

Exhibit B

**SQUARE 54
TRANSPORTATION IMPACT STUDY
WASHINGTON, D.C.**

Prepared for:
Boston Properties, Inc.,
KSI Services, Inc.,
The George Washington University

Prepared by:
Wells & Associates, LLC

May 24, 2006
Revised October 2006

**SQUARE 54
TRANSPORTATION IMPACT STUDY
WASHINGTON, D.C.**

TABLE OF CONTENTS

	<u>Page</u>
Section 1 - Introduction	1
Section 2 - Background Data.....	4
Overview	4
Study Scope	4
Public Street Network.....	6
Vehicular Access Concept	7
Existing Traffic Counts.....	8
Curb Parking	10
Public Transportation Facilities and Services.....	10
Pedestrian Facilities.....	13
Bicycle Facilities	13
U.S. Census Data.....	14
Section 3 - Analysis.....	17
Overview	17
Existing Levels of Service.....	17
Pipeline Project Vehicle-trip Generation.....	22
Vehicle-Trip Distribution and Assignment.....	22
Background Traffic Growth.....	23
Background Traffic Forecasts.....	23
Background Future Levels of Service	23
Site Trip Generation Analysis	23
Site Trip Distribution	26
Site Traffic Assignments.....	26
Total Future Traffic Forecasts.....	26
Total Future Levels of Service.....	26
Queue Analysis	28
Parking Analysis	28
Loading	29
Transportation Demand Management	29
Section 4 - Conclusions	30

**SQUARE 54
TRANSPORTATION IMPACT STUDY
WASHINGTON, D.C.**

LIST OF FIGURES

<u>Figure</u>	<u>Title</u>	<u>Page</u>
1-1	Site Location	31
2-1	Existing Lane Use and Traffic Control	32
2-2	Existing Vehicular Counts	34
2-3	Existing Pedestrian Counts	36
2-4	Day Time Curb Parking Restrictions	38
2-5	Existing Public Transportation Services	39
3-1	Pipeline Project Traffic Assignments	40
3-2	Background Future Peak Hour Traffic Forecasts	42
3-3	Site-Generated Traffic Assignments and Directional Distribution	44
3-4	Total Future Peak Hour Traffic Forecasts	46

**SQUARE 54
TRANSPORTATION IMPACT STUDY
WASHINGTON, D.C.**

LIST OF TABLES

<u>Table</u>	<u>Title</u>	<u>Page</u>
2-1	2002 Link Traffic Counts	9
2-2	Foggy Bottom-GWU Metro Station Passenger Boardings and Alightings	11
2-3	Foggy Bottom-GWU Metro Station Passenger Ingress and Egress Modes	11
2-4	Foggy Bottom-GWU Metro Station Egress Trip Purpose	12
2-5	Metrobus Service in Vicinity of Square 54	13
2-6	Local Resident Auto Availability	15
2-7	Local Resident Journey to Work Mode Split	16
3-1	Level of Service Summary	18
3-2	Pipeline Trip Generation Summary	22
3-3	Site Trip Generation Analysis	25

**SQUARE 54
TRANSPORTATION IMPACT STUDY
WASHINGTON, D.C.**

LIST OF APPENDICES

- A. Existing Peak Hour Traffic Counts
- B. Existing Pedestrian Traffic Counts
- C. Existing Intersection Levels of Service
- D. Background Future Intersection Levels of Service
- E. Total Future Intersection Levels of Service
- F. Improvement Analysis

Section I INTRODUCTION

This report presents the results of a transportation impact analysis of Square 54, which is located on The George Washington University Foggy Bottom campus, as shown on Figure I-1. Square 54 is bordered by the Washington Circle and Pennsylvania Avenue on the north, Eye Street on the south, 22nd Street on the east, and 23rd Street on the west. The Foggy Bottom-GWU Metro station is located adjacent to Square 54, in the northwest quadrant of the Eye Street/23rd Street intersection.

The George Washington University Hospital was formerly located on Square 54. The old hospital building was razed and the new hospital was built on the west side of 23rd Street. Square 54 presently is vacant, ready for redevelopment.

Boston Properties, Inc., KSI Services, Inc, and The George Washington University (GW) have submitted a joint PUD application to redevelop Square 54 with a mix of office, residential, and retail uses. The current development program includes approximately 454,000 gross square feet (GSF) of office space, 333 residential units, and 84,000 GSF of retail space at and below grade¹, including a contemplated grocery store of up to 45,000 GSF.

These proposed uses will be served by up to 1,026 parking spaces in five underground levels. As set forth in the recently-filed *Foggy Bottom Campus Plan: 2006-2025*, approximately 362 of these spaces are proposed to be used by GW for University purposes. These below-grade spaces will replace existing at or above-grade spaces that are anticipated to be displaced by future development on the GW campus as set forth the in the proposed *Foggy Bottom Campus Plan: 2006-2025*.

For purposes of this traffic analysis, the Square 54 development was assumed to be completely built and occupied by 2010.

¹ Of this, approximately 56,000 SF is above grade and counts as gross floor area.

Tasks undertaken in this study included the following:

1. Review of Boston Properties, Inc. and KSI Services, Inc.'s proposed development program, Square 54 project plans prepared by Pelli Clarke Pelli, and other background data.
2. A field reconnaissance of existing street and intersection geometrics, traffic controls, traffic signal phasing/timings, and speed limits.
3. Counts of existing traffic at 22 key intersections including 10 intersections around Washington Circle.
4. Analysis of existing levels of service at these intersections.
5. Projection of background future traffic volumes for project build out (2010).
6. Calculation of background levels of service at key intersections based on background traffic forecasts, existing traffic controls, and existing intersection geometrics.
7. Estimation of the number of AM and PM peak hour vehicle-trips that would be generated by the proposed project based on the Institute of Transportation Engineers (ITE) trip generation rates and the proximity of the project to the Foggy Bottom-GWU Metro station.
8. Projection of total future traffic volumes for the project build out (2010).
9. Calculation of total future levels of service at key intersections based on total future traffic forecasts, existing traffic controls, and existing intersection geometrics.
10. Identification of improvements required to adequately accommodate site traffic.

Additional sources of data for this analysis included traffic counts conducted by Wells & Associates, ITE, the Washington Metropolitan Area Transit Authority (WMATA), the District of Columbia Office of Planning, the District Department of Transportation (DDOT), the U.S. Census Bureau, Pelli Clarke Pelli, GW, Boston Properties, Inc., and KSI Services, Inc.

The conclusions of this study are as follows:

1. The majority of the key intersections in the study area presently operate at an overall acceptable level of service (LOS) "D" or better during the AM and PM peak hours.
2. The approved and/or proposed but unbuilt projects in the study area will generate a total of 404 AM peak hour vehicle-trips and 452 PM peak hour vehicle-trips, upon completion and full occupancy.

These additional background vehicle-trips would not significantly affect the existing intersection levels of service described above, except at the 23rd Street/F Street/Virginia Avenue Westbound intersection, which is projected to operate at an overall LOS E during the AM peak hour and 24th Street/Pennsylvania Avenue, which is projected to operate at an overall LOS F during the PM peak hour.

3. Square 54 will add another 396 AM peak hour vehicle-trips and 627 PM peak hour vehicle-trips to the public street system upon project completion and full occupancy.
4. The impact of the proposed redevelopment of Square 54 could be offset by implementing the following improvements:
 - 23rd Street/F Street/Virginia Avenue Westbound – Adjust signal timings during the AM peak hour.
 - 22nd Street/Eye Street – Install a traffic signal and restrict parking on the south side of Eye Street during the peak hours to provide separate eastbound left and through lanes.
 - 24th Street/Pennsylvania Avenue – Adjust signal timings during the AM and PM peak hours.

Section 2 BACKGROUND DATA

Overview

This section presents background data, including the study scope, description of the public street system, description of the proposed Square 54 vehicular access concept, existing vehicular and pedestrian traffic counts, curb parking inventory, existing public transportation facilities and services, pedestrian facilities, bicycle facilities, and U.S. Census data.

Study Scope

This traffic study includes the following intersections:

- Washington Circle/23rd Street (South)
- Washington Circle/New Hampshire Avenue (Southwest)
- Washington Circle/K Street Eastbound
- Washington Circle/Pennsylvania Avenue (Northwest),
- Washington Circle/23rd Street (North)
- Washington Circle/New Hampshire Avenue (Northeast)
- Washington Circle/K Street Westbound
- Washington Circle/Pennsylvania Avenue (Southeast)
- 23rd Street/Eye Street
- 23rd Street/ F Street /Virginia Avenue
- 23rd Street/Virginia Avenue Eastbound
- 22nd Street/K Street Westbound
- 22nd Street/K Street Eastbound
- 22nd Street/Pennsylvania Avenue
- 22nd Street/Eye Street
- 22nd Street/Virginia Avenue
- 24th Street/K Street Westbound
- 24th Street/K Street Eastbound
- 23rd Street/H Street
- K Street Eastbound/Pennsylvania Avenue
- K Street Westbound/Pennsylvania Avenue
- 24th Street/Pennsylvania Avenue
- 22nd Street/Proposed Driveway

This study also includes the following approved and proposed development projects²:

1. **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.)
2. **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.
3. **2425 L Street, N.W.** This building will contain approximately 200 condominiums and ground-level retail (including a Trader Joe's, which opened in August 2006) 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. To date, approximately half of the development is complete and occupied.
4. **George Washington (GW) Foggy Bottom Campus Plan: 2006-2025.** The proposed Campus Plan calls for the addition of approximately 2,000,000 square feet of gross floor area (GFA) within the existing Campus Plan boundaries for university use, including classrooms, labs, residential space, offices, support space, and other University facilities. At the request of the Zoning Commission, the traffic study associated with the proposed Campus Plan contemplates the potential increase in students and faculty/staff to the existing and proposed population caps (i.e. an increase of 1,198 students and 6,475 faculty/staff from Fall 2005 levels). However, since the anticipated build out of the Square 54 project is 2010, for the purpose of this analysis the potential increase in faculty/staff over the next four years was estimated assuming faculty/staff would grow linearly over the 20-year term of the Campus Plan. Therefore, faculty/staff was assumed to increase by approximately 1,000 by 2010. Furthermore, for the purpose of this analysis, the number of students was assumed to increase to the cap by 2010 (i.e. an additional 1,198 students).

² The IMF 2 Headquarters, Columbia House I, and Columbia House II, which were included in the original report dated May 24, 2006, have been removed from the analysis since they are now open and occupied. Traffic associated with these developments is included in updated traffic counts taken October 19, 2006. Since 2425 L Street currently is under construction and portions of the project are open and occupied, some of the traffic associated with the project also is included in the updated traffic counts taken on October 19, 2006. Therefore, the trip generation for 2425 L Street was based on one-half of the development program and was included in the pipeline generated traffic forecasts.

5. **DCPS/GW School Without Walls PUD.** This joint development partnership consists of two projects. The GW component is a new apartment-style undergraduate residence to be located between 2125 and 2135 F Street, with access to a below-grade parking garage and internal service area directly off F Street. The residence hall will include approximately 474 undergraduate beds and 178 parking spaces. The second component is the modernization of and an addition to the existing School Without Walls (Grant School) building, which includes classrooms, laboratories, and a common area.

The impacts of these approved and proposed projects and the subject project were evaluated at project build out, which is anticipated to occur in 2010.

Level of service (LOS) "D" is considered the minimum acceptable level of service in urban areas such as Washington, D.C. LOS "E" generally is considered acceptable for short periods of time in built-up areas such as downtown Washington, D.C.

Public Street Network

Square 54 is served by a connected network of arterial, collector, and local streets. Pennsylvania Avenue, Washington Circle, 23rd Street, K Street, and Eye Street are classified by DDOT as principal arterial streets. New Hampshire Avenue north of Washington Circle, Virginia Avenue and 19th and 20th Streets are classified as minor arterial streets. F, G, H, 21st, 22nd, and 24th Streets are classified as collector streets. Existing intersection lane use and traffic control at key intersections in the site vicinity are shown on Figure 2-1.

Washington Circle. 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. Washington Circle is a two- to four-lane circle with a posted speed limit of 25 miles per hour (mph). No parking is permitted within the Circle, except for a small portion along the north side near 23rd Street. Metrobus lines 30, 32, 34, 35, 36, 38B, H1, L1, N3, and D5 provide service along Washington Circle.

23rd Street. 23rd Street is a five-lane street classified as a principal arterial. The Foggy Bottom-GWU Metro station, The George Washington University, and the George Washington University Hospital generate large numbers of pedestrians that use the sidewalks and crosswalks on 23rd Street, particularly at Eye Street.

Three lanes are provided in the northbound direction and two lanes are provided in the southbound direction. The posted speed limit is 25 mph. The intersections of Eye and H Streets are controlled by a traffic signal. Metrobus lines H1, L1, and N3 provide service along 23rd Street to Washington Circle.

22nd Street. 22nd Street is a two-lane northbound (one-way) street in the vicinity of Eye Street, and increases to a three-lane northbound (one-way) street in the vicinity of Pennsylvania Avenue. The posted speed limit is 35 mph. The 22nd Street/Eye Street intersection is controlled by all-way stop signs. The intersections of 22nd Street with Pennsylvania Avenue and K Street (eastbound and westbound) are controlled by traffic signals.

Eye Street. Eye Street is a two-lane street with a posted speed limit of 25 mph. The Eye Street/23rd Street intersection is controlled by a traffic signal and the Eye Street/22nd Street intersection is controlled by all-way stop signs. Eye Street, between 23rd and 24th Streets, is a pedestrian mall, closed to vehicular traffic. Metrobus lines H1, L1, and N3 provide service in the vicinity of the intersection of Eye Street and 23rd Street.

Pennsylvania Avenue. Pennsylvania Avenue is a four-lane street with a posted speed limit of 25 mph. Pennsylvania Avenue (northwest bound) allows two lanes to merge onto Washington Circle and two lanes to merge back onto Pennsylvania Avenue. Pennsylvania Avenue (southeast bound) allows three lanes to merge onto Washington Circle and two lanes to merge back onto Pennsylvania Avenue. Metrobus lines 30, 32, 34, 35, 36, and 38B provide service along Pennsylvania Avenue.

Vehicular Access Concept

Square 54 fronts on Washington Circle, Eye Street, 22nd Street, and 23rd Street. Before the old George Washington University Hospital was razed, the site was served by nine driveways: three on Washington Circle, three on Eye Street, one on 22nd Street, and two on 23rd Street.

All vehicular access to the proposed Square 54 underground parking garage and the loading docks would be consolidated at two adjacent driveways on 22nd Street near the center of the block. No driveways are proposed on Washington Circle, Eye Street, or 23rd Street.

Existing Traffic Counts

Intersection Vehicular Traffic Counts. Existing AM and PM peak period vehicular (including heavy vehicles) and pedestrian traffic counts were conducted on Thursday, October 19, 2006, by Wells & Associates at the following intersections:

- Washington Circle/23rd Street (South)
- Washington Circle/New Hampshire Avenue (Southwest)
- Washington Circle/K Street Eastbound
- Washington Circle/Pennsylvania Avenue (Northwest)
- Washington Circle/23rd Street (North)
- Washington Circle/New Hampshire Avenue (Northeast)
- Washington Circle/K Street Westbound
- Washington Circle/Pennsylvania Avenue (Southeast)
- 23rd Street/Eye Street
- 23rd Street/ F Street /Virginia Avenue
- 23rd Street/Virginia Avenue Eastbound
- 22nd Street/K Street Westbound
- 22nd Street/K Street Eastbound
- 22nd Street/Pennsylvania Avenue
- 22nd Street/Eye Street
- 22nd Street/Virginia Avenue
- 24th Street/K Street Westbound
- 24th Street/K Street Eastbound
- 23rd Street/H Street
- K Street Eastbound/Pennsylvania Avenue
- K Street Westbound/Pennsylvania Avenue
- 24th Street/Pennsylvania Avenue

Copies of the counts are included in Appendix A.

The common peak hours for the study intersections occurred from 8:30 AM to 9:30 AM and from 5:15 PM to 6:15 PM. Existing traffic volumes from Wells & Associates' counts were adjusted to balance between study intersections with some allowance for driveways or roadways located between study intersections. Baseline peak hour traffic volumes are shown on Figure 2-2.

Figure 2-2 indicates that 23rd Street, south of Washington Circle, presently carries 1,019 vehicle-trips during the AM peak hour and 1,482 vehicle-trips during the PM peak hour. Approximately 60 percent of the traffic travels northbound along 23rd Street during the AM peak hour; approximately 70 percent of the traffic travels southbound along 23rd Street during the PM peak hour.

22nd Street, south of Pennsylvania Avenue, carries 585 vehicle-trips during the AM peak hour and 289 vehicle-trips during the PM peak hour.

Eye Street, between 22nd and 23rd Streets, carries 418 vehicle-trips during the AM peak hour and 281 vehicle-trips during the PM peak hour. Approximately 86 percent of the traffic travels eastbound along Eye Street during the AM peak hour; approximately 56 percent of the traffic travels westbound along Eye Street during the PM peak hour.

Link Vehicular Traffic Counts. Average daily traffic (ADT) counts for 2002 were obtained from DDOT, as shown in Table 2-1. The most heavily traveled streets in the study area are K Street, Pennsylvania Avenue, 23rd Street, and Virginia Avenue.

Table 2-1
2002 Link Traffic Counts

Link	Location	2002 Average Daily Traffic
23 rd Street	North of Washington Circle	13,300
23 rd Street	South of Washington Circle	18,000
Pennsylvania Avenue	East of Washington Circle	23,200
Pennsylvania Avenue	West of Washington Circle	23,500
K Street	East of Washington Circle	30,000
K Street	West of Washington Circle	32,000
New Hampshire Avenue	East of Washington Circle	6,000
New Hampshire Avenue	West of Washington Circle	4,900
22 nd Street	Between K Street and Pennsylvania Avenue	13,500
22 nd Street	Between I Street and H Street	5,900
23 rd Street	Between I Street and H Street	18,000
Virginia Avenue	West of 23 rd Street	12,800
Virginia Avenue	East of 23 rd Street	13,400

Pedestrian Traffic Counts. Existing AM and PM peak hour pedestrian traffic counts are presented in Appendix B and summarized on Figure 2-3.

Significant numbers of pedestrians cross 23rd and Eye Streets during peak hours. Approximately 1,854 to 2,456 pedestrians cross the three legs of the 23rd Street/Eye Street intersection during the AM and PM peak commuter hours and 1,332 to 1,790 pedestrians cross the four legs of the 22nd Street/Eye Street intersection during peak hours.

Approximately 325 to 500 pedestrians cross 23rd Street south of Washington Circle. Approximately 1,365 to 1,532 pedestrians cross the four legs of the Pennsylvania Avenue/22nd Street intersection during peak hours.

Curb Parking

Curb parking is permitted on most streets in the study area. Daytime curb parking regulations in the immediate site vicinity are shown on Figure 2-4. A total of 32 short-term parking meters are located along the site frontage on 22nd, Eye, and 23rd Streets. (Meters were missing at two parking spaces on both 22nd and 23rd Streets at the time this information was collected). No parking is permitted in Washington Circle, except in the vicinity of 23rd Street (north) where two-hour parking is permitted. No parking is permitted on the west side of 23rd Street between the Circle and Eye Street; however, shuttle buses, police cars, and other official vehicles typically park here for short periods of time.

In order to accommodate the proposed driveways to the parking structure and loading area, approximately six metered spaces would need to be removed on 22nd Street. However, two of these spaces currently are missing meters. Approximately five spaces could be gained on Eye Street and 23rd Street by eliminating existing curb cuts. As a result, the proposed development would result in a net loss of only one metered parking space.

Public Transportation Facilities and Services

Overview. Square 54 is served by the Foggy Bottom-GWU Metrorail Station and six Metrobus lines, as shown on Figure 2-5. The Foggy Bottom-GWU Metro station also is served by the Kennedy Center and other private shuttle bus lines.

Metrorail. The Foggy Bottom-GWU Metro Station is located across 23rd Street from Square 54 in 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 2-2. About half of all passengers using this station alight from trains in the AM peak period and board in the PM peak period.

Table 2-2
 Foggy Bottom-GWU Metro Station Passenger Boardings and Alightings

Time Period	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 2-3.

Table 2-3
 Foggy Bottom-GWU Metro Station Passenger Ingress and Egress Modes

Mode	Ingress		Egress	
	Number	Percent	Number	Percent
Metrobus	761	3.5%	533	2.8%
Other Bus	1,271	5.8%	1,120	5.9%
Park and Ride	360	1.6%	216	1.1%
Rode with Another	19	0.1%	24	0.1%
Kiss and 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	100.0%	19,065	100.0%

About two-thirds of all passengers using the Foggy Bottom-GWU Metro station were traveling for the purpose of work or job-related business, as shown in Table 2-4. School trips accounted for less than 10 percent of all trips. As indicated in the *Transportation Impact Study for the George Washington University Campus Plan: 2006-2025*, the vast majority of students walk to Campus.

Table 2-4
 Foggy Bottom-GWU Metro Station Egress Trip Purpose

Trip Purpose	Number of Passengers	Percent
Work	11,441	60.0%
Job-Related Business	944	5.0%
Shopping or Meal	726	3.8%
School	1,870	9.8%
Personal Trip	2,541	13.3%
Sightseeing or Recreation	957	5.0%
Unknown	586	3.1%
Total	19,065	100.0%

Metrobus. Six Metrobus lines operate on adjacent or nearby streets, as shown on Figure 2-5. A total of 790 bus-trips are operated on these lines on a typical weekday, 259 bus-trips on a typical Saturday, and 165 bus-trips on a typical Sunday, as shown in Table 2-5.

Table 2-5
 Metrobus Service in Vicinity of Square 54

Line	Name	Daily Bus-Trips		
		Weekday	Saturday	Sunday
30, 32, 34, 35, 36	Pennsylvania Avenue	320	N/A	N/A
38B	Ballston-Farragut Square	93	73	36
D5	MacArthur Blvd-Georgetown	13	N/A	N/A
H1	Brookland-Potomac Park	15	N/A	N/A
L1, L2, L4	Connecticut Avenue	177	102	70
N2, N3, N4, N6	Massachusetts Avenue	172	84	59
Total		790	259	165

Pedestrian Facilities

Pedestrian access to Square 54 would be provided via a sidewalk system that exists on both sides of the streets in the immediate vicinity of the subject site. The sidewalks facilitate access to the site and to the Foggy Bottom-GWU Metro station, which is located adjacent to Square 54. Pedestrian signals with clearly marked crosswalks are located at all major intersections surrounding Square 54 and along Washington Circle.

Bicycle Facilities

DDOT published a draft District of Columbia Bicycle Master Plan in August 2005³, which evaluates existing bicycling facilities, policies, and other bicycle-related matters. It also establishes goals, makes recommendations for achieving those goals, and presents an implementation plan.

Presently, there are no bicycle lanes, routes, or trails in the immediate vicinity of Square 54, according to the Bicycle Master Plan. Bicyclists share the public streets with motor vehicles.

The Bicycle Level of Service (BLOS) on most streets in and around the GWU campus is BLOS “D” or better, according to the Bicycle Master Plan.

³ District Department of Transportation, District of Columbia Bicycle Master Plan, April 2005.

The Plan recommends new bicycle lanes in the site vicinity on:

1. 22nd Street, between Virginia Avenue and Q Street,
2. 21st Street, between Constitution Avenue and R Street,
3. F Street, between Virginia Avenue and 17th Street,
4. G Street, between Virginia Avenue and 17th Street,
5. Pennsylvania Avenue, between 17th Street and M Street,
6. New Hampshire Avenue, between Virginia Avenue and Dupont Circle, and
7. Virginia Avenue, between Constitution Avenue and Rock Creek Parkway.

The Plan also recommends that the District improve bicycle access through complex intersections including Washington Circle.

In order to accommodate the proposed bike lane on 22nd Street, DDOT proposes to restripe the easternmost lane, in which parking currently is allowed, to provide a five-foot bike lane and seven-foot parking lane. Two travel lanes would remain during the AM and PM peak hours, as currently exists. The redevelopment of Square 54 does not preclude or inhibit the implementation of the proposed Bicycle Master Plan.

U.S. Census Data

Overview. The 2000 U.S. Census reports auto availability and means of transportation to work for workers 16 years and over. Square 54 is located in Census Block 57.01. Adjacent blocks are 54.01, 55, 56, and 57.01.

Auto Availability. Home owners have an average of 0.70 available vehicles per household, as shown on Table 2-6. Nearly four out of every ten households own no vehicle and slightly more than half own one vehicle. Fewer than one out of every ten owner-occupied households have two or more available vehicles.

Renters have an average of only 0.43 available vehicles per household. Nearly two out of every three renter-occupied households have no available vehicle, and less than a third own one vehicle. About one of every 20 renter-occupied households have two or more available vehicles.

Table 2-6
 Local Resident Auto Availability

Auto Availability	Housing Units	Percent	Cumulative Percent
Total All Census Tract Block Groups	6,816		
Owner Occupied:	1,998		
No vehicle available	786	39.3%	39.3%
1 vehicle available	1,041	52.1%	91.4%
2 vehicles available	165	8.3%	99.7%
3 vehicles available	6	0.3%	100.0%
4 vehicles available	0	0.0%	100.0%
5 vehicles available	0	0.0%	100.0%
Average Auto Ownership	0.70		
Renter Occupied:	4,818		
No vehicle available	3,076	63.8%	63.8%
1 vehicle available	1,512	31.4%	95.2%
2 vehicles available	190	3.9%	99.2%
3 vehicles available	8	0.2%	99.3%
4 vehicles available	0	0.0%	99.3%
5 vehicles available	32	0.7%	100.0%
Average Auto Ownership	0.43		
Total Average Auto Ownership	0.51		

Journey to Work Mode Split. Few neighborhood residents commute to work by automobile. Most walk or take Metro. Approximately 14 percent of all local residents drive or are passengers in private automobiles, as shown in Table 2-7. More than half walk and about a quarter take some form of public transportation.

Table 2-7
 Local Resident Journey to Work Mode Split

Mode	Workers (Age 16+)	Percent	Cumulative Percent
Total All Census Tract Block Groups	6,699		
Car, Truck or Van	961		
Drove Alone	795	11.9%	11.9%
Carpooled	166	2.5%	14.3%
Public Transportation	1,754		
Bus	282	4.2%	18.6%
Streetcar	0	0.0%	18.6%
Subway	1,375	20.5%	39.1%
Railroad	6	0.1%	39.2%
Ferryboat	0	0.0%	39.2%
Taxicab	91	1.4%	40.5%
Motorcycle	9	0.1%	40.7%
Bicycle	29	0.4%	41.1%
Walked	3,568	53.3%	94.4%
Other	19	0.3%	94.6%
Stayed Home	359	5.4%	100.0%

Section 3 ANALYSIS

Overview

This section presents analyses of existing and projected traffic conditions. It includes analysis of existing intersection levels of service, projections of future traffic volumes with and without redevelopment of Square 54, estimates of peak hour traffic that would be generated by Square 54, and analysis of future intersection levels of service with and without redevelopment of Square 54.

Existing Levels of Service

Existing peak hour levels of service were estimated at the key intersections in the study area based on the existing lane use and traffic control shown on Figure 2-1, the existing vehicular and pedestrian traffic counts shown on Figures 2-2 and 2-3, respectively, field observed heavy vehicle percentages, the existing traffic signal timing plans obtained from DDOT, and the Highway Capacity Manual methodology. The results are presented in Appendix C and summarized in Table 3-1.

Table 3-1 indicates that the majority of the key intersections in the study area presently operate at an overall acceptable level of service (LOS) "D" or better during the AM and PM peak hours. Exceptions include the Washington Circle/K Street intersection and the 24th Street/Pennsylvania Avenue intersection.

Some intersections that operate at an overall LOS D or better do have lane groups that operate at or near capacity, as indicated in Table 3-1.

Table 3-1
 Level of Service Summary

Intersection/ Lane Group	Existing Conditions		2010 Background Conditions Without Square 54		2010 Total Future Conditions With Square 54		2010 Total Future Conditions With Square 54 With Improvements	
	AM	PM	AM	PM	AM	PM	AM	PM
1. Washington Circle/23rd Street								
EBTR	A (0.3)	A (0.3)	A (0.3)	A (0.3)	A (0.4)	A (0.4)	A (0.4)	A (0.4)
EBR	A (1.3)	A (1.8)	A (1.4)	A (1.9)	A (1.4)	A (2.4)	A (1.4)	A (2.4)
NBR	A (7.9)	A (2.4)	A (8.1)	A (2.5)	A (7.9)	A (2.4)	A (7.8)	A (2.4)
Overall	A (2.2)	A (1.0)	A (2.2)	A (1.1)	A (2.1)	A (1.2)	A (2.1)	A (1.2)
2. Washington Circle/New Hampshire Avenue								
SBL	B (11.5)	C (20.2)	B (12.0)	B (14.7)	B (12.5)	A (8.5)	B (12.9)	A (8.5)
SBR	A (3.0)	A (6.8)	A (3.0)	A (6.8)	A (3.0)	A (6.6)	A (2.9)	A (6.6)
NER	C (25.7)	B (13.6)	C (26.2)	B (13.7)	C (28.3)	B (14.4)	C (28.3)	B (14.4)
Overall	B (12.5)	B (17.9)	B (12.9)	B (13.6)	B (14.0)	A (8.6)	B (14.0)	A (8.6)
3. Washington Circle/K Street Eastbound								
EBR	F [164.8]	F [158.1]	F [216.9]	F [182.6]	F [291.6]	F [249.9]	F [291.6]	F [249.9]
5. Washington Circle/23rd Street Southbound								
WBTR	A (0.0)	A (0.1)	A (0.0)	A (0.1)	A (0.0)	A (0.1)	A (0.0)	A (0.1)
SBR	A (3.9)	A (4.0)	A (3.9)	A (4.1)	A (4.0)	A (4.3)	A (4.0)	A (4.3)
Overall	A (2.1)	A (2.2)	A (2.2)	A (2.2)	A (2.2)	A (2.3)	A (2.2)	A (2.3)
6. Washington Circle/New Hampshire Avenue								
WBTR	A (6.2)	A (4.9)	A (6.4)	A (5.0)	B (6.8)	A (5.2)	A (6.8)	A (5.2)
WBR	A (4.8)	A (3.6)	A (4.8)	A (3.7)	A (4.8)	A (4.1)	A (4.8)	A (4.1)
Overall	A (5.8)	A (4.6)	A (6.0)	A (4.7)	A (6.2)	A (5.0)	A (6.2)	A (5.0)
7. Washington Circle/K Street Westbound								
WBR	B [13.1]	C [15.8]	B [13.3]	C [16.3]	B [13.8]	C [20.3]	B [13.8]	C [20.3]
(23.3) = Signalized intersection delay (sec/veh) [23.3] = Unsignalized intersection delay (sec/veh)								

Intersection/ Lane Group	Existing Conditions		2010 Background Conditions Without Square 54		2010 Total Future Conditions With Square 54		2010 Total Future Conditions With Square 54 With Improvements	
	AM	PM	AM	PM	AM	PM	AM	PM
9. 23rd Street/Eye Street								
WBLR	C (29.7)	D (51.8)	C (30.1)	E (75.2)	C (30.1)	E (75.2)	C (22.4)	E (62.3)
NBTR	A (6.3)	A (7.0)	A (6.0)	A (6.8)	A(6.5)	A (6.6)	A (6.0)	A (6.6)
SBLT	A (9.3)	B (12.6)	B (10.3)	B (13.0)	B (17.1)	C (26.4)	B (16.7)	C (25.5)
Overall	A (8.2)	B (14.9)	A (8.6)	B (18.6)	B (11.7)	C (26.1)	B (11.0)	C (24.2)
10. 23rd Street/F Street/Virginia Avenue Westbound								
NBLTR	E (55.2)	B (13.8)	E (75.6)	B (18.4)	F (91.3)	C (22.3)	E (74.7)	C (25.3)
SBTR	B (10.2)	B (10.6)	B (10.7)	B (10.1)	A (9.3)	A (9.8)	A (8.5)	A (9.8)
NWLTR	C (24.5)	C (24.8)	C (24.5)	C (26.8)	C (24.5)	C (24.9)	C (26.1)	C (24.9)
NWR	C (21.8)	D (50.0)	C (21.8)	D (50.0)	C (21.8)	D (50.0)	C (23.2)	D (50.0)
Overall	D (45.1)	B (12.6)	E (60.0)	B (14.0)	E (72.1)	B (15.5)	E (59.4)	B (15.5)
11. 23rd Street/Virginia Avenue Eastbound								
EBLTR	C (25.4)	E (55.2)	C (25.4)	E (58.1)	C (25.4)	E (58.1)	C (27.1)	E (58.1)
NBT	C (21.1)	B (13.1)	C (21.8)	B (13.3)	C (23.8)	B (13.8)	C (20.9)	B (13.3)
NBR	A (9.2)		A (9.2)		A (9.2)		A (8.4)	
SBLT	A (2.2)	A (2.4)	A (2.2)	A (2.6)	A (2.6)	A (2.7)	A (2.4)	A (2.7)
Overall	B (17.4)	B (14.1)	B (17.8)	B (14.6)	B (19.5)	B (14.8)	B (17.4)	B (14.8)
12. 22nd Street/K Street Westbound								
WBTR	D (37.3)	D (43.5)	D (37.6)	D (43.8)	D (37.6)	D (43.8)	D (37.6)	D (43.8)
NBLT	A (0.9)	A (0.7)	A (0.8)	A (0.7)	A (0.5)	A (0.1)	A (0.5)	A (0.1)
Overall	B (11.8)	C (24.8)	B (11.7)	C (24.1)	B (10.9)	B (19.7)	B (10.9)	B (19.7)
13. 22nd Street/K Street Eastbound								
EBLT	A (2.7)	B (10.3)	A (2.6)	B (10.2)	A (2.5)	B (10.3)	A (2.6)	B (10.3)
NBTR	A (3.8)	A (4.3)	A (3.9)	A (3.9)	A (3.9)	A (2.7)	A (3.9)	A (2.7)
Overall	A (3.5)	A (6.8)	A (3.5)	A (6.2)	A (3.5)	A (5.0)	A (3.5)	A (5.0)
(23.3) = Signalized intersection delay (sec/veh)								
[23.3] = Unsignalized intersection delay (sec/veh)								

Intersection/ Lane Group	Existing Conditions		2010 Background Conditions Without Square 54		2010 Total Future Conditions With Square 54		2010 Total Future Conditions With Square 54 With Improvements	
	AM	PM	AM	PM	AM	PM	AM	PM
14. 22nd Street/Pennsylvania Avenue								
EBLT	A (7.1)	B (11.3)	A (6.8)	B (11.3)	A (6.1)	B (11.2)	A (6.2)	B (11.2)
WBTR	C (26.6)	D (45.7)	C (26.6)	D (48.7)	C (26.6)	D (48.7)	C (26.6)	D (48.7)
NBLTR	C (34.5)	C (21.9)	D (35.2)	C (22.5)	D (38.8)	C (27.5)	D (37.0)	C (26.0)
Overall	B (18.4)	C (28.8)	B (18.6)	C (30.1)	C (20.2)	C (30.4)	B (19.6)	C (29.9)
15. 22nd Street/Eye Street								
EBL	B [14.5]	A [9.3]	C [17.1]	A [9.7]	F (72.7)	C (15.5)	B (11.5)	A (7.3)
EBT							A (3.3)	A (4.3)
WBTR	A [9.5]	A [9.4]	A [9.6]	A [9.8]	B (10.4)	B (11.2)	C (33.1)	C (30.9)
NBLTR	B [11.4]	A [8.7]	B [12.9]	A [9.2]	C (17.3)	B (11.2)	C (33.9)	C (33.2)
Overall	B [12.4]	A [9.0]	B [14.2]	A [9.5]	E (43.3)	B (12.7)	C (22.0)	C (23.3)
17. 24th Street/K Street Westbound								
WBLTR	A (1.2)	A (4.5)	A (1.2)	A (4.6)	A (1.3)	A (4.7)	A (1.3)	A (4.7)
NBLT	B (17.2)	A (3.7)	B (17.3)	A (4.2)	B (17.2)	A (3.5)	B (17.2)	A (4.3)
SBTR	A (3.7)	A (7.3)	A (4.0)	A (6.5)	A (3.9)	A (6.5)	A (4.0)	B (9.3)
Overall	B (11.4)	A (5.4)	B (11.4)	A (5.2)	B (11.2)	A (5.3)	B (11.2)	A (6.2)
18. 24th Street/K Street Eastbound								
EBLTR	B (19.2)	B (16.1)	B (19.9)	B (16.2)	C (20.4)	B (16.5)	C (20.4)	B (16.5)
NBTR	C (29.1)	C (25.1)	C (29.3)	C (26.1)	C (29.3)	C (26.1)	C (29.3)	C (26.1)
SBLT	A (2.8)	A (3.6)	A (2.7)	A (3.6)	A (2.7)	A (3.6)	A (2.8)	A (3.6)
Overall	C (20.1)	B (13.5)	C (20.4)	B (14.1)	C (20.7)	B (14.3)	C (20.7)	B (14.1)
(23.3) = Signalized intersection delay (sec/veh) [23.3] = Unsignalized intersection delay (sec/veh)								

Intersection/ Lane Group	Existing Conditions		2010 Background Conditions Without Square 54		2010 Total Future Conditions With Square 54		2010 Total Future Conditions With Square 54 With Improvements	
	AM	PM	AM	PM	AM	PM	AM	PM
19. 23rd Street/H Street								
EBLTR	C (31.2)	D (38.0)	C (32.4)	D (40.3)	C (32.4)	D (40.4)	C (32.4)	D (40.4)
WBLTR	C (26.1)	E (78.6)	C (25.6)	D (37.1)	C (25.8)	D (39.1)	C (25.8)	D (39.1)
NBLTR	A (0.9)	B (13.3)	A (0.9)	B (13.9)	A (0.9)	B (14.3)	A (0.8)	B (14.3)
SBLTR	B (10.9)	A (6.8)	B (11.9)	A (8.5)	B (15.5)	A (8.0)	B (15.3)	A (8.0)
Overall	A (7.2)	B (18.9)	A (7.8)	B (14.8)	A (8.4)	B (15.1)	A (8.3)	B (15.1)
20. 22nd Street/Proposed Driveway								
EBL	N/A	N/A	N/A	N/A	D [30.8]	E [41.2]	D [30.8]	E [41.2]
NBL	N/A	N/A	N/A	N/A	A [6.3]	A [6.5]	A [6.3]	A [6.5]
21. K Street Eastbound/Pennsylvania Avenue								
EBT	B (15.3)	C (27.1)	B (15.1)	C (26.5)	B (14.5)	C (26.6)	B (14.5)	C (26.6)
NWT	A (5.7)	A (1.0)	A (5.8)	A (1.1)	A (5.8)	A (1.4)	A (5.9)	A (1.6)
Overall	B (10.6)	A (7.8)	B (10.5)	A (7.4)	B (10.1)	A (7.3)	B (10.2)	A (7.4)
22. K Street Westbound/Pennsylvania Avenue								
WBT	B (16.8)	B (14.3)	B (16.8)	B (14.5)	B (16.9)	B (15.4)	B (16.9)	B (15.4)
SET	A (0.2)	A (1.7)	A (0.2)	A (2.1)	A (0.3)	A (2.2)	A (0.3)	A (2.2)
Overall	A (2.6)	A (7.5)	A (2.6)	A (7.7)	A (2.6)	A (8.2)	A (2.7)	A (8.2)
24. 24th Street/Pennsylvania Avenue								
EBTR	F (174.3)	F (120.6)	F (197.6)	F (131.0)	F (228.8)	F (163.0)	F (190.9)	F (122.5)
WBLTR	A (9.3)	A (9.4)	A (9.4)	A (9.4)	A (9.4)	A (9.7)	A (8.5)	B (10.3)
NBLT	B (16.3)	B (13.1)	B (16.7)	B (13.0)	B (16.7)	B (13.0)	C (20.0)	B (14.6)
SBLTR	D (36.8)	F (82.1)	D (38.2)	F (115.8)	D (38.2)	F (115.8)	D (42.7)	F (115.8)
Overall	F (106.7)	E (78.2)	F (120.5)	F (87.8)	F (139.7)	F (101.0)	F (118.5)	F (81.8)
(23.3) = Signalized intersection delay (sec/veh)								
(23.3) = Unsignalized intersection delay (sec/veh)								

Pipeline Project Vehicle-trip Generation

The number of peak hour vehicle-trips that will be generated by the five other approved or proposed but incomplete development projects was taken from the traffic study for each project.

As shown in Table 3-2, it is estimated that these projects will generate a total of 404 AM peak hour vehicle-trips and 452 PM peak hour vehicle-trips upon completion and full occupancy.

Table 3-2
 Pipeline Trip Generation Summary

Land Use	Development Program	Unit	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Allstate Hotel								
Hotel	147	Rooms	50	33	83	58	51	109
United State Institute of Peace								
Office	259	Employees	61	9	70	12	53	65
2425 L Street								
Condominiums	100	DU	7	24	31	19	11	30
Retail	14,000	SF	12	7	19	33	35	68
School without Walls								
School	100	Students	15	10	25	2	4	6
Residence Hall/ Parking Garage	148	Spaces	26	3	29	9	21	30
Proposed GW Campus Plan								
University	1,198	Students	16	0	16	9	16	25
University	1,000	Faculty/ Staff	131	0	131	0	119	119
Total Net New Pipeline Generated Trips			318	86	404	142	310	452

Vehicle-trip Distribution and Assignment

The distribution of peak hour vehicle-trips generated by the other approved projects was determined based on their respective traffic studies. The pipeline site trip assignments are shown on Figure 3-1.

Background Traffic Growth

In order to account for regional traffic growth outside the immediate site vicinity and growth beyond that already accounted for in the aforementioned pipeline developments, an annual traffic growth rate of 0.5 percent per year compounded annually over four years (to the 2010 project build out) was applied. This growth rate was applied to all movements at each intersection in the study area and was applied to non-GW traffic only.

As a result of the combined effect of both the growth rate and the traffic associated with the pipeline developments, the increase in traffic at individual intersections approaches one percent per year and, in fact, exceeds one percent per year at several intersections.

Background Traffic Forecasts

Background peak hour traffic forecasts without redevelopment of Square 54 were estimated based on existing traffic counts, traffic generated by approved or proposed but not yet constructed developments, and historic background traffic growth. The background traffic forecasts for 2010 project build out are shown on Figure 3-2.

Background Future Levels of Service

Future peak hour levels of service without redevelopment of Square 54 were estimated at the key intersections in the study area for the 2010 project build out based on the intersection lane use and traffic control shown on Figure 2-1, the background traffic forecasts shown on Figure 3-2, and the Highway Capacity Manual methodology. The results are presented in Appendix D and are summarized in Table 3-1.

Under background conditions without the proposed redevelopment, levels of service generally would be similar to those experienced under existing conditions. Notable exceptions include the 23rd Street/F Street/Virginia Avenue intersection, which is projected to operate at an overall LOS E during the AM peak hour and 24th Street/Pennsylvania Avenue, which is projected to operate at an overall LOS F during the PM peak hour.

Site Trip Generation Analysis

The number of vehicle-trips that will be generated by redevelopment of Square 54 was estimated based on ITE trip generation rates and the proximity of the project to the Foggy Bottom-GWU Metro station.

Based on information contained in the Development Related Ridership Survey II⁴ and the 2005 Development Related Ridership Survey⁵, it was assumed that 60 percent of all office trips, 63 percent of all residential trips, and 60 percent of all retail and grocery store trips would be made on foot, by Metrorail or Metrobus, or by some means of transportation other than automobile.

The proposed redevelopment of Square 54 would generate a total of 396 AM peak hour vehicle-trips (287 in and 109 out) and 627 PM peak hour vehicle-trips (245 in and 382 out) at project build out and full occupancy, as shown in Table 3-3.

During the AM peak hour, the office component would account for approximately 64 percent of the site-generated vehicle-trips. The residential and retail components would account for approximately 13 percent and 24 percent of the AM peak hour site-generated traffic, respectively. During the PM peak hour, the office component would account for approximately 37 percent of the site-generated vehicle-trips. The residential and retail components would account for approximately 10 percent and 53 percent of the PM peak hour site-generated traffic, respectively.

⁴ Development Related Ridership Survey II, JHK & Associates, December 1998.

⁵ 2005 Development Related Ridership Survey, Washington Metropolitan Area Transit Authority, 2005.

Table 3-3
Site Trip Generation Analysis[†]

Land Use	ITE Code	Amount	Unit	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Residential	230	333	D.U.	23	112	135	108	53	161
<i>Non-Auto Reduction (63%) ‡</i>				14	71	85	68	33	101
New Net Residential Trips				9	41	50	40	20	60
Office	710	454,000	S.F.	554	76	630	100	487	587
<i>Non-Auto Reduction (60%) ‡</i>				333	45	378	60	292	352
New Net Office Trips				221	31	252	40	195	235
Grocery Store ^{††}	850	45,000	S.F.	89	57	146	253	243	496
<i>Non-Auto Reduction (60%) ‡</i>				54	34	88	152	146	298
New Net Office Trips				35	23	58	101	97	198
Retail	820	39,000	S.F.	54	35	89	161	175	336
<i>Non-Auto Reduction (60%) ‡</i>				32	21	53	97	105	202
New Net Retail Trips				22	14	36	64	70	134
Total Net New Site Generated Trips				287	109	396	245	382	627

† Based on Trip Generation, 7th Edition, Institute of Transportation Engineers.

‡ Non-auto mode split was calculated based on information provided in the Development Related Ridership Survey II, JHK & Associates, December 1989 and 2005 Development Related Ridership Survey, Final Report, Washington Metropolitan Area Transit Authority.

†† While the specific square footage of the grocery store has not yet been determined, for the purposes of this analysis, the grocery store component has been assumed to include 45,000 square feet, the maximum which would be accommodated under the current development proposal.

Site Trip Distribution

The distribution of the peak hour vehicle-trips generated by Square 54 was determined based on existing travel patterns. This distribution is described as follows:

<u>To/From:</u>	<u>Retail/Office</u>	<u>Residential</u>
North along 23 rd Street	15%	35%
South along 23 rd Street	33%	16%
East along K Street	10%	20%
West along K Street	13%	6%
Northwest along Pennsylvania Avenue	23%	19%
<u>Southwest along New Hampshire Avenue</u>	<u>6%</u>	<u>4%</u>
Total	100%	100%

Site Traffic Assignments

The site-generated traffic volumes were assigned to the public street network according to the directional distribution described above. The resulting site traffic assignments are shown on Figure 3-3.

Total Future Traffic Forecasts

These site traffic assignments were added to the future background traffic volumes shown on Figure 3-2 to yield the total future traffic forecasts shown on Figure 3-4.

Total Future Levels of Service

Future peak hour levels of service with redevelopment of Square 54 were estimated at the key intersections in the study area based on the lane use and traffic control shown on Figure 2-1, the total future traffic forecasts shown on Figure 3-4, and the Highway Capacity Manual methodology. The results are presented in Appendix E and summarized in Table 3-1.

Table 3-1 indicates that with the redevelopment of Square 54, the majority of the key intersections would continue to operate at an overall acceptable LOS "D" or better during the AM and PM peak hours. Traffic generated by the proposed development would have an impact at a few of the intersections, as outlined below:

- Washington Circle/K Street Eastbound – Under background conditions without the proposed development, the K Street approach of this intersection, which operates under yield control, is projected to operate at a LOS F. With the proposed development, this approach would continue to operate at a LOS F with an increase in delay.
- 23rd Street/F Street/Virginia Avenue Westbound – Under background conditions without the proposed development, during the AM peak hour, the northbound approach of this intersection is projected to drop from a LOS "E". With the proposed development, it would drop to a LOS "F".
- 22nd Street/Eye Street – During the AM peak hour, the eastbound approach of this intersection is projected to drop from a LOS "C" under background conditions without the proposed development, to a LOS "F" under total future conditions with the proposed development. The overall level of service would drop to a LOS "E" during the AM peak hour.
- 24th Street/Pennsylvania Avenue - The eastbound approach of this intersection is projected to operate at a LOS F under background conditions without the proposed redevelopment. With the proposed development, this approach would continue to operate at a LOS F with an increase in delay.

In order to mitigate the impacts noted above, the following improvements are recommended:

- 23rd Street/F Street/Virginia Avenue Westbound – Adjust signal timings during the AM peak hour.
- 22nd Street/Eye Street – Install a traffic signal and restrict parking on the south side of Eye Street during the peak hours to provide separate eastbound left and through lanes. Note that approximately six Zone 2 parking spaces would need to be restricted during the AM and PM peak hours along the south side of Eye Street.
- 24th Street/Pennsylvania Avenue – Adjust signal timings during the AM and PM peak hours.

As shown in Table 3-1, these recommended improvements would allow for levels of service with the proposed development at each of the three intersections to be consistent with those experienced under conditions without the proposed development. That is, where approaches would operate at a LOS "D" or better without the proposed development, they would continue to operate at a LOS "D" or better with the proposed development. Where approaches are projected to operate at a LOS "E" or "F" without the proposed development, they would operate at the same level of service or better with the proposed development.

Results of the improvement analysis and details of the recommended timing adjustments are provided in Appendix F.

Queue Analysis

A queue analysis was conducted for the proposed driveway intersection with 22nd Street. Approximately 130 feet of storage exists along 22nd Street between the proposed driveway and Pennsylvania Avenue. Under total future conditions, the 95th percentile queue on 22nd Street is projected to be 184 feet during both the AM and PM peak hours. The average queue during the AM and PM peak hours is projected to be 136 feet. Therefore, at times during the peak hours, queues from the 22nd Street/Pennsylvania Avenue intersection will extend past the proposed driveway. During those times, it is anticipated that vehicles will be able to exit the garage as queues are forming and as queues begin to dissipate.

Parking Analysis

The subject site will be rezoned to C-3-C. Section 2100 of the District of Columbia Zoning Regulations (the "Regulations") sets forth the minimum parking requirements in the C-3-C Zone as follows: for apartment houses or multiple dwellings, one space for every four units; for office use, one space for each 1,800 S.F. in excess of 2,000 S.F.; and for retail uses (including grocery), one space for each 750 S.F. in excess of 3,000 S.F. of gross floor area.

Accordingly, the subject site would require 83 residential parking spaces, 251 office parking spaces, and 71 retail parking spaces, for a total of 405 parking spaces.

The subject site will be served by five levels of underground parking with up to 1,026 parking spaces. The residents will be provided with approximately 274 parking spaces or 187 more parking spaces than the minimum number of spaces required by the Regulations. The office and retail users will be provided with approximately 390 spaces or 67 more parking spaces than the minimum number of spaces required by the Regulations. Office and residential parking will be controlled by permits. The remaining 362 spaces are anticipated to be allocated to GW for general university use as set forth in the Foggy Bottom Campus Plan: 2006-2025.

In summary, the proposed on-site parking supply would exceed the minimum zoning parking requirements.

Loading

Loading for the proposed development will take place entirely underground on the P1 level of the proposed parking structure. Four 30-foot bays and three 55-foot bays will be provided. Access to the loading area will be provided via 22nd Street. Trucks will enter and exit the facility front first thereby minimizing disruption to 22nd Street.

Transportation Demand Management

The Applicant understands the importance of an appropriate Transportation Demand Management Plan (TDMP) to limit the traffic impact of the Square 54 development. To that end, the Applicant currently is seeking DDOT's input on its proposed TDMP and will provide a final TDMP to the Zoning Commission at the time of the public hearing.

Section 4

CONCLUSIONS

The conclusions of this traffic impact study are as follows:

1. The majority of the key intersections in the study area presently operate at an overall acceptable level of service (LOS) "D" or better during the AM and PM peak hours.
2. The approved and/or proposed but unbuilt projects in the study area will generate a total of 404 AM peak hour vehicle-trips and 452 PM peak hour vehicle-trips, upon completion and full occupancy.

These additional background vehicle-trips would not significantly affect the existing intersection levels of service described above, except at the 23rd Street/F Street/Virginia Avenue Westbound intersection, which is projected to operate at an overall LOS E during the AM peak hour and 24th Street/Pennsylvania Avenue, which is projected to operate at an overall LOS F during the PM peak hour.

3. Square 54 will add another 396 AM peak hour vehicle-trips and 627 PM peak hour vehicle-trips, to the public street system upon project completion and full occupancy.
4. The impact of the proposed redevelopment of Square 54 could be offset by implementing the following improvements:
 - 23rd Street/F Street/Virginia Avenue Westbound – Adjust signal timings during the AM peak hour.
 - 22nd Street/Eye Street – Install a traffic signal and restrict parking on the south side of Eye Street during the peak hours to provide separate eastbound left and through lanes.
 - 24th Street/Pennsylvania Avenue – Adjust signal timings during the AM and PM peak hours.



Figure 1-1
Site Location



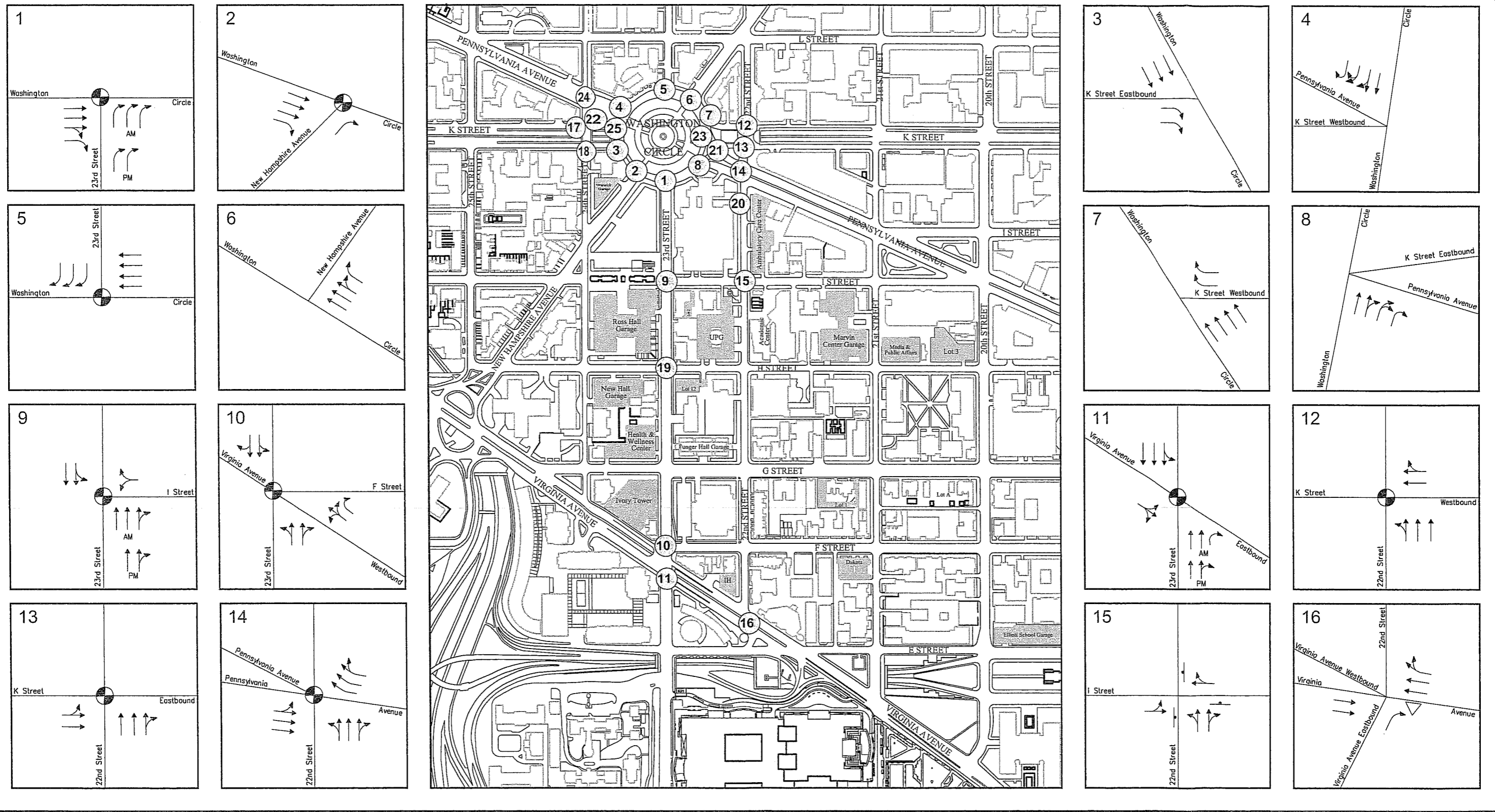


Figure 2-1
Existing Lane Use and Traffic Control

- ← Represents One Travel Lane
- ⊗ Signalized Intersection
- Stop Sign
- ▽ Yield Sign



o:\Projects\2501-3000\2954 George Washington University\Graphics\2954 rpt_graphics.dwg\DAO

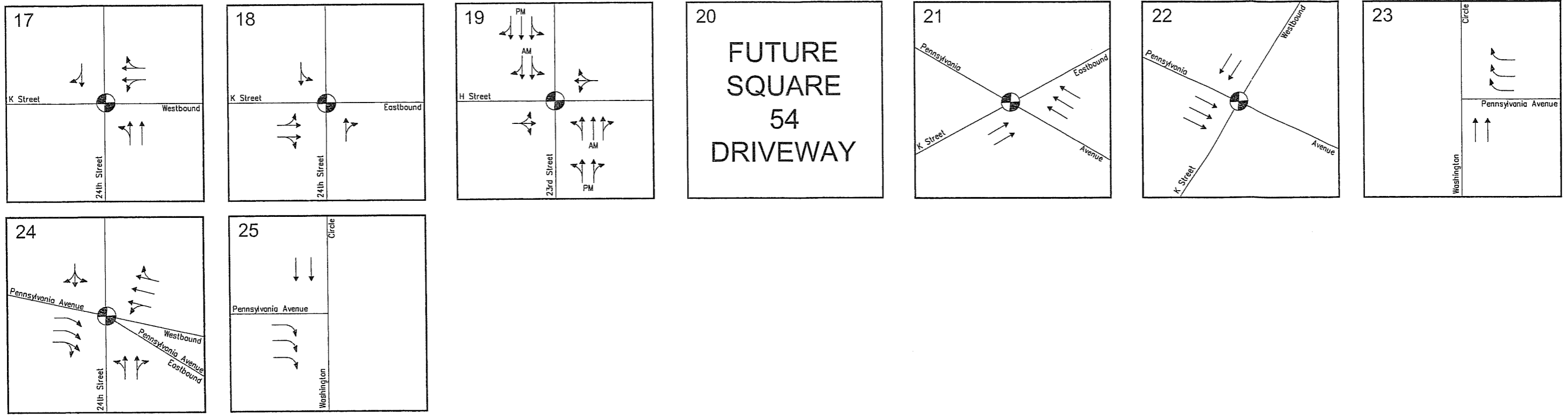


Figure 2-1
Existing Lane Use and Traffic Control

- ← Represents One Travel Lane
- ⊗ Signalized Intersection
- ⊥ Stop Sign
- ▽ Yield Sign



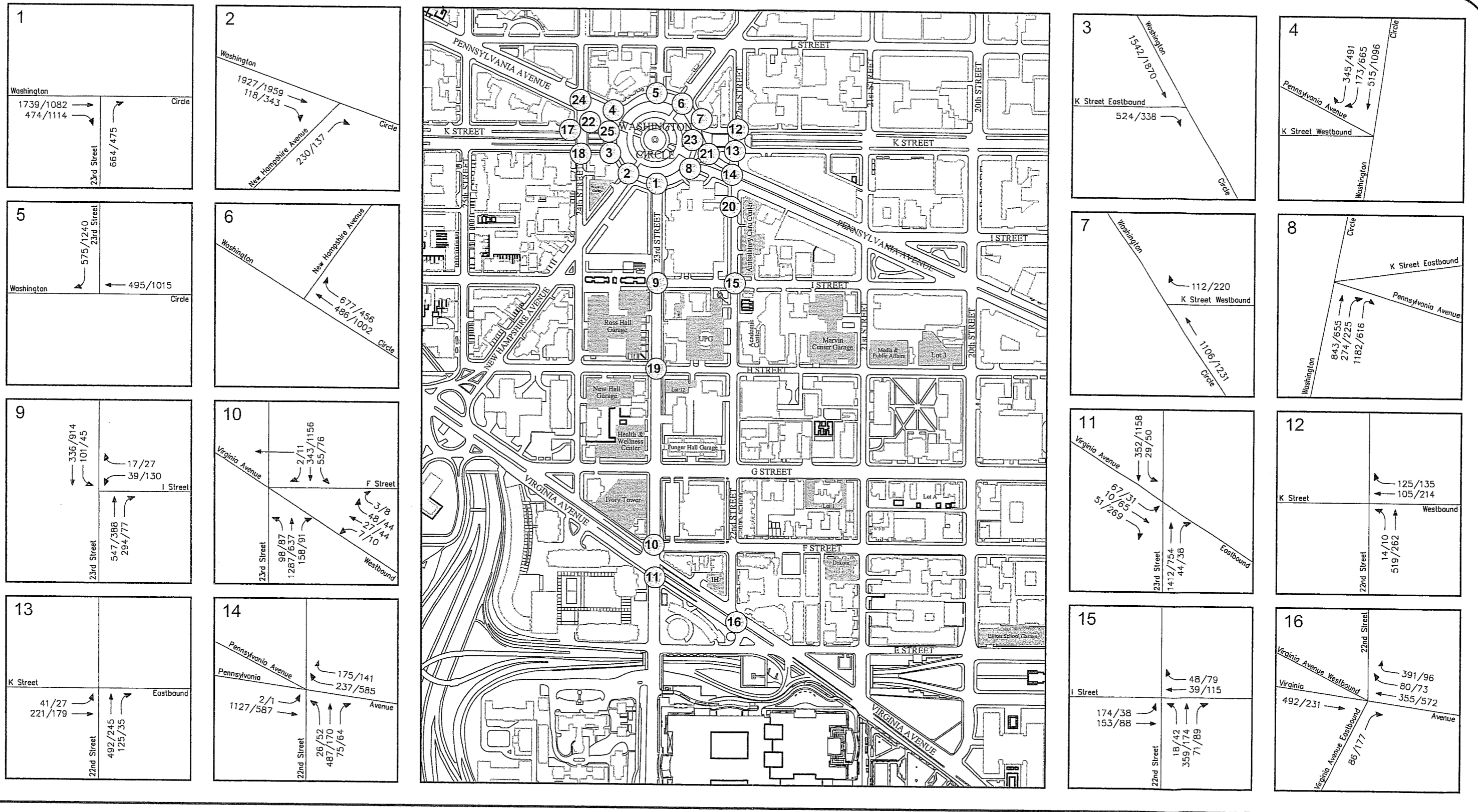


Figure 2-2
Existing Vehicular Counts

Square 54
Washington, D.C.

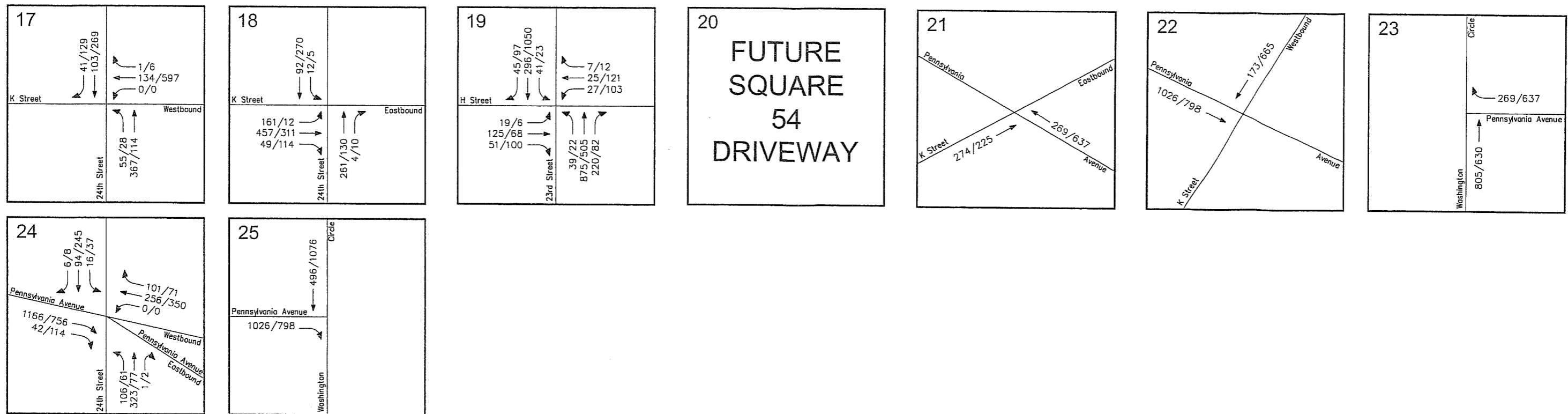
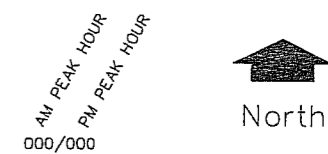


Figure 2-2
Existing Vehicular Counts



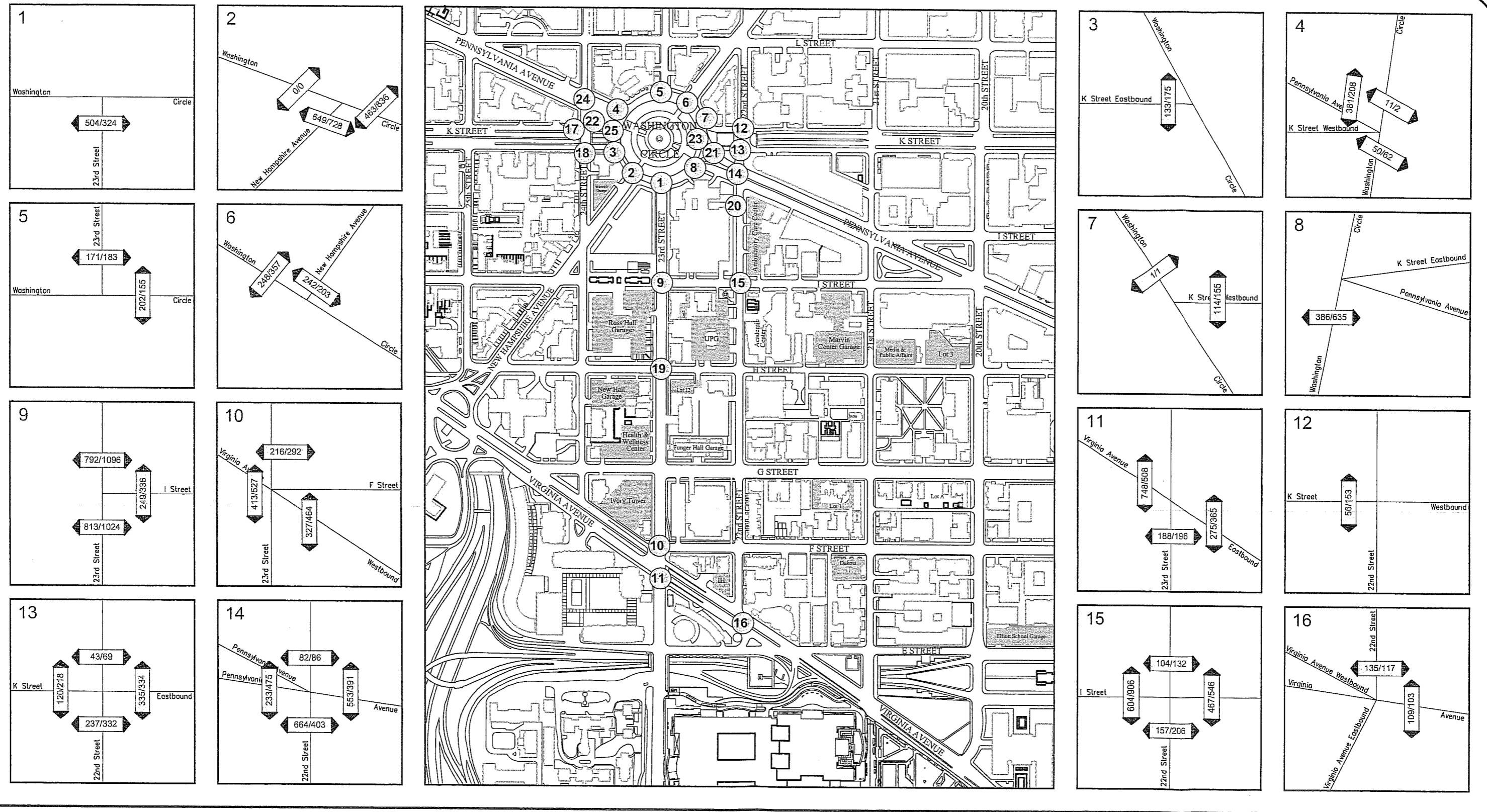
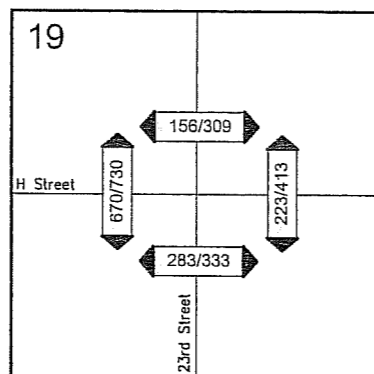
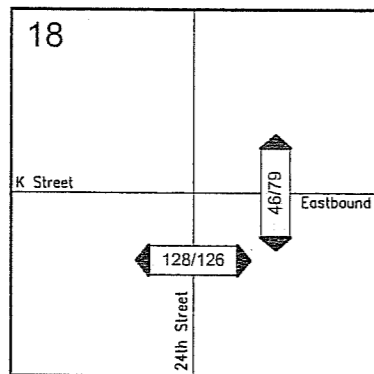
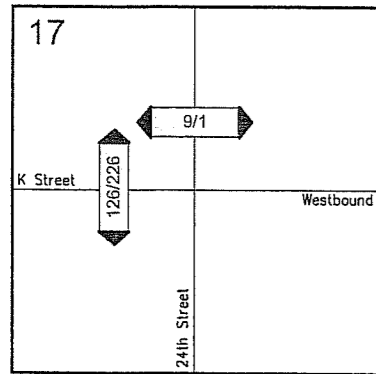


Figure 2-3
Existing Pedestrian Counts

AM PEAK HOUR
PM PEAK HOUR
000/000

North

O:\Projects\2501--3000\2954 George Washington University\Graphics\2954 rpt graphics.dwg\DAO



20
**FUTURE
 SQUARE
 54
 DRIVEWAY**

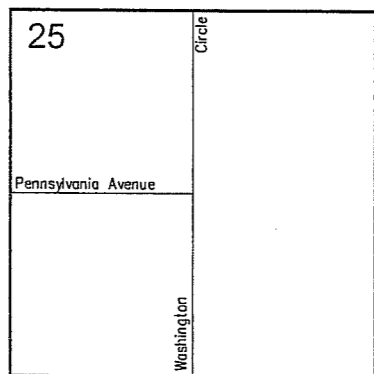
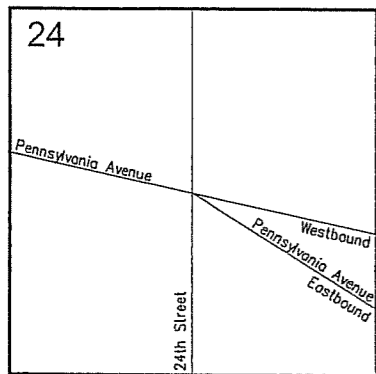
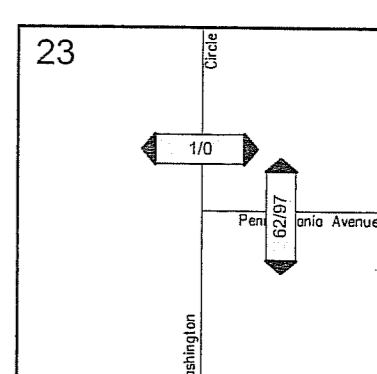
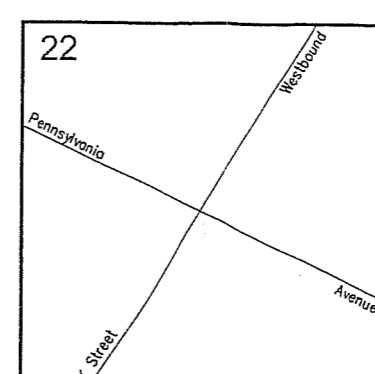
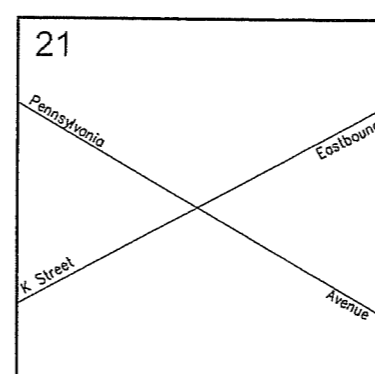
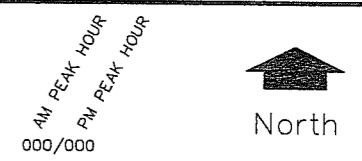


Figure 2-3
 Existing Pedestrian Counts



Square 54
 Washington, D.C.

O:\Projects\2501-3000\2954 George Washington University\Graphics\2954 rpt_graphics.dwg\DAO

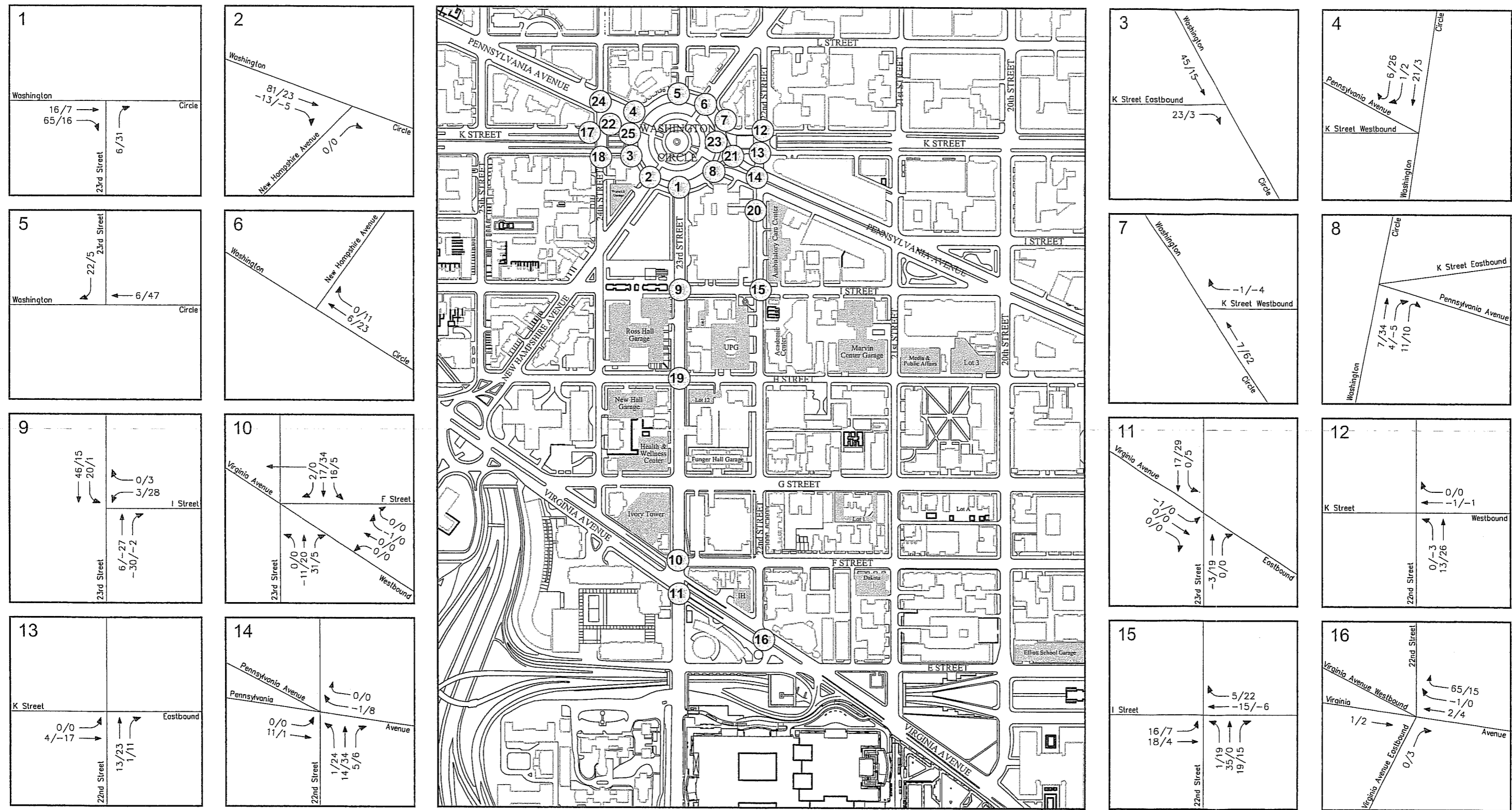


Figure 3-1
Pipeline Project Traffic Assignments


 North
 AM PEAK HOUR
 PM PEAK HOUR
 000/000

Square 54
Washington, D.C.


WELLS & ASSOCIATES, LLC
 TRAFFIC, TRANSPORTATION, and PARKING CONSULTANTS

O:\Projects\2501-3000\2954 George Washington University\Graphics\2954 rpt graphics.dwg \DAO

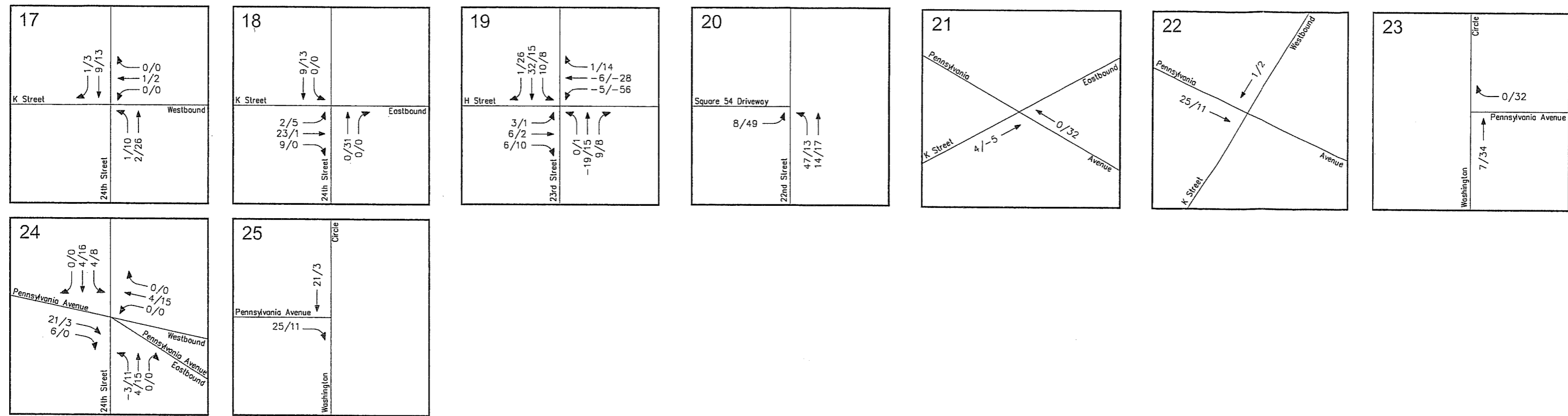


Figure 3-1
Pipeline Project Traffic Assignments

AM PEAK HOUR
PM PEAK HOUR
000/000



Square 54
Washington, D.C.

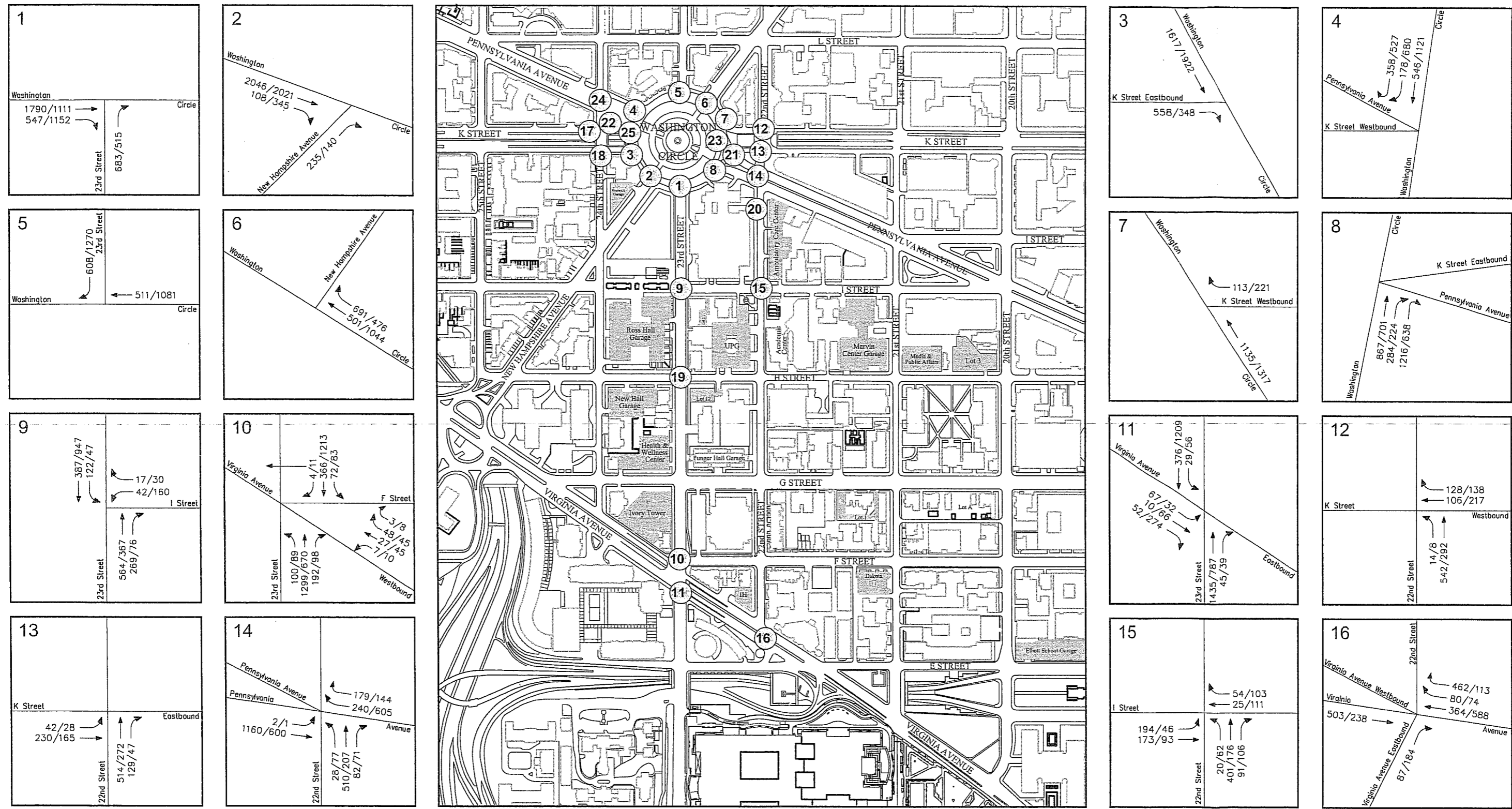
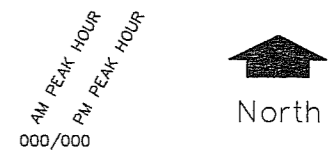


Figure 3-2
Background Future Peak Hour Traffic Forecasts



O:\Projects\2501-3000\2954 George Washington University\Graphics\2954 rpt graphics.dwg\DAO

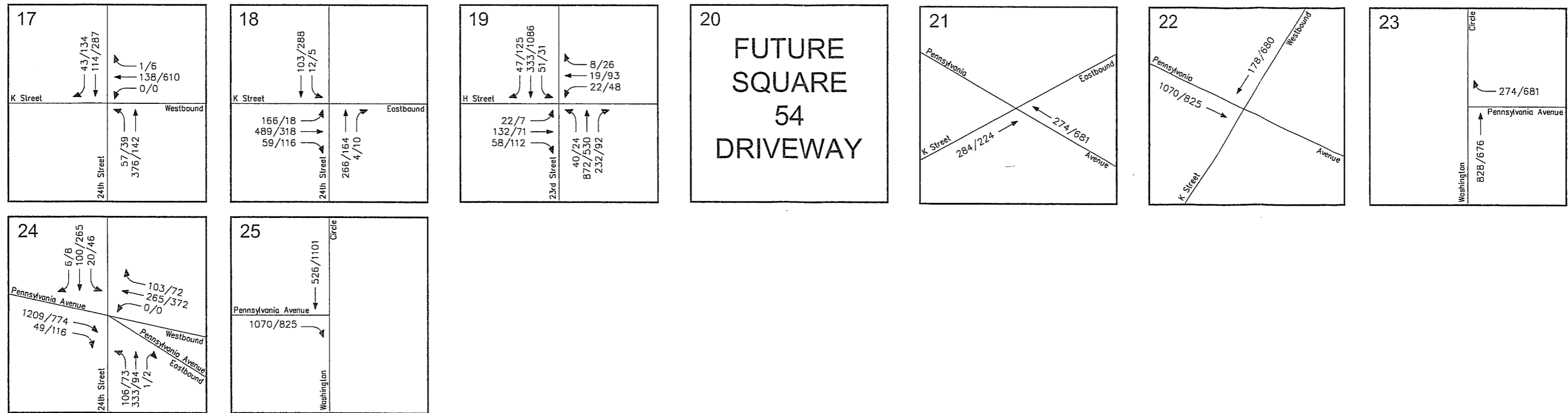
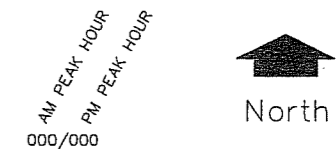


Figure 3-2
Background Future Peak Hour Traffic Forecasts



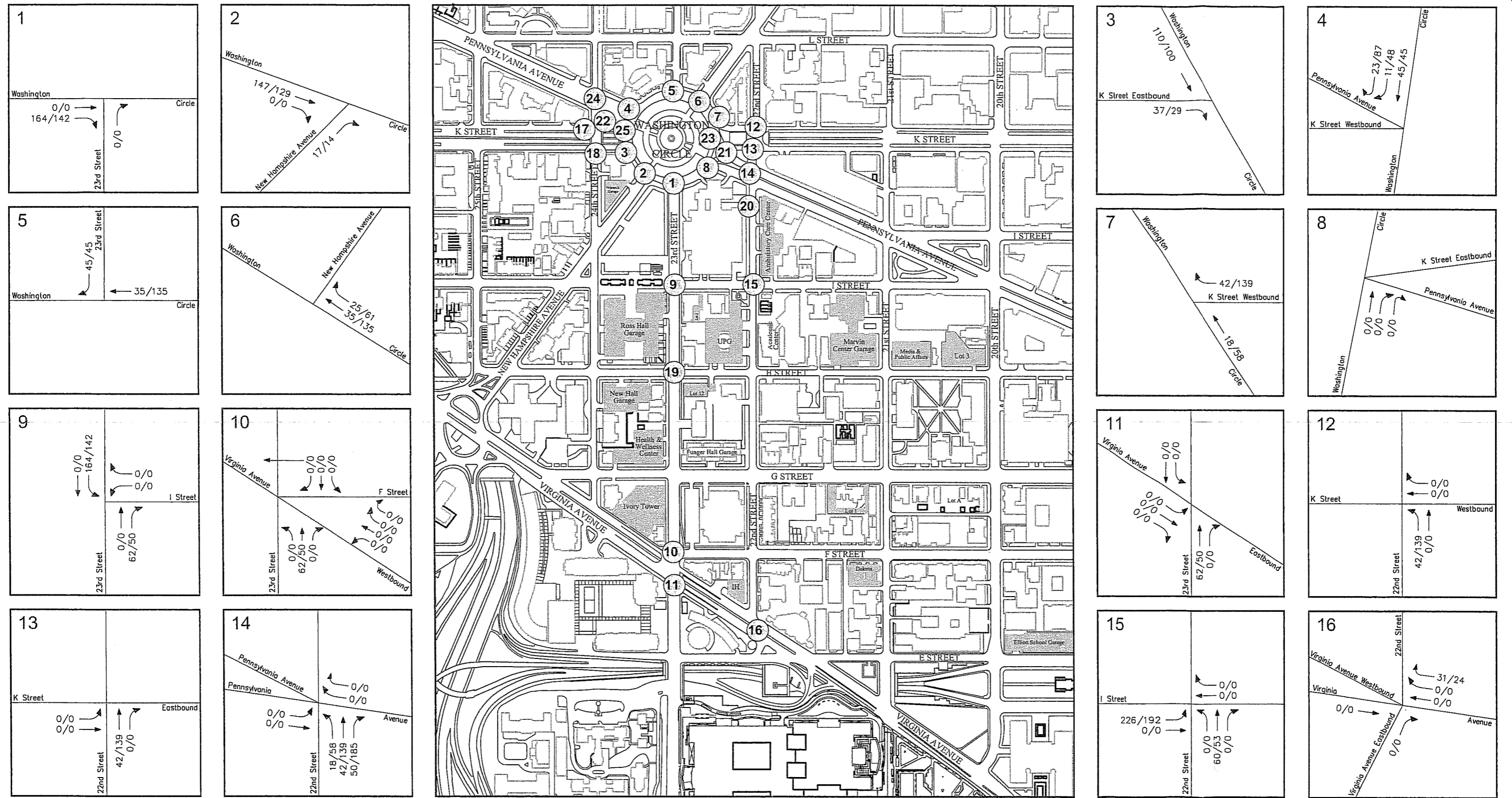


Figure 3-3
Site-Generated Traffic Assignments and Directional Distribution

AM PEAK HOUR
PM PEAK HOUR
000/000

North

O:\Projects\2501-3000\2954 George Washington University\Graphics\2954 rpt_graphics.dwg\DAO

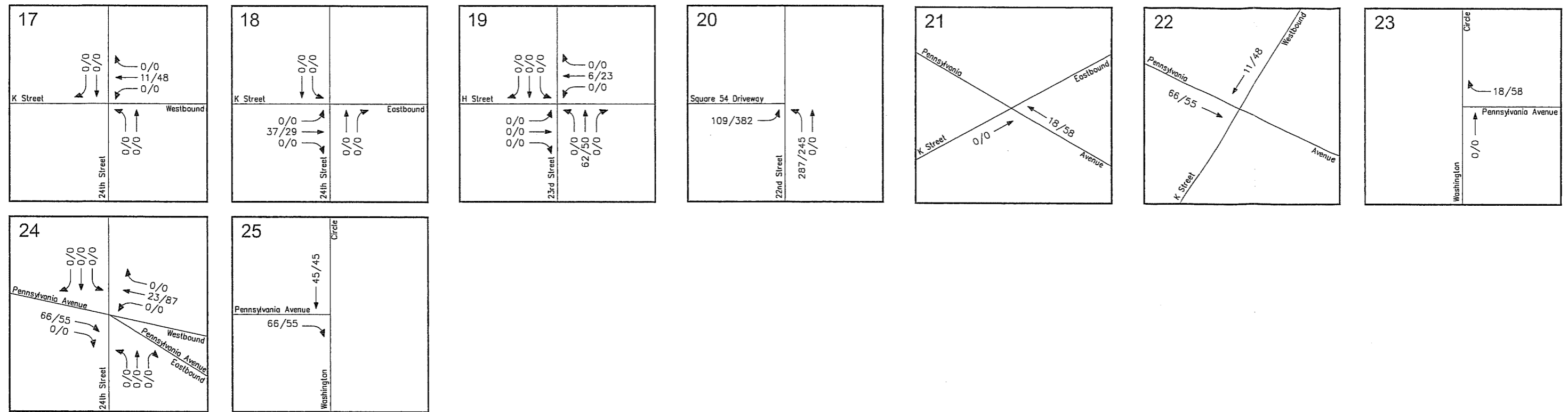
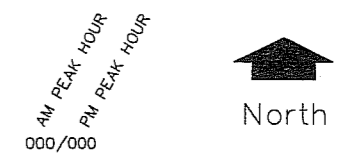


Figure 3-3
Site-Generated Traffic Assignments and Directional Distribution



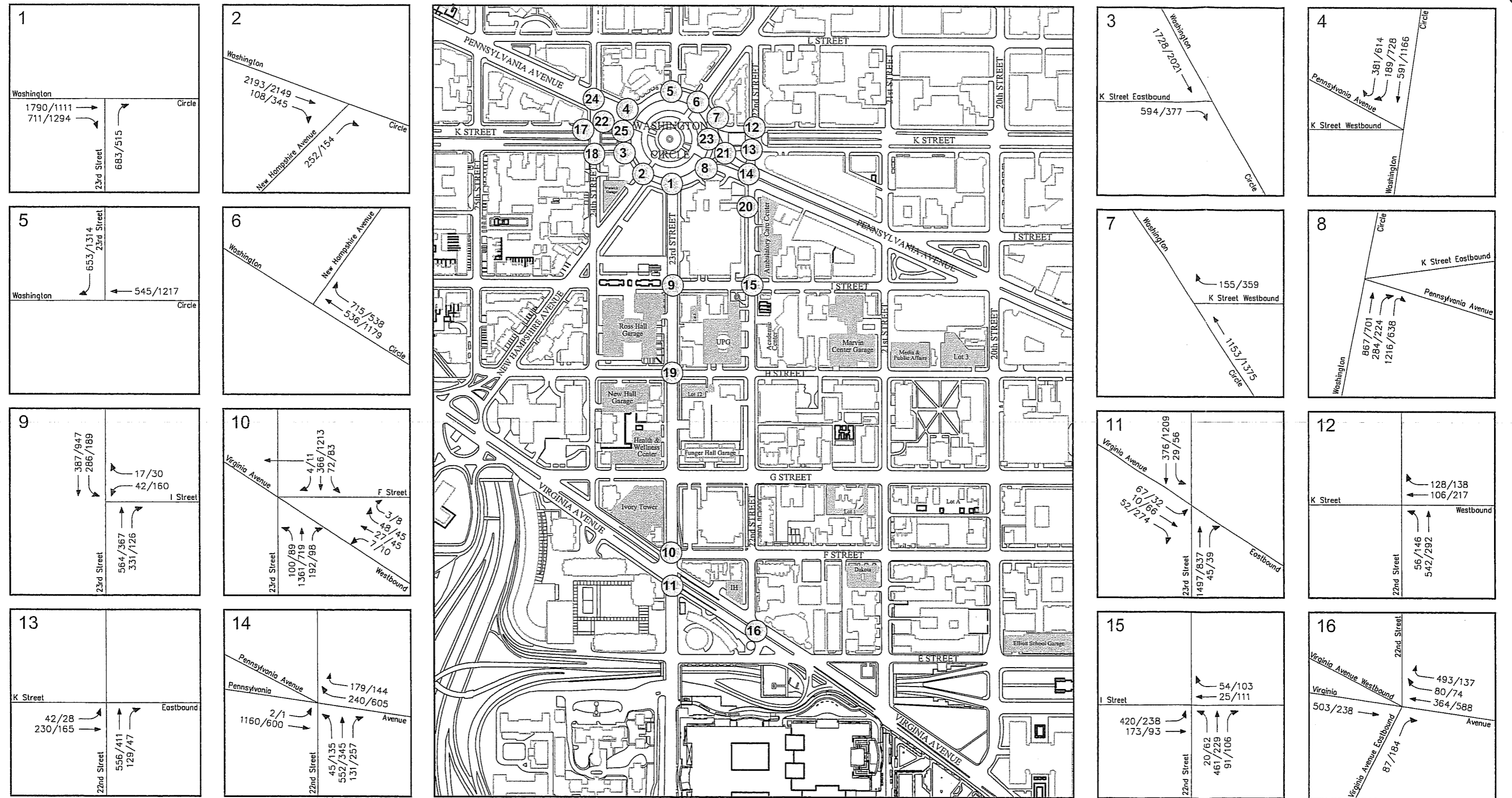


Figure 3-4
Total Future Peak Hour Traffic Forecasts

AM PEAK HOUR
PM PEAK HOUR
000/000

North

O:\Projects\2501-3000\2954 George Washington University\Graphics\2954 rpt_graphics.dwg\DAO

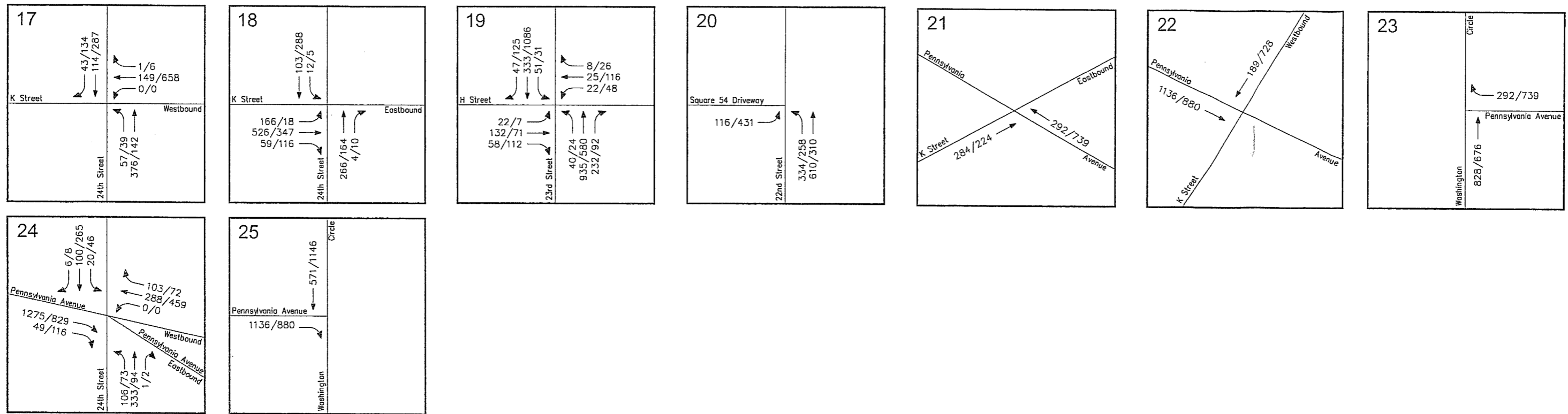


Figure 3-4
Total Future Peak Hour Traffic Forecasts

AM PEAK HOUR
PM PEAK HOUR
000/000

