GOVERNMENT OF THE DISTRICT OF COLUMBIA
DISTRICT DEPARTMENT OF TRANSPORTATION

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Office of the Director

RECEIVED
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2003 FEB 10 PM 4:25

TO: Carol Mitten, Chair
District of Columbia Zoning Commission
FROM: Ken Laden
Associate Director
RE: Zoning Commission Application No. 02-38
DATE: February 3, 2003

The District Department of Transportation (DDOT) has reviewed Zoning Commission Application No. 02-38, a Planned Unit Development (PUD) for Waterside Mall, and has conducted an independent analysis of the impacts of the PUD on transportation conditions in the area.

A copy of the "4th Street SW Transportation Study" draft report, which was conducted by DMJM+Harris, Inc. for DDOT, is attached. The Study Team evaluated four scenarios for future conditions for the years 2010 and 2022. They include the following:

Case 02-38
Exhibit No. 39

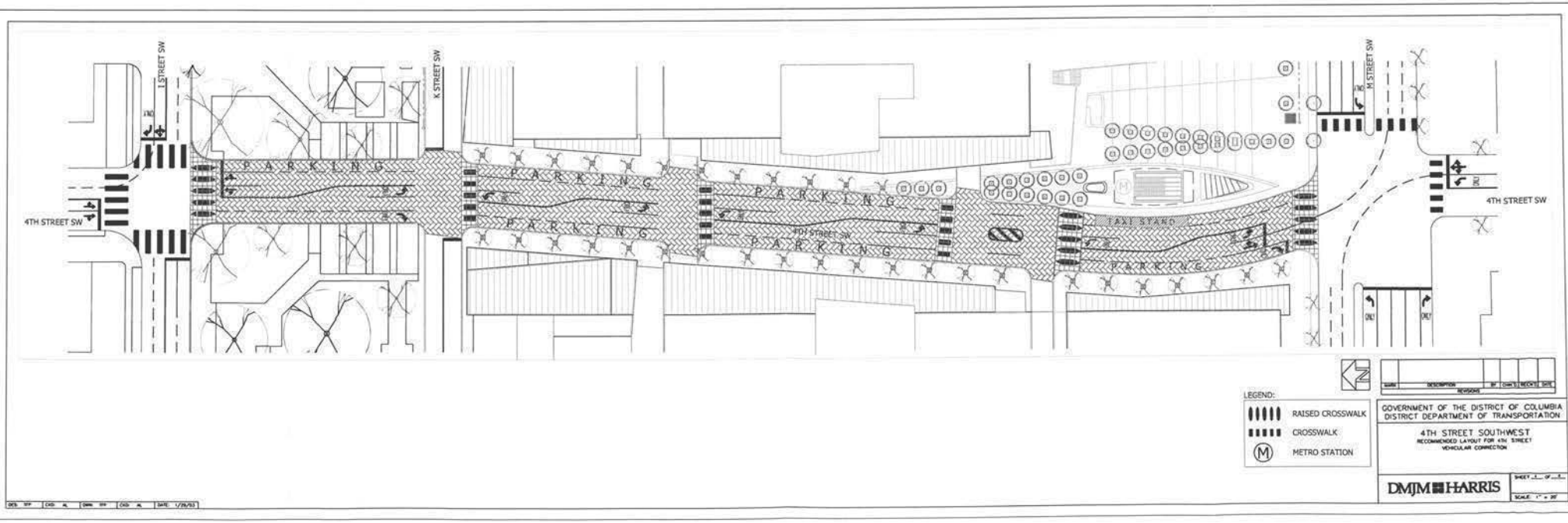
1. Background Transportation Conditions, with Other Area Development Projects but Without New Development at Waterside Mall
2. With PUD Level of Development at Waterside Mall and without a Vehicular Connection Along 4th Street Between I and M Streets
3. With PUD Level of Development at Waterside Mall and with a Vehicular Connection Along 4th Street Between I and M Streets
4. With PUD Level of Development at Waterside Mall and with a Vehicular Connection Along the Eastern and Western Waterside Mall Service Roads Between I and M Streets

Because of improved levels of service, reduced delay and queue lengths, and reduced traffic on local residential streets, the study recommends that 4th Street be connected between I and M Streets and that this connection be made available to vehicles. Additional mitigation measures would have to be implemented to accommodate future growth in background traffic, other area developments and development at the Waterside Mall site.

DDOT is in the process of following up on community comments to the attached draft report and adding to and finalizing recommendations for future mitigation measures. A final version of the study report will be sent to the Zoning Commission in early March.

Also attached is the proposed roadway configuration that DDOT recommends for 4th Street, SW.

Please feel free to call Rachel MacCleery, Ward 6 Transportation Planner, at (202) 671-2555, should you have any questions.


L STREET SW
K STREET SW
M STREET SW
4TH STREET SW
4TH STREET SW
4th Street SW
PARKING
PARKING
PARKING
PARKING
PARKING
TAXI STAND
ONE WAY
ONE WAY
ONE WAY
ONE WAY
LEGEND:
RAISED CROSSWALK
CROSSWALK
METRO STATION
MARK
DESCRIPTION
BY
CHK'D
CHK'D
DATE
REVISIONS
GOVERNMENT OF THE DISTRICT OF COLUMBIA
DISTRICT DEPARTMENT OF TRANSPORTATION
4TH STREET SOUTHWEST
RECOMMENDED LAYOUT FOR 4TH STREET VEHICULAR CONNECTION
DMJM HARRIS
SHEET 1 OF 1
SCALE: 1" = 20'
DES. STP
CHD. AL
DWN. STP
CHD. AL
DATE: 1/28/03

4th Street SW Transportation Study

Existing Conditions and Assessment of Development Alternatives



Prepared by:
DMJM+HARRIS, Inc.
for:
District Department of Transportation
District of Columbia

January 2003

Zoning Commission
District of Columbia
Case 02-38
Exhibit 39A

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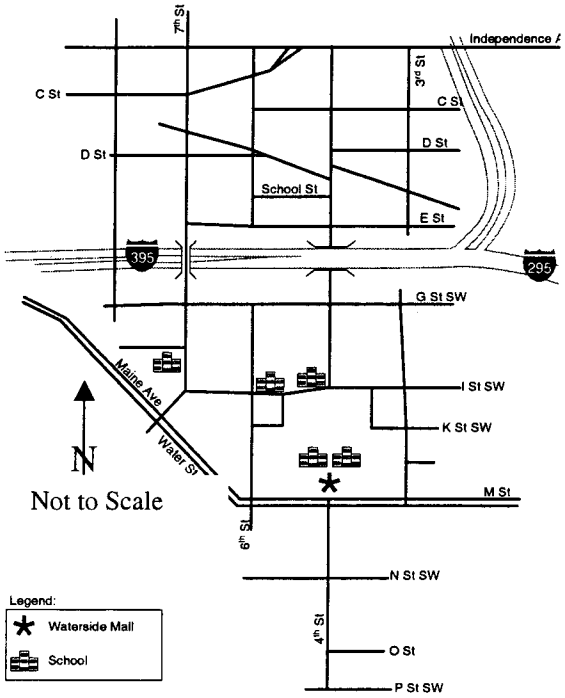
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EXECUTIVE SUMMARY

The District of Columbia Department Transportation (DDOT) is conducting a study that evaluates the potential impacts of proposed redevelopment at Waterside Mall. The study area is located in Southwest Washington, DC and is shown in Figure ES-1.

EXISTING CONDITIONS

Figure ES-1 – Study Area Map



The major roadways in the Study area are 3rd, 4th, 6th, 7th, I and M Streets SW. 4th Street is discontinuous between M and I Streets. The Washington Metropolitan Area Transit Authority provides extensive bus and rail service in the study area. The Waterfront Metrorail station, served by the Green line, is located at the intersection of 4th Street and M Street SW.

M Street/Maine Avenue is the most traveled road in the study area, with over 30,000 vehicles using it daily. The intersection of 7th Street and Maine Avenue is the location with the largest number of accidents in the study area.

Traffic congestion is greatest during the PM peak hours. Two intersections, 4th and I Streets and 4th and M Streets, are operating at level of service (LOS) D during the PM peak hour. This indicates that traffic volumes are approaching the capacity of these intersections.

The Study Team conducted and extensive field evaluation of the transportation infrastructure in the study area. The Study Team identified existing transportation issues on 3rd, 4th, 6th, 7th, G, I and M Streets, and area-wide issues associated with pedestrian safety around school buildings. Detailed descriptions of the existing transportation issues are presented in the study. In addition, many recommendations are made for improvements to these existing problems.

FUTURE DEVELOPMENT SCENARIOS

The Study Team evaluated the following scenarios for future conditions for the years 2010 and 2022:

1. Total Background Scenario with Other Area Developments and without New Development at Waterside Mall

2. With PUD Level of Development at Waterside Mall and without a Vehicular Connection Along 4th Street Between I and M Streets
3. With PUD Level of Development at Waterside Mall and with a Vehicular Connection Along 4th Street Between I and M Streets
4. With PUD Level of Development at Waterside Mall and with a Vehicular Connection Along the Eastern and Western Waterside Mall Service Roads Between I and M Streets

The Study Team included in the analysis of future conditions all other area developments between Independence Avenue and Buzzards Point and between Washington Channel and 4th Street SW. The Southeast Federal Center and the Anacostia Waterfront Initiative are expected to be the largest trip generators. Table ES-1 summarizes the existing, by-right and Planned Unit Development (PUD) levels of development at Waterside Mall.

Table ES-1
Summary of Waterside Mall Development Levels

Land Use	Existing	By-Right[1]	2010 PUD	2022 PUD
Office	1,117,500 Sq. Ft.[2]	1,754,100 Sq. Ft.	1,693,500 Sq. Ft.	2,051,500 Sq. Ft.
Retail	104,500 Sq. Ft.	554,700 Sq. Ft.	75,000 Sq. Ft.	75,000 Sq. Ft.
Residential	0 Units	584 Units	200 Units	400 Units
Supermarket	30,000 Sq. Ft.	30,000 Sq. Ft.	30,000 Sq. Ft.	30,000 Sq. Ft.
[1]Likely scenario based on existing land uses. [2]1,000,000 Sq. Ft. of existing office space is vacant.				

The Waterside Mall PUD development is expected to generate 3,732 and 4,870 trips in 2010 and 2022, respectively. The likely by-right scenario would generate 19,860 trips.

SUMMARY OF FINDINGS

Scenario 1

The Study Team conducted a full evaluation of the scenarios listed above for 2010 and 2022. The assessment of the scenario with background growth, other area development and no new development at Waterside Mall indicates that for 2010 and 2022, several intersections are expected to operate at LOS F during the peak hours. Therefore, mitigation measures would be needed to address the expected deficiencies in the study area even without new development at the Waterside Mall.

Scenarios 2 and 3

The scenarios with and without a 4th Street vehicular connection have different effects on traffic operations in the study area and on pedestrian conditions. The vehicular connection on 4th Street between M and I Streets would help minimize the impact of new development on traffic operations in the study area. The implementation of the 4th Street vehicular connection would help reduce traffic on 3rd, I and 6th Streets. While pedestrian movements would be safer with the scenario that does not include a vehicular connection,

the conflicts between vehicles and pedestrians can be minimized with the implementation of mitigation measures throughout the connection.

Scenario 4

The analysis indicates that traffic conditions under the scenario that uses service roadways east and west of 4th Street as an alternative to a vehicular connection of 4th Street between I and M Streets are significantly worse than under the scenario with a 4th Street vehicular connection. The proximity of the service roads to 3rd and 6th Streets precludes the installation of traffic signals at the intersections of the service roads with M and I Streets. The lack of traffic signals would result in long queues forming on the service roads and poor levels of service for study area intersections.

RECOMMENDATIONS

Because of improved levels of service, reduced delay and queue lengths, and reduced traffic on local residential streets, the Study Team recommends that 4th Street be connected between I and M Streets and that this connection be made available to vehicles. Mitigation measures would have to be implemented to accommodate future growth in background traffic, other area developments and development at the Waterside Mall site.

The last chapter of the report summarizes recommended mitigation measures for future conditions. In the next phase of the study, the Study Team will develop additional recommendations to mitigate the effects of future development on transportation operations in the study area.

I. INTRODUCTION

In response to the planned unit development (PUD) application for proposed redevelopment at Waterside Mall SW, the District of Columbia Department Transportation (DDOT) is conducting a study that evaluates the potential impacts of this development upon vehicle, pedestrian and bicycle mobility and safety in the Southwest residential neighborhood. The consulting firm DMJM+HARRIS, Inc. (Consultant) is conducting the study with assistance from DDOT staff. In this report the team of Consultant and DDOT staff is referred to as the "Study Team."

As detailed in the Scope of Work presented in Appendix A, the main goals of the study are to address existing traffic conditions in the study area, and estimate traffic impacts associated with the PUD level of redevelopment of Waterside Mall (throughout the report, Waterside Mall is referred to as "site"). This report summarizes findings on the following:

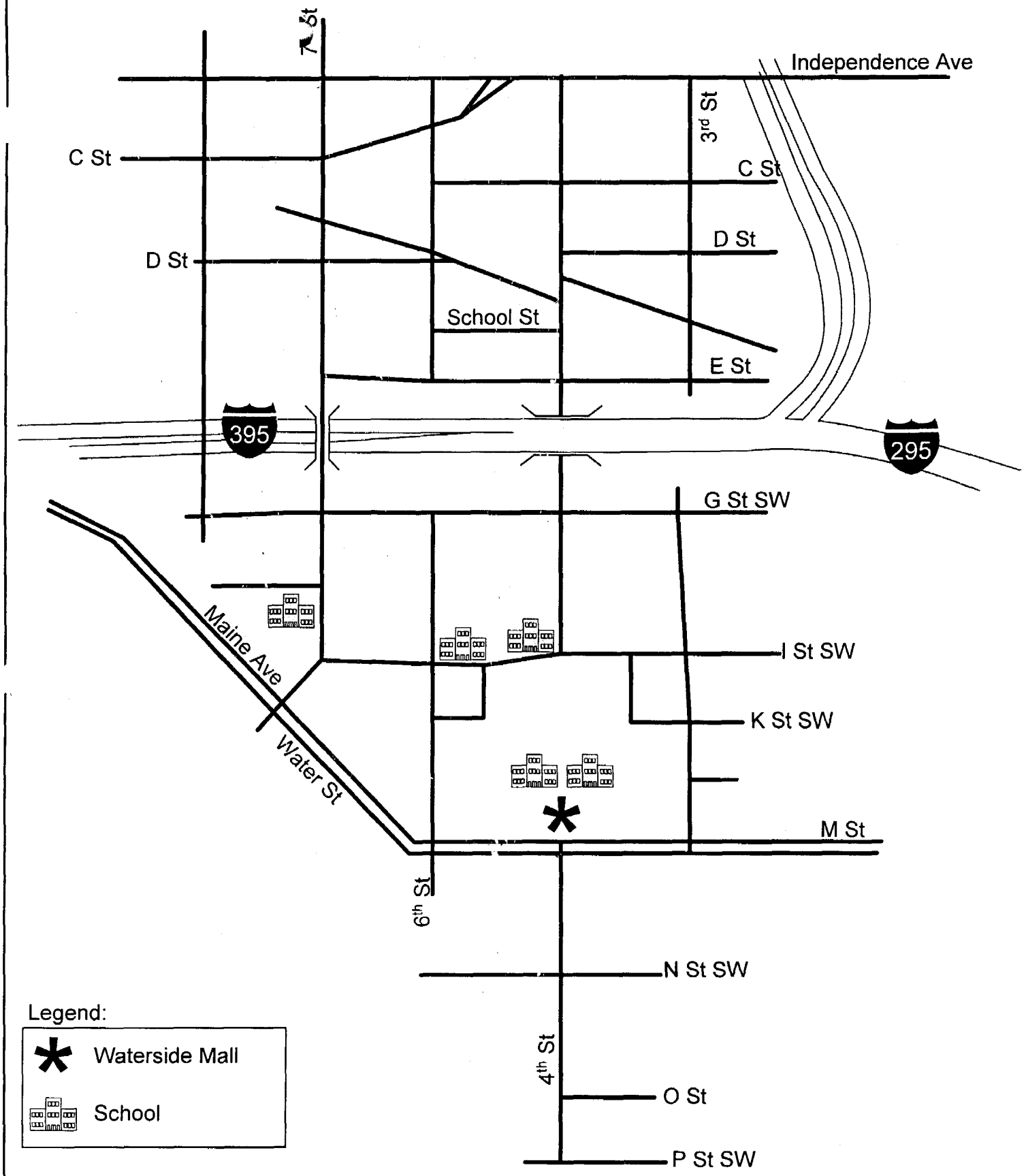
- Chapter II - The assessment of existing conditions, with recommended improvements;
- Chapter III - The effects on traffic due to other nearby developments that are in the planning, proposal or construction stages; and
- Chapter IV - The impact of redevelopment at Waterside Mall under various alternatives, including with and without a proposed 4th Street connection between I and M Streets SW, and with service roads.

This report also includes recommendations to improve pedestrian safety, mobility, traffic safety and compliance with speeding regulations.

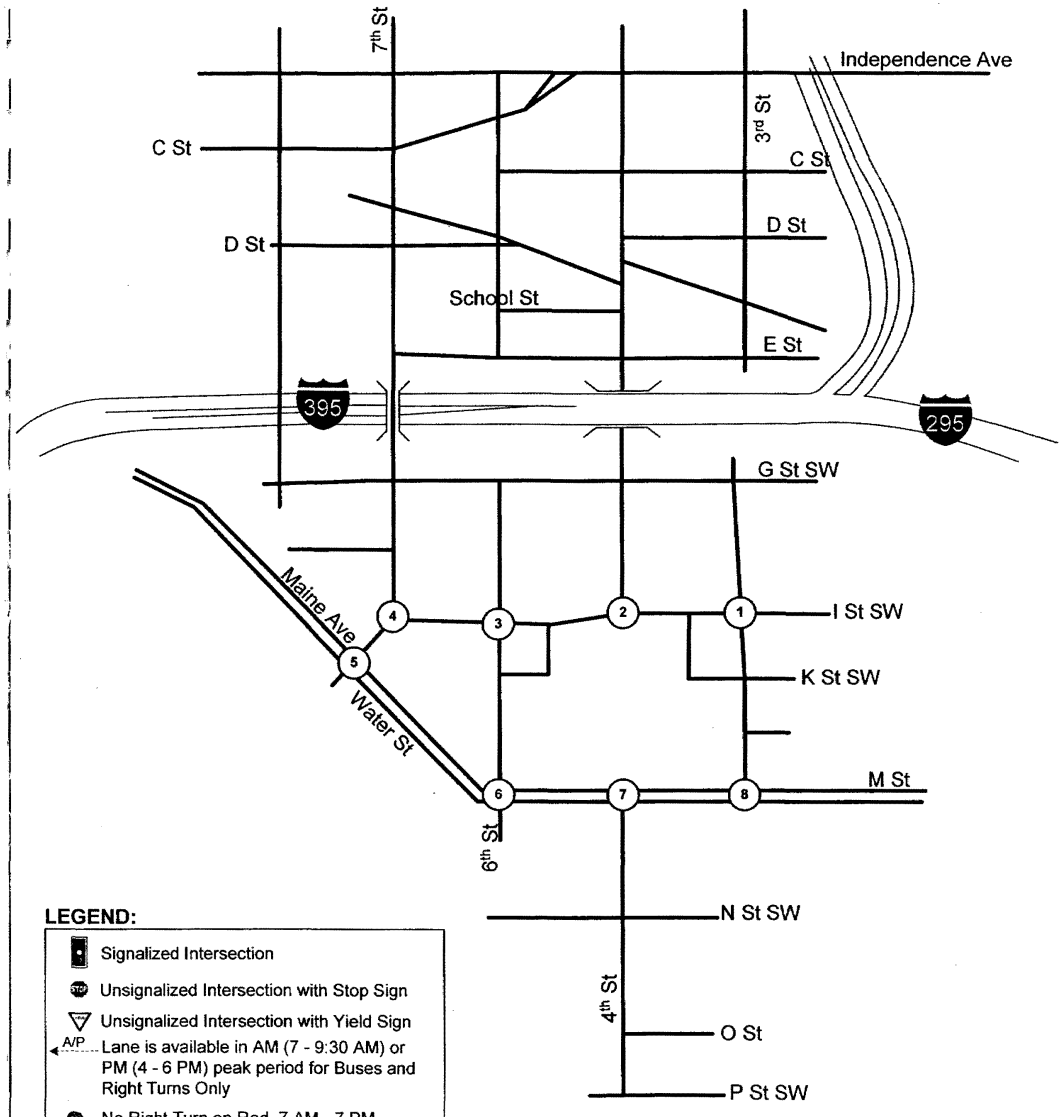
The study area, shown in Figure 1, includes the following:

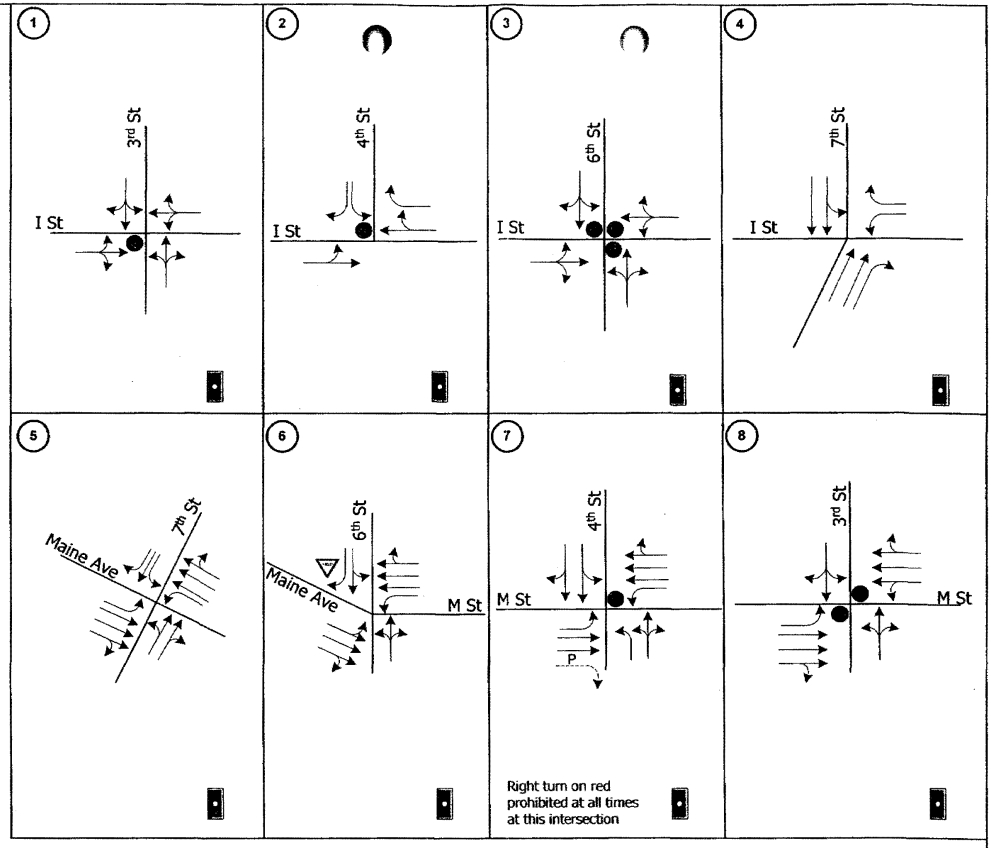
- 3rd Street SW between Eye and M Streets SW;
- 4th Street SW between Independence Avenue and P Street SW;
- 6th Street SW between G and M Streets SW; and
- 7th Street SW between Independence and Maine Avenue Avenues

The study is being conducted with assistance from area residents. The Study Team held one meeting with area residents to discuss transportation issues and potential improvement options and another to present preliminary findings. Area residents provided additional input via e-mail and regular correspondence. Input from residents was helpful in the identification of key transportation issues noted in this report and in the development of recommendations with respect to transportation improvements. The Washington DC Office of Planning, Gorove/Slade Associates, Inc., Shalom Baranes Associates and The Kaempfer Company provided additional information to the Study Team.



Not to Scale		4th Street SW Transportation Study	**Study Area**	FIGURE 1
January, 2003				





LEGEND:

- Signalized Intersection
- Unsignalized Intersection with Stop Sign
- Unsignalized Intersection with Yield Sign
- A/P — Lane is available in AM (7 - 9:30 AM) or PM (4 - 6 PM) peak period for Buses and Right Turns Only
- No Right Turn on Red, 7 AM - 7 PM

Not to Scale January, 2003	N	4th Street SW Transportation Study	**Existing (2002)** **Peak Period Lane Configurations**	FIGURE 2

II. EXISTING CONDITIONS

EXISTING TRANSPORTATION FEATURES

The Study Team conducted an extensive data collection effort to gain an understanding of existing conditions in the study area. In addition to collecting data for the quantitative assessment of existing conditions, the Study Team conducted field evaluations throughout the study area during peak and off-peak hours to further assist in the assessment of existing conditions. This section of the report summarizes the data collected for the study and addresses issues and deficiencies in the transportation infrastructure.

MAJOR ROADWAYS IN THE STUDY AREA

The study area is located in Southwest Washington, DC and is shown in Figure 1. The following are the major roadways in the study area:

- 3rd Street SW between Eye and M Streets SW;
- 4th Street SW between Independence Avenue and P Street SW;
- 6th Street SW between G and M Streets SW;
- 7th Street SW between Independence and Maine Avenue Avenues;
- I Street SW between 3rd and 7th Streets; and
- M Street/Maine Avenue between 3rd and 7th Streets

While most of the studied roadways continue beyond the above terminals, their associated characteristics will only be described within these limits.

3rd Street

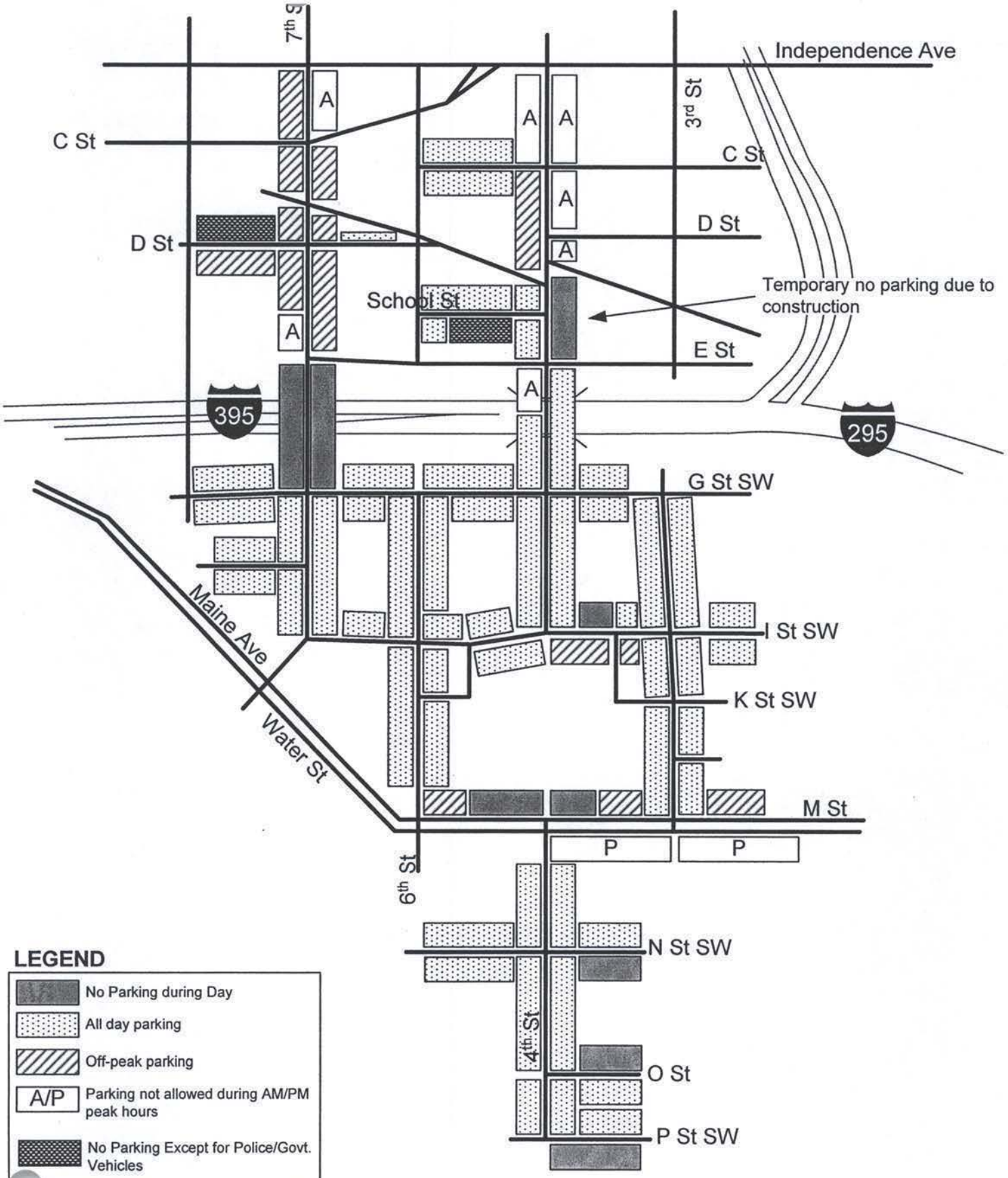
3rd Street[1] is a two-way local street[2] running north-south between I Street and M Street. There is one lane in each direction, as shown in Figure 2, with parking permitted all day on both sides of the street, as shown in Figure 3. The intersections of 3rd Street with I and M Streets are signalized, while the intersections with K Street/Wesley Place and L Street are stop-controlled on the minor streets. The speed limit is 25 mph, but there are no posted speed limit signs. Both sides of the road have sidewalks.

As shown in Figure 4, land usage along 3rd Street is primarily medium-density residential, with medium-density commercial use where it borders the Waterside Mall property.

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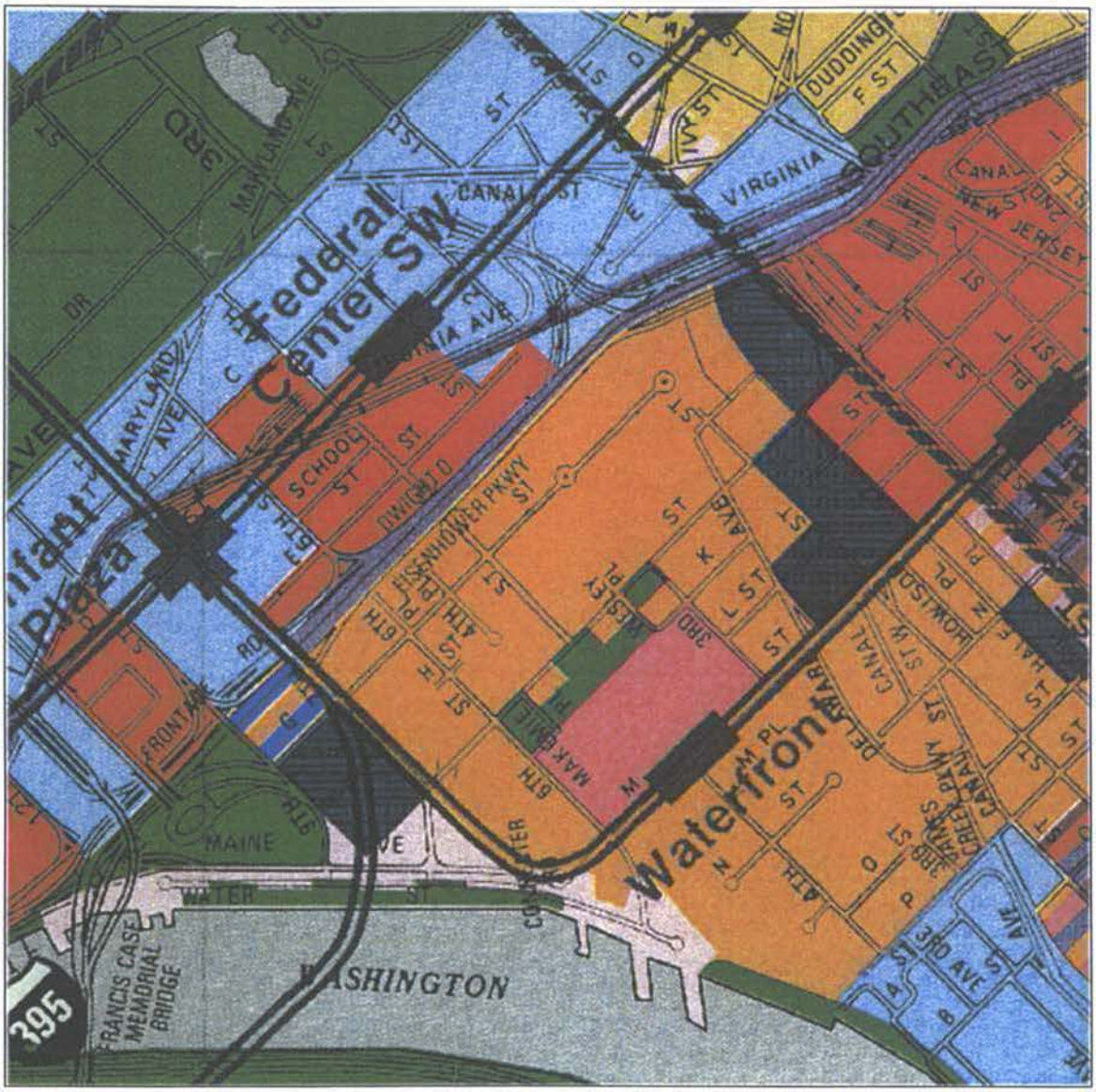
[1] All of the streets in the study area are located in the southwest quadrant of the District. Therefore, throughout this report where the SW designation is omitted, it should be understood that the street is located in the southwest quadrant of the District.

[2] All roadway classifications were taken from the District of Columbia Functional Classification Map, Draft, January 1, 2002.



1. AM peak period is from 7:00 to 9:30 AM
2. PM peak period is from 4:00 to 6:30 PM

Not to Scale		4th Street SW Transportation Study	Daytime Parking Restrictions	FIGURE 3
January, 2003				



Legend:

- Moderate density residential
- Medium density residential
- Low density commercial
- Medium - high density commercial
- Medium density commercial
- Federal
- Institutional
- Parks, recreation and open space
- Local public facilities

Source:
District of Columbia Office of Planning
[illegible]01 North Capitol Street N.E., Suite 4000, Washington, D.C. 20002
[illegible]ebruary 2001

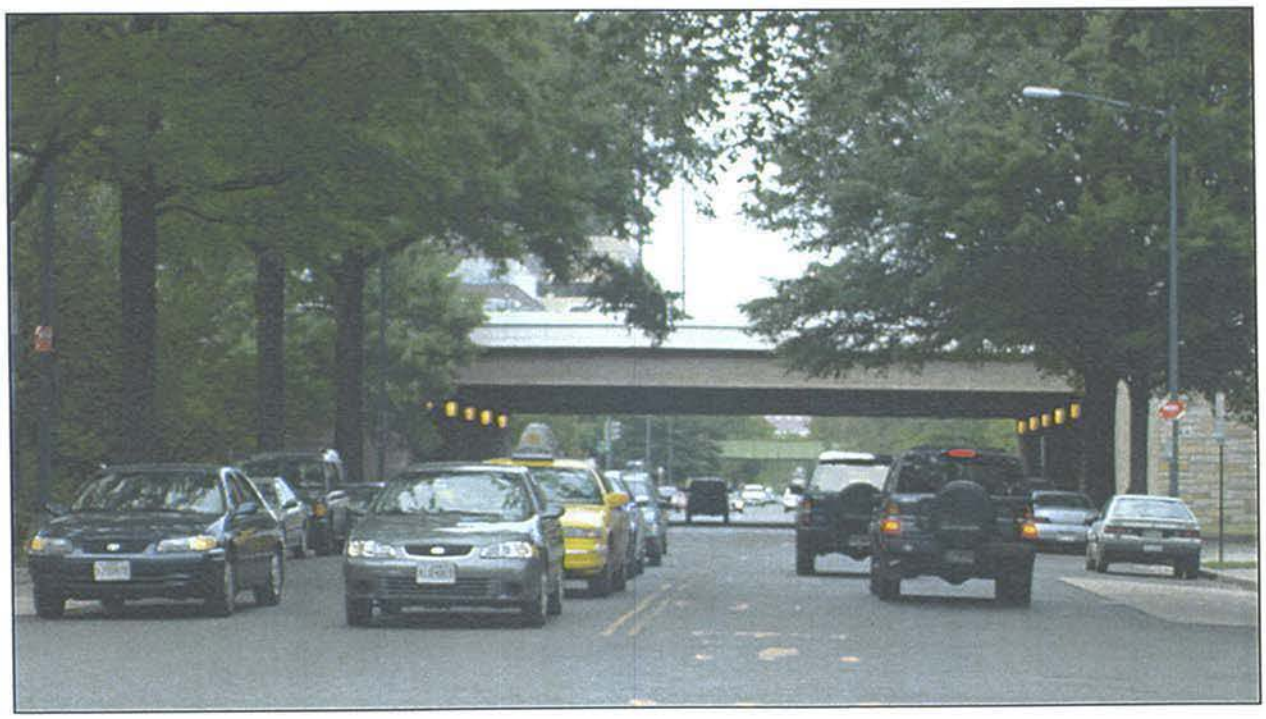
Not to Scale		4th Street SW Transporation Study	Generalized Land Use Map	FIGURE 4
January, 2003				

4th Street

4th Street is a two-way minor arterial running north-south between Independence Avenue and I Street, as well as a collector running north-south between M Street and P Street. The existing Waterside Mall occupies 4th Street right-of-way between I and M Streets. The speed limit is 25 mph, but there are no posted speed limit signs. 4th Street generally operates with one lane in each direction, although some sections of it have a second lane. Parking restrictions vary throughout the corridor – parking is generally permitted all day between E and P Streets. Between Independence Avenue and E Street, parking restrictions range from no parking at all, to off-peak parking, to all-day permitted parking. Signalized intersections along this portion of 4th Street include C, E, G, I, M, N and P Streets, as well as Independence and Virginia Avenues.

North of the Southeast-Southwest Freeway (I-395), shown in Figure 5, 4th Street is a mix of medium-high density commercial and Federal use. Between the freeway and I Street, it passes through a medium density residential neighborhood, ending at a park just south of the intersection with I Street. Waterside Mall, occupying 4th Street right-of-way between I and M Streets, is a medium density commercial use. South of M Street, 4th Street goes through another medium density residential neighborhood, before ending at Ft. McNair. Sidewalks are present on both sides of 4th Street throughout the corridor.

Figure 5
4th Street at Southwest Freeway



6th Street

6th Street is a two-way local street running north-south between G Street and M Street/Maine Avenue. It has one lane in each direction with all-day parking permitted on both sides of the street. The speed limit is 25 mph, but there are no posted speed limit signs. The intersections of 6th Street with I Street and M Street/Maine Avenue are signalized. Sidewalks are present on both sides of 6th Street throughout the corridor.

Land usage along 6th Street is primarily medium-density residential, with medium-density commercial use where it borders the Waterside Mall property.

7th Street

7th Street is a two-way minor arterial running north-south between Independence and Maine Avenues. During peak periods, it generally operates with three lanes in each direction and has no peak period parking. Parking is allowed at other times of the day. However, parking is permitted on 7th Street between G and I Streets at all times of the day, with only two lanes available to traffic. The speed limit is 25 mph, but there are no posted speed limit signs throughout the corridor. Sidewalks are present on both sides of 7th Street throughout the corridor.

North of I-395, land uses along 7th Street are primarily Federal, with some medium-high density commercial development. South of the freeway, land usage on the east side is medium density residential. The west side of 7th Street is a mix of institutional, medium density residential, a school and low density commercial.

I Street

I Street is a two-way principal arterial running east-west through the study area, between 3rd and 7th Streets. I Street operates with one lane in each direction, except at the westbound approach to 4th Street, where there are two lanes. Parking is generally permitted throughout the day on both sides of I Street, except between 3rd and 4th Streets, where there are parking restrictions. These and all other parking restrictions throughout the study area are shown in Figure 3. Sidewalks are present on both sides of I Street. The speed limit is 25 mph, but there are no posted speed limit signs.

Aside from the park along the south side of I Street between 3rd and 6th Streets, I Street is entirely medium density residential through the study area.

M Street/Maine Avenue

M Street is a minor arterial running east-west between 3rd and 6th Streets, where it becomes Maine Avenue and continues northwest-southeast to 7th Street. M Street/Maine Avenue has three through lanes in each direction and is divided by a median. Exclusive left turn lanes are provided on M/Maine in both directions at 4th and 7th Streets; for eastbound traffic at 3rd street; and for westbound traffic at 6th Street. Parking restrictions

vary throughout the corridor and can be viewed in Figure 3. The posted speed limit on M Street/Maine Avenue is 25 mph. Sidewalks are present on both sides of the street.

Land usage along M Street is primarily medium density residential, except the medium density Waterside Mall. After M Street becomes Maine Avenue, land usage is a mixture of low-density commercial and medium density residential.

PUBLIC TRANSPORTATION

The Washington Metropolitan Area Transit Authority (WMATA) provides extensive bus and rail service in the study area. As shown in Figure 6, 28 routes serve the study area, with ten serving Waterside Mall and adjacent streets. There are also private buses serving major employers in the study area. The Waterfront-SEU Metrorail station (Green Line) is located at the intersection of 4th and M Streets, directly in front of Waterside Mall. The L'Enfant Plaza (Orange, Blue, Yellow, Green Lines) and Federal Center SW (Orange, Blue Lines) Metrorail stations are also located within the study area. Bus routes operating in the immediate vicinity of Waterside Mall are as follows. Detailed timetables and route maps may be found in Appendix B.

WMATA Route A9 – South Capitol Street Line

Route A9 provides inbound service between 6:21 and 10:16 AM and outbound service between 3:17 and 6:51 PM, Monday-Friday. No service is provided at other times. AM headways at the stop located at 4th and M Streets range from 10 to 32 minutes, while PM headways range from 10 to 24 minutes.

