THE GEORGE WASHINGTON UNIVERSITY
FOGGY BOTTOM CAMPUS PLAN: 2006-2025
TRANSPORTATION IMPACT STUDY
WASHINGTON, D.C.

Prepared for:
The George Washington University

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February 16, 2006
Revised August 24, 2006

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TABLE OF CONTENTS

THE GEORGE WASHINGTON UNIVERSITY
FOGGY BOTTOM CAMPUS PLAN: 2006-2025
TRANSPORTATION IMPACT STUDY
WASHINGTON, D.C.

LIST OF TABLES

THE GEORGE WASHINGTON UNIVERSITY
FOGGY BOTTOM CAMPUS PLAN: 2006-2025
TRANSPORTATION IMPACT STUDY
WASHINGTON, D.C.

LIST OF FIGURES

Section 1
INTRODUCTION

OVERVIEW

This traffic and parking report presents an evaluation of The George Washington University Foggy Bottom Campus Plan: 2006 – 2025.

The University is an independent academic institution chartered by the United States Congress in 1821. The Campus includes approximately 44 acres of land in the Foggy Bottom/West End neighborhood of Washington, DC.

The campus generally is bounded by 19th Street on the east, 24th Street on the west, Washington Circle and Pennsylvania Avenue on the north, and F Street on the south, as shown on Figure 1-1.

As of fall 2005, the Foggy Bottom Campus community included 18,802 undergraduate and graduate students on a headcount basis, and 6,054 faculty and staff (regular full- and part-time) on a headcount basis. The Foggy Bottom Campus Plan: 2006 – 2025 proposes no increase to the population caps set forth under the existing Campus Plan for student enrollment, faculty and staff. Accordingly, the new Campus Plan does not contemplate any modification to the minimum parking requirement of 2,800 spaces or the general parking aggregation guidelines as set forth in the existing Campus Plan.

This Foggy Bottom Campus Plan: 2006 – 2025 accommodates the University's forecasted academic and student housing space needs within the existing Campus Plan boundaries. Eighteen potential development sites (some of which include parking opportunity sites) have been identified throughout the campus, including the potential location of a new cancer center on Square 39 and redevelopment of the 1,482-space University Parking Garage on Square 55 (the anticipated site of a new inter-disciplinary Science Center). The Plan proposes approximately 2,000,000 gross square feet (GSF) of new university uses, including high-tech classrooms, labs, offices, residential space, support space, and other modernized University facilities.

Under the existing Campus Plan, effective August 31, 2006, the University is required to make available 5,600 beds for full-time Foggy Bottom undergraduate students up to an enrollment of 8,000 students and one bed for every full-time Foggy Bottom undergraduate student in excess of 8,000. Since 1999, the University has added nearly 2,500 undergraduate beds on campus to meet this requirement and to enhance the University's undergraduate *living and learning* environment. Under the proposed Campus Plan, the University seeks to add up to 1,000 additional on campus beds.

The existing public street, pedestrian, public transportation, parking, loading, and bicycle systems are described and evaluated in this report. In addition to proposed development proposed under the Campus Plan, the impacts of two GW projects currently pending review by the Zoning Commission under separate consolidated PUD applications – specifically, the redevelopment of the former GW Hospital site (Square 54) and joint DCPS/GW School Without Walls project (Square 80) – are included in this analysis, as well as impact of potential future increases to existing Foggy Bottom student enrollment and faculty/staff over the term of the Plan. Additionally, planned or approved projects in and around the study area were also taken into account.

Sources of data for this study include traffic counts and other data collected by Wells & Associates; The George Washington University Foggy Bottom Campus Plan Traffic and Parking Study (dated December 21, 1999); the Washington Metropolitan Area Transit Authority; the District Department of Transportation (DDOT); the Institute of Transportation Engineers (ITE); traffic impact studies conducted by Wells & Associates and others; Ehrenkrantz Eckstut & Kuhn (EE&K); and the University.

STUDY AREA

The study area (bounded by 19th Street on the east, 24th Street on the west, Washington Circle and Pennsylvania Avenue on the north, and F Street on the south) was determined based on those intersections that could potentially be affected by the GW Campus Plan. The following intersections were selected for analysis (numbers in parentheses indicate intersection number as labeled on the figures):

- Washington Circle/23rd Street (#1),
- Washington Circle/New Hampshire Avenue (#2),
- Washington Circle/K Street Eastbound (#3)
- Washington Circle/K Street Westbound/ Pennsylvania Avenue (#4)
- Washington Circle/23rd Street Southbound (#5)
- Washington Circle/New Hampshire Avenue (#6)
- Washington Circle/K Street Westbound (#7)
- Washington Circle/K Street Eastbound/Pennsylvania Avenue (#8)
- 23rd Street/Eye Street (#9)
- 23rd Street/F Street/Virginia Avenue Westbound (#10)
- 23rd Street/Virginia Avenue Eastbound (#11)
- 22nd Street/K Street Westbound (#12)
- 22nd Street/K Street Eastbound (#13)
- 22nd Street/Pennsylvania Avenue (#14)
- 22nd Street/Eye Street (#15)
- 22nd Street/Virginia Avenue (#16)
- 24th Street/K Street Westbound (#17)
- 24th Street/K Street Eastbound (#18)
- 23rd Street/H Street (#19)
- 22nd Street/Potential Future Square 54 Driveway (#21)
- K Street Eastbound/Pennsylvania Avenue (#25)
- K Street Westbound/Pennsylvania Avenue (#28)
- Washington Circle/K Street Westbound (#36)
- 24th Street/Pennsylvania Avenue (#37)
- Washington Circle/K Street Eastbound (#44)
- Eye Street/New Hampshire Avenue (#50)
- 24th Street/New Hampshire Avenue (#51)
- 24th Street/Eye Street (#52)
- 24th Street/H Street (#53)
- 24th Street/G Street (#54)
- 23rd Street/G Street (#55)
- 22nd Street/H Street (#56)
- 22nd Street/G Street (#57)
- 22nd Street/F Street (#58)
- 21st Street/Eye Street (#59)
- 21st Street/H Street (#60)
- 21st Street/G Street (#61)
- 21st Street/F Street (#62)
- 20th Street/Pennsylvania Avenue (#63)
- 20th Street/H Street (#64)
- 20th Street/G Street (#65)
- 20th Street/F Street (#66)
- Eye Street/Pennsylvania Avenue (#67)
- New Hampshire Avenue/Warwick Garage Driveway (#70)
- 24th Street/New Hall Garage Driveway (#71)
- G Street/Health & Wellness Center Driveway (#72)
- Virginia Avenue/Ivory Tower Driveway (#73)
- 23rd Street/Ross Hall Garage Driveway (#74)
- Eye Street/Kennedy Onassis Garage Driveway (#75)
- H Street/Lot 12 Driveway (#76)
- G Street/Funger Hall Driveway (#77)
- Virginia Avenue/IH Driveway (#78)
- Eye Street/UPG Driveway (#79)
- 22nd Street/UPG Driveway (#80)
- H Street/UPG Driveway (#81)
- Eye Street/Academic Center Driveway (#82)
- H Street/Marvin Center Driveway Outbound (#83)
- G Street/Lot 1 Driveway (#84)
- F Street/Dakota Driveway (#85)
- Eye Street/Ambulatory Care Center Driveway (#86)
- 21st Street/Lot A Driveway (#87)
- H Street/Media & Public Affairs Driveway (#88)
- H Street/Lot 3 Driveway (#89)
- 20th Street/Lot A Driveway (#90)
- H Street/Marvin Center Driveway Inbound (#91)

STUDY OBJECTIVES

The objectives of this study were to:

- Evaluate existing traffic operational conditions on- and off-campus,
- Inventory existing off-street parking supply and identify the existing off-street parking demand,
- Identify existing mode choice alternatives,
- Identify existing pedestrian and bicycle facilities,
- Project future traffic volumes based on the proposed Campus Plan and its associated parking changes,
- Evaluate the effectiveness of the existing Transportation Management Plan and recommend changes, as necessary,
- Recommend transportation improvements to promote the safe and efficient flow of vehicular and pedestrian traffic on campus.

Section 2
EXISTING CONDITIONS

OVERVIEW

This section describes existing transportation conditions on The George Washington University Foggy Bottom Campus in terms of the public road network, pedestrian circulation, bicycle circulation, public transportation, parking, loading facilities, travel behavior, and transportation management.

PUBLIC STREET SYSTEM

The University is served by a connected network of arterial, collector, and local streets. Existing intersection lane use and traffic control at key intersections in the site vicinity are shown on Figure 2-1.

The north-south streets through campus (21st, 22nd, and 23rd Streets) and Pennsylvania Avenue/ Washington Circle primarily serve through commuter traffic. The east-west streets through campus (F, G, H, and Eye Streets) are more diverse and primarily serve local traffic and pedestrians.

Pennsylvania Avenue is a two-way, six-lane principal arterial with a posted speed limit of 25 miles per hour (mph). Pennsylvania Avenue carries an average daily traffic (ADT) volume of 23,200 vehicles per day (vpd). Metrobus lines 30, 32, 34, 35, 36 provide service along Pennsylvania Avenue, east of Washington Circle. Metrobus lines 38B, D5, and the East-West DC Circulator, provide service along Pennsylvania Avenue, west of Washington Circle.

New Hampshire Avenue is a two-way, two-lane minor arterial. New Hampshire Avenue carries an ADT volume of 4,900 vpd.

Virginia Avenue is a two-way, four-lane minor arterial in the study area. The mainline of Virginia Avenue crosses under 23rd Street while turning movements are facilitated by signalized intersections on 23rd Street. The Virginia Avenue/22nd Street intersection is controlled by a traffic signal.

Metrobus line 80 provides service along Virginia Avenue from 18th Street to New Hampshire Avenue and Metrobus line S1 provides service along Virginia Avenue from 18th to 22nd Streets. The ADT on Virginia Avenue ranges from 12,800 to 13,400 vpd.

K Street, 23rd Street, Pennsylvania Avenue, and New Hampshire Avenue converge at

Washington Circle. The mainline of K Street passes beneath the Circle. Frontage roads on both sides of K Street intersect the Circle at grade. All streets except the K Street frontage roads intersect the Circle at signalized junctions.

The cross-section of the circle varies from two- to four-lanes. The posted speed limit of the circle, which is classified by DDOT as a principal arterial, is 25 mph. No parking is permitted within the Circle, except in the vicinity of 23rd Street (north). Metrobus lines 30, 32, 34, 35, 36, 38B, H1, L1, N3, and D5, and the East-West DC Circulator, provide service along Washington Circle.

24th Street is a two-way, two-lane collector street with parking intermittently permitted on both sides of the street. The posted speed limit is 25 mph. The intersections of 24th Street with K Street (eastbound and westbound) and Pennsylvania Avenue are controlled by traffic signals. The intersections of 24th Street with H Street, Eye Street, and New Hampshire Avenue are controlled by all-way stop signs. The intersection of 24th Street with G Street is stop-controlled in the westbound direction. The ADT on 24th Street ranges from 4,000 to 5,500 vpd within the study area.

23rd Street is classified by DDOT as a principal arterial. It is one of the most vibrant streets in Washington, DC. Automobile, public buses, private shuttle buses, pedestrians, bicyclists, and cars parked along the curb share this two-way, five-lane street. The Foggy Bottom-GWU Metrorail station, the University, and the GW Hospital generate large numbers of pedestrians that use the sidewalks and crosswalks on 23rd Street, particularly at Eye Street.

Within the study area along 23rd Street, three lanes are provided in the northbound direction and two lanes are provided in the southbound direction. The ADT on 23rd Street, between F Street and Washington Circle, ranges from 17,600 to 18,000 vpd on the GW campus. The posted speed limit is 25 mph. The intersections of 23rd Street with Eye, H, G, and F Streets and Virginia Avenue are controlled by traffic signals. Metrobus lines H1, L1, and N3 provide service along 23rd Street from M Street to Constitution Avenue, while Metrobus line 80 provides service along 23rd Street from H Street to Virginia Avenue.

22nd Street is a one-way collector, with two northbound lanes south of Eye Street and three northbound lanes in the vicinity of Pennsylvania Avenue. The posted speed limit is 35 mph.

The 22nd Street/Eye Street and 22nd Street/H Street intersections are controlled by all-way stop signs. The 22nd Street/F Street intersection is stop-controlled on the eastbound approach. The intersections of 22nd Street with Pennsylvania Avenue, K Street (eastbound and westbound) and G Street are controlled by traffic signals. The ADT on 22nd Street varies from 5,100 vpd to 5,900 vpd within the study area.

21st Street is a one-way collector, with two travel lanes in the southbound direction. The intersections of 21st Street with F, G, and H Streets are controlled by traffic signals. The 21st Street/Eye Street intersection is stop-controlled in the eastbound direction. The ADT on 21st Street ranges from 5,900 to 6,500 vpd within the study area. Metrobus line 80 provides service along 21st Street within the vicinity of F Street.

20th Street is a one-way minor arterial, with two to three lanes in the northbound direction. The intersections of 20th Street with F, G, and H Streets, and Pennsylvania Avenue, are controlled by traffic signals. The ADT on 20th Street ranges from 12,000 to 14,700 vpd within the study area.

K Street operates as a one-way pair with the mainline passing under Washington Circle. K Street (eastbound and westbound) operates under signal control at its intersections with 24th Street, 22nd Street, and Washington Circle. At these intersections, two travel lanes are available on the eastbound and westbound approaches. K Street is classified as a principal arterial and carries approximately 30,000 vpd within the study area. Metrobus lines 38B and D5 provide service along K Street just east of Washington Circle, and the East-West DC Circulator provides service along K Street just west of Washington Circle.

Eye Street is a two-way, two-lane street, except between 21st Street and Pennsylvania Avenue where it is one-way eastbound. The posted speed limit is 25 mph. The ADT volume varies from 1,000 vpd on the one-way portion to 3,700 vpd on the two-way portion on the GW campus.

The Eye Street/23rd Street intersection is controlled by a traffic signal. The Eye Street/22nd Street, Eye Street/24th Street and Eye Street/New Hampshire Avenue intersections are all-way stop controlled. Eye Street/21st Street and Eye Street/Pennsylvania Avenue intersections are stop controlled on the eastbound approaches.

Eye Street, between 23rd and 24th Streets, is a pedestrian mall, closed to vehicular traffic. Metrobus lines H1, L1, N3 and 80 provide service in the vicinity of the intersection of Eye Street and 23rd Street.

H Street is a two-lane, east-west collector that provides one travel lane in each direction in the site vicinity. The intersections of H Street with 20th, 21st, and 23rd Streets are controlled by traffic signals. The H Street/22nd Street and H Street/24th Street intersections are controlled by all-way stop signs. Metrobus line 80 provides service along H Street from 23rd Street to 25th Street. The ADT on H Street ranges from 3,200 to 3,600 vpd within the study area.

G Street is a one-way collector, with one lane in the westbound direction. The intersections of G Street with 20th, 21st, 22nd, and 23rd Streets are controlled by traffic signals. The G Street/24th Street intersection is stop controlled on the westbound approach. The ADT ranges from 1,400 vpd to 2,000 vpd within the study area.

F Street is a one-lane, one-way eastbound collector. The F Street/20th Street, F Street/21st Street and F Street/23rd Street intersections are controlled by traffic signals. The F Street/22nd Street intersection is stop-controlled in the eastbound direction. The ADT ranges from 1,700 to 3,400 vpd within the study area. Metrobus line 80 provides service along F Street from 21st Street to 23rd Street.

EXISTING TRAFFIC COUNTS

Vehicular Traffic Counts

Existing AM and PM peak period vehicular and pedestrian traffic counts were conducted on Wednesday, May 11, 2005, by Wells & Associates at the following intersections:

1. Washington Circle/23rd Street,
2. Washington Circle/New Hampshire Avenue,
3. Washington Circle/K Street Eastbound,
4. Washington Circle/K Street Westbound/ Pennsylvania Avenue,
5. Washington Circle/23rd Street Southbound,
6. Washington Circle/New Hampshire Avenue,
7. Washington Circle/K Street Westbound,
8. Washington Circle/K Street Eastbound/Pennsylvania Avenue,
9. 23rd Street/Eye Street,
10. 23rd Street/F Street/Virginia Avenue Westbound,
11. 23rd Street/Virginia Avenue Eastbound,
12. 22nd Street/K Street Westbound,
13. 22nd Street/K Street Eastbound,
14. 22nd Street/Pennsylvania Avenue,
15. 22nd Street/Eye Street,
16. 22nd Street/Virginia Avenue,

Peak hour turning movements were obtained from the Square 37 Traffic Impact Study[1] at the following intersections:

17. 24th Street/K Street Westbound,
18. 24th Street/K Street Eastbound,
19. 23rd Street/H Street,

Additional AM and PM peak period vehicular and pedestrian traffic counts were conducted on Wednesday, September 21, 2005, by Wells & Associates at the following intersections:

21. 22nd Street/Potential Future Square 54 Driveway,
25. K Street Eastbound/Pennsylvania Avenue,
28. K Street Westbound/Pennsylvania Avenue,
36. Washington Circle/K Street Westbound,
37. 24th Street/Pennsylvania Avenue,
44. Washington Circle/K Street Eastbound,
50. Eye Street/New Hampshire Avenue,
51. 24th Street/New Hampshire Avenue,
52. 24th Street/Eye Street,
53. 24th Street/H Street,
54. 24th Street/G Street,
55. 23rd Street/G Street,
56. 22nd Street/H Street,
57. 22nd Street/G Street,
58. 22nd Street/F Street,
59. 21st Street/Eye Street,
60. 21st Street/H Street,
61. 21st Street/G Street,
62. 21st Street/F Street,
63. 20th Street/Pennsylvania Avenue,
64 20th Street/H Street,
65 20th Street/G Street,
66. 20th Street/F Street, and
67. Eye Street/Pennsylvania Avenue.

These counts are summarized on Figure 2-2.

[1] Published by the Traffic Services Administration of DDOT, September 2002.

Parking Facility Driveway Traffic Counts

AM and PM peak period vehicular traffic counts also were conducted at each on-campus University parking facility driveway. The results are summarized on Figure 2-2.

The University peak hours, as measured at the University's parking facility driveways, occurred between 8:00 AM to 9:00 AM and between 5:00 PM to 6:00 PM. The adjacent street AM street peak hour generally occurred between 8:30 AM to 9:30 AM, and the adjacent street PM peak hour generally occurred between 5:30 PM to 6:30 PM. The University AM and PM peak hours, therefore, occur one-half hour before the street peak hours.

The University parking lots and garages generated a total of 643 AM peak hour vehicle-trips, and 727 PM peak hour vehicle-trips, during the ***University*** peak hours. They generated 607 AM peak hour vehicle-trips, and 638 PM peak hour vehicle-trips, during the ***street*** peak hours.

University Parking Garage Counts

Extended counts were conducted at the University Parking Garage (UPG) on Thursday, November 10, 2005, from 7:00 AM to 12:00 midnight in order to identify AM commuter, mid-day, PM commuter, and evening peak hour trip characteristics. Additional counts were performed because the UPG supports a representative mix of parking users found throughout the campus, including visitors, staff, students, etc.

The UPG generated a total of 289 vehicle-trips at 7:30 to 8:30 AM, 189 vehicle-trips at 11:45 AM to 12:45 PM, 303 vehicle-trips at 5:15 to 6:15 PM, and only 147 vehicle-trips at 8:00 to 9:00 PM. The critical peak hours, therefore, are the AM and PM commuter peak hours. The mid-day and evening peaks are lower than the commuter peaks.

GW Vehicle-Trip Generation

The garage site trips were increased by 25 percent to account for on-street parking. GW is estimated to generate a total of 804 AM peak hour vehicle-trips, and 909 PM peak hour vehicle-trips, during the ***University*** peak hours, and GW is estimated to generate 759 AM peak hour vehicle-trips, and 798 PM peak hour vehicle-trips, during the ***street*** peak hours.

Cordon Analysis

A total of 9,763 vehicles crossed the cordon around the GW campus during the ***street*** AM peak hour; 9,163 vehicles crossed the cordon during the ***street*** PM peak hour.

University traffic accounts for 7.8 to 8.7 percent of all traffic on streets within the campus during the ***street*** AM and PM peak hours, respectively; the majority of traffic (92.2 percent during the street AM peak and 91.3 percent during the street PM peak) is non-University traffic.

