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 critical 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

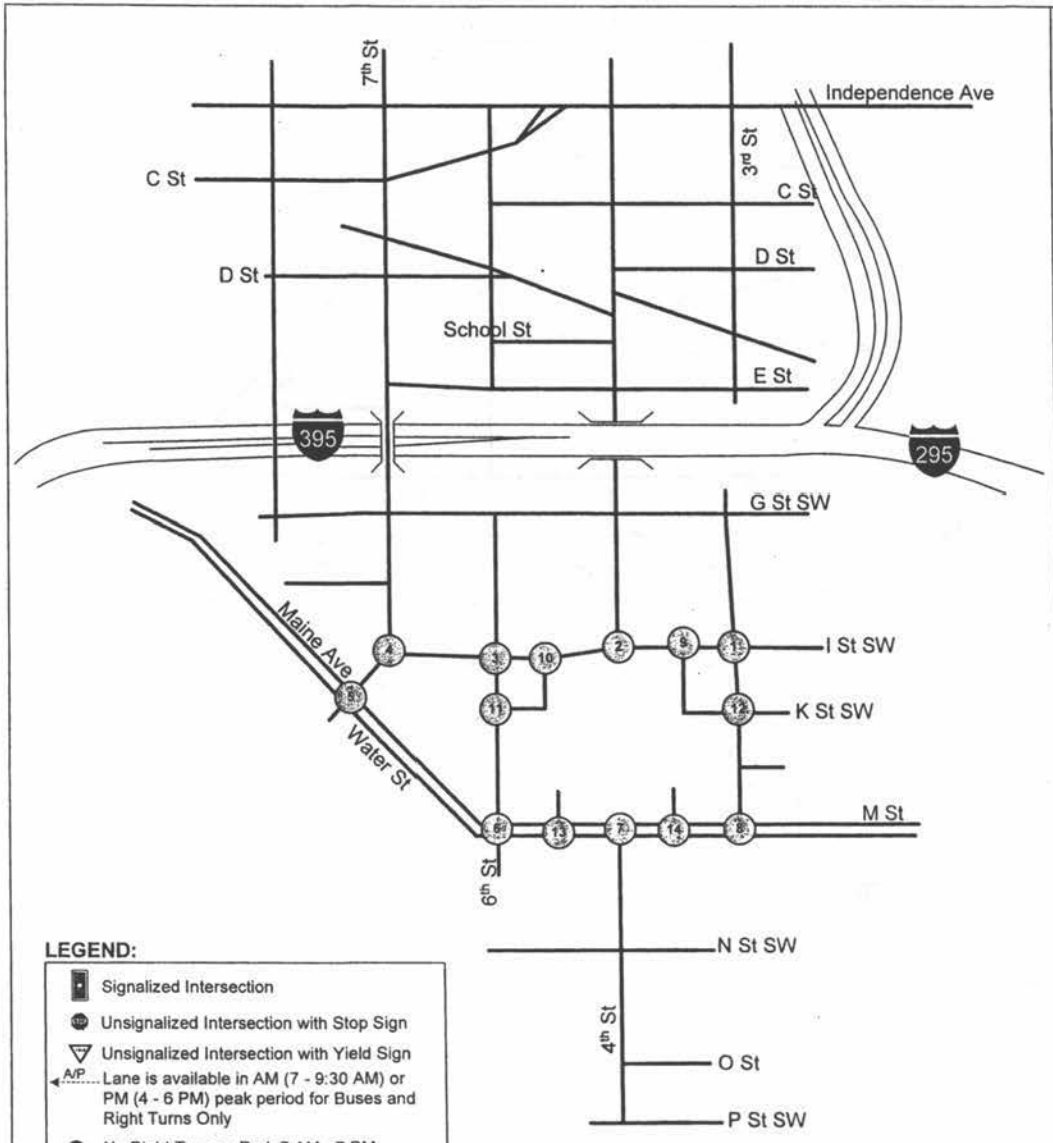
Note that the existing, currently vacant office space of Waterside Mall was not used in this scenario. This scenario assumes that Waterside Mall will be developed as shown in Table 7. Figures 24 and 25 show total volumes for site development without a vehicular connection of 4th Street for 2010 and 2022,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

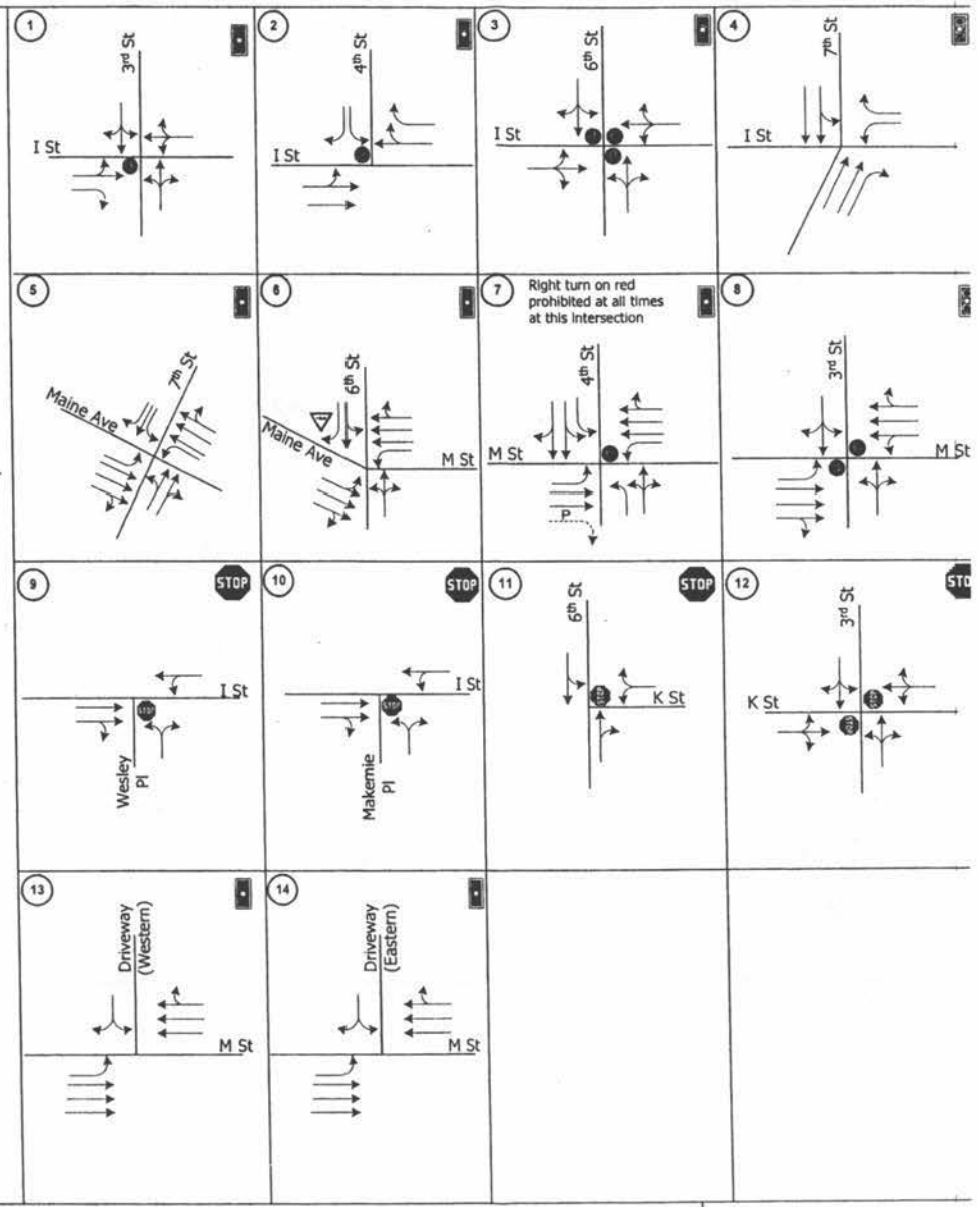
SITE IMPACTS

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 site generated traffic by the total forecast traffic at each intersection.

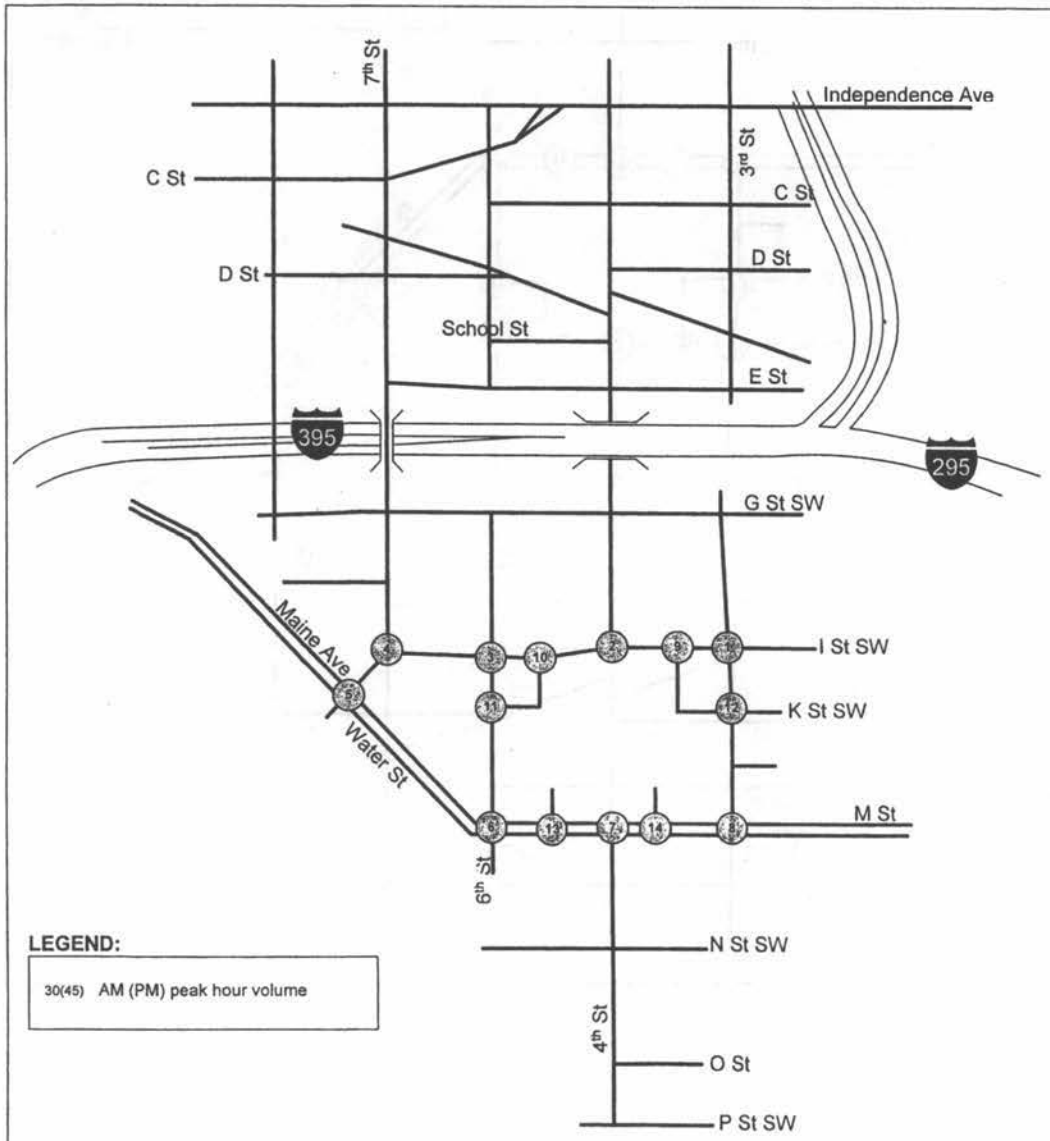
Site impacts of less than five percent are low and generally reflect negligible effects on traffic operations and delays. Site impacts between five and 15 percent are moderate and

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CASE NO.02-38
EXHIBIT NO.69A2