WMATA Routes A42,46,48 – Anacostia-Congress Heights Line

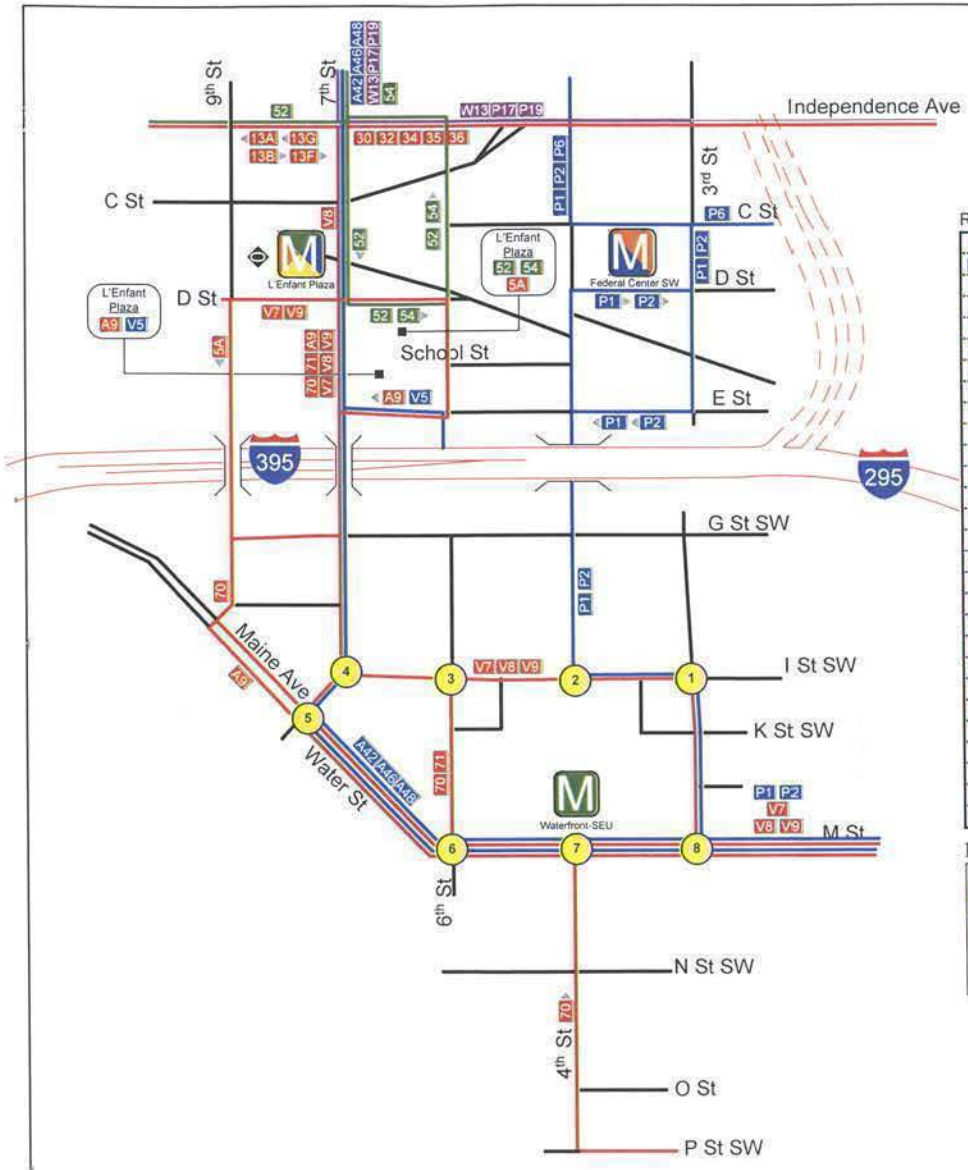
Routes A42,46,48 operate on M Street/Maine Avenue and 7th Street through the study area, providing bus service 7 days a week during non-rail hours.

WMATA Routes P1,2,6 – Anacostia-Eckington Line

Routes P1,2,6 operate on I, 3rd and M Streets in the vicinity of Waterside Mall and continue through the eastern side of the study area, including Federal Center SW. Inbound, this route operates at an approximate headway of 20 minutes during the AM peak period and approximately 40 minutes during the PM peak period. There is no outbound service during the AM peak period. During the PM peak period, outbound headways are approximately 20 minutes. There is no weekend service in the vicinity of Waterside Mall.

WMATA Routes V7,8,9 – Minnesota Avenue-M Street Line

Routes V,7,8,9 operate on M, 3rd, I and 7th Streets in the vicinity of the Waterside Mall. Headways for inbound AM peak period service range from 7 to 12 minutes. Inbound PM



Route	Terminals	AM Rush	PM Rush	Midday	Evening	Saturday	Sunday	♿	Remarks
A9	Livingston / L'Enfant Metro	In	Out	---	---	---	---		
A42	Southern Avenue Metro / Archives	---	---	---	---	---	---	X	Operates non-rail hours only
A46	Livingston / Archives	---	---	---	---	---	---	X	Operates non-rail hours only
A48	Livingston / Archives	---	---	---	---	---	---	X	Operates non-rail hours only
P1	Anacostia Metro / Potomac Park	In	Out	---	---	---	---	X	Via 4th St. SW
P2	Anacostia Metro / Archives	---	In	X	---	---	---	X	Via 4th St. SW
P6	Anacostia Metro / Rhode Island Avenue Metro	X	X	X	X	X	X	X	Via Capitol Hill
P17	Fort Washington / Farragut Square	In	Out	X	---	---	---	X	
P19	Fort Washington / Farragut Square	In	Out	X	---	---	---	X	
V5	Fairfax Village / L'Enfant Plaza Metro	In	Out	---	---	---	---		
V7	Deanwood Metro / Bureau of Engraving	X	X	X	X	---	---	X	
V8	Deanwood Metro / Archives	---	---	---	---	X	X	X	
V9	Benning Heights / Bureau of Engraving	In	Out	---	---	---	---		
W13	Bock Road Line	In	Out	X	---	---	---	X	
5A	L'Enfant Plaza Metro / Dulles Airports	X	X	X	X	X	X	X	
13A	Pentagon-Mall Loop (Clockwise)	X	X	X	X	X	X	X	
13B	Pentagon-Mall Loop (Counter-clockwise)	X	X	---	X	X	---	X	
13F	Pentagon-Mall-National Airport Loop (Clockwise)	---	---	---	---	X	X	X	Operates non-rail hours only
13G	Pentagon-Mall-National Airport Loop (Counter-clockwise)	---	---	---	---	X	X	X	Operates non-rail hours only
30	Friendship Heights Metro / Potomac Avenue Metro	In	---	---	---	---	---	X	Late night / early mornings daily
32	Friendship Heights Metro / Southern Avenue Metro	X	X	X	X	X	X	X	
34	Friendship Heights Metro / Naylor Road Metro	X	X	X	X	X	---	X	
35	Friendship Heights Metro / Naylor Road Metro	Out	In	X	X	X	X	X	
36	Friendship Heights Metro / Naylor Road Metro	In	Out	X	X	X	X	X	
52	Takoma Metro / L'Enfant Plaza Metro	X	X	X	X	X	X	X	
54	Takoma Metro / L'Enfant Plaza Metro	X	X	X	X	X	X	X	Via F Street
70	Silver Spring Metro / Half & O Streets SW	X	X	X	X	X	X	X	
71	Silver Spring Metro / Buzzard Point	X	X	---	---	---	---	X	

Legend:

- 1 Critical Intersection
- Metrorail Station
- Virginia Railway Express Station

Service Guide Key:

- In = Inbound
- Out = Outbound
- X = Both Directions
- --- = Not Available
- ♿ = Wheelchair Lift-Equipped Service

Not to Scale		4th Street SW Transportation Study	**Public Transit**	FIGURE 6
January, 2003				

peak period headways range from 9 to 16 minutes. Outbound headways range from 8 to 15 minutes during the AM peak period, and from 8 to 11 minutes during the PM peak period. Weekend service is offered on this route.

WMATA Routes 70,71 – Georgia Avenue-7th Street Line

In the vicinity of Waterside Mall, routes 70 and 71 operate on 7th, I, 6th, M and 4th Streets, as well as Maine Avenue. Headways during the AM peak period range from 6 to 14 minutes, while PM peak period headways range from 7 to 12 minutes. Weekend service is offered on this route.

TRAFFIC VOLUMES

In order to evaluate existing traffic conditions throughout the study area, the Study Team collected turning movement counts at eight intersections during the peak periods. Additionally, the Study Team collected daily traffic counts at key locations throughout the study area. Figure 7 shows the intersections where the Study Team collected turning movement count data:

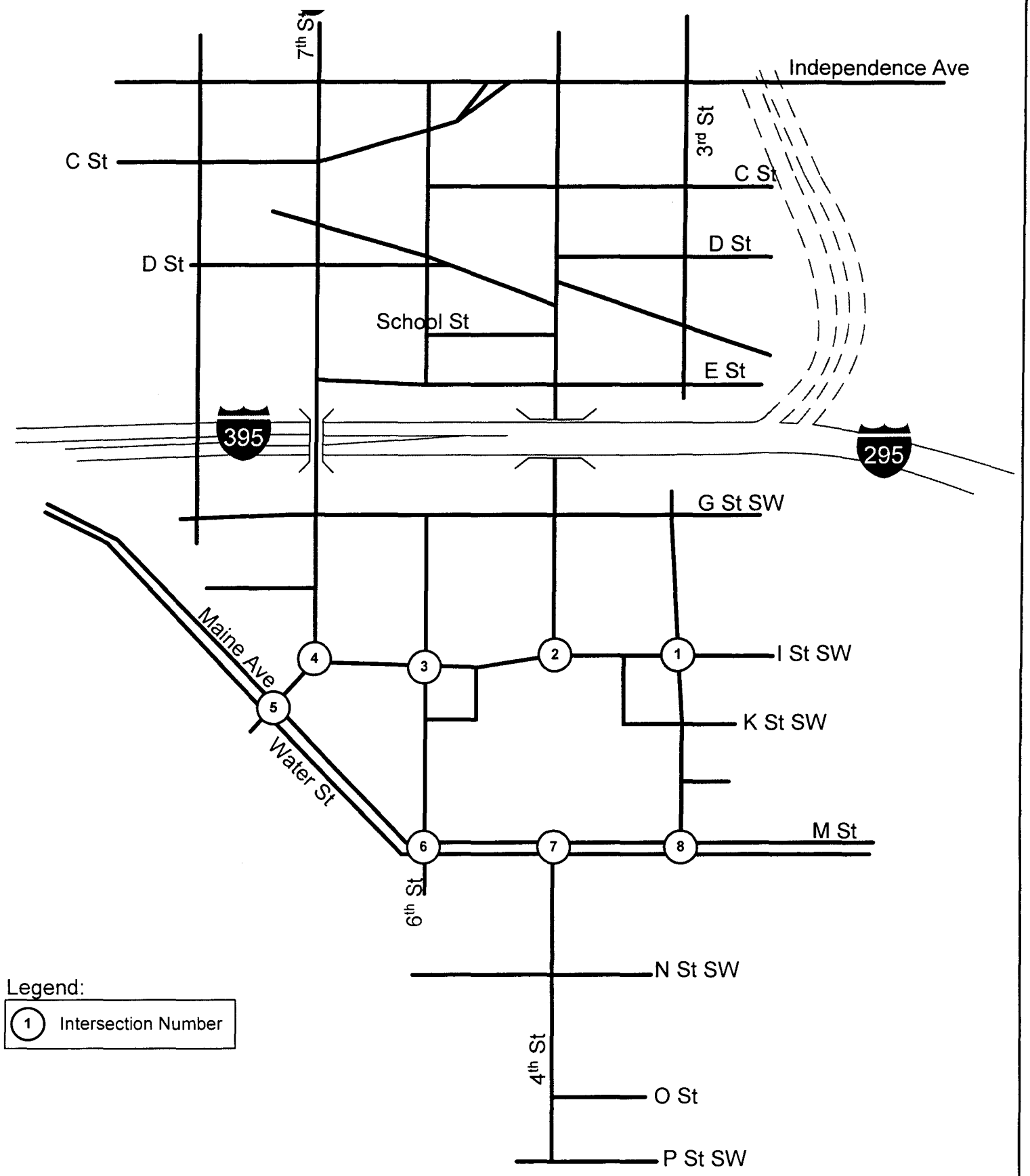
1. 3rd and I (Eye) Streets[1]
2. 4th and I (Eye) Streets
3. 6th and I (Eye) Streets
4. 7th and I (Eye) Streets
5. 7th Street and Maine Avenue
6. 6th Street and Maine Avenue/M Street
7. 4th and M Streets
8. 3rd and M Streets[1]

Each of the intersections was counted during the AM and PM peak periods, 7:00-9:00 AM and 4:30-6:30 PM, respectively. Four counts were taken at each intersection during the AM and PM peak periods. Counts taken previously, during the month of February 2002 were included in the sample and were averaged with new counts taken as part of this study during the month of August 2002.

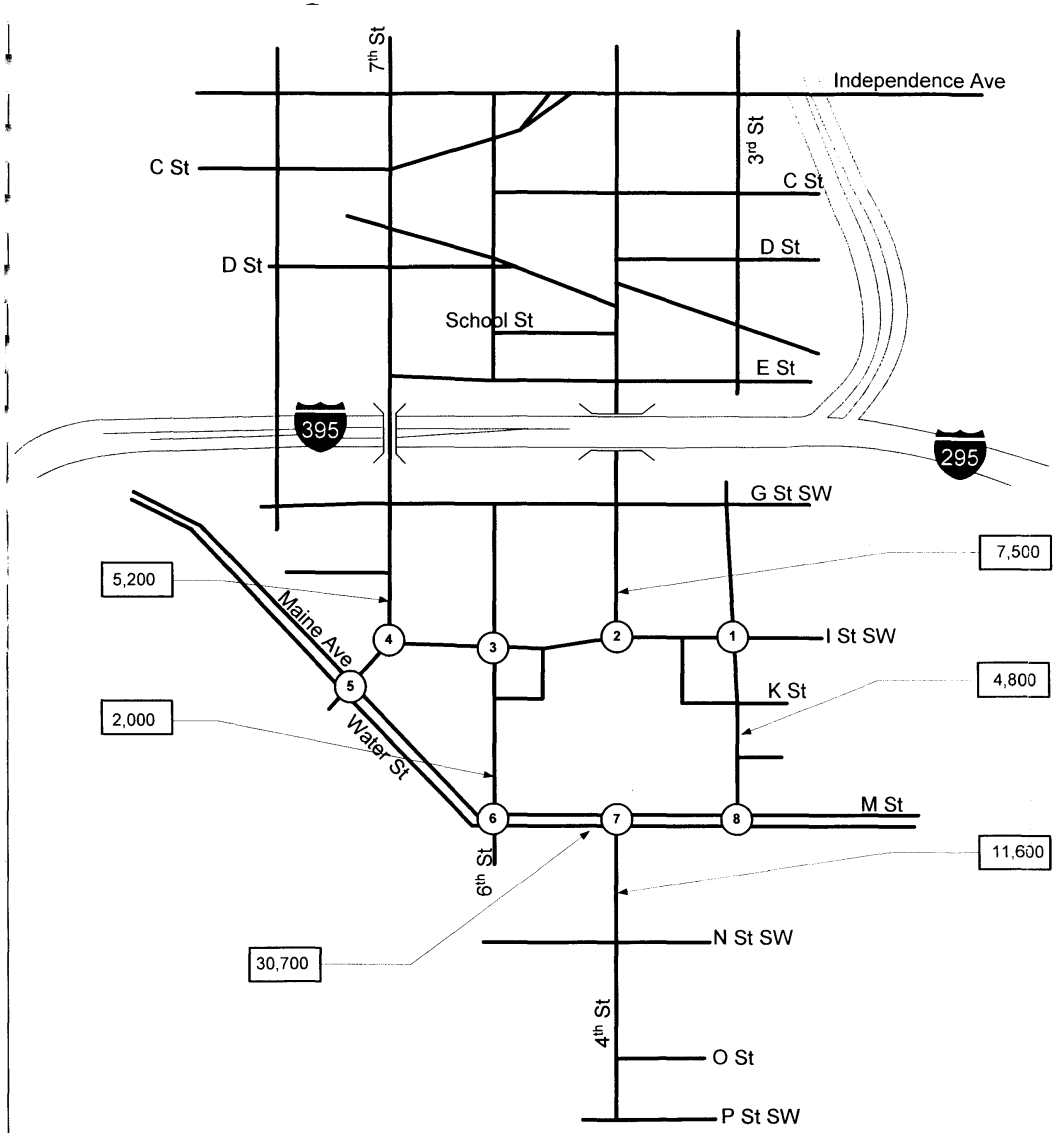
Since the majority of counts were taken during the summer months, when traffic volumes are typically lower than during other seasons, a seasonal adjustment factor of 13 percent was used to raise the summer counts to fall levels. This adjustment factor was derived from counts taken by DDOT at nearby locations during the summer and fall months. Finally, the "seasonally adjusted" counts were averaged with the February counts to create the raw volumes used for the study.

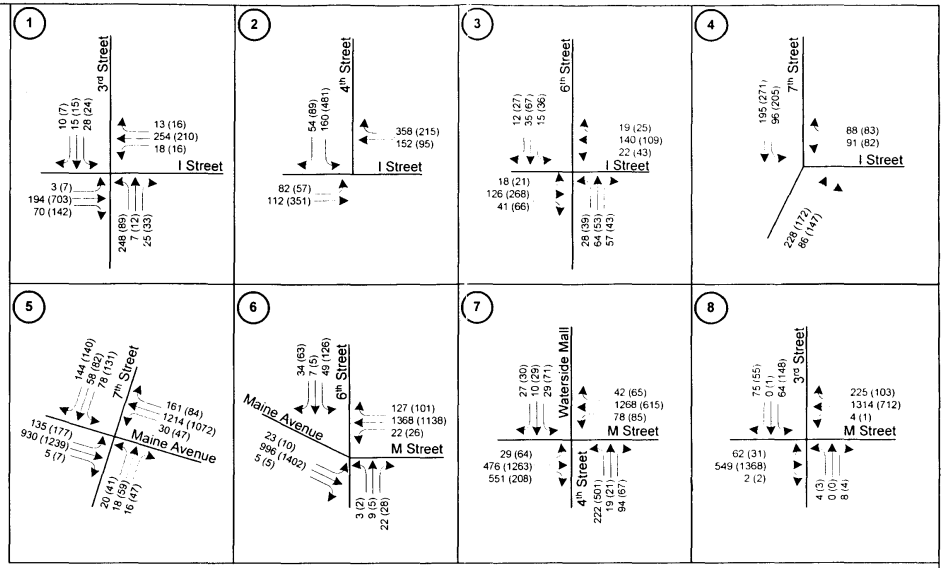
Because of the averaging process, there were minor discrepancies in the overall balance of traffic volumes throughout the study area network. In order to improve the modeling

[1] The intersections on 3rd Street were not part of the original Scope of Work, but were added later as part of a complete study of Waterside Mall.



Not to Scale January, 2003	N	4th Street SW Transportation Study	Location of Turning Movement Counts	FIGURE 7

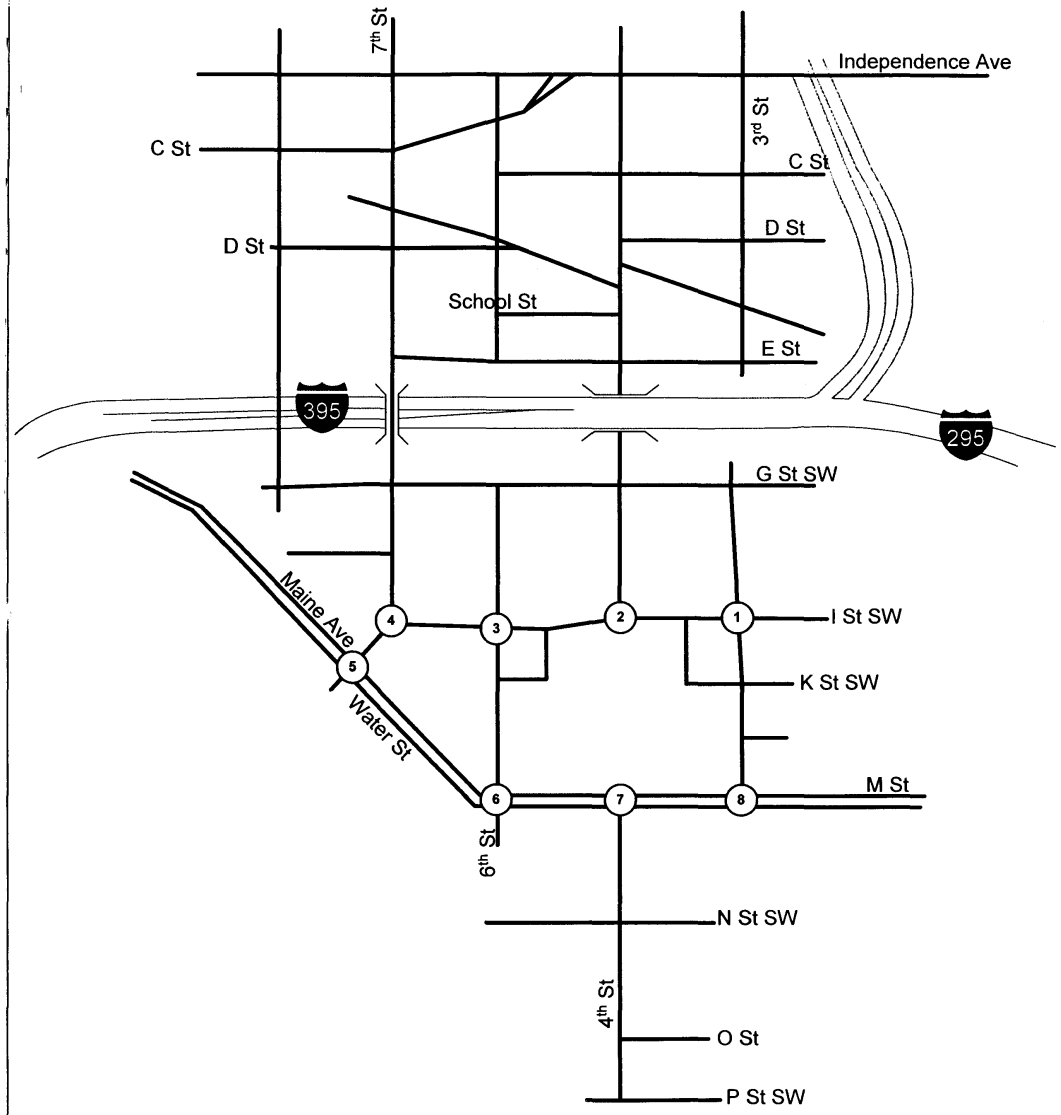


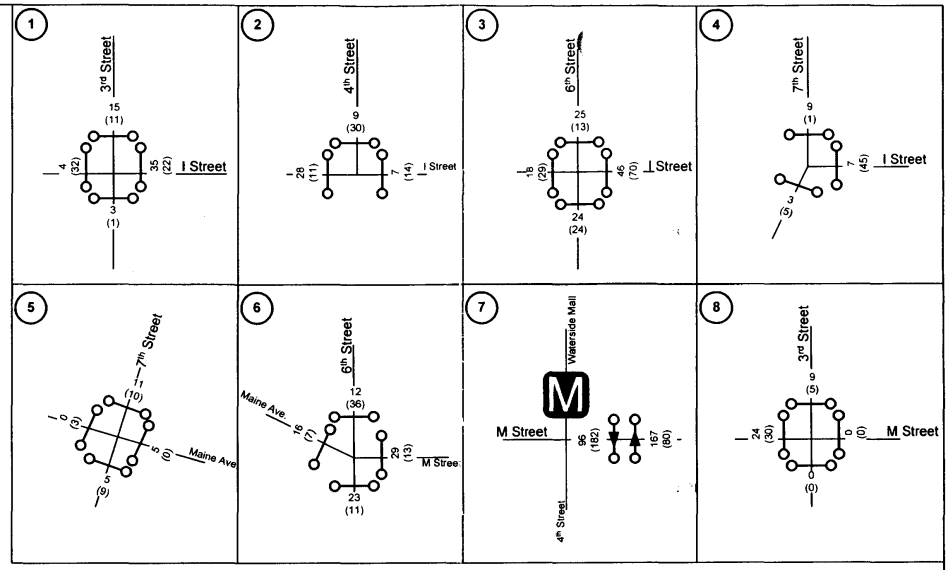


LEGEND:

(1)	Critical Intersection
30(45)	AM (PM) peak hour volume
22,000	Two-Way Daily Traffic

Not to Scale January, 2003	N	4th Street SW Transportation Study	**Existing (2002) Daily and Peak Hour Traffic Volumes**	**FIGURE 8**





LEGEND:

(1)	Critical Intersection
30(45)	No. of Pedestrians per AM (PM) peak hour

Not to Scale January, 2003	N	4th Street SW Transportation Study	**Existing (2002) Peak Hour Pedestrian Counts**	**FIGURE 9**

of existing traffic conditions, the Study Team applied standard traffic engineering techniques to adjust the turning movement counts at intersections where minor unjustified imbalances were found. Figure 8 presents the existing (2002) balanced peak hour turning movement counts for the study area. Appendix C presents the raw volume counts for the eight intersections shown in Figure 8. Accompanying pedestrian counts are presented in Figure 9.

As shown in Figure 8, the intersections in the study area with the highest turning movement volumes can be found on M Street, with the intersection of 4th and M Streets the highest overall. The intersection of 6th and I Streets had the lowest turning movement volumes. Figure 9 shows that, as expected, the highest number of pedestrians can be found at 4th and M Streets, the intersection closet to the Metro station. Other high pedestrian volumes can be found along the predominantly residential I Street.

The Study Team collected automated Average Daily Traffic (ADT) counts over a one-week period, throughout September 2002, at the following locations:

- 3rd Street SW between L and M Streets
- 4th Street SW directly north of I Street
- 4th Street SW directly south of M Street
- 6th Street SW between K and M Streets
- 7th Street SW between G and I Streets
- M Street SW between 4th and 6th Streets

Figure 9 shows that M Street/Maine Avenue is the most heavily traveled roadway in the study area, with over 30,000 vehicles using it daily. 4th Street has the next highest volumes, with over 11,000 vehicles using the southern portion, and 7,500 using the northern section. 3rd Street has an ADT of 4,800 vehicles, which is high for a local street. Much of this 3rd Street traffic can be attributed to the lack of a direct connection on 4th Street between I and M Streets.

SPEED AND TRAVEL TIMES

In order to gain an understanding of driving patterns and to gather information needed in the development of the traffic model for the study area, the Study Team collected information on speed and travel times on the major corridors. The Study Team collected the data on travel times and delay on September 19, 2002.

Study Team data collectors drove the 4th Street, 7th Street, I Street and M Street/Maine Avenue corridors several times in each direction during both the AM and PM peak hours, and recorded the elapsed travel times at predetermined travel points and the distance between the selected travel points. For the travel time runs, the data collectors were instructed to drive at the same speed as most of the vehicles traversing the study area. Thus, in some sections of the corridors, the data collectors traveled at speeds above the speed limit.

The Study Team calculated average speed for each roadway segment as well as an overall average speed for the corridor using the data collected on travel times and distances between time points. Due to the numerous traffic signals along most of the corridors, as well as moderate to heavy peak period traffic volumes, overall average speeds are considerably slower than the speed limits of the roadways. However, there are individual sections on all of the corridors except I Street where average speeds met or exceeded the speed limit, as can be seen in Table 1. In particular, traffic traveling on 4th Street northbound between E and D Streets; 4th Street southbound between M and N Streets; M Street eastbound between 6th and 4th Streets; and 6th Street in both directions between I and M Streets exceeded the speed limit by several miles per hour.

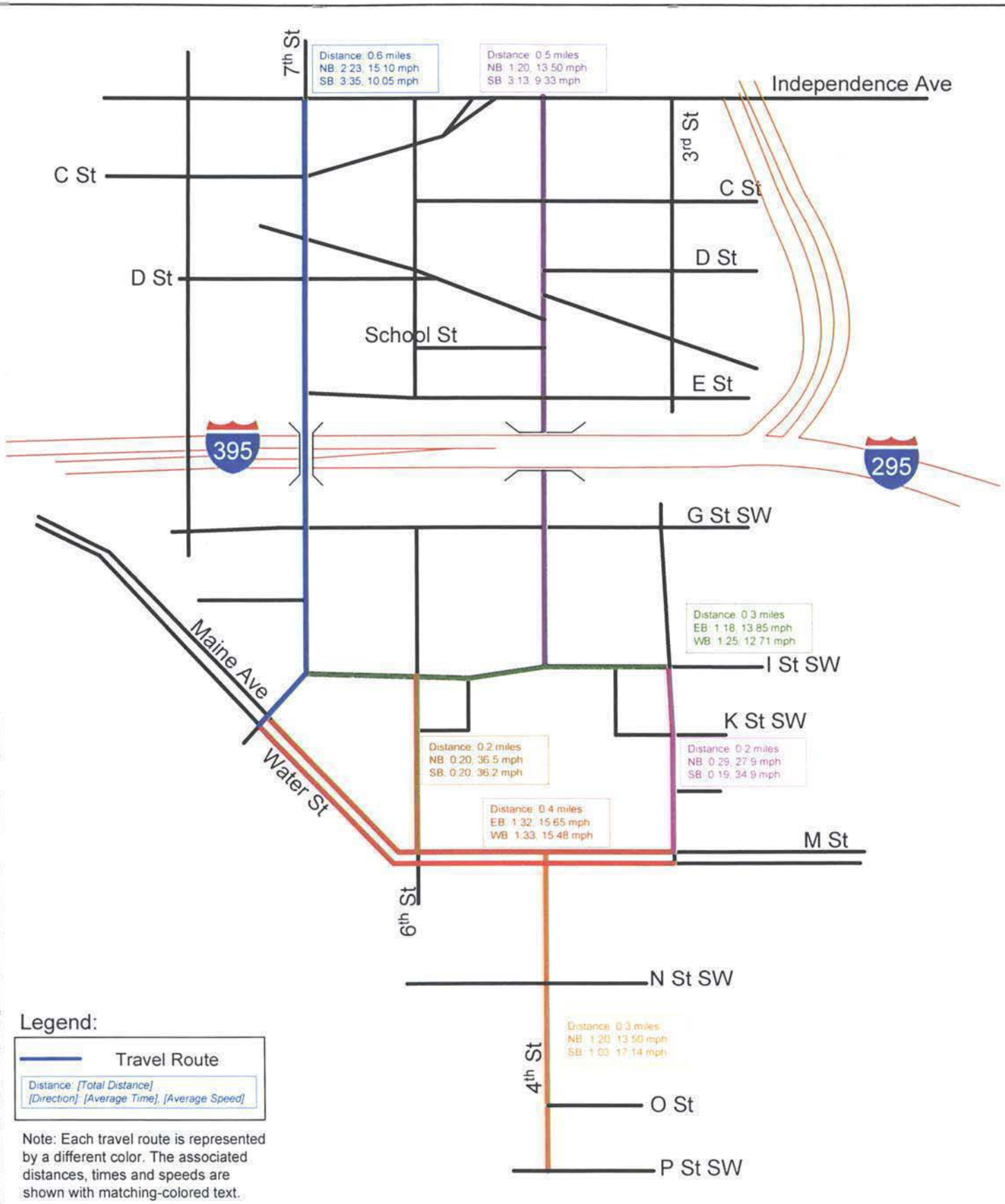
As shown in Figures 10 and 11, due to signal coordination, the 4th Street corridor (north of I Street) and 7th Street corridor have higher northbound speeds in the morning, and higher southbound speeds in the afternoon. Speeds on M Street/Maine Avenue are generally consistent regardless of direction or time period, with the exception of westbound M Street between 3rd and 4th Streets, which has a considerably slower segment speed than any of the other segments. Average speeds on I Street are consistent regardless of direction, but AM speeds are higher than PM speeds. For individual segments, the approaches to 4th Street and the segment between 6th and 7th Streets are noticeably slower than all other segments.

Table 1
Average Travel Speed at Selected Segments

Roadway and Direction	Segment	Speed Limit (mph)	AM Peak	PM Peak
3rd Street Northbound	M Street – I Street	25	24.9	23.7
3rd Street Southbound	I Street – M Street	25	37.9	23.4
4th Street Northbound (N)	E Street – D Street	25	38.3	21.6
4th Street Southbound (N)	D Street – E Street	25	12.3	18.1
4th Street Northbound (S)	N Street – M Street	25	17.5	12.3
4th Street Southbound (S)	M Street – N Street	25	24.5	41.7
6th Street Northbound	M Street – I Street	25	36.5	20.6
6th Street Southbound	I Street – M Street	25	36.2	20.3
7th Street Northbound	D Street – C Street	25	26.2	16.0
7th Street Southbound	C Street – D Street	25	22.3	22.3
I Street Eastbound	4th Street – 3rd Street	25	18.9	18
I Street Westbound	3rd Street – 4th Street	25	9.1	5.5
M Street / Maine Avenue Eastbound	6th Street – 4th Street	25	29.1	16.4
M Street / Maine Avenue Westbound	4th Street – 6th Street	25	21.8	22.5

Appendix D presents a list of the recorded speeds for all the studied segments in the Study Area.

Due to the fact that 4th Street is not constructed between I and M Streets, traffic wishing to pass through the study area on 4th Street must go by way of I Street and M Street, and use either 3rd or 6th Street. Most vehicles choose to utilize 3rd Street rather than 6th Street. The length of this route between Independence Avenue and P Street is 1.3 miles.



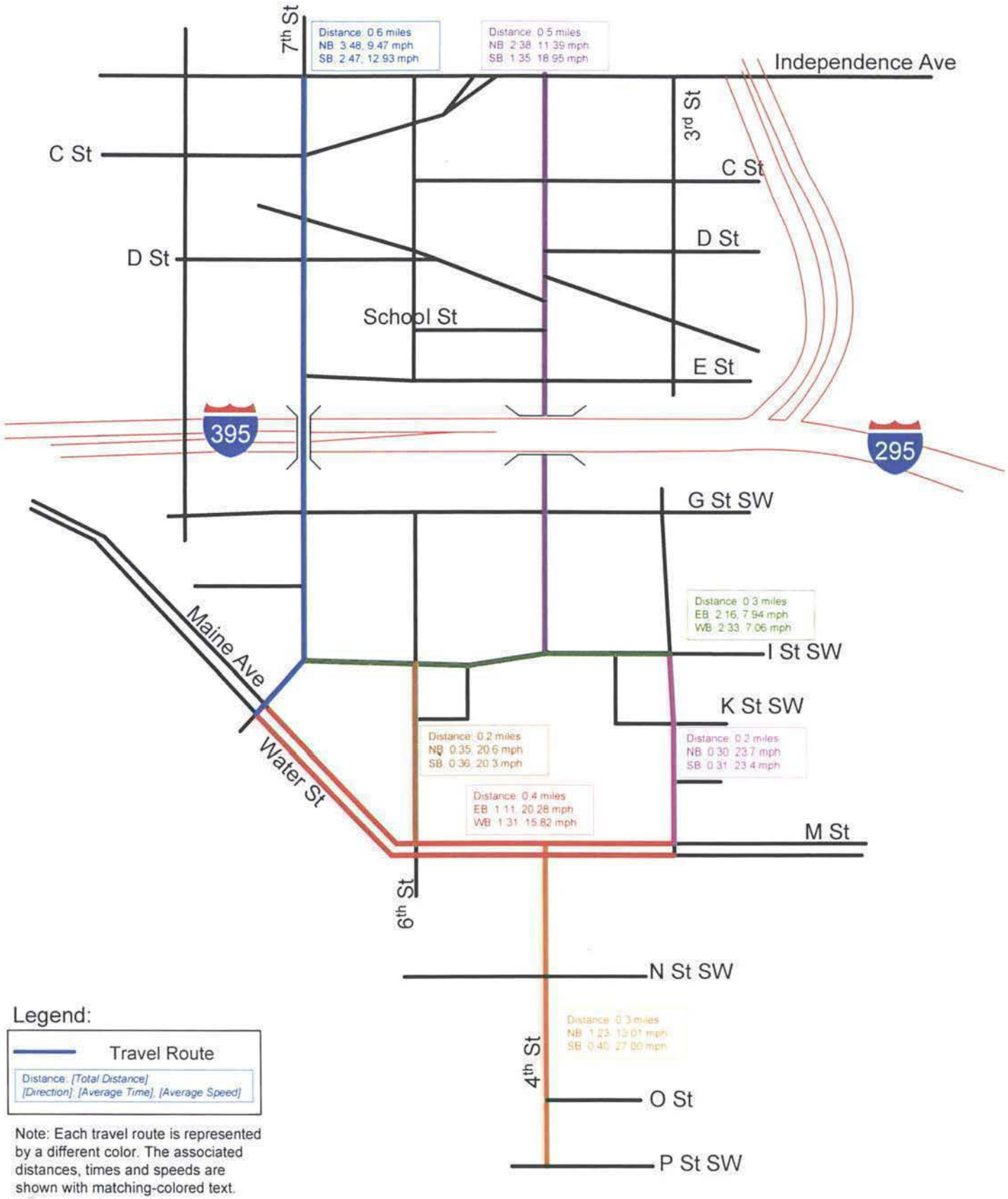
Legend:

Travel Route

Distance: *[Total Distance]*
[Direction]: *[Average Time]*, *[Average Speed]*

Note: Each travel route is represented by a different color. The associated distances, times and speeds are shown with matching-colored text.

Not to Scale		4th Street SW Transportation Study	AM Peak Period Travel Times and Speeds	FIGURE 10
January, 2003				



Legend:

Travel Route

Distance: *[Total Distance]*
[Direction]: *[Average Time]*, *[Average Speed]*

Note: Each travel route is represented by a different color. The associated distances, times and speeds are shown with matching-colored text.

Not to Scale January, 2003		4th Street SW Transportation Study	PM Peak Period Travel Times and Speeds	FIGURE 11

Table 2 shows that, as expected, travel speeds are highest for northbound traffic during the AM peak period and southbound traffic during the PM peak period. Should 4th Street be connected between I and M Streets, these travel times may decrease.

Table 2
Travel Times and Speeds – Entire 4th Street Corridor[1]

Direction	Peak Period	Total Time	Average Speed
Northbound	AM Peak	4:22	17.8 mph
Southbound	AM Peak	5:53	13.3 mph
Northbound	PM Peak	6:32	11.9 mph
Southbound	PM Peak	3:48	20.5 mph

SAFETY

In order to assess safety conditions in the study area, the Study Team obtained accident data from the District Department of Transportation (DDOT) for each of the five corridors, for the years 1999 through 2001. As the information summarized in Table 3 indicates, the intersection of 7th Street and Maine Avenue is the location with the largest number of accidents in the study area, with 15 during the three analyzed years. Rear end and side-swipes were the most prevalent type of accidents at this intersection. This indicates that enhancements to signing and signalization at this location may be needed to improve the safety of traffic operations. Recommendations are listed in a later section of this report.

The intersection with the next highest number of accidents between 1999 and 2001 is 3rd and M Street, with a total of 11 accidents. Ranking third was the intersection of 6th and I Streets, with 8 overall accidents and five right angle accidents.

Pedestrian accidents occurred at the intersections of 3rd and I Streets, 3rd and M Streets and 4th and I Streets. While no pedestrian accidents were reported at the intersection of 4th and M Streets, pedestrian safety issues were observed at this intersection. These issues are described in the next section of this report. Detailed accident data is presented in Appendix E.

QUEUES AT STUDIED INTERSECTIONS

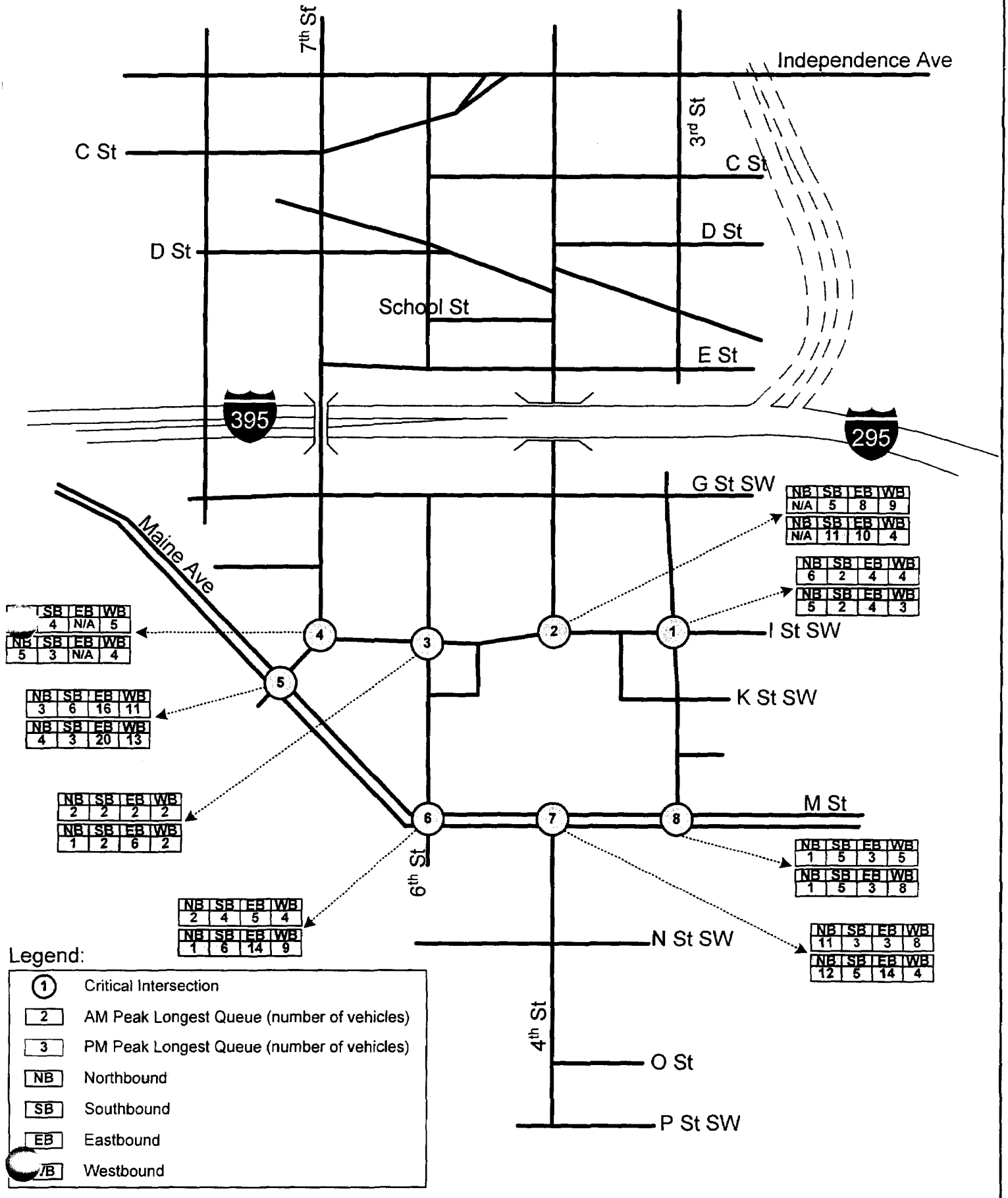
The Study Team collected information on existing queues – the number of vehicles lined up at an intersection during the red phase of a traffic signal – at analyzed intersections in the study area. This information was needed to adequately develop a computerized model of existing traffic conditions. The Study Team took samples of maximum queues of each approach at the eight studied intersections. The Study Team calculated the average of the maximum queues for each of the approaches. Figure 12 summarizes the average of the observed maximum queues for the eight intersections. The longest queues

[1] 4th Street from Independence Avenue to I Street; I Street from 4th Street to 3rd Street; 3rd Street from I Street to M Street; M Street from 3rd Street to 4th Street; 4th Street from M Street to P Street.

