

APPENDIX B

Gorove/Slade

NCI Consolidated Office Space EA: Transportation Study

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National Cancer Institute

Consolidated Office Space

Environmental Assessment
Transportation Study

January 20, 2010

**Prepared For:
National Cancer Institute**



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Table of Contents

List of Figures	iii
List of Tables	v
List of Appendices.....	v
1.0 Introduction	1
1.1 Project Purpose and Scope.....	1
1.2 Proposal Description	2
1.3 Report Organization	2
2.0 Site 1: Johns Hopkins University Campus	4
2.1 Introduction	4
2.2 Base Conditions	4
2.2.1 Roadway Accessibility	4
2.2.2 Study Area Intersections.....	6
2.2.3 Existing Conditions: Pedestrians and Transit.....	7
2.2.4 Base Capacity Analysis	11
2.3 Future Conditions without Development (Year 2012).....	14
2.3.1 Background Developments.....	14
2.3.2 Future Background Traffic Forecast.....	17
2.3.3 Future Background Capacity Analysis	17
2.4 Analysis of Future Conditions with Development (Year 2012)	17
2.4.1 Project Trip Generation.....	22
2.4.2 Project Trip Distribution.....	23
2.4.3 Total Future Traffic Forecasts.....	23
2.4.4 Total Future Capacity Analysis	23
2.4.5 Transportation Improvement Considerations	31
2.5 Site 1 Summary.....	31
3.0 Site 2: Tower Oaks	35
3.1 Introduction	35
3.2 Base Conditions	35
3.2.1 Roadway Accessibility	35
3.2.2 Study Area Intersections.....	38
3.2.3 Existing Conditions: Pedestrians and Transit.....	38

- 3.2.4 Base Capacity Analysis 43
- 3.3 Future Conditions without Development (Year 2012)..... 43
 - 3.3.1 Background Developments..... 46
 - 3.3.2 Future Background Traffic Forecast..... 51
 - 3.3.3 Future Background Capacity Analysis 51
- 3.4 Analysis of Future Conditions with Development (Year 2012) 51
 - 3.4.1 Project Trip Generation..... 56
 - 3.4.2 Project Trip Distribution..... 56
 - 3.4.3 Total Future Traffic Forecasts..... 56
 - 3.4.4 Total Future Capacity Analysis and Improvement Considerations..... 63
- 3.5 Site 2 Summary..... 67
- 4.0 Site 3: Washington Science Center 68
 - 4.1 Introduction 68
 - 4.2 Base Conditions 68
 - 4.2.1 Roadway Accessibility 68
 - 4.2.2 Study Area Intersections..... 71
 - 4.2.3 Existing Conditions: Pedestrians and Transit..... 72
 - 4.2.4 Base Capacity Analysis 76
 - 4.3 Future Conditions without Development (Year 2012)..... 79
 - 4.3.1 Background Developments..... 79
 - 4.3.2 Planned and Programmed Improvements 86
 - 4.3.3 Future Background Traffic Forecast..... 86
 - 4.3.4 Future Background Capacity Analysis 86
 - 4.4 Analysis of Future Conditions with Development (Year 2012) 93
 - 4.4.1 Project Trip Generation..... 93
 - 4.4.2 Project Trip Distribution..... 93
 - 4.4.3 Total Future Traffic Forecasts..... 94
 - 4.4.4 Total Future Capacity Analysis 94
 - 4.4.5 Transportation Improvement Considerations 102
 - 4.5 Site 3 Summary..... 105
- Appendices 107

List of Figures

Figure 1 Site Location Map	3
Figure 2 Johns Hopkins University Site Location Map	5
Figure 3a Site 1 Existing Lane Configuration and Traffic Control Devices	8
Figure 3b Site 1 Existing Lane Configurations and Traffic Control Devices	9
Figure 4 Site 1 Area Transit Network	10
Figure 5a Site 1 Existing Peak Hour Traffic Volumes	12
Figure 5b Existing Peak Hour Traffic Volumes	13
Figure 6 Site 1 Location of Background Developments	16
Figure 7a Site 1 Background Trip Distribution	18
Figure 7b Site 1 Background Trip Distribution	19
Figure 8a Site 1 Future Background Peak Hour Traffic Volumes	20
Figure 8b Site 1 Future Background Peak Hour Traffic Volumes	21
Figure 9a Site 1 Project Trip Distribution	25
Figure 9b Site 1 Project Trip Distribution	26
Figure 10a Site 1 Total Future Peak Hour Traffic Volumes	27
Figure 10b Site 1 Total Future Peak Hour Traffic Volumes	28
Figure 11a Site 1 Future Lane Configurations and Traffic Control Devices	33
Figure 11b Site 1 Future Lane Configurations and Traffic Control Devices	34
Figure 12 Tower Oaks Site Location Map	37
Figure 13a Site 2 Lane Configurations and Traffic Control Devices	40
Figure 13b Site 2 Lane Configurations and Traffic Control Devices	41
Figure 14 Site 2 Area Transit Network	42
Figure 15a Site 2 Base Peak Hour Traffic Volumes	44
Figure 15b Site 2 Base Peak Hour Traffic Volumes	45
Figure 16 Site 2 Locations of Background Developments	50
Figure 17a Site 2 Background Trip Distribution	52
Figure 17b Site 2 Background Trip Distribution	53
Figure 18a Site 2 Future Background Peak Hour Traffic Volumes	54
Figure 18b Site 2 Future Background Peak Hour Traffic Volumes	55
Figure 19a Site 2 Project Trip Distribution	58
Figure 19b Site 2 Project Trip Distribution	59

Figure 19c Site 2 Project Driveway Volumes60

Figure 20a Site 2 Total Future Peak Hour Traffic Volumes.....61

Figure 20b Site 2 Total Future Peak Hour Traffic Volumes.....62

Figure 21a Site 2 Future Lane Configurations and Traffic Control Devices65

Figure 21b Site 2 Future Lane Configurations and Traffic Control Devices66

Figure 22 Washington Science Center Site Location Map.....70

Figure 23a Site 3 Existing Lane Configurations and Traffic Control Devices73

Figure 23b Site 3 Existing Lane Configurations and Traffic Control Devices74

Figure24 Site 3 Area Transit Network75

Figure 25a Site 3 Base Peak Hour Traffic Volumes.....77

Figure 25b Site 3 Base Peak Hour Traffic Volumes.....78

Figure 26 Site 3 Location of Background Developments85

Figure 27a Site 3 Background Trip Distribution87

Figure 27b Site 3 Background Trip Distribution88

Figure 28a Site 3 Adjustment to Background Trip Distribution.....89

Figure 28b Site 3 Adjustment to Background Trip Distribution.....90

Figure 29a Site 3 Future Background Peak Hour Traffic Volumes91

Figure 29b Site 3 Future Background Peak Hour Traffic Volumes92

Figure 30a Site 3 Project Trip Distribution95

Figure 30b Site 3 Project Trip Distribution96

Figure 31 Site 3 Adjustment to Project Trip Distribution.....97

Figure 32a Site 3 Total Future Peak Hour Traffic Volumes.....98

Figure 32b Site 3 Total Future Peak Hour Traffic Volumes.....99

Figure 33a Site 3 Future Lane Configurations and Traffic Control Devices103

Figure 33b Site 3 Future Lane Configurations and Traffic Control Devices104

List of Tables

Table 1 – Site 1 Background Trip Generation.....	15
Table 2a – Site 1 Comparative CLV Results for Morning Peak Hour.....	29
Table 2b – Site 1 Comparative CLV Results for Evening Peak Hour.....	30
Table 3 – Site 2 Background Trip Generation.....	47
Table 4 – Site 2 Comparative CLV Results.....	64
Table 5 – Site 3 Background Trip Generation.....	81
Table 6a - Site 3 Comparative CLV Results for Morning Peak Hour.....	100
Table 6b - Site 3 Comparative CLV Results for Evening Peak Hour.....	101

List of Appendices

Appendix A-1 Site 1 Base Conditions Capacity Analysis Worksheets
Appendix A-2 Site 1 Future Background Capacity Analysis Worksheets
Appendix A-3 Site 1 Total Future Capacity Analysis Worksheets
Appendix B-1 Site 2 Base Conditions Capacity Analysis Worksheets
Appendix B-2 Site 2 Future Background Capacity Analysis Worksheets
Appendix B-3 Site 2 Total Future Capacity Analysis Worksheets
Appendix C-1 Site 3 Base Conditions Capacity Analysis Worksheets
Appendix C-2 Site 3 Future Background Capacity Analysis Worksheets
Appendix C-3 Site 3 Total Future Capacity Analysis Worksheets

1.0 Introduction

1.1 Project Purpose and Scope

The National Cancer Institutes proposes to relocate 2,400 daily employees at one consolidated location of three prospective locations: Johns Hopkins University Montgomery County Campus, The Preserve at Tower Oaks and Washington Science Center. As a matter of background, comprehensive traffic studies have been previously prepared for each respective site. This report documents the transportation components of an Environmental Assessment that references previous studies to develop a comprehensive and consistent report.

In keeping with National Environmental Protection Agency (NEPA) requirements, NCI has commissioned the preparation of an Environmental Assessment (EA) to evaluate the potential environmental impacts of relocation at each site.

The primary purpose of this transportation study was to evaluate the local transportation impacts of the proposed NCI consolidation, and identify potential mitigation measures to address adverse impacts.

The following key tasks were undertaken to facilitate the preparation of this study:

- Field Reconnaissance: Observed existing roadway and intersection geometrics, traffic controls, speed limits and operations.
- Document Review: Reviewed several planning documents including the following -
 - Local Area Transportation Review Guidelines, M-NCPPC (Montgomery County), July, 2004.
 - Johns Hopkins University Montgomery County Campus LATR, Montgomery County, MD, Wells and Associates, Inc., February 5, 2007.
 - Preserve Parkway Regional Traffic Assessment, Montgomery County, MD, Wells and Associates, Inc., September 8, 2008.
 - Revised and Updated Letter Report for Park Potomac, Montgomery County, MD, The Traffic Group, April 11, 2007.
 - LATR and PAMR for 6000 Montrose Parkway (Formerly Wilgus East Property), Montgomery County, MD, The Traffic Group, May 11, 2009.

- LATR and PAMR and Site Plan Amendment #81993016C for 6015 Executive Boulevard, Montgomery County, MD, The Traffic Group, Revised March 9, 2009.
- Analyses: Conducted Critical Lane Volume (CLV) capacity analyses for the following
 - Base transportation conditions.
 - Future (2012) traffic conditions without the consolidation (based on other planned land use developments).
 - Future (2012) traffic conditions with the consolidation and other planned area land uses.
 - Future (2012) traffic conditions with potential mitigation measures.

1.2 Proposal Description

The National Cancer Institute is consolidating office space for 2,400 employees currently located throughout the metropolitan Washington, DC area. The consolidated office space serving 2,400 employees consists of approximately 550,000 square feet (sf), regardless of which site is selected. As previously mentioned, the three sites are Johns Hopkins University Montgomery County Campus, The Preserve at Tower Oaks and Washington Science Center. A location map for these sites is shown on Figure 1.

1.3 Report Organization

This report is organized into four main sections. Section 1 presents the Introduction and Background. Section 2 presents an assessment of the base transportation conditions, potential future transportation conditions, impacts, and mitigations for the Johns Hopkins University site. Section 3 presents an assessment of the base transportation conditions, potential future transportation conditions, impacts, and mitigations for the Preserve at Tower Oaks site. Section 4 presents an assessment of the base transportation conditions, potential future transportation conditions, impacts, and mitigations for the Washington Science Center site.

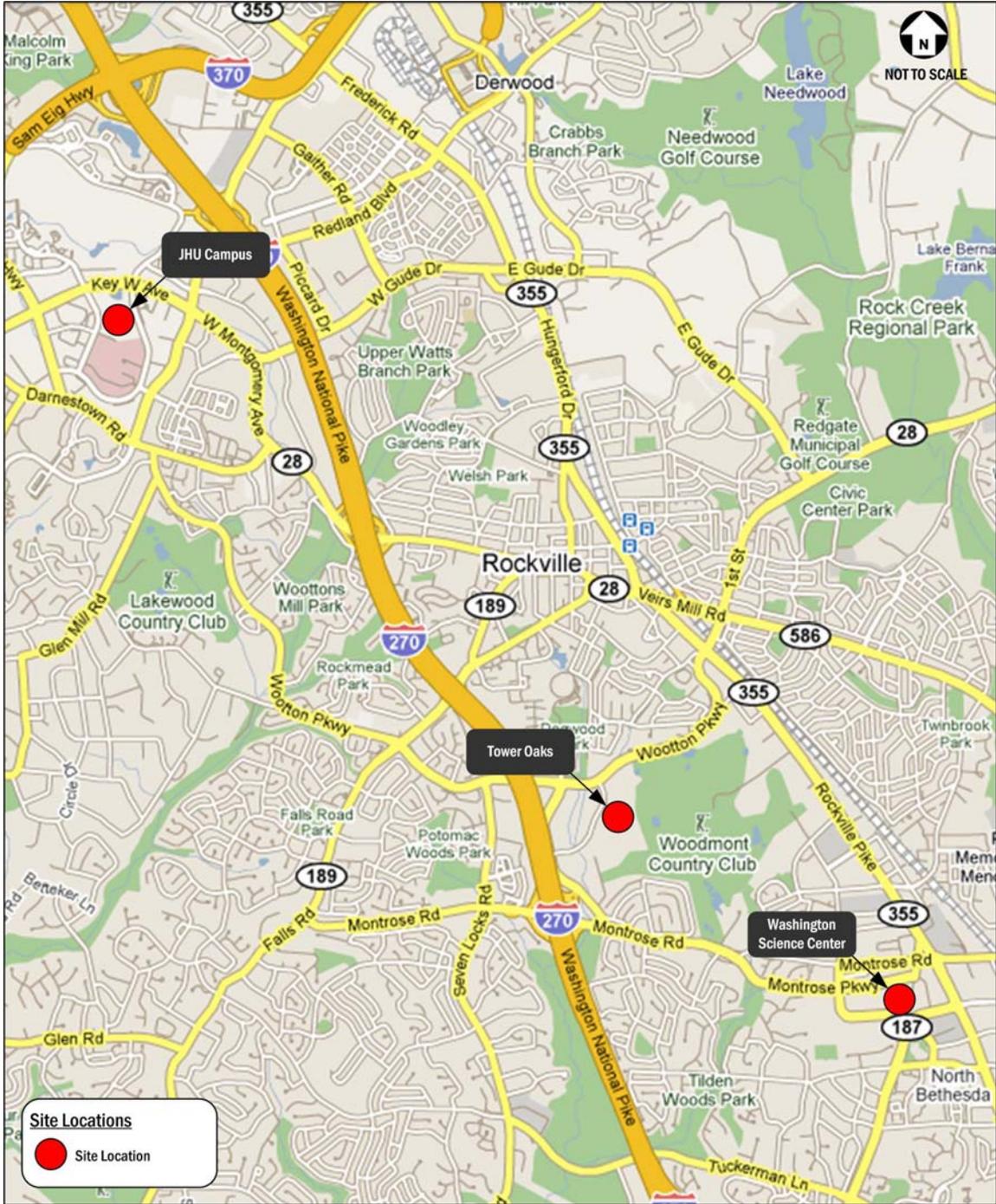


Figure 1 Site Location Map

2.0 Site 1: Johns Hopkins University Campus

2.1 Introduction

This section of the report outlines the evaluation of the transportation elements of the prospective site at the Johns Hopkins University's (JHU) Montgomery County Campus. The site is located in the Shady Grove Life Sciences Center near the Shady Grove Adventist Hospital. The campus is located in the Research and Development Village Policy Area of Montgomery County, MD. The proposed buildings would be located north of the future Blackwell Road, south of Key West Avenue, west of Medical Center Drive and east of the existing Johns Hopkins buildings which are east of Broschart Road.

2.2 Base Conditions

The base conditions of the JHU campus have been analyzed to identify existing constraints and opportunities that are present within the transportation network and to establish a point of reference for the analysis of future traffic conditions. As previously stated, this analysis is based on information from the *Johns Hopkins University Montgomery County Campus LATR*, Montgomery County, MD, Wells and Associates, Inc., February 5, 2007.

2.2.1 Roadway Accessibility

Direct access to the JHU campus is provided via Medical Center Drive and Broschart Drive. Key regional arterial roads include Key West Avenue to the north, Darnestown Road to the south, Shady Grove Road to the east and Great Seneca Highway to the west. The roadway network providing both regional and local access to the campus is illustrated in Figure 2.

The principal roadways involved in this analysis include the following:

Blackwell Road is an east-west four lane arterial that connects Great Seneca Highway to Broschart Road, then continues east as a two-lane internal roadway for the Potomac Ridge Behavioral Health group. When the campus is completed, Blackwell Road will connect to Medical Center Drive adjacent to the JHU campus.

Medical Center Drive is a four lane divided arterial that runs north-south adjacent to the JHU campus to the east. Medical Center Drive connects the JHU campus to Key West Avenue and Great Seneca Highway through the study area. North of Key West Avenue the name changes to Omega Drive.

Key West Avenue, also known as Maryland Route 28, is a six lane divided

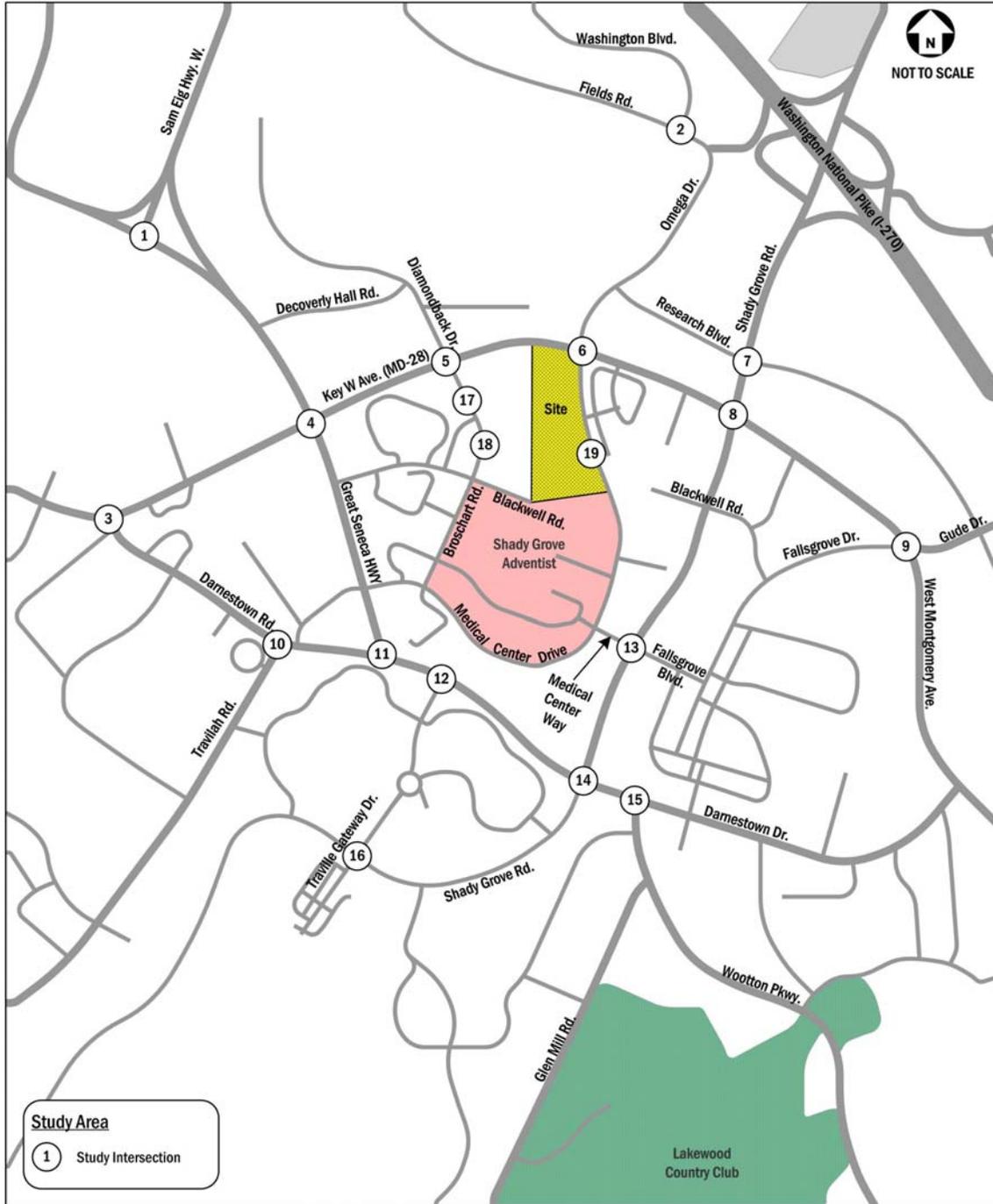


Figure 2 Johns Hopkins University Site Location Map

highway connecting Darnestown Road to the west with Shady Grove Road to the east. Left turn lanes are provided throughout the study area, with double left turn lanes at a few intersections including Medical Center Drive.

Broschart Road is a north-south four lane arterial that connects Key West Road and Medical Center Drive. Broschart provides direct access to the JHU Campus and the name changes to Diamondback Drive north of Key West Avenue.

Darnestown Road is a four to six lane median divided arterial that runs east-west through the study area. Darnestown Road is also designated as Maryland Route 28. The posted speed limit is 40 mph.

Shady Grove Road is a north-south six lane arterial with left turn lanes. The road connects Falls Grove Road and Key West Avenue to I-270. The posted speed limit is 40 mph.

Great Seneca Highway is a four lane median divided highway that extends north from Darnestown Road through the study area. Great Seneca Highway is designated as Maryland Route 119.

2.2.2 Study Area Intersections

The following key intersections were analyzed in this study:

1. Great Seneca Highway and Sam Eig Highway
2. Fields Road and Omega Drive and Washingtonian Boulevard
3. Key West Avenue and Darnestown Road
4. Key West Avenue and Great Seneca Highway
5. Key West Avenue and Broschart Drive/Diamondback Drive
6. Key West Avenue and Omega Drive/Medical Center Drive
7. Research Boulevard and Shady Grove Road
8. Key West Avenue and Shady Grove Road
9. Key West Avenue and West Gude Drive/Falls Grove Drive
10. Darnestown Road and Travilah Road
11. Darnestown Road and Great Seneca Highway

12. Darnestown Road and Traville Gateway Drive
13. Medical Center Way and Falls Grove Boulevard and Shady Grove Road
14. Darnestown Road and Shady Grove Road
15. Darnestown Road and Glen Mill Road
16. Shady Grove Road and Traville Gateway Drive

Existing intersection lane configurations and traffic control devices at the study intersections are shown on Figures 3a and 3b.

2.2.3 Existing Conditions: Pedestrians and Transit

As JHU is in a suburban location, few pedestrians were observed in the morning and afternoon peak hours at the study intersections. Adjacent to the site, sidewalks are located on both sides of Medical Center Drive and Broschart Road. With the exception of the westbound Key West Avenue approach, crosswalks and pedestrian signals are provided at each approach at the Key West Avenue intersections with Broschart Road/Diamondback Drive and with Omega Drive/Medical Center Drive. A pedestrian network exists around the JHU campus, Life Sciences Center and Shady Grove Hospital connecting to the Ride-On bus lines.

The JHU campus is served by Montgomery County's Ride-On Lines 43, 56, 66 and 74. Lines 43 and 66 travel along Medical Center Drive through the study area. Line 74 runs along Key West Avenue and Omega Drive, and Line 56 traverses Darnestown Road and through hospital to Shady Grove Road. Lines 43, 66, and 74 connect to the Shady Grove MetroRail station. Figure 4 shows the area transit network for the JHU campus.

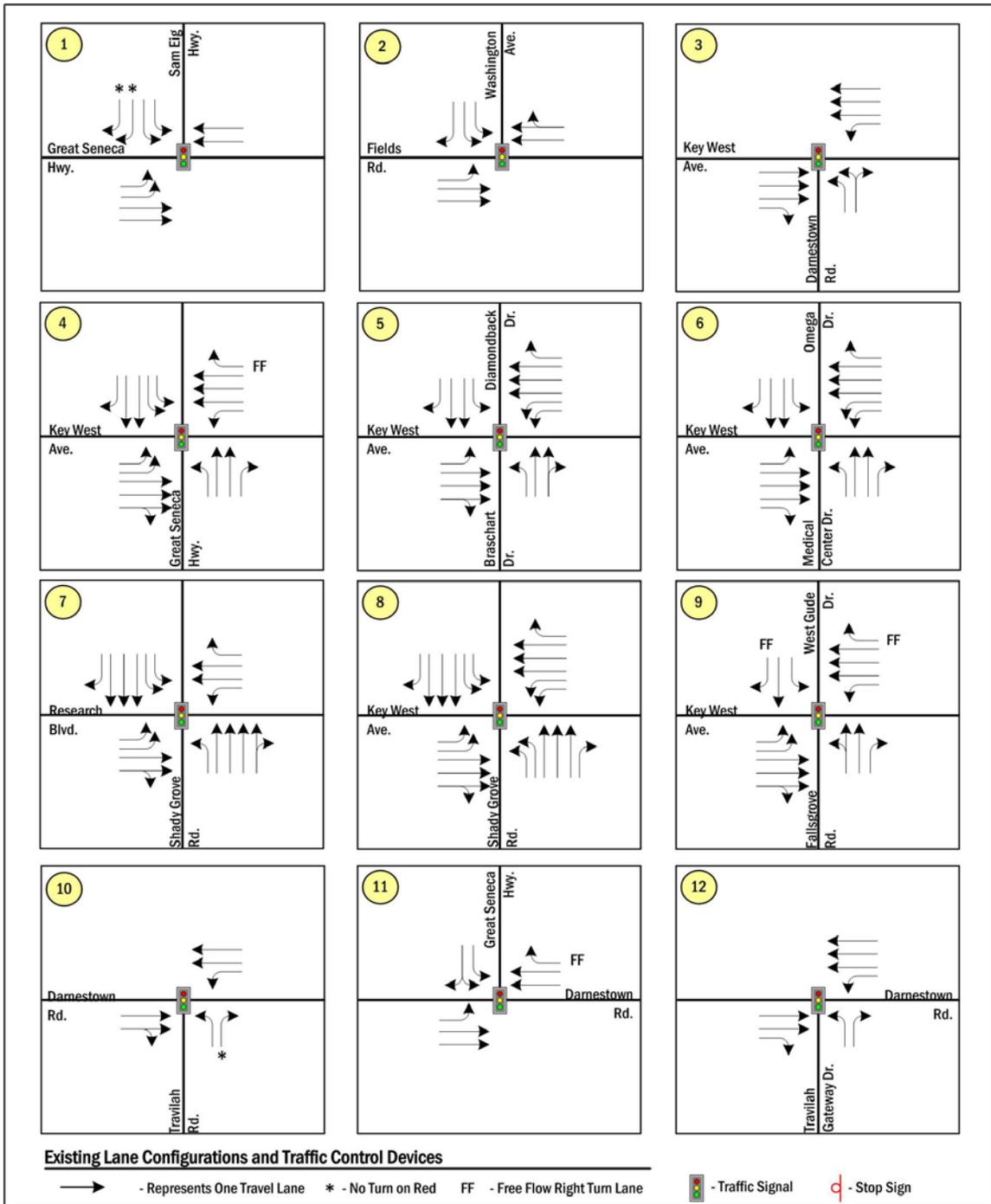


Figure 3a Site 1 Existing Lane Configuration and Traffic Control Devices

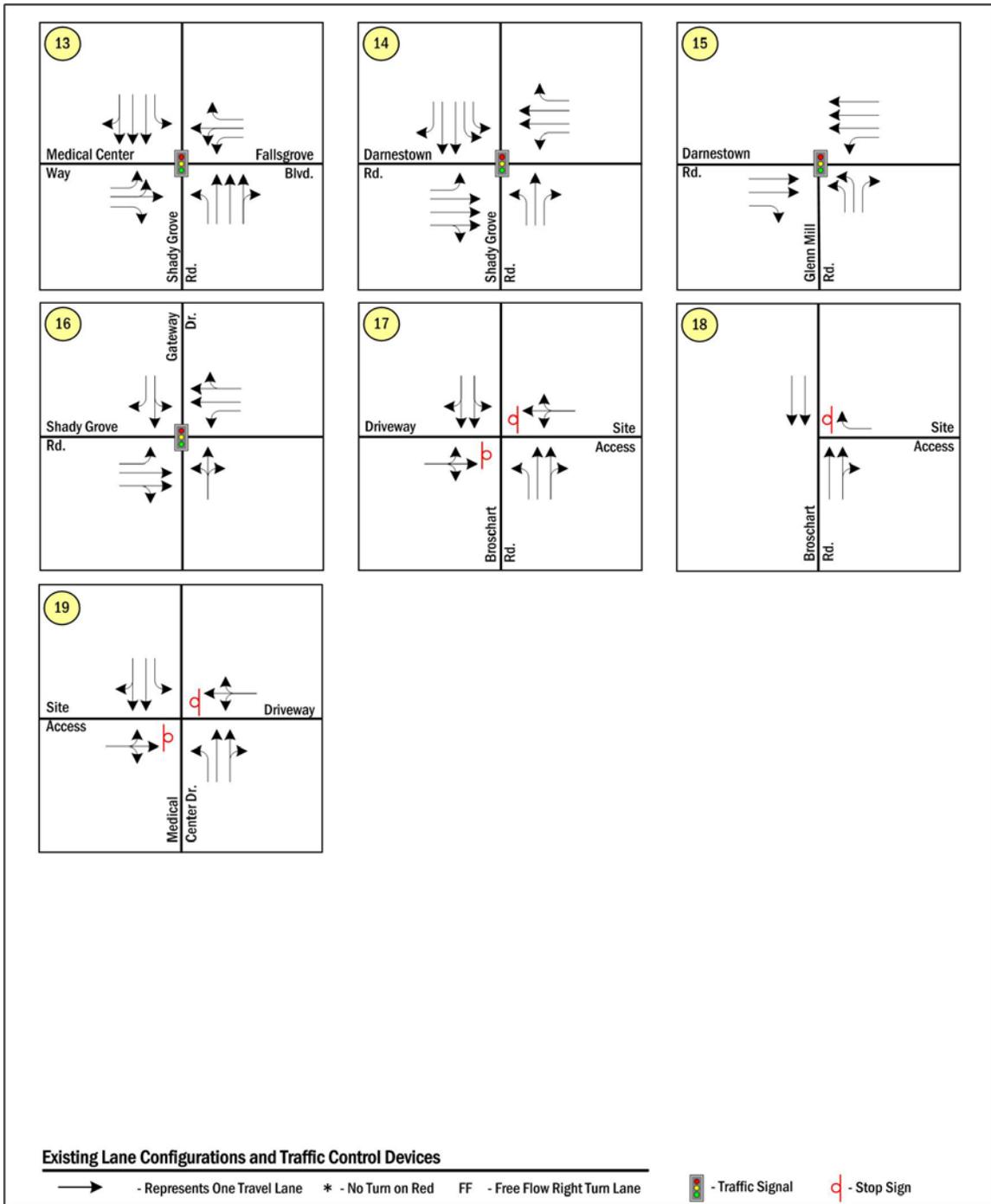


Figure 3b Site 1 Existing Lane Configurations and Traffic Control Devices

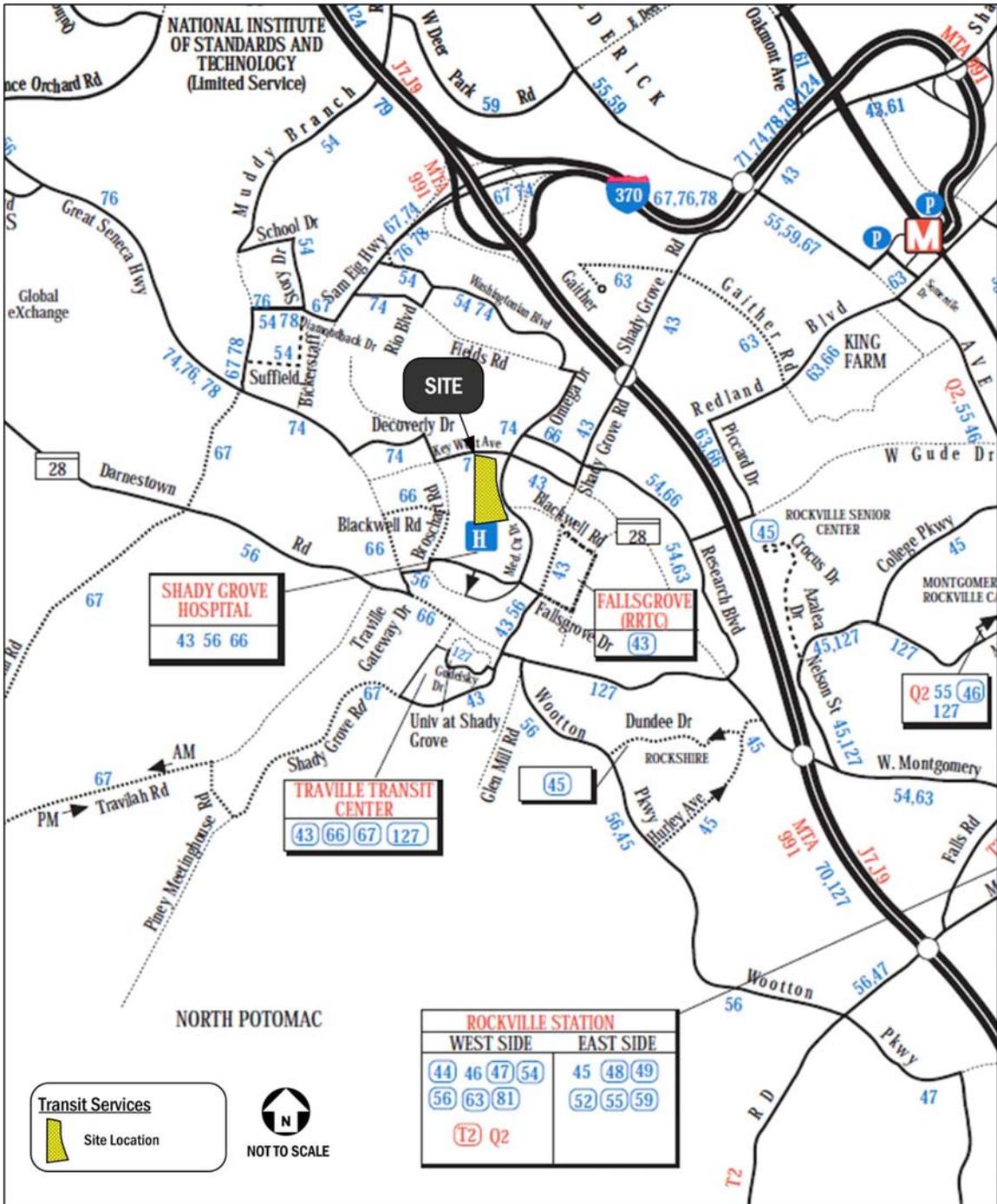


Figure 4 Site 1 Area Transit Network

2.2.4 Base Capacity Analysis

Turning movement counts were conducted at the study intersections by Wells and Associates on Tuesday, June 6, 2006 between the hours of 6:30 to 9:30 a.m. and 4:00 to 7:00 p.m. Driveway counts for the JHU campus were conducted on Thursday, November 17, 2005, also from 6:30 to 9:30 a.m. and 4:00 to 7:00 p.m. Both counts were conducted during non-holiday weeks while school was in session as required by LATR guidelines.

