Appendix D

Transportation Study

The contents of Appendix D contain some large tables and diagrams that show traffic modeling outputs; the outputs are complex in nature and would not conform to 508 compliance in any meaningful way, but the results they depict are summarized within the main text of the Transportation Study. Although the complex tables in Appendix D are not fully 508 accessible, it is available. If you would like more information on this data please contact navfacwashnepa1@navy.mil.

TRANSPORTATION STUDY

For

A Large Vehicle Inspection Station and Access Control Point at

Joint Base Anacostia-Bolling, Washington, D.C.

January 11, 2024

This page intentionally left blank.

Abstract

Designation:	Transportation Study Supporting the Environmental Assessment
Title of Proposed Action:	A Large Vehicle Inspection Station and Access Control Point at
Project Location:	Joint Base Anacostia-Bolling
Lead Agency for the EA:	Department of the Air Force
Affected Region:	Washington, DC
Action Proponent:	Joint Base Anacostia-Bolling
Point of Contact:	Nik Tompkins-Flagg
	NAVFAC Washington
	1314 Harwood Street SE, Building 212
	Washington, DC 20374-5018
	Email address: navfacwashnepa@navy.mil
Date:	January 2024

The United States Air Force (hereinafter referred to as the Air Force) has prepared this standalone Transportation Study in preparation to construct a new Large Vehicle Inspection Station (LVIS) and Access Control Point (ACP) at Firth Sterling Gate located on Joint Base Anacostia Bolling (JBAB). This study analyzes pedestrian, bicycle, and transit travel modes; traffic capacity and levels of service; truck access; and parking conditions for existing and 2028 future conditions. The analysis of the future conditions consists of determining the impacts of three Action Alternatives and a No Action Alternative. The LVIS and ACP would comply with Unified Facilities Criteria (UFC) 04-022-01 (Entry Control Facilities Access Control Points) and UFC 4-010-01 (Department of Defense [DoD] Minimum Antiterrorism Standards for Buildings) and would include a commercial vehicle gate house/search building, a personally operated vehicle (POV) gate house, and a canopy. Design and construction also include communications; a backup generator; fencing; passive and active vehicle barriers; site preparation; road realignment; utilities; lighting; a permanent X-ray unit; pavement; parking; sidewalks; curbs and gutters; storm drainage; landscaping and signage; and aircraft removal. This project would keep uninspected vehicles outside the installation and would increase inspection capacity to reduce off-installation impacts. This report analyzes each transportation mode based on the three Action Alternatives compared to the No Action Alternative, provides a summary in the discussion section, and presents a set of recommendations by travel mode based on the analyses.

This page intentionally left blank.

TABLE OF CONTENTS

This page intentionally left blank.

List of Figures

List of Tables

Attachments

Abbreviations and Acronyms

Acronym	Definition
AADT	Annual Average Daily Traffic
ACP	Access Control Point
ADA	Americans with Disability Act
ART	Anacostia Riverwalk Trail
ATR	Automatic Traffic Recorder
AWI	Anacostia Waterfront Initiative
CAC	Common Access Card
DDOT	District Department of Transportation
DHS	Department of Homeland Security
DoD	Department of Defense
EA	Environmental Assessment
FHWA	Federal Highway Administration
GIS	Geographic Information System
HCM	Highway Capacity Manual
I	Interstate
JBAB	Joint Base Anacostia-Bolling
LOS	Level of Service
LTS	Level of Traffic Stress
LVIS	Large Vehicle Inspection Station
MARC	Maryland Area Regional Commuter Rail
MPH	Miles Per Hour
MTA	Maryland Transit Authority
NEMA	National Electrical Manufacturers Association
NCPC	National Capital Planning Commission
NRL	Naval Research Laboratory
POV	Personal Occupancy Vehicle
SOV	Single Occupancy Vehicle
TMP	Transportation Management Program
UFC	Unified Facilities Criteria
U.S.	United States
v/c	Volume to Capacity
VRE	Virginia Railway Express
WMATA	Washington Metropolitan Area Transit Authority

This page intentionally left blank.

1 Introduction

1.1 Introduction

The United States Air Force (hereinafter referred to as the Air Force) has prepared this standalone Transportation Study in preparation to construct a new, Unified Facilities Criteria (UFC)-compliant Large Vehicle Inspection Station (LVIS) and Access Control Point (ACP) at Firth Sterling Gate. The LVIS and ACP would comply with Unified Facilities Criteria (UFC) 04-022-01 (Entry Control Facilities Access Control Points) and UFC 4-010-01 (Department of Defense [DoD] Minimum Antiterrorism Standards for Buildings) and would include a commercial vehicle gate house/search building, a Personal Occupancy Vehicle (POV) gate house, and a canopy. Design and construction also include communications; a backup generator; fencing; passive and active vehicle barriers; site preparation; road realignment; utilities; lighting; a permanent X-ray unit; pavement; parking; sidewalks; curbs and gutters; storm drainage; landscaping and signage; and aircraft removal.

Three alternatives are examined in this transportation study. Alternative 1 is the construction of the new, UFC-compliant LVIS and ACP, hereinafter referred to as the LVIS, at Firth Sterling Gate (Figure 1-1). Alternative 2, the preferred action, is an alternative LVIS configuration at the Firth Sterling Gate. Alternative 3 is the permanent closure of Firth Sterling Gate, leaving the existing LVIS at South Gate.

Figure 1-1 Proposed Site

1.2 Location

JBAB consists of approximately 934 acres of land located along the Potomac River in the southwest quadrant of Washington, D.C. (Figure 1-2). JBAB is bounded by the Frederick Douglass Memorial Bridge to the north; South Capitol Street to the east; the Naval Research Laboratory (NRL) to the south; and the Potomac River to the west. Several major arterial roads are close by: Interstate (I)-695, I-295, I-495, and South Capitol Street. JBAB can be accessed using several public transit modes, including the DC Circulator, Metrorail, and Metrobus. The Anacostia Metro Station is approximately 0.5 miles away from Firth Sterling Gate. The installation is in an urban area surrounded by public facilities, parks, and residential communities (Air Force, 2021a).

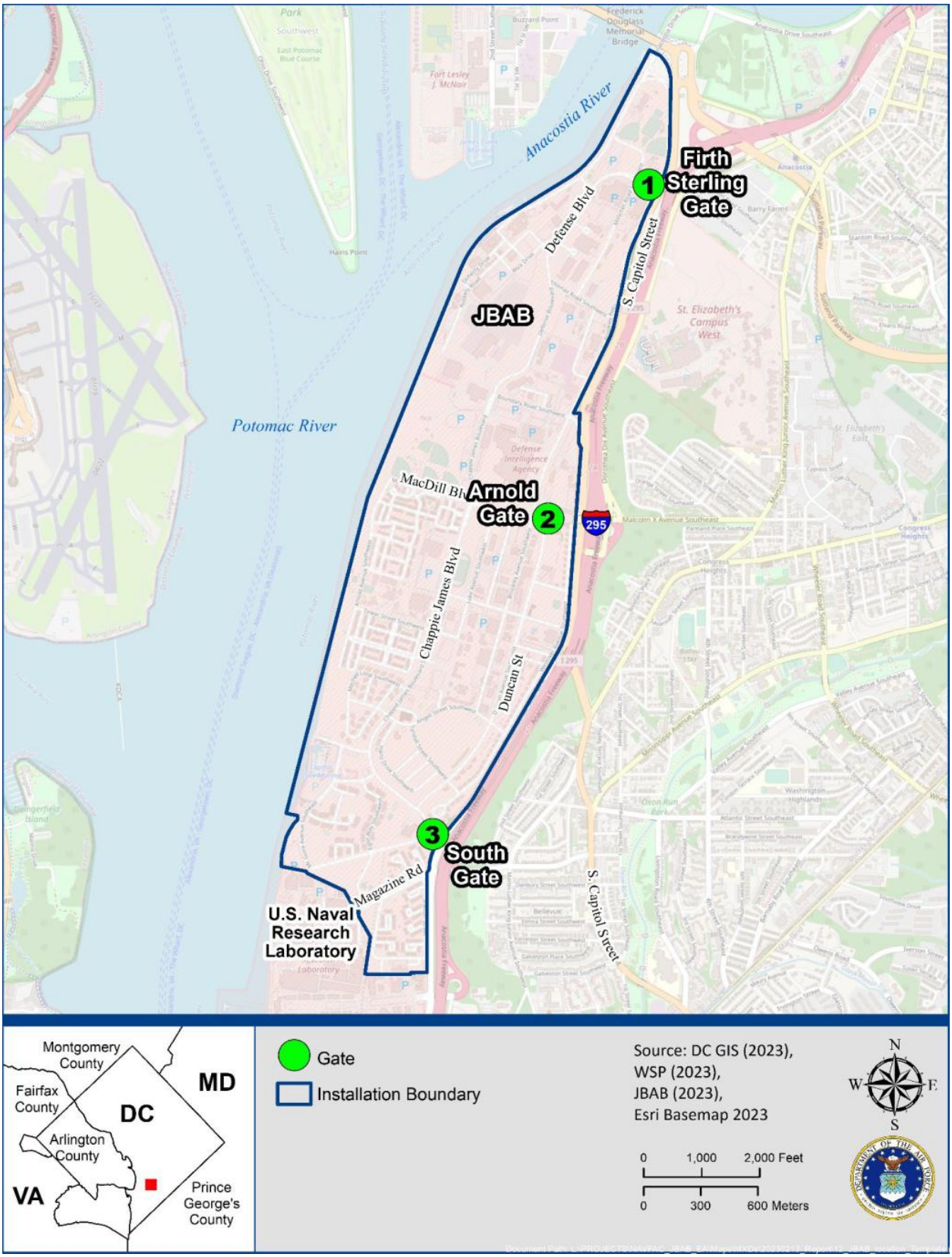


Figure 1-2 Location Map

This page intentionally left blank.

2 Background

Section 2.1 outlines the scope of the study and elements contained in the study by section title. Section 2.2 describes the current land use surrounding the installation, including land owned by JBAB and private use. Section 2.3 reviews the most relevant plans covering the affected environment, including broad bicycle and master plans and specific sector plans. Section 2.4 covers the agreed-upon assumptions by the Air Force and the District Department of Transportation (DDOT) that the study uses to develop future traffic volumes and the methods proposed to evaluate the traffic conditions.

2.1 Description of the Project Tasking

The scope of work for this transportation study includes the following:

- Provide engineering services necessary to prepare a condition assessment report of the traffic capacity and level of service (LOS) analysis.
- Provide recommendations for improvements to the study area road system based on the results of the capacity and LOS analysis of future requirements.
- Provide a list of findings, recommendations, and alternatives for the Action Alternatives.

This transportation study has eight sections to document the analysis, findings, and recommendations for the LVIS EA.

- Section 1 presents the introduction and the proposed action.
- Section 2 describes the background, including the project tasking, existing land use, the planning context, and the transportation assumption agreement.
- Section 3 presents an operational analysis of the existing conditions and includes an operational analysis of the study area roadway networks and non-automotive transportation modes.
- Section 4 presents an operational analysis of the future conditions and includes future background growth and proposed actions and presents the operational analysis under these conditions.
- Section 5 presents a discussion of the future findings.
- Section 6 describes transportation impacts from construction activities associated with the proposed actions.
- Section 7 presents the recommendations for minimizing transportation impacts once the proposed actions are implemented.
- Section 8 presents recommendations for minimizing transportation impacts during construction activities.

2.2 Existing Land Use

The installation is not currently zoned by the District of Columbia Office of Zoning (DC Office of Zoning, n.d.). JBAB has its own land uses (unaffiliated with the District's Office of Zoning) described in its Installation Development Plan (Air Force, 2021a). The two most extensive land uses include Family Housing and Mission and Administrative Uses.

2.3 Planning Context

This section summarizes the local land use and regulatory plans that apply to the project and the surrounding area; these plans serve as background for the remainder of the report and provide context for the evaluation of the proposed actions.

2.3.1 District of Columbia Bicycle Master Plan

DDOT prepared The District of Columbia Bicycle Master Plan in 2005 with a focus on additional and improved bicycling facilities; bicycle-friendly policies; and bicycle-related education, promotion, and enforcement (NACTO, 2005). The plan serves as a guide to establish high-quality bicycle facilities and programs as a part of a broader initiative to create a sustainable, multimodal transportation system in the nation's capital. To achieve the goal for additional and improved bicycle facilities, the plan includes recommendations for closing trail gaps, improving bridges, upgrading existing trails, and building new trails and on-street facilities.

The District of Columbia Bicycle Master Plan recommends that bicycle issues be included in all federal initiatives planned and implemented in Washington, D.C. Since the plan was adopted, many of its recommendations have been met in Anacostia on the 11th Street Bridge and the South Capitol Street Bridge (renamed to the Frederick Douglass Memorial Bridge in 2021). Multi-use trails on the two bridges now connect the Anacostia and Poplar Point side of the Anacostia River to the Navy Yard, and multi-use trails between the two bridges along both sides of the river are in place (Anacostia Riverwalk Trail [ART]). The Suitland Parkway Trail does not connect to the ART in Anacostia; however, a recommended connection between South Capitol Street and the trail along the I-295 corridor has already been completed. JBAB has an existing multi-use trail inside the installation, but it does not connect to any trails outside the installation.

The plan also recommends that federal agencies strive to eliminate barriers to promote connectivity in the bicycle network. Barriers are developments, highways, or inhospitable roads that prevent bicyclists from traveling safely between facilities. Barriers to trail connectivity within one mile of JBAB include the interchange of I-695 and I-295 in Anacostia and I-695 itself.

2.3.2 District of Columbia Pedestrian Master Plan

DDOT prepared the District of Columbia Pedestrian Master Plan in 2009. This plan lays out a vision of Washington, D.C., as a place where any trip can be taken safely and comfortably on foot, and where pedestrians, bicyclists, transit users, and motorists are all equally served (DDOT, 2009). The two primary goals of the plan include:

1. Reduce the number of pedestrians killed and injured in crashes with motor vehicles.
2. Increase pedestrian activity by making walking a comfortable and accessible mode of travel throughout all parts of the District.

DDOT conducted a general assessment concerning the quality of the pedestrian network in the District by gathering data on roadway characteristics such as street width, number of lanes, destinations that attract pedestrian activity, and the presence of sidewalks. Portions of the network with high volumes of pedestrians but poor conditions for walking were identified as priority pedestrian corridors. Specific recommendations for improvements, including closing sidewalk gaps and improving crosswalks and curbs are included in Appendix D of the plan and have been implemented since the plan was adopted.

The following three objectives were developed based on the results of the general assessment to meet the vision and goals defined in the plan.

1. Provide accessible, safe, and well-maintained pedestrian facilities along and across all streets.
2. Institute policies and practices to ensure that every street in the District meets the needs of pedestrians of all abilities.
3. Establish education, enforcement, and encouragement programs that support pedestrian travel.

These overarching objectives are measured by pedestrian deaths and injuries and the number of people using walking and transit to get to work.

2.3.3 moveDC

DDOT officially updated moveDC, the District of Columbia's Multimodal Long-Range Transportation Plan, in December 2021 to provide a vision and goals for the future of the District's transportation system (DDOT, 2021a). The vision for the District is to have a world-class transportation system that serves the people who live, work, and visit the city to make the city more livable, sustainable, prosperous, and attractive.

The goals and objectives identified to achieve this vision are broken down into the areas of safety, equity, mobility, management and operations, project delivery, sustainability, and enjoyable spaces. The implementation of the plan is coordinated among many partner organizations. DDOT leads several of the recommended projects but relies on other District agencies, the Washington Metropolitan Area Transit Authority (WMATA), the National Park Service, the Architect of the Capitol, the Metropolitan Washington Council of Governments, and other partners in the region for support in implementing the plan's vision.

The moveDC plan is intended to provide an overarching framework for coordinated transportation investments for the District for the next 25 years. The plan is based on the understanding that there has been and will continue to be significant growth within the District and the region, and investment in transportation, along with coordinated land use planning, are necessary to maintain the quality of life in the District. The plan notes that transportation plays a significant role in achieving the city's goals related to shared prosperity, neighborhood vitality, environmental stewardship, and competitiveness, which is why the plan is built not just on transportation infrastructure recommendations but also on service and policy recommendations organized into 10 categories. Some of these categories include using placemaking to create a dynamic public realm, identifying sustainable funding strategies, connecting transportation technology with users, prioritizing pedestrians, and improving bicycling safety and convenience.

Specific recommendations from the plan relevant to the area around JBAB include:

- Pedestrian and Bicycle
    - Increase the people-focused use of the right-of-way and public space and prioritize construction of the Capital Trails Network. Develop a method to measure the extent to which a project improves trail network connectivity. Include features in the design of trails that enhance the safety, comfort, and orientation of users (e.g., wayfinding, lights, and mile markers).

- Transit
  - Expand the transit priority network by building dedicated bus lanes.
- Vehicle
  - Establish a working group with Virginia and Maryland to consider a regional approach to congestions.
  - Assess where demand-based parking policy will be most effective to balance curbside needs. Develop an implementation plan for the new policy.
  - Determine the demand for electric chargers. Encourage developers to provide electric chargers where demand is identified. Allow electric chargers in the public right-of-way through a permit process.
- Freight
  - Create a checklist to ensure freight routes and goods movement are considered in transportation improvement projects on arterial or higher functional classification.
- Parking
  - Assess where demand-based parking policy will be most effective to balance curbside needs. Develop an implementation plan for the new policy.

2.3.4 District Department of Transportation Design and Engineering Manual

Last updated in January 2019, DDOT's Design and Engineering Manual lays out procedures for planning and project development, as well as design standards for construction documents and construction projects that occur within the District (DDOT, 2019b). The manual also augments the latest edition of the DDOT Standard Specifications for Highways and Structures and the DDOT Standard Drawings. The main objectives of the manual are as follows:

- Improve the safety of pedestrians, cyclists, and drivers throughout the District.
- Increase non-vehicular transportation modes to meet the mobility and economic development needs of the District.
- Maintain and enhance the District's transportation infrastructure and streetscapes, while balancing the needs of all users.
- Minimize adverse impacts on natural and environmental resources and promote energy efficiency.
- Respect the unique character of the District and its many historic districts. Encourage flexibility in design. Ensure that public safety is maintained at all times and that public inconvenience is minimized to the maximum extent possible.
- Support the principles of crime prevention through environmental design.
- Preserve the limited physical capacity of public rights-of-way.
- Protect private property from damage that could occur as a result of construction and repair projects in the transportation network.
- Protect the District's infrastructure investment by establishing criteria for public improvements.

Furthermore, the manual requires that the following transportation issues be addressed for all DDOT projects.

- Traffic design data
- Traffic accident analysis
- Turning movements/access issues
- Signal warrants
- Traffic movement diagrams
- Intersection/interchange design
- Traffic issues
- Bicycle/pedestrian improvements
- Americans with Disabilities Act (ADA) accommodations
- Mass transit accommodations
- Traffic calming
- Traffic signal plans
- Lighting plans
- Permanent signing and pavement marking
- Construction traffic control plans

2.3.5 Your Metro, The Way Forward Strategic Transformation Plan

WMATA has developed a strategic plan that includes a long-term strategy for guiding development as well as specific initiatives for the next five years beginning in 2023. This plan includes values, a vision statement, goals, objectives, and other initiatives to meet the evolving needs of customers and employees while enhancing transparency and trust in the region.

This plan is shaped by input from customers, employees, and regional stakeholders and aims to guide long-term strategy, enhance the customer experience, improve employee engagement, and inform funding decisions for capital programs and operating budgets. Metro recognizes challenges like funding shortfalls and labor shortages and will use the strategic plan as a framework to overcome these challenges.

The plan also defines Metro's mission, which is to connect people to possibilities in the DMV region, fostering prosperity and quality of life. Additionally, it lays out core values, including a focus on safety, customer-centricity, equity, ethics, and innovation, which underpin Metro's decision-making and actions.

The plan sets four overarching goals:

1. Service Excellence, with objectives related to safety, reliability, and convenience.
2. Talented Teams, with objectives regarding workforce recruitment, engagement, and skill development.
3. Regional Opportunity and Partnership, with objectives focusing on regional network optimization and community partnerships.

4. Sustainability, with objectives concerning financial and environmental sustainability.

Metro plans to execute these goals and objectives through initiative programs and projects. The strategic framework will guide prioritization and funding, with the annual budget process determining which specific initiatives are funded each year. The ultimate aim of this plan is to establish Metro as a trusted and sustainable means of moving people safely and efficiently in the region (WMATA, 2023c).

2.3.6 District of Columbia Comprehensive Plan

The Comprehensive Plan for the National Capital, initiated by the National Capital Planning Commission (NCPC) and the District of Columbia, is a statement of principles, goals, and planning policies to guide the growth and development in Washington, D.C., for the next 20 years.

In 1973, the federal Home Rule Act designated the Mayor of the District of Columbia as the city's principal planner. At that time, the Comprehensive Plan was divided into "District" Elements to be prepared by the District's Office of Planning, and "Federal" Elements to be prepared by NCPC (DCOP, 2021). The first Comprehensive Plan of the post-Home Rule era, containing both District and Federal Elements, was completed in 1984. The most recent DC Comprehensive Plan was started in 2016 and became effective in 2021 (DCOP, 2021). The most recent Federal Elements were updated and were adopted on March 4, 2021, effective on May 10, 2021, with the exception of the Parks and Open Space Element, which was updated in 2016, and the Federal Workplace and Transportation Elements, which was updated in July 2020 (NCPC, 2021).

The District Elements include both Citywide Elements and Area Elements. Citywide Elements provide goals, objectives, and policies for land use issues that affect the whole city, while Area Elements provide goals, objectives, and policies that are specific to geographic areas of the city (DCOP, 2021). JBAB and the surrounding area are located within the Far Southeast and Southwest Area Element, and the Lower Anacostia Waterfront/Near Southwest Area Element. The element's policies assume that the area will change dramatically as the 2004 Anacostia River Framework Plan is implemented. The area near JBAB is addressed in several of the policies and actions listed for these areas. Transportation-related policies relevant to the area include:

- Conservation of established waterfront neighborhoods – Invest in existing housing stock and commercial areas in these neighborhoods.
- Connecting to the River – Reconnect the neighborhoods of the far southeast/southwest to the Anacostia River, particularly through the redevelopment of Poplar Point, implementation of the Anacostia Waterfront Initiative park and trail improvements, and reconstruction of the Anacostia River bridges.
- Pedestrian orientation of waterfront uses – Provide a high level of pedestrian amenities along the shoreline.
- Multimodal waterfront streets – Improve waterfront access to meet the needs of bicyclists, pedestrians, and transit uses.
- Barriers to shoreline access – Minimize the visual and accessibility impacts of railroad, highway, and surface parking.

- Upgrades to bridges – Upgrade the bridges across the Anacostia River to better manage transportation flows, improve pedestrian and bicycle access, and provide better connectivity between Downtown, I-295, and Suitland Parkway.
- Dedicated off-street parking – Support additional dedicated off-street parking and loading areas in the business districts at Martin Luther King Jr Avenue/Malcom X Avenue, Alabama Avenue/23rd Street SE, and Historic Anacostia.

More specific policies are included for small areas within the Far Southeast and Southwest Area Element. These areas include: Poplar Point – Improve pedestrian, bicycle, and transit connectivity between the Anacostia Metro Station, Poplar Point, Anacostia Park, Cedar Hill, the Good Hope Road area, and Hillsdale/Fort Stanton.

The Citywide Elements of the District Elements in the Comprehensive Plan include a Transportation Element that describes citywide transportation policies and actions focused on linking land use and transportation, including a focus on transit-oriented development, context-sensitive transportation, and ensuring transportation impacts of development projects are focused on multimodal standards rather than on vehicular standards. Citywide transportation policies also address regional smart growth transportation solutions and transportation system efficiency and management, including transportation demand management strategies. The Comprehensive Plan places a strong focus on multimodal transportation choices, especially exploring the use of lower cost options such as streetcars and bus rapid transit instead of Metrorail. Also emphasized is the need to ensure that new mass transit routes connect seamlessly with existing ones, thus increasing the use of existing systems. Improvements to bicycle and pedestrian safety and networks are also emphasized in the policies of the plan in response to concerns about above-average accidents and below-average levels of service.

The Federal Elements of the Comprehensive Plan for the National Capital are initiated by NCPC and provide a policy framework for the federal government to manage its operations in the National Capital Region (NCPC, 2021). The Transportation Element acknowledges that the federal government has played an influential role in the region's development and the development of its transit system, including Metrorail, and has an interest in improving the quality of transportation infrastructure and services, which are strained by rapid development and age. The Transportation Element policies are built on the principles of transit-oriented development and sustainability, with the knowledge that the federal government can accommodate its own workers' mobility needs and set the standard for the region. These two roles are expected to help develop the transportation infrastructure required by the federal government while contributing to regional infrastructure solutions. Policies in the Transportation Element of the Federal Elements include:

- Integrated regional transit – Federal workers, residents, and visitors should be able to meet their travel needs with an integrated transit, walking, and biking network. Federal agencies should support the expansion of the regional mass transit system and push to fill in holes in the walking and bicycle network around transit facilities to help increase mass transit use.
- Parking – Parking policies should be designed to encourage the gradual shift from single occupancy vehicle (SOV) commuting to the use of transit, walking, biking, carpooling, vehicle sharing, and telecommuting by using parking ratios, parking facility design, and other standards and incentives. Building new federal facilities in outlying areas is discouraged to maximize accessibility and lower infrastructure costs.

- Transportation Management Programs (TMPs) – TMPs are required for any project that would increase employment levels at a worksite to 500 or more to help those facilities operate in a sustainable manner. In addition, a TMP should provide a framework for encouraging "active commuting," which consists of bicycling, walking, running, or any method not using a motorized vehicle because this will help create a healthier workforce.
- Transportation demand management – Transportation demand management strategies should be used to encourage non-SOV commuting, telecommuting, alternative work schedules, and live near where you work programs and create incentives for the use of mass transit.
- Active commuting and bicycling – Federal agencies should ensure adequate bicycle parking, showers, and locker rooms; develop trails on their properties; and create connections to the regional bicycle network to encourage the use of the regional bicycle and trail network.
- Shuttles and circulators – Frequent circulator buses on campuses and shuttles to stations and across town between federal agencies (if adequate offsite transit service is not present) should be used to increase employee utilization and save resources.
- Related tourism and development interests – NCPC should work to reduce the existing highway/freeway infrastructure in the city and the barrier effect of the Potomac and Anacostia Rivers by coordinating and supporting city and development projects to achieve those and other important regional transportation challenges.
- Investment priorities – Due to the decline in funding for large regional projects, NCPC should focus first on improving the efficiency of the existing regional system through inexpensive transportation system management projects and technology-based solutions and fix the existing system with a focus on mass transit, pedestrian, and bicycle facilities.

The action plan matrix for the Federal Elements of the Comprehensive Plan for the National Capital includes a few projects specific to various federal agencies in the vicinity. One of these projects is the Anacostia Waterfront Initiative (AWI), which will develop public and private properties along the Anacostia River for park and water-related uses, including federal facilities as proposed in the plan.

2.3.7 Monumental Core Framework Plan

The NCPC adopted the Monumental Core Framework Plan in 2009 as a coordinated approach to land use, urban design, and transportation to use parcels of federal land surrounding the National Mall. The purpose of the plan is to ensure that the National Mall can accommodate public gatherings and political demonstrations, maintain its dignified appearance, and meet the needs of routine users. The plan seeks to project the civic qualities of the National Mall into the city and integrate the city's vitality into adjacent federal precincts by creating new mixed-use destinations for future cultural attractions, museums, government offices, private development, and places that enhance the lives of residents and visitors. The plan contains a variety of large and small, short- and long-term initiatives to achieve those goals, many of which will need more detailed planning and will be led by either one or more federal agencies or private entities (NCPC, 2009).

With regard to transportation, the plan calls for its new destination areas to be connected by a cohesive transportation network of green spaces, walkways, transit routes, and water shuttles. In some cases, this may require removing or covering barriers caused by highways, rail lines, and buildings to create an enhanced corridor that can link the new or revitalized mixed-use destinations. Near JBAB, South Capitol Street is designated as an existing symbolic connection between the core of the city and the Anacostia River area, which will become an enhanced corridor.

2.3.8 Anacostia Waterfront Framework Plan

The Anacostia Waterfront Framework Plan guides the efforts of the AWI. Created in 2000, the AWI is a Memorandum of Understanding between 20 federal and District agencies, all of which own land along the Anacostia River. These stakeholders committed to working together to revitalize the Anacostia River and waterfront (DCOP, 2003). The Anacostia River was originally developed as an industrial area with limited public access. The agencies and community leaders created the AWI, which states that the agencies should strive to create:

- A clean and active river – Mitigate pollution and restore streams and wetlands.
- Eliminate barriers and gain access – Design transportation infrastructure to gain access to waterfront lands and serve waterfront neighborhoods.
- A great urban riverfront park system – Create a system of interconnected and continuous waterfront parks linked to the ART.
- Cultural destinations and distinct character – Protect the cultural heritage of the neighborhoods and the regional destinations along the waterfront.
- Strong waterfront neighborhoods – Promote sustainable economic development and re-connect the city to the river.

The transportation chapter of the plan describes DDOT's efforts to align its projects with the goals of the AWI. It recognizes that, in the past, transportation has played a negative role in the area by creating highways that are barriers to waterfront access. The plan proposes to reshape the transportation infrastructure in the waterfront into a network that connects people to the river by setting new priorities for projects and reconstruction. These goals include:

- All activities along the waterfront must be linked by the ART.
- Public transportation must be enhanced and increased to afford more residents direct access to the river.
- The bridges across the Anacostia River must be designed to allow bicyclists and pedestrians easy access.
- The highways near the river must be transformed to become less of a physical and visual barrier.
- All streets and boulevards that lead to the Anacostia River must be multimodal and scaled for mixed-use development near the river.

Specific transportation projects to support the goals of the plan include:

- Create a new waterfront light rail line.
- Connect regional traffic from I-695 and I-295 and Suitland Parkway via a new tunnel under South Capitol Street.
- Transform Anacostia Freeway into a green parkway to slow traffic and provide scenic elements.

2.3.9 Sustainable DC Plan 2.0

The Sustainable DC Plan 2.0, originally completed in 2013 and updated in 2019, was led by the District of Columbia city government and included a vast array of stakeholders in the private and public sectors and a substantial campaign of public outreach and input. The plan highlights goals and objectives surrounding a wide range of topics, including jobs, health and wellness, equity, the natural and built environments, energy, food, open space, transportation, waste, and water (Sustainable DC, 2019). The goals described in the plan that are relevant to transportation in the area surrounding JBAB include:

- Improve connectivity and accessibility through efficient, integrated, and affordable transit systems.
- Expand provision of safe, secure infrastructure for cyclists and pedestrians.
- Reduce traffic congestion to improve mobility.
- Improve air quality along major transportation routes.

2.3.10 DC Circulator 2017 Transit Development Plan Update

The DC Circulator 2017 Transit Development Plan Update is the planned three-year update to the DC Circulator 2014 Transit Development Plan. It included a public engagement process and operations analysis of the existing system. DDOT plans to strategically expand DC Circulator service, while considering the overall efficiency of the system. This expansion will primarily consist of extending or realigning existing routes into fast-growing neighborhoods, some of which lack adequate connectivity to the surrounding city. The DC Circulator bus is expected to play an important role in meeting the transportation needs of the District as it adds residents and jobs by using the DC Circulator's established reputation as a reliable, efficient, and appealing transit option (DC Circulator, 2017).

2.3.11 Joint Base Anacostia-Bolling Installation Development Plan

The JBAB Installation Development Plan is the installation commander's "long-term plan to ensure that management and development of the real property assets of the installation support the planning vision, mission readiness, and quality of life (QOL) for those who live and work on JBAB" (Air Force, 2021a). The Installation Development Plan summarizes the planning process, evaluates relevant planning data, and establishes the overarching planning vision to guide future investment decisions.

The planning vision for JBAB is stated as follows:

> Joint Base Anacostia-Bolling, the Sentinels of the Capital, is an urban waterfront military community that enables readiness and resilience and honors its heritage with an integrated and efficient development pattern organized around complete transportation and park networks. (Air Force, 2021a)

Specific supporting goals and objectives are used to organize planning actions in support of JBAB's missions and broader master planning principles based on the planning vision:

- Promote and strengthen JBAB's identity as an Urban Waterfront Military Community.
    - Enable mission partners and unique National Capital Region missions.
    - Promote multi-story, compact, urban development.
    - Leverage waterfront assets.
    - Provide development that supports military and community needs.

- Enhance mission and community readiness and resilience.
  - Reinvest in facilities and infrastructure that support mission readiness.
  - Adapt to and mitigate climate change and sea level rise.
  - Enhance installation security and force protection.
  - Promote community resilience.
- Honor and communicate JBAB's heritage.
  - Honor and communicate the historic significance of the installation.
  - Develop and implement architectural design standards that are reflective of historic features.
  - Promote the compatibility of new development with historic viewsheds.
- Organize development within an integrated and efficient development pattern.
  - Make efficient and effective use of limited land through infill development, consolidation of functions, and appropriate facility siting.
  - Preserve development potential for future growth.
  - Promote connections among mission campuses.
  - Provide a dense mix of compatible land uses.
- Integrate the installation with complete transportation and parks networks.
  - Provide complete, multimodal transportation networks.
  - Reduce the demand for parking while providing consolidated and accessible parking facilities.
  - Improve gate security and efficiency.
  - Connect and enhance park-like corridors with trails, open space amenities, and increased tree canopy.

2.3.12 Poplar Point

Poplar Point is envisioned as the home for a variety of different uses, including residential, retail, office, entertainment, cultural, and park/open space uses. The 110-acre site located on the Anacostia River adjacent to JBAB is slated to be transferred to the District from the federal government. The site is bounded by I-295 and the South Capitol Street and 11th Street Bridges. While the site is largely unused, it contains some National Park Service and the U.S. Park Police facilities. The project is undergoing a federal environmental impact analysis and small area planning process. Currently, no specific figures are available for the actual allotment of space for the different uses. These figures will be determined during the small area planning process. Significant development at this location could increase area roadway congestion and stimulate additional local area transit service improvements (Air Force, 2021a).

2.3.13 Blue/Orange/Silver Capacity and Reliability Study

This study identifies cost effective solutions to better serve the NCR and identified issues and opportunities on the Blue, Orange, and Silver lines related to capacity, reliability, equity, and long-term sustainability. The study identifies six potential alternatives:

- Alternative 1: No-Build
- Alternative 2: Rail Optimization and Bus Service (Lower Capital Cost)

- Alternative 3: Blue Line to Greenbelt
- Alternative 4: Blue Line to National Harbor
- Alternative 5: Silver Line Express in VA
- Alternative 6: Sliver Line to New Carrollton

The selected alternative needs to provide sufficient rail capacity to serve ridership demand, improve reliability and on-time performance, improve operational flexibility, be cost effective, and provide transportation options that support sustainable development and expand access to opportunities.

The proposed Alternative 4 consists of a blue line "loop" that would create stops at St Elizabeths and JBAB and additionally serve Navy Yard, Union Station, National Harbor, Alexandria, Arlington, and Georgetown. These stops and connections would greatly improve transit options for the installation if this alternative is pursued (Metro, 2023).

2.3.14 10-Year Strategic Plan for Joint Development

The goal of this strategic plan is to advance transit-oriented development in the NCR by completing 20 new joint development agreements by 2032. The plan identifies challenges and obstacles to advancing joint development, developing strategies to increase project feasibility and accelerate implementation, evaluates and prioritizes future station opportunities, and establishes an aggressive joint development goal for the next 10 years.

Metro categorized projects into four groups in this plan. These four groups are centered around either existing development agreements, or specific Metrorail stations. Station specific action plans were developed for each group that establish near and mid-term actions which will improve transit-oriented development around that station and advance the general goals of the plan. The Anacostia Metro Station is part of Group Four, which is the lowest priority out of all the groups. One of the mid-term actions includes upgrades to Firth Sterling Avenue to provide better connectivity and access to the metro station (Metro, 2022).

2.4 Transportation Assumption Agreement

Prior to initiating the transportation analysis, it was essential to determine what analysis tools, data parameters, and assumptions would provide the basis for the analysis. The Air Force prepared a DDOT scoping form containing the assumptions for the transportation study that covers all relevant travel models including non-vehicle modes. Air Force and DDOT met on October 26, 2022, to review the assumptions and begin the process for both parties to reach a final agreement.

DDOT, through its Comprehensive Transportation Review process (DDOT, 2022a), provides requirements for the study, including a study area definition, trip generation, trip distribution, modal split, analysis years, analysis methods, and No Action Alternative assumptions (background growth, planned developments, and planning roadways). Attachment 1 contains the final DDOT scoping form.

3 Existing Conditions

This section describes the transportation study area and summarizes the existing transportation conditions within the study area as of February 2023. This section covers the following modes of transportation: pedestrian, bicycle, public transit, and traffic (vehicular). Existing parking conditions are also discussed.

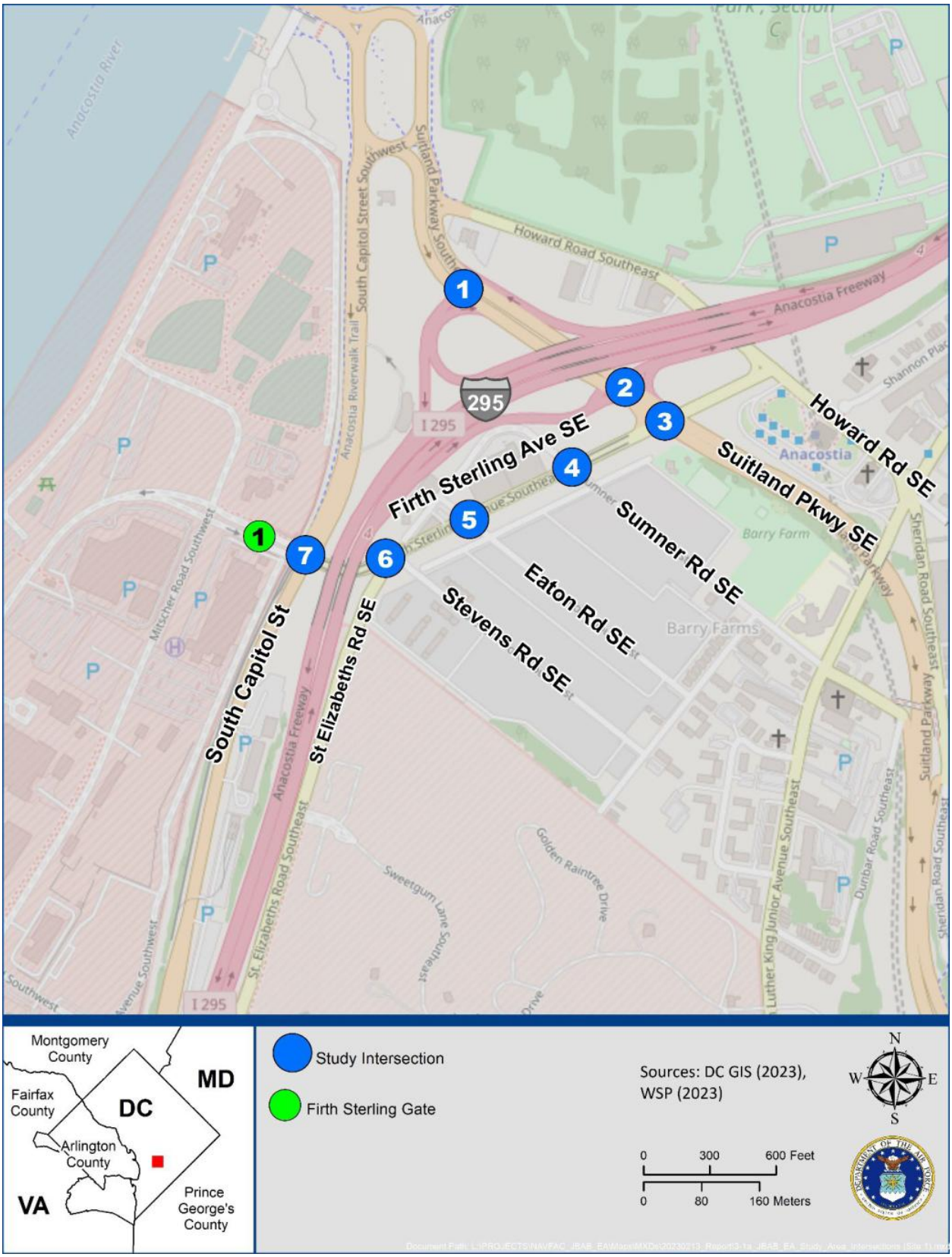
3.1 Study Area Description

The study areas were delineated based on the DDOT Comprehensive Transportation Review and focus on the Firth Sterling Gate area, as well as the Firth Sterling, South Capitol, Overlook, and Malcolm X corridors. A different study area is proposed for each transportation mode. The transit study area consists of 1.0-mile radius for Metrorail stations and 0.5-mile radius for Streetcar, Circulator, and buses. The bicycle network study area consists of a 0.5-mile radius from each gate to represent a typical distance that a visitor might be willing to use a bicycle to reach the installation. The traffic study area includes 16 intersections broken into three study areas surrounding the three ACPs and their respective corridors. These intersections are located along local roads where the proposed LVIS is expected to affect the volume of trucks by shifting existing truck traffic from South Gate to Firth Sterling Gate. The pedestrian network study areas match the traffic study area corridors directly adjacent to the gates. Figures 3-1A, 3-1B, and 3-1C illustrate the traffic study areas.

3.2 Roadway Descriptions

The following section describes the roadways in the study area, including the DDOT roadway functional classification, the number of lanes in each direction, the latest annual average daily traffic (AADT) volumes available from DDOT from 2020, and any noteworthy characteristics such as the roadway's role within the transportation network and if bicycle lanes are present. The information was collected from a DC Roadway Functional Classification map (DDOT, 2016), observations in the field, aerial imagery, and the DDOT 2019 Traffic Volume Data (DDOT, 2019a). The number of lanes of traffic indicated below are for mid-day and weekend conditions. Conditions during AM and PM rush hours may have additional travel lanes because on-street parking is often not allowed during peak hours in certain directions.

- **South Capitol Street** is a predominately north-south-oriented roadway adjacent to JBAB that connects the installation and the surrounding neighborhoods to the southwest waterfront. DDOT classifies it as a minor arterial while it runs parallel to JBAB, but the roadway is upgraded to a principal arterial heading north across the Frederick Douglass Memorial Bridge (DDOT, 2016). South Capitol Street has two travel lanes in both directions. A median is present through some of the study area, and the posted speed limit is 40 miles per hour (MPH). In 2019, the portion of South Capitol Street classified as a minor arterial had an AADT of 19,964; the section classified as a principal arterial had an AADT of 46,990 (DDOT, 2019a).
- **Sumner Road SE** is classified by DDOT as a local road with a posted speed limit of 25 MPH except in school zones, Monday to Friday, 8:30 a.m. to 5:30 p.m. where the posted speed limit is 15 MPH (DDOT, 2016). The roadway is two-way with one lane in each direction and on-street parking on both sides of the street. No AADT data are available for Sumner Road SE.



1 **Figure 3-1A Study Intersections – Firth Sterling Gate**

1 **Figure 3-1B Study Intersections – Arnold Gate**

1 **Figure 3-1C Study Intersections – South Gate**

- **Firth Sterling Avenue SE** is east-west oriented, connecting Suitland Parkway SE to South Capitol Street. DDOT classifies the roadway as a collector road, and it includes two travel lanes in each direction (DDOT, 2016). Firth Sterling Avenue SE had an AADT of 9,292 in 2019 (DDOT, 2019a).
- **Eaton Road SE** is classified as a local road by DDOT (DDOT, 2016). There is one travel lane in each direction with on-street parking flanking both sides of the street. No AADT data are available for Eaton Road SE.
- **Howard Road SE** is classified as a collector road by DDOT (DDOT, 2016). The roadway has two travel lanes in each direction near the study area. The street had an AADT of 14,535 in 2019 (DDOT, 2019a).
- **Stevens Road SE** is classified as a local road by DDOT (DDOT, 2016). It is a one-way road with on-street parking flanking both sides of the street. No AADT data are available for Stevens Road SE.
- **St. Elizabeths Road SE/Department of Homeland Security (DHS) Access Road** is a federally managed road that provides access to the U.S. Coast Guard and DHS Headquarters. It has two travel lanes in the direction of the headquarters and one travel lane in the direction of Firth Sterling Avenue SE. The roadway has a posted speed limit of 30 MPH (CNIC, n.d.). The street had an AADT of 104,042 in 2019 (DDOT, 2019a).
- **Malcolm X Avenue SE** is classified as a minor arterial by DDOT (DDOT, 2016). It has two travel lanes in each direction. The street had an AADT of 13,710 in 2019 (DDOT, 2019a).
- **South Capitol Street** is classified as a collector road south of Malcolm X Avenue SW (DDOT, 2019a). South Capitol Street has two travel lanes in both directions. The street had an AADT of 37,476 in 2019 (DDOT, 2019a).
- **Chappie James Boulevard SW** is a JBAB road that provides one of three gated access points to the installation. This gate entrance also serves as a route to the JBAB Visitor Center. It has two travel lanes in each direction (Air Force, 2021a).
- **The U.S. Naval Research Laboratory driveway (Oberlin Avenue SW)** is an NRL-owned road with a gated entrance into the NRL. It has two travel lanes in each direction with a median (Air Force, 2021a).
- **Chesapeake Street SW** is classified as a collector roadway by DDOT, and it has an east-west orientation (DDOT, 2016). There are two travel lanes in each direction with on-street parking on either side of the street east of Martin Luther King Jr Avenue SW. The section west of Martin Luther King Jr Avenue SW includes an on-ramp to I-295 northbound (Anacostia Freeway). It had an AADT of 2,101 in 2019 (DDOT, 2019a).
- **Overlook Avenue SW** is classified as a collector roadway by DDOT, and it has a north-south orientation (DDOT, 2016). The roadway begins when South Capitol Street veers southeast towards Bellevue and terminates at I-295. It runs parallel to JBAB and has one lane in each direction. Traveling northbound on Overlook Avenue SW, the roadway terminates at the JBAB South Gate on Chappie James Boulevard SW. It had an AADT of 4,459 in 2019 (DDOT, 2019a).
- **Suitland Parkway SE** is classified as other freeway and expressway by DDOT (DDOT, 2016). The roadway has two lanes in each direction, separated by a median. It had an AADT of 60,843 in 2019 (DDOT, 2019a).

Figures 3-2A, 3-2B, and 3-2C show the DDOT functional classification assigned to each roadway in the study area.

As part of the field data collection effort, the transportation team conducted a detailed inventory of the intersection lane configurations through field reconnaissance and a study of aerial imagery. Based on this information, the existing intersection lane configurations and traffic control type (signalized or unsignalized) are shown in Figures 3-3A, 3-3B, and 3-3C.

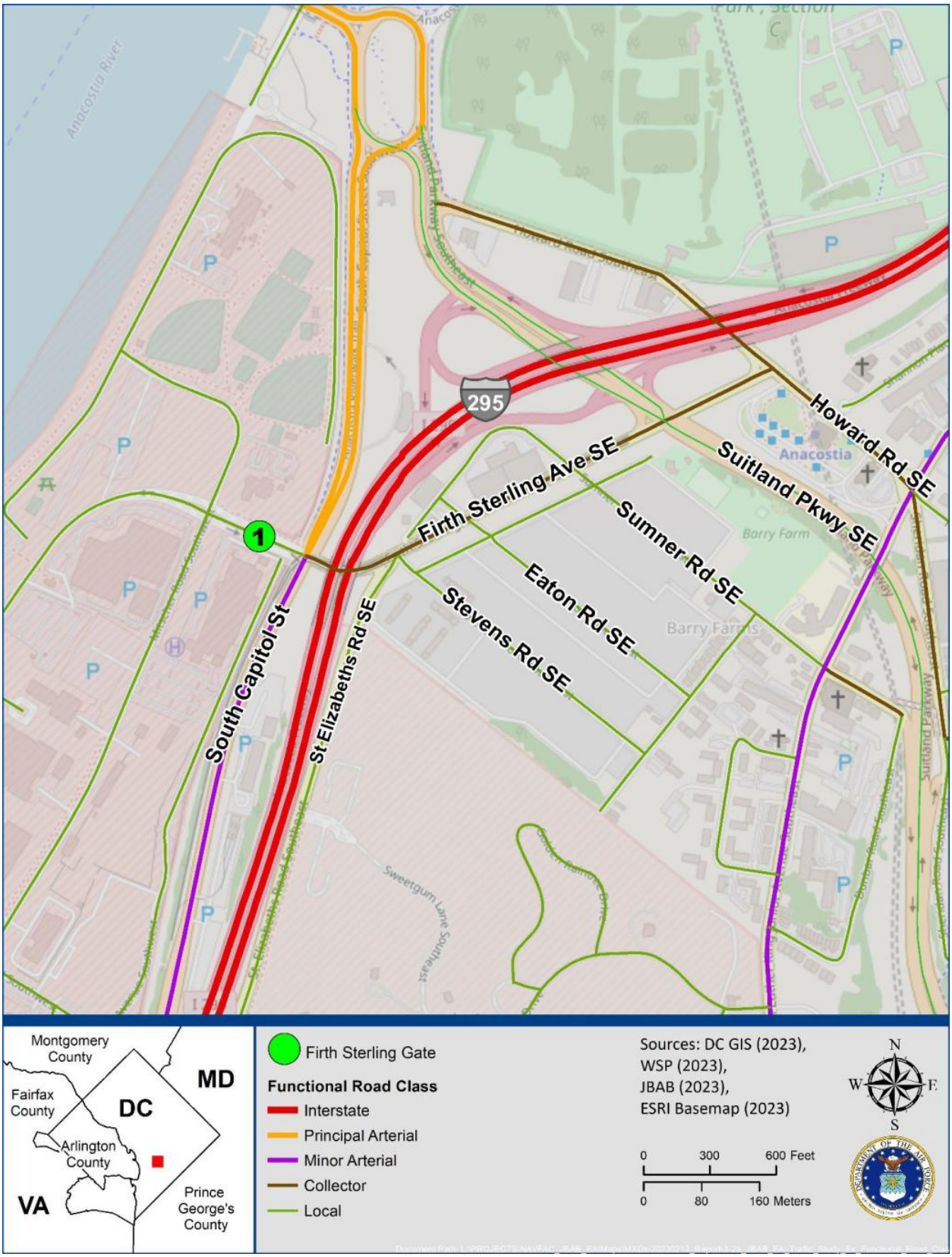


Figure 3-2A Functional Classification Road Map – Firth Sterling Gate

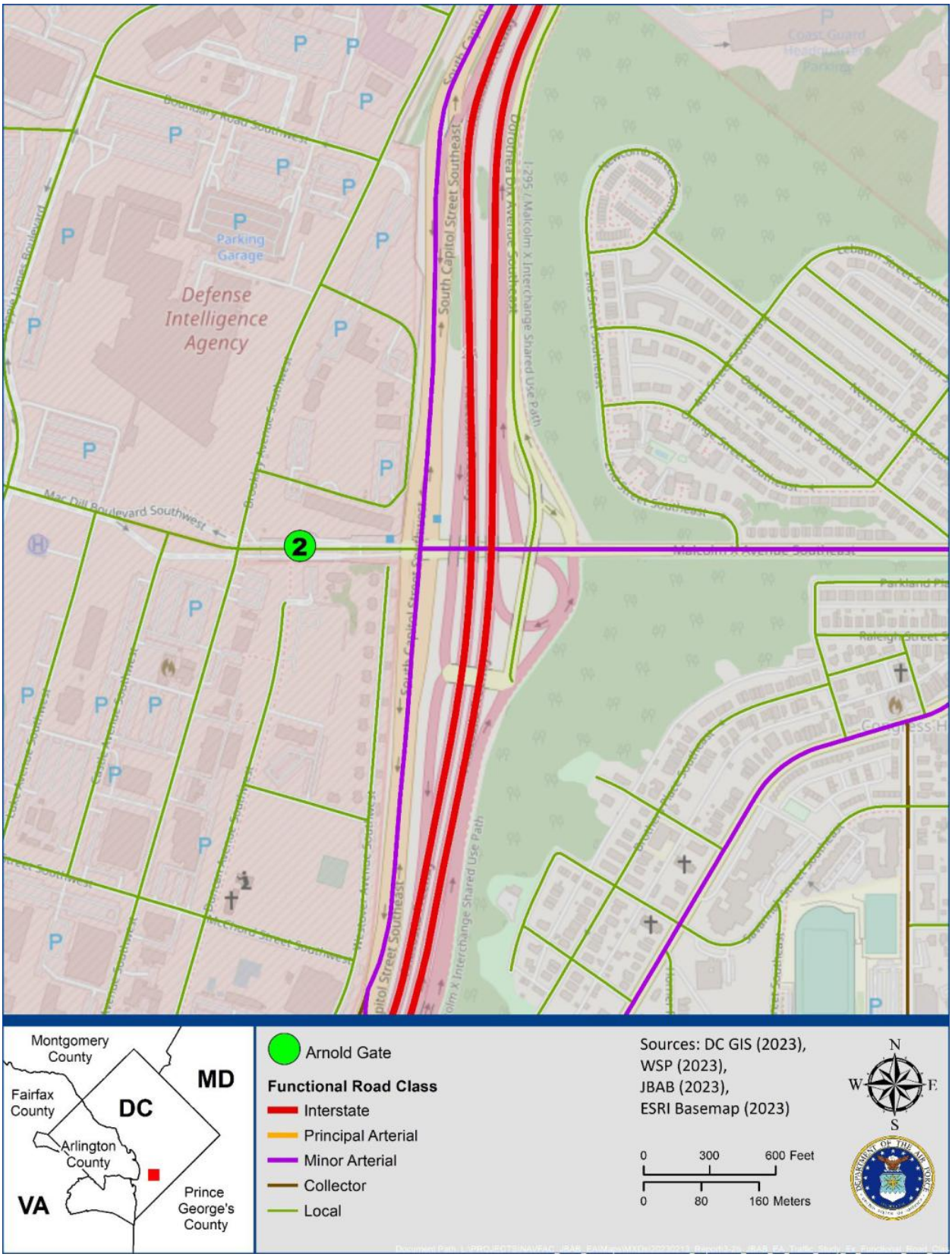


Figure 3-2B Functional Classification Road Map – Arnold Gate

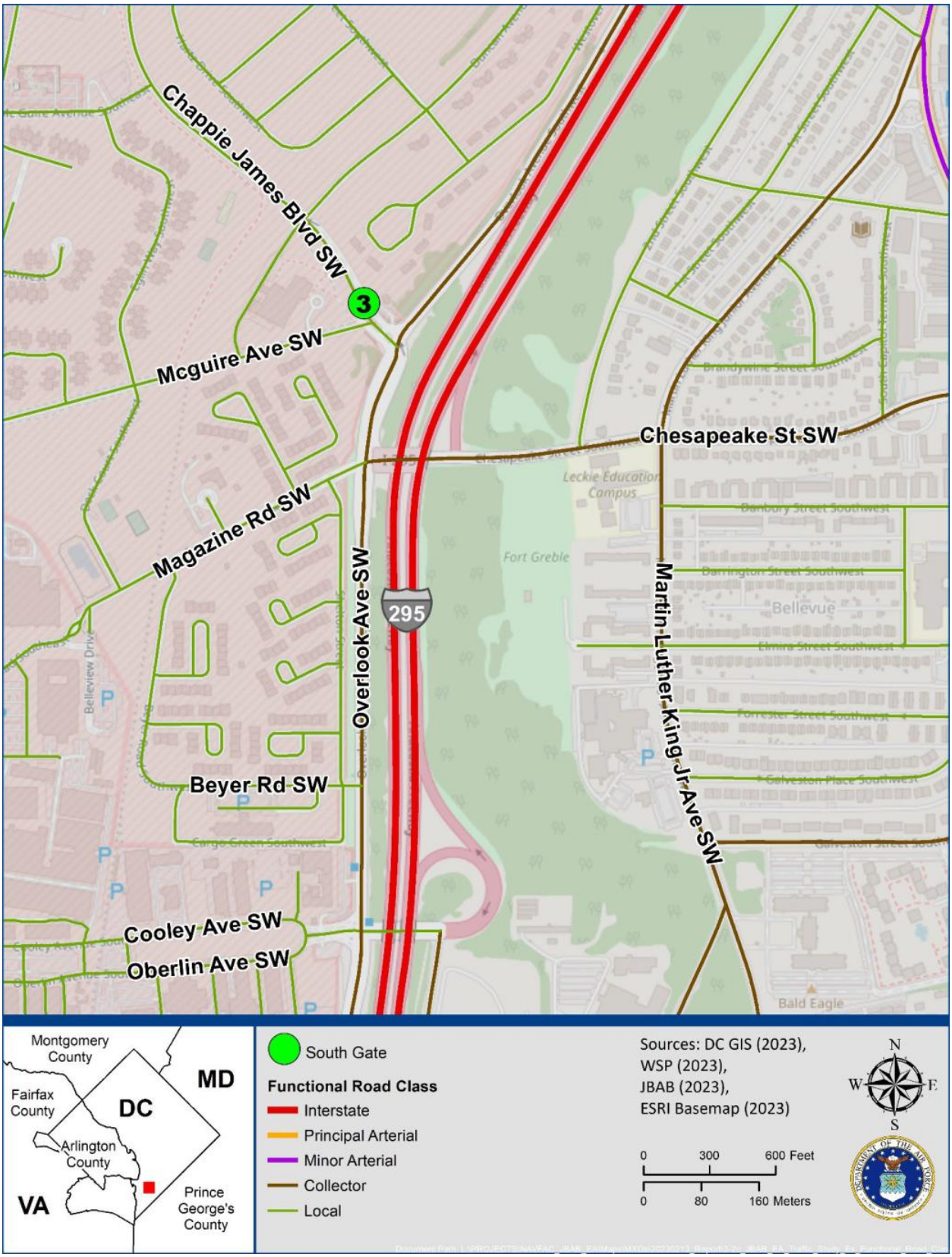
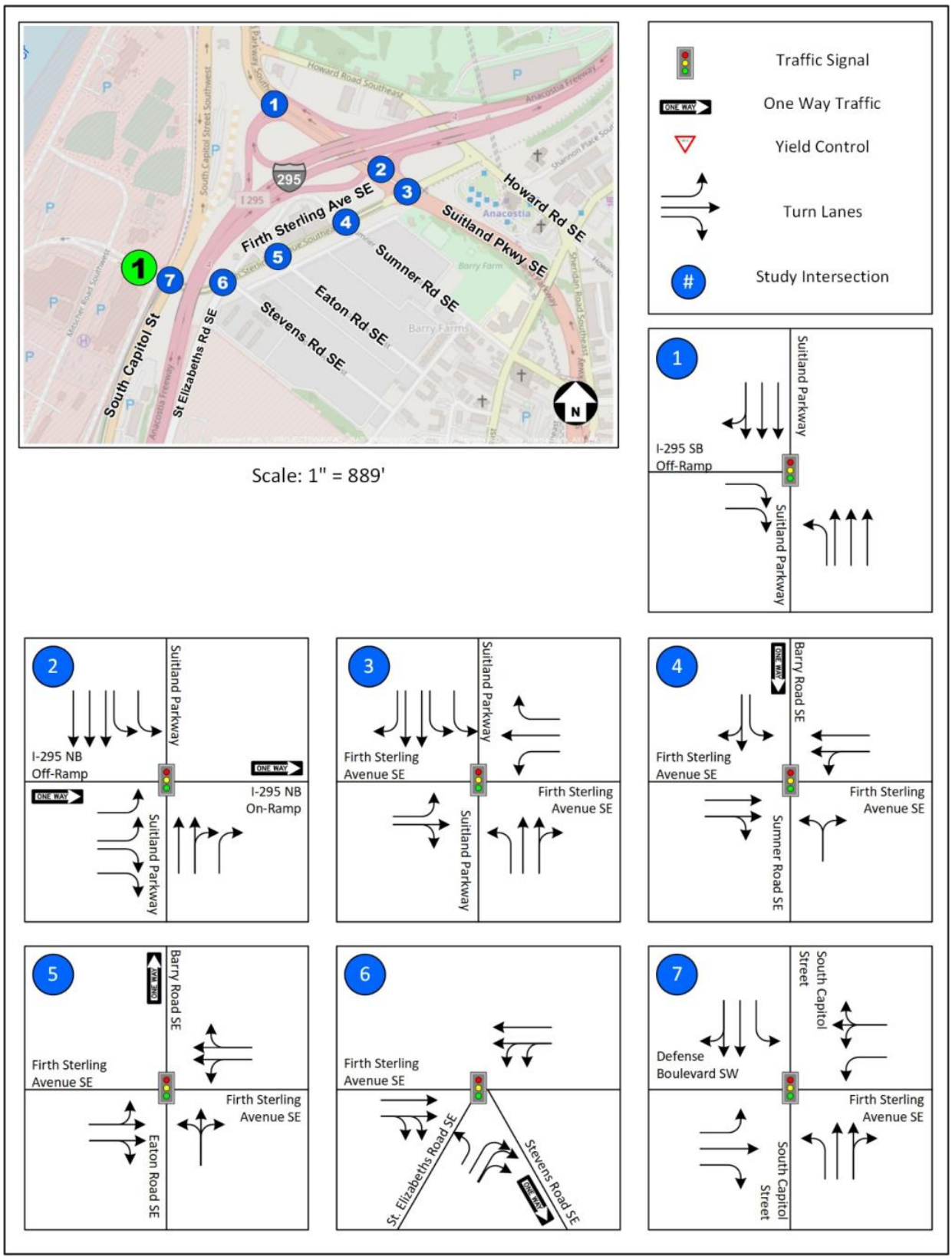