Table 3
Summary of Accident Data

Intersection	Total Number of Accidents (Injuries)			AM Peak Hour Percentage			PM Peak Hour Percentage			Off-Peak Percentage			Accident Type(s) (1999-2001)
	1999	2000	2001	1999	2000	2001	1999	2000	2001	1999	2000	2001	
3rd and I Streets	1 (0)	2 (0)	2 (4)	0	0	0	0	0	50	100	100	50	Side Swiped - 1 Parked - 2 Right Angle - 1 Pedestrian - 1
3rd and M Streets	7 (11)	3 (2)	1 (0)	14	0	0	14	0	0	72	100	100	Left Turn - 4 Rear End - 2 Pedestrian - 1 Right Angle - 2 Side Swiped - 2
4th Street and Independence Avenue	2 (1)	1 (0)	3 (4)	0	0	0	0	0	0	100	100	100	Right Angle - 2 Parked -1 Rear End - 1
4th and C Streets	1 (0)	1 (0)	1 (0)	0	0	0	0	0	0	100	100	100	Parked -3
4th and D Streets	3 (4)	2 (0)	N/A	67	50	N/A	0	0	N/A	33	50	N/A	Right Angle - 2 Left Turn - 1 Head On - 1 Parked - 1
4th and E Streets		1 (0)			0			0			100		Rear End - 1
4th and I Streets	1 (0)	1(1) [1]		0	0 [1]		0	100 [1]		100	0 [1]		Parked - 1 Pedestrian - 1
4th and M Streets	2 (5)	0	2 (0)	0	0	50	0	0	50	100	0	0	Left Turn - 2 Right Angle - 1 Side Swiped - 1
6th and G Streets	N/A	1 (0)	1 (1)	N/A	0	0	N/A	0	0	N/A	100	100	Right Angle - 1 Parked - 1
6th and I Streets	2 (1)	5 (9)	1 (0)	0	0	0	0	20	100	100	80	0	Right Angle - 5 Parked - 1 Left Turn - 1 Side Swiped - 1
6th and M Streets	N/A	N/A	5 (5)	N/A	N/A	0	N/A	N/A	40	N/A	N/A	60	Right Angle - 1 Rear End - 3 Side Swiped - 1
7th Street and Independence Avenue	N/A	N/A	1 (0)	N/A	N/A	0	N/A	N/A	0	N/A	N/A	100	Side Swiped - 1
7th and C Streets		2 (0)			50			0			50		Parked - 1
7th and E Streets	1 (0)	N/A	2 (0)	0	N/A	0	0	N/A	0	100	N/A	100	Side Swiped - 2 Parked - 1
7th and G Streets	1 (2)	N/A	2 (1)	0	N/A	0	100	N/A	50	0	N/A	50	Fixed Object - 1 Right Angle - 1
7th and I Streets	2 (0)	2 (0)	1 (0)	50	50	0	0	0	100	50	50	0	Right Angle - 1 Rear End - 1 Side Swiped - 2 Parked - 1
7th Street and Maine Avenue	5 (1)	6 (5)	4 (0)	40	0	0	20	17	0	40	83	100	Right Angle - 1 Rear End - 4 Side Swiped - 5 Left Turn - 2

N/A: Not Available
Complete DCDPW Accident Summary Reports can be found in Appendix E
[1] Data was combined for the years 2000 and 2001



Note: N/A = not applicable

Not to Scale		4th Street SW Transportation Study	Observed Queues at Critical Intersections	FIGURE 12
January, 2003				

were observed on westbound Maine Avenue at 7th Street during the AM and PM peak hours. Another location with long queues is northbound 4th Street at M Street.

The Study Team used the queue information to develop the traffic model. The results of the traffic simulations were compared to the observed queues. Where the Study Team found significant discrepancies between modeled conditions and observed conditions, the input data used to set up the model was examined to eliminate the possibility of errors in the development of the model. After errors were ruled out, discrepancies were reconciled by making adjustments to the traffic model parameters to make the model replicate more accurately observed traffic conditions.

EXISTING LEVELS OF SERVICE

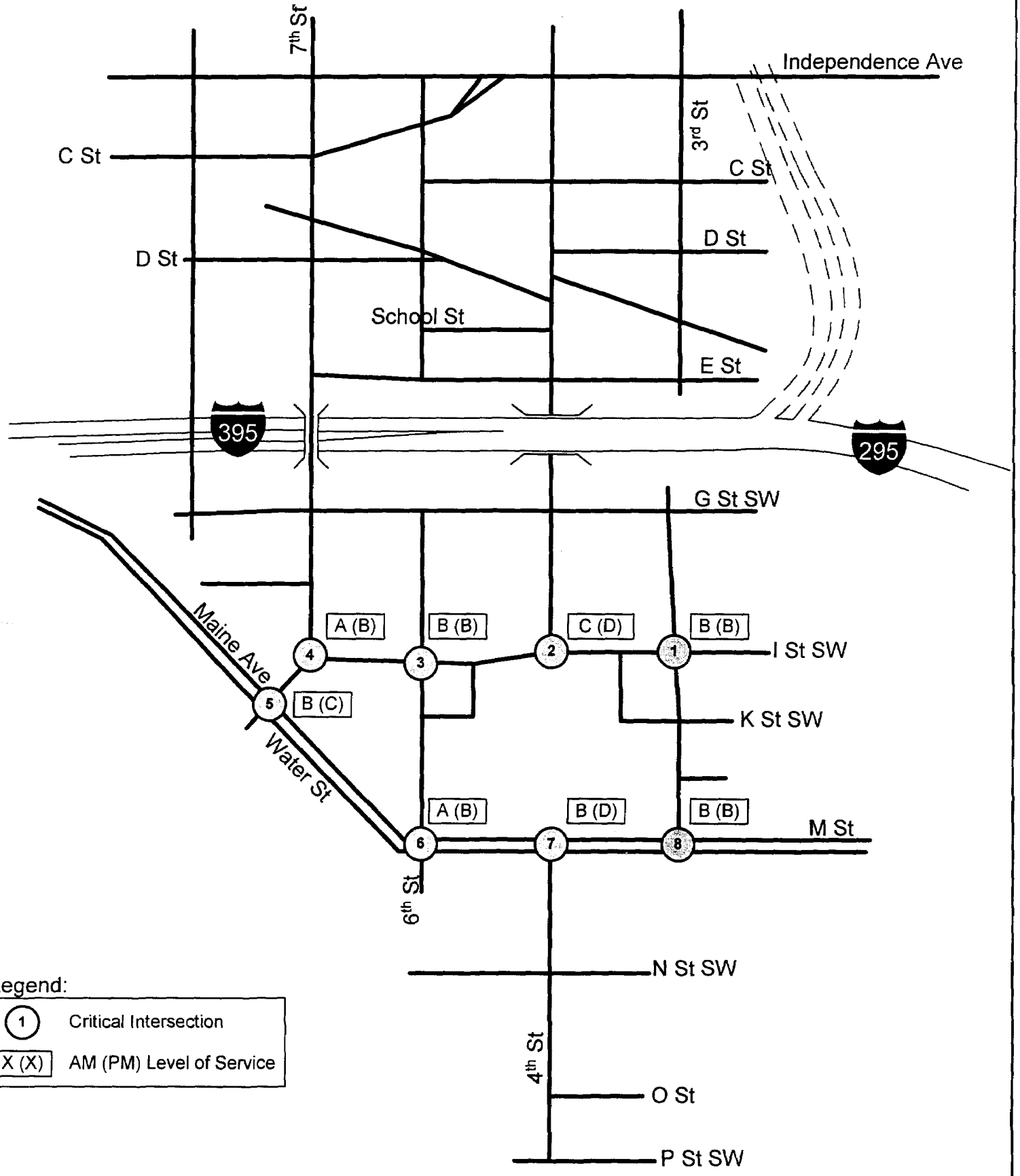
The Consultant used SYNCHRO, a traffic modeling/analysis program, to evaluate existing traffic conditions at the eight studied intersections. For the evaluation, the Consultant entered existing traffic volumes, lane configurations, pedestrian volumes and signal timings into SYNCHRO to develop a base case, existing conditions model. SimTraffic, SYNCHRO's associated traffic simulation software, was used to assist in the development of a model that accurately replicates existing conditions.

The Consultant used the SimTraffic software results to calculate levels of service (LOS) and the delay per vehicle for the eight analyzed intersections in the study area. The LOS evaluation uses a six-letter grade scale (A to F) to rank the overall traffic handling ability of an intersection or a network. LOS A indicates excellent traffic operations with minimal delays. LOS F represents failing conditions with long delays. Levels of service E and F are generally considered undesirable. Appendix F provides a description of the different levels of service and their associated delays for both signalized and unsignalized intersections.

As Figure 13 indicates, traffic congestion is greater during the PM peak hour. For three of the eight intersections, AM and PM LOS is the same. Four of the remaining five intersections drop by one letter grade from AM to PM.

Two intersections, 4th and I Streets and 4th and M Streets are operating at LOS D during the PM peak hour. LOS D indicates that the existing traffic volumes are approaching the capacity of these two intersections and traffic delays are approaching undesirable levels during the PM peak hour.

The Consultant used the existing levels of service to identify locations where future improvements - such as signalization, changes in signal timing/phasing and additional lanes – could be implemented. These issues are described in the next section of this report.



Not to Scale January, 2003	N	4th Street SW Transportation Study	Existing Levels of Service (LOS)	FIGURE 13

EXISTING TRANSPORTATION ISSUES AND RECOMMENDED IMPROVEMENTS

In addition to conducting the traffic assessments with the use of the SYNCHRO computerized transportation model and reviewing accident data, the Study Team reviewed correspondence from citizens and citizen groups, and conducted field evaluations to assess existing conditions. In addition to congested operations at the intersections currently operating at LOS D, the Study Team identified a number of issues at locations throughout the study area.

The following is a discussion of existing transportation issues and recommended improvements throughout the study area. Locations where issues were identified are shown in Figure 14[1].

3RD STREET

Issue:

1. Safety of pedestrian operations at 3rd and I Streets

Recommended Improvement:

- Replace existing crosswalks with zebra-striped crosswalks.

4TH STREET

Issue:

2. Inadequate pavement striping between Independence Avenue and I Street.

Recommended Improvement:

- Re-stripe centerline markings.

Issue:

3. Safety of traffic and pedestrian operations at 4th and C Streets

Recommended Improvement:

- Re-stripe crosswalks. Add stop bars to pavement on 4th Street.

Issue:

4. Safety of traffic and pedestrian operations at 4th Street and Virginia Avenue

Recommended Improvements:

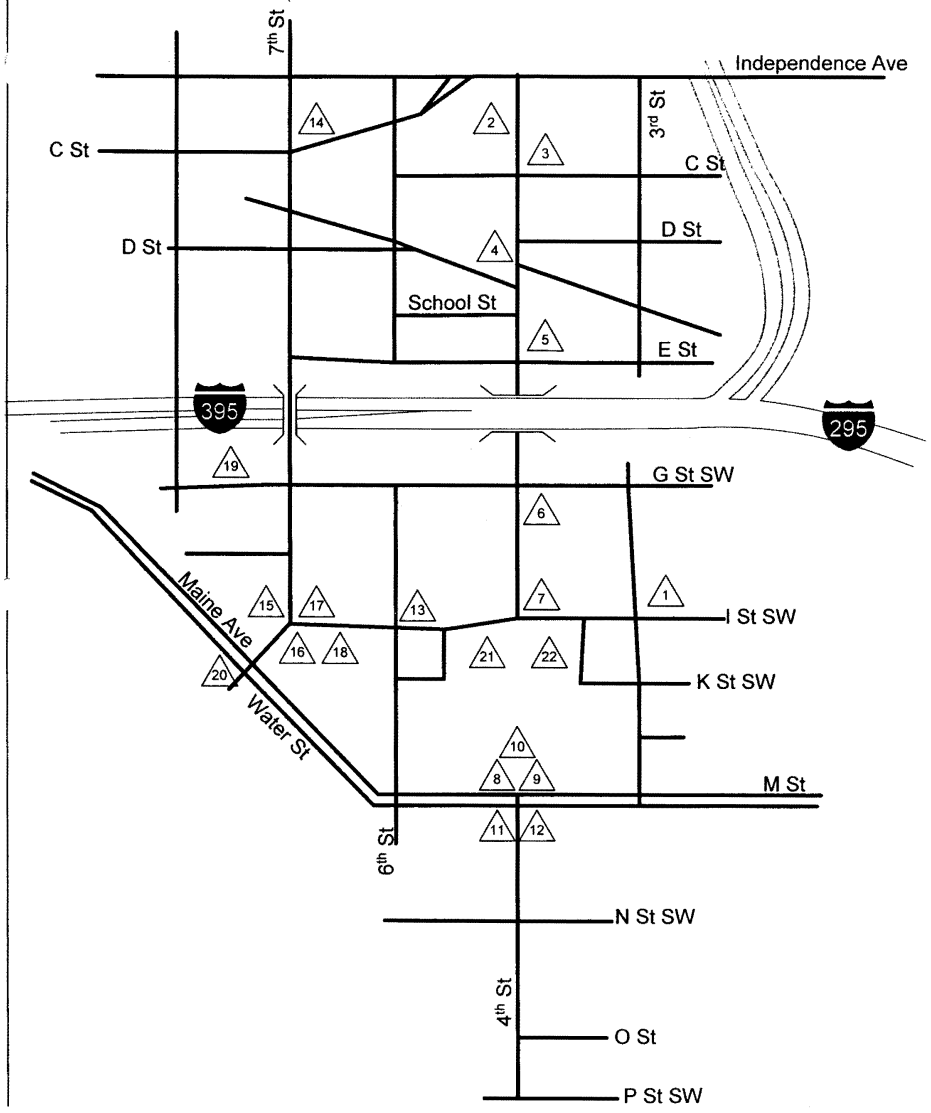
- Add stop bar for northbound 4th Street at westbound leg of Virginia Avenue.
- Place crosswalk across 4th Street north of Virginia Avenue. Place crosswalk to connect the handicapped ramps on each side of 4th Street.
- Place stop bar for southbound 4th Street traffic 40 feet before signal heads.

Issue:

5. Safety of traffic and pedestrian operations at 4th and E Streets.

---

[1] The Summary of Findings and Recommendations chapter of this report includes a graphic showing the location of the recommended improvements discussed within this section.



1. Safety of pedestrian operations at 3rd and I Streets
2. Inadequate pavement striping on 4th Street between Independence Avenue and I Street.
3. Safety of traffic and pedestrian operations at 4th and C Streets
4. Safety of traffic and pedestrian operations at 4th Street and Virginia Avenue
5. Safety of traffic and pedestrian operations at 4th and E Streets.
6. Safety of traffic and pedestrian operations at 4th and G Streets.
7. Safety of traffic and pedestrian operations at 4th and I Streets.
8. Traffic operations at 4th and M Streets. Northbound 4th Street is operating as two left turn lanes, but is not signed or striped for it.
9. Traffic operations at 4th and M Streets. Traffic entering Waterside Mall tends to queue onto M Street.
10. Pedestrian operations at 4th and M Streets. Pedestrians cross on the west side of the intersection, despite the lack of crosswalk and pedestrian signal.
11. Safety of pedestrians crossing M Street at 4th Street. There are heavy pedestrian volumes during the peak periods.
12. Blind pedestrians crossing 4th and M Streets
13. Safety of traffic and pedestrian operations at 6th and I Streets.
14. Inadequate pavement striping at 7th and C Streets.
15. Traffic Operations at 7th and I Streets. Due to the skewed geometry of the legs of 7th Street, some southbound vehicles continue south on the red light, thinking they are actually making a legal right turn on red.
16. Missing sign at 7th and I Streets. The "No Right Turn on Red" sign for northbound 7th Street traffic is missing. However, the "While Pedestrians are Present" sign is still in place.
17. Pedestrian and traffic operations at 7th and I Streets. Westbound right turns on red conflict with pedestrian crossings.
18. Pedestrian and traffic operations at 7th and I Streets.
19. One-way operation of G Street between 7th and 9th Streets.
20. High number of accidents at the intersection of 7th Street and Maine Avenue.
21. Inadequate pavement striping on I Street.
22. Vehicular congestion on I Street

Not to Scale		4th Street SW Transportation Study	**Existing Transportation Issues**	**FIGURE 14**
January, 2003	N			

Recommended Improvements:

- Add stop bars on 4th Street.
- Add pedestrian signals on all four approaches.

Issue:

6. Safety of traffic and pedestrian operations at 4th and G Streets.

Recommended Improvements:

- Add stop bars on all four approaches.
- Add crosswalks on all four approaches.

Issue:

7. Safety of traffic and pedestrian operations at 4th and I Streets.

Recommended Improvements:

- Replace existing crosswalks with zebra-striped crosswalks.
- Police enforcement of right turn on red restrictions.

Issue:

8. Traffic operations at 4th and M Streets. Northbound 4th Street is operating as two left turn lanes, but is not signed or striped for it.

Discussion:

- Due to the large number of left turns at this intersection, and the split-phase operation of 4th Street/Waterside Mall driveway, this approach should be allowed to continue to operate with two left turn lanes. However, signing and striping should accompany the operation, to alert drivers to it.

Recommended Improvement:

- Place pavement marking arrow in the right lane of the northbound 4th Street approach indicating shared left/through/right operation. Install signage on the approach indicating the operation of the right lane.

Issue:

9. Traffic operations at 4th and M Streets. Traffic entering Waterside Mall tends to queue onto M Street.

Recommended Improvement:

- Reconfigure entrance to Waterside Mall and move parking gates away from M Street. This improvement would not have to be implemented if a vehicular connection is constructed on 4th Street between M and I Streets.

Issue:

10. Pedestrian operations at 4th and M Streets. Pedestrians cross on the west side of the intersection, despite the lack of crosswalk and pedestrian signal.

Recommended Improvements:

- Increase police enforcement of pedestrian laws.
- Make pedestrians aware of the crosswalk on the east side of the intersection.

Issue:

11. Safety of pedestrians crossing M Street at 4th Street. There are heavy pedestrian volumes during the peak periods.

Discussion:

- This intersection has the largest number of pedestrian crossings in the study area, as well as the highest traffic volumes. A pedestrian underpass would help improve both safety and intersection operations. However, the cost of constructing a grade-separated pedestrian tunnel across M Street at 4th Street would be high, and neighborhood residents have strong objections to this proposal based on pedestrian security and physical barriers. Therefore, a pedestrian underpass is not recommended.

Recommended Improvements:

- Increase pedestrian crossing time.
- Install "No Right Turn on Red When Pedestrians Are Present" signs on all approaches where right turns on red are permitted.

Issue:

12. Blind pedestrians crossing 4th and M Streets

Discussion:

- Audio buzzers are used at other locations around the city to assist blind pedestrians at busy intersection crossings. They should be installed at the two intersections closest to the metro station: 4th and I Streets and 4th and M Streets.

Recommended Improvement:

- Equip pedestrian signals with audio buzzers at the intersection of 4th and M Streets and at the intersection of 4th and I Streets.

6TH STREET

Issue:

13. Safety of traffic and pedestrian operations at 6th and I Streets.

Recommended Improvements:

- Replace existing crosswalks with zebra-striped crosswalks.
- Police or camera enforcement of right turn on red restrictions.

7TH STREET

Issue:

14. Inadequate pavement striping on 7th Street.

Recommended Improvement:

- Re-stripe crosswalks at 7th and C Streets.

Issue:

15. Traffic Operations at 7th and I Streets. Due to the skewed geometry of the legs of 7th Street, some southbound vehicles continue south on the red light, thinking they are actually making a legal right turn on red.

Recommended Improvement:

- Install "No Right Turn on Red" sign on southbound 7th Street at I Street.

Issue:

16. Missing sign at 7th and I Streets. The "No Right Turn on Red" sign for northbound 7th Street traffic is missing.

Recommended Improvement:

- Replace "No Right Turn on Red" sign on northbound 7th Street at I Street.

Issue:

17. Pedestrian and traffic operations at 7th and I Streets. Westbound right turns on red conflict with pedestrian crossings.

Recommended Improvement:

- Install "No Right Turn on Red when Pedestrians are Present" sign on westbound I Street at 7th Street.

Issue:

18. Pedestrian and traffic operations at 7th and I Streets.

Recommended Improvement:

- If the Special Traffic Operations Patrol program[1] is implemented in the District, station an officer at this intersection.

Issue:

19. One-way operation of G Street between 7th and 9th Streets.

Discussion:

- The land on the north side of G Street between 7th and 9th Streets was used as a parking lot prior to the construction of the Capitol Square residential development. Residents of this development find it difficult to access their homes due to the one-way eastbound nature of G Street. Under current conditions, they can only access their homes via 9th Street. The Study Team conducted a field evaluation of conditions on G Street and at the intersection of G and 9th Streets and found that G Street can safely and effectively be converted to two-way operation.

  Currently, all traffic traveling south on 9th Street must stop at G Street, as well as traffic on the exit ramp from the Southwest Freeway. Northbound 9th Street traffic, which must turn right at G Street, is also controlled by a stop sign.

  Additionally, in order to restrict westbound G Street traffic to turning left onto 9th Street, the pavement north of the island separating 9th Street from the Freeway exit ramp should be striped with 24" wide white pavement markings.

  Finally, traffic signal hardware installation will be necessary at the intersection of 7th and G Streets to provide for two-way operation.

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[1] This program, which is under consideration, would place special traffic operations patrol officers at select intersections in the District during peak periods to help improve traffic operations.

Recommended Improvements:

- Convert G Street to two-way operation between 7th and 9th Streets.
- An all-way stop sign should be installed at the intersection of 9th and G Streets.
- Add pavement markings to area north of island separating 9th Street and exit ramp from Southwest Freeway.
- Upgrade traffic signal at 7th and G Streets.

Issue:

20. High number of accidents at the intersection of 7th Street and Maine Avenue.

Discussion:

- DDOT accident records indicate that there were 15 accidents at this intersection between 1999 and 2001, with rear-end and side-swipe accidents the most common. Field evaluations indicate that the pavement striping is missing, in poor condition or substandard on the 7th Street approaches. Additionally, the intersection pavement is in poor condition.

  Due to poor sight distance to the left, as well as the parking lane on eastbound Maine Avenue, right turns on red onto Maine Avenue from northbound 7th Street should be prohibited. Traffic volumes for this movement are light, and the recommended prohibition is not expected to have an impact on current traffic operations.

  The left lane of the southbound 7th Street approach to the intersection should operate as a left turn only lane due to the high number of left turns at this approach compared to the volume of through traffic.

Recommended Improvements:

- Install "Signal Ahead" advance traffic control signs on both approaches of Maine Avenue, 150 feet before the intersection.
- Replace the "Keep Right" sign on northbound 7th Street between Water Street and Maine Avenue (the existing sign is not in good condition).
- Stripe northbound 7th Street as 3 lanes between Water Street and Maine Avenue. Due to the short length of this approach, it should be striped with solid lines the entire length. To remain consistent with existing signage, the right lane should be designated as a right turn only lane with the appropriate pavement arrow and legend.
- Prohibit right turns on red for northbound 7th Street.
- Re-stripe pavement markings on southbound 7th Street approaching Maine Avenue.
- Convert the left lane of southbound 7th Street to a left turn only lane. Add the appropriate pavement arrow and legend.
- Re-pave the intersection.

I STREET

Issue:

21. Inadequate pavement striping on I Street.

Recommended Improvement:

- Re-stripe centerline markings from 4th Street to 7th Street.

Issue:

22. Vehicular congestion on I Street

Recommended Improvement:

- Improve coordination of traffic signals.

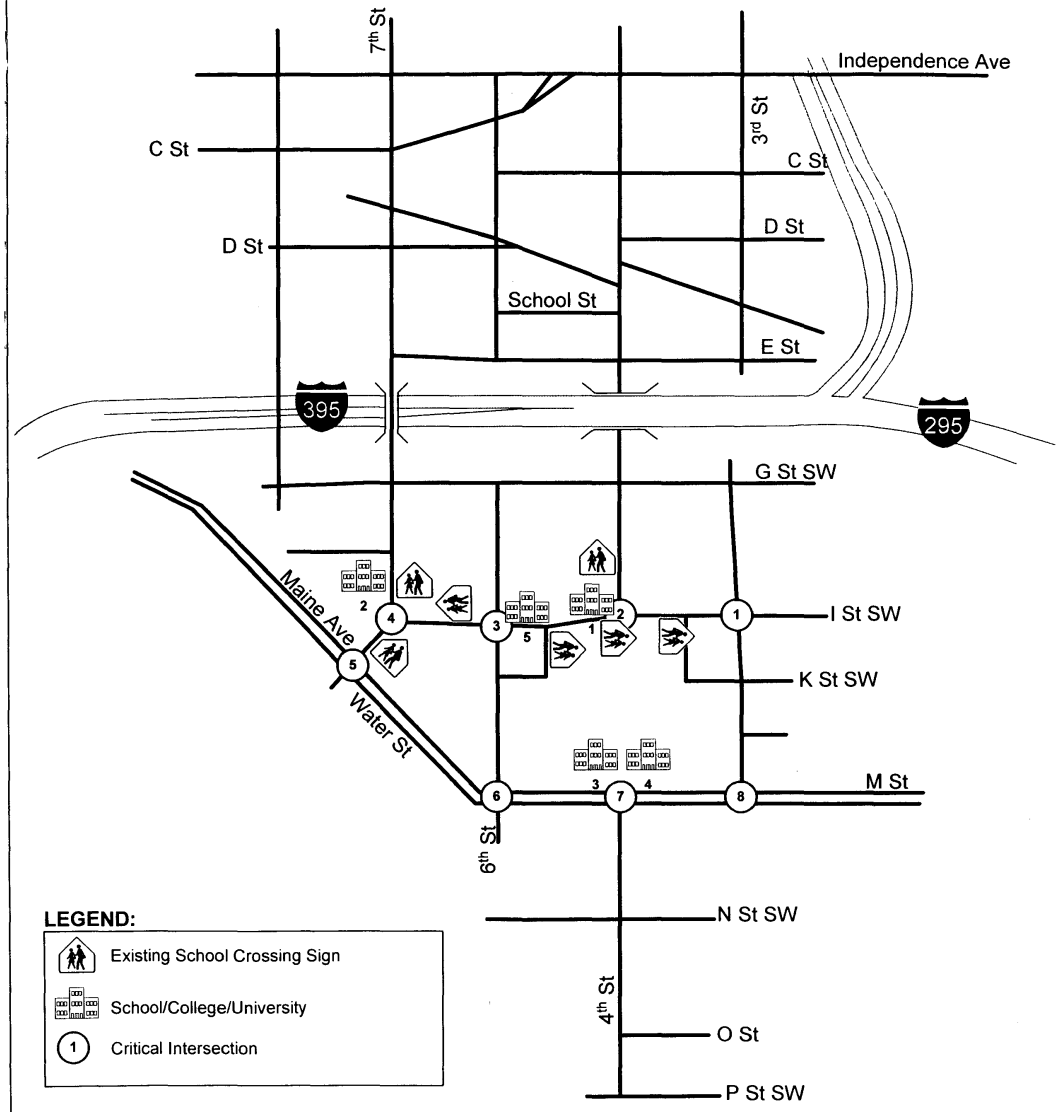
AREA-WIDE

Issue:

23. Pedestrian safety around school buildings. The Consultant observed pedestrian and vehicular traffic and safety around the following schools:
    - Amidon Elementary School – 401 I Street
    - Jefferson Junior High School – 801 7th Street
    - Techworld Public Chartered – 401 M Street
    - Washington Math Science Tech – 401 M Street
    - Southeastern University – 501 I Street

Recommended Improvement:

- Figure 15 presents a list of issues and potential improvements associated with the areas around each of the observed schools.



1 - AMIDON ELEMENTARY SCHOOL

Location - 401 I Street S.W.
School Crossings - 4th St. & I St. S.W.
Signs Posted on - 4th St. between G & I St.; I St. between 6th St. & 4th St. S.W.

Potential Improvements:
1. Add stop bars and crosswalks on all four approaches at 4th and G Streets.
2. Replace existing crosswalks on I Street at 4th and 6th Streets with zebra-striped crosswalks.
3. Police or camera enforcement of right turn on red restrictions.

2 - JEFFERSON JUNIOR HIGH SCHOOL

Location - 801 7th Street S.W.
School Crossings - 7th St. & I St. S.W.
Signs Posted on - 7th St. between H St. & I St. S.W.

Potential Improvements:
1. Install "No Right Turn on Red" sign on southbound 7th Street at I Street.
2. Replace "No Right Turn on Red" sign on northbound 7th Street at I Street.
3. Install "No Right Turn on Red when Pedestrians are Present" sign on westbound I Street at 7th Street.
4. When the STOP (Special Traffic Operations Patrol) program begins, station a STOP officer at 7th and I Streets.

3 - TECHWORLD PUBLIC CHARTERED
4 - WASHINGTON MATH SCIENCE TECH

Location - 401 M Street S.W.
School Crossings - None
Signs Posted on - None

Potential Improvements:
1. Make pedestrians aware of the crosswalk on the east side of the intersection of 4th and M Streets, rather than crossing on the west side, where there is no crosswalk.
2. Construct pedestrian underpass under M Street.
3. Equip pedestrian signals at 4th and M Streets with audio buzzers.

5 - SOUTH EASTERN UNIVERSITY

Location - 501 I Street S.W.
School Crossings - None
Signs Posted on - None

Potential Improvements:
1. Add stop bars and crosswalks on all four approaches at 4th and G Streets.
2. Replace existing crosswalks on I Street at 4th and 6th Streets with zebra-striped crosswalks.
3. Police or camera enforcement of right turn on red restrictions.
4. Install "No Right Turn on Red" sign on southbound 7th Street at I Street.
5. Replace "No Right Turn on Red" sign on northbound 7th Street at I Street.
6. Install "No Right Turn on Red when Pedestrians are Present" sign on westbound I Street at 7th Street.
7. When the STOP (Special Traffic Operations Patrol) program begins, station a STOP officer at 7th and I Streets.

Not to Scale January, 2003	N	4th Street SW Transportation Study	**Existing (2002)** **Schools and School Crossings**	**FIGURE** **15**

III. FUTURE CONDITIONS

FUTURE CONDITIONS WITHOUT NEW SITE DEVELOPMENT (TOTAL BACKGROUND SCENARIO)

In order to evaluate the impact of the Waterside Mall PUD, an analysis of future traffic conditions without Waterside Mall was performed.

The Study Team evaluated future conditions taking into consideration growth in background traffic and traffic generated by new and proposed developments in the study area. The background traffic and other area development traffic were added to existing traffic counts to determine future traffic volumes without new development at Waterside Mall.

BACKGROUND GROWTH

The calculated growth rate used for background traffic was 1.0 percent per year. This rate accounts for regional growth as well as significant development growth in the area adjacent to the study area. All balanced traffic volumes were grown by this percentage to determine background traffic volumes for the years 2010 and 2022, the two analysis years selected by the Study Team.

WATERSIDE MALL

The majority of the existing office space at Waterside Mall is currently vacant. The future conditions without new development scenarios presented in this study assume that this space would not remain vacant if Waterside Mall is not redeveloped. Therefore, background conditions were analyzed assuming full occupancy of the unused one million square feet of existing office space at the Waterside Mall site.

Trip Generation For Waterside Mall

Trip generation for the currently unoccupied office space in the Waterside Mall was calculated based on the available land use information and applying trip generation rates from the Institute of Transportation Engineers (ITE) Trip Generation Manual (6th Edition). Additionally, the number of trips was adjusted to account for transit usage based on information found in "Development Related Ridership Survey II," published by the Washington Metropolitan Area Transit Authority (WMATA). As Table 4 shows, filling up the existing vacant office space at the Waterside Mall will generate more than 450 vehicular trips during the peak hours and approximately 3,000 daily trips.

Trip Distribution for Waterside Mall

Trips generated by the existing vacant office space of Waterside Mall were distributed based on existing entrance and exit locations, and on existing traffic patterns.

Table 4
Summary of Trip Generation for Currently Vacant Waterside Mall Office Space

	AM Peak Hour Trips			PM Peak Hour Trips			
Development	**IN**	**OUT**	**TOTAL**	**IN**	**OUT**	**TOTAL**	**Daily Trips (two-way)**
Waterside Mall Currently Vacant Office Space (1,000,000 sq. ft.)	1,028	140	1,168	204	996	1,200	7,779
Transit Reduction = 61%	*(627)*	*(85)*	*(712)*	*(124)*	*(607)*	*(731)*	*(4,745)*
Net Waterside Mall Currently Vacant Office Space Trips	401	55	**456**	80	389	**469**	**3,034**
Trip Generation information calculated based on ITE Code 710, General Office Building							

OTHER AREA DEVELOPMENTS

Several developments in the vicinity of the study area are in the proposal, planning or construction stages. Traffic associated with these developments was analyzed and included in the future conditions scenario.

The boundaries used for other area developments in this study are as follows:

- North-south – Independence Avenue to Buzzards Point
- East-west – Washington Channel to 4th Street SE

Based on information provided by the District of Columbia Office of Planning, 15 developments in the area were identified. These developments, shown in Figure 16, are as follows:

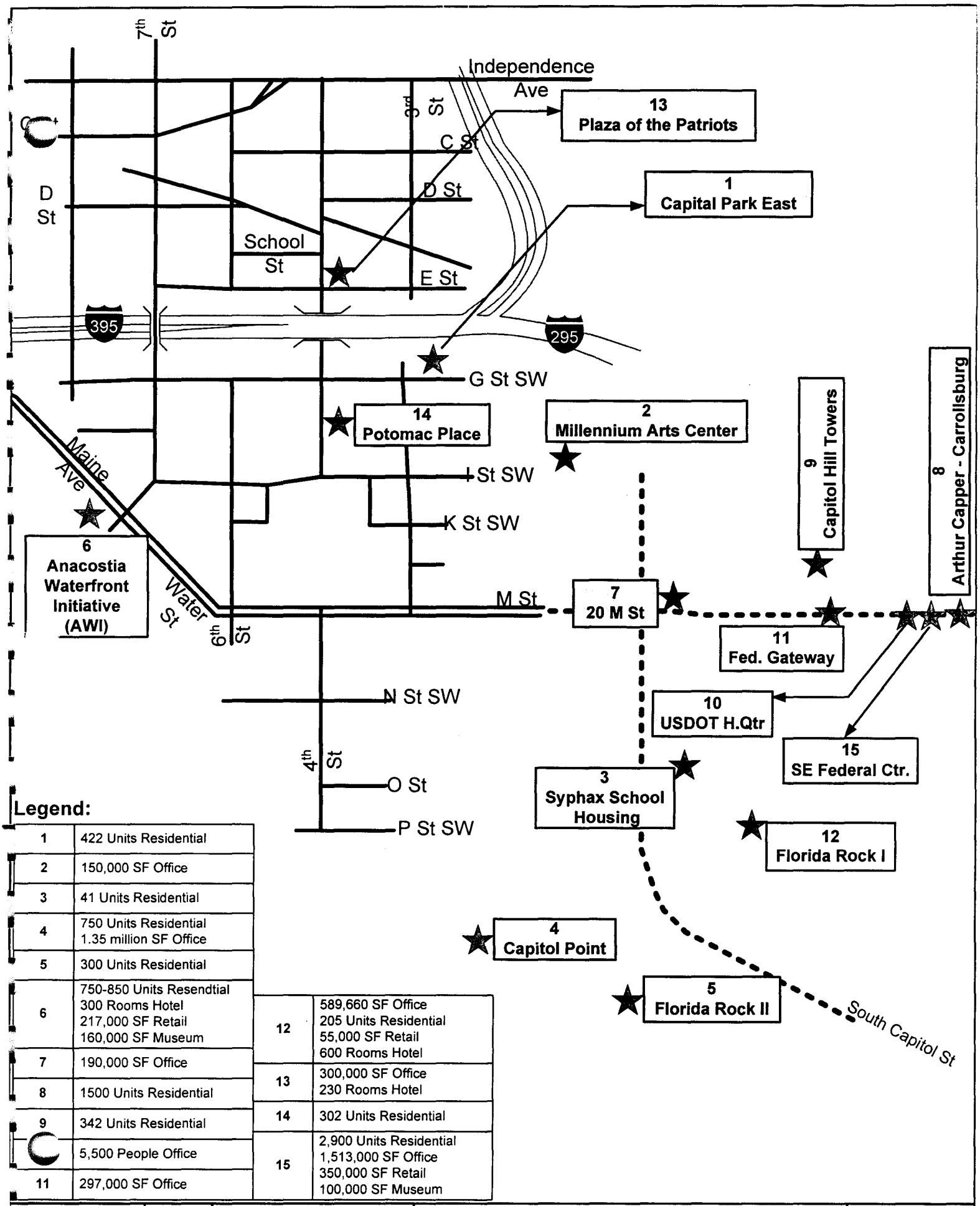
1. Capital Park East – 422-unit multi-family rental development. Located at 301 G Street SW. Currently under construction.
2. Millennium Arts Center – 150,000 square foot studio arts center. Located at 65 I Street SW. Currently under construction.
3. Syphax School Housing – 41-unit single-family residential development. Located at Half and O Streets SW. Currently under construction.
4. Capitol Point – 750-unit multi-family residential development, with 1.35 million square feet of office development. Located at 2nd Street and Potomac Avenue SW. Currently in the planning stage.
5. Florida Rock II – 300-unit multi-family residential development. Located at South Capitol and S Streets SW. Currently in the planning stage.
6. Anacostia Waterfront Initiative (AWI) – Mixed-use development located along the current Water Street SW. The most current scenario calls for 800 residential units, a 300-room hotel, 217,000 square feet of retail space, and a 160,000 square foot museum at build-out. The expected level of development by 2010 is 560 residential units, 210 hotel rooms and 151,900 square feet of retail space.

7. 20 M Street – 190,000 square foot office building planned for 20 M Street SE.
8. Arthur Capper-Carrollsburg – 1,500-unit planned residential development located on M Street SE between 3rd and 6th Streets. 800 units will be new construction, while the remaining 700 units are to be rehabilitated existing units.
9. Capitol Hill Towers – 342-unit planned residential development, located at L Street and New Jersey Avenue SE.
10. USDOT Headquarters – Relocation of the Department of Transportation headquarters to 3rd and M Streets SE. This building is expected to employ 5,500 people.
11. Federal Gateway – 297,000 square foot office building currently under construction at 140 M Street SE.
12. Florida Rock I – Mixed-use development, located at 100 Potomac Avenue SE, This development calls for 589,660 square feet of office space, 205 units of residential development, 55,000 square feet of retail space and a 600-room hotel.
13. Plaza of the Patriots – mixed-use development located at 4th and E Streets SW. Currently partially under construction. Current proposal calls for 300,000 square feet of office space and a 230-room hotel.
14. Potomac Place – Proposed 302-unit addition to currently existing residential development located at 800 4th Street SW.
15. Southeast Federal Center – Large, mixed-use development located between M Street and the Anacostia River in Southeast. Current proposals call for 2,900 residential units, 1,513,000 square feet of office space, 350,000 square feet of retail space, and a 100,000 square foot museum at build-out. The expected level of development by 2010 is 1,800 residential units, 713,000 square feet of office space, 160,000 square feet of retail space and 20,000 square feet of museum.

In addition to the developments listed above, Arena Stage, located at 6th and M Streets, is planning to undergo renovations. The proposed redevelopment at this site will generate only a marginal increase in peak hour traffic.

Trip Generation For Other Area Developments

Table 5 summarizes AM and PM peak hour, and daily traffic volume forecasts for the other area developments analyzed in this study. The trips shown below are for the year 2022. AWI and Southeast Federal Center are expected to be partially complete by 2010, and built-out by 2022. Trip generation rates for area developments were calculated based on available land use information and applying trip generation rates from the Institute of Transportation Engineers (ITE) Trip Generation Manual (6th Edition). Additionally, the numbers of trips were adjusted to account for transit usage based on information found in "Development Related Ridership Survey II," published by the Washington Metropolitan Area Transit Authority (WMATA). As the table indicates, the Southeast Federal Center and AWI, with their mixture of office, residential, retail and museum space, are expected to be the major traffic generators in the area.



