Traffic Impact Study

Marina View

Washington, D.C.

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EXECUTIVE SUMMARY

The following report details the findings of a traffic impact study conducted in conjunction with the Planned Unit Development (PUD) for Fairfield Marina View in Washington, D.C. The subject site is located in Ward 6 on the Southwest Waterfront and is bounded by M Street, SW to the south, Sixth Street to the west, Waterside Mall to the east, and K Street to the north.

Two residential buildings presently occupy the subject site. The developers, Fairfield Residential LLC, propose a mixed-use project that will add two new buildings to the north and south ends of the site and replace the existing surface parking lots. The existing buildings will also be renovated as part of the project. The new buildings will consist of up to 300 residential units and the existing buildings include approximately 256 units. The new south building will include 8,300 square feet of ground floor retail along M Street. Approximately 564 parking spaces will be provided, with 556 being allotted to residential development and 8 for retail.

Several features of the Marina View PUD help to reduce potential traffic impacts. The site is located next to the Waterfront-SEU Metrorail station (Green Line) and conforms to the six design principles outlined by the Office of Planning for Transit-Oriented Development (TOD) initiative. The mixed-use plan for the development reduces both the traffic generated by the community and automobile dependence. The retail uses on the site will reduce the need for residents to travel by car to access certain retail amenities.

The traffic capacity analyses of the roadway intersections detailed in the study found the following conclusions:

- *Existing Conditions*

  Under existing conditions, all but one study area intersection operate at overall acceptable levels. Recommended signal timing improvements would improve the Levels of Service where required.

- *Future Background Conditions*

  The results of the future background capacity analyses (future without the Marina View PUD) show that all study area intersections are projected to operate at or above acceptable Levels of Service in the AM when the signal timing recommendations of the existing scenario are applied at background.

- *Total Future Conditions*

  The total future conditions capacity analysis, including Marina View PUD generated traffic, showed similar results to the future background conditions. There would be no significant change between background conditions and future conditions with the build out of Marina

View.

- *Parking*

  Sufficient parking is provided at an approximate rate of one space per residential unit.

INTRODUCTION

This report presents the findings of a traffic impact study conducted in conjunction with a Planned Unit Development (PUD) and Zoning Map Amendment application for Fairfield Marina View in Washington, D.C. The site consists of Lots 50 and 853 in Square 499 in Ward 6 on the Southwest Waterfront (the "Site") and is approximately 135,263 square feet in area. It lies adjacent to the Waterside Mall and just east of the Washington Channel of the Potomac River as shown in Figure 1.

Two residential buildings presently occupy the site, with approximately 164 parking spaces on two surface parking lots. Fairfield Residential LLC proposes to develop a mixed-use project with two new buildings to the north and south extremes of the Site by replacing the two existing parking lots. The new buildings will consist of up to 300 residential units and the existing structures include approximately 256 units. The new south building will include 8,300 square feet of ground floor retail along M Street. Approximately 564 parking spaces will be provided in an underground parking garage below the new buildings, with 556 being allotted to residential development and 8 for the retail portion.

The primary purpose of this study is to evaluate the traffic impacts of the proposed development at five study intersections located around the site and identify any necessary transportation improvements needed to mitigate impacts.

The following list summarizes the tasks performed by Gorove/Slade Associates as part of this study:

- Field reconnaissance to collect existing roadway and intersection geometrics, traffic controls, speed limits, and signal operations;
- Peak hour turning movement counts at study intersections;
- Existing Levels of Service at the study intersections;
- Background traffic forecasts for project build-out in 2010 (one year after the Marina View PUD build-out year of 2009) based on existing counts, traffic generated by other pending/future developments, and traffic pattern changes as a result of roadway improvements (where applicable);
- Future Background Levels of Service at study intersections based on background traffic forecasts and existing traffic controls;
- AM and PM peak hour trips that would be generated by the new development, including mode split assumptions;
- Total Future traffic volumes in 2010 (one year after project build-out of 2009) based on Future Background traffic forecasts and site traffic assignments; and
- Total Future Levels of Service at the study intersections based on Total Future traffic forecasts, existing and future traffic controls, and existing and future intersection geometrics.

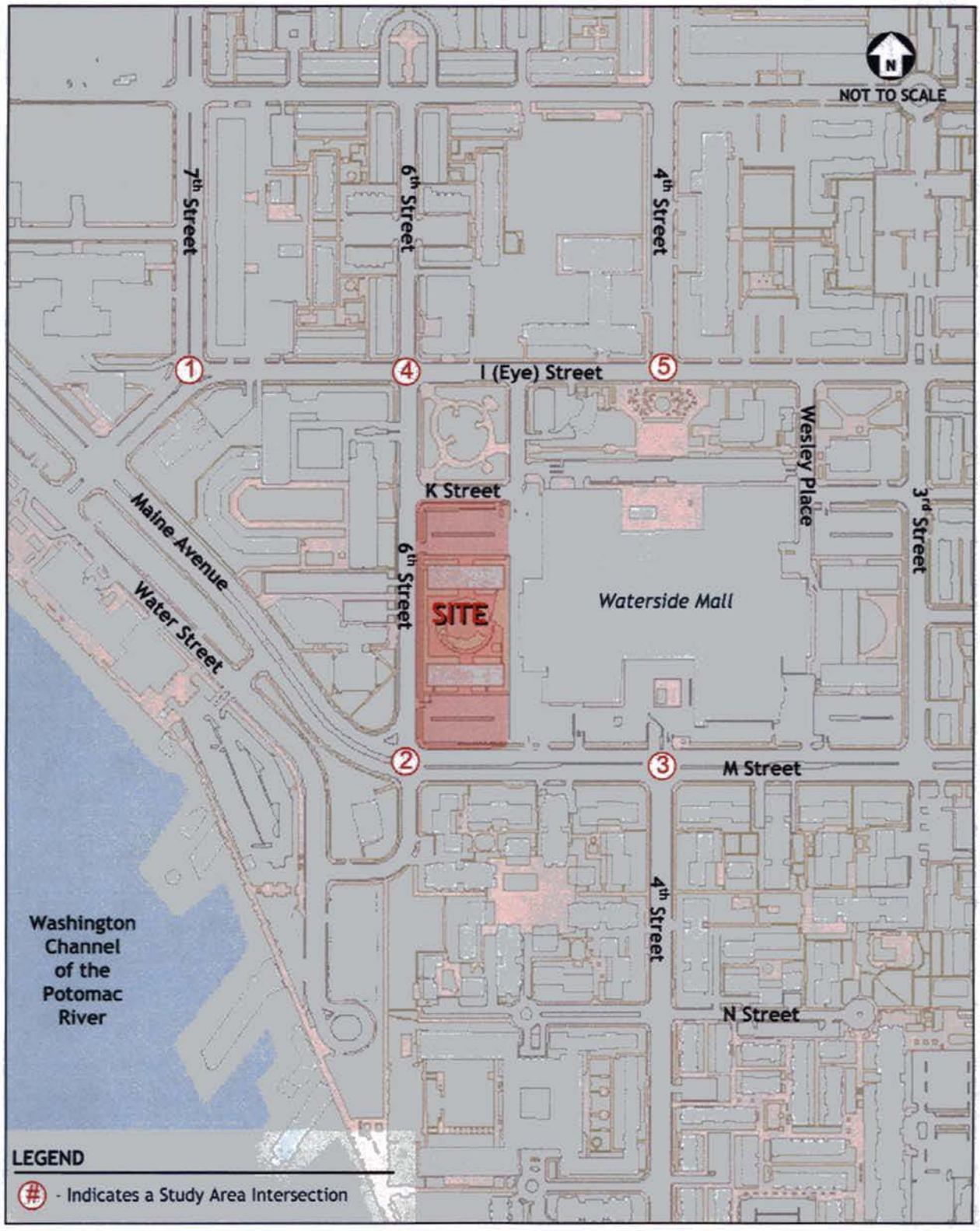

Figure 1 – Site Map and Study Intersections

Sources of data for this study include traffic counts conducted by Gorove/Slade Associates, the Institute of Transportation Engineers (ITE) *Trip Generation*, 7th Edition, Escoff and Associates architects, Zion, Breen, and Richardson Associates landscape architects, the District Department of Transportation (DDOT), Fairfield Residential LLC, the "2005 Development-Related Ridership Survey" prepared by WMATA, the 4th Street, SW Transportation Study prepared by DMJM+Harris, Incorporated for DDOT, and the files/library of Gorove/Slade Associates.

