

Multimodal Transportation Study

Potomac River Generating Station Redevelopment Coordinated Development District

City of Alexandria, Virginia

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Executive Summary

The following report presents the findings of a Multimodal Transportation Study (MTS) for the proposed Potomac River Generating Station (PRGS) Redevelopment Coordinated Development District (CDD) located in the Old Town North area of the City of Alexandria, Virginia.

The purpose of this report is to provide a transportation analysis associated with the proposed Potomac River Generating Station (PRGS) Redevelopment CDD to determine the multi-modal infrastructure needs for the entire site, identify all vehicular and external recommendations to mitigate transportation impacts from the CDD, and provide a context within which the Development Special Use Permit (DSUP) for each individual block/phase will identify more detailed recommendations. **This report concludes that the proposed development will have a manageable impact** on the surrounding transportation network, assuming the proposed infrastructure and mitigation recommendations are implemented, as outlined in the Summary of Recommendations chapter, and specific development block details on building access and transportation demand management are developed during the DSUP process.

Site Location and Study Area

The proposed development site is located in the Old Town North area of the City of Alexandria, Virginia and is bounded by Slaters Lane to the north, E Abingdon Drive and a PEPCO sub-station to the west, Norfolk Southern Corporation right-of-way to the south, and the Potomac River to the east as shown in Figure 2. The general extents of the study area are Richmond Highway to the west, N Fairfax Street to the east, Slaters Lane to the north, and Madison Street to the south.

The vehicular study area consists of 41 intersections along Richmond Highway, George Washington Memorial Parkway, Slaters Lane, Bashford Lane, Second Street, First Street, Montgomery Street, and Madison Street, as vetted and approved by the City of Alexandria.

The proposed development site is currently occupied by the Potomac River Generating Station, which is no longer in operation. The site is zoned as UT: "Utility and Transportation" according to Section 4-1300 of the City of Alexandria Zoning Ordinance. The redevelopment of the PRGS site is subject to a Coordinated Development District (CDD) process.

Proposed Project

The proposed development site is currently occupied by the Potomac River Generating Station, which is no longer in operation. The proposed development will include redeveloping the existing, unused power station site into a mixed-use development consisting of six (6) development blocks and existing pumphouse identified for potential renovation and reuse. A total of up to 2.5 million square feet gross square feet (GSF) of development is proposed, with a mix of office, arts, retail, residential, and hotel uses proposed throughout the site. GSF is the same as gross floor area (GFA) for the purposes of this report, per the City's definition of GFA on the PRGS site. The exact program for each block will be determined as part of future DSUPs.

The proposed development will provide vehicular parking in a shared below-grade parking garage. The below-grade parking will be shared between all development blocks and will meet the practical needs of the development. Details about the proposed development's parking facilities will be examined in the Infrastructure DSUP and subsequent DSUP applications for each block. The proposed development will provide loading areas within or adjacent to each development block. The number of on-site loading facilities will accommodate the practical needs of the development.

The proposed project build-out year is 2033. The proposed overall site plan is shown in Figure 3.

Compliance with Small Area Plan

The City Council adopted the Old Town North Small Area Plan in 2017 along with the Old Town North Urban Design Standards and Guidelines to present recommendations that focus on placemaking and economic development. The Plan includes recommendations to promote a balanced mix of land uses and centers around a pedestrian-focused vision for the neighborhood with design standards and guidelines that support and enhance the pedestrian experience.

One of the principles upon which the Plan is based is to "establish a conceptual framework for the redevelopment of the former power plant site," i.e. the site of the PRGS CDD. The Plan identifies the following transportation goals for the area:

- Enhanced streetscapes and pedestrian environment that reflects the goal of the City's adopted Vision Zero

resolution and offers an interesting, safe, attractive, and engaging environment for pedestrians.

- Reuse of the rail corridor as a linear park with pedestrian and bicycle connections and recreational amenities.
- Separation of pedestrian and bicycle paths to be provided along the expanded waterfront open space as part of the redevelopment of the former power plant site.
- Enhanced bicycle facilities as recommended in the City's Transportation Master Plan to improve north-south and east-west connectivity in Old Town North. The recommended facilities provide additional options for connections to the Mount Vernon Trail and improved bicycle connectivity between the Metrorail Stations, the Mount Vernon Trail, and the waterfront.
- Existing or new local transit routes will be configured to provide service to the former power plant site and transit connectivity to the Braddock Road Metrorail Station and the future Potomac Yard Metrorail Station.
- Local and circulator transit service to provide more frequent and convenient service between the King Street Metrorail Station and the Braddock Road Metrorail Station, as recommended in the City's Transportation Master Plan. The service would traverse through Old Town North using North Fairfax, Madison, and Montgomery Streets.
- Extend the urban street network as part of the redevelopment of the former power plant site.

The proposed development is consistent with the Small Area Plan's goals by extending the urban street grid into the site, providing pedestrian and bicycle facilities within the site and along the waterfront that are consistent with Plan's proposed improvements, and accommodating changes to transit service as recommended in the City's Transportation Master Plan. The design of the proposed development's transportation infrastructure shall continue to be coordinated with the City through subsequent DSUP processes.

Transit Facilities

The project area is served by regional and local transit services that include DASH, Metroway, and Metrorail:

- There is currently one (1) bus route (DASH Line 34) that stops within a quarter mile walk of the site, with multiple bus stops located near the site, which provides access to the regional transit system via the Braddock Road Metrorail Station and Old Town Alexandria. There

are two (2) Metroway stops less than a mile from the project site.

- The site is located 1.0 mile from the Braddock Road Metrorail Station and 1.0 mile from the future Potomac Yard Metrorail Station.
- Planned and proposed improvements to transit service in the vicinity of the site will improve connectivity to/from the proposed development.
- As part of the proposed development, DASH Line 34 will be realigned to utilize the new roadways within the site, consistent with the Old Town North Small Area Plan and Alexandria Mobility Vision Plan. Two two-way transit stops will be located within the site, providing for direct on-site transit connectivity to/from the proposed development.
- In coordination with City staff, National Park Service, and a number of other relevant stakeholders, the CDD will, if feasible, take advantage of the project's proximity to the Potomac River and provide a stop along the waterfront for any future ferry service or water taxis.

The development is well-served by numerous transit options under existing conditions and includes proposed facilities that will improve transit access to the site.

Bicycle Facilities

The site has access to several on- and off-street bicycle facilities, including bicycle lanes on Slaters Lane west of GW Memorial Parkway, shared lanes on N Royal Street and Bashford Lane, and the Mount Vernon Trail.

A number of planned improvements by the City will improve bicycle infrastructure and connectivity in the vicinity of the proposed development. These include a new trail/sidepath along E Abingdon Drive from Bashford Lane to Slaters Lane and a new trail connection from Mount Vernon Trail/E Abingdon Drive to Potomac Avenue/Potomac Yard Trail across GW Memorial Parkway.

The project's proposed bicycle improvements include the provision of a two-way bicycle route through the project site, new bike lanes along Slaters Lane, upgrades to the existing Mount Vernon Trail, and new connection points to the Mount Vernon Trail along the eastern frontage of the site. These improvements will provide connectivity to regional bicycle facilities, provide connectivity to the local bicycle network, and will circulate bicycles internally through the site. These proposed connections to the MVT will be developed in a context-sensitive manner in

coordination with the City of Alexandria and the National Park Service (NPS).

Additionally, as part of the proposed development, short-term bicycle parking spaces will be provided throughout the site. Long-term bicycle parking spaces will be provided for use of residents and employees of the site.

Pedestrian Facilities

The existing pedestrian infrastructure surrounding the site provides an adequate walking environment. There are sidewalks along the majority of primary routes to pedestrian destinations with a few gaps in the system.

Planned and proposed pedestrian improvements to the pedestrian infrastructure surrounding the site will further improve pedestrian comfort and connectivity. Sidewalks will be provided on both sides of all internal roads. All new pedestrian facilities will meet or exceed City of Alexandria and ADA standards. The project proposes to connect and tie into the existing street network at N Royal Street, N Fairfax Street, and Slaters Lane; proposed sidewalks will connect to the existing pedestrian network at those same locations. These new connections will help complete the street grid, significantly improving pedestrian circulation and porosity, and will provide connectivity to the many commercial destinations to the south, as well as the major transit stations to the west and south. Wherever feasible, curb extensions will be provided within the internal roadway network to shorten crossing distances and provide a more comfortable pedestrian environment. All intersections within the internal roadway network will have all-way stop control or will be signalized, providing more abundant and frequent crossings for pedestrians to navigate the site. The proposed development will provide trail spurs connecting the eastern frontage of the site to the Mount Vernon Trail, connecting pedestrians to Daingerfield Island to the north and Old Town Alexandria to the south. These improvements will be developed in a context-sensitive manner in coordination with the City of Alexandria and NPS.

Travel Demand Assumptions

Mode split (also called mode share) is the percentage of travelers using a particular type (or mode) of transportation when traveling. Vehicular mode split information for this report was based on approved studies in the area, census data using American Community Survey (ACS), Transportation Analysis Zones (TAZs), data contained in the 2005 WMATA Development-Related Ridership Survey Report, and discussions

with the City during the scoping process. The following mode splits were assumed in the analysis:

- Office:
 - Auto – 60%, Transit – 30%, Bike – 5%, Walk – 5%
- Residential:
 - Auto – 50%, Transit – 35%, Bike – 5%, Walk – 10%
- Retail:
 - Auto – 20%, Transit – 15%, Bike – 25%, Walk – 40%
- Grocer:
 - Auto – 70%, Transit – 5%, Bike – 5%, Walk – 20%
- Hotel:
 - Auto – 50%, Transit – 25%, Bike – 5%, Walk – 20%
- Arts:
 - Auto – 60%, Transit – 20%, Bike – 5%, Walk – 15%

These mode splits reflect the expected modes of travel for trips during the typical weekday commuter peak hours, assuming a transportation management plan will be in place as part of future DSUPs for the proposed development. The proposed mode splits were vetted and approved by the City of Alexandria during the scoping process.

This data was then applied to the calculated number of trips that are generated by the proposed uses using the methodology outlined in the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition (with the exception of the Retail, which used 10th Edition rates due to the neighborhood-serving, ground-floor nature of the use). After incorporating trip adjustments for synergy between uses on site and vehicular trips from drivers already passing by the site, the resulting new vehicular trips at full development build-out were calculated to be:

- AM Peak Hour: 628 veh/hr
- PM Peak Hour: 793 veh/hr

Traffic Analysis

Existing Conditions

Intersection capacity analyses were performed for the morning and afternoon peak hours at the study area intersections. Synchro version 10 was used to analyze the study intersections based on the *Highway Capacity Manual* (HCM) 2000 methodology.

The existing conditions analysis shows many intersections and movements that operate at an acceptable level of service during the morning and afternoon peak hours. However, of the 33 existing intersections in the study area, five (5) intersections have one or more movements that operate at levels beyond Level of Service (LOS) E or better in one or more peak hour. LOS E is typically used as the acceptable LOS threshold in the City of Alexandria; although LOS F is generally accepted in urbanized areas if vehicular improvements would be a detriment to safety or to non-auto modes of transportation. The capacity analysis results also show that 10 intersections have 95th percentile queues that exceed the available storage length in one or more peak hour in existing conditions.

Existing areas of congestion are primarily focused along the heavily trafficked commuter routes, such as GW Memorial Parkway and Richmond Highway.

Future Traffic Operations

A capacity analysis was developed to compare the future roadway network without the proposed development to the future roadway network with the proposed development. Intersection capacity analyses were performed for the morning and afternoon peak hours at the study area intersections for the 2033 (full build-out) and 2039 (plus-six-year planning level) analysis years. Synchro version 10 was used to analyze the study intersections based on the *Highway Capacity Manual* (HCM) 2000 methodology.

A number of planned transportation improvements in the vicinity of the proposed development are expected to be complete by the 2033 full build-out year. These improvements are detailed in the report and include:

- Slaters Lane Connection to N Fayette Street
- New Signal at Route 1 and N Fayette Street

Traffic projections for 2033 (full build-out) and 2039 (plus-six-year planning level) are based on existing volumes, plus traffic generated by approved nearby background developments, regional growth on the roadways, and traffic generated by the proposed PRGS CDD.

Based on historical data obtained from VDOT and discussions with City of Alexandria staff during the scoping process, a 0.25% annual growth rate was assumed for the 2033 and 2039 scenarios. This growth rate was applied to the thru movements at intersections along Richmond Highway, GW Memorial Parkway, N Patrick Street, N Henry Street, and Slaters Lane

between Richmond Highway and GW Memorial Parkway and applied to the movements on Potomac Avenue between the City of Alexandria and Crystal City (i.e., westbound left-turn and northbound right-turn at the intersection of Richmond Highway and Potomac Avenue within the study area).

Mitigations

As detailed in the Geometry and Operations section of this report, the proposed development will include several improvements, including a new network of internal roadways with external connections to Slaters Lane, N Royal Street, and N Fairfax Street.

In addition to the improvements noted above, mitigation measures were identified based on City of Alexandria standards or as outlined in the approved scoping document. The proposed development is considered to have an impact at an intersection if any of the following conditions are met:

- The capacity analyses show a LOS F at an intersection or any movement in the future where one does not exist in the background conditions;
- There is an increase in delay at any movement or overall intersection operating under LOS F of greater than 10 percent when compared to the background conditions; or
- The 95th percentile queue length in the future conditions exceeds the available capacity and increases by more than 150 feet compared to background conditions.

Following these guidelines, there are impacts to six (6) study intersections as a result of the proposed development during the 2033 (full build-out) analysis year and impacts to the same six (6) study intersections as a result of the proposed development during the 2039 (plus-six-year planning level) analysis year. Mitigation measures were explored at these intersections, and included the following recommendations:

Future (2033) Full Build-Out Conditions:

- Modifications to signal phasing and signal timings at three (3) intersections.
- Adjustments to signal timings at one (1) intersection.
- Restriping at four (4) intersections.
- Adding a right-turn pocket at one (1) intersection.

Future (2039) Plus-Six-Year Planning Level Conditions:

- Modifications to signal phasing and signal timings at three (3) intersections.

- Adjustments to signal timings at one (1) intersection.
- Restriping at four (4) intersections.
- Adding a right-turn pocket at one (1) intersection.

With these mitigations in place, the analysis shows that traffic operations with proposed development will improve or are consistent with the background scenarios at many intersections.

Along GW Memorial Parkway, there are certain movements that continue to experience congestion, as they do under existing and background conditions. GW Memorial Parkway is a heavily commuted route and while there is additional capacity at the side street approaches that could be shifted to the mainline to further reduce delays along GW Memorial Parkway, this would be detrimental to the safety of non-auto modes as it would require a decrease in pedestrian crossing times. It is likely that drivers cutting through the area will alter their route and mode choices as future conditions change.

Additional Improvements

While not required to mitigate impacts by the proposed development, there are additional opportunities to further the City's goal to develop a complete street network in the vicinity of the proposed development, particularly along the heavily commuted GW Memorial Parkway corridor. In addition to the mitigation measures identified based on City of Alexandria standards, the following additional improvements could be beneficial to the operations in the vicinity of the proposed development:

- Restriping the westbound approach of the GW Memorial Parkway and E Abingdon Drive intersection from one lane to two lanes.
- Construction of a new east-west street connecting the Primary Street, a new internal roadway, to E/W Abingdon Drive and/or GW Memorial Parkway.

These additional improvements could improve existing points of congestion along the GW Memorial Parkway, provide additional capacity for trips generated by the proposed development, and create opportunities for enhanced east-west multimodal connectivity where it is currently challenging due to the limited access nature of GW Memorial Parkway. These improvements would need to be further coordinated with the City and NPS.

Transportation Management Plan

A Transportation Management Plan (TMP) will be outlined in the DSUP for each individual block. The unique characteristics of

this site offer a variety of possibilities for the TMPs. Factors such as coordinated transportation management between the development blocks, the on-site transit facilities, and proximity to the Mount Vernon Trail, present an exceptional opportunity to minimize the number of commuters driving alone to and from the site.

Summary and Recommendations

This report finds that this CDD meets the goals set by the Old Town North SAP, and fits within the City's Mobility Plan, Complete Streets Design Guidelines, Old Town North Urban Design Standards and Guidelines and Vision Zero initiative. The project achieves this through providing high-quality internal and external multimodal connections as well as incorporating a roadway system that accommodates expected traffic flows while not providing excess capacity at the expense of non-auto accessibility.

Thus, this report concludes that the proposed development **will have a manageable impact** on the surrounding transportation network, assuming the proposed infrastructure and mitigation recommendations are implemented, as outlined in the Summary of Recommendations chapter, and specific development block details on building access and transportation demand management are developed during the DSUP process.

Introduction

This report presents the findings of a Multimodal Transportation Study (MTS) for the proposed Potomac River Generating Station (PRGS) Redevelopment Coordinated Development District (CDD) located in the City of Alexandria, Virginia. This report reviews the transportation aspects of the proposed development and development program.

The proposed development site is currently occupied by the Potomac River Generating Station, which is no longer in operation. The proposed development will include redeveloping the existing, unused power station site into a mixed-use development consisting of six (6) development blocks and existing pumphouse identified for potential renovation and reuse. Up to 2.5 million square feet gross square feet (GSF) of development is proposed, with a mix of office, arts, retail, residential, and hotel uses proposed throughout the site. GSF is the same as gross floor area (GFA) for the purposes of this report, per the City's definition of GFA on the PRGS site. The proposed project build-out year is 2033.

Purpose of Study

The purpose of this study is to evaluate the transportation network in the vicinity of the site and identify any potential transportation impacts that may result from the proposed redevelopment. Elements of this report include a description of the proposed development, an evaluation of the existing multimodal transportation network, and evaluations of the future transportation network with and without the proposed development.

Study Tasks

The following tasks were completed as part of this study:

- A scoping meeting was held on February 26, 2021 with representatives from the City of Alexandria. An updated scope dated November 5, 2021 was submitted by Gorove Slade to the City of Alexandria. This scope includes discussions about the parameters of the study and relevant background information. A copy of the signed scoping document is included in the Technical Attachments.
- Field reconnaissance in the vicinity of the site was performed to collect information related to the existing traffic controls, signal timings, roadway geometry, traffic flow characteristics, sidewalk conditions, bicycle facilities, and transit stop amenities.

- Data collection was not possible during Fall 2021 as traffic volumes were not representative of typical traffic conditions due to impacts to travel patterns associated with the COVID-19 public health crisis. In order to establish baseline conditions, the study analyzed morning and afternoon peak hour traffic volumes comprised of turning movement count data collected between 2015-2016 (from the Old Town North Small Area Plan Transportation Study), with applied growth based on data collection year. Where historical intersection count data was not available, a methodology using vehicle probe data was applied, as vetted and approved by the City.
- As outlined in the scoping document, thirteen (13) planned developments in the vicinity of the proposed development were assumed to be in place for the 2033 (full build-out) and 2039 (plus-six-year planning level). According to historical data obtained from VDOT, and discussions with the City during scoping, the average historical growth on the roadway has been low in recent years. A 0.25% annual growth rate was assumed for the 2033 and 2039 scenarios.
- Proposed site traffic volumes were generated based on the methodology outlined in [Trip Generation, 11th Edition](#) published by the Institute of Transportation Engineers (ITE).
- Intersection capacity analyses were performed using the software package Synchro, Version 10 based on the [Highway Capacity Manual](#) (HCM) methodology. Traffic analyses were performed for existing conditions (2021), future conditions (2033) with and without development. At the City's request, an additional plus-six-year (2039) planning level analysis was included.
- A Transportation Management Plan framework was developed as a TMP will be necessary to meet City requirements.

Project Summary

Site Location

The project site is located in the Old Town North area of the City of Alexandria, Virginia. Figure 1 shows the location of the project in a regional context. The project site is bounded by Slaters Lane to the north, E Abingdon Drive and a PEPCO sub-station to the west, Norfolk Southern Corporation right-of-way to the south, and the Potomac River to the east. The site location is shown in Figure 2.

Zoning Information

According to the City of Alexandria Zoning Map and Zoning Ordinance, the site is currently zoned as Utility and Transportation (UT). The redevelopment of the PRGS site is subject to a Coordinated Development District (CDD) process.

Proposed Site Plan

The proposed development site is currently occupied by the Potomac River Generating Station, which is no longer in operation. The proposed development will include redeveloping the existing, unused power station site into a mixed-use development consisting of six (6) development blocks and existing pumphouse identified for potential renovation and reuse. Up to 2.5 million square feet gross square feet (GSF) of development is proposed, with a mix of office, arts, retail, residential, and hotel uses proposed throughout the site. GSF is the same as gross floor area (GFA) for the purposes of this report, per the City's definition of GFA on the PRGS site. The exact program for each block will be determined as part of future DSUPs.

The proposed development will provide vehicular parking in a shared below-grade parking garage. The below-grade parking will be shared between all development blocks and will meet the practical needs of the development. Details about the proposed development's parking facilities will be examined in the DSUP application for each block. The proposed development will provide loading areas within or adjacent to each development block. The number of on-site loading facilities will accommodate the practical needs of the development.

The proposed project build-out year is 2033. The proposed overall site plan is shown in Figure 3.

Scope and Limits of the Study Area

The study area is generally bounded by Richmond Highway to the west, N Fairfax Street to the east, Slaters Lane to the north, and Madison Street to the south. The following intersections were identified for inclusion in the vehicular study area, as shown in Figure 4.

1. George Washington Memorial Pkwy & E Abingdon Dr
2. George Washington Memorial Pkwy & Slaters Ln
3. Slaters Ln & W Abingdon Dr
4. Slaters Ln & E Abingdon Dr
5. Slaters Ln & Potomac Greens Dr/Portner Rd
6. Slaters Ln & Powhatan St
7. Slaters Ln & Richmond Hwy
8. Bashford Ln & Powhatan St

9. George Washington Memorial Pkwy & Bashford Ln
10. Bashford Ln & W Abingdon Dr
11. Bashford Ln & E Abingdon Dr
12. Bashford Ln & N Pitt St
13. Bashford Ln & N Royal St
14. Third St & N Royal St
15. Third St & N Fairfax St
16. Second St & N Royal St
17. Second St & N Pitt St
18. Second St & E Abingdon Dr
19. First St & Richmond Highway (East)
20. First St & Richmond Highway (West)
21. N Fayette St & Richmond Hwy
22. First St & N Washington St
23. First St & N St Asaph St
24. First St & N Pitt St
25. Montgomery St & N Fairfax St
26. Montgomery St & N Royal St
27. Montgomery St & N Pitt St
28. Montgomery St & St Asaph St
29. Montgomery St & N Washington St
30. Montgomery St & N Patrick St
31. Montgomery St & Richmond Hwy
32. Madison St & N Washington St
33. Potomac Ave & Richmond Hwy
34. Slaters Ln & Primary St & Woonerf St – Planned
35. Primary St & Lane C – Planned
36. Lane C & Woonerf St – Planned
37. Primary St & Lane B (North) – Planned
38. Primary St & Lane B – Planned
39. Primary St & Lane A – Planned
40. Lane A & Woonerf St – Planned
41. Primary St & Woonerf St & N Fairfax St – Planned

Data Sources

Sources of data for this study include the City of Alexandria, the Virginia Department of Transportation (VDOT), the Institute of Transportation Engineers (ITE) Trip Generation, 10th and 11th Editions, Census Transportation Planning Products (CTPP), Hilco Redevelopment Partners, Gensler, OJB Landscape Architecture, Christopher Consultants, and the office files and field reconnaissance efforts of Gorove Slade Associates, Inc.

Contents of Study

This report contains nine (9) chapters as follows:

- Study Area Overview
This chapter reviews the area near and adjacent to the project and includes an overview of the site location.
- Project Design

This chapter reviews the transportation components of the project, including the site plan and access.

- *Transit Facilities*

This chapter reviews existing and future transit service adjacent to the site, reviews how the proposed development's transit demand will be accommodated, outlines impacts, and presents recommendations as needed.

- *Bicycle Facilities*

This chapter reviews existing and future bicycle facilities access to the proposed development, reviews the quality of cycling routes to and from the project site, outlines impacts, and presents recommendations as needed.

- *Pedestrian Facilities*

This chapter reviews existing and future pedestrian facilities, reviews walking routes to and from the proposed development, outlines impacts, and presents recommendations as needed.

- *Travel Demand Assumptions*

This chapter outlines the travel demand of the proposed development. It summarizes the expected mode splits multimodal trip generation of the proposed development.

- *Traffic Operations*

This chapter provides a summary of the existing and future roadway facilities and an analysis of the existing and future roadway capacity in the study area. It summarizes the distribution and routing assumptions used in the analysis. This chapter highlights the vehicular impacts of the proposed development, including presenting mitigation measures for minimizing impacts as needed, as well as other recommendations.

- *Transportation Management Plan*

This chapter outlines various components of the proposed development's Transportation Management Plan (TMP).

- *Summary and Conclusions*

This chapter presents a summary of the recommended mitigation measures by mode and presents overall findings and conclusions.

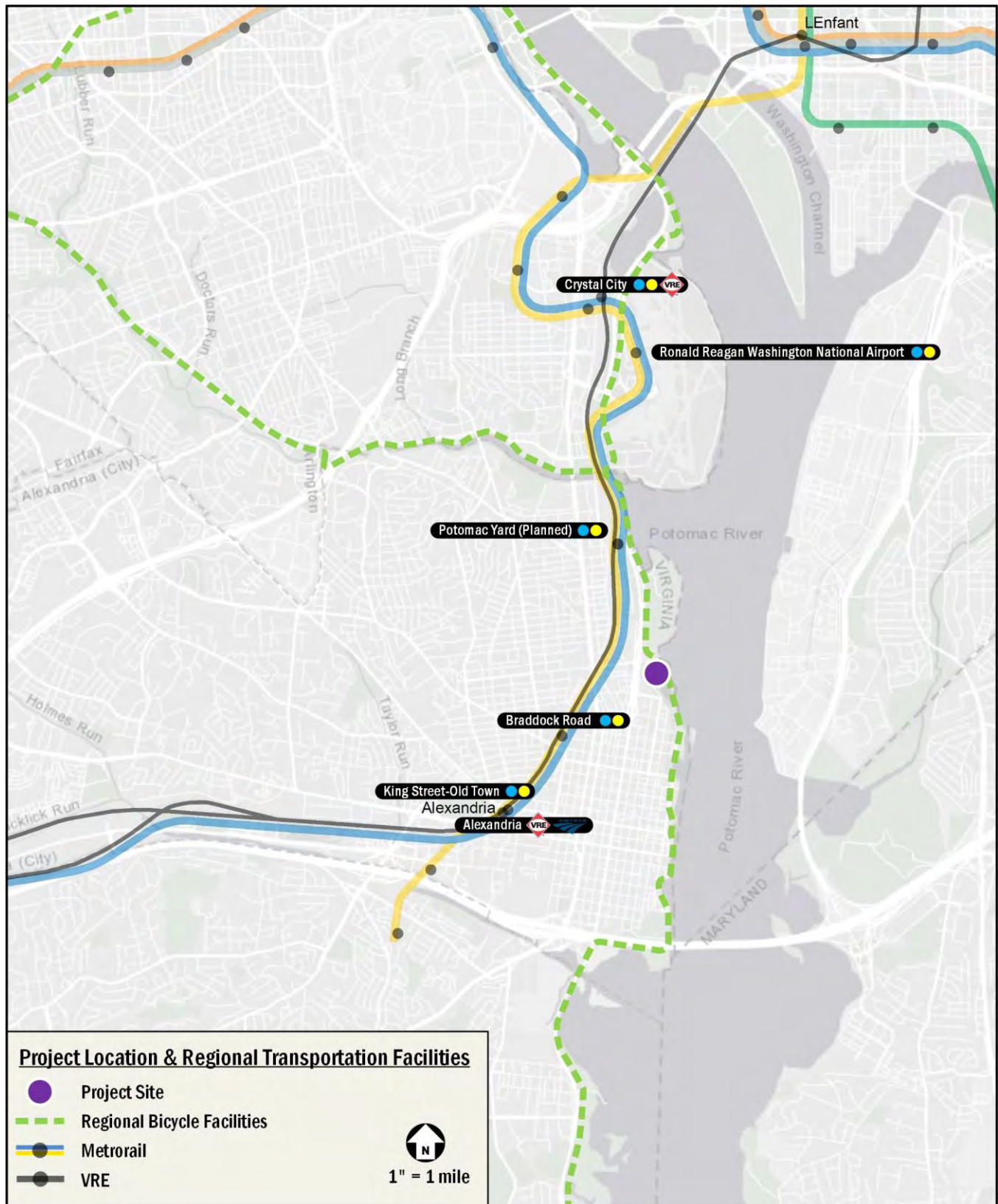


Figure 1: Project Location and Regional Transportation Facilities

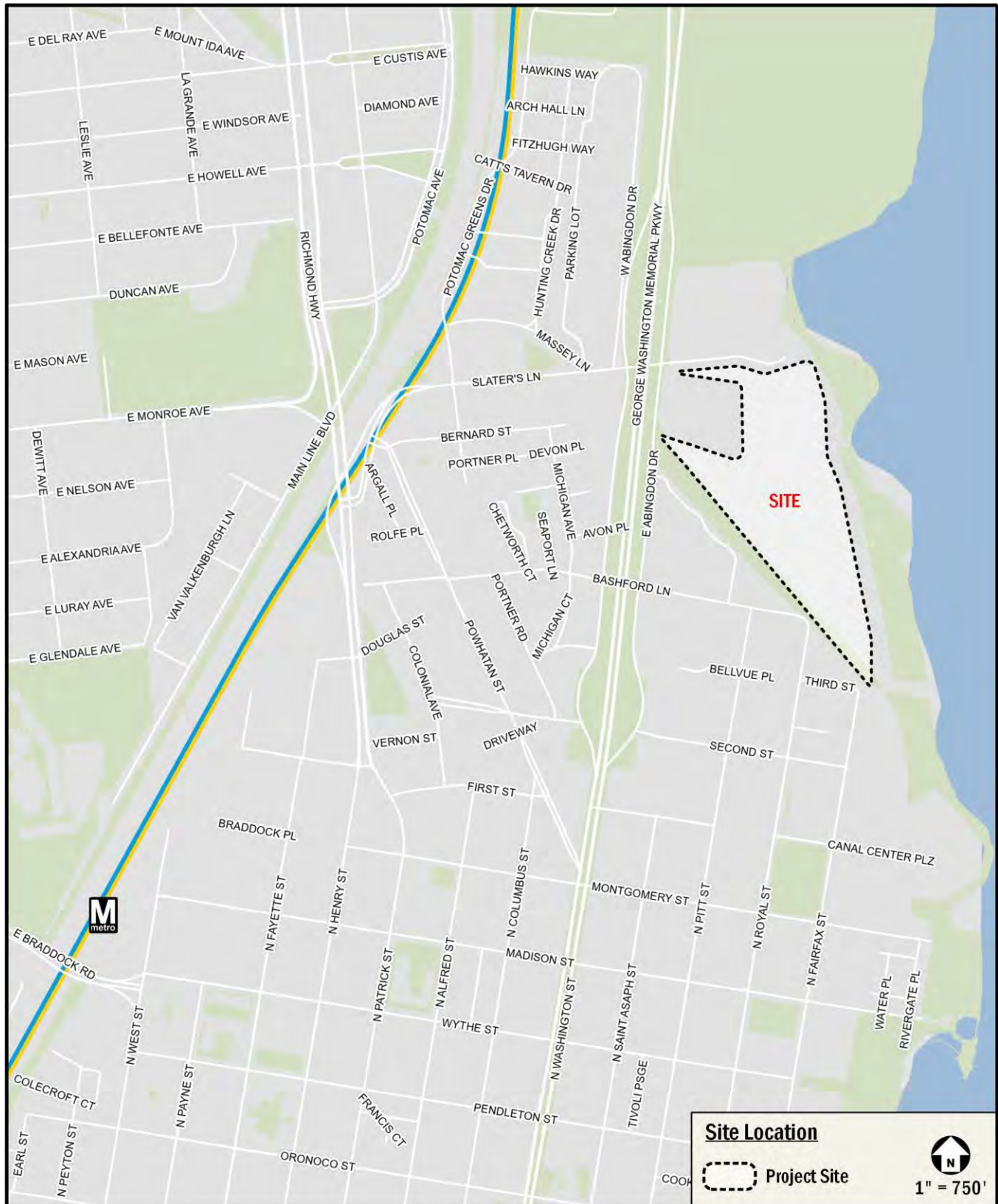


Figure 2: Site Location

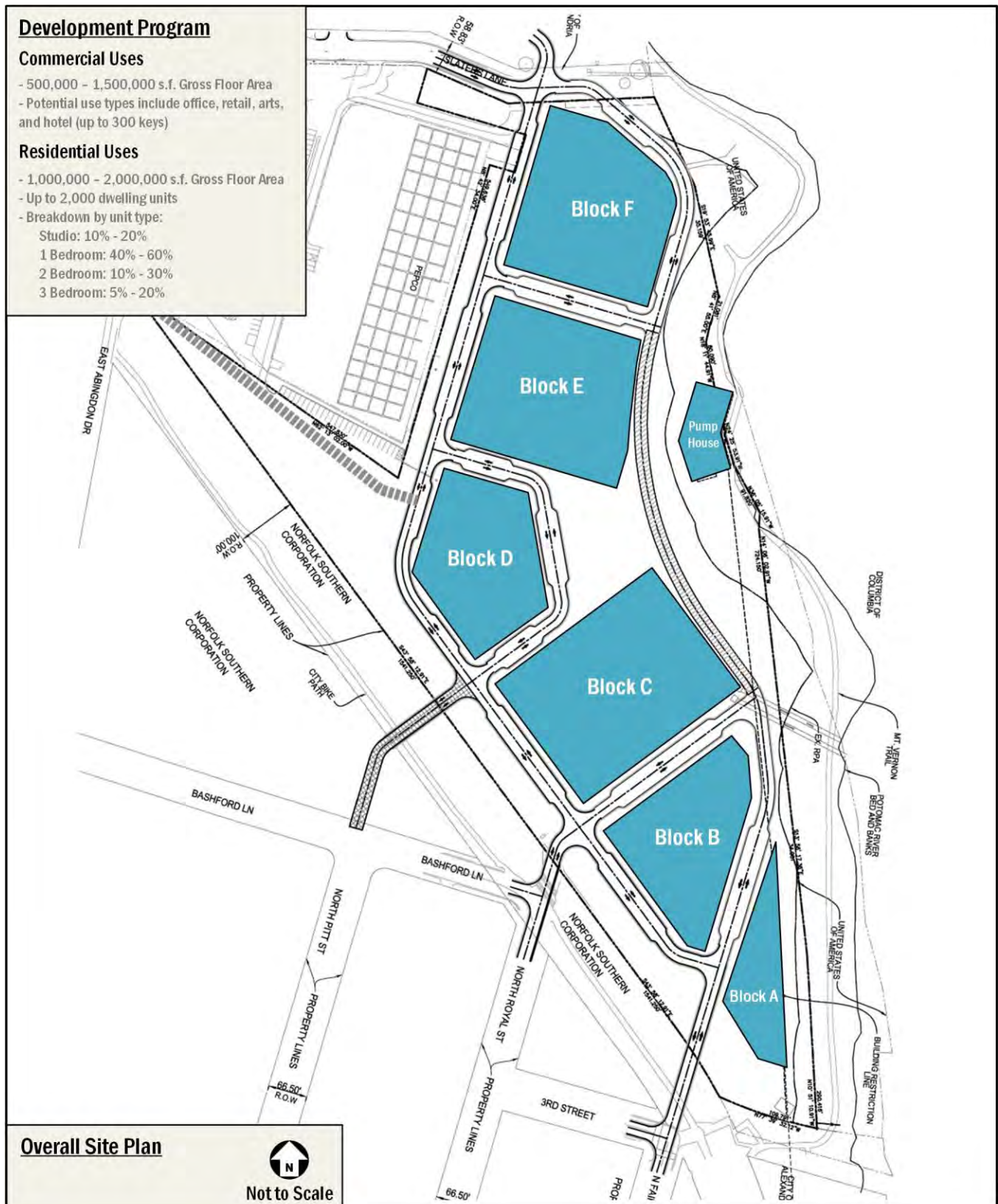


Figure 3: Overall Site Plan



Figure 4: Study Intersections

Study Area Overview

This chapter reviews the existing conditions of the surrounding transportation network and includes an overview of the site location, including a summary of the major transportation characteristics of the area and of future regional projects. Detailed characteristics of each mode and their subsequent study areas will be defined in the chapters that follow.

The following conclusions are reached within this chapter:

- The project site is surrounded by an extensive regional and local transportation system that will accommodate the employees, residents, and visitors of the proposed development.
- The project area is well-served by public transportation with access to the Metrorail's Blue and Yellow lines, regional and commuter rail, and local and regional bus routes, including Metroway.
- The site is surrounded by a well-connected pedestrian environment with facilities that generally meet standards recommended by the City of Alexandria, particularly along anticipated major walking routes.
- The existing bicycle network, including the Mount Vernon Trail, designated bicycle routes, and bicycle lanes near the project site, provides regional and local connections that facilitate bicycle commuting and recreational cycling options.
- Several local initiatives will positively impact the study area, including streetscape enhancements and investments to improve the transit, pedestrian, and bicycle networks.

Major Transportation Features

Overview of Regional Access

Under existing conditions, the proposed development site has ample access to regional vehicular- and transit-based transportation options, as shown in Figure 1, that connect the project area to destinations within Virginia, the District of Columbia, and Maryland.

The project site is well connected via principal arterials such as US-1 (Richmond Highway), GW Memorial Parkway, SR-7 (King Street), SR-235 (Duke Street), and S Glebe Road. These arterials ultimately create connections to the Capital Beltway (I-495), I-395, and I-66. These roadways bring vehicular traffic within a mile of the site, at which point minor arterials and local roads can be used to access the project site directly. While the

GW Memorial Parkway functions as a commuter corridor during morning and afternoon rush hours, it is a parkway with a design and planning emphasis on the scenic driving experience.

The project site has access to the Blue and Yellow lines via the Braddock Road Metro station, located approximately 1.0 mile from the site, which provide connections to areas in Virginia, the District, and Maryland. In the future, the project site will also have access to the Blue and Yellow lines via the planned Potomac Yard station, which will be located approximately 1.0 mile from the site. The Blue Line connects Springfield, VA with Largo, MD, and the Yellow Line connects Huntington, VA with Greenbelt, MD, with both lines providing access to the DC core. Both lines provide connections to the Red Line, which provides a direct connection to Washington Union Station, a hub for commuter rail such as Amtrak, MARC, and VRE – in addition to all additional Metrorail lines, allowing for access to much of the DC Metropolitan area. Two (2) Metroway bus stops are located less than a mile from the site; one at Potomac Avenue and Richmond Highway, and a second at First Street and Fayette Street, providing access between Pentagon City and the Braddock Road neighborhood.

The project site is located approximately 1.8 miles from Alexandria Union Station, which is serviced by VRE and Amtrak. The station serves Amtrak's Cardinal, Carolinian, Crescent, Northeast Regional, Palmetto, Silver Meteor, and Silver Star routes, as well as VRE's Manassas and Fredericksburg Lines. The Alexandria Union Station is accessible via Metro and bus from the project site.

The proposed development is located directly adjacent to the Mount Vernon Trail, which is owned, maintained, and operated by the National Park Service. The Mount Vernon Trail is an 18-mile paved multi-use trail that runs along the Potomac River from George Washington's Mount Vernon estate to Theodore Roosevelt Island, just across the river from downtown Washington, DC. The Mount Vernon Trail connects to the Washington and Old Dominion (W&OD) trail, Four Mile Run, and Custis Trails in Arlington County, as well as the Capital Crescent Trail in Washington, DC, providing regional bicycle connectivity to Rosslyn and the District of Columbia. A detailed review of existing bicycle infrastructure is provided in a later chapter of this report.

Overall, the project site has access to several roadways, transit, and bicycle options, making it convenient to travel between the

proposed development and destinations in Virginia, the District of Columbia, and Maryland.

Overview of Local Access

There are several local transportation options near the proposed PRGS development that serve vehicular, transit, walking, and cycling trips under existing conditions, as shown in Figure 5.

In addition to several principal arterials, the site is served by a local vehicular network that includes several minor arterials and collectors such as Slaters Lane, Potomac Avenue, Montgomery Street, and Powhatan Street. In addition, there is an existing network of local roadways that provide access to the site.

The project site is serviced by the DASH bus route system and by premium bus service via the Metroway. DASH is a local, fare-free bus system operated by the City of Alexandria. DASH supplements the WMATA Metrobus system with cross-city routes as well as connections to Metrorail. As shown in Figure 5, there are multiple bus stops that service the project site, with stops on Slaters Lane, E/W Abingdon Drive, Bashford Lane, N Pitt Street, and Second Street. DASH service at these stops provides connections to Braddock Road Metro and Old Town Alexandria. Metroway is a premium bus service that connects Pentagon City, Crystal City, Potomac Yard, and the Braddock Road neighborhood. Metroway buses travel in either mixed-traffic or dedicated bus-only lanes. There are two (2) Metroway stops less than a mile, or a 15-minute walk, from the project site. A detailed review of existing and future transit facilities is provided in a later chapter of this report.

There are existing bicycle facilities that connect the proposed development to neighborhoods within the City of Alexandria and other jurisdictions, most notably via the Mount Vernon Trail.

There are bicycle lanes on portions of Slaters Lane and Potomac Greens Drive, and shared bike lanes on Bashford Lane, N Royal Street, Powhatan Street, and N Columbus Street. There are also signed routes along portions of N Fayette Street. A detailed review of existing and future bicycle facilities and connectivity is provided in a later chapter of this report.

In the vicinity of the site, pedestrian facilities are well established, with most sidewalks meeting Americans with Disabilities Act (ADA) and City of Alexandria standards. Anticipated pedestrian routes, such as those to public transportation stops, retail zones, nearby residential areas, and community amenities provide well-connected pedestrian facilities. A detailed review of existing

pedestrian infrastructure is provided in a later chapter of this report.

Detailed reviews of the multimodal facilities providing local access to the project site are provided in later chapters of this report.



Figure 5: Multimodal Facilities in the Vicinity of the Site

Carsharing

One (1) carsharing company, Zipcar, provides service in the City of Alexandria. Zipcar is a private company that provides registered users access to a variety of automobiles in designated spaces for their vehicles. Currently, there are no Zipcar locations within a quarter mile of the site. The nearest Zipcar location is approximately 0.9 mile away near the Braddock Road Metro Station. The location and the number of available vehicles at this location are listed in Table 1.

Table 1: Carshare Locations

Zipcar Carshare Location	Number of Vehicles
1260 Braddock Place	1 Vehicle

Bikeshare and Dockless Mobility

The Capital Bikeshare program provides an additional cycling option for residents, employees, and visitors throughout the area. The Bikeshare program has placed over 500 bicycle-share stations across the Washington, DC metropolitan area with over 4,500 bicycles and electric-assist bicycles (e-bikes) provided. Currently, there are no Capital Bikeshare stations within a quarter mile of the site. There are three (3) Capital Bikeshare stations located within a half-mile of the site at the Montgomery Street and N Pitt Street intersection, the N Fairfax Street and Madison Street intersection, and the Bashford Lane and Powhatan Street intersection.

In addition to Capital Bikeshare, the City of Alexandria has granted operating permits to four (4) companies (Lime, Bird, Helbiz, and Link) to provide additional options for point-to-point Shared Mobility Device (SMD) transportation services as of 2021. These SMDs are provided by private companies that give registered users access to a variety of e-scooter and e-bike options. These devices are used through each company-specific mobile phone application. Through its Dockless Mobility Pilot Program (now in Phase II), the City plans to continue the installation of “parking corrals”, but many SMDs do not have designated stations where pick-up/drop-off activities occur like with Capital Bikeshare. Instead, many SMDs are parked in public space, most commonly in the “furniture zone” (the portion of

sidewalk between where people walk and the curb, often where other street signs, street furniture, trees, and parking meters are located). While e-bikes are permitted to utilize the Mount Vernon Trail, e-scooters are not allowed on the trail.

Additionally, Capital Bikeshare reintroduced a fleet of e-bikes to its system in Summer 2020. Users may park the e-bikes at any available dock at a Capital Bikeshare station or lock them to any public bike rack within the designated service area for an additional fee. Currently, there are seven (7) public racks with spaces for 14 bicycles within a quarter mile from the site, with racks located on N Pitt Street, N Royal Street, 3rd Street, and N Fairfax Street.

Walkscore and Bikescore

Walkscore.com is a website that provides scores and rankings for the walking, biking, and transit conditions for an area. The project site is located in the Old Town North neighborhood in the City of Alexandria, Virginia. The Old Town North neighborhood has a walk score of 84 (or “Very Walkable”), a transit score of 65 (or “Good Transit”), and a bike score of 83 (or “Very Bikeable”). Figure 6 shows the neighborhood borders in relation to the site location and displays a heat map for walkability and bikeability.

The following conclusions can be made based on the data obtained from Walkscore.com:

- The site is situated in an area with a “Very Walkable” walk score because of the abundance of neighborhood serving retail locations that are in close proximity, where most errands can be completed by walking.
- The site is situated in an area with a “Good Transit” transit score due to its proximity to multiple bus routes.
- The site is situated in an area with a “Very Bikeable” bike score due to its proximity to low volume roadways, a number of bicycle lanes and trails, including the Mount Vernon Trail, and flat topography.
- Overall, the Old Town North neighborhood has attractive walk, transit, and bicycle scores.

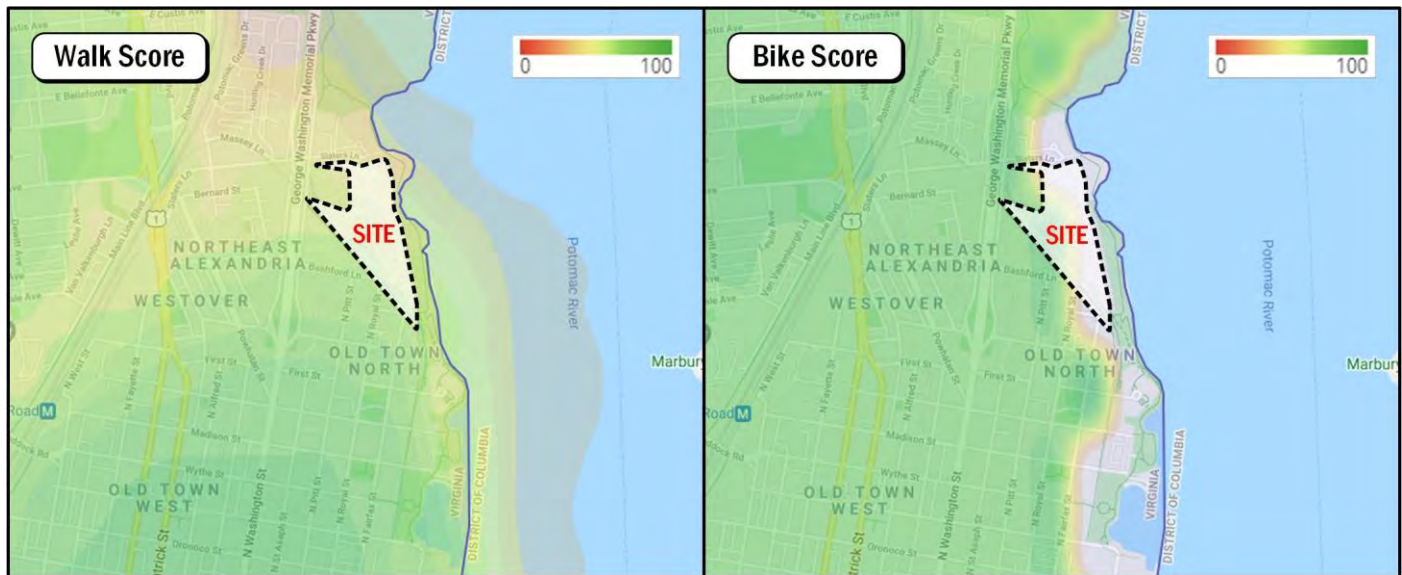


Figure 6: Summary of Walkscore and Bikescore

Future Projects

This section reviews City-wide initiatives, local initiatives, regional initiatives, and planned transportation improvements in the vicinity of the site. These planned projects are summarized in the section below.

City-wide Initiatives

Comprehensive Transportation Master Plan (2008)

Adopted in April 2008, updated in 2016, and having recently undergone an update that culminated in the adoption of the 2021 Alexandria Mobility Plan (AMP), the City of Alexandria's Comprehensive Transportation Master Plan was developed to ensure wise, effective, and sustainable planning of the City's transportation future.

The Comprehensive Transportation Master Plan is driven by seven (7) guiding principles to inform transportation related decision making within the City. These guiding principles are:

1. Developing innovative local and regional transit options
2. Providing quality pedestrian and bicycle accommodations
3. Providing accessibility and mobility to all citizens, regardless of age or ability
4. Increasing the use of communications technology in transportation systems
5. Promoting transportation policies that enhance quality of life and support livable, urban land use, and encourage neighborhood preservation
6. Leading the region in promoting environmentally friendly transportation policies
7. Ensuring accessible, reliable, and safe transportation for older and disabled citizens

Transit, pedestrian, and bicycle recommendations included in the Comprehensive Transportation Master Plan are outlined in the corresponding sections of this report that follow and review the future planned network for that mode.

The Comprehensive Transportation Master Plan's recommendations for the City's street system to enhance the transportation network include:

1. Ensuring that streets can accommodate all users
2. Formally adopt a Complete Streets policy
3. Develop new and enhance existing programs regarding Transportation Demand Management (TDM)

4. Improve mobility on the City's arterials through the incorporation of technology into transportation infrastructure
5. Improve safety at intersections
6. Focusing on improvements that improve the natural and human environment, preservation of historic resources, and creation of more enjoyable public street spaces
7. Developing a comprehensive design manual for City street space
8. Exploring opportunities to enhance the use of high-occupancy vehicle (HOV) lanes as a traffic management strategy for periods of peak travel demand.

The proposed development is consistent with several of the recommendations set out by this plan. The development of the site's internal street network was informed by the City's Green Street and Complete Streets guidelines with all user groups in mind. The incorporation of green space and landscaping along these streets will create healthy and livable spaces, and the provision of new and upgraded trail facilities will increase the quality of bicycle and pedestrian accommodations.

The Alexandria Mobility Plan, adopted in 2021, has since replaced the Comprehensive Transportation Master Plan as the City's primary transportation planning document.

Alexandria Mobility Plan (2021)

Adopted in November 2021, the City of Alexandria Mobility Plan (AMP) is an update to the 2008 Comprehensive Transportation Master Plan. This update lays out the policies and strategies that shall guide transportation decisions for the City in pursuit of enhanced quality of life, sustainability, and equity, centered around the concept of choice.

The AMP includes policies and strategies that seek to improve and expand access to transportation choices and key destinations throughout Alexandria. These policies and strategies are sorted into broader categories, each with a chapter in the Plan. The Plan's recommended policies for transportation in the City that apply to the project area are outlined as follows:

- Transit – The City will address the transit system by: (1) Implementing a citywide transit network with frequent, all-day service; (2) Building out the city's priority transitway corridors and identify improvements on congested, high ridership corridors to reduce travel

times and improve reliability; (3) Transitioning the City's bus fleet to fully electric, zero-emission vehicles; (4) Improving the rider experience from trip planning, to accessing the stop, riding the bus, and arriving at the destination; (5) Evaluating DASH's fare free service and continue to explore low-income WMATA fares; (6) Supporting a better connected regional transit network; and (7) Modernizing the paratransit program for the city's aging population.

- **Smart Mobility** – The City will (1) Expand smart signal technology to enable detection and real-time signal adjustments; (2) Strategically invest in partnerships to expand city data, technology, and communications capabilities; (3) Upgrade capabilities of the Traffic Management Center to better manage congestion in real-time; (4) Proactively prepare for connected and autonomous vehicles; and (5) Develop a framework for pilot projects to test new modes, infrastructure, or initiatives.
- **Streets** - The City will (1) Implement the Vision Zero Action Plan to eliminate traffic fatalities and serious injuries by 2028; (2) Develop a comprehensive program to reduce speeding and cut through traffic on local streets; (3) Ensure new development minimizes negative impacts to the street network; (4) Work with regional, state, and private sector partners to develop tools to keep traffic on highways and reduce regional cut through traffic; (5) Consider the use of speed cameras and other automated tools to improve safety; and (6) Maintain a state of good repair for our streets using a proactive, data driven, and equitable approach.
- **Pedestrian and Bicycle** - The City will (1) Create a safe, well-maintained, and comfortable walking and bicycling environment; (2) Build out a continuous, connected, and accessible pedestrian network that enables people of all ages and abilities to move safely and comfortably; (3) Build out a connected bicycle network of both on- and off-street facilities and shared mobility devices to benefit riders of all ages and abilities; (4) Upgrade or install infrastructure that increases the accessibility of City streets and public spaces for people of all ages and abilities; and (5) Educate all street users about safety and traffic laws.

- **Supporting Travel Options** - The City will (1) Use information, programs, and encouragement to make it easier for residents and workers to choose options other than driving alone; (2) Use the Potomac River to expand transportation options; (3) Create mobility hubs; and (4) Pursue regional approaches to reduce traffic and congestion, particularly during peak times.
- **Curb Space and Parking** - The City will (1) Implement a prioritization framework for making changes to curb space; (2) Consider pricing, regulation, data, and communications to manage parking availability; (3) Reconsider parking requirements in new developments; (4) Promote electric vehicle charging opportunities.

The proposed development is consistent with many of the recommendations laid out by this plan. The development of the site's internal street network was informed by the City's Complete Streets Design guidelines with all user groups in mind. The provision of new bicycle facilities will assist in the build-out of a connected bicycle network for riders of all ages and abilities. Building out a continuous, connected, and accessible pedestrian network that enables people of all ages and abilities to move safely and comfortably, and completing the street network that is currently missing, will significantly improve pedestrian circulation and porosity. The incorporation of landscaping and traffic calming measures along the site's internal streets will create a safe and livable space.

The AMP also identifies the following specific recommendations relevant to PRGS CDD site:

- **Transit:**
 - New DASH system routes (N3, N4, and N6) implemented in the vicinity of the project site
- **Pedestrian and Bicycle:**
 - Prioritize closing the sidewalk gap on Slaters Lane east of Abingdon Drive
 - Enhanced bicycle corridor on Madison Street from Mount Vernon Trail to N West Street
 - Enhanced bicycle corridor on N Pitt Street from Second Street to Bashford Lane
 - Enhanced bicycle corridor on the ramp from southbound Slaters Lane to southbound Richmond Highway
 - Trail/sidepath along E Abingdon Drive from Bashford Lane to Slaters Lane
 - Trail connection from Mount Vernon Trail/E Abingdon Drive to Potomac Avenue/Potomac Yard Trail across GW Memorial Parkway

- Shared lane markings on Second Street from N Pitt Street to N Royal Street
- Shared lane markings on W Abingdon Drive north of Slaters Lane

In direct relation to the PRGS CDD, these improvements would create additional multi-modal capacity and connectivity to/from the site that is lacking under existing conditions.

Alexandria Transit Vision Plan

The City of Alexandria conducted a comprehensive review of how the bus network in the City can best serve existing needs, as well as new residents, business, and visitors who come to Alexandria over the next 10-20 years. The Transit Choices Report presents an overview of Alexandria's existing transit network, as well as the City's current and planned development patterns as they relate to transit performance. After several rounds of public engagement, the City adopted the Alexandria Transit Vision Plan proposed transit networks. The first phase of the 2022 Alexandria Transit Vision Plan – referred to as the “New DASH Network” – went into effect in September 2021. The first phase of the Plan included major route and service changes and the change to fare-free DASH bus service.

This plan proposes the following changes in bus service as part of its 2030 transit network in the Old Town North area:

- A new high-frequency “Old Town Circulator (OTC)” route that would be accessible from stops along Montgomery Street and Madison Street (within a half-mile of the site) with headways of 5 to 8 minutes. This route would effectively replace the existing DASH AT2, AT5, and AT8 routes;
- A new DASH “N6” route which would replace parts of the existing DASH AT2, AT5 and AT7 routes by providing a direct connection from Lee Center to City Hall to Old Town North and the new Potomac Yard Metro Station; and
- Removing DASH AT4 service to Old Town. Route AT4 is planned to remain in operation (renamed route “N24” in the Vision Plan) with service ending at the Braddock Road Metro where riders can transfer to the OTC or Metrobus 10A/B/E route.

Complete Streets Design Guidelines (2016)

The Complete Streets Design Guidelines integrate existing City policy and design guidance related to roadways, sidewalks, and trails, and incorporate new information to reflect best practices for developing a transportation system that serves the needs of people who walk, bike, ride transit or drive vehicles. The

Complete Streets Design Guidelines identify new street types for Alexandria and provide direction on the design of sidewalks, roadways, intersections, and curbsides.

The Complete Streets Design Guidelines are used by City staff, design professionals, developers, and consultants in the planning and design of all types of street improvements. The Guidelines ensure that new roadways, intersections, sidewalks, and trails are achieving the City's objectives for a safe and effective multimodal transportation system.

This CDD incorporates these guidelines in its proposed internal streets. A two-way bicycle facility is proposed along internal streets, connecting Slaters Lane to N Royal Street via the woonerf. Sidewalks will be provided on both sides of all internal streets, improving pedestrian circulation internal to the site and providing additional connectivity to the existing street network in the area. Details on proposed bicycle and pedestrian facilities is provided in a later chapter of this report.

Vision Zero

Vision Zero is a multi-national initiative that aims to eliminate road deaths and serious injuries for all users, regardless of transportation mode. The City of Alexandria is one of over 20 municipalities across the United States that has adopted its own Vision Zero program.

The City of Alexandria included the development of a Vision Zero program in a 2016 amendment to its Transportation Master Plan. In January 2017, the City adopted a Vision Zero resolution instructing the City Manager to develop an action plan. The resulting action plan was adopted by the City Council in December 2017.

The City's Vision Zero Action Plan includes the following strategies:

- Improve data collection and evaluation
- Enhance city processes and collaboration
- Build safe streets for everyone
- Promote a culture of safety

While the Vision Zero Action Plan's recommendations are more related to overall strategy than individual projects, the Action Plan references several funded City programs projects that are aligned with Vision Zero principles.

As part of Alexandria's Vision Zero Action Plan, new “no turn on red” restrictions will go into place at various intersections

throughout the City. These restrictions are designed to improve pedestrian safety by reducing turning-movement vehicle crashes.

Another Vision Zero strategy includes Leading Pedestrian Interval (LPI) signal treatments, which will be implemented at various intersections throughout the City. LPIs are designed to improve pedestrian safety by increasing pedestrian visibility in intersections and reinforcing pedestrian priority above turning vehicles during shared signal phases.

The proposed development aligns with the Vision Zero Action Plan's goals by providing several new slow streets that are designed to accommodate all modes of transportation.

Local Initiatives

Old Town North Small Area Plan (2017)

The City Council adopted the Old Town North Small Area Plan (OTN SAP) in 2017 along with the Old Town North Urban Design Standards and Guidelines to present recommendations that achieve placemaking and economic development. The Plan includes recommendations to promote a balanced mix of land uses and the creation of affordable housing options.

The OTN SAP recommendations center around a pedestrian-focused vision for the neighborhood with design standards and guidelines that support and enhance the pedestrian experience.

One of the principles upon which the OTN SAP is based is to “establish a conceptual framework for the redevelopment of the former power plant site,” i.e. the site of the PRGS CDD. The Plan identifies the following transportation goals for the area:

- Enhanced streetscapes and pedestrian environment that reflects the goal of the City's adopted Vision Zero resolution and offers an interesting, safe, attractive, and engaging environment for pedestrians.
- Reuse of the rail corridor as a linear park with pedestrian and bicycle connections and recreational amenities.
- Separation of pedestrian and bicycle paths to be provided along the expanded waterfront open space as part of the redevelopment of the former power plant site.
- Enhanced bicycle facilities as recommended in the City's Transportation Master Plan to improve north-south and east-west connectivity in Old Town North. The recommended facilities provide additional options for connections to the Mount Vernon Trail and improved bicycle connectivity between the Metrorail Stations, the Mount Vernon Trail, and the waterfront.

- Existing or new local transit routes will be configured to provide service to the former power plant site and transit connectivity to the Braddock Road Metrorail Station and the future Potomac Yard Metrorail Station.
- Local and circulator transit service to provide more frequent and convenient service between the King Street Metrorail Station and the Braddock Road Metrorail Station, as recommended in the City's Transportation Master Plan. The service would traverse through Old Town North using North Fairfax, Madison, and Montgomery Streets.
- Extend the urban street grid as part of the redevelopment of the former power plant site.

The proposed development is consistent with the Small Area Plan's goals by extending the urban street network into the site, providing pedestrian and bicycle facilities within the site and along the waterfront that are consistent with Plan's proposed improvements, and accommodating changes to transit service as recommended in the City's Transportation Master Plan. The design of the proposed development's transportation infrastructure shall continue to be coordinated with the City through subsequent DSUP processes.

Old Town North Urban Design Standards and Guidelines (2017)

The Old Town North Urban Design Standards and Guidelines provide specific requirements and guidance in document form for projects in the Old Town North area to implement the vision of the Small Area Plan. In relation to the PRGS CDD, the Design Standards and Guidelines provide guidance on recommended street cross sections for the project site; the relevant cross-sections for the PRGS CDD are shown in Figure 7. The Design Standards and Guidelines note that final street section configurations, including those for the PRGS CDD site, shall be determined as part of the development review process and CDD approvals for the site.

The CDD is compatible with the Old Town North Urban Design Standards and Guidelines. The proposed street network in the Design Standards and Guidelines varies from the current proposed street network for the PRGS CDD, which has been coordinated with City staff. The CDD's proposed street sections are compatible with the objectives of the Design Standards and Guidelines, including but not limited to:

- An enhanced pedestrian circulation network
- An enhance bicycle network

- Urban, human scaled streets with appropriate block sizes
- Provision of green infrastructure
- Provision of on-street parallel parking spaces
- Provision of narrow travel lanes where feasible
- Provision of curb extensions where feasible

Old Town North Transportation Study (2017)

The Old Town North Transportation Study was conducted to inform the transportation element of the Old Town North Small Area Plan. The Study makes recommendations to improve the transportation network in the area. The findings and recommendations of the Transportation Study are incorporated in the Old Town North Small Area Plan.

The Transportation Study analyzed a 2040 Build Scenario, which assumes the implementation of the Small Area Plan (including development of the power plant site) along with the following improvements to the transportation network:

- Conversion of Montgomery Street from one-way operation to a two-way operation and associated intersection improvements along N Washington and Montgomery Streets.
- Extension of N Royal, N Fairfax, and N Pitt Streets into the former power plant site.
- Additional roadway grid within the former power plant site to support development.
- Additional local transit service/routes from the south to serve the redeveloped power plant site and connect to the new Potomac Yard Metrorail Station.
- Conversion of the Norfolk-Southern Rail Spur to a linear park with improved bicycle and pedestrian connectivity to the Mount Vernon Trail.
- Deployment of additional Capital Bikeshare stations in redeveloped power plant site.
- A potential new east-west street connecting the redeveloped former power plant site to E/W Abingdon Drive and GW Memorial Parkway. Alternative options include widening of W Abingdon Drive north of Slaters Lane.
- Roadway re-striping of W Abingdon Drive at Slaters Lane to provide additional vehicle capacity.
- Roadway re-striping along Bashford Lane at GW Memorial Parkway.
- Roadway re-striping along northbound E Abingdon Drive at GW Memorial Parkway to provide additional queuing capacity.

The study showed that with the construction of all the recommended roadway and transit improvements, the transportation network operates more efficiently in the 2040 Build Scenario than the 2040 Baseline Scenario, which did not include the implementation of the Small Area Plan, development of the power plant site, or any of the improvements listed above.

The Transportation Study ultimately informed the Small Area Plan and the Design Standards and Guidelines, which serve as the guiding documents for the proposed development. The capacity analysis included in the Traffic Operations chapter of this report is generally consistent with the assumptions and findings of this study.

Old Town North Parking Study (2015)

The Old Town North Transportation Study specifically reviewed the parking conditions and provided the basis for the parking strategies outlined in the Small Area Plan. The findings of the Parking Study are incorporated in the Small Area Plan, which makes the following parking-related recommendations specifically related to the project site:

- New parking constructed on the former power plant site should incorporate shared parking strategies to maximize the use of the parking, while minimizing the overall amount of parking needed to serve all of the uses. This parking should be made available to the public, in partnership with the property owner, the City will have some level of control over the management, operations, and pricing of the garage(s).
- Explore parking maximums for each use on the former power plant to encourage pedestrian, bike and transit use and help in achieving the sustainability objectives of the Plan.

The total parking supply for the proposed development will be determined as part of future DSUPs. The proposed development plans to align with the Old Town North Parking Study recommendations by incorporating a shared parking facility and providing a total parking supply that falls below parking maximums based on the City's zoning ordinance.

Regional Initiatives

Mount Vernon Trail Corridor Study (2020)

The National Park Service, which owns, maintains, and operates the Mount Vernon Trail (MVT), conducted a comprehensive analysis of the design, condition, usage, and crash history of the 18-mile trail corridor. The study provided an assessment of the existing condition and usage of the trail, provided guidance on trail design standards and best practices, and outlines recommendations for NPS to consider for improving the MVT. As it relates to the PRGS CDD, the study's recommendations include:

- Maintenance to bridges and guardrails, including repair or replacement of decking and/or railings at multiple trail bridges near the project site.
- Development of a trail signage and pavement marking plan, including specifications for at-grade crossings and wayfinding.
- Coordination with the City of Alexandria to improve wayfinding along the on-street portions of the Mount Vernon Trail, which include segments near the project site.

The study also provides guidance on trail design, including recommended widths and railing types, typical bridge design, wayfinding best practices, and preferred configurations of trail crossings and intersections. The Applicant shall coordinate with the City and NPS on trail design as more detailed designs of the project's bicycle and pedestrian facilities are prepared in subsequent phases of development.

National Park Service National Capital Region Paved Trails Study (2016)

The National Park Service conducted a study of the paved trail network within the service's National Capital Region (NCR), which includes the Mount Vernon Trail. The study established a vision for the trail network, identified capital and programmatic recommendations, and established a framework for prioritizing the implementation and funding of trail-related projects in the future.

The study describes a National Capital Trail Concept, which is intended to help build momentum and focus resources towards a national capital trail that integrates existing and proposed trail segments from NPS and other jurisdictions into an easily identifiable concept.

The study provides a set of programmatic recommendations, which do not include infrastructure improvements and are not specific to the project area. Among the proposed capital

infrastructure projects, two proposed projects are located near the project site:

- Project G2.1 - On the Mount Vernon Trail, replace existing 300-foot long bridge through wetlands on Daingerfield Island.
- Project G5.2 - Coordinate with the City of Alexandria to promote the Potomac Yard Trail as a Mount Vernon Trail relief/commuter route through enhanced signage.

The study also identified challenges related to the safety of at-grade trail crossings, and identifies the Mount Vernon Trail as an area that demonstrates these safety challenges. The study notes that at-grade crossings should be studied in further detail to evaluate the safety concerns and potential improvements of the individual crossings. It also noted that a number of the existing bridges and boardwalks on the Mount Vernon Trail include a wooden trail surface, which can present unsafe conditions in wet or icy weather. General guidance on best practices in the design of trail facilities, trailheads, and signage is also provided. The Applicant will coordinate with the City and NPS on trail design as more detailed designs of the project's bicycle and pedestrian facilities are prepared in subsequent phases of development.

M-495 Commuter Fast Ferry Study (2019)

The Northern Virginia Regional Commission conducted a study of a new commuter ferry service along the Potomac River with potential stops in Woodbridge, VA, Joint Base Anacostia/Bolling, The Wharf, Navy Yard, and National Harbor. The study evaluated potential terminal locations, estimated costs, identified potential demand, and identified the infrastructure that would be needed to support potential terminal locations.

The study included an analysis of the travel markets that would be served by the potential service, and found that 700 AM commute trips would save travel time by taking a ferry running at a standard speed (26 mph), and almost 4,500 trips would save time by taking a ferry running at optimum speed (35 mph).

The study identified two locations, Occuquan Harbor Marina and Joint Base Anacostia/Bolling, as feasible sites for terminals with viable market for fast commuter ferry service.

As it relates to the PRGS CDD, the project site's proximity to the proposed service presents an opportunity for the project to provide a ferry stop along the Potomac waterfront.

Planned Improvements

Potomac Yard Metrorail Station (2022)

The City of Alexandria and WMATA are working together in the planning and construction of a new Potomac Yard Metrorail station along the existing Metrorail Blue and Yellow Lines between the Ronald Reagan Washington International Airport Station and the Braddock Road Station. The Potomac Yard Metrorail station will add additional transit capacity to accommodate the growing transportation demand and support the long-term vision of the Potomac Yard area as a transit-oriented, walkable, mixed-use community with access to high quality land uses. The Potomac Yard Metrorail station will also include facilities to create bus-rail connections at the new station. The new station will be located the same distance from the project site as the Braddock Road Metro station (approximately 1.0 mile), and will thus serve as an additional connection point to the regional transit system.

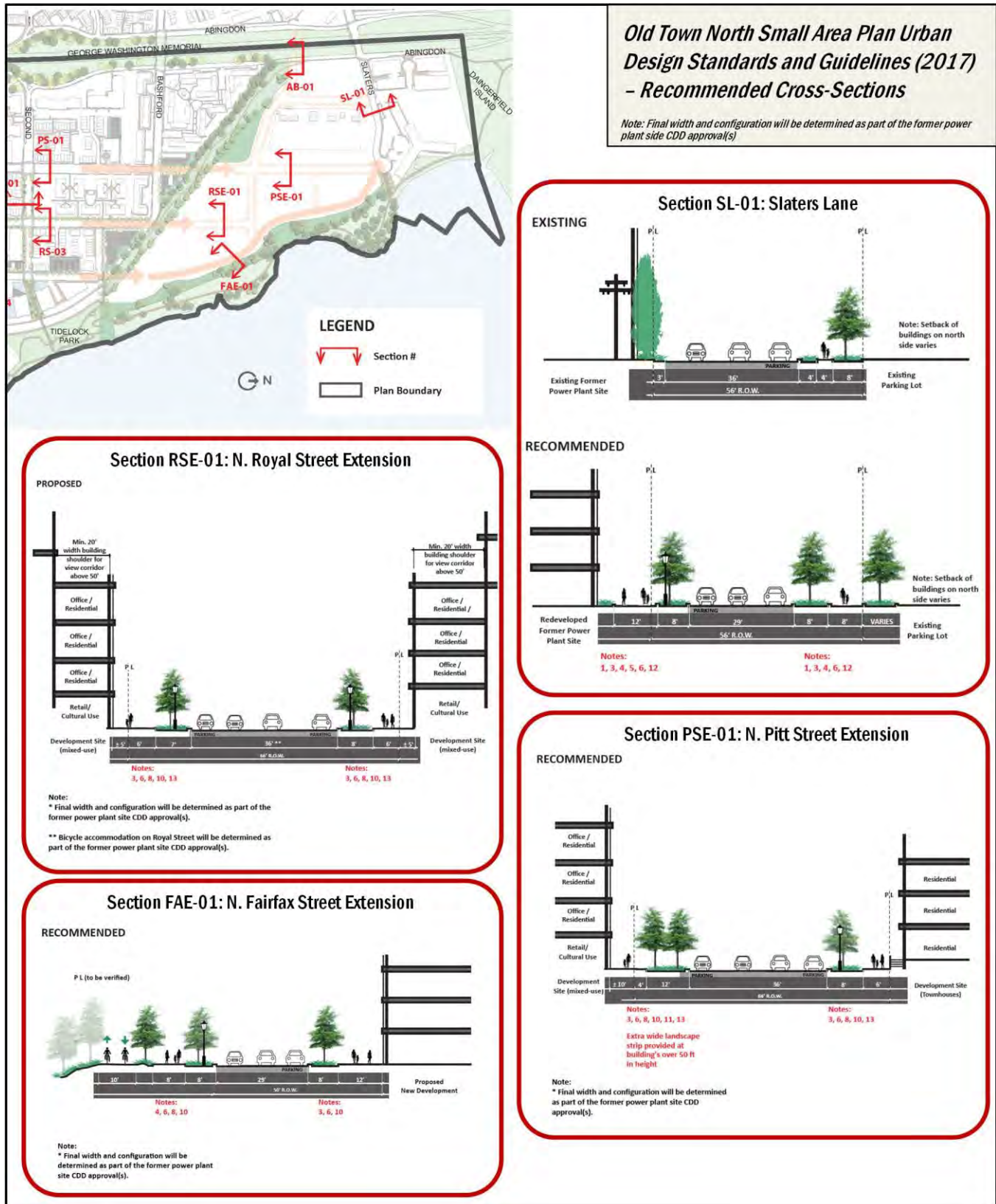


Figure 7: Old Town North SAP Urban Design Standards and Guidelines – Recommended Cross-Sections

Project Design

This chapter reviews the transportation components of the proposed Potomac River Generating Station (PRGS) Redevelopment CDD, including the proposed site plan and access points. It includes descriptions of the overall site program that was assumed for this analysis, vehicular access, loading, parking, bicycle, and pedestrian facilities.

Block-specific access, loading, and vehicular and bicycle parking details will be examined at the DSUP application for each individual site.

Project Overview

The proposed development site is located in the Old Town North area of the City of Alexandria, Virginia and is bounded by Slaters Lane to the north, E Abingdon Drive and a PEPCO sub-station to the west, Norfolk Southern Corporation right-of-way to the south, and the Potomac River to the east. The site location is shown in Figure 2. The proposed development site is currently occupied by the Potomac River Generating Station, which is no longer in operation.

The proposed development will include redeveloping the existing, unused power station site into a mixed-use development consisting of six (6) development blocks and existing pumphouse identified for potential renovation and reuse. Table 2 shows the range of floor area proposed for each use type across the development site. Up to 2.5 million square feet GSF of development is proposed.

Table 2: Floor Area by Use

Use	Maximum Percentage of Overall GSF	Total GSF by Use
Commercial (Office, Arts, Hotel, & Retail)	20%-60%	500,000 – 1,500,000 sf
Residential	40%-80%	1,000,000 – 2,000,000 sf
Total		2,500,000

Note: Gross Floor Area (GFA) as defined in the OTN SAP is equivalent to Gross Square Footage (GSF). All areas shown represent Gross Square Feet (GSF). GSF is a measurement of the area of all occupied levels above grade from exterior face of the building enclosure with no internal reductions.

As can be seen in the table above, the proposed floor area by use is not yet finalized. Table 3 shows a breakdown of the proposed floor area by block and the potential uses on each block.

Table 3: Floor Area Potential Uses By Block

Block ¹	Total GSF (s.f.) ²	Commercial				Residential
		Office	Arts ³	Hotel	Retail	
Block A	66,000	✓	✓		✓	✓
Block B	414,000	✓	✓	✓	✓	✓
Block C	633,000	✓	✓	✓	✓	✓
Block D	326,000	✓	✓	✓	✓	✓
Block E	579,000	✓	✓	✓	✓	✓
Block F	472,000	✓	✓	✓	✓	✓
Pump House	10,000		✓		✓	

Notes:

1. Check marks indicate uses that may be located on each block.

2. The applicable GSF on any block may increase by up to 10% of anticipated maximum set forth above, provided that the total GSF does not exceed 2,500,000 GSF and the approved maximum block heights are respected.

3. Any arts uses that utilize the Arts Bonus will not be counted in the total GSF per the guidelines outlined in the Old Town North Small Area Plan.