The peak hours of the driveways occurred from 9:15 a.m. to 10:15 a.m. in the morning and 5:45 p.m. to 6:45 p.m. during the afternoon. For the off-site study intersections, the morning peak occurred from 8:00 a.m. to 9:00 a.m. and in the afternoon from 5:00 p.m. to 6:00 p.m. The base morning and evening peak hour volumes at the sixteen (16) study intersections that were used for this report are shown in Figures 5a and 5b.

Based on these volumes and other collected information, the capacity of the intersections was evaluated for both the weekday morning and afternoon peak hours, using the Critical Lane Analysis Technique, as stipulated by the Montgomery County Local Area Transportation Review (LATR) Guidelines (M-NCPPC, 2008). The Critical Lane Analysis outputs an intersection Critical Lane Volume (CLV) which is then compared against the CLV standard¹ for that jurisdiction. The capacity analysis worksheets are included in the Appendix A-1.

The base conditions capacity analysis results show that all study area intersections and campus access points operate within the applicable CLV standards.

¹ CLV Standard – refers to the maximum acceptable critical lane volume threshold for a given intersection established by M-NCPPC Transportation Planning Division staff.

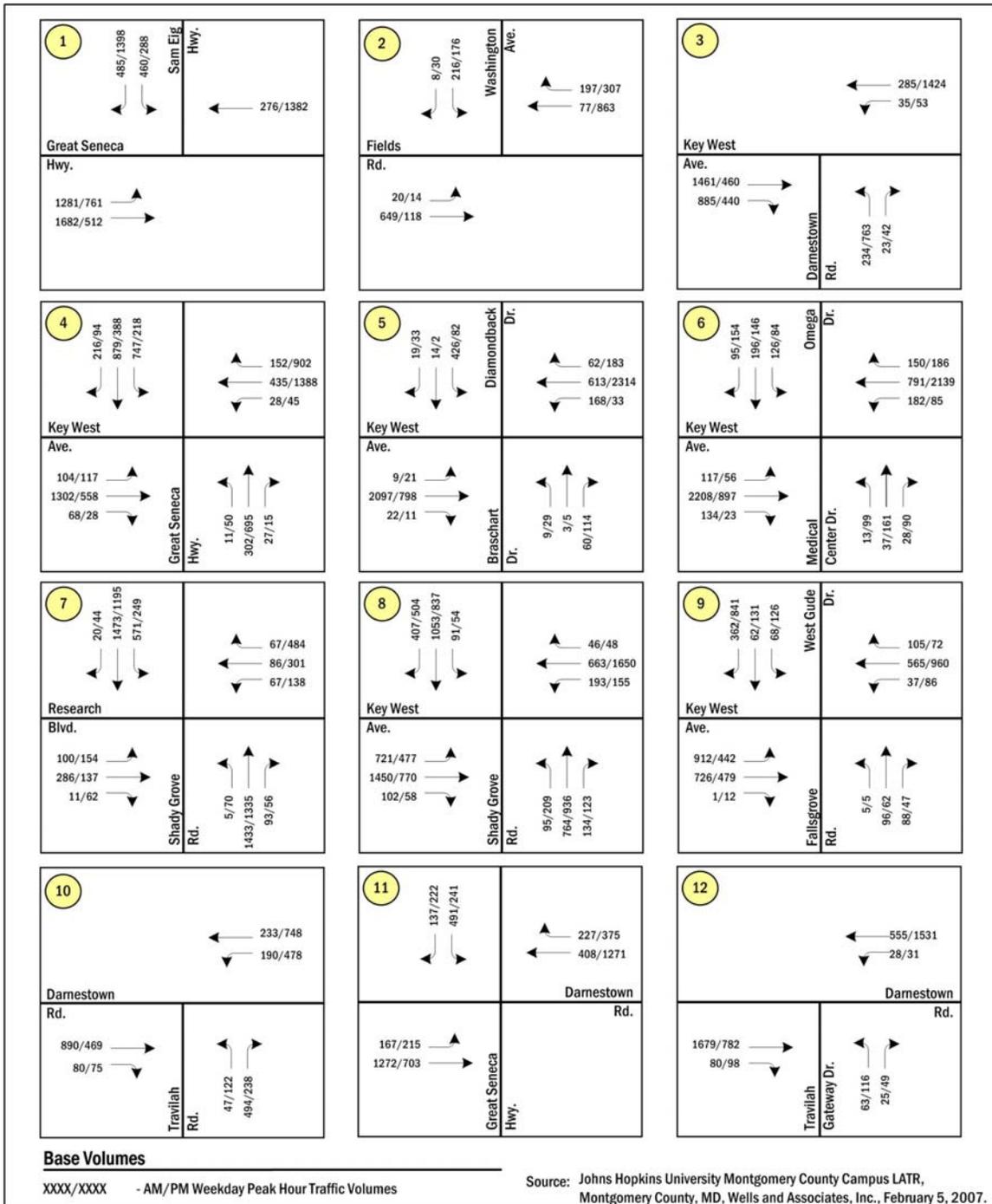


Figure 5a Site 1 Existing Peak Hour Traffic Volumes

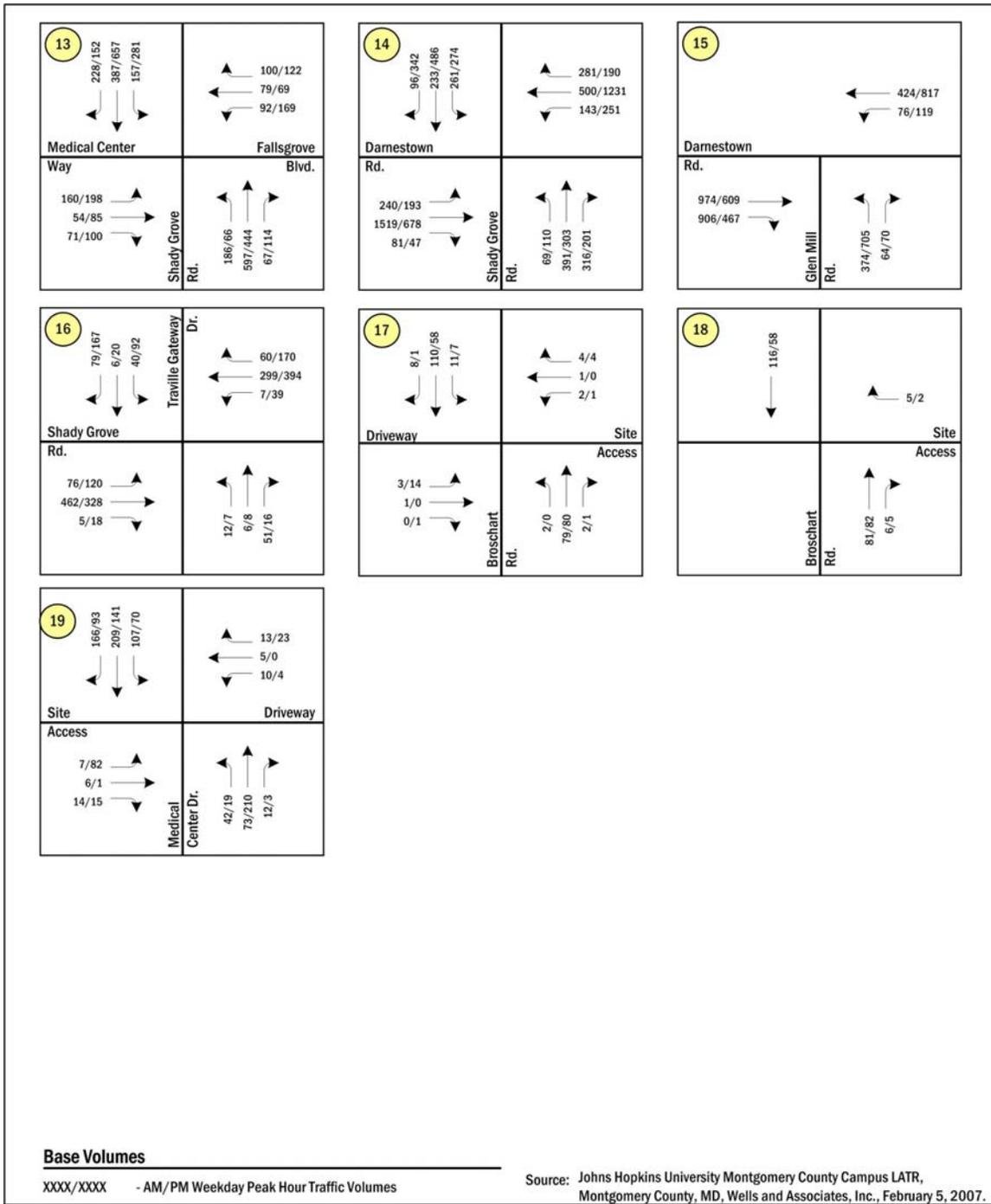


Figure 5b Existing Peak Hour Traffic Volumes

2.3 Future Conditions without Development (Year 2012)

The Future Background scenario represents future traffic levels in 2012 without the proposed development on the JHU campus. This situation is the basis for comparative evaluation of the Total Future conditions. In order to develop the background traffic forecasts, the base traffic and traffic generated by planned area developments (anticipated to be built by year 2012) were combined.

2.3.1 Background Developments

The planned developments considered in the traffic forecasts were identified by the M-NCPPC Transportation Planning Division staff as a part of the study scoping process outlined in the Wells and Associates report for the JHU campus. Seven background projects have been identified as approved, yet un-built projects, reasonably assumed to be completed by Fall 2012, which is the build-out year for the NCI project. County staff has confirmed that these background projects remain valid and no additional projects are required for this analysis. The projects are as follows:

1. Traveille Research and Development
2. Johns Hopkins Research Campus
3. Avalon at Decoverly
4. Travilah Quarry
5. Decoverly Hall Parcel "S"
6. Shady Grove Hospital Addition
7. Danac's Stiles Property

The LATR notes that peak hour trip estimates for planned land uses should be based on trip rates and formulas provided in Appendix A of the LATR document, if applicable. Trip rates for other land uses not included in the LATR Guidelines can be obtained from the 8th Edition of the Trip Generation Manual published by the Institute of Transportation Engineers (ITE).² The User's Guide of this Manual states that the trip rates provided were derived from surveys undertaken at "suburban locations having little or no transit service, nearby pedestrian amenities or travel demand management (TDM) programs". The Guide also advises that the trip rates should be supplemented with locally derived data, when practical.

² "Local Area Transportation Review Guidelines", M-NCPPC, July 2008, Page 33.

Approximately 2,723 trips are forecasts for the morning peak hour and 2,599 trips for the afternoon peak hour. Table 1 shows the anticipated trip generation for the background developments. Figure 6 shows the location of these developments.

Table 1 – Site 1 Background Trip Generation

#	Land Use	ITE Land Use Code or LATR Code	Size	Units	AM Peak In Trips	AM Peak Out Trips	AM Peak Total Trips	PM Peak In Trips	PM Peak Out Trips	PM Peak Total Trips
1	Traville Research & Development (1)	760	244,860	S.F	253	52	305	42	235	277
2	Johns Hopkins Research Campus (1)	760	1,227,502	S.F.	1,046	214	1,260	159	898	1,057
3	Avalon at Decoverly (2)	Mid-Rise Apartment	168	D.U.	14	56	70	53	27	80
4	Travilah Quarry (2)	Office	40,000	S.F.	52	8	60	13	65	78
5	Decoverly Hall Parcel "S" (2)	Office	234,200	S.F.	339	51	390	61	296	357
6	Shady Grove Hospital Addition (1)	720	203,262	S.F.	398	106	504	164	445	609
7	Danac's Stiles Property(2)	Office	83,738	S.F.	117	17	134	24	117	141
				Total	2,219	504	2,723	516	2,083	2,599

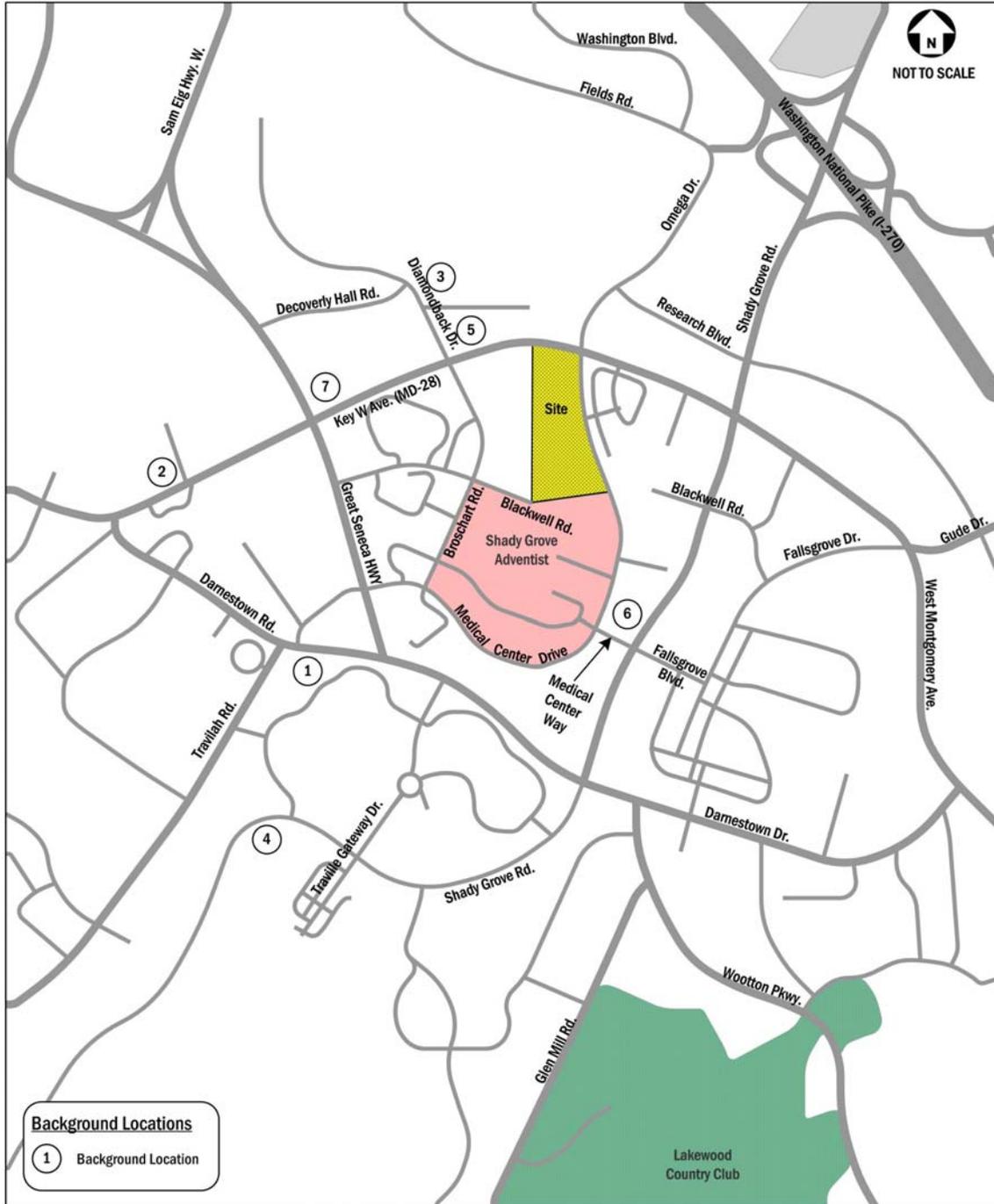


Figure 6 Site 1 Location of Background Developments

2.3.2 Future Background Traffic Forecast

Future Background traffic forecasts are developed based on a composite of base traffic counts and impacts from other future area developments approved, but not yet built.

The volumes derived from the background developments were then distributed throughout the transportation network through the study intersections. The directional distribution of new trips generated by the future background developments was derived from LATR Guidelines (July 2008), Appendix E, Table E -1 of the LATR document. The resulting background development distribution at each study intersection is displayed in Figures 7a and 7b.

2.3.3 Future Background Capacity Analysis

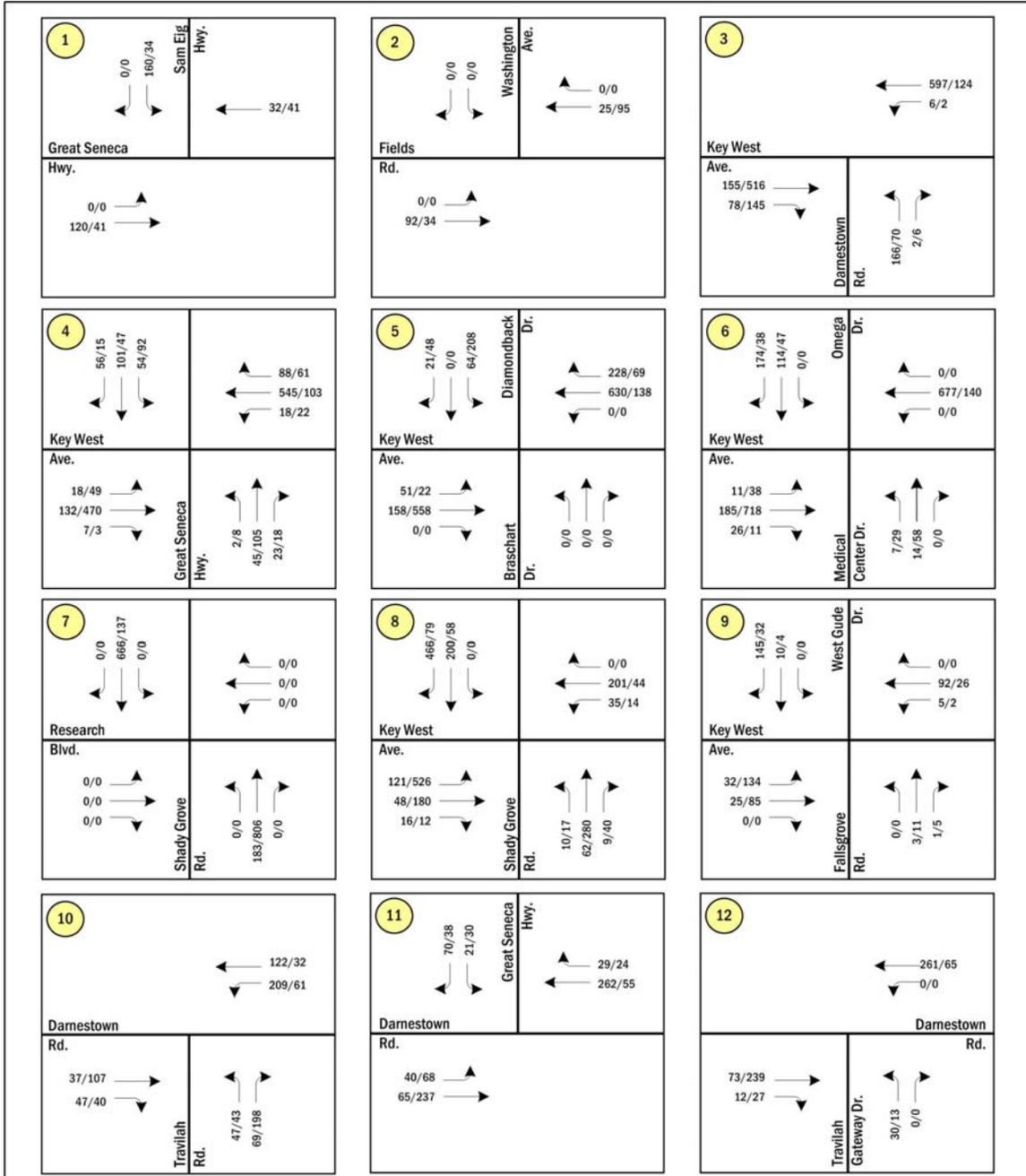
In order to obtain the future background volumes, the base volumes were combined with background development distribution. The future background volumes for the morning and afternoon peak hours at each intersection are presented in Figures 8a and 8b. These volumes were evaluated using the Critical Lane Analysis Technique as previously described. The capacity analysis results are summarized in Tables 2a and 2b, and the capacity analysis worksheets are included in the Appendix A-2.

The future background capacity analysis results show that all study area intersections and campus access points operate within the applicable CLV standards in the morning and afternoon peak hours except for the following:

- Great Seneca Highway and Sam Eig Highway (p.m. peak hour only), and
- Key West Avenue and Shady Grove Road (p.m. peak hour only)

2.4 Analysis of Future Conditions with Development (Year 2012)

The Total Future scenario represents future traffic levels in 2012 with the proposed development on the JHU campus. This scenario is compared to the Future Background scenario to determine the incremental impact of the proposed development. In order to develop the Total Future forecasts, the Future Background volumes and the project trip volumes are combined.



Background Trip Distribution

XXXX/XXXX - AM/PM Weekday Peak Hour Traffic Volumes

Source: Johns Hopkins University Montgomery County Campus LATR, Montgomery County, MD, Wells and Associates, Inc., February 5, 2007.

Figure 7a Site 1 Background Trip Distribution

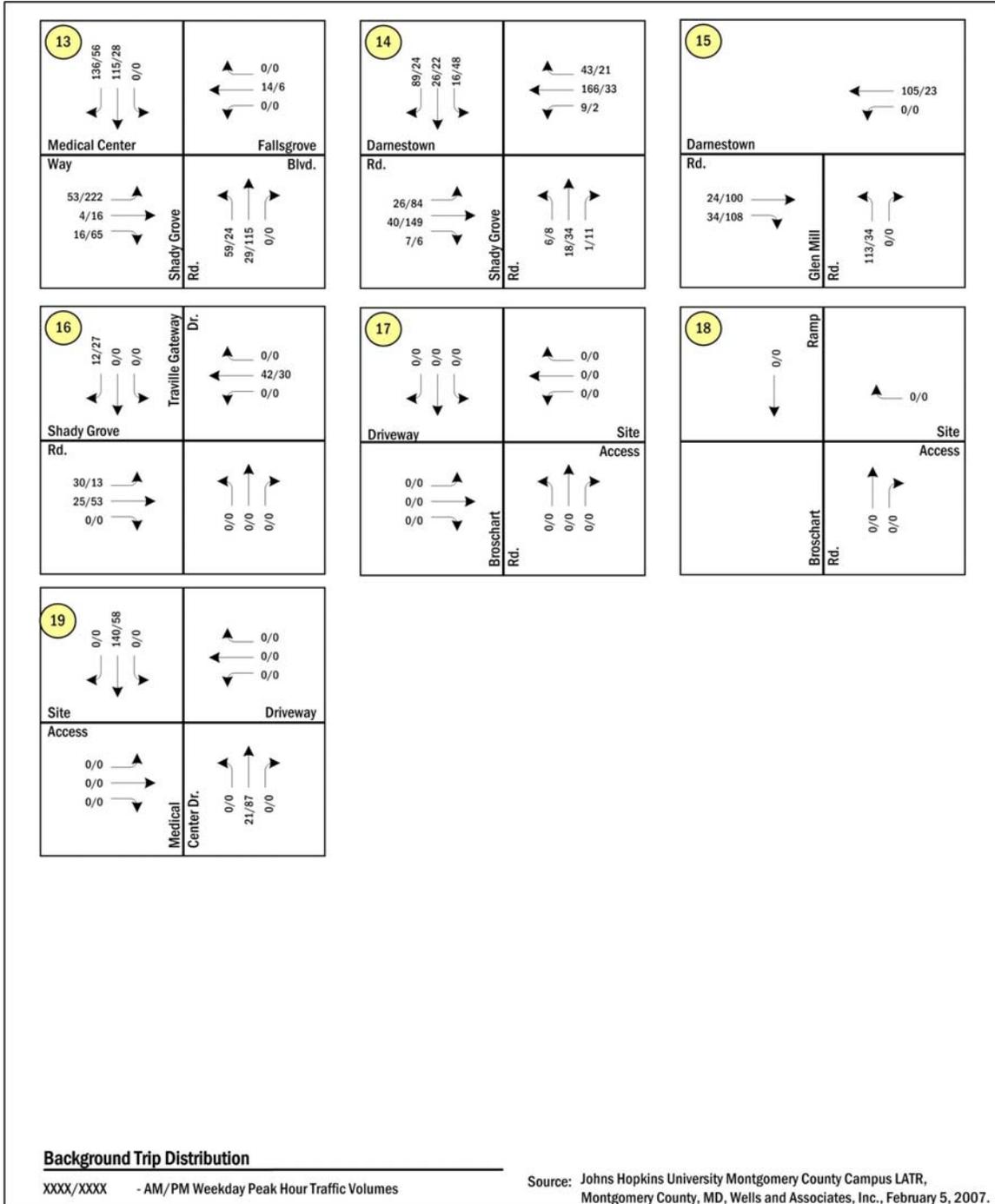


Figure 7b Site 1 Background Trip Distribution

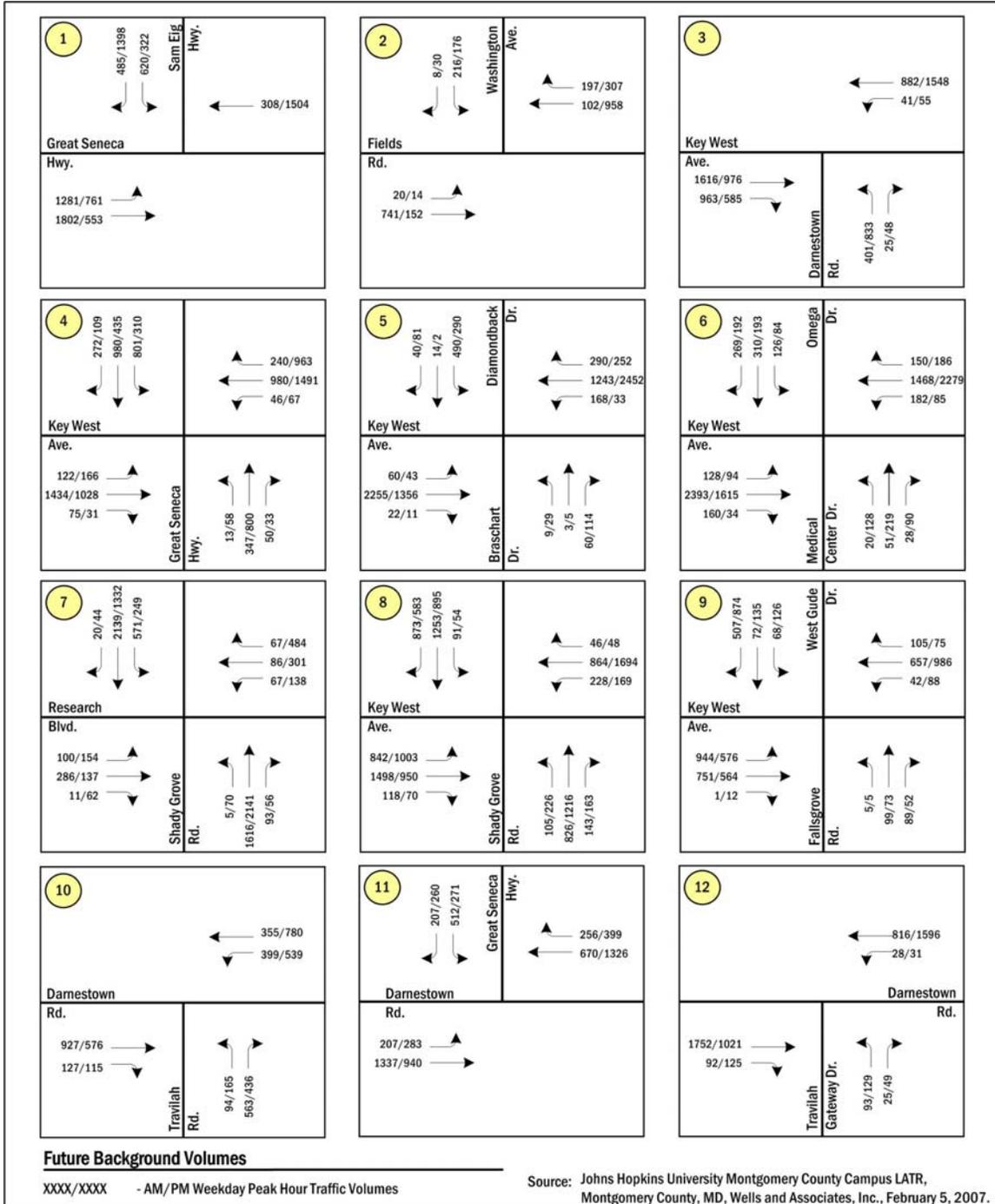


Figure 8a Site 1 Future Background Peak Hour Traffic Volumes

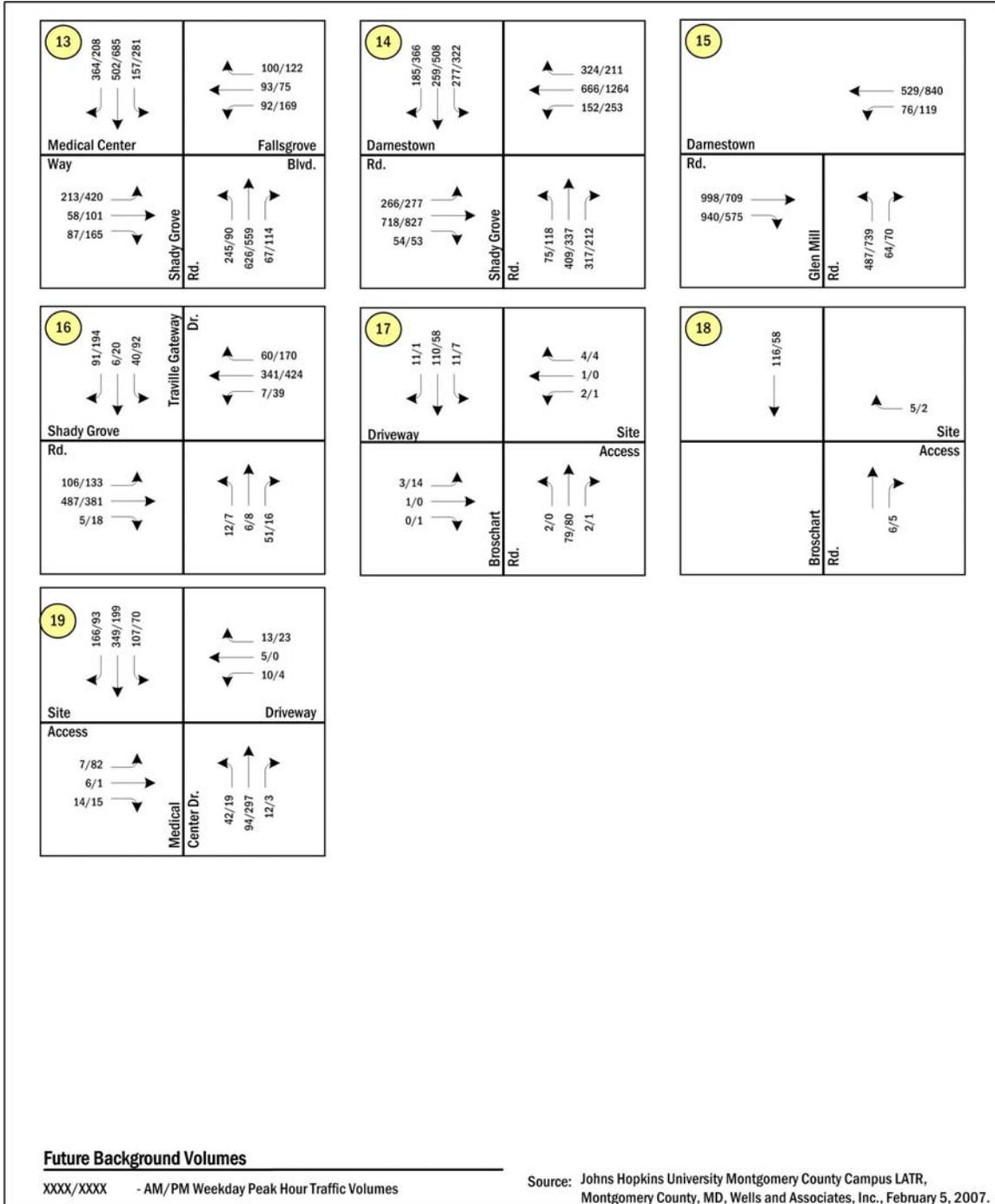


Figure 8b Site 1 Future Background Peak Hour Traffic Volumes

2.4.1 Project Trip Generation

Although all three prospective sites are in varying locations, the trip generation is consistent throughout each site analysis. The LATR notes that peak hour trip estimates for planned land uses should be based on trip rates and formulas provided in Appendix A of the LATR document, if applicable. For this analysis, rates for “General Office over 25,000 sf gross leasable area” will be used for each site. From page 49 of the 2008 LATR:

$$\text{AM: } T = 1.70 (A) - 8$$

$$\text{PM: } T = 1.44 (A) + 20$$

Where T = weekday peak hour vehicle trips and A = gross floor area of building in 1,000sf, therefore,

$$\text{AM: } T = 1.7 (550) - 8 = 927 \text{ trips}$$

$$\text{PM: } T = 1.44 (550) + 20 = 812 \text{ trips}$$

The LATR guidelines also give directional distribution to abide by. In the morning peak hour, 87% (807 trips) are inbound and 13% (120) are outbound. In the afternoon peak hour, 17% (138) are inbound and 83% (674) are outbound.