Legend:

1	422 Units Residential
2	150,000 SF Office
3	41 Units Residential
4	750 Units Residential 1.35 million SF Office
5	300 Units Residential
6	750-850 Units Resendtial 300 Rooms Hotel 217,000 SF Retail 160,000 SF Museum
7	190,000 SF Office
8	1500 Units Residential
9	342 Units Residential
C	5,500 People Office
11	297,000 SF Office
12	589,660 SF Office 205 Units Residential 55,000 SF Retail 600 Rooms Hotel
13	300,000 SF Office 230 Rooms Hotel
14	302 Units Residential
15	2,900 Units Residential 1,513,000 SF Office 350,000 SF Retail 100,000 SF Museum

Not to Scale January, 2003	N	4th Street SW Transportation Study	**Other Area Developments**	FIGURE 16

Table 5
Summary of Trip Generation for Other Area Development[1]

No.	Development	AM Peak Hour Trips IN	AM Peak Hour Trips OUT	AM Peak Hour Trips TOTAL	PM Peak Hour Trips IN	PM Peak Hour Trips OUT	PM Peak Hour Trips TOTAL	Daily Trips (two-way)
1	Capital Park East	34	179	213	166	82	248	2,664
	Transit Reduction = 45%	*(15)*	*(81)*	*(96)*	*(75)*	*(37)*	*(112)*	*(1,200)*
	Net Trips	19	98	**117**	91	45	**136**	**1,464**
2	Millennium Arts Center	131	67	198	89	173	262	
	Transit Reduction = 42%	*(55)*	*(28)*	*(83)*	*(37)*	*(73)*	*(110)*	
	Net Trips (See Note 2)	76	39	**115**	52	100	**152**	**1,336**[2]
3	Syphax School Housing	10	29	39	31	17	48	456
	Transit Reduction = 30%	*(3)*	*(9)*	*(12)*	*(9)*	*(5)*	*(14)*	*(136)*
	Net Trips	7	20	**27**	22	12	**34**	**320**
4	Capitol Point							
	Transit Reduction = 0%							
	Net Trips	1,361	343	**1,704**	423	1,419	**1,842**	**12,670**
5	Florida Rock II							
	Transit Reduction = 0%							
	Net Trips	24	128	**152**	119	60	**179**	**1,932**
6	AWI[4]	245	570	815	1,025	1,028	2,053	21,190
	Transit Reduction (varies[1])	*(90)*	*(170)*	*(260)*	*(368)*	*(403)*	*(771)*	*(7,784)*
	Net Trips	155	400	**555**	657	625	**1,282**	**13,406**
7	20 M Street	274	37	311	50	243	293	2,172
	Transit Reduction = 61%	*(167)*	*(23)*	*(190)*	*(30)*	*(148)*	*(178)*	*(1,326)*
	Net Trips	107	15	**121**	20	95	**115**	**846**
8	Arthur Capper-Carrollsburg	64	337	401	303	149	452	4,930
	Transit Reduction = 50%	*(32)*	*(169)*	*(201)*	*(152)*	*(74)*	*(226)*	*(2,465)*
	Net Trips	32	168	**200**	151	75	**226**	**2,465**
9	Capitol Hill Towers	28	145	173	137	67	204	2,184
	Transit Reduction = 55%	*(15)*	*(80)*	*(95)*	*(75)*	*(37)*	*(112)*	*(1,202)*
	Net Trips	13	65	**78**	62	30	**92**	**982**
10	DOT Headquarters	840	64	904	85	767	852	
	Transit Reduction = 45%	*(378)*	*(29)*	*(407)*	*(38)*	*(345)*	*(383)*	
	Net Trips	462	35	**497**	47	422	**469**	**4,830**[3]
11	Federal Gateway	391	53	444	70	342	412	3,062
	Transit Reduction = 61%	*(238)*	*(33)*	*(271)*	*(43)*	*(209)*	*(252)*	*(1,868)*
	Net Trips	153	20	**173**	27	133	**160**	**1,194**
12	Florida Rock I	820	541	1361	549	863	1,412	13,782
	Transit Reduction = 26%	*(213)*	*(140)*	*(353)*	*(43)*	*(209)*	*(252)*	*(3,584)*
	Net Trips	607	401	**1,008**	506	654	**1,160**	**10,198**
13	Plaza of the Patriots	412	151	563	155	386	541	4,776
	Transit Reduction (varies[1])	*(171)*	*(52)*	*(223)*	*(55)*	*(157)*	*(212)*	*(1,802)*
	Net Trips	241	99	**340**	100	229	**329**	**2,974**
14	Potomac Place	25	129	154	122	60	182	1,944
	Transit Reduction = 46%	*(11)*	*(59)*	*(70)*	*(56)*	*(28)*	*(84)*	*(894)*
	Net Trips	14	70	**84**	66	32	**98**	**1,050**

Table 5 (cont.)

	SE Federal Center[4]	1,867	1,539	3,406	2,119	2,918	5,037	45,166
15	*Transit Reduction (varies[1])*	*(967)*	*(769)*	*(1,736)*	*(1,031)*	*(1,457)*	*(2,488)*	*(22,054)*
	Net Trips	900	770	**1,670**	1,088	1,461	**2,549**	**23,112**
	Total Other Area Development Traffic	**4,171**	**2,671**	**6,842**	**3,431**	**5,392**	**8,823**	**72,613**

Notes:

1. The Table *" Trip Generation For Area Development,"* included in Appendix G, presents more details on the square footage and number of units used in the calculations. It also presents detailed information on the ITE Trip Generation rates used in the calculations.

2. ITE provides no daily trip generation info for the land use chosen for Millennium Arts Center. The daily trips generated by Millennium Arts Center were estimated by averaging the AM and PM peak hours and using the standard engineering practice of the peak hour representing 10 percent of total daily volume.

3. Trip Generation for the USDOT headquarters was provided by the engineer for this project, and no daily trip generation was provided. The same methodology described in Note 2 was used to calculate the estimated daily trips that will be generated by the USDOT site.

4. This table shows the estimated number of trips for AWI and the Southeast Federal Center at build-out (2022). The number of estimated trips for the 2010 interim year are presented in Appendix G.

Trip Distributions for Other Area Developments

In order to distribute trips for other area developments, major regional population and employment centers were determined. Based on these locations, anticipated expressway and arterial routes were determined for the other area developments, and trips were distributed based on these anticipated routes. A significant proportion of the other area development traffic is expected to pass through the Waterside Mall study area. Separate trip distributions were developed for residential and commercial development. The greatest percentage of traffic enters and exits the study area via M Street/Maine Avenue, with a considerable amount of traffic entering and exiting via 4th and 7th Streets. Detailed distributions used for other area development traffic can be found in Appendix H.

TRIP ASSIGNMENTS FOR OTHER AREA DEVELOPMENTS AND EXISTING WATERSIDE MALL

The projected year 2010 and 2022 background trip assignments at each of the study area intersections were estimated by combining:

1. Trip assignments for the developments listed in Table 5
2. Full occupancy of the existing Waterside Mall office space
3. Existing traffic volumes increased by the one percent per-year growth rate.

Figure 17 shows anticipated 2010 volumes, while Figure 18 shows expected 2022 volumes with growth in background traffic and the addition of area developments. When compared to existing traffic volumes, the individual volume increases at each intersection can be seen.

Overall, AM peak hour traffic is expected to increase by 52.5 percent between 2002 and 2010 and by 71.0 percent by 2022. PM peak hour traffic is expected to increase by 63.9 percent in between 2002 and 2010 and by 91.0 percent by 2022. Most of the increase in traffic is due to the additional trips generated by the developments listed on Table 5.

PEDESTRIAN MOVEMENTS

Along with the increase in traffic associated with development in the vicinity of the Waterside Mall, as well as the anticipated full occupancy of the Waterside Mall office space, an increase in pedestrian traffic is anticipated. An annual increase in pedestrian volume of 4.0 percent was used. The Study Team calculated this annual increase based on the calculated annual increase in traffic volumes for the 2022 scenario.

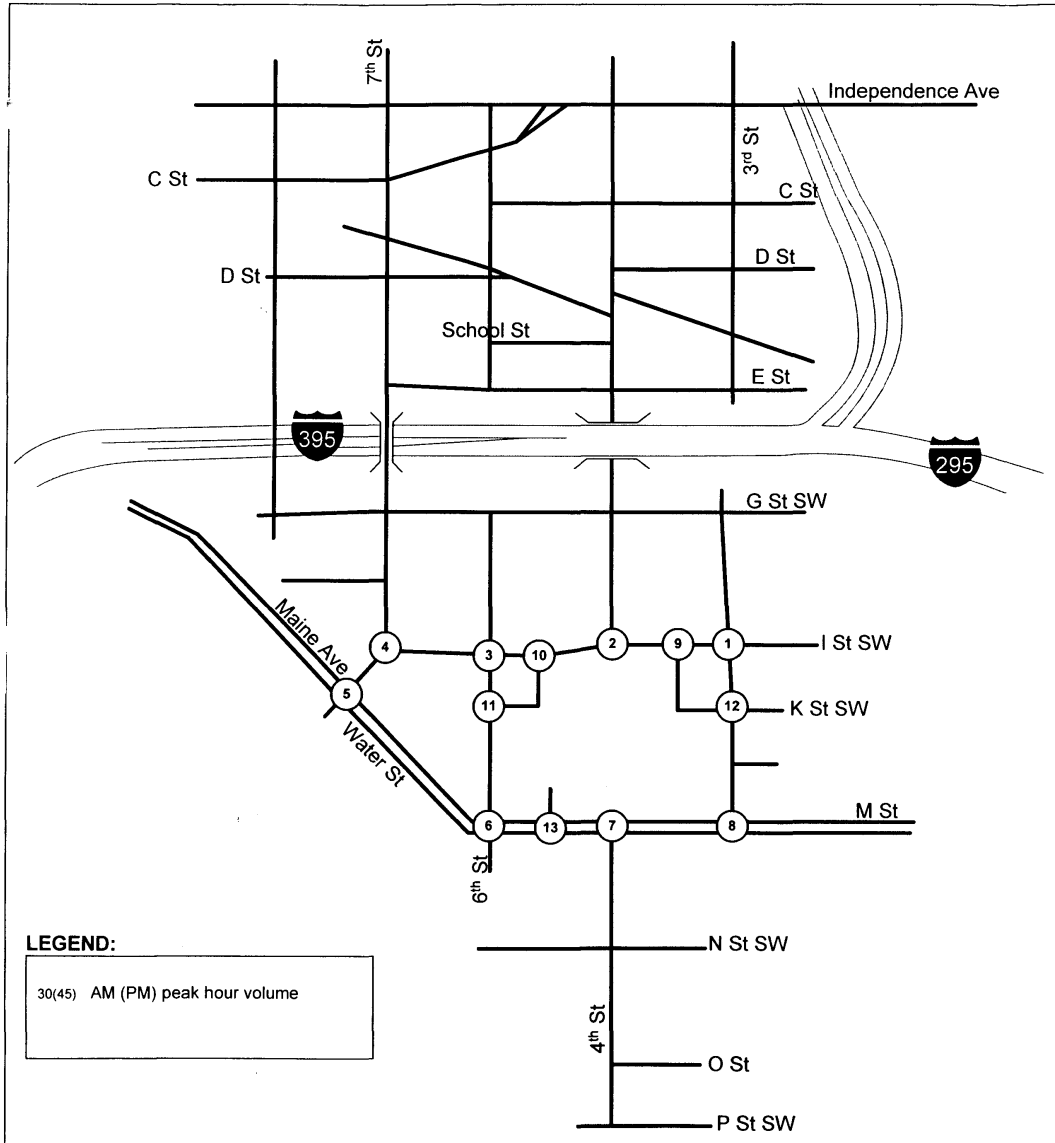
LEVELS OF SERVICE WITH BACKGROUND TRAFFIC

Using the SYNCHRO traffic analysis software, the Study Team evaluated traffic conditions at the eight intersections in the study area for future conditions with background traffic. SimTraffic, SYNCHRO's associated traffic simulation software, was used to assist in the development of a model depicting expected future traffic conditions with background traffic.

In the course of the initial 2010 scenario modeling, SimTraffic indicated conditions of gridlock throughout the network due to the impacts of the traffic generated by the developments listed in Table 5 on eastbound I Street. Thus, the Study Team modeled I Street with two eastbound lanes to address these gridlock conditions. Currently, there is metered parking along eastbound I Street between 6th and 3rd Streets. Field observations indicate that this parking is little used during the peak periods. All SimTraffic future scenarios were modeled with two eastbound through lanes on I Street, between 6th and 3rd Streets. At 3rd Street, the curb lane was modeled as an exclusive right turn lane.

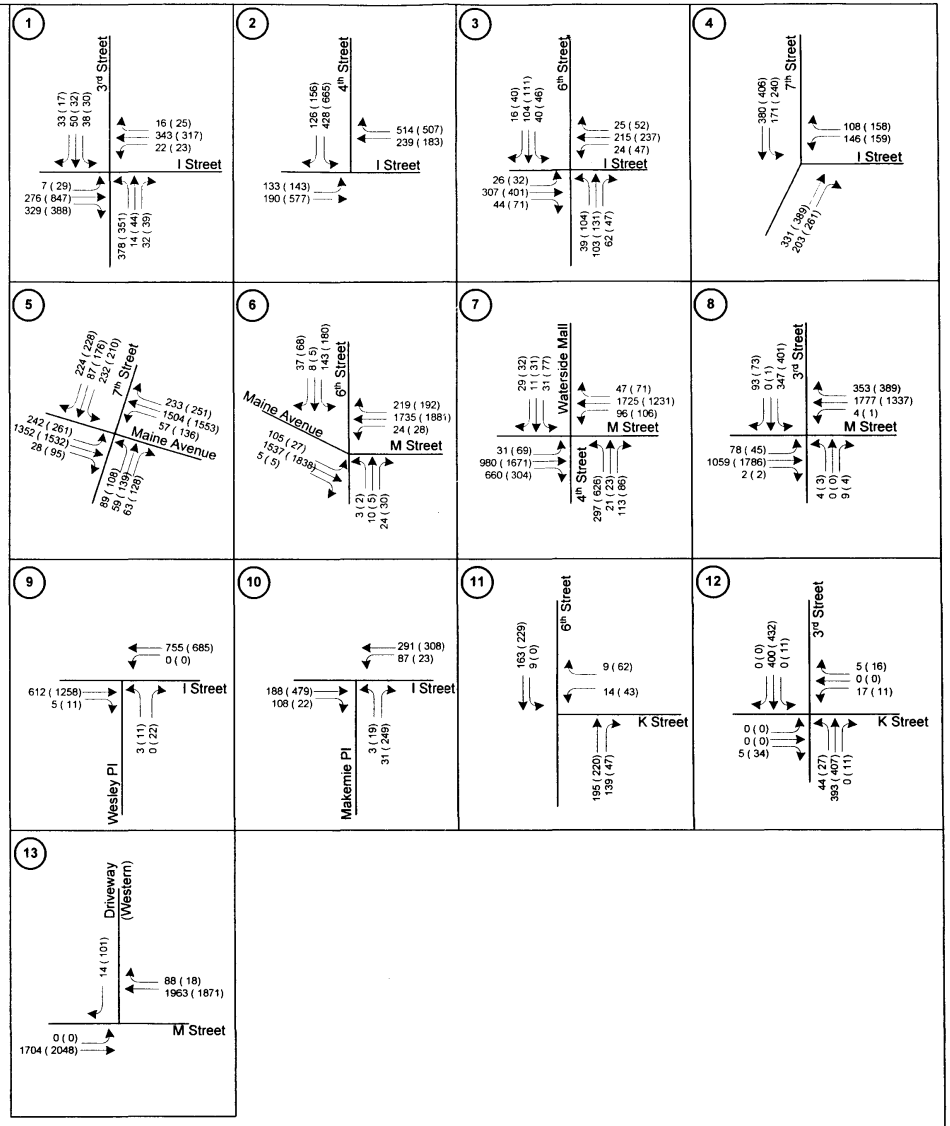
The Study Team used the SimTraffic results to calculate LOS and the delay per vehicle for the intersections in the study area. Table 6 compares the levels of service and delay per vehicle for existing traffic conditions and for future background and other area development traffic during the AM and PM peak hours.

Traffic conditions at all of the intersections degrade in the 2010 model and further degrade in the 2022 model. As Table 6 indicates, with the background growth, other area developments and filling-in of the vacant office space at the Waterside Mall, most study area intersections are expected to operate at acceptable levels of service during the AM peak hour for the year 2010, with the exceptions of 3rd and 4th Streets with I Street, which are expected to operate at LOS F. However, without improvements, traffic conditions at

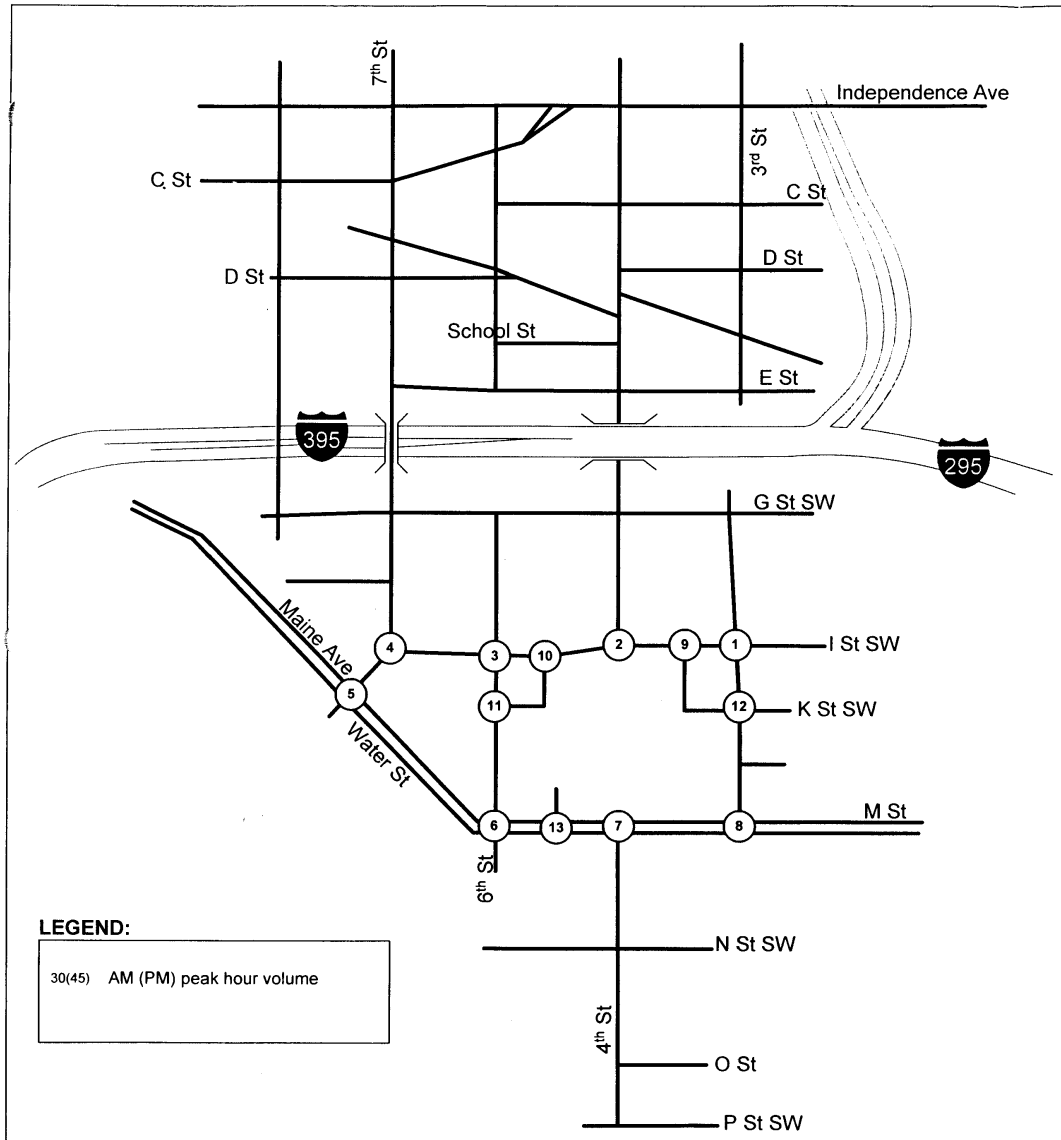


LEGEND:

30(45) AM (PM) peak hour volume

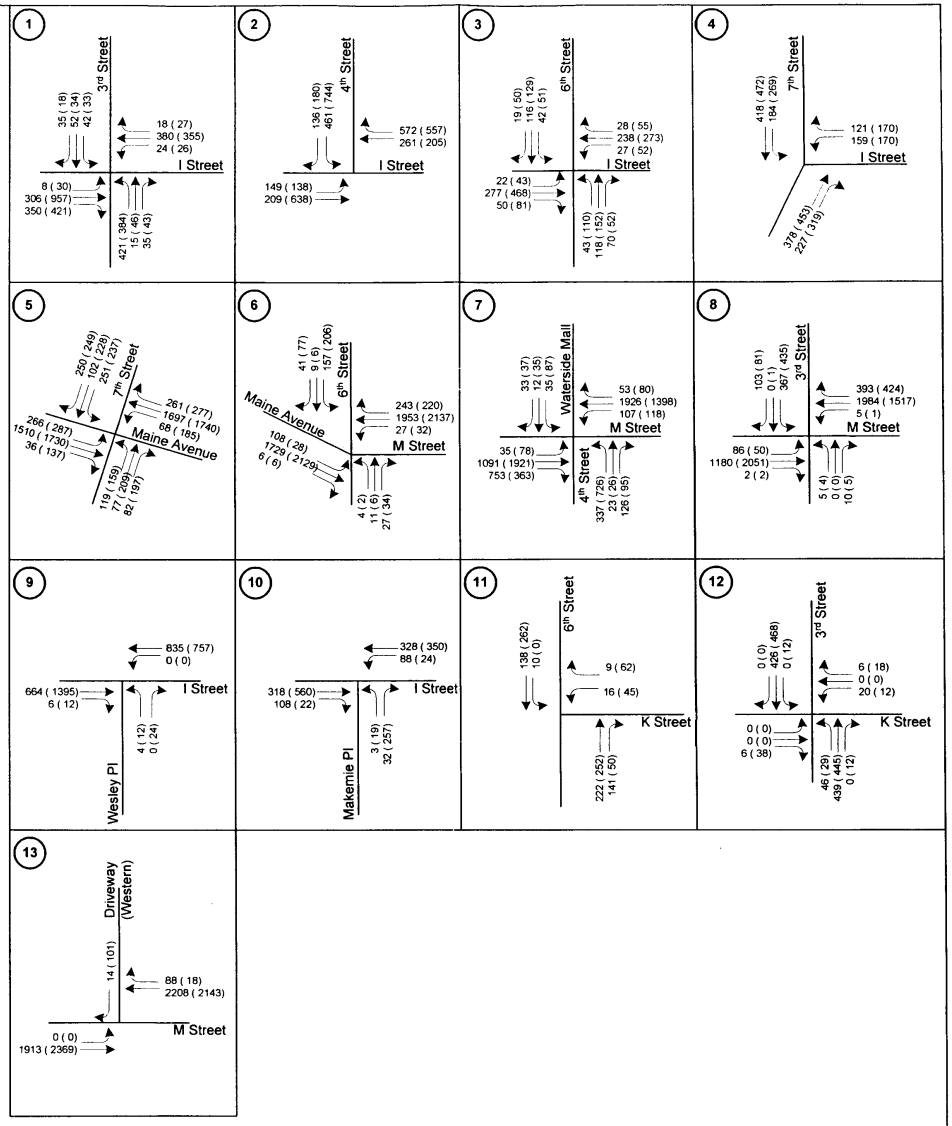


Not to Scale		4th Street SW Traffic Study	Total Background (2010) AM and PM Peak Hour Volumes	FIGURE 17
January, 2003				



LEGEND:

30(45) AM (PM) peak hour volume



Not to Scale		4th Street SW Traffic Study	Total Background (2022) AM and PM Peak Hour Volumes	FIGURE 18
January, 2003				

Table 6

Level of Service and Delay per Vehicle Comparison
Existing Conditions, 2010 Total Background and Other Area Developments, 2022 Total Background and Other Area Developments

Intersection	Existing Conditions				2010				2022			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. 3rd and I (Eye) Streets	16.6	B	17.6	B	226.8	F	213.6	F	273.5	F	233.2	F
2. 4th and I (Eye) Streets	21.5	C	38.4	D	147.2	F	180.5	F	244.3	F	292.5	F
3. 6th and I (Eye) Streets	14.8	B	17.3	B	24.0	C	37.2	D	54.9	D	33.3	C
4. 7th and I (Eye) Streets	8.5	A	10.9	B	10.9	B	29.2	C	26.2	C	14.4	B
5. 7th Street and Maine Avenue	14.8	B	21.5	C	20.5	C	177.0	F	69.2	E	343.4	F
6. 6th Street and Maine Avenue/M Street	6.8	A	10.3	B	17.0	B	71.0	E	36.7	D	78.0	E
7. 4th and M Streets	13.9	B	35.6	D	16.5	B	55.1	E	25.3	C	125.6	F
8. 3rd and M Streets	14.0	B	14.3	B	30.8	C	155.5	F	47.1	D	292.3	F

Note: The levels of service shown in this table assume that I Street between 6th and 3rd Streets would operate with two eastbound lanes during peak periods.

these intersections are expected to degrade significantly during the 2010 PM peak hour. The intersections of 3rd and 4th Streets with I Street, and 3rd and 7th Streets with M Street/Maine Avenue are expected to operate at LOS F during the 2010 PM peak hour.

For the year 2022, the intersections of 3rd and 4th Streets with I Street are expected to operate at LOS F during the AM peak hour and most of the intersections included in the analysis are expected to operate at LOS F during the PM peak hour. This level of service indicates that even without the PUD level of redevelopment of Waterside Mall, transportation improvements should be put in place prior to 2010 to accommodate the substantial growth in background traffic and to accommodate the needs of other area development traffic.

FUTURE CONDITIONS WITH SITE DEVELOPMENT AND WITHOUT 4TH STREET VEHICULAR CONNECTION

The Study Team evaluated future conditions with site traffic under five scenarios. The first two scenarios analyzed traffic in the years 2010 and 2022 (the interim phase and the projected build-out year for Waterside Mall) without a vehicular connection of 4th Street between I and M Streets. These scenarios assumed that 4th Street would be constructed as a pedestrian promenade between I and M Streets, with vehicular traffic prohibited. The next two scenarios analyzed traffic with a 4th Street connection for the years 2010 and 2022. The fifth scenario analyzed the redevelopment project assuming that connections from M Street to I Street would be provided along service roads at the western and eastern ends of the Waterside Mall development instead of along a 4th Street connector.

SITE TRAFFIC TRIP GENERATION

In order to gain an understanding of the impact of the traffic that would be generated by the PUD application for Waterside Mall, the land uses and associated trips generated by a "by-right" (allowable under current zoning) development were determined.

The Mall site includes Square 542, Lot 88 and Square 499, Lot 60, encompassing a total area of 584,656 square feet. The existing C-3-B zoning allows development up to a floor area ratio (FAR) of 5.0, with up to 4.0 FAR of an allowable nonresidential use. Based on this information, the property could be developed with approximately 2,923,300 square feet of construction, possibly consisting of:

- Up to 2,923,300 square feet (5.0 FAR) of residential uses representing approximately 2,923 apartments with average floor areas of 1,000 square feet;
- From 584,700 square feet (1.0 FAR) to 2,338,600 square feet (4.0 FAR) of retail and service uses, with the remaining floor area in residential use;
- From 584,700 square feet (1.0 FAR) to 2,338,600 square feet (4.0 FAR) of office uses, with the remaining floor area in residential use; and
- Any other combination of allowable residential and nonresidential uses.

The PUD level of development used in the estimation of site trips was based on PUD application information provided to the Study Team by the developer. As shown in Table 7, in the year 2010, the Waterside Mall PUD is expected to have a total of 1.6935 million square feet of office space, or 82.6 percent of the projected total office space at build-out of 2.0515 million square feet. 75,000 square feet of retail space will be provided, or 100 percent of the anticipated total at build-out. Finally, 200 apartment units will be complete, or 50 percent of the projected 400 units expected to be constructed at build-out. The PUD redevelopment proposal does not utilize the maximum allowable FAR.

The existing 30,000 square foot supermarket will remain unchanged, and therefore was not included in the calculation of new trips. However, the 75,000 square feet of retail space is a reduction of 29,500 square feet from the existing 104,500 square feet of retail space at Waterside Mall. Only 117,500 square feet of the existing office space is currently occupied.

Trips for both scenarios were calculated based on the ITE Trip Generation Manual, 6th Edition. Net trips were calculated by subtracting the number of trips generated by the existing land uses from the number of trips generated by the proposed usage. Transit reduction rates were based on information provided in "Development Related Ridership Survey II," published by WMATA. Trips were generated for the by-right scenario for comparison purposes only. No traffic modeling was performed with trips generated under the by-right scenario.

Table 7
Summary of Development Levels

Land Use	Existing	By-Right[1]	2010 PUD	2022 PUD
Office	1,117,500 Sq. Ft.[2]	1,754,100 Sq. Ft.	1,693,500 Sq. Ft.	2,051,500 Sq. Ft.
Retail	104,500 Sq. Ft.	554,700 Sq. Ft.	75,000 Sq. Ft.	75,000 Sq. Ft.
Residential	0 Units	584 Units	200 Units	400 Units
Supermarket	30,000 Sq. Ft.	30,000 Sq. Ft.	30,000 Sq. Ft.	30,000 Sq. Ft.

[1]Likely scenario based on existing land uses.
[2]1,000,000 Sq. Ft. of existing office space is vacant.

Tables 8 and 9 show the net trip generation information for the proposed PUD level of development for the years 2010 and 2022, respectively. Detailed trip generation information for Waterside Mall, including by-right trip generation for three possible scenarios, is presented in Appendix I.

As shown in Table 10, when compared to full occupancy of the existing vacant office space at Waterside Mall, the proposed PUD redevelopment is expected to generate 170 additional AM peak hour trips in 2010; 319 additional AM peak hour trips in 2022; 209 additional PM peak hour trips in 2010; and 414 additional PM peak hour trips in 2022. The number of daily trips generated by the 1,000,000 square feet of vacant office space is 700 less than the number of daily trips generated by the redeveloped site in the year 2010.

Table 8
Summary of 2010 Trip Generation for Site – PUD Level of Development

	Land Use	AM Peak Hour Trips IN	AM Peak Hour Trips OUT	AM Peak Hour Trips TOTAL	PM Peak Hour Trips IN	PM Peak Hour Trips OUT	PM Peak Hour Trips TOTAL	Daily Trips (two-way)
A	Proposed Total New Office - 1,693,500 SF	1,565	213	1,778	336	1,641	1,977	11,658
	Transit Reduction = 61%	*(955)*	*(130)*	*(1,085)*	*(205)*	*(1,001)*	*(1,206)*	*(7,112)*
	Net Trips	610	83	**693**	131	640	**771**	**4,546**
B	Existing Occupied Office – 117,500 SF	(187)	(25)	(212)	(36)	(175)	(211)	(1,502)
	Transit Reduction = 61%	*(114)*	*(15)*	*(129)*	*(22)*	*(107)*	*(129)*	*(916)*
	Net Trips	(73)	(10)	**(83)**	(14)	(68)	**(82)**	**(586)**
C	Net New Office Trips (A – B)	537	73	**610**	117	572	**689**	**3,960**
D	Proposed Retail – 75,000 SF	82	52	134	93	101	194	3,050
	Transit Reduction = 46%	*(38)*	*(24)*	*(62)*	*(43)*	*(46)*	*(89)*	*(1,402)*
	Net Trips	44	28	**72**	50	55	**105**	**1,648**
E	Existing Retail – 104,500 SF	(100)	(64)	(164)	(130)	(141)	(271)	(4,250)
	Transit Reduction = 46%	*(46)*	*(29)*	*(75)*	*(60)*	*(65)*	*(125)*	*(1,954)*
	Net Trips	(54)	(35)	**(89)**	(70)	(76)	**(146)**	**(2,296)**
F	Net New Retail Trips (D – E)	(10)	(7)	**(17)**	(20)	(21)	**(41)**	**(648)**
G	Proposed Residential (200 units)	16	86	102	85	42	127	1,332
	Transit Reduction = 67%	*(11)*	*(58)*	*(69)*	*(57)*	*(28)*	*(85)*	*(892)*
	Net Trips	5	28	**33**	28	14	**42**	**440**
H	Net New Commercial Trips (C + F)	527	66	**593**	97	551	**638**	**3,312**
I	Net New Residential Trips (G)	5	28	**33**	28	14	**40**	**420**
J	Net New Total Trips (H + I)	532	94	**626**	125	565	**678**	**3732**

Note: Detailed trip generation information for Waterside Mall is presented in Appendix I.

Table 9
Summary of 2022 Trip Generation for Site – PUD Level of Development

	Land Use	AM Peak Hour Trips IN	AM Peak Hour Trips OUT	AM Peak Hour Trips TOTAL	PM Peak Hour Trips IN	PM Peak Hour Trips OUT	PM Peak Hour Trips TOTAL	Daily Trips (two-way)
A	Proposed Total New Office – 2,051,500 SF	1,823	249	2,072	404	1,975	2,379	13,508
	Transit Reduction = 61%	*(1,112)*	*(152)*	*(1,264)*	*(246)*	*(1,205)*	*(1,451)*	*(8,240)*
	Net Trips	711	97	**808**	158	770	**928**	**5,268**
B	Existing Occupied Office – 117,500 SF	(187)	(25)	(212)	(36)	(175)	(211)	(1,502)
	Transit Reduction = 61%	*(114)*	*(15)*	*(129)*	*(22)*	*(107)*	*(129)*	*(916)*
	Net Trips	(73)	(10)	**(83)**	(14)	(68)	**(82)**	**(586)**
C	Net New Office Trips (A – B)	638	87	**725**	144	702	**846**	**4,682**
D	Proposed Retail – 75,000 SF	82	52	134	93	101	194	3,050
	Transit Reduction = 46%	*(38)*	*(24)*	*(62)*	*(43)*	*(46)*	*(89)*	*(1,402)*
	Net Trips	44	28	**72**	50	55	**105**	**1,648**
E	Existing Retail – 104,500 SF	(100)	(64)	(164)	(130)	(141)	(271)	(4,250)
	Transit Reduction = 46%	*(46)*	*(29)*	*(75)*	*(60)*	*(65)*	*(125)*	*(1,954)*
	Net Trips	(54)	(35)	**(89)**	(70)	(76)	**(146)**	**(2,296)**
F	Net New Retail Trips (D – E)	(10)	(7)	**(17)**	(20)	(21)	**(41)**	**(648)**
G	Proposed Residential (400 units)	32	170	202	158	78	236	2,532
	Transit Reduction = 67%	*(21)*	*(114)*	*(135)*	*(106)*	*(52)*	*(158)*	*(1,696)*
	Net Trips	11	56	**67**	52	26	**78**	**836**
H	Net New Commercial Trips (C + F)	628	80	**708**	124	681	**805**	**4,034**
I	Net New Residential Trips (G)	11	56	**67**	52	26	**78**	**836**
J	Net New Total Trips (H + I)	639	136	**775**	176	707	**883**	**4,870**

Note: Detailed trip generation information for Waterside Mall is presented in Appendix I.

Table 10
Total Site Trips Comparison

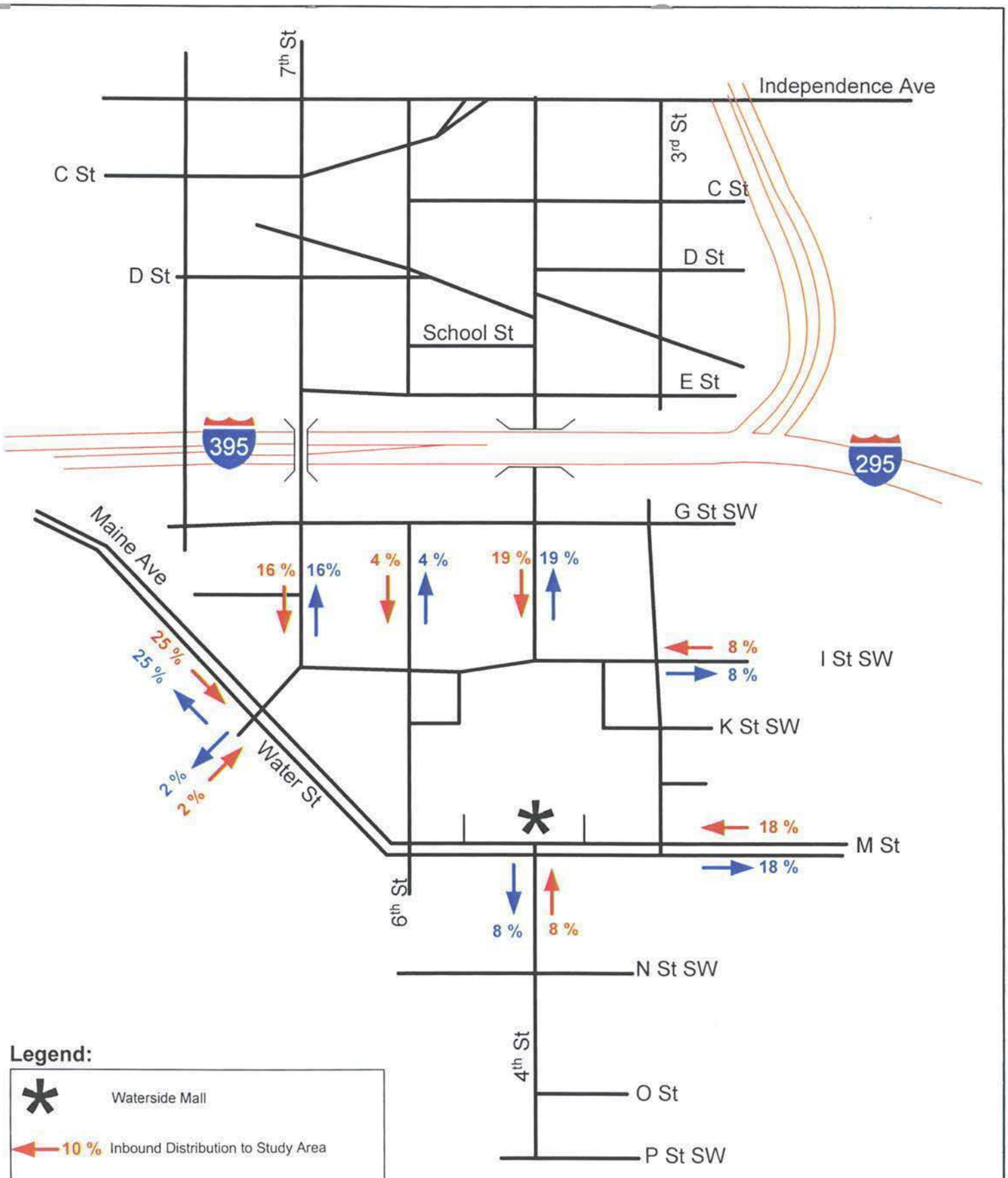
	AM Peak Hour Net Trips			PM Peak Hour Net Trips			
Level of Development	**IN**	**OUT**	**TOTAL**	**IN**	**OUT**	**TOTAL**	**Daily Trips (two-way)**
Net Waterside Mall Existing Vacant Office Space Trips (1,000,000 SF)	401	55	**456**	80	389	**469**	3,034
By-right Net New Trips (1,754,100 SF Office, 584 Apartment Units, 554,700 SF Retail, 30,000 SF Supermarket)	815	277	**1,092**	679	1,194	**1,873**	19,860
2010 PUD Net New Trips (1,693,500 SF Office, 45,000 SF Retail, 200 Apartment Units)	532	94	**626**	125	565	**678**	3,732
2022 PUD Net New Trips (2,100,500 SF Office, 45,000 SF Retail, 400 Apartment Units)	639	136	**775**	176	707	**883**	4,870

Note: Detailed trip generation information for Waterside Mall is presented in Appendix I.