Figure 3-2C Functional Classification Road Map – South Gate



1 **Figure 3-3A Existing Roadway Lane Geometry – Firth Sterling Gate**

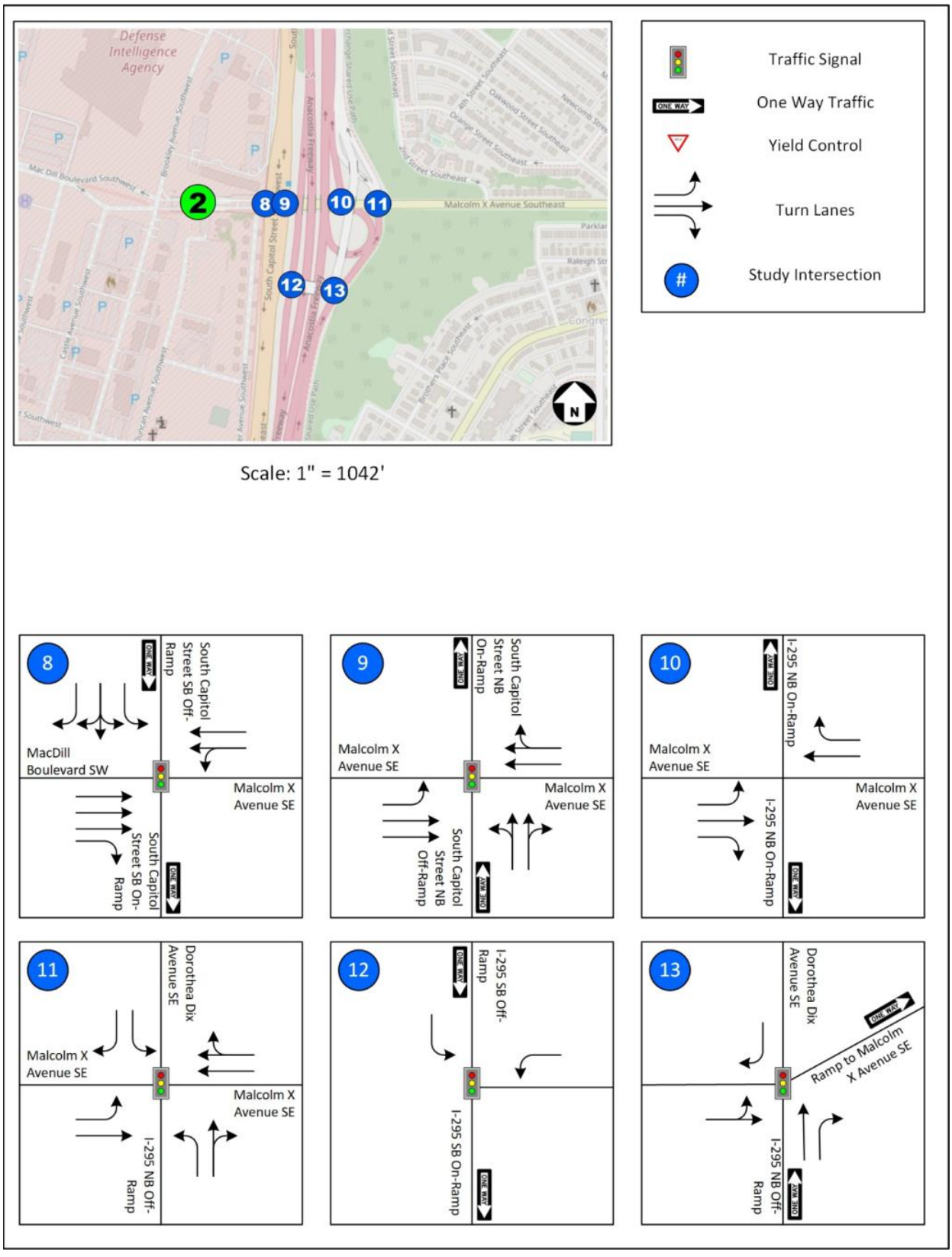


Figure 3-3B Existing Roadway Lane Geometry – Arnold Gate

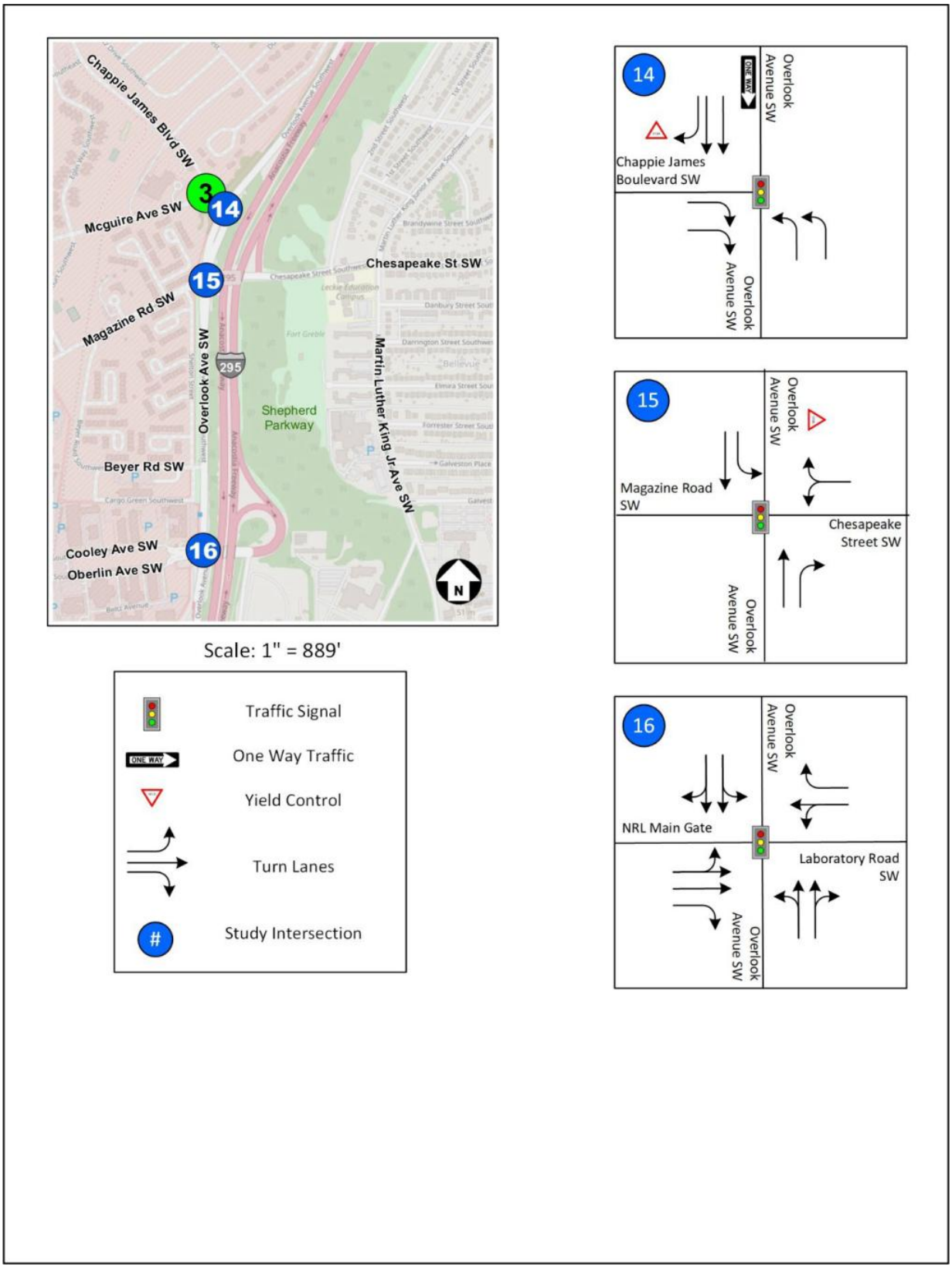


Figure 3-3C Existing Roadway Lane Geometry – South Gate

3.2.1 Data Collection

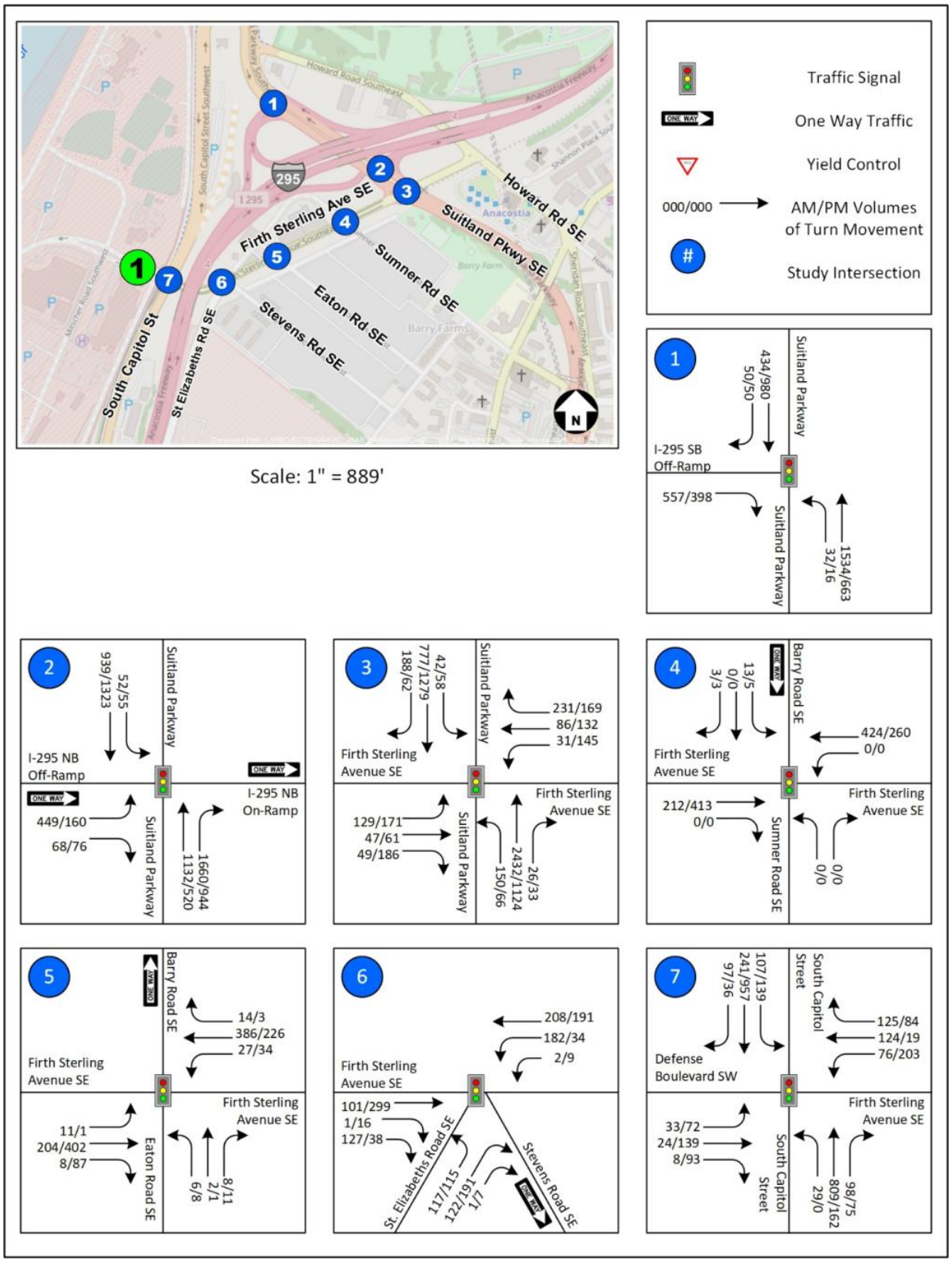
The transportation team collected vehicular turning movement counts with pedestrian crossing volumes on Wednesday, November 16, 2022, during the weekday AM and PM peak periods (6:00 a.m.–9:00 a.m. and 4:00 p.m.–7:00 p.m.), a non-holiday week in mid-November. These times were selected based on typical traffic data from Google Maps' Traffic layer and institutional knowledge of traffic patterns in the study area. The U.S. Congress was in session on the date that was selected because it affects some traffic patterns within the city. (Note: One intersection was counted again on Tuesday, December 6, 2022, due to an equipment malfunction).

In addition to the vehicular turning movements, the team placed automatic traffic recorders (ATRs) at several key locations, including South Capitol Street north and south of Firth Sterling Avenue SE, Firth Sterling Avenue SE between South Capitol Street and Suitland Parkway, and Overlook Drive SW north and south of Chappie James Boulevard (i.e., the JBAB South Gate). The ATRs captured volumes for two consecutive days beginning on Wednesday, November 16, through Thursday, November 17, 2022, recording the volumes in 15-minute increments. ATR data provide a daily log of traffic, highlighting the multiple peak periods and changes in vehicle demand throughout a typical weekday.

The ATR data were compared to the turning movement counts along Firth Sterling Avenue SE, Overlook Avenue SW, and South Capitol Street. The ATR data were lower than the intersection volume along Overlook Avenue SW during the AM and PM peak periods for the northbound and southbound movement, respectively. The lower count volumes may be due to vehicles being queued (i.e., stopped) atop the ATR, which depends on the motion of vehicles across pneumatic tubes to accurately count them, whereas the accuracy of the video cameras used to count vehicles at the intersections are not affected by stopped traffic.

Figures 3-4A, 3-4B, and 3-4C show the AM and PM observed peak hour (7:00 a.m.–8:00 a.m. and 4:00 p.m.–5:00 p.m.) turning movement volumes.

Attachment 2 contains the raw traffic counts obtained throughout the study area.



1 **Figure 3-4A AM and PM Existing Turning Movement Volumes – Firth Sterling Gate**

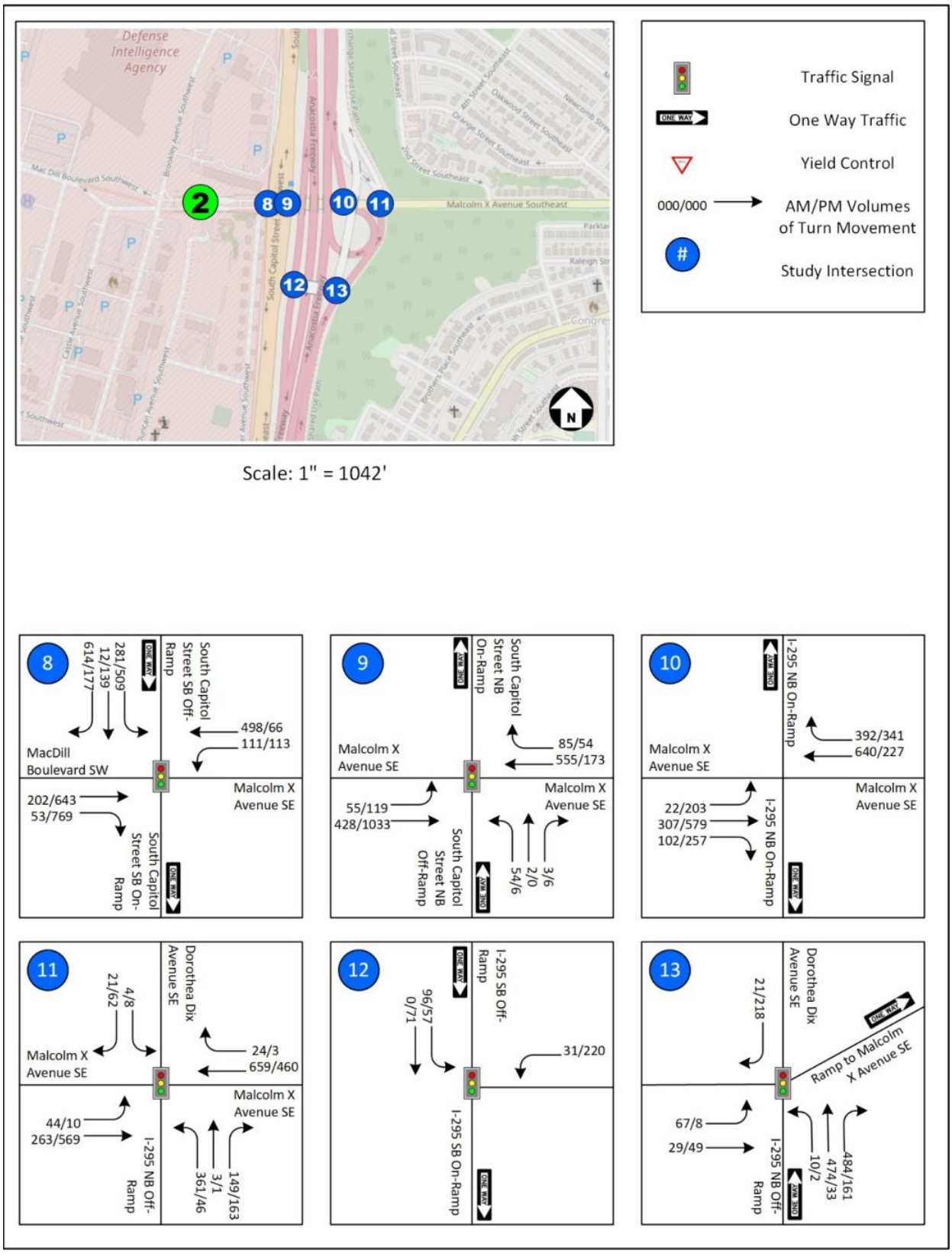


Figure 3-4B AM and PM Existing Turning Movement Volumes – Arnold Gate

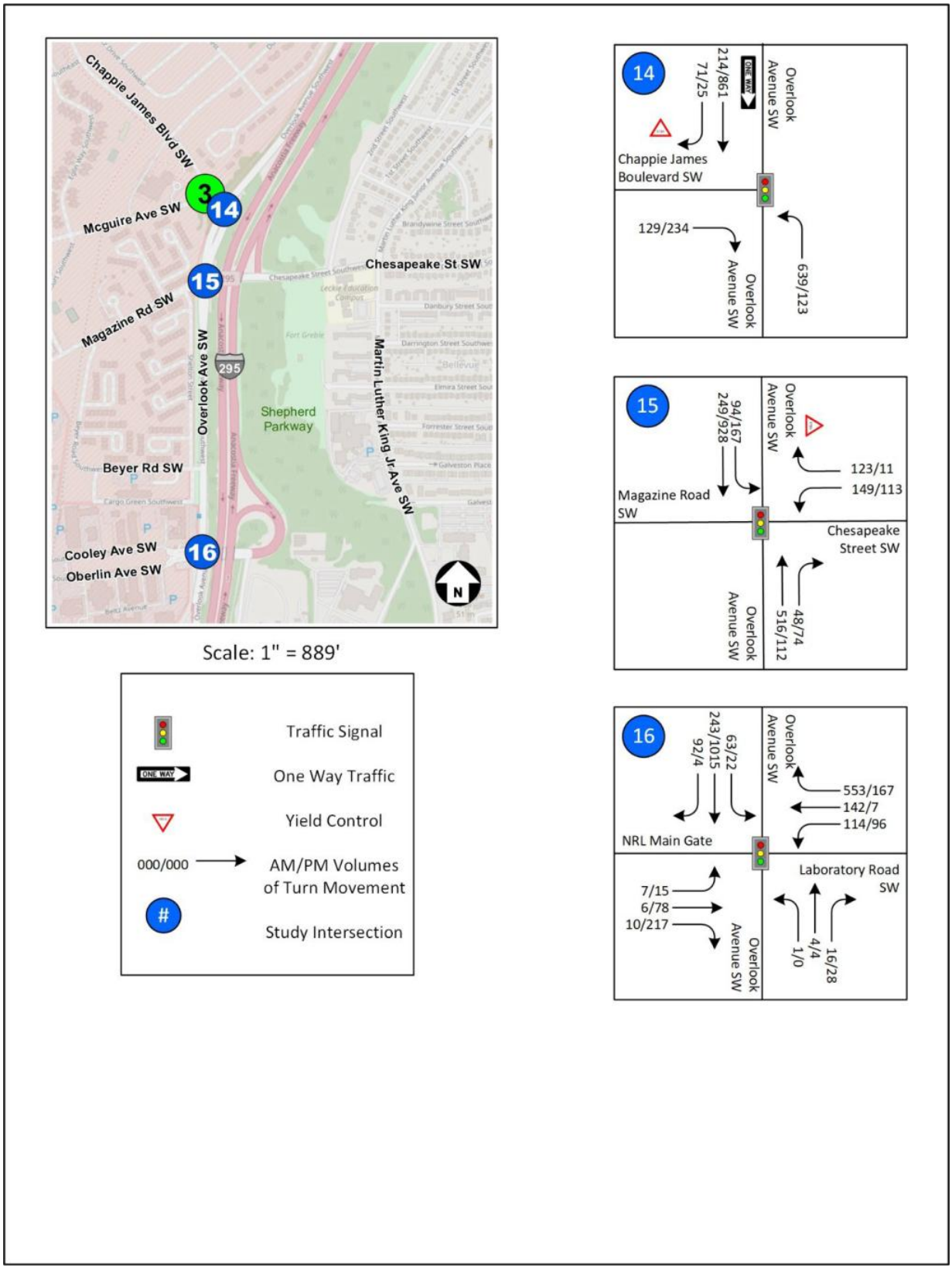


Figure 3-4C AM and PM Existing Turning Movement Volumes – South Gate

3.2.2 Observations

The transportation team made traffic observations while driving through the study area on multiple days in November 2022 while the turning movement counts and ATR counts were occurring (on Wednesday, November 16, 2022, and Thursday, November 17, 2022). Observations were made during the AM and PM peak period on both days. The following sections summarize key observations by location within the study area.

3.2.2.1 Firth Sterling Gate and Surrounding Intersections

During the AM peak period, the vehicle queue along Defense Boulevard entering Firth Sterling Gate used the entire storage distance between the gate and the upstream South Capitol Street intersection. However, this queue rarely extended back into this adjacent intersection and did not typically impede the flow of traffic along South Capitol Street or on Firth Sterling Avenue SE east of the intersection. The majority of observed trips to Firth Sterling Gate came from Suitland Parkway via Firth Sterling Avenue SE. Traffic volumes along northbound and southbound South Capitol Street were relatively low compared to traffic along nearby Suitland Parkway, which is a major commuter route between suburban Maryland and downtown Washington, D.C. Although no pedestrian traffic was observed traveling between the Anacostia Metro Station and JBAB via Firth Sterling Avenue SE, several shuttle buses were observed entering JBAB via this gate. On St. Elizabeths Road SE, queues were observed occasionally extending from Firth Sterling Avenue SE back toward the Department of Homeland Security's Gate 6, a distance of approximately 1,200 feet. This is noteworthy since Dorothea Dix Avenue SE and St. Elizabeths Road SE are potential alternate routes for vehicles to reach Firth Sterling Avenue SE and Firth Sterling Gate from the south instead of remaining on I-295.

During the PM peak period, no vehicles are permitted to enter JBAB via Firth Sterling Gate, so only exiting traffic was observed. The gate closes to all vehicular traffic at 5:00 p.m. No traffic problems were observed, although traffic along nearby Suitland Parkway was very heavy with southbound queues extending back from the Firth Sterling Avenue SE intersection through the I-295 interchange, traffic oval, and onto the Frederick Douglass Memorial Bridge.

3.2.2.2 South Gate and Overlook Avenue SW

During the AM peak hour, excessive queuing occurred along northbound Overlook Avenue SW traveling toward South Gate, with maximum queues extending approximately a half mile back to the NRL Gate opposite Laboratory Road SW. This queue was longest for about 30 minutes during the AM peak hour. Several trucks were observed entering the installation during the site visit on the second day, but none were observed on the first day, indicating day-to-day variability in the truck demand at the inspection station at South Gate during the morning peak period. One truck inspection lane remained open during the peak entry period, despite the variability in demand, while lengthy queues persisted at the SOV lanes.

During the PM peak hour, there were long queues, excessive delays, and multiple cycle failures at the traffic signals along Overlook Avenue SW at Chappie James Boulevard (i.e., the exit from South Gate), Chesapeake Street SW, and the NRL Gate/Laboratory Road SW intersection (i.e., vehicles waited through multiple red-yellow-green signal cycles before proceeding through the intersection). These queues extended back onto the installation and were likely exacerbated by southbound I-295 traffic using Overlook Avenue SW as a bypass for congestion on the adjacent freeway.

3.3 Pedestrian Network

This section describes the location and condition of sidewalks within the pedestrian network study areas defined in the study area description (Section 3.1) to represent access between adjacent bus stops and other common walkable destinations. The assessment describes the existing disruptions or obstacles in the pedestrian environment, especially those between the defined pedestrian network study area and adjacent bus stops, general ADA curb ramp compliance, and sidewalk and crosswalk compliance with DDOT standards.

3.3.1 Sidewalk Description

Sidewalks line both sides of most publicly accessible roads in the pedestrian network study areas except along on- or off-ramps to expressways or freeways and in areas under construction. Intersections generally have reasonable accommodations for pedestrians, including traffic lights and crosswalks, although in some instances, these crosswalks are not accessible (compliant with ADA) as discussed in further detail in Section 3.3.2. However, the transportation team observed a general lack of maintenance across all pedestrian facilities, notably sidewalks, with the presence of overgrown vegetation and miscellaneous debris or litter causing obstructions to pedestrian access, and a lack of lighting (i.e., on Firth Sterling Avenue SE near Anacostia Metro Station). Construction near Firth Sterling Gate has reduced pedestrian access, but provisions for pedestrian walkways are still provided and will likely be fixed once construction is complete.

Pedestrian trips near the three traffic study areas were predominately completed by commuters. As observed on site visits, South Capitol Street and the DHS Access Road had the highest level of pedestrian activity. Firth Sterling Avenue SE also had a moderately high level of pedestrian activity, likely due to its proximity to the Anacostia Metro Station. Most commuters were observed in the First Sterling pedestrian study area and were predominantly headed to the DHS campus. As defined by the most recent DDOT Pedestrian Master Plan, there are no priority pedestrian corridors in the pedestrian network study areas (DDOT, 2009). However, moveDC's 2021 update indicates that the area around the three traffic study areas, notably near the Anacostia Metro Station, has a low Pedestrian Friendliness Index, a metric that characterizes the walkability of an area based on sidewalk availability, building accessibility, and street network design (DDOT, 2021b).

The pedestrian network study areas include several barriers and areas of concern that negatively affect the quality and attractiveness of walking. Most noticeably, I-295 creates a barrier between the Ward 8 neighborhoods and JBAB that requires pedestrians to walk under overpasses at Firth Sterling Avenue SE or Chesapeake Street SW. Additionally, pedestrian traffic along South Capitol Street, Overlook Avenue SW, and Firth Sterling Avenue SE is relatively light and may discourage pedestrian activity through these corridors. Specifically, pedestrian facilities along the entire length of Firth Sterling Avenue SE are insufficient and are not integrated with new facilities along Suitland Parkway, South Capitol Street, and the DHS Access Road.

3.3.2 ADA and DDOT Compliance

Curb ramps at intersection crossings are required to comply with ADA, except for those curb ramps built prior to the enactment of the ADA. However, local jurisdictions must have a plan to retrofit curb ramps to comply with ADA. Within the pedestrian network study areas, the transportation team analyzed curb ramps using a combination of national ADA standards and DDOT standards, whichever was more stringent. Therefore, curb ramps were evaluated for a minimum width of 4 feet (DDOT, 2019b) and were

required to have minimal slopes and detectable warnings (i.e., dome-shaped bumps) (DOJ, 2010). Curb ramps were also required to be installed in pairs on each corner, one for each direction of travel (DDOT, 2019b).

Figures 3-5A, 3-5B, and 3-5C depict the state of ADA compliance at crosswalks in the pedestrian network study areas. As noted, fully compliant curb ramps are 4-feet wide, include detectable warnings, and are installed in pairs on each corner. Partially compliant curb ramps contain at least one of the three required elements. As shown on Figures 3-5A, 3-5B, and 3-5C, slightly more than half of the curbs in the immediate vicinity of the three study areas are ADA compliant. Of the non-ADA-compliant curb ramps, the majority are missing detectable warnings, curb ramps were not installed in pairs, or an obstruction is blocking comfortable passage. Along Firth Sterling Avenue SE, the most direct path from Firth Sterling Gate to the Anacostia Metro Station, the majority of curb ramps are ADA compliant except for the South Capitol Street intersection, which was non-compliant as a result of nearby construction. Most curb ramps near Arnold Gate along Malcolm X Avenue SE are ADA compliant except over the pedestrian bridge at South Capitol Street. Three non-complaint curb ramps are located near South Gate at the intersection of Overlook Avenue SW and Laboratory Road SW, approximately half a mile south of the entrance gate. The curb ramp compliance information on Figures 3-5A, 3-5B, and 3-5C was gathered during site visits on November 15, 16, and 17, 2023 (WSP, 2022a).

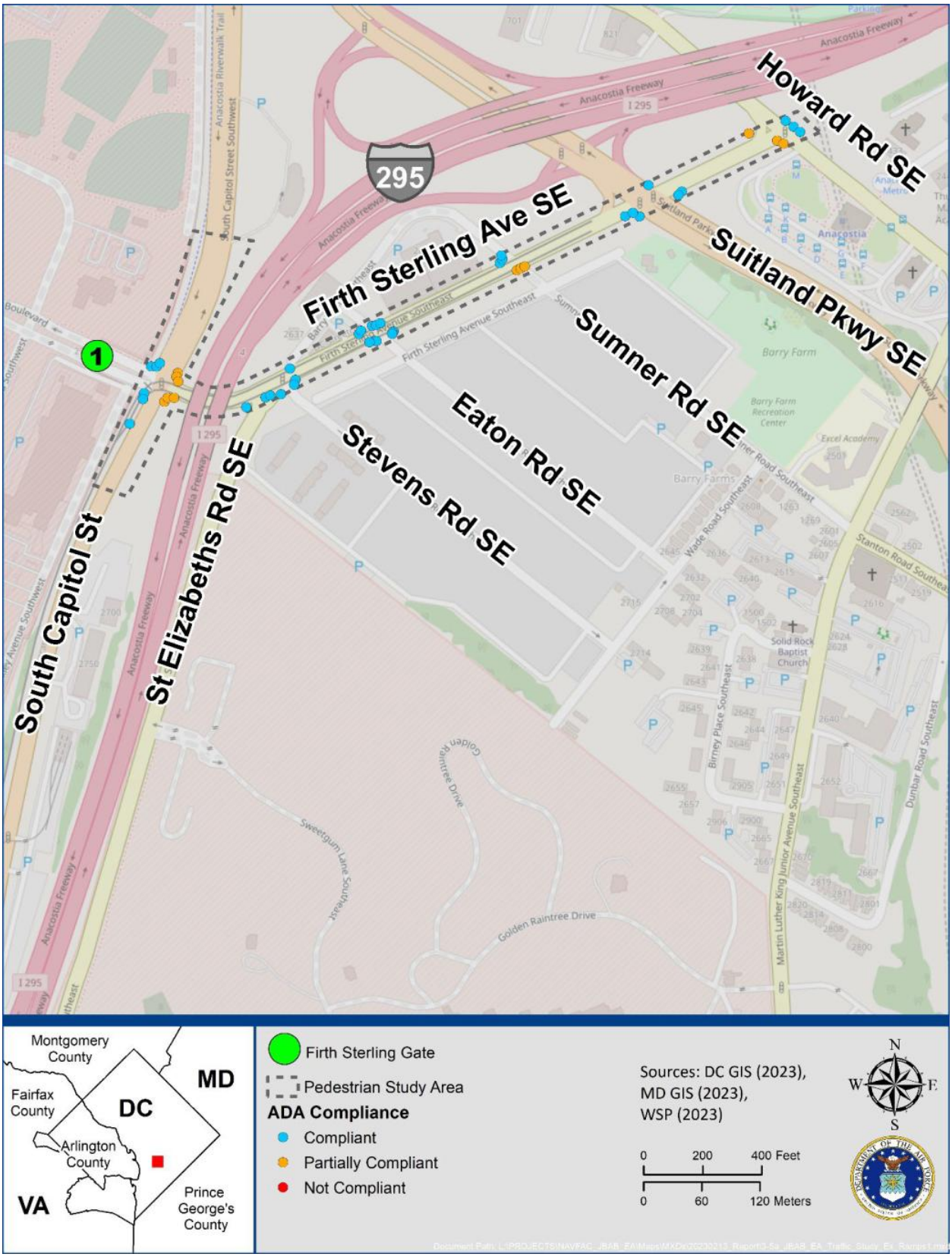


Figure 3-5A ADA Compliance – Firth Sterling Gate

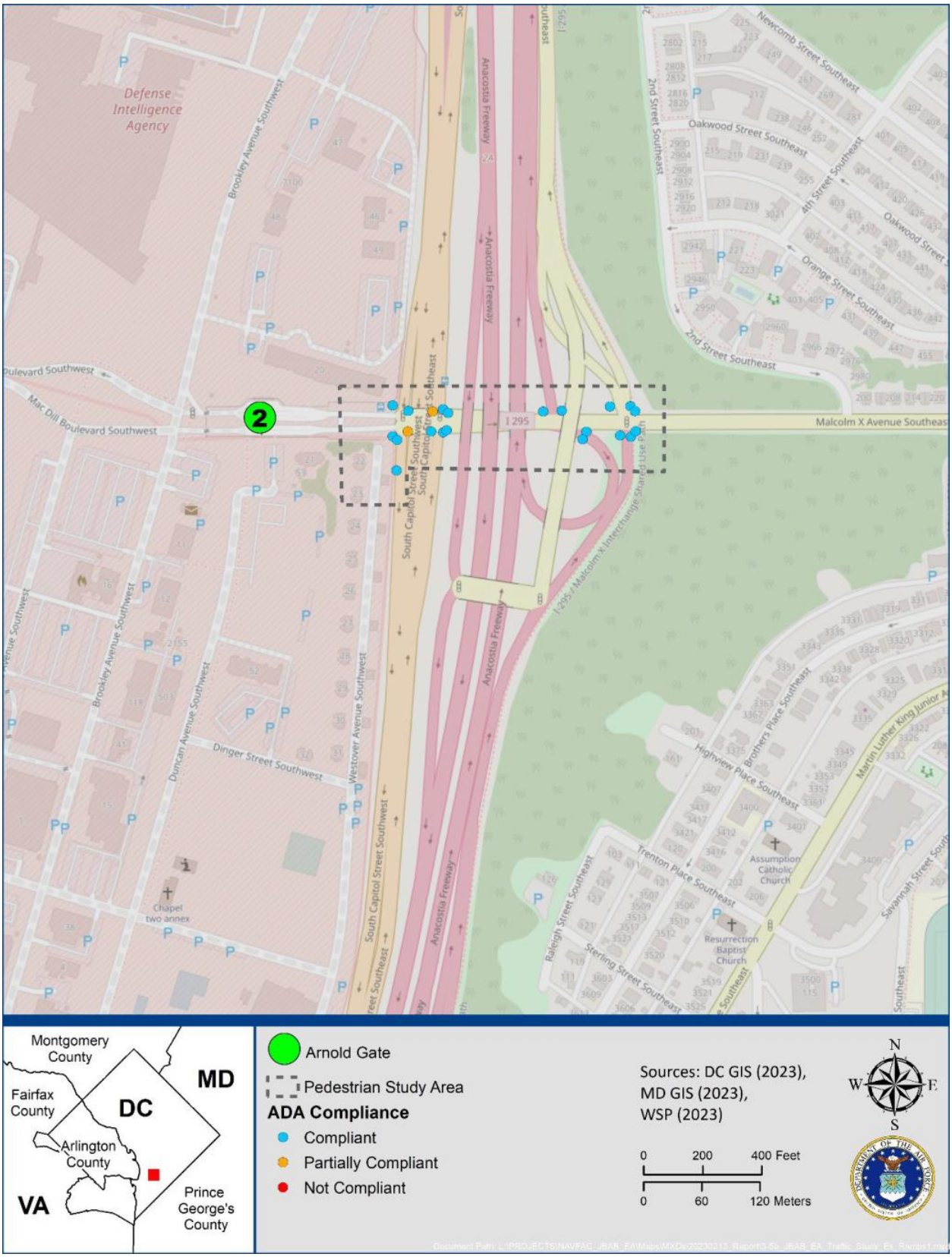


Figure 3-5B ADA Compliance – Arnold Gate

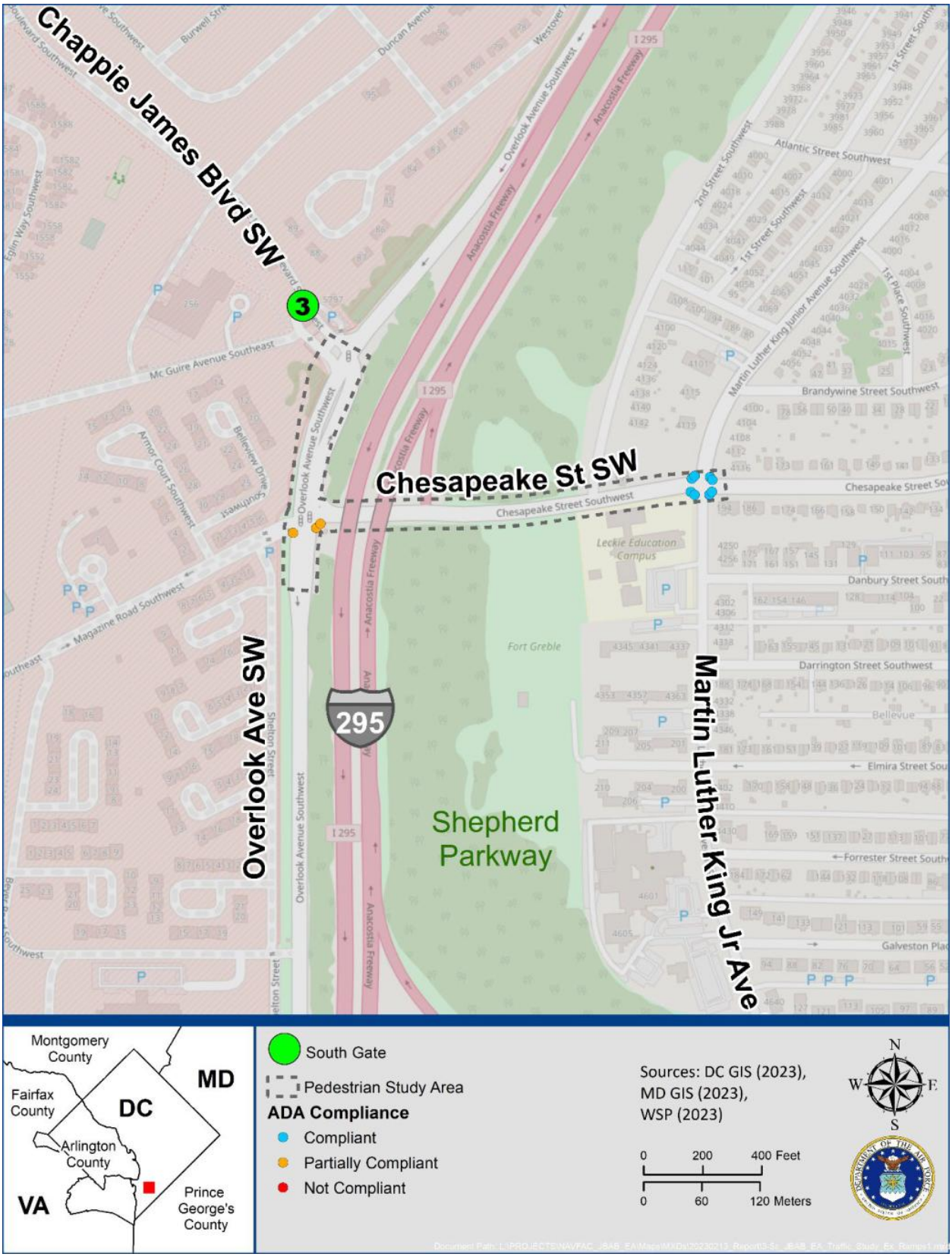


Figure 3-5C ADA Compliance – South Gate

3.3.3 Pedestrian Crossing Times

Pedestrian clearance interval times were reviewed in this study to help determine if pedestrian crossing times are adequate. The 2009 Manual on Uniform Traffic Control Devices defines a pedestrian clearance interval time as the duration it would require a person walking at a pace of 3.5 feet per second to cross from the curb at the start of a crosswalk to the far side of a traveled lane or a median where a pedestrian can safely refuge (FHWA, 2009). Specifically, a pedestrian would need to be able to cross such a distance within the allotted signal timings that include the sum of the "Flash Don't Walk" time, the yellow time, and the all-red time. The crossing distances, the allotted pedestrian interval times for the legs of each intersection with pedestrian signals, and an evaluation on the adequacy of the timings are summarized in Table 3-1. Current crossing time information was not available for the intersection of Suitland Parkway SE and I-295 SB Off-ramp (Intersection #1). With the exception of the western leg of the intersection of Overlook Ave SW and Chesapeake St SW (Intersection #15), which provides 2 fewer seconds than would be considered adequate for pedestrian crossing, the allotted signal timings suggest that crossing intervals are currently adequate.

Table 3-1 Pedestrian Crossing Times

#	Intersection Name and Approach	Crossing Leg	Existing Pedestrian Crossing Distance (feet)	Crossing Time Required (seconds)	Walk Time (seconds)	Flashing Don't Walk Time (seconds)	Buffer Interval (seconds)	Adequate Time to Cross Based on Flash Don't Walk Time?
1	**Suitland Parkway SE/I-295 SB Off-ramp**							
	SB (Suitland Parkway SE)	West (Crossing WB On-ramp)	35	10	N/A	N/A	8	N/A
	SB (Suitland Parkway SE)	West (Crossing EB On-ramp)	30	9	N/A	N/A	8	N/A
2	**Suitland Parkway SE/I-295 NB Off-ramp/I-295 NB On-ramp**							
	SB (Suitland Parkway SE)	West	85	25	7	21	12	Yes
	NB (Suitland Parkway SE)	East (Crossing NB Right Turns to On-Ramp)	35	10	7	16	7	Yes
	NB (Suitland Parkway SE)	East (Crossing SB Left Turns to On-Ramp)	25	8	7	16	7	Yes

#	Intersection Name and Approach	Crossing Leg	Existing Pedestrian Crossing Distance (feet)	Crossing Time Required (seconds)	Walk Time (seconds)	Flashing Don't Walk Time (seconds)	Buffer Interval (seconds)	Adequate Time to Cross Based on Flash Don't Walk Time?
3	**Firth Sterling Ave SE/Firth Sterling Ave SE & Suitland Pkwy**							
	SB (Suitland Parkway SE)	West (Crossing SB Right Turns)	20	6	7	21	12	Yes
	SB (Suitland Parkway SE)	West (Crossing Firth Sterling Avenue SE)	50	15	7	21	12	Yes
	EB (Firth Sterling Avenue SE)	South	105	30	7	24	8	Yes
	NB (Suitland Parkway SE)	East	70	20	7	16	7	Yes
4	**Sumner Rd SE/Barry Rd SE & Firth Sterling Ave SE**							
	SB (Sumner Road SE)	West	45	13	7	7	6	Yes
	EB (Firth Sterling Avenue SE)	South	45	13	7	12	6	Yes
5	**Eaton Rd SE & Firth Sterling Ave SE**							
	SB (Eaton Road SE)	West	45	13	7	14	6	Yes
	EB (Firth Sterling Avenue SE)	South	45	13	7	12	6	Yes
	NB (Eaton Road SE)	East	45	13	7	14	6	Yes
	WB (Firth Sterling Avenue SE)	North	30	9	7	12	6	Yes
6	**St Elizabeth Rd SE & Stevens Rd SE & Firth Sterling Ave SE**							
	NB (St Elizabeth Road SE)	East	45	13	7	8	7	Yes
	EB (Firth Sterling Avenue SE)	South (Crossing Southbound St. Elizabeths Avenue SE)	70	20	7	16	8	Yes

#	Intersection Name and Approach	Crossing Leg	Existing Pedestrian Crossing Distance (feet)	Crossing Time Required (seconds)	Walk Time (seconds)	Flashing Don't Walk Time (seconds)	Buffer Interval (seconds)	Adequate Time to Cross Based on Flash Don't Walk Time?
	EB (Firth Sterling Avenue SE)	South (Crossing Northbound St. Elizabeths Avenue SE)	30	9	7	16	8	Yes
7	**South Capitol St & Defense Blvd/Firth Sterling Ave SE**							
	SB (South Capitol Street)	West	85	25	7	20	6	Yes
	EB (Defense Boulevard SW)	South	60	18	7	14	6	Yes
	NB (South Capitol Street)	East	50	15	7	20	6	Yes
8	**S Capitol St SB Ramps & MacDill Blvd SW/Malcolm X Ave SE**							
	SB (South Capitol Street)	West	100	29	10	24	6	Yes
	EB (MacDill Boulevard SW)	South	30	9	4	4	6	Yes
	WB (Malcolm X Avenue SE)	North	45	13	7	7	6	Yes
9	**S Capitol St NB Ramps & Malcolm X Ave SE**							
	EB (Malcolm X Avenue SE)	South	25	8	7	6	6	Yes
	NB (South Capitol Street)	East	65	19	10	15	6	Yes
	WB (Malcolm X Avenue SE)	North	30	9	7	7	5	Yes
11	**I-295 NB Ramps /Dorothea Dix Ave SE & Malcolm X Ave SE**							
	EB (Malcolm X Avenue SE)	South	30	9	7	5	6	Yes
	NB (I-295 NB Ramps)	East	60	18	7	14	6	Yes
	WB (Malcolm X Avenue SE)	North	60	18	7	14	6	Yes

#	Intersection Name and Approach	Crossing Leg	Existing Pedestrian Crossing Distance (feet)	Crossing Time Required (seconds)	Walk Time (seconds)	Flashing Don't Walk Time (seconds)	Buffer Interval (seconds)	Adequate Time to Cross Based on Flash Don't Walk Time?
15	**Overlook Ave SW & Chesapeake St SW**							
	SB (Overlook Avenue SW)	West	55	16	7	8	6	No
	EB (Magazine Road SW)	South	70	20	7	13	7	Yes

3.3.4 Pedestrian Environmental Analysis

Sidewalks in the pedestrian network study areas range from between approximately 4-feet wide to more than 6.5-feet wide in some locations. Federal Highway Administration (FHWA) guidelines state that sidewalks should have a minimum of 5 feet of clear space (FHWA, 2016). Any width less than 5 feet must be 3-feet wide with 5-foot-wide turn-around locations every 200 feet to meet the minimum requirements for people with disabilities (DOJ, 2010). Based on a review of District geographic information system (GIS) data and site observations, most locations with sidewalks in the pedestrian network study area adhere to the minimum 5-foot-wide sidewalk requirement.

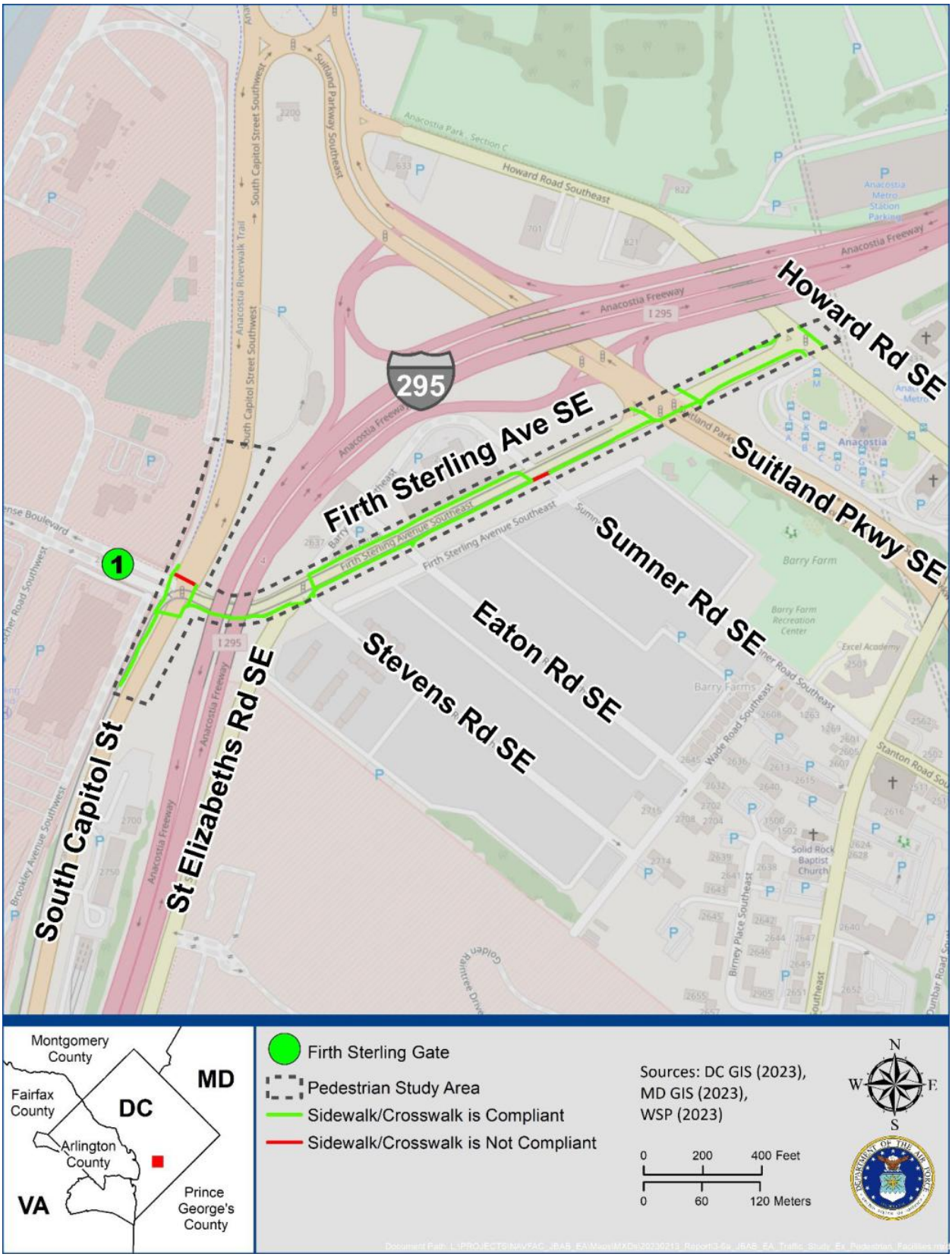
As required by the DDOT scoping form, the transportation team completed a more detailed inventory of pedestrian conditions in the pedestrian network study areas that included most of the pedestrian activity near the three ACPs. Sidewalks, crosswalks, and curb ramps were evaluated based on the guidelines in DDOT's Public Realm Design Manual and Design and Engineering Manual in addition to ADA standards. DDOT prescribes a minimum sidewalk width of 6 feet; a full list of applicable sidewalk widths and requirements for the pedestrian study areas are shown in Table 3-2 (DDOT, 2019c); (DDOT, 2019b). DDOT also prescribes that crosswalks have parallel edge lines with proper width depending on street classifications (i.e., 10 feet for local streets, 15 feet for collectors, and 20 feet for major arterials) (DDOT, 2019b).

Table 3-2 District Department of Transportation Minimum Sidewalk and Crosswalk Requirements

Street Type	Treebox Area Minimum	Sidewalk Area Minimum (Does Not Include Treebox)		Crosswalks
		Residential	Commercial	
Local	4 feet	6 feet	10 feet	10 feet
Collector	4 feet	6 feet	10 feet	15 feet
Principal and Secondary Arterials	6 feet	8 feet	10 feet	20 feet (major arterials)

Source: (DDOT, 2019c); (DDOT, 2019b)

The pedestrian network study areas include a mix of collector and local streets with one minor arterial that is reclassified as a principal arterial at the northern boundary of the study area. South Capitol Street, the arterial in the pedestrian network study area, has sidewalks at Firth Sterling Gate. This sidewalk stops at the DC Streetcar Testing and Commissioning Center, approximately one-third of a mile south of the intersection of Firth Sterling Avenue SE and South Capitol Street. Most sidewalks along these streets do comply with the required 6-foot width as shown in Figures 3-6A, 3-6B, and 3-6C. Additionally, some areas do not comply because the sidewalks narrow around obstructions (e.g., trees) or are temporary (e.g., through construction zones).



1 **Figure 3-6A Pedestrian Facilities – Firth Sterling Gate**

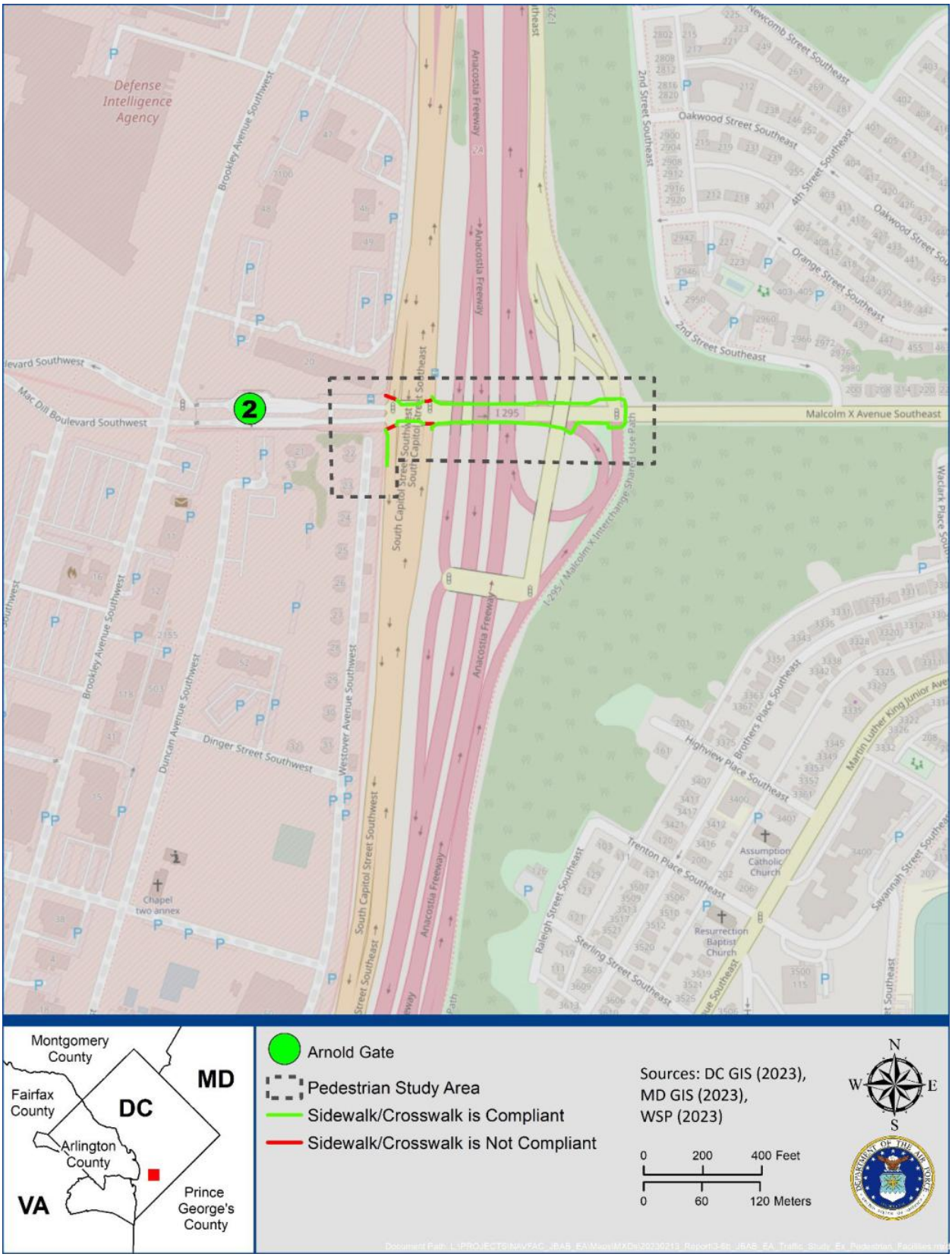


Figure 3-6B Pedestrian Facilities – Arnold Gate

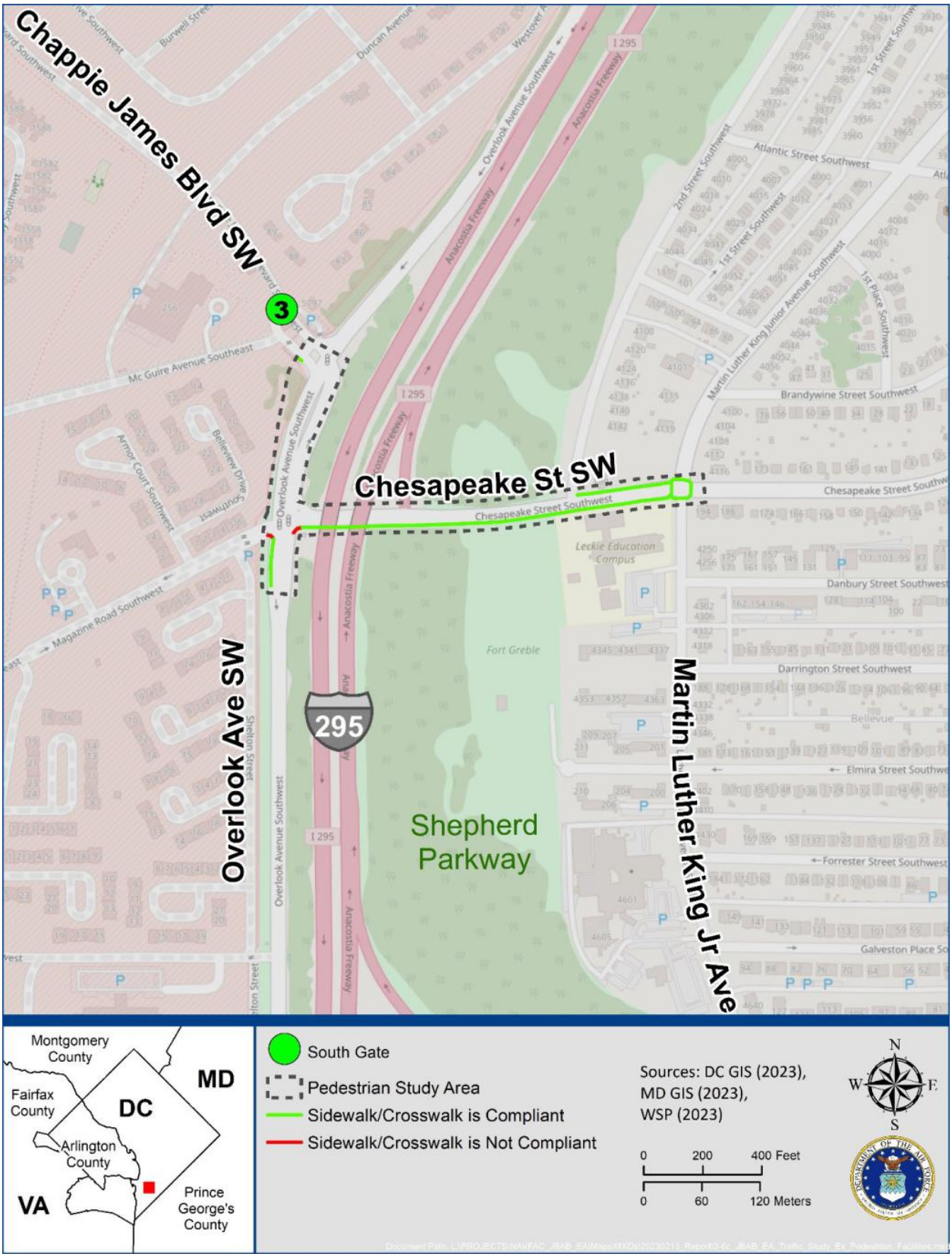


Figure 3-6C Pedestrian Facilities – South Gate

Collector streets include Howard Road SE, Firth Sterling Avenue SE, Chesapeake Street, and Overlook Avenue SW. Notably, most sidewalks along these roads are only 4- to 5-feet wide except the recently reconstructed sidewalks along Firth Sterling Avenue SE between Suitland Parkway and Stevens Road SE, where the sidewalks are 6 feet wide. Most crosswalks along these collector streets comply with the DDOT requirement, with 15-foot-wide sidewalks. Sidewalks or crosswalks that are missing, obstructed, or with faded pavement marking are located near all three gates. By Firth Sterling Gate, the intersections of Firth Sterling Avenue SE and Sumner Road SE along with the north side of Firth Sterling Avenue SE and South Capitol Street have missing or faded crosswalk markings. By Arnold Gate, all four crosswalks at the intersection of South Capitol Street and Malcolm X Avenue SE have missing or faded crosswalk markings. By South Gate, the south side of the intersection of Overlook Avenue SW and Magazine Road SW has missing or obstructed sidewalks, and the three crosswalks nearest to the gate entrance have faded crosswalk markings.

3.4 Bicycle Network

Existing bicycle facilities within a 1-mile radius from the gates are described below. Data were collected from DC GIS bicycle and trail data, local bicycle plans, and verified with aerial imagery and field visits as needed. Gaps or deficiencies in the bicycle network are also identified. The existing bicycle networks are shown in Figures 3-7A, 3-7B, and 3-7C.

3.4.1 Bicycle Network Description

The three bicycle network study areas encompass a range of multi-use trails and shared-use paths. The Anacostia Riverwalk Trail (ART), a multi-use trail that travels along both sides of the Anacostia River in northeast and southeast DC and along the Potomac Channel in southwest DC, ends in front of Firth Sterling Gate. The Fredrick Douglass Memorial Bridge and 11th Street Bridge both have multi-use trails that cross the Anacostia River and connect to the ART within the bicycle network study areas. Across all three site areas, the JBAB Waterfront Trail runs along the waterfront of the Potomac River. The Suitland Parkway, Oxon Run, and Dorothea Dix multi-use trails are also within the bicycle network study areas. In addition to these multi-use trails, a limited number of bicycle lanes and signed bicycle routes connecting to various points in Anacostia serve the bicycle network study areas and connect to some of the ACPs.

The ART is a major recreational and commuter multi-use trail along both sides of the Anacostia River that runs continuously from Bladensburg Waterfront Park at its northern point, Nationals Park/Poplar Point at its southern point, and the Tidal Basin at its western point. The AWI, a collective of 19 regional and federal agency partners led by DDOT, manages the ART. To date, the ART is approximately 20-miles long with additional planned segments to ultimately achieve 28 miles. Planned segments aim to fill in connectivity and accessibility gaps, notably along Overlook Avenue SW, an improvement that has already received funding (DDOT, 2021d). Key project elements of the ART include expanding shared-use paths and educational signage; enhancing trail viewsheds to bring trail users closer to the water's edge; and minimizing impacts on the natural environmental from paving and other trail infrastructure (DDOT, 2022b).