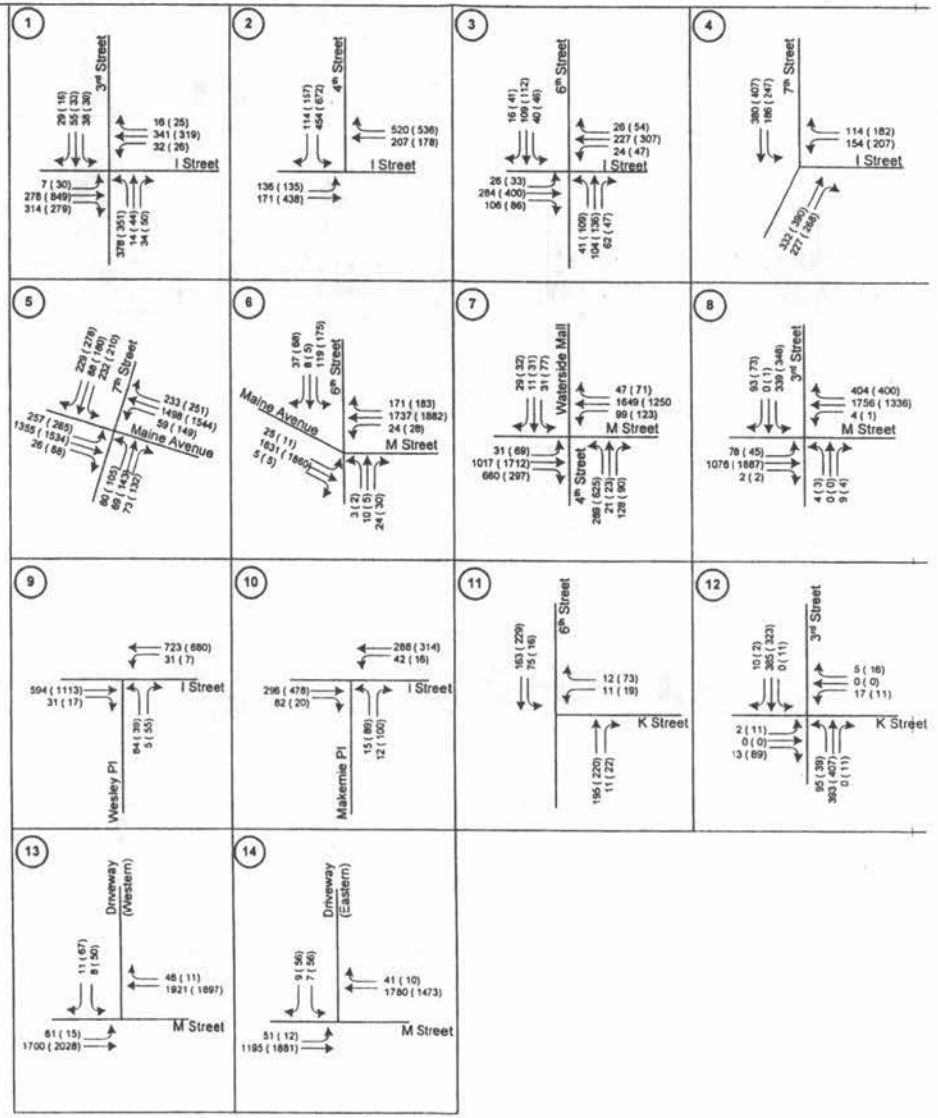


Not to Scale		4th Street SW Transportation Study	Future/Proposed Peak Period Lane Configurations without 4th Street Vehicular Connection	FIGURE 23
January, 2003				

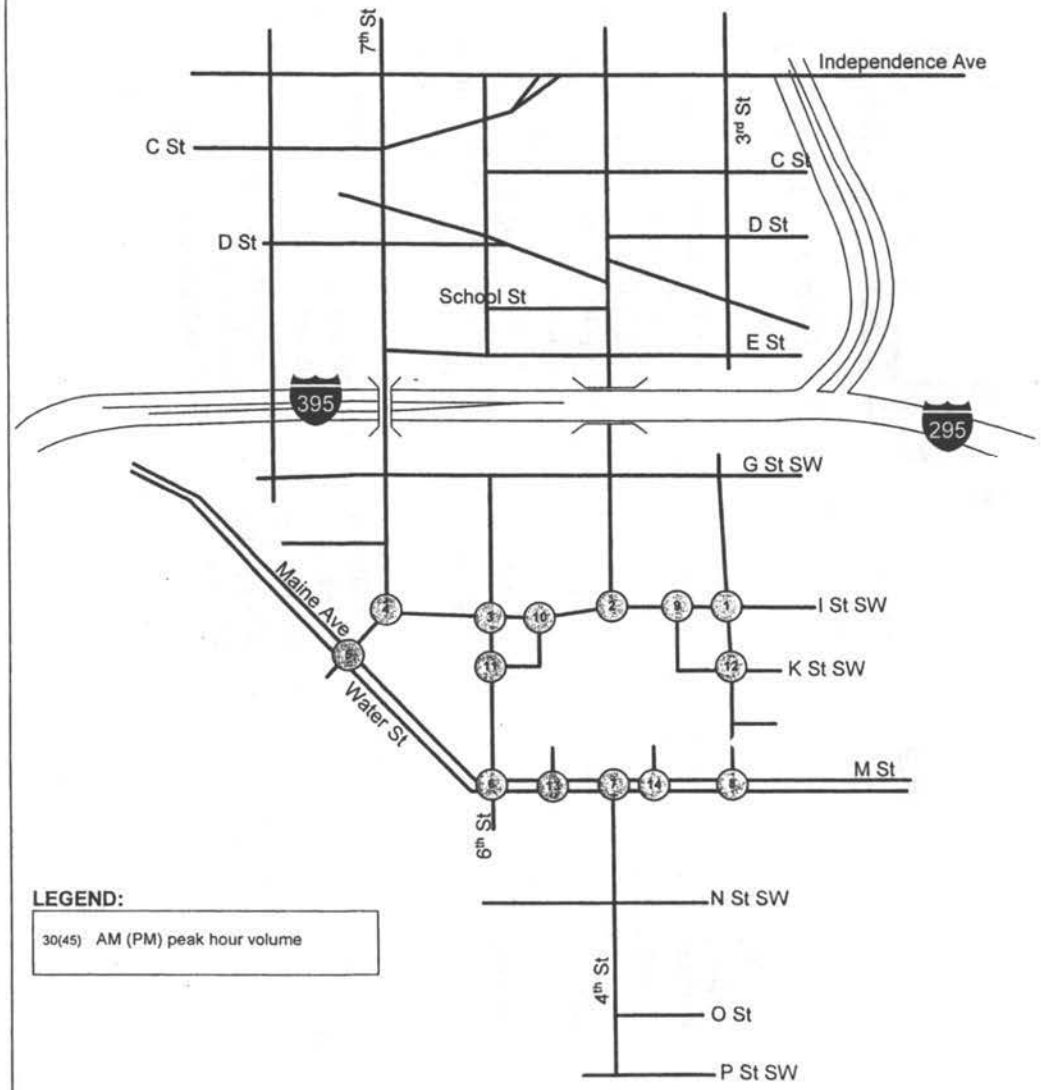


LEGEND:

30(45) AM (PM) peak hour volume

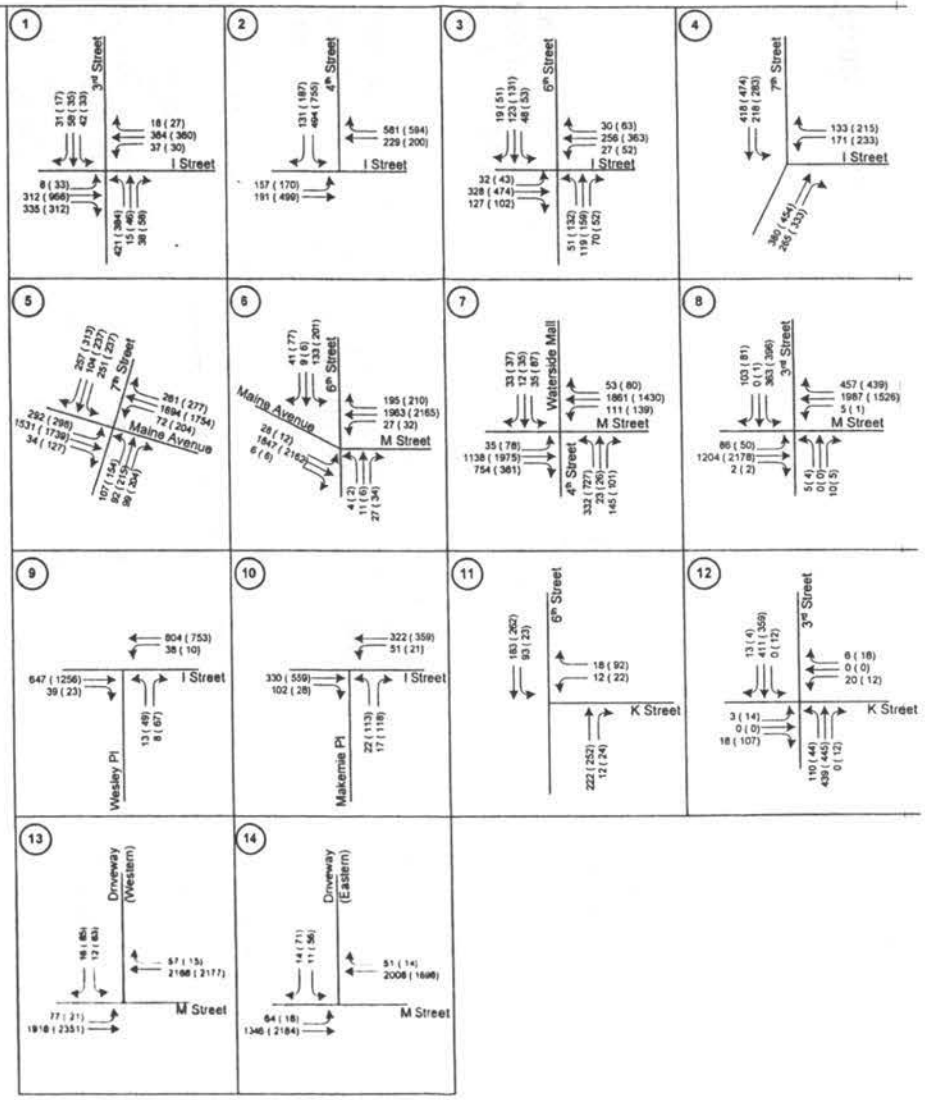


Not to Scale		4th Street SW Traffic Study	Total (2010) AM and PM Peak Hour Volumes without 4th Street Vehicular Connection	FIGURE 24
January, 2003				



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				

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.[illegible]	D	[illegible]	F	[illegible]	F	[illegible]	F	[illegible]	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	[illegible]	B	[illegible]	A	[illegible]	B	[illegible]	B	[illegible]	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	[illegible]		[illegible]	B	[illegible]	A	[illegible]	F	[illegible]	B	[illegible]	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	[illegible]		[illegible]	B	[illegible]	C	[illegible]	F	[illegible]	F	[illegible]	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.

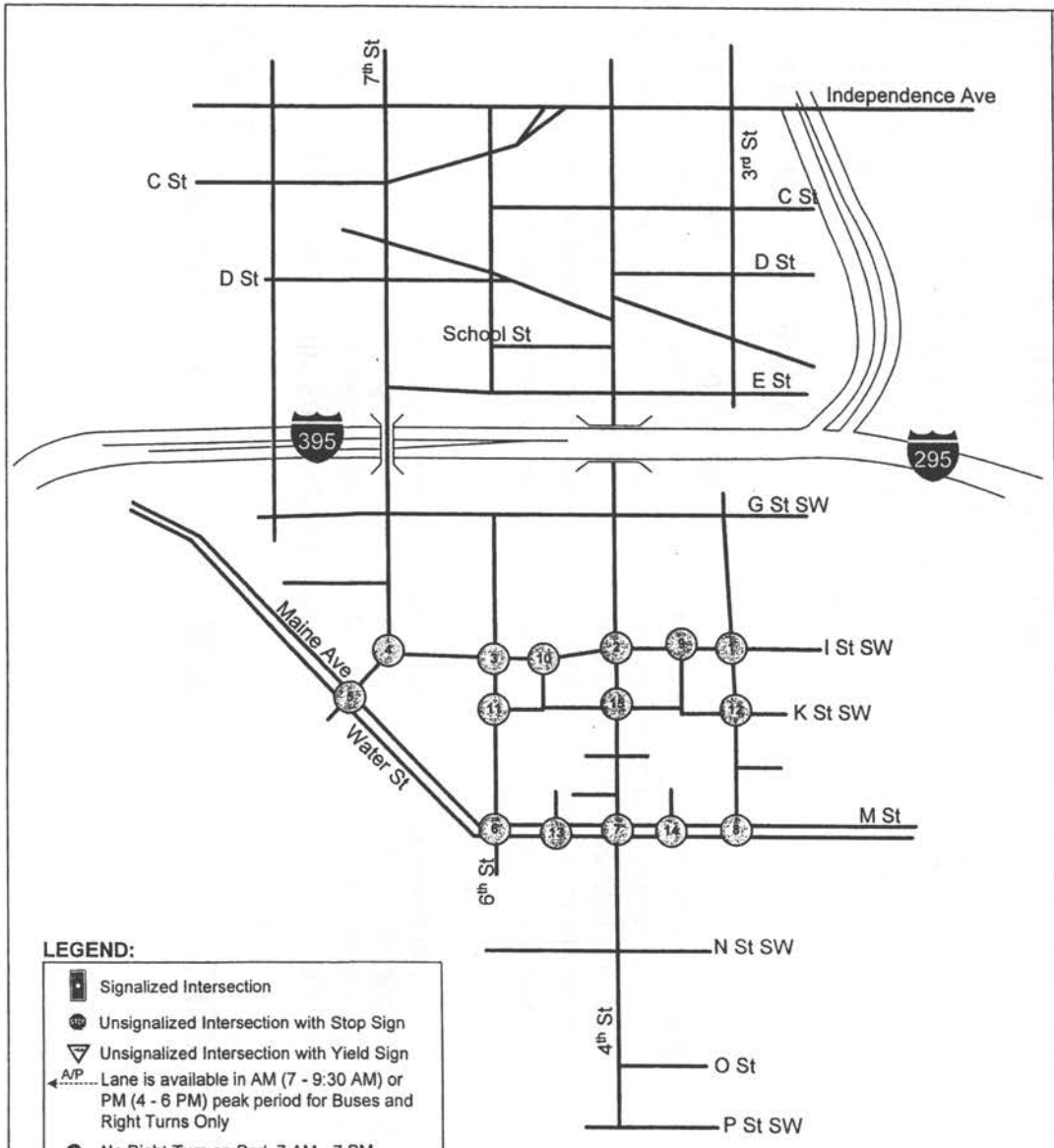
TRIP DISTRIBUTIONS FOR SITE DEVELOPMENTS