2.4.2 Project Trip Distribution

The Trip Distribution and Traffic Assignment Guidelines in the LATR were used for the distribution of peak hour trips for the JHU site. Distribution percentages are as follows:

To/From	Via	Percent
North	Sam Eig Highway	4%
North	Fields Road	13%
North and East	Shady Grove Road	39%
East	Gude Drive	8%
South and East	Key West Avenue	8%
South	Glen Mill Road	5%
South	Shady Grove Road	3%
South and West	Travilah Road	3%
West	Darnestown Road	5%
West and North	Great Seneca Highway	12%
	Total	100%

Project trip distribution volumes are shown in Figures 9a and 9b.

2.4.3 Total Future Traffic Forecasts

In order to calculate the total future volumes, the future background traffic volumes were combined with the assigned site trips. Figures 10a and 10b show the total future peak hour traffic volumes.

2.4.4 Total Future Capacity Analysis

Based on the total future volumes and other field observations noted above, the capacity of the intersections was evaluated for both the weekday morning and afternoon peak hours, using the Critical Lane Analysis Technique, as was done for the base and future background traffic conditions. The capacity analysis results are summarized in Tables 2a and 2b. The capacity analysis worksheets are included in the Appendix A-3.

The capacity analysis results for total future conditions show that four (4) intersections would operate near or above the CLV standards. These include the following:

- Great Seneca Highway and Sam Eig Highway (p.m. peak hour only)
- Key West Avenue and Diamondback Drive (a.m. peak hour only)
- Key West Avenue and Shady Grove Road (p.m. peak hour only), and

- Darnestown Road and Shady Grove Road (p.m. peak hour only)

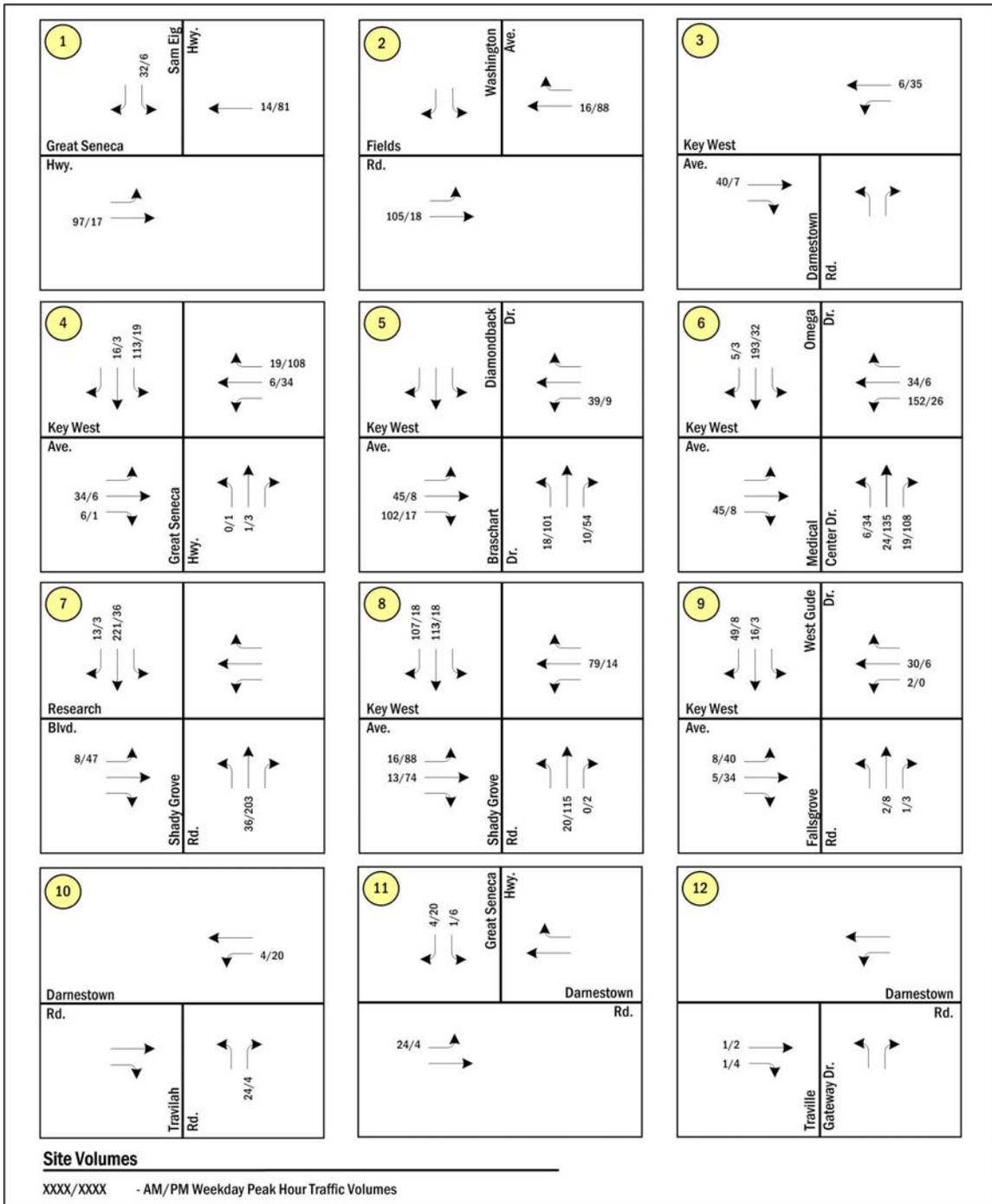


Figure 9a Site 1 Project Trip Distribution

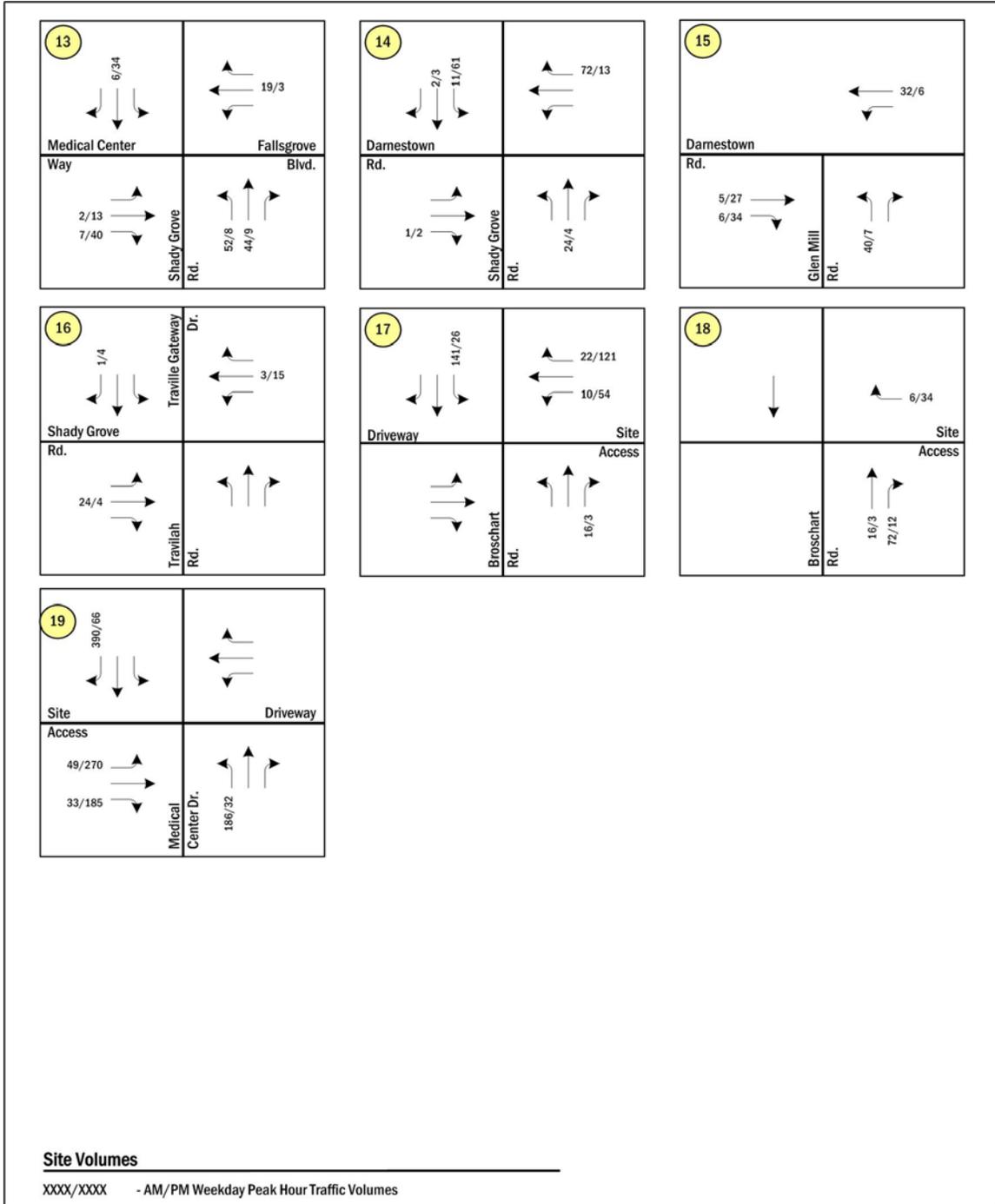


Figure 9b Site 1 Project Trip Distribution

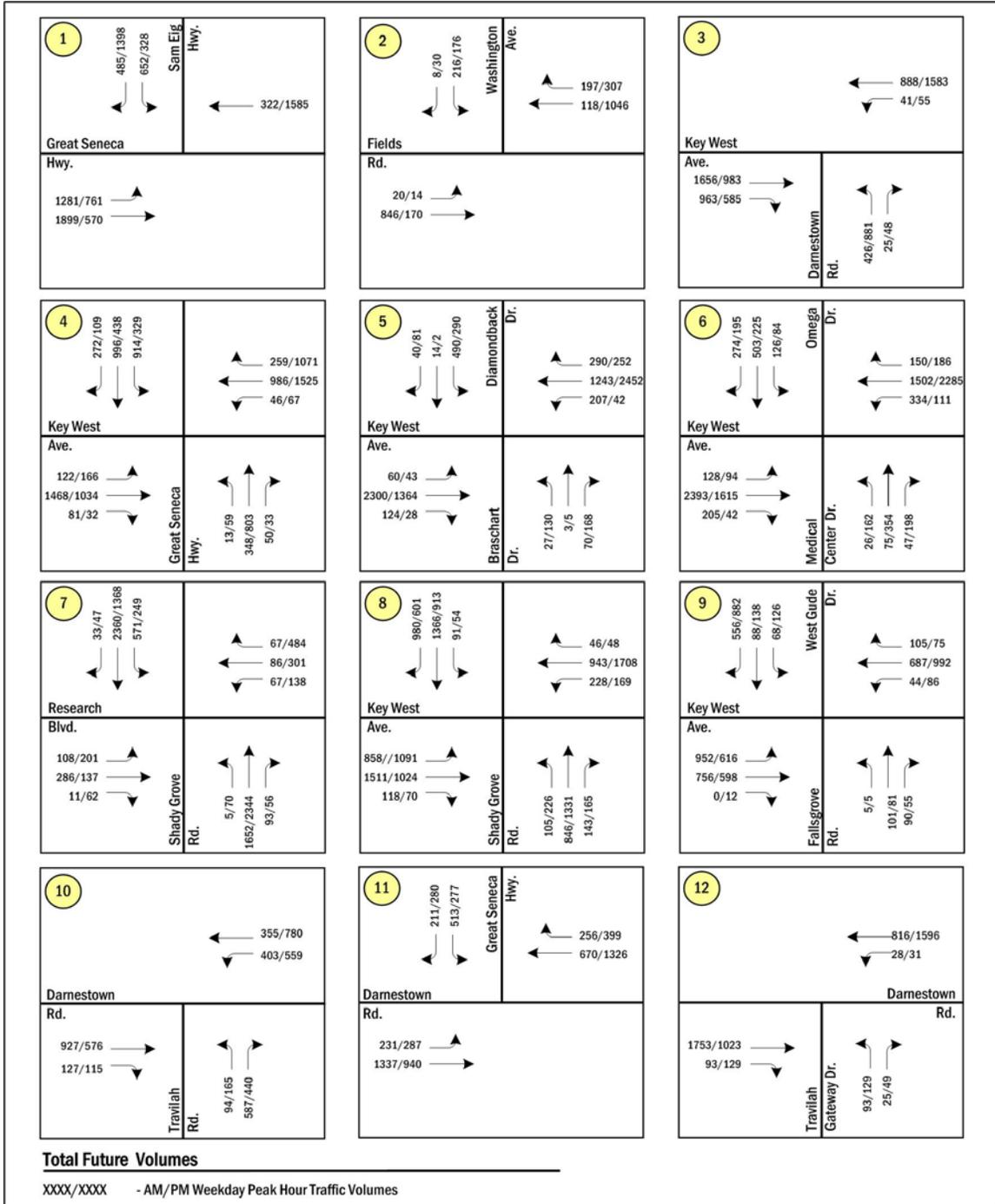


Figure 10a Site 1 Total Future Peak Hour Traffic Volumes

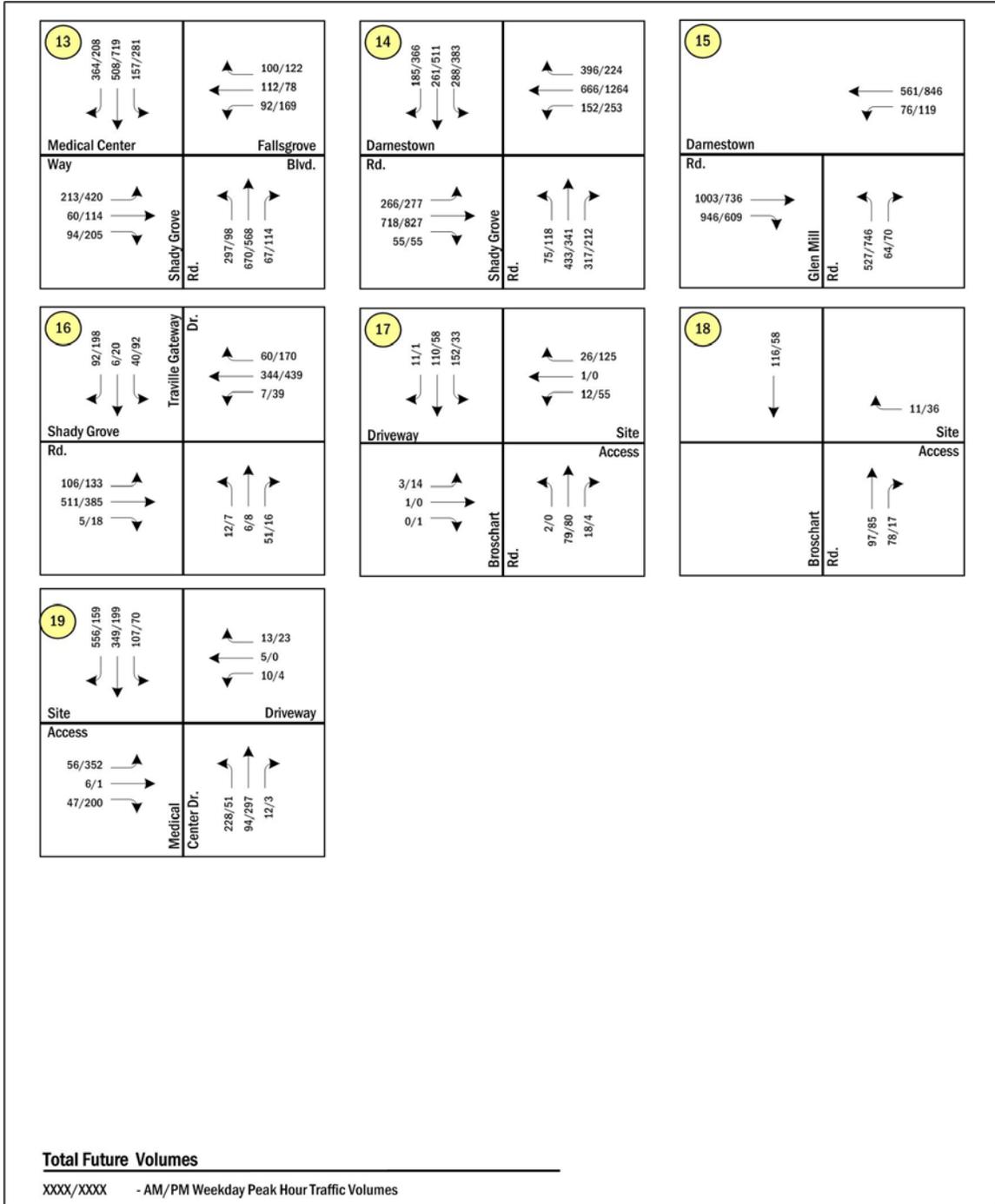


Figure 10b Site 1 Total Future Peak Hour Traffic Volumes

Table 2a – Site 1 Comparative CLV Results for Morning Peak Hour

#	Intersection	CLV Threshold	Existing	Background	Total Future
			AM	AM	AM
1	Great Seneca Highway and Sam Eig Highway *	1475	1135	1284	1352
	with improvements				1352
2	Fields Road and Omega Drive and Washingtonian Boulevard	1475	458	507	563
3	Key West Avenue and Darnestown Road	1475	1056	1230	1230
4	Key West Avenue and Great Seneca Highway	1475	1091	1213	1288
5	Key West Avenue and Broschart Drive/Diamondback Drive *	1475	1332	1455	1535
	with improvements				1232
6	Key West Avenue and Omega Drive/Medical Center Drive	1475	1059	1166	1355
7	Research Boulevard and Shady Grove Road	1475	985	1040	1103
8	Key West Avenue and Shady Grove Road *	1475	1116	1285	1365
	with improvements				1285
9	Key West Avenue and West Gude Drive and Fallsgrove Drive	1475	814	867	883
10	Darnestown Road and Travilah Road	1475	1008	1122	1146
11	Darnestown Road and Great Seneca Highway	1475	1007	1090	1092
12	Darnestown Road and Traville Gateway Drive	1475	981	1050	1050
13	Medical Center Way and Fallsgrove Boulevard and Shady Grove Road	1475	618	807	872
14	Darnestown Road and Shady Grove Road *	1475	1264	1175	1205
	with improvements				1174
15	Darnestown Road and Glen Mill Road	1475	790	863	887
16	Shady Grove Road and Traville Gateway Drive	1475	375	428	429
17	Broschart Drive and Site Driveway	1475	80	82	245
18	Broschart Drive and Site Driveway (RIRO)	1475	61	61	93
19	Medical Center Drive and Site Driveway	1475	278	352	827

Table 2b – Site 1 Comparative CLV Results for Evening Peak Hour

#	Intersection	CLV Threshold	Existing	Background	Total Future
			PM	PM	PM
1	Great Seneca Highway and Sam Eig Highway *	1475	1473	1538	1581
	with improvements				1327
2	Fields Road and Omega Drive and Washingtonian Boulevard	1475	727	778	824
3	Key West Avenue and Darnestown Road	1475	954	1107	1107
4	Key West Avenue and Great Seneca Highway	1475	1059	1228	1252
5	Key West Avenue and Broschart Drive/Diamondback Drive *	1475	1022	1303	1332
	with improvements				1188
6	Key West Avenue and Omega Drive/Medical Center Drive	1475	1044	1168	1221
7	Research Boulevard and Shady Grove Road	1475	941	1225	1311
8	Key West Avenue and Shady Grove Road *	1475	1284	1637	1731
	with improvements				1557
9	Key West Avenue and West Gude Drive and Fallsgrave Drive	1475	751	837	865
10	Darnestown Road and Travilah Road	1475	888	1070	1090
11	Darnestown Road and Great Seneca Highway	1475	1134	1267	1285
12	Darnestown Road and Traville Gateway Drive	1475	682	720	720
13	Medical Center Way and Fallsgrave Boulevard and Shady Grove Road	1475	764	935	947
14	Darnestown Road and Shady Grove Road *	1475	1406	1553	1559
	with improvements				1432
15	Darnestown Road and Glen Mill Road	1475	815	886	904
16	Shady Grove Road and Traville Gateway Drive	1475	542	571	579
17	Broschart Drive and Site Driveway	1475	69	69	272
18	Broschart Drive and Site Driveway (RIRO)	1475	46	46	54
19	Medical Center Drive and Site Driveway	1475	292	338	798

2.4.5 Transportation Improvement Considerations

Of the 16 intersections analyzed, 12 are projected to operate in 2012 conditions with a CLV of less than 1,475 during both the weekday morning and afternoon peak hours. Mitigation measures for the remaining four intersections operating above the congestion standard are as follows:

1. Install an additional the westbound through lane on Great Seneca Highway at Sam Eig Highway, increasing from two lanes to three lanes.
2. At the Key West Avenue/Broschart Drive/Diamondback Drive intersection, adjust the traffic signal operation to a split-phase for the northbound and southbound approaches. Re-stripe southbound Diamondback Drive approach to include one left-turn lane, one through-left turn lane, one through lane and one-right turn lane.
3. Install a third left-turn lane for the eastbound approach at Key West Avenue onto northbound Shady Grove Road.
4. At the Darnestown Road/Shady Grove Road intersection, adjust the traffic signal operation to remove north-south split phasing and run split-phase operations for the eastbound and westbound approaches. Modify the westbound approach to change the southern through lane to a shared through left-turn lane.

These proposed improvements are illustrated in Figures 11a and 11b.

2.5 Site 1 Summary

This section of the report presents the results of the transportation conditions assessment prepared by Gorove/Slade Associates, Inc. for the Johns Hopkins University site. The highlights for this section of the report are summarized as follows:

- a) Direct access to the JHU campus is provided via Medical Center Drive and Broschart Drive. Key regional arterial roads include Key West Avenue to the north, Darnestown Road to the south, Shady Grove Road to the east and Great Seneca Highway to the west.
- b) A total of sixteen intersections were analyzed to determine the base traffic conditions in the vicinity of the campus. The analysis shows that all of the study intersections operate within the CLV threshold.
- c) Seven background projects have been identified as approved, but un-built projects expected to be complete in 2012.

- d) For future background conditions, 14 intersections operate at CLV of less than 1,475. The following intersections operate above the 1,475 CLV congestion standard: Great Seneca Highway and Sam Eig Highway (p.m. peak hour only), and Key West Avenue and Shady Grove Road (p.m. peak hour only).
- e) Projected trip generation using the LATR 2008 guidelines for 550,000 sf of general office uses consists of approximately 927 trips (807 in and 120 out) in the morning peak hour and 812 trips (138 in and 674 out) in the afternoon peak hour.
- f) Total future conditions result in four intersections that operate with a CLV over the threshold of 1,475 in the morning or afternoon peak hours. Mitigation measures would reduce the impact at these intersections to acceptable levels and include the following:
 - 1. Install an additional the westbound through lane on Great Seneca Highway at Sam Eig Highway, increasing from two lanes to three lanes.
 - 2. At the Key West Avenue/Broschart Drive/Diamondback Drive intersection, adjust the traffic signal operation to a split-phase for the northbound and southbound approaches. Re-stripe southbound Diamondback Drive approach to include one left-turn lane, one through-left turn lane, one through lane and one-right turn lane.
 - 3. Install a third left-turn lane for the eastbound approach at Key West Avenue onto northbound Shady Grove Road.
 - 4. At the Darnestown Road/Shady Grove Road intersection, adjust the traffic signal operation to remove north-south split phasing and run split-phase operations for the eastbound and westbound approaches. Modify the westbound approach to change the southern through lane to a shared through left-turn lane.

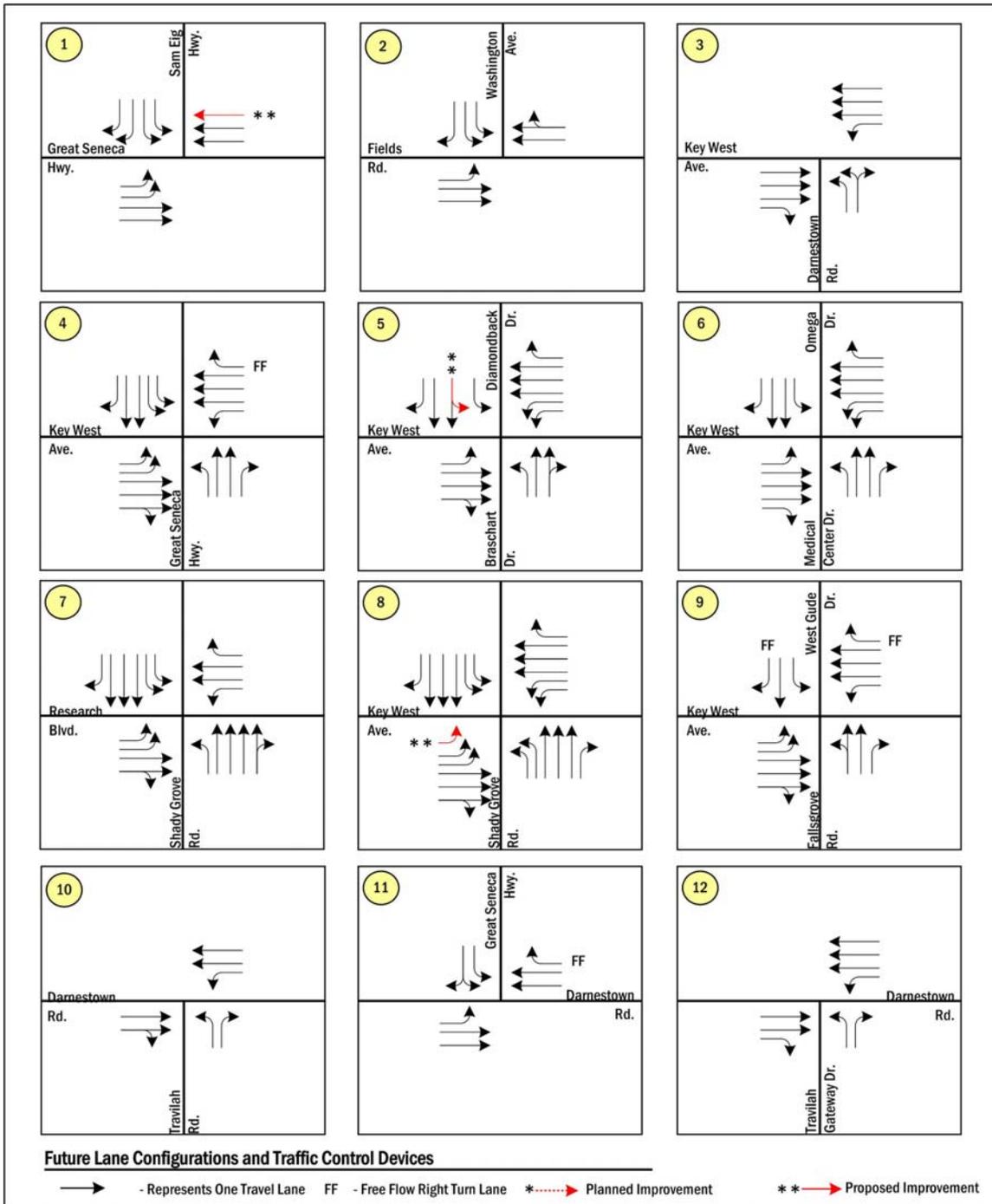


Figure 11a Site 1 Future Lane Configurations and Traffic Control Devices

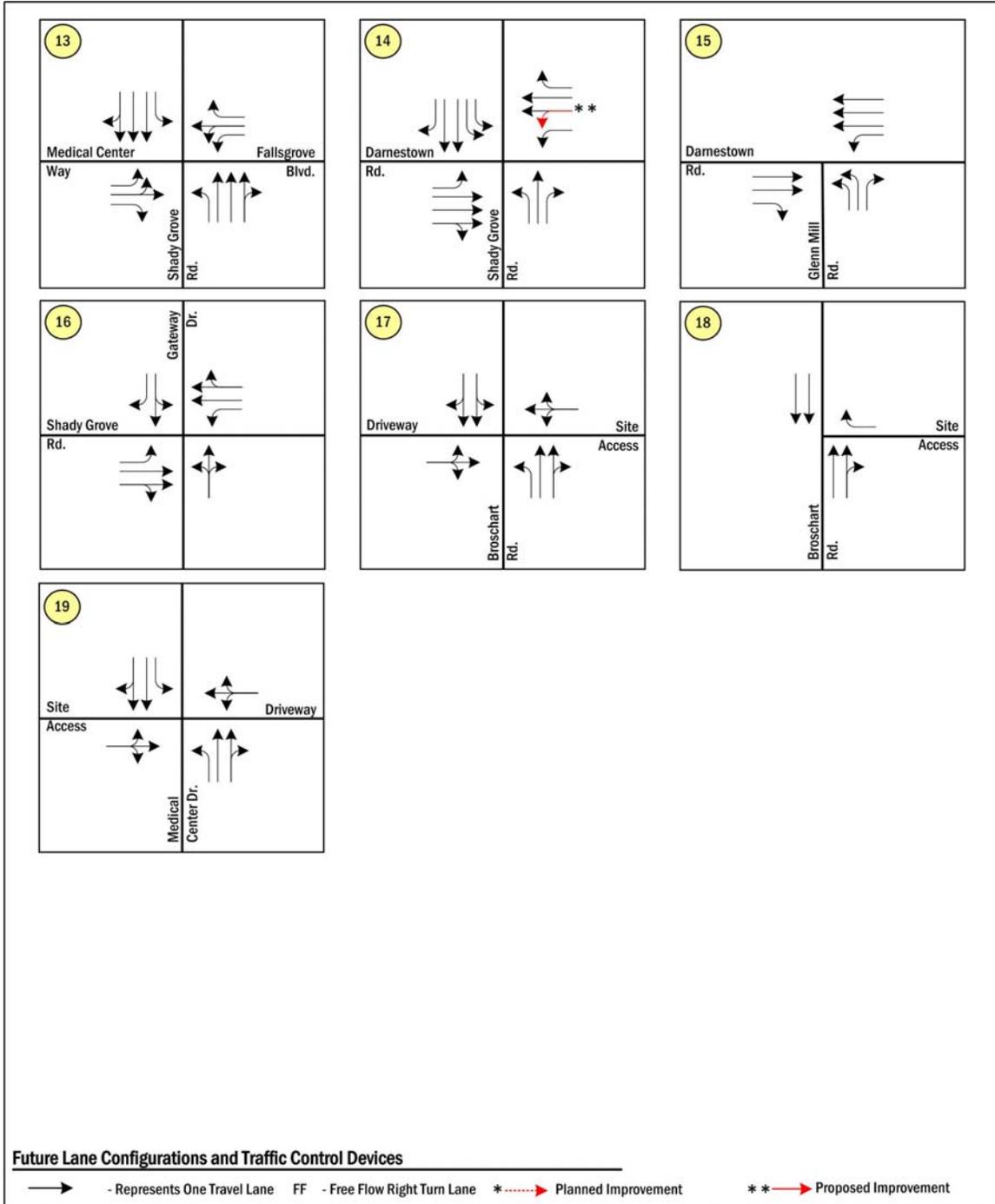


Figure 11b Site 1 Future Lane Configurations and Traffic Control Devices

3.0 Site 2: Tower Oaks

3.1 Introduction

This section of the report outlines the evaluation of the transportation elements of the prospective site at the Preserve at Tower Oaks. The site is located along Preserve Parkway between I-270 to the west and Woodmont Country Club to the east in Montgomery County, MD. The proposed campus would have direct access from Preserve Parkway between Wootton Parkway and Tower Oaks Boulevard.

3.2 Base Conditions

The base conditions of the Tower Oaks campus have been analyzed to identify existing constraints and opportunities that are present within the transportation network and to establish a point of reference for the analysis of future traffic conditions. This analysis is based on information from the following two reports:

- Preserve Parkway Regional Traffic Assessment, Montgomery County, MD, Wells and Associates, Inc., dated September 8, 2008.
- Revised and Updated Letter Report for Park Potomac, Montgomery County, MD, The Traffic Group, April 11, 2007.