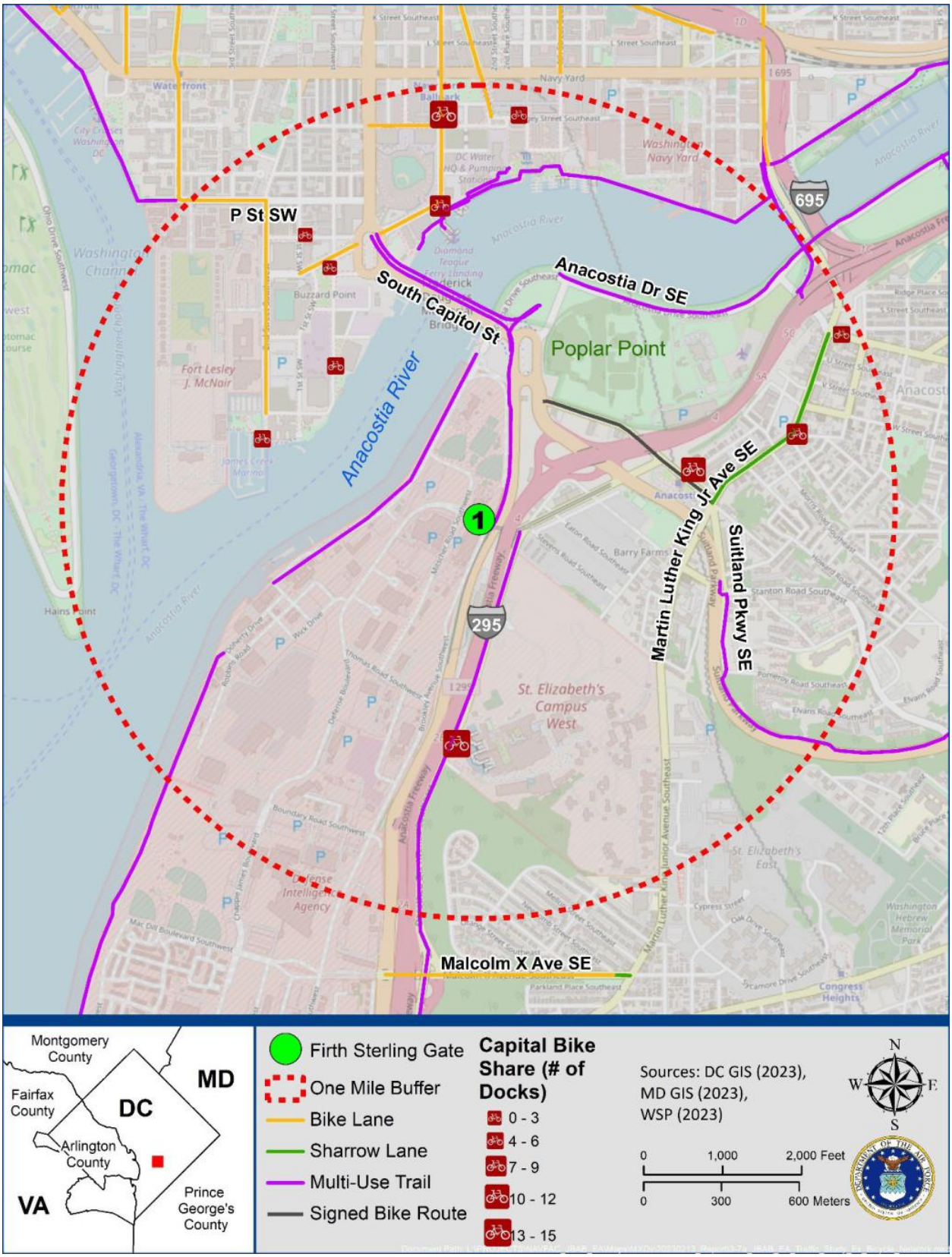


Figure 3-7A Bicycle Facilities – Firth Sterling Gate

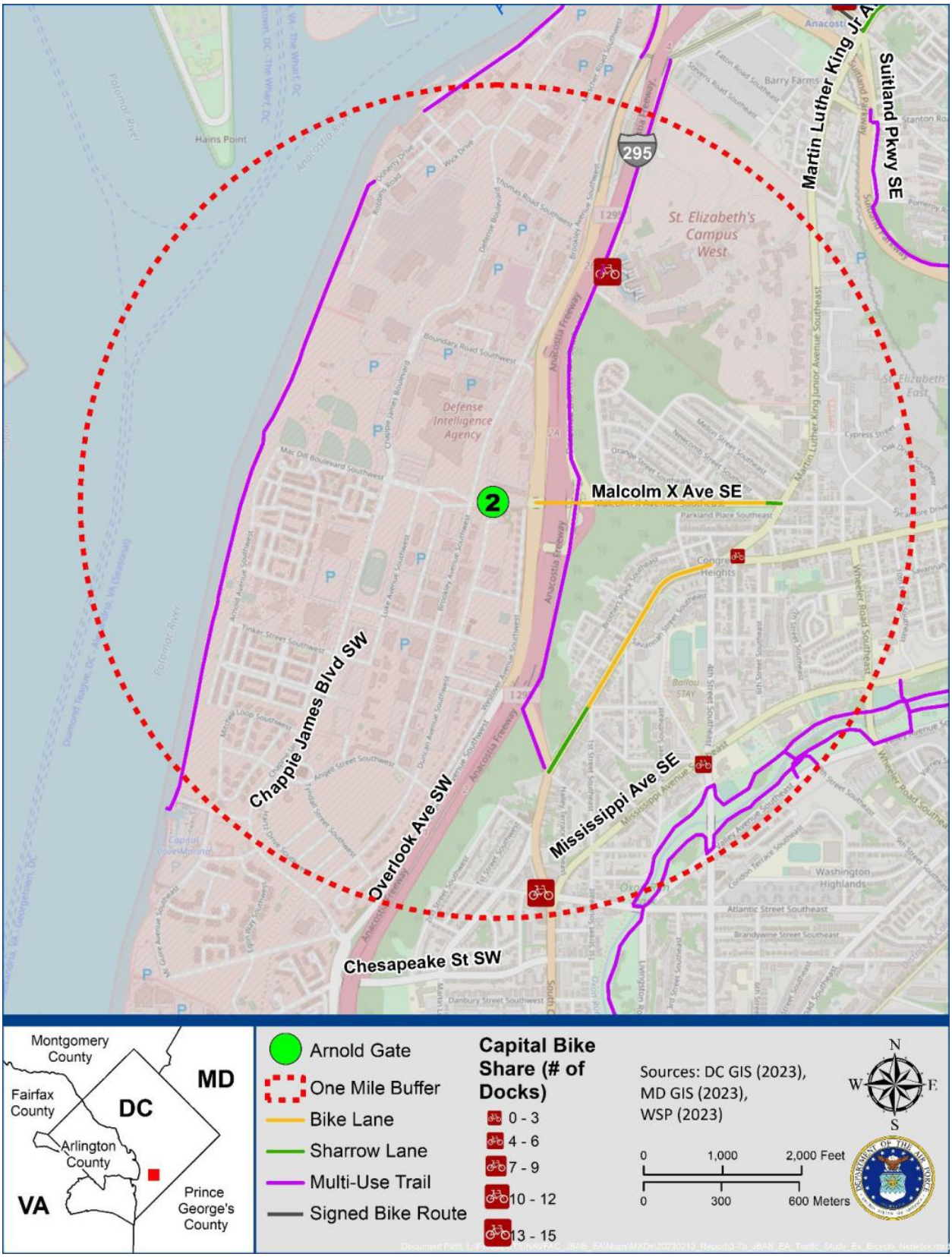


Figure 3-7B Bicycle Facilities – Arnold Gate

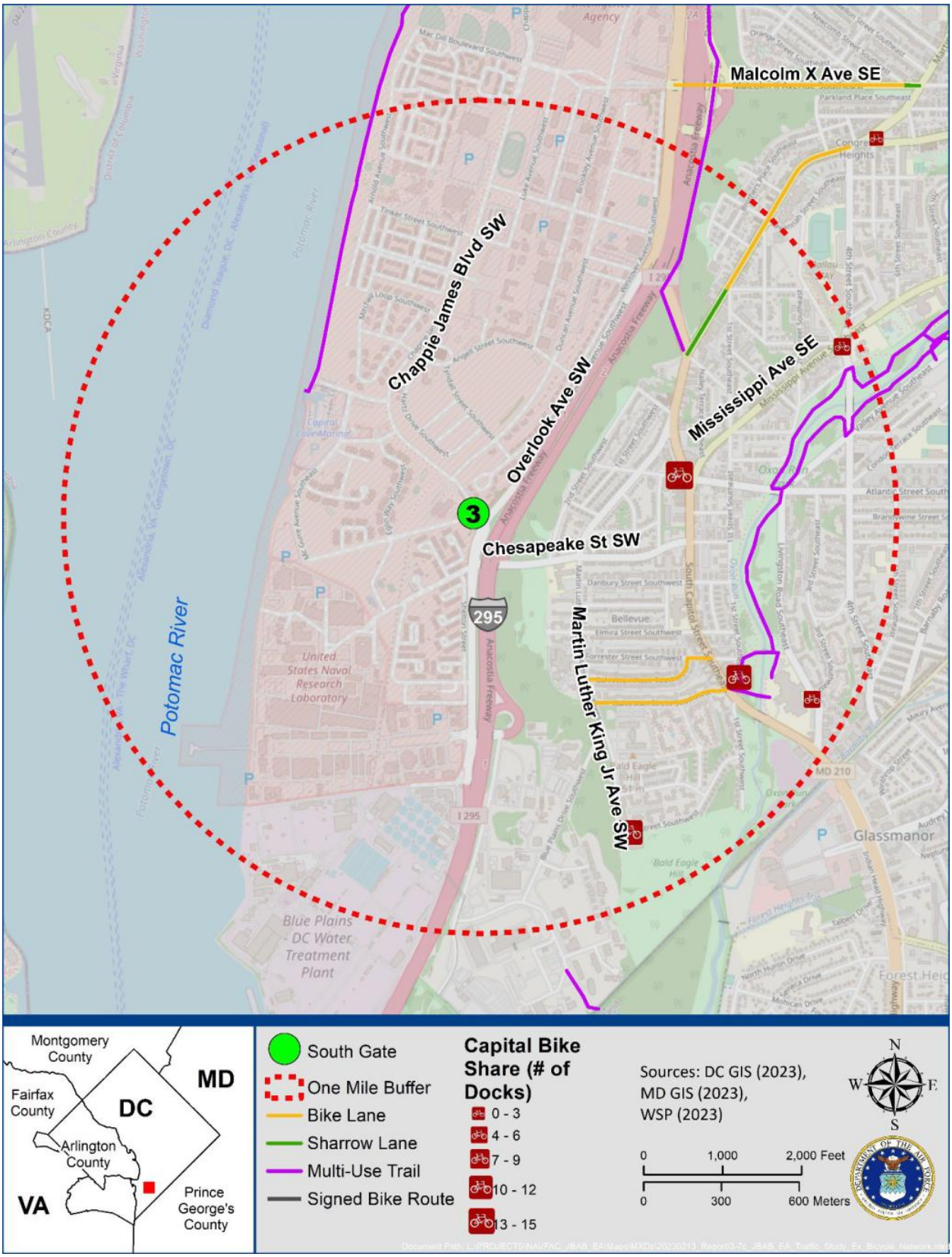


Figure 3-7C Bicycle Facilities – South Gate

Bicycle lanes are found on a limited number of streets in the bicycle network study areas. Bicycle lanes are marked lanes that allow one-way bicycle travel, typically in the same direction as adjacent vehicle travel lanes. Bicycle lanes may or may not be separated from vehicle travel lanes by physical barriers. The main bicycle lanes within a mile of Firth Sterling Gate are an approximately half-mile stretch on 2nd Street SW between P Street SW and V Street SW; a short stretch of Potomac Avenue SW between 1st Street SW and 1st Street SE; and finally, a short stretch of 1st Street SE between N Street SE and Potomac Avenue SE. The main bicycle lanes within a mile of Arnold Gate are an approximately half-mile stretch on Malcolm X Avenue SE between Martin Luther King Jr Avenue SE and South Capitol Street, terminating near Arnold Gate; and an approximately half-mile stretch on Martin Luther King Jr Avenue SE between 4th Street SE and Upsal Street SE. The main bicycle lanes within a mile of South Gate are two short stretches on Galveston Place SW and Galveston Street SW between South Capitol Street and Martin Luther King Jr Avenue SW. These bicycle lanes connect to the Oxon Run Trail and provide some level of connectivity to Congress Heights. Generally, connectivity is lacking within the bicycle study area boundaries. No bicycle lanes or shared-use trails directly service Arnold Gate.

Three sharrow (i.e., shared) lanes are present in the bicycle network study areas. A sharrow lane typically has physical pavement marking to indicate that vehicles and bicycles share the road. Near Firth Sterling Gate, a sharrow branches off Howard Road SE onto Martin Luther King Jr Avenue SE and ends at Good Hope Road SE. Near Arnold Gate, a short sharrow begins at the intersection of Malcolm X Avenue SE and Martin Luther King Jr Avenue SE and proceeds west along both travel directions of Malcolm X Avenue SE until it transitions into a bicycle lane at Newcomb Street SE. Finally, between Arnold Gate and South Gate, a sharrow begins at the intersection of South Capitol Street and Martin Luther King Jr Avenue SE and proceeds northeast until it transitions into a bicycle lane slightly north of Upsal Street SE. Additionally, near Firth Sterling Gate, a signed bicycle route that only has roadside signs to indicate the shared road on both travel directions along Howard Road SE connecting the Suitland Parkway Trail and the Fredrick Douglass Memorial Bridge trail is located between Stanton Road SE and I-295.

3.4.2 Bicycle Network Gaps and Barriers

DDOT and the AWI have recently improved the bicycle network to close gaps and barriers. Multi-use trail improvements include continually upgrading the ART, reconstructing the 11th Street Bridge with plans to construct additional bicycle infrastructure through the 11th Street Bridge Park project (Building Bridges Across the River, 2017), and installing bicycle infrastructure, whether in conjunction with new private development or as a public project, consistent with the 2021 update to the DDOT District of Columbia Bicycle Master Plan (DDOT, 2021a).

Gaps and barriers in the bicycle network within the bicycle network study areas occur on both sides of the Anacostia River. Signed bicycle routes, such as the signed route along Howard Road that connects the Suitland Parkway Trail to ART, help address some of the gaps in the physical bicycle network. According to the 2005 DDOT District of Columbia Bicycle Master Plan, safe and convenient bicycle connections around South Capitol Street and I-695 are not available because of freeways, grade separations, and heavy traffic (NACTO, 2005). These factors are still present in some way around these major corridors, and they prevent bicyclists from easily reaching nearby multi-use trails and roads with less traffic.

Roads within the bicycle network study areas were evaluated for bicycle LOS for the 2005 DDOT District of Columbia Bicycle Master Plan. This model used roadway lane and shoulder widths, speed limits, pavement conditions, and the presence of on-street parking to rank streets from best (LOS A) to worst

(LOS F) level of comfort for bicyclists. Only major collectors and arterials were evaluated because it was assumed that bicyclists would not use limited access roads, and local roads would have a good LOS (DDOT 2005). MoveDC, DDOT's Long-Range Intermodal Transportation plan, updated these bicycle LOS rankings in 2021, using a Bicycle Level of Traffic Stress (LTS) model to evaluate the impact of traffic, street configuration, and other factors on a bicyclist's level of comfort. Bicycle LTS analysis classifies streets into four categories that describe the "stress levels" for cycling ranging from LTS 1, a low speed and low volume street that is comfortable for novice bicyclists, to LTS 4, a street comfortable only for advanced cyclists characterized as "strong and fearless." Roads within or immediately adjacent to the three gates were found to have fair to poor conditions for bicyclists. Roads near Firth Sterling Gate with poor bicycle LTS (score of 3 or 4) include Firth Sterling Street SE, South Capitol Street, Howard Road SE, and Martin Luther King Jr Avenue SE. Roads near Arnold Gate with poor bicycle LTS include portions of Malcolm X Avenue SE, South Capitol Street, and MacDill Boulevard SW. Roads near South Gate have a higher LTS generally, but roads with poor LTS include Overlook Avenue SW, Laboratory Road SW, and Perimeter North Road SW (DDOT, 2021b).

3.4.3 Bikeshare Facilities

Capital Bikeshare is an automated bicycle-sharing system serving Washington, D.C.; Arlington and Alexandria, Virginia; and Montgomery County, Maryland. Capital Bikeshare has several bicycle stations within the bicycle network study areas, as shown on the bicycle facilities maps in Figures 3-7A, 3-7B, and 3-7C. Seventeen Capital Bikeshare stations are within a 1-mile radius of the three gates, some of which overlap with other gates within the 1-mile radius. Eleven Capital Bikeshare stations are close to Firth Sterling Gate, including 11 docking stations at Good Hope Road and Martin Luther King Jr Avenue SE, 19 docking stations at the Anacostia Metro Station, and 19 docking stations at St. Elizabeths West Campus/DHS. Four Capital Bikeshare stations are close to Arnold Gate, including 19 docking stations at 4th Street and Mississippi Avenue SE, and 11 docking stations at Alabama Avenue and Martin Luther King Jr Avenue SE. Five Capital Bikeshare stations are close to South Gate, including 19 docking stations at Joliet Street and Martin Luther King Jr Avenue SW/Bald Eagle Recreation Center, 19 docking stations at 1st Street and South Capitol Street/Oxon Run Trail, and 19 docking stations at South Capitol Street and Atlantic Street SW. Also, within the bicycle network study area and within a 1-mile radius of Firth Sterling Gate but across the Anacostia River are 15 docking stations at Half Street and Water Street SW, 23 docking stations at Potomac Avenue and Half Street SW, 15 docking stations at 1st Street and Q Street SW, and 19 docking stations at 1st Street and Potomac Avenue SE.

As of December 2022, Capital Bikeshare was operating approximately 17 bikeshare stations within a 1-mile radius of the three gates, as shown in Table 3-3. From January 2022 to December 2022, total arrivals and departures of bicycle trips at these 17 Capital Bikeshare stations varied from about 50 to 10,000 per station, with an overall average of about 2,800 arrivals and 2,500 departures (Capital Bikeshare, 2022).

Table 3-3 Capital Bikeshare Summary

Station Number	Address	Number of Bicycle Docks	Number of Bicycles Rented January 2022 to December 2022 From Station	Number of Bicycles Rented January 2022 to December 2022 To Station
31209	1st and N Streets SE	39	9,081	10,590
31676	1st and Q Streets SW	15	1,092	1,062
31817	1st and South Capitol Street/Oxon Run Trail	19	525	595
31668	1st and Potomac Ave SE	19	7,783	7,984
31668	2nd and V Streets SW/ James Creek Marina	19	4,130	4,260
31634	3rd and Tingey Streets SE	19	8,109	9,773
31816	4th Street and Mississippi Avenue SE	19	442	424
31800	Alabama and Martin Luther King Jr Avenues SE	11	375	275
31648	Potomac Avenue and Half Street SW	23	3,732	4,224
31801	Anacostia Metro Station	19	1,236	1,254
31802	Good Hope Road and Martin Luther King Jr Avenue SE	11	1,401	1,451
31664	Half and Water Streets SW	15	3,927	3,961
31807	Pleasant Street and Martin Luther King Jr Avenue SE	11	597	587
31811	South Capitol Street and Atlantic Street SW	19	389	396
31818	Livingston Road and 3rd Street SE	11	227	253
31819	Joliet Street and Martin Luther King Jr Avenue SW/Bald Eagle Recreation Center	19	58	56
31827	St. Elizabeths West Campus/DHS	19	774	535
Total bicycles stored in 1-mile bicycle study area		179	N/A	N/A
Total bicycles rented			43,878	47,680

Source: (Capital Bikeshare, 2022)

3.5 Transit

Multiple modes of transit are present in the transit study area, including Metrorail lines, local and commuter buses, and shuttles. This section summarizes these transit services, frequencies and headways, and ridership, if available, within the transit study area. The analysis is limited to weekday service.

3.5.1 Metrorail

JBAB is served by the Metrorail Green Line, located approximately 0.5-mile east of Firth Sterling Gate via the Anacostia Metro Station with one entrance at Howard Road SE south of Firth Sterling Avenue SE and one entrance at the Anacostia Metro Station parking garage. Based on WMATA's Rail Ridership Data Viewer, Anacostia had 2,170 weekday passenger boardings (WMATA, 2022). Figures 3-8A, 3-8B, and 3-8C display the Metrorail entrance locations and Metro lines within a 0.25-mile radius of Firth Sterling Gate.

No heavy commuter rail corridors pass through the transit study areas, and no nearby transfer points exist for commuter rail to the installation.

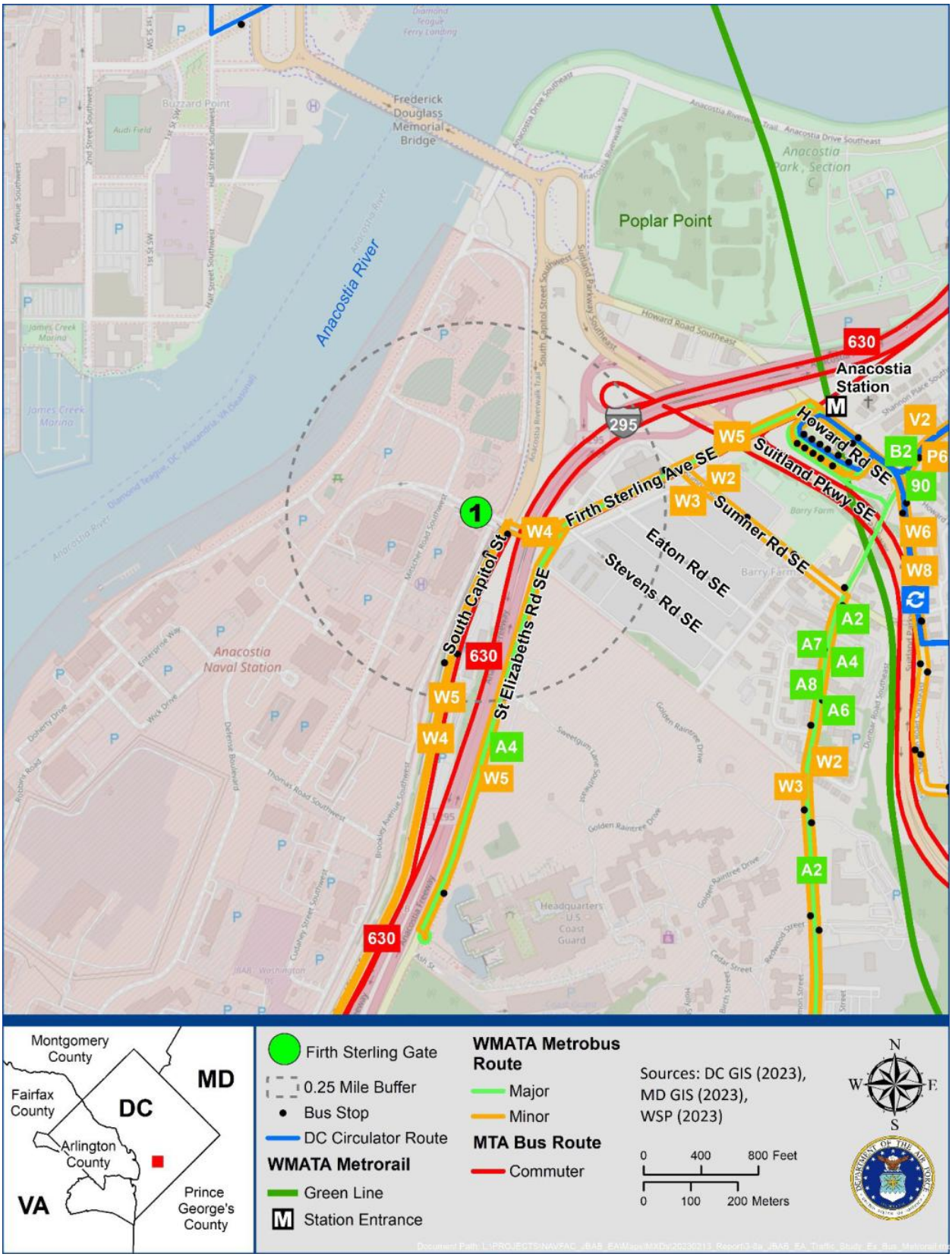


Figure 3-8A WMATA Metrobus and Metrorail Map – Firth Sterling Gate

Figure 3-8B WMATA Metrobus and Metrorail Map – Arnold Gate

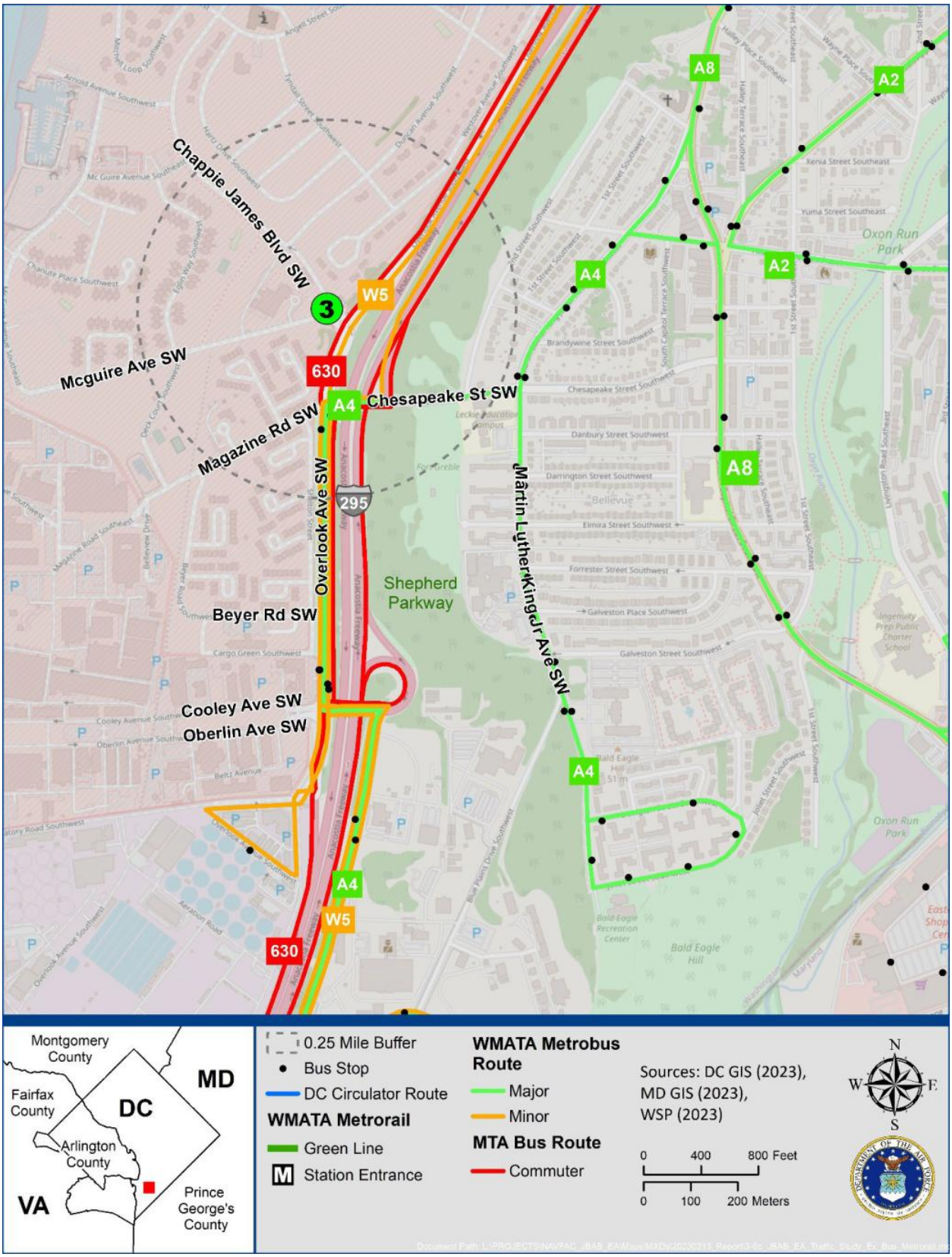


Figure 3-8C WMATA Metrobus and Metrorail Map – South Gate

3.5.1.1 Station Frequency of Service

Metrorail service operates on all lines between 5:00 a.m. and 12:00 a.m., Monday through Thursday, and 5:00 a.m. and 1:00 a.m. on Friday. The peak frequency is 8 minutes for the Red and Green Lines and 15 minutes for the Orange, Silver, and Blue Lines. Off-peak frequencies vary between 8 and 15 minutes (WMATA, 2023a).

The Green Line serves the Anacostia Metro Station. Peak headways during AM and PM peak hours on the Green Line create an effective headway of 8 minutes if trains are on time, assuming 8 Green Line trains serve the station every hour. Table 3-4 summarizes 2023 Metrorail headways by line, day of the week, and time at the Anacostia Metro Station.

Table 3-4 Green Line Metrorail Headway and Timespan

Day	Timespan	Period	Headways (Minutes)
			Green Line
Weekday	5:00 AM–9:30 AM 3:00 PM–7:00 PM	Peak	8
	5:00 AM–3:00 PM	Midday	8
	7:00 PM–9:30 PM	Evening	8
	9:30 PM–12:00 AM	Late night	8

Source: (WMATA, 2023a)

3.5.1.2 Anacostia Metro Station Weekday Ridership

Table 3-5 summarizes ridership data from WMATA Office of Planning detailing the Green Line Ridership for Anacostia Station.

Table 3-5 Anacostia Metro Station Weekday Ridership for October 2022

AM Peak		15-Minute Intervals			1-Hour Intervals	
Station	Hour Interval	Avg Total Entries	Avg Total Exits	Hour of the Day	Avg Total Entries	Avg Total Exits
Anacostia	7:00 AM to 7:15 AM	62	30	7:00 AM	268	163
Anacostia	7:15 AM to 7:30 AM	66	43	8:00 AM	246	156
Anacostia	7:30 AM to 7:45 AM	67	46	9:00 AM	147	97
Anacostia	7:45 AM to 8:00 AM	72	45			
Anacostia	8:00 AM to 8:15 AM	71	38			
Anacostia	8:15 AM to 8:30 AM	59	38			
Anacostia	8:30 AM to 8:45 AM	61	41			
Anacostia	8:45 AM to 9:00 AM	55	38			
Anacostia	9:00 AM to 9:15 AM	48	31			
Anacostia	9:15 AM to 9:30 AM	35	25			

Table 3-5 Anacostia Metro Station Weekday Ridership for October 2022 (continued)

PM Peak		15-Minute Intervals			1-Hour Intervals	
Station	Hour Interval	Avg Total Entries	Avg Total Exits	Hour of the Day	Avg Total Entries	Avg Total Exits
Anacostia	2:00 PM to 2:15 PM	26	23	5:00 PM	133	244
Anacostia	2:15 PM to 2:30 PM	28	32	6:00 PM	79	163
Anacostia	2:30 PM to 2:45 PM	30	32	7:00 PM	48	99
Anacostia	2:45 PM to 3:00 PM	26	38			
Anacostia	3:00 PM to 3:15 PM	35	39			
Anacostia	3:15 PM to 3:30 PM	39	44			
Anacostia	3:30 PM to 3:45 PM	50	43			
Anacostia	3:45 PM to 4:00 PM	43	53			
Anacostia	4:00 PM to 4:15 PM	47	68			
Anacostia	4:15 PM to 4:30 PM	46	64			
Anacostia	4:30 PM to 4:45 PM	51	66			
Anacostia	4:45 PM to 5:00 PM	43	62			

3.5.2 Local and Commuter Bus

Many local and commuter buses also serve the transit study area. WMATA Metrobus services connect the study area with other neighborhoods in the District and the surrounding metropolitan area. The DC Circulator operates from Congress Heights to Union Station with a stop at the Anacostia Metro Station along Stanton and Sheridan Roads SE and Martin Luther King Jr Avenue SE through the transit study area, and commuter buses connect the Maryland and Virginia destinations to Anacostia and the Navy Yard within the transit study area.

3.5.2.1 Metrobus Service

WMATA provides local bus service throughout the District and neighboring jurisdictions, including operating 15 WMATA bus lines within a 0.25-mile radius of the installation. The busiest Metrobus routes, by average weekday daily boardings, are the Deanwood – Alabama Avenue Line (W4), the Bladensburg Road – Anacostia Line (B2), and the U Street – Garfield Lines (90 &92). These bus routes serve the Anacostia Metro Station, providing peak hour service in the primary direction of pedestrians walking from the Metrorail (eastbound in the morning and westbound in the evening).

Most bus lines operate with weekday AM peak period headways of around 12 minutes, although some bus lines have headways as short as 10 minutes and as long as 30 minutes. Table 3-6 presents Metrobus service by route for Metrobus lines that serve the transit study area, including headways (time between buses), service hours, route type, and endpoints.

Metrobus bus stops within a 0.25-mile radius of the installation are mostly bus stop sign posts adjacent to a sidewalk. Some of these include trash cans, and a few include shelters, benches, and timetable information. The bus stop just north of MacDill Boulevard SE on Malcolm X Avenue SE and the stop at Overlook Avenue and Shepherd Parkway SW include a bus shelter, bench, and digital information

screen. Some bus stops are accessible with curb ramps and sidewalks leading to the stop pickup area. Several bus stops have grassy medians separating the sidewalk and the bus stop (WSP, 2022b).

Table 3-6 WMATA Bus Service Summary

Route Name	Route Endpoints	Headway (during hours of operation)	Service Hours for Study Area
Major Route			
A2	Operates between Anacostia and Southern Avenue	12 minutes weekdays	Weekdays: southbound 4:55 AM—12:00 AM Weekdays: northbound 4:11 AM—12:10 AM
A4	Operates between D.C. Village and Anacostia (via Fort Drum)	12 minutes weekdays	Weekdays: northbound 4:48 AM—11:54 PM Weekdays: southbound 5:19 AM—12:20 AM
A6	Operates between Anacostia and Livingston	12 minutes weekdays	Weekdays: southbound 5:20 AM—12:12 AM Weekdays: northbound 4:31 AM—2:12 AM
A7	Operates between Anacostia and Livingston	12 minutes weekdays	Weekdays: southbound from 3:34 PM—7:09 PM Weekdays: northbound from 6:39 AM—4:21 PM
A8	Operates between Anacostia and Livingston	12 minutes weekdays	Weekdays: southbound 4:10 AM—1:57 AM Weekdays: northbound 4:30 AM—12:16 AM
B2	Operates between Mount Rainier and Anacostia	20 minutes weekdays	Weekdays: southbound 4:30 AM—12:21 AM Weekdays: northbound 4:30 AM—12:28 AM
90	Operates between Anacostia and Adams Morgan (Duke Ellington Bridge)	12 minutes weekdays	Weekdays: northbound 4:29 AM–12:23 AM Weekdays: southbound 4:46 AM–12:38 AM
92	Operates between Congress Heights and Reeves Center	12 minutes weekdays	Weekdays: northbound 4:03 AM–2:28 AM Weekdays: southbound 4:30 AM–02:29 AM

Table 3-6 WMATA Bus Service Summary (continued)

Route Name	Route Endpoints	Headway (during hours of operation)	Service Hours for Study Area
Minor Routes			
P6	Operates between Anacostia and Eckington	10–30 minutes weekdays	Weekdays: northbound 4:30 AM–2:08 AM Weekdays: southbound 4:15 AM–02:05 AM
V2	Operates between Anacostia and Capitol Heights	12 minutes weekdays	Weekdays: westbound 5:40 AM–2:12 AM Weekdays: eastbound 4:40 AM–1:59 AM
W2	Operates between the United Medical Center and Anacostia	20 minutes weekdays	Weekdays: westbound from 6:00 AM—9:32 AM and from 3:20 PM—2:12 AM Weekdays: eastbound from 5:48 AM—9:43 AM and from 2:53 PM—2:00 AM
W3	Operates between the United Medical Center and Washington Overlook	20 minutes weekdays	Weekdays: westbound 9:00 AM—4:16 PM Weekdays: eastbound 9:00 AM—3:19 PM
W4	Operated between Deanwood and Alabama Avenue	12 minutes weekdays	Weekdays: northbound 4:30 AM—2:16 AM Weekdays: southbound 4:30 AM—2:42 AM
W5	Operates between DC Village and St. Elizabeths Gate 4 (Coast Guard HQ)	20-25 minutes weekdays	Weekdays: northbound 3:30 PM—6:22 PM Weekdays: southbound 6:04 AM—9:30 AM
W6	Operates between Garfield and Anacostia	15-30 minutes weekdays	Weekdays: clockwise 5:56 AM—12:33 AM
W8	Garfield—Anacostia Loop	15-30 minutes weekdays	Weekdays: counterclockwise 5:49 AM—12:12 AM

Source: (WMATA, 2023b)

The transportation team requested bus capacity data from WMATA. This information is shown in Table 3-7. Blank cells in the table indicate that vehicles did not reach the load factor capacity threshold.

Table 3-7 WMATA Bus Ridership Summary

Route	Time Period	Average ONS	Max Load	Max Load %	Load Duration at 100% Full
90	AM Peak	1,116	21	53%	1.4%
90	PM Peak	1,380	22	57%	1.8%
92	AM Peak	1,455	19	48%	2.5%
92	PM Peak	1,940	21	53%	3.0%
A2	AM Peak	964	19	47%	1.4%
A2	PM Peak	1,357	21	54%	4.1%
A4	AM Peak	623	11	29%	2.0%
A4	PM Peak	1,019	12	31%	3.4%
A6	AM Peak	621	15	39%	1.0%
A6	PM Peak	985	17	44%	2.2%
A7	AM Peak	111	15	38%	--
A7	PM Peak	300	15	37%	1.5%
A8	AM Peak	744	19	47%	2.9%
A8	PM Peak	1,274	22	54%	3.5%
B2	AM Peak	1,799	22	54%	3.3%
B2	PM Peak	2,269	24	60%	2.8%
P6	AM Peak	785	17	43%	1.5%
P6	PM Peak	957	17	43%	2.4%
V2	AM Peak	1,065	27	66%	4.3%
V2	PM Peak	1,356	30	74%	7.8%
W2	AM Peak	539	17	60%	2.1%
W2	PM Peak	906	17	63%	4.5%
W3	PM Peak	NA	NA	NA	--
W3	PM Peak	44	16	57%	--
W4	AM Peak	1,738	28	57%	5.0%
W4	PM Peak	2,610	27	58%	2.9%
W5	AM Peak	42	4	11%	--
W5	PM Peak	NA	NA	NA	--
W6	AM Peak	295	14	52%	1.5%
W6	PM Peak	467	18	63%	5.1%
W8	AM Peak	357	17	62%	2.8%
W8	PM Peak	410	15	54%	1.7%

Average ONS = Average Boardings
Max Load = average of highest observed passenger load on board bus.
Max Load % = max load divided by number of seats on vehicle
Load Duration at 100% Full = the percentage of stops where the max load is at or greater than the seated load.
Source: (WMATA, 2022)

3.5.2.2 DC Circulator

The DC Circulator bus system launched its first route through the transit study area in 2018. It is one of several transit options in the study area and operates on Stanton and Sheridan Roads SE and Martin Luther King Jr Avenue SE. The study area is served by one route: Congress Heights – Union Station Route via Barracks Row and Historic Anacostia.

The Congress Heights – Union Station Route provides service from the transit study area to Union Station from 6:00 a.m. to 9:00 p.m. on weekdays and 7:00 a.m. to 9:00 p.m. on weekends. Connections can be made to the intercity trains of Amtrak, the regional/commuter rail systems of the Maryland Area Regional Commuter Rail (MARC) and the Virginia Railway Express (VRE), and the Metrorail transit system from Union Station. All DC Circulator bus routes operate on a 10-minute headway for the length of the service day, with no additional service during peak hours (DC Circulator, 2023b).

Within a 0.25-mile radius of Firth Sterling Gate, the Congress Heights – Union Station Route operates in both directions along the length of Stanton Road, Sheridan Road, and Martin Luther King Jr Avenue SE between Alabama Avenue SE and I-295. The route also services bus stops in the transit study area in both directions at the Anacostia Metro Station (DC Circulator, 2023b). Ridership data for the Congress Heights – Union Station Route showed an approximate yearly ridership of 810,000 trips (DC Circulator, 2021).

DC Circulator bus stops within a 0.25-mile radius of Firth Sterling Gate are marked by bus stop sign posts and feature few improvements for bus riders. The bus stop at the Anacostia Metro Station is a transfer point between multiple Metrobus lines and has additional seating, multiple shelters, greenspace, trash cans, and adjacency to Capital Bikeshare (WSP, 2022b).

A summary of DC Circulator route information is presented in Table 3-8. The DC Circulator route is also shown in Figure 3-8A, above.

Table 3-8 DC Circulator Route Information

Route Name	Route Endpoints	Headway (During Hours of Operation)	Service Hours for Study Area
Congress Heights to Union Station	Operates between Congress Heights and Union Station via Barracks Row and Historic Anacostia	10 minutes weekdays	Weekdays: 6:00 AM–9:00 PM – loop Weekends: 7:00 AM–9:00 PM– loop

Source: (DC Circulator, 2023a)

3.5.2.3 Commuter Bus Service

In Maryland, the Maryland Transit Administration (MTA) operates Route 630 in the transit study area (Figure 3-8A, 3-8B, and 3-8C) serving Prince George's and Charles Counties, and the District of Columbia. This route serves Arnold Gate with an inbound discharge-only stop during the AM and outbound boarding-only stop during the PM. The MTA operates eight additional commuter bus routes that use I-295 just south of Firth Sterling Gate; however, no route has a bus stop near the gate. Table 3-9 shows the commuter bus services. Commuter bus capacity issues were not examined because ridership data are not easily available or consistent among jurisdictions.

Table 3-9 Commuter Buses Servicing the Study Area

Operator	Route Number or Name	Stop Location	AM Trips	PM Trips[a]	Service Area
MTA	630	Overlook Avenue and Laboratory Road SW, South Capitol Street and Malcolm X Avenue SE	4	4	Charles and Prince George's Counties, and the District of Columbia

Source: (MTA, 2023)
Notes:
[a] PM trips typically include any mid-day trips. Many routes provide one mid-day trip around noon, with afternoon service starting between 2:00 p.m. and 3:30 p.m.

3.5.2.4 Shuttle

Several mission partner-operated shuttle bus routes serve JBAB. These shuttles connect JBAB with other DoD agency offices and Metrorail stations in the nearby areas with more frequent headways and longer windows of time than the Metrobus and DC Circulator routes running near JBAB. According to DoD regulations, these shuttles are intended for official business travel only, and commuters are not allowed to use them. Two shuttles are operated: a DoD-to-DoD facility shuttle and the JBAB to L'Enfant Plaza Station shuttle. The DoD-to-DoD facility shuttle transports individuals who need to travel between DoD facilities during the workday. The JBAB to L'Enfant Plaza Station shuttle operates from 5:30 a.m. to 6:30 p.m. each workday with various headways depending on the time of day (Air Force, 2021a). Additionally, the JBAB to L-Enfant Plaza Station Shuttle must connect the place of employment with a transit station according to DoD rules. The JBAB internal shuttle is no longer in operation.

3.6 Truck Access

DDOT has established primary truck routes throughout the city to identify specific preferred routes for trucks to travel while in the District. DDOT has also placed truck restrictions on specific streets in the city where trucks are explicitly prohibited from travel. Truck travel is also permissible on all remaining streets within the city limits under DDOT's jurisdiction that are not assigned these two specific designations. The Freight Priority Network was developed in 2010 and consists of interstates and routes designated as bus or truck routes based on engineering analysis and public engagement (DDOT, 2021a). Within the study area, South Capitol Street and I-295 have been established as primary truck routes. There are no truck restrictions on any of the roads within the study area, although trucks are prohibited from using Suitland Parkway SE (National Park Service jurisdiction) east of Firth Sterling Ave SE, which brings some traffic into and out of the study area. DDOT's primary truck routes are displayed in Figures 3-9A, 3-9B, and 3-9C.

1 **Figure 3-9A DDOT Primary and Restricted Truck Routes – Firth Sterling Gate**

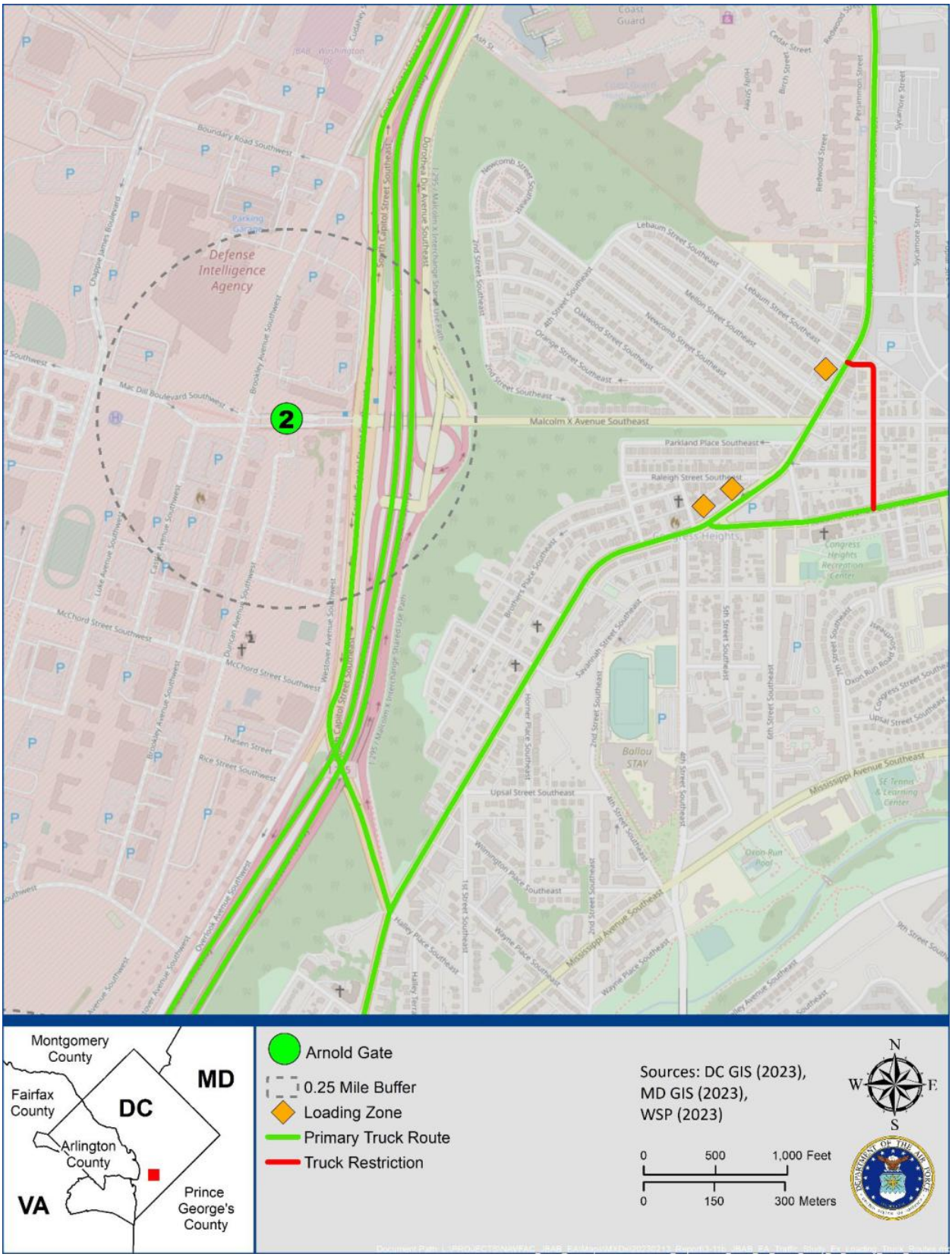


Figure 3-9B DDOT Primary and Restricted Truck Routes – Arnold Gate

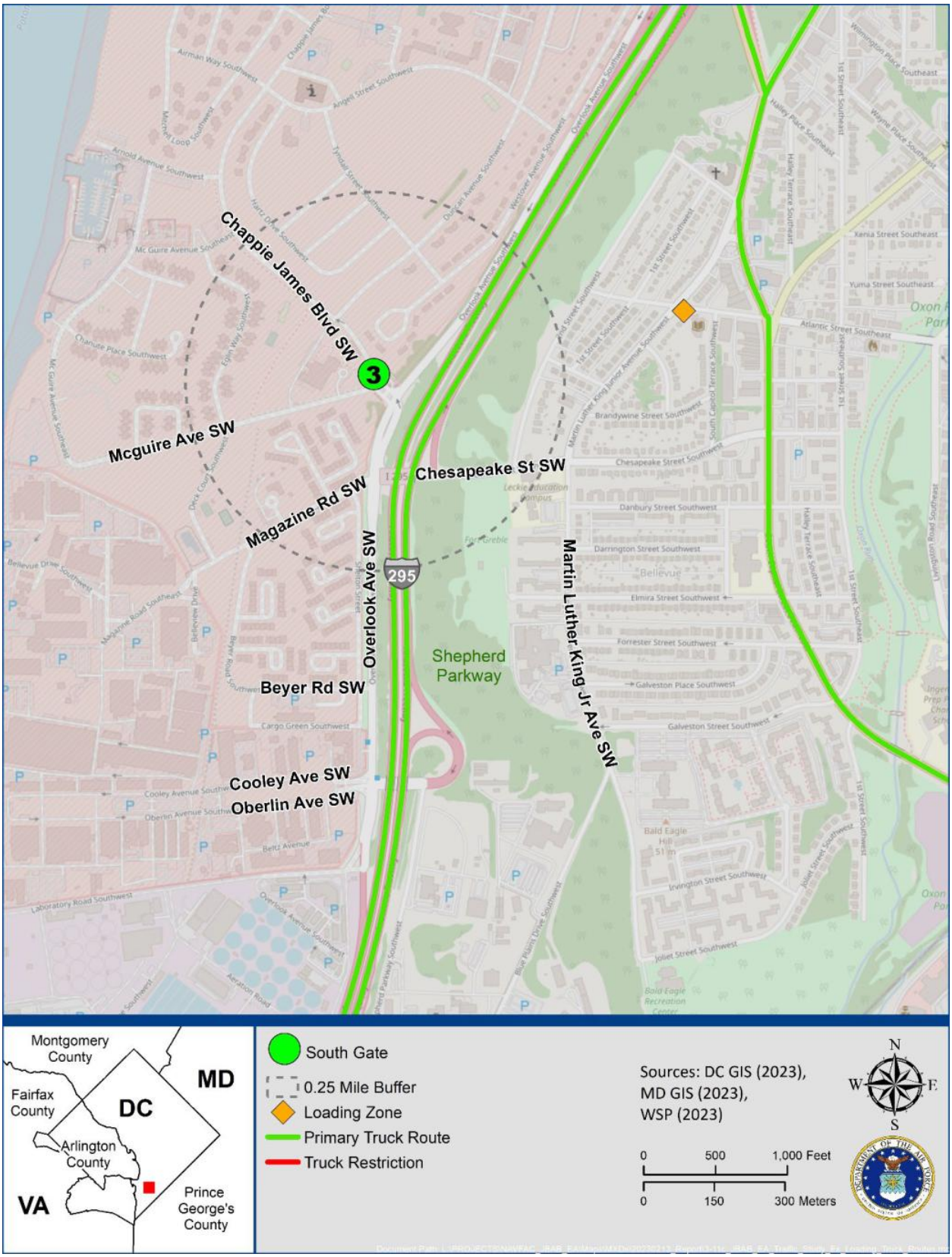


Figure 3-9C DDOT Primary and Restricted Truck Routes – South Gate

3.7 Parking

On and off-street parking, in the form of either metered or unmetered street parking, is sparse in the vicinity of JBAB. Two-hour parking (except zone 8 permit holders) exists along the south side of Firth Sterling Avenue SE. Underground garages and outdoor surface lots are not present in the parking study area. WMATA operates a parking garage north of the Anacostia Metro Station. Information about on-street parking was gathered during site visits on November 15, 16, and 17, 2022 (WSP, 2022a).

3.8 Traffic

This section describes the concepts and definitions for analyzing the traffic operations, the process used to analyze the 16 traffic study area intersections, and the results.

3.8.1 Analysis Tools

The study analyzed the traffic study area intersections using Synchro software version 11 (Build 2, Revision 9). Additionally, Vissim software version 11 was used to simulate and analyze the operations at Firth Sterling Gate and two adjacent signalized intersections along Firth Sterling Avenue SE. Synchro is sufficiently capable for analyzing traditional traffic control devices at intersections such as traffic signals and stop signs. Vissim was selected instead of Synchro for the gate analysis because this software can simulate non-traditional traffic control scenarios. Intersection capacity analyses and intersection queueing analyses were performed. The intersection capacity analyses used Synchro and various input values as described in the following section to determine the Level of Service (LOS), which categorizes drivers' perception of an intersection's operation based on the amount of delay they experience. The intersection capacity analyses results are presented in Section 3.8.3. The intersection queuing analyses used Synchro to estimate the average and maximum distance (in feet) that a line of vehicles (i.e., the queue) extends back from an intersection. The intersection queuing analysis process is described more in Section 3.8.4, and the traffic study area results of the queuing analyses are presented in Section 3.8.5.

3.8.2 Intersection Operations Analysis Methods

LOS is a common measure of traffic operations for both signalized and unsignalized intersections. LOS on roads provides a scale that is intended to match motorists' perception of how a transportation facility operates based on the average amount of delay they experience and to provide a scale to compare different facilities.

Synchro software calculates vehicle control delay in accordance with the Highway Capacity Manual (HCM) version 6 method for signalized and unsignalized (stop-controlled) intersections. However, for signalized intersections, it uses a more robust alternative computation based on an assumed distribution of traffic volumes for the intersection during the analysis period (typically one hour).

Primary inputs include:

- Vehicular volumes
- Pedestrian volumes
- Traffic signal timings
- Roadway geometry
- Speed limits
- Heavy vehicle (i.e., trucks and buses) percentages
- Peak hour factor (measure of vehicle 15-minute flow rate)

Synchro calculates the average vehicle control delay, measured in seconds per vehicle, using the parameters described above. The average vehicle control delay represents the average extra delay in seconds per vehicle caused by the presence of a traffic control device or traffic signal and includes the time required to decelerate, stop, and accelerate. Control delay can be characterized for an entire intersection, each intersection approach by direction, and each lane group. Lane groups are defined by the vehicular turning movements they serve and include left turn lanes, through lanes, right turn lanes, and sometimes combinations of these when different turning movements share the same lane (such as a shared through/right turn lane). Control delay is used to determine LOS for an entire intersection, approach, and lane group. LOS E corresponds to a delay of 55.1 to 80.0 seconds, and LOS F corresponds to a delay of 80.1 seconds or greater. Table 3-10 shows the average control delay and corresponding LOS for signalized intersections. The HCM thresholds for unsignalized intersections are similar, except LOS F is assigned to delays exceeding 50 seconds per vehicle instead of 80 second per vehicle.

Table 3-10 Signalized Intersection Control Delay and LOS Thresholds—HCM Method

LOS	Average Control Delay (seconds/vehicle)	Description
A	Less than or equal to 10	Stable conditions
B	>10–20	
C	>20–35	
D	>35–55	
E	>55–80	Unstable conditions
F	More than 80	Above capacity and unstable conditions

Source: (TRB, 2010)

Stable conditions are when vehicle queues are relatively short, and they clear during each cycle of the traffic signal and are considered to be satisfactory. Unstable conditions are when vehicle queues are long enough such that some vehicles near the back of the queue are unable to clear the intersection during a single cycle (known as “cycle failure”), and this occurs several times during the analysis period. When traffic volume exceeds the intersection’s capacity to accommodate it, these unstable conditions are present often, with cycle failures occurring frequently during the analysis period.

To determine the LOS of an intersection, the critical input values were input into Synchro software which calculated the average vehicle delay (seconds per vehicle). Based on the average vehicle delay, the LOS was determined for all movements (left, through, and right), directional approaches, and the whole intersection. Volume to capacity (v/c) ratios were also calculated using Synchro.

3.8.3 Existing Condition Intersection Operations Analysis

Synchro was used to calculate the vehicle delay and LOS operation based on the HCM method for all signalized intersections.

Based on the Synchro, most study intersections operate at satisfactory overall conditions during the morning and evening peak hours. However, the following four signalized intersections in the study area operate with overall unsatisfactory conditions (LOS E or LOS F) using the HCM method (average control delay exceeds 55 seconds per vehicle):

- Suitland Parkway SE and I-295 NB Off-ramp/I-295 NB On-ramp (Intersection #2) during the AM peak hour
- Suitland Parkway SE and Firth Sterling Avenue SE (Intersection #3) during the AM peak hour

- Suitland Parkway SE and Firth Sterling Avenue SE (Intersection #3) during the PM peak hour
- Overlook Avenue SW and Chappie James Boulevard (Intersection #14) during the AM peak hour
- Overlook Avenue SW and Chappie James Boulevard (Intersection #14) during the PM peak hour
- Overlook Avenue SW and Chesapeake Street SW (Intersection #15) during the PM peak hour

Based on the Synchro signalized intersection analysis results, six signalized intersections have directional approaches that operate at unsatisfactory conditions (LOS E or LOS F) during one or more of the evaluated periods. The following are the individual signalized intersection approaches within the study area that operate at unsatisfactory conditions during the AM and PM peak hours:

- Suitland Parkway SE and I-295 SB Off-ramp (Intersection #1)
  - Off-ramp from southbound I-295 to southeast-bound Suitland Parkway SE during the AM and PM peak hour (shown as the NB approach in the summary tables)
- Suitland Parkway SE and I-295 NB Off-ramp/I-295 NB On-ramp (Intersection #2)
  - Northwest-bound Suitland Parkway SE during the AM peak hour
- Suitland Parkway SE and Firth Sterling Avenue SE (Intersection #3)
  - Eastbound Suitland Parkway SE during the PM peak hour
  - Westbound Suitland Parkway SE during the AM peak hour
  - Northbound Firth Sterling Avenue SE during the AM and PM peak hour
  - Southbound Firth Sterling Avenue SE during the PM peak hour
- Firth Sterling Avenue SE and Eaton Road SE (Intersection #5)
  - Northwest-bound Eaton Road SE during the PM peak hour
- South Capitol Street and Firth Sterling Avenue SE/Defense Blvd (Intersection #7)
  - Westbound Firth Sterling Avenue SE during the PM peak hour
- I-295 NB On-ramps/Dorothea Dix Avenue SE and Malcolm X Avenue SE (Intersection #12)
  - Northbound I-295 NB Off-ramp during the AM peak hour
- Overlook Avenue SW and Chappie James Boulevard (Intersection #14)
  - Northwest-bound Overlook Avenue SW during the AM peak hour
  - Southeast-bound Chappie James Boulevard during the PM peak hour
  - Southwest-bound Overlook Avenue SW during the PM peak hour
- Overlook Avenue SW and Chesapeake Street SW (Intersection #15)
  - Northbound Overlook Avenue SW during the AM peak hour
  - Southbound Overlook Avenue SW during the PM peak hour
- Overlook Avenue SW and NRL Main Gate/Laboratory Road SW (Intersection #16)
  - Westbound Laboratory Road SW during the AM peak hour

The overall intersection LOS grades are depicted in Figures 3-10A through 3-10C for the AM and PM peak hours for all three segments. Table 3-11 shows the results of the LOS capacity analysis and the intersection vehicle delay for the existing condition during the AM and PM peak hour.

Of note are the existing unsatisfactory operating conditions at the following locations:

- Off-ramp (loop) from southbound I-295 to southeast-bound Suitland Parkway SE
- Eastbound Suitland Parkway SE at Firth Sterling Avenue SE
- Westbound Firth Sterling Ave SE at South Capitol Street

Figures 3-9A, 3-9B, and 3-9C show DDOT's primary truck routes; these three approaches are likely to carry new truck traffic in the future if the proposed LVIS is constructed at Firth Sterling Gate.

The study area includes one unsignalized intersection—Malcolm X Avenue SE at the on-ramp to northbound I-295 (Intersection #10). Only one movement at this intersection—the left turn from eastbound Malcolm X Avenue SE onto the on-ramp to northbound I-295—is opposed by other traffic. Vehicles making this left turn must wait for gaps in the opposing westbound through and right-turning traffic before proceeding to turn left onto the ramp. Although this is a permissible movement, it is a redundant movement because northbound I-295 can also be reached from eastbound Malcolm X Avenue SE using the free-flow, unopposed loop ramp on the right, which does not require waiting for gaps in traffic. The HCM 6 analysis of this eastbound left turn movement, determined using Synchro, shows LOS B operations during the AM peak hour and LOS A operations during the PM peak hour. The left turn volume is higher during the PM peak hour than during the AM peak hour; however, the opposing westbound through and right-turning traffic volume is higher during the AM peak hour, resulting in a slight degradation in LOS. Nevertheless, the LOS remains in the satisfactory range for the left turn movement during both peak hours.