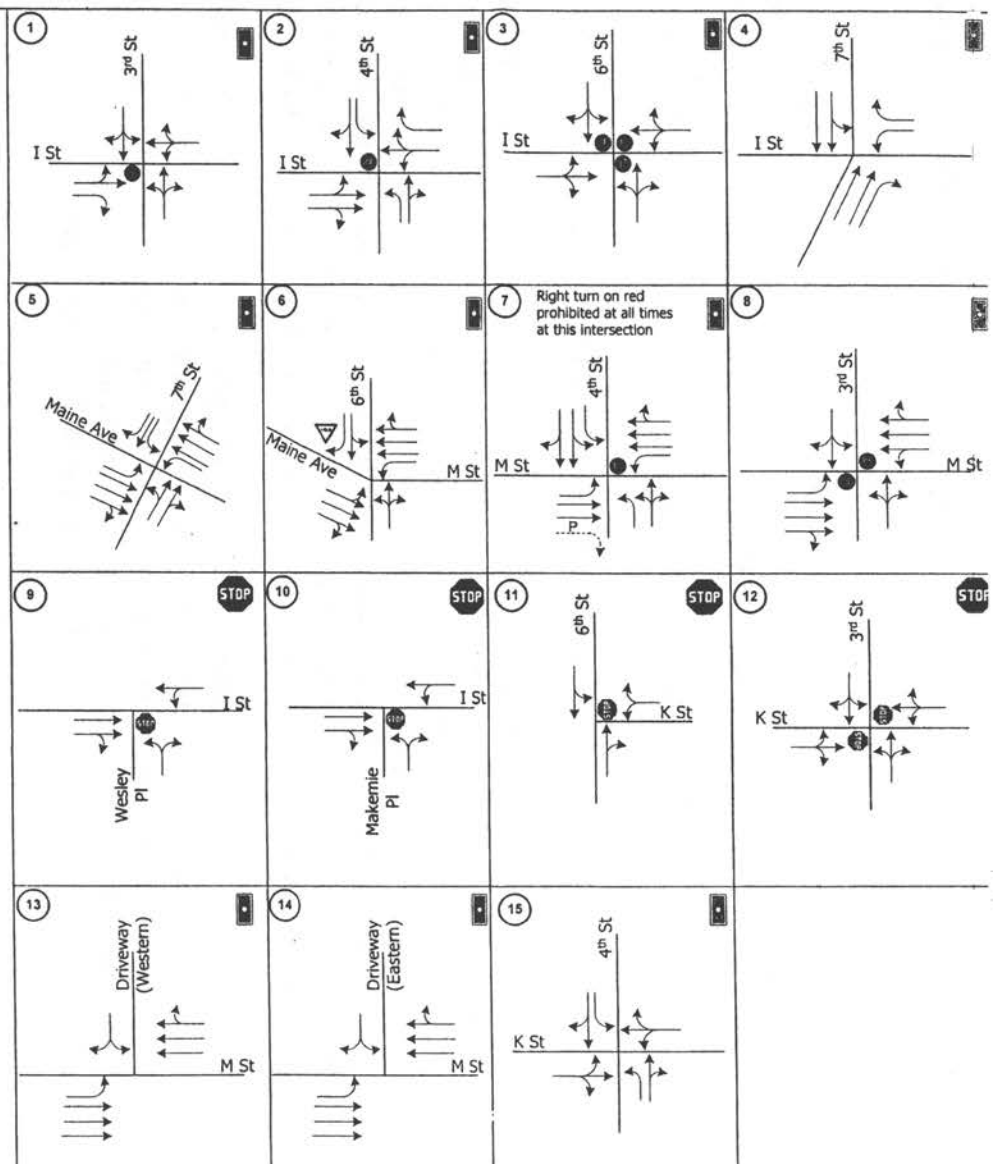
Trip distribution at the entry and exit points to the study area for site traffic under this scenario is the same as the scenario without the proposed 4th Street vehicular connection. All site traffic is assumed to enter the study area via the same routes with or without this vehicular connection. Figures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

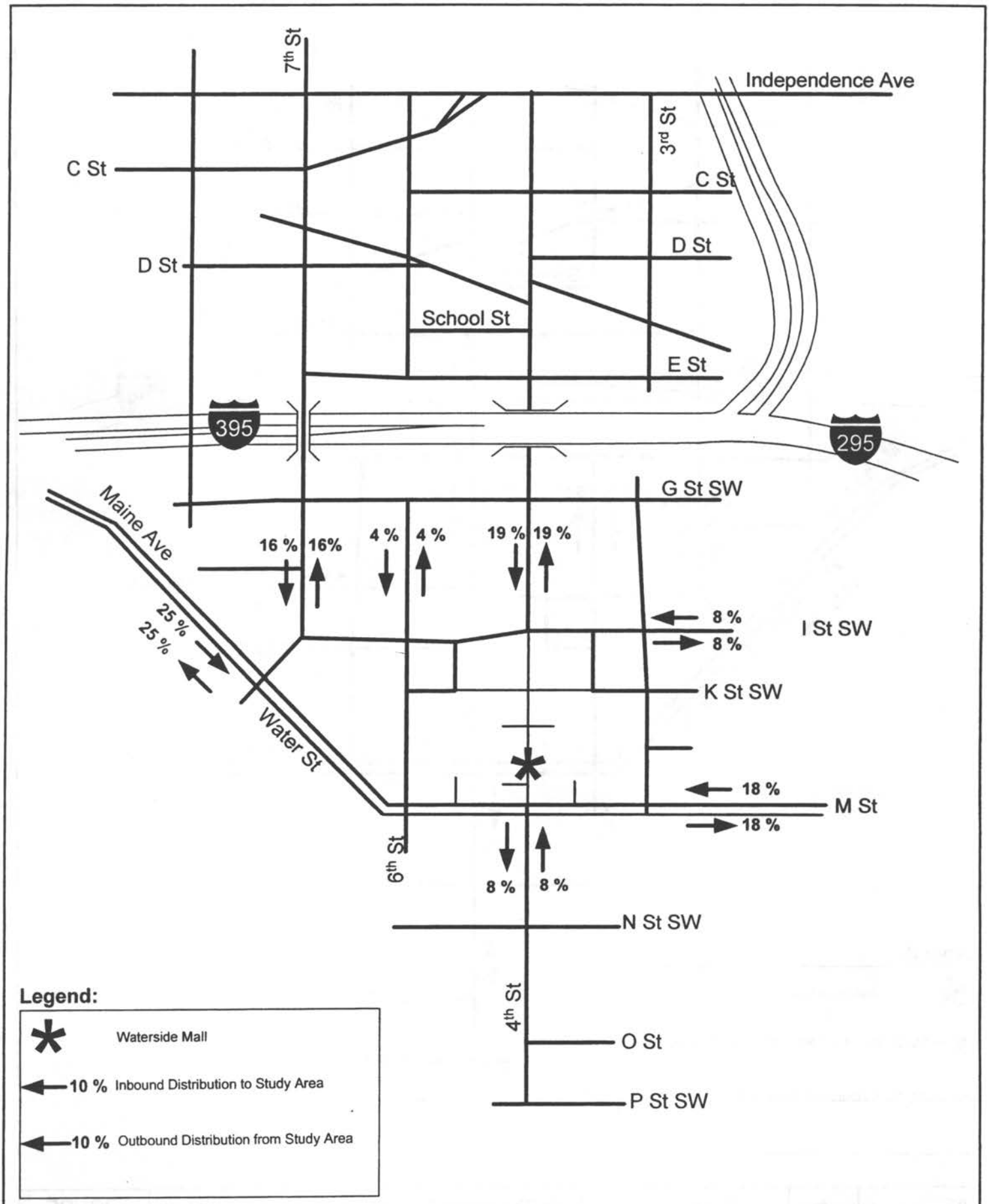
TRIP ASSIGNMENTS FOR SITE DEVELOPMENTS

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

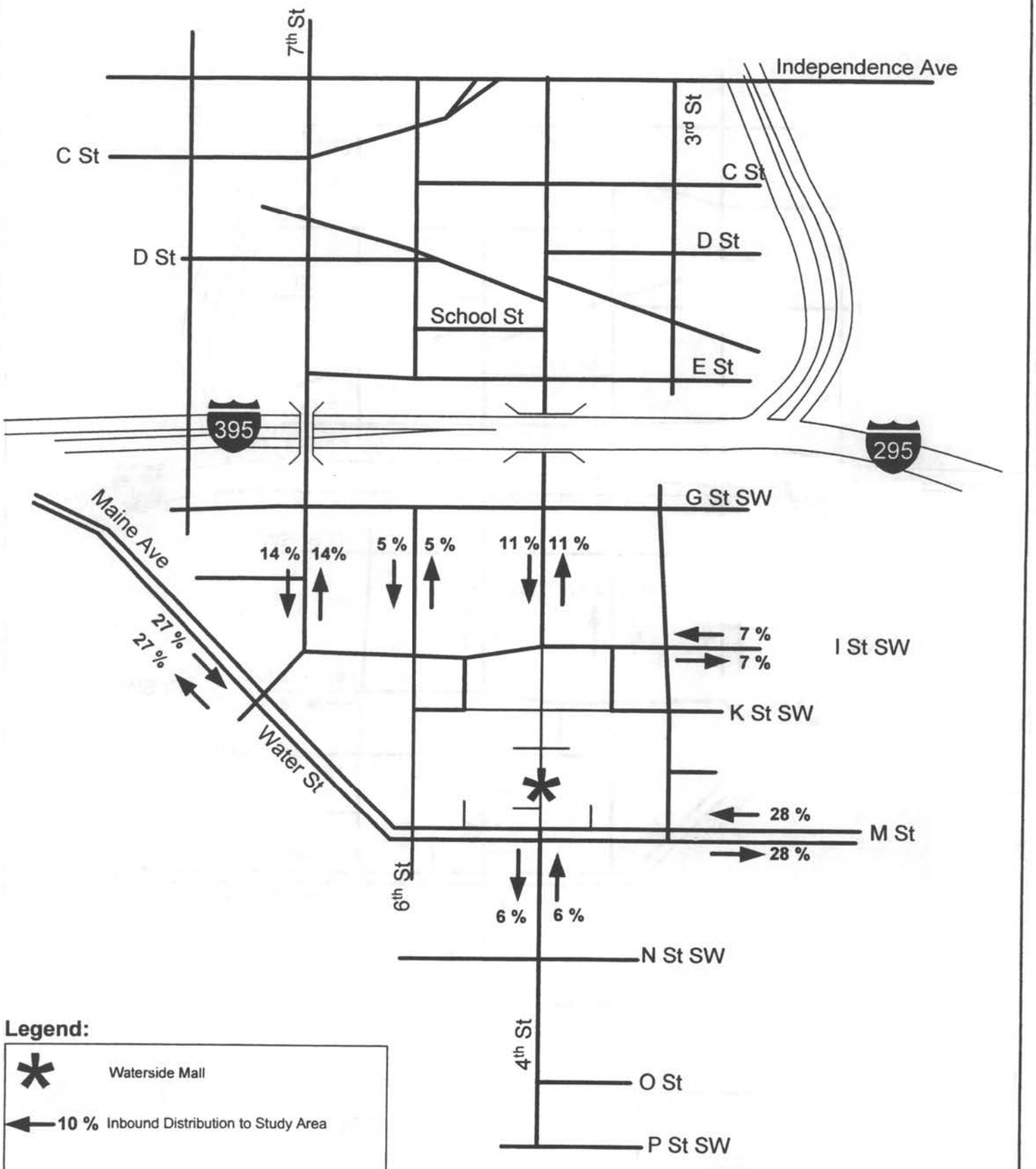




Not to Scale		4th Street SW Transportation Study	Future/Proposed Peak Period Lane Configurations with 4th Street Vehicular Connection	FIGURE 26
January, 2003				



Not to Scale | 4th Street SW | Site Distribution for Residential Development with | FIGURE



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

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 critical 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