The potential breakdown of the residential and hotel uses across the development site is as follows:

- Residential: Up to 2,000 Dwelling Units
 - Studio: 10%-20% of total dwelling units
 - 1 Bedroom: 40%-60% of total dwelling units
 - 2 Bedroom: 10%-30% of total dwelling units
 - 3 Bedroom: 5%-20% of total dwelling units
- Hotel: Up to 300 Keys

The exact program for each block will be determined as part of future DSUPs. For the purposes of this transportation analysis, a block-by-block program was assumed based on a split of 60% of overall GSF assigned to commercial uses and 40% of overall GSF assigned to residential uses. In terms of the transportation analysis, this 60%/40% split between commercial and residential uses represents the most conservative vehicular trip generation scenario within the range of possible uses across the entire site. The development program analyzed in this report is shown in Table 4. It should be noted that the trip generation used in the vehicular capacity analysis is based on residential units, hotel keys, and Gross Leasable/ Rentable Area as defined by ITE as opposed to Gross Floor Area (as defined in the PRGS CDD), and as such the development program shown in that chapter may slightly deviate from the development program shown in the CDD submission. GSF is the same as gross floor area (GFA) for the purposes of this report, per the City's definition of GFA on the PRGS site.

Vehicular Parking

The proposed development is anticipated to provide vehicular parking in a shared below-grade parking garage. The below-grade parking will be shared between all development blocks and will meet the practical needs of the development. Details

about the proposed development's parking facilities will be examined in the DSUP application for each block. The proposed development will provide loading areas within or adjacent to each development block. The number of on-site loading facilities will accommodate the practical needs of the development.

Figure 3 shows the overall site plan and an overview of the development program.

Site Access and Circulation

Vehicular Access

The proposed development would include a new internal roadway network on the project site; this network would connect into the existing street network at N Royal Street, N Fairfax Street, and Slaters Lane. The proposed roadway network is shown in Figure 8. The operations and geometrical layout of these streets is based on the Old Town North Small Area Plan, the Old Town North Urban Design Standards and Guidelines, the City's Complete Street Guidelines, and the traffic operations analysis presented later in this report, and extensive coordination with City staff. The number of vehicular travel and turn lanes on the internal streets was designed to accommodate traffic with the minimal cross-sections possible for acceptable traffic flow, including the provision of on-street parallel parking spaces and curb extensions where feasible. Details on the baseline roadway improvements are provided in the Traffic Operations chapter of this report and will continue to be refined as part of subsequent DSUPs.

Pedestrian Access

Primary pedestrian access to the site will occur along sidewalks along N Royal Street, N Fairfax Street, and Slaters Lane where they tie into the new internal roadway network. Pedestrians will also have access to the site from the north and south via the Mount Vernon Trail; the proposed development will connect the Mount Vernon Trail to pedestrian facilities along the waterfront side of the site. Sidewalks will be present on both sides of all streets within the site, creating a safe and walkable environment. Curb extensions will be provided wherever feasible to shorten crossing distances and provide a more comfortable pedestrian environment. All intersections within the internal roadway network will have all-way stop control or will be signalized, providing more abundant and frequent crossings for pedestrians to navigate the site.

A curbless, low-speed street designed for all user types, also known as the woonerf, is proposed along the eastern frontage of

the site. Bicycles, pedestrians, and vehicles will mix within this space; its design will reflect an intent to prioritize bicycle and pedestrian activity and slow vehicles. The extent of the proposed woonerf is shown in Figure 8. Specific design details, including but not limited to traffic calming, how the woonerf will connect the site and the open space to the east, and when it will transition from a shared space to a non-motor-vehicle space, will be included in subsequent DSUPs.

The Applicant also proposes to contribute to improvements to the multi-use trail that connects E Abingdon Drive and the intersection of Bashford Lane and N Royal Street. Details of the crossing of Royal Street will be included in the Infrastructure DSUP.

At the request of the City, the Applicant proposes enhancements to the existing pedestrian facilities along Slaters Lane. These will include upgraded sidewalks on the north side of the street, which will connect to the internal sidewalk network of the site and the proposed trail spurs connecting to the Mount Vernon Trail. There is currently no sidewalk on the south side of the Slaters Lane segment fronting the existing power substation. Right-of-way is constrained along this segment, and as such, it is not feasible to accommodate south-side sidewalks while also accommodating the proposed on-street bike lane, vehicular lanes, and north-side enhanced sidewalks within the public right-of-way.

All new pedestrian facilities are expected to meet City and ADA requirements with an emphasis on pedestrian safety and comfort. Sidewalks will meet or exceed the width requirements, crosswalks at all necessary locations, and curb ramps with detectable warnings.

Bicycle Access

The PRGS CDD proposes new bicycle facilities on and around the project. A two-way bicycle route is proposed along the internal roadway network to the site, connecting the intersection of N Royal Street and Bashford Lane to Slaters Lane at the northwest corner of the site. Shared lane markings ("Sharrows") will be provided on N Royal Street between Bashford Lane and the N Fairfax Street extension. The route continues north along a proposed woonerf along the N Fairfax Street extension. Sharrows will be provided along the segment of the N Fairfax Street extension between the Woonerf and Slaters Lane. At the request of the City, the Applicant proposes to extend the existing bicycle lanes on Slaters Lane that are west of GW Memorial Parkway along Slaters Lane to the Primary Street.

Connections to the Mount Vernon Trail are also proposed along the eastern frontage of the site, connecting to the portions of the trail along the Potomac River. The Applicant will coordinate with NPS on context-sensitive approaches to these connections, consistent with NPS's existing trail planning studies.

The Applicant also proposes, subject to coordination with and approval of National Park Service (NPS), realigning a portion of the Mount Vernon Trail along a segment of the trail on the Potomac River waterfront. As part of this realignment, improvements and upgrades will be made to the trail. Additionally, the Applicant will contribute to improvements to the multi-use trail that connects E Abingdon Drive and the intersection of Bashford Lane and N Royal Street. Details of the crossing of Royal Street will be included in the Infrastructure DSUP. The proposed bicycle access and circulation routes are shown in Figure 8.

Transit Access

To improve transit access to the site, the CDD proposes realigning Dash Line 34 route through the internal roadway network of the project site, running along Royal Street, the Primary Street, and Slaters Lane. Additionally, two (2) two-way transit stops for Line 34 are proposed to be located on the project site along the Primary Street. The proposed transit circulation route through the site is shown in Figure 8. The exact configuration of the new Line 34 alignment and new stop locations will be coordinated with the City as part of future DSUPs.

Phasing

The Phasing of the CDD will be planned in such a way that adequate infrastructure will be in place to support each phase of development. While the configuration of the internal roadways and the curb lines will be built to final condition during the infrastructure phase, some streetscape elements may be temporary, such as sidewalks and street trees. Details about final condition of those temporary elements will be examined and finalized in the DSUP application for each block included in the proposed development. The infrastructure DSUP will include details on proposed phasing, sidewalks, and streets such as traffic controls, on-street parking locations, driveways, and building entrance/exit locations.

Table 4: Potential Development Plan by Block Assumed in Vehicular Capacity Analysis (Final Programs to be Determined in Subsequent DSUPs)

LAND USE/BLOCK	A	B	C	D	E	F	TOTAL
Office (sf)	20,000	50,000	-	-	499,000	296,000	865,000
Arts (sf)	20,000	-	-	-	-	-	20,000
Hotel (rooms)	-	-	-	-	-	296	296
Retail (sf)	-	9,000	17,000	11,000	19,000	13,000	68,000
Grocer (sf)	-	-	20,000	-	-	-	20,000
Residential (du)	-	336	497	273	-	-	1,106

**Trip generation is based on residential units, hotel keys, and Gross Leasable/ Rentable Area as defined by ITE as opposed to Gross Floor Area (as defined in the PRGS CDD), and as such the development program shown here may slightly deviate from the development program shown in the CDD submission*

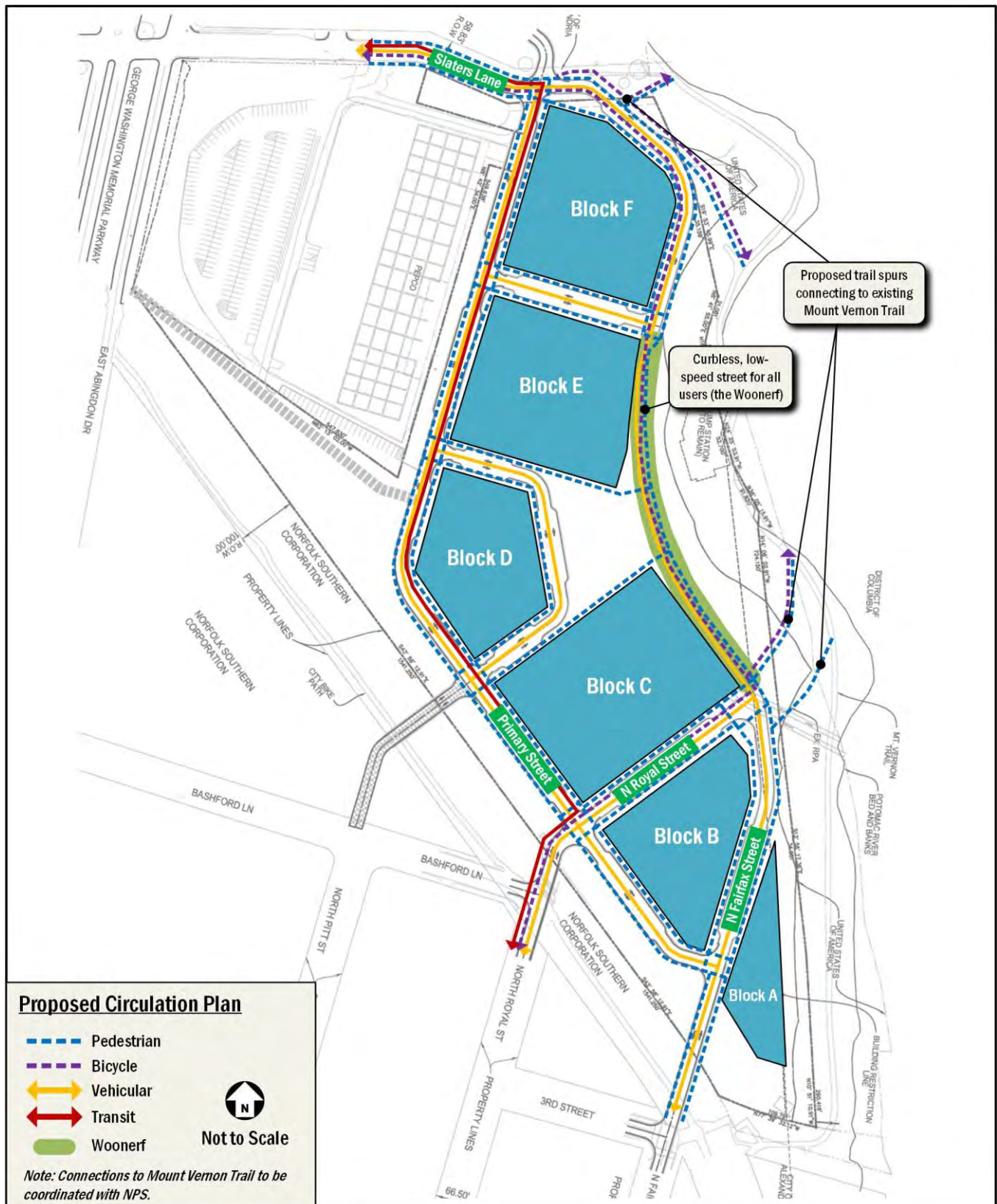


Figure 8: Proposed Circulation Plan

Transit Facilities

This chapter discusses the existing and planned transit facilities in the vicinity of the site, accessibility to transit, and evaluates the overall transit impacts of the proposed development.

The following conclusions are reached within this chapter:

- The existing transit infrastructure surrounding the site provides a highly connected network.
- There is currently one (1) bus route (DASH Line 34) that stops within a quarter mile walk of the site, with multiple bus stops located near the site, which provides access to the regional transit system and Old Town Alexandria. There are two (2) Metroway stops less than a mile from the project site.
- The development is located 1.0 mile from the Braddock Road Metrorail Station and 1.0 mile from the future Potomac Yard Metrorail Station.
- Planned and proposed improvements to transit service in the vicinity of the site will improve connectivity to/from the proposed development.
- As part of the proposed development, DASH Line 34 will be realigned to utilize the new roadways within the site, consistent with the Old Town North Small Area Plan and the Alexandria Transit Vision Plan. Two two-way transit stops will be located within the site, improving transit connectivity to/from the proposed development.

The site is well-served by numerous transit options under existing conditions. Combined, these transit services provide local, citywide, and regional connections and link the site with major cultural, residential, employment, and commercial destinations throughout the region. Figure 9 identifies the major transit routes, stations, and stops in the study area.

Existing Transit Facilities

Metrorail Service

The project site is located 1.0 mile from the Braddock Road Metrorail Station. This station serves the Blue and Yellow lines. The Blue Line travels north from Springfield, VA to Rosslyn then continues east to Largo, MD. Trains run approximately every 8 minutes during the morning and afternoon peak periods. They run about every 12 minutes during weekday non-peak periods, every 20 minutes on weekday evenings after 9:30pm, and every 12-20 minutes on weekends. The Yellow Line travels north from Huntington, VA to the Pentagon, through to the District of

Columbia core, and continues north to Greenbelt, MD. Trains run approximately every 8 minutes during the morning and afternoon peak periods. They run about every 12 minutes during weekday non-peak periods, every 20 minutes during weekday evenings after 9:30pm, and every 12-20 minutes on weekends.

Figure 11 shows the average annual weekday passenger boardings from 2010 to 2019 for the Braddock Road Metro station. Metrorail ridership in the area is down 11% from its peak in 2015. The decline in boardings at the station near the proposed development indicates there is available capacity at this station. WMATA has initiated the Back2Good plan to improve safety, reduce delays, and build rider confidence in Metrorail. The average daily boardings at the Braddock Road Metro station was 4,043 for 2019.

Bus Service

A review of the existing bus stops within a quarter-mile radius of the site, detailing individual bus stop amenities and conditions, is shown in Table 5. There are 12 bus stops within one-quarter mile of the site: two (2) on Slaters Lane, two (2) on E/W Abingdon Drive, two (2) on Bashford Lane, two (2) on Pitt Street, three (3) on 2nd Street, and one (1) on N Fairfax Street.

The bus stops near the site are currently served by DASH Line 34, which runs with 30-minute headways all day. DASH is a local, fare-free bus system operated by the City of Alexandria. DASH supplements the WMATA Metrobus system with cross-city routes as well as connections to Metrorail. Line 34 connects the site to the Braddock Road metro station and Old Town Alexandria. Within a half-mile of the site, DASH Lines 30 and 31 serve stops along Montgomery Street and Madison Street; these two routes have the same alignment through Old Town Alexandria. Table 6 shows a summary of information for the bus routes that serve the site, including service hours, headway, and distance to the nearest bus stop.

Potomac Water Taxi

The Potomac Water Taxi is a privately-operated ferry service which docks at the Alexandria City Marina in Old Town, located 1.0 mile from the project site. The service is largely tourism-oriented, operating afternoons and evenings Wednesday through Sunday. The service provides routes connecting directly to the Wharf and National Harbor, running at 1-1.5 hour headways. The ferry route to the Wharf also connects to Georgetown.

Metroway

Metroway is an enhanced bus route that provides a connection between the Braddock Road Metro, Crystal City Metro, and Pentagon City Metro stations and travels through Pentagon City, Crystal City, and Potomac Yard. The Potomac Yard Line provides 4.5 miles of service between the Braddock Road, Crystal City, and Pentagon City Metro stations with faster, more reliable bus service along the Route 1 corridor, with a ridership of approximately 2,400 passengers per day.

Within the City of Alexandria, Metroway buses travel in dedicated lanes along Richmond Highway between E Glebe Road and Potomac Avenue; however, there are also sections of the route where Metroway buses operate in mixed traffic. There are two (2) Metroway stops less than a mile from the project site, or a 15-minute walk, located at the Richmond Highway and Potomac Avenue intersection, approximately 0.7 miles from the site, and the First Street and N Fayette Street intersection, approximately 0.8 miles from the site. Buses from these stops proceed both north into Crystal City and south towards the Braddock Road Metro station.

Figure 10 shows the 10-minute, 20-minute, and 30-minute transit travel shed to and from the proposed development. As shown in the transit travel shed, much of Alexandria and portions of Arlington are accessible via transit within 30 minutes from the proposed development, including Arlington Cemetery, the Pentagon, and Ronald Reagan Washington National Airport. Several destinations are accessible within a 20-minute transit trip from the proposed development, including the King Street Metro Station, Old Town, and retail destinations at Potomac Yard Center.

Planned Transit Improvements

Comprehensive Transportation Master Plan (2008)

As part of the Comprehensive Transportation Master Plan, the City of Alexandria will create a network of three (3) transit corridors within secure rights-of-way dedicated exclusively for transit use. The Comprehensive Transportation Master Plan has identified the corridors of Route 1, Van Dorn/Shirlington, and Duke Street for these projects. In doing so the City will:

1. Conduct public outreach regarding the concept and process;
2. Coordinate with adjacent jurisdictions to ensure integration with existing transit and explore opportunities for future connections;
3. Prioritize transit corridors for investments;

4. Plan for dedicated transit lanes and ensure new developments do not preclude dedicated transit lanes;
5. Identify locations for smart stations that serve both new and existing transportation modes;
6. Ensure development does not preclude efforts to expand public transit;
7. Identify transit technologies and techniques that suit the identified corridors;
8. Integrate existing DASH service with new transit system elements;
9. Incorporate traffic signal priority, traffic circulation changes, and other on-street enhancements into the new system;
10. Create Transportation Management Plans, Transit Overlay Zoning Districts, Parking Management Zones, etc. to coordinate efforts to support the system;
11. Investigate potential funding from existing and new revenue sources;
12. Develop an outreach and marketing campaign to engage citizens about the City's transportation future; and
13. Coordinate with pertinent Boards and Commissions to ensure special transportation needs of all citizens are considered.

Transit Vision Plan (2020)

Through the Transit Vision Study, the City of Alexandria conducted a comprehensive review of how the bus network in the City can best serve existing needs, as well as new residents, business, and visitors who come to Alexandria over the next 10-20 years. The study presents an overview of Alexandria's existing transit network, as well as the City's current and planned development patterns as they relate to transit performance. After several rounds of public engagement, the City adopted the Alexandria Transit Vision Plan proposed transit networks. The first phase of the 2020 Alexandria Transit Vision Plan – referred to as the "New DASH Network" – went into effect in September 2021. The first phase of the Plan included major route and service changes and the change to fare-free DASH bus service.

This plan proposes the following changes in bus service as part of its 2030 transit network in the Old Town North area:

- A new high-frequency "Old Town Circulator (OTC)" route that would be accessible from stops along Montgomery Street and Madison Street (within a half-mile of the site) with headways of 5 to 8 minutes. This route would effectively replace the existing DASH AT2, AT5, and AT8 routes;
- A new DASH "N6" route which would replace parts of the existing DASH AT2, AT5 and AT7 routes by providing a

direct connection from Lee Center to City Hall to Old Town North and the new Potomac Yard Metro Station; and

- Removing DASH AT4 service to Old Town. Route AT4 is planned to remain in operation (renamed route “N24” in the Vision Plan) with service ending at the Braddock Road Metro where riders can transfer to the OTC or Metrobus 10A/B/E route.

Alexandria Mobility Plan (2021)

The Alexandria Mobility plan outlines transit-supportive policies and strategies that will help the City achieve the 2030 network envisioned in the Transit Vision Plan and build upon the three transitway corridors identified in the 2008 Transportation Master Plan. The Plan identifies the following transit-related strategies to achieve its vision:

- Implement a citywide transit network with frequent, all-day service
- Build out the city’s priority transitway corridors and identify improvements on congested, high ridership corridors to reduce travel times and improve reliability
- Transition the City’s bus fleet to fully electric, zero-emission vehicles
- Improve the rider experience from trip planning, to accessing the stop, riding the bus, and arriving at the destination
- Evaluate DASH’s fare free service and continue to explore low-income WMATA fares
- Support a better connected regional transit network
- Modernize the paratransit program for the city’s aging population

FY 2022 – FY 2027 Alexandria Transit Company (DASH) Transit Development Plan (Adopted 2021)

In 2021, the Alexandria Transit Company (DASH) adopted a transit development plan (TDP) which provides a comprehensive vision for implementing changes to transit service in the City. The TDP is updated annually, and the TDP adopted in 2021 identifies steps to implement the 2030 Transit Vision Plan Network.

The plan includes the implementation of a new DASH network in September 2021, which included the following service changes near the project site:

- Fare-free service for all DASH routes.

- New Lines 30 and 31, which combine to serve as the Transit Vision Plan’s “Old Town Circulator (OTC)” Route connecting the King Street and Braddock Road Metro stations via King Street, Fairfax Street, and Montgomery Street/Madison Street in Old Town. This line effectively replaced previous routes AT2, AT5, and AT8.
- New Line 34, which serves to partially implement the “N6” route in the Transit Vision Plan, which provides north-south bus service through Old Town and connects to Braddock Road Metro. This line effectively replaced previous routes AT2, AT5, and AT7.

In anticipation of the new Potomac Yard Metro, the TDP proposes realigning Line 34 in FY 2023 to serve Potomac Yard Metro as its northern terminus, instead of Braddock Road Metro. The plan also proposes shifting Line 34’s alignment from N Fairfax Street to N Pitt Street. The TDP also notes that Line 34 could also be realigned in future years to serve any major redevelopment at the former power plant site, as recommended by the Old Town North Small Area Plan.

Potomac Yard Metrorail Station (2022)

The City of Alexandria and WMATA are working together in the planning and construction of a new Potomac Yard Metrorail station along the existing Metrorail Blue and Yellow Lines between the Ronald Reagan Washington International Airport Station and the Braddock Road Station. The Potomac Yard Metrorail station will add additional transit capacity to accommodate the growing transportation demand and support the long-term vision of the Potomac Yard area as a transit-oriented, walkable, mixed-use community with access to high quality land uses. The Potomac Yard Metrorail station will also include facilities to create bus-rail connections at the new station. The new station is expected to open in late 2022.

M-495 Commuter Fast Ferry Study (2019)

The Northern Virginia Regional Commission conducted a study of a new commuter ferry service along the Potomac River with potential stops in Woodbridge, VA, Joint Base Anacostia/Bolling, The Wharf, Navy Yard, and National Harbor. The study evaluated potential terminal locations, estimated costs, identified potential demand, and identified the infrastructure that would be needed to support potential terminal locations.

The study included an analysis of the travel markets that would be served by the potential service, and found that 700 AM commute trips would save travel time by taking a ferry running at

a standard speed (26 mph), and almost 4,500 trips would save time by taking a ferry running at optimum speed (35 mph).

The study identified two locations, Occuquan Harbor Marina and Joint Base Anacostia/Bolling, as feasible sites for terminals with viable market for fast commuter ferry service.

As it relates to the PRGS CDD, the project site's proximity to the proposed service presents an opportunity for the project to provide a ferry stop along the Potomac waterfront.

Proposed Transit Improvements

DASH Service

In coordination with City staff, the project proposes realigning Dash Line 34 route through the internal roadway network of the project site, running along Royal Street, the Primary Street, and Slaters Lane. Additionally, two (2) two-way transit stops for Line 34 are proposed to be located on the project site. The exact configuration of the new Line 34 alignment and new stop locations will be coordinated with the City as part of future DSUPs.

Maritime / Ferry Service

In coordination with City staff, National Park Service, and a number of other relevant stakeholders, the project will, if feasible, take advantage of the project's proximity to the Potomac River and provide a stop along the waterfront for any future ferry service or water taxis.

The planned transit network in the vicinity of the project site is shown in Figure 12. Note that Metrobus Routes 10e and 11y are existing Metrobus routes that are not currently in service. These routes are planned to be in service as part of the Transit Vision Plan 2030 network.

Proposed Transit Benefits and Amenities

As part of the Potomac River Generating Station CDD, a Transportation Management Plan (TMP) will be provided which will include a number of components that further encourage the use of transit to access the proposed development. These components will be further refined as part of the (TMP) for each development block, and may include:

- Provision of SmarTrip cards for free, one time, per employee, to each of the tenants' employees and each on-site employee of the property management companies and/or building operators.
- Provision of SmarTrip cards per person, for free, one time, per resident.
- Employer facilitation of employee use of pre-tax payroll deduction transit benefit as outlined in USC 26 § 132(f).

- Promotion of the availability and use of the on-site transit facilities.
- Installation and maintenance of transit information display screens and Transit Information Centers (kiosks) in building lobbies (hotel, retail, grocery, office, residences, arts).

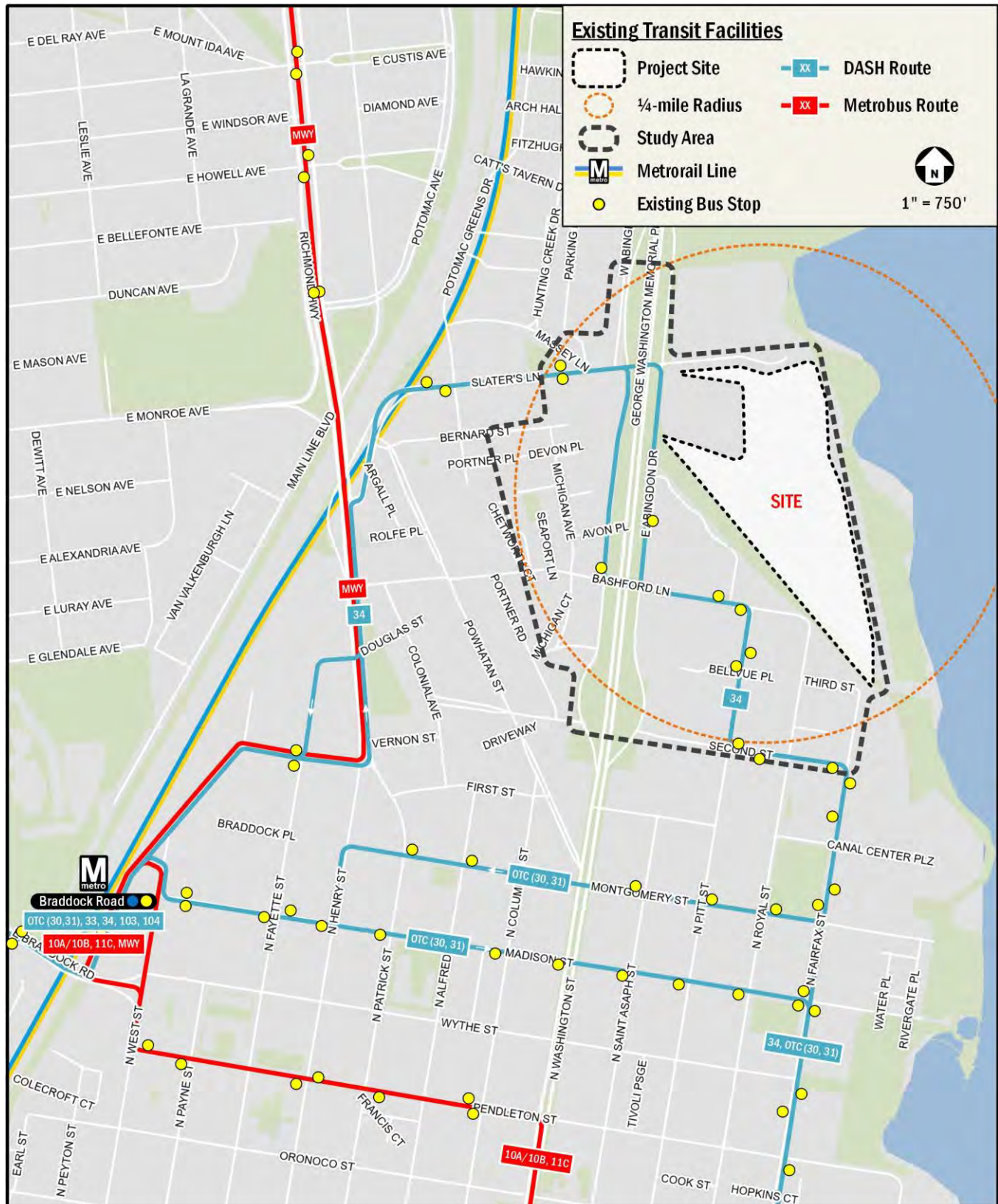


Figure 9: Existing Transit Facilities

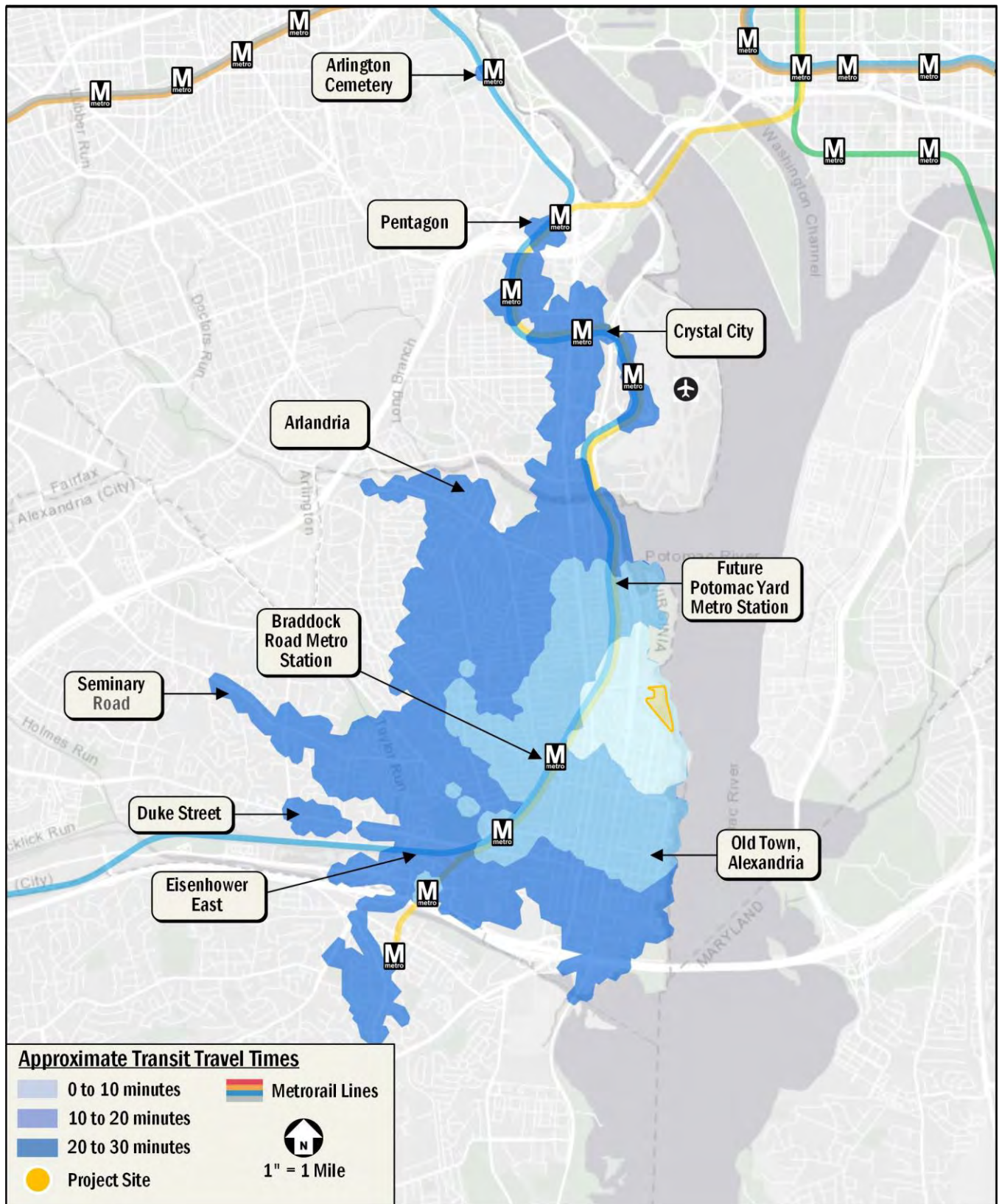


Figure 10: Approximate Transit Travel Times

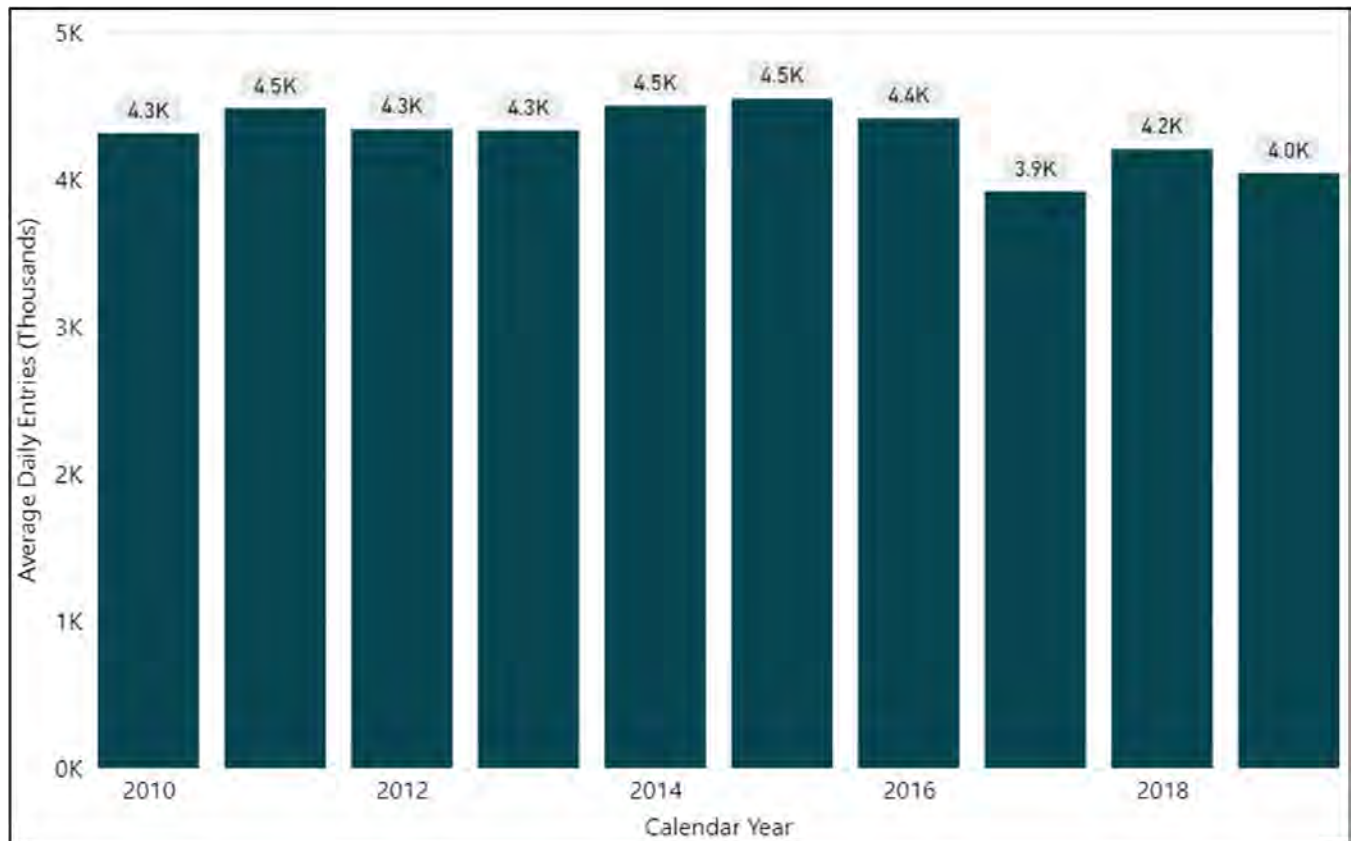


Figure 11: Annual Metro Ridership at Braddock Road Metro Station (Source: WMATA 2019)

Table 5: Existing Bus Stop Inventory

Location	Stop ID	Routes Served	Features						
			Sign	ADA Landing Pad	Sidewalk	Info Case	Seating	Shelter	Trash Recep.
EB Slaters Ln + Massey Ln	4000476	34	●	●	●				
NB N Fairfax St + Second St	4000762	34	●	●	●				●
WB Slaters Ln + Massey Ln	4000731	34	●	●	●		●	●	
EB Second St + N Fairfax St	4000660	34	●		●				
EB Second St + N Pitt St	4000661	34	●	●	●				
WB Second St + N Pitt St	4000662	34	●	●	●				
SB N Pitt St + Bellvue Pl	4000635	34	●	●	●				
NB N Pitt St + Bellvue Pl	4000634	34	●	●	●				
EB Bashford Ln + N Pitt St	4000500	34	●		●				
WB Bashford Ln + N Pitt St	4000761	34	●		●				
NB E Abingdon Dr + Bashford Ln	4000230	34	●	●	●		●	●	
SB W Abingdon Dr + Bashford Ln	4000970	34	●	●	●				

*Includes bus stops within ¼-mile of the proposed development

Table 6: Existing Bus Route Information

Route Number	Route Name	Service Hours	Headway (minutes)	Walking Distance to Nearest Bus Stop
34	Lee Center to Braddock Road Metro via City Hall/Lee Center via N Fairfax St – S Royal St	Weekdays: 5:00 AM – 10:56 PM Saturdays: 6:30 AM – 10:56 PM Sundays: 7:00 AM – 10:56 PM	30-60	0.1 miles (2 min)
30/Old Town Circulator	Braddock Road Metro via Whiting – Duke St – King St Metro/Van Dorn Metro via King St Metro – Duke St – Whiting Van Dorn Metro	Weekdays: 4:45 AM – 1:36 AM Saturdays: 5:44 AM – 1:15 AM Sundays: 5:44 AM – 1:15 AM	10-60	0.3 miles (8 min)
31/Old Town Circulator	Braddock Road Metro via King St – King St Metro/NVCC – Alexandria via King St Metro – King St	Weekdays: 4:51 AM – 1:07 AM Saturdays: 5:43 AM – 1:15 AM Sundays: 5:43 AM – 11:45 PM	10-30	0.3 miles (8 min)
Metroway	Metroway-Potomac Yard	Weekdays: 5:30 AM – 10:24 PM Saturdays: 6:30 AM – 11:03 AM Sundays: 7:30 AM – 10:25 PM	12-20 20-30	0.7 miles (18 min)



Figure 12: Planned Transit Network (2030)

Bicycle Facilities

This chapter summarizes existing and future bicycle access to the proposed development and reviews the quality of cycling routes to and from the site.

The following conclusions are reached within this chapter:

- The site has access to several on- and off-street bicycle facilities, including bicycle lanes on Slaters Lane, shared lanes on N Royal Street and Bashford Lane, and the Mount Vernon Trail.
- Existing bicycle infrastructure surrounding the site provides good connectivity to the north and south; however, there is limited east-west connectivity due to the GW Memorial Parkway and rail tracks to the west.
- The project's proposed bicycle improvements include the provision of a two-way bike route through the project site, new bike lanes along Slaters Lane, upgrades to the existing Mount Vernon Trail, and new connection points to the Mount Vernon Trail along the eastern frontage of the site. These improvements will provide connectivity to regional bicycle facilities, provide connectivity to the local bicycle network, and will circulate bicycles internally through the site.
- The City's major planned improvements in the vicinity of the proposed development include a new trail/sidepath along E Abingdon Drive from Bashford Lane to Slaters Lane and a new trail connection from Mount Vernon Trail/E Abingdon Drive to Potomac Avenue/Potomac Yard Trail across GW Memorial Parkway.
- As part of the proposed development, short-term bicycle parking spaces will be provided throughout the site. Long-term bicycle parking spaces will be provided for use of residents and employees of the site. Additional proposed elements such as a Capital Bikeshare station and improved wayfinding will further enhance bicycle facilities and connectivity.

Existing Bicycle Facilities

The site has access to several on- and off-street bicycle facilities. Under existing conditions, shared lanes are provided on N Royal Street and Bashford Lane. Bicycle lanes are provided along Slaters Lane between W Abingdon Drive and Potomac Greens Drive. Residential, low-volume roadways also provide connectivity to bicycle facilities to the south of the project site. These facilities connect to the Mount Vernon Trail to the east. Figure 13 shows the existing facilities within the study area.

The project is located directly adjacent to the Mount Vernon Trail, which is owned, maintained, and operated by the National Park service. The Mount Vernon Trail is an 18-mile off-street multi-use trail running along the Potomac River from George Washington's Mount Vernon estate to Theodore Roosevelt Island, just across the river from the District of Columbia. The Mount Vernon Trail connects to the W&OD, Four Mile Run, and Custis Trails in Arlington County, as well as the Capital Crescent Trail in the District of Columbia, providing regional bicycle connectivity to the City of Alexandria, Arlington County, and the DC.

The Mount Vernon Trail branches near the project site; these two branches run to the east and west of the project site. The eastern branch of the trail is comprised entirely of an off-street, multi-use path that runs along eastern frontage of the project site and the Potomac River waterfront. The western branch of the Mount Vernon Trail near the site runs along the southwestern frontage of the project site and is contained within the Norfolk Southern right-of-way, then continues as a signed route along E Abingdon Drive and re-connects to a multi-use path north of Slaters Lane. These two branches of the Mt Vernon Trail connect at points north and south of the site as shown in Figure 13.

Currently, there are no short-term bicycle parking spaces along the frontages of the site. The proposed development will provide at least the required short-term bicycle parking, and the Applicant will work with City staff to select locations for short-term bicycle parking as part of future DSUPs, which will add to the existing inventory in the surrounding neighborhood.

Figure 14 shows the 10-minute, 20-minute, and 30-minute bicycle travel shed for the proposed development. Within a 10-minute bicycle ride, the proposed development has access to several destinations including the Mount Vernon Trail, the Braddock Road Metro Station and future Potomac Yard Metro Station, and retail zones, residential neighborhoods, and community amenities in Old Town Alexandria. Within a 20-minute bicycle ride, the proposed development has access to destinations in Arlington and Alexandria such as the Four Mile Run Trail, the Eisenhower East neighborhood, Crystal City, residential neighborhoods, and retail zones. Within a 30-minute bicycle ride, the proposed development has access to additional portions of Arlington and Alexandria, including Shirlington, the

Pentagon and Pentagon City, as well as some destinations in Prince George's County, Maryland including National Harbor.

Capital Bikeshare

In addition to personal bicycles, the Capital Bikeshare program provides cycling options for residents and patrons of the proposed development. The Capital Bikeshare program has placed more than 500 Bikeshare stations across Washington, DC, Arlington County, VA, City of Alexandria, VA, Montgomery County, MD, Fairfax County, VA, Prince George's County, MD, and most recently the City of Falls Church, VA, with over 4,500 bicycles provided.

Currently, there are no Capital Bikeshare stations within a quarter mile of the site. There are four (4) Capital Bikeshare stations located within a half-mile of the site at the Montgomery Street and N Pitt Street intersection, the N Fairfax Street and Madison Street intersection, the Potomac Greens Drive and Slaters Lane intersection, and the Bashford Lane and Powhatan Street intersection. Table 7 summarizes the available Capital Bikeshare facilities near the site.

Table 7: Capital Bikeshare Locations

Capital Bikeshare Location	Number of Docks	Distance
Montgomery Street & N Pitt Street	15	0.4 mi
N Fairfax Street & Madison Street	15	0.4 mi
Potomac Greens Drive & Slaters Lane	11	0.4 mi
Bashford Lane & Powhatan Street	15	0.5 mi
Total Docks Available	56	

One (1) Capital Bikeshare station is proposed within the PRGS CDD. This proposed station aligns with the City's long-term bicycle planning efforts and will enhance the bicycle network in the area. The exact location of the station shall be determined as part of future DSUP processes.

E-Scooters and Dockless E-Bicycles

Four (4) electric-assist scooter (e-scooter) and electric-assist bicycle (e-bike) companies provide Shared Mobility Device (SMD) service in the City of Alexandria as of 2021: Lime, Bird, Helbiz, and Link. These SMDs are provided by private companies that give registered users access to a variety of e-scooter and e-bike options. These devices are used through each company-specific mobile phone application. Through its Dockless Mobility Program (a pilot program made permanent as of November 2021), the City plans to continue the installation of

"parking corrals", but many SMDs do not have designated stations where pick-up/drop-off activities occur like with Capital Bikeshare. Instead, many SMDs are parked in public space, most commonly in the "furniture zone" (the portion of sidewalk between where people walk and the curb, often where street signs, street furniture, trees and parking meters are located). Currently, SMD programs (including pilots and demonstrations) are underway in the City of Alexandria, Arlington County, the District, Fairfax County, and Montgomery County. While e-bikes are permitted to utilize the Mount Vernon Trail, e-scooters are not allowed on the trail.

Additionally, Capital Bikeshare reintroduced a fleet of e-bikes to its system in Summer 2020. Users may park the e-bikes at any available dock at a Capital Bikeshare station or lock them to any public bike rack within the designated service area for an additional fee. Currently, there are seven (7) public racks, with spaces for a total of 14 bicycles within a quarter mile from the site, with racks located on N Pitt Street, N Royal Street, 3rd Street, and N Fairfax Street.

Planned Bicycle Improvements

Comprehensive Transportation Master Plan (2008)

As part of the Comprehensive Transportation Master Plan, the City of Alexandria committed to promoting and encouraging the use of bicycles by creating a safe, well-maintained bicycling environment that encourages bicycling as an enjoyable and convenient mode of travel and recreation for riders of all ages and abilities. The City continues its work to develop a connected bicycle network that includes both on-street and off-street facilities, as well as support facilities such as bicycle parking, that provide safe, enjoyable, and comfortable accommodations for all bicycle users. The City is committed to promoting bicycling as a means of improving transportation circulation, transit access, public health, environmental quality, and recreation, with the ultimate goal of increasing bicycling trips as a percent of all travel in Alexandria. In support of these goals, the City works to educate users of all transportation modes about bicycle safety, rights, and responsibilities.

Madison Street, located south of the project site, is the top ranked On-Street Bicycle Project in the 2008 Transportation Master Plan and is recommended to become an enhanced bicycle corridor. As an enhanced bicycle corridor, it will provide east-west connectivity between the Mount Vernon Trail and Braddock Road Metro Station and feature bicycle lanes.

Pedestrian and Bicycle Master Plan Update (2016)

In 2016, the City of Alexandria updated the pedestrian and bicycle sections of its 2008 Comprehensive Transportation Master Plan and replaced them with a new Plan chapter, which is also referred to as the Pedestrian and Bicycle Master Plan Update. This update included an evaluation of existing conditions, issues, constraints, and needs, as well as a review of policies, goals, and objectives. This effort incorporated public feedback through mapping and survey exercises.

Near the project site, the update recommends the following bicycle facilities:

- Trail/sidepath along E Abingdon Drive from Bashford Lane to Slaters Lane
- Trail connection from Mount Vernon Trail/E Abingdon Drive to Potomac Avenue/Potomac Yard Trail across GW Memorial Parkway
- Enhanced bicycle corridor on Madison Street from Mount Vernon Trail to N West Street
- Enhanced bicycle corridor on N Pitt Street from Second Street to Bashford Lane
- Enhanced bicycle corridor on the ramp from southbound Slaters Lane to southbound Richmond Highway
- Shared lane markings on Second Street from N Pitt Street to N Royal Street
- Shared lane markings on W Abingdon Drive north of Slaters Lane

The updated Bicycle and Pedestrian Master Plan also recommends future Capital Bikeshare stations at the intersection of E Abingdon Drive and Second Street and the intersection of N Fairfax Street and Second Street. The Plan notes that recommended placements are shown as “generalized areas,” are not final, and are subject to public outreach.

Alexandria Mobility Plan (2021)

In November 2021, the City of Alexandria adopted the Alexandria Mobility Plan (AMP) to replace the 2008 Comprehensive Transportation Master Plan. The Pedestrian and Bicycle Chapter of the Plan incorporates the 2016 Pedestrian and Bicycle Master Plan Update with City policies and programs developed after 2016, such as the City’s Vision Zero and Complete Streets programs. The Pedestrian and Bicycle chapter policies identified in the Plan are to a) prioritize safety by focusing on vulnerable street user crashes to help achieve Vision Zero, and b) to address network gaps by completing pedestrian and bicycle

networks equitably and cost-effectively. The Plan identifies strategies to support these policies; relevant strategies for the PRGS CDD include:

- Create a safe, well-maintained, and comfortable walking and bicycling environment.
- Build out a continuous, connected, and accessible pedestrian network that enables people of all ages and abilities to move safely and comfortably.
- Build out a connected bicycle network of both on- and off-street facilities to benefit cyclists of all ages and abilities.
- Upgrade or install infrastructure that increases the accessibility of City streets and public spaces for people of all ages and abilities.

The AMP incorporates the specific bicycle projects that were identified and prioritized as part of the 2016 Pedestrian and Bicycle Master Plan update, accounting for projects that have been completed since 2016. The planned bicycle network is shown in Figure 15. The City continues its work to pursue funding from grants and through the City’s budget process and implement pedestrian and bicycle projects through routine street resurfacing, as part of larger capital investments, and in coordination with developers and redevelopment.

Mount Vernon Trail Corridor Study (2020)

The National Park Service, which owns, maintains, and operates the Mount Vernon Trail (MVT), conducted a comprehensive analysis of the design, condition, usage, and crash history of the 18-mile trail corridor. The study provided an assessment of the existing condition and usage of the trail, provided guidance on trail design standards and best practices, and outlines recommendations for NPS to consider for improving the MVT. As it relates to the PRGS CDD, the study’s recommendations include:

- Maintenance to bridges and guardrails, including repair or replacement of decking and/or railings at multiple trail bridges near the project site.
- Development of a trail signage and pavement marking plan, including specifications for at-grade crossings and wayfinding.
- Coordination with the City of Alexandria to improve wayfinding along the on-street portions of the Mount Vernon Trail, which include segments near the project site.

- Reconstruction and rehabilitation of portions of the trail within the City of Alexandria, including reconstruction of the existing trail bridge on Daingerfield Island. The study also notes that widening on this segment of the trail “may be prudent.”

The study also provides guidance on trail design, including recommended widths and railing types, typical bridge design, wayfinding best practices, and preferred configurations of trail crossings and intersections. The Applicant shall coordinate with the City and NPS on trail design as more detailed designs of the project’s bicycle and pedestrian facilities are prepared in subsequent phases of development.

National Park Service National Capital Region Paved Trails Study (2016)

The National Park Service conducted a study of the paved trail network within the service’s National Capital Region (NCR), which includes the Mount Vernon Trail. The study established a vision for the trail network, identified capital and programmatic recommendations, and established a framework for prioritizing the implementation and funding of trail-related projects in the future.

The study describes a National Capital Trail Concept, which is intended to help build momentum and focus resources towards a national capital trail that integrates existing and proposed trail segments from NPS and other jurisdictions into an easily identifiable concept.

The study provides a set of programmatic recommendations, which do not include infrastructure improvements and are not specific to the project area. Among the proposed capital infrastructure projects, two proposed projects are located near the project site:

- Project G2.1 - On the Mount Vernon Trail, replace existing 300-foot long bridge through wetlands on Daingerfield Island.
- Project G5.2 - Coordinate with the City of Alexandria to promote the Potomac Yard Trail as a Mount Vernon Trail relief/commuter route through enhanced signage.

The also study identified challenges related to the safety of at-grade trail crossings, and identifies the Mount Vernon Trail as an area that demonstrates these safety challenges. The study notes that at-grade crossings should be studied in further detail to evaluate the safety concerns and potential improvements of the individual crossings. It also noted that a number of the existing bridges and boardwalks on the Mount Vernon Trail include a wooden trail surface, which can present unsafe conditions in wet or icy weather. General guidance on best practices in the design

of trail facilities, trailheads, and signage is also provided. The Applicant shall coordinate with the City and NPS on trail design as more detailed designs of the project’s bicycle and pedestrian facilities are prepared in subsequent phases of development.

Proposed Bicycle Improvements

Proposed Bicycle Facilities

As part of the Potomac River Generating Station CDD, new bicycle facilities are proposed through the site. A two-way bicycle route is proposed along the internal roadway network to the site, connecting the intersection of N Royal Street and Bashford Lane to Slaters Lane at the northwest corner of the site. Shared lane markings (“Sharrows”) will be provided on N Royal Street between Bashford Lane and the N Fairfax Street extension. The route continues north along a proposed woonerf along the N Fairfax Street extension. Sharrows will be provided along the segment of the N Fairfax Street extension between the Woonerf and Slaters Lane. At the request of the City, the Applicant proposes to extend the existing bicycle lanes on Slaters Lane that are west of GW Memorial Parkway along Slaters Lane to the Primary Street.

Multiple bicycle and pedestrian paths connecting to the Mount Vernon Trail are also proposed along the eastern frontage of the site, connecting to the portions of the trail along the Potomac River.

The CDD also proposes realigning a portion of the Mount Vernon Trail along a segment of the trail on the Potomac River waterfront. As part of this realignment, improvements and upgrades will be made to the trail. Additionally, the Applicant will contribute to improvements to the multi-use trail that connects E Abingdon Drive and the intersection of Bashford Lane and N Royal Street. Details of the crossing of Royal Street will be included in the Infrastructure DSUP.

Proposed Bicycle Parking

There are no existing short-term bicycle parking spaces (bicycle racks) on or directly adjacent to the site; however, the Potomac River Generating Station CDD will significantly improve the condition of and increase the presence of bicycle parking facilities. Per the City of Alexandria’s Bicycle Parking Requirements, the proposed development will provide at least the minimum Class 1 (secure storage room/cage), Class 2 (protected/covered “inverted U” racks), or Class 3 (short-term “inverted U” racks) bicycle parking spaces based on the land

uses determined in final site plans. Based on the potential development plan, this includes:

- **Office:** one (1) employee space (Class 1 or Class 2) for every 7,500 SF and one (1) visitor space (Class 2 or Class 3) for every 20,000 SF
- **Retail:** two (2) Class 2 or Class 3 spaces for every 10,000 SF of the first 50,000 SF and one (1) space for every additional 12,500 SF plus one (1) employee space for every 25,000 SF
- **Residential:** three (3) spaces for every 10 residential units and one (1) visitor space for every 50 residential units; 25% of residential spaces must be Class 1 with remaining being Class 1 or Class 2; visitor spaces may be Class 2 or Class 3
- **Hotel:** One (1) rack per 15 rooms for less than 75 rooms and six (6) racks for more than 75 rooms (Class 2 or Class 3)
- Installation of secure bicycle storage in parking garages serving office and residential uses.
- Provision of on-site shower and changing facilities for employees.
- Provision of secure bike racks appropriately located to support bicycle access to retail uses.
- Establishing covenants securing the right to bring bicycles into all garages and dwelling units.

These bicycle parking requirements are based on the current potential development plan for the CDD. It should be noted that arts space uses are not specifically outlined in the City's Bicycle Parking Requirements and will be determined at the DSUP application for each individual block within the CDD.

Additionally, one (1) Capital Bikeshare station is proposed within the PRGS CDD. This proposed station aligns with the City's long-term bicycle planning efforts and will enhance the bicycle network in the area. The exact location of the station shall be determined as part of the DSP/DSUP process.

Proposed Bicycle Benefits and Amenities

As part of the Potomac River Generating Station CDD, a Transportation Management Plan (TMP) will be provided which will include a number of components that further encourage bicycling to and from the proposed development. These components will be further refined as part of the (TMP) for each development block, and may include:

- Provision of funding and location for one (1) on-site Capital Bikeshare station.
- Providing each new resident with 1-year Capital Bikeshare subscription or a dollar-equivalent rebate for bicycle or bicycle equipment purchases at an authorized bicycle retailer.
- Secure discounted rates for continued Capital Bikeshare subscriptions per the terms of Capital Bikeshare management.



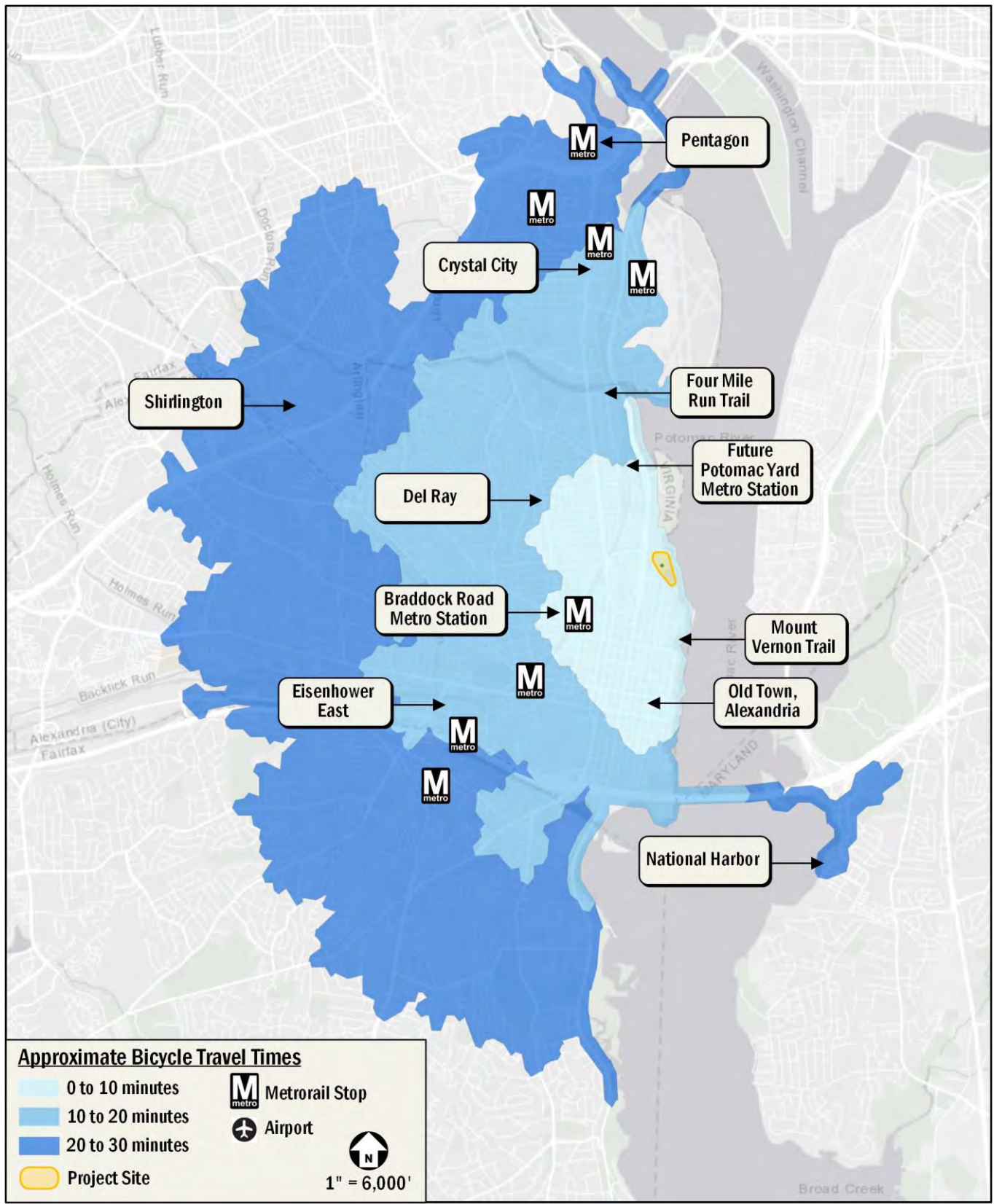


Figure 14: Approximate Bicycle Travel Times



Figure 15: Future Bicycle Facilities

Pedestrian Facilities

This chapter summarizes the existing and future pedestrian access to the site and reviews walking routes to and from the site.

The following conclusions are reached within this chapter:

- The existing pedestrian infrastructure surrounding the site provides a quality walking environment. There are sidewalks along the majority of primary routes to pedestrian destinations with a few gaps in the system.
- The proposed development will provide new connections that will help complete the street grid that is currently missing, significantly improving pedestrian circulation and porosity.
- Planned and proposed pedestrian improvements to the pedestrian infrastructure surrounding the site will improve pedestrian comfort and connectivity.

Pedestrian Study Area

Pedestrian facilities within a quarter-mile of the site were evaluated as well as routes to nearby transit facilities, including routes to the nearest Metroway stops to the west and at the Braddock Road Metro station. The site is accessible to transit options such as the 12 bus stops located within a quarter mile of the site. In general, existing pedestrian facilities surrounding the site provide comfortable walking routes to and from nearby transit options.

Figure 16 shows expected pedestrian pathways, approximate walking time and distances, and areas that challenge connectivity. Within the study area, GW Memorial Parkway poses significant east-west connectivity and mobility challenges. The major east-west crossing locations are at Slaters Lane and Bashford Lane. To the south of the project site, the dense street grid of Old Town Alexandria provides a quality walking environment.

Figure 17 shows the 10-minute, 20-minute, and 30-minute walk travel shed for the proposed development. Within a 10-minute walk, the proposed development has access to several destinations including DASH bus stops, Mount Vernon Trail, St. Anthony's School, Montgomery Park, and nearby retail zones and residential neighborhoods. Within a 20-minute walk, the proposed development has access to destinations such as retail zones in Old Town North, Oronoco Bay Park, two Metroway stations, and multiple grocery stores. Within a 30-minute walk, the proposed development has access to destinations including

Braddock Road Metro Station, the post office, and retail zones and community amenities in Old Town Alexandria.

Existing Pedestrian Facilities

A review of pedestrian facilities surrounding the proposed development shows that many facilities provide a quality walking environment. Figure 18 shows a detailed inventory of the existing pedestrian infrastructure within a quarter-mile radius of the site. Figure 19 reviews the existing pedestrian infrastructure found on the pathway to the two (2) closest Metroway stops (one at Potomac Ave/Richmond Highway and another at First Street/Fayette Street). Figure 20 reviews the existing pedestrian infrastructure along the pathways to the nearest existing Metro Station (Braddock Road). Figure 21 reviews the existing pedestrian infrastructure along the pathways to the planned Potomac Yard Metro Station.

Sidewalks, crosswalks, and curb ramps are evaluated based on the guidelines set forth by the City of Alexandria and ADA standards. Table 8 outlines the City of Alexandria sidewalk and buffer width recommendations. It should be noted that the sidewalk widths shown in Figure 18 through Figure 21 reflect the total sidewalk widths based on observations in the field taken for the pedestrian and buffer zones and do not evaluate the frontage zone.

ADA standards require that curb ramps be provided wherever an accessible route crosses a curb and must have a detectable warning. Additionally, curb ramps shared between two crosswalks are not desired. As shown in Figure 18 through Figure 21, under existing conditions the majority of curb ramps are either shared between crosswalks or do not provide detectable warnings. There are no curb ramps on the east side of the N Fairfax Street and Second Street intersection under existing conditions.

Within the study area, the majority of roadways have existing sidewalks on both sides, with few deficiencies. A majority of the sidewalk gaps are located along GW Memorial Parkway, where high traffic volumes impact the pedestrian environment. Adjacent to the project site, there is no sidewalk on the south side of Slaters Lane east of E Abingdon Drive; this street segment fronts along an existing power substation. All primary pedestrian destinations are accessible via routes with crosswalks and sidewalks, many of which meet the City of Alexandria's and ADA standards. Overall, the site is situated within an urban transportation network, with quality pedestrian access.

Table 8: Preferred Sidewalk Widths per City of Alexandria Complete Streets Design Guidelines

Street Type	Preferred Sidewalk Width	Preferred Buffer Width
Commercial Connector	6-15 ft	6-10 ft
Main Street	6-10 ft	6-10 ft
Mixed Use Boulevard	6-18 ft	6-10 ft
Neighborhood Connector	6-8 ft	6-7 ft
Neighborhood Residential	6 ft	5-7 ft
Parkway	6-10 ft	5-10 ft
Industrial	6 ft	5-7 ft

Planned Pedestrian Improvements

Comprehensive Transportation Master Plan (2008)

As part of the Comprehensive Transportation Master Plan, the City will promote and encourage walking by creating a safe, well-maintained, comfortable and enjoyable pedestrian environment that is accessible for people of all ages and abilities. The City will provide a continuous, connected, and accessible pedestrian network that enables users to move safely and comfortably between places and destinations. The City will promote walking as a means of improving transportation circulation, transit access, public health, environmental quality, and recreation, with the ultimate goal of increasing walking trips as a percent of all travel in Alexandria. Finally, the City will educate users of all transportation modes about pedestrian safety, rights, and responsibilities.

Alexandria Mobility Plan (2021)

In November 2021, the City of Alexandria adopted the Alexandria Mobility Plan (AMP) to replace the 2008 Comprehensive Transportation Master Plan. The Pedestrian and Bicycle Chapter incorporates the 2016 chapter update with City policies and programs developed after 2016, such as the City's Vision Zero and Complete Streets programs. The pedestrian and bicycle policies identified in the AMP are to prioritize safety by focusing on vulnerable street user crashes to help achieve Vision Zero, and to address network gaps by completing pedestrian and bicycle networks equitably and cost-effectively.

The AMP incorporates the bicycle projects that were identified and prioritized as part of the 2016 Pedestrian and Bicycle Chapter update, accounting for projects that have been completed since 2016. The AMP sets out pedestrian priority projects through a tiered prioritization of sidewalk gaps in the City. In the vicinity of the project site, the AMP identifies the following sidewalk gaps, which are all classified as Tier 4 priority:

- Slaters Lane east of E Abingdon Drive

- Bernard Street between Portner Road and Michigan Avenue
- Chetworth Place between Seaport Lane and Chetworth Court

Old Town North Urban Design Standards and Guidelines (2017)

The Old Town North Urban Design Standards and Guidelines provide specific requirements and guidance in document form for projects in the Old Town North area to implement the vision of the Small Area Plan. In relation to the PRGS CDD, the Design Standards and Guidelines provide guidance on recommended street cross sections for the project site; the relevant cross-sections for the PRGS CDD are shown in Figure 7. The Design Standards and Guidelines note that final street section configurations, including those for the PRGS CDD site, shall be determined as part of the development review process and CDD approvals for the site.

The CDD is compatible with the Old Town North Urban Design Standards and Guidelines. The proposed street network in the Design Standards and Guidelines varies from the current proposed street network for the PRGS CDD, which has been coordinated with City staff. The CDD's proposed pedestrian facilities are compatible with the objectives of the Design Standards and Guidelines, including but not limited to:

- An enhanced pedestrian circulation network
- Urban, human scaled streets with appropriate block sizes
- Provision of green infrastructure
- Provision of curb extensions where feasible

Mount Vernon Trail Corridor Study (2020)

The National Park Service, which owns, maintains, and operates the Mount Vernon Trail (MVT), conducted a comprehensive analysis of the design, condition, usage, and crash history of the 18-mile trail corridor. The study provided an assessment of the existing condition and usage of the trail, provided guidance on trail design standards and best practices, and outlines recommendations for NPS to consider for improving the MVT. As it relates to the PRGS CDD, the study's recommendations include:

- Maintenance to bridges and guardrails, including repair or replacement of decking and/or railings at multiple trail bridges near the project site.

- Development of a trail signage and pavement marking plan, including specifications for at-grade crossings and wayfinding.
- Coordination with the City of Alexandria to improve wayfinding along the on-street portions of the Mount Vernon Trail, which include segments near the project site.
- Reconstruction and rehabilitation of portions of the trail within the City of Alexandria, including reconstruction of the existing trail bridge on Daingerfield Island. The study also notes that widening on this segment of the trail “may be prudent.”

The study also provides guidance on trail design, including recommended widths and railing types, typical bridge design, wayfinding best practices, and preferred configurations of trail crossings and intersections. The Applicant shall coordinate with the City and NPS on trail design as more detailed designs of the project’s bicycle and pedestrian facilities are prepared in subsequent phases of development.

National Park Service National Capital Region Paved Trails Study (2016)

The National Park Service conducted a study of the paved trail network within the service’s National Capital Region (NCR), which includes the Mount Vernon Trail. The study established a vision for the trail network, identified capital and programmatic recommendations, and established a framework for prioritizing the implementation and funding of trail-related projects in the future.

The study describes a National Capital Trail Concept, which is intended to help build momentum and focus resources towards a national capital trail that integrates existing and proposed trail segments from NPS and other jurisdictions into an easily identifiable concept.

The study provides a set of programmatic recommendations, which do not include infrastructure improvements and are not specific to the project area. Among the proposed capital infrastructure projects, two proposed projects are located near the project site:

- Project G2.1 - On the Mount Vernon Trail, replace existing 300-foot long bridge through wetlands on Daingerfield Island.
- Project G5.2 - Coordinate with the City of Alexandria to promote the Potomac Yard Trail as a Mount Vernon Trail relief/commuter route through enhanced signage.

The study also identified challenges related to the safety of at-grade trail crossings, and identifies the Mount Vernon Trail as an

area that demonstrates these safety challenges. The study notes that at-grade crossings should be studied in further detail to evaluate the safety concerns and potential improvements of the individual crossings. It also noted that a number of the existing bridges and boardwalks on the Mount Vernon Trail include a wooden trail surface, which can present unsafe conditions in wet or icy weather. General guidance on best practices in the design of trail facilities, trailheads, and signage is also provided. The Applicant shall coordinate with the City and NPS on trail design as more detailed designs of the project’s bicycle and pedestrian facilities are prepared in subsequent phases of development.

Proposed Pedestrian Improvements

The proposed CDD includes a set of internal roadways which will circulate vehicles, bicycles, and pedestrians within the site and connect to the existing street network. Proposed pedestrian facilities are based on the Old Town North Small Area Plan, the Old Town North Urban Design Standards and Guidelines, and the City’s Complete Street Guidelines, and will continue to be refined as part of subsequent DSUPs.

Sidewalks will be provided on both sides of all internal roads. All new pedestrian facilities will meet or exceed City of Alexandria and ADA standards. The CDD proposes to connect to the existing street network at N Royal Street, N Fairfax Street, and Slaters Lane; proposed sidewalks will connect to the existing pedestrian network at those locations. These new connections will help complete the street network that is currently missing, significantly improving pedestrian circulation and porosity, and will provide connectivity to the many commercial destinations to the south. Wherever feasible, curb extensions will be provided within the internal roadway network to shorten crossing distances and provide a more comfortable pedestrian environment. All intersections within the internal roadway network will have all-way stop control or will be signalized, providing more abundant and frequent crossings for pedestrians to navigate the site. Any proposed sidewalk improvements within NPS right-of-way will be developed in a context-sensitive manner in coordination with the City of Alexandria and NPS.

At the request of the City, the Applicant proposes enhancements to the existing pedestrian facilities along Slaters Lane. These will include upgraded sidewalks on the north side of the street, which will connect to the internal sidewalk network of the site and to the Mount Vernon Trail. There is currently no sidewalk on the south side of the Slaters Lane segment fronting the existing power substation. Right-of-way is constrained along this segment, and

as such, it is not feasible to accommodate south-side sidewalks while also accommodating the proposed on-street bike lane, vehicular lanes, and north-side enhanced sidewalks within the public right-of-way.

A curbless, low-speed street designed for all user types, also known as the woonerf, is proposed along the eastern frontage of the site. Bicycles, pedestrians, and vehicles will mix within this space; its design will reflect an intent to prioritize bicycle and pedestrian activity and slow vehicles. Specific design details, including but not limited to traffic calming, how the woonerf will connect the site and the open space to the east and when it will transition from a shared space to a non-motor-vehicle space, will be included in subsequent DSUPs.

The proposed CDD will also provide new bicycle and pedestrian connections to the Mount Vernon Trail along the Potomac River waterfront, connecting pedestrians to Daingerfield Island to the north and Old Town Alexandria to the south. These proposed connections to the MVT will be developed in a context-sensitive manner in coordination with the City of Alexandria and NPS. The Applicant will also contribute to improvements to the multi-use trail that connects E Abingdon Drive and the intersection of Bashford Lane and N Royal Street. Details of the crossing of Royal Street will be included in the Infrastructure DSUP.