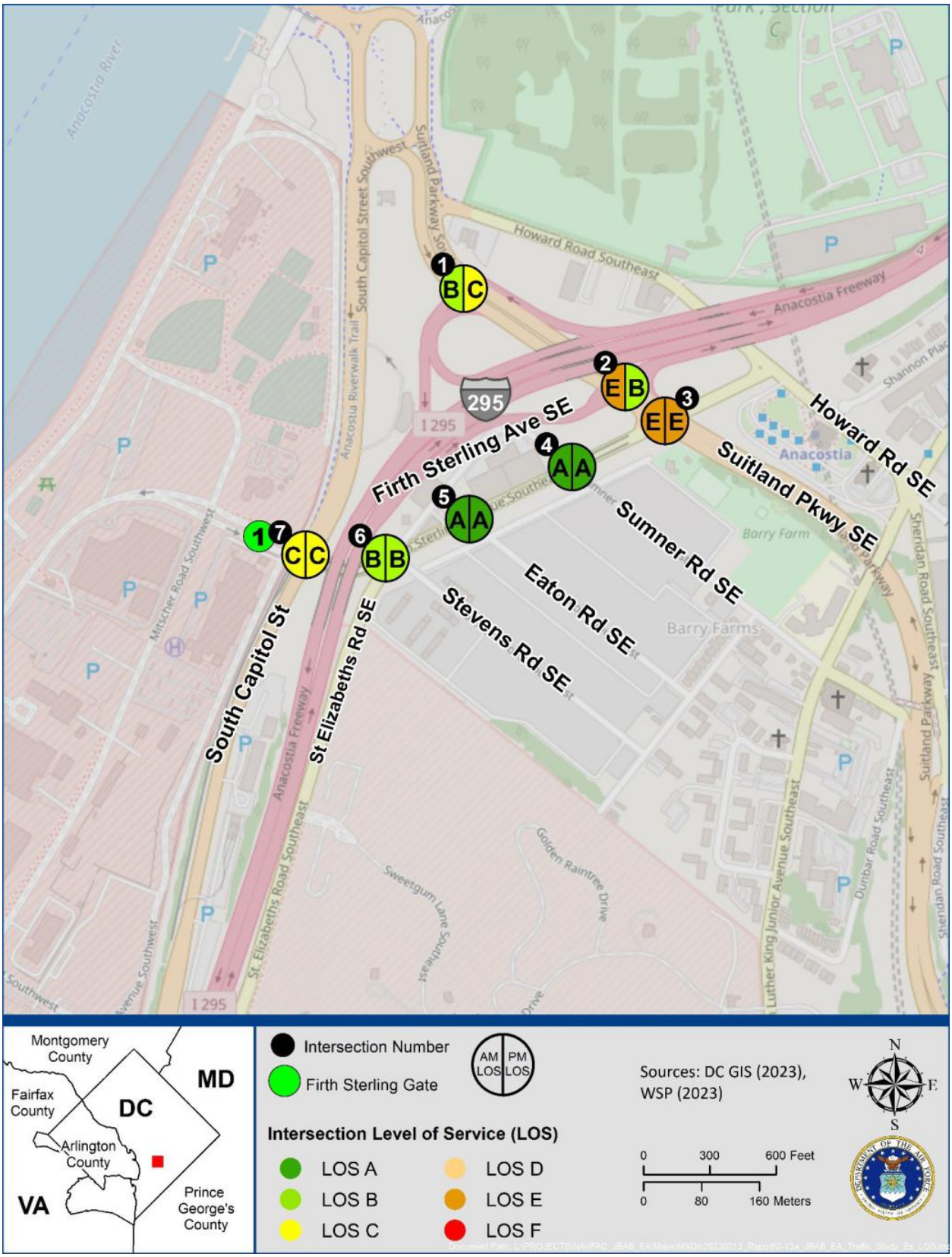


Figure 3-10A AM and PM Peak Hour Level of Service – Firth Sterling Gate

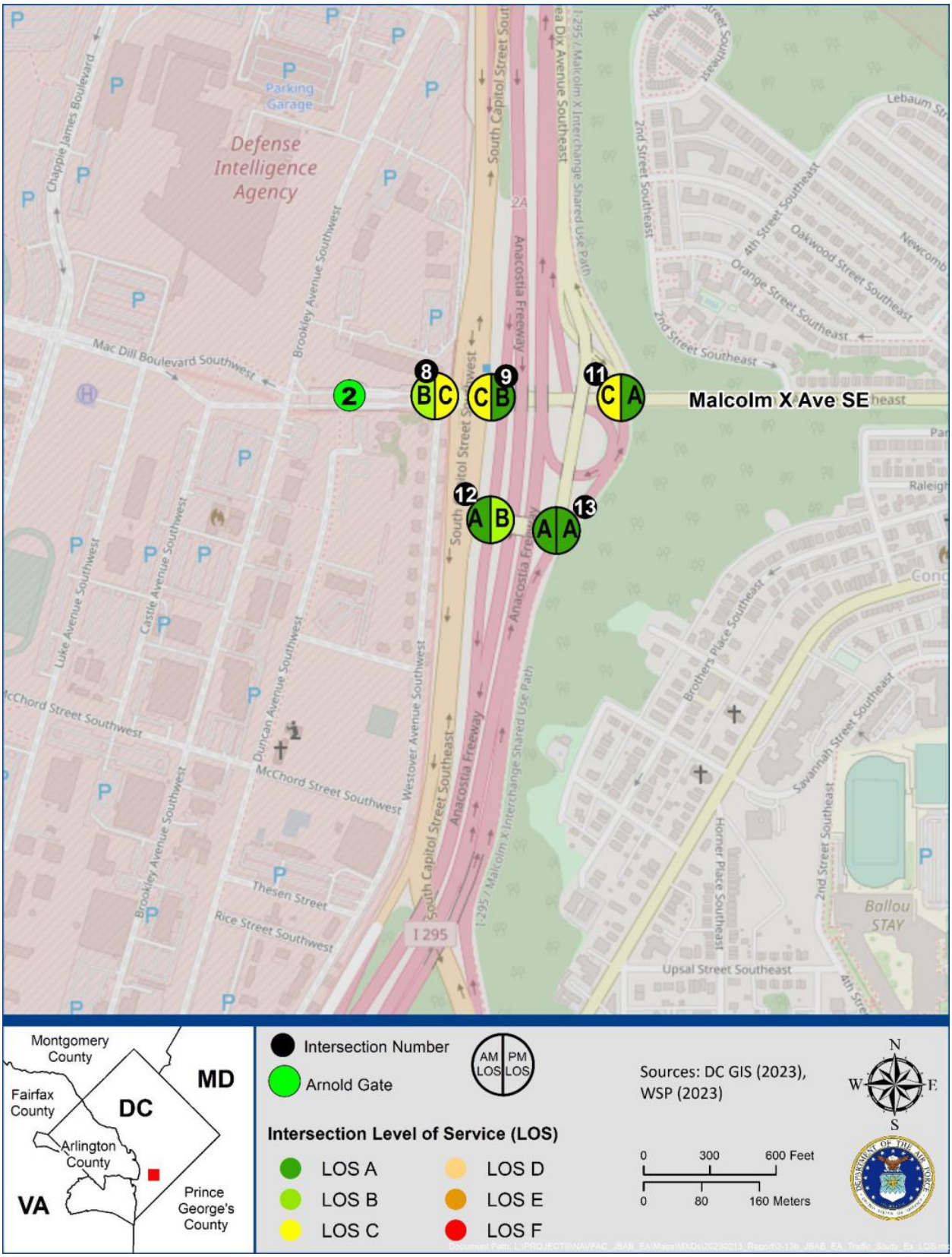
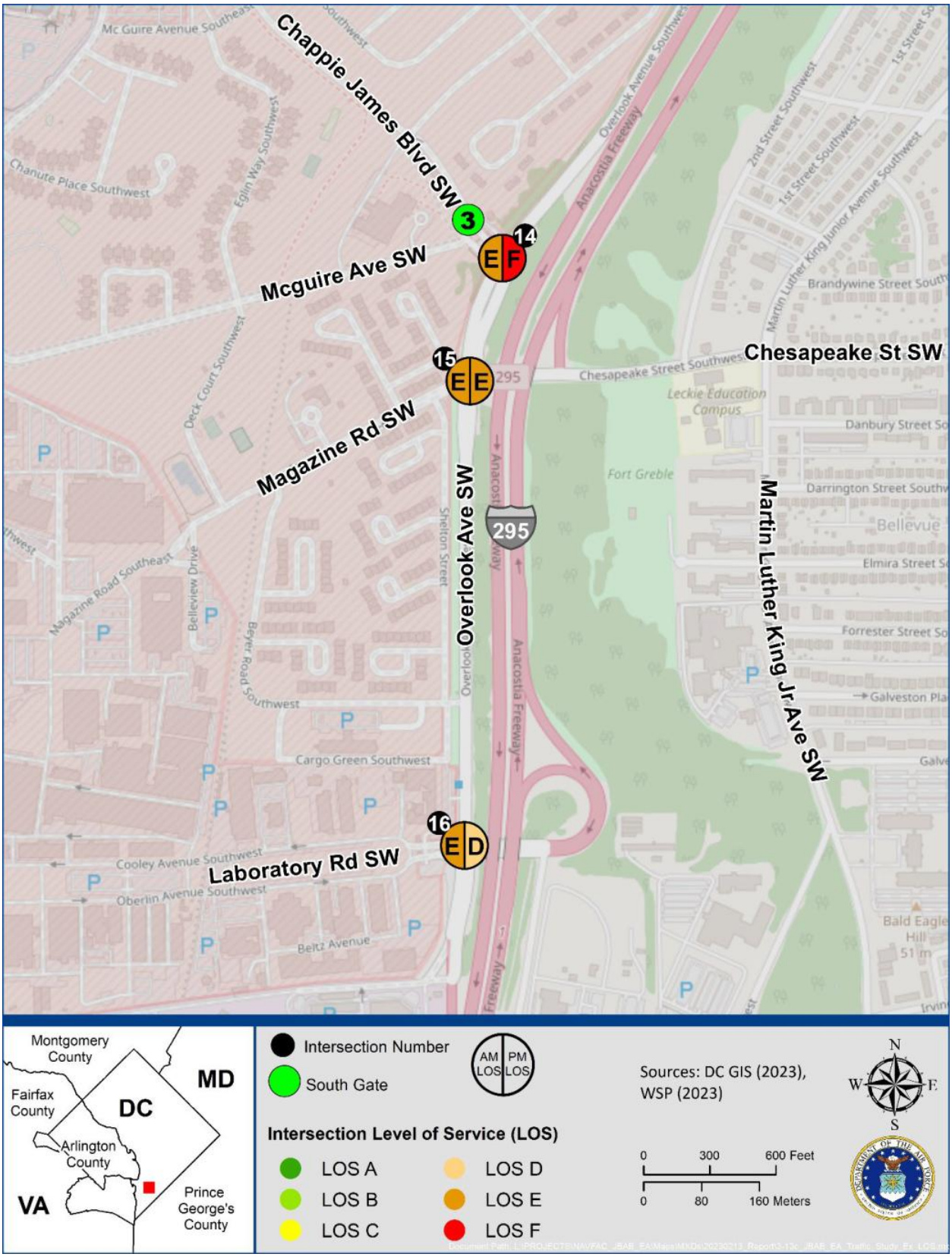


Figure 3-10B AM and PM Peak Hour Level of Service – Arnold Gate



1 **Figure 3-10C AM and PM Peak Hour Level of Service – South Gate**

Table 3-11 Synchro Existing Condition AM and PM Peak Hour Operations Analysis

Intersection	Approach	Movement	AM 2022 Existing							PM 2022 Existing						
			Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS	Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
1. Suitland Pkwy & I-295 SB Ramps	NB (Ramp)	Right	88.1	F	0.71	88.1	F	2.3	A	91.8	F	0.89	91.8	F	13.6	B
	SEB	Thru/Right	9.6	A	0.13	9.6	A			7.8	A	0.28	7.8	A		
	NWB	Left	58.7	E	0.44	1.2	A			47.9	D	0.11	1.2	A		
		Thru	0.0	A	0.33					0.1	A	0.14				
2. Suitland Pkwy & I-295 NB Off-Ramp/ I-295 NB On-Ramp	EB (Ramp)	Left	61.9	E	0.59	53.8	D	65.4	E	53.3	D	0.21	36.2	D	12.8	B
		Right	0.2	A	0.10					0.5	A	0.10				
	SEB	Left	80.7	F	0.23	15.6	B			82.0	F	0.25	15.6	B		
		Thru	12.0	B	0.31					12.8	B	0.42				
	NWB	Thru	120.3	F	1.23	85.2	F			9.1	A	0.63	6.5	A		
		Right	9.0	A	0.68					1.1	A	0.36				
3. Suitland Pkwy & Firth Sterling Ave SE	EB	Left	67.6	E	0.18	37.4	D	67.1	E	73.6	E	0.27	95.9	F	70.1	E
		Thru	41.7	D	0.68					101.1	F	1.10				
		Right	12.9	B	0.21					8.4	A	0.07				
	WB	Left	59.0	E	0.35	82.7	F			55.0	D	0.15	28.6	C		
		Thru/Right	84.1	F	0.98					27.1	C	0.47				
	NB	Left	67.5	E	0.59	60.5	E			93.9	F	0.84	88.9	F		
		Thru/Right	51.1	D	0.38					85.5	F	0.89				
	SB	Left	50.1	D	0.12	40.9	D			179.5	F	1.17	85.1	F		
		Thru	69.7	E	0.38					75.8	E	0.54				
		Right	29.1	C	0.65					11.5	B	0.47				

Table 3-11 Synchro Existing Condition AM and PM Peak Hour Operations Analysis (continued)

Intersection	Approach	Movement	AM 2022 Existing							PM 2022 Existing						
			Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS	Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
4. Firth Sterling Ave SE & Sumner Rd SE/ Barry Rd SE	EB	Thru	0.5	A	0.09	0.5	A	2.2	A	1.1	A	0.16	1.1	A	1.1	A
	WB	Thru	1.4	A	0.16	1.4	A			0.4	A	0.10	0.4	A		
	SEB	Left	59.9	E	0.14	49.3	D			39.4	D	0.03	26.3	C		
		Thru/Right	0.0	A	0.01					0.0	A	0.00				
5. Firth Sterling Ave SE & Eaton Rd SE	EB	Left/Thru/Right	0.7	A	0.10	0.7	A	2.0	A	1.7	A	0.21	1.7	A	1.9	A
	WB	Thru	1.4	A	0.18	1.4	A			0.4	A	0.13	0.4	A		
	NWB	Left/Thru/Right	36.8	D	0.13	36.8	D			25.8	C	0.12	70.7	E		
6. Firth Sterling Ave SE & St. Elizabeth Rd SE & Stevens Rd SE	EB	Thru /Right	16.2	B	0.16	16.2	B	14.1	B	1.0	A	0.16	1.0	A	11.6	B
	WB	Sharp Left	3.5	A	0.23	3.5	A			4.0	A	0.13	4.0	A		
		Left														
		Thru/Right														
	NB	Left	56.3	E	0.54	29.5	C			56.1	E	0.54	29.1	C		
		Right	4.0	A	0.30					13.4	B	0.44				
7. South Capitol St & Defense Blvd/Firth Sterling Ave SE	EB	Left	55.2	E	0.26	41.2	D	25.1	C	44.4	D	0.27	34.5	C	28.3	C
		Thru	52.0	D	0.16					48.6	D	0.46				
		Right	0.7	A	0.08					5.6	A	0.29				
	WB	Left	38.2	D	0.24	46.9	D			72.3	E	0.64	62.1	E		
		Thru/Right	49.2	D	0.74					51.6	D	0.53				
	NB	Left	18.8	B	0.06	22.7	C			0.0	A	0.0	15.3	B		
		Thru/Right	22.8	C	0.57					15.3	B	0.17				
	SB	Left	17.5	B	0.43	11.8	B			16.1	B	0.26	20.3	C		
		Thru/Right	9.9	A	0.18					20.9	C	0.58				

Table 3-11 Synchro Existing Condition AM and PM Peak Hour Operations Analysis (continued)

Intersection	Approach	Movement	AM 2022 Existing							PM 2022 Existing						
			Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS	Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
8. MacDill Blvd SW/ Malcolm X Ave SE & S Capitol St SB Ramps	EB	Thru	21.8	C	0.13	17.3	B	11.3	B	26.2	C	0.41	20.7	A	27.9	C
		Right	0.3	A	0.09					16.0	B	0.85				
	WB	Thru	5.0	A	0.46	5.0	A			4.5	A	0.18	4.5	A		
	SB	Left	29.1	C	0.45	13.9	B			48.3	D	0.57	45.5	D		
		Thru	9.1	A	0.49					62.5	E	0.60				
		Right	7.0	A	0.47					3.8	A	0.27				
9. Malcolm X Ave SE & S Capitol St NB Ramps	EB	Left	8.9	A	0.11	10.3	B	20.9	C	6.7	A	0.17	10.1	B	10.5	B
		Thru	10.5	B	0.23					10.5	B	0.52				
	WB	Thru/Right	28.3	C	0.64	28.3	C			13.0	B	0.24	13.0	B		
	NB	Left/Thru/Right	28.7	C	0.08	28.7	C			0.0	A	0.02	0.0	A		
11. Malcolm X Ave SE & I-295 NB On-Ramp & I-295 NB Ramp/Dorothea Dix Ave SE	EB	Left	4.3	A	0.13	3.4	A	30.3	C	2.1	A	0.02	2.5	A	8.0	A
		Thru	4.5	A	0.28					3.5	A	0.50				
		Right to Ramp	0.1	A	0.08					0.2	A	0.18				
	WB	Thru/Right	18.9	B	0.42	18.9	B			11.5	B	0.24	11.5	B		
	NB	Left	93.4	F	1.03	68.1	E			47.8	D	0.34	21.8	C		
		Thru/Right	7.8	A	0.38					14.5	B	0.59				
	SB	Left	44.0	D	0.03	6.9	A			44.9	D	0.07	9.4	A		
		Right	0.5	A	0.07					4.6	A	0.20				
12. I-295 SB Ramps & Crossover	WB	Left	19.7	B	0.12	19.7	B	7.0	A	20.2	C	0.53	20.2	C	15.3	B
	SB	Thru	2.7	A	0.06	2.7	A			5.9	A	0.13	5.9	A		
		Left														

Table 3-11 Synchro Existing Condition AM and PM Peak Hour Operations Analysis (continued)

Intersection	Approach	Movement	AM 2022 Existing							PM 2022 Existing						
			Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS	Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
13. I-295 NB Ramps/ Dorothea Dix Ave SE & Crossover	EB	Left	23.0	C	0.35	23.0	C	6.4	A	22.3	C	0.23	22.3	C	4.8	A
	NB	Left	7.6	A	0.44	4.9	A			7.6	A	0.48	4.8	A		
		Thru														
		Right	2.1	A	0.45					2.1	A	0.47				
	SB	Right	0.0	A	0.01	0.0	A			0.2	A	0.14	0.2	A		
14. Overlook Ave SW & Chappie James Blvd	SEB	Right	0.1	A	0.08	0.1	A	59.4	E	88.2	F	1.04	88.2	F	149.7	F
	NWB	Thru	82.8	F	1.14	82.8	F			22.1	C	0.17	22.1	C		
	SWB	Thru	17.4	B	0.19	33.8	C			188.5	F	1.35	183.6	F		
		Right	83.6	F	0.88					2.2	A	0.04				
15. Overlook Ave SW & Chesapeake St SW	WB	Left	25.3	C	0.73	25.3	C	43.4	D	18.5	B	0.57	18.5	B	61.3	E
		Right														
	NB	Thru	83.6	F	1.12	76.5	E			21.9	C	0.20	15.8	B		
		Right	0.0	B	0.08					6.4	A	0.15				
	SB	Left	4.1	A	0.20	3.5	A			4.2	A	0.24	73.9	E		
		Thru	3.2	A	0.24					86.4	F	1.15				
16. Overlook Ave SW & NRL Main Gate/ Laboratory Rd SW	EB	Left/Thru	29.3	C	0.03	16.6	B	51.5	D	30.7	C	0.18	53.8	D	38.9	D
		Right	0.5	A	0.05					63.7	E	1.00				
	WB	Left/Thru	12.5	B	0.31	60.0	E			45.3	D	0.55	23.9	C		
		Right	82.0	F	1.11					10.7	B	0.53				
	NB	Left/Thru/ Right	15.3	B	0.05	15.3	B			4.7	A	0.03	4.7	A		
	SB	Left/Thru/ Right	38.2	D	0.75	38.2	D			39.5	D	1.05	39.5	D		

Notes:

EB = Eastbound, WB = Westbound; NB = Northbound; SB = Southbound

LOS = Level of Service

V/C = Volume to Capacity ratio

Delay is measured in seconds per vehicle.

Red Cells denote intersections or approaches operating at unsatisfactory conditions.

* Highway Capacity Manual 2000 results

3.8.4 Intersection Queuing Analysis Method

In addition to analyzing the vehicle delay to determine LOS, vehicle queue lengths were calculated for each approach using Synchro. The 50th percentile queue length is the average queue length, calculated as the queue expected during 50 percent of the analysis period (which is typically one hour). The 95th percentile queue length represents the worst-case scenario, calculated as the queue length that has a 5 percent probability of being exceeded during the analysis period. A failing queue length is defined as a queue length that exceeds the intersection approach storage capacity, regardless of whether the entire queue can clear the intersection during a single cycle of the traffic signal. Because the available storage for each intersection approach depends on roadway/intersection geometry, these values reflect whether the available storage provides enough space for vehicles waiting to pass through the intersection without blocking another lane or an adjacent upstream intersection. Because failing queues might occur along the same approach as a failing LOS, these values are calculated independently and might result in one approach receiving a failing LOS grade, while another approach has a failing queue length. The study used Synchro to calculate both the 50th and 95th percentile queue lengths for the lane groups at each signalized intersection within the study area.

3.8.5 Existing Condition Intersection Queuing Analysis

Based on the Synchro signalized intersection analysis results, six signalized intersections experience 95th percentile queuing lengths that exceed the available storage capacity. The remaining signalized intersections in the traffic study area provide enough storage for the anticipated demand or the upstream traffic signals controlled the queue lengths. The lane group within the approach that is operating under unsatisfactory conditions is noted in parentheses.

- Suitland Parkway SE and I-295 SB Off-ramp (Intersection #1)
  - Off-ramp from southbound I-295 to southeast-bound Suitland Parkway SE during the AM and PM peak hour (shown as the NB approach in the summary tables)
- Suitland Parkway SE and I-295 NB Off-ramp/I-295 NB On-ramp (Intersection #2)
  - Northwest-bound Suitland Parkway SE (though movement) during the AM peak hour
- Suitland Parkway SE and Firth Sterling Avenue SE (Intersection #3)
  - Eastbound Suitland Parkway SE (through movement) during the AM and PM peak hour
  - Westbound Suitland Parkway SE (through movement) during the AM peak hour
- Malcolm X Avenue SE and S Capitol Street NB ramps (Intersection #9)
  - Eastbound Malcolm X Avenue SE (through movement) during the AM and PM peak hour
- Overlook Avenue SW and Chappie James Boulevard (Intersection #14)
  - Southeast-bound Chappie James Boulevard (right turn) during the PM peak hour
  - Northwest-bound Overlook Avenue SW (through movement) during the AM peak hour
  - Southwest-bound Overlook Avenue SW (through movement) during the PM peak hour
- Overlook Avenue SW and Chesapeake Street SW (Intersection #15)
  - Northbound Overlook Avenue SW (through movement) during the AM peak hour
  - Southbound Overlook Avenue SW (through movement) during the PM peak hour

- Overlook Avenue SW and NRL Main Gate/Laboratory Road SW (Intersection #16)
  - Eastbound Laboratory Road SW (right turn) during the PM peak hour
  - Westbound NRL Main Gate (right turn) during the AM peak hour
  - Southbound Overlook Avenue SW (through movement) during the AM peak hour

All queuing results are depicted in Table 3-12.

Similar to the delay and LOS assessment, queue lengths for two specific approaches should receive special notice:

- Off-ramp (loop) from southbound I-295 to southeast-bound Suitland Parkway SE
- Eastbound Suitland Parkway SE at Firth Sterling Avenue SE

Based on the locations of the DDOT-designated primary truck routes shown in Figures 3-9A, 3-9B, and 3-9C, these two approaches may experience an increase in truck traffic volumes in the future with the proposed LVIS at Firth Sterling Gate.

Table 3-12 Synchro Existing Condition AM Peak Hour Queue Analysis

Intersection	Approach	Movement	Turning Bay/Link Length (feet)	AM Peak 2022 Existing		PM Peak 2022 Existing	
				50th Percentile (feet)	95th Percentile (feet)	50th Percentile (feet)	95th Percentile (feet)
1. Suitland Pkwy & I-295 SB Ramps	NB (Ramp)	Right	249	400	466	288	345
	SEB	Thru	603	<25	34	95	141
	NWB	Left	701	43	48	<25	30
		Thru	701	0	0	0	0
2. Suitland Pkwy & I-295 NB Off-Ramp/ I-295 NB On-Ramp	EB (Ramp)	Left	315	257	312	84	115
		Right	315	0	0	0	<25
	SEB	Left	701	32	60	32	64
		Thru	701	182	218	217	329
	NWB	Thru	343	1,638	1,725	95	124
		Right	343	100	159	0	<25
3. Suitland Pkwy & Firth Sterling Ave SE	EB	Left	343	26	50	37	63
		Thru	343	444	523	960	1,132
		Right	343	85	149	<25	57
	WB	Left	797	163	246	67	121
		Thru	797	1,220	1,325	335	400
	NB	Left	479	135	202	192	275
		Thru	479	80	146	240	359
	SB	Left	555	30	61	158	300
		Thru	555	97	157	156	229
		Right	555	81	183	0	75
4. Firth Sterling Ave SE & Sumner Rd SE/ Barry Rd SE	EB	Thru	531	0	<25	<25	37
	WB	Thru	479	<25	43	<25	<25
	SEB	Left	345	<25	0	<25	<25
		Thru	1,504	0	0	0	0
5. Firth Sterling Ave SE & Eaton Rd SE	EB	Thru	396	0	<25	<25	46
	WB	Thru	531	<25	41	<25	<25
	NWB	Right	344	<25	30	<25	28
6. Firth Sterling Ave SE & St. Elizabeth Rd SE & Stevens Rd SE	EB	Thru	415	72	98	<25	<25
	WB	Sharp Left	396	40	30	<25	41
		Left					
		Thru					
	NB	Left	3,062	95	153	94	150
		Right	3,062	0	<25	<25	53

1

Table 3-12 Synchro Existing Condition AM Peak Hour Queue Analysis (continued)

Intersection	Approach	Movement	Turning Bay/Link Length (feet)	AM Peak 2022 Existing		PM Peak 2022 Existing	
				50th Percentile (feet)	95th Percentile (feet)	50th Percentile (feet)	95th Percentile (feet)
7. South Capitol St & Defense Blvd/Firth Sterling Ave SE	EB	Left	871	26	58	51	97
		Thru	871	19	47	102	167
		Right	871	0	0	0	28
	WB	Left	235	54	85	135	210
		Thru	235	195	220	89	164
	NB	Left	1,207	12	35	0	0
		Thru	1,207	264	399	42	78
	SB	Left	784	36	80	55	107
		Thru	784	49	91	282	405
8. MacDill Blvd SW/ Malcolm X Ave SE & S Capitol St SB Ramps	EB	Thru	800	34	52	123	159
		Right	800	0	0	79	382
	WB	Thru	102	27	33	<25	<25
	SB	Left	757	133	211	186	284
		Thru	757	29	107	197	306
		Right	757	27	98	0	37
9. Malcolm X Ave SE & S Capitol St NB Ramps	EB	Left	102	<25	40	33	50
		Thru	102	83	113	171	206
	WB	Thru	322	215	200	51	<25
	NB	Thru	693	<25	33	0	0
11. Malcolm X Ave SE & I-295 NB On-Ramp & I-295 NB Ramp/Dorothea Dix Ave SE	EB	Left	256	<25	<25	<25	<25
		Thru	256	28	40	42	63
		Right to Ramp	256	0	0	0	0
	WB	Thru	1,405	176	236	82	126
	NB	Left	543	272	457	31	0
		Thru	543	<25	45	0	64
	SB	Left	473	<25	<25	<25	<25
		Right	473	0	0	0	<25
12. I-295 SB Ramps & Crossover	WB	Left	292	<25	27	62	103
	SB	Thru	365	0	<25	<25	42
		Left	365				

2

Table 3-12 Synchro Existing Condition AM Peak Hour Queue Analysis (continued)

Intersection	Approach	Movement	Turning Bay/Link Length (feet)	AM Peak 2022 Existing		PM Peak 2022 Existing	
				50th Percentile (feet)	95th Percentile (feet)	50th Percentile (feet)	95th Percentile (feet)
13. I-295 NB Ramps/Dorothea Dix Ave SE & Crossover	EB	Left	292	28	72	<25	41
	NB	Left	408	74	159	66	139
		Thru	408				
		Right	408	0	34	0	30
	SB	Right	1,142	0	0	0	0
14. Overlook Ave SW & Chappie James Blvd	SEB	Right	233	0	0	59	110
	NWB	Thru	605	215	209	39	59
	SWB	Thru	648	40	64	437	455
		Right	648	0	74	0	<25
15. Overlook Ave SW & Chesapeake St SW	WB	Left	438	76	145	<25	50
		Right	438	76	145	<25	50
	NB	Thru	2,147	339	286	53	100
		Right	2,147	0	0	0	26
	SB	Left	577	<25	<25	26	35
		Thru	577	<25	35	766	679
16. Overlook Ave SW & NRL Main Gate/Laboratory Rd SW	EB	Thru	229	<25	<25	28	46
		Right	229	0	0	0	109
	WB	Thru	350	75	124	67	112
		Right	350	63	257	0	44
	NB	Thru	389	<25	<25	<25	<25
	SB	Thru	2,147	97	157	524	266

Notes
~ 50th percentile volume exceeds capacity; queue may be longer (denoted in purple cells).
# 95th percentile volume exceeds capacity; queue may be longer (denoted in red cells).
EB = Eastbound, WB = Westbound, NB= Northbound, SB = Southbound

3.8.6 Existing Condition Firth Sterling Gate Operations and Queuing Analysis Method

Vissim microsimulation software was used to model and analyze the existing traffic operations at Firth Sterling Gate. The analysis periods represent a typical weekday AM and PM peak hour for traffic volumes. Vissim was selected as the tool for the gate analysis because it can simulate customized, non-traditional types of traffic control such as using security personnel to screen vehicles and verify the identification of vehicle occupants prior to granting them access to the installation. Using Vissim for this study allows the transportation team to determine how the existing and proposed gate lane configurations and vehicle screening processes by security personnel might affect queue lengths entering the installation. The goal is to recommend a gate lane configuration that prevents queues from extending back into the adjacent upstream signalized intersections along Firth Sterling Avenue SE at South Capitol Street and at St. Elizabeths Road SE.

As a microsimulation tool, Vissim models individual vehicle movements in increments of one second or less for a predefined analysis period. Models of existing conditions require extensive calibration using observed field data such as traffic volumes, queue lengths, and travel times to ensure that the simulated behavior of motorists and their vehicles is a reasonably accurate representation of real-world conditions. Inputs for the microsimulation model are the same as those used for the Synchro intersection operations and queuing analyses described in Section 3.8.2 of this report. Traffic control data describing the typical vehicle screening process at Firth Sterling Gate, such as the average time each vehicle entering the installation is stopped for inspection and/or identification check, was obtained from the Air Force. These data were entered into the model by approximating stop signs controlling each screening lane at the gate with custom stop durations for each vehicle based on the Air Force data instead of the typical stop HCM-based stop duration assumptions.

The traffic engineer places virtual detectors in the model to measure effects such as delay (seconds per vehicle), volume throughput (i.e., the actual number of vehicles observed passing a certain point during the analysis period, as opposed to the volume demand, which is the number vehicles that need to pass that point during the analysis period), and travel speed and time between two points. Since Vissim does not directly output results in terms of LOS, the practitioner must post-process the Vissim-reported delays to determine the corresponding LOS based on the HCM criteria.

3.8.7 Existing Condition Firth Sterling Gate Operations and Queuing Analysis Results

Based on the Vissim microsimulation results, only one approach of the two signalized intersections modeled along Firth Sterling Avenue SE—South Capitol Street at Firth Sterling Ave SE/Defense Boulevard—has a queue length that could be considered borderline unsatisfactory, because the queue length appears to equal but not exceed the available storage capacity during the AM peak hour. The remaining approaches at this intersection provide enough storage for the traffic demand, or the upstream traffic signals meter the flow of traffic arriving at the intersection, which limits the queue lengths. At this intersection, the westbound shared through/right-turn movement experiences this longer, borderline unsatisfactory queue length. This result differs slightly from the Synchro analysis results discussed in a previous section of the report because Synchro is a deterministic model, while Vissim is a stochastic model; however, the magnitude of the difference in results is negligible. This is noteworthy because the westbound through movement may experience increased truck traffic volume in the future if the proposed LVIS is constructed at Firth Sterling Gate.

Firth Sterling Gate was modeled as a stop-controlled approach with custom stop durations based on average screening time data provided by the Air Force. Vissim was used to calculate the vehicle delay for the gate. Firth Sterling Gate experiences an average delay of 36.3 seconds per vehicle during the AM peak hour and an average delay of 13.3 seconds per vehicle during the PM peak hour, which is attributed to the time required to process vehicles being screened prior to entering the installation.

The Vissim LOS and queuing results for the AM peak hour and PM peak hour are depicted in Tables 3-13 and 3-14, respectively.

1 **Table 3-13 Vissim Existing Conditions AM Peak Hour Operations and Queue Analysis**

Intersection	Approach	Movement	AM 2022 Existing								
			Delay (s/veh)	LOS	Q Length Avg (ft)	Q Length Max (ft)	Turning Bay/Link Length (feet)	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
6. St Elizabeth Rd SE & Stevens Rd SE & Firth Sterling Ave SE	EB	Thru	24.1	C	29	213	415	25.9	C	32.0	C
		Right	27.1	C	29	213	415				
		Sharp right	45.0	D	29	213	415				
	WB	Sharp Left	17.8	B	22	194	396	26.0	C		
		Left	18.6	B	24	195	396				
		Thru	31.0	C	23	193	396				
	NB	Left	41.0	D	24	191	3,062	47.5	D		
		Right	57.0	E	33	196	3,062				
		Sharp Right	20.7	C	49	220	3,062				
7. South Capitol St & Defense Blvd/Firth Sterling Ave SE	EB	Left	46.1	D	13	93	871	40.4	D	32.9	C
		Thru	44.0	D	13	93	871				
		Right	5.1	A	17	124	871				
	WB	Left	54.0	D	138	412	235	64.0	E		
		Thru	72.1	E	138	412	235				
		Right	55.3	E	138	412	235				
	NB	Left	27.3	C	105	506	1,207	29.6	C		
		Thru	30.0	C	105	506	1,207				
		Right	27.3	C	105	506	150				
	SB	Left	27.8	C	26	167	784	17.2	B		
		Thru	15.6	B	26	167	784				
		Right	12.9	B	26	167	220				
Firth Sterling Gate	WB	Thru Gate Lane 1	36.4	n/a	58	242	250	36.4	n/a	n/a	n/a

Table 3-14 Vissim Existing Conditions PM Peak Hour Operations and Queue Analysis

Intersection	Approach	Movement	PM 2022 Existing								
			Delay (s/veh)	LOS	Queue Length Avg (ft)	Queue Length Max (ft)	Turning Bay/Link Length (feet)	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
6. St. Elizabeth Rd SE & Stevens Rd SE & Firth Sterling Ave SE	EB	Thru	7.5	A	11	140	415	7.6	A	16.7	B
		Right	8.4	A	11	140	415				
		Sharp right	7.8	A	11	140	415				
	WB	Sharp Left	6.8	A	4	98	396	6.2	A		
		Left	8.3	A	4	98	396				
		Thru	5.8	A	4	98	396				
	NB	Left	36.4	D	26	207	3,062	35.0	C		
		Right	34.7	C	31	203	3,062				
		Sharp Right	19.2	B	40	219	3,062				
7. South Capitol St & Defense Blvd/Firth Sterling Ave SE	EB	Left	49.2	D	57	252	871	37.0	D	26.0	C
		Thru	48.7	D	57	252	871				
		Right	10.0	A	59	257	871				
	WB	Left	48.4	D	59	246	415	43.6	D		
		Thru	48.4	D	59	246	415				
		Right	31.0	C	59	253	415				
	NB	Left	0.0	A	27	179	1,207	26.0	C		
		Thru	29.9	C	27	179	1,207				
		Right	17.7	B	27	186	150				
	SB	Left	17.3	B	72	497	784	18.1	B		
		Thru	18.2	B	72	497	784				
		Right	18.2	B	72	547	220				
Firth Sterling Gate	WB	Thru Gate Lane 1	13.1	n/a	<25	68	250	13.1	n/a	n/a	n/a

3.8.8 Traffic Patterns Along South Capitol Street, Firth Sterling Avenue SE, and Overlook Avenue SW

ATRs were placed along South Capitol Street, Firth Sterling Avenue SE, and Overlook Avenue SW to gather existing traffic flows circulating from the Fredrick Douglass Memorial Bridge north of Firth Sterling Gate and Overlook Avenue SW to capture traffic flow adjacent to South Gate (Figures 3-11A through 3-11C). The ATRs captured an hourly record of vehicles on these three key study area roadways.

The transportation team collected ATR data at seven locations for two consecutive days (November 16 and November 17) to reflect typical work week traffic. Vehicle counts were made by direction, allowing each direction of traffic to be analyzed separately. All three locations showed higher volumes during the AM and PM peak periods with lower volumes during the mid-day and evening periods.

Figures 3-12 through 3-16 show the weekday ATR summary.

Analysis of the ATR data for the average day revealed several trends for the five locations. Although Figures 3-15 and 3-16 depict accurate volume trends (i.e., peaks and troughs), the specific hourly volumes show some inconsistencies when compared to turning movement counts performed nearby on the same date. This is often due to vehicles being queued atop the ATR, which depends on the motion of vehicles to accurately count them. The operational analyses (i.e., delay, LOS, and queue length results) summarized previously in this report are based on the turning movement count data collected using accurate video cameras, not the ATR volume counts.

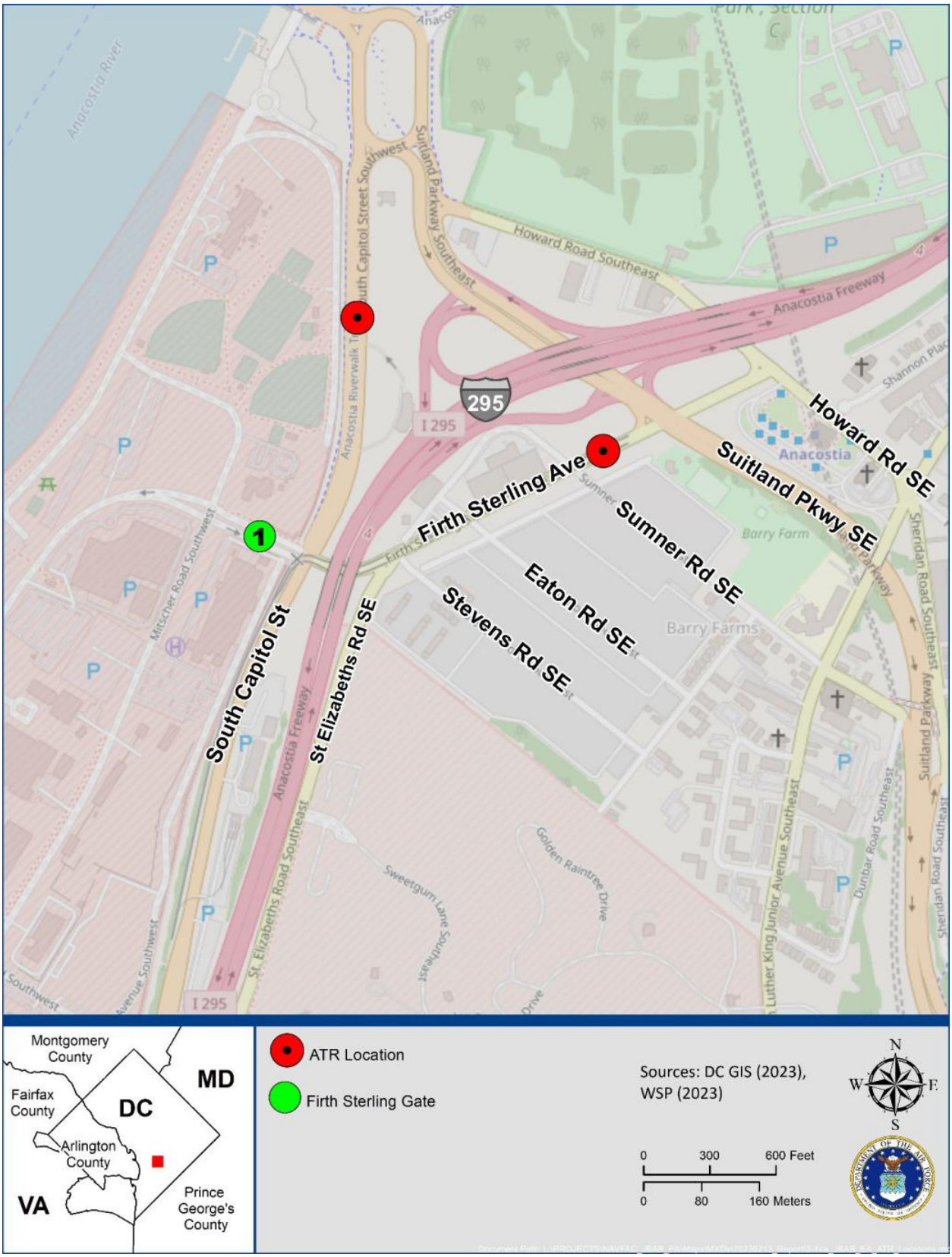
- The dominant flow of traffic along Firth Sterling Avenue SE during the AM peak period is west, toward South Capitol Street and Firth Sterling Gate, away from Suitland Parkway SE (which provides access to and from I-295). The dominant PM traffic flow is east, away from South Capitol Street and JBAB, and toward Suitland Parkway SE.

- The dominant flow of traffic along South Capitol Street during the AM peak period is north toward the Frederick Douglass Memorial Bridge (i.e., Capitol Riverfront, Capitol Hill, and Downtown), while the dominant PM traffic flow is south away from the bridge.

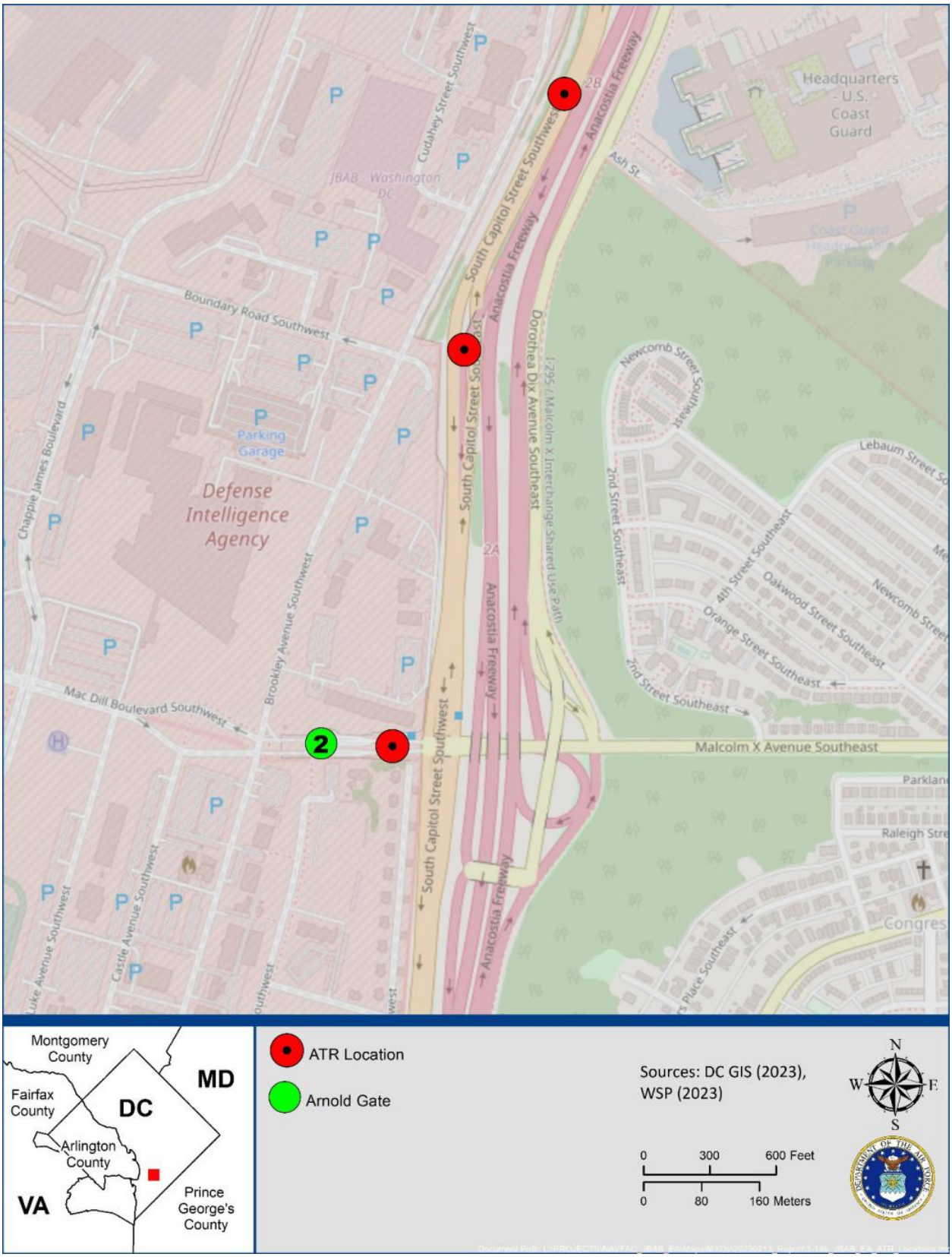
- During the morning, Overlook Avenue SW has a northbound peak for traffic traveling toward South Gate.

- During the evening, South Capitol Street and Overlook Avenue SW had a similar 3-hour peak between 3:00 p.m. and 6:00 p.m. consisting primarily of southbound traffic.

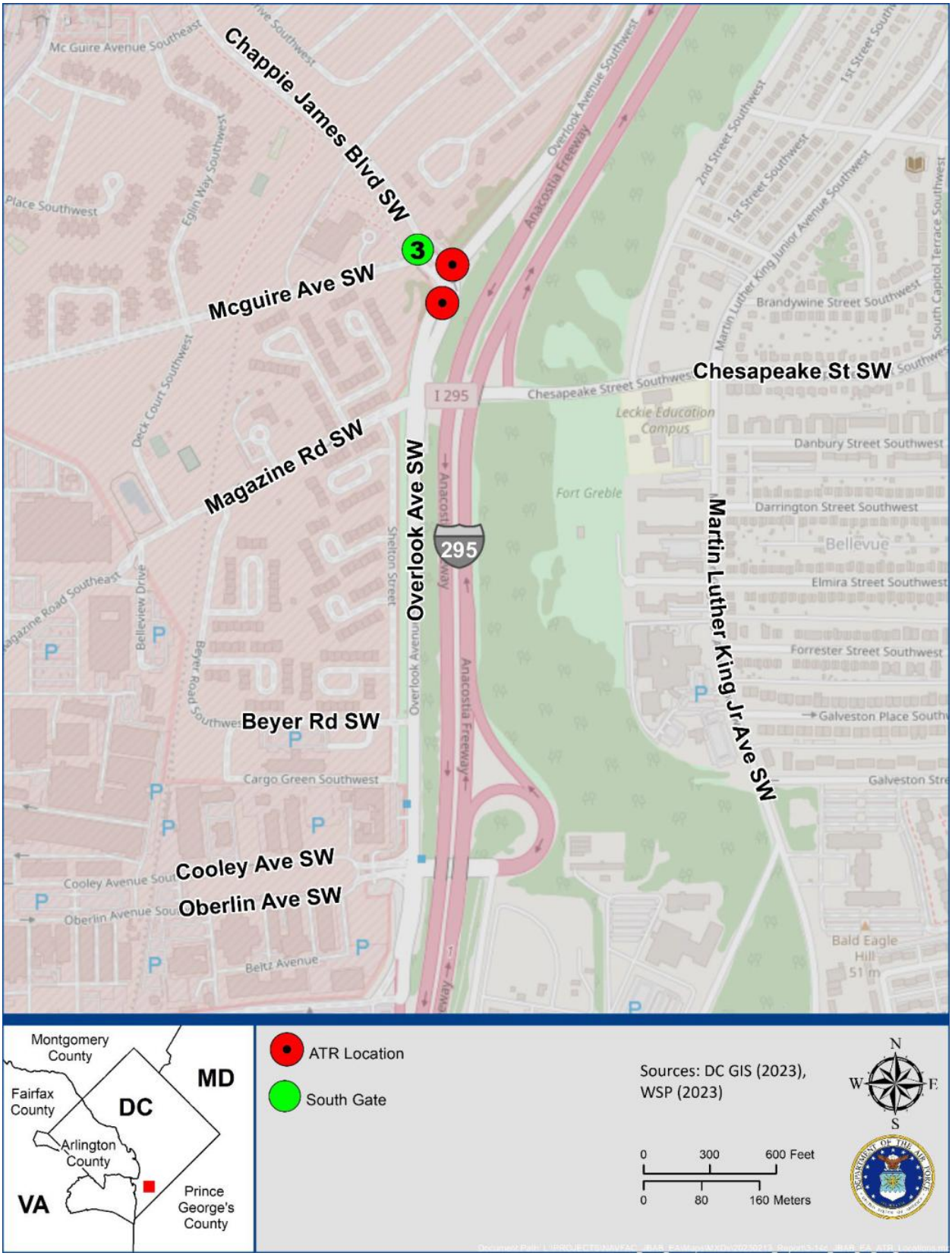
- All three corridors had more vehicles heading in the outbound direction away from Washington, D.C., from 11:00 a.m. through the remainder of the day.



1 **Figure 3-11A Automatic Traffic Recorder Location – Firth Sterling Gate**



1 **Figure 3-11B Automatic Traffic Recorder Location – Arnold Gate**



1 **Figure 3-11C Automatic Traffic Recorder Location – South Gate**

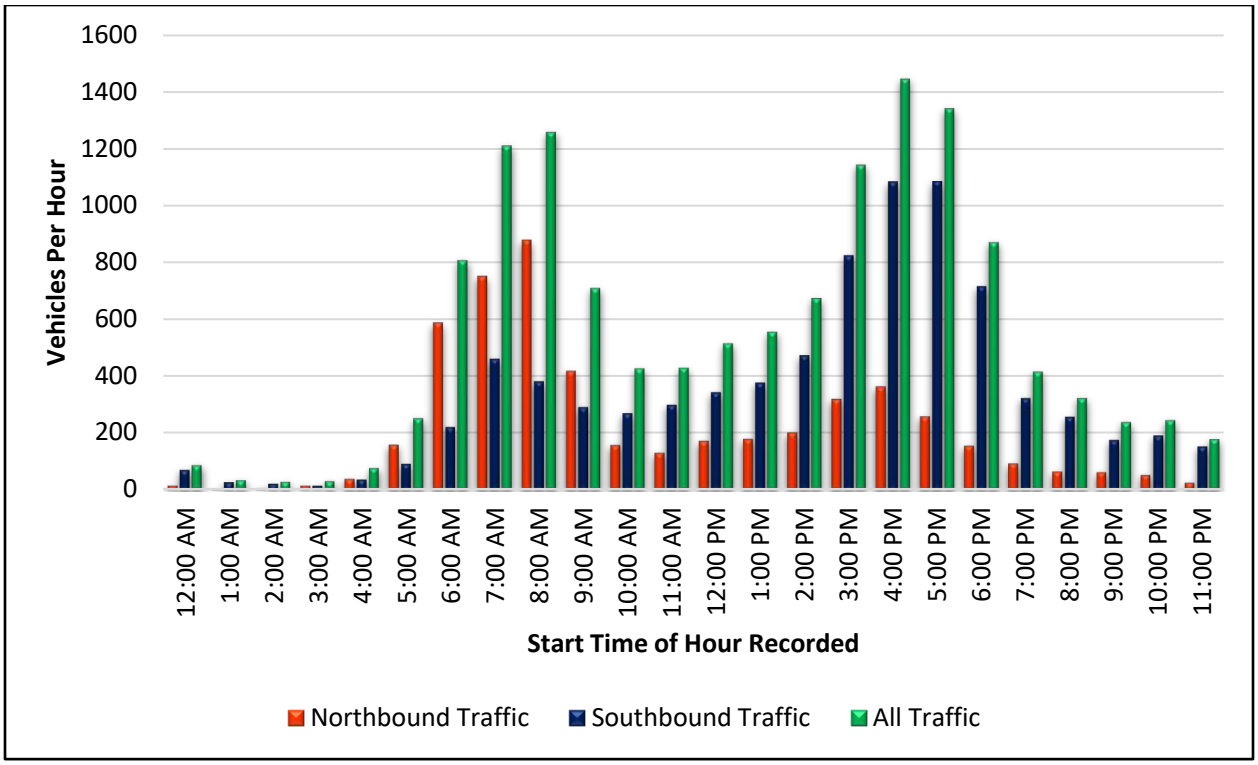


Figure 3-12 South Capitol Street North of Firth Sterling Avenue Typical Weekday ATR Volumes

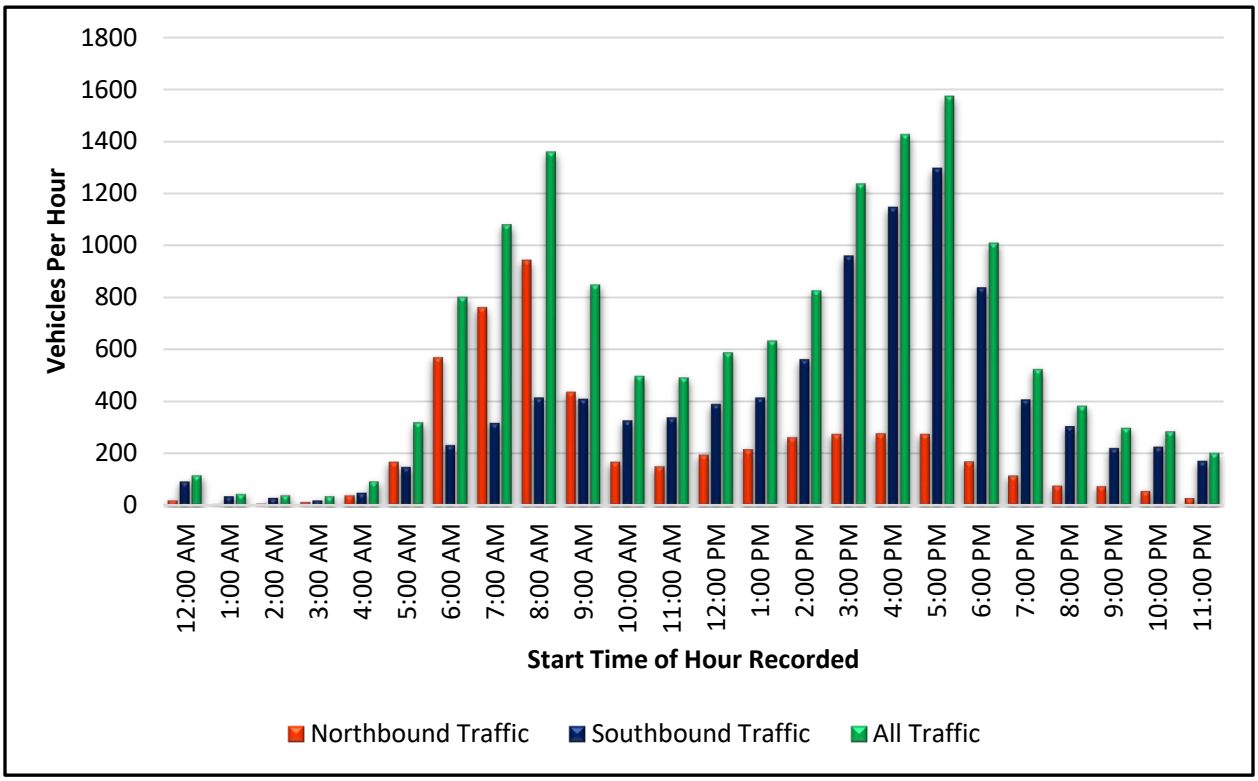


Figure 3-13 South Capitol Street south of Firth Sterling Avenue Typical Weekday ATR Volumes

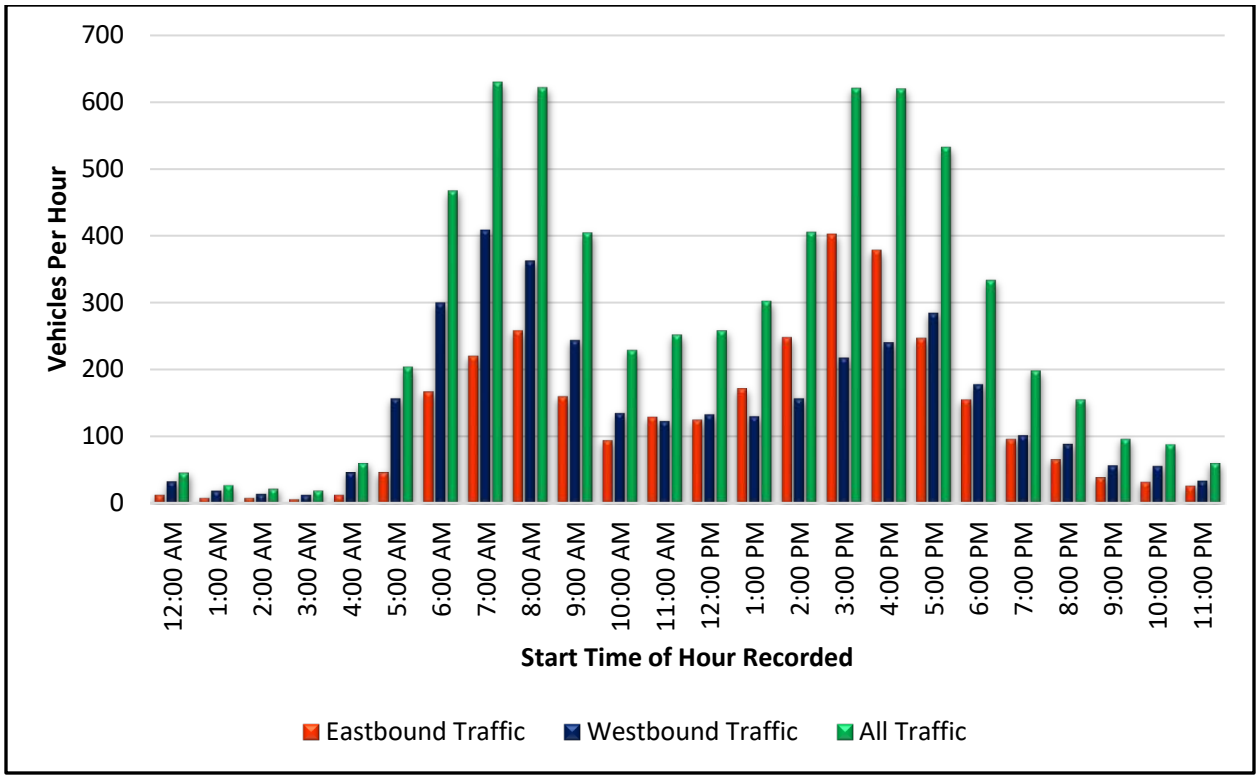


Figure 3-14 Firth Sterling Avenue SE Weekday Vehicle per Hour

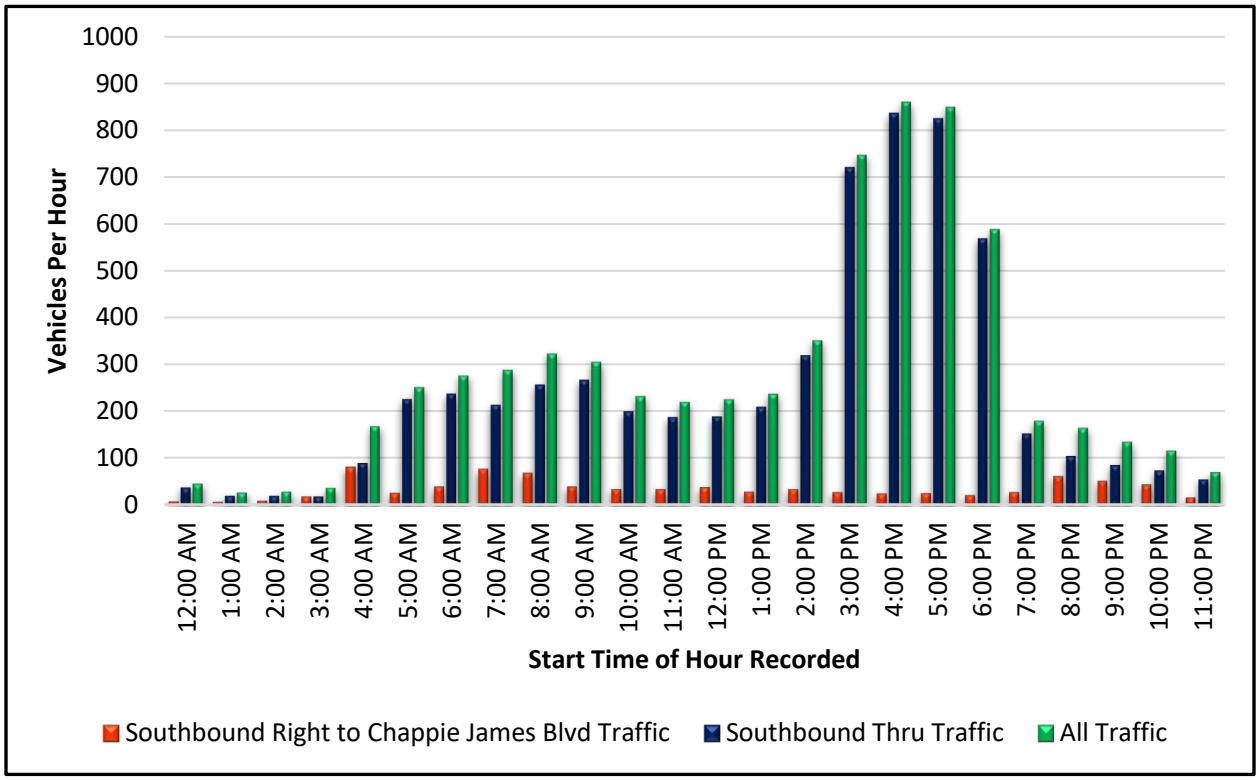


Figure 3-15 Overlook Avenue SW at Chappie James Blvd Typical Weekday ATR Volumes

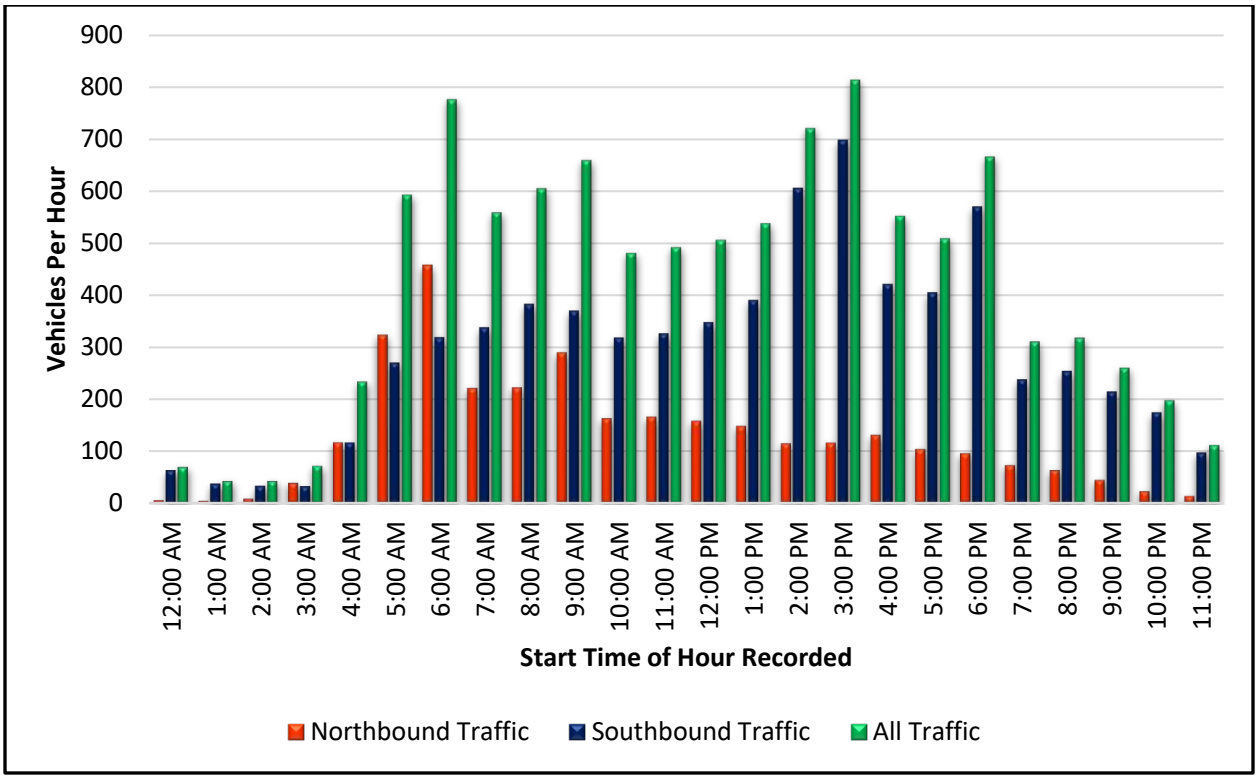


Figure 3-16 Overlook Avenue SW south of Chappie James Blvd Typical Weekday ATR Volumes

3.9 Existing JBAB Transportation Management Program

The JBAB Master Plan contains a TMP that includes recommended goals for promoting more efficient employee commuting patterns. These goals include enhancing mobility and transportation options, mitigating future traffic impacts related to JBAB's growth and developments, and improving air quality by minimizing the impact of SOVs (Air Force, 2022).