The percentage of traffic attributable to GW at specific points within the campus is documented in Table 2-1. It is notable that in only two cases, traffic attributable to GW exceeds 25 percent.

Table 2-1
Percent of Traffic Attributable to GW

LOCATION	AM PEAK HOUR	PM PEAK HOUR
23rd Street south of Washington Circle	6.5%	7.9%
23rd Street north of Virginia Avenue	10.6%	4.5%
22nd Street south of Pennsylvania Avenue	2.5%	19.3%
22nd Street north of Virginia Avenue	17.9%	11.7%
21st Street south of Pennsylvania Avenue	20.0%	9.5%
21st Street north of Virginia Avenue	3.5%	9.1%
20th Street south of Pennsylvania Avenue	1.6%	5.8%
20th Street north of Virginia Avenue	2.4%	3.4%
Eye Street between 22nd and 23rd Streets	23.5%	12.7%
H Street between 22nd and 23rd Streets	32.3%	59.3%
G Street between 22nd and 23rd Streets	8.6%	4.3%
F Street between 22nd and 23rd Streets	52%	4.5%

Pedestrian Traffic Counts

Existing AM and PM peak hour pedestrian traffic counts are summarized on Figure 2-3.

The pedestrian activity within the campus boundaries is very high, especially in the vicinity of the University Parking Garage, the Marvin Center, the Gelman Library, and the GW Hospital.

The pedestrian traffic counts indicated that very large numbers of pedestrians cross 22nd and 23rd at Eye Street during the AM and PM peak hours. Approximately 2,900 to 3,100 pedestrians cross the three legs of the 23rd Street/Eye Street intersection and 1,300 to 1,500 pedestrians cross the four legs of the 22nd Street/Eye Street intersection.

Pedestrian activity is not limited to public sidewalks and pedestrian street crossings, as numerous mid-block locations reflected high pedestrian activity. Mid-block pedestrian traffic counts were performed by Wells & Associates on Thursday, November 10, 2005, at the following locations between 8:00 AM to 10:00 AM and 5:00 PM to 7:00 PM:

1. Between 21st and 22nd Streets along Eye Street,
2. Between 21st and 22nd Streets, along H Street, and
3. Between 20th and 21st Streets, along H Street.

As shown on Figure 2-3, approximately 40 to 200 pedestrians cross mid-block along Eye Street between 21st and 22nd Streets during the AM and PM peak hours; approximately 450 to 700 pedestrians cross mid-block along H Street between 21st and 22nd Streets during the AM and PM peak hours; and approximately 300 pedestrian cross mid-block along H Street between 20th and 21st Streets during the AM and PM peak hours.

Accident data provided by the Metropolitan Police Department of the District of Columbia indicated that a very small number of pedestrian related accidents occurred in 2004 and 2005. However, pedestrian safety along H and Eye Streets at mid-block crossings and the need for the uninterrupted flow of vehicular traffic are important aspects to achieve.

EXISTING CAPACITY ANALYSES

Capacity/level of service analyses were conducted at the study intersections based on the existing lane use and traffic controls shown on Figure 2-1, the existing vehicular traffic volumes shown on Figure 2-2, the existing pedestrian traffic volumes shown on Figure 2-3 and existing traffic signal timings obtained from DDOT.

Synchro Traffic Analysis Software (version 6, build 612) was used to evaluate peak hour levels of service. Synchro is a macroscopic capacity analysis model that evaluates the effects of intersection geometrics, traffic demands, traffic control, and traffic signal settings. Traffic signal timings can be optimized by the Synchro model. The levels of service reported in this study were taken from the Highway Capacity Manual 2000 reports generated by Synchro.

Level of Service Criteria

Level of Service (LOS) for signalized intersections is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time, as shown in Table 2-2.

Table 2-2
Level of Service Criteria for Signalized Intersections

LEVEL OF SERVICE	AVERAGE CONTROL DELAY (SEC/VEH)
A	≤ 10.0
B	> 10.0 and ≤ 20.0
C	> 20.0 and ≤ 35.0
D	> 35.0 and ≤ 55.0
E	> 55.0 and ≤ 80.0
F	>80.0

LOS "A" describes operations with very low delay, up to 10 seconds 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.

LOS "B" describes operations with delay greater than 10 and up to 20 seconds per vehicle. This level generally occurs with good progression and/or short cycle lengths. More vehicles stop than with LOS A, causing higher levels of average delay.

LOS "C" describes operations with delay greater than 20 and up to 35 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.

LOS "D" describes operations with delay greater than 35 and up to 55 seconds per vehicle. At LOS "D", the influence of congestion becomes more noticeable. Longer delays may result from a combination of unfavorable progression, long cycle lengths or high volume to capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

LOS "E" describes operations with delay greater than 55 and up to 80 seconds per vehicle. These high delay values generally indicate poor progression, long cycle lengths and high volume to capacity ratios. Individual cycle failures are frequent occurrences.

LOS "F" describes operations with delay in excess of 80 seconds 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 volume to capacity ratios with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

The level of service criteria for stop controlled intersections is presented in Table 2-3.

Table 2-3
Level of Service Criteria for
Stop Controlled Intersections

Level of Service	**Average Control Delay (sec/veh)**
A	$\leq$ 10
B	> 10 and $\leq$ 15
C	> 15 and $\leq$ 25
D	> 25 and $\leq$ 35
E	> 35 and $\leq$ 50
F	> 50

Existing levels of service are summarized in Table 2-4. Several study intersections currently operate with lane groups near or at capacity, at LOS "E" or "F", during the AM and/or PM peak hours, as shown in Table 2-4.

Table 2-4
Intersection Levels of Service

Approach	Existing Conditions	
	AM Peak	PM Peak
1. Washington Circle/23rd Street		
EBTR	A (0.3)	A (0.3)
EBR	A (1.1)	A (1.5)
NBR	A (4.9)	A (3.8)
Overall	A (1.4)	A (1.2)
2. Washington Circle/New Hampshire Avenue		
SBL	B (13.9)	A (6.5)
SBR	A (2.6)	A (3.6)
NER	B (18.8)	B (11.7)
Overall	B (13.7)	A (6.4)
3. Washington Circle/K Street Eastbound		
EBR	F [230.5]	D [27.9]
5. Washington Circle/23rd Street Southbound		
WBT	A (0.0)	A (0.1)
SBR	A (4.0)	A (4.5)
Overall	A (2.3)	A (2.4)
6. Washington Circle/New Hampshire Avenue		
WBTR	A (9.0)	A (4.7)
WBR	A (6.2)	A (3.8)
Overall	A (8.1)	A (4.5)
7. Washington Circle/K Street Westbound		
WBR	C [16.2]	C [16.8]
9. 23rd Street/Eye Street		
WBLR	C (34.6)	F (306.5)
NBTR	A (4.6)	B (11.4)
SBLT	A (9.6)	B (15.8)
Overall	A (7.8)	E (58.7)
10. 23rd Street/F Street/Virginia Avenue Westbound		
NBLTR	C (24.0)	A (5.6)
SBTR	A (4.2)	C (32.3)
NWLTR	C (24.2)	C (24.2)
NWR	C (21.8)	C (22.0)
Overall	B (18.9)	C (25.7)
(23.3) = Signalized intersection delay (sec/veh) [23.3] = Unsignalized intersection delay (sec/veh)		

Approach	Existing Conditions	
	AM Peak	PM Peak
11. 23rd Street/Virginia Avenue Eastbound		
EBLTR	C (26.4)	D (48.0)
NBT	C (20.7)	B (11.5)
NBR	A (9.3)	
SBLT	A (2.0)	A (1.3)
Overall	B (16.7)	B (10.8)
12. 22nd Street/K Street Westbound		
WBTR	C (34.5)	D (44.8)
NBLT	A (0.2)	A (0.2)
Overall	A (8.6)	C (20.9)
13. 22nd Street/K Street Eastbound		
EBLT	A (1.9)	A (9.3)
NBTR	A (5.8)	A (5.4)
Overall	A (4.4)	A (7.0)
14. 22nd Street/Pennsylvania Avenue		
EBLT	A (2.2)	B (11.2)
WBTR	C (23.0)	F (95.8)
NBLTR	C (34.9)	C (22.0)
Overall	B (16.3)	D (53.5)
15. 22nd Street/Eye Street		
EBLT	C [17.2]	B [10.0]
WBTR	A [9.8]	B [13.3]
NBLTR	B [13.3]	B [10.3]
Overall	B [14.4]	B [11.5]
17. 24th Street/K Street Westbound		
WBLTR	A (0.9)	A (6.0)
NBLT	B (17.1)	B (18.0)
SBTR	A (4.7)	E (72.6)
Overall	B (10.4)	C (31.4)
18. 24th Street/K Street Eastbound		
EBLTR	C (20.6)	B (15.1)
NBTR	C (34.0)	C (27.7)
SBLT	A (2.5)	A (3.1)
Overall	C (22.5)	B (13.8)
(23.3) = Signalized intersection delay (sec/veh) [23.3] = Unsignalized intersection delay (sec/veh)		

Table 2-4 (Continued)
Intersection Levels of Service

Approach	Existing Conditions	
	AM Peak	PM Peak
19. 23rd Street/H Street		
EBLTR	C (32.8)	D (35.2)
WBLTR	C (25.1)	D (35.1)
NBLTR	A (2.5)	A (7.4)
SBLTR	B (11.2)	A (4.7)
Overall	A (8.5)	B (10.7)
25. K Street Eastbound/Pennsylvania Avenue		
EBT	B (13.7)	C (25.0)
NWT	A (4.6)	A (1.0)
Overall	A (9.6)	A (8.0)
28. K Street Westbound/Pennsylvania Avenue		
WBT	B (15.5)	B (17.5)
SET	A (0.4)	A (1.6)
Overall	A (2.8)	A (9.4)
37. 24th Street/Pennsylvania Avenue		
EBTR	F (165.5)	F (247.8)
WBLTR	A (9.6)	A (9.4)
NBLT	B (17.2)	B (12.9)
SBLTR	D (36.8)	F (276.2)
Overall	F (92.7)	F (168.8)
50. Eye Street/New Hampshire Avenue		
EBLTR	A [8.5]	A [9.2]
WBLTR	A [8.4]	A [9.3]
NELTR	B [10.5]	A [9.7]
SWLTR	A [8.6]	C [21.8]
Overall	A [9.8]	C [18.3]
51. 24th Street/New Hampshire Avenue		
NBLTR	B [10.6]	A [9.9]
SBLTR	A [9.5]	B [13.4]
NELTR	B [12.3]	B [11.3]
SWLTR	A [9.7]	B [13.8]
Overall	B [10.9]	B [12.8]
52. 24th Street/Eye Street		
EBLR	A [7.5]	A [7.2]
NBLT	A [8.3]	A [7.9]
SBTR	A [7.7]	A [8.1]
Overall	A [8.1]	A [7.9]
(23.3) = Signalized intersection delay (sec/veh) [23.3] = Unsignalized intersection delay (sec/veh)		

Approach	Existing Conditions	
	AM Peak	PM Peak
53. 24th Street/H Street		
EBLTR	A [8.6]	A [8.4]
WBLTR	A [7.9]	A [9.8]
NBLTR	A [8.7]	A [8.7]
SBLTR	A [8.5]	A [9.7]
Overall	A [8.5]	A [9.4]
54. 24th Street/G Street		
WBLTR	B [10.7]	C [20.6]
NBLT	A [0.3]	A [0.8]
55. 23rd Street/G Street		
WBLTR	C (27.7)	F (170.1)
NBLT	A (0.3)	A (3.7)
SBTR	B (13.0)	A (9.5)
Overall	A (5.2)	D (40.3)
56. 22nd Street/H Street		
EBLT	B [14.7]	A [9.8]
WBTR	A [9.2]	A [9.8]
NBLTR	B [10.9]	A [8.9]
Overall	B [12.3]	A [9.4]
57. 22nd Street/G Street		
WBTR	A (16.8)	B (14.0)
NBLT	B (17.1)	B (18.8)
Overall	B (17.0)	B (15.1)
58. 22nd Street/F Street		
EBLT	C [21.7]	C [21.1]
59. 21st Street/Eye Street		
EBTR	F [215.4]	F [245.3]
SBLTR	A [1.1]	A [0.8]
60. 21st Street/H Street		
EBTR	B (11.4)	B (13.8)
WBLT	A (7.8)	B (11.4)
SBLTR	B (13.0)	B (14.8)
Overall	B (12.2)	B (14.3)
61. 21st Street/G Street		
WBLT	B (10.6)	D (53.6)
SBTR	A (5.8)	A (5.0)
Overall	A (7.0)	C (25.9)
(23.3) = Signalized intersection delay (sec/veh) [23.3] = Unsignalized intersection delay (sec/veh)		

Table 2-4 (Continued)
Intersection Levels of Service

Approach	Existing Conditions	
	AM Peak	PM Peak
62. 21st Street/F Street		
EBTR	B (10.6)	B (11.6)
SBLT	A (7.7)	A (9.4)
Overall	A (8.7)	A (9.7)
63. 20th Street/Pennsylvania Avenue		
EBLT	C (26.1)	B (17.5)
WBTR	B (12.1)	B (10.9)
NBLTR	F (290.7)	C (32.0)
Overall	F (147.5)	C (20.9)
64. 20th Street/H Street		
EBLT	E (65.4)	B (15.9)
WBTR	C (23.9)	B (15.5)
NBLTR	A (6.8)	B (10.1)
Overall	B (16.6)	B (11.4)
65. 20th Street/G Street		
WBTR	C (31.4)	C (25.7)
NBLT	A (3.5)	A (4.0)
Overall	A (6.5)	B (14.2)
66. 20th Street/F Street		
EBLT	D (37.6)	B (18.1)
NBTR	D (36.2)	C (24.6)
Overall	D (36.4)	C (23.3)
67. Eye Street/Pennsylvania Avenue		
NEL	E [49.8]	D [28.7]
NER	B [13.7]	B [12.2]

(23.3) = Signalized intersection delay (sec/veh)
[23.3] = Unsignalized intersection delay (sec/veh)

BICYCLE SYSTEM

Currently, no designated bicycle lanes or routes exist within the Campus Plan boundaries, as shown on Figure 2-4. Bicyclists must share the roads with vehicular and pedestrian traffic. Bicycle racks are provided throughout the campus, as shown on Figure 2-5.

Existing bicycle levels of service (LOS) are shown on Figure 2-6. The majority of the roads contained within the GW campus boundaries operate at BLOS "D". H, Eye, and K Streets operate at BLOS "E" or "F". F and G Streets (between 21st and 23rd Street) operate at LOS "A".

The Bicycle Master Plan[2] also reports the number of bicycle accidents that occurred between 2000 and 2002. As shown on Figure 2-7, no accidents, or only one accident, were reported at the majority of the key intersections within the campus boundaries. Four to five accidents were reported at the 20th Street/Eye Street/Pennsylvania Avenue intersection. Two to three 3 accidents were reported at the 21st Street/Pennsylvania Avenue intersection.

[2] DDOT, DC Bicycle Master Plan, August 2002

TRANSIT SERVICES AND FACILITIES

Overview

GW is served by both Metrobus and Metrorail. Additionally, GW provides three forms of campus transportation – the Colonial Express Shuttle Buses, the Vern Express, and the University Police Department (UPD) Escort Service.

Metrorail

The Foggy Bottom-GWU Metrorail Station is located on the northwest quadrant of the 23rd Street/Eye Street intersection. This station was used by nearly 41,000 passengers on an average weekday in 2002, according to the WMATA passenger surveys that are summarized in Table 2-5. About half of all passengers using this station alight from trains in the AM peak period and board in the PM peak period.

Table 2-5
Foggy Bottom-GWU Metrorail Station Passenger Boardings and Alightings

Time of Day	Boardings	Alightings	Total
AM Peak	2,007	9,326	11,333
AM Off Peak	4,219	5,278	9,497
PM Peak	10,725	3,440	14,165
PM Off Peak	4,906	1,021	5,927
Total	21,857	19,065	40,922

A large majority of passengers (85 to 87 percent) walk to and from the station; very few drive or are driven to the station, as shown in Table 2-6.

Table 2-6
Foggy Bottom-GWU Metrotail Station Passenger Access and Egress Modes

Mode	Access		Egress	
	Number	Percent	Number	Percent
Metrobus	761	3.5	533	2.8
Other Bus	1,271	5.8	1,120	5.9
Park & Ride	360	1.6	216	1.1
Carpool	19	0.1	24	0.1
Kiss & Ride	362	1.7	145	0.8
Bike	13	0.1	5	0.0
Walk	18,673	85.4	16,666	87.4
Taxi	57	0.3	43	0.2
Unknown	339	1.6	313	1.6
Total	21,855	100	19,065	100

Approximately ten percent of all passengers using the Foggy Bottom-GWU Metrotail Station were GW-related, according to the WMATA survey.

Metrobus

Eight Metrobus routes travel through the campus, as shown on Figure 2-8. A total of 981 bus-trips are operated on these lines on a typical weekday, 354 bus-trips on a typical Saturday, and 239 bus-trips on a typical Sunday, as shown in Table 2-7. Though not all routes stop within the Campus boundaries, stops for each route are easily accessible from the GW Campus.

Table 2-7
Metrobus Service on GW Foggy Bottom Campus

Line	No. of Trips		
	Weekday Service	Saturday Service	Sunday Service
30, 32, 34, 35, 36: Pennsylvania Avenue	32	NA	NA
38B: Ballston-Farragut Square	93	73	36
D5: MacArthur Blvd-Georgetown	13	NA	NA
H1: Brookland-Potomac Park	15	NA	NA
L1, L2, L4: Connecticut Avenue	177	102	70
N2, N3, N4, N6: Massachusetts Avenue	172	84	59
80: North Capitol Street	157	96	74
S1: 16th Street-Potomac Park	34	NA	NA
Total	981	354	239

GW Campus Transportation

The University provides three forms of inter-campus transportation: the Colonial Express, the Vern Express, and the University Police Department (UPD) Escort Service.

Colonial Express is a shuttle bus service that operates on two routes. The northern route operates as a clockwise loop with stops at Marvin Center, The Aston residence hall (located at 1129 New Hampshire Avenue), 19th Street at L Street, Connecticut Avenue at L Street, and 20th Street at Eye Street.

The southern route also serves five stops at the following locations: Marvin Center, Thurston Hall, Health and Wellness Center, the HOVA residence hall, and Columbia Plaza. Both routes operate between 7:00 PM and approximately 3:00 AM. The northern route has headways of generally 23 minutes while the southern route has headways ranging from 19 minutes to 49 minutes.

The Vern Express provides transportation service to students, faculty, staff, and visitors between the University's Foggy Bottom and Mount Vernon Campuses. On weekdays, service is provided at five- to 10-minute headways from 7:00 AM to 8:00 PM, and at 15- to 30-minute headways at all other times of day. On weekends, service is provided at 15- to 30-minute headways.

The UPD Escort Service is offered by the UPD to enhance safety and peace of mind for members of the GW community when they must walk alone after dark. UPD Escort vans are in operation between 7:00 PM and 6:00 AM. During all other hours, escorts are provided by UPD officers on foot or in patrol cars. Escorts are provided from on-campus to on-campus, on-campus to off-campus, and off-campus to on-campus locations. To obtain a ride, the GW community can dial 202-994-RIDE and provide their name, current location and destination to the UPD dispatcher. Upon pick-up, a GWorld card must be presented to the driver.

PARKING

Off-Street Parking Inventory

Currently, the University is served by 2,863 marked parking spaces and 604 attendant spaces, or 3,467 total spaces, in the 19 on-campus parking lots and garages. This is consistent with the minimum of 2,800 off-street spaces required under the existing Campus Plan.