Project Scope

This traffic impact study was conducted in general accordance with parameters set by a scoping letter sent to DDOT on July 11, 2005. A copy of the letter is included in the Appendix. The following study intersections were included in this study (as shown in Figure 1):

1) 7th Street, SW and Maine Avenue, SW
2) 6th Street, SW and Maine Avenue, SW/M Street, SW
3) 4th Street, SW and M Street, SW
4) I Street, SW and 6th Street, SW
5) I Street, SW and 4th Street, SW

Capacity analyses were performed to determine the existing Levels of Service (LOS) for the AM and PM peak hours for the study intersections. A LOS equates a letter grade to the average delay in seconds experienced by motorists at an intersection. LOS results range from "LOS A" being the best to "LOS F" being the worst. A "LOS D" or better is typically used as the acceptable LOS threshold in the District; although a "LOS E" is acceptable in highly urbanized areas. The *Highway Capacity Manual 2000* methodology and Synchro traffic software, version 6.0, were used for analysis.

For purposes of this study, it was assumed that the Fairfield Marina View development would be complete and fully occupied by the year 2008.

Analysis was conducted for the following three scenarios:

1) Existing analysis (2006)
2) Future background analysis (2010) – future conditions without the proposed development
3) Future analysis (2010) – future conditions with the proposed development

EXISTING CONDITIONS

Site Access and Existing Roadway Network

The project site is bound by M Street to the south, 6th Street to the west, K Street to the north, and Waterside Mall on the east. Site access is provided from 6th Street and K Street. Descriptions of the roadways serving the Site include:

- *7th Street, SW*

  7th Street, SW is classified by the District Department of Transportation (DDOT) as a minor arterial with an Annual Average Weekday Traffic (AAWT) of 11,400 vehicles per day (near the Site). 7th Street is a four-lane north-south major collector that connects Water Street, SW to New Hampshire Avenue, NW. Restricted residential parking lines both sides of the roadway north of I Street. Parking is prohibited on both sides of the roadway south of I Street. The posted speed limit in the vicinity of the Site is 25 mph.

- *Maine Avenue, SW*

  DDOT classifies Maine Avenue, SW as a minor arterial with an AAWT volume of 27,100 vehicles per day (near the Site). Maine Avenue extends from M Street, SW to 17th Street, NW and serves as a connection between the Southwest Waterfront and the National Mall. Four-hour restricted residential parking is available along the southern side of the roadway. The posted speed limit in the vicinity of the Site is 25 mph.

- *6th Street, SW*

  DDOT classifies 6th Street, SW as a local roadway with an AAWT volume of 3,300 vehicles per day (near the Site). 6th Street is a four-lane north-south minor collector that connects Water Street to G Street, SW. Restricted residential parking lines both sides of the roadway. The posted speed limit in the vicinity of the Site is 25 mph.

- *M Street, SW*

  DDOT classifies M Street, SW as a minor arterial with an AAWT volume of 26,100 vehicles per day (near the Site). M Street is a six-lane divided east-west major collector that connects Maine Avenue, SW to 11th Street, SE. Limited parking is available along both sides of the street, but parking is prohibited at these locations during peak hours. The posted speed limit in the vicinity of the Site is 25 mph.

- *4th Street, SW*

  DDOT classifies 4th Street, SW as a collector south of M Street with an AAWT volume of 12,100 vehicles per day and as a minor arterial north of I Street with an AAWT volume of 11,400 vehicles per day. 4th Street is a four-lane north-south minor collector from P Street,

SW to M Street, SW and then continues from I Street, SW to Pennsylvania Avenue, NW. Restricted residential parking lines both sides of the roadway. The posted speed limit in the vicinity of the Site is 25 mph. In the project area, 4th Street is presently discontinuous as Waterside Mall occupies the space between K and M Streets. Plans are to re-open this section of 4th Street as the Waterside Mall area is redeveloped sometime after 2010.

- *I (Eye) Street, SW*

  DDOT classifies I Street as a principal arterial with an AAWT volume of 8,600 vehicles per day (near the Site). Eye Street is a four-lane east-west minor collector that connects 7th Street, SW to New Jersey Avenue, SE. The AADT volumes for I Street near the Site are approximately 6,300 vehicle trips. Restricted residential parking and limited parking lines both sides of the roadway. The posted speed limit in the vicinity of the Site is 25 mph.

Gorove/Slade Associates conducted field reconnaissance to obtain the existing lane usage and traffic controls at the intersections within the study area. Figure 2 presents the local roadway network of the study area, as well as existing lane use configurations.

Existing Transit

Fairfield Marina View is well-served by several Metrobus lines, Metrorail, and the D.C. Circulator as shown in Figure 3. Eleven Metrobus routes on five lines operate within the vicinity of the development. The Metrobus routes offer limited and full service to several Metrorail stations and points throughout the District as shown in Table 1. Limited service lines are primarily for commuters as they are offered Monday to Friday with restricted hours of operation. The Fairfield Marina View development is also within a short walking distance to the Waterfront-SEU Metrorail station (Green Line). The D.C. Circulator stops directly in front of the site on Sixth Street and provides connection to the new Convention Center (as well as other points) from the Southwest Waterfront.

Table 1 – Metrobus Routes

Line	Route	Metrorail Stops	Service
South Capitol Street	A9	L'Enfant, Waterfront-SEU	Monday to Friday, limited
Anacostia-Eckington Line	P1, P2	Anacostia, Navy Yard, Waterfront-SEU, Federal Center SW, Federal Triangle	Monday to Friday, limited
Anacostia-Congress Heights	A42, A46, A48	Archives-Navy Memorial, L'Enfant, Navy Yard, Anacostia	Monday to Sunday, early AM, after midnight
Minnesota Avenue - M Street	V7, V8, V9	Archives-Navy Memorial, L'Enfant, Smithsonian, Waterfront, Navy Yard, Minnesota Ave, Deanwood	Monday to Sunday, service to Archives Metrorail only on weekends
Georgia Avenue - Seventh Street	70, 71	Silver Spring, Petworth, Shaw-Howard U., Mt. Vernon Square, Gallery Place/Chinatown, Archives-Navy Memorial, L'Enfant, Waterfront/SEU	Monday to Sunday, full service