An effective TMP requires continual monitoring and evaluation to ensure that the strategies that JBAB implements reduce SOV use and reduce the number of vehicles traveling through the JBAB area and along internal JBAB roadways. According to the TMP, the installation will strive to improve the existing transit and biking infrastructure along with the communication of transportation options and benefits while pursuing new, alternative modes of transportation. It will work toward reducing employee parking supply to achieve compliance with NCPC parking ratios and coordinate with regional agencies, organizations, and DHS to improve transportation infrastructure in the area especially within the corridors that serve both JBAB and DHS. Finally, the installation will monitor progress toward targeted mode split metrics, support and incentivize sustainable transportation options, and improve transportation options to shorten commute times (Air Force, 2022).

3.10 Safety Analysis

The safety analysis examines where additional attention or examination of safety should be undertaken. In 2015, DDOT published a Vision Zero Action Plan with a primary goal to reduce fatalities to zero by 2024. The plan focuses on four pillars to accomplish the goal: (1) data collection to better understand the existing situation; (2) enforcement to develop effective ways to improve enforcement of traffic laws;

(3) education to teach District residents about the traffic laws and safe behavior; and (4) engineering to develop road designs to address safety for all users (DDOT, 2015a). The Vision Zero Action Plan contains maps highlighting areas of safety concern for pedestrians, bicycling, and driving. The area around Firth Sterling Avenue SE and Suitland Parkway SE and the Anacostia Metro Station was identified as a safety concern.

DDOT developed an action plan (DDOT, 2017) to address safety issues at high crash intersections. The following measures are included in the plan:

- Refurbish roadway and crosswalk pavement markings to clearly denote crosswalks and lane geometry.
- Evaluate lighting levels to improve sight distance.
- Install signs to warn drivers of pedestrians in slip ramps.
- Evaluate the potential to remove slip ramps or reduce the radius, thus giving pedestrians safer passage to cross the intersection.
- Upgrade the pedestrian ramps to comply with the ADA.
- Review traffic signal timing to reduce traffic queueing.

4 Future Conditions

4.1 No Action Alternative

This section describes the No Action Alternative or the baseline condition if an LVIS is not built and gate operations do not change. This condition is the basis for examining impacts on the transportation network for the three Action Alternatives. Analysis of the No Action Alternative assumes background development and growth through 2028, which is the full implementation year of the associated Action Alternative.

Under the No Action Alternative, no changes are proposed in the project area. Therefore, this section only describes changes that are planned or reasonably foreseeable outside the project area but within the various modal study areas covered in the existing conditions discussed in Section 3.

4.1.1 No Action Improvements

The following sections describe the No Action Alternative improvements in the traffic study area that include reasonably foreseeable planned developments estimated to be completed by 2028, other planned developments where a construction timeline has not been publicly established, and planned roadway improvements to be completed by 2028.

4.1.1.1 Planned Developments

Based on the DDOT transportation scoping form (Attachment 1), the No Action Alternative includes five planned developments external to the JBAB installation and one internal development that are reasonably foreseeable to be completed by 2028. The JBAB Installation Development Plan notes that the Navy-owned land on the northern tip of JBAB may be used by the Navy for a future land exchange that could involve some level of private development. This potential development is too speculative and too far in the future to analyze the impacts. The Navy would complete appropriate NEPA analyses if the action were to move forward (Air Force, 2021a). The five external planned developments that were ultimately included are all multiple-phased mixed-use projects, located east of Firth Sterling Gate, south of the Anacostia River, and east of South Capitol Street. The Douglass and the Frederick are located north of I-295, whereas Howard Road, Barry Farm, and Reunion Square are all south of I-295. The numbers beside each project description correspond to the general location of the project shown on Figure 4-1.

1. **Howard Road** (formerly part of Columbian Quarter/Poplar Point) is a residential project, which will contain 28,704 square feet of residential space. The approved development is scheduled to be completed by 2025 and will be accessible from Howard Road SE (DMPED, 2023a).
2. **The Asberry at Barry Farm** is a mixed-use development and is one of the New Communities Initiative projects in the District. The project is primarily residential and will include 108 mixed-income residential units of affordable rental senior (55+) housing and approximately 5,000 square feet of retail space. The Asberry will be accessible from Firth Sterling Avenue SE to the north and Sumner Road SE to the south via an internal grid of public streets to be developed. The approved development is scheduled to be completed by 2028 (DMPED, 2022).
3. **The Douglass** (formerly part of Columbian Quarter/Poplar Point) will comprise 757 residential units and 40,000 square feet of retail space. The approved development is scheduled to be completed by 2025 and will be accessible from Howard Road SE (DMPED, 2023b).

4. **The Frederick** (formerly part of Columbian Quarter/Poplar Point) will include 825 residential units, 24,407 square feet of retail space, and an additional, 98,904 square feet for hotel/lodging. The approved development is scheduled to be completed by 2027 and will be accessible from Howard Road SE (DMPED, 2023b).
5. **Reunion Square** will include the eight remaining buildings of the development. These eight buildings of the project will include 638,500 square feet of office space, 130,000 square feet of retail space, a 120-room hotel, and 480 residential units. The buildings will be integrated within a grid of streets by way of Railroad Avenue, Shannon Place, Martin Luther King Jr. Avenue, V Street, and W Street SE. The approved development is scheduled to be completed by 2028 (DMPED, 2023b).
6. **JBAB Internal Installation Development** involves a planned building upgrade that is estimated to add 250 new personnel to the installation. This increase in personnel is not necessarily a permanent change because the upgrade reflects stationing decisions that can change frequently.

Traffic growth was applied to the roadway network to account for new vehicle trips originating outside the traffic study area (i.e., background traffic growth) that would travel through the study area. Because the study area for this transportation study includes the same streets as the study area for the *Final Transportation Study For Real Estate Outgrant for a Charter School at Joint Base Anacostia-Bolling, Washington, D.C.,* DDOT approved the use of the same background traffic growth rates from that study in this study for Firth Sterling Gate improvements. The annual exponential growth rates from the previous study are: (1) no growth for Suitland Parkway; (2) 0.2 percent growth for South Capitol Street; and (3) 0.3 percent growth for all other streets.

Trips expected to be generated by the nearby planned developments and internal installation development described above were then added to the background traffic volumes to estimate the total future traffic volumes in the study area. Although the names of several of the developments have changed for this study, the trip generation, transit-oriented development vehicle trip reduction factors, and trip distribution assumptions for these developments are the same as those for the aforementioned 2020 charter school transportation study. Those trip generation assumptions are summarized in Table 4-1. For details about the trip distribution used in this study, please refer to Appendix 3 of this report.

Table 4-1 No-Action Alternative Planned Development Trip Generation Summary

Project and Land Use	AM Peak Hour Trips In	AM Peak Hour Trips Out	AM Peak Hour Trips Total	PM Peak Hour Trips In	PM Peak Hour Trips Out	PM Peak Hour Trips Total
1. The Howard, 3. The Douglass, and 4. The Frederick (formerly Columbian Quarter[a])						
Residential (ITE – 220)	70	282	352	265	143	408
55% Auto Reduction	-39	-155	-194	-146	-79	-225
Retail (ITE – 820)	63	39	102	181	195	376
30% Auto Reduction	-19	-12	-31	-54	-59	-113
Office (ITE – 710)	1,609	219	1,828	333	1,627	1,960
30% Auto Reduction	-483	-66	-549	-100	-488	-588
Total Columbian Quarter Vehicle Trips	**1,201**	**307**	**1,508**	**479**	**1,339**	**1,818**
2. The Asberry at Barry Farm (formerly Barry Farm[a])						
Residential (ITE – 220)	279	641	920	566	460	1,026
Retail (ITE – 820)	36	23	59	70	89	159
45% Auto Reduction for AM inbound and PM outbound; 40% Auto Reduction for AM outbound and PM inbound[b]	-221	-393	-614	-365	-380	-745
Total Barry Farm Vehicle Trips	**94**	**271**	**365**	**271**	**169**	**440**
5. Reunion Square[a]						
Total Reunion Square Vehicle Trips	**182**	**56**	**238**	**78**	**194**	**272**
6. Internal JBAB Development						
Existing Building Upgrade	**63**	**13**	**76**	**16**	**69**	**85**
Total Vehicle Trips (All Developments)	**1,540**	**647**	**2,187**	**844**	**1,771**	**2,615**

Notes:

[a] Source: (Gorove Slade, 2018)

[b] The percentages shown are as they are depicted verbatim in the Barry Farm analysis.

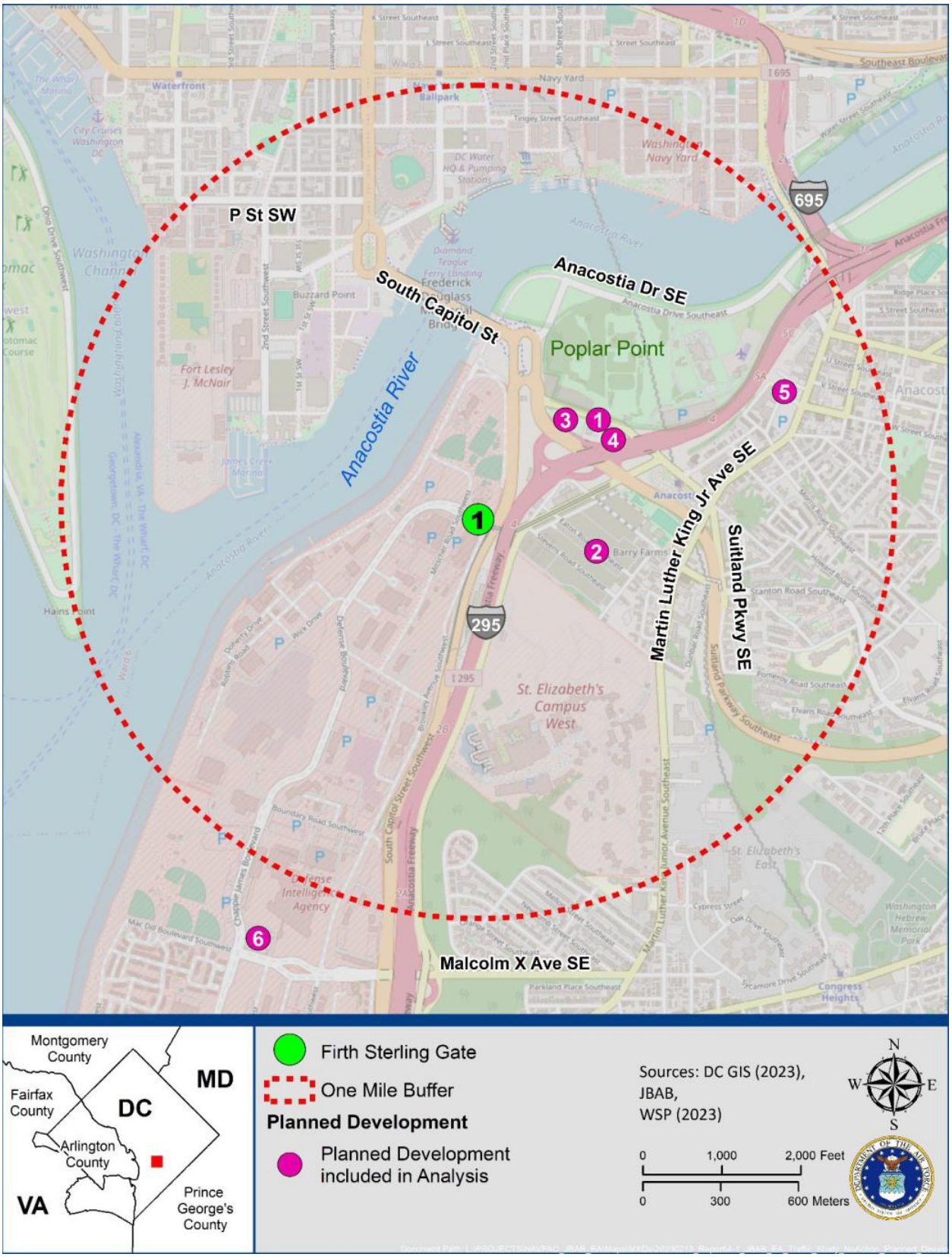
4.1.1.2 Planned Roadway Improvements

Under the No Action Alternative, no planned roadway improvements were identified that would be constructed by 2028 (the project completion year). However, several recently completed roadway improvements are described. Most of these improvements were part of the AWI and the new Frederick Douglass Memorial Bridge project. Figures 4-2A, 4-2B, and 4-2C show the No Action Alternative lane geometry.

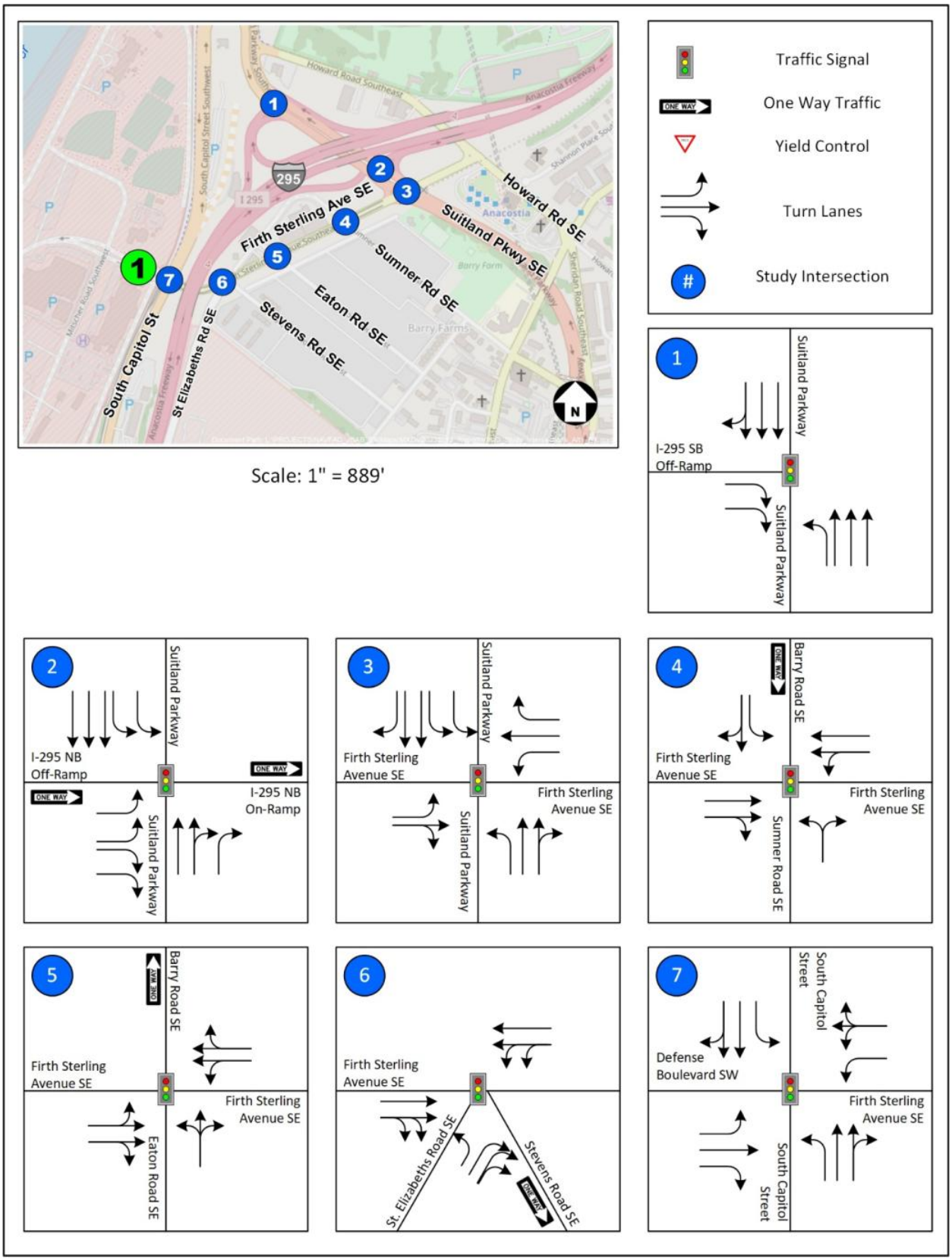
The AWI is a multi-agency effort to revitalize the areas around the waterfront of the Anacostia River. The South Capitol Street Corridor, including the Frederick Douglass Memorial Bridge, is one of the most important corridors in the project area and one of the most widely used bridges in the District. The new bridge replaced the former Frederick Douglass Memorial Bridge on a new alignment to the south. In addition to the bridge, the project included two new traffic ovals or ellipses at the western and eastern approaches. The eastern ellipse connects Suitland Parkway SE, Howard Road SE, and South Capitol Street. This project segment also included an upgraded and reconstructed section of South Capitol Street between Firth Sterling Avenue SE and the ellipse. The former Frederick Douglass Memorial Bridge and approaches were demolished and removed after the completion of the new bridge and roadway improvements (CH2MHill, 2013).

The recently completed improvements at the Suitland Parkway/I-295 interchange removed the former cloverleaf ramps at the interchange and replaced them with diamond interchange ramps. The diamond interchange includes two at-grade signalized intersections, one each at the I-295 northbound and southbound ramps. With the removal of the partial interchange at I-295/Howard Road SE, traffic exits at Suitland Parkway, which eliminates the use of local roads, including Howard Road SE and First Sterling Avenue SE, as I-295 ramps (CH2MHill, 2013).

The DHS relocation to the St. Elizabeths' campus required substantial improvements to the I-295/Malcolm X interchange and widening of Martin Luther King, Jr. Avenue to accommodate the expected increase in traffic. The I-295 Malcolm X Interchange project was a multi-phase project to improve I-295 between Firth Sterling Avenue SE and Martin Luther King Jr. Avenue SE. In addition to reconstructing this interchange, improvements included bridges, a shared use path, updated storm drainage and lighting, and various landscaping features. Construction began in late 2018 and was completed in spring 2022.



1 **Figure 4-1 Planned Development Locations**



1 **Figure 4-2A No Action Alternative Lane Geometry – Firth Sterling Gate**

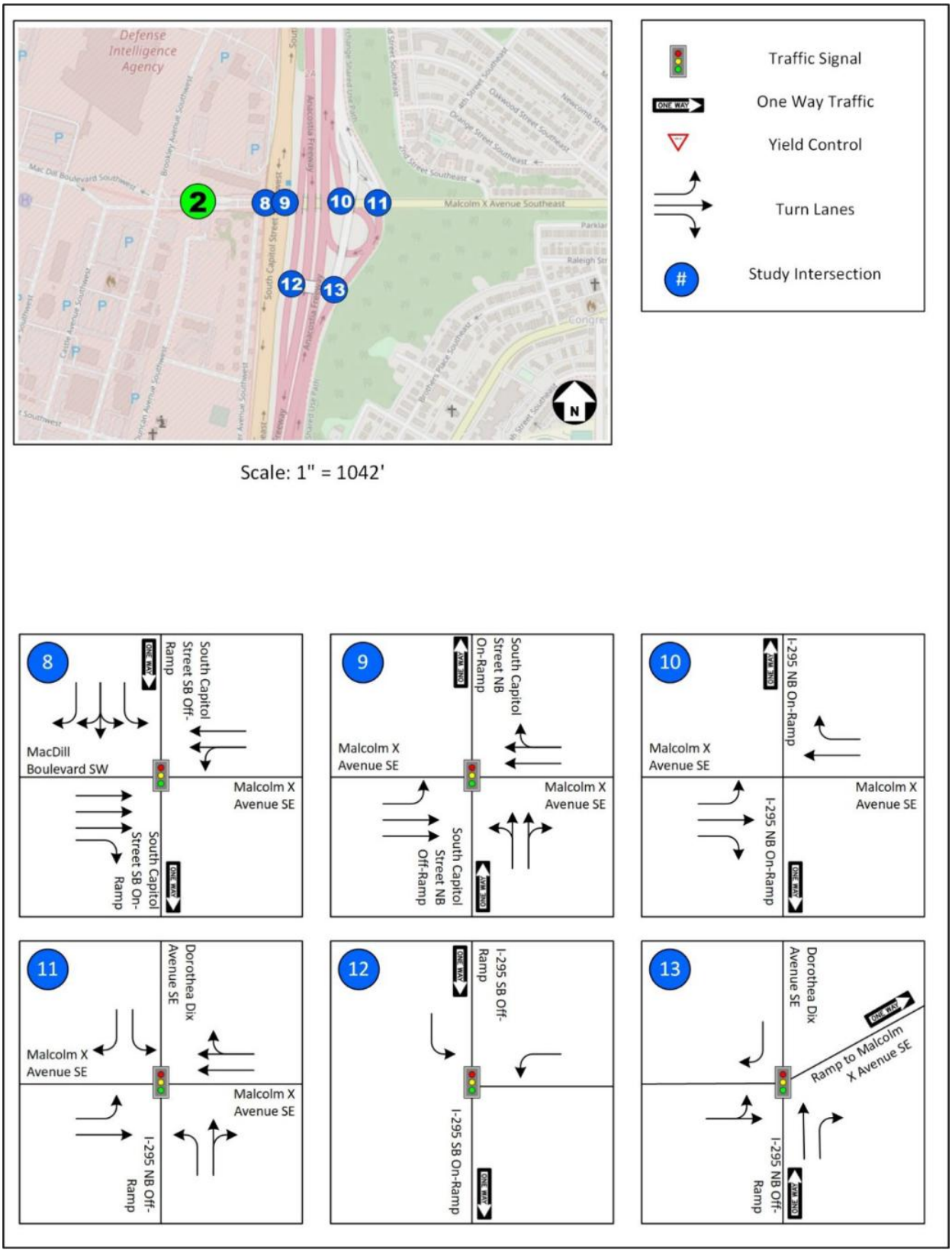


Figure 4-2B No Action Alternative Lane Geometry – Arnold Gate

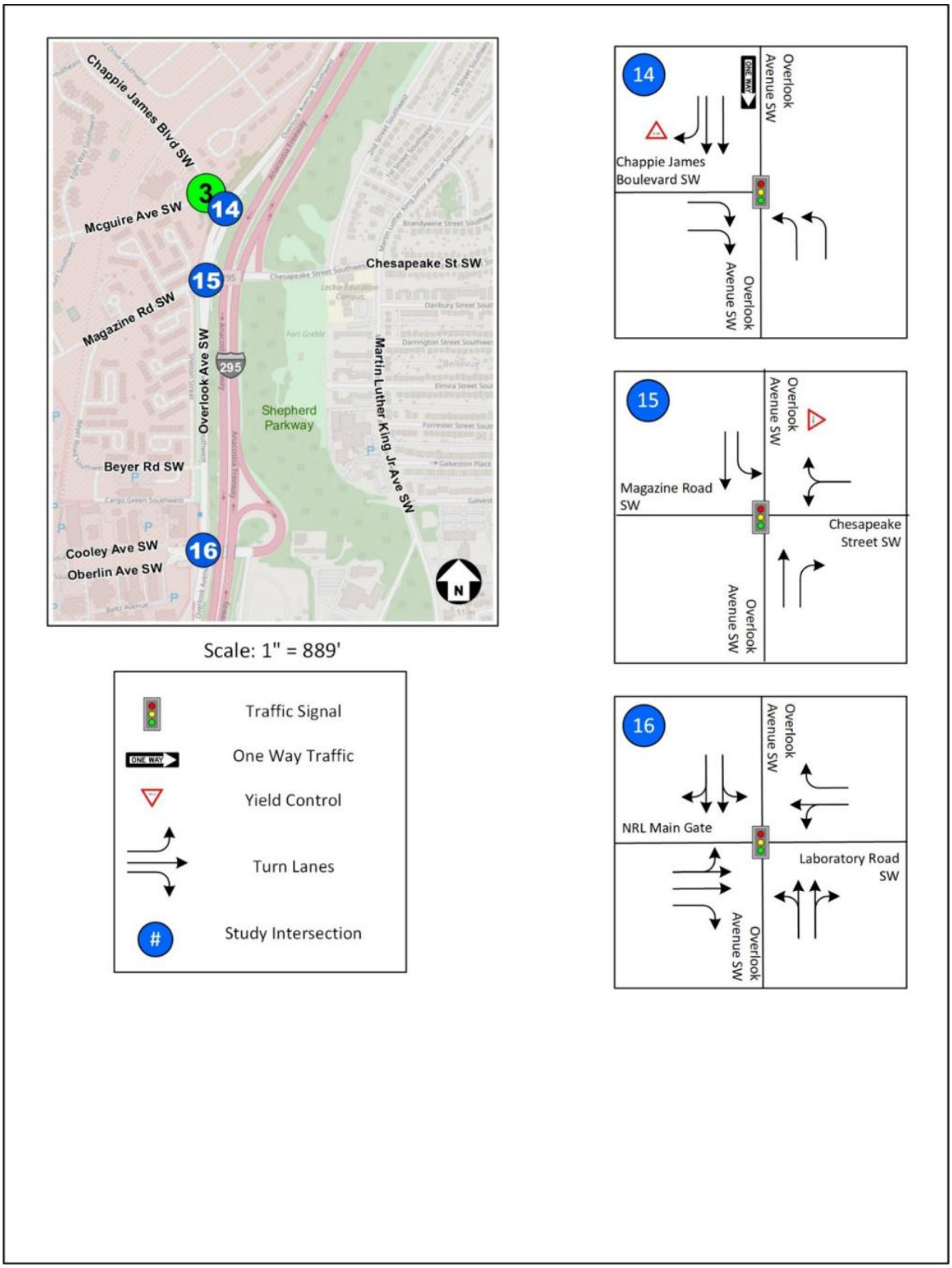


Figure 4-2C No Action Alternative Lane Geometry – South Gate

4.1.2 Pedestrian Network

The No Action Alternative includes five external planned development projects, described in Section 4.1.1.1, that are reasonably foreseeable to be completed by 2028, the full build out year. These projects may include replacing existing sidewalks damaged during construction or improving the sidewalks to adhere to ADA requirements or DDOT streetscape guidelines. A funded trail improvement starting at Firth Sterling Gate and running south along South Capitol Street to Overlook Avenue SW will provide pedestrian connections to all three gates. A future planned trail will improve the section of Firth Sterling Avenue SE between the Anacostia Metro Station and Firth Sterling Gate. Additionally, DDOT plans to build a bridge that carries a shared use path across Suitland Parkway to connect Barry Farm to the Anacostia Metro Station.

Under the No Action Alternative, pedestrian improvements adjacent to South Gate are expected based on the mitigation described in the Charter School Supplemental EA, including narrowing the apron of the I-295 on-ramp on Chesapeake Street, upgrading the sidewalk on Overlook Avenue SW from Chesapeake Street to South Gate, and implementing modern ADA-compliant ramps and high-visibility crosswalks on the western leg of the intersection of Chesapeake Street and Overlook Avenue SW. These improvements are due to be completed with the permanent school facility toward the end of 2024/beginning of 2025.

Under the No Action Alternative, these planned developments and other area pedestrian growth through 2028 are expected to result in a substantial change to the volume of pedestrian activity and the existing pedestrian infrastructure near the ACPs, particularly Firth Sterling Gate.

4.1.3 Bicycle Network

DDOT plans to construct several new bicycle facilities throughout the city, including new bicycle lanes and multiuse trails. According to moveDC, the mode share of bicycle commutes increased from 2.2 percent in 2010 to 4.5 percent in 2018, and DDOT is actively seeking to increase this number in the coming years. Planned improvements are underway to accommodate this increase in bicycle mode share (DDOT, 2021a). Table 4-2 contains the planned bicycle facilities included in the City's Bicycle Priority Network within a 1-mile radius of each of the three gates as presented in the moveDC 2021 update.

Note that moveDC breaks the Bicycle Priority Network into two different categories: funded improvements for on-street facilities and trails (these are locations that currently have funding identified for construction by 2028), and future planned improvements for on-street facilities and trails (these are locations for which bicycle priority may be added in the future, but funding has not been committed). Future planned improvements may not be implemented by 2028. Figures 4-3A, 4-3B, and 4-3C show the existing and No Action Alternative bicycle network.

In addition to bicycle facilities within a 1-mile radius of the project area, the 2015 District of Columbia Capital Bikeshare Development Plan recommends reviving commercial corridors in Anacostia despite access restrictions that limit Capital Bikeshare's ability to serve major employment sites like JBAB (DDOT, 2015b). The 2020 Update to the Capital Bikeshare Development Plan highlights Anacostia and Congress Heights as areas with a high "public needs propensity" for bikeshare based on established District and Capital Bikeshare goals, making them key areas for bikeshare station growth within the study area (DDOT, 2020).

The No Action Alternative includes development within the bicycle study area; therefore, an increase in bicycles is anticipated. With the increase of Capital Bikeshare station docks and stations in the bicycle study area and the possibility for additional bicycle infrastructure improvements as planned by DDOT, the bicycle network in the bicycle study area under the No Action Alternative is expected to improve. Annual background growth in bicyclists through 2028 is expected, especially with the introduction of Capital Bikeshare stations throughout Congress Heights and Bellevue.

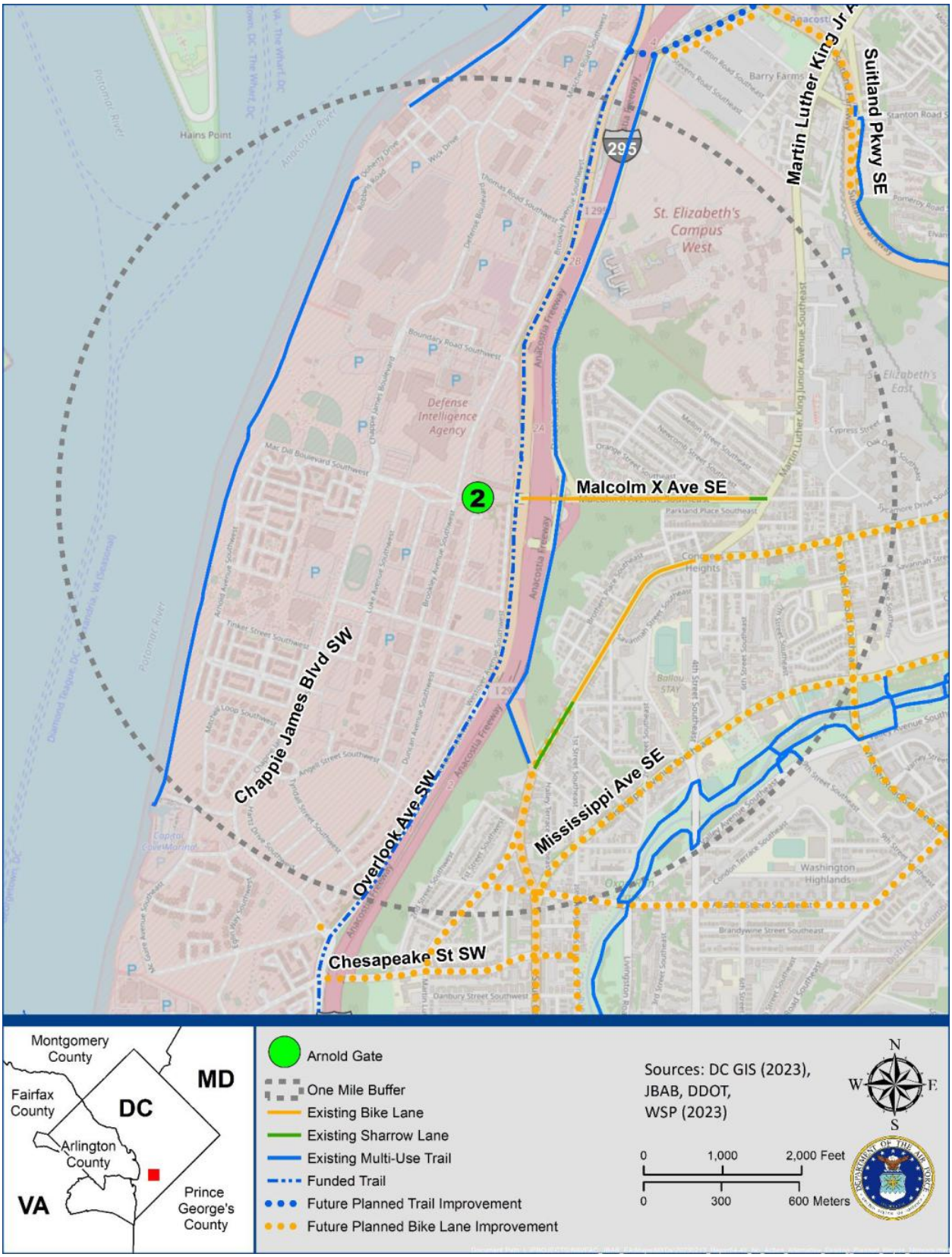
Table 4-2 No Action Alternative Proposed Bicycle Facilities

Roadway	From/To	Planned Type	Nearest Gates	Category
Firth Sterling Avenue SE	South Capitol Street SW to Good Hope Road SE	Trail	Firth Sterling	Future Planned Improvement
Firth Sterling Avenue SE	Stevens Road SE to Sumner Road SE	Bicycle Lane	Firth Sterling	Future Planned Improvement
Suitland Parkway SE	I-295 to Pomeroy Road SE	Bicycle Lane	Firth Sterling	Future Planned Improvement
Sheridan Road SE	Stanton Road SE to Pomeroy Road SE	Bicycle Lane	Firth Sterling	Future Planned Improvement
2nd Street SW	V Street SW to Anacostia River Waterfront	Bicycle Lane	Firth Sterling	Future Planned Improvement
V Street/Half Street SW	1st Street SW to Water Street SW	Bicycle Lane	Firth Sterling	Future Planned Improvement
Buzzard Point/Anacostia River Waterfront	2nd Street SW to Half Street SW	Trail	Firth Sterling	Future Planned Improvement
Anacostia River Waterfront	Half Street SW to South Capitol Street SW	Trail	Firth Sterling	Future Planned Improvement
South Capitol Street SW	Q Street SW to Potomac Avenue SW	Bicycle Lane	Firth Sterling	Future Planned Improvement
Anacostia Pedestrian Bridge	Barry Farms to Anacostia Metro Station	Trail	Firth Sterling	Funded Improvement
South Capitol Street SE/Overlook Avenue SW	Firth Sterling Avenue SE to Bright Street SW	Trail	Firth Sterling, Arnold, and South	Funded Improvement

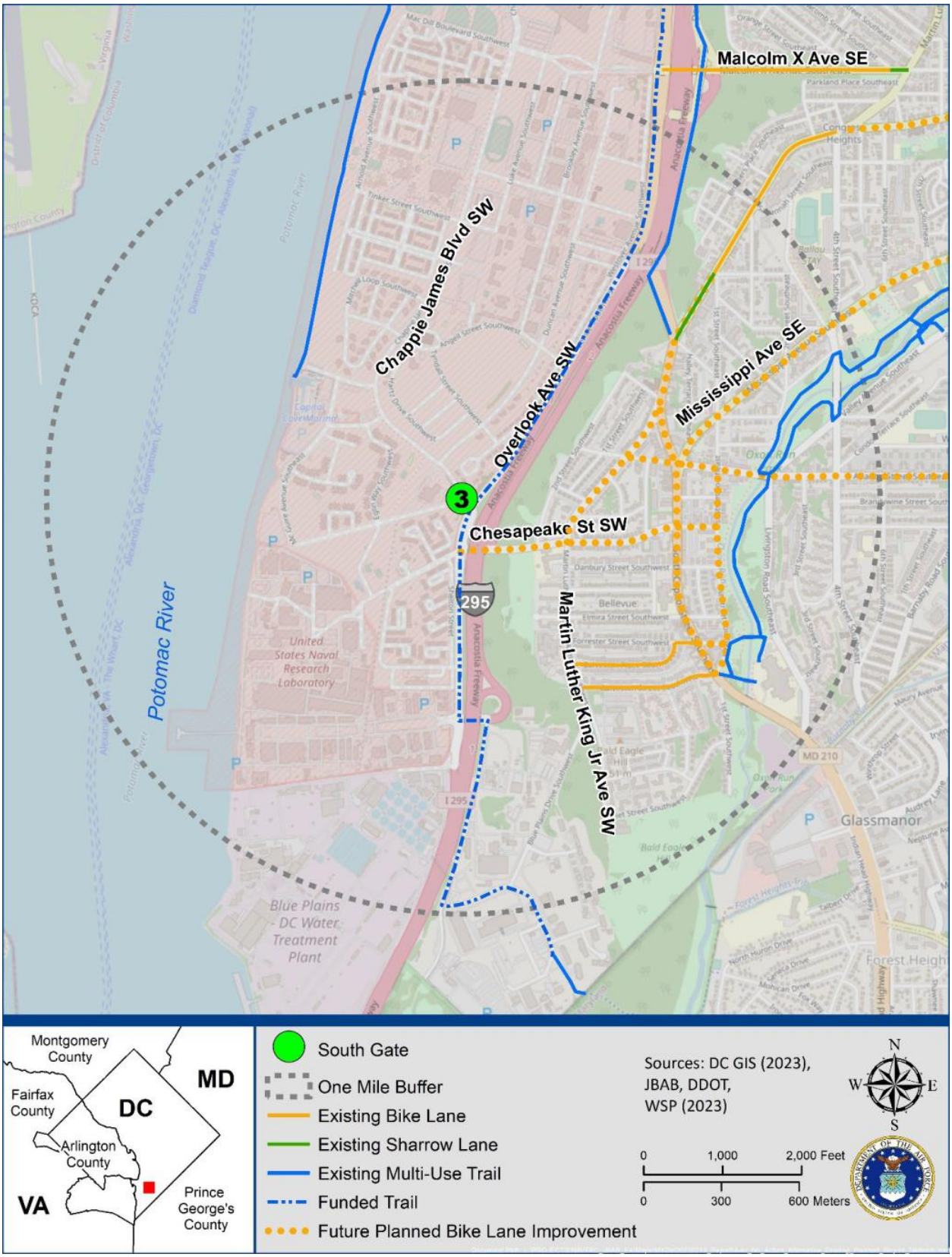
Table 4-2 No Action Alternative Proposed Bicycle Facilities (continued)

Roadway	From/To	Planned Type	Nearest Gates	Category
Alabama Avenue SE	Martin Luther King JR Avenue SE to 18th Street SE	Bicycle Lane	Arnold	Future Planned Improvement
Martin Luther King JR Avenue SE	Upsal Street SE to Chesapeake Street SW	Bicycle Lane	Arnold and South	Future Planned Improvement
Mississippi Avenue SE	Atlantic Street SE to Southern Avenue	Bicycle Lane	South	Future Planned Improvement
Chesapeake Street SW	Overlook Avenue SW to 1st Street SE	Bicycle Lane	South	Future Planned Improvement
South Capitol Street SE	Martin Luther King JR Avenue SW to 1st Street SE	Bicycle Lane	South	Future Planned Improvement
Atlantic Street SW	Martin Luther King JR Avenue SW to Barnaby Street SE	Bicycle Lane	South	Future Planned Improvement
Wheeler Road SE	Alabama Avenue SE to Southern Avenue	Bicycle lane	South	Future Planned Improvement
Forrester Street SE	South Capitol Street SE to 1st Street SE	Bicycle Lane	South	Future Planned Improvement

Figure 4-3A No Action Alternative Existing and Planned Bicycle Network – Firth Sterling Gate



1 **Figure 4-3B No Action Alternative Existing and Planned Bicycle Network – Arnold Gate**



1 **Figure 4-3C No Action Alternative Existing and Planned Bicycle Network – South Gate**

4.1.4 Transit

The 2020 DC Circulator Transit Development Plan Update does not include any recommendations related to the Congress Heights – Union Station route in the transit study area. The only service change is the route span, which was extended to 10:00 p.m. for all Mystics games starting at 7:00 p.m. or later on any day (DDOT, 2022c).

WMATA initiatives, including the Metrobus Priority Corridor Network Service Evaluation studies and the Momentum plan for the Metro system 2013–2025, are expected to result in ongoing changes to local bus operations. Additionally, the Momentum plan recommends offering more eight-car trains during peak periods, which would increase the system's ability to move more passengers. These types of changes would directly affect Metrobus and Metrorail routes that currently serve the transit study area (WMATA, 2013). Additionally, the Bus Priority Program was established to improve bus speeds and reliability (DDOT, 2021c).

Under the No Action Alternative, the five external planned developments and annual background growth are expected to moderately increase transit trips from the study area. For Metrorail service, the Green Line operates between 5:00 a.m. and 12:00 a.m. on weekdays. Green Line train headways are 8 minutes across all service times (WMATA, 2023a). Mixed-use developments will increase Metrorail ridership to and from the Anacostia Metro Station during morning peak periods, with the reverse effect during afternoon peak periods.

The five external planned developments and annual background growth, coupled with route improvements, are expected to increase Metrobus and DC Circulator ridership by 2028. The proposed Metrobus and Metrorail improvements and recommendations are anticipated to have a moderate benefit on ridership by providing enhanced service to disperse the increased demand.

Additionally, no change to regional commuter bus service or DOD-operated bus shuttles is anticipated beyond routine route and schedule adjustments under the No Action Alternative.

4.1.5 Truck Access

With five external planned developments proposed near the Action Alternatives; construction-related truck trips and regularly scheduled deliveries to the development could increase truck traffic in the short and long term, respectively. No other changes to truck circulation or loading are expected.

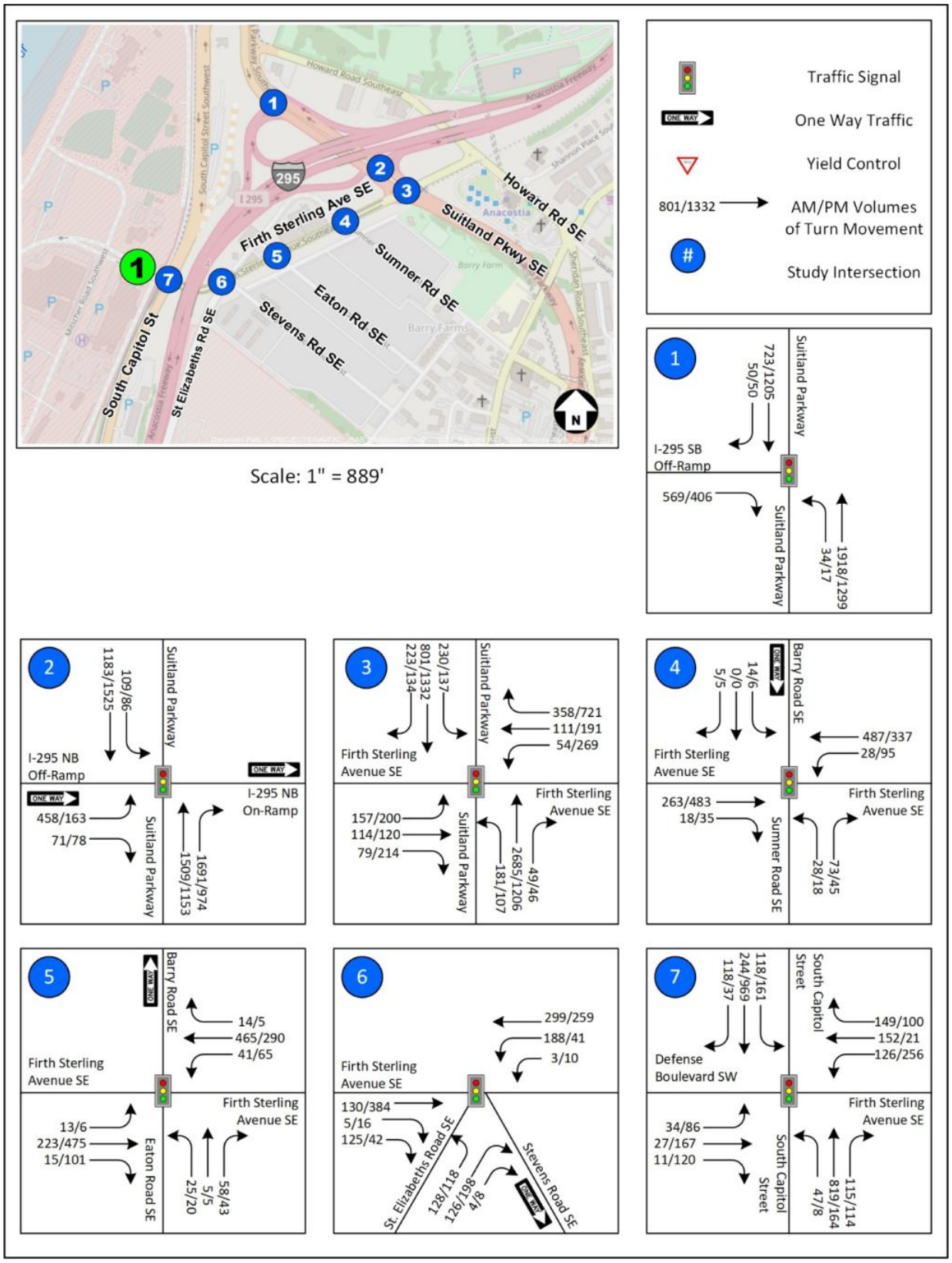
4.1.6 Parking

Under the No Action Alternative, the Douglass, Frederick, Barry Farm and Reunion Square developments will provide new parking spaces to serve residential units and commercial space. The Howard Road development will provide new spaces primarily for residential units. Parking calculations will consider the development's proximity to the Anacostia Metro Station and other transportation infrastructure.

4.1.7 Traffic

The No Action Alternative includes trips generated by approved planned developments and growth in vehicle trips generated from outside the study area through 2028. Sections 4.1.1.1 and 4.1.1.2 summarize the planned developments and planned roadway improvements, respectively. Traffic volumes were then used as an input, along with delay, signal timing, and geometrics to evaluate traffic operations and queuing at the signalized intersections within the study area to determine the impacts of traffic growth. Note that the procedures to forecast future traffic volumes throughout the study include rounding; therefore, values may not add up to the precise value indicated.

Traffic growth was added to the roadway network to account for new vehicle trips originating outside the traffic study area (i.e., background traffic) that would travel through the study area. Because the study area for this transportation study includes the same streets as the study area for the *Final Transportation Study For Real Estate Outgrant for a Charter School at Joint Base Anacostia-Bolling, Washington, D.C.*, DDOT approved the use of the same background traffic growth rates from that study in this study for Firth Sterling Gate improvements (WSP, 2020). The annual exponential growth rates from the previous study are: (1) no growth for Suitland Parkway; (2) 0.2 percent growth for South Capitol Street; and (3) 0.3 percent growth for all other streets. Trips generated by the nearby developments and internal installation development (as determined in the 2020 charter school study) were then added to the background traffic volumes to estimate the total future No-Action Alternative traffic volumes. These total No-Action Alternative traffic volumes are depicted in Figure 4-4A, Figure 4-4B, and Figure 4-4C.



1 **Figure 4-4A No Action Alternative Forecasted Volumes – Firth Sterling Gate**

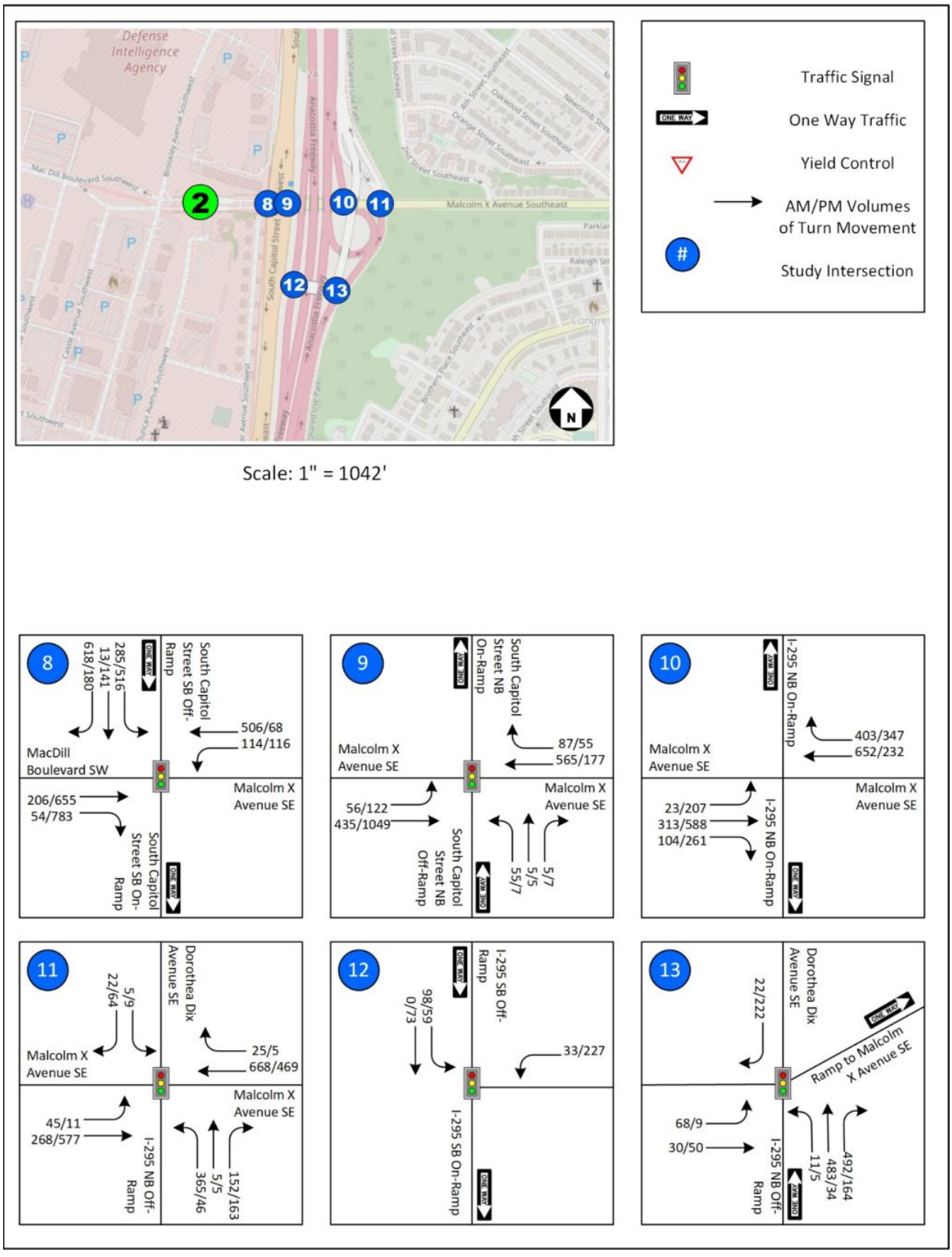
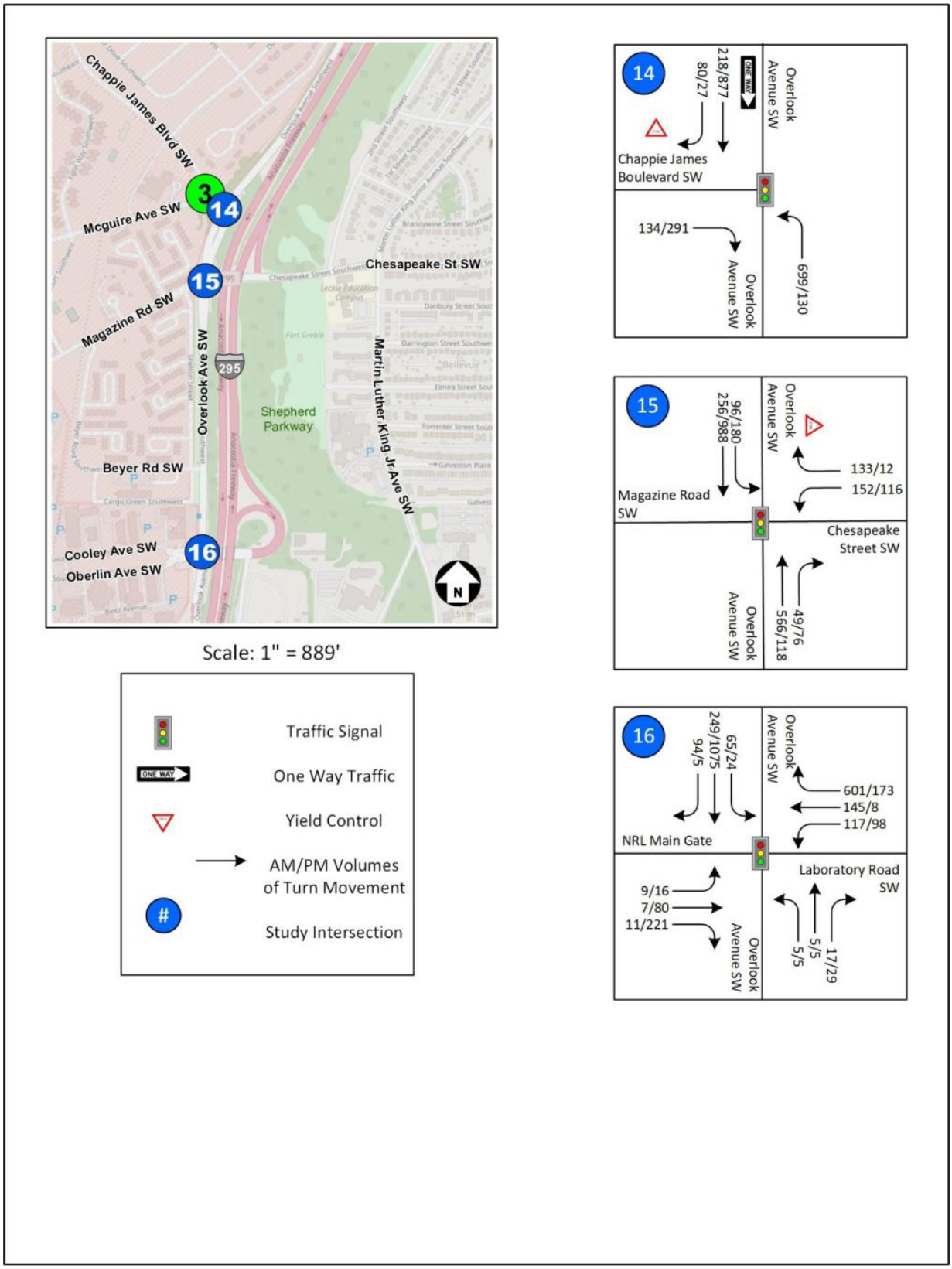


Figure 4-4B No Action Alternative Forecasted Volumes – Arnold Gate



1 **Figure 4-4C No Action Alternative Forecasted Volumes – South Gate**

4.2 Action Alternatives

This section describes the three Action Alternatives for building and operating the LVIS. Alternative 1 is the construction of a new, UFC-compliant LVIS and ACP at Firth Sterling Gate. Alternative 2, the preferred action, is an alternative LVIS configuration at the Firth Sterling Gate. Alternative 3 is the permanent closure of Firth Sterling Gate, leaving the existing LVIS at South Gate. The study focuses on the full build out and implementation in 2028.

The following sections describe the three Action Alternatives, the future number of vehicle trips that would be generated by each site, and the impact on non-vehicular modes.

4.2.1 Descriptions of Action Alternatives

4.2.1.1 Alternative 1

Alternative 1 is the construction of a new, UFC-compliant LVIS and ACP at Firth Sterling Gate with the configuration shown in Figure 4-5. Alternative 1 would be located on an approximately 10-acre site at the northern end of JBAB that is generally bounded by Building 414 to the east, the current alignment of Mitscher Road to the north, Robbins Road to the west, and Defense Boulevard to the south. This alternative would include an overwatch facility, a commercial gate house, a POV gate house, a Multimodal Transit Center (MTC), and an ADA/bicycle Common Access Card (CAC) access overwatch building. The pedestrian and bicycle CAC access would provide 24/7 access. Three truck inspection lanes would include two ID check lanes for POVs as well as an MTC for buses and carpooling. The MTC would have a bus shelter and approximately 10 spaces for carshares to drop off and pick up customers. The perimeter fence would begin several hundred feet north of the South Capitol Street intersection, travel close to Building 414, and extend around the northern perimeter of the LVIS until it reaches the M50 active vehicle barrier. The fence would continue on the southern side of the roadway closest to the stormwater detention area and end opposite of the location where it started. The Alternative 1 driveway would be a four lane, median-divided roadway with a turnaround that can accommodate an inbound “WB-67” truck turning to exit, as well as an outbound POV/escort, if necessary (“WB-67” is the most common semi-trailer truck type).

4.2.1.2 Alternative 2

Alternative 2, the preferred action, is the construction of a new, UFC-compliant LVIS and ACP at Firth Sterling Gate but with the configuration shown in Figure 4-6. Alternative 2 would include the same specifications as described for Alternative 1 with one notable exception: This alternative would include two truck inspection lanes plus three ID check lanes for POVs (compared to three POV lanes under Alternative 1).

4.2.1.3 Alternative 3

Alternative 3 is the permanent closure of Firth Sterling Gate to vehicular access, leaving the existing LVIS at South Gate. The existing pedestrian and bicycle CAC access would remain and would be operational 24/7.

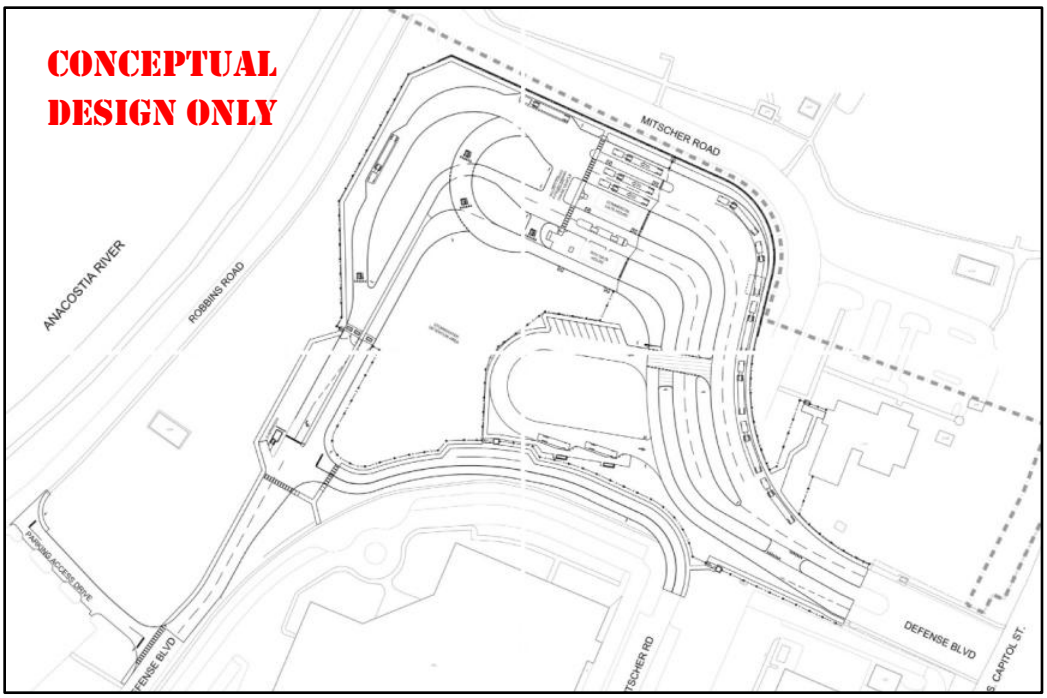


Figure 4-5 Action Alternative 1 Site Conceptual Design

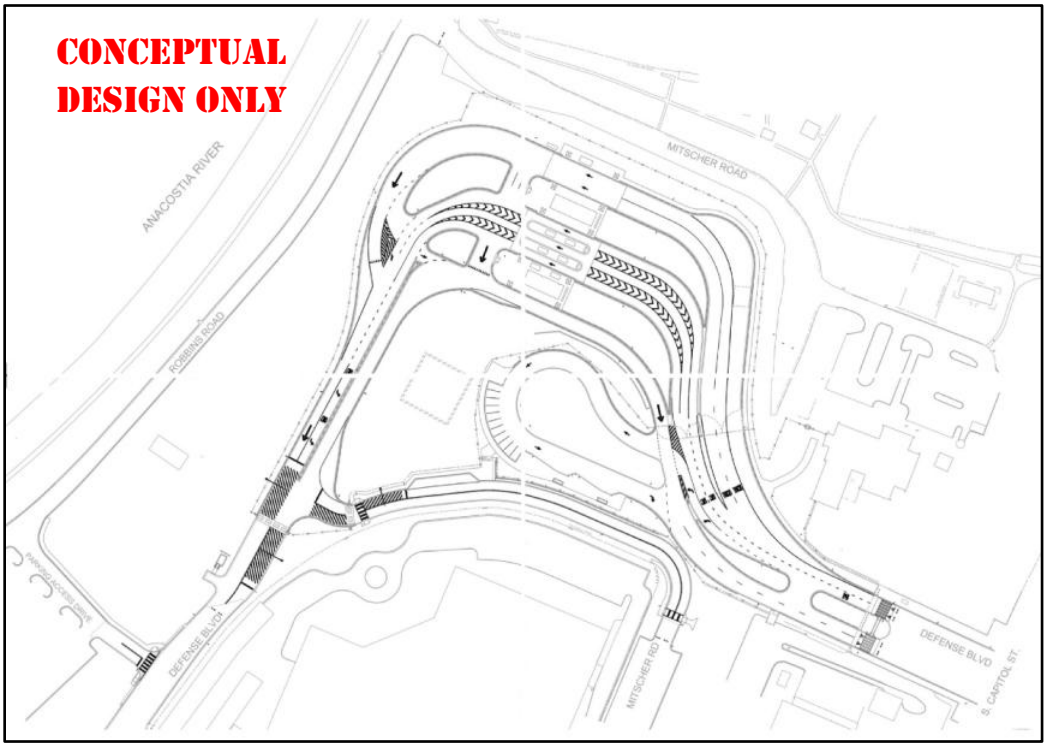


Figure 4-6 Action Alternative 2 Site Conceptual Design

4.2.2 Trip Rerouting and Truck Access

4.2.2.1 Action Alternative 1

Under Action Alternative 1, all truck inspection activity would be relocated from its current location at South Gate to a new LVIS located at Firth Sterling Gate. Therefore, under Action Alternatives 1, all truck traffic that entered the installation at South Gate under the No Action Alternative would enter the installation at Firth Sterling Gate.

