Traffic Impact Study

Columbia Place PUD

Washington, DC

December 12, 2014

GOROVE / SLADE

Transportation Planners and Engineers

Prepared by:

1140 Connecticut Avenue NW
Suite 600
Washington, DC 20036
Tel: 202.296.8625
Fax: 202.785.1276

3914 Centreville Road
Suite 330
Chantilly, VA 20151
Tel: 703.787.9595
Fax: 703.787.9905

15125 Washington Street
Suite 316
Haymarket, VA 20169
Tel: 571.248.0992

www.goroveslade.com

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1: INTRODUCTION

This report presents the findings of a Traffic Impact Study (TIS) conducted for the Columbia Place development located in the northwest quadrant of Washington, DC in support of a Planned Unit Development (PUD) application and zoning map amendment for Square 369. The site is located on two sides of an existing zoning boundary line; part of the site is currently zoned DD/C-2-C and the other is zoned DD/C-2-A. The zoning map amendment requests that most of the site be rezoned to the DD/C-3-C zone, with a portion of the eastern side remaining as DD/C-2-A. Figure 1 identifies the site location within the District. The site is bordered by 9th Street to the east, L Street to the south, and existing buildings/parking to the north and west in Northwest Washington, DC. This site will be redeveloped as a mixed-use development consisting of approximately 200 residential units, two hotels containing approximately 500 rooms combined, and 2,250 square feet (sf) of ground floor retail. Additionally, there will be two levels of below-grade parking providing 271 spaces in a parking garage below the site, accessed from alleys connecting to L, M, and 9th Streets.

Vehicular access to the residential and hotel components of the project will be through a reconfigured alley system, as shown on Figure 6. Access to the residential garage will be off the new easement area at L Street. Access to hotel parking will be from an entrance located on the new east-west easement area that will connect 9th Street to the north-south public alley (Shepherd Court) connecting M Street and L Street. Loading activities will take place at two separate loading docks located in the back of the building along the east-west alley. Trucks will primarily access the loading docks from 9th Street. Pedestrian access to the residential component will be provided via a single entrance from L Street on the western side of the site. Pedestrian access to the hotel lobbies will be provided via two separate entrances on L Street east of the residential entrance and on 9th Street, while pedestrian access to the ground floor retail uses will be from 9th Street. The purpose of this report is to:

1. Review the transportation elements of the development site plan, supplementing the material provided in the site plans that accompany the development application, and demonstrate that the site promotes non-automobile modes of travel and sustainability.
2. Provide information to the District Department of Transportation (DDOT) and other agencies on how the development of the site will influence the local transportation network. This report accomplishes this by identifying the potential trips generated by the site and where these trips will be distributed on the network.
3. Determine if development of the site will lead to adverse impacts on the local transportation network. This report accomplishes this by projecting future conditions with and without development of the site and performing analyses of vehicular delays. These delays are compared to the acceptable levels of delay set by DDOT standards to determine if the site will negatively impact the study area. Transit, pedestrian, and bicycle modes are also analyzed to determine how they are impacted by the site.

This report contains three sections as follows:

- *Site Review (Section 2)*
  This section provides a summary of major transportation features near the site, to help establish a reference for the following sections. This includes reviewing roadways, transit and bicycle facilities, and future developments.
- *Design Review (Section 3)*
  This section provides a summary of the internal transportation features of the proposed development. This section is meant to supplement the details provided in the site plan package contained in the PUD application and

reviews such items as the general parking strategy of the site, bicycle accommodations, and transportation demand management (TDM).

- *Impacts Review (Section 4)*
  This section provides a review of the impacts development of the proposed buildings could have to each mode within the transportation network. For each mode, and where necessary, a list of recommendations and mitigation measures are compiled.

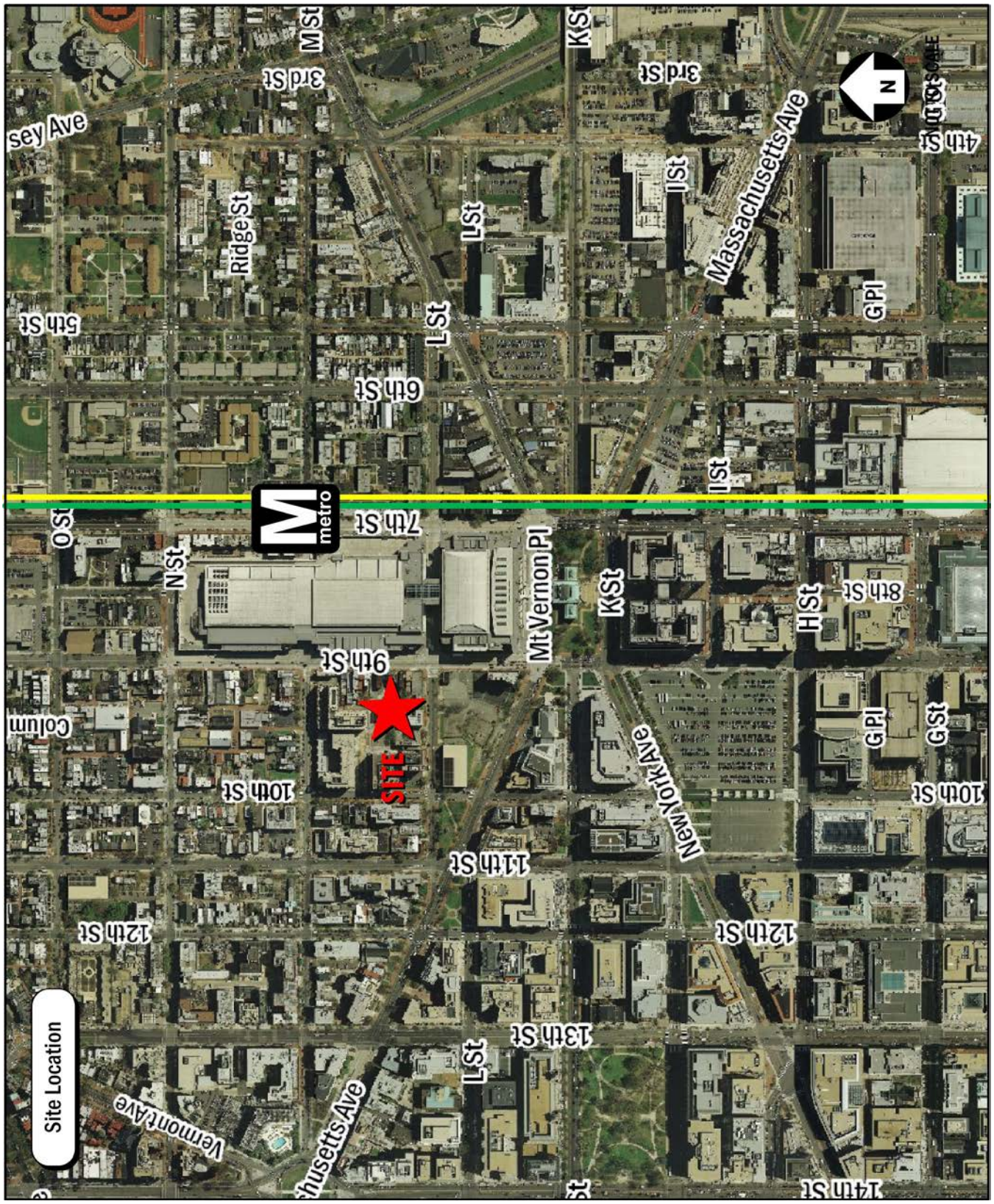

Figure 1: Site Location

2: SITE REVIEW

2.1 Site Location & Major Transportation Features

The proposed development is located in Square 369 in the northwest quadrant of Washington, DC. The site is bounded by L Street to the south, 9th Street to the east, and existing buildings to the north and west.

The site is served by many regional and principal arterial roadways including Massachusetts Avenue, New York Avenue, K Street, and 7th Street. The site is accessible via these roadways along with a network of minor arterial, collector, and local streets. Figure 2 shows the roadway network hierarchy and the average daily traffic volumes for the roadways in the vicinity of the proposed development.

The site is served by several public transportation services, including Metrorail and Metrobus. The site is also served by a pedestrian network consisting of sidewalks and crosswalks around local streets surrounding the project site. In addition to pedestrian accommodations, the site has access to many on- and off-street bicycle facilities.

2.2 Car-Sharing

Three car-sharing companies provide service in the District: Zipcar, Enterprise Carshare, and Car2Go. All three services are private companies that provide registered users access to a variety of automobiles. Of the three, Zipcar and Enterprise Carshare have locations near the project site. Table 1 lists the car-sharing locations nearby and the number of vehicles available (with stations closest to the site listed first).

Table 1: Carshare Location and Vehicles

Carshare Location	Number of Vehicles
Zipcar	
6th Street and New York Avenue	7 vehicles
Embassy Suites at 10th and New York	5 vehicles
Enterprise Carshare	
1009 K Street, 1 block to Mt. Vernon Square	2 vehicles
900 New York Avenue, PMI Open Parking Lot	4 vehicles
Total Number of Carshare Vehicles	**18 vehicles**

Car-sharing is also provided by Car2Go, which provides point-to-point car sharing. Unlike Zipcar or Enterprise, which require two-way trips, Car2Go can be used for one-way rentals. Car2Go currently has a fleet of vehicles located throughout the District. Car2Go vehicles may park in any non-restricted metered curbside parking space or Residential Parking Permit (RPP) location in any zone throughout the defined "Home Area". Members do not have to pay the meters or pay stations. Car2Go does not have permanent designated spaces for their vehicles; however availability is tracked through their website, which provides an additional option for car-sharing patrons.

2.3 Transit

The study area is well served by Metrorail and Metrobus. Combined, these transit services provide local, city wide, and regional transit connections and link the site with major cultural, residential, employment, and commercial destinations throughout the region. Figure 3 identifies the major transit routes, stations, and stops in the study area.

The Mount Vernon station is located approximately 800 feet east of the development site and serves the Green and Yellow Lines. The Green Line connects the study area with Fort Totten and Greenbelt, Maryland to the north, major downtown connections such as Chinatown/Gallery Place, and Branch Avenue station in Maryland to the south. The Yellow Line connects the study area with Fort Totten and Huntington with additional service to Greenbelt and Franconia-Springfield during rush hour. Trains run frequently during the morning and afternoon peak hours. Trains run approximately every 5 to 6 minutes during weekday non-peak hours, every 10 to 15 minutes on weekday evenings after 7:00 pm, and every 6 to 15 minutes on the weekends.

The site is also serviced by Metrobus along K Street, M Street, 7th Street, 9th Street, and 11th Street, which are all within walking distance of the site. The routes serving this area connect the site to the Metrorail system and with various locations throughout the downtown business core. Table 2 shows a summary of the bus route information for the routes that serve the site, including service hours, headway, and distance to the nearest bus stop.

Table 2: Bus Route Information

Route Number	Route Name	Service Hours[1]	Headway[1]	Distance to Nearest Stop
64	Fort Totten-Petworth Line	Weekdays: 5:38 AM – 1:23 AM Saturdays: 5:33 AM – 2:02 AM Sundays: 5:35 AM – 1:06 AM	Peak: 8 to 24 min Off-Peak: 14 to 26 min	600 feet (2 minutes)
G8	Rhode Island Avenue Line	Weekdays: 5:13 AM – 12:12 PM Saturdays: 5:49 AM – 1:07 AM Sundays: 5:49 AM – 12:15 AM	Peak: 8 to 20 min Off-Peak: 24 to 35 min	600 feet (2 minutes)
79	Georgia Avenue Limited (Express) Line	Monday – Sunday: 6:00 AM – 7:00 PM	10 to 15 min	300 feet (1 minute)
70	Georgia Avenue – 7th Street Line	Weekdays: 4:04 AM – 3:09 AM Saturdays: 5:51 AM – 9:18 AM Sundays: 3:58 PM – 7:38 PM	Peak: 12 to 16 min Off-Peak: 12 to 30 min	800 feet (3 minutes)
Circulator	Georgetown-Union Station	Sunday – Thursday: 7:AM -!2:00 AM Friday & Saturday: 7:AM – 2:00 AM	Every 10 min	1,000 feet (3.5 minutes)

