Whitehurst Freeway Deconstruction Feasibility Study

Draft Existing Conditions Report

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For:

District Department of Transportation
District of Columbia

October 2005

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1. INTRODUCTION

The District Department of Transportation (DDOT) is conducting a study to determine whether or not it is feasible to remove the Whitehurst Freeway and to assess the impacts associated with its removal. This freeway is a physical barrier separating Georgetown from the waterfront. 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."

The purpose of the Whitehurst Freeway Deconstruction Feasibility Study is to determine whether or not it is feasible to remove the Whitehurst Freeway. The goal of the study is to evaluate the feasibility of removing the Whitehurst Freeway to provide better access to Georgetown and to the future waterfront park and to provide traffic relief to M Street NW during time periods when M Street NW operates at congested levels.

The study objectives are the following:

- Accommodate future traffic volumes without significant deterioration in peak period traffic operations.
- Improve traffic operations on M Street NW during time periods when M Street NW operates at congested levels.
- Improve pedestrian access to Georgetown businesses and parking facilities and to the future waterfront park.
- Improve transit operations.
- Improve vehicular access to Georgetown businesses and parking facilities and to the future waterfront park.
- Improve urban design and visual environment by minimizing the presence of visual barriers at the waterfront.
- Avoid adverse effects to water resources.
- Minimize disruption to existing land uses.
- Maximize public participation to develop transportation improvements that are supported by the community.
- Minimize impacts on historic structures.

The study area, shown in Figure 1-1, focuses on the Whitehurst Freeway and is bounded by the following roadways:

- Potomac River on the south extending up to Virginia Avenue and 23rd Street on the southeast
- K Street on the southeast of 26th Street
- Foxhall Road on the west
- Reservoir Road on the north, west of Wisconsin Avenue
- M Street on the northeast of Wisconsin Avenue
- 19th Street on the east

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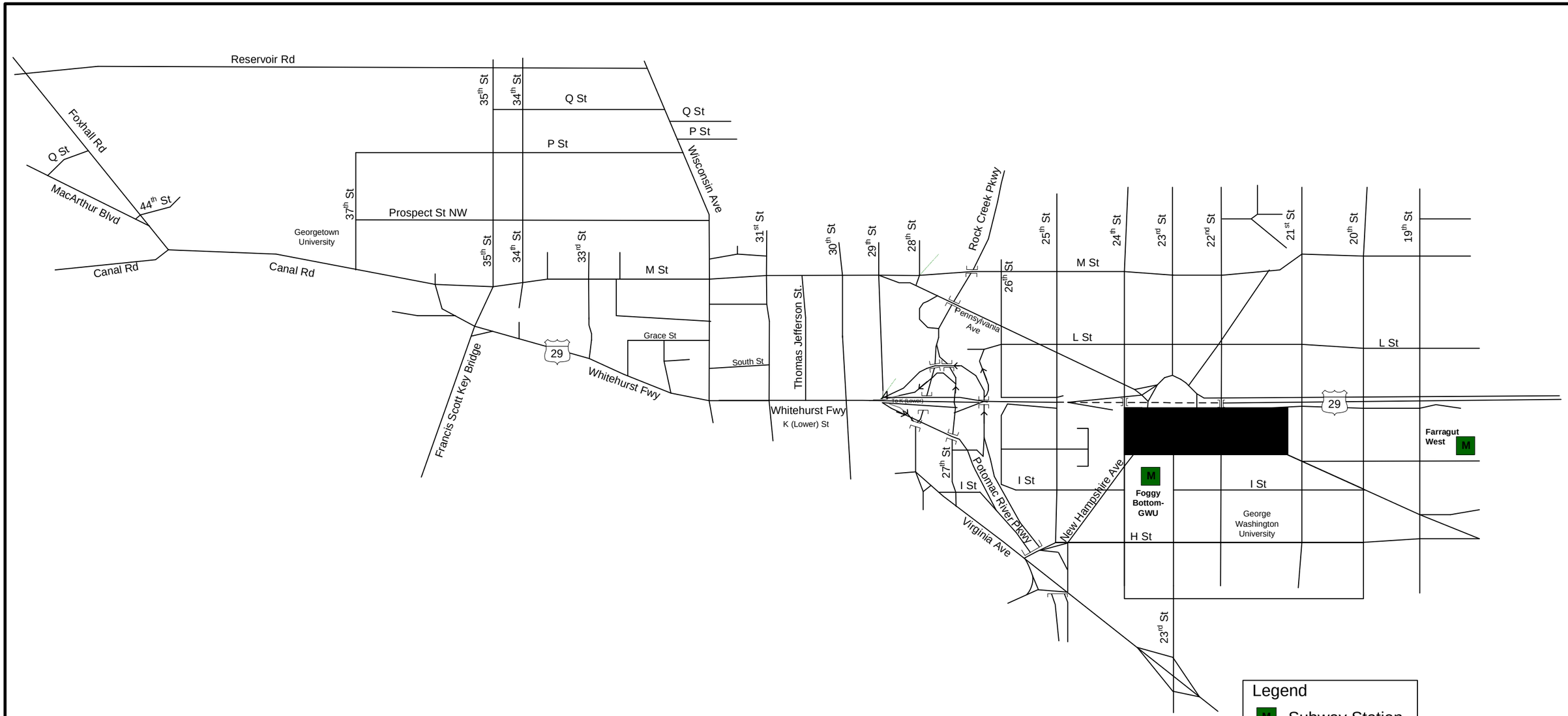

Legend

M Subway Station

Figure 1-1

Study Area

N

Whitehurst Freeway Deconstruction Feasibility Study

The study is being conducted with assistance from area residents. The Study Team held meetings with area residents to discuss study issues and the potential impacts of deconstructing the Whitehurst Freeway. 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 potential traffic impacts due to the removal of the Whitehurst Freeway.

This report summarizes the assessment of existing conditions and identifies constraints that affect the potential deconstruction of Whitehurst Freeway. The existing conditions section of this report includes a description of the major roadways in the study area, origin-destination patterns, information on traffic volumes and levels of service at critical intersections. It also describes the conditions of existing pedestrian facilities, parking regulations and public transportation. This report also includes a section that summarizes information on existing land use and land values of the properties in the study area. The last section of this report presents a summary of the findings of three case studies where a freeway was deconstructed.

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2. PREVIOUS STUDIES

In the past, different studies involving the Whitehurst Freeway were undertaken by the District of Columbia Department of Transportation (DDOT) and other government agencies. Most of the studies suggested implementing modifications to the existing Whitehurst Freeway Structure.

The three previous studies are:

- National Capital Planning Commission - Georgetown Waterfront Study (1975)
- Whitehurst Freeway Corridor System Modification Study (1985)
- The Study Conducted for Committee of 100 by Joseph Passonneau and Partners (1990)

National Capital Planning Commission – Georgetown Waterfront Study (1975)

The goal of this study was to preserve and strengthen Georgetown as a viable community by providing a good circulation system for vehicles and pedestrians. As shown in Figure 2-1, the boundaries of the study area were M Street in the north, Potomac River in the south, Rock Creek in the east and the Georgetown University entrance in the west. This study was focused on improvements in the overall Georgetown Area. The study report suggested some improvements to vehicular circulation along the study corridor. There were no alternatives suggested to the existing Whitehurst Freeway structure. This study proposed new land uses and suggested new potential for additional growth. This study also proposed a new circulation plan for vehicles and pedestrians in the Georgetown Area.

Whitehurst Freeway Corridor System Modification Study (1985)

The District of Columbia Department of Public Works initiated the Whitehurst Freeway Corridor Study to develop and evaluate alternatives for modifying the transportation system in the study corridor and to assess the traffic, technical, cost and environmental impacts of the alternatives. This study included an Environmental Impact Statement (EIS) report for the selected alternative.

Three ground rules were established by the District of Columbia Department of Public Works. These ground rules are:

1. The alternatives are to accommodate present travel demand while minimizing the generation of additional traffic.
2. Through traffic in adjacent residential neighborhood is to be controlled and reduced where possible.
3. A potential waterfront park along Georgetown shore must be accommodated.

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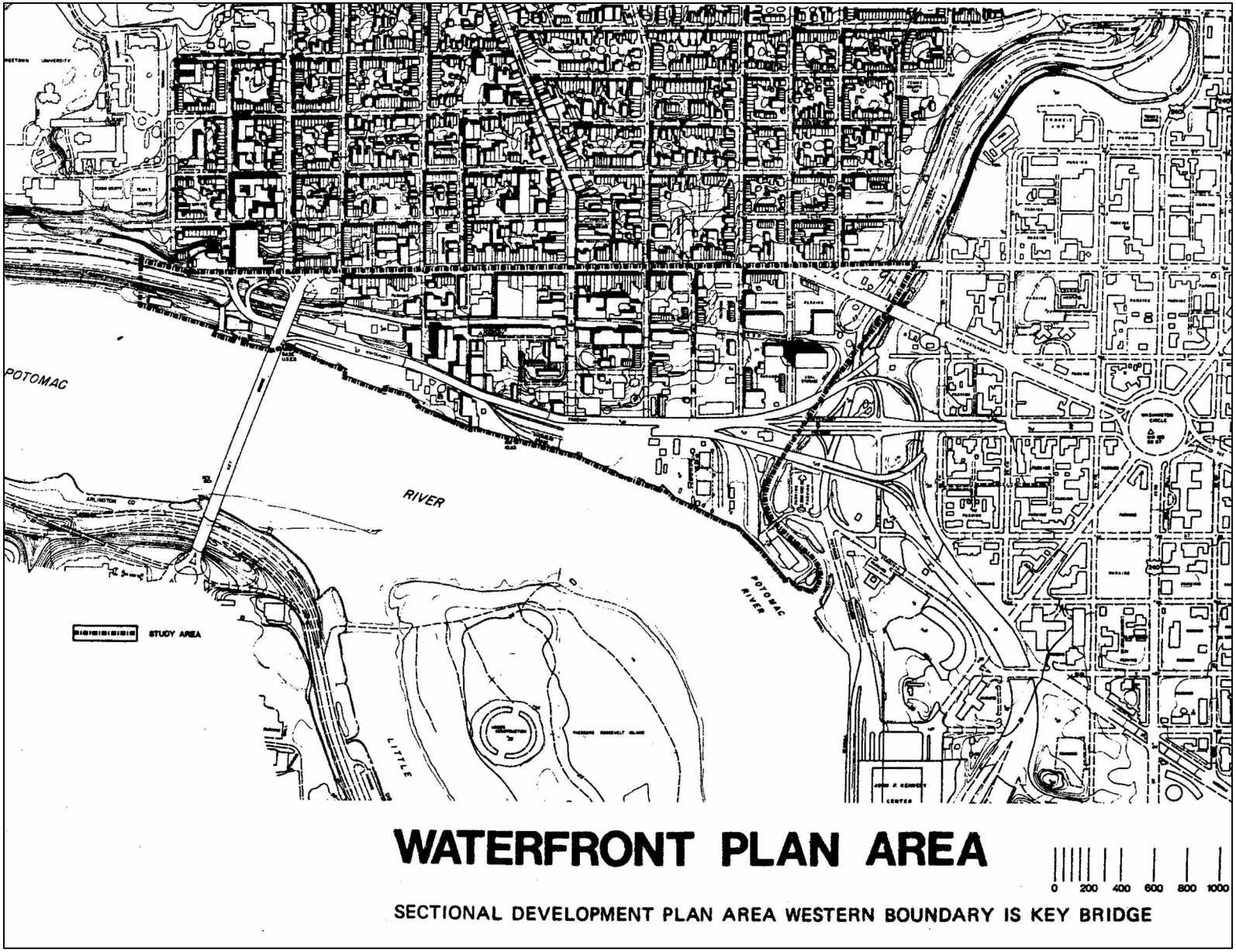

	N	Whitehurst Freeway Deconstruction Feasibility Study	**Georgetown Waterfront Study Area (1975)**	Figure 2-1
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Four alternatives were evaluated during this process. The selected alternative was a combination of rehabilitation and no build alternative in which modifications would be made to the existing structure and roadway connections as shown in Figure 2-2.

The Study conducted for Committee of 100 by Joseph Passonneau and Partners (1990)

The study was initiated to propose new alternatives to Whitehurst Freeway and to review the alternatives suggested in the 1985 EIS report. This study proposed three alternatives for the Whitehurst Freeway. The selected alternative included an Avenue alternative with 6- lanes at grade on K Street as shown in Figure 2-3. This alternative was rejected because it recommended the construction of a tunnel underneath the historic C & O canal. The National Park Service strongly opposed this alternative.

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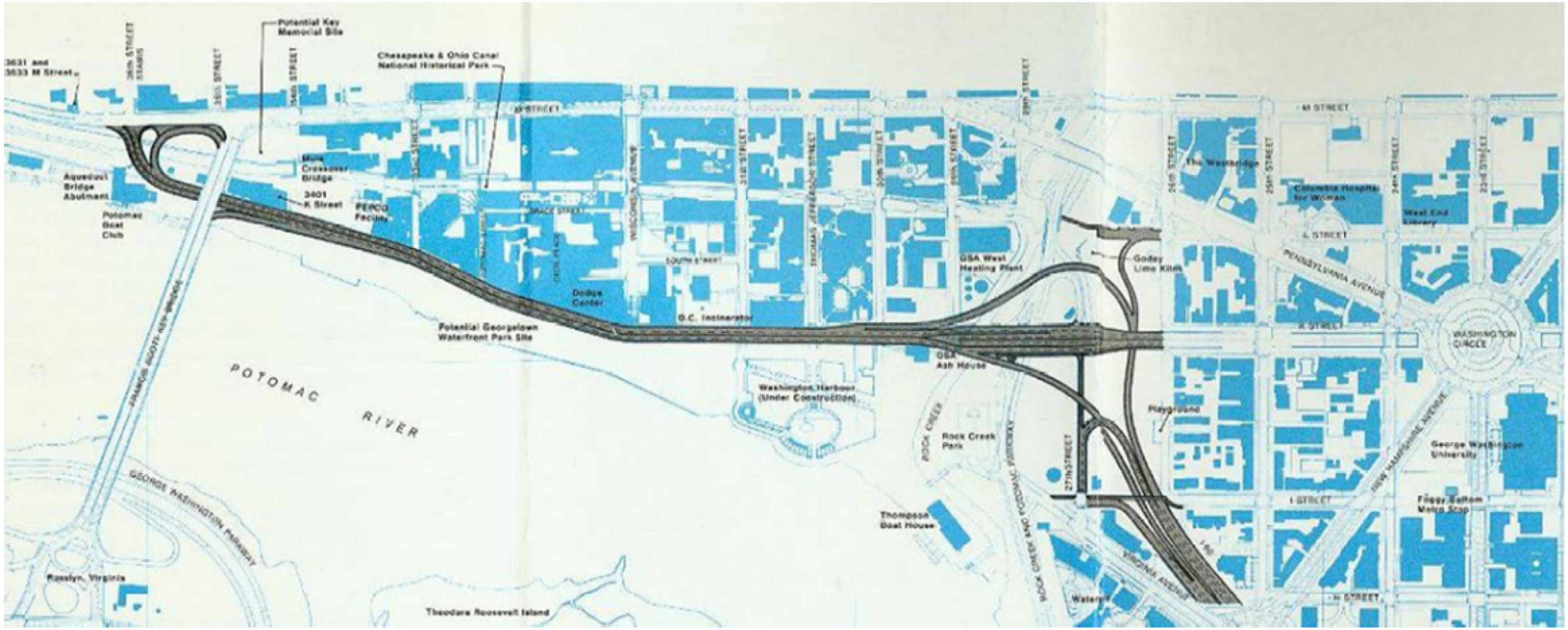

Figure 2-2

Whitehurst Freeway Corridor System Modification Study (1985) Selected Alternative A Modified

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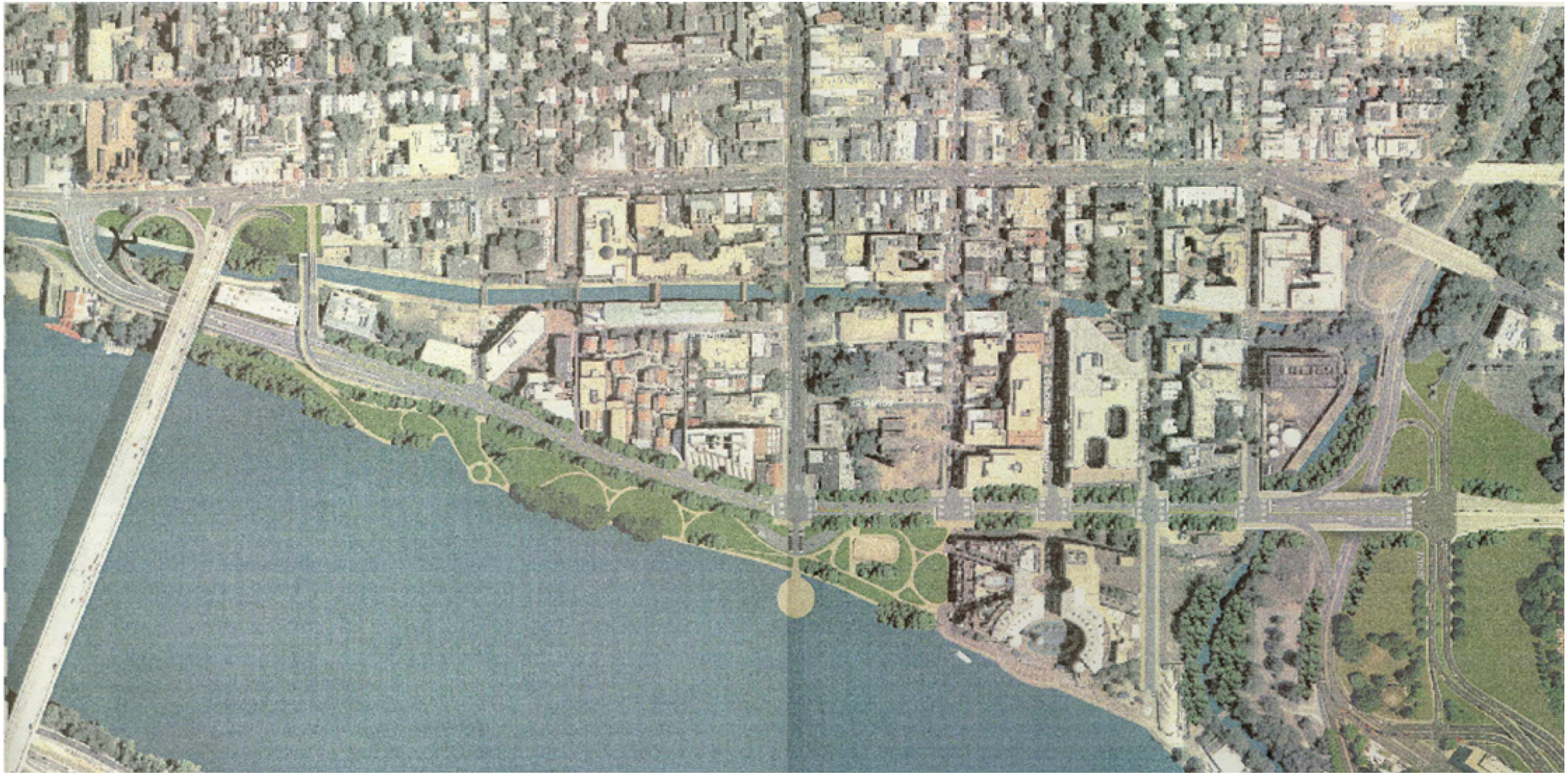

Figure 2-3

Recommended Alternative in the Study Conducted for Committee of 100 by Joseph Passonneau & Partners

N

3. EXISTING CONDITIONS

3-1. 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.

3-1.1. MAJOR ROADWAYS IN THE STUDY AREA

The study area is located in Northwest Washington, DC as is shown in Figure 1-1. The following are the major roadways in the study area:

- Whitehurst Freeway
- K Street
- M Street
- Canal Road
- Wisconsin Avenue

While some of the studied roadways continue beyond the above terminals, their associated characteristics will only be described within these limits. Figure 3-1 shows the intersections in the study area. The existing lane configuration for the study intersections is shown in Figure 3-2.

3-1.1.1. Whitehurst Freeway

The Whitehurst Freeway[1] is a four lane elevated roadway classified as freeway.[2] This facility runs east-west through the study area. It was built in the 1940's to connect the Key Bridge to a citywide freeway system which was never built. There are two lanes in each direction on Whitehurst Freeway. It is a 3/4-mile long section with signals at each end; therefore, it functions more as an "elevated arterial street" than a freeway. No parking is allowed on the Whitehurst Freeway at any time. There is a concrete barrier in the middle throughout the length of the Whitehurst Freeway. The posted speed limit is 35 mph.

There are two intersections at each end: Canal Road/M Street and Whitehurst Freeway on the west end and 27th Street and Whitehurst Freeway/K Street on the east end. At the Canal Road/M Street and Whitehurst Freeway intersection, the left turn movement is not

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

[2] All roadway classifications were taken from the District of Columbia Functional Classification Map, February 5, 2003.

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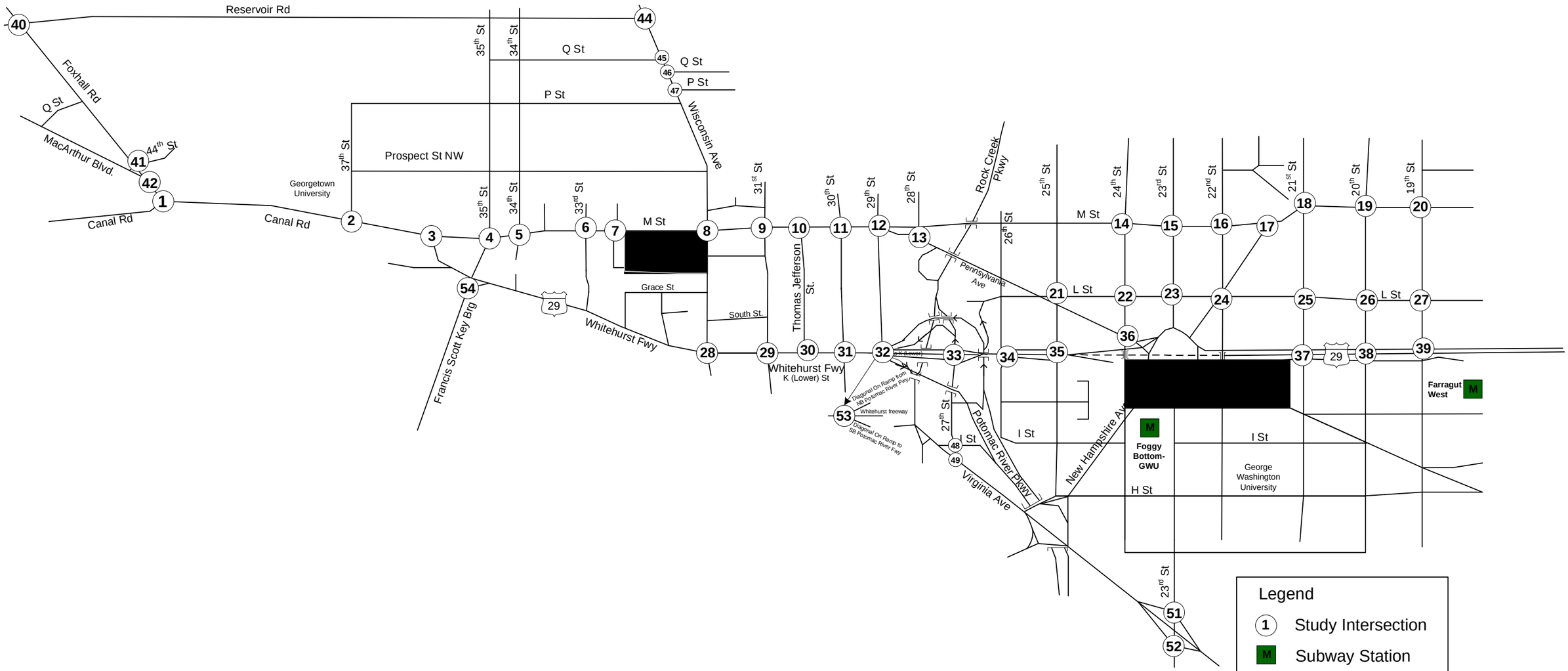

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1 Study Intersection

M Subway Station

Figure 3-1

Study Area Intersections

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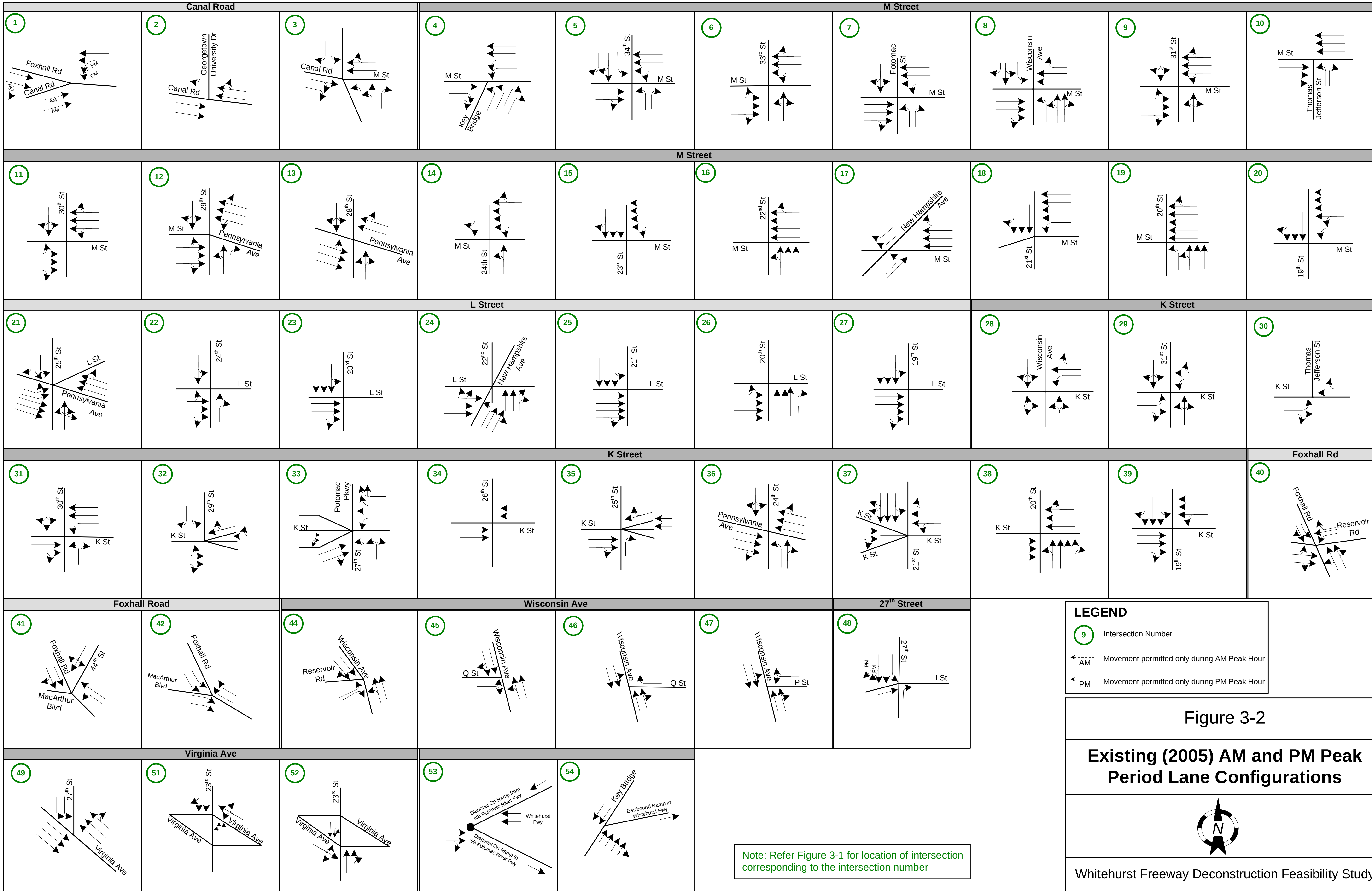
Whitehurst Freeway Deconstruction Feasibility Study



Note: Refer Figure 3-1 for location of intersection corresponding to the intersection number

LEGEND

9 Intersection Number

AM Movement permitted only during AM Peak Hour

PM Movement permitted only during PM Peak Hour

Figure 3-2

Existing (2005) AM and PM Peak Period Lane Configurations

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Whitehurst Freeway Deconstruction Feasibility Study

allowed from westbound Canal Road to the Whitehurst Freeway. Pedestrian activity is moderate at the two intersections at each end of the Whitehurst Freeway.

3-1.1.2. K Street

K Street is primarily a two way principal arterial[3] running east-west through the study area. In the western section of the study area from Wisconsin Avenue to 27th Street, Lower K Street is a two lane minor arterial with two lanes with all way stops controlled intersections. Parking is allowed on both sides in sections from 30th Street to Wisconsin Avenue. From 27th Street to 21st Street, K Street is a four-lane divided roadway with access and exit ramps to the Washington Circle and parking is not allowed at any time.

In the eastern end of the study area, there are a total of four lanes on K Street from 21st Street to 12th Street with limited access one-way service roads. Parking is allowed during the off-peak hours along the right side of the K Street service roads. Service roads are provided in the north and south sides of K Street east of 21st Street in the study area.

Parking is not allowed on the main K Street roadway from 27th Street to 19th Street, and most left turns are prohibited during the AM and PM peak periods. Most right-turn-on-red maneuvers are limited at all times from K Street and K Street service roads in the study area. Many parking garage entrances and exits are accessible from the service roads in this section. The speed limit on all sections of K Street in the study area is 25 mph.

3-1.1.3. Wisconsin Avenue

Wisconsin Avenue is a two-way minor arterial[1] running north-south through the study area from K Street to Reservoir Road. Wisconsin Avenue has two lanes in each direction. Between K Street and M Street parking is allowed on the east side of the roadway and limited parking is available on the west side. Between M Street and Reservoir Road, parking is allowed during the off-peak periods only. The speed limit is 25 mph.

3-1.1.4. M Street

M Street is a two-way principal arterial[1] running east-west between 28th Street/ Pennsylvania Avenue and Canal Road/Whitehurst Freeway in the central section of the study area. M Street has three lanes in each direction with parking allowed on both sides of the roadway during off-peak hours. Most of the intersections along M Street experience heavy pedestrian volumes. Illegal parking and high loading-unloading activity often cause delays on this street. Most of the land use along M Street is commercial. Most of the intersections along M Street in the study area are signalized. The speed limit is 25 mph.

[3] All roadway classifications were taken from the District of Columbia Functional Classification Map, February 5, 2003.

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3-1.1.5. Canal Road

Canal Road is a two-way principal arterial running east-west. There are two lanes in each direction between Foxhall Road and the Whitehurst Freeway. An exclusive left turn lane is provided for westbound traffic at the intersection of Canal Road and Foxhall Road. The posted speed limit is 35 miles per hour (mph).

In the section west of Foxhall Road, Canal Road runs as one-way inbound (eastbound) between the hours of 6:00 AM - 10:15 AM, and one-way outbound (westbound) from 2:45 PM to 7:15 PM. There are no shoulders or parking in this section of the road.

3-1.2. PUBLIC TRANSPORTATION

The Washington Metropolitan Area Transit Authority (WMATA) provides extensive bus and rail service in the study area. As shown in Figure 3-3, nine WMATA routes (Routes 38B, 30, 32, 34, 35, 36, G2, L1, D5, L2, H1, N3, and N7) provide service within the study area. Other agencies providing transit service in the study area are Georgetown Metro Connection, Georgetown University Transportation Shuttle, George Washington University Transportation Shuttle and the Downtown Circulator as shown in Figure 3-3. There are two routes that use the Whitehurst Freeway; Law Center line from Georgetown University and George Washington University Shuttle.

3-1.2.1. WMATA

As shown in Figure 3-3, nine WMATA routes (Routes 38 B, 30, 32, 34, 35, 36, G2, L1, D5, L2, H1, N3, and N7) provide service within the study area primarily along K Street, M Street and Pennsylvania Avenue. The average headway for most of the WMATA buses is 15 to 30 minutes.[4]

3-1.2.2. Georgetown Metro Connection

In addition, Georgetown Metro Connection, Route 1 Wisconsin Avenue Line and Route 2 M Street Line, operate along the major corridors in the study area. The average headway for these buses is 10 minutes.

3-1.2.3. Georgetown University Transportation Shuttle

The Georgetown University Transportation Shuttle provides service to and from the university campus. Law Center Line, Arlington Line and Rosslyn Line are the three shuttle routes that serve the study area.[1]

[4] Routes and headways based on WMATA schedules published on March, 2005. Georgetown University Transportation Shuttle schedules published on January, 2005.

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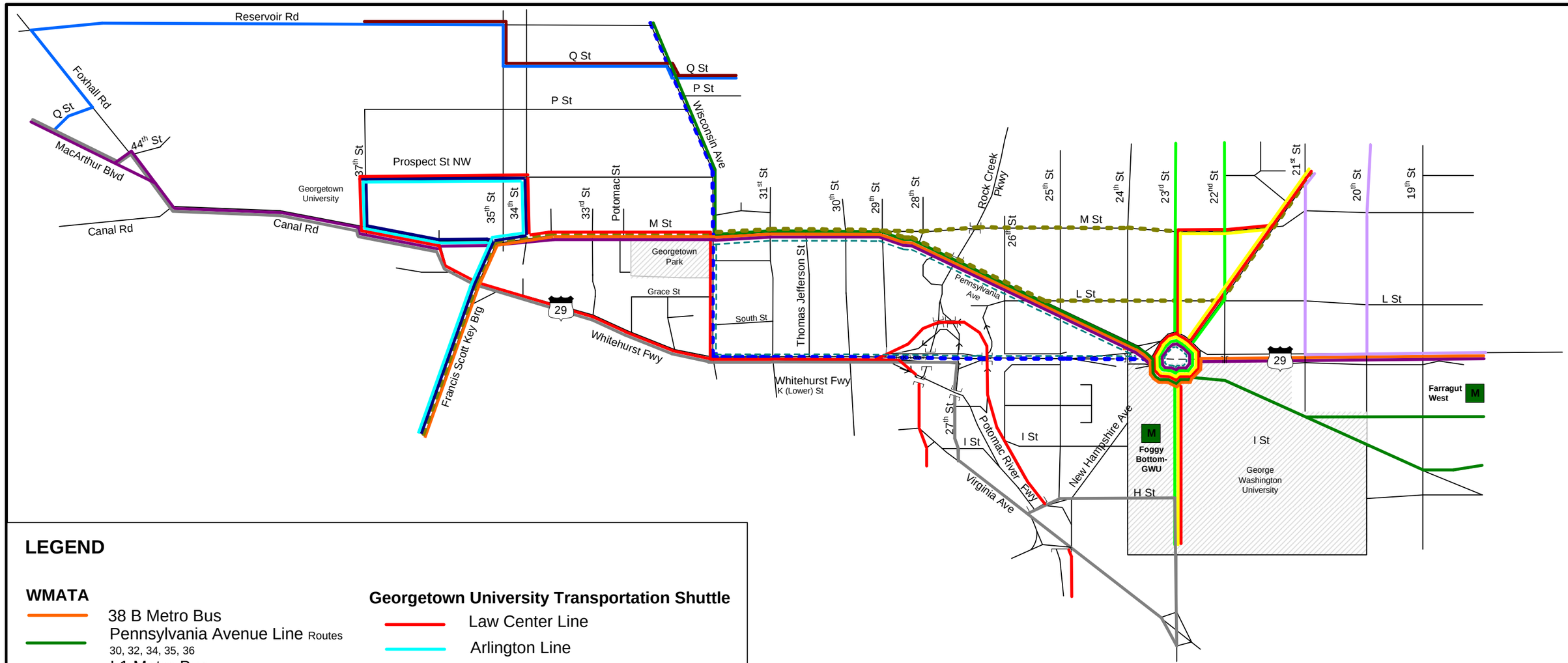

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WMATA

- 38 B Metro Bus
- Pennsylvania Avenue Line Routes 30, 32, 34, 35, 36
- L1 Metro Bus
- D5 Metro Bus
- L2 Metro Bus
- H1 Metro Bus
- N3 Metro Bus
- D3, D6 Metro Bus

Georgetown University Transportation Shuttle

- Law Center Line
- Arlington Line
- Rosslyn Line
- Dupont Circle Line

Georgetown Metro Connection

- Route 1 Wisconsin Avenue Line
- Route 2 M Street Line

- **George Washington University Shuttle**
- **Downtown Circulator**
- M **Subway Station**

Figure 3-3

Public Transit

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Whitehurst Freeway Deconstruction Feasibility Study

3-1.2.3. Georgetown University Transportation Shuttle

The Georgetown University Transportation Shuttle provides service to and from the university campus. Law Center Line, Arlington Line and Rosslyn Line are the three shuttle routes that serve the study area.[5]

3-1.2.4. George Washington University Shuttle

George Washington University also provides transit service within the study area. Buses operate every 5-7 minutes from both the campuses (Foggy Bottom Campus and Mount Vermon Campus).

3-1.2.5. Downtown Circulator

The recently started Downtown Circulator operates in a circular manner on Wisconsin Avenue, Lower K Street, Washington Circle and Pennsylvania Avenue. The Circulator operates from 7:00 AM to 9:00 PM. The average headway between circulator buses is 5 to 10 minutes.

3-2. TRAFFIC VOLUMES

In order to evaluate existing traffic conditions throughout the study area, the Study Team collected turning movement counts at the following intersections:

1. Foxhall Road and Canal Road
2. Canal Road and Southern Entrance to Georgetown University
3. M and Francis Scott Key Memorial Bridge
4. M and Wisconsin Avenue
5. M and 24th Street
6. M and 23th Street
7. L and 24th Street
8. L and 23th Street
9. K Street and Wisconsin Avenue
10. K Street and 31st Street
11. K Street and 29th Street
12. K Street and 26th Street
13. Pennsylvania Avenue and 24th Street

Additionally, the Study Team collected intersection counts at key locations throughout the study area from recent studies conducted by the District Department of Transportation.

[5] Routes and headways based on WMATA schedules published on March, 2005. Georgetown University Transportation Shuttle schedules published on January, 2005.

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Counts were taken during the months of January, February and March 2005. No traffic was counted during holiday weeks or while District public schools and universities were not in session.

The turning movement traffic counts on all the study intersections were treated as raw volumes. Because of existing public and private parking locations throughout the study area, there were minor discrepancies in the overall balance of traffic volumes. In order to improve the modeling of existing traffic conditions, the Study Team applied standard traffic engineering techniques to adjust the turning movement volumes at intersections where minor unjustified imbalances were found. Figure 3-4 presents the existing 2005 balanced AM and PM weekday peak hour turning movement counts at all 54 intersections (Figure 3-1 presents the location of the intersections shown in Figure 3-4). Pedestrian counts are presented in Figure 3-5 for weekdays. The pedestrian high pedestrian volumes are found along M Street, especially at the M Street and Wisconsin Avenue intersection. On the eastern side of the study area, there are also high pedestrian volumes along L Street and K Street. Appendix A presents raw vehicular and pedestrian volumes.

Figure 3-6 shows the summary of traffic data for key links within the study area and the average daily traffic at key locations. As Figure 3-6 indicates, the Whitehurst Freeway carries approximately 2,000 vehicles per hour in the peak direction during the AM and PM peak hours. The Whitehurst Freeway carries 33,000 vehicles per day. M Street immediately west of Wisconsin Avenue carries approximately 1,200 vehicles per hour in the peak direction during the AM and PM peak hours and 26,000 vehicles per day. The traffic volumes on Lower K Street east of Wisconsin are approximately 300 vehicles per hour in the peak direction during the AM and PM peak hours and 13,000 vehicles per day. Figure 3-7 shows the average annual bi-directional volumes for the bridges in the vicinity of the study area. Currently, the Key Bridge is carrying 66,000 vehicles per day as compared to 100,000 vehicles per day for Theodore Roosevelt Bridge. The bridges on the Potomac River are currently operating at capacity during the peak periods.

The Study Team collected automated Average Daily Traffic (ADT) counts over a one-week period in September 2005 at the following three locations:

- Whitehurst Freeway (between Key Bridge Ramp and Potomac Expressway Ramp)
- M Street (East of Key Bridge and M Street intersection)
- K Street (between 31st Street and Thomas Jefferson Street)

The Whitehurst Freeway carries approximately 33,000 vehicles per day during a typical weekday. As shown in Figure 3-8, on a typical weekday 40 percent of the total eastbound daily traffic traverses the Whitehurst Freeway between the hours of 7:00 AM and 10:00 AM. The average daily traffic in the eastbound direction is 13,400 vehicles. The Whitehurst Freeway carries approximately 500 vehicles per hour in the eastbound direction during the rest of the day on a typical weekday. On a typical weekday 29 percent of the total westbound daily traffic traverses the Whitehurst Freeway between the

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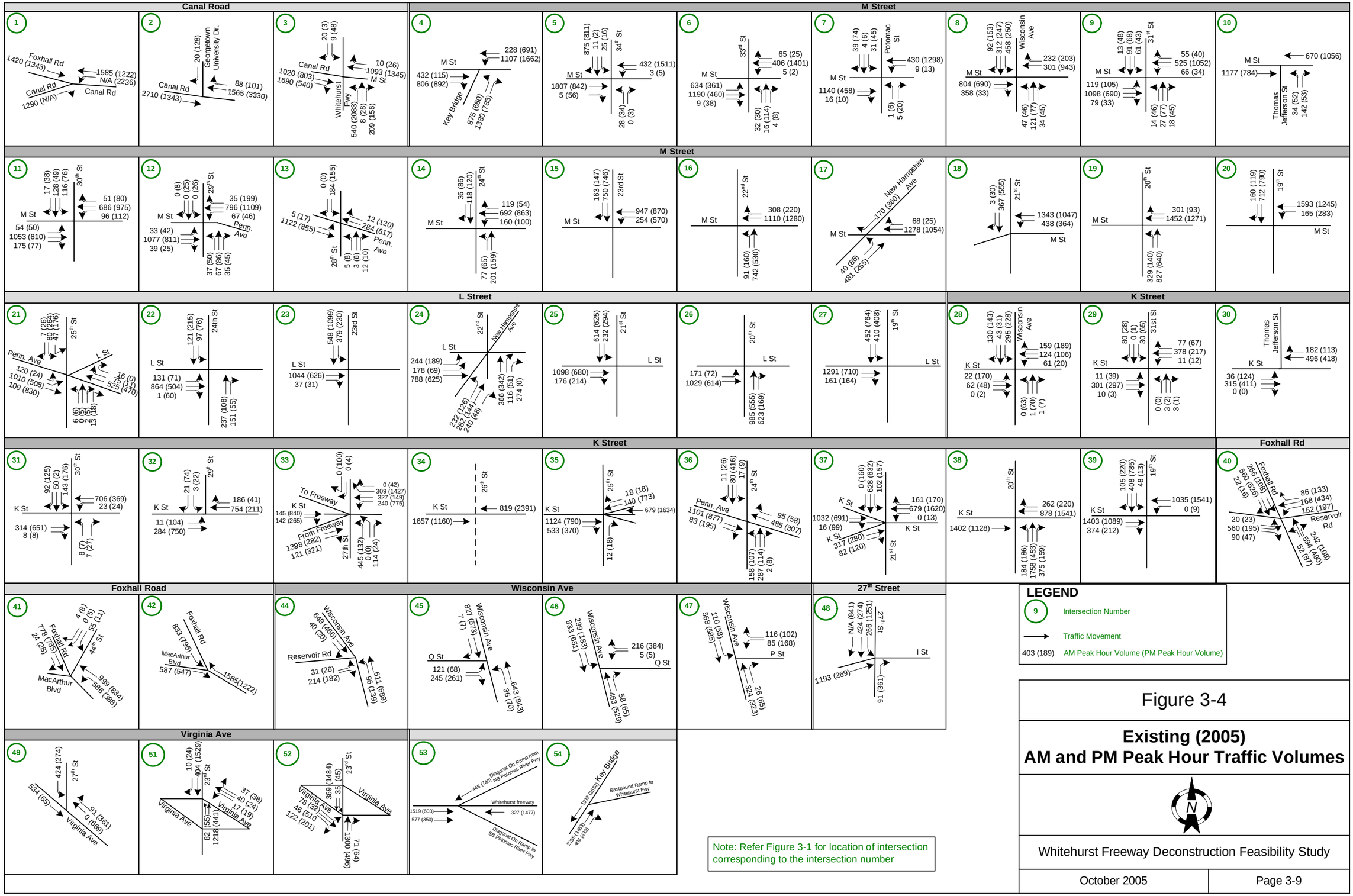
Canal Road
M Street
M Street
L Street
K Street
Foxhall Rd
K Street
Foxhall Road
Wisconsin Ave
27th Street
Virginia Ave
1 Foxhall Rd 1420 (1343) Canal Rd 1290 (N/A) 1585 (1222) N/A (2236) Canal Rd
2 Georgetown University Dr. 20 (128) Canal Rd 2710 (1343) 88 (101) 1565 (3330)
3 20 (3) 9 (48) Canal Rd 1020 (803) 1690 (540) 10 (26) 1093 (1345) M St Whitehurst Fwy 540 (2083) 8 (28) 209 (156)
4 M St 432 (115) 806 (892) 228 (691) 1107 (1662) Key Bridge 875 (680) 1380 (783)
5 875 (811) 11 (2) 25 (16) 34th St M St 1807 (842) 5 (56) 432 (1511) 3 (5) 28 (34) 0 (3)
6 33rd St M St 634 (361) 1190 (460) 9 (38) 65 (25) 406 (1401) 5 (2) 32 (30) 16 (114) 4 (8)
7 39 (74) 4 (6) 31 (45) Potomac St M St 1140 (458) 16 (10) 430 (1298) 9 (13) 1 (6) 5 (20)
8 92 (153) 312 (247) 458 (250) Wisconsin Ave M St 804 (690) 358 (33) 232 (203) 301 (943) 47 (46) 121 (77) 34 (45)
9 13 (48) 91 (68) 61 (43) 31st St M St 119 (105) 1098 (690) 79 (33) 55 (40) 525 (1052) 66 (34) 14 (46) 27 (77) 18 (45)
10 M St 1177 (784) 670 (1056) Thomas Jefferson St 34 (52) 142 (53)
11 17 (38) 128 (49) 116 (76) 30th St M St 54 (50) 1053 (810) 175 (77) 51 (80) 686 (975) 96 (112)
12 0 (8) 0 (25) 0 (26) 29th St M St 33 (42) 1077 (811) 39 (25) 35 (199) 796 (1109) 67 (46) Penn. Ave 37 (50) 67 (86) 35 (45)
13 0 (0) 184 (155) 28th St 5 (17) 1122 (855) 12 (120) 284 (617) Penn. Ave 5 (8) 3 (6) 12 (10)
14 36 (86) 118 (120) 24th St M St 119 (54) 692 (863) 160 (100) 77 (65) 201 (159)
15 163 (147) 750 (746) 23rd St M St 947 (870) 254 (570)
16 22nd St M St 308 (220) 1110 (1280) 91 (160) 742 (530)
17 New Hampshire Ave 170 (360) M St 68 (25) 1278 (1054) 40 (86) 481 (255)
18 3 (30) 367 (555) 21st St 1343 (1047) 438 (364) M St
19 20th St M St 301 (93) 1452 (1271) 329 (140) 827 (640)
20 160 (119) 712 (790) 19th St 1593 (1245) 165 (283) M St
21 7 (26) 80 (126) 47 (176) 25th St Penn. Ave L St 120 (24) 1010 (508) 109 (830) 16 (0) 75 (21) 525 (470) 6 (6) 0 (5) 2 (5) 13 (18)
22 121 (215) 97 (76) 24th St L St 131 (71) 864 (504) 1 60) 237 (108) 151 (55)
23 548 (1099) 379 (230) 23rd St L St 1044 (626) 37 (31)
24 22nd St New Hampshire Ave L St 244 (189) 178 (69) 788 (625) 232 (128) 282 (144) 240 (48) 366 (342) 116 (51) 274 (0)
25 614 (625) 232 (294) 21st St 1098 (680) 176 (214) L St
26 20th St L St 171 (72) 1029 (614) 985 (555) 623 (169)
27 452 (764) 410 (408) 19th St 1291 (710) 161 (164) L St
28 130 (143) 43 (31) 295 (228) Wisconsin Ave K St 22 (170) 62 (48) 0 (2) 159 (189) 124 (106) 61 (20) 0 (63) 1 (70) 1 (7)
29 80 (28) 0 (1) 30 (65) 31st St K St 11 (39) 301 (297) 10 (3) 77 (67) 378 (217) 11 (12) 0 (0) 3 (2) 3 (1)
30 Thomas Jefferson St K St 36 (124) 315 (411) 0 (0) 182 (113) 496 (418)
31 92 (125) 50 (2) 143 (176) 30th St K St 314 (651) 8 (8) 706 (369) 23 (24) 8 (7) 7 (27)
32 21 (74) 3 (22) 29th St K St 11 (104) 284 (750) 186 (41) 754 (211)
33 0 (100) 0 (4) To Freeway K St 145 (840) 142 (265) From Freeway 1398 (282) 121 (321) 27th St 0 (42) 309 (1427) 327 (149) 240 (775) 445 (132) 0 (0) 114 (24)
34 26th St K St 1657 (1160) 819 (2391)
35 25th St K St 1124 (790) 533 (370) 18 (18) 140 (773) 679 (1634) 12 (18)
36 11 (26) 80 (416) 17 (9) 24th St Penn. Ave 1101 (877) 83 (195) 95 (58) 485 (307) 158 (107) 287 (114) 2 (8)
37 0 (160) 628 (632) 102 (157) K St 1032 (691) 16 (99) K St 317 (280) 82 (120) 161 (170) 679 (1620) 0 (13) K St 21st St
38 20th St K St 1402 (1128) 262 (220) 878 (1541) 184 (186) 1758 (453) 375 (159)
39 105 (220) 408 (785) 48 (13) 19th St K St 1403 (1089) 374 (212) 1035 (1541) 0 (9)
40 Foxhall Rd 266 (109) 560 (526) 22 (16) 20 (23) 560 (195) 90 (47) 86 (133) 168 (434) 152 (197) Reservoir Rd 242 (108) 394 (490) 52 (87)
41 4 (8) 0 (5) 55 (11) 44th St Foxhall Rd 778 (785) 24 (28) MacArthur Blvd 999 (834) 586 (388)
42 Foxhall Rd 833 (796) MacArthur Blvd 587 (547) 1585(1222)
44 Wisconsin Ave 649 (466) 40 (20) Reservoir Rd 31 (26) 214 (182) 611 (689) 96 (139)
45 827 (573) 7 (1) Wisconsin Ave Q St 121 (68) 245 (261) 643 (843) 36 (70)
46 Wisconsin Ave 239 (183) 833 (651) 216 (384) 5 (5) Q St 58 (65) 463 (529)
47 Wisconsin Ave 110 (58) 568 (585) 116 (102) 85 (168) P St 26 (65) 324 (323)
48 27th St N/A (841) 424 (274) 266 (1251) I St 1193 (269) 91 (361)
49 424 (274) 27th St 534 (65) Virginia Ave 91 (361) 0 (668)
51 10 (24) 404 (1529) 23rd St Virginia Ave 82 (55) 1218 (441) 37 (38) 40 (24) 17 (19) Virginia Ave
52 23rd St Virginia Ave 369 (1484) 35 (45) Virginia Ave 78 (32) 46 (510) 122 (201) 130 (496) 71 (64)
53 Diagonal On Ramp from NB Potomac River Fwy 448 (740) 1519 (603) 577 (350) Whitehurst freeway 327 (1477) Diagonal On Ramp to SB Potomac River Fwy
54 Key Bridge 1913 (2554) Eastbound Ramp to Whitehurst Fwy 2261 (1465) 466 (419)
LEGEND
9 Intersection Number
Traffic Movement
403 (189) AM Peak Hour Volume (PM Peak Hour Volume)
Note: Refer Figure 3-1 for location of intersection corresponding to the intersection number
Figure 3-4
Existing (2005)
AM and PM Peak Hour Traffic Volumes
N
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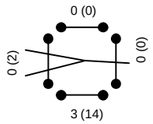
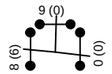
Canal Road

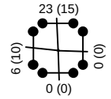
1 Foxhall Rd and Canal Rd



2 Georgetown University Drwy and Canal Rd

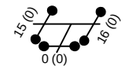


3 Whitehurst Fwy, M St and Canal Rd

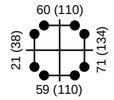


M Street

4 M St and Key Bridge



5 M St and 34th St



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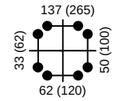
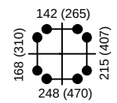
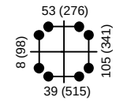