Table 2-8
Existing Off-Street Parking Inventory
(includes attendant spaces)

Square	Lot No.	Name	No. of Spaces
39	10	Warwick Lot	24
41	14	Ross Hall	187
42	6	New Hall	59
42	21	Health & Wellness	112
43	17	Ivory Tower	90
55	2	Kennedy Onassis	20
55	UPG	University Parking Garage	1,482
56	12	Lot 12	23
56	16	Funger Hall	206
58	IH	International House	5
75	7	Ambulatory Care Center	110
77	4	Academic Center	286
77	MCG	Marvin Center	296
80	1	Lot 1	34
81	20	Dakota	60
101	3	Lot 3	67
101	9	Media/Public Affairs	64
103	A	Support Building	85
122	5	1957 E Street	257
Total			**3,467**

On-Street Parking Inventory

Curb parking is permitted on most streets in the study area. Peak period restrictions apply on many streets. Some spaces are designated Zone 2 residential permit parking. A total of 635 on-street parking spaces are located on campus, as shown in Table 2-9 and on Figure 2-9.

Table 2-9
On-Street Parking Inventory

Square	On-Street Parking Spaces (Perimeter of Square)
39	21
40	12
41	33
42	39
43	19
54	32
55	29
56	40
57	40
58	11
75	46
77	50
79	49
80	47
101	35
102	46
103	39
119	0
121	26
122	21
Total	**635**

Permits

Monthly and daily/occasional parking permits are available for purchase by undergraduate and graduate students, faculty/staff, medical residents, and physicians. The allocation of the off-street parking spaces for students, faculty/staff, residents, physicians, visitors, and others was determined based on parking permit records provided by GW for the 2005-2006 academic year, as shown in Table 2-10.

Table 2-10
GW Parking Permit Allocation[3]

Site	GW Parking Permits				
	Staff	Students	Medical Residents	Physicians	Other
Warwick Lot	5	0	0	0	0
Ross Hall	135	0	125	0	0
New Hall	35	20	0	0	0
Health & Wellness	48	55	0	0	0
Ivory Tower	20	62	0	0	0
Kennedy Onassis	0	0	0	30	0
UPG	465	67	189	0	0
Lot 12	0	0	0	0	23
International House	0	0	0	0	0
Funger Hall	75	85	0	0	0
Academic Center	166	0	92	0	0
Ambulatory Care Center	44	0	0	0	0
Marvin Center	0	15	0	0	0
Lot 1	38	0	0	0	0
Dakota	7	12	0	0	39
Lot 3	34	0	0	0	0
Media/Public Affairs	61	0	0	0	0
Support Building	0	0	0	0	0
1957 E Street	40	16	0	0	0
Total	**1,173**	**332**	**406**	**30**	**62**

[3] Reflects data as of June 6, 2006. Permit figures included in Table 2-10 reflect both monthly as well as daily/occasional parking permit holders.

Off-Street Parking Occupancy

Parking occupancy counts were conducted on typical weekdays at each off-street University parking lot and garage. The parking occupancy counts were conducted to assess the existing utilization of the off-street parking facilities, while school was in session. The results are shown on Table 2-11. The existing parking facilities are shown on Figure 2-10.

Table 2-11
Parking Occupancy Counts
(based on September 21, 2005 counts)

Name	Parking Occupancy Counts				Total Parking Spaces
	9:00	11:00	2:00	5:00	
Warwick Lot	4	9	12	8	24
Ross Hall	121	155	147	84	187
New Hall	29	37	43	21	59
Health & Wellness	68	74	73	71	112
Ivory Tower	49	55	57	54	90
Kennedy Onassis	16	17	17	13	20
UPG	843	984	1,008	722	1,482
Lot 12	14	15	11	13	23
International House	3	5	3	2	5
Ambulatory Care Center	77	103	75	46	110
Academic Center	153	184	183	122	286
Marvin Center	95	94	125	116	296
Lot 1	23	29	36	21	34
Dakota	12	15	15	11	60
Lot 3	41	37	43	28	67
Media/ Public Affairs	29	37	50	43	64
Support Building	68	72	61	36	85
1957 E Street	162	190	201	142	257
Total (% Occ.)	**1,807 55%**	**2,112 65%**	**2,160 66%**	**1,553 48%**	**3,261[4]**

All attendant parking spaces were taken into consideration when determining the utilization of the off-street parking facilities.

The peak parking demand was observed at 2:00, when 2,160 spaces or 66-percent of all off-street parking spaces, were occupied.

The University's existing off-street parking supply adequately accommodates current parking demands.

LOADING FACILITIES

Various loading facilities are located throughout the GW campus, as shown on Figure 2-11. Many of the University's deliveries are received at the central Support Building on F Street. Special deliveries include medical equipment delivered directly to the GW hospital.

The 2000-2009 Campus Plan included a Traffic Management Plan that proposed a truck management program to reduce the impact of GW delivery trucks on the campus roadways. The Plan included a truck circulation route that identified the main roadways that delivery vehicles should use to access the GW loading facilities, while discouraging the use of smaller and narrower neighborhood streets.

[4] Funger Hall garage (206 spaces) was under construction at time of parking occupancy counts. When added to the total parking spaces in Table 2-11, the number of parking spaces totals 3,467 spaces (the current GW off-street parking inventory).

FOGGY BOTTOM CAMPUS EVENTS

Some of the significant annual events held on the GW Foggy Bottom campus are described below. The location, frequency, and seating capacity for each event are provided.

Commencement activities are held over a three-day weekend in May, and are attended by a total of approximately 45,000 guests. The main commencement exercises are held at an off-campus venue. Various commencement-related activities are held at the Charles E. Smith Center, which has a seating capacity of 5,000. Commencement Events are also held at the Marvin Center, which has a seating capacity of 1,525 (two ballrooms and a theatre). Both on- and off-street parking is utilized.

Colonial Weekend is held at various venues, including the Charles E. Smith Center and the Marvin Center over a three-day weekend in October. Approximately 16,500 guests attend and utilize both on- and off-street parking facilities.

Women's and Men's Basketball Games are held at the Charles E. Smith Center from November to April. A total of thirty home games entertain between 200 and 5,000 people (per game). The games are held throughout the week in the evenings, and during weekend afternoons and evenings. On- and off-street parking facilities are utilized by game attendees.

Colonial Inauguration, a five-session, three-day/two-night event, held at various campus venues during June and July. Approximately 500 guests attend per night and utilize both on- and off-street parking facilities.

Other on-campus events include the Freshmen Convocation (3,000 participants), Grad Fair (1,000 participants), Spring Fling (4,300 participants), Night in the Marvin Center (2,000 participants), Midnight Breakfast (2,500 participants).

Various ballets, concerts, operas, and theatrical plays occur at Lisner Auditorium, which provides a seating capacity of 1,500. Over 160 events were held in the past year, between November 2004 and October 2005.

"Reliable Sources", a CNN programming event, will be taped (beginning in September 2006) one evening per month at the Jack Morton Auditorium in the Media and Public Affairs building, which has a seating capacity of 260. This program replaces CNN's "On the Story", which also was taped at the Morton Auditorium.

Move in Weekend occurs annually in late August and is coordinated by GW Housing Programs (formerly the Community Living and Learning Center) and the University Police Department. During Move in Weekend, approximately 5,000 students are expected to arrive and move into GW residence halls. To allow the maneuvering of delivery trucks, specific streets are sectioned off (F Street between 19th and 20th Streets and G Street between 23rd and 24th Streets) at various times during the weekend.

Section 3
FOGGY BOTTOM CAMPUS PLAN: 2006 – 2025

OVERVIEW

The Foggy Bottom Campus Plan: 2006 – 2025 proposes no increase to the population caps set forth under the existing Campus Plan for student enrollment, faculty and staff. Accordingly, the new Campus Plan does not contemplate any modification to the minimum parking requirement of 2,800 spaces or the general parking aggregation guidelines as set forth in the existing Campus Plan.

The Plan includes several development opportunity sites that could accommodate underground parking facilities. It is not necessary nor intended that all of these parking sites will be developed to capacity in order to maintain the appropriate campus parking capacity and continue to meet the 2,800 space requirement. Identification of numerous opportunity sites allows the University to meet campus parking needs, while providing the flexibility necessary given the long-term nature of this Plan, to accommodate various options for the sequencing of development sites. In order to ensure that campus parking capacity is not over-developed, an appropriate maximum cap on parking capacity could be implemented.

The Campus Plan contemplates including University parking capacity proposed on Square 54 and accommodated in University-owned facilities on Square 122 for Campus Plan parking compliance purposes. Specifically, it is presently anticipated that approximately 362 spaces in the proposed Square 54 redevelopment project will be dedicated for University use, and would, therefore, be included in the aggregated 2,800 parking space requirement[5]. The Campus Plan also proposes that the parking capacity in all University-owned facilities located on Square 122, including Old Main at 1922 F Street (located just outside the existing Campus Plan boundaries), be counted toward the Campus Plan parking requirement.

In addition to the development plan set forth in the Campus Plan, this report takes into account the impact of potential increases to Foggy Bottom student enrollment and faculty/staff over the term of the Plan.

The University will present and maintain a plan for continued compliance with the parking requirement throughout the duration of the Plan. Depending on the timing and sequencing of the various development projects, particularly with respect to the planned redevelopment of the University Parking Garage (UPG), with a capacity of 1,482 parking spaces, the University may seek to use, on an interim basis, certain off-campus parking resources to maintain compliance with the 2,800 space parking requirement.

PARKING

Opportunity Sites

Since, over the 20-year term of the Campus Plan, several campus parking facilities are planned to be eliminated as a result of the proposed development plan, various off-street potential parking opportunity sites were identified throughout the campus to ensure that the required minimum number of parking spaces was maintained. These proposed parking opportunity sites are shown on Figure 3-1.

The potential parking opportunity sites were assumed to function at 90-percent efficiency, either 3 or 4 levels underground, and 350 square feet per space.

The potential off-street opportunity sites could yield up to an additional 1,123 net new spaces on campus, as shown in Table 3-1. As indicated above, however, it is not the University's desire or intent to develop all of these spaces, but rather to identify potential locations that could be used to accommodate the appropriate campus parking space inventory over the term of the Campus Plan.

[5] The redevelopment of Square 54 is addressed under a consolidated PUD application pending review by the Zoning Commission, separate from the Campus Plan zoning process.

Proposed Future Parking Supply

The proposed future parking supply will maintain an appropriate campus parking capacity and continue to meet the 2,800 space requirement. In order to ensure that campus parking capacity is not over-developed, an appropriate maximum cap on parking capacity could be implemented. Parking structures will be sized and located throughout campus to minimize impacts on surrounding neighborhoods and provide convenient access to major commuting routes.

Table 3-1
Existing and Proposed Parking Sites

Site	Existing Parking Spaces	Potential New Spaces	Net Potential New Spaces
39A	24	0	-24
41A	0	0	0
41B	0	0	0
54	0	362	362
55A1	0	102	102
55A2	1,482	478	-1004
56A	23	424	401
75A	0	0	0
75B	0	193	193
77A	0	136	136
77B1	0	127	127
77B2	0	0	0
77B3	0	76	76
77C	0	0	0
77D	0	0	0
79A1	0	227	227
79A2	0	0	0
79A3	0	0	0
80A	0	178	178
101A	67	109	42
102A	0	0	0
102B	0	0	0
103A	85	392	307
			1,123

LOADING

Loading docks and entries to parking garages will be located and/or screened to minimize potential negative impacts on existing residential streets.

TRAFFIC ANALYSIS

Overview

23rd Street will remain an important regional vehicular street. This Campus Plan will improve the pedestrian environment and access to the Foggy Bottom-GWU Metrorail station.

H Street is the location of the Marvin Center, Gelman Library, the Academic Center, Law School, and other primary campus uses. It is the proposed location of many future academic facilities and residential uses.

Limited new academic sites would be developed along G Street. A future residence hall is proposed to be developed along F Street. New student housing would be designed to minimize direct impacts on existing residential buildings in the surrounding neighborhoods.

Eye Street is envisioned as a retail corridor with new retail stores on both sides of the street, as the University redevelops individual sites. The Eye Street Retail Corridor would be anchored by The Shops at 2000 Penn on the east and the Eye Street Mall at the Foggy Bottom-GWU Metrorail station on the west.

Future Background Traffic Forecasts

Future background traffic forecasts were developed as the sum of: (1) existing traffic counts, (2) background (non-University) traffic growth, and (3) traffic that will be generated by developments that have been proposed and/or approved but have not yet been built or occupied at the time the counts were taken.

Background traffic growth was estimated at 0.5 percent per year, compounded annually, for the duration of the campus plan update (i.e. 20 years).

To determine the non-GW traffic, the existing GW garage site trips were routed to/from the various existing garages throughout the roadway network as shown on Figure 3-2.

The GW garage site trips shown on Figure 3-2 do not represent the total number of GW site trips because many site trips utilize on-street parking rather than the garages. For purposes of this analysis, it was assumed that 25 percent of GW site traffic utilizes on-street parking. Therefore, to obtain the non-GW traffic volumes, the existing GW garage site trips (Figure 3-2) were increased by 25 percent and then subtracted from the existing vehicular traffic volumes (Figure 2-2). The resulting non-GW traffic volumes are shown on Figure 3-3.

In order to account for regional traffic growth outside the immediate site vicinity, a 0.5 percent growth rate, compounded annually, was applied to the non-GW traffic shown on Figure 3-3. The regional growth expected at each study intersection is shown on Figure 3-4.

Additionally, traffic volumes from six planned developments were included in the future traffic forecasts. The number of trips that would be generated by the various planned developments generally was estimated based on the Institute of Transportation Engineers (ITE) Trip Generation manual. Details on the trip generation for each pipeline development are summarized below.

IMF Headquarters 2 – At the time of the traffic counts, the existing PEPCO office building (420,000 S.F.) was proposed to be expanded to 649,350 S.F. This development is located in the vicinity of 20th and H Streets. According to the International Monetary Fund Headquarters 2 – Planned Unit Development Application report, the proposed expansion will generate 129 net new AM peak hour trips and 128 net new PM peak hour trips. The trip generation for the IMF Headquarters 2 includes a 57 percent non-auto trip reduction, according to the report. This relocation was completed in the fall 2005.

Columbia House Apartments I and II – Columbia House Apartments I and II will be developed with 142 and 213 residential units, respectively, on M Street, between 24th and 25th Streets. Columbia House Apartments I will generate 36 AM peak hour trips and 48 PM peak hour trips. Columbia House Apartments II will generate 54 AM peak hour trips and 68 PM peak hour trips. These estimates reflect a 50 percent non-auto trip reduction, as calculated using the Development Related Ridership Survey II published by WMATA.

2425 L Street, N.W. – This building will contain 200 luxury condominiums and 28,000 S.F. of retail space on the site of the former Columbia Hospital for Women, which is bounded by 24th Street on the east, 25th Street on the west, and L Street on the south. According to the 2425 L Street Traffic Impact Study, the proposed development will generate 99 AM peak hour trips and 195 PM peak hour trips. These estimates reflect a 45 percent non-auto trip reduction for residents and a 50 percent non-auto trip reduction for the retail portions.

United States Institute of Peace (USIP) – The new USIP headquarters will be located in the northwest quadrant of the 23rd Street/Constitution Avenue intersection and will contain a total of 248,000 square feet (S.F.) (128,000 S.F. of workspace for Institute staff and research fellows (including a 250-seat auditorium), 20,000 S.F. Public Education Center, and 100,000 S.F. for a below-grade garage.)

Allstate Hotel Partnership – Allstate Hotel Partnership proposes to raze an existing six-story parking garage and develop a nine-story, 147-room hotel on Lot 25 in Square 122 of Northwest Washington, DC. The property, 515 20th Street, N.W., is located on the east side of 20th Street, between E and F Streets, in the northwest section of Washington, DC.

The combined peak hour trip assignments for the six pipeline developments are depicted on Figure 3-5.

The background peak hour traffic forecasts were established from a composite of the existing non-GW traffic volumes shown on Figure 3-3, the regional growth shown on Figure 3-4, the pipeline traffic volumes shown on Figure 3-5 and the existing GW garage site trips shown on Figure 3-2 factored by 25 percent. The background peak hour traffic forecasts are shown on Figure 3-6.

Future Background Capacity Analyses

Capacity analyses were performed for the study intersections based on existing lane use and traffic controls, the background peak hour traffic forecasts shown on Figure 3-6 and existing signal timings. The results are summarized in Table 3-2.

As shown in Table 3-2, during the AM and PM peak hour, the increase in traffic volumes associated with regional growth and the pipeline developments would cause some lane groups at various study intersections to drop to LOS "E" or "F" or have significantly increased delays for lane groups currently experiencing LOS "F".

GW Traffic Forecasts

Traffic generated by GW will be comprised of (1) existing GW site trips (rerouted to account for some existing garages being razed and new, proposed garages being built), (2) trips generated by the projected increase in students and faculty/staff, (3) trips generated by the proposed redevelopment of the former GW Hospital site (Square 54), and (4) trips generated by the proposed development of the School Without Walls (Square 80).[6]

Existing GW Traffic – Under the proposed Campus Plan, a few existing garages will be eliminated, some of the existing garages will remain unchanged and the available parking in some existing garages will be altered. Additionally, several potential new off-street parking facilities are proposed as part of the new Campus Plan. Figure 3-7 displays the existing garage site trips for garages that will remain unchanged under the Campus Plan (i.e. existing number of spaces equals proposed number of spaces).

Subtracting the garage site trips for garages that are to remain unchanged (shown on Figure 3-7) from the total existing garage site trips (shown on Figure 3-2), results in the garage site trips that would need to be rerouted based on the new/altered off-street parking sites. The rerouted garage site trips to the new/altered off-street parking sites are shown on Figure 3-8. The rerouting was based on existing travel patterns in the study area and the location of each new or altered garage.

Increase in Students, Faculty, and Staff - The number of trips that would be generated by the potential increases (from Fall 2005 levels) in Foggy Bottom student enrollment and faculty/staff populations (of 1,198 and 1,000, respectively) was estimated using transportation surveys conducted University-wide in October 2005.[7] Each respondent was asked to indicate their arrival and departure times for each weekday. In order to provide a conservative analysis, Tuesday data were utilized for the AM peak hour and Friday data were used for the PM peak hour, since survey results indicated that these days had the highest trip generation during their respective peak hours.

Based on the survey information, the University generates approximately one AM peak hour person-trip per every 10 students and approximately one PM peak hour person-trip per every 6.8 students. Additionally, the University generates approximately one AM peak hour person-trip per every three employees and approximately one PM peak hour person-trip per every 13.6 employees.

The existing trip generation rates are summarized in Table 3-2.

[6] The Square 54 redevelopment and the joint DCPS/GW School Without Walls projects are each addressed under individual consolidated PUD applications pending review by the Zoning Commission, separate from the Campus Plan zoning review process.

[7] Undergraduate students, graduate students, faculty, and staff were surveyed to determine information regarding their arrival/departure times, their mode of transportation, vehicle occupancy, and parking location. The University received nearly 2,500 responses to this survey. The information from the survey was compiled and utilized to determine the number of trips that would be generated by the potential increases in Foggy Bottom student enrollment and Foggy Bottom faculty/staff.

Table 3-2
Existing Trip Generation Rates

Component	AM Peak			PM Peak		
	In	Out	Total	In	Out	Total
Survey Results						
Students (1,643)*	159	4	163	236	7	243
Faculty/Staff (827)*	278	1	279	58	3	61
Corresponding Trip Generation Rates						
Students (trips/student)	0.097	0.002	0.009	0.144	0.004	0.148
Faculty/Staff (trips/employee)	0.336	0.001	0.337	0.070	0.004	0.074
* Number in parenthesis = Number of respondents						

The surveys also revealed that approximately 74 percent of the students (undergraduate and graduate combined) and approximately 36 percent of the faculty/staff utilized a mode of transportation other than the automobile. Additionally, students reported an average vehicle occupancy of 1.12 persons per vehicle while faculty/staff reported an average vehicle occupancy of 1.21 persons per vehicle. The travel mode information is summarized in Table 3-3.

Table 3-3
Travel Mode by Group

Mode	Students		Faculty/Staff	
	No.	%	No.	%
Drove Alone	202	11%	313	26%
Motorcycle	4	0%	3	0%
2-person Carpool	14	1%	49	4%
3-person Carpool	7	0%	14	1%
4+ person Carpool	0	0%	1	0%
Vanpool	5	0%	2	0%
Sub-total	**232**	**12%**	**382**	**32%**
Private Bus	29	2%	5	0%
Public Bus	81	4%	51	4%
Metrorail	589	31%	304	25%
Walked/Jogged	544	29%	54	4%
Bicycle	51	3%	12	1%
Other	26	1%	8	1%
Did not answer	89	5%	9	1%
Total	**1,873**	**100%**	**1,207**	**100%**

Based on the arrival/departure and travel mode information, the potential enrollment increase is projected to generate 28 AM peak hour vehicle-trips and 40 PM peak-hour vehicle trips and the potential faculty/staff population increase would generate 178 AM peak hour vehicle-trips and 39 PM peak hour vehicle-trips. The trip generation is summarized in Table 3-4.