[1] WMATA route schedules, http://wmata.com/bus/timetables/

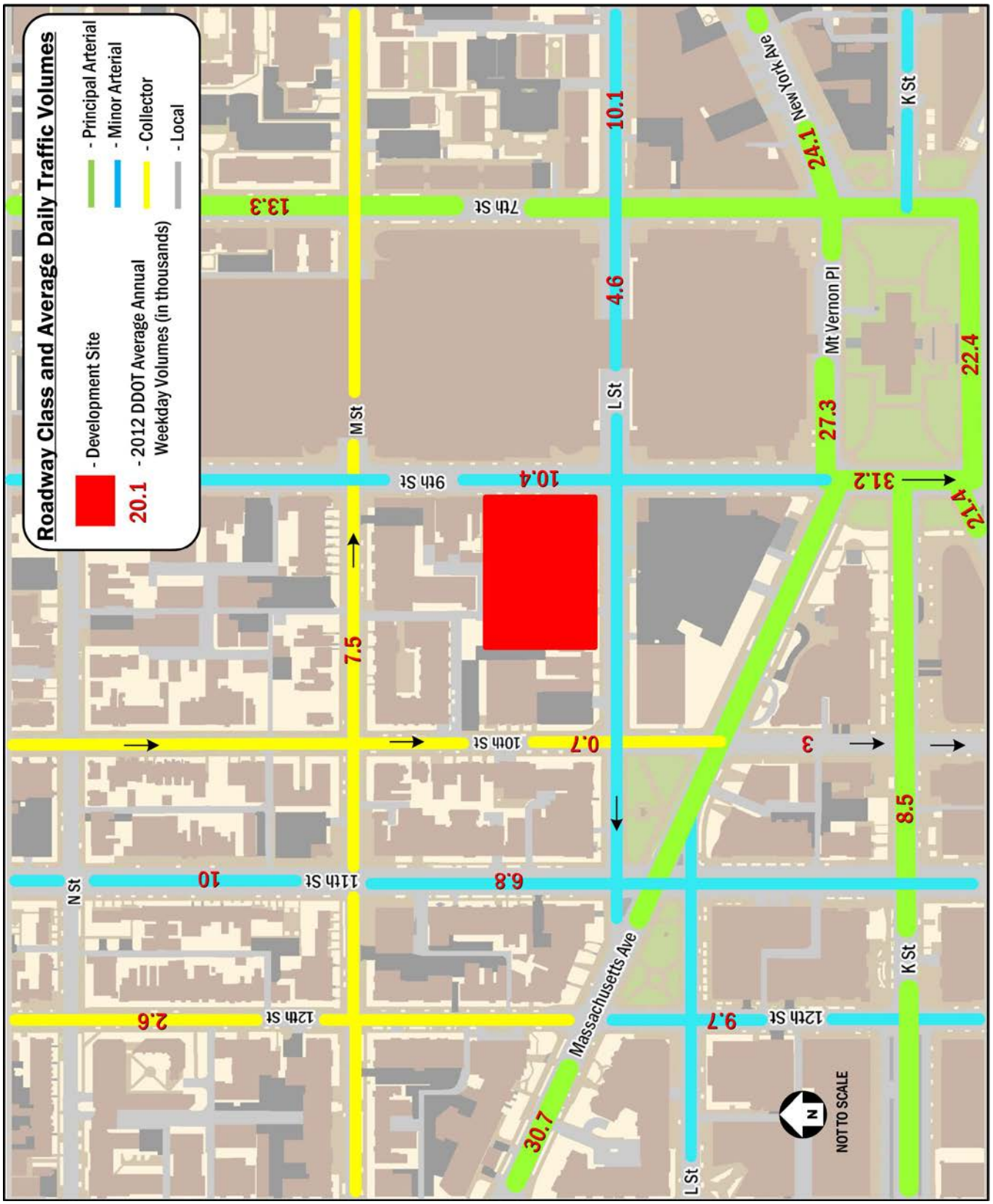

Figure 2: Roadway Class and Average Daily Traffic Volumes

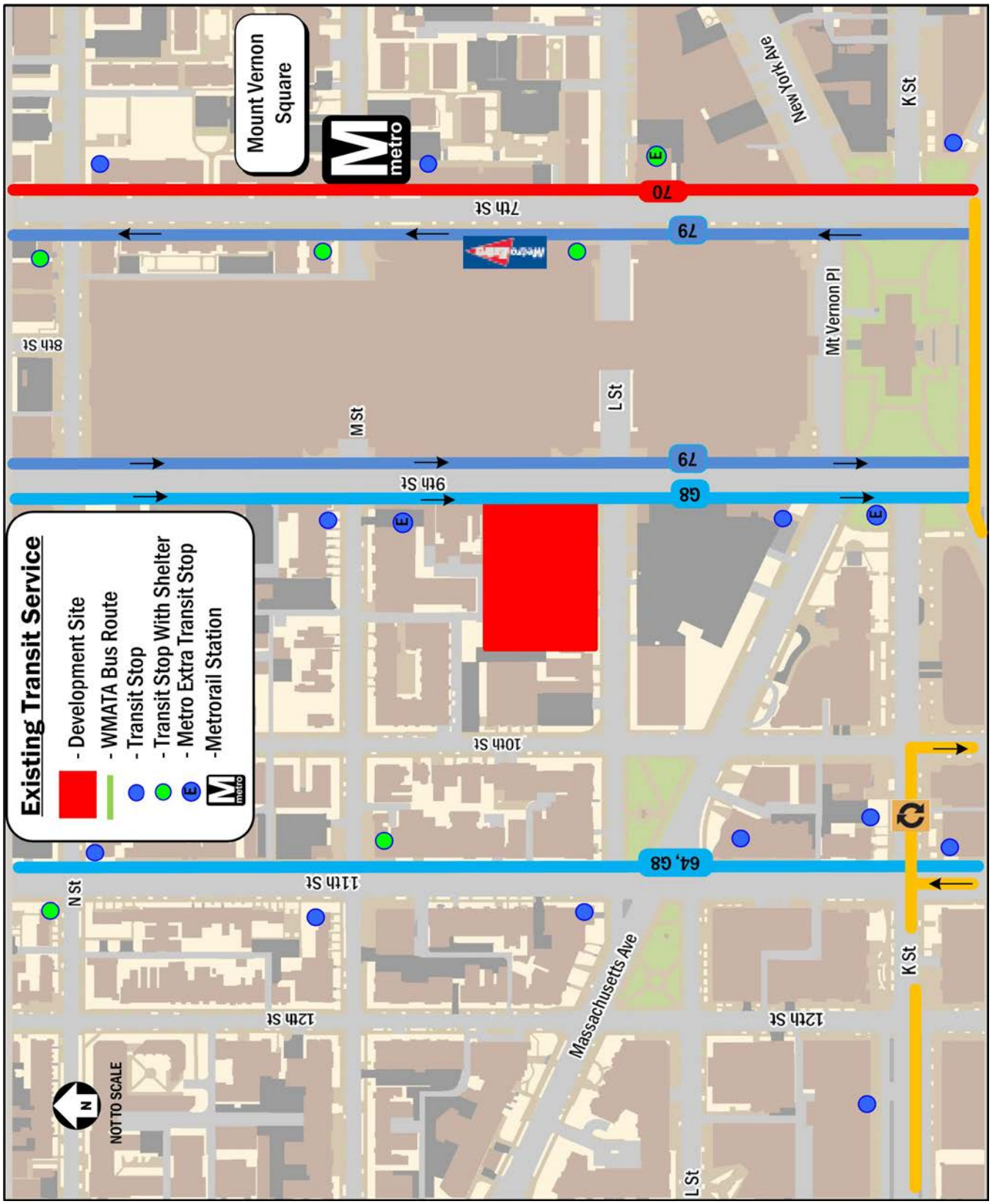

Figure 3: Existing Transit Service

2.4 Bicycle Facilities

Within the study area, bicyclists have access to on-street bicycle lanes, signed bicycle routes, and local and residential streets that facilitate cycling. The bicycle network provides good conditions for local trips, and there are several routes for trips that require more regional access.

Near the site, 7th Street, 11th Street and 12th Street provide dedicated bicycle lanes. These streets, along with the on-street signed bicycle route on 13th Street, provide the safest north-south connectivity, providing on-street bicycle lanes which connect to additional bicycle lanes or bicycle routes mostly to the north of the site. There are no primary east-west bicycle lanes in the direct vicinity of the site. However, R Street to the north provides east-west dedicated bicycle lanes. The R Street lanes connect to the Metropolitan Branch Trail to the east for more regional trips. Figure 4 illustrates bicycle facilities in the study area and identifies street corridors with poor cycling conditions.

In addition, the Capital Bikeshare program has placed over 300 bicycle-share stations across Washington, DC, Arlington and Alexandria, VA, and most recently Montgomery County, MD with over 2,500 bicycles provided. Capital Bikeshare already provides one station near the site at the intersection of M Street and 7th Street and has plans to expand the system, though none are currently proposed within the study area. Figure 4 identifies existing station locations in the study area.

Little to no existing bicycle parking was observed in the study area. Most cyclists use street signs, parking meters, or similar objects to secure their bicycles. This indicates that there is a demand for bicycle parking facilities in the study area.

2.5 Pedestrian Facilities

This section provides an inventory of the existing site access facilities and deficiencies. Overall, the pedestrian facilities within the study area provide a good walking environment. Pedestrian access to the site is provided along 9th Street and L Street

The site has good pedestrian access to nearby transit service. The bus stops located along 7th, 9th, 11th, and K Streets are all within walking distance and provide local and commuter service between the study area and destinations in all directions. In addition, pedestrians can safely and conveniently access the Mount Vernon Square Metro Station, which is located less than a quarter mile northeast of the site.

A review of pedestrian facilities near the site shows that most facilities meet DDOT standards, and provide a quality walking environment. Some crosswalks along 9th Street and N Street have faded. Also, several sidewalks do not meet the District's width requirements, particularly those located along public parks in the study area. Figure 5 shows a detailed inventory of the existing pedestrian infrastructure in the vicinity of the development site and along primary walking routes. Sidewalks, crosswalks, and curb ramps are evaluated based on the guidelines set forth by DDOT's *Public Realm Design Manual* in addition to ADA standards. Sidewalk width and buffer requirements for the District are shown below in Table 3. Within the area shown, Massachusetts Avenue, New York Avenue, K Street, and 7th Street are considered commercial streets with the remaining roadways considered residential with a moderate to high density. These roadways generally comply with the commercial requirements as do most of the residential side streets. ADA standards require that all curb ramps be provided wherever an accessible route crosses a curb and must have a detectable warning. Additionally, curb ramps shared between two crosswalks is not desired. As shown in the figure, under existing conditions most intersections are adequate.

Table 3: Sidewalk Requirements

Street Type	Minimum Sidewalk Width	Minimum Buffer Width
Residential (Low to Moderate Density)	6 ft	4 ft (6 ft preferred for tree space)
Residential (High Density)	8 ft	4 ft (6 ft preferred for tree space)
Commercial (Non-downtown)	10 ft	4 ft
Downtown	16 ft	6 ft

2.6 Future Projects & Developments

2.6.1 Developments

There are four other projects approved or under construction located in the vicinity of the proposed development. These projects meet the criteria of having an origin/destination within the study area and being completed prior to 2017, the anticipated completion year for the Columbia Place development.

1100 M Street

1100 M Street is a mixed-use development located on the northeast corner of 11th Street and M Street. The development plan consists of 71 residential units and 4,100 square feet of ground-floor retail.

The Colonel (1250 9th Street)

The Colonel is a mixed-use development located on the northeast corner of 9th Street and N Street. The development plan consists of 70 residential units and 8,200 square feet of ground-floor retail.

The Flats at Blagden Alley

The Flats at Blagden Alley will be a residential development located on Blagden Alley between M Street and N Street. The development plan consists of 125 residential units.

Gallery Tower

Gallery Tower is a mixed-use development located between H and I Streets and between 6th and 7th Streets, NW. The development plan consists of 72,000 square feet of office space and 19,000 square feet of retail space.

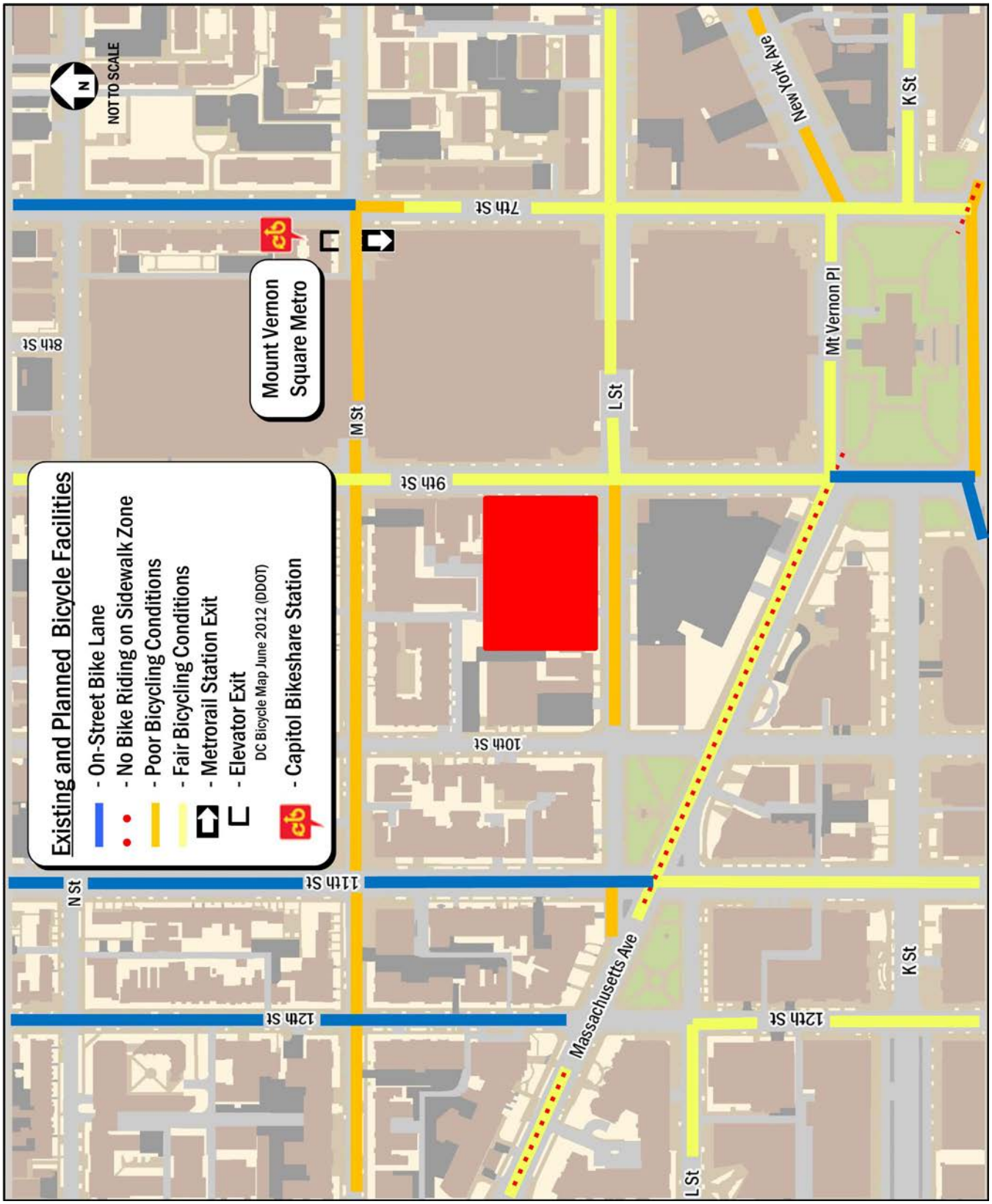

Figure 4: Existing Bicycle Facilities

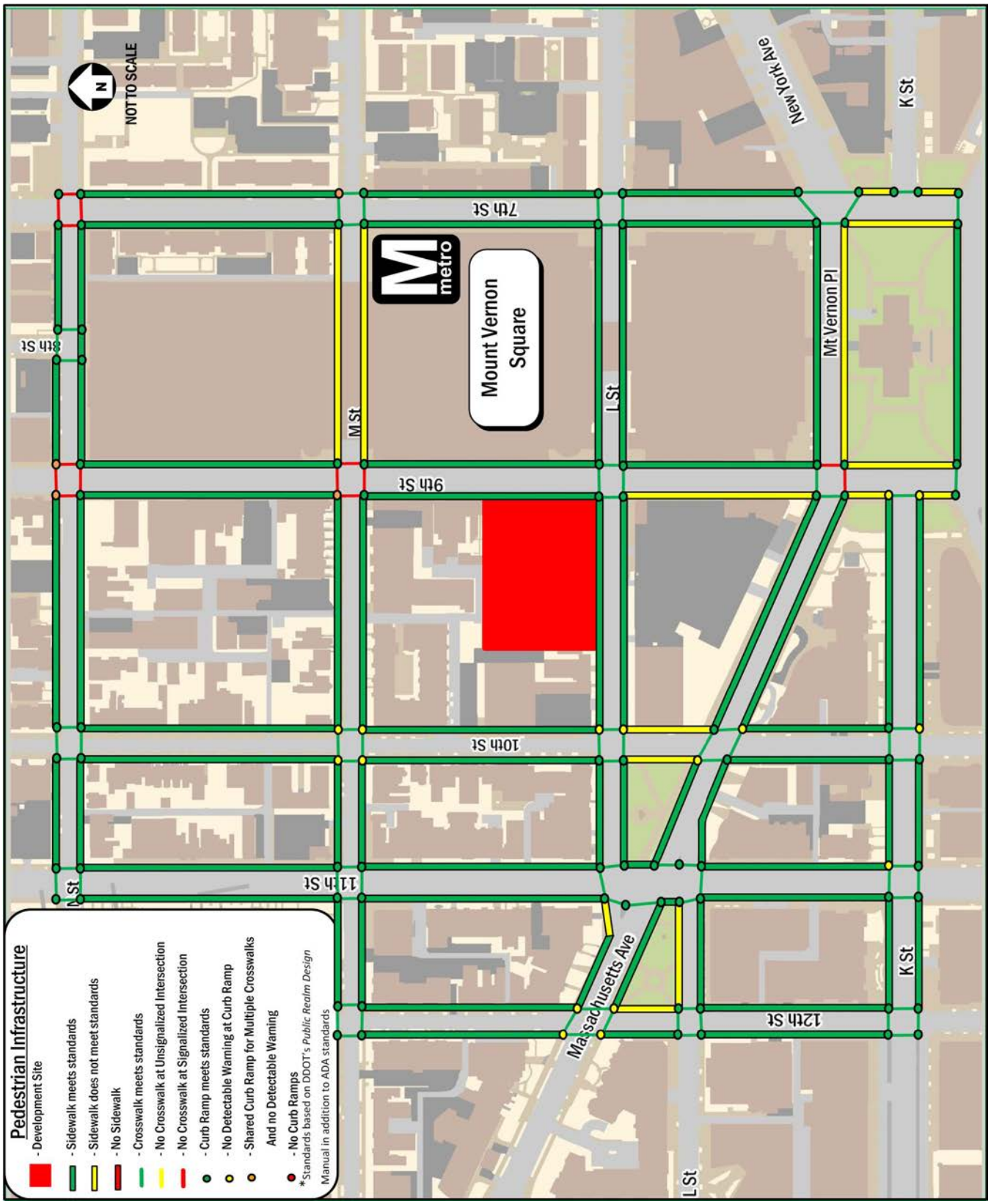

Figure 5: Pedestrian Infrastructure

3. DESIGN REVIEW

This section provides an overview of the transportation features of the proposed Columbia Place development. The development program consists of 200 residential units, two hotels with a combined total of 500 rooms, and 2,250 square feet of ground floor retail. Additionally, two levels of underground parking are proposed that will include a total of 271 on-site parking spaces.