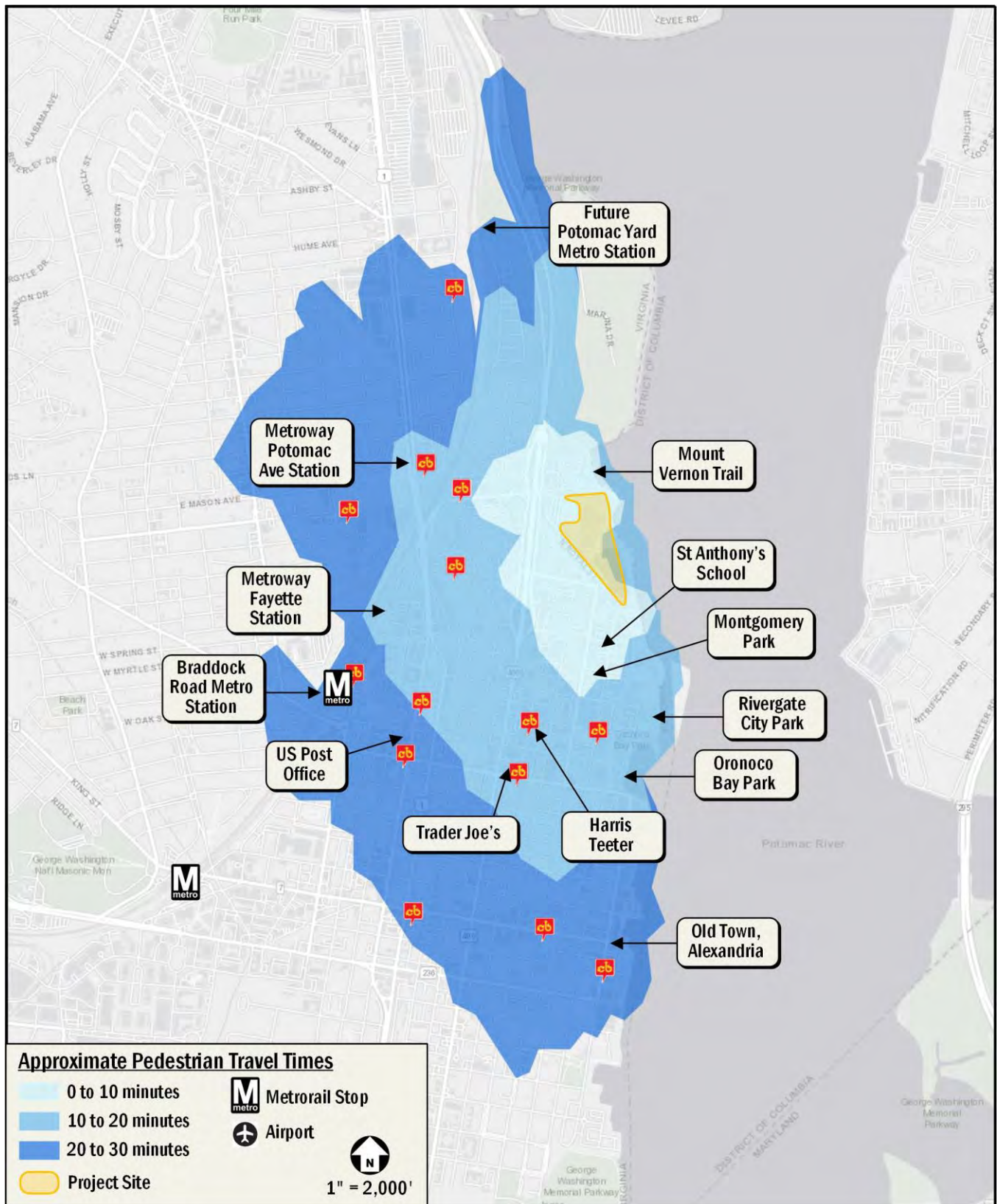


Figure 17: Approximate Pedestrian Travel Time

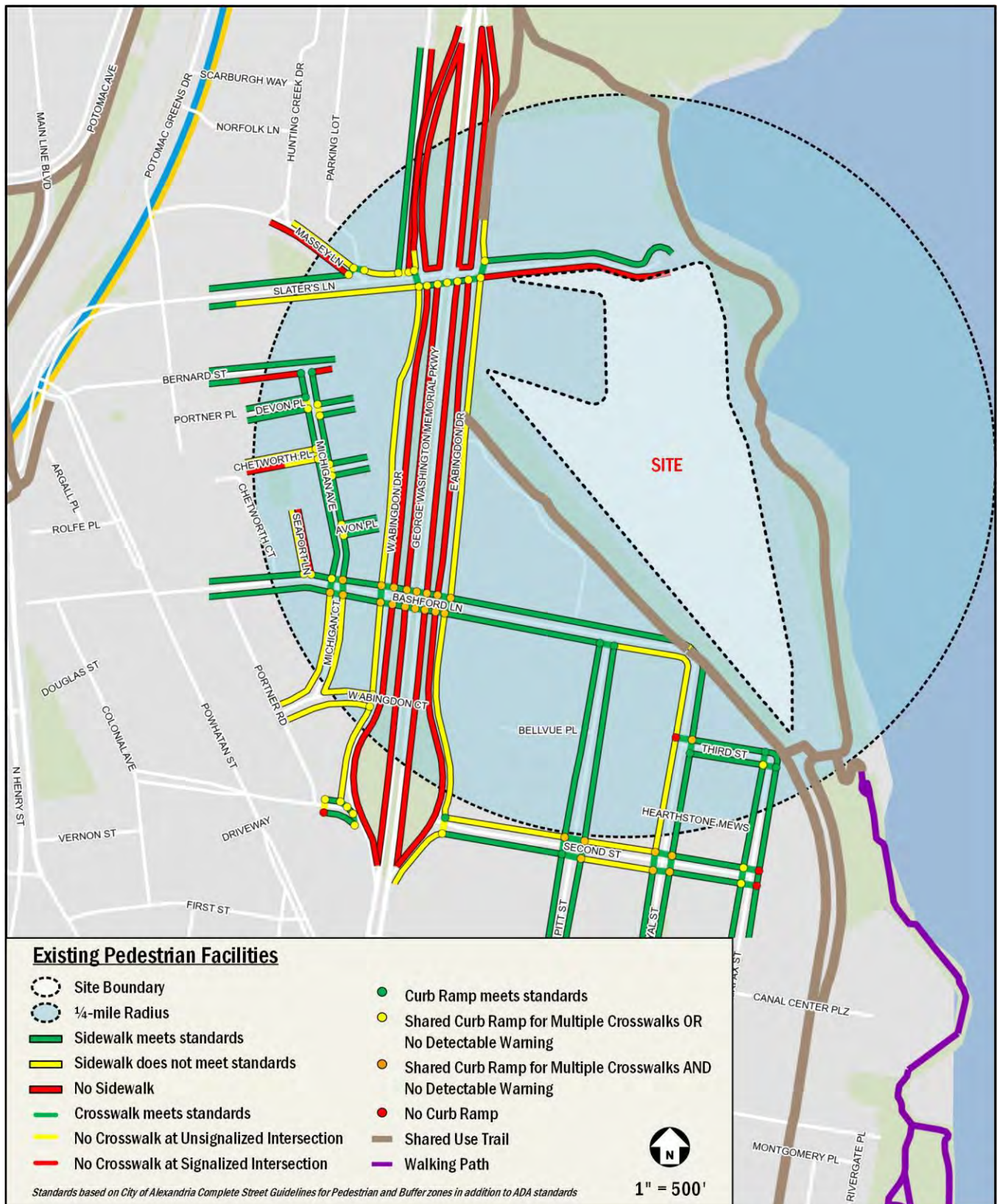


Figure 18: Existing Pedestrian Facilities

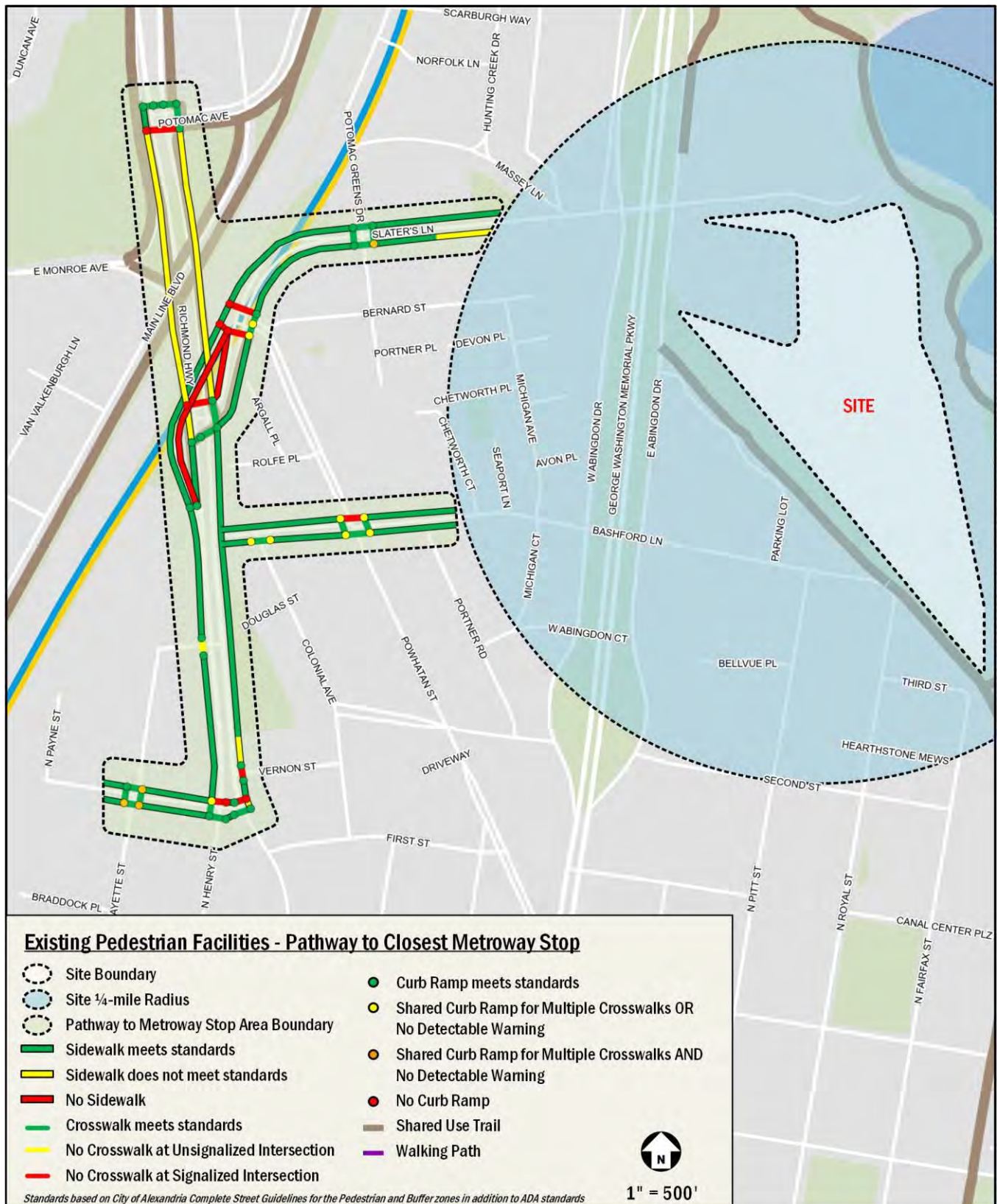


Figure 19: Existing Pedestrian Facilities – Pathway to Closest Metroway Stop

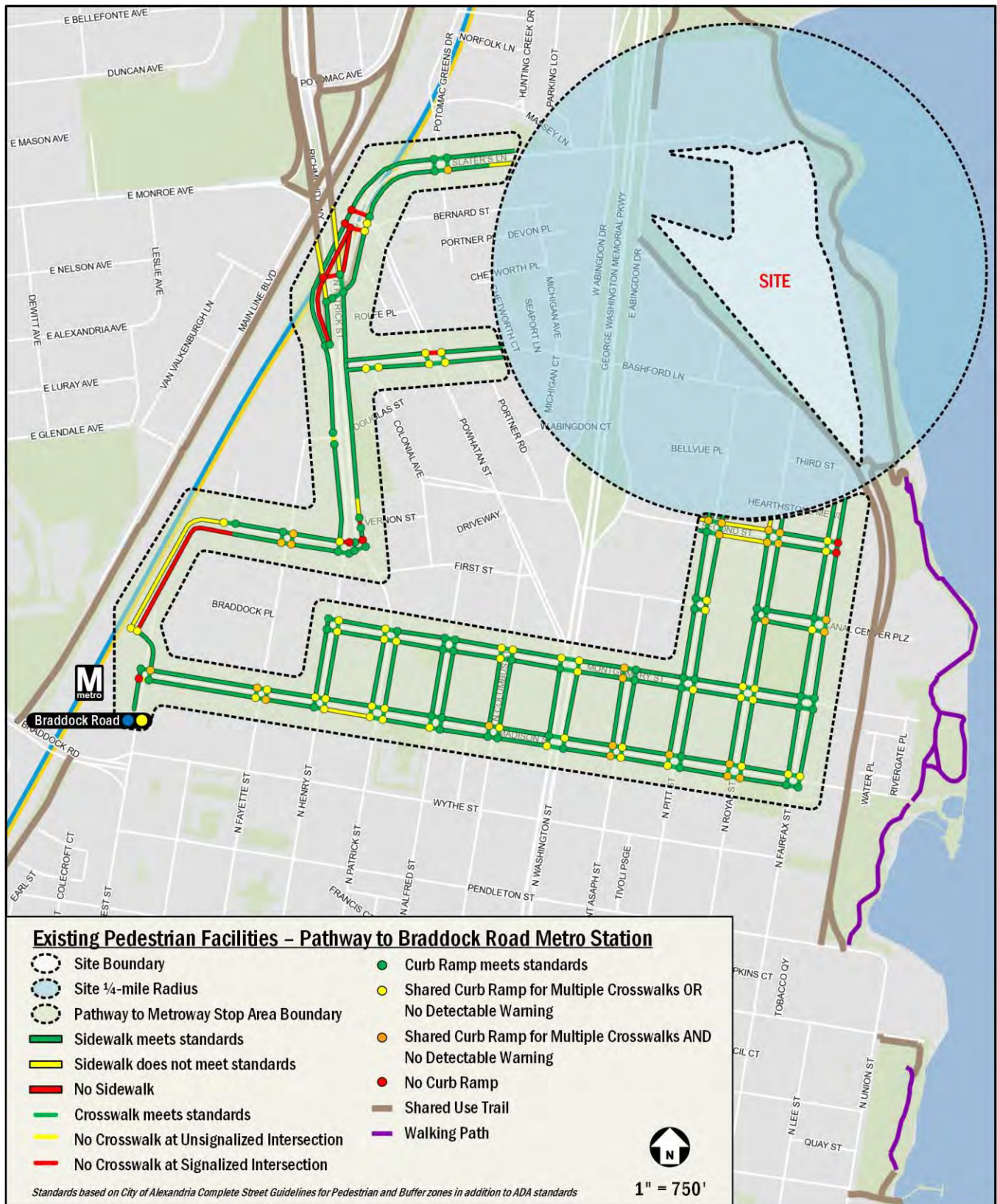


Figure 20: Existing Pedestrian Facilities – Pathway to Braddock Road Metro Station

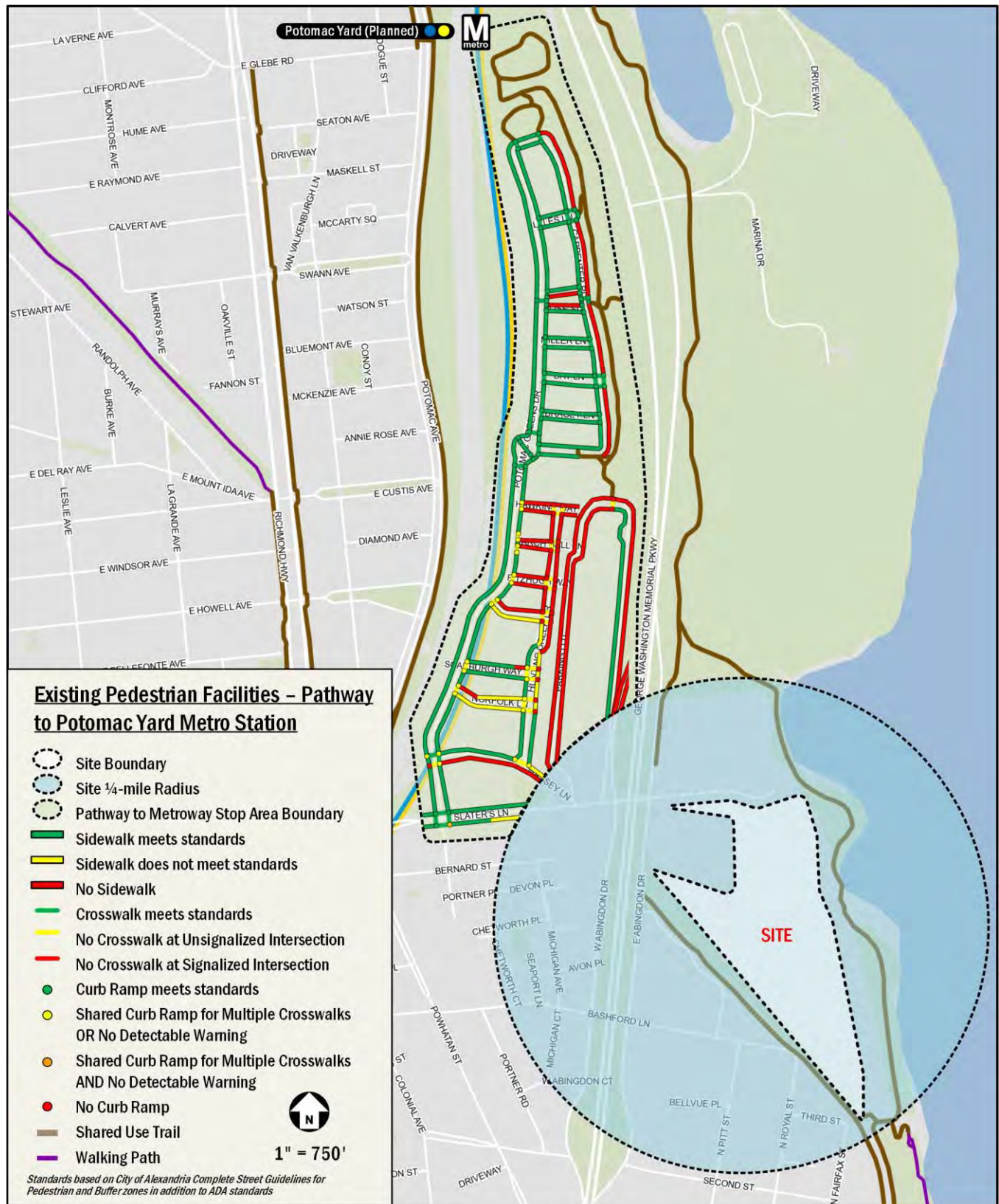


Figure 21: Existing Pedestrian Facilities – Pathway to Potomac Yard Metro Station

Travel Demand Assumptions

This chapter outlines the transportation demand of the of the Potomac River Generating Station (PRGS) Redevelopment Coordinated Development District (CDD). This includes a review of the expected mode splits, multimodal trip generation, and the trip distribution and routing assumptions for the 2033 (full build-out) and 2039 (plus-six-year planning level) analysis years, which forms the basis for the chapters that follow, as vetted and approved by the City of Alexandria.

While the proposed development program is subject to change as the development plan progress, this analysis assumes the following preliminary land uses:

- 865,235 square feet of office space
- 1,106 residential units
- 20,000 square feet of grocery space
- 67,755 square feet of retail space
- 296 hotel rooms
- 19,900 square feet of arts space

It should be noted that trip generation is based on residential units, hotel keys, and Gross Leasable/ Rentable Area as defined by ITE as opposed to Gross Floor Area (as defined in the PRGS CDD), and as such the development program shown here may slightly deviate from the development program shown in the CDD submission.

Mode Split Methodology

Mode split (also called mode share) is the percentage of travelers using a particular type (or mode) of transportation when traveling. Vehicular mode split information for this report was based on approved studies in the area, census data using American Community Survey (ACS), Transportation Analysis Zones (TAZs), data contained in the 2005 WMATA Development-Related Ridership Survey Report, and discussions with the City during the scoping process.

Office Mode Splits

Office mode splits are primarily based on mode splits used in approved studies in the area, particularly the 2017 Old Town North SAP study, as well as census data at the TAZ level for commuters with destinations in the project TAZ and City of Alexandria Staff input. The TAZ that the site is located in covers a smaller area than the area covered by the Census Tract and

was therefore determined to be more representative of the neighborhood and travel patterns around the proposed development. Table 9 summarizes the data that was used to establish the office mode splits assumptions for this report.

Table 9: Summary of Office Mode Split Data

Information Source	Mode				
	SOV	Carpool	Transit	Bike/Walk	Other
CTPP – TAZ Employees (TAZ 11576)	75%	2%	17%	0%	7%
CTPP – Adjacent TAZ Employees (TAZ 11579)	73%	9%	10%	3%	5%
CTPP – Adjacent TAZ Employees (TAZ 21580)	60%	9%	10%	0%	21%
WMATA Ridership Survey Table 9 (King Street Station)	71%		29%	0%	---
WMATA Ridership Survey Table 9 (333 John Carlyle)	50%		45%	5%	---
WMATA Ridership Survey Table 4 (Office Mode Share: Inside Beltway)	66%		30%	6%	---
Old Town North SAP 2017 (Office within ¼ mile from transit)	64%		30%	6%	---
TideLock MTS (11.10.2021)	75%		15%	10%	---
Eisenhower East SAP Update Phase II (10.23.2019) (Office within ¼ and ½ mile from Metro)	40%		50%	10%	---

Residential Mode Splits

Residential mode splits are primarily based on mode splits used in approved studies in the area, particularly the 2017 Old Town North SAP study, as well as census data at the TAZ level for commuters with origins in the project TAZ and City of Alexandria Staff input. The TAZ that the site is located in covers a smaller area than the area covered by the Census Tract and was therefore determined to be more representative of the neighborhood and travel patterns around the proposed

development. Table 10 summarizes the data that was used to establish the residential mode split assumptions for this report.

Table 10: Summary of Residential Mode Split Data

Information Source	Mode				
	SOV	Carpool	Transit	Bike/Walk	Other
Census Tract 2018.01 Residents	61%	5%	16%	5%	13%
Adjacent Census Tract 2018.02	61%	5%	14%	6%	14%
CTPP – TAZ Residents (11576)	65%	0%	0%	0%	35%
CTPP – Adjacent TAZ Residents (TAZ 11579)	42%	7%	24%	8%	19%
CTPP – Adjacent TAZ Residents (TAZ 21580)	50%	2%	30%	11%	7%
WMATA Ridership Survey Table 9 (Crystal City)	47%		46%	7%	---
WMATA Ridership Survey Table 10 (Residential Mode Share: Inside Beltway)	39%		49%	14%	---
Old Town North SAP 2017 (Residential within ¼ to ½ mile from transit)	54%		36%	10%	---
TideLock MTS (11.10.2021)	60%		30%	10%	---
Eisenhower East SAP Update Phase II (10.23.2019) (Residential within ¼ and ½ mile from Metro)	40%		45%	15%	---

Retail and Grocer Mode Splits

Retail mode splits are primarily based on the neighborhood-serving characteristic of this component of the proposed development and mode splits used in approved studies in the area, particularly the 2017 Old Town North SAP study. Grocer mode splits are primarily based on the large format retail nature of this component and mode splits used in approved studies in the area, particularly the 2017 Old Town North SAP study. Table 11 summarizes the data that was used to establish the retail and grocer mode split assumptions for this report.

Table 11: Summary of Retail and Grocer Mode Split Data

Information Source	Mode				
	SOV	Carpool	Transit	Bike/Walk	Other

Information Source	Mode				
	SOV	Carpool	Transit	Bike/Walk	Other
WMATA Ridership Survey Table 12 (U Street Main Street Retail)	19%		57%	25%	---
WMATA Ridership Survey Table 12 (Crystal City – Crystal Plaza Shops)	24%		41%	36%	---
WMATA Ridership Survey Table 12 (Retail Sites)	36%		37%	27%	---
Old Town North SAP 2017 (Retail: all excluding large format)	36%		37%	27%	---
Old Town North SAP 2017 (Retail: large format)	73%		14%	13%	---
TideLock MTS (11.10.2021)	10%		30%	60%	---
Eisenhower East SAP Update Phase II (10.23.2019) (Neighborhood Serving Retail)	10%		10%	80%	---
Eisenhower East SAP Update Phase II (10.23.2019) (Grocery Store)	65%		5%	30%	---

Hotel Mode Splits

Hotel mode splits are primarily based on mode splits used in approved studies in the area, particularly the 2017 Old Town North SAP study, as well as data from the WMATA Ridership survey. Table 12 summarizes the data that was used to establish the hotel mode split assumptions for this report.

Table 12: Summary of Hotel Mode Split Data

Information Source	Mode				
	SOV	Carpool	Transit	Bike/Walk	Other
WMATA Ridership Survey Table 15 (Crystal City – Crystal Gateway Marriott)	24%		37%	42%	---
WMATA Ridership Survey Table 15 (Crystal City – Crystal Hyatt Regency)	21%		51%	28%	---
WMATA Ridership Survey Table 125 (Hotel Sites)	38%		31%	31%	---

Old Town North SAP 2017 (Hotel)	38%	31%	31%	---
Eisenhower East SAP Update Phase II (10.23.2019) (Hotel)	20%	55%	25%	---

Arts Mode Splits

As a conservative measure, the same auto mode split as that assigned to office was applied to the arts component of the proposed development.

It is expected that a portion of trips, particularly for retail, will be by bus, bicycle or on foot during the morning and afternoon peak hours, rather than by personal vehicle. Based on this, the auto mode splits for the development were determined to be 60 percent for the office component, 50 percent for the residential component, 20 percent for the retail component, 70 percent for the grocer component, 50 percent for the hotel component, and 60 percent for the arts component. These mode splits reflect the expected modes of travel for trips during the typical weekday commuter peak hours, assuming a transportation management plan will be in place as part of future DSUPs for the proposed development. The proposed mode splits were vetted and approved the City of Alexandria during the scoping process. The mode split assumptions for the PRGS CDD are shown in Table 13.

Table 13: Mode Split Summary

Land Use	Auto	Transit	Bike	Walk
Office	60%	30%	5%	5%
Residential	50%	35%	5%	10%
Retail	20%	15%	25%	40%
Grocer	70%	5%	5%	20%
Hotel	50%	25%	5%	20%
Arts	60%	20%	5%	15%

Trip Generation Methodology

Traditionally, weekday peak hour trip generation is calculated based on the methodology outlined in the ITE Trip Generation Manual, 11th Edition. This methodology was supplemented to account for the urban nature of the site (Trip Generation Manual provides data for non-urban, low transit use sites) and to generate trips for multiple modes, as vetted and approved by the City of Alexandria.

It should be noted that trip generation is based on residential units, hotel keys, and Gross Leasable/ Rentable Area as defined by ITE as opposed to Gross Floor Area (as defined in the PRGS CDD), and as such the development program shown here may

slightly deviate from the development program shown in the CDD submission.

Office Trip Generation

Office trip generation is based on the development program of 865,235 square feet of office space. Office trip generation was calculated based on ITE land use 710, *General Office Building*, using the setting Dense Multi-Use Urban. Trips were split into different modes using the assumptions outlined in the mode split section of this report.

Residential Trip Generation

Residential trip generation is based on the development program of 1,106 residential dwelling units. Residential trip generation was calculated based on ITE land use 222, *Multifamily Housing (High-Rise)*, using the settings for Not Close to Rail Transit and General Urban/Suburban. Trips were split into different modes using the assumptions outlined in the mode split section of this report.

Retail Trip Generation

Retail trip generation is based on the development program of 67,755 square feet of retail space. Limited data is available in ITEs' Trip Generation 11th Edition for the neighborhood-serving, ground-floor nature of the retail proposed with the development. To better reflect the trips expected to be generated by this type of retail use, vehicular rates based on ITEs' Trip Generation 10th Edition were used for the proposed retail component. As such, retail trip generation was calculated based on ITE land use 820, *Shopping Center*, using the setting General Urban/Suburban. Trips were split into different modes using the assumptions outlined in the mode split section of this report.

Grocer Trip Generation

Grocer trip generation is based on the development program of 20,000 square feet of grocer space. Grocer trip generation was calculated based on ITE land use 850, *Supermarket*, using the setting General Urban/Suburban. Trips were split into different modes using the assumptions outlined in the mode split section of this report.

Pass-By Reduction

As vetted and approved by the City of Alexandria, the grocer trip generation applies a pass-by reduction of 20 percent in the morning and afternoon peak hours. Pass-by trips are vehicular trips that are already present on the road network that now deviate from their existing route due to the addition of the

proposed development. These pass-by rates are available in the ITE Trip Generation Handbook, 3rd Edition, for grocer (ITE Land Use 850). The site-generated vehicular trip generation with this pass-by reduction is summarized in Table 15 to Table 21 for each development block.

Hotel Trip Generation

Hotel trip generation is based on the development program of 296 rooms. Hotel trip generation was calculated based on ITE land use 310, *Hotel*, using the setting General Urban/Suburban. Trips were split into different modes using the assumptions outlined in the mode split section of this report.

Arts Trip Generation

Arts trip generation is based on the development program of 19,900 square feet of arts space. Arts trip generation was calculated based on ITE land use 580, *Museum*, using the setting General Urban/Suburban. Trips were split into different modes using the assumptions outlined in the mode split section of this report.

Internal Capture

Internal trip capture is the portion of trips generated by a mixed-use development that both begin and end within the development. Since the proposed development contains a variety of uses, it was assumed that several trips would be entirely contained with the site; for example, office employees may live in the residential portion of the development or visitors to the development will visit the Arts component and retail component. The methodology for applying internal capture was based on that outlined in the ITE Trip Generation Handbook, 3rd Edition, as vetted and approved by the City of Alexandria during the scoping process. Details internal capture trip calculations are included in the Technical Appendix.

A summary of the multimodal trip generation for the proposed development by development block is shown in Table 15 to Table 21 for the weekday morning and weekday afternoon peak hours. Detailed trip generation calculations are included in the Technical Appendix.

Distribution and Assignment Methodology

Trip distribution for the site-generated trips was determined based on: (1) Census Transportation Planning Products (CTPP) Traffic Analysis Zone (TAZ) data, (2) existing and future travel patterns in the study area, and (3) previously approved methodologies employed in approved studies in the vicinity of

the site. Figure 22 shows the origins of driving commuters with destinations in the project TAZ. Figure 23 shows the destinations of driving commuters with origins in the project TAZ.

Based on this review and the site access locations, the site-generated trips were distributed through the study area intersections. Trip distribution assumptions were analyzed for inbound and outbound trips. Residential and retail trip distribution assumptions for the proposed development are provided in Figure 24 for inbound trips and Figure 25 for outbound trips, as vetted and agreed to by the City of Alexandria during the scoping process. Detailed trip assignments at each study intersection are shown in a later chapter of this report.

Cut-Through Traffic

As part of the analysis, this report examined the relative level of cut-through traffic that is present in the study area under existing conditions during the morning and afternoon peak periods. The analysis was based on StreetLight InSight® data. StreetLight metrics are derived from a combination of two types of data: navigation-GPS data and Location Based Services (LBS) data, including historical data, with a sample size of approximately 23% of the adult population. This data is then transformed into contextualized, aggregated, and normalized travel patterns that can be used to create origin and destination analyses.

In order to determine what percentage of traffic entering or existing Old Town North is cut-through traffic versus local traffic, an analysis was performed which compared the number of trips with an origin or destination in the Old Town North neighborhood to trips that pass through the neighborhood and are originating from/destined for locations outside of the City of Alexandria. This analysis was based on data for an average weekday (Tuesday – Thursday), during the morning (7:00AM-9:00AM) and afternoon (4:00PM-6:00PM) peak periods, in 2019. Table 2 shows the results of the cut-through analysis. As shown, approximately 87% of traffic entering or exiting Old Town North during the morning peak period cut-through traffic and 87% during the afternoon peak period is cut-through traffic.

Table 14: Cut-Through Analysis Results

Traffic Direction/Type	AM	PM	Total
To Old Town North	2,040	1,740	3,780
From Old Town North	2,003	2,209	4,212
Cut-Through	26,479	25,445	51,924
Total	30,522	29,394	59,916
Cut-Through % of Total	87%	87%	87%

During the morning peak, the most common route for cut-through trips through Old Town North was northbound GW Memorial Parkway, south of Old Town North, towards GW Memorial Parkway to the north. Approximately 5% of cut-through trips shift between Richmond Highway and GW Memorial Parkway using Slaters Lane.

During the afternoon peak, the most common route for cut-through trips through Old Town North was southbound GW Memorial Parkway, north of Old Town North, towards GW Memorial Parkway the south. Approximately 3% of cut-through trips shift between Richmond Highway and GW Memorial Parkway using Slaters Lane.

In order to provide a conservative analysis, it was assumed that existing traffic would remain on the network and no regional cut-through trips were re-routed.

In addition, chord diagrams were produced to show the relative volume of traffic between origin-destination pairs for cut-through traffic. At the chord base, blue indicates destination and red indicates origin. Base widths are proportional to the traffic volume of the origin-destination pair, and the shade of the chord reflects the number of trips from the origin to the destination. Figure 26 shows the chord diagram for cut-through traffic during the morning peak period. Figure 27 shows the chord diagram for cut-through traffic during the afternoon peak period.

Table 15: Multimodal Trip Generation Summary – Overall Site

Land Use	Size	Mode Split	AM Peak Hour			PM Peak Hour			
			In	Out	Total	In	Out	Total	
Office	865	ksf	Auto (veh/hr)	367	28	395	58	370	428
			Transit (ppl/hr)	217	16	233	35	219	254
			Bike (ppl/hr)	36	2	38	5	36	41
			Walk (ppl/hr)	36	2	38	5	36	41
Residential	1,106	du	Auto (veh/hr)	44	96	140	84	59	143
			Transit (ppl/hr)	36	78	114	69	49	118
			Bike (ppl/hr)	5	11	16	9	8	17
			Walk (ppl/hr)	11	22	33	20	13	33
Grocer	20	ksf	Auto (veh/hr)	15	11	26	46	46	92
			Pass-By (veh/hr)	4	2	6	12	11	23
			Transit (ppl/hr)	3	1	4	8	7	15
			Bike (ppl/hr)	3	1	4	8	7	15
			Walk (ppl/hr)	10	7	17	30	30	60
Retail	68	ksf	Auto (veh/hr)	7	4	11	22	24	46
			Transit (ppl/hr)	7	6	13	31	33	64
			Bike (ppl/hr)	14	10	24	51	55	106
			Walk (ppl/hr)	21	14	35	81	88	169
Hotel	296	rooms	Auto (veh/hr)	31	24	55	41	39	80
			Transit (ppl/hr)	32	26	58	43	42	85
			Bike (ppl/hr)	6	6	12	9	8	17
			Walk (ppl/hr)	26	20	46	34	34	68
Arts	20	ksf	Auto (veh/hr)	2	1	3	1	1	2
			Transit (ppl/hr)	1	1	2	0	1	1
			Bike (ppl/hr)	0	0	0	0	0	0
			Walk (ppl/hr)	1	0	1	0	1	1
Overall Site Auto Trips			465 veh/hr	163 veh/hr	628 veh/hr	254 veh/hr	539 veh/hr	793 veh/hr	
Overall Site Pass-By Trips			4 veh/hr	2 veh/hr	6 veh/hr	12 veh/hr	11 veh/hr	23 veh/hr	
Overall Site Non-Auto Trips			468 ppl/hr	227 ppl/hr	695 ppl/hr	444 ppl/hr	671 ppl/hr	1,115 ppl/hr	

Table 16: Multimodal Trip Generation Summary – Block A

Land Use	Size	Mode Split	AM Peak Hour			PM Peak Hour			
			In	Out	Total	In	Out	Total	
Office	20	ksf	Auto (veh/hr)	8	1	9	2	7	9
		Transit (ppl/hr)	5	0	5	1	5	6	
		Bike (ppl/hr)	1	0	1	0	1	1	
		Walk (ppl/hr)	1	0	1	0	1	1	
Arts	20	ksf	Auto (veh/hr)	2	1	3	1	1	2
		Transit (ppl/hr)	1	1	2	0	1	1	
		Bike (ppl/hr)	0	0	0	0	0	0	
		Walk (ppl/hr)	1	0	1	0	1	1	
Block A Auto Trips			10 veh/hr	2 veh/hr	12 veh/hr	3 veh/hr	8 veh/hr	11 veh/hr	
Block A Non-Auto Trips			9 ppl/hr	1 ppl/hr	10 ppl/hr	1 ppl/hr	9 ppl/hr	10 ppl/hr	

Table 17: Multimodal Trip Generation Summary – Block B

Land Use	Size	Mode Split	AM Peak Hour			PM Peak Hour			
			In	Out	Total	In	Out	Total	
Office	50	ksf	Auto (veh/hr)	22	1	23	3	22	25
			Transit (ppl/hr)	13	1	14	2	13	15
			Bike (ppl/hr)	2	0	2	0	2	2
			Walk (ppl/hr)	2	0	2	0	2	2
Residential	336	du	Auto (veh/hr)	14	28	42	25	18	43
			Transit (ppl/hr)	11	24	35	21	15	36
			Bike (ppl/hr)	2	3	5	3	2	5
			Walk (ppl/hr)	3	7	10	6	4	10
Retail	9	ksf	Auto (veh/hr)	1	0	1	2	3	5
			Transit (ppl/hr)	0	1	1	3	4	7
			Bike (ppl/hr)	1	1	2	5	6	11
			Walk (ppl/hr)	1	1	2	8	10	18
Block B Auto Trips			37 veh/hr	29 veh/hr	66 veh/hr	30 veh/hr	43 veh/hr	73 veh/hr	
Block B Non-Auto Trips			35 ppl/hr	38 ppl/hr	73 ppl/hr	48 ppl/hr	58 ppl/hr	106 ppl/hr	

Table 18: Multimodal Trip Generation Summary – Block C

Land Use	Size	Mode Split	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Residential	497 du	Auto (veh/hr)	19	44	63	38	26	64
		Transit (ppl/hr)	16	35	51	31	22	53
		Bike (ppl/hr)	2	5	7	4	4	8
		Walk (ppl/hr)	5	10	15	9	6	15
Grocer	20 ksf	Auto (veh/hr)	15	11	26	46	46	92
		Pass-By (veh/hr)	4	2	6	12	11	23
		Transit (ppl/hr)	3	1	4	8	7	15
		Bike (ppl/hr)	3	1	4	8	7	15
		Walk (ppl/hr)	10	7	17	30	30	60
Retail	17 ksf	Auto (veh/hr)	2	1	3	6	6	12
		Transit (ppl/hr)	2	1	3	8	9	17
		Bike (ppl/hr)	4	2	6	13	15	28
		Walk (ppl/hr)	6	3	9	21	23	44
Block C Auto Trips			40 veh/hr	58 veh/hr	98 veh/hr	102 veh/hr	89 veh/hr	191 veh/hr
Block C Non-Auto Trips			51 ppl/hr	65 ppl/hr	116 ppl/hr	132 ppl/hr	123 ppl/hr	255 ppl/hr

Table 19: Multimodal Trip Generation Summary – Block D

Land Use	Size	Mode Split	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Residential	273 du	Auto (veh/hr)	11	24	35	21	15	36
		Transit (ppl/hr)	9	19	28	17	12	29
		Bike (ppl/hr)	1	3	4	2	2	4
		Walk (ppl/hr)	3	5	8	5	3	8
Retail	11 ksf	Auto (veh/hr)	1	1	2	3	4	7
		Transit (ppl/hr)	1	1	2	5	5	10
		Bike (ppl/hr)	2	2	4	8	9	17
		Walk (ppl/hr)	4	2	6	13	14	27
Block D Auto Trips			12 veh/hr	25 veh/hr	37 veh/hr	24 veh/hr	19 veh/hr	43 veh/hr
Block D Non-Auto Trips			20 ppl/hr	32 ppl/hr	52 ppl/hr	50 ppl/hr	45 ppl/hr	95 ppl/hr

Table 20: Multimodal Trip Generation Summary – Block E

Land Use	Size	Mode Split	AM Peak Hour			PM Peak Hour			
			In	Out	Total	In	Out	Total	
Office	499	ksf	Auto (veh/hr)	212	15	227	34	213	247
		Transit (ppl/hr)	125	9	134	20	126	146	
		Bike (ppl/hr)	21	1	22	3	21	24	
		Walk (ppl/hr)	21	1	22	3	21	24	
Retail	19	ksf	Auto (veh/hr)	2	1	3	7	6	13
		Transit (ppl/hr)	2	2	4	9	9	18	
		Bike (ppl/hr)	4	3	7	15	15	30	
		Walk (ppl/hr)	6	5	11	24	24	48	
Block E Auto Trips			214 veh/hr	16 veh/hr	230 veh/hr	41 veh/hr	219 veh/hr	260 veh/hr	
Block E Non-Auto Trips			179 ppl/hr	21 ppl/hr	200 ppl/hr	74 ppl/hr	216 ppl/hr	290 ppl/hr	

Table 21: Multimodal Trip Generation Summary – Block F

Land Use	Size	Mode Split	AM Peak Hour			PM Peak Hour			
			In	Out	Total	In	Out	Total	
Office	296	ksf	Auto (veh/hr)	125	11	136	19	128	147
			Transit (ppl/hr)	74	6	80	12	75	87
			Bike (ppl/hr)	12	1	13	2	12	14
			Walk (ppl/hr)	12	1	13	2	12	14
Hotel	296	rooms	Auto (veh/hr)	31	24	55	41	39	80
			Transit (ppl/hr)	32	26	58	43	42	85
			Bike (ppl/hr)	6	6	12	9	8	17
			Walk (ppl/hr)	26	20	46	34	34	68
Retail	13	ksf	Auto (veh/hr)	1	1	2	4	5	9
			Transit (ppl/hr)	2	1	3	6	6	12
			Bike (ppl/hr)	3	2	5	10	10	20
			Walk (ppl/hr)	4	3	7	15	17	32
Block F Auto Trips			157 veh/hr	36 veh/hr	193 veh/hr	64 veh/hr	172 veh/hr	236 veh/hr	
Block F Non-Auto Trips			171 veh/hr	66 veh/hr	237 veh/hr	133 veh/hr	216 veh/hr	349 veh/hr	

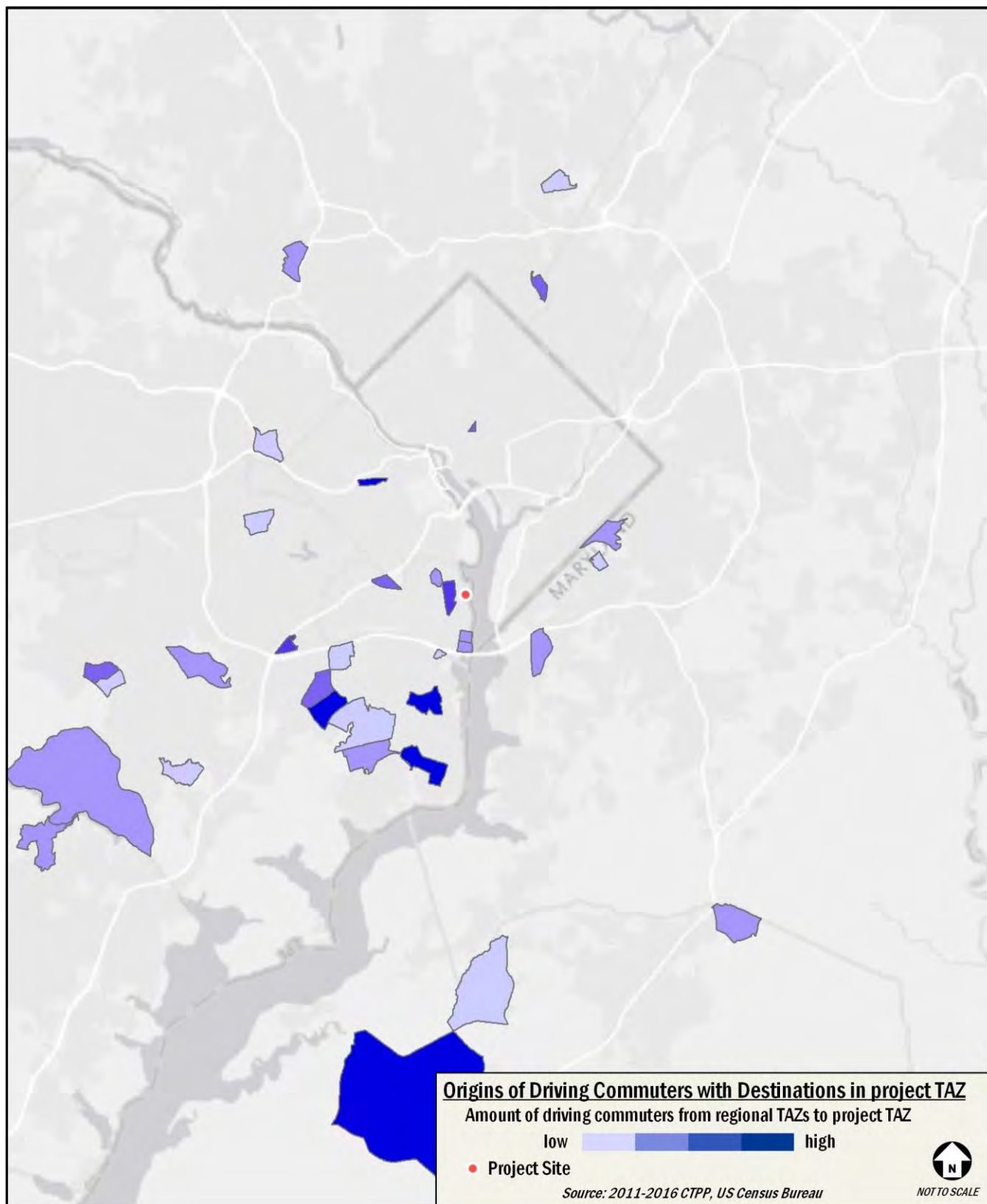


Figure 22: Origins of Driving Commuters with Destinations in Project TAZ

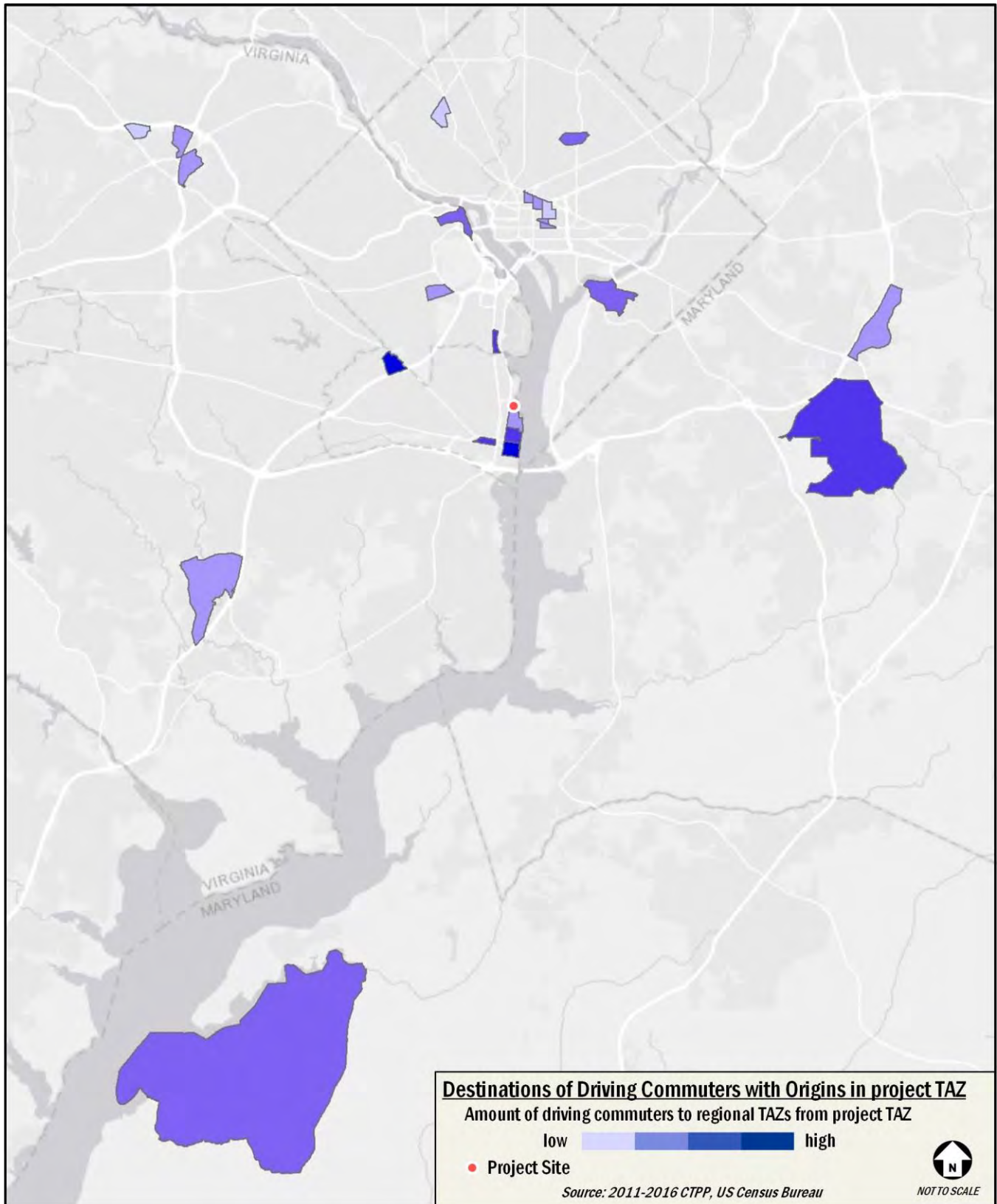


Figure 23: Destinations of Driving Commuters with Origins in Project TAZ

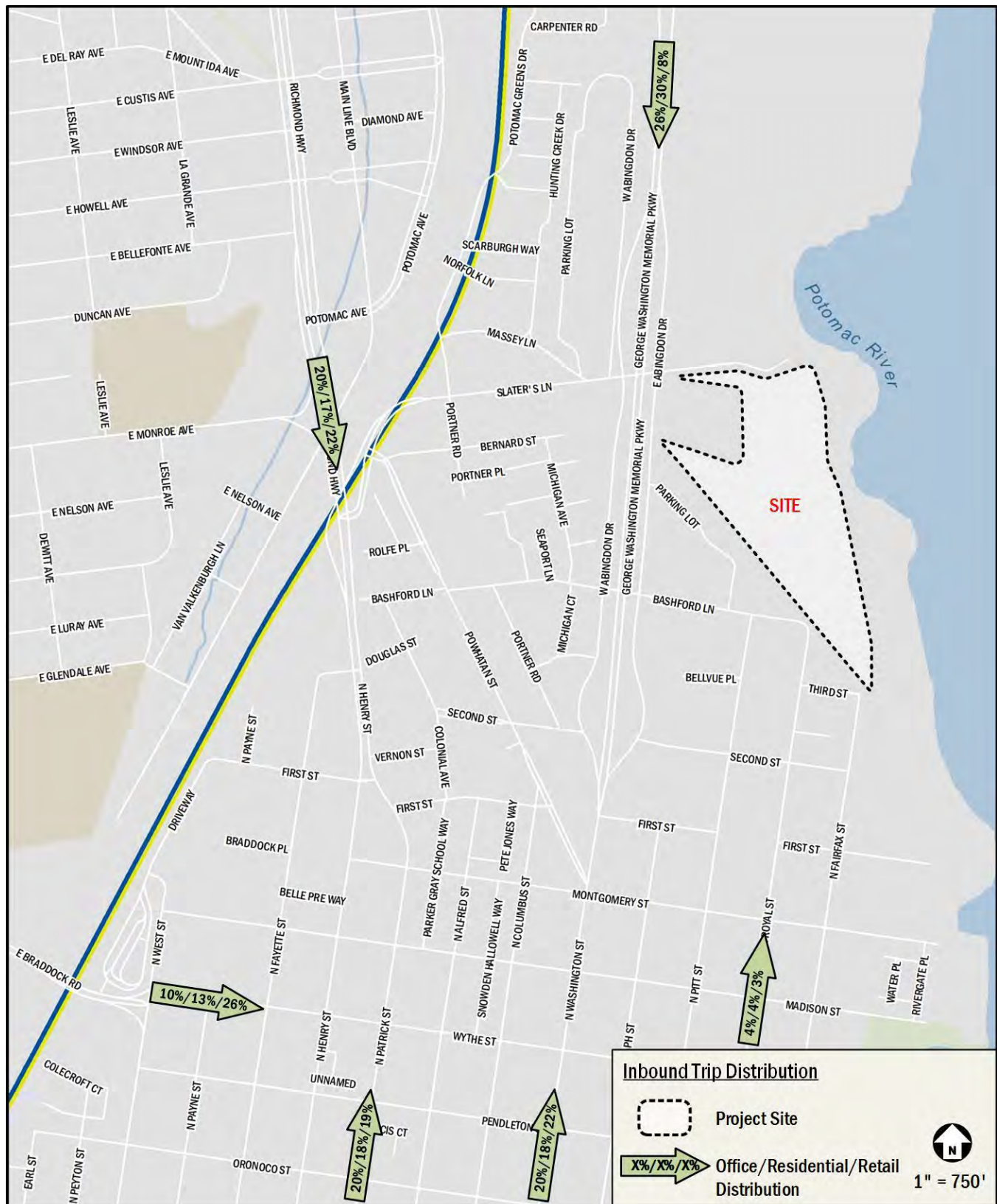


Figure 24: Inbound Trip Distribution

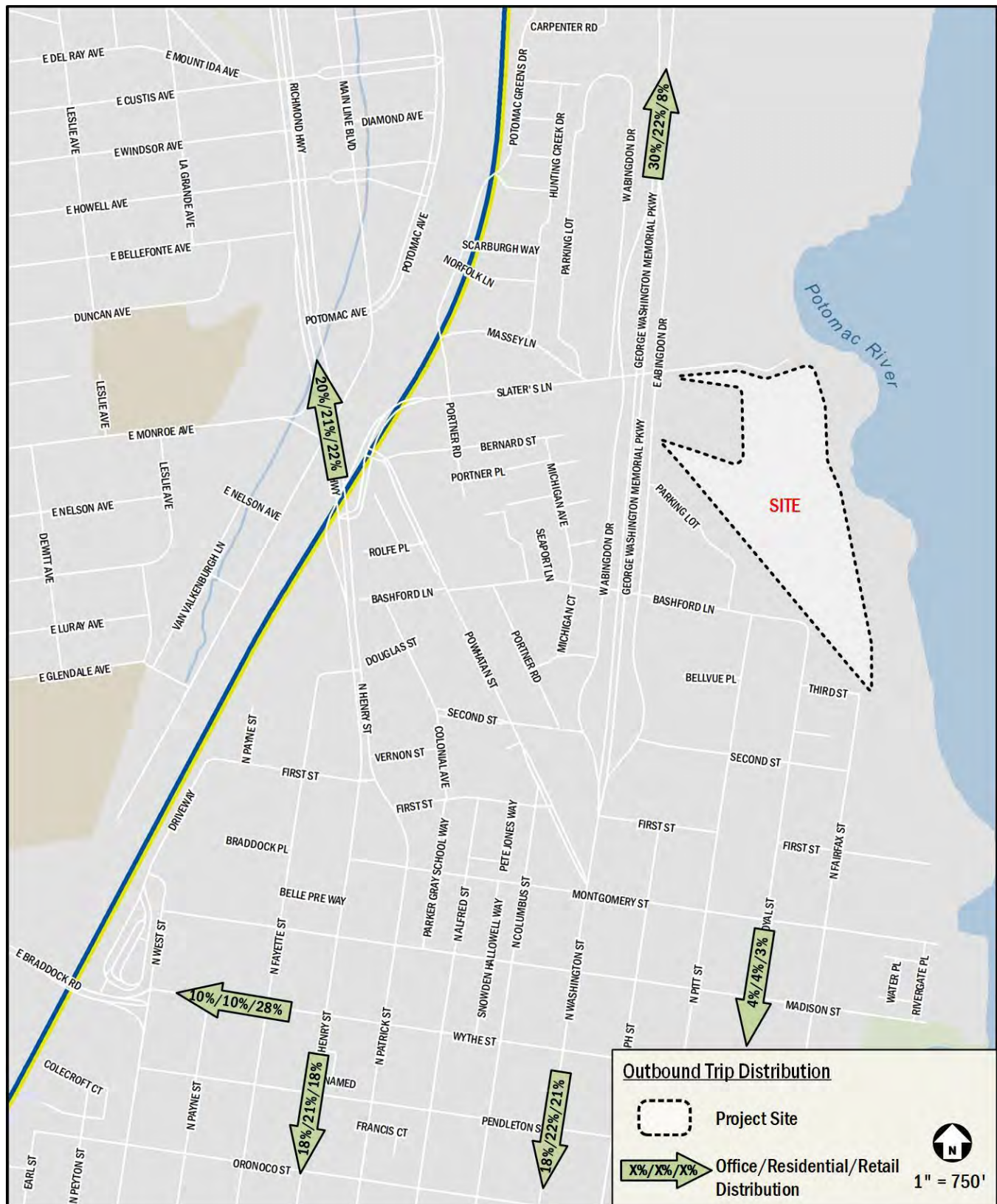
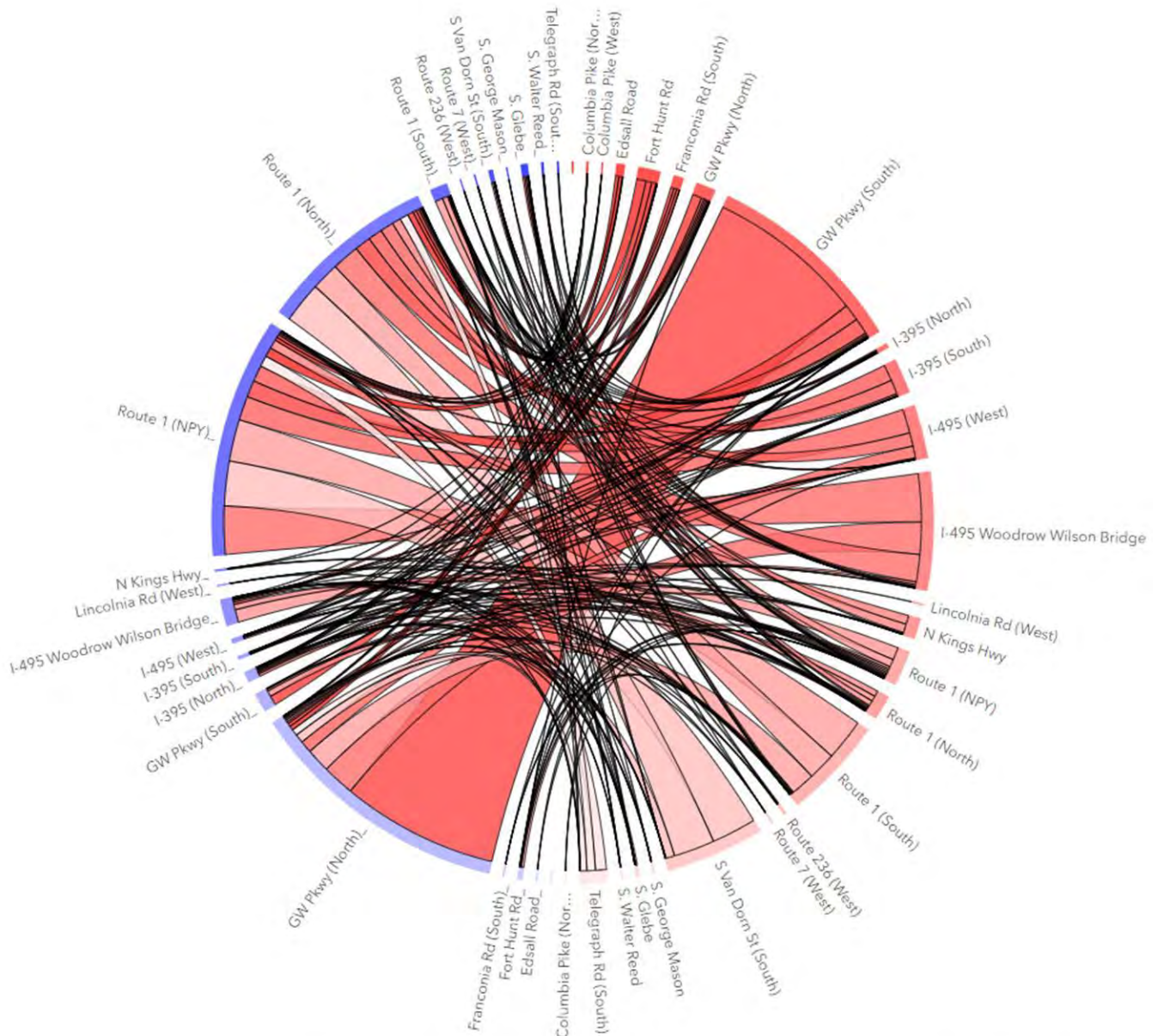


Figure 25: Outbound Trip Distribution

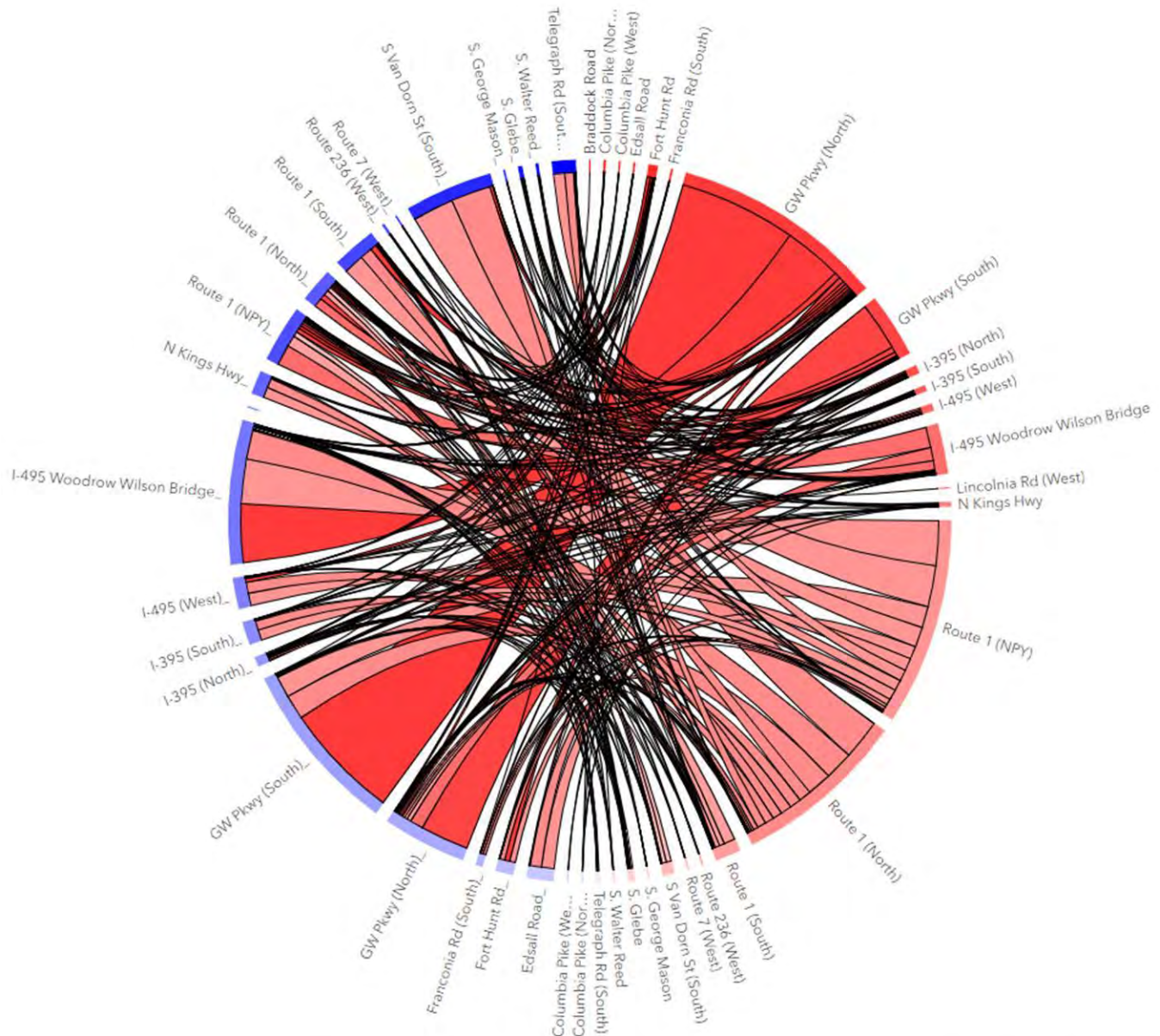
Chord Diagram (AM Peak Period)



This diagram shows the relative volume of traffic between selected O-D pairs. At the chord base, blue indicates destination and red indicates origin. Base widths are proportional to the StreetLight Index for the traffic volume of the O-D pair. The shade of the chord reflects the number of trips from the origin to the destination.

Figure 26: AM Peak Cut-Through Results

Chord Diagram (PM Peak Period)



This diagram shows the relative volume of traffic between selected O-D pairs. At the chord base, blue indicates destination and red indicates origin. Base widths are proportional to the StreetLight Index for the traffic volume of the O-D pair. The shade of the chord reflects the number of trips from the origin to the destination.

Figure 27: PM Peak Cut-Through Results

Traffic Operations

This chapter provides a summary of an analysis of the existing and future roadway capacity of the study area for the 2033 (full build-out) and 2039 (plus-six-year planning level) analysis years. Included is an analysis of potential vehicular impacts of the Potomac River Generating Station (PRGS) Redevelopment Coordinated Development District (CDD) and a discussion of potential improvements.

The capacity analysis focuses on the morning and afternoon commuter peak hours, as determined by the existing traffic volumes in the study area.

The purpose of the capacity analysis is to:

- Determine the existing capacity of the study area roadways;
- Determine the overall impact of the proposed development on the study area roadways; and
- Discuss potential improvements and mitigation measures to accommodate the additional vehicular trips.

The proposed development is considered to have an impact at an intersection within the vehicular study area if any of the following conditions are met:

- The capacity analyses show a LOS F at an intersection or any movement in the future where one does not exist the background conditions;
- There is an increase in delay at any movement or overall intersection operating under LOS F of greater than 10 percent when compared to the background conditions; or
- The 95th percentile queue length in the future conditions exceeds the available capacity and increases by more than 150 feet compared to background conditions.

The following conclusions are reached within this chapter:

- There are impacts to six (6) study intersections as a result of the proposed development during the 2033 (full build-out) analysis year.
- There are impacts to six (6) study intersections as a result of the proposed development during the 2039 (plus-six year planning level) analysis year.
- Mitigation measures were analyzed and discussed for these intersections, of which feasible solutions were recommended for implementation given City of Alexandria approval.

- Future areas of congestion for roadway capacity are primarily focused along the heavily trafficked commuter routes, such as GW Memorial Parkway and Richmond Highway.
- Additional improvements were analyzed and discussed for intersections along the heavily commuted GW Memorial Parkway corridor. While not required to mitigate impacts by the proposed development, there are additional opportunities to further improve conditions at a number of study intersections.
- Overall, this report concludes that the proposed development will have a manageable impact on the surrounding transportation network.

Study Area, Scope, & Methodology

This section outlines the assumptions used to develop the existing and future roadway capacity analyses, including volumes, roadway geometries, and traffic operations. The scope of the analysis contained within this report was discussed with and approved by City of Alexandria staff. The general methodology of the analysis follows national and City of Alexandria guidelines on the preparation of transportation impact evaluations of site development.

Capacity Analysis Scenarios

The vehicular capacity analyses are performed to determine if the proposed development will lead to adverse impacts on traffic operations. This is accomplished by comparing future scenarios: (1) without the proposed development (referred to as the Background conditions) and (2) with the development approved and constructed (referred to as the Future conditions). At the City's request, an additional plus-six-year planning level analysis was included.

Specifically, the roadway capacity analysis examined the following scenarios:

1. Existing Conditions
2. 2033 Future Conditions without the development (2033 Background)
3. 2033 Future Conditions with the development (2033 Future)
4. 2039 Future Conditions without the development (2039 Background)
5. 2039 Future Conditions with the development (2039 Future)

Study Area

The study area of the analysis is a set of intersections where detailed capacity analyses are performed for the scenarios listed above. The set of intersections included are those intersections most likely to have potential impacts or require changes to traffic operations to accommodate the proposed development.

Based on the projected future trip generation and the location of the planned site access points, as agreed to in this report's scoping agreement, the following intersections were chosen for analysis:

14. George Washington Memorial Pkwy & E Abingdon Dr
15. George Washington Memorial Pkwy & Slaters Ln
16. Slaters Ln & W Abingdon Dr
17. Slaters Ln & E Abingdon Dr
18. Slaters Ln & Potomac Greens Dr/Portner Rd
19. Slaters Ln & Powhatan St
20. Slaters Ln & Richmond Hwy
21. Bashford Ln & Powhatan St
22. George Washington Memorial Pkwy & Bashford Ln
23. Bashford Ln & W Abingdon Dr
24. Bashford Ln & E Abingdon Dr
25. Bashford Ln & N Pitt St
26. Bashford Ln & N Royal St
27. Third St & N Royal St
28. Third St & N Fairfax St
29. Second St & N Royal St
30. Second St & N Pitt St
31. Second St & E Abingdon Dr
32. First St & Richmond Highway (East)
33. First St & Richmond Highway (West)
34. N Fayette St & Richmond Hwy
35. First St & N Washington St

36. First St & N St Asaph St
37. First St & N Pitt St
38. Montgomery St & N Fairfax St
39. Montgomery St & N Royal St
40. Montgomery St & N Pitt St
41. Montgomery St & St Asaph St
42. Montgomery St & N Washington St
43. Montgomery St & N Patrick St
44. Montgomery St & Richmond Hwy
45. Madison St & N Washington St
46. Potomac Ave & Richmond Hwy
47. Slaters Ln & Primary St & Woonerf St – Planned
48. Primary St & Lane C – Planned
49. Lane C & Woonerf St – Planned
50. Primary St & Lane B (North) – Planned
51. Primary St & Lane B – Planned
52. Primary St & Lane A – Planned
53. Lane A & Woonerf St – Planned
54. Primary St & Woonerf St & N Fairfax St – Planned

Roadway characteristics including classification, number of lanes, speed limit, the presence of on-street parking, average annual daily traffic volumes (AADT) are outlined in Table 22.

Table 22: Existing Roadway Network

Roadway	Street Typology	Lanes	Speed (mph)	On-Street Parking	AADT*
	Functional Classification (VDOT & City of Alexandria)				
GW Memorial Parkway	Principal Arterial	4-6	30	No	35,000
Richmond Highway	Principal Arterial	6	25	No	48,000
Potomac Avenue	Minor Arterial	4	25	Yes	Not Available
Slaters Lane (West of GW Memorial Parkway)	Minor Arterial	3	25	No	15,000
Powhatan Street	Minor Collector	2	25	Yes	Not Available
Montgomery Street (West of GW Memorial Parkway)	Minor Arterial	2	25	Yes	2,000
Montgomery Street (East of GW Memorial Parkway)	Major Collector	2	25	Yes	2,000

*VDOT 2019 AADT shown to reflect pre-COVID-19 traffic conditions

Traffic Volume Assumptions

This section reviews the traffic volume assumptions and methodologies used in the roadway capacity analyses.

Existing Traffic Volumes

Data collection was not possible during Fall 2021 as traffic volumes were not representative of typical traffic conditions due to impacts to travel patterns associated with the COVID-19 public health crisis. In order to establish baseline conditions, the study analyzed morning and afternoon peak hour traffic volumes comprised of turning movement count data collected between 2015-2016, with applied growth based on data collection year. Where historical intersection count data was not available, a methodology using vehicle probe data was applied. The traffic volume sources for each study intersection are summarized below.

Historical Volumes from Approved Transportation Studies

Historical turning movement counts were collected as part of several approved transportation studies in the vicinity of the site in 2015 and 2018. The following intersection(s) are based on available historical volumes:

- GW Memorial Pkwy & Slaters Ln (2015)
- Slaters Ln & W Abingdon Dr (2015)
- Slaters Ln & E Abingdon Dr (2015)
- Slaters Ln & Powhatan St (2018)
- Slaters Ln & Richmond Hwy (2018)
- GW Memorial Pkwy & Bashford Ln (2015)
- Bashford Ln & W Abingdon Dr (2015)
- Bashford Ln & E Abingdon Dr (2015)
- Bashford Ln & N Pitt St (2015)
- Bashford Ln & N Royal St (2015)
- Second St & N Pitt St (2015)
- Second St & E Abingdon Dr (2015)
- First St & N Patrick St (East) (2018)
- First St & N Patrick St (West) (2018)
- N Fayette St & Richmond Hwy (2018)
- First St & N Washington St (2015)
- First St & N St Asaph St (2015)
- First St & N Pitt St (2015)
- Montgomery St & N Fairfax St (2015)
- Montgomery St & N Royal St (2015)
- Montgomery St & N Pitt St (2015)
- Montgomery St & St Asaph St (2015)
- Montgomery St & N Washington St (2015)
- Montgomery St & N Patrick St (2015)
- Montgomery St & Richmond Hwy (2015)
- Madison St & N Washington St (2015)
- Potomac Ave & Richmond Hwy (2018)

StreetLight Volumes

StreetLight Insight® origin and destination data was used to determine traffic patterns during pre-COVID conditions (2019) at intersections without available data. StreetLight metrics are derived from a combination of two types of data: navigation-GPS data and Location Based Services (LBS) data, including historical data, with a sample size of approximately 23% of the adult population. This data is then transformed into contextualized, aggregated, and normalized travel patterns that can be used to create origin and destination analyses. StreetLight data was used to estimate the pre-COVID turning movement ratios at intersections without available count data. Using these turning movement ratios, existing field-collected data at adjacent intersections was extrapolated to estimate the pre-COVID turning movement counts at the following intersections:

- Slaters Ln & Potomac Greens Dr/Portner Rd
- Bashford Ln & Powhatan St
- Third St & N Royal St
- Second St & N Royal St

Baseline conditions were established by projecting the available volumes into existing conditions using the annual growth rate determined during scoping, using StreetLight data to estimate volumes at the intersections without available traffic count data, and balancing volumes between intersections as needed.

Volumes at the following intersections were determined by balancing turning movement counts collected at an adjacent intersection:

- GW Memorial Pkwy & E Abingdon Dr
- Third St & N Fairfax St

The existing turning movement counts are included in the Technical Appendix. The existing peak hour traffic volumes for intersections within the vehicular study area are shown in Figure 28, Figure 29, and Figure 30.

2033 Traffic Volumes

2033 Background Traffic Volumes (without the proposed development)

Traffic projections for the 2033 Background Conditions consist of the existing volumes with two additions:

- Inherent growth on the roadway (representing regional traffic growth); and
- Traffic generated by traffic generated by developments expected to be completed prior to 2033 (representing local traffic growth), known as background developments.

Inherent Growth

While the background developments represent local traffic changes, regional traffic growth is typically accounted for using growth rates. The growth rates used in this analysis were derived using VDOT's Annual Average Daily Traffic (AADT) data and discussions with the City of Alexandria staff during the scoping process. According to historical data, the average historical growth rate on the roadway network surrounding the study area has been low in recent years. As such, a 0.25% growth rate has been assumed for the 2033 scenarios. This growth rate was applied to the thru movements at intersections along Richmond Highway, GW Memorial Parkway, N Patrick Street, N Henry Street, and Slaters Lane between Richmond Highway and GW Memorial Parkway and applied to the movements on Potomac Avenue between the City of Alexandria and Crystal City (i.e., westbound left-turn and northbound right-turn at the intersection of Richmond Highway and Potomac Avenue within the study area). The traffic volumes generated by the inherent growth along the network are shown in Figure 31, Figure 32, and Figure 33.

Background Developments

Following industry methodologies, a background development must meet the following criteria to be incorporated into the analysis:

- Be located in the study area, defined as having an origin or destination point within the cluster of study area intersections;
- Have entitlements; and

- Have a construction completion date prior or close to the proposed development.

Based on these criteria, 13 developments were included in the 2033 Background Conditions scenario. These developments are:

55. 1101 N Washington Street – Old Colony Inn Redevelopment
56. 901/925 N Fairfax Street – Crowne Plaza Redevelopment
57. 600 N Royal Street – Royal Street Bus Garage
58. 1200 N Fayette Street – Braddock Gateway (Phase II & III)
59. 1201 N Royal Street – The Muse
60. 1200 N Henry Street
61. 900 N Henry Street – Carpenter's Shelter Redevelopment
62. 801 N Fairfax Street
63. 802 N Washington Street – Towne Motel
64. Gables Old Town North
65. Towngate North
66. North Potomac Yard
67. Oakville Triangle

The location of the background developments included in the 2033 Background Conditions scenario in relation to the proposed PRGS development is shown on Figure 34. Transportation studies were available for several of the developments included in the 2033 Background Conditions. Trip generation was determined using ITE's Trip Generation, 11th Edition if a study was not available. Details on each of the background developments included in the 2033 Background Conditions are presented below:

1. **1101 N Washington Street – Old Colony Inn Redevelopment:** Located at 1101 N Washington Street in Alexandria, Virginia, the approved Old Colony Inn redevelopment will renovate the existing 49 hotel rooms to include approximately 95 hotel rooms and 19 townhouses. The development is currently under construction and is expected to be complete and occupied by 2022. North Potomac Yard is expected to generate 26 weekday AM peak hour net new vehicle trips and 30 weekday PM peak hour net new vehicle trips based on the Traffic Impact Study prepared by Wells + Associates dated November 19, 2015.
2. **901/925 N Fairfax Street – Crowne Plaza Redevelopment:** Located at 901 and 925 N Fairfax Street in Alexandria, Virginia, the approved Crowne Plaza development will improve upon the existing 256-room hotel with approximately 119 residential dwelling units, 41 townhouses, and 7,000 square feet of theater space. The development is currently under construction and is expected

to be complete and occupied by 2022. To determine the number of trips generated by development, ITE's Trip Generation, 11th Edition was used, with mode splits based on those assumed for the proposed development. The Crowne Plaza redevelopment is expected to generate -28 weekday AM peak hour net new vehicle trips and -41 weekday PM peak hour net new vehicle trips.

