

**MASON ROW
TRAFFIC IMPACT STUDY
CITY OF FALLS CHURCH, VIRGINIA**

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Section I INTRODUCTION

This report presents the results of a traffic impact study conducted in support of a proposed new mixed-use project to be developed in the City of Falls Church, Virginia. The subject site is located in the northeast quadrant of the West Broad Street/North West Street intersection, and south of Park Avenue, as shown on Figure I-1.

The properties that comprise the subject application are currently zoned B-3 (“General Business District”), B-1 (“Limited Business”), and R-1B (“Medium Density Residential”). The properties are currently developed with a variety of commercial, office, and residential uses.

The applicant, Spectrum Development LLC, proposes to raze the existing uses and subsequently redevelop the property with the following mix of uses:

- 46,931 gross square feet (GSF) of retail uses.
- A 150-room hotel.
- 253 apartment dwelling units.
- 67 condominium dwelling units.

In furtherance of the above proposed redevelopment project, rezoning and special exception (SE) applications have been filed by the applicant in order to achieve the envisioned mix of uses for the properties. The applicant’s development Statement is provided for reference as Appendix A.

The redevelopment plan, as proposed, is consistent with the City’s vision for mixed-use development within the West Street/West Broad Street Area as outlined in the City’s Comprehensive Plan. The development plan includes an enhanced pedestrian network designed in a manner to be both visually appealing and functionally superior to meet the needs of existing and future residents/patrons.

The entire redevelopment, from its mix of uses on one site to its transit connectivity, trip mitigation measures, and pedestrian friendly environment achieves this future vision as outlined in the Falls

Church Comprehensive Plan. By providing complementary uses on the same site, the proposed development will encourage self-contained pedestrian trips. Additionally, due to its location along transit routes and with the implementation of Transportation Demand Management (TDM) strategies, many of the trips generated by the proposed development are anticipated to utilize non-auto modes of transportation, also consistent with the City’s framework established in the Comprehensive Plan. The redevelopment plan, as submitted, is shown on Figure I-2.

According to the 24VAC30-155 (“Chapter 870”) regulations, all development proposals which meet certain specific trip generation thresholds are subject to the regulations as outlined in VDOT’s Traffic Impact Analysis Regulations Administrative Guidelines (“Administrative Guidelines”). In January 2012, an amendment to the Administrative Guidelines took effect that determined a development proposal is considered to substantially impact the transportation network if it generates 5,000 or more net new daily vehicle trips located on, or within 3,000 feet of, a VDOT maintained roadway. Based on the trips anticipated to be generated by the subject development, the subject development would not require a Chapter 870 compliant traffic study.

Although a traffic impact analysis is not required per 24VAC30-155, the City of Falls Church requires the submission of a traffic study in conjunction with any development application. The basis of this traffic impact assessment then includes a field reconnaissance of the area to determine access opportunities and constraints, traffic counts conducted at key intersections in the site vicinity, a review of the City’s Comprehensive Plan, as well as conversations with City staff to ascertain planned transportation improvements/enhancements, and information from Spectrum Development LLC including preliminary site concepts.

This traffic assessment was completed in accordance with the City of Falls Church policies and guidelines and is intended to address the following issues:

- I. Estimation of the total vehicle trip ends generated by the planned land uses during the weekday peak hours.

2. Determination of the effects of the development proposal on the surrounding local roadway network.
3. Identification of potential road and/or operational improvements necessary to mitigate the impacts of the developer's proposal.

A scoping meeting was held with City staff to determine specific study parameters. The resulting traffic study scoping form is provided in Appendix B. Tasks undertaken in the course of this study included the following:

1. A review of the Spectrum Development LLC's conceptual plans for the subject site.
2. A field reconnaissance of the subject site in order to determine existing roadway and intersection geometrics and traffic controls, access opportunities and/or constraints, and general traffic conditions.
3. Peak hour turning movement and pedestrian counts were obtained at the following study intersections:
 - a. West Broad Street/West Street
 - b. North West Street/Grove Avenue
 - c. North West Street/Park Avenue
 - d. West Broad Street/Spring Street
 - e. Park Avenue/North Spring Street
 - f. North West Street/Lincoln Avenue
 - g. Grove Avenue/W&OD Trail
 - h. North West Street/W&OD Trail
 - i. West Broad Street/Birch Street
 - j. West Broad Street/Oak Street*
 - k. Park Avenue/North Oak Street*

Generally, counts were conducted at the key study intersections listed above on Thursday, September 12, 2013. The intersections denoted above by an asterisk (*) were added to the scope at the request of staff and advised that the baseline counts associated with the *706 West Broad Street Traffic Impact Study* should be used for those intersections.

Additionally, all existing entrances serving the current site uses were counted on

Thursday, September 12, 2013 in order to determine the existing trip generation characteristics of the subject site.

4. Calculation of existing weekday AM and PM peak hour intersection levels of service at the study intersections.
5. Identification of the number of peak hour trips that would be generated by the proposed mixed-use development based on standard Institute of Transportation Engineers (ITE) 9th edition Trip Generation rates/equations.
6. Determination of future background traffic forecasts based on estimates of traffic that would be generated by other approved/planned developments in the site vicinity.
7. Calculation of future levels of service both with and without the proposed development at the key study intersections and all proposed site entrances for a proposed build-out year of 2019.

Sources of data for this analysis included traffic counts conducted by Wells + Associates Inc, information obtained from the City of Falls Church, the Institute of Transportation Engineers (ITE), the Highway Capacity Manual 2000 (Synchro software, version 7), Spectrum Development LLC, and the files and library of Wells + Associates.

Conclusions

Based on the results of this traffic impact study, the following may be concluded:

1. ***The redevelopment plan proposed by Spectrum Development LLC is consistent with the City and community's long term vision for the West Broad Street corridor as reflected in the adopted Comprehensive Plan.***

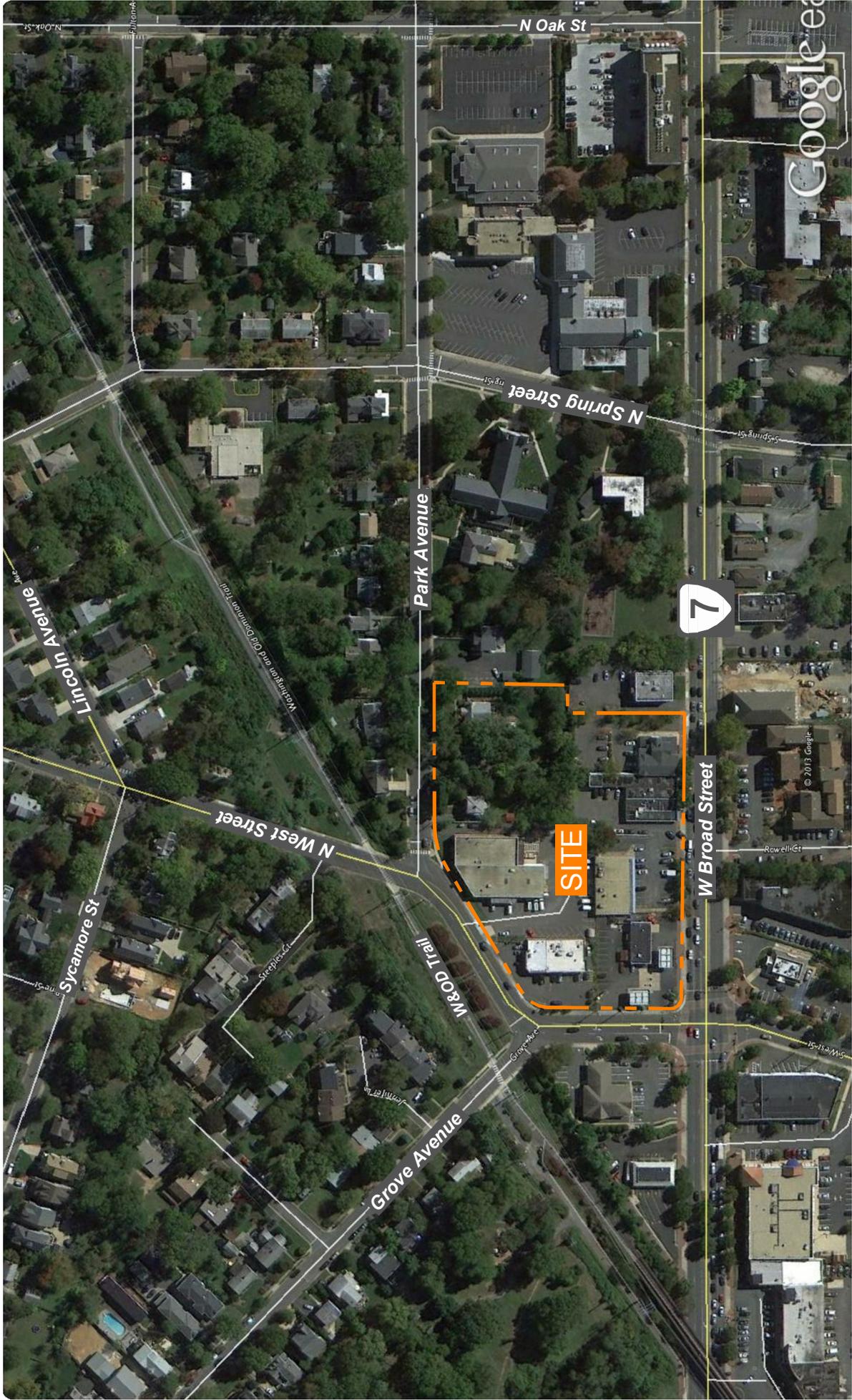


Figure 1-1
Site Location



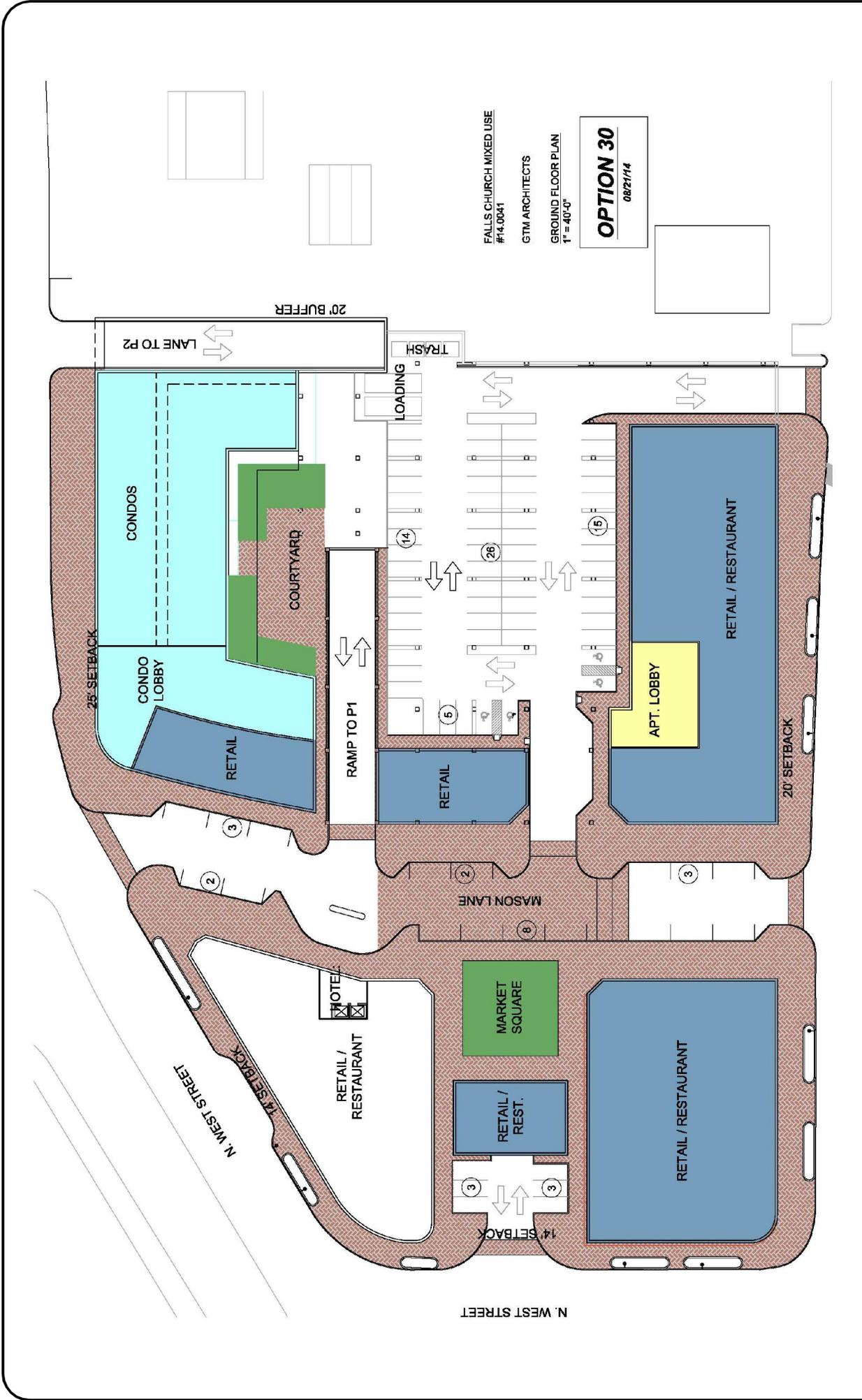


Figure 1-2
Site Redevelopment Plan Reduction



2. **All signalized intersections within the study area currently operate at overall adequate levels of service (LOS “D” or better), except for the West Broad Street/West Street intersection which operates at LOS “E” during the PM peak hour.**
3. **Side street approaches along West Broad Street that operate under STOP sign control generally experience significant delays during commuter peak hours due to heavy mainline volumes.**
4. **Under future 2019 traffic conditions, without the development of the subject site, delays would increase at study intersections due to regional traffic growth and trips generated by other approved/pending development within the City. However, overall levels of service would remain generally consistent with existing conditions, except for the West Broad Street/West Street intersection which would operate at LOS “E” during the AM peak hour.**
5. **The Broad & West redevelopment project is anticipated to experience vehicle trip reductions due to internal trip capture, pass-by trip activity, and non-auto mode choice. The development, as a whole, is forecasted to generate 367 weekday AM and 366 weekday PM upon completion and full occupancy by 2019.**
6. **Under future 2019 traffic conditions, with the development of the subject site, intersection levels of service would remain generally consistent with background conditions, except the West Broad Street/West Street intersection which would operate at overall LOS “F” during the PM peak hour. Additional mitigation measures, as outlined below, would serve to further improve the transportation network.**

Recommendations

Based on the above conclusions and in order to mitigate the impacts of the subject development and improve the overall transportation network, the following recommendations should be considered:

1. **As part of the redevelopment plan and to encourage walking trips, the applicant should provide and enhance the pedestrian facilities within the site’s block. The applicant should further ensure connections between the site’s internal network and the surrounding pedestrian/bicycle system, including the W&OD Trail, as envisioned in the Comprehensive Plan.**
2. **The applicant should encourage bicycling as a mode of travel. Bicycle racks for site customers/visitors as well as bicycle storage lockers for residents should be provided.**
3. **The western site access point along West Broad Street should operate as right-in/right-out only.**
4. **The site access point along North West Street nearest to the signalized intersection at West Broad Street should operate as right-in/right-out only.**
5. **The intersection of North West Street and Park Avenue should be reconfigured to accommodate a fourth leg accessing the subject site. The reconfiguration should properly align the four approaches and a signal should be installed in order to improve intersection operations and safety.**
6. **To improve levels of service, restriping of North West Street at the approach to West Broad Street should be considered in order to provide for three approach lanes.**
7. **The applicant should implement Transportation Demand Management**

(TDM) strategies to encourage the use of alternate modes of transportation. A peak hour trip reduction target of 15% should be established for the site's residential and hotel components

Section 2 BACKGROUND INFORMATION

Location and Surrounding Uses

The site is located within the western limits of the City of Falls Church and is currently developed with a mix of commercial buildings, including a gas station, strip retail, and a warehouse building. Additionally, the site includes three single family detached homes along Park Avenue. Low-scale commercial uses generally surround the property to the west, south, and east. Residential uses are found east along Park Avenue and north along North West Street. Notably, the Washington and Old Dominion (W&OD) trail runs proximate to the site along the north side of North West Street. The W&OD trail is a major recreational trail for foot traffic and bicyclists. Also, Saint James Catholic Church and School is located east of the site along North Spring Street.

Comprehensive Plan Land Use Recommendations

The subject site is located within AREA 3-West Street/West Broad Street Area of the City's Comprehensive Land Use Plan (cf. Chapter 4). Redevelopment of the corridor with primarily retail and commercial uses is encouraged in the Plan in a manner that would be harmonious with the City's Design Guidelines. The Plan further states that when redevelopment is considered along the corridor, the following recommendations (among others) should be adhered to:

- Consolidate parcels to allow larger scale and mixed-use development,
- Consolidate entrances,
- Develop retail uses or retail appearance on the first floor of buildings on West Broad Street,
- Locate buildings close to West Broad Street with parking in the rear whenever possible,
- Effectively landscape parking areas on the interiors and such that they are screened from streets,

- Achieve specific and consistent architectural goals (building materials, window types, roof overhangs, roof pitch, and porches.

In furtherance of these recommendations and as elaborated in the applicant's Statement, an amendment to the City's Comprehensive Plan has been requested in order to change the site's designation on the land use map to "Mixed Use". The redevelopment plan achieves these objectives and further promotes a sustainable multi-modal transportation environment as elaborated in the following sections.

Existing Transportation Network

Existing Road Network. The following is a description of the roadways surrounding the proposed mixed-use development. For purposes of this report, West Broad Street (Route 7) is assumed east/west. All cross streets are referenced north/south, as appropriate. Figure 2-1 depicts existing lane use and traffic controls in the vicinity of the subject site:

West Broad Street (Route 7). West Broad Street fronts the southern boundary of the subject site and is currently constructed as a four-lane, median divided highway which transitions to an undivided highway immediately east of the site. West Broad Street carries a posted speed limit of 25 miles per hour (mph). According to the Falls Church Comprehensive Plan, South Washington Street is classified as a principal arterial. As stated in the Plan, "principal arterials are high traffic volume corridors that serve the major centers of activity of metropolitan areas and carry the longest trips over relatively straight courses." Accordingly, it is one of the major thoroughfares for travelers within the City of Falls Church.