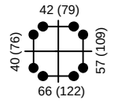
7 M St and Potomac St



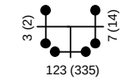
8 M St and Wisconsin Ave



9 M St and 31st St

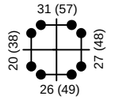


10 M St and Thomas Jefferson St

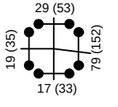


M Street

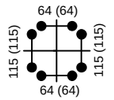
11 M St and 30th St



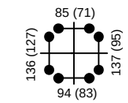
12 M St, 29th St and Penn Ave



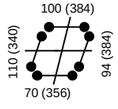
15 M St and 23rd St



16 M St and 22nd St



17 M St and New Hampshire Ave



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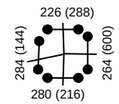

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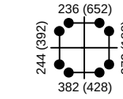
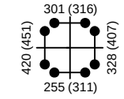
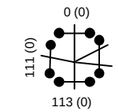


20 M St and 19th St

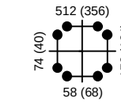


L Street

21 L St, Penn Ave and 25th St

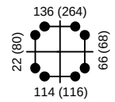


22 L St and 24th St

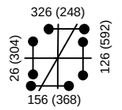


L Street

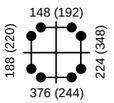
23 L St and 23rd St



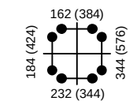
24 L St, 22nd St and New Hampshire Ave



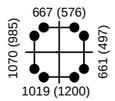
25 L St and 21st St



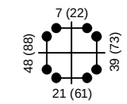
26 L St and 20th St



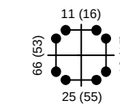
27 L St and 19th St



28 K (Lower) St and Wisconsin Ave

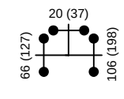


29 K (Lower) St and 31st St

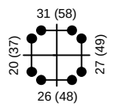


K Street

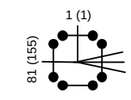
30 K (Lower) St and Thomas Jefferson St



31 K (Lower) St and 30th St



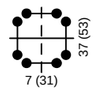
32 K St and 29th St



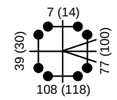
K Street

33 K St, Whitehurst Fwy and 27th St

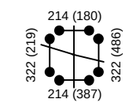
34 K St and 26th St



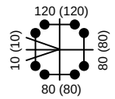
35 K St and 25th St



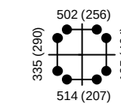
36 Penn Ave and 24th St



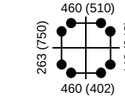
37 K St and 21st St



38 K St and 20th St

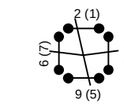


39 K St and 19th St



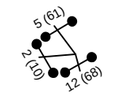
Foxhall Rd

40 Foxhall Rd and Reservoir Rd

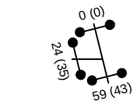


Wisconsin Ave

44 Wisconsin Ave and Reservoir Rd

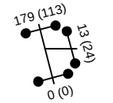


45 Wisconsin Ave and Q St

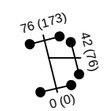


Wisconsin Ave

46 Wisconsin Ave and Q St

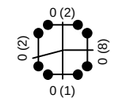


47 Wisconsin Ave and P St



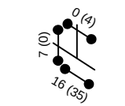
27th Street

48 27th and I St

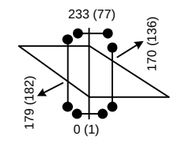


Virginia Ave

49 27th and Virginia Ave



51 23rd and Virginia Ave



LEGEND

9 Intersection Number

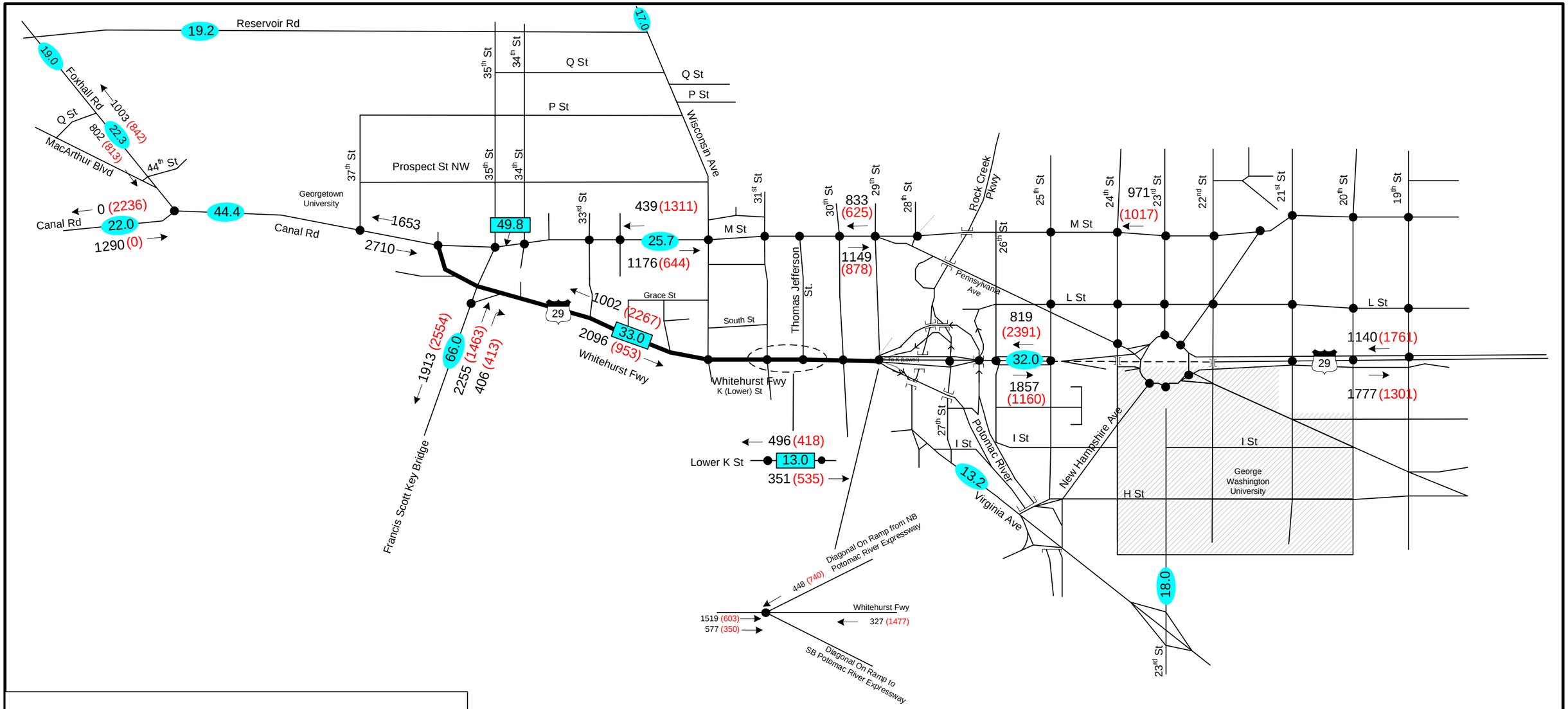
10 (25) AM (PM) Pedestrian Counts

Figure 3-5

Existing (2005) AM and PM Peak Period Pedestrian Volumes

N

Whitehurst Freeway Deconstruction Feasibility Study



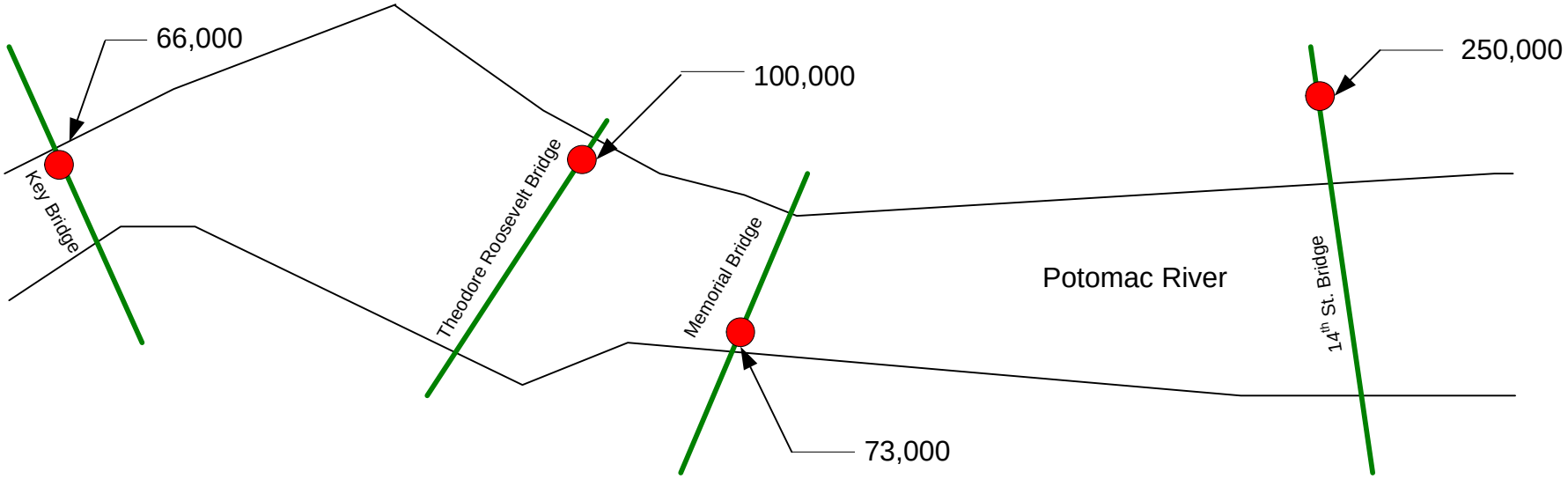
LEGEND

- Intersection
- Flow of Traffic
- 123 (456) AM (PM) Volume Counts
- 22.0 Average Annual Weekday Bi-Directional Volumes Expressed in thousands (Year 2002)
- 13.0 Average Annual Weekday Bi-Directional Volumes Expressed in thousands (Year 2005)

Figure 3-6

Existing (2005) Peak Hour Volumes and ADT at Key Locations

N



LEGEND

- Permanent Traffic Count Location

20,000 - Average Annual Weekday Volumes (Year 2002)

Source - http://www.ddot.dc.gov website

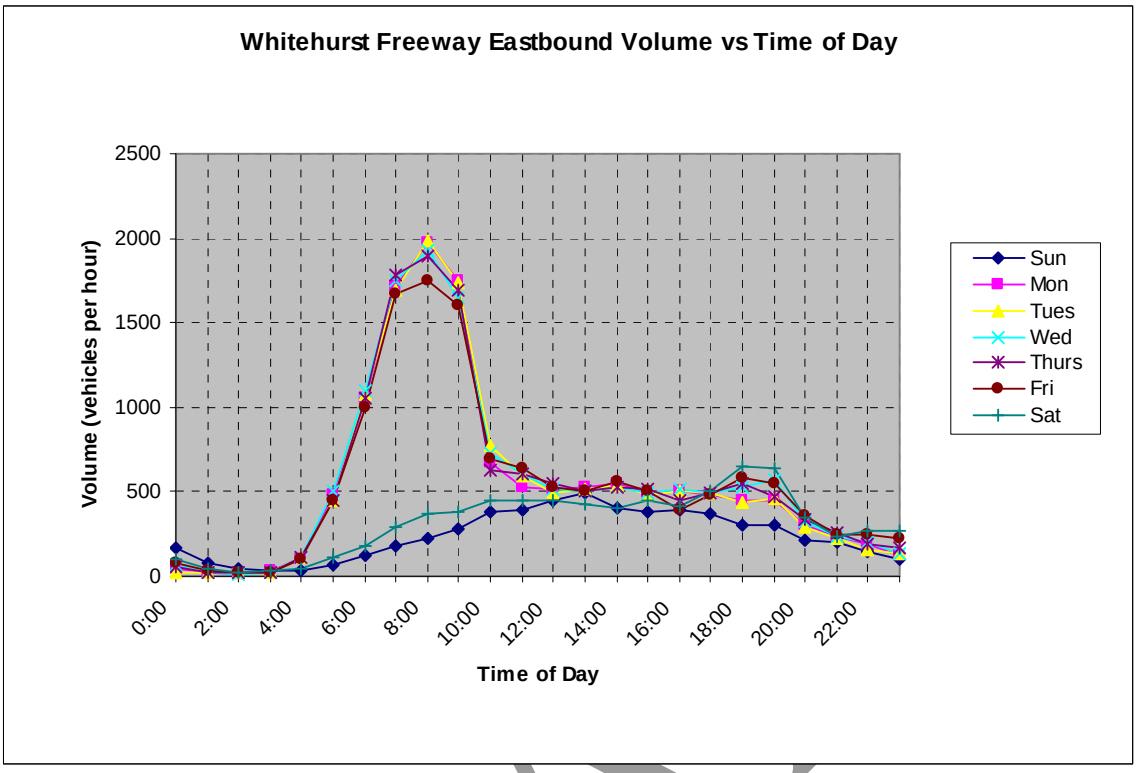
Figure 3-7

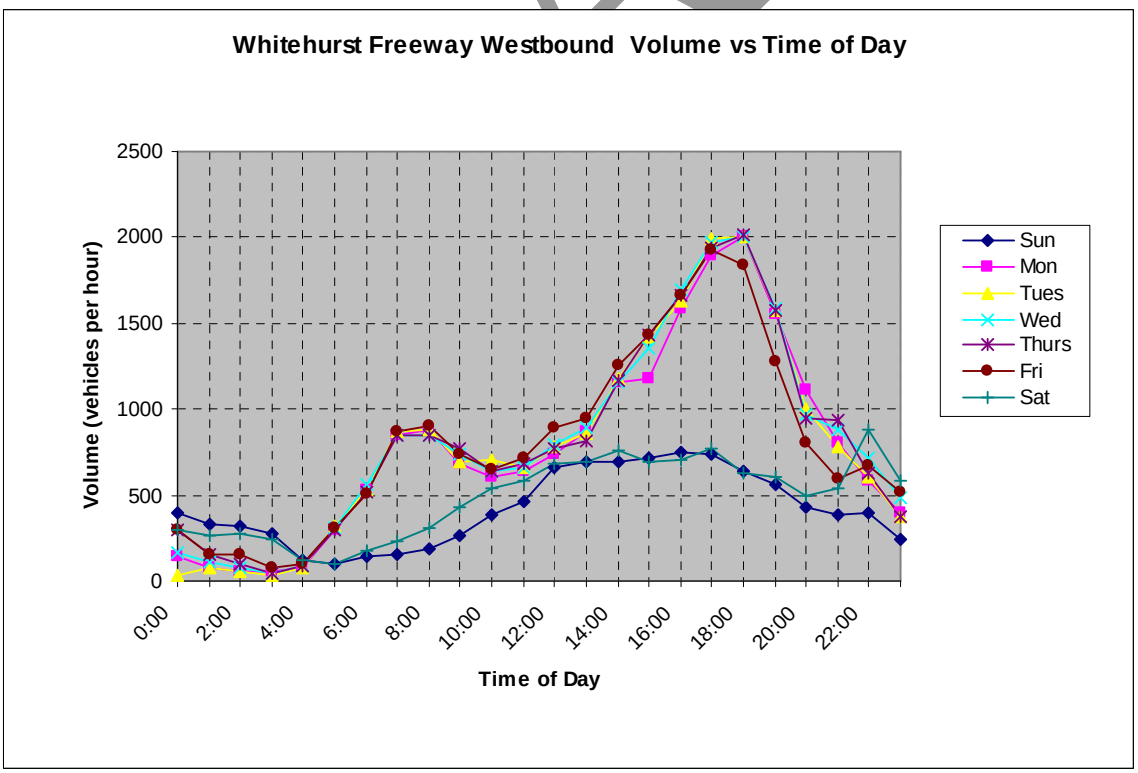
Average Annual Weekday Volume

N

Whitehurst Freeway Deconstruction Feasibility Study

Figure 3-8. Weekday Hourly Distribution of Vehi cular Trips – Whitehurst Freeway





hours of 4:00 PM and 7:00 PM. The average daily traffic in the westbound direction is 19,400 vehicles. As Figure 3-8 indicates, traffic volumes on the Whitehurst Freeway are low during the weekends.

The daily traffic volume on K Street east of Wisconsin Avenue on a typical weekday is 13,000 vehicles, and on M Street east of the Key Bridge the daily traffic volume is 49,800 vehicles. As shown in Figure 3-9, K Street carries less than 600 vehicles per hour during any time of the day due to the lack of connection to Canal Road from K Street. The pattern of utilization of this street, however, is different from the pattern of the Whitehurst Freeway. The street has relatively constant utilization throughout the day.

M Street east of the Key Bridge carries approximately 1,800 vehicles in the eastbound direction during the AM peak hour and 2,300 vehicles in the westbound direction during the PM peak hour. On a daily basis, M Street carries 20,500 vehicles in the eastbound direction and 29,200 vehicles in the westbound direction. During off-peak hours, M Street carries significantly high volumes, as shown in Figure 3-10. The utilization pattern of M Street is different from the utilization pattern of the Whitehurst Freeway. M Street is more evenly utilized throughout the day. As Figure 3-11 indicates, during off peak hours when M Street is congested due to high volumes, the Whitehurst Freeway carries relatively low volumes in both directions. The detailed daily counts are provided in Appendix B.

3-3. SPEED AND TRAVEL TIMES

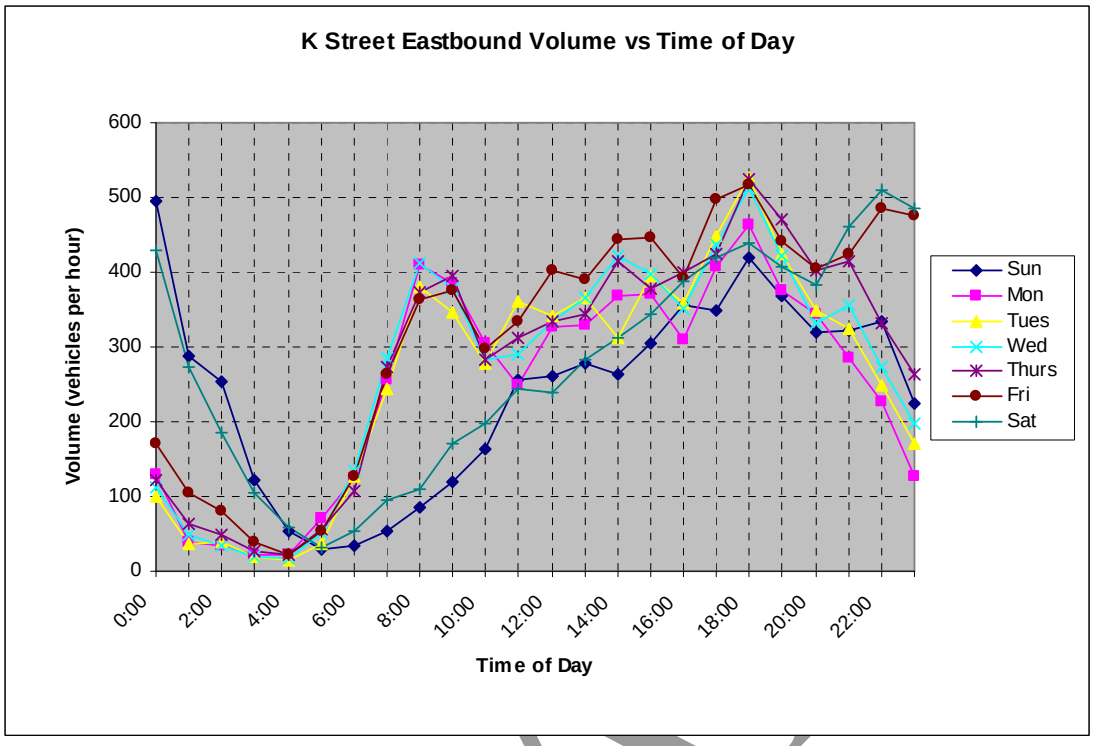
In order to gain an understanding of driving patterns and to gather information needed in the development of the traffic model for the study area, the Study Team collected information on speed and travel times on key corridors. The Study Team collected the data on travel times and delay on March 1 to March 3, 2005.

Study Team data collectors drove the Whitehurst Freeway, M Street and Lower K Street 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 critical 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. Table 3-1 and Table 3-2 present travel time for the key routes in the study area. Figures 3-12 and 3-13 present travel speeds for the key corridors segments for AM and PM peak hours, respectively.

DRAFT

Figure 3-9. Weekday Hourly Distribution of Vehicular Trips – K Street



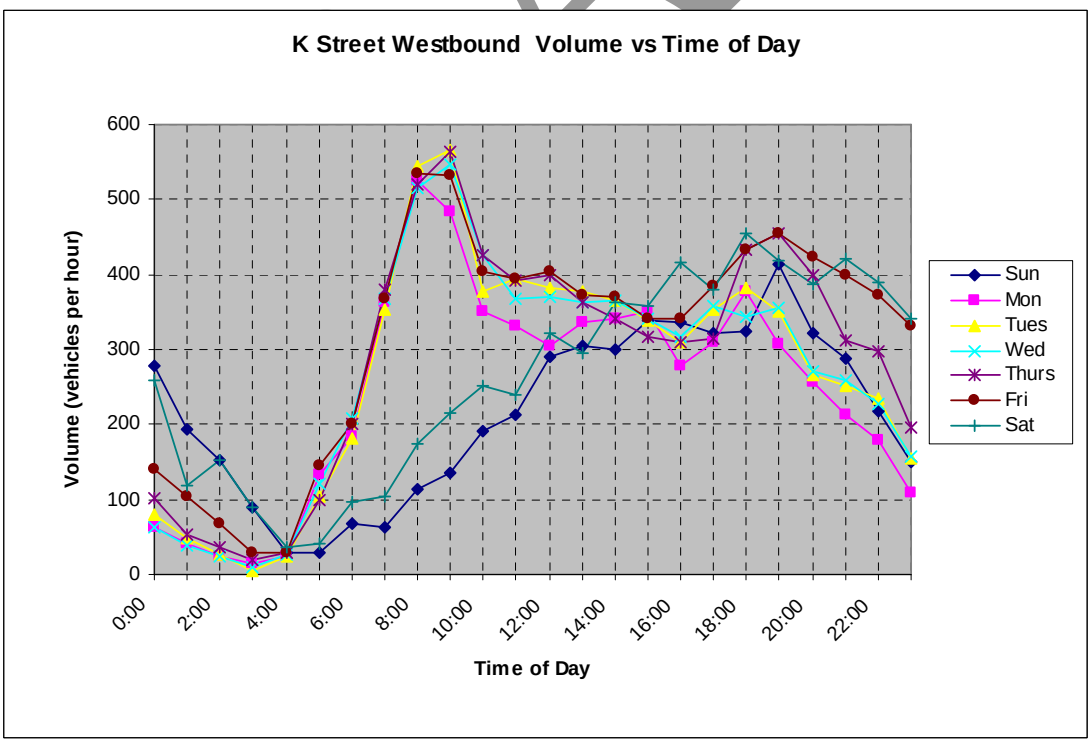
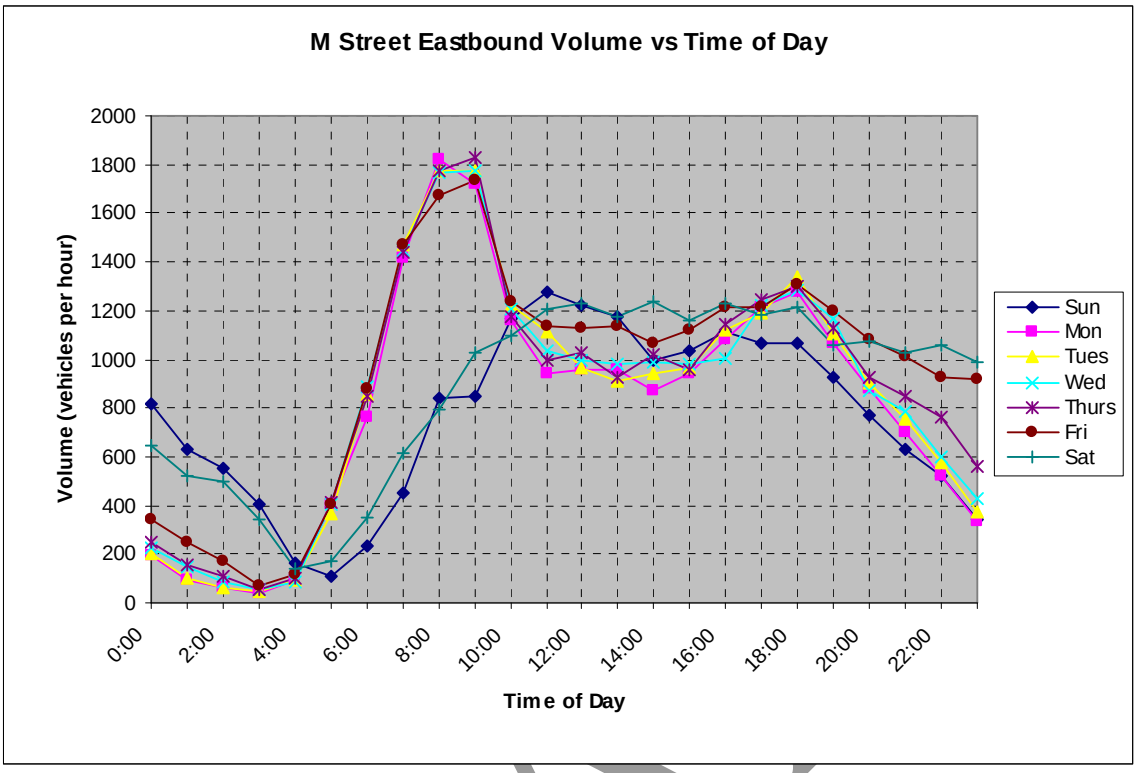


Figure 3-10. Weekday Hourly Distribution of Vehicular Trips – M Street



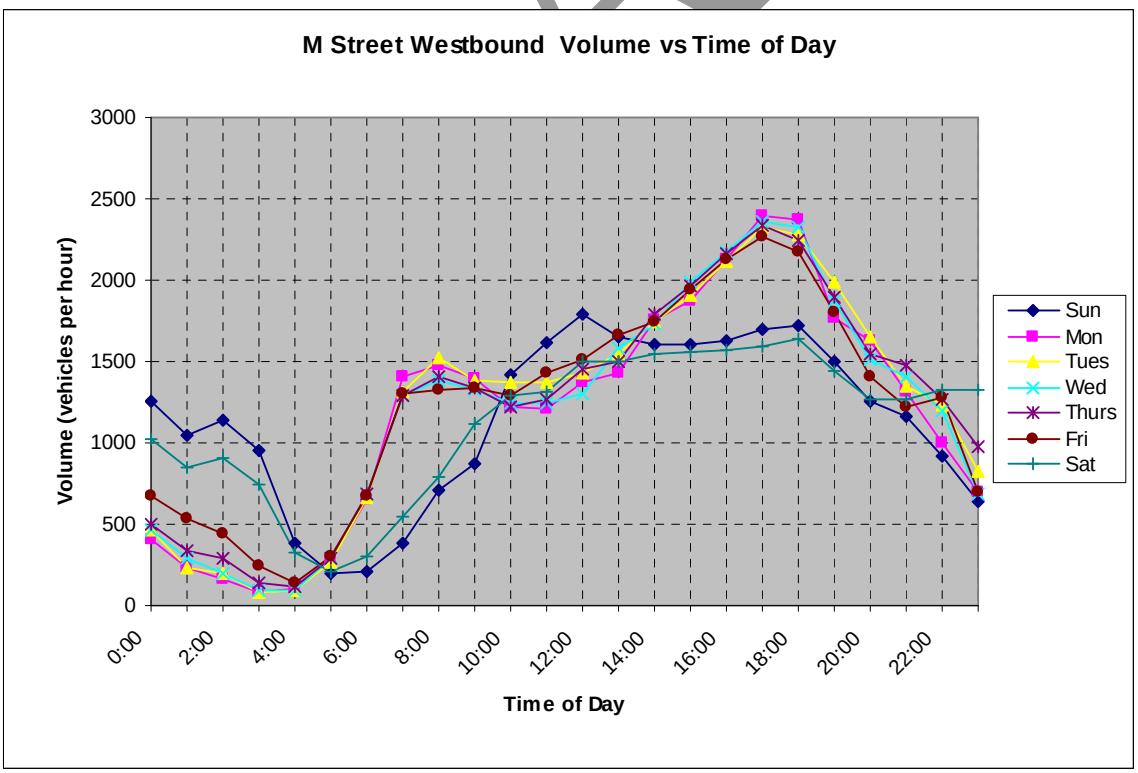
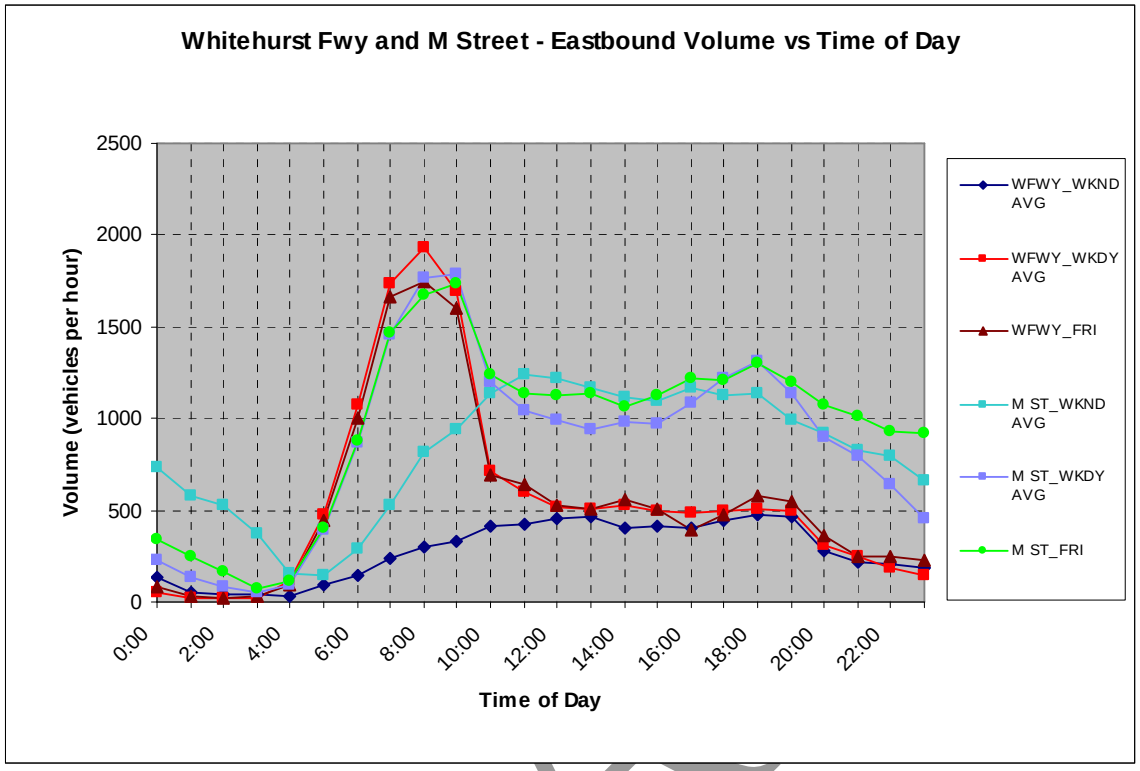


Figure 3-11. Weekday Hourly Distribution of Vehicular Trips – Whitehurst Freeway and M Street



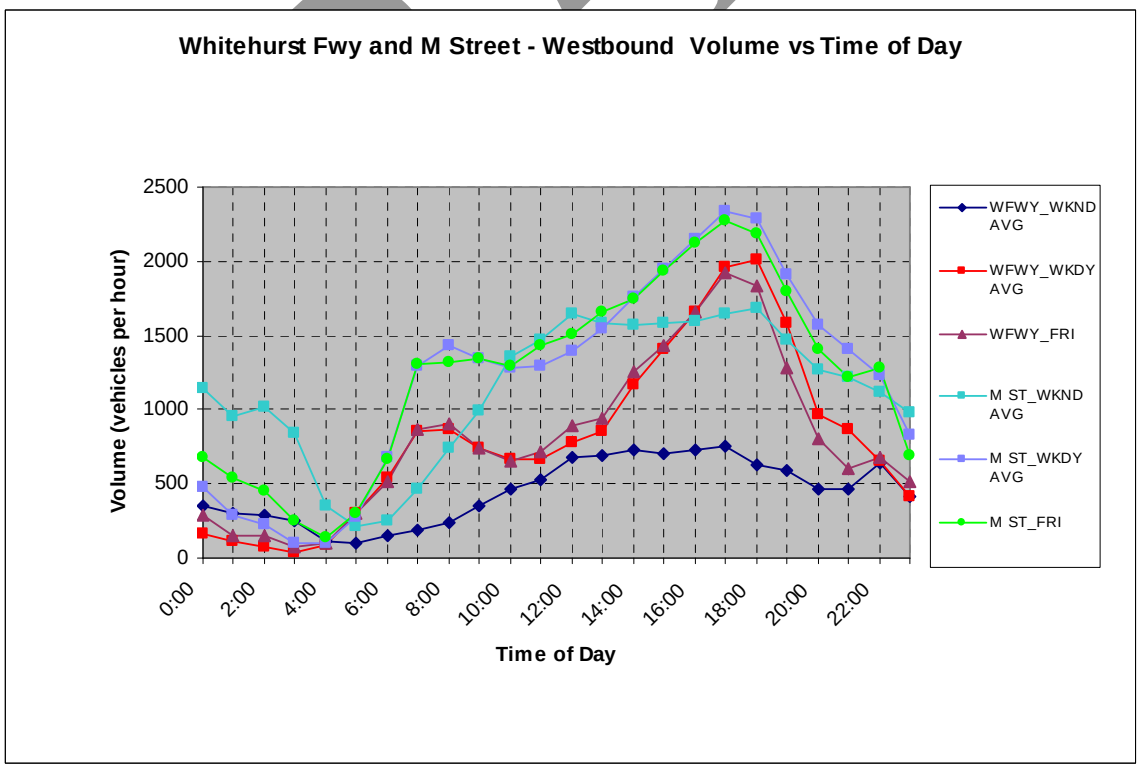


Table 3-1. AM Peak Period Travel Times

Roadway and Direction	Segment	Eastbound (min:sec)	Westbound (min:sec)
M Street	Foxhall and Canal Road – Washington Circle and New Hampshire Avenue	9:01	10:09
Whitehurst Freeway	Foxhall and Canal Road – K Street and 19th Street	7:55	5:07
Lower K Street	Wisconsin Avenue – K Street and 27th Street	2:45	1:34

Appendix C presents a list of recorded speeds for all analyzed segments within the study area.

Table 3-2. PM Peak Period Travel Times

Roadway	Segment	Eastbound (min:sec)	Westbound (min:sec)
M Street	Foxhall and Canal Road – Washington Circle and New Hampshire Avenue	14:34	17:43
Whitehurst Freeway	Foxhall and Canal Road – K Street and 19th Street	7:31	15:27
Lower K Street	Wisconsin Avenue – K Street and 27th Street	4:00	1:50

Appendix C presents a list of recorded speeds for all analyzed segments within the study area.

The main findings of the travel time survey for AM and PM peak periods are:

- Speeds on the eastbound Whitehurst Freeway during the AM peak hours are greater than 20 mph near the Key Bridge but are reduced significantly as vehicles approach the traffic signal at 27th Street.
- Vehicles on Canal Road east of Foxhall Road travel at speeds greater than 20 mph during the AM peak period.
- Travel speeds on M Street during the AM peak period are greater than the speeds during the PM peak period.
- During the PM peak period, the average speed of westbound Whitehurst Freeway traffic is less than 10 mph.
- Westbound vehicles travel at speeds greater than 20 mph on westbound Canal Road west of the Whitehurst Freeway during the PM peak period.
- The average travel speed for eastbound traffic (off-peak direction) on the Whitehurst Freeway and K Street during the PM peak period is below 20 mph on these two roadways.
- Vehicles travel at slow speeds in the eastbound and westbound direction on M Street during the PM peak period.

3-4. ORIGIN DESTINATION PATTERNS IN THE STUDY AREA

In order to gain an understanding of existing traffic patterns in the study area, the Study Team conducted a comprehensive assessment of origins and destinations for vehicles entering and exiting the study area during the AM and PM peak period. The origin-destination survey helped identify the travel patterns of all vehicles entering the study area during the peak hours.

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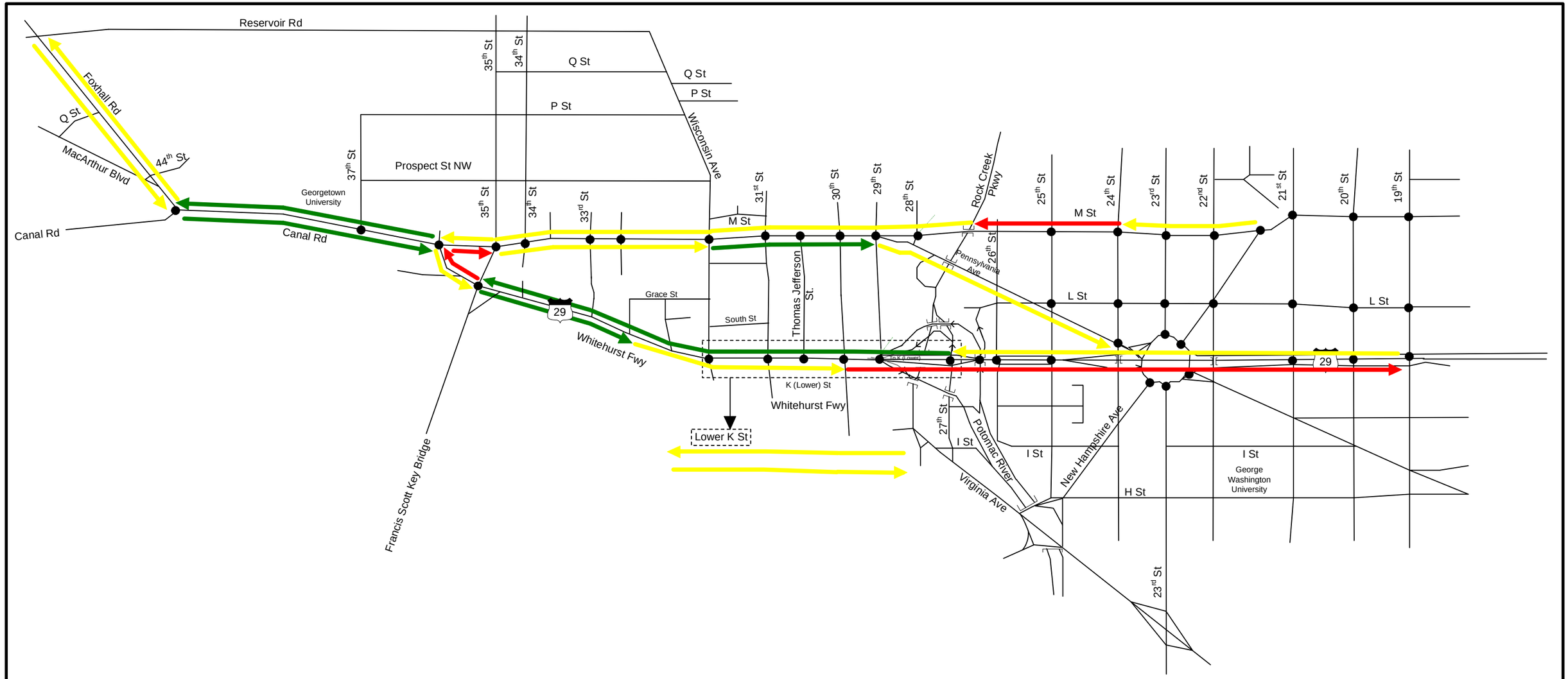


LEGEND

- Intersection

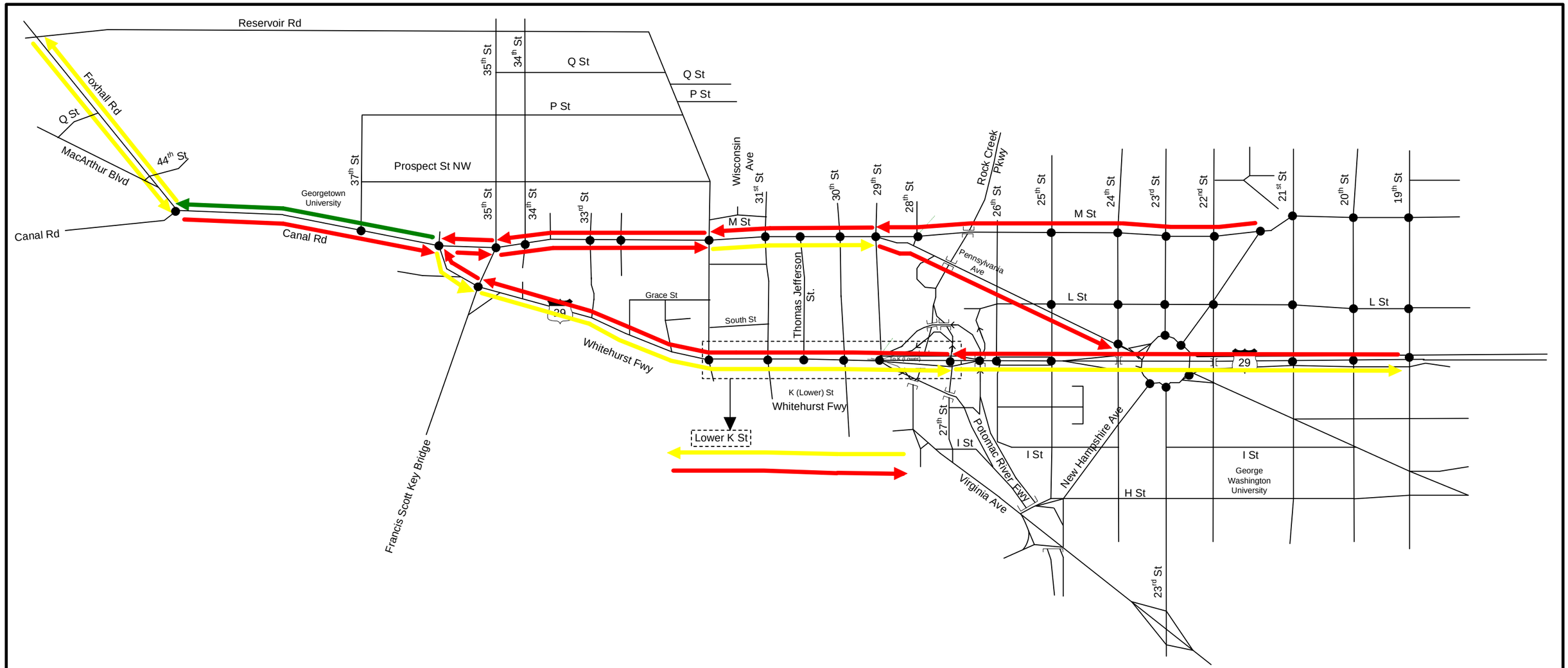
Speed in miles per hour

- 0-10
- 10-20
- > 20

Figure 3-12

Existing (2005) Travel Speeds for AM Peak Period

N



LEGEND

- Intersection

Speed in miles per hour

- 0-10
- 10-20
- > 20

Figure 3-13

Existing (2005) Travel Speeds for PM Peak Period

N

Whitehurst Freeway Deconstruction Feasibility Study

3-4.1. DATA COLLECTION FOR ORIGIN-DESTINATION SURVEY

The data collection effort for the origin-destination survey encompassed the following tasks:

1. Recording vehicle license plates at all major entry and exit points for the Whitehurst Freeway: survey personnel (surveyors) recorded license plate data, state and number, onto tape recorders at the locations shown in Figure 3-14 on February 15, 2005.
2. Recording of missed vehicles: if a surveyor could not get the license plate of a vehicle, he/she was instructed to note the vehicle as a "missed" to have control totals that could be used for the expansion of the survey data.
3. Transcription of license plate records: surveyors entered the state and license plate data for each location onto a computerized database.

3-4.2. DATA PROCESSING FOR ORIGIN-DESTINATION SURVEY

Study Team staff used the license plate database to match entering and exiting vehicles. The Study Team made the assumptions in the database matching process that missed vehicles would have the same travel patterns as vehicles for which origin-destination matches were found.

In the first step of the license plate matching process, the Study Team developed a "raw" origin-destination trip matrix based on exiting license plates that matched entering license plates. This raw origin-destination matrix excluded unmatched vehicles and missed vehicles. In the second step, the Study Team used the data to determine a "total" origin-destination trip matrix for all the vehicles entering and exiting the study area.

3-4.3. TRIP MATRICES AND ORIGIN-DESTINATION SURVEYS FINDINGS

Tables 3-3 and 3-4 present the results of the vehicle matching for the study area during the AM peak hour. The matrix of origins and destinations shown in Table 3-3 are the totals for all vehicles and include adjustments to account for unmatched and missed vehicles (the unadjusted "raw" origin-destination matrices are included in Appendix D) . The main findings of the origin-destination survey results for the AM peak period are:

- 31 percent of the eastbound traffic enters the Whitehurst Freeway from the Key Bridge.
- 30 percent of vehicles destined to eastbound K Street enter the Whitehurst Freeway via the ramp from the Key Bridge.
- 37 percent of the eastbound traffic that enters the Whitehurst Freeway from Canal Road is destined to the southbound Potomac Expressway.
- Only 13 percent of the eastbound traffic that enters the Whitehurst Freeway from the Key Bridge is destined to the southbound Potomac Expressway.
- 83 percent of the eastbound traffic that enters the Whitehurst Freeway from the Key Bridge is destined to points east on K Street.

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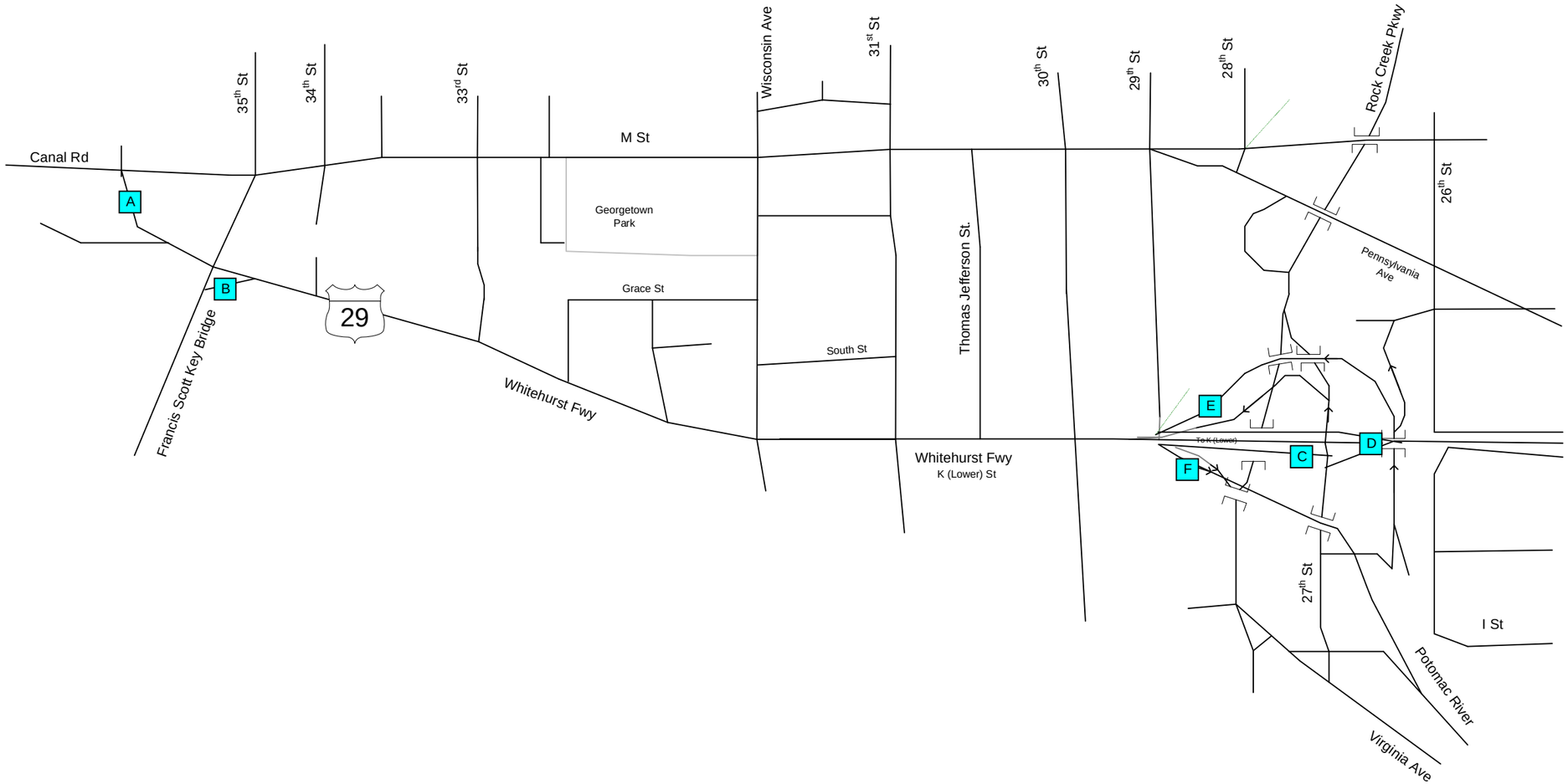

LEGEND

F License Plate Survey Location- Inbound and outbound during AM and PM peak periods

Figure 3-14

License Plate Survey Locations for Origin-Destination Study

N

Whitehurst Freeway Deconstruction Feasibility Study

Table 3-3
Total Origin and Destination Trips During AM Peak Hour

			Destination					
		Location	Eastbound Whitehurst Freeway to Eastbound K-Street	Eastbound Whitehurst Freeway to Southbound 27th Street	Eastbound Whitehurst Freeway Diagonal Off Ramp going towards Southbound Potomac Expressway	Westbound Whitehurst Freeway to Westbound Canal Road	Westbound Whitehurst Freeway to Eastbound Canal Road	Total
			D (OUT)	C (OUT)	F (OUT)	A (OUT)	A (OUT)	
Origin	A (IN)	Eastbound Canal Road going towards Whitehurst Freeway	960	53	604			1617
	B (IN)	Northbound Key Bridge On Ramp to Eastbound Whitehurst Freeway	421	20	66			507
	D (IN)	Westbound K-Street towards Westbound Whitehurst Freeway				129	182	311
	E (IN)	Northbound Potomac Expressway Diagonal On Ramp to Westbound Whitehurst Freeway				363	136	499
		Total	1381	73	670	492	318	

Note:

1. The trips shown on this table include adjustments to the raw matching data to account for license plates that were not adequately documented in the data collection process and license plates that were not adequately matched in the database matching process.

Table 3-4
Origin and Destination Trips During AM Peak Period As Percentage of Exit Volumes

			Destination				
		Location	Eastbound Whitehurst Freeway to Eastbound K-Street	Eastbound Whitehurst Freeway to Southbound 27th Street	Eastbound Whitehurst Freeway Diagonal Off Ramp going towards Southbound Potomac Expressway	Westbound Whitehurst Freeway to Westbound Canal Road	Westbound Whitehurst Freeway to Eastbound Canal Road
			D (OUT)	C (OUT)	F (OUT)	A (OUT)	A (OUT)
Origin	A (IN)	Eastbound Canal Road going towards Whitehurst Freeway	70%	73%	90%		
	B (IN)	Northbound Key Bridge On Ramp to Eastbound Whitehurst Freeway	30%	27%	10%		
	D (IN)	Westbound K-Street towards Westbound Whitehurst Freeway				26%	57%
	E (IN)	Northbound Potomac Expressway Diagonal On Ramp to Westbound Whitehurst Freeway				74%	43%
		Total	100%	100%	100%	100%	100%

- Only three percent of the eastbound vehicles entering the Whitehurst Freeway from Canal Road are destined to southbound 27th Street.
- Only four percent of the eastbound vehicles entering the Whitehurst Freeway from the Key Bridge are destined to southbound 27th Street.
- As shown in Figure 3-15, a majority of eastbound vehicles entering the Whitehurst Freeway from Canal Road have Maryland license plates. 12 percent of the traffic entering from Canal Road have DC license plates.

Tables 3-5 and 3-6 present the results of the vehicle matching for the study area during the PM peak hour. The matrix of origins and destinations shown in Table 3-5 includes the adjustments to account for unmatched and missed vehicles[1]. The main findings of the origin-destination survey results for the PM peak period are:

- 79 percent of the traffic that enters the Whitehurst Freeway from westbound K Street exits to westbound Canal Road.
- 92 percent of the traffic that enters the Whitehurst Freeway from northbound Potomac Expressway exits to westbound Canal Road.
- Only 16 percent of the westbound exiting traffic is destined to eastbound Canal Road (most of these vehicles are destined to the Key Bridge).
- 48 percent of the eastbound traffic enters from the Key Bridge.
- 46 percent of the eastbound traffic that enters from the Key Bridge is destined to points west on K Street.
- 40 percent of the eastbound traffic that enters from the Key Bridge is destined to southbound 27th Street.
- 63 percent of all westbound trips entered the Whitehurst Freeway from westbound K Street.
- As shown in Figure 3-16, Maryland license plates were the most prevalent on the Whitehurst Freeway during the PM peak period.
- 61 percent of vehicles exiting the study area via westbound Canal Road had Maryland license plates.