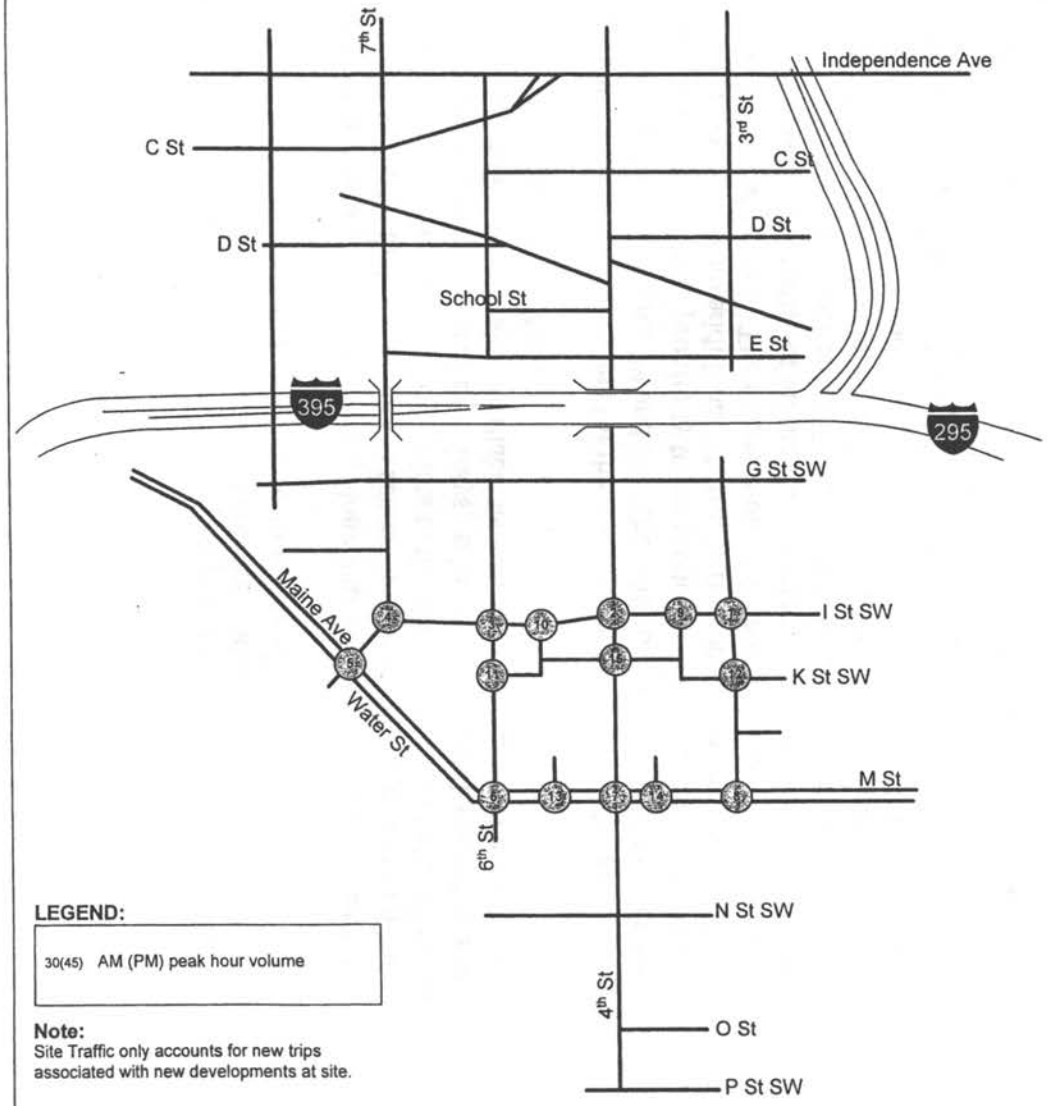
In order to forecast the total number of vehicular trips that are expected to traverse the study area intersections during the forecast years of 2010 and 2022, the Study Team added the following layers of traffic volumes:

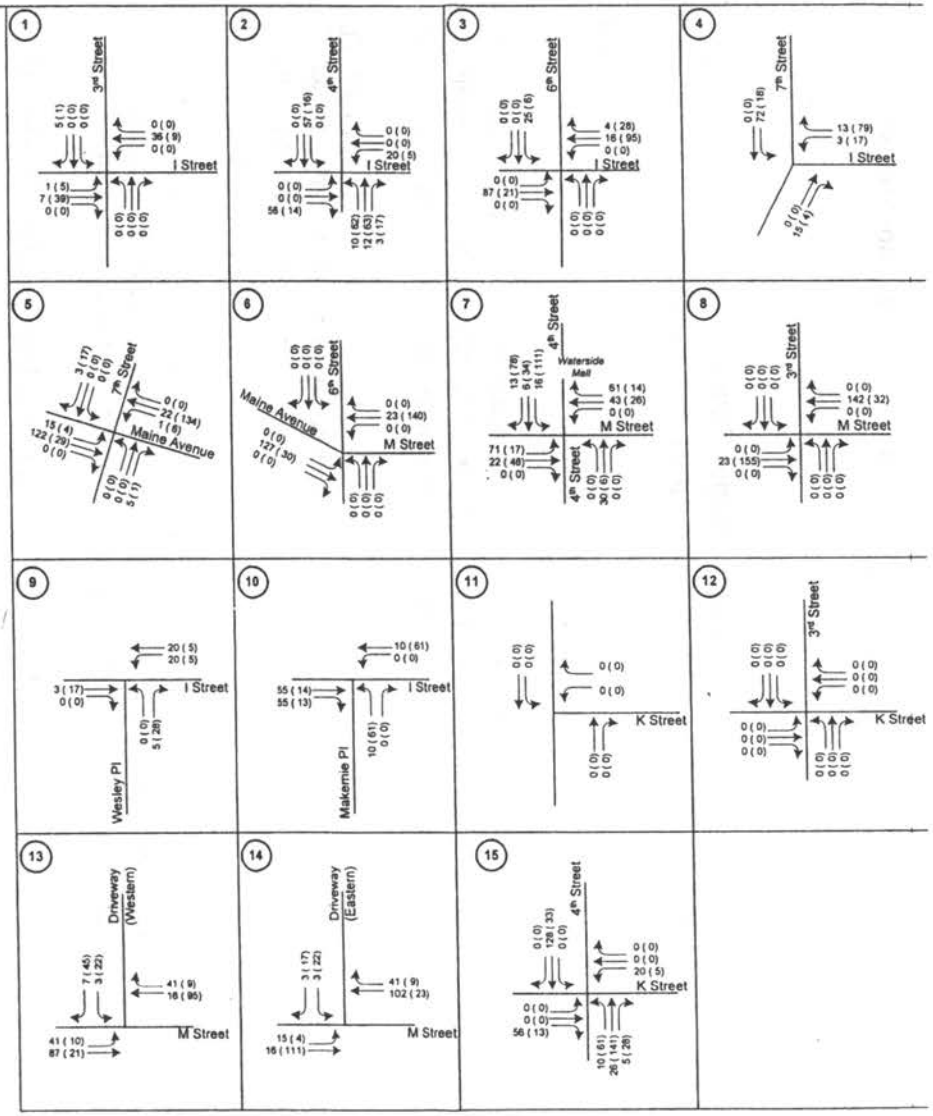
1. Existing traffic
2. Growth in background traffic
3. Trips generated by other area development
4. PUD site traffic

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.

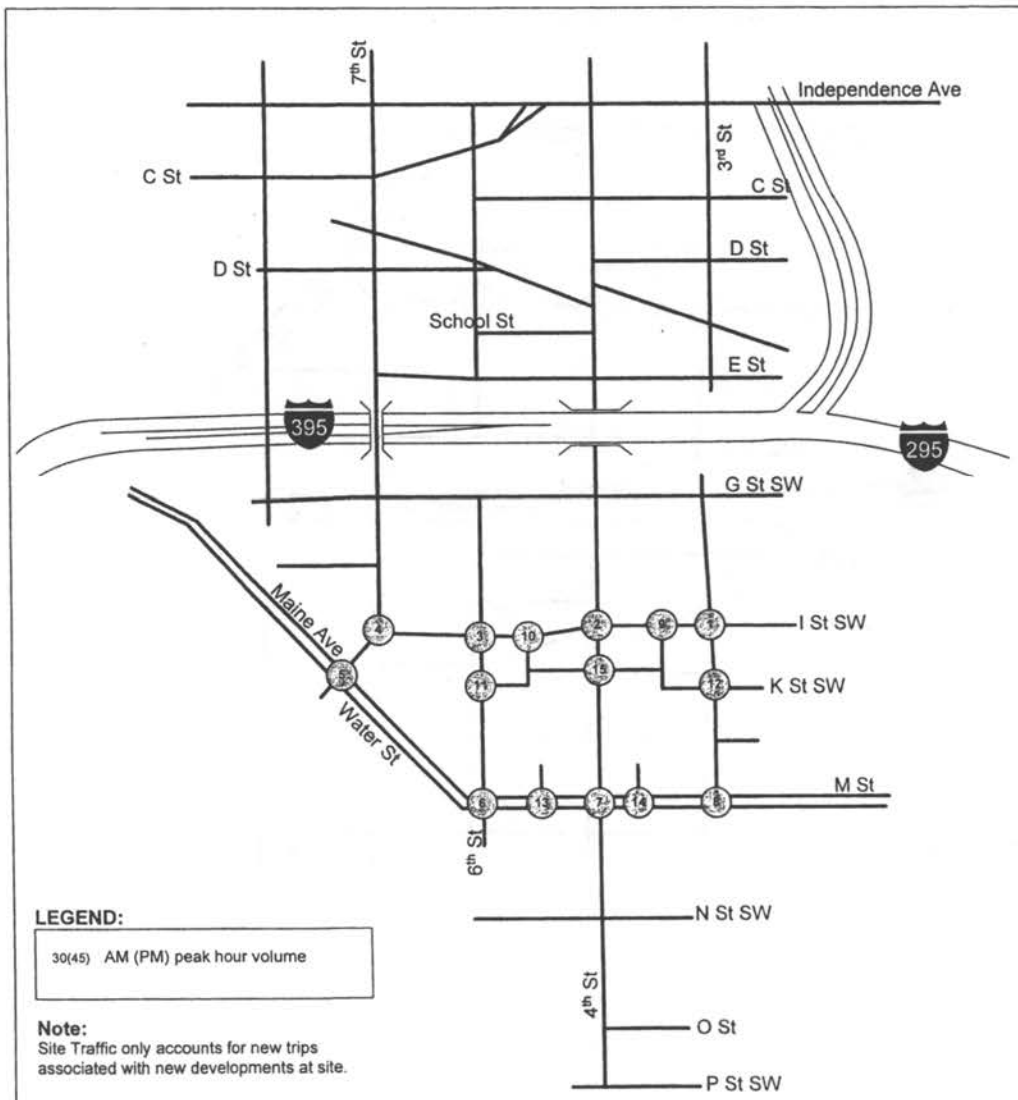
SITE IMPACTS

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.





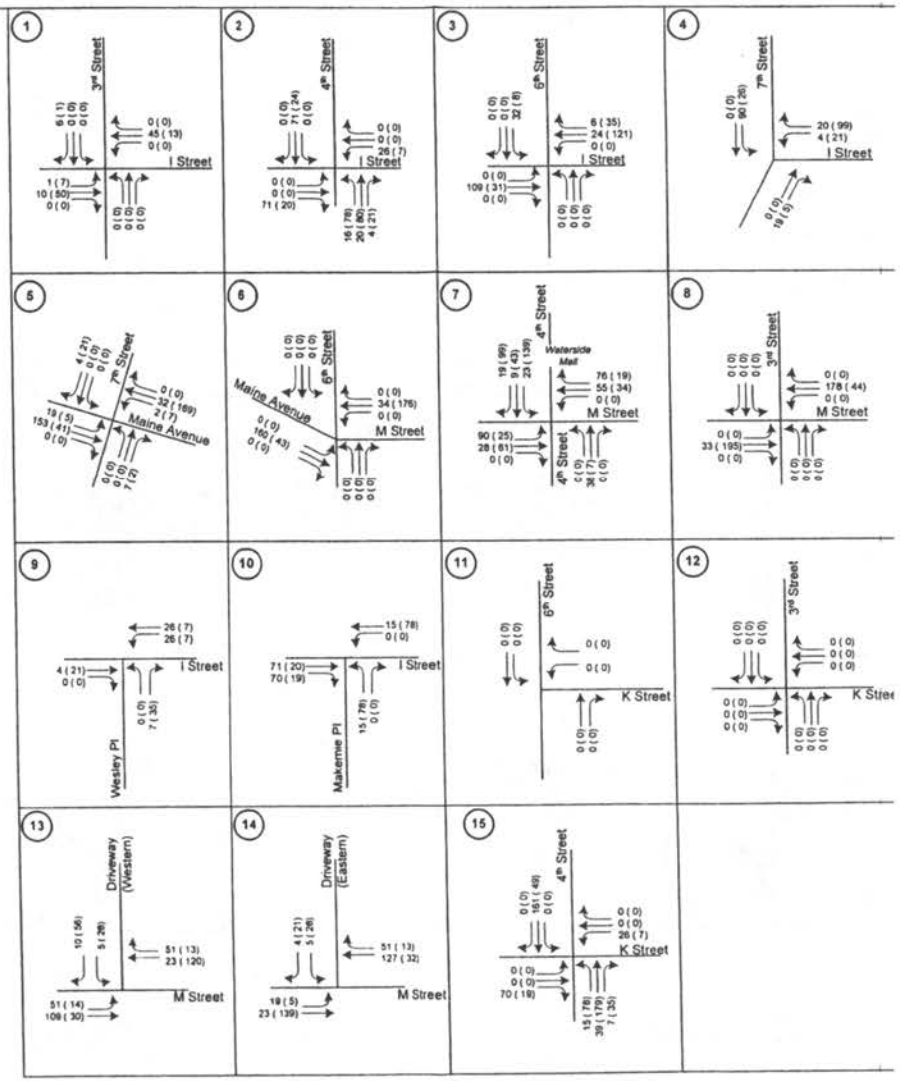
Not to Scale January, 2003	N	4th Street SW Traffic Study	**Site Traffic for 2010 with 4th Street Vehicular Connection**	**FIGURE 29**