Table 3-4
Trip Generation Summary
Projected Increase in Students Faculty, and Staff

Component	AM Peak			PM Peak		
	In	Out	Total	In	Out	Total
Projected Person-Trips						
Students (1,198)	116	3	119	172	5	177
Faculty/Staff (1,000)	336	1	337	70	4	74
Total	452	4	456	242	9	51
Projected Vehicle-Trips						
Students (1,198)	27	1	28	39	1	40
Faculty/Staff (1,000)	177	1	178	37	2	39
Total	204	2	206	76	3	79

Square 54 – Boston Properties, Inc., KSI Services, Inc, and GW filed a consolidated PUD application on May 30, 2006 for the proposed redevelopment of Square 54 as a mixed-use "town center" including office, residential, and retail uses. The preliminary development program includes approximately 454,000 gross square feet (GSF) of office space, 333 residential units, 84,000 GSF of above and below grade retail space, including a contemplated grocery store of up to 45,000 GSF.

A preliminary *Square 54 Transportation Impact Study* conducted by Wells & Associates indicated that the proposed development would generate 396 AM peak hour vehicle-trips and 627 PM peak hour vehicle-trips.

School Without Walls – This joint DCPS/GW public-private development project consists of two components. The first is a new GW apartment-style residence hall building to be located between 2125 and 2135 F Street, with access to a below grade parking garage and internal loading dock directly off F Street. The proposed residence hall will contain approximately 474 undergraduate beds and 178 parking spaces, serving the general GW population. The second component is an addition to the existing DCPS School Without Walls building, which includes classrooms, laboratories, and a common area, and an increase of up to 23 percent in the student and faculty population.

The site trips associated with the potential increase in student enrollment, the potential increase in faculty/staff, Square 54, and the School Without Walls are summarized on Figure 3-9.

Total Future Traffic Forecasts

Future 2025 traffic forecasts were developed based on a composite of the existing non-GW traffic volumes (Figure 3-3), regional growth (Figure 3-4), the pipeline development site trips (Figure 3-5), the GW garage site trips that would remain unchanged (Figure 3-7) factored by 25 percent, the rerouted GW garage site trips (Figure 3-8) factored by 25 percent, and the site trips associated with the following (Figure 3-9): potential increase in student enrollment, the potential increase in faculty/staff Square 54, and the School Without Walls. The total future peak hour traffic forecasts are shown on Figure 3-10.

Total Future Capacity Analyses

Capacity analyses were performed for the study intersections using the existing lane use and traffic control, the total future peak hour traffic forecasts shown on Figure 3-11 and existing signal timings.

The results of total future capacity analyses are presented in Table 3-5.

Increases in traffic volumes on the Foggy Bottom Campus associated with the Campus Plan are projected to be modest. Additionally, the Campus Plan would disperse both new and existing GW traffic across the Campus, rather than concentrating it at the UPG. Traffic would increase at some intersections and decrease at others.

Improvement Analyses

Localized traffic impacts can be fully mitigated by adjusting existing traffic signal timings, installing a new traffic signal, and prohibiting curb parking at a few locations. These potential mitigation strategies include:

- Adjust signal timings and phasing (i.e. to include a southbound advance phase and a westbound right-turn overlap phase) at the 23rd Street/Eye Street intersection (#9).
- Adjust signal timings at the 23rd Street/G Street intersection (#55).
- Adjust traffic signal timings at the 23rd Street/ F Street/Virginia Avenue (WB) intersection.
- Adjust traffic signal timings at the 24th Street/ Pennsylvania Avenue intersection.
- Adjust traffic signal timings at the 20th Street/ H Street intersection.
- Adjust traffic signal timings at the 20th Street/ F Street intersection.
- Install a traffic signal at the 22nd Street/Eye Street intersection (#15).
- Eliminate curb parking along the south side of Eye Street on the eastbound approach of the 22nd/Eye Street intersection (#15) to provide an eastbound left turn lane.
- Eliminate curb parking along the south side of Eye Street on the eastbound approach of the 21st Street/Eye Street intersection to provide separate eastbound through and right turn lanes.
- Eliminate curb parking along the east side of 23rd Street on the northbound approach of the 23rd Street/Eye Street intersection to provide a northbound right turn lane.
- Eliminate curb parking along the north side of Eye Street on the westbound approach of the 23rd Street/Eye Street intersection to provide a westbound right turn lane.

Table 3-5
Intersection Levels of Service

Approach	2025 Background Conditions		2025 Total Future Conditions		2025 Total Future Conditions with Improvements	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
1. Washington Circle/23rd Street						
EBTR	A (0.3)	A (0.7)	A (0.4)	A (0.4)	A (0.4)	A (0.4)
EBR	A (1.1)	A (1.8)	A (1.0)	A (2.4)	A (1.0)	A (2.4)
NBR	A (4.9)	A (3.7)	A (4.8)	A (3.6)	A (0.4)	C (22.3)
Overall	A (1.4)	A (1.3)	A (1.3)	A (1.3)	A (0.4)	A (4.5)
2. Washington Circle/New Hampshire Avenue						
SBL	B (17.1)	A (7.4)	C (25.6)	A (8.2)	C (25.6)	A (8.2)
SBR	A (2.6)	A (3.8)	A (2.6)	A (3.7)	A (2.6)	A (3.8)
NER	B (19.6)	B (12.1)	C (20.4)	B (12.4)	C (20.4)	B (12.4)
Overall	B (17.3)	A (7.1)	C (24.2)	A (7.8)	C (24.2)	A (7.9)
3. Washington Circle/K Street Eastbound						
EBR	F [392.6]	E [37.7]	F [526.3]	F [50.8]	F [526.3]	F [51.8]
5. Washington Circle/23rd Street Southbound						
WBT	A (0.0)	A (0.1)	A (0.0)	A (0.1)	A (0.0)	A (0.1)
SBR	A (4.2)	A (5.1)	A (4.4)	A (5.5)	A (4.4)	A (5.5)
Overall	A (2.3)	A (2.8)	A (2.5)	A (2.9)	A (2.5)	A (2.9)
6. Washington Circle/New Hampshire Avenue						
WBTR	A (9.9)	A (5.1)	A (10.0)	A (5.3)	B (10.8)	A (4.6)
WBR	A (7.2)	A (4.3)	A (7.6)	A (4.9)	A (7.5)	A (4.9)
Overall	A (9.0)	A (4.9)	A (9.3)	A (5.2)	A (9.8)	A (4.7)
7. Washington Circle/K Street Westbound						
WBR	C [17.7]	C [19.2]	C [19.0]	D [25.4]	C [19.0]	D [25.7]
9. 23rd Street/Eye Street						
WBL	D (36.1)	F (368.6)	D (36.8)	F (416.2)	D (37.1)	E (59.8)
WBR					C (31.6)	A (6.0)
NBT	A (4.9)	B (10.9)	A (5.2)	A (9.9)	B (14.0)	D (44.0)
NBR					D (50.6)	D (37.7)
SBLT	B (11.8)	B (19.2)	C (24.9)	F (124.0)	C (21.6)	D (53.9)
Overall	A (8.9)	E (69.4)	B (14.4)	F (137.1)	C (24.5)	D (51.3)

(23.3) = Signalized intersection delay (sec/veh)
[23.3] = Unsignalized intersection delay (sec/veh)

Table 3-5 (Continued)
Intersection Levels of Service

Approach	2025 Background Conditions		2025 Total Future Conditions		2025 Total Future Conditions with Improvements	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
10. 23rd Street/F Street/Virginia Avenue Westbound						
NBLTR	E (65.0)	A (7.4)	F (100.2)	A (8.8)	E (67.3)	A (8.9)
SBTR	A (5.2)	F (81.6)	B (11.4)	F (93.8)	A (6.2)	F (95.1)
NWLTR	C (24.4)	C (24.2)	C (24.4)	C (24.5)	C (27.7)	C (24.5)
NWR	C (21.8)	C (22.0)	C (21.8)	C (22.0)	C (24.6)	C (22.0)
Overall	D (47.0)	E (61.2)	E (73.3)	E (68.4)	D (49.4)	E (69.4)
11. 23rd Street/Virginia Avenue Eastbound						
EBLTR	C (27.6)	E (60.2)	C (27.5)	E (60.2)	C (31.0)	E (61.1)
NBT	C (25.0)	B (12.2)	C (29.6)	B (12.8)	C (21.3)	B (12.8)
NBR	A (9.4)		A (9.4)		A (7.7)	
SBLT	A (2.4)	A (1.6)	A (3.0)	A (1.6)	A (2.2)	A (1.6)
Overall	B (19.6)	B (12.8)	C (22.7)	B (13.0)	B (17.6)	B (13.1)
12. 22nd Street/K Street Westbound						
WBTR	C (35.0)	D (49.0)	C (35.0)	D (48.7)	C (35.0)	D (48.8)
NBLT	A (0.2)	A (0.2)	A (0.2)	A (0.2)	A (0.2)	A (0.2)
Overall	A (8.7)	C (23.0)	A (8.3)	B (19.7)	A (8.3)	B (19.8)
13. 22nd Street/K Street Eastbound						
EBLT	A (2.1)	A (9.5)	A (2.2)	A (9.5)	A (2.1)	B (10.3)
NBTR	A (5.7)	A (5.4)	A (5.7)	A (4.7)	A (5.7)	A (4.8)
Overall	A (4.4)	A (7.1)	A (4.4)	A (6.3)	A (4.4)	A (6.6)
14. 22nd Street/Pennsylvania Avenue						
EBLT	A (2.2)	B (11.1)	A (2.2)	B (11.1)	A (2.0)	B (13.6)
WBTR	C (24.2)	F (157.8)	C (24.2)	F (157.8)	C (24.2)	F (160.9)
NBLTR	D (36.4)	C (22.3)	D (40.3)	C (26.0)	D (48.1)	C (26.0)
Overall	B (16.7)	F (83.9)	B (18.9)	E (74.7)	C (21.3)	E (76.7)
15. 22nd Street/Eye Street						
EBL	C [17.2]	B [10.0]	F [100.9]	C [17.9]	D (43.2)	C (20.3)
EBT					B (14.7)	A (8.9)
WBTR	A [9.8]	B [13.3]	B [10.6]	C [17.0]	D (41.0)	C (32.6)
NBLTR	B [13.3]	B [10.3]	C [16.7]	B [13.2]	D (41.0)	D (35.1)
Overall	B [14.4]	B [11.5]	F [57.0]	C [15.9]	D (38.4)	C (29.2)

(23.3) = Signalized intersection delay (sec/veh)
[23.3] = Unsignalized intersection delay (sec/veh)

Table 3-5 (Continued)
Intersection Levels of Service

Approach	2025 Background Conditions		2025 Total Future Conditions		2025 Total Future Conditions with Improvements	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
17. 24th Street/K Street Westbound						
WBLTR	A (0.9)	A (6.5)	A (0.9)	A (6.9)	A (0.9)	A (6.9)
NBLT	B (17.4)	C (21.1)	B (17.3)	C (21.5)	B (17.3)	C (21.6)
SBTR	A (7.9)	F (164.4)	A (7.6)	F (168.3)	A (8.2)	F (173.0)
Overall	B (11.3)	E (65.2)	B (11.0)	E (65.9)	B (11.1)	E (67.6)
18. 24th Street/K Street Eastbound						
EBLTR	C (22.2)	B (15.5)	C (23.6)	B (15.8)	C (23.6)	B (15.8)
NBTR	D (39.0)	C (30.8)	D (38.3)	C (30.2)	D (38.3)	C (30.3)
SBLT	A (3.6)	A (3.4)	A (3.5)	A (3.4)	A (3.6)	A (3.5)
Overall	C (24.7)	B (15.2)	C (25.1)	B (14.9)	C (25.1)	B (15.0)
19. 23rd Street/H Street						
EBLTR	D (36.3)	D (40.5)	D (38.9)	D (42.3)	D (38.9)	D (42.6)
WBLTR	C (25.2)	D (35.7)	C (25.0)	C (31.9)	C (25.0)	C (31.9)
NBLTR	A (2.7)	A (9.9)	A (2.9)	B (11.3)	A (4.9)	B (11.2)
SBLTR	B (10.6)	A (5.3)	B (16.5)	A (7.5)	B (14.4)	A (6.5)
Overall	A (9.2)	B (12.0)	B (11.2)	B (12.9)	B (11.8)	B (12.3)
25. K Street Eastbound/Pennsylvania Avenue						
EBT	B (15.6)	C (25.4)	B (16.7)	C (24.2)	B (16.4)	B (18.6)
NWT	A (4.3)	A (1.0)	A (4.7)	A (1.3)	A (4.6)	A (1.3)
Overall	B (10.7)	A (8.2)	B (11.3)	A (7.4)	B (11.1)	A (6.0)
28. K Street Westbound/Pennsylvania Avenue						
WBT	B (16.4)	B (19.2)	B (17.2)	C (20.4)	B (17.2)	B (19.3)
SET	A (1.4)	A (3.0)	A (1.9)	A (3.5)	A (1.7)	A (3.2)
Overall	A (3.6)	B (10.8)	A (4.2)	B (11.5)	A (4.0)	B (10.9)
37. 24th Street/Pennsylvania Avenue						
EBTR	F (242.7)	F (324.0)	F (293.4)	F (370.3)	F (271.4)	F (342.4)
WBLTR	A (9.4)	A (9.5)	A (9.3)	A (9.7)	A (8.8)	A (9.9)
NBLT	C (23.4)	B (14.2)	C (22.7)	B (13.8)	C (26.2)	B (15.4)
SBLTR	E (63.3)	F (456.5)	E (57.4)	F (455.1)	E (68.9)	F (501.1)
Overall	F (134.5)	F (236.0)	F (164.0)	F (252.2)	F (153.5)	F (248.8)

(23.3) = Signalized intersection delay (sec/veh)
[23.3] = Unsignalized intersection delay (sec/veh)

Table 3-5 (Continued)
Intersection Levels of Service

Approach	2025 Background Conditions		2025 Total Future Conditions		2025 Total Future Conditions With Improvements	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
50. Eye Street/New Hampshire Avenue						
EBLTR	A [8.6]	A [9.5]	A [8.6]	A [9.5]	A [8.6]	A [9.6]
WBLTR	A [8.5]	A [9.7]	A [8.6]	A [9.7]	A [8.6]	A [9.7]
NELTR	B [10.9]	B [10.4]	B [11.2]	B [10.6]	B [11.2]	B [10.7]
SWLTR	A [8.9]	D [33.0]	A [8.9]	D [31.3]	A [8.9]	D [32.2]
Overall	B [10.1]	C [26.3]	B [10.3]	C [24.9]	B [10.3]	D [25.5]
51. 24th Street/New Hampshire Avenue						
NBLTR	B [12.0]	B [12.0]	B [12.4]	B [12.0]	B [12.4]	B [12.0]
SBLTR	B [10.7]	C [20.1]	B [11.2]	C [20.5]	B [11.2]	C [20.9]
NELTR	B [14.5]	B [13.7]	C [14.9]	B [13.8]	B [14.9]	B [13.9]
SWLTR	B [10.6]	C [18.5]	B [10.7]	C [18.0]	B [10.7]	C [18.2]
Overall	B [12.4]	C [17.4]	B [12.8]	C [17.4]	B [12.8]	C [17.6]
52. 24th Street/Eye Street						
EBLR	A [7.7]	A [7.5]	A [7.7]	A [7.4]	A [7.7]	A [7.4]
NBLT	A [8.7]	A [8.4]	A [8.7]	A [8.2]	A [8.7]	A [8.2]
SBTR	A [7.9]	A [8.6]	A [8.0]	A [8.6]	A [8.0]	A [8.6]
Overall	A [8.4]	A [8.4]	A [8.4]	A [8.3]	A [8.4]	A [8.4]
53. 24th Street/H Street						
EBLTR	A [9.0]	A [8.9]	A [9.2]	A [8.9]	A [9.2]	A [8.9]
WBLTR	A [8.2]	B [10.7]	A [8.3]	B [10.4]	A [8.3]	B [10.4]
NBLTR	A [9.2]	A [9.7]	A [9.3]	A [9.6]	A [9.3]	A [9.6]
SBLTR	A [8.9]	B [10.9]	A [9.2]	B [10.9]	A [9.2]	B [11.0]
Overall	A [8.9]	B [10.4]	A [9.1]	B [10.2]	A [9.1]	B [10.3]
54. 24th Street/G Street						
WBLTR	B [11.0]	D [28.1]	B [11.0]	D [32.8]	B [11.0]	D [33.2]
NBLT	A [0.3]	A [0.7]	A [0.3]	A [0.7]	A [0.3]	A [0.7]
55. 23rd Street/G Street						
WBLTR	C (28.1)	F (217.8)	C (30.9)	F (259.8)	C (30.8)	F (209.1)
NBLT	A (0.2)	A (3.9)	A (0.2)	A (3.8)	A (0.3)	A (4.5)
SBTR	B (13.9)	B (13.2)	B (10.1)	B (13.8)	B (12.5)	B (17.1)
Overall	A (5.5)	D (50.8)	A (4.8)	E (60.7)	A (5.5)	D (52.7)

(23.3) = Signalized intersection delay (sec/veh)
[23.3] = Unsignalized intersection delay (sec/veh)

Approach	2025 Background Conditions		2025 Total Future Conditions		2025 Total Future Conditions With Improvements	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
56. 22nd Street/H Street						
EBLT	C [16.6]	B [10.1]	C [19.8]	A [9.6]	C [19.8]	A [9.6]
WBTR	A [9.5]	B [10.2]	A [10.0]	B [10.2]	A [10.0]	B [10.2]
NBLTR	B [11.8]	A [9.2]	B [13.1]	A [9.3]	B [13.1]	A [9.4]
Overall	B [13.5]	A [9.7]	C [15.4]	A [9.7]	C [15.4]	A [9.7]
57. 22nd Street/G Street						
WBTR	B (16.6)	B (17.0)	B (18.6)	B (18.6)	B (18.6)	B (18.7)
NBLT	B (17.5)	B (18.9)	B (18.2)	B (19.3)	B (18.2)	B (19.3)
Overall	B (17.2)	B (17.4)	B (18.3)	B (18.8)	B (18.3)	B (18.9)
58. 22nd Street/F Street						
EBLT	C [24.6]	C [22.3]	E [44.6]	D [25.2]	E [44.6]	D [25.3]
59. 21st Street/Eye Street						
EBTR	F [300.1]	F [333.9]	F [355.1]	F [464.3]	F [99.5]	F [198.0]
SBLTR	A [1.2]	A [0.9]	A [1.1]	A [2.3]	A [1.1]	A [2.3]
60. 21st Street/H Street						
EBTR	B (11.9)	B (14.2)	B (12.1)	B (13.7)	B (12.1)	B (13.8)
WBLT	A (7.5)	B (12.0)	A (7.7)	B (11.1)	A (7.6)	B (11.2)
SBLTR	B (13.7)	B (17.5)	B (14.5)	C (20.8)	B (14.5)	C (21.1)
Overall	B (12.8)	B (16.4)	B (13.2)	B (18.9)	B (13.2)	B (19.1)
61. 21st Street/G Street						
WBLT	B (10.5)	E (78.4)	B (10.4)	F (85.6)	B (10.4)	F (87.5)
SBTR	A (5.9)	A (6.7)	A (6.6)	A (5.9)	A (6.6)	A (6.0)
Overall	A (7.1)	D (35.0)	A (7.5)	D (37.6)	A (7.5)	D (38.4)
62. 21st Street/F Street						
EBTR	B (10.9)	B (11.7)	B (11.4)	B (12.7)	B (11.4)	B (12.7)
SBLT	A (8.3)	A (8.4)	A (8.6)	A (8.2)	A (8.6)	A (8.2)
Overall	A (9.2)	A (8.9)	A (9.7)	A (9.1)	A (9.7)	A (9.1)

(23.3) = Signalized intersection delay (sec/veh)
[23.3] = Unsignalized intersection delay (sec/veh)

Table 3-5 (Continued)
Intersection Levels of Service

Approach	2025 Background Conditions		2025 Total Future Conditions		2025 Total Future Conditions with Improvements	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
63. 20th Street/Pennsylvania Avenue						
EBLT	D (35.7)	B (18.4)	D (35.4)	B (16.4)	D (37.2)	B (14.6)
WBTR	B (12.2)	B (11.0)	B (12.2)	B (11.0)	B (12.2)	B (11.0)
NBLTR	F (383.7)	C (34.6)	F (378.3)	C (34.8)	F (378.5)	C (35.0)
Overall	F (197.4)	C (22.2)	F (194.1)	C (21.1)	F (195.0)	C (20.1)
64. 20th Street/H Street						
EBLT	F (89.0)	B (16.0)	F (102.0)	B (16.7)	F (89.7)	B (16.7)
WBTR	C (24.4)	B (15.5)	C (25.7)	B (16.2)	C (24.9)	B (16.2)
NBLTR	A (7.7)	B (10.6)	A (7.8)	B (10.8)	A (8.5)	B (10.9)
Overall	C (20.8)	B (11.7)	C (22.7)	B (12.3)	C (21.7)	B (12.3)
65. 20th Street/G Street						
WBTR	C (32.5)	C (28.4)	C (32.5)	C (28.2)	C (32.5)	C (28.4)
NBLT	A (3.7)	A (4.4)	A (3.8)	A (5.2)	A (4.3)	A (5.2)
Overall	A (6.7)	B (15.8)	A (6.7)	B (16.0)	A (7.2)	B (16.1)
66. 20th Street/F Street						
EBLT	D (38.8)	B (18.6)	D (41.3)	B (18.4)	D (43.2)	B (18.4)
NBTR	F (82.0)	C (23.7)	F (86.6)	C (23.6)	E (79.0)	C (23.7)
Overall	E (77.7)	C (22.6)	F (81.5)	C (22.2)	E (75.0)	C (22.3)
67. Eye Street/Pennsylvania Avenue						
NEL	F [66.0]	E [35.4]	F [65.6]	E [35.5]	F [65.6]	E [35.9]
NER	B [13.5]	B [12.9]	B [13.3]	B [12.9]	B [13.3]	B [12.9]

(23.3) = Signalized intersection delay (sec/veh)
[23.3] = Unsignalized intersection delay (sec/veh)

An evaluation of the peak hour traffic signal warrant contained in the Manual on Uniform Traffic Control Devices (MUTCD),[8] was conducted for the 22nd Street/Eye Street intersection (#15) intersection. This analysis showed that the peak hour traffic signal would be met under the projected background traffic volumes and the projected total future traffic volumes during the AM peak hour.

