

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 re-development of Square 54 were estimated at the key intersections in the study area based on the lane usage and traffic controls shown on Figure 2-1, the total future traffic forecasts shown on Figure 3-4, and the Highway Capacity Manual. The results are presented in Appendix F and summarized in Table 3-1.

Table 3-1 indicates that with the re-development of Square 54, the majority of the key intersections would continue to operate at overall acceptable LOS "D" or better during the AM and PM peak hours, except at the intersections discussed previously in the existing and background future levels of service sections.

The eastbound yield controlled right turn movement at the intersection of Washington Circle/K Street (eastbound) will operate at a LOS "E" with an approximately 23 percent increase in delay during the PM peak hour. The southbound movement at the intersection of 23rd Street/Eye Street will operate at a LOS "E" during the PM peak hour. A potential mitigation strategy includes the adjustment of the signal timings at this intersection. The delays for all other approaches operating at a LOS "E" or "F" under the background condition will not increase under the total future condition.

A new traffic signal and a separate eastbound left turn lane are recommended to be constructed at the intersection of 22nd and Eye Streets to accommodate the high volume of traffic turning left onto northbound 22nd Street. In accordance with the Manual on Uniform Traffic Control Devices, the peak hour traffic signal warrant at this intersection would be met under total future traffic volumes. Approximately 50 to 75 percent of this traffic is anticipated to be generated by the re-development of Square 54.

Parking Analysis

The subject site is proposed to be zoned as C-3-C. The District of Columbia zoning ordinance minimum parking requirement in zone C-3-C for apartment houses or multiple dwellings is one (1) space for every four units, for commercial space is one (1) space for each 750 S.F. in excess of 3,000 S.F. of gross floor area, and for office space is one (1) space for each 1,800 S.F. in excess of 2,000 S.F.

Per the District of Columbia zoning ordinance minimum parking requirements, the subject site would require 252 office parking spaces, 84 residential parking spaces, 56 grocery store parking spaces, and 48 retail parking spaces, for a total of 440 parking spaces.

The subject site will be served by five (5) levels of underground parking with approximately 1,026 parking spaces. The residents will be provided with 269 parking spaces or 185 more parking spaces than the minimum number of spaces required by the zoning ordinance. The office users will be provided with 315 spaces or 63 more parking spaces than the minimum number of spaces required by the zoning ordinance. The grocery store will be provided with 80 parking spaces or 24 more spaces than the minimum number of spaces required by the zoning ordinance. The retail users are anticipated to use office parking spaces during the PM peak hours as office users leave for the day. 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.