3. **600 N Royal Street – Royal Street Bus Garage:** Located at 600 N Royal Street in Alexandria, Virginia, the approved Royal Street Bus Garage redevelopment will raze the existing WMATA bus garage and improve upon the site with approximately 288 residential dwelling units. The development is currently under construction and is expected to be complete and occupied by 2022. The Royal Street Bus Garage redevelopment is expected to generate 76 weekday AM peak hour net new vehicle trips and 95 weekday PM peak hour net new vehicle trips based on the Traffic Impact Study prepared by Wells + Associates dated October 15, 2018.
4. **1200 N Fayette Street – Braddock Gateway (Phase II & III):** Located at 1200 N Fayette Street in Alexandria, Virginia, the approved Braddock Gateway development will raze the existing vacant warehouse space and improve upon the site with approximately 628 residential dwelling units and 10,700 square feet of retail. The development is currently under construction and is expected to be complete and occupied by 2022. Braddock Gateway (Phase II & III) is expected to generate 253 weekday AM peak hour net new vehicle trips and 343 weekday PM peak hour net new vehicle trips based on the Traffic Impact Study prepared by Gorove Slade dated March 2, 2016 and the Trip Generation Comparison Memorandum prepared by Gorove Slade dated June 20, 2018.
5. **1201 N Royal Street – The Muse:** Located at 1201 N Royal Street in Alexandria, Virginia, the Muse development was approved to improve upon the existing 3,250 square feet of arts space with approximately 90 residential dwelling units and 5,700 square feet of arts space. The development is currently under construction and is expected to be complete and occupied by 2022. To determine the number of trips generated by development, ITE's Trip Generation, 11th Edition was used, with mode splits based on those assumed for the proposed development. The Muse is expected to generate 18 weekday AM peak hour net new vehicle trips and 18 weekday PM peak hour net new vehicle trips.
6. **1200 N Henry Street:** Located at 1200 N Henry Street in Alexandria, Virginia, the approved 1200 N Henry Street redevelopment will raze the existing industrial site and improve upon the site with approximately 115 residential dwelling units, 17,000 square feet of retail, and a 10,000 square foot daycare center. The development is expected to be complete prior to 2033. The 1200 N Henry Street redevelopment is expected to generate 114 weekday AM peak hour net new vehicle trips and 148 weekday PM peak hour net new vehicle trips based on the Traffic Impact Study prepared by Wells + Associates dated May 9, 2018.
7. **900 N Henry Street – Carpenter's Shelter Redevelopment:** Located at 900 N Henry Street in Alexandria, Virginia, the approved Carpenter's Shelter redevelopment will improve upon the existing site with approximately 90 residential dwelling units and a 60-bed purpose-built homeless shelter. The development was completed in 2020. To determine the number of trips generated by development, ITE's Trip Generation, 11th Edition was used, with mode splits based on those assumed for the proposed development. The Carpenter's Shelter Redevelopment is expected to generate 23 weekday AM peak hour net new vehicle trips and 26 weekday PM peak hour net new vehicle trips.
8. **801 N Fairfax Street:** Located at 802 N Washington Street in Alexandria, Virginia, the existing vacant office building was approved to be demolished and reconstructed as 54 residential dwelling units. The redevelopment is currently under construction and is expected to be complete prior to 2033. To determine the number of trips generated by development, ITE's Trip Generation, 11th Edition was used, with mode splits based on those assumed for the proposed development. The 801 N Fairfax Street redevelopment is expected to generate 10 weekday AM peak hour net new vehicle trips and 11 weekday PM peak hour net new vehicle trips.
9. **Towne Motel:** Located at 801 N Fairfax Street in Alexandria, Virginia, the approved Towne Motel redevelopment will raze the existing 26-room motel improve upon the site with approximately 98 hotel rooms. The redevelopment is currently under construction and is expected to be complete by 2022. To determine the number of trips generated by development, ITE's Trip Generation, 11th Edition was used, with mode splits based on those assumed for the proposed development. The Towne Motel

redevelopment is expected to generate 18 weekday AM peak hour net new vehicle trips and 24 weekday PM peak hour net new vehicle trips.

10. **Gables Old Town North:** Located at 525 Montgomery Street in Alexandria, Virginia, the approved Gables Old Town North redevelopment will raze the existing retail and grocer space and improve upon the site with approximately 232 residential dwelling units and 51,000 square feet of retail. The redevelopment was completed in 2019. To determine the number of trips generated by development, ITE's Trip Generation, 11th Edition was used, with mode splits based on those assumed for the proposed development. The Gables Old Town North redevelopment is expected to generate 13 weekday AM peak hour net new vehicle trips and -38 weekday PM peak hour net new vehicle trips.
11. **Towngate North:** Located at 802 N Washington Street in Alexandria, Virginia, the existing office buildings was approved to be demolished and reconstructed as 81 residential dwelling units. The redevelopment is expected to be complete by 2023. To determine the number of trips generated by development, ITE's Trip Generation, 11th Edition was used, with mode splits based on those assumed for the proposed development. The Towngate North redevelopment is expected to generate -49 weekday AM peak hour net new vehicle trips and -49 weekday PM peak hour net new vehicle trips.
12. **North Potomac Yard:** Located in the northeast corner of the City of Alexandria, the approved North Potomac Yard development will improve upon the existing retail site with approximately 7.5 million square feet of development, consisting of hotel, office, residential, and retail space. Phase I of the development is planned to be built out by 2021, with full build-out expected to be complete prior to 2033. North Potomac Yard is expected to generate 2,704 weekday AM peak hour net new vehicle trips and 3,392 weekday PM peak hour net new vehicle trips based on the Traffic Impact Study prepared by Kimley-Horn dated May 2017.
13. **Oakville Triangle:** Located in the northeast corner of the City of Alexandria, the approved Oakville Triangle development will improve upon the existing industrial site with the addition of approximately 1,074 residential dwelling units, 150 hotel rooms, 85,400 square feet of retail, and

56,900 square feet of restaurant space. Full build-out of the development is expected to be complete prior to 2033.

Oakville Triangle is expected to generate 311 weekday AM peak hour net new vehicle trips and 313 weekday PM peak hour net new vehicle trips based on the Traffic Impact Study prepared by Kimley-Horn dated March 6, 2015.

Trip generation assumptions for the background developments are shown in Table 23. For background developments with existing uses, the existing site trips were removed from the network based on the distributions assumed for the proposed PRGS development and the proposed site trips were added to the network, rather than applying a delta between existing and proposed trip generation. The background development peak hour traffic volumes are shown in Figure 35, Figure 36, and Figure 37.

2033 Future Traffic Volumes (with the proposed development)

The 2033 Future Conditions traffic volumes consist of the 2033 Background volumes with the addition of the traffic volumes generated by the proposed development (site-generated trips), shown in Table 15. Thus, the 2033 Future Conditions traffic volumes include traffic generated by: the existing volumes, inherent growth, background developments, and the proposed development.

Trip distribution and assignments for site-generated traffic was primarily determined using CTPP TAZ data, existing and anticipated future travel patterns in the study area, and the location of the parking access. The origin of outbound and destination of inbound vehicular trips were the access points to the below-grade parking garage located within the new internal roadway network, accessed from Slaters Lane, N Royal Street, and N Fairfax Street. A summary of trip distribution assumptions is shown on Figure 24 for the inbound distribution assumptions and on Figure 25 for the outbound distribution assumptions. Trip distribution and assignment assumptions were vetted and approved by the City of Alexandria.

Based on the trip distribution and assignment assumptions, site-generated trips were distributed through the study area intersections. The site-generated traffic volumes for the 2033 horizon year are shown on Figure 41, Figure 42, and Figure 43. Grocer pass-by volumes are shown on Figure 44, Figure 45, and Figure 46. The 2033 Future Conditions traffic volumes, which are comprised of existing volumes, inherent growth, background

developments, and the proposed development are shown on Figure 47, Figure 48, and Figure 49.

Table 23: Traffic Generated by Background Developments

Development	Trip Generation					
	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
1101 N Washington Street - Old Colony Inn Redevelopment¹						
Total New Vehicle Trips	15	11	26	16	14	30
901/925 N Fairfax Street - Crowne Plaza Redevelopment²						
Total New Vehicle Trips	-24	-4	-28	-18	-23	-41
600 N Royal Street - Royal Street Bus Garage³						
Total New Vehicle Trips	20	56	76	58	37	95
1200 N Fayette Street - Braddock Gateway Phase II⁴						
Total New Vehicle Trips	31	109	140	122	79	201
1200 N Fayette Street - Braddock Gateway Phase III⁵						
Total New Vehicle Trips	23	90	113	91	51	142
1201 N Royal Street⁶						
Total New Vehicle Trips	5	13	18	11	7	18
1200 N Henry Street⁷						
Total New Vehicle Trips	54	60	114	74	74	148
900 N Henry Street - Carpenter's Shelter Redevelopment⁸						
Total New Vehicle Trips	7	16	23	14	12	26
801 N Fairfax Street⁹						
Total New Vehicle Trips	3	7	10	7	4	11
Towne Motel¹⁰						
Total New Vehicle Trips	12	6	18	12	12	24
Gables Old Town North¹¹						
Total New Vehicle Trips	-6	19	13	-14	-24	-38
Towngate North¹²						
Total New Vehicle Trips	-52	3	-49	0	-49	-49
North Potomac Yard¹³						
Total New Vehicle Trips	1,810	894	2,704	1,257	2,135	3,392
Oakville Triangle¹⁴						
Total New Vehicle Trips	104	207	311	195	118	313
Total New Background Trips	2,002 veh/hr	1,487 veh/hr	3,489 veh/hr	1,825 veh/hr	2,447 veh/hr	4,272 veh/hr

(1) Extracted from 1101 N Washington Street TIS (11.19.2015) prepared by Wells + Associates

(2) Determined based on ITE Trip Generation, 11th Edition

(3) Extracted from 600 N Royal Street TIS (10.16.2018) prepared by Wells + Associates

(4) Extracted from Braddock Gateway TIS (3.2.2016) prepared by Gorove Slade and Braddock Gateway Trip Generation Comparison Memorandum (6.20.2018) prepared by Gorove Slade

(5) Extracted from Braddock Gateway TIS (3.2.2016) prepared by Gorove Slade and Braddock Gateway Trip Generation Comparison Memorandum (6.20.2018) prepared by Gorove Slade

(6) Determined based on ITE Trip Generation, 11th Edition

(7) Extracted from 1200 N Henry Street TIS (5.9.2018) prepared by Wells + Associates

(8) Determined based on ITE Trip Generation, 11th Edition(9) Determined based on ITE Trip Generation, 11th Edition(10) Determined based on ITE Trip Generation, 11th Edition(11) Determined based on ITE Trip Generation, 11th Edition(12) Determined based on ITE Trip Generation, 11th Edition

(13) Extracted from North Potomac Yard MTS (May 2017) prepared by Kimley-Horn

(14) Extracted from Oakville Triangle TIS (3.6.2015) prepared by Kimley-Horn

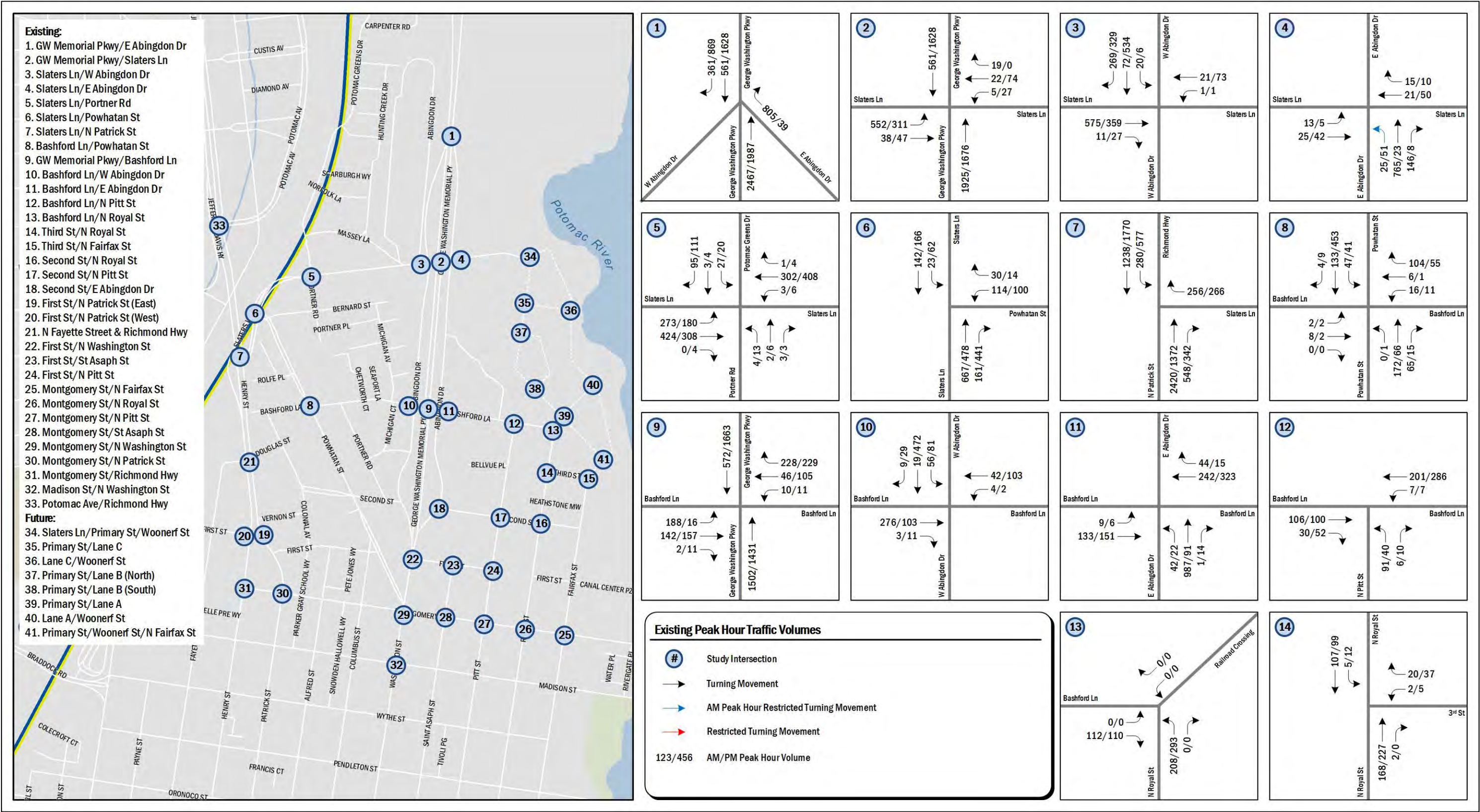


Figure 28: Existing Peak Hour Traffic Volumes (Intersections 1 – 14)

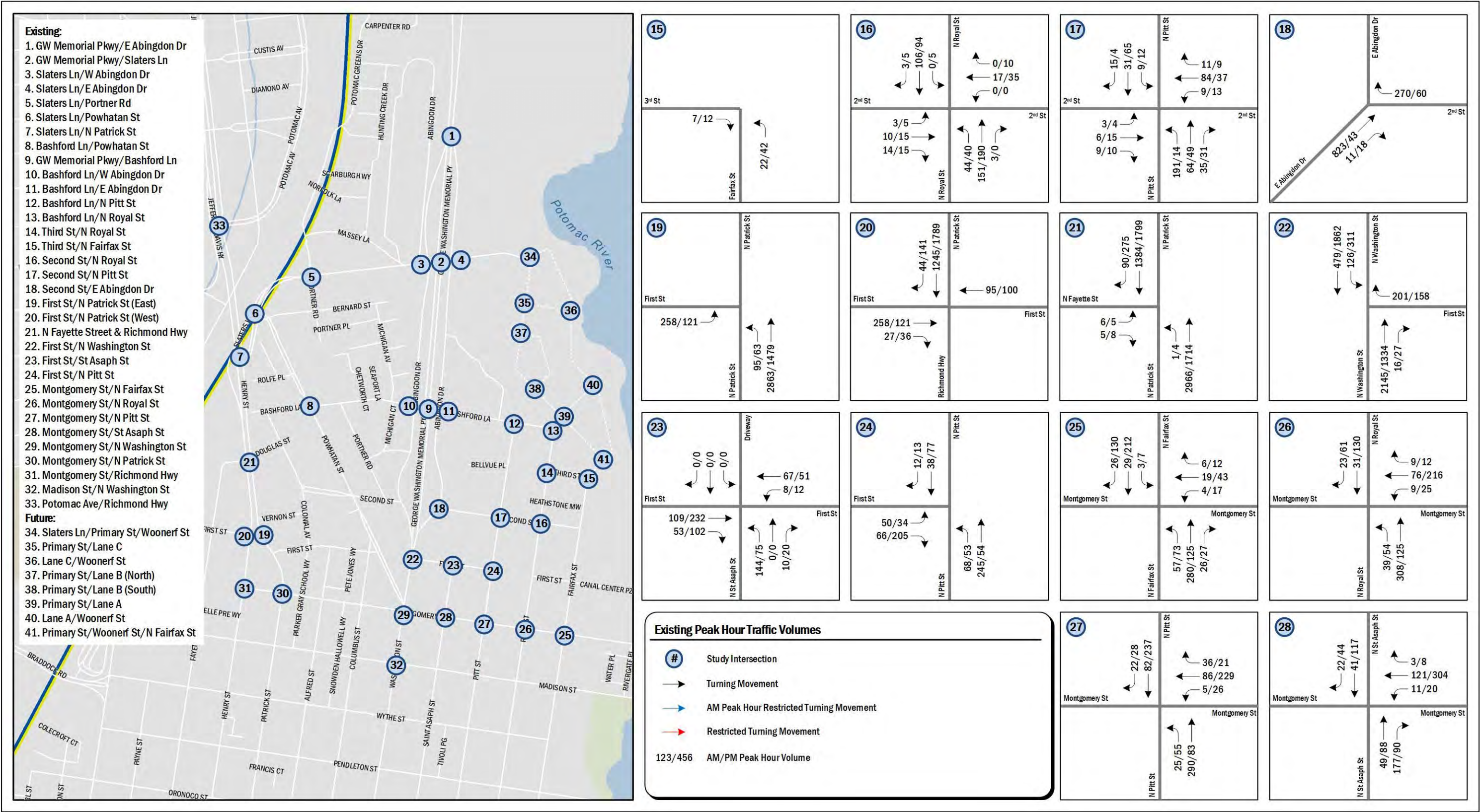


Figure 29: Existing Peak Hour Traffic Volumes (Intersections 15 – 28)



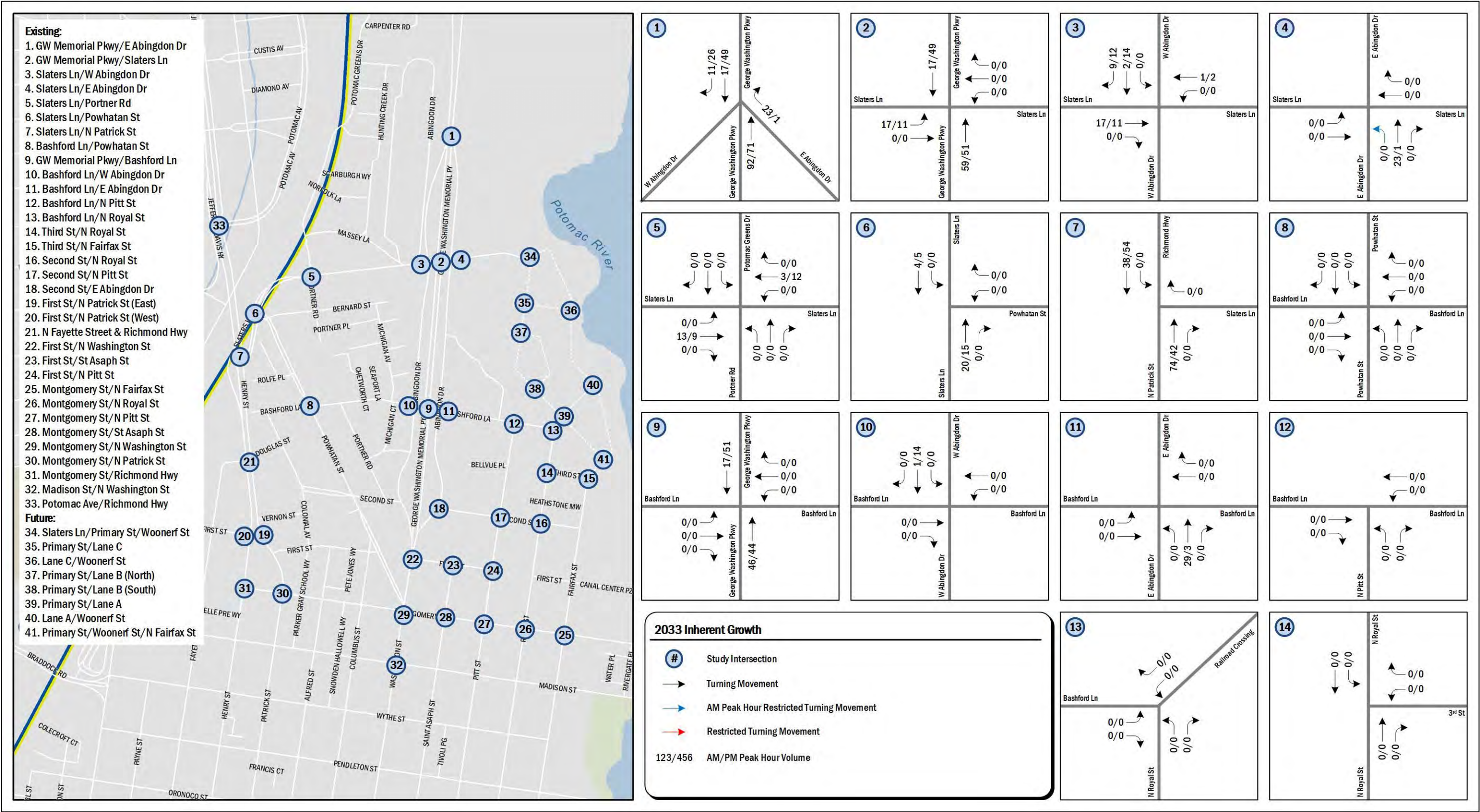


Figure 31: 2033 Inherent Growth (Intersections 1 – 14)

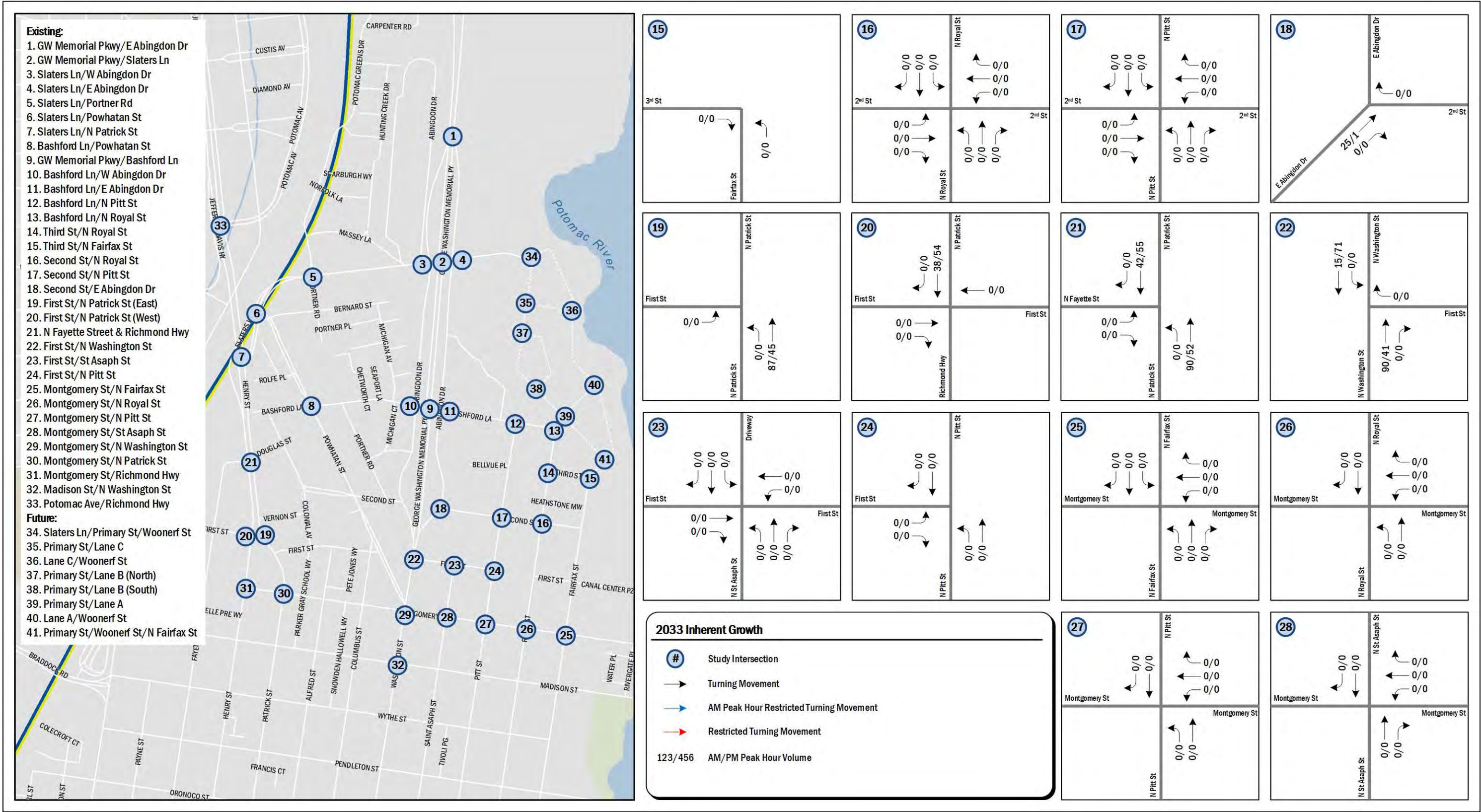


Figure 32: 2033 Inherent Growth (Intersections 15 – 28)



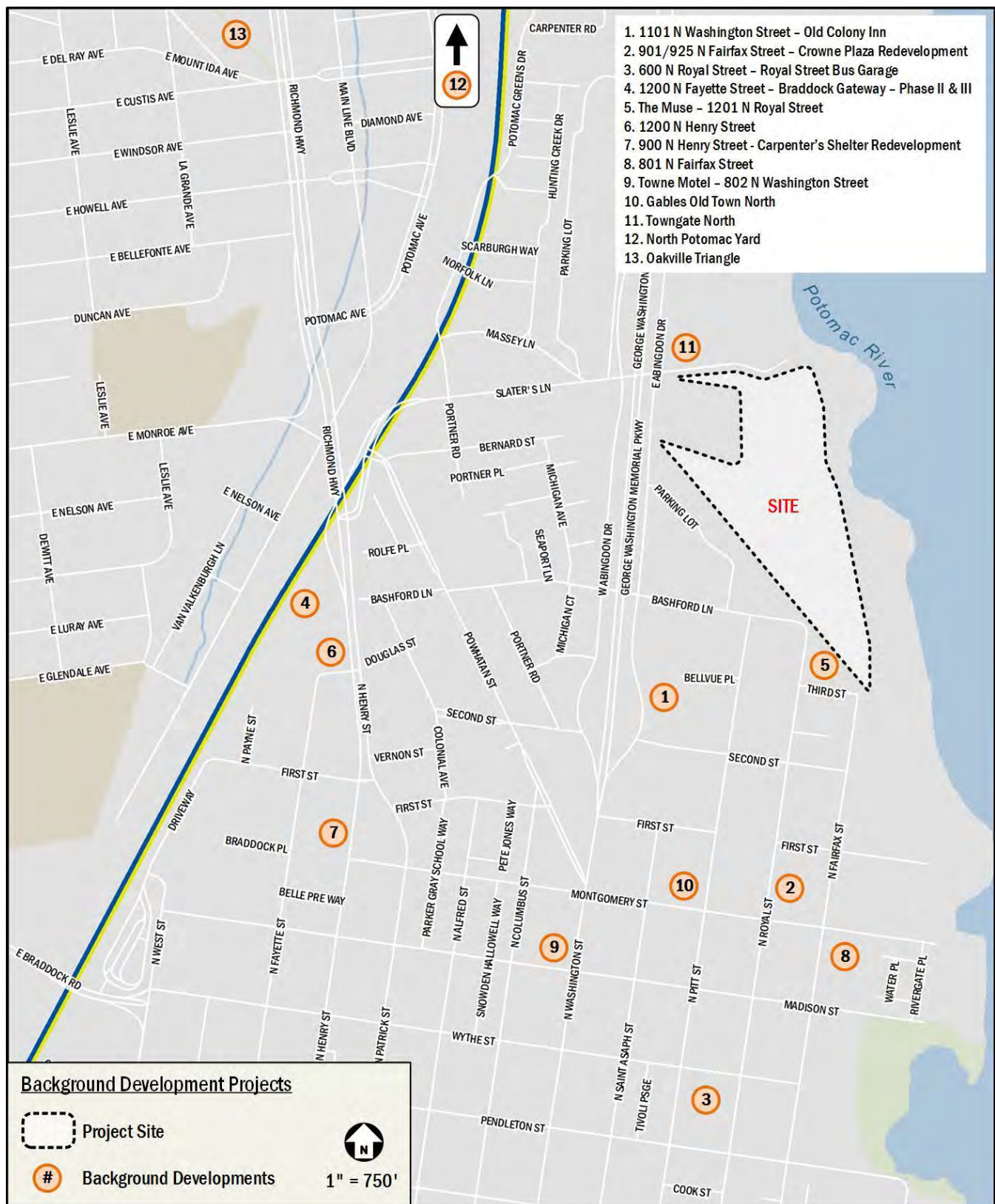


Figure 34: 2033/2039 Future Background Developments

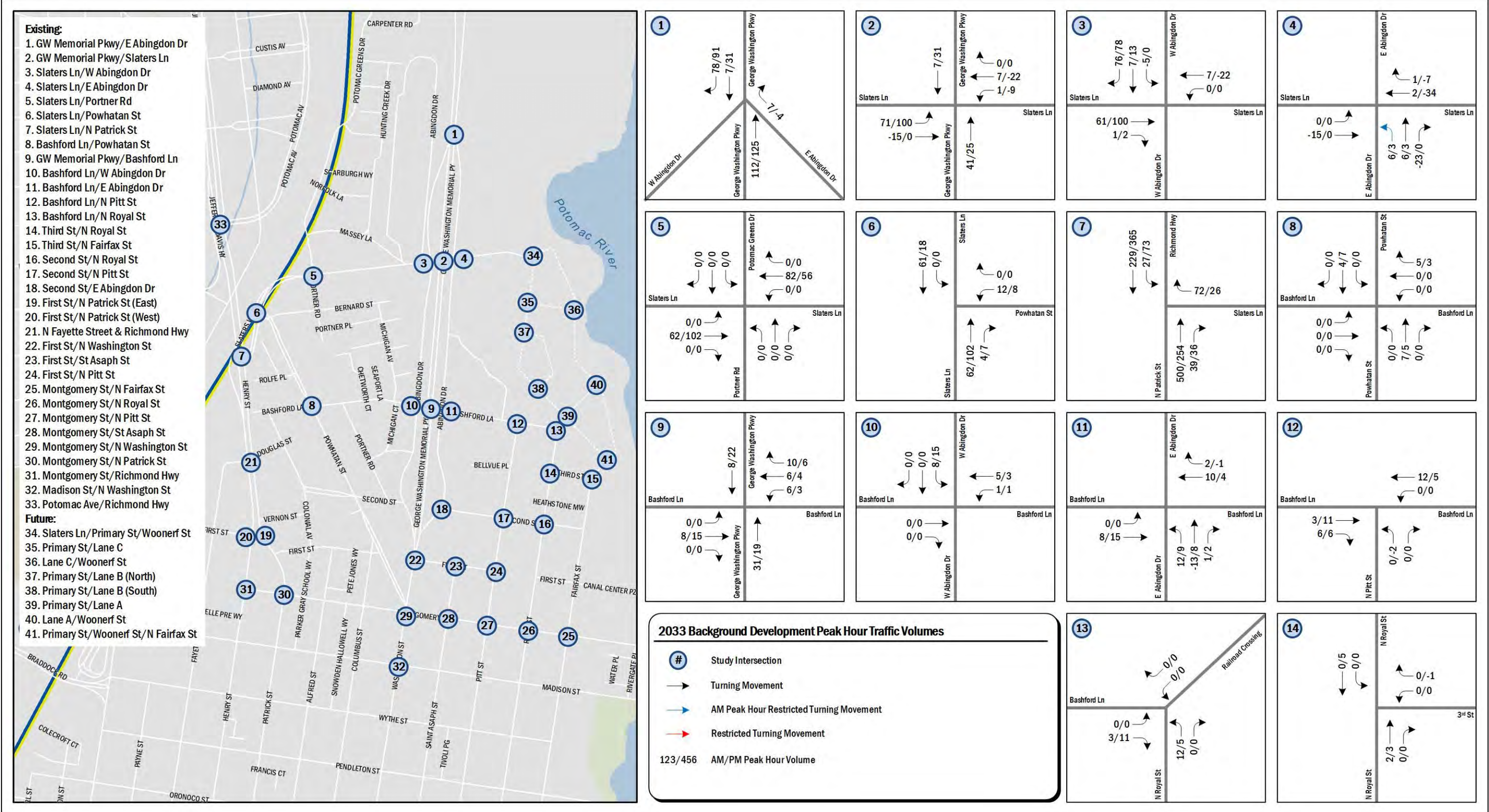
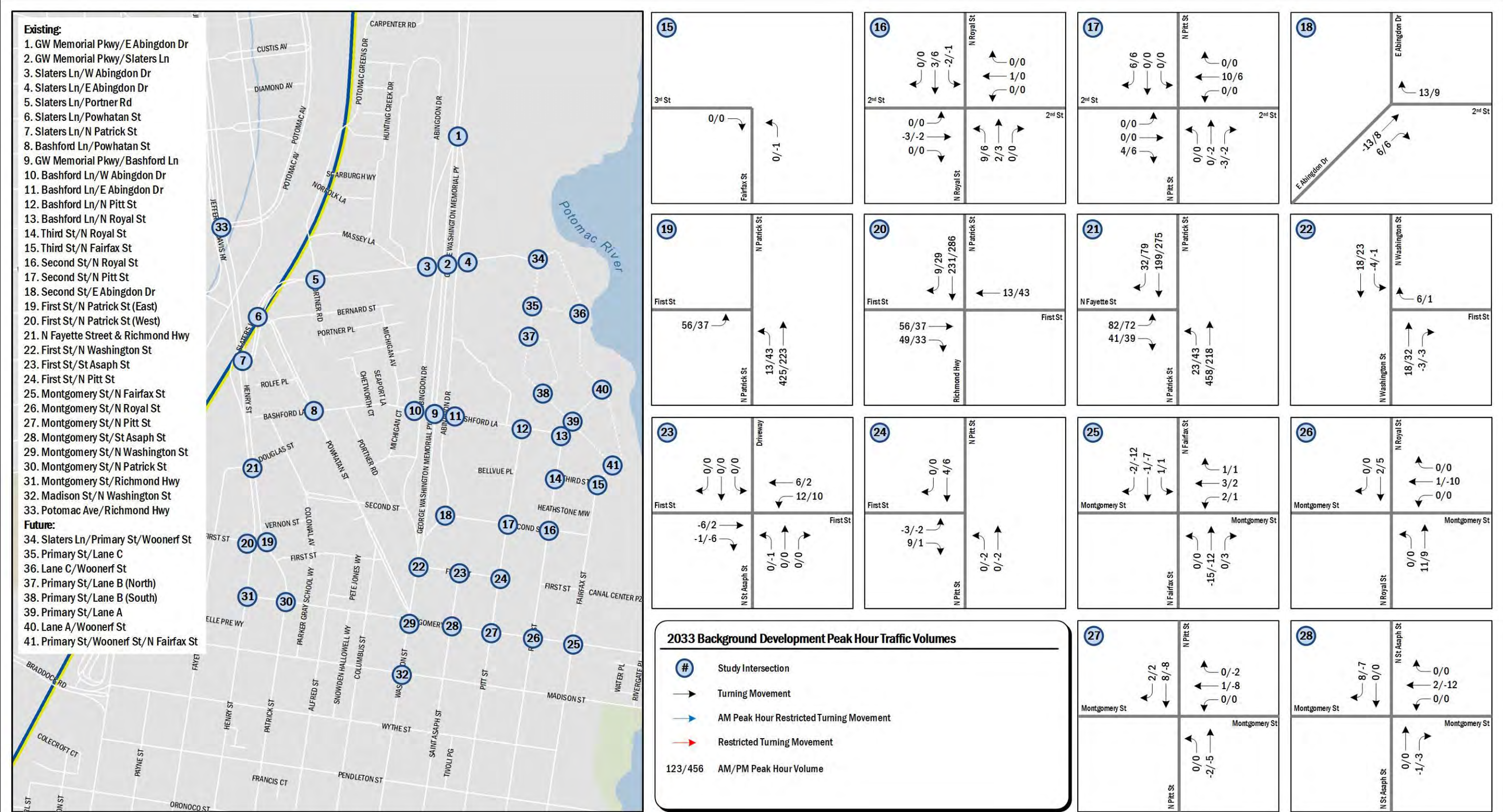
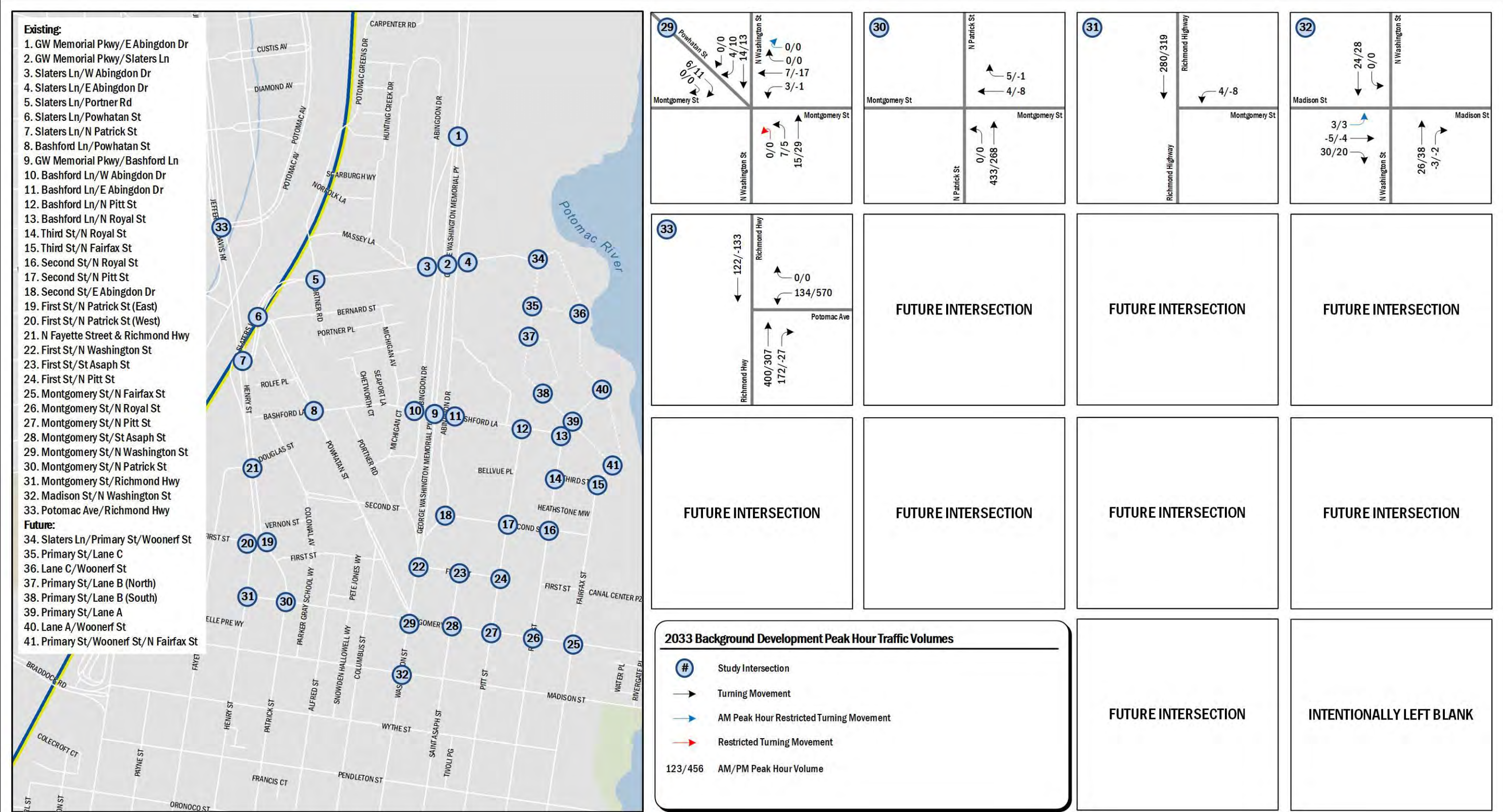


Figure 35: 2033 Background Development Peak Hour Traffic Volumes (Intersections 1 – 14)





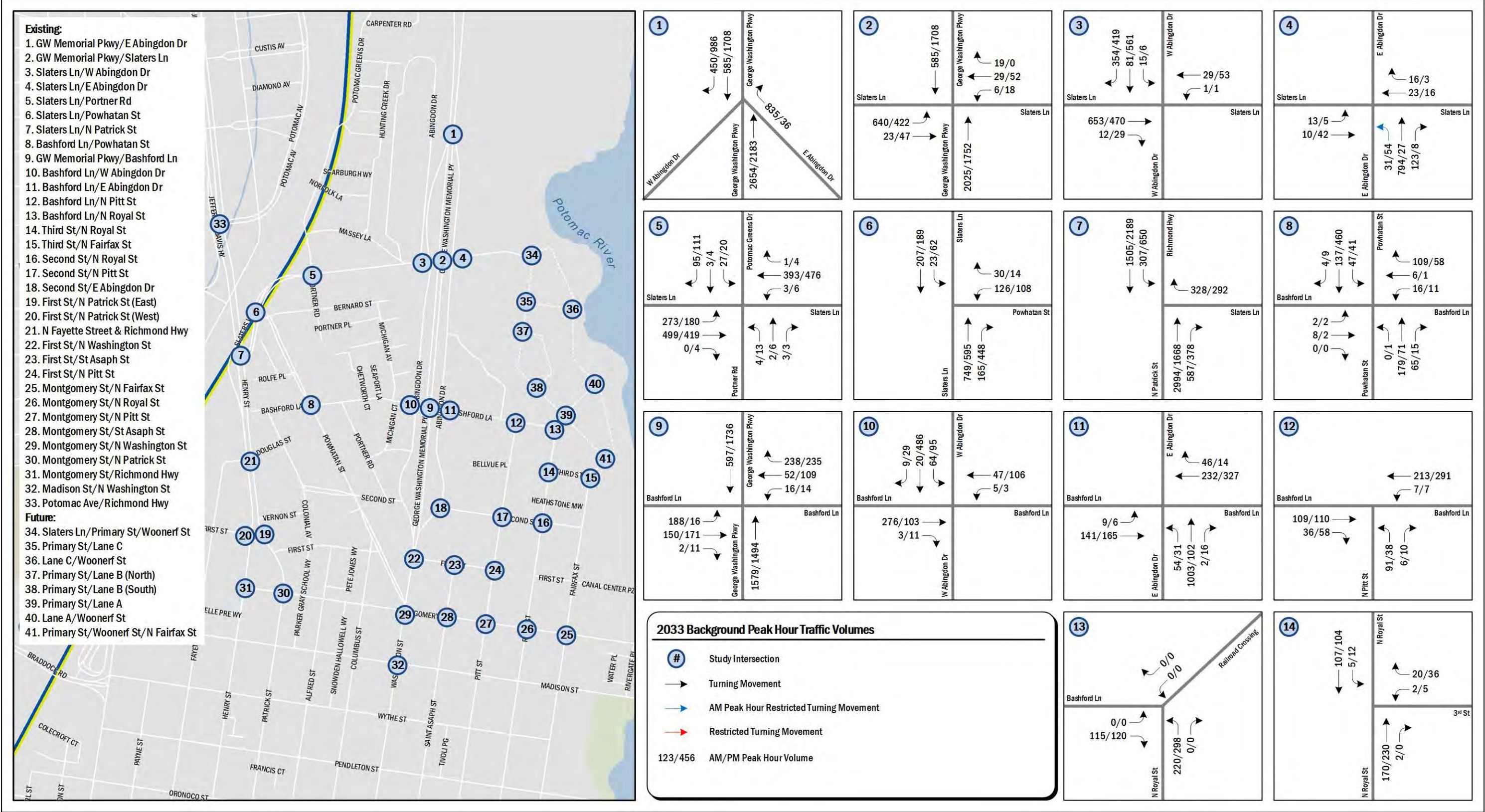


Figure 38: 2033 Background Peak Hour Traffic Volumes (Intersections 1 – 14)





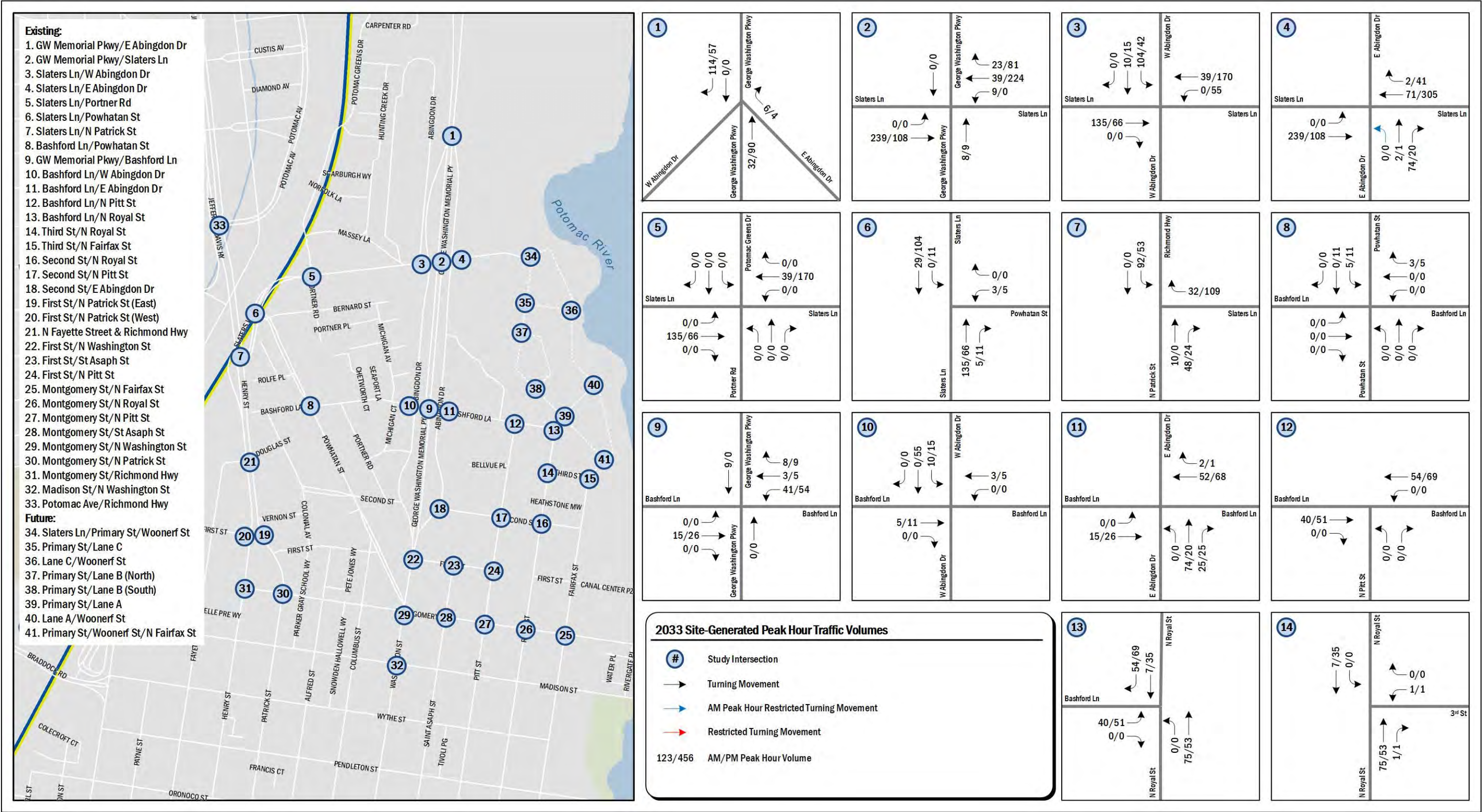
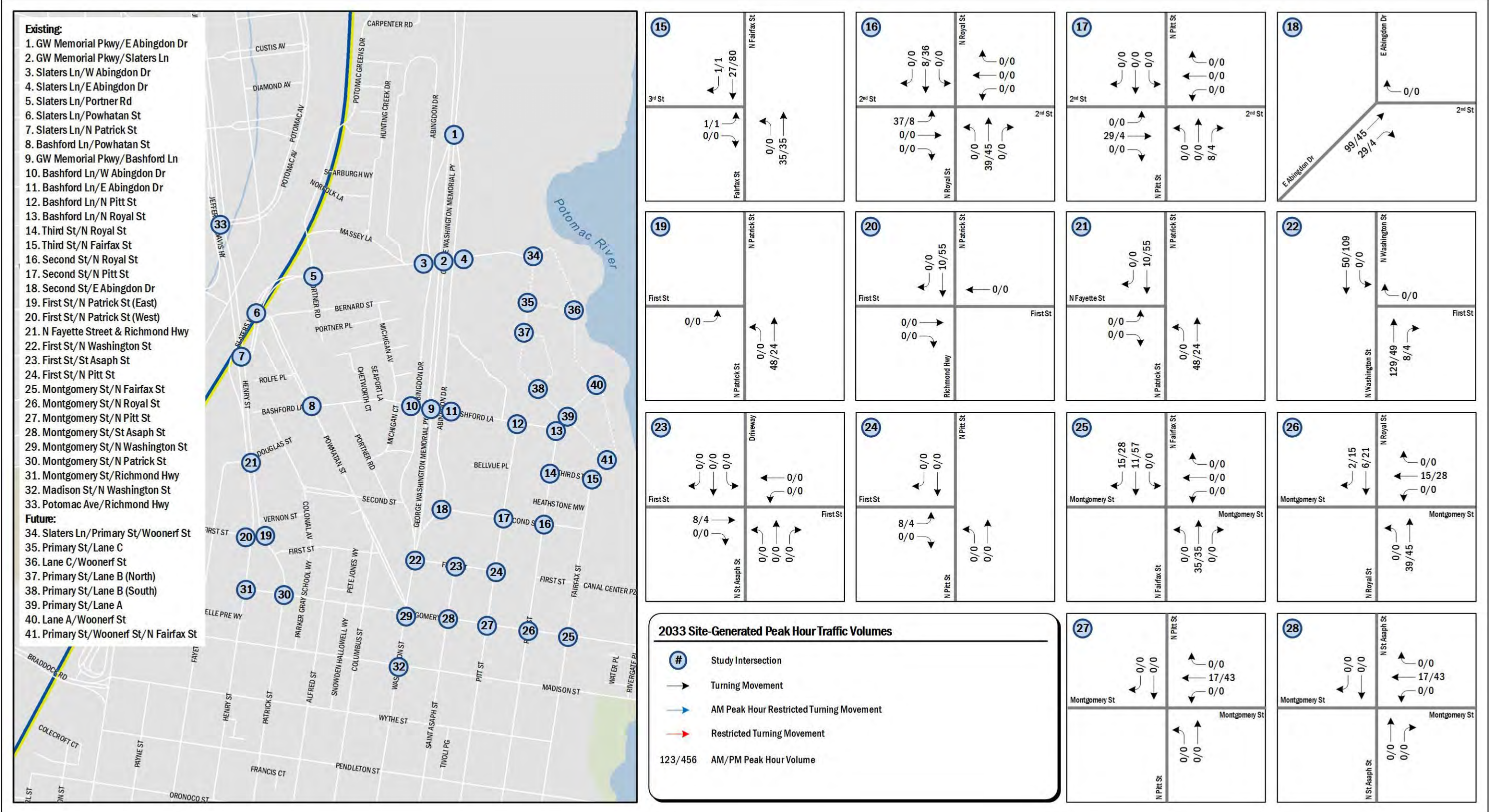
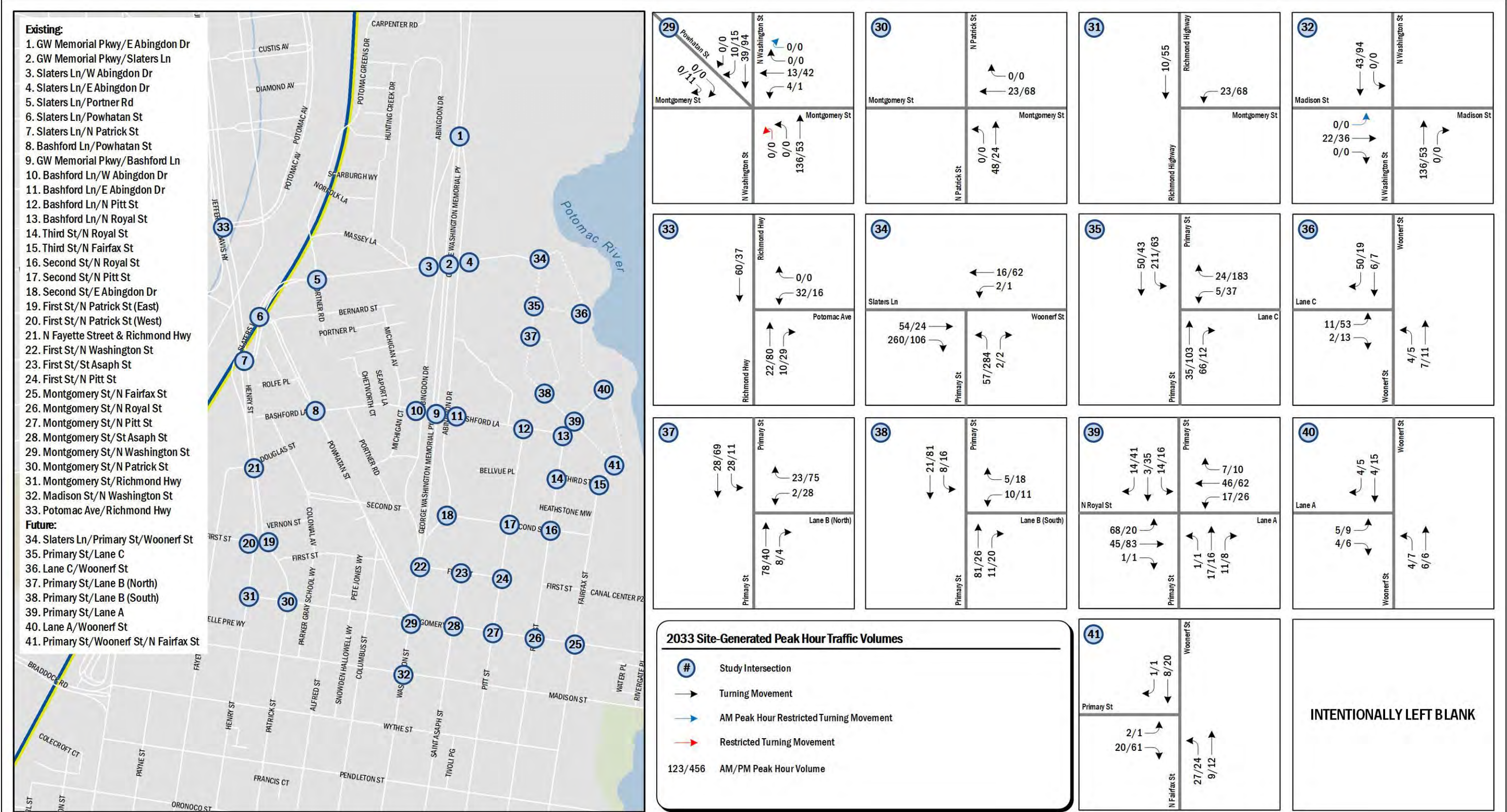


Figure 41: 2033 Site-Generated Peak Hour Traffic Volumes (Intersections 1 – 14)











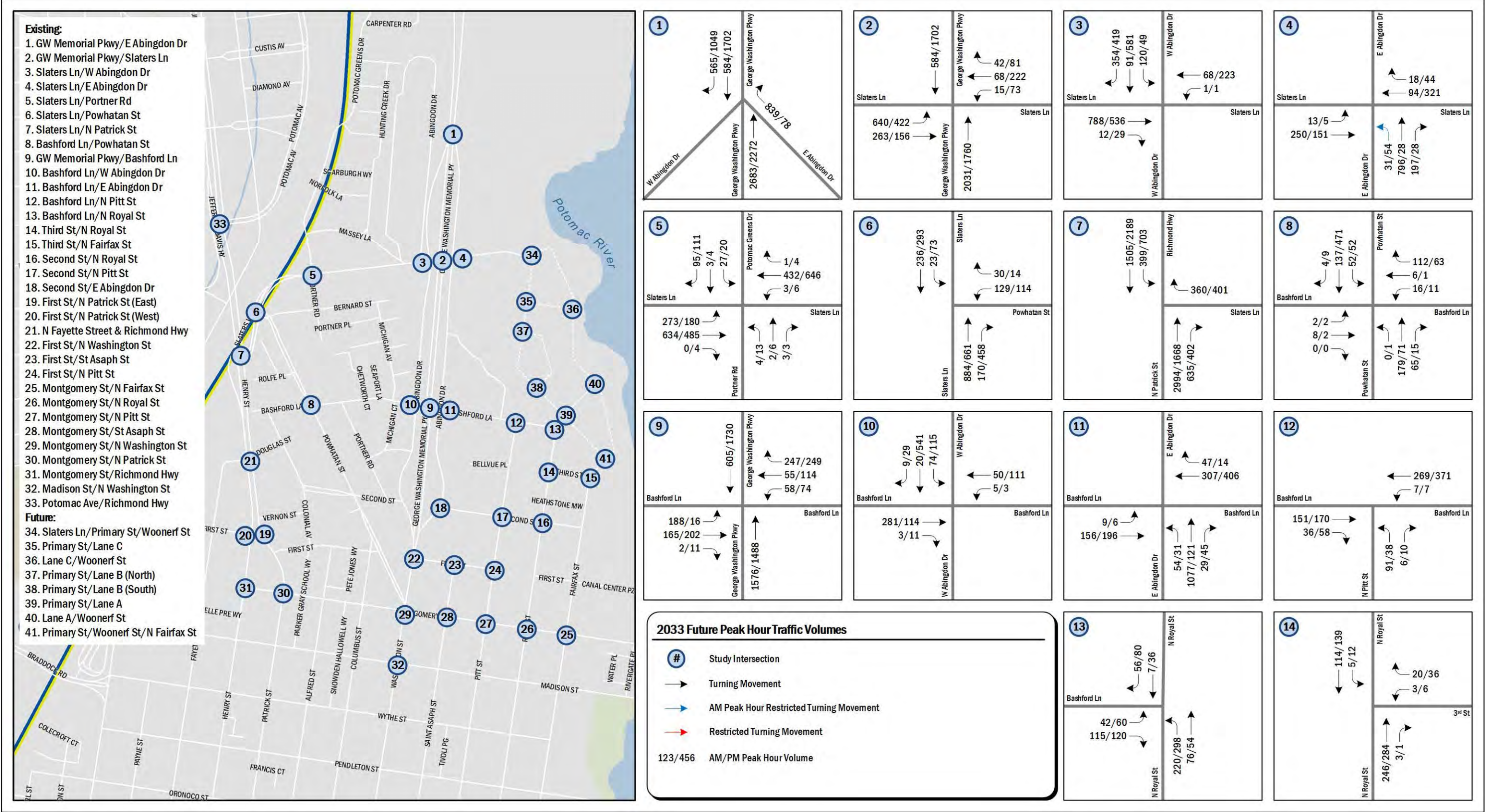


Figure 47: 2033 Future Peak Hour Traffic Volumes (Intersections 1 – 14)



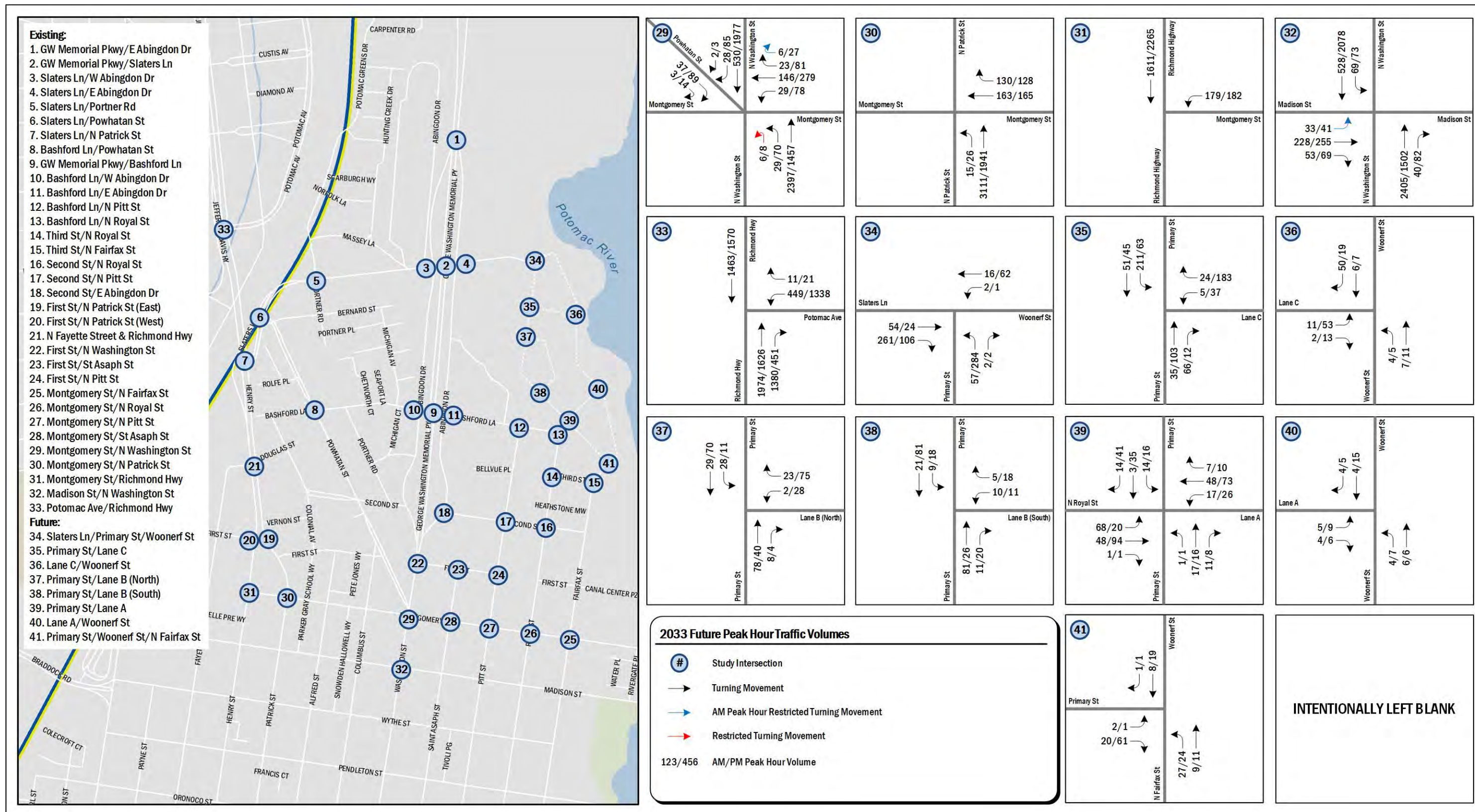


Figure 49: 2033 Future Peak Hour Traffic Volumes (Intersections 29 – 41)

2039 Traffic Volumes

2039 Background Traffic Volumes (without the proposed development)

Traffic projections for the 2039 Background Conditions consist of the existing volumes with two additions:

- Inherent growth on the roadway (representing regional traffic growth); and
- Traffic generated by traffic generated by developments expected to be completed prior to 2039 (representing local traffic growth), known as background developments.

Inherent Growth

While the background developments represent local traffic changes, regional traffic growth is typically accounted for using growth rates. The growth rates used in this analysis were derived using VDOT's Annual Average Daily Traffic (AADT) data and discussions with the City of Alexandria staff during the scoping process. According to historical data, the average historical growth rate on the roadway network surrounding the study area has been low in recent years. As such, a 0.25% growth rate has been assumed for the 2039 scenarios. This growth rate was applied to the thru movements at intersections along Richmond Highway, GW Memorial Parkway, N Patrick Street, N Henry Street, and Slaters Lane between Richmond Highway and GW Memorial Parkway and applied to the movements on Potomac Avenue between the City of Alexandria and Crystal City (i.e., westbound left-turn and northbound right-turn at the intersection of Richmond Highway and Potomac Avenue within the study area). The traffic volumes generated by the inherent growth along the network are shown in Figure 50, Figure 51, and Figure 52.

Background Developments

Following industry methodologies, a background development must meet the following criteria to be incorporated into the analysis:

- Be located in the study area, defined as having an origin or destination point within the cluster of study area intersections;
- Have entitlements; and
- Have a construction completion date prior or close to the proposed development.

Based on these criteria, no additional developments were included in the 2039 Background Conditions scenario. All background developments are consistent with that assumed under 2033 Background conditions and are detailed in the previous section.

The location of the background developments included in the 2039 Background Conditions scenario in relation to the proposed PRGS development is shown on Figure 34. Trip generation assumptions for the background developments are shown in Table 23. The background development peak hour traffic volumes are shown in Figure 53, Figure 54, and Figure 55.

2039 Future Traffic Volumes (with the proposed development)

The 2039 Future Conditions traffic volumes consist of the 2039 Background volumes with the addition of the traffic volumes generated by the proposed development (site-generated trips), shown in Table 15. Thus, the 2039 Future Conditions traffic volumes include traffic generated by: the existing volumes, inherent growth, background developments, and the proposed development.

Trip distribution and assignments for site-generated traffic is consistent with that assumed under 2033 Future Conditions. The site-generated traffic volumes for the 2039 horizon year are shown on Figure 59, Figure 60, and Figure 61. Grocer pass-by volumes are shown on Figure 62, Figure 63, and Figure 64. Site trip assignment for the 2039 Future Conditions is consistent with that assumed under 2033 Future Conditions. The 2039 Future Conditions traffic volumes, which are comprised of existing volumes, inherent growth, background developments, and the proposed development are shown on Figure 65, Figure 66, and Figure 67.