West Street. West Street is constructed as a two-lane, undivided, street with a posted speed limit of 25 mph. According to the Plan, West Street is classified as a minor arterial. As stated in the Plan, a minor arterial roadway "connects to and augments the principal arterial system. Minor arterials provide access to property abutting the street and carry lower traffic volumes and less through traffic than principal arterials." The intersection of West Broad Street and West Street operates under signal

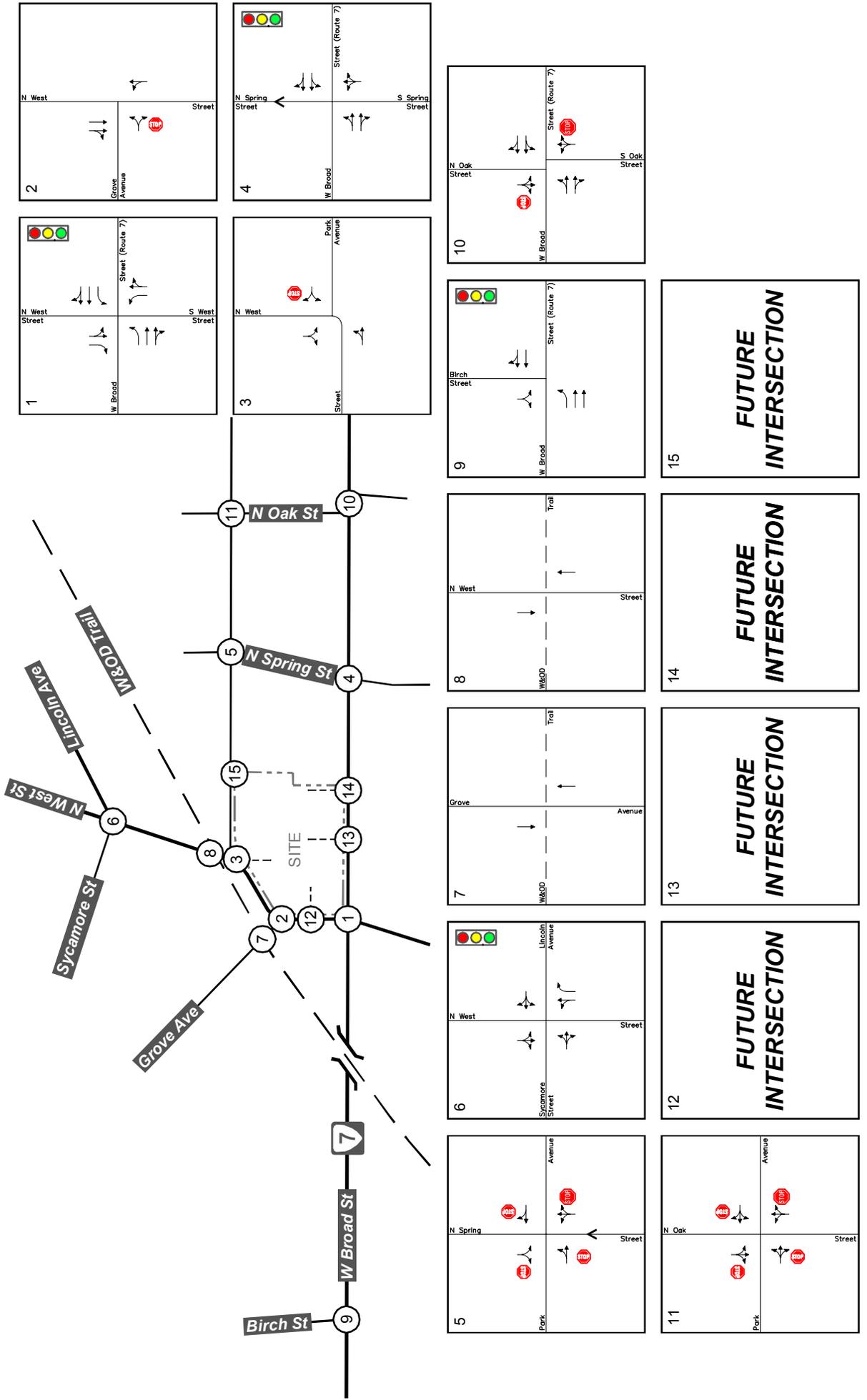


Figure 2-1 Existing Lane Use and Intersection Control

Represents One Travel Lane
 Signalized Intersection
 Stop Sign



control.

Park Avenue. Park Avenue is a two-lane, undivided, local street with a posted speed limit of 25 mph that runs from North West Street east along the northern property boundary. On-street parking is permitted along Park Avenue.

Grove Avenue. Grove Avenue is a two-lane, undivided, local street with a posted speed limit of 25 mph that runs from North West Street northwest to Haycock Road proximate to the West Falls Church metrorail station. On-street parking is permitted along Grove Avenue.

Washington and Old Dominion (W&OD) Trail. The W&OD Trail is a major multi-use recreational trail that generally follows the former alignment of the Washington and Old Dominion railroad. In the vicinity of the subject site, the trail has at-grade crossings at both Grove Avenue and North West Street.

Public Transit Service. The subject site is served by the following WMATA Metrobus Routes:

- 28A – “Leesburg Pike Line”
- 28X – “Leesburg Pike Limited Line”
- 3T – “Pimmit Hills Line”

These bus routes all run along West Broad Street within the City of Falls Church and provide service to the West Falls Church metrorail station. Directly adjacent to the site, marked bus stops are provided along West Broad Street as shown on Figure 2-2.

Pedestrian Facilities. Sidewalks are generally provided along the roadways in the immediate area of the subject site. As shown on Figure 2-3, sidewalks are located on both sides of West Broad Street and Park Avenue, and along the south and east sides of West Street. The W&OD trail also provides regional pedestrian access. As shown, there is a current lack of marked crosswalks at certain intersections proximate to the subject site.

Future Transportation Network

Planned Roadway Improvements. The City of Falls Church Comprehensive Plan includes recommendations for the future design and functionality of City streets. A summary of the right-of-way and curb-to-curb section widths as recommended in the Plan is provided as follows:

<u>Street</u>	<u>Right-of-Way Width</u>	<u>Curb-to-Curb Width</u>
West Broad Street	90 feet	62 feet
West Street	40-50 feet	37-39 feet

West Broad Street is currently constructed to the ultimate planned section within 90 feet of public right-of-way. Similarly, West Street is constructed within its Comprehensive Plan recommended section. However, as part of this analysis, the City has requested the Applicant investigate ways to improve the performance and functionality of the North West Street/Park Avenue intersection. As part of this evaluation, past proposals and concepts for the reconfiguration of this intersection were considered. Details of the intersection analysis are provided later in this report.

Bicycle and Pedestrian Facilities. The Comprehensive Plan addresses the future bike/pedestrian facilities in and around the City. The Plan considers walking as a viable option that is “facilitated by a reasonable quality sidewalk network. Strengthening this network and other non-automotive transportation networks will be key to making the City more self-sustaining.” One of the strategies outlined in the Plan include “improving pedestrian and bicycle safety throughout the city.” The required actions include “pursuing the addition of sidewalks and bicycle trails in all areas where they are needed and where they are possible to build.”

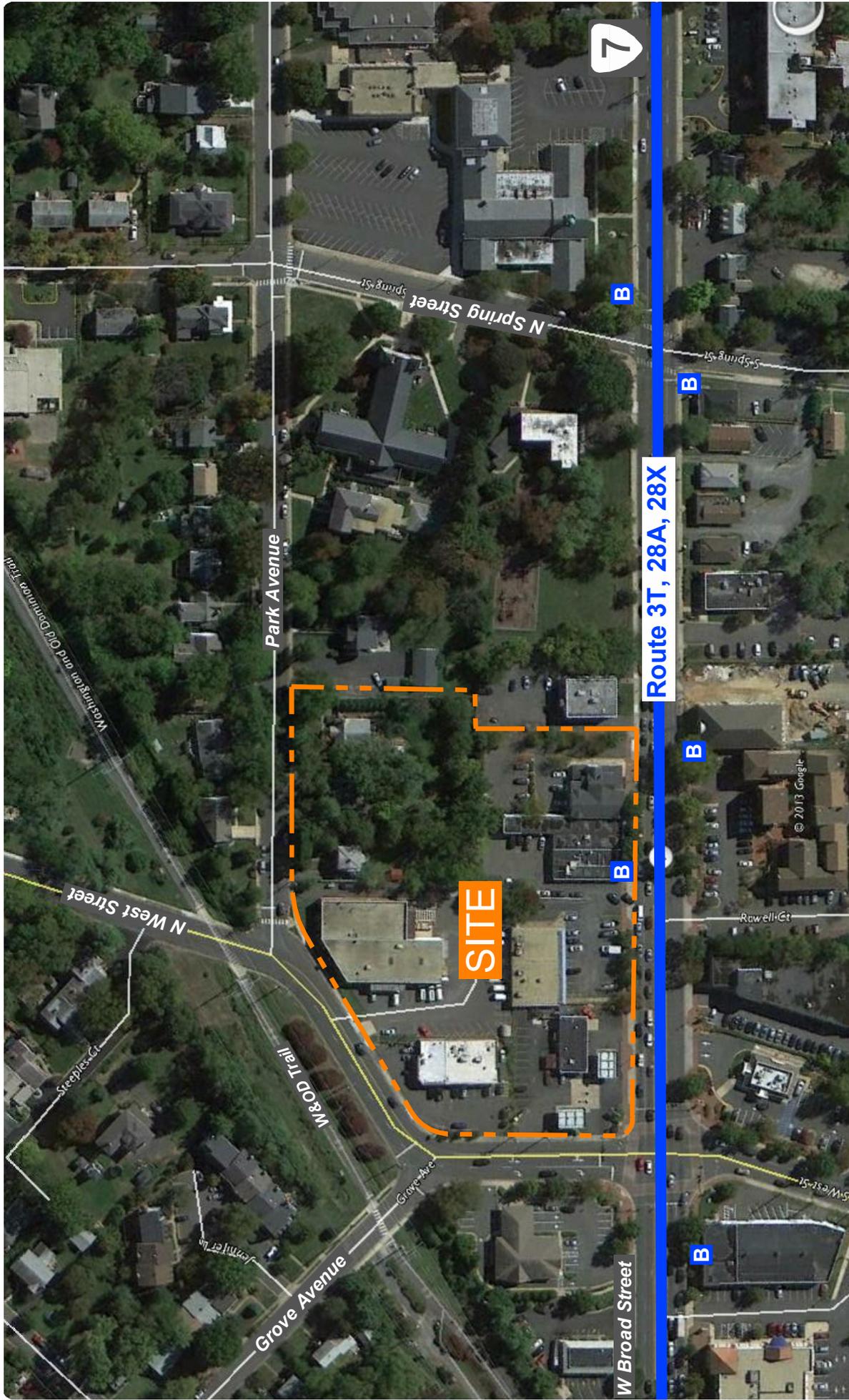


Figure 2-2
Existing Transit Service

- WMATA Bus Routes 2B, 28A, and 28X
- B Bus Stop



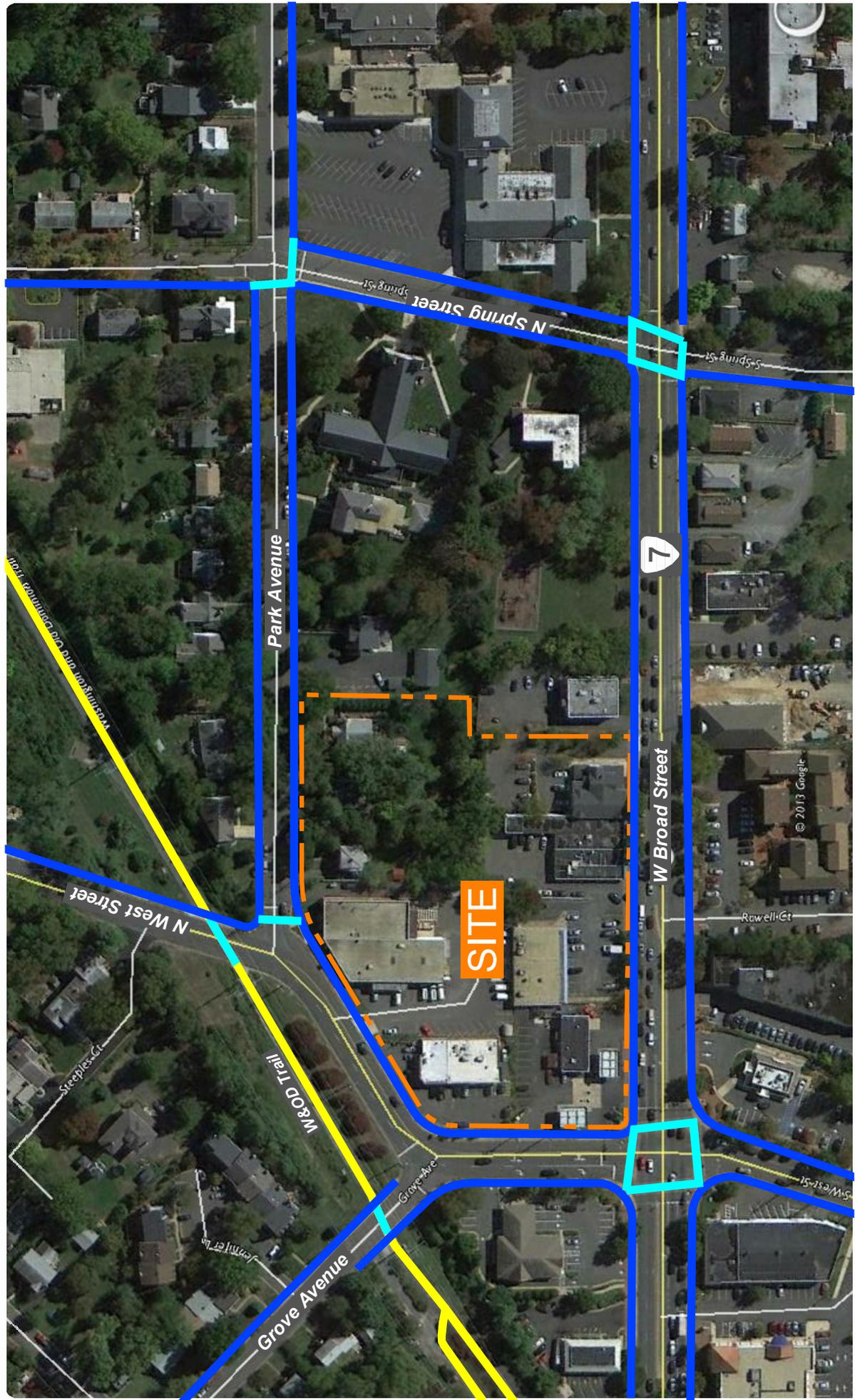


Figure 2-3
Existing Pedestrian Facilities

- Sidewalk
- Marked Crosswalk
- W&OD Trail



The proposed mixed-use development will take advantage of the pedestrian/bicycle opportunities related to trip reduction and transportation demand management (described in greater detail later) and provide for amenities to encourage non-auto modes of travel. The applicant's development plan will enhance the pedestrian facilities by providing a complete sidewalk around its entire street frontage. The plan also shows the provision of crosswalks that will serve to connect the development with the surrounding pedestrian network.

To further enhance the pedestrian experience, the plan provides special paving and site furnishings. The enhanced streetscape is intended to encourage pedestrian and bicycle use, and strengthen connections to the W&OD Trail as well as adjacent commercial uses. Furthermore, the applicant has indicated a commitment to provide for bicycle storage facilities on-site for both residents and patrons.

Section 3 STUDY SCOPE AND ANALYSIS PARAMETERS

Overview

The Mason Row project is envisioned as a diverse mixed-use community of residential and retail uses. The primary advantages and assets associated with the community are its physical relationship and location adjacent to existing transit service and multi-modal network. The primary objective of this study is to assess the impacts associated with the proposed development plan on the surrounding street system.

This traffic study was conducted in general accordance with the City of Falls Church's "Guidelines for Development and Submittal of Traffic Impact Analysis (TIA)" and meetings/discussions with Wells + Associates, City staff, and the applicant. The traffic study scoping meeting between the applicant, City staff, and the City's traffic consultant (Sabra Wang) was held on August 15, 2013. Subsequent discussions further refined the desired study parameters and the City issued a letter, dated September 18, 2013, which finalized the scope. The scoping document and the City's letter are both provided in Appendix B.

Study Area

The study area was determined based on the intersections and roadways that potentially would be affected by implementation of the proposed development plan. The following intersections were selected for analysis and evaluation:

- West Broad Street/West Street
- North West Street/Grove Avenue
- North West Street/Park Avenue
- West Broad Street/Spring Street
- Park Avenue/North Spring Street
- North West Street/Lincoln Avenue
- Grove Avenue/W&OD Trail
- North West Street/W&OD Trail
- West Broad Street/Birch Street
- West Broad Street/Oak Street*
- Park Avenue/North Oak Street*

- All proposed site entrances

The intersections denoted with an asterisk (*) above were not initially proposed for analysis. City staff and the City's traffic consultant deemed that these intersections were critical to the analysis and requested these be added to the scope.

Study Methodology

Traffic (or site) impact studies are generally required by jurisdictions to assess the level of impact proposed changes in land use or development could have on a community's transportation system. Traffic impact studies focus on access to/from a property and those off-site local intersections that would potentially be impacted by traffic from the proposed development or land use change. Utilizing a four-step process, intersections are evaluated in terms of levels of service and then appropriate mitigation measures are identified to remediate sub-standard levels of service. The four-step planning process consists of trip generation, trip distribution, a determination of mode split, and traffic assignment.

As recommended by the City, trip generation estimates were developed based on standard Institute of Transportation Engineers (ITE), 9th edition, Trip Generation rates/equations for all land uses. As directed by staff, a transit/mode-split reduction of 5% was utilized. Furthermore, appropriate internal trip reductions were accounted for due to the mixed-use nature of the redevelopment and that certain trips would travel internal to the site. Appropriate pass-by reductions were applied for the retail components of the site in recognition that these uses would likely attract existing vehicles currently present along City roadways. Directional distributions and traffic assignments were developed based on a review of existing travel patterns, data from other traffic studies, local knowledge and experience, and engineering judgment and agreed to among the parties.

Levels of service and vehicle queues were estimated using established Highway Capacity Manual 2000 methodologies as reported by Synchro software, version 7. Synchro is a macroscopic analysis tool

and has the advantage of analyzing not only individual intersection performance but also how the performance measures of the intersection relate to other intersections in the same network. Important roadway network parameters, such as signal coordination/offsets and vehicle progression, are included in the Synchro analysis.

Assumed Site Development Program

For purposes of this analysis, the following types and levels of development were analyzed:

- 46,931 gross square feet (GSF) of retail uses.
- A 150-room hotel.
- 253 apartment dwelling units.
- 67 condominium dwelling units.

For purposes of this assessment, buildout of the project is anticipated to occur in a single phase by the year 2019.

Analysis Study Periods

As requested by City staff, the intersections within the study area were analyzed under weekday AM and PM peak hour conditions.

Regional Growth

Through conversations/discussions with City staff, a 1% per year compounded growth rate was applied to existing traffic to account for background traffic growth.

Other Approved/Planned Developments

Background developments to be included in this analysis include the following planned (i.e. "pipeline") developments:

- 706 West Broad Street/707 Park Avenue
- 301 West Broad Street

Both of these proposed pipeline developments are mixed-use projects currently consisting of both residential and retail components.