Table 3-1
 Square 54
 Peak Hour Intersection Levels of Service ¹

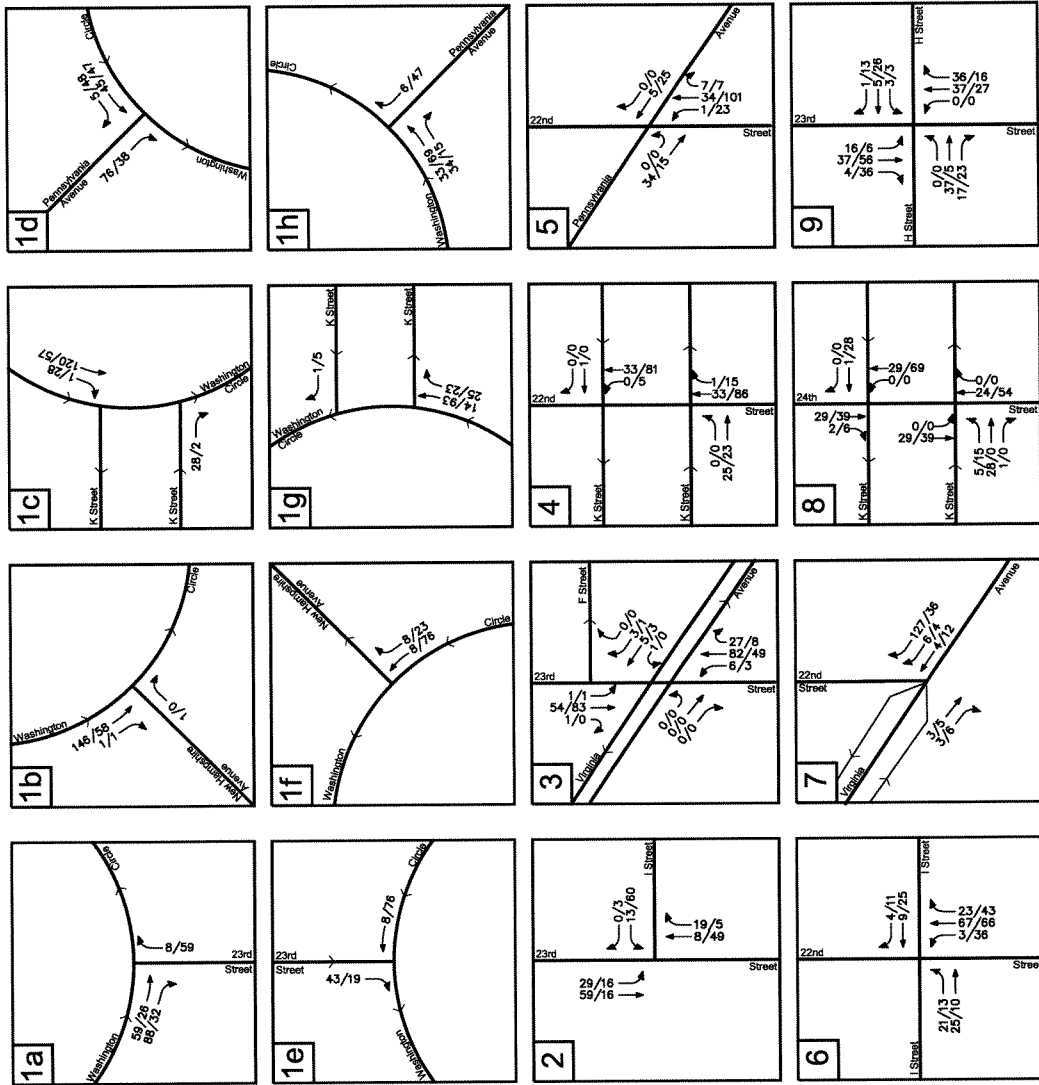
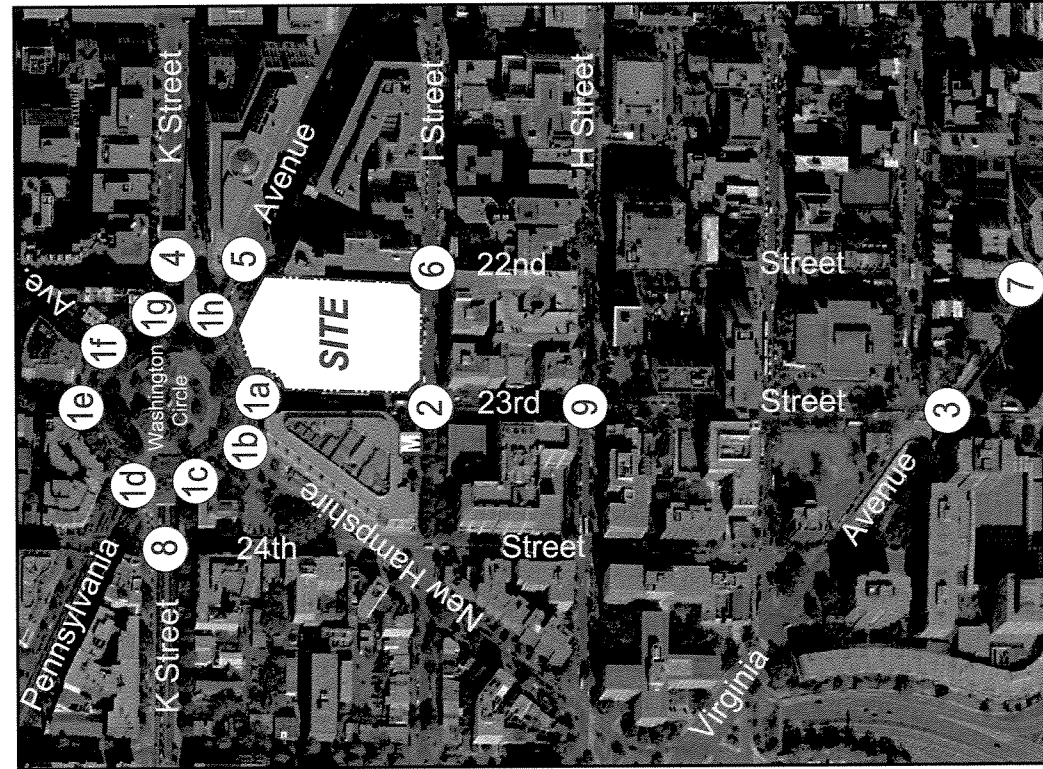
Intersection	Type of Control	2005 Existing Conditions		2010 Background Conditions		2010 Total Future Conditions	
		AM	PM	AM	PM	AM	PM
1a Washington Circle/23rd Street (NB) Eastbound Northbound Overall	Signal	A(0.4) <u>A(7.5)</u> A(1.9)	A(0.5) <u>A(3.3)</u> A(1.1)	A(0.4) <u>A(7.7)</u> A(1.9)	A(0.6) <u>A(3.0)</u> A(1.0)	A(0.4) <u>A(7.3)</u> A(1.8)	A(0.7) <u>A(2.7)</u> A(1.1)
1b Washington Circle/New Hampshire Avenue (NB) Southbound Northeastbound Overall	Signal	A(12.6) <u>B(18.5)</u> B(13.1)	A(5.9) <u>B(11.6)</u> A(6.2)	B(14.5) <u>B(18.8)</u> B(14.8)	A(6.2) <u>B(11.8)</u> A(6.6)	B(16.6) <u>B(19.5)</u> B(16.8)	A(6.7) <u>B(12.0)</u> A(7.1)
1c Washington Circle/K Street (EB) Eastbound R	Yield Sign	F[235.7]	D[28.0]	F[327.0]	D[32.8]	F[412.4]	E[40.3]
1d Washington Circle/Pennsylvania Avenue (EB) Southwestbound Southeastbound Overall	Signal	B(15.7) <u>A(0.3)</u> A(2.7)	B(16.2) <u>A(1.7)</u> A(8.8)	B(15.9) <u>A(0.8)</u> A(3.1)	B(16.8) <u>A(2.7)</u> A(9.5)	B(16.2) <u>A(1.0)</u> A(3.4)	B(18.1) <u>A(2.9)</u> B(10.2)