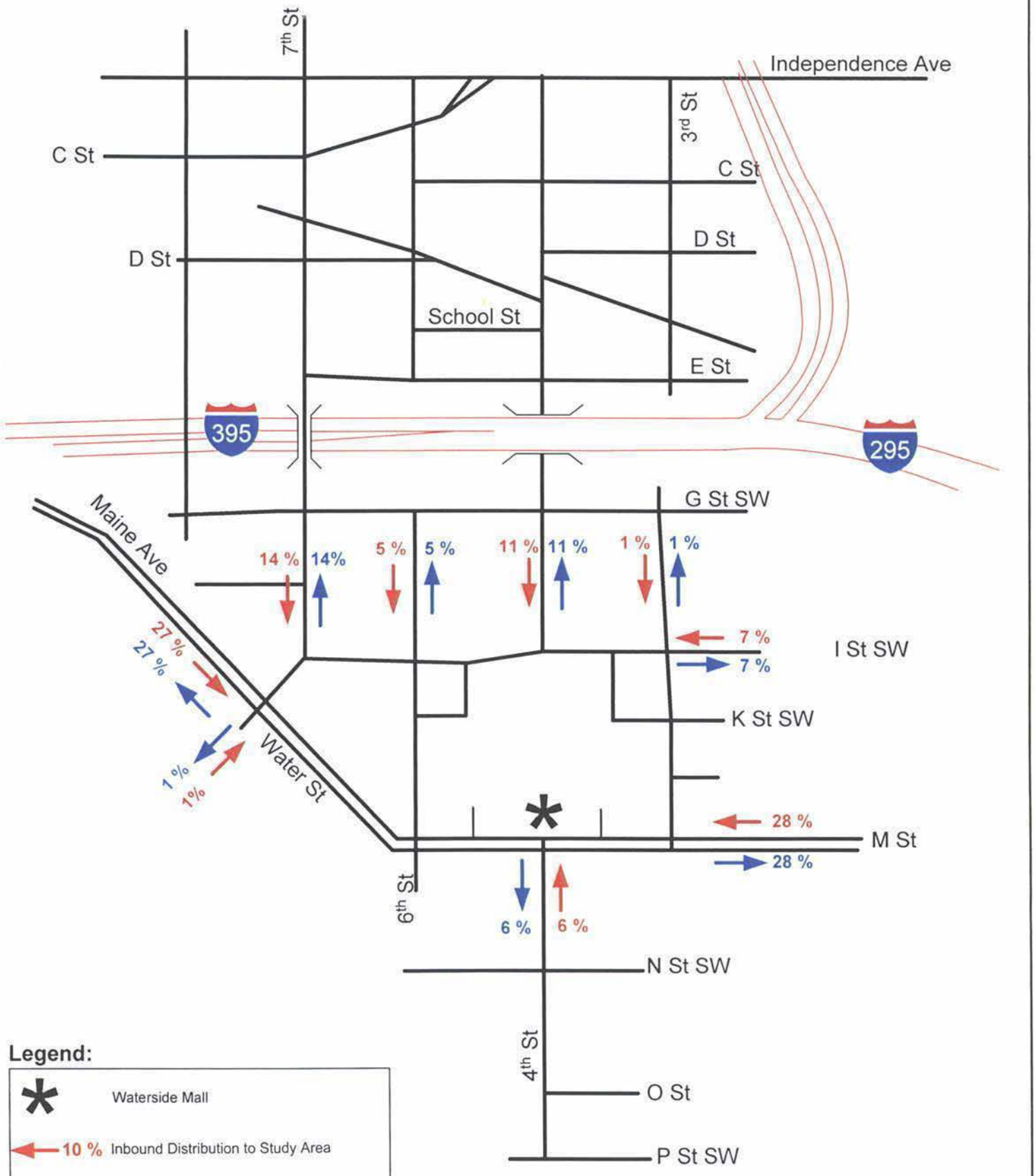
When compared to the likely by-right scenario, the proposed 2022 PUD level of development is expected to generate 317 fewer trips during the AM peak hour; 990 fewer trips during the PM peak hour; and 14,990 fewer daily trips. Other possible by-right scenarios would generate a wide range of trips. For example, the scenario consisting solely of 2,923 residential units would be expected to contribute approximately 5,800 total trips, which is approximately 930 more than what is expected in 2022 under the PUD application. Finally, the scenario with 2,338,600 square feet of retail space and 584 apartment units would be expected to generate over 29,000 daily trips, a number far greater than anticipated by the PUD level of development.

TRIP DISTRIBUTIONS FOR SITE DEVELOPMENTS

As with the other area developments, in order to distribute the generated trips for the PUD development, major regional population and employment centers were determined. Based on these locations, anticipated expressway and arterial routes were determined for the other area developments, and trips were distributed based on these anticipated routes. Unlike the other area developments, all trips associated with the Waterside Mall PUD originate or terminate within the study area. Separate trip distributions were developed for residential and commercial development for the 2010 and 2022 scenarios. Commercial and residential site traffic distributions are presented in Figures 19 and 20, respectively. It can be seen that the greatest percentage of traffic entering and exiting the



Not to Scale January, 2003	N	4th Street SW Transportation Study	Site Distribution for Residential Development without 4th Street Vehicular Connection	FIGURE 19



Legend:

- Waterside Mall
- 10 % Inbound Distribution to Study Area
- 10 % Outbound Distribution from Study Area

Not to Scale January, 2003		4th Street SW Transportation Study	Site Distribution for Commercial Development without 4th Street Vehicular Connection	FIGURE 20

site is via M Street/Maine Avenue, while a considerable amount of traffic enters and exits the site via 4th and 7th Streets.

TRIP ASSIGNMENTS FOR SITE DEVELOPMENTS

The Study Team assigned the site trips generated by the Waterside Mall PUD to the study area network using the distributions shown in Figures 19 and 20. The estimated future year trip assignments for the scenario without the 4th Street connection are summarized in Figures 21 and 22. For site access, three main entry/exit points were used.

The developer proposes two full-movement driveways for M Street, as shown in Figure 23. One driveway is proposed between 3rd and 4th Streets, while the other is proposed between 4th and 6th Streets. Median breaks on M Street would be necessary for these driveways. The third major access point is on K Street/Makemie Place. A relatively small number of trips were assigned to the driveway on K Street/Wesley Place.

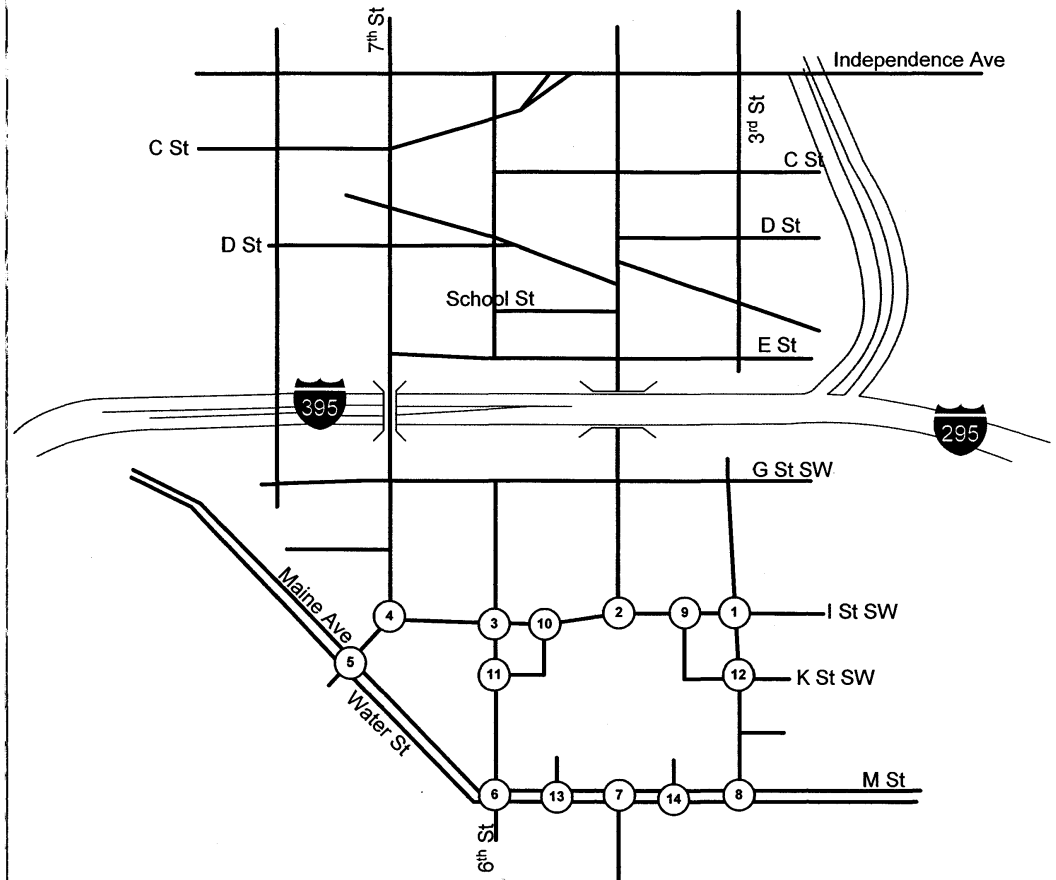
The addition of traffic volumes at the intersections increases with proximity to the proposed Waterside Mall driveway locations. M Street is expected to see the greatest overall increase in site traffic of all the studied intersections, with up to 168 trips added during the 2010 AM peak hour and 190 trips during the 2010 PM peak hour. When Waterside Mall is fully redeveloped in 2022, these numbers will increase during the AM and PM peak hours to 217 and 246, respectively. Of the studied intersections on I Street, the intersection of 6th and I Streets will see the largest amount of site trips, with 175 during the 2010 AM peak hour and 197 during the 2010 PM peak hour. In 2022, the AM and PM peak hour site traffic volumes are expected to increase to 225 and 256, respectively. 3rd Street between I and M Streets will see an increase of 71 vehicles during the 2010 AM peak and 81 vehicles during the 2010 PM peak. These numbers will increase with full development of Waterside Mall in 2022. 6th Street between I and M Street will see a similar increase in traffic generated by the site.

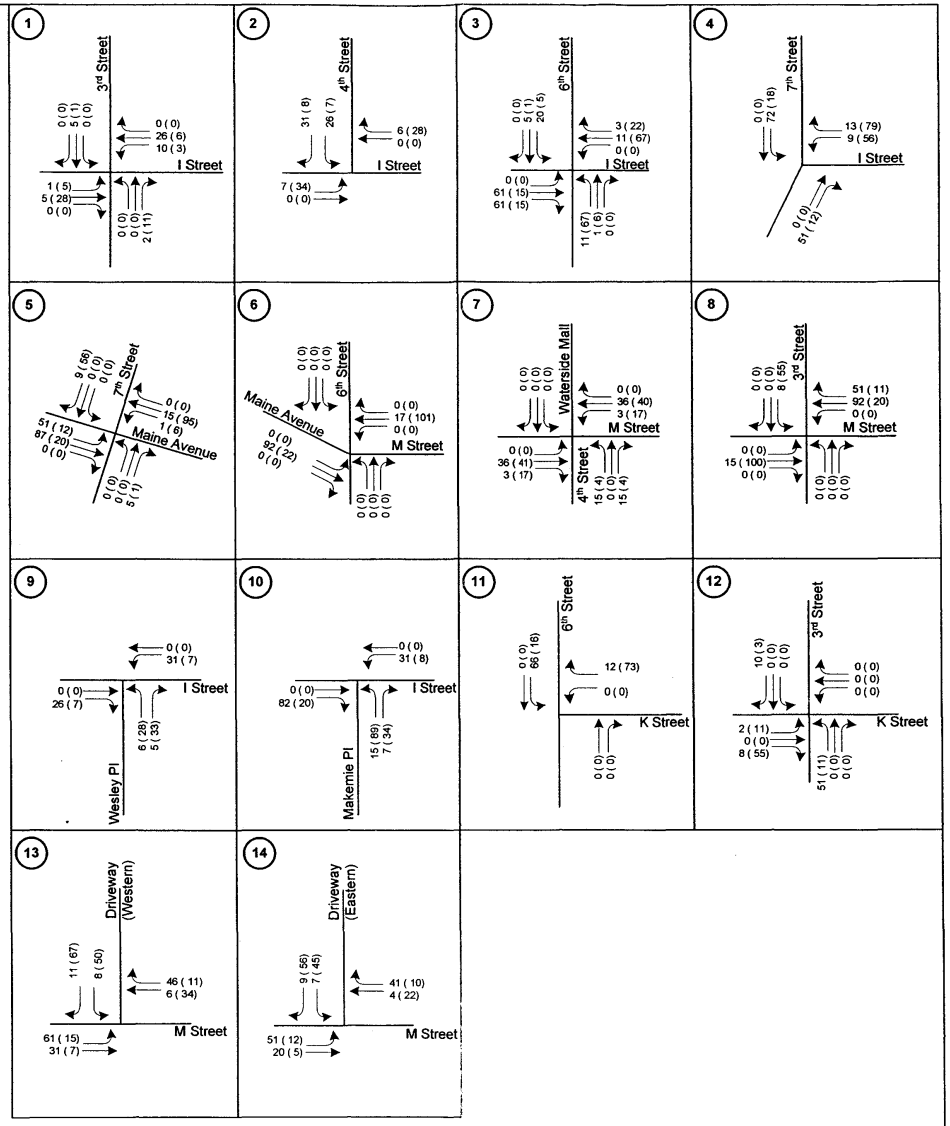
TOTAL TRIP ASSIGNMENTS WITH SITE DEVELOPMENT

In order to forecast the total number of vehicular trips that are expected to traverse the study area intersections during the forecast years of 2010 and 2022, the Study Team added the following layers of traffic volumes:

1. Existing traffic
2. Growth in background traffic
3. Trips generated by other area development
4. PUD site traffic

Note that the existing, currently vacant office space of Waterside Mall was not used in this scenario. This scenario assumes that Waterside Mall will be developed as shown in Table 7. Figures 24 and 25 show total volumes for site development without a vehicular connection of 4th Street for 2010 and 2022, respectively.



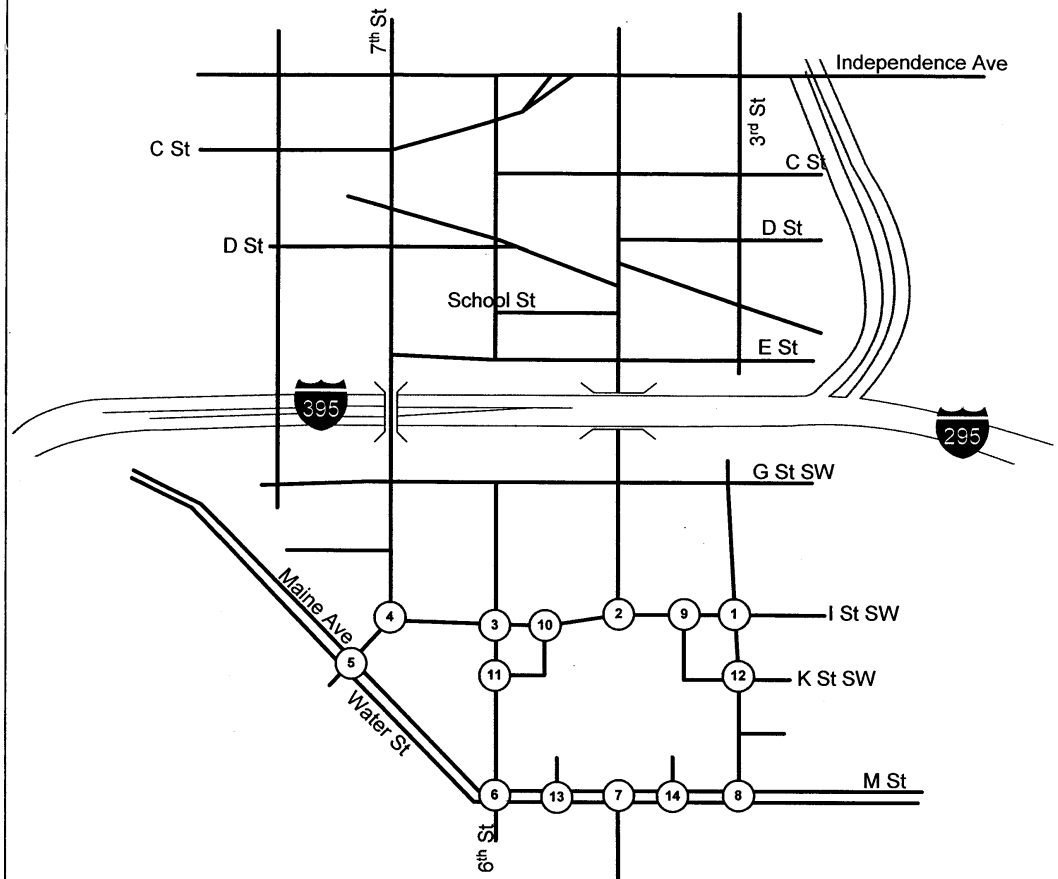


LEGEND:

30(45) AM (PM) peak hour volume

Note:
Site Traffic only accounts for new trips associated with new developments at site.

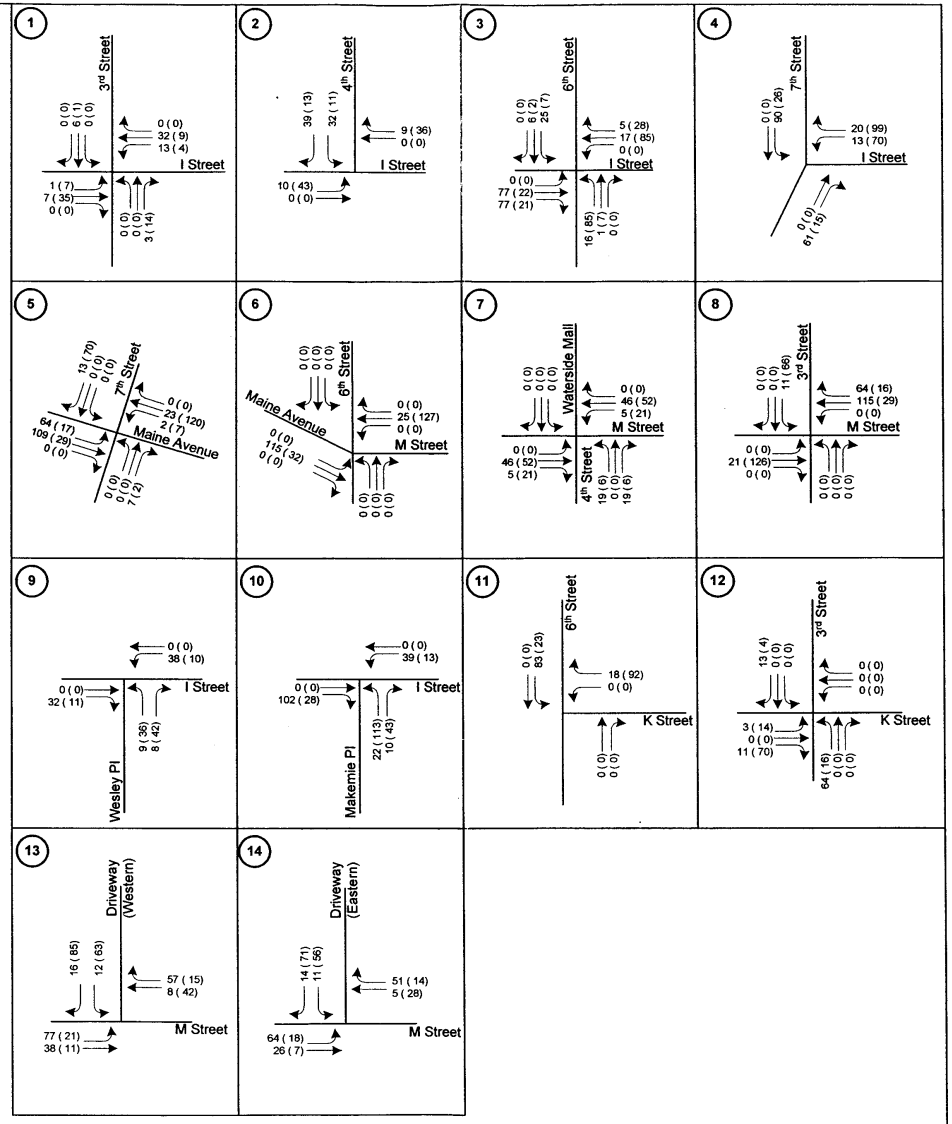
Not to Scale		4th Street SW Traffic Study	**Site Traffic for 2010 without 4th Street Vehicular Connection**	**FIGURE 21**
January, 2003				



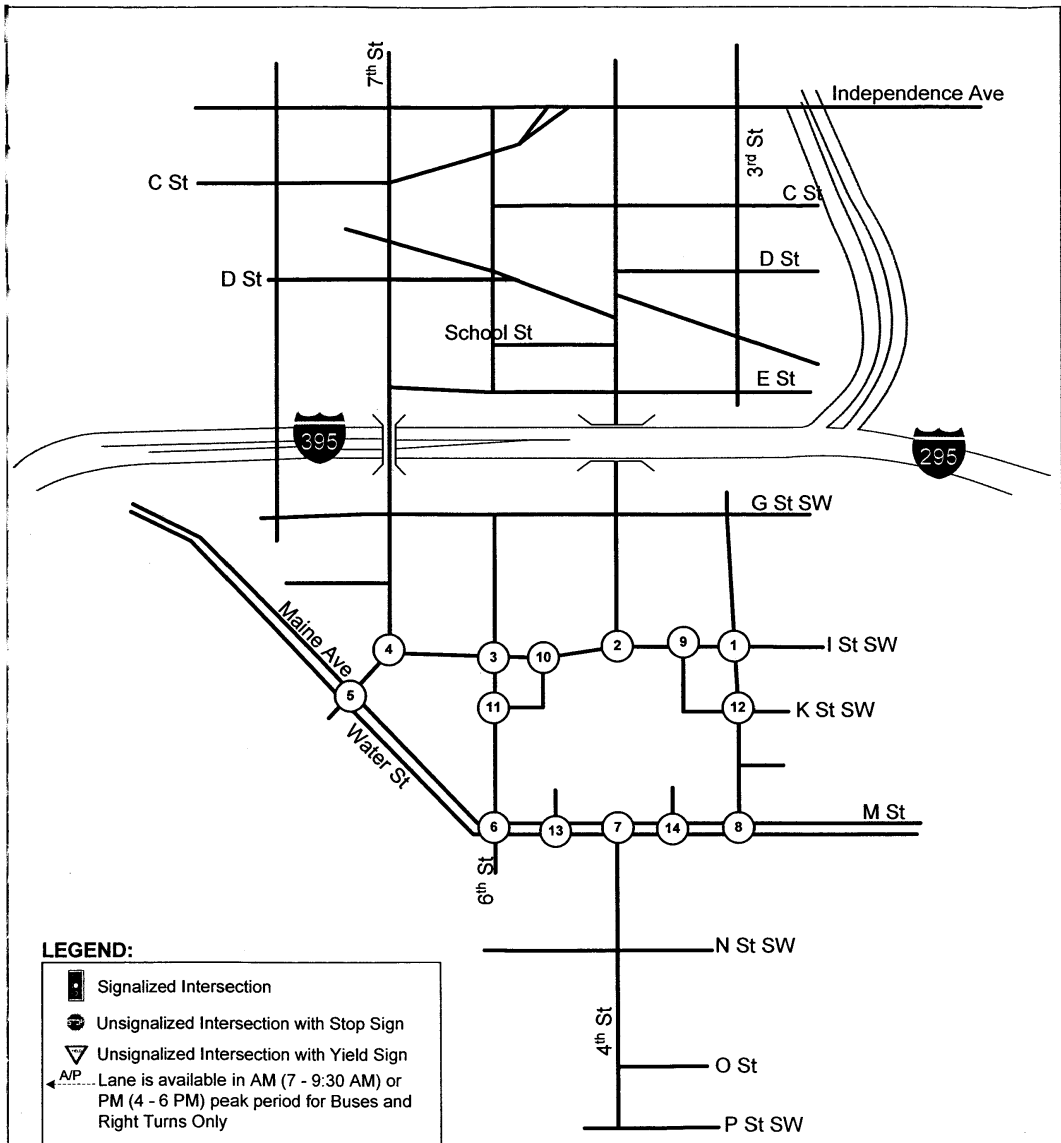
LEGEND:

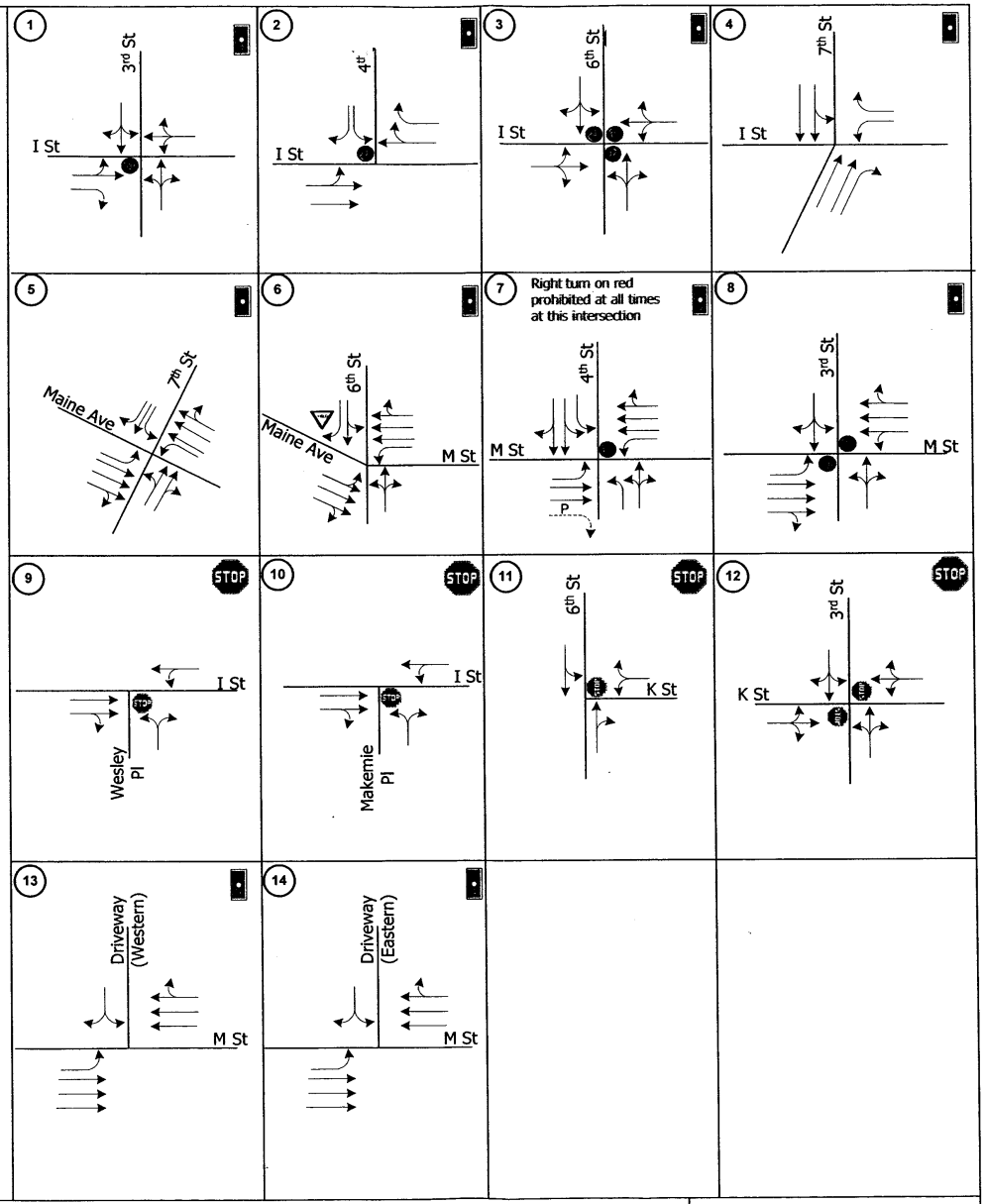
30(45) AM (PM) peak hour volume

Note:
Site Traffic only accounts for new trips associated with new developments at site.

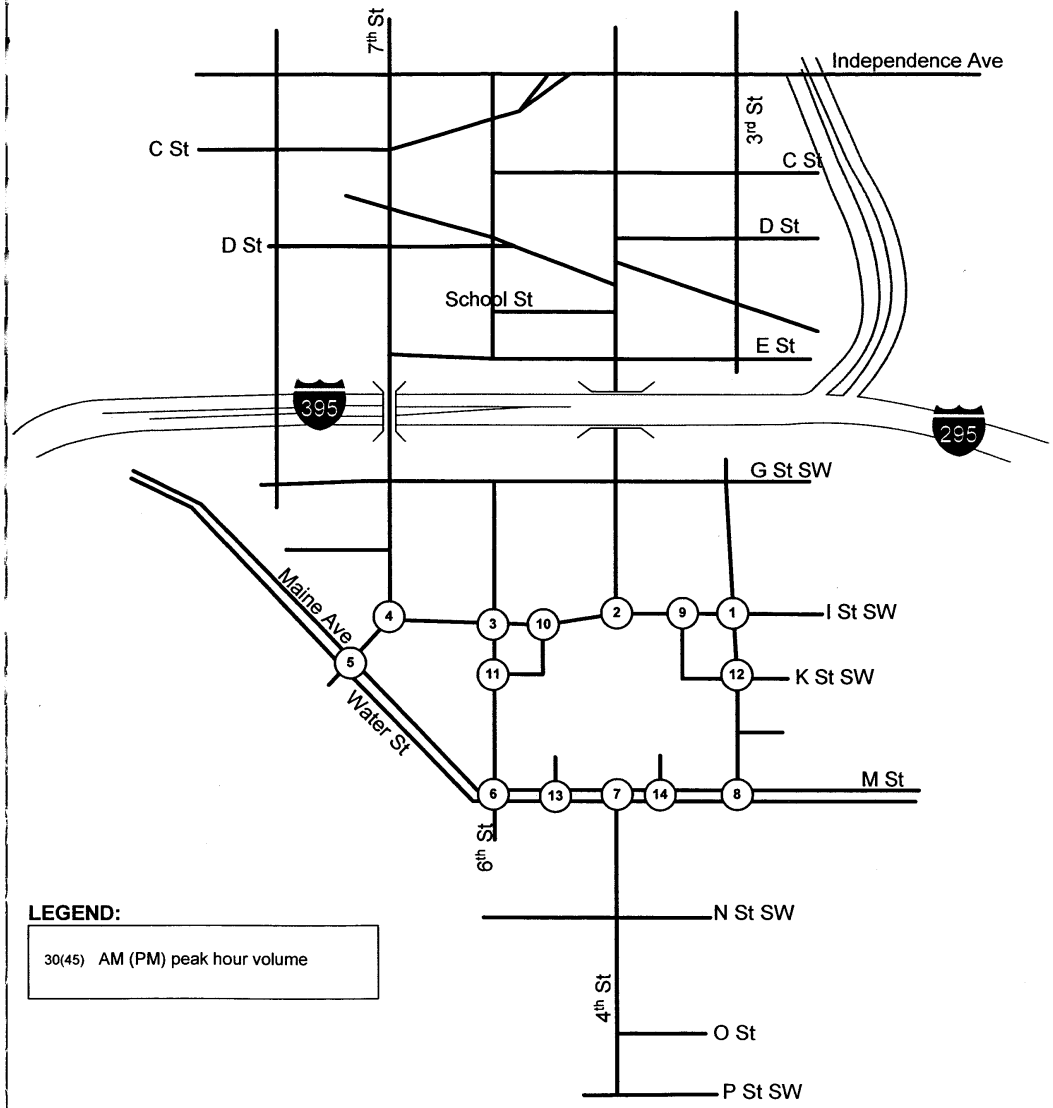


Not to Scale		4th Street SW Traffic Study	**Site Traffic for 2022 without 4th Street Vehicular Connection**	**FIGURE 22**
January, 2003				



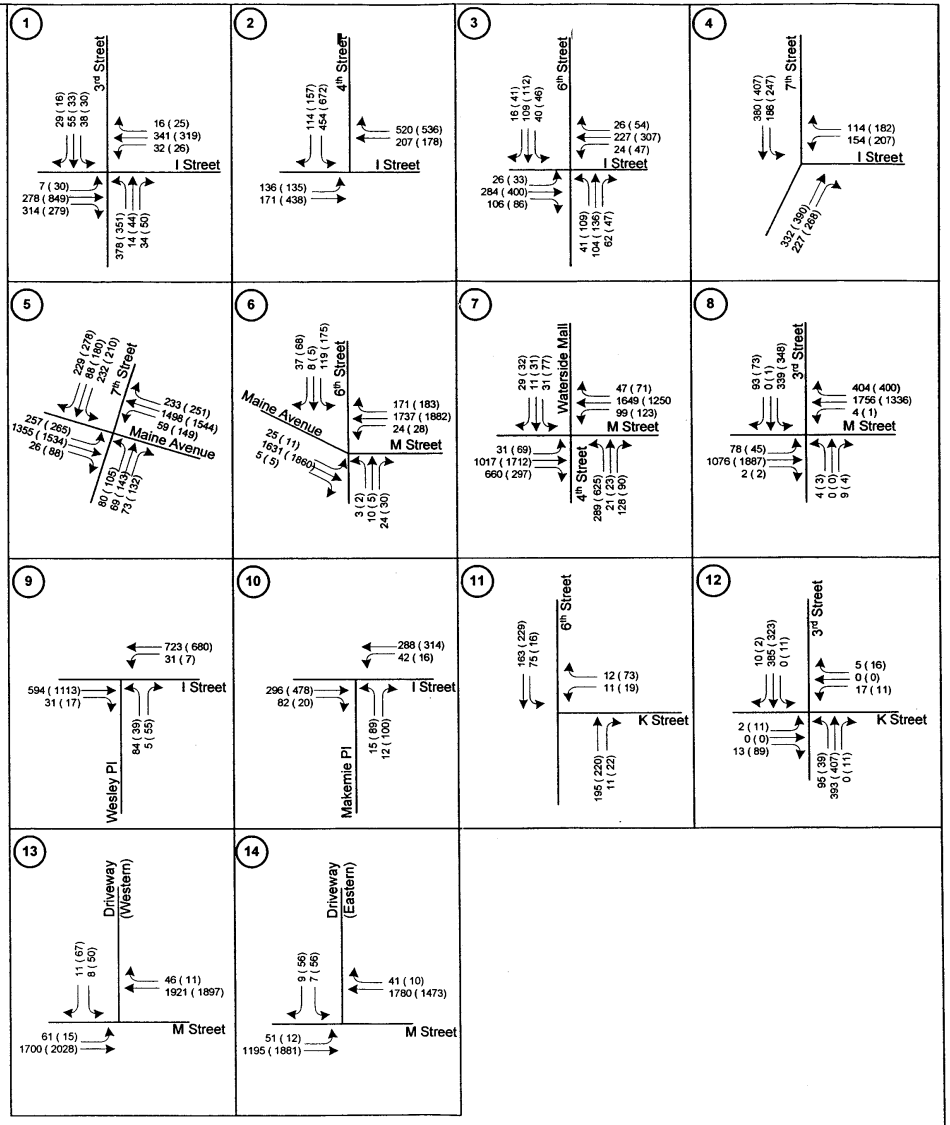


Not to Scale		4th Street SW Transportation Study	Future/Proposed Peak Period Lane Configurations without 4th Street Vehicular Connection	FIGURE 23
January, 2003				

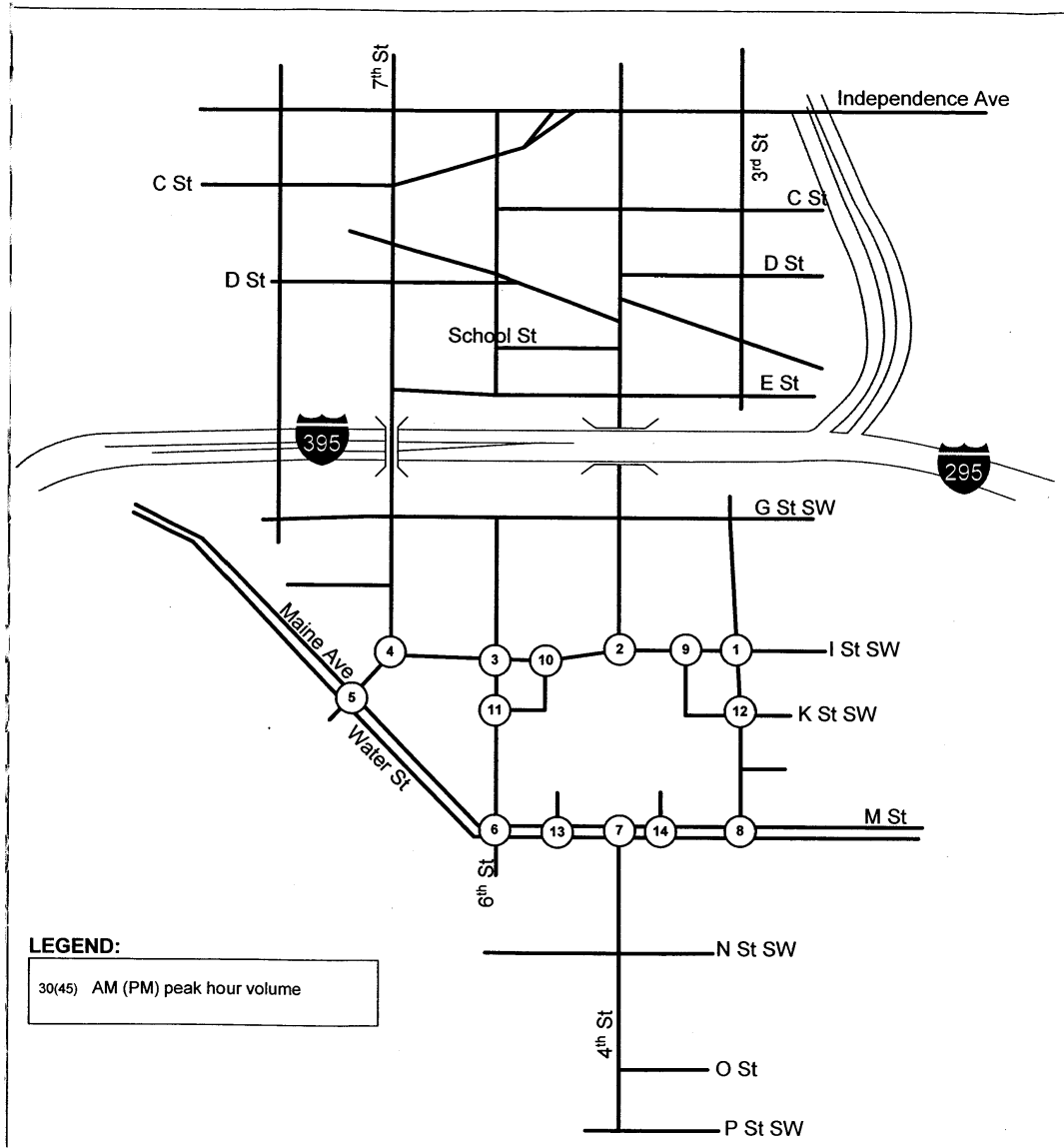


LEGEND:

30(45) AM (PM) peak hour volume

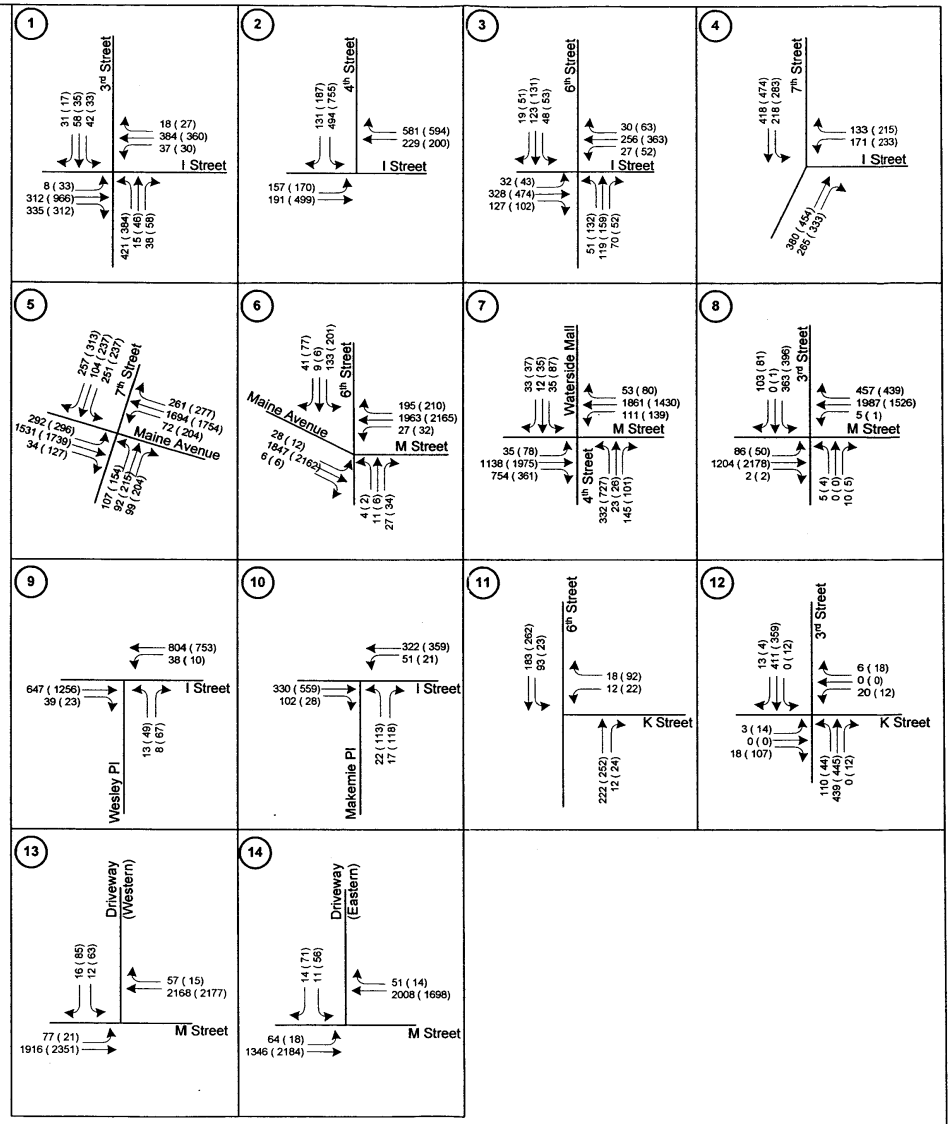


Not to Scale		4th Street SW Traffic Study	Total (2010) AM and PM Peak Hour Volumes without 4th Street Vehicular Connection	FIGURE 24
January, 2003				



LEGEND:

30(45) AM (PM) peak hour volume



Not to Scale		4th Street SW Traffic Study	**Total (2022) AM and PM Peak Hour Volumes without 4th Street Vehicular Connection**	**FIGURE 25**
January, 2003				

SITE IMPACTS

The Study Team evaluated the impacts of the PUD development traffic on the study area intersections. The site impacts indicate what proportion of the forecast total traffic at a particular intersection is generated by new site traffic. The Study Team calculated the site impacts by dividing the additional PUD-generated traffic by the total forecast traffic at each intersection.

Site impacts of less than five percent are low and generally reflect negligible effects on traffic operations and delays. Site impacts between five and 15 percent are moderate and minor effects on traffic operations and delays are expected at intersections with site impacts at these levels. Site impacts of more than 15 percent are significant and generally result in significant degradation of traffic operations and increased delays. The intersections most affected by the site traffic are those located in the immediate vicinity of the site. Site impacts generally decrease with increased distance to the site that generates the trips.

Table 11 shows that the intersections of I Street with 6th and 7th Streets will be impacted the most by site traffic. Site traffic is expected to have a significant impact on the intersection of 6th and I Streets. A large portion of site traffic is expected to pass through this intersection. While the impact at 7th and I Streets is in the moderate range, this intersection experiences the second highest impact of the studied intersections. Of the remaining intersections, 4th and I, 7th and Maine and 3rd & M are expected to experience a change in impact from 2010 to 2022 – increasing from low to moderate impact. All other studied intersections are expected to experience a low level of impact in 2010 and 2022.