Existing Traffic Volumes

Existing weekday AM and PM peak hour turning movement and pedestrian counts were conducted on Thursday, September 12, 2013 at the following intersections from 6:00 AM to 9:00 AM and from 4:00 PM to 7:00 PM:

- West Broad Street/West Street
- North West Street/Grove Avenue
- North West Street/Park Avenue
- West Broad Street/Spring Street
- Park Avenue/North Spring Street
- North West Street/Lincoln Avenue
- Grove Avenue/W&OD Trail
- North West Street/W&OD Trail

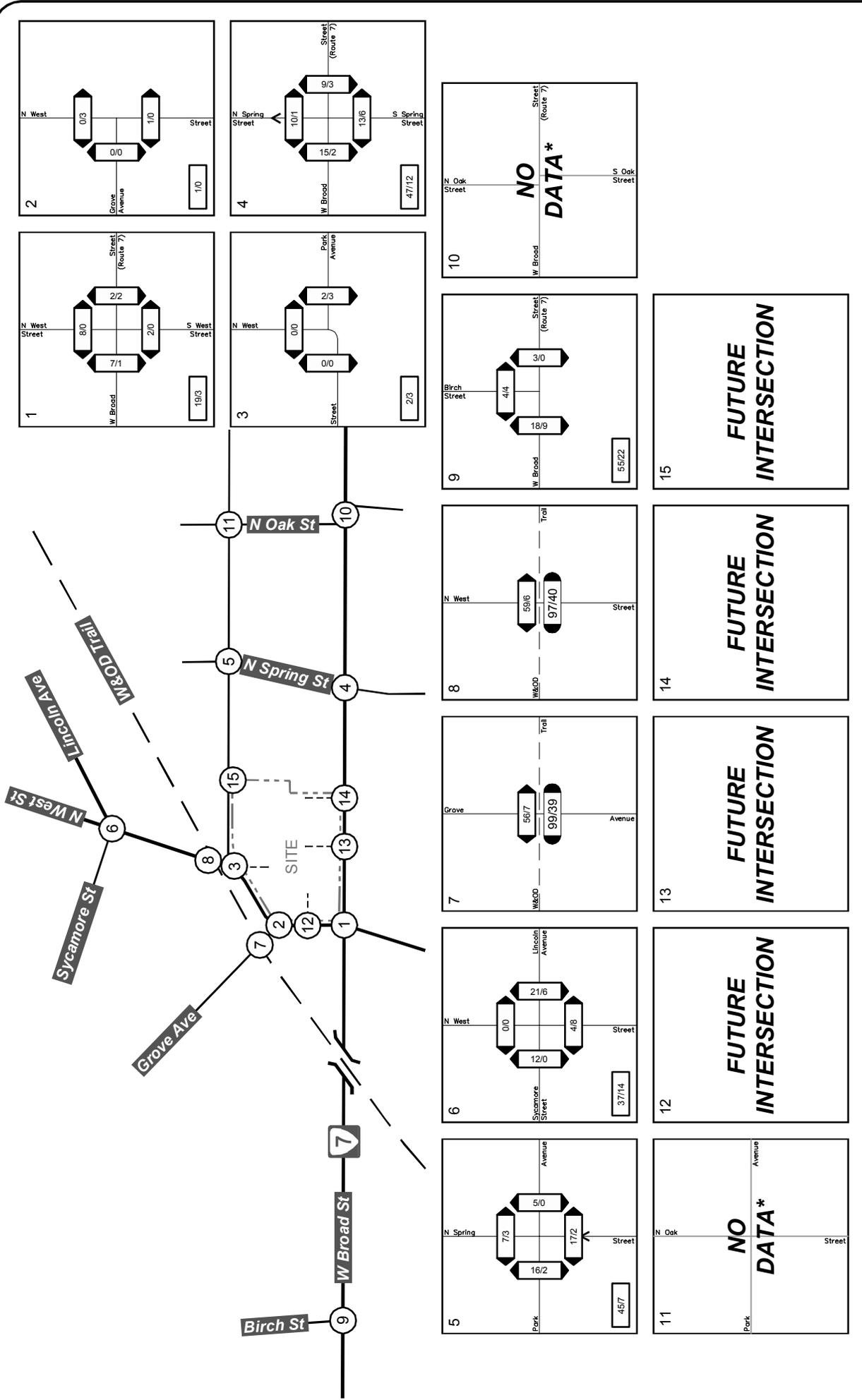
In addition, all existing site driveways were counted on September 12, 2013 in order to understand the existing trip generation characteristics of the site. On Saturday, September 14, 2013, additional Saturday midday peak hour turning movement and pedestrian counts were performed by Wells + Associates at the two W&OD Trail crossings at the request of the Northern Virginia Regional Park Authority (NVRPA).

Peak hour volumes for the following two intersections were taken from the *706 West Broad Street Traffic Impact Study*, prepared by Patton Harris Rust & Associates (PHR&A):

- West Broad Street/Oak Street
- Park Avenue/North Oak Street

The mainline volumes from the traffic counts were then balanced between intersections in order to provide a more representative picture of traffic conditions for analysis purposes.

The existing vehicle traffic volumes used in the analysis are provided on Figure 3-1. Existing pedestrian counts are provided on Figure 3-2. All counts data are included in Appendix C.



AM PEAK HOUR
000/000
PM PEAK HOUR
000/000

* Intersection Data gathered from 706 W. Broad Street and 707 Park Avenue TIA

Figure 3-2
Existing Pedestrian Volumes



Section 4 EXISTING CONDITIONS ANALYSIS

Existing Intersection Levels of Service

Peak hour levels of service were calculated for the study intersections based on the existing lane use and traffic controls shown on Figure 2-1, the existing traffic volumes shown on Figures 3-1 and 3-2, signal timings/phasings obtained from the City of Falls Church and the Virginia Department of Transportation (VDOT) as included in the base Synchro files, and the 2000 Highway Capacity Manual (HCM) analysis procedures for signalized and unsignalized intersections. The results are presented in Appendix D and summarized on Table 4-1 and Figure 4-1. Descriptions of levels of service are provided as Appendix E.

As reflected in Table 4-1, certain critical movements at the unsignalized intersection of West Broad Street and Oak Street are operating at or near theoretical capacity (LOS "F") during peak hours. These minor street approaches experience significant delays waiting for adequate gaps in the West Broad Street traffic stream before drivers attempt their turning maneuvers. It should be noted that the side-street delays reported by the analysis software may not reflect actual delays. Based on field data collection conducted by Wells + Associates on other projects within the City, actual STOP controlled delays may be less than HCM estimates as drivers may accept smaller gaps in traffic or may choose alternate routes if their desired turn is hindered. Mainline movements are not impacted at these intersections.

The signalized intersections currently operate at overall adequate levels of service (LOS "D" or better) based on the analysis results. The only exception is the West Broad Street/West Street intersection, which operates at LOS "E" during the PM peak hour.

Existing Intersection Queues

As requested by staff, an analysis of intersection 95th-percentile queues was performed at key locations.

The results of the queuing analysis, as reported by Synchro, are summarized in Table 4-2.

As shown in the table, 95th-percentile queues at the West Broad Street/West Street intersection currently extend beyond the available turn bay distance at times. Specifically, the eastbound left turn queue from West Broad Street on to northbound West Street exceeds the available storage. The presence of adjacent turn lanes and the W&OD Trail aerial crossing make extending this turn bay problematic. In addition, the northbound and southbound queues on West Street at West Broad Street extend beyond upstream intersections and driveway entrances during peak hours. All other queues can be accommodated within the storage provided.

Table 4-1
Mason Row
Existing Intersection Levels of Service Summary ⁽¹⁾⁽²⁾⁽³⁾⁽⁴⁾

Intersection	Control	Lane Group	Existing	
			AM	PM
1. N West Street /W Broad Street	Signal	EBL	F (100.6)	F (82.8)
		EBTR	C (24.1)	C (32.7)
		WBL	C (26.0)	D (36.5)
		WBTR	D (41.0)	C (33.3)
		NBL	E (56.0)	D (52.5)
		NBTR	F (98.8)	E (72.9)
		SBLT	D (49.0)	F (199.8)
		<u>SBR</u>	<u>C (34.0)</u>	<u>D (45.4)</u>
		Overall	D (47.3)	E (60.3)
2. N West Street /Grove Street	STOP	EBLR	C [19.2]	E [43.8]
		NBLT	A [0.2]	A [1.2]
3. N West Street /Park Avenue	STOP	WBLR	D [33.7]	D [29.9]
		SBLT	A [1.6]	A [1.2]
4. W Broad Street/ N Spring Street	Signal	EBLTR	B (15.6)	A (2.4)
		WBTR	A (7.6)	A (4.5)
		<u>NBLTR</u>	<u>C (23.3)</u>	<u>E (56.0)</u>
		Overall	B (12.0)	A (4.4)
5. Park Avenue/ N Spring Street	All-way STOP	EBLT	A [9.3]	A [9.1]
		WBTR	A [10.0]	A [9.1]
		NBLTR	A [9.2]	A [8.2]
		<u>SBLR</u>	<u>A [8.4]</u>	<u>A [8.2]</u>
		Overall	A [9.4]	A [8.9]
6. N West Street /Lincoln Avenue	Signal	EBLTR	D (54.3)	C (34.7)
		WBLTR	D (46.2)	C (29.1)
		NBLT	A (4.8)	C (26.5)
		NBR	A (4.4)	C (21.8)
		<u>SBLTR</u>	<u>A (4.2)</u>	<u>C (31.0)</u>
		Overall	A (9.0)	C (28.3)
9. W Broad Street/ Birch Street	Signal	EBL	A (8.8)	A (6.9)
		EBT	A (6.6)	A (7.8)
		WBTR	A (9.7)	C (22.7)
		<u>SBLR</u>	<u>D (48.7)</u>	<u>E (63.8)</u>
		Overall	A (9.6)	B (17.6)
10. W Broad Street/ N Oak Street	STOP	EBLTR	A [2.3]	A [1.6]
		WBLTR	A [0.7]	A [1.7]
		NBLTR	F [639.1]	F [418.4]
		SBLTR	F [63.9]	F [293.8]
11. Park Avenue/ N Oak Street	All-way STOP	EBLTR	B [11.3]	B [10.3]
		WBLTR	A [9.8]	B [10.1]
		NBLTR	A [9.7]	A [8.8]
		<u>SBLTR</u>	<u>A [9.0]</u>	<u>A [9.1]</u>
		Overall	B [10.3]	A [9.9]

Notes:

- (1) Numbers in parentheses () represent delay at signalized intersections in seconds per vehicle.
- (2) Numbers in square brackets [] represent delay at unsignalized intersections in seconds per vehicle.
- (3) Roadways in **BOLD** are considered North/South for purposes of this analysis
- (4) Asterisks * represent delays in excess of 999.9 seconds.

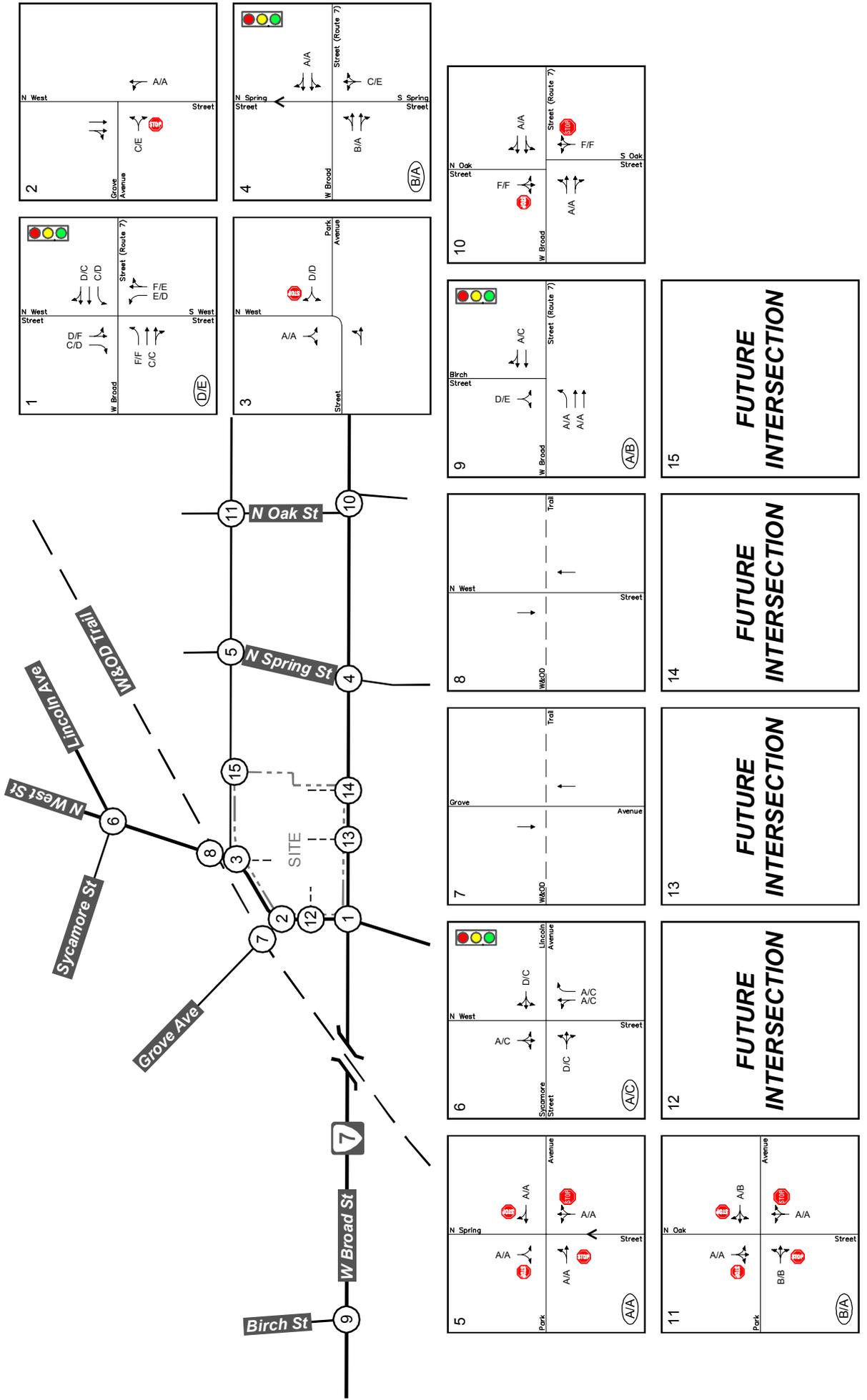


Figure 4-1
Existing Levels of Service

Lane Group Level of Service
 Signalized Intersection
 Stop Sign
 North

Table 4-2
Mason Row
Existing Intersection Queues ⁽¹⁾⁽²⁾⁽³⁾⁽⁴⁾⁽⁵⁾

Intersection	Control	Lane Group	Available Storage	Existing	
				AM	PM
1. N West Street /W Broad Street	Signal	EBL	175	#321	#305
		EBTR	N/A	474	#674
		WBL	140	m26	93
		WBTR	N/A	#534	328
		NBL	250	#281	196
		NBTR	N/A	#424	#303
		SBLT	N/A	165	#656
		SBR	N/A	91	99
2. N West Street /Grove Street	STOP	EBLR	N/A	28	76
		NBLT	N/A	1	3
3. N West Street /Park Avenue	STOP	WBLR	N/A	118	98
		SBLT	N/A	3	3
4. W Broad Street/ N Spring Street	Signal	EBLTR	N/A	m508	m55
		WBTR	N/A	203	211
		NBLTR	N/A	61	53
5. Park Avenue/ N Spring Street ⁽⁶⁾	All-way STOP	EBLT	N/A	74	64
		WBTR	N/A	53	49
		NBLTR	N/A	64	39
		SBLR	N/A	41	46
6. N West Street /Lincoln Avenue	Signal	EBLTR	N/A	22	30
		WBLTR	N/A	71	159
		NBLT	N/A	127	205
		NBR	150	26	39
		SBLTR	N/A	65	308
9. W Broad Street/ Birch Street	Signal	EBL	300	30	43
		EBT	N/A	288	380
		WBTR	N/A	517	507
		SBLR	N/A	113	213
10. W Broad Street/ N Oak Street	STOP	EBLTR	N/A	6	4
		WBLTR	N/A	2	5
		NBLTR	N/A	183	139
		SBLTR	N/A	89	193
11. Park Avenue/ N Oak Street ⁽⁶⁾	All-way STOP	EBLTR	N/A	77	72
		WBLTR	N/A	66	71
		NBLTR	N/A	61	55
		SBLTR	N/A	56	55

Notes:

- (1) Queue length is based on the 95th percentile queue in feet as reported by Synchro, Version 7.
- (2) "##" indicates that the 95th percentile volume exceeds capacity, queue may be longer.
- (3) "m" indicates that the volume for 95th percentile queue is metered by upstream signal.
- (4) Roadways in **BOLD** are considered North/South for purposes of this analysis
- (5) "*)" indicates that the volume exceeds capacity, queue is theoretically infinite.
- (6) Queue length analyzed with SimTraffic 7.

Section 5 ANALYSIS OF FUTURE CONDITIONS WITHOUT SITE DEVELOPMENT

Overview

Forecasts for traffic conditions without the development of the Mason Row project were estimated at key study intersections based on a composite of existing traffic, regional traffic growth, and pipeline development trips as described in Section 3 of this report. Future levels of service and queues under these forecasted conditions were evaluated at the key study intersections.

Grove Avenue Traffic Calming

In conjunction with this development proposal, City staff and area citizen groups requested that the Applicant work with the City to explore potential traffic calming measures for Grove Avenue. Such traffic calming measures would serve to address long standing concerns related to commuter traffic and excessive speeding along Grove Avenue between Haycock Road to the west and North West Street to the east. A separate document, "Grove Avenue Assessment and Traffic Management," prepared by Wells + Associates and dated March 11, 2014 evaluates Grove Avenue and offers improvement recommendations. One of the recommendations is to convert the intersection of North West Street/Grove Avenue to right-in/right-out only. Therefore, for purposes of this analysis, it was assumed that existing traffic volumes at the intersection would be reassigned to account for this potential traffic calming measure. Figure 5-1 shows the existing traffic reassignments on the roadway network if the recommended turning restrictions are implemented. It should be noted that the following signed turning restrictions are present currently at the Grove Avenue/North West Street intersection:

- AM Peak: Left from West Street
- PM Peak: Right from Grove Avenue

As shown in Figure 3-1, there are a number of drivers that currently violate these restrictions.

Furthermore, the proposed intersection modification would potentially increase the eastbound right turn volume during the PM peak period since that restriction would be lifted. The reassignments shown on Figure 5-1 account for these shifts.

The analysis of the North West Street/Grove Avenue intersection under background and total future conditions reflects the proposed. However, it should be noted that the City has not committed to any modifications of Grove Avenue at this time.

Regional Traffic Growth

For purposes of this traffic assessment, a study horizon year of 2019 was assumed for the anticipated build-out of the subject development. In order to develop future traffic forecasts, the existing traffic volumes shown on Figure 3-1 were adjusted to account for increases associated with regional traffic growth.

In order to account for a continued pattern of growth, a rate of one (1) percent per year compounded was applied to all existing mainline volumes within the study area. This rate is compatible with other area studies. The resulting increases in traffic volumes due to regional growth are depicted on Figure 5-2.