The results of total future capacity analyses with improvements are presented in Table 3-2.

PEDESTRIAN PLAN

Physical design and space programming promotes pedestrian circulation, access to transit facilities and service, and reduces reliance on the private automobile.

The Campus Plan includes a network of informal pedestrian-oriented pathways throughout the Foggy Bottom Campus, as shown on Figure 3-14. These pathways will complement the existing network of sidewalks along public streets. They will provide more direct pedestrian linkages among campus open spaces as well as existing and new buildings.

Special treatments may be appropriate at the mid-block crossings where the north-south pathways meet east-west public streets, on G Street (between 21st and 22nd Streets) and on H Street (between 20th and 21st Streets and between 21st and 22nd Streets).

TRANSPORTATION MANAGEMENT PLAN (TMP)

Existing Transportation Management Plan Measures

The GW Transportation Management Plan (TMP) was created as a comprehensive plan that promotes safe and efficient traffic operations within the campus, maximizes the use of the on- and off-street parking facilities to efficiently serve the campus parking demands, and implements effective shuttle service on- and off-campus. The plan currently consists of the following measures:

1. Public Transportation Pass,
2. GW Parking Facility Permits,
3. Carpool Programs,
4. Off-Campus Parking Tax Deductions,
5. Attendant Parking,
6. Parking Deduction Program, and
7. Shuttle Bus Service Plan.

Public Transportation Pass - The Foggy Bottom campus is served by the Foggy Bottom-GWU Metrorail station, conveniently located within the campus, and also numerous Metrobus lines. GW offers a pre-tax transportation benefits program to their employees (regular full-time and part-time) to promote the use of public transportation. This program allows employees to purchase a SmarTrip Card or Metro "Checks", which can be used on Metrorail, Metrobus, and also on MARC or VRE commuter trains. In addition, GW provides an introduction to the WMATA public transportation program for all new students during their orientation.

GW Parking Facility Permits – Permits are issued to students, faculty, staff, residents, and physicians who drive and park on-campus. The permits are sold with monthly contracts or on an occasional/daily parking basis and are assigned to a specific parking facility. Visitors are required to pay hourly rate fees, but do not need to purchase a permit.

Carpool Programs - Carpooling is encouraged at GW through the Carpool Program, which allows employees to park any car registered in their carpool group in one group-shared parking space in any parking facility.

On-Campus Parking Pre-tax Deduction Program – A pre-tax deduction for on-campus parking fees is offered to all regular GW employees.

Off-Campus Parking Pre-Tax Deduction Program – This program allows employees who pay for parking at a Metro station or at a commercial parking facility to participate in a pre-tax parking program.

Attendant Parking – When class attendance is high or when special events occur on campus, attendant parking is available at specific parking facilities to provide additional parking spaces.

[8] Manual on Uniform Traffic Control Devices, U.S. Department of Transportation, Federal Highway Administration, 2003 Edition with Revision No. 1 Incorporated, effective July 21, 2004.

Shuttle Bus Service Plan – GW provides three forms of campus transportation – the Colonial Express Shuttle Buses, the Vern Express, and the University Police Department (UPD) Escort Service.

Proposed Transportation Management Plan Measures

Improvements to the existing TMP measures are proposed in conjunction with the Foggy Bottom Campus Plan: 2006 – 2025. The following elements could comprise the enhanced TMP program:

1. Public Transportation,
2. Pedestrian and Bicycle Programs,
3. Parking Management during On-Site Construction,
4. Truck Management Program, and
5. Special Event Management.

Public Transportation – Public transportation is continuously encouraged at GW for students and employees; however, it should also be encouraged for special events taking place on-campus.

Pedestrian and Bicycle Programs – As previously stated, special pedestrian treatments (pavement markings, traffic control devices) may be appropriate at the mid-block crossings where the north-south pathways meet east-west public streets, on G Street (between 21st and 22nd Streets) and on H Street (between 20th and 21st Streets and between 21st and 22nd Streets).

Numerous bicycle racks and storage facilities are currently available throughout the campus, which promote their regular use by students and GW employees. The installation of additional racks and storage facilities where none currently exist would further promote their use.

Parking Management during On-Site Construction – During construction, various campus parking facilities will be inaccessible. To compensate for the loss of these parking spaces, attendant parking at several parking facilities can be utilized to help ensure that the campus' parking demands are adequately met.

Truck Management Program – The goal of this program is to reduce the impact of GW delivery trucks on the campus roadways. The campus could provide a truck circulation route that identifies the main roadways that delivery vehicles should use to access the GW loading facilities, while discouraging the use of smaller and narrower neighborhood streets. Access/egress should, to the extent possible, be directed to Pennsylvania, F, G, Eye and 23rd Streets and away from H, 21st, and 22nd Streets.

Special Event Management – GW is encouraged to schedule any large on-campus events carefully to reduce congestion during the GW peak hours and minimize the parking demands.

Section 4
CONCLUSIONS

The conclusions and proposed recommendations of this study are as follows:

1. The Campus Plan envisions approximately 2,000,000 gross square feet (GSF) of new university uses, including high-tech classrooms, labs, offices, residential space, support space, and other modernized University facilities. In addition to the proposed development plan, this report takes into account the impact of potential increases in Foggy Bottom student enrollment and faculty/staff over the term of the Plan.
2. GW proposes to increase the supply of undergraduate, on-campus housing.
3. Parking structures will be sized and located throughout campus to minimize impacts on surrounding neighborhoods and provide convenient access to major commuting routes.
4. The potential off-street opportunity sites could accommodate up to 1,123 net new parking spaces. While it is not the University's desire or intent to develop all of these spaces, identification of numerous opportunity sites allows the University to meet campus parking needs while providing the flexibility necessary to accommodate various options for the sequencing of development sites given the long-term nature of the Campus Plan.
5. GW currently generates an estimated 804 AM peak hour vehicle-trips and 909 PM peak hour vehicle-trips, during the ***University*** peak hours. GW currently generates an estimated 759 AM peak hour vehicle-trips, and 798 PM peak hour vehicle-trips, during the ***street*** peak hours.
6. University traffic accounts for 7.8 to 8.7 percent of all traffic on streets within the campus during the ***street*** AM and PM peak hours, respectively.
7. The impact of potential increases to Foggy Bottom student enrollment and faculty/staff is expected to generate 206 AM peak hour vehicle-trips and 79 PM peak hour vehicle-trips.
8. Several study intersections currently operate with lane groups near or at capacity, at LOS "E" or "F", during the AM and/or PM peak hours.
9. The Campus Plan would disperse traffic across the Campus, rather than concentrating it at the University Parking Garage.
10. Localized traffic impacts can be fully mitigated by adjusting existing traffic signal timings, installing a new traffic signal, and prohibiting curb parking at a few locations. Specifically, this could include:
    - Adjust signal timings and phasing (i.e. to include a southbound advance phase and a westbound right-turn overlap phase) at the 23rd Street/Eye Street intersection (#9).
    - Adjust signal timings at the 23rd Street/G Street intersection (#55).
    - Adjust traffic signal timings at the 23rd Street/ F Street/Virginia Avenue (WB) intersection.
    - Adjust traffic signal timings at the 24th Street/ Pennsylvania Avenue intersection.
    - Adjust traffic signal timings at the 20th Street/ H Street intersection.
    - Adjust traffic signal timings at the 20th Street/ F Street intersection.
    - Install a traffic signal at the 22nd Street/Eye Street intersection (#15).
    - Eliminate curb parking along the south side of Eye Street on the eastbound approach of the 22nd/Eye Street intersection (#15) to provide an eastbound left turn lane.
    - Eliminate curb parking along the south side of Eye Street on the eastbound approach of the 21st Street/Eye Street intersection to provide separate eastbound through and right turn lanes.
    - Eliminate curb parking along the east side of 23rd Street on the northbound approach of the 23rd Street/Eye Street intersection to provide a northbound right turn lane.
    - Eliminate curb parking along the north side of Eye Street on the westbound approach of the 23rd Street/Eye Street intersection to provide a westbound right turn lane.

11. GW currently has a comprehensive Transportation Management Plan (TMP) that promotes safe and efficient traffic operations within the campus, maximizes the use of the on- and off-street parking facilities to efficiently serve the campus parking demands, and implements effective shuttle service on- and off-campus. The plan currently consists of the following measures:

    1. Public Transportation Pass,
    2. GW Parking Facility Permits,
    3. Carpool Programs,
    4. Off-Campus Parking Tax Deductions,
    5. Attendant Parking,
    6. Parking Deduction Program, and
    7. Shuttle Bus Service Plan.

12. Potential improvements to the existing TMP could include the following:

    - Encourage, promote and implement public transportation for any special events taking place on-campus.
    - Enhance pedestrian treatments (i.e. pavement markings and traffic control devices) at key mid-block crossings.
    - Install bicycle racks and storage facilities in areas where none currently exist.
    - Provide attendant parking at several parking facilities during construction to ensure parking demands are adequately met.
    - Provide a truck circulation route that identifies the main roadways that delivery vehicles should use to access the GW loading facilities, while discouraging the use of smaller and narrower neighborhood streets.
    - Schedule any large on-campus events carefully to reduce congestion during the GW peak hours and minimize the parking demands.

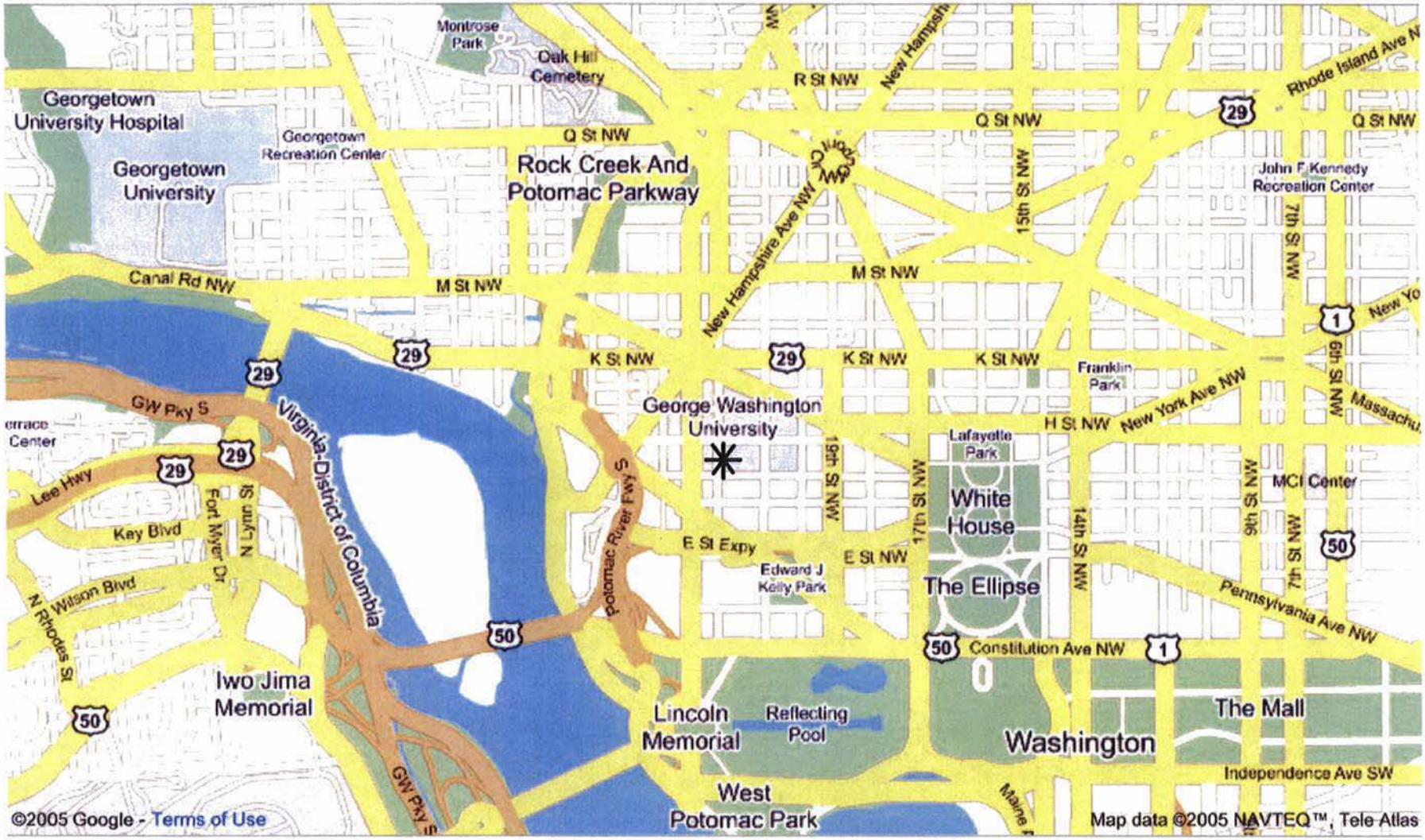

Figure 1—1
Site Location

North
Schematic

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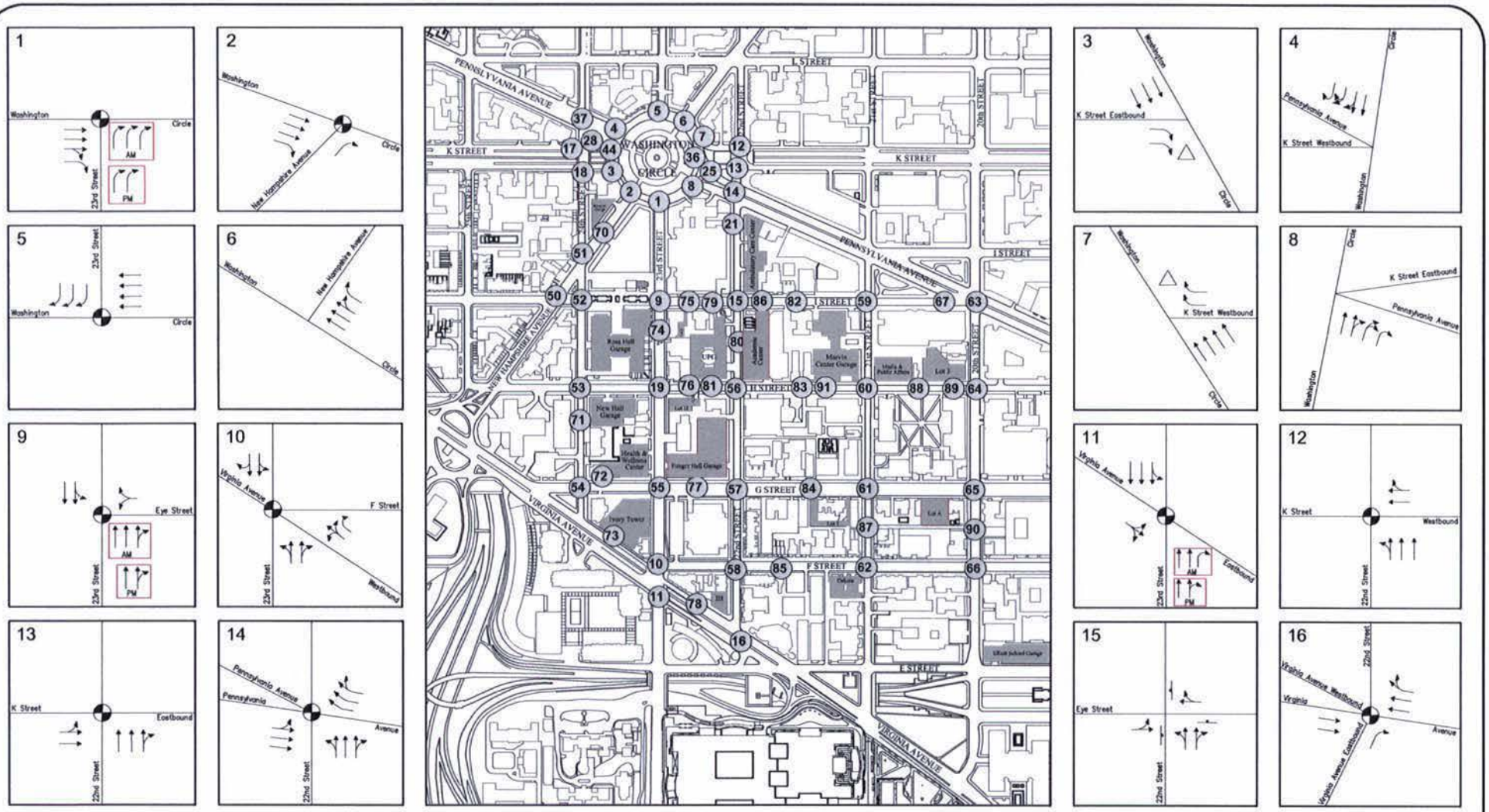

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Figure 2–1
Existing Lane Use and Traffic Control