Table 11
Impact of Site Traffic on Area Intersections without 4th Street Connection

Intersection	2010 AM Peak Hour Site Impact	2022 AM Peak Hour Site Impact	2010 PM Peak Hour Site Impact	2022 PM Peak Hour Site Impact
1. 3rd and I Streets	3%	4%	3%	3%
2. 4th and I Streets	4%	5%	4%	4%
3. 6th and I Streets	16%	18%	14%	15%
4. 7th and I Streets	10%	12%	9%	10%
5. 7th Street and Maine Avenue	4%	5%	4%	4%
6. 6th and M Streets	3%	3%	3%	3%
7. 4th and M Streets	3%	3%	3%	3%
8. 3rd and M Streets	4%	5%	5%	5%

PEDESTRIAN MOVEMENTS

Along with the increase in traffic the redevelopment of Waterside Mall, an increase in pedestrian traffic is anticipated. Based on projected development growth, the Study

Team calculated that pedestrian traffic is expected to increase at a rate of 4.1 percent per year.

This scenario, with a pedestrian connection and no vehicular connection along 4th Street between M and I Streets, would be the safest for pedestrians. Without vehicles on the proposed 4th Street connection, there would be no conflicts between pedestrians and vehicles.

FUTURE LEVELS OF SERVICE WITH SITE DEVELOPMENT WITHOUT 4TH STREET CONNECTION

As stated above, the two analysis years used in this study are 2010 and 2022. The year 2022 is the build-out year for Waterside Mall. Levels of service were calculated using the trips generated and assigned for the appropriate levels of development at each of these years.

In the course of the initial 2010 scenario modeling, SimTraffic indicated conditions of gridlock throughout the network due to site traffic added along eastbound I Street. Thus, the Study Team modeled I Street with two eastbound lanes to address the gridlock conditions. Currently, there is metered parking along eastbound I Street between 6th and 3rd Streets. Field observations indicate that this parking is little used during the peak periods. All SimTraffic scenarios with redevelopment at the site were modeled with two eastbound through lanes on I Street, between 6th and 3rd Streets. At 3rd Street, the curb lane was modeled as an exclusive right turn lane.

The Study Team used the SimTraffic results to calculate LOS and the delay per vehicle for the intersections in the study area. Table 12 compares the levels of service and delay per vehicle for existing traffic conditions and for total traffic conditions without the 4th Street connection for the years 2010 and 2022.

As noted above, without improvements, the study area intersections would operate at gridlock conditions during the peak hours. Nevertheless, even with the I Street improvement, the intersections of 3rd and 4th Streets with I Street are expected to operate at LOS F during the AM and PM peak hours for the years 2010 and 2022. The poor operation of these intersections is primarily attributed to motorists passing through the study area who must use I and 3rd Streets to access M Street or the southern portion of 4th Street. By 2022, even with the improvements on I Street, several intersections are expected to operate at LOS F during the PM peak hour. The intersections that are expected to operate at LOS F during the PM peak hour for the 2022 scenario are 3rd Street and I Street, 4th Street and I Street, 7th Street and Maine Avenue, 4th Street and M Street and 3rd Street and M Street. Thus, additional improvements would be needed to accommodate the 2010 and 2022 PUD levels of development at the Waterside Mall with a scenario that does not include a vehicular connection along 4th Street between M and I Streets.

Table 12

Level of Service and Delay per Vehicle Comparison
Existing Conditions, 2010 Total Traffic, and 2022 Total Traffic -
Without 4th Street Vehicular Connection

Intersection	Existing Conditions				2010				2022			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS	delay	LOS	delay	LOS	delay	LOS	delay	LOS
1. 3rd and I (Eye) Streets	16.6	B	17.6	B	245.4	F	130.5	F	294.1	F	210.1	F
2. 4th and I (Eye) Streets	21.5	C	38.4	D	127.5	F	100.2	F	207.8	F	173.7	F
3. 6th and I (Eye) Streets	14.8	B	17.3	B	18.4	B	26.8	C	28.7	C	36.0	D
4. 7th and I (Eye) Streets	8.5	A	10.9	B	10.0	A	13.5	B	13.7	B	17.0	B
5. 7th Street and Maine Avenue	14.8	B	21.5	C	20.4	C	156.8	F	30.7	C	395.6	F
6. 6th Street and Maine Avenue/M Street	6.8	A	10.3	B	8.7	A	66.5	E	10.8	B	79.2	E
7. 4th and M Streets	13.9	B	35.6	D	16.1	B	68.3	E	20.4	C	148.6	F
8. 3rd and M Streets	14.0	B	14.3	B	29.4	C	134.1	F	80.1	F	323.0	F

Note: The levels of service shown in this table assume that I Street between 6th and 3rd Streets would operate with two eastbound lanes during peak periods.

FUTURE CONDITIONS WITH SITE DEVELOPMENT AND WITH 4TH STREET CONNECTION

The next alternative analyzed by the Study Team establishes a vehicular connection of 4th Street between I and M Streets. The developer has proposed a 55-foot cross-section. 4th Street is proposed to be five lanes wide. The curb lanes are to be used as parking lanes, there is to be one travel lane in each direction, while the center lane is proposed to be used for left turn bays.

As shown in Figure 26, at the intersection of 4th and M Streets, southbound 4th Street is proposed to have three approach lanes: an exclusive left turn lane, a shared left/through lane, and an exclusive right turn lane. This approach configuration is necessary due to the Waterfront Metro station skewing the geometry of the proposed intersection. The Study Team evaluated future conditions with a 4th Street vehicular connection for the AM and PM peak hours of the years 2010 and 2022.

SITE TRAFFIC TRIP GENERATION

There is no change in site traffic trip generation under this scenario from the scenario without a 4th Street connection. Tables 8 and 9 show the net trip generation information for the proposed PUD site development for the years 2010 and 2022, respectively. Detailed trip generation information for Waterside Mall is presented in Appendix I.

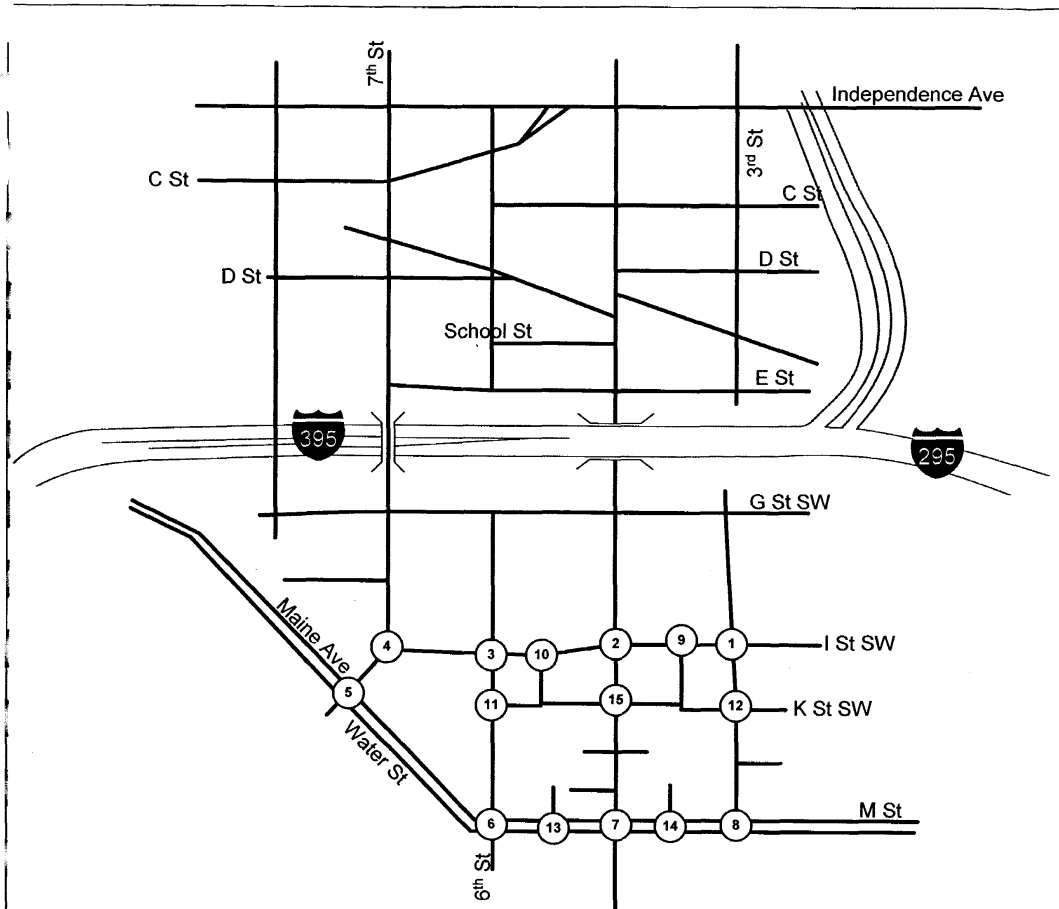
TRIP DISTRIBUTIONS FOR SITE DEVELOPMENTS

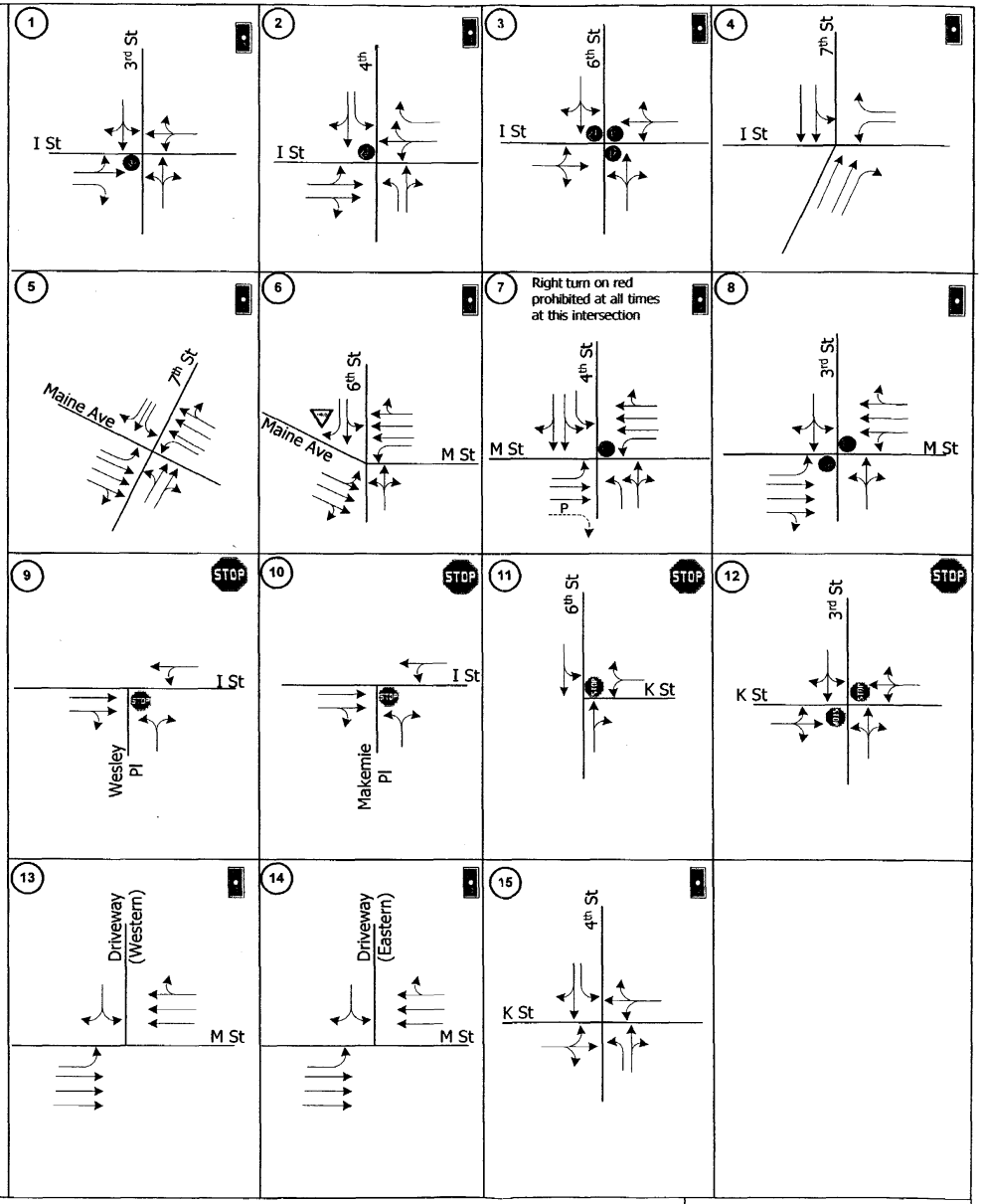
Trip distribution at the entry and exit points to the study area for site traffic under this scenario is the same as the scenario without the proposed 4th Street vehicular connection. All site traffic is assumed to enter the study area via the same routes with or without this vehicular connection. Figures 27 and 28 show these distributions. The distributions within the study area are different with the 4th Street vehicular connection.

Furthermore, there are differences in the distributions of both existing traffic and traffic associated with other area developments. The construction of 4th Street would provide an alternate route through the study area, reducing the need for vehicles to use I and 3rd Streets to access 4th and M Streets. In addition to diversions of a number of existing trips through the proposed 4th Street connection, some of the other area development trips would also be diverted to make use of the 4th Street connection. Trip distributions for other area developments under this scenario can be found in Appendix J.

TRIP ASSIGNMENTS FOR SITE DEVELOPMENTS

Site trip assignments are different with the proposed 4th Street connection. As Figure 26 indicates, under this scenario, in addition to the two full-movement driveways proposed for M Street, two driveways are proposed for the 4th Street connection. One driveway is proposed to be approximately 270 feet north of M Street. This driveway would serve only the western portion of Waterside Mall and would therefore create a three-leg





Not to Scale January, 2003	N	4th Street SW Transportation Study	**Future/Proposed Peak Period Lane Configurations with 4th Street Vehicular Connection**	**FIGURE 26**

intersection with 4th Street. The second driveway is proposed approximately 300 feet north of the first driveway. This full-movement driveway would serve both sides of Waterside Mall and would create a four-leg intersection with 4th Street.

The proposed vehicular connection of 4th Street, along with its two proposed driveways, reduces the amount of traffic that is expected to access the site via K Street and Makemie Place. Under this scenario, the major access points to the site are expected to be 4th Street at I and M Streets, and the two proposed driveways on M Street. A small amount of site traffic is expected to use K Street/Makemie Place, as well as a small amount expected to access the site via K Street/Wesley Place.

The estimated future year trip assignments for the scenario without the 4th Street connection are summarized in Figures 29 and 30. The addition of traffic volumes at the intersections increases with proximity to the proposed Waterside Mall driveway locations. Under this scenario, no additional site traffic is expected to be added to 3rd or 6th Streets between I and M Streets. The intersection of 4th and M Streets is expected to see the greatest increase in site traffic of all the studied intersections, with up to 263 trips added during the 2010 AM peak hour and 333 trips during the 2010 PM peak hour. When Waterside Mall is fully redeveloped in 2022, these numbers will increase during the AM and PM peak hours to 339 and 427, respectively. Of the studied intersections on I Street, the intersection of 4th and I Streets will see the largest amount of site trips, with 159 during the 2010 AM peak hour and 175 during the 2010 PM peak hour. In 2022, the AM and PM peak hour site traffic volumes are expected to increase to 207 and 229, respectively.

TOTAL TRIP ASSIGNMENTS WITH SITE DEVELOPMENT

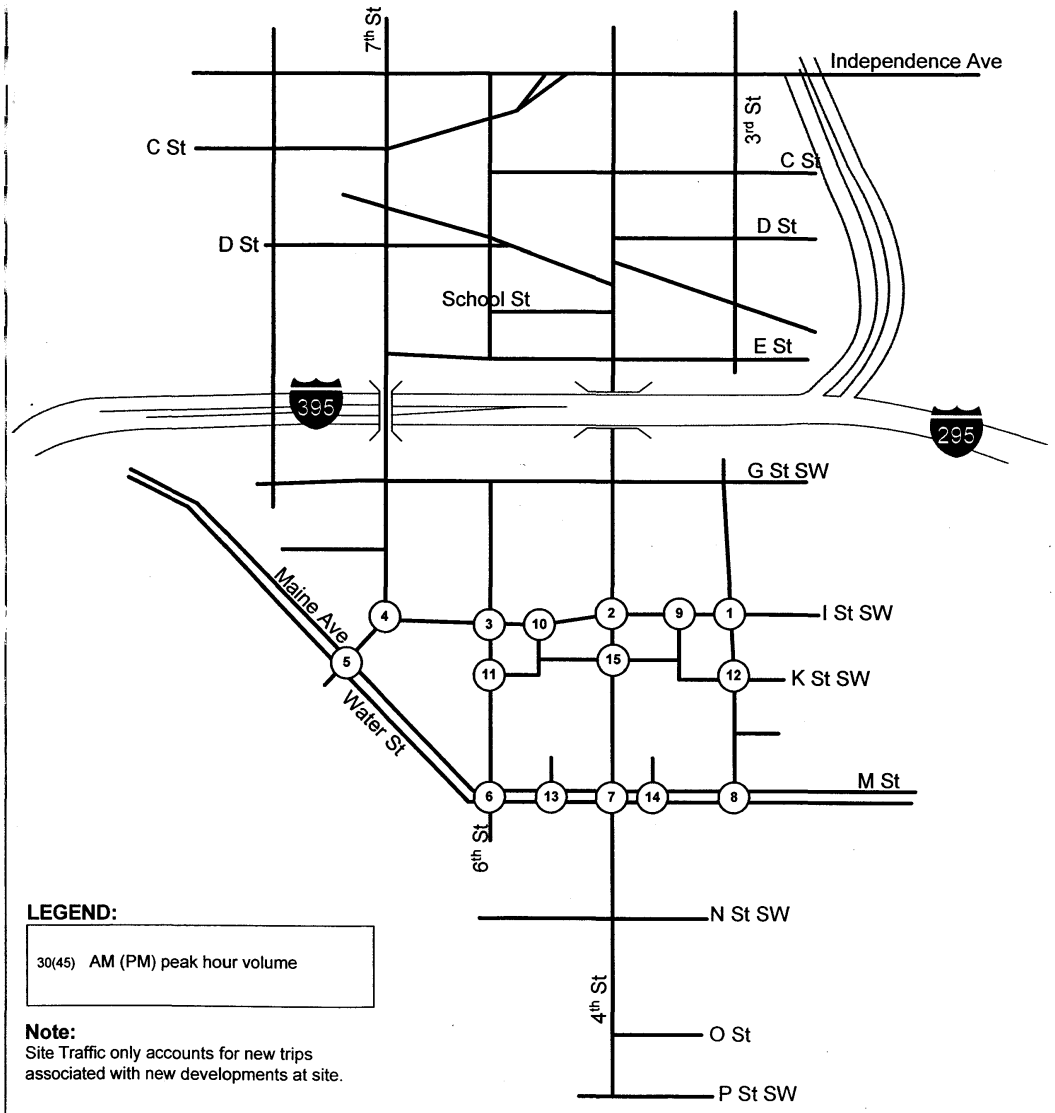
In order to forecast the total number of vehicular trips that are expected to traverse the study area intersections during the forecast years of 2010 and 2022, the Study Team added the following layers of traffic volumes:

1. Existing traffic
2. Growth in background traffic
3. Trips generated by other area development
4. PUD site traffic

This scenario assumes that Waterside Mall will be developed with the level of development shown in Table 7. Figures 31 and 32 show total volumes for site development with the proposed vehicular connection of 4th Street for 2010 and 2022, respectively.

SITE IMPACTS

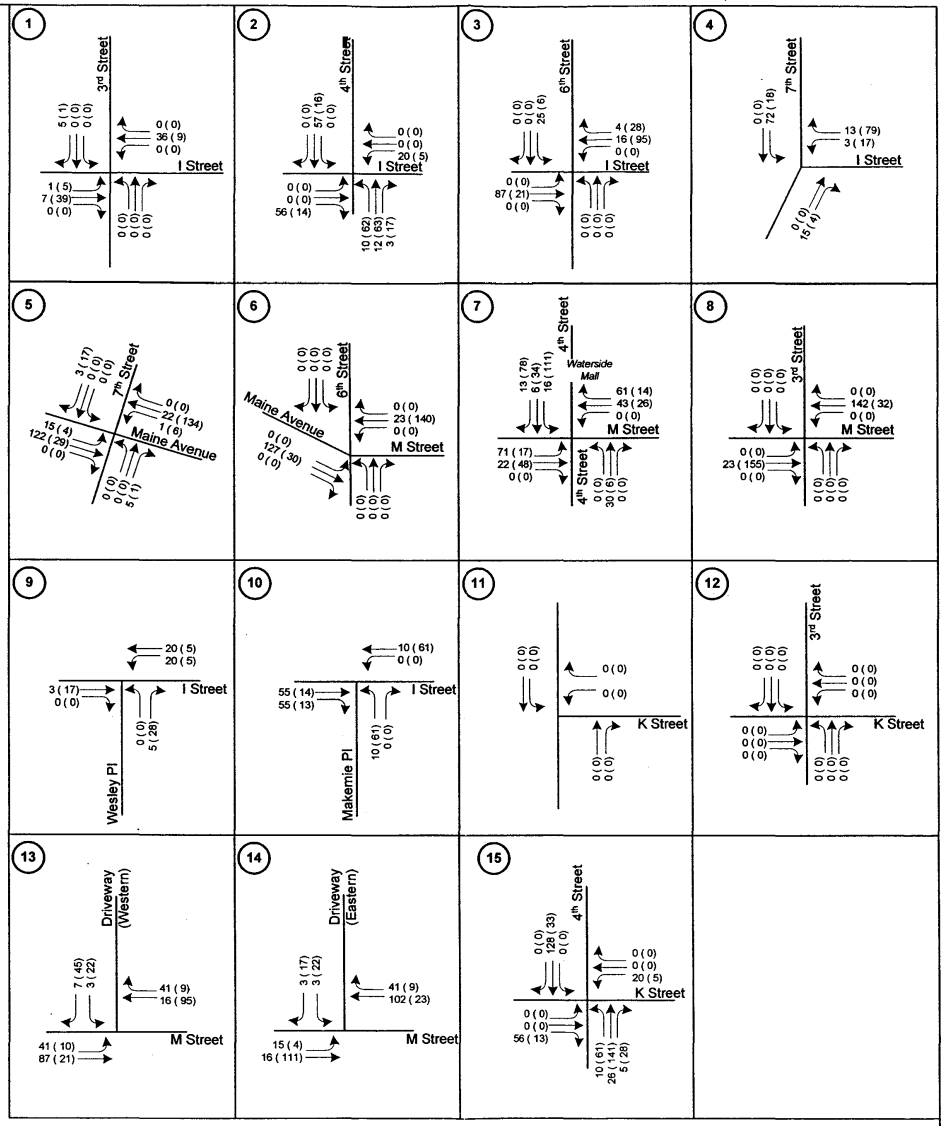
The Study Team evaluated the impacts of the PUD site development traffic, with the proposed 4th Street connection, on the intersections in the immediate vicinity of the site.



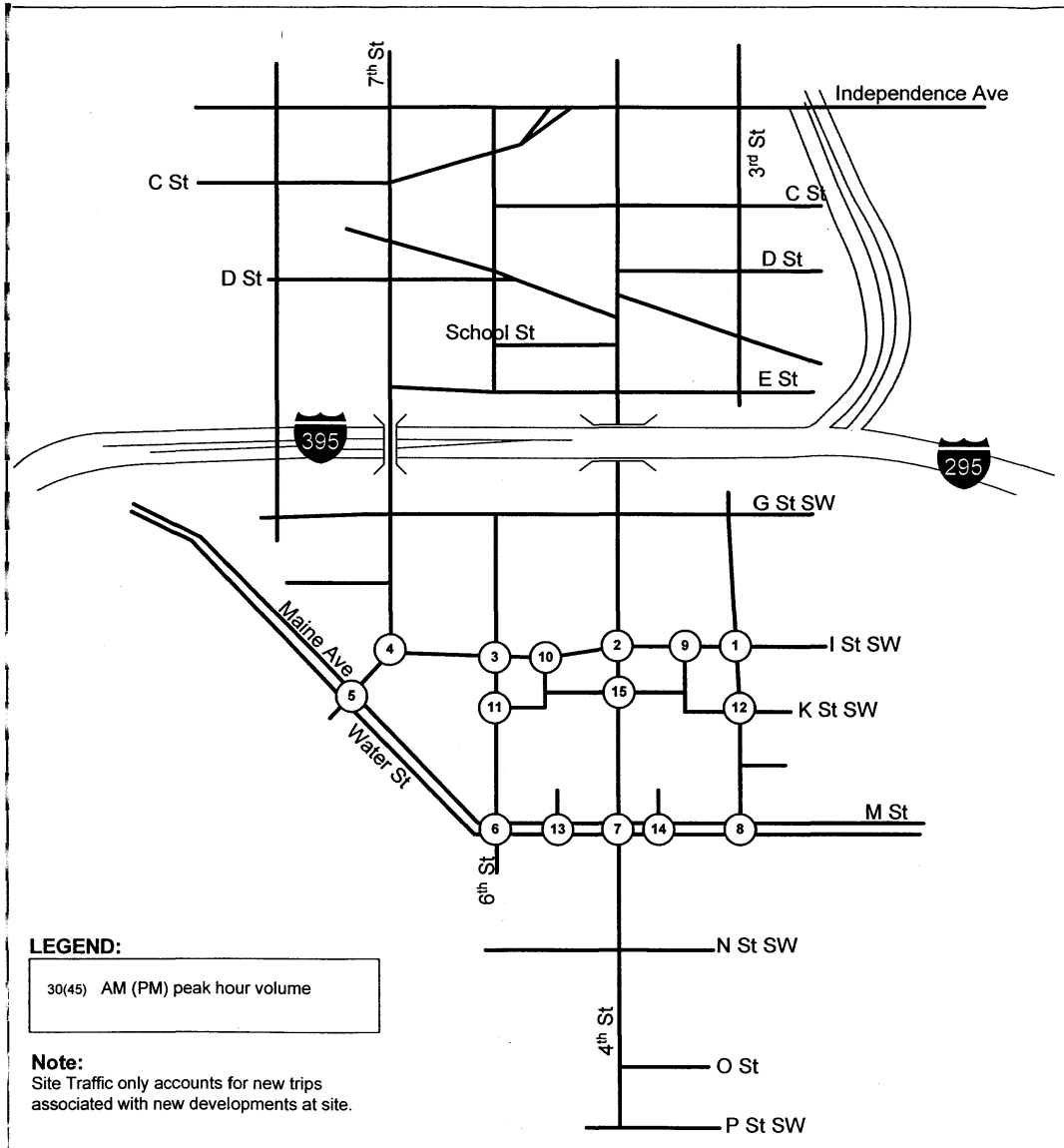
LEGEND:

30(45) AM (PM) peak hour volume

Note:
Site Traffic only accounts for new trips associated with new developments at site.



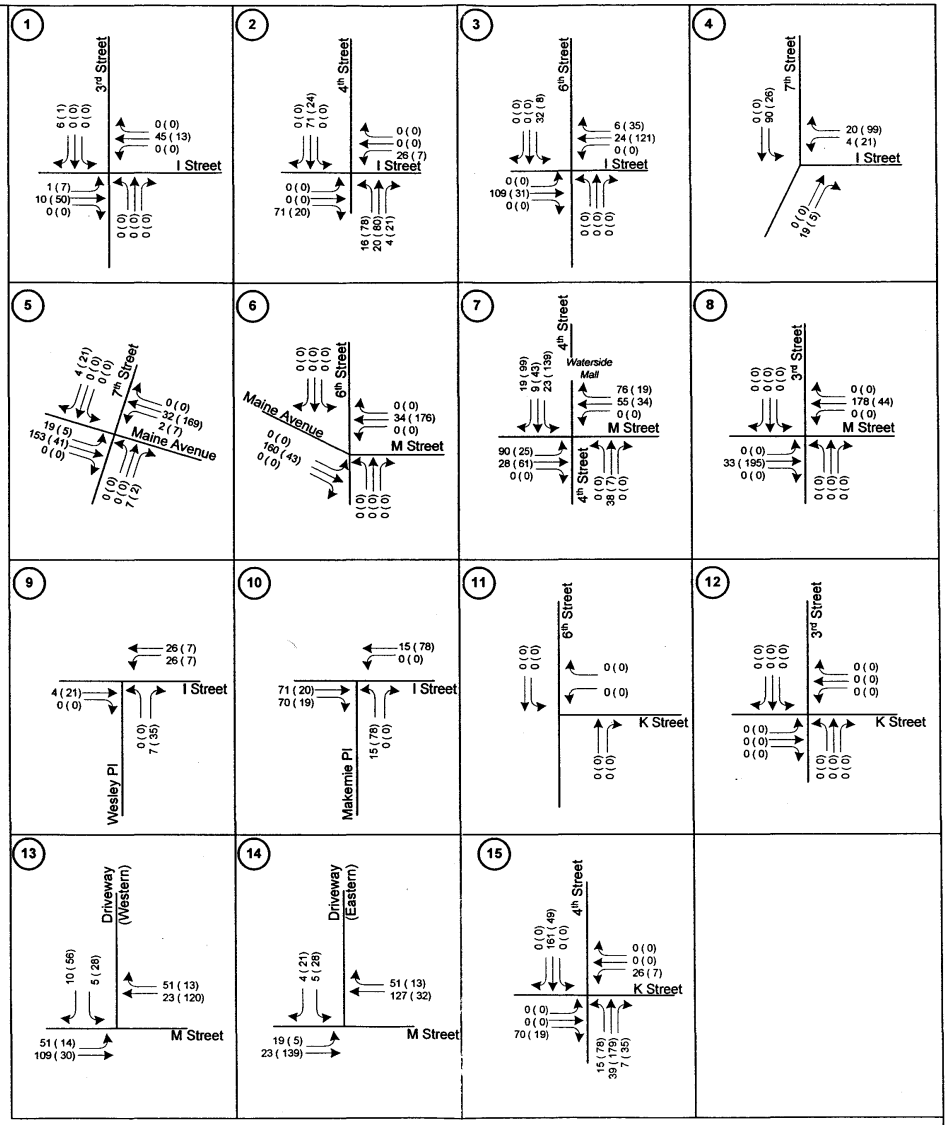
Not to Scale	N	4th Street SW Traffic Study	Site Traffic for 2010 with 4th Street Vehicular Connection	FIGURE 29
January, 2003				



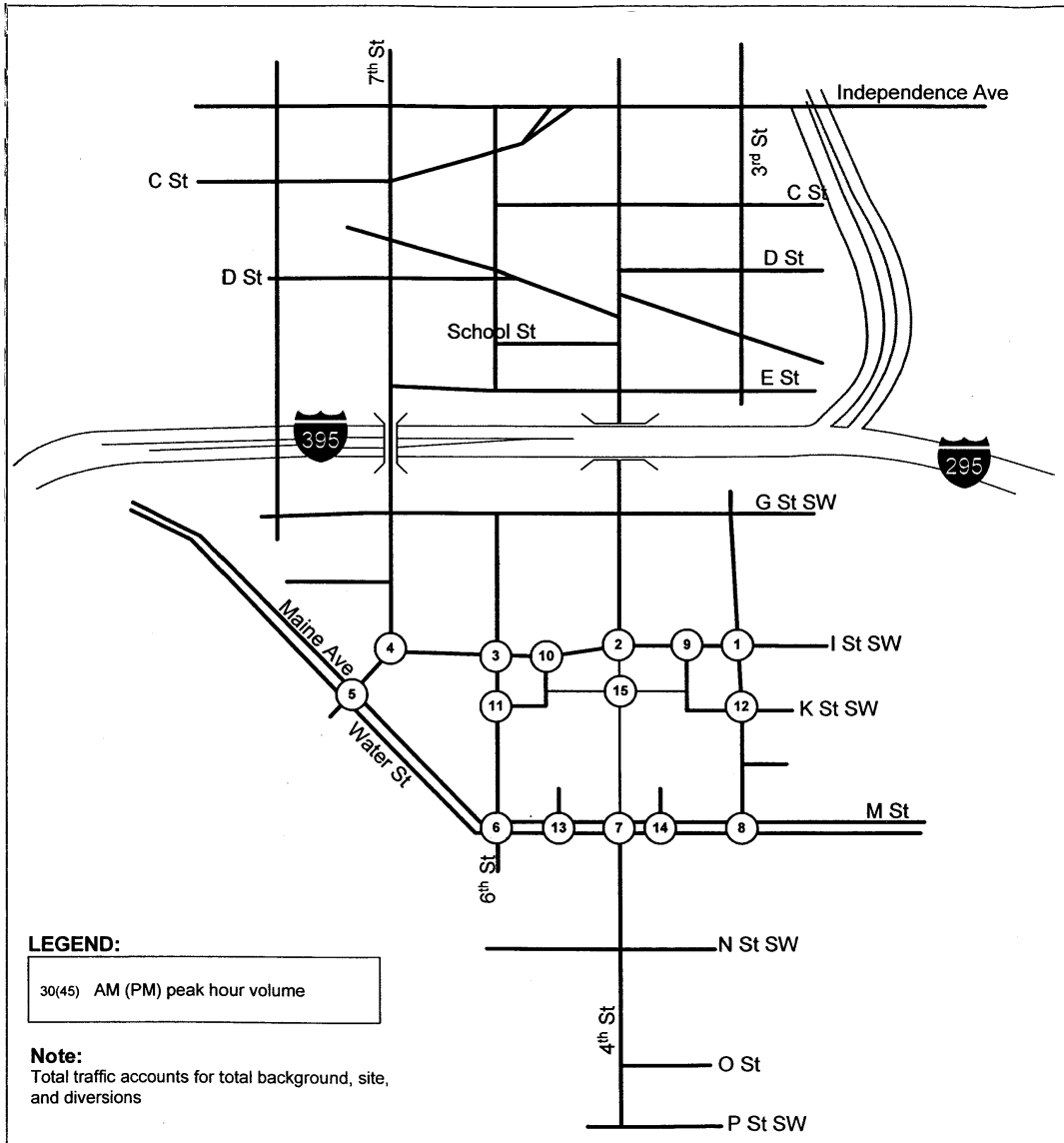
LEGEND:

30(45) AM (PM) peak hour volume

Note:
Site Traffic only accounts for new trips associated with new developments at site.



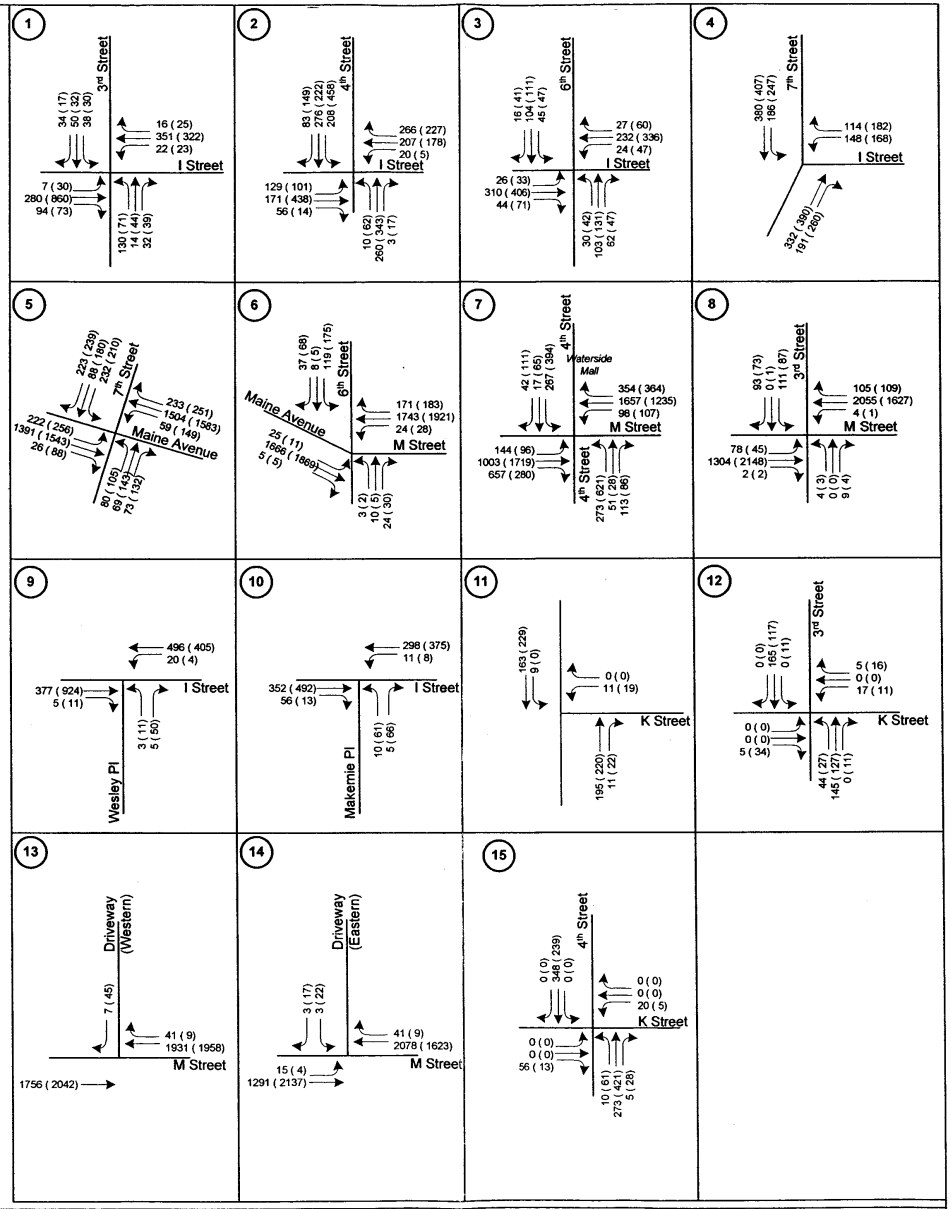
Not to Scale		4th Street SW Traffic Study	Site Traffic for 2022 with 4th Street Vehicular Connection	FIGURE 30
January, 2003				



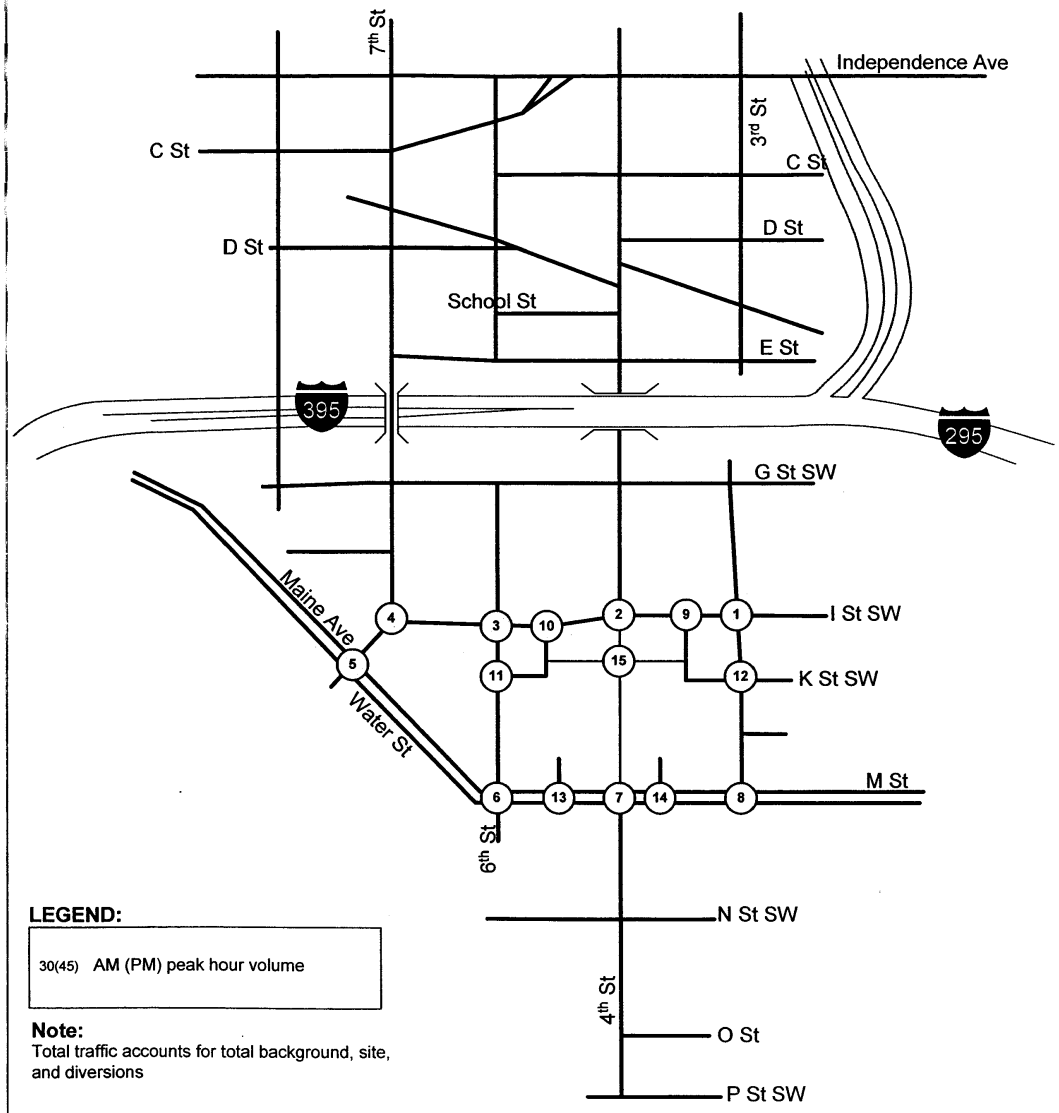
LEGEND:

30(45) AM (PM) peak hour volume

Note:
Total traffic accounts for total background, site, and diversions



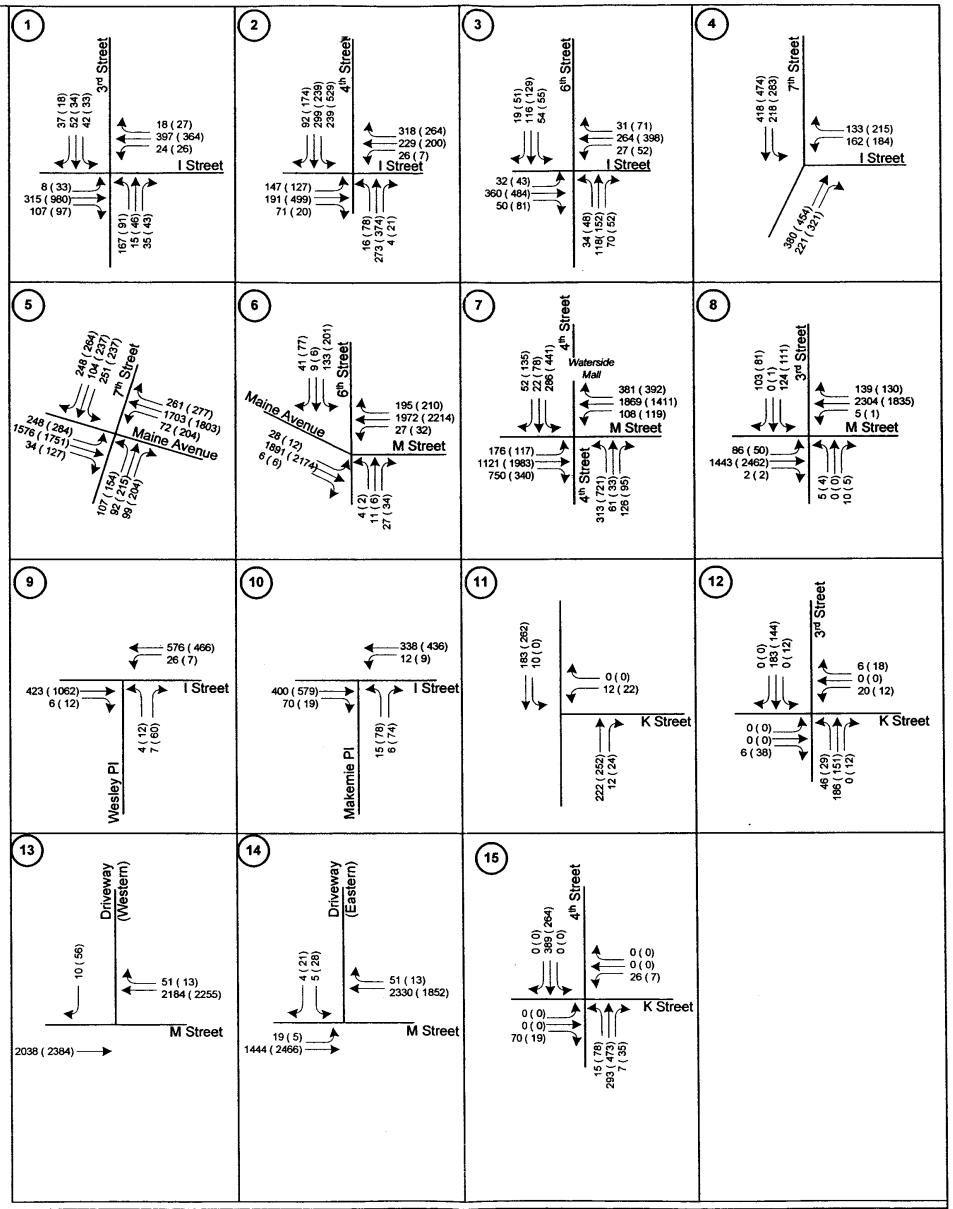
Not to Scale		4th Street SW Traffic Study	Total (2010) AM and PM Peak Hour Volumes with 4th Street Vehicular Connection	FIGURE 31
January, 2003				



LEGEND:

30(45) AM (PM) peak hour volume

Note:
Total traffic accounts for total background, site, and diversions



Not to Scale		4th Street SW Traffic Study	Total (2022) AM and PM Peak Hour Volumes with 4th Street Vehicular Connection	FIGURE 32
January, 2003				

Site impacts indicate what proportion of the forecast total traffic at a particular intersection is generated by new site traffic. The Study Team calculated the site impacts by dividing the additional site generated traffic by the total forecast traffic at each intersection.