3.2.1 Roadway Accessibility

Site 2 is located at the Preserve at Tower Oaks, south of Rockville in Montgomery County, MD. Regional access to the site is provided by I-270 approximately one-half mile to the south and arterials such as Montrose Road, Wootton Parkway and Tower Oaks Boulevard. Direct access to the site is available from Preserve Parkway. The roadway network providing both regional and local access to the campus is illustrated in Figure 12.

The principal roadways involved in this analysis include the following:

Preserve Parkway connects Tower Oaks Boulevard to the south and Wootton Parkway to the north, running in a northeast direction. The roadway is a four lane divided roadway which is classified as a Business District roadway by the City of Rockville and the posted speed limit is 30 mph.

Tower Oaks Boulevard is a four lane divided highway serves residential uses and has a posted speed limit of 35 mph. Tower Oaks Boulevard is classified as an Arterial Collector, running from Montrose Road from the south to Wootton Parkway to the north.

Wootton Parkway connects Darnestown Road to the west and Rockville Pike to the east. It is classified as a Major Arterial with a posted speed limit of 40 mph.



Figure 12 Tower Oaks Site Location Map

3.2.2 Study Area Intersections

The following key intersections were analyzed in this study:

1. Tower Oaks Boulevard and Wootton Parkway
2. Preserve Parkway and Wootton Parkway
3. Preserve Parkway and Clyde's Entrance/1 Preserve Parkway Entrance
4. Preserve Parkway and Driveway
5. Tower Oaks Boulevard and Preserve Parkway
6. Wootton Parkway and Henslowe Drive
7. Wootton Parkway and Seven Locks Road
8. Wootton Parkway and Edmonston Drive
9. Seven Locks Road and Fortune Terrace
10. Montrose Road and Whites Ford Way
11. Montrose Road and Seven Locks Road
12. Montrose Road and Tower Oaks Road
13. Tower Oaks Boulevard and I-270 NB Off and On Ramp
14. Montrose Road and Hitching Post Lane
15. Montrose Road and Farm Haven Drive.
16. Montrose Road and Park Potomac Access

Existing intersection lane configurations at the study intersections are shown in Figures 13a and 13b.

3.2.3 Existing Conditions: Pedestrians and Transit

Sidewalks, crosswalks and pedestrian signals are present on most of the streets in the study area. Pedestrian and bicycle counts were conducted on the same days as the vehicular counts. It was observed that minimal pedestrians and bicycles were present and counts concluded that no more than single digits were observed during any peak hour.

Two Montgomery County Transit Ride-On bus lines service the immediate area. Line 81 runs along Montrose Road, Tower Oaks Boulevard and Wootton Parkway in the study area. Line 38 runs along Montrose Road and Seven Locks Road through the study area. Figure 14 shows the area transit network for the Preserve at Tower Oaks site.

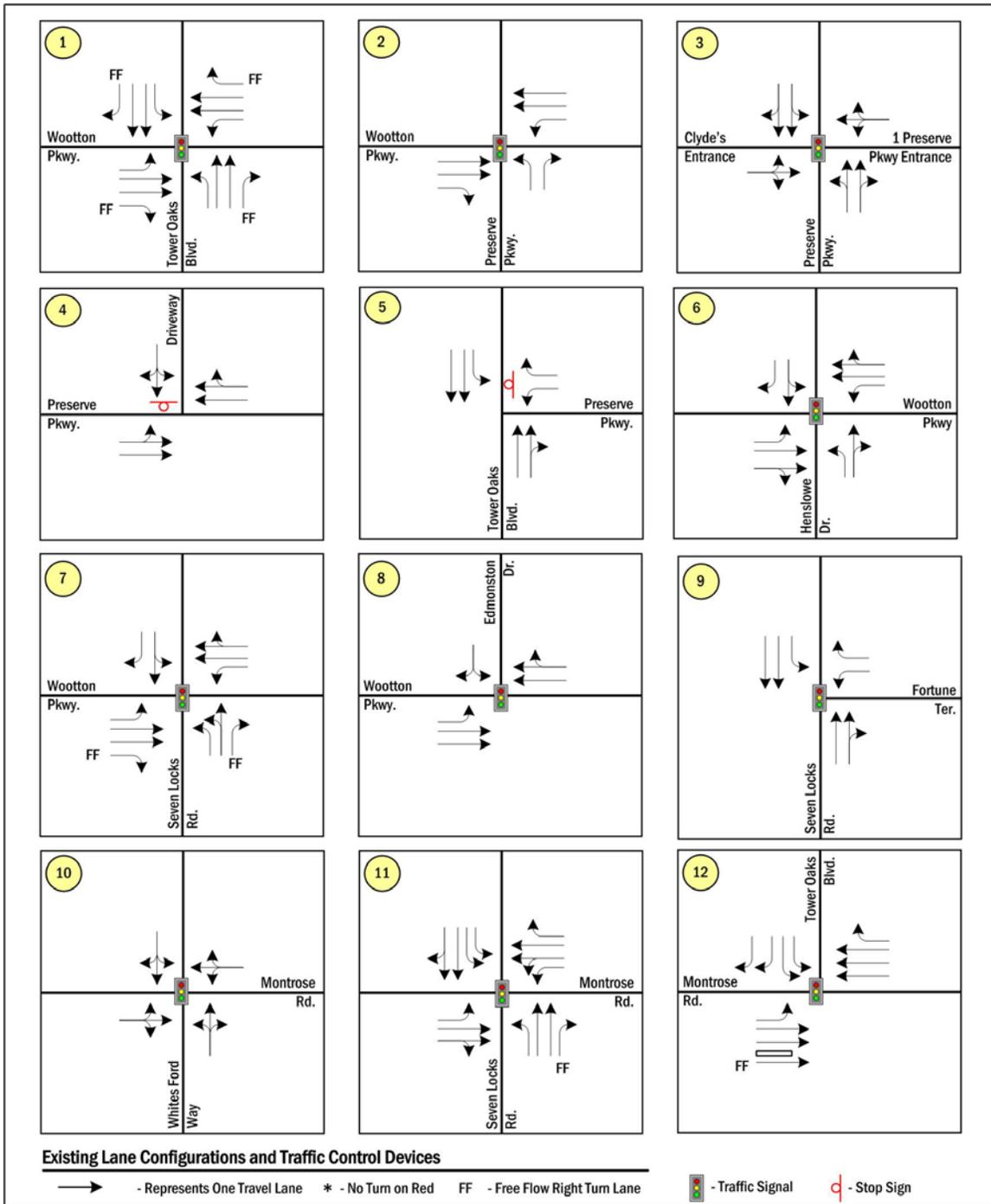


Figure 13a Site 2 Lane Configurations and Traffic Control Devices

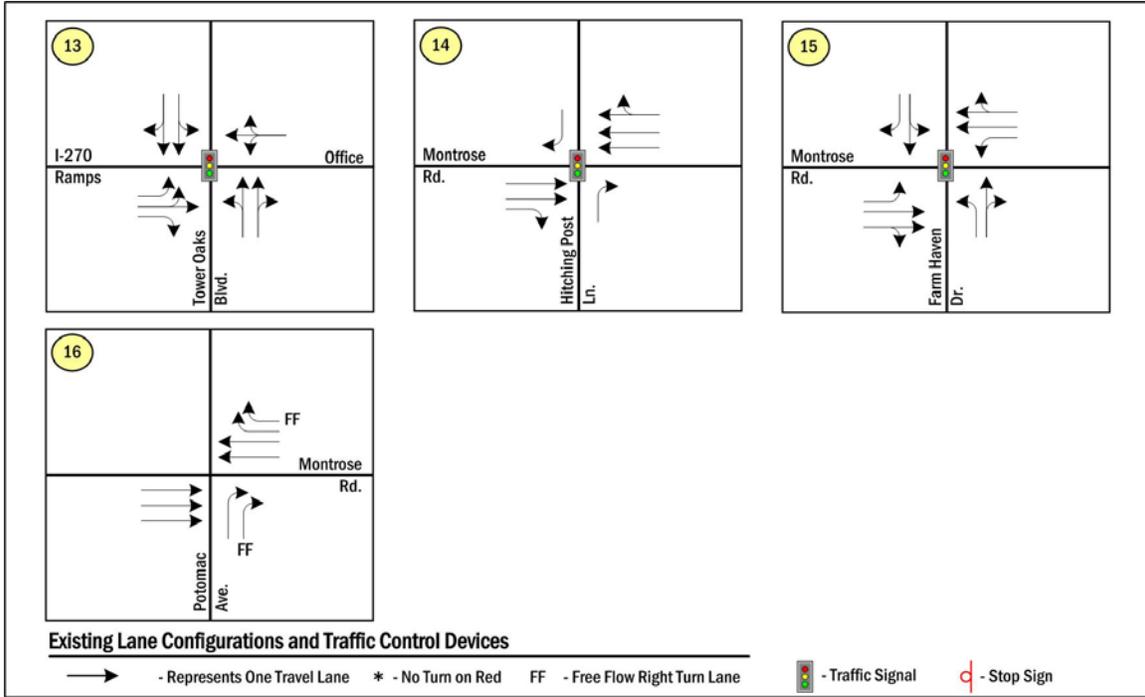


Figure 13b Site 2 Lane Configurations and Traffic Control Devices

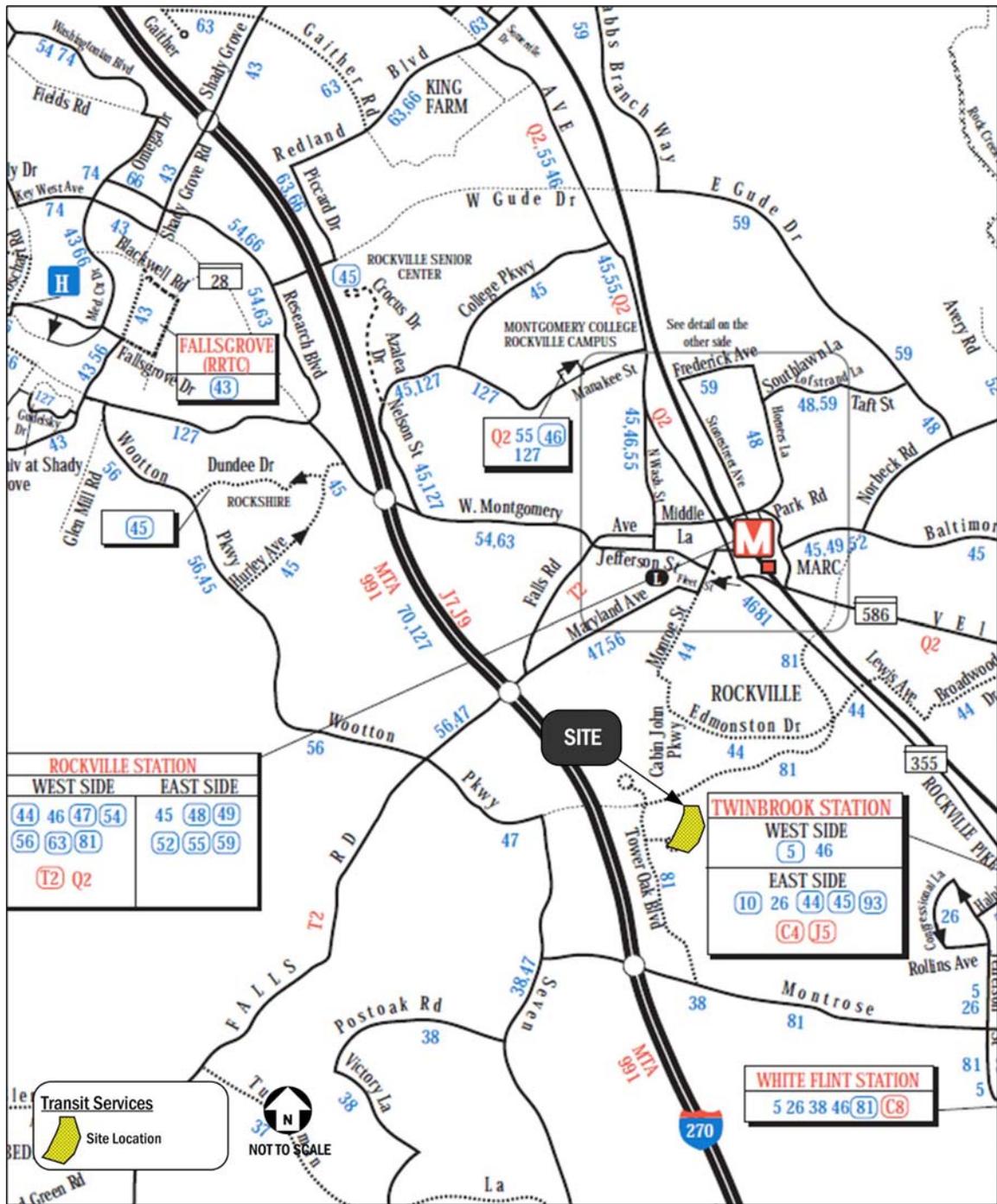


Figure 14 Site 2 Area Transit Network

3.2.4 Base Capacity Analysis

Turning movement counts were conducted by The Traffic Group at the study intersections between the hours of 6:30 to 9:30 a.m. and 4:00 to 7:00 p.m. in November 2006 and March 2007 while school was in session. Turning movement counts for four intersections were conducted by Wells and Associates on Thursday, May 22, 2008, between the hours of 6:00 a.m. to 7:00 p.m. in 15 minute increments. The base morning and evening peak hour volumes at the sixteen study intersections are shown in Figures 15a and 15b.

Based on these volumes and other collected information, the capacity of the intersections was evaluated for both the weekday morning and afternoon peak hours, using the Critical Lane Analysis Technique, as stipulated by the Montgomery County Local Area Transportation Review (LATR) Guidelines (M-NCPPC, 2008). The Critical Lane Analysis outputs an intersection Critical Lane Volume (CLV) which is then compared against the CLV standard³ for that jurisdiction. The capacity analysis worksheets are included in the Appendix B-1.

The base conditions capacity analysis results show that all study area intersections and campus access points operate within the applicable CLV standards.

3.3 Future Conditions without Development (Year 2012)

The Future Background situation represents future traffic levels in 2012 without the proposed development at the Preserve at Tower Oaks. This situation is the basis for comparative evaluation of the Total Future conditions. In order to develop the background traffic forecasts, the base traffic and traffic generated by planned area developments (anticipated to be built by year 2012) were combined. The background traffic situation also includes planned and programmed roadway improvements that can influence the capacity of study area intersections and/or influence travel route and time of day patterns.

³ CLV Standard – refers to the maximum acceptable critical lane volume threshold for a given intersection established by M-NCPPC Transportation Planning Division staff.

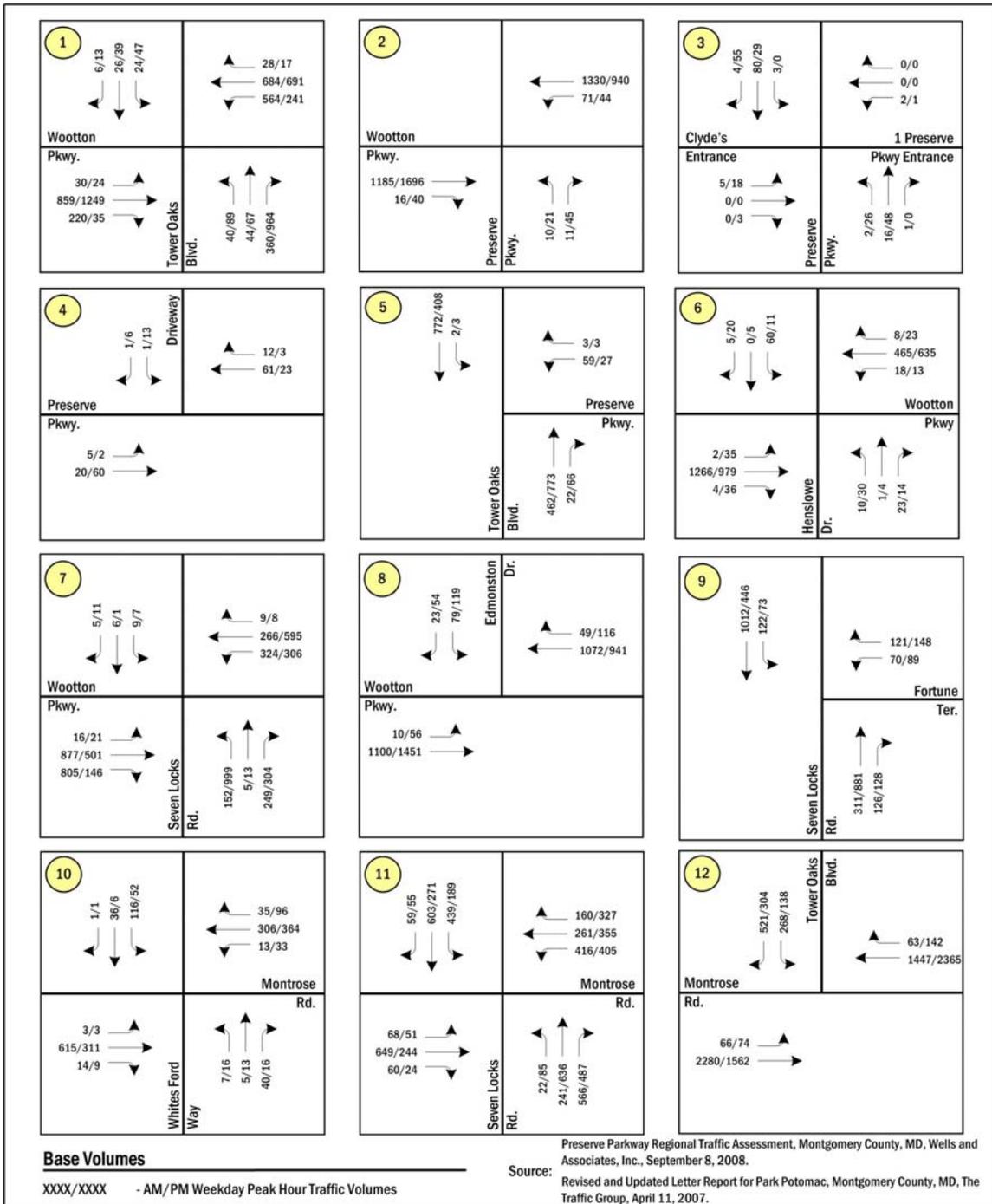


Figure 15a Site 2 Base Peak Hour Traffic Volumes

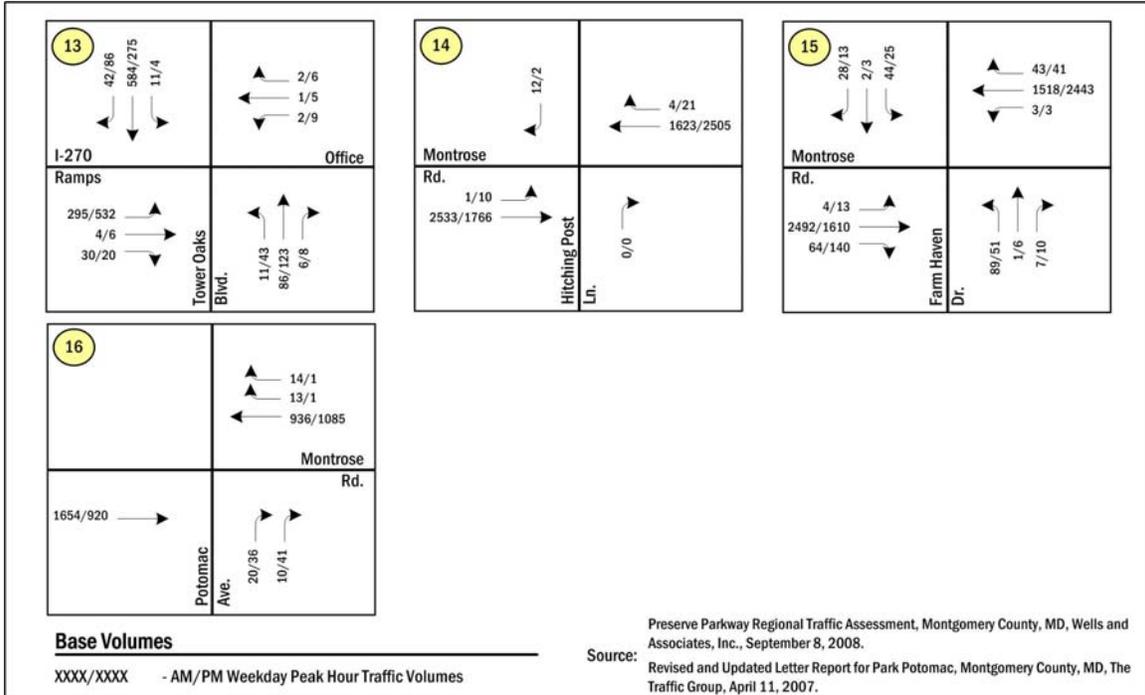


Figure 15b Site 2 Base Peak Hour Traffic Volumes

3.3.1 Background Developments

The planned developments considered in the traffic forecasts were identified by the M-NCPPC Transportation Planning Division staff as a part of the study scoping process outlined in The Traffic Group and Wells and Associates reports. Nineteen background projects have been identified as approved, yet un-built projects, reasonably assumed to be completed by Fall 2012 which is the build out year for the NCI project. County staff has confirmed that these background projects remain valid and no additional projects are required for this analysis. The projects are as follows:

1. Archstone Apartment Complex
2. Wootton Crossing
3. Champion Billiards
4. Sandy Spring National Bank
5. Montgomery County Conference Center
6. Washington Science Center
7. Wilgus East
8. Wilgus Property
9. Mervis Property
10. Tower Oaks
11. Falls Farm (3 sfh)
12. Falls Farm (12 sfh)
13. Beverly Farms
14. LCDR Tract
15. Bells Mill Road Corporation Property
16. Heights School
17. Camilier/Davis Property
18. Park Potomac

19. Tower west of Lake

The LATR notes that peak hour trip estimates for planned land uses should be based on trip rates and formulas provide in Appendix A of the LATR document, if applicable. Trip rates for other land uses not included in the LATR Guidelines can be obtained from the 8th Edition of the Trip Generation Manual published by the Institute of Transportation Engineers (ITE).⁴ The User’s Guide of this Manual states that the trip rates provided were derived from surveys undertaken at “suburban locations having little or no transit service, nearby pedestrian amenities or travel demand management (TDM) programs”. The Guide also advises that the trip rates should be supplemented with locally derived data, when practical.

Approximately 4,399 trips will be added to the transportation network in the morning peak hour and 4,783 trips in the afternoon peak hour. Table 3 shows the anticipated trip generation for the background developments. Figure 16 shows the locations of these developments.

Table 3 – Site 2 Background Trip Generation

#	Land Use	ITE Land Use Code or LATR Code	Size	Units	AM Peak In Trips	AM Peak Out Trips	AM Peak Total Trips	PM Peak In Trips	PM Peak Out Trips	PM Peak Total Trips
1	Archstone Apartments	223	192	DU	16	64	80	60	31	91
2	Wootten Crossing	820	2100	S.F.	4	3	7	14	12	26
3	Champion Billiards	820	12,500	S.F.	20	19	39	81	74	155
4	Sandy Springs National Bank	710	126,000	S.F.	179	27	206	34	167	201
5	Montgomery County Conference Center (Gorove/Slade Study)	310	450	Hotel Rooms	388	188	576	351	230	581
6	Washington Science Center	720	67,500	S.F	131	33	164	57	155	212
7	Wilgus East	Office > 25kS.F.	308,400	S.F	449	67	516	84	380	464
8	Wilgus Property	Townhouse < 100 units	19	DU	2	7	9	9	7	16
9	Mervis Property	Townhouse < 100 units	14	DU	2	5	7	7	5	12

⁴ “Local Area Transportation Review Guidelines”, M-NCPPC, July 2008, Page 33.

Environmental Assessment Transportation Study – National Cancer Institute Consolidated Office Space

10	Tower Oaks	High Turnover Restaurant (ITE – 832)	22,000	S.F.	106	98	204	143	96	239	
		Office > 25kS.F.	600,000	S.F.	880	132	1012	159	725	884	
		Subtotal			986	230	1216	302	821	1123	
#	Land Use	ITE Land Use Code or LATR Code	Size	Units	AM Peak In Trips	AM Peak Out Trips	AM Peak Total Trips	PM Peak In Trips	PM Peak Out Trips	PM Peak Total Trips	
11	Falls Farm	S.F.U < 75 units	3	DU	1	2	3	2	1	3	
12	Falls Farm	S.F.U < 75 units	12	DU	3	8	11	8	5	13	
13	Beverly Farms (Lots 1-4)	S.F.U < 75 units	5	DU	1	4	5	4	2	6	
14	LCDR Tract	Townhouse < 100 units	39	DU	5	14	19	19	13	32	
15	Bells Mill Rd Corp. Property	S.F.U < 75 units	45	DU	12	31	43	31	19	50	
16	Heights School	530	60	Students	18	7	25	6	12	18	
17	Camalier/Davis Property	S.F.U < 75 units	6	DU	2	4	6	4	3	7	
18	Park Potomac	Office > 25kS.F.	570,000	S.F.		836	125	961	151	690	841
					Internal Trips	13	6	19	21	26	47
					Off-site Trips	823	119	942	130	664	794
		Retail (50-200 ksf)	145,000	S.F.		172	159	331	688	636	1324
					Internal trips	35	40	75	145	157	302
					Off-site Trips	137	119	256	543	479	1,022
					Pass-by-Trips	34	30	64	190	168	358
					New Trips	103	89	192	353	311	664
Condos > 75 units	450	DU	44	139	183	126	87	213			

Environmental Assessment Transportation Study – National Cancer Institute Consolidated Office Space

				Internal trips	9	11	20	43	32	75
				Off-site Trips	35	128	163	83	55	138
		Townhouse > 100 units	150	DU	18	57	75	63	44	107
				Internal trips	4	4	8	21	16	37
				Off-site Trips	14	53	67	42	28	70
		Hotel Rooms (ITE-310)	156	Hotel rooms	43	28	71	49	43	92
				Internal trips	9	2	11	17	16	33
#	Land Use	ITE Land Use Code or LATR Code	Size	Units	AM Peak In Trips	AM Peak Out Trips	AM Peak Total Trips	PM Peak In Trips	PM Peak Out Trips	PM Peak Total Trips
				Off-site Trips	34	26	60	32	27	59
				Subtotal	1009	415	1424	640	1085	1725
19	Tower west of Lake	Mid Rise Apartments > 75 units	100	DU	9	34	43	32	16	48
	Total				3,237	1162	4,399	1,745	3,038	4,783



Figure 16 Site 2 Locations of Background Developments

3.3.2 Future Background Traffic Forecast

Future Background traffic forecasts are developed based on a composite of base traffic counts and impacts from other future area developments approved, but not yet built.

The volumes derived from the background developments were then distributed throughout the transportation network through the study intersections. The directional distribution of new trips generated by the future background developments was derived from LATR Guidelines (July 2008), Appendix E, Table E -1 of the LATR document. The resulting background development volumes at each study intersection are displayed in Figures 17a and 17b.

3.3.3 Future Background Capacity Analysis

In order to obtain the future background volumes, the base volumes were combined with background volumes. The future background volumes for the morning and afternoon peak hours at each intersection are presented in Figures 18a and 18b. These volumes are evaluated using the Critical Lane Analysis Technique as previously described. The capacity analysis results are summarized in Table 4, and the capacity analysis worksheets are included in the Appendix B-2.

The future background capacity analysis results show that all study area intersections and campus access points operate within the applicable CLV standards.

3.4 Analysis of Future Conditions with Development (Year 2012)

The Total Future scenario represents future traffic levels in 2012 with the proposed development on the Preserve at Tower Oaks campus. This scenario is compared to the Future Background scenario to determine the incremental impact of the proposed development. In order to develop the Total Future forecasts, the Future Background volumes and the project trip volumes are combined. The Total Future scenario also includes planned and programmed roadway improvements that can influence the capacity of study area intersections and/or influence travel route and time of day patterns.