3.1 Site Access and Internal Circulation

3.1.1 Vehicular Access

Vehicular access to the site parking garage will occur via two entrances: one from the reconfigured alley system on the western site boundary side that will connect to L and M Streets, and the second from a new east-west easement area on the northern site boundary that will connect to 9th Street to the north-south alley, as shown on Figure 6. A layby area for the hotels will be provided along L Street toward the eastern side of the site. This will require some narrowing of the sidewalk along L Street, but will not necessitate a complete break in the sidewalk thus allowing for a continuous pedestrian path in front of the site.

3.1.2 Loading and Trash Access

The loading docks will be located along the east-west alley in the rear of the building. Loading for the residential uses will occur toward the western site side while hotel loading will take place toward the site center. Projected truck access routes are shown in Figure 7. There is adequate regional access for trucks along New York Avenue, Massachusetts Avenue, 9th Street, and 7th Street, with additional truck routes near the site along 10th Street, M Street, and L Street. From these roadways, trucks will have direct and efficient routes to the site without significant disturbance through residential neighborhoods.

As mentioned above, loading facilities are planned in the northern edge of the site via a new alley from 9th Street. The new alley easement will connect with the existing alley system which provides access to L Street, M Street, and 10th Street. This existing alley system provides access to the loading and parking facilities of several adjoining properties which primarily use the M Street and 10th Street alley entrances.

The current Columbia Place development plans show three 30-foot berths and one 24-foot delivery berth to serve the site. Two of the 30-foot berths will be designated for retail and hotel use while the remaining two will be designated for residential use. Trucks will access the loading docks from 9th Street via the new alley easement and usage of the loading docks will be managed via a dock manager so as to minimize conflicts within the alley system.

Based on data collected at similar developments, the Columbia Place loading facilities are anticipated to see a two to three trash pick-ups per week (one every other day) and a total of eight to ten deliveries per day as outlined below:

- 2-3 Trash Pick-ups per Week
  - 1 Every Other Day
- 2-3 SU-30 (or smaller) Box Trucks Per Day
  - 1 Residential
  - 1-2 Hotel/Retail
- 6-7 Delivery Vans (UPS/FedEx/Etc.) Per Day
  - 3 Residential
  - 3-4 Hotel/Retail

Given the size of the loading dock, the nature of hotel, residential, and small retail deliveries, and the size of the residential units planned for the development, the maximum size vehicle that will deliver to the site would be an SU-30 box truck vehicle. No 55 foot or larger trucks are anticipated to need access to the site. As described above, the majority of the deliveries to the site are anticipated to be smaller delivery vans. Turning diagrams for 30' trucks entering and exiting the four loading bays from 9th Street are shown in Figures 8, 9, 10, and 11. These diagrams show 30' single-unit trucks accessing the docks without difficulties. All backing maneuvers will be accommodated on-site and within the east-west alley system outside of the local roadway network.

Trash will be collected in receptacles near the loading facilities. These trash receptacles will be wheeled out for pick-up along the alley several times per week.

3.1.3 Parking

Parking for residents will be provided in a two-level below grade parking garage accessible from the new alley easement at L Street while parking for hotel patrons will be accessed via the new alley easement at 9th Street. The parking garage is proposed to have a total of 271 below grade parking spaces with the completion of the development. Based on the zoning amendment to DD/C-2-C and DD/C-2-A, a development of this size would require parking at the following rates:

- Residential – 1 parking space for each 3 dwelling units.
- Hotel – 1 parking space for each 4 rooms plus 1 for each 300 sf of floor area in the largest function room, which for this development is the 9,900 sf meeting space.

Based on these rates and the development plan of 200 residential units and 500 hotel rooms, the development would require 66 residential parking spaces and 158 hotel parking spaces, for a total of 224 parking spaces. Therefore the development meets the parking supply requirements set forth by the District and is sufficient to meet demand for the project.

3.1.4 Bicycle Facilities

The development will supply short- and long-term bicycle parking. The development plan contains bicycle rooms which can hold approximately 66 bicycles. According to the Bicycle Commuter and Parking Expansion Act of 2007, a residential building owner shall provide at least one secure parking space for each 3 residential units (or 66 spaces for a 200-unit residential development). Bicycle parking spaces are not required for other uses in the C-3-C zone according to Zoning Regulations. As such, the development is planned to provide the required number of bicycle parking spaces.

3.2 Transportation Demand Management

Transportation Demand Management (TDM) is the application of policies and strategies to reduce travel demand or to redistribute demand to other times or spaces. TDM typically focuses on reducing the demand of single-occupancy private vehicles during peak period travel times or on shifting single-occupancy vehicular demand to off-peak periods.

TDM's importance within the District is highlighted within section T-3.1 of the DC Comprehensive Plan, where it has its own dedicated section including TDM policies and actions. As stated in the Plan, the Washington DC, metropolitan region is a leader in developing and implementing TDM strategies. Typical TDM programs include:

- Carpooling/vanpooling, employee shuttles, and improvements that encourage bicycling and walking
- Financial incentives, such as preferential parking for ride-sharers and transit subsidies

- Congestion avoidance strategies, such as compressed work weeks, flexible work schedules, and telecommuting

The District of Columbia is quickly growing and attracting new residential, commercial, and retail development and redevelopment, which are generating significant additional vehicular traffic to, from, and within the District. In order to meet the District's goals of reducing automobile trips and accommodation of travel through a complete transportation network, DDOT is developing a systematic approach and process for integrating TDM in to the development and redevelopment permit process.

Based on the DDOT expectations for TDM programs, the following is the proposed TDM requirements for Columbia Place:

- The Applicant will identify a TDM Leader (for planning, construction, and operations) and provide DDOT/Zoning Enforcement with annual TDM Leader contact updates.
- The Applicant will provide an adequate amount of short-and long-term bicycle parking spaces, including a secure bicycle room within the building that can house up to 66 bicycles.
- The TDM Leader will make printed materials related to local transportation alternatives available to residents and employees upon request and at move-in for new tenants.
- The Applicant will dedicate one space on site for car sharing services to use with right of first refusal.

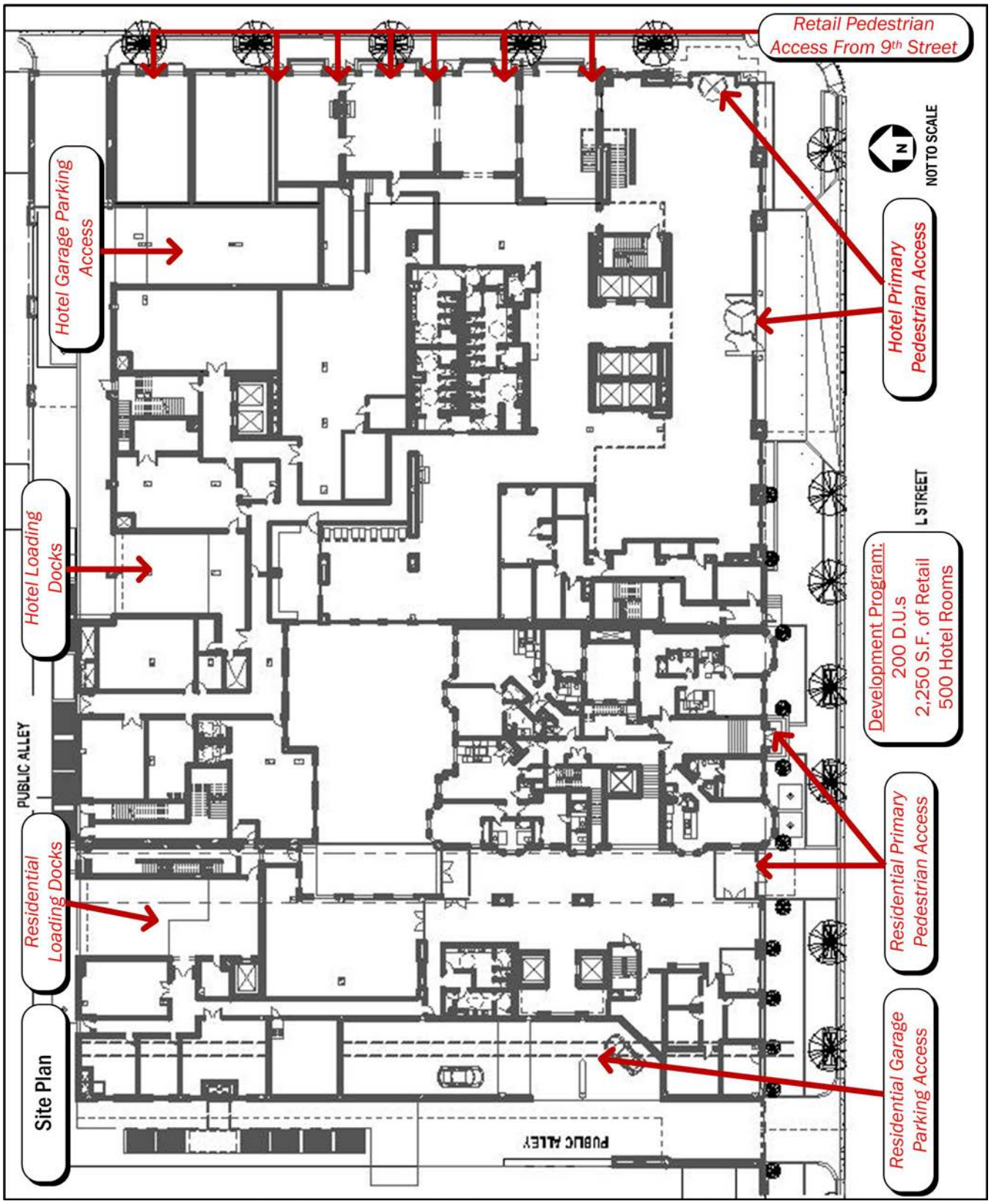

Figure 6: Site Plan

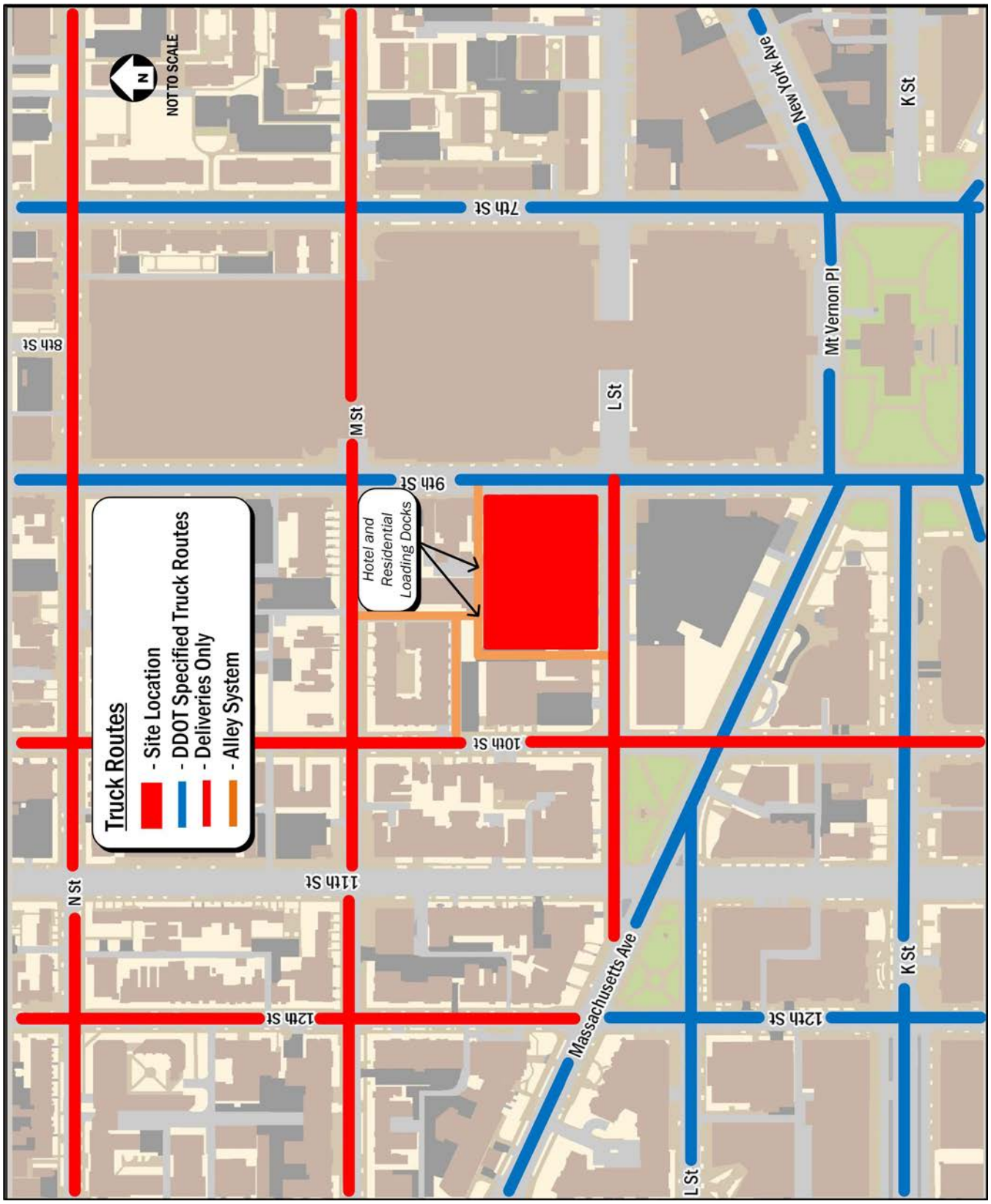

Figure 7: Truck Routes

Figure 8: 24' Delivery Truck Turning Movement Diagrams – West Residential Loading Bay

Figure 9: SU-30 Turning Movement Diagrams – East Residential Loading Bay

Figure 10: SU-30 Turning Movement Diagrams – West Hotel Loading Bay

Figure 11: SU-30 Turning Movement Diagrams – East Hotel Loading Bay

4. IMPACTS REVIEW

This section of the report focuses on the influence and impact site generated traffic will have on the local transportation network, with the following purpose:

- To provide information to the District Department of Transportation (DDOT) and other agencies on how the development of the site will influence the local transportation network. This report accomplishes this by identifying the potential trips generated by the site and where these trips are expected to travel to and from.
- To determine if development of the site will lead to adverse impacts on the local transportation network. This report accomplishes this by projecting future conditions with and without development of the site and performing analysis of intersection delays. These delays are compared to the acceptable levels of delay set by DDOT standards to determine if the site will negatively impact the study area.