3-5. SAFETY

In order to assess safety conditions in the study area, the Study Team obtained crash data from DDOT for major intersections in the study area, for the years 2000 to 2004. Based on the information summarized in Table 3-7, there were a total of 218 reported crashes in the study area involving 56 injuries. More than 80 percent of the reported crashes and injuries occurred on M Street. There were six head on collisions in the study area, four occurred on M Street itself. The high number of crashes on M Street can be attributed in part to the high volume of traffic, parking and loading activity, and the high pedestrian activity.

As the information in Table 3-7 indicates, the intersection of M Street and Wisconsin Avenue experienced the highest number of crashes in the study area, with 147 during the four analyzed years. Side-swiped and rear end were the most common types of crashes at

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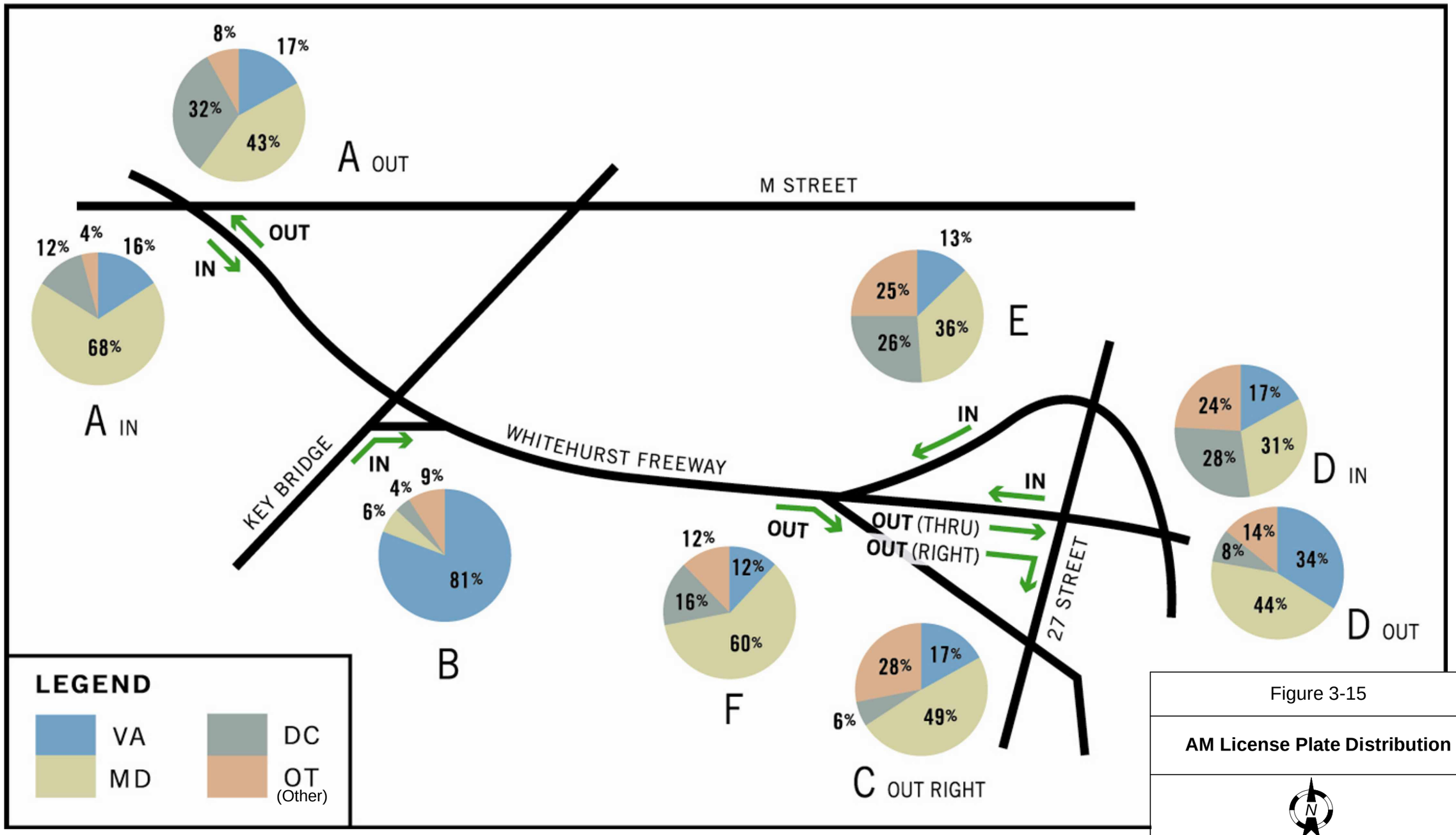

Figure 3-15

AM License Plate Distribution

Whitehurst Freeway Deconstruction Feasibility Study

Table 3-5
Origin and Destination Trips During PM Peak Hour

			Destination					
		Location	Eastbound Whitehurst Freeway to Eastbound K-Street	Eastbound Whitehurst Freeway to Southbound 27th Street	Eastbound Whitehurst Freeway Diagonal Off Ramp going towards Southbound Potomac Expressway	Westbound Whitehurst Freeway to Westbound Canal Road	Westbound Whitehurst Freeway to Eastbound Canal Road	Total
			D (OUT)	C (OUT)	F (OUT)	A (OUT)	A (OUT)	
Origin	A (IN)	Eastbound Canal Road going towards Whitehurst Freeway	161	121	238			520
	B (IN)	Northbound Key Bridge On Ramp to Eastbound Whitehurst Freeway	222	195	67			484
	D (IN)	Westbound K-Street towards Westbound Whitehurst Freeway				1082	286	1368
	C (IN)	Northbound Rock Creek Parkway going towards westbound Whitehurst Freeway				112	15	127
	E (IN)	Northbound Potomac Expressway Diagonal On Ramp to Westbound Whitehurst Freeway				627	51	678
		Total	383	316	305	1821	352	

Note:

1. The trips shown on this table include adjustments to the raw matching data to account for license plates that were not adequately documented in the data collection process and license plates that were not adequately matched in the database matching process.

Table 3-6
Origin and Destination Trips During PM Peak Period As Percentage of Exit Volumes

			Destination				
		Location	Eastbound Whitehurst Freeway to Eastbound K-Street	Eastbound Whitehurst Freeway to Southbound 27th Street	Eastbound Whitehurst Freeway Diagonal Off Ramp going towards Southbound Potomac Expressway	Westbound Whitehurst Freeway to Westbound Canal Road	Westbound Whitehurst Freeway to Eastbound Canal Road
			D (OUT)	C (OUT)	F (OUT)	A (OUT)	A (OUT)
Origin	A (IN)	Eastbound Canal Road going towards Whitehurst Freeway	42%	38%	78%		
	B (IN)	Northbound Key Bridge On Ramp to Eastbound Whitehurst Freeway	58%	62%	22%		
	D (IN)	Westbound K-Street towards Westbound Whitehurst Freeway				60%	82%
	C (IN)	Northbound Rock Creek Parkway going towards westbound Whitehurst Freeway				6%	4%
	E (IN)	Northbound Potomac Expressway Diagonal On Ramp to Westbound Whitehurst Freeway				34%	14%
		Total	100%	100%	100%	100%	100%

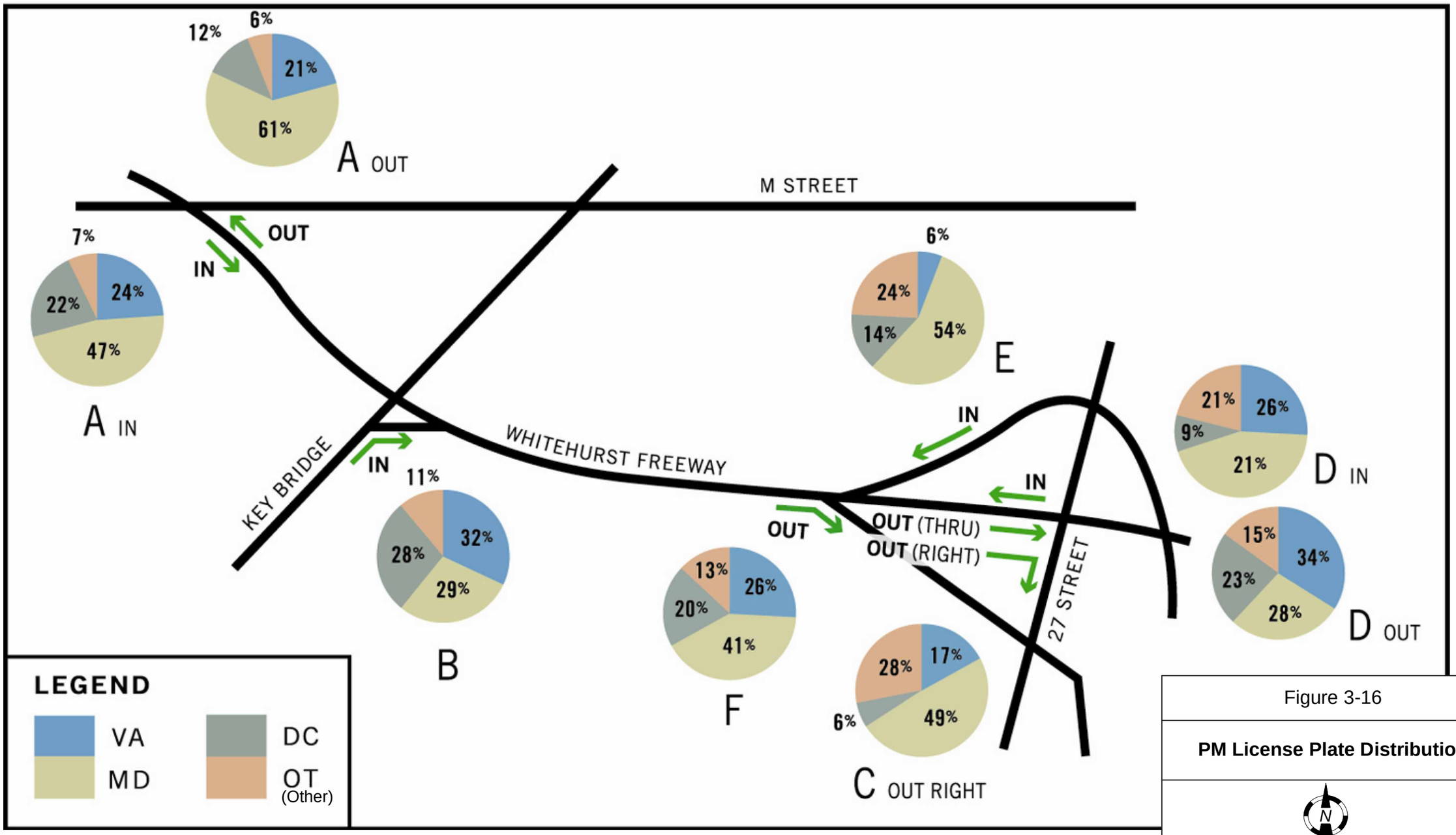

Figure 3-16

PM License Plate Distribution

Table 3-7
Summary of Crash Data

Intersection	Total Number of Crashes (Injuries) 2000-2004	Crash Types (2000-2004)
Wisconsin Avenue and M Street	147 (28)	Right - 8 Left - 6 Right Turn - 6 Rear End - 38 Side Swiped - 57 Head On - 4 Parked - 12 Fixed - 2 Pedestrian - 5 Other - 1
Key Bridge and M Street **	34 (10)	Right - 1 Left - 3 Right Turn - 2 Rear End - 14 Side Swiped - 9 Fixed - 1 Pedestrian - 2 Other - 2
Whitehurst Freeway and K Street / 27th Street	28 (11)	Right - 2 Left - 1 Right Turn - 1 Rear End - 11 Side Swiped - 6 Head On - 2 Fixed - 2 Ran Off Road - 1 Non Collision - 1 Other - 1
Whitehurst Freeway and Canal Road	9 (7)	Rear End - 2 Side Swiped - 4 Ran Off Road - 1 Fixed - 2

** Includes the accidents occurred at the intersection of Northbound Key Bridge and Whitehurst Freeway ramp.

Complete DDOT Accident Summary Reports can be found in Appendix E

this intersection. The number of head-on collisions was four at this intersection. The crashes due to parked vehicles in the roadway are twelve. No parking is allowed during the AM and PM peak period along M Street. The high number of crashes at this intersection indicates that infrastructural enhancements may be needed to improve the safety of traffic operations. Measures to reduce the number of vehicles that traverse M Street would help improve safety of traffic operations at this intersection.

Thirty four crashes were reported at the intersection of the Key Bridge and M Street, with 14 rear end and nine side-swiped crashes. The crash data at this intersection also includes the crashes occurring at the intersection of the Key Bridge and the Whitehurst Freeway on ramp. Most of the crashes occurred at this location are due to a sharp northbound right turn in the middle of the Key Bridge going towards eastbound Whitehurst Freeway[6]. This location is dangerous for pedestrians traversing the Key Bridge on the sidewalk on the east side of the bridge; as drivers hesitate to stop in the middle of the bridge to yield to pedestrians.

Twenty-eight crashes were reported at the Whitehurst Freeway and 27th Street intersection, with rear end and sideswipes as the most common types. Two head-on collisions were also reported at the Whitehurst Freeway and 27th Street intersection. Because of complicated geometry, this intersection is susceptible to crashes. Nine crashes were reported at the Whitehurst Freeway and Canal Road intersection. Sideswipe was the most common type of crash at this intersection.

Pedestrian crashes occurred at the intersections of Wisconsin Avenue and M Street, and Key Bridge and M Street. Based on pedestrian observations and counts, a relatively high number of pedestrians use these intersections. While no pedestrian crashes were reported at the other critical intersections in the study area, pedestrian safety issues were observed at some of these intersections. The primary issue observed was right-turning vehicles not yielding to pedestrians[7]. Detailed crash data is presented in Appendix E.

3-6. QUEUES AT CRITICAL 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 critical intersections in the study area. This information was needed to adequately develop a computerized simulation model of existing traffic conditions. The Study Team observed AM and PM peak hour queues for each of the approaches of all the critical intersections inside the study area. The Study Team calculated the maximum queues for all of the approaches. Figure 3-17 summarizes the observed maximum queues for all the critical intersections.

The longest queues observed during the AM peak hours were at the following locations:

- Eastbound Canal Road at Foxhall Road

[7] A motorcycle driver was killed recently (Summer 2005) as a result of a crash at the intersection of the Key Bridge and the on-ramp to the Whitehurst Freeway.

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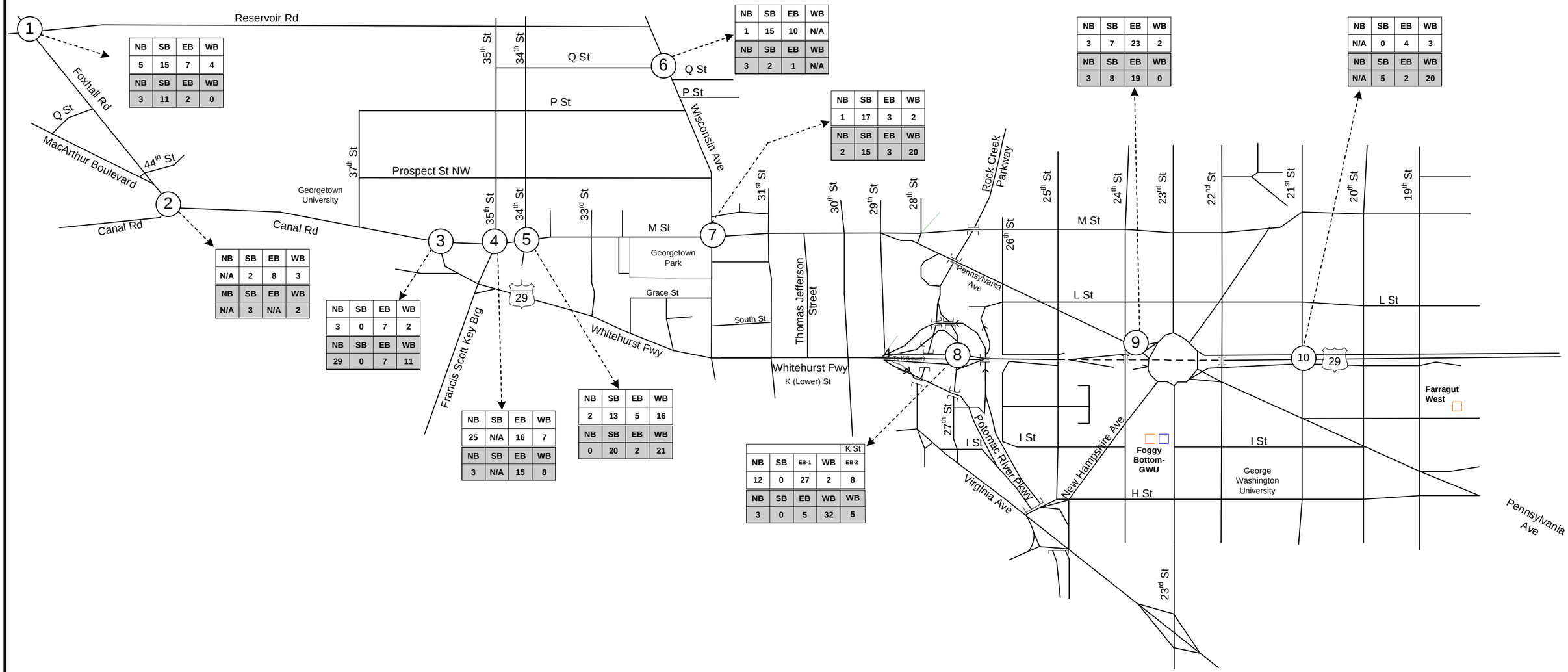

NB	SB	EB	WB
5	15	7	4
NB	SB	EB	WB
3	11	2	0

NB	SB	EB	WB
N/A	2	8	3
NB	SB	EB	WB
N/A	3	N/A	2

NB	SB	EB	WB
3	0	7	2
NB	SB	EB	WB
29	0	7	11

NB	SB	EB	WB
25	N/A	16	7
NB	SB	EB	WB
3	N/A	15	8

NB	SB	EB	WB
2	13	5	16
NB	SB	EB	WB
0	20	2	21

NB	SB	EB	WB
1	15	10	N/A
NB	SB	EB	WB
3	2	1	N/A

NB	SB	EB	WB
1	17	3	2
NB	SB	EB	WB
2	15	3	20

				K St
NB	SB	EB-1	WB	EB-2
12	0	27	2	8
NB	SB	EB	WB	WB
3	0	5	32	5

NB	SB	EB	WB
3	7	23	2
NB	SB	EB	WB
3	8	19	0

NB	SB	EB	WB
N/A	0	4	3
NB	SB	EB	WB
N/A	5	2	20

Legend

1	Study Intersection
3	AM Peak Maximum Queue (no. of vehicles)
4	PM Peak Maximum Queue (no. of vehicles)
NB	Northbound
SB	Southbound
WB	Westbound
EB	Eastbound
N/A	Not Applicable

Figure 3-17

Queues at Critical Intersections

N

- Northbound Key Bridge at Canal Road
- Southbound 34th Street at M Street
- Southbound Wisconsin Avenue at M Street
- Eastbound Whitehurst Freeway/K Street at 27th Street

As shown in Figure 3-17, queues during the PM peak hours are longer than the queues observed during the AM peak period. During the PM peak period, the longest queues on M Street and the Whitehurst Freeway are in the westbound direction. The longest queues observed during the PM peak hours were at the following locations:

- Westbound Whitehurst Freeway at Canal Road
- Eastbound Canal Road at Key Bridge
- Westbound M Street at 34th Street
- Southbound 34th Street at M Street
- Westbound M Street at Wisconsin Avenue
- Southbound Wisconsin Avenue at M Street
- Westbound K Street at 27th Street

The Study Team used the queuing information to develop the existing conditions traffic model. The queues of the traffic simulations were compared with 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 thoroughly 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 so the model more accurately replicates observed traffic conditions.

3-7. PARKING

The study team performed an inventory of parking facilities in Georgetown and collected information on parking restrictions on M Street and K Street. As shown in Figure 3-18, there are a significant number of parking facilities between M Street and K Street. Parking restrictions on M Street are different from the parking restrictions on K Street. On M Street, two hour parking is allowed on both the sides of the street during off peak hours. However no parking is allowed on either side of the street between 7:00 AM and 9:30 AM and from 4:00 PM until 6:30 PM. Parking utilization is very high on M Street during off peak hours. During peak hours, parking on side streets that intersect M Street is allowed. Most streets in the north-south direction between M Street and K Street have one hour on-street parking.

As shown in Table 3-8, on street parking restrictions on K Street vary significantly. There are 229 on-street parking spaces available on the section of K Street between 30th Street and the Key Bridge (western terminus of K Street/Water Street).

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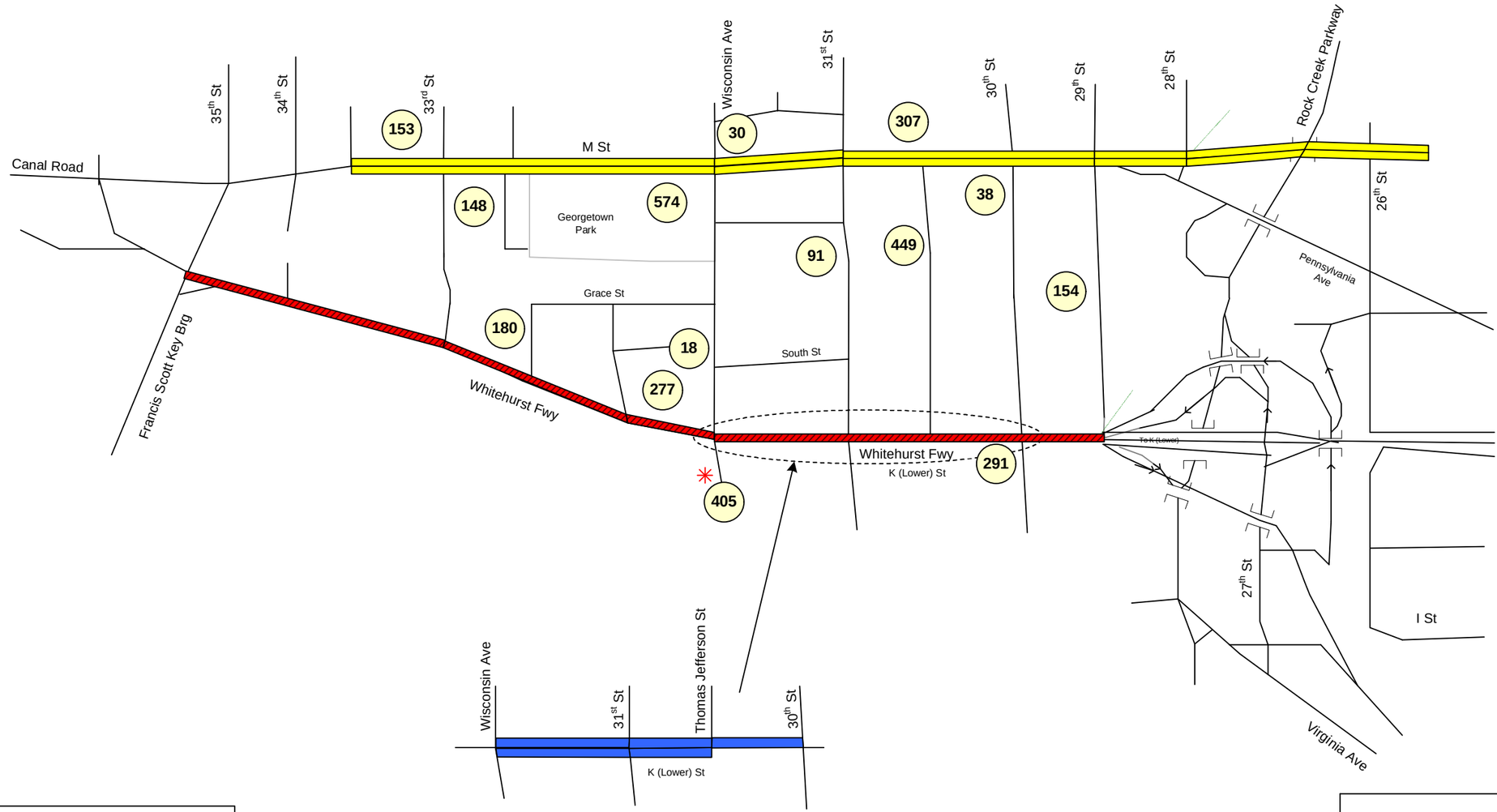

Legend

- 153 — Number of Parking Spaces in Garage
- ✳ — Removal of Parking Spaces due to proposed Waterfront Park
- Metered Parking During Off Peak Hours
- No Parking
- Metered Parking All Day

Figure 3-18

Parking Inventory

N

Whitehurst Freeway Deconstruction Feasibility Study

Table 3-8. On-Street Parking on K Street

From	To	Parking Spaces	Parking Restriction
34th Street	Key Bridge	21	Back-In Two-Hour Meters
		12	Reserved Parking for Government Vehicles
33rd Street	34th Street	16	Parallel Metered with Three-Hour Limit
		46	Back-In Three-Hour Meters
Potomac Street	33rd Street	18	Parallel Metered with Two-Hour Limit
Cecil Place	Potomac Street	7	Parallel Metered with Two-Hour Limit
		26	Back-In Two-Hour Meters
Wisconsin Avenue	Cecil Place	6	Parallel Metered with Two-Hour Limit
		32	Back-In Two-Hour Meters
31st Street	Wisconsin Avenue	25	Parallel Metered with Two-Hour Limit
Thomas Jefferson Street	31st Street	15	Parallel Metered with Two-Hour Limit
30th Street	Thomas Jefferson Street	5	Off-Peak Only Parallel Metered with Two-Hour Limit

3-8. MODELING OF EXISTING CONDITIONS

Simulation modeling is used in transportation engineering as an analysis tool to assess existing conditions and evaluate future alternatives over a specific period of time. The computerized transportation model attempts to simulate the traffic conditions along the described roadway links coded into the model. The model parameters can be used to evaluate each intersection, link and the entire study area. For this feasibility study, the Study Team developed simulation models for the existing AM and PM peak hours in CORSIM. CORSIM is a stochastic microscopic simulation program capable of modeling individual vehicle interactions on complex roadway networks. CORSIM uses inputs such as lane assignments and geometries, intersection turning movement volumes, vehicle speeds, percentages of vehicles by type, and pre-timed and/or actuated signal timing to produce output that contains measures of effectiveness commonly used in the traffic engineering profession, including total delay, stopped delay, and queue lengths. The CORSIM models used in this study cover all roadway segments in the study area.

The base existing AM and PM peak hour models were completed in CORSIM and calibrated to field data. The Study Team used the information on corridor travel speeds and queues to develop the existing conditions models.

The existing peak hour CORSIM models were simulated five consecutive times with randomly selected seed values. Calibration tables were completed comparing the results

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from the existing CORSIM simulation models to the existing travel times. As Table 3-9 shows, the existing conditions peak models adequately replicate the travel speeds observed in the field.

3-9. EXISTING LEVELS OF SERVICE

The Consultant used the COSRIM traffic modeling/analysis program to evaluate existing traffic conditions in the study area. For the evaluation, the Consultant entered existing traffic volumes, lane configurations, pedestrian volumes and signal timings into CORSIM to develop a base case, existing conditions model. SYNCHRO was used to assist in the development of a model that accurately replicates signal timings for all study area intersections.

The Consultant used the CORSIM software results to calculate levels of service (LOS) and the delay per vehicle for the 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 based on delay per vehicle. 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 shown in Table 3-10, during the AM peak hour, several intersections in the study area are operating at level of service (LOS) E or worse. The intersections operating at LOS E or worse during the AM peak hour are:

- M Street and 34th Street
- L Street and 20th Street
- Pennsylvania Avenue and 24th Street
- K Street and 20th Street
- Foxhall Road and Reservoir Road
- Wisconsin Avenue and Reservoir Road
- Wisconsin Avenue and Q Street

As Table 3-10 indicates, the other studied intersections in the study area are operating at LOS D or better during the AM peak hour.

As shown in Table 3-11, during the PM peak hour, several intersections in the study area are operating at level of service (LOS) E or worse. The intersections operating at LOS E or worse during the PM peak hour are:

- Canal Road/ M Street and Whitehurst Freeway
- M Street and Key Bridge
- M Street and 34th Street

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- M Street and 33rd Street
- M Street and Potomac Street
- M Street and Wisconsin Avenue
- M Street and 31st Street
- M Street and Thomas Jefferson Street
- K Street and Wisconsin Avenue
- K Street and 27th Street
- Foxhall Road and Reservoir Road

As Table 3-11 indicates, the other studied intersections in the study area are operating at LOS D or better during the PM peak hour.

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Table 3-9
Calibration Results for AM and PM Peak Hour Models
AM Peak Hour

Eastbound

Street Name	From	To	Actual Travel Time in Sec.	Average Model Travel Time in Sec.	Model - Actual	% difference
Whitehurst Freeway	Intersection of Foxhall Rd & Canal Rd	Intersection of K St & 19th St	475	479.1	4.1	1
M Street	Intersection of Foxhall Rd & Canal Rd	Intersection of New Hampshire Avenue @ Washington Circle	541	546.8	5.8	1
Lower K Street	Wisconsin Avenue	Intersection of 27th & K St	165	179.7	14.7	8

Westbound

Street Name	From	To	Actual Travel Time in Sec	Average Model Travel Time in Sec.	Model - Actual	% difference
Whitehurst Freeway	Intersection of K St & 19th St	Intersection of Foxhall Rd & Canal Rd	307	374.5	67.5	18
M Street	Intersection of New Hampshire Avenue & M St	Intersection of Foxhall Rd & Canal Rd	609	644.2	35.2	5
Lower K Street	Intersection of 27th & K St	Wisconsin Avenue	94	105.7	11.7	11

PM Peak Hour

Eastbound

Street Name	From	To	Actual Travel Time in Sec.	Average Model Travel Time in Sec.	Model - Actual	% difference
Whitehurst Freeway	Intersection of Foxhall Rd & Canal Rd	Intersection of K St & 19th St	451	504.6	53.6	11
M Street	Intersection of Foxhall Rd & Canal Rd	Intersection of New Hampshire Avenue @ Washington Circle	874	791.6	-82.4	-10
Lower K Street	Wisconsin Avenue	Intersection of 27th & K St	240	249.9	9.9	4

Westbound

Street Name	From	To	Actual Travel Time in Sec	Average Model Travel Time in Sec.	Model - Actual	% difference
Whitehurst Freeway	Intersection of K St & 19th St	Intersection of Foxhall Rd & Canal Rd	810	814.1	4.1	1
M Street	Intersection of New Hampshire Avenue & M St	Intersection of Foxhall Rd & Canal Rd	1063	1145.0	82.0	7
Lower K Street	Intersection of 27th & K St	Wisconsin Avenue	110	98.9	-11.1	-11

Table 3-10
Existing Level Of Service - AM Peak Hour

No	Intersection	Delay [1] Sec/Veh	LOS [2]
1	Foxhall Road and Canal Road	12.9	B
2	Canal Road and Georgetown Univ. Dr.	0.4	A
3	Canal Road, Whitehurst Freeway and M St	19.5	B
4	M St and Key Bridge	31.1	C
5	M St and 34th St	80.9	F
6	M St and 33rd St	17.8	B
7	M St and Potomac St	7.1	A
8	M St and Wisconsin Avenue	27.2	C
9	M St and 31st St	8.0	A
10	M St and Thomas Jefferson St	9.8	A
11	M St and 30th St	9.7	A
12	M St, 29th St and Penn Ave	4.3	A
13	Pennsylvania Avenue and 28th St	7.7	A
14	M St and 24th St	15.2	B
15	M St and 23rd St	8.6	A
16	M St and 22nd St	8.7	A
17	M St and New Hampshire Ave	15.9	B
18	M St and 21st St	12.7	B
19	M St and 20th St	15.3	B
20	M St and 19th St	14.4	B
21	L St and 25th St and Penn. Ave.	19.2	B
22	L St and 24th St	13.8	B
23	L St and 23rd St	9.9	A
24	L St and 22nd St	26.6	C
25	L St and 21st St	10.3	B

Table 3-10 (Continued)
Existing Level Of Service - AM Peak Hour

No	Intersection	Delay [1] Sec/Veh	LOS [2]
26	L St and 20th St	70.7	E
27	L St and 19th St	19.5	B
28	K St and Wisconsin Avenue *(STOP Controlled)*	24.4	C
29	K St and 31st St *(STOP Controlled)*	6.9	A
30	K St and Thomas Jefferson St *(STOP Controlled)*	16.1	C
31	K St and 30th St *(STOP Controlled)*	8.2	A
32	K St and 29th St *(STOP Controlled)*	0.4	A
33	K St / Whitehurst Freeway and 27th St	31.0	C
35	K St and 25th St	6.4	A
36	Pennsylvania Ave and 24th St	69.8	E
37	K St and 21st St	9.7	A
38	K St and 20th St	68.7	E
39	K St and 19th St	24.8	C
40	Foxhall Road and Reservoir Road	67.1	E
41	Foxhall Road and 44th Street	15.1	B
42	Foxhall Road and MacArthur Road	13.9	B
44	Wisconsin Avenue and Reservoir Road *(STOP Controlled)*	50.8	F
45	Wisconsin Avenue and Q Street (WB leg)	137.5	F
46	Wisconsin Avenue and Q Street (EB leg)	29.5	C
47	Wisconsin Avenue and P Street	6.9	A
48	27th Street / I Street and Virginia Avenue	33.4	C
51	Virginia Avenue and 23rd Street (NB leg)	7.6	A
52	Virginia Avenue and 23rd Street (SB leg)	9.2	A

Note:
1. The values reported in the table are the average of 5 runs.
2. LOS is calculated based on the Highway Capacity Manual (HCM) 2000 methodology.

Table 3-11
Existing Level Of Service - PM Peak Hour

No	Intersection	Delay [1] Sec/Veh	LOS [2]
1	Foxhall Road and Canal Road	24.6	C
2	Canal Road and Georgetown Univ. Dr.	1.8	A
3	Canal Road, Whitehurst Freeway and M St	99.4	F
4	M St and Key Bridge	107.6	F
5	M St and 34th St	123.6	F
6	M St and 33rd St	124.7	F
7	M St and Potomac St	112.3	F
8	M St and Wisconsin Avenue	123.3	F
9	M St and 31st St	101.0	F
10	M St and Thomas Jefferson St	69.4	E
11	M St and 30th St	51.5	D
12	M St, 29th St and Penn Ave	38.9	D
13	Pennsylvania Avenue and 28th St	19.2	B
14	M St and 24th St	17.3	B
15	M St and 23rd St	16.5	B
16	M St and 22nd St	15.0	B
17	M St and New Hampshire Ave	9.7	A
18	M St and 21st St	9.8	A
19	M St and 20th St	19.9	B
20	M St and 19th St	18.2	B
21	L St and 25th St and Pennsylvania. Ave.	13.1	B
22	L St and 24th St	37.6	D
23	L St and 23rd St	13.5	B
24	L St and 22nd St	25.1	C
25	L St and 21st St	25.3	C

Table 3-11 (Continued)
Existing Level Of Service - PM Peak Hour

No	Intersection	Delay [1] Sec/Veh	LOS [2]
26	L St and 20th St	16.4	B
27	L St and 19th St	16.9	B
28	K St and Wisconsin Avenue *(STOP Controlled)*	58.1	F
29	K St and 31st St *(STOP Controlled)*	28.2	D
30	K St and Thomas Jefferson St *(STOP Controlled)*	11.5	B
31	K St and 30th St *(STOP Controlled)*	4.6	A
32	K St and 29th St *(STOP Controlled)*	0.8	A
33	K St / Whitehurst Freeway and 27th St	117.0	F
35	K St and 25th St	64.1	E
36	Penn Ave and 24th St	88.0	F
37	K St and 21st St	23.9	C
38	K St and 20th St	20.3	C
39	K St and 19th St	15.0	B
40	Foxhall Road and Reservoir Road	87.4	F
41	Foxhall Road and 44th Street	10.1	B
42	Foxhall Road and MacArthur Road	4.6	A
44	Wisconsin Avenue and Reservoir Road *(STOP Controlled)*	1.5	A
45	Wisconsin Avenue and Q Street (WB leg)	15.6	B
46	Wisconsin Avenue and Q Street (EB leg)	14.6	B
47	Wisconsin Avenue and P Street	10.2	B
48	27th Street / I Street and Virginia Avenue	40.8	D
51	Virginia Avenue and 23rd Street (NB leg)	9.5	A
52	Virginia Avenue and 23rd Street (SB leg)	5.8	A

Note:
1. The values reported in the table are the average of 5 runs.
2. LOS is calculated based on the Highway Capacity Manual (HCM) 2000 methodology.

4. LAND USE AND LAND VALUE

4-1. OVERVIEW

Along with the engineering and traffic issues associated with the potential removal of the Whitehurst Freeway, the Whitehurst Freeway study is examining the economic development, land use, and land value impacts which could be expected if the Freeway were removed. The study area for purposes of economic development, land use, and land values is approximately 205 acres in size (including four acres which comprise the C&O Canal). The land use study area is irregularly shaped and is bounded by the Potomac River on the south; Foxhall Road and Canal Road on the west; M Street on the north; and 24th Street on the east.

4-1.1. PURPOSE

This section of the *Existing Conditions Report* outlines the current land use, zoning, and property value conditions in the study area. Fully understanding these conditions is important because they provide the baseline for evaluating the development and finance implications of the various Whitehurst Freeway alternatives. In particular:

1. Economic Development.

   - One reason to consider modifying the Whitehurst Freeway is to promote high-quality, high-value, pedestrian-friendly development between the Potomac River and M Street.

   - The study must therefore evaluate the potential for additional development, compared to that which has already occurred or is in the near-term pipeline.

2. Value Capture.

   - One strategy for funding public improvements is to use the projected *induced growth* in property values or tax revenue increment to help pay for the improvement in question. This strategy is known as "value capture."

   - To estimate the potential growth that might occur with or without the Whitehurst Freeway, the study must first determine the current levels of assessed valuation and local tax revenues, as well as the current trend.

The interplay among land use, transportation, and land value conditions is illustrated in Figure 4-1.

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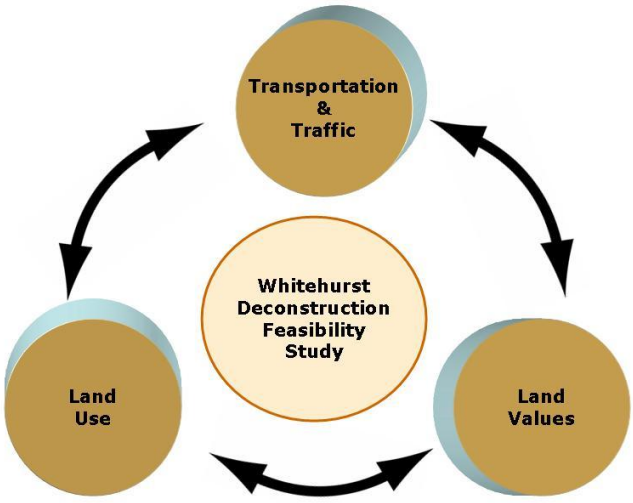
Figure 4-1. Relationship Between Land Use, Land Value, and Transportation



4-1.2. ORGANIZATION OF THIS SECTION

The remainder of this section is comprised of two subsections:

- § a narrative description of land use and zoning conditions in the study area
- § an evaluation of land valuation and tax revenues in the study area, and the potential applicability of tax increment financing mechanisms.

4-2. LAND USE AND ZONING

This subsection identifies existing land use and zoning conditions in the study area. Existing land use information was developed through site visits, interviews, examination of recent aerial photographs, and other secondary sources of information.

4-2.1. LAND USE DESCRIPTION

The community of Georgetown predates the District of Columbia. Georgetown's founding and evolution are historically oriented to the Potomac River. The area was settled in 1703, platted in 1751, and incorporated in 1789.

The town flourished as a tobacco port until silting of the Potomac River early in the 19th Century caused a decline in port activity. Construction commenced of the Chesapeake and Ohio (C&O) Canal in 1825. The C&O Canal, shown in Figure 4-2, maintained an association with the river through barge traffic up until the end of the 19th century, when railroads began to steadily replace canal shipping. Today, residential and commercial

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developments that preserve the character of historic buildings have been built abutting the canal, and a national bicycle and pedestrian path runs along its edge.

Figure 4-2. C & O Ship Canal (1860 and 2005)

Source: C & O Canal At Georgetown
by Paul McGehee

Source: DMJM Harris, 2005

The Whitehurst Freeway was built in 1948, above what is known as "Lower K Street." The Freeway and Lower K Street thus share the same 70-foot right-of-way. The Whitehurst Freeway, shown in Figure 4-3, visually separates the majority of the study area from the waterfront.

South of the K Street, along the riverfront, most land was privately owned until the 1960's, when it was acquired for a larger freeway that was never built.[1] Proposals for housing, retail and commercial projects were later advanced, including the large-scale Washington Harbour development, which was built in the mid-1980's. In 1985, a proposal was accepted to dedicate the remainder of the Georgetown shoreline (from 31st Street to the Key Bridge) as a waterfront park. Twenty years later, in 2006, these plans will come to fruition when the National Park Service begins construction of the Georgetown Waterfront Park.

Land on the north side of the Whitehurst Freeway/K Street corridor is privately owned for the most part. The principal exception, aside from streets and sidewalks, is the C&O Canal and its towpath. The area between M Street and the corridor consists predominantly of moderate-density development in small- to medium-scale structures. The existing land use pattern is a diverse mixture of commercial, residential, institutional, and recreational uses. These uses are not evenly distributed across the study area, but tend to occur in clusters of varying size, each characterized by one or two dominant use types.

[1] Although the freeway was not built, asphalt was actually laid along the shoreline.

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Figure 4-3. Whitehurst Freeway (above), Lower K Street /Water Street

A vibrant commercial "main street" with shops, restaurants, and entertainment venues is located along M Street. As shown in Figure 4-4, the general land use pattern between M Street and the C&O Canal is one of commercial use and low density. As one descends the hill from the C&O Canal to K Street, the densities and scales diversify, as small- and mid-scale residential properties, including traditional row houses, mixed with larger-scale commercial development.

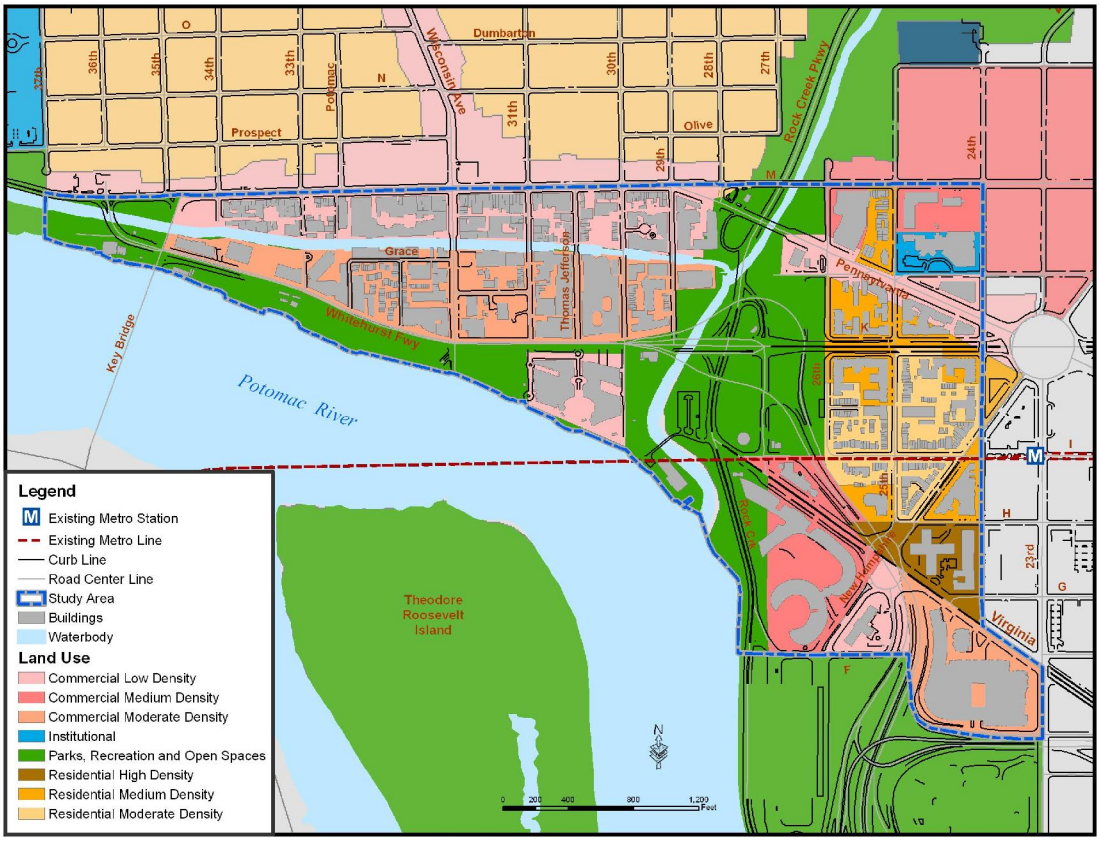
At the middle section of the study area, where the Whitehurst Freeway, Rock Creek Parkway, the Potomac River Freeway, and the local street system converge, much of the land remains vacant. At the eastern end of the study area within the Foggy Bottom neighborhood much of the land use is comprised of higher-density residential housing, hotels, commercial/office uses, and part of the George Washington University campus.

Rapid changes in land use have occurred throughout the study area in recent years, with intense development activity occurring south of M Street. This has included rehabilitation and new infill construction within five to ten feet of the Whitehurst freeway, as shown in Figure 4-5

In addition to the extensive historic building stock, the key land use features of the study area include:

- Parks – Rock Creek Park, the Georgetown Canal Trail, C&O Canal, Francis Scott Key Park and the Capital Crescent Trail.

Figure 4-4. Study Area Land Use Classification



Source: District Planning GIS, March 2005.
Note: The map reflects general land use conditions in the study area. As such, planned unit developments (PUDs) such as the Washington Harbour complex may have density that is greater than that reflected in the generalized land use classification.

Figure 4-5. New Residences Adjacent to the Whitehurst Freeway

- Harbor Parking – This large, rectangular surface lot of 450 parking stalls has its entrance at Wisconsin Avenue and extends west along Lower K Street to the Key Bridge. This undeveloped land, site of the future Georgetown Waterfront Park, is owned by the National Park Service.

- Washington Harbour – a large multi-use complex including restaurants, offices, shops and residential uses, located on the riverfront, south of the Whitehurst Freeway/K Street corridor and east of Wisconsin Avenue.

- The Ritz Carlton complex – a mixed-use development including hotel, retail, residential, and cinema components.

- Jefferson Court (1025 Thomas Jefferson Street) – an 8-story, 300,000 square foot, office building. The building houses the Georgetown BID, Urban Land Institute, and professional services.

- Waterfront Center (1622 Wisconsin Avenue) – a large, terraced office building. The building houses US News & World Report, the AD Agency, the non-profit organization The Waterfront Center, and professional services.

- Cady's Alley (also known as Design Center West) – a 120,000 square foot retail and residential historic redevelopment located on M Street, between 33rd and 34th Street, NW.

- Thompson's Boathouse – located southeast on the small peninsula created by the confluence of Rock Creek and the Potomac River.

4-2.2. LAND USE REGULATION AND CONTROL

With respect to planning controls and policies, as reflected in the zoning map displayed in Figure 4-6, most of the land in the study area is zoned for low- to medium-density mixed residential and commercial uses. Lands zoned for high-density, mixed residential and commercial uses, have the highest valuation and are concentrated in the portion of the study area between 30th and 31st Streets, south of the C&0 Canal.

In general, the blocks south of M Street are zoned as W-1, W-2, and W-3 (mixed-use waterfront categories of ascending density). Zoning at the far eastern end of the study area is primarily GOV (Government Use) along Rock Creek Park, R-5-B, R-5-D, R-5-E (medium-, moderate-, and high-density residential), and CR (mixed residential, retail, offices and light industrial) east of Rock Creek Park. A concentration of land zoned C-2-C (commercial business center, high density) is located along M Street in the north Foggy Bottom neighborhood.

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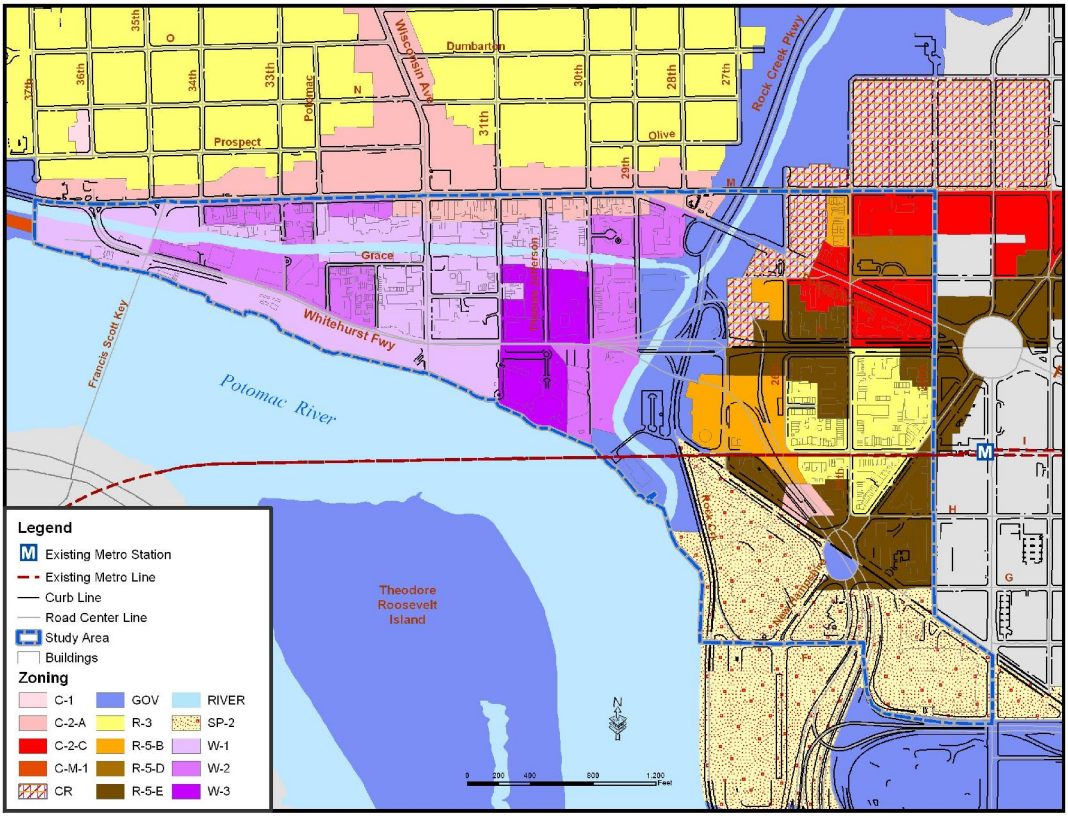
Figure 4-6. Whitehurst Study Area Zoning Classification



Source: District Planning GIS, March 2005.

Notes: The existing zoning map does not show the most current update in land uses. For example, the new Georgetown Waterfront Park that is planned is not shown because ownership of the parcels was recently transferred from the District to National Park Service. The zoning map has not been updated by the District of Columbia. Note also, that federal and district land owners are exempt from applicable zoning regulations, and land uses can also be permitted through conditional use permits and other mechanisms.

Table 4-1 presents descriptions of the zoning classifications shown in Figure 4-6

The study area's rich history is reflected in the **Georgetown Historic District**, the first such district established in Washington, DC, and one of the first in the nation. The Historic District, which includes the study area, is roughly bounded by Reservoir Road, NW, and Dumbarton Oaks Park on the north; Rock Creek Park on the east; the Potomac River on the south; and Glover-Archbold Parkway on the west.

Listed on the National Register of Historic Places in 1967, the nomination for the Georgetown Historic District was updated in 1990. Permission to build, remodel, demolish, or subdivide must be sought from the Permit Processing Center of the D.C.

Department of Consumer and Regulatory Affairs (DCRA). The DCRA cannot issue a permit until it receives confirmation of project design approval from the D.C. Historic Preservation Review Board (HPRB) and from the U.S. Commission of Fine Arts (CFA).