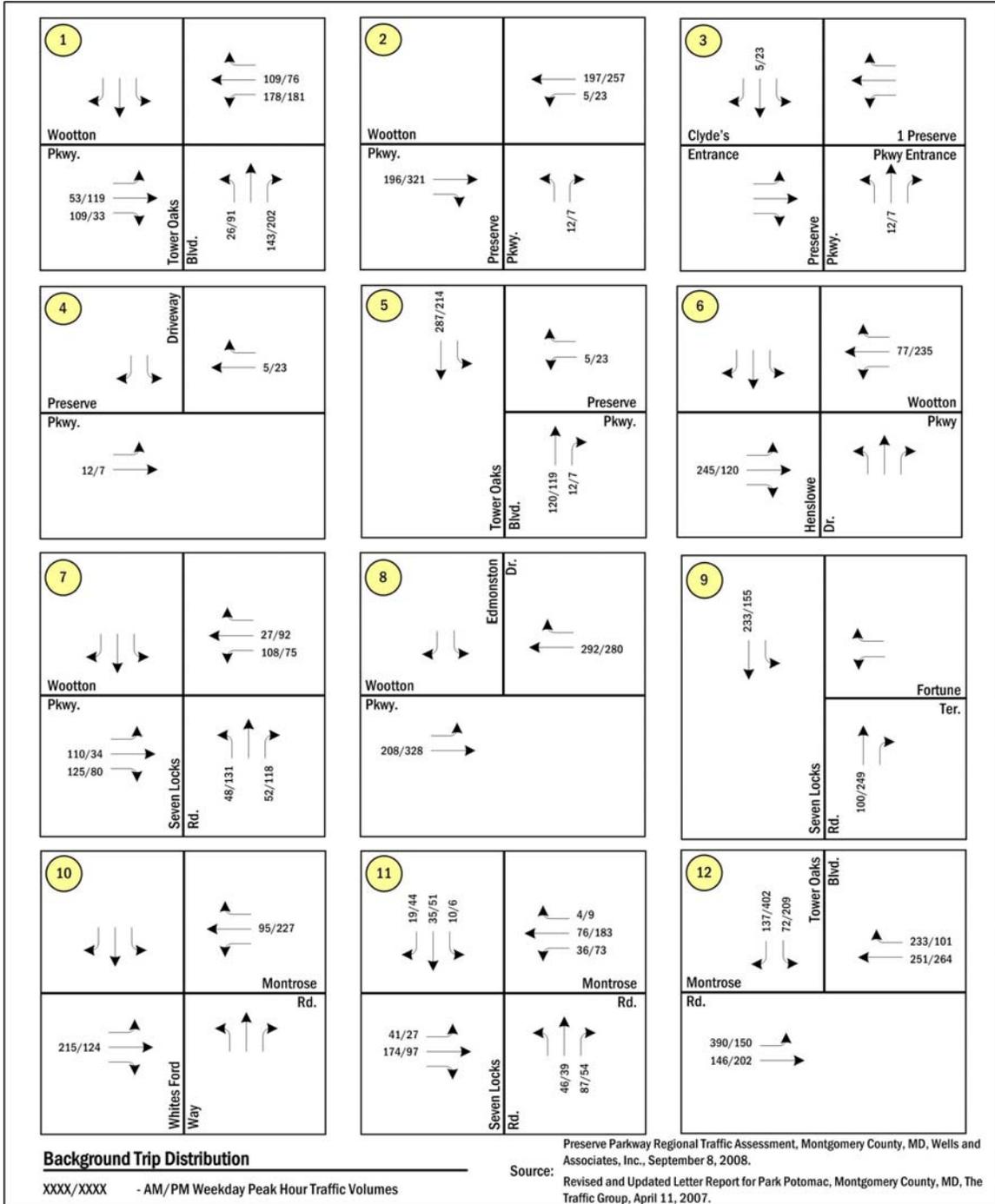


Figure 17a Site 2 Background Trip Distribution

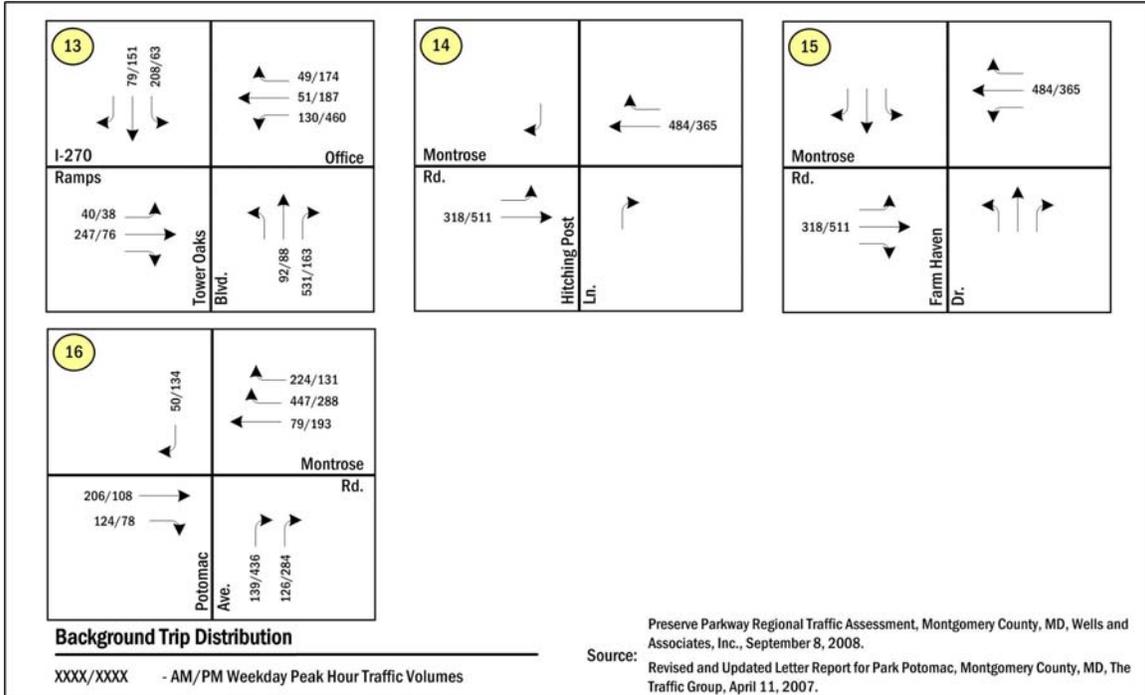


Figure 17b Site 2 Background Trip Distribution

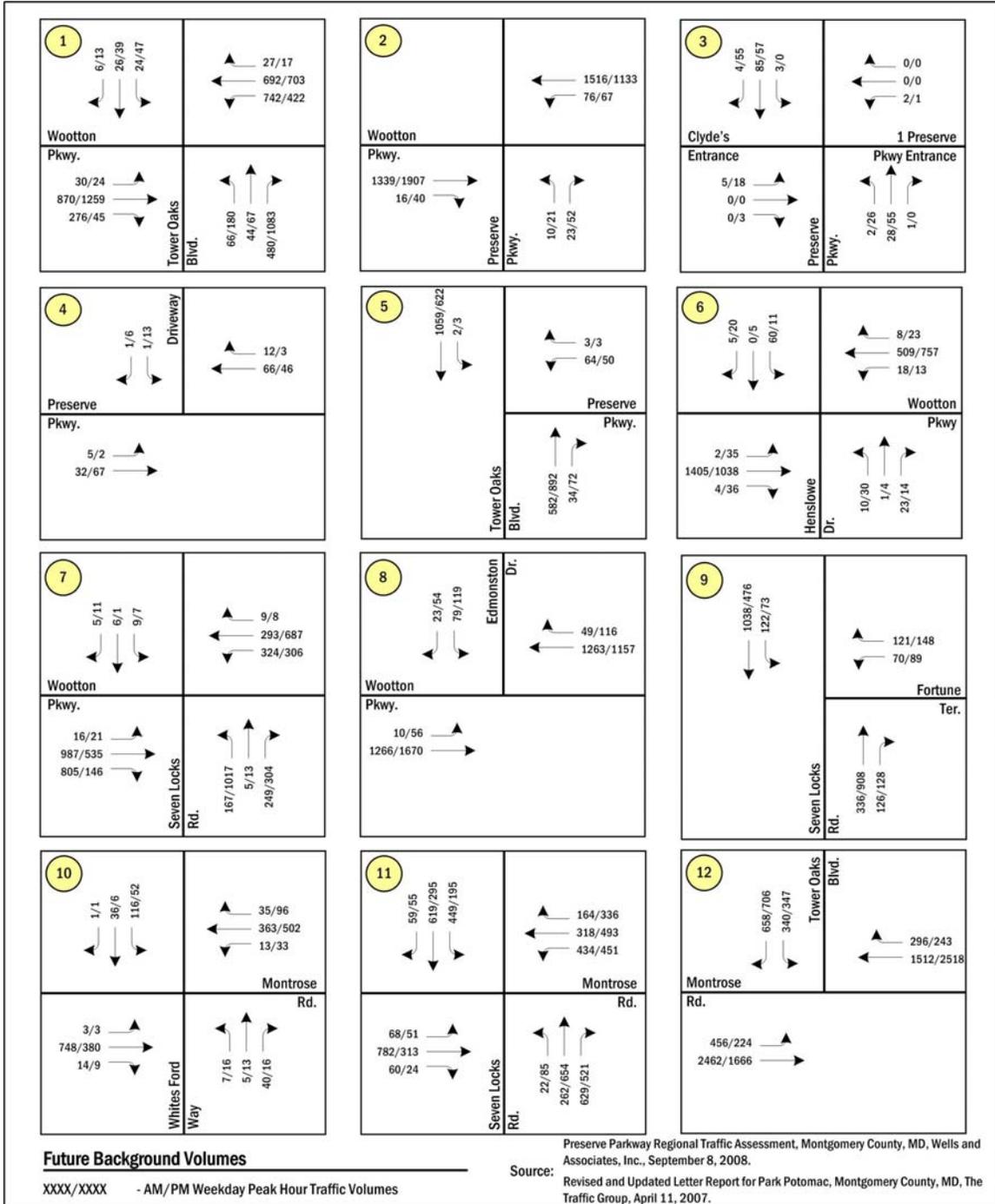


Figure 18a Site 2 Future Background Peak Hour Traffic Volumes

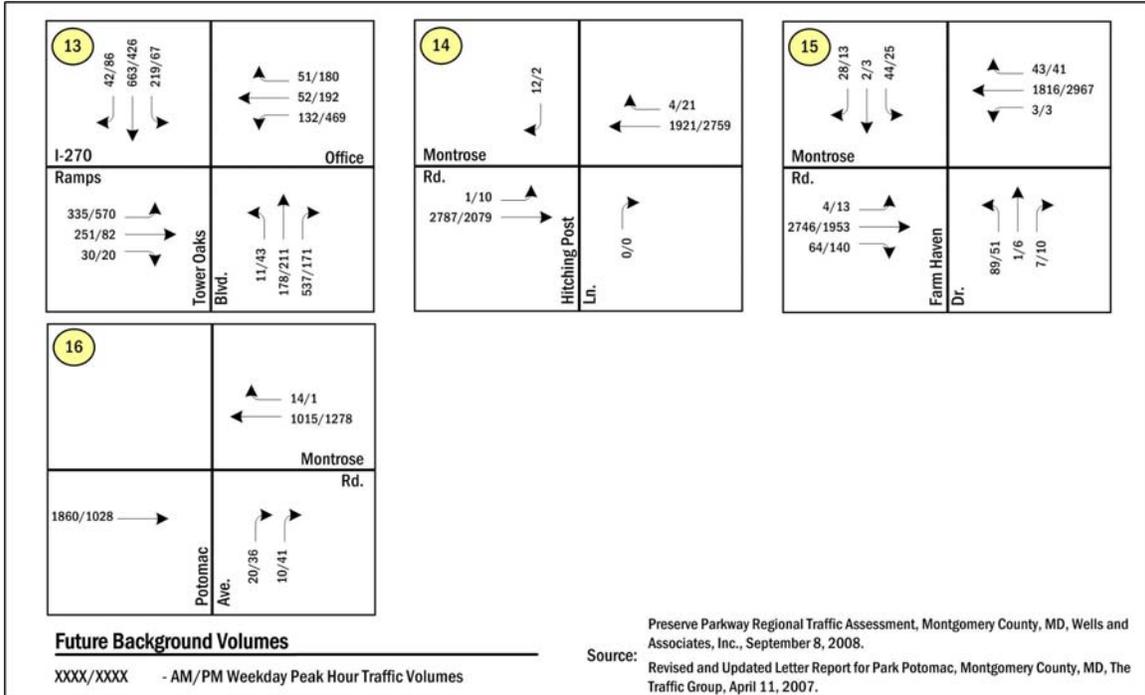


Figure 18b Site 2 Future Background Peak Hour Traffic Volumes

3.4.1 Project Trip Generation

Although all three prospective sites are in varying locations, the trip generation is consistent throughout each site analysis. The LATR notes that peak hour trip estimates for planned land uses should be based on trip rates and formulas provided in Appendix A of the LATR document, if applicable. For this analysis, rates for “General Office over 25,000 sf gross leasable area” will be used for each site. From page 49 of the 2008 LATR:

AM: $T = 1.70 (A) - 8$

PM: $T = 1.44 (A) + 20$

Where T = weekday peak hour vehicle trips and A = gross floor area of building in 1,000sf, therefore,

AM: $T = 1.7 (550) - 8 = 927$ trips

PM: $T = 1.44 (550) + 20 = 812$ trips

The LATR guidelines also give directional distribution to abide by. In the morning peak hour, 87% (807 trips) are inbound and 13% (120) are outbound. In the afternoon peak hour, 17% (138) are inbound and 83% (674) are outbound.

3.4.2 Project Trip Distribution

The Trip Distribution and Traffic Assignment Guidelines in the LATR were used for the distribution of peak hour trips for the Tower Oaks site. Distribution percentages are as follows:

To/From	Via	Percent
North	I-270	23%
South	I-270	25%
North and East	Wootton Parkway	10%
South and East	Montrose Road	19%
North and West	Wootton Parkway	11%
West	Falls Road	8%
South	Seven Locks Road	4%
	Total	100%

Figures 19a, 19b and 19c show the project trip distribution volumes at each of the study intersections.

3.4.3 Total Future Traffic Forecasts

In order to calculate the total future volumes, the future background traffic

volumes were combined with the assigned site trips. Figures 20a and 20b show the total future peak hour traffic volumes.

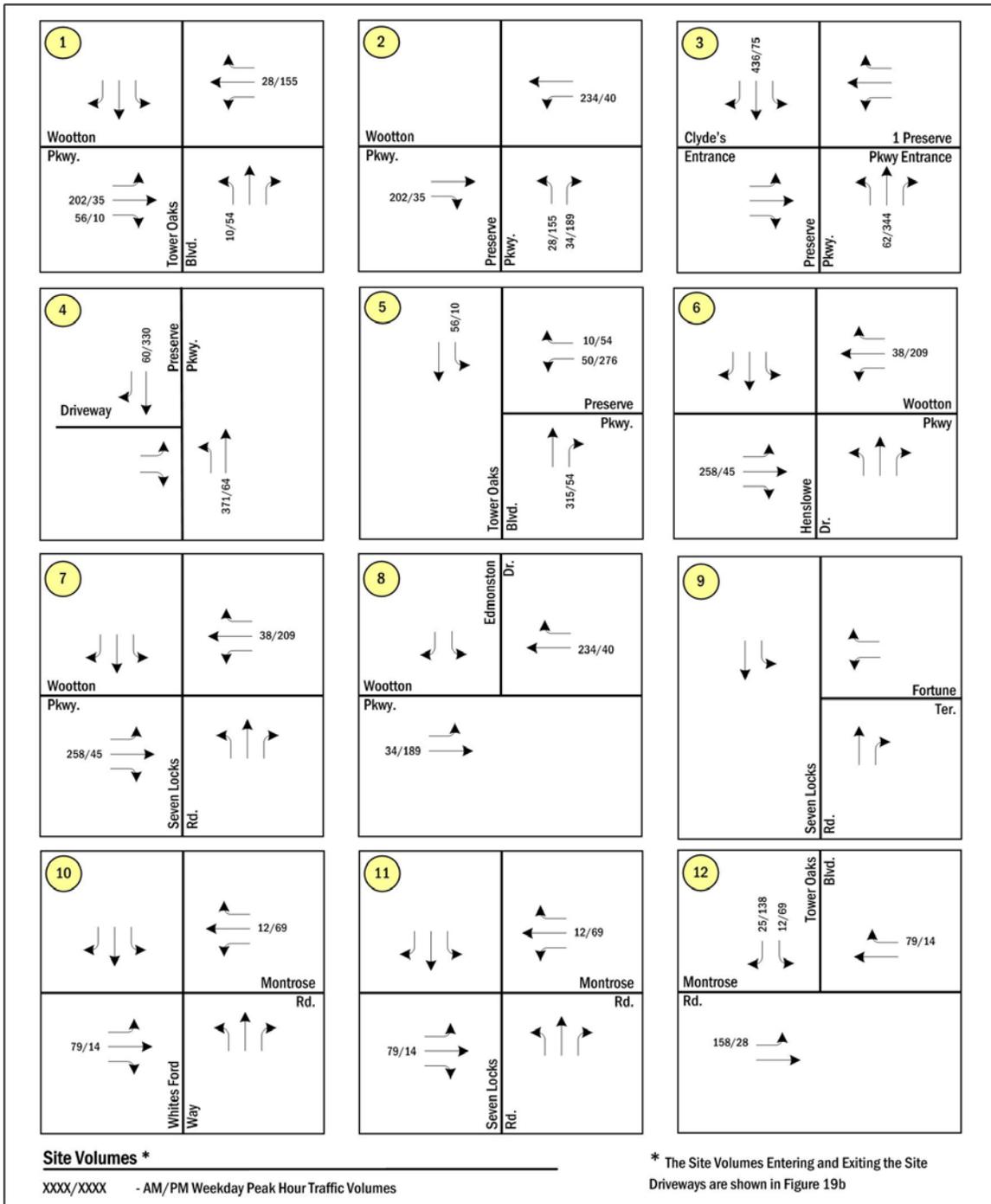


Figure 19a Site 2 Project Trip Distribution

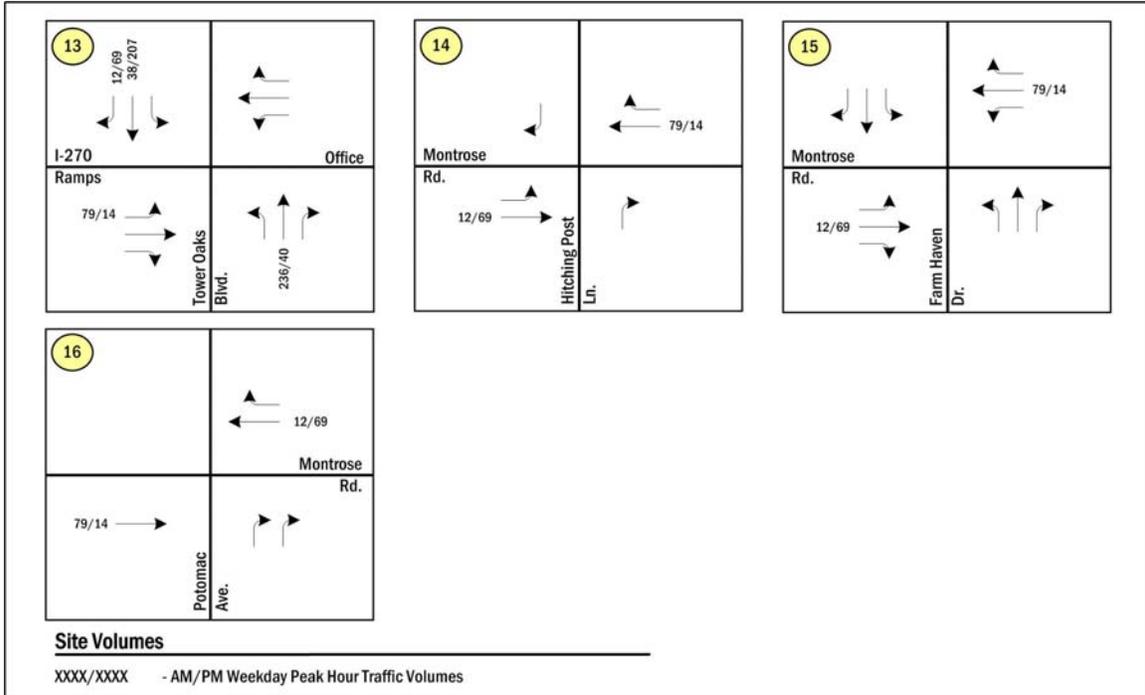


Figure 19b Site 2 Project Trip Distribution

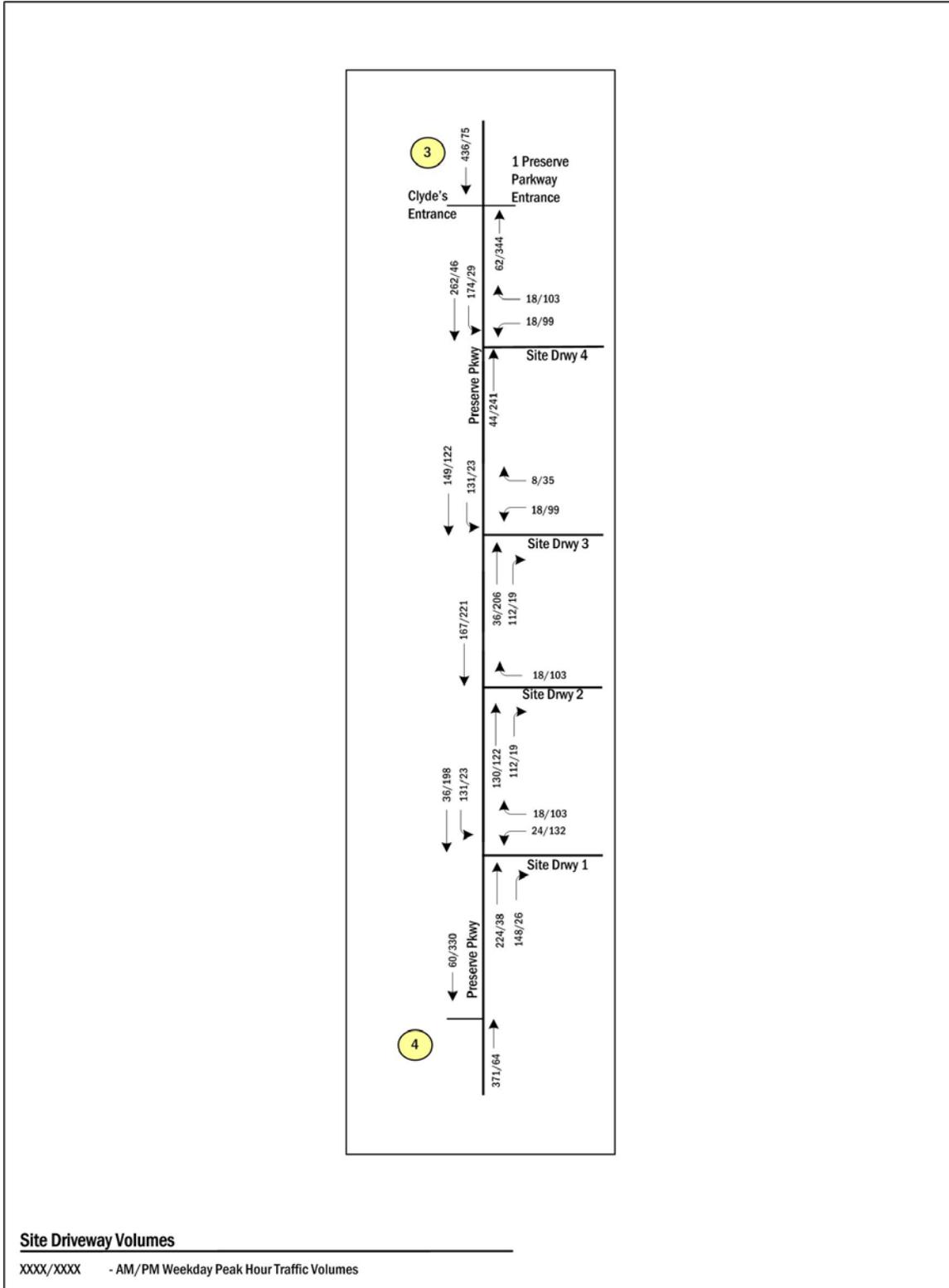


Figure 19c Site 2 Project Driveway Volumes

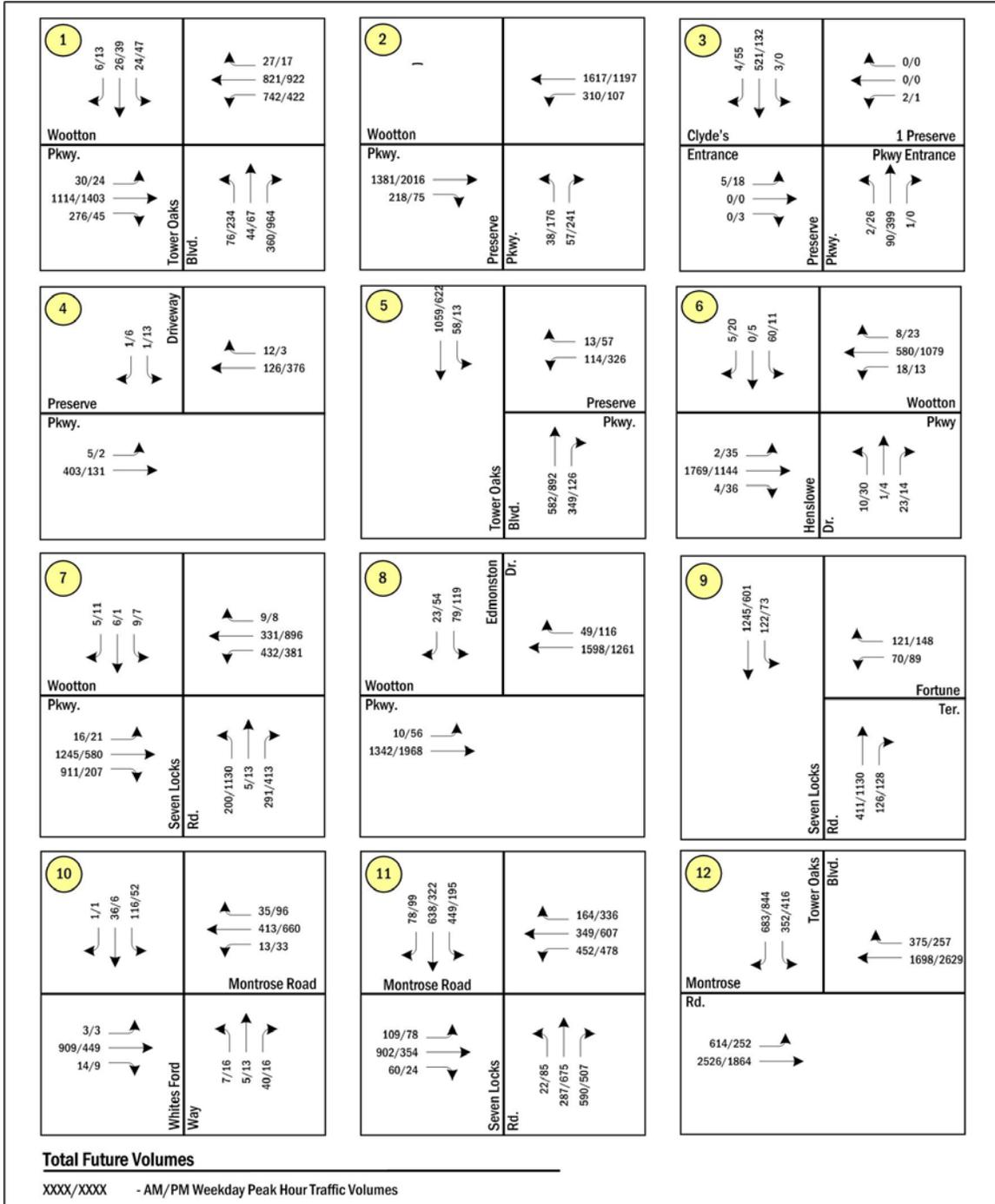


Figure 20a Site 2 Total Future Peak Hour Traffic Volumes

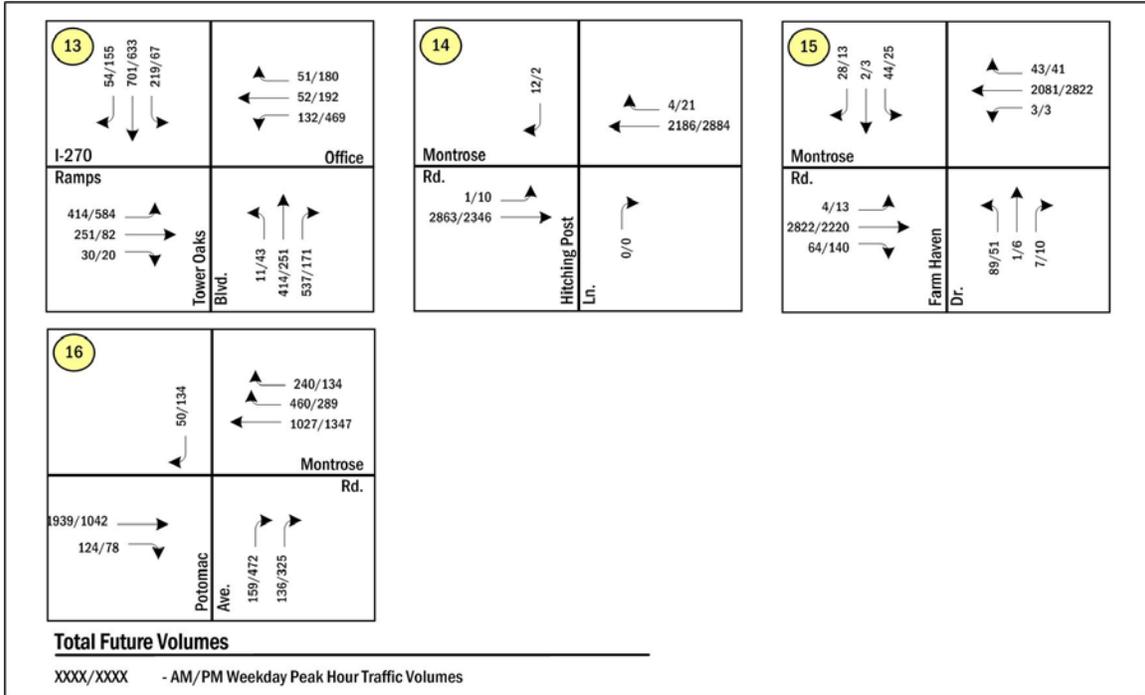


Figure 20b Site 2 Total Future Peak Hour Traffic Volumes

3.4.4 Total Future Capacity Analysis and Improvement Considerations

Based on the total future volumes and other field observations noted above, the capacity of the intersections was evaluated for both the weekday morning and afternoon peak hours, using the Critical Lane Analysis Technique, as was done for the base and background traffic conditions. The capacity analysis results are summarized in Table 4. The capacity analysis worksheets are included in the Appendix B-3.

The capacity analysis results for total future conditions show that the intersection of the northbound I-270 off-ramp and on-ramp with Tower Oaks Boulevard would operate above the CLV standards for the afternoon peak hour. Providing a separate westbound left-turn lane at this intersection would mitigate the impact at this intersection. The future proposed and planned roadway improvements are shown in Figures 21a and 21b.

Table 4 – Site 2 Comparative CLV Results

#	Intersection	CLV Threshold	Existing	Background	Total Future
			AM	AM	AM
1	Tower Oaks Road and Wootton Parkway	1500	1073	1305	1422
2	Preserve Parkway and Wootton Parkway	1500	715	867	1080
3	Preserve Parkway and Clyde’s Entrance	1500	55	58	289
4	Preserve Parkway and Driveway	1500	46	48	218
5	Tower Oaks Road and Preserve Parkway	1500	468	625	675
6	Wootton Parkway and Henslowe Drive	1500	775	905	1042
7	Wootton Parkway and Seven Locks Road	1500	887	1072	1216
8	Wootton Parkway and Edmonston Drive	1500	706	861	985
9	Seven Locks Road and Fortune Terrace	1500	606	730	730
10	Montrose Road and Whites Ford Way	1475	813	1028	1107
11	Montrose Road and Seven Locks Road	1500	999	1161	1208
12	Montrose Road and Tower Oaks Road	1550	1350	1519	1525
13	Tower Oaks Road and I-270 NB Off and On Ramp *	1500	512	1149	1316
	with Improvements				1213
14	Montrose Road and Hitching Post Lane	1550	1343	1055	1060
15	Montrose Road and Farm Haven Drive	1550	1493	1201	1206
16	Montrose Road and Park Potomac Access	1500	632	847	876
#	Intersection	CLV Threshold	Existing	Background	Total Future
			PM	PM	PM
1	Tower Oaks Road and Wootton Parkway	1500	1013	1348	1420
2	Preserve Parkway and Wootton Parkway	1500	963	1156	1351
3	Preserve Parkway and Clyde’s Entrance	1500	93	107	247
4	Preserve Parkway and Driveway	1500	52	56	222
5	Tower Oaks Road and Preserve Parkway	1500	475	564	879
6	Wootton Parkway and Henslowe Drive	1500	597	661	684
7	Wootton Parkway and Seven Locks Road	1500	1116	1267	1302
8	Wootton Parkway and Edmonston Drive	1500	942	1116	1216
9	Seven Locks Road and Fortune Terrace	1500	697	829	829
10	Montrose Road and Whites Ford Way	1475	593	820	889
11	Montrose Road and Seven Locks Road	1500	860	1030	1063
12	Montrose Road and Tower Oaks Road	1550	1036	1381	1445
13	Tower Oaks Road and I-270 NB Off and On Ramp *	1500	542	1536	1690
	with Improvements				1318
14	Montrose Road and Hitching Post Lane	1550	945	1080	1085
15	Montrose Road and Farm Haven Drive	1550	1409	1146	1151
16	Montrose Road and Park Potomac Access	1500	575	852	858

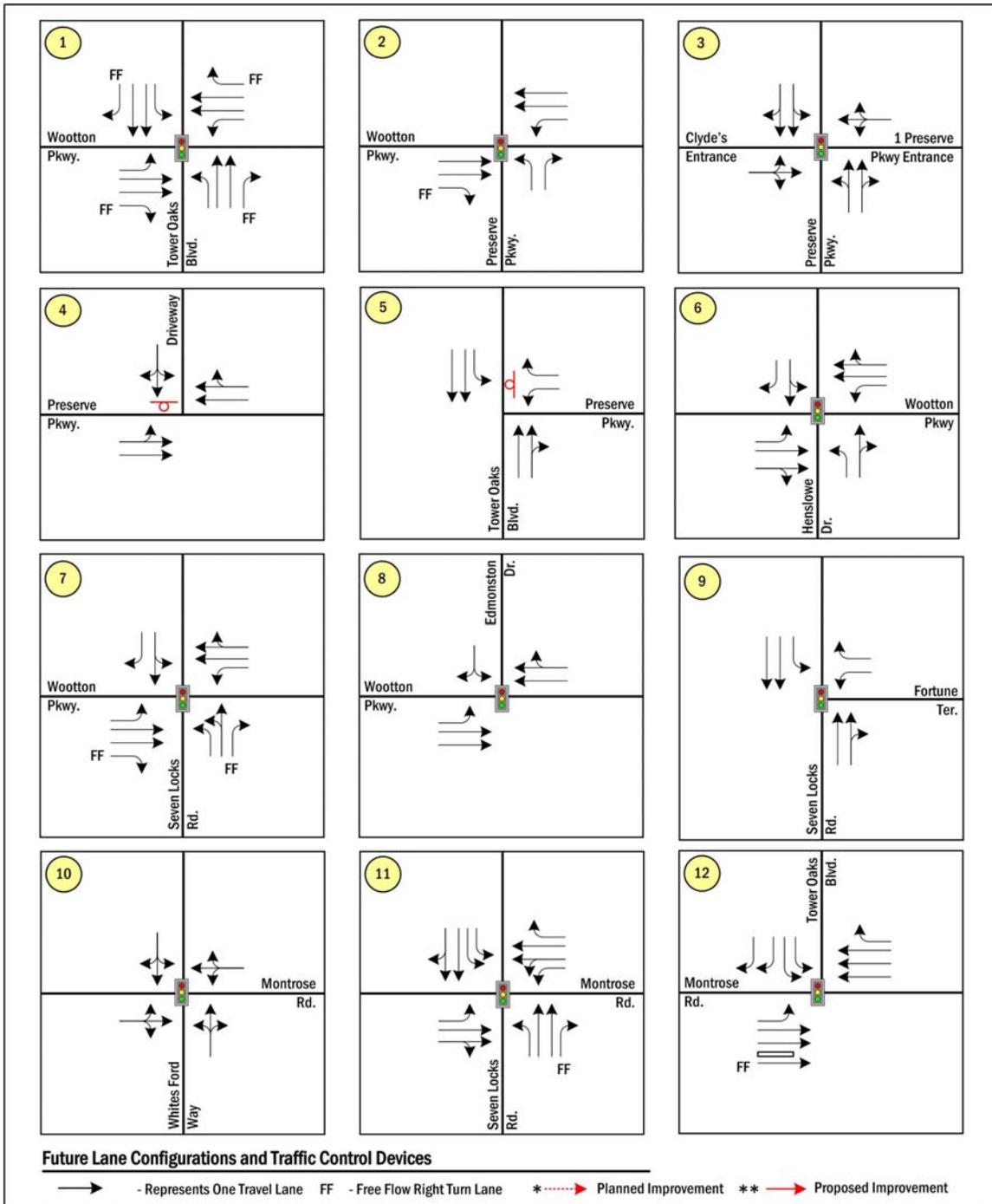


Figure 21a Site 2 Future Lane Configurations and Traffic Control Devices

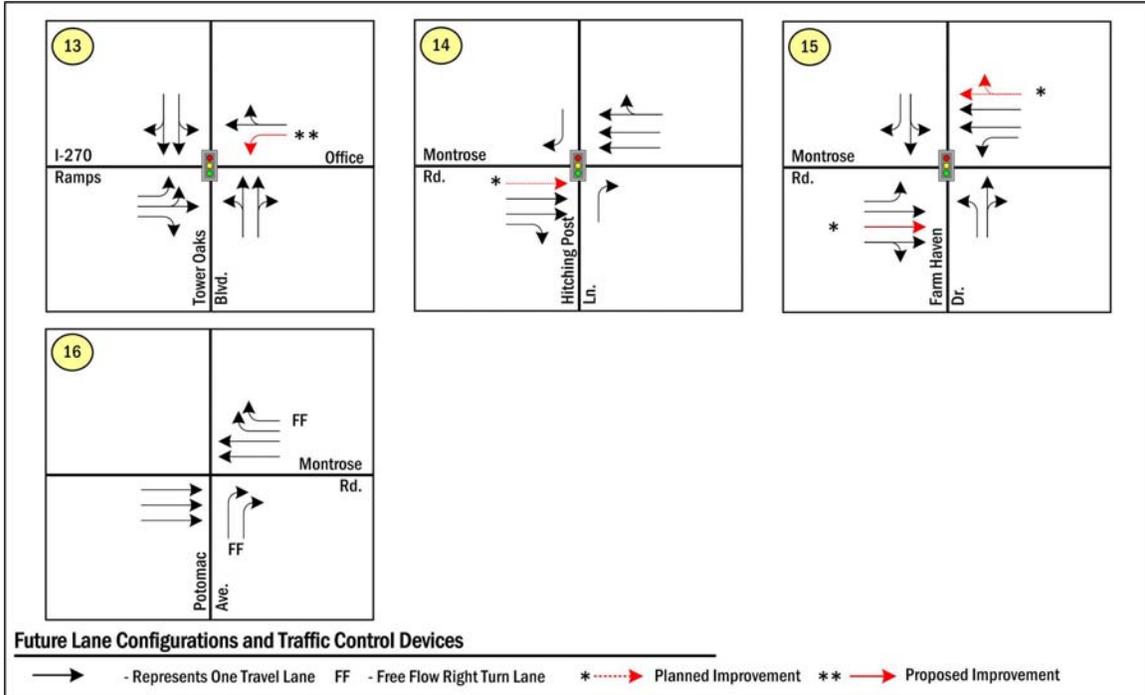


Figure 21b Site 2 Future Lane Configurations and Traffic Control Devices

3.5 Site 2 Summary

This section of the report presents the results of the transportation conditions assessment prepared by Gorove/Slade Associates, Inc. for the Preserve at Tower Oaks site. The highlights of this section of the report are summarized as follows:

- a) Regional access to the site is provided by I-270 approximately one-half mile to the south and arterials such as Montrose Road, Wootton Parkway and Tower Oaks Boulevard. Direct access to the site is available from Preserve Parkway.
- b) The base conditions capacity analysis results show that all study area intersections and campus access points operate within the applicable CLV standards.
- c) Nineteen (19) background projects have been identified as approved, but un-built, projects expected to be complete in 2012.
- d) Future background capacity analysis results show that all study area intersections and campus access points operate within the applicable CLV standards.
- e) Projected trip generation using the LATR 2008 guidelines for 550,000 sf of general office uses consists of approximately 927 trips (807 in and 120 out) in the morning peak hour and 812 trips (138 in and 674 out) in the afternoon peak hour.
- f) The capacity analysis results for total future conditions show that the intersection of the northbound I-270 off-ramp and on-ramp with Tower Oaks Boulevard would operate above the CLV standards for the afternoon peak hour. Providing a separate westbound left-turn lane at this intersection would mitigate the impact at this intersection.