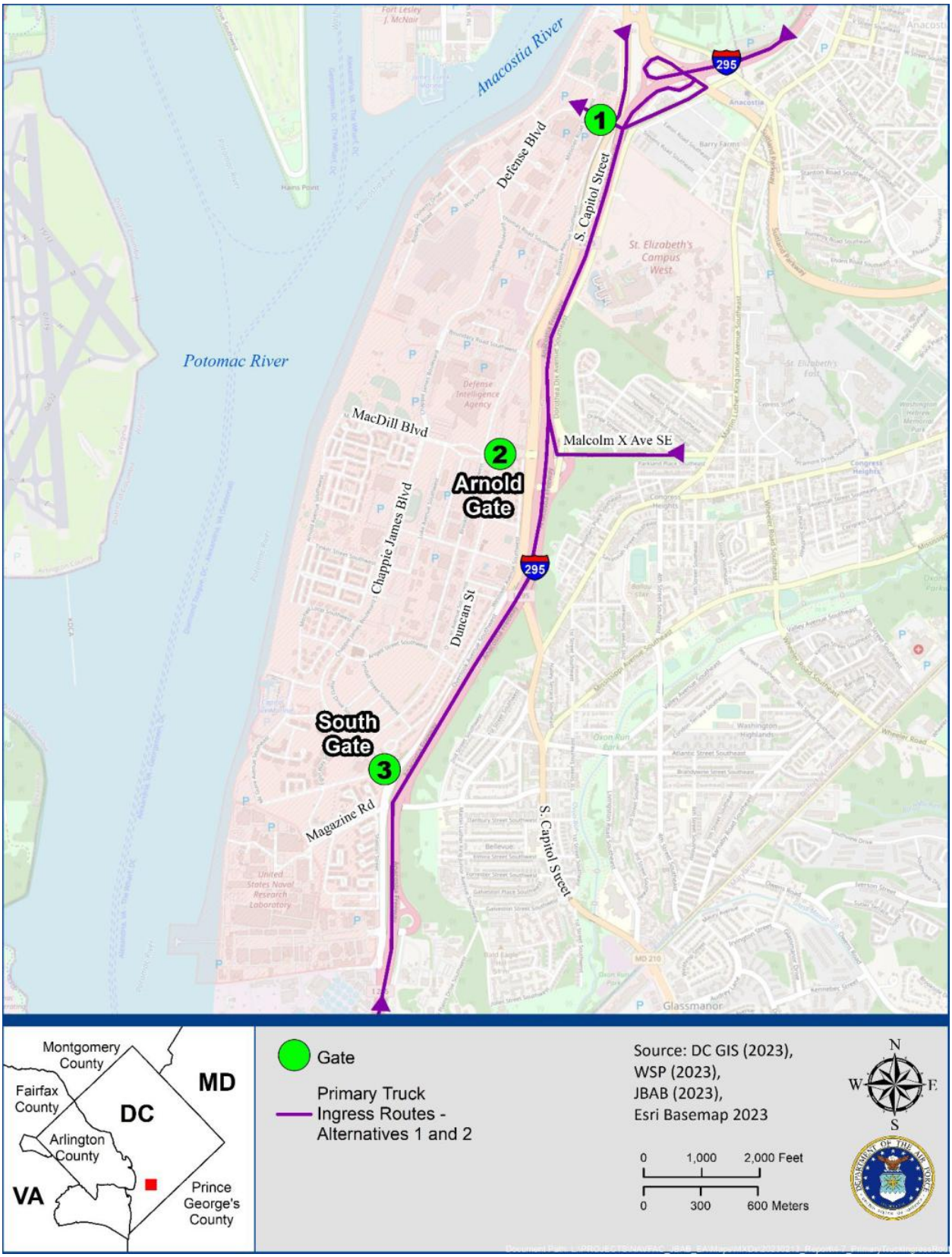
Trucks that entered South Gate from northbound Overlook Avenue SW (i.e., coming from the south along I-295 via Exit 1 – Laboratory Road and turning right onto Overlook Ave SW) were rerouted to Firth Sterling Gate via I-295 northbound, Suitland Parkway SE, and Firth Sterling Ave SE. The potential origins of the trucks that entered South Gate from southbound Overlook Avenue SW were based on the truck volume from the traffic counts performed on southbound South Capitol Street, the I-295 southbound ramp to South Capitol Street, and westbound Malcolm X Avenue SE. Trucks coming from South Capitol Street (15 percent in the AM and 27 percent in the PM) were redistributed to the right turn movement at Firth Sterling Gate via southbound South Capitol Street, trucks from I-295 southbound ramp (80 percent in the AM and 70 percent in the PM) were redistributed to Firth Sterling Avenue SE via I-295 southbound to Suitland Parkway SE, and trucks from Malcolm X Avenue SE (5 percent in the AM and 3 percent in the PM) were rerouted to Firth Sterling Avenue SE via I-295 northbound and Suitland Parkway SE.

Table 4-3 summarizes AM and PM peak hour potential trip origin percentages for trucks going to South Gate based on traffic counts; however, no truck volume was observed entering South Gate during the PM peak during the subsequent site visit. Truck traffic leaving the installation is assumed to exit via South Gate, Arnold Gate, and Firth Sterling Gate at the same volumes that they would exit under the No Action Alternative.

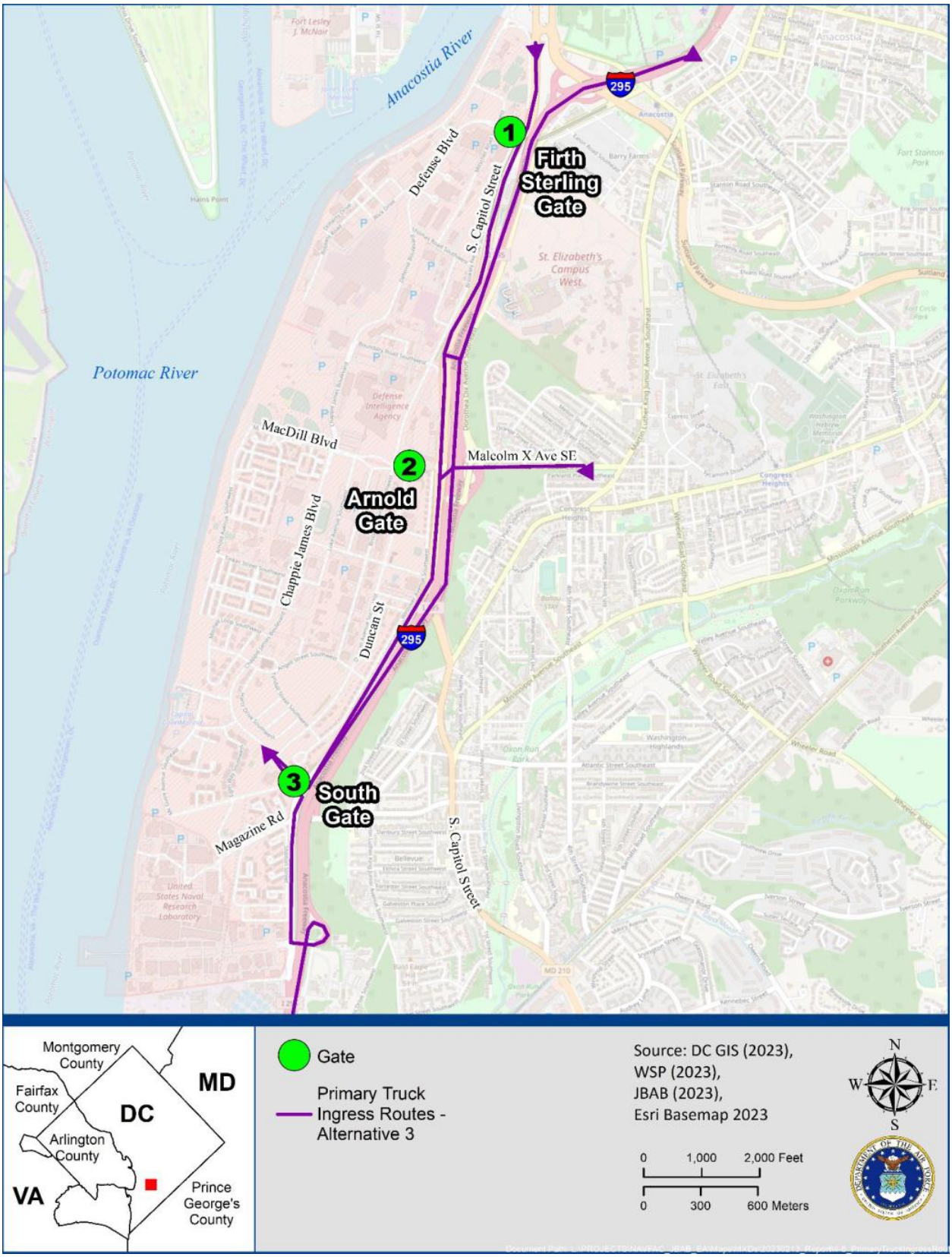
Table 4-3 AM & PM Peak Truck Origins and Percentages to South Gate

Origin	Movement into South Gate	AM Percentage	PM Percentage
South on South Capitol Street	SB Right from Overlook Ave SW	15%	27%
South on I-295 Ramp		80%	70%
West on Malcolm X Avenue SE		5%	3%
I-295 NB via Exit 1	NB Left from Overlook Ave SW	100%	100%

Figure 4-7 shows the primary routes that trucks would take to enter the installation at Firth Sterling Gate under Action Alternative 1. Figure 4-8 shows the truck ingress routes for Existing Conditions, the future No Action Alternative, and Action Alternative 3, all of which have all trucks entering the installation via South Gate. Figure 4-9 shows the routes that are available for trucks to use upon exiting the installation, which could occur via any of the three gates.



1 **Figure 4-7 Primary Truck Ingress Routes for Action Alternatives 1 and 2**



1 **Figure 4-8 Primary Truck Ingress Routes for Existing, No Action, and Action Alternative 3**

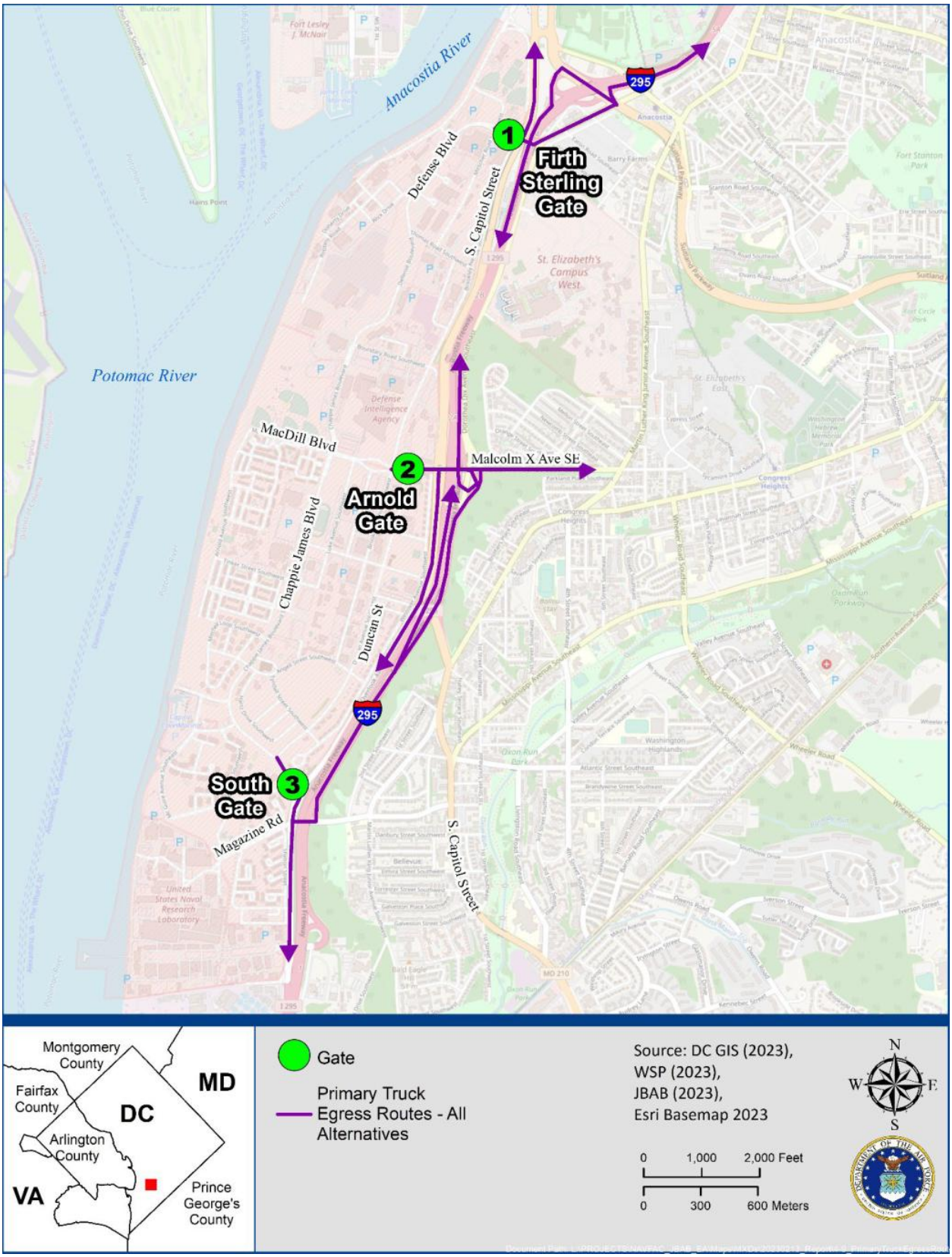


Figure 4-9 Primary Truck Egress Routes for All Alternatives

4.2.2.2 Action Alternative 2

Action Alternative 2 uses the same trip rerouting and truck access assumptions as Action Alternative 1 described above.

4.2.2.3 Action Alternative 3

For Action Alternative 3, all vehicular traffic entering or exiting the installation at Firth Sterling Gate under the No Action Alternative would shift to Arnold Gate and South Gate. All trucks would continue to enter at South Gate under Action Alternative 3 (similar to the No Action Alternative). However, no trucks (or any other vehicles) would exit the installation via Firth Sterling Gate.

All vehicles that would have entered Firth Sterling Gate from northbound South Capitol Street were redistributed to Arnold Gate via northbound South Capitol Street to Malcolm X Avenue SE. Of the vehicles that would have entered Firth Sterling Gate from southbound South Capitol Street, two-thirds were redistributed to Arnold Gate via southbound South Capitol Street to Malcolm X Avenue SE, and one-third were redistributed to South Gate via southbound South Capitol Street to Overlook Avenue SW.

For vehicles that would have entered Firth Sterling Gate from westbound Firth Sterling Avenue SE, Table 4-4 summarizes the AM and PM peak hour trip origin percentages of those vehicles under Existing Conditions based on traffic counts. For Action Alternative 3, these vehicles that would have entered Firth Sterling Gate from westbound Firth Sterling Avenue SE were redistributed to the other gates based on the proportion of those vehicles counted as coming from the I-295 southbound off-ramp to Suitland Parkway SE, the I-295 northbound off-ramp to Suitland Parkway SE, and St Elizabeths Road SE, as shown in the table. Vehicles from the I-295 SB off-ramp (74 percent in the AM and 67 percent in the PM) were redistributed to Arnold Gate via southbound South Capitol Street; vehicles from the I-295 NB off-ramp (9 percent in the AM and 13 percent in the PM) were redistributed to South Gate from northbound Overlook Avenue SW via I-295 northbound to Laboratory Road SW; and vehicles from St. Elizabeths Road SE (17 percent in the AM and 20 percent in the PM) were redistributed to Arnold Gate via westbound Malcolm X Avenue SE.

Table 4-4 Existing & No Action Alternative AM and PM Peak Trip Origins to Firth Sterling Gate

Origin	AM Percentage	PM Percentage
From I-295 from the North	74%	67%
From I-295 from the South	9%	13%
From St Elizabeths Road SE	17%	20%

The overall split for inbound vehicles diverted from Firth Sterling Gate under Alternative 3 was 68 percent to Arnold Gate and 32 percent to South Gate. For outbound volumes, the vehicular volume from Firth Sterling Gate headed to northbound South Capitol Street was redistributed to northbound South Capitol Street via Arnold Gate; vehicles headed to southbound South Capitol Street were redistributed to Overlook Avenue SW and I-295 southbound via South Gate; and vehicles headed to eastbound Firth Sterling Avenue SE were split evenly to I-295 northbound via Arnold Gate and to I-295 southbound via South Gate.

4.2.3 Pedestrian Network

Under Action Alternatives 1 and 2, pedestrian improvements are not proposed, beyond providing connections to the future multiuse trail that would serve all three gates and the trail completed as part of the new Frederick Douglass Memorial Bridge project. The reconfigured gate would provide safe connections to the pedestrian entrance despite the addition of trucks.

For Action Alternative 3, pedestrian improvements are not proposed, and pedestrian access would remain at Firth Sterling Gate for 24 hours a day, 7 days a week. No further changes are planned to the pedestrian network beyond the planned DDOT improvements.

4.2.4 Bicycle Network

Under Action Alternatives 1 and 2, bicycle lanes or paths are not proposed, beyond providing connections to the planned multiuse trail south of Firth Sterling Gate and the trail completed as part of the new Frederick Douglass Memorial Bridge project. The reconfigured gate would provide safe bicycle connections to the entrance.

For Alternative 3, bicycle lanes or paths are not planned, and bicycle access would remain at Firth Sterling Gate for 24 hours a day, 7 days a week. No further changes are planned to the bicycle network beyond the planned improvements by DDOT and Capital Bikeshare.

4.2.5 Transit

Under Action Alternatives 1 and 2, minimal new transit trips would be generated. No change in transit levels of service or operation hours in the transit study area are anticipated beyond those listed under the No Action Alternative. The proposed MTC would provide approximately 10 parking spaces for pick-up and drop-off. Two bus bays with covered shelters would house the W2 and W4 bus stop relocated from South Capitol Street, approximately 200 feet away from Firth Sterling Gate. Additionally, an upgraded ADA/bicycle CAC access point would be available for individuals dropped off at the MTC. The MTC would be located before ID check. Transit ridership is not expected to increase significantly; however, bus routes, scheduling, and stop locations are expected to be planned and updated as conditions require, and as bus routes are adjusted periodically by the operators (e.g., WMATA's Better Bus Program).

Under Alternative 3, no new transit trips would be generated, and conditions would be the same as those described for the No Action Alternative.

4.2.6 Parking

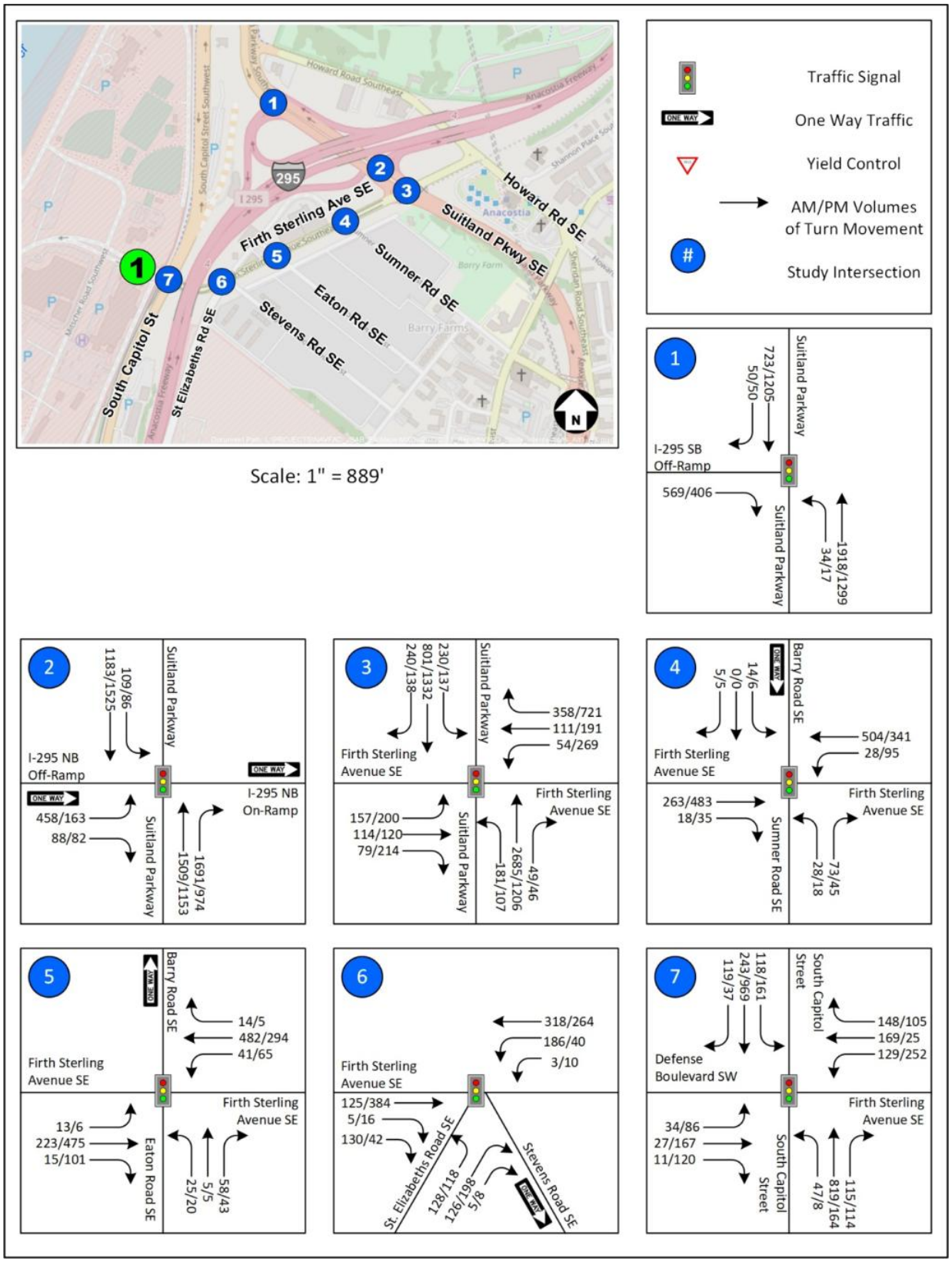
No changes to publicly available parking are expected in the parking study area under the Action Alternatives. Under Alternatives 1 and 2, the LVIS would include a surface parking lot that would provide approximately 10 spaces for carpooling. Four additional spaces would be allocated for security forces for a total of 14 spaces. Under Alternative 3, no spaces would be provided because the existing gate would cease operations. There would be no measurable impacts on parking in the study area.

4.2.7 Traffic

The vehicle trip redistribution assumptions described in Section 4.2.2 are the foundation for determining the impacts of the three Action Alternatives. The following sections present the total forecasted traffic volumes associated with these alternatives. Section 4.3 analyzes intersection operations and queuing results under each Action Alternative and compares them to the No Action Alternative.

4.2.7.1 Action Alternatives 1 and 2 Vehicle Trips

Vehicle trip redistribution is discussed in Section 4.2.2. Figures 4-10A, 4-10B, and 4-10C show the total forecasted volumes that were used to analyze the effects of Action Alternatives 1 and 2 on traffic operations in the study area. Figures 4-11A, 4-11B, and 4-11C show the forecasted truck volumes that were rerouted through the study area to enter the installation at Firth Sterling Gate instead of South Gate under these alternatives.



1 **Figure 4-10A Total Forecasted Volumes – Firth Sterling Gate – Action Alternatives 1 and 2**

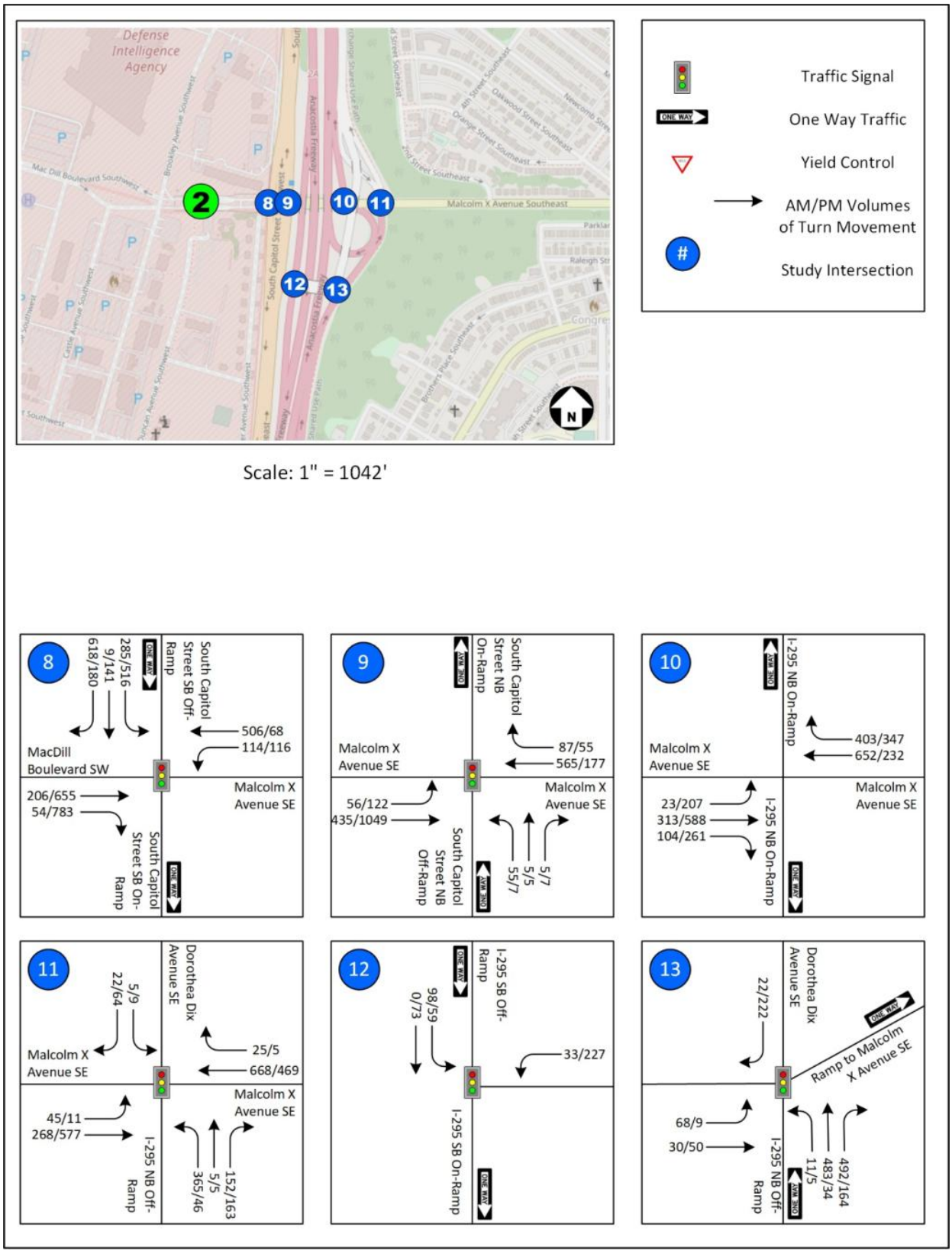
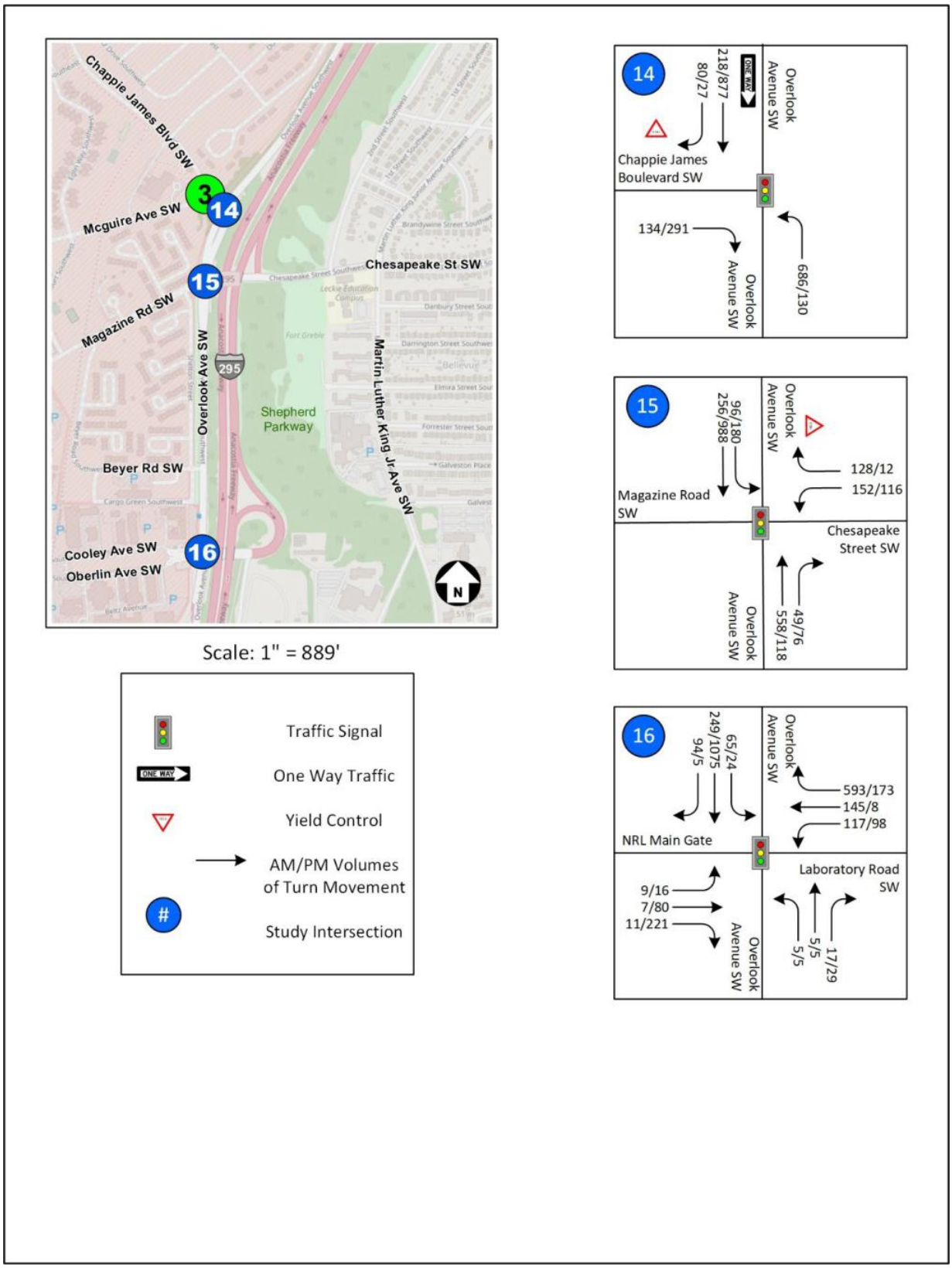
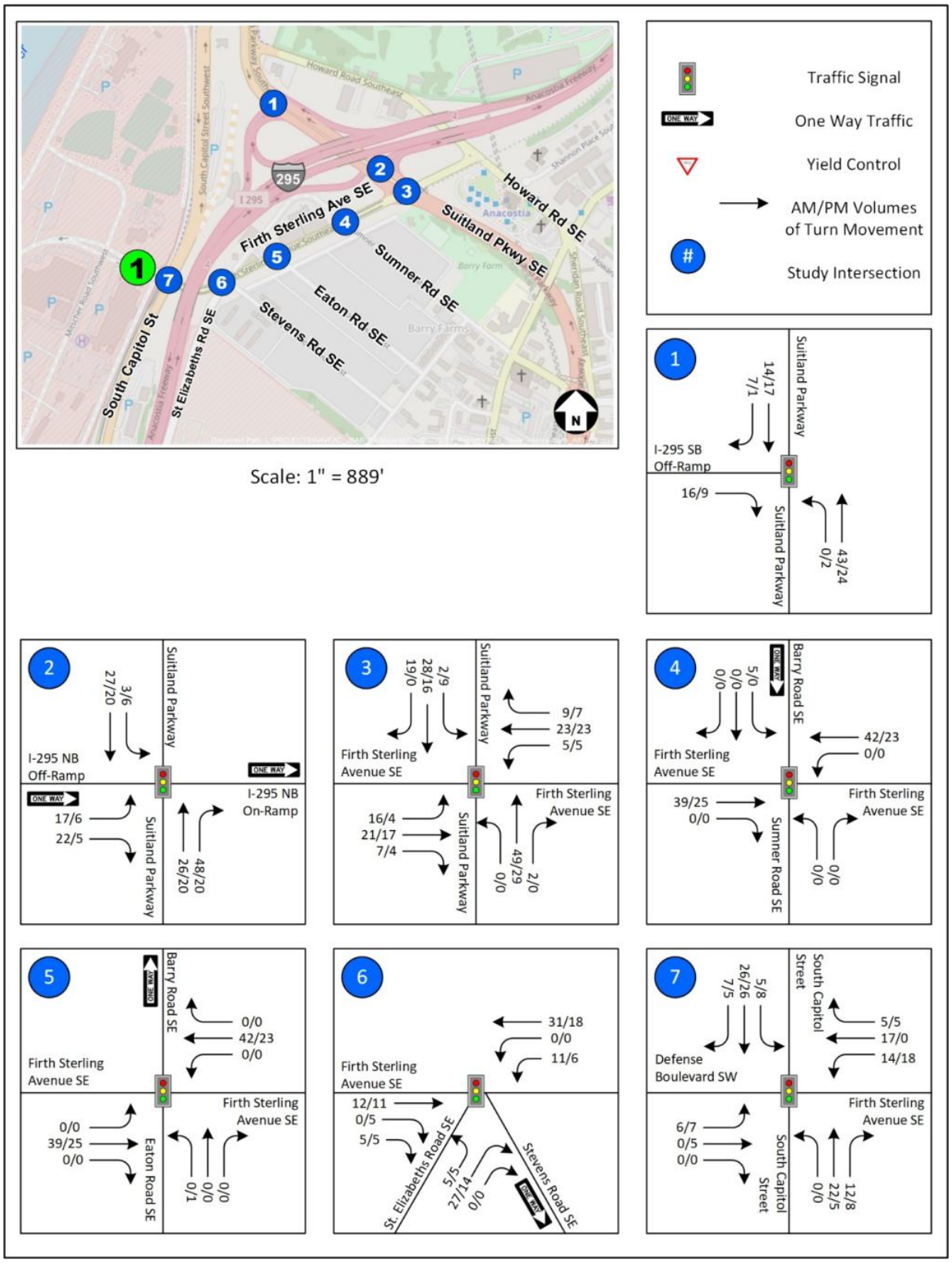


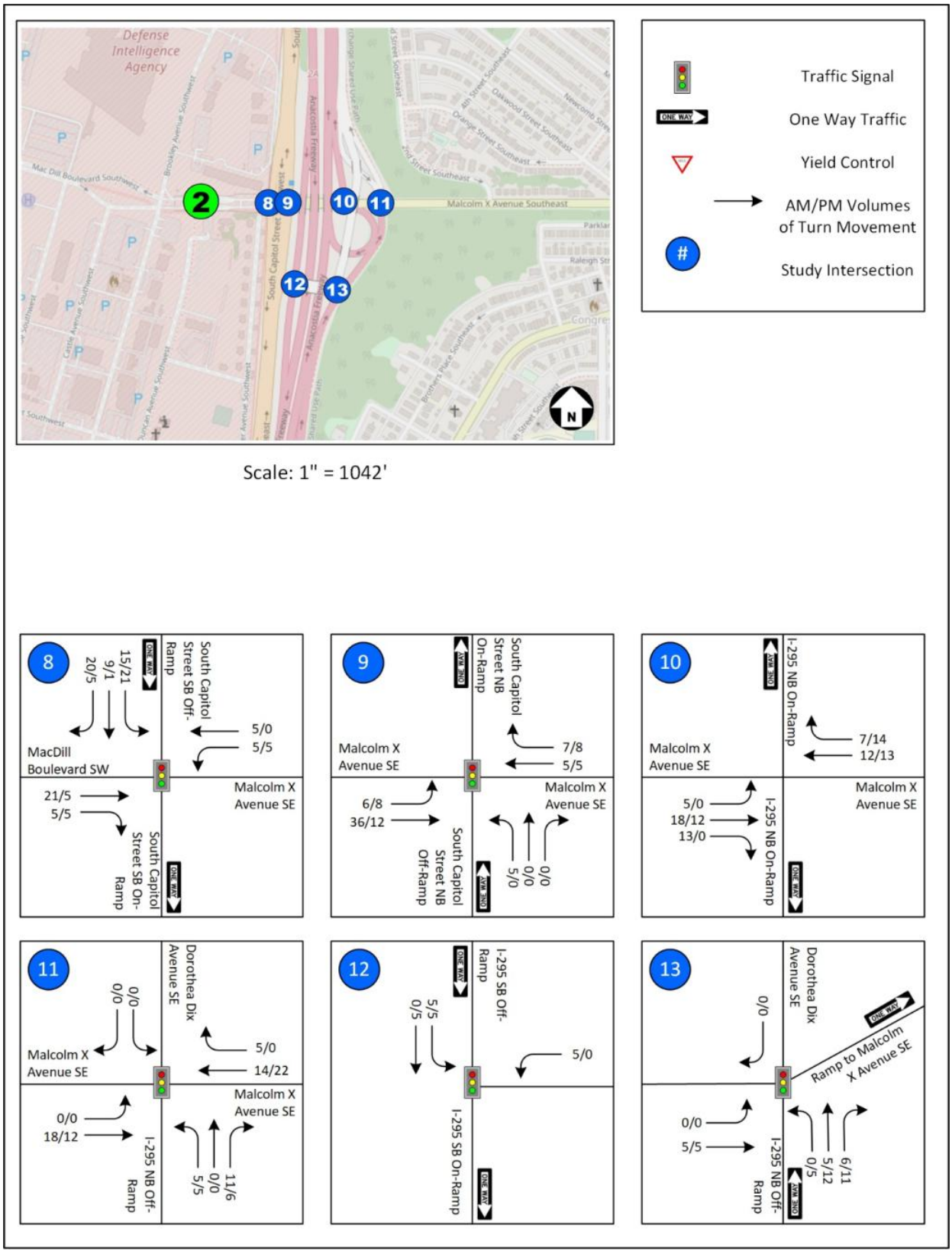
Figure 4-10B Total Forecasted Volumes – Arnold Gate – Action Alternatives 1 and 2



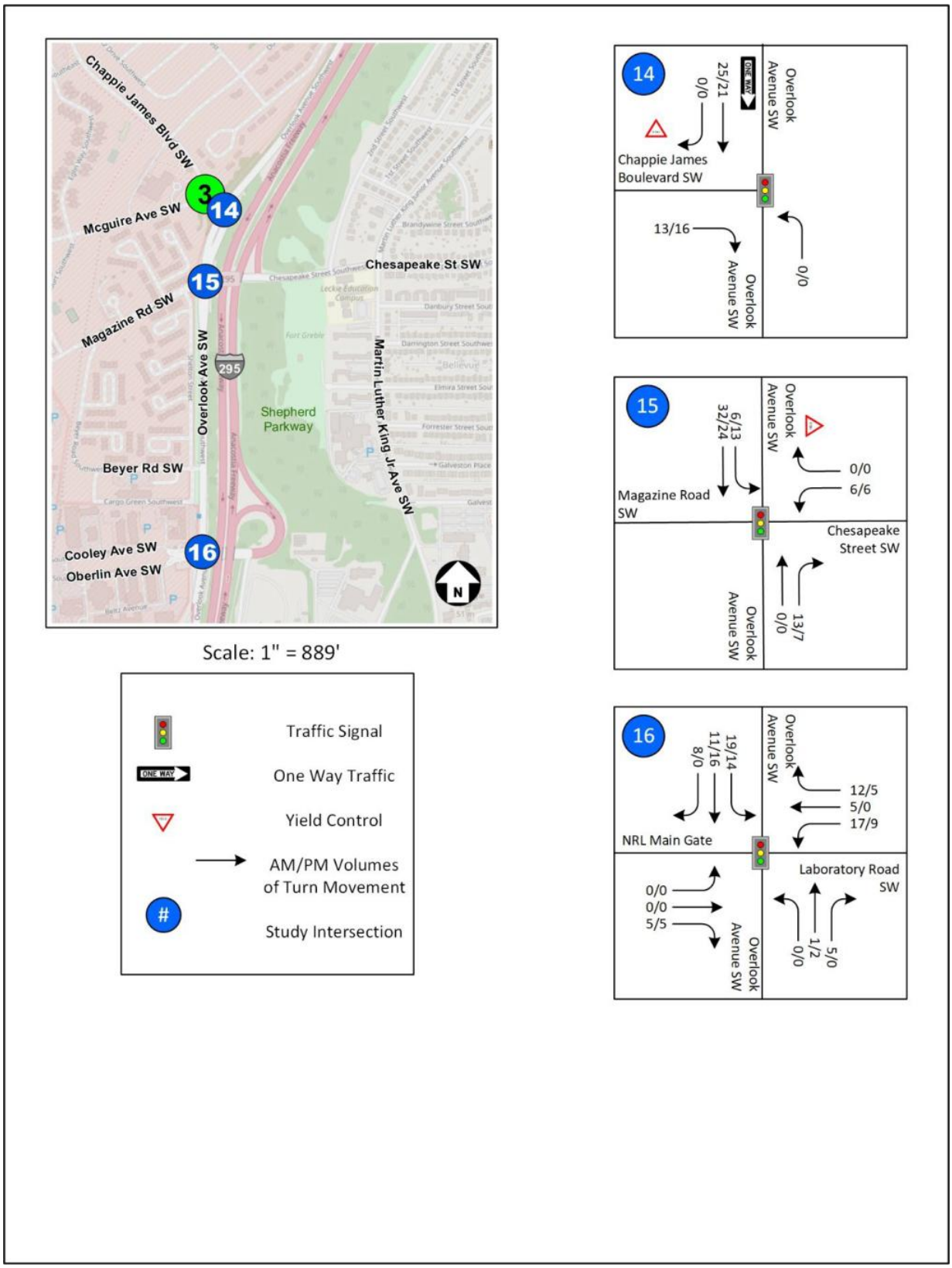
1 **Figure 4-10C Total Forecasted Volumes – South Gate – Action Alternatives 1 and 2**



1 **Figure 4-11A Forecasted Truck Volumes – Firth Sterling Gate – Action Alternatives 1 and 2**



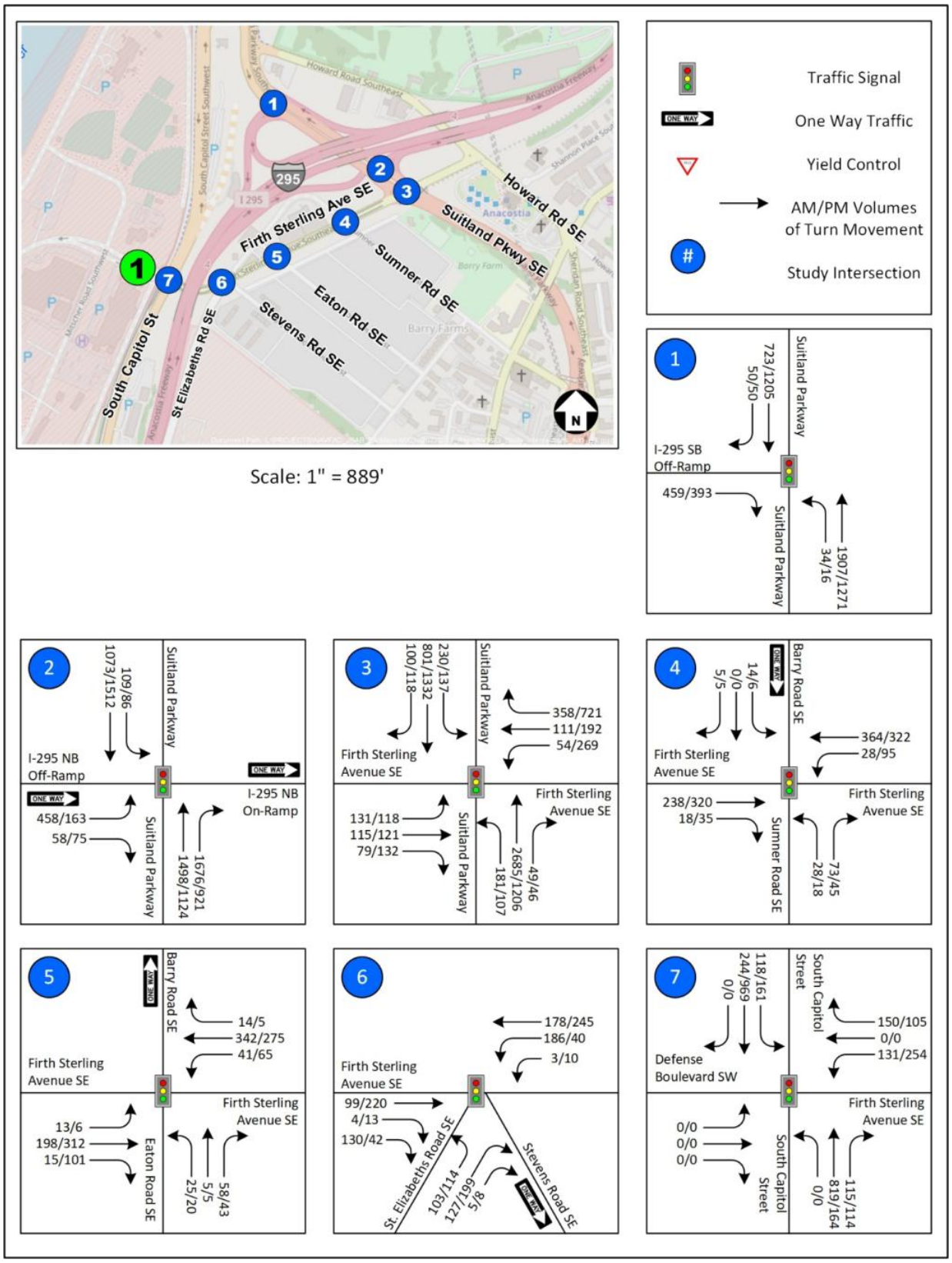
1 **Figure 4-11B Forecasted Truck Volumes – Arnold Gate – Action Alternatives 1 and 2**



1 **Figure 4-11C Forecasted Truck Volumes – South Gate – Action Alternatives 1 and 2**

4.2.7.2 Action Alternative 3 Vehicle Trips

Vehicle trip redistribution is discussed in Section 4.2.2. Figures 4-12A, 4-12B, and 4-12C show the total forecasted volumes that were used to analyze the effects of Action Alternative 3 on traffic operations in the study area. Figures 4-13A, 4-13B, and 4-13C show the forecasted truck volumes throughout the study area, which are different from the No Action Alternative and Action Alternatives 1 and 2 due to the closure of Firth Sterling Gate to all vehicular traffic under this Action Alternative.



1 **Figure 4-12A Total Forecasted Volumes – Firth Sterling Gate – Action Alternative 3**

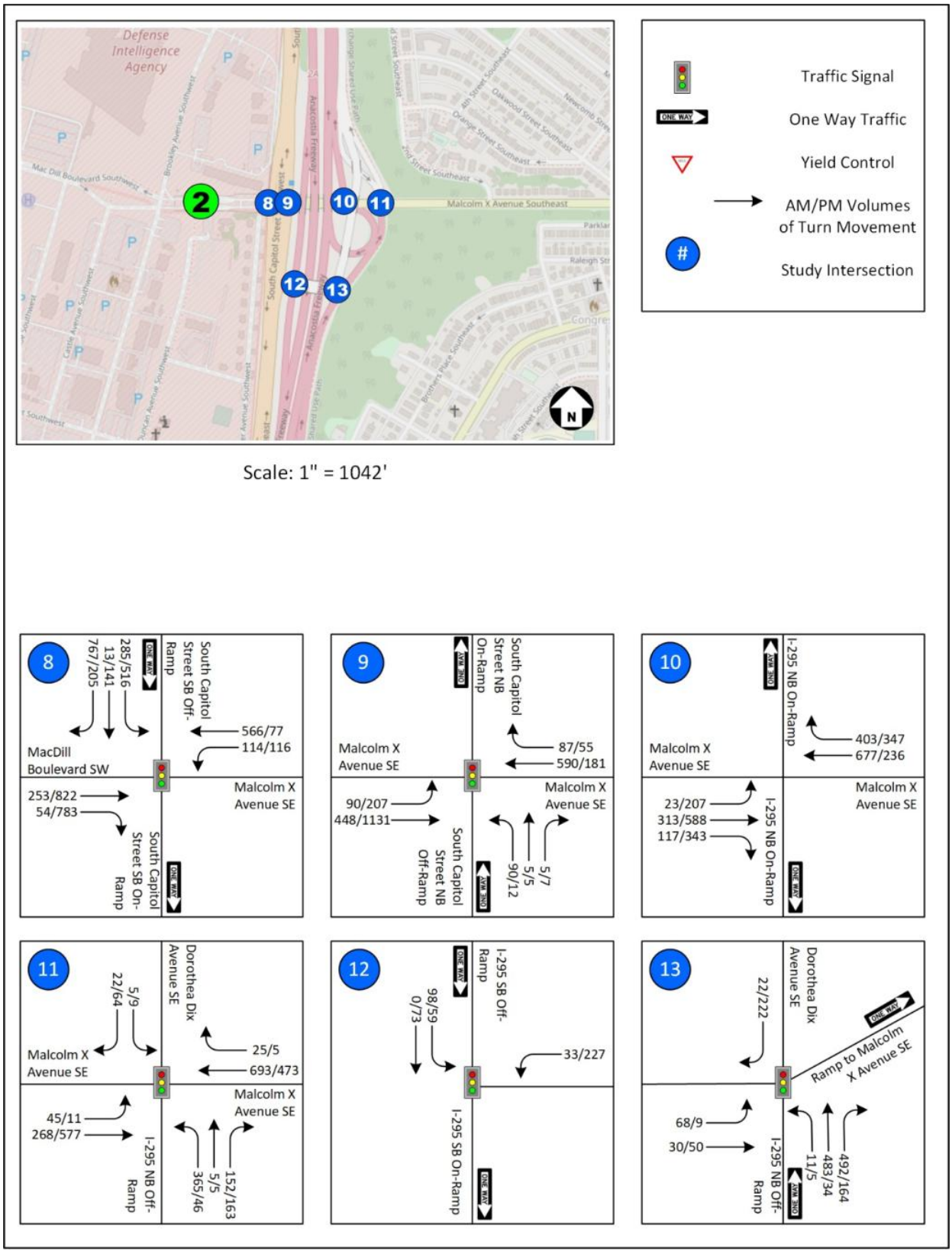


Figure 4-12B Total Forecasted Volumes – Arnold Gate – Action Alternative 3

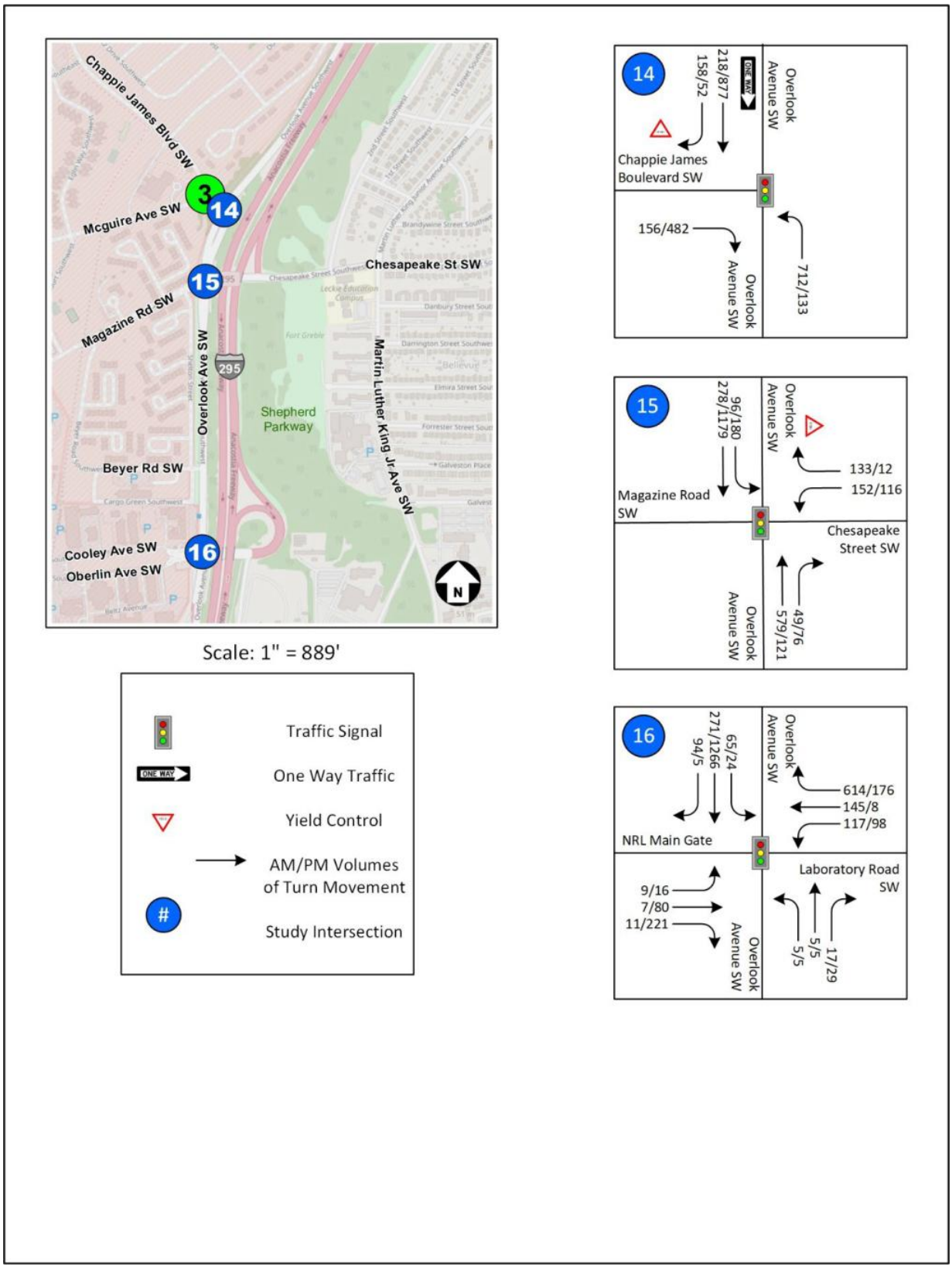
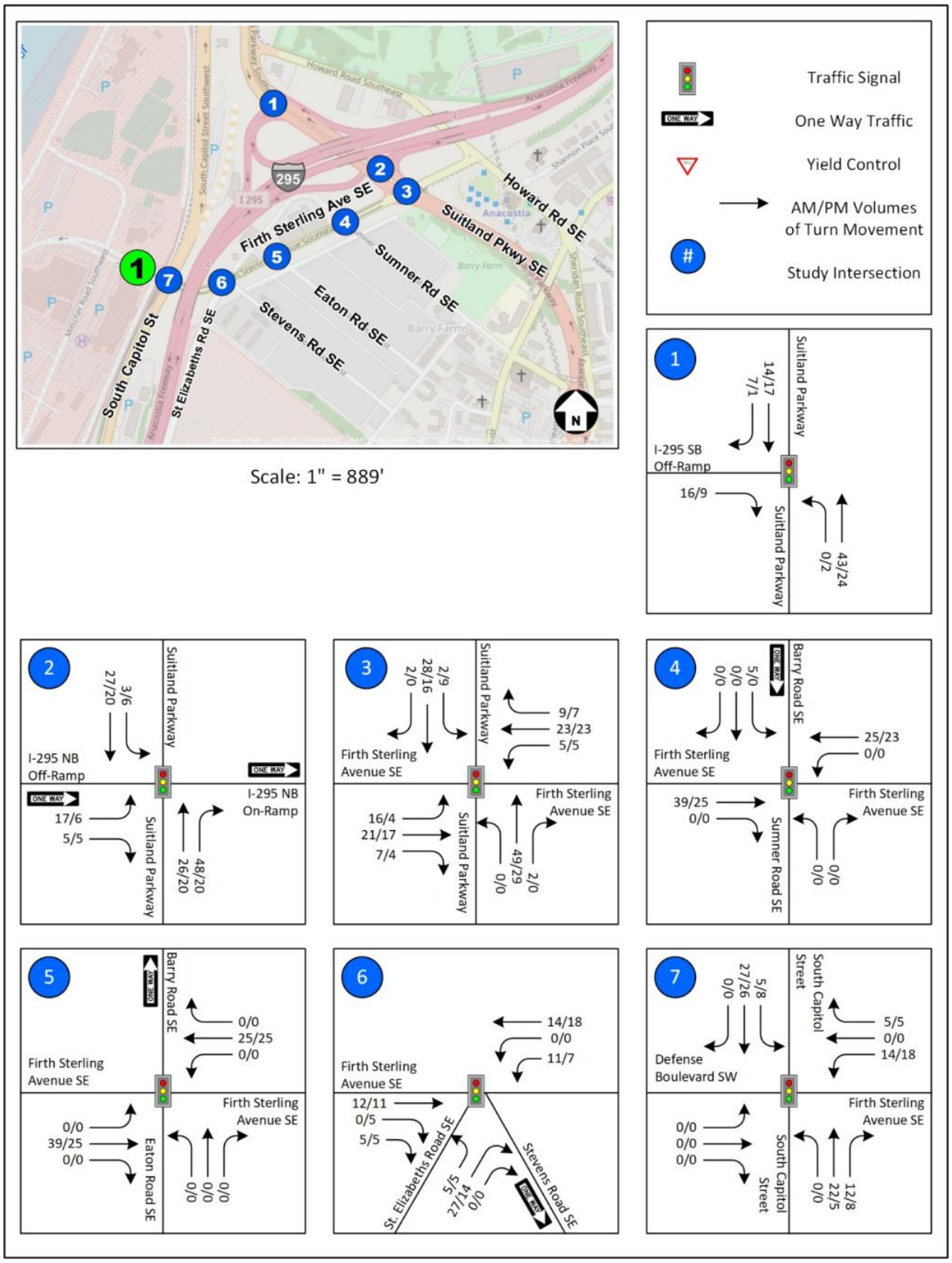
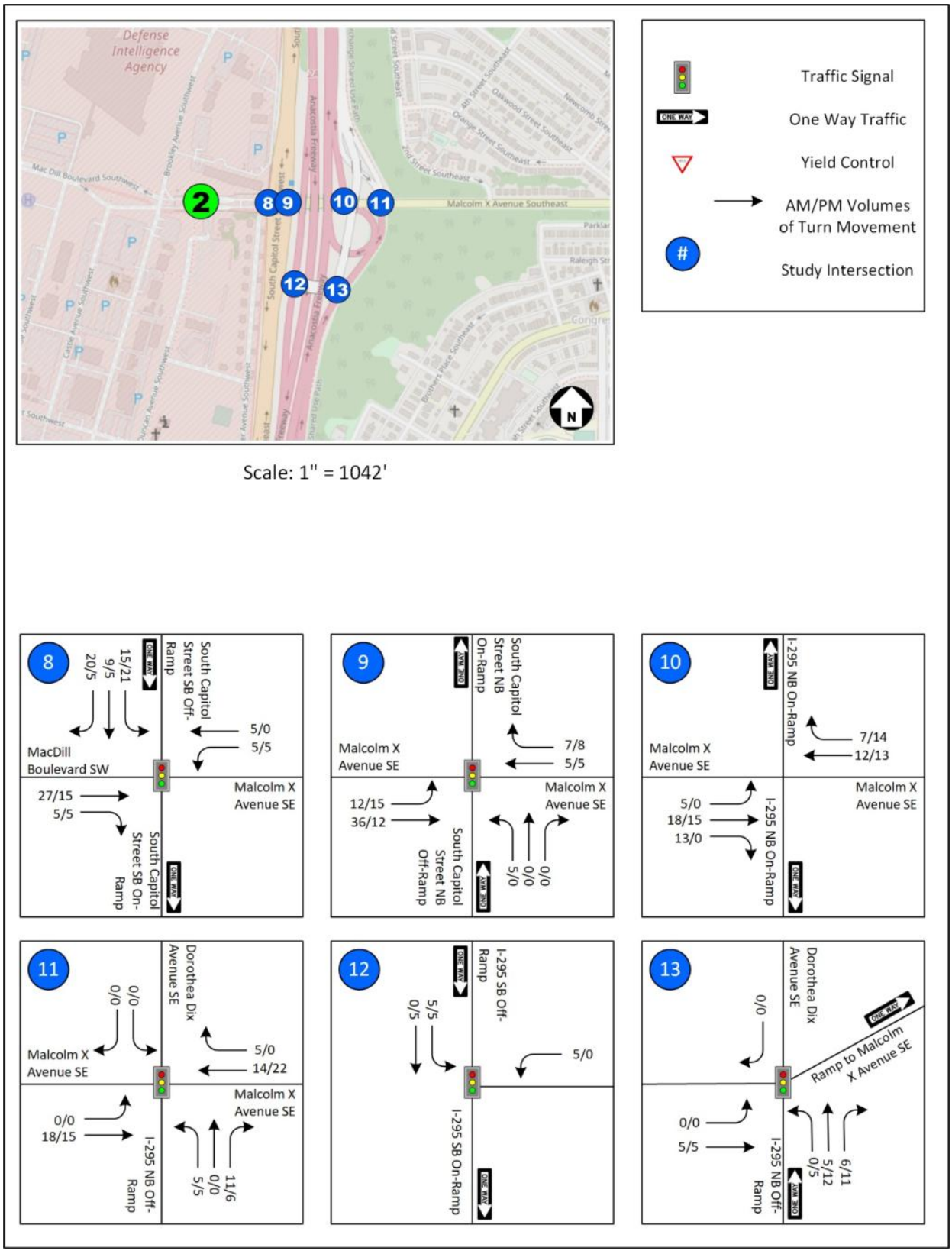


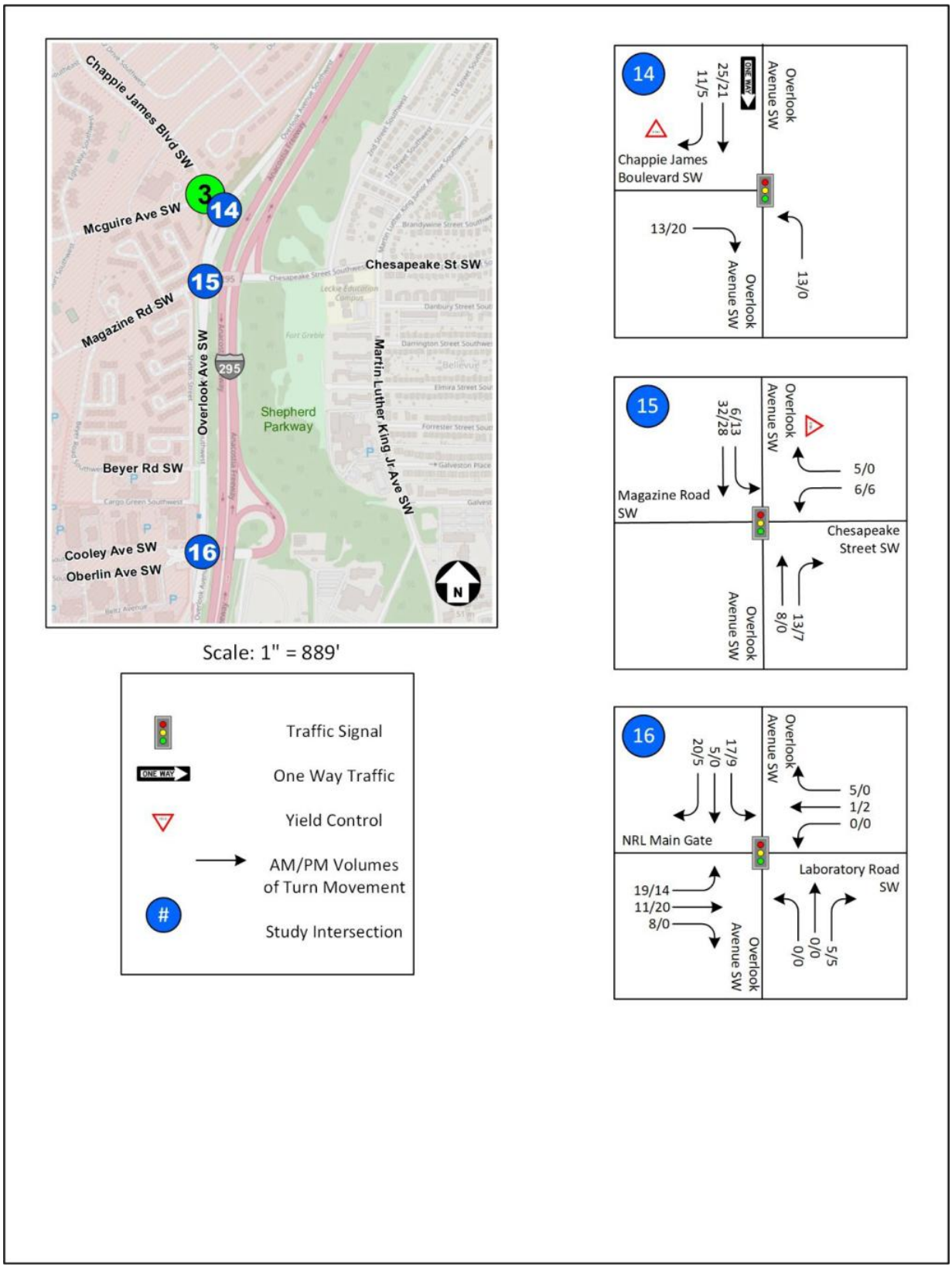
Figure 4-12C Total Forecasted Volumes – South Gate – Action Alternative 3



1 **Figure 4-13A Forecasted Truck Volumes – Firth Sterling Gate – Action Alternative 3**



1 **Figure 4-13B Forecasted Truck Volumes – Arnold Gate – Action Alternative 3**



1 **Figure 4-13C Forecasted Truck Volumes – South Gate – Action Alternative 3**

4.3 Traffic Analysis

An analysis of the study area intersections for the No Action Alternative and the three Action Alternatives was performed using Synchro. Two types of analyses were performed for traffic, including an intersection capacity analysis measuring delays and levels of service (which are based on delay according to HCM thresholds) and an intersection queueing analysis.