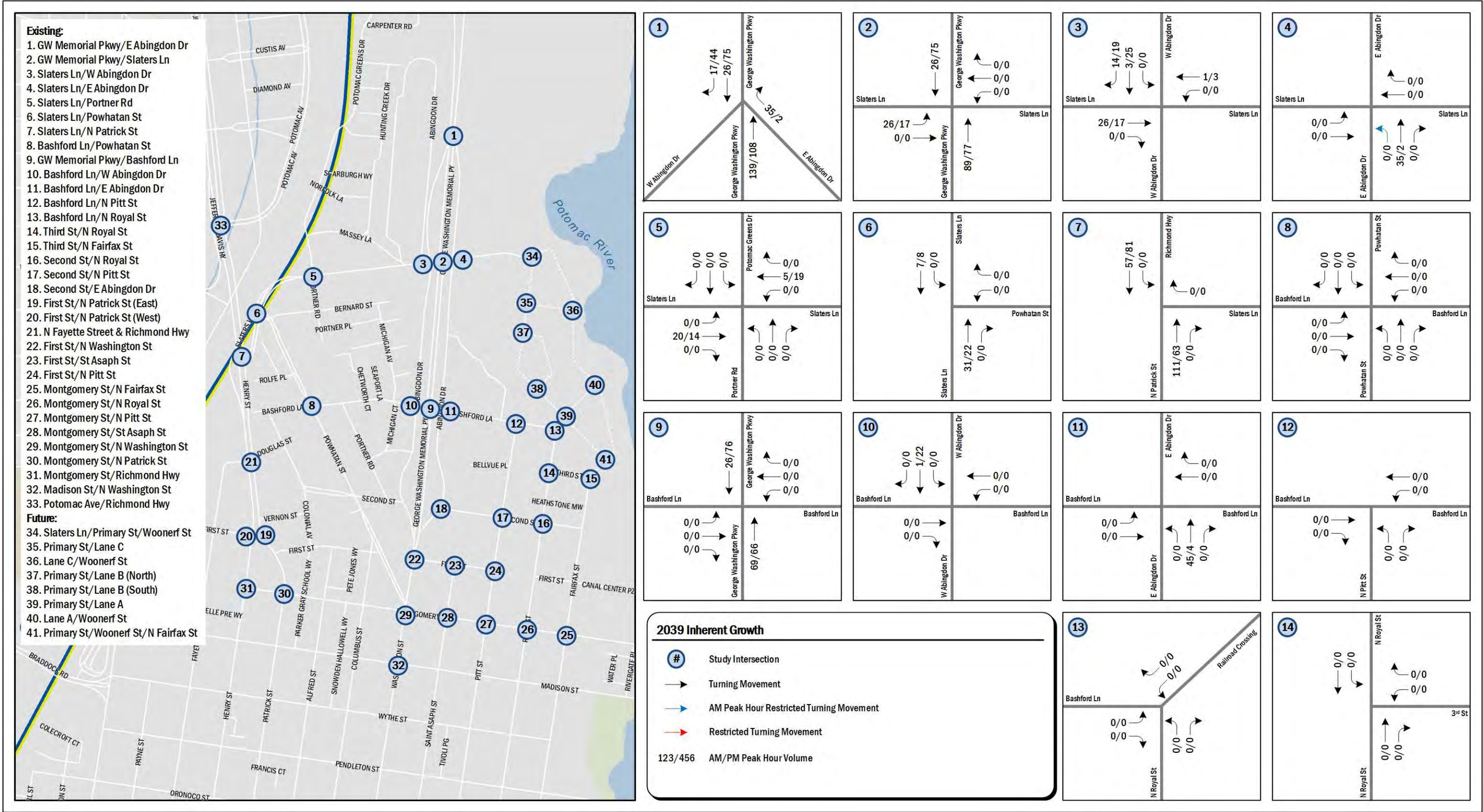


Figure 50: 2039 Inherent Growth (Intersections 1 – 14)

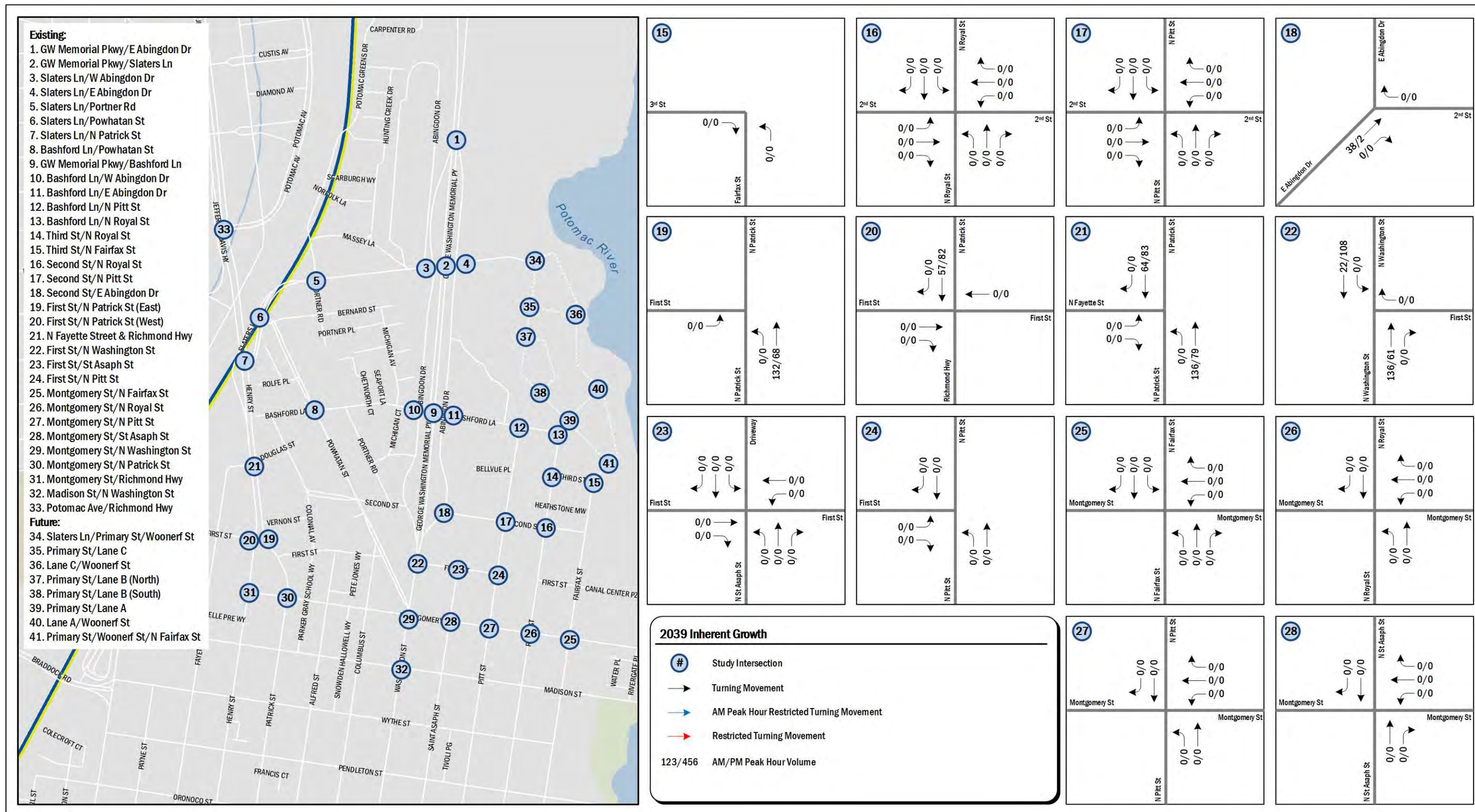
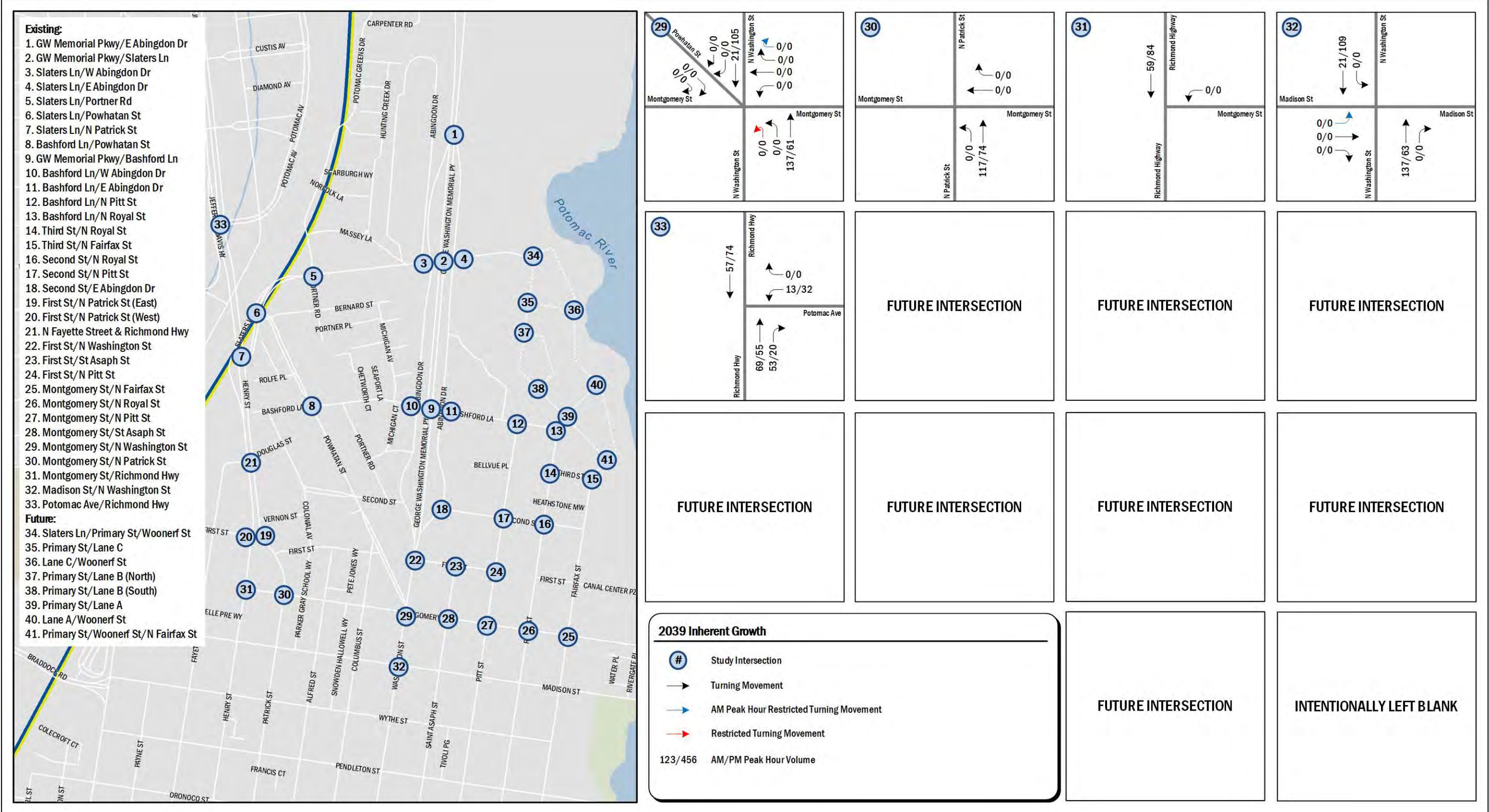


Figure 51: 2039 Inherent Growth (Intersections 15 – 28)



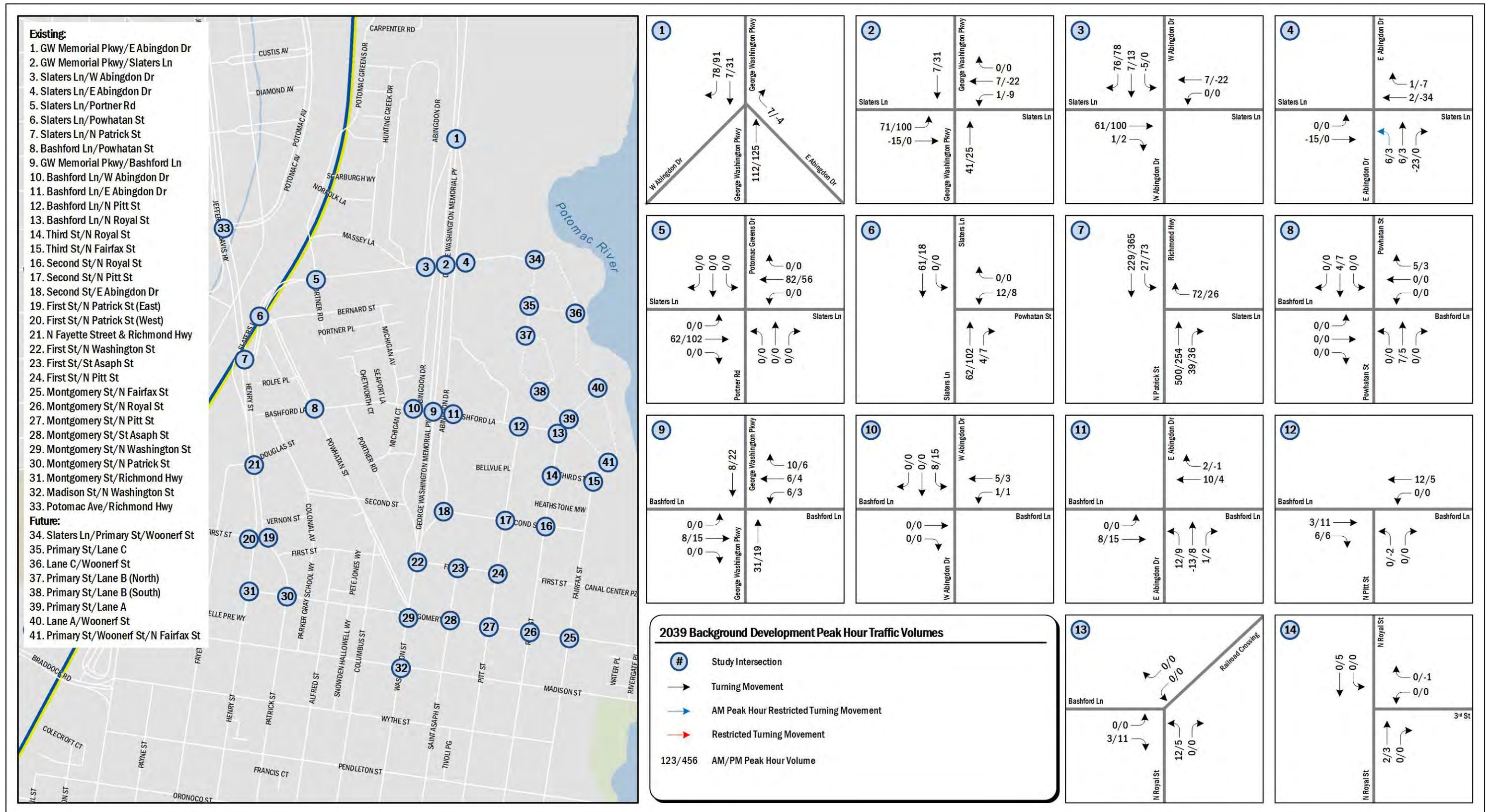
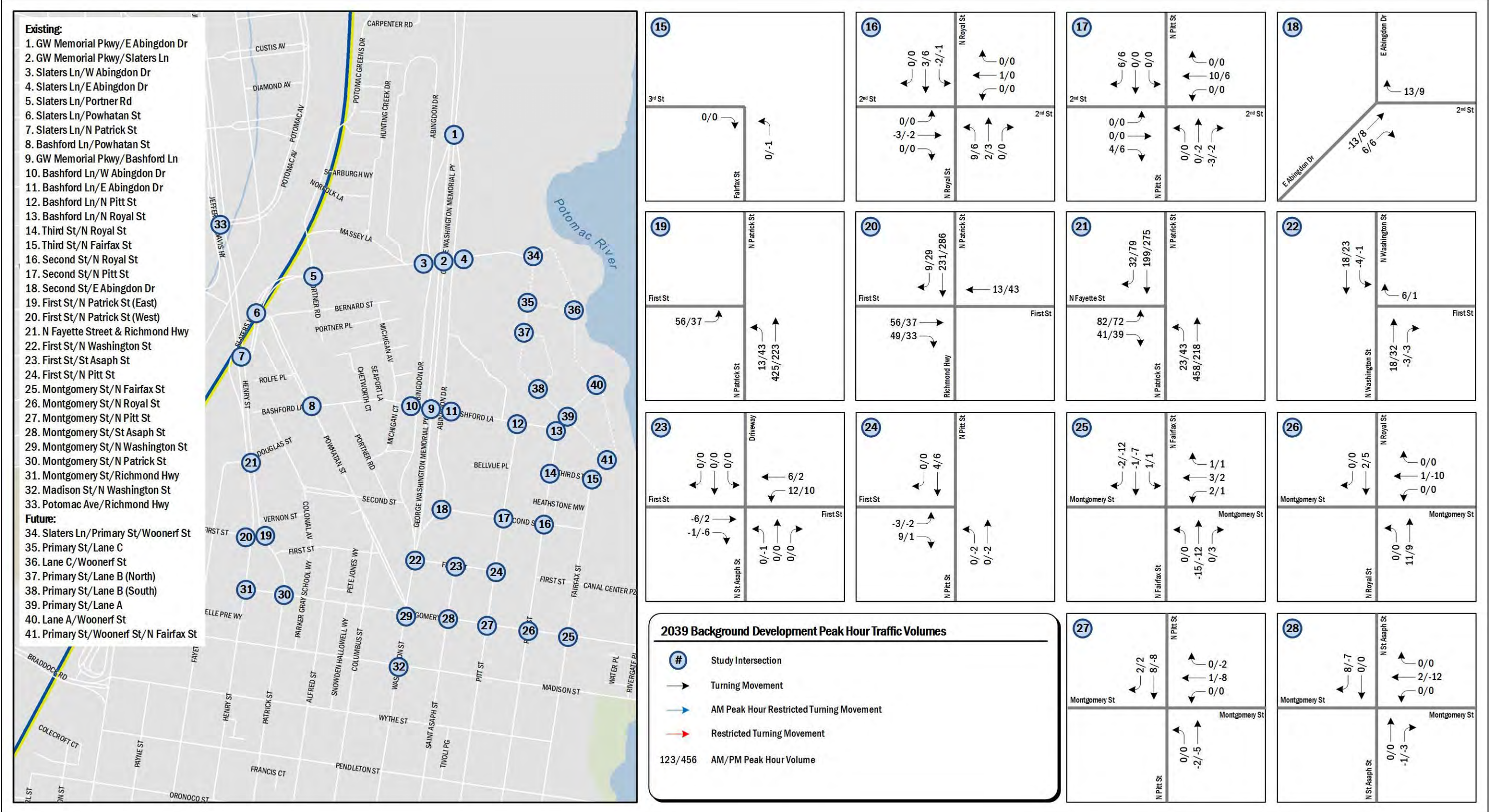
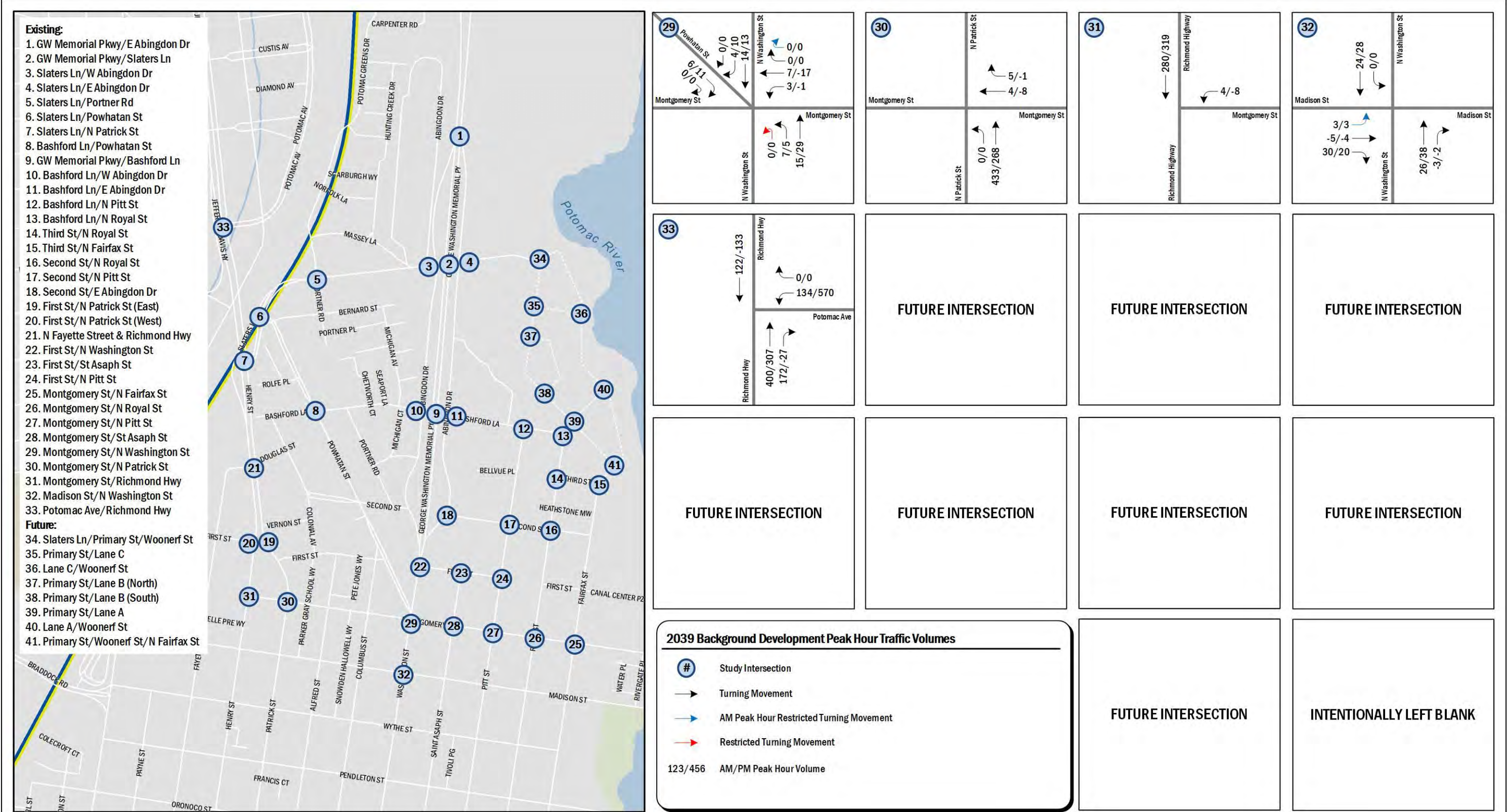


Figure 53: 2039 Background Development Peak Hour Traffic Volumes (Intersections 1 – 14)





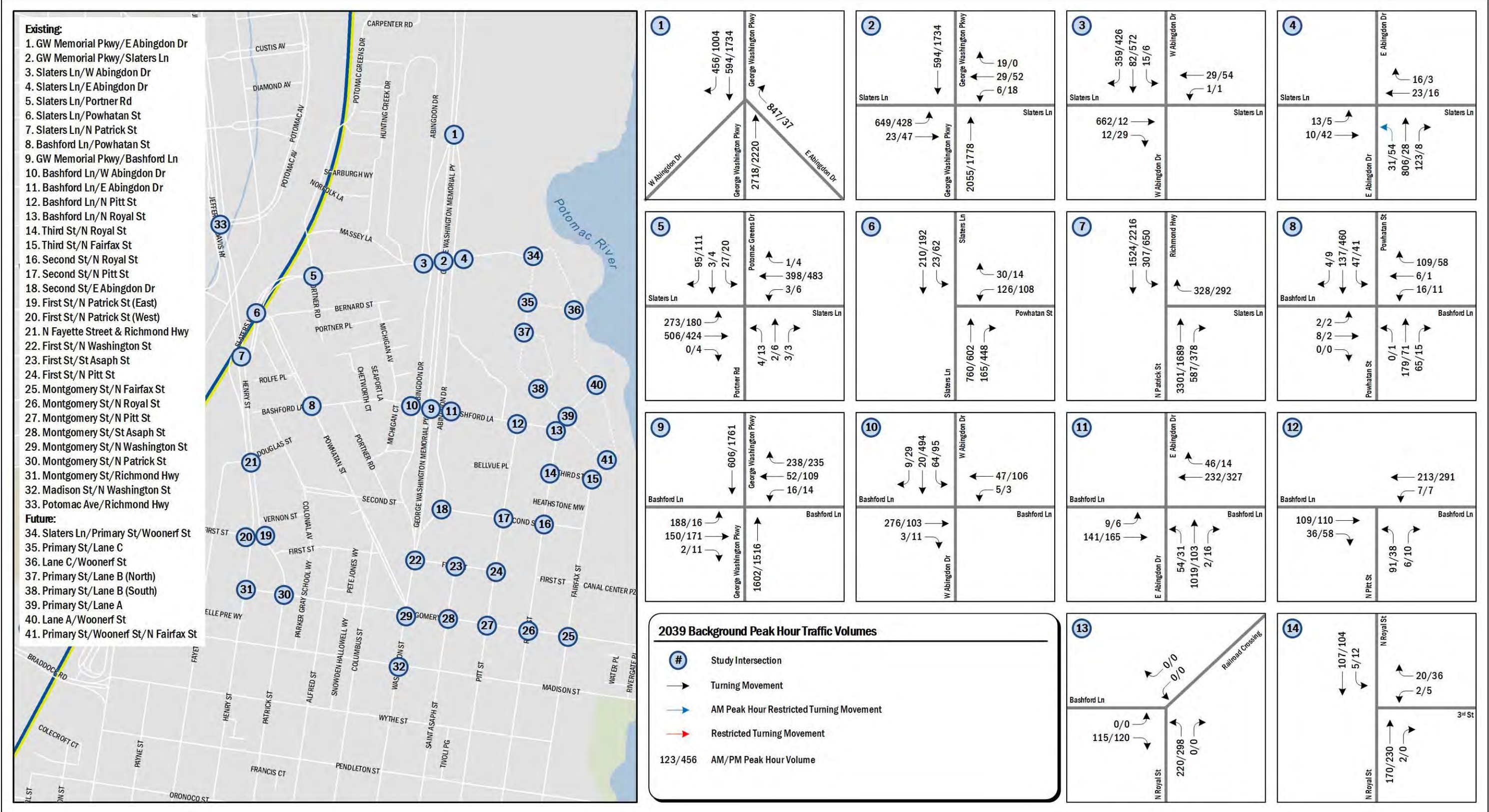
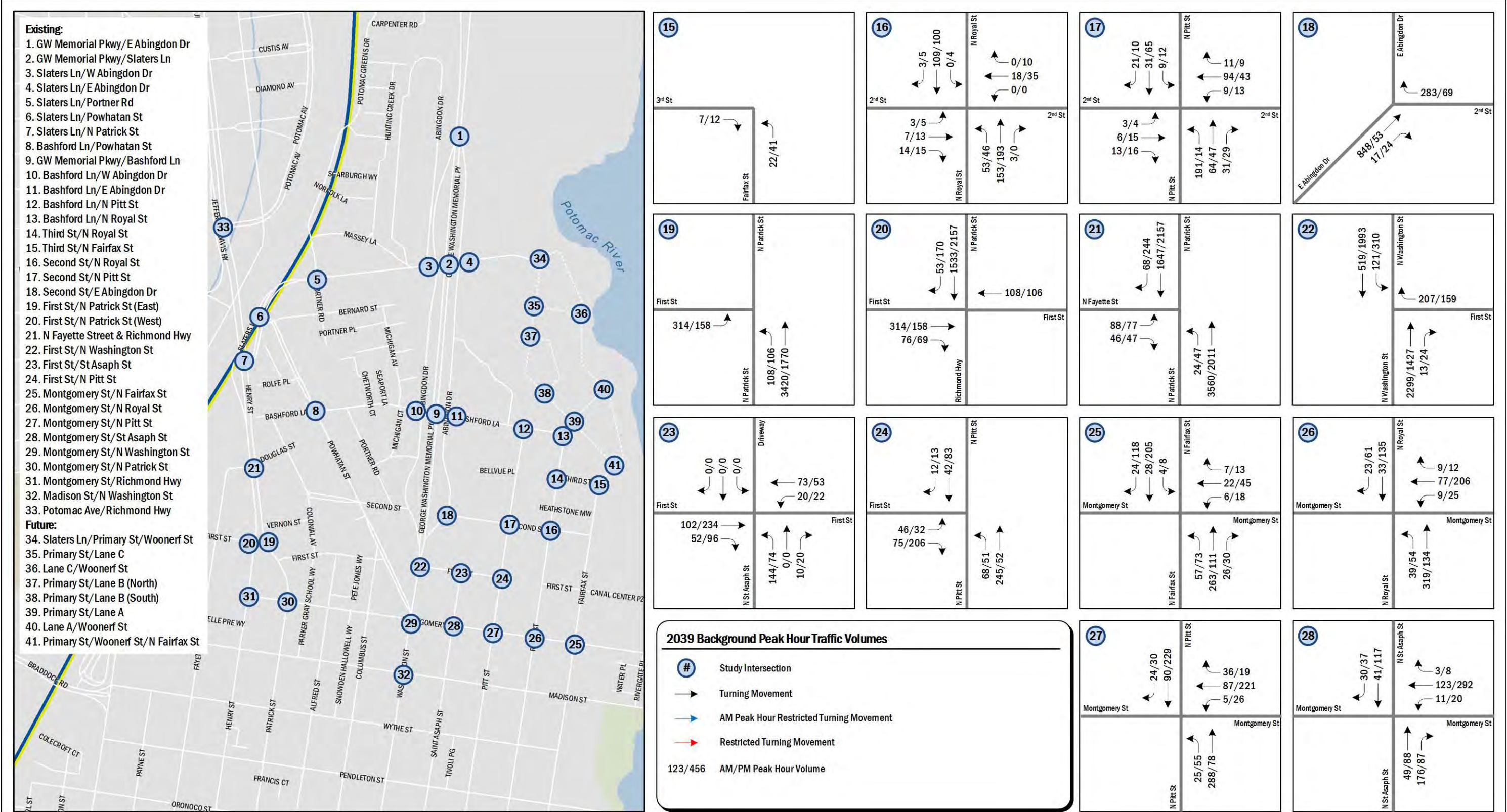


Figure 56: 2039 Background Peak Hour Traffic Volumes (Intersections 1 – 14)





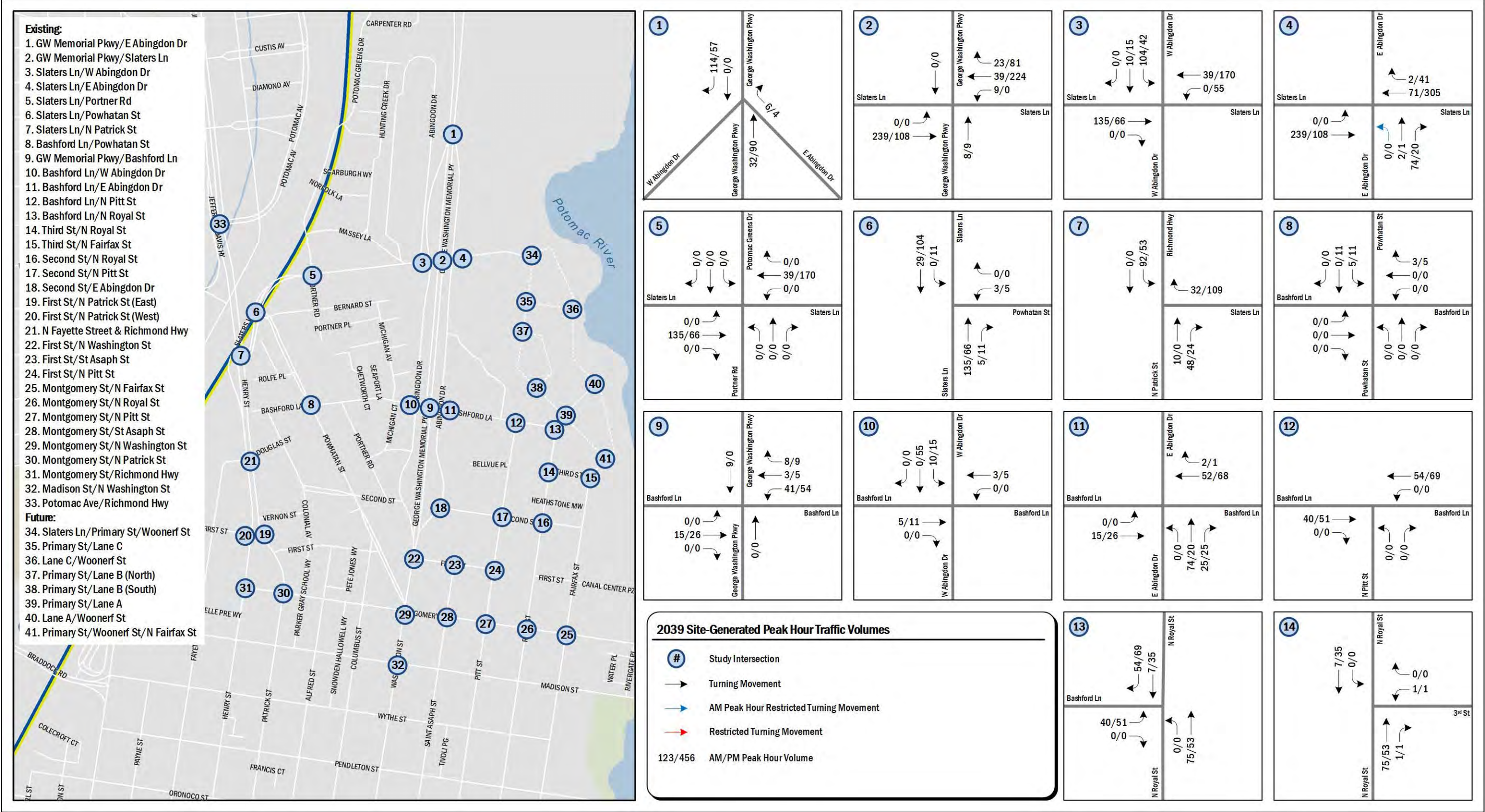


Figure 59: 2039 Site-Generated Peak Hour Traffic Volumes (Intersections 1 – 14)

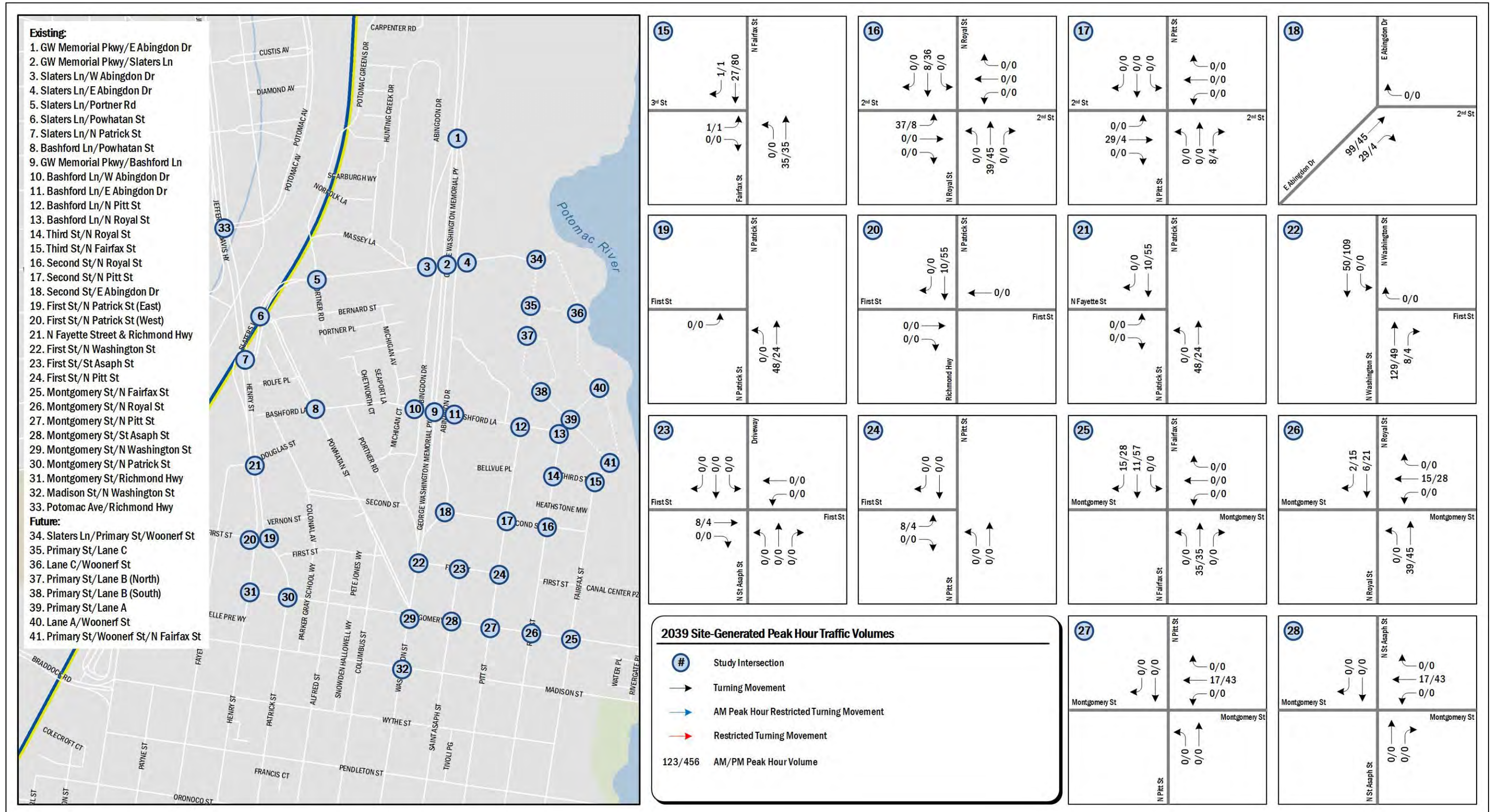


Figure 60: 2039 Site-Generated Peak Hour Traffic Volumes (Intersections 15 – 28)



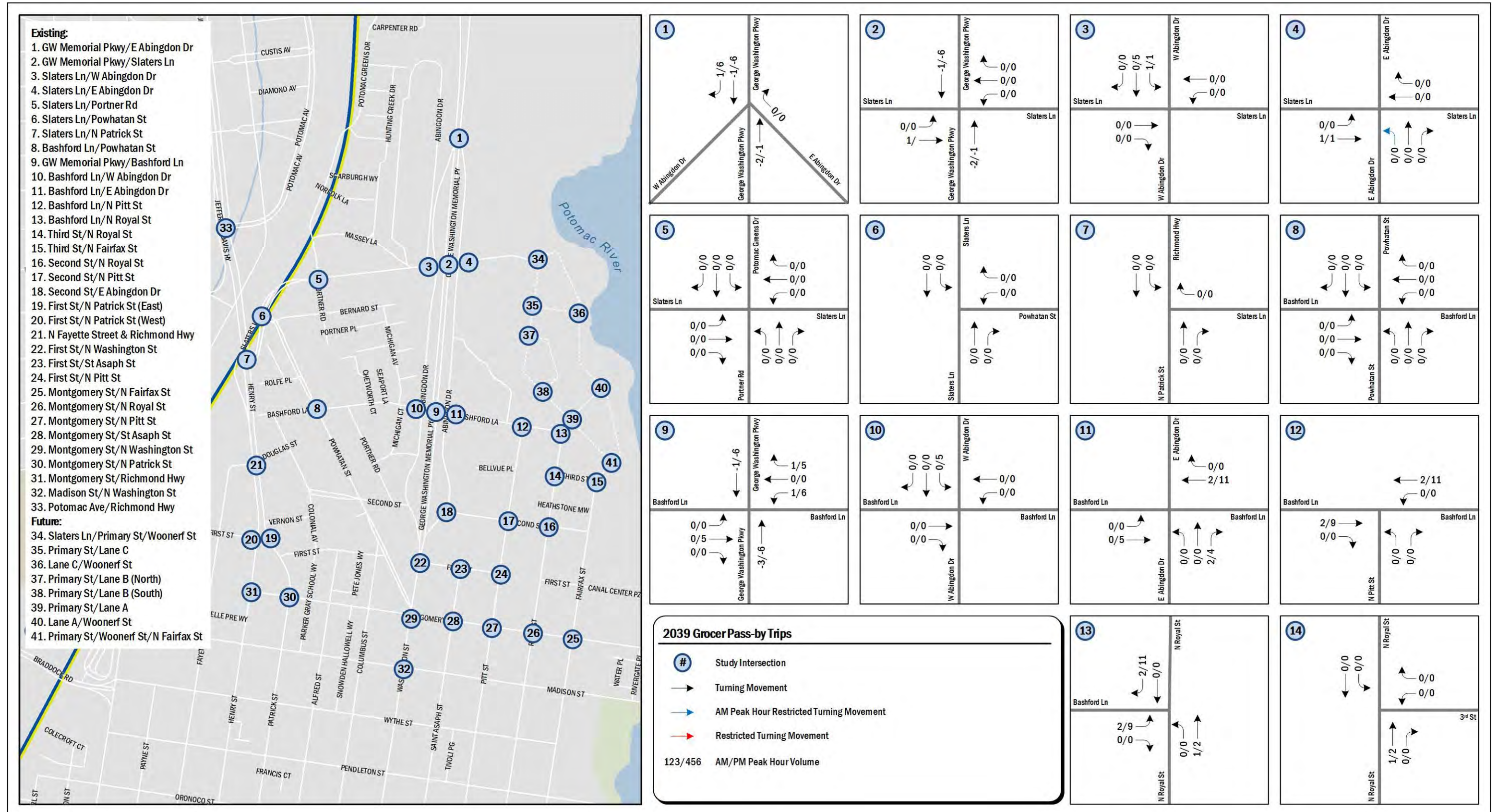


Figure 62: 2039 Grocer Pass-by Trips (Intersections 1 – 14)



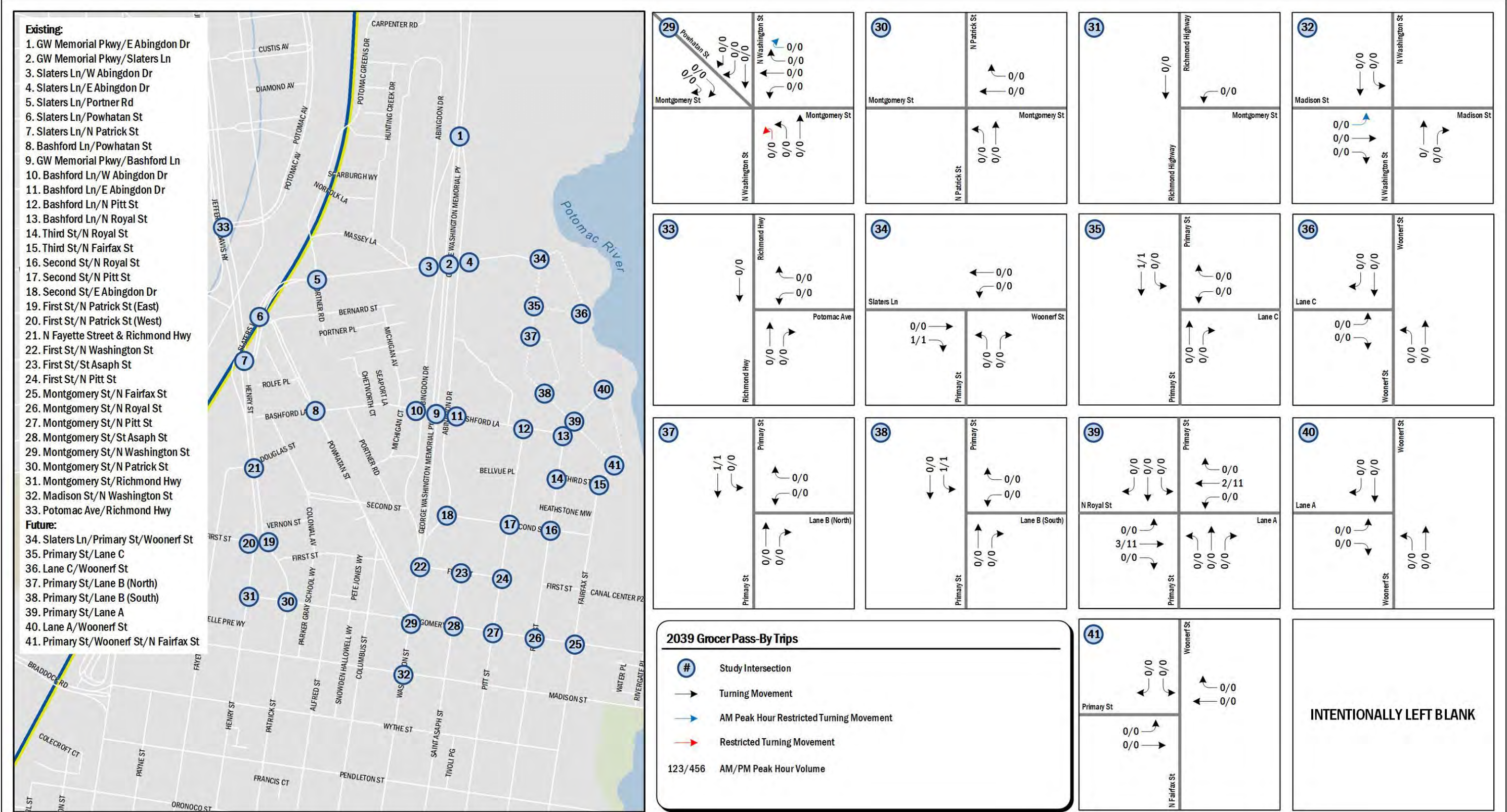


Figure 64: 2039 Grocer Pass-by Trips (Intersections 29 – 41)

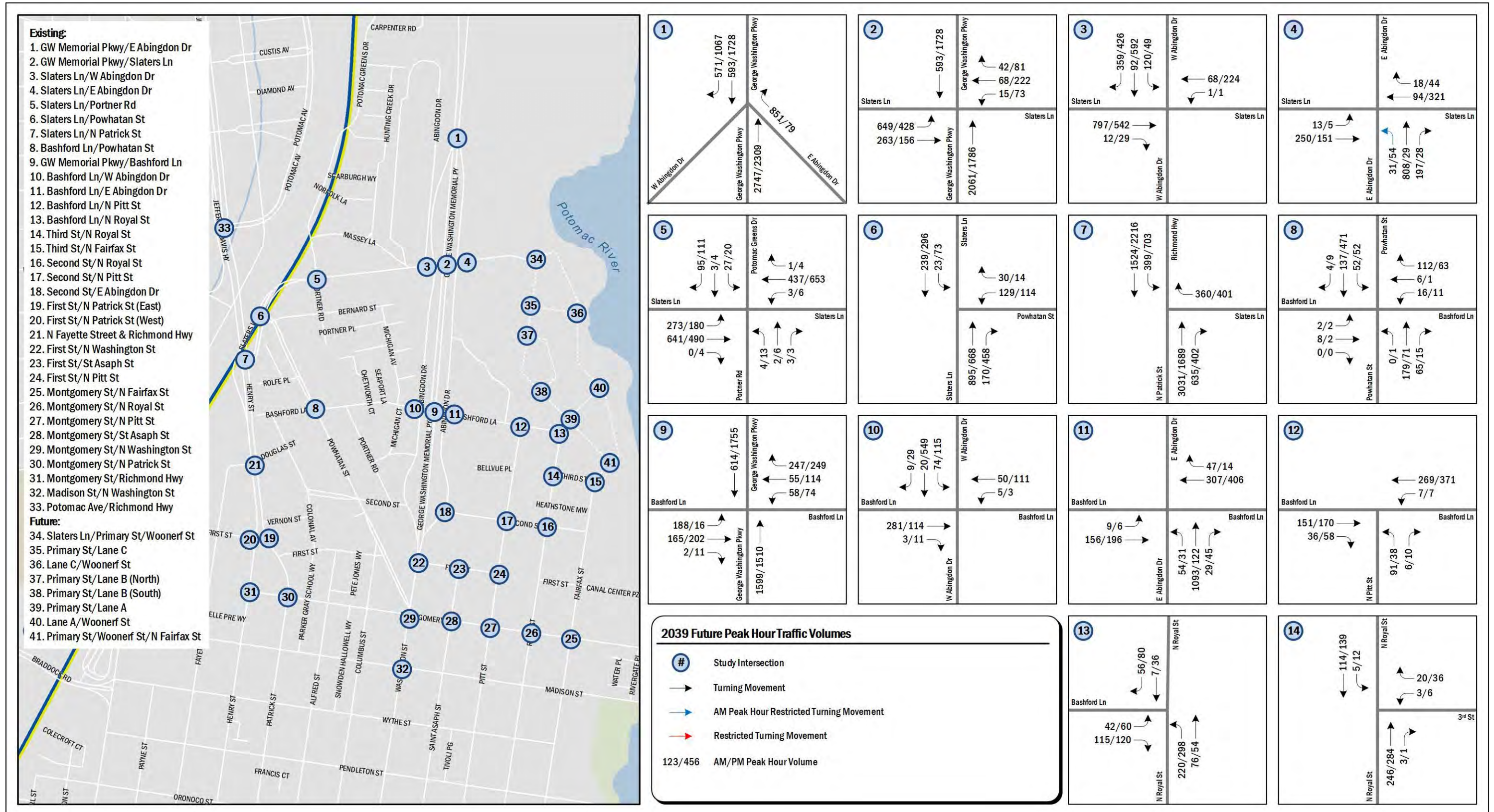


Figure 65: 2039 Future Peak Hour Traffic Volumes (Intersections 1 – 14)

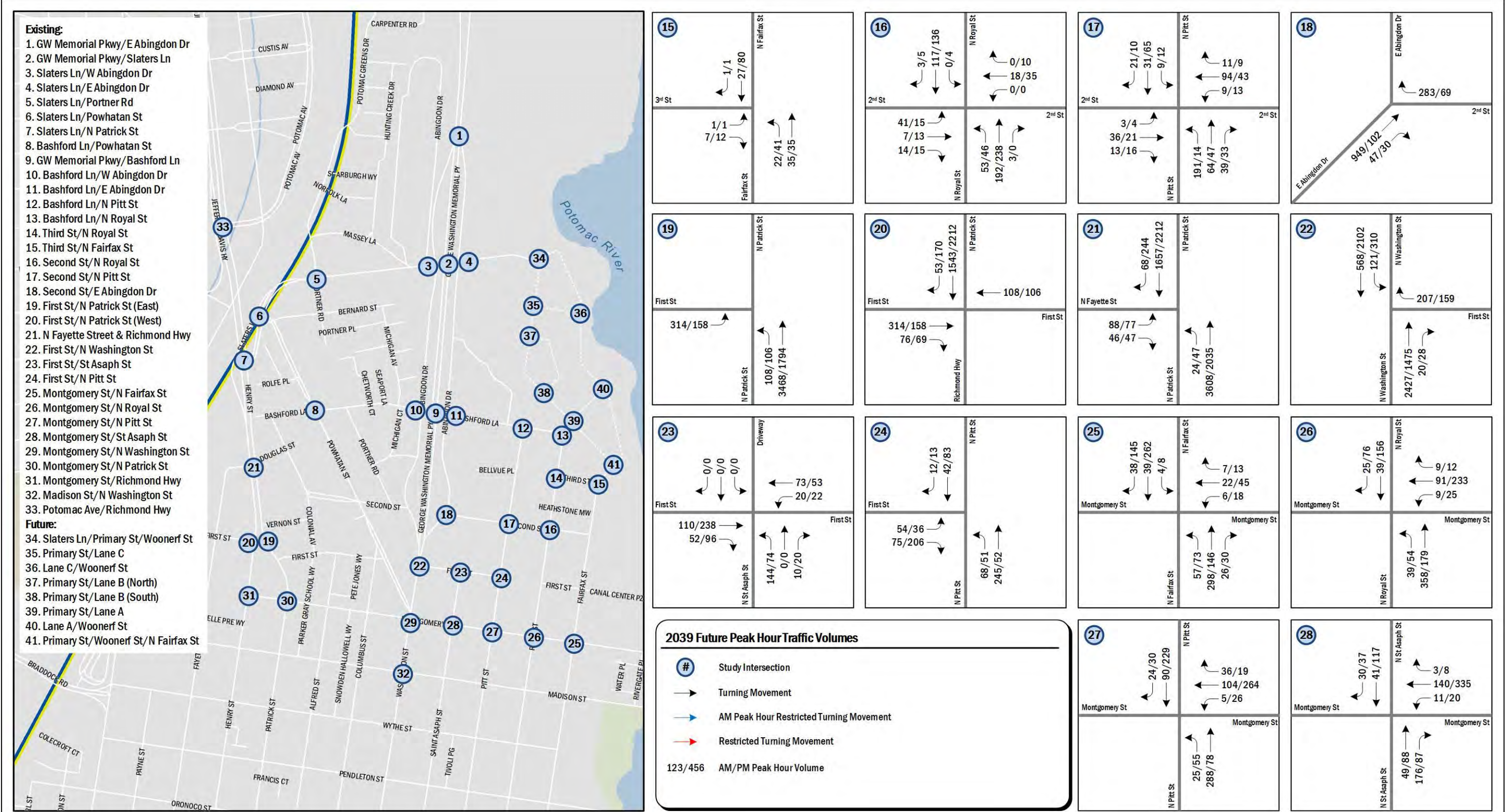


Figure 66: 2039 Future Peak Hour Traffic Volumes (Intersections 15 – 28)



Geometry and Operations Assumptions

The following section reviews the roadway geometry and operations assumptions made and the methodologies used in the roadway capacity analyses:

Existing Geometry and Operations Assumptions

The geometry and operations assumed in the existing conditions scenario are those present when the main data collection occurred. Gorove Slade made observations and confirmed the existing lane configurations and traffic controls at the intersections within the study area. Existing signal timings and offsets were obtained from the City of Alexandria and confirmed during field reconnaissance.

A description of the roadways within the study area is presented below in

Table 22. The existing local roadway network including lane configurations and intersection control is detailed in and illustrated in Figure 68, Figure 69, Figure 70.

2033 Geometry and Operations Assumptions

2033 Background Geometry and Operations Assumptions (without the proposed development)

Following industry standard methodologies, a background improvement must meet the following criteria to be incorporated into the analysis:

- Be funded; and
- Have a construction completion date prior or close to the proposed development.

Based on these criteria, geometry and operations improvements that are part of the Braddock Gateway project were incorporated into the 2033 Background scenario. This includes the following changes to roadway geometry and operations within the study area:

1. Richmond Highway and N Fayette Street (Int. 21) will be reconfigured to provide full signalized access to the site. Each intersection approach is configured with the following:
 - The eastbound approach will include one left/right lane.
 - The northbound approach will include one left/thru lane and two thru lanes.
 - The southbound approach will include two thru lanes and one thru/right lane.

Signal timing and phasing assumptions were based on approved signal plans submitted to the City of Alexandria and nearby signalized intersections.

2. The existing Slaters Lane ramp to southbound Richmond Highway will be reconfigured to add a new roadway connection between the existing and N Fayette Street. Traffic that currently uses the ramp from Slaters Lane to southbound Richmond Highway will have the option to bypass Richmond Highway and continue southbound onto N Fayette Street. As such, a portion of existing traffic that currently uses the Slaters Lane ramp to Richmond Highway then makes a right turn onto N Fayette Street is expected to utilize the new connection. Consistent with the re-routed trip assumptions in the Braddock Gateway TIS (dated March 2, 2016), it is expected that 60 percent of the southbound right-turning traffic will shift to the new connection in the morning peak hour and 40 percent in the afternoon peak hour.

Lane configurations and traffic controls for the 2033 Background Conditions are shown in Figure 71, Figure 72, Figure 73.

2033 Future Geometry and Operations Assumptions (with the proposed development)

The configurations and traffic controls for the 2033 Future Conditions were based on those for the 2033 Background Conditions with the addition of the PRGS development. Eight (8) new and two (2) modified intersections/access points where roadways associated with the PRGS development were added.

The modifications of the roadway network as a result of the proposed development are as follows:

1. N Royal Street and Bashford Lane (Int. 13) will be reconfigured to provide unsignalized (two-way stop control) access to the new internal roadway network. Each intersection approach is configured with the following:
 - The eastbound approach will include one left/right lane.
 - The northbound approach will include one left/thru lane.
 - The southbound approach will include one thru/right lane.
2. N Fairfax Street and Third Street (Int. 15) will be reconfigured to provide unsignalized (all-way stop control) access to the new internal roadway network. Each intersection approach is configured with the following:
 - The eastbound approach will include one left/right lane.
 - The northbound approach will include one left/thru lane.
 - The southbound approach will include one thru/right lane.

3. Slaters Lane/Woonerf Street and Primary Street (Int. 34) is a new intersection that will provide unsignalized (all-way stop control) access to the new internal roadways, Primary Street and Woonerf Street. Each intersection approach is configured with the following:
 - The eastbound approach will include one thru/right lane.
 - The northbound approach will include one left/right lane.
 - The southbound approach will include one left/thru lane.
4. Primary Street and Lane C (Int. 35) is a new intersection that will provide unsignalized (all-way stop control) access to the new internal roadways, Primary Street and Lane C. Each intersection approach is configured with the following:
 - The westbound approach will include one left/right lane.
 - The northbound approach will include one thru/right lane.
 - The southbound approach will include one left/thru lane.
5. Woonerf Street and Lane C (Int. 36) is a new intersection that will provide unsignalized (all-way stop control) access to the new internal roadways, Woonerf Street and Lane C. Each intersection approach is configured with the following:
 - The eastbound approach will include one left/right lane.
 - The northbound approach will include one left/thru lane.
 - The southbound approach will include one thru/right lane.
6. Primary Street and Lane B (North) (Int. 37) is a new intersection that will provide unsignalized (all-way stop control) access to the new internal roadways, Primary Street and Lane B. Each intersection approach is configured with the following:
 - The westbound approach will include one left/right lane.
 - The northbound approach will include one thru/right lane.
 - The southbound approach will include one left/thru lane.
7. Primary Street and Lane B (South) (Int. 38) is a new intersection that will provide unsignalized (all-way stop control) access to the new internal roadways, Primary Street and Lane B. Each intersection approach is configured with the following:
 - The westbound approach will include one left/right lane.
- The northbound approach will include one thru/right lane.
- The southbound approach will include one left/thru lane.

 8. Primary Street and N Royal Street/Lane A (Int. 39) is a new intersection that will provide unsignalized (all-way stop control) access to the new internal roadways, Primary Street and Lane A. Each intersection approach is configured with the following:
 - The eastbound approach will include one left/thru/right lane.
 - The westbound approach will include one left/thru/right lane.
 - The northbound approach will include one left/thru/right lane.
 - The southbound approach will include one left/thru/right lane.
 9. Woonerf Street and Lane A (Int. 40) is a new intersection that will provide unsignalized (all-way stop control) access to the new internal roadways, Woonerf Street and Lane A. Each intersection approach is configured with the following:
 - The eastbound approach will include one left/right lane.
 - The northbound approach will include one left/thru lane.
 - The southbound approach will include one thru/right lane.
 10. N Fairfax Street/Woonerf Street and Primary Street (Int. 41) is a new intersection that will provide unsignalized (all-way stop control) access to the new internal roadways, Woonerf Street and Primary Street. Each intersection approach is configured with the following:
 - The eastbound approach will include one left/right lane.
 - The northbound approach will include one left/thru lane.
 - The southbound approach will include one thru/right lane.

Lane configurations and traffic controls for the 2033 Future Conditions are shown in Figure 74, Figure 75, Figure 76.

2039 Geometry and Operations Assumptions

2039 Background Geometry and Operations Assumptions (without the proposed development)

The geometry and operations assumptions for the 2039 Background Conditions are consistent with that which were assumed under 2033 Background conditions. Lane

configurations and traffic controls for the 2039 Background Conditions are shown in Figure 71, Figure 72, Figure 73.

2039 Future Geometry and Operations Assumptions (with the proposed development)

The geometry and operations assumptions for the 2039 Future Conditions are consistent with that which were assumed under 2033 Future conditions. Lane configurations and traffic controls for the 2039 Future Conditions are shown in Figure 74, Figure 75, Figure 76.

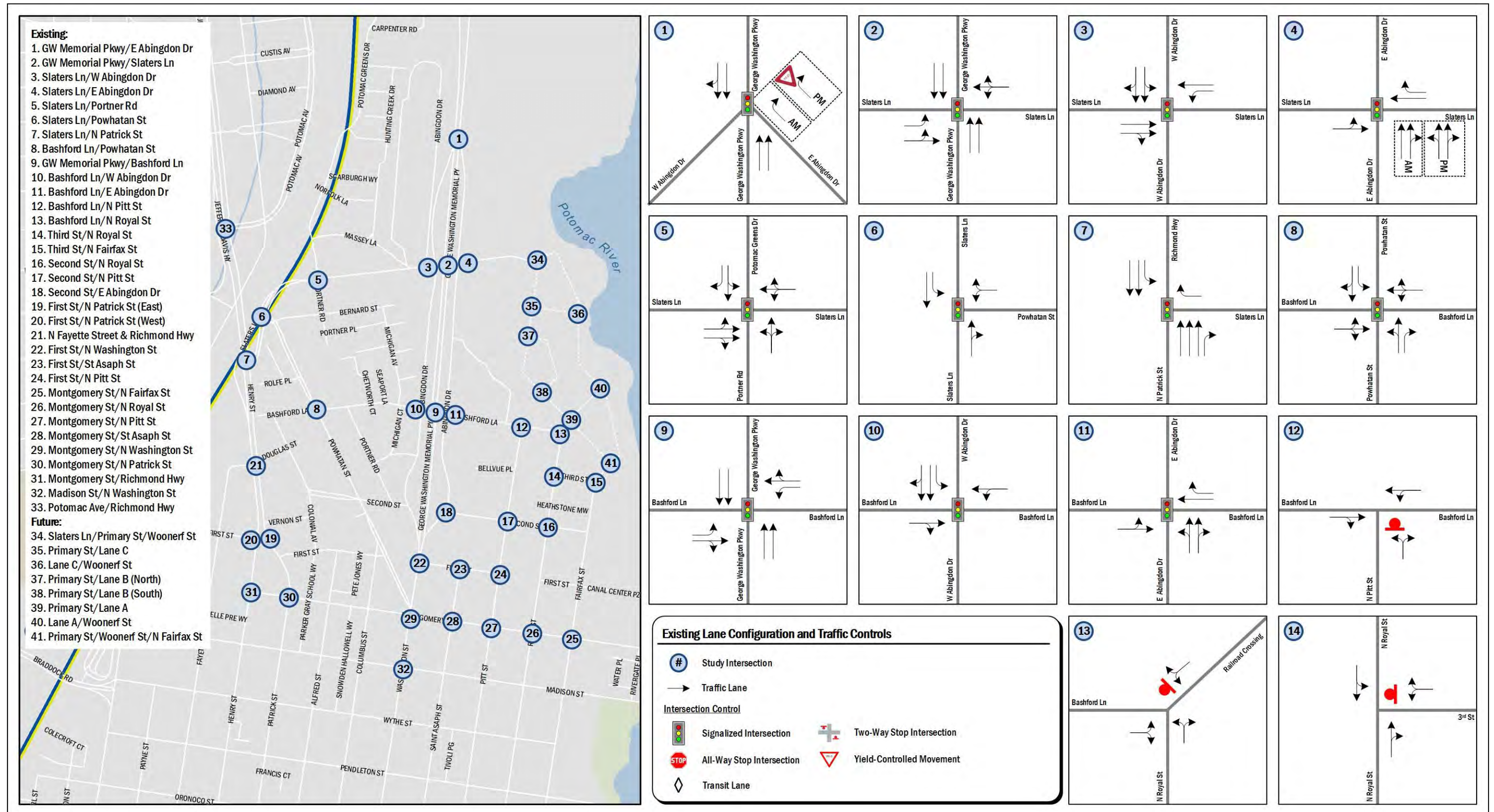


Figure 68: Existing Lane Configurations and Traffic Controls (Intersections 1 – 14)

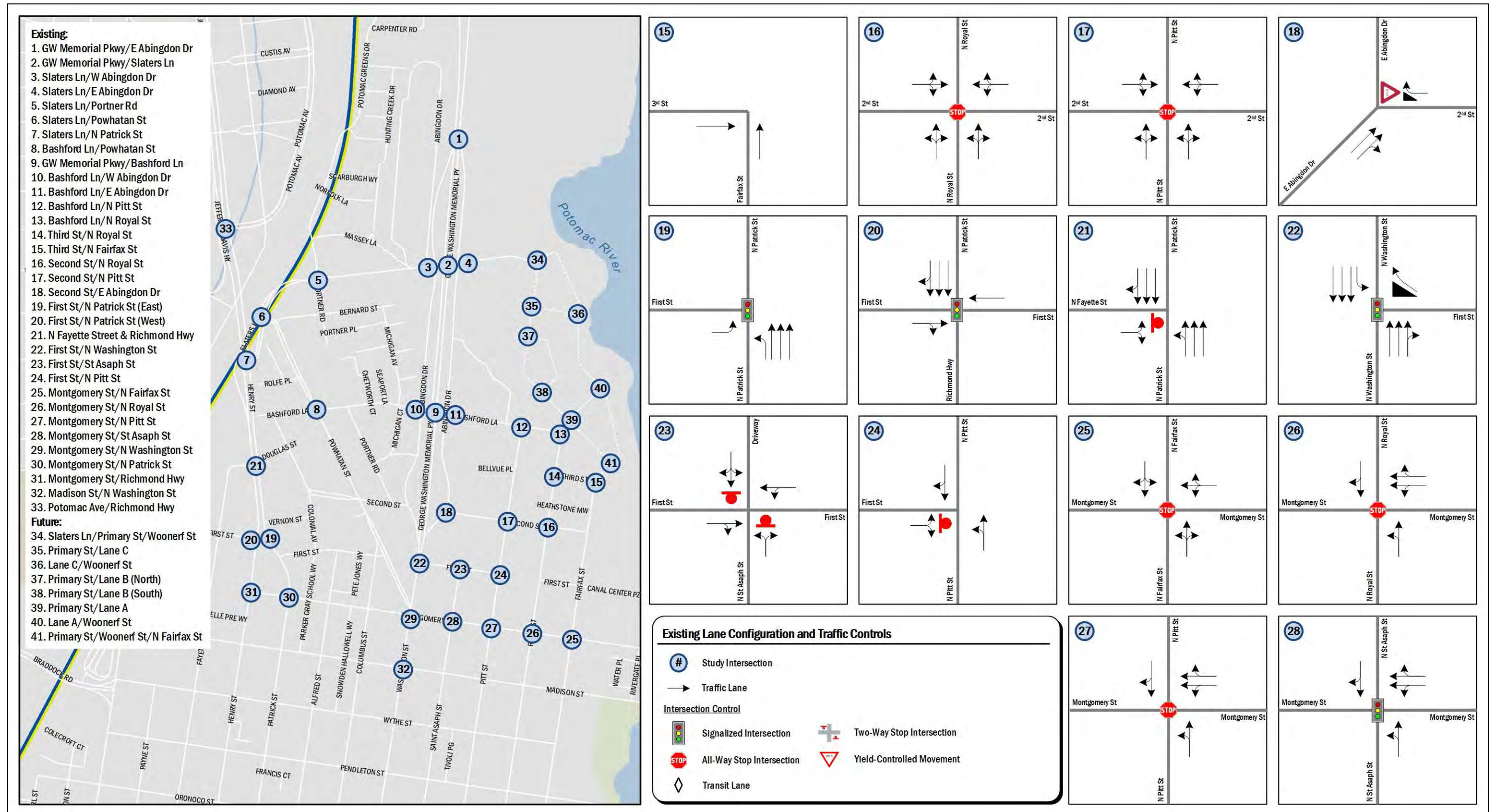


Figure 69: Existing Lane Configurations and Traffic Controls (Intersections 15 – 28)

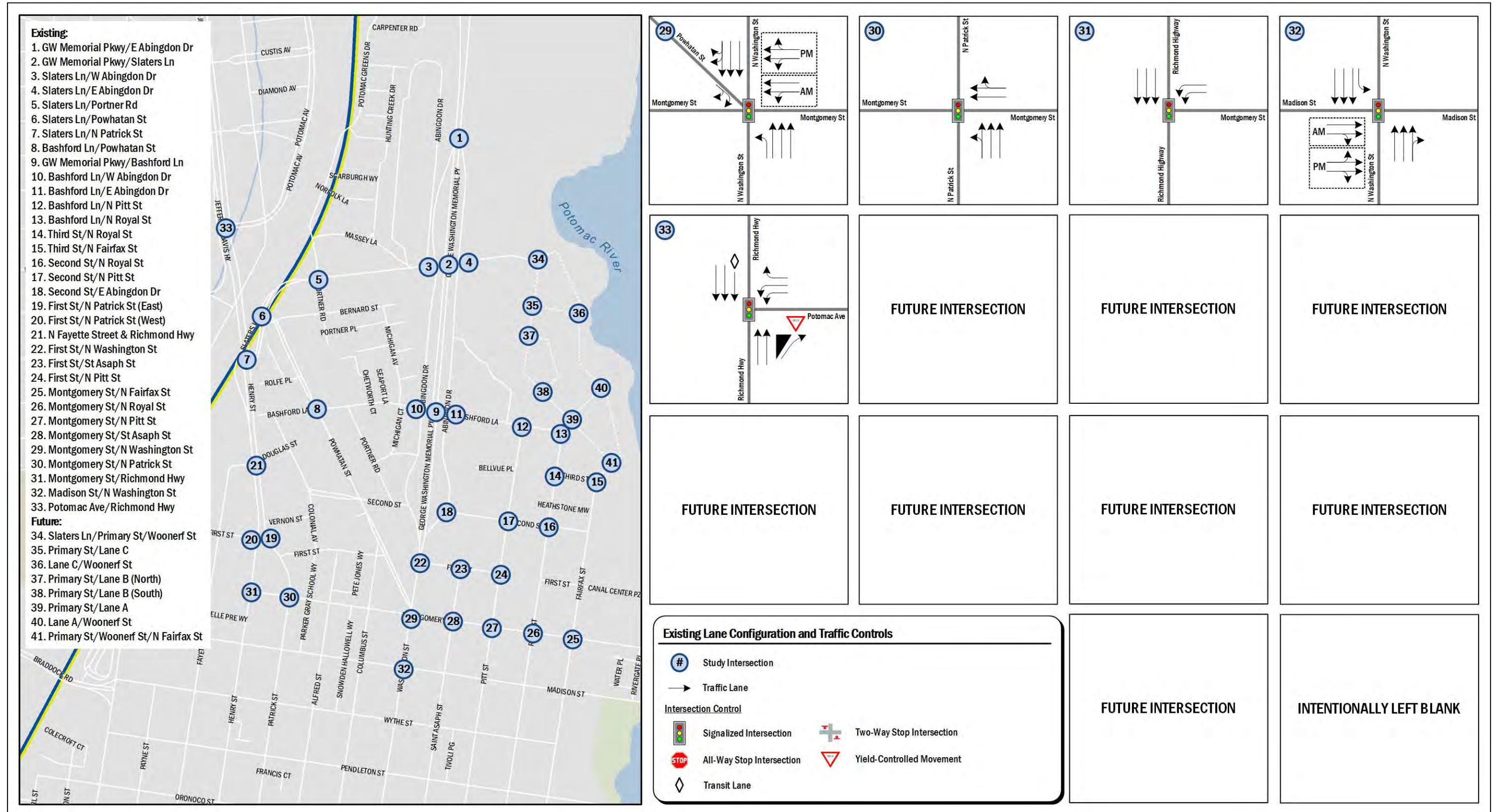


Figure 70: Existing Lane Configurations and Traffic Controls (Intersections 29 – 33)

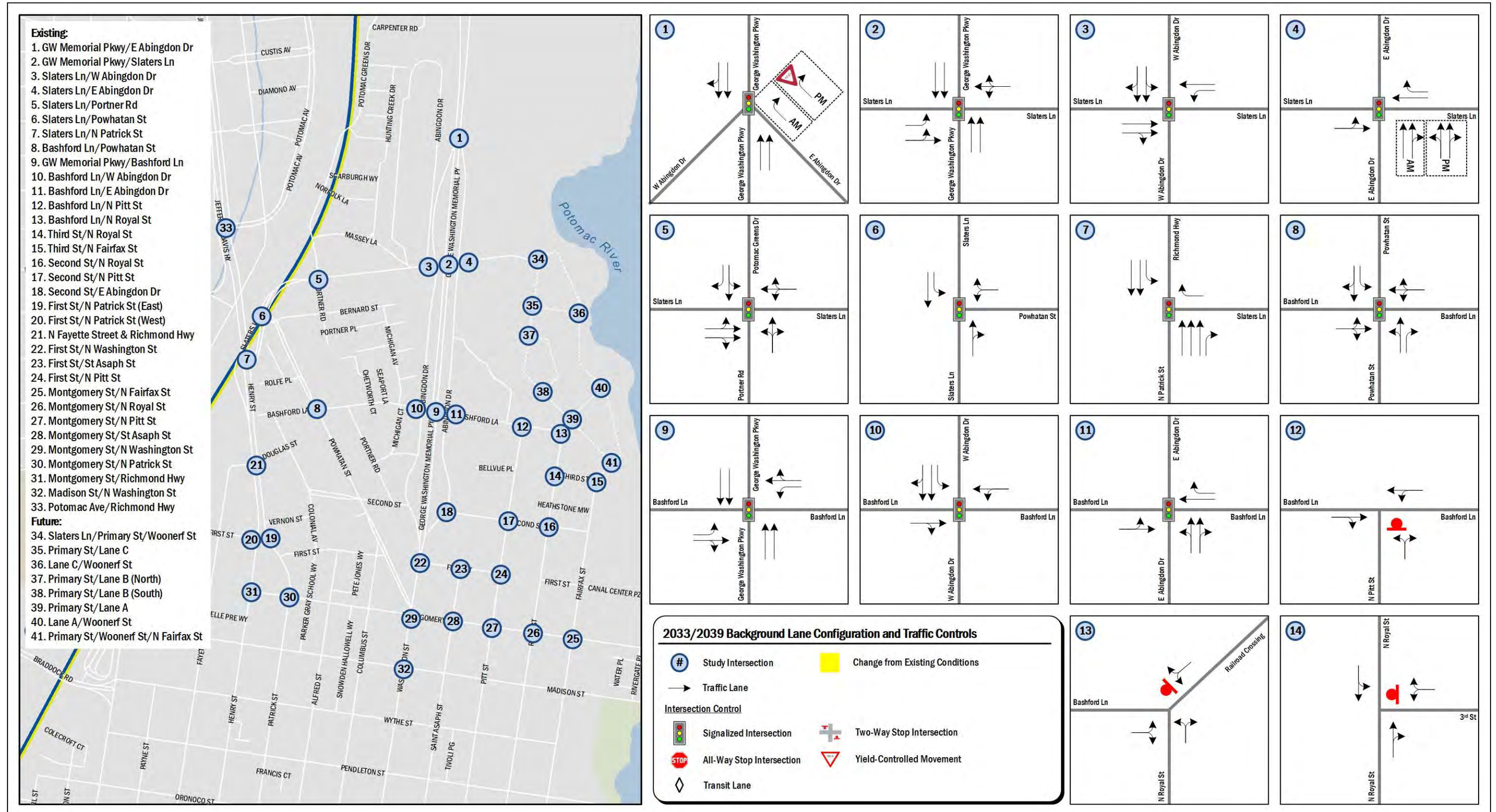
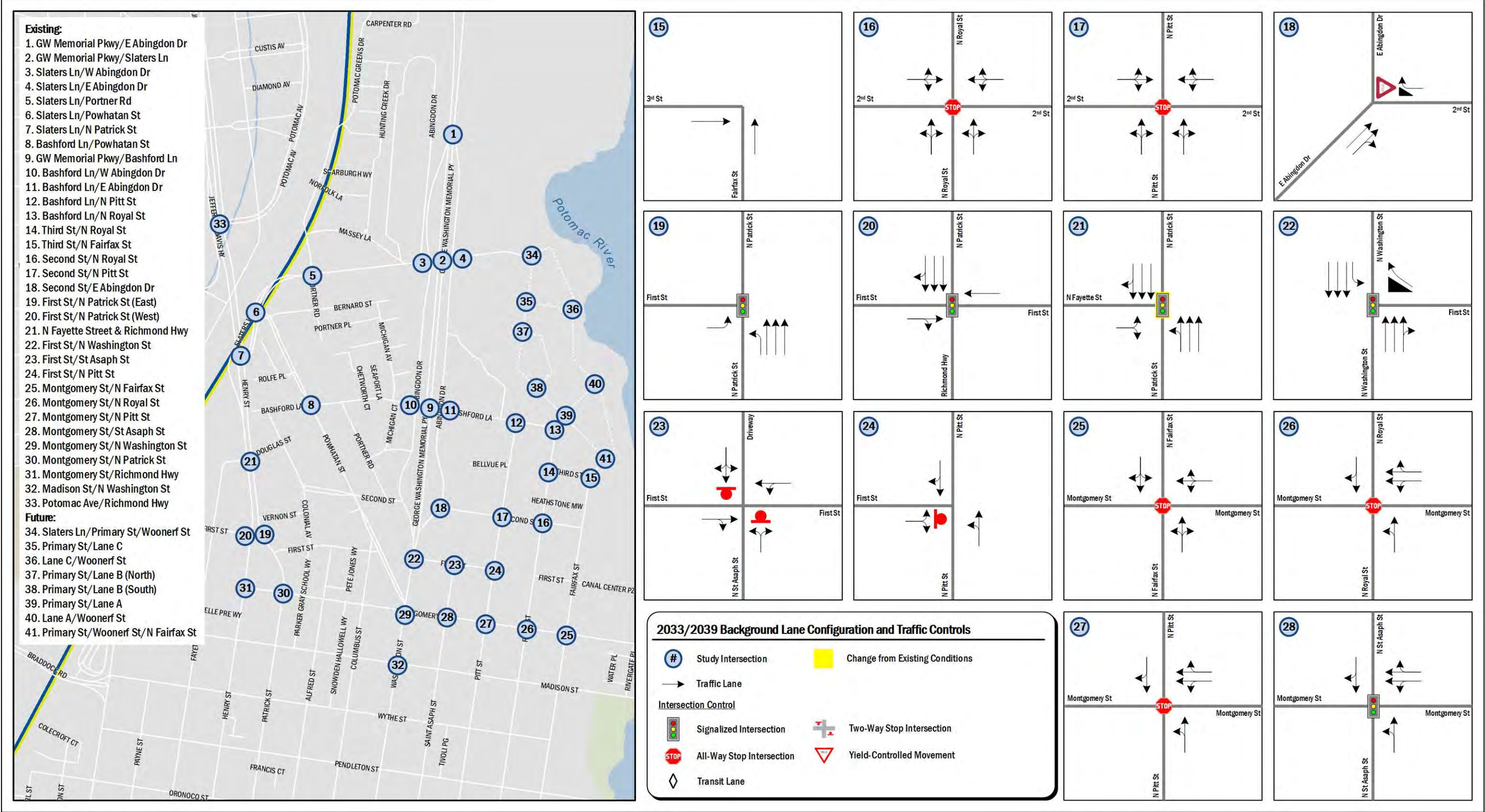


Figure 71: 2033/2039 Background Lane Configurations and Traffic Controls (Intersections 1 – 14)



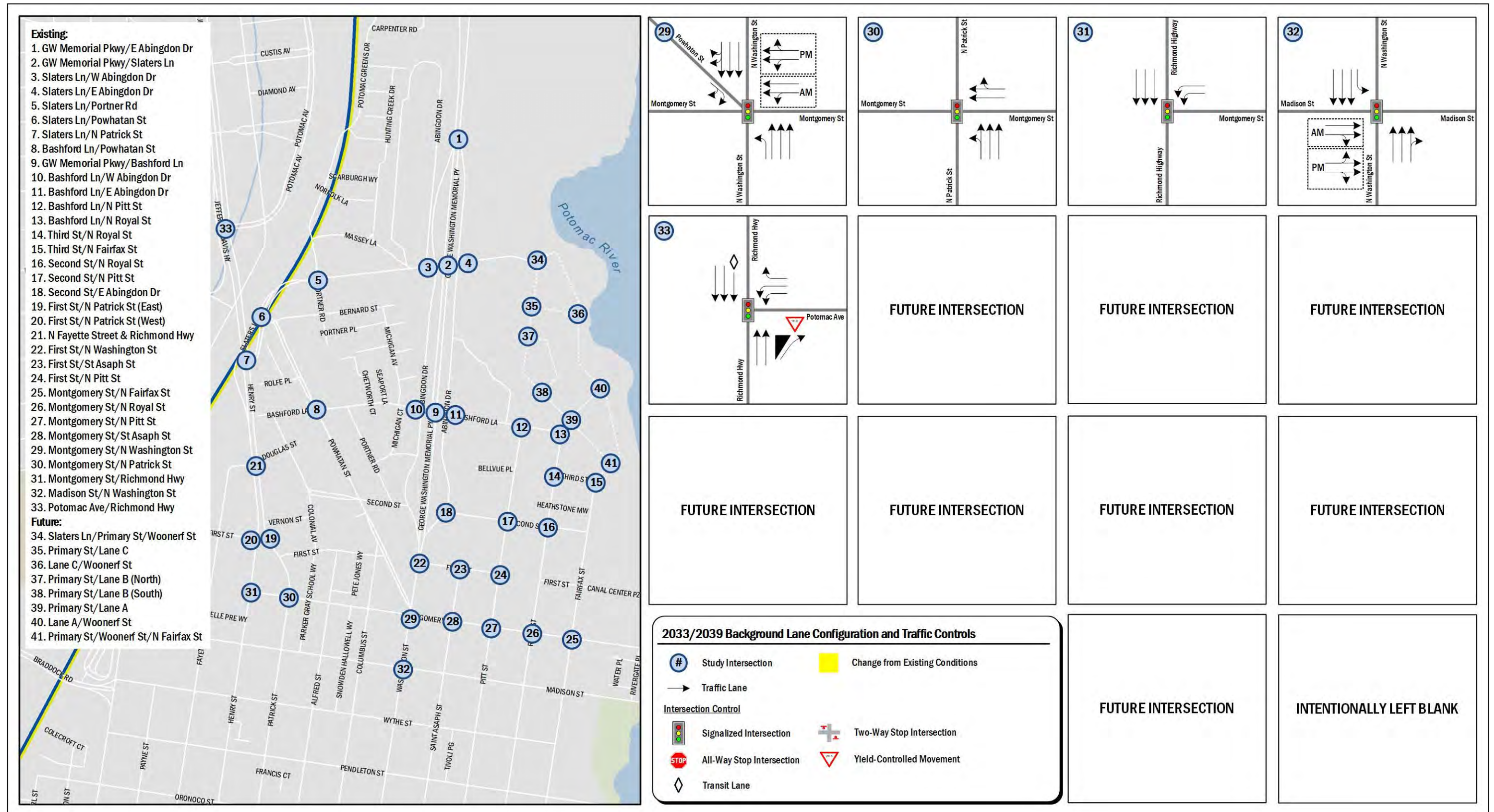


Figure 73: 2033/2039 Background Lane Configurations and Traffic Controls (Intersections 29 – 33)

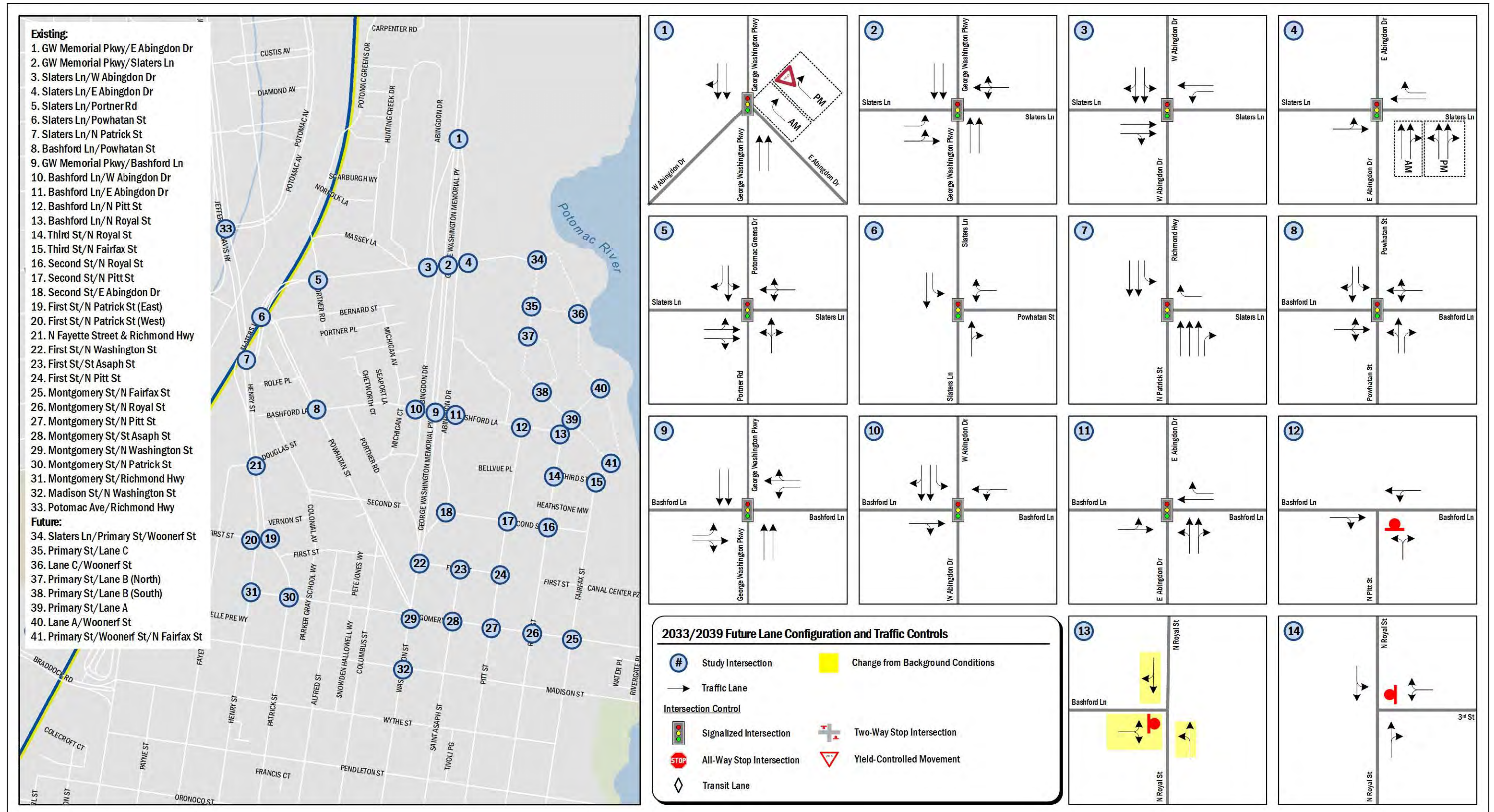


Figure 74: 2033/2039 Future Lane Configurations and Traffic Controls (Intersections 1 – 14)

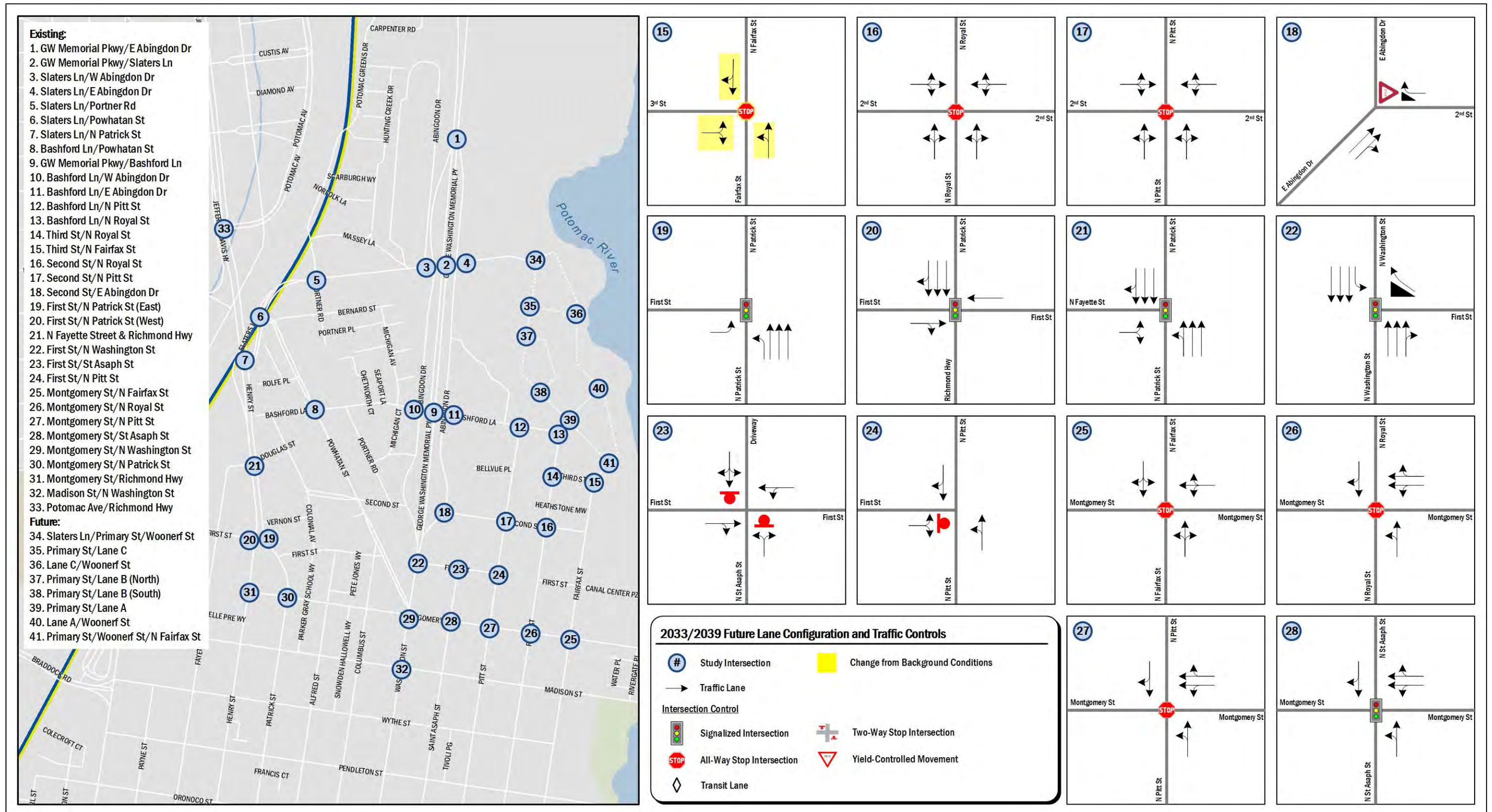


Figure 75: 2033/2039 Future Lane Configurations and Traffic Controls (Intersections 15 – 28)

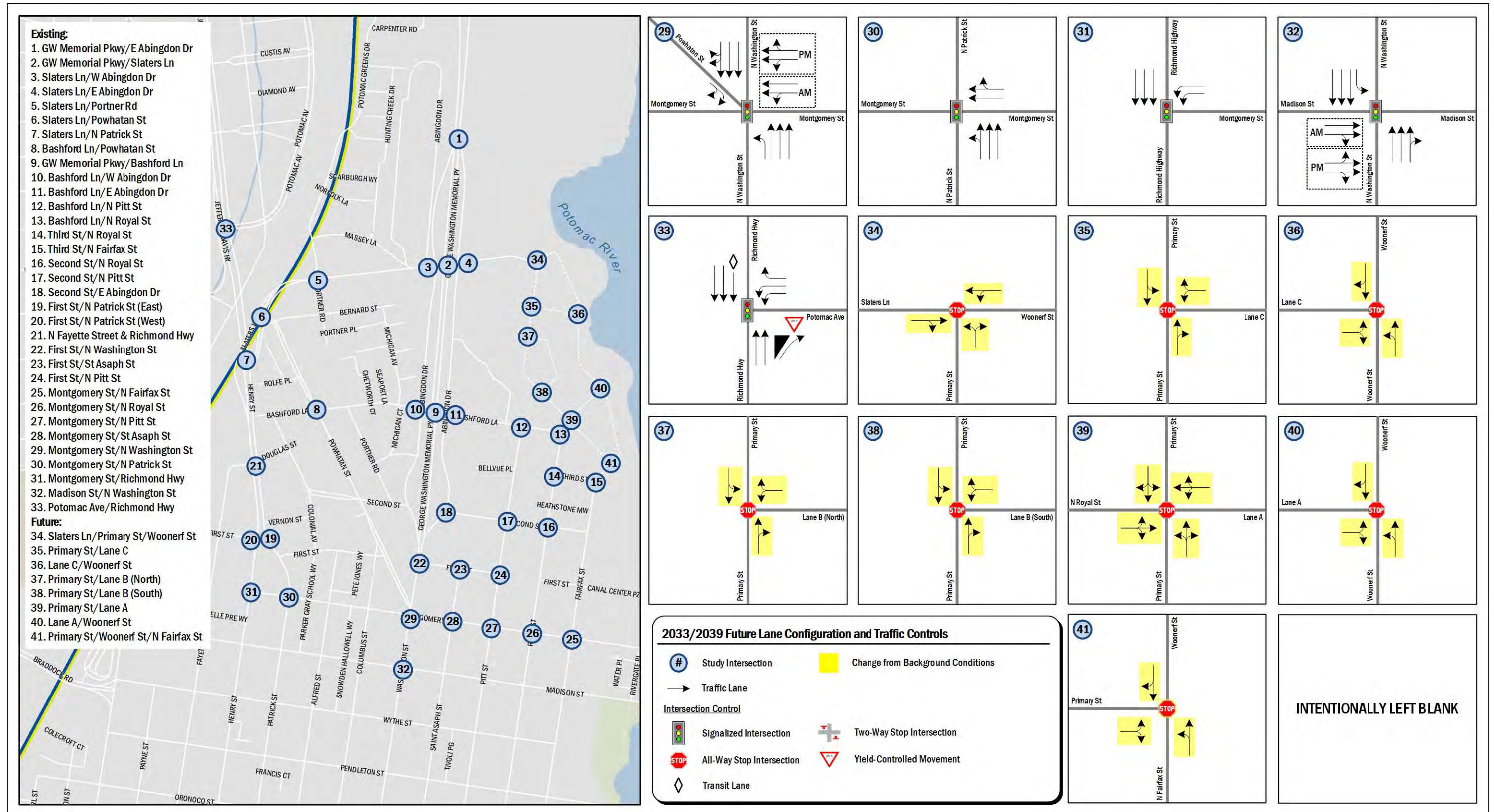


Figure 76: 2033/2039 Future Lane Configurations and Traffic Controls (Intersections 29 – 41)

Vehicular Analysis Results

Intersection Capacity Analysis

Intersection capacity analyses were performed at the intersections contained within the study area during the morning and afternoon peak hours. *Synchro*, version 10 was used to analyze the study intersections based on the Highway Capacity Manual 2000 (HCM) methodology and includes level of service (LOS), delay, and queue length comparisons for the turning movements analyzed. Both signalized and unsignalized intersections were evaluated using HCM 2000.