Traffic from Other Approved/Pending Developments

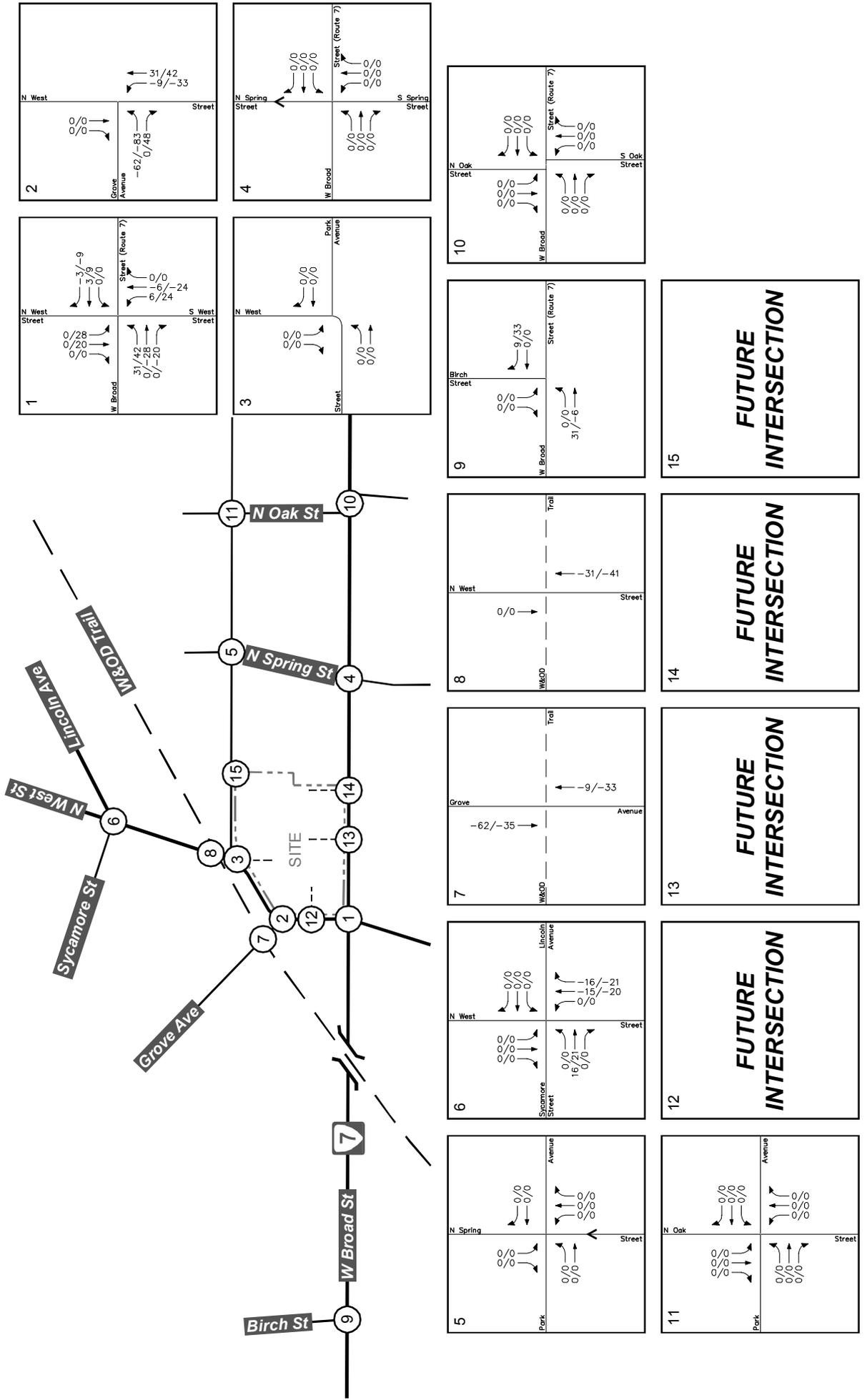
At the request of staff, the following approved or pending (i.e., "pipeline") developments were included in the forecasting of future traffic conditions:

- 706 West Broad Street
- 301 West Broad Street

The land use assumptions for each of these pipeline developments is summarized as follows and, as much as possible, are based on the most current development plans for each respective site and/or application.

706 West Broad Street

- 110-Room Hotel
- 5,439 gross square feet of office uses



000/000
 AM PEAK HOUR
 PM PEAK HOUR
 North

Figure 5-1
 Grove Avenue Traffic Reassignments

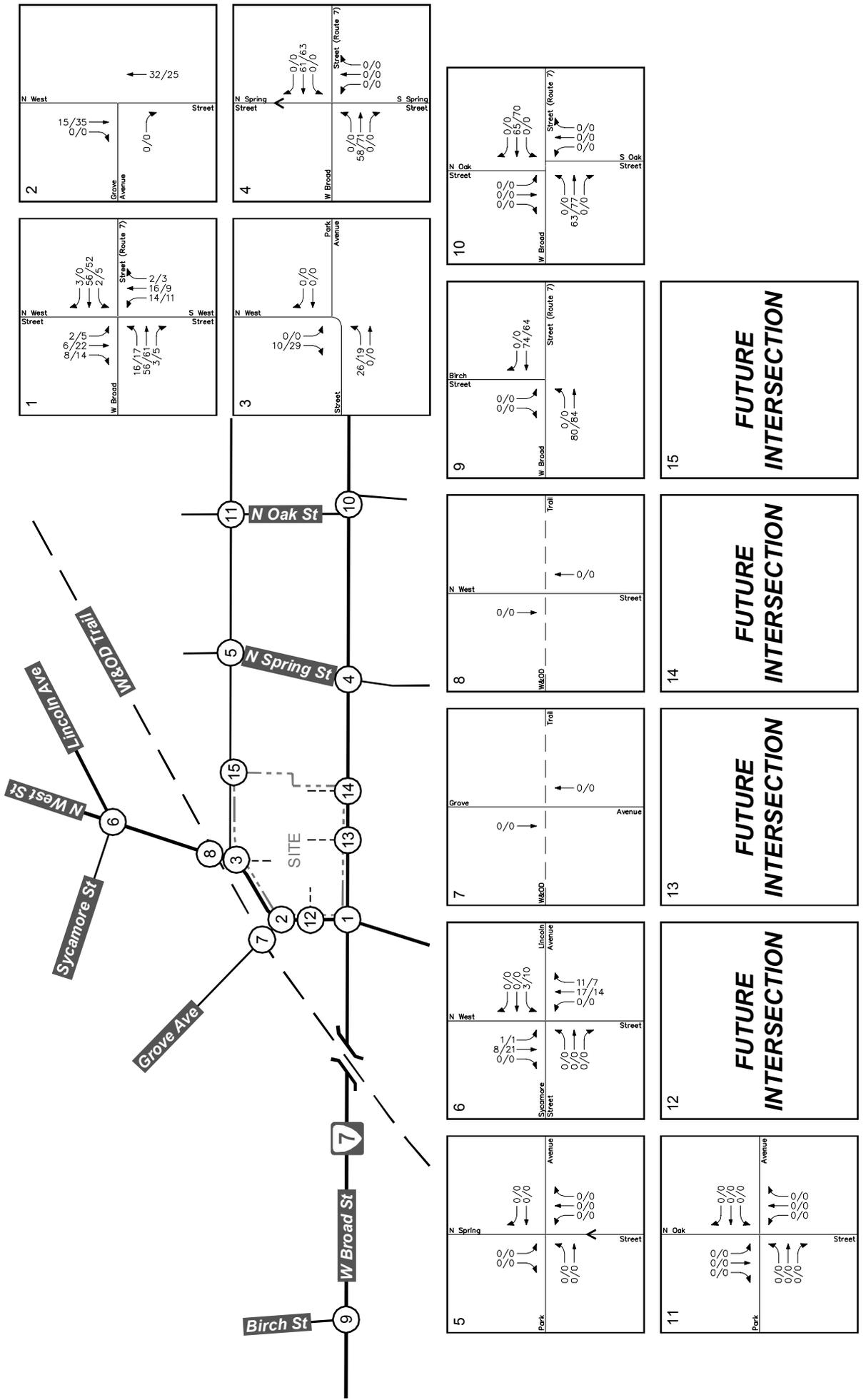


Figure 5-2
Regional Traffic Growth

000/000
AM PEAK HOUR
PM PEAK HOUR
North

301 West Broad Street

- 294 multifamily residential dwelling units
- 60,883 gross square foot supermarket
- 4,011 gross square feet of retail uses

Trips generated by these pipeline developments were estimated using ITE Trip Generation rates/equations consistent with their respective traffic studies. The trips are summarized in Table 5-1. Internal trip reductions and pass-by trip rates, as applicable, were applied to this analysis consistent with the background traffic studies. It should be noted that the trip generation estimates associated with these pipeline developments are not based on economic prediction models.

The pipeline development trips summarized in Table 5-1 were assigned to the public street network consistent with the directional distributions used in the background traffic studies. Trip assignments related to each individual pipeline development are provided in Appendix F. The sum total of all pipeline development related trips through each study intersection is summarized on Figure 5-3.

Background Traffic Forecasts

The existing traffic forecasts depicted on Figures 3-1, the Grove Avenue traffic reassignments shown on Figure 5-1, the regional growth shown on Figures 5-2, and the pipeline trip assignments shown on Figures 5-3 were added together to yield the background future traffic forecasts shown on Figure 5-4 for the study intersections.

Background Future Levels of Service

Capacity analyses of 2019 future traffic conditions without the proposed redevelopment are provided in Appendix G and summarized in Table 5-2. The forecasted levels of service are also depicted graphically on Figure 5-5.

As shown on Table 5-2, delays and levels of service do not change significantly from existing (2013) to background future (2019) conditions. Critical movements at the unsignalized intersections on West Broad Street will continue to operate at or near capacity during one or more peak periods (LOS "F") due to heavy mainline through movements

which are further exacerbated by increases in traffic resulting from regional growth and pipeline development.

The signalized intersections continue to operate at levels of service consistent with existing LOS. The exception is that the West Broad Street/West Street intersection would worsen from LOS "D" to LOS "E" under future background conditions.

Background Future Queuing

As requested by staff, an analysis of intersection queues was performed at key locations under background future traffic conditions. The results of the queuing analysis, with and without the recommended background improvement, are summarized in Table 5-3.

As shown in the table, under background future conditions, 95th-percentile queues would increase over existing conditions as a result of regional growth and future pipeline development. Consistent with existing conditions, certain turning movement queues would exceed the available storage length at the West Broad Street/West Street intersection during weekday peak hours.

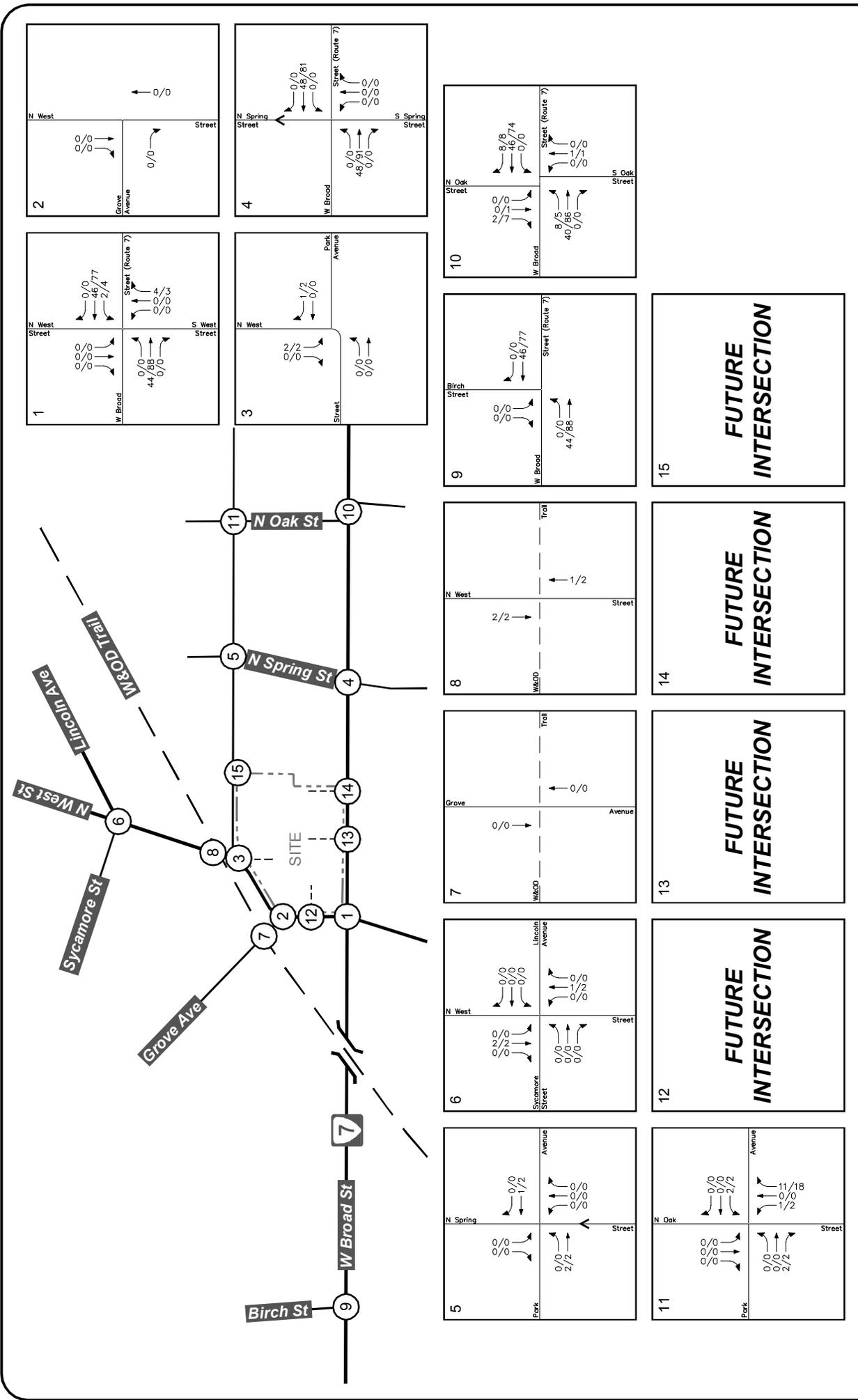
Table 5-1
Mason Row
Pipeline Development Trip Generation Analysis ⁽¹⁾

Pipeline Development	Land Use Code	Amount	Units	AM Peak Hour		PM Peak Hour		ADT
				In	Out	In	Out	
301 W Broad Street (2)								
Apartment	220	294	DU	30	118	148	63	2,052
Internal Trips Reduction				(2)	(6)	(8)	(6)	205
			Total Residential External Trips	28	112	140	57	1847
Supermarket	850	60,883	GSF	134	85	219	312	10,812
Specialty Retail Center	814	4,011	GSF	2	2	4	17	169
Internal Trips Reduction			Subtotal Retail Trips	136	87	223	329	668
				(6)	(2)	(8)	(12)	205
Pass by Trips Reduction			Subtotal Retail Trips	130	85	215	317	10,776
				(47)	(31)	(78)	(114)	3,879
			Total Retail External Trips	83	54	137	203	6,897
Existing Counts				19	20	39	36	1,196
			Total Net New External Trips (Less Existing Trips)	92	146	238	224	7,548
706 W Broad Street/707 Park Avenue								
Hotel	310	110	rooms	38	24	62	31	899
Medical Office	710	5,439	GSF	10	3	13	14	197
			Total Trips	48	27	74	44	1,095
Total Pipeline Development Trip Generation				140	173	312	268	8,643

Note(s):

(1) Trip generation based on the Institute of Transportation Engineers' Trip Generation, 8th Edition.

(2) Trip generation taken from the "301 W. Broad Street - Traffic Impact Study" prepared by Gorove/Siade Associates, dated January 23, 2013



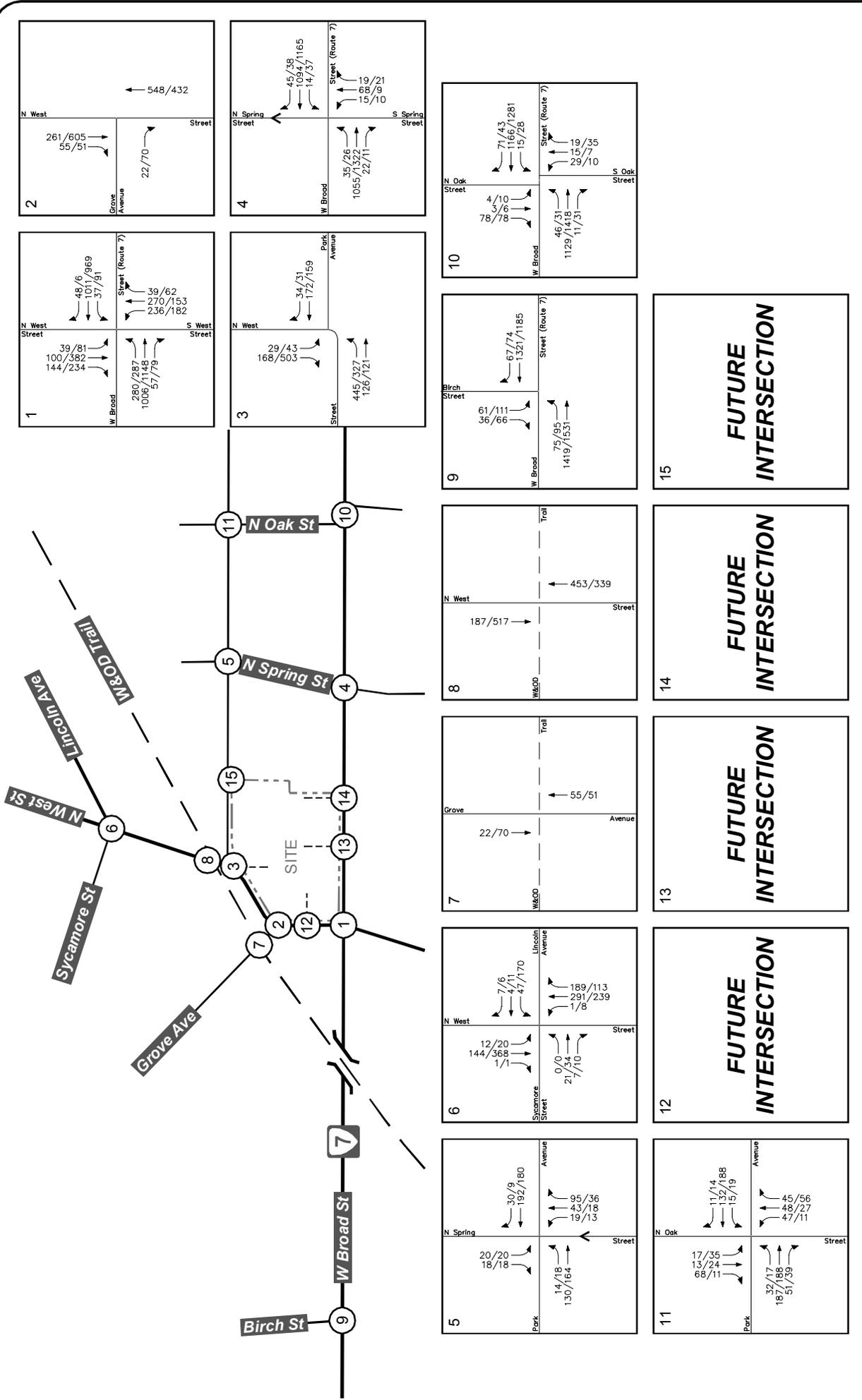
North

AM PEAK HOUR
PM PEAK HOUR
000/000

**Figure 5-3
Pipeline Trip Assignments**

Mason Row
City of Falls Church, Virginia

Wells + Associates, Inc.