Section 4.3.1 provides a summary and discussion of the intersection capacity analysis results comparing each Action Alternative to the No Action Alternative. Section 4.3.2 provides a summary and discussion of the intersection queuing results comparing each Action Alternative to the No Action Alternative.

4.3.1 Action Alternatives 1 and 2 Traffic Analysis

Since Action Alternatives 1 and 2 are identical except for the lane configuration at Firth Sterling Gate, the forecasted traffic volumes and the lane configurations and signal timings and phasing for all of the intersections within the study area are also identical, such that the traffic analysis results for Action Alternatives 1 and 2 are the same.

4.3.1.1 Action Alternatives 1 and 2 Intersection Operations

Based on the Synchro signalized intersection analysis results, several signalized intersections and intersection approaches in the traffic study area would operate at satisfactory conditions (LOS D or better is considered a satisfactory operating level) under the Action Alternatives during the AM and PM peak hour time periods. However, based on Synchro analysis results, the following signalized intersections and intersection approaches in the study area would operate under unsatisfactory conditions (LOS E or worse) during peak hours under Action Alternatives 1 and 2:

- Suitland Parkway SE and I-295 SB Off-ramp (Intersection #1)
  - Off-ramp from southbound I-295 to southeast-bound Suitland Parkway SE during the AM and PM peak hour (shown as the NB approach in the summary tables)
- Suitland Parkway SE and I-295 NB Off-ramp/I-295 NB On-ramp (Intersection #2)
  - Northwest-bound Suitland Parkway SE during the AM and PM peak hour
- Suitland Parkway SE and Firth Sterling Avenue SE (Intersection #3)
  - Westbound Suitland Parkway SE during the AM peak hour
  - Northbound Firth Sterling Avenue SE during the AM and PM peak hour
  - Southbound Firth Sterling Avenue SE during the AM and PM peak hour
- South Capitol Street and Firth Sterling Avenue SE/Defense Blvd (Intersection #7)
  - Westbound Firth Sterling Avenue SE during the PM peak hour
- I-295 NB On-ramps/Dorothea Dix Avenue SE and Malcolm X Avenue SE (Intersection #11)
  - Northbound I-295 NB Off-ramp during the AM peak hour
- Overlook Avenue SW and Chappie James Boulevard (Intersection #14)
  - Northwest-bound Overlook Avenue SW during the AM peak hour
  - Southeast-bound Chappie James Boulevard during the PM peak hour
  - Southwest-bound Overlook Avenue SW during the PM peak hour
- Overlook Avenue SW and Chesapeake Street SW (Intersection #15)
  - Northbound Overlook Avenue SW during the AM peak hour
  - Southbound Overlook Avenue SW during the PM peak hour

- Overlook Avenue SW and NRL Main Gate/Laboratory Road SW (Intersection #16)
  - Westbound Laboratory Road SW during the AM peak hour
  - Southbound Overlook Avenue SW during the AM peak hour

Table 4-5 shows the delays and LOS results from the traffic analysis of Action Alternatives 1 and 2 (which use the same traffic volumes) to the No-Action Alternative during the AM peak hour. Table 4-6 makes this same comparison of alternatives results for the PM peak hour. Figures 4-14A, 4-14B, and 4-14C show the AM and PM LOS for the No Action Alternative. Figures 4-15A, 4-15B, and 4-15C show the AM and PM LOS for Action Alternatives 1 and 2.

Table 4-5 Synchro 2028 No-Action and Action Alternatives 1 & 2 – AM Peak Hour Operations Analysis

Intersection (ACISA #)	Approach	Movement	AM 2028 No-Action Alternative							AM 2028 Action Alternatives 1 & 2						
			Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS	Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
1. I-295 SB Ramps & Suitland Pkwy (2286)	NB	Right	75.8	E	0.85	75.8	E	16.6	B	75.8	E	0.85	75.8	E	16.6	B
	SEB	Thru/Right	12.7	B	0.26	12.7	B			12.7	B	0.26	12.7	B		
	NWB	Left	51.0	D	0.08	0.9	A			51.0	D	0.08	0.9	A		
		Thru	0.0	A	0.41					0.0	A	0.41				
2. Suitland Pkwy & I-295 NB Off Ramp/I-295 NB On Ramp (7159)	EB	Left	59.6	E	0.56	51.7	D	115.3	F	59.6	E	0.56	50.3	D	114.9	F
		Right	0.2	A	0.10					2.2	A	0.12				
	SEB	Left	106.8	F	0.51	33.0	C			106.8	F	0.51	33.0	C		
		Thru	26.3	C	0.40					26.3	C	0.40				
	NWB	Thru	222.0	F	1.45	159.0	F			222.0	F	1.45	159.0	F		
		Right	19.9	B	0.80					19.9	B	0.80				
3. Firth Sterling Ave SE/Firth Sterling Ave SE & Suitland Pkwy (4159)	EB	Left	146.0	F	1.08	46.9	D	85.2	F	146.1	F	1.08	46.7	D	85.1	F
		Thru	28.8	C	0.58					29.1	C	0.58				
		Right	9.7	A	0.21					10.3	B	0.24				
	WB	Left	84.0	F	0.68	100.0	F			84.0	F	0.68	100.0	F		
		Thru/Right	101.1	F	1.12					101.1	F	1.12				
	NB	Left	76.3	E	0.70	79.2	E			76.3	E	0.70	79.2	E		
		Thru/Right	81.6	F	0.77					81.6	F	0.77				
	SB	Left	59.4	E	0.33	98.8	F			59.4	E	0.33	98.8	F		
		Thru	76.6	E	0.50					76.6	E	0.50				
		Right	111.7	F	0.95					111.7	F	0.95				

Table 4-5 Synchro 2028 No-Action and Action Alternatives 1 & 2 – AM Peak Hour Operations Analysis (continued)

Intersection (ACISA #)	Approach	Movement	AM 2028 No-Action Alternative							AM 2028 Action Alternatives 1 & 2						
			Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS	Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
4. Sumner Rd SE/Barry Rd SE & Firth Sterling Ave SE (4268)	EB	Thru	1.8	A	0.14	1.8	A	6.2	A	1.8	A	0.14	1.8	A	6.1	A
	WB	Thru	3.0	A	0.24	3.0	A			3.1	A	0.25	3.1	A		
	SEB	Left	69.1	E	0.27	50.3	D			69.1	E	0.27	50.2	D		
		Thru/Right	0.0	A	0.01					0.0	A	0.01				
	NWB	Thru	26.1	C	0.52	26.1	C			26.1	C	0.52	26.1	C		
5. Eaton Rd SE & Firth Sterling Ave SE (4270)	EB	Left/Thru/Right	2.2	A	0.13	2.2	A	5.2	A	2.2	A	0.13	2.2	A	5.2	A
	WB	Thru	2.8	A	0.25	2.8	A			2.9	A	0.26	2.9	A		
	NWB	Left/Thru/Right	28.0	C	0.46	28.0	C			28.0	C	0.46	28.0	C		
6. St Elizabeth Rd SE & Stevens Rd SE & Firth Sterling Ave SE (4269)	EB	Thru/Right	4.7	A	0.15	4.7	A	11.3	B	4.0	A	0.15	4.0	A	11.1	B
	WB	Sharp Left	4.9	A	0.31	4.9	A			5.1	A	0.33	5.1	A		
		Left														
		Thru/Right														
	NB	Left	56.3	E	0.57	30.1	C			56.3	E	0.57	30.0	C		
		Right	4.3	A	0.30					4.4	A	0.31				
7. South Capitol St & Defense Blvd/Firth Sterling Ave SE (4186)	EB	Left	55.4	E	0.27	45.6	D	29.3	C	55.4	E	0.27	45.6	D	31.1	C
		Thru	52.1	D	0.17					52.1	D	0.17				
		Right	0.4	A	0.05					0.4	A	0.05				
	WB	Left	37.6	D	0.31	44.1	D			35.6	D	0.28	43.1	D		
		Thru/Right	46.4	D	0.72					45.7	D	0.72				
	NB	Left	22.3	C	0.12	28.8	C			22.9	C	0.13	31.8	C		
		Thru/Right	29.1	C	0.68					32.2	C	0.73				
	SB	Left	24.0	C	0.54	14.8	B			28.6	C	0.60	16.6	B		
		Thru/Right	11.8	B	0.23					12.6	B	0.25				

Table 4-5 Synchro 2028 No-Action and Action Alternatives 1 & 2 – AM Peak Hour Operations Analysis (continued)

Intersection	Approach	Movement	AM 2028 No-Action Alternative							AM 2028 Action Alternatives 1 & 2						
			Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS	Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
8. S Capitol St SB Ramps & MacDill Blvd SW/Malcolm X Ave	EB	Thru	21.8	C	0.14	17.3	B	11.7	B	21.8	C	0.14	17.3	A	11.6	B
		Right	0.3	A	0.09					0.3	A	0.09				
	WB	Thru	5.0	A	0.47	5.0	A			5.0	A	0.47	5.0	A		
	SB	Left	29.6	C	0.46	14.5	B			29.6	C	0.46	14.4	B		
		Thru	9.8	A	0.50					9.4	A	0.49				
		Right	7.4	A	0.47					7.4	A	0.47				
9. S Capitol St NB Ramps & Malcolm X Ave SE	EB	Left	8.9	A	0.11	10.3	B	21.0	C	8.9	A	0.11	10.3	B	21.0	C
		Thru	10.5	B	0.23					10.5	B	0.23				
	WB	Thru/Right	28.4	C	0.66	28.4	C			28.4	C	0.66	28.4	C		
	NB	Left/Thru/Right	27.9	C	0.09	27.9	C			27.9	C	0.09	27.9	C		
11. I-295 NB Ramps /Dorothea Dix Ave SE & Malcolm X Ave SE	EB	Left	4.4	A	0.13	3.4	A	30.3	C	4.4	A	0.13	3.4	A	31.8	C
		Thru	4.5	A	0.29					4.5	A	0.29				
		Right to Ramp	0.1	A	0.08					0.1	A	0.08				
	WB	Thru/Right	19.1	B	0.43	19.1	B			19.1	B	0.43	19.1	B		
	NB	Left	100.2	F	1.06	72.6	E			100.2	F	1.06	72.5	E		
		Thru	7.9	A	0.38					7.9	A	0.38				
	SB	Left	44.2	D	0.04	8.0	A			44.2	D	0.04	8.0	A		
		Right	0.5	A	0.08					0.5	A	0.08				
12. I-295 SB Ramps & Crossover	WB	Left	20.6	C	0.14	20.6	C	7.2	A	20.6	C	0.14	20.6	C	6.9	A
	SB	Thru	2.8	A	0.06	2.8	A			2.3	A	0.07	2.3	A		
		Left														

Table 4-5 Synchro 2028 No-Action and Action Alternatives 1 & 2 – AM Peak Hour Operations Analysis (continued)

Intersection (ACISA #)	Approach	Movement	AM 2028 No-Action Alternative							AM 2028 Action Alternatives 1 & 2						
			Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS	Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
13. I-295 NB Off Ramp/Dorothea Dix Ave SE & Crossover & I-295 NB Ramp (4284)	EB	Left	23.1	C	0.36	23.1	C	6.4	A	22.2	C	0.36	22.2	C	6.4	A
	NB	Left	7.9	A	0.46	5.0	A			7.9	A	0.46	5.0	A		
		Thru														
		Right	2.1	A	0.45					2.1	A	0.45				
	SB	Right	0.0	A	0.01	0.0	A			0.0	A	0.01	0.0	A		
14. Overlook Ave SW & Chappie James Blvd (4001)	SEB	Right	0.1	A	0.08	0.1	A	40.9	D	0.1	A	0.08	0.1	A	45.5	D
	NWB	Thru	48.1	D	1.07	48.1	D			55.8	E	1.05	55.8	E		
	SWB	Thru	22.8	C	0.25	42.2	D			22.8	C	0.25	42.2	D		
		Right	95.2	F	0.95					95.2	F	0.95				
15. Overlook Ave SW & Chesapeake St SW (4169)	WB	Left	26.9	C	0.75	26.9	C	53.0	D	26.0	C	0.74	26.0	C	49.9	D
		Right														
	NB	Thru	100.4	F	0.16	92.5	F			93.2	F	1.15	85.7	F		
		Right	0.0	A	0.08					0.0	A	0.08				
	SB	Left	9.4	A	0.23	5.1	A			6.9	A	0.23	7.1	A		
		Thru	3.5	A	0.25					7.1	A	0.25				
16. Overlook Ave SW & NRL Main Gate/Laboratory Rd SW (4170)	EB	Left/Thru	29.4	C	0.03	17.7	B	105.2	F	29.4	C	0.03	17.7	B	102.9	F
		Right	0.3	A	0.04					0.3	A	0.04				
	WB	Left/Thru	9.1	A	0.28	86.4	F			9.1	A	0.28	81.8	F		
		Right	120.2	F	1.21					113.9	F	1.19				
	NB	Left/Thru/Right	20.8	C	0.14	20.8	C			20.8	C	0.14	20.8	C		
	SB	Left/Thru/Right	156.2	F	1.23	156.2	F			158.1	F	1.23	158.1	F		

Notes:
EB = Eastbound, WB = Westbound; NB = Northbound; SB = Southbound
LOS = Level of Service
V/C = Volume to Capacity ratio
Delay is measured in seconds per vehicle.
Red and yellow cells denote intersections or approaches operating at unsatisfactory conditions.
Table shows Highway Capacity Manual 2000 results.

Table 4-6 Synchro 2028 No-Action and Action Alternatives 1 & 2 – PM Peak Hour Operations Analysis

Intersection (ACISA #)	Approach	Movement	PM 2028 No-Action Alternative							PM 2028 Action Alternatives 1 & 2						
			Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS	Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
1. I-295 SB Ramps & Suitland Pkwy (2286)	NB	Right	89.2	F	0.86	89.2	F	16.1	B	89.2	F	0.86	89.2	F	16.1	B
	SEB	Thru/Right	8.8	A	0.37	8.8	A			8.8	A	0.38	8.8	A		
	NWB	Left	46.1	D	0.07	0.6	A			46.1	D	0.07	0.6	A		
		Thru	0.0	A	0.28					0.0	A	0.28				
2. Suitland Pkwy & I-295 NB Off Ramp/I-295 NB On Ramp (7159)	EB	Left	37.2	D	0.14	25.3	C	66.6	E	37.2	D	0.14	25.0	C	66.5	E
		Right	0.6	A	0.08					0.9	A	0.08				
	SEB	Left	91.4	F	0.42	32.2	C			91.5	F	0.42	32.3	C		
		Thru	28.9	C	0.61					29.0	C	0.61				
	NWB	Thru	139.6	F	1.24	97.3	F			139.6	F	1.24	97.3	F		
		Right	1.6	A	0.51					1.6	A	0.51				
3. Firth Sterling Ave SE/Firth Sterling Ave SE & Suitland Pkwy (4159)	EB	Left	76.2	E	0.71	49.7	D	86.1	F	76.4	E	0.71	49.6	D	86.1	F
		Thru	51.8	D	0.99					51.8	D	0.99				
		Right	1.9	A	0.14					1.9	A	0.15				
	WB	Left	134.5	F	0.89	52.1	D			134.5	F	0.89	52.1	D		
		Thru/Right	45.1	D	0.66					45.1	D	0.66				
	NB	Left	125.6	F	0.72	121.8	F			125.6	F	0.72	121.8	F		
		Thru/Right	119.5	F	1.04					119.5	F	1.04				
	SB	Left	131.5	F	1.09	158.6	F			131.5	F	1.09	158.6	F		
		Thru	53.0	D	0.42					53.0	D	0.42				
		Right	196.7	F	1.33					196.7	F	1.33				

Table 4-6 Synchro 2028 No-Action and Action Alternatives 1 & 2 – PM Peak Hour Operations Analysis (continued)

Intersection (ACISA #)	Approach	Movement	PM 2028 No-Action Alternative							PM 2028 Action Alternatives 1 & 2						
			Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS	Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
4. Sumner Rd SE/Barry Rd SE & Firth Sterling Ave SE (4268)	EB	Thru	2.6	A	0.23	2.6	A	3.9	A	2.6	A	0.23	2.6	A	3.9	A
	WB	Thru	4.2	A	0.26	4.2	A			4.2	A	0.26	4.2	A		
	SEB	Left	36.3	D	0.05	19.6	B			36.3	D	0.05	19.6	B		
		Thru/Right	0.0	A	0.01					0.0	A	0.01				
	NWB	Thru	10.1	B	0.30	10.1	B			10.1	B	0.30	10.1	B		
5. Eaton Rd SE & Firth Sterling Ave SE (4270)	EB	Left/Thru/Right	3.0	A	0.27	3.0	A	3.4	A	3.1	A	0.27	3.1	A	3.4	A
	WB	Thru	0.7	A	0.21	0.7	A			0.7	A	0.21	0.7	A		
	NWB	Left/Thru/Right	21.1	C	0.33	21.1	C			21.3	C	0.33	21.3	C		
6. St Elizabeth Rd SE & Stevens Rd SE & Firth Sterling Ave SE (4269)	EB	Thru/Right	0.9	A	0.20	0.9	A	10.5	B	0.9	A	0.20	0.9	A	10.5	B
	WB	Sharp Left	4.3	A	0.18	4.3	A			4.3	A	0.18	4.3	A		
		Left														
		Thru/Right														
	NB	Left	56.3	E	0.55	29.6	C			56.3	E	0.55	29.6	C		
		Right	14.4	B	0.46					14.4	B	0.46				
7. South Capitol St & Defense Blvd/Firth Sterling Ave SE (4186)	EB	Left	45.3	D	0.31	36.8	D	30.8	C	45.3	D	0.31	36.8	D	30.9	C
		Thru	51.6	D	0.55					51.6	D	0.55				
		Right	10.2	B	0.37					10.2	B	0.37				
	WB	Left	68.2	E	0.69	59.7	E			68.2	E	0.69	59.4	E		
		Thru/Right	50.5	D	0.58					50.2	D	0.58				
	NB	Left	26.2	C	0.06	14.7	B			26.4	C	0.06	14.7	B		
		Thru/Right	14.3	B	0.22					14.4	B	0.22				
	SB	Left	19.6	B	0.34	23.5	C			19.7	B	0.34	23.6	C		
		Thru/Right	24.1	C	0.62					24.2	C	0.62				

Table 4-6 Synchro 2028 No-Action and Action Alternatives 1 & 2 – PM Peak Hour Operations Analysis (continued)

Intersection	Approach	Movement	PM 2028 No-Action Alternative							PM 2028 Action Alternatives 1 & 2						
			Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS	Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
8. S Capitol St SB Ramps & MacDill Blvd SW/Malcolm X Ave SE	EB	Thru	24.7	C	0.39	20.2	B	28.8	C	24.7	C	0.39	20.2	A	28.8	C
		Right	16.5	B	0.86					16.5	B	0.86				
	WB	Thru	5.1	A	0.19	5.1	A			5.1	A	0.19	5.1	A		
	SB	Left	51.9	D	0.58	48.8	D			51.9	D	0.58	48.8	D		
		Thru	67.0	E	0.61					67.0	E	0.61				
		Right	3.9	A	0.28					3.9	A	0.28				
9. S Capitol St NB Off Ramps & Malcolm X Ave SE	EB	Left	6.7	A	0.18	10.3	B	10.8	B	6.7	A	0.18	10.1	B	10.8	B
		Thru	10.5	B	0.53					10.5	B	0.53				
	WB	Thru/Right	13.5	B	0.24	13.5	B			13.5	B	0.24	13.5	B		
	NB	Left/Thru/Right	21.6	C	0.03	28.7	C			21.6	C	0.03	21.6	C		
11. I-295 NB On Ramps/ Dorothea Dix Ave SE & Malcolm X Ave SE	EB	Left	3.1	A	0.02	3.3	A	8.7	A	3.1	A	0.02	3.3	A	8.7	A
		Thru	4.6	A	0.51					4.6	A	0.51				
		Right to Ramp	0.2	A	0.18					0.2	A	0.18				
	WB	Thru/Right	11.6	B	0.25	11.6	B			11.6	B	0.25	11.6	B		
	NB	Left	47.7	D	0.34	23.4	C			47.6	D	0.34	23.4	C		
		Thru	16.8	B	0.60					16.8	B	0.60				
	SB	Left	44.9	D	0.08	9.9	A			44.9	D	0.08	9.9	A		
		Right	5.0	A	0.21					5.0	A	0.21				
12. I-295 SB On Ramps & Crossover	WB	Left	21.0	C	0.53	21.0	C	15.5	B	21.0	C	0.53	21.0	C	13.7	B
	SB	Thru	6.1	A	0.14	6.1	A			6.4	A	0.24	6.4	A		
		Left														

Table 4-6 Synchro 2028 No-Action and Action Alternatives 1 & 2 – PM Peak Hour Operations Analysis (continued)

Intersection (ACISA #)	Approach	Movement	PM 2028 No-Action Alternative							PM 2028 Action Alternatives 1 & 2						
			Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS	Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
13. I-295 NB Off Ramp/Dorothea Dix Ave SE & Crossover & I-295 NB Ramp (4284)	EB	Left	17.7	B	0.24	17.7	B	3.1	A	16.9	B	0.24	16.9	B	3.0	A
	NB	Left	4.6	A	0.04	2.1	A			4.6	A	0.04	2.1	A		
		Thru														
		Right	1.6	A	0.18					1.6	A	0.18				
	SB	Right	0.2	A	0.15	0.2	A			0.2	A	0.15	0.2	A		
14. Overlook Ave SW & Chappie James Blvd (4001)	SEB	Right	178.2	F	1.30	178.2	F	159.4	F	178.2	F	1.30	178.2	F	159.4	F
	NWB	Thru	24.7	C	0.20	24.7	C			24.7	C	0.20	24.7	C		
	SWB	Thru	178.1	F	1.33	172.8	F			178.1	F	1.33	172.8	F		
		Right	2.1	A	0.04					2.1	A	0.04				
15. Overlook Ave SW & Chesapeake St SW (4169)	WB	Left	19.4	B	0.58	19.4	B	81.7	F	19.4	B	0.58	19.4	B	81.7	F
		Right														
	NB	Thru	17.6	B	0.18	12.9	B			17.6	B	0.18	12.9	B		
		Right	5.6	A	0.14					5.6	A	0.14				
	SB	Left	4.0	A	0.27	100.0	F			4.0	A	0.27	100.0	F		
		Thru	117.5	F	1.23					117.5	F	1.23				
16. Overlook Ave SW & NRL Main Gate/Laboratory Rd SW (4170)	EB	Left/Thru	37.0	D	0.28	43.2	D	38.8	D	37.0	D	0.28	43.6	D	23.1	C
		Right	45.9	D	0.85					46.4	D	0.85				
	WB	Left/Thru	48.5	D	0.60	25.2	C			46.3	D	0.58	24.4	C		
		Right	10.8	B	0.54					10.8	B	0.54				
	NB	Left/Thru/Right	3.9	A	0.04	3.9	A			3.9	A	0.04	3.9	A		
	SB	Left/Thru/Right	17.5	B	0.99	17.5	B			17.5	B	0.99	17.5	B		

Notes:

EB = Eastbound, WB = Westbound; NB = Northbound; SB = Southbound

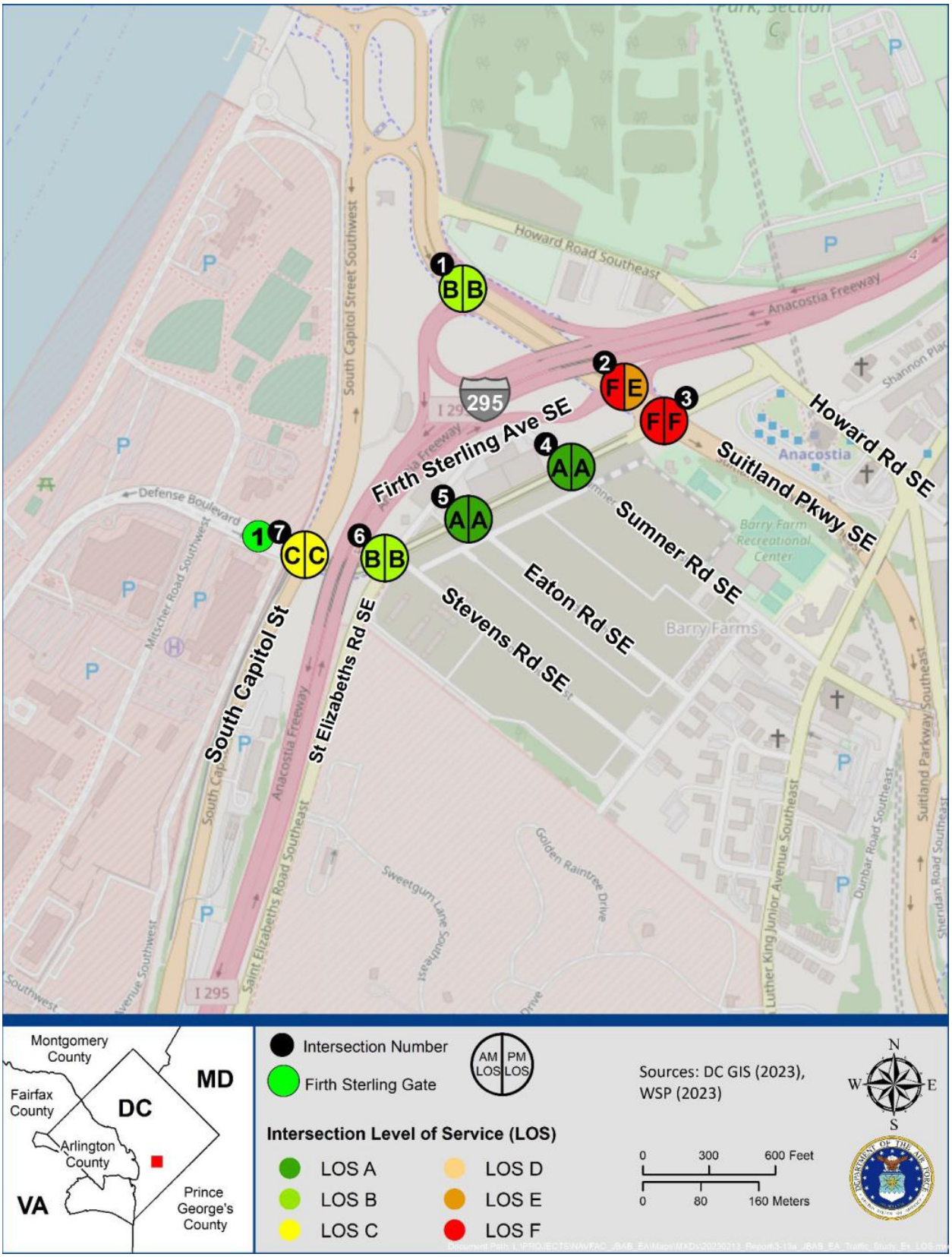
LOS = Level of Service

V/C = Volume to Capacity ratio

Delay is measured in seconds per vehicle.

Red and yellow cells denote intersections or approaches operating at unsatisfactory conditions.

Table shows Highway Capacity Manual 2000 results.



1 **Figure 4-14A No-Action Alternative – AM and PM Peak Hour LOS – Firth Sterling Gate**

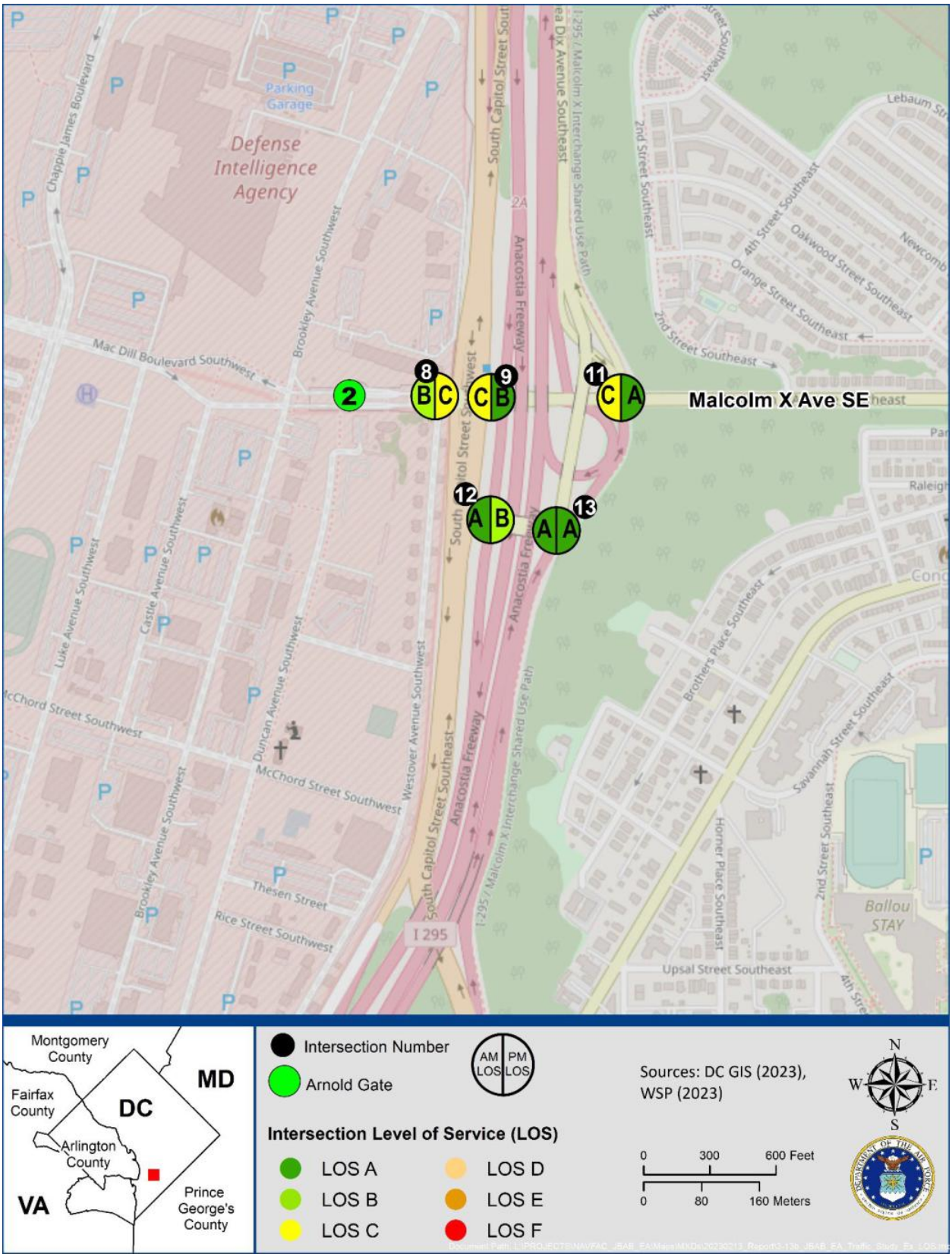


Figure 4-14B No-Action Alternative – AM and PM Peak Hour LOS – Arnold Gate

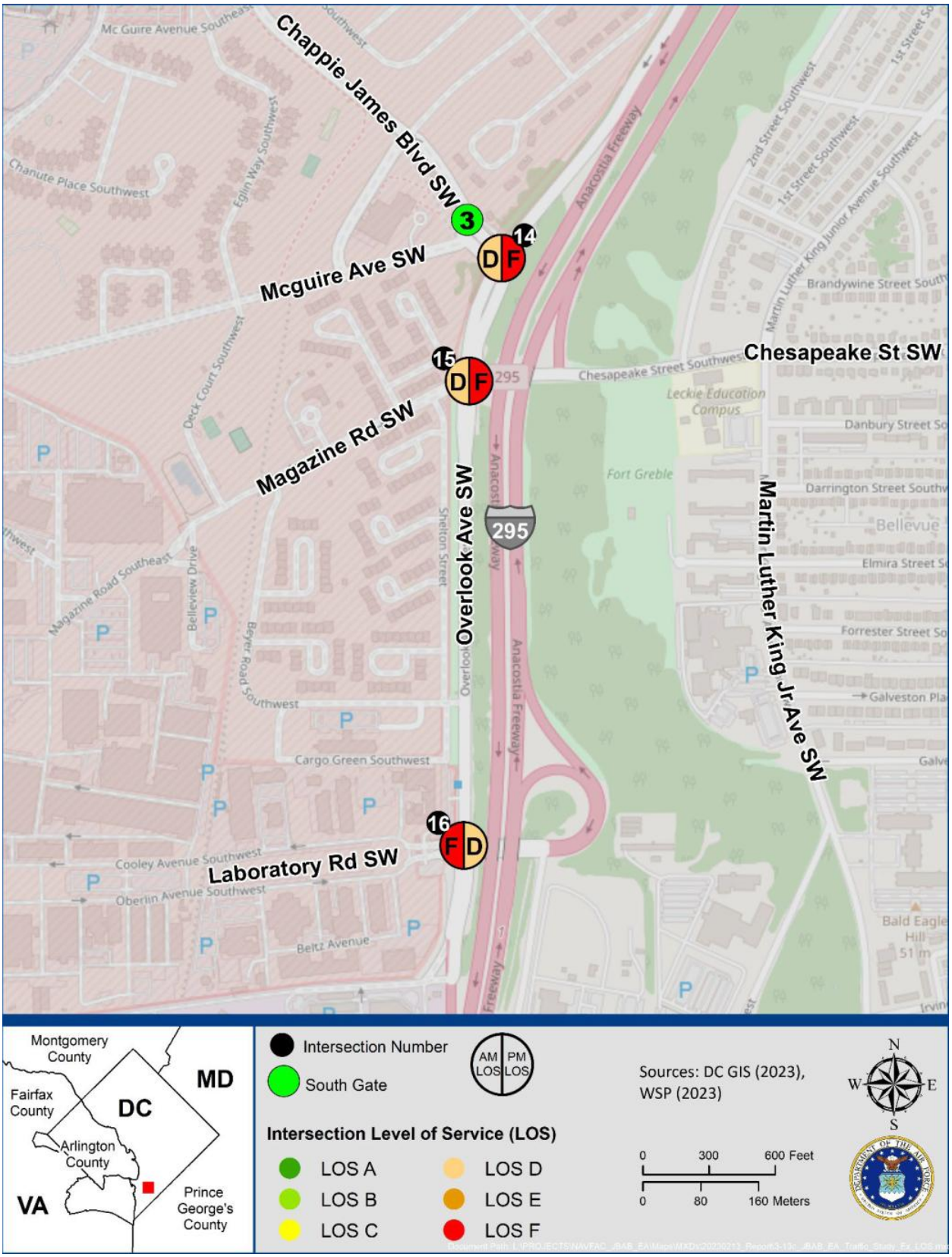
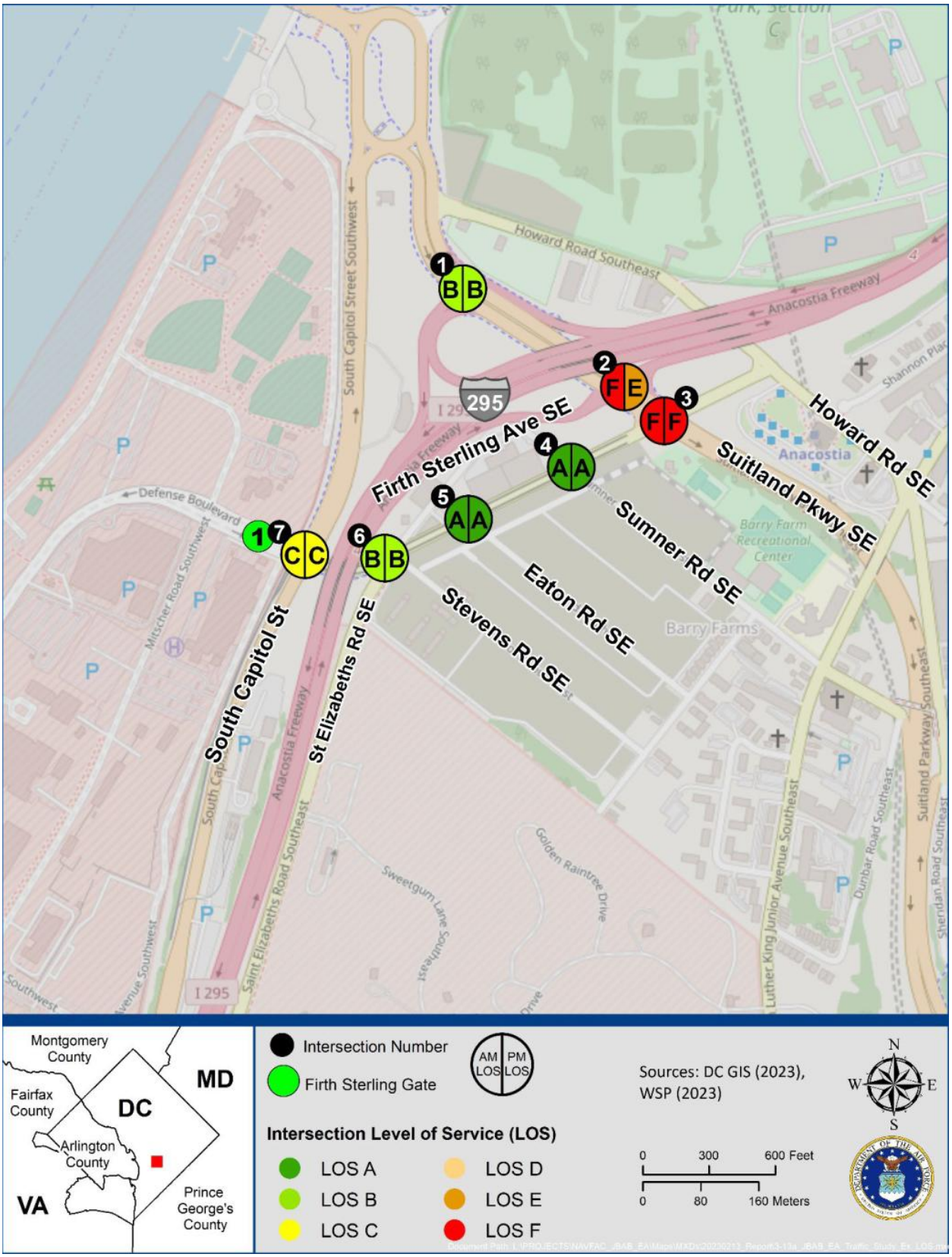
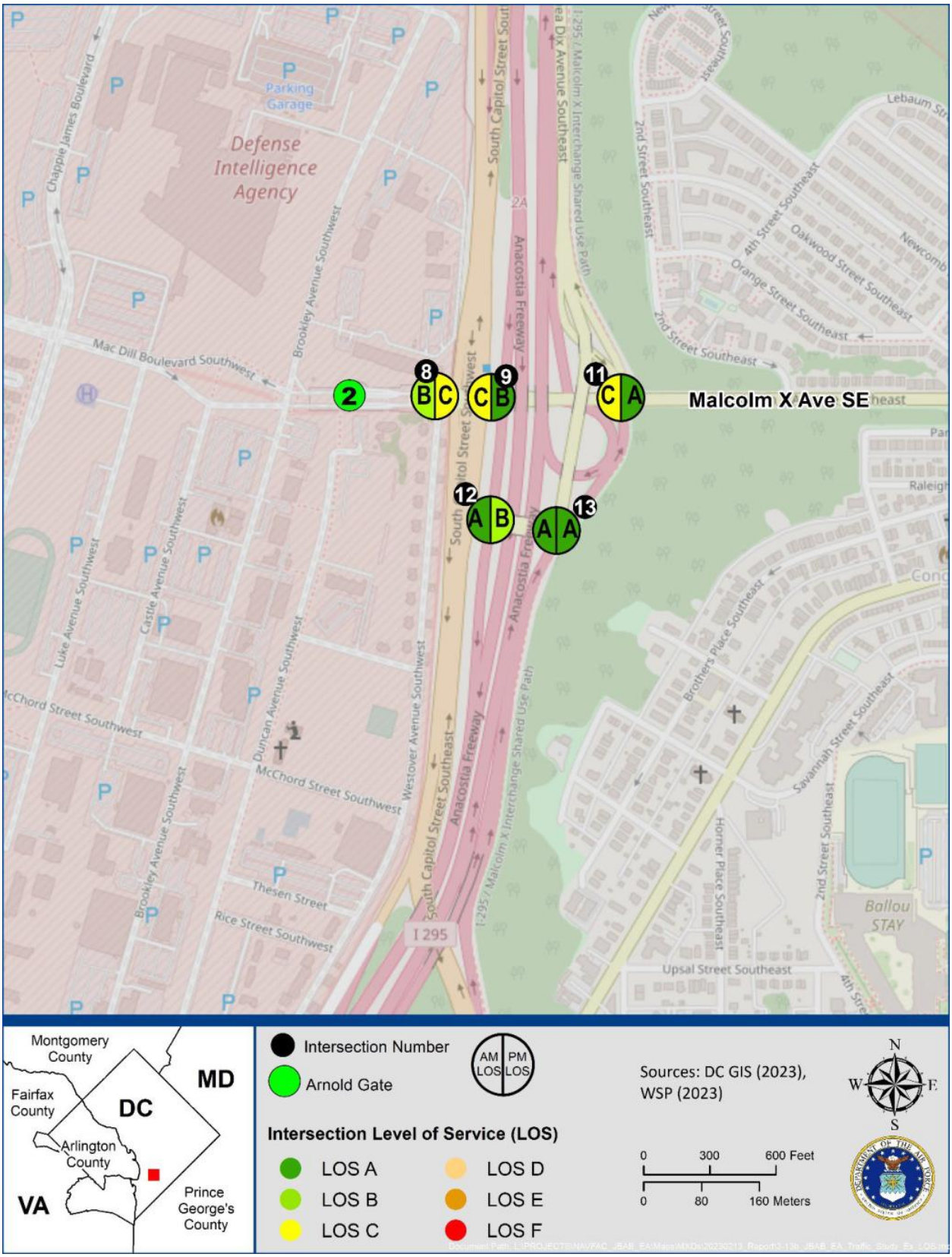


Figure 4-14C No-Action Alternative – AM and PM Peak Hour LOS – South Gate



1 **Figure 4-15A Action Alternatives 1 & 2 – AM and PM Peak Hour LOS – Firth Sterling Gate**



1 **Figure 4-15B Action Alternatives 1 & 2 – AM and PM Peak Hour LOS – Arnold Gate**

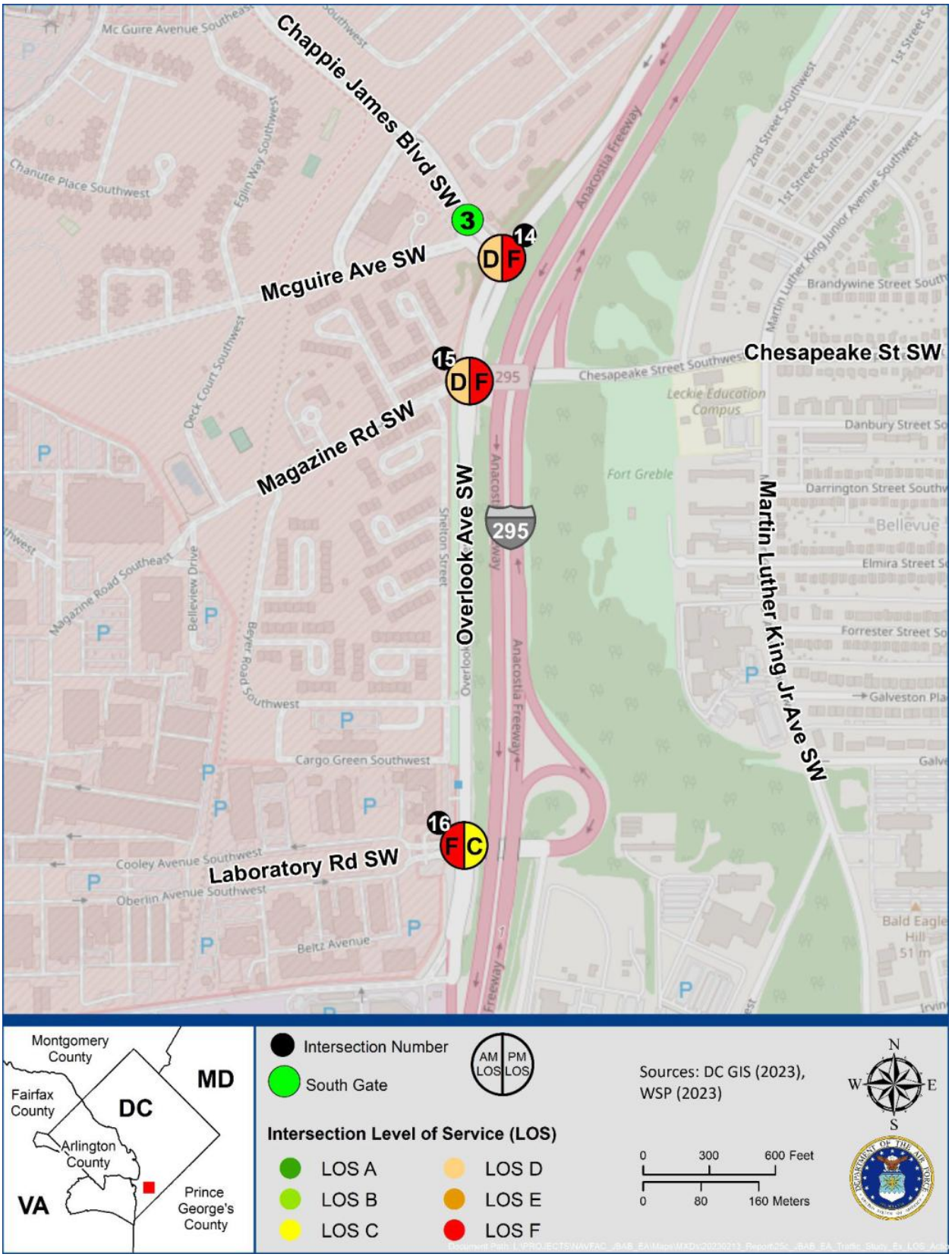


Figure 4-15C Action Alternatives 1 & 2 – AM and PM Peak Hour LOS – South Gate

4.3.1.2 Action Alternatives 1 and 2 Intersection Queue Lengths

Based on the Synchro queue results of all study intersections, five signalized intersections have lane groups that would experience queuing lengths exceeding the available storage capacity. The following lane groups, with a comparison to the queues for the No Action Alternative, would exceed the available storage under Action Alternatives 1 and 2:

- Suitland Parkway SE and I-295 SB Off-ramp (Intersection #1)
  - Off-ramp from southbound I-295 to southeast-bound Suitland Parkway SE during the AM and PM peak hour (shown as the NB approach in the summary tables)
- Suitland Parkway SE and I-295 NB Off-ramp/I-295 NB On-ramp (Intersection #2)
  - Off-ramp from northbound I-295 to northwest-bound Suitland Parkway SE during the AM peak hour (shown as the EB approach in the summary tables)
  - Northwest-bound Suitland Parkway SE (though movement) during the AM and PM peak hour
- Suitland Parkway SE and Firth Sterling Avenue SE (Intersection #3)
  - Eastbound Suitland Parkway SE (through movement) during the AM and PM peak hour
  - Westbound Suitland Parkway SE (through movement) during the AM peak hour
  - Northbound Fifth Sterling Ave SE (through movement) during the PM peak hour
  - Southbound Fifth Sterling Ave SE to Suitland Parkway during the PM peak hour
- Malcolm X Avenue SE and S Capitol Street NB ramps (Intersection #9)
  - Eastbound Malcolm X Avenue SE (through movement) during the AM and PM peak hour
- Overlook Avenue SW and Chesapeake St SW (Intersection #15)
  - Southbound Overlook Avenue SW (through movement) during the PM peak hour

All other intersection lane groups would experience queues that are adequately stored. Queuing results comparing Action Alternatives 1 and 2 to the No-Action Alternative are depicted in Table 4-7.

Table 4-7 Synchro No-Action Alternative and Action Alternatives 1 & 2 – AM and PM Peak Hour Queue Analysis

Intersection (ACISA #)	Approach	Movement	Turning Bay/Link Length (feet)	AM 2028 No-Action Alternative		AM 2028 Action Alternatives 1 & 2		PM 2028 No-Action Alternative		PM 2028 Action Alternatives 1 & 2	
				50th Percentile (feet)	95th Percentile (feet)	50th Percentile (feet)	95th Percentile (feet)	50th Percentile (feet)	95th Percentile (feet)	50th Percentile (feet)	95th Percentile (feet)
1. I-295 SB Ramps & Suitland Pkwy (2286)	NB	Right	249	400	450	400	450	292	349	292	349
	SEB	Thru	603	138	190	138	190	191	254	193	255
	NWB	Left	701	40	36	40	36	<25	<25	<25	<25
		Thru	701	0	0	0	0	0	0	0	0
2. Suitland Pkwy & I-295 NB Off Ramp/I-295 NB On Ramp (7159)	EB	Left	315	263	326	263	326	71	101	71	101
		Right	315	0	0	0	<25	0	<25	0	<25
	SEB	Left	701	73	111	73	111	55	94	55	94
		Thru	701	424	468	424	468	384	550	385	550
	NWB	Thru	343	2076	1798	2076	1798	1288	1196	1288	1196
		Right	343	218	106	218	106	<25	<25	<25	<25
3. Firth Sterling Ave SE/Firth Sterling Ave SE & Suitland Pkwy (4159)	EB	Left	343	170	272	170	271	94	139	94	139
		Thru	343	486	560	486	560	949	1077	948	1077
		Right	343	163	228	182	263	<25	<25	<25	<25
	WB	Left	797	223	320	223	320	139	271	139	271
		Thru	797	1478	1536	1478	1536	473	527	473	527
	NB	Left	479	169	250	169	250	177	242	177	242
		Thru	479	220	348	220	348	340	648	341	647
	SB	Left	555	54	98	54	98	334	542	334	542
		Thru	555	132	208	132	208	197	283	197	283
		Right	555	238	460	238	460	1032	1296	1032	1296
4. Sumner Rd SE/Barry Rd SE & Firth Sterling Ave SE (4268)	EB	Thru	531	<25	27	<25	27	33	49	33	50
	WB	Thru	479	38	70	40	74	82	118	82	119
	SEB	Left	345	<25	36	<25	35	<25	<25	<25	<25
		Thru	1504	0	0	0	0	0	0	0	0
	NWB	Thru	250	<25	78	<25	78	0	30	0	30
5. Eaton Rd SE & Firth Sterling Ave SE	EB	Thru	396	<25	32	<25	34	38	68	38	68
	WB	Thru	531	38	64	40	66	<25	<25	<25	<25
	NWB	Right	344	25	76	25	76	<25	54	<25	54

Table 4-7 Synchro No-Action Alternative and Action Alternatives 1 & 2 – AM and PM Peak Hour Queue Analysis (continued)

Intersection (ACISA #)	Approach	Movement	Turning Bay/Link Length (feet)	AM 2028 No-Action Alternative		AM 2028 Action Alternatives 1 & 2		PM 2028 No-Action Alternative		PM 2028 Action Alternatives 1 & 2	
				50th Percentile (feet)	95th Percentile (feet)	50th Percentile (feet)	95th Percentile (feet)	50th Percentile (feet)	95th Percentile (feet)	50th Percentile (feet)	95th Percentile (feet)
6. St Elizabeth Rd SE & Stevens Rd SE & Firth Sterling Ave SE (4269)	EB	Thru	415	31	54	0	52	<25	<25	<25	<25
	WB	Sharp Left	396	51	66	53	69	31	56	32	56
		Left									
		Thru									
	NB	Left	3062	104	162	104	162	96	153	96	153
		Right	3062	0	<25	0	<25	<25	56	<25	56
7. South Capitol St & Defense Blvd/Firth Sterling Ave SE (4186)	EB	Left	871	27	60	27	60	61	111	61	111
		Thru	871	21	51	<25	51	125	198	125	198
		Right	871	0	0	0	0	0	53	0	53
	WB	Left	415	74	123	74	124	166	241	168	241
		Thru	415	189	321	198	392	116	188	118	190
	NB	Left	1207	23	52	<25	52	<25	<25	<25	<25
		Thru	1207	325	414	331	414	42	84	42	84
	SB	Left	784	49	86	50	86	69	133	70	133
		Thru	784	61	94	62	94	305	444	306	446
8. S Capitol St SE SB On Ramp/S Capitol St SE SB Off Ramp & MacDill Blvd SW/Malcolm X Ave SE (7249)	EB	Thru	800	34.0	53.0	34.0	53.0	122.0	157.0	122.0	157.0
		Right	800	0.0	0.0	0.0	0.0	98.0	408.0	98.0	408.0
	WB	Thru	102	27.0	33.0	27.0	33.0	<25	<25	<25	<25
	SB	Left	757	136.0	216.0	136.0	216.0	189.0	290.0	189.0	290.0
		Thru	757	35.0	116.0	32.0	112.0	202.0	310.0	202.0	310.0
		Right	757	30.0	104.0	30.0	104.0	0.0	38.0	0.0	38.0
9. S Capitol St SE NB Off Ramp/S Capitol St SE NB On Ramp & Malcolm X Ave SE (4249)	EB	Left	102	<25	41.0	<25	41.0	34.0	51.0	34.0	51.0
		Thru	102	84.0	115.0	84.0	115.0	174.0	208.0	174.0	208.0
	WB	Thru	322	220.0	202.0	220.0	202.00	52.0	86.0	52.0	86.00
	NB	Thru	693	<25	35.0	<25	35.0	<25	<25	<25	<25

Table 4-7 Synchro No-Action Alternative and Action Alternatives 1 & 2 – AM and PM Peak Hour Queue Analysis (continued)

Intersection (ACISA #)	Approach	Movement	Turning Bay/Link Length (feet)	AM 2028 No-Action Alternative		AM 2028 Action Alternatives 1 & 2		PM 2028 No-Action Alternative		PM 2028 Action Alternatives 1 & 2	
				50th Percentile (feet)	95th Percentile (feet)	50th Percentile (feet)	95th Percentile (feet)	50th Percentile (feet)	95th Percentile (feet)	50th Percentile (feet)	95th Percentile (feet)
11. I-295 NB On Ramp & I-295 NB Ramp/Dorothea Dix Ave SE & Malcolm X Ave SE (4283)	EB	Left	256	<25	<25	<25	<25	<25	<25	<25	<25
		Thru	256	29	41	29	41	58	85	58	85
		Right to Ramp	256	0	0	0	0	0	0	0	0
	WB	Thru	1405	180	241	180	241	84	132	84	132
	NB	Left	543	281	469	281	469	31	63	32	63
		Thru	543	<25	47	<25	47	0	60	0	60
	SB	Left	473	<25	<25	<25	<25	<25	<25	<25	<25
		Right	473	0	0	0	0	0	<25	0	21
12. I-295 SB On Ramp/I-295 SB Off	WB	Left	292	<25	28	<25	212	64	106	64	106
	SB	Thru	365	0	<25	0	285	<25	44	29	72
		Left	365								
13. I-295 NB Off Ramp/Dorothea Dix Ave SE & Crossover & I-	EB	Left	292	28	73	28	69	<25	47	<25	47
	NB	Left	408	77	167	77	167	<25	<25	<25	<25
		Thru	408								
		Right	408	0	34	0	34	0	<25	0	<25
	SB	Right	1142	0	0	0	0	0	0	0	0
14. Overlook Ave SW & Chappie James Blvd	SEB	Right	233	0	0	0	0	107	159	107	159
	NWB	Thru	605	231	191	179	280	44	66	44	66
	SWB	Thru	648	46	76	36	62	441	457	441	457
		Right	648	0	84	0	78	0	<25	0	<25
15. Overlook Ave SW & Chesapeake St SW (4169)	WB	Left	438	83	156	80	150	<25	53	<25	53
		Right	438	83	156	80	150	<25	53	<25	53
	NB	Thru	2147	382	251	372	249	50	98	50	98
		Right	2147	0	0	0	0	0	26	0	26
	SB	Left	577	<25	25	<25	42	29	31	29	31
		Thru	577	<25	37	49	110	863	647	863	647
16. Overlook Ave SW & NRL Main Gate/Laboratory Rd SW (4170)	EB	Thru	229	<25	<25	<25	<25	32	52	32	52
		Right	229	0	0	0	0	84	178	85	179
	WB	Thru	350	63	105	63	105	70	116	69	115
		Right	350	117	315	109	306	0	45	0	45
	NB	Thru	389	<25	<25	<25	<25	<25	<25	<25	<25
	SB	Thru	2147	141	236	140	236	394	131	394	131

Notes

~ 50th percentile volume exceeds capacity; queue may be longer (denoted in purple cells).

95th percentile volume exceeds capacity; queue may be longer (denoted in red cells).

EB = Eastbound, WB = Westbound, NB= Northbound, SB = Southbound

4.3.2 Action Alternative 3 Traffic Analysis

Action Alternative 3 would close Firth Sterling Gate to all vehicular traffic; therefore, the traffic volumes associated with this alternative are different from those used to evaluate Action Alternatives 1 and 2.

4.3.2.1 Action Alternative 3 Intersection Operations

Based on the Synchro signalized intersection analysis results, several signalized intersections and intersection approaches in the traffic study area would operate at satisfactory conditions (LOS D or better is considered a satisfactory operating level) under the Action Alternatives during the AM and PM peak hour time periods. However, based on Synchro analysis results, the following signalized intersection approaches in the study area would operate under unsatisfactory conditions (LOS E or worse) during peak hours under Action Alternative 3:

- Suitland Parkway SE and I-295 SB Off-ramp (Intersection #1)
  - Off-ramp from southbound I-295 to southeast-bound Suitland Parkway SE during the AM and PM peak hour (shown as the NB approach in the summary tables)
- Suitland Parkway SE and I-295 NB Off-ramp/I-295 NB On-ramp (Intersection #2)
  - Northwest-bound Suitland Parkway SE during the AM and PM peak hour
- Suitland Parkway SE and Firth Sterling Avenue SE (Intersection #3)
  - Westbound Suitland Parkway SE during the AM peak hour
  - Northbound Firth Sterling Avenue SE during the AM and PM peak hour
  - Southbound Firth Sterling Avenue SE during the AM and PM peak hour
- I-295 NB On-ramps/Dorothea Dix Avenue SE and Malcolm X Avenue SE (Intersection #11)
  - Northbound I-295 NB Off-ramp during the AM peak hour
- Overlook Avenue SW and Chappie James Boulevard (Intersection #14)
  - Northwest-bound Chappie James Boulevard during the AM peak hour
  - Southeast-bound Chappie James Boulevard during the PM peak hour
  - Southwest-bound Overlook Avenue SW during the PM peak hour
- Overlook Avenue SW and Chesapeake Street SW (Intersection #15)
  - Northbound Overlook Avenue SW during the AM peak hour
  - Southbound Overlook Avenue SW during the PM peak hour
- Overlook Avenue SW and NRL Main Gate/Laboratory Road SW (Intersection #16)
  - Westbound Laboratory Road SW during the AM peak hour
  - Southbound Overlook Avenue SW during the PM peak hour

Table 4-8 shows the delays and LOS results from the traffic analysis of Action Alternative 3 compared to the No-Action Alternative during the AM peak hour. Table 4-9 makes this same comparison for the PM peak hour. Figures 4-16A, 4-16B, and 4-16C show the AM and PM LOS for Action Alternative 3.