Peak Hour Factors

Peak hour factors were applied in accordance with the City of Alexandria Transportation Planning Administrative Guidelines dated June 2017. As such, peak hour factors by approach between 0.92 and 1.0 were used for all future scenarios. Where the calculated peak hour factor based on existing turning movement counts was greater than 0.92, the calculated factor was applied. Where the calculated factor was 0.92 or less, a factor of 0.92 was applied.

Heavy Vehicle Percentages

A heavy vehicle percentage of 2% was used for existing movements unless determined to be higher from the turning movement counts, which case the higher percentage was used. A default heavy vehicle percentage of 2% was used for any new movements.

Geometry and Operations

Existing signal timings were obtained from the City of Alexandria for signalized intersections in the vehicular study area. These timings were verified in the field by Gorove Slade and adjusted where necessary.

Level of Service and Delay

The results of the capacity analyses are expressed in level of service (LOS) and delay (seconds per vehicle) for each movement. A LOS grade is a letter grade based on the average delay (in seconds) experienced by motorists traveling through an intersection. LOS results range from “A” being the best to “F” being the worst. LOS E is typically used as the acceptable LOS threshold in the City of Alexandria; although LOS F is generally accepted in urbanized areas if vehicular improvements would be a detriment to safety or to non-auto modes of transportation.

The LOS capacity analyses were based on: (1) the peak hour traffic volumes; (2) the lane use and traffic controls; and (3) the Highway Capacity Manual (HCM) methodologies (using *Synchro* software). The average delay of each movement and LOS is shown for the signalized intersections in addition to the overall average delay and intersection LOS grade. The HCM does not give guidelines for calculating the average delay for a two-way stop-controlled intersection, as the approaches without stop signs would technically have no delay. Detailed LOS descriptions and the analysis worksheets are contained in the Technical Appendix.

Queuing Analysis

In addition to the capacity analyses, a queuing analysis was performed at the study intersections. The queuing analysis was performed using *Synchro* software. The 50th percentile and 95th percentile queue lengths are shown for each lane group at the study area signalized intersections. The 95th percentile queue is the maximum back of queue on a median cycle. For unsignalized, two-way stop-controlled intersections, only the 95th percentile queue is reported for each lane group (including free-flowing left-turns and stop-controlled movements) based on the HCM 2000 calculations. For unsignalized, all-way stop-controlled intersections, no queues are reported based on HCM 2000 calculations. Queuing analysis worksheets are contained in the Technical Appendix.

Existing Analysis Results

The Existing Conditions results of the intersection capacity analyses for the morning and afternoon peak hours are expressed in level of service (LOS) and delay (seconds per vehicle) per movement and presented in Table 24. The capacity analysis results indicate that most intersections operate at acceptable LOS under the Existing Conditions; however, five (5) intersections have one or more movements that operate at levels beyond acceptable thresholds in one or more peak hour:

- GW Memorial Pkwy & E Abingdon Dr (Int. 1)
 - Overall Intersection (AM)
 - Westbound Right (AM)
 - Northbound Thru (AM)
- GW Memorial Pkwy & Slaters Ln (Int. 2)
 - Westbound Left/Thru/Right (PM)
- GW Memorial Pkwy & Bashford Ln (Int. 9)
 - Eastbound Left (AM)

- N Fayette St & Richmond Hwy (Int. 21)
 - Eastbound Left/Right (AM/PM)
- GW Memorial Pkwy & Montgomery St (Int. 29)
 - Southeastbound Right (PM)

The Existing Conditions queuing results for the AM and PM peak hours are expressed by movement are presented in Table 25.

The 95th percentile queues at most lane groups at study area intersections do not exceed their available storage length in Existing Conditions; however, 10 intersections have at least one movement with 95th percentile queues that exceed the available storage length in the morning and/or afternoon peak hour:

- GW Memorial Pkwy & E Abingdon Dr (Int. 1)
 - Westbound Right (AM)
 - Northbound Thru (AM)
- GW Memorial Pkwy & Slaters Ln (Int. 2)
 - Northbound Thru (AM)
- Slaters Ln & Powhatan St (Int. 6)
 - Eastbound Thru/Right (AM/PM)
- Richmond Hwy & Slaters Ln (Int. 7)
 - Westbound Right (AM)
 - Northbound Right (AM/PM)
- Richmond Hwy & First St (East) (Int. 19)
 - Northbound Thru (AM)
- Richmond Hwy & First St (West) (Int. 20)
 - Westbound Thru (AM/PM)
- GW Memorial Pkwy & Montgomery St (Int. 29)
 - Westbound Left/Thru/Right (PM)
 - Southbound Thru/Right (PM)
- N Patrick St & Montgomery St (Int. 30)
 - Northbound Left/Thru (AM)
- GW Memorial Pkwy (Int. 32)
 - Northbound Thru/Right (AM)
- Richmond Hwy & Potomac Ave (Int. 33)
 - Westbound Left (PM)
 - Southbound Thru (AM/PM)

2033 Future Analysis Results

2033 Background Analysis Results (without the proposed development)

The Background (2033) results of the intersection capacity analyses for the AM and PM peak hours are expressed in level of service (LOS) and delay (seconds per vehicle) per movement and presented in Table 26. The capacity analysis results indicate that most intersections operate at acceptable LOS under the Background (2033) Conditions; however, seven (7) intersections have one or more movements that operate at levels beyond acceptable thresholds in one or more peak hour:

- GW Memorial Pkwy & E Abingdon Dr (Int. 1)
 - Overall Intersection (AM)
 - Westbound Right (AM)
 - Northbound Thru (AM)
- GW Memorial Pkwy & Slaters Ln (Int. 2)
 - Westbound Left/Thru/Right (PM)
- GW Memorial Pkwy & Bashford Ln (Int. 9)
 - Eastbound Left (AM)
- Richmond Highway Street & First Street (East) (Int. 19)
 - Overall Intersection (AM)
 - Northbound Thru (AM)
- N Fayette St & Richmond Hwy (Int. 21)
 - Overall Intersection (AM)
 - Northbound Left/Thru (AM)
- GW Memorial Pkwy & Montgomery St (Int. 29)
 - Northbound Left (AM)
 - Southeastbound Right (PM)
- Richmond Highway & Potomac Avenue (Int. 33)
 - Westbound Left (PM)

The Background (2033) queuing results for the AM and PM peak hours are expressed by movement are presented in Table 27.

The 95th percentile queues at most lane groups at study area intersections do not exceed their available storage length in the Background (2033) Conditions; however, 11 intersections have at least one movement with 95th percentile queues that exceed the available storage length in the morning and/or afternoon peak hour:

- GW Memorial Pkwy & E Abingdon Dr (Int. 1)
 - Westbound Right (AM)

- Northbound Thru (AM)
- GW Memorial Pkwy & Slaters Ln (Int. 2)
 - Northbound Thru (AM)
- Slaters Ln & Powhatan St (Int. 6)
 - Eastbound Thru/Right (AM/PM)
- Richmond Hwy & Slaters Ln (Int. 7)
 - Westbound Right (AM/PM)
 - Northbound Thru (AM)
 - Northbound Right (AM/PM)
- Richmond Hwy & First St (East) (Int. 19)
 - Northbound Thru (AM)
- Richmond Hwy & First St (West) (Int. 20)
 - Eastbound Thru/Right (AM)
 - Westbound Thru (AM/PM)
- Richmond Hwy & N Fayette St (Int. 21)
 - Northbound Left/Thru (AM/PM)
- GW Memorial Pkwy & Montgomery St (Int. 29)
 - Westbound Left/Thru/Right (PM)
 - Southbound Thru/Right (PM)
- N Patrick St & Montgomery St (Int. 30)
 - Northbound Left/Thru (AM)
- GW Memorial Pkwy (Int. 32)
 - Northbound Thru/Right (AM)
- Richmond Hwy & Potomac Ave (Int. 33)
 - Westbound Left (AM/PM)
 - Southbound Thru (AM/PM)

2033 Future Analysis Results (with the proposed development)

The Future (2033) results of the intersection capacity analyses for the AM and PM peak hours are expressed in level of service (LOS) and delay (seconds per vehicle) per movement and presented in Table 26. The capacity analysis results indicate that all intersections operate at acceptable LOS under the Future (2033) Conditions; however, nine (9) intersections have one or more movements that operate at levels beyond acceptable thresholds in one or more peak hour:

- GW Memorial Pkwy & E Abingdon Dr (Int. 1)
 - Overall Intersection (AM)
 - Westbound Right (AM)

- Northbound Thru (AM)
- GW Memorial Pkwy & Slaters Ln (Int. 2)
 - Overall Intersection (AM/PM)
 - Eastbound Left (AM)
 - Eastbound Left/Thru
 - Westbound Left/Thru/Right (AM/PM)
 - Northbound Thru (AM)
- GW Memorial Pkwy & W Abingdon Dr (Int. 3)
 - Overall Intersection (AM)
 - Eastbound Thru/Right (AM)
- Slaters Ln & E Abingdon Dr (Int. 4)
 - Overall Intersection (PM)
 - Westbound Thru (PM)
- GW Memorial Pkwy & Bashford Ln (Int. 9)
 - Eastbound Left (AM)
- Richmond Highway Street & First Street (East) (Int. 19)
 - Overall Intersection (AM)
 - Northbound Thru (AM)
- N Fayette St & Richmond Hwy (Int. 21)
 - Overall Intersection (AM)
 - Northbound Left/Thru (AM)
- GW Memorial Pkwy & Montgomery St (Int. 29)
 - Northbound Left (AM)
 - Southeastbound Right (PM)
- Richmond Highway & Potomac Avenue (Int. 33)
 - Westbound Left (PM)

The Future (2033) queuing results for the AM and PM peak hours are expressed by movement are presented in Table 27. The 95th percentile queues at most lane groups at study area intersections do not exceed their available storage length in the Future (2033) Conditions; however, 11 intersections have at least one movement with 95th percentile queues that exceed the available storage length in the afternoon peak hour:

- GW Memorial Pkwy & E Abingdon Dr (Int. 1)
 - Westbound Right (AM)
 - Northbound Thru (AM)
- GW Memorial Pkwy & Slaters Ln (Int. 2)
 - Northbound Thru (AM)
- Slaters Ln & Powhatan St (Int. 6)

- Eastbound Thru/Right (AM/PM)
- Richmond Hwy & Slaters Ln (Int. 7)
 - Westbound Right (AM/PM)
 - Northbound Thru (AM)
 - Northbound Right (AM/PM)
- Richmond Hwy & First St (East) (Int. 19)
 - Northbound Thru (AM)
- Richmond Hwy & First St (West) (Int. 20)
 - Eastbound Thru/Right (AM)
 - Westbound Thru (AM/PM)
- Richmond Hwy & N Fayette St (Int. 21)
 - Northbound Left/Thru (AM/PM)
- GW Memorial Pkwy & Montgomery St (Int. 29)
 - Westbound Left/Thru/Right (PM)
 - Southbound Thru/Right (PM)
- N Patrick St & Montgomery St (Int. 30)
 - Northbound Left/Thru (AM)
- GW Memorial Pkwy (Int. 32)
 - Northbound Thru/Right (AM)
- Richmond Hwy & Potomac Ave (Int. 33)
 - Westbound Left (AM/PM)
 - Southbound Thru (AM/PM)

2033 Future Mitigations

Based on City of Alexandria standards or as outlined in the approved scoping document, the proposed development is considered to have an impact at an intersection if any of the following conditions are met:

- The capacity analyses show a LOS F at an intersection or any movement in the future where one does not exist the background conditions;
- There is an increase in delay at any movement or overall intersection operating under LOS F of greater than 10 percent when compared to the background conditions; or
- The 95th percentile queue length in the future conditions exceeds the available capacity and increases by more than 150 feet compared to background conditions.

Following these guidelines, there are impacts to six (6) intersections as a result of the proposed development under Future (2033) Conditions. The following conclusions were made:

• GW Memorial Parkway & Slaters Lane (Int. 2)

Under Future (2033) conditions, during the morning peak hour, delays for the overall intersection, eastbound left, eastbound left/thru, westbound left/thru/right, and northbound thru movements increase to LOS F from acceptable levels of service in Background conditions. During the afternoon peak hour, delays for the overall intersection increase to LOS F from LOS D in Background conditions and delays for the westbound left/thru/right movement increase by more than 10 percent over LOS F in Background conditions.

The increase in delay at this intersection attributable to the proposed development can be mitigated by: (1) Concentrating turning movements throughout the clustered intersection by restricting the westbound left-turn and right-turn movements onto GW Memorial Parkway; (2) Converting the westbound phase from a leading to lagging phase; and (3) Signal timing adjustments. Volumes were re-routed to E/W Abingdon Drive accordingly, as shown in Figure 77. These recommended improvements will help optimize existing inefficiencies and accommodate changes in volume patterns as a result of the proposed development.

With these mitigation measures in place, during the morning peak hour, delays for the northbound thru movement are reduced; however, delays remain at LOS F. GW Memorial Parkway is a heavily commuted route and while there is additional capacity at the side street approaches that could be shifted to the northbound approach to further reduce delays along GW Memorial Parkway, this would be detrimental to the safety of non-auto modes as it would require a decrease in pedestrian crossing times compared to existing conditions. Additionally, the cut-through analysis, detailed in the Travel Demand Assumptions chapter, concluded that approximately 87% of traffic entering or exiting Old Town North during the morning and afternoon peak periods is cut-through traffic. As such,, it is likely that drivers will alter their route and mode choices as future conditions change.

• Slaters Lane & W Abingdon Drive (Int. 3)

Under Future (2033) conditions, during the morning peak hour, delays for the overall intersection and eastbound left/thru/right movement increase to LOS F from acceptable levels of service in Background conditions.

The increase in delay at this intersection attributable to the proposed development can be mitigated by: (1) Adding a southbound right-turn pocket; (2) Adding a southbound right-turn overlap with the eastbound phase; (3) Converting the westbound phase from a leading to lagging phase; and (4) Signal timing adjustments. These recommended improvements will help optimize existing inefficiencies and accommodate changes in volume patterns as a result of the proposed development.

- **Slaters Lane & E Abingdon Drive (Int. 4)**

Under Future (2033) conditions, during the afternoon peak hour, delays for the westbound thru movement increase to LOS F from LOS D in Background conditions.

The increase in delay at this intersection attributable to the proposed development can be mitigated by: (1) Concentrating turning movements throughout the clustered intersection by restricting the eastbound left-turn movement onto E Abingdon Drive; (2) Converting the westbound phasing from a leading to lagging phase; and (3) Signal timing adjustments. Additionally, improved enforcement of the northbound left-turn morning peak period restriction is assumed to allow for more capacity where vehicles continue to turn under existing conditions. Volumes were re-routed to GW Memorial Parkway and W Abingdon Drive/Bashford Lane accordingly, as shown in Figure 77. These recommended improvements will help optimize existing inefficiencies and accommodate changes in volume patterns as a result of the proposed development.

**Slaters Lane & GW Memorial Parkway Intersection
Cluster Alternative Mitigation: Phasing Modification**

As an alternative to the above phasing improvement, phasing may be modified to include a brief additional eastbound thru phase that runs concurrently with the southbound left-turn phase at W Abingdon Drive. The modification would allow additional time for vehicles turning onto Slaters Lane from W Abingdon Drive to clear the intersection prior. In order to incorporate this additional phase, the northbound-southbound approaches of GW Memorial Parkway and the northbound-southbound approaches of E Abingdon Drive will end early, resulting in increased delays. This improvement would be consistent with the City's goal of making city streets a complete network rather than a series of major corridors for commuter traffic by prioritizing the east-west movements at this location. This approach would need to be further

coordinated with NPS. This alternative mitigation was tested, and results are shown in Table 30 and Table 31.

**Slaters Lane & GW Memorial Parkway Intersection
Cluster Alternative Mitigation: Pretimed Signal Control**

In addition to the operational improvements at this intersection, converting the signal at this intersection from actuated-coordinated to pretimed would further the City's goal of making city streets a complete network rather than a series of major corridors for commuter traffic. More predictable and frequent signal cycles provide more consistent gaps for cross streets and more consistent crossing opportunities for pedestrians and bicycles, while long or unpredictable cycle lengths may increase pedestrian and bicycle non-compliance and risk-taking behavior. This alternative mitigation was tested, and results are shown in Table 32 and Table 33.

- **GW Memorial Parkway & Bashford Lane (Int. 9)**

Under Future (2033) conditions, during the morning peak hour, delays for the eastbound left movement increase by more than 10 percent over LOS F in Background conditions.

The increase in delay at this intersection attributable to the proposed development can be mitigated by: (1) Concentrating turning movements throughout the clustered intersection by restricting eastbound right-turn movement; (2) Restriping the eastbound approach from a left-turn lane and thru/right lane to a left/thru and thru lane; (3) Restriping the westbound approach from a left-turn lane and a thru/right lane to a left/thru lane and thru/right lane. Volumes were re-routed to W Abingdon Drive accordingly, as shown in Figure 77. The westbound approach at the Bashford Lane/W Abingdon Drive intersection and the eastbound approach at the Bashford Lane/E Abingdon Drive intersection were reconfigured from a left/thru to a left-turn lane and thru lane to accommodate the additional eastbound/westbound thru movements at this intersection. While this recommendation may require the removal of approximately six (6) on-street vehicle parking spaces, these recommended improvements will help optimize existing inefficiencies and accommodate changes in volume patterns as a result of the proposed development.

- **Bashford Lane & W Abingdon Drive (Int. 10)**

Under Future (2033) conditions, during the afternoon peak hour, the 95th percentile queue length for the eastbound

thru/right movement exceeds the storage length where it did not in Background conditions.

The increase in queues at this intersection attributable to the proposed development can be mitigated by: (1) Restriping the westbound approach from a left/thru lane to a left-turn lane and a thru lane to create additional capacity through the intersection; and (2) Signal timing adjustments.

Recommended mitigation measures at the GW Memorial Parkway/Bashford Lane also create additional capacity through along Bashford Lane between W Abingdon Drive and E Abingdon Drive. While this recommendation may require the removal of approximately six (6) on-street vehicle parking spaces, these recommended improvements will help optimize existing inefficiencies and accommodate changes in volume patterns as a result of the proposed development.

Bashford Lane & GW Memorial Parkway Intersection Cluster Alternative Mitigation: Pretimed Signal Control

In addition to the operational improvements at this intersection, converting the signal at this intersection from actuated-coordinated to pretimed would further the City's goal of making city streets a complete network rather than a series of major corridors for commuter traffic. More predictable and frequent signal cycles provide more consistent gaps for cross streets and more consistent crossing opportunities for pedestrians and bicycles, while long or unpredictable cycle lengths may increase pedestrian and bicycle non-compliance and risk-taking behavior. This alternative mitigation was tested, and results are shown in Table 32 and Table 33.

- GW Memorial Parkway & Montgomery Street (Int. 29)

Under Future (2033) conditions, during the afternoon peak hour, delays for the southeastbound right movement increase by more than 10 percent over LOS F in Background conditions.

The increase in delay at this intersection attributable to the proposed development can be mitigated through signal timing adjustments.

The mitigation measures outlined above were tested at each intersection, with results shown in Table 28 and Table 29 and detailed Synchro reports included in the Technical Appendix.

Additional Improvements

With the above mitigation measures in place, the roadway network operates at acceptable levels compared to Background conditions. While not required to mitigate impacts by the proposed development, there are additional opportunities to further improve the City's goal to develop a complete street network in the vicinity of the proposed development, particularly along the heavily commuted GW Memorial Parkway corridor. As such, in addition to the mitigation measures identified for intersections being impacted by the proposed development based on City of Alexandria mitigation standards, the following additional improvements could be beneficial to the operations in the vicinity of the proposed development:

- GW Memorial Parkway & E Abingdon Drive Restriping

During the morning peak hour, the northbound and westbound approaches experience significant delays and queues in Existing, 2033 Background, and 2033 Future conditions.

Currently, the E Abingdon Drive ramp to GW Memorial Parkway narrows from two lanes to one lane. To increase the capacity of this roadway, this report recommends reconfiguring this segment of E Abingdon Drive to include two lanes between GW Memorial Parkway and Slaters Lane. This improvement would not require any roadway widening and can be implemented through restriping. Note that this intersection is currently only signalized during the morning peak period. Implementing this improvement would require the signal to operational all day. This approach would need to be further coordinated with NPS.

In addition to the operational improvements that this reconfiguration would provide, this improvement would likely lead to a reduced crash rates at this intersection by replacing a merge with two metered approaches.

The potential lane configuration is shown in Figure 78. The results of this improvement are shown in Table 28 and Table 29 and detailed Synchro reports included in the Technical Appendix.

- New East-West Connection

In line with the recommended improvements from the 2017 Old Town North SAP study, this report explored the impacts of constructing a new east-west street connecting Primary Street, a new internal roadway, to E/W Abingdon Drive and/or GW Memorial Parkway. While GW Memorial Parkway is an asset to the area, it presents challenges for

east-west connectivity within Old Town North for all modes of travel. This new street would create additional porosity within the Old Town North neighborhood and opportunities for enhanced multimodal connectivity. Based on the results of the capacity analysis the new east-west connection is not required because of site-generated vehicular trips but provides a number of positive mobility features.

As it directly relates to the proposed development, this new connection would give users of the site and the larger Old Town North neighborhood a new direct connection to/from GW Memorial Parkway. With the previously outlined mitigations implemented, all study intersections operate at acceptable levels; however, site-generated trips would be able to utilize the additional capacity here, further alleviating pressures along Slaters Lane and Bashford Lane connection points to GW Memorial Parkway.

For the purposes of this analysis, it was assumed that 50% of trips previously assumed to access GW Memorial Parkway via Slaters Lane and Bashford Lane would shift to use the new connection. This is largely consistent with the utilization assumption of this new connection in the Old Town North Small Area Plan Transportation Study. The potential lane configuration and re-assigned volumes are shown in Figure 79.

The results of this improvement are shown in Table 34 and Table 35. These results assume the identified mitigation measures are also in place. The design of this new connection would need to be studied as part of future Infrastructure DSUP efforts and would need further coordination with NPS.

2039 Future Analysis Results

2039 Background Analysis Results (without the proposed development)

The Background (2039) results of the intersection capacity analyses for the AM and PM peak hours are expressed in level of service (LOS) and delay (seconds per vehicle) per movement and presented in Table 36. The capacity analysis results indicate that most intersections operate at acceptable LOS under the Background (2039) Conditions; however, seven (7) intersections have one or more movements that operate at levels beyond acceptable thresholds in one or more peak hour:

- GW Memorial Pkwy & E Abingdon Dr (Int. 1)
 - Overall Intersection (AM)
 - Westbound Right (AM)
 - Northbound Thru (AM)
- GW Memorial Pkwy & Slaters Ln (Int. 2)
 - Westbound Left/Thru/Right (PM)
- GW Memorial Pkwy & Bashford Ln (Int. 9)
 - Eastbound Left (AM)
- Richmond Highway Street & First Street (East) (Int. 19)
 - Overall Intersection (AM)
 - Northbound Thru (AM)
- N Fayette St & Richmond Hwy (Int. 21)
 - Overall Intersection (AM)
 - Northbound Left/Thru (AM)
- GW Memorial Pkwy & Montgomery St (Int. 29)
 - Northbound Left (AM)
 - Southeastbound Right (PM)
- Richmond Highway & Potomac Avenue (Int. 33)
 - Westbound Left (PM)

The Background (2039) queuing results for the AM and PM peak hours are expressed by movement are presented in Table 37.

The 95th percentile queues at most lane groups at study area intersections do not exceed their available storage length in the Background (2039) Conditions; however, 11 intersections have at least one movement with 95th percentile queues that exceed the available storage length in the morning and/or afternoon peak hour:

- GW Memorial Pkwy & E Abingdon Dr (Int. 1)
 - Westbound Right (AM)

- Northbound Thru (AM)
- GW Memorial Pkwy & Slaters Ln (Int. 2)
 - Northbound Thru (AM)
- Slaters Ln & Powhatan St (Int. 6)
 - Eastbound Thru/Right (AM/PM)
- Richmond Hwy & Slaters Ln (Int. 7)
 - Westbound Right (AM/PM)
 - Northbound Thru (AM)
 - Northbound Right (AM/PM)
- Richmond Hwy & First St (East) (Int. 19)
 - Northbound Thru (AM)
- Richmond Hwy & First St (West) (Int. 20)
 - Eastbound Thru/Right (AM)
 - Westbound Thru (AM/PM)
- Richmond Hwy & N Fayette St (Int. 21)
 - Northbound Left/Thru (AM/PM)
- GW Memorial Pkwy & Montgomery St (Int. 29)
 - Westbound Left/Thru/Right (PM)
 - Southbound Thru/Right (PM)
- N Patrick St & Montgomery St (Int. 30)
 - Northbound Left/Thru (AM)
- GW Memorial Pkwy (Int. 32)
 - Northbound Thru/Right (AM)
- Richmond Hwy & Potomac Ave (Int. 33)
 - Westbound Left (AM/PM)
 - Southbound Thru (AM/PM)

2039 Future Analysis Results (with the proposed development)

The Future (2039) results of the intersection capacity analyses for the AM and PM peak hours are expressed in level of service (LOS) and delay (seconds per vehicle) per movement and presented in Table 36. The capacity analysis results indicate that all intersections operate at acceptable LOS under the Future (2039) Conditions; however, nine (9) intersections have one or more movements that operate at levels beyond acceptable thresholds in one or more peak hour:

- GW Memorial Pkwy & E Abingdon Dr (Int. 1)
 - Overall Intersection (AM)
 - Westbound Right (AM)

- Northbound Thru (AM)
- GW Memorial Pkwy & Slaters Ln (Int. 2)
 - Overall Intersection (AM/PM)
 - Eastbound Left (AM)
 - Eastbound Left/Thru
 - Westbound Left/Thru/Right (AM/PM)
 - Northbound Thru (AM)
- GW Memorial Pkwy & W Abingdon Dr (Int. 3)
 - Overall Intersection (AM)
 - Eastbound Thru/Right (AM)
- Slaters Ln & E Abingdon Dr (Int. 4)
 - Overall Intersection (PM)
 - Westbound Thru (PM)
- GW Memorial Pkwy & Bashford Ln (Int. 9)
 - Eastbound Left (AM)
- Richmond Highway Street & First Street (East) (Int. 19)
 - Overall Intersection (AM)
 - Northbound Thru (AM)
- N Fayette St & Richmond Hwy (Int. 21)
 - Overall Intersection (AM)
 - Northbound Left/Thru (AM)
- GW Memorial Pkwy & Montgomery St (Int. 29)
 - Northbound Left (AM)
 - Southeastbound Right (PM)
- Richmond Highway & Potomac Avenue (Int. 33)
 - Westbound Left (PM)
- Eastbound Thru/Right (AM/PM)
- Richmond Hwy & Slaters Ln (Int. 7)
 - Westbound Right (AM/PM)
 - Northbound Thru (AM)
 - Northbound Right (AM/PM)
- Richmond Hwy & First St (East) (Int. 19)
 - Northbound Thru (AM)
- Richmond Hwy & First St (West) (Int. 20)
 - Eastbound Thru/Right (AM)
 - Westbound Thru (AM/PM)
- Richmond Hwy & N Fayette St (Int. 21)
 - Northbound Left/Thru (AM/PM)
- GW Memorial Pkwy & Montgomery St (Int. 29)
 - Westbound Left/Thru/Right (PM)
 - Southbound Thru/Right (PM)
- N Patrick St & Montgomery St (Int. 30)
 - Northbound Left/Thru (AM)
- GW Memorial Pkwy (Int. 32)
 - Northbound Thru/Right (AM)
- Richmond Hwy & Potomac Ave (Int. 33)
 - Westbound Left (AM/PM)
 - Southbound Thru (AM/PM)

2039 Future Mitigations

Based on City of Alexandria standards or as outlined in the approved scoping document, the proposed development is considered to have an impact at an intersection if any of the following conditions are met:

- The capacity analyses show a LOS F at an intersection or any movement in the future where one does not exist the background conditions;
- There is an increase in delay at any movement or overall intersection operating under LOS F of greater than 10 percent when compared to the background conditions; or
- The 95th percentile queue length in the future conditions exceeds the available capacity and increases by more than 150 feet compared to background conditions.

Following these guidelines, there are impacts to six (6) intersections as a result of the proposed development under Future (2039) Conditions. The following conclusions were made:

The Future (2039) queuing results for the AM and PM peak hours are expressed by movement are presented in Table 37. The 95th percentile queues at most lane groups at study area intersections do not exceed their available storage length in the Future (2039) Conditions; however, 11 intersections have at least one movement with 95th percentile queues that exceed the available storage length in the afternoon peak hour:

- GW Memorial Pkwy & E Abingdon Dr (Int. 1)
 - Westbound Right (AM)
 - Northbound Thru (AM)
- GW Memorial Pkwy & Slaters Ln (Int. 2)
 - Northbound Thru (AM)
- Slaters Ln & Powhatan St (Int. 6)

- GW Memorial Parkway & Slaters Lane (Int. 2)

Under Future (2039) conditions, during the morning peak hour, delays for the overall intersection, eastbound left, eastbound left/thru, westbound left/thru/right, and northbound thru movements increase to LOS F from acceptable levels of service in Background conditions. During the afternoon peak hour, delays for the overall intersection increase to LOS F from LOS D in Background conditions and delays for the westbound left/thru/right movement increase by more than 10 percent over LOS F in Background conditions.

The increase in delay at this intersection attributable to the proposed development can be mitigated by: (1) Concentrating turning movements throughout the clustered intersection by restricting the westbound left-turn and right-turn movements onto GW Memorial Parkway; (2) Converting the westbound phase from a leading to lagging phase; and (3) Signal timing adjustments. Volumes were re-routed E/W Abingdon Drive accordingly, as shown in Figure 77. These recommended improvements will help optimize existing inefficiencies and accommodate changes in volume patterns as a result of the proposed development.

With these mitigation measures in place, during the morning peak hour, delays for the northbound thru movement are reduced; however, delays remain at LOS F. GW Memorial Parkway is a heavily commuted route and while there is additional capacity at the side street approaches that could be shifted to the northbound approach to further reduce delays along GW Memorial Parkway, this would be detrimental to the safety of non-auto modes as it would require a decrease in pedestrian crossing times compared to existing conditions. Additionally, the cut-through analysis, detailed in the Travel Demand Assumptions chapter, concluded that approximately 87% of traffic entering or exiting Old Town North during the morning and afternoon peak periods is cut-through traffic. As such, it is likely that drivers will alter their route and mode choices as future conditions change.

- Slaters Lane & W Abingdon Drive (Int. 3)

Under Future (2039) conditions, during the morning peak hour, delays for the overall intersection and eastbound left/thru/right movement increase to LOS F from acceptable levels of service in Background conditions.

The increase in delay at this intersection attributable to the proposed development can be mitigated by: (1) Adding a southbound right-turn pocket; (2) Adding a southbound right-turn overlap with the eastbound phase; (3) Converting the westbound phase from a leading to lagging phase; and (4) Signal timing adjustments. These recommended improvements will help optimize existing inefficiencies and accommodate changes in volume patterns as a result of the proposed development.

- Slaters Lane & E Abingdon Drive (Int. 4)

Under Future (2039) conditions, during the afternoon peak hour, delays for overall intersection and the westbound thru movement increase to LOS F from acceptable levels in Background conditions.

The increase in delay at this intersection attributable to the proposed development can be mitigated by: (1) Concentrating turning movements throughout the clustered intersection by restricting the eastbound left-turn movement onto E Abingdon Drive; (2) Converting the westbound phasing from a leading to lagging phase; and (3) Signal timing adjustments. Additionally, improved enforcement of the northbound left-turn morning peak period restriction is assumed to allow for more capacity where vehicles continue to turn under existing conditions. Volumes were re-routed to GW Memorial Parkway and W Abingdon Drive/Bashford Lane accordingly, as shown in Figure 77. These recommended improvements will help optimize existing inefficiencies and accommodate changes in volume patterns as a result of the proposed development.

Slaters Lane & GW Memorial Parkway Intersection Cluster Alternative Mitigation: Phasing Modification

As an alternative to the above phasing improvement, phasing may be modified to include a brief additional eastbound thru phase that runs concurrently with the southbound left-turn phase at W Abingdon Drive. The modification would allow additional time for vehicles turning onto Slaters Lane from W Abingdon Drive to clear the intersection prior. In order to incorporate this additional phase, the northbound-southbound approaches of GW Memorial Parkway and the northbound-southbound approaches of E Abingdon Drive will end early, resulting in increased delays. This improvement would be consistent with the City's goal of making city streets a complete network rather than a series of major corridors for commuter traffic by prioritizing the east-west movements at this

location. This approach would need to be further coordinated with NPS. This alternative mitigation was tested, and results are shown in Table 40 and Table 41.

Slaters Lane & GW Memorial Parkway Intersection Cluster Alternative Mitigation: Pretimed Signal Control

In addition to the operational improvements at this intersection, converting the signal at this intersection from actuated-coordinated to pretimed would further the City's goal of making city streets a complete network rather than a series of major corridors for commuter traffic. More predictable and frequent signal cycles provide more consistent gaps for cross streets and more consistent crossing opportunities for pedestrians and bicycles, while long or unpredictable cycle lengths may increase pedestrian and bicycle non-compliance and risk-taking behavior. This alternative mitigation was tested, and results are shown in Table 42 and Table 43.

- GW Memorial Parkway & Bashford Lane (Int. 9)
Under Future (2039) conditions, during the morning peak hour, delays for the eastbound left movement increase by more than 10 percent over LOS F in Background conditions. Concentrating turning movements throughout the clustered intersection by restricting eastbound right-turn movement; (2) Restriping the eastbound approach from a left-turn lane and thru/right lane to a left/thru and thru lane; (3) Restriping the westbound approach from a left-turn lane and a thru/right lane to a left/thru lane and thru/right lane. Volumes were re-routed to W Abingdon Drive accordingly, as shown in Figure 77. The westbound approach at the Bashford Lane/W Abingdon Drive intersection and the eastbound approach at the Bashford Lane/E Abingdon Drive intersection were reconfigured from a left/thru to a left-turn lane and thru lane to accommodate the additional eastbound/westbound thru movements at this intersection. While this recommendation may require the removal of approximately six (6) on-street vehicle parking spaces, these recommended improvements will help optimize existing inefficiencies and accommodate changes in volume patterns as a result of the proposed development.
- Bashford Lane & W Abingdon Drive (Int. 10)
Under Future (2039) conditions, during the afternoon peak hour, the 95th percentile queue length for the eastbound thru/right movement exceeds the storage length where it did not in Background conditions.

The increase in queues at this intersection attributable to the proposed development can be mitigated by: (1) Restriping the westbound approach from a left/thru lane to a left-turn lane and a thru lane to create additional capacity through the intersection; and (2) Signal timing adjustments.

Recommended mitigation measures at the GW Memorial Parkway/Bashford Lane also create additional capacity through along Bashford Lane between W Abingdon Drive and E Abingdon Drive. While this recommendation may require the removal of approximately six (6) on-street vehicle parking spaces, these recommended improvements will help optimize existing inefficiencies and accommodate changes in volume patterns as a result of the proposed development.

Bashford Lane & GW Memorial Parkway Intersection Cluster Alternate Mitigation: Pretimed Signal Control

In addition to the operational improvements at this intersection, converting the signal at this intersection from actuated-coordinated to pretimed would further the City's goal of making city streets a complete network rather than a series of major corridors for commuter traffic. More predictable and frequent signal cycles provide more consistent gaps for cross streets and more consistent crossing opportunities for pedestrians and bicycles, while long or unpredictable cycle lengths may increase pedestrian and bicycle non-compliance and risk-taking behavior. This alternative mitigation was tested, and results are shown in Table 42 and Table 43.

- GW Memorial Parkway & Montgomery Street (Int. 29)
Under Future (2039) conditions, during the afternoon peak hour, delays for the southeastbound right movement increase by more than 10 percent over LOS F in Background conditions.

The increase in delay at this intersection attributable to the proposed development can be mitigated through signal timing adjustments.

The mitigation measures outlined above were tested at each intersection, with results shown in Table 38 and Table 39 and detailed Synchro reports included in the Technical Appendix.

Additional Improvements

With the above mitigation measures in place, the roadway network operates at acceptable levels compared to Background conditions. While not required to mitigate impacts by the proposed development, there are additional opportunities to

further the City's goal to develop a complete street network improve multimodal connectivity in the vicinity of the proposed development, particularly along the heavily commuted GW Memorial Parkway corridor. As such, in addition to the mitigation measures identified for intersections being impacted by the proposed development based on City of Alexandria mitigation standards, the following additional improvements could be beneficial to the operations in the vicinity of the proposed development:

- GW Memorial Parkway & E Abingdon Drive Restriping

During the morning peak hour, the northbound and westbound approaches experience significant delays and queues in Existing, 2033 Background, and 2033 Future conditions.

Currently, the E Abingdon Drive ramp to GW Memorial Parkway narrows from two lanes to one lane. To increase the capacity of this roadway, this report recommends reconfiguring this segment of E Abingdon Drive to include two lanes between GW Memorial Parkway and Slaters Lane. This improvement would not require any roadway widening and can be implemented through restriping. Note that this intersection is currently only signalized during the morning peak period. Implementing this improvement would require the signal to operational all day. This approach would need to be further coordinated with NPS.

In addition to the operational improvements that this reconfiguration would provide, this improvement would likely lead to a reduced crash rates at this intersection by replacing a merge with two metered approaches.

The potential lane configuration is shown in Figure 78. The results of this improvement are shown in Table 38 and Table 39 and detailed Synchro reports included in the Technical Appendix.

- New East-West Connection

In line with the recommended improvements from the 2017 Old Town North SAP study, this report explored the impacts of constructing a new east-west street connecting Primary Street, a new internal roadway, to E/W Abingdon Drive and/or GW Memorial Parkway. While GW Memorial Parkway is an asset to the area, it presents challenges for east-west connectivity within Old Town North for all modes of travel. This new street would create additional porosity within the Old Town North neighborhood and opportunities for enhanced multimodal connectivity. Based on the results of the capacity analysis the new east-west connection is not required because of site-generated vehicular trips but provides a number of positive mobility features.

As it directly relates to the proposed development, this new connection would give users of the site and the larger Old Town North neighborhood a new direct connection to/from GW Memorial Parkway. With the previously outlined mitigations implemented, all study intersections operate at acceptable levels; however, site-generated trips would be able to utilize the additional capacity here, further alleviating pressures along Slaters Lane and Bashford Lane connection points to GW Memorial Parkway.

For the purposes of this analysis, it was assumed that 50% of trips previously assumed to access GW Memorial Parkway via Slaters Lane and Bashford Lane would shift to use the new connection. This is largely consistent with the utilization assumption of this new connection in the Old Town North Small Area Plan Transportation Study. The potential lane configuration and re-assigned volumes are shown in Figure 79.

The results of this improvement are shown in Table 44 and Table 45. These results assume the identified mitigation measures are also in place. The design of this new connection would need to be studied as part of future Infrastructure DSUP efforts and would need further coordination with NPS.

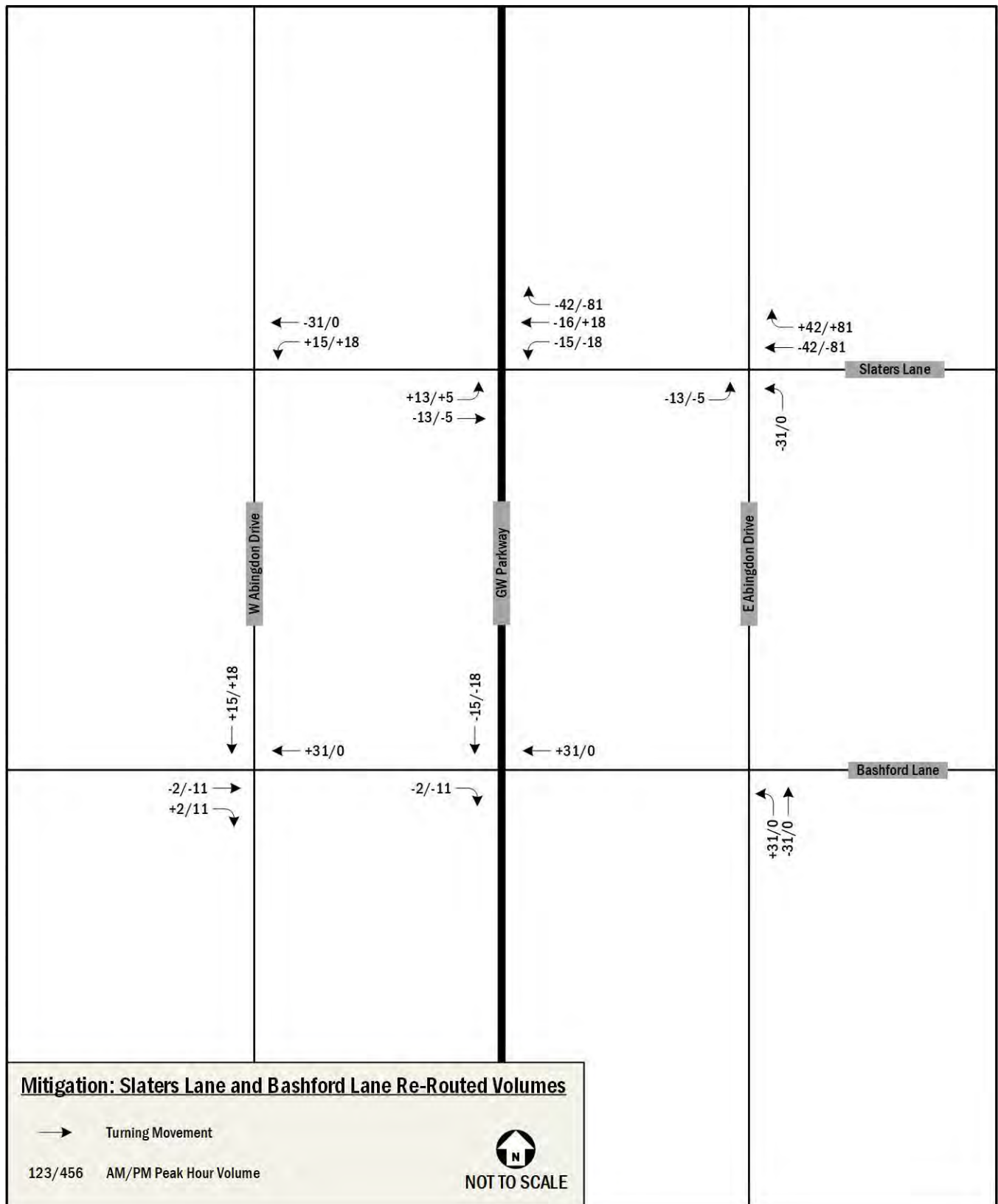


Figure 77: Mitigation - Slaters Lane and Bashford Lane Re-Routed Volumes

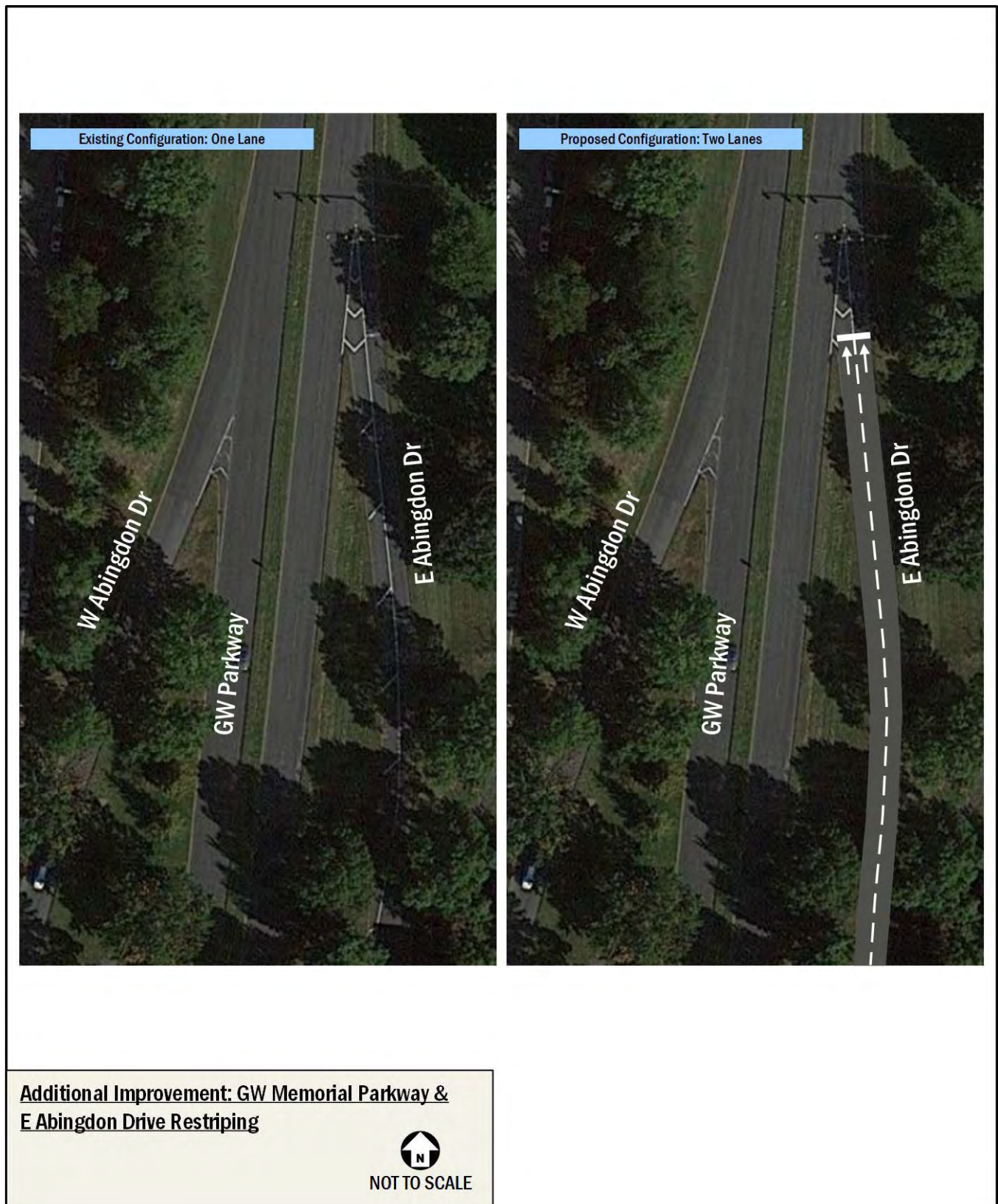


Figure 78: Additional Improvement – GW Memorial Parkway & E Abingdon Drive Restriping

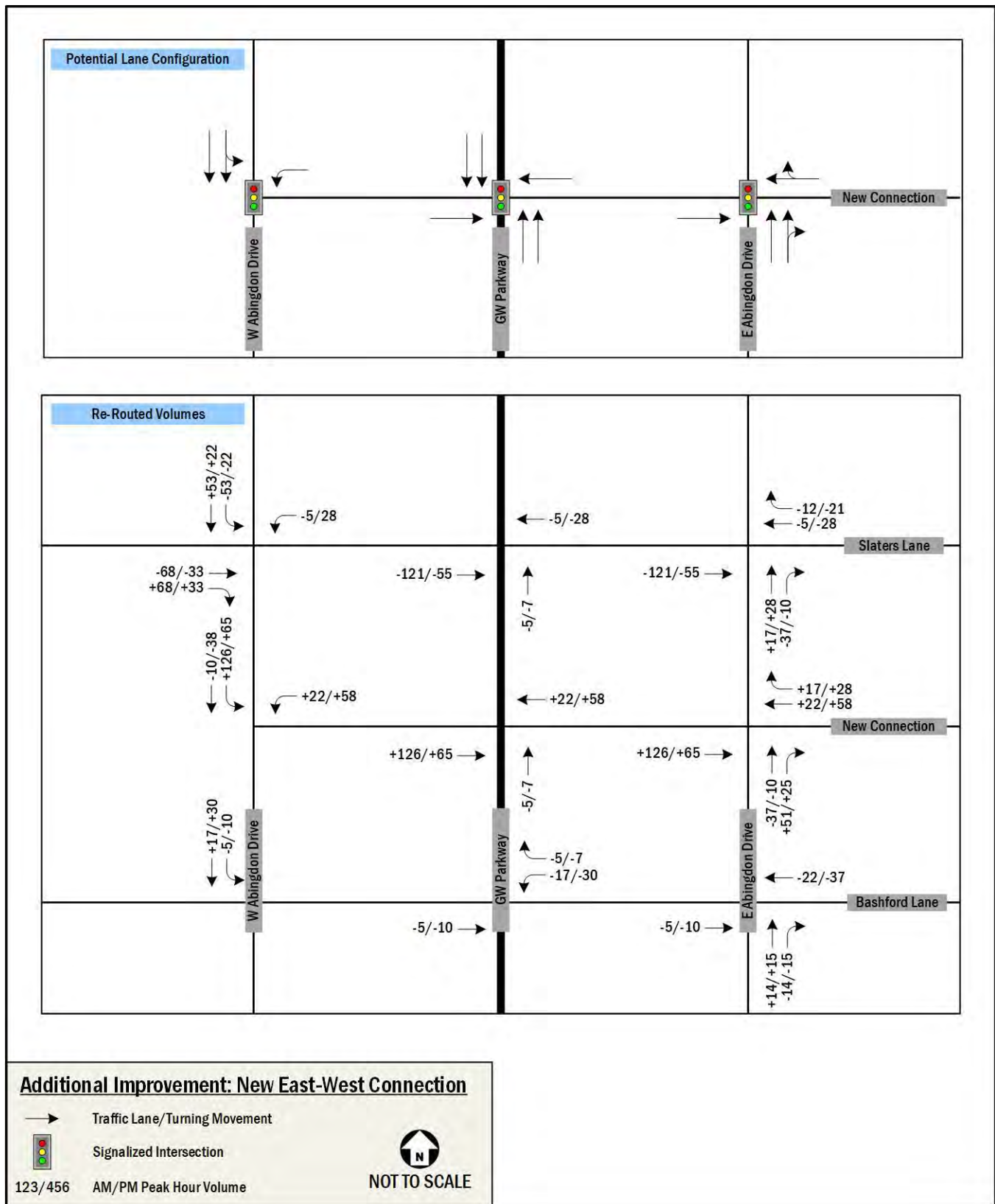


Figure 79: Additional Improvement - New East-West Connection

Table 24: Existing Capacity Analysis Results

Intersection and Movement	Existing Conditions			
	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. GW Memorial Pkwy & E Abingdon Dr (Signalized AM, Yield Control PM) Overall	154.2	F	--	--
Westbound Right	354.9	F	13.0	B
Northbound Thru	144.4	F	0.0	A
Southbound TR	0.2	A	0.0	A
2. GW Memorial Pkwy & Slaters Ln (Signalized) Overall	46.3	D	44.0	D
Eastbound Left	18.6	B	6.7	A
Eastbound LT	19.3	B	6.6	A
Westbound LTR	49.9	D	355.5	F
Northbound Thru	63.2	E	49.0	D
Southbound Thru	13.2	B	28.0	C
3. Slaters Ln & W Abingdon Dr (Signalized) Overall	45.5	D	27.3	C
Eastbound TR	67.3	E	48.9	D
Westbound Left	4.6	A	16.3	B
Westbound Thru	5.7	A	15.0	B
Southbound LTR	12.7	B	17.9	B
4. Slaters Ln & E Abingdon Dr (Signalized) Overall	8.7	A	19.4	B
Eastbound LT	11.4	B	2.4	A
Westbound Thru	52.5	D	45.5	D
Westbound Right	51.5	D	43.8	D
Northbound LTR	6.9	A	10.1	B
5. Slaters Ln & Potomac Greens Dr (Signalized) Overall	7.0	A	6.0	A
Eastbound LTR	5.7	A	1.9	A
Westbound LTR	5.6	A	6.5	A
Northbound LTR	17.1	B	17.3	B
Southbound LT	17.5	B	17.4	B
Southbound Right	17.4	B	17.4	B
6. Slaters Ln & Powhatan St (Signalized) Overall	13.4	B	20.9	C
Eastbound TR	14.3	B	22.7	C
Westbound Left	8.5	A	30.1	C
Westbound Thru	6.3	A	8.5	A
Northbound LR	15.7	B	18.7	B
7. Richmond Highway & Slaters Ln (Signalized) Overall	19.0	B	19.0	B
Westbound Right	43.3	D	32.5	C
Northbound Thru	20.3	C	20.0	B
Northbound Right	14.8	B	17.9	B
Southbound Left	28.2	C	34.5	C
Southbound Thru	10.7	B	11.4	B
8. Bashford Ln & Powhatan St (Signalized) Overall	9.7	A	6.4	A
Eastbound LTR	12.2	B	12.1	B
Westbound LTR	13.0	B	12.5	B
Northbound LT	8.5	A	4.5	A
Northbound Right	7.3	A	7.6	A
Southbound Left	9.4	A	3.4	A

Intersection and Movement	Existing Conditions			
	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
Southbound TR	9.4	A	5.9	A
9. GW Memorial Pkwy & Bashford Ln (Signalized)				
Overall	22.7	C	10.9	B
Eastbound Left	111.1	F	23.3	C
Eastbound TR	10.4	B	25.1	C
Westbound Left	9.3	A	4.8	A
Westbound TR	12.7	B	9.0	A
Northbound Thru	18.5	B	17.7	B
Southbound Thru	11.5	B	4.0	A
10. Bashford Ln & W Abingdon Dr (Signalized)				
Overall	30.7	C	6.5	A
Eastbound TR	41.4	D	31.6	C
Westbound LT	4.5	A	5.5	A
Southbound Left	9.5	A	1.5	A
Southbound TR	9.6	A	1.6	A
11. Bashford Ln & E Abingdon Dr (Signalized)				
Overall	17.8	B	25.1	C
Eastbound LT	2.6	A	5.1	A
Westbound Thru	39.3	D	40.8	D
Westbound Right	32.3	C	29.0	C
Northbound LTR	14.1	B	9.5	A
12. Bashford Ln & N Pitt St (Two-Way Stop)				
Eastbound TR	0.0	A	0.0	A
Westbound LT	0.3	A	0.2	A
Northbound LR	12.1	B	11.9	B
13. Bashford Ln & N Royal St (Two-Way Stop)				
Westbound LR	0.0	A	0.0	A
Northbound TR	0.0	A	0.0	A
Southbound LT	0.0	A	0.0	A
14. N Royal St & Third St (Two-Way Stop)				
Westbound LR	9.5	A	10.2	B
Northbound TR	0.0	A	0.0	A
Southbound LT	0.4	A	0.9	A
15. N Fairfax St & Third St				
Eastbound Thru	--	--	--	--
Northbound Thru	--	--	--	--
16. N Royal St & Second St (All-Way Stop)				
Eastbound LTR	7.7	A	7.9	A
Westbound LTR	7.9	A	8.1	A
Northbound LTR	8.8	A	9.4	A
Southbound LTR	8.0	A	8.2	A
17. N Pitt St & Second St (All-Way Stop)				
Eastbound LTR	7.9	A	7.5	A
Westbound LTR	8.8	A	7.8	A
Northbound LTR	10.7	A	7.8	A
Southbound LTR	8.0	A	7.8	A
18. E Abingdon Dr & Second St (Yield Control)				
Westbound Right	23.1	C	8.9	A
Northbound TR	0.0	A	0.0	A
19. Richmond Highway & First St (East) (Signalized)				

Intersection and Movement	Existing Conditions			
	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
Overall	20.2	C	3.1	A
Eastbound Left	3.2	A	2.3	A
Northbound Left	2.3	A	2.0	A
Northbound Thru	22.5	C	3.3	A
20. Richmond Highway & First St (West) (Signalized)				
Overall	14.6	B	14.4	B
Eastbound TR	26.8	C	24.2	C
Westbound Thru	32.0	C	31.6	C
Southbound TR	10.3	B	12.6	B
21. Richmond Highway & N Fayette St (Two-Way Stop)				
Eastbound LR	114.8	F	55.0	F
Northbound LT	0.1	A	0.4	A
Southbound TR	0.0	A	0.0	A
22. GW Memorial Pkwy & First St (Signalized)				
Overall	6.0	A	8.3	A
Westbound Right	32.3	C	32.0	C
Northbound TR	3.3	A	5.3	A
Southbound Left	19.9	B	12.1	B
Southbound Thru	5.1	A	7.7	A
23. N St Asaph St & First St (Two-Way Stop)				
Eastbound TR	0.0	A	0.0	A
Westbound LT	0.8	A	1.7	A
Northbound LR	12.0	B	13.9	B
Southbound LTR	0.0	A	0.0	A
24. N Pitt St & First St (Two-Way Stop)				
Eastbound LR	11.7	B	11.1	B
Northbound LT	2.0	A	3.9	A
Southbound TR	0.0	A	0.0	A
25. Montgomery St & N Fairfax St (All-Way Stop)				
Westbound LTR	8.1	A	9.1	A
Northbound LTR	10.8	B	9.9	A
Southbound LTR	7.5	A	11.2	B
26. Montgomery St & N Royal St (All-Way Stop)				
Westbound LTR	8.1	A	9.4	A
Northbound LT	11.5	B	10.2	B
Southbound TR	7.8	A	9.9	A
27. Montgomery St & N Pitt St (All-Way Stop)				
Westbound LTR	8.1	A	9.6	A
Northbound LT	11.3	B	9.9	A
Southbound TR	8.5	A	11.2	B
28. Montgomery St & N St Asaph St (Signalized)				
Overall	19.4	B	10.9	B
Westbound LTR	17.8	B	11.3	B
Northbound LT	20.6	C	11.3	B
Southbound TR	18.8	B	9.7	A
29. GW Memorial Pkwy & Montgomery St (Signalized)				
Overall	6.3	A	19.5	B
Westbound LTR	28.1	C	49.1	D
Northbound Left	78.3	E	74.5	A
Northbound Thru	2.3	A	9.2	A

Intersection and Movement	Existing Conditions			
	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
Southbound TR	9.1	A	13.3	B
Southeastbound Right	52.2	D	91.8	F
30. N Patrick St & Montgomery St (Signalized)				
Overall	20.2	C	15.2	B
Westbound TR	20.8	C	16.5	B
Northbound LT	20.1	C	15.0	B
31. Richmond Hwy & Montgomery St (Signalized)				
Overall	5.8	A	3.9	A
Westbound Left	13.4	B	18.9	B
Southbound Thru	4.8	A	2.8	A
32. GW Memorial Pkwy & Madison St (Signalized)				
Overall	24.0	C	9.3	A
Eastbound LTR	37.5	D	33.0	C
Northbound TR	24.9	C	12.3	B
Southbound Left	63.6	E	13.0	B
Southbound Thru	5.2	A	2.6	A
33. Richmond Hwy & Potomac Ave (Signalized)				
Overall	9.7	A	28.1	C
Westbound Left	53.7	D	55.6	E
Westbound Right	48.1	D	35.7	D
Northbound Thru	3.9	A	13.6	B
Northbound Right	2.6	A	0.4	A
Southbound Thru	11.7	B	31.9	C

Table 25: Existing Queuing Analysis Results

Intersection and Lane Group	Storage Length (ft)	Existing Conditions			
		AM Peak		PM Peak	
		50th	95th	50th	95th
1. GW Memorial Pkwy & E Abingdon Dr (Signalized AM, Yield Control PM)					
Westbound Right	840	~1183	#1333	--	8
Northbound Thru	930	~1636	m#1510	--	0
Southbound TR	2250	0	0	--	0
2. GW Memorial Pkwy & Slaters Ln (Signalized)					
Eastbound Left	850	15	m37	8	10
Eastbound LT	850	15	m38	8	10
Westbound LTR	600	21	82	~125	#247
Northbound Thru	1100	~1161	m#1218	~881	#928
Southbound Thru	3125	139	191	606	732
3. Slaters Ln & W Abingdon Dr (Signalized)					
Eastbound TR	850	301	#374	173	213
Westbound Left	600	0	m0	0	m0
Westbound Thru	600	2	m3	15	m10
Southbound LTR	850	88	123	244	305
4. Slaters Ln & E Abingdon Dr (Signalized)					
Eastbound LT	850	6	m7	1	m2
Westbound Thru	600	19	42	42	78
Westbound Right	600	0	0	0	0
Northbound LTR	1110	40	316	13	23
5. Slaters Ln & Potomac Greens Dr (Signalized)					
Eastbound LTR	480	147	142	26	m32
Westbound LTR	850	68	108	102	156
Northbound LTR	205	2	10	5	18
Southbound LT	200	9	23	7	20
Southbound Right	50	0	16	0	22
6. Slaters Ln & Powhatan St (Signalized)					
Eastbound TR	300	246	#487	298	#550
Westbound Left	140	7	25	26	#77
Westbound Thru	205	42	75	53	91
Northbound LR	750	52	78	44	73
7. Richmond Highway & Slaters Ln (Signalized)					
Westbound Right	250	228	292	200	243
Northbound Thru	1300	597	719	287	375
Northbound Right	150	145	259	69	157
Southbound Left	930	184	223	363	498
Southbound Thru	930	254	443	462	342
8. Bashford Ln & Powhatan St (Signalized)					
Eastbound LTR	400	2	10	1	6
Westbound LTR	130	6	33	3	23
Northbound LT	960	52	76	24	m32
Northbound Right	960	0	16	1	m2
Southbound Left	50	8	m14	2	m3
Southbound TR	690	24	m40	28	m36
9. GW Memorial Pkwy & Bashford Ln (Signalized)					
Eastbound Left	125	~216	#353	6	19
Eastbound TR	125	28	38	70	105
Westbound Left	530	2	m4	1	m1
Westbound TR	530	27	39	20	1
Northbound Thru	1130	470	557	405	484

Intersection and Lane Group	Storage Length (ft)	Existing Conditions			
		AM Peak		PM Peak	
		50th	95th	50th	95th
Southbound Thru	1100	115	163	22	m24
10. Bashford Ln & W Abingdon Dr (Signalized)					
Eastbound TR	125	232	308	76	120
Westbound LT	530	4	m5	9	m14
Southbound Left	120	17	m38	6	m8
Southbound TR	1060	2	m10	17	18
11. Bashford Ln & E Abingdon Dr (Signalized)					
Eastbound LT	125	2	3	12	16
Westbound Thru	530	195	264	260	342
Westbound Right	225	31	60	10	26
Northbound LTR	1000	279	306	21	32
12. Bashford Ln & N Pitt St (Two-Way Stop)					
Eastbound TR	535	--	0	--	0
Westbound LT	560	--	0	--	0
Northbound LR	670	--	15	--	8
13. Bashford Ln & N Royal St (Two-Way Stop)					
Westbound LR	100	--	0	--	0
Northbound TR	260	--	0	--	0
Southbound LT	250	--	0	--	0
14. N Royal St & Third St (Two-Way Stop)					
Westbound LR	250	--	2	--	5
Northbound TR	360	--	0	--	0
Southbound LT	560	--	0	--	1
15. N Fairfax St & Third St					
Eastbound Thru	250	--	--	--	--
Northbound Thru	350	--	--	--	--
16. N Royal St & Second St (All-Way Stop)					
Eastbound LTR	240	--	--	--	--
Westbound LTR	240	--	--	--	--
Northbound LTR	350	--	--	--	--
Southbound LTR	360	--	--	--	--
17. N Pitt St & Second St (All-Way Stop)					
Eastbound LTR	375	--	--	--	--
Westbound LTR	240	--	--	--	--
Northbound LTR	340	--	--	--	--
Southbound LTR	670	--	--	--	--
18. E Abingdon Dr & Second St (Yield Control)					
Westbound Right	450	--	106	--	6
Northbound TR	280	--	0	--	0
19. Richmond Highway & First St (East) (Signalized)					
Eastbound Left	30	5	7	3	4
Northbound Left	50	5	m7	0	m0
Northbound Thru	455	~641	#717	27	31
20. Richmond Highway & First St (West) (Signalized)					
Eastbound TR	250	131	195	65	108
Westbound Thru	30	60	105	56	97
Southbound TR	500	152	190	302	353
21. Richmond Highway & N Fayette St (Two-Way Stop)					
Eastbound LR	140	--	24	--	15
Northbound LT	515	--	0	--	1

Intersection and Lane Group	Storage Length (ft)	Existing Conditions			
		AM Peak		PM Peak	
		50th	95th	50th	95th
Southbound TR	685	--	0	--	0
22. GW Memorial Pkwy & First St (Signalized)					
Westbound Right	245	117	183	100	149
Northbound TR	210	27	28	55	61
Southbound Left	150	21	66	39	115
Southbound Thru	1130	50	65	273	312
23. N St Asaph St & First St (Two-Way Stop)					
Eastbound TR	245	--	0	--	0
Westbound LT	210	--	0	--	1
Northbound LR	345	--	23	--	20
Southbound LTR	200	--	0	--	0
24. N Pitt St & First St (Two-Way Stop)					
Eastbound LR	210	--	18	--	35
Northbound LT	340	--	4	--	3
Southbound TR	355	--	0	--	0
25. Montgomery St & N Fairfax St (All-Way Stop)					
Westbound LTR	235	--	--	--	--
Northbound LTR	330	--	--	--	--
Southbound LTR	340	--	--	--	--
26. Montgomery St & N Royal St (All-Way Stop)					
Westbound LTR	240	--	--	--	--
Northbound LT	350	--	--	--	--
Southbound TR	350	--	--	--	--
27. Montgomery St & N Pitt St (All-Way Stop)					
Westbound LTR	255	--	--	--	--
Northbound LT	350	--	--	--	--
Southbound TR	360	--	--	--	--
28. Montgomery St & N St Asaph St (Signalized)					
Westbound LTR	245	34	51	38	62
Northbound LT	350	117	179	43	81
Southbound TR	345	23	m55	28	57
29. GW Memorial Pkwy & Montgomery St (Signalized)					
Westbound LTR	235	47	65	208	252
Northbound Left	150	27	m34	64	116
Northbound Thru	345	23	23	105	116
Southbound TR	180	23	30	394	450
Southeastbound Right	345	26	58	80	#153
30. N Patrick St & Montgomery St (Signalized)					
Westbound TR	240	58	85	44	66
Northbound LT	355	396	482	208	256
31. Richmond Hwy & Montgomery St (Signalized)					
Westbound Left	240	35	m56	28	m51
Southbound Thru	355	10	12	9	10
32. GW Memorial Pkwy & Madison St (Signalized)					
Eastbound LTR	240	101	134	105	146
Northbound TR	345	555	613	212	247
Southbound Left	180	28	77	6	m8
Southbound Thru	345	30	38	53	52
33. Richmond Hwy & Potomac Ave (Signalized)					

Intersection and Lane Group	Storage Length (ft)	Existing Conditions			
		AM Peak		PM Peak	
		50th	95th	50th	95th
Westbound Left	180	134	171	377	419
Westbound Right	180	0	0	0	0
Northbound Thru	930	352	207	237	347
Northbound Right	930	505	492	0	0
Southbound Thru	400	264	487	635	#1026

95th percentile volume exceeds capacity, queue may be longer.

m Volume for 95th percentile queue is metered by upstream signal.

