure Headway (s)	4.1	4.2	4.4	4.5
Degree Utilization, x	0.17	0.11	0.03	0.04
Capacity (veh/h)	857	832	761	751
Control Delay (s)	7.9	7.8	7.6	7.7
Approach Delay (s)	7.9	7.8	7.6	7.7
Approach LOS	A	A	A	A

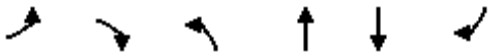
Intersection Summary				
Delay	7.8			
Level of Service	A			
Intersection Capacity Utilization	19.9%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	4	17	1	0	65
Future Volume (Veh/h)	3	4	17	1	0	65
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	4	5	20	1	0	76
Pedestrians	8					1
Lane Width (ft)	12.0					12.0
Walking Speed (ft/s)	3.5					3.5
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	104	30			29	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	104	30			29	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	887	1036			1559	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	9	21	76
Volume Left	4	0	0
Volume Right	5	1	0
cSH	964	1700	1559
Volume to Capacity	0.01	0.01	0.00
Queue Length 95th (ft)	1	0	0
Control Delay (s)	8.8	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.8	0.0	0.0
Approach LOS	A		

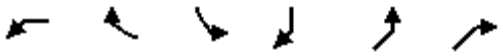
Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	16.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	4	10	19	60	4
Future Volume (Veh/h)	1	4	10	19	60	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	1	5	12	22	71	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	120	74	76			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	120	74	76			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	99			
cM capacity (veh/h)	869	988	1523			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	6	34	76
Volume Left	1	12	0
Volume Right	5	0	5
cSH	966	1523	1700
Volume to Capacity	0.01	0.01	0.04
Queue Length 95th (ft)	0	1	0
Control Delay (s)	8.7	2.6	0.0
Lane LOS	A	A	
Approach Delay (s)	8.7	2.6	0.0
Approach LOS	A		

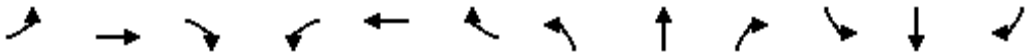
Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	18.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	10	5	1	59	26	74
Future Volume (Veh/h)	10	5	1	59	26	74
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	12	6	1	69	31	87
Pedestrians	4		18		5	
Lane Width (ft)	12.0		12.0		12.0	
Walking Speed (ft/s)	3.5		3.5		3.5	
Percent Blockage	0		2		0	
Right turn flare (veh)						
Median type			None		None	
Median storage veh)						
Upstream signal (ft)					195	
pX, platoon unblocked						
vC, conflicting volume	154	96	122			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	154	96	122			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	100			
cM capacity (veh/h)	829	940	1460			

Direction, Lane #	WB 1	SB 1	NE 1
Volume Total	18	70	118
Volume Left	12	1	0
Volume Right	6	0	87
cSH	863	1460	1700
Volume to Capacity	0.02	0.00	0.07
Queue Length 95th (ft)	2	0	0
Control Delay (s)	9.3	0.1	0.0
Lane LOS	A	A	
Approach Delay (s)	9.3	0.1	0.0
Approach LOS	A		

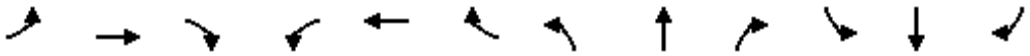
Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	30.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	31	26	2	10	9	30	6	87	13	37	19	26
Future Volume (vph)	31	26	2	10	9	30	6	87	13	37	19	26
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	36	31	2	12	11	35	7	102	15	44	22	31

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	69	58	124	97
Volume Left (vph)	36	12	7	44
Volume Right (vph)	2	35	15	31
Hadj (s)	0.12	-0.28	-0.03	0.03
Departure Headway (s)	4.6	4.2	4.3	4.4
Degree Utilization, x	0.09	0.07	0.15	0.12
Capacity (veh/h)	744	798	809	786
Control Delay (s)	8.0	7.5	8.0	7.9
Approach Delay (s)	8.0	7.5	8.0	7.9
Approach LOS	A	A	A	A

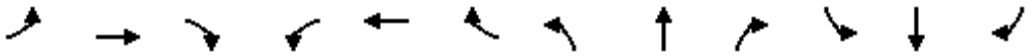
Intersection Summary				
Delay	7.9			
Level of Service	A			
Intersection Capacity Utilization	27.0%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	5	0	26	54	2	6	40	45	8	18	4
Future Volume (vph)	0	5	0	26	54	2	6	40	45	8	18	4
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	6	0	31	64	2	7	47	53	9	21	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	6	97	107	35
Volume Left (vph)	0	31	7	9
Volume Right (vph)	0	2	53	5
Hadj (s)	0.03	0.09	-0.24	0.03
Departure Headway (s)	4.3	4.3	3.9	4.3
Degree Utilization, x	0.01	0.12	0.12	0.04
Capacity (veh/h)	793	811	884	815
Control Delay (s)	7.4	7.8	7.4	7.4
Approach Delay (s)	7.4	7.8	7.4	7.4
Approach LOS	A	A	A	A

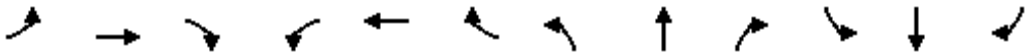
Intersection Summary				
Delay	7.6			
Level of Service	A			
Intersection Capacity Utilization	25.4%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	69	2	11	55	3	3	13	7	10	14	2
Future Volume (vph)	3	69	2	11	55	3	3	13	7	10	14	2
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	4	81	2	13	65	4	4	15	8	12	16	2

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	87	82	27	30
Volume Left (vph)	4	13	4	12
Volume Right (vph)	2	4	8	2
Hadj (s)	0.03	0.04	-0.11	0.07
Departure Headway (s)	4.1	4.1	4.2	4.4
Degree Utilization, x	0.10	0.09	0.03	0.04
Capacity (veh/h)	850	849	816	778
Control Delay (s)	7.6	7.6	7.3	7.5
Approach Delay (s)	7.6	7.6	7.3	7.5
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.5			
Level of Service	A			
Intersection Capacity Utilization	19.8%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	4	108	8	13	68	16	3	79	7	16	162	9
Future Volume (vph)	4	108	8	13	68	16	3	79	7	16	162	9
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.86	0.86	0.86	0.91	0.91	0.91
Hourly flow rate (vph)	5	127	9	15	80	19	3	92	8	18	178	10

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	141	114	103	206
Volume Left (vph)	5	15	3	18
Volume Right (vph)	9	19	8	10
Hadj (s)	0.00	-0.04	0.02	0.02
Departure Headway (s)	4.8	4.8	4.8	4.7
Degree Utilization, x	0.19	0.15	0.14	0.27
Capacity (veh/h)	693	691	695	722
Control Delay (s)	8.9	8.7	8.6	9.4
Approach Delay (s)	8.9	8.7	8.6	9.4
Approach LOS	A	A	A	A

Intersection Summary				
Delay	9.0			
Level of Service	A			
Intersection Capacity Utilization	33.7%	ICU Level of Service	A	
Analysis Period (min)	15			

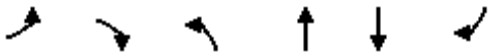
Queues
1: 50th St & Massachusetts Ave

Lane Group	NBL	SET	NWT
Lane Group Flow (vph)	44	910	1235
v/c Ratio	0.14	0.44	0.51
Control Delay	35.3	11.5	3.5
Queue Delay	0.0	0.0	0.0
Total Delay	35.3	11.5	3.5
Queue Length 50th (ft)	23	151	61
Queue Length 95th (ft)	52	194	71
Internal Link Dist (ft)	174	579	255
Turn Bay Length (ft)			
Base Capacity (vph)	318	2088	2405
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.14	0.44	0.51

Intersection Summary

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Volume (vph)	37	1	833	40	3	1146
Future Volume (vph)	37	1	833	40	3	1146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		6.0			6.0
Lane Util. Factor	1.00		0.95			0.95
Frpb, ped/bikes	1.00		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	1.00		0.99			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	1764		3474			3539
Flt Permitted	0.95		1.00			0.95
Satd. Flow (perm)	1764		3474			3376
Peak-hour factor, PHF	0.87	0.87	0.96	0.96	0.93	0.93
Adj. Flow (vph)	43	1	868	42	3	1232
RTOR Reduction (vph)	1	0	4	0	0	0
Lane Group Flow (vph)	43	0	906	0	0	1235
Confl. Peds. (#/hr)	2	5		12	12	
Heavy Vehicles (%)	2%	2%	3%	2%	2%	2%
Turn Type	Perm		NA		pm+pt	NA
Protected Phases			6		5	2
Permitted Phases	4				2	
Actuated Green, G (s)	18.0		60.0			71.0
Effective Green, g (s)	18.0		60.0			71.0
Actuated g/C Ratio	0.18		0.60			0.71
Clearance Time (s)	5.0		6.0			6.0
Lane Grp Cap (vph)	317		2084			2405
v/s Ratio Prot			0.26			c0.03
v/s Ratio Perm	c0.02					c0.34
v/c Ratio	0.14		0.43			0.51
Uniform Delay, d1	34.5		10.8			6.6
Progression Factor	1.00		1.00			0.43
Incremental Delay, d2	0.9		0.7			0.6
Delay (s)	35.4		11.5			3.5
Level of Service	D		B			A
Approach Delay (s)	35.4		11.5			3.5
Approach LOS	D		B			A

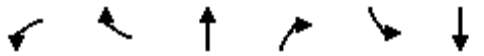
Intersection Summary			
HCM 2000 Control Delay	7.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	55	28	1160	832	3
Future Volume (Veh/h)	5	55	28	1160	832	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.93	0.93	0.96	0.96
Hourly flow rate (vph)	6	61	30	1247	867	3
Pedestrians	13					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				343	335	
pX, platoon unblocked	0.84	0.86	0.86			
vC, conflicting volume	1565	448	883			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	564	39	544			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	93	97			
cM capacity (veh/h)	367	872	869			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	67	446	831	578	292
Volume Left	6	30	0	0	0
Volume Right	61	0	0	0	3
cSH	776	869	1700	1700	1700
Volume to Capacity	0.09	0.03	0.49	0.34	0.17
Queue Length 95th (ft)	7	3	0	0	0
Control Delay (s)	10.1	1.0	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	10.1	0.4		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	98	1090	0	0	887
Future Volume (Veh/h)	0	98	1090	0	0	887
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.93	0.93	0.96	0.96
Hourly flow rate (vph)	0	115	1172	0	0	924
Pedestrians	21					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	2					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			248			430
pX, platoon unblocked	0.84	0.77			0.77	
vC, conflicting volume	1655	607			1193	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	674	0			664	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	86			100	
cM capacity (veh/h)	320	822			698	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	0	115	586	586	462	462
Volume Left	0	0	0	0	0	0
Volume Right	0	115	0	0	0	0
cSH	1700	822	1700	1700	1700	1700
Volume to Capacity	0.00	0.14	0.34	0.34	0.27	0.27
Queue Length 95th (ft)	0	12	0	0	0	0
Control Delay (s)	0.0	10.1	0.0	0.0	0.0	0.0
Lane LOS	A	B				
Approach Delay (s)	10.1		0.0		0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	NBL	NBT	SBL	SBT	SET	NWT
Lane Group Flow (vph)	80	113	45	52	896	1181
v/c Ratio	0.29	0.29	0.18	0.13	0.57	0.67
Control Delay	36.6	35.1	34.6	30.8	9.7	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.6	35.1	34.6	30.8	9.7	12.4
Queue Length 50th (ft)	43	60	24	24	83	269
Queue Length 95th (ft)	87	110	55	57	98	345
Internal Link Dist (ft)		489		90	168	265
Turn Bay Length (ft)						
Base Capacity (vph)	277	385	256	388	1583	1755
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.29	0.18	0.13	0.57	0.67

Intersection Summary

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	74	100	5	41	43	5	87	732	68	29	1014	56
Future Volume (vph)	74	100	5	41	43	5	87	732	68	29	1014	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	0.98	1.00		0.96	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1734	1828		1696	1830			3461			3475	
Flt Permitted	0.72	1.00		0.68	1.00			0.64			0.91	
Satd. Flow (perm)	1320	1828		1222	1830			2220			3155	
Peak-hour factor, PHF	0.93	0.93	0.93	0.92	0.92	0.92	0.99	0.99	0.99	0.93	0.93	0.93
Adj. Flow (vph)	80	108	5	45	47	5	88	739	69	31	1090	60
RTOR Reduction (vph)	0	2	0	0	4	0	0	6	0	0	4	0
Lane Group Flow (vph)	80	111	0	45	48	0	0	890	0	0	1177	0
Confl. Peds. (#/hr)	15		34	34		15	25		16	16		25
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	9%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			4		5	2			6	
Permitted Phases	4			4			2			6		
Actuated Green, G (s)	21.0	21.0		21.0	21.0			67.5			55.5	
Effective Green, g (s)	21.0	21.0		21.0	21.0			67.5			55.5	
Actuated g/C Ratio	0.21	0.21		0.21	0.21			0.68			0.56	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Grp Cap (vph)	277	383		256	384			1585			1751	
v/s Ratio Prot		c0.06			0.03			c0.04				
v/s Ratio Perm	0.06			0.04				0.34			c0.37	
v/c Ratio	0.29	0.29		0.18	0.13			0.56			0.67	
Uniform Delay, d1	33.2	33.2		32.4	32.0			8.5			15.8	
Progression Factor	1.00	1.00		1.00	1.00			1.12			0.65	
Incremental Delay, d2	2.6	1.9		1.5	0.7			1.3			1.9	
Delay (s)	35.8	35.2		33.9	32.7			10.9			12.2	
Level of Service	D	D		C	C			B			B	
Approach Delay (s)		35.4			33.3			10.9			12.2	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	87.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	0	767	1108	0	0	5
Future Volume (Veh/h)	0	767	1108	0	0	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.97	0.97	0.85	0.85
Hourly flow rate (vph)	0	825	1142	0	0	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		345	417			
pX, platoon unblocked	0.86				0.91	0.86
vC, conflicting volume	1142				1554	571
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	839				932	175
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	99
cM capacity (veh/h)	680				241	721

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	SW 1
Volume Total	412	412	761	381	6
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	6
cSH	1700	1700	1700	1700	721
Volume to Capacity	0.24	0.24	0.45	0.22	0.01
Queue Length 95th (ft)	0	0	0	0	1
Control Delay (s)	0.0	0.0	0.0	0.0	10.0
Lane LOS					B
Approach Delay (s)	0.0		0.0		10.0
Approach LOS					B