4.0 Site 3: Washington Science Center

4.1 Introduction

This section of the report outlines the evaluation of the transportation elements of the prospective site at the Washington Science Center location. The site is located along Montrose Parkway near Rockville Pike in Montgomery County, MD.

4.2 Base Conditions

The base conditions of the Washington Science Center campus have been analyzed to identify existing constraints or opportunities that are present within the transportation network, and to establish a point of reference for the analysis of future traffic conditions. Consolidating 2,400 employees at the Washington Science Center site will require occupancy at two different office buildings on opposite sides of Montrose Parkway, thus two previous traffic analyses were conducted. As previously stated, this analysis is based on information from the following two reports:

- LATR and PAMR for 6000 Montrose Parkway (Formerly Wilgus East Property), Montgomery County, MD, The Traffic Group, May 11, 2009
- LATR and PAMR and Site Plan Amendment #81993016C for 6015 Executive Boulevard, Montgomery County, MD, The Traffic Group, Revised March 9, 2009

4.2.1 Roadway Accessibility

This prospective site is located on the campus of the Washington Science Center in the North Bethesda area of Montgomery County, MD. Regional access to the site is provided by I-270 approximately 1.7 miles to the west and arterials such as Montrose Road, Randolph Road, Rockville Pike (MD 355) and Old Georgetown Road (MD 187). Local access to the site is available from “old” Old Georgetown Road, Montrose Road, Montrose Parkway and Executive Boulevard. The roadway network providing both regional and local access to the campus is illustrated in Figure 22.

The principal roadways involved include the following:

Executive Boulevard is a four to five lane divided roadway in the study area and connects Nicholson Lane to East Jefferson Street.

East Jefferson Street is a north-south street that connects Executive Boulevard

with Congressional Plaza to the north via four lanes.

Montrose Parkway is a new roadway that runs east-west, acting as a bypass for Montrose Road to the north. The west end of Montrose Parkway connects with Montrose Road and its east end connects with Old Georgetown Road.

Montrose Road is a four lane road running east-west through the study area. Montrose Road connects I-270 to Rockville Pike and terminates at Falls Road.

Randolph Road is an extension of Montrose Road east of Rockville Pike, and ends at the intersection of Cherry Hill Road and Columbia Pike. In the study area, Randolph Road has four lanes and a posted speed limit of 35 mph.

Rockville Pike (MD 355) is a six-lane divided roadway is classified as a Major Highway by the County. It runs north-south along the western edge of the campus, connecting the site with Washington, DC to the south and the City of Frederick, Maryland to the north. This roadway also provides connections to other regional areas via an interchange with the I-270/I-495 Freeway System, and intersections with major east-west arterials along other segments to the north and south of the campus. The posted speed limit on Rockville Pike is 35 mph.

Old Georgetown Road (MD 187) This six-lane divided roadway is classified as a Major Highway by the County. It runs north-south just to the west of Rockville Pike. It begins at Rockville Pike just south of Montrose Road towards the north and ends at the intersection of Rockville Pike and East-West Highway towards south. The posted speed is 40 mph.

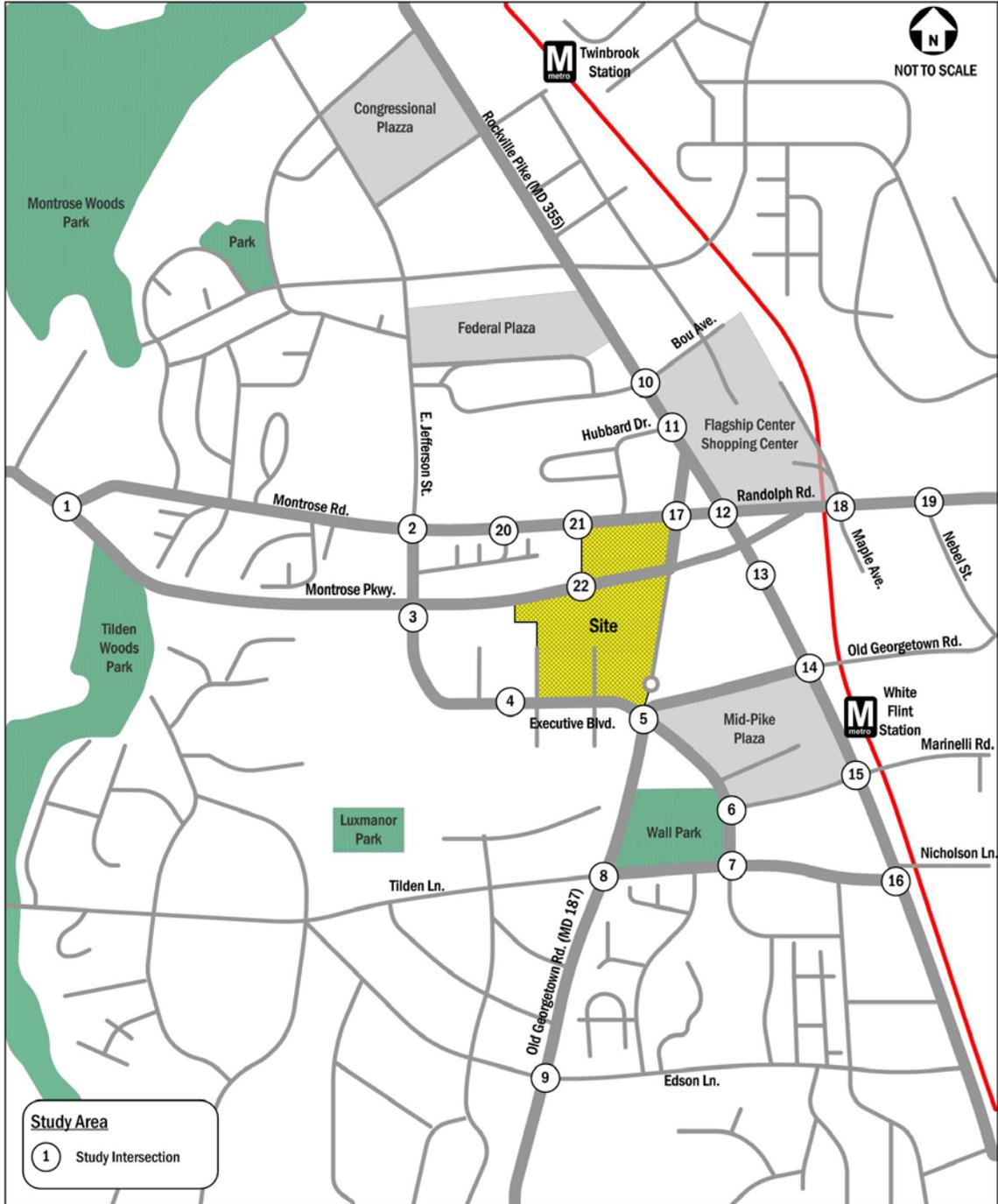


Figure 22 Washington Science Center Site Location Map

4.2.2 Study Area Intersections

The following key intersections were analyzed in this study:

1. Montrose Road and Montrose Parkway
2. East Jefferson Street and Montrose Road
3. East Jefferson Street and Montrose Parkway
4. Executive Boulevard and 1st/2nd/3rd access points
5. Executive Boulevard and Old Georgetown Road
6. Executive Boulevard and Marinelli Road
7. Executive Boulevard and Nicholson Lane
8. Old Georgetown Road and Tilden Lane/Nicholson Lane
9. Old Georgetown Road and Poindexter Lane/Edson Lane
10. Rockville Pike and Bou Avenue
11. Rockville Pike and Hubbard Drive
12. Rockville Pike and Montrose Road/Randolph Road
13. Rockville Pike and Mid Pike Plaza
14. Rockville Pike and Old Georgetown Road
15. Rockville Pike and Marinelli Road
16. Rockville Pike and Nicholson Lane
17. Old Georgetown Road and Montrose Road
18. Maple Avenue and Randolph Road
19. Nebel Street and Randolph Road
20. Hebrew Home driveway and Montrose Road
21. Hebrew Home Main driveway and Montrose Road
22. Cherrington Road Access and Montrose Parkway

Figures 23a and 23b show the lane configuration provided at each of these intersections.

4.2.3 Existing Conditions: Pedestrians and Transit

At all the study intersections, sidewalks and pedestrian signals are provided. For bicyclists, the North Bethesda Trail runs four (4) miles from the Capital Crescent Trail to the south to just short of the White Flint MetroRail station with bridges over I-270 and I-495. The trail connects Medical Center, White Flint, Grosvenor and Twinbrook neighborhoods and MetroRail stations.

As the location is close to the White Flint MetroRail station, Lines 5, 26, 38, 46, and 81 provide access to the study area, site and the MetroRail station. Line 5 traverses Jefferson Street, Executive Boulevard and Rockville Pike. Line 26 runs along Jefferson Street, Executive Boulevard and Old Georgetown Road. Line 38 runs along Montrose Road to Rockville Pike and Lines 38 and 46 run along Rockville Pike through the study area. Line 81 connects Montrose Road, Jefferson Street, Executive Boulevard, and Marinelli Road. Figure 24 shows the area transit network for the Washington Science Center site.

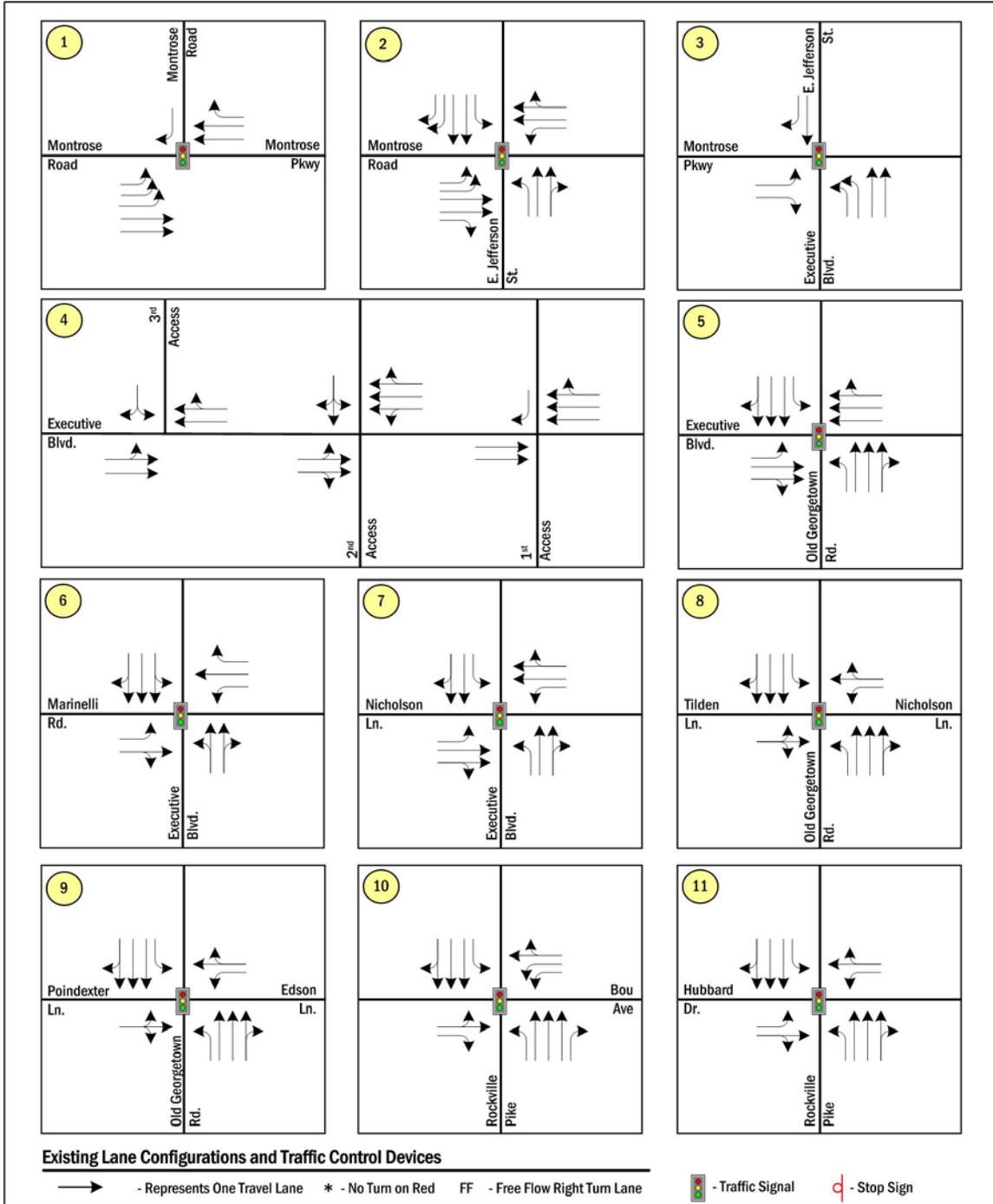


Figure 23a Site 3 Existing Lane Configurations and Traffic Control Devices

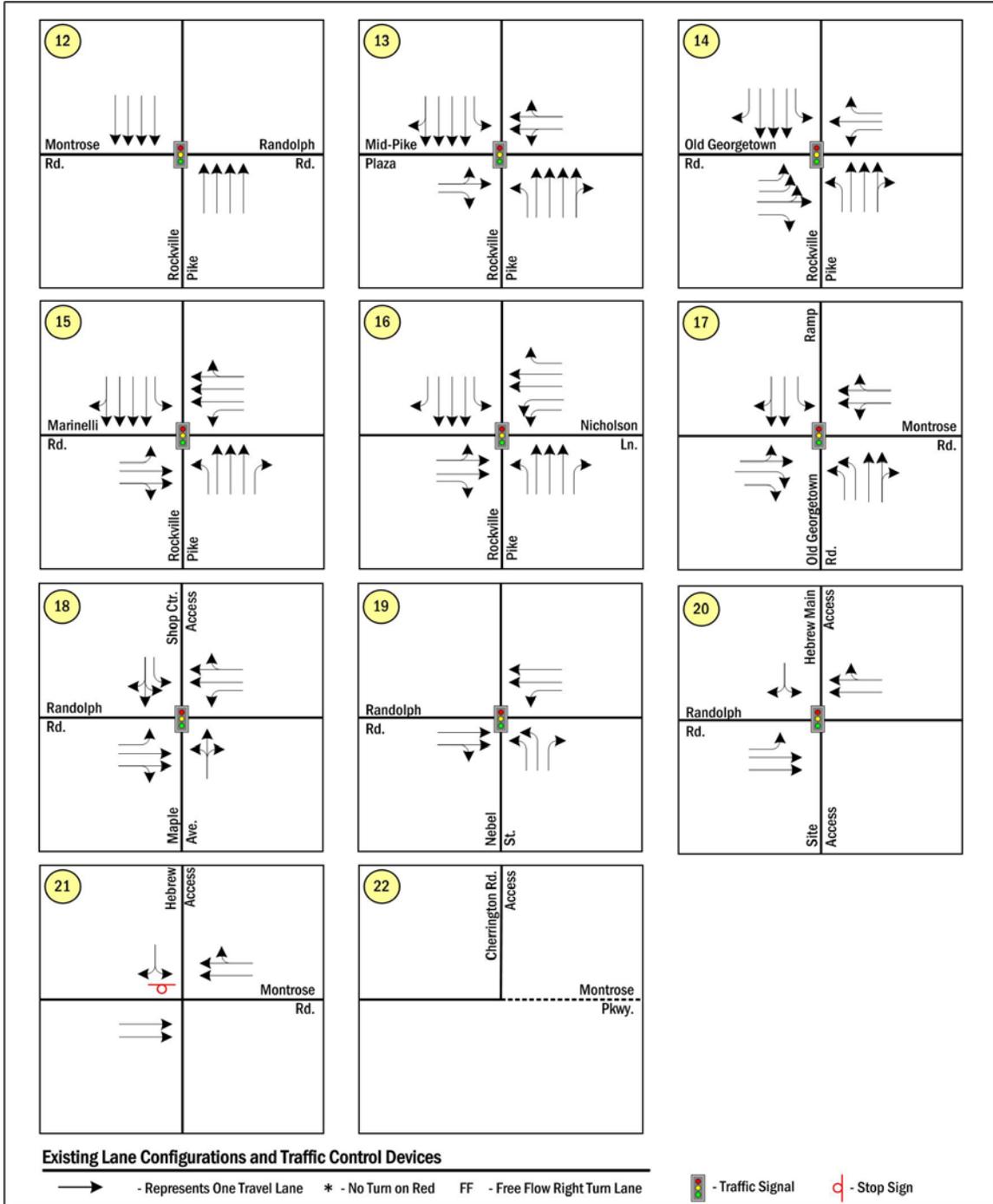


Figure 23b Site 3 Existing Lane Configurations and Traffic Control Devices

4.2.4 Base Capacity Analysis

Turning movement counts were conducted by The Traffic Group at the study intersections between the hours of 6:30 to 9:30 a.m. and 4:00 to 7:00 p.m. in September and October 2008 while school was in session.

Two roadway infrastructure projects are under construction within the study area and are expected to be completed in the near future:

Completion of Montrose Parkway, a new east-west roadway parallel to Montrose Road with its west end at Montrose Road and its east end at Old Georgetown Road. The base conditions traffic projections account for the construction of Montrose Parkway as an alternative east-west route through the region.

Construction of an interchange at the intersection of Rockville Pike (MD 355) and Montrose Road.

The base peak hour volumes were adjusted to account for these developments based on input from the Montgomery County. The adjusted base volumes during morning and evening peak hours at the twenty two (22) study intersections are shown in Figures 25a and 25b.

Based on these volumes and other collected information, the capacity of the intersections was evaluated for both the weekday morning and afternoon peak hours, using the Critical Lane Analysis Technique, as stipulated by the Montgomery County Local Area Transportation Review (LATR) Guidelines (M-NCPPC, 2008). The Critical Lane Analysis outputs an intersection Critical Lane Volume (CLV) which is then compared against the CLV standard⁵ for that jurisdiction. The capacity analysis worksheets are included in the Appendix C-1.

The base conditions capacity analysis results show that all study area intersections and campus access points operate within the applicable CLV standards except Executive Boulevard and Montrose Parkway in the morning peak hour. Executive Boulevard and Montrose Parkway has a threshold CLV of 1,550 and the morning CLV is 1,652.

⁵ CLV Standard – refers to the maximum acceptable critical lane volume threshold for a given intersection established by M-NCPPC Transportation Planning Division staff.

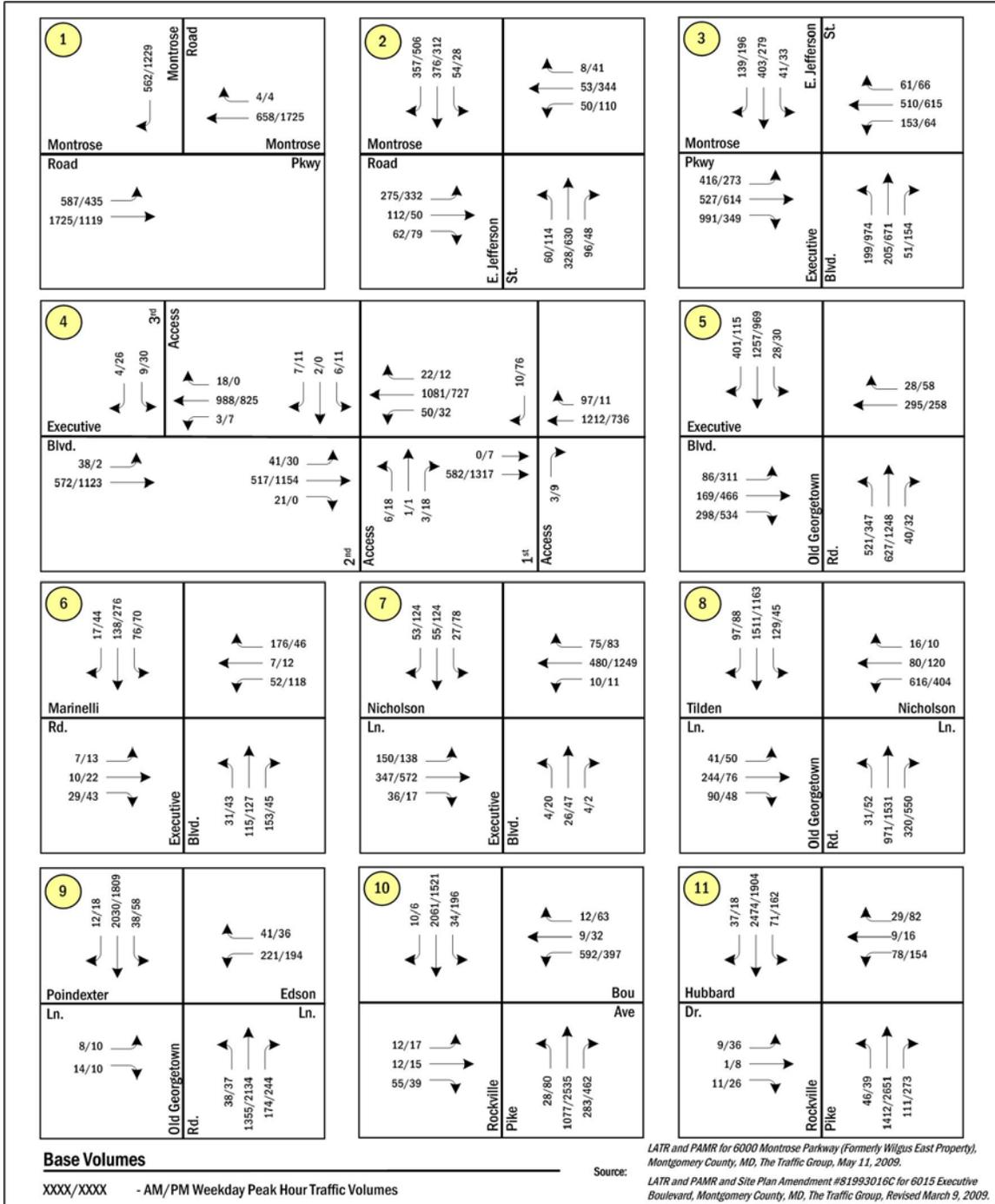


Figure 25a Site 3 Base Peak Hour Traffic Volumes

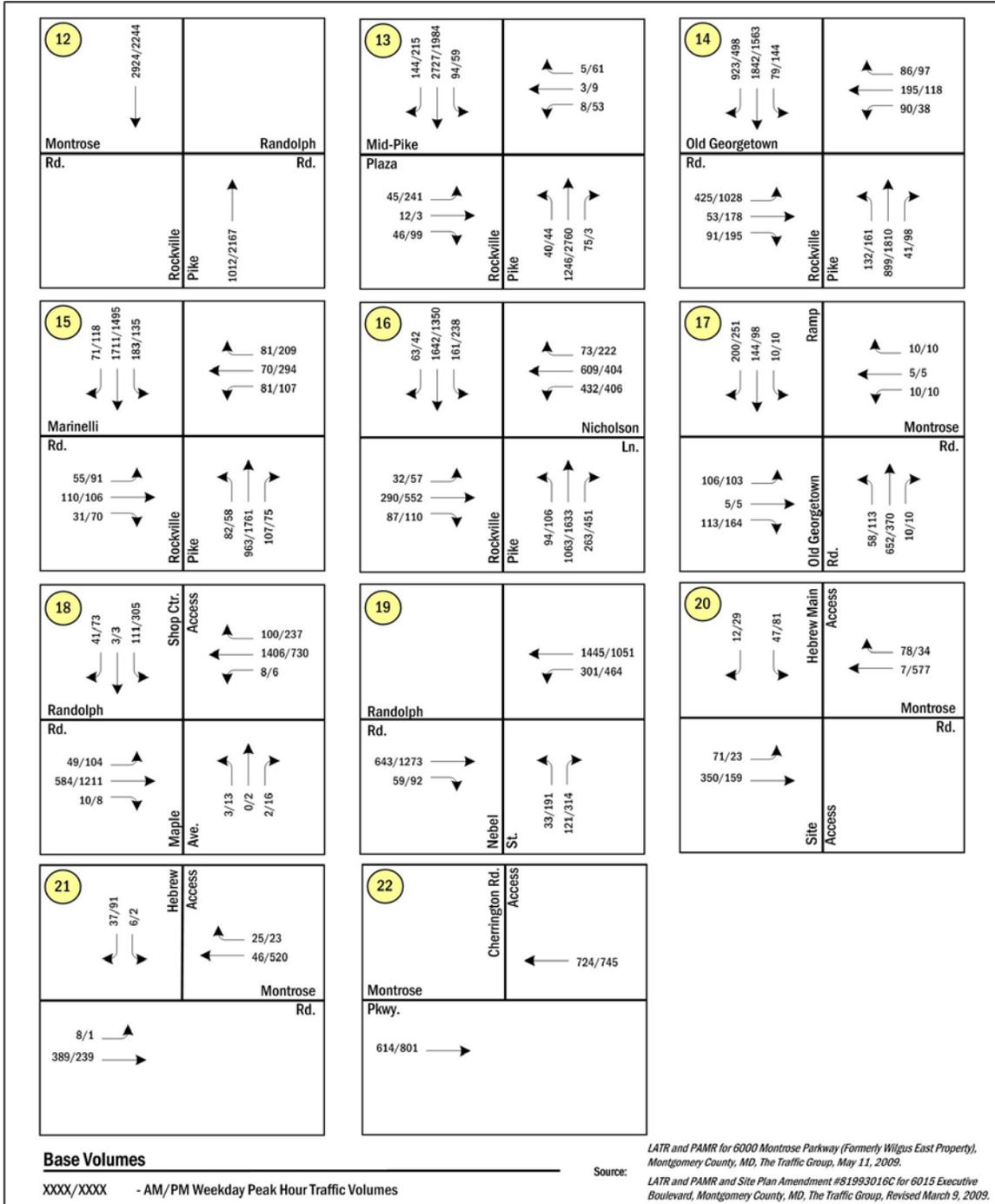


Figure 25b Site 3 Base Peak Hour Traffic Volumes

4.3 Future Conditions without Development (Year 2012)

The Future Background situation represents future traffic levels in 2012 without the proposed development at the Washington Science Center. This situation would be the basis for comparative evaluation of the Total Future conditions. In order to develop the background traffic forecasts, the base traffic and traffic generated by planned area developments (anticipated to be built by year 2012) were combined. The background traffic situation also includes planned and programmed roadway improvements that can influence the capacity of study area intersections and/or influence travel route and time of day patterns.

4.3.1 Background Developments

The planned developments considered in the traffic forecasts were identified by the M-NCPPC Transportation Planning Division staff as a part of the study scoping process outlined in The Traffic Group reports. Fifteen background projects have been identified as approved yet un-built projects reasonably assumed to be completed by Fall 2012, the build-out year for the NCI project. County staff has confirmed that these background projects remain valid and no additional projects are required for this analysis. The projects are as follows:

1. Spring Lake Park
2. Spring Lake Halpine
3. Thompson's Property
4. Twinbrook Common East
5. Suburban Propane (Halpine Road)
6. Boland Campus Development
7. Twinbrook Common West
8. Commerce Bank
9. Rollins Ridge
10. Alexan Montrose Crossing
11. North Bethesda Town Center
12. Montgomery County Conference Center
13. White Flint Crossing

14. Towers Oaks – West of Lake

15. Towers Oaks – West of Lake Hotel

The LATR notes that peak hour trip estimates for planned land uses should be based on trip rates and formulas provided in Appendix A of the LATR document, if applicable. Trip rates for other land uses not included in the LATR Guideline can be obtained from the 8th Edition of the Trip Generation Manual published by the Institute of Transportation Engineers (ITE).⁶ The User's Guide of this Manual states that the trip rates provided were derived from surveys undertaken at "suburban locations having little or no transit service, nearby pedestrian amenities or travel demand management (TDM) programs". The Guide also advises that the trip rates should be supplemented with locally derived data, when practical.

Approximately 4,759 trips will be added to the transportation network in the morning peak hour and 8,802 will be added during the evening peak hour by year 2012. Table 5 shows the anticipated trip generation for the background developments. Figure 26 shows the locations of these developments.

⁶ "Local Area Transportation Review Guidelines", M-NCPPC, July 2008, Page 33.