1e Washington Circle/23rd Street (SB) Southbound Westbound Overall	Signal	A(4.0) <u>A(0.0)</u> A(2.2)	A(4.3) <u>A(0.1)</u> A(2.3)	A(4.1) <u>A(0.0)</u> A(2.3)	A(4.6) <u>A(0.1)</u> A(2.5)	A(4.2) <u>A(0.0)</u> A(2.4)	A(4.8) <u>A(0.1)</u> A(2.5)
1f Washington Circle/New Hampshire Avenue (SB) Westbound Overall	Signal	<u>A(7.1)</u> A(7.1)	<u>A(4.8)</u> A(4.8)	<u>A(7.7)</u> A(7.7)	<u>A(4.9)</u> A(4.9)	<u>A(8.0)</u> A(8.0)	<u>A(5.2)</u> A(5.2)
1g Washington Circle/K Street (WB) Westbound R	Yield Sign	C[16.3]	C[16.9]	C[17.1]	C[18.0]	C[18.2]	C[23.5]
1h Washington Circle/Pennsylvania Avenue (WB) Northeastbound Northwestbound Overall	Signal	B(13.1) <u>A(4.8)</u> A(9.4)	C(24.3) <u>A(1.1)</u> A(7.9)	B(13.9) <u>A(4.5)</u> A(9.8)	C(24.7) <u>A(1.1)</u> A(7.6)	B(14.7) <u>A(4.7)</u> B(10.2)	C(24.7) <u>A(1.4)</u> A(7.6)
2 23rd Street/I Street Northbound Southbound Westbound Overall	Signal	A(7.1) A(8.6) <u>C(34.1)</u> A(9.1)	A(9.5) B(14.4) <u>F(283.6)</u> D(54.0)	A(6.6) A(9.7) <u>C(35.2)</u> A(9.3)	A(9.4) B(15.7) <u>F(392.9)</u> E(77.9)	A(7.0) B(15.1) <u>D(35.2)</u> B(11.5)	B(10.1) E(55.1) <u>F(392.9)</u> F(95.8)