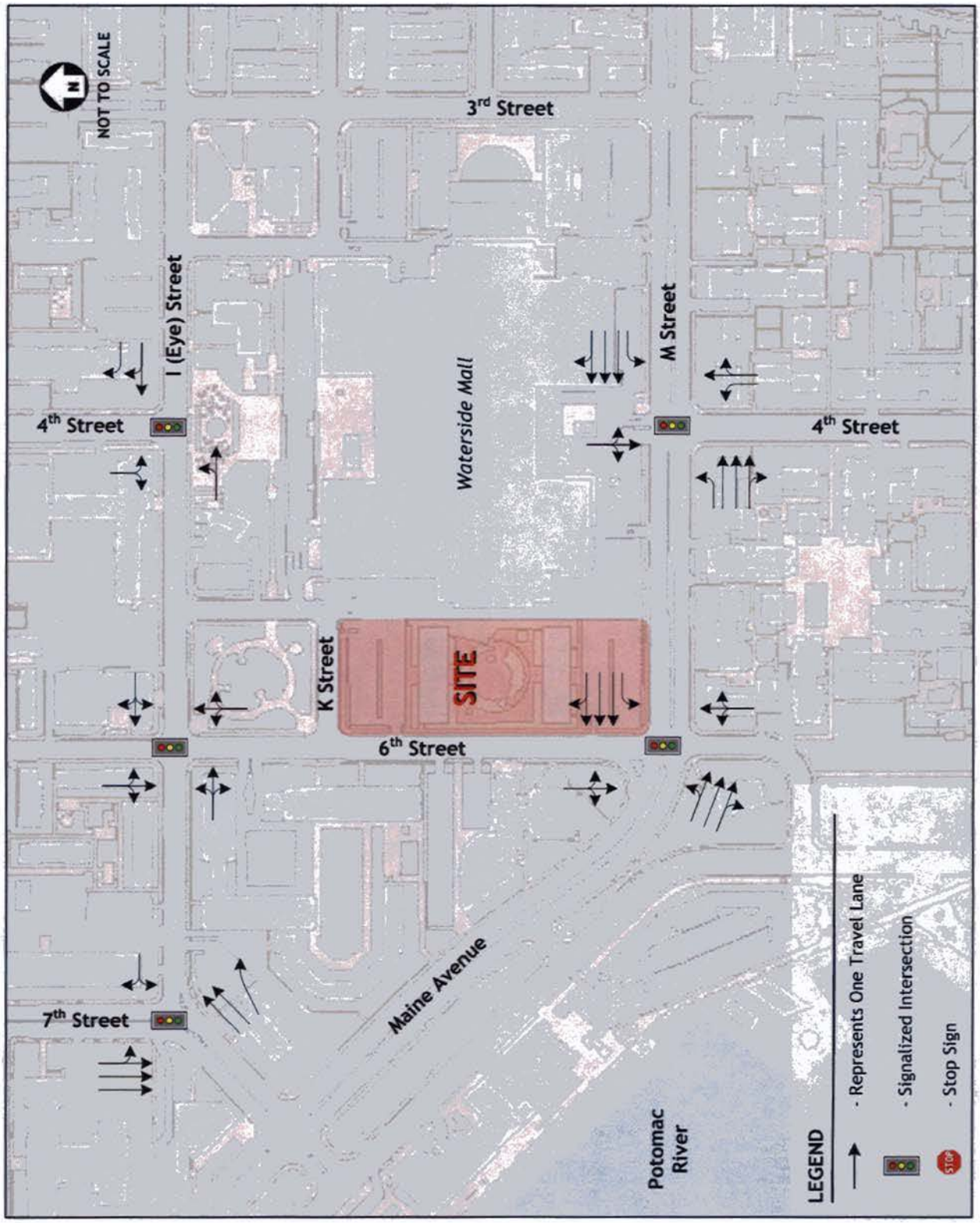

Figure 2 – Existing Lane Use and Traffic Control

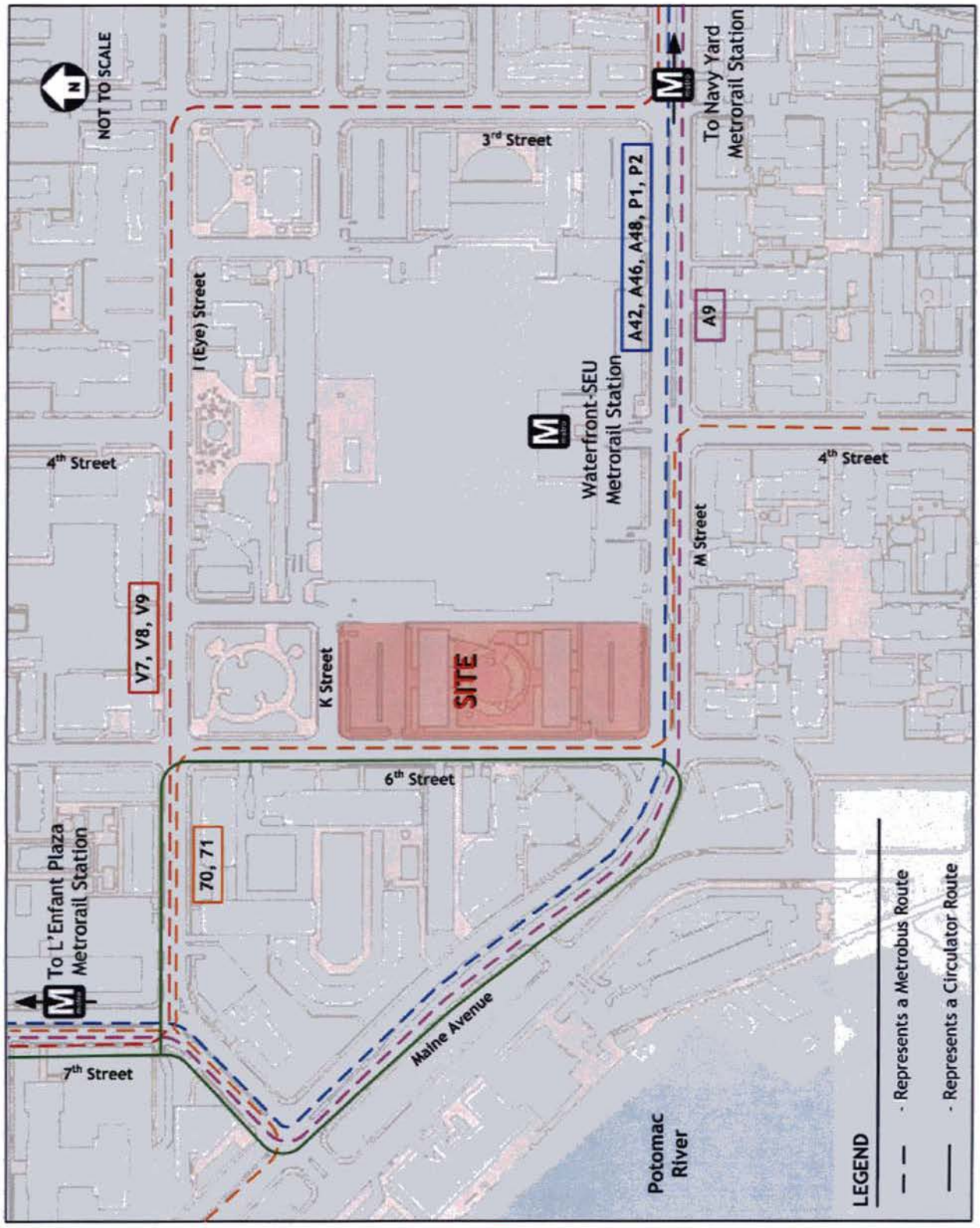

Figure 3 – Existing Transit Service

Existing Traffic Volumes

Turning movement traffic counts were conducted at the five (5) study intersections on several days. Counts were conducted on Wednesday, August 30 2006, Wednesday September 6, 2006 and Thursday, September 21 2006, between the hours of 6:00 a.m. to 9:00 a.m. and 4:00 p.m. to 7:00 p.m. at the key study intersections each day. In addition to collecting turning movement counts, the geometry of the study area and traffic control information was also collected. The peak hour of each intersection was used in all analyses. The existing volumes are shown in Figure 4.

Existing Capacity Analysis

Capacity analyses and Levels of Service (LOS) determinations were made for the AM and PM peak scenarios using Synchro software (version 6.0), existing lane use and traffic controls, and existing traffic volumes. The results of the existing analysis are summarized in Table 2.

The analyses reveal that a few intersection approaches or movements may exhibit prolonged delays. Four of the five signalized intersections operate at overall acceptable LOS D or better during both the AM and PM peak hours.

The I Street SW/4th Street SW intersection operates at overall LOS C during the AM peak and LOS F during the PM peak hours. While all movements of the intersection operate acceptably in the AM peak, the southbound and westbound movements operate at LOS F in the PM peak. This is mainly due to the delay or wait time this movement experiences in order to accommodate the other and heavier movements at the intersection. The intersection also has an all-pedestrian phase where all vehicles are stopped for approximately 20 seconds to allow pedestrians to cross all approaches. If the time allotted to this pedestrian phase was reduced, and a longer green time given to the westbound movement, the level of service would be improved, as well as the overall levels of service for the intersection. This improvement is reflected in Table 2a.

The southbound approach of the M Street SW/Fourth Street SW intersection operates at LOS D (AM peak) and LOS F (PM peak). The Level of Service experience by this approach may be due to the difference in volumes and green time allotted to the different movements and approaches. The traffic moving eastbound and westbound along M Street, as well as the northbound movement on 4th Street is very heavy when compared to the southbound movement out of the Waterside Mall. The intersection is therefore timed and phased to ensure that the heavier movements get sufficient green time, which in-turn causes the southbound movement (from Waterside Mall) to experience delays exceeding 60 seconds. This southbound phase is also skipped if no traffic is queued. Improvements to the intersection are expected with the development of the Waterside Mall after 2010.