Table 5 – Site 3 Background Trip Generation

#	Land Use	ITE Land Use Code or LATR Code	Size	Units	AM Peak In Trips	AM Peak Out Trips	AM Peak Total Trips	PM Peak In Trips	PM Peak Out Trips	PM Peak Total Trips
1.	Spring Lake Park (Fishers Place)									
	General Office	MC > 25kS.F.	93,000	S.F.	131	19	150	26	128	154
	Research & Development Center	ITE 760	98,790	S.F.	114	23	137	20	111	131
	Total New Trips #1				245	42	287	46	239	285
2	Spring Lake Halpine (US Pharmacopoela)									
	Research & Development Center	ITE 760	76,914	S.F.	91	19	110	16	90	106
3	Thompson's Property									
	General Office	MC > 25kS.F.	150,000	S.F.	215	32	247	40	196	236
4	Twinbrook Commons East									
	Retail	MC 50-200kS.F.	140,000	S.F.	167	155	322	669	618	1287
	50% Mitigated				(84)	(78)	(162)	(335)	(309)	(644)
	Garden Mid-Rise Apartments	MC >75DU	424	DU	35	138	173	132	68	200
	High Rise Apts	MC >100DU	690	DU	53	158	211	151	96	247
	50% Mitigated				(44)	(148)	(192)	(142)	(82)	(224)
	Total New Trips #4				128	226	354	477	391	868
5	Suburban Propane (Halpine Rd)									
	High Ride Apartments	MC >100DU	110	DU	11	32	43	30	19	49
6	Boland Campus Development									
	General Office	MC > 25kS.F.	69,500	S.F.	96	14	110	20	100	120
7	Twinbrook Commons West									

Environmental Assessment Transportation Study – National Cancer Institute Consolidated Office Space

	Retail	MC 50-200kS.F.	80,000	S.F.	109	101	210	437	404	841
	Transit Rection (AM:15%;PM:15%)				(16)	(15)	(31)	(66)	(61)	(127)
	General Office	MC > 25kS.F.	325,000	S.F.	581	87	668	101	494	595
	Transit Reduction (AM:50%;PM:36%)				(291)	(44)	(335)	(36)	(178)	(214)
	High Rise Apts	MC >100DU	481	DU	38	112	150	107	69	176
#	Land Use	ITE Land Use Code or LATR Code	Size	Units	AM Peak In Trips	AM Peak Out Trips	AM Peak Total Trips	PM Peak In Trips	PM Peak Out Trips	PM Peak Total Trips
	Transit Reduction (AM:25%;PM:25%)				(10)	(28)	(38)	(27)	(17)	(44)
	Total New Trips #7				411	213	624	516	711	1,227
8	Commerce Bank									
	Exist Trips				(11)	(11)	(22)	(11)	(11)	(22)
	Drive-in Bank	ITE 912	3,669	S.F.	25	20	45	84	84	168
	Pass-by Trips				0	0	0	(39)	(39)	(78)
	Total New Trips #8				14	9	23	34	34	68
9	Rollins Ridge									
	Retail	MC <50kS.F.	15,000	S.F.	24	22	46	96	89	185
	Pass-by Trips				(13)	(12)	(25)	(62)	(58)	(120)
	New Trips				11	10	21	34	31	65
10	Alexan Montrose Crossing									
	High Rise Apts (<100 units)	MC <100DU	53	DU	5	16	21	15	9	24
	High Rise Apts (>=100 units)	MC >100DU	100	DU	10	30	40	28	18	46
	Total New Trips #10				15	46	61	43	27	70
11	North Bethesda Town Center (Metro DAP)									
	High Rise Apartments	MC >100DU	1,350	DU	101	302	403	287	184	471
	Transit Reduction (AM:25%;PM25%)				(25)	(76)	(101)	(72)	(46)	(118)

Environmental Assessment Transportation Study – National Cancer Institute Consolidated Office Space

	General Office	MC >25kS.F.	1,148,000	S.F.	1691	253	1944	284	1389	1673
	Transit Reduction (AM:50%;PM25%)				(846)	(127)	(973)	(71)	(347)	(418)
	Retail	MC 50-200kS.F.	202,037	S.F.	227	210	437	909	839	1748
	Movie Theater, Matinee	ITE 444	3,500	Seats				96	149	245
	Transit Reduction (AM:15%;PM15%)				(34)	(32)	(66)	(151)	(148)	(299)
	Total New Trips #11				1114	530	1,644	1,282	2,020	3,302
12	Montgomery County Conference Center (Metro DAP)									
	Hotel	ITE 310	225	hotel rooms	68	44	112	70	63	133
13	White Flint Crossing									
	Hotel (existing)	ITE 310	160	hotel rooms	(45)	(28)	(73)	(50)	(44)	(94)
	Retail	MC 50-200kS.F.	173,000	S.F.	199	184	383	797	735	1532
	Pass-by Trips				(46)	(42)	(88)	(263)	(243)	(506)
#	Land Use	ITE Land Use Code or LATR Code	Size	Units	AM Peak In Trips	AM Peak Out Trips	AM Peak Total Trips	PM Peak In Trips	PM Peak Out Trips	PM Peak Total Trips
	High Turnover Sit Down Restaurant	ITE 932	30,000	S.F.	180	166	346	200	128	328
	Pass-by Trips				0	0	0	(86)	(55)	(141)
	Garden/Mid-Rise Apartments	MC >75DU	172	DU	14	58	72	54	28	82
	High Rise Apts	MC >100DU	268	DU	22	67	89	63	40	103
	Total New Trips #13				324	405	729	715	589	1,304
14	Tower Oaks-West of Lake									
	Garden/Mid-Rise Apartments	MC >75DU	172	DU	14	58	72	54	28	82
15	Tower Oaks-West of Lake- Hotel									
	Retail	MC 50-200kS.F.	75,000	S.F.	105	96	201	418	386	804

Environmental Assessment Transportation Study – National Cancer Institute Consolidated Office Space

	Pass-by Trips			(34)	(31)	(65)	(176)	(162)	(338)
	Health & Fitness Center	ITE 492	75,000 S.F.	38	53	91	155	149	304
	Hotel	ITE 310	198 hotel rooms	58	37	95	62	55	117
	Total New Trips #15			167	155	322	459	428	887
	Total Trips			2,924	1,835	4,759	3,836	4,966	8,802

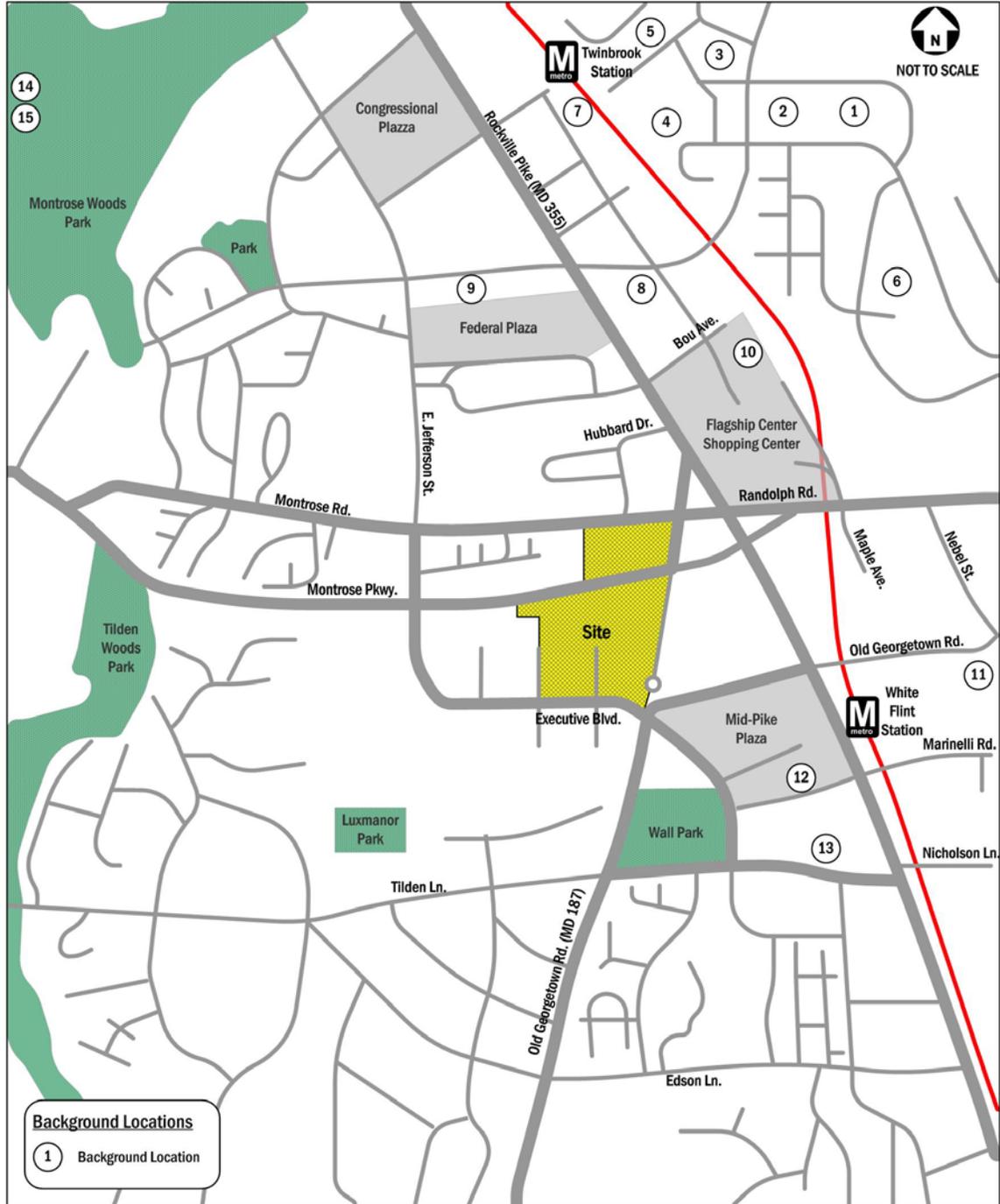


Figure 26 Site 3 Location of Background Developments

4.3.2 Planned and Programmed Improvements

In addition to the background developments, traffic will be impacted as a result of the planned improvement of the Nebel Street extension. Using traffic projections from The Traffic Group study, trip adjustments have been incorporated into the analysis.

4.3.3 Future Background Traffic Forecast

Future Background traffic forecasts are developed based on a composite of base traffic counts and impacts from other future area developments approved, but not yet built.

The volumes derived from the background developments were then distributed throughout the transportation network through the study intersections. The directional distribution of new trips generated by the future background developments was derived from LATR Guidelines (July 2008), Appendix E, Table E -1 of the LATR document. The resulting background development volumes at each study intersection are displayed in Figures 27a and 27b, and the adjustments made to the background trip as a result of the Nebel Street improvement are shown in Figures 28a and 28b.

4.3.4 Future Background Capacity Analysis

In order to obtain the future background volumes, base volumes were combined with background trip distribution. The future background volumes for the morning and afternoon peak hours at each intersection are presented in Figures 29a and 29b. These volumes were evaluated using the Critical Lane Analysis Technique as previously described. The capacity analysis results are summarized in Tables 6a and 6b, and the capacity analysis worksheets are included in Appendix C-2.

The future background capacity analysis results show that all study area intersections and campus access points operate within the applicable CLV standards except for the following:

- Executive Boulevard and Montrose Parkway
- Rockville Pike and Bou Avenue
- Rockville Pike and Hubbard Drive
- Rockville Pike and Old Georgetown Road
- Nebel Street and Randolph Road

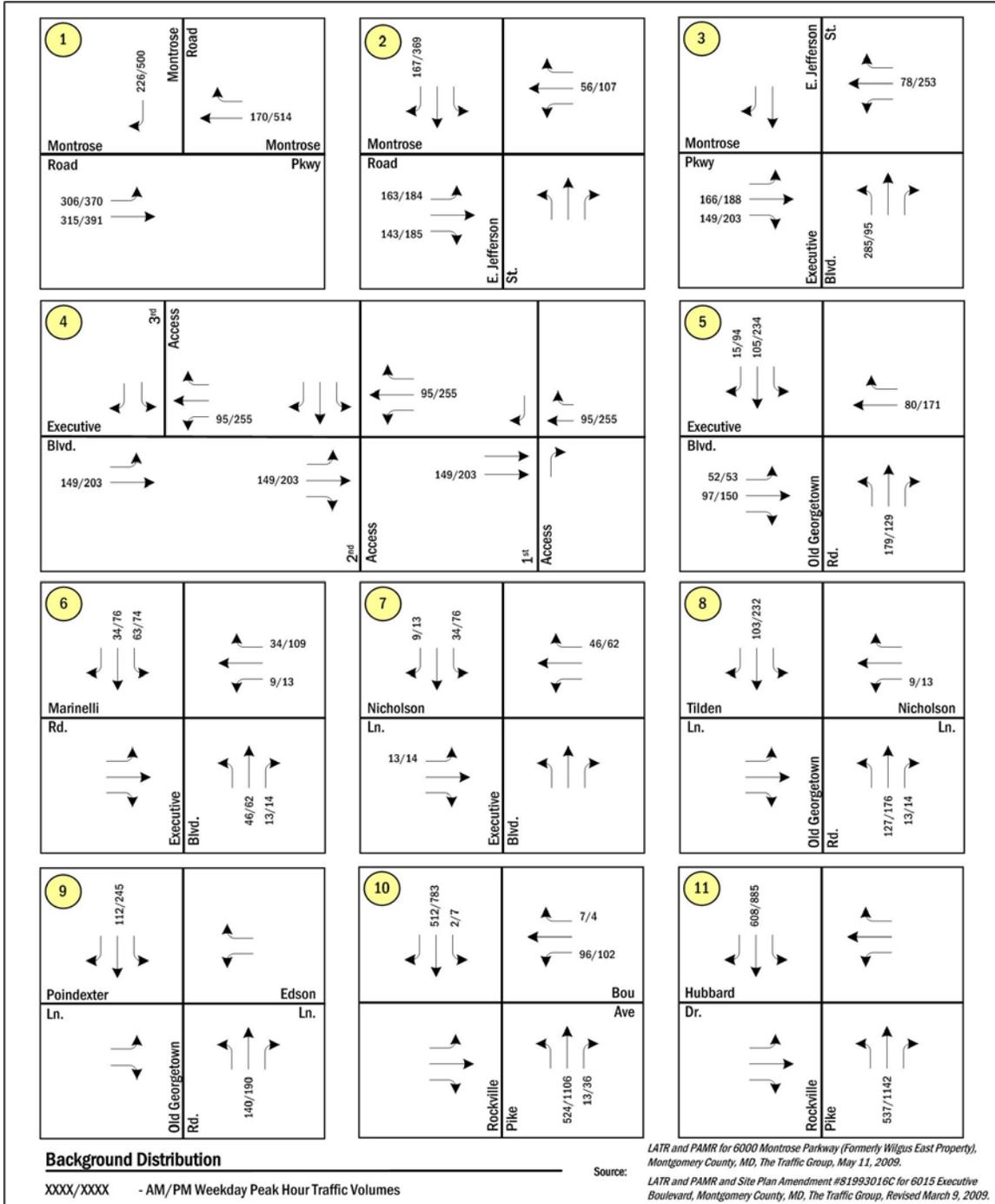


Figure 27a Site 3 Background Trip Distribution

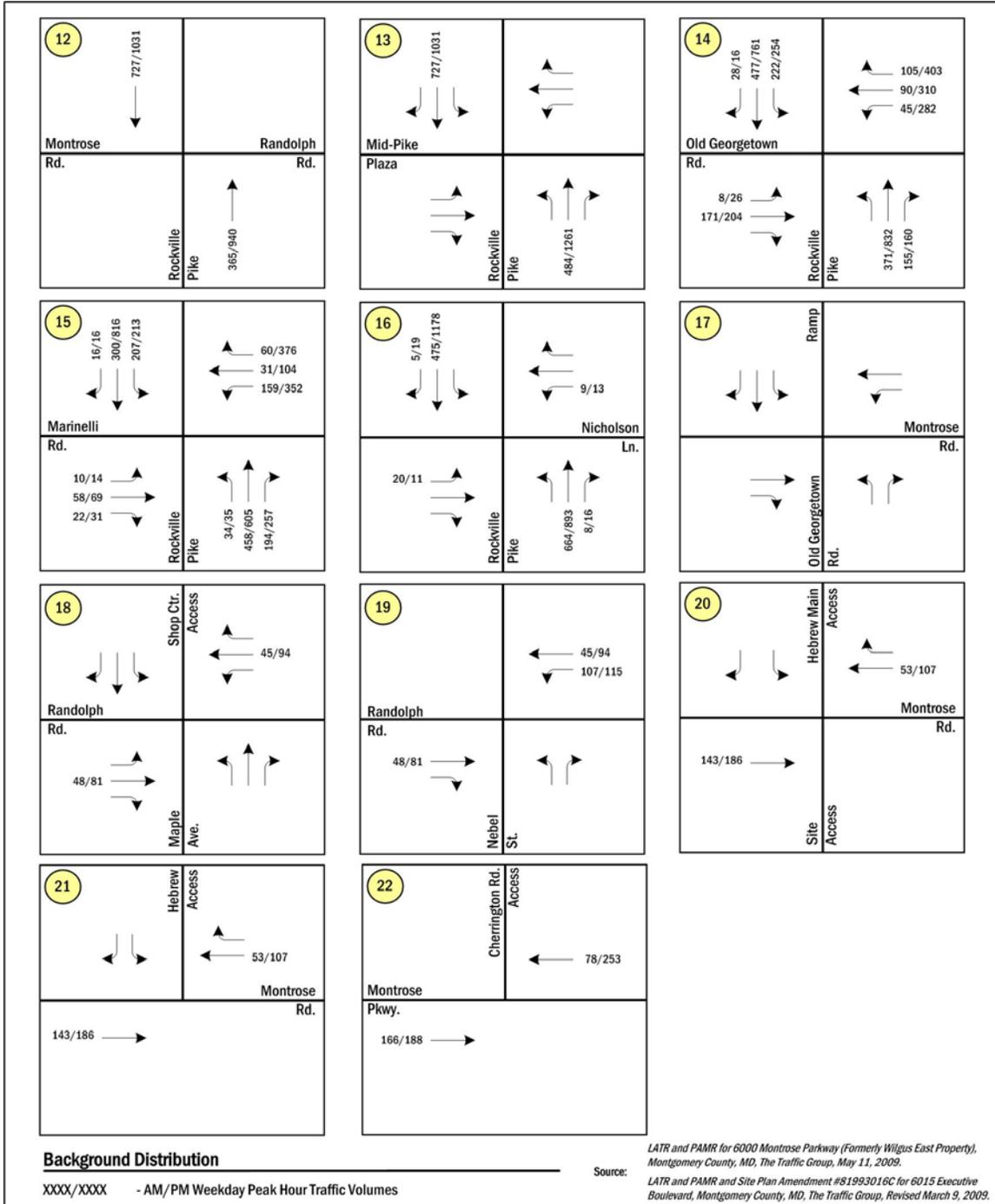


Figure 27b Site 3 Background Trip Distribution

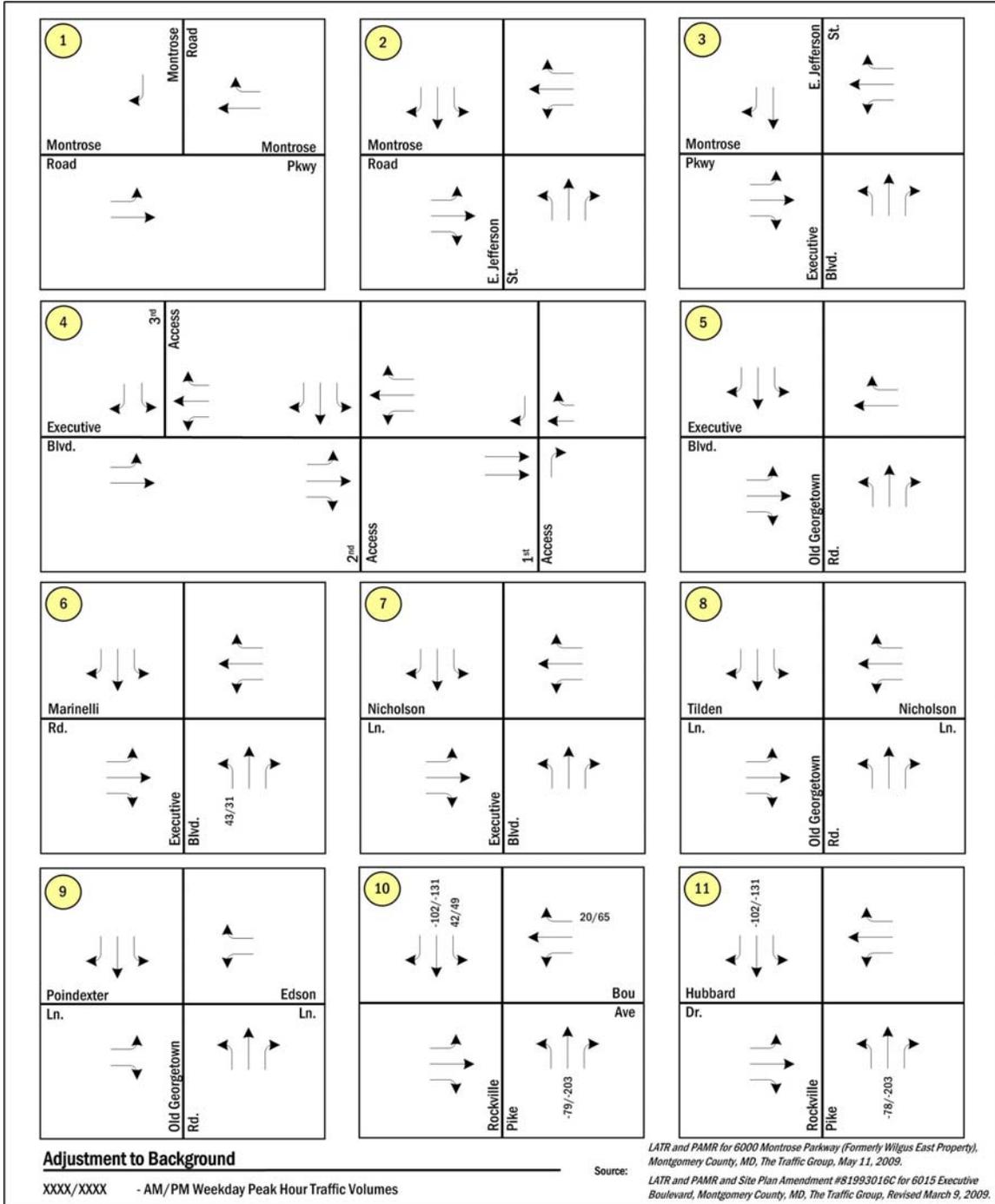


Figure 28a Site 3 Adjustment to Background Trip Distribution

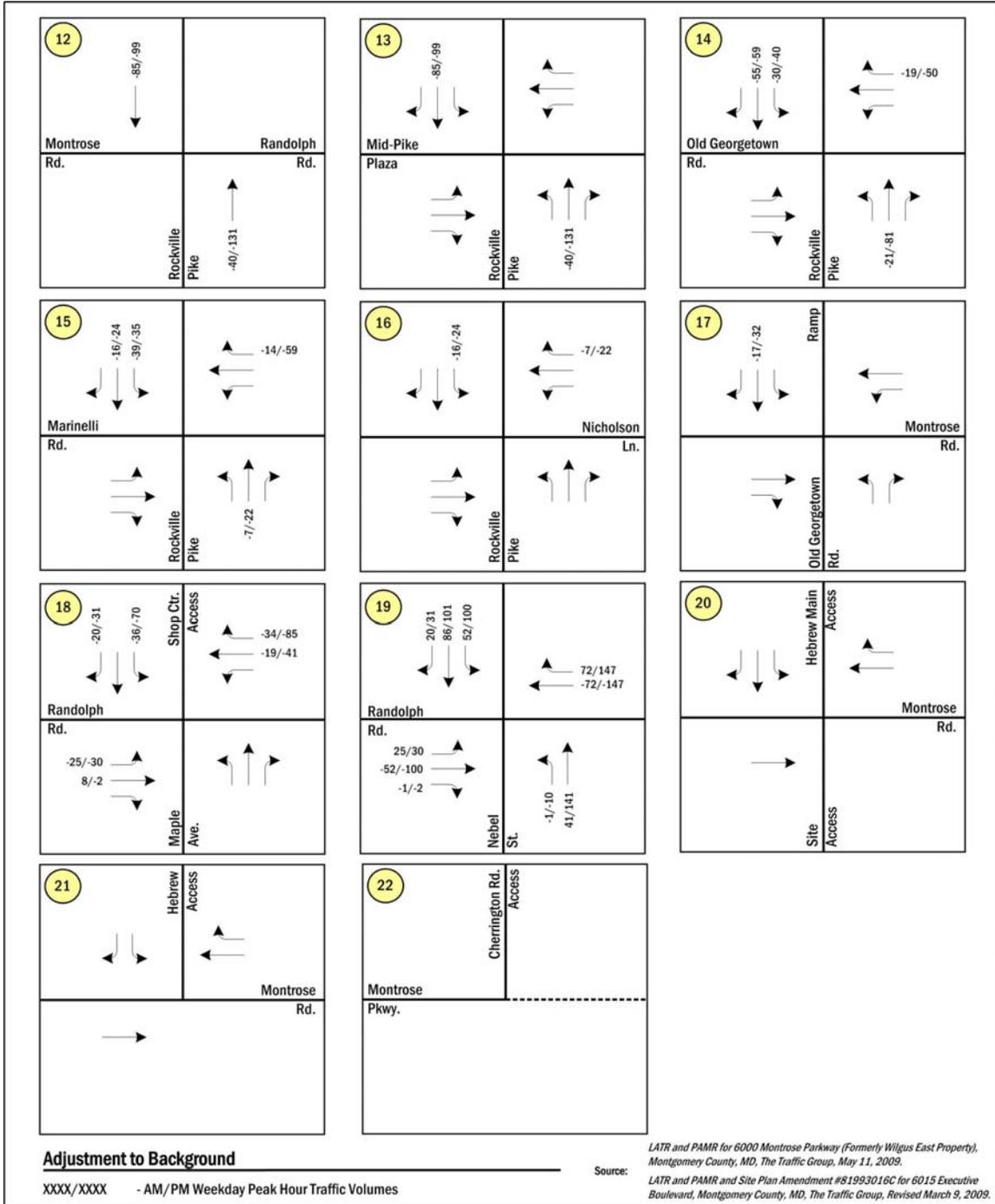


Figure 28b Site 3 Adjustment to Background Trip Distribution

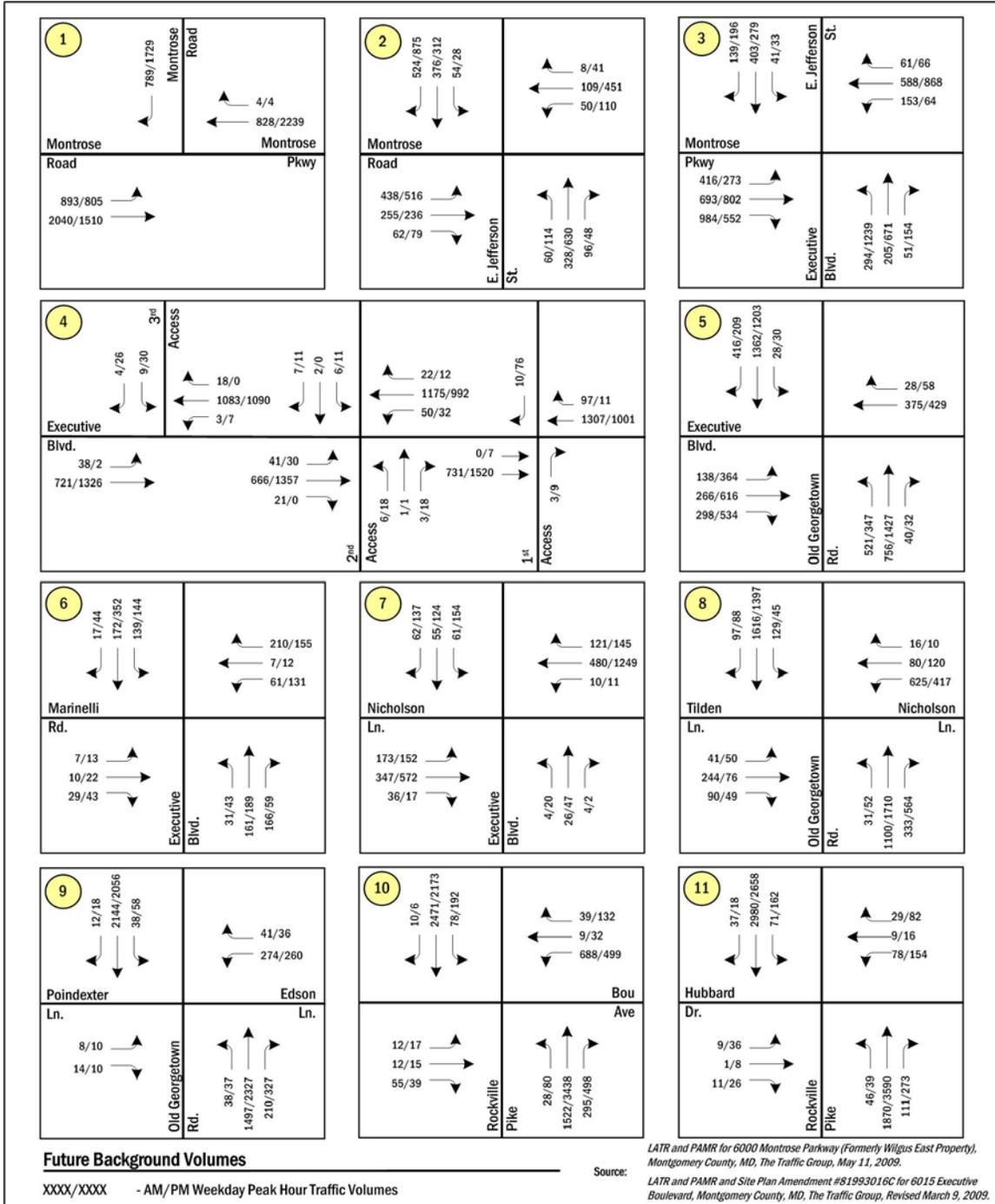


Figure 29a Site 3 Future Background Peak Hour Traffic Volumes

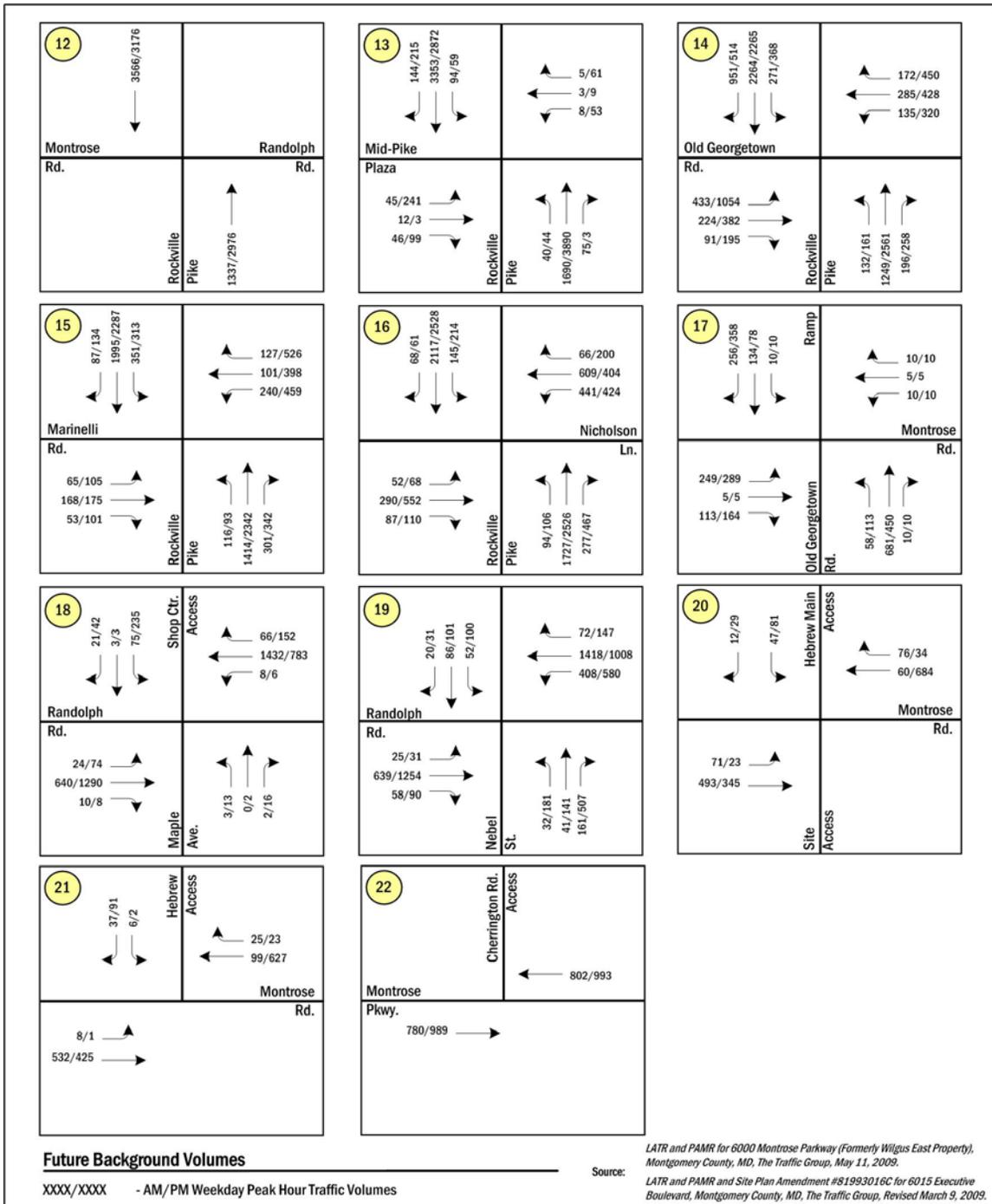


Figure 29b Site 3 Future Background Peak Hour Traffic Volumes

4.4 Analysis of Future Conditions with Development (Year 2012)

The Total Future scenario represents future traffic levels in 2012 with the proposed development on the Washington Science Center campus. This scenario is compared to the Future Background scenario to determine the incremental impact of the proposed development. In order to develop the Total Future forecasts, the Future Background volumes and the project trip volumes are combined. The Total Future scenario also includes planned and programmed roadway improvements that can influence the capacity of study area intersections and/or influence travel route and time of day patterns.

4.4.1 Project Trip Generation

Although all three prospective sites are in varying locations, the trip generation is consistent throughout each site analysis. The LATR notes that peak hour trip estimates for planned land uses should be based on trip rates and formulas provided in Appendix A of the LATR document, if applicable. For this analysis, rates for “General Office over 25,000 sf gross leasable area” will be used for each site. From page 49 of the 2008 LATR:

$$\text{AM: } T = 1.70 (A) - 8$$

$$\text{PM: } T = 1.44 (A) + 20$$

Where T = weekday peak hour vehicle trips and A = gross floor area of building in 1,000sf, therefore,

$$\text{AM: } T = 1.7 (550) - 8 = 927 \text{ trips}$$

$$\text{PM: } T = 1.44 (550) + 20 = 812 \text{ trips}$$

The LATR guidelines also give directional distribution to abide by. In the morning peak hour, 87% (807 trips) are inbound and 13% (120) are outbound. In the afternoon peak hour, 17% (138) are inbound and 83% (674) are outbound.

4.4.2 Project Trip Distribution

The trips generated by the proposed project were distributed to the transportation network using the Trip Distribution and Traffic Assignment Guidelines in the LATR as follows:

To/From	Via	Percent
West	Montrose Road	45%
North	Rockville Pike	15%
East	Randolph Road	15%
South	Rockville Pike	15%
South	Old Georgetown Road	10%
	Total	100%

Figures 30a and 30b show the project trip distribution volumes at each of the study intersections. Figure 31 shows the adjustment to the project trip distribution volumes including the new signal access to the site from Montrose Parkway.

4.4.3 Total Future Traffic Forecasts

In order to calculate the total future volumes, the future background traffic volumes were combined with the assigned site trips. Figures 32a and 32b show the total future peak hour traffic volumes.