Site impacts of less than five percent are low and generally reflect negligible effects on traffic operations and delays. Site impacts between five and 15 percent are moderate and minor effects on traffic operations and delays are expected at intersections with site impacts at these levels. Site impacts of more than 15 percent are significant and generally result in significant degradation of traffic operations and increased delays. The intersections most affected by the site traffic are those located in the immediate vicinity of the site. Site impacts generally decrease with increase distance to the site that generates the trips.

Table 13 shows that the intersection of 6th and I Streets is the only intersection that will experience a significant site impact under this scenario for year 2022 conditions. All other intersections are expected to see low and moderate impact under the studied scenarios for 2010 and 2022 conditions.

Table 13
Impact of Site Traffic on Area Intersections with 4th Street Connection

Intersection	2010 AM Peak Hour Site Impact	2022 AM Peak Hour Site Impact	2010 PM Peak Hour Site Impact	2022 PM Peak Hour Site Impact
1. 3rd and I Streets	5%	5%	4%	4%
2. 4th and I Streets	9%	11%	8%	9%
3. 6th and I Streets	13%	15%	11%	12%
4. 7th and I Streets	8%	9%	7%	8%
5. 7th Street and Maine Avenue	4%	5%	4%	4%
6. 6th and M Streets	4%	5%	4%	4%
7. 4th and M Streets	6%	7%	7%	7%
8. 3rd and M Streets	4%	5%	5%	5%

PEDESTRIAN MOVEMENTS

Along with the increase in traffic the redevelopment of Waterside Mall, an increase in pedestrian traffic is anticipated. Based on projected PUD development growth, the Study Team calculated that pedestrian traffic is expected to increase at a rate of 4.1 percent per year.

This scenario, with a vehicular connection along 4th Street between M and I Streets, would require pedestrians and vehicles to share transportation facilities and would result in more potential interaction than the alternative with an exclusive pedestrian connection. Under this scenario, there would be an increase in potential conflicts between pedestrians

and vehicles. These potential conflicts, however, can be minimized with the implementation of mitigation measures throughout the connection. These measures should be implemented if a vehicular connection is constructed along 4th Street between M and I Streets.

FUTURE LEVELS OF SERVICE WITH SITE DEVELOPMENT AND 4TH STREET CONNECTION

The 4th Street connection adds an additional leg to the intersection of 4th and I Streets, changing intersection operation. Various minor changes were made to the signal operation at this intersection in the traffic model to provide for the additional movements. No changes were made to the existing 21-second pedestrian phase.

As with the scenario without the 4th Street connection, this scenario was modeled during the AM and PM peak hours in the years 2010 and 2022. This scenario was also modeled with two eastbound lanes on I Street, as above. Levels of service were calculated using the trips generated and assigned above for the appropriate PUD levels of development at each of these years.

The Study Team used the SimTraffic results to calculate LOS and the delay per vehicle for the intersections in the study area. Table 14 compares the levels of service and delay per vehicle for existing traffic conditions and for total traffic conditions with the 4th Street connection for the years 2010 and 2022.

As noted above, without improvements, the study area intersections would operate at gridlock conditions during the peak hours. However, as shown in Table 14, with the operation of I Street between 6th and 3rd Streets with two eastbound lanes during the peak periods and with a 4th Street connection between 4th and 6th Street, traffic conditions at most of the intersections are adequate for the 2010 and 2022 AM peak scenarios. None of the intersections are expected to operate at LOS F for 2010 AM peak hour conditions. Only the intersection of 3rd and I Streets is expected to operate at LOS F for the 2022 AM peak hour scenario. During the 2010 PM peak hour only one of the studied intersections, 4th Street at M Street, is expected to operate at LOS F. However, all intersections with the exception of 6th and I Streets are expected to operate at LOS F during the PM peak hour for the 2022 scenario. Traffic mitigation measures will be required to reduce congestion. This indicates that improvements would need to be implemented to accommodate the expected 2022 traffic volumes.

Table 14

Level of Service and Delay per Vehicle Comparison
Existing Conditions, 2010 Total Traffic, and 2022 Total Traffic -
With 4th Street Vehicular Connection

Intersection	Existing Conditions				2010				2022			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS	delay	LOS	delay	LOS	delay	LOS	delay	LOS
1. 3rd and I (Eye) Streets	16.6	B	17.6	B	47.4	D	47.7	D	121.9	F	172.1	F
2. 4th and I (Eye) Streets	21.5	C	38.4	D	59.8	E	76.9	E	68.1	E	85.4	F
3. 6th and I (Eye) Streets	14.8	B	17.3	B	21.3	C	42.4	D	24.0	C	60.1	E
4. 7th and I (Eye) Streets	8.5	A	10.9	B	12.1	B	46.0	D	12.7	B	111.8	F
5. 7th Street and Maine Avenue	14.8	B	21.5	C	21.2	C	209.3	F	26.4	C	425.1	F
6. 6th Street and Maine Avenue/M Street	6.8	A	10.3	B	9.2	A	75.8	E	30.3	C	105.5	F
7. 4th and M Streets	13.9	B	35.6	D	28.9	C	144.9	F	52.9	D	150.1	F
8. 3rd and M Streets	14.0	B	14.3	B	15.6	B	29.2	C	61.2	E	145.5	F

Note: The levels of service shown in this table assume that I Street between 6th and 3rd Streets would operate with two eastbound lanes during peak periods.

FUTURE CONDITIONS WITH SITE DEVELOPMENT AND SERVICE ROAD CONNECTION

As a final alternative, the Study Team analyzed 2010 and 2022 scenarios that utilized service roads proposed by the developer as a means of connecting I and M Streets. These service roads, located east and west of 4th Street, as shown in Figure 33, are proposed as the driveway points to the site from M Street and continue north to join with Makemie Place in the west and Wesley Place in the east.

Due to insufficient right-of-way to construct adequate roadway width for two-way operation, the western service road would need to operate one-way northbound[1]. The eastern service road could serve both north and southbound traffic.

A full analysis of this option, including trip distribution and assignment, as well as SYNCHRO/SimTraffic analysis, was performed. The results of this analysis show that these service roads are not viable options to connect I and M Streets. Because of their proximity to 3rd and 6th Streets, the ability of the service roads to divert through traffic from 3rd and 6th Streets is very limited.

Furthermore, the proximity of the service roads to 3rd Street and 6th Street precludes the installation of traffic signals at the intersections of the service roads with M and I Streets. The SimTraffic modeling shows that the lack of a signalized access point at the intersections of the eastern access route with I and M Streets, combined with high traffic volumes, makes left turns from the access road very difficult. Additionally, the proposed geometry of the eastern service road is not adequate for high volumes of through traffic. Finally, this access road would do nothing to reduce traffic volumes on I Street east of 4th Street.

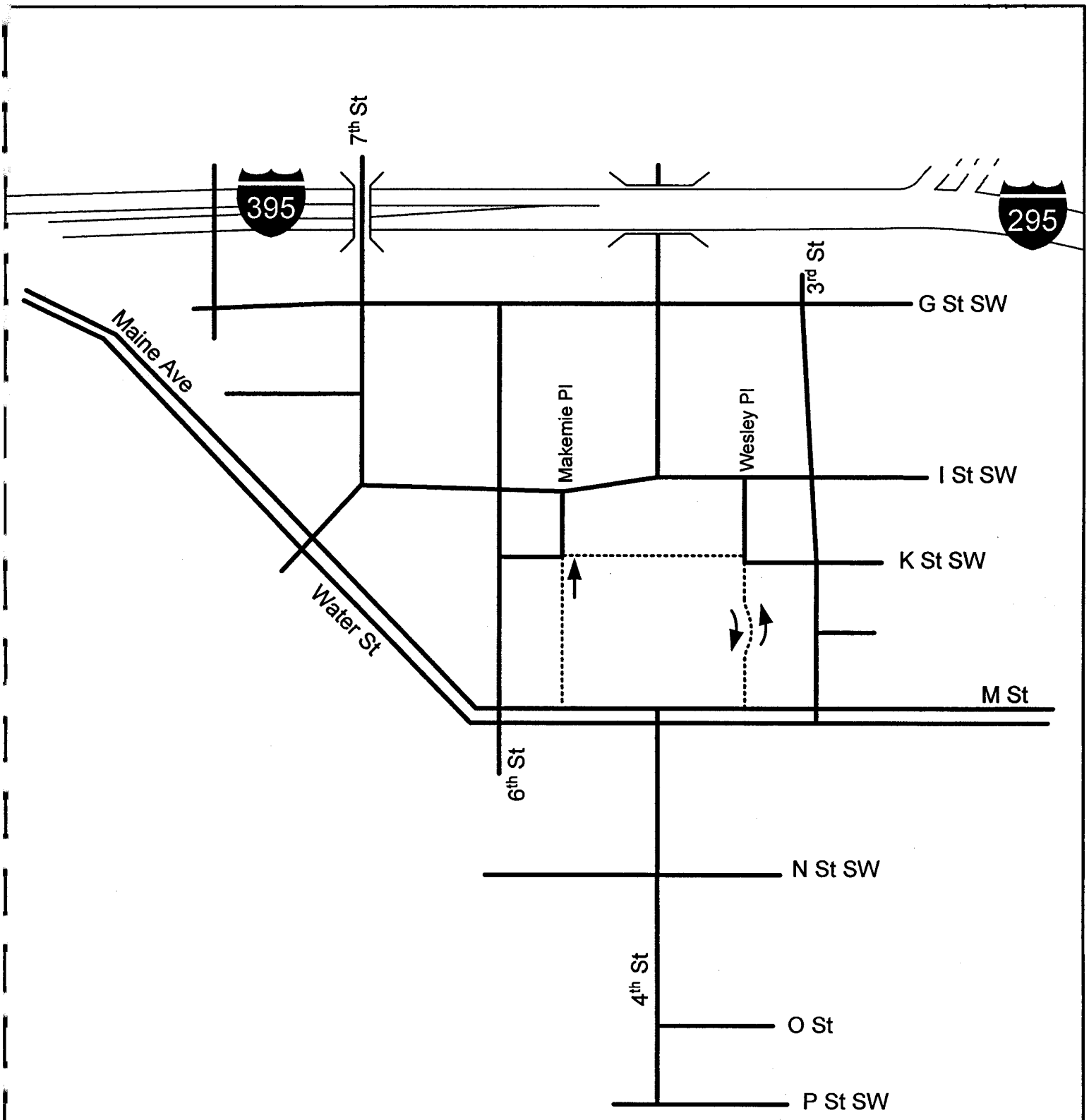
The SimTraffic modeling indicates that northbound queues would extend the full length of the service roadway from I Street to M Street under the 2010 and 2022 scenarios. Additionally, vehicle delays at the intersections of 3rd and I Streets and 3rd and M Streets, as shown in Table 15, are considerably worse under this scenario than under than under the scenario with a 4th Street vehicular connection.

With regards to the western access roadway, the lack of a signalized left turn from M Street into the site would encourage drivers to continue to use I Street as a means of accessing the western portion of the site. As a result, no reduction of site traffic on I Street would occur.

While the service roadways alone do not represent a solution to traffic congestion in the study area, they will provide additional capacity if used in conjunction with the proposed 4th Street vehicular connection.

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[1] Based on plans provided by the developer of Waterside Mall, this service roadway is expected to be 16 feet wide at its narrowest point.



Not to Scale January, 2003	N	4th Street SW Transportation Study	Scenario with Service Road Connections	FIGURE 33

Table 15

Level of Service and Delay per Vehicle Comparison
Existing Conditions, 2010 Total Traffic, and 2022 Total Traffic - Service Road Scenario

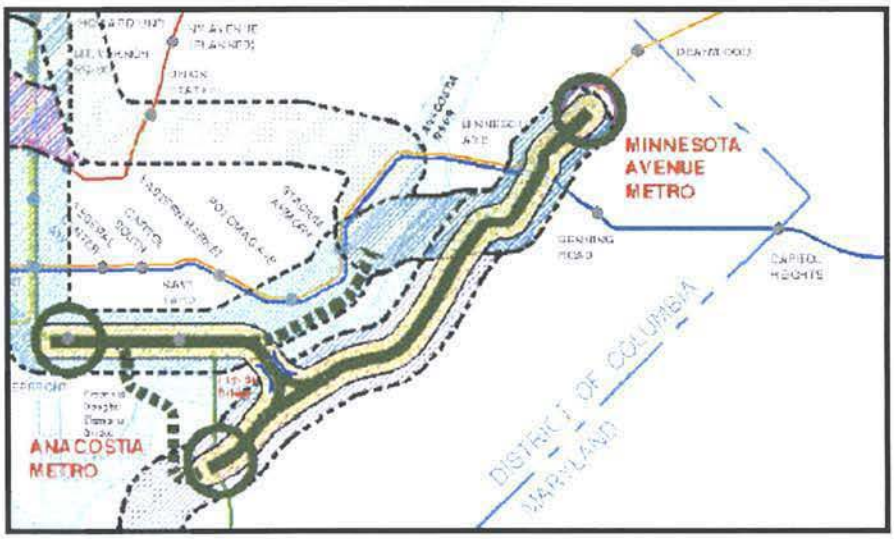
Intersection	Existing Conditions				2010				2022			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS	delay	LOS	delay	LOS	delay	LOS	delay	LOS
1. 3rd and I (Eye) Streets	16.6	B	17.6	B	46.9	D	89.1	F	202.5	F	184.5	F
2. 4th and I (Eye) Streets	21.5	C	38.4	D	58.9	E	79.5	E	123.0	F	225.7	F
3. 6th and I (Eye) Streets	14.8	B	17.3	B	23.4	C	25.5	C	62.5	E	62.8	E
4. 7th and I (Eye) Streets	8.5	A	10.9	B	50.2	D	154.2	F	37.0	D	267.7	F
5. 7th Street and Maine Avenue	14.8	B	21.5	C	49.5	D	129.0	F	35.0	C	349.1	F
6. 6th Street and Maine Avenue/M Street	6.8	A	10.3	B	35.5	D	71.0	E	58.8	E	76.7	E
7. 4th and M Streets	13.9	B	35.6	D	18.7	B	84.9	F	30.6	C	150.3	F
8. 3rd and M Streets	14.0	B	14.3	B	28.8	C	113.7	F	63.4	E	353.5	F

Note: The levels of service shown in this table assume that I Street between 6th and 3rd Streets would operate with two eastbound lanes during peak periods.

FUTURE PUBLIC TRANSPORTATION

WMATA is currently undertaking a study exploring the possibility of various alternative forms of public transit, including light rail transit (LRT) in different locations throughout the city. Their currently proposed LRT starter route would run east on Maine Avenue/M Street from the Southwest Waterfront and cross the Anacostia River to the Anacostia and Minnesota Avenue Metro stations, as shown in Figure 34. This starter route is expected to be operational by 2010.

Figure 34
Proposed LRT Starter Line – Anacostia Waterfront to Minnesota Ave.



Trolleys are the most likely mode of transportation to be implemented in this corridor. These trolleys would share one lane with motor vehicles in each direction of Maine Avenue and M Street. Trolleys would require no exclusive right-of-way, nor would there be any loss of parking or sidewalks throughout the study area. At the current time, no information is available concerning station spacing or headways.

In the traffic analysis and modeling, no adjustments were made to account for the implementation of this transit mode. The positive and negative effects of the trolley route on vehicular traffic will be offsetting. While there will be increased friction on Maine Avenue and M Street due to trolley stops and vehicles passing the trolleys, there will be a decrease in the number of vehicular trips due to the increased use of the transit mode.

At this time, WMATA has no plans for bus service on the proposed 4th Street vehicular connection. However, should service be implemented, the proposed width of the roadway is adequate for bus operation. If the decision is made to implement bus service, a bus pad would need to be constructed adjacent to the Metro.

IV. SUMMARY OF FINDINGS AND RECOMMENDATIONS

The first two phases of this study included the evaluation of existing conditions around the Waterside Mall and the assessment of the impacts of its redevelopment. The Study Team conducted a full evaluation of existing conditions around Waterside Mall and determined the locations where transportation issues need to be addressed. A map with the identified existing transportation issues was developed and is presented in Figure 14. Figure 35 summarizes the recommended improvements to address these issues.

The Study Team conducted a full evaluation of total background traffic scenarios for the years 2010 and 2022. These scenarios include existing traffic, growth in background traffic, traffic from other area developments using roads in the study area, and the assumed full occupancy of the currently vacant Waterside Mall office space. The assessment of this scenario indicates that for 2010 and 2022 several intersections are expected to operate at LOS F during the peak hours. Therefore, transportation improvements (mitigation measures) would be needed to address the expected deficiencies in the study area.

The Study Team also conducted a full evaluation of the PUD level of redevelopment of Waterside Mall under three scenarios for the years 2010 and 2022. The first scenario assumes that a connection of 4th Street between I and M Streets is not open to vehicles and serves strictly as a pedestrian promenade between these two roadways. The second scenario assumes that 4th Street is connected between I and M Streets and this connection is made available to vehicles. The final scenario uses service roadways proposed by the developer as an alternative to a vehicular connection of 4th Street between I and M Streets. As discussed in the Future Conditions with Site Development and Service Road Connection section of this report, while these service roadways alone do not represent a solution to traffic congestion in the study area, they will provide additional capacity if used in conjunction with the proposed 4th Street vehicular connection.

COMPARISON BETWEEN THE SCENARIO WITH A 4TH STREET VEHICULAR CONNECTION AND THE SCENARIO WITHOUT A VEHICULAR CONNECTION

The scenarios with and without a 4th Street vehicular connection have different effects on traffic operations in the study area and on pedestrian conditions. The scenario with a vehicular connection on 4th Street between M and I Streets would help reduce traffic on 3rd Street and would minimize the impacts of new development on this residential street.

SITE IMPACTS

Site impacts indicate what proportion of the forecast total traffic at a particular intersection is generated by new site traffic. The Study Team calculated the site impacts by dividing the additional site generated traffic by the total forecast traffic at each intersection.

Site impacts of less than five percent are low and generally reflect negligible effects on traffic operations and delays. Site impacts between five and 15 percent are moderate and minor effects on traffic operations and delays are expected at intersections with site impacts at these levels. Site impacts of more than 15 percent are significant and generally result in significant degradation of traffic operations and increased delays. The intersections most affected by the site traffic are those located in the immediate vicinity of the site. Site impacts generally decrease with increase distance to the site that generates the trips.

Figures 36 and 37 show that site traffic has the greatest impact on the intersection of 6th and I Streets in both scenarios. However, if the scenario with the 4th Street vehicular connection is implemented, site impacts at this intersection are expected to be reduced by approximately four percent during the AM and PM peak hours. Another intersection expected to see reduced impact is 7th and I Streets. The reduced impacts at these intersections show that the addition of a vehicular connection between M and I Streets would encourage fewer drivers entering the study area from the west to use I Street to access the site.

As expected, the site impacts at the intersections of 4th Street with I and M Streets increase with the 4th Street vehicular connection. These increased impacts are due to the creation of an additional approach at each intersection and the large amount of site traffic expected to use 4th Street between I and M Streets. When comparing the two scenarios, it can be seen that the expected impacts at the intersection of 3rd and I Streets increase with the 4th Street connection. However, the increase in site impact is associated with a *reduction* in overall volume at this intersection. Both site traffic and background traffic are expected to utilize the 4th Street extension. Due to the large volume of background traffic expected to be diverted away from this intersection, this intersection's percentage of site traffic is expected to be higher with the 4th Street vehicular connection than without it, but overall intersection volume will be less.

LEVEL OF SERVICE

It can be seen in Figure 38, Figure 39, Table 12 and Table 14 that the proposed 4th Street vehicular connection is expected to improve LOS and reduce delays at the two studied intersections on 3rd Street. This is primarily due to the effect of background and other area development trips that would divert away from this local, residential street to 4th Street. Without the 4th Street vehicular connection, the total daily traffic on 3rd Street is expected to increase from the existing 4,800 vehicles per day to 6,800 vehicles per day. With the 4th Street vehicular connection, the daily traffic volume on 3rd Street is expected to be 2,800 vehicles per day, which represents a significant reduction compared to existing conditions.

With a vehicular connection between I and M Street, total daily traffic on 4th Street north of I Street is expected to increase from the existing 7,500 vehicles per day to 17,000 vehicles under 2022 conditions. Under 2022 total background conditions, the daily

volume on this segment is expected to be 16,200, indicating that 800 new daily trips are the impact at this location of the PUD level of redevelopment of Waterside Mall. The proposed 4th Street vehicular connection between M and I Streets is expected to have a daily traffic volume of 12,000 in 2022, indicating that this roadway will operate at or near capacity, discouraging further diversions from existing parallel traffic routes. A portion of this volume represents through trips on 4th Street that no longer need to use 3rd or 6th Streets to reach 4th Street south of M Street.

The Waterside Mall PUD and other area developments, either with or without the 4th Street vehicular connection, would create congestion throughout the study area without the implementation of traffic mitigation measures. Thus, the study team conducted the analysis of both of these scenarios assuming that parking would be prohibited on the south side of I Street during peak hours to accommodate the traffic needs. This additional lane would be needed to accommodate the additional traffic generated by other area developments and background growth even if there is no redevelopment at the Waterside Mall site. As expected, the intersection of 4th and I Streets will perform worse under the scenario with the 4th Street vehicular connection than under the scenario without the vehicular connection. However, the impact is minimal during the AM peak hour, and PM impacts are expected to occur on the proposed northbound leg. Transportation mitigation measures would be needed to further reduce congestion.

For the intersections on M Street/Maine Avenue, the intersections with 6th and 7th Streets will operate with approximately the same delay per vehicle under each of the proposed scenarios. The intersection of 4th and M Street will degrade, as expected, with the addition of the 4th Street connection. However, this degradation is expected to take place on the proposed southbound leg of 4th Street. The remaining legs of this intersection are expected to operate approximately equally under all scenarios. Finally, with the 4th Street vehicular connection, the intersection of 3rd and M Streets is expected to improve significantly, due to trips diverted to 4th Street.

QUEUING

A vehicular connection on 4th Street is expected to reduce queuing on 3rd Street, as shown in Figures 40 and 41. The reduction is primarily due to the background and other area development trips that will be diverted away from 3rd Street onto 4th Street. Southbound queues on 4th Street at I Street, and northbound queues on 4th Street at M Street are expected to be greater with the 4th Street vehicular connection. The increase in queue length is directly associated with the additional approach that was added to each intersection. The additional approach, additional volume and changes to signal timing necessary to accommodate the increased volumes result in longer queues. However, by 2022, the queues are approximately equal with or without the vehicular connection. Queues at other locations are expected to be similar with or without the vehicular connection.

PEDESTRIANS

With regards to pedestrians, the scenario without the proposed vehicular connection of 4th Street is the safer alternative. Without vehicles on the proposed 4th Street connection, pedestrians and vehicles would not be sharing the same right-of-way. However, the conflicts associated with a vehicular connection of 4th Street can be minimized with the implementation of mitigation measures throughout the connection. These measures should be implemented if a vehicular connection is constructed between I and M Streets.

RECOMMENDATIONS FOR FUTURE CONDITIONS

Based on higher levels of service, decreased delay and shorter queue lengths on 3rd Street, as well as reduced site impacts on I Street, the Study Team recommends the construction of the vehicular connection of 4th Street SW between I and M Streets. The primary effect of constructing this roadway will be decreased traffic on neighborhood residential streets, including 3rd and I Streets.

4TH STREET

The recommended connection of 4th Street between I and M Streets should be open to vehicles. The roadway should have a five-lane cross-section. Parking should be permitted at all times on the curb lanes. There should be one travel lane in each direction, and the center lane should be used for left turn bays into the two proposed site driveways on 4th Street.

The increase in vehicular traffic associated with the redevelopment of Waterside Mall should not come at the expense of pedestrians. Measures should be implemented to ensure that vehicles travel at low speeds on the 4th Street connector. Additionally, the existing 21-second pedestrian phase at the intersection of 4th and I Streets should remain. The analysis indicates that this can be obtained through the use of a 100-second cycle length at the intersections on I Street.

Due to both the Metro station and the expected increase in pedestrian activity along the proposed connection, motorists should be discouraged from using 4th Street as a through route. Recommendations to aid in accomplishing this are as follows:

- Rather than standard asphalt pavement, the new 4th Street connection should be constructed of a texturized pavement surface.
- Raised crosswalks should be constructed across 4th Street at the following locations:
    - M Street
    - Each of the two proposed driveways
    - K Street
    - I Street
- Parking should be permitted at all times in the curb lanes of 4th Street.

- A taxi stand zone should be designated on the west side of 4th Street adjacent to the intersection with M Street (next to the Metro Station entrance).

I STREET

In order to accommodate the traffic associated with the increase in background traffic, other area developments and the redevelopment of Waterside Mall, parking should be prohibited in the eastbound curb lane of I Street between 6th and 3rd Streets, during AM (7:00 – 9:30 AM) and PM (4:00 – 6:30) peak periods. Field observations indicate that this parking is little used during these periods. The curb lane should operate as an exclusive right turn lane at 3rd Street, allowing only the center lane to continue east towards South Capitol Street.

M STREET/ACCESS DRIVEWAYS

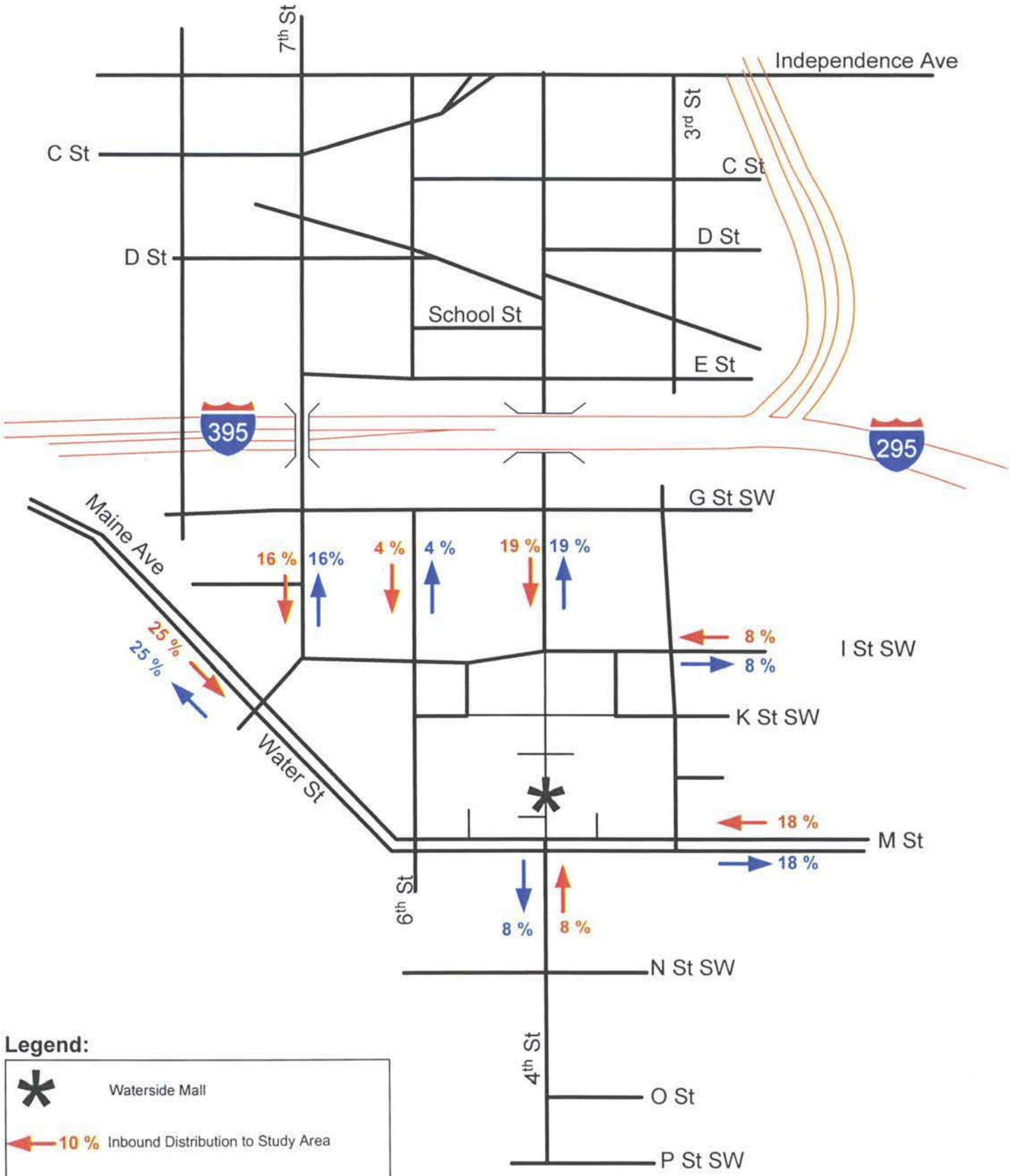
The developer of Waterside Mall is proposing two full-movement driveways on M Street, with median breaks to support them. One driveway is proposed to be located east of 4th Street and the other one is proposed to be located west of 4th Street. The analysis indicates that eastbound volumes on M Street during the PM peak hour are too high to allow for drivers to exit the driveway west of 4th Street onto eastbound M Street. This driveway, west of 4th Street, should be constructed as a right-in, right-out driveway only.

Figure 42 illustrates the driveway configuration proposed by the developer, as well as that proposed by the Study Team. Plans submitted by the developer indicate that the proposed M Street driveways serve as two separate entry/exit points to the site, creating a dangerous condition where conflicting movements are likely to occur. The site plan should be redesigned with the elimination of one of the access points at each driveway. The driveways proposed by the Study Team have one lane in and one lane out instead of the two lanes in and two lanes out that the developer is proposing. The analysis indicates that this proposed full-movement driveway between 3rd and 4th Streets would operate satisfactorily with only one lane out and one lane into the development.

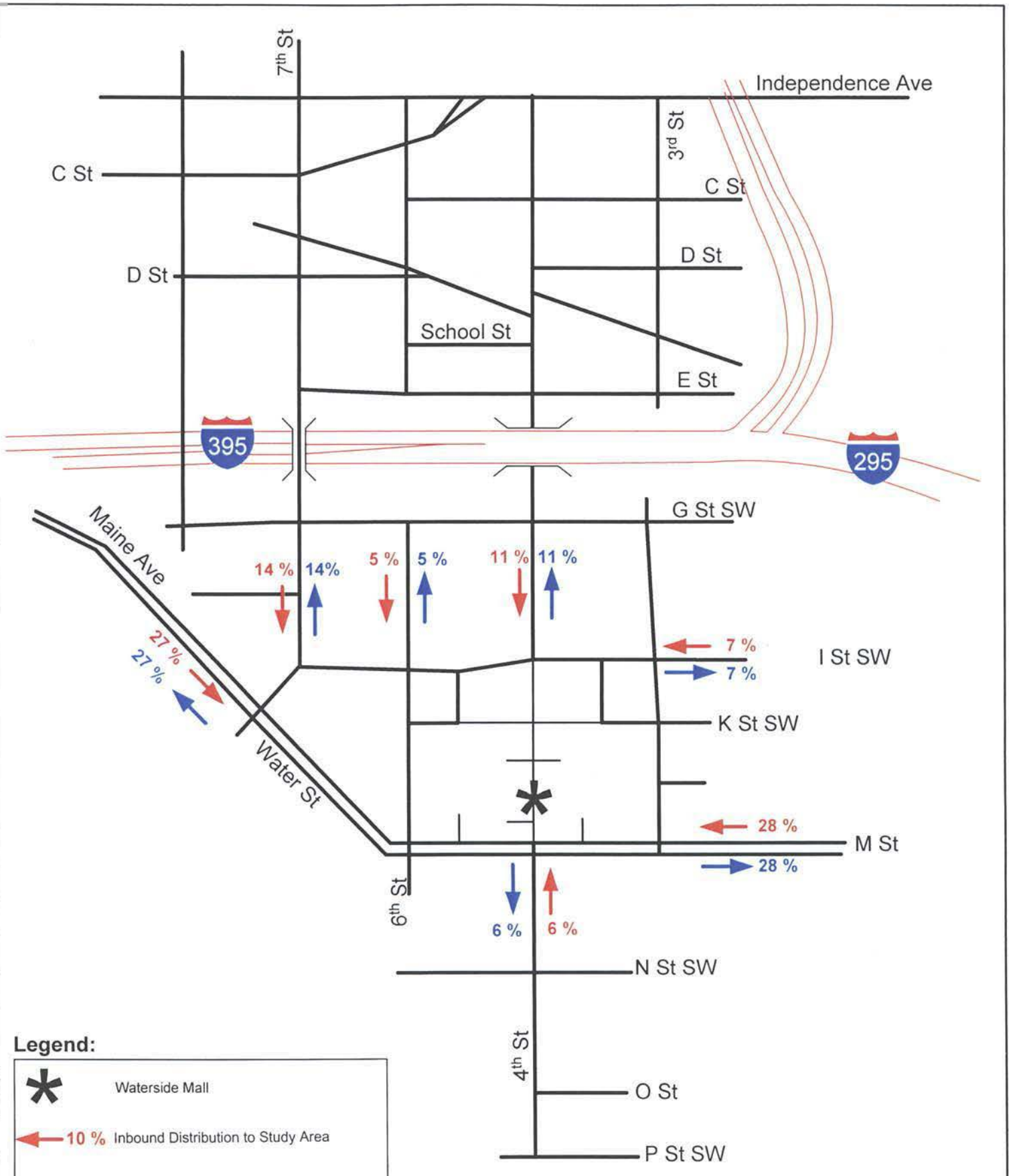
The first 80 feet on the north side of M Street, east of 4th Street, should be reserved as a taxi stand.

ADDITIONAL MITIGATION MEASURES

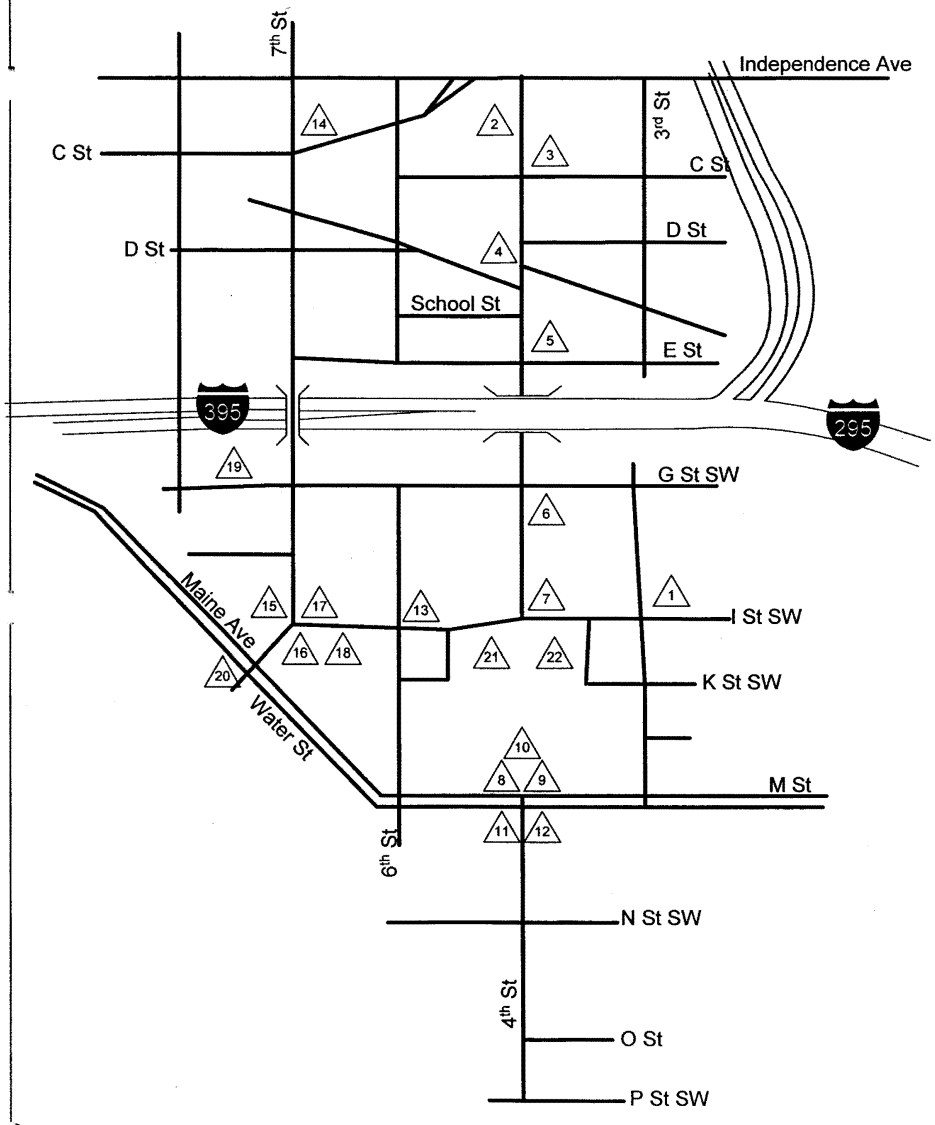
In the next steps of this project, the Study Team will develop additional mitigation measures to address future transportation demands. The Study Team will hold a meeting with citizens to discuss the material included in this report and to present these additional mitigation measures. A preliminary depiction of the 4th Street vehicular connection will also be developed.