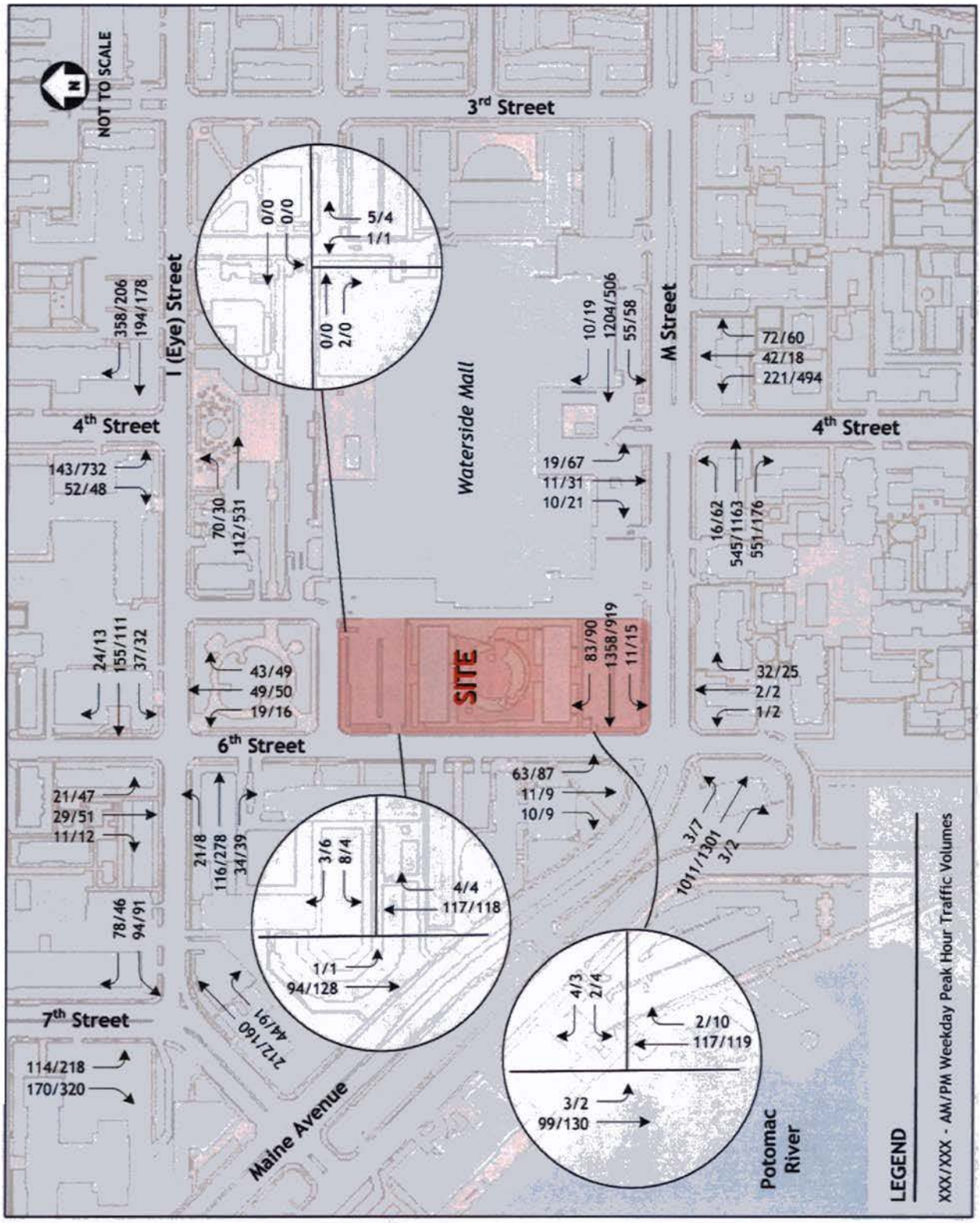

Figure 4 – Existing Peak Hour Traffic Volumes

Table 2 – Existing Levels of Service

Intersection (Approach)	Existing Conditions			
	AM Peak Hour		*PM Peak Hour*	
	Delay (sec/veh)	Level of Service	Delay (sec/veh)	Level of Service
Seventh Street, SW and Eye Street, SW				
Overall	**6.0**	**A**	**6.3**	**A**
Westbound	9.6	A	14.9	B
Northbound	4.4	A	3.2	A
Southbound	5.3	A	5.6	A
Sixth Street, SW and Eye Street, SW				
Overall	**10.9**	**B**	**13.2**	**B**
Eastbound	2.1	A	4.1	A
Westbound	0.8	A	1.1	A
Northbound	30.3	C	29.1	C
Southbound	35.7	D	40.3	D
Fourth Street, SW and Eye Street, SW				
Overall	**31.1**	**C**	**81.9**	**F**
Eastbound	13.5	B	35.9	D
Westbound	36.3	D	114.0	F
Southbound	32.6	B	99.1	F
Sixth Street, SW and Maine Avenue, SW/ M Street, SW				
Overall	**10.1**	**B**	**12.0**	**B**
Eastbound	9.7	A	12.8	B
Westbound	9.2	A	8.5	A
Northbound	27.0	C	26.2	C
Southbound	23.9	C	33.4	C
Fourth Street, SW and M Street, SW				
Overall	**17.1**	**B**	**35.7**	**D**
Eastbound	11.7	B	35.5	D
Westbound	14.8	B	23.2	C
Northbound	38.7	D	33.2	C
Southbound	57.0	E	111.7	F

Table 2a – Existing Levels of Service (with signal timing improvements)

Intersection (Approach)	Existing Conditions (Timing Improvements)			
	AM Peak Hour		*PM Peak Hour*	
	Delay (sec/veh)	Level of Service	Delay (sec/veh)	Level of Service
Seventh Street, SW and Eye Street, SW				
Overall	**6.4**	**A**	**5.5**	**A**
Westbound	11.3	B	9.6	A
Northbound	4.4	A	3.2	A
Southbound	5.3	A	5.6	A
Sixth Street, SW and Eye Street, SW				
Overall	**11.2**	**B**	**13.5**	**B**
Eastbound	3.3	A	5.1	A
Westbound	0.7	A	0.5	A
Northbound	30.3	C	29.1	C
Southbound	35.7	D	40.3	D
Fourth Street, SW and Eye Street, SW				
Overall	**22.2**	**C**	**35.7**	**D**
Eastbound	15.5	B	33.8	C
Westbound	22.7	C	39.0	D
Southbound	27.0	C	35.5	D
Sixth Street, SW and Maine Avenue, SW/ M Street, SW				
Overall	**10.2**	**B**	**12.6**	**B**
Eastbound	9.7	A	12.8	B
Westbound	9.2	A	8.5	A
Northbound	27.0	C	26.2	C
Southbound	27.6	C	45.6	D
Fourth Street, SW and M Street, SW				
Overall	**17.1**	**B**	**35.7**	**D**
Eastbound	11.7	B	35.5	D
Westbound	14.8	B	23.2	C
Northbound	38.7	D	33.2	C
Southbound	57.0	E	111.7	F

FUTURE BACKGROUND CONDITIONS

Future Background conditions represent future traffic levels in 2010 (one year after the build-out of the Marina View PUD) if the Fairfield Marina View development was not constructed. These conditions are the basis for comparative evaluation to Total Future conditions, which will include traffic generated by the proposed development.

Future Background Traffic Forecast

In order to develop background traffic forecasts, a composite of existing traffic, traffic growth, and traffic from other area developments is normally considered. The ambient growth is intended to capture growth in through traffic on streets serving new development located outside of the study area (regional traffic). Generating and assigning traffic for approved developments near the study site accounts for local traffic growth. Ideally, traffic is not double-counted, although it is possible that the ambient growth used may account for both regional and local growth. In some cases, ambient growth rates are skipped entirely, if an extensive list of approved developments exists, to avoid any double-counting of traffic.

Due to the amount of new development and on-going growth expected in the Southeast/Southwest area of the District, it is difficult to employ this method for this impact analysis. First, the amount of ambient growth is hard to determine, since the majority of growth in local roads has been generated by the new developments in near Southeast/Southwest itself. Most areas of the District are not experiencing regional traffic growth, but historical counts of M Street in the last four years show an increase of nearly 3% per year (based on counts from the library at Gorove/Slade). Second, the list of approved and proposed developments is lengthy and due to the size and nature of some of these projects, the details are in flux. A list of approved developments can be generated, but that would not include any changes that may occur over time, any planned developments expected to be complete after 2010, or by-right developments that would occur prior to the horizon years. The Ballpark, which is expected in 2008 does not represent typical daily traffic volumes and was not included in the analysis. Due to these considerations, this traffic impact analysis will estimate the anticipated growth in the area by applying a growth rate to the existing traffic volumes. Figure 5 shows a list of developments in the area, most of which will be developed after 2009.