4.4.4 Total Future Capacity Analysis

Based on the total future volumes and other field observations noted above, the capacity of the intersections was evaluated for both the morning and afternoon peak hours, using the Critical Lane Analysis Technique, as was done for the base and background traffic conditions. The capacity analysis results are summarized in Tables 6a and 6b. The capacity analysis worksheets are included in the Appendix C-3.

The capacity analysis results for total future conditions show that the following five intersections would operate above the CLV standards during atleast one peak hour:

- Executive Boulevard/E. Jefferson Street and Montrose Parkway
- Rockville Pike and Bou Avenue
- Rockville Pike an Hubbard Drive
- Rockville Pike and Old Georgetown Road
- Nebel Street and Randolph Road

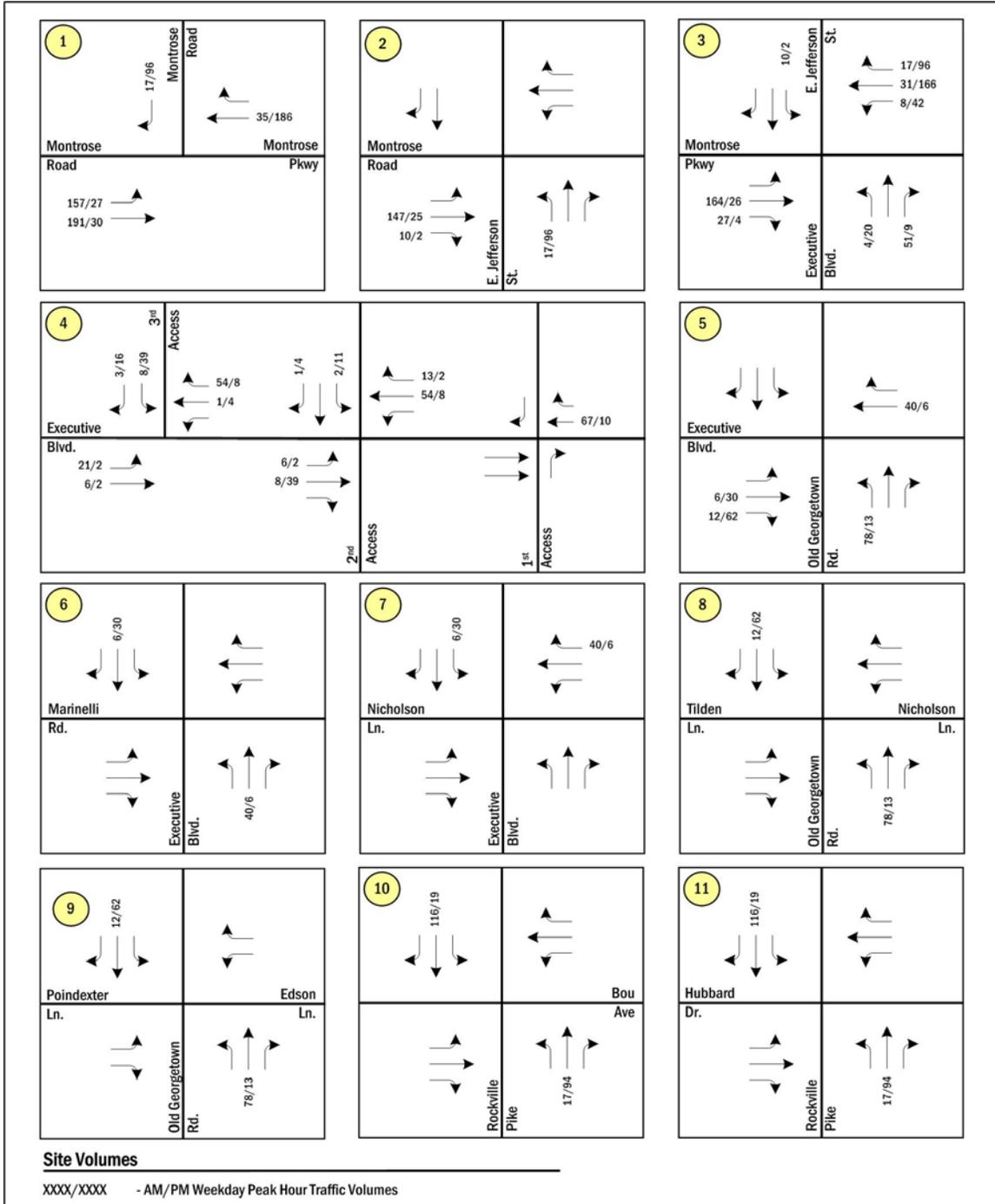


Figure 30a Site 3 Project Trip Distribution

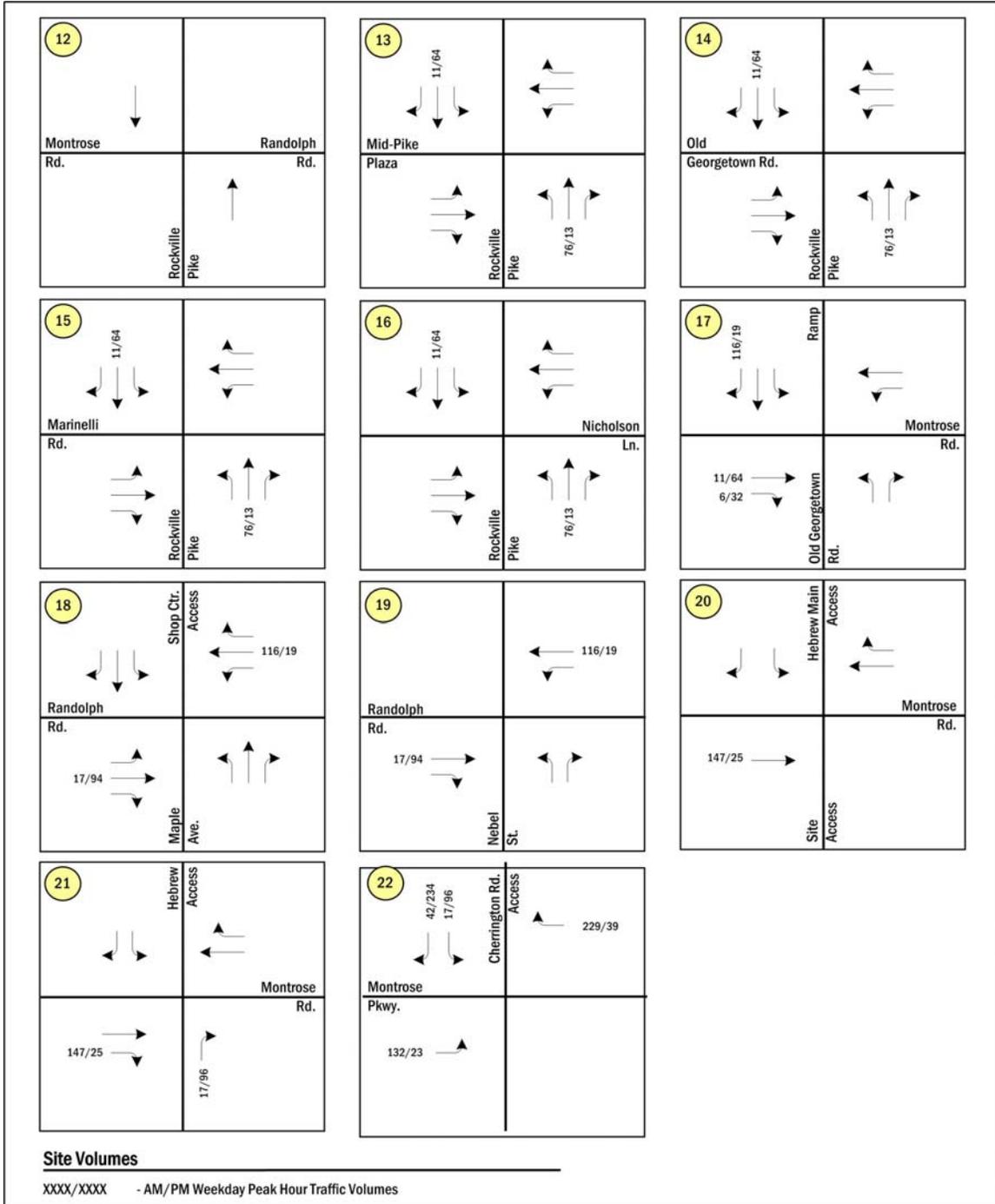


Figure 30b Site 3 Project Trip Distribution

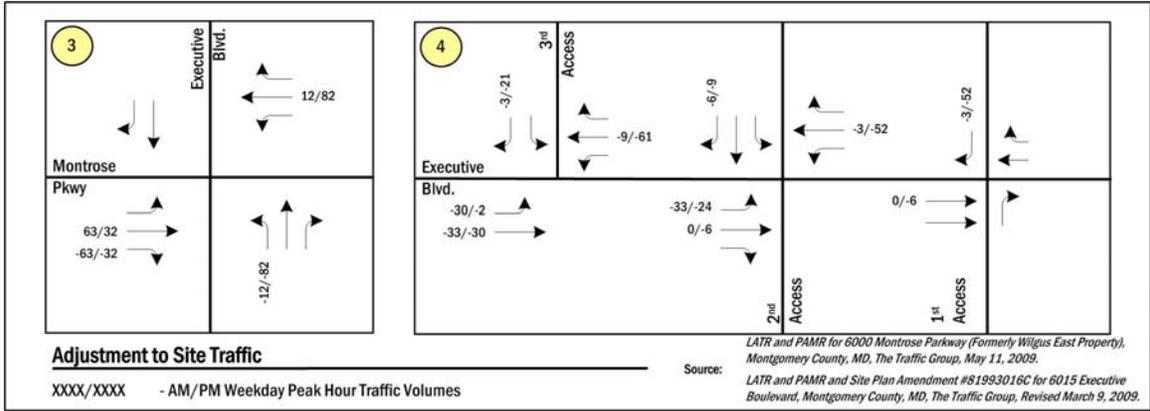


Figure 31 Site 3 Adjustment to Project Trip Distribution

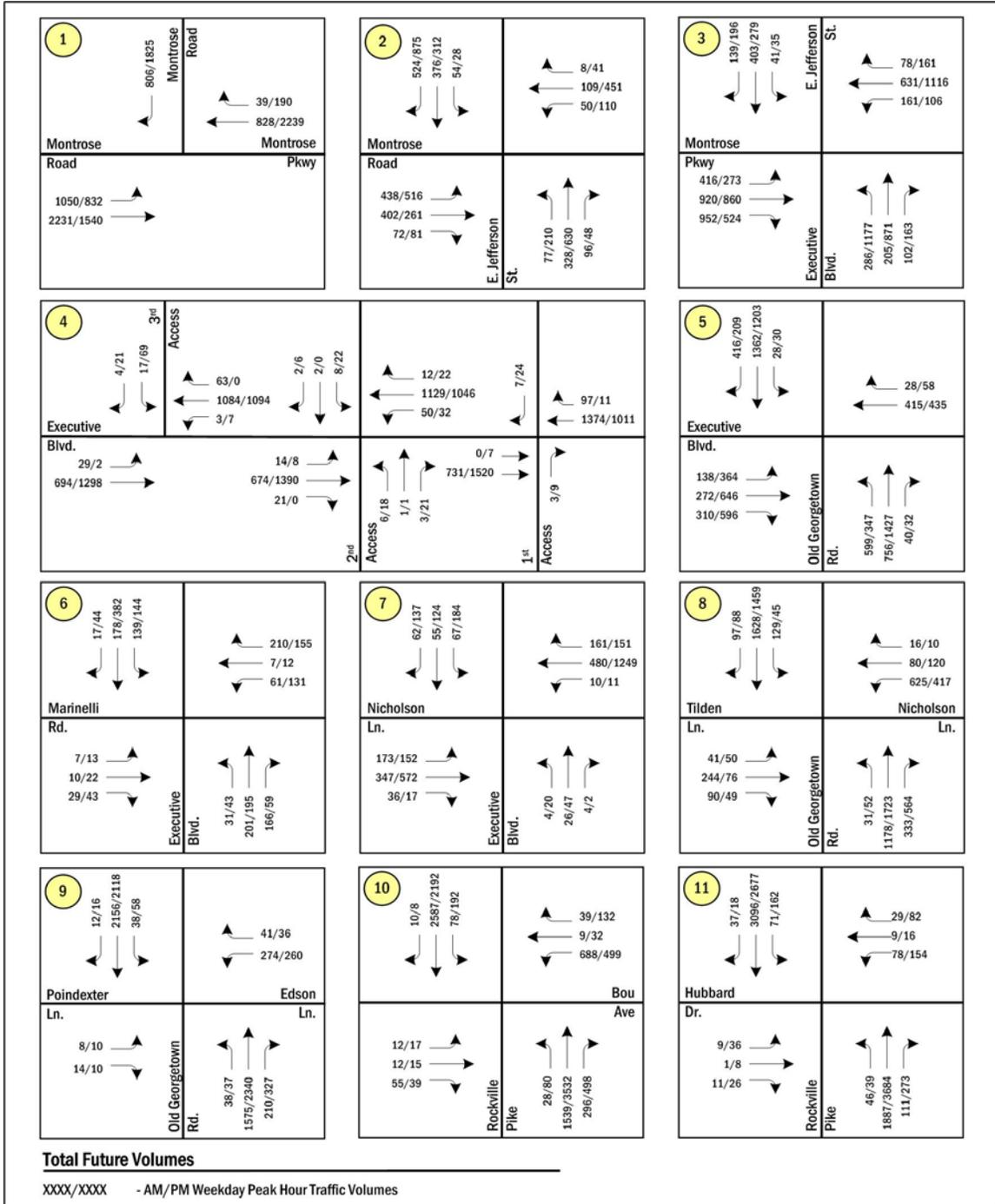


Figure 32a Site 3 Total Future Peak Hour Traffic Volumes

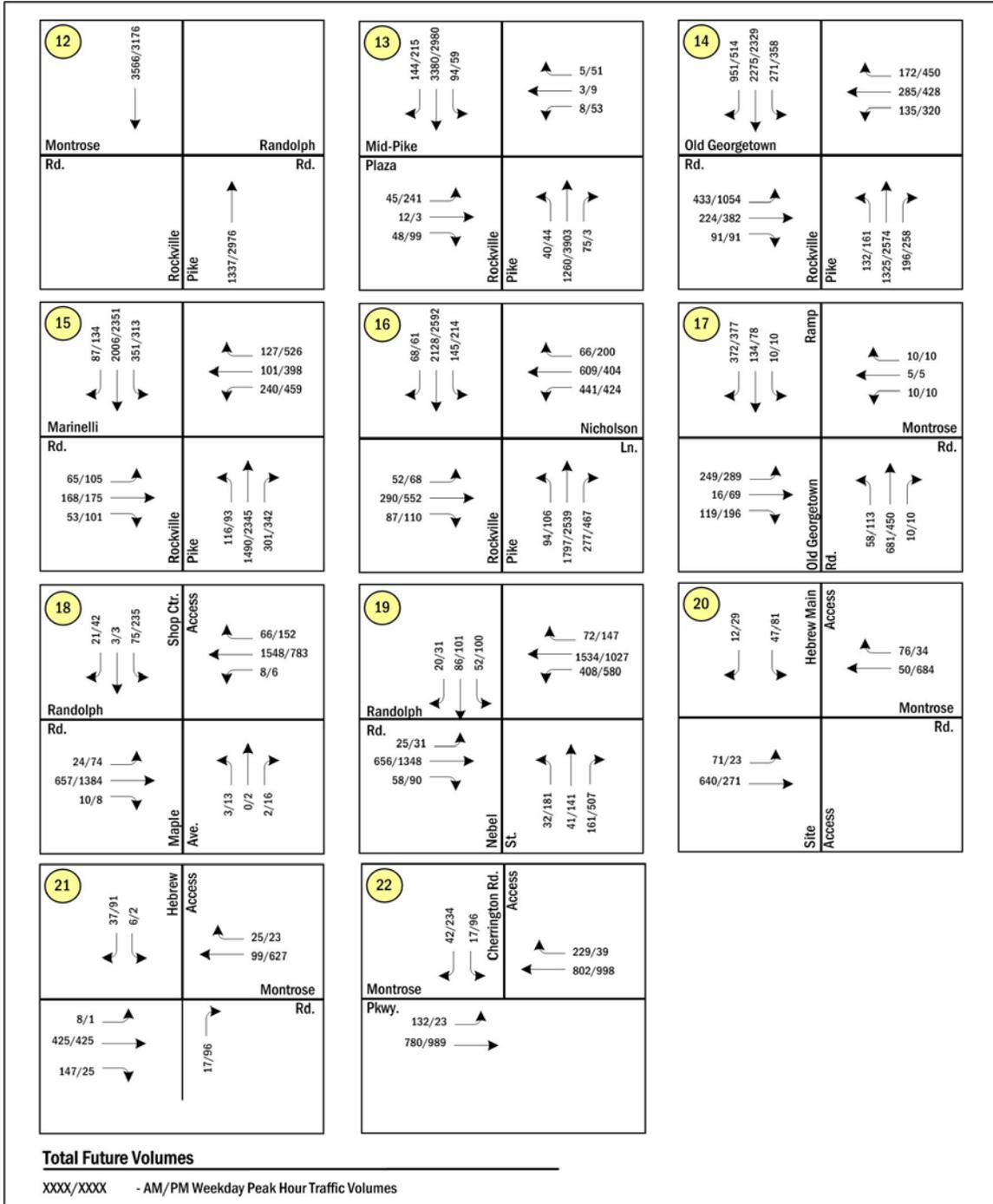


Figure 32b Site 3 Total Future Peak Hour Traffic Volumes

Table 6a - Site 3 Comparative CLV Results for Morning Peak Hour

#	Intersection	CLV Threshold	Existing	Background	Total Future
			AM	AM	AM
1	Montrose Road and Montrose Parkway	1550	914	1081	1182
2	East Jefferson Street and Montrose Road	1550	602	718	718
3	Executive Blvd and Montrose Parkway *	1550	1652	1696	1668
	with Improvements				1500
4	Executive Boulevard and 3rd access point	1550	586	636	660
5	Executive Boulevard and 2nd access point	1550	489	486	473
6	Executive Boulevard and 1st access point	1550	494	529	551
7	Executive Boulevard and Old Georgetown Road	1800	1382	1478	1565
8	Executive Boulevard and Marinelli Road	1800	341	429	450
9	Executive Boulevard and Nicholson Lane	1550	505	568	596
10	Old Georgetown Road and Tilden Lane/Nicholson Lane	1800	1617	1665	1688
11	Old Georgetown Road and Poindexter Lane/Edson Lane	1800	1037	1132	1136
12	Rockville Pike and Bou Avenue *	1550	1135	1338	1381
	with Improvements				1288
13	Rockville Pike and Hubbard Drive *	1550	1065	1252	1295
	with Improvements				1279
14	Rockville Pike and Montrose Road/Randolph Road	1550	877	1070	1070
15	Rockville Pike and Mid Pike Plaza	1800	967	1159	1162
16	Rockville Pike and Old Georgetown Road *	1800	1185	1498	1502
	Improvements are infeasible				
17	Rockville Pike and Marinelli Road	1800	772	1231	1259
18	Rockville Pike and Nicholson Lane	1800	1101	1292	1296
19	Old Georgetown Road and Montrose Road	1550	849	640	651
20	Maple Avenue and Randolph Road	1550	963	898	959
21	Nebel Street and Randolph Road *	1550	783	1069	1130
	with Improvements				1121
22	Hebrew Access and Montrose Road	1550	245	320	398
23	Hebrew main access and Montrose Road	1550	253	329	350
24	Montrose Parkway and Site Access	1550	384	425	633

Table 6b - Site 3 Comparative CLV Results for Evening Peak Hour

#	Intersection	CLV Threshold	Existing	Background	Total Future
			PM	PM	PM
1	Montrose Road and Montrose Parkway	1550	1075	1485	1495
2	East Jefferson Street and Montrose Road	1550	767	1084	1084
3	Executive Blvd and Montrose Parkway *	1550	1429	1703	1853
	with Improvements				1740
4	Executive Boulevard and 3rd access point	1550	658	767	786
5	Executive Boulevard and 2nd access point	1550	707	815	835
6	Executive Boulevard and 1st access point	1550	710	809	815
7	Executive Boulevard and Old Georgetown Road	1800	1278	1479	1528
8	Executive Boulevard and Marinelli Road	1800	370	494	497
9	Executive Boulevard and Nicholson Lane	1550	995	1071	1104
10	Old Georgetown Road and Tilden Lane/Nicholson Lane	1800	1394	1478	1483
11	Old Georgetown Road and Poindexter Lane/Edson Lane	1800	1152	1320	1325
12	Rockville Pike and Bou Avenue *	1550	1376	1761	1795
	with Improvements				1776
13	Rockville Pike and Hubbard Drive *	1550	1434	1779	1814
	with Improvements				1795
14	Rockville Pike and Montrose Road/Randolph Road	1550	673	953	953
15	Rockville Pike and Mid Pike Plaza	1800	1197	1528	1532
16	Rockville Pike and Old Georgetown Road *	1800	1414	2360	2365
	Improvements are infeasible				
17	Rockville Pike and Marinelli Road	1800	1066	1785	1786
18	Rockville Pike and Nicholson Lane	1800	1380	1702	1707
19	Old Georgetown Road and Montrose Road	1550	617	595	669
20	Maple Avenue and Randolph Road	1550	1495	960	1007
21	Nebel Street and Randolph Road *	1550	1388	2057	2107
	with Improvements				1897
22	Hebrew Access and Montrose Road	1550	457	514	514
23	Hebrew main access and Montrose Road	1550	382	439	444
24	Montrose Parkway and Site Access	1550	425	529	784

4.4.5 Transportation Improvement Considerations

Of the 22 intersections analyzed, 17 intersections will operate in 2012 conditions with an acceptable CLV level during both the morning and afternoon peak hours. Mitigation measures for the five intersections operating above the congestion standard are as follows:

1. At the intersection of Executive Boulevard and Montrose Parkway, restripe the southbound through lane as a shared through left-turn lane and modify the signal phasing to provide split phasing operations for the northbound and southbound approaches.
2. At the intersection of Bou Avenue and Rockville Pike, restripe Bou Avenue's westbound approach to provide two left turn lanes and one left-through-right lane onto Rockville Pike. Signal modifications will be required to provide additional signal heads, additional signage and optimized phasing/timing operations.
3. At the intersection of Rockville Pike and Hubbard Drive, restripe the westbound shared through-right-turn lane as a shared left-through-right-turn lane and modify the signal phasing to provide split phasing operations for the eastbound and westbound approaches. Signal modifications will be required to provide additional signal heads, additional signage and optimized phasing/timing operations.
4. At the intersection of Randolph Road and Nebel Street, restripe the middle northbound left-turn lane as a shared left-right-turn lane and modify the signal phasing to provide split phasing operations for the northbound and southbound approaches.
5. Due to right-of-way constraints, the additional trips impacting the intersection of Rockville Pike and Old Georgetown Road cannot be mitigated at this location.

The proposed roadway improvements are shown in the Future Lane Configuration Figures 33a and 33b.

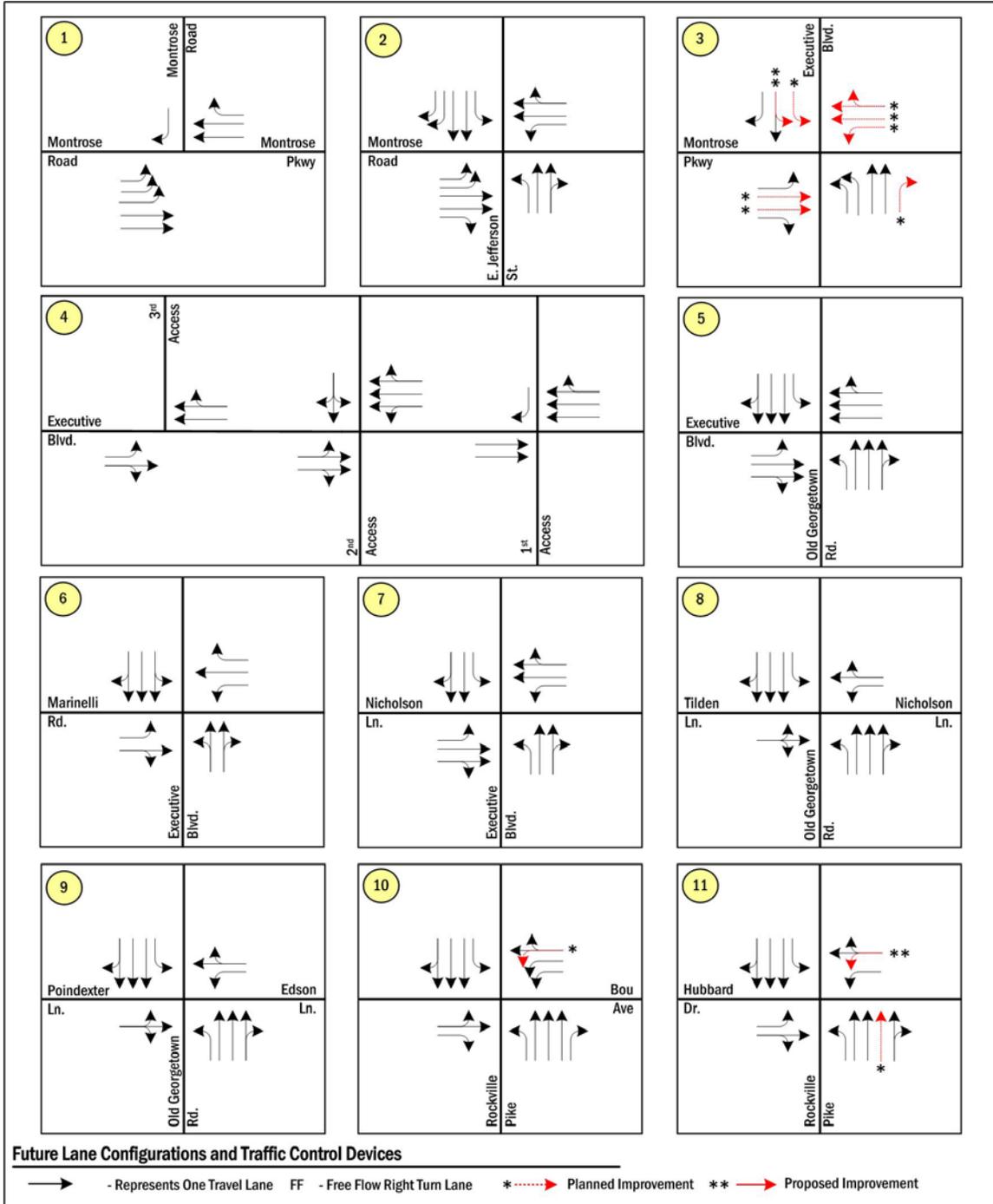


Figure 33a Site 3 Future Lane Configurations and Traffic Control Devices

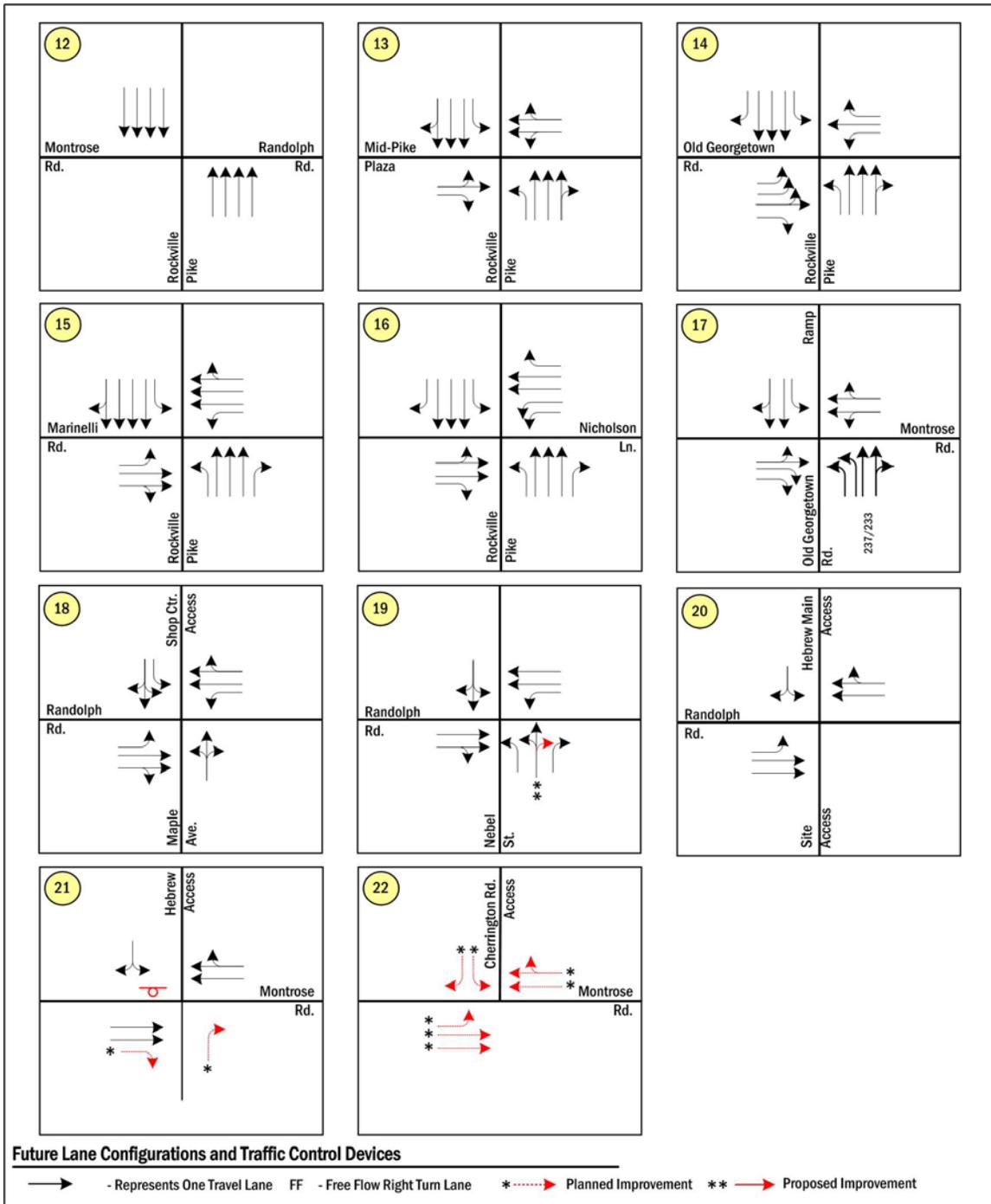


Figure 33b Site 3 Future Lane Configurations and Traffic Control Devices

4.5 Site 3 Summary

This section of the report presents the results of the transportation conditions assessment prepared by Gorove/Slade Associates, Inc. for the Washington Science Center site. The highlights of this report are summarized as follows:

- a) Regional access to the site is provided by I-270 approximately 1.7 miles to the west and arterials such as Montrose Road, Randolph Road, Rockville Pike (MD 355) and Old Georgetown Road (MD 187). Direct access to the site is available from “old” Old Georgetown Road, Montrose Road, Montrose Parkway and Executive Boulevard.
- b) A total of twenty two (21) intersections were analyzed to determine the base traffic conditions in the vicinity of the campus.
- c) The base volumes were adjusted to include the roadway projects currently under construction. The base conditions capacity analysis results show that all study area intersections and campus access points operate within the applicable CLV standards except Executive Boulevard and Montrose Parkway in the morning peak hour.
- d) Fifteen (15) background projects have been identified as approved, but un-built projects expected to be complete in 2012.
- e) The future background capacity analysis results show that all study area intersections and campus access points operate within the applicable CLV standards except for the following:
 - Executive Boulevard and Montrose Parkway
 - Rockville Pike and Bou Avenue
 - Rockville Pike and Hubbard Drive
 - Rockville Pike and Old Georgetown Road
 - Nebel Street and Randolph Road
- f) Projected trip generation using the LATR 2008 guidelines for 550,000 sf of general office uses consists of approximately 927 trips (807 in and 120 out) in the morning peak hour and 812 trips (138 in and 674 out) in the afternoon peak hour.
- g) Of the 22 intersections analyzed, 17 intersections will operate in 2012 conditions with an acceptable CLV level during both the morning and

afternoon peak hours. Mitigation measures for the five intersections operating above the congestion standard are as follows:

1. At the intersection of Executive Boulevard and Montrose Parkway, restripe the southbound through lane as a shared through left-turn lane and modify the signal phasing to provide split phasing operations for the northbound and southbound approaches.
2. At the intersection of Bou Avenue and Rockville Pike, restripe Bou Avenue's westbound approach to provide two left turn lanes and one left-through-right lane onto Rockville Pike. Signal modifications will be required to provide additional signal heads, additional signage and optimized phasing/timing operations.
3. At the intersection of Rockville Pike and Hubbard Drive, restripe the westbound shared through-right-turn lane as a shared left-through-right-turn lane and modify the signal phasing to provide split phasing operations for the eastbound and westbound approaches. Signal modifications will be required to provide additional signal heads, additional signage and optimized phasing/timing operations.
4. At the intersection of Randolph Road and Nebel Street, restripe the middle northbound left-turn lane as a shared left-right-turn lane and modify the signal phasing to provide split phasing operations for the northbound and southbound approaches.
5. Due to right-of-way constraints, the additional trips impacting the intersection of Rockville Pike and Old Georgetown Road cannot be mitigated at this location.



APPENDICES

(RAW DATA NOT INCLUDED)

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