Not to Scale		4th Street SW Transportation Study	Site Distribution for Residential Development with 4th Street Vehicular Connection	FIGURE 27
January, 2003				

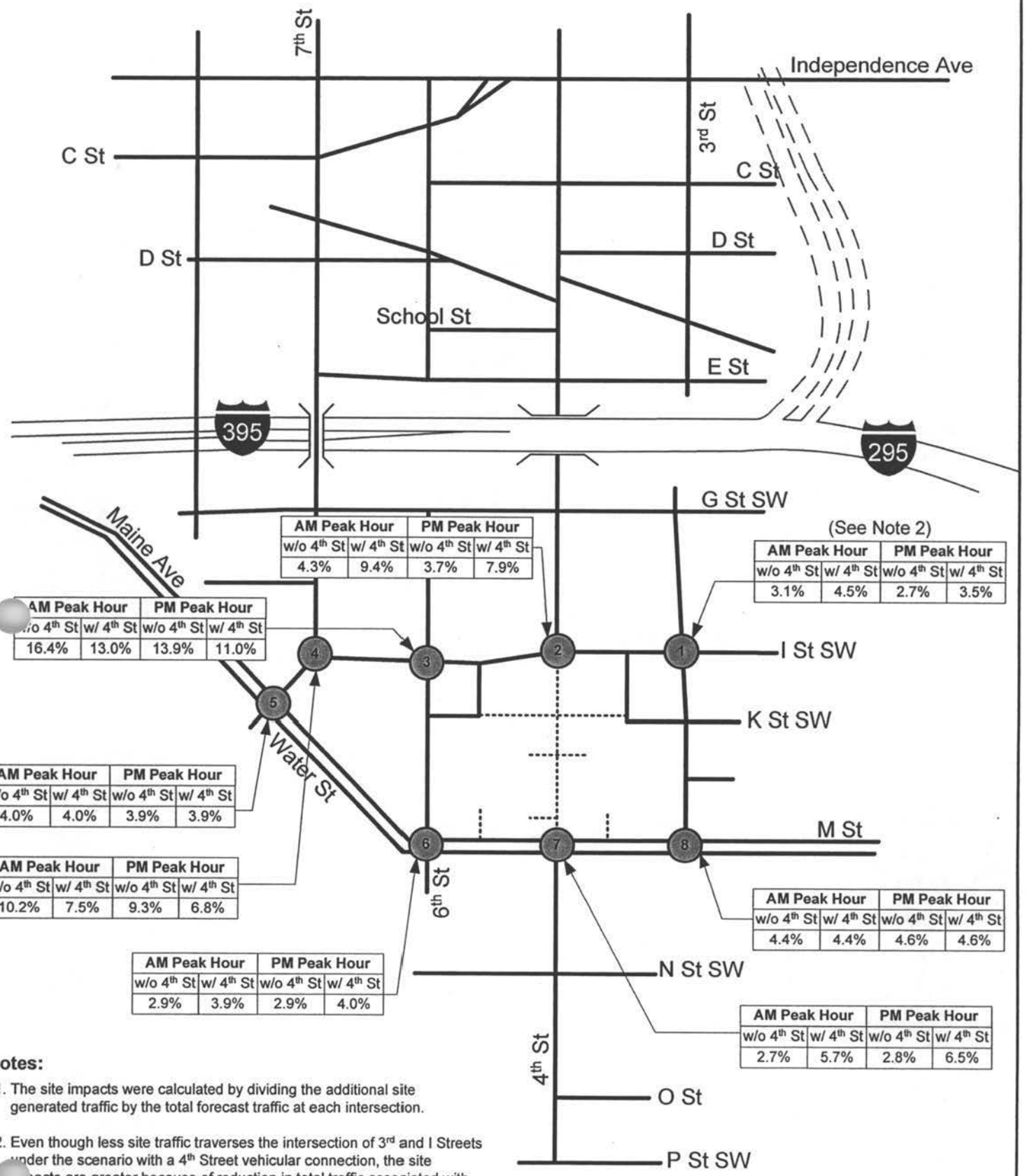


Not to Scale		4th Street SW Transportation Study	Site Distribution for Commercial Development with 4th Street Vehicular Connection	FIGURE 28
January, 2003				



1. Replace existing crosswalks with zebra-striped crosswalks.
2. Re-stripe centerline markings.
3. Re-stripe crosswalks. Add stop bars to pavement on 4th Street.
4. Add stop bar for northbound 4th Street at westbound leg of Virginia Avenue. Place crosswalk across 4th Street north of Virginia Avenue. Place crosswalk to connect the handicapped ramps on each side of 4th Street. Place stop bar for southbound 4th Street traffic 40 feet before signal heads.
5. Add stop bars on 4th Street. Add pedestrian signals on all four approaches.
6. Add stop bars on all four approaches. Add crosswalks on all four approaches.
7. Replace existing crosswalks with zebra-striped crosswalks. Police enforcement of right turn on red restrictions.
8. Place pavement marking arrow in the right lane of the northbound 4th Street approach indicating shared left/ through/right operation. Install signage on the approach indicating the operation of the right lane.
9. Reconfigure entrance to Waterside Mall and move parking gates away from M Street. This improvement would not have to be implemented if a vehicular connection is constructed on 4th Street between M and I Streets.
10. Increase enforcement. Make pedestrians aware of the crosswalk on the east side of the intersection.
11. Increase pedestrian crossing time. Install "No Right Turn on Red When Pedestrians Are Present" signs on all approaches where right turns on red are permitted.
12. Equip pedestrian signals with audio buzzers.
13. Replace existing crosswalks with zebra-striped crosswalks. Police or camera enforcement of right turn on red restrictions.
14. Re-stripe crosswalks at 7th and C Streets.
15. Install "No Right Turn on Red" sign on southbound 7th Street at I Street.
16. Replace "No Right Turn on Red" sign on northbound 7th Street at I Street.
17. Install "No Right Turn on Red when Pedestrians are Present" sign on westbound I Street at 7th Street.
18. If the Special Traffic Operations Patrol program is implemented in the District, station an officer at this intersection.
19. Convert G Street to two-way operation between 7th and 9th Streets. An all-way stop sign should be installed at the intersection of 9th and G Streets. Add pavement markings to area north of island separating 9th Street and exit ramp from Southwest Freeway. Upgrade traffic signal at 7th and G Streets
20. Install "Signal Ahead" advance traffic control signs on both approaches of Maine Avenue, 150 feet before the intersection. Replace the "Keep Right" sign on northbound 7th Street between Water Street and Maine Avenue. Stripe northbound 7th Street with sold lines as 3 lanes between Water Street and Maine Avenue. The right lane should continue to operate as a right turn only lane with the appropriate pavement arrow and legend. Prohibit right turns on red for northbound 7th Street Restripe pavement markings on southbound 7th Street approaching Maine Avenue. Convert the left lane of southbound 7th Street to a left turn only lane, with the appropriate pavement arrow and legend. Re-pave the intersection.
21. Re-stripe centerline markings from 4th Street to 7th Street.
22. Improve coordination of traffic signals.

Not to Scale		4th Street SW Transportation Study	**Recommended Improvements to Address Existing Transportation Issues**	**FIGURE 35**
January, 2003	N			



AM Peak Hour		PM Peak Hour	
w/o 4th St	w/ 4th St	w/o 4th St	w/ 4th St
4.3%	9.4%	3.7%	7.9%

(See Note 2)

AM Peak Hour		PM Peak Hour	
w/o 4th St	w/ 4th St	w/o 4th St	w/ 4th St
3.1%	4.5%	2.7%	3.5%

AM Peak Hour		PM Peak Hour	
w/o 4th St	w/ 4th St	w/o 4th St	w/ 4th St
16.4%	13.0%	13.9%	11.0%

AM Peak Hour		PM Peak Hour	
w/o 4th St	w/ 4th St	w/o 4th St	w/ 4th St
4.0%	4.0%	3.9%	3.9%

AM Peak Hour		PM Peak Hour	
w/o 4th St	w/ 4th St	w/o 4th St	w/ 4th St
10.2%	7.5%	9.3%	6.8%

AM Peak Hour		PM Peak Hour	
w/o 4th St	w/ 4th St	w/o 4th St	w/ 4th St
4.4%	4.4%	4.6%	4.6%

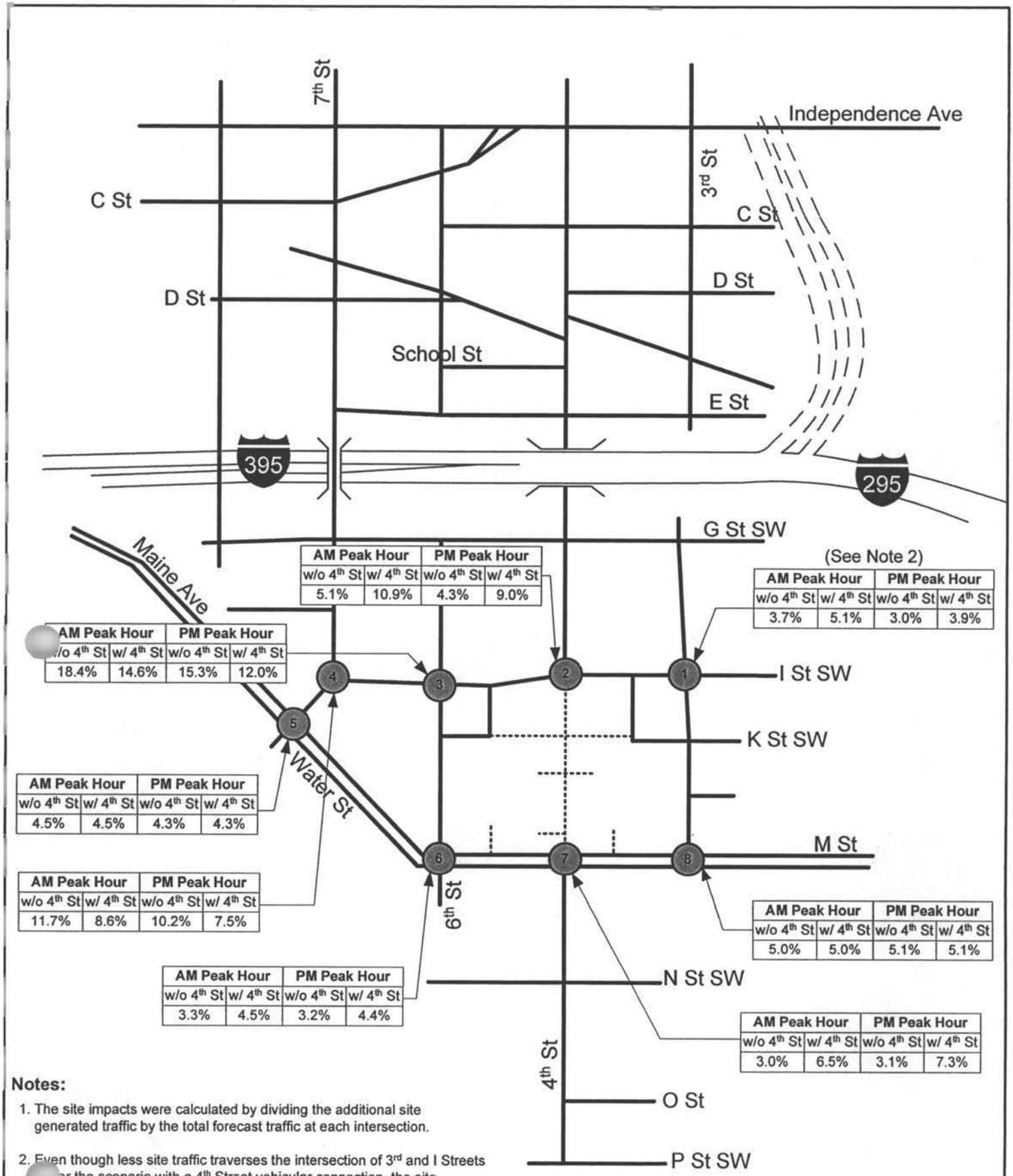
AM Peak Hour		PM Peak Hour	
w/o 4th St	w/ 4th St	w/o 4th St	w/ 4th St
2.9%	3.9%	2.9%	4.0%

AM Peak Hour		PM Peak Hour	
w/o 4th St	w/ 4th St	w/o 4th St	w/ 4th St
2.7%	5.7%	2.8%	6.5%

Notes:

1. The site impacts were calculated by dividing the additional site generated traffic by the total forecast traffic at each intersection.
2. Even though less site traffic traverses the intersection of 3rd and I Streets under the scenario with a 4th Street vehicular connection, the site impacts are greater because of reduction in total traffic associated with background traffic diversions through the 4th Street extension.

Not to Scale		4th Street SW Transportation Study	Site Impacts for 2010 Total Traffic with and without 4th Street Vehicular Connection	FIGURE 36
January, 2003				



AM Peak Hour		PM Peak Hour	
w/o 4th St	w/ 4th St	w/o 4th St	w/ 4th St
5.1%	10.9%	4.3%	9.0%

(See Note 2)

AM Peak Hour		PM Peak Hour	
w/o 4th St	w/ 4th St	w/o 4th St	w/ 4th St
3.7%	5.1%	3.0%	3.9%

AM Peak Hour		PM Peak Hour	
w/o 4th St	w/ 4th St	w/o 4th St	w/ 4th St
18.4%	14.6%	15.3%	12.0%

AM Peak Hour		PM Peak Hour	
w/o 4th St	w/ 4th St	w/o 4th St	w/ 4th St
4.5%	4.5%	4.3%	4.3%

AM Peak Hour		PM Peak Hour	
w/o 4th St	w/ 4th St	w/o 4th St	w/ 4th St
11.7%	8.6%	10.2%	7.5%

AM Peak Hour		PM Peak Hour	
w/o 4th St	w/ 4th St	w/o 4th St	w/ 4th St
5.0%	5.0%	5.1%	5.1%

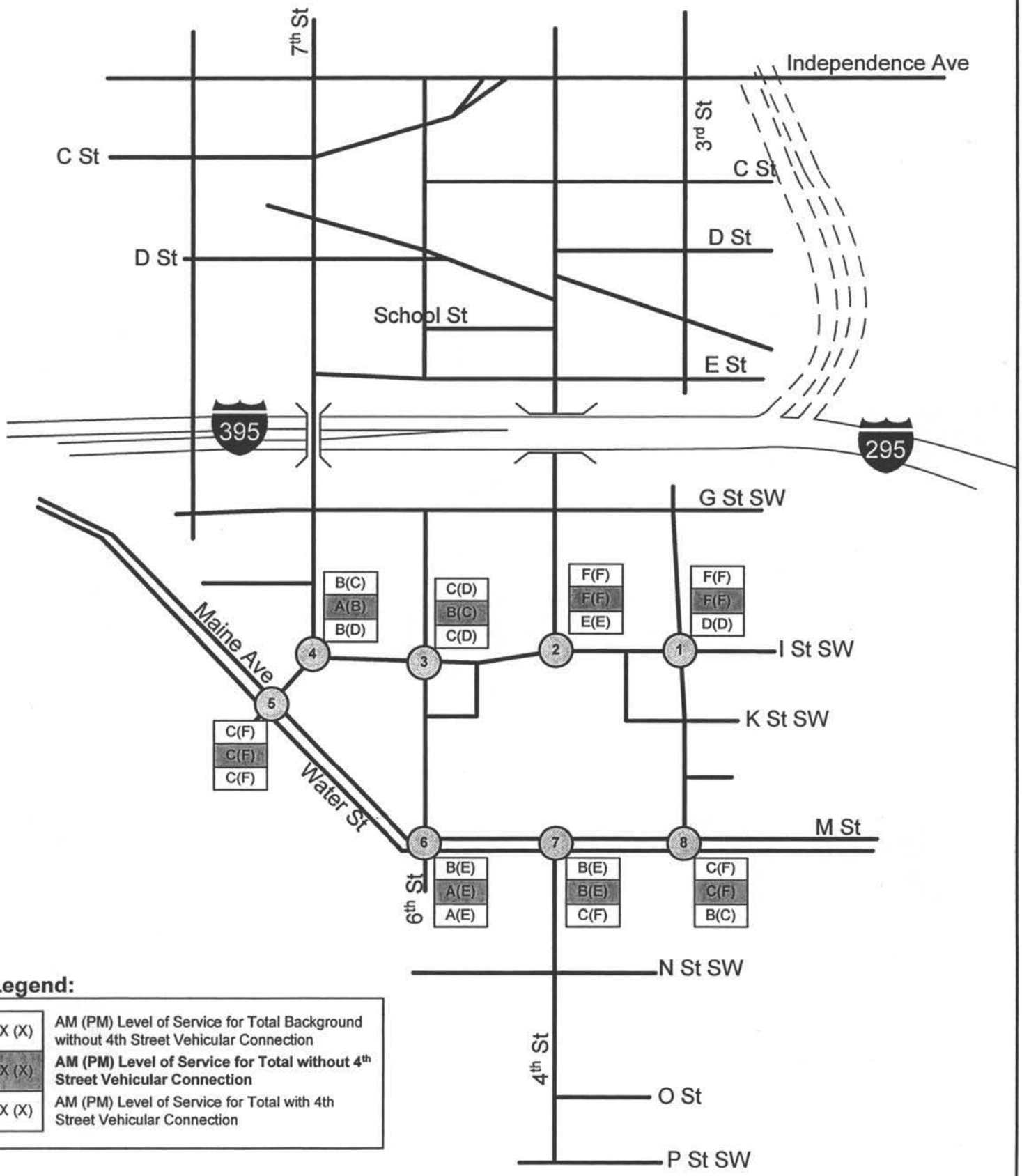
AM Peak Hour		PM Peak Hour	
w/o 4th St	w/ 4th St	w/o 4th St	w/ 4th St
3.3%	4.5%	3.2%	4.4%

AM Peak Hour		PM Peak Hour	
w/o 4th St	w/ 4th St	w/o 4th St	w/ 4th St
3.0%	6.5%	3.1%	7.3%

Notes:

1. The site impacts were calculated by dividing the additional site generated traffic by the total forecast traffic at each intersection.
2. Even though less site traffic traverses the intersection of 3rd and I Streets under the scenario with a 4th Street vehicular connection, the site impacts are greater because of reduction in total traffic associated with background traffic diversions through the 4th Street extension.

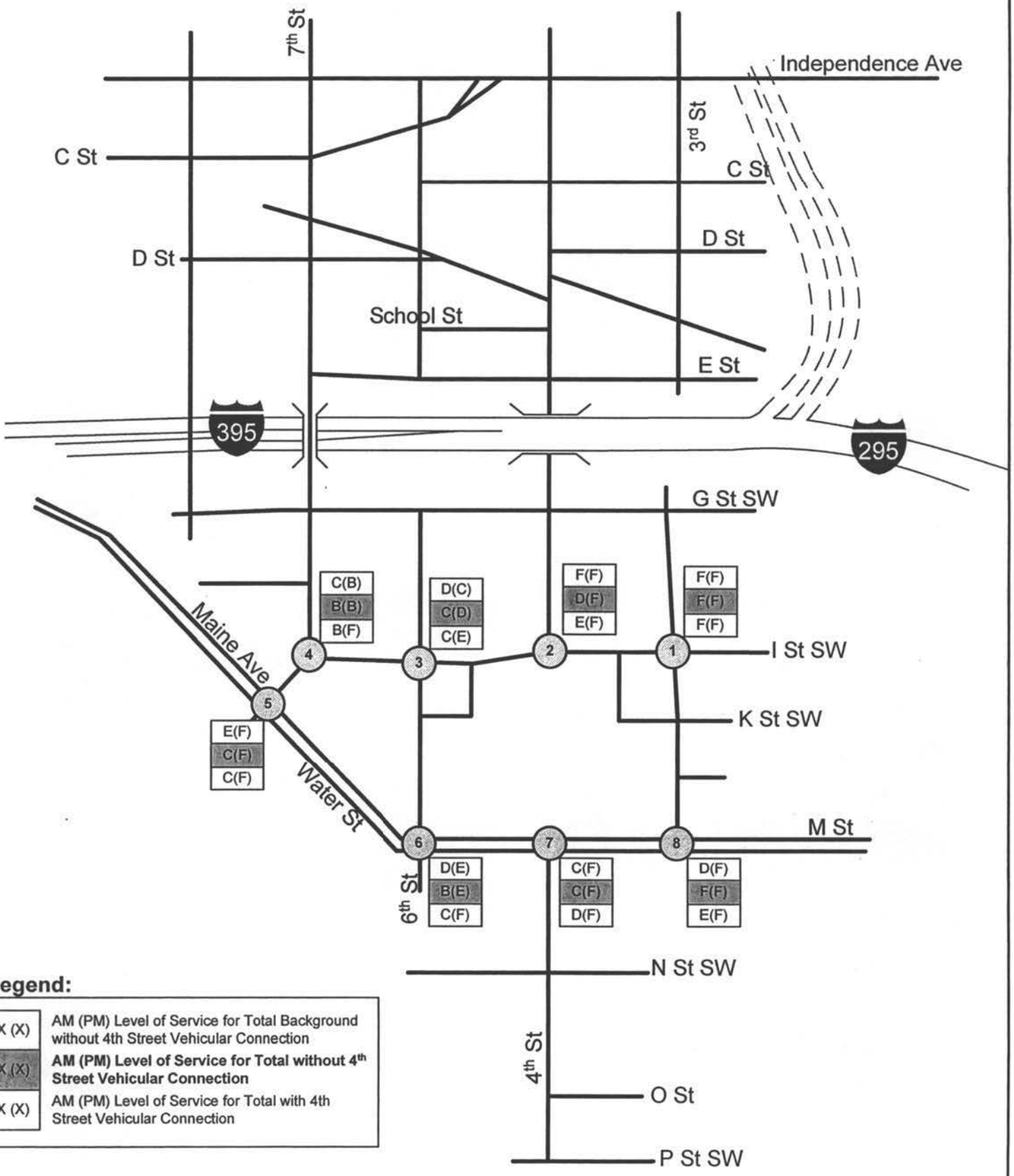
Not to Scale		4th Street SW Transportation Study	Site Impacts for Total Traffic for 2022 with and without 4th Street Vehicular Connection	FIGURE 37
January, 2003				



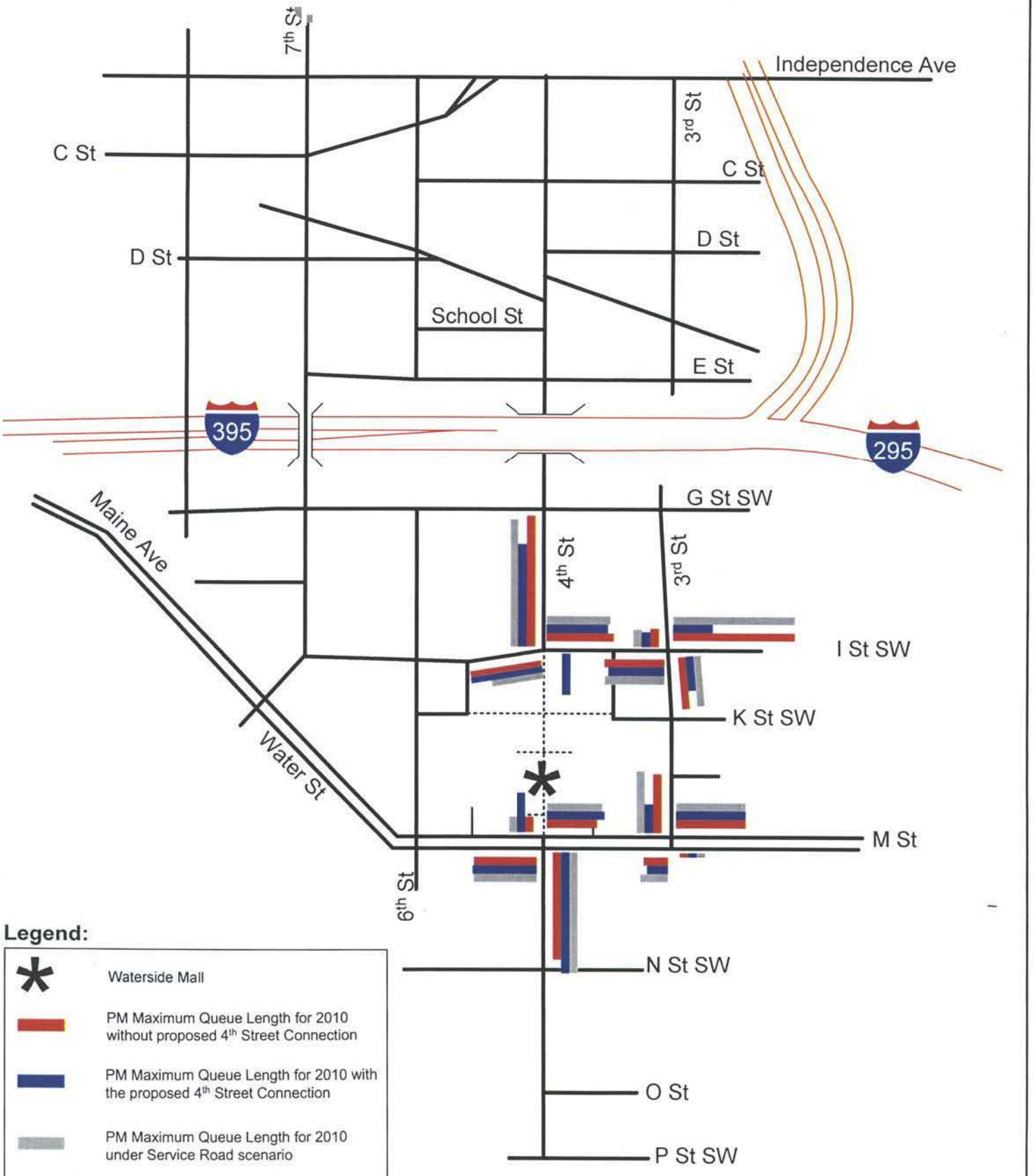
Legend:

X (X)	AM (PM) Level of Service for Total Background without 4th Street Vehicular Connection
X (X)	**AM (PM) Level of Service for Total without 4th Street Vehicular Connection**
X (X)	AM (PM) Level of Service for Total with 4th Street Vehicular Connection

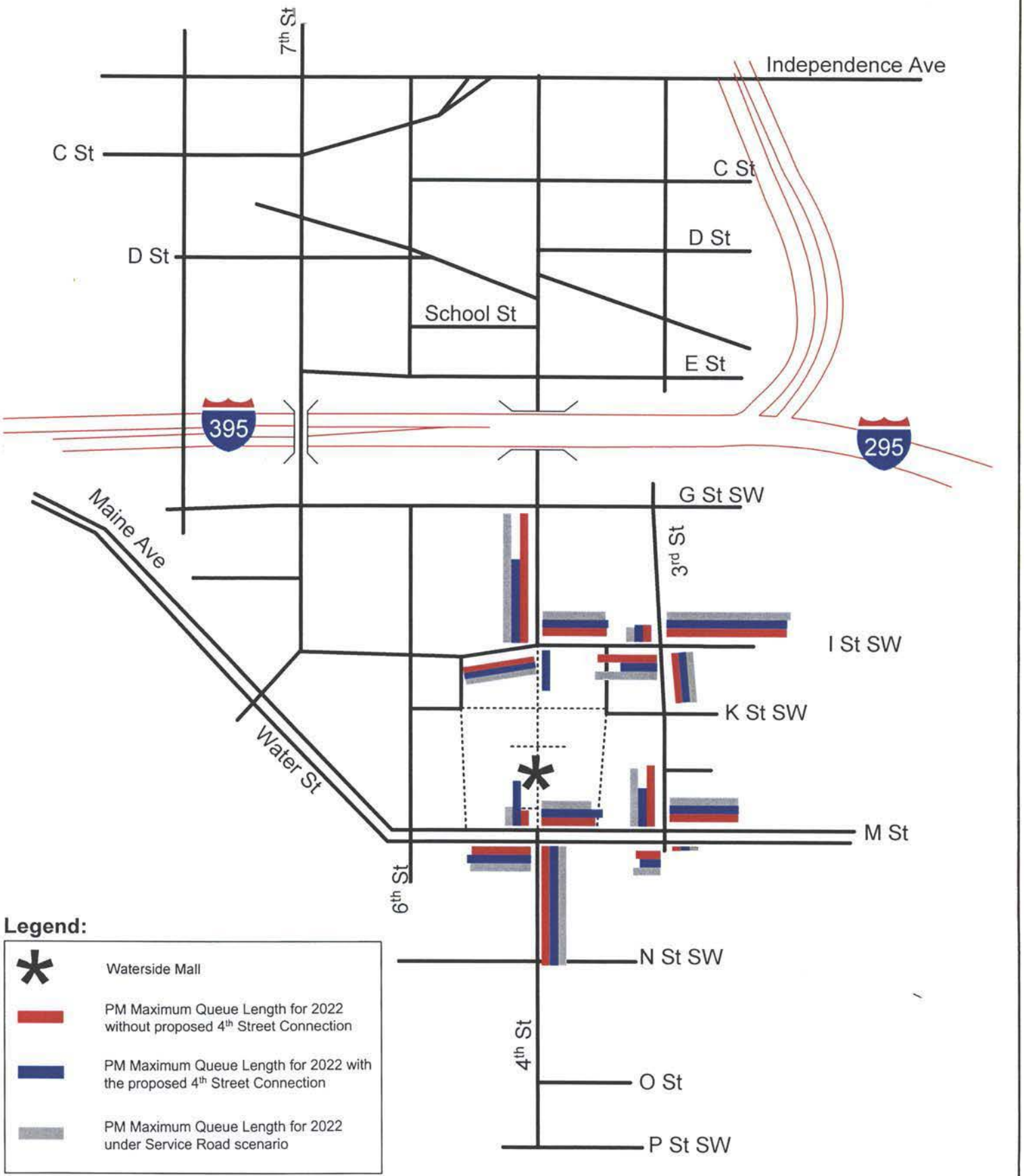
Not to Scale January, 2003	N	**4th Street SW Transportation Study**	**2010 Levels of Service (LOS)**	**FIGURE 38**



Not to Scale		4th Street SW Transportation Study	2022 Levels of Service (LOS)	FIGURE 39
January, 2003				

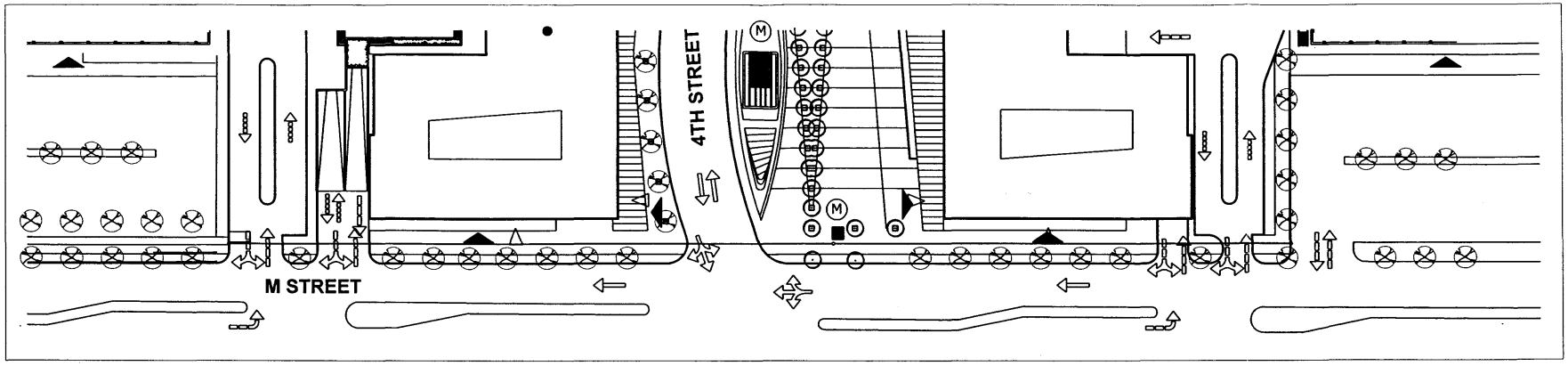


Scale: 1" = 675'		4th Street SW Transportation Study	PM Maximum Queues for 2010 with and without 4th Street Vehicular Connection	FIGURE 40
January, 2003				

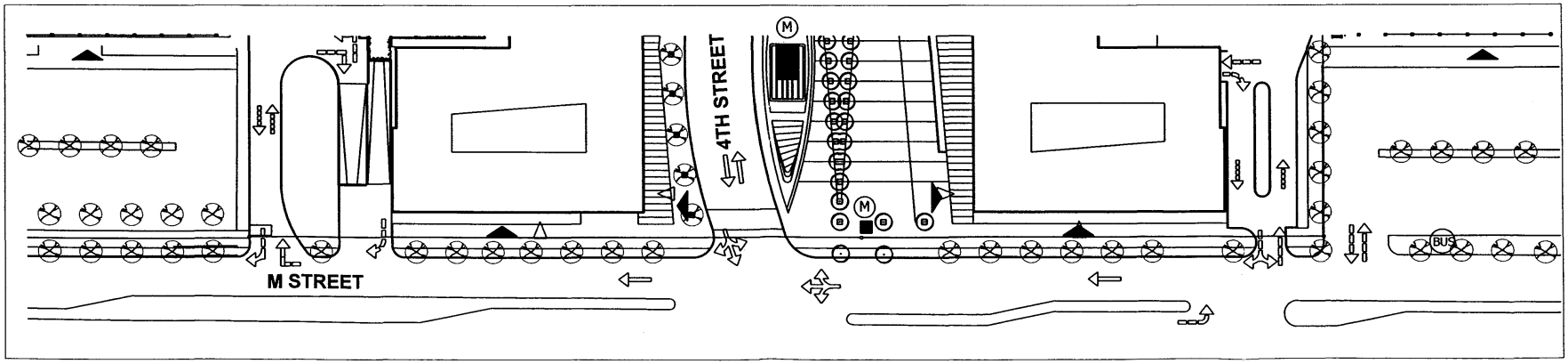


Scale: 1" = 675'		4th Street SW Transportation Study	PM Maximum Queues for 2022 with and without 4th Street Vehicular Connection	FIGURE 41
January, 2003				

DEVELOPER PROPOSAL



STUDY TEAM PROPOSAL



Scale: 1" = 80'		4th Street SW	M Street Driveways	FIGURE
January 2003		Transportation Study		42

APPENDIX A
SCOPE OF WORK

4th Street SW/Waterside Mall Traffic Study
Scope of Work
April 30, 2002

Purpose

The District Division of Transportation (DDOT) proposes to investigate existing traffic conditions along 4th Street SW and adjacent streets, estimate projected future traffic conditions related to proposed development at Waterside Mall SW, and to determine the impact of reestablishing vehicular traffic along 4th Street SW between Eye Street and M Street SW on 4th Street SW and on adjacent streets in the community. The study shall identify anticipated traffic volumes in the study area and estimate anticipated levels of service and identify any transportation safety issues arising out of reestablishing vehicular traffic on 4th Street SW between Eye Street and M Street SW. The study shall also investigate pedestrian, bicycle and transit impacts of the proposed Waterside Mall development.

Study Area

The "study area" for this project includes:

- 4th Street SW between Independence Avenue and P Street SW;
- 3rd Street SW between Eye Street and M Street SW;
- 6th Street SW between G Street and M Street SW; and
- 7th Street SW between Independence Avenue and Maine Avenue SW

Definition of Work

The contractor will examine existing traffic conditions in the study area, estimate projected future traffic conditions resulting from anticipated development projects and assess the impact of reopening that portion of 4th Street SW between Eye Street and M Street, SW. Over an 18–week period, the contractor will also investigate current and future needs regarding vehicle, pedestrian and bicycle mobility.

The contractor shall prepare a proposed study scope of work, project schedule and proposed budget and submit these documents to the project manager at the end of week #1.

Description of Work to be Performed

Task 1: Scoping Meeting

The contractor shall develop a community participation process that will consist of at least three meetings with community stakeholders in the study area. The purpose of these meetings shall be to obtain comments regarding the collection of background information and analysis of transportation impacts from reopening 4th Street SW between Eye Street and M Street SW to vehicular traffic.

The first meeting will be held with Advisory Neighborhood Commission 2D, the Southwest Neighborhood Assembly and other stakeholders to discuss the proposed scope of work and schedule for the traffic study. This meeting will be scheduled for the second week of the study. The purpose of this meeting will be to announce the project to the neighborhood, outline the projected timeframe for the study and introduce the contractor to community stakeholders.

The second public meeting will occur after Task 2 is completed. The third public meeting will be held after Task 4 is completed.

Task #1 to be completed Week 2

Task 2: Collect and Consolidate Data

The contractor will collect data on the following elements:

1. Existing traffic volumes and level of service for roadway segments within the study area. This includes mapping, aerial photography, historical research and other materials available from the DC Office of Planning, DPW Traffic Services and Transportation Planning, and other District and Federal government agencies.

2. Information from traffic studies (if any) conducted in the study area within the past two years.

3. Field reconnaissance of the study area noting existing land uses, existing roadway geometric and traffic control conditions, traffic flow patterns, transit facilities and services, pedestrian facilities, bicycle facilities (if any), as well as opportunities and constraints pertaining to access from the intersecting sidestreets and driveways.

4. Conduct field studies to identify vehicular and pedestrian traffic characteristics, including turning motions during the morning peak period (7 AM to 9 AM) and the afternoon peak period (4:30 PM to 6:30 PM on four typical weekdays at the following intersections:

    - 4th and M Street SW
    - 6th and M Street SW
    - 6th and Eye Street SW
    - 4th and Eye Street SW
    - 7th and Maine Avenue SW
    - 7th and Eye Street SW

5. Mechanical/continuous vehicle volume, speed and classification survey at one location on 4th Street, 6th Street and 7th Street (a total of 3 stations).

6. Investigate and describe bus and rail transit services in the study area.

7. Investigate and describe pedestrian traffic and bicycle traffic within the study area.

From: Lerner, Abraham

To: 'Rybeck, Rick (DDOT) '

Cc: 'ken.laden@dc.gov '; Prestia, Thomas

Subject: 4th Street SW Study

Sent: 7/16/2002 7:11 PM **Importance:** Normal

Rick,

As I mentioned to you last week, the scope for the 4th Street SW study needs some modifications. Ken indicated that he is going to make the changes. Ken and I met on on July 2, 2002 to discuss the changes. The following is my understanding of the changes that will be made to the scope:

1. The contractor will evaluate an option that includes a pedestrian facility connecting M and I Streets (with no access to vehicles).

2. The study will have a heavy emphasis on pedestrian mobility.

3. The contractor will identify schools and school crossings in the study area and assess the adequacy of operations.

4. The study area for land use purposes (trip generation of planned and approved developments) will extend from the Washington Channel to South Capitol Street and from I-395 to Buzzard Point.

5. The contractor will add two more tube counts. These counts will be taken around the area of 7th and Maine.

6. The contractor will make recommendations to improve pedestrian movements across M Street.

Because of the time constraints on this project, we are proceeding with the work. I told Ken that we need to review the revised scope to assess whether or not we can accommodate the modified scope of work with the previously developed cost estimate. Please coordinate with Ken the preparation of a revised scope and provide it to me at your earliest convenience. I will be on vacation from July 19 until July 30. If you need to talk to someone about this project during the days that I am out, please contact Tom Prestia (Tel: 202.671-1485 - E-Mail: thomas.prestia@dmjmharris.com).

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E-Mail: abraham.lerner@dmjmharris.com

8. Identify any proposed new construction within the study area including the proposed redevelopment of Waterside Mall, and calculate proposed vehicular traffic generated by the proposed development.

9. The contractor will prepare a brief report of findings regarding traffic and safety identified through Task 2 and make 20 copies available to District agencies, ANC 2-D, the Southwest Neighborhood Assembly and other interested community groups.

Task #2 to be completed Week 8

Task 3: Public meeting

The contractor and DDOT shall conduct one public meeting with the ANC 2-D, the Southwest Neighborhood Assembly and other stakeholders to review the findings of the research and field investigations and obtain public comment and request preliminary information from stakeholders on proposed features of the transportation facility.

Task #3 to be completed Week 10

Task 4: Transportation Impacts and Recommendations

The contractor will analyze the current vehicular, bicycle and pedestrian traffic conditions and estimate transportation impacts of future proposed development at Waterside Mall and other proposed development sites in the study area. The contractor shall prepare a report describing any changes in mobility, safety, and level of service of the major corridor within the study area. The contractor shall also analyze average delays, queues and travel times along the 4th Street, 6th Street and 7th Street SW corridors using a Sychro software-modeling program. The report shall also analyze the impact of proposed development on bus and rail transit, pedestrian and bicycle services in the study area. The report shall recommend future transportation uses of 4th Street SW between Eye and M Streets SW. The report shall also identify recommended transportation management policies and programs to improve mobility, safety and reduce congestion, such as traffic control measures, traffic calming measures, improved signage, signalization, channelization, etc. The contractor shall also prepare a concept plan providing a graphic depiction of the proposed transportation recommendations.

The contractor will prepare a draft report of findings and recommendations regarding traffic and safety identified in Task 4 and make 20 copies available to District agencies, ANC 2-D, the Southwest Neighborhood Assembly and other interested community groups.

Task #4 to be completed Week 12

Task 5: Public meeting

The contractor will conduct a public meeting to review recommendations with the ANC 2-D, the Southwest Neighborhood Assembly and other community groups and stakeholders and obtain comments.

Task #5 to be completed Week 14

Task 6: Final Report

The contractor shall incorporate comments from the public meeting and District and Federal agencies into a final report. The final report shall also contain preliminary budget estimates and a proposed schedule for implementing the proposed recommendations.

Task #6 to be completed Week 18

Deliverables

- Detailed scope of work and study schedule and project budget.
- Preliminary report on transportation findings
- Preliminary report on transportation impacts and recommended improvements
- Graphic depiction of the proposed transportation recommendations
- Final report of recommended improvements
- Visual aids including maps or aerial photos of study area as needed

Coordination

Consultant will work closely with the DDOT/Traffic Services Administration, the Office of Planning, ANC 2-D, the Southwest Neighborhood Assembly, other community groups, and stakeholders.

Key Dates/Schedule

Week 2: Conduct a scoping meeting with local Advisory Neighborhood Commission, the Southwest Neighborhood Assembly and community groups.

Week 8: Determine existing traffic volumes and level of service for roadway segments and other transportation information within the study area. Identify turning motions at key intersections. Collect additional information on proposed development in the study area.

Week 12: Identify potential impacts and proposed improvements to address mobility, safety and reduce congestion.

Week 12: Draft Report

Weeks 10 and 14: Public Meetings

Week 18: Final Report and Public Meeting