← Represents One Travel Lane
Signalized Intersection
Stop Sign
△ Yield Sign

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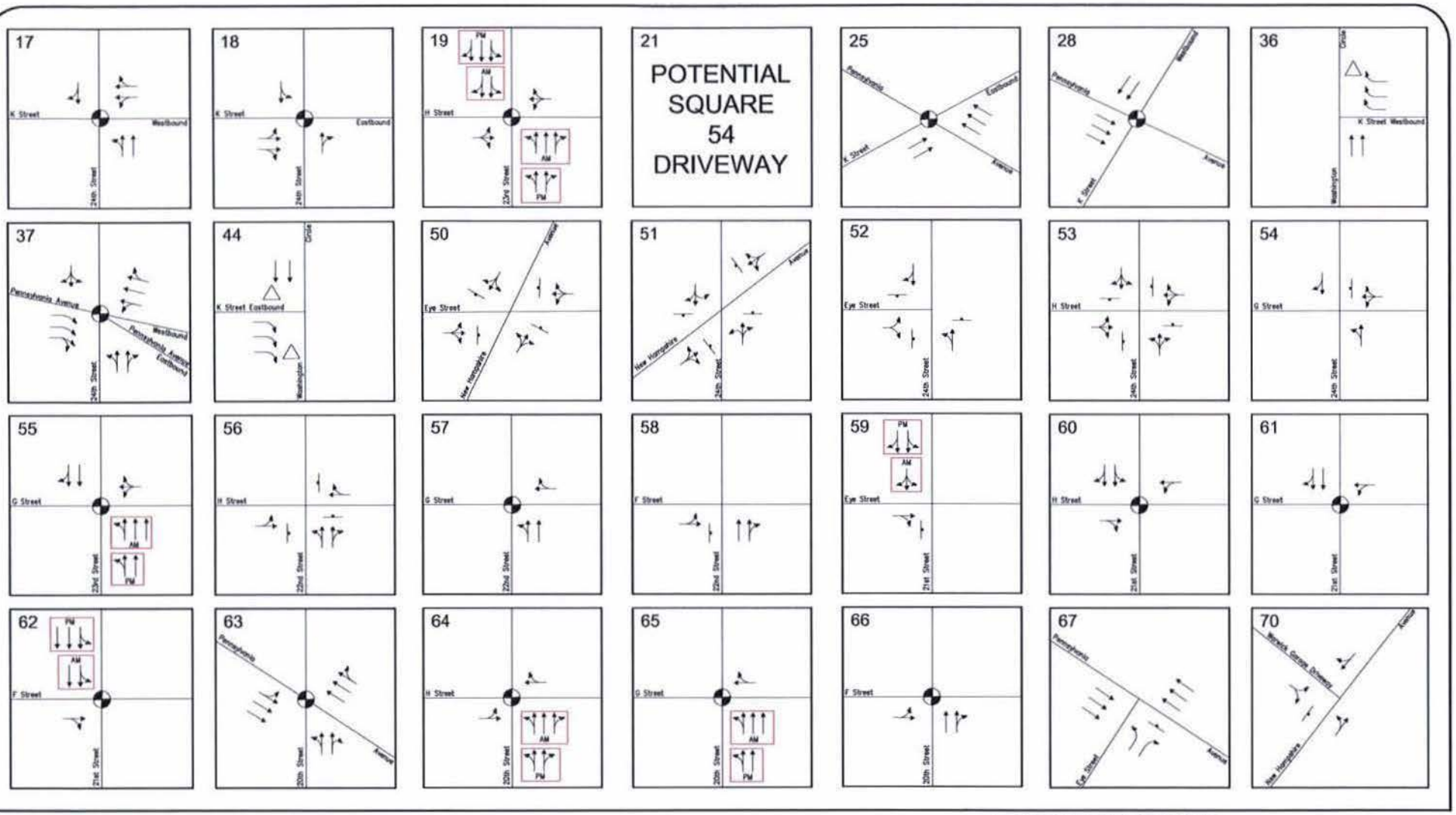

Figure 2–1
Existing Lane Use and Traffic Control

← Represents One Travel Lane
Signalized Intersection
Stop Sign
△ Yield Sign

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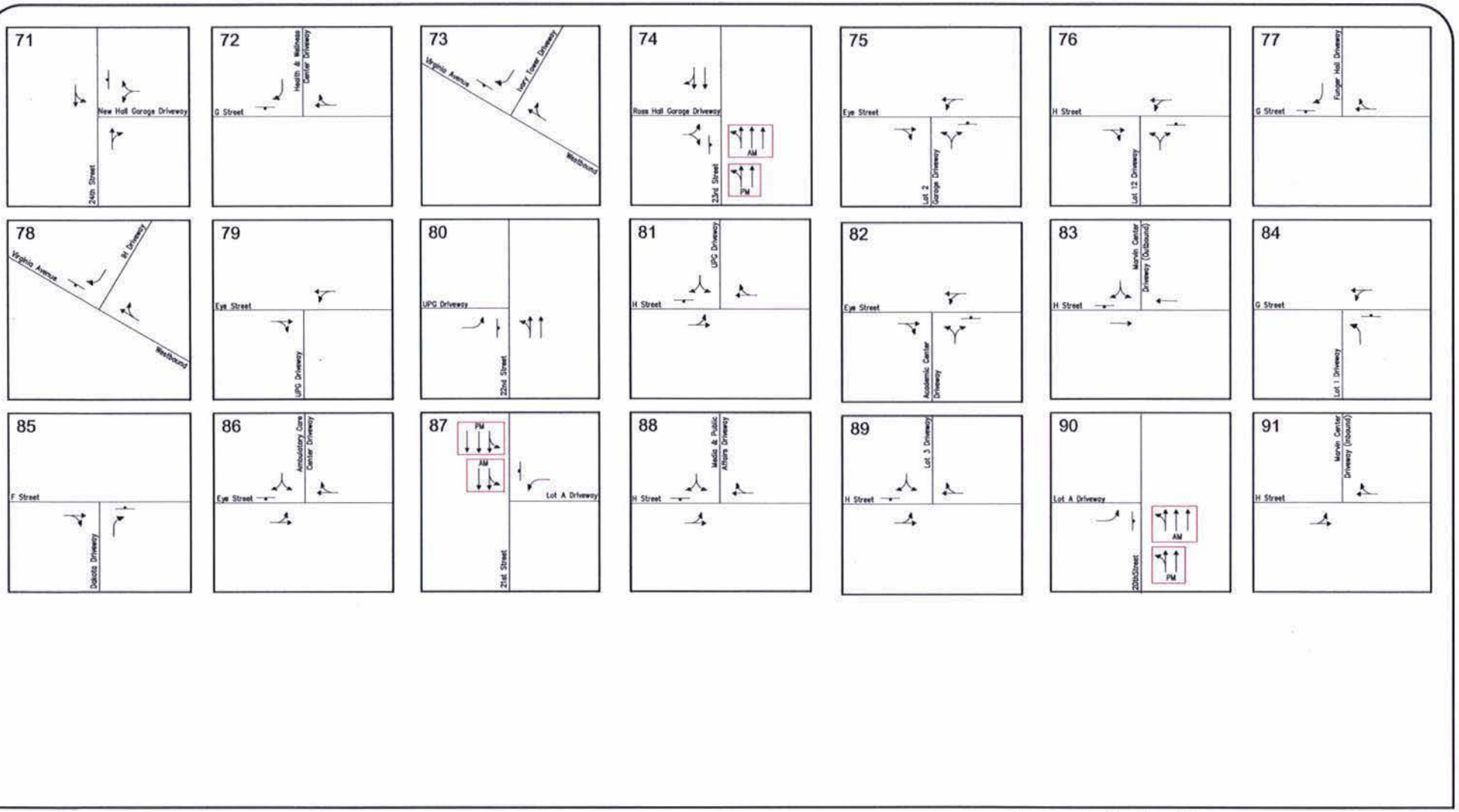

Figure 2–1
Existing Lane Use and Traffic Control

← Represents One Travel Lane
Signalized Intersection
Stop Sign
△ Yield Sign

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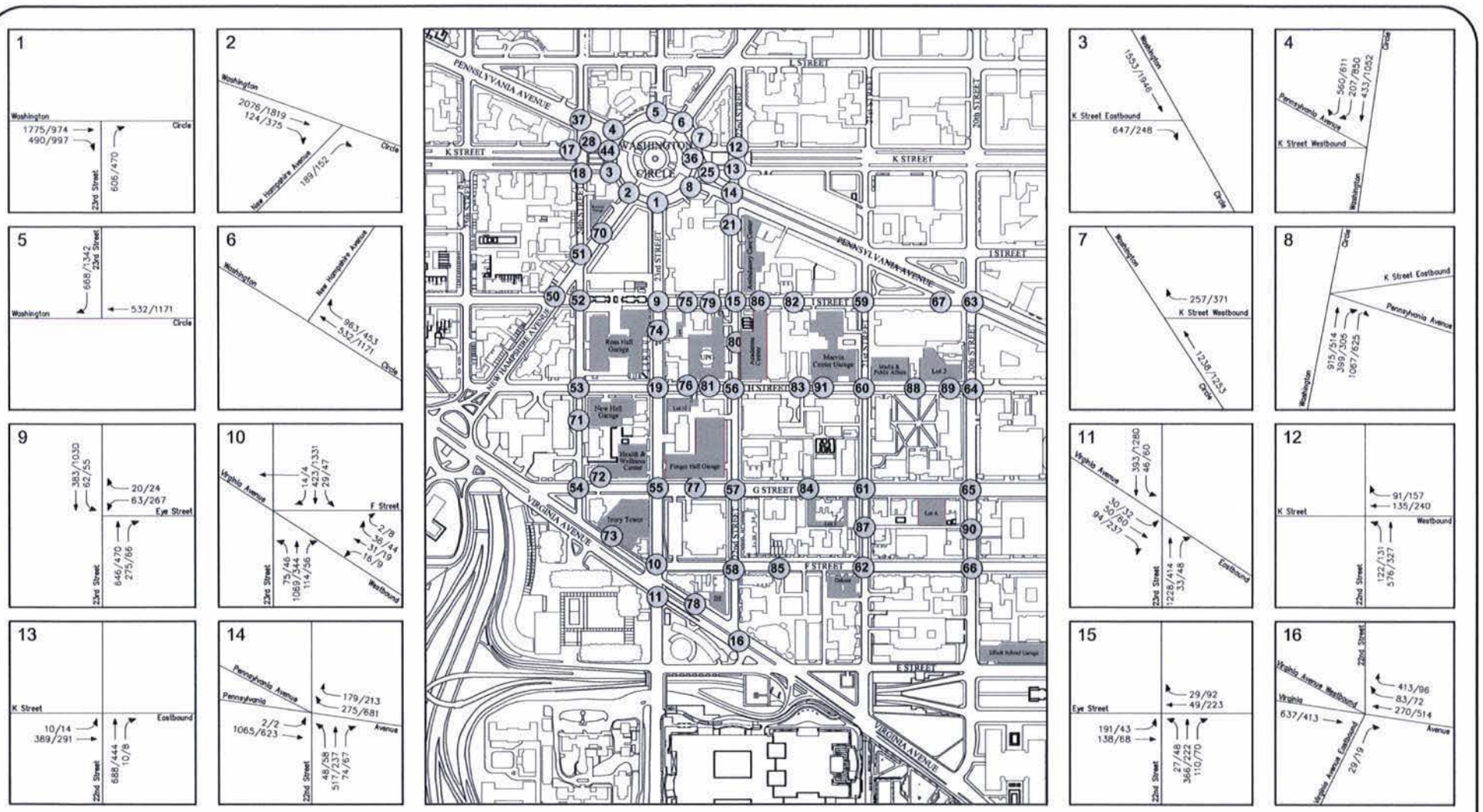

Figure 2-2
Existing Vehicular Counts

AM PEAK HOUR
PM PEAK HOUR
000/000

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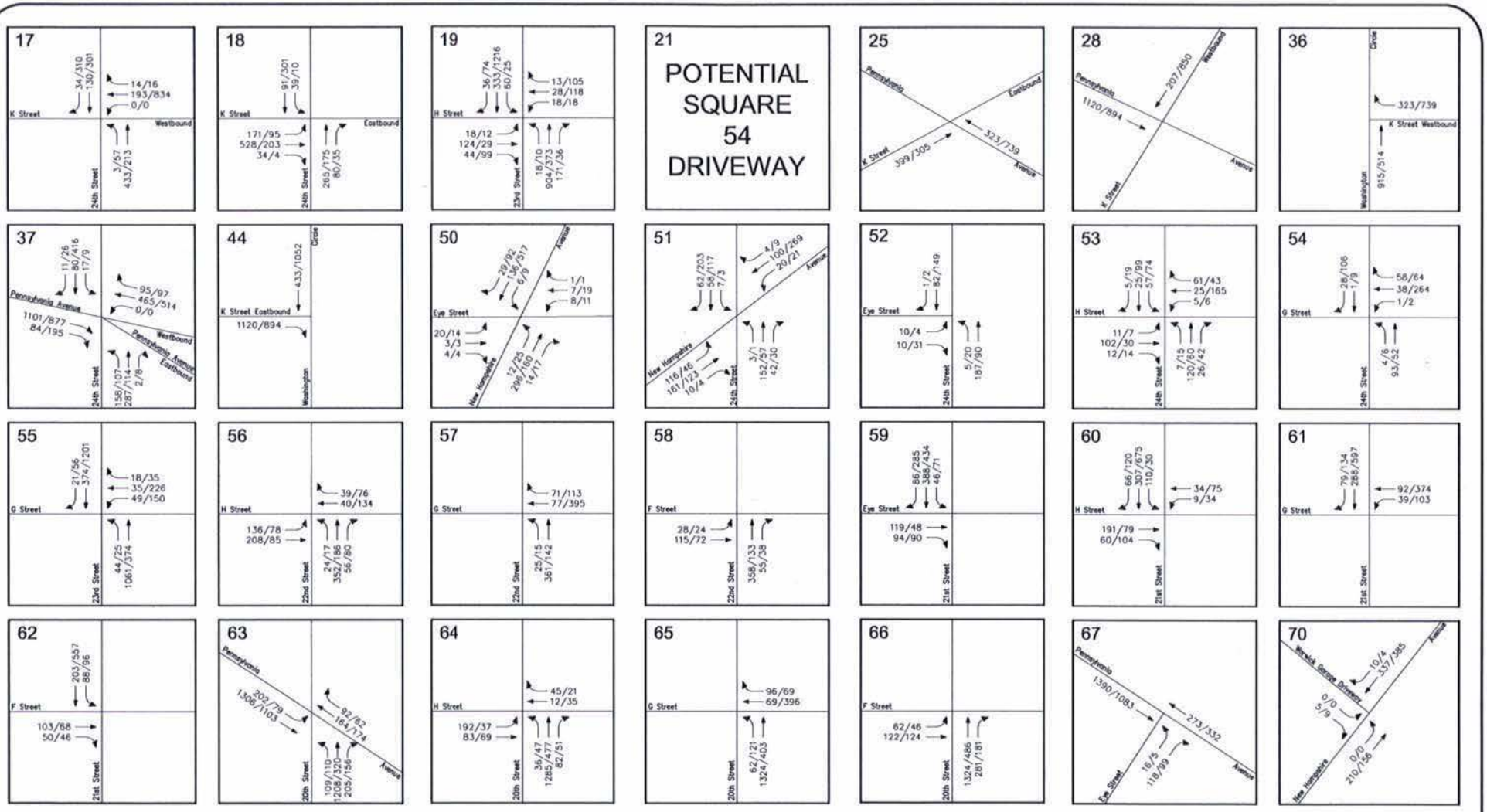

Figure 2–2
Existing Vehicular Counts

AM PEAK HOUR
PM PEAK HOUR
000/000

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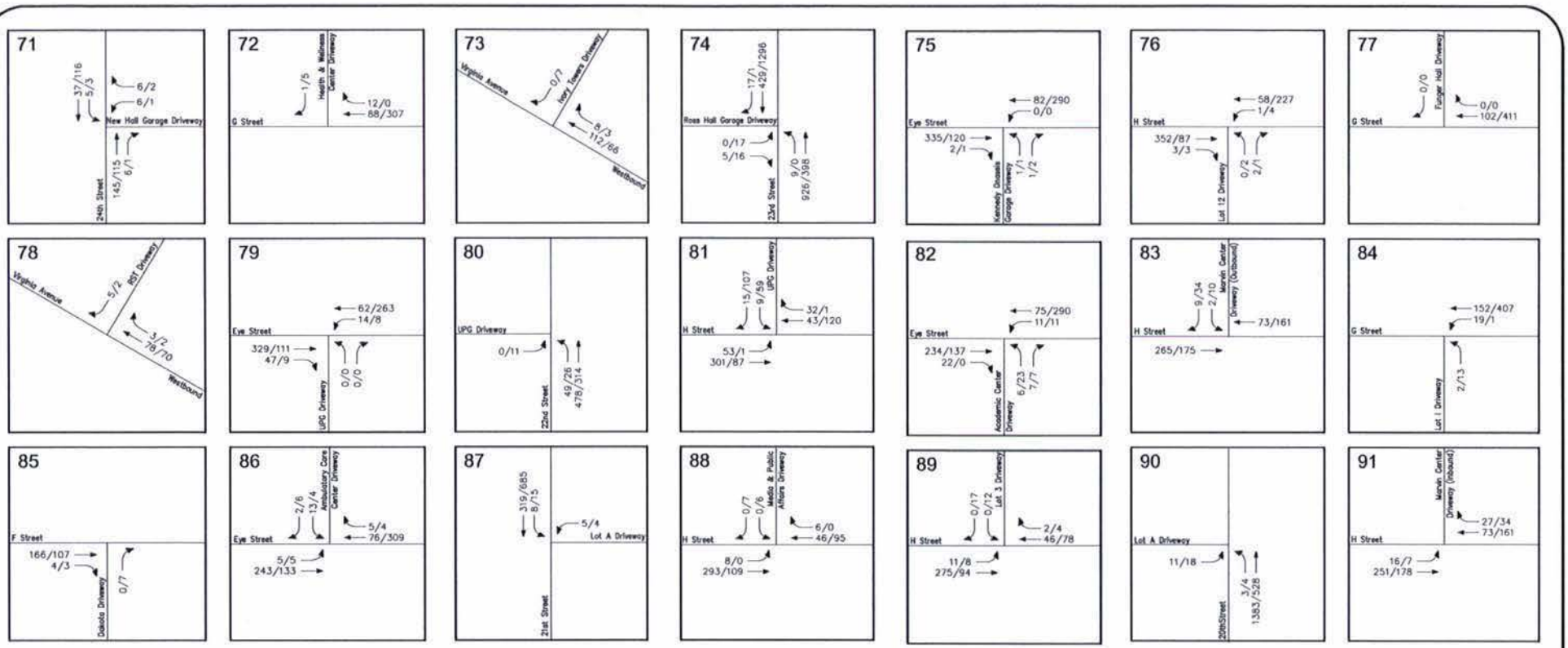

Figure 2–2
Existing Vehicular Counts

AM PEAK HOUR
PM PEAK HOUR
000/000

North

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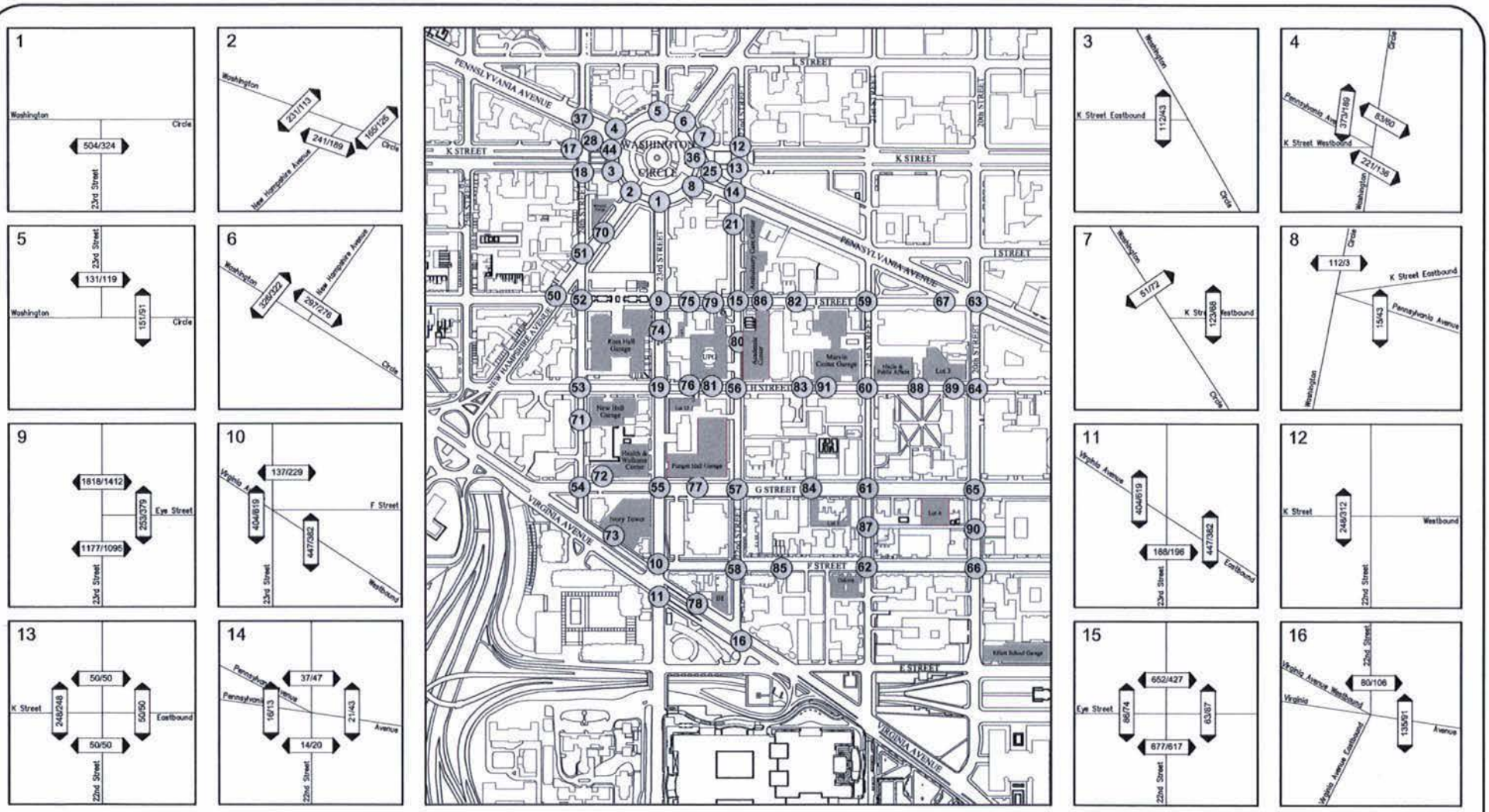