Table 4-8 Synchro 2028 No-Action and Action Alternative 3 – AM Peak Hour Operations Analysis

Intersection (ACISA #)	Approach	Movement	AM 2028 No-Action Alternative							AM 2028 Action Alternative 3						
			Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS	Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
1. I-295 SB Ramps & Suitland Pkwy (2286)	NB	Right	75.8	E	0.85	75.8	E	16.6	B	83.4	F	0.85	83.4	F	15.0	B
	SEB	Thru/Right	12.7	B	0.26	12.7	B			9.3	A	0.25	9.3	A		
	NWB	Left	51.0	D	0.08	0.9	A			61.8	E	0.10	1.1	A		
		Thru	0.0	A	0.41					0.0	A	0.41				
2. Suitland Pkwy & I-295 NB Off Ramp/I-295 NB On Ramp (7159)	EB	Left	59.6	E	0.56	51.7	D	115.3	F	59.6	E	0.56	52.9	D	114.6	F
		Right	0.2	A	0.10					0.2	A	0.08				
	SEB	Left	106.8	F	0.51	33.0	C			107.5	F	0.51	33.0	C		
		Thru	26.3	C	0.40					25.5	C	0.36				
	NWB	Thru	222.0	F	1.45	159.0	F			216.6	F	1.44	155.0	F		
		Right	19.9	B	0.80					18.8	B	0.79				
3. Firth Sterling Ave SE/Firth Sterling Ave SE & Suitland Pkwy (4159)	EB	Left	146.0	F	1.08	46.9	D	85.2	F	146.8	F	1.08	51.5	D	86.9	F
		Thru	28.8	C	0.58					29.6	C	0.58				
		Right	9.7	A	0.21					7.7	A	0.10				
	WB	Left	84.0	F	0.68	100.0	F			84.0	F	0.68	100.0	F		
		Thru/Right	101.1	F	1.12					101.1	F	1.12				
	NB	Left	76.3	E	0.70	79.2	E			67.8	E	0.60	76.2	E		
		Thru/Right	81.6	F	0.77					81.9	F	0.78				
	SB	Left	59.4	E	0.33	98.8	F			59.3	E	0.33	97.3	F		
		Thru	76.6	E	0.50					75.0	E	0.48				
		Right	111.7	F	0.95					110.0	F	0.94				

Table 4-8 Synchro 2028 No-Action and Action Alternative 3 – AM Peak Hour Operations Analysis (continued)

Intersection (ACISA #)	Approach	Movement	AM 2028 No-Action Alternative							AM 2028 Action Alternative 3						
			Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS	Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
4. Sumner Rd SE/Barry Rd SE & Firth Sterling Ave SE (4268)	EB	Thru	1.8	A	0.14	1.8	A	6.2	A	2.0	A	0.13	2.0	A	6.8	A
	WB	Thru	3.0	A	0.24	3.0	A			2.8	A	0.19	2.8	A		
	SEB	Left	69.1	E	0.27	50.3	D			68.0	E	0.27	49.5	D		
		Thru/Right	0.0	A	0.01					0.0	A	0.01				
	NWB	Thru	26.1	C	0.52	26.1	C			26.1	C	0.52	26.1	C		
5. Eaton Rd SE & Firth Sterling Ave SE (4270)	EB	Left/Thru/Right	2.2	A	0.13	2.2	A	5.2	A	2.8	A	0.12	2.8	A	5.8	A
	WB	Thru	2.8	A	0.25	2.8	A			2.6	A	0.19	2.6	A		
	NWB	Left/Thru/Right	28.0	C	0.46	28.0	C			27.9	C	0.46	27.9	C		
6. St Elizabeth Rd SE & Stevens Rd SE & Firth Sterling Ave SE (4269)	EB	Thru/Right	4.7	A	0.15	4.7	A	11.3	B	8.9	A	0.13	8.9	A	12.0	B
	WB	Sharp Left	4.9	A	0.31	4.9	A			4.0	A	0.24	4.0	A		
		Left														
		Thru/Right														
	NB	Left	56.3	E	0.57	30.1	C			56.4	E	0.52	27.4	C		
		Right	4.3	A	0.30					4.9	A	0.33				
7. South Capitol St & Defense Blvd/Firth Sterling Ave SE (4186)	EB	Left	55.4	E	0.27	45.6	D	29.3	C	0.0	A	0.00	0.0	A	13.4	B
		Thru	52.1	D	0.17					0.0	A	0.00				
		Right	0.4	A	0.05					0.0	A	0.00				
	WB	Left	37.6	D	0.31	44.1	D			64.3	E	0.60	38.9	D		
		Thru/Right	46.4	D	0.72					20.7	C	0.50				
	NB	Left	22.3	C	0.12	28.8	C			0.0	A	0.00	9.3	A		
		Thru/Right	29.1	C	0.68					9.3	A	0.45				
	SB	Left	24.0	C	0.54	14.8	B			5.6	A	0.31	4.4	A		
		Thru/Right	11.8	B	0.23					3.8	A	0.11				

Table 4-8 Synchro 2028 No-Action and Action Alternative 3 – AM Peak Hour Operations Analysis (continued)

Intersection	Approach	Movement	AM 2028 No-Action Alternative							AM 2028 Action Alternative 3						
			Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS	Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
8. S Capitol St SB Ramps & MacDill Blvd SW/Malcolm X Ave SE	EB	Thru	21.8	C	0.14	17.3	B	11.7	B	22.2	C	0.17	18.3	A	16.3	B
		Right	0.3	A	0.09					0.3	A	0.09				
	WB	Thru	5.0	A	0.47	5.0	A			7.2	A	0.52	7.2	A		
	SB	Left	29.6	C	0.46	14.5	B			29.4	C	0.46	21.4	C		
		Thru	9.8	A	0.50					23.7	C	0.64				
		Right	7.4	A	0.47					14.1	B	0.60				
9. S Capitol St NB Ramps & Malcolm X Ave SE	EB	Left	8.9	A	0.11	10.3	B	21.0	C	8.8	A	0.19	9.5	A	21.2	C
		Thru	10.5	B	0.23					9.6	A	0.24				
	WB	Thru/Right	28.4	C	0.66	28.4	C			29.3	C	0.68	29.3	C		
	NB	Left/Thru/Right	27.9	C	0.09	27.9	C			29.5	C	0.14	29.5	C		
11. I-295 NB Ramps & Dorothea Dix Ave SE & Malcolm X Ave SE	EB	Left	4.4	A	0.13	3.4	A	30.3	C	4.6	A	0.13	3.5	A	31.6	C
		Thru	4.5	A	0.29					4.7	A	0.29				
		Right to Ramp	0.1	A	0.08					0.1	A	0.09				
	WB	Thru/Right	19.1	B	0.43	19.1	B			19.1	B	0.43	19.1	B		
	NB	Left	100.2	F	1.06	72.6	E			100.2	F	1.06	72.6	E		
		Thru	7.9	A	0.38					7.9	A	0.38				
	SB	Left	44.2	D	0.04	8.0	A			44.2	D	0.04	8.0	A		
		Right	0.5	A	0.08					0.5	A	0.08				
12. I-295 SB Ramps & Crossover	WB	Left	20.6	C	0.14	20.6	C	7.2	A	20.6	C	0.14	20.6	C	7.2	A
	SB	Thru	2.8	A	0.06	2.8	A			2.8	A	0.06	2.8	A		
		Left														

Table 4-8 Synchro 2028 No-Action and Action Alternative 3 – AM Peak Hour Operations Analysis (continued)

Intersection (ACISA #)	Approach	Movement	AM 2028 No-Action Alternative							AM 2028 Action Alternative 3						
			Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS	Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
13. I-295 NB Off Ramp/Dorothea Dix Ave SE & Crossover & I-295 NB Ramp (4284)	EB	Left	23.1	C	0.36	23.1	C	6.4	A	23.1	C	0.36	23.1	C	6.5	A
	NB	Left	7.9	A	0.46	5.0	A			7.9	A	0.46	5.0	A		
		Thru														
		Right	2.1	A	0.45					2.1	A	0.45				
	SB	Right	0.0	A	0.01	0.0	A			0.0	A	0.01	0.0	A		
14. Overlook Ave SW & Chappie James Blvd (4001)	SEB	Right	0.1	A	0.08	0.1	A	58.3	E	0.1	A	0.09	0.1	A	60.4	E
	NWB	Thru	77.9	E	1.12	77.9	E			81.6	F	1.14	81.6	F		
	SWB	Thru	20.3	C	0.22	38.6	D			20.3	C	0.22	45.6	D		
		Right	90.1	F	0.92					80.9	F	1.00				
15. Overlook Ave SW & Chesapeake St SW (4169)	WB	Left	26.9	C	0.75	26.9	C	57.0	E	26.9	C	0.75	26.9	C	53.7	D
		Right														
	NB	Thru	110.4	F	1.15	101.5	F			103.7	F	1.17	95.5	F		
		Right	0.2	A	0.08					0.0	A	0.08				
	SB	Left	7.8	A	0.23	4.6	A			8.4	A	0.23	4.9	A		
		Thru	3.4	A	0.25					3.7	A	0.27				
16. Overlook Ave SW & NRL Main Gate/Laboratory Rd SW (4170)	EB	Left/Thru	30.1	C	0.04	18.2	B	61.4	E	31.1	C	0.04	18.8	B	67.2	E
		Right	0.3	A	0.04					0.4	A	0.05				
	WB	Left/Thru	28.3	C	0.56	87.1	F			27.0	C	0.53	94.7	F		
		Right	113.2	F	1.19					124.1	F	1.22				
	NB	Left/Thru/Right	8.0	A	0.03	8.0	B			8.5	A	0.03	8.5	A		

	SB	Left/Thru/Right	13.8	B	0.35	13.8	D			18.1	B	0.37	18.1	B		

Notes:
EB = Eastbound, WB = Westbound; NB = Northbound; SB = Southbound
LOS = Level of Service
V/C = Volume to Capacity ratio
Delay is measured in seconds per vehicle.
Red Cells and yellow denote intersections or approaches operating at unsatisfactory conditions.
Table shows Highway Capacity Manual 2000 results.

Table 4-9 Synchro 2028 No-Action and Action Alternative 3 – PM Peak Hour Operations Analysis

Intersection (ACISA #)	Approach	Movement	PM 2028 No-Action Alternative							PM 2028 Action Alternative 3						
			Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS	Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
1. I-295 SB Ramps & Suitland Pkwy (2286)	NB	Right	89.2	F	0.86	89.2	F	16.1	B	89.9	F	0.86	89.8	F	15.9	B
	SEB	Thru/Right	8.8	A	0.37	8.8	A			8.5	A	0.37	8.5	A		
	NWB	Left	46.1	D	0.07	0.6	A			50.2	D	0.06	0.6	A		
		Thru	0.0	A	0.28					0.0	A	0.27				
2. Suitland Pkwy & I-295 NB Off Ramp/I-295 NB On Ramp (7159)	EB	Left	37.2	D	0.14	25.3	C	66.6	E	38.5	D	0.14	26.4	C	52.2	D
		Right	0.6	A	0.08					0.2	A	0.08				
	SEB	Left	91.4	F	0.42	32.2	C			87.2	F	0.40	28.3	C		
		Thru	28.9	C	0.61					24.9	C	0.60				
	NWB	Thru	139.6	F	1.24	97.3	F			105.8	F	1.16	73.9	E		
		Right	1.6	A	0.51					1.5	A	0.49				
3. Firth Sterling Ave SE/Firth Sterling Ave SE & Suitland Pkwy (4159)	EB	Left	76.2	E	0.71	49.7	D	86.1	F	80.4	F	0.71	44.7	D	75.1	E
		Thru	51.8	D	0.99					44.8	D	0.96				
		Right	1.9	A	0.14					1.6	A	0.12				
	WB	Left	134.5	F	0.89	52.1	D			153.8	F	0.97	51.9	D		
		Thru/Right	45.1	D	0.66					43.2	D	0.64				
	NB	Left	125.6	F	0.72	121.8	F			58.1	E	0.46	72.0	E		
		Thru/Right	119.5	F	1.04					78.5	E	0.83				
	SB	Left	131.5	F	1.09	158.6	F			80.1	F	0.93	143.6	F		
		Thru	53.0	D	0.42					53.0	D	0.42				
		Right	196.7	F	1.33					191.4	F	1.32				

Table 4-9 Synchro 2028 No-Action and Action Alternative 3 – PM Peak Hour Operations Analysis (continued)

Intersection (ACISA #)	Approach	Movement	PM 2028 No-Action Alternative							PM 2028 Action Alternative 3						
			Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS	Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
4. Sumner Rd SE/Barry Rd SE & Firth Sterling Ave SE (4268)	EB	Thru	2.6	A	0.23	2.6	A	3.9	A	2.3	A	0.16	2.3	A	3.9	A
	WB	Thru	4.2	A	0.26	4.2	A			3.9	A	0.24	3.9	A		
	SEB	Left	36.3	D	0.05	19.6	B			36.5	D	0.05	19.7	B		
		Thru/Right	0.0	A	0.01					0.0	A	0.01				
	NWB	Thru	10.1	B	0.30	10.1	B			10.1	B	0.30	10.1	B		
5. Eaton Rd SE & Firth Sterling Ave SE (4270)	EB	Left/Thru/Right	3.0	A	0.27	3.0	A	3.4	A	2.5	A	0.20	2.5	A	3.3	A
	WB	Thru	0.7	A	0.21	0.7	A			0.7	A	0.20	0.7	A		
	NWB	Left/Thru/Right	21.1	C	0.33	21.1	C			21.0	C	0.33	21.0	C		
6. St Elizabeth Rd SE & Stevens Rd SE & Firth Sterling Ave SE (4269)	EB	Thru/Right	0.9	A	0.20	0.9	A	10.5	B	0.9	A	0.13	0.9	A	12.3	B
	WB	Sharp Left	4.3	A	0.18	4.3	A			4.1	A	0.17	4.1	A		
		Left														
		Thru/Right														
	NB	Left	56.3	E	0.55	29.6	C			56.2	E	0.54	29.5	C		
		Right	14.4	B	0.46					14.7	B	0.46				
7. South Capitol St & Defense Blvd/Firth Sterling Ave SE (4186)	EB	Left	45.3	D	0.31	36.8	D	30.8	C	0.0	A	0.00	0.0	A	26.2	C
		Thru	51.6	D	0.55					0.0	A	0.00				
		Right	10.2	B	0.37					0.0	A	0.00				
	WB	Left	68.2	E	0.69	59.7	E			69.3	E	0.68	52.0	D		
		Thru/Right	50.5	D	0.58					33.7	C	0.49				
	NB	Left	26.2	C	0.06	14.7	B			0.0	A	0.00	13.6	B		
		Thru/Right	14.3	B	0.22					13.6	B	0.20				
	SB	Left	19.6	B	0.34	23.5	C			18.2	B	0.31	21.1	C		
		Thru/Right	24.1	C	0.62					21.5	C	0.55				

Table 4-9 Synchro 2028 No-Action and Action Alternative 3 – PM Peak Hour Operations Analysis (continued)

Intersection	Approach	Movement	PM 2028 No-Action Alternative							PM 2028 Action Alternative 3						
			Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS	Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
8. S Capitol St SB Ramps & MacDill Blvd SW/Malcolm X Ave SE	EB	Thru	24.7	C	0.39	20.2	B	28.8	C	27.0	C	0.54	23.5	C	30.0	C
		Right	16.5	B	0.86					19.8	B	0.89				
	WB	Thru	5.1	A	0.19	5.1	A			5.8	A	0.21	5.8	A		
	SB	Left	51.9	D	0.58	48.8	D			51.3	D	0.58	47.4	D		
		Thru	67.0	E	0.61					66.9	E	0.62				
		Right	3.9	A	0.28					4.4	A	0.31				
9. S Capitol St NB Ramps & Malcolm X Ave SE	EB	Left	6.7	A	0.18	10.3	B	10.8	B	6.6	A	0.30	8.6	A	9.6	A
		Thru	10.5	B	0.53					9.0	A	0.57				
	WB	Thru/Right	13.5	B	0.24	13.5	B			13.9	B	0.25	13.9	B		
	NB	Left/Thru/Right	21.6	C	0.03	28.7	C			22.8	C	0.03	22.8	C		
11. I-295 NB Ramp & Dorothea Dix Ave SE & Malcolm X Ave SE	EB	Left	3.1	A	0.02	3.3	A	8.7	A	3.5	A	0.02	3.4	A	8.6	A
		Thru	4.6	A	0.51					5.2	A	0.52				
		Right to Ramp	0.2	A	0.18					0.3	A	0.24				
	WB	Thru/Right	11.6	B	0.25	11.6	B			11.7	B	0.25	11.7	B		
	NB	Left	47.7	D	0.34	23.4	C			47.7	D	0.35	23.5	C		
		Thru	16.8	B	0.60					16.6	B	0.60				
	SB	Left	44.9	D	0.08	9.9	A			44.9	D	0.08	9.9	A		
		Right	5.0	A	0.21					5.0	A	0.21				
12. I-295 SB Ramps & Crossover	WB	Left	21.0	C	0.53	21.0	C	15.5	B	21.0	C	0.53	21.0	C	13.7	B
	SB	Thru	6.1	A	0.14	6.1	A			6.4	A	0.24	6.4	A		
		Left														

Table 4-9 Synchro 2028 No-Action and Action Alternative 3 – PM Peak Hour Operations Analysis (continued)

Intersection (ACISA #)	Approach	Movement	PM 2028 No-Action Alternative							PM 2028 Action Alternative 3						
			Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS	Delay (s/veh)	LOS	v/c	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
13. I-295 NB Off Ramp/Dorothea Dix Ave SE & Crossover & I-295 NB Ramp	EB	Left	17.7	B	0.24	17.7	B	3.1	A	17.7	B	0.24	17.7	B	3.1	A
	NB	Left	4.6	A	0.04	2.1	A			4.6	A	0.04	2.1	A		
		Thru														
		Right	1.6	A	0.18					1.6	A	0.18				
	SB	Right	0.2	A	0.15	0.2	A			0.2	A	0.15	0.2	A		
14. Overlook Ave SW & Chappie James Blvd (4001)	SEB	Right	144.5	F	1.23	145.0	F	133.0	F	538.8	F	2.13	528.8	F	282.6	F
	NWB	Thru	25.8	C	0.22	25.8	C			24.1	C	0.18	24.1	C		
	SWB	Thru	148.7	F	1.27	144.5	F			200.0	F	1.38	189.2	F		
		Right	1.7	A	0.03					2.1	A	0.08				
15. Overlook Ave SW & Chesapeake St SW (4169)	WB	Left	19.4	B	0.58	19.4	B	77.9	E	19.4	B	0.58	19.4	B	157.9	F
		Right														
	NB	Thru	17.5	B	0.18	12.8	B			17.4	B	0.19	12.7	B		
		Right	5.5	A	0.14					5.4	A	0.14				
	SB	Left	3.9	A	0.26	95.2	F			3.9	A	0.26	192.0	F		
		Thru	111.8	F	1.21					220.5	F	1.45				
16. Overlook Ave SW & NRL Main Gate/Laboratory Rd SW (4170)	EB	Left/Thru	32.7	C	0.21	31.7	C	38.8	D	37.0	D	0.28	47.3	D	53.5	D
		Right	31.2	C	0.71					51.8	D	0.87				
	WB	Left/Thru	48.5	D	0.60	25.3	C			55.5	E	0.67	28.8	C		
		Right	10.8	B	0.54					12.4	B	0.58				
	NB	Left/Thru/Right	4.8	A	0.04	4.8	B			3.5	A	0.04	3.5	A		
	SB	Left/Thru/Right	45.5	D	1.06	45.5	D			61.9	E	1.11	61.9	E		

Notes:

EB = Eastbound, WB = Westbound; NB = Northbound; SB = Southbound

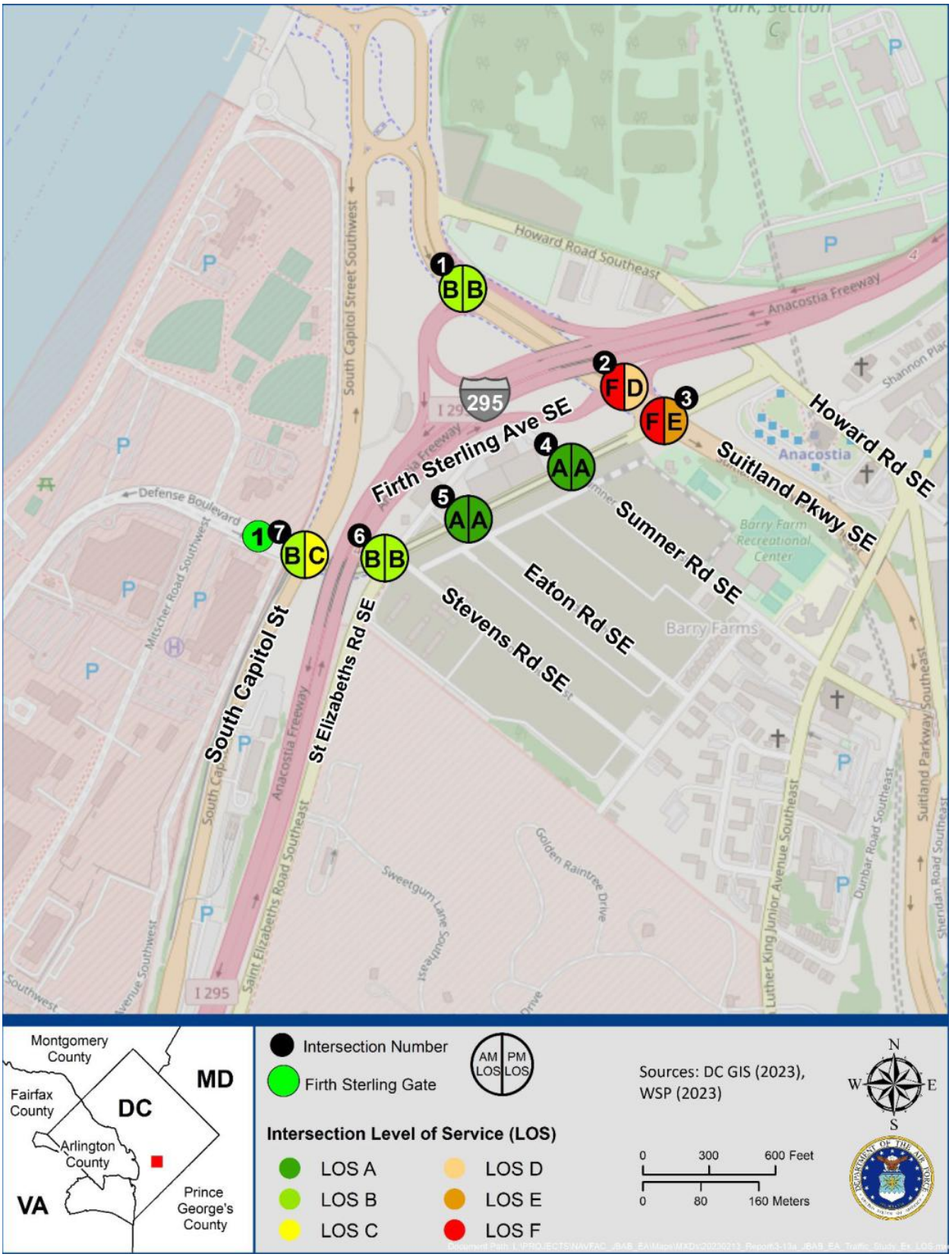
LOS = Level of Service

V/C = Volume to Capacity ratio

Delay is measured in seconds per vehicle.

Red and yellow cells denote intersections or approaches operating at unsatisfactory conditions.

Table shows Highway Capacity Manual 2000 results.



1 **Figure 4-16A Action Alternative 3 – AM and PM Peak Hour LOS – Firth Sterling Gate**

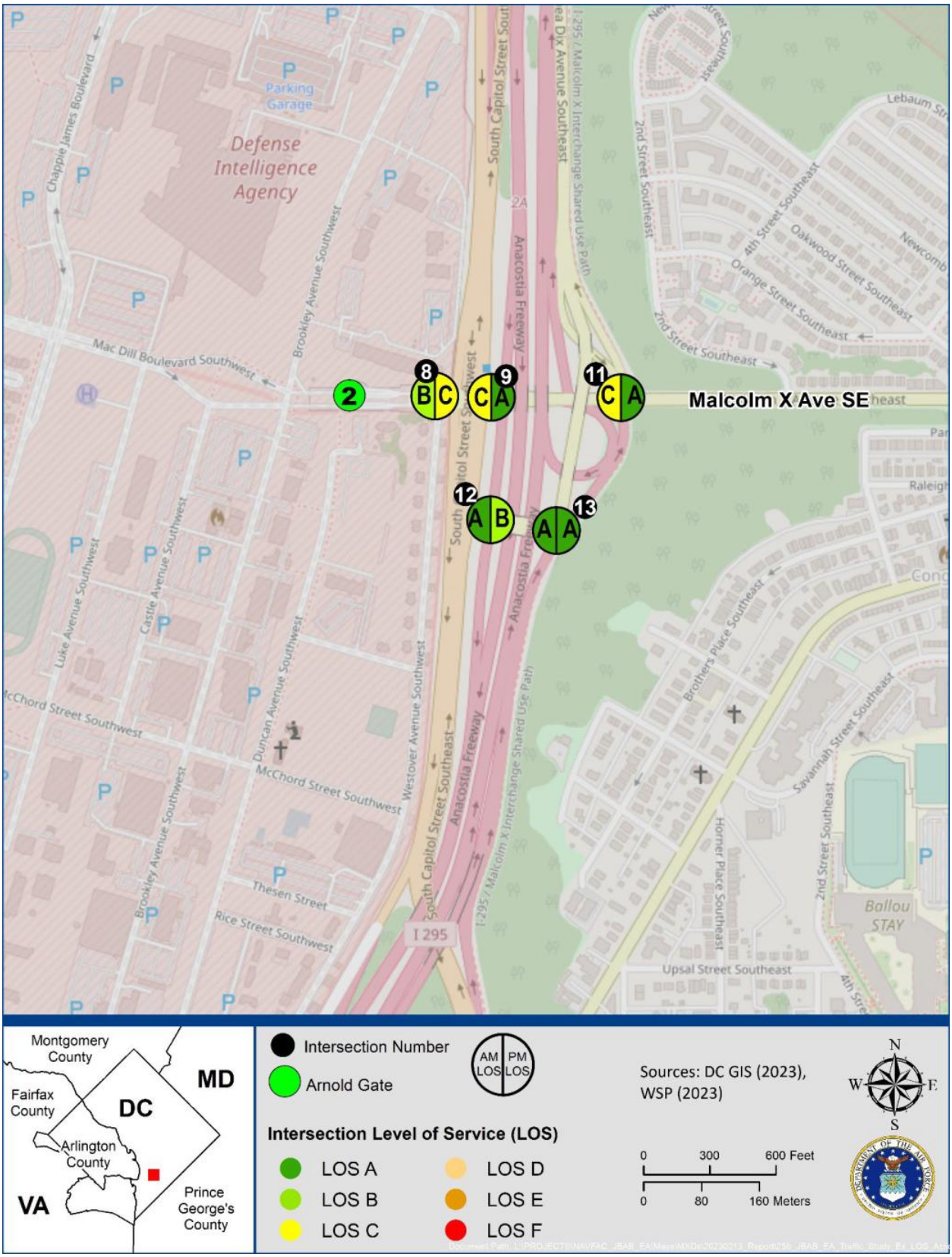


Figure 4-16B Action Alternative 3 – AM and PM Peak Hour LOS – Arnold Gate

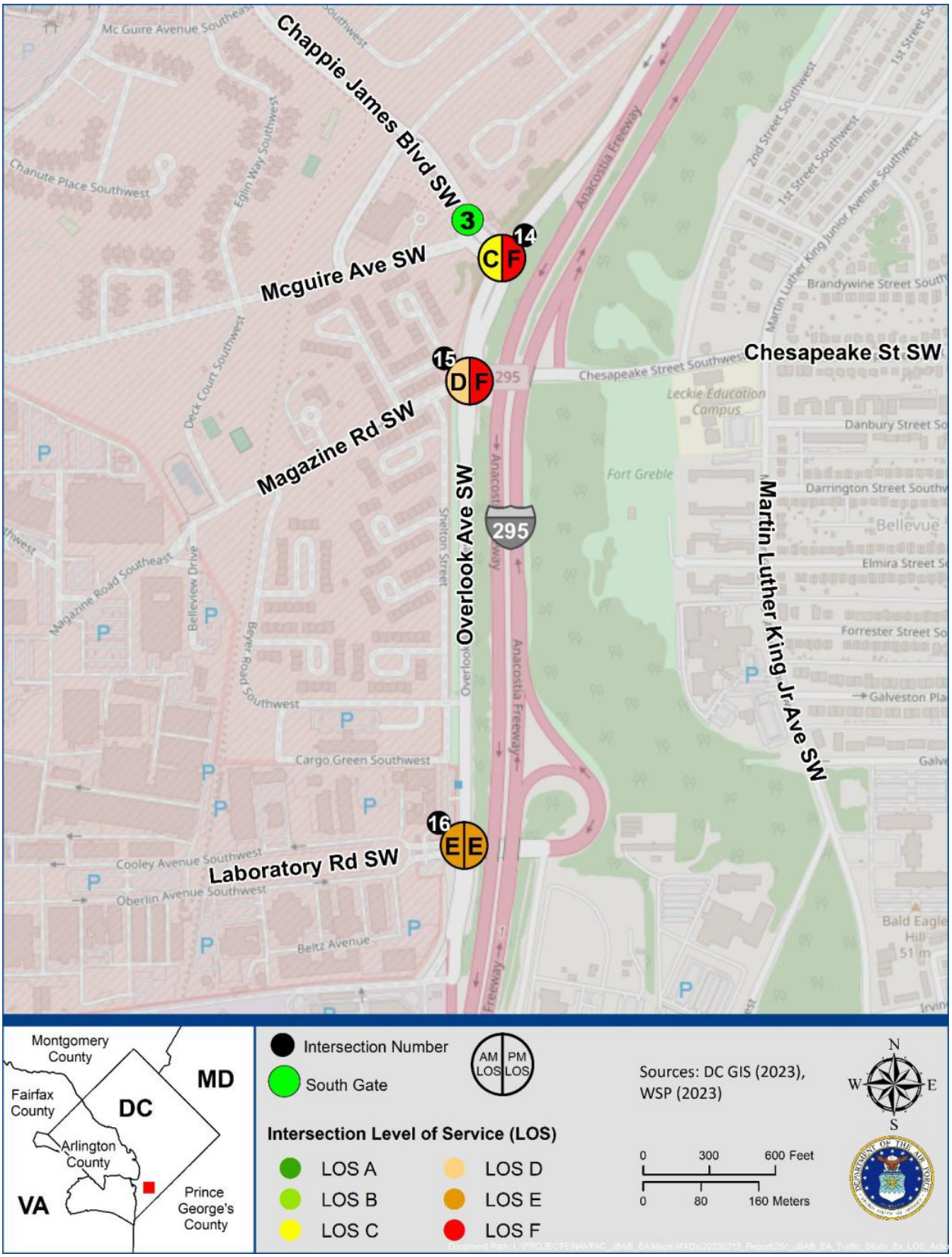


Figure 4-16C Action Alternative 3 – AM and PM Peak Hour LOS – South Gate

4.3.2.2 Action Alternative 3 Intersection Queue Lengths

Based on the Synchro queue results of all study intersections, several signalized intersections have lane groups that would experience queuing lengths exceeding the available storage capacity. The following lane groups, with a comparison to the queues for the No Action Alternative, would exceed the available storage under Action Alternative 3:

- Suitland Parkway SE and I-295 SB Off-ramp (Intersection #1)
  - Off-ramp from southbound I-295 to southeast-bound Suitland Parkway SE during the AM and PM peak hour (shown as the NB approach in the summary tables)
- Suitland Parkway SE and I-295 NB Off-ramp/I-295 NB On-ramp (Intersection #2)
  - Off-ramp from northbound I-295 to northwest-bound Suitland Parkway SE during the AM peak hour (shown as the EB approach in the summary tables)
  - Northwest-bound Suitland Parkway SE (though movement) during the AM and PM peak hour
- Suitland Parkway SE and Firth Sterling Avenue SE (Intersection #3)
  - Eastbound Suitland Parkway SE (through movement) during the AM and PM peak hour
  - Westbound Suitland Parkway SE (through movement) during the AM peak hour
  - Southbound Fifth Sterling Ave SE to Suitland Parkway during the PM peak hour
- Malcolm X Avenue SE and S Capitol Street NB ramps (Intersection #9)
  - Eastbound Malcolm X Avenue SE (through movement) during the AM and PM peak hour
- Overlook Avenue SW and Chappie James Boulevard (Intersection #14)
  - Southeast-bound Chappie James Boulevard during the PM peak period
- Overlook Avenue SW and Chesapeake Street SW (Intersection #15)
  - Southbound Overlook Avenue SW (through movement) during the PM peak period

All other intersection lane groups would experience queues that are adequately stored. Queuing results for the No Action Alternative and Alternative 3 are depicted in Table 4-10.

Table 4-10 Synchro No-Action Alternative and Action Alternative 3 – AM and PM Peak Hour Queue Analysis

Intersection (ACISA #)	Approach	Movement	Turning Bay/Link Length (feet)	AM 2028 No-Action Alternative		AM 2028 Action Alternative 3		PM 2028 No-Action Alternative		PM 2028 Action Alternative 3	
				50th Percentile (feet)	95th Percentile (feet)	50th Percentile (feet)	95th Percentile (feet)	50th Percentile (feet)	95th Percentile (feet)	50th Percentile (feet)	95th Percentile (feet)
1. I-295 SB Ramps & Suitland Pkwy (2286)	NB	Right	249	400	450	327	382	292	349	282	339
	SEB	Thru	603	138	190	115	160	191	254	189	250
	NWB	Left	701	40	36	43	40	<25	<25	<25	<25
		Thru	701	0	0	0	0	0	0	0	0
2. Suitland Pkwy & I-295 NB Off Ramp/I-295 NB On Ramp (7159)	EB	Left	315	263	326	263	326	71	101	72	103
		Right	315	0	0	0	0	0	<25	0	0
	SEB	Left	701	73	111	72	111	55	94	51	93
		Thru	701	424	468	362	402	384	550	331	500
	NWB	Thru	343	2,076	1,798	2,051	1,772	1288	1,196	1,180	1,095
		Right	343	218	106	218	106	<25	<25	<25	<25
3. Firth Sterling Ave SE/Firth Sterling Ave SE & Suitland Pkwy (4159)	EB	Left	343	170	272	169	271	94	139	93	140
		Thru	343	486	560	478	551	949	1,077	918	1,044
		Right	343	163	228	59	95	<25	<25	<25	<25
	WB	Left	797	223	320	223	320	139	271	140	283
		Thru	797	1,478	1,536	1,478	1,536	473	527	464	516
	NB	Left	479	169	250	138	211	177	242	103	154
		Thru	479	220	348	221	351	340	648	259	443
	SB	Left	555	54	98	54	98	334	542	263	394
		Thru	555	132	208	131	207	197	283	198	284
		Right	555	238	460	236	453	1,032	1,296	1,019	1,284
4. Sumner Rd SE/Barry Rd SE & Firth Sterling Ave SE (4268)	EB	Thru	531	<25	27	<25	28	33	49	<25	32
	WB	Thru	479	38	70	27	52	82	118	81	110
	SEB	Left	345	<25	36	<25	35	<25	<25	<25	<25
		Thru	1,504	0	0	0	0	0	0	0	0
	NWB	Thru	250	<25	78	23	78	0	30	0	30
5. Eaton Rd SE & Firth Sterling Ave SE (4270)	EB	Thru	396	<25	32	<25	36	38	68	<25	43
	WB	Thru	531	38	64	27	49	<25	<25	<25	<25
	NWB	Right	344	25	76	25	76	<25	54	<25	54

Table 4-10 Synchro No-Action Alternative and Action Alternative 3 – AM and PM Peak Hour Queue Analysis (continued)

Intersection (ACISA #)	Approach	Movement	Turning Bay/Link Length (feet)	AM 2028 No-Action Alternative		AM 2028 Action Alternative 3		PM 2028 No-Action Alternative		PM 2028 Action Alternative 3	
				50th Percentile (feet)	95th Percentile (feet)	50th Percentile (feet)	95th Percentile (feet)	50th Percentile (feet)	95th Percentile (feet)	50th Percentile (feet)	95th Percentile (feet)
6. St Elizabeth Rd SE & Stevens Rd SE & Firth Sterling Ave SE (4269)	EB	Thru	415	31	54	30	80	<25	<25	<25	<25
	WB	Sharp Left	396	51	66	33	48	31	56	28	52
		Left									
		Thru									
	NB	Left	3,062	104	162	84	138	96	153	93	150
		Right	3,062	0	<25	0	<25	<25	56	<25	57
7. South Capitol St & Defense Blvd/Firth Sterling Ave SE (4186)	EB	Left	871	27	60	0	0	61	111	0	0
		Thru	871	21	51	0	0	125	198	0	0
		Right	871	0	0	0	0	0	53	0	0
	WB	Left	415	74	123	109	171	166	241	158	240
		Thru	415	189	321	21	109	116	188	57	133
	NB	Left	1,207	23	52	0	0	<25	<25	0	0
		Thru	1,207	325	414	156	245	42	84	42	82
	SB	Left	784	49	86	<25	44	69	133	68	129
		Thru	784	61	94	<25	42	305	444	284	409
8. S Capitol St SE SB On Ramp/S Capitol St SE SB Off Ramp & MacDill Blvd SW/Malcolm X Ave SE (7249)	EB	Thru	800	34	53	43	6	122	157	163	206
		Right	800	0	0	0	0	98	408	107	434
	WB	Thru	102	27	33	41	50.0	<25	<25	<25	<25
	SB	Left	757	136	216	136	216	189	290	189	290
		Thru	757	35	116	108	229	202	310	202	312
		Right	757	30	104	93	202	0	38	0	46
9. S Capitol St SE NB Off Ramp/S Capitol St SE NB On Ramp & Malcolm X Ave SE (4249)	EB	Left	102	<25	41	29	54	34	51	51	73
		Thru	102	84	115	80	108	174	208	163	192
	WB	Thru	322	220	202	230	220	52	86	53	88
	NB	Thru	693	<25	35	27	50	<25	<25	<25	<25

1 **Table 4-10 Synchro No-Action Alternative and Action Alternative 3 – AM and PM Peak Hour Queue Analysis (continued)**

Intersection (ACISA #)	Approach	Movement	Turning Bay/Link Length (feet)	AM 2028 No-Action Alternative		AM 2028 Action Alternative 3		PM 2028 No-Action Alternative		PM 2028 Action Alternative 3	
				50th Percentile (feet)	95th Percentile (feet)	50th Percentile (feet)	95th Percentile (feet)	50th Percentile (feet)	95th Percentile (feet)	50th Percentile (feet)	95th Percentile (feet)
11. I-295 NB On Ramp & I-295 NB Ramp/Dorothea Dix Ave SE & Malcolm X Ave SE (4283)	EB	Left	256	<25	<25	<25	<25	<25	<25	<25	<25
		Thru	256	29	41	31	44	58	85	68	101
		Right to Ramp	256	0	0	0	0	0	0	0	0
	WB	Thru	1,405	180	241	180	241	84	132	85	133
	NB	Left	543	281	469	281	469	31	63	33	65
		Thru	543	<25	47	<25	47	0	60	0	60
	SB	Left	473	<25	<25	<25	<25	<25	<25	<25	<25
		Right	473	0	0	0	0	0	<25	0	21
12. I-295 SB On Ramp/I-295 SB Off Ramp & Crossover (4285)	WB	Left	292	<25	28	<25	28	64	106	64	106
	SB	Thru	365	0	<25	0	24	<25	44	<25	44
		Left	365								
13. I-295 NB Off Ramp/Dorothea Dix Ave SE & Crossover & I-295 NB Ramp (4284)	EB	Left	292	28	73	28	73	<25	47	<25	47
	NB	Left	408	77	167	77	167	<25	<25	<25	<25
		Thru	408								
		Right	408	0	34	0	34	0	<25	0	<25
	SB	Right	1,142	0	0	0	0	0	0	0	0
14. Overlook Ave SW & Chappie James Blvd (4001)	SEB	Right	233	0	0	0	0	107	159	231	277
	NWB	Thru	605	231	191	309	274	44	66	43	63
	SWB	Thru	648	46	76	27	44	441	457	523	539
		Right	648	0	84	94	216	0	<25	0	<25

2

Table 4-10 Synchro No-Action Alternative and Action Alternative 3 – AM and PM Peak Hour Queue Analysis (continued)

Intersection (ACISA #)	Approach	Movement	Turning Bay/Link Length (feet)	AM 2028 No-Action Alternative		AM 2028 Action Alternative 3		PM 2028 No-Action Alternative		PM 2028 Action Alternative 3	
				50th Percentile (feet)	95th Percentile (feet)	50th Percentile (feet)	95th Percentile (feet)	50th Percentile (feet)	95th Percentile (feet)	50th Percentile (feet)	95th Percentile (feet)
15. Overlook Ave SW & Chesapeake St SW (4169)	WB	Left	438	83	156	83	156	<25	53	<25	53
		Right	438	83	156	83	156	<25	53	<25	53
	NB	Thru	2,147	382	251	396	252	50	98	51	100
		Right	2,147	0	0	0	0	0	26	0	27
	SB	Left	577	<25	25	<25	51	29	31	32	26
		Thru	577	<25	37	<25	142	863	647	1,149	280
16. Overlook Ave SW & NRL Main Gate/Laboratory Rd SW (4170)	EB	Thru	229	<25	<25	<25	<25	32	52	32	52
		Right	229	0	0	0	0	84	178	91	190
	WB	Thru	350	63	105	59	97	70	116	71	128
		Right	350	117	315	132	332	0	45	0	46
	NB	Thru	389	<25	<25	<25	<25	<25	<25	<25	<25
	SB	Thru	2,147	141	236	154	251	394	131	691	74

Notes
~ 50th percentile volume exceeds capacity; queue may be longer (denoted in purple cells).
# 95th percentile volume exceeds capacity; queue may be longer (denoted in red cells).
EB = Eastbound, WB = Westbound, NB= Northbound, SB = Southbound

4.3.3 Firth Sterling Gate Operations

Vissim was used for the express purpose of simulating and evaluating traffic operations at Firth Sterling Gate with the proposed LVIS and combination of POV and truck screening lanes under Action Alternatives 1 and 2. Although Synchro was used to evaluate traffic operations for the entire study area, it is not a suitable tool for modeling the vehicle screening operations at the gate. Therefore, Vissim was used to estimate vehicle delay and queue lengths extending back along Defense Boulevard toward the South Capitol Street signalized intersection, especially for trucks waiting to be screened before entering the installation. The Vissim model also accounts for transit vehicles and Transportation Network Company (TNC) vehicles (e.g., Uber, Lyft) that will use Defense Boulevard to access the new bus loop and pick-up/drop-off parking spaces that are included with Action Alternatives 1 and 2.

Traffic control data describing the proposed vehicle screening process at the reconfigured Firth Sterling Gate, such as the average time each vehicle entering the installation is stopped for inspection and/or identification check, was obtained from the Air Force. These data were entered into the model by approximating stop signs controlling each screening lane at the gate with custom stop durations for each vehicle based on Air Force data instead of the typical HCM-based stop duration assumptions. The analysis results for Action Alternative 1 at Firth Sterling Gate during the AM peak hour and PM peak hour are depicted in Tables 4-11 and 4-12, respectively. Figure 4-17 shows the queue space available and maximum simulated queue lengths for POVs and trucks based on the Alternative 1 gate design.

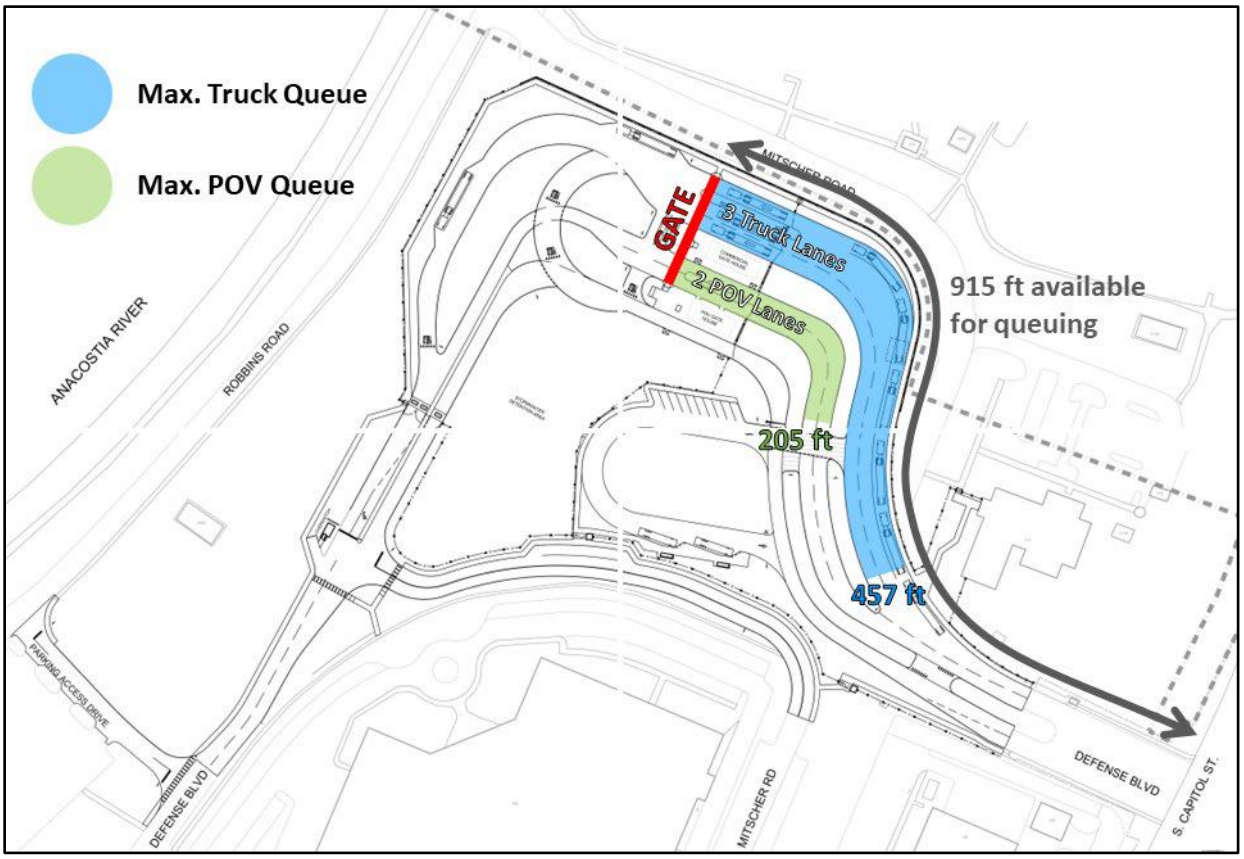


Figure 4-17 Action Alternative 1 – Maximum Queue Lengths

Table 4-11 Vissim Action Alternative 1 – AM Operations and Queue Analysis

Intersection	Approach	Movement	AM 2028 Action Alternative 1								
			Delay (s/veh)	LOS	Q Length Avg (ft)	Q Length Max (ft)	Avail-able Q Distance (ft)	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
6. St Elizabeth Rd SE & Stevens Rd SE & Firth Sterling Ave SE	EB	Thru	22.0	C	27	201		23.1	C	71.4	E
		Right	24.1	C	27	201					
		Sharp right	18.1	B	27	201					
	WB	Sharp Left	67.1	E	164	307		82.9	F		
		Left	36.5	D	166	308					
		Thru	118.6	F	166	308					
	NB	Left	115.1	F	66	250		90.9	F		
		Right	67.9	E	72	261					
		Sharp Right	46.1	D	90	285					
7. South Capitol St & Defense Blvd/Firth Sterling Ave SE	EB	Left	43.7	D	15	97		38.3	D	37.1	D
		Thru	42.0	D							
		Right	7.3	A	11	99					
	WB	Left	85.8	F	242	398		77.9	E		
		Thru	80.5	F							
		Right	69.6	E							
	NB	Left	24.9	C	98	483		28.2	C		
		Thru	28.6	C							
		Right	26.4	C							
	SB	Left	33.4	C	33	206		19.4	B		
		Thru	17.2	B							
		Right	10.8	B							
Firth Sterling Gate	WB	Truck Stop Line before Xray	42.7	N/A	3	86	565	3.3	N/A	N/A	
		Truck Gate	786.3		116	371	350	166.4			
		Car Gate Lane 1	53.0		38	204	915	53.0			
		Car Gate Lane 2	53.0		38	204					

Based on the Vissim microsimulation results for Action Alternative 1, the average and maximum queues from Firth Sterling Gate would not interfere with other traffic passing through the adjacent upstream signalized intersection at South Capitol Street. Under Action Alternative 1, the available storage for queued vehicles would be between 565 and 915 feet, depending on the ultimate placement of the initial stop line for truck sorting prior to inspection. The maximum queue length for Action Alternative 1 during the AM peak hour would be 86 feet, and there would be no standing queue during the PM peak hour due to low demand. Queue lengths reported in these tables that are less than the length of a typical truck indicate that demand was low enough such that there were no trucks stopped or the only truck

waiting to enter was already in motion and partially across the stop line at the time when the model measured the queue length.

Note that the westbound approach along Firth Sterling Avenue SE at the South Capitol Street signalized intersection that provides access to the installation via Defense Boulevard and Firth Sterling Gate is projected to operate at LOS E during the AM peak hour in this Vissim simulation, whereas the Synchro analysis results discussed earlier in this report show this same approach operating at LOS D. Since Vissim is a stochastic analysis tool while Synchro is a deterministic analysis, it is not unusual for results to vary even when the same input parameters are used for both analyses. In this case, it is best to treat these results as a range between which the future traffic conditions under Action Alternative 1 are expected to fall (i.e., between LOS D and E).

Table 4-12 Vissim Action Alternative 1 – PM Operations and Queue Analysis

Intersection	Approach	Movement	PM 2028 Action Alternative 1								
			Delay (s/veh)	LOS	Q Length Avg (ft)	Q Length Max (ft)	Avail-able Q Distance (ft)	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
6. St Elizabeth Rd SE & Stevens Rd SE & Firth Sterling Ave SE	EB	Thru	19.5	B	35	220		20.0	B	28.7	C
		Right	20.4	B	35	220					
		Sharp right	19.1	C	35	220					
	WB	Sharp Left	20.6	B	23	169		26.7	C		
		Left	31.5	C	28	170					
		Thru	23.2	C	27	168					
	NB	Left	25.4	C	17	213		41.5	D		
		Right	58.2	E	53	264					
		Sharp Right	34.9	C	72	288					
7. South Capitol St & Defense Blvd/Firth Sterling Ave SE	EB	Left	45.5	D	63	388		43.0	D	26.5	C
		Thru	49.5	D							
		Right	14.7	B	65	392					
	WB	Left	38.1	D	58	288		31.3	C		
		Thru	33.4	C							
		Right	24.3	C							
	NB	Left	33.1	C	21	210		28.6	C		
		Thru	30.0	C							
		Right	15.6	B							
	SB	Left	21.6	C	86	538		21.0	C		
		Thru	20.9	C							
		Right	20.8	C							
Firth Sterling Gate	WB	Truck Stop Line before Xray	8.9	N/A	0	0	565	0.0	N/A	N/A	
		Truck Gate	253.5		6	91	350	5.6			
		Car Gate Lane 1	19.8		0	48	915	21.5			
		Car Gate Lane 2	23.2		0	56					

The analysis results for Action Alternative 2 at Firth Sterling Gate and the adjacent intersections during the AM peak hour and PM peak hour are depicted in Tables 4-13 and 4-14, respectively. Figure 4-18 shows the queue space available and simulated maximum queue lengths for POV and trucks based on the Alternative 2 gate design.

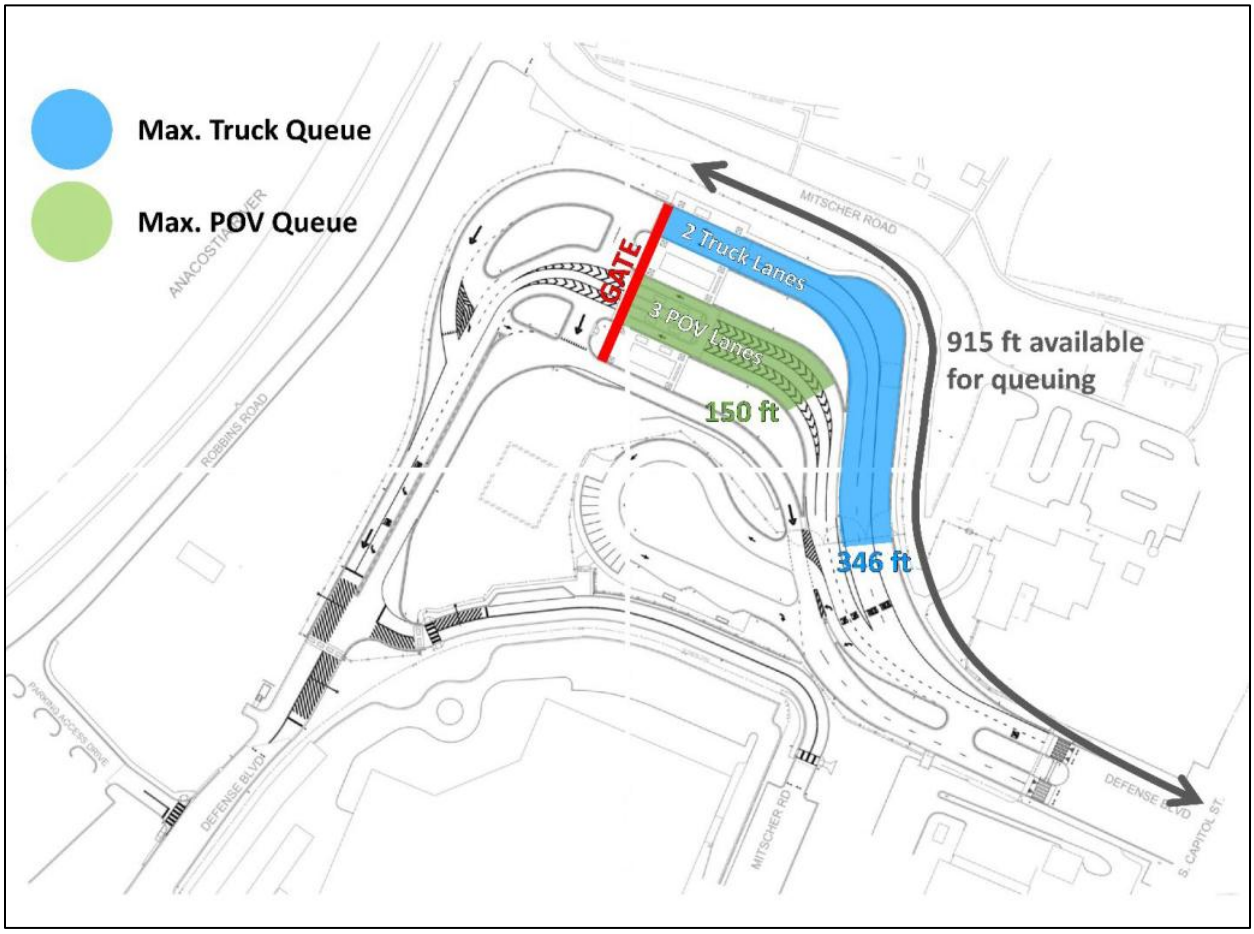


Figure 4-18 Action Alternative 2 – Maximum Queue Lengths

Based on the Vissim microsimulation results for Action Alternative 2, the average and maximum queues from Firth Sterling Gate would not interfere with other traffic passing through the adjacent upstream signalized intersection at South Capitol Street. Under Action Alternative 2, the available storage for queued vehicles would also be between 565 and 915 feet, depending on the ultimate placement of the initial stop line for truck sorting prior to inspection. The maximum queue lengths for Action Alternative 2 during the AM peak hour would be 126 feet, and there would be no standing queue during the PM peak hour due to low demand. Queue lengths reported in these tables that are less than the length of a typical truck indicate that demand was low enough such that there were no trucks stopped or the only truck waiting to enter was already in motion and partially across the stop line at the time when the model measured the maximum queue length.

Note that the westbound approach along Firth Sterling Avenue SE at the South Capitol Street signalized intersection that provides access to the installation via Defense Boulevard and Firth Sterling Gate is projected to operate at LOS F during the AM peak hour in this Vissim simulation, whereas the Synchro analysis results discussed earlier in this report show this same approach operating at LOS D. Since Vissim

is a stochastic analysis tool while Synchro is a deterministic analysis, it is not unusual for results to vary even when the same input parameters are used for both analyses. In this case, it is best to treat these results as a range between which the future traffic conditions under Action Alternative 1 are expected to fall (i.e., between LOS D and F).

Table 4-13 Vissim Action Alternative 2 – AM Operations and Queue Analysis

Intersection	Approach	Movement	AM 2028 Action Alternative 2								
			Delay (s/veh)	LOS	Q Length Avg (ft)	Q Length Max (ft)	Avail-able Q Distance (ft)	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
6. St Elizabeth Rd SE & Stevens Rd SE & Firth Sterling Ave SE	EB	Thru	24.0	C	28	199		23.0	C	101.7	F
		Right	21.9	C	28	199					
		Sharp right	31.7	C	28	199					
	WB	Sharp Left	102.3	F	151	308		104.5	F		
		Left	58.9	E	153	309					
		Thru	139.3	F	153	309					
	NB	Left	275.8	F	141	277		188.2	F		
		Right	102.8	F	140	291					
		Sharp Right	80.1	F	161	315					
7. South Capitol St & Defense Blvd/Firth Sterling Ave SE	EB	Left	43.9	D	16	101		39.7	D	41.3	D
		Thru	45.7	D							
		Right	6.9	A	20	129					
	WB	Left	104.9	F	312	440		99.6	F		
		Thru	103.1	F							
		Right	91.7	F							
	NB	Left	23.7	C	104	495		28.3	C		
		Thru	28.7	C							
		Right	26.6	C							
	SB	Left	38.4	D	39	217		21.2	C		
		Thru	17.4	B							
		Right	12.7	B							
Firth Sterling Gate	WB	Truck Stop Line before Xray	35.2	N/A	5	126	565	35.2	N/A	N/A	
		Truck Gate (no Xray)	404.4		28	123	220	404.4			
		Truck Gate (Xray)	10.8		2	123		10.8			
		Car Gate Lane 1	36.5		15	131	915	35.5			
		Car Gate Lane 2	34.5		11	147					
		Car Gate Lane 3	32.6		12	151					

Table 4-14 Vissim Action Alternative 2 – PM Operations and Queue Analysis

Intersection	Approach	Movement	PM 2028 Action Alternative 2								
			Delay (s/veh)	LOS	Q Length Avg (ft)	Q Length Max (ft)	Avail-able Q Distance (ft)	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
6. St Elizabeth Rd SE & Stevens Rd SE & Firth Sterling Ave SE	EB	Thru	30.7	C	36	231		28.1	C	28.6	C
		Right	7.7	A	36	231					
		Sharp right	30.6	C	36	231					
	WB	Sharp Left	17.4	B	11	141		15.5	B		
		Left	17.9	B	14	142					
		Thru	15.0	B	14	142					
	NB	Left	36.6	D	27	226		51.8	E		
		Right	61.4	E	55	261					
		Sharp Right	43.3	D	74	285					
7. South Capitol St & Defense Blvd/Firth Sterling Ave SE	EB	Left	44.8	D	65	404		36.3	D	26.5	C
		Thru	47.8	D							
		Right	12.4	B	85	434					
	WB	Left	46.1	D	73	310		42.8	D		
		Thru	49.5	D							
		Right	33.3	C							
	NB	Left	22.2	C	20	174		20.2	C		
		Thru	23.4	C							
		Right	13.1	B							
	SB	Left	19.3	B	86	505		19.9	B		
		Thru	20.1	C							
		Right	17.5	B							
Firth Sterling Gate	WB	Truck Stop Line before Xray	28.6	N/A	0	11	565	28.6	N/A	N/A	
		Truck Gate (no Xray)	268.4		1	43	220	268.4			
		Truck Gate (Xray)	0.0		1	106		0.0			
		Car Gate Lane 1	18.3		0	34	915	18.9			
		Car Gate Lane 2	19.5		0	31					
		Car Gate Lane 3	18.7		0	28					

4.3.4 Firth Sterling Gate Traffic Sensitivity Analysis

A sensitivity analysis was performed for Action Alternative 1 at Firth Sterling Gate to measure traffic operations impacts using AM peak hour traffic demand forecasts based on pre-COVID-19 pandemic traffic counts data (the other analyses in this study are based on post-pandemic traffic counts performed in November 2022). JBAB provided roadway volume data that was collected in January 2020, two months prior to an abrupt shift to highly prevalent telework amid the World Health Organization's announcement of the COVID-19 pandemic. Prior to the COVID-19 pandemic, the federal government offered telework policies, but telework became widely adopted with the advent of the COVID-19 pandemic. These January 2020 roadway volumes were used to develop 2028 Action Alternative 1 AM peak hour intersection turning movement volumes for use in the sensitivity model of traffic operations. The future traffic volume forecasts for the sensitivity analysis followed the methodology used to develop the original 2028 Action Alternative 1 forecasts (as described in Section 4.2) but used the January 2020 traffic data as a baseline of existing volumes instead of the November 2022 traffic data. For this sensitivity analysis, turning movement count forecasts were developed for the intersection of Firth Sterling Ave SE and St Elizabeths Rd SE/Stevens Rd SE (Intersection #6) and the intersection of South Capitol Street and Firth Sterling Avenue SE/Defense Blvd (Intersection #7).

Using the January 2020 volumes as the baseline, the forecasted 2028 Action Alternative 1 AM peak hour trips that would be inbound to Firth Sterling Gate would total 475 trips. Comparatively, there would be 318 total inbound trips during the AM peak hour in 2028 using the original forecasts based on the November 2022 baseline, as depicted previously in Figure 4-10A. Therefore, the sensitivity analysis was performed using a 49 percent increase in the volume of inbound trips. Inbound truck volumes at Firth Sterling Gate during the AM peak hour in 2028 would total 24 trips for this sensitivity analysis, unchanged from the original 2028 truck volumes shown previously in Figure 4-11A. Thus, the increase in inbound trips at Firth Sterling Gate using the forecasts from January 2020 baseline traffic data is wholly attributed to POVs.

Vissim was used to simulate and evaluate traffic operations at Firth Sterling Gate for the sensitivity analysis. Consistent with the original Action Alternative 1 gate operations analysis summarized in Section 4.3.3, this simulation assumed two POV screening lanes and three truck screening lanes. The Vissim sensitivity analysis results for Action Alternative 1 at Firth Sterling Gate during the AM peak hour are depicted in Table 4-15. These results show that Action Alternative 1 would fail to accommodate the higher volume of traffic entering the installation from future traffic demand that uses pre-pandemic volumes as the baseline for growth. The POV lane queues would extend beyond the available storage distance for vehicles along Defense Boulevard between the gate and the South Capitol Street intersection, exacerbating the queues that intersection. The queues in the truck lanes would not exceed their available storage length. Figure 4-19 shows the queue space available and maximum simulated queue lengths for POVs and trucks based on the Alternative 1 gate design using the higher sensitivity analysis traffic volumes.

Action Alternative 2 (shown previously in Figure 4-18) provides three POV inspection lanes instead of the two POV lanes provided under Action Alternative 1, and provides two truck inspection lanes instead of three (i.e., Action Alternative 2 increases screening capacity for POVs while decreasing screening

capacity for trucks). Action Alternative 2 provides 33% more capacity for POV screening than Action Alternative 1 and, therefore, should be able to adequately accommodate this higher future POV demand while still accommodating the truck demand with 33% less truck screening capacity. Therefore, no separate Vissim sensitivity analysis of Action Alternative 2 was performed.