PM PEAK HOUR
000/000
North

Figure 5-4
Background Future Traffic Forecasts

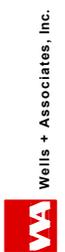
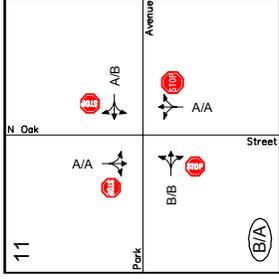
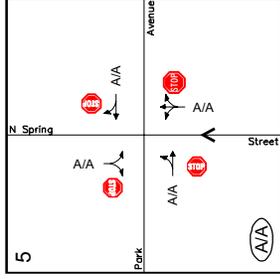
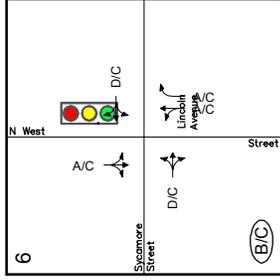
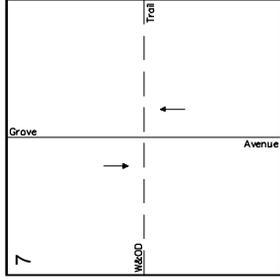
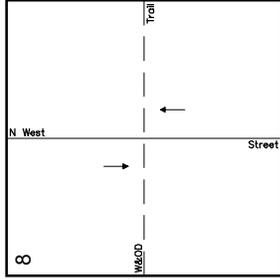
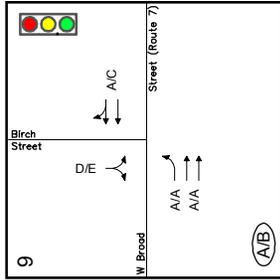
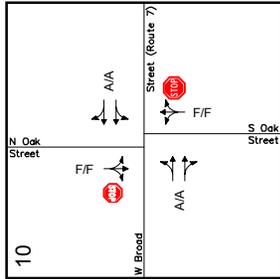
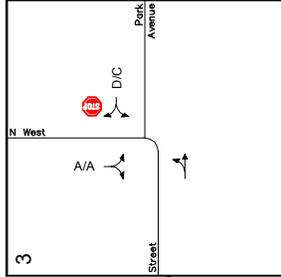
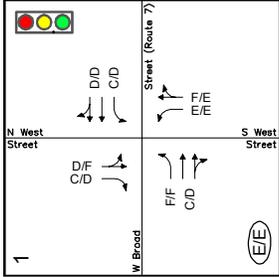
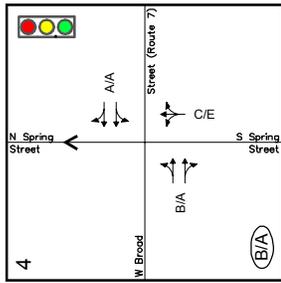
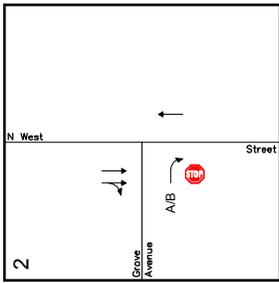
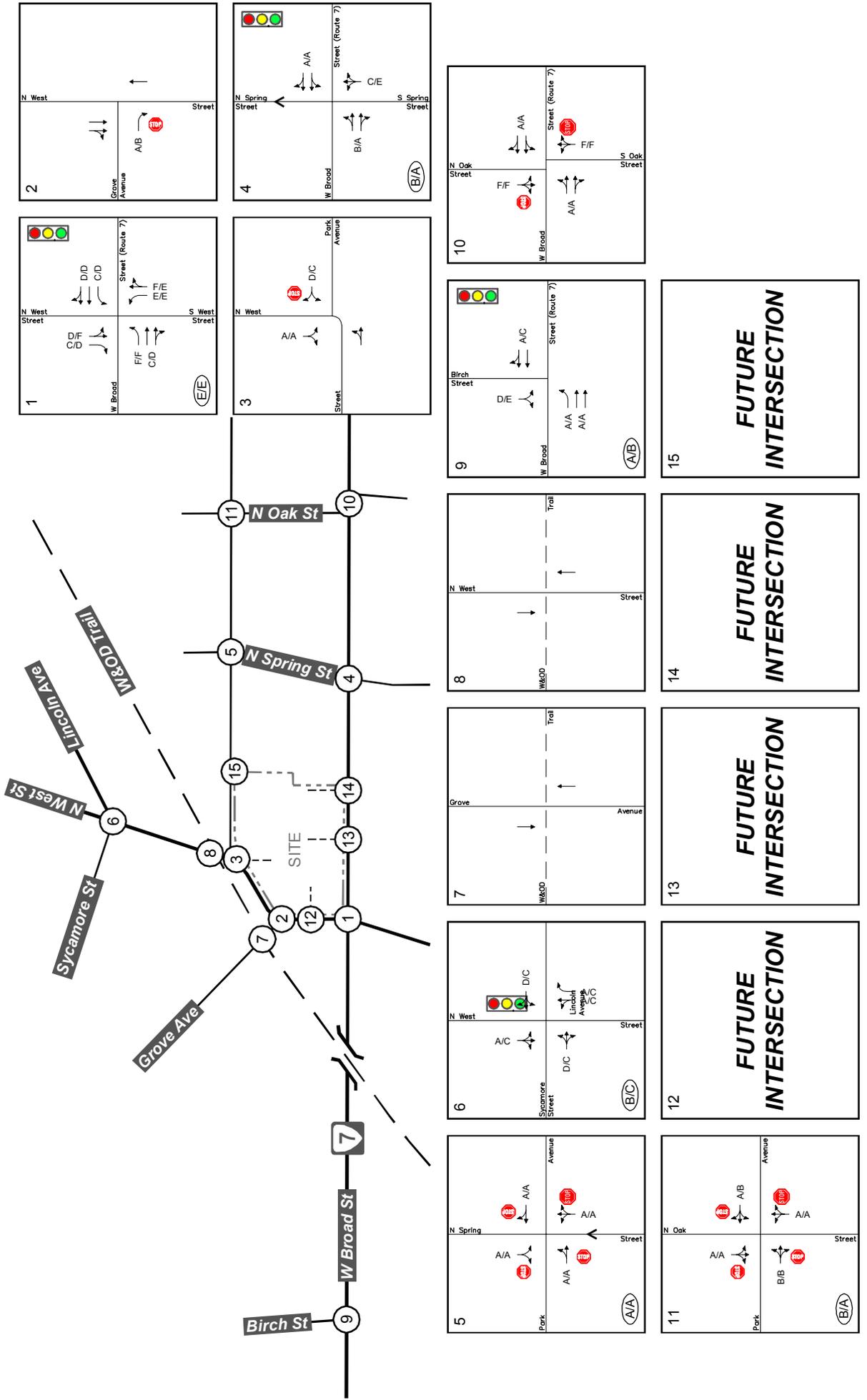


Table 5-2
Mason Row
Background Intersection Levels of Service Summary ⁽¹⁾⁽²⁾⁽³⁾⁽⁴⁾

Intersection	Control	Lane Group	Existing		Background	
			AM	PM	AM	PM
1. N West Street /W Broad Street	Signal	EBL	F (100.6)	F (82.8)	F (262.0)	F (203.9)
		EBTR	C (24.1)	C (32.7)	C (27.6)	D (38.8)
		WBL	C (26.0)	D (36.5)	C (26.9)	D (39.4)
		WBTR	D (41.0)	C (33.3)	D (45.3)	D (36.1)
		NBL	E (56.0)	D (52.5)	E (56.9)	E (60.7)
		NBTR	F (98.8)	E (72.9)	F (90.9)	E (69.5)
		SBLT	D (49.0)	F (199.8)	D (48.8)	F (303.8)
		<u>SBR</u>	<u>C (34.0)</u>	<u>D (45.4)</u>	<u>C (34.1)</u>	<u>D (46.6)</u>
	Overall	D (47.3)	E (60.3)	E (62.7)	F (87.8)	
2. N West Street /Grove Street	STOP	EBLR	C [19.2]	E [43.8]	N/A	N/A
		NBLT	A [0.2]	A [1.2]	N/A	N/A
		<i>Disallow left-turning movements</i>	STOP	EBR	N/A	N/A
3. N West Street /Park Avenue	STOP	WBLR	D [33.7]	D [29.9]	D [31.6]	C [24.1]
		SBLT	A [1.6]	A [1.2]	A [1.7]	A [1.2]
4. W Broad Street/ N Spring Street	Signal	EBLTR	B (15.6)	A (2.4)	B (18.1)	A (4.0)
		WBTR	A (7.6)	A (4.5)	A (7.7)	A (5.1)
		<u>NBLTR</u>	<u>C (23.3)</u>	<u>E (56.0)</u>	<u>C (23.2)</u>	<u>E (55.9)</u>
		Overall	B (12.0)	A (4.4)	B (13.3)	A (5.3)
5. Park Avenue/ N Spring Street	All-way STOP	EBLT	A [9.3]	A [9.1]	A [9.0]	A [8.9]
		WBTR	A [10.0]	A [9.1]	A [9.6]	A [8.9]
		NBLTR	A [9.2]	A [8.2]	A [8.9]	A [8.1]
		<u>SBLR</u>	<u>A [8.4]</u>	<u>A [8.2]</u>	<u>A [8.2]</u>	<u>A [8.1]</u>
		Overall	A [9.4]	A [8.9]	A [9.1]	A [8.7]
6. N West Street /Lincoln Avenue	Signal	EBLTR	D (54.3)	C (34.7)	D (47.9)	D (35.6)
		WBLTR	D (46.2)	C (29.1)	D (46.2)	C (29.2)
		NBLT	A (4.8)	C (26.5)	A (6.0)	C (26.3)
		NBR	A (4.4)	C (21.8)	A (5.3)	C (21.7)
		<u>SBLTR</u>	<u>A (4.2)</u>	<u>C (31.0)</u>	<u>A (5.3)</u>	<u>C (32.3)</u>
		Overall	A (9.0)	C (28.3)	B (10.5)	C (29.1)
9. W Broad Street/ Birch Street	Signal	EBL	A (8.8)	A (6.9)	A (8.7)	A (8.5)
		EBT	A (6.6)	A (7.8)	A (6.8)	A (8.4)
		WBTR	A (9.7)	C (22.7)	A (8.5)	C (23.4)
		<u>SBLR</u>	<u>D (48.7)</u>	<u>E (63.8)</u>	<u>D (48.6)</u>	<u>E (62.4)</u>
		Overall	A (9.6)	B (17.6)	A (9.0)	B (17.7)
10. W Broad Street/ N Oak Street	STOP	EBLTR	A [2.3]	A [1.6]	A [2.8]	A [2.2]
		WBLTR	A [0.7]	A [1.7]	A [0.7]	A [2.1]
		NBLTR	F [639.1]	F [418.4]	F [976.3]	F [*]
		SBLTR	F [63.9]	F [293.8]	F [804.7]	F [*]
11. Park Avenue/ N Oak Street	All-way STOP	EBLTR	B [11.3]	B [10.3]	B [10.7]	A [10.0]
		WBLTR	A [9.8]	B [10.1]	A [9.5]	A [9.8]
		NBLTR	A [9.7]	A [8.8]	A [9.5]	A [8.7]
		<u>SBLTR</u>	<u>A [9.0]</u>	<u>A [9.1]</u>	<u>A [8.8]</u>	<u>A [9.0]</u>
		Overall	B [10.3]	A [9.9]	A [9.9]	A [9.6]

Notes:

- (1) Numbers in parentheses () represent delay at signalized intersections in seconds per vehicle.
- (2) Numbers in square brackets [] represent delay at unsignalized intersections in seconds per vehicle.
- (3) Roadways in **BOLD** are considered North/South for purposes of this analysis
- (4) Asterisks * represent delays in excess of 999.9 seconds.



Represents One Travel Lane
 Signalized Intersection
 Stop Sign

XX Lane Group Level of Service
 (XX) Overall Level of Service

Figure 5-5
Background Future Levels of Service

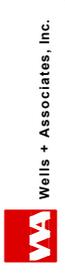


Table 5-3
Mason Row
Background Intersection Queues ⁽¹⁾⁽²⁾⁽³⁾⁽⁴⁾⁽⁵⁾

Intersection	Control	Lane Group	Available Storage	Existing		Background	
				AM	PM	AM	PM
1. N West Street /W Broad Street	Signal	EBL	175	#321	#305	#456	#465
		EBTR	N/A	474	#674	#589	#768
		WBL	140	m26	93	m28	114
		WBTR	N/A	#534	328	#626	406
		NBL	250	#281	196	#318	241
		NBTR	N/A	#424	#303	#449	#271
		SBLT	N/A	165	#656	172	#809
2. N West Street /Grove Street	STOP	EBLR	N/A	28	76	N/A	N/A
		NBLT	N/A	1	3	N/A	N/A
<i>Disallow left-turning movements</i>	STOP	EBR	N/A	N/A	N/A	2	10
3. N West Street /Park Avenue	STOP	WBLR	N/A	118	98	104	75
		SBLT	N/A	3	3	3	4
4. W Broad Street/ N Spring Street	Signal	EBLTR	N/A	m508	m55	m562	m93
		WBTR	N/A	203	211	236	259
		NBLTR	N/A	61	53	61	53
5. Park Avenue/ N Spring Street ⁽⁶⁾	All-way STOP	EBLT	N/A	74	64	90	75
		WBTR	N/A	53	49	69	57
		NBLTR	N/A	64	39	63	38
		SBLR	N/A	41	46	48	48
6. N West Street /Lincoln Avenue	Signal	EBLTR	N/A	22	30	42	52
		WBLTR	N/A	71	159	73	165
		NBLT	N/A	127	205	134	200
		NBR	150	26	39	26	37
		SBLTR	N/A	65	308	73	332
9. W Broad Street/ Birch Street	Signal	EBL	300	30	43	30	41
		EBT	N/A	288	380	343	448
		WBTR	N/A	517	507	601	596
		SBLR	N/A	113	213	111	214
10. W Broad Street/ N Oak Street	STOP	EBLTR	N/A	6	4	8	6
		WBLTR	N/A	2	5	2	6
		NBLTR	N/A	183	139	206	*
		SBLTR	N/A	89	193	249	*
11. Park Avenue/ N Oak Street ⁽⁶⁾	All-way STOP	EBLTR	N/A	77	72	85	65
		WBLTR	N/A	66	71	69	81
		NBLTR	N/A	61	55	63	66
		SBLTR	N/A	56	55	57	51

Notes:

- (1) Queue length is based on the 95th percentile queue in feet as reported by Synchro, Version 7.
- (2) "#" indicates that the 95th percentile volume exceeds capacity, queue may be longer.
- (3) "m" indicates that the volume for 95th percentile queue is metered by upstream signal.
- (4) Roadways in **BOLD** are considered North/South for purposes of this analysis
- (5) "*" indicates that the volume exceeds capacity, queue is theoretically infinite.
- (6) Queue length analyzed with SimTraffic 7.

Section 6 SITE ANALYSIS

Overview

As part of the four-step process described previously, trips anticipated to be generated by the proposed redevelopment plan were forecasted and then assigned to the surrounding roadway network based on a trip distribution. The generation, distribution, and assignment of site trips were based on the proposed development plan and program as well as the locations of future site entrances in relation to the surrounding roadway network.

Existing Site Trips

As stated previously, the site is currently developed with a number of existing commercial uses as well as three residential lots. The redevelopment plan proposes razing these existing uses in order to develop the site. As a result, trips currently generated by these uses would no longer be experienced on the surrounding roadway network. Driveway counts were conducted at each of the existing site driveways in order to determine the number of existing trips that should be removed from the network. These driveway count data are provided in Appendix H and summarized in Table 6-1. As shown in Table 6-1, the current site uses generate 216 weekday AM and 120 weekday PM peak hour trips. For purposes of forecasting future traffic conditions with the proposed redevelopment plan, these trips were removed at key study intersections based on these driveway counts as shown on Figure 6-1.

Proposed Site Access

A reduction of the proposed redevelopment plan is provided on Figure 1-2. As shown, the plan depicts two points of site access along West Broad Street. The westernmost access would operate as a right-in/right-out partial movement intersection. The easternmost would operate as a full-movement intersection. A right-in/right-out would be provided along the western site frontage of North West Street. Full-movement access would be provided at the intersection of North West Street and Park

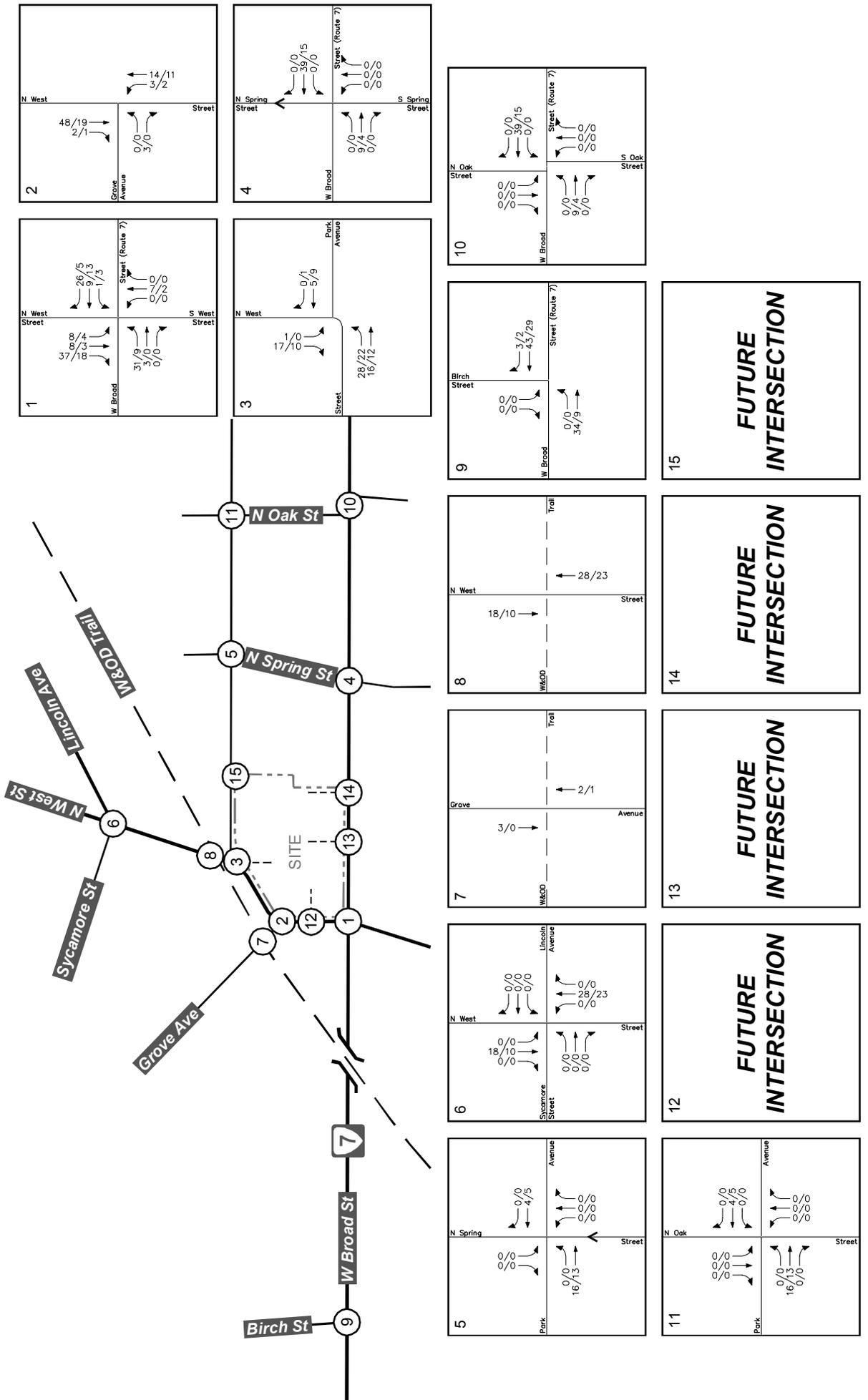
Avenue pending a reconfiguration of the intersection. A new full-movement intersection is also proposed along Park Avenue along the eastern property line that would provide direct access to the below-grade parking garage. The analysis of these site access points are detailed in Section 7 of this report. The future lane use and intersection controls (with the proposed site entrances) are provided on Figure 6-2.