4.1 Site Transportation Demand

4.1.1 Base Trip Generation

Traditionally, trip generation for a development is calculated based on the methodology outlined in the Institute of Transportation Engineers' (ITE) *Trip Generation*, 9th Edition. For this report, the methodology was supplemented to account for the urban nature of the site (*Trip Generation* provides data for non-urban, low transit use sites) and to generate trips for multiple modes. The following summarizes the methodology that was used in this study.

First, ITE Trip Generation was used to develop base vehicular-trip rates, not accounting for reductions due to mode split. Following the base vehicular-trip rate calculations, the vehicle-trips were converted to person-trips by assuming average vehicle occupancies of 1.1 persons per vehicle for residential use, 1.7 persons per vehicle for hotel use, and 1.8 persons per vehicle for the retail use, based on the Census Data Transportation Planning Package (CTPP) 2000. Table 4 shows the base number of trips generated by the proposed development.

Table 4: Base Vehicle- and Person-Trip Generation

Proposed Development	Quantity		AM Peak Hour			PM Peak Hour			Weekday Trips
			In	Out	Total	In	Out	Total	
Residential Component	200	DU	20	82	102	83	45	128	1,336
Converted Person Trips at 1.1 persons/vehicle			**22**	**90**	**112**	**91**	**50**	**141**	**1,470**
Hotel Component	500	rooms	184	117	301	156	139	295	4,102
Converted Person Trips at 1.7 persons/vehicle			**313**	**199**	**512**	**265**	**236**	**502**	**6,973**
Retail/Commercial Component	2,250	sf	1	1	2	4	4	8	96
Converted Person Trips at 1.8 persons/vehicle			**2**	**2**	**4**	**7**	**7**	**14**	**173**
Net Vehicle-Trips before Non-Auto Reduction			205	200	405	243	188	431	5,534
Net Person-Trips			**337**	**291**	**628**	**364**	**293**	**657**	**8,616**

4.1.2 Mode Split

Following base trip generation, the trips were split into each mode: transit, walking, bicycle, and vehicle. Each land use was analyzed separately in order to account for varying mode splits. The mode split assumptions for the residential component are based on data from the WMATA *Ridership Survey* as well as census data from the 2008-2012 American Community Survey for Census Tract 49.02. Within the *Ridership Survey* there are two sites (Lincoln Towers at Ballston and Courtland Towers at Court House) that are conservatively comparable to the development site based on distance to the metro and location type. These sites have the following mode splits: (1) Lincoln Towers – 50% Metrorail, 2% Bus, 38% Auto, and 11%

Walk & Other, (2) Courtland Towers – 46% Metrorail, 0% Bus, 39% Auto, and 15% Walk & Other. Additionally, the overall average for sites within the Central Business District is 50% Metrorail, 6% Bus, 18% Auto, and 26% Walk & Other. The census data for census tract 49.02 depicts the distribution of transportation modes to work as 32% transit, 27% auto, 39% walking, and 2% bike. Based on these data sets, and taking into account the amount of parking that is being supplied, the PUD will assume a conservative residential mode split of 35% auto, 45% transit, 15% walking, and 5% biking.

The mode split assumptions for the hotel component are based on data from the WMATA *Ridership Survey* as well as previous Gorove/Slade studies that incorporate a hotel. In the *Ridership Study* there are no sites that are directly comparable to the proposed development; however the average among all hotel sites is 27% Metrorail, 4% Bus, 38% Auto, and 31% Walk & Other. Taking this into account and considering past studies, the PUD will assume a hotel mode split of 35% auto, 35% transit, 25% walking, and 5% biking.

The mode split assumptions for the retail component are based on data from the WMATA *Ridership Survey*. Within the *Ridership Survey* there are two sites (Crystal Plaza Shops at Crystal City and U Street Main Street) are comparable to the proposed development site. These sites have the following mode splits: (1) Crystal Plaza Shops – 36% Metrorail, 5% Bus, 24% Auto, and 36% Walk & Other, (2) U Street Main Street – 44% Metrorail, 13% Bus, 19% Auto, and 27% Walk & Other. Additionally, the overall average for retail sites is 29% Metrorail, 8% Bus, 36% Auto, and 27% Walk & Other. Based on the data provided by the *Ridership Survey*, the PUD will assume a retail mode split of 25% auto, 45% transit, 20% walking, and 5% biking.

4.1.3 Multi-Modal Trip Generation

Based on the trip generation calculations and mode split assumptions shown previously, Table 5 shows the resulting calculations by mode. The proposed development will generate approximately 141 vehicular trips, 230 transit trips, 146 walking trips, and 32 bicycle trips during the morning peak hour; and 151 vehicular trips, 245 transit trips, 150 walking trips, and 33 bicycle trips during the afternoon peak hour.

Table 5: Multi-Modal Trip Generation

Trip Generation by Land Use & Mode		AM Peak Hour			PM Peak Hour			Weekday
		In	Out	Total	In	Out	Total	Trips
Residential								
Transit Person-Trips	45%	10	39	50	40	24	64	663
Walking Person-Trips	15%	3	14	17	14	7	21	220
Bicycling Person-Trips	5%	1	5	6	5	2	7	73
Vehicular Person-Trips	35%	8	32	39	32	17	49	514
Vehicle-Trips		***7***	***28***	***35***	***29***	***16***	***45***	***302***
Hotel								
Transit Person-Trips	35%	110	69	179	93	82	176	2,440
Walking Person-Trips	25%	78	50	128	66	59	125	1,743
Bicycling Person-Trips	5%	16	10	26	13	12	25	349
Vehicular Person-Trips	35%	109	70	179	93	83	176	2,441
Vehicle-Trips		***64***	***41***	***105***	***55***	***49***	***104***	***1,436***
Retail								
Transit Person-Trips	45%	1	1	1	2	2	6	30
Walking Person-Trips	30%	1	1	1	2	2	4	24
Bicycling Person-Trips	10%	0	0	0	1	1	1	8
Vehicular Person-Trips	25%	0	0	1	2	2	3	20
Vehicle-Trips		***0***	***0***	***1***	***1***	***1***	***2***	***11***

Overall Trip Generation							
Transit Person-Trips	121	109	230	135	108	245	3,133
Walking Person-Trips	82	65	146	82	68	150	1,987
Bicycling Person-Trips	17	15	32	19	15	33	430
Vehicular Person-Trips	117	102	219	127	102	228	2,975
Total Person-Trips	**337**	**291**	**627**	**363**	**293**	**656**	**8,525**
Total Vehicle-Trips	***71***	***69***	***140***	***85***	***66***	***151***	***1,749***

4.2 Vehicular Impacts

This section details the vehicular trips generated in the study area along the vehicular access routes, defines the analysis assumptions, analyzes the vehicular impacts of the proposed development, and makes recommendations for improvements where needed.

4.2.1 Scope of Analysis

The purpose of the vehicular capacity analysis is to determine the existing conditions of the intersections located in the immediate vicinity of the proposed development. The following intersections were selected, as shown in Figure 12:

1. M Street and 11th Street NW
2. M Street and 10th Street NW
3. L Street and 10th Street NW
4. L Street and Alley (Shepherd Court) NW
5. N Street and 9th Street NW
6. M Street and 9th Street NW
7. L Street and 9th Street NW
8. 9th Street, Massachusetts Avenue, and Mount Vernon Place NW
9. K Street and 9th Street NW
10. L Street and 7th Street NW
11. 7th Street, New York Avenue, and Mount Vernon Place NW
12. Massachusetts Avenue and 10th Street NW
13. M Street and Alley (Shepherd Court) NW
14. 9th Street and Site Access

Intersection capacity analyses were performed for the existing conditions at each intersection within the study area during the morning and afternoon peak hours, as well as for future conditions with and without the proposed development. The study scenarios are as follows:

- 2014 Existing Conditions
- 2017 Future Conditions without Development (2017 Background)
- 2017 Future Conditions with Development (2017 Future)

The *Synchro, Version 7.0* software package was used to analyze the study intersections based on the Highway Capacity Manual (HCM) methodology. The *Synchro* model was compiled using signal timings provided by DDOT and with lane configurations and traffic volumes collected by Gorove/Slade. The following sections review the assumptions made for the technical analyses, as summarized in Table 6.

4.2.2 Traffic Volume Assumptions

The following section reviews the traffic volume assumptions and methodologies used in the roadway capacity analyses, as summarized in Table 6.

2014 Existing Conditions

The overall purpose of this study is to show what effect the proposed development will have on the transportation system in the study area. The existing conditions in and around the site are characterized in order to provide a foundation for assessing the transportation implications of the proposed development. This is determined by examining the peak traffic hours, which are directly associated with the peaking characteristics of the site and the adjacent transportation system. These peaking characteristics are found through analysis of existing count data.

DDOT and National standards require that traffic counts be conducted on a weekday, not including Monday or Friday, when traffic conditions can be described as "typical". This includes the consideration for adjacent uses, such as retail, special events, and recreation facilities and for major traffic generators, such as the area public school system or any large public or private institutions. Weekend and other off-peak periods are also often reviewed if the study area includes other uses that may be relatively inactive during the "typical" weekday.

The traffic counts conducted on a "typical" day are used to determine the morning and afternoon "peak hour" of traffic within the study area. According to the Highway Capacity Manual (HCM) methodologies, a one-hour analysis period is preferred. Analysis periods that exceed one hour are not usually used because traffic conditions are typically not steady for long time periods and because the adverse impact of short peaks in traffic demand may not be detected in a long time period. The "peak hour" represents the worst-case scenario, when the system traffic volumes are the highest. The use of a "typical" weekday morning and afternoon peak hours are used to ensure that conclusions regarding adverse impacts and their respective mitigation measures would apply to the vast majority of time roadways are used in the study area. Although there may be times when volume flows exceed these conditions, such as during special events, holiday weekends, or other times depending on the study area and site location, it is the industry standard to design transportation infrastructure for the peak times during "typical" weekdays.

In order to ensure that the data collected contains the peak hour, traffic counts are taken for a period of several hours during the morning and afternoon peak periods. From these peak periods, a peak hour is derived for both the morning and the afternoon time periods. According to the Transportation Impact Analyses for Site Development Manual published by the Institute of Transportation Engineers (ITE), data is generally collected during the weekday morning (7:00 to 9:00 AM) and afternoon (4:00 to 6:00 PM) peak hours. Although this is the standard, Gorove/Slade usually collects data for a three-hour (or longer) period to ensure that the peak hour is contained within the data collection timeframe.

The peak period counts are analyzed to determine the one hour during the morning and afternoon periods that contains the highest cumulative directional traffic demands. From each peak period count, the morning and afternoon "peak hours" are determined by summing up the four fifteen-minute consecutive time periods in the study area that experience the highest cumulative traffic volumes. These morning and afternoon "peak hours" are analyzed for the system of intersections investigated, choosing the "peak hour" of the entire system instead of each individual intersection.

Following the above guidelines, traffic counts, including vehicular and pedestrian volumes, were conducted by Gorove/Slade at the key study intersections between the hours of 6:30 and 9:30 AM and between 4:00 and 7:00 PM on Wednesday, May 28, 2014, Tuesday, June 17, 2014, and Wednesday, September 9, 2014. Additional counts previously collected at study intersections for other projects on Wednesday, September 19, 2012, Thursday, December 13, 2012, and Wednesday, June 12, 2013 were also utilized. These count dates represents "typical" weekdays when the DC public school systems were in session, as well as the surrounding counties in Maryland and Virginia. These "typical" weekdays also represent time periods that include normal operation for other major traffic generators in the study area. Historical traffic data show that traffic volume growth on the study area roadways has been flat or negative over the past three years. Thus, it is believed that the counts collected prior to 2014 are representative of present-day conditions. The results of the traffic counts are included in the Technical Attachments. The morning and afternoon peak hours for the system of intersections being studied occurred between 8:15 – 9:15 AM and 5:00 – 6:00 PM, respectively. Peak hour traffic volumes for the existing conditions are shown on Figure 13 for the morning and afternoon peak hours.