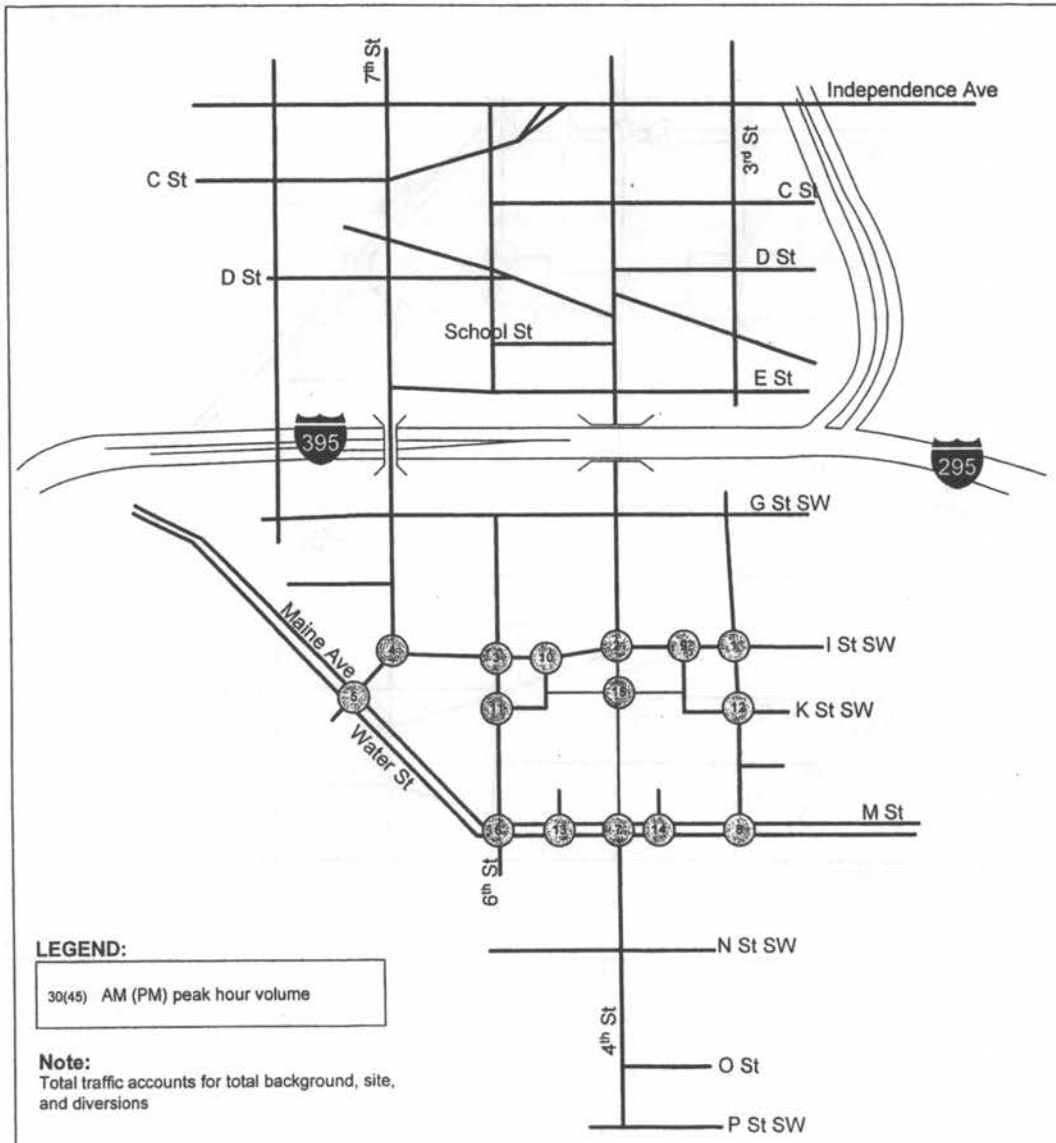
LEGEND:

30(45) AM (PM) peak hour volume

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



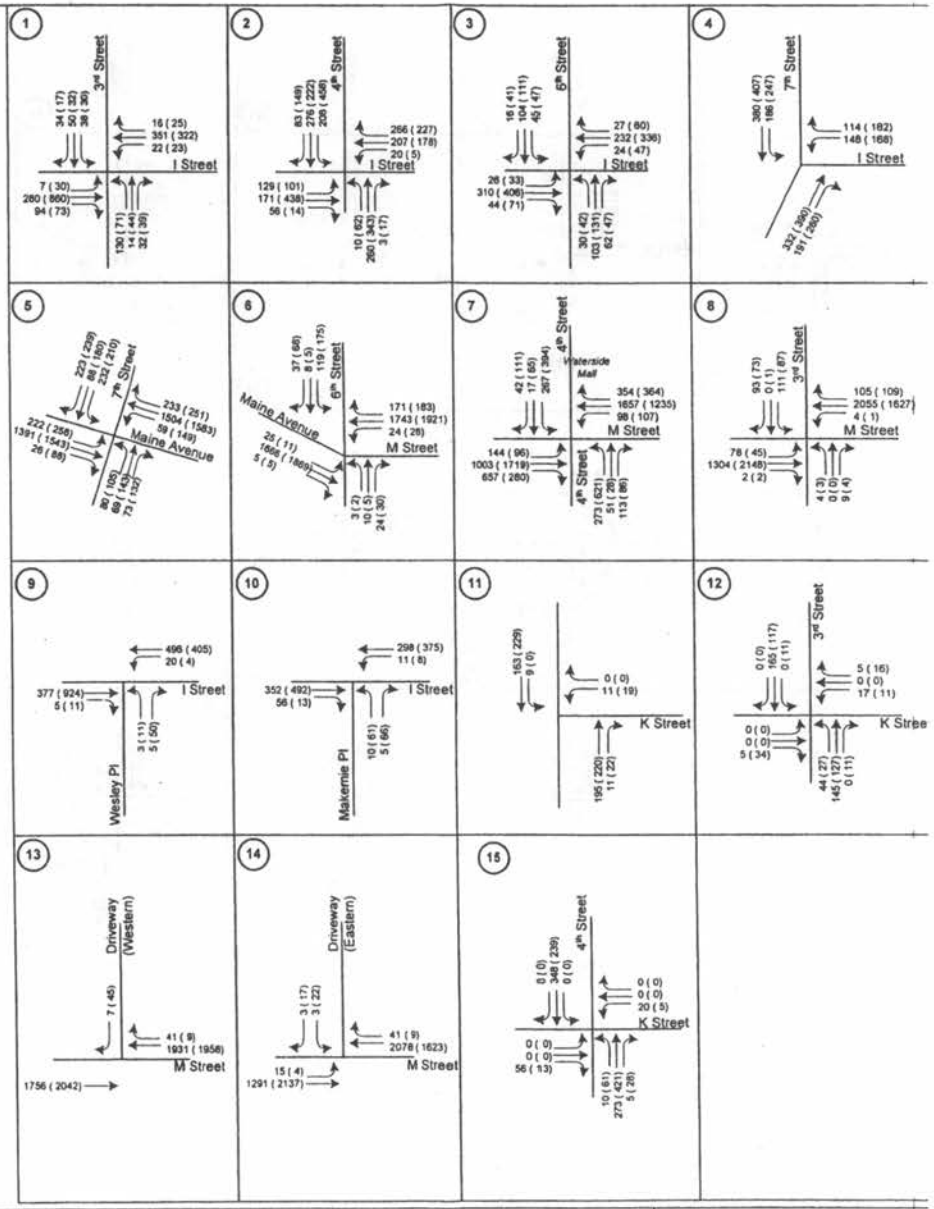
Not to Scale	N	4th Street SW Traffic Study	**Site Traffic for 2022 with 4th Street Vehicular Connection**	FIGURE 30



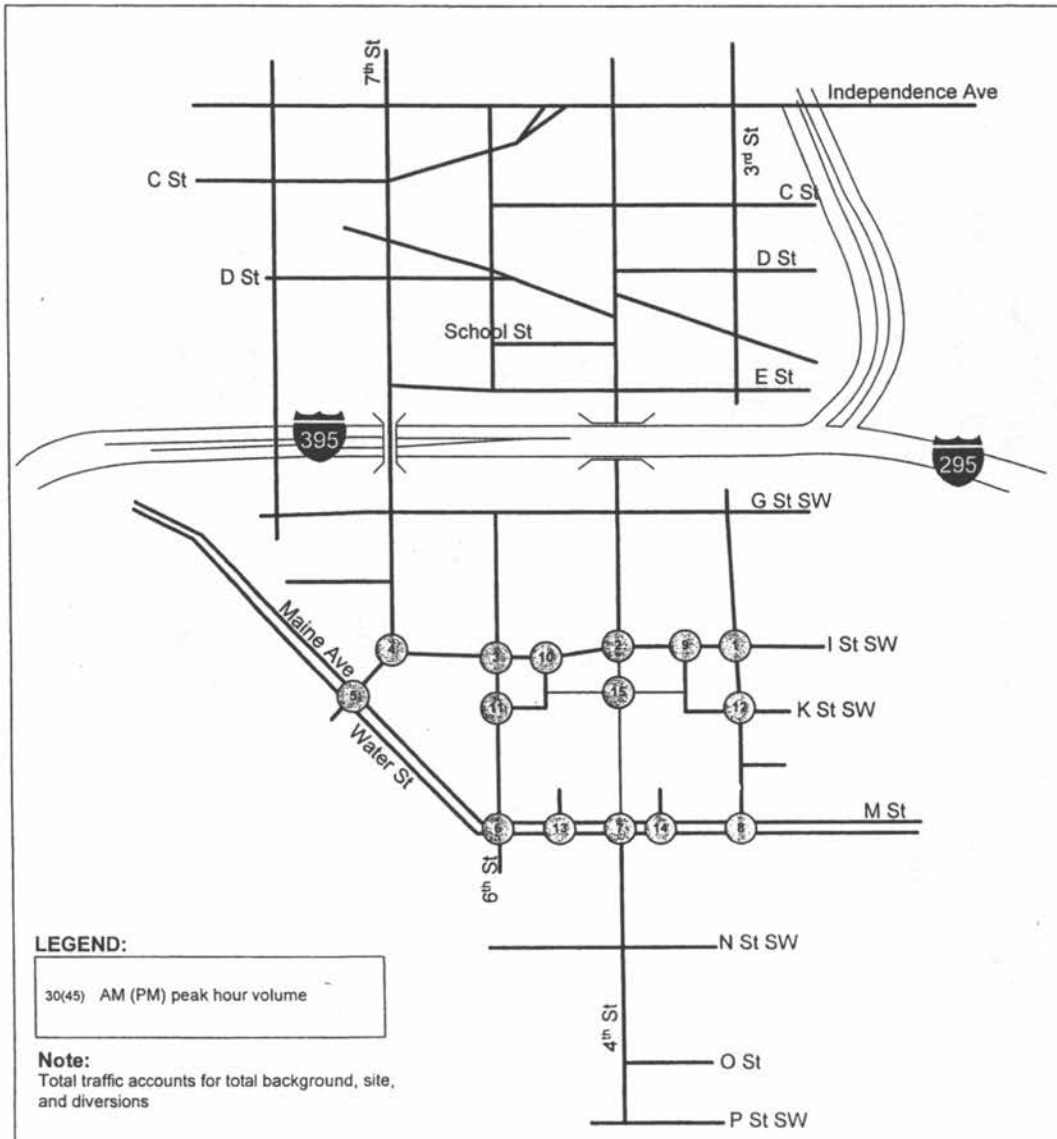
LEGEND:

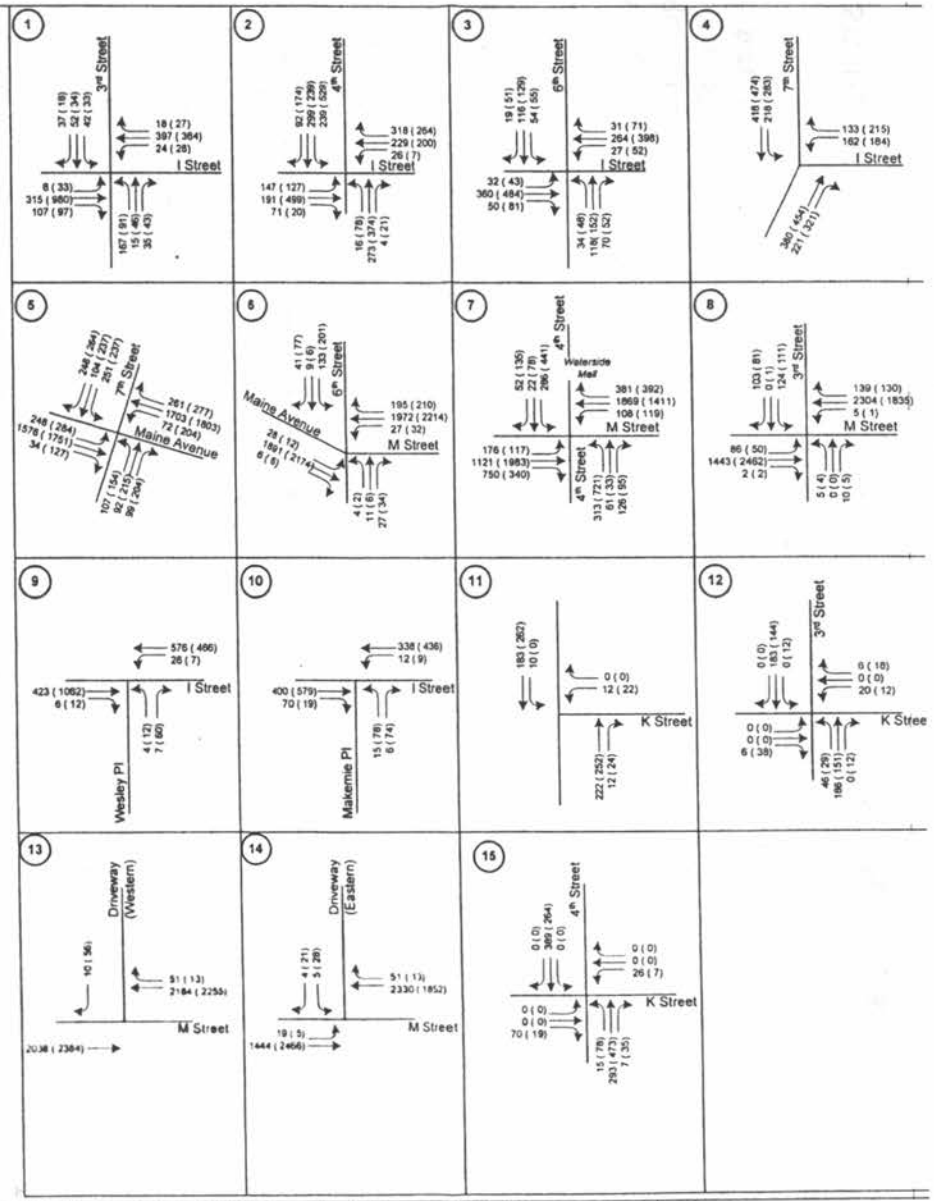
30(45) AM (PM) peak hour volume

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				





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

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	12.5	B	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	9.1	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	10.8	B	9.2	A	51.8	E	30.8	C	105.3	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. The eastern service road could serve both north and southbound traffic.