Table 4-1: Zoning Classification

Zoning Classification	Code	Acres	Remarks
Community Business Center Low Moderate density	C-2-A	8	Non-residential max FAR 1.5
Community Business Center High density	C-2-C	12	Non-residential FAR is 2.0
Mixed Residential, retail, offices and Light Industrial Uses	CR	6	Residential recreation space is required
Government	GOV	26	
Row Dwellings & Flats	R-3	14	60% lot occupancy for church and public school use
Moderate Density Apartments Houses	R-5-B	10	
Medium High Density Apartments Houses	R-5-D	3	
High Density Apartments Houses	R-5-E	21	6.0 max FAR for apartment houses and hotels
River	RIVER	0	
Medium Density Residential/Limited Office	SP-2	33	6.0 max FAR for residential
Low Density Mixed Residential Commercial	W-1	42	Non-residential FAR limited to 1.0
Medium Density Mixed Residential Commercial	W-2	26	Non-residential FAR limited to 2.0
High Density Mixed Residential Commercial	W-3	11	Non-residential FAR limited to 5.0

Source: District of Columbia, Office of Zoning, 2005
Note: FAR refers to the floor area ratio, that is the building's gross floor area divided by the net lot area. The new Georgetown Waterfront Park that is planned is not indicated in the zoning classification.

The CFA has jurisdiction over projects visible from public space—including from streets, sidewalks, parks, and public alleys. Work that is not visible from public space is reviewed only by HPRB.

The CFA delegates primary review of Georgetown projects to its Old Georgetown Board (OGB), and the Commission makes a final determination after having received the OGB recommendation. A D.C. Historic Preservation Office (HPO) staff member typically provides comment on projects at the monthly OGB hearing and then approves permits after the CFA has done so. The OGB and HPRB obtain the input from Georgetown property owners and neighbors through the Citizens Association of Georgetown (CAG) and the Georgetown Advisory Neighborhood Commission (ANC).

In the eastern section of the study area within historic Squares 1, 4, and 5[1], there are several National Register-eligible historic or archaeological sites that date to both prehistoric and historic times. The primary sites are:

- The GSA's West Heat Plant, located at 29th and K Streets, is considered to be a contributing property to the Georgetown Historic District.

- The historic Peter House site, located southeast of the Whitehurst Freeway/27th Street intersection, between 27th Street and the Potomac Freeway.

- The Cammack and Decker Lime Works, located between the Rock Creek Parkway and 27th Street, south of the overhead eastbound ramp connecting the Whitehurst Freeway to the southbound Potomac Freeway.

[1] Source: Kennedy Center Environmental Assessment, Chapter 3, Affected Environment (2004).

- The Hayman Brewery/Arlington Bottling Company site is located just northeast of the Whitehurst Freeway/27th Street intersection.

In the remaining study area, there are several historic sites with some listed in the National Register of Historic Places.[1] These sites are:

- Dodge Warehouses (3205 K Street) are Federal-era warehouses on the waterfront and date from 1813 to 1824, built on foundations of earlier stone warehouses.
- Joseph Carlton House (1052-54 Potomac Street) was built in 1794 for Georgetown's first postmaster.
- Brickyard Hill House a historic landmark was built in 1800 and was owned by Georgetown's first mayor. It is located on the site of the Ritz-Carlton Hotel complex.

Buildings that are listed on the National Register of Historic Places are:

- Grace Protestant Episcopal Church (1041 Wisconsin Avenue NW, D.C.).
- Vigilant Firehouse (1066 Wisconsin Avenue NW, D.C.) was built in 1844 and is the oldest remaining firehouse in the District of Columbia.
- Potomac Masonic Lodge No. 5 (1212 Wisconsin Avenue NW, D.C.).
- Bomford Mill (3261 K Street NW, D.C.) built on the site of 1832 flour mill and used as a cotton mill during the Civil War period.
- Old Stone House (3051 M Street NW, D.C.) was built in 1765 and is the oldest remaining home in Georgetown.
- Forest-Marbury House (3350 M Street NW, D.C.).
- Georgetown Market (3276 M Street NW, D.C.).
- City Tavern (3206 M Street NW, D.C.).
- Chesapeake and Ohio National Historic Park.

4-2.3. MARKET PROFILE

Washington, DC is in the midst of a development boom unparalleled in the city's history. As of 2004 over $29 billion worth of development projects had recently been completed, were under construction, were planned to begin construction, or had been proposed as potential development projects in the District.[2] Projects are being built in every ward of the District and in every market sector.

While the rest of the nation's cities are facing office vacancy rates approaching 20 percent, the District's commercial office market, which accounts for more than 60 percent

[1] http://planning.dc.gov/planning/lib/planning/preservation/brochures/georgetown.pdf
[2] District Marketing Center, Development Center annual report (2005).

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of real property tax collections, had a vacancy rate of 5.6 percent in the fourth quarter of 2004. For the second year in a row, the Association of Foreign Investors in Real Estate (AFIRE) ranked the District as the best city for commercial real estate investment for 2004 in the nation.[1]

On the residential side, the District has also maintained a strong demand for high-quality property. This high level of demand has contributed to double-digit growth rates in annual assessments and has prompted a significant level of new residential construction, rehabilitation and renovations. The housing produced downtown, in much of Northwest D.C., and in Capitol Hill consists primarily of market rate, unsubsidized units and is likely to be new construction, adding to the supply of high-end housing and demonstrating increasing interest in city living among middle- and upper-income households."[2]

Overall, the District sustains a very strong real estate market. *Emerging Trends in Real Estate (2005)*, an annual report produced by Lend Lease Real Estate Investments and PricewaterhouseCoopers, ranked D.C. as the top market in the U.S. for the third consecutive year. Washington is positioned to retain its edge over many other real estate markets in the nation.

The Study Team contacted developers, real estate brokers, and the DC Assessor's Office for their perspective on the market in the District and the Georgetown study area market.[3] A number of market observers point out that some key fundamentals affecting the District's real estate markets remain strong. While it may not be prudent to assume that the very high rates of growth in prices and the value of transactions experienced over the past three years can be sustained for long, there is considerable uncertainty about how much of a slowdown will occur and when it will take place. A sharp increase in interest rates would contribute to such a slowdown, and other factors such as slow growth in employment and income could adversely affect the markets as well.[4]

A summary of pertinent market trends is as follows:[5]

- Washington, D.C., southern California, and New York are the best metro areas for investment. Other regional markets languish.

- For the third consecutive year, the District is the country's number-one real estate market for investment, development, supply/demand balance, and homebuilding.

- Baby boomers continue to influence market trends as they shy away from

[1] Association of Foreign Investors in Real Estate (AFIRE), September/October 2004.
[2] Fannie Mae Foundation, *Housing in the Nation's Capital* (2003).
[3] Interviews that were conducted by Mark Gander, DMJM Harris, in February 2005 include: Eastbanc Inc., Trammel Crow Company; and the District Assessor's Office.
[4] District Marketing Center, March 2005
[5] District Marketing Center, March 2005; Pricewaterhousecoopers Market Trends, 2005.

suburban perimeters and look toward vibrant urban areas with amenities, high-quality urban design and infrastructure, good schools, and shopping and retail within walking distance of home.

§ The trend towards more mixed-use town center and compact developments, infill residential, and condominium conversions, loft rehabs, townhouses, and adaptive use projects will continue.

Based on the Study Team's discussions with local developers and brokers, the study area mixes office, retail and residential uses in a very efficient manner. This mixed-use pattern is reinforced by geography. The absence of a Metro stop has limited Georgetown's ability to attract high-density office development. So do the stringent building height restrictions and development review that give Georgetown quainter environment than the neighboring West End and Central Business District submarkets. Several brokers indicated that most sites are small by conventional development standards; to achieve higher lease rates and sale prices, developers turn to high-end retail, hotel, and residential uses, with "signature" quality and premium amenities.[1]

That said, Georgetown has 2.69 million square feet of office space – three percent of the District's office market – with over half located in the study area. Lease rates for premium class A office space within the study area average between $32 to $39 per square foot, only slightly lower than comparable space located in nearby Golden Triangle neighborhood (served by a Metro station). Georgetown offers a rich, historical character that encourages innovative, high-quality design. According to real estate brokers, the high lease rates in the study area are the product of the overall quality of retail offerings in the area.

Demand over the past year has remained fairly constant, with a steady net absorption of approximately 24,000 square feet per quarter. The direct vacancy rate of 2.0 percent is the lowest in the entire Metropolitan Area. Inventory has remained essentially unchanged for the past decade as space constraints impeded large-scale office development.[2]

The bulk of available space in the study area is in Class B buildings, and comprises relatively small spaces. Average full-service asking rates for Class B space remain around $32 per square. In 2004, several large tenants renewed or expanded in the submarket. Among them were the law firms of Foley Lardner and Collier Shannon, both anchor tenants in Washington Harbour. Other significant office tenants in Georgetown include the law firms of Swidler Berlin and Kattin Muchin Zavis, as well as U.S. News & World Report and Georgetown University.[3]

[1] The preceding discussion is drawn from discussion with the Trammel Crow Company, February 2005.
[2] However, the new Class A Harbourside development broke ground in late 2004, adjoining Washington Harbour on Lower K Street; see discussion below.
[3] DC Marketing Center, March 2005; Trammel Crow Companies, March 2005.

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Overall, Georgetown and the study area can expect to remain among the most stable office submarkets in the Metropolitan Area. The disciplined development and improving economy and job market should keep vacancy rates low until the delivery of new space. Georgetown has a strong ability to attract and retain tenants who enjoy the retail amenities and easy accessibility that will add to the submarket's long-term stability.

A summary of study area market trends is as follows:

- The area will continue as a vibrant and active place seven days a week.

- Georgetown will continue to remain a prime retail and high-end residential location, and a magnet for boutique and specialty retailers.

- Under current conditions, development activity in the general study area will be limited and most real estate markets and sectors will remain stable. The reason is the limited supply of developable land: most of the recently available quality sites have been developed in the past three to five years or are now under construction (see below). The same is true with respect to converting developed land to higher or more intense use.

4-2.4. RECENT, CURRENT, AND PLANNED PROJECTS

This sub-section describes some of the larger development projects in or adjacent to the study area that are recently completed, currently under construction, or planned for the near future. The location, scale and timing of these projects has an important bearing on the interplay between traffic, land use and associated land values that will be analyzed in the *Future Conditions Report* of the Whitehurst Freeway Deconstruction Feasibility Study.

Commercial, residential and recreational development projects that have been completed or are currently under construction are summarized in Table 4-2. The location of these developments is presented in Figure 4-7. The Kennedy Center and Waterview Complex projects, while not directly in the study area, are in adjacent locations with significant transportation and development implications for the study area.

A summary of these six projects is as follows:

- **Kennedy Center**

  The Federal Highway Administration, in partnership with the John F. Kennedy Center for the Performing Arts, the District of Columbia Department of Transportation, the National Park Service, the National Capital Planning Commission, and the Commission of Fine Arts, is proposing to improve access to the Kennedy Center. The proposed action would include both transportation and urban design improvements.

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Table 4-2: Current and Planned Projects

	Project Description	Total Sq. Ft.	Major Use	Hotel Rooms	Office Sq. Ft.	Residential Units	Status
1	Kennedy Center	n/a	Performing Arts Center	0	0	0	Planned
2	Georgetown Waterfront Park	1,500,000	Park	0	0	0	Planned
3	Four Seasons Hotel	120,000	Hotel	212	0	0	Under Construction/ renovation
4	Harbourside - South Building / House of Sweden	69,000	Office	0	40,500	0	Under Construction
5	Harbourside - North Building / Coal & Ash site	166,000	Office	0	132,810	30	Under Construction
6	Waterview Complex	1,300,000	Office/ mixed	220	600,000	60	Under Construction

Source: Washington, DC Marketing Center (March 2005)

Figure 4-7. Map of Current and Planned Development Projects

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The goals of the project are to:

- Enhance vehicular access by remedying conditions that can create congestion and delay. Of particular concern is the connection between Rock Creek Parkway and the Potomac River Freeway and the intersections of both of these roads with Ohio Drive.

- Establish linkages between the Kennedy Center and the city, including Georgetown, the National Mall, the Foggy Bottom neighborhood, and President's Park.

- Improve the setting of the Kennedy Center as a national monument, particularly its connection to the riverfront.

- Enhance the aesthetic quality of the Foggy Bottom neighborhood.

The Kennedy Center Draft Environmental Assessment was completed in 2004, and a final environmental impact determination is pending. The Kennedy Center improvements would provide better pedestrian and bicycle trail connectivity to the Thompson Boathouse and the Georgetown Waterfront Park.

- **Georgetown Waterfront Park**

A new National Park Service park has been planned along the riverfront for many years. Construction was scheduled to begin in 2005. The 19-acre park is bounded by the Potomac River and Lower K/Water Street, from the Francis Scott Key Bridge to 31st Street. The park is intended to be passive in nature, and its design would complement the varied edge of the waterfront between Washington Harbor and the Key Bridge.

- **Four Seasons Hotel**

This luxury hotel is located at the mouth of Georgetown at 2800 Pennsylvania Avenue, NW, backing up against Rock Creek Park and the C&O Canal. A major renovation and expansion that started in August 2004 is scheduled for completion in 2005.

- **Harbourside South: House of Sweden**

Two projects, known as Harbourside South and North, are being developed immediately east of the Washington Harbour complex, between 30th Street and Rock Creek. The site plan is shown in Figure 4-8.The **Swedish National Property Board** is constructing a new five-story mixed-use office and residential project to be named "House of Sweden". It is located on the waterfront between Washington Harbour and Thompson's Boat House.

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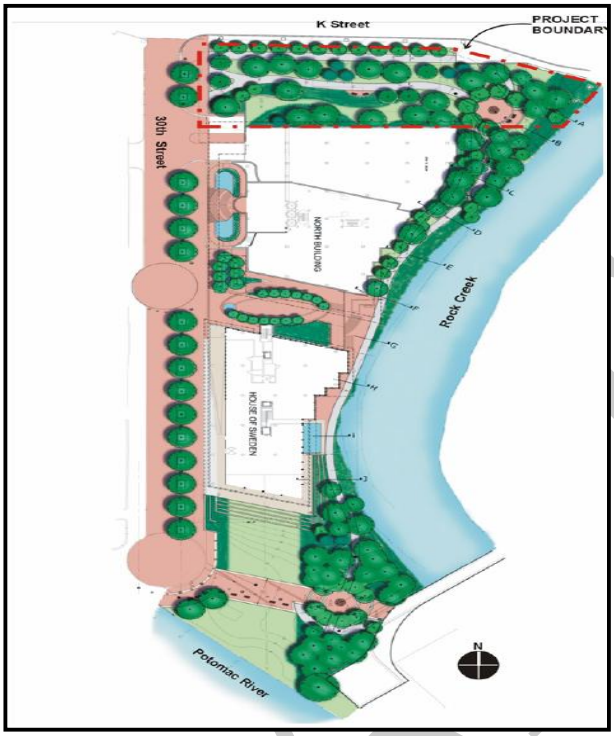
Figure 4-8. Harbourside Site Plan



The Embassy of Sweden will be the principal tenant, occupying approximately 40,000 square feet in the 69,000 square foot building. Occupancy is anticipated by June 2006.

§ **Harbourside North: Coal and Ash Site**

This six-story building began construction in 2004, with occupancy anticipated in spring 2006. The development will feature over 130,000 square feet of office space on the first five floors, luxury residential units on the top floor, and underground parking. The building is located north of the House of Sweden, with pedestrian walkways and gardens between the two buildings (see the site plan, Figure 4-8).

Harbourside will demolish the existing Coal and Ash House, remediate any hazardous waste conditions on-site, and create and maintain a public park connecting the Capital Crescent Trail with the Georgetown Waterfront Park. With this project, the Georgetown Waterfront Park will have a pedestrian link to the C&O Canal National Historic Park and the east side of Rock Creek.

§ **Waterview Complex**

The Waterview Complex is located on the Virginia side of the Potomac River, on

a 2.2 acre site at 1

9th and North Lynn Streets in Rosslyn, adjacent to Potomac Tower. Waterview is a large (1.3 million gross square-foot) mixed-use project, containing: a 600,000 square-foot, 24-story office building; a 220-room luxury hotel; and 60 condominium apartments in two towers atop a four-story podium (plus an additional three layers below ground). The podium will house enclosed parking, 7,500 square feet of retail, and a variety of public spaces.

In addition to these current or planned projects, there are several recently completed commercial and residential projects in the study area. A review of these projects provides important information about existing land use dynamics and their relationship with traffic and land values. These recent projects are summarized as follows:

§ **The Ritz-Carlton Hotel & Residences, Loews Cineplex Theater (2003)**

Millennium Georgetown Development LLC, in association with local developer Eastbanc, has redeveloped 2.1 acres of property along K Street, including a 17-story brick smokestack that has been a Georgetown landmark since 1932. The main project components are a 450 space public parking garage, 100,000 square feet of condominium apartments, a 125 room hotel, a 2,200 seat 14-screen multi-theater art cinema and 75,000 square feet of retail space. The site occupies the entire square bounded by Wisconsin Avenue to the west, the K Street to the south, 31st Street to the east, and South Street to the north.

§ **3303 Water Street (2004)**

Known as the PEPCO Condominium Project, this project, developed by the Eastbanc Company, includes 72 luxury residential condominiums along the Potomac River and the C&O Canal.

4-2.5. INFILL AND REDEVELOPMENT POTENTIAL

Based on the Study Team's discussion with developers and real estate brokers knowledgeable of the study area, the infill and redevelopment potential is limited under current conditions. Some of the recently available supply of infill and redevelopment sites has been, or will soon be developed. Other potential development sites could become apparent based on the outcome of transportation designs that consider a potential deconstruction of the Whitehurst Freeway. The following two additional sites should be noted:

§ **GSA West Heating Plant Building (1948)**

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The five-acre, six-story West Heating Plant, shown in Figure 4-9, is located at 1051 29th Street, just north of the Whitehurst Freeway westbound on-ramp near the eastern end of the study area. The original boilers in the West Heating Plant have been modified and augmented over the years. Today the long-term use of the facility is uncertain due to the completion of a new GSA office building complex and facilities located two miles east that would supply heat to federal buildings. The West Heating Plant is not listed within the D.C. Inventory of Historic Sites as an Individual Landmark, but it is located within the Georgetown Historic District.

Figure 4-9. GSA West Heating Plant Site

§ **Ice House Building (1937)**

This building, shown in Figure 4-10, is located near the western end of the study area, at 3401 Lower K Street with the C&O Canal at the rear. This commercial structure, dating only to 1937, is occupied by numerous short-term, five-year lessees, including a light manufacturer, exercise gym, and office/storage space used by the GSA (Figure 4-9). Acquisition of the building and its demolition is proposed by the National Park Service in its Waterfront Park Plan (1987). The site could accommodate public-destination type development which complements the Waterfront Park.

4-3. LAND VALUATION, TAXES, AND FINANCING MECHANISMS

The Study Team collected data on real property assessment values and associated property taxes in the study area to establish a base frame of reference for current conditions and trends. This sub-section describes the District's current tax-increment

financing mechanism and its potential applicability to the improvements associated with any future Whitehurst Freeway modifications.

Figure 4-10. Ice House Site

4-3.1. DESCRIPTION OF REAL ESTATE TAXING

The District of Columbia, like many other local jurisdictions throughout the United States, taxes real property based on 100 percent of its assessed valuation. The real property tax is the second largest source of tax receipts for the District government, accounting for 22.4 percent of its total local-source General Fund revenues in fiscal year 2004.

The District's real property tax system differs from that of other jurisdictions in two ways. First, the District's system divides properties into three tax classes, depending on the use of the real property. As shown in Table 4-3,[1] each class is taxed at a different rate. And second, the District has an extraordinarily large proportion of real property that is exempt from paying the District's real property tax—roughly 38 percent by total assessed value. Tax-exempt properties primarily include those owned by the federal government, foreign governments, non-profit organizations, educational institutions, the District government itself, and other locally tax-exempt entities.

As shown in Figure 4-11, *inflation-adjusted* property tax revenues accruing to the District peaked in the early 1990's, and only recently began to rise past the levels of the mid-1980's.

[1] In 2002, the District increased the number of property classes from two to three, adding Class 3.

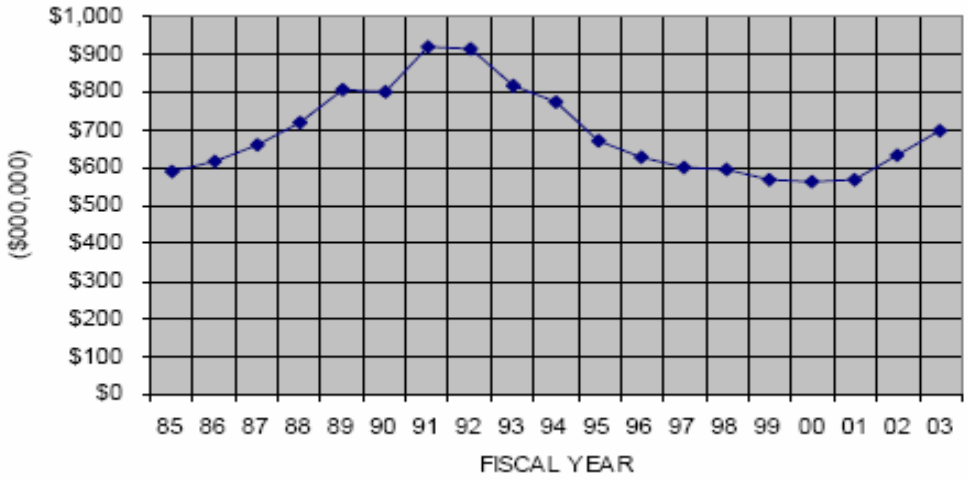
Property assessments in District neighborhoods have risen significantly in recent years, reflecting both a strong real estate market and the recent elimination of a triennial assessment system that had caused assessments to fall below actual market values.

Table 4-3: Property Tax Classification and Rates

Description	Rates
Class 1 – improved residential real property that is occupied and is used exclusively for non-transient residential dwelling purposes.	$0.96 per $100 of assessed value. *Note: For Class 1 residential real property that is owner occupied, the first $38,000 of assessed value is exempt from tax.*
Class 2 – commercial property.	$1.85 per $100 of assessed value.
Class 3 – unimproved or abandoned property.	$5.00 per $100 of assessed value.

Source: *DC Code Citation: Title 47, Chapters 7 - 14.*

Figure 4-11. District Real Property Tax Revenue
Adjusted for Inflation (in 1996 Dollars)



Source: District Office of Tax and Revenue

Table 4-4 indicates the total value of taxable property within the boundaries of the study area. Assuming the most recent year, FY2005, as the base year, the assessed value of all land in the study area is $2.9 billion, generating $33.2 million in annual property taxes based on tax roll data from the District Assessor's Office, Division of Real Property Assessment. Overall, the average valuation per property in the study area is $900,418.

As also shown in the table, the study area contributes approximately 3.3 percent of the District of Columbia's total annual property taxes This is attributable to the number of higher valued properties and a strong real estate market in the study area. As shown in Figure 4-12, the higher valued properties in the study area are located along the Potomac riverfront area.

Table 4-5 highlights some of the properties shown in Figure 4-12 by listing the top property values in the study area. The Washington Harbour parcels at K Street represent the highest valued property in the study area, followed by the Watergate Hotel complex, and offices along Thomas Jefferson Street.

Table 4-4: Total Property Valuation and Property Taxes (FY2005)

Area	Total Valuation	Annual Property Taxes
Study Area	$2,968,018,123	$33,199,100
District of Columbia	$136,191,353,776	$1,017,653,000
Study Area Contribution	2.2%	3.3%

Source: District Office of Tax and Revenue, 2005

Figure 4-12. Distribution of Property Values

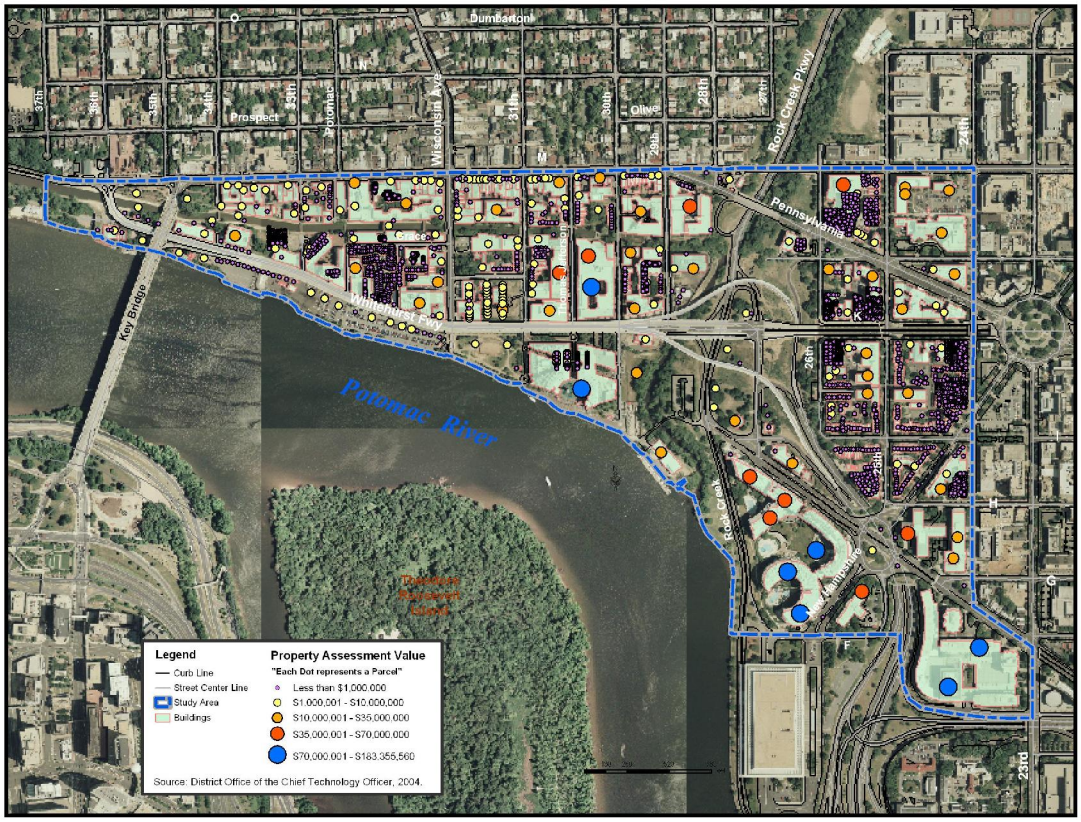


Table 4-5: Top Property Values (Year 2005)

Address	Property Valuation
3000 K STREET NW (Washington. Harbour)	$183,355,560
2440 VIRGINIA AVENUE NW	$ 87,076,830
2401 - 2305 E STREET NW	$ 86,722,070
2500 VIRGINIA AVENUE NW	$ 80,890,110
1025 THOMAS JEFFERSON STREET NW	$ 72,203,970
2800 PENNSYLVANIA AVENUE NW	$ 50,740,000
1055 THOMAS JEFFERSON STREET NW	$ 49,907,700
1050 THOMAS JEFFERSON STREET NW	$ 35,573,310
1010 - 1014 WISCONSIN AVENUE NW	$ 29,631,170
1000 THOMAS JEFFERSON STREET NW	$ 29,289,000
1101 - 1115 30TH STREET NW	$ 27,342,000
1055 29TH STREET NW	$ 25,436,400
3100 K ST REET NW	$ 25,136,250
3111 K STREET NW	$ 21,940,440

Source: District Office of Tax and Revenue, 2005

Additional important statistics pertaining to the land valuation of the study area are as follows:

- Total valuation of land in the study area is $370 per square foot, compared to $217 per square foot in Georgetown and $180 per square foot in the District of Columbia.

- From 1998 to 2005, 104 percent appreciation in total land valuation (*in real value terms*) occurred in the study area, a strong 10.7 percent average annual rate of growth.

- During the same period of 1998 to 2005, a steady increase occurred in the ratio of *improvement value* to *total assessed value*. This indicates that land is becoming more valuable and productive.

Market profile data, summarized in Table 4-6, indicates that the study area generates $280.5 Billion in annual retail sales transactions. Retail sales transactions in the study area are strong with M Street providing the majority of traditional and high-end clothing and merchandise retail establishments. Significant sales transactions are also generated by the Washington Harbour restaurants and Watergate Hotel complex. Another key retail generating use is the cineplex theater.

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Table 4-6: Retail Market Profile (2004)

		Supply (Retail Sales)
Total Retail Trade (NAICS 44-45)		$191,559,258
Total Food & Drink (NAICS 722)		$88,895,281
	TOTAL	$280,454,539

Source: Business data provided by InfoUSA, Omaha NE Copyright 2004, all rights reserved. ESRI forecasts for 2005.

4-3.2. VALUE CAPTURE FINANCING MECHANISMS

Value capture finance is a strategy for funding public improvements by capitalizing upon the anticipated stream of future incremental tax revenues that the improvements are expected to generate. In theory, public infrastructure improvements stimulate real estate development that increases property values, incomes, and, consequently, revenues.

Such a financing approach could potentially be applied to the proposed Whitehurst Freeway deconstruction, since it is expected that this project would enhance property values by creating river views, river access, a more attractive pedestrian environment, and other amenities, all of which would support higher rental and sales prices. In addition, depending on the revised roadway design, new developable land may become available for commercial and residential development. The new revenues generated in the process could be "captured" to help fund the Whitehurst project and related improvements.

A form of value capture finance that is practiced in the District and in 48 states is tax increment financing, or "TIF". Under this model, a municipality defines a TIF district and undertakes the public improvements needed to encourage economic development. These improvements may include not only transportation projects, but a variety of other typical public investments.[1]

Incremental real property taxes and incremental sales tax revenues produced by a project may be used to repay its TIF bond issues. Future property taxes and retail sales tax transactions within the TIF district are divided into two components: the *base* (the aggregate amount collected in "year zero") and the *increment*. In most TIF jurisdictions, including the District, the increment includes revenues attributable to the appreciation in existing property as well as new development. The tax increment is then dedicated, in whole or in part, to fund the public improvements; typically this is done by using the multi-year stream of incremental revenues to pay debt service on a "TIF Bond". These bonds are often structured as special revenue bonds, which do not require a pledge of the municipality's full faith and credit and fall outside the municipality's general obligation debt ceiling. At the conclusion of the financing term, the "carve-out" of TIF revenues ends and the full annual tax yield of the TIF district start to flow to the general fund.

The District's Tax Increment Finance program was established in 1998 and has been reauthorized through a number of temporary acts beginning in 2002. District legislation to permanently reauthorize the TIF Act and refine certain provisions is expected to be enacted in 2005. [2]

Key provisions of the DC TIF program include:

- The aggregate principal amount of TIF bonds, other than refunding bonds, shall not exceed $300 million. All TIF bonds issued pursuant to the original Act must have been issued before January 1, 2003. The current TIF authorization ceiling of $300 million has been reached, but is expected to be increased to $600 million as part of the 2005 TIF reauthorization.

- The District's TIF program can use both the property tax and the District's sales tax; this is a relatively unusual provision among US TIF statutes.

- Since on average approximately 60 percent of DC property taxes are pledged for repayment of the District's general obligation bond indebtedness, the capacity for new TIF borrowing based on incremental real property taxes may be limited in cases where there is modest growth in new development.

[1] TIF bonds can be issued to finance eligible development costs such as soft costs, property assemblage, rehabilitation of existing structures, and costs of public works and infrastructure.
[2] The TIF Act exists parallel to the Downtown Retail Incentive Act, which also authorizes the use of TIF to promote retail development Downtown and in District neighborhoods.

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- Incremental retail sales taxes also incur a prior obligation to use ten percent of the food and beverage sales tax revenues in the District to support the convention center bonds.

Under the DC TIF program to date, TIF bonds have been issued for projects that would result in a significant increase in sales and property tax revenues. All of DC's TIF projects approved thus far are expected to repay their bonds with new revenue generated directly from the project in question.

4-3.3. CONCLUSION AND FINDINGS OF LAND VALUATION AND FUNDING MECHANISMS

The study area has seen a substantial increase in prices and value of property transactions in both the residential and commercial real estate markets. This trend is expected to remain stable, as well as the trend in retail sales transactions.

Under existing conditions, there is limited redevelopment or infill capacity remaining in the study area. Consequently, application of TIF funding for the Whitehurst Freeway deconstruction would rely primarily on the appreciation of the existing property tax base. The same assumption is applicable with regard to the growth in the volume of retail sales activity in the study area being limited to the growth in existing retail establishments, as opposed to significant new retail growth occurring from new establishments.

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5. CASE STUDY PROJECTS FROM PORTLAND, SAN FRANCISCO, AND BOSTON

This report draws upon the experiences from other cities that have removed or deconstructed major waterfront highways. The case study cities are arranged chronologically, starting with Portland, Oregon – one of the first cities to remove a highway in the United States – and culminating with the largest and most recent project, the waterfront portion of Boston's "Big Dig".

5-1. BACKGROUND ON THE CASE STUDIES

In all three case study projects, the action to redesign, remove or deconstruct a highway was undertaken as part of a more elaborate initiative to invigorate and renew a waterfront, create a new or enhanced public realm, and promote economic development.

In two of the cities, Portland and San Francisco, the "barrier" freeway was removed but not replaced by a new roadway. The vehicular traffic was redistributed to a new or upgraded network of surface streets that accommodated the anticipated volumes. In Boston, where the old Central Artery carried I-93—the only north-south interstate highway traversing the city—the freeway was replaced and expanded underground, with the number of on- and off-ramps in the downtown significantly reduced.

Together these case studies provide valuable input on the relationship between highway deconstruction and waterfront land value. They offer additional lessons as well, as the District considers the feasibility of removing the Whitehurst Freeway. Among these lessons are the importance of transit in the creation of a high-value-added downtown waterfront; the importance of replacing the freeway footprint with a pedestrian-friendly environment, and the potential role of special institutional or financial mechanisms in implementing the long-term plan for place-making in the freeway corridor.

5-2. PORTLAND'S HARBOR DRIVE

5-2.1. PROJECT DESCRIPTION AND RELATED OUTCOMES

In 1974 the four-lane Harbor Drive expressway, shown in Figure 5-1, was removed from the Portland's southern waterfront along the Willamette River to create Waterfront Park. The new park and master plan established the framework and development trajectory for the signature RiverPlace (1987) residential and commercial development projects along the river. Subsequently, extensive planning and development efforts have occurred along the north and south sides of the Willamette River as Portland continues to reclaim and improve its riverfront area.

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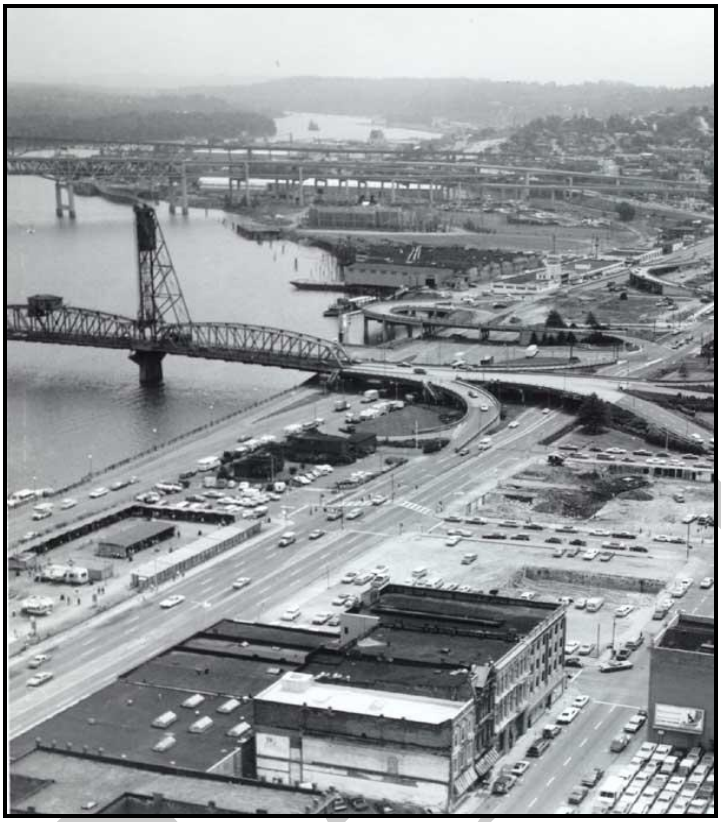
Figure 5-1. Portland's Harbor Drive (1974)



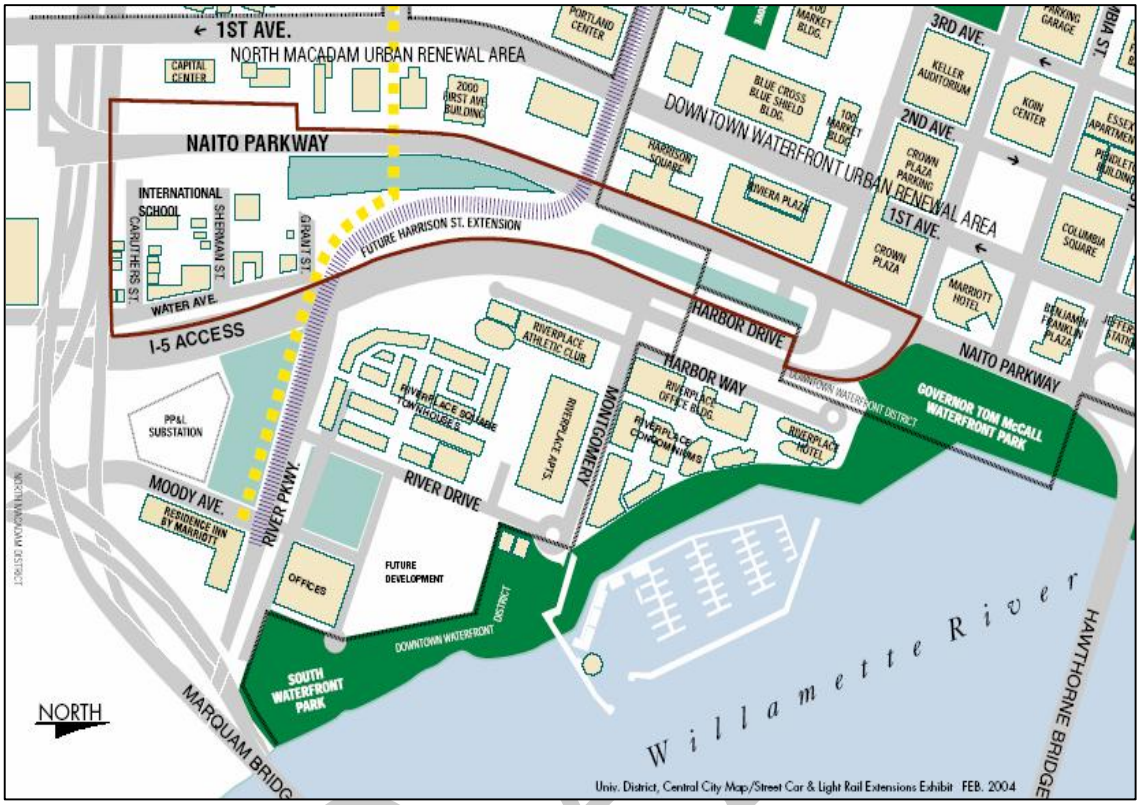
5-2.2. LAND USE AND DEVELOPMENT

The RiverPlace project and the surrounding 73-acre Waterfront Park, shown in Figure 5-2, are located adjacent to the Willamette River. Above all else, Portland 's *Central City Plan Fundamental Design Guidelines (1978)* call for an integration with the Willamette River: "The river is the Central City's most significant geographic feature and acts as the binding element," the *Guidelines* state. "The river is also a center for activity; important to Portland's overall economic health and livability. The river's importance is measured not just as a working river, but also in terms of its aesthetic, recreational, and tourism potential."[1]

The specific river-oriented design guideline that helped RiverPlace's developers create its form states: "Integrate the river as an important design consideration into the projects which are located along or near the edge of the Willamette River, through means such as the composition of architectural and landscape elements, location of windows, doors and attached outdoor areas, and offering access ways for the pedestrian to, along, and from the water's edge."[2]

[1] City of Portland, *Central City Plan Fundamental Design Guidelines (1978).*
[2] Ibid, (1978).

Figure 5-2. Map of Portland's RiverPlace Development Area (2004)



After the deconstruction of Harbor Drive and the formulation of a master plan to guide new development, a key agency involved in waterfront renewal was the Portland Development Commission (PDC). The PDC acquired 73 acres of undeveloped waterfront land between the Marquam and Hawthorne Bridges in 1979. The highly visible site was Portland's last centrally located vacant tract of significant size.

Over the next five years, the PDC completed more than $6 million in infrastructure development and improvements, including public streets, riverfront and park expansion, marina basin dredging, and enhanced pedestrian access. The city and the local utility company were also key players in waterfront renewal efforts.

The Pacific Power & Light utility company assisted by shutting down its on-site steam plant and agreeing to relocate a major substation to the southwest corner of the development area. This action enabled the PDC to construct a marina basin enclosed by a floating breakwater and fishing pier, a five-acre terraced meadow, swimming beach, and a half-mile extension of the riverfront esplanade. The financing for infrastructure improvements for the RiverPlace project was secured through city-issued bonds, while the city had been assembling various parts of the site itself since 1975.

The RiverPlace project began in 1983 when the PDC sponsored a nationwide design competition for a ten-acre parcel of the South Waterfront Development Area. Phase I of

RiverPlace was completed in 1985. The city's share of Phase I funding was provided largely through tax-increment financing (TIF). This phase included 158 condominium units, the 75-room RiverPlace Alexis Hotel, a public marina with 200 spaces for large sailboats and light watercraft, a floating restaurant, specialty shops along the esplanade, and an athletic facility sized to serve both RiverPlace and the surrounding community. All docking spaces, retail shops, and restaurants were immediately leased. The following year, a four-story, 40,000-square-foot office building was constructed, as were 32 condominium units and below-grade, hidden parking.

RiverPlace's Phase II, which began in summer 1988, included a 300-space public parking garage with six street-level retail spaces forming the base for 108 rental apartments of middle-income housing. In 1994, the Commission received approval from the Oregon Department of Environmental Quality to market additional RiverPlace land to meet increasing housing demand. The Commission approved a plan to develop 182 townhomes, which were completed and opened in 1995. The townhomes—the first to be built in Portland's downtown core—were quickly leased.

In total, the 10.5-acre RiverPlace project shown as "before and after" in Figure 5-3 and in Figure 5-2 includes 480 condominium, townhome, and rental units. RiverPlace also includes 26,000 square feet of retail and nearly 42,000 square feet of office space. Almost 60 percent of the parking at RiverPlace is underground and all residential parking is underground or otherwise hidden behind vine-covered facades or retail shops. All told, the RiverPlace project represents a reintegration with Portland's urban and river fabric, a 25-year turnaround from four-lane freeway to a thriving downtown neighborhood.

5-2.3. LAND VALUATION

The waterfront park and RiverPlace project are located in what is called the Downtown Waterfront Urban Renewal Area. The area is considered to be one of Portland's most successful examples of urban renewal and tax increment financing. Since its creation in 1974, assessed land values have increased an average of 10.4 percent annually, from a total of $466 million to more than $1.6 billion (2003).[1]

Recent planning and investment proposals in Portland are focused on additional redevelopment of the riverfront. The proposed tax-increment financing to be applied to these new areas totals $500 million.

5-2.4. INSTITUTIONAL AND FINANCIAL MECHANISMS

One of the primary institutional entities in the development and waterfront renewal was and will continue to be the Portland Development Commission (PDC). The PDC facilitates public-private partnerships, and provides planning, marketing, and financial

[1] Portland Development Commission, *Annual Report* (2005).

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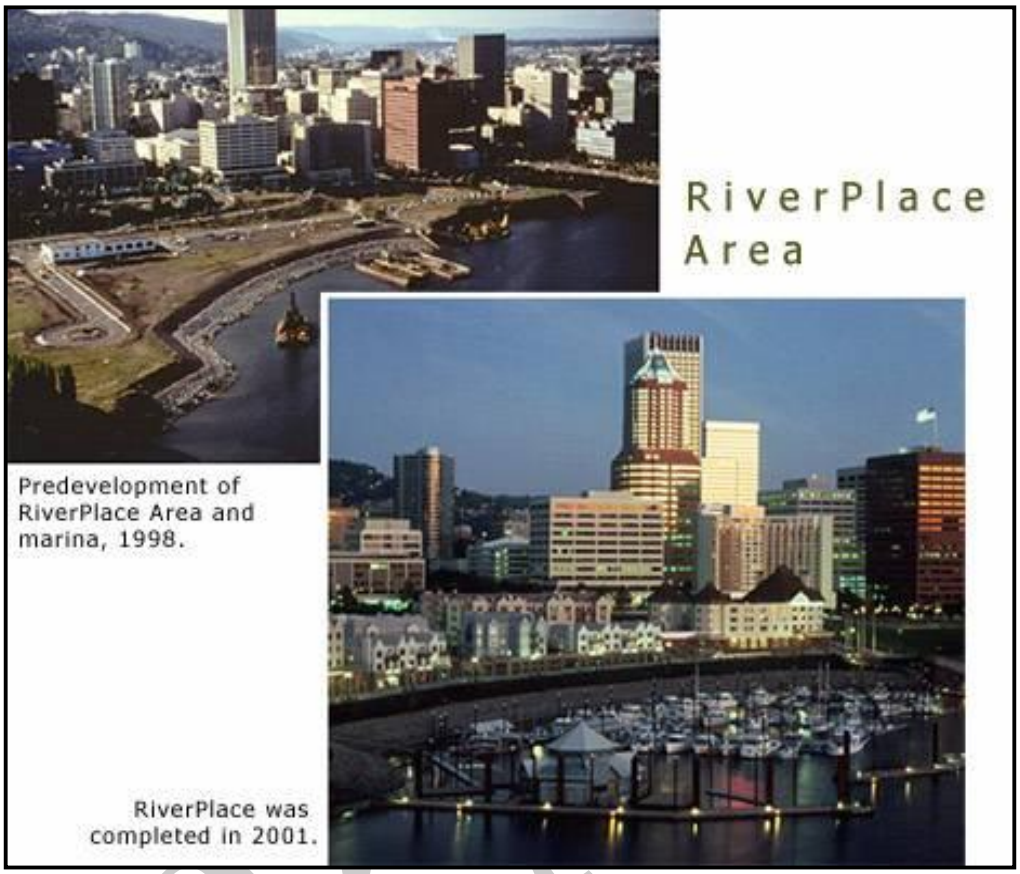
Figure 5-3. RiverPlace Area in 1998 and 2001



investment assistance primarily through the use of property-based, tax-increment financing.

Alongside TIF, Portland has used business improvement districts (BIDs), as a mechanism to raise private funds for maintenance, programming, and routine improvements of its waterfront and downtown development areas. Portland's BIDs consist of quasi-public special districts which raise funds through property special assessments, exactions in development agreements, and negotiated development contributions.

5-3. SAN FRANCISCO'S EMBARCADERO FREEWAY

5-3.1. PROJECT DESCRIPTION AND RELATED OUTCOMES

Like many other ill-planned urban highways of the post-World War II era, San Francisco's double-decked Embarcadero Freeway (Route 480) was built along the city's downtown wharves, as the evolution of marine cargo technology was rendering those old

piers obsolete. Like similar freeways in other cities, the Embarcadero Freeway, shown in Figure 5-4, cut the city off from its waterfront and hastened its decline.

In the 1960's, the elevated Embarcadero became one of the first freeways in the nation to be halted by citizen protest. At that time, it functioned as an extended off-ramp that connected downtown to the Bay Bridge. For years afterward, the city tried with little success to have the freeway removed.

The October 17, 1989, Loma Prieta earthquake wreaked havoc throughout the San Francisco Bay Area, but in the process provided San Francisco a once-in-a-lifetime opportunity to reclaim and revitalize its isolated and neglected downtown waterfront. The Freeway sustained significant damage in the quake and was demolished in 1991.

With the removal of the freeway, San Francisco gained dozens of acres for redevelopment along the central Embarcadero, which lies directly in front of the landmark Ferry Building and adjacent to Embarcadero Center and the downtown business district. The "before and after" photographs shown in Figure 5-5 clearly display the function of the old Embarcadero and an economic and physical barrier. The privately and publicly funded projects along the waterfront and adjacent blocks include mixed-use development, parks and open space, a new surface roadway for automobiles, two new trolley lines, and a seven-mile-long waterfront promenade overlooking San Francisco Bay.

5-3.2. LAND USE AND DEVELOPMENT

The demolition of the Freeway was the turning-point event in the City's waterfront land use plan. Started in 1990 and completed in 1997, that plan recommended the redevelopment of 7.5 miles of San Francisco's bayfront, beginning with the restoration of the landmark 1898 Ferry Building. With the Port Authority in need of a new office before redevelopment could take place, it made sense to first redevelop the adjacent Pier 1 building and prepare it for the Port Authority's use.[1] In 1998, AMB Properties was selected to develop the property in exchange for a 50-year ground lease, with the port authority leasing back 52,000 square feet. Pier 1 is a pioneering waterfront redevelopment project, with an innovative use of structural and energy-efficient technologies.

Additional publicly and privately funded projects are being carried out under the terms of the Northeast Waterfront Survey Plan, which was prepared by the San Francisco Redevelopment Agency, the city planning department, the Port of San Francisco, and a Citizens Advisory Group. The iconic projects are the restoration of the Ferry Building itself, the pedestrian and transit plaza in front of it, and the planned Ferry Terminal behind it, on the Bay.

[1] Historic and background information obtained by personal communication with SF Planning Department personnel and SF Port Authority Finance Director, Christina Olson, February 2005.

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Figure 5-4. Embarcadero Freeway (1969)

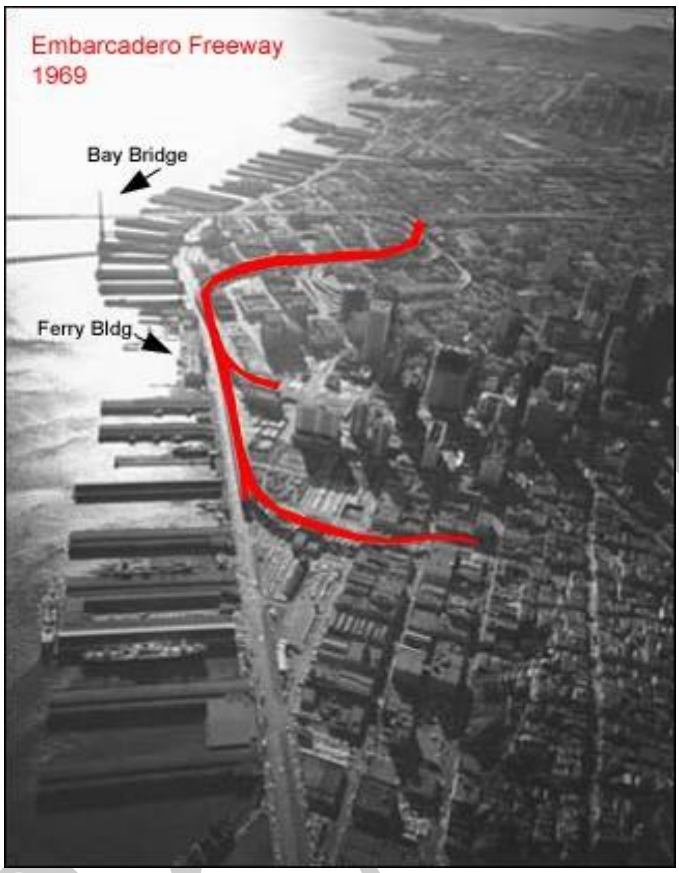

Figure 5-5. Embarcadero Area Before (1988) and After Removal (2003)

The following is a summary description of some of the other completed, soon-to-be-completed, and proposed projects along the downtown waterfront that became possible due to the deconstruction of the elevated freeway. The quantity of these projects demonstrates the scope of the investment that was undertaken to renew the waterfront.

Embarcadero Promenade, Roadway, and Trolley Lines: In 1999, new projects included a seven-mile waterfront pedestrian promenade, surface-level roadway, and a trolley line that operates along the Embarcadero from Second and King Street (near the new Giants baseball park) past the Ferry Building to Fisherman's Wharf.

South Embarcadero (from China Basin at the foot of Second Street to the foot of Folsom Street, three blocks south of the Ferry Building): This section of waterfront promenade and vehicular roadway was completed in 1994. The waterfront promenade is already a favorite with walkers, joggers and bicyclists.

A $200 million extension of the Muni Metro transit system (which currently ends at the underground Embarcadero station beneath the foot of Market Street) was completed. Modern trolleys now run down the light-rail median in the South Embarcadero's vehicular roadway, linking China Basin and the South Beach neighborhood to the Muni Metro lines and BART stations under the foot of Market Street.

Central Embarcadero (from Folsom Street to the foot of Broadway near North Beach and Chinatown). Construction of this section of the waterfront promenade, vehicular roadway, and trolley median was completed in 2000.

The **five-year-old Pier 7**, located just north of the Ferry Building, was the first pier to be built in San Francisco since the 1940s. Extending 845 feet into San Francisco Bay, the recreation and fishing pier is now lined with streetlights, park benches, and overlooks.

North Embarcadero (from the foot of Broadway to Fisherman's Wharf). Lined by palms, this section of the waterfront promenade and vehicular roadway was completed in 2001. A historic trolley, known as the "F Line," runs from Fisherman's Wharf, along the waterfront, and then three miles up Market Street to Castro Street.