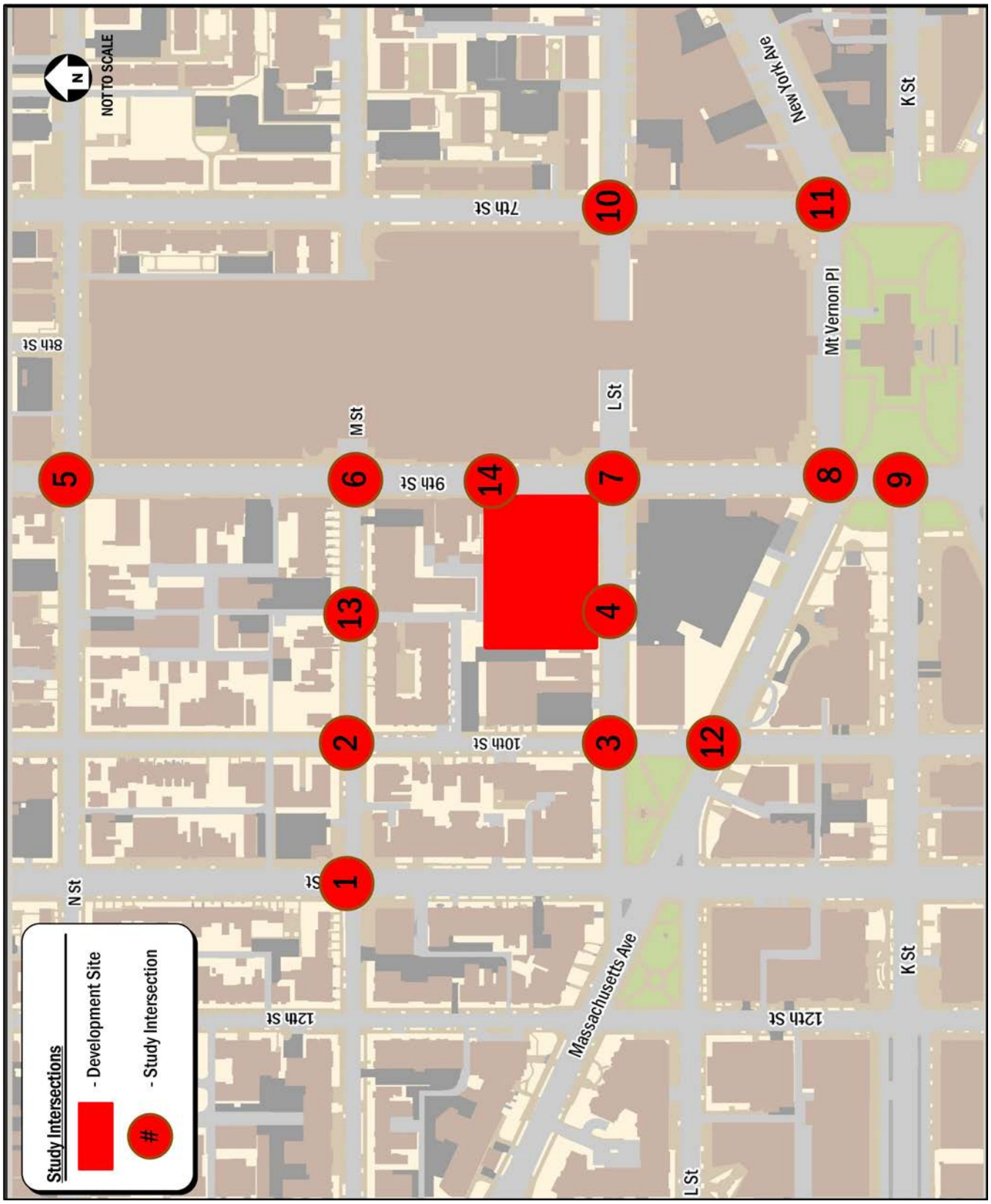

Figure 12: Study Intersections

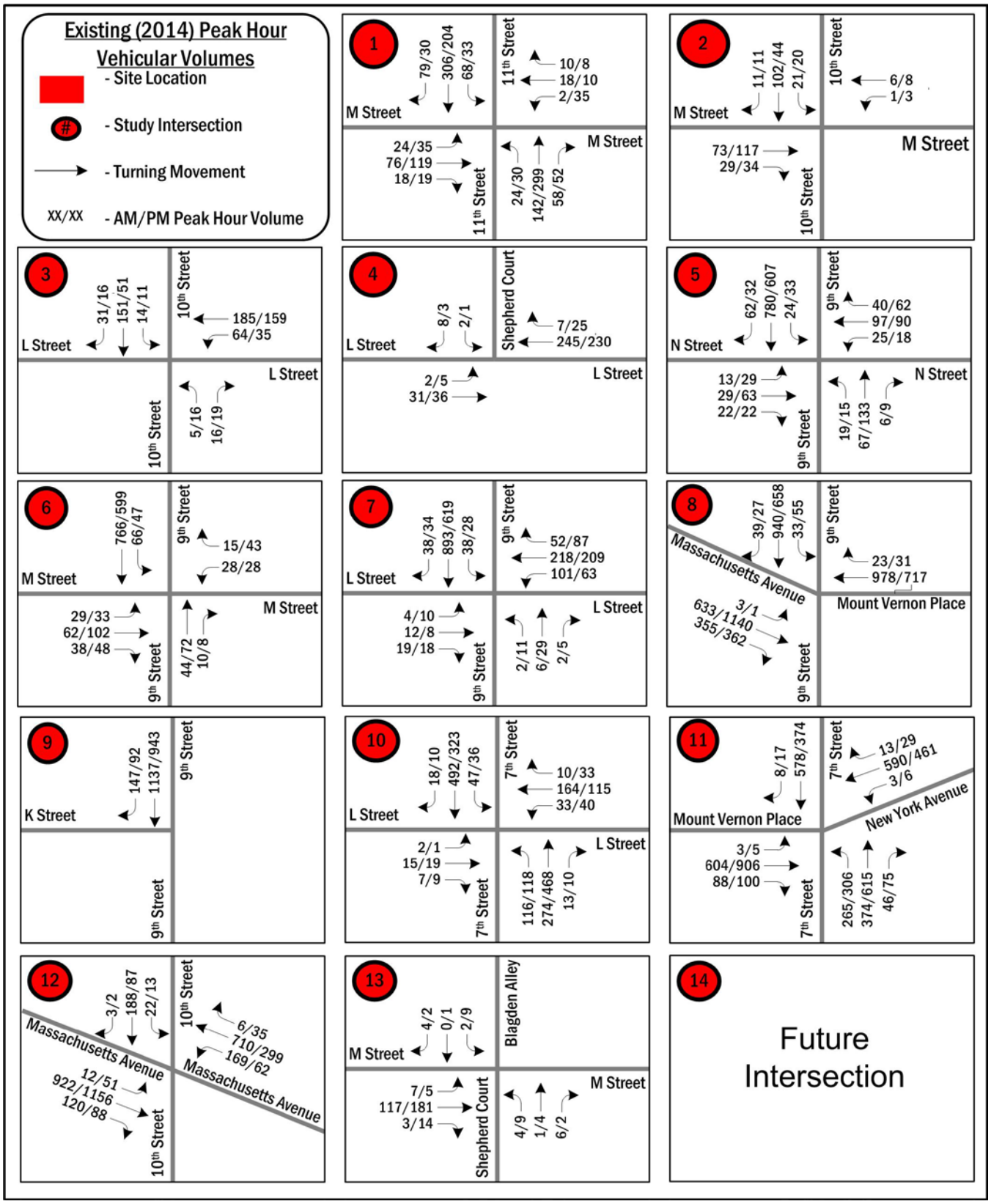

Figure 9: Existing Peak Hour Vehicular Volumes

2017 Future Conditions without Development (2017 Background)

The Columbia Place development is anticipated to be complete in 2017. The traffic projections for the future condition without the development consist of the traffic generated by background developments with planned completion by 2017 added to the existing traffic volumes. Only developments that meet the criteria of being approved and having an origin/destination within the study area are including in the 2017 Background scenario. As discussed previously, the only developments that fit these criteria are 1100 M Street, The Colonel at 1250 9th Street, The Flats at Blagden Alley, and Gallery Tower located within the block bounded by H, I, 6th, and 7th Streets.

Available background development traffic studies were used to determine the number of trips added for the background developments. These documents were used to determine the number of trips generated, the mode split percentages, and the trip routing. According to these studies, the background developments are expected to collectively generate 108 vehicular trips and 245 non-auto trips during the morning peak hour, and 155 vehicular trips and 410 non-auto trips during the afternoon peak hour.

In addition to the background developments, inherent growth on the study area roadways due to ambient growth in the vicinity of the site was accounted for with a half (.5) percent per year growth rate compounded annually over the study period. This growth rate was applied to existing through movement volumes on 9th, L, and M Streets.

The traffic volumes generated by the background developments were added to the 2014 existing traffic volumes plus growth in order to establish the 2017 background traffic volumes. The traffic volumes for the 2017 background conditions are shown on Figure 14 for the morning and afternoon peak hours.

2017 Future Conditions with Development (2016 Total Future)

The future conditions scenario with site development adds trips generated by the proposed development to the 2017 future conditions without development scenario. Regional traffic patterns were analyzed in order to determine the trip distribution for vehicles accessing the site, as shown in Figure 15. The majority of site trips will be concentrated on 9th Street because it provides north-south mobility and connects the site with roadways to the north and south that provide east-west mobility within the District. Most of the east-west trips will be concentrated on L Street to the east and M Street Inbound, and Massachusetts Avenue outbound to the west. A limited number of trips will be generated along local roads because most local trips are anticipated to be made by walking, cycling or transit. The site-generated traffic volumes are shown in Figure 16 for the morning and afternoon peak hours.

The traffic volumes for the 2017 Total Future conditions were calculated by adding the site-generated traffic volumes to the 2017 background traffic volumes. Thus the future conditions with the proposed development include traffic generated by the existing volumes, background development through the year 2017, ambient growth in the study area, and the proposed Columbia Place development. The 2017 Total Future traffic volumes are shown on Figure 17 for the morning and afternoon peak hours.