Notes: ¹ Analysis performed using Synchro/Simtraffic Version 6.0
 * An asterisk (*) indicates delays greater than 999.9 seconds.

Table 3-1 (continued)
 Square 54
 Peak Hour Intersection Levels of Service ¹

Intersection	Type of Control	2005 Existing Conditions		2010 Background Conditions		2010 Total Future Conditions			
		AM	PM	AM	PM	AM	PM		
3a 23rd Street/Virginia Avenue (WB)/ F Street	Signal	Northbound	A(9.7)	A(4.6)	B(13.4)	A(5.2)	B(17.2)	A(5.3)	
		Southbound	A(8.6)	A(6.5)	A(9.0)	A(6.8)	A(8.0)	A(6.9)	
		Northwestbound	C(24.1)	C(26.7)	C(24.1)	C(26.7)	C(24.1)	C(26.7)	
		Overall	B(10.1)	A(6.9)	B(12.7)	A(7.2)	B(15.1)	A(7.3)	
3b 23rd Street/Virginia Avenue (EB)	Signal	Northbound	B(17.5)	B(11.0)	B(17.5)	B(11.2)	B(18.6)	B(11.6)	
		Southbound	A(2.5)	A(2.1)	A(2.8)	A(2.5)	A(3.2)	A(2.7)	
		Eastbound	C(26.2)	D(44.8)	C(26.8)	D(49.0)	C(26.8)	D(49.0)	
		Overall	B(14.8)	B(10.6)	B(14.7)	B(11.5)	B(15.6)	B(11.7)	
4a 22nd Street/K Street (WB)	Signal	Northbound	A(0.2)	A(0.1)	A(0.2)	A(0.1)	A(0.2)	A(0.2)	
		Westbound	C(34.4)	D(43.9)	C(34.5)	D(45.3)	C(34.5)	D(45.3)	
		Overall	A(8.6)	C(20.5)	A(8.4)	C(20.6)	A(8.1)	B(18.0)	
4b 22nd Street/K Street (EB)	Signal	Northbound	A(5.7)	A(5.6)	A(5.6)	A(4.9)	A(5.6)	A(4.7)	
		Eastbound	A(2.2)	A(9.2)	A(2.3)	A(9.2)	A(2.3)	A(9.8)	
		Overall	A(4.4)	A(7.1)	A(4.4)	A(6.7)	A(4.4)	A(6.4)	
5 22nd Street/Pennsylvania Avenue	Signal	Northbound	C(34.5)	C(21.9)	D(35.5)	C(22.5)	D(38.1)	C(25.8)	
		Eastbound	A(2.2)	B(11.3)	A(2.2)	B(11.5)	A(2.1)	B(11.3)	
		Westbound	C(27.3)	F(84.1)	C(27.8)	F(114.8)	C(27.8)	F(114.8)	
		Overall	B(17.0)	D(48.0)	B(17.4)	E(61.9)	B(19.0)	E(56.8)	
	Effect on new traffic signal at 22nd and Eye Streets	Signal	Northbound	N/A	N/A	N/A	N/A	C(32.2)	C(23.1)
			Eastbound	N/A	N/A	N/A	N/A	A(2.1)	B(10.9)
Westbound	Signal	Westbound	N/A	N/A	N/A	N/A	C(27.8)	F(114.8)	
		Overall	N/A	N/A	N/A	N/A	B(17.1)	E(55.8)	
6 22nd Street/I Street	Stop Sign	Northbound LTR	B(11.9)	A(9.7)	B(13.9)	B(10.9)	C(19.6)	B(13.6)	
		Eastbound TL	B(14.9)	A(9.6)	C(17.3)	B(10.3)	F(73.6)	C(17.2)	
		Westbound TR	A(9.5)	B(12.0)	A(9.6)	B(13.0)	B(10.3)	C(15.8)	
	Install a new traffic signal and construct a separate eastbound left turn lane	Signal	Eastbound	N/A	N/A	N/A	N/A	B(19.5)	A(8.3)
			Westbound	N/A	N/A	N/A	N/A	B(19.4)	C(26.1)
			Overall	N/A	N/A	N/A	N/A	D(48.0)	C(31.5)
8a 24th Street/K Street (WB)	Signal	Northbound	B(17.1)	B(17.7)	B(17.2)	B(19.7)	B(17.0)	B(19.6)	
		Southbound	A(4.9)	E(55.4)	A(6.2)	F(114.8)	A(5.9)	F(114.8)	
		Westbound	A(1.6)	A(6.0)	A(1.6)	A(6.2)	A(1.7)	A(6.5)	
		Overall	B(10.6)	C(25.3)	B(10.9)	D(47.3)	B(10.7)	D(46.4)	
	8b 24th Street/K Street (EB)	Signal	Northbound	C(33.0)	C(27.3)	C(35.0)	C(29.2)	C(35.0)	C(29.2)
			Southbound	A(2.3)	A(3.0)	A(2.7)	A(3.1)	A(2.7)	A(3.1)
Eastbound	Signal	Eastbound	C(20.1)	B(15.0)	C(21.0)	B(15.2)	C(21.6)	B(15.5)	
		Overall	C(21.9)	B(13.6)	C(22.7)	B(14.4)	C(23.1)	B(14.5)	
9 23rd Street/H Street	Signal	Northbound	A(0.9)	A(6.0)	A(0.9)	A(6.8)	A(0.8)	A(7.6)	
		Southbound	B(13.1)	A(6.4)	B(12.6)	A(7.6)	B(13.2)	A(8.8)	
		Eastbound	C(29.6)	C(32.2)	C(30.5)	C(34.1)	C(30.5)	C(34.1)	
		Westbound	C(25.3)	D(37.8)	C(24.8)	C(29.6)	C(25.0)	C(30.8)	
		Overall	A(7.7)	B(11.6)	A(7.9)	B(10.6)	A(7.9)	B(11.7)	
		10 22nd Street/Square 54 Driveway	Stop Sign	N/A	N/A	N/A	N/A	A(3.0)	A(3.4)
Northbound TL	Stop Sign	N/A	N/A	N/A	N/A	E(35.3)	F(53.3)		
Eastbound L	Stop Sign	N/A	N/A	N/A	N/A				

Notes: ¹ Analysis performed using Synchro/Simtraffic Version 6.0
 * An asterisk (*) indicates delays greater than 999.9 seconds.