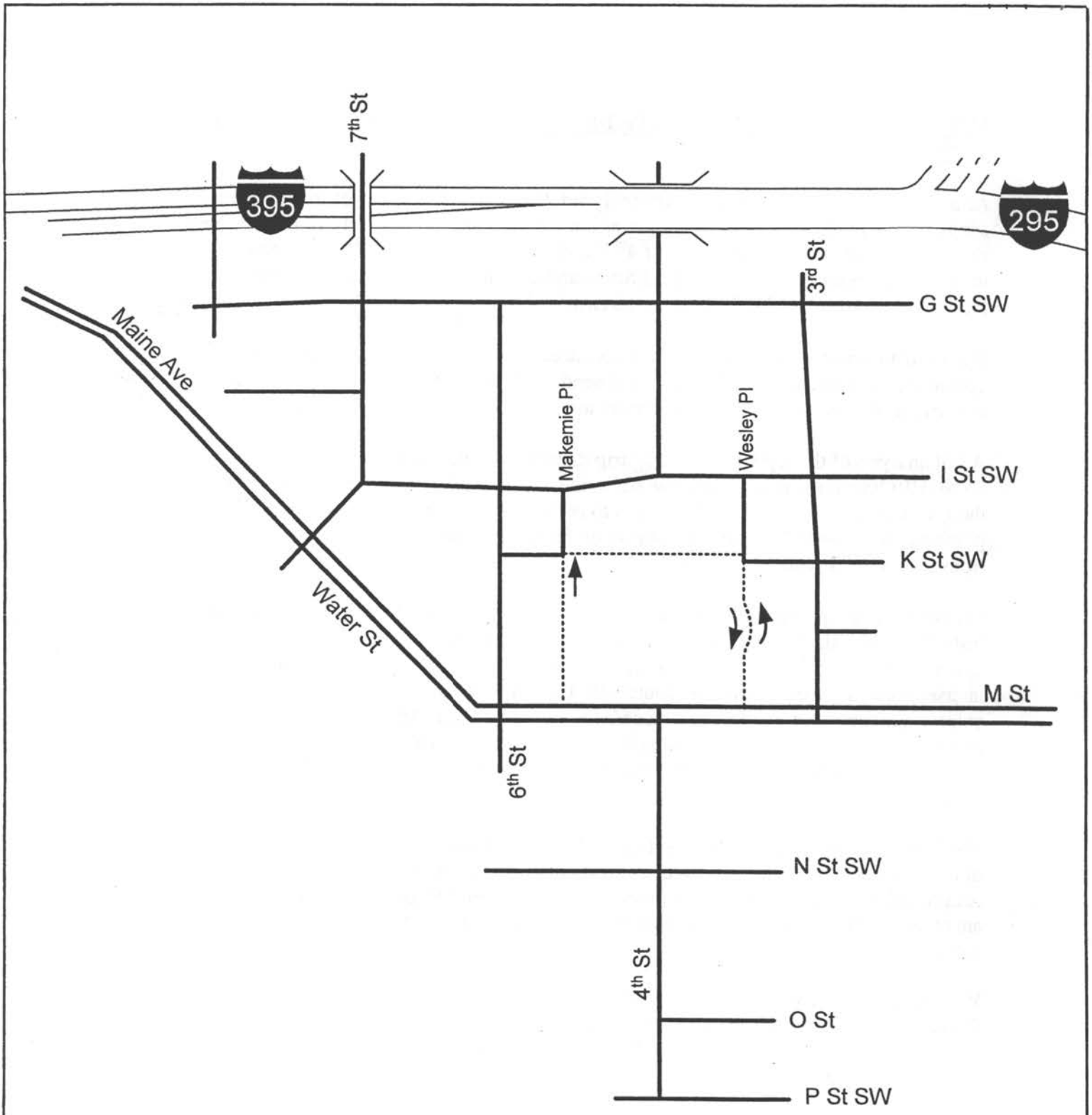
A full analysis of this option, including trip distribution and assignment, as well as SYNCHRO/SimTraffic analysis, was performed. The results of this analysis show that these service roads are not viable options to connect I and M Streets. Because of their proximity to 3rd and 6th Streets, the ability 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 access 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 are considerably worse under this scenario than under either of the other two analyzed scenarios.

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.

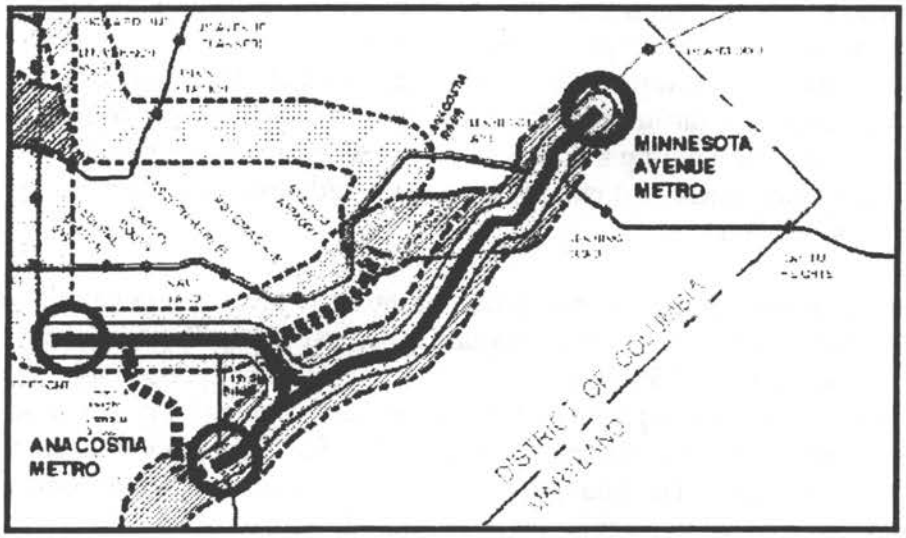


Not to Scale		4th Street SW Transportation Study	Scenario with Service Road Connections	FIGURE 33
January 2003				

FUTURE PUBLIC TRANSPORTATION

WMATA is currently undertaking a study exploring the possibility of various alternative forms of public transit in different locations throughout the city. Their currently proposed 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.

SUMMARY OF FINDINGS AND RECOMMENDATIONS

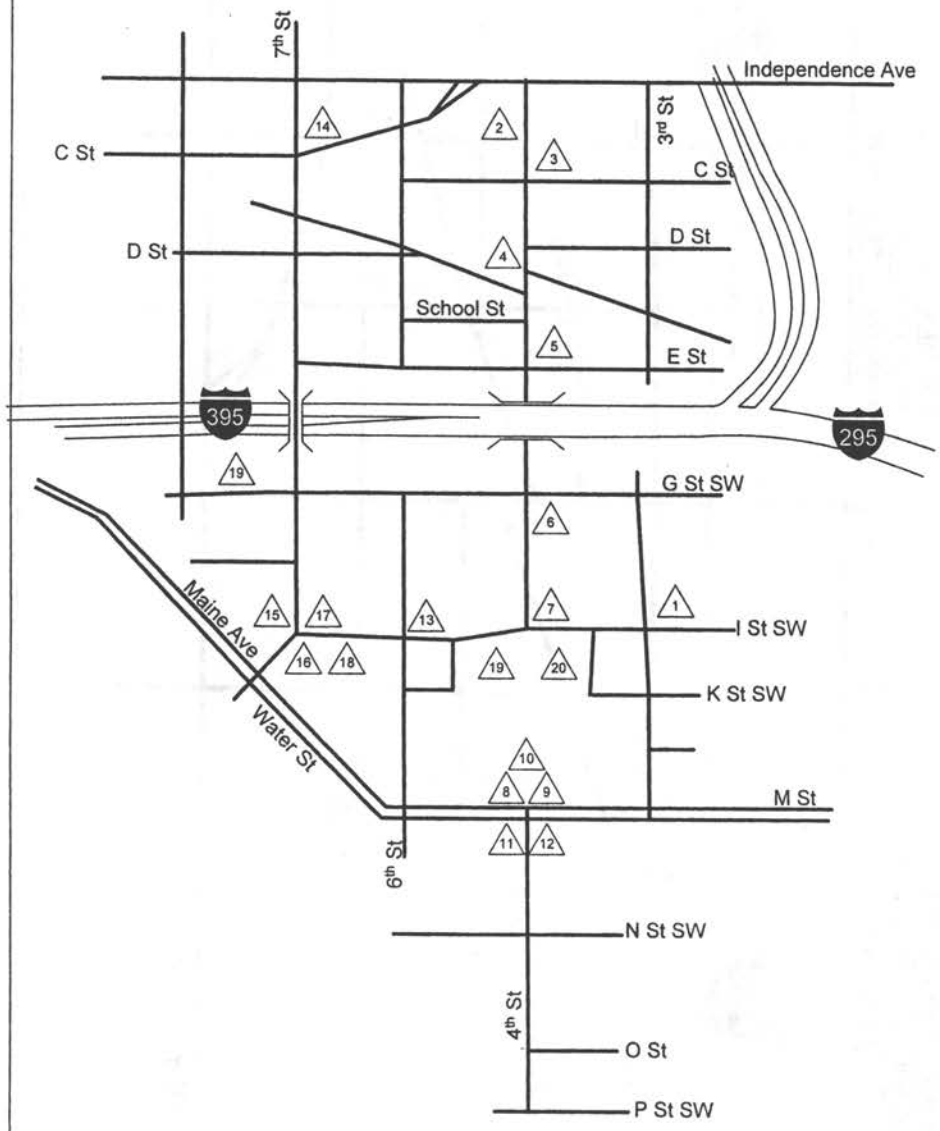
The first two phases of this study included the evaluation of existing conditions around the Waterside Mall and the assessment of the impacts of its redevelopment. The Study Team conducted a full evaluation of existing conditions around Waterside Mall and determined the locations where transportation 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.

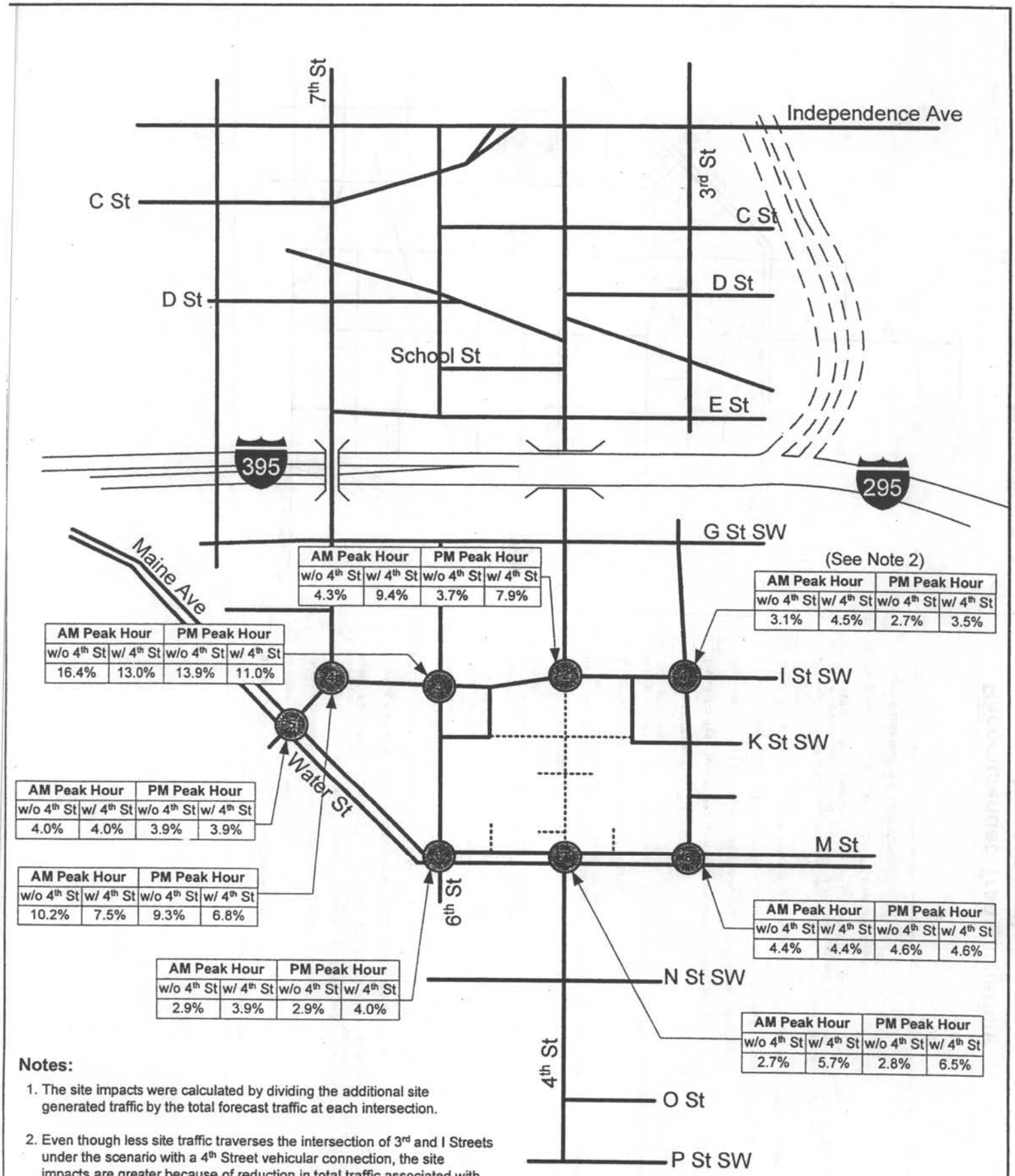
COMPARISON BETWEEN THE SCENARIO WITH A 4TH STREET VEHICULAR CONNECTION AND THE SCENARIO WITHOUT A VEHICULAR CONNECTION

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. 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 reduce 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.