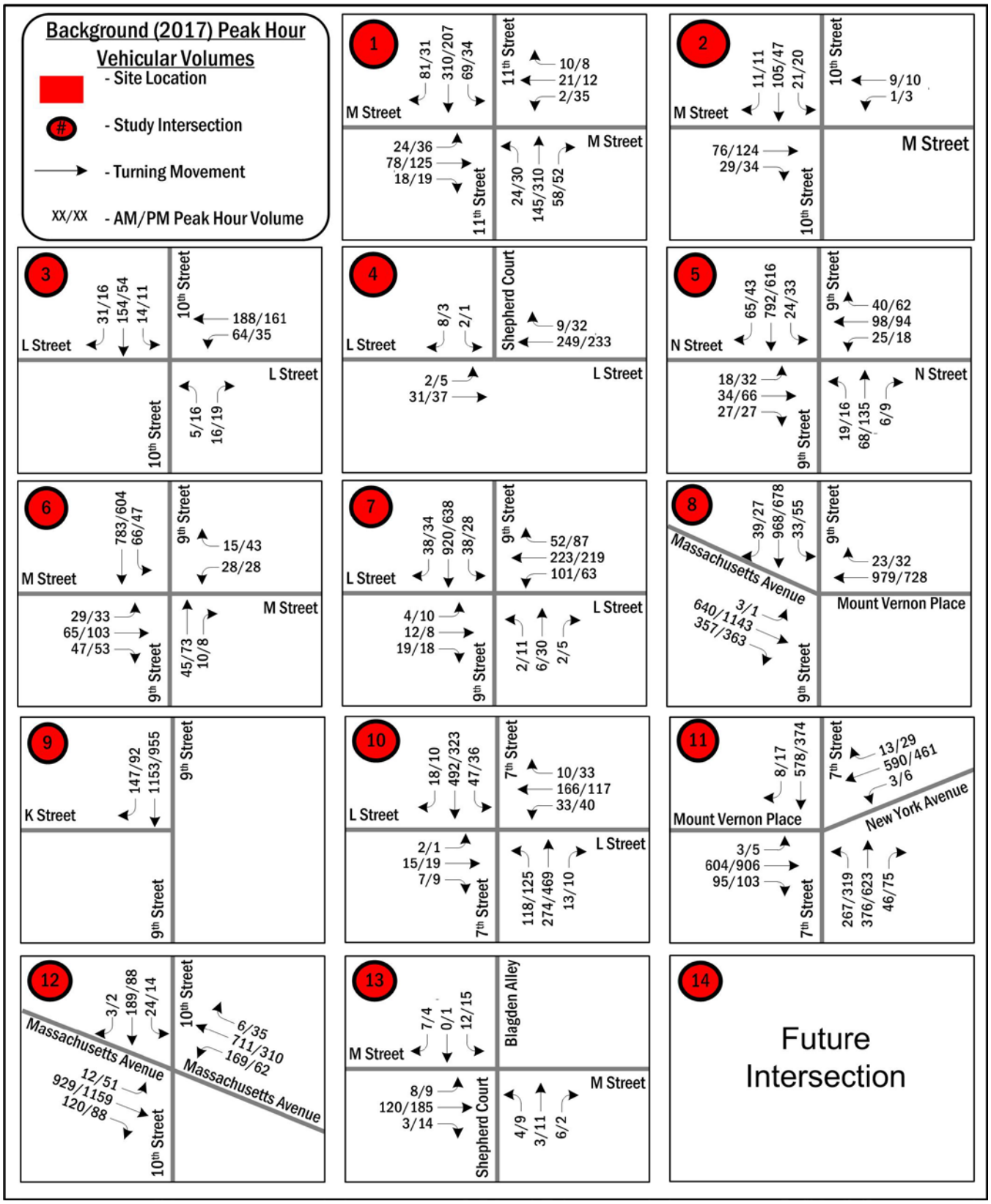

Figure 10: Background Peak Hour Vehicular Volumes

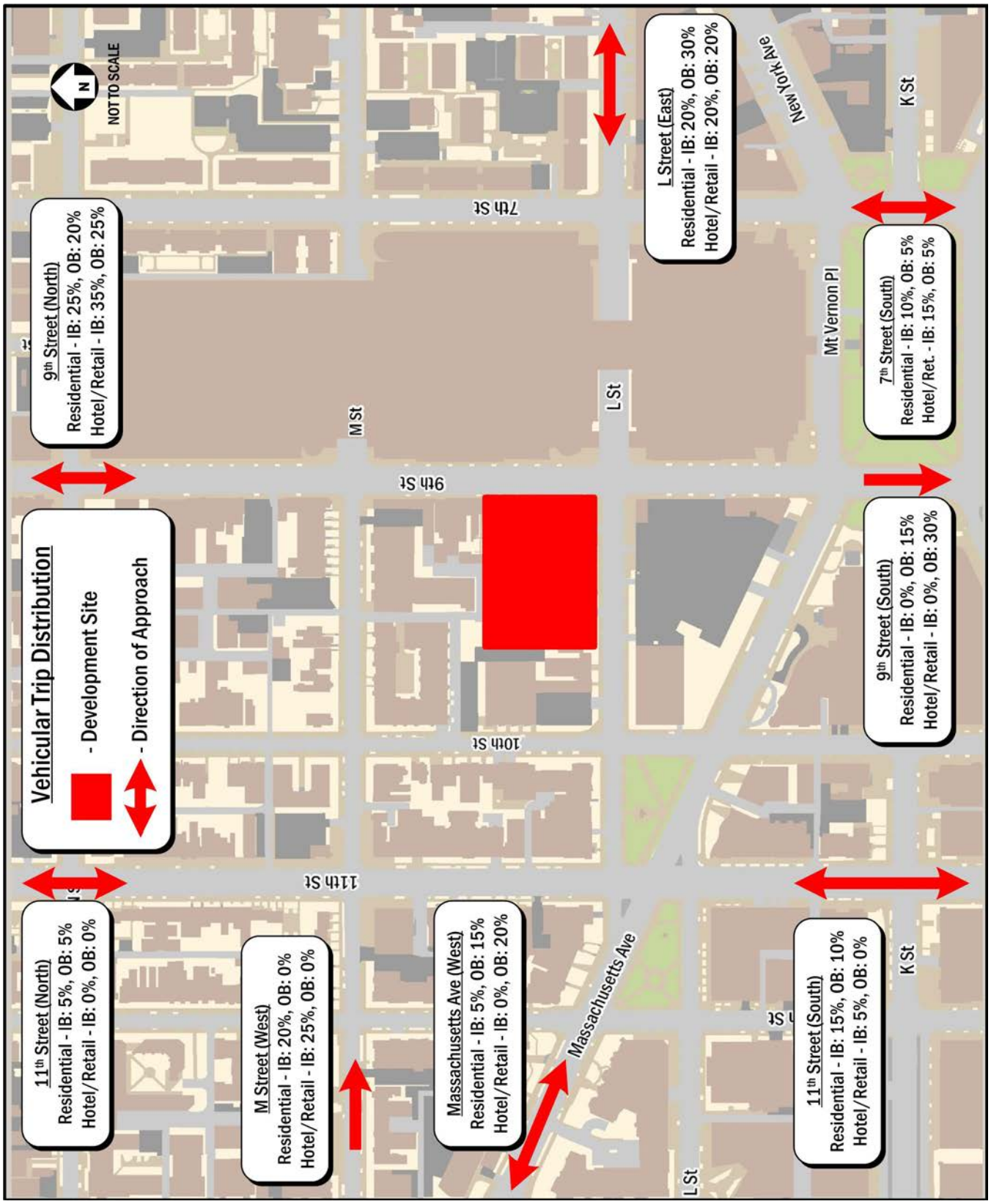

Figure 11: Vehicular Trip Distribution

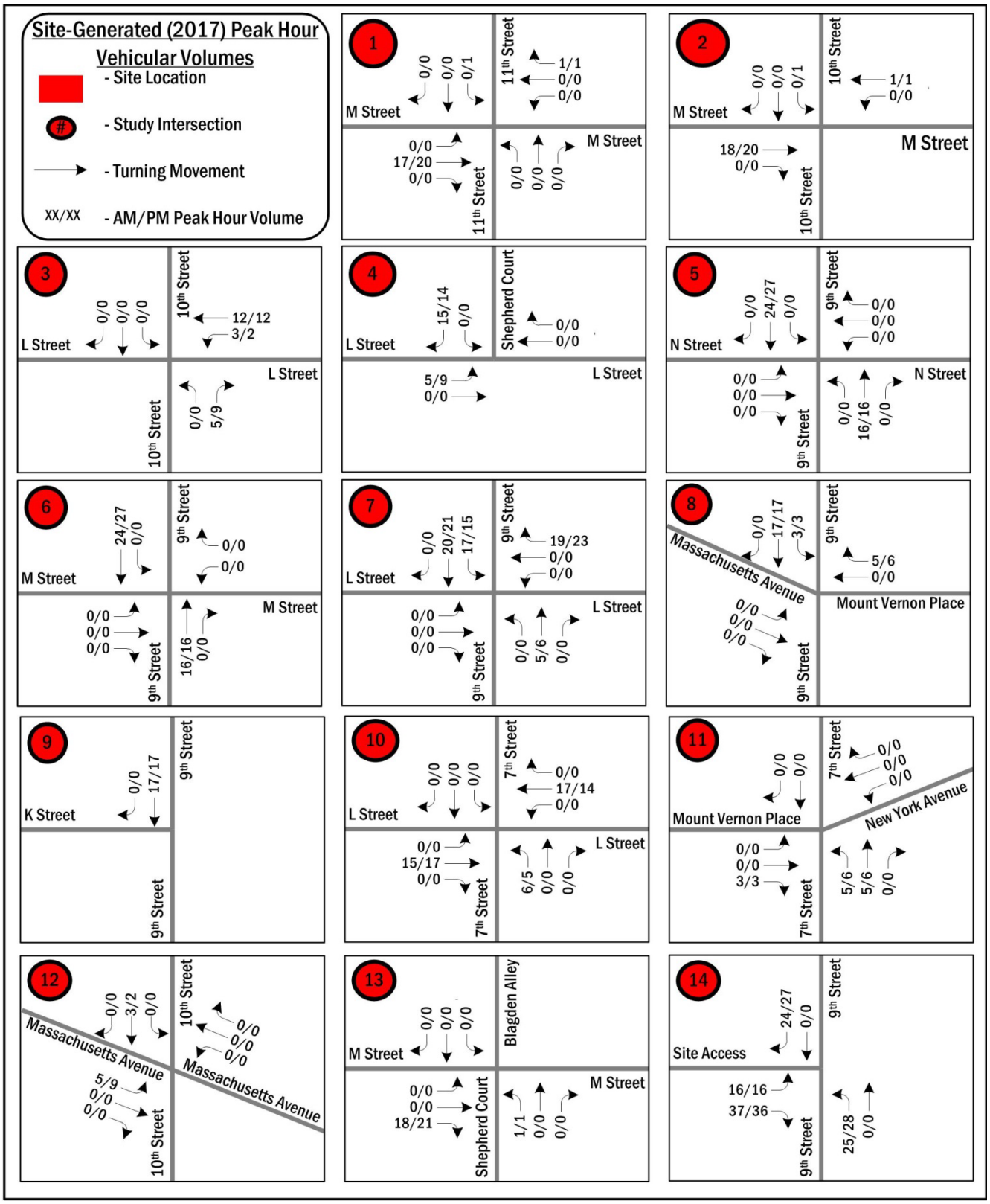

Figure 12: Site-Generated Peak Hour Vehicular Volumes

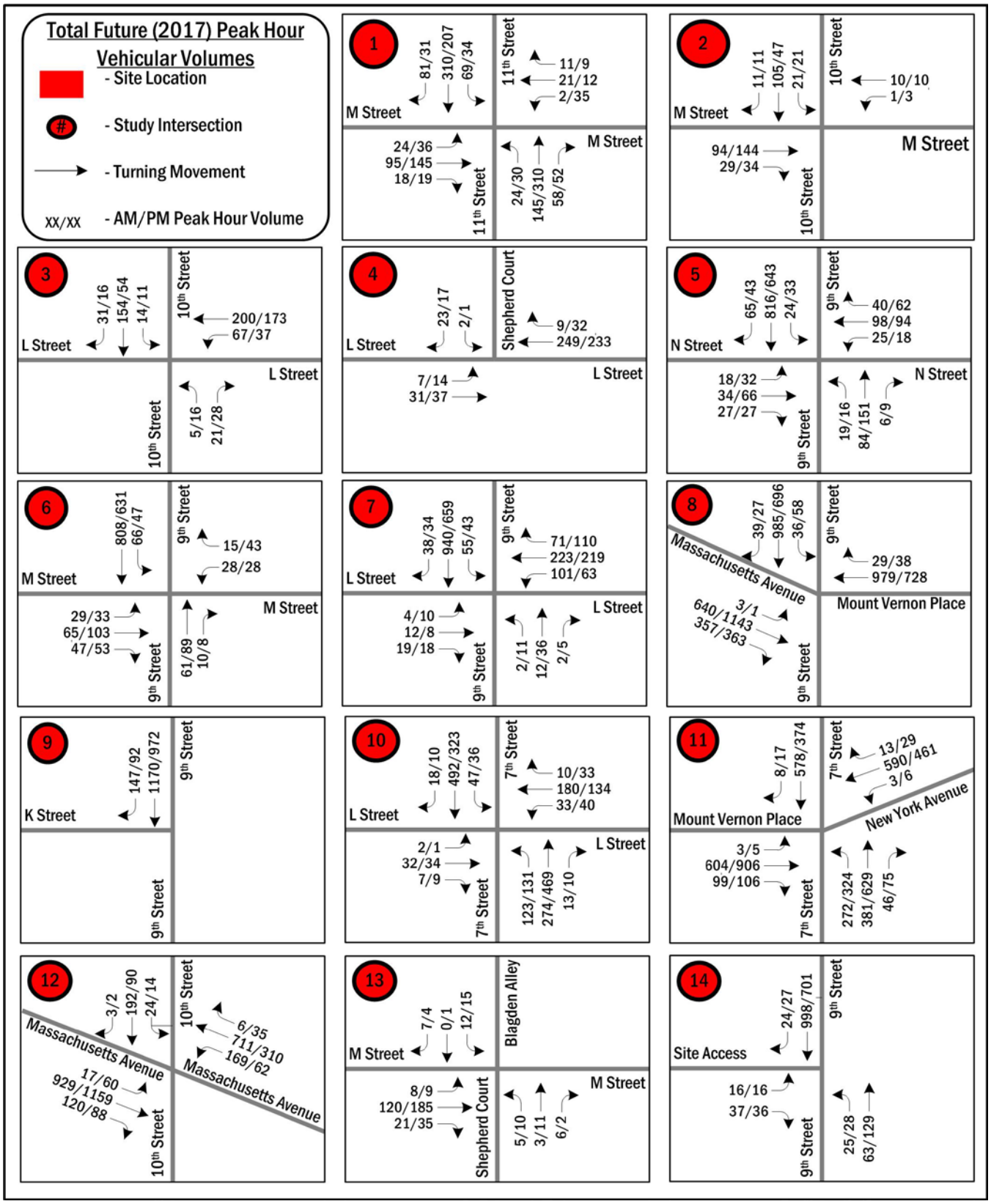

Figure 13: Total Future Peak Hour Vehicular Volumes

4.2.3 Geometry and Operations Assumptions

The following section reviews the roadway geometry and operations assumptions made and the methodologies used in the roadway capacity analyses, as summarized in Table 6.

2014 Existing Conditions

Gorove/Slade conducted field reconnaissance to confirm the existing lane configurations and traffic controls at the intersections within the study area, as shown on Figure 18. Existing signal timings and offsets were obtained from DDOT and confirmed during field reconnaissance.

2017 Future Conditions without Development (2017 Background)

The lane configurations and traffic controls for the 2017 future conditions without the proposed development are based on the 2014 existing conditions. No roadway infrastructure changes were assumed for the future conditions without development for 2017.

2017 Future Conditions with Development (2017 Total Future)

The lane configurations and traffic controls for the 2017 future conditions with the proposed development are largely based on the 2014 existing conditions. The only changes in roadway infrastructure are shifting the existing alley (Shepherd Court) slightly west to the western site edge and the extension of the east-west alley to connect to 9th Street. These alterations do not affect vehicular travel patterns.

4.2.4 Vehicular Analysis Results

Intersection capacity analyses were performed for the three scenarios at the intersections contained within the study area during the morning and afternoon peak hours. *Synchro, Version 7.0* was used to analyze the study intersections based on the Highway Capacity Manual (HCM) methodology. The results of the capacity analyses are expressed in level of service (LOS) and delay (seconds per vehicle) for each approach. A LOS grade is a letter grade based on the average delay (in seconds) experienced by motorists traveling through an intersection. LOS results range from "A" being the best to "F" being the worst. LOS E is typically used as the acceptable LOS threshold in the District; however, LOS F is sometimes accepted in urbanized areas.

The LOS capacity analyses were based on: (1) the peak hour traffic volumes; (2) the lane use and traffic controls; and (3) the Highway Capacity Manual (HCM) methodologies (using *Synchro 7* software). The average delay of each approach and LOS is shown for the signalized intersections, in addition to the overall average delay and intersection LOS grade. The HCM does not give guidelines for calculating the average delay for a two-way stop-controlled intersection, as the approaches without stop signs would technically have no delay.

Table 7 shows the results of the capacity analyses, including LOS and average delay per vehicle (in seconds) for the 2014 Existing conditions and the 2017 Background and Total Future scenarios. The capacity analysis results for the morning and afternoon peak hours are shown on Figure 19 and Figure 20, respectively.

All but one of the study intersections operate at acceptable conditions during the morning and afternoon peak hours for the 2014 Existing, 2017 Background, and 2017 Total Future scenarios. The exception to this is the intersection of 7th Street with New York Avenue and Mount Vernon Place. The southbound approach at this location operates at an LOS "F" during both the AM and PM peak hours under all three scenarios and also causes the overall intersection to operate at LOS "F" during the AM peak hour for all scenarios. The delay at this approach is likely attributable to the signal timings, which

provide a protected phase for northbound lefts, thus giving more green time to northbound through movements than southbound through movements. Additional green time is also given to New York Avenue and Mount Vernon Place, which carry higher traffic volumes. The development would not add any additional vehicles to this approach, and thus would not contribute to further deterioration in LOS. Typically, a proposed development is considered to have an impact at an intersection if the capacity analyses yield an LOS F in the future with the proposed development where it does not in the future without the proposed development. This is not the case in this instance since the unacceptable LOS is present under existing conditions. As a result, no significant vehicular impacts are expected with the completion of the project.

Table 6: Summary of Vehicular Capacity Analysis Assumptions

2014 Existing Conditions
▪ Dates of data collection: ▫ Wednesday, September 19, 2012 ▫ Thursday, December 13, 2012 ▫ Wednesday, June 12, 2013 ▫ Wednesday, May 28, 2014 ▫ Tuesday, June 17, 2014 ▫ Wednesday, September 3, 2014 ▫ Counts taken from 6:30 – 9:30 AM and 4:00 – 7:00 PM ▪ System Peak: 8:15 – 9:15 AM, 5:00 – 6:00 PM ▪ Geometries and lane configurations based on existing conditions ▪ Signal timings/phasings/offsets provided by DDOT
2017 Future Conditions without Development (2017 Background)
▪ Background developments: ▫ Developments assumed completed by 2017 and with origins/destinations within the study area ▪ Background growth percentage: ▫ .5 percent per year applied to existing through movement volumes on L, M and 9th Streets. ▪ No roadway infrastructure or signal timing improvements assumed.
2017 Future Conditions with Development (2017 Total Future)
▪ Site trip generation based on ITE *Trip Generation*, 9th Edition ▫ Total AM peak hour trips assigned: 141; Total PM peak hour trips assigned: 151 ▪ Mode split determined based on: ▫ US Census data and comparable sites from WMATA's *Ridership Survey* for the residential component; ▫ Previous studies conducted by Gorove Slade that contained a hotel use and WMATA's *Ridership Survey* for the hotel component; ▫ Comparable retail sites from WMATA's *Ridership Survey* for the retail component; and ▪ Trip distribution for vehicles based on existing traffic volumes and travel patterns in the study area as shown in Figure 12. ▪ No roadway infrastructure or signal timing improvements assumed.