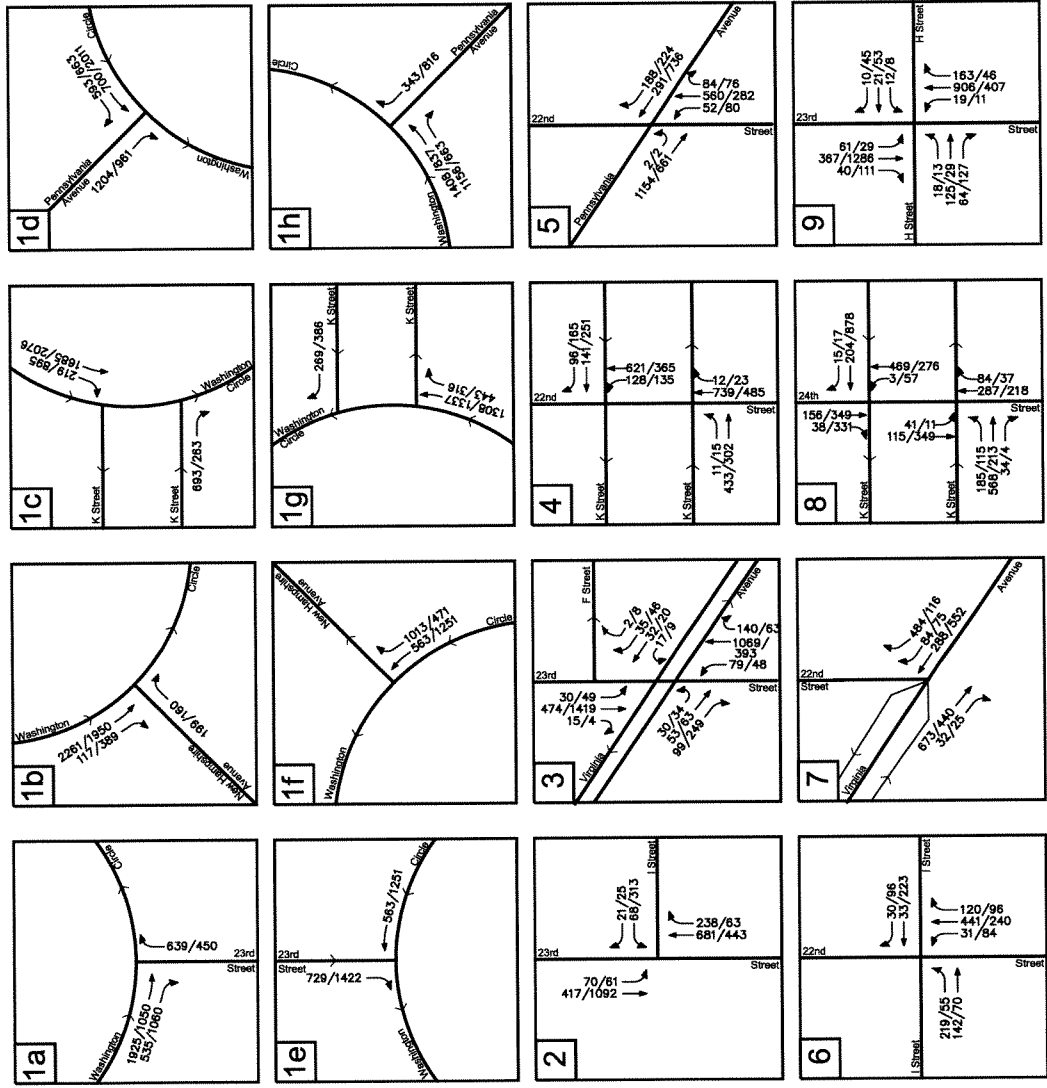


North
Schematic

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At Peak Hour
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Figure 3-1
Pipeline Projects Traffic Assignments