~ Volume exceeds capacity, queue is theoretically infinite.

Table 26: 2033 Capacity Analysis Results

Intersection and Movement	Background (2033)				Future (2033)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. GW Memorial Pkwy & E Abingdon Dr (Signalized AM, Yield Control PM) Overall	143.5	F	--	--	140.3	F	--	--
Westbound Right	325.3	F	12.6	B	325.7	F	13.4	B
Northbound Thru	142.2	F	0.0	A	142.3	F	0.0	A
Southbound TR	0.3	A	0.0	A	0.3	A	0.0	A
2. GW Memorial Pkwy & Slaters Ln (Signalized) Overall	42.8	D	37.1	D	111.9	F	460.2	F
Eastbound Left	36.8	D	9.4	A	180.6	F	22.1	C
Eastbound LT	32.9	C	10.0	A	170.9	F	20.8	C
Westbound LTR	67.4	E	109.1	F	192.2	F	4880.5	F
Northbound Thru	53.1	D	45.5	D	106.0	F	51.6	D
Southbound Thru	13.5	B	32.8	C	17.6	B	35.3	D
3. Slaters Ln & W Abingdon Dr (Signalized) Overall	49.7	D	29.9	C	85.9	F	31.8	C
Eastbound TR	76.1	E	51.1	D	139.9	F	53.6	D
Westbound Left	7.0	A	12.9	B	13.7	B	21.0	C
Westbound Thru	8.6	A	9.9	A	12.8	B	21.7	C
Southbound LTR	13.4	B	20.1	C	18.4	B	21.9	C
4. Slaters Ln & E Abingdon Dr (Signalized) Overall	8.8	A	13.2	B	13.8	B	82.2	F
Eastbound LT	9.9	A	5.4	A	10.9	B	5.8	A
Westbound Thru	51.9	D	44.4	D	47.8	D	148.7	F
Westbound Right	51.0	D	43.9	D	44.6	D	44.0	D
Northbound LTR	7.0	A	10.8	B	10.9	B	11.4	B
5. Slaters Ln & Potomac Greens Dr (Signalized) Overall	7.3	A	5.7	A	7.5	A	6.6	A
Eastbound LTR	6.0	A	1.9	A	6.7	A	2.1	A
Westbound LTR	6.1	A	6.8	A	6.4	A	8.8	A
Northbound LTR	17.0	B	17.3	B	17.1	B	17.3	B
Southbound LT	18.8	B	17.4	B	17.5	B	17.4	B
Southbound Right	17.0	B	17.4	B	17.4	B	17.4	B
6. Slaters Ln & Powhatan St (Signalized) Overall	13.8	B	26.0	C	23.7	C	37.8	D
Eastbound TR	15.0	B	29.8	C	28.9	C	47.8	D
Westbound Left	9.5	A	26.7	C	10.8	B	32.0	C
Westbound Thru	7.2	A	8.7	A	6.9	A	9.3	A
Northbound LR	15.8	B	19.3	B	16.0	B	19.5	B
7. Richmond Highway & Slaters Ln (Signalized) Overall	37.9	D	24.9	C	42.8	D	25.9	C
Westbound Right	43.6	D	29.5	C	44.0	D	32.1	C
Northbound Thru	54.5	D	25.5	C	63.4	E	27.0	C
Northbound Right	18.3	B	21.8	C	20.8	C	24.1	C
Southbound Left	29.0	C	29.8	C	32.0	C	31.3	C
Southbound Thru	13.1	B	22.9	C	13.9	B	22.6	C
8. Bashford Ln & Powhatan St (Signalized) Overall	9.7	A	6.0	A	10.0	A	5.9	A
Eastbound LTR	12.2	B	12.1	B	12.2	B	12.1	B
Westbound LTR	12.9	B	12.5	B	13.0	B	12.5	B
Northbound LT	8.5	A	4.7	A	8.5	A	4.3	A
Northbound Right	7.4	A	7.6	A	7.4	A	7.6	A
Southbound Left	9.2	A	3.4	A	9.9	A	3.3	A

Intersection and Movement	Background (2033)				Future (2033)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Southbound TR	9.2	A	5.4	A	10.0	B	5.3	A
9. GW Memorial Pkwy & Bashford Ln (Signalized)								
Overall	21.2	C	11.7	B	21.4	C	10.9	B
Eastbound Left	80.6	F	24.5	C	96.9	F	25.7	C
Eastbound TR	11.4	B	27.5	C	13.0	B	29.6	C
Westbound Left	13.0	B	6.2	A	10.4	B	6.8	A
Westbound TR	18.2	B	9.8	A	12.4	B	8.2	A
Northbound Thru	19.4	B	18.5	B	19.3	B	18.4	B
Southbound Thru	11.4	B	4.5	A	11.3	B	2.7	A
10. Bashford Ln & W Abingdon Dr (Signalized)								
Overall	29.3	C	5.8	A	30.1	C	6.4	A
Eastbound TR	40.2	D	31.3	C	40.4	D	31.7	C
Westbound LT	4.2	A	4.6	A	4.2	A	5.8	A
Southbound Left	10.4	B	1.2	A	14.7	B	1.8	A
Southbound TR	10.9	B	1.2	A	16.6	B	1.9	A
11. Bashford Ln & E Abingdon Dr (Signalized)								
Overall	17.0	B	23.0	C	18.9	B	25.9	C
Eastbound LT	2.6	A	2.9	A	2.9	A	3.1	A
Westbound Thru	38.0	D	39.5	D	41.7	D	45.1	D
Westbound Right	32.3	C	28.9	C	32.3	C	28.9	C
Northbound LTR	13.7	B	9.5	A	14.6	B	9.7	A
12. Bashford Ln & N Pitt St (Two-Way Stop)								
Eastbound TR	0.0	A	0.0	A	0.0	A	0.0	A
Westbound LT	0.3	A	0.2	A	0.3	A	0.2	A
Northbound LR	12.0	B	11.8	B	13.3	B	13.4	B
13. Bashford Ln & N Royal St (Two-Way Stop)								
Westbound LR	0.0	A	0.0	A	11.6	B	15.6	C
Northbound TR	0.0	A	0.0	A	6.1	A	7.2	A
Southbound LT	0.0	A	0.0	A	0.0	A	0.0	A
14. N Royal St & Third St (Two-Way Stop)								
Westbound LR	9.4	A	10.0	B	10.0	A	10.6	B
Northbound TR	0.0	A	0.0	A	0.0	A	0.0	A
Southbound LT	0.3	A	0.9	A	0.3	A	0.7	A
15. N Fairfax St & Third St (All-Way Stop)								
Eastbound LR	--	--	--	--	6.7	A	6.8	A
Northbound LT	--	--	--	--	7.4	A	7.6	A
Southbound TR	--	--	--	--	7.1	A	7.5	A
16. N Royal St & Second St (All-Way Stop)								
Eastbound LTR	7.5	A	7.8	A	8.4	A	8.3	A
Westbound LTR	7.9	A	8.0	A	8.1	A	8.3	A
Northbound LTR	8.7	A	9.2	A	9.4	A	10.0	A
Southbound LTR	8.0	A	8.1	A	8.3	A	8.6	A
17. N Pitt St & Second St (All-Way Stop)								
Eastbound LTR	7.8	A	7.4	A	8.3	A	7.5	A
Westbound LTR	8.8	A	7.8	A	8.9	A	7.8	A
Northbound LTR	10.3	A	7.7	A	10.6	B	7.7	A
Southbound LTR	7.9	A	7.8	A	8.0	A	7.8	A
18. E Abingdon Dr & Second St (Yield Control)								
Westbound Right	20.7	C	9.0	A	25.2	D	9.2	A
Northbound TR	0.0	A	0.0	A	0.0	A	0.0	A

Intersection and Movement	Background (2033)				Future (2033)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
19. Richmond Highway & First St (East) (Signalized)								
Overall	99.8	F	2.8	A	106.8	F	2.7	A
Eastbound Left	3.6	A	1.9	A	3.6	A	1.8	A
Northbound Left	2.3	A	1.7	A	2.3	A	1.7	A
Northbound Thru	112.2	F	2.9	A	119.8	F	2.9	A
20. Richmond Highway & First St (West) (Signalized)								
Overall	22.6	C	10.1	B	22.6	C	10.4	B
Eastbound TR	30.1	C	25.1	C	30.1	C	25.1	C
Westbound Thru	31.1	C	36.0	D	31.1	C	35.9	D
Southbound TR	20.1	C	7.4	A	20.2	C	7.9	A
21. Richmond Highway & N Fayette St (Signalized)								
Overall	120.7	F	18.5	B	126.5	F	19.9	B
Eastbound LR	24.1	C	24.1	C	24.1	C	24.1	C
Northbound LT	177.1	F	21.9	C	185.4	F	24.1	C
Southbound TR	10.7	B	15.5	B	10.7	B	16.3	B
22. GW Memorial Pkwy & First St (Signalized)								
Overall	5.2	A	8.5	A	5.5	A	8.7	A
Westbound Right	32.3	C	31.8	C	32.3	C	31.8	C
Northbound TR	2.0	A	5.3	A	2.5	A	5.4	A
Southbound Left	18.7	B	14.2	B	20.0	C	15.8	B
Southbound Thru	5.2	A	7.9	A	5.3	A	8.3	A
23. N St Asaph St & First St (Two-Way Stop)								
Eastbound TR	0.0	A	0.0	A	0.0	A	0.0	A
Westbound LT	1.8	A	2.6	A	1.8	A	2.6	A
Northbound LR	12.1	B	14.0	B	12.2	B	14.0	B
Southbound LTR	0.0	A	0.0	A	0.0	A	0.0	A
24. N Pitt St & First St (Two-Way Stop)								
Eastbound LR	11.2	B	10.8	B	11.5	B	10.9	B
Northbound LT	2.0	A	3.8	A	2.0	A	3.8	A
Southbound TR	0.0	A	0.0	A	0.0	A	0.0	A
25. Montgomery St & N Fairfax St (All-Way Stop)								
Westbound LTR	8.0	A	8.9	A	8.2	A	9.2	A
Northbound LTR	10.1	B	9.4	A	10.7	B	10.1	B
Southbound LTR	7.5	A	10.2	B	7.6	A	12.1	B
26. Montgomery St & N Royal St (All-Way Stop)								
Westbound LTR	7.9	A	9.0	A	8.2	A	9.6	A
Northbound LT	11.0	B	9.9	A	12.1	B	11.0	B
Southbound TR	7.7	A	9.5	A	7.9	A	10.4	B
27. Montgomery St & N Pitt St (All-Way Stop)								
Westbound LTR	8.0	A	9.2	A	8.1	A	9.6	A
Northbound LT	10.7	B	9.5	A	10.8	B	9.7	A
Southbound TR	8.4	A	10.7	B	8.5	A	11.0	B
28. Montgomery St & N St Asaph St (Signalized)								
Overall	19.3	B	10.8	B	19.3	B	11.0	B
Westbound LTR	17.7	B	11.2	B	17.8	B	11.5	B
Northbound LT	20.5	C	11.1	B	20.5	C	11.1	B
Southbound TR	18.6	B	9.6	A	18.9	B	9.7	A
29. GW Memorial Pkwy & Montgomery St (Signalized)								
Overall	6.1	A	19.2	B	6.2	A	20.5	C
Westbound LTR	28.7	C	48.3	D	28.1	C	50.0	D

Intersection and Movement	Background (2033)				Future (2033)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Northbound Left	79.1	E	76.2	E	77.4	E	75.6	E
Northbound Thru	1.6	A	9.3	A	1.8	A	9.3	A
Southbound TR	9.1	A	13.9	B	9.2	A	14.7	B
Southeastbound Right	52.8	D	96.8	F	52.8	D	111.2	F
30. N Patrick St & Montgomery St (Signalized)								
Overall	59.8	E	17.4	B	66.0	E	17.7	B
Westbound TR	20.6	C	16.3	B	20.9	C	16.8	B
Northbound LT	63.4	E	17.6	B	70.4	E	17.8	B
31. Richmond Hwy & Montgomery St (Signalized)								
Overall	6.7	A	4.1	A	6.8	A	4.5	A
Westbound Left	12.3	B	19.6	B	12.3	B	19.2	B
Southbound Thru	6.2	A	3.2	A	6.2	A	3.4	A
32. GW Memorial Pkwy & Madison St (Signalized)								
Overall	24.4	C	9.4	A	27.0	C	9.6	A
Eastbound LTR	37.5	D	33.2	C	38.0	D	33.8	C
Northbound TR	25.6	C	12.6	B	29.0	C	12.9	B
Southbound Left	64.7	E	16.6	B	71.9	E	18.7	B
Southbound Thru	5.3	A	2.5	A	5.3	A	2.4	A
33. Richmond Hwy & Potomac Ave (Signalized)								
Overall	12.5	B	76.6	E	12.6	B	77.8	E
Westbound Left	56.2	E	211.6	F	56.9	E	218.1	F
Westbound Right	46.3	D	33.4	C	45.7	D	33.4	C
Northbound Thru	7.0	A	26.1	C	7.2	A	26.6	C
Northbound Right	4.7	A	0.4	A	2.4	A	0.4	A
Southbound Thru	14.4	B	30.3	C	15.6	B	31.7	C
34. Slaters Ln & Primary St/Woonerf St - Planned (All-Way Stop)								
Eastbound TR	--	--	--	--	8.5	A	8.2	A
Westbound LT	--	--	--	--	7.5	A	8.4	A
Northbound LR	--	--	--	--	8.2	A	10.7	B
35. Primary St & Lane C - Planned (All-Way Stop)								
Westbound LR	--	--	--	--	7.5	A	8.5	A
Northbound TR	--	--	--	--	7.4	A	8.4	A
Southbound LT	--	--	--	--	9.4	A	8.6	A
36. Lane C & Woonerf St - Planned (All-Way Stop)								
Eastbound LR	--	--	--	--	7.2	A	7.4	A
Northbound LT	--	--	--	--	7.1	A	7.3	A
Southbound TR	--	--	--	--	6.7	A	6.8	A
37. Primary St & Lane B (North) - Planned (All-Way Stop)								
Westbound LR	--	--	--	--	6.8	A	7.4	A
Northbound TR	--	--	--	--	7.5	A	7.4	A
Southbound LT	--	--	--	--	7.5	A	7.7	A
38. Primary St & Lane B (South) - Planned (All-Way Stop)								
Westbound LR	--	--	--	--	7.2	A	7.1	A
Northbound TR	--	--	--	--	7.4	A	7.1	A
Southbound LT	--	--	--	--	7.3	A	7.7	A
39. Primary St & Lane A - Planned (All-Way Stop)								
Eastbound LTR	--	--	--	--	8.0	A	8.2	A
Westbound LTR	--	--	--	--	7.6	A	8.1	A
Northbound LTR	--	--	--	--	7.4	A	7.6	A

Intersection and Movement	Background (2033)				Future (2033)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Southbound LTR	--	--	--	--	7.4	A	7.9	A
40. Lane A & Woonerf St - Planned (All-Way Stop)								
Eastbound LR	--	--	--	--	6.9	A	7.0	A
Northbound LT	--	--	--	--	7.1	A	7.2	A
Southbound TR	--	--	--	--	6.7	A	6.9	A
41. Primary St & Fairfax St/Woonerf St - Planned (All-Way Stop)								
Eastbound LR	--	--	--	--	6.6	A	6.7	A
Northbound LT	--	--	--	--	7.3	A	7.4	A
Southbound TR	--	--	--	--	7.0	A	7.2	A

Table 27: 2033 Queuing Analysis Results

Intersection and Lane Group	Storage Length (ft)	Background (2033)				Future (2033)			
		AM Peak		PM Peak		AM Peak		PM Peak	
		50th	95th	50th	95th	50th	95th	50th	95th
1. GW Memorial Pkwy & E Abingdon Dr (Signalized AM, Yield Control PM)									
Westbound Right	840	~1113	#1372	--	6	~1119	#1378	--	15
Northbound Thru	930	~1622	m#1550	--	0	~1647	m#1184	--	0
Southbound TR	2250	0	0	--	0	0	0	--	0
2. GW Memorial Pkwy & Slaters Ln (Signalized)									
Eastbound Left	850	~33	m#51	8	13	~522	m#445	29	m#82
Eastbound LT	850	27	m#46	8	16	~524	m#447	30	m#80
Westbound LTR	600	28	97	66	#169	~142	#279	~608	m#571
Northbound Thru	1100	~1102	m#1294	~611	#974	~1177	m#1292	~620	#983
Southbound Thru	3125	138	195	673	#864	154	195	668	#827
3. Slaters Ln & W Abingdon Dr (Signalized)									
Eastbound TR	850	320	#450	212	276	~458	#592	247	317
Westbound Left	600	0	m0	0	m0	0	m0	0	m0
Westbound Thru	600	3	m7	3	m8	10	m8	59	m6
Southbound LTR	850	105	154	296	365	153	197	324	397
4. Slaters Ln & E Abingdon Dr (Signalized)									
Eastbound LT	850	2	m2	1	m7	28	m21	3	m18
Westbound Thru	600	19	44	12	34	76	132	~330	#522
Westbound Right	600	0	0	0	0	0	0	0	20
Northbound LTR	1110	38	366	14	26	334	390	14	27
5. Slaters Ln & Potomac Greens Dr (Signalized)									
Eastbound LTR	480	154	183	28	m33	185	m228	35	m36
Westbound LTR	850	86	145	113	188	98	164	177	296
Northbound LTR	205	1	9	5	18	1	9	5	18
Southbound LT	200	26	58	6	20	8	23	6	20
Southbound Right	50	0	0	0	22	0	15	0	22
6. Slaters Ln & Powhatan St (Signalized)									
Eastbound TR	300	258	#559	~440	#660	~406	#693	~507	#731
Westbound Left	140	7	m27	23	#76	7	m25	29	m#60
Westbound Thru	205	65	123	58	106	71	128	103	173
Northbound LR	750	54	91	45	79	55	93	48	83
7. Richmond Highway & Slaters Ln (Signalized)									
Westbound Right	250	276	365	191	275	309	405	291	407
Northbound Thru	1300	~1183	#1328	436	491	~1186	#1330	436	491
Northbound Right	150	222	382	136	226	256	438	172	270
Southbound Left	930	208	211	357	m334	302	299	464	m424
Southbound Thru	930	373	542	1153	m710	382	559	1153	m695
8. Bashford Ln & Powhatan St (Signalized)									
Eastbound LTR	400	2	11	1	6	2	11	1	6
Westbound LTR	130	5	36	3	25	5	36	3	26
Northbound LT	960	54	84	25	m35	55	84	22	m31
Northbound Right	960	0	18	1	m2	0	18	0	m1
Southbound Left	50	8	m13	2	m3	10	m14	3	m3
Southbound TR	690	23	m37	27	m31	27	m35	27	m29
9. GW Memorial Pkwy & Bashford Ln (Signalized)									
Eastbound Left	125	~179	#344	7	21	~190	#352	7	21
Eastbound TR	125	30	44	84	154	34	53	103	245
Westbound Left	530	3	m8	1	m2	9	m16	6	m9
Westbound TR	530	50	73	17	24	31	48	0	22
Northbound Thru	1130	505	600	437	523	504	597	434	519

Intersection and Lane Group	Storage Length (ft)	Background (2033)				Future (2033)			
		AM Peak		PM Peak		AM Peak		PM Peak	
		50th	95th	50th	95th	50th	95th	50th	95th
Southbound Thru	1100	119	167	18	28	119	m165	31	m32
10. Bashford Ln & W Abingdon Dr (Signalized)									
Eastbound TR	125	210	304	69	119	214	309	78	130
Westbound LT	530	4	m5	8	m10	4	m5	8	m17
Southbound Left	120	19	m48	5	m7	30	m61	8	m12
Southbound TR	1060	2	m12	13	13	4	m14	20	23
11. Bashford Ln & E Abingdon Dr (Signalized)									
Eastbound LT	125	2	3	4	6	3	4	5	6
Westbound Thru	530	169	250	239	342	236	337	315	440
Westbound Right	225	30	62	8	25	31	63	8	25
Northbound LTR	1000	259	312	23	37	297	357	26	43
12. Bashford Ln & N Pitt St (Two-Way Stop)									
Eastbound TR	535	--	0	--	0	--	0	--	0
Westbound LT	560	--	0	--	0	--	0	--	0
Northbound LR	670	--	14	--	7	--	17	--	9
13. Bashford Ln & N Royal St (Two-Way Stop)									
Westbound LR	100	--	0	--	0	--	23	--	42
Northbound TR	260	--	0	--	0	--	14	--	21
Southbound LT	250	--	0	--	0	--	0	--	0
14. N Royal St & Third St (Two-Way Stop)									
Westbound LR	250	--	2	--	5	--	3	--	5
Northbound TR	360	--	0	--	0	--	0	--	0
Southbound LT	560	--	0	--	1	--	0	--	1
15. N Fairfax St & Third St (All-Way Stop)									
Eastbound LR	250	--	--	--	--	--	--	--	--
Northbound LT	350	--	--	--	--	--	--	--	--
Southbound TR	230	--	--	--	--	--	--	--	--
16. N Royal St & Second St (All-Way Stop)									
Eastbound LTR	240	--	--	--	--	--	--	--	--
Westbound LTR	240	--	--	--	--	--	--	--	--
Northbound LTR	350	--	--	--	--	--	--	--	--
Southbound LTR	360	--	--	--	--	--	--	--	--
17. N Pitt St & Second St (All-Way Stop)									
Eastbound LTR	375	--	--	--	--	--	--	--	--
Westbound LTR	240	--	--	--	--	--	--	--	--
Northbound LTR	340	--	--	--	--	--	--	--	--
Southbound LTR	670	--	--	--	--	--	--	--	--
18. E Abingdon Dr & Second St (Yield Control)									
Westbound Right	450	--	92	--	6	--	112	--	7
Northbound TR	280	--	0	--	0	--	0	--	0
19. Richmond Highway & First St (East) (Signalized)									
Eastbound Left	30	8	12	3	4	8	12	2	4
Northbound Left	50	6	m6	0	m0	6	m6	0	m0
Northbound Thru	455	~832	m#743	26	29	~852	m#743	26	29
20. Richmond Highway & First St (West) (Signalized)									
Eastbound TR	250	174	275	92	156	174	275	93	156
Westbound Thru	30	65	117	64	116	65	117	64	116
Southbound TR	500	263	316	105	#129	265	318	113	#145
21. Richmond Highway & N Fayette St (Signalized)									

Intersection and Lane Group	Storage Length (ft)	Background (2033)				Future (2033)			
		AM Peak		PM Peak		AM Peak		PM Peak	
		50th	95th	50th	95th	50th	95th	50th	95th
Eastbound LR	140	51	94	47	88	51	94	47	88
Northbound LT	515	~1065	m#813	~421	#524	~1086	m#814	~434	#537
Southbound TR	685	240	295	436	#587	242	298	~467	#610
22. GW Memorial Pkwy & First St (Signalized)									
Westbound Right	245	120	188	92	150	120	188	92	150
Northbound TR	210	13	13	57	63	13	21	58	65
Southbound Left	150	18	61	54	131	18	61	64	142
Southbound Thru	1130	53	68	297	338	59	75	326	371
23. N St Asaph St & First St (Two-Way Stop)									
Eastbound TR	245	--	0	--	0	--	0	--	0
Westbound LT	210	--	1	--	2	--	1	--	2
Northbound LR	345	--	24	--	19	--	24	--	19
Southbound LTR	200	--	0	--	0	--	0	--	0
24. N Pitt St & First St (Two-Way Stop)									
Eastbound LR	210	--	17	--	31	--	19	--	32
Northbound LT	340	--	4	--	3	--	4	--	3
Southbound TR	355	--	0	--	0	--	0	--	0
25. Montgomery St & N Fairfax St (All-Way Stop)									
Westbound LTR	235	--	--	--	--	--	--	--	--
Northbound LTR	330	--	--	--	--	--	--	--	--
Southbound LTR	340	--	--	--	--	--	--	--	--
26. Montgomery St & N Royal St (All-Way Stop)									
Westbound LTR	240	--	--	--	--	--	--	--	--
Northbound LT	350	--	--	--	--	--	--	--	--
Southbound TR	350	--	--	--	--	--	--	--	--
27. Montgomery St & N Pitt St (All-Way Stop)									
Westbound LTR	255	--	--	--	--	--	--	--	--
Northbound LT	350	--	--	--	--	--	--	--	--
Southbound TR	360	--	--	--	--	--	--	--	--
28. Montgomery St & N St Asaph St (Signalized)									
Westbound LTR	245	32	52	37	60	36	57	43	68
Northbound LT	350	113	174	40	78	113	174	40	78
Southbound TR	345	21	m57	25	60	21	m55	25	63
29. GW Memorial Pkwy & Montgomery St (Signalized)									
Westbound LTR	235	47	71	180	240	50	73	207	266
Northbound Left	150	32	m37	68	#130	32	m35	68	#129
Northbound Thru	345	13	13	110	121	13	16	114	124
Southbound TR	180	24	31	427	487	27	34	469	534
Southeastbound Right	345	28	66	83	#179	29	66	93	#204
30. N Patrick St & Montgomery St (Signalized)									
Westbound TR	240	56	88	40	65	61	95	54	83
Northbound LT	355	~677	#773	276	337	~698	#793	283	344
31. Richmond Hwy & Montgomery St (Signalized)									
Westbound Left	240	36	m60	26	m47	42	m69	45	m74
Southbound Thru	355	27	28	16	17	27	29	16	17
32. GW Memorial Pkwy & Madison St (Signalized)									
Eastbound LTR	240	99	142	109	152	108	153	124	170
Northbound TR	345	573	648	228	265	644	726	241	278
Southbound Left	180	27	75	5	m7	27	76	5	m6
Southbound Thru	345	32	40	53	51	36	44	50	51

Intersection and Lane Group	Storage Length (ft)	Background (2033)				Future (2033)			
		AM Peak		PM Peak		AM Peak		PM Peak	
		50th	95th	50th	95th	50th	95th	50th	95th
33. Richmond Hwy & Potomac Ave (Signalized)									
Westbound Left	180	196	252	~880	#1018	213	267	~896	#1034
Westbound Right	180	0	0	0	0	0	0	0	0
Northbound Thru	930	546	m384	465	540	646	m648	503	580
Northbound Right	930	520	m542	0	0	532	m520	0	0
Southbound Thru	400	325	615	540	#858	352	686	566	#944
34. Slaters Ln & Primary St/Woonerf St - Planned (All-Way Stop)									
Eastbound TR	600	--	--	--	--	--	--	--	--
Westbound LT	570	--	--	--	--	--	--	--	--
Northbound LR	270	--	--	--	--	--	--	--	--
35. Primary St & Lane C - Planned (All-Way Stop)									
Westbound LR	350	--	--	--	--	--	--	--	--
Northbound TR	250	--	--	--	--	--	--	--	--
Southbound LT	270	--	--	--	--	--	--	--	--
36. Lane C & Woonerf St - Planned (All-Way Stop)									
Eastbound LR	350	--	--	--	--	--	--	--	--
Northbound LT	650	--	--	--	--	--	--	--	--
Southbound TR	570	--	--	--	--	--	--	--	--
37. Primary St & Lane B (North) - Planned (All-Way Stop)									
Westbound LR	550	--	--	--	--	--	--	--	--
Northbound TR	425	--	--	--	--	--	--	--	--
Southbound LT	250	--	--	--	--	--	--	--	--
38. Primary St & Lane B (South) - Planned (All-Way Stop)									
Westbound LR	550	--	--	--	--	--	--	--	--
Northbound TR	270	--	--	--	--	--	--	--	--
Southbound LT	425	--	--	--	--	--	--	--	--
39. Primary St & Lane A - Planned (All-Way Stop)									
Eastbound LTR	100	--	--	--	--	--	--	--	--
Westbound LTR	350	--	--	--	--	--	--	--	--
Northbound LTR	330	--	--	--	--	--	--	--	--
Southbound LTR	270	--	--	--	--	--	--	--	--
40. Lane A & Woonerf St - Planned (All-Way Stop)									
Eastbound LR	350	--	--	--	--	--	--	--	--
Northbound LT	450	--	--	--	--	--	--	--	--
Southbound TR	650	--	--	--	--	--	--	--	--
41. Primary St & Fairfax St/Woonerf St - Planned (All-Way Stop)									
Eastbound LR	330	--	--	--	--	--	--	--	--
Northbound LT	230	--	--	--	--	--	--	--	--
Southbound TR	450	--	--	--	--	--	--	--	--

95th percentile volume exceeds capacity, queue may be longer.

m Volume for 95th percentile queue is metered by upstream signal.

~ Volume exceeds capacity, queue is theoretically infinite.

Table 28: 2033 Mitigated Capacity Analysis Results

Intersection and Movement	Background (2033)				Future (2033)				Future (2033) with Mitigations			
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. GW Memorial Pkwy & E Abingdon Dr (Signalized AM, Yield Control PM) Overall	143.5	F	--	--	140.3	F	--	--	94.4	F	7.8	A
Westbound Right	325.3	F	12.6	B	325.7	F	13.4	B	73.9	E	49.8	D
Northbound Thru	142.2	F	0.0	A	142.3	F	0.0	A	141.2	F	9.2	A
Southbound TR	0.3	A	0.0	A	0.3	A	0.0	A	0.3	A	4.3	A
2. GW Memorial Pkwy & Slaters Ln (Signalized) Overall	42.8	D	37.1	D	111.9	F	460.2	F	73.6	E	42.7	D
Eastbound Left	36.8	D	9.4	A	180.6	F	22.1	C	74.7	E	19.6	B
Eastbound LT	32.9	C	10.0	A	170.9	F	20.8	C	77.5	E	18.6	B
Westbound LTR	67.4	E	109.1	F	192.2	F	4880.5	F	--	--	--	--
Westbound Thru	--	--	--	--	--	--	--	--	3.6	A	75.7	E
Northbound Thru	53.1	D	45.5	D	106.0	F	51.6	D	90.8	F	55.5	E
Southbound Thru	13.5	B	32.8	C	17.6	B	35.3	D	16.4	B	31.1	C
3. Slaters Ln & W Abingdon Dr (Signalized) Overall	49.7	D	29.9	C	85.9	F	31.8	C	41.1	D	24.2	C
Eastbound TR	76.1	E	51.1	D	139.9	F	53.6	D	--	--	--	--
Eastbound Thru	--	--	--	--	--	--	--	--	67.4	E	52.7	D
Westbound Left	7.0	A	12.9	B	13.7	B	21.0	C	5.7	A	11.3	B
Westbound Thru	8.6	A	9.9	A	12.8	B	21.7	C	2.9	A	10.9	B
Southbound LTR	13.4	B	20.1	C	18.4	B	21.9	C	--	--	--	--
Southbound LT	--	--	--	--	--	--	--	--	14.1	B	16.8	B
Southbound Right	--	--	--	--	--	--	--	--	3.2	A	5.4	A
4. Slaters Ln & E Abingdon Dr (Signalized) Overall	8.8	A	13.2	B	13.8	B	82.2	F	12.4	B	39.9	D
Eastbound LT	9.9	A	5.4	A	10.9	B	5.8	A	--	--	--	--
Eastbound Thru	--	--	--	--	--	--	--	--	7.1	A	5.8	A
Westbound Thru	51.9	D	44.4	D	47.8	D	148.7	F	54.1	D	71.7	E
Westbound Right	51.0	D	43.9	D	44.6	D	44.0	D	51.9	D	44.5	D
Northbound LTR	7.0	A	10.8	B	10.9	B	11.4	B	9.2	A	11.6	B
9. GW Memorial Pkwy & Bashford Ln (Signalized) Overall	21.2	C	11.7	B	21.4	C	10.9	B	16.7	B	11.9	B
Eastbound Left	80.6	F	24.5	C	96.9	F	25.7	C	--	--	--	--
Eastbound TR	11.4	B	27.5	C	13.0	B	29.6	C	--	--	--	--
Eastbound LT	--	--	--	--	--	--	--	--	15.5	B	30.5	C
Westbound Left	13.0	B	6.2	A	10.4	B	6.8	A	--	--	--	--
Westbound TR	18.2	B	9.8	A	12.4	B	8.2	A	--	--	--	--
Westbound LTR	--	--	--	--	--	--	--	--	13.9	B	4.6	A
Northbound Thru	19.4	B	18.5	B	19.3	B	18.4	B	19.3	B	20.1	C
Southbound Thru	11.4	B	4.5	A	11.3	B	2.7	A	12.0	B	4.4	A
10. Bashford Ln & W Abingdon Dr (Signalized) Overall	29.3	C	5.8	A	30.1	C	6.4	A	25.8	C	6.7	A
Eastbound TR	40.2	D	31.3	C	40.4	D	31.7	C	40.4	D	30.1	C
Westbound LT	4.2	A	4.6	A	4.2	A	5.8	A	--	--	--	--
Westbound Left	--	--	--	--	--	--	--	--	3.5	A	3.5	A
Westbound Thru	--	--	--	--	--	--	--	--	3.8	A	4.2	A
Southbound Left	10.4	B	1.2	A	14.7	B	1.8	A	7.1	A	2.8	A

Intersection and Movement	Background (2033)				Future (2033)				Future (2033) with Mitigations			
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Southbound TR	10.9	B	1.2	A	16.6	B	1.9	A	6.4	A	3.0	A
11. Bashford Ln & E Abingdon Dr (Signalized)												
Overall	17.0	B	23.0	C	18.9	B	25.9	C	18.8	B	24.9	C
Eastbound LT	2.6	A	2.9	A	2.9	A	3.1	A	--	--	--	--
Eastbound Left	--	--	--	--	--	--	--	--	1.7	A	1.4	A
Eastbound Thru	--	--	--	--	--	--	--	--	2.5	A	4.6	A
Westbound Thru	38.0	D	39.5	D	41.7	D	45.1	D	41.7	D	41.9	D
Westbound Right	32.3	C	28.9	C	32.3	C	28.9	C	32.3	C	27.6	C
Northbound LTR	13.7	B	9.5	A	14.6	B	9.7	A	14.6	B	10.5	B
29. GW Memorial Pkwy & Montgomery St (Signalized)												
Overall	6.1	A	19.2	B	6.2	A	20.5	C	NO MITIGATIONS		20.5	C
Westbound LTR	28.7	C	48.3	D	28.1	C	50.0	D			50.0	D
Northbound Left	79.1	E	76.2	E	77.4	E	75.6	E			71.9	E
Northbound Thru	1.6	A	9.3	A	1.8	A	9.3	A			9.3	A
Southbound TR	9.1	A	13.9	B	9.2	A	14.7	B			15.7	B
Southeastbound Right	52.8	D	96.8	F	52.8	D	111.2	F			95.8	F

Table 29: 2033 Mitigated Queuing Analysis Results

Intersection and Lane Group	Storage Length (ft)	Background (2033)				Future (2033)				Future (2033) with Mitigations			
		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
		50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
1. GW Memorial Pkwy & E Abingdon Dr (Signalized AM, Yield Control PM)													
Westbound Right	840	~1113	#1372	--	6	~1119	#1378	--	15	464	#570	68	113
Northbound Thru	930	~1622	m#1550	--	0	~1647	m#1184	--	0	~1633	m#1332	217	m223
Southbound TR	2250	0	0	--	0	0	0	--	0	0	0	0	0
2. GW Memorial Pkwy & Slaters Ln (Signalized)													
Eastbound Left	850	~33	m#51	8	13	~522	m#445	29	m#82	~446	m#511	29	m#80
Eastbound LT	850	27	m#46	8	16	~524	m#447	30	m#80	~465	m#532	29	m#80
Westbound LTR	600	28	97	66	#169	~142	#279	~608	m#571	--	--	--	--
Westbound Thru	600	--	--	--	--	--	--	--	--	1	2	~68	m#352
Northbound Thru	1100	~1102	m#1294	~611	#974	~1177	m#1292	~620	#983	~1184	#1328	~646	#983
Southbound Thru	3125	138	195	673	#864	154	195	668	#827	155	198	668	#827
3. Slaters Ln & W Abingdon Dr (Signalized)													
Eastbound TR	850	320	#450	212	276	~458	#592	247	317	381	#515	247	317
Westbound Left	600	0	m0	0	m0	0	m0	0	m0	0	3	8	m8
Westbound Thru	600	3	m7	3	m8	10	m8	59	m6	1	1	26	m24
Southbound LTR	850	105	154	296	365	153	197	324	397	--	--	--	--
Southbound LT	850	--	--	--	--	--	--	--	--	49	72	158	m182
Southbound Right	70	--	--	--	--	--	--	--	--	64	94	93	m109
4. Slaters Ln & E Abingdon Dr (Signalized)													
Eastbound LT	850	2	m2	1	m7	28	m21	3	m18	--	--	--	--
Eastbound Thru	850	--	--	--	--	--	--	--	--	22	m20	3	m17
Westbound Thru	600	19	44	12	34	76	132	~330	#522	44	86	208	#355
Westbound Right	600	0	0	0	0	0	0	0	20	0	42	0	57
Northbound LTR	1110	38	366	14	26	334	390	14	27	321	380	14	27
9. GW Memorial Pkwy & Bashford Ln (Signalized)													
Eastbound Left	125	~179	#344	7	21	~190	#352	7	21	--	--	--	--
Eastbound TR	125	30	44	84	154	34	53	103	245	--	--	--	--
Eastbound LT	125	--	--	--	--	--	--	--	--	41	53	59	84
Westbound Left	530	3	m8	1	m2	9	m16	6	m9	--	--	--	--
Westbound TR	530	50	73	17	24	31	48	0	22	--	--	--	--
Westbound LTR	530	--	--	--	--	--	--	--	--	36	50	8	13
Northbound Thru	1130	505	600	437	523	504	597	434	519	504	597	455	545
Southbound Thru	1100	119	167	18	28	119	m165	31	m32	118	180	16	m27
10. Bashford Ln & W Abingdon Dr (Signalized)													
Eastbound TR	125	210	304	69	119	214	309	78	130	213	308	73	124
Westbound LT	530	4	m5	8	m10	4	m5	8	m17	--	--	--	--
Westbound Left	530	--	--	--	--	--	--	--	--	0	m0	0	m0
Westbound Thru	530	--	--	--	--	--	--	--	--	5	7	6	10
Southbound Left	120	19	m48	5	m7	30	m61	8	m12	19	m32	12	m20
Southbound TR	1060	2	m12	13	13	4	m14	20	23	4	m9	33	42
11. Bashford Ln & E Abingdon Dr (Signalized)													

Intersection and Lane Group	Storage Length (ft)	Background (2033)				Future (2033)				Future (2033) with Mitigations			
		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
		50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
Eastbound LT	125	2	3	4	6	3	4	5	6	--	--	--	--
Eastbound Left	125	--	--	--	--	--	--	--	--	0	m0	0	0
Eastbound Thru	125	--	--	--	--	--	--	--	--	3	4	16	70
Westbound Thru	530	169	250	239	342	236	337	315	440	236	337	307	429
Westbound Right	225	30	62	8	25	31	63	8	25	31	63	8	24
Northbound LTR	1000	259	312	23	37	297	357	26	43	297	356	27	45
29. GW Memorial Pkwy & Montgomery St (Signalized)													
Westbound LTR	235	47	71	180	240	50	73	207	266	NO MITIGATIONS		207	266
Northbound Left	150	32	m37	68	#130	32	m35	68	#129			68	123
Northbound Thru	345	13	13	110	121	13	16	114	124			114	124
Southbound TR	180	24	31	427	487	27	34	469	534			479	545
Southeastbound Right	345	28	66	83	#179	29	66	93	#204			93	#193

95th percentile volume exceeds capacity, queue may be longer.

m Volume for 95th percentile queue is metered by upstream signal.

~ Volume exceeds capacity, queue is theoretically infinite.

Table 30: 2033 Mitigated Capacity Analysis Results (Alternate Phasing on Slaters Lane)

Intersection and Movement	Background (2033)				Future (2033)				Future (2033) with Mitigations: Alternate Phasing			
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
2. GW Memorial Pkwy & Slaters Ln (Signalized)												
Overall	42.8	D	37.1	D	111.9	F	460.2	F	72.2	E	81.6	F
Eastbound Left	36.8	D	9.4	A	180.6	F	22.1	C	42.8	D	10.1	B
Eastbound LT	32.9	C	10.0	A	170.9	F	20.8	C	44.2	D	9.6	A
Westbound LTR	67.4	E	109.1	F	192.2	F	4880.5	F	--	--	--	--
Westbound Thru	--	--	--	--	--	--	--	--	3.9	A	61.8	E
Northbound Thru	53.1	D	45.5	D	106.0	F	51.6	D	102.3	F	118.7	F
Southbound Thru	13.5	B	32.8	C	17.6	B	35.3	D	17.3	B	70.5	E
3. Slaters Ln & W Abingdon Dr (Signalized)												
Overall	49.7	D	29.9	C	85.9	F	31.8	C	72.0	E	24.3	C
Eastbound TR	76.1	E	51.1	D	139.9	F	53.6	D	--	--	--	--
Eastbound Thru	--	--	--	--	--	--	--	--	123.1	F	52.7	D
Westbound Left	7.0	A	12.9	B	13.7	B	21.0	C	6.5	A	11.8	B
Westbound Thru	8.6	A	9.9	A	12.8	B	21.7	C	3.1	A	11.6	B
Southbound LTR	13.4	B	20.1	C	18.4	B	21.9	C	--	--	--	--
Southbound LT	--	--	--	--	--	--	--	--	11.2	B	16.8	B
Southbound Right	--	--	--	--	--	--	--	--	2.9	A	5.5	A
4. Slaters Ln & E Abingdon Dr (Signalized)												
Overall	8.8	A	13.2	B	13.8	B	82.2	F	12.6	B	32.8	C
Eastbound LT	9.9	A	5.4	A	10.9	B	5.8	A	--	--	--	--
Eastbound Thru	--	--	--	--	--	--	--	--	7.0	A	4.6	A
Westbound Thru	51.9	D	44.4	D	47.8	D	148.7	F	55.7	E	65.2	E
Westbound Right	51.0	D	43.9	D	44.6	D	44.0	D	25.4	C	19.6	B
Northbound LTR	7.0	A	10.8	B	10.9	B	11.4	B	10.9	B	15.6	B

Table 31: 2033 Mitigated Queuing Analysis Results (Alternate Phasing on Slaters Lane)

Intersection and Lane Group	Storage Length (ft)	Background (2033)				Future (2033)				Future (2033) with Mitigations: Alternate Phasing			
		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
		50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
2. GW Memorial Pkwy & Slaters Ln (Signalized)													
Eastbound Left	850	~33	m#51	8	13	~522	m#445	29	m#82	~138	m103	27	m56
Eastbound LT	850	27	m#46	8	16	~524	m#447	30	m#80	~148	m107	28	m57
Westbound LTR	600	28	97	66	#169	~142	#279	~608	m#571	--	--	--	--
Westbound Thru	600	--	--	--	--	--	--	--	--	1	2	~54	m#363
Northbound Thru	1100	~1102	m#1294	~611	#974	~1177	m#1292	~620	#983	~1223	#1366	~952	#1099
Southbound Thru	3125	138	195	673	#864	154	195	668	#827	164	210	~832	#972
3. Slaters Ln & W Abingdon Dr (Signalized)													
Eastbound TR	850	320	#450	212	276	~458	#592	247	317	~445	#579	247	317
Westbound Left	600	0	m0	0	m0	0	m0	0	m0	0	3	8	m8
Westbound Thru	600	3	m7	3	m8	10	m8	59	m6	1	1	25	m25
Southbound LTR	850	105	154	296	365	153	197	324	397	--	--	--	--
Southbound LT	850	--	--	--	--	--	--	--	--	44	65	158	m182
Southbound Right	70	--	--	--	--	--	--	--	--	64	94	97	m114
4. Slaters Ln & E Abingdon Dr (Signalized)													
Eastbound LT	850	2	m2	1	m7	28	m21	3	m18	--	--	--	--
Eastbound Thru	850	--	--	--	--	--	--	--	--	21	m20	3	19
Westbound Thru	600	19	44	12	34	76	132	~330	#522	44	86	205	#343
Westbound Right	600	0	0	0	0	0	0	0	20	0	26	0	32
Northbound LTR	1110	38	366	14	26	334	390	14	27	337	414	15	30

95th percentile volume exceeds capacity, queue may be longer.

m Volume for 95th percentile queue is metered by upstream signal.

~ Volume exceeds capacity, queue is theoretically infinite.

Table 32: 2033 Mitigated Capacity Analysis Results (Pretimed Signal Control)

Intersection and Movement	Background (2033)				Future (2033)				Future (2033) with Mitigations: Pretimed Signal Control			
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
2. GW Memorial Pkwy & Slaters Ln (Signalized)												
Overall	42.8	D	37.1	D	111.9	F	460.2	F	87.9	F	46.0	D
Eastbound Left	36.8	D	9.4	A	180.6	F	22.1	C	74.5	E	21.5	C
Eastbound LT	32.9	C	10.0	A	170.9	F	20.8	C	77.3	E	20.4	C
Westbound LTR	67.4	E	109.1	F	192.2	F	4880.5	F	--	--	--	--
Westbound Thru	--	--	--	--	--	--	--	--	4.5	A	61.2	E
Northbound Thru	53.1	D	45.5	D	106.0	F	51.6	D	115.3	F	62.8	E
Southbound Thru	13.5	B	32.8	C	17.6	B	35.3	D	18.2	B	33.9	C
3. Slaters Ln & W Abingdon Dr (Signalized)												
Overall	49.7	D	29.9	C	85.9	F	31.8	C	42.4	D	25.4	C
Eastbound TR	76.1	E	51.1	D	139.9	F	53.6	D	--	--	--	--
Eastbound Thru	--	--	--	--	--	--	--	--	68.5	E	54.3	D
Westbound Left	7.0	A	12.9	B	13.7	B	21.0	C	8.5	A	14.4	B
Westbound Thru	8.6	A	9.9	A	12.8	B	21.7	C	3.4	A	12.9	B
Southbound LTR	13.4	B	20.1	C	18.4	B	21.9	C	--	--	--	--
Southbound LT	--	--	--	--	--	--	--	--	15.7	B	17.7	B
Southbound Right	--	--	--	--	--	--	--	--	4.7	A	6.1	A
4. Slaters Ln & E Abingdon Dr (Signalized)												
Overall	8.8	A	13.2	B	13.8	B	82.2	F	13.9	B	39.5	D
Eastbound LT	9.9	A	5.4	A	10.9	B	5.8	A	--	--	--	--
Eastbound Thru	--	--	--	--	--	--	--	--	7.5	A	7.0	A
Westbound Thru	51.9	D	44.4	D	47.8	D	148.7	F	52.3	D	69.9	E
Westbound Right	51.0	D	43.9	D	44.6	D	44.0	D	49.3	D	44.1	D
Northbound LTR	7.0	A	10.8	B	10.9	B	11.4	B	11.3	B	12.3	B
9. GW Memorial Pkwy & Bashford Ln (Signalized)												
Overall	21.2	C	11.7	B	21.4	C	10.9	B	16.7	B	12.0	B
Eastbound Left	80.6	F	24.5	C	96.9	F	25.7	C	--	--	--	--
Eastbound TR	11.4	B	27.5	C	13.0	B	29.6	C	--	--	--	--
Eastbound LT	--	--	--	--	--	--	--	--	15.3	B	30.1	C
Westbound Left	13.0	B	6.2	A	10.4	B	6.8	A	--	--	--	--
Westbound TR	18.2	B	9.8	A	12.4	B	8.2	A	--	--	--	--
Westbound LTR	--	--	--	--	--	--	--	--	13.9	B	4.6	A
Northbound Thru	19.4	B	18.5	B	19.3	B	18.4	B	19.3	B	20.1	C
Southbound Thru	11.4	B	4.5	A	11.3	B	2.7	A	12.1	B	4.6	A
10. Bashford Ln & W Abingdon Dr (Signalized)												
Overall	29.3	C	5.8	A	30.1	C	6.4	A	25.8	C	6.7	A
Eastbound TR	40.2	D	31.3	C	40.4	D	31.7	C	40.4	D	30.1	C
Westbound LT	4.2	A	4.6	A	4.2	A	5.8	A	--	--	--	--
Westbound Left	--	--	--	--	--	--	--	--	3.5	A	3.5	A
Westbound Thru	--	--	--	--	--	--	--	--	3.8	A	4.2	A
Southbound Left	10.4	B	1.2	A	14.7	B	1.8	A	7.1	A	2.7	A
Southbound TR	10.9	B	1.2	A	16.6	B	1.9	A	6.3	A	3.0	A
11. Bashford Ln & E Abingdon Dr (Signalized)												
Overall	17.0	B	23.0	C	18.9	B	25.9	C	18.8	B	24.9	C

Intersection and Movement	Background (2033)				Future (2033)				Future (2033) with Mitigations: Pretimed Signal Control			
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Eastbound LT	2.6	A	2.9	A	2.9	A	3.1	A	--	--	--	--
Eastbound Left	--	--	--	--	--	--	--	--	1.7	A	1.4	A
Eastbound Thru	--	--	--	--	--	--	--	--	2.5	A	4.6	A
Westbound Thru	38.0	D	39.5	D	41.7	D	45.1	D	41.7	D	41.9	D
Westbound Right	32.3	C	28.9	C	32.3	C	28.9	C	32.3	C	27.6	C
Northbound LTR	13.7	B	9.5	A	14.6	B	9.7	A	14.6	B	10.5	B

Table 33: 2033 Mitigated Queuing Analysis Results (Pretimed Signal Control)

Intersection and Lane Group	Storage Length (ft)	Background (2033)				Future (2033)				Future (2033) with Mitigations: Pretimed Signal Control			
		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
		50 th	95 th	50 th	95 th	50 th	95 th	50 th	95 th	50 th	95 th	50 th	95 th
2. GW Memorial Pkwy & Slaters Ln (Signalized)													
Eastbound Left	850	~33	m#51	8	13	~522	m#445	29	m#82	~446	m#511	29	m#80
Eastbound LT	850	27	m#46	8	16	~524	m#447	30	m#80	~465	m#532	29	m#80
Westbound LTR	600	28	97	66	#169	~142	#279	~608	m#571	--	--	--	--
Westbound Thru	600	--	--	--	--	--	--	--	--	1	2	~54	m#362
Northbound Thru	1100	~1102	m#1294	~611	#974	~1177	m#1292	~620	#983	~1191	#1328	~848	#995
Southbound Thru	3125	138	195	673	#864	154	195	668	#827	156	198	681	#872
3. Slaters Ln & W Abingdon Dr (Signalized)													
Eastbound TR	850	320	#450	212	276	~458	#592	247	317	381	#515	247	317
Westbound Left	600	0	m0	0	m0	0	m0	0	m0	0	3	7	m9
Westbound Thru	600	3	m7	3	m8	10	m8	59	m6	1	1	24	m25
Southbound LTR	850	105	154	296	365	153	197	324	397	--	--	--	--
Southbound LT	850	--	--	--	--	--	--	--	--	50	72	161	m185
Southbound Right	70	--	--	--	--	--	--	--	--	65	94	97	m114
4. Slaters Ln & E Abingdon Dr (Signalized)													
Eastbound LT	850	2	m2	1	m7	28	m21	3	m18	--	--	--	--
Eastbound Thru	850	--	--	--	--	--	--	--	--	22	m20	3	m17
Westbound Thru	600	19	44	12	34	76	132	~330	#522	43	86	205	#343
Westbound Right	600	0	0	0	0	0	0	0	20	0	42	0	56
Northbound LTR	1110	38	366	14	26	334	390	14	27	324	380	14	27
9. GW Memorial Pkwy & Bashford Ln (Signalized)													
Eastbound Left	125	~179	#344	7	21	~190	#352	7	21	--	--	--	--
Eastbound TR	125	30	44	84	154	34	53	103	245	--	--	--	--
Eastbound LT	125	--	--	--	--	--	--	--	--	41	53	60	84
Westbound Left	530	3	m8	1	m2	9	m16	6	m9	--	--	--	--
Westbound TR	530	50	73	17	24	31	48	0	22	--	--	--	--
Westbound LTR	530	--	--	--	--	--	--	--	--	36	50	8	13
Northbound Thru	1130	505	600	437	523	504	597	434	519	504	597	455	545
Southbound Thru	1100	119	167	18	28	119	m165	31	m32	119	180	17	m21
10. Bashford Ln & W Abingdon Dr (Signalized)													
Eastbound TR	125	210	304	69	119	214	309	78	130	213	308	73	124
Westbound LT	530	4	m5	8	m10	4	m5	8	m17	--	--	--	--
Westbound Left	530	--	--	--	--	--	--	--	--	0	m0	0	m0
Westbound Thru	530	--	--	--	--	--	--	--	--	5	7	6	10
Southbound Left	120	19	m48	5	m7	30	m61	8	m12	19	m32	12	m19
Southbound TR	1060	2	m12	13	13	4	m14	20	23	4	m9	32	41
11. Bashford Ln & E Abingdon Dr (Signalized)													
Eastbound LT	125	2	3	4	6	3	4	5	6	--	--	--	--
Eastbound Left	125	--	--	--	--	--	--	--	--	0	m0	0	0
Eastbound Thru	125	--	--	--	--	--	--	--	--	3	4	16	70
Westbound Thru	530	169	250	239	342	236	337	315	440	236	337	307	429
Westbound Right	225	30	62	8	25	31	63	8	25	31	63	8	24
Northbound LTR	1000	259	312	23	37	297	357	26	43	297	356	27	45

95th percentile volume exceeds capacity, queue may be longer.M Volume for 95th percentile queue is metered by upstream signal.

~ Volume exceeds capacity, queue is theoretically infinite.

Table 34: 2033 Mitigated Capacity Analysis Results (New East-West Connection)

Intersection and Movement	Background (2033)				Future (2033)				Future (2033) with Mitigations: East-West Connection			
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
2. GW Memorial Pkwy & Slaters Ln (Signalized)												
Overall	42.8	D	37.1	D	111.9	F	460.2	F	52.7	D	38.2	D
Eastbound Left	36.8	D	9.4	A	180.6	F	22.1	C	28.4	C	13.4	B
Eastbound LT	32.9	C	10.0	A	170.9	F	20.8	C	30.4	C	12.7	B
Westbound LTR	67.4	E	109.1	F	192.2	F	4880.5	F	--	--	--	--
Westbound Thru	--	--	--	--	--	--	--	--	3.8	A	42.8	D
Northbound Thru	53.1	D	45.5	D	106.0	F	51.6	D	73.5	E	48.9	D
Southbound Thru	13.5	B	32.8	C	17.6	B	35.3	D	15.5	B	33.9	C
3. Slaters Ln & W Abingdon Dr (Signalized)												
Overall	49.7	D	29.9	C	85.9	F	31.8	C	42.5	D	25.0	C
Eastbound TR	76.1	E	51.1	D	139.9	F	53.6	D	--	--	--	--
Eastbound Thru	--	--	--	--	--	--	--	--	70.1	E	53.8	D
Westbound Left	7.0	A	12.9	B	13.7	B	21.0	C	5.6	A	9.5	A
Westbound Thru	8.6	A	9.9	A	12.8	B	21.7	C	4.1	A	11.9	B
Southbound LTR	13.4	B	20.1	C	18.4	B	21.9	C	--	--	--	--
Southbound LT	--	--	--	--	--	--	--	--	13.4	B	17.4	B
Southbound Right	--	--	--	--	--	--	--	--	2.9	A	5.8	A
4. Slaters Ln & E Abingdon Dr (Signalized)												
Overall	8.8	A	13.2	B	13.8	B	82.2	F	15.4	B	33.6	C
Eastbound LT	9.9	A	5.4	A	10.9	B	5.8	A	--	--	--	--
Eastbound Thru	--	--	--	--	--	--	--	--	6.6	A	6.0	A
Westbound Thru	51.9	D	44.4	D	47.8	D	148.7	F	55.6	E	56.9	E
Westbound Right	51.0	D	43.9	D	44.6	D	44.0	D	53.2	D	43.5	D
Northbound LTR	7.0	A	10.8	B	10.9	B	11.4	B	12.8	B	8.0	A
9. GW Memorial Pkwy & Bashford Ln (Signalized)												
Overall	21.2	C	11.7	B	21.4	C	10.9	B	15.4	B	11.9	B
Eastbound Left	80.6	F	24.5	C	96.9	F	25.7	C	--	--	--	--
Eastbound TR	11.4	B	27.5	C	13.0	B	29.6	C	--	--	--	--
Eastbound LT	--	--	--	--	--	--	--	--	16.1	B	29.7	C
Westbound Left	13.0	B	6.2	A	10.4	B	6.8	A	--	--	--	--
Westbound TR	18.2	B	9.8	A	12.4	B	8.2	A	--	--	--	--
Westbound LTR	--	--	--	--	--	--	--	--	13.9	B	4.8	A
Northbound Thru	19.4	B	18.5	B	19.3	B	18.4	B	19.3	B	20.4	C
Southbound Thru	11.4	B	4.5	A	11.3	B	2.7	A	5.5	A	3.9	A
10. Bashford Ln & W Abingdon Dr (Signalized)												
Overall	29.3	C	5.8	A	30.1	C	6.4	A	24.2	C	6.0	A
Eastbound TR	40.2	D	31.3	C	40.4	D	31.7	C	40.4	D	30.1	C
Westbound LT	4.2	A	4.6	A	4.2	A	5.8	A	--	--	--	--
Westbound Left	--	--	--	--	--	--	--	--	3.5	A	3.0	A
Westbound Thru	--	--	--	--	--	--	--	--	3.9	A	4.0	A
Southbound Left	10.4	B	1.2	A	14.7	B	1.8	A	2.7	A	1.7	A
Southbound TR	10.9	B	1.2	A	16.6	B	1.9	A	1.7	A	2.3	A
11. Bashford Ln & E Abingdon Dr (Signalized)												
Overall	17.0	B	23.0	C	18.9	B	25.9	C	18.3	B	23.1	C
Eastbound LT	2.6	A	2.9	A	2.9	A	3.1	A	--	--	--	--
Eastbound Left	--	--	--	--	--	--	--	--	1.7	A	1.2	A
Eastbound Thru	--	--	--	--	--	--	--	--	2.3	A	4.3	A
Westbound Thru	38.0	D	39.5	D	41.7	D	45.1	D	40.5	D	39.5	D
Westbound Right	32.3	C	28.9	C	32.3	C	28.9	C	32.3	C	27.6	C
Northbound LTR	13.7	B	9.5	A	14.6	B	9.7	A	14.6	B	10.5	B
43. W Abingdon Dr & Connector St (Signalized)												
Overall	--	--	--	--	--	--	--	--	5.1	A	3.8	A
Westbound Left	--	--	--	--	--	--	--	--	3.0	A	3.3	A

Intersection and Movement	Background (2033)				Future (2033)				Future (2033) with Mitigations: East-West Connection			
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Southbound LT	--	--	--	--	--	--	--	--	5.3	A	3.8	A
44. GW Memorial Pkwy & Connector St (Signalized)												
Overall	--	--	--	--	--	--	--	--	34.0	C	10.3	B
Eastbound Thru	--	--	--	--	--	--	--	--	58.6	E	55.7	E
Westbound Thru	--	--	--	--	--	--	--	--	20.7	C	10.5	B
Northbound Thru	--	--	--	--	--	--	--	--	39.8	D	15.4	B
Southbound Thru	--	--	--	--	--	--	--	--	8.7	A	3.3	A
45. E Abingdon Dr & Connector St (Signalized)												
Overall	--	--	--	--	--	--	--	--	7.6	A	20.4	C
Eastbound Thru	--	--	--	--	--	--	--	--	1.1	A	3.2	A
Westbound TR	--	--	--	--	--	--	--	--	54.6	D	52.8	D
Northbound TR	--	--	--	--	--	--	--	--	6.6	A	7.7	A

Table 35: 2033 Mitigated Queuing Analysis Results (New East-West Connection)

Intersection and Lane Group	Storage Length (ft)	Background (2033)				Future (2033)				Future (2033) with Mitigations: East-West Connection			
		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
		50 th	95 th	50 th	95 th	50 th	95 th	50 th	95 th	50 th	95 th	50 th	95 th
2. GW Memorial Pkwy & Slaters Ln (Signalized)													
Eastbound Left	850	~33	m#51	8	13	~522	m#445	29	m#82	50	m#68	20	m46
Eastbound LT	850	27	m#46	8	16	~524	m#447	30	m#80	51	m#75	20	m46
Westbound LTR	600	28	97	66	#169	~142	#279	~608	m#571	--	--	--	--
Westbound Thru	600	--	--	--	--	--	--	--	--	1	2	55	#358
Northbound Thru	1100	~1102	m#1294	~611	#974	~1177	m#1292	~620	#983	~1200	m#1174	~869	#1008
Southbound Thru	3125	138	195	673	#864	154	195	668	#827	155	197	701	#895
3. Slaters Ln & W Abingdon Dr (Signalized)													
Eastbound TR	850	320	#450	212	276	~458	#592	247	317	380	#517	247	318
Westbound Left	600	0	m0	0	m0	0	m0	0	m0	0	1	1	m6
Westbound Thru	600	3	m7	3	m8	10	m8	59	m6	1	3	5	m29
Southbound LTR	850	105	154	296	365	153	197	324	397	--	--	--	--
Southbound LT	850	--	--	--	--	--	--	--	--	49	72	165	m185
Southbound Right	70	--	--	--	--	--	--	--	--	64	92	99	m114
4. Slaters Ln & E Abingdon Dr (Signalized)													
Eastbound LT	850	2	m2	1	m7	28	m21	3	m18	--	--	--	--
Eastbound Thru	850	--	--	--	--	--	--	--	--	11	m12	2	m12
Westbound Thru	600	19	44	12	34	76	132	~330	#522	39	80	178	#282
Westbound Right	600	0	0	0	0	0	0	0	20	0	27	0	52
Northbound LTR	1110	38	366	14	26	334	390	14	27	100	120	10	15
9. GW Memorial Pkwy & Bashford Ln (Signalized)													
Eastbound Left	125	~179	#344	7	21	~190	#352	7	21	--	--	--	--
Eastbound TR	125	30	44	84	154	34	53	103	245	--	--	--	--
Eastbound LT	125	--	--	--	--	--	--	--	--	39	51	54	77
Westbound Left	530	3	m8	1	m2	9	m16	6	m9	--	--	--	--
Westbound TR	530	50	73	17	24	31	48	0	22	--	--	--	--
Westbound LTR	530	--	--	--	--	--	--	--	--	36	50	9	14
Northbound Thru	1130	505	600	437	523	504	597	434	519	504	597	467	559
Southbound Thru	1100	119	167	18	28	119	m165	31	m32	24	52	0	17
10. Bashford Ln & W Abingdon Dr (Signalized)													
Eastbound TR	125	210	304	69	119	214	309	78	130	213	308	73	124
Westbound LT	530	4	m5	8	m10	4	m5	8	m17	--	--	--	--
Westbound Left	530	--	--	--	--	--	--	--	--	0	m1	0	m0
Westbound Thru	530	--	--	--	--	--	--	--	--	5	7	6	9
Southbound Left	120	19	m48	5	m7	30	m61	8	m12	4	7	7	8
Southbound TR	1060	2	m12	13	13	4	m14	20	23	0	1	25	19
11. Bashford Ln & E Abingdon Dr (Signalized)													
Eastbound LT	125	2	3	4	6	3	4	5	6	--	--	--	--
Eastbound Left	125	--	--	--	--	--	--	--	--	0	m0	0	0
Eastbound Thru	125	--	--	--	--	--	--	--	--	2	3	4	52
Westbound Thru	530	169	250	239	342	236	337	315	440	216	311	272	383
Westbound Right	225	30	62	8	25	31	63	8	25	31	63	8	24
Northbound LTR	1000	259	312	23	37	297	357	26	43	297	356	31	48
43. W Abingdon Dr & Connector St (Signalized)													
Westbound Left	500	--	--	--	--	--	--	--	--	0	1	1	2
Southbound LT	500	--	--	--	--	--	--	--	--	33	m41	52	65

Intersection and Lane Group	Storage Length (ft)	Background (2033)				Future (2033)				Future (2033) with Mitigations: East-West Connection			
		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
		50 th	95 th	50 th	95 th	50 th	95 th	50 th	95 th	50 th	95 th	50 th	95 th
44. GW Memorial Pkwy & Connector St (Signalized)													
Eastbound Thru	50	--	--	--	--	--	--	--	--	134	194	62	114
Westbound Thru	500	--	--	--	--	--	--	--	--	9	11	9	10
Northbound Thru	650	--	--	--	--	--	--	--	--	~1261	#1258	314	#964
Southbound Thru	500	--	--	--	--	--	--	--	--	111	125	20	m#23
45. E Abingdon Dr & Connector St (Signalized)													
Eastbound Thru	50	--	--	--	--	--	--	--	--	1	0	3	6
Westbound TR	500	--	--	--	--	--	--	--	--	20	53	63	111
Northbound TR	650	--	--	--	--	--	--	--	--	110	116	18	29

95th percentile volume exceeds capacity, queue may be longer.

M Volume for 95th percentile queue is metered by upstream signal.

~ Volume exceeds capacity, queue is theoretically infinite.