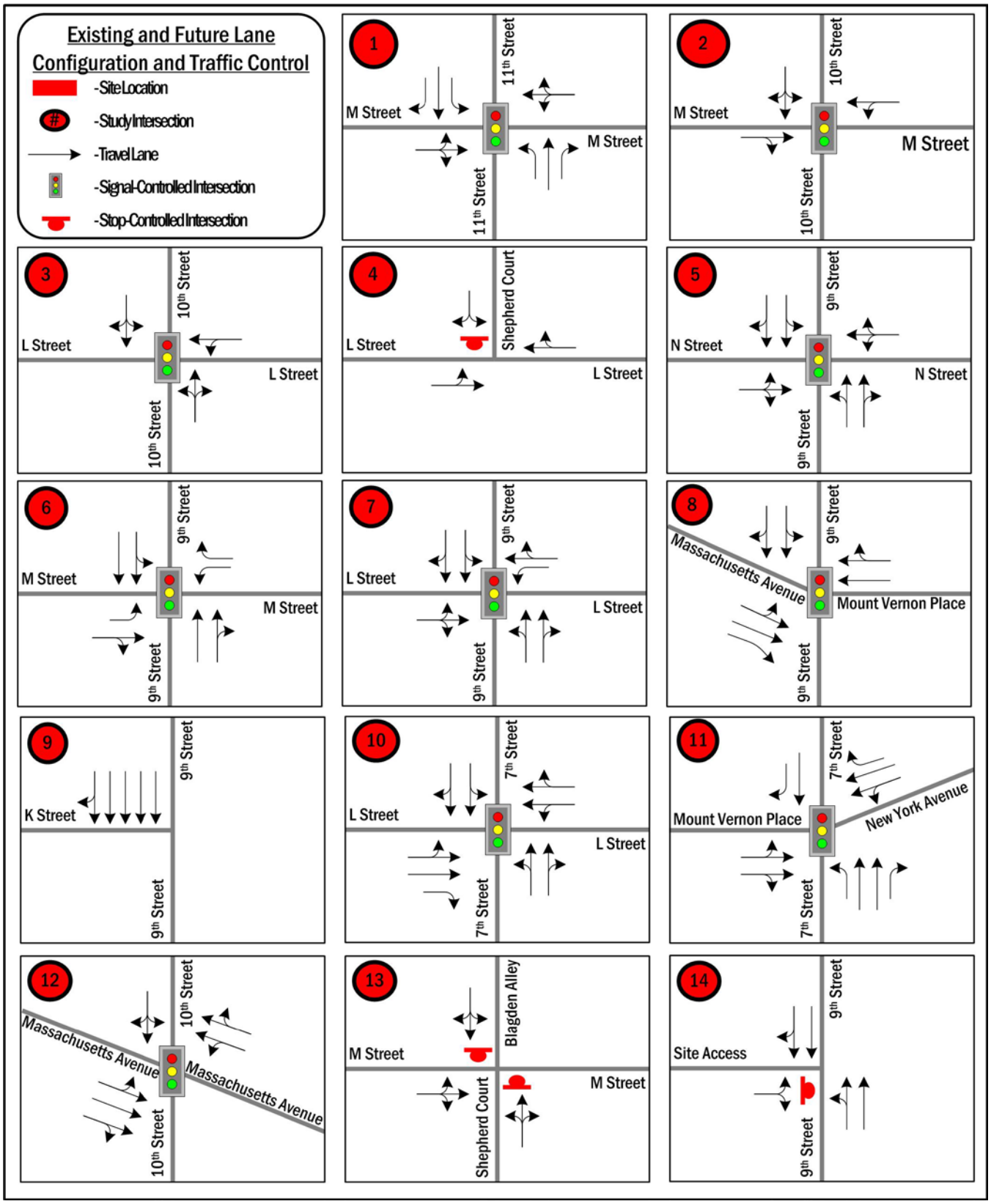

Figure 14: Existing and Future Lane Configuration and Traffic Control

Table 7: Peak Hour Capacity Analysis Results

		Existing				Background				Total Future			
Intersection	Movement	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
M Street and 11th	EB	D	35.5	D	36.4	D	35.7	D	37.0	D	36.6	D	38.5
Street	WB	C	23.6	C	26.9	C	23.9	C	27.4	C	24.3	C	27.6
	NB	A	7.9	A	9.3	A	8.0	A	9.3	A	8.0	A	9.4
	SB	A	8.8	A	8.5	A	8.9	A	8.7	A	8.9	A	8.7
	Overall	**B**	**13.6**	**B**	**16.1**	**B**	**13.7**	**B**	**16.4**	**B**	**14.3**	**B**	**17.2**
M Street and 10th	EB	C	21.9	C	30.5	C	21.9	C	30.7	C	23.6	C	32.0
Street	WB	B	15.6	B	11.5	B	15.7	B	11.5	B	15.7	B	11.5
	SB	B	18.0	C	21.9	B	18.1	C	22.0	B	18.1	C	22.0
	Overall	**B**	**19.3**	**C**	**26.8**	**B**	**19.4**	**C**	**26.8**	**C**	**20.2**	**C**	**27.9**
L Street and 10th	WB	C	29.9	C	23.9	C	30.0	C	24.0	C	29.6	C	23.5
Street	NB	B	18.9	C	24.4	B	18.9	C	24.6	B	18.1	C	27.8
	SB	C	30.2	B	18.9	C	30.4	B	19.3	C	30.1	B	19.1
	Overall	**C**	**29.2**	**C**	**22.7**	**C**	**29.4**	**C**	**22.9**	**C**	**28.9**	**C**	**23.1**
L Street and Alley	EB	A	0.9	A	1.3	A	0.9	A	1.3	A	2.4	A	2.9
(Shepherd Court)	SB	B	11.1	B	11.0	B	11.1	B	11.1	B	11.4	B	11.5
N Street and 9th	EB	C	27.3	C	25.5	C	28.2	C	26.0	C	28.2	C	26.0
Street	WB	C	32.5	C	27.0	C	32.6	C	27.2	C	32.6	C	27.2
	NB	B	10.1	A	7.9	A	9.9	A	7.9	A	8.8	A	7.0
	SB	B	12.7	B	14.6	B	12.8	B	14.9	B	13.0	B	15.1
	Overall	**B**	**16.6**	**B**	**16.9**	**B**	**16.9**	**B**	**17.2**	**B**	**16.7**	**B**	**17.0**
M Street and 9th	EB	B	14.4	A	7.1	B	14.6	A	7.0	B	14.9	A	6.6
Street	WB	B	18.9	B	12.1	B	18.9	B	12.1	B	18.9	B	12.1
	NB	A	4.3	A	9.0	A	4.3	A	9.1	A	6.5	B	10.8
	SB	B	12.1	C	31.1	B	12.2	C	31.8	B	12.3	C	33.0
	Overall	**B**	**12.3**	**C**	**22.3**	**B**	**12.4**	**C**	**22.6**	**B**	**12.6**	**C**	**23.4**
L Street and 9th	EB	B	12.9	A	6.6	B	12.9	A	6.4	B	15.0	A	6.1
Street	WB	C	24.5	C	26.9	C	24.6	C	27.2	C	25.3	C	29.1
	NB	A	8.4	B	13.2	A	8.4	B	13.4	A	7.9	B	13.5
	SB	B	10.0	A	9.1	B	10.5	A	9.6	B	11.8	B	10.6
	Overall	**B**	**14.1**	**B**	**14.9**	**B**	**14.4**	**B**	**15.3**	**B**	**15.5**	**B**	**16.5**
Massachusetts	EB	C	24.9	D	36.8	C	25.0	D	37.3	C	25.1	D	37.1
Avenue and	WB	D	46.2	C	32.2	D	46.2	C	32.8	D	46.3	C	33.2
Mount Vernon	SB	B	10.0	C	31.0	B	10.0	C	31.5	A	9.6	C	32.4
Place at 9th Street	**Overall**	**C**	**26.8**	**C**	**34.2**	**C**	**26.6**	**C**	**34.7**	**C**	**26.5**	**C**	**34.9**
K Street and 9th St.	(SB) This location has no delay since there are no conflicting movements.												
L Street and 7th	EB	A	9.3	C	21.8	A	9.6	C	22.1	B	10.8	C	23.9
Street	WB	C	20.0	C	22.6	C	20.0	C	22.7	C	20.2	C	22.9
	NB	A	3.6	A	10.0	A	3.6	B	10.4	A	3.6	B	10.7
	SB	D	46.1	D	35.8	D	46.1	D	35.9	D	46.3	D	35.9
	Overall	**C**	**25.5**	**C**	**20.5**	**C**	**25.4**	**C**	**20.6**	**C**	**25.2**	**C**	**21.0**

New York Avenue	EB	B	10.6	D	46.5	B	10.8	D	46.7	B	11.0	D	46.7
and Mount Vernon	WB	C	20.9	B	18.8	C	20.9	B	18.8	C	20.9	B	18.8
Place at 7th Street	NB	D	36.4	D	49.8	D	36.9	E	55.9	D	38.7	E	58.4
	SB	F	298.8	F	87.0	F	298.8	F	87.1	F	298.7	F	87.1
	Overall	**F**	**82.8**	**D**	**48.2**	**F**	**82.7**	**D**	**50.3**	**F**	**83.0**	**D**	**51.2**
Massachusetts	EB	A	7.7	A	9.6	A	7.8	A	9.6	A	7.9	A	9.8
Avenue	WB	B	13.8	A	2.9	B	14.0	A	3.2	B	13.8	A	3.0
and 10th Street	SB	E	65.4	D	40.0	E	66.6	D	39.8	E	66.9	D	39.7
	Overall	**B**	**16.9**	**A**	**9.8**	**B**	**17.2**	**A**	**9.9**	**B**	**17.3**	**B**	**10.0**
M Street and Alley	EB	A	0.9	A	0.3	A	1.0	A	0.5	A	0.9	A	0.5
(Blagden Alley)	NB	C	15.8	C	17.7	C	16.6	C	19.2	C	17.1	C	19.8
(Shepherd Court)	SB	B	10.3	B	13.6	B	12.0	B	13.9	B	12.1	B	14.1
9th Street and Site	EB									B	13.2	B	11.0
Access	NB									A	3.0	A	1.6

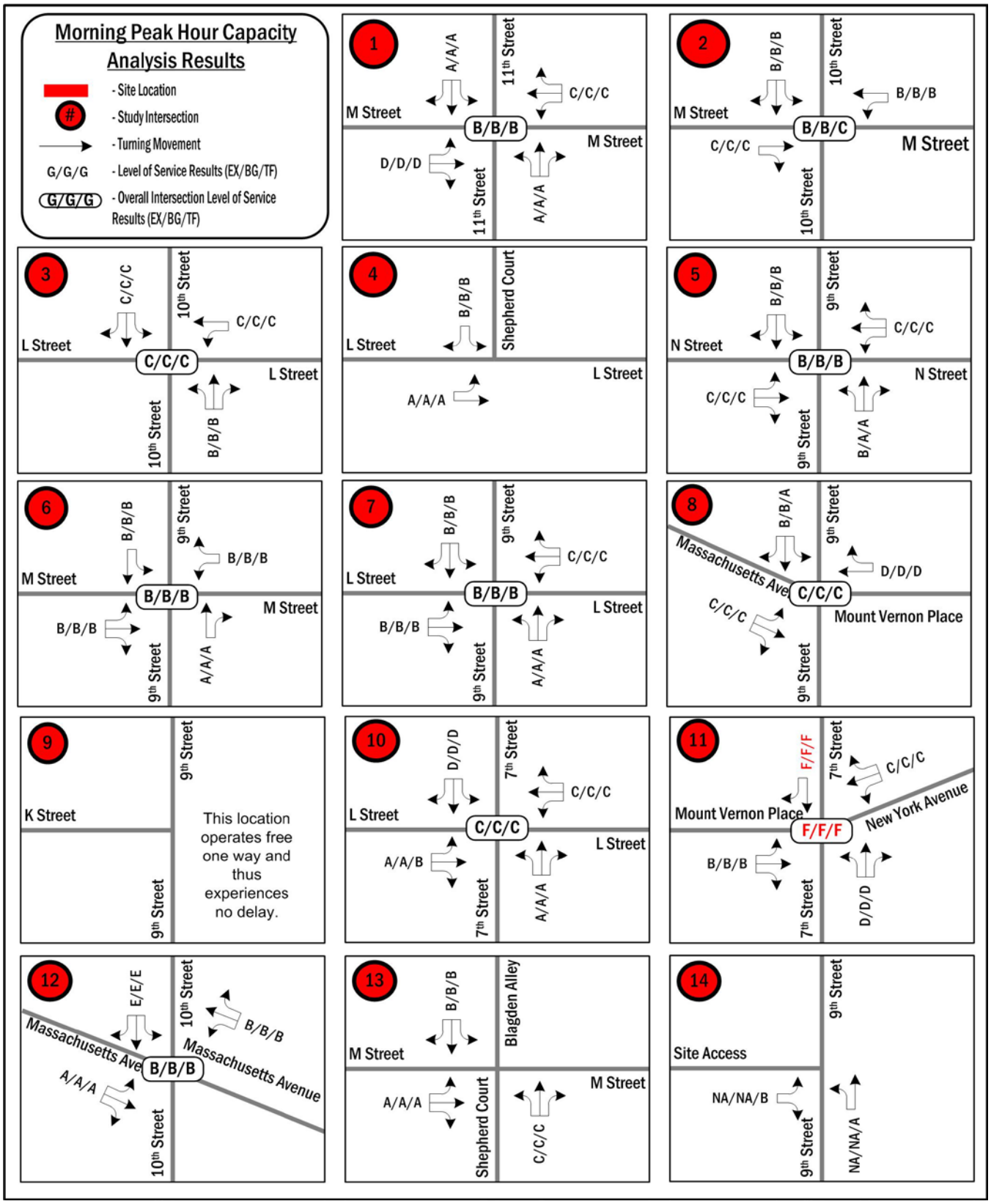

Figure 19: Morning Peak Hour Capacity Analysis Results

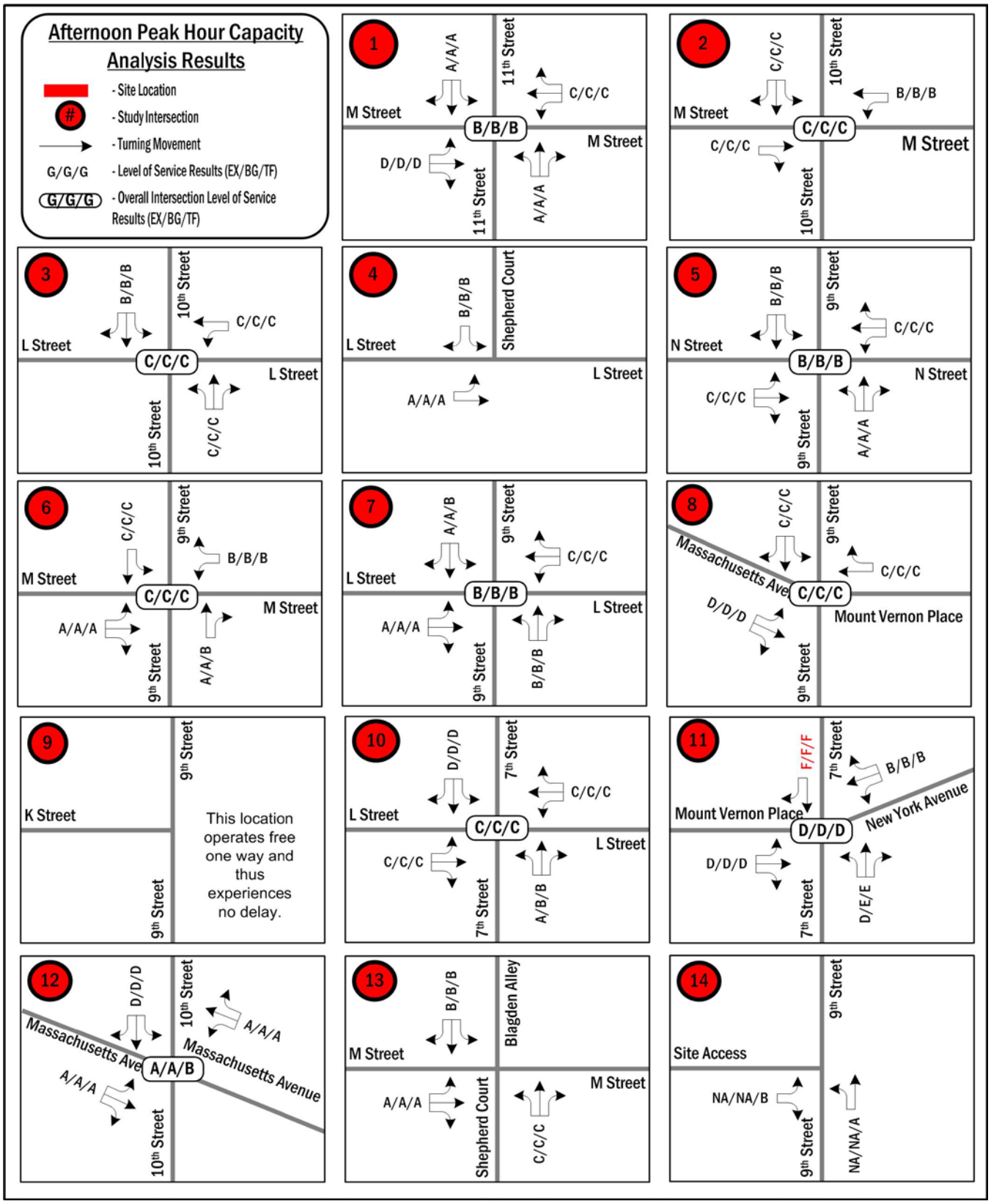

Figure 20: Afternoon Peak Hour Capacity Analysis Results

4.3 Crash Data

This section of the report reviews available crash data within the study area, reviews potential impacts of the proposed development on crash rates, and makes recommendations for mitigation measures where needed.