North
Schematic

ML Peak Hour
AM Peak Hour
PM Peak Hour

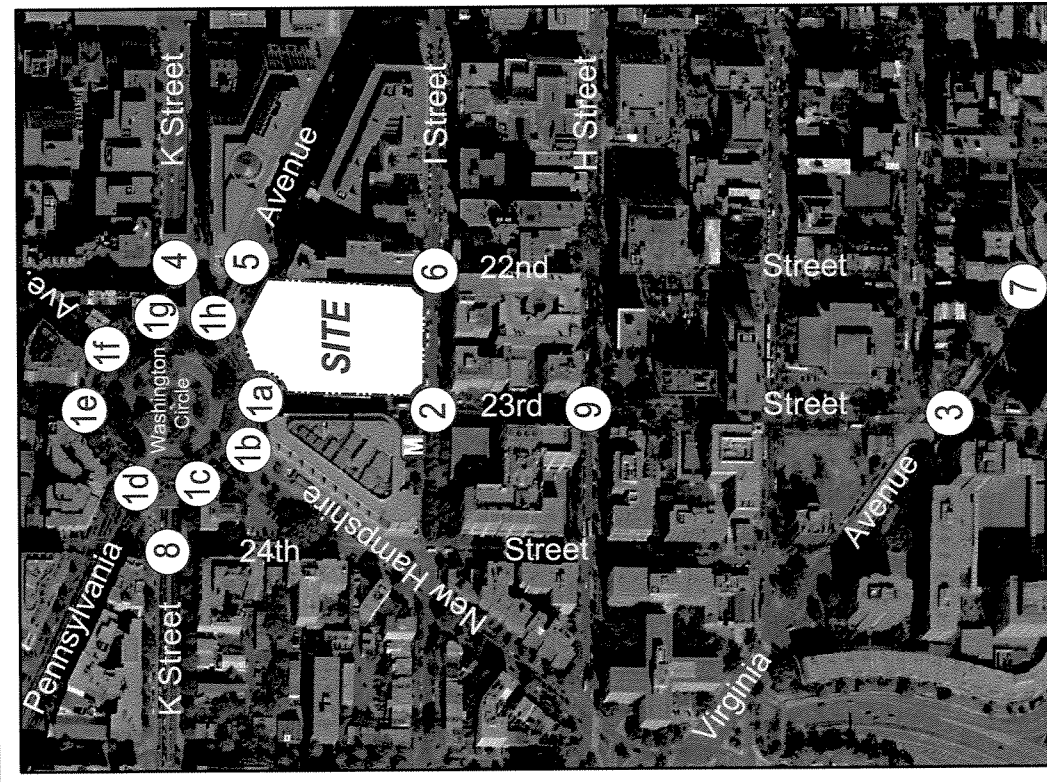


Figure 3-2