Redevelopment of the Waterfront Piers: Recently, the Port of San Francisco prepared a Waterfront Land Use Plan (2004) for the underused waterfront piers.

Steuart Street Adaptive Reuse of Historic Buildings: The east side of Steuart Street between Mission and Folsom streets (once known as the East Street Row) was one of the few parts of downtown San Francisco that escaped destruction in the fire after the 1906 earthquake. Today, it is lined with historic buildings that have been renovated into offices, hotels, and restaurants. A few sensitively designed infill buildings have been constructed along this street, which is located one block inland from the Embarcadero.

The Gap Headquarters, Facing the Embarcadero: The Gap built its new signature 440,000-square-foot, 17-story, $90 million headquarters at the northwest corner of Folsom and Steuart streets, overlooking the Embarcadero.

The Transbay Terminal Redevelopment Project: The 66 acre redevelopment site is possible because of the removal of the freeway. The area contains a mix of uses including

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office, light industrial, warehouses, and some residential, as well as an aging regional bus terminal that is slated for replacement by a new multimodal transportation facility and substantial new commercial and residential uses. The project will be assisted through the use of property-based tax increment financing, and several joint development initiatives.

The scope of these projects demonstrates that the post-Freeway renewal strategy for the Embarcadero rests on large-scale infrastructure improvements that recast the entire downtown shoreline as a high-value, mixed-use environment, with a ripple effect extending many blocks inland as shown in Figure 5-6. The twin themes of this long-term reinvestment program are *the public realm* and *mass transit*. San Francisco is creating a central and highly accessible public destination, where high-value residential and commercial development will thrive.

5-3.3. LAND VALUATION

As more development projects are completed, the "whole" of San Francisco's waterfront is becoming greater than the sum of its individual parts.[1] These projects have unified and enhanced other development and open-space activities that were completed in a piecemeal manner before and after the earthquake.

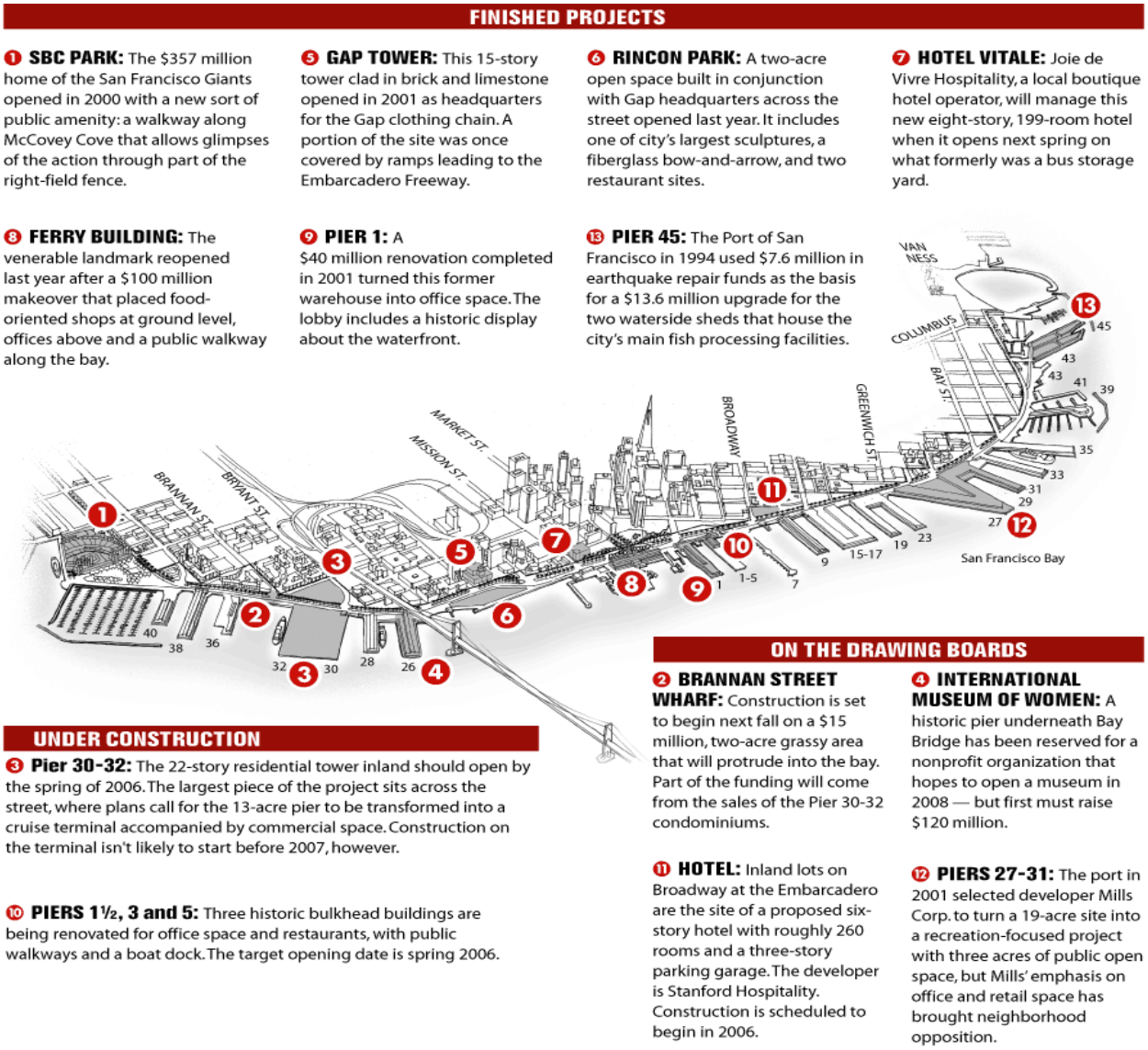
Considering San Francisco's "post-dot.com" economic malaise, one might surmise the paucity of demand for most real estate products would be keeping construction cranes idle. But as recent, current, and planned major waterfront development projects illustrate, the city's waterfront continues to undergo a dramatic transformation. "There's a tremendous amount of actual construction activity underway right now along San Francisco's shoreline," observes Elliot Stein, senior managing director at the locally based Sedway Group consulting division of CB Richard Ellis. "And there's a lot more on the way."[2] Overall, land values in the Embarcadero corridor have appreciated more than 300 percent over the past ten years.[3]

5-3.4. INSTITUTIONAL AND FINANCIAL MECHANISMS

Following the Port Commission's 1997 Waterfront Land Use Plan, the Port alone is guiding privately managed developments representing investments amounting to well over $1 billion. Since the Port owned a sizeable supply of real estate within the Embarcadero, they were one of the key entities that initiated and bolstered the development dynamics along the waterfront and extended inland as well. Other agencies that had a key role were the SF Redevelopment Agency that leveraged its property-based tax increment financing resources with public-private investment. SF Planning

[1] Personal Communication, Jesse Blout, SF Economic Development Director, February 22, 2005.
[2] Personal Communication, Elliot Stein, Director, Sedway Group, February 9, 2005.
[3] Personal Communication, Alex Tharayil, Deputy Director, San Francisco Assessor's Office, February 23, 2005.

Figure 5-6. San Francisco Waterfront and Embarcadero Area (2003)



Department provided the oversight of the development approval process and provided coherence to the various initiatives through planning workshops and official planning documents.

5-4. BOSTON'S CENTRAL ARTERY

5-4.1. PROJECT DESCRIPTION AND RELATED OUTCOMES

Boston's Central Artery - Ted Williams Tunnel Project (widely known as the "Big Dig"),

is the largest single urban public works project in US history.[1] It currently stands at 96 percent completion. While the national audience understandably sees the Big Dig as an interstate highway and tunnel project, it is also a city-building project of massive scale.[2]

The most visible of the project's city-building goals was to eliminate the Central Artery viaduct and boat sections as a barrier between Downtown Boston and its waterfront.[3]. Bostonians hated the elevated Central Artery since it was built in 1959, before the days of environmental-impact statements and litigious public process. Construction crews had blasted a path through downtown, displacing 20,000 people and demolishing 1,000 buildings in the process.

The scale of the barrier they created can be seen in Figure 5-7. Boston's central waterfront is well over a mile long, with extensive land and wharf space seaward of the Central Artery alignment. As in Georgetown, structures on the landward side of the Central Artery once pressed right up against the viaduct. The space beneath the viaduct was more unfriendly than Georgetown's, criss-crossed with on- and off-ramps and in some segments closed to pedestrians. Alongside the financial district, the viaduct transitioned to a tunnel, its boat section creating a lengthy gash in the urban street network.

Today, the viaduct and boat section are gone; the new underground I-93 roadway is in operation; and construction of the Rose Kennedy Greenway—a 27-acre park and boulevard environment atop the Artery roof—has begun.

5-4.2. LAND USE AND DEVELOPMENT

In the downtown corridor, the opportunity for joint development on the Big Dig-owned real estate is limited.[4] In 1990, the state and City agreed that of the 27 acres of land to be created in the Greenway, 75 percent would be dedicated to open space.[5] The 25 percent available for development consists of several parcels in the North End, Chinatown, and North Station / Bullfinch Triangle neighborhoods. These parcels, which are intended to

[1] The total project cost will exceed $15 billion. While the federal government will have paid well over half the cost, making it the largest federal-aid highway project, the local share is by far the largest ever.
[2] The principal highway mobility goals were to enhance north-south capacity, safety, and throughput on I-93 (the Central Artery) by widening and rebuilding it underground; to create direct east-west access from the Massachusetts Turnpike to the Port of Boston and Logan Airport (by extending I-90 under Boston Harbor to East Boston); and to reduce the flow of regional traffic on downtown and neighborhood streets.
[3] Other city-building objectives included opening up the South Boston Waterfront for dense, mixed-use development; rejuvenating North and South Stations as centers of downtown activity; and building a network of waterfront and neighborhood parks. The Big Dig also included, as companion and/or mitigation measures, a series of MBTA capacity enhancements and extensions.
[4] In other parts of the City—South Boston, Charlestown, and South Bay—the Big Dig created much more extensive development parcels. These fall outside the scope of this case study discussion.
[5] The definition of "open space" includes civic venues such as an indoor botanical garden, Boston historic museum, and neighborhood YMCA.

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help "re-knit" the neighborhood fabric with housing, retail, and community uses, have been offered to developers through a competitive RFP process.

Figure 5-7. The Former Central Artery (I-93)

The development opportunity created on private land *alongside* the Greenway is far more dramatic. Several diverse examples tell the story:

Atlantic Avenue, from Congress Street to Northern Avenue. This key block fronts on the future Greenway, with the waterfront directly behind. It consists of three separate development projects. At the northern end is Independence Wharf, a once-decrepit office building renovated as Class A space. In the center is 500 Atlantic Avenue, a hotel-condominium-retail project wrapped around a Big Dig vent building.[1] At the southern end is Russia Wharf, a set of three historic buildings owned by Equity Office Investments, which will renovate the existing space and add a series of towers above, creating a hotel-office-condominium-retail project of over a million square feet.

Broad, Batterymarch, India, and Franklin Streets. These historic streets, on the landward side of the Greenway, typify the downtown areas formerly cut off from the waterfront. They are now undergoing numerous infill and adaptive reuse projects, both residential and commercial.

[1] The vent towers were built on land owned by Boston Edison (now NStar), which retained the development rights.

The Leather District. This compact area of 19th century lofts adjoins the southern end of the Greenway. The Big Dig has reconnected these streets to South Station and brought the waterfront within comfortable walking distance (if not direct view). The key development trend in the Leather District is the conversion of loft space from low-end office and commercial uses to market-rate condominiums, as shown in Figure 5-8

Wharf District. At the mid-point of the Greenway corridor is a cluster of land uses dominated on the water side by the New England Aquarium, Long Wharf Marriott, Long Wharf ferry terminal, and Christopher Columbus Park; and on the land side by Quincy Market and the Custom House blocks.[1] In the 1990's the Aquarium decided to remain on Central Wharf, weather the Big Dig construction period, and expand its facilities; its first phase is now complete (Figure 5-9). The rejuvenation of the building stock in this area is

Figure 5-8. Leather District loft conversion to luxury housing

evidenced by two projects: the development of two large waterfront restaurants on the ground level of 255 State Street; and the conversion of 199 State—the end bay of a historic wharf building that almost touched the viaduct—from throw-away office and storage space to luxury apartments (Figure 5-10).

Causeway Street. At the northern end of the Greenway, the new Central Artery crosses beneath Causeway Street, emerging onto the city skyline's new icon, the Zakim Bridge. Causeway Street, long obscured by two viaducts (the Central Artery and the MBTA's Green Line) is now open to the sky, with the rediscovered Charles River waterfront behind. In the same block as North Station and Boston Garden is "Strada 234", a former bakery loft building redeveloped as office space on the lower floors and luxury residences on the six upper floors (Figure 5-11). Immediately next door, the underused Hoffman Building will be redeveloped as 260 units of luxury housing, with street retail Hoffman Building and a new wharf.

[1] Quincy Market, opened in the late 1970's, was the Rouse Company's prototypic "festival marketplace" development and is one of Boston's principal destinations. Increased synergy between Quincy Market and the waterfront was a specific objective in eliminating the elevated Central Artery.

Figure 5-9. New England Aquarium Expansion

Figure 5-10. Office Conversion to Luxury Housing

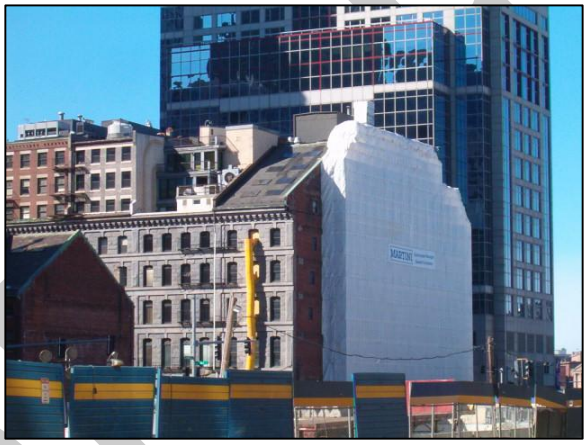

Figure 5-11. Causeway Street

Strada 234 and Hoffman Buildings; North Station behind and waterfront to right.

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5-4.3. PROPERTY VALUATION

It is widely understood in the Boston real estate community that the replacement of the old Central Artery by the Greenway, and the reconnection of the financial district, Quincy Market, and other parts of downtown with the waterfront, represent a transformative event on property values in this corridor. From the wharves on the seaward side of the alignment, to a depth of several blocks on the landward side, this public investment is already being priced into both land and building stock.

This view was reinforced in a 2004 analysis by the Boston *Globe*, which used both Assessing Department data and stakeholder interviews to examine 45 commercial properties adjoining the Greenway corridor. In the aggregate, from 1988 (when the Big Dig began and investors could rely on its eventual completion) to 2003, these properties increased in assessed valuation by 79 percent—nearly double the city-wide average of 41 percent for the same period (see Figure 5-12).[1]

While some of these properties show artificially large increases because they were placed in service during this period, the aggregate increase is all the more noteworthy because it occurred in the face of two pervasively negative factors: the general recession in office rental values that occurred throughout downtown Boston in the 1990s (accounting for the several blue-colored properties in Figure 5-12 that actually *lost* value), and the disruption of the Big Dig construction period itself.

As part of this Report, the Study Team conducted interviews with four key stakeholders who are experts in Greenway corridor real estate.[2] These interviews echoed the Globe analysis on several key points:

- The recovery in downtown office values is happening in the Greenway corridor before it happens elsewhere.[3]

[1] "For Property Owners, Parks Mean Profits" (Thomas C. Palmer, Jr.), Boston *Globe*, June 14, 2004.

[2] The following were interviewed by Alden S. Raine of DMJM Harris between February 22 and 27, 2004:

- Peter Shields, Sr. Vice President in the Boston office of Equity Office Properties, which recently acquired two landmark Greenway properties: Rowe's Wharf (the waterfront's first large-scale, mixed-use project, developed in the 1980s), and Russia Wharf (see Figure B3);
- Robert Beal, Chair of The Beal Companies (also the long-time chair of the Massachusetts Development Finance Agency, the state's principal quasi-public economic development corporation);
- Roger Berman, Principle of The Berman Company, a major building owner and redeveloper in the Leather District.
- Thomas Nally, Director of Planning for the Artery Business Committee (the principal association of corridor property owners).

[3] A recent sale illustrates this point. Marketplace Center, a retail and office project originally built into the curve of the Central Artery viaduct, forms the "hinge" between Quincy Market and the Greenway. The building was recently sold for $141 million, 40 percent more than its 2003 assessed value; there were 22 bids over $130 million. Industry experts called this sale indicative of what to expect for Greenway commercial properties in general, for those which had been directly impacted by the viaduct in particular. (Boston *Globe*, March 11, 2005; see also Figure B11.)

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- Office and hotel space that was most directly impacted by the Artery viaduct—i.e., space that looked out on the Artery from the second through sixth floors—is undergoing the greatest increase in value.[1]

- The attraction of the Greenway as a prospective residential address is exceeding industry expectations. As noted earlier, many Greenway loft buildings are being converted from high-vacancy Class B office space to luxury apartments.[2] For new construction, Greenway views are turning out to be competitive with water views in attracting new residential investment.

- Street-level retail and restaurant space that used to lie in the shadow of the Artery viaduct is being refurbished and re-tenanted at a rapid pace. In addition, buildings that were designed with blank walls facing the Artery at street level are expected to be redesigned to capture the value created by future pedestrian traffic.

While the impact of these changes on corridor property values is clear, all of the experts interviewed for this case study identified one other key locational discriminator: *mass transit*. While most of the Greenway corridor does not have lengthwise transit service like that found on the Embarcadero, it is transit-rich nonetheless. The Greenway is intersected by MBTA transit lines at South Station (Metro, BRT, AMTRAK, commuter rail, intercity bus); North Station (Metro, commuter rail); Haymarket (Metro); and Aquarium (Metro). There are regional ferry terminals at Long Wharf (Aquarium) and Rowes Wharf (financial district). In conjunction with the Big Dig, North, South, and Aquarium Stations were rebuilt and their peak-load capacities expanded. Every development project or major property sale cited in this report is located within a quarter-mile (five-minute) walk of at least one transit station (see Figure 5-13).

5-4.4. INSTITUTIONAL AND FINANCIAL MECHANISMS

No single institutional, financing, or regulatory district has been put in place to govern the Greenway/Downtown Waterfront corridor. To understand how land use and the public realm are managed, it is helpful to divide the discussion into the Greenway proper and its wider corridor of wharves and city blocks.

With respect to the Greenway proper:

- The surface of the now-underground I-93 Central Artery is owned by the state. Once the Massachusetts Turnpike Authority (the agency in charge of the Big Dig)

[1] A property owner interviewed for this case study estimated that lower- and mid-level office space facing the Greenway is now renting for $8 to10 per square foot more than it would have if the office recession were ending but the Artery were still in place.

[2] One of the property owners stated that one-time Class B office space which had been barely rentable at $10 per square foot (i.e., a capitalized value of under $100) is selling for $400 to 500 per square foot as residential condominiums.

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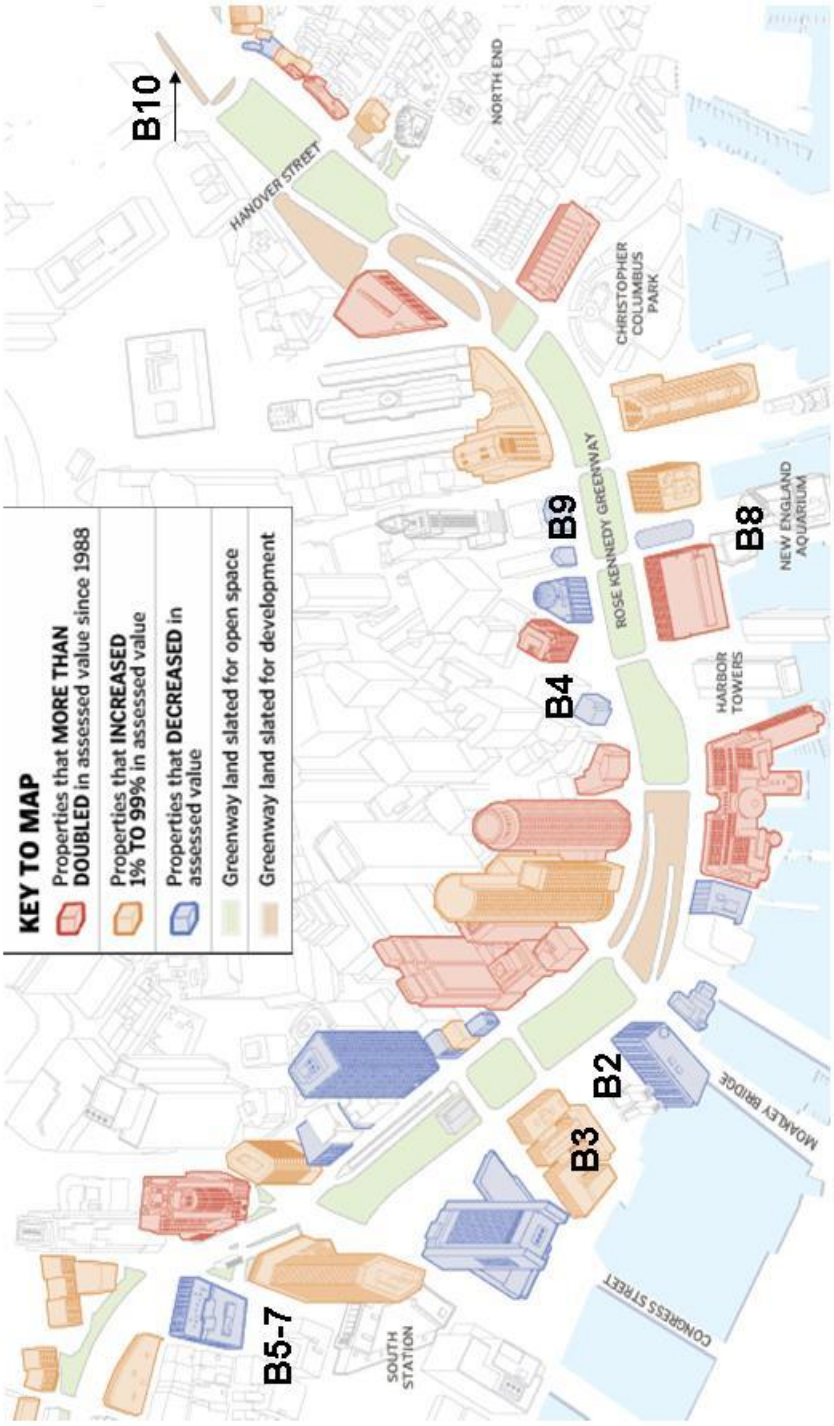
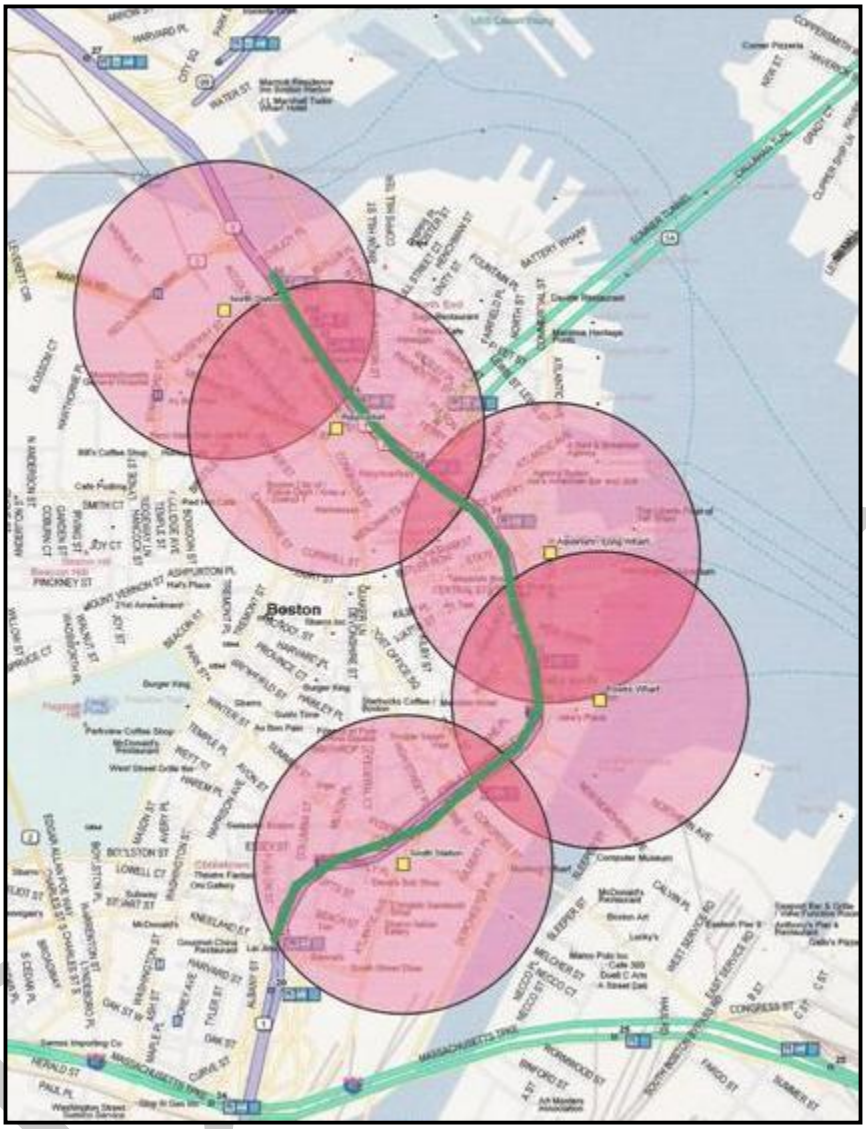
Figure 5-12. Property Valuation



B11: Boston *Globe* graphic; June 14, 2004
(B1, etc.: locations of photos)

Figure 5-13. Greenway MBTA Stations with Quarter-Mile Waling Radius



has finished constructing the basic elements of the Greenway, the streets and sidewalks will be turned over to the City and the park spaces retained by the state.

§ The Greenway will then be programmed and maintained by a public-private partnership known as the Greenway Conservancy. Established by Memorandum of Understanding rather than by legislation, the Conservancy will be funded by the Turnpike, the City, and private fund-raising. The Conservancy is explicitly not a Business Improvement District, and while abutting property owners are expected to provide a significant share of funding, their contributions will not take the form of a mandatory assessment.

- The Turnpike Authority's disposition of its joint development parcels is governed by the project's environmental approvals and corresponding City zoning. The proceeds will be used to help fund Greenway expenses.

With respect to the corridor as a whole:

- There is no special land-use or tax increment district.

- A substantial public consensus exists as to the scale, mix, and quality of development in the Greenway corridor. All major development in Boston is regulated concurrently by the City and state.[1] In this case, the joint review is guided by three well-established planning regimes: the City's zoning for the Greenway and contiguous areas (adopted in the 1990's); the state's 1990 Tidelands Development regulations (which govern the wharves, water sheet, and filled land on the seaward side of the Greenway); and a Parking Freeze covering all of downtown Boston, which severely limits the commercial parking supply and reinforces the traditionally high transit mode split.

5-5. CONCLUSIONS AND FINDINGS FOR CASE STUDIES

In each of the case studies reviewed for this *Existing Conditions Report*, a major metropolitan city set out to reinvent its downtown waterfront through a far-reaching and multifaceted investment plan. Each of the three case studies represents a package of transformative projects, in which the deconstruction of the barrier freeway was an indispensable but not sufficient condition for reconnection and renewal.

Each of these three cities replaced its barrier freeway with a new surface environment characterized by public parks and welcoming streets and sidewalks. Transit was an essential component in San Francisco and Boston, where the waterfront renewal zones were already transit-rich and became more so. In Portland, transit improvements are an essential ingredient in the later rounds of waterfront development.

Each waterfront corridor had significant underutilized land and building stock available for development when the freeway was gone and waterfront land values were unleashed. Each city used some form of structured land use regime to ensure that it got the kind of waterfront development it wanted. The cities vary widely, however, in the degree to which they have used public land disposition and public finance mechanisms like TIF to stimulate development.

A key finding was that the positive impacts of freeway deconstruction were felt on both

[1] The Massachusetts Environmental Policy Act (MEPA) review process and the Boston Redevelopment Authority's Major Project Review process are usually conducted together. While each level of government retains its own jurisdiction, the proponent prepares a consolidated "EIR/PIR" document which is scoped and reviewed collaboratively.

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sides of the demolished freeway. In Boston and San Francisco, particularly, there was an immediate rush to upgrade, re-tenant, and convert existing buildings on the landward side of the former freeway corridor. This "landside" effect would be very important for Georgetown, where most of the developable land on the water side of the Whitehurst/K Street corridor has either been developed already (Washington Harbour and the new Harbourside buildings) or is off-limits to development (the Waterfront Park).

In all three cities, land values in the freeway/waterfront corridor appreciated dramatically, but it is difficult to isolate the effects of freeway deconstruction from those of transit improvements, the new public realm, and, where applicable, public economic development tools. Without question, the freeway removal launched the renewal process, created higher-valued properties, and induced development. But in these three cities, at least, the land appreciation windfall has also reflected the synergistic effects of a growing economy, the other public interventions, and, once begun, the domino effect in the real estate market.

Based on the Study Team's case study research, the key findings can be summarized as follows:

- Removing a freeway that separates the downtown from the waterfront has supported increased property values and new or infill development. In general, freeway removal served as a transformative catalyst for waterfront renewal and other public/private investments.

- Successful waterfront renewal programs have also placed a high value on the public realm - the streets, sidewalks, parks, and other connective places that are open and accessible to all. The design quality of the new public realm, and the avoidance of excessive regional through-traffic on surface streets, appear to be key factors in private reinvestment and development decisions.

- The same is true with respect to high-quality mass transit in the affected corridor including water transit, where applicable.

- The reclamation of the waterfronts has created a redevelopment domino effect. The success of the early projects made them precursors for a new wave of development, characterized by historic preservation and high-quality mixed-use new development.

- Within the existing building stock, space in the lower floors of buildings along the alignment is especially likely to increase in per-square foot rental or sales value.

- A supportive public policy environment was critical in all three cities—including, to varying degrees, public or quasi-public development entities,

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focused planning and regulatory policies, and public-private governance and funding mechanisms.

§ Federal and state capital grant funding was needed to realize the freeway deconstruction projects and related highway and transit investments.

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APPENDIX A
TRAFFIC COUNT DATA

MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Aalexandria, VA 22312
703-914-4850

File Name : Foxhall Rd Resevior R
Site Code : 00006462
Start Date : 06/29/2005
Page No : 1

Groups Printed- Unshifted

	Foxhall Rd From North				Reservior Rd From East				Foxhall Rd From South				Reservior Rd From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu Total	Inclu Total	Int Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
07:00 AM	18	56	0	1	25	20	8	0	7	153	41	7	0	68	7	3	11	403	414
07:15 AM	19	123	7	0	19	18	5	0	14	126	54	2	1	62	8	1	3	454	457
07:30 AM	28	82	2	2	27	34	15	1	11	146	62	6	0	84	10	2	11	501	512
07:45 AM	40	91	3	3	35	26	11	0	5	122	48	4	4	102	15	3	10	502	512
Total	105	352	12	6	106	98	39	1	37	547	205	19	5	316	40	9	35	1860	1895
08:00 AM	37	117	7	0	26	19	11	0	12	149	46	5	2	86	11	2	7	523	530
08:15 AM	56	123	4	0	16	22	26	1	11	104	37	3	4	94	13	0	4	510	514
08:30 AM	41	123	8	1	34	46	19	0	21	175	49	4	5	123	5	2	7	649	656
08:45 AM	83	149	7	2	27	31	16	1	9	135	52	4	5	160	17	6	13	691	704
Total	217	512	26	3	103	118	72	2	53	563	184	16	16	463	46	10	31	2373	2404
09:00 AM	79	133	4	3	50	47	33	1	15	159	79	5	6	143	10	0	9	758	767
09:15 AM	53	109	3	0	41	44	18	0	7	135	62	3	4	134	9	1	4	619	623
09:30 AM	61	92	4	0	46	24	12	0	10	136	72	6	4	104	9	1	7	574	581
09:45 AM	33	102	2	0	13	23	50	1	8	104	61	4	3	109	11	0	5	516	521
Total	236	436	13	3	150	137	113	2	40	534	274	18	17	490	39	2	25	2469	2494
04:00 PM	24	124	2	0	42	58	35	0	0	0	0	0	0	0	0	0	0	283	283
04:15 PM	19	91	2	0	52	66	21	0	10	83	29	2	3	29	9	1	3	414	417
04:30 PM	10	80	2	0	48	76	18	0	9	94	31	0	2	42	9	0	0	421	421
04:45 PM	29	140	5	0	58	94	25	0	23	98	28	1	5	52	12	0	1	569	570
Total	82	435	11	0	200	292	99	0	42	275	88	3	10	123	30	1	4	1687	1691
05:00 PM	30	130	4	6	55	103	41	0	24	87	34	5	5	49	13	3	13	575	588
05:15 PM	24	121	4	0	46	128	33	0	20	103	20	4	6	48	13	2	6	566	572
05:30 PM	25	135	3	1	38	109	34	1	20	102	26	1	7	46	9	1	4	554	558
05:45 PM	15	139	6	2	37	81	19	0	24	119	39	3	3	44	8	4	9	536	545
Total	94	525	19	9	176	421	127	1	88	411	119	13	21	187	43	9	32	2231	2263
06:00 PM	22	101	4	3	40	88	31	0	24	114	34	3	6	42	22	0	6	528	534
06:15 PM	17	86	3	1	40	98	34	0	22	108	40	5	7	40	6	4	10	521	531
06:30 PM	18	83	3	2	39	102	33	0	19	112	48	6	5	58	13	2	10	532	542
06:45 PM	16	80	1	1	35	96	30	2	18	107	45	4	7	51	15	1	8	501	509
Total	73	350	11	7	154	384	128	2	83	461	167	18	25	191	55	7	34	2082	2116
Grand Total	307	2610	92	28	889	1448	578	8	343	2781	1037	67	94	1770	253	36	161	12702	12863
Apprch %	23.0	74.4	2.6		30.5	49.7	19.8		8.2	66.8	24.9		4.4	83.6	12.0				
Total %	6.4	20.5	0.7		7.0	11.4	4.6		2.7	21.9	8.2		0.7	13.9	2.0		1.3	98.7	

(1)

MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Aalexandria, VA 22312
703-914-4850

File Name : Foxhall Rd Resevior R
Site Code : 00006462
Start Date : 06/29/2005

	Fox hall Rd From North				Reservior Rd From East				Fox hall Rd From South				Reservior Rd From West				
Start Time	Left	Thru	Right	App Total	Left	Thru	Right	App Total	Left	Thru	Right	App Total	Left	Thru	Right	App Total	Int Total
Peak Hour From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Intersection	08:30 AM																
Volume	266	514	22	802	152	168	86	406	52	594	242	888	20	560	41	621	2717
Percent	33.2	64.1	2.7		37.4	41.4	21.2		5.9	66.9	27.3		3.2	90.2	6.6		
09:00 Volume	79	133	4	216	50	47	33	130	15	159	79	253	6	143	10	159	758
Peak Factor																	0.896
High Int.	08:45 AM				09:00 AM				09:00 AM				08:45 AM				
Volume	83	149	7	239	50	47	33	130	15	159	79	253	5	160	17	182	
Peak Factor				0.839				0.781				0.877				0.853	
Peak Hour From 04:00 PM to 06:45 PM - Peak 1 of 1																	
Intersection	04:45 PM																
Volume	108	526	16	650	197	434	133	764	87	390	108	585	23	195	47	265	2264
Percent	16.6	80.9	2.5		25.8	56.8	17.4		14.9	66.7	18.5		8.7	73.6	17.7		
05:00 Volume	30	130	4	164	55	103	41	199	24	87	34	145	5	49	13	67	525
Peak Factor																	0.984
High Int.	04:45 PM				05:15 PM				04:45 PM				04:45 PM				
Volume	29	140	5	174	46	128	33	207	23	98	28	149	5	52	12	69	
Peak Factor				0.934				0.923				0.982				0.960	

(2)

MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Aalexandria, VA 22312
703-914-4850

File Name : reserviorrd wisconsin ave
Site Code : 00000011
Start Date : 06/23/2005
Page No : 1

Groups Printed- Unshifted

	Wisconsin Ave From North					Reservior Rd From East					Wisconsin Ave From South					Reservior Rd From West							
Start Time	Left	Thru	Right	Bikes	Peds	Left	Thru	Right	Bikes	Peds	Left	Thru	Right	Bikes	Peds	Left	Thru	Right	Bikes	Peds	Exclu Total	Inclu Total	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
07:00 AM	2	93	5	0	0	0	1	0	0	3	7	97	1	0	0	2	2	10	0	3	6	220	226
07:15 AM	0	90	9	0	1	0	0	2	0	7	32	120	3	0	1	3	6	19	0	2	11	284	295
07:30 AM	1	95	7	0	0	1	1	2	0	2	31	115	2	0	0	6	7	22	0	3	5	290	295
07:45 AM	1	121	5	0	0	0	2	2	0	3	31	160	6	0	3	5	7	19	0	8	14	359	373
Total	4	399	26	0	1	1	4	6	0	15	101	492	12	0	4	16	22	70	0	16	36	1153	1189
08:00 AM	1	156	6	0	2	0	0	0	0	10	36	164	5	0	2	4	8	21	0	2	16	401	417
08:15 AM	4	161	0	0	0	2	0	0	0	7	30	153	4	0	1	2	6	49	0	2	10	411	421
08:30 AM	13	181	5	0	0	0	1	0	2	3	24	167	2	0	1	4	7	24	0	1	7	428	435
08:45 AM	13	252	0	0	0	0	0	1	0	1	35	148	3	0	0	6	12	23	0	1	2	533	535
Total	31	750	11	0	2	2	1	1	2	21	115	632	14	0	4	16	33	117	0	6	35	1773	1808
03:00 AM	17	288	15	1	0	0	1	2	1	3	19	167	3	2	0	15	2	37	1	6	14	586	580
09:15 AM	22	234	12	0	0	0	0	0	0	1	19	148	5	0	0	0	3	58	1	3	5	501	506
09:30 AM	26	175	13	1	0	1	2	2	1	0	33	148	5	0	2	10	9	46	1	2	7	470	477
09:45 AM	24	126	14	2	2	0	2	3	0	3	10	142	3	0	0	10	23	48	0	9	16	407	423
Total	89	825	54	4	2	1	5	7	2	7	81	605	16	2	2	35	37	189	3	20	42	1944	1986
04:00 PM	5	85	2	0	0	1	0	0	1	4	10	94	5	0	0	3	7	18	0	4	9	230	239
04:15 PM	7	101	2	0	1	0	1	1	2	6	13	114	9	0	0	2	9	21	2	6	19	280	299
04:30 PM	10	125	3	2	0	1	0	0	2	8	16	123	15	0	0	5	11	24	2	6	20	340	360
04:45 PM	12	132	4	2	0	0	2	2	2	4	13	132	8	0	0	6	21	24	3	4	15	354	369
Total	34	443	11	4	1	2	3	3	7	22	52	469	36	0	0	16	48	87	7	22	63	1204	1267
05:00 PM	16	139	4	2	2	0	1	1	2	15	27	130	3	0	6	1	27	32	2	6	35	381	416
05:15 PM	19	131	3	3	2	0	0	1	3	11	39	138	3	0	0	4	21	30	3	16	38	389	427
05:30 PM	17	128	1	1	6	0	0	0	1	12	30	131	18	0	0	3	5	38	2	28	50	371	421
05:45 PM	11	164	0	2	2	0	0	1	3	8	42	175	3	0	0	8	24	67	2	9	28	495	523
Total	63	562	8	8	12	0	1	3	9	46	138	574	27	0	6	16	77	167	9	59	149	1636	1785
06:00 PM	23	153	3	4	0	2	0	3	4	14	45	146	0	0	0	1	21	106	4	20	46	509	555
06:15 PM	13	121	4	3	5	0	1	4	4	25	23	133	8	0	0	12	9	55	3	22	62	378	440
06:30 PM	24	128	7	2	0	0	0	1	1	14	24	145	6	0	3	5	25	54	3	17	40	419	459
06:45 PM	3	148	5	3	0	0	0	0	1	9	44	153	1	0	1	4	13	45	0	27	41	416	457
Total	63	550	25	12	5	2	1	8	10	62	141	567	15	0	4	22	68	260	10	86	189	1722	1911
Grand Total	284	3529	135	28	23	8	15	28	30	173	628	3339	120	2	20	121	285	940	29	209	514	9432	9946
Apprch %	7.2	89.4	3.4			15.7	29.4	54.9			15.4	81.7	2.9			9.0	21.2	69.8					
Total %	3.0	37.4	1.4			0.1	0.2	0.3			6.7	35.4	1.3			1.3	3.0	10.0			5.2	94.8	

MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Aalexandria, VA 22312
703-914-4850

(2)

File Name : reserviorrd wisconsin av
Site Code : 00000011
Start Date : 06/23/2005

	Wisconsin Ave From North				Reservior Rd From East				Wisconsin Ave From South				Reservior Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
Peak Hour From 07 00 AM to 09 45 AM - Peak 1 of 1																	
Intersection	08 45 AM																
Volume	78	949	40	1067	1	3	5	9	96	611	16	723	31	26	214	271	2070
Percent	7 3	88 9	3.7		11 1	33 3	55 6		13 3	84 5	2 2		11 4	9 6	79.0		
09 00 Volume	17	288	15	320	0	1	2	3	19	167	3	189	15	2	37	54	566
Peak Factor																	0 914
High Int.	09 00 AM				09 30 AM				09 00 AM				08 45 AM				
Volume	17	288	15	320	1	2	2	5	19	167	3	189	0	12	73	91	
Peak Factor				0 834				0 450				0 956				0 745	
Peak Hour From 04:00 PM to 06 45 PM - Peak 1 of 1																	
Intersection	05 45 PM																
Volume	71	566	20	657	2	1	9	12	139	589	17	745	26	79	282	387	1801
Percent	10 8	86 1	3 0		16 7	8 3	75 0		18 7	79 1	2 3		6 7	20.4	72 9		
06 00 Volume	23	153	9	185	2	0	3	5	45	146	0	191	1	21	106	128	503
Peak Factor																	0 885
High Int.	06 00 PM				06 00 PM				05 45 PM				06 00 PM				
Volume	23	153	9	185	2	0	3	5	42	175	3	220	1	21	106	128	
Peak Factor				0 888				0 600				0 847				0 756	

3-1 (TOP)

MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Aalexandria, VA 22312
703-914-4850

File Name : q st wiscons rrk one
Site Code : 00000095
Start Date : 06/22/2005

Groups Printed- Unshifted

	Wisconsin Ave From North				Q Street From East				Wisconsin Ave From South				From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu Total	Inclu Total	Int Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
07:00 AM	16	111	0	0	1	0	22	4	0	44	2	0	0	0	0	0	4	196	200
07:15 AM	25	131	0	3	0	0	27	7	0	68	6	1	0	0	0	0	11	257	268
07:30 AM	35	119	0	0	0	0	35	5	0	72	3	2	0	0	0	0	7	264	271
07:45 AM	52	110	0	0	1	0	38	13	0	68	6	2	0	0	0	0	15	295	310
Total	128	471	0	3	2	0	122	29	0	272	17	5	0	0	0	0	37	1012	1049
08:00 AM	39	198	0	0	0	0	34	5	0	62	6	2	0	0	0	0	7	339	346
08:15 AM	67	216	0	0	0	0	53	2	0	102	20	3	0	0	0	0	5	458	463
08:30 AM	66	149	0	0	0	0	57	13	0	103	6	5	0	0	0	0	18	381	399
08:45 AM	61	237	0	1	1	0	53	16	0	117	12	1	0	0	0	0	18	481	499
Total	233	800	0	1	1	0	197	36	0	384	44	11	0	0	0	0	48	1659	1707
09:00 AM	61	201	0	0	0	0	53	11	0	113	22	7	0	0	0	0	18	455	473
09:15 AM	76	164	0	0	1	0	51	15	0	125	11	3	0	0	0	0	18	428	446
09:30 AM	41	231	0	0	3	0	59	8	0	103	13	1	0	0	0	0	8	450	458
09:45 AM	69	134	0	0	1	0	50	16	0	142	11	1	0	0	0	0	17	407	424
Total	247	730	0	0	5	0	213	50	0	488	57	12	0	0	0	0	62	1740	1802
04:00 PM	22	142	0	0	0	0	23	4	0	54	11	5	0	0	0	3	9	252	261
04:15 PM	27	148	0	0	0	0	15	5	0	65	30	2	0	0	0	0	7	285	292
04:30 PM	51	164	0	0	1	0	90	20	0	129	22	11	0	0	0	0	31	457	488
04:45 PM	44	168	0	0	2	0	44	12	0	45	16	2	0	0	0	1	15	319	334
Total	144	622	0	0	3	0	172	41	0	293	79	20	0	0	0	1	62	1313	1375
05:00 PM	51	162	0	0	0	0	58	20	0	120	16	15	0	0	0	0	35	407	442
05:15 PM	61	165	0	0	0	0	90	48	0	130	22	2	0	0	0	0	50	468	518
05:30 PM	39	177	0	0	1	0	91	28	0	159	13	20	0	0	0	0	48	466	514
05:45 PM	47	147	0	0	0	0	81	23	0	136	13	2	0	0	0	0	25	424	449
Total	188	651	0	0	1	0	320	119	0	541	64	39	0	0	0	0	158	1765	1923
06:00 PM	46	162	0	0	4	0	122	16	0	108	17	0	0	0	0	0	16	459	475
06:15 PM	46	101	0	0	1	0	70	32	0	101	14	13	0	0	0	0	45	333	378
06:30 PM	25	114	0	1	1	0	81	23	0	111	13	1	0	0	0	0	25	345	370
06:45 PM	36	108	0	0	0	0	51	10	0	116	13	3	0	0	0	0	13	324	337
Total	153	485	0	1	6	0	324	81	0	436	57	17	0	0	0	0	99	1461	1560
Grand Total	1093	3759	0	5	18	0	1348	356	0	2414	318	104	0	0	0	1	466	8350	9416
Apprch %	22.5	77.5	0.0		1.3	0.0	98.7		0.0	88.4	11.6		0.0	0.0	0.0				
Total %	12.2	42.0	0.0		0.2	0.0	15.1		0.0	27.0	3.6		0.0	0.0	0.0		4.9	95.1	

MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Aalexandria, VA 22312
703-914-4850

File Name : Q St Wiscon dcONE
Site Code : 00000011
Start Date : 06/22/2005
Page No : 1

Groups Printed- Unshifted

	Wisconsin Ave From North					From East				Wisconsin Ave From South				Q Street From West							
Start Time	Left	Thru	Right	Bikes	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Bikes	Peds	Exclu Total	Inclu Total	Int Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
07:00 AM	0	112	4	0	1	0	0	0	0	10	56	0	0	10	0	15	0	6	7	207	214
07:15 AM	0	138	4	1	3	0	0	0	0	12	83	0	0	5	0	18	0	4	8	260	268
07:30 AM	0	132	2	4	5	0	0	0	0	7	100	0	0	26	0	22	2	2	13	289	302
07:45 AM	0	134	3	4	3	0	0	0	0	8	118	0	0	21	0	28	0	6	13	312	325
Total	0	516	13	9	12	0	0	0	0	37	357	0	0	62	0	83	2	18	41	1068	1109
08:00 AM	0	192	2	1	1	0	0	0	0	11	85	0	0	26	0	45	1	3	6	361	367
08:15 AM	0	238	0	12	4	0	0	0	0	10	145	0	0	25	0	45	10	6	32	463	495
08:30 AM	0	147	0	10	2	0	0	0	0	16	144	0	0	32	0	68	6	4	22	407	429
08:45 AM	0	241	1	6	2	0	0	0	0	6	164	0	0	19	0	57	2	8	18	488	506
Total	0	818	3	29	9	0	0	0	0	43	538	0	0	102	0	215	19	21	78	1719	1797
09:00 AM	0	205	2	7	6	0	0	0	0	9	162	0	0	33	0	57	5	2	20	468	488
09:15 AM	0	184	2	4	9	0	0	0	0	10	166	0	0	33	0	56	0	27	40	451	491
09:30 AM	0	197	2	0	7	0	0	0	0	11	151	0	0	36	0	75	0	22	29	472	501
09:45 AM	0	159	2	8	2	0	0	0	0	8	184	0	0	11	0	44	0	2	12	408	420
Total	0	745	8	19	24	0	0	0	0	38	663	0	0	113	0	232	5	53	101	1799	1900
04:00 PM	0	141	9	0	12	0	0	0	0	26	51	0	0	10	0	33	1	13	26	260	286
04:15 PM	0	128	3	3	16	0	0	0	0	28	52	0	0	9	0	47	2	18	39	267	306
04:30 PM	0	173	5	0	18	0	0	0	0	26	103	0	0	13	0	42	0	17	35	452	487
04:45 PM	0	169	3	0	5	0	0	0	0	20	69	0	0	4	0	43	4	8	17	308	325
Total	0	611	20	3	51	0	0	0	0	100	365	0	0	36	0	165	7	56	117	1287	1404
05:00 PM	0	157	0	2	9	0	0	0	0	11	167	0	0	11	0	56	0	15	26	402	428
05:15 PM	0	150	0	6	9	0	0	0	0	16	204	0	0	2	0	66	7	7	29	448	477
05:30 PM	0	122	0	4	13	0	0	0	0	26	218	0	0	21	0	84	0	7	24	473	497
05:45 PM	0	140	3	2	2	0	0	0	0	12	205	0	0	28	0	54	0	13	17	442	459
Total	0	579	3	14	33	0	0	0	0	67	794	0	0	62	0	260	7	42	96	1765	1861
06:00 PM	0	151	4	1	11	0	0	0	0	14	216	0	0	17	0	57	2	16	30	459	489
06:15 PM	0	104	5	1	23	0	0	0	0	8	163	0	0	9	0	43	0	17	41	332	373
06:30 PM	0	108	6	4	6	0	0	0	0	13	179	0	0	6	0	31	1	8	19	343	362
06:45 PM	0	104	2	3	8	0	0	0	0	6	161	0	0	7	0	40	0	17	28	320	348
Total	0	467	17	9	48	0	0	0	0	41	719	0	0	39	0	171	3	58	118	1454	1572
Grand Total	0	3736	64	83	177	0	0	0	0	326	3436	0	0	414	0	1116	43	248	551	9092	9643
Apprch %	0.0	98.3	1.7			0.0	0.0	0.0		6.7	91.3	0.0		27.1	0.0	72.9					
Total %	0.0	41.1	0.7			0.0	0.0	0.0		3.6	37.8	0.0		4.6	0.0	12.3			5.7	94.3	

MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Aalexandria, VA 22312
703-914-4850

File Name : Q St Wiscon dcONE
Site Code : 00000011
Start Date : 06/22/2005
Page No : 2

	Wisconsin Ave From North				From East				Wisconsin Ave From South				Q Street From West				
Start Time	Left	Thru	Right	App Total	Left	Thru	Right	App Total	Left	Thru	Right	App Total	Left	Thru	Right	App Total	Int Total
Peak Hour From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Intersection	08:45 AM																
Volume	0	827	7	834	0	0	0	0	36	643	0	679	121	0	245	366	1879
Percent	0.0	99.2	0.8		0.0	0.0	0.0		5.3	94.7	0.0		33.1	0.0	66.9		
08:45 Volume	0	241	1	242	0	0	0	0	6	164	0	170	19	0	57	76	488
Peak Factor																	0.963
High Int.	08:45 AM				6:45:00 AM				09:15 AM				09:30 AM				
Volume	0	241	1	242	0	0	0	0	10	166	0	176	36	0	75	111	
Peak Factor				0.862								0.964				0.824	
Peak Hour From 04:00 PM to 06:45 PM - Peak 1 of 1																	
Intersection	05:15 PM																
Volume	0	573	7	580	0	0	0	0	70	843	0	913	68	0	261	329	1822
Percent	0.0	98.8	1.2		0.0	0.0	0.0		7.7	92.3	0.0		20.7	0.0	79.3		
05:30 Volume	0	122	0	122	0	0	0	0	28	218	0	246	21	0	84	105	473
Peak Factor																	0.963
High Int.	05:15 PM								05:30 PM				05:30 PM				
Volume	0	160	0	160	0	0	0	0	28	218	0	246	21	0	84	105	
Peak Factor				0.906								0.928				0.783	

MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Aalexandria, VA 22312
703-914-4850

File Name : P Street Wisconsin Ave
Site Code : 00000055
Start Date : 06/23/2005
Page No : 1