Growth Rate

Since the growth in the area is expected to continue through and beyond the project build year, a two-percent growth rate was applied to the through movements along M Street and 7th Street. This relatively high rate of growth would maintain a sufficiently conservative analysis and account for the regional growth and anticipated growth in the immediate area. Additionally, a one-percent growth rate was applied to 4th Street, I Streets and heavy turning movements between these roads, M Street and 7th Street. Figure 6 shows the projected Background traffic volumes for the five study area intersections.

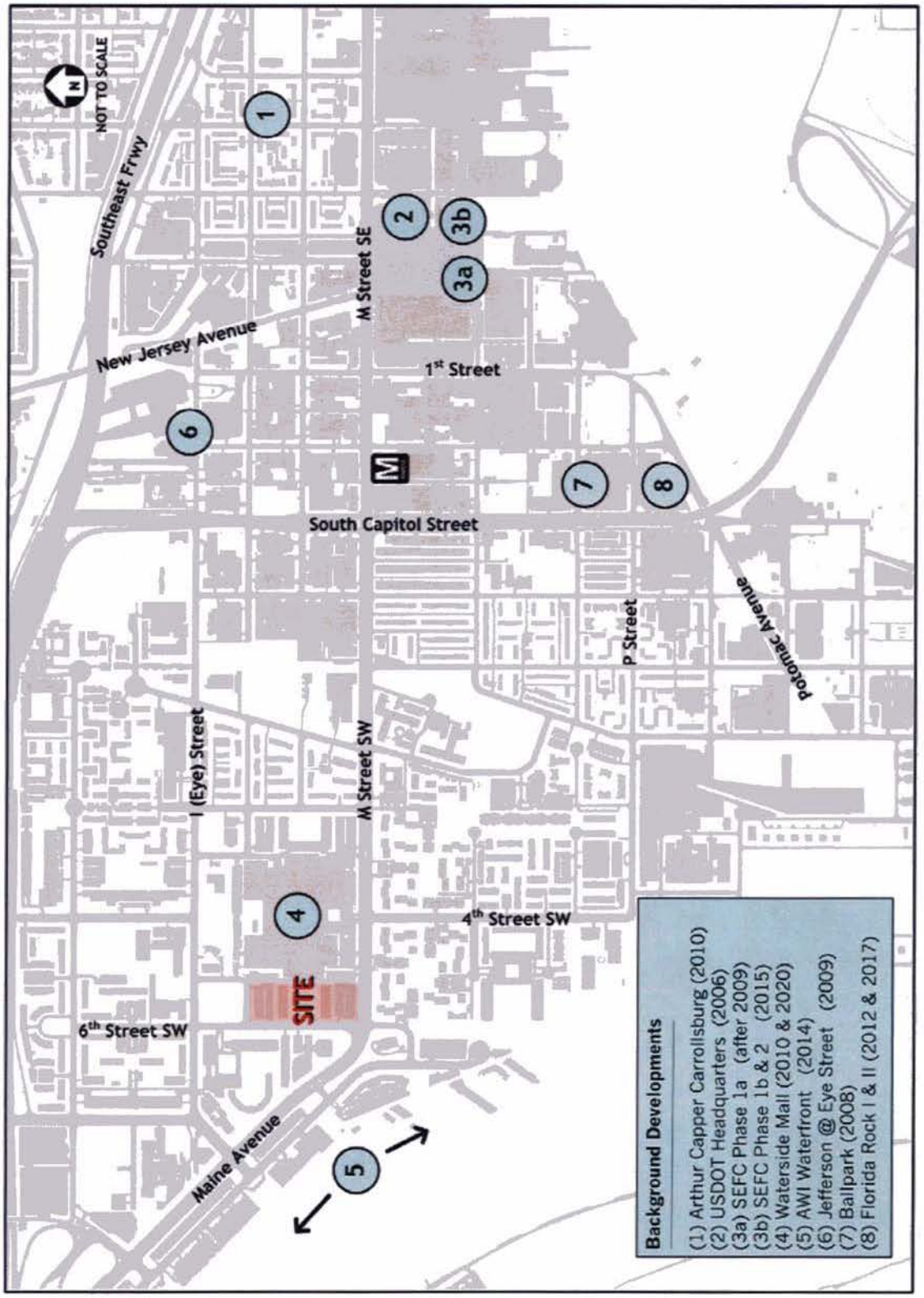

Figure 5 – Future Background Developments

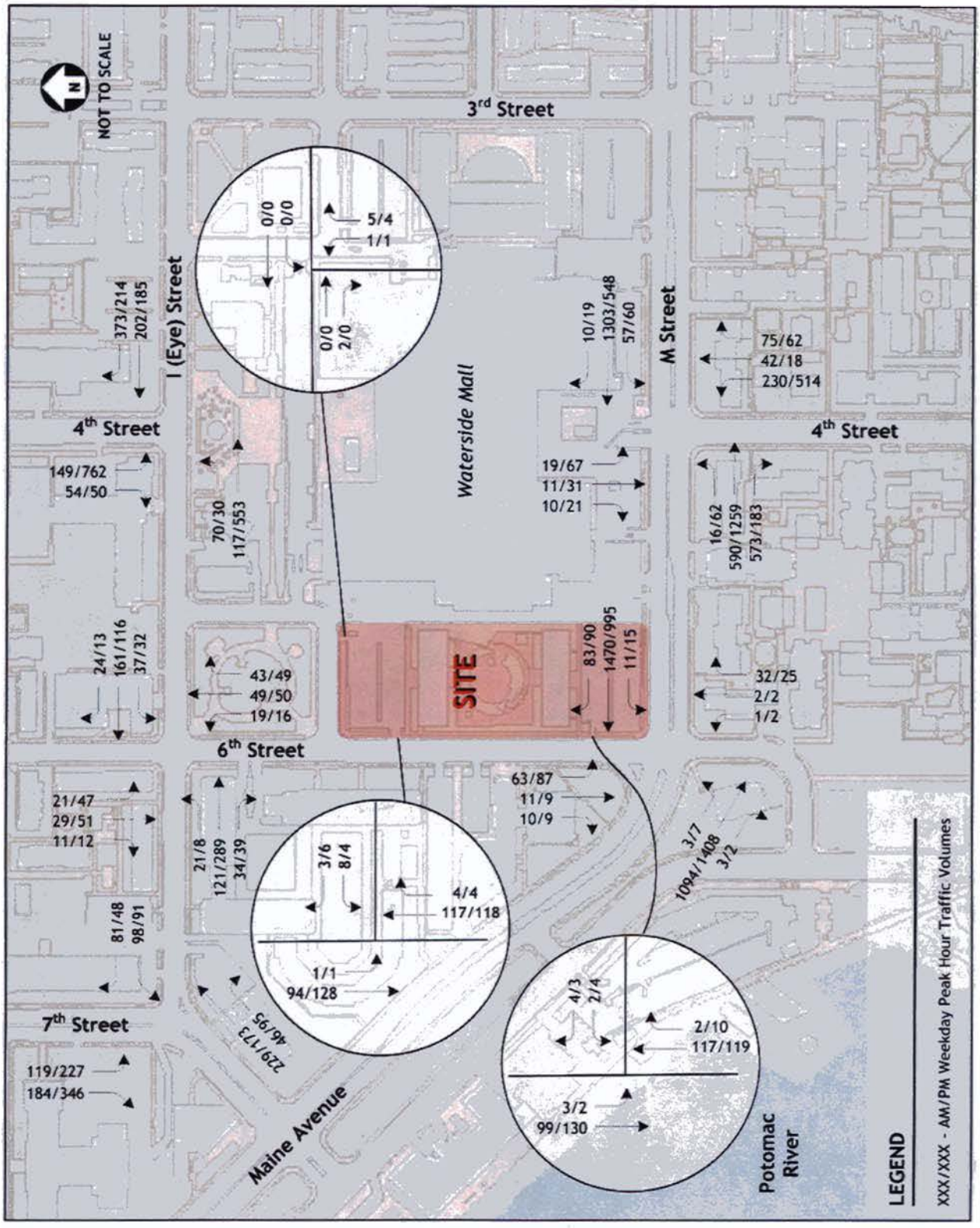

Figure 6 – Future Background Traffic Forecast (without Marina View PUD)

Future Transportation Improvements

Several studies were examined to determine changes to the road network in the future. These studies examined regional traffic and major highways and arterials. Those reviewed in the preparation of this report included the *4th Street NW Transportation Study*, the *Anacostia Access Study*, the *South Capitol Street EIS*, the *Middle Anacostia River Crossings Study* and the *11th Street Bridges EIS*. Information on these reports can be found on the DDOT website at www.ddot.dc.gov; however, the recommendations of these studies will not affect traffic in the Marina View study area.