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. Re-stripe centerline markings from 4th Street to 7th Street.
21. Improve coordination of traffic signals.

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



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%

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%

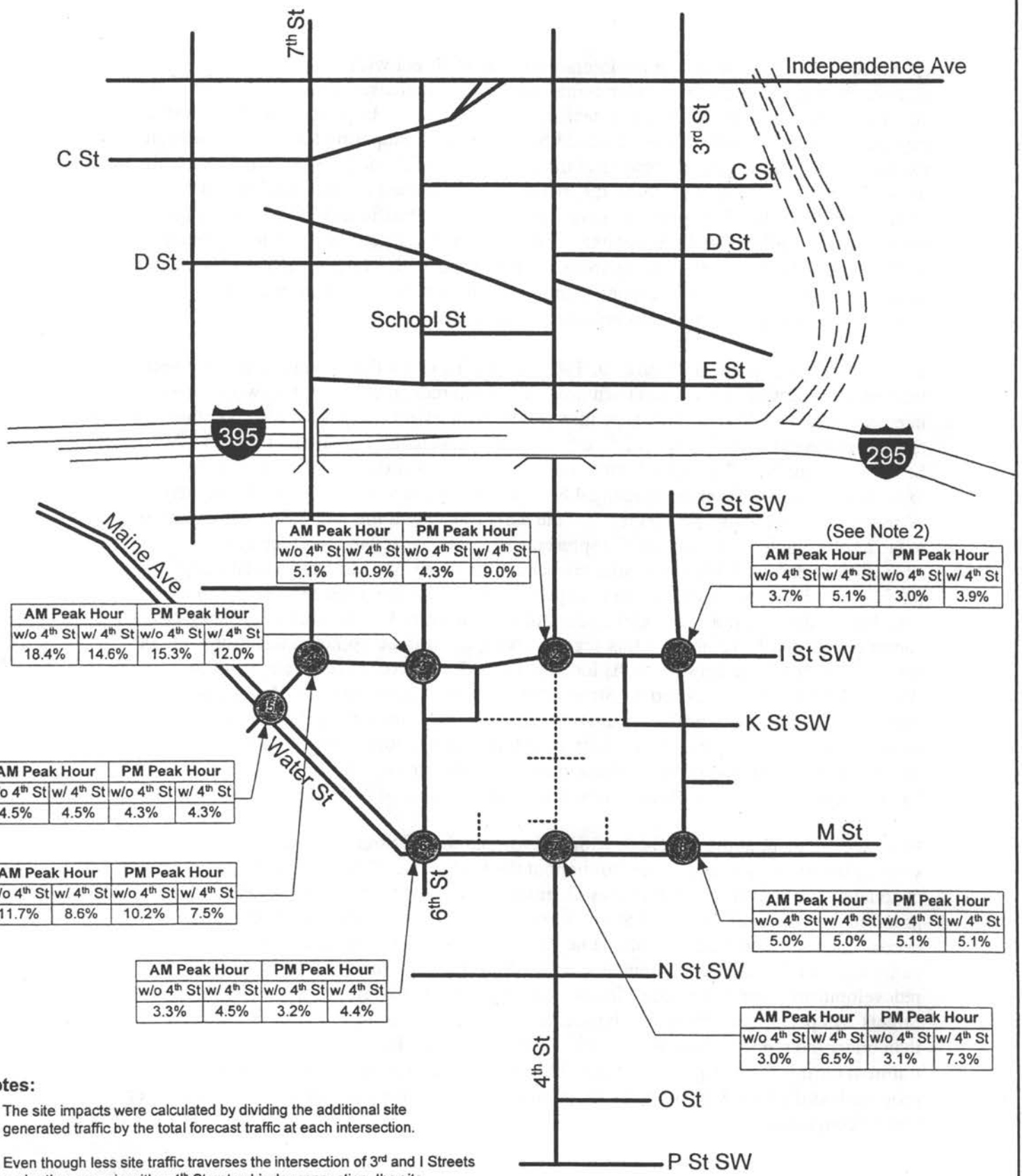
AM Peak Hour		PM Peak Hour	
w/o 4th St	w/ 4th St	w/o 4th St	w/ 4th St
2.9%	3.9%	2.9%	4.0%

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 26



Notes:

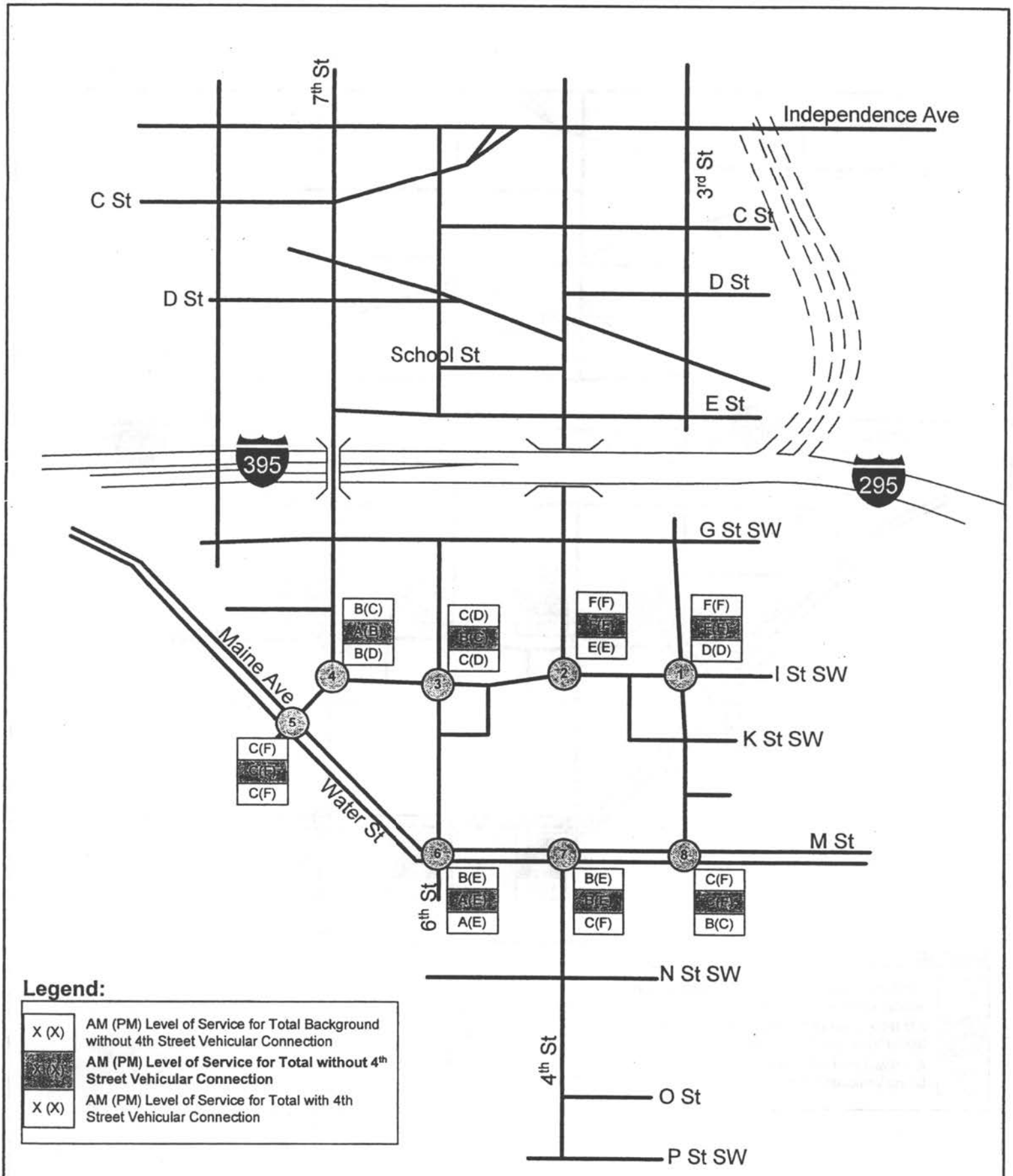
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2. Even though less site traffic traverses the intersection of 3rd and I Streets under the scenario with a 4th Street vehicular connection, the site impacts are greater because of reduction in total traffic associated with background traffic diversions through the 4th Street extension.

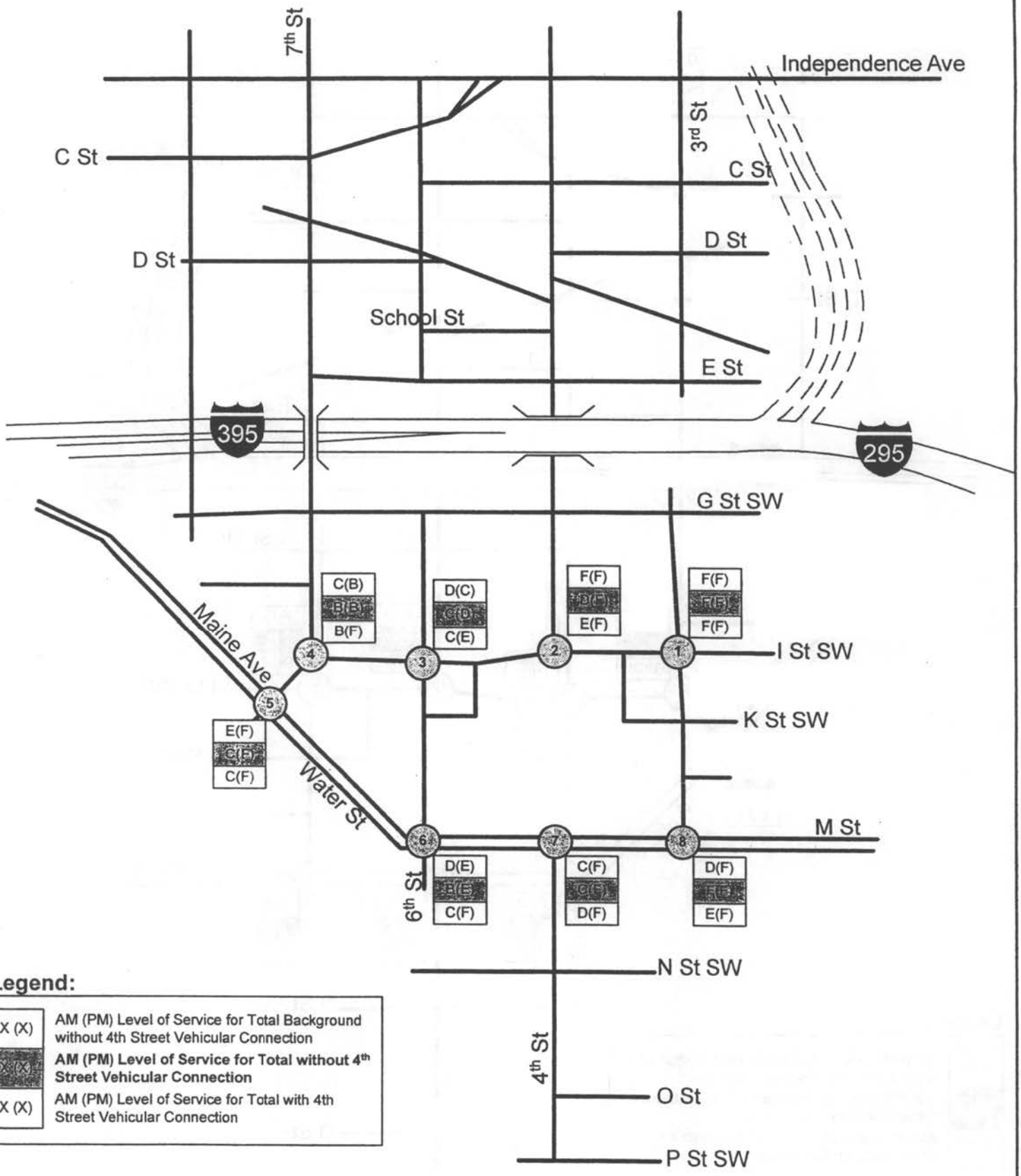
Not to Scale		4th Street SW Transportation Study	Site Impacts for Total Traffic for 2022 with and without 4th Street Vehicular Connection	FIGURE 37

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.