Groups Printed- Unshifted

	Wisconsin Ave From North				P Street From East					Wisconsin Ave From South				From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Bikes	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Bikes	Exclu Total	Inclu Total	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
07:00 AM	7	71	0	2	14	0	7	0	6	0	79	3	1	0	0	0	0	9	181	190
07:15 AM	21	81	0	3	9	0	11	0	6	0	62	3	1	0	0	0	0	10	187	197
07:30 AM	8	106	0	4	17	0	16	0	5	0	72	3	2	0	0	0	0	11	222	233
07:45 AM	13	99	0	5	20	0	21	0	17	0	76	6	1	0	0	0	0	23	235	258
Total	49	357	0	14	60	0	55	0	34	0	289	15	5	0	0	0	0	53	825	878
08:00 AM	18	131	0	5	24	0	22	0	16	0	87	5	6	0	0	0	0	27	287	314
08:15 AM	31	148	0	2	20	0	24	0	17	0	80	5	2	0	0	0	0	21	308	329
08:30 AM	30	136	0	13	19	0	32	3	28	0	82	4	4	0	0	0	2	50	305	355
08:45 AM	30	146	0	0	23	0	27	0	18	0	81	8	10	0	0	0	0	28	316	344
Total	109	563	0	20	86	0	105	3	79	0	330	23	22	0	0	0	2	126	1216	1342
09:00 AM	19	136	0	9	23	0	33	0	13	0	81	8	2	0	0	0	2	26	300	326
09:15 AM	13	124	0	1	31	0	11	0	9	0	81	14	4	0	0	0	2	16	274	290
09:30 AM	14	113	0	2	22	0	21	0	31	0	78	5	6	0	0	0	2	41	253	294
09:45 AM	10	90	0	12	31	0	14	1	10	0	97	8	11	0	0	0	0	34	250	284
Total	56	463	0	24	107	0	79	1	63	0	337	35	23	0	0	0	6	117	1077	1194
04:00 PM	22	95	0	10	37	0	26	1	31	0	85	15	6	0	0	0	0	48	282	330
04:15 PM	23	117	0	12	43	0	31	0	46	0	82	16	10	0	0	0	1	69	312	381
04:30 PM	30	110	0	6	35	0	24	0	37	0	80	17	4	0	0	0	0	47	296	343
04:45 PM	20	129	0	14	51	0	27	3	40	0	73	15	14	0	0	0	0	71	315	386
Total	95	451	0	42	166	0	110	4	154	0	320	63	34	0	0	0	1	235	1205	1440
05:00 PM	17	115	0	5	34	0	45	3	41	0	81	24	16	0	0	0	0	65	316	381
05:15 PM	21	114	0	17	37	0	27	2	36	0	63	15	13	0	0	0	0	68	277	345
05:30 PM	22	156	0	3	39	0	33	4	34	0	90	20	13	0	0	0	0	54	360	414
05:45 PM	20	141	0	12	49	0	31	3	43	0	84	12	5	0	0	0	2	66	337	403
Total	80	526	0	37	159	0	136	12	154	0	318	71	47	0	0	0	2	252	1290	1542
06:00 PM	12	134	0	10	41	0	21	0	46	0	70	16	13	0	0	0	1	70	296	366
06:15 PM	4	154	0	10	39	0	17	3	50	0	79	21	10	0	0	0	0	73	314	387
06:30 PM	9	131	0	4	28	0	25	2	37	0	81	10	5	0	0	0	4	52	284	336
06:45 PM	4	137	0	14	26	0	23	0	48	0	89	7	5	0	0	0	0	67	296	363
Total	29	556	0	38	134	0	86	5	181	0	319	56	33	0	0	0	5	262	1190	1452
Grand Total	418	2916	0	175	712	0	571	25	865	0	1913	263	164	0	0	0	16	1045	6793	7838
Apprch %	12.5	87.5	0.0		55.5	0.0	44.5			0.0	87.9	12.1		0.0	0.0	0.0				
Total %	6.2	42.9	0.0		10.5	0.0	8.4			0.0	28.2	3.9		0.0	0.0	0.0		13.3	86.7	

MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Aalexandria, VA 22312
703-914-4850

(4)

File Name : P Street Wisconsin Ave
Site Code : 00000055
Start Date : 06/23/2005
Page No : 2

	Wisconsin Ave From North				P Street From East				Wisconsin Ave From South				From West				
Start Time	Left	Thru	Right	App Total	Left	Thru	Right	App Total	Left	Thru	Right	App Total	Left	Thru	Right	App Total	Int Total
Peak Hour From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Intersection 08:15 AM																	
Volume	110	568	0	678	85	0	116	201	0	324	26	350	0	0	0	0	1229
Percent	16.2	83.8	0.0		42.3	0.0	57.7		0.0	92.6	7.4		0.0	0.0	0.0		
08:45 Volume	30	146	0	176	23	0	27	50	0	81	9	90	0	0	0	0	316
Peak Factor																	0.972
High Int.	08:15 AM				09:00 AM				08:45 AM				6:45:00 AM				
Volume	31	148	0	179	23	0	33	56	0	81	9	90					
Peak Factor				0.947				0.897				0.972					
Peak Hour From 04:00 PM to 06:45 PM - Peak 1 of 1																	
Intersection 05:30 PM																	
Volume	53	585	0	643	168	0	102	270	0	323	71	394	0	0	0	0	1307
Percent	9.0	91.0	0.0		62.2	0.0	37.8		0.0	82.0	18.0		0.0	0.0	0.0		
05:30 Volume	22	156	0	178	39	0	33	72	0	90	20	110	0	0	0	0	360
Peak Factor																	0.908
High Int.	05:30 PM				05:45 PM				05:30 PM								
Volume	22	156	0	178	49	0	31	80	0	90	20	110					
Peak Factor				0.903				0.844				0.995					

(5)

MCV Associates, Inc.
4604-C Pinecrest Office Park Drive
Alexandria, VA 22312
703-914-4850

File Name : 27th Virginia Ave
Site Code : 00000055
Start Date : 06/28/2005
Page No : 1

Groups Printed- Unshifted

	27th Street From North					Virginia Avenue From East			27th Street From South				Virginia Avenue From West					
Start Time	Left	Thru	Right	Peds	U Turns	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	U Turns	Peds	Int Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
07:00 AM	76	0	0	2	3	0	16	0	0	0	0	0	0	86	0	0	0	183
07:15 AM	82	0	0	4	5	0	17	0	0	0	0	0	1	90	0	0	0	199
07:30 AM	88	0	0	6	11	0	21	0	0	0	0	0	0	114	0	2	1	243
07:45 AM	87	0	0	3	17	0	17	0	0	0	0	0	0	132	0	1	6	263
Total	333	0	0	15	36	0	71	0	0	0	0	0	1	422	0	3	7	888
08:00 AM	93	0	0	0	18	0	16	0	0	0	0	0	0	135	0	0	4	271
08:15 AM	100	0	0	6	15	0	29	0	0	0	0	0	0	149	0	2	2	303
08:30 AM	133	0	0	0	12	0	27	0	0	0	0	0	1	115	0	2	2	298
08:45 AM	101	0	0	1	12	0	19	0	0	0	0	0	0	135	0	4	8	280
Total	438	0	0	7	57	0	91	0	0	0	0	0	1	534	0	8	16	1152
09:00 AM	106	0	0	2	9	0	26	0	0	0	0	0	0	119	0	3	7	272
09:15 AM	104	0	0	0	14	6	36	0	0	0	0	0	4	62	0	0	5	231
09:30 AM	86	0	34	0	9	31	22	0	0	0	0	0	0	67	0	0	3	252
09:45 AM	32	0	19	0	9	28	20	0	0	0	0	0	0	64	0	0	5	177
Total	328	0	53	2	41	65	104	0	0	0	0	0	4	312	0	3	20	932
04:00 PM	35	0	0	2	4	109	58	3	0	0	0	0	2	4	0	5	5	228
04:15 PM	47	0	0	3	7	114	69	2	0	0	0	0	3	6	0	9	6	266
04:30 PM	49	0	2	0	14	110	76	0	0	0	0	0	1	11	0	6	4	273
04:45 PM	46	0	1	1	8	115	103	1	0	0	0	0	4	15	0	5	7	306
Total	178	0	3	6	33	448	306	6	0	0	0	0	10	36	0	25	22	1073
05:00 PM	35	0	0	0	6	131	86	0	0	0	0	0	0	14	0	2	8	286
05:15 PM	47	0	0	0	8	121	99	3	0	0	0	0	2	17	0	2	11	360
05:30 PM	52	0	2	0	9	162	76	0	0	0	0	0	1	17	0	9	10	340
05:45 PM	52	0	0	0	13	285	98	1	0	0	0	0	0	17	0	3	6	393
Total	186	0	2	0	36	669	361	4	0	0	0	0	3	65	0	16	35	1379
06:00 PM	41	0	0	0	15	108	87	0	0	0	0	0	10	16	0	3	4	284
06:15 PM	99	0	0	0	23	91	80	4	0	0	0	0	4	19	0	0	5	325
06:30 PM	69	0	24	0	14	92	48	0	0	0	0	0	9	16	0	2	2	276
06:45 PM	54	0	27	0	19	69	19	0	0	0	0	0	9	17	0	0	4	218
Total	263	0	51	0	71	360	234	4	0	0	0	0	32	68	0	5	15	1103
Grand Total	1726	0	109	30	276	1542	1167	14	0	0	0	0	51	1437	0	60	115	6527
Apprch %	92.5	0.0	5.8	1.6	9.2	51.4	38.9	0.5	0.0	0.0	0.0	0.0	3.1	96.4	0.0	3.6	6.9	
Total %	26.4	0.0	1.7	0.5	4.2	23.6	17.9	0.2	0.0	0.0	0.0	0.0	0.8	22.0	0.0	0.9	1.8	

cc: -00229

(5)

MCV Associates, Inc.
4604-C Pinecrest Office Park Drive
Alexandria, VA 22312
703-914-4850

File Name : 27th Virginia Av
Site Code : 00000055
Start Date : 06/28/2005
Page No : 2

	27th Street From North					Virginia Avenue From East					27th Street From South					Virginia Avenue From West						
Start Time	Left	Thru	Right	App Total	U Turns	Thru	Right	Peds	App Total	Left	Thru	Right	Peds	App Total	Left	Thru	Right	U Turns	Peds	App. Total	Int Total
Peak Hour From 07:00 AM to 09:45 AM - Peak 1 of 1																					
Intersection	08:00 AM																				
Volume	438	0	0	438	57	0	91	0	148	0	0	0	0	0	1	534	0	8	16	559	1145
Percent	100.0	0.0	0.0		38.5	0.0	61.5	0.0		0.0	0.0	0.0	0.0		0.2	95.5	0.0	1.4	2.9		
08:30 Volume	139	0	0	139	12	0	27	0	39	0	0	0	0	0	1	115	0	2	2	120	298
Peak Factor																					0.961
High Int.	08:30 AM				08:15 AM					6:45:00 AM					08:15 AM						
Volume	139	0	0	139	15	0	29	0	44	0	0	0	0	0	0	149	0	2	2	153	
Peak Factor				0.788					0.841											0.913	
Peak Hour From 04:00 PM to 06:45 PM - Peak 1 of 1																					
Intersection	05:00 PM																				
Volume	186	0	2	188	38	669	361	4	1072	0	0	0	0	0	3	65	0	16	35	119	1379
Percent	98.9	0.0	1.1		3.5	62.4	33.7	0.4		0.0	0.0	0.0	0.0		2.5	54.6	0.0	13.4	29.4		
05:45 Volume	52	0	0	52	13	205	96	1	315	0	0	0	0	0	0	17	0	3	6	26	393
Peak Factor																					0.877
High Int.	05:30 PM				05:45 PM										05:30 PM						
Volume	52	0	2	54	13	205	96	1	315	0	0	0	0	0	1	17	0	9	10	37	
Peak Factor				0.870					0.851											0.804	

(6)

MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Aalexandria, VA 22312
703-914-4850

File Name : 23rd St Virginia Ave
Site Code : 00000033
Start Date : 06/29/2005
Page No : 1

Groups Printed- Unshifted

	23rd Street From North				Virginia Ave From East				23rd Street From South				Virginia Ave From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu Total	Inclu Total	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
07:00 AM	18	61	1	17	4	6	7	35	13	201	14	4	5	6	19	17	73	355	428
07:15 AM	11	65	0	18	4	5	11	49	13	231	12	35	8	8	21	73	175	389	564
07:30 AM	12	107	1	26	3	6	9	62	17	260	11	43	11	8	21	135	266	466	732
07:45 AM	11	95	2	33	2	7	13	74	28	265	8	47	18	10	33	156	310	492	802
Total	52	328	4	94	13	24	40	220	71	957	45	129	42	32	94	381	824	1702	2526
08:00 AM	12	114	0	49	8	13	14	64	27	244	13	61	11	7	30	182	356	493	849
08:15 AM	11	103	6	36	13	16	16	77	12	281	19	46	16	13	39	176	337	535	872
08:30 AM	5	90	0	53	2	12	11	66	17	307	23	51	27	13	27	128	298	534	832
08:45 AM	12	103	2	58	1	5	3	62	21	319	14	32	16	8	31	132	284	535	819
Total	40	410	8	196	24	46	44	269	77	1151	69	192	70	41	117	618	1275	2097	3372
09:00 AM	7	73	2	32	1	7	7	28	32	311	15	39	19	12	35	119	218	521	739
09:15 AM	7	60	3	24	4	17	9	8	35	273	25	14	21	15	31	79	125	501	626
09:30 AM	18	103	2	33	5	7	6	14	16	265	14	17	10	11	19	32	86	476	562
09:45 AM	13	70	3	11	2	12	3	7	19	200	11	10	15	9	11	40	68	368	436
Total	45	306	10	100	12	43	25	57	103	1049	65	80	65	47	96	270	507	1866	2373
04:00 PM	18	267	4	38	4	8	15	52	9	125	13	9	11	18	36	104	203	526	731
04:15 PM	16	315	5	31	1	8	7	28	13	113	14	14	7	18	46	107	150	569	719
04:30 PM	6	273	13	27	3	2	17	37	15	138	17	11	10	10	58	130	205	562	767
04:45 PM	8	388	6	17	0	2	15	22	14	135	32	42	13	19	38	125	206	670	876
Total	48	1243	28	113	8	20	54	139	51	511	76	76	41	65	178	466	764	2329	3093
05:00 PM	8	270	4	44	3	5	4	46	10	158	24	42	7	13	66	199	331	582	913
05:15 PM	6	331	5	51	1	9	7	37	13	135	31	43	5	26	62	183	314	631	945
05:30 PM	8	293	13	56	2	3	9	54	11	139	18	51	0	12	57	150	311	574	885
05:45 PM	2	339	4	63	1	4	15	23	13	117	20	61	3	18	67	136	283	603	886
Total	24	1233	26	214	7	21	35	160	47	550	93	197	24	69	252	668	1239	2390	3629
06:00 PM	10	361	2	32	6	5	8	11	10	115	15	45	10	14	60	117	205	616	821
06:15 PM	4	428	2	46	3	4	2	10	18	121	13	19	6	12	43	97	172	656	828
06:30 PM	29	356	16	41	9	11	13	33	14	88	16	11	13	7	31	134	219	603	822
06:45 PM	9	230	4	31	5	7	4	31	11	111	11	15	8	1	26	76	153	427	580
Total	52	1375	24	150	23	27	27	85	53	435	55	90	37	34	160	424	749	2302	3051
Grand Total	261	4835	100	867	87	181	225	930	402	4668	403	764	279	288	897	2827	5368	12686	18074
Apprch %	5.0	93.1	1.9		17.6	36.7	45.6		7.3	85.3	7.4		19.1	19.7	61.3				
Total %	2.1	38.6	0.8		0.7	1.4	1.8		3.2	36.8	3.2		2.2	2.3	7.1		29.8	70.2	

MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Aalexandria, VA 22312
703-914-4850

File Name : 23rd St Virginia Ave
Site Code : 00000033
Start Date : 06/29/2005
Page No : 2

	23rd Street From North				Virginia Ave From East				23rd Street From South				Virginia Ave From West				
Start Time	Left	Thru	Right	App Total	Left	Thru	Right	App Total	Left	Thru	Right	App Total	Left	Thru	Right	App Total	Int Total
Peak Hour From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Intersection	08:15 AM																
Volume	35	369	10	414	17	40	37	94	82	1218	71	1371	78	46	122	246	2125
Percent	8.5	89.1	2.4		18.1	42.6	39.4		6.0	88.8	5.2		31.7	18.7	49.6		
08:45 Volume	12	103	2	117	1	5	3	9	21	319	14	354	10	8	31	55	535
Peak Factor																	0.993
High Int.	08:15 AM				08:15 AM				09:00 AM				08:30 AM				
Volume	11	103	6	120	13	16	16	45	32	311	15	358	27	13	27	67	
Peak Factor				0.863				0.522				0.957				0.918	
Peak Hour From 04:00 PM to 06:45 PM - Peak 1 of 1																	
Intersection	05:45 PM																
Volume	45	1484	24	1553	19	24	38	81	55	441	64	560	32	51	201	284	2478
Percent	2.9	95.6	1.5		23.5	29.6	46.9		9.8	78.8	11.4		11.3	18.0	70.8		
06:15 Volume	4	428	2	434	3	4	2	9	18	121	13	152	6	12	43	61	656
Peak Factor																	0.944
High Int.	06:15 PM				06:30 PM				06:15 PM				05:45 PM				
Volume	4	428	2	434	9	11	13	33	18	121	13	152	3	18	67	88	
Peak Factor				0.895				0.614				0.921				0.807	

MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Aalexandria, VA 22312
703-914-4850

File Name : 27thst i st
Site Code : 00009402
Start Date : 06/28/2005
Page No : 1

Groups Printed- Unshifted

	27th Street From North				From East				27th Street From South				I Street From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu Total	Inclu Total	Int Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
07:00 AM	45	76	0	0	0	0	0	0	0	0	0	0	0	245	0	0	0	366	366
07:15 AM	58	81	0	0	0	0	0	0	0	0	0	0	0	239	0	0	0	378	378
07:30 AM	70	86	0	0	0	0	0	0	0	0	0	0	0	265	0	0	0	421	421
07:45 AM	55	87	0	0	0	0	0	0	0	0	0	0	0	302	0	0	0	444	444
Total	228	330	0	0	0	0	0	0	0	0	0	0	0	1051	0	0	0	1609	1609
08:00 AM	68	98	0	0	0	0	0	0	0	0	0	0	0	268	0	0	0	434	434
08:15 AM	66	98	0	0	0	0	0	0	0	0	0	0	0	306	0	0	0	470	470
08:30 AM	77	141	0	0	0	0	0	0	0	0	0	0	0	317	0	0	0	535	535
08:45 AM	54	103	0	0	0	0	0	0	0	0	0	0	0	233	0	0	0	390	390
Total	265	440	0	0	0	0	0	0	0	0	0	0	0	1124	0	0	0	1829	1829
09:00 AM	79	106	0	0	0	0	0	0	0	0	0	0	0	246	0	0	0	431	431
09:15 AM	60	106	52	0	0	0	0	0	0	0	0	0	0	239	0	0	0	457	457
09:30 AM	65	125	150	0	0	0	0	0	0	0	0	0	0	197	0	0	0	537	537
09:45 AM	64	58	50	0	0	0	0	0	0	0	0	0	0	132	0	0	0	304	304
Total	268	395	252	0	0	0	0	0	0	0	0	0	0	814	0	0	0	1729	1729
04:00 PM	123	25	117	0	0	0	0	0	0	0	83	0	0	2	0	0	0	330	330
04:15 PM	141	38	123	0	0	0	0	0	0	0	71	0	0	6	0	0	0	379	379
04:30 PM	263	71	197	1	0	0	0	0	0	0	86	0	0	3	0	0	1	620	621
04:45 PM	270	37	200	0	0	0	0	1	0	0	106	0	0	3	1	0	1	617	618
Total	797	171	637	1	0	0	0	1	0	0	326	0	0	14	1	0	2	1946	1948
05:00 PM	310	68	187	0	0	0	0	0	0	0	187	0	0	11	0	0	0	763	763
05:15 PM	313	64	201	0	0	0	0	0	0	0	210	0	0	11	0	0	0	799	799
05:30 PM	287	50	185	0	0	0	0	0	0	0	51	0	0	0	0	0	0	573	573
05:45 PM	315	36	253	0	0	0	0	0	0	0	94	0	0	6	0	0	0	704	704
Total	1225	218	826	0	0	0	0	0	0	0	542	0	0	28	0	0	0	2839	2839
06:00 PM	310	38	200	0	0	0	0	0	0	0	130	8	0	12	0	0	8	698	698
06:15 PM	420	103	216	0	0	0	0	0	0	0	203	0	0	0	2	0	0	944	944
06:30 PM	268	72	244	0	0	0	0	0	0	0	100	0	0	114	0	1	1	799	799
06:45 PM	253	61	181	2	0	0	0	2	0	0	76	0	0	140	1	0	4	712	716
Total	1251	274	841	2	0	0	0	2	0	0	509	8	0	266	3	1	13	3144	3157
Grand Total	4034	1828	2556	3	0	0	0	3	0	0	1377	8	0	3237	4	1	15	13036	13111
Apprch %	47.9	21.7	30.4		0.0	0.0	0.0		0.0	0.0	100.0		0.0	99.9	0.1				
Total %	30.8	14.0	19.5		0.0	0.0	0.0		0.0	0.0	10.5		0.0	25.2	0.0		0.1	99.9	

MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Aalexandria, VA 22312
703-914-4850

File Name : foxhalll Salem Li
Site Code : 00000011
Start Date : 06/29/2005
Page No : 1

Salem Lane Traffic

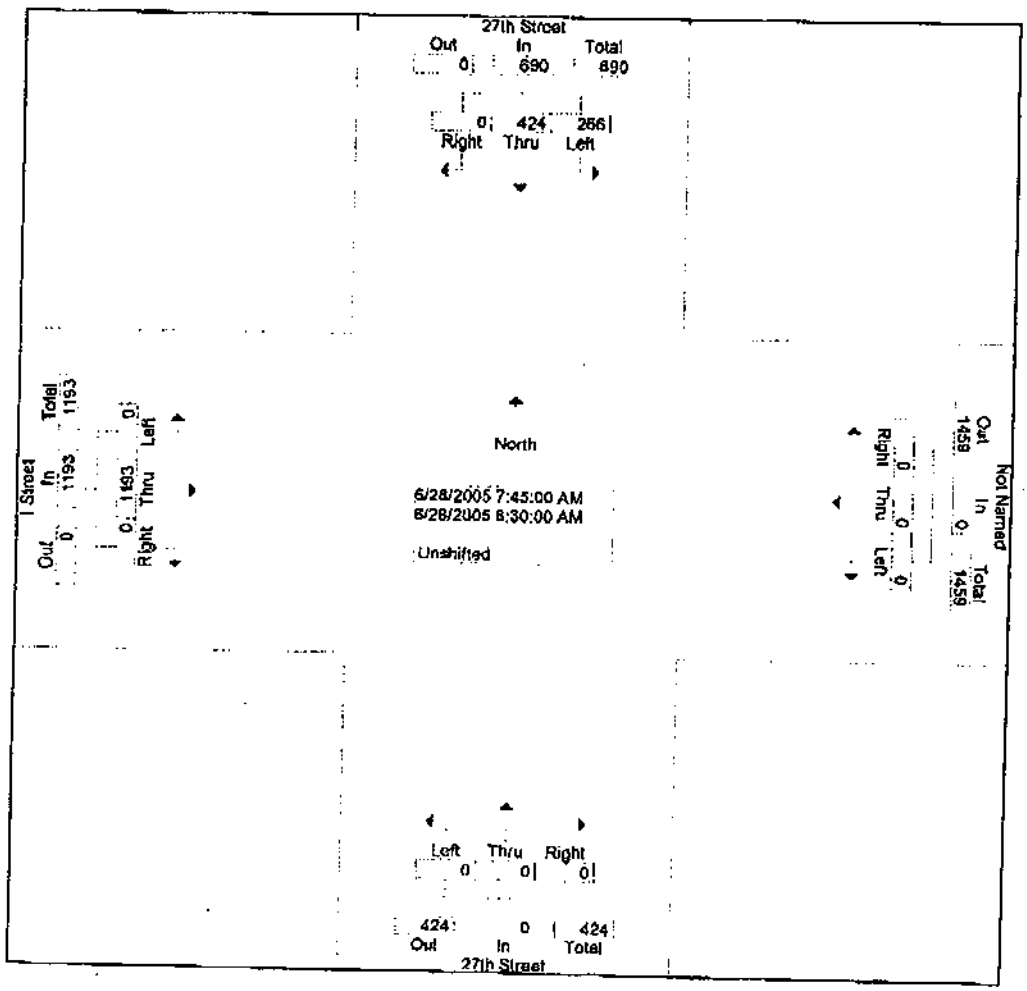
Groups Printed- Unshifted

	Fox hall Rd From North				Reservior Rd From East				South West Salem Lane From South				Reservior Rd From West				
Start Time	Left	Thru	Right	Bikes	Left	Thru	Right	Bikes	Left	Thru	Right	Bikes	Left	Thru	Right	Bikes	Int Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
07:00 AM	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	3
07:15 AM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
07:30 AM	0	0	0	2	0	0	0	1	0	0	3	0	0	0	0	0	6
07:45 AM	0	0	0	3	0	0	0	0	0	0	3	0	0	0	0	0	6
Total	0	0	0	6	0	0	0	1	0	0	9	1	0	0	0	0	17
08:00 AM	0	0	0	0	2	0	0	1	0	0	1	0	0	0	0	1	5
08:15 AM	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	1	4
08:30 AM	0	0	0	1	0	0	0	1	0	0	4	2	0	0	0	0	8
08:45 AM	0	0	0	2	1	0	0	0	0	0	2	0	0	0	0	0	5
Total	0	1	0	3	3	0	0	2	0	0	9	2	0	0	0	2	22
09:00 AM	0	1	0	3	0	0	0	1	0	0	2	0	0	0	0	0	7
09:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
09:30 AM	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	3
09:45 AM	0	1	0	0	0	0	0	1	0	0	4	1	0	0	0	0	7
Total	0	2	0	3	0	0	0	2	0	0	9	2	0	0	0	0	18
04:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
04:15 PM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2
04:30 PM	0	0	0	0	1	0	0	0	0	0	1	0	0	0	2	0	4
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Total	0	0	0	1	3	0	0	0	0	0	1	0	0	0	2	1	8
05:00 PM	0	1	0	6	1	0	0	0	0	0	0	0	0	0	1	2	11
05:15 PM	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	2	4
05:30 PM	0	0	0	1	3	0	0	1	0	0	0	0	0	0	1	1	7
05:45 PM	0	0	0	2	3	0	0	0	0	0	2	0	0	0	1	0	8
Total	0	1	0	9	8	0	0	1	0	0	3	0	0	0	3	5	30
06:00 PM	0	0	0	3	2	0	0	0	0	0	1	0	0	0	2	1	3
06:15 PM	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3
06:30 PM	0	0	0	2	1	0	0	0	0	0	2	0	0	0	0	2	7
06:45 PM	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	2
Total	0	2	0	6	4	0	0	0	0	0	4	0	0	0	2	3	21
Grand Total	0	6	0	28	18	0	0	6	0	0	35	5	0	0	7	11	116
Apprch %	0.0	17.6	0.0	82.4	75.0	0.0	0.0	25.0	0.0	0.0	87.5	12.5	0.0	0.0	38.9	61.1	
Total %	0.0	5.2	0.0	24.1	15.5	0.0	0.0	5.2	0.0	0.0	30.2	4.3	0.0	0.0	6.0	9.5	

MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Aalexandria, VA 22312
703-914-4850

File Name : 27thst i st
Site Code : 00009402
Start Date : 06/28/2005
Page No : 2

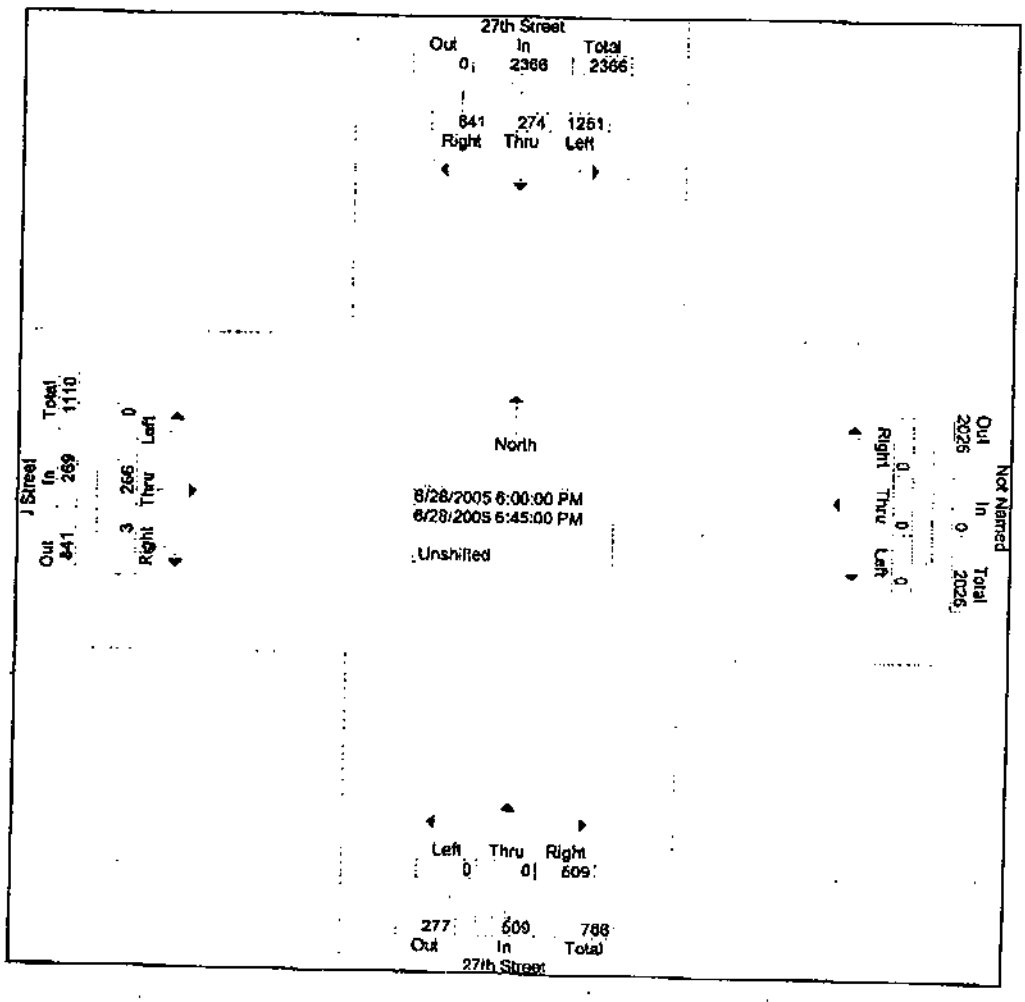
	27th Street From North				27th Street From East				27th Street From South				I Street From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Intersection 07:45 AM																	
Volume	266	424	0	690	0	0	0	0	0	0	0	0	0	1193	0	1193	1883
Percent	38.6	61.4	0.0		0.0	0.0	0.0		0.0	0.0	0.0		0.0	100.0	0.0		
08:30 Volume	77	141	0	218	0	0	0	0	0	0	0	0	0	317	0	317	535
Peak Factor																	0.880
High Int.	08:30 AM				6:45:00 AM				6:45:00 AM				08:30 AM				
Volume	77	141	0	218	0	0	0	0	0	0	0	0	0	317	0	317	
Peak Factor				0.791												0.941	



MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Aalexandria, VA 22312
703-914-4850

File Name : 27thst i st
Site Code : 00009402
Start Date : 06/28/200
Page No : 3

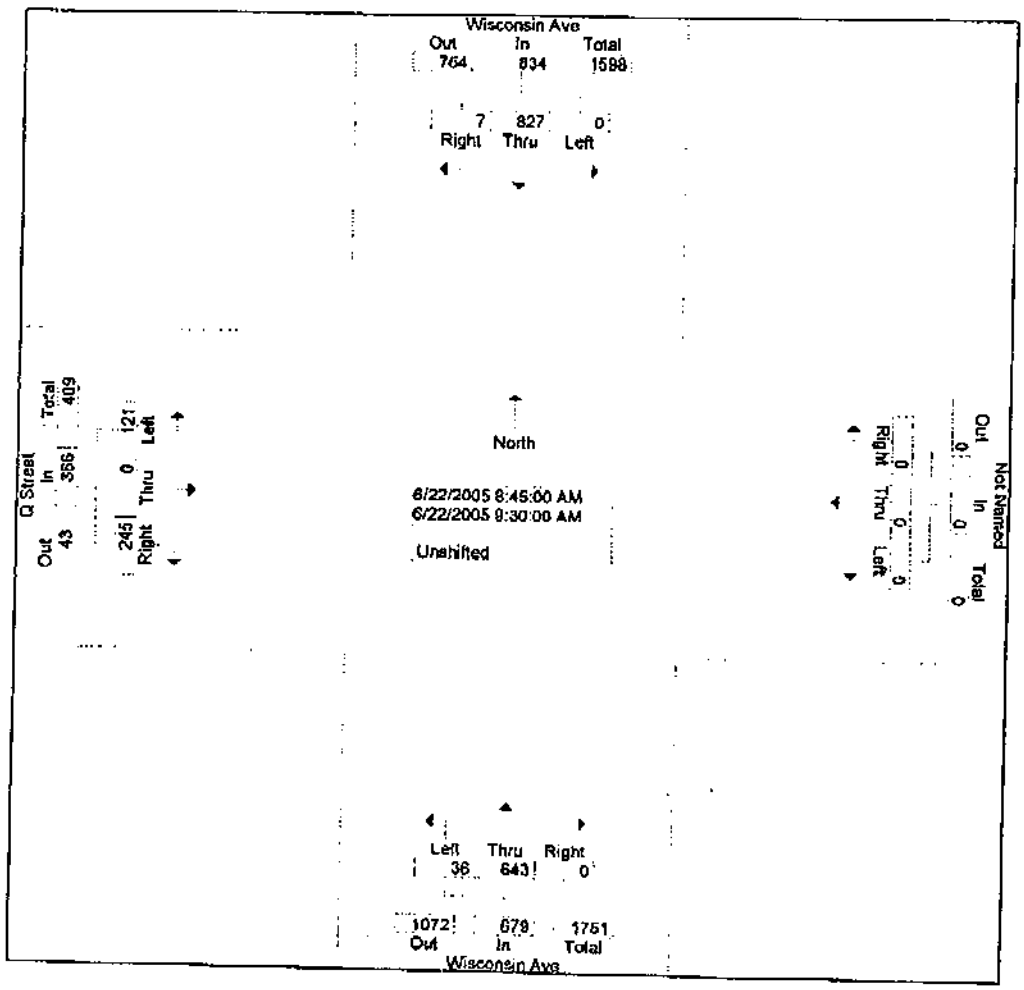
	27th Street From North				From East				27th Street From South				I Street From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 04:00 PM to 06:45 PM - Peak 1 of 1																	
Intersection	06:00 PM																
Volume	1251	274	841	2366	0	0	0	0	0	0	509	509	0	266	3	269	3144
Percent	52.9	11.6	35.5		0.0	0.0	0.0		0.0	0.0	100.0		0.0	98.9	1.1		
06:15 Volume	420	103	216	739	0	0	0	0	0	0	203	203	0	0	2	2	944
Peak Factor																	0.833
High Int.	06:15 PM								06:15 PM				06:45 PM				
Volume	420	103	216	739	0	0	0	0	0	0	203	203	0	140	1	141	
Peak Factor				0.800								0.627				0.477	



MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Aalexandria, VA 22312
703-914-4850

File Name : Q St Wiscon dcONE
Site Code : 00000011 Top
Start Date : 06/22/2005
Page No : 2

	Wisconsin Ave From North				From East				Wisconsin Ave From South				Q Street From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Intersection	08:45 AM																
Volume	0	827	7	834	0	0	0	0	36	643	0	679	121	0	245	366	1879
Percent	0.0	99.2	0.8		0.0	0.0	0.0		5.3	94.7	0.0		33.1	0.0	66.9		
08:45 Volume	0	241	1	242	0	0	0	0	6	164	0	170	19	0	57	76	488
Peak Factor																	0.963
High Int.	08:45 AM				6:45:00 AM				09:15 AM				09:30 AM				
Volume	0	241	1	242	0	0	0	0	10	166	0	176	36	0	75	111	
Peak Factor				0.862								0.964				0.824	

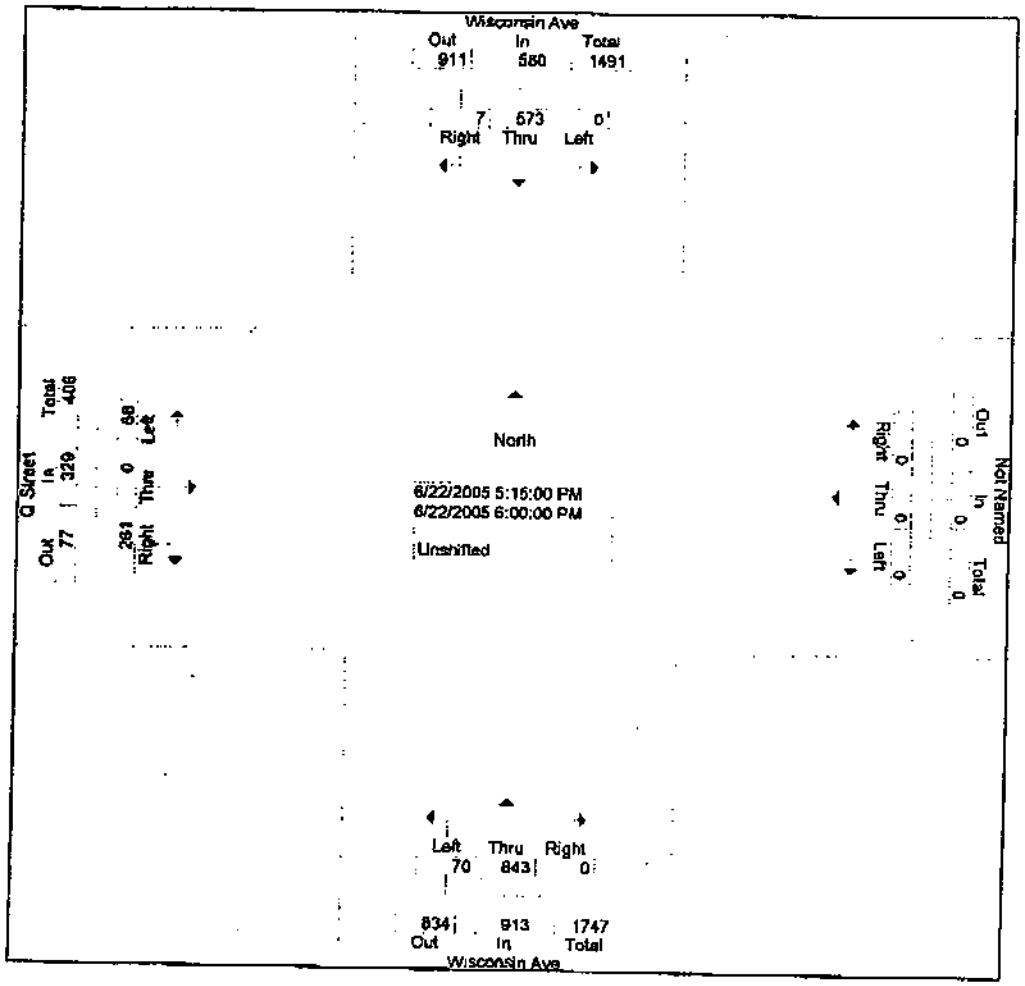


MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Aalexandria, VA 22312
703-914-4850

File Name : Q St Wiscon dcONE
Site Code : 00000011
Start Date : 06/22/2005
Page No : 3

Top

	Wisconsin Ave From North				From East				Wisconsin Ave From South				Q Street From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 04:00 PM to 06:45 PM - Peak 1 of 1																	
Intersection 05:15 PM																	
Volume	0	573	7	580	0	0	0	0	70	843	0	913	68	0	261	329	1822
Percent	0.0	98.8	1.2		0.0	0.0	0.0		7.7	92.3	0.0		20.7	0.0	79.3		
05:30 Volume	0	122	0	122	0	0	0	0	28	218	0	246	21	0	84	105	473
Peak Factor																	0.963
High Int.	05:15 PM								05:30 PM				05:30 PM				
Volume	0	160	0	160	0	0	0	0	28	218	0	246	21	0	84	105	
Peak Factor				0.906								0.928				0.783	



MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
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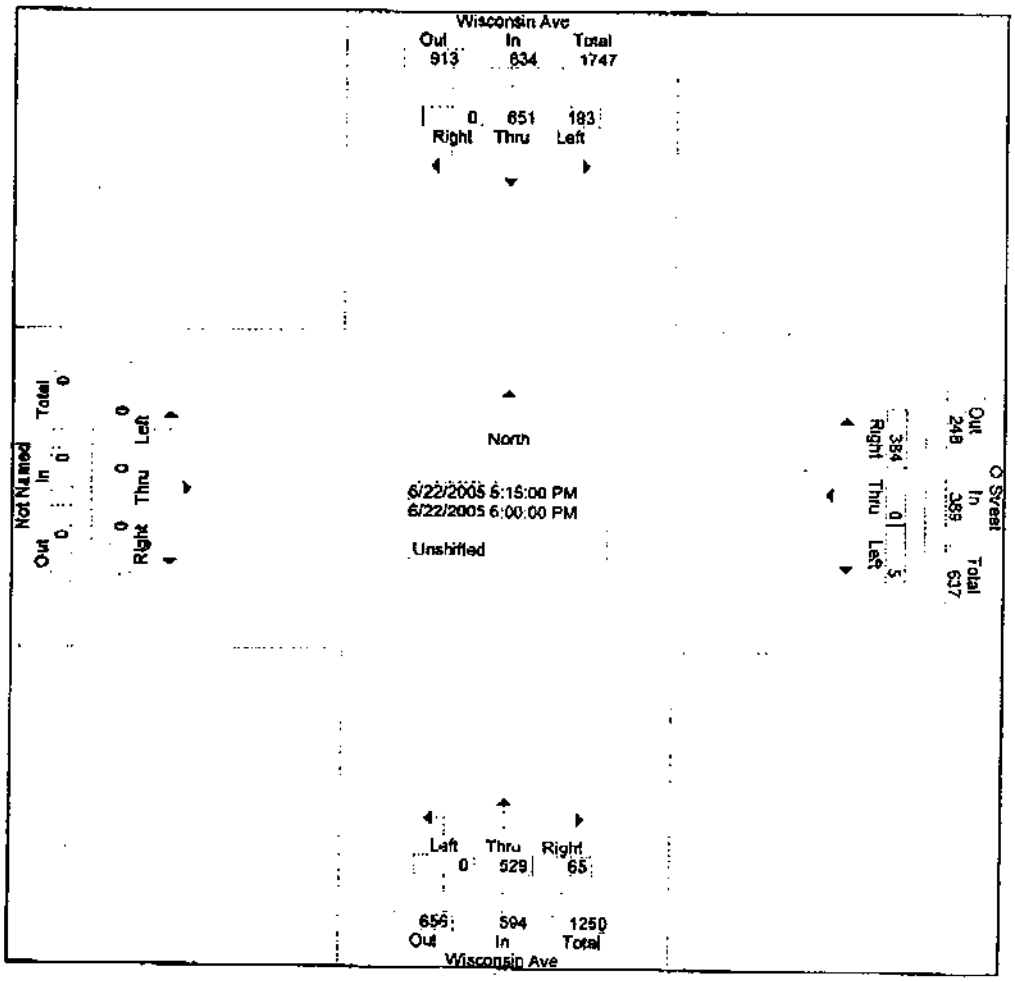
703-914-4850

bottom

File Name : q st wiscons rrk one
Site Code : 00000095
Start Date : 06/22/2005

	Wisconsin Ave From North				Q Street From East				Wisconsin Ave From South				From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 04:00 PM to 06:45 PM - Peak 1 of 1																	
Intersection 05:15 PM																	
Volume	183	651	0	834	5	0	384	389	0	529	65	594	0	0	0	0	1817
Percent	21.9	78.1	0.0		1.3	0.0	98.7		0.0	89.1	10.9		0.0	0.0	0.0		
05:15 Volume	61	165	0	226	0	0	90	90	0	130	22	152	0	0	0	0	468
Peak Factor																	0.971
High Int.	05:15 PM				06:00 PM				05:30 PM								
Volume	61	165	0	226	4	0	122	126	0	155	13	160					
Peak Factor				0.923				0.772				0.884					

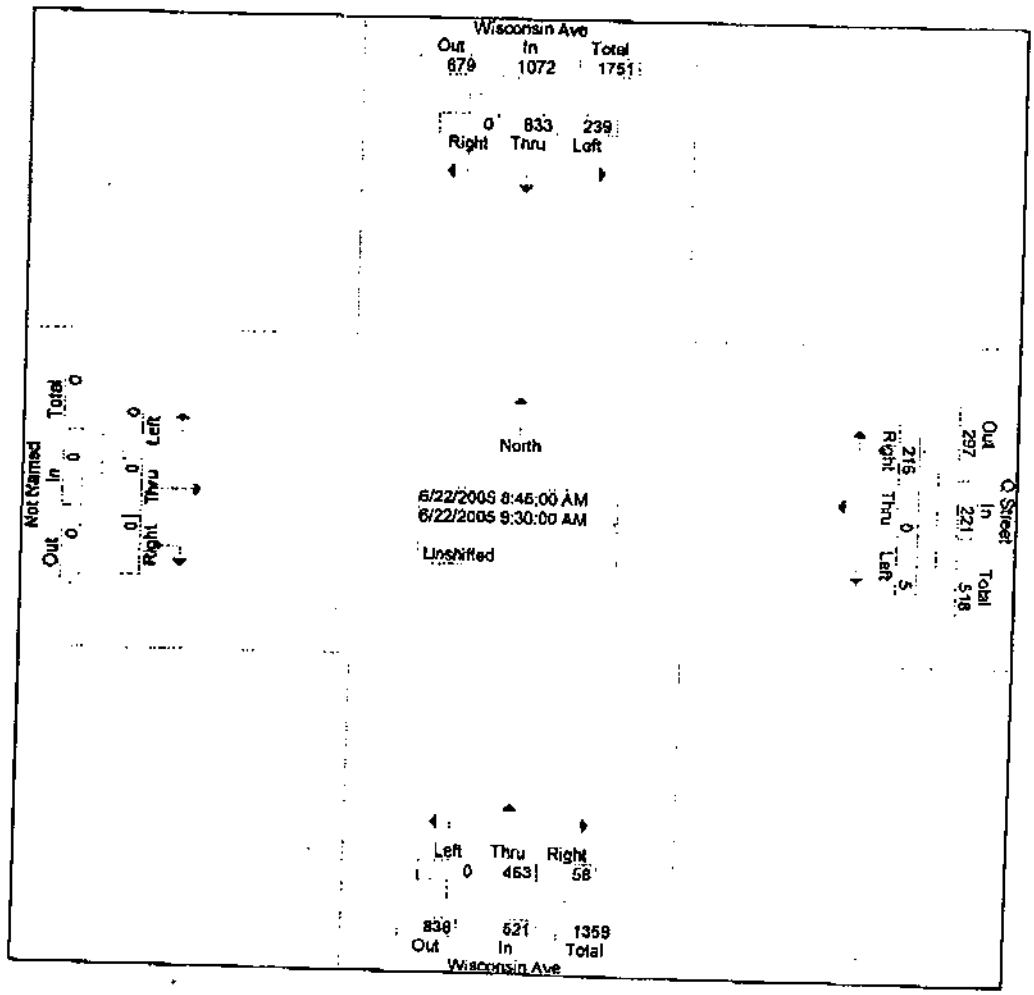


MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Aalexandria, VA 22312
703-914-4850

baltimo

File Name : q st wiscons rrk one
Site Code : 00000095
Start Date : 06/22/2005
Page No : 2

	Wisconsin Ave From North				Q Street From East				Wisconsin Ave From South				From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Intersection	08:45 AM																
Volume	239	833	0	1072	5	0	216	221	0	463	58	521	0	0	0	0	1814
Percent	22.3	77.7	0.0		2.3	0.0	97.7		0.0	88.9	11.1		0.0	0.0	0.0		
08:45 Volume	61	237	0	298	1	0	53	54	0	117	12	129	0	0	0	0	481
Peak Factor																	0.943
High Int.	08:45 AM				09:30 AM				09:00 AM				6:45:00 AM				
Volume	61	237	0	298	3	0	59	62	0	118	22	140					
Peak Factor				0.899				0.891				0.930					



MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Alexandria, VA 22312
(703) 914-4850

File Name : K St at Wisconsin Av
Site Code : 00000095
Start Date : 2/8/2005
Page No : 1

Groups Printed- Unshifted

Start Time	Wisconsin Ave From North					K Street From East					Driveway From South					K Street From West					Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Bikes	Peds	Left	Thru	Right	Bikes	Peds	Left	Thru	Right	Bikes	Peds	Left	Thru	Right	Bikes	Peds			
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
07:00 AM	24	5	21	0	4	2	16	15	0	0	0	0	0	0	3	3	2	0	0	2	9	88	97
07:15 AM	28	3	25	0	5	4	18	20	0	0	0	0	0	0	5	5	5	0	0	2	12	108	120
07:30 AM	44	8	16	1	9	8	16	29	0	0	0	0	0	2	22	5	13	0	4	24	62	138	200
07:45 AM	49	8	24	0	13	5	28	48	0	0	0	0	1	1	8	4	11	0	1	7	30	178	208
Total	145	24	86	1	31	19	77	112	0	0	0	0	1	3	38	17	31	0	5	35	113	512	625
08:00 AM	64	10	35	0	7	14	30	37	1	3	0	0	0	1	7	8	16	0	1	1	21	214	235
08:15 AM	81	8	27	2	10	17	25	37	0	1	0	0	0	0	10	2	21	0	0	6	29	218	247
08:30 AM	73	13	27	1	13	9	34	45	0	2	0	0	0	3	12	6	7	0	1	6	38	213	251
08:45 AM	77	12	41	1	18	21	35	40	0	1	0	1	1	2	10	7	18	0	0	8	40	253	293
Total	295	43	130	4	48	61	124	159	1	7	0	1	1	6	39	22	62	0	2	21	128	898	1026
** BREAK ***																							
04:00 PM	38	1	9	2	11	0	7	26	1	2	3	1	7	3	12	17	24	4	1	10	42	137	179
04:15 PM	31	0	8	0	15	2	25	31	0	8	0	2	6	0	8	8	24	0	0	14	45	137	182
04:30 PM	27	0	19	1	24	4	11	34	1	17	0	2	5	0	9	22	24	1	0	11	63	149	212
04:45 PM	37	2	25	1	19	1	13	33	1	5	0	5	11	1	8	23	29	1	0	13	48	180	228
Total	133	3	61	4	69	7	56	124	3	32	3	10	29	4	37	70	101	6	1	48	198	603	801
05:00 PM	39	3	20	0	21	2	15	33	0	6	0	6	19	0	13	18	20	0	3	13	56	175	231
05:15 PM	32	2	14	0	25	1	13	44	0	2	3	5	19	1	16	35	31	0	2	19	65	199	264
05:30 PM	19	0	17	1	22	0	23	31	0	5	1	11	21	2	29	29	23	0	0	13	72	175	247
05:45 PM	27	0	12	0	20	2	22	41	1	9	0	3	22	0	15	23	26	0	0	16	61	178	239
Total	117	5	63	1	88	5	73	149	1	22	4	25	81	3	73	105	100	0	5	61	254	727	981
Grand Total	690	75	340	10	236	92	330	544	6	61	7	36	112	16	187	214	294	6	13	165	693	2740	3433
Apprch %	62.4	6.8	30.8			9.5	34.2	56.3			4.5	23.2	72.3			41.6	57.2	1.2					
Total %	25.2	2.7	12.4			3.4	12.0	19.9			0.3	1.3	4.1			7.8	10.7	0.2			20.2	79.8	

MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Alexandria, VA 22312
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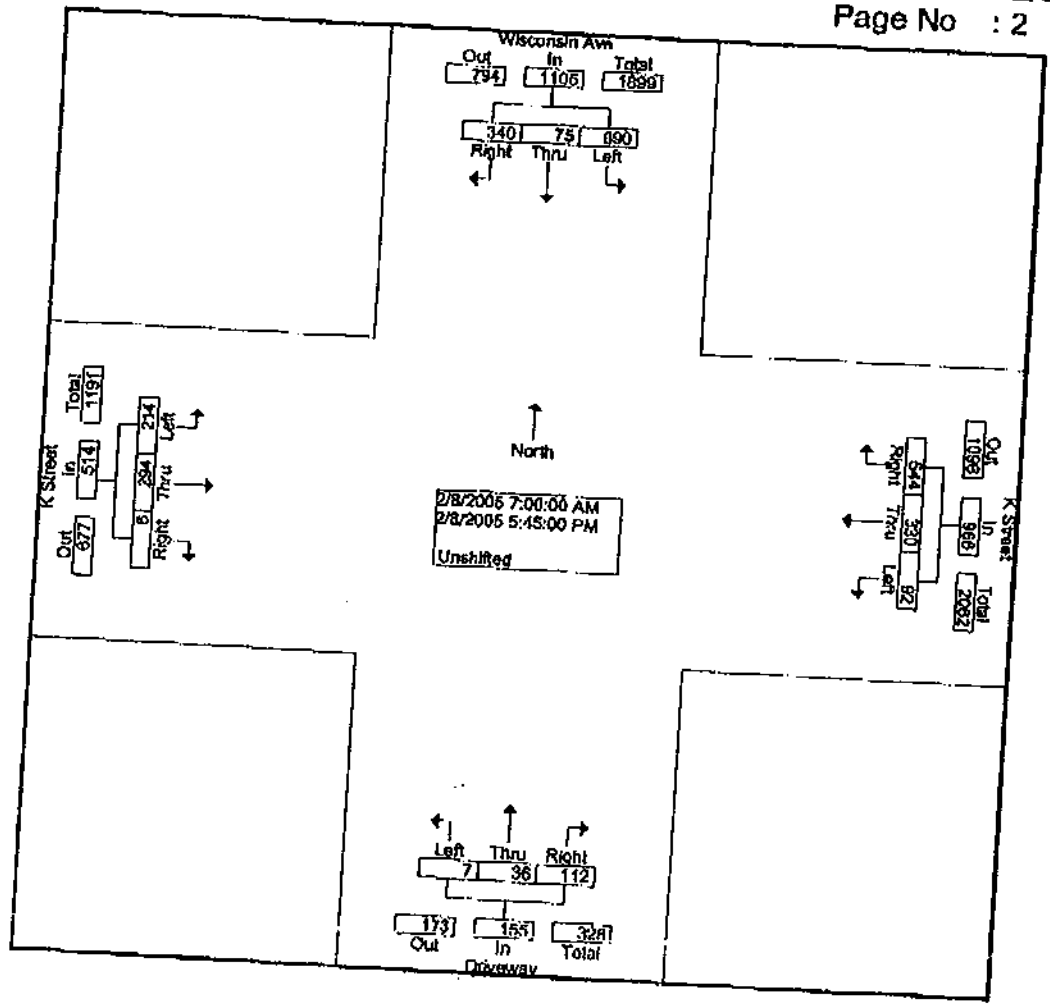
File Name : K St at Wisconsin Av
Site Code : 00000095
Start Date : 2/8/2005



Start Time	Wisconsin Ave From North				K Street From East				Driveway From South				K Street From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Intersection 08:00 AM																	
Volume	295	43	130	468	61	124	159	344	0	1	1	2	22	62	0	84	898
Percent	63.0	9.2	27.8		17.7	36.0	46.2		0.0	50.0	50.0		26.2	73.8	0.0		
08:45 Volume	77	12	41	130	21	35	40	96	0	1	1	2	7	18	0	25	253
Peak Factor																	
High Int.	08:45 AM				08:45 AM				08:45 AM				08:45 AM				0.867
Volume	77	12	41	130	21	35	40	96	0	1	1	2	7	18	0	25	
Peak Factor				0.900				0.896				0.250				0.840	
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection 04:45 PM																	
Volume	127	7	76	210	4	64	141	209	4	27	70	101	105	103	1	209	729
Percent	60.5	3.3	36.2		1.9	30.6	67.5		4.0	26.7	69.3		50.2	49.3	0.5		
05:15 Volume	32	2	14	48	1	13	44	58	3	5	19	27	35	31	0	66	199
Peak Factor																	
High Int.	04:45 PM				05:15 PM				05:30 PM				05:15 PM				0.916
Volume	37	2	25	64	1	13	44	58	1	11	21	33	35	31	0	66	
Peak Factor				0.820				0.901				0.765				0.792	

MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
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File Name : M Street at Wisconsin Av
Site Code : 00000011
Start Date : 2/9/2005
Page No : 1

Groups Printed- Unshifted

Start Time	Wisconsin Ave From North					M Street From East					Wisconsin Ave From South					M Street From West					Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Bikes	Peds	Left	Thru	Right	Bikes	Peds	Left	Thru	Right	Bikes	Peds	Left	Thru	Right	Bikes	Peds			
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
07:00 AM	58	12	15	0	4	1	105	36	0	12	5	7	1	4	3	2	101	13	0	1	24	356	380
07:15 AM	60	15	17	0	4	0	109	27	0	7	4	26	2	1	9	3	105	25	0	2	23	393	416
07:30 AM	68	12	17	0	3	0	115	31	0	10	7	8	4	3	0	1	149	11	0	2	18	423	441
07:45 AM	79	31	29	3	3	1	107	25	2	14	3	8	1	2	36	2	179	47	0	7	67	512	579
Total	265	70	78	3	14	2	436	119	2	43	19	49	8	10	48	8	534	96	0	12	132	1684	1816
08:00 AM	72	39	27	1	4	1	182	45	0	16	32	33	5	0	16	2	209	51	0	1	38	698	736
08:15 AM	77	62	38	0	15	1	158	76	0	3	20	52	13	5	11	1	192	56	1	9	44	746	790
08:30 AM	88	75	28	2	12	0	214	101	2	6	47	40	7	8	40	1	207	63	3	13	86	871	957
08:45 AM	81	119	27	2	15	0	194	71	1	0	44	35	28	0	21	3	270	65	0	12	51	937	988
Total	318	295	120	5	46	2	748	293	3	25	143	160	53	13	88	7	878	235	4	35	219	3252	3471
** BREAK ***																							
04:00 PM	24	18	18	1	45	0	190	65	0	73	55	68	7	1	53	1	66	10	2	29	204	522	726
04:15 PM	38	14	19	10	47	1	228	77	1	10	82	80	24	1	56	0	109	19	0	17	142	691	833
04:30 PM	34	20	15	6	29	0	283	56	1	31	43	59	21	4	49	0	99	23	0	30	150	653	803
04:45 PM	27	23	19	6	31	1	244	56	1	6	64	67	3	4	76	1	131	27	0	67	190	663	853
Total	123	75	71	23	152	2	945	254	3	120	244	274	55	10	233	2	405	79	2	143	686	2529	3215
05:00 PM	48	45	33	2	56	2	278	46	2	0	97	73	2	0	39	12	73	13	4	40	143	722	865
05:15 PM	23	18	24	5	45	1	226	69	0	12	64	85	7	3	75	2	85	15	1	31	172	619	791
05:30 PM	38	26	13	4	31	6	165	69	0	0	76	121	11	2	24	1	106	22	2	52	115	654	769
05:45 PM	36	36	11	5	38	1	196	68	1	0	72	85	6	0	54	2	81	19	0	44	142	613	755
Total	145	125	81	16	170	10	865	252	3	12	309	364	26	5	192	17	345	69	7	167	572	2608	3180
Grand Total	851	565	350	47	382	16	2994	918	11	200	715	947	142	38	581	34	2162	479	13	357	1609	1007 3	1168 2
Apprch %	48.2	32.0	19.8			0.4	76.2	23.4			42.0	49.7	8.3			1.3	80.8	17.9					
Total %	8.4	5.6	3.5			0.2	29.7	9.1			7.1	8.4	1.4			0.3	21.5	4.8			13.8	86.2	

From West No Left Turn except Buses

MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Alexandria, VA 22312
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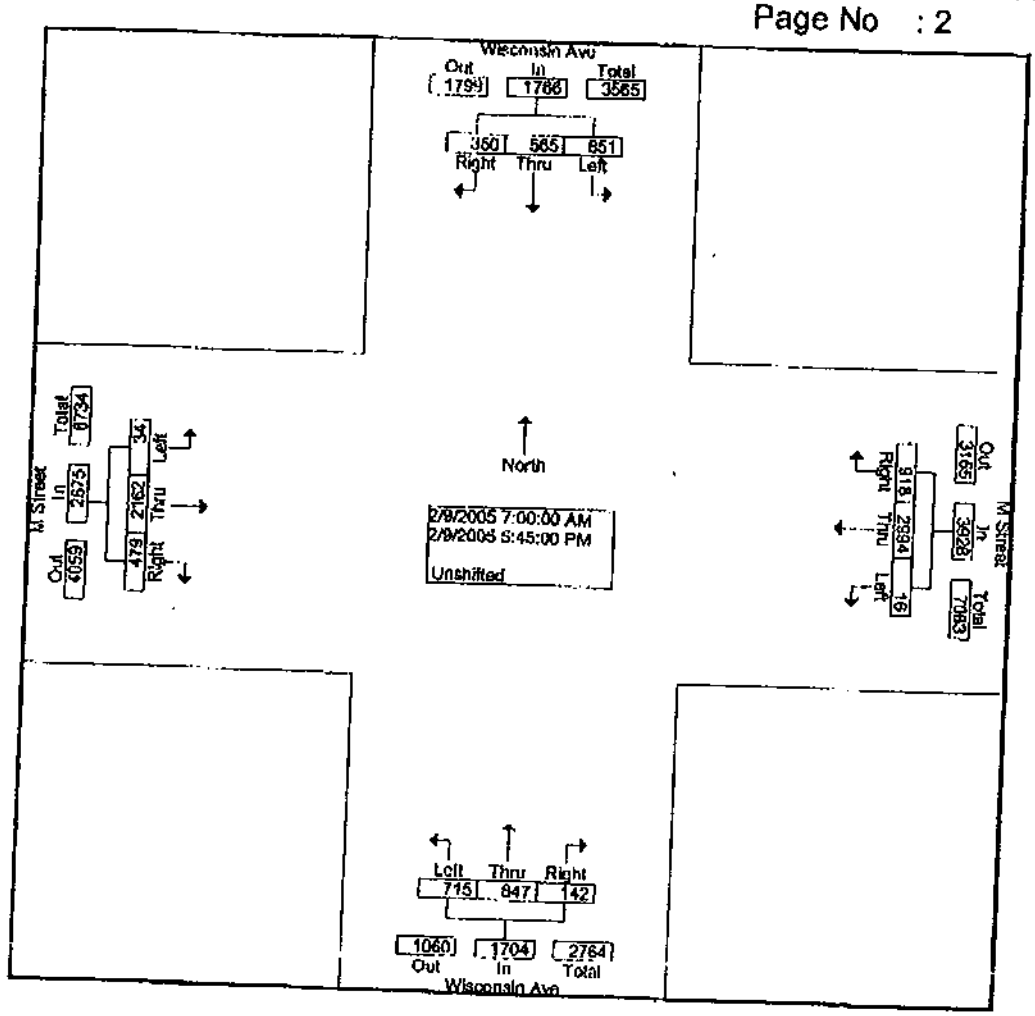
File Name : M Street at Wisconsin Ave
Site Code : 00000011
Start Date : 2/9/2005
Page No : 2



Start Time	Wisconsin Ave From North				M Street From East				Wisconsin Ave From South				M Street From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Intersection	08:00 AM																
Volume	318	295	120	733	2	748	293	1043	143	160	53	356	7	878	235	1120	3252
Percent	43.4	40.2	16.4		0.2	71.7	28.1		40.2	44.9	14.9		0.6	78.4	21.0		
08:45 Volume	81	119	27	227	0	194	71	265	44	35	28	107	3	270	65	338	937
Peak Factor																	
High Int.	08:45 AM				08:30 AM				08:45 AM				08:45 AM				0.868
Volume	81	119	27	227	0	214	101	315	44	35	28	107	3	270	65	338	
Peak Factor				0.807				0.828				0.832				0.828	
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection	04:15 PM																
Volume	147	102	86	335	4	1033	235	1272	286	279	50	615	13	412	82	507	2729
Percent	43.9	30.4	25.7		0.3	81.2	18.5		46.5	45.4	8.1		2.6	81.3	16.2		
05:00 Volume	48	45	33	126	2	278	46	326	97	73	2	172	12	73	13	98	722
Peak Factor																	
High Int.	05:00 PM				04:30 PM				04:15 PM				04:45 PM				0.945
Volume	48	45	33	126	0	283	58	339	82	80	24	186	1	131	27	159	
Peak Factor				0.665				0.938				0.827				0.797	

MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Alexandria, VA 22312
(703) 914-4850

File Name : Canal Rd at Foxhall Rd
Site Code : 00000011
Start Date : 2/3/2005
Page No : 1

Groups Printed- Unshifted

	Foxhall Road From North				From East				Canal Road From South				Canal Road From West							
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Bikes	Peds	Exclu. Total	Inclu. Total	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
07:00 AM	0	229	0	0	0	0	0	0	0	370	0	0	0	0	397	0	0	0	996	996
07:15 AM	0	213	0	1	0	0	0	0	0	398	0	0	0	0	453	0	0	1	1064	1065
07:30 AM	0	310	0	0	0	0	0	0	0	437	0	0	0	0	436	1	1	2	1183	1185
07:45 AM	0	341	0	0	0	0	0	0	0	438	0	1	0	0	440	0	0	1	1219	1220
Total	0	1093	0	1	0	0	0	0	0	1643	0	1	0	0	1726	1	1	4	4462	4466
08:00 AM	0	442	0	0	0	0	0	0	0	492	0	0	0	0	392	1	1	2	1326	1328
08:15 AM	0	426	0	0	0	0	0	0	0	556	0	0	0	0	384	0	0	0	1366	1366
08:30 AM	0	421	0	0	0	0	0	0	0	431	0	0	0	0	382	2	2	4	1214	1218
08:45 AM	0	398	0	0	0	0	0	0	0	479	0	0	0	0	420	0	0	0	1297	1297
Total	0	1687	0	0	0	0	0	0	0	1958	0	0	0	0	1558	3	3	6	5203	5209
** BREAK **																				
04:00 PM	0	266	0	0	0	0	0	0	424	225	0	0	0	0	0	0	1	1	915	916
04:15 PM	0	273	1	1	0	0	0	0	500	261	0	0	0	0	0	0	1	2	1035	1037
04:30 PM	0	272	1	0	0	0	0	0	464	253	0	0	0	0	0	1	2	3	990	993
04:45 PM	0	288	2	0	0	0	0	0	523	289	0	0	0	0	0	0	3	3	1102	1105
Total	0	1099	4	1	0	0	0	0	1911	1028	0	0	0	0	0	1	7	9	4042	4051
05:00 PM	0	282	3	0	0	0	0	0	457	280	0	0	0	0	0	0	2	2	1022	1024
05:15 PM	0	281	1	1	0	0	0	0	611	260	0	0	0	0	0	0	7	8	1153	1161
05:30 PM	0	280	0	1	0	0	0	0	645	362	0	0	0	0	0	0	2	3	1287	1290
05:45 PM	0	282	3	0	0	0	0	0	422	361	0	0	0	0	0	0	3	3	1068	1071
Total	0	1125	7	2	0	0	0	0	2135	1263	0	0	0	0	0	0	14	16	4530	4546
Total	0	5004	11	4	0	0	0	0	4046	5892	0	1	0	0	3284	5	25	35	18237	18272
Apprch %	0.0	99.8	0.2		0.0	0.0	0.0		40.7	59.3	0.0		0.0	0.0	100.0					
Total %	0.0	27.4	0.1		0.0	0.0	0.0		22.2	32.3	0.0		0.0	0.0	18.0			0.2	99.8	

MCV Associates, Inc.
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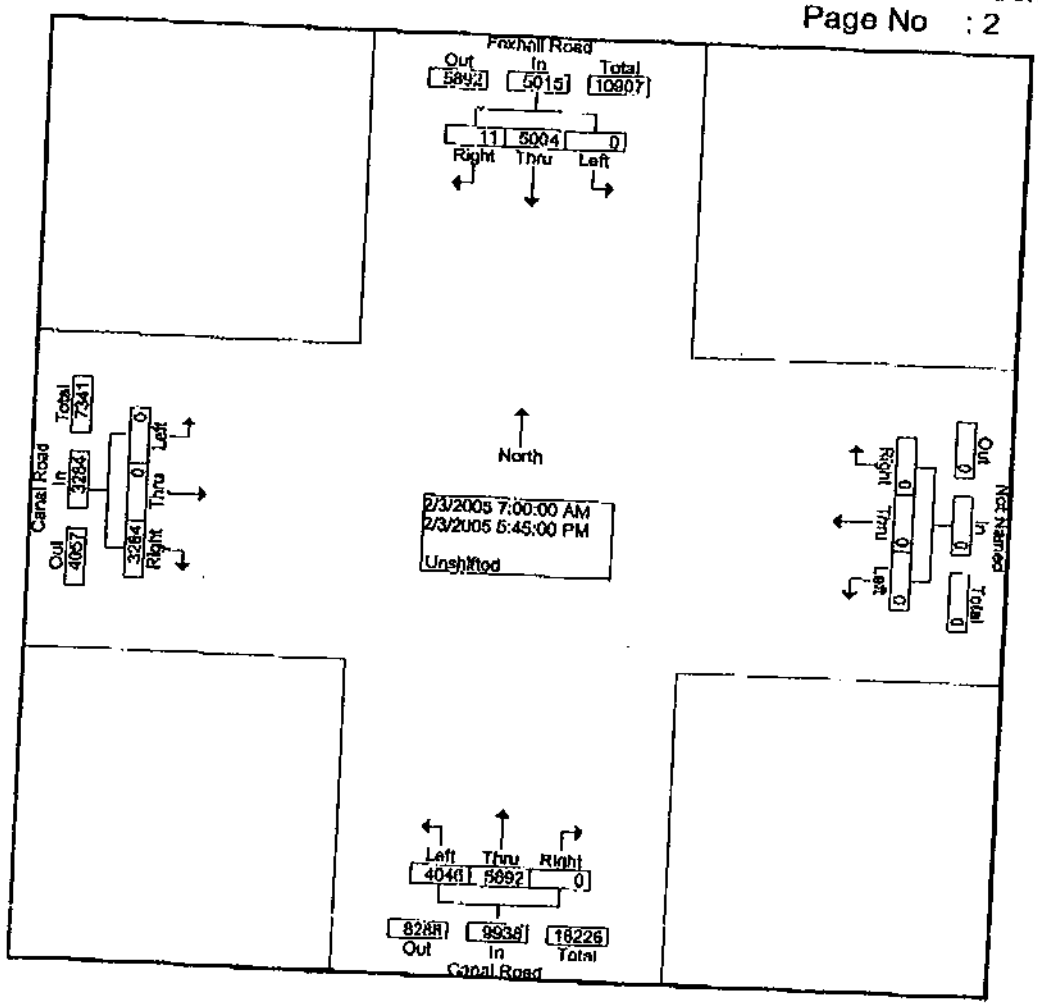
File Name : Canal Rd at Foxhall Rd
Site Code : 00000011
Start Date : 2/3/2005
Page No : 2



Start Time	Foxhall Road From North Left	Thru	Right	App. Total	From East Left	Thru	Right	App. Total	Canal Road From South Left	Thru	Right	App. Total	Canal Road From West Left	Thru	Right	App. Total	Int. Total
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Intersection 08:00 AM																	
Volume	0	1687	0	1687	0	0	0	0	0	1958	0	1958	0	0	1558	1558	5203
Percent	0.0	100.0	0.0		0.0	0.0	0.0		0.0	100.0	0.0		0.0	0.0	100.0		
08:15 Volume	0	426	0	426	0	0	0	0	0	556	0	556	0	0	384	384	1366
Peak Factor																	0.952
High Int. 08:00 AM					6:45:00 AM				08:15 AM				08:45 AM				
Volume	0	442	0	442	0	0	0	0	0	558	0	556	0	0	420	420	
Peak Factor				0.954								0.880				0.927	
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection 04:45 PM																	
Volume	0	1131	6	1137	0	0	0	0	2236	1191	0	3427	0	0	0	0	4564
Percent	0.0	99.5	0.5		0.0	0.0	0.0		65.2	34.8	0.0		0.0	0.0	0.0		
05:30 Volume	0	280	0	280	0	0	0	0	645	362	0	1007	0	0	0	0	1287
Peak Factor																	0.887
High Int. 04:45 PM									05:30 PM								
Volume	0	288	2	290	0	0	0	0	645	362	0	1007					
Peak Factor				0.980								0.851					

MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
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File Name : K St at Rock Creel
Site Code : 00000011
Start Date : 2/2/2005
Page No : 1

Eastbound Lower K and Rock Creek Pkwy Southbound Ramp

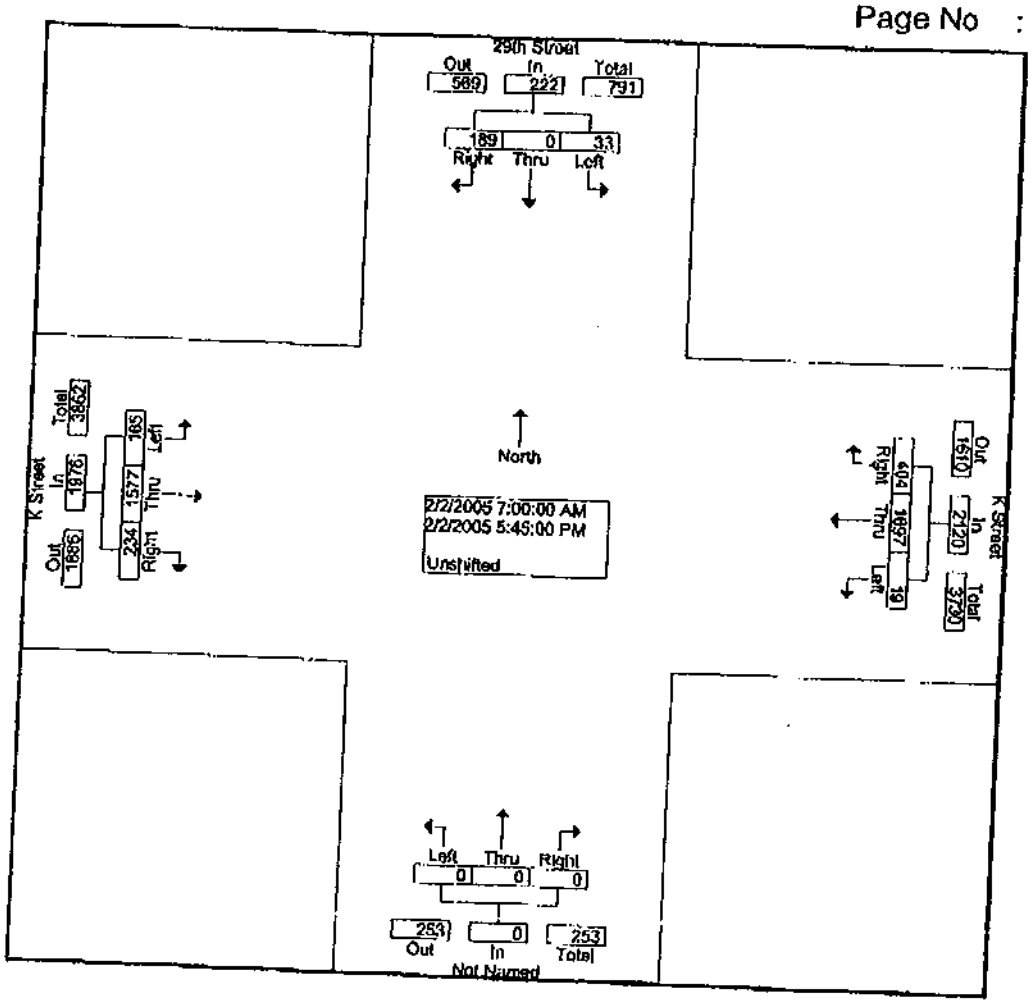
Groups Printed- Unshifted

	29th Street From North					K Street From East					From South				K Street From West							
Start Time	Left	Thru	Right	Bikes	Peds	Left	Thru	Right	Bikes	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Bikes	Peds	Exclu. Total	Inclu. Total	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
07:00 AM	2	0	5	0	1	3	101	28	0	0	0	0	0	2	0	13	12	0	0	3	164	167
07:15 AM	1	0	7	1	1	4	107	30	0	0	0	0	0	5	3	16	16	0	1	8	184	192
07:30 AM	3	0	6	1	2	2	122	35	0	0	0	0	0	5	4	18	24	0	1	9	214	223
07:45 AM	4	0	9	0	2	2	156	39	0	0	0	0	0	0	2	37	25	1	1	4	274	278
Total	10	0	27	2	6	11	486	132	0	0	0	0	0	12	9	84	77	1	3	24	836	860
08:00 AM	2	0	6	0	0	2	160	37	0	0	0	0	0	2	1	34	30	0	0	2	272	274
08:15 AM	1	0	3	1	1	1	232	49	0	0	0	0	0	0	0	38	37	2	0	4	361	365
08:30 AM	0	0	2	4	5	3	153	49	0	2	0	0	0	0	2	40	54	0	0	11	303	314
08:45 AM	0	0	10	1	2	1	209	51	0	2	0	0	0	0	8	73	36	0	0	5	388	393
Total	3	0	21	6	8	7	754	186	0	4	0	0	0	2	11	185	157	2	0	22	1324	1346
** BREAK ***																						
04:00 PM	1	0	12	1	0	0	60	11	0	1	0	0	0	0	8	144	0	0	0	2	236	238
04:15 PM	0	0	16	0	2	1	59	15	0	1	0	0	0	0	6	143	0	1	0	4	240	244
04:30 PM	4	0	16	1	2	0	57	11	0	0	0	0	0	0	13	132	0	0	0	3	233	236
04:45 PM	4	0	23	2	0	0	70	8	0	1	0	0	0	0	14	139	0	0	0	3	258	261
Total	9	0	67	4	4	1	246	45	0	3	0	0	0	0	41	558	0	1	0	12	967	979
05:00 PM	1	0	21	2	1	0	50	9	0	1	0	0	0	0	29	216	0	1	0	5	326	331
05:15 PM	4	0	18	1	3	0	43	9	0	1	0	0	0	0	24	177	0	0	0	5	273	278
05:30 PM	4	0	18	2	1	0	59	7	0	0	0	0	0	0	24	170	0	2	0	5	282	287
05:45 PM	2	0	19	1	1	0	59	16	0	1	0	0	0	0	27	187	0	1	0	4	310	314
Total	11	0	74	6	6	0	211	41	0	3	0	0	0	0	104	750	0	4	0	19	1191	1210
Grand Total	33	0	189	18	24	19	169	404	0	10	0	0	0	14	165	157	234	8	3	77	4318	4395
Apprch %	14.9	0.0	85.1				7									7						
Total %	0.8	0.0	4.4			0.9	80.0	19.1			0.0	0.0	0.0		8.4	79.8	11.8			1.8	98.2	
						0.4	39.3	9.4			0.0	0.0	0.0		3.8	36.5	5.4					

From North Left Turns are violation

MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Alexandria, VA 22312
(703) 914-4850

File Name : K St at Rock Creel
Site Code : 00000011
Start Date : 2/2/2005
Page No : 2



Start Time	29th Street From North Left	Thru	Right	App. Total	K Street From East Left	Thru	Right	App. Total	From South Left	Thru	Right	App. Total	K Street From West Left	Thru	Right	App. Total	Int. Total
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Intersection 08:00 AM																	
Volume	3	0	21	24	7	754	186	947	0	0	0	0	11	165	157	353	1324
Percent	12.5	0.0	87.5		0.7	79.6	19.6		0.0	0.0	0.0		3.1	52.4	44.5		
08:45 Volume	0	0	10	10	1	209	51	261	0	0	0	0	8	73	36	117	388
Peak Factor																	
High Int.	08:45 AM				08:15 AM				6:45:00 AM				08:45 AM				0.853
Volume	0	0	10	10	1	232	49	282	0	0	0	0	8	73	36	117	
Peak Factor				0.600				0.840								0.754	
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection 05:00 PM																	
Volume	11	0	74	85	0	211	41	252	0	0	0	0	104	750	0	854	1191
Percent	12.9	0.0	87.1		0.0	83.7	16.3		0.0	0.0	0.0		12.2	87.8	0.0		
05:00 Volume	1	0	21	22	0	50	9	59	0	0	0	0	29	216	0	245	326
Factor																	
h Int.	05:00 PM				05:45 PM								05:00 PM				0.913
me	1	0	21	22	0	59	16	75	0	0	0	0	29	216	0	245	
Peak Factor				0.966				0.840								0.871	

MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Alexandria, VA 22312
(703) 914-4850

File Name : Canal at Whitehurstfreeway
Site Code : 00000095
Start Date : 2/1/2005
Page No : 1

3 Whitehurst Freeway and Canal Road

Groups Printed- Unshifted

Start Time	Driveway From North					M Street From East					Whitehurstfreeway From South					Canal Road From West					Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Bikes	Peds	Left	Thru	Right	Bikes	Peds	Left	Thru	Right	Bikes	Peds	Left	Thru	Right	Bikes	Peds			
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
07:00 AM	3	0	0	0	1	0	181	5	0	0	153	0	72	0	0	1	216	390	0	0	1	1021	1022
07:15 AM	5	0	0	0	3	0	226	2	0	3	153	1	105	0	2	1	218	362	0	0	8	1073	1081
07:30 AM	2	0	0	2	0	0	223	5	0	1	152	0	97	1	0	0	216	415	0	0	4	1110	1114
07:45 AM	0	0	0	1	2	0	270	2	0	5	165	6	42	1	0	2	272	385	0	0	9	1144	1153
Total	10	0	0	3	6	0	900	14	0	9	623	7	316	2	2	4	922	1552	0	0	22	4348	4370
08:00 AM	1	0	0	0	0	0	301	5	0	3	147	7	70	0	0	0	254	449	0	0	3	1234	1237
08:15 AM	0	0	0	0	1	0	285	13	0	1	160	4	71	0	0	0	278	404	0	0	2	1215	1217
08:30 AM	5	0	0	1	3	0	331	9	0	19	190	3	47	0	0	0	256	421	0	0	23	1262	1285
08:45 AM	3	0	0	2	2	0	459	7	0	0	204	4	95	0	0	0	232	416	0	0	4	1420	1424
Total	9	0	0	3	6	0	1376	34	0	23	701	18	283	0	0	0	1020	1690	0	0	32	5131	5163
** BREAK ***																							
04:00 PM	0	0	0	1	4	0	327	6	0	4	425	3	78	0	0	0	192	127	0	0	9	1158	1167
04:15 PM	0	0	0	0	1	0	208	2	0	0	441	8	50	0	0	0	197	115	0	0	1	1021	1022
04:30 PM	8	0	0	1	0	0	292	7	0	1	362	4	51	0	0	0	185	171	0	0	2	1090	1092
04:45 PM	6	0	2	1	1	0	313	8	0	5	428	3	53	0	0	0	166	117	0	0	7	1096	1103
Total	14	0	2	3	6	0	1140	23	0	10	1656	18	232	0	0	0	750	530	0	0	19	4365	4384
05:00 PM	25	0	0	2	4	0	371	4	0	8	508	10	64	0	0	0	190	157	0	0	14	1329	1343
05:15 PM	5	0	0	0	1	0	299	3	0	1	506	5	38	0	0	0	208	166	0	0	2	1230	1232
05:30 PM	11	0	3	0	4	0	293	11	0	0	591	6	61	0	0	0	203	157	0	0	4	1336	1340
05:45 PM	7	1	0	1	1	0	382	8	0	6	593	7	37	0	0	0	202	119	0	0	8	1356	1364
Total	48	1	3	3	10	0	1345	26	0	15	2198	28	200	0	0	0	803	599	0	0	28	5251	5279
Grand Total	81	1	5	12	28	0	4761	97	0	57	5178	71	1031	2	2	4	3495	4371	0	0	101	19095	19196
Apprch %	93.1	1.1	5.7			0.0	98.0	2.0			82.5	1.1	16.4			0.1	44.4	55.5					
Total %	0.4	0.0	0.0			0.0	24.9	0.5			27.1	0.4	5.4			0.0	18.3	22.9			0.5	99.5	

MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Alexandria, VA 22312
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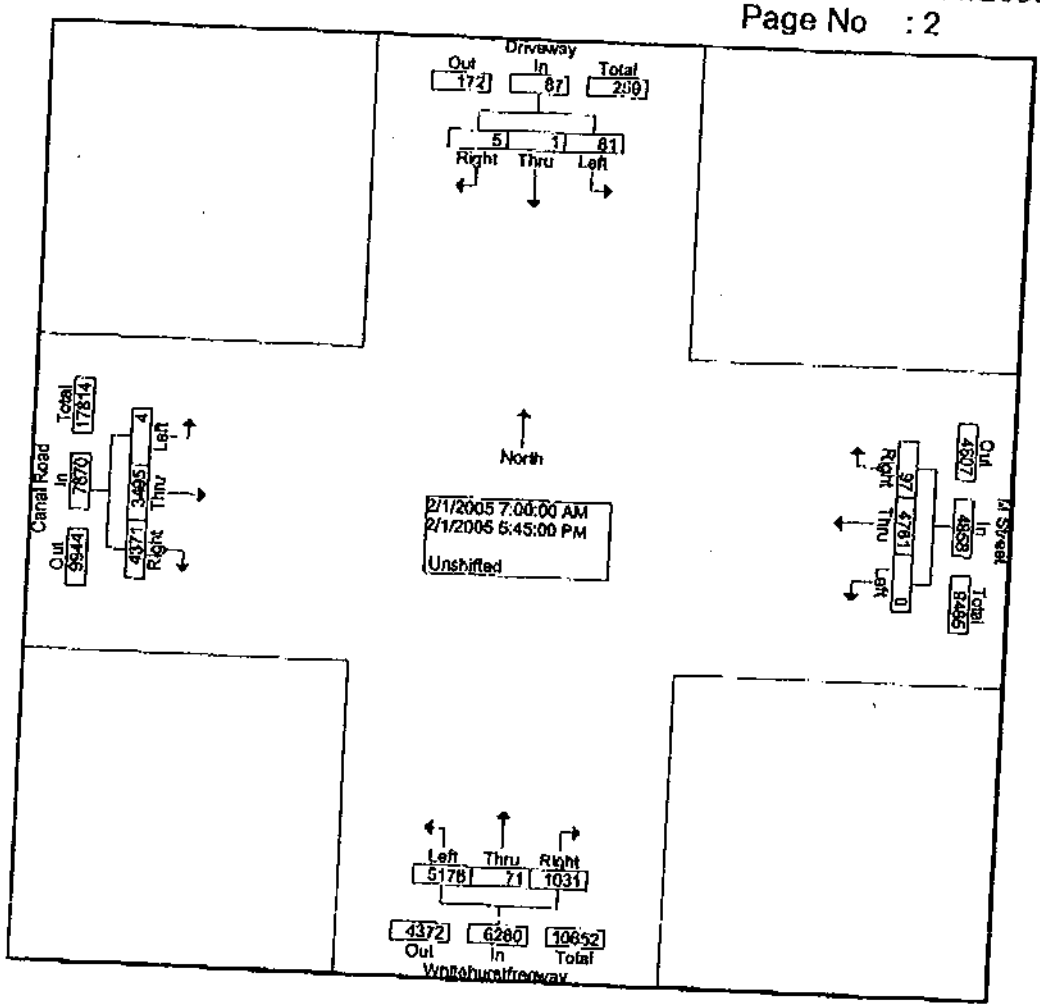
File Name : Canal at Whitehurstfreeway
Site Code : 00000095
Start Date : 2/1/2005
Page No : 2



Start Time	Driveway From North				M Street From East				Whitehurstfreeway From South				Canal Road From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Intersection 08:00 AM																	
Volume	9	0	0	9	0	1376	34	1410	701	18	283	1002	0	1020	1690	2710	5131
Percent	100.0	0.0	0.0		0.0	97.6	2.4		70.0	1.8	28.2		0.0	37.6	62.4		
08:45 Volume	3	0	0	3	0	459	7	466	204	4	95	303	0	232	416	648	1420
Peak Factor																	0.903
High Int.	08:30 AM				08:45 AM				08:45 AM				08:00 AM				
Volume	5	0	0	5	0	459	7	466	204	4	95	303	0	254	449	703	
Peak Factor				0.450				0.756				0.827				0.964	
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection 05:00 PM																	
Volume	48	1	3	52	0	1345	26	1371	2198	28	200	2426	0	803	599	1402	5251
Percent	92.3	1.9	5.8		0.0	98.1	1.9		90.6	1.2	8.2		0.0	57.3	42.7		
05:45 Volume	7	1	0	8	0	382	8	390	593	7	37	637	0	202	119	321	1356
Peak Factor																	0.968
High Int.	05:00 PM				05:45 PM				05:30 PM				05:15 PM				
Volume	25	0	0	25	0	382	8	390	591	6	61	658	0	208	166	374	
Peak Factor				0.520				0.879				0.922				0.937	

MCV Associates, Inc.
4605-C Pinecrest Office Park Drive
Alexandria, VA 22312
(703) 914-4850

File Name : 27th St at K Stree
Site Code : 00000095
Start Date : 1/27/2005
Page No : 1

Groups Printed- Unshifted

Start Time	27th Street From North					K Street From East					27th Street From South					K St/Freehurstfreeway From West					Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Bikes	Peds	Left	Thru	Right	Bikes	Peds	Left	Thru	Right	Bikes	Peds	Left	Thru	Right	Bikes	Peds			
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
07:00 AM	0	0	0	0	0	51	101	0	0	0	76	0	24	0	10	0	321	21	0	0	10	594	604
07:15 AM	0	0	0	0	0	86	111	0	0	0	80	0	37	0	13	0	339	41	0	0	13	674	687
07:30 AM	0	0	0	0	0	53	131	0	1	0	93	0	44	1	4	1	395	33	0	2	8	750	758
07:45 AM	0	0	0	1	0	49	125	0	1	0	108	0	51	3	16	0	365	24	0	3	24	722	746
Total	0	0	0	1	0	219	468	0	2	0	357	0	156	4	43	1	1420	119	0	5	55	2740	2795
08:00 AM	0	0	0	0	0	56	137	0	0	0	108	0	44	0	15	1	432	35	0	0	15	813	828
08:15 AM	0	0	0	3	0	44	151	0	0	0	149	0	40	2	19	0	436	38	0	0	24	858	882
08:30 AM	0	0	0	0	0	52	110	0	0	0	148	0	53	3	28	1	505	32	0	0	31	901	932
08:45 AM	0	0	0	2	0	60	143	0	0	0	195	0	34	0	30	0	447	39	0	0	32	918	950
Total	0	0	0	5	0	212	541	0	0	0	600	0	171	5	92	2	1820	144	0	0	102	3490	3592
** BREAK ***																							
04:00 PM	0	0	22	2	0	123	191	9	0	0	14	0	16	1	11	1	141	87	1	0	15	604	619
04:15 PM	0	0	31	0	0	178	235	26	0	0	28	0	3	0	7	0	159	84	1	0	8	744	752
04:30 PM	0	0	20	2	0	160	277	18	0	0	18	0	4	1	18	2	135	115	7	0	28	749	777
04:45 PM	0	0	10	1	0	176	278	21	0	0	34	0	9	1	15	1	170	113	0	0	17	812	829
Total	0	0	83	5	0	637	981	74	0	0	94	0	32	3	51	4	605	399	9	0	68	2909	2977
05:00 PM	0	0	19	1	0	188	295	19	0	0	21	2	5	1	19	0	201	127	0	0	21	877	898
05:15 PM	0	0	38	6	0	202	353	17	0	0	26	0	1	1	28	0	160	135	0	0	33	932	965
30 PM	0	0	40	4	0	194	332	32	0	0	22	0	3	3	22	1	171	144	0	0	29	939	968
45 PM	0	0	42	2	0	213	329	43	0	0	38	0	6	5	16	0	202	118	3	0	26	991	1017
otal	0	0	139	13	0	797	1309	111	0	0	107	2	15	10	83	1	734	524	3	0	109	3739	3848
Grand Total	0	0	222	24	0	1885	3299	185	2	0	1158	2	374	22	269	8	4579	1186	12	5	334	12878	13212
Apprch %	0.0	0.0	100.0			34.9	61.7	3.5			75.5	0.1	24.4			0.1	79.3	20.5					
Total %	0.0	0.0	1.7			14.5	25.6	1.4			9.0	0.0	2.9			0.1	35.6	9.2			2.5	97.5	

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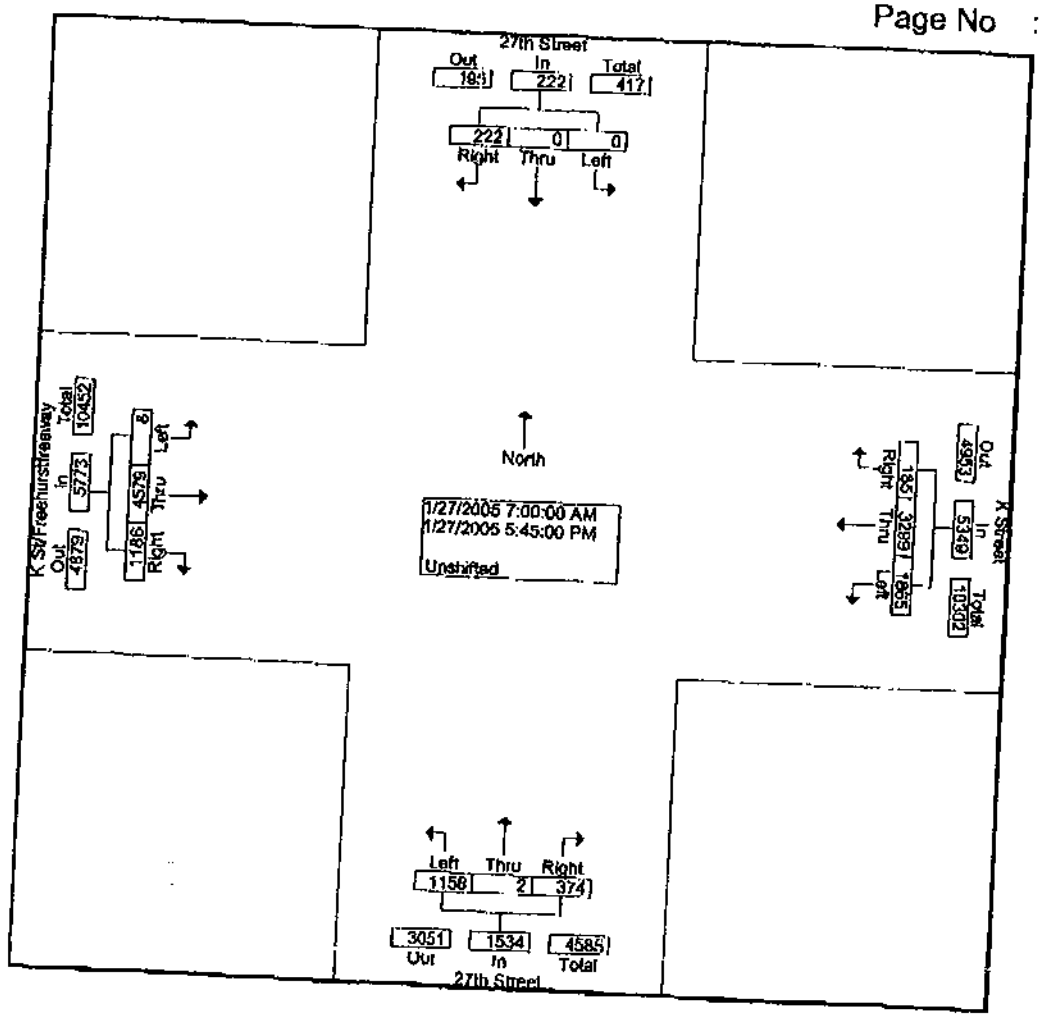

Start Time	27th Street From North				K Street From East				27th Street From South				K St/Freehurstfreeway From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Intersection 08:00 AM																	
Volume	0	0	0	0	212	541	0	753	600	0	171	771	2	1820	144	1966	3490
Percent	0.0	0.0	0.0		28.2	71.8	0.0		77.8	0.0	22.2		0.1	92.6	7.3		
08:45 Volume	0	0	0	0	60	143	0	203	195	0	34	229	0	447	39	486	918
Peak Factor																	
High Int.	6:45:00 AM																
Volume	0	0	0	0	08:45 AM 60	143	0	203	08:45 AM 195	0	34	229	08:30 AM 1	505	32	538	0.950
Peak Factor								0.927				0.842				0.914	
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection 05:00 PM																	
Volume	0	0	139	139	797	1309	111	2217	107	2	15	124	1	734	524	1259	3739
Percent	0.0	0.0	100.0		35.9	59.0	5.0		86.3	1.6	12.1		0.1	58.3	41.6		
05:45 Volume	0	0	42	42	213	329	43	585	38	0	6	44	0	202	118	320	991
Peak Factor																	
High Int.	05:45 PM																
Volume	0	0	42	42	05:45 PM 213	329	43	585	05:45 PM 38	0	6	44	05:00 PM 0	201	127	328	0.943
Peak Factor				0.827				0.947				0.705				0.960	

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File Name : L Street Ramp
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6. NB Potomac Freeway Ramp to Whitehurst Freeway and Ramp to L Street

Groups Printed- Unshifted

	From North				From East				From South				From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left *	Thru **	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
07:00 AM	0	0	0	0	0	0	0	0	84	221	0	0	0	0	0	0	0	305	305
07:15 AM	0	0	0	0	0	0	0	0	95	238	0	0	0	0	0	0	0	333	333
07:30 AM	0	0	0	0	0	0	0	0	83	203	0	0	0	0	0	0	0	286	286
07:45 AM	0	0	0	0	0	0	0	0	36	149	0	0	0	0	0	0	0	185	185
Total	0	0	0	0	0	0	0	0	298	811	0	0	0	0	0	0	0	1109	1109
08:00 AM	0	0	0	0	0	0	0	0	52	159	0	0	0	0	0	0	0	211	211
08:15 AM	0	0	0	0	0	0	0	0	63	164	0	0	0	0	0	0	0	227	227
08:30 AM	0	0	0	0	0	0	0	0	61	148	0	0	0	0	0	0	0	209	209
08:45 AM	0	0	0	0	0	0	0	0	51	158	0	0	0	0	0	0	0	209	209
Total	0	0	0	0	0	0	0	0	227	629	0	0	0	0	0	0	0	856	856
*** BREAK ***																			
04:00 PM	0	0	0	0	0	0	0	0	150	59	0	0	0	0	0	0	0	209	209
04:15 PM	0	0	0	0	0	0	0	0	169	74	0	0	0	0	0	0	0	243	243
04:30 PM	1	0	0	0	0	0	0	0	172	71	0	0	0	0	0	0	0	244	244
04:45 PM	0	0	0	0	0	0	0	0	184	78	0	0	0	0	0	0	0	262	262
Total	1	0	0	0	0	0	0	0	675	282	0	0	0	0	0	0	0	958	958
05:00 PM	0	0	0	0	0	0	0	0	108	83	0	0	0	0	0	0	0	191	191
05:15 PM	0	0	0	0	0	0	0	0	157	82	0	0	0	0	0	0	0	239	239
05:30 PM	0	0	0	0	0	0	0	0	163	58	0	0	0	0	0	0	0	221	221
05:45 PM	0	0	0	0	0	0	0	0	152	51	0	0	0	0	0	0	0	203	203
Total	0	0	0	0	0	0	0	0	580	274	0	0	0	0	0	0	0	854	854
Grand Total	1	0	0	0	0	0	0	0	1780	1996	0	0	0	0	0	0	0	3777	3777
Apprch %	100.0	0.0	0.0		0.0	0.0	0.0		47.1	52.9	0.0		0.0	0.0	0.0				
Total %	0.0	0.0	0.0		0.0	0.0	0.0		47.1	52.8	0.0		0.0	0.0	0.0		0.0	100.0	

* Left - Vehicles to Whitehurst Freeway
** Thru - Vehicles Ramp to L Street

	From North				From East				From South				From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left *	Thru **	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Intersection 07:00 AM																	
Volume	0	0	0	0	0	0	0	0	298	811	0	1109	0	0	0	0	1109
Percent	0.0	0.0	0.0		0.0	0.0	0.0		26.9	73.1	0.0		0.0	0.0	0.0		
07:15 Volume	0	0	0	0	0	0	0	0	95	238	0	333	0	0	0	0	333
Peak Factor																	0.833
High Int.	6:45:00 AM				6:45:00 AM				07:15 AM				6:45:00 AM				
Volume	0	0	0	0	0	0	0	0	95	238	0	333					
Peak Factor												0.833					

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	From North				From East				From South				From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left *	Thru **	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection	04:00 PM																
Volume	1	0	0	1	0	0	0	0	675	282	0	957	0	0	0	0	958
Percent	100.0	0.0	0.0		0.0	0.0	0.0		70.5	29.5	0.0		0.0	0.0	0.0		
04:45																	
Volume	0	0	0	0	0	0	0	0	184	78	0	262	0	0	0	0	262
Peak Factor																	0.914
High Int.	04:30 PM								04:45 PM								
Volume	1	0	0	1	0	0	0	0	184	78	0	262					
Peak Factor				0.250								0.913					

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File Name : 31st at K Stree
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Groups Printed- Unshifted

	31st Street From North					K Street From East					31st Street From South					K Street From West							
Start Time	Left	Thru	Right	Bikes	Peds	Left	Thru	Right	Bikes	Peds	Left	Thru	Right	Bikes	Peds	Left	Thru	Right	Bikes	Peds	Exclu. Total	Inclu. Total	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
07:00 AM	10	0	2	0	3	1	42	14	0	0	0	0	1	0	1	2	49	2	0	1	5	123	128
07:15 AM	12	0	4	0	6	2	48	12	0	1	0	0	2	0	1	2	51	3	0	2	10	136	146
07:30 AM	15	1	6	0	12	3	54	14	0	2	0	0	1	0	2	2	47	2	0	4	20	145	165
07:45 AM	13	0	7	0	8	3	106	18	2	3	0	0	1	3	1	0	62	0	0	1	18	208	226
Total	50	1	19	0	29	9	250	58	2	6	0	0	5	3	5	6	209	7	0	8	53	612	665
08:00 AM	15	0	8	0	10	3	93	20	0	1	0	0	1	4	1	3	65	3	0	2	18	211	229
08:15 AM	19	0	5	2	8	4	64	20	0	1	0	0	1	0	0	4	79	4	0	5	16	200	216
08:30 AM	21	0	7	2	21	1	117	19	0	6	0	2	1	0	8	1	77	2	0	9	46	248	294
08:45 AM	25	0	10	0	27	3	104	18	1	3	0	1	0	9	1	3	80	1	0	9	50	245	295
Total	80	0	30	4	66	11	378	77	1	11	0	3	3	13	10	11	301	10	0	25	130	904	1034
** BREAK ***																							
04:00 PM	12	0	5	3	6	5	38	10	0	8	1	0	5	0	1	7	75	5	1	8	27	163	190
04:15 PM	14	0	6	2	5	3	43	8	2	8	1	0	0	1	1	7	53	7	4	9	32	142	174
04:30 PM	21	4	5	3	13	6	47	12	0	2	0	1	1	0	5	8	65	3	0	13	36	173	209
04:45 PM	14	0	1	1	12	6	49	11	1	2	0	0	0	0	1	6	55	1	0	17	34	143	177
Total	61	4	17	9	36	20	177	41	3	20	2	1	6	1	8	28	248	16	5	47	129	621	750
05:00 PM	21	0	5	2	15	2	49	13	0	4	0	0	0	1	4	9	87	1	0	12	38	187	225
05:15 PM	19	0	7	6	11	5	57	19	0	4	0	0	1	1	4	13	80	2	2	20	48	203	251
05:30 PM	13	1	6	2	15	1	50	12	0	3	0	2	0	0	5	9	65	0	1	12	38	159	197
05:45 PM	12	0	10	2	12	4	61	23	0	5	0	0	0	0	2	8	65	0	0	11	32	183	215
Total	65	1	28	12	53	12	217	67	0	16	0	2	1	2	15	39	297	3	3	55	156	732	888
Grand Total	256	6	94	25	184	52	1022	241	6	53	2	6	15	19	38	84	1055	36	8	135	468	2869	3337
Apprch %	71.9	1.7	26.4			4.0	77.7	18.3			8.7	26.1	65.2			7.1	89.8	3.1					
Total %	3.9	0.2	3.3			1.6	35.6	8.4			0.1	0.2	0.5			2.9	36.8	1.3			14.0	86.0	