Trip Generation

Overview. Trip generation estimates for the AM, and PM peak hours, as well as the weekday average daily traffic (ADT), were derived from the standard Institute of Transportation Engineers (ITE) trip generation rates, as published in the 9th edition. The rates used for the analysis were for land uses “apartments” (220) and “condominium/townhouse” (230) for the residential component, “specialty retail” (826) for the retail portion, and “hotel” (310) for the proposed hotel portion. The trip generation analysis is presented in Table 6-1.

Internal Trips. The redevelopment plan, as proposed by Spectrum Development LLC reflects a mix of retail, hotel, and residential uses. It is not unreasonable to assume that due to the nature of the mix of uses, a portion of trips generated by the site would be “captured” trips; that are trips internal to the development, and not new trips to the roadway network.

By its nature and character of uses, the land uses within the center would experience a naturally occurring synergy. That is, a proportion of individual residential trips may then utilize the retail uses or retail customers that would take advantage of trip combining to conduct a multitude of trips. As a result of this naturally occurring synergy, some reduction in future volumes is likely. Given the variety of retail uses proposed and through conversation with City of Falls Church staff, an internal allowance of 5%/10% for the AM/PM peak hours, respectively, was applied between the residential and retail components of the generated trips. This internal trip reduction is shown in Table 6-1.



AM PEAK HOUR
PM PEAK HOUR
000/000

Figure 6-1
Existing Site Trips Removed

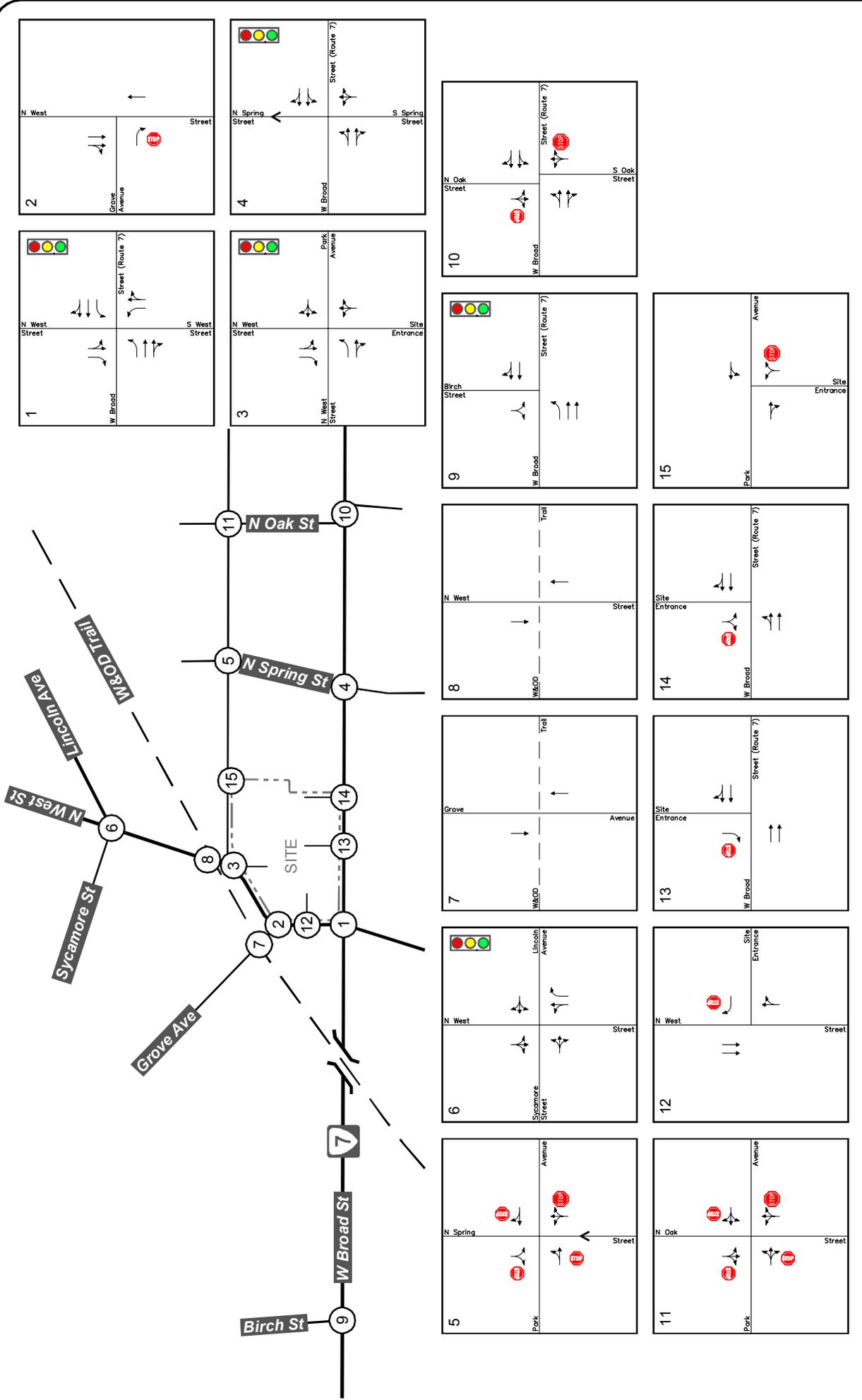


Figure 6-2
Future Lane Use and Intersection Control

 Represents One Travel Lane
 Signalized Intersection
 Stop Sign



Table 6-1
 Mason Row
 Site Trip Generation Analysis ⁽¹⁾

Scenario	Land Use Code	Amount	Units	AM Peak Hour			PM Peak Hour			Average Daily Trips
				In	Out	Total	In	Out	Total	
Existing Driveway Counts										
		106		110	216	42	78	120	1200	
Proposed Uses										
Residential/Hotel Uses										
Hotel	310	150	occupied rooms	59	42	101	51	54	105	1,338
Apartment	220	253	dwelling units	26	102	128	102	55	157	1,657
Condominium	230	67	dwelling units	6	31	37	29	14	43	454
Residential/Hotel Subtotal				91	175	266	182	123	305	3,449
Retail/Residential Internal Allowance (5% AM/10% PM)				(5)	(4)	(9)	(8)	(6)	(14)	(312)
Residential/Hotel External Trips				86	171	257	174	117	291	3,137
5% Residential/Hotel Mode Split				(4)	(9)	(13)	(9)	(6)	(15)	(157)
Total Residential/Hotel Vehicle Trips				82	162	244	165	111	276	2,980
Retail Uses										
Specialty Retail Center	826	46,931	GSF	83	90	173	(2)	75	134	2,080
Retail Subtotal				83	90	173	59	75	134	2,080
Retail/Residential Internal Allowance (5% AM/10% PM)				(4)	(5)	(9)	(6)	(8)	(14)	(312)
Retail External Trips				79	85	164	53	67	120	1,768
Pass-by Trips (25%)				(20)	(21)	(41)	(13)	(17)	(30)	(442)
Total Retail Vehicle Trips				59	64	123	40	50	90	1,326
Total Site Trips				141	226	367	205	161	366	4,306
Total Net New Trips				35	116	151	163	83	246	3,106

Note(s):

(1) Trip generation based on the Institute of Transportation Engineers' Trip Generation, 9th Edition.

(2) AM peak hour of adjacent street rate based on (AM peak hour of generator rate X (PM peak hour of adjacent street rate / PM peak hour of generator rate))

Pass-by Trips. According to ITE, in some cases the driveway volumes at a particular land use are different from the amount of traffic added to the adjacent street system. Uses such as retail establishments attract a portion of their trips from traffic that is already present on the road network.

Pass-by trips are those trips which are made as intermediate stops on the way to a primary destination. An example of a pass-by trip would be one in which a driver stops at a retail store on his/her way home from work.

In recognition of this phenomenon and as agreed to with City staff, it was assumed that 25% of site generated retail trips would be classified as pass-by as shown in Table 6-1. As shown in the table, the site is anticipated to generate 34 weekday AM and 56 weekday PM pass-by trips. Therefore, these trips would be drawn from the existing road network and assigned to the future site entrances accordingly. Pass-by trip assignments at key study intersections are shown on Figure 6-3.

Transit Mode Split. A trip reduction was applied to account for the ready availability of transit given the location of the development proximate to a number of bus routes. As agreed to with staff, a trip reduction of 5% was only applied to the residential/hotel portion of the site. However, it should be noted that with the implementation of transportation demand management (TDM) strategies as proposed in Section 8, actual vehicle trip reductions may be higher than those forecasted herein. Therefore, this reduction should be considered conservative.

Net Site Trips. The net vehicle trips that would be generated by the proposed redevelopment plan (after discounting internal, pass-by, and transit/mode-split trips) are summarized in Table 6-1. As shown, the site would generate, upon completion and full occupancy, 331 weekday AM and 411 weekday PM, net peak hour vehicle trips.

Site Trip Distribution

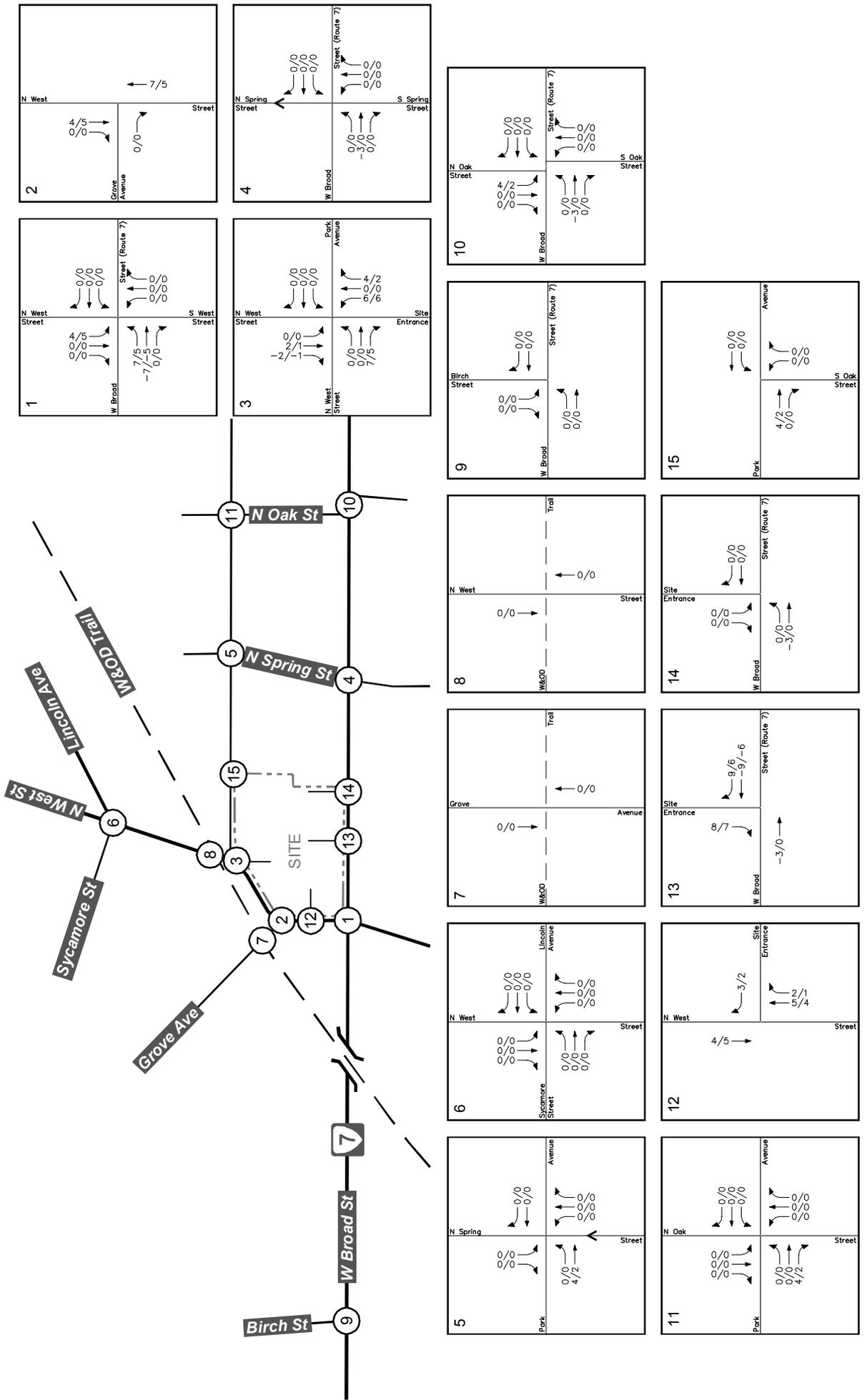
The distribution of the anticipated trips generated by the completion of the proposed redevelopment was based on an examination of existing traffic counts and local knowledge. As agreed to with City staff, existing travel patterns indicate the following

distribution is appropriate in the forecasting of future site traffic:

- To/from the west on West Broad Street: 35%
- To/from the east on West Broad Street: 35%
- To/from the north on North West Street: 10%
- To/from the south on South West Street: 8%
- To/from the east on Park Avenue: 10%
- To/from the west on Grove Avenue: 2%

Site Trip Assignments

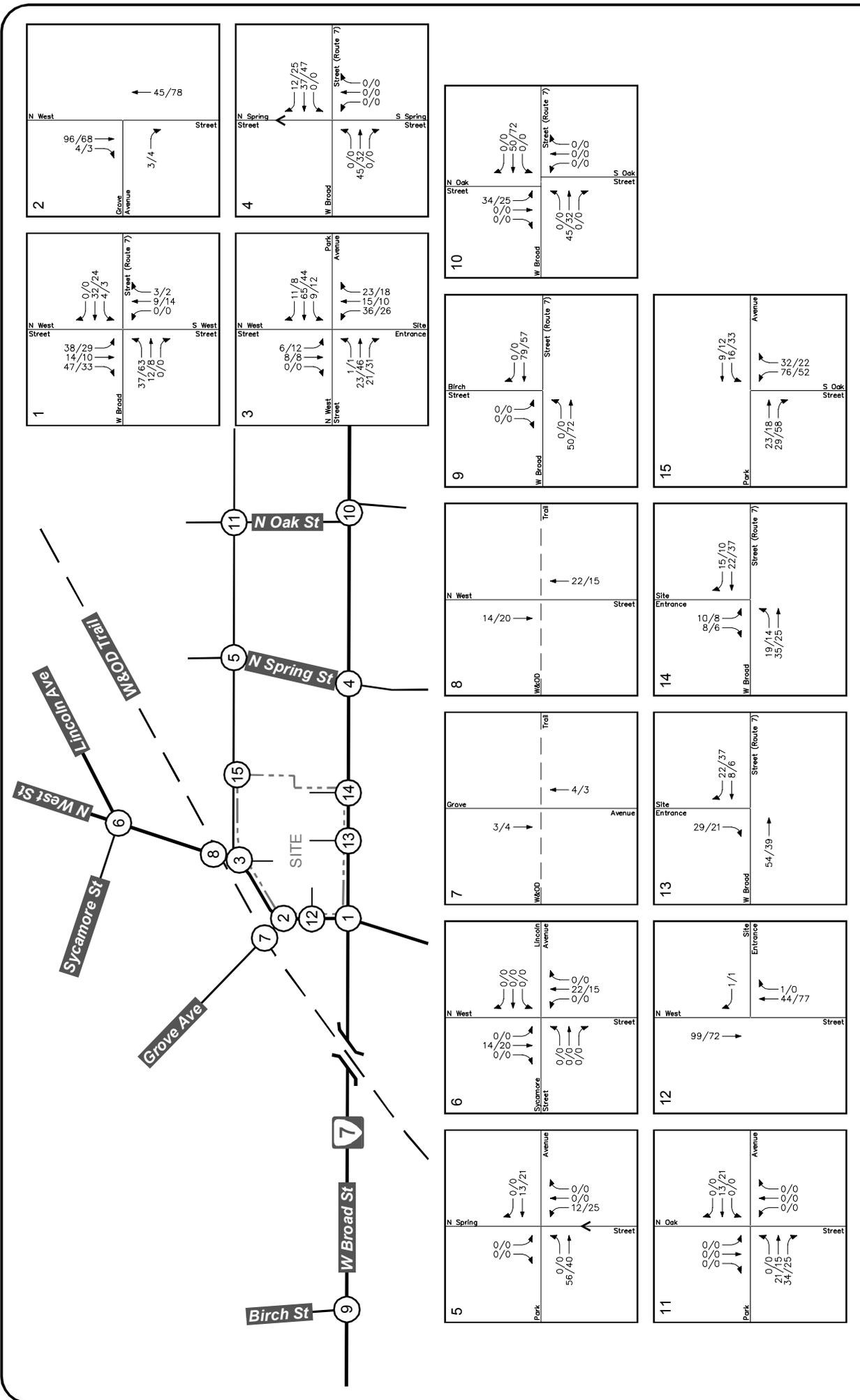
The assignment of the net vehicle trips generated upon the future build-out of the Mason Row redevelopment project was based on the above distribution. These trip assignments are depicted on Figure 6-4.