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Figure 2-3
Existing Pedestrian Counts

AM PEAK HOUR
PM PEAK HOUR
000/000

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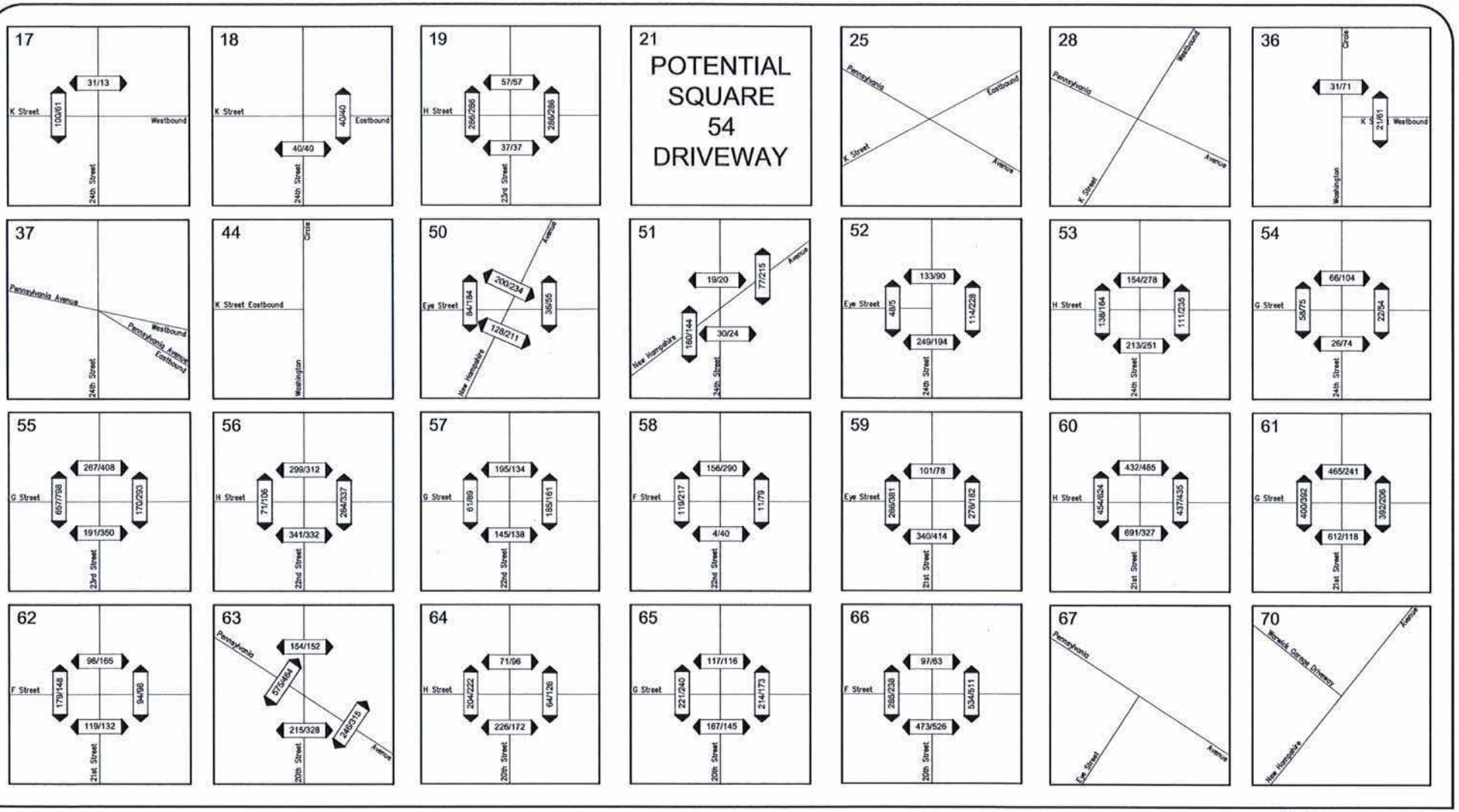

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Figure 2–3
Existing Pedestrian Counts

AM PEAK HOUR
PM PEAK HOUR
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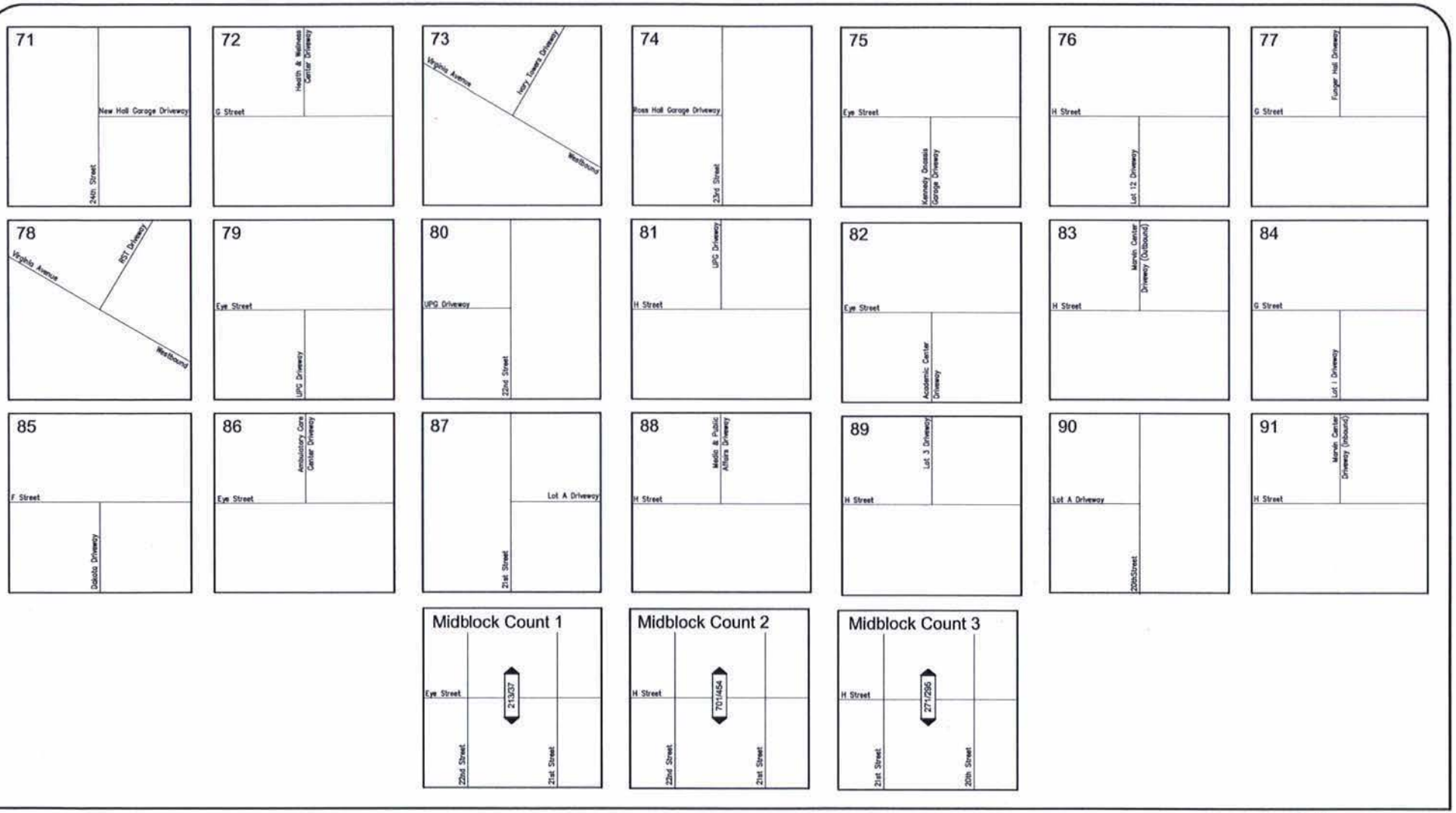

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Figure 2-3
Existing Pedestrian Counts

AM PEAK HOUR
PM PEAK HOUR
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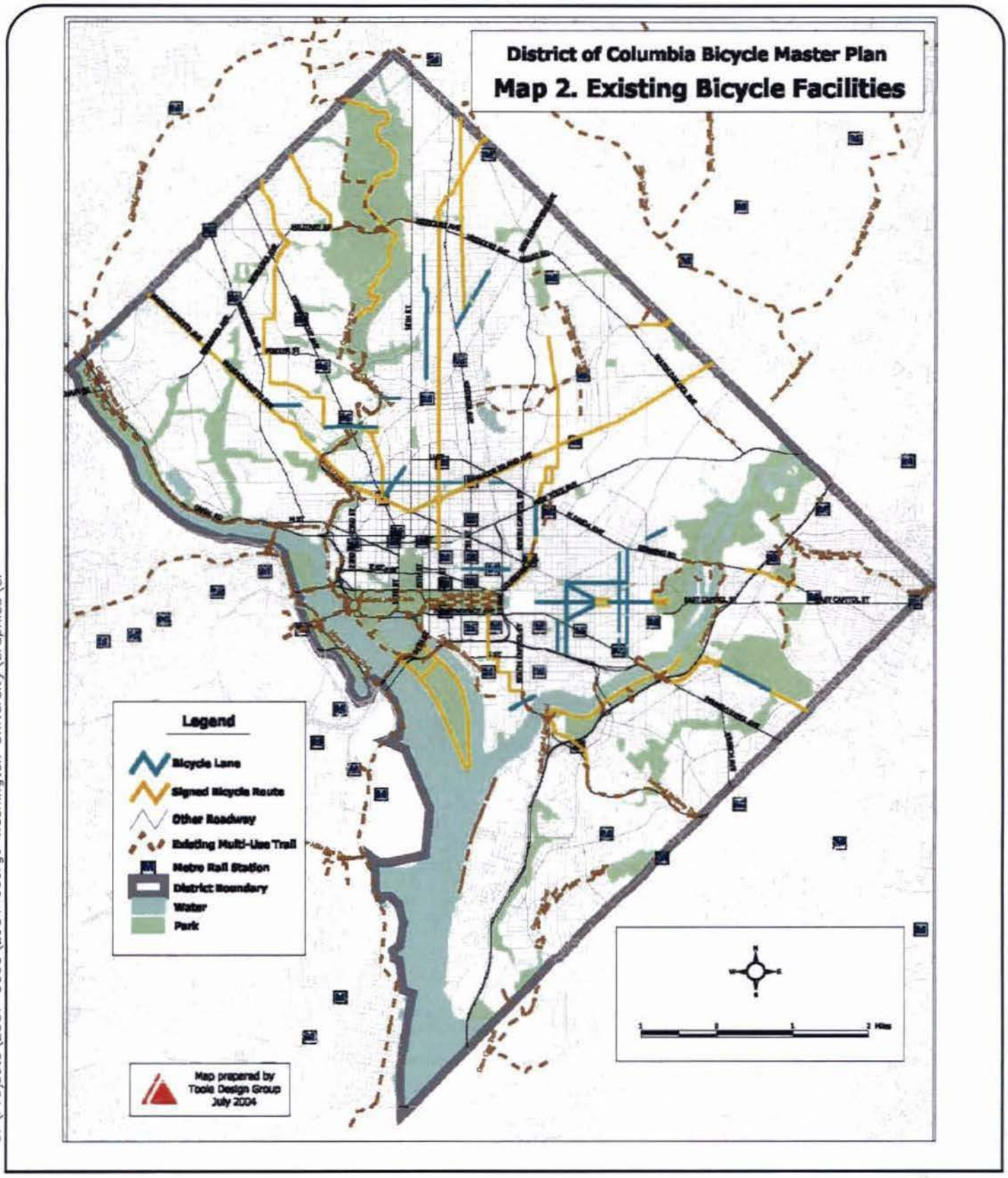

Figure 2-4
Bicycle Routes (DC Bicycle Master Plan)

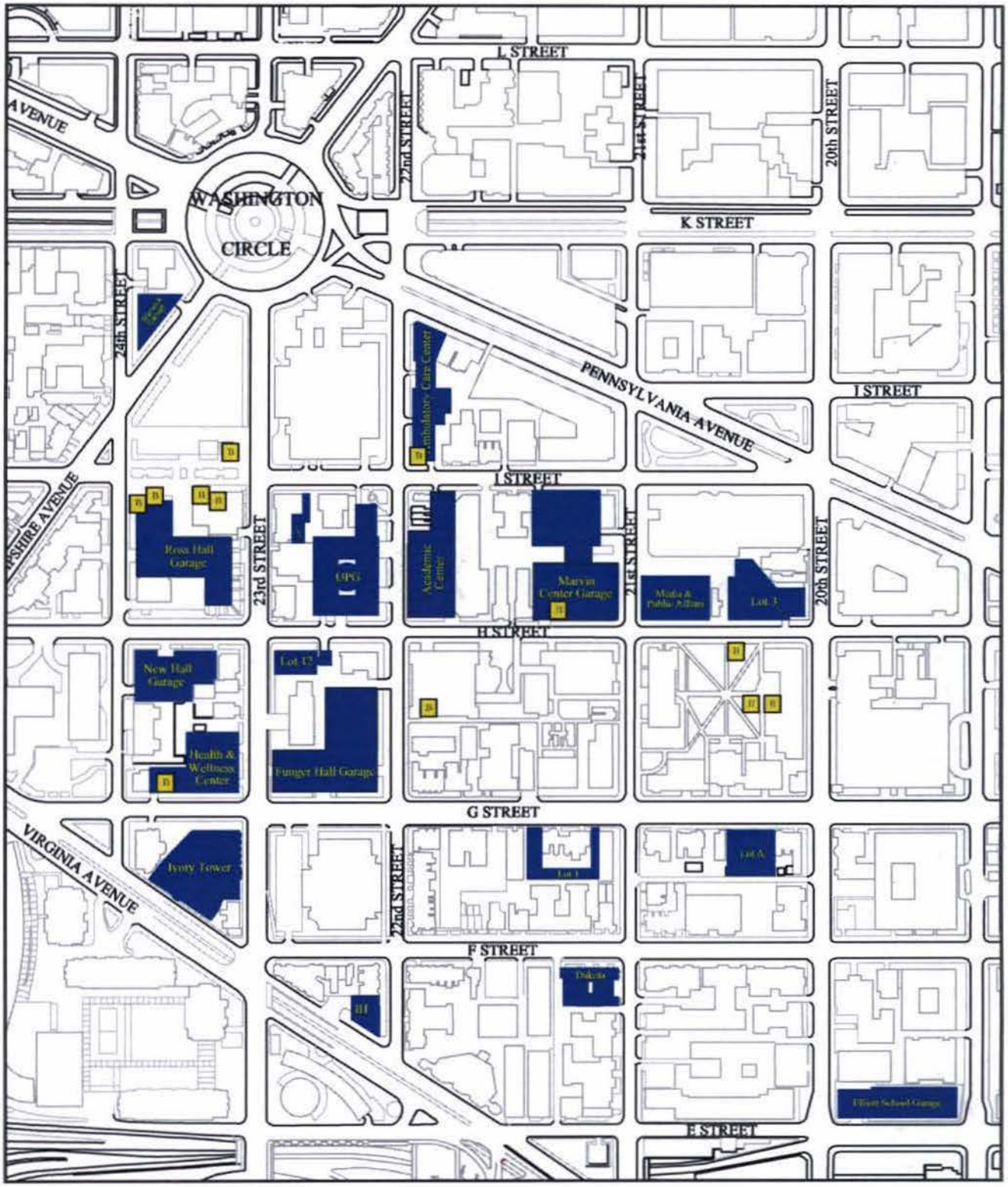

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Figure 2-5
Existing Bicycle Racks

B Bicycle Racks

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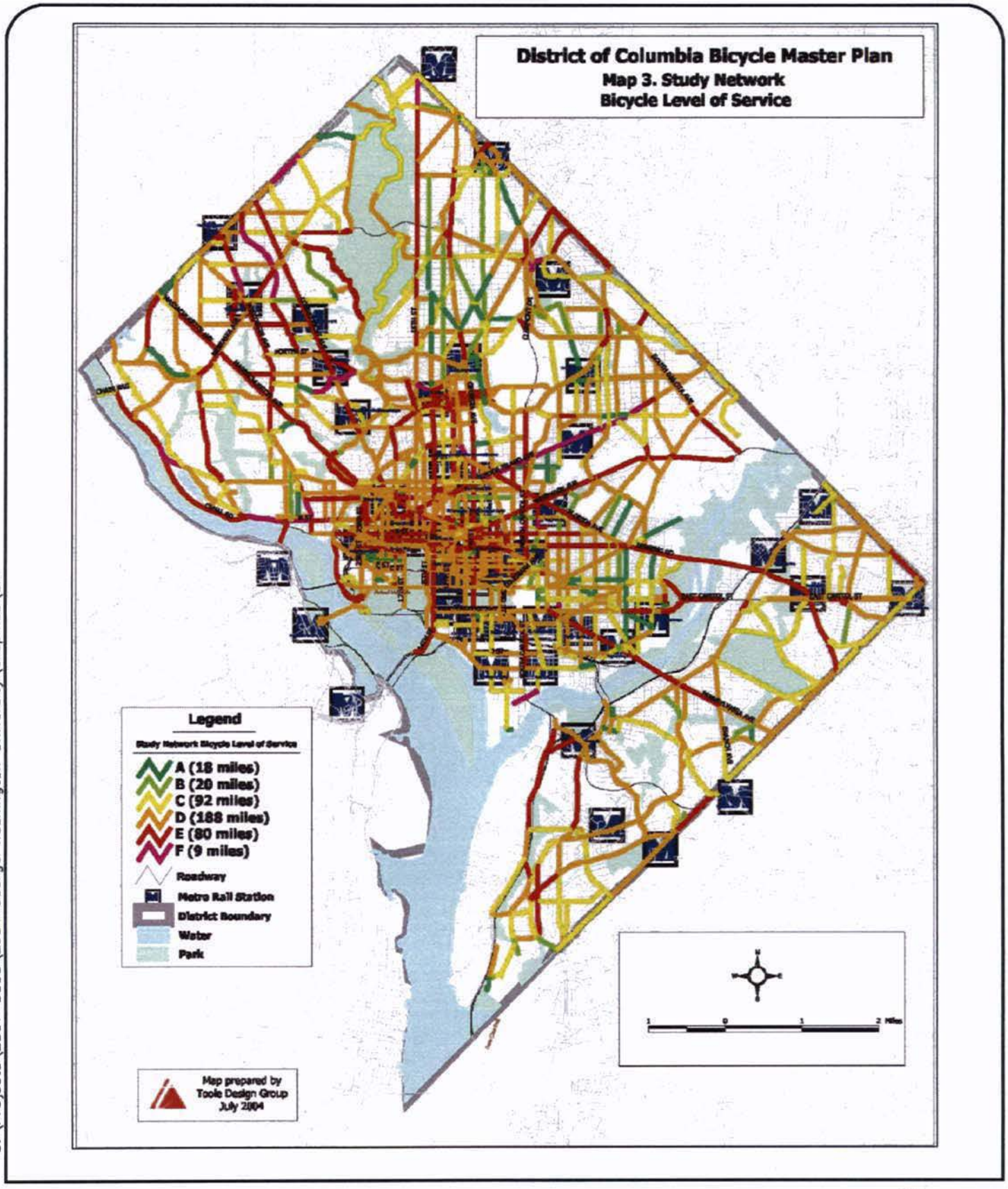