Table 36: 2039 Capacity Analysis Results

Intersection and Movement	Background (2039)				Future (2039)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. GW Memorial Pkwy & E Abingdon Dr (Signalized AM, Yield Control PM) Overall	153.3	F	--	--	150.2	F	--	--
Westbound Right	335.0	F	12.7	B	335.5	F	13.4	B
Northbound Thru	155.9	F	0.0	A	156.4	F	0.0	A
Southbound TR	0.3	A	0.0	A	0.3	A	0.0	A
2. GW Memorial Pkwy & Slaters Ln (Signalized) Overall	47.1	D	39.6	D	117.3	F	457.5	F
Eastbound Left	39.3	D	10.0	B	180.5	F	21.5	C
Eastbound LT	35.5	D	10.1	B	183.0	F	22.0	C
Westbound LTR	67.8	E	109.2	F	195.4	F	4880.2	F
Northbound Thru	59.3	E	49.5	D	113.0	F	56.1	E
Southbound Thru	13.6	B	34.4	C	17.7	B	37.2	D
3. Slaters Ln & W Abingdon Dr (Signalized) Overall	51.8	D	30.2	C	88.7	F	32.1	C
Eastbound TR	79.5	E	51.4	D	144.7	F	53.9	D
Westbound Left	7.0	A	13.8	B	13.7	B	21.0	C
Westbound Thru	8.5	A	10.5	B	12.6	B	21.9	C
Southbound LTR	13.5	B	20.4	C	18.4	B	22.3	C
4. Slaters Ln & E Abingdon Dr (Signalized) Overall	8.8	A	13.2	B	13.8	B	82.1	F
Eastbound LT	9.9	A	5.4	A	10.9	B	6.2	A
Westbound Thru	51.8	D	44.4	D	47.8	D	148.7	F
Westbound Right	50.9	D	43.9	D	44.6	D	44.0	D
Northbound LTR	7.1	A	10.9	B	11.0	B	11.4	B
5. Slaters Ln & Potomac Greens Dr (Signalized) Overall	7.1	A	5.8	A	7.6	A	6.7	A
Eastbound LTR	6.0	A	1.9	A	6.7	A	2.1	A
Westbound LTR	6.1	A	6.9	A	6.4	A	8.9	A
Northbound LTR	17.1	B	17.3	B	17.1	B	17.3	B
Southbound LT	17.5	B	17.4	B	17.5	B	17.4	B
Southbound Right	17.4	B	17.4	B	17.4	B	17.4	B
6. Slaters Ln & Powhatan St (Signalized) Overall	14.1	B	26.9	C	25.1	C	39.4	D
Eastbound TR	15.6	B	31.1	C	30.8	C	50.0	D
Westbound Left	9.0	A	26.7	C	10.8	B	31.9	C
Westbound Thru	6.7	A	8.8	A	6.9	A	9.3	A
Northbound LR	15.8	B	19.3	B	16.0	B	19.5	B
7. Richmond Highway & Slaters Ln (Signalized) Overall	40.4	D	25.6	C	45.5	D	26.6	C
Westbound Right	43.6	D	29.4	C	44.0	D	32.0	C
Northbound Thru	59.1	E	25.8	C	68.5	E	27.3	C
Northbound Right	18.3	B	21.9	C	20.8	C	24.2	C
Southbound Left	28.8	C	30.0	C	31.7	C	31.6	C
Southbound Thru	13.3	B	24.2	C	14.1	B	23.8	C
8. Bashford Ln & Powhatan St (Signalized) Overall	9.7	A	6.0	A	10.0	A	5.9	A
Eastbound LTR	12.2	B	12.1	B	12.2	B	12.1	B
Westbound LTR	12.9	B	12.5	B	13.0	B	12.5	B
Northbound LT	8.5	A	4.7	A	8.5	A	4.3	A
Northbound Right	7.4	A	7.6	A	7.4	A	7.6	A
Southbound Left	9.3	A	3.3	A	9.9	A	3.3	A

Intersection and Movement	Background (2039)				Future (2039)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Southbound TR	9.4	A	5.4	A	10.1	B	5.3	A
9. GW Memorial Pkwy & Bashford Ln (Signalized)								
Overall	21.4	C	12.0	B	21.6	C	11.2	B
Eastbound Left	80.6	F	24.4	C	96.9	F	25.5	C
Eastbound TR	11.3	B	27.4	C	13.1	B	29.4	C
Westbound Left	13.0	B	6.2	A	10.4	B	6.8	A
Westbound TR	18.4	B	10.0	B	12.5	B	8.4	A
Northbound Thru	19.8	B	18.8	B	19.7	B	18.7	B
Southbound Thru	11.6	B	4.9	A	11.4	B	3.1	A
10. Bashford Ln & W Abingdon Dr (Signalized)								
Overall	29.3	C	5.7	A	30.1	C	6.3	A
Eastbound TR	40.2	D	31.3	C	40.4	D	31.7	C
Westbound LT	4.0	A	4.5	A	4.2	A	5.7	A
Southbound Left	10.5	B	1.1	A	14.8	B	1.7	A
Southbound TR	11.1	B	1.1	A	16.8	B	1.8	A
11. Bashford Ln & E Abingdon Dr (Signalized)								
Overall	17.0	B	23.0	C	18.9	B	25.9	C
Eastbound LT	2.6	A	2.9	A	2.9	A	3.1	A
Westbound Thru	38.0	D	39.5	D	41.7	D	45.1	D
Westbound Right	32.3	C	28.9	C	32.3	C	28.9	C
Northbound LTR	13.9	B	9.5	A	14.7	B	9.7	A
12. Bashford Ln & N Pitt St (Two-Way Stop)								
Eastbound TR	0.0	A	0.0	A	0.0	A	0.0	A
Westbound LT	0.3	A	0.2	A	0.3	A	0.2	A
Northbound LR	12.0	B	11.8	B	13.3	B	13.4	B
13. Bashford Ln & N Royal St (Two-Way Stop)								
Westbound LR	0.0	A	0.0	A	11.6	B	15.6	C
Northbound TR	0.0	A	0.0	A	6.1	A	7.2	A
Southbound LT	0.0	A	0.0	A	0.0	A	0.0	A
14. N Royal St & Third St (Two-Way Stop)								
Westbound LR	9.4	A	10.0	B	10.0	A	10.6	B
Northbound TR	0.0	A	0.0	A	0.0	A	0.0	A
Southbound LT	0.3	A	0.9	A	0.3	A	0.7	A
15. N Fairfax St & Third St (All-Way Stop)								
Eastbound LR	--	--	--	--	6.7	A	6.8	A
Northbound LT	--	--	--	--	7.4	A	7.6	A
Southbound TR	--	--	--	--	7.1	A	7.5	A
16. N Royal St & Second St (All-Way Stop)								
Eastbound LTR	7.5	A	7.8	A	8.4	A	8.3	A
Westbound LTR	7.9	A	8.0	A	8.1	A	8.3	A
Northbound LTR	8.7	A	9.2	A	9.4	A	10.0	A
Southbound LTR	8.0	A	8.1	A	8.3	A	8.6	A
17. N Pitt St & Second St (All-Way Stop)								
Eastbound LTR	7.8	A	7.4	A	8.3	A	7.5	A
Westbound LTR	8.8	A	7.8	A	8.9	A	7.8	A
Northbound LTR	10.3	A	7.7	A	10.6	B	7.7	A
Southbound LTR	7.9	A	7.8	A	8.0	A	7.8	A
18. E Abingdon Dr & Second St (Yield Control)								
Westbound Right	21.1	C	9.0	A	25.8	D	9.2	A
Northbound TR	0.0	A	0.0	A	0.0	A	0.0	A

Intersection and Movement	Background (2039)				Future (2039)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
19. Richmond Highway & First St (East) (Signalized)								
Overall	106.4	F	2.7	A	113.5	F	2.7	A
Eastbound Left	3.6	A	1.8	A	3.6	A	1.8	A
Northbound Left	2.3	A	1.7	A	2.3	A	1.6	A
Northbound Thru	119.4	F	2.9	A	127.2	F	2.9	A
20. Richmond Highway & First St (West) (Signalized)								
Overall	22.7	C	10.3	B	22.7	C	10.6	B
Eastbound TR	30.1	C	25.1	C	30.2	C	25.1	C
Westbound Thru	31.1	C	35.9	D	31.1	C	35.7	D
Southbound TR	20.3	C	7.7	A	20.3	C	8.1	A
21. Richmond Highway & N Fayette St (Signalized)								
Overall	126.2	F	19.6	B	132.1	F	21.2	C
Eastbound LR	24.1	C	24.1	C	24.1	C	24.1	C
Northbound LT	185.3	F	23.8	C	193.7	F	26.4	C
Southbound TR	10.8	B	15.9	B	10.8	B	16.7	B
22. GW Memorial Pkwy & First St (Signalized)								
Overall	5.3	A	8.6	A	5.7	A	8.8	A
Westbound Right	32.3	C	31.8	C	32.3	C	31.8	C
Northbound TR	2.2	A	5.4	A	2.8	A	5.4	A
Southbound Left	19.1	B	14.8	B	20.5	C	16.4	B
Southbound Thru	5.2	A	8.0	A	5.3	A	8.4	A
23. N St Asaph St & First St (Two-Way Stop)								
Eastbound TR	0.0	A	0.0	A	0.0	A	0.0	A
Westbound LT	1.8	A	2.6	A	1.8	A	2.6	A
Northbound LR	12.1	B	14.0	B	12.2	B	14.0	B
Southbound LTR	0.0	A	0.0	A	0.0	A	0.0	A
24. N Pitt St & First St (Two-Way Stop)								
Eastbound LR	11.2	B	10.8	B	11.5	B	10.9	B
Northbound LT	2.0	A	3.8	A	2.0	A	3.8	A
Southbound TR	0.0	A	0.0	A	0.0	A	0.0	A
25. Montgomery St & N Fairfax St (All-Way Stop)								
Westbound LTR	8.0	A	8.9	A	8.2	A	9.2	A
Northbound LTR	10.1	B	9.4	A	10.7	B	10.1	B
Southbound LTR	7.5	A	10.2	B	7.6	A	12.1	B
26. Montgomery St & N Royal St (All-Way Stop)								
Westbound LTR	7.9	A	9.0	A	8.2	A	9.6	A
Northbound LT	11.0	B	9.9	A	12.1	B	11.0	B
Southbound TR	7.7	A	9.5	A	7.9	A	10.4	B
27. Montgomery St & N Pitt St (All-Way Stop)								
Westbound LTR	8.0	A	9.2	A	8.1	A	9.6	A
Northbound LT	10.7	B	9.5	A	10.8	B	9.7	A
Southbound TR	8.4	A	10.7	B	8.5	A	11.0	B
28. Montgomery St & N St Asaph St (Signalized)								
Overall	19.3	B	10.8	B	19.3	B	11.0	B
Westbound LTR	17.7	B	11.2	B	17.8	B	11.5	B
Northbound LT	20.5	C	11.1	B	20.5	C	11.1	B
Southbound TR	18.7	B	9.6	A	19.0	B	9.7	A
29. GW Memorial Pkwy & Montgomery St (Signalized)								
Overall	6.1	A	19.3	B	6.4	A	20.5	C
Westbound LTR	28.7	C	48.3	D	28.1	C	50.1	D

Intersection and Movement	Background (2039)				Future (2039)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Northbound Left	78.5	E	76.0	E	77.5	E	75.3	E
Northbound Thru	1.6	A	9.3	A	2.2	A	9.3	A
Southbound TR	9.1	A	14.2	B	9.2	A	15.1	B
Southeastbound Right	53.0	D	96.7	F	52.8	D	111.1	F
30. N Patrick St & Montgomery St (Signalized)								
Overall	65.0	E	17.6	B	71.3	E	17.9	B
Westbound TR	20.6	C	16.3	B	20.9	C	16.8	B
Northbound LT	69.0	E	17.8	B	76.1	E	18.1	B
31. Richmond Hwy & Montgomery St (Signalized)								
Overall	6.7	A	4.1	A	6.8	A	4.6	A
Westbound Left	12.3	B	19.6	B	12.3	B	19.2	B
Southbound Thru	6.2	A	3.3	A	6.2	A	3.4	A
32. GW Memorial Pkwy & Madison St (Signalized)								
Overall	25.2	C	9.4	A	28.3	C	9.6	A
Eastbound LTR	37.5	D	33.2	C	38.0	D	33.8	C
Northbound TR	26.6	C	12.7	B	30.8	C	13.0	B
Southbound Left	67.2	E	17.4	B	74.7	E	20.2	C
Southbound Thru	5.3	A	2.5	A	5.3	A	2.4	A
33. Richmond Hwy & Potomac Ave (Signalized)								
Overall	12.1	B	78.0	E	13.0	B	79.2	E
Westbound Left	56.4	E	216.1	F	57.1	E	222.7	F
Westbound Right	46.2	D	33.4	C	45.6	D	33.4	C
Northbound Thru	7.0	A	26.7	C	7.5	A	27.1	C
Northbound Right	2.7	A	0.4	A	3.2	A	0.4	A
Southbound Thru	14.6	B	31.2	C	15.9	B	32.7	C
34. Slaters Ln & Primary St/Woonerf St - Planned (All-Way Stop)								
Eastbound TR	--	--	--	--	8.5	A	8.2	A
Westbound LT	--	--	--	--	7.5	A	8.4	A
Northbound LR	--	--	--	--	8.2	A	10.7	B
35. Primary St & Lane C - Planned (All-Way Stop)								
Westbound LR	--	--	--	--	7.5	A	8.5	A
Northbound TR	--	--	--	--	7.4	A	8.4	A
Southbound LT	--	--	--	--	9.4	A	8.6	A
36. Lane C & Woonerf St - Planned (All-Way Stop)								
Eastbound LR	--	--	--	--	7.2	A	7.4	A
Northbound LT	--	--	--	--	7.1	A	7.3	A
Southbound TR	--	--	--	--	6.7	A	6.8	A
37. Primary St & Lane B (North) - Planned (All-Way Stop)								
Westbound LR	--	--	--	--	6.8	A	7.4	A
Northbound TR	--	--	--	--	7.5	A	7.4	A
Southbound LT	--	--	--	--	7.5	A	7.7	A
38. Primary St & Lane B (South) - Planned (All-Way Stop)								
Westbound LR	--	--	--	--	7.2	A	7.1	A
Northbound TR	--	--	--	--	7.4	A	7.1	A
Southbound LT	--	--	--	--	7.3	A	7.7	A
39. Primary St & Lane A - Planned (All-Way Stop)								
Eastbound LTR	--	--	--	--	8.0	A	8.2	A
Westbound LTR	--	--	--	--	7.6	A	8.1	A
Northbound LTR	--	--	--	--	7.4	A	7.6	A
Southbound LTR	--	--	--	--	7.4	A	7.9	A

Intersection and Movement	Background (2039)				Future (2039)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
40. Lane A & Woonerf St - Planned (All-Way Stop)								
Eastbound LR	--	--	--	--	6.9	A	7.0	A
Northbound LT	--	--	--	--	7.1	A	7.2	A
Southbound TR	--	--	--	--	6.7	A	6.9	A
41. Primary St & Fairfax St/Woonerf St - Planned (All-Way Stop)								
Eastbound LR	--	--	--	--	6.6	A	6.7	A
Northbound LT	--	--	--	--	7.3	A	7.4	A
Southbound TR	--	--	--	--	7.0	A	7.2	A

Table 37: 2039 Queuing Analysis Results

Intersection and Lane Group	Storage Length (ft)	Background (2039)				Future (2039)			
		AM Peak		PM Peak		AM Peak		PM Peak	
		50 th	95 th	50 th	95 th	50 th	95 th	50 th	95 th
1. GW Memorial Pkwy & E Abingdon Dr (Signalized AM, Yield Control PM)									
Westbound Right	840	~1135	#1397	--	6	~1142	#1401	--	15
Northbound Thru	930	~1688	m#1573	--	0	~1713	m#1211	--	0
Southbound TR	2250	0	0	--	0	0	0	--	0
2. GW Memorial Pkwy & Slaters Ln (Signalized)									
Eastbound Left	850	~37	m#51	8	16	~522	m#438	29	m#78
Eastbound LT	850	~32	m#46	8	18	~541	m#454	30	m#84
Westbound LTR	600	29	98	66	#169	~144	#281	~609	m#573
Northbound Thru	1100	~1132	m#1326	~639	#1000	~1208	m#1323	~861	#1007
Southbound Thru	3125	141	198	694	#887	157	198	688	#882
3. Slaters Ln & W Abingdon Dr (Signalized)									
Eastbound TR	850	325	#458	215	280	~467	#601	250	321
Westbound Left	600	0	m0	0	m0	0	m0	0	m0
Westbound Thru	600	3	m7	3	m9	10	m8	60	m6
Southbound LTR	850	106	156	304	374	155	200	333	408
4. Slaters Ln & E Abingdon Dr (Signalized)									
Eastbound LT	850	2	m2	1	m7	28	m20	3	m18
Westbound Thru	600	19	44	12	34	76	132	~330	#522
Westbound Right	600	0	0	0	0	0	0	0	20
Northbound LTR	1110	38	372	14	26	340	386	14	27
5. Slaters Ln & Potomac Greens Dr (Signalized)									
Eastbound LTR	480	157	188	28	m33	190	m227	35	m36
Westbound LTR	850	88	147	115	192	99	165	180	303
Northbound LTR	205	1	9	5	18	1	9	5	18
Southbound LT	200	8	23	6	20	8	23	6	20
Southbound Right	50	0	15	0	22	0	15	0	22
6. Slaters Ln & Powhatan St (Signalized)									
Eastbound TR	300	265	#569	~446	#666	~466	#704	~514	#739
Westbound Left	140	7	m25	23	m#76	7	m25	29	m#58
Westbound Thru	205	61	112	59	109	72	130	104	175
Northbound LR	750	54	91	45	79	55	93	48	83
7. Richmond Highway & Slaters Ln (Signalized)									
Westbound Right	250	276	365	191	276	309	405	292	408
Northbound Thru	1300	~1212	#1355	445	501	~1214	#1358	445	501
Northbound Right	150	224	384	137	226	258	441	172	271
Southbound Left	930	208	206	367	m343	302	293	473	m430
Southbound Thru	930	385	553	1175	m723	393	570	1175	m710
8. Bashford Ln & Powhatan St (Signalized)									
Eastbound LTR	400	2	11	1	6	2	11	1	6
Westbound LTR	130	5	36	3	25	5	36	3	26
Northbound LT	960	54	83	25	m35	55	84	22	m31
Northbound Right	960	0	18	1	m2	0	18	0	m1
Southbound Left	50	8	m13	2	m3	10	m14	3	m3
Southbound TR	690	24	m37	27	m30	27	m35	27	m29
9. GW Memorial Pkwy & Bashford Ln (Signalized)									
Eastbound Left	125	~178	#344	7	21	~190	#352	7	22
Eastbound TR	125	30	44	84	154	34	53	103	245
Westbound Left	530	3	m8	1	m2	9	m16	6	m9
Westbound TR	530	51	74	17	25	32	49	0	23
Northbound Thru	1130	519	617	449	538	517	614	446	534

Intersection and Lane Group	Storage Length (ft)	Background (2039)				Future (2039)			
		AM Peak		PM Peak		AM Peak		PM Peak	
		50 th	95 th	50 th	95 th	50 th	95 th	50 th	95 th
Southbound Thru	1100	122	172	18	40	121	m171	31	m32
10. Bashford Ln & W Abingdon Dr (Signalized)									
Eastbound TR	125	210	304	69	119	214	309	78	130
Westbound LT	530	4	m4	8	m9	4	m5	8	m16
Southbound Left	120	19	m49	5	m7	30	m62	8	m11
Southbound TR	1060	2	m12	12	13	4	m14	20	22
11. Bashford Ln & E Abingdon Dr (Signalized)									
Eastbound LT	125	2	3	4	6	3	4	5	6
Westbound Thru	530	169	250	239	342	236	337	315	440
Westbound Right	225	30	62	8	25	31	63	8	25
Northbound LTR	1000	265	320	23	37	303	364	26	43
12. Bashford Ln & N Pitt St (Two-Way Stop)									
Eastbound TR	535	--	0	--	0	--	0	--	0
Westbound LT	560	--	0	--	0	--	0	--	0
Northbound LR	670	--	14	--	7	--	17	--	9
13. Bashford Ln & N Royal St (Two-Way Stop)									
Westbound LR	100	--	0	--	0	--	23	--	42
Northbound TR	260	--	0	--	0	--	14	--	21
Southbound LT	250	--	0	--	0	--	0	--	0
14. N Royal St & Third St (Two-Way Stop)									
Westbound LR	250	--	2	--	5	--	3	--	5
Northbound TR	360	--	0	--	0	--	0	--	0
Southbound LT	560	--	0	--	1	--	0	--	1
15. N Fairfax St & Third St (All-Way Stop)									
Eastbound LR	250	--	--	--	--	--	--	--	--
Northbound LT	350	--	--	--	--	--	--	--	--
Southbound TR	230	--	--	--	--	--	--	--	--
16. N Royal St & Second St (All-Way Stop)									
Eastbound LTR	240	--	--	--	--	--	--	--	--
Westbound LTR	240	--	--	--	--	--	--	--	--
Northbound LTR	350	--	--	--	--	--	--	--	--
Southbound LTR	360	--	--	--	--	--	--	--	--
17. N Pitt St & Second St (All-Way Stop)									
Eastbound LTR	375	--	--	--	--	--	--	--	--
Westbound LTR	240	--	--	--	--	--	--	--	--
Northbound LTR	340	--	--	--	--	--	--	--	--
Southbound LTR	670	--	--	--	--	--	--	--	--
18. E Abingdon Dr & Second St (Yield Control)									
Westbound Right	450	--	93	--	6	--	115	--	7
Northbound TR	280	--	0	--	0	--	0	--	0
19. Richmond Highway & First St (East) (Signalized)									
Eastbound Left	30	8	12	2	4	8	13	2	4
Northbound Left	50	6	m6	0	m0	6	m6	0	m0
Northbound Thru	455	~850	m#746	26	29	~870	m#747	26	29
20. Richmond Highway & First St (West) (Signalized)									
Eastbound TR	250	174	275	93	156	174	276	93	156
Westbound Thru	30	65	117	64	116	65	117	64	116
Southbound TR	500	267	320	111	#137	269	322	115	#153
21. Richmond Highway & N Fayette St (Signalized)									

Intersection and Lane Group	Storage Length (ft)	Background (2039)				Future (2039)			
		AM Peak		PM Peak		AM Peak		PM Peak	
		50 th	95 th	50 th	95 th	50 th	95 th	50 th	95 th
Eastbound LR	140	51	94	47	88	51	94	47	88
Northbound LT	515	~1085	m#816	~434	#537	~1106	m#816	~446	#550
Southbound TR	685	245	301	447	#599	247	304	~490	#621
22. GW Memorial Pkwy & First St (Signalized)									
Westbound Right	245	120	188	92	150	120	188	92	150
Northbound TR	210	13	16	57	64	13	36	59	65
Southbound Left	150	18	61	58	136	18	61	67	146
Southbound Thru	1130	54	69	306	348	60	76	335	381
23. N St Asaph St & First St (Two-Way Stop)									
Eastbound TR	245	--	0	--	0	--	0	--	0
Westbound LT	210	--	1	--	2	--	1	--	2
Northbound LR	345	--	24	--	19	--	24	--	19
Southbound LTR	200	--	0	--	0	--	0	--	0
24. N Pitt St & First St (Two-Way Control)									
Eastbound LR	210	--	17	--	31	--	19	--	32
Northbound LT	340	--	4	--	3	--	4	--	3
Southbound TR	355	--	0	--	0	--	0	--	0
25. Montgomery St & N Fairfax St (All-Way Stop)									
Westbound LTR	235	--	--	--	--	--	--	--	--
Northbound LTR	330	--	--	--	--	--	--	--	--
Southbound LTR	340	--	--	--	--	--	--	--	--
26. Montgomery St & N Royal St (All-Way Stop)									
Westbound LTR	240	--	--	--	--	--	--	--	--
Northbound LT	350	--	--	--	--	--	--	--	--
Southbound TR	350	--	--	--	--	--	--	--	--
27. Montgomery St & N Pitt St (All-Way Stop)									
Westbound LTR	255	--	--	--	--	--	--	--	--
Northbound LT	350	--	--	--	--	--	--	--	--
Southbound TR	360	--	--	--	--	--	--	--	--
28. Montgomery St & N St Asaph St (Signalized)									
Westbound LTR	245	32	52	37	60	36	57	43	68
Northbound LT	350	113	174	40	78	113	174	40	78
Southbound TR	345	21	m57	25	61	21	m55	25	64
29. GW Memorial Pkwy & Montgomery St (Signalized)									
Westbound LTR	235	47	71	180	240	50	73	207	266
Northbound Left	150	32	m36	68	#129	32	m34	68	#130
Northbound Thru	345	13	16	112	123	13	16	116	126
Southbound TR	180	25	31	441	503	27	35	483	550
Southeastbound Right	345	29	66	83	#179	29	66	93	#204
30. N Patrick St & Montgomery St (Signalized)									
Westbound TR	240	56	88	40	65	61	95	54	83
Northbound LT	355	~694	#789	283	345	~714	#809	288	352
31. Richmond Hwy & Montgomery St (Signalized)									
Westbound Left	240	36	m61	26	m48	42	m69	45	m75
Southbound Thru	355	27	29	16	17	27	29	16	17
32. GW Memorial Pkwy & Madison St (Signalized)									
Eastbound LTR	240	99	142	110	153	108	153	124	170
Northbound TR	345	596	673	233	270	671	757	246	284
Southbound Left	180	26	75	5	m7	27	76	5	m6
Southbound Thru	345	33	41	53	51	36	45	51	52

Intersection and Lane Group	Storage Length (ft)	Background (2039)				Future (2039)			
		AM Peak		PM Peak		AM Peak		PM Peak	
		50 th	95 th	50 th	95 th	50 th	95 th	50 th	95 th
33. Richmond Hwy & Potomac Ave (Signalized)									
Westbound Left	180	199	254	~891	#1029	216	269	~907	#1044
Westbound Right	180	0	0	0	0	0	0	0	0
Northbound Thru	930	616	m437	475	552	723	m681	513	591
Northbound Right	930	542	m546	0	0	554	m524	0	0
Southbound Thru	400	334	634	557	#929	360	704	584	#970
34. Slaters Ln & Primary St/Woonerf St – Planned (All-Way Stop)									
Eastbound TR	600	--	--	--	--	--	--	--	--
Westbound LT	570	--	--	--	--	--	--	--	--
Northbound LR	270	--	--	--	--	--	--	--	--
35. Primary St & Lane C – Planned (All-Way Stop)									
Westbound LR	350	--	--	--	--	--	--	--	--
Northbound TR	250	--	--	--	--	--	--	--	--
Southbound LT	270	--	--	--	--	--	--	--	--
36. Lane C & Woonerf St – Planned (All-Way Stop)									
Eastbound LR	350	--	--	--	--	--	--	--	--
Northbound LT	650	--	--	--	--	--	--	--	--
Southbound TR	570	--	--	--	--	--	--	--	--
37. Primary St & Lane B (North) – Planned (All-Way Stop)									
Westbound LR	550	--	--	--	--	--	--	--	--
Northbound TR	425	--	--	--	--	--	--	--	--
Southbound LT	250	--	--	--	--	--	--	--	--
38. Primary St & Lane B (South) – Planned (All-Way Stop)									
Westbound LR	550	--	--	--	--	--	--	--	--
Northbound TR	270	--	--	--	--	--	--	--	--
Southbound LT	425	--	--	--	--	--	--	--	--
39. Primary St & Lane A – Planned (All-Way Stop)									
Eastbound LTR	100	--	--	--	--	--	--	--	--
Westbound LTR	350	--	--	--	--	--	--	--	--
Northbound LTR	330	--	--	--	--	--	--	--	--
Southbound LTR	270	--	--	--	--	--	--	--	--
40. Lane A & Woonerf St – Planned (All-Way Stop)									
Eastbound LR	350	--	--	--	--	--	--	--	--
Northbound LT	450	--	--	--	--	--	--	--	--
Southbound TR	650	--	--	--	--	--	--	--	--
41. Primary St & Fairfax St/Woonerf St – Planned (All-Way Stop)									
Eastbound LR	330	--	--	--	--	--	--	--	--
Northbound LT	230	--	--	--	--	--	--	--	--
Southbound TR	450	--	--	--	--	--	--	--	--

95th percentile volume exceeds capacity, queue may be longer.

M Volume for 95th percentile queue is metered by upstream signal.

~ Volume exceeds capacity, queue is theoretically infinite.

Table 38: 2039 Mitigated Capacity Analysis Results

Intersection and Movement	Background (2039)				Future (2039)				Future (2039) with Mitigations			
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. GW Memorial Pkwy & E Abingdon Dr (Signalized AM, Yield Control PM) Overall	153.3	F	--	--	150.2	F	--	--	106.1	F	8.6	A
Westbound Right	335.0	F	12.7	B	335.5	F	13.4	B	82.0	F	49.7	D
Northbound Thru	155.9	F	0.0	A	156.4	F	0.0	A	158.4	F	10.3	B
Southbound TR	0.3	A	0.0	A	0.3	A	0.0	A	0.3	A	4.9	A
2. GW Memorial Pkwy & Slaters Ln (Signalized) Overall	47.1	D	39.6	D	117.3	F	457.5	F	76.9	E	47.2	D
Eastbound Left	39.3	D	10.0	B	180.5	F	21.5	C	68.7	E	20.4	C
Eastbound LT	35.5	D	10.1	B	183.0	F	22.0	C	67.4	E	18.7	B
Westbound LTR	67.8	E	109.2	F	195.4	F	4880.2	F	--	--	--	--
Westbound Thru	--	--	--	--	--	--	--	--	3.6	A	61.2	E
Northbound Thru	59.3	E	49.5	D	113.0	F	56.1	E	99.9	F	65.6	E
Southbound Thru	13.6	B	34.4	C	17.7	B	37.2	D	17.0	B	34.3	C
3. Slaters Ln & W Abingdon Dr (Signalized) Overall	51.8	D	30.2	C	88.7	F	32.1	C	38.7	D	24.7	C
Eastbound TR	79.5	E	51.4	D	144.7	F	53.9	D	--	--	--	--
Eastbound Thru	--	--	--	--	--	--	--	--	63.1	E	53.1	D
Westbound Left	7.0	A	13.8	B	13.7	B	21.0	C	5.7	A	12.0	B
Westbound Thru	8.5	A	10.5	B	12.6	B	21.9	C	2.9	A	11.8	B
Southbound LTR	13.5	B	20.4	C	18.4	B	22.3	C	--	--	--	--
Southbound LT	--	--	--	--	--	--	--	--	14.6	B	17.5	B
Southbound Right	--	--	--	--	--	--	--	--	3.3	A	5.8	A
4. Slaters Ln & E Abingdon Dr (Signalized) Overall	8.8	A	13.2	B	13.8	B	82.1	F	14.9	B	37.2	D
Eastbound LT	9.9	A	5.4	A	10.9	B	6.2	A	--	--	--	--
Eastbound Thru	--	--	--	--	--	--	--	--	6.5	A	5.9	A
Westbound Thru	51.8	D	44.4	D	47.8	D	148.7	F	54.1	D	65.2	E
Westbound Right	50.9	D	43.9	D	44.6	D	44.0	D	51.9	D	43.7	D
Northbound LTR	7.1	A	10.9	B	11.0	B	11.4	B	12.7	B	12.0	B
9. GW Memorial Pkwy & Bashford Ln (Signalized) Overall	21.4	C	12.0	B	21.6	C	11.2	B	16.3	B	12.1	B
Eastbound Left	80.6	F	24.4	C	96.9	F	25.5	C	--	--	--	--
Eastbound TR	11.3	B	27.4	C	13.1	B	29.4	C	--	--	--	--
Eastbound LT	--	--	--	--	--	--	--	--	16.8	B	30.1	C
Westbound Left	13.0	B	6.2	A	10.4	B	6.8	A	--	--	--	--
Westbound TR	18.4	B	10.0	B	12.5	B	8.4	A	--	--	--	--
Westbound LTR	--	--	--	--	--	--	--	--	13.9	B	4.8	A
Northbound Thru	19.8	B	18.8	B	19.7	B	18.7	B	19.7	B	20.4	C
Southbound Thru	11.6	B	4.9	A	11.4	B	3.1	A	8.4	A	4.5	A
10. Bashford Ln & W Abingdon Dr (Signalized) Overall	29.3	C	5.7	A	30.1	C	6.3	A	25.7	C	6.6	A
Eastbound TR	40.2	D	31.3	C	40.4	D	31.7	C	40.4	D	30.1	C
Westbound LT	4.0	A	4.5	A	4.2	A	5.7	A	--	--	--	--
Westbound Left	--	--	--	--	--	--	--	--	3.4	A	3.5	A
Westbound Thru	--	--	--	--	--	--	--	--	3.7	A	4.1	A
Southbound Left	10.5	B	1.1	A	14.8	B	1.7	A	6.7	A	2.7	A

Intersection and Movement	Background (2039)				Future (2039)				Future (2039) with Mitigations			
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Southbound TR	11.1	B	1.1	A	16.8	B	1.8	A	5.9	A	2.9	A
11. Bashford Ln & E Abingdon Dr (Signalized)												
Overall	17.0	B	23.0	C	18.9	B	25.9	C	18.9	B	24.8	C
Eastbound LT	2.6	A	2.9	A	2.9	A	3.1	A	--	--	--	--
Eastbound Left	--	--	--	--	--	--	--	--	1.7	A	1.4	A
Eastbound Thru	--	--	--	--	--	--	--	--	2.5	A	4.6	A
Westbound Thru	38.0	D	39.5	D	41.7	D	45.1	D	41.7	D	41.9	D
Westbound Right	32.3	C	28.9	C	32.3	C	28.9	C	32.3	C	27.6	C
Northbound LTR	13.9	B	9.5	A	14.7	B	9.7	A	14.7	B	10.5	B
29. GW Memorial Pkwy & Montgomery St (Signalized)												
Overall	6.1	A	19.3	B	6.4	A	20.5	C	NO MITIGATIONS		20.6	C
Westbound LTR	28.7	C	48.3	D	28.1	C	50.1	D			50.1	D
Northbound Left	78.5	E	76.0	E	77.5	E	75.3	E			71.7	E
Northbound Thru	1.6	A	9.3	A	2.2	A	9.3	A			9.3	A
Southbound TR	9.1	A	14.2	B	9.2	A	15.1	B			16.1	B
Southeastbound Right	53.0	D	96.7	F	52.8	D	111.1	F			95.8	F

Table 39: 2039 Mitigated Queuing Analysis Results

Intersection and Lane Group	Storage Length (ft)	Background (2039)				Future (2039)				Future (2039) with Mitigations			
		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
		50 th	95 th	50 th	95 th	50 th	95 th	50 th	95 th	50 th	95 th	50 th	95 th
1. GW Memorial Pkwy & E Abingdon Dr (Signalized AM, Yield Control PM)													
Westbound Right	840	~1135	#1397	--	6	~1142	#1401	--	15	459	#578	68	113
Northbound Thru	930	~1688	m#1573	--	0	~1713	m#1211	--	0	~1720	m#1373	248	m227
Southbound TR	2250	0	0	--	0	0	0	--	0	0	0	0	0
2. GW Memorial Pkwy & Slaters Ln (Signalized)													
Eastbound Left	850	~37	m#51	8	16	~522	m#438	29	m#78	~451	m#529	29	m#340
Eastbound LT	850	~32	m#46	8	18	~541	m#454	30	m#84	~462	m#543	29	m#78
Westbound LTR	600	29	98	66	#169	~144	#281	~609	m#573	--	--	--	--
Westbound Thru	600	--	--	--	--	--	--	--	--	1	2	~54	m#363
Northbound Thru	1100	~1132	m#1326	~639	#1000	~1208	m#1323	~861	#1007	~1223	#1347	~874	#1021
Southbound Thru	3125	141	198	694	#887	157	198	688	#882	161	206	701	#895
3. Slaters Ln & W Abingdon Dr (Signalized)													
Eastbound TR	850	325	#458	215	280	~467	#601	250	321	382	#510	250	321
Westbound Left	600	0	m0	0	m0	0	m0	0	m0	0	3	8	m8
Westbound Thru	600	3	m7	3	m9	10	m8	60	m6	1	1	25	m25
Southbound LTR	850	106	156	304	374	155	200	333	408	--	--	--	--
Southbound LT	850	--	--	--	--	--	--	--	--	50	74	165	m185
Southbound Right	70	--	--	--	--	--	--	--	--	65	95	99	m114
4. Slaters Ln & E Abingdon Dr (Signalized)													
Eastbound LT	850	2	m2	1	m7	28	m20	3	m18	--	--	--	--
Eastbound Thru	850	--	--	--	--	--	--	--	--	22	m20	3	m17
Westbound Thru	600	19	44	12	34	76	132	~330	#522	44	86	205	#343
Westbound Right	600	0	0	0	0	0	0	0	20	0	42	0	56
Northbound LTR	1110	38	372	14	26	340	386	14	27	127	146	14	28
9. GW Memorial Pkwy & Bashford Ln (Signalized)													
Eastbound Left	125	~178	#344	7	21	~190	#352	7	22	--	--	--	--
Eastbound TR	125	30	44	84	154	34	53	103	245	--	--	--	--
Eastbound LT	125	--	--	--	--	--	--	--	--	42	53	59	83
Westbound Left	530	3	m8	1	m2	9	m16	6	m9	--	--	--	--
Westbound TR	530	51	74	17	25	32	49	0	23	--	--	--	--
Westbound LTR	530	--	--	--	--	--	--	--	--	37	50	9	14
Northbound Thru	1130	519	617	449	538	517	614	446	534	517	614	467	559
Southbound Thru	1100	122	172	18	40	121	m171	31	m32	70	84	14	m22
10. Bashford Ln & W Abingdon Dr (Signalized)													
Eastbound TR	125	210	304	69	119	214	309	78	130	213	308	73	124
Westbound LT	530	4	m4	8	m9	4	m5	8	m16	--	--	--	--
Westbound Left	530	--	--	--	--	--	--	--	--	0	m0	0	m0
Westbound Thru	530	--	--	--	--	--	--	--	--	5	6	6	10
Southbound Left	120	19	m49	5	m7	30	m62	8	m11	16	m27	11	m19
Southbound TR	1060	2	m12	12	13	4	m14	20	22	2	m6	32	40
11. Bashford Ln & E Abingdon Dr (Signalized)													

Intersection and Lane Group	Storage Length (ft)	Background (2039)				Future (2039)				Future (2039) with Mitigations			
		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
		50 th	95 th	50 th	95 th	50 th	95 th	50 th	95 th	50 th	95 th	50 th	95 th
Eastbound LT	125	2	3	4	6	3	4	5	6	--	--	--	--
Eastbound Left	125	--	--	--	--	--	--	--	--	0	m0	0	0
Eastbound Thru	125	--	--	--	--	--	--	--	--	3	4	16	70
Westbound Thru	530	169	250	239	342	236	337	315	440	236	337	307	429
Westbound Right	225	30	62	8	25	31	63	8	25	31	63	8	24
Northbound LTR	1000	265	320	23	37	303	364	26	43	304	364	27	45
29. GW Memorial Pkwy & Montgomery St (Signalized)													
Westbound LTR	235	47	71	180	240	50	73	207	266	NO MITIGATIONS		207	266
Northbound Left	150	32	m36	68	#129	32	m34	68	#130			68	123
Northbound Thru	345	13	16	112	123	13	16	116	126			116	126
Southbound TR	180	25	31	441	503	27	35	483	550			494	562
Southeastbound Right	345	29	66	83	#179	29	66	93	#204			93	#193

95th percentile volume exceeds capacity, queue may be longer.

M Volume for 95th percentile queue is metered by upstream signal.

~ Volume exceeds capacity, queue is theoretically infinite.

Table 40: 2039 Mitigated Capacity Analysis Results (Alternate Phasing on Slaters Lane)

Intersection and Movement	Background (2039)				Future (2039)				Future (2039) with Mitigations: Alternate Phasing			
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
2. GW Memorial Pkwy & Slaters Ln (Signalized)												
Overall	47.1	D	39.6	D	117.3	F	457.5	F	73.6	E	87.5	F
Eastbound Left	39.3	D	10.0	B	180.5	F	21.5	C	39.4	D	10.4	B
Eastbound LT	35.5	D	10.1	B	183.0	F	22.0	C	38.4	D	9.7	A
Westbound LTR	67.8	E	109.2	F	195.4	F	4880.2	F	--	--	--	--
Westbound Thru	--	--	--	--	--	--	--	--	3.9	A	61.8	E
Northbound Thru	59.3	E	49.5	D	113.0	F	56.1	E	106.7	F	126.3	F
Southbound Thru	13.6	B	34.4	C	17.7	B	37.2	D	17.3	B	77.4	E
3. Slaters Ln & W Abingdon Dr (Signalized)												
Overall	51.8	D	30.2	C	88.7	F	32.1	C	74.6	E	24.5	C
Eastbound TR	79.5	E	51.4	D	144.7	F	53.9	D	--	--	--	--
Eastbound Thru	--	--	--	--	--	--	--	--	127.5	F	53.1	D
Westbound Left	7.0	A	13.8	B	13.7	B	21.0	C	6.6	A	12.0	B
Westbound Thru	8.5	A	10.5	B	12.6	B	21.9	C	3.1	A	11.8	B
Southbound LTR	13.5	B	20.4	C	18.4	B	22.3	C	--	--	--	--
Southbound LT	--	--	--	--	--	--	--	--	11.2	B	17.0	B
Southbound Right	--	--	--	--	--	--	--	--	2.9	A	5.5	A
4. Slaters Ln & E Abingdon Dr (Signalized)												
Overall	8.8	A	13.2	B	13.8	B	82.1	F	12.6	B	32.8	C
Eastbound LT	9.9	A	5.4	A	10.9	B	6.2	A	--	--	--	--
Eastbound Thru	--	--	--	--	--	--	--	--	7.1	A	4.8	A
Westbound Thru	51.8	D	44.4	D	47.8	D	148.7	F	55.7	E	65.2	E
Westbound Right	50.9	D	43.9	D	44.6	D	44.0	D	25.4	C	19.5	B
Northbound LTR	7.1	A	10.9	B	11.0	B	11.4	B	11.0	B	15.6	B

Table 41: 2039 Mitigated Queuing Analysis Results (Alternate Phasing on Slaters Lane)

Intersection and Lane Group	Storage Length (ft)	Background (2039)				Future (2039)				Future (2039) with Mitigations: Alternate Phasing			
		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
		50 th	95 th	50 th	95 th	50 th	95 th	50 th	95 th	50 th	95 th	50 th	95 th
2. GW Memorial Pkwy & Slaters Ln (Signalized)													
Eastbound Left	850	~37	m#51	8	16	~522	m#438	29	m#78	~151	m105	27	m57
Eastbound LT	850	~32	m#46	8	18	~541	m#454	30	m#84	~153	m107	28	m57
Westbound LTR	600	29	98	66	#169	~144	#281	~609	m#573	--	--	--	--
Westbound Thru	600	--	--	--	--	--	--	--	--	1	2	~55	m#362
Northbound Thru	1100	~113 2	m#1326	~639	#1000	~1208	m#1323	~861	#1007	~1250	#1393	~977	#1124
Southbound Thru	3125	141	198	694	#887	157	198	688	#882	167	213	~855	#995
3. Slaters Ln & W Abingdon Dr (Signalized)													
Eastbound TR	850	325	#458	215	280	~467	#601	250	321	~454	#587	250	321
Westbound Left	600	0	m0	0	m0	0	m0	0	m0	0	3	8	m8
Westbound Thru	600	3	m7	3	m9	10	m8	60	m6	1	1	25	m25
Southbound LTR	850	106	156	304	374	155	200	333	408	--	--	--	--
Southbound LT	850	--	--	--	--	--	--	--	--	45	66	162	m182
Southbound Right	70	--	--	--	--	--	--	--	--	65	95	99	m114
4. Slaters Ln & E Abingdon Dr (Signalized)													
Eastbound LT	850	2	m2	1	m7	28	m20	3	m18	--	--	--	--
Eastbound Thru	850	--	--	--	--	--	--	--	--	21	m20	3	19
Westbound Thru	600	19	44	12	34	76	132	~330	#522	44	86	205	#343
Westbound Right	600	0	0	0	0	0	0	0	20	0	26	0	32
Northbound LTR	1110	38	372	14	26	340	386	14	27	72	83	15	30

95th percentile volume exceeds capacity, queue may be longer.m Volume for 95th percentile queue is metered by upstream signal.

~ Volume exceeds capacity, queue is theoretically infinite.

Table 42: 2039 Mitigated Capacity Analysis Results (Pretimed Signal Control)

Intersection and Movement	Background (2039)				Future (2039)				Future (2039) with Mitigations: Pretimed Signal Control			
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
2. GW Memorial Pkwy & Slaters Ln (Signalized)												
Overall	47.1	D	39.6	D	117.3	F	457.5	F	91.6	F	48.4	D
Eastbound Left	39.3	D	10.0	B	180.5	F	21.5	C	68.5	E	22.3	C
Eastbound LT	35.5	D	10.1	B	183.0	F	22.0	C	67.2	E	20.6	C
Westbound LTR	67.8	E	109.2	F	195.4	F	4880.2	F	--	--	--	--
Westbound Thru	--	--	--	--	--	--	--	--	4.5	A	61.3	E
Northbound Thru	59.3	E	49.5	D	113.0	F	56.1	E	125.2	F	67.0	E
Southbound Thru	13.6	B	34.4	C	17.7	B	37.2	D	18.9	B	35.3	D
3. Slaters Ln & W Abingdon Dr (Signalized)												
Overall	51.8	D	30.2	C	88.7	F	32.1	C	40.2	D	25.6	C
Eastbound TR	79.5	E	51.4	D	144.7	F	53.9	D	--	--	--	--
Eastbound Thru	--	--	--	--	--	--	--	--	64.5	E	54.8	D
Westbound Left	7.0	A	13.8	B	13.7	B	21.0	C	8.7	A	14.8	B
Westbound Thru	8.5	A	10.5	B	12.6	B	21.9	C	3.4	A	13.2	B
Southbound LTR	13.5	B	20.4	C	18.4	B	22.3	C	--	--	--	--
Southbound LT	--	--	--	--	--	--	--	--	16.2	B	17.8	B
Southbound Right	--	--	--	--	--	--	--	--	4.7	A	6.1	A
4. Slaters Ln & E Abingdon Dr (Signalized)												
Overall	8.8	A	13.2	B	13.8	B	82.1	F	17.0	B	39.4	D
Eastbound LT	9.9	A	5.4	A	10.9	B	6.2	A	--	--	--	--
Eastbound Thru	--	--	--	--	--	--	--	--	6.8	A	7.1	A
Westbound Thru	51.8	D	44.4	D	47.8	D	148.7	F	52.3	D	69.9	E
Westbound Right	50.9	D	43.9	D	44.6	D	44.0	D	49.3	D	44.1	D
Northbound LTR	7.1	A	10.9	B	11.0	B	11.4	B	15.8	B	12.2	B
9. GW Memorial Pkwy & Bashford Ln (Signalized)												
Overall	21.4	C	12.0	B	21.6	C	11.2	B	16.1	B	12.1	B
Eastbound Left	80.6	F	24.4	C	96.9	F	25.5	C	--	--	--	--
Eastbound TR	11.3	B	27.4	C	13.1	B	29.4	C	--	--	--	--
Eastbound LT	--	--	--	--	--	--	--	--	17.2	B	29.9	C
Westbound Left	13.0	B	6.2	A	10.4	B	6.8	A	--	--	--	--
Westbound TR	18.4	B	10.0	B	12.5	B	8.4	A	--	--	--	--
Westbound LTR	--	--	--	--	--	--	--	--	13.9	B	4.8	A
Northbound Thru	19.8	B	18.8	B	19.7	B	18.7	B	19.7	B	20.4	C
Southbound Thru	11.6	B	4.9	A	11.4	B	3.1	A	6.9	A	4.6	A
10. Bashford Ln & W Abingdon Dr (Signalized)												
Overall	29.3	C	5.7	A	30.1	C	6.3	A	25.6	C	6.7	A
Eastbound TR	40.2	D	31.3	C	40.4	D	31.7	C	40.4	D	30.1	C
Westbound LT	4.0	A	4.5	A	4.2	A	5.7	A	--	--	--	--
Westbound Left	--	--	--	--	--	--	--	--	3.4	A	3.5	A
Westbound Thru	--	--	--	--	--	--	--	--	3.7	A	4.1	A
Southbound Left	10.5	B	1.1	A	14.8	B	1.7	A	6.2	A	2.9	A
Southbound TR	11.1	B	1.1	A	16.8	B	1.8	A	5.4	A	3.1	A
11. Bashford Ln & E Abingdon Dr (Signalized)												
Overall	17.0	B	23.0	C	18.9	B	25.9	C	18.9	B	24.8	C

Intersection and Movement	Background (2039)				Future (2039)				Future (2039) with Mitigations: Pretimed Signal Control			
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Eastbound LT	2.6	A	2.9	A	2.9	A	3.1	A	--	--	--	--
Eastbound Left	--	--	--	--	--	--	--	--	1.7	A	1.4	A
Eastbound Thru	--	--	--	--	--	--	--	--	2.5	A	4.6	A
Westbound Thru	38.0	D	39.5	D	41.7	D	45.1	D	41.7	D	41.9	D
Westbound Right	32.3	C	28.9	C	32.3	C	28.9	C	32.3	C	27.6	C
Northbound LTR	13.9	B	9.5	A	14.7	B	9.7	A	14.7	B	10.5	B

Table 43: 2039 Mitigated Queuing Analysis Results (Pretimed Signal Control)

Intersection and Lane Group	Storage Length (ft)	Background (2039)				Future (2039)				Future (2039) with Mitigations: Pretimed Signal Control			
		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
		50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
2. GW Memorial Pkwy & Slaters Ln (Signalized)													
Eastbound Left	850	~37	m#51	8	16	~522	m#438	29	m#78	~451	m#529	29	m#340
Eastbound LT	850	~32	m#46	8	18	~541	m#454	30	m#84	~462	m#543	29	m#78
Westbound LTR	600	29	98	66	#169	~144	#281	~609	m#573	--	--	--	--
Westbound Thru	600	--	--	--	--	--	--	--	--	1	2	~54	m#363
Northbound Thru	1100	~1132	m#1326	~639	#1000	~1208	m#1323	~861	#1007	~1230	#1347	~874	#1021
Southbound Thru	3125	141	198	694	#887	157	198	688	#882	163	206	701	#895
3. Slaters Ln & W Abingdon Dr (Signalized)													
Eastbound TR	850	325	#458	215	280	~467	#601	250	321	382	#510	250	321
Westbound Left	600	0	m0	0	m0	0	m0	0	m0	0	3	8	m8
Westbound Thru	600	3	m7	3	m9	10	m8	60	m6	1	1	25	m25
Southbound LTR	850	106	156	304	374	155	200	333	408	--	--	--	--
Southbound LT	850	--	--	--	--	--	--	--	--	51	74	165	m185
Southbound Right	70	--	--	--	--	--	--	--	--	66	95	99	m114
4. Slaters Ln & E Abingdon Dr (Signalized)													
Eastbound LT	850	2	m2	1	m7	28	m20	3	m18	--	--	--	--
Eastbound Thru	850	--	--	--	--	--	--	--	--	22	m20	3	m17
Westbound Thru	600	19	44	12	34	76	132	~330	#522	43	86	205	#343
Westbound Right	600	0	0	0	0	0	0	0	20	0	42	0	56
Northbound LTR	1110	38	372	14	26	340	386	14	27	153	175	14	28
9. GW Memorial Pkwy & Bashford Ln (Signalized)													
Eastbound Left	125	~178	#344	7	21	~190	#352	7	22	--	--	--	--
Eastbound TR	125	30	44	84	154	34	53	103	245	--	--	--	--
Eastbound LT	125	--	--	--	--	--	--	--	--	41	54	59	84
Westbound Left	530	3	m8	1	m2	9	m16	6	m9	--	--	--	--
Westbound TR	530	51	74	17	25	32	49	0	23	--	--	--	--
Westbound LTR	530	--	--	--	--	--	--	--	--	37	50	9	14
Northbound Thru	1130	519	617	449	538	517	614	446	534	517	614	467	559
Southbound Thru	1100	122	172	18	40	121	m171	31	m32	53	64	14	m17
10. Bashford Ln & W Abingdon Dr (Signalized)													
Eastbound TR	125	210	304	69	119	214	309	78	130	213	308	73	124
Westbound LT	530	4	m4	8	m9	4	m5	8	m16	--	--	--	--
Westbound Left	530	--	--	--	--	--	--	--	--	0	m0	0	m0
Westbound Thru	530	--	--	--	--	--	--	--	--	5	6	6	10
Southbound Left	120	19	m49	5	m7	30	m62	8	m11	14	m24	12	m19
Southbound TR	1060	2	m12	12	13	4	m14	20	22	2	m5	32	41
11. Bashford Ln & E Abingdon Dr (Signalized)													
Eastbound LT	125	2	3	4	6	3	4	5	6	--	--	--	--
Eastbound Left	125	--	--	--	--	--	--	--	--	0	m0	0	0
Eastbound Thru	125	--	--	--	--	--	--	--	--	3	4	16	70
Westbound Thru	530	169	250	239	342	236	337	315	440	236	337	307	429
Westbound Right	225	30	62	8	25	31	63	8	25	31	63	8	24
Northbound LTR	1000	265	320	23	37	303	364	26	43	304	364	27	45

95th percentile volume exceeds capacity, queue may be longer.

m Volume for 95th percentile queue is metered by upstream signal.

~ Volume exceeds capacity, queue is theoretically infinite.

Table 44: 2039 Mitigated Capacity Analysis Results (New East-West Connection)

Intersection and Movement	Background (2039)				Future (2039)				Future (2039) with Mitigations: East-West Connection			
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
2. GW Memorial Pkwy & Slaters Ln (Signalized)												
Overall	47.1	D	39.6	D	117.3	F	457.5	F	56.8	E	38.2	D
Eastbound Left	39.3	D	10.0	B	180.5	F	21.5	C	30.6	C	13.4	B
Eastbound LT	35.5	D	10.1	B	183.0	F	22.0	C	31.9	C	12.7	B
Westbound LTR	67.8	E	109.2	F	195.4	F	4880.2	F	--	--	--	--
Westbound Thru	--	--	--	--	--	--	--	--	9.2	A	42.8	D
Northbound Thru	59.3	E	49.5	D	113.0	F	56.1	E	79.6	E	48.9	D
Southbound Thru	13.6	B	34.4	C	17.7	B	37.2	D	15.6	B	33.9	C
3. Slaters Ln & W Abingdon Dr (Signalized)												
Overall	51.8	D	30.2	C	88.7	F	32.1	C	43.7	D	25.0	C
Eastbound TR	79.5	E	51.4	D	144.7	F	53.9	D	--	--	--	--
Eastbound Thru	--	--	--	--	--	--	--	--	72.2	E	53.8	D
Westbound Left	7.0	A	13.8	B	13.7	B	21.0	C	4.6	A	9.5	A
Westbound Thru	8.5	A	10.5	B	12.6	B	21.9	C	3.1	A	11.9	B
Southbound LTR	13.5	B	20.4	C	18.4	B	22.3	C	--	--	--	--
Southbound LT	--	--	--	--	--	--	--	--	13.4	B	17.4	B
Southbound Right	--	--	--	--	--	--	--	--	2.9	A	5.8	A
4. Slaters Ln & E Abingdon Dr (Signalized)												
Overall	8.8	A	13.2	B	13.8	B	82.1	F	17.1	B	33.6	C
Eastbound LT	9.9	A	5.4	A	10.9	B	6.2	A	--	--	--	--
Eastbound Thru	--	--	--	--	--	--	--	--	23.8	C	6.0	A
Westbound Thru	51.8	D	44.4	D	47.8	D	148.7	F	55.5	E	56.9	E
Westbound Right	50.9	D	43.9	D	44.6	D	44.0	D	53.1	D	43.5	D
Northbound LTR	7.1	A	10.9	B	11.0	B	11.4	B	11.8	B	8.0	A
9. GW Memorial Pkwy & Bashford Ln (Signalized)												
Overall	21.4	C	12.0	B	21.6	C	11.2	B	15.7	B	11.9	B
Eastbound Left	80.6	F	24.4	C	96.9	F	25.5	C	--	--	--	--
Eastbound TR	11.3	B	27.4	C	13.1	B	29.4	C	--	--	--	--
Eastbound LT	--	--	--	--	--	--	--	--	16.0	B	29.7	C
Westbound Left	13.0	B	6.2	A	10.4	B	6.8	A	--	--	--	--
Westbound TR	18.4	B	10.0	B	12.5	B	8.4	A	--	--	--	--
Westbound LTR	--	--	--	--	--	--	--	--	13.9	B	4.8	A
Northbound Thru	19.8	B	18.8	B	19.7	B	18.7	B	19.7	B	20.4	C
Southbound Thru	11.6	B	4.9	A	11.4	B	3.1	A	6.0	A	3.9	A
10. Bashford Ln & W Abingdon Dr (Signalized)												
Overall	29.3	C	5.7	A	30.1	C	6.3	A	24.2	C	6.0	A
Eastbound TR	40.2	D	31.3	C	40.4	D	31.7	C	40.4	D	30.1	C
Westbound LT	4.0	A	4.5	A	4.2	A	5.7	A	--	--	--	--
Westbound Left	--	--	--	--	--	--	--	--	3.5	A	3.0	A
Westbound Thru	--	--	--	--	--	--	--	--	3.9	A	4.0	A
Southbound Left	10.5	B	1.1	A	14.8	B	1.7	A	2.9	A	1.7	A
Southbound TR	11.1	B	1.1	A	16.8	B	1.8	A	1.9	A	2.3	A
11. Bashford Ln & E Abingdon Dr (Signalized)												
Overall	17.0	B	23.0	C	18.9	B	25.9	C	18.4	B	23.1	C
Eastbound LT	2.6	A	2.9	A	2.9	A	3.1	A	--	--	--	--
Eastbound Left	--	--	--	--	--	--	--	--	1.7	A	1.2	A
Eastbound Thru	--	--	--	--	--	--	--	--	2.3	A	4.3	A
Westbound Thru	38.0	D	39.5	D	41.7	D	45.1	D	40.5	D	39.5	D
Westbound Right	32.3	C	28.9	C	32.3	C	28.9	C	32.3	C	27.6	C
Northbound LTR	13.9	B	9.5	A	14.7	B	9.7	A	14.7	B	10.5	B
43. W Abingdon Dr & Connector St												

Intersection and Movement	Background (2039)				Future (2039)				Future (2039) with Mitigations: East-West Connection			
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
(Signalized)												
Overall	--	--	--	--	--	--	--	--	5.2	A	3.8	A
Westbound Left	--	--	--	--	--	--	--	--	3.0	A	3.3	A
Southbound LT	--	--	--	--	--	--	--	--	5.4	A	3.8	A
44. GW Memorial Pkwy & Connector St (Signalized)												
Overall	--	--	--	--	--	--	--	--	37.5	D	10.3	B
Eastbound Thru	--	--	--	--	--	--	--	--	59.2	E	55.7	E
Westbound Thru	--	--	--	--	--	--	--	--	20.7	C	10.5	B
Northbound Thru	--	--	--	--	--	--	--	--	44.7	D	15.4	B
Southbound Thru	--	--	--	--	--	--	--	--	8.6	A	3.3	A
45. E Abingdon Dr & Connector St (Signalized)												
Overall	--	--	--	--	--	--	--	--	7.3	A	20.4	C
Eastbound Thru	--	--	--	--	--	--	--	--	1.1	A	3.2	A
Westbound TR	--	--	--	--	--	--	--	--	54.6	D	52.8	D
Northbound TR	--	--	--	--	--	--	--	--	6.3	A	7.7	A

Table 45: 2039 Mitigated Queuing Analysis Results (New East-West Connection)

Intersection and Lane Group	Storage Length (ft)	Background (2039)				Future (2039)				Future (2039) with Mitigations: East-West Connection			
		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
		50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
2. GW Memorial Pkwy & Slaters Ln (Signalized)													
Eastbound Left	850	~37	m#51	8	16	~522	m#438	29	m#78	53	m#70	20	m46
Eastbound LT	850	~32	m#46	8	18	~541	m#454	30	m#84	55	m#75	20	m46
Westbound LTR	600	29	98	66	#169	~144	#281	~609	m#573	--	--	--	--
Westbound Thru	600	--	--	--	--	--	--	--	--	6	11	55	#358
Northbound Thru	1100	~1132	m#132 6	~639	#1000	~1208	m#132 3	~861	#1007	~1232	m#117 4	~869	#1008
Southbound Thru	3125	141	198	694	#887	157	198	688	#882	158	201	701	#895
3. Slaters Ln & W Abingdon Dr (Signalized)													
Eastbound TR	850	325	#458	215	280	~467	#601	250	321	385	#525	247	318
Westbound Left	600	0	m0	0	m0	0	m0	0	m0	0	1	1	m6
Westbound Thru	600	3	m7	3	m9	10	m8	60	m6	1	1	5	m29
Southbound LTR	850	106	156	304	374	155	200	333	408	--	--	--	--
Southbound LT	850	--	--	--	--	--	--	--	--	50	72	165	m185
Southbound Right	70	--	--	--	--	--	--	--	--	65	93	99	m114
4. Slaters Ln & E Abingdon Dr (Signalized)													
Eastbound LT	850	2	m2	1	m7	28	m20	3	m18	--	--	--	--
Eastbound Thru	850	--	--	--	--	--	--	--	--	101	m129	2	m12
Westbound Thru	600	19	44	12	34	76	132	~330	#522	39	80	178	#282
Westbound Right	600	0	0	0	0	0	0	0	20	0	27	0	52
Northbound LTR	1110	38	372	14	26	340	386	14	27	94	138	10	15
9. GW Memorial Pkwy & Bashford Ln (Signalized)													
Eastbound Left	125	~178	#344	7	21	~190	#352	7	22	--	--	--	--
Eastbound TR	125	30	44	84	154	34	53	103	245	--	--	--	--
Eastbound LT	125	--	--	--	--	--	--	--	--	39	51	54	77
Westbound Left	530	3	m8	1	m2	9	m16	6	m9	--	--	--	--
Westbound TR	530	51	74	17	25	32	49	0	23	--	--	--	--
Westbound LTR	530	--	--	--	--	--	--	--	--	36	50	9	14
Northbound Thru	1130	519	617	449	538	517	614	446	534	517	614	467	559
Southbound Thru	1100	122	172	18	40	121	m171	31	m32	29	61	0	17
10. Bashford Ln & W Abingdon Dr (Signalized)													
Eastbound TR	125	210	304	69	119	214	309	78	130	213	308	73	124
Westbound LT	530	4	m4	8	m9	4	m5	8	m16	--	--	--	--
Westbound Left	530	--	--	--	--	--	--	--	--	0	m1	0	m0
Westbound Thru	530	--	--	--	--	--	--	--	--	5	7	6	9
Southbound Left	120	19	m49	5	m7	30	m62	8	m11	4	8	7	8
Southbound TR	1060	2	m12	12	13	4	m14	20	22	1	2	25	19
11. Bashford Ln & E Abingdon Dr (Signalized)													
Eastbound LT	125	2	3	4	6	3	4	5	6	--	--	--	--
Eastbound Left	125	--	--	--	--	--	--	--	--	0	m0	0	0
Eastbound Thru	125	--	--	--	--	--	--	--	--	2	3	4	52
Westbound Thru	530	169	250	239	342	236	337	315	440	216	311	272	383
Westbound Right	225	30	62	8	25	31	63	8	25	31	63	8	24
Northbound LTR	1000	265	320	23	37	303	364	26	43	304	364	31	48

43.	W Abingdon Dr & Connector St (Signalized)													
	Westbound Left	500	--	--	--	--	--	--	--	--	0	1	1	2
	Southbound LT	500	--	--	--	--	--	--	--	--	35	m43	52	65
44.	GW Memorial Pkwy & Connector St (Signalized)													
	Eastbound Thru	50	--	--	--	--	--	--	--	--	134	194	62	114
	Westbound Thru	500	--	--	--	--	--	--	--	--	9	11	9	10
	Northbound Thru	650	--	--	--	--	--	--	--	--	~1294	#1290	314	#964
	Southbound Thru	500	--	--	--	--	--	--	--	--	108	122	20	m#23
45.	E Abingdon Dr & Connector St (Signalized)													
	Eastbound Thru	50	--	--	--	--	--	--	--	--	1	0	3	6
	Westbound TR	500	--	--	--	--	--	--	--	--	20	53	63	111
	Northbound TR	650	--	--	--	--	--	--	--	--	102	108	18	29

95th percentile volume exceeds capacity, queue may be longer.

m Volume for 95th percentile queue is metered by upstream signal.

~ Volume exceeds capacity, queue is theoretically infinite.

Transportation Management Plan Framework

The Potomac River Generating Station (PRGS) Redevelopment CDD is being designed in alignment with the City of Alexandria's long-term goals and policies as outlined in its Comprehensive Transportation Master Plan, associated updates, and other related documents. While a detailed transportation management plan will be included at the DSUP-level, this section provides a framework to encourage the use of transit, walking, bicycling, and carpooling.

A Transportation Management Plan (TMP) has many components that are tailored to accommodate a given facility with the goal being the reduction of automobile trips by encouraging alternative forms of transportation. A few of the typical TMP components include the establishment of a TMP coordinator, distribution of transit literature, and designation of carpool and/or vanpool spaces. Management measures taken by this project can be monitored and adjusted as needed to continually create opportunities to reduce the amount of traffic generated by the site and to promote sustainable mobility options. The TMPs for each development block may include, but not be limited to, the following items:

- General
 - Designate a TMP coordinator for the CDD and/or sites within the CDD.
 - Contribute to the TMP fund at a rate negotiated with City staff.
 - Conduct an annual survey with minimum response rate of 50% to be submitted to Transportation Planning Division. Survey of commercial tenants to focus on commute mode choice; survey of residents to focus on vehicle ownership and daily travel patterns.
 - Provide an annual TDM report to the City with occupied space (commercial space and dwelling units), results of the annual survey, and a review of the project's completed TMP program elements.
 - Post all TDM commitments and the annual TDM report online and publicize availability to confirm commitments are being met.
 - Provide website links to [Commuter Connections](#) on developer and property management websites.
 - Provide information on regional transportation programs and services to residents and employees.
- Transit Infrastructure and Subsidies
 - Promote the availability and use of on-site transit facilities.
 - Install and maintain transit information display screens and Transit Information Centers (kiosks) in building lobbies (hotel, retail, grocery, office, residences, arts).
 - Provide SmarTrip cards for free, one time, per employee, to each of the tenants' employees and each on-site employee of the property management companies and/or building operators.
 - Provide SmarTrip cards per person, for free, one time, per resident.
 - Employers based at the site will facilitate employee use of pre-tax payroll deduction transit benefit as outlined in USC 26 § 132(f).
 - Accommodate within the right-of-way, a site for the City to locate and furnish an on-site Transit Store adjacent to the transit hub.
- Bicycle Infrastructure
 - Provide funding and location for one (1) on-site Capital Bikeshare station.
 - Provide each new resident with 1-year Capital Bikeshare subscription or a dollar-equivalent rebate for bicycle or bicycle equipment purchases at an authorized bicycle retailer.
 - Secure discounted rates for continued Capital Bikeshare subscriptions per the terms of Capital Bikeshare management.
 - Install secure bicycle storage in parking garages serving office and residential uses.
 - Provide on-site shower and changing facilities for employees.
 - Provide secure bike racks appropriately located to support bicycle access to retail uses.
 - Establish covenants securing the right to bring bicycles into all garages and dwelling units.
- Parking
 - Implement a parking pricing strategy that encourages sustainable mobility options other than single-occupancy-vehicle (SOV) travel.

-
- Require all parking costs be unbundled from the cost of leasing or purchasing commercial space and residential units.
 - Maintain a standing “right of first refusal” offer for spaces in the garage to established car sharing services.
 - When occupied by a car sharing service, make these spaces available to its members, twenty-four hours a day, seven days a week, without restrictions. Request that the City count the car sharing spaces towards the project’s parking requirements.
 - Provide a one-time membership fee subsidy in a car sharing program for each residential unit.
 - Share spaces between uses to minimize on-site parking supply needs.
 - Monitor and enforce proper use of parking spaces reserved for carpools and vanpools.
 - Marketing and Promotions
 - Promote the regional Guaranteed Ride Home Program as part of the ridesharing and transit marketing efforts.
 - Participate in regionally sponsored clean air, transit, and traffic mitigation promotions by advertising such promotions in a manner and at such locations within buildings acceptable to on-site management.
 - Host events or participate in Bike to Work Day, Try Transit Week, Car Free Day, Earth Day or other events with GO Alex.

Summary of Recommendations

This chapter provides a summary of recommendations included in this report for transportation components of the proposed PRGS CDD, including external and internal roadway recommendations, transit recommendations, bicycle recommendations, and pedestrian recommendations.

Internal Roadway Recommendations

The recommendations contained within the Traffic Operations Chapter of this report prioritize a right-sized internal roadway network that accommodates traffic flows without providing excess capacity discouraging the use of multi-modal improvements. Details on the design of the internal streets will continue to be refined as part of the Infrastructure DSUP and subsequent DSUP applications for each block.

External Roadway Recommendations

In addition to the improvements recommended for internal roadways above, this report recommends the following improvements to the external roadways based on the capacity analysis:

- Modifications to signal phasing and signal timings at the following three (3) intersections:
 - Slaters Lane and GW Memorial Parkway
 - Slaters Lane and W Abingdon Drive
 - Slaters Lane and E Abingdon Drive
- Adjustments to signal timings at the following intersection:
 - GW Memorial Parkway and Montgomery Street
- Restriping at the following four (4) intersections:
 - Slaters Lane and GW Memorial Parkway
 - Slaters Lane and E Abingdon Drive
 - Bashford Lane and GW Memorial Parkway
 - Bashford Lane and W Abingdon Drive
- Adding a right-turn pocket at the following intersection:
 - Slaters Lane and W Abingdon Drive

In addition to the mitigation measures identified based on City of Alexandria standards, the following additional improvements could be beneficial to the operations in the vicinity of the proposed development. While not required to mitigate impacts by the proposed development, these measures are additional opportunities to further the City's goal to develop a complete street network in the vicinity of the proposed development:

- Restriping the westbound approach of the GW Memorial Parkway and E Abingdon Drive intersection from one lane to two lanes.
- Construction of a new east-west street connecting the Primary Street, a new internal roadway, to E/W Abingdon Drive and/or GW Memorial Parkway.

These additional improvements could improve existing points of congestion along the GW Memorial Parkway, provide additional capacity for trips generated by the proposed development, and create opportunities for enhanced east-west multimodal connectivity where it is currently challenging due to the limited access nature of GW Memorial Parkway. These improvements would need to be further coordinated with NPS and explored as part of subsequent DSUPs.

Transit Facility Recommendations

In accordance with the Alexandria Transit Vision Plan, the Old Town North SAP, and an analysis of the transit needs of the CDD, this report recommends the following transit facilities:

- Realignment of DASH Line 34 to run through the proposed development via the Royal Street extension, the Primary Street, and Slaters Lane.
- Two two-way transit stops, to be located along the Primary Street, which would be served by the realigned Line 34.

Bicycle Facility Recommendations

This report recommends the following bicycle facilities, which are consistent with the City's Mobility Plan and Old Town North Small Area Plan and will enhance bicycle connectivity to the local and regional bicycle networks around the project site:

- Shared lane markings ("Sharrows") on N Royal Street between Bashford Lane and the N Fairfax Street extension, and on the N Fairfax Street extension between the proposed Woonerf and Slaters Lane.
- Extension of on-street bike lanes along Slaters Lane between GW Parkway and the Primary Street.
- Trail spurs connecting the Mount Vernon Trail to the eastern frontage of the site, with NPS approval.

- Contribution to improvements to the multi-use trail that connects E Abingdon Drive and the intersection of Bashford Lane and N Royal Street.
- On-site bicycle parking, which will comply with the City's Bicycle Parking Requirements.
- One (1) Capital Bikeshare station.

Pedestrian Facility Recommendations

This report recommends the following pedestrian facilities, which comply with the City's Mobility Plan, Complete Streets Design Guidelines and Old Town North Small Area Plan:

- Sidewalks along all internal roadways. All sidewalks will meet or exceed City of Alexandria and ADA standards.
- Curb extensions within the internal roadway network to shorten crossing distances and provide a more comfortable pedestrian environment, wherever feasible.
- Abundant and frequent crossings for pedestrians to navigate the site by providing an all-way stop or signal at all intersections.
- Trail spurs connecting the Mount Vernon Trail to the eastern frontage of the site, with NPS approval.
- A curbless, low speed street (Woonerf) for all user types along the N Fairfax Street extension.

Summary and Conclusions

The purpose of this report was to provide a transportation analysis associated with the proposed Potomac River Generating Station (PRGS) Redevelopment CDD to determine the multi-modal infrastructure needs for the entire site, identify all vehicular and external recommendations to mitigate transportation impacts from the CDD, and provide a context within which the Development Special Use Permit (DSUP) for each individual block/phase will identify more detailed recommendations. **This report concludes that the proposed development will have a manageable impact** on the surrounding transportation network, assuming the proposed infrastructure and mitigation recommendations are implemented, as outlined in the Summary of Recommendations chapter, and specific development block details on building access and transportation demand management are developed during the DSUP process.

Proposed Project

The proposed development site is currently occupied by the Potomac River Generating Station, which is no longer in operation. The proposed development will include redeveloping the existing, unused power station site into a mixed-use development consisting of six (6) development blocks and existing pumphouse identified for potential renovation and reuse. A total of up to 2.5 million square feet GSF of development is proposed, with a mix of office, arts, retail, residential, and hotel uses proposed throughout the site. The exact program for each block will be determined as part of future DSUPs. The proposed project build-out year is 2033.

The proposed development will provide vehicular parking below-grade parking garages. The below-grade parking will be shared between all development blocks and will meet City requirements. Details about the proposed development's parking facilities will be examined in the DSUP application for each building. The proposed development will provide loading areas within or adjacent to each development block. The number of on-site loading facilities will accommodate the practical needs of the development.

Compliance With Small Area Plan

The City Council adopted the Old Town North Small Area Plan in 2017 along with the Old Town North Urban Design Standards and Guidelines to present recommendations that achieve placemaking and economic development. The OTN SAP

includes recommendations to promote a balanced mix of land uses and the creation of affordable housing options.

The Plan's recommendations centers around a pedestrian-focused vision for the neighborhood with design standards and guidelines that support and enhance the pedestrian experience.

One of the principles upon which the OTN SAP is based is to "establish a conceptual framework for the redevelopment of the former power plant site," i.e. the site of the PRGS CDD. The Plan identifies the following transportation goals for the area:

- Enhanced streetscapes and pedestrian environment that reflects the goal of the City's adopted Vision Zero resolution and offers an interesting, safe, attractive, and engaging environment for pedestrians.
- Reuse of the rail corridor as a linear park with pedestrian and bicycle connections and recreational amenities.
- Separation of pedestrian and bicycle paths to be provided along the expanded waterfront open space as part of the redevelopment of the former power plant site.
- Enhanced bicycle facilities as recommended in the City's Transportation Master Plan to improve north-south and east-west connectivity in Old Town North. The recommended facilities provide additional options for connections to the Mount Vernon Trail and improved bicycle connectivity between the Metrorail Stations, the Mount Vernon Trail, and the waterfront.
- Existing or new local transit routes will be configured to provide service to the former power plant site and transit connectivity to the Braddock Road Metrorail Station and the future Potomac Yard Metrorail Station.
- Local and circulator transit service to provide more frequent and convenient service between the King Street Metrorail Station and the Braddock Road Metrorail Station, as recommended in the City's Transportation Master Plan. The service would traverse through Old Town North using North Fairfax, Madison, and Montgomery Streets.
- Extend the urban street network as part of the redevelopment of the former power plant site.

The proposed development is consistent with the Small Area Plan's goals by extending the urban street network into the site, providing pedestrian and bicycle facilities within the site and along the waterfront that are consistent with Plan's proposed improvements, and accommodating changes to transit service as

recommended in the City's Transportation Master Plan. The design of the proposed development's transportation infrastructure shall continue to be coordinated with the City throughout the CDD and DSUP processes.

Transit Facilities

The project area is served by regional and local transit services that include DASH, Metroway, and Metrorail:

- There is currently one (1) bus route (DASH Line 34) that stops within a quarter mile walk of the site, with multiple bus stops located near the site, which provides access to the regional transit system and Old Town Alexandria. There are two (2) Metroway stops less than a mile from the project site.
- The development is located 1.0 mile from the Braddock Road Metrorail Station and 1.0 mile from the future Potomac Yard Metrorail Station.
- Planned and proposed improvements to transit service in the vicinity of the site will improve connectivity to/from the proposed development.
- As part of the proposed development, DASH Line 34 will be realigned to utilize the new roadways within the site, consistent with the Old Town North Small Area Plan. Two two-way transit stops will be located within the site, improving transit connectivity to/from the proposed development.
- In coordination with City staff, National Park Service, and a number of other relevant stakeholders, the CDD will, if feasible, take advantage of the project's proximity to the Potomac River and provide a stop along the waterfront for any future ferry service or water taxis.

The development is well-served by numerous transit options under existing conditions and includes proposed facilities that will improve transit access to the site.

Bicycle Facilities

The site has access to several on- and off-street bicycle facilities, including bicycle lanes on Slaters Lane, shared lanes on N Royal Street and Bashford Lane, and the Mount Vernon Trail.

A number of planned improvements by the City will improve bicycle infrastructure and connectivity in the vicinity of the proposed development. These include a new trail/sidepath along E Abingdon Drive from Bashford Lane to Slaters Lane and a new trail connection from Mount Vernon Trail/E Abingdon Drive to Potomac Avenue/Potomac Yard Trail across GW Memorial Parkway.

The project's proposed bicycle improvements include the provision of a two-way bike route through the project site, new bike lanes along Slaters Lane, upgrades to the existing Mount Vernon Trail, and new connection points to the Mount Vernon Trail along the eastern frontage of the site. These improvements will provide connectivity to regional bicycle facilities, provide connectivity to the local bicycle network, and will circulate bicycles internally through the site.

Additionally, as part of the proposed development, short-term bicycle parking spaces will be provided throughout the site. Long-term bicycle parking spaces will be provided for use of residents and employees of the site.

Pedestrian Facilities

The existing pedestrian infrastructure surrounding the site provides a quality walking environment. There are sidewalks along the majority of primary routes to pedestrian destinations with few gaps in the system.

Planned and proposed pedestrian improvements to the pedestrian infrastructure surrounding the site will improve pedestrian comfort and connectivity. Sidewalks will be provided on both sides of all internal roads. All new pedestrian facilities will meet or exceed City of Alexandria and ADA standards. The CDD proposes to connect to the existing street network at N Royal Street, N Fairfax Street, and Slaters Lane; proposed sidewalks will connect to the existing pedestrian network at those same locations. These new connections will provide connectivity to the many commercial destinations to the south, as well as the major transit stations to the west and south. Wherever feasible, curb extensions will be provided within the internal roadway network to shorten crossing distances and provide a more comfortable pedestrian environment. All intersections within the internal roadway network will have all-way stop control or will be signalized, providing more abundant and frequent crossings for pedestrians to navigate the site. The CDD will provide new trail spurs connecting the eastern frontage of the site to the Mount Vernon Trail, connecting pedestrians to Daingerfield Island to the north and Old Town Alexandria to the south.

Travel Demand Assumptions

Mode split (also called mode share) is the percentage of travelers using a particular type (or mode) of transportation when traveling. The following mode splits were assumed in the analysis:

- Office:

- Auto – 60%, Transit – 30%, Bike – 5%, Walk – 5%
- Residential:
 - Auto – 50%, Transit – 35%, Bike – 5%, Walk – 10%
- Retail:
 - Auto – 20%, Transit – 15%, Bike – 25%, Walk – 40%
- Grocer:
 - Auto – 70%, Transit – 5%, Bike – 5%, Walk – 20%
- Hotel:
 - Auto – 50%, Transit – 25%, Bike – 5%, Walk – 20%
- Arts:
 - Auto – 60%, Transit – 20%, Bike – 5%, Walk – 15%

These mode splits reflect the expected modes of travel for trips during the typical weekday commuter peak hours, assuming a transportation management plan will be in place as part of future DSUPs for the proposed development. The proposed mode splits were vetted and approved by the City of Alexandria during the scoping process.

This data was then applied to the calculated number of trips that are generated by the proposed uses using the methodology outlined in the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition (with the exception of the Retail, which used 10th Edition rates due to the neighborhood-serving, ground-floor nature of the use), resulting in new vehicular trips at full development build-out as follows:

- AM Peak Hour: 628 veh/hr
- PM Peak Hour: 793 veh/hr

Future Traffic Operations

A capacity analysis was developed to compare the future roadway network without the proposed development to the future roadway network with the proposed development. Intersection capacity analyses were performed for the morning and afternoon peak hours at the study area intersections for the 2033 (full build-out) and 2039 (plus-six-year planning level) analysis years. Synchro version 10 was used to analyze the study intersections based on the *Highway Capacity Manual* (HCM) 2000 methodology.

Traffic projections for 2033 (full build-out) and 2039 (plus-six-year planning level) are based on existing volumes, plus traffic generated by approved nearby background developments,

regional growth on the roadways, and traffic generated by the proposed PRGS CDD.

Mitigations

As detailed in the Geometry and Operations section of this report, the proposed development will include several improvements, including a new network of internal roadways with external connections to Slaters Lane, N Royal Street, and N Fairfax Street.

In addition to the improvements outlined above, mitigation measures were identified based on City of Alexandria guidelines. Mitigation measures were explored at the six (6) identified intersections, and included the following recommendations:

Future (2033) Full Build-Out Conditions:

- Modifications to signal phasing and signal timings at three (3) intersections.
- Adjustments to signal timings at one (1) intersection.
- Restriping at five (5) intersections.
- Adding a right-turn pocket at one (1) intersection.

Future (2039) Plus-Six-Year Planning Level Conditions:

- Modifications to signal phasing and signal timings at three (3) intersections.
- Adjustments to signal timings at one (1) intersection.
- Restriping at four (4) intersections.
- Adding a right-turn pocket at one (1) intersection.

With these mitigations in place, the analysis shows that traffic operations with proposed development will improve or are consistent with the background scenarios at many intersections.

Along GW Memorial Parkway, there are certain movements that continue to experience congestion, as they do under existing and background conditions. GW Memorial Parkway is a heavily commuted route and while there is additional capacity at the side street approaches that could be shifted to the mainline to further reduce delays along GW Memorial Parkway, this would be detrimental to the safety of non-auto modes as it would require a decrease in pedestrian crossing times. It is likely that drivers cutting through the area will alter their route and mode choices as future conditions change.

Additional Improvements

In addition to the mitigation measures identified based on City of Alexandria standards, the following additional improvements

could be beneficial to the operations in the vicinity of the proposed development. While not required to mitigate impacts by the proposed development, these measures are additional opportunities to further the City's goal to develop a complete street network in the vicinity of the proposed development:

- Restriping the westbound approach of the GW Memorial Parkway and E Abingdon Drive intersection from one lane to two lanes.
- Construction of a new east-west street connecting the Primary Street, a new internal roadway, to E/W Abingdon Drive and/or GW Memorial Parkway.

These additional improvements could improve existing points of congestion along the GW Memorial Parkway, provide additional capacity for trips generated by the proposed development, and create opportunities for enhanced east-west multimodal connectivity where it is currently challenging due to the limited access nature of GW Memorial Parkway. These improvements would need to be further coordinated with NPS.

Transportation Management Plan

A Transportation Management Plan (TMP) will be outlined in the DSUP for each individual block. The unique characteristics of this site offer a variety of possibilities for the TMPs. Factors such as coordinated transportation management between the development blocks and the on-site transit hub present an exceptional opportunity to minimize the number of commuters driving alone to and from the site.

Summary and Recommendations

This report finds that this CDD meets the goals set by the Old Town North SAP, and fits within the City's Mobility Plan, Complete Streets Design Guidelines, Old Town North Urban Design Standards and Guidelines and Vision Zero initiative. The project achieves this through providing high-quality internal and external multimodal connections as well as incorporating a roadway system that accommodates expected traffic flows while not providing excess capacity at the expense of non-auto accessibility.

Thus, this report concludes that the proposed development **will have a manageable impact** on the surrounding transportation network, assuming the proposed infrastructure and mitigation recommendations are implemented, as outlined in the Summary of Recommendations chapter, and specific development block details on building access and transportation demand management are developed during the DSUP process.