It is expected that future development of the Waterside Mall will make changes to the M Street SW and 4th Street, NW intersection. It is anticipated that the northbound approach (4th Street) of the intersection will be extended through the existing Waterside Mall to the southbound approach (4th Street) of the I Street, SW and 4th Street intersection. These changes are expected in 2010, one year after the build out of the Marina View PUD. The Waterside Mall development is not approved and details of the project are not available and therefore not included in the analyses.

Future Background Capacity Analysis

Future Background peak hour Levels of Service (without the development) were calculated based on the following: existing lane use and traffic controls; the Future Background traffic volumes; and the *Highway Capacity Manual* (HCM) 2000 methodologies using the Synchro, version 6, traffic software. Table 3 displays the results of the capacity analysis including the Levels of Service and average delay per vehicle in seconds. Copies of the LOS worksheets can be found in the Appendix.

The capacity analysis shows that all the study area intersections will continue to operate similar to existing conditions. There will be no significant change in the delays experienced by motorists when background growth is applied to existing traffic.

Table 3 also shows that one or more intersections would realize a slight improvement in delay, but this is merely due to the HCM method of calculating the overall delay of an intersection. In a few cases, if traffic is slightly increased on heavier movements that were in a previous free flow state, mathematically the intersection may realize a reduction in aggregate delay. This is not practically realized.

If the signal timing changes recommended for existing conditions were implemented all intersections would operate at or better than acceptable levels.

Table 3 – Future Background Levels of Service

Intersection (Approach)	Background Conditions (without Marina View)			
	AM Peak Hour		*PM Peak Hour*	
	Delay (sec/veh)	Level of Service	Delay (sec/veh)	Level of Service
Seventh Street, SW and Eye Street, SW				
Overall	**6.5**	**A**	**5.7**	**B**
Westbound	11.5	B	10.2	B
Northbound	4.4	A	3.3	A
Southbound	5.4	A	5.7	A
Sixth Street, SW and Eye Street, SW				
Overall	**11.0**	**B**	**13.3**	**B**
Eastbound	3.3	A	5.2	A
Westbound	0.7	A	0.7	A
Northbound	29.9	C	28.8	C
Southbound	35.7	D	40.3	D
Fourth Street, SW and Eye Street, SW				
Overall	**22.5**	**C**	**38.3**	**D**
Eastbound	15.7	B	34.4	C
Westbound	23.1	C	40.7	D
Southbound	27.3	C	39.8	D
Sixth Street, SW and Maine Avenue, SW/ M Street, SW				
Overall	**10.6**	**B**	**13.2**	**B**
Eastbound	10.2	B	13.9	B
Westbound	9.5	A	8.7	A
Northbound	27.0	C	26.2	C
Southbound	28.0	C	45.5	D
Fourth Street, SW and M Street, SW				
Overall	**17.3**	**B**	**42.1**	**D**
Eastbound	12.0	B	47.4	D
Westbound	15.3	B	23.6	C
Northbound	39.1	D	34.0	C
Southbound	57.0	E	111.7	F

TOTAL FUTURE TRAFFIC CONDITIONS

The Total Future traffic conditions represent future traffic in the study area including existing traffic, background growth, and traffic generated by the Fairfield Marina View development.

Development Program and Transportation Features

The highlight of the Marina View PUD is the construction of two new residential buildings at the north and south extremes of the property, replacing the existing parking lots. The project will however preserve the existing residential structures ("Pei Towers"). The two new buildings will house approximately 300 residential units, while the existing Pei Towers will be restored and adapted to accommodate approximately 256 units – for a total of up to 570 residential units. The new south building will also include 8,300 square feet of ground floor retail along M Street.

Approximately 564 parking spaces will be provided, with 556 being allotted to residential development (at approximately one space per unit) and 8 for the retail portion. All parking will be located underground. This exceeds the zoning requirements of the District of Columbia for areas zoned R-5-D which is 1 space for every 3 units or a requirement of 186 spaces in this case. The zoning requirements for the C-3-C district are 1 space for every 4 units or a requirement of approximately 140 spaces.

As reflected in Figure 7, access to the underground parking for residents will be from two points on 6th Street via ramps that lead down to an underground "auto court" rotary. This will allow traffic to circulate for both self and valet parking.

Other transportation facilities include eight foot wide paths that function as "pedestrian walkways," similar to those found on college campuses. They also serve the purpose of providing an east-west access to Metro and future developments to the east thereby re-establishing the connection in the public right-of way that was lost after the L Street closure.

The proposed Marina View PUD has several features that encourage use of alternate modes of transportation. The buildings are designed to be cycle-friendly and will feature air-conditioned bicycle rooms and maintenance areas located adjacent to the auto courts. The bicycle access will be safe and secure with designated bike/pedestrian lanes. In addition to this, each residential unit will be equipped with a bike storage "garage."

Marina View PUD Trip Generation

The number of anticipated vehicle trips to be generated by the PUD was estimated based on data provided in the ITE's *Trip Generation*, 7th Edition, WMATA's Development-Related Ridership Survey, 2005, trip generation of the existing buildings from traffic counts, and past studies conducted in the area from the library of Gorove/Slade Associates, Inc.