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Figure 2-6
Bicycle Levels of Service (DC Bicycle Master Plan)

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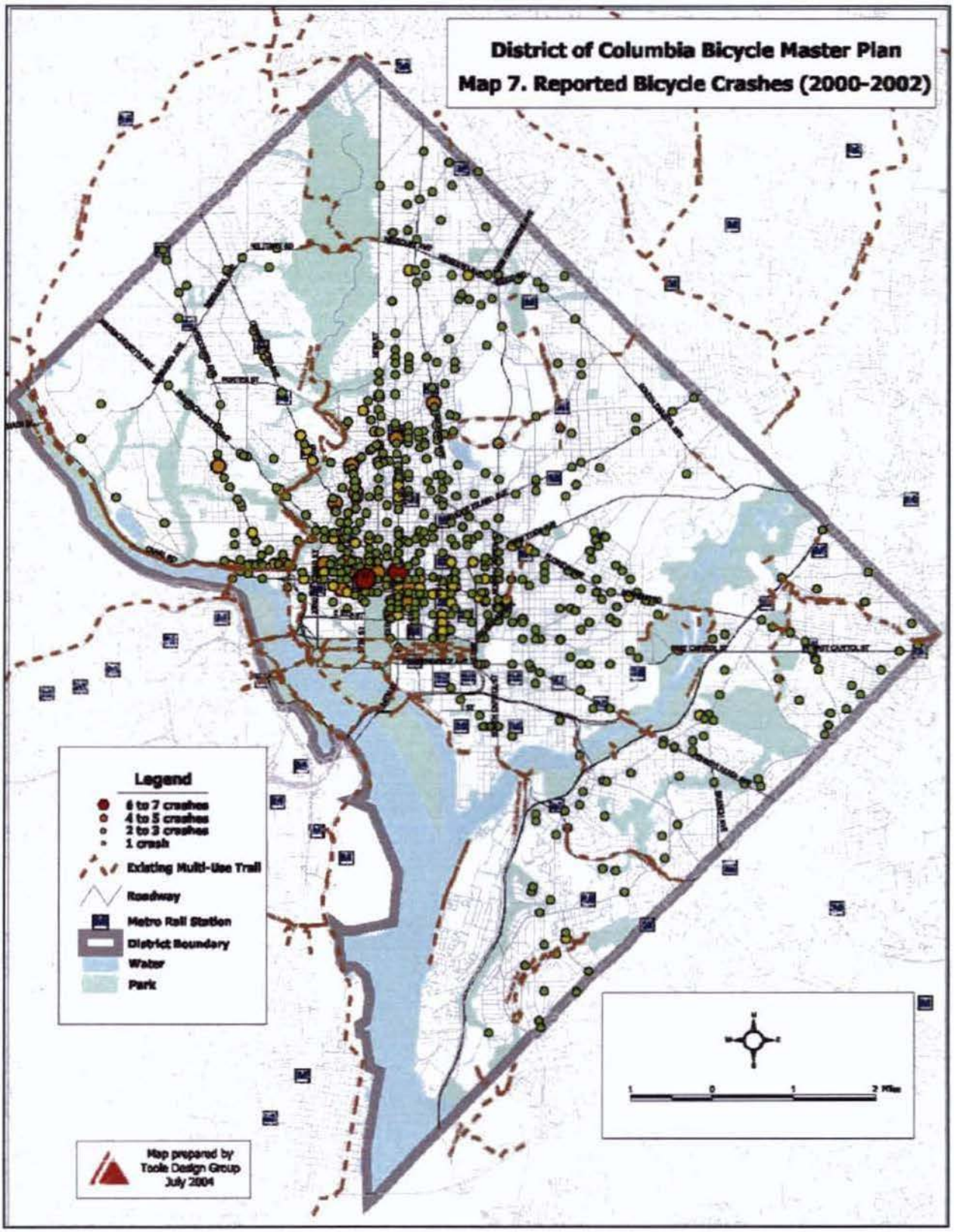

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Figure 2-7
Bicycle Accidents (DC Bicycle Master Plan)

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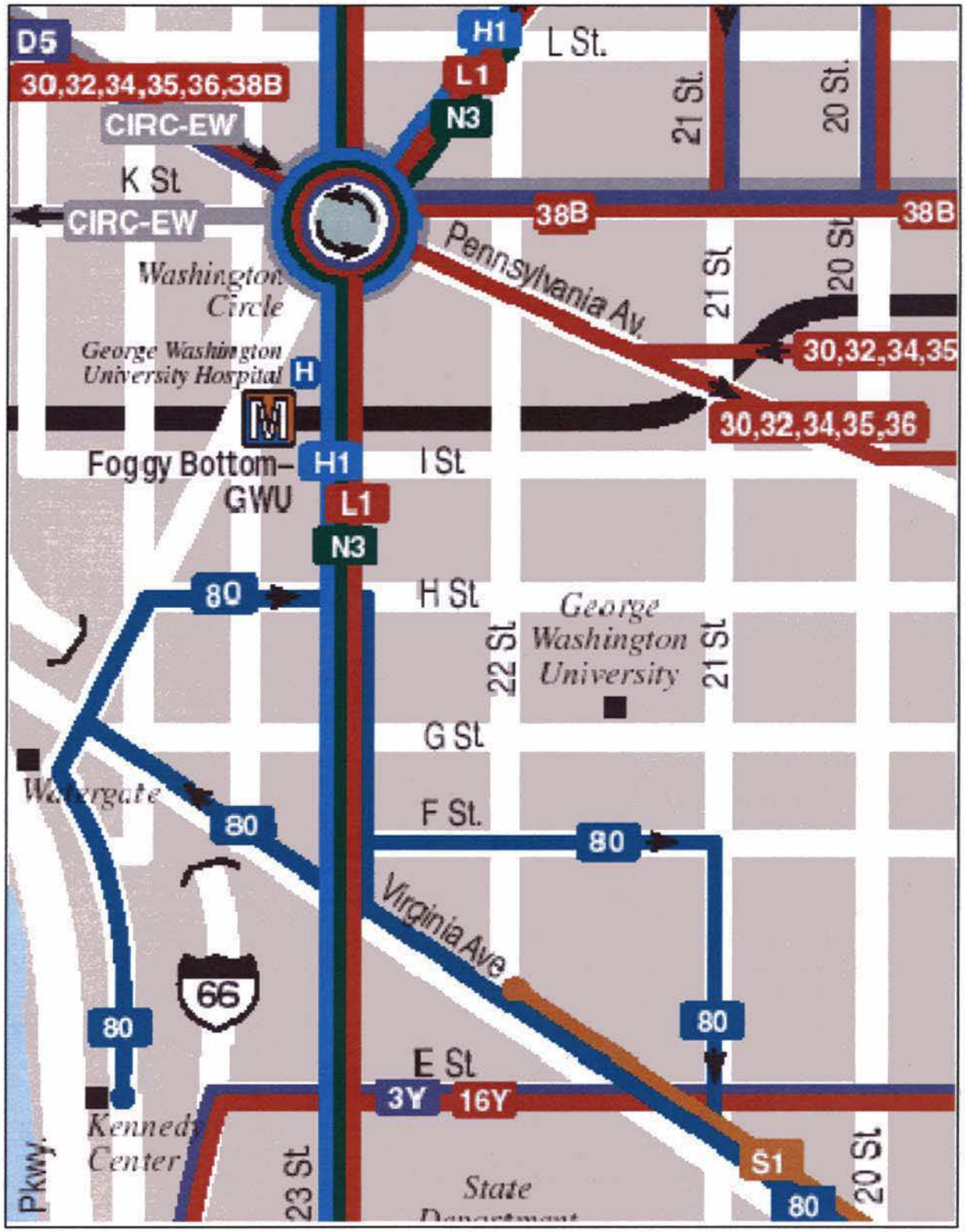

Figure 2–8
Existing Metrobus Routes

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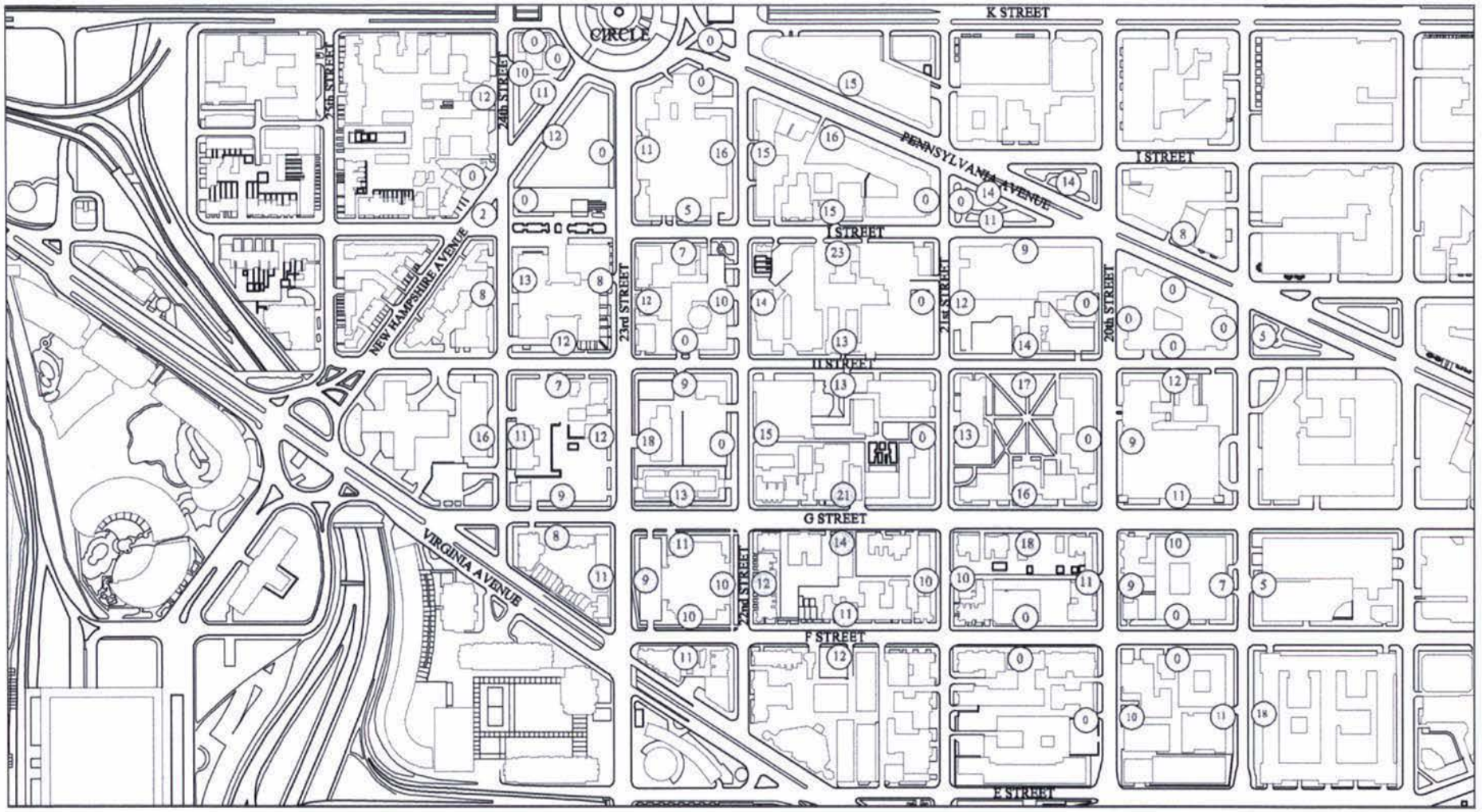

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Figure 2-9
On-Street Parking Inventory

(XX) On-Street Parking Spaces

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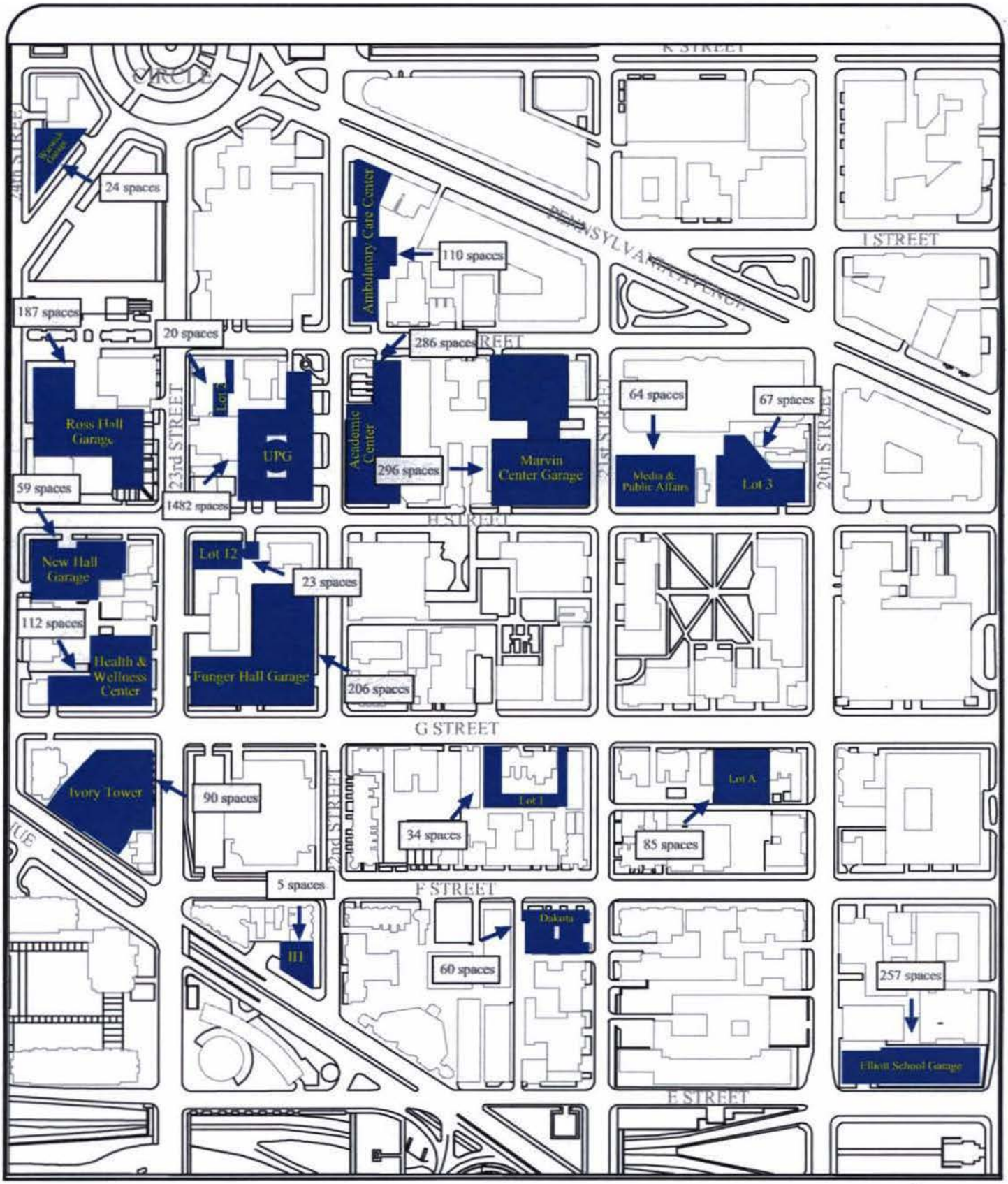

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Figure 2-10
Existing Parking Sites

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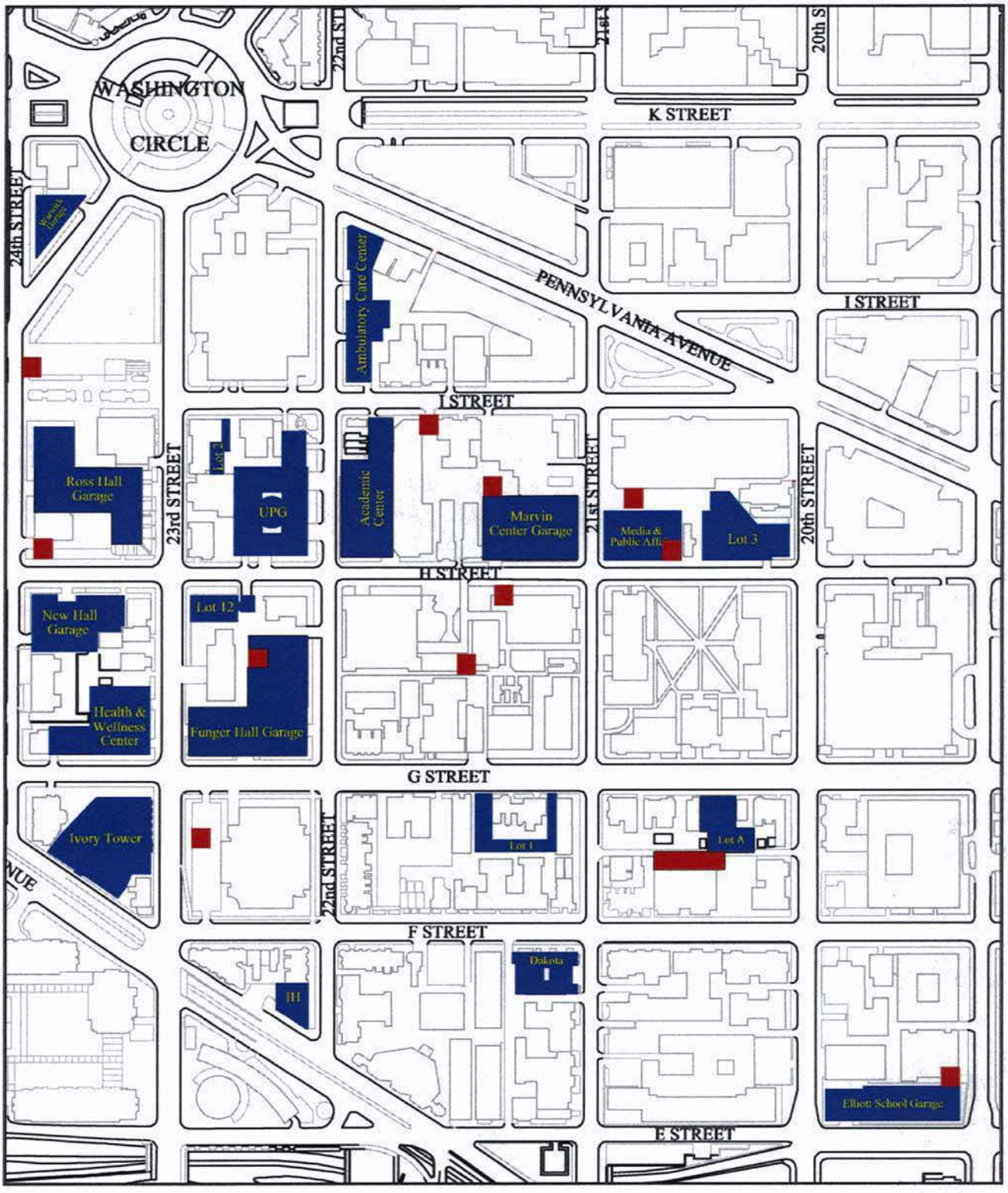

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Figure 2-11
Existing Loading Facilities

Loading Facilities

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