Background Future Peak Hour Traffic Forecasts

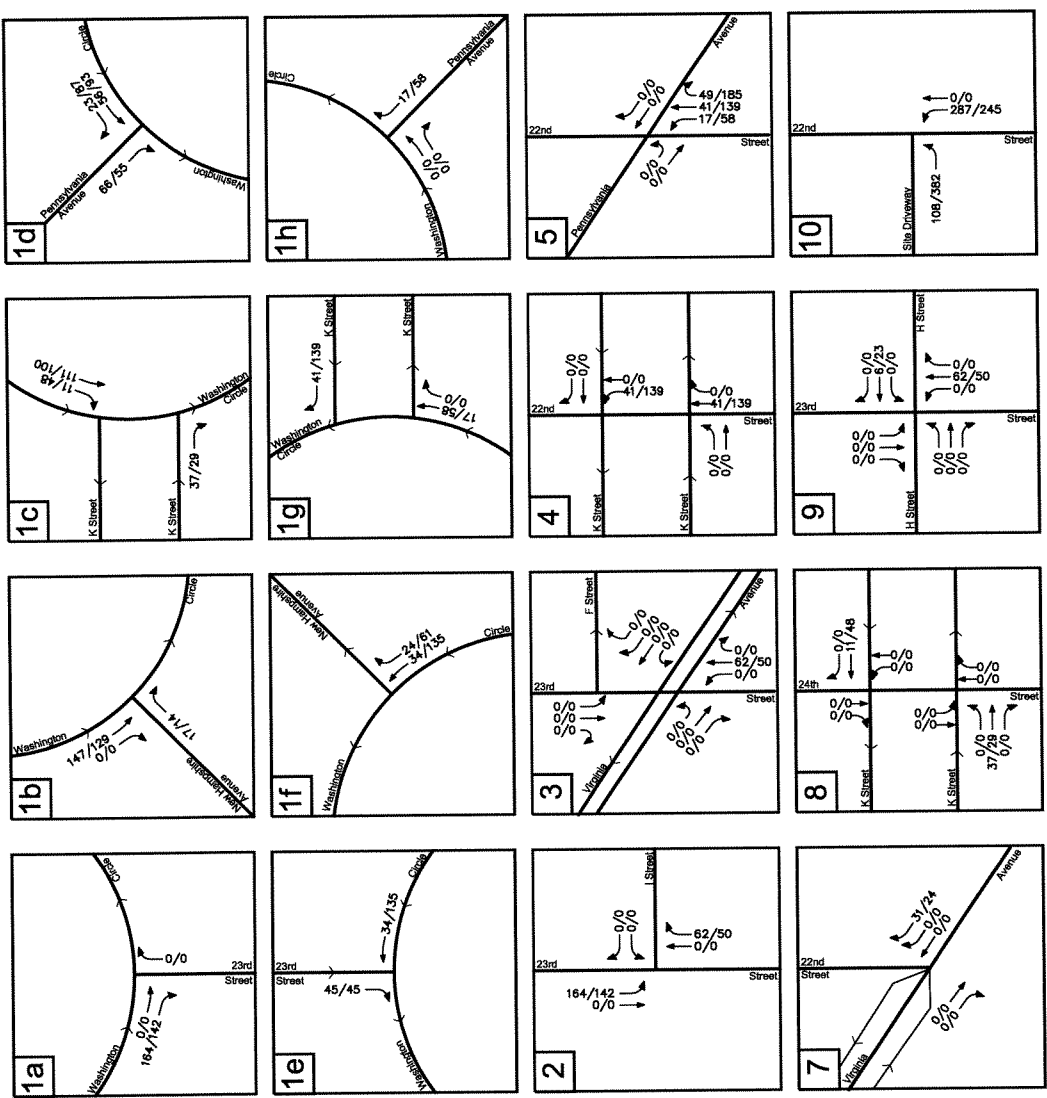
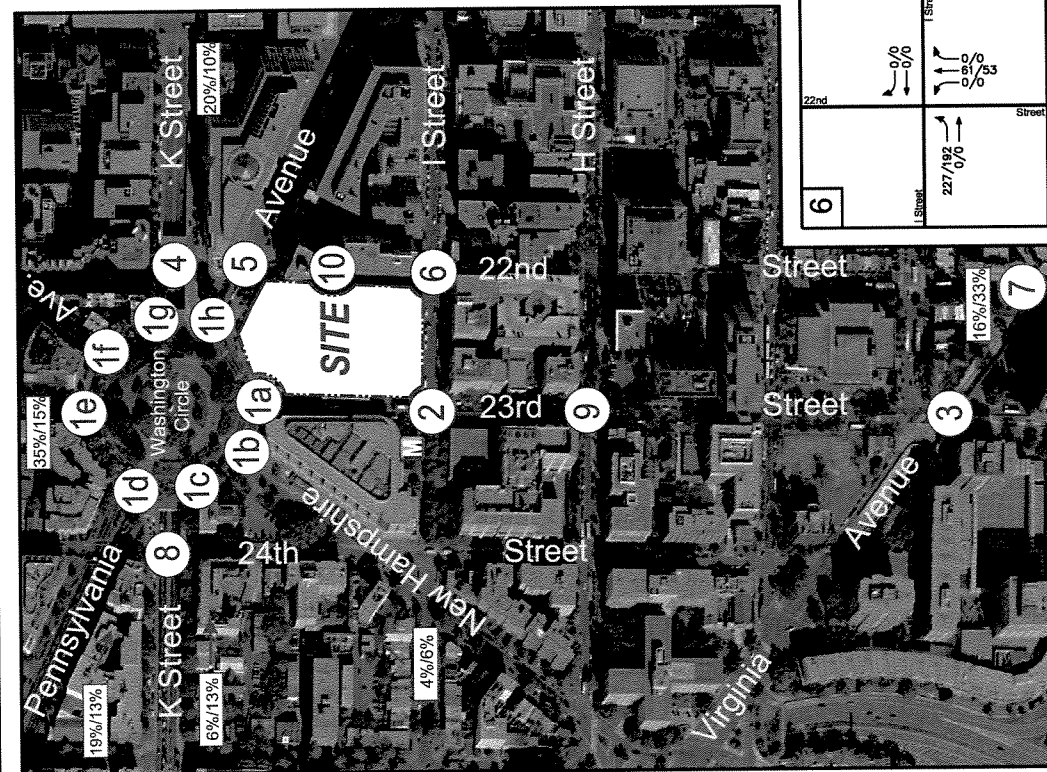
Table 3-2
Square 54