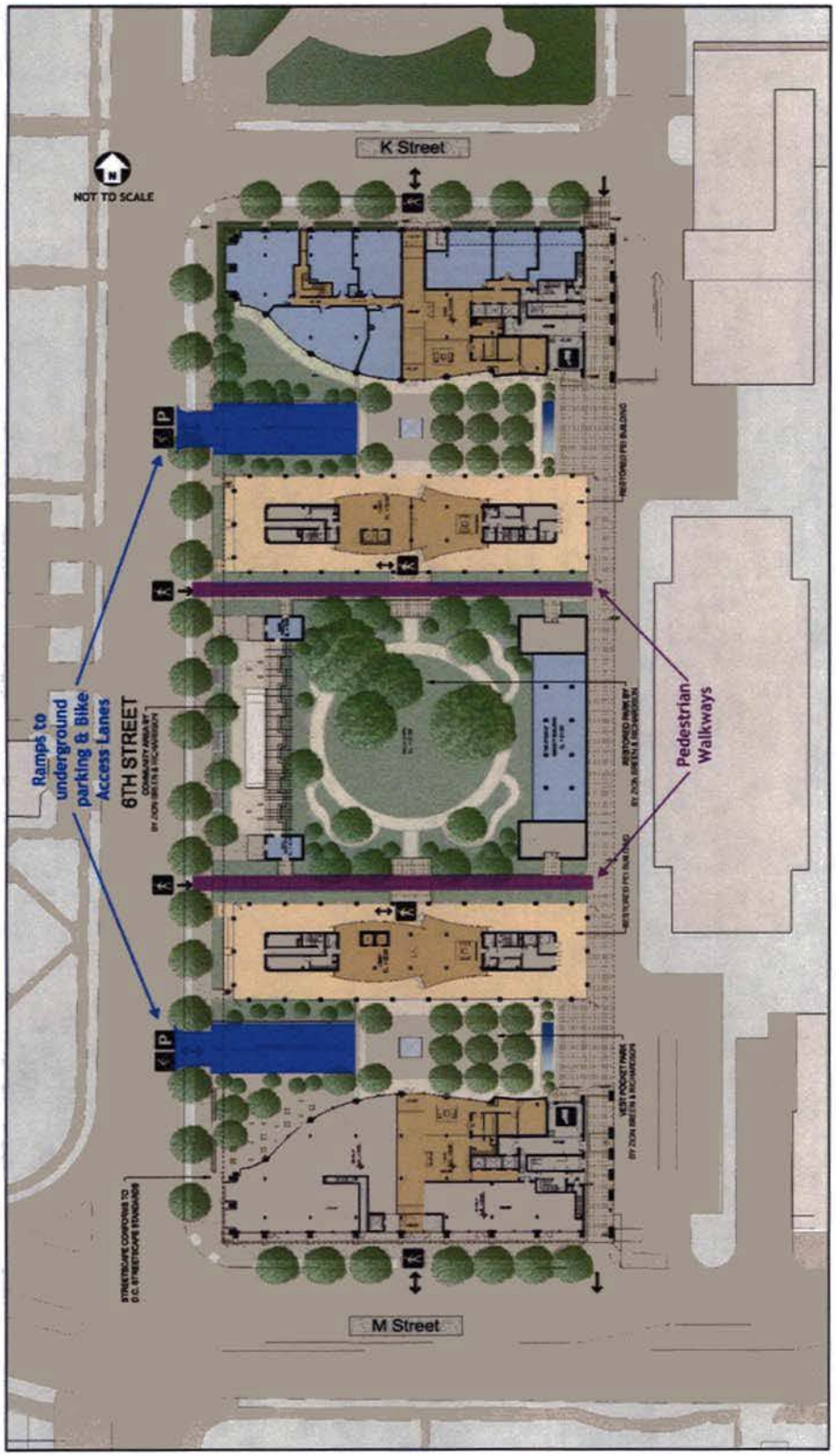

Figure 7 – Marina View Site Plan

Trip Generation of Existing Buildings

Trip generation rates were estimated for the existing residential buildings using the existing traffic count data. Traffic counts conducted by Gorove/Slade at the driveway to the parking lots found that the building generates a total of 35 AM peak hour trips (12 in and 23 out), 39 PM peak hour trips (17 in and 22 out). At the time of the counts, the buildings were 59% occupied. According to ITE, at 59% building occupancy, these residential buildings should generate approximately 47 AM peak hour trips (12 in and 35 out), 62 PM peak hour trips (38 in and 24 out). The existing trip generation numbers obtained from the traffic counts are 25% and 37% less than those estimated using ITE trip generation rates. This appears to be lower than that which is used in previous studies in the area, so further analysis was conducted to determine the transit mode share.

It is possible that the difference in trip numbers may be due to the source of ITE's data. By definition, ITE's trip generation rates were derived from data collected from single-use developments where virtually all access to the development would be by private automobile (Source – ITE *Trip Generation Handbook*, 2nd Edition, Appendix B). *Trip Generation* does not account for the potential effects of Transit Demand Management (TDM) programs, transit availability, and interaction between various on-site uses (synergy), particularly when these uses are in walking distance of each other.

The Marina View development is in close proximity to a Metrorail station, several bus routes, and the DC Circulator. If consideration was given to the various transportation characteristics of the present and future characteristics of the area, such as the Waterfront-SEU Metrorail Station almost adjacent to the property and transit such as Metrobus and the DC Circulator, it is likely that the reduction due to alternate mode of travel would be even more significant. According to the recently published WMATA *Development-Related Ridership Survey, 2005,* residential sites reflected alternate (non-auto) mode shares from an average high of 60% at suburban areas inside the Beltway to 33% in suburban areas outside of the Beltway. Marina View is located in an urban setting, so reductions are expected to be more than that of the suburban setting. The ITE numbers were therefore used to generate trip estimates for the proposed buildings, however a 65% reduction was made for alternate mode use based on WMATA's *Development-Related Ridership Survey, 2005*. A detailed description of the trip generation analysis is included in the Appendix to this report.

Trip Generation Summary

According to the rates and equations provided by ITE, the Marina View PUD would generate a total of 290 AM peak hour trips (61 in and 229 out), 274 PM peak hour trips (234 in and 140 out), and 4,298 daily trips. This is without consideration to any reduction in the trips as a result of its proximity and access to transit, and the actual trip generation rate of the existing residential buildings.

The 65% alternate mode reduction was applied to the ITE generated trips for the project as shown in Table 4. With the reduction applied, a total of 104 AM peak hour trips (23 in and 80 out) and 154 PM

peak hour trips (92 in and 63 out) and 1,747 daily trips would be generated by the development as shown in Table 4. Since the existing traffic counts include trips being generated by the existing buildings, the net trips generated by the proposed development will be 69 AM peak hour trips (11 in and 57 out) and 115 PM peak hour trips (75 in and 41 out) and 1,314 daily trips. A detailed description of the trip generation analysis is included in the Appendix to this report.

Table 4 – Trip Generation Comparison

Marina View PUD Component	ITE Code	Amount	Trip Generation[1]						
			AM Peak Hour[2]			PM Peak Hour[2]			Daily
			In	Out	Total	In	Out	Total	Total
Residential Apartments	220	556 Units	55	221	276	210	113	323	3,792
65% Alt. Mode Reduction			-36	-144	-179	-137	-73	-210	-2,465
Residential Total			19	77	97	74	40	113	1,327
Specialty Retail Total	814	8,300 SF	4	3	7	18	23	41	420
Total Trips (Proposed PUD)			**23**	**80**	**104**	**92**	**63**	**154**	**1,747**
Existing Trips			-12	-23	-35	-17	-22	-39	-433[3]
Total New Trips (net trips)			**11**	**57**	**69**	**75**	**41**	**115**	**1,314**

Note: (1) Numbers in the table may be slightly off due to rounding. (2) Data for the AM and PM Peak Hours are for peak hours of Adjacent Street traffic between 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m., respectively. (3) The Daily total for the existing buildings was estimated from the peak hour volumes.

Trip Distribution

The site-generated traffic volumes were assigned to the roadway network based on existing travel patterns identified during data collection and the entrance locations of the new parking garages. The site-generated volumes are shown on Figure 8.

Total Future Traffic Forecast

The site-generated traffic assignments were combined with the Future Background traffic forecasts to yield the Total Future traffic forecasts associated with the complete build-out of Fairfield Marina View development and are shown on Figure 9.

Total Future Capacity Analysis

Total Future peak hour Levels of Service (including the build-out of Fairfield Marina View) were calculated based on the following: existing lane use and traffic controls; the Total Future traffic volumes; and the Highway Capacity Manual (HCM) 2000 methodologies using the Synchro, version 6, traffic software. Table 5 displays the results of the capacity analysis including the Level of Service and average delay per vehicle in seconds. Copies of the LOS calculation worksheets can be found in the Appendix.