000/000
PM PEAK HOUR
AM PEAK HOUR

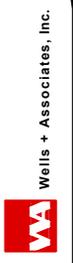
Figure 6-3
Pass-by Trip Assignments





North
 000/000
 AM PEAK HOUR
 PM PEAK HOUR

Figure 6-4
 Site Trip Assignments



Section 7 ANALYSIS OF FUTURE CONDITIONS WITH SITE DEVELOPMENT

Total Future Traffic Forecasts

The 2019 total future traffic forecasts shown on Figure 7-1 were estimated by adding the site trip assignments (Figures 6-4) and pass-by trip assignments (Figures 6-3) to the background future traffic forecasts (Figures 5-4) after discounting those trips generated by the existing site uses (Figures 6-1).

Total Future Levels of Service with Proposed Development Plan

Future levels of service with the proposed redevelopment plan were estimated at key study intersections based on the future traffic volumes shown on Figures 7-1, the future lane use on Figure 6-2, the signal timings for the signalized intersections provided by the City of Falls Church and VDOT and the 2000 HCM methodologies for signalized and unsignalized intersections. The results of these analyses are provided in Appendix I and presented in Table 7-1. Total future levels of service are also presented graphically on Figure 7-2.

As shown in Table 7-1, levels of service under future site development conditions would remain generally consistent with future background conditions (i.e., without site development). Critical movements at the unsignalized intersections on West Broad Street would continue to operate at or near capacity during one or more peak periods as a result of heavy and increased mainline traffic volumes. Notably, however the overall LOS at the West Broad Street/West Street intersection would be “F” during the PM peak hour. Improvements to the intersection, as detailed below, would improve levels of service.

The recommended improvements outlined in the following section would serve to mitigate site impacts evidenced in the total future conditions analysis.

Recommended Improvements

North West Street/Park Avenue Intersection.

As shown on the Applicant’s plan (see Figure 1-2), the development would add a fourth leg to the North West Street/Park Avenue intersection in order to accommodate site access. City officials, NVRPA staff, and local citizens have long recognized the inherent challenges associated with the current configuration of the intersection. As stated earlier, the intersection is currently constructed with awkward angles and an operating condition that favors North West Street mainline traffic which often conflicts with the foot and bicycle traffic associated with the adjacent W&OD Trail crossing.

In order to improve the safety and performance of this intersection, the Applicant proposes to reconfigure the approaches in order for it to function more as a typical four-legged intersection. This would be achieved by having the western approach of North West Street align with Park Avenue while having the northern approach align with the new site entrance. An eastbound left turn lane would be provided while the southbound right turn lane would be narrowed in order to calm traffic. A traffic signal is proposed for this intersection to improve operations. The benefits of a traffic signal include:

- Reduce vehicle speeds
- Improve safety of the W&OD trail crossing as a result of lower travel speeds and, potentially, a dedicated signal phase for trail crossing traffic.
- Improve the performance of the intersection by providing controlled signal phases for all movements.
- Allow pedestrians (trail and non-trail) to cross the intersection safely.

In order to determine the potential ability to signalize this intersection, a signal warrant analysis was conducted in accordance with Warrant 3 – “Peak Hour Volume” of the Manual of Uniform Traffic Control Devices (2009). The analysis is provided in Appendix J and shows that a signal is warranted under peak hour traffic conditions.

Based on the preliminary concepts to date, the proposed intersection improvements would not require the acquisition of off-site right-of-way, thus

negating any encroachment of roadways on to existing park land or other neighboring properties.

West Broad Street/West Street Intersection.

As shown in Table 7-1, the overall level of service at the West Broad Street/West Street intersection would be “F” during the PM peak hour. As discussed with staff, a potential restriping of the North West Street approach would serve to increase capacity at the intersection. The restriping would add an exclusive left-turn lane to the approach (totaling three approach lanes). As shown in Table 7-1, this restriping improvement would result in LOS “E” for the overall intersection during the PM peak hour, which is consistent with conditions without the subject development.

West Broad Street/West Entrance. During the scoping of this traffic study, City staff indicated a strong desire to closely examine the future operations of the proposed site entrances. In particular, staff was concerned about the interaction of new site generated trips accessing via West Broad Street at the intersection closest to West Street in relation to the overall through traffic present on the highly traveled principal arterial. Because of the proximity of the proposed entrance to the nearby signalized intersection of West Broad Street/West Street, the Applicant proposes to operate this entrance as right-in/right-out only. The results of the site entrance analysis are shown in Table 7-1 (levels of service). As shown, the West Broad Street/West Entrance intersection would operate with adequate levels of service under this proposed operational condition.

West Broad Street/East Entrance. As stated previously, the West Broad Street/East Entrance would provide direct access to the site’s retail parking and is proposed to operate as a full-movement intersection (all movements permitted) under STOP sign control.

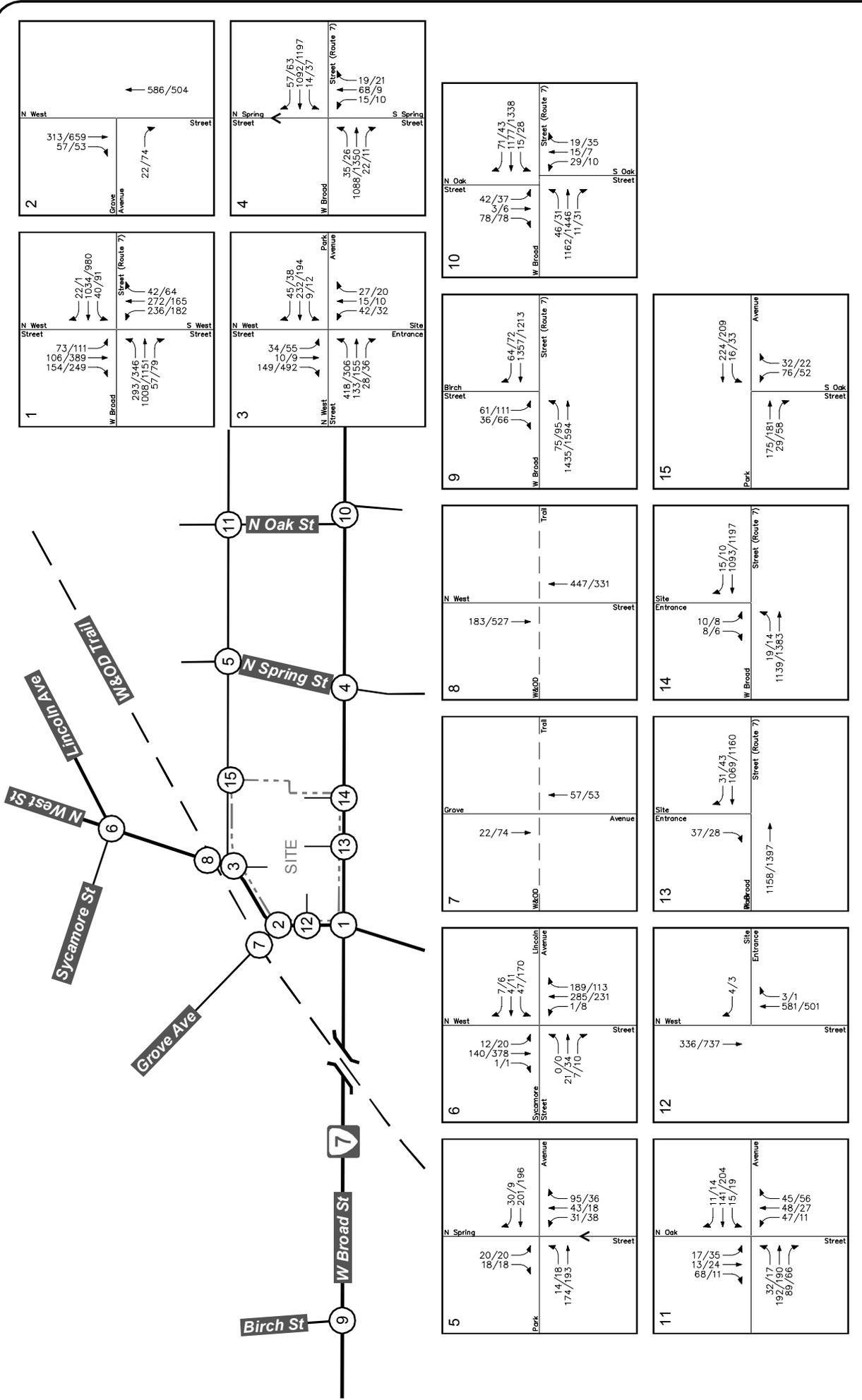
North West Street/Site Entrance. The proposed entrance along North West Street nearest to the West Street/West Broad Street intersection is recommended to operate with only right-in and right-out movements permitted, in order to minimize vehicular conflicts.

Pedestrian/Multi-modal Enhancements. The proposed development should provide an enhanced

pedestrian network and promote connectivity to existing pedestrian/multi-modal facilities in order to reduce vehicular trips and create a vibrant, accessible environment in keeping with the vision of the City’s Comprehensive Plan. The Applicant has committed to providing wider sidewalks and an enhanced streetscape along the entire site’s roadway frontages. Furthermore, the Applicant has shown an open park space on the north side of the site adjacent to the North West Street/Park Avenue intersection, which would offer a place for site visitors and passers-by the opportunity to recreate. In conjunction with a crosswalk across Park Avenue, this space would offer connectivity to the W&OD trail, thus integrating the proposed development with the regional trail network.

Total Future Queuing

Total future queues were forecasted using Synchro software. The results of the queuing analysis are summarized in Table 7-2. As shown, forecasted queues with the proposed development would remain generally consistent with queues forecasted under background future conditions.



North

AM PEAK HOUR

PM PEAK HOUR

000/000

Figure 7-1
Total Future Traffic Forecasts

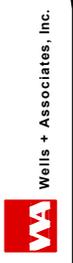
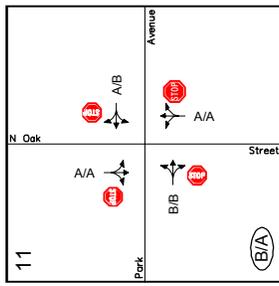
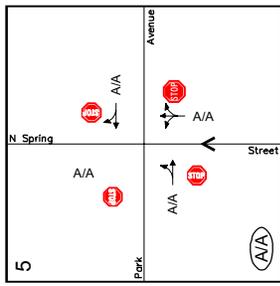
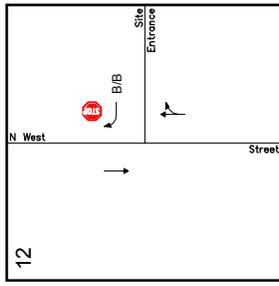
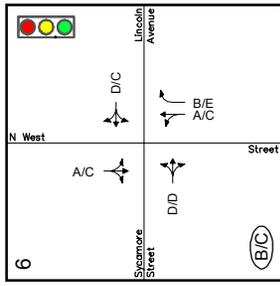
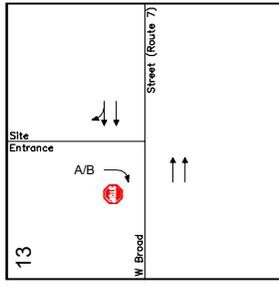
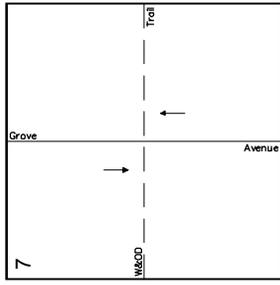
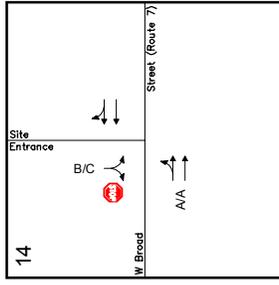
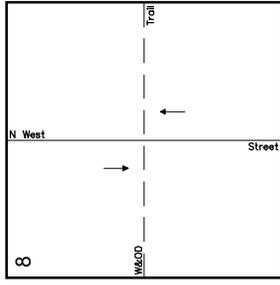
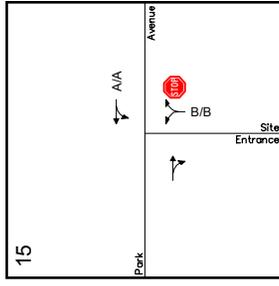
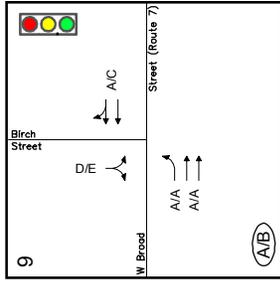
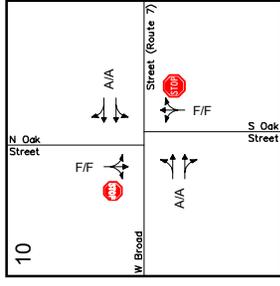
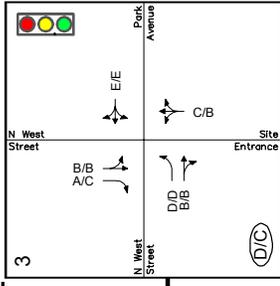
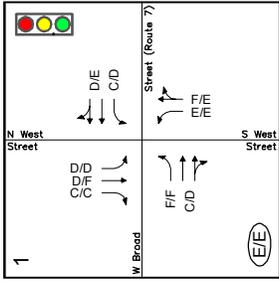
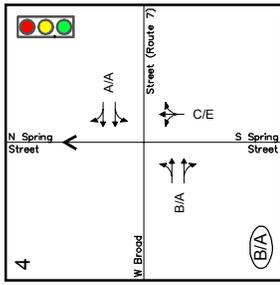
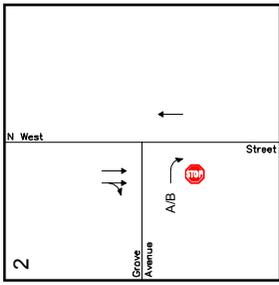
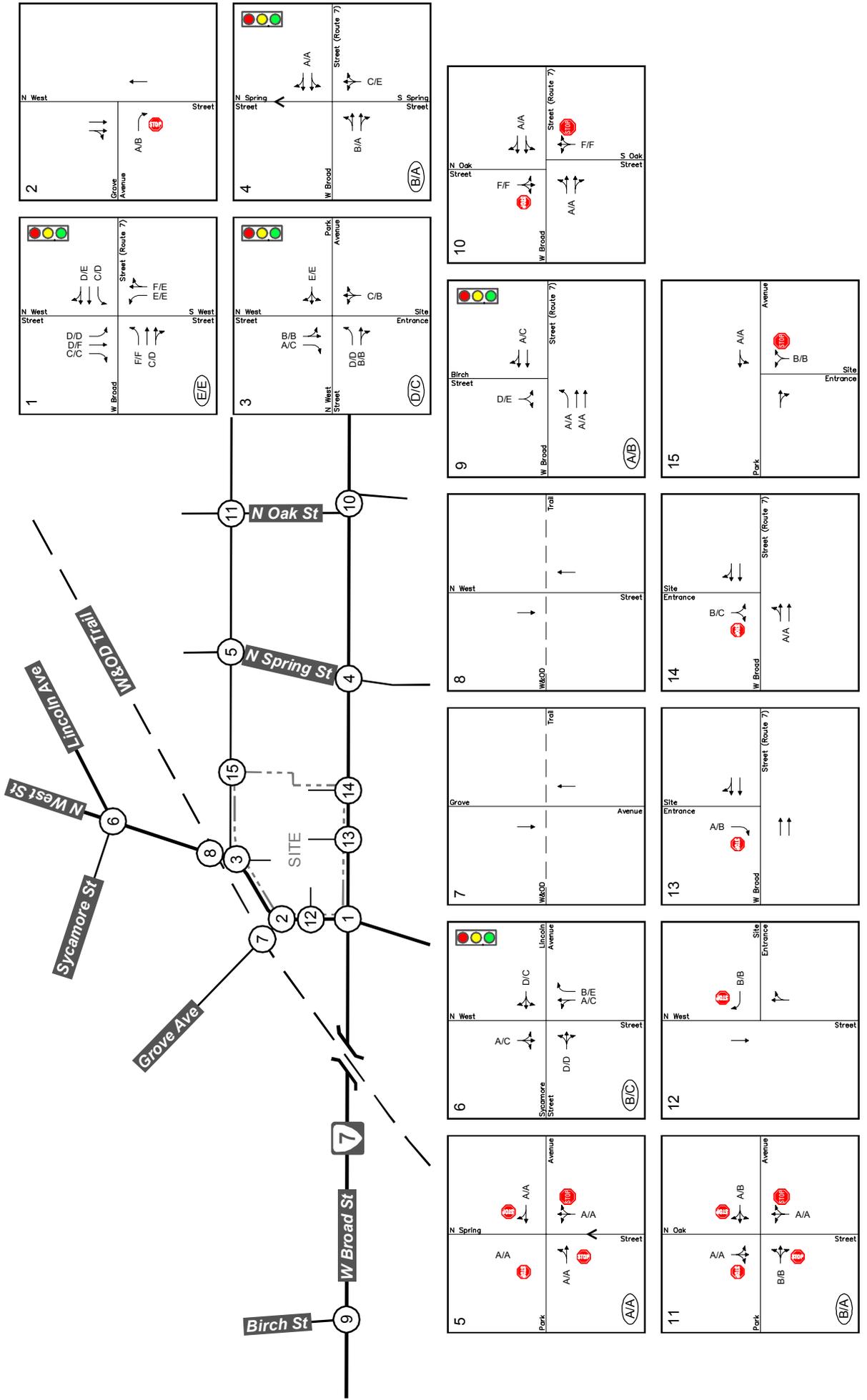


Table 7-1
 Mason Row
 Total Future Intersection Levels of Service Summary ⁽¹⁾⁽²⁾⁽³⁾⁽⁴⁾