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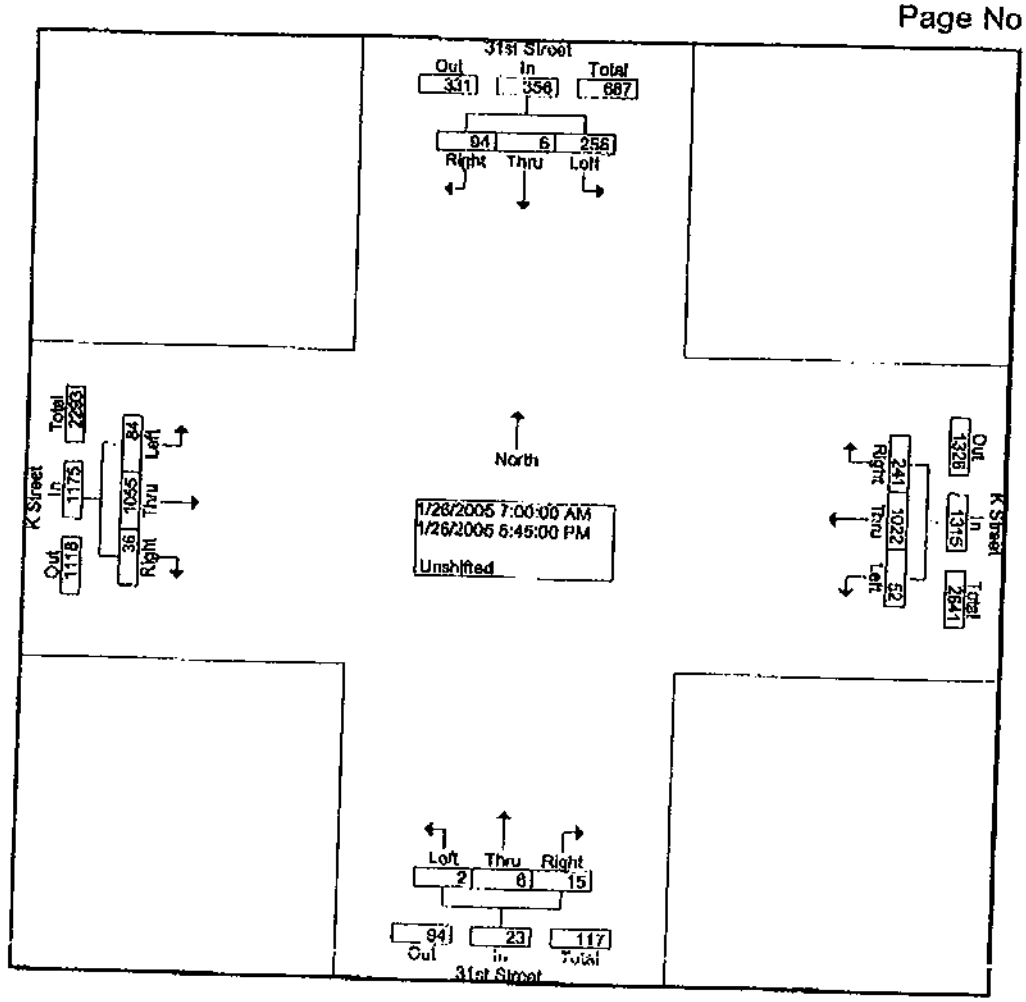

Start Time	31st Street From North				K Street From East				31st Street From South				K Street From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Intersection	08:00 AM																
Volume	80	0	30	110	11	378	77	466	0	3	3	6	11	301	10	322	904
Percent	72.7	0.0	27.3		2.4	81.1	16.5		0.0	50.0	50.0		3.4	93.5	3.1		
08:30 Volume	21	0	7	28	1	117	19	137	0	2	1	3	1	77	2	80	248
Peak Factor																	
High Int.	08:45 AM				08:30 AM				08:30 AM				08:15 AM				0.911
Volume	25	0	10	35	1	117	19	137	0	2	1	3	4	79	4	87	
Peak Factor				0.786				0.850				0.500				0.925	
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection	05:00 PM																
Volume	65	1	28	94	12	217	67	296	0	2	1	3	39	297	3	339	732
Percent	69.1	1.1	29.8		4.1	73.3	22.6		0.0	66.7	33.3		11.5	87.6	0.9		
05:15 Volume	19	0	7	26	5	57	19	81	0	0	1	1	13	80	2	95	203
Peak Factor																	
High Int.	05:00 PM				05:45 PM				05:30 PM				05:00 PM				0.901
Volume	21	0	5	26	4	61	23	88	0	2	0	2	9	87	1	97	
Peak Factor				0.904				0.841				0.375				0.874	

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? Canal Rd and Southern Entrance to Georgetown University

Groups Printed- Unshifted

	Georgetown Uni Ent From North					Canal Road From East				From South				Canal Road From West						
Start Time	Left	Thru	Right	Bikes	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
07:00 AM	0	0	6	0	0	0	347	28	0	0	0	0	0	0	554	0	0	0	935	935
07:15 AM	0	0	0	0	0	0	373	32	0	0	0	0	0	0	663	0	0	0	1068	1068
07:30 AM	0	0	1	0	1	0	407	39	0	0	0	0	0	0	741	0	0	1	1188	1189
07:45 AM	0	0	5	1	2	0	400	36	0	0	0	0	0	0	789	0	0	3	1230	1233
Total	0	0	12	1	3	0	1527	135	0	0	0	0	0	0	2747	0	0	4	4421	4425
08:00 AM	0	0	3	1	1	0	445	31	2	0	0	0	0	0	777	0	0	4	1256	1260
08:15 AM	0	0	5	0	0	0	498	43	3	0	0	0	0	0	734	0	2	5	1280	1285
08:30 AM	0	0	7	1	5	0	401	55	0	0	0	0	0	0	790	0	2	8	1253	1261
08:45 AM	0	0	5	3	2	0	394	47	0	0	0	0	0	0	828	0	0	5	1274	1279
Total	0	0	20	5	8	0	1738	176	5	0	0	0	0	0	3129	0	4	22	5063	5085
** BREAK ***																				
04:00 PM	0	0	30	1	1	0	604	23	0	0	0	0	0	0	410	0	0	2	1067	1069
04:15 PM	0	0	24	0	0	0	682	18	0	0	0	0	0	1	388	0	0	0	1113	1113
04:30 PM	0	0	22	2	0	0	657	16	0	0	0	0	0	0	344	0	0	2	1039	1041
04:45 PM	0	0	39	0	2	0	701	13	0	0	0	0	0	0	300	0	0	2	1053	1055
Total	0	0	115	3	3	0	2644	70	0	0	0	0	0	1	1442	0	0	6	4272	4278
05:00 PM	0	0	40	0	0	0	763	20	0	0	0	0	0	0	371	0	0	0	1194	1194
05:15 PM	0	0	45	0	1	0	799	21	0	0	0	0	0	0	346	0	0	1	1211	1212
[illegible] M	0	0	28	1	2	0	985	30	0	0	0	0	0	0	373	0	0	3	1416	1419
[illegible] M	0	0	47	1	3	0	783	30	0	0	0	0	0	0	253	0	0	4	1113	1117
Total	0	0	160	2	6	0	3330	101	0	0	0	0	0	0	1343	0	0	8	4934	4942
Grand Total	0	0	307	11	20	0	9239	482	5	0	0	0	0	1	8661	0	4	40	18690	18730
Apprch %	0.0	0.0	100.0			0.0	95.0	5.0		0.0	0.0	0.0		0.0	100.0	0.0				
Total %	0.0	0.0	1.6			0.0	49.4	2.6		0.0	0.0	0.0		0.0	46.3	0.0		0.2	99.8	

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File Name : Canal at George Uni En
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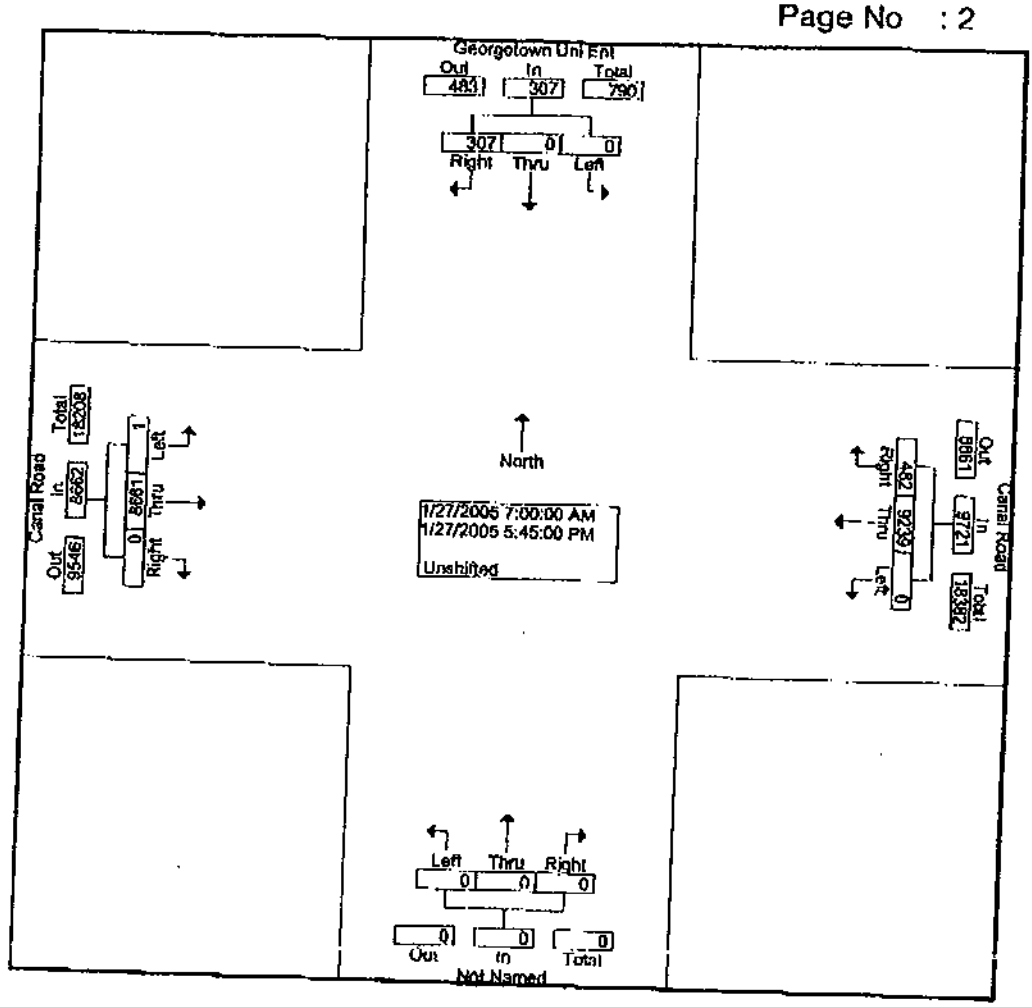
Start Date : 1/27/2005
Page No : 2



Start Time	Georgetown Uni Ent From North				Canal Road From East				From South				Canal Road From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Intersection 08:00 AM																	
Volume	0	0	20	20	0	1738	176	1914	0	0	0	0	0	3129	0	3129	5063
Percent	0.0	0.0	100.0		0.0	90.8	9.2		0.0	0.0	0.0		0.0	100.0	0.0		
08:15 Volume	0	0	5	5	0	498	43	541	0	0	0	0	0	734	0	734	1280
Peak Factor																	
High Int.	08:30 AM				08:15 AM				6:45:00 AM				08:45 AM				0.989
Volume	0	0	7	7	0	498	43	541	0	0	0	0	0	828	0	828	
Peak Factor				0.714				0.884								0.945	
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection 05:00 PM																	
Volume	0	0	160	160	0	3330	101	3431	0	0	0	0	0	1343	0	1343	4934
Percent	0.0	0.0	100.0		0.0	97.1	2.9		0.0	0.0	0.0		0.0	100.0	0.0		
05:30 Volume	0	0	28	28	0	985	30	1015	0	0	0	0	0	373	0	373	1416
Peak Factor																	
High Int.	05:45 PM				05:30 PM								05:30 PM				0.871
Volume	0	0	47	47	0	985	30	1015	0	0	0	0	0	373	0	373	
Peak				0.851				0.845								0.900	

24TH STREET & M STREET.

24th Street at M Street

Wells & Associates, LLC

McLean, Virginia

Existing Traffic Count

PROJECT: Columbia Hgts
W & A JOB NO: 2497
INTERSECTION: 24th & M street.
LOCATION: Wash D.C.

DATE: 04/10/2003
DAY:
WEATHER:
COUNTED BY:
INPUTED BY: LJZ

SOUTHBOUND ROAD: 24th st
NORTHBOUND ROAD: 24th st
WESTBOUND ROAD: M st.
EASTBOUND ROAD: M st.

Time Period	Turning Movements: Southbound 24th Street 1 Right	2 Thru	3 Left	Total	Westbound M Street 4 Right	5 Thru	6 Left	Total	Northbound 24th Street 7 Right	8 Thru	9 Left	Total	Eastbound M Street 10 Right	11 Thru	12 Left	Total	North & South	East & West	Total	PHF	Time Period
AM																					
6:00-6:15				2				47				17				0	19	47	66		6:00-6:15
6:15-6:30				6				51				23				0	29	51	80		6:15-6:30
6:30-6:45				20				64				32				0	52	64	116		6:30-6:45
6:45-7:00				20				90				43				0	63	90	153		6:45-7:00
7:00-7:15				18				111				51				0	69	111	180		7:00-7:15
7:15-7:30				27				133				67				0	94	133	227		7:15-7:30
7:30-7:45				26				148				54				0	80	148	228		7:30-7:45
7:45-8:00				6				129				55				0	61	129	190		7:45-8:00
8:00-8:15				37				140				63				0	100	140	240		8:00-8:15
8:15-8:30				41				168				75				0	116	168	284		8:15-8:30
8:30-8:45				43				172				65				0	108	172	281		8:30-8:45
8:45-9:00				33				172				74				0	107	172	279		8:45-9:00
3 Hour Totals	69	210	0	279	159	1,022	244	1,425	0	445	177	620	0	0	0	0	899	1,425	2,324		
1 Hour Totals																					
6:00-7:00	10	38	0	48	24	181	47	252	0	84	31	115	0	0	0	0	163	252	415	0.68	6:00-7:00
6:15-7:15	12	52	0	64	38	221	59	318	0	107	42	149	0	0	0	0	213	318	529	0.73	6:15-7:15
6:30-7:30	17	68	0	85	49	278	71	398	0	138	55	193	0	0	0	0	278	398	676	0.74	6:30-7:30
6:45-7:45	21	70	0	91	63	338	81	482	0	154	61	215	0	0	0	0	306	482	788	0.86	6:45-7:45
7:00-8:00	23	54	0	77	66	388	67	521	0	158	69	227	0	0	0	0	304	521	825	0.90	7:00-8:00
7:15-8:15	29	67	0	96	64	396	90	550	0	165	74	239	0	0	0	0	335	550	885	0.92	7:15-8:15
7:30-8:30	29	81	0	110	69	418	98	585	0	172	75	247	0	0	0	0	357	585	942	0.83	7:30-8:30
7:45-8:45	33	94	0	127	69	437	103	609	0	181	78	259	0	0	0	0	386	609	995	0.86	7:45-8:45
8:00-9:00	38	116	0	154	69	473	110	652	0	201	77	278	0	0	0	0	432	652	1,084	0.95	8:00-9:00
AM Peak 8:00-9:00	38	116	0	154	69	473	110	652	0	201	77	278	0	0	0	0	432	652	1,084	0.95	AM Peak 8:00-9:00
PM																					
4:00-4:15				49				186				26				0	75	186	261		4:00-4:15
4:15-4:30				52				192				40				0	92	192	284		4:15-4:30
4:30-4:45				62				201				47				0	109	201	310		4:30-4:45
4:45-5:00				62				231				46				0	108	231	339		4:45-5:00
5:00-5:15				65				228				40				0	103	228	331		5:00-5:15
5:15-5:30				59				239				57				0	116	239	355		5:15-5:30
5:30-5:45				65				290				60				0	125	290	415		5:30-5:45
5:45-6:00				63				301				57				0	110	301	411		5:45-6:00
6:00-6:15				36				310				58				0	92	310	402		6:00-6:15
6:15-6:30				52				291				51				0	103	291	394		6:15-6:30
6:30-6:45				52				251				47				0	99	251	350		6:30-6:45
6:45-7:00				61				211				42				0	103	211	314		6:45-7:00
3 Hour Totals	200	466	0	666	275	2,262	374	2,911	0	400	169	569	0	0	0	0	1,235	2,911	4,146		
1 Hour Totals																					
4:00-5:00	55	170	0	225	78	618	94	790	0	112	47	159	0	0	0	0	384	790	1,174	0.87	4:00-5:00
4:15-5:15	55	184	0	239	87	664	101	852	0	122	51	173	0	0	0	0	412	852	1,264	0.93	4:15-5:15
4:30-5:30	56	190	0	246	105	679	117	899	0	134	56	190	0	0	0	0	436	899	1,335	0.94	4:30-5:30
4:45-5:45	72	177	0	249	105	748	139	992	0	145	58	203	0	0	0	0	452	992	1,444	0.97	4:45-5:45
5:00-6:00	78	164	0	240	107	808	143	1,058	0	151	63	214	0	0	0	0	454	1,058	1,512	0.91	5:00-6:00
5:15-6:15	63	130	0	213	106	868	148	1,140	0	163	67	230	0	0	0	0	443	1,140	1,583	0.95	5:15-6:15
5:30-6:30	66	120	0	206	104	938	150	1,192	0	159	65	224	0	0	0	0	430	1,192	1,622	0.98	5:30-6:30
5:45-6:45	73	120	0	193	98	911	144	1,153	0	144	67	211	0	0	0	0	404	1,153	1,557	0.95	5:45-6:45
6:00-7:00	69	132	0	201	90	836	137	1,063	0	137	59	196	0	0	0	0	397	1,063	1,460	0.91	6:00-7:00
PM Peak 5:30-6:30	66	120	0	206	104	938	150	1,192	0	159	65	224	0	0	0	0	430	1,192	1,622	0.98	PM Peak 5:30-6:30

24TH STREET @ L STREET.

24th Street and L Street

Wells & Associates, LLC

McLean, Virginia

Existing Traffic Count

PROJECT: Columbia Heights
W & A JOB NO.: 2097.
INTERSECTION: 24th Street and L Street
LOCATION: Washington, D.C.

DATE: 04/10/2003
DAY:
WEATHER:
COUNTED BY:
INPUTED BY: Wells Again.

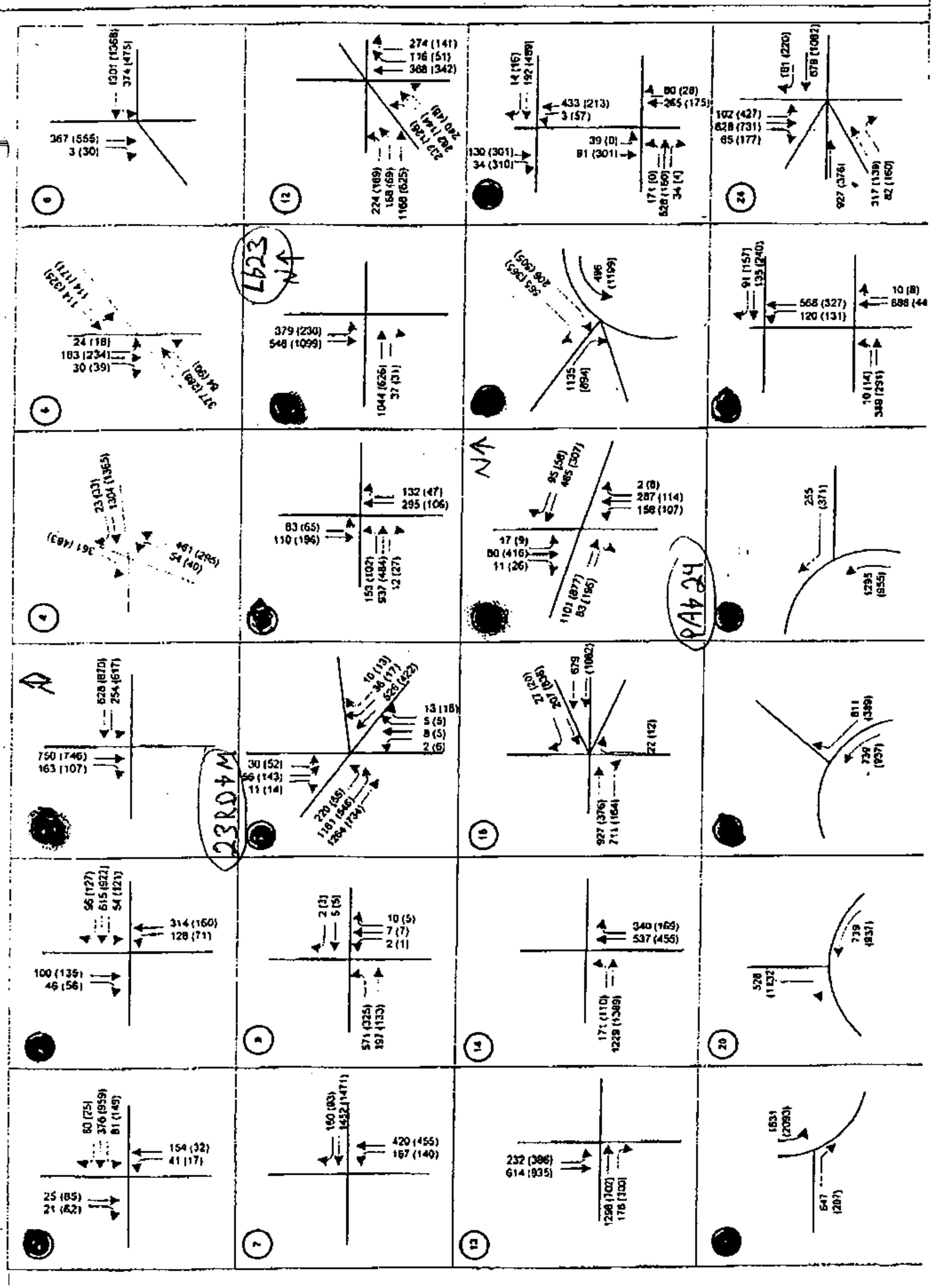
SOUTHBOUND ROAD: 24th St
NORTHBOUND ROAD: 24th St
WESTBOUND ROAD: [illegible] L St
EASTBOUND ROAD: [illegible] L St.

Time Period	Turning Movements: Southbound 24th Street 1 Right	2 Thru	3 Left	Total	Westbound L Street 4 Right	5 Thru	6 Left	Total	Northbound 24th Street 7 Right	8 Thru	9 Left	Total	Eastbound L Street 10 Right	11 Thru	12 Left	Total	North & South	East & West	Total	PHF	Time Period
AM																					
6:00-6:15				10				0				32				83	42	83	105		6:00-6:15
6:15-6:30				13				0				28				74	41	74	115		6:15-6:30
6:30-6:45				20				0				25				110	45	110	155		6:30-6:45
6:45-7:00				27				0				58				155	83	155	238		6:45-7:00
7:00-7:15				29				0				77				169	106	169	275		7:00-7:15
7:15-7:30				24				0				85				216	109	216	325		7:15-7:30
7:30-7:45				50				0				74				215	104	215	319		7:30-7:45
7:45-8:00				40				0				89				242	129	242	371		7:45-8:00
8:00-8:15				57				0				84				216	141	216	357		8:00-8:15
8:15-8:30				50				0				98				257	148	257	405		8:15-8:30
8:30-8:45				62				0				99				257	161	257	418		8:30-8:45
8:45-9:00				49				0				107				266	156	266	422		8:45-9:00
3 Hour Totals	0	241	170	411	0	0	0	0	328	926	0	854	141	1,941	293	2,240	1,265	2,240	3,505		
1 Hour Totals																					
6:00-7:00	0	49	21	70	0	0	0	0	44	97	0	141	9	338	57	402	211	402	613	0.64	6:00-7:00
6:15-7:15	0	58	31	89	0	0	0	0	69	117	0	186	11	434	63	508	275	508	783	0.71	6:15-7:15
6:30-7:30	0	61	39	100	0	0	0	0	94	149	0	243	10	552	88	650	343	650	993	0.76	6:30-7:30
6:45-7:45	0	63	47	110	0	0	0	0	123	169	0	292	7	657	91	755	402	755	1,157	0.89	6:45-7:45
7:00-8:00	0	71	52	123	0	0	0	0	133	192	0	325	4	741	97	842	448	842	1,290	0.87	7:00-8:00
7:15-8:15	0	87	64	151	0	0	0	0	136	196	0	332	1	778	110	889	483	889	1,372	0.92	7:15-8:15
7:30-8:30	0	102	75	177	0	0	0	0	139	206	0	345	1	820	109	930	522	930	1,452	0.90	7:30-8:30
7:45-8:45	0	119	90	209	0	0	0	0	151	219	0	370	1	839	132	972	579	972	1,551	0.93	7:45-8:45
8:00-9:00	0	121	97	218	0	0	0	0	151	237	0	388	1	864	131	996	606	996	1,602	0.95	8:00-9:00
AM Peak 8:00-9:00	0	121	97	218	0	0	0	0	151	237	0	388	1	864	131	996	606	996	1,602	0.95	AM Peak 8:00-9:00
PM																					
4:00-4:15				74				0				40				126	114	126	240		4:00-4:15
4:15-4:30				70				0				43				152	113	152	265		4:15-4:30
4:30-4:45				68				0				51				141	117	141	258		4:30-4:45
4:45-5:00				83				0				32				155	115	155	270		4:45-5:00
5:00-5:15				84				0				42				182	126	182	286		5:00-5:15
5:15-5:30				62				0				40				159	102	159	261		5:15-5:30
5:30-5:45				64				0				49				159	113	159	272		5:30-5:45
5:45-6:00				61				0				48				142	107	142	249		5:45-6:00
6:00-6:15				54				0				33				165	87	165	252		6:00-6:15
6:15-6:30				61				0				50				160	111	160	271		6:15-6:30
6:30-6:45				88				0				36				139	124	139	263		6:30-6:45
6:45-7:00				62				0				40				103	102	103	205		6:45-7:00
3 Hour Totals	0	622	297	828	0	0	0	0	181	321	0	502	156	1,386	221	1,763	1,331	1,763	3,094		
1 Hour Totals																					
4:00-5:00	0	223	70	293	0	0	0	0	61	105	0	166	31	461	82	574	459	574	1,033	0.96	4:00-5:00
4:15-5:15	0	217	86	303	0	0	0	0	65	103	0	168	42	492	76	610	471	610	1,081	0.94	4:15-5:15
4:30-5:30	0	215	80	295	0	0	0	0	63	102	0	165	48	499	70	617	460	617	1,077	0.93	4:30-5:30
4:45-5:45	0	215	78	293	0	0	0	0	55	108	0	163	60	504	71	635	456	635	1,091	0.95	4:45-5:45
5:00-6:00	0	201	70	271	0	0	0	0	61	116	0	177	73	497	82	652	448	652	1,070	0.93	5:00-6:00
5:15-6:15	0	187	54	241	0	0	0	0	52	116	0	168	79	478	70	625	409	625	1,034	0.95	5:15-6:15
5:30-6:30	0	186	54	240	0	0	0	0	59	119	0	178	80	482	64	626	418	626	1,044	0.96	5:30-6:30
5:45-6:45	0	197	67	264	0	0	0	0	64	101	0	165	70	465	71	606	429	606	1,035	0.95	5:45-6:45
6:00-7:00	0	198	67	265	0	0	0	0	59	100	0	159	52	438	77	567	424	567	991	0.91	6:00-7:00
PM Peak 4:45-5:45	0	215	78	293	0	0	0	0	55	108	0	163	60	504	71	635	456	635	1,091	0.95	PM Peak 4:45-5:45

PENNSYLVANIA AVE & 24TH STREET.

M STREET & 23RD STREET.

L STREET & 23RD STREET



APPENDIX B
DAILY COUNTS

K Street -	Between 31st St. and Thomas Jefferson St.						
Eastbound	Date:	9/10/2005	to	9/16/2005			
	Day of The Week						
Hour	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
0:00	495	130	99	112	121	170	429
1:00	288	39	37	50	64	106	274
2:00	254	34	39	35	50	80	186
3:00	122	22	20	20	26	38	106
4:00	54	23	15	16	22	21	58
5:00	30	70	36	52	56	53	31
6:00	35	124	128	134	107	126	54
7:00	53	255	244	285	274	264	96
8:00	86	409	381	413	374	364	110
9:00	119	386	347	377	396	376	171
10:00	164	304	278	282	283	298	198
11:00	256	250	360	290	311	333	243
12:00	261	327	342	334	334	403	240
13:00	278	330	366	366	344	390	283
14:00	264	368	312	422	415	443	312
15:00	304	371	394	398	377	446	344
16:00	356	310	358	352	401	393	387
17:00	348	408	450	436	424	497	420
18:00	420	464	527	512	524	516	438
19:00	368	376	424	422	470	442	408
20:00	320	345	350	332	402	406	383
21:00	322	285	324	355	415	425	460
22:00	334	226	250	272	332	486	510
23:00	224	127	170	198	264	476	486
Total:	5755	5983	6251	6465	6786	7552	6627

K Street -	Between 31st St. and Thomas Jefferson St.						
Westbound	Date:	9/10/2005	to	9/16/2005			
	Day of The Week						
Hour	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
0:00	278	62	80	64	102	141	260
1:00	193	40	49	38	53	103	119
2:00	153	24	26	25	36	68	152
3:00	90	14	6	9	20	29	90
4:00	30	24	24	27	28	28	37
5:00	29	133	105	122	98	144	40
6:00	68	184	182	209	200	202	97
7:00	62	362	354	368	380	368	104
8:00	114	524	545	516	519	534	174
9:00	135	484	565	547	563	532	215
10:00	190	350	378	425	426	404	252
11:00	212	332	394	368	393	395	239
12:00	290	306	382	371	398	404	322
13:00	304	337	378	362	364	373	294
14:00	301	340	366	366	340	369	362
15:00	338	352	339	340	316	342	357
16:00	336	278	310	316	310	342	416
17:00	322	310	354	359	315	385	381
18:00	323	378	382	344	434	434	455
19:00	414	308	350	355	454	455	419
20:00	322	256	266	270	398	423	386
21:00	289	214	252	258	312	399	422
22:00	218	178	234	228	298	372	390
23:00	151	108	154	158	196	331	340
Total:	5162	5898	6475	6445	6953	7577	6323

Hour Summary

M Street -	East of Key Bridge						
Eastbound	Date:	9/11/2005	to	9/17/2005			
	Day of The Week						
Hour	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
0:00	814	192	204	222	250	344	645
1:00	632	96	104	146	152	251	523
2:00	555	61	65	82	106	170	495
3:00	408	36	46	54	58	70	340
4:00	161	97	93	88	101	116	142
5:00	112	403	366	406	413	402	172
6:00	234	766	858	888	847	883	350
7:00	450	1414	1471	1448	1438	1472	614
8:00	844	1821	1776	1763	1772	1676	792
9:00	846	1719	1774	1776	1826	1734	1030
10:00	1166	1156	1222	1206	1176	1240	1101
11:00	1276	942	1112	1036	994	1136	1208
12:00	1222	956	966	994	1026	1130	1226
13:00	1172	960	912	981	928	1138	1172
14:00	999	872	938	990	1020	1069	1240
15:00	1038	944	966	984	956	1122	1161
16:00	1112	1079	1118	1005	1144	1216	1227
17:00	1066	1214	1189	1224	1247	1212	1184
18:00	1064	1280	1342	1282	1298	1306	1214
19:00	929	1068	1108	1164	1132	1201	1062
20:00	774	877	900	870	924	1078	1072
21:00	633	702	756	784	848	1008	1028
22:00	524	522	572	601	762	926	1059
23:00	340	338	372	425	560	920	992
Total:	18371	19515	20230	20419	20978	22820	21049
			20542.33				

M Street -	East of Key Bridge						
Westbound	Date:	9/11/2005	to	9/17/2005			
	Day of The Week						
Hour	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
0:00	1258	411	466	466	496	678	1024
1:00	1050	228	238	286	338	540	850
2:00	1134	162	198	196	289	447	909
3:00	949	87	82	91	134	246	745
4:00	382	104	96	92	120	136	321
5:00	203	279	266	288	292	306	214
6:00	206	648	666	685	688	670	298
7:00	382	1408	1314	1296	1288	1302	546
8:00	704	1474	1519	1379	1410	1320	788
9:00	873	1395	1378	1328	1334	1340	1118
10:00	1422	1226	1373	1250	1222	1288	1292
11:00	1622	1206	1374	1249	1271	1434	1312
12:00	1794	1367	1426	1306	1452	1512	1500
13:00	1654	1425	1542	1584	1496	1657	1504
14:00	1603	1753	1750	1736	1786	1744	1544
15:00	1605	1872	1905	1990	1963	1940	1554
16:00	1632	2132	2112	2169	2168	2126	1568
17:00	1696	2396	2324	2366	2334	2268	1596
18:00	1722	2374	2274	2331	2248	2180	1635
19:00	1498	1764	1983	1868	1893	1799	1444
20:00	1260	1630	1646	1512	1550	1411	1271
21:00	1166	1316	1354	1409	1474	1224	1264
22:00	914	1000	1236	1196	1262	1278	1331
23:00	638	697	828	684	978	696	1326
Total:	27367	28354	29350	28757	29486	29542	26954
			29197.67				

Whitehurst Fwy -	Between Key Bridge and Potomac Expy							
Eastbound	Date:	9/13/2005	to	9/19/2005				
	Day of The Week							weekday
Hour	Sun	Mon	Tues	Wed	Thurs	Fri	Sat	total
0:00	170	40	20	72	60	79	104	271
1:00	73	21	18	21	18	36	40	114
2:00	46	14	18	10	19	20	28	81
3:00	36	33	22	26	28	27	38	136
4:00	30	103	110	108	110	97	42	528
5:00	72	478	454	506	454	443	110	2335
6:00	118	1052	1080	1094	1057	998	179	5281
7:00	183	1717	1688	1750	1781	1666	290	8602
8:00	228	1970	1981	1930	1891	1747	370	9519
9:00	276	1754	1733	1652	1688	1599	385	8426
10:00	380	670	771	724	629	690	445	3484
11:00	391	531	590	600	604	640	454	2965
12:00	452	512	498	513	544	530	450	2597
13:00	496	522	512	502	500	510	430	2546
14:00	400	544	538	523	522	560	404	2687
15:00	378	496	484	490	514	505	454	2489
16:00	388	501	504	515	452	390	415	2362
17:00	370	484	488	492	494	478	510	2436
18:00	300	452	434	526	544	583	650	2539
19:00	298	446	458	577	468	552	634	2501
20:00	214	302	291	322	332	360	353	1607
21:00	200	234	229	239	262	250	241	1214
22:00	144	186	152	206	188	245	264	977
23:00	98	127	136	140	170	229	274	802
Total:	5741	13189	13209	13538	13329	13234	7564	66499
			13358.67					

Whitehurst Fwy -	Between Key Bridge and Potomac Expy							
Westbound	Date:	9/13/2005	to	9/19/2005				
	Day of The Week							
Hour	Sun	Mon	Tues	Wed	Thurs	Fri	Sat	
0:00	400	146	32	166	296	292	295	932
1:00	330	81	78	114	158	150	268	581
2:00	314	54	52	82	98	153	270	439
3:00	270	50	38	46	46	79	241	259
4:00	118	74	77	93	92	99	120	435
5:00	98	294	318	305	298	304	94	1519
6:00	141	524	530	564	518	510	171	2646
7:00	150	846	872	850	851	869	230	4288
8:00	182	879	882	852	852	906	304	4371
9:00	266	680	698	733	776	740	431	3627
10:00	384	608	700	641	642	654	536	3245
11:00	466	636	656	660	678	711	580	3341
12:00	663	736	787	792	770	892	688	3977
13:00	692	873	862	892	817	944	694	4388
14:00	692	1156	1181	1151	1165	1260	762	5913
15:00	717	1173	1419	1356	1436	1434	694	6818
16:00	744	1583	1631	1691	1660	1660	709	8225
17:00	734	1895	1995	1968	1934	1925	766	9717
18:00	634	2007	2002	2000	2014	1840	632	9863
19:00	562	1556	1577	1589	1578	1278	608	7578
20:00	428	1117	1007	964	948	802	492	4838
21:00	386	802	786	886	932	600	537	4006
22:00	396	583	606	720	625	674	884	3208
23:00	240	392	378	482	371	519	582	2142
Total:	10007	18745	19164	19597	19555	19295	11588	96356
			19438.67					

APPENDIX C
RECORDED SPEEDS FOR STUDIED SEGMENTS IN THE STUDY AREA

Average Speed in miles per hour

AM Peak	Section	Travel Time in Seconds	Speed in MPH	Posted Speed Limit
M St. (EB)	Foxhall Rd & Reservior Rd / Foxhall Rd & Canal Rd	135	15	25
	Foxhall Rd & Canal Rd / Canal Road & Whitehurst Freeway	57	31	
	Canal Road & Whitehurst Freeway / 35th Street	64	4	
	35th Street / M St & Wisconsin Ave	77	12	
	M St & Wisocnsin Ave / M St & Penn Ave	42	25	
	M St & Penn Ave / New Hamp Ave & Wash Circle	162	13	
M street (WB)	New Hamp Ave & M Street / M St & 24th Street	90	12	25
	M St & 24th Street / Rock Creek Parkway	103	8	
	Rock Creek Parkway / Canal Road & Whitehurst Freeway	366	12	
	Canal Road & Whitehurst Freeway / Foxhall Rd & Canal Rd	48	37	
	Foxhall Rd & Canal Rd / Foxhall Rd & Reservior Rd	240	11	
Whitehurst Freeway (EB)	Canal Road & Whitehurst Freeway / Key Bridge Ramp	16	16	35
	Key Bridge Ramp / Water Front Center	30	54	
	Water Front Center / Whitehurst Freeway Split To Potomac Expressway	38	14	
	Whitehurst Freeway Split To Potomac Expressway / K Street & 19th Street	303	8	
Whitehurst Freeway (WB)	Whitehurst Freeway & 27th Street / K Street & 19th Street Ramp	144	17	35
	Merge from Key Bridge Ramp/ Whitehurst Freeway & 27th Street	73	36	
	Canal Road & Whitehurst Freeway / Key Bridge Ramp	39	6	

AM Peak	Section	Travel Time in Seconds		Speed in MPH		Posted Speed Limit
		EB	WB	EB	WB	
K street	Wisconsin Ave & K Street / K Street & 27th Street	104	94	12	14	25

PM Peak	Section	Travel Time in Seconds		Speed in MPH		Posted Speed Limit
		EB	WB	EB	WB	
M St.	Foxhall Rd & Reservior Rd / Foxhall Rd & Canal Rd	134	123	15	16	25
	Foxhall Rd & Canal Rd / Canal Road & Whitehurst Freeway	262	50	7	35	
	Canal Road & Whitehurst Freeway / 35th Street	152	61	2	4	
	35th Street / M St & Wisconsin Ave	104	221	9	4	
	M St & Wisocnsin Ave / M St & Penn Ave	75	325	14	3	
	M St & Penn Ave / New Hamp Ave & Wash Circle	266	-	8	-	
	New Hamp Ave & M Street / M St and Penn Ave	-	182	-	9	
Whitehurst Freeway	Canal Road & Whitehurst Freeway / Key Bridge Ramp	15	33	17	8	35
	Merge from Key Bridge Ramp/ Whitehurst Freeway & 27th Street	222	280	12	9	
	Whitehurst Freeway & 27th Street / K Street & 19th Street Ramp	151	519	16	5	
K Street	Wisconsin Ave & K Street / K Street & 27th Street	240	110	5	12	25

APPENDIX D
UNADJUSTED ORIGIN-DESTINATION MATRICES FROM THE ORIGIN-DESTINATION STUDY

Table D-1

Unadjusted Origin and Destination Trips During AM Peak Period

		Destination					
	Location	Eastbound Whitehurst Freeway to Eastbound K-Street	Eastbound Whitehurst Freeway to Southbound 27th Street	Eastbound Whitehurst Freeway Diagonal Off Ramp going towards Southbound Potomac Expressway	Westbound Whitehurst Freeway to Westbound Canal Road	Westbound Whitehurst Freeway to Eastbound Canal Road	Total
Origin	Eastbound Canal Road going towards Whitehurst Freeway	1477	82	930			2489
	Northbound Key Bridge On Ramp to Eastbound Whitehurst Freeway	648	31	102			781
	Westbound K-Street towards Westbound Whitehurst Freeway				199	280	479
	Northbound Potomac Expressway Diagonal On Ramp to Westbound Whitehurst Freeway				559	209	768
	Total	2125	113	1032	758	489	

Note:

1. The volumes shown on the table are for a one and half hour period
2. The trips shown on this table include adjustments to the raw matching data to account for license plates that were not adequately documented in the data collection process and license plates that were not adequately matched in the database matching process.

Table D-2

Unadjusted Origin and Destination Trips During AM Peak Period As Percentage of Exit Volumes

		Destination				
	Location	Eastbound Whitehurst Freeway to Eastbound K-Street	Eastbound Whitehurst Freeway to Southbound 27th Street	Eastbound Whitehurst Freeway Diagonal Off Ramp going towards Southbound Potomac Expressway	Westbound Whitehurst Freeway to Westbound Canal Road	Westbound Whitehurst Freeway to Eastbound Canal Road
Origin	Eastbound Canal Road going towards Whitehurst Freeway	70%	73%	90%		
	Northbound Key Bridge On Ramp to Eastbound Whitehurst Freeway	30%	27%	10%		
	Westbound K-Street towards Westbound Whitehurst Freeway				26%	57%
	Northbound Potomac Expressway Diagonal On Ramp to Westbound Whitehurst Freeway				74%	43%
	Total	100%	100%	100%	100%	100%

Table D-3

Unadjusted Origin and Destination Trips During PM Peak Period

		Destination					
	Location	Eastbound Whitehurst Freeway to Eastbound K-Street	Eastbound Whitehurst Freeway to Southbound 27th Street	Eastbound Whitehurst Freeway Diagonal Off Ramp going towards Southbound Potomac Expressway	Westbound Whitehurst Freeway to Westbound Canal Road	Westbound Whitehurst Freeway to Eastbound Canal Road	Total
Origin	Eastbound Canal Road going towards Whitehurst Freeway	244	184	360			788
	Northbound Key Bridge On Ramp to Eastbound Whitehurst Freeway	336	295	101			732
	Westbound K-Street towards Westbound Whitehurst Freeway				1640	434	2074
	Northbound Rock Creek Parkway going towards westbound Whitehurst Freeway				169	23	192
	Northbound Potomac Expressway Diagonal On Ramp to Westbound Whitehurst Freeway				950	77	1027
	Total	580	479	461	2759	534	

Note:

1. The volumes shown on the table are for a one and half hour period
2. The trips shown on this table include adjustments to the raw matching data to account for license plates that were not adequately documented in the data collection process and license plates that were not adequately matched in the database matching process.

Table D-4

Unadjusted Origin and Destination Trips During PM Peak Period As Percentage of Exit Volumes

		Destination				
	Location	Eastbound Whitehurst Freeway to Eastbound K-Street	Eastbound Whitehurst Freeway to Southbound 27th Street	Eastbound Whitehurst Freeway Diagonal Off Ramp going towards Southbound Potomac Expressway	Westbound Whitehurst Freeway to Westbound Canal Road	Westbound Whitehurst Freeway to Eastbound Canal Road
Origin	Eastbound Canal Road going towards Whitehurst Freeway	42%	38%	78%		
	Northbound Key Bridge On Ramp to Eastbound Whitehurst Freeway	58%	62%	22%		
	Westbound K-Street towards Westbound Whitehurst Freeway				60%	82%
	Northbound Rock Creek Parkway going towards westbound Whitehurst Freeway				6%	4%
	Northbound Potomac Expressway Diagonal On Ramp to Westbound Whitehurst Freeway				34%	14%
	Total	100%	100%	100%	100%	100%

APPENDIX E
CRASH DATA

DDOT: Accident Summary Report (R-4) Date: Prepared By:

Location			Quadrant
KEY BRIDGE	And	WHITEHURST FRWY	NW

Summary for the time period 1/1/2000 To 12/31/2004

Total Number of Accidents 1

Total Number of Injuries 0

Contributing

Driver		Vehicle		Roadway		Unknown	
1	100.00	0	0.00%	0	0.00%	0	0.00%

Collision Types:

Right	Left	Right Turn:	Rear End:	Side Swiped:	Head On:	Parked
0	0	0	0	1	0	0

Fixed	Ran Off Road:	Pedestrian	Backing	Non Collision:	Other:
0	0	0	0	0	0

Accident Times:

Time	Number	Percent
07:30-09:30	0	0.00%
09:30-11:30	0	0.00%
11:30-13:30	0	0.00%
13:30-16:00	0	0.00%
16:00-18:30	0	0.00%
18:30-07:30	1	100.00%
Weekday	0	0.00%
Weekend:	0	0.00%

DDOT: Accident Summary Report (R-4) Date: Prepared By:

Location Quadrant

WHITEHURST FRWY And **27TH ST** **NW**

Summary for the time period **1/1/2002** To **12/31/2004**

Total Number of Accidents **6**

Total Number of Injuries **6**

Contributing

Driver		Vehicle		Roadway		Unknown	
3	50.00%	0	0.00%	0	0.00%	1	16.67

Collision Types:

Right	Left	Right Turn:	Rear End:	Side Swiped:	Head On:	Parked
1	0	0	2	2	0	0

Fixed	Ran Off Road:	Pedestrian	Backing	Non Collision:	Other:
1	0	0	0	0	0

Accident Times:

Time	Number	Percent
07:30-09:30	0	0.00%
09:30-11:30	0	0.00%
11:30-13:30	0	0.00%
13:30-16:00	1	16.67%
16:00-18:30	1	16.67%
18:30-07:30	4	66.67%
Weekday	5	83.33%
Weekend:	1	16.67%

DDOT: Accident Summary Report (R-4) Date: Prepared By:

Location		Quadrant
M ST	And CANAL RD	NW

Summary for the time period 1/1/2002 To 12/31/2004

Total Number of Accidents 6

Total Number of Injuries 6

Contributing

Driver		Vehicle		Roadway		Unknown	
3	50.00%	0	0.00%	0	0.00%	3	50.00

Collision Types:

Right	Left	Right Turn:	Rear End:	Side Swiped:	Head On:	Parked
0	0	0	1	2	0	0

Fixed	Ran Off Road:	Pedestrian	Backing	Non Collision:	Other:
2	1	0	0	0	0

Accident Times:

Time	Number	Percent
07:30-09:30	1	16.67%
09:30-11:30	0	0.00%
11:30-13:30	0	0.00%
13:30-16:00	1	16.67%
16:00-18:30	1	16.67%
18:30-07:30	3	50.00%
Weekday	3	50.00%
Weekend:	3	50.00%

DDOT: Accident Summary Report (R-4) Date: Prepared By:

Location Quadrant

WHITEHURST FRWY And **CANAL RD** **NW**

Summary for the time period **1/1/2002** To **12/31/2004**

Total Number of Accidents **3**

Total Number of Injuries **1**

Contributing

Driver		Vehicle		Roadway		Unknown	
2	66.67%	0	0.00%	0	0.00%	1	33.33

Collision Types:

Right	Left	Right Turn:	Rear End:	Side Swiped:	Head On:	Parked
0	0	0	1	2	0	0

Fixed	Ran Off Road:	Pedestrian	Backing	Non Collision:	Other:
0	0	0	0	0	0

Accident Times:

Time	Number	Percent
07:30-09:30	0	0.00%
09:30-11:30	0	0.00%
11:30-13:30	0	0.00%
13:30-16:00	2	66.67%
16:00-18:30	0	0.00%
18:30-07:30	1	33.33%
Weekday	2	66.67%
Weekend:	1	33.33%

DDOT: Accident Summary Report (R-4) Date: Prepared By:

Location			Quadrant
K ST	And	27TH ST	NW

Summary for the time period 1/1/2002 To 12/31/2004

Total Number of Accidents 18

Total Number of Injuries 4

Contributing

Driver		Vehicle		Roadway		Unknown	
10	55.56%	0	0.00%	2	11.11	4	22.22

Collision Types:

Right	Left	Right Turn:	Rear End:	Side Swiped:	Head On:	Parked
1	1	0	9	3	1	0

Fixed	Ran Off Road:	Pedestrian	Backing	Non Collision:	Other:
1	0	0	0	1	1

Accident Times:

Time	Number	Percent
07:30-09:30	1	5.56%
09:30-11:30	1	5.56%
11:30-13:30	1	5.56%
13:30-16:00	2	11.11%
16:00-18:30	2	11.11%
18:30-07:30	11	61.11%
Weekday	11	61.11%
Weekend:	7	38.89%

DDOT: Accident Summary Report (R-4) Date: Prepared By:

Location Quadrant

WHITEHURST FRWY And **K ST** **NW**

Summary for the time period **1/1/2002** To **12/31/2004**

Total Number of Accidents **4**

Total Number of Injuries **1**

Contributing

Driver		Vehicle		Roadway		Unknown	
0	0.00%	0	0.00%	0	0.00%	4	100.00

Collision Types:

Right	Left	Right Turn:	Rear End:	Side Swiped:	Head On:	Parked
0	0	1	0	1	1	0

Fixed	Ran Off Road:	Pedestrian	Backing	Non Collision:	Other:
0	1	0	0	0	0

Accident Times:

Time	Number	Percent
07:30-09:30	1	25.00%
09:30-11:30	1	25.00%
11:30-13:30	0	0.00%
13:30-16:00	0	0.00%
16:00-18:30	0	0.00%
18:30-07:30	2	50.00%
Weekday	3	75.00%
Weekend:	0	0.00%

DDOT: Accident Summary Report (R-4) Date: Prepared By:

Location Quadrant

KEY BRIDGE And **M ST** **NW**

Summary for the time period **1/1/2000** To **12/31/2004**

Total Number of Accents **33**

Total Number of Injuries **10**

Contributing

Driver		Vehicle		Roadway		Unknown	
9	27.27%	0	0.00%	1	3.03%	17	51.52

Collision Types:

Right	Left	Right Turn:	Rear End:	Side Swiped:	Head On:	Parked
1	3	2	14	8	0	0

Fixed	Ran Off Road:	Pedestrian	Backing	Non Collision:	Other:
1	0	2	0	0	2

Accident Times:

Time	Number	Percent
07:30-09:30	1	3.03%
09:30-11:30	3	9.09%
11:30-13:30	6	18.18%
13:30-16:00	4	12.12%
16:00-18:30	3	9.09%
18:30-07:30	16	48.48%
Weekday	22	66.67%
Weekend:	10	30.30%

DDOT: Accident Summary Report (R-4) Date: Prepared By:

Location			Quadrant
WISCONSIN AVE	And	M ST	NW

Summary for the time period 1/1/2000 To 12/31/2004

Total Number of Accidents 146

Total Number of Injuries 28

Contributing

Driver		Vehicle		Roadway		Unknown	
66	45.21%	0	0.00%	8	5.48%	55	37.67

Collision Types:

Right	Left	Right Turn:	Rear End:	Side Swiped:	Head On:	Parked
8	6	6	38	57	3	12

Fixed	Ran Off Road:	Pedestrian	Backing	Non Collision:	Other:
2	0	5	0	0	1

Accident Times:

Time	Number	Percent
07:30-09:30	6	4.11%
09:30-11:30	14	9.59%
11:30-13:30	12	8.22%
13:30-16:00	23	15.75%
16:00-18:30	15	10.27%
18:30-07:30	76	52.05%
Weekday	92	63.01%
Weekend:	50	34.25%

District Department of Transportation
Traffic Services Administration

2000 - 2005 Traffic Fatalities
Whitehurst FRWY Corridor

CRASH #	DEATH #	CNN	QDR	Location	Driver	Passengers	Pedestrian	Motorcycle/Bik	Age	MONTH	Day	Time	V Type	Year
1	5	22033	NW	WHITEHURST FRWY AND M ST	1				36	FEB	SUN	0210	Passenger Auto	2005
2	20	62132	NW	WISCONSIN AND M ST			1		59	MAY	SAT	1545	Passenger Auto	2005

updated: 6/8/2005

APPENDIX F
DESCRIPTION OF LEVEL OF SERVICE FOR SIGNALIZED AND UNSIGNALIZED INTERSECTIONS

Level of Service Descriptions for Signalized Intersections

Level of Service	Description
A	***Level of Service A*** describes operations with very low delay, up to 10 sec per vehicle. This level of service occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	***Level of Service B*** describes operations with delay greater than 10 and up to 20 sec per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than for LOS A, causing higher levels of average delay.
C	***Level Of Service C*** describes operations with delay greater than 20 and up to 35 sec per vehicle. These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, though many still pass though the intersection without stopping.
D	***Level of Service D*** describes operations with delay greater than 35 and up to 55 sec per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, longer cycle lengths, or high volume to capacity (v/c) ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable. This level is considered by many agencies to be the limit of acceptable delay.
E	***Level of Service E*** describes operations with delay greater than 55 and up to 80 sec per vehicle. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.
F	***Level of Service F*** describes operations with delay in excess of 80 sec per vehicle. This level, considered to be unacceptable to most drivers, often occurs with over saturation, that is, when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios below 1.0 with many individual cycle failures. Poor progression and cycle lengths may also be major contributing causes to such delay levels.

LEVEL OF SERVICE
UNSIGNALIZED INTERSECTIONS

At unsignalized intersections, the criteria used to evaluate the quality of flow is the measure of the adequacy of the number of acceptable gaps in the thru traffic stream for drivers facing a STOP or YIELD condition. Variables affecting the gaps fare the distribution or arrival of vehicles in the thru traffic stream, the width of the highway, trucks, grades and the amount of time it requires to enter the traffic stream from a stop position (critical gap size).

As a result, the following criteria has been established:

Level of Service	Average Control Delay	Status
A	0 – 10	Little or no Delay
B	> 10 – 15	Short Traffic Delays
C	> 15 – 25	Average Delays
D	> 25 – 35	Long Delays
E	> 35 – 50	Very Long Delays
F	> 50	Extremely Long Delays with significant queuing and traffic congestion