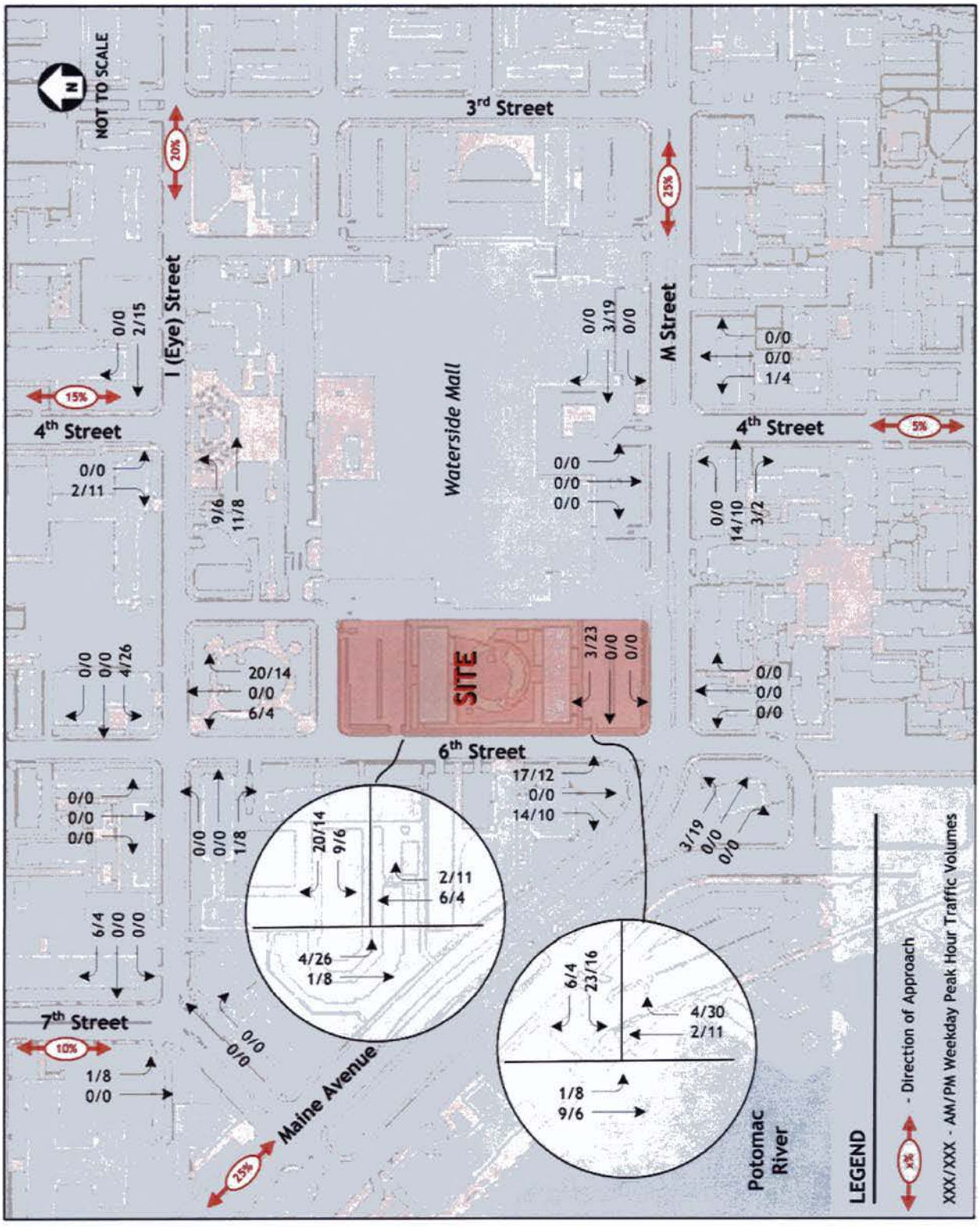

Figure 8 – Site-Generated Traffic Volumes

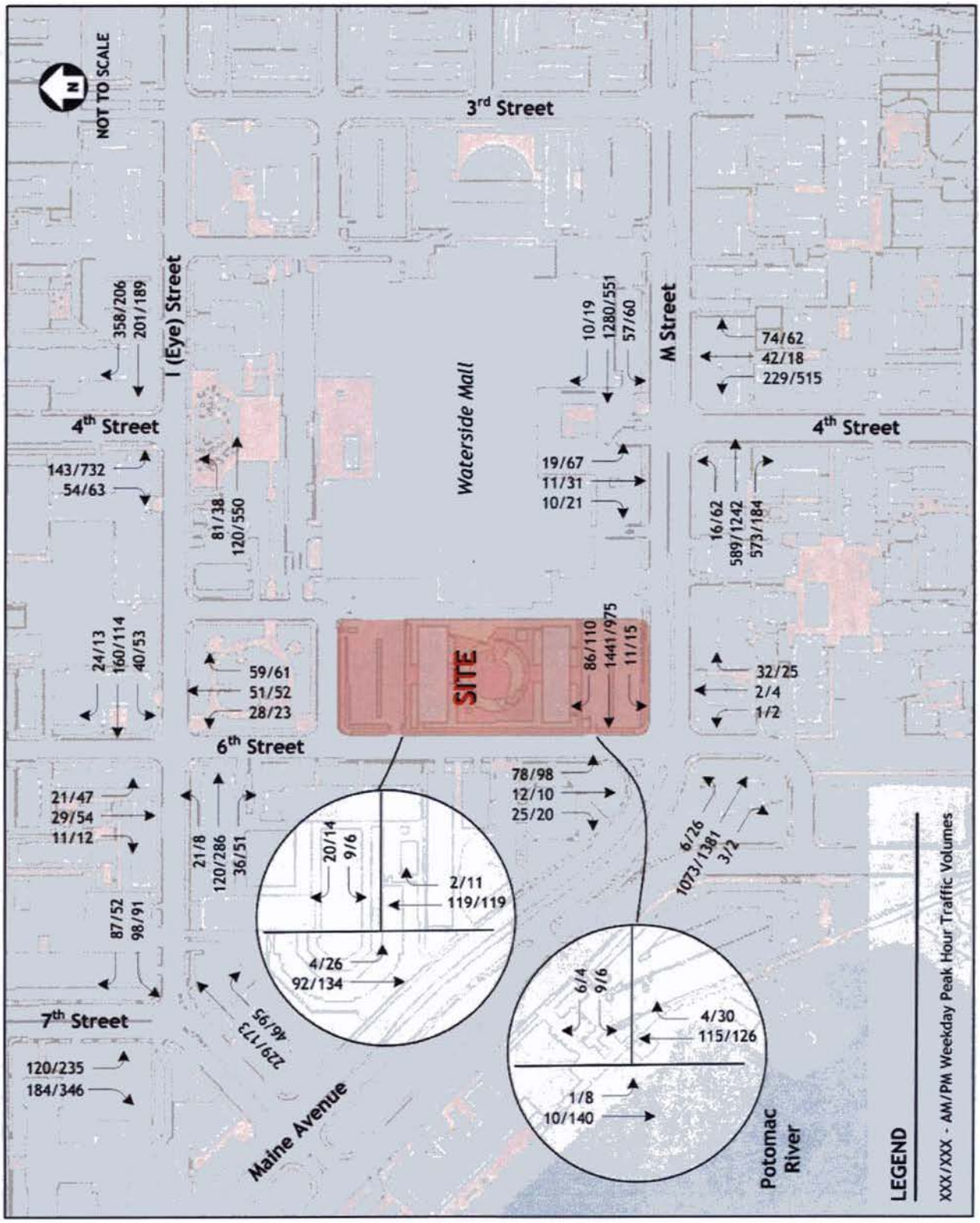

Figure 9 – Total Future Traffic Forecast (with Marina View development)

Table 5 – Total Future Levels of Service

Intersection (Approach)	Future Conditions (with Marina View)			
	AM Peak Hour		*PM Peak Hour*	
	Delay (sec/veh)	Level of Service	Delay (sec/veh)	Level of Service
Seventh Street, SW and Eye Street, SW				
Overall	**6.7**	**A**	**6.3**	**A**
Westbound	12.4	B	14.5	B
Northbound	4.4	A	3.3	A
Southbound	5.4	A	5.7	A
Sixth Street, SW and Eye Street, SW				
Overall	**12.3**	**B**	**13.1**	**B**
Eastbound	3.3	A	5.3	A
Westbound	0.7	A	2.6	A
Northbound	32.6	C	27.3	C
Southbound	35.7	D	40.4	D
Fourth Street, SW and Eye Street, SW				
Overall	**22.4**	**C**	**39.6**	**D**
Eastbound	15.3	B	35.1	D
Westbound	23.3	C	46.5	D
Southbound	27.3	C	39.5	D
Sixth Street, SW and Maine Avenue, SW/ M Street, SW				
Overall	**10.8**	**B**	**14.6**	**B**
Eastbound	10.3	B	15.1	B
Westbound	9.5	A	8.8	A
Northbound	27.0	C	26.2	C
Southbound	28.5	C	47.3	D
Fourth Street, SW and M Street, SW				
Overall	**17.4**	**B**	**42.8**	**D**
Eastbound	12.1	B	49.0	D
Westbound	15.3	B	23.7	C
Northbound	39.2	D	34.1	C
Southbound	57.0	E	111.7	F

The capacity analysis shows that the roadway network and the intersections of the study area will continue to operate at conditions similar to background condition with the additional traffic forecasted for the Fairfield Marina View development added to the network. Increases in delays will be incremental and will not be noticed by commuters. All intersection will operate at or better than acceptable levels in the future scenario with the recommended signal timing changes.

CONCLUSION

The traffic capacity analyses of the roadway intersections detailed in the study found the following conclusions:

- *Existing Conditions*

  Under existing conditions, all but one study area intersection operate at overall acceptable levels. Recommended signal timing improvements would improve the levels of service where required.

- *Future Background Conditions*

  The results of the future background capacity analyses (future without the Marina View PUD) show that all study area intersections are projected to operate at or above acceptable Levels of Service in the AM when the signal timing recommendations of the existing scenario are applied at background.

- *Total Future Conditions*

  The total future conditions capacity analysis, including Marina View PUD generated traffic, showed similar results to the future background conditions. There would be no significant change between background conditions and future conditions with the build out of Marina View.

- *Parking*

  Sufficient parking is provided at an approximate rate of one space per residential unit.

Based on these results, the proposed Marina View PUD would have no significant impact on traffic in the area and the additional vehicle-trips can be accommodated by the surrounding network with little or no measurable change in delay.