Intersection	Control	Lane Group	Existing		Background		Total Future			
			AM	PM	AM	PM	AM	PM		
1. N West Street/W Broad Street	Signal	EBL	F (100.6)	F (82.8)	F (262.0)	F (203.9)	F (302.4)	F (329.8)		
		EBTR	C (24.1)	C (32.7)	C (27.6)	D (38.8)	C (28.6)	D (41.1)		
		WBL	C (26.0)	D (36.5)	C (26.9)	D (39.4)	C (27.5)	D (38.5)		
		WBTR	D (41.0)	C (33.3)	D (45.3)	D (36.1)	D (46.2)	D (37.8)		
		NBL	E (56.0)	D (52.5)	E (56.9)	E (60.7)	E (56.9)	E (58.9)		
		NBTR	F (98.8)	E (72.9)	F (90.9)	E (69.5)	F (99.1)	E (74.7)		
		SBLT	D (49.0)	F (199.8)	D (48.8)	F (303.8)	D (53.9)	F (360.3)		
		SBR	C (34.0)	D (45.4)	C (34.1)	D (46.6)	C (33.9)	D (36.2)		
		Overall	D (47.3)	E (60.3)	E (62.7)	F (87.8)	E (68.4)	F (110.9)		
		Add SBL turning lane	Signal	EBL	N/A	N/A	N/A	N/A	F (283.8)	F (149.4)
EBTR	N/A			N/A	N/A	N/A	C (27.2)	D (41.1)		
WBL	N/A			N/A	N/A	N/A	C (26.5)	D (35.9)		
WBTR	N/A			N/A	N/A	N/A	D (43.9)	E (60.3)		
NBL	N/A			N/A	N/A	N/A	E (56.9)	E (58.6)		
NBTR	N/A			N/A	N/A	N/A	F (99.1)	E (73.8)		
SBL	N/A			N/A	N/A	N/A	D (45.9)	D (46.8)		
SBT	N/A			N/A	N/A	N/A	D (46.9)	F (197.8)		
SBR	N/A			N/A	N/A	N/A	C (34.7)	C (28.9)		
Overall	N/A			N/A	N/A	N/A	E (65.3)	E (73.9)		
2. N West Street/Grove Street	STOP	EBLR	C [19.2]	E [43.8]	N/A	N/A	N/A	N/A		
		NBLT	A [0.2]	A [1.2]	N/A	N/A	N/A	N/A		
Disallow left-turning movements	STOP	EBR	N/A	N/A	A [9.4]	B [11.4]	A [9.6]	B [11.8]		
3. N West Street/Park Avenue	STOP	WBLR	D [33.7]	D [29.9]	D [27.9]	C [21.6]	N/A	N/A		
		SBLT	A [1.6]	A [1.2]	A [1.6]	A [1.2]	N/A	N/A		
		Re-alignment with site entrance	All-way STOP	EBL	N/A	N/A	N/A	N/A	D [33.3]	C [28.7]
				EBTR	N/A	N/A	N/A	N/A	A [10.0]	B [13.7]
				WBLTR	N/A	N/A	N/A	N/A	C [17.2]	C [20.3]
				NBLTR	N/A	N/A	N/A	N/A	B [12.3]	B [13.3]
				SBLT	N/A	N/A	N/A	N/A	B [10.4]	B [10.8]
				SBR	N/A	N/A	N/A	N/A	B [11.2]	F [56.4]
		Overall	N/A	N/A	N/A	N/A	C [20.8]	D [33.8]		
		Re-alignment with site entrance Add Signal	Signal	EBL	N/A	N/A	N/A	N/A	D (39.1)	D (42.2)
EBTR	N/A			N/A	N/A	N/A	B (10.8)	B (15.2)		
WBLTR	N/A			N/A	N/A	N/A	E (75.6)	E (57.9)		
NBLTR	N/A			N/A	N/A	N/A	C (25.1)	B (19.2)		
SBLT	N/A			N/A	N/A	N/A	B (17.3)	B (14.8)		
SBR	N/A			N/A	N/A	N/A	A (5.1)	C (23.8)		
Overall	N/A	N/A	N/A	N/A	D (38.0)	C (32.2)				
4. W Broad Street/N Spring Street	Signal	EBLTR	B (15.6)	A (2.4)	B (18.1)	A (4.0)	B (17.7)	A (4.0)		
		WBTR	A (7.6)	A (4.5)	A (7.7)	A (5.1)	A (7.8)	A (5.5)		
		NBLTR	C (23.3)	E (56.0)	C (23.2)	E (55.9)	C (23.2)	E (55.9)		
		Overall	B (12.0)	A (4.4)	B (13.3)	A (5.3)	B (13.1)	A (5.5)		
5. Park Avenue/N Spring Street	All-way STOP	EBLT	A [9.3]	A [9.1]	A [9.0]	A [8.9]	A [9.7]	A [9.4]		
		WBTR	A [10.0]	A [9.1]	A [9.6]	A [8.9]	A [10.0]	A [9.3]		
		NBLTR	A [9.2]	A [8.2]	A [8.9]	A [8.1]	A [9.3]	A [8.7]		
		SBLR	A [8.4]	A [8.2]	A [8.2]	A [8.1]	A [8.5]	A [8.3]		
		Overall	A [9.4]	A [8.9]	A [9.1]	A [8.7]	A [9.6]	A [9.2]		
6. N West Street/Lincoln Avenue	Signal	EBLTR	D (54.3)	C (34.7)	D (47.9)	D (35.6)	D (47.9)	D (35.6)		
		WBLTR	D (46.2)	C (29.1)	D (46.2)	C (29.2)	D (46.2)	C (29.2)		
		NBLT	A (4.8)	C (26.5)	A (6.0)	C (26.3)	A (8.0)	C (25.7)		
		NBR	A (4.4)	C (21.8)	A (5.3)	C (21.7)	B (16.6)	E (67.4)		
		SBLTR	A (4.2)	C (31.0)	A (5.3)	C (32.3)	A (5.3)	C (32.9)		
		Overall	A (9.0)	C (28.3)	B (10.5)	C (29.1)	B (14.4)	C (34.5)		
9. W Broad Street/Birch Street	Signal	EBL	A (8.8)	A (6.9)	A (8.7)	A (8.5)	A (9.3)	A (8.9)		
		EBT	A (6.6)	A (7.8)	A (6.8)	A (8.4)	A (6.9)	A (8.9)		
		WBTR	A (9.7)	C (22.7)	A (8.5)	C (23.4)	A (8.7)	C (22.9)		
		SBLR	D (48.7)	E (63.8)	D (48.6)	E (62.4)	D (48.6)	E (62.4)		
		Overall	A (9.6)	B (17.6)	A (9.0)	B (17.7)	A (9.1)	B (17.6)		
10. W Broad Street/N Oak Street	STOP	EBLTR	A [2.3]	A [1.6]	A [2.8]	A [2.2]	A [2.8]	A [2.4]		
		WBLTR	A [0.7]	A [1.7]	A [0.7]	A [2.1]	A [0.7]	A [2.2]		
		NBLTR	F [639.1]	F [418.4]	F [976.3]	F []	F []	F []		
		SBLTR	F [63.9]	F [293.8]	F [804.7]	F []	F []	F []		
11. Park Avenue/N Oak Street	All-way STOP	EBLTR	B [11.3]	B [10.3]	B [10.7]	A [10.0]	B [11.5]	B [10.4]		
		WBLTR	A [9.8]	B [10.1]	A [9.5]	A [9.8]	A [9.8]	B [10.2]		
		NBLTR	A [9.7]	A [8.8]	A [9.5]	A [8.7]	A [9.8]	A [8.9]		
		SBLTR	A [9.0]	A [9.1]	A [8.8]	A [9.0]	A [9.0]	A [9.1]		
		Overall	B [10.3]	A [9.9]	A [9.9]	A [9.6]	B [10.5]	A [10.0]		
12. N West Street/RIRO Entrance	STOP	WBR	N/A	N/A	N/A	N/A	B [12.0]	B [11.0]		
13. W Broad Street/Mason Lane	STOP	SBR	N/A	N/A	N/A	N/A	A [9.6]	B [11.5]		
14. W Broad Street/Driveway	STOP	EBLT	N/A	N/A	N/A	N/A	A [0.9]	A [0.8]		
		SBLR	N/A	N/A	N/A	N/A	B [11.7]	C [18.0]		
15. Park Avenue/Garage Entrance	STOP	WBLT	N/A	N/A	N/A	N/A	A [0.6]	A [1.3]		
		NBLR	N/A	N/A	N/A	N/A	B [12.4]	B [12.3]		

Notes:

- (1) Numbers in parentheses () represent delay at signalized intersections in seconds per vehicle.
- (2) Numbers in square brackets [] represent delay at unsignalized intersections in seconds per vehicle.
- (3) Roadways in **BOLD** are considered North/South for purposes of this analysis
- (4) Asterisks * represent delays in excess of 999.9 seconds.



Represents One Travel Lane
 Signalized Intersection
 Stop Sign
 XX Lane Group Level of Service
 (XX) Overall Level of Service

Figure 7-2
Total Future Levels of Service

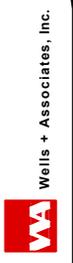


Table 7-2
Mason Row
Total Future Intersection Queues ⁽¹⁾⁽²⁾⁽³⁾⁽⁴⁾⁽⁵⁾

Intersection	Control	Lane Group	Available Storage	Existing		Background		Total Future		
				AM	PM	AM	PM	AM	PM	
1. N West Street/W Broad Street	Signal	EBL	175	#321	#305	#456	#465	#486	#598	
		EBTR	N/A	474	#674	#589	#768	#595	#775	
		WBL	140	m26	93	m28	114	m31	m107	
		WBTR	N/A	#534	328	#626	406	#621	433	
		NBL	250	#281	196	#318	241	#318	241	
		NBTR	N/A	#424	#303	#449	#271	#465	#312	
		SBLT	N/A	165	#656	172	#809	217	#887	
		SBR	N/A	91	99	102	139	112	204	
	Add SBL turning lane	Signal	EBL	175	N/A	N/A	N/A	N/A	#479	#527
			EBTR	N/A	N/A	N/A	N/A	N/A	#595	#775
			WBL	140	N/A	N/A	N/A	N/A	m31	m100
			WBTR	N/A	N/A	N/A	N/A	N/A	#621	#636
			NBL	250	N/A	N/A	N/A	N/A	#318	241
			NBTR	N/A	N/A	N/A	N/A	N/A	#465	#312
2. N West Street/Grove Street	STOP	EBLR	N/A	28	76	N/A	N/A	N/A	N/A	
		NBLT	N/A	1	3	N/A	N/A	N/A	N/A	
Disallow left-turning movements	STOP	EBR	N/A	N/A	N/A	2	10	2	11	
3. N West Street/Park Avenue	STOP	WBLR	N/A	118	98	93	66	N/A	N/A	
		SBLT	N/A	3	3	3	3	N/A	N/A	
	Re-alignment with site entrance ⁽⁶⁾	All-way STOP	EBL	100	N/A	N/A	N/A	N/A	141	101
			EBTR	N/A	N/A	N/A	N/A	N/A	268	81
			WBLTR	N/A	N/A	N/A	N/A	N/A	153	90
			NBLTR	N/A	N/A	N/A	N/A	N/A	60	57
			SBLT	50	N/A	N/A	N/A	N/A	34	88
			SBR	N/A	N/A	N/A	N/A	N/A	59	182
	Re-alignment with site entrance Add Signal	Signal	EBL	100	N/A	N/A	N/A	N/A	330	264
			EBTR	N/A	N/A	N/A	N/A	N/A	58	88
			WBLTR	N/A	N/A	N/A	N/A	N/A	#361	#290
			NBLTR	N/A	N/A	N/A	N/A	N/A	80	54
			SBLT	N/A	N/A	N/A	N/A	N/A	38	m34
			SBR	N/A	N/A	N/A	N/A	N/A	11	63
4. W Broad Street/N Spring Street	Signal	EBLTR	N/A	m508	m55	m562	m93	m555	m74	
		WBTR	N/A	203	211	236	259	240	284	
		NBLTR	N/A	61	53	61	53	61	54	
5. Park Avenue/N Spring Street ⁽⁶⁾	All-way STOP	EBLT	N/A	71	80	90	75	66	62	
		WBTR	N/A	72	64	69	57	69	61	
		NBLTR	N/A	69	47	63	38	70	55	
		SBLR	N/A	46	48	48	48	44	46	
6. N West Street/Lincoln Avenue	Signal	EBLTR	N/A	22	30	42	52	42	52	
		WBLTR	N/A	71	159	73	165	73	165	
		NBLT	N/A	127	205	134	200	m143	m232	
		NBR	150	26	39	26	37	m50	m92	
		SBLTR	N/A	65	308	73	332	71	343	
9. W Broad Street/Birch Street	Signal	EBL	300	30	43	30	41	30	41	
		EBT	N/A	288	380	343	448	351	490	
		WBTR	N/A	517	507	601	596	630	600	
		SBLR	N/A	113	213	111	214	111	214	
10. W Broad Street/Oak Street	STOP	EBLTR	N/A	6	4	8	6	8	6	
		WBLTR	N/A	2	5	2	6	2	6	
		NBLTR	N/A	183	139	206	*	211	*	
		SBLTR	N/A	89	193	249	*	*	*	
11. Park Avenue/Oak Street ⁽⁶⁾	All-way STOP	EBLTR	N/A	88	74	85	65	68	72	
		WBLTR	N/A	63	97	69	81	73	85	
		NBLTR	N/A	65	49	63	66	87	45	
		SBLTR	N/A	54	49	57	51	62	53	
12. N West Street/RIRO Entrance	STOP	WBR	N/A	N/A	N/A	N/A	1	0		
13. W Broad Street/Mason Lane	STOP	SBR	N/A	N/A	N/A	N/A	4	4		
14. W Broad Street/Driveway	STOP	EBLT	N/A	N/A	N/A	N/A	N/A	2	2	
		SBLR	N/A	N/A	N/A	N/A	N/A	3	4	
15. Park Avenue/Garage Entrance	STOP	WBLT	N/A	N/A	N/A	N/A	N/A	1	2	
		NBLR	N/A	N/A	N/A	N/A	N/A	18	12	

Notes:

- (1) Queue length is based on the 95th percentile queue in feet as reported by Synchro, Version 7.
- (2) "*" indicates that the 95th percentile volume exceeds capacity, queue may be longer.
- (3) "m" indicates that the volume for 95th percentile queue is metered by upstream signal.
- (4) Roadways in **BOLD** are considered North/South for purposes of this analysis
- (5) "*" indicates that the volume exceeds capacity, queue is theoretically infinite.
- (6) Queue length analyzed with SimTraffic 7.

Section 8 TRANSPORTATION DEMAND MANAGEMENT

In order to mitigate the potential impacts of the development and take full advantage of the site's proximity to various transit facilities/services, a key component of the project would be the implementation of comprehensive transportation demand management (TDM) strategies.

In an effort to decrease reliance on the personal automobile and encourage the use of transit, ridesharing, bicycling, and walking, the applicant should implement a Transportation Demand Management (TDM) Program. "TDM is a general term for strategies that result in more efficient use of transportation resources. There are many different TDM strategies with a variety of impacts. Some improve the transportation options available to consumers, while others provide an incentive to choose more efficient travel patterns. Some reduce the need for physical travel through mobility substitutes or more efficient land use. TDM strategies can change travel timing, route, destination, or mode."

Based on the site's proximity to transit opportunities and by its proposed mixed-use nature, the TDM program employed by the Applicant should target a goal of a 15 percent reduction in generated peak hour vehicle trips from established Institute of Transportation Engineers (ITE) trip rates for its residential and hotel components.

In developing the TDM program, the following strategies should be considered:

- A. Designate a Transportation Management Coordinator (TMC) to implement the TDM program and advise residents, tenants, and employees of the availability and location of the TDM coordinator and program at least once a year. The position may be part of other duties assigned to the individual. Duties of the Transportation Management Coordinator would include the following:
 - I. Assist residents and employees in making effective and efficient commuting choices.
 2. Disseminate Metrorail, Metrobus, ridesharing, and other relevant transit options to new residents, tenants and employees.
 3. Solicit support from the Metropolitan Washington Council of Governments (MWCOG) Commuter Connections program, the Washington Metropolitan Area Transit Authority (WMATA), the City of Falls Church government, and others.
 4. Provide on-site assistance to residents and employees in forming and maintaining carpools and vanpools.
 5. Disseminate park-and-ride lot information to prospective carpoolers and vanpoolers.
 6. Register carpool/vanpool participants, transit users, bicyclists, and walkers in the Guaranteed Ride Home (GRH) program.
 7. Encourage residents and employees to ride bikes or walk to work.
 8. Provide on-site facilities for bicycle parking and/or storage, including bike racks for visitors and bike storage lockers for residents.
 9. Market and promote the TDM Program among residents and employees through printed materials and web sites (if available).
- B. Commuter Center.
 1. Designate a centralized space on-site as a "Commuter Center". The TMC functions would take place in this space, as appropriate.
 2. Install display racks that would provide information on local transit options.
 3. Sell transit fare media, such as SmarTrip cards, Metro fare cards, and Metrobus passes.
 4. Promote transit and multi-modal options provided by the City.
- C. Incentives to use transit, including:
 - I. Provide information on Metrorail, Metrobus, and other public transportation facilities, services, routes, schedules, and

fares.

2. Encourage retail tenants to subsidize part of employees' transit fare.
3. Disseminate information to transit users regarding free guaranteed rides home in cases of emergency.
4. At the time of initial lease/sales, provide SmarTrip cards to residents.
5. Provide safe, convenient, and attractive pedestrian connections on and off-site.

D. Carpool programs, including:

1. Disseminate information to carpoolers regarding free guaranteed rides home in cases of emergency.
2. Reserve a number of conveniently-located, first-level, free parking spaces for carpools only.

E. Parking management, including:

1. Reserve a number of conveniently-located, first-level, free parking spaces for carpools, vanpools and hybrid vehicles.
2. Reserve a conveniently-located, first-level, free parking space for Flex and/or Zip cars.
3. Provide a parking space on site for a car sharing service (i.e., Zip or Flex Car).

Section 9 CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Based on the results of this traffic impact study, the following may be concluded:

1. The redevelopment plan proposed by Spectrum Development LLC is consistent with the City and community's long term vision for the West Broad Street corridor as reflected in the adopted Comprehensive Plan.
2. All signalized intersections within the study area currently operate at overall adequate levels of service (LOS "D" or better), except for the West Broad Street/West Street intersection which operates at LOS "E" during the PM peak hour.
3. Side street approaches along West Broad Street that operate under STOP sign control generally experience significant delays during commuter peak hours due to heavy mainline volumes.
4. Under future 2019 traffic conditions, without the development of the subject site, delays would increase at study intersections due to regional traffic growth and trips generated by other approved/pending development within the City. However, overall levels of service would remain generally consistent with existing conditions, except for the West Broad Street/West Street intersection which would operate at LOS "E" during the AM peak hour.
5. The Broad & West redevelopment project is anticipated to experience vehicle trip reductions due to internal trip capture, pass-by trip activity, and non-auto mode choice. The development, as a whole, is forecasted to generate 367 weekday AM

and 366 weekday PM upon completion and full occupancy by 2019.

6. Under future 2019 traffic conditions, with the development of the subject site, intersection levels of service would remain generally consistent with background conditions, except the West Broad Street/West Street intersection which would operate at overall LOS "F" during the PM peak hour. Additional mitigation measures, as outlined below, would serve to further improve the transportation network.

Recommendations

Based on the above conclusions and in order to mitigate the impacts of the subject development and improve the overall transportation network, the following recommendations should be considered:

1. As part of the redevelopment plan and to encourage walking trips, the applicant should provide and enhance the pedestrian facilities within the site's block. The applicant should further ensure connections between the site's internal network and the surrounding pedestrian/bicycle system, including the W&OD Trail, as envisioned in the Comprehensive Plan.
2. The applicant should encourage bicycling as a mode of travel. Bicycle racks for site customers/visitors as well as bicycle storage lockers for residents should be provided.
3. The western site access point along West Broad Street should operate as right-in/right-out only.
4. The site access point along North West Street nearest to the signalized intersection at West Broad Street should operate as right-in/right-out only.
5. The intersection of North West Street and Park Avenue should be reconfigured to accommodate a fourth leg accessing the subject site. The reconfiguration should properly align the four approaches and a

signal should be installed in order to improve intersection operations and safety.

6. To improve levels of service, restriping of North West Street at the approach to West Broad Street should be considered in order to provide for three approach lanes.
7. The applicant should implement Transportation Demand Management (TDM) strategies to encourage the use of alternate modes of transportation. A peak hour trip reduction target of 15% should be established for the site's residential and hotel components