4.3.1 Summary of Available Crash Data

A safety analysis was performed to determine if there was an abnormally high accident rate at any study area intersection. The District Department of Transportation (DDOT) provided the last three years of intersection accident data, from 2011 to 2013. This data set included all intersections adjacent to the site. This data was reviewed and analyzed to determine the accident rate at each location. For intersections, the accident rate is measured in accidents per million-entering vehicles (MEV). The accident rates per intersections are shown in Table 8.

According to the Institute of Transportation Engineer's Transportation Impact Analysis for Site Development, an accident rate of 1.0 or higher is an indication that further study is required. Ten intersections in this study area meet this criterion (as shown in red in Table 8 and detailed in Table 9). The proposed site needs to be developed in a manner to help alleviate, or at minimum not add to, the conflicts at these intersections.

Table 8: Intersection Crash Rates

Intersection	Total Crashes	Ped Crashes	Bike Crashes	Rate per MEV*
11th Street & M Street	22	2	2	**2.37**
10th Street & M Street	9	0	1	**3.40**
10th Street & L Street	11	1	1	**2.59**
9th Street & N Street	22	5	1	**1.75**
9th Street & M Street	14	2	0	**1.25**
9th Street & L Street	8	0	0	**3.03**
9th Street & Massachusetts Avenue/Mount Vernon Place	80	0	0	**2.44**
7th Street & L Street	20	0	3	**1.54**
7th Street & New York Avenue/Mount Vernon Place	50	6	5	**1.67**
10th Street & Massachusetts Avenue	35	2	2	**1.62**

** - Million Entering Vehicles; Volumes estimated based on turning movement count data*
***No accident data was provided for the three existing, unsignalized study intersections.*

The crash summary data in Table 8 shows all 10 signalized intersections have a crash rate over 1.0 crash per million entering vehicles – the rate which is considered a threshold for further analysis. A rate over 1.0 does not necessarily mean there is a significant problem at an intersection, but rather it is a threshold used to identify which intersections may have higher crash rates due to operational, geometric, or other issues.

For these 10 intersections, the crash type information from the DDOT crash data was reviewed to see if there are high percentages of certain crash types. Generally, the reasons for why an intersection has a high crash rate cannot be derived from crash data, as the exact details of each crash are not represented. However, some summaries of crash data can be used to develop general trends or eliminate some possible causes.Table 9 contains a breakdown of crash types reported for the 10 intersections with a crash rate over 1.0 per MEV.

Table 9: High Crash Rate Intersections by Crash Type

Intersection	Rate per MEV	Right Angle	Left Turn	Right Turn	Rear End	Side Swiped	Head On	Parked	Fixed Object	Ran Off Road	Ped. Involved	Backing	Non-Collision	Under/ Over Ride	Unspecified	Total
11th Street & M Street	2.37	1 *5%*	3 *14%*	2 *9%*	2 *9%*	9 *41%*	0 *0%*	0 *0%*	0 *0%*	0 *0%*	1 *5%*	2 *9%*	0 *0%*	0 *0%*	2 *9%*	**22**
10th Street & M Street	3.40	1 *11%*	0 *0%*	0 *0%*	0 *0%*	4 *44%*	0 *0%*	1 *11%*	0 *0%*	0 *0%*	0 *0%*	2 *22%*	0 *0%*	0 *0%*	1 *11%*	**9**
10th Street & L Street	2.59	0 *0%*	2 *18%*	0 *0%*	1 *9%*	3 *27%*	1 *9%*	0 *0%*	0 *0%*	0 *0%*	3 *27%*	1 *9%*	0 *0%*	0 *0%*	0 *0%*	**11**
9th Street & N Street	1.75	2 *9%*	1 *5%*	1 *5%*	0 *0%*	4 *18%*	0 *0%*	3 *14%*	1 *5%*	0 *0%*	4 *18%*	4 *18%*	1 *5%*	0 *0%*	1 *5%*	**22**
9th Street & M Street	1.25	0 *0%*	3 *21%*	1 *7%*	1 *7%*	3 *21%*	1 *7%*	1 *7%*	1 *7%*	0 *0%*	1 *7%*	0 *0%*	0 *0%*	0 *0%*	2 *14%*	**14**
9th Street & L Street	3.03	0 *0%*	0 *0%*	1 *13%*	1 *13%*	3 *38%*	1 *13%*	0 *0%*	0 *0%*	0 *0%*	1 *13%*	1 *13%*	0 *0%*	0 *0%*	0 *0%*	**8**
9th St. & Mass. Ave/Mt. Vernon Pl.	2.44	6 *8%*	0 *0%*	2 *3%*	22 *28%*	39 *49%*	1 *1%*	2 *3%*	3 *4%*	1 *1%*	0 *0%*	2 *3%*	1 *1%*	0 *0%*	1 *1%*	**80**
7th Street & L Street	1.54	1 *5%*	0 *0%*	3 *15%*	4 *20%*	9 *45%*	0 *0%*	1 *5%*	0 *0%*	0 *0%*	0 *0%*	0 *0%*	0 *0%*	0 *0%*	2 *10%*	**20**
7th St. & N.Y. Ave/Mt. Vernon Pl.	1.67	4 *8%*	7 *14%*	2 *4%*	9 *18%*	20 *40%*	0 *0%*	1 *2%*	1 *2%*	0 *0%*	3 *6%*	2 *4%*	0 *0%*	0 *0%*	1 *2%*	**50**
10th Street & Massachusetts Ave.	1.62	1 *3%*	3 *9%*	2 *6%*	6 *17%*	18 *51%*	1 *3%*	0 *0%*	0 *0%*	0 *0%*	3 *9%*	0 *0%*	0 *0%*	0 *0%*	1 *3%*	**35**

4.3.2 Potential Impacts

This section summarizes the 10 locations with existing crash rates over 1.0 MEV and reviews potential impacts of the proposed development.

Several factors could contribute to the high crash rates experienced at the study intersections. First, the presence of the Convention Center and historical attractions within the study area likely draws many trips made by non-District residents who may not be as familiar with the local roadway system and intersections' operations. Second, the plentiful street parking, numerous bus stops, and intersections with atypical geometry present additional challenges and obstacles for motorists navigating the study area roadways. Finally, high pedestrian volumes counted at the study intersections means there are more opportunities for conflicts with vehicles.

The majority of the crashes at the 10 intersections listed above were side swiped vehicles. In this case, side swipe crashes are likely due to vehicles making a last-second lane change or as a result of significant on-street parking which may result in swipe crashes when vehicles pull out of parking spaces without looking. Rear end collisions were also high at several intersections, particularly at 9th Street & Massachusetts Avenue/Mount Vernon Place, 7th Street & L Street, 7th Street and New York Avenue/Mount Vernon Place, and 10th Street & Massachusetts Avenue, likely resulting from vehicles not slowing down enough or paying attention when the signal at their approach is red.

Although there are 10 intersections within the study area that have a high crash rate, this report does not recommend mitigation measures as the collisions are an existing condition and the proposed development is not projected to make significant changes to the commuting patterns, operations, or geometry at these intersections.

4.4 Non-Auto Impacts

In addition to the local vehicular network, the Columbia Place development is served by public transit, bicycle, and pedestrian networks, as described in Chapter 2. This section of the report discusses the non-auto impacts of the site by reviewing the ability of each non-auto transportation network to handle the expected trips.

4.4.1 Transit

The proposed development will generate transit trips due to the residential nature of the site. As stated in Section 2, there is a significant amount of transit service nearby, including the Metrorail Green and Yellow Lines and several bus routes. The Mount Vernon Metrorail station is under a quarter mile from the site and there are several bus lines also within a quarter mile of the site. Based on US Census data for the census tract of the development, roughly half of transit users utilize the Metrobus system and half use Metrorail.

WMATA studied the capacity of Metrorail stations in its 2008 *Station Access & Capacity Study*[1]. The study analyzed capacity of Metrorail stations for their vertical transportation, for example the capacity of the station at elevators, stairs, and escalators to shuttle patrons between the street, mezzanine, and platforms. The study also analyzed stations' capacity to process riders at farecard gates. For both analyses, vertical transportation and farecard gates, volume to capacity ratios were calculated for existing data (from 2005) and projections for the year 2030. Based on findings presented in the *Station Access & Capacity Study*, the Mount Vernon station can accommodate the additional riders generated by the proposed development. The study did not find any high volume to capacity ratios at the station.

WMATA also studied capacity for its bus routes in *DC's Transit Future System Plan*[2]. This study lists the bus routes with the highest load factor (a ratio of passenger volume to seated bus capacity). Only one of the five Metrobus routes that travel near the development site is cited for having unacceptable load factors. The 70 (Georgia Avenue/7th Street) line realizes a load factor of 1.07 on Saturday and 1.39 on Sunday. All bus lines within the site vicinity operate within capacity at all times during weekdays, and thus are able to absorb additional transit trips generated by the site.

4.4.2 Bicycle

The impacts of bicycling will be relatively less than impacts to other modes, due to the relatively lower amount of cycling trips generated.

Cyclists traveling to and from the site are expected to take advantage of existing and planned routes. Near the site, 7th Street, 11th Street and 12th Street provide dedicated bicycle lanes. These streets, along with the on-street signed bicycle route on 13th Street, provide the safest north-south connectivity, providing on-street bicycle lanes which connect to additional bicycle lanes or bicycle routes mostly to the north of the site. There are no primary east-west bicycle lanes in the direct vicinity of the site. However, R Street to the north provides east-west dedicated bicycle lanes. The R Street lanes connect to the Metropolitan Branch Trail to the east for more regional trips. Based on the quality of the routes near the project's location, the proposed development will not have a negative impact to bicycle facilities in the study area.

[1] *Station Access & Capacity Study Final Report*, April 2008, Washington Metropolitan Area Transit Authority
[2] *DC's Transit Future System Plan Final Report*, April 2010, District of Columbia Department of Transportation

4.4.3 Pedestrian

The Columbia Place development is located in a walkable area, with connections to major existing and future retail locations, employment sites, residential neighborhoods, and transit connections.

The origins and destinations of these trips are likely to be:

- Employment opportunities where residents can walk to work
- Retail locations, primarily 9th Street, 7th Street, and Massachusetts Avenue.
- Transit connections such as the Mount Vernon Metrorail station or nearby Metrobus stops

Based on these origins/destinations, most pedestrians generated by the proposed development will travel along L and 9th Streets. M, 7th, and 11th Streets may also be used to a lesser extent as some Metrobus stops are east and west of the site. About half of the transit riders are expected to take the bus, and therefore will likely be walking within a quarter mile radius of the site. The other half is expected to take the train which will consist of walking less than a quarter mile along L Street to the Mount Vernon Metrorail station.

Most of the sidewalks surrounding the site are of high quality offering safe connections to transit, retail, and employment in all directions. A summary of the sidewalk availability and quality is shown previously on Figure 5. The capacity of the sidewalks to handle the projected number of pedestrians will not be negatively impacted by this project, as long as future redevelopments build sidewalks to DDOT standards. DDOT requires that all sidewalks are a minimum of 6 feet wide, with sidewalks on arterial streets 8 to 10 feet wide depending on the location. The proposed widths of the sidewalks adjacent to the site property meet the District standard. The *Highway Capacity Manual* (HCM) outlines methodologies for calculating capacity of sidewalks based on the sidewalk widths. According to methodologies contained in the HCM, the LOS grade on a 6 foot wide sidewalk does not reach LOS D until the sidewalk volumes reach 2,000 pedestrians per hour. Similarly, LOS E is not reached until volumes reach 3,000 pedestrians per hour. The existing pedestrian counts adjacent to the site combined with the projected pedestrian trips associated with the site will not approach these thresholds. Thus, the sidewalk capacity will not be exceeded, and there will be no detrimental impacts.

5. CONCLUSIONS

This report has presented the findings of a Traffic Impact Study (TIS) conducted for the Columbia Place development located in the northwest quadrant of Washington, DC in support of a Planned Unit Development (PUD) application and zoning map amendment from R-5-B District to R-5-D District. Based on the analyses presented in this report, the following can be concluded:

- The site is well served by carshare, transit, pedestrian, bicycle, and Capital Bikeshare facilities.
- The project is planned to provide one 30' loading berth and one 24' loading berth for the residential use and two 30' loading berths for the hotel and retail uses. All four loading bays will be located at-grade in the rear of the building along the east-west alley that will connect 9th Street to the north-south alley. Given the size of the residential units and retail space in the development as well as the nature of the proposed hotels, these loading berths are adequate to serve the site.
- The project is planned to provide a total of 271 parking spaces. This meets the zoning requirements and is sufficient to meet the demands of the site.
- The following Transportation Demand Management (TDM) strategies are planned to be implemented:
  - The Applicant will identify a TDM Leader (for planning, construction, and operations) and provide DDOT/Zoning Enforcement with annual TDM Leader contact updates.
  - The Applicant will provide an adequate amount of short-and long-term bicycle parking spaces, including a secure bicycle room within the building that can house up to 66 bicycles.
  - The TDM Leader will make printed materials related to local transportation alternatives available to residents and employees upon request and at move-in for new tenants.
  - The Applicant will dedicate one space on site for car sharing services to use with right of first refusal.
- All but one of the study intersections operate at acceptable conditions during the morning and afternoon peak hours for the 2014 Existing, 2017 Background, and 2017 Total Future scenarios. The only location that operates at an LOS "F" (southbound on 7th Street at New York Avenue/Mount Vernon Place) under all scenarios will not be further exacerbated with the proposed development since site trips will not be added to this approach. As a result, no significant vehicular impacts are expected with the completion of the project.