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.

PUD development at the site, both with and without the 4th Street vehicular connection, would generate major congestion throughout the study area. 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.


7th St
Independence Ave
3rd St
C St
C St
D St
D St
School St
E St
395
295
G St SW
Maine Ave
B(C)
A(B)
B(D)
C(D)
B(C)
C(D)
F(F)
E(E)
F(F)
D(D)
4
3
2
1
I St SW
5
K St SW
C(F)
C(F)
C(F)
Water St
M St
6
7
8
6th St
B(E)
A(E)
A(E)
B(E)
C(F)
C(F)
B(C)
N St SW
4th St
O St
P St SW
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	4th Street SW Transportation Study	2022 Levels of Service (LOS)	FIGURE 39

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.

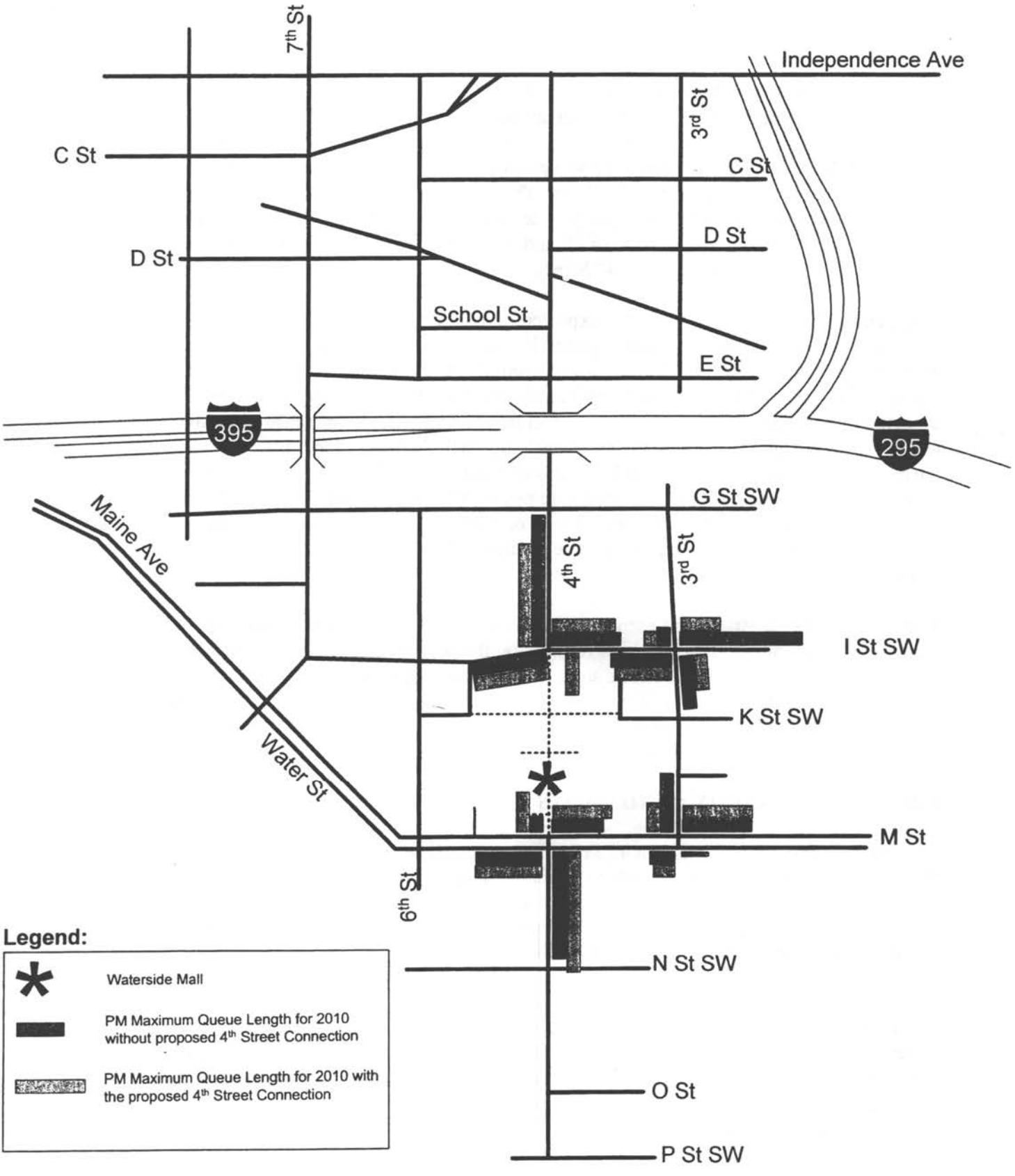
A vehicular connection on 4th Street is expected to reduce queuing on 3rd Street, as shown in Figures 40 and 41. The reduction is primarily due to the background and other area development trips that will be diverted away from 3rd Street onto 4th Street. Southbound queues on 4th Street at I Street, and 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.

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.

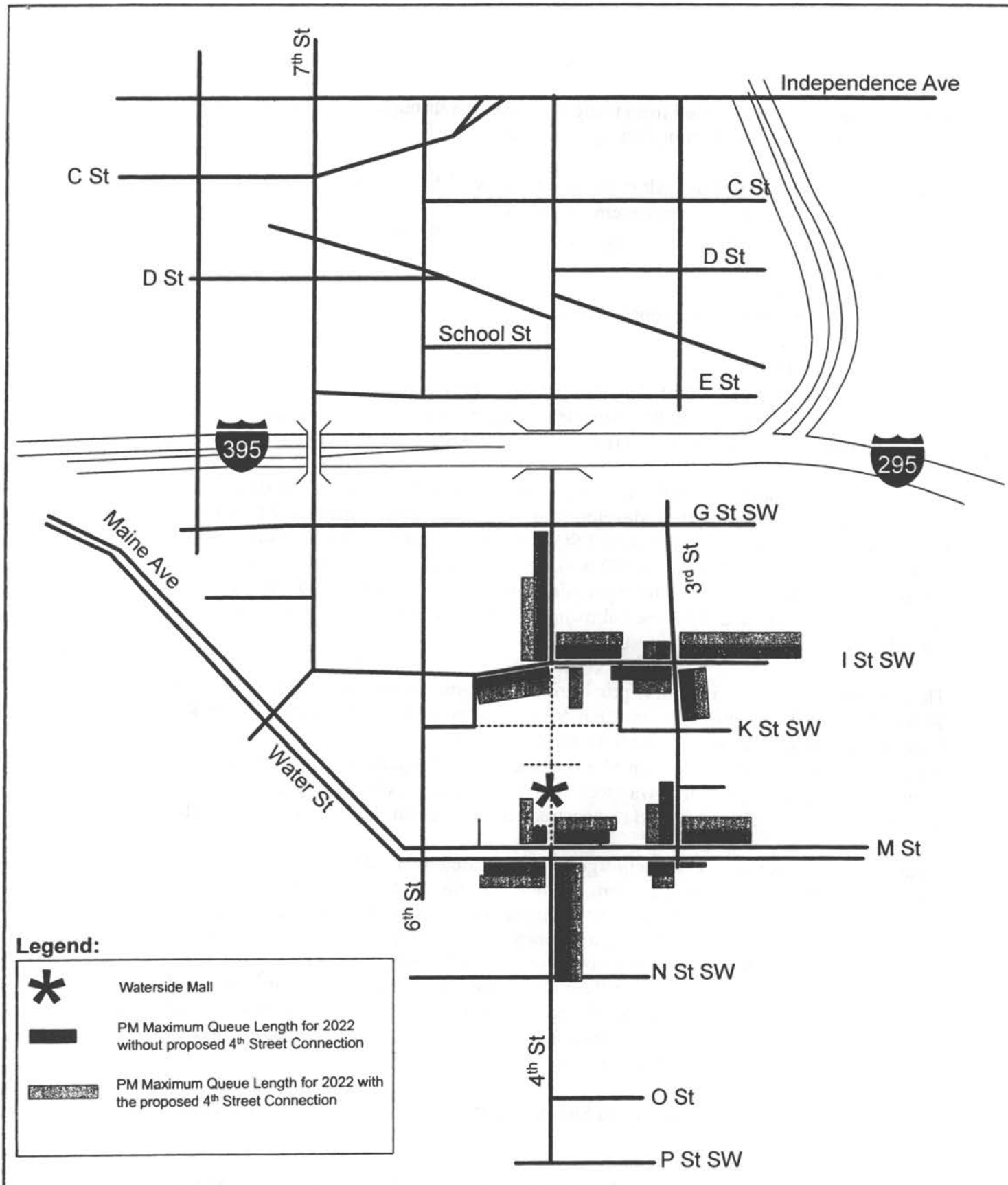
PRELIMINARY RECOMMENDATIONS

The Study Team recommends that 4th Street be connected between I and M Streets and that this connection is made available to vehicles. The roadway should have a 55-foot 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.



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				

Motorists should be discouraged from using 4th Street as a through route. Preliminary 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 and
  - I Street.
- Parking should be permitted at all times in the curb lanes.
- 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).

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.

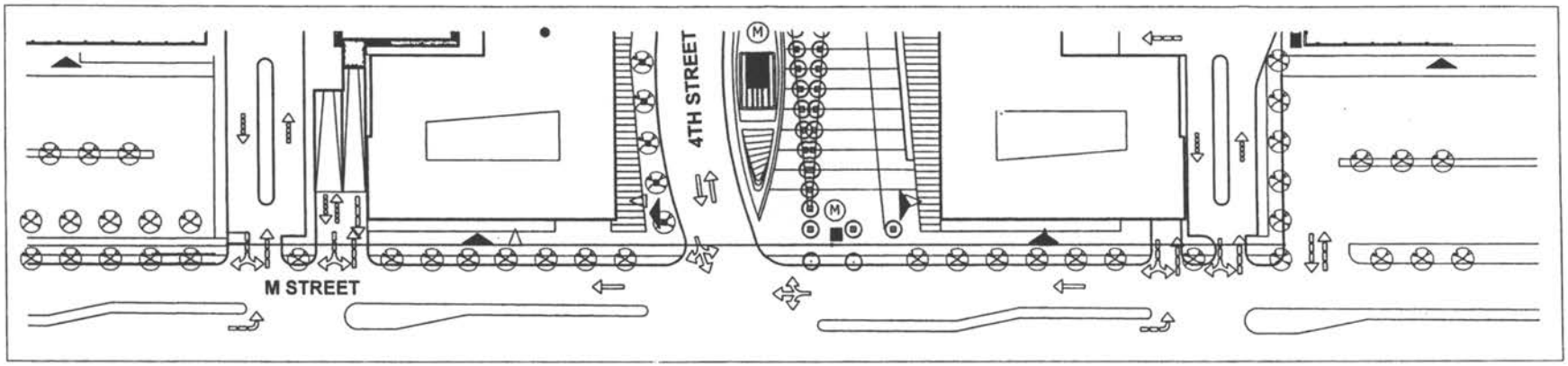
The developer of Waterside Mall is proposing two full-movement driveways on M Street, with median breaks to support them. One driveway is proposed to be located east of 4th Street and the other one is proposed to be located west of 4th Street. The analysis indicates that eastbound volumes on M Street 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.

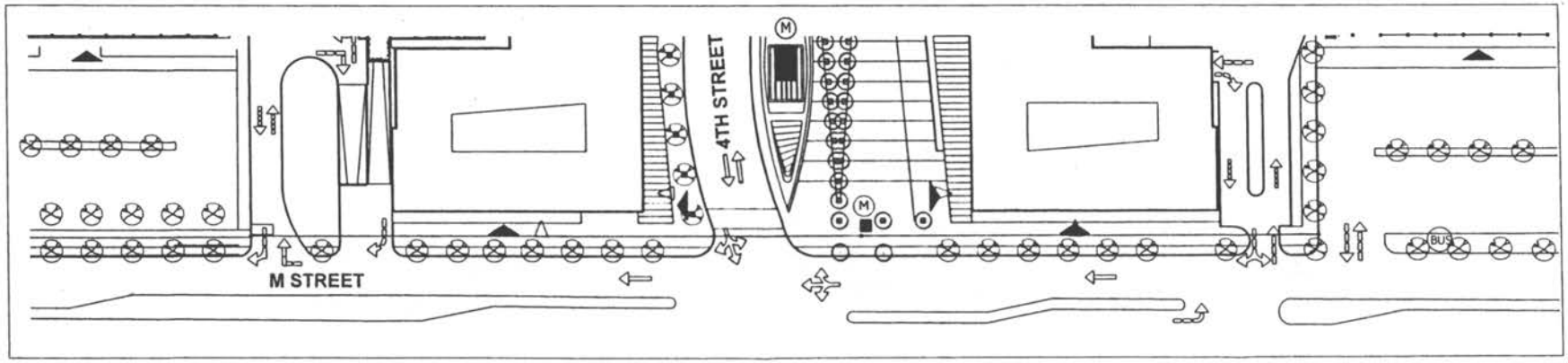
The first 80 feet on the north side of M Street, east of 4th Street, should be reserved as a taxi stand.

The mitigation measures described above are only preliminary and changes may be made based on citizen input. Additional measures will be recommended in the next phase of the study to address existing and future transportation needs.

DEVELOPER PROPOSAL



STUDY TEAM PROPOSAL



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