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	40.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	SET	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	779	1145	14	54	43	46
v/c Ratio	0.33	0.49	0.06	0.17	0.20	0.14
Control Delay	8.5	7.3	34.5	18.4	37.3	18.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.5	7.3	34.5	18.4	37.3	18.5
Queue Length 50th (ft)	105	146	7	10	23	8
Queue Length 95th (ft)	144	187	23	40	56	40
Internal Link Dist (ft)	337	584		513		115
Turn Bay Length (ft)						
Base Capacity (vph)	2338	2346	241	327	217	325
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.49	0.06	0.17	0.20	0.14

Intersection Summary

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	12	748	4	17	1042	17	12	16	30	41	15	29
Future Volume (vph)	12	748	4	17	1042	17	12	16	30	41	15	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0		5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00		1.00	0.96		1.00	0.97	
Flpb, ped/bikes		1.00			1.00		0.96	1.00		0.96	1.00	
Frt		1.00			1.00		1.00	0.90		1.00	0.90	
Flt Protected		1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3532			3521		1706	1615		1549	1626	
Flt Permitted		0.93			0.94		0.73	1.00		0.72	1.00	
Satd. Flow (perm)		3295			3302		1306	1615		1177	1626	
Peak-hour factor, PHF	0.98	0.98	0.98	0.94	0.94	0.94	0.85	0.85	0.85	0.96	0.96	0.96
Adj. Flow (vph)	12	763	4	18	1109	18	14	19	35	43	16	30
RTOR Reduction (vph)	0	0	0	0	1	0	0	29	0	0	24	0
Lane Group Flow (vph)	0	779	0	0	1144	0	14	25	0	43	22	0
Confl. Peds. (#/hr)	33		21	21		33	23		15	15		23
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	12%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		71.0			71.0		18.5	18.5		18.5	18.5	
Effective Green, g (s)		71.0			71.0		18.5	18.5		18.5	18.5	
Actuated g/C Ratio		0.71			0.71		0.18	0.18		0.18	0.18	
Clearance Time (s)		5.0			5.0		5.5	5.5		5.5	5.5	
Lane Grp Cap (vph)		2339			2344		241	298		217	300	
v/s Ratio Prot								0.02			0.01	
v/s Ratio Perm		0.24			c0.35		0.01			c0.04		
v/c Ratio		0.33			0.49		0.06	0.09		0.20	0.07	
Uniform Delay, d1		5.5			6.4		33.6	33.7		34.5	33.7	
Progression Factor		1.46			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			0.7		0.5	0.6		2.0	0.5	
Delay (s)		8.4			7.2		34.0	34.3		36.5	34.1	
Level of Service		A			A		C	C		D	C	
Approach Delay (s)		8.4			7.2			34.3			35.3	
Approach LOS		A			A			C			D	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	2	0	15	1	12	192	0	827	2	14	887	0
Future Volume (Veh/h)	2	0	15	1	12	192	0	827	2	14	887	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.85	0.85	0.85	0.97	0.97	0.97	0.96	0.96	0.96
Hourly flow rate (vph)	2	0	17	1	14	226	0	853	2	15	924	0
Pedestrians		31			25			1			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		3			2			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								664				
pX, platoon unblocked	0.93	0.93	0.93	0.93	0.93					0.93		
vC, conflicting volume	1611	1864	460	1424	1865	488	949			886		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1509	1780	272	1307	1781	488	949			730		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	100	97	99	80	56	100			98		
cM capacity (veh/h)	34	70	655	98	70	513	702			786		

Direction, Lane #	EB 1	WB 1	WB 2	SE 1	SE 2	NW 1	NW 2
Volume Total	19	15	226	569	286	323	616
Volume Left	2	1	0	0	0	15	0
Volume Right	17	0	226	0	2	0	0
cSH	222	72	513	1700	1700	786	1700
Volume to Capacity	0.09	0.21	0.44	0.33	0.17	0.02	0.36
Queue Length 95th (ft)	7	18	56	0	0	1	0
Control Delay (s)	22.7	68.2	17.4	0.0	0.0	0.7	0.0
Lane LOS	C	F	C			A	
Approach Delay (s)	22.7	20.6		0.0		0.2	
Approach LOS	C	C					

Intersection Summary				
Average Delay	2.7			
Intersection Capacity Utilization	50.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	20	97	3	20	156	88	4	55	3
Future Volume (Veh/h)	0	0	0	20	97	3	20	156	88	4	55	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.94	0.94	0.94	0.89	0.89	0.89
Hourly flow rate (vph)	0	0	0	21	103	3	21	166	94	4	62	3
Pedestrians		6			22			2			8	
Lane Width (ft)		0.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		0			2			0			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								170				
pX, platoon unblocked	0.95	0.95		0.95	0.95	0.95				0.95		
vC, conflicting volume	395	402	72	350	356	243	71			282		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	340	347	72	293	299	180	71			221		
tC, single (s)	7.1	6.5	6.2	7.2	6.5	6.2	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2			2.4		
p0 queue free %	100	100	100	96	82	100	99			100		
cM capacity (veh/h)	483	529	989	582	562	798	1529			1141		

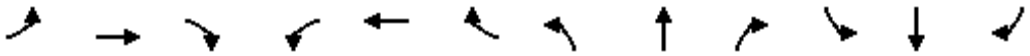
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	127	281	69
Volume Left	21	21	4
Volume Right	3	94	3
cSH	569	1529	1141
Volume to Capacity	0.22	0.01	0.00
Queue Length 95th (ft)	21	1	0
Control Delay (s)	13.1	0.7	0.5
Lane LOS	B	A	A
Approach Delay (s)	13.1	0.7	0.5
Approach LOS	B		

Intersection Summary				
Average Delay	4.0			
Intersection Capacity Utilization	40.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	97	3	4	110	5	7
Future Volume (Veh/h)	97	3	4	110	5	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.87	0.87	0.85	0.85
Hourly flow rate (vph)	114	4	5	126	6	8
Pedestrians	5			5	8	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	0			0	1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			126		265	129
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			126		265	129
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	99
cM capacity (veh/h)			1449		713	909

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	118	131	14
Volume Left	0	5	6
Volume Right	4	0	8
cSH	1700	1449	813
Volume to Capacity	0.07	0.00	0.02
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.3	9.5
Lane LOS		A	A
Approach Delay (s)	0.0	0.3	9.5
Approach LOS			A

Intersection Summary			
Average Delay		0.7	
Intersection Capacity Utilization		20.6%	ICU Level of Service
Analysis Period (min)		15	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	52	38	4	106	8	9	9	2	4	20	6
Future Volume (vph)	7	52	38	4	106	8	9	9	2	4	20	6
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.86	0.86	0.86
Hourly flow rate (vph)	8	61	45	5	125	9	11	11	2	5	23	7

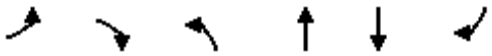
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	114	139	24	35
Volume Left (vph)	8	5	11	5
Volume Right (vph)	45	9	2	7
Hadj (s)	-0.10	0.03	0.08	-0.06
Departure Headway (s)	4.1	4.2	4.6	4.4
Degree Utilization, x	0.13	0.16	0.03	0.04
Capacity (veh/h)	861	844	738	757
Control Delay (s)	7.7	8.0	7.7	7.6
Approach Delay (s)	7.7	8.0	7.7	7.6
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.8			
Level of Service	A			
Intersection Capacity Utilization	21.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	2	17	0	2	69
Future Volume (Veh/h)	1	2	17	0	2	69
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.86	0.86	0.89	0.89
Hourly flow rate (vph)	1	2	20	0	2	78
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	102	20			20	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	102	20			20	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	895	1058			1596	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	3	20	80
Volume Left	1	0	2
Volume Right	2	0	0
cSH	997	1700	1596
Volume to Capacity	0.00	0.01	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	8.6	0.0	0.2
Lane LOS	A		A
Approach Delay (s)	8.6	0.0	0.2
Approach LOS	A		

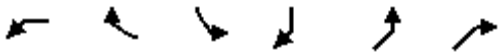
Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	15.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	12	5	16	70	0
Future Volume (Veh/h)	2	12	5	16	70	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	2	14	6	19	82	0
Pedestrians				17	1	
Lane Width (ft)				12.0	12.0	
Walking Speed (ft/s)				3.5	3.5	
Percent Blockage				2	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	114	99	82			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	114	99	82			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	878	941	1515			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	16	25	82
Volume Left	2	6	0
Volume Right	14	0	0
cSH	933	1515	1700
Volume to Capacity	0.02	0.00	0.05
Queue Length 95th (ft)	1	0	0
Control Delay (s)	8.9	1.8	0.0
Lane LOS	A	A	
Approach Delay (s)	8.9	1.8	0.0
Approach LOS	A		

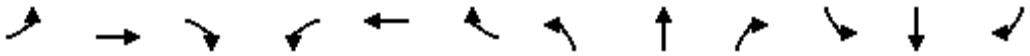
Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	19.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	29	4	5	77	18	15
Future Volume (Veh/h)	29	4	5	77	18	15
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	34	5	6	91	21	18
Pedestrians	6		22		8	
Lane Width (ft)	12.0		12.0		12.0	
Walking Speed (ft/s)	3.5		3.5		3.5	
Percent Blockage	1		2		1	
Right turn flare (veh)						
Median type			None		None	
Median storage veh)						
Upstream signal (ft)					195	
pX, platoon unblocked						
vC, conflicting volume	147	58	45			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	147	58	45			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	99	100			
cM capacity (veh/h)	831	981	1554			

Direction, Lane #	WB 1	SB 1	NE 1
Volume Total	39	97	39
Volume Left	34	6	0
Volume Right	5	0	18
cSH	847	1554	1700
Volume to Capacity	0.05	0.00	0.02
Queue Length 95th (ft)	4	0	0
Control Delay (s)	9.5	0.5	0.0
Lane LOS	A	A	
Approach Delay (s)	9.5	0.5	0.0
Approach LOS	A		

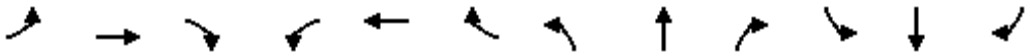
Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	31.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	42	7	0	5	16	22	2	124	6	12	80	29
Future Volume (vph)	42	7	0	5	16	22	2	124	6	12	80	29
Peak Hour Factor	0.95	0.95	0.95	0.85	0.85	0.85	0.88	0.88	0.88	0.85	0.85	0.85
Hourly flow rate (vph)	44	7	0	6	19	26	2	141	7	14	94	34

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	51	51	150	142
Volume Left (vph)	44	6	2	14
Volume Right (vph)	0	26	7	34
Hadj (s)	0.25	-0.22	0.01	-0.07
Departure Headway (s)	4.9	4.4	4.3	4.2
Degree Utilization, x	0.07	0.06	0.18	0.17
Capacity (veh/h)	685	755	806	812
Control Delay (s)	8.2	7.7	8.2	8.1
Approach Delay (s)	8.2	7.7	8.2	8.1
Approach LOS	A	A	A	A

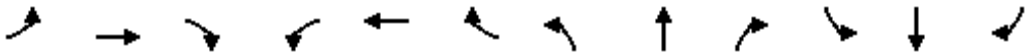
Intersection Summary				
Delay	8.1			
Level of Service	A			
Intersection Capacity Utilization	29.8%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	2	0	14	35	4	8	96	36	9	50	4
Future Volume (vph)	0	2	0	14	35	4	8	96	36	9	50	4
Peak Hour Factor	1.00	1.00	1.00	0.85	0.85	0.85	0.90	0.90	0.90	0.85	0.85	0.85
Hourly flow rate (vph)	0	2	0	16	41	5	9	107	40	11	59	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	2	62	156	75
Volume Left (vph)	0	16	9	11
Volume Right (vph)	0	5	40	5
Hadj (s)	0.03	0.05	-0.11	0.02
Departure Headway (s)	4.5	4.4	4.0	4.2
Degree Utilization, x	0.00	0.08	0.17	0.09
Capacity (veh/h)	752	759	872	831
Control Delay (s)	7.5	7.8	7.9	7.6
Approach Delay (s)	7.5	7.8	7.9	7.6
Approach LOS	A	A	A	A

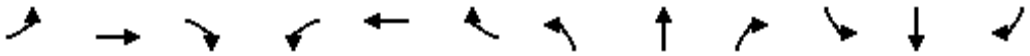
Intersection Summary				
Delay	7.8			
Level of Service	A			
Intersection Capacity Utilization	26.9%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	1	38	1	9	69	7	8	14	8	5	24	1
Future Volume (vph)	1	38	1	9	69	7	8	14	8	5	24	1
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	1	45	1	11	81	8	9	16	9	6	28	1

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	47	100	34	35
Volume Left (vph)	1	11	9	6
Volume Right (vph)	1	8	9	1
Hadj (s)	0.03	0.01	-0.03	0.05
Departure Headway (s)	4.2	4.1	4.2	4.3
Degree Utilization, x	0.05	0.11	0.04	0.04
Capacity (veh/h)	838	857	813	803
Control Delay (s)	7.4	7.6	7.4	7.5
Approach Delay (s)	7.4	7.6	7.4	7.5
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.5			
Level of Service	A			
Intersection Capacity Utilization	20.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	50	7	6	107	18	5	124	4	8	127	10
Future Volume (vph)	7	50	7	6	107	18	5	124	4	8	127	10
Peak Hour Factor	0.85	0.85	0.85	0.94	0.94	0.94	0.86	0.86	0.86	0.91	0.91	0.91
Hourly flow rate (vph)	8	59	8	6	114	19	6	144	5	9	140	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	75	139	155	160
Volume Left (vph)	8	6	6	9
Volume Right (vph)	8	19	5	11
Hadj (s)	0.00	-0.04	0.02	0.01
Departure Headway (s)	4.8	4.7	4.7	4.6
Degree Utilization, x	0.10	0.18	0.20	0.21
Capacity (veh/h)	681	708	732	731
Control Delay (s)	8.4	8.8	8.8	8.8
Approach Delay (s)	8.4	8.8	8.8	8.8
Approach LOS	A	A	A	A

Intersection Summary				
Delay	8.7			
Level of Service	A			
Intersection Capacity Utilization	26.2%	ICU Level of Service	A	
Analysis Period (min)	15			

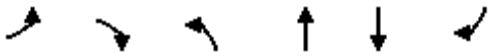
L: 2021 Background Vehicular Capacity and Queuing Analysis Worksheets

Lane Group	NBL	SET	NWT
Lane Group Flow (vph)	35	1492	725
v/c Ratio	0.11	0.75	0.56
Control Delay	33.2	19.2	12.5
Queue Delay	0.0	0.0	0.0
Total Delay	33.2	19.2	12.5
Queue Length 50th (ft)	18	351	227
Queue Length 95th (ft)	42	441	241
Internal Link Dist (ft)	174	579	255
Turn Bay Length (ft)			
Base Capacity (vph)	321	1979	1293
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.11	0.75	0.56

Intersection Summary

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Volume (vph)	28	2	1294	78	5	684
Future Volume (vph)	28	2	1294	78	5	684
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		6.0			6.0
Lane Util. Factor	1.00		0.95			1.00
Frpb, ped/bikes	1.00		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.99		0.99			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	1683		3467			1860
Flt Permitted	0.95		1.00			0.99
Satd. Flow (perm)	1683		3467			1845
Peak-hour factor, PHF	0.85	0.85	0.92	0.92	0.95	0.95
Adj. Flow (vph)	33	2	1407	85	5	720
RTOR Reduction (vph)	2	0	4	0	0	0
Lane Group Flow (vph)	33	0	1488	0	0	725
Confl. Peds. (#/hr)	1			9	9	
Heavy Vehicles (%)	7%	2%	3%	3%	20%	2%
Turn Type	Perm		NA		pm+pt	NA
Protected Phases			6		5	2
Permitted Phases	4				2	
Actuated Green, G (s)	19.0		57.0			70.0
Effective Green, g (s)	19.0		57.0			70.0
Actuated g/C Ratio	0.19		0.57			0.70
Clearance Time (s)	5.0		6.0			6.0
Lane Grp Cap (vph)	319		1976			1292
v/s Ratio Prot			c0.43			c0.04
v/s Ratio Perm	c0.02					0.35
v/c Ratio	0.10		0.75			0.56
Uniform Delay, d1	33.5		16.2			7.4
Progression Factor	1.00		1.00			1.42
Incremental Delay, d2	0.7		2.7			1.6
Delay (s)	34.1		18.9			12.1
Level of Service	C		B			B
Approach Delay (s)	34.1		18.9			12.1
Approach LOS	C		B			B

Intersection Summary			
HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	24	59	727	1264	5
Future Volume (Veh/h)	1	24	59	727	1264	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.97	0.97	0.96	0.96
Hourly flow rate (vph)	1	28	61	749	1317	5
Pedestrians	8					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				343	335	
pX, platoon unblocked	0.78	0.68	0.68			
vC, conflicting volume	2198	669	1330			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1211	0	535			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	96	91			
cM capacity (veh/h)	122	729	687			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	29	810	878	444
Volume Left	1	61	0	0
Volume Right	28	0	0	5
cSH	623	687	1700	1700
Volume to Capacity	0.05	0.09	0.52	0.26
Queue Length 95th (ft)	4	7	0	0
Control Delay (s)	11.1	2.4	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	11.1	2.4	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	77	708	0	0	1288
Future Volume (Veh/h)	1	77	708	0	0	1288
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.97	0.97	0.96	0.96
Hourly flow rate (vph)	1	91	730	0	0	1342
Pedestrians	11		13			
Lane Width (ft)	12.0		12.0			
Walking Speed (ft/s)	3.5		3.5			
Percent Blockage	1		1			
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			248			430
pX, platoon unblocked	0.74	0.88			0.88	
vC, conflicting volume	1425	376			741	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	125	7			423	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	90			100	
cM capacity (veh/h)	620	931			982	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	1	91	365	365	671	671
Volume Left	1	0	0	0	0	0
Volume Right	0	91	0	0	0	0
cSH	620	931	1700	1700	1700	1700
Volume to Capacity	0.00	0.10	0.21	0.21	0.39	0.39
Queue Length 95th (ft)	0	8	0	0	0	0
Control Delay (s)	10.8	9.3	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	9.3		0.0		0.0	
Approach LOS	A					

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	NBL	NBT	SBL	SBT	SET	NWT
Lane Group Flow (vph)	85	87	33	39	1375	677
v/c Ratio	0.30	0.23	0.12	0.10	0.79	0.49
Control Delay	36.9	32.7	33.5	30.3	15.6	22.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.9	32.7	33.5	30.3	15.6	22.2
Queue Length 50th (ft)	46	44	17	18	120	147
Queue Length 95th (ft)	86	81	42	44	191	210
Internal Link Dist (ft)		489		90	168	265
Turn Bay Length (ft)						
Base Capacity (vph)	279	384	270	380	1748	1387
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.23	0.12	0.10	0.79	0.49

Intersection Summary

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	72	67	7	28	30	3	142	1099	79	23	596	31
Future Volume (vph)	72	67	7	28	30	3	142	1099	79	23	596	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Flpb, ped/bikes	0.98	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			1.00	
Satd. Flow (prot)	1727	1813		1747	1795			3433			3447	
Flt Permitted	0.73	1.00		0.70	1.00			0.67			0.86	
Satd. Flow (perm)	1330	1813		1288	1795			2328			2977	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	85	79	8	33	35	4	148	1145	82	24	621	32
RTOR Reduction (vph)	0	4	0	0	3	0	0	5	0	0	4	0
Lane Group Flow (vph)	85	83	0	33	36	0	0	1370	0	0	673	0
Confl. Peds. (#/hr)	18		10	10		18	11		21	21		11
Heavy Vehicles (%)	2%	2%	14%	2%	4%	2%	2%	3%	5%	4%	2%	32%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			4		5	2			6	
Permitted Phases	4			4			2			6		
Actuated Green, G (s)	21.0	21.0		21.0	21.0			67.5			46.5	
Effective Green, g (s)	21.0	21.0		21.0	21.0			67.5			46.5	
Actuated g/C Ratio	0.21	0.21		0.21	0.21			0.68			0.46	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Grp Cap (vph)	279	380		270	376			1748			1384	
v/s Ratio Prot		0.05			0.02			c0.13				
v/s Ratio Perm	c0.06			0.03				c0.40			0.23	
v/c Ratio	0.30	0.22		0.12	0.10			0.78			0.49	
Uniform Delay, d1	33.3	32.7		32.0	31.8			11.2			18.5	
Progression Factor	1.00	1.00		1.00	1.00			1.37			1.13	
Incremental Delay, d2	2.8	1.3		0.9	0.5			2.5			1.2	
Delay (s)	36.1	34.0		33.0	32.3			17.9			22.1	
Level of Service	D	C		C	C			B			C	
Approach Delay (s)		35.1			32.6			17.9			22.1	
Approach LOS		D			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	87.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	0	1097	685	3	0	2
Future Volume (Veh/h)	0	1097	685	3	0	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.94	0.94	0.85	0.85
Hourly flow rate (vph)	0	1219	729	3	0	2
Pedestrians					34	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					3.5	
Percent Blockage					3	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		345	417			
pX, platoon unblocked	0.91				0.84	0.91
vC, conflicting volume	766				1374	400
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	551				593	149
tC, single (s)	4.1				6.9	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	896				351	768

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	SW 1
Volume Total	610	610	486	246	2
Volume Left	0	0	0	0	0
Volume Right	0	0	0	3	2
cSH	1700	1700	1700	1700	768
Volume to Capacity	0.36	0.36	0.29	0.14	0.00
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	9.7
Lane LOS					A
Approach Delay (s)	0.0		0.0		9.7
Approach LOS					A

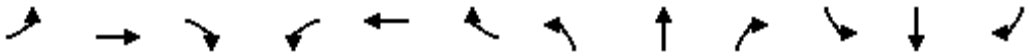
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	33.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	SET	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	1219	792	32	91	33	49
v/c Ratio	0.63	0.39	0.10	0.19	0.13	0.12
Control Delay	9.9	9.3	29.7	14.9	30.3	14.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.9	9.3	29.7	14.9	30.3	14.5
Queue Length 50th (ft)	182	115	16	18	16	7
Queue Length 95th (ft)	376	148	38	52	40	33
Internal Link Dist (ft)	337	584		513		115
Turn Bay Length (ft)						
Base Capacity (vph)	1943	2024	318	468	263	426
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.39	0.10	0.19	0.13	0.12

Intersection Summary

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	53	1025	6	17	674	14	27	31	47	28	13	29
Future Volume (vph)	53	1025	6	17	674	14	27	31	47	28	13	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0		5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00		1.00	0.99		1.00	0.94	
Flpb, ped/bikes		1.00			1.00		0.93	1.00		1.00	1.00	
Frt		1.00			1.00		1.00	0.91		1.00	0.90	
Flt Protected		1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3522			3481		1635	1677		1404	1574	
Flt Permitted		0.86			0.91		0.73	1.00		0.70	1.00	
Satd. Flow (perm)		3035			3161		1248	1677		1032	1574	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	60	1152	7	19	757	16	32	36	55	33	15	34
RTOR Reduction (vph)	0	0	0	0	1	0	0	41	0	0	25	0
Lane Group Flow (vph)	0	1219	0	0	791	0	32	50	0	33	24	0
Confl. Peds. (#/hr)	31		10	10		31	43		3	3		43
Heavy Vehicles (%)	2%	2%	2%	2%	3%	7%	3%	2%	2%	28%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		64.0			64.0		25.5	25.5		25.5	25.5	
Effective Green, g (s)		64.0			64.0		25.5	25.5		25.5	25.5	
Actuated g/C Ratio		0.64			0.64		0.26	0.26		0.26	0.26	
Clearance Time (s)		5.0			5.0		5.5	5.5		5.5	5.5	
Lane Grp Cap (vph)		1942			2023		318	427		263	401	
v/s Ratio Prot								0.03			0.02	
v/s Ratio Perm		c0.40			0.25		0.03			c0.03		
v/c Ratio		0.63			0.39		0.10	0.12		0.13	0.06	
Uniform Delay, d1		10.8			8.6		28.5	28.6		28.7	28.2	
Progression Factor		0.80			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.0			0.6		0.6	0.6		1.0	0.3	
Delay (s)		9.7			9.2		29.1	29.2		29.6	28.5	
Level of Service		A			A		C	C		C	C	
Approach Delay (s)		9.7			9.2			29.2			28.9	
Approach LOS		A			A			C			C	

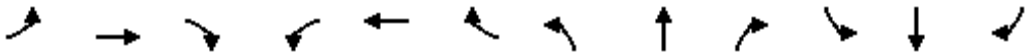
Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	14	0	18	99	10	605	0	0	1095	7
Future Volume (Veh/h)	1	0	14	0	18	99	10	605	0	0	1095	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.91	0.91	0.91	0.93	0.93	0.93
Hourly flow rate (vph)	1	0	16	0	21	116	11	665	0	0	1177	8
Pedestrians		19			15							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		3.5			3.5							
Percent Blockage		2			1							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											664	
pX, platoon unblocked	0.82	0.82	0.82	0.82	0.82		0.82					
vC, conflicting volume	1681	1902	612	1306	1906	348	1204			680		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1386	1657	78	928	1661	348	803			680		
tC, single (s)	7.5	6.5	7.2	7.5	6.7	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.1	3.3	2.2			2.2		
p0 queue free %	98	100	98	100	69	82	98			100		
cM capacity (veh/h)	50	75	746	169	68	639	656			895		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	17	21	116	233	443	785	400
Volume Left	1	0	0	11	0	0	0
Volume Right	16	0	116	0	0	0	8
cSH	408	68	639	656	1700	1700	1700
Volume to Capacity	0.04	0.31	0.18	0.02	0.26	0.46	0.24
Queue Length 95th (ft)	3	28	16	1	0	0	0
Control Delay (s)	14.2	79.4	11.9	0.7	0.0	0.0	0.0
Lane LOS	B	F	B	A			
Approach Delay (s)	14.2	22.2		0.2		0.0	
Approach LOS	B	C					

Intersection Summary				
Average Delay	1.7			
Intersection Capacity Utilization	40.5%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	18	50	6	10	98	121	8	38	13
Future Volume (Veh/h)	0	0	0	18	50	6	10	98	121	8	38	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	0	0	20	54	7	12	115	142	9	45	15
Pedestrians		6			13			10			2	
Lane Width (ft)		0.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		0			1			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								170				
pX, platoon unblocked	0.97	0.97		0.97	0.97	0.97				0.97		
vC, conflicting volume	322	370	68	304	307	201	66			270		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	283	333	68	264	267	158	66			229		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	97	91	99	99			99		
cM capacity (veh/h)	585	553	985	639	601	847	1536			1280		

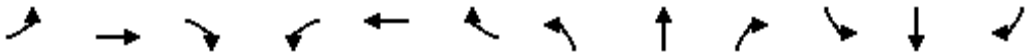
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	81	269	69
Volume Left	20	12	9
Volume Right	7	142	15
cSH	626	1536	1280
Volume to Capacity	0.13	0.01	0.01
Queue Length 95th (ft)	11	1	1
Control Delay (s)	11.6	0.4	1.1
Lane LOS	B	A	A
Approach Delay (s)	11.6	0.4	1.1
Approach LOS	B		

Intersection Summary				
Average Delay	2.7			
Intersection Capacity Utilization	32.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	132	2	2	84	1	5
Future Volume (Veh/h)	132	2	2	84	1	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.93	0.93	0.85	0.85
Hourly flow rate (vph)	155	2	2	90	1	6
Pedestrians	5			3	5	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			162		260	164
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			162		260	164
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1410		721	874

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	157	92	7
Volume Left	0	2	1
Volume Right	2	0	6
cSH	1700	1410	848
Volume to Capacity	0.09	0.00	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.2	9.3
Lane LOS		A	A
Approach Delay (s)	0.0	0.2	9.3
Approach LOS			A

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	19.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	2	94	31	8	74	1	7	8	5	8	18	4
Future Volume (vph)	2	94	31	8	74	1	7	8	5	8	18	4
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.88	0.88	0.88	0.85	0.85	0.85
Hourly flow rate (vph)	2	111	36	9	87	1	8	9	6	9	21	5

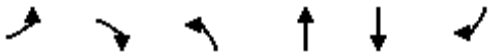
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	149	97	23	35
Volume Left (vph)	2	9	8	9
Volume Right (vph)	36	1	6	5
Hadj (s)	-0.03	0.05	-0.05	0.00
Departure Headway (s)	4.1	4.2	4.4	4.5
Degree Utilization, x	0.17	0.11	0.03	0.04
Capacity (veh/h)	857	832	761	751
Control Delay (s)	7.9	7.8	7.6	7.7
Approach Delay (s)	7.9	7.8	7.6	7.7
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.8			
Level of Service	A			
Intersection Capacity Utilization	19.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	4	17	1	0	65
Future Volume (Veh/h)	3	4	17	1	0	65
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	4	5	20	1	0	76
Pedestrians	8					1
Lane Width (ft)	12.0					12.0
Walking Speed (ft/s)	3.5					3.5
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	104	30			29	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	104	30			29	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	887	1036			1559	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	9	21	76
Volume Left	4	0	0
Volume Right	5	1	0
cSH	964	1700	1559
Volume to Capacity	0.01	0.01	0.00
Queue Length 95th (ft)	1	0	0
Control Delay (s)	8.8	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.8	0.0	0.0
Approach LOS	A		

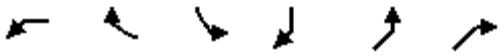
Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	16.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	4	10	19	60	4
Future Volume (Veh/h)	1	4	10	19	60	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	1	5	12	22	71	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	120	74	76			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	120	74	76			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	99			
cM capacity (veh/h)	869	988	1523			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	6	34	76
Volume Left	1	12	0
Volume Right	5	0	5
cSH	966	1523	1700
Volume to Capacity	0.01	0.01	0.04
Queue Length 95th (ft)	0	1	0
Control Delay (s)	8.7	2.6	0.0
Lane LOS	A	A	
Approach Delay (s)	8.7	2.6	0.0
Approach LOS	A		

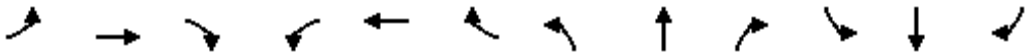
Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	18.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	10	5	1	59	26	75
Future Volume (Veh/h)	10	5	1	59	26	75
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	12	6	1	69	31	88
Pedestrians	4		18		5	
Lane Width (ft)	12.0		12.0		12.0	
Walking Speed (ft/s)	3.5		3.5		3.5	
Percent Blockage	0		2		0	
Right turn flare (veh)						
Median type			None		None	
Median storage veh)						
Upstream signal (ft)					195	
pX, platoon unblocked						
vC, conflicting volume	155	97	123			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	155	97	123			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	100			
cM capacity (veh/h)	829	939	1458			

Direction, Lane #	WB 1	SB 1	NE 1
Volume Total	18	70	119
Volume Left	12	1	0
Volume Right	6	0	88
cSH	863	1458	1700
Volume to Capacity	0.02	0.00	0.07
Queue Length 95th (ft)	2	0	0
Control Delay (s)	9.3	0.1	0.0
Lane LOS	A	A	
Approach Delay (s)	9.3	0.1	0.0
Approach LOS	A		

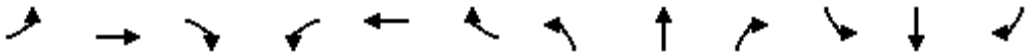
Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	30.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	31	26	2	10	9	30	6	88	13	37	19	26
Future Volume (vph)	31	26	2	10	9	30	6	88	13	37	19	26
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	36	31	2	12	11	35	7	104	15	44	22	31

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	69	58	126	97
Volume Left (vph)	36	12	7	44
Volume Right (vph)	2	35	15	31
Hadj (s)	0.12	-0.28	-0.03	0.03
Departure Headway (s)	4.6	4.2	4.3	4.4
Degree Utilization, x	0.09	0.07	0.15	0.12
Capacity (veh/h)	743	797	808	786
Control Delay (s)	8.0	7.5	8.0	7.9
Approach Delay (s)	8.0	7.5	8.0	7.9
Approach LOS	A	A	A	A

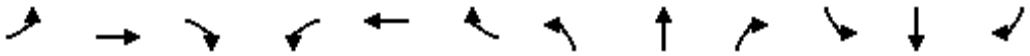
Intersection Summary				
Delay	7.9			
Level of Service	A			
Intersection Capacity Utilization	27.0%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	5	0	27	54	2	6	41	45	8	19	4
Future Volume (vph)	0	5	0	27	54	2	6	41	45	8	19	4
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	6	0	32	64	2	7	48	53	9	22	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	6	98	108	36
Volume Left (vph)	0	32	7	9
Volume Right (vph)	0	2	53	5
Hadj (s)	0.03	0.09	-0.24	0.03
Departure Headway (s)	4.3	4.3	3.9	4.3
Degree Utilization, x	0.01	0.12	0.12	0.04
Capacity (veh/h)	792	809	883	814
Control Delay (s)	7.4	7.9	7.5	7.5
Approach Delay (s)	7.4	7.9	7.5	7.5
Approach LOS	A	A	A	A

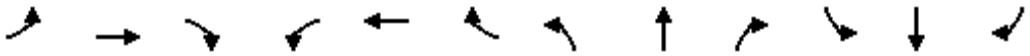
Intersection Summary				
Delay	7.6			
Level of Service	A			
Intersection Capacity Utilization	25.5%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	69	2	11	56	3	3	13	7	10	14	2
Future Volume (vph)	3	69	2	11	56	3	3	13	7	10	14	2
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	4	81	2	13	66	4	4	15	8	12	16	2

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	87	83	27	30
Volume Left (vph)	4	13	4	12
Volume Right (vph)	2	4	8	2
Hadj (s)	0.03	0.04	-0.11	0.07
Departure Headway (s)	4.1	4.1	4.2	4.4
Degree Utilization, x	0.10	0.10	0.03	0.04
Capacity (veh/h)	850	849	815	778
Control Delay (s)	7.6	7.6	7.3	7.5
Approach Delay (s)	7.6	7.6	7.3	7.5
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.6			
Level of Service	A			
Intersection Capacity Utilization	19.8%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	4	109	8	13	68	16	3	83	7	16	177	9
Future Volume (vph)	4	109	8	13	68	16	3	83	7	16	177	9
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.86	0.86	0.86	0.91	0.91	0.91
Hourly flow rate (vph)	5	128	9	15	80	19	3	97	8	18	195	10

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	142	114	108	223
Volume Left (vph)	5	15	3	18
Volume Right (vph)	9	19	8	10
Hadj (s)	0.00	-0.04	0.03	0.02
Departure Headway (s)	4.9	4.9	4.9	4.7
Degree Utilization, x	0.19	0.15	0.15	0.29
Capacity (veh/h)	682	679	690	720
Control Delay (s)	9.0	8.8	8.7	9.6
Approach Delay (s)	9.0	8.8	8.7	9.6
Approach LOS	A	A	A	A

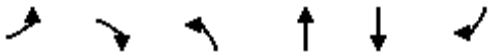
Intersection Summary				
Delay	9.2			
Level of Service	A			
Intersection Capacity Utilization	34.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	NBL	SET	NWT
Lane Group Flow (vph)	44	1003	1245
v/c Ratio	0.14	0.48	0.52
Control Delay	35.3	12.1	3.6
Queue Delay	0.0	0.0	0.0
Total Delay	35.3	12.1	3.6
Queue Length 50th (ft)	23	173	63
Queue Length 95th (ft)	52	222	72
Internal Link Dist (ft)	174	579	255
Turn Bay Length (ft)			
Base Capacity (vph)	318	2090	2405
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.14	0.48	0.52

Intersection Summary

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Volume (vph)	37	1	923	40	3	1155
Future Volume (vph)	37	1	923	40	3	1155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		6.0			6.0
Lane Util. Factor	1.00		0.95			0.95
Frpb, ped/bikes	1.00		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	1.00		0.99			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	1764		3477			3539
Flt Permitted	0.95		1.00			0.95
Satd. Flow (perm)	1764		3477			3376
Peak-hour factor, PHF	0.87	0.87	0.96	0.96	0.93	0.93
Adj. Flow (vph)	43	1	961	42	3	1242
RTOR Reduction (vph)	1	0	3	0	0	0
Lane Group Flow (vph)	43	0	1000	0	0	1245
Confl. Peds. (#/hr)	2	5		12	12	
Heavy Vehicles (%)	2%	2%	3%	2%	2%	2%
Turn Type	Perm		NA		pm+pt	NA
Protected Phases			6		5	2
Permitted Phases	4				2	
Actuated Green, G (s)	18.0		60.0			71.0
Effective Green, g (s)	18.0		60.0			71.0
Actuated g/C Ratio	0.18		0.60			0.71
Clearance Time (s)	5.0		6.0			6.0
Lane Grp Cap (vph)	317		2086			2405
v/s Ratio Prot			0.29			c0.03
v/s Ratio Perm	c0.02					c0.34
v/c Ratio	0.14		0.48			0.52
Uniform Delay, d1	34.5		11.2			6.6
Progression Factor	1.00		1.00			0.43
Incremental Delay, d2	0.9		0.8			0.6
Delay (s)	35.4		12.0			3.5
Level of Service	D		B			A
Approach Delay (s)	35.4		12.0			3.5
Approach LOS	D		B			A

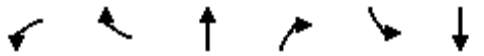
Intersection Summary			
HCM 2000 Control Delay	7.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	55	28	1169	922	3
Future Volume (Veh/h)	5	55	28	1169	922	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.93	0.93	0.96	0.96
Hourly flow rate (vph)	6	61	30	1257	960	3
Pedestrians	13					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				343	335	
pX, platoon unblocked	0.85	0.84	0.84			
vC, conflicting volume	1663	494	976			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	590	18	591			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	93	96			
cM capacity (veh/h)	356	876	814			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	67	449	838	640	323
Volume Left	6	30	0	0	0
Volume Right	61	0	0	0	3
cSH	775	814	1700	1700	1700
Volume to Capacity	0.09	0.04	0.49	0.38	0.19
Queue Length 95th (ft)	7	3	0	0	0
Control Delay (s)	10.1	1.1	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	10.1	0.4		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	62.7%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	98	1098	0	0	982
Future Volume (Veh/h)	0	98	1098	0	0	982
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.93	0.93	0.96	0.96
Hourly flow rate (vph)	0	115	1181	0	0	1023
Pedestrians	21					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	2					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			248			430
pX, platoon unblocked	0.85	0.77			0.77	
vC, conflicting volume	1714	612			1202	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	649	0			671	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	86			100	
cM capacity (veh/h)	336	820			693	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	0	115	590	590	512	512
Volume Left	0	0	0	0	0	0
Volume Right	0	115	0	0	0	0
cSH	1700	820	1700	1700	1700	1700
Volume to Capacity	0.00	0.14	0.35	0.35	0.30	0.30
Queue Length 95th (ft)	0	12	0	0	0	0
Control Delay (s)	0.0	10.1	0.0	0.0	0.0	0.0
Lane LOS	A	B				
Approach Delay (s)	10.1		0.0		0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	NBL	NBT	SBL	SBT	SET	NWT
Lane Group Flow (vph)	83	118	45	55	976	1187
v/c Ratio	0.30	0.31	0.18	0.14	0.61	0.68
Control Delay	36.9	35.4	34.6	31.0	10.9	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.9	35.4	34.6	31.0	10.9	12.4
Queue Length 50th (ft)	45	63	24	26	88	273
Queue Length 95th (ft)	90	115	55	59	125	349
Internal Link Dist (ft)		489		90	168	265
Turn Bay Length (ft)						
Base Capacity (vph)	276	385	255	388	1596	1745
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.31	0.18	0.14	0.61	0.68

Intersection Summary

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	77	105	5	41	46	5	87	808	71	29	1019	56
Future Volume (vph)	77	105	5	41	46	5	87	808	71	29	1019	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	0.98	1.00		0.96	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1734	1829		1697	1832			3465			3475	
Flt Permitted	0.72	1.00		0.68	1.00			0.64			0.90	
Satd. Flow (perm)	1317	1829		1216	1832			2239			3138	
Peak-hour factor, PHF	0.93	0.93	0.93	0.92	0.92	0.92	0.99	0.99	0.99	0.93	0.93	0.93
Adj. Flow (vph)	83	113	5	45	50	5	88	816	72	31	1096	60
RTOR Reduction (vph)	0	2	0	0	4	0	0	6	0	0	4	0
Lane Group Flow (vph)	83	116	0	45	51	0	0	970	0	0	1183	0
Confl. Peds. (#/hr)	15		34	34		15	25		16	16		25
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	9%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			4		5	2			6	
Permitted Phases	4			4			2			6		
Actuated Green, G (s)	21.0	21.0		21.0	21.0			67.5			55.5	
Effective Green, g (s)	21.0	21.0		21.0	21.0			67.5			55.5	
Actuated g/C Ratio	0.21	0.21		0.21	0.21			0.68			0.56	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Grp Cap (vph)	276	384		255	384			1597			1741	
v/s Ratio Prot		c0.06			0.03			c0.04				
v/s Ratio Perm	0.06			0.04				0.37			c0.38	
v/c Ratio	0.30	0.30		0.18	0.13			0.61			0.68	
Uniform Delay, d1	33.3	33.3		32.4	32.1			9.0			15.9	
Progression Factor	1.00	1.00		1.00	1.00			1.18			0.65	
Incremental Delay, d2	2.8	2.0		1.5	0.7			1.6			1.9	
Delay (s)	36.1	35.4		33.9	32.8			12.1			12.3	
Level of Service	D	D		C	C			B			B	
Approach Delay (s)		35.7			33.3			12.1			12.3	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	89.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	0	847	1114	0	0	5
Future Volume (Veh/h)	0	847	1114	0	0	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.97	0.97	0.85	0.85
Hourly flow rate (vph)	0	911	1148	0	0	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		345	417			
pX, platoon unblocked	0.86				0.91	0.86
vC, conflicting volume	1148				1604	574
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	841				920	172
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	99
cM capacity (veh/h)	678				247	722

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	SW 1
Volume Total	456	456	765	383	6
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	6
cSH	1700	1700	1700	1700	722
Volume to Capacity	0.27	0.27	0.45	0.23	0.01
Queue Length 95th (ft)	0	0	0	0	1
Control Delay (s)	0.0	0.0	0.0	0.0	10.0
Lane LOS					B
Approach Delay (s)	0.0		0.0		10.0
Approach LOS					B

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	SET	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	859	1158	14	66	43	49
v/c Ratio	0.37	0.50	0.06	0.20	0.20	0.15
Control Delay	9.0	7.4	34.5	17.5	37.3	19.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.0	7.4	34.5	17.5	37.3	19.3
Queue Length 50th (ft)	124	151	7	12	23	10
Queue Length 95th (ft)	147	192	23	44	56	42
Internal Link Dist (ft)	337	584		513		115
Turn Bay Length (ft)						
Base Capacity (vph)	2344	2305	240	333	215	327
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.50	0.06	0.20	0.20	0.15

Intersection Summary

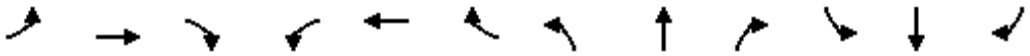
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	12	826	4	24	1047	17	12	19	37	41	18	29
Future Volume (vph)	12	826	4	24	1047	17	12	19	37	41	18	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0		5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00		1.00	0.96		1.00	0.97	
Flpb, ped/bikes		1.00			1.00		0.96	1.00		0.96	1.00	
Frt		1.00			1.00		1.00	0.90		1.00	0.91	
Flt Protected		1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3532			3520		1706	1608		1550	1640	
Flt Permitted		0.93			0.92		0.73	1.00		0.71	1.00	
Satd. Flow (perm)		3301			3244		1302	1608		1165	1640	
Peak-hour factor, PHF	0.98	0.98	0.98	0.94	0.94	0.94	0.85	0.85	0.85	0.96	0.96	0.96
Adj. Flow (vph)	12	843	4	26	1114	18	14	22	44	43	19	30
RTOR Reduction (vph)	0	0	0	0	1	0	0	36	0	0	24	0
Lane Group Flow (vph)	0	859	0	0	1157	0	14	30	0	43	25	0
Confl. Peds. (#/hr)	33		21	21		33	23		15	15		23
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	12%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		71.0			71.0		18.5	18.5		18.5	18.5	
Effective Green, g (s)		71.0			71.0		18.5	18.5		18.5	18.5	
Actuated g/C Ratio		0.71			0.71		0.18	0.18		0.18	0.18	
Clearance Time (s)		5.0			5.0		5.5	5.5		5.5	5.5	
Lane Grp Cap (vph)		2343			2303		240	297		215	303	
v/s Ratio Prot								0.02			0.01	
v/s Ratio Perm		0.26			c0.36		0.01			c0.04		
v/c Ratio		0.37			0.50		0.06	0.10		0.20	0.08	
Uniform Delay, d1		5.7			6.5		33.6	33.8		34.5	33.7	
Progression Factor		1.50			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4			0.8		0.5	0.7		2.1	0.5	
Delay (s)		8.9			7.3		34.0	34.5		36.6	34.2	
Level of Service		A			A		C	C		D	C	
Approach Delay (s)		8.9			7.3			34.4			35.3	
Approach LOS		A			A			C			D	

Intersection Summary			
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	2	0	15	1	12	195	0	920	2	14	896	0
Future Volume (Veh/h)	2	0	15	1	12	195	0	920	2	14	896	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.85	0.85	0.85	0.97	0.97	0.97	0.96	0.96	0.96
Hourly flow rate (vph)	2	0	17	1	14	229	0	948	2	15	933	0
Pedestrians		31			25			1			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		3			2			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								664				
pX, platoon unblocked	0.92	0.92	0.92	0.92	0.92					0.92		
vC, conflicting volume	1714	1968	507	1480	1969	492	958			981		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1596	1874	279	1341	1875	492	958			796		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	100	97	99	77	55	100			98		
cM capacity (veh/h)	27	60	638	91	60	509	697			730		

Direction, Lane #	EB 1	WB 1	WB 2	SE 1	SE 2	NW 1	NW 2
Volume Total	19	15	229	632	318	326	622
Volume Left	2	1	0	0	0	15	0
Volume Right	17	0	229	0	2	0	0
cSH	189	62	509	1700	1700	730	1700
Volume to Capacity	0.10	0.24	0.45	0.37	0.19	0.02	0.37
Queue Length 95th (ft)	8	21	58	0	0	2	0
Control Delay (s)	26.1	81.1	17.7	0.0	0.0	0.7	0.0
Lane LOS	D	F	C			A	
Approach Delay (s)	26.1	21.6		0.0		0.2	
Approach LOS	D	C					

Intersection Summary				
Average Delay	2.8			
Intersection Capacity Utilization	51.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	20	97	3	20	161	89	4	58	3
Future Volume (Veh/h)	0	0	0	20	97	3	20	161	89	4	58	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.94	0.94	0.94	0.89	0.89	0.89
Hourly flow rate (vph)	0	0	0	21	103	3	21	171	95	4	65	3
Pedestrians		6			22			2			8	
Lane Width (ft)		0.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		0			2			0			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								170				
pX, platoon unblocked	0.95	0.95		0.95	0.95	0.95				0.95		
vC, conflicting volume	404	410	74	359	364	248	74			288		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	345	353	74	299	304	182	74			224		
tC, single (s)	7.1	6.5	6.2	7.2	6.5	6.2	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2			2.4		
p0 queue free %	100	100	100	96	81	100	99			100		
cM capacity (veh/h)	477	523	985	575	556	794	1526			1135		

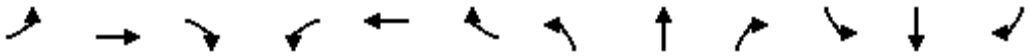
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	127	287	72
Volume Left	21	21	4
Volume Right	3	95	3
cSH	563	1526	1135
Volume to Capacity	0.23	0.01	0.00
Queue Length 95th (ft)	21	1	0
Control Delay (s)	13.2	0.7	0.5
Lane LOS	B	A	A
Approach Delay (s)	13.2	0.7	0.5
Approach LOS	B		

Intersection Summary				
Average Delay	3.9			
Intersection Capacity Utilization	40.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	98	3	4	111	5	7
Future Volume (Veh/h)	98	3	4	111	5	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.87	0.87	0.85	0.85
Hourly flow rate (vph)	115	4	5	128	6	8
Pedestrians	5			5	8	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	0			0	1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			127		268	130
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			127		268	130
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	99
cM capacity (veh/h)			1448		710	908

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	119	133	14
Volume Left	0	5	6
Volume Right	4	0	8
cSH	1700	1448	811
Volume to Capacity	0.07	0.00	0.02
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.3	9.5
Lane LOS		A	A
Approach Delay (s)	0.0	0.3	9.5
Approach LOS			A

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	20.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	53	38	5	107	8	9	10	2	4	21	6
Future Volume (vph)	7	53	38	5	107	8	9	10	2	4	21	6
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.86	0.86	0.86
Hourly flow rate (vph)	8	62	45	6	126	9	11	12	2	5	24	7

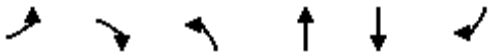
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	115	141	25	36
Volume Left (vph)	8	6	11	5
Volume Right (vph)	45	9	2	7
Hadj (s)	-0.10	0.03	0.07	-0.05
Departure Headway (s)	4.1	4.2	4.6	4.4
Degree Utilization, x	0.13	0.16	0.03	0.04
Capacity (veh/h)	859	842	737	755
Control Delay (s)	7.7	8.0	7.7	7.6
Approach Delay (s)	7.7	8.0	7.7	7.6
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.8			
Level of Service	A			
Intersection Capacity Utilization	21.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	2	18	1	2	71
Future Volume (Veh/h)	1	2	18	1	2	71
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.86	0.86	0.89	0.89
Hourly flow rate (vph)	1	2	21	1	2	80
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	106	22			22	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	106	22			22	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	891	1056			1593	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	3	22	82
Volume Left	1	0	2
Volume Right	2	1	0
cSH	995	1700	1593
Volume to Capacity	0.00	0.01	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	8.6	0.0	0.2
Lane LOS	A		A
Approach Delay (s)	8.6	0.0	0.2
Approach LOS	A		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	15.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	12	5	18	72	0
Future Volume (Veh/h)	2	12	5	18	72	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	2	14	6	21	85	0
Pedestrians				17	1	
Lane Width (ft)				12.0	12.0	
Walking Speed (ft/s)				3.5	3.5	
Percent Blockage				2	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	119	102	85			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	119	102	85			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	872	938	1512			

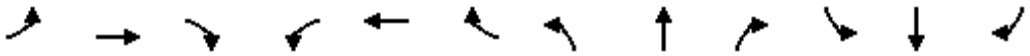
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	16	27	85
Volume Left	2	6	0
Volume Right	14	0	0
cSH	929	1512	1700
Volume to Capacity	0.02	0.00	0.05
Queue Length 95th (ft)	1	0	0
Control Delay (s)	8.9	1.7	0.0
Lane LOS	A	A	
Approach Delay (s)	8.9	1.7	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	19.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	30	4	5	79	20	16
Future Volume (Veh/h)	30	4	5	79	20	16
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	35	5	6	93	24	19
Pedestrians	6		22		8	
Lane Width (ft)	12.0		12.0		12.0	
Walking Speed (ft/s)	3.5		3.5		3.5	
Percent Blockage	1		2		1	
Right turn flare (veh)						
Median type			None		None	
Median storage veh)						
Upstream signal (ft)					195	
pX, platoon unblocked						
vC, conflicting volume	152	62	49			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	152	62	49			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	99	100			
cM capacity (veh/h)	825	977	1549			

Direction, Lane #	WB 1	SB 1	NE 1
Volume Total	40	99	43
Volume Left	35	6	0
Volume Right	5	0	19
cSH	841	1549	1700
Volume to Capacity	0.05	0.00	0.03
Queue Length 95th (ft)	4	0	0
Control Delay (s)	9.5	0.5	0.0
Lane LOS	A	A	
Approach Delay (s)	9.5	0.5	0.0
Approach LOS	A		

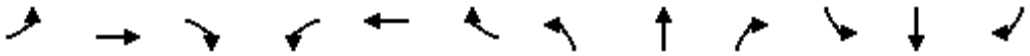
Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	31.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	43	7	0	5	16	22	2	128	6	12	82	30
Future Volume (vph)	43	7	0	5	16	22	2	128	6	12	82	30
Peak Hour Factor	0.95	0.95	0.95	0.85	0.85	0.85	0.88	0.88	0.88	0.85	0.85	0.85
Hourly flow rate (vph)	45	7	0	6	19	26	2	145	7	14	96	35

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	52	51	154	145
Volume Left (vph)	45	6	2	14
Volume Right (vph)	0	26	7	35
Hadj (s)	0.25	-0.22	0.01	-0.07
Departure Headway (s)	4.9	4.4	4.3	4.2
Degree Utilization, x	0.07	0.06	0.18	0.17
Capacity (veh/h)	682	751	804	811
Control Delay (s)	8.3	7.7	8.3	8.1
Approach Delay (s)	8.3	7.7	8.3	8.1
Approach LOS	A	A	A	A

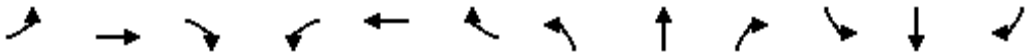
Intersection Summary				
Delay	8.2			
Level of Service	A			
Intersection Capacity Utilization	30.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	2	0	15	35	4	8	99	37	9	52	4
Future Volume (vph)	0	2	0	15	35	4	8	99	37	9	52	4
Peak Hour Factor	1.00	1.00	1.00	0.85	0.85	0.85	0.90	0.90	0.90	0.85	0.85	0.85
Hourly flow rate (vph)	0	2	0	18	41	5	9	110	41	11	61	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	2	64	160	77
Volume Left (vph)	0	18	9	11
Volume Right (vph)	0	5	41	5
Hadj (s)	0.03	0.05	-0.11	0.02
Departure Headway (s)	4.5	4.5	4.0	4.2
Degree Utilization, x	0.00	0.08	0.18	0.09
Capacity (veh/h)	748	755	870	829
Control Delay (s)	7.5	7.9	7.9	7.7
Approach Delay (s)	7.5	7.9	7.9	7.7
Approach LOS	A	A	A	A

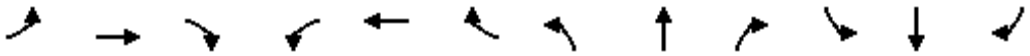
Intersection Summary				
Delay	7.8			
Level of Service	A			
Intersection Capacity Utilization	27.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	1	39	1	9	70	7	8	15	8	5	25	1
Future Volume (vph)	1	39	1	9	70	7	8	15	8	5	25	1
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	1	46	1	11	82	8	9	18	9	6	29	1

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	48	101	36	36
Volume Left (vph)	1	11	9	6
Volume Right (vph)	1	8	9	1
Hadj (s)	0.03	0.01	-0.02	0.05
Departure Headway (s)	4.2	4.1	4.2	4.3
Degree Utilization, x	0.06	0.12	0.04	0.04
Capacity (veh/h)	836	854	810	801
Control Delay (s)	7.4	7.7	7.4	7.5
Approach Delay (s)	7.4	7.7	7.4	7.5
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.5			
Level of Service	A			
Intersection Capacity Utilization	20.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	51	7	6	109	18	5	130	4	8	133	10
Future Volume (vph)	7	51	7	6	109	18	5	130	4	8	133	10
Peak Hour Factor	0.85	0.85	0.85	0.94	0.94	0.94	0.86	0.86	0.86	0.91	0.91	0.91
Hourly flow rate (vph)	8	60	8	6	116	19	6	151	5	9	146	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	76	141	162	166
Volume Left (vph)	8	6	6	9
Volume Right (vph)	8	19	5	11
Hadj (s)	0.00	-0.04	0.02	0.01
Departure Headway (s)	4.9	4.8	4.7	4.7
Degree Utilization, x	0.10	0.19	0.21	0.21
Capacity (veh/h)	674	701	729	727
Control Delay (s)	8.4	8.8	8.9	8.9
Approach Delay (s)	8.4	8.8	8.9	8.9
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.8		
Level of Service	A		
Intersection Capacity Utilization	26.5%	ICU Level of Service	A
Analysis Period (min)	15		

M: 2021 Future Vehicular Capacity and Queuing Analysis Worksheets

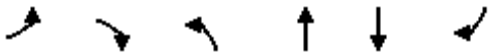
Queues
1: 50th St & Massachusetts Ave

Lane Group	NBL	SET	NWT
Lane Group Flow (vph)	35	1499	737
v/c Ratio	0.11	0.76	0.57
Control Delay	33.2	19.3	12.6
Queue Delay	0.0	0.0	0.0
Total Delay	33.2	19.3	12.6
Queue Length 50th (ft)	18	354	225
Queue Length 95th (ft)	42	444	240
Internal Link Dist (ft)	174	579	255
Turn Bay Length (ft)			
Base Capacity (vph)	321	1979	1293
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.11	0.76	0.57

Intersection Summary

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Volume (vph)	28	2	1301	78	5	695
Future Volume (vph)	28	2	1301	78	5	695
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		6.0			6.0
Lane Util. Factor	1.00		0.95			1.00
Frpb, ped/bikes	1.00		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.99		0.99			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	1683		3467			1860
Flt Permitted	0.95		1.00			0.99
Satd. Flow (perm)	1683		3467			1845
Peak-hour factor, PHF	0.85	0.85	0.92	0.92	0.95	0.95
Adj. Flow (vph)	33	2	1414	85	5	732
RTOR Reduction (vph)	2	0	4	0	0	0
Lane Group Flow (vph)	33	0	1495	0	0	737
Confl. Peds. (#/hr)	1			9	9	
Heavy Vehicles (%)	7%	2%	3%	3%	20%	2%
Turn Type	Perm		NA		pm+pt	NA
Protected Phases			6		5	2
Permitted Phases	4				2	
Actuated Green, G (s)	19.0		57.0			70.0
Effective Green, g (s)	19.0		57.0			70.0
Actuated g/C Ratio	0.19		0.57			0.70
Clearance Time (s)	5.0		6.0			6.0
Lane Grp Cap (vph)	319		1976			1292
v/s Ratio Prot			c0.43			c0.04
v/s Ratio Perm	c0.02					0.36
v/c Ratio	0.10		0.76			0.57
Uniform Delay, d1	33.5		16.3			7.5
Progression Factor	1.00		1.00			1.40
Incremental Delay, d2	0.7		2.8			1.7
Delay (s)	34.1		19.0			12.2
Level of Service	C		B			B
Approach Delay (s)	34.1		19.0			12.2
Approach LOS	C		B			B

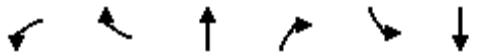
Intersection Summary			
HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	24	59	738	1271	5
Future Volume (Veh/h)	1	24	59	738	1271	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.97	0.97	0.96	0.96
Hourly flow rate (vph)	1	28	61	761	1324	5
Pedestrians	8					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				343	335	
pX, platoon unblocked	0.77	0.67	0.67			
vC, conflicting volume	2218	672	1337			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1226	0	535			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	96	91			
cM capacity (veh/h)	119	726	684			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	29	822	883	446
Volume Left	1	61	0	0
Volume Right	28	0	0	5
cSH	618	684	1700	1700
Volume to Capacity	0.05	0.09	0.52	0.26
Queue Length 95th (ft)	4	7	0	0
Control Delay (s)	11.1	2.4	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	11.1	2.4	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	90.7%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	84	712	0	0	1271
Future Volume (Veh/h)	1	84	712	0	0	1271
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.97	0.97	0.96	0.96
Hourly flow rate (vph)	1	99	734	0	0	1324
Pedestrians	11		13			
Lane Width (ft)	12.0		12.0			
Walking Speed (ft/s)	3.5		3.5			
Percent Blockage	1		1			
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			248			430
pX, platoon unblocked	0.74	0.88			0.88	
vC, conflicting volume	1420	378			745	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	113	6			425	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	89			100	
cM capacity (veh/h)	631	932			980	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	1	99	367	367	662	662
Volume Left	1	0	0	0	0	0
Volume Right	0	99	0	0	0	0
cSH	631	932	1700	1700	1700	1700
Volume to Capacity	0.00	0.11	0.22	0.22	0.39	0.39
Queue Length 95th (ft)	0	9	0	0	0	0
Control Delay (s)	10.7	9.3	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	9.3		0.0		0.0	
Approach LOS	A					

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	NBL	NBT	SBL	SBT	SET	NWT
Lane Group Flow (vph)	85	88	33	39	1382	681
v/c Ratio	0.30	0.23	0.12	0.10	0.80	0.49
Control Delay	36.9	32.8	33.5	30.3	16.5	22.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.9	32.8	33.5	30.3	16.5	22.8
Queue Length 50th (ft)	46	44	17	18	128	151
Queue Length 95th (ft)	86	82	42	44	200	214
Internal Link Dist (ft)		489		90	168	265
Turn Bay Length (ft)						
Base Capacity (vph)	279	384	270	380	1726	1388
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.23	0.12	0.10	0.80	0.49

Intersection Summary

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	72	68	7	28	30	3	149	1099	79	23	600	31
Future Volume (vph)	72	68	7	28	30	3	149	1099	79	23	600	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Flpb, ped/bikes	0.98	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			1.00	
Satd. Flow (prot)	1727	1814		1747	1795			3433			3447	
Flt Permitted	0.73	1.00		0.70	1.00			0.66			0.86	
Satd. Flow (perm)	1330	1814		1287	1795			2290			2977	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	85	80	8	33	35	4	155	1145	82	24	625	32
RTOR Reduction (vph)	0	4	0	0	3	0	0	5	0	0	4	0
Lane Group Flow (vph)	85	84	0	33	36	0	0	1377	0	0	677	0
Confl. Peds. (#/hr)	18		10	10		18	11		21	21		11
Heavy Vehicles (%)	2%	2%	14%	2%	4%	2%	2%	3%	5%	4%	2%	32%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			4		5	2			6	
Permitted Phases	4			4			2			6		
Actuated Green, G (s)	21.0	21.0		21.0	21.0			67.5			46.5	
Effective Green, g (s)	21.0	21.0		21.0	21.0			67.5			46.5	
Actuated g/C Ratio	0.21	0.21		0.21	0.21			0.68			0.46	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Grp Cap (vph)	279	380		270	376			1728			1384	
v/s Ratio Prot		0.05			0.02			c0.13				
v/s Ratio Perm	c0.06			0.03				c0.41			0.23	
v/c Ratio	0.30	0.22		0.12	0.10			0.80			0.49	
Uniform Delay, d1	33.3	32.7		32.0	31.8			11.4			18.5	
Progression Factor	1.00	1.00		1.00	1.00			1.41			1.16	
Incremental Delay, d2	2.8	1.3		0.9	0.5			2.7			1.2	
Delay (s)	36.1	34.1		33.0	32.3			18.8			22.7	
Level of Service	D	C		C	C			B			C	
Approach Delay (s)		35.1			32.6			18.8			22.7	
Approach LOS		D			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	87.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	0	1097	685	16	0	6
Future Volume (Veh/h)	0	1097	685	16	0	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.94	0.94	0.85	0.85
Hourly flow rate (vph)	0	1219	729	17	0	7
Pedestrians					34	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					3.5	
Percent Blockage					3	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		345	417			
pX, platoon unblocked	0.91				0.84	0.91
vC, conflicting volume	780				1381	407
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	556				581	145
tC, single (s)	4.1				6.9	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	888				357	770

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	SW 1
Volume Total	610	610	486	260	7
Volume Left	0	0	0	0	0
Volume Right	0	0	0	17	7
cSH	1700	1700	1700	1700	770
Volume to Capacity	0.36	0.36	0.29	0.15	0.01
Queue Length 95th (ft)	0	0	0	0	1
Control Delay (s)	0.0	0.0	0.0	0.0	9.7
Lane LOS					A
Approach Delay (s)	0.0		0.0		9.7
Approach LOS					A

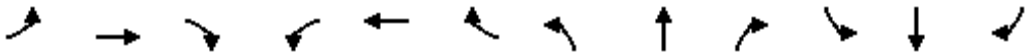
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	33.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	SET	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	1219	818	32	91	81	52
v/c Ratio	0.63	0.41	0.10	0.19	0.31	0.12
Control Delay	10.3	9.4	29.7	14.9	34.1	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.3	9.4	29.7	14.9	34.1	15.0
Queue Length 50th (ft)	197	120	16	18	42	9
Queue Length 95th (ft)	385	154	38	52	80	35
Internal Link Dist (ft)	337	584		513		115
Turn Bay Length (ft)						
Base Capacity (vph)	1934	2019	317	468	263	430
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.41	0.10	0.19	0.31	0.12

Intersection Summary

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	53	1025	6	17	687	24	27	31	47	69	15	29
Future Volume (vph)	53	1025	6	17	687	24	27	31	47	69	15	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0		5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00		1.00	0.99		1.00	0.95	
Flpb, ped/bikes		1.00			1.00		0.93	1.00		1.00	1.00	
Frt		1.00			1.00		1.00	0.91		1.00	0.90	
Flt Protected		1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3523			3468		1636	1677		1404	1590	
Flt Permitted		0.86			0.91		0.72	1.00		0.70	1.00	
Satd. Flow (perm)		3023			3154		1245	1677		1032	1590	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	60	1152	7	19	772	27	32	36	55	81	18	34
RTOR Reduction (vph)	0	0	0	0	3	0	0	41	0	0	25	0
Lane Group Flow (vph)	0	1219	0	0	815	0	32	50	0	81	27	0
Confl. Peds. (#/hr)	31		10	10		31	43		3	3		43
Heavy Vehicles (%)	2%	2%	2%	2%	3%	7%	3%	2%	2%	28%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		64.0			64.0		25.5	25.5		25.5	25.5	
Effective Green, g (s)		64.0			64.0		25.5	25.5		25.5	25.5	
Actuated g/C Ratio		0.64			0.64		0.26	0.26		0.26	0.26	
Clearance Time (s)		5.0			5.0		5.5	5.5		5.5	5.5	
Lane Grp Cap (vph)		1934			2018		317	427		263	405	
v/s Ratio Prot								0.03			0.02	
v/s Ratio Perm		c0.40			0.26		0.03			c0.08		
v/c Ratio		0.63			0.40		0.10	0.12		0.31	0.07	
Uniform Delay, d1		10.9			8.7		28.5	28.6		30.1	28.2	
Progression Factor		0.84			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.0			0.6		0.6	0.6		3.0	0.3	
Delay (s)		10.1			9.3		29.1	29.2		33.1	28.5	
Level of Service		B			A		C	C		C	C	
Approach Delay (s)		10.1			9.3			29.2			31.3	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	14	0	18	103	10	624	0	0	1136	7
Future Volume (Veh/h)	1	0	14	0	18	103	10	624	0	0	1136	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.91	0.91	0.91	0.93	0.93	0.93
Hourly flow rate (vph)	1	0	16	0	21	121	11	686	0	0	1222	8
Pedestrians		19			15							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		3.5			3.5							
Percent Blockage		2			1							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											664	
pX, platoon unblocked	0.82	0.82	0.82	0.82	0.82		0.82					
vC, conflicting volume	1742	1968	634	1350	1972	358	1249			701		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1460	1737	106	981	1742	358	858			701		
tC, single (s)	7.5	6.5	7.2	7.5	6.7	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.1	3.3	2.2			2.2		
p0 queue free %	98	100	98	100	65	81	98			100		
cM capacity (veh/h)	41	67	715	154	61	629	625			879		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	17	21	121	240	457	815	415
Volume Left	1	0	0	11	0	0	0
Volume Right	16	0	121	0	0	0	8
cSH	365	61	629	625	1700	1700	1700
Volume to Capacity	0.05	0.35	0.19	0.02	0.27	0.48	0.24
Queue Length 95th (ft)	4	32	18	1	0	0	0
Control Delay (s)	15.4	92.9	12.1	0.7	0.0	0.0	0.0
Lane LOS	C	F	B	A			
Approach Delay (s)	15.4	24.0		0.2		0.0	
Approach LOS	C	C					

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	41.6%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	19	57	15	10	98	129	12	38	13
Future Volume (Veh/h)	0	0	0	19	57	15	10	98	129	12	38	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	0	0	21	62	16	12	115	152	14	45	15
Pedestrians		6			13			10			2	
Lane Width (ft)		0.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		0			1			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								170				
pX, platoon unblocked	0.97	0.97		0.97	0.97	0.97				0.97		
vC, conflicting volume	350	390	68	318	322	206	66			280		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	312	353	68	278	282	162	66			239		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	97	89	98	99			99		
cM capacity (veh/h)	545	536	985	623	587	842	1536			1269		

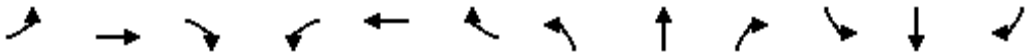
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	99	279	74
Volume Left	21	12	14
Volume Right	16	152	15
cSH	625	1536	1269
Volume to Capacity	0.16	0.01	0.01
Queue Length 95th (ft)	14	1	1
Control Delay (s)	11.8	0.4	1.6
Lane LOS	B	A	A
Approach Delay (s)	11.8	0.4	1.6
Approach LOS	B		

Intersection Summary				
Average Delay	3.1			
Intersection Capacity Utilization	33.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	123	23	15	84	18	13
Future Volume (Veh/h)	123	23	15	84	18	13
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.93	0.93	0.85	0.85
Hourly flow rate (vph)	145	27	16	90	21	15
Pedestrians	5			3	5	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			177		290	166
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			177		290	166
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		97	98
cM capacity (veh/h)			1392		686	871

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	172	106	36
Volume Left	0	16	21
Volume Right	27	0	15
cSH	1700	1392	752
Volume to Capacity	0.10	0.01	0.05
Queue Length 95th (ft)	0	1	4
Control Delay (s)	0.0	1.2	10.0
Lane LOS		A	B
Approach Delay (s)	0.0	1.2	10.0
Approach LOS			B

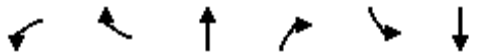
Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	28.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	96	31	10	75	1	7	13	8	8	20	16
Future Volume (vph)	7	96	31	10	75	1	7	13	8	8	20	16
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.88	0.88	0.88	0.85	0.85	0.85
Hourly flow rate (vph)	8	113	36	12	88	1	8	15	9	9	24	19

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	157	101	32	52
Volume Left (vph)	8	12	8	9
Volume Right (vph)	36	1	9	19
Hadj (s)	-0.02	0.05	-0.08	-0.15
Departure Headway (s)	4.2	4.3	4.4	4.4
Degree Utilization, x	0.18	0.12	0.04	0.06
Capacity (veh/h)	838	813	755	767
Control Delay (s)	8.1	7.9	7.6	7.7
Approach Delay (s)	8.1	7.9	7.6	7.7
Approach LOS	A	A	A	A

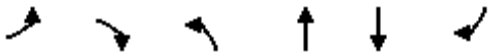
Intersection Summary				
Delay	7.9			
Level of Service	A			
Intersection Capacity Utilization	19.9%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	4	4	25	3	0	69
Future Volume (Veh/h)	4	4	25	3	0	69
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	5	5	29	4	0	81
Pedestrians	8					1
Lane Width (ft)	12.0					12.0
Walking Speed (ft/s)	3.5					3.5
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	120	40			41	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	120	40			41	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	869	1022			1544	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	10	33	81
Volume Left	5	0	0
Volume Right	5	4	0
cSH	939	1700	1544
Volume to Capacity	0.01	0.02	0.00
Queue Length 95th (ft)	1	0	0
Control Delay (s)	8.9	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.9	0.0	0.0
Approach LOS	A		

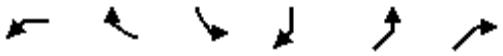
Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	16.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	65	27	19	60	9
Future Volume (Veh/h)	11	65	27	19	60	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	13	76	32	22	71	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	162	76	82			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	162	76	82			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	92	98			
cM capacity (veh/h)	811	985	1515			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	89	54	82
Volume Left	13	32	0
Volume Right	76	0	11
cSH	955	1515	1700
Volume to Capacity	0.09	0.02	0.05
Queue Length 95th (ft)	8	2	0
Control Delay (s)	9.2	4.5	0.0
Lane LOS	A	A	
Approach Delay (s)	9.2	4.5	0.0
Approach LOS	A		

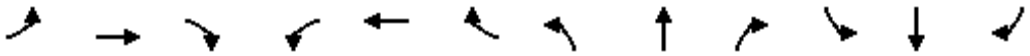
Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	20.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	10	7	18	102	39	75
Future Volume (Veh/h)	10	7	18	102	39	75
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	12	8	21	120	46	88
Pedestrians	4		18		5	
Lane Width (ft)	12.0		12.0		12.0	
Walking Speed (ft/s)	3.5		3.5		3.5	
Percent Blockage	0		2		0	
Right turn flare (veh)						
Median type			None		None	
Median storage veh)						
Upstream signal (ft)					195	
pX, platoon unblocked						
vC, conflicting volume	261	112	138			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	261	112	138			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	99			
cM capacity (veh/h)	711	921	1440			

Direction, Lane #	WB 1	SB 1	NE 1
Volume Total	20	141	134
Volume Left	12	21	0
Volume Right	8	0	88
cSH	783	1440	1700
Volume to Capacity	0.03	0.01	0.08
Queue Length 95th (ft)	2	1	0
Control Delay (s)	9.7	1.2	0.0
Lane LOS	A	A	
Approach Delay (s)	9.7	1.2	0.0
Approach LOS	A		

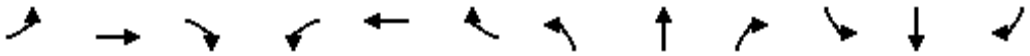
Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	34.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	31	27	2	10	9	30	6	89	13	38	19	26
Future Volume (vph)	31	27	2	10	9	30	6	89	13	38	19	26
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	36	32	2	12	11	35	7	105	15	45	22	31

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	70	58	127	98
Volume Left (vph)	36	12	7	45
Volume Right (vph)	2	35	15	31
Hadj (s)	0.12	-0.28	-0.03	0.03
Departure Headway (s)	4.6	4.2	4.3	4.4
Degree Utilization, x	0.09	0.07	0.15	0.12
Capacity (veh/h)	743	795	807	785
Control Delay (s)	8.0	7.5	8.0	8.0
Approach Delay (s)	8.0	7.5	8.0	8.0
Approach LOS	A	A	A	A

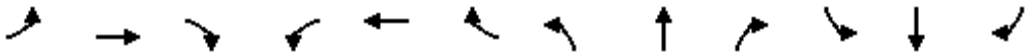
Intersection Summary				
Delay	7.9			
Level of Service	A			
Intersection Capacity Utilization	27.0%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	5	0	27	54	2	6	50	45	8	23	4
Future Volume (vph)	0	5	0	27	54	2	6	50	45	8	23	4
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	6	0	32	64	2	7	59	53	9	27	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	6	98	119	41
Volume Left (vph)	0	32	7	9
Volume Right (vph)	0	2	53	5
Hadj (s)	0.03	0.09	-0.21	0.04
Departure Headway (s)	4.4	4.3	4.0	4.3
Degree Utilization, x	0.01	0.12	0.13	0.05
Capacity (veh/h)	782	801	875	810
Control Delay (s)	7.4	7.9	7.6	7.5
Approach Delay (s)	7.4	7.9	7.6	7.5
Approach LOS	A	A	A	A

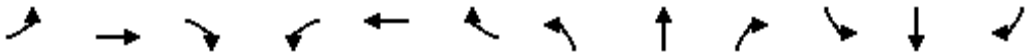
Intersection Summary				
Delay	7.7			
Level of Service	A			
Intersection Capacity Utilization	25.9%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	69	2	14	56	3	3	17	13	10	17	2
Future Volume (vph)	3	69	2	14	56	3	3	17	13	10	17	2
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	4	81	2	16	66	4	4	20	15	12	20	2

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	87	86	39	34
Volume Left (vph)	4	16	4	12
Volume Right (vph)	2	4	15	2
Hadj (s)	0.03	0.04	-0.18	0.07
Departure Headway (s)	4.2	4.2	4.1	4.4
Degree Utilization, x	0.10	0.10	0.04	0.04
Capacity (veh/h)	839	837	824	783
Control Delay (s)	7.6	7.7	7.3	7.6
Approach Delay (s)	7.6	7.7	7.3	7.6
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.6			
Level of Service	A			
Intersection Capacity Utilization	21.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	4	114	8	13	71	16	3	83	7	16	177	9
Future Volume (vph)	4	114	8	13	71	16	3	83	7	16	177	9
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.86	0.86	0.86	0.91	0.91	0.91
Hourly flow rate (vph)	5	134	9	15	84	19	3	97	8	18	195	10

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	148	118	108	223
Volume Left (vph)	5	15	3	18
Volume Right (vph)	9	19	8	10
Hadj (s)	0.00	-0.04	0.03	0.02
Departure Headway (s)	4.9	4.9	4.9	4.7
Degree Utilization, x	0.20	0.16	0.15	0.29
Capacity (veh/h)	681	675	684	714
Control Delay (s)	9.1	8.8	8.7	9.7
Approach Delay (s)	9.1	8.8	8.7	9.7
Approach LOS	A	A	A	A

Intersection Summary				
Delay	9.2			
Level of Service	A			
Intersection Capacity Utilization	34.8%	ICU Level of Service	A	
Analysis Period (min)	15			

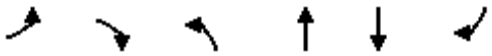
Queues
1: 50th St & Massachusetts Ave

Lane Group	NBL	SET	NWT
Lane Group Flow (vph)	44	1026	1264
v/c Ratio	0.14	0.49	0.53
Control Delay	35.3	12.2	3.6
Queue Delay	0.0	0.0	0.0
Total Delay	35.3	12.2	3.6
Queue Length 50th (ft)	23	179	64
Queue Length 95th (ft)	52	228	74
Internal Link Dist (ft)	174	579	255
Turn Bay Length (ft)			
Base Capacity (vph)	318	2090	2405
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.14	0.49	0.53

Intersection Summary

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Volume (vph)	37	1	945	40	3	1173
Future Volume (vph)	37	1	945	40	3	1173
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		6.0			6.0
Lane Util. Factor	1.00		0.95			0.95
Frpb, ped/bikes	1.00		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	1.00		0.99			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	1764		3478			3539
Flt Permitted	0.95		1.00			0.95
Satd. Flow (perm)	1764		3478			3376
Peak-hour factor, PHF	0.87	0.87	0.96	0.96	0.93	0.93
Adj. Flow (vph)	43	1	984	42	3	1261
RTOR Reduction (vph)	1	0	3	0	0	0
Lane Group Flow (vph)	43	0	1023	0	0	1264
Confl. Peds. (#/hr)	2	5		12	12	
Heavy Vehicles (%)	2%	2%	3%	2%	2%	2%
Turn Type	Perm		NA		pm+pt	NA
Protected Phases			6		5	2
Permitted Phases	4				2	
Actuated Green, G (s)	18.0		60.0			71.0
Effective Green, g (s)	18.0		60.0			71.0
Actuated g/C Ratio	0.18		0.60			0.71
Clearance Time (s)	5.0		6.0			6.0
Lane Grp Cap (vph)	317		2086			2405
v/s Ratio Prot			0.29			c0.03
v/s Ratio Perm	c0.02					c0.35
v/c Ratio	0.14		0.49			0.53
Uniform Delay, d1	34.5		11.3			6.7
Progression Factor	1.00		1.00			0.43
Incremental Delay, d2	0.9		0.8			0.7
Delay (s)	35.4		12.2			3.6
Level of Service	D		B			A
Approach Delay (s)	35.4		12.2			3.6
Approach LOS	D		B			A

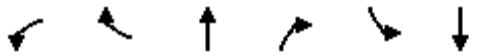
Intersection Summary			
HCM 2000 Control Delay	8.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	55	28	1187	944	3
Future Volume (Veh/h)	5	55	28	1187	944	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.93	0.93	0.96	0.96
Hourly flow rate (vph)	6	61	30	1276	983	3
Pedestrians	13					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				343	335	
pX, platoon unblocked	0.85	0.83	0.83			
vC, conflicting volume	1696	506	999			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	600	11	602			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	93	96			
cM capacity (veh/h)	351	879	800			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	67	455	851	655	331
Volume Left	6	30	0	0	0
Volume Right	61	0	0	0	3
cSH	774	800	1700	1700	1700
Volume to Capacity	0.09	0.04	0.50	0.39	0.19
Queue Length 95th (ft)	7	3	0	0	0
Control Delay (s)	10.1	1.1	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	10.1	0.4		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	63.2%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	110	1104	0	0	1004
Future Volume (Veh/h)	0	110	1104	0	0	1004
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.93	0.93	0.96	0.96
Hourly flow rate (vph)	0	129	1187	0	0	1046
Pedestrians	21					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	2					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			248			430
pX, platoon unblocked	0.85	0.77			0.77	
vC, conflicting volume	1731	614			1208	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	641	0			672	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	84			100	
cM capacity (veh/h)	340	818			690	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	0	129	594	594	523	523
Volume Left	0	0	0	0	0	0
Volume Right	0	129	0	0	0	0
cSH	1700	818	1700	1700	1700	1700
Volume to Capacity	0.00	0.16	0.35	0.35	0.31	0.31
Queue Length 95th (ft)	0	14	0	0	0	0
Control Delay (s)	0.0	10.2	0.0	0.0	0.0	0.0
Lane LOS	A	B				
Approach Delay (s)	10.2		0.0		0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	NBL	NBT	SBL	SBT	SET	NWT
Lane Group Flow (vph)	83	128	45	57	998	1194
v/c Ratio	0.30	0.33	0.18	0.15	0.67	0.69
Control Delay	36.9	35.9	34.7	31.6	14.0	12.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.9	35.9	34.7	31.6	14.0	12.3
Queue Length 50th (ft)	45	69	24	28	91	276
Queue Length 95th (ft)	90	123	55	62	157	354
Internal Link Dist (ft)		489		90	168	265
Turn Bay Length (ft)						
Base Capacity (vph)	276	385	252	388	1485	1737
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.33	0.18	0.15	0.67	0.69

Intersection Summary

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	77	114	5	41	48	5	109	808	71	30	1025	56
Future Volume (vph)	77	114	5	41	48	5	109	808	71	30	1025	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes	0.98	1.00		0.96	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			1.00	
Satd. Flow (prot)	1735	1830		1698	1833			3463			3476	
Flt Permitted	0.72	1.00		0.67	1.00			0.59			0.90	
Satd. Flow (perm)	1314	1830		1203	1833			2056			3125	
Peak-hour factor, PHF	0.93	0.93	0.93	0.92	0.92	0.92	0.99	0.99	0.99	0.93	0.93	0.93
Adj. Flow (vph)	83	123	5	45	52	5	110	816	72	32	1102	60
RTOR Reduction (vph)	0	2	0	0	3	0	0	6	0	0	4	0
Lane Group Flow (vph)	83	126	0	45	54	0	0	992	0	0	1190	0
Confl. Peds. (#/hr)	15		34	34		15	25		16	16		25
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	9%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			4		5	2			6	
Permitted Phases	4			4			2			6		
Actuated Green, G (s)	21.0	21.0		21.0	21.0			67.5			55.5	
Effective Green, g (s)	21.0	21.0		21.0	21.0			67.5			55.5	
Actuated g/C Ratio	0.21	0.21		0.21	0.21			0.68			0.56	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Grp Cap (vph)	275	384		252	384			1486			1734	
v/s Ratio Prot		c0.07			0.03			c0.05				
v/s Ratio Perm	0.06			0.04				c0.40			0.38	
v/c Ratio	0.30	0.33		0.18	0.14			0.67			0.69	
Uniform Delay, d1	33.3	33.5		32.4	32.2			9.6			16.0	
Progression Factor	1.00	1.00		1.00	1.00			1.42			0.64	
Incremental Delay, d2	2.8	2.3		1.5	0.8			2.2			2.0	
Delay (s)	36.1	35.8		34.0	32.9			15.8			12.2	
Level of Service	D	D		C	C			B			B	
Approach Delay (s)		35.9			33.4			15.8			12.2	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	90.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	0	847	1114	55	0	12
Future Volume (Veh/h)	0	847	1114	55	0	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.97	0.97	0.85	0.85
Hourly flow rate (vph)	0	911	1148	57	0	14
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		345	417			
pX, platoon unblocked	0.84				0.90	0.84
vC, conflicting volume	1205				1632	602
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	864				903	146
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	98
cM capacity (veh/h)	651				248	734

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	SW 1
Volume Total	456	456	765	440	14
Volume Left	0	0	0	0	0
Volume Right	0	0	0	57	14
cSH	1700	1700	1700	1700	734
Volume to Capacity	0.27	0.27	0.45	0.26	0.02
Queue Length 95th (ft)	0	0	0	0	1
Control Delay (s)	0.0	0.0	0.0	0.0	10.0
Lane LOS					A
Approach Delay (s)	0.0		0.0		10.0
Approach LOS					A

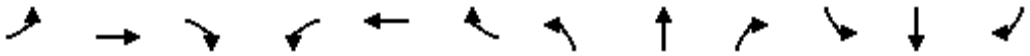
Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	SET	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	859	1250	14	77	85	59
v/c Ratio	0.37	0.54	0.06	0.23	0.40	0.18
Control Delay	9.0	7.9	34.5	19.6	42.3	21.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.0	7.9	34.5	19.6	42.3	21.6
Queue Length 50th (ft)	135	170	7	18	48	16
Queue Length 95th (ft)	135	216	23	53	96	51
Internal Link Dist (ft)	337	584		513		115
Turn Bay Length (ft)						
Base Capacity (vph)	2339	2297	239	339	213	334
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.54	0.06	0.23	0.40	0.18

Intersection Summary

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	12	826	4	24	1102	49	12	28	37	82	28	29
Future Volume (vph)	12	826	4	24	1102	49	12	28	37	82	28	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0		5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00		1.00	0.97		1.00	0.97	
Flpb, ped/bikes		1.00			1.00		0.96	1.00		0.96	1.00	
Frt		1.00			0.99		1.00	0.91		1.00	0.92	
Flt Protected		1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3532			3496		1707	1644		1551	1677	
Flt Permitted		0.93			0.92		0.72	1.00		0.71	1.00	
Satd. Flow (perm)		3293			3230		1291	1644		1154	1677	
Peak-hour factor, PHF	0.98	0.98	0.98	0.94	0.94	0.94	0.85	0.85	0.85	0.96	0.96	0.96
Adj. Flow (vph)	12	843	4	26	1172	52	14	33	44	85	29	30
RTOR Reduction (vph)	0	0	0	0	3	0	0	36	0	0	24	0
Lane Group Flow (vph)	0	859	0	0	1247	0	14	41	0	85	35	0
Confl. Peds. (#/hr)	33		21	21		33	23		15	15		23
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	12%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		71.0			71.0		18.5	18.5		18.5	18.5	
Effective Green, g (s)		71.0			71.0		18.5	18.5		18.5	18.5	
Actuated g/C Ratio		0.71			0.71		0.18	0.18		0.18	0.18	
Clearance Time (s)		5.0			5.0		5.5	5.5		5.5	5.5	
Lane Grp Cap (vph)		2338			2293		238	304		213	310	
v/s Ratio Prot								0.03			0.02	
v/s Ratio Perm		0.26			c0.39		0.01			c0.07		
v/c Ratio		0.37			0.54		0.06	0.14		0.40	0.11	
Uniform Delay, d1		5.7			6.8		33.6	34.1		35.9	33.9	
Progression Factor		1.50			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4			0.9		0.5	0.9		5.5	0.7	
Delay (s)		8.9			7.8		34.0	35.0		41.4	34.6	
Level of Service		A			A		C	C		D	C	
Approach Delay (s)		8.9			7.8			34.8			38.6	
Approach LOS		A			A			C			D	

Intersection Summary			
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	15	1	12	211	14	967	0	0	961	2
Future Volume (Veh/h)	2	0	15	1	12	211	14	967	0	0	961	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.85	0.85	0.85	0.96	0.96	0.96	0.97	0.97	0.97
Hourly flow rate (vph)	2	0	17	1	14	248	15	1007	0	0	991	2
Pedestrians		31			25			1			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		3			2			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											664	
pX, platoon unblocked	0.92	0.92	0.92	0.92	0.92		0.92					
vC, conflicting volume	1812	2085	528	1576	2086	530	1024			1032		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1704	2001	302	1445	2002	530	843			1032		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	89	100	97	99	72	49	98			100		
cM capacity (veh/h)	19	50	616	76	50	482	701			653		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	19	15	248	351	671	661	332
Volume Left	2	1	0	15	0	0	0
Volume Right	17	0	248	0	0	0	2
cSH	143	51	482	701	1700	1700	1700
Volume to Capacity	0.13	0.29	0.51	0.02	0.39	0.39	0.20
Queue Length 95th (ft)	11	25	72	2	0	0	0
Control Delay (s)	34.1	102.0	20.1	0.7	0.0	0.0	0.0
Lane LOS	D	F	C	A			
Approach Delay (s)	34.1	24.8		0.2		0.0	
Approach LOS	D	C					

Intersection Summary				
Average Delay	3.2			
Intersection Capacity Utilization	54.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	23	109	15	20	161	117	18	58	3
Future Volume (Veh/h)	0	0	0	23	109	15	20	161	117	18	58	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.94	0.94	0.94	0.89	0.89	0.89
Hourly flow rate (vph)	0	0	0	24	116	16	21	171	124	20	65	3
Pedestrians		6			22			2			8	
Lane Width (ft)		0.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		0			2			0			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								170				
pX, platoon unblocked	0.94	0.94		0.94	0.94	0.94				0.94		
vC, conflicting volume	470	472	74	406	411	263	74			317		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	409	411	74	341	347	190	74			247		
tC, single (s)	7.1	6.5	6.2	7.2	6.5	6.2	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2			2.4		
p0 queue free %	100	100	100	95	78	98	99			98		
cM capacity (veh/h)	404	475	985	530	516	781	1526			1105		

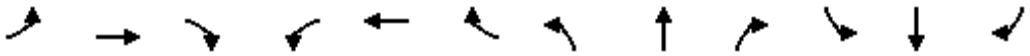
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	156	316	88
Volume Left	24	21	20
Volume Right	16	124	3
cSH	537	1526	1105
Volume to Capacity	0.29	0.01	0.02
Queue Length 95th (ft)	30	1	1
Control Delay (s)	14.4	0.6	2.0
Lane LOS	B	A	A
Approach Delay (s)	14.4	0.6	2.0
Approach LOS	B		

Intersection Summary				
Average Delay	4.7			
Intersection Capacity Utilization	40.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	98	45	19	111	33	20
Future Volume (Veh/h)	98	45	19	111	33	20
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.87	0.87	0.85	0.85
Hourly flow rate (vph)	115	53	22	128	39	24
Pedestrians	5			5	8	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	0			0	1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			176		326	154
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			176		326	154
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		94	97
cM capacity (veh/h)			1390		649	880

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	168	150	63
Volume Left	0	22	39
Volume Right	53	0	24
cSH	1700	1390	721
Volume to Capacity	0.10	0.02	0.09
Queue Length 95th (ft)	0	1	7
Control Delay (s)	0.0	1.2	10.5
Lane LOS		A	B
Approach Delay (s)	0.0	1.2	10.5
Approach LOS			B

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	31.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	15	56	38	9	110	8	9	17	5	4	31	17
Future Volume (vph)	15	56	38	9	110	8	9	17	5	4	31	17
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.86	0.86	0.86
Hourly flow rate (vph)	18	66	45	11	129	9	11	20	6	5	36	20

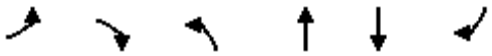
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	129	149	37	61
Volume Left (vph)	18	11	11	5
Volume Right (vph)	45	9	6	20
Hadj (s)	-0.05	0.04	0.00	-0.15
Departure Headway (s)	4.2	4.3	4.6	4.4
Degree Utilization, x	0.15	0.18	0.05	0.07
Capacity (veh/h)	823	814	730	754
Control Delay (s)	8.0	8.2	7.8	7.8
Approach Delay (s)	8.0	8.2	7.8	7.8
Approach LOS	A	A	A	A

Intersection Summary				
Delay	8.0			
Level of Service	A			
Intersection Capacity Utilization	23.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	2	28	4	2	88
Future Volume (Veh/h)	5	2	28	4	2	88
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.86	0.86	0.89	0.89
Hourly flow rate (vph)	6	2	33	5	2	99
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	138	36			38	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	138	36			38	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	854	1037			1572	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	8	38	101
Volume Left	6	0	2
Volume Right	2	5	0
cSH	893	1700	1572
Volume to Capacity	0.01	0.02	0.00
Queue Length 95th (ft)	1	0	0
Control Delay (s)	9.1	0.0	0.2
Lane LOS	A		A
Approach Delay (s)	9.1	0.0	0.2
Approach LOS	A		

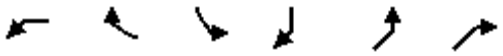
Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	16.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	87	54	18	72	18
Future Volume (Veh/h)	15	87	54	18	72	18
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	18	102	64	21	85	21
Pedestrians				17	1	
Lane Width (ft)				12.0	12.0	
Walking Speed (ft/s)				3.5	3.5	
Percent Blockage				2	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	246	112	106			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	246	112	106			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	89	96			
cM capacity (veh/h)	710	925	1485			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	120	85	106
Volume Left	18	64	0
Volume Right	102	0	21
cSH	885	1485	1700
Volume to Capacity	0.14	0.04	0.06
Queue Length 95th (ft)	12	3	0
Control Delay (s)	9.7	5.8	0.0
Lane LOS	A	A	
Approach Delay (s)	9.7	5.8	0.0
Approach LOS	A		

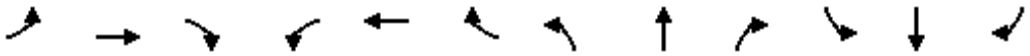
Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	27.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	30	9	27	130	61	16
Future Volume (Veh/h)	30	9	27	130	61	16
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	35	11	32	153	72	19
Pedestrians	6		22		8	
Lane Width (ft)	12.0		12.0		12.0	
Walking Speed (ft/s)	3.5		3.5		3.5	
Percent Blockage	1		2		1	
Right turn flare (veh)						
Median type			None		None	
Median storage veh)						
Upstream signal (ft)					195	
pX, platoon unblocked						
vC, conflicting volume	312	110	97			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	312	110	97			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	99	98			
cM capacity (veh/h)	657	919	1488			

Direction, Lane #	WB 1	SB 1	NE 1
Volume Total	46	185	91
Volume Left	35	32	0
Volume Right	11	0	19
cSH	705	1488	1700
Volume to Capacity	0.07	0.02	0.05
Queue Length 95th (ft)	5	2	0
Control Delay (s)	10.5	1.4	0.0
Lane LOS	B	A	
Approach Delay (s)	10.5	1.4	0.0
Approach LOS	B		

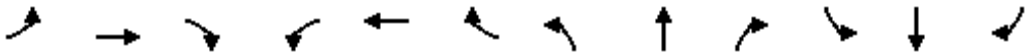
Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	35.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	45	10	0	13	18	22	2	132	12	12	84	32
Future Volume (vph)	45	10	0	13	18	22	2	132	12	12	84	32
Peak Hour Factor	0.95	0.95	0.95	0.85	0.85	0.85	0.88	0.88	0.88	0.85	0.85	0.85
Hourly flow rate (vph)	47	11	0	15	21	26	2	150	14	14	99	38

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	58	62	166	151
Volume Left (vph)	47	15	2	14
Volume Right (vph)	0	26	14	38
Hadj (s)	0.24	-0.15	-0.01	-0.08
Departure Headway (s)	4.9	4.5	4.3	4.3
Degree Utilization, x	0.08	0.08	0.20	0.18
Capacity (veh/h)	674	728	796	798
Control Delay (s)	8.4	7.9	8.4	8.2
Approach Delay (s)	8.4	7.9	8.4	8.2
Approach LOS	A	A	A	A

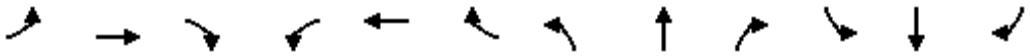
Intersection Summary				
Delay	8.3			
Level of Service	A			
Intersection Capacity Utilization	29.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	2	0	15	35	4	8	109	37	9	66	4
Future Volume (vph)	0	2	0	15	35	4	8	109	37	9	66	4
Peak Hour Factor	1.00	1.00	1.00	0.85	0.85	0.85	0.90	0.90	0.90	0.85	0.85	0.85
Hourly flow rate (vph)	0	2	0	18	41	5	9	121	41	11	78	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	2	64	171	94
Volume Left (vph)	0	18	9	11
Volume Right (vph)	0	5	41	5
Hadj (s)	0.03	0.05	-0.10	0.03
Departure Headway (s)	4.6	4.5	4.1	4.3
Degree Utilization, x	0.00	0.08	0.19	0.11
Capacity (veh/h)	724	741	863	826
Control Delay (s)	7.6	7.9	8.0	7.8
Approach Delay (s)	7.6	7.9	8.0	7.8
Approach LOS	A	A	A	A

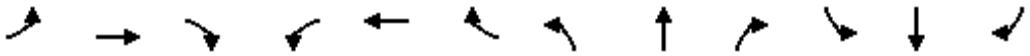
Intersection Summary				
Delay	7.9			
Level of Service	A			
Intersection Capacity Utilization	27.5%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	1	39	1	21	70	7	8	20	16	5	33	1
Future Volume (vph)	1	39	1	21	70	7	8	20	16	5	33	1
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	1	46	1	25	82	8	9	24	19	6	39	1

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	48	115	52	46
Volume Left (vph)	1	25	9	6
Volume Right (vph)	1	8	19	1
Hadj (s)	0.03	0.04	-0.11	0.05
Departure Headway (s)	4.3	4.2	4.2	4.4
Degree Utilization, x	0.06	0.13	0.06	0.06
Capacity (veh/h)	816	833	815	789
Control Delay (s)	7.5	7.9	7.5	7.6
Approach Delay (s)	7.5	7.9	7.5	7.6
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.7		
Level of Service	A		
Intersection Capacity Utilization	24.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	57	7	6	116	18	5	130	4	8	133	10
Future Volume (vph)	7	57	7	6	116	18	5	130	4	8	133	10
Peak Hour Factor	0.85	0.85	0.85	0.94	0.94	0.94	0.86	0.86	0.86	0.91	0.91	0.91
Hourly flow rate (vph)	8	67	8	6	123	19	6	151	5	9	146	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	83	148	162	166
Volume Left (vph)	8	6	6	9
Volume Right (vph)	8	19	5	11
Hadj (s)	0.01	-0.03	0.02	0.01
Departure Headway (s)	4.9	4.8	4.7	4.7
Degree Utilization, x	0.11	0.20	0.21	0.22
Capacity (veh/h)	672	698	721	719
Control Delay (s)	8.5	8.9	9.0	9.0
Approach Delay (s)	8.5	8.9	9.0	9.0
Approach LOS	A	A	A	A

Intersection Summary				
Delay	8.9			
Level of Service	A			
Intersection Capacity Utilization	27.0%	ICU Level of Service	A	
Analysis Period (min)	15			