Site Trip Generation Analysis ¹

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
Non-Auto Reduction ²		63%		14	71	85	68	33	101
Net Net Residential Trips				9	41	50	40	20	60
Office	710	454,000	S.F.	554	76	630	100	487	587
Non-Auto Reduction ²		60%		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
Non-Auto Reduction ³		60%		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
Non-Auto Reduction ³		60%		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

Notes:

- ¹ Traffic estimates based on *Trip Generation*, Seventh Edition, The Institute of Transportation Engineers.
- ² The non-auto reduction percentages were calculated based on information provided in the Development Related Ridership Survey II, published by the Washington Metropolitan Area Transit Authority.
- ³ The non-auto reduction percentages were calculated based on information provided in the Development Related Ridership Survey II, published by the Washington Metropolitan Area Transit Authority, and on 2000 US Census population and household data.



North
Schematic

at peak hour
000/000

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

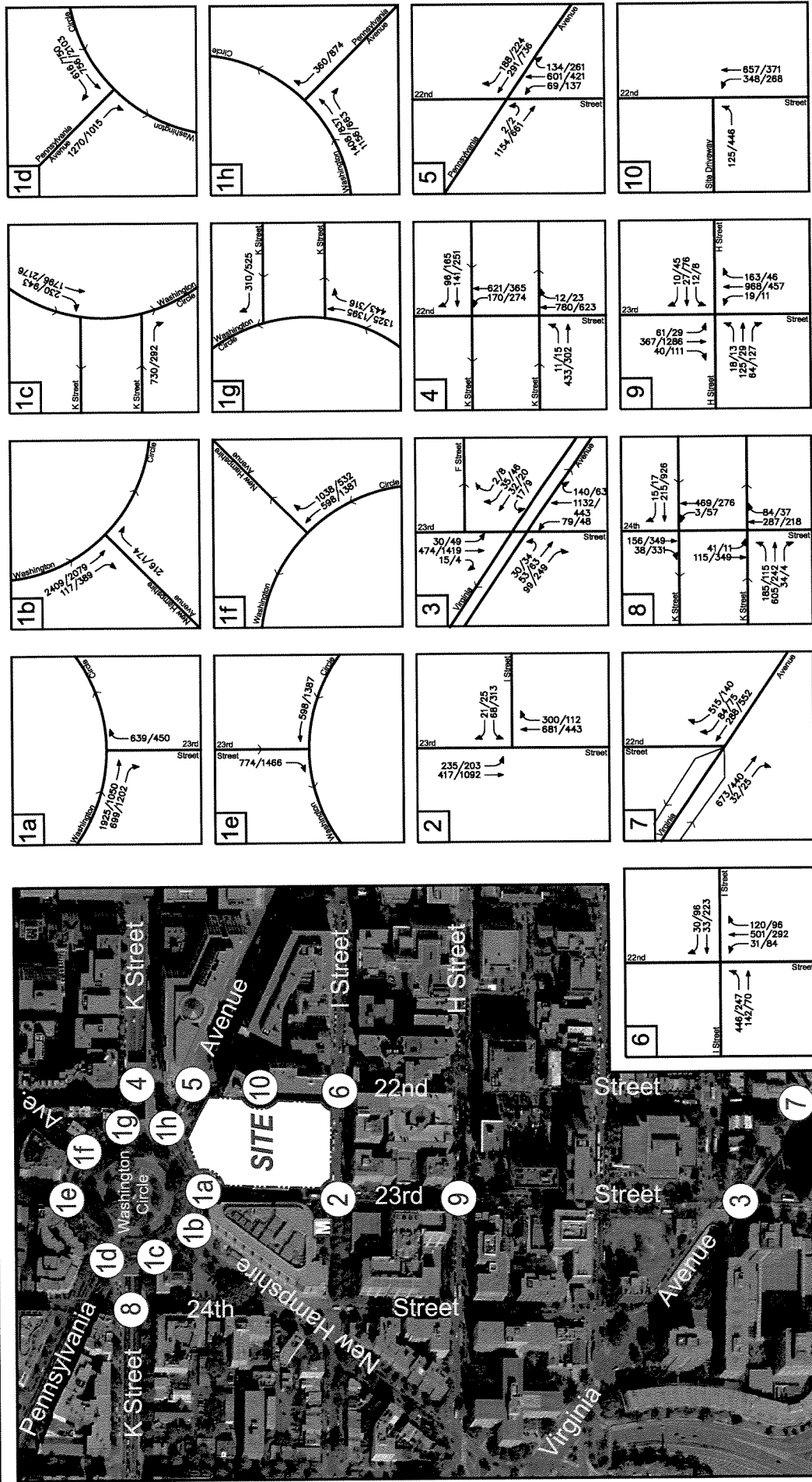


Figure 3-4
Total Future Peak Hour Traffic Forecasts

North
Schematic

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.

The approved and/or proposed but unbuilt projects in the study area will generate a total of 476 AM peak hour vehicle-trips and 592 PM peak hour vehicle-trips, upon completion and full occupancy.

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.

2. The eastbound right turn movement, which operates under yield control, at the Washington Circle/K Street intersection currently operates at a LOS "F" during the AM peak hour.

The westbound approach at the 23rd Street/Eye Street intersection currently operates at capacity at a LOS "F" during the PM peak hour due to the high volume of westbound traffic turning left onto 23rd Street.

The westbound movement at the 22nd Street/Pennsylvania Avenue intersection presently operates at capacity at LOS "F" during the PM peak hour due to the high volume of through traffic traveling towards Washington Circle.

Finally, the southbound approach at the 24th and K Street (westbound) intersection currently operates at a LOS "E" during the PM peak hour.

3. These additional background vehicle-trips would not significantly affect the existing intersection delays or levels of service described above, except at the 22nd Street/Pennsylvania Avenue and 23rd Street/Eye Street intersections, where the overall level of service would drop to a LOS "E" and at the intersection of 24th Street and K Street (westbound), where the southbound approach would operate at a LOS "F" during the PM peak hour.

4. Most of the key intersections in the study area would continue to operate at overall acceptable LOS "D" or better during the AM and PM peak hours, with these additional site-generated vehicle-trips, except at the intersections discussed previously in the existing and background future levels of service sections.

The eastbound yield controlled right turn movement at the intersection of Washington Circle/K Street (eastbound) and the southbound movement at the intersection of 23rd Street/Eye Street will operate at a LOS "E" during the PM peak hour.

5. A new traffic signal and a separate eastbound left turn lane are recommended to be constructed at the intersection of 22nd and Eye Streets to accommodate the high volume of traffic turning left onto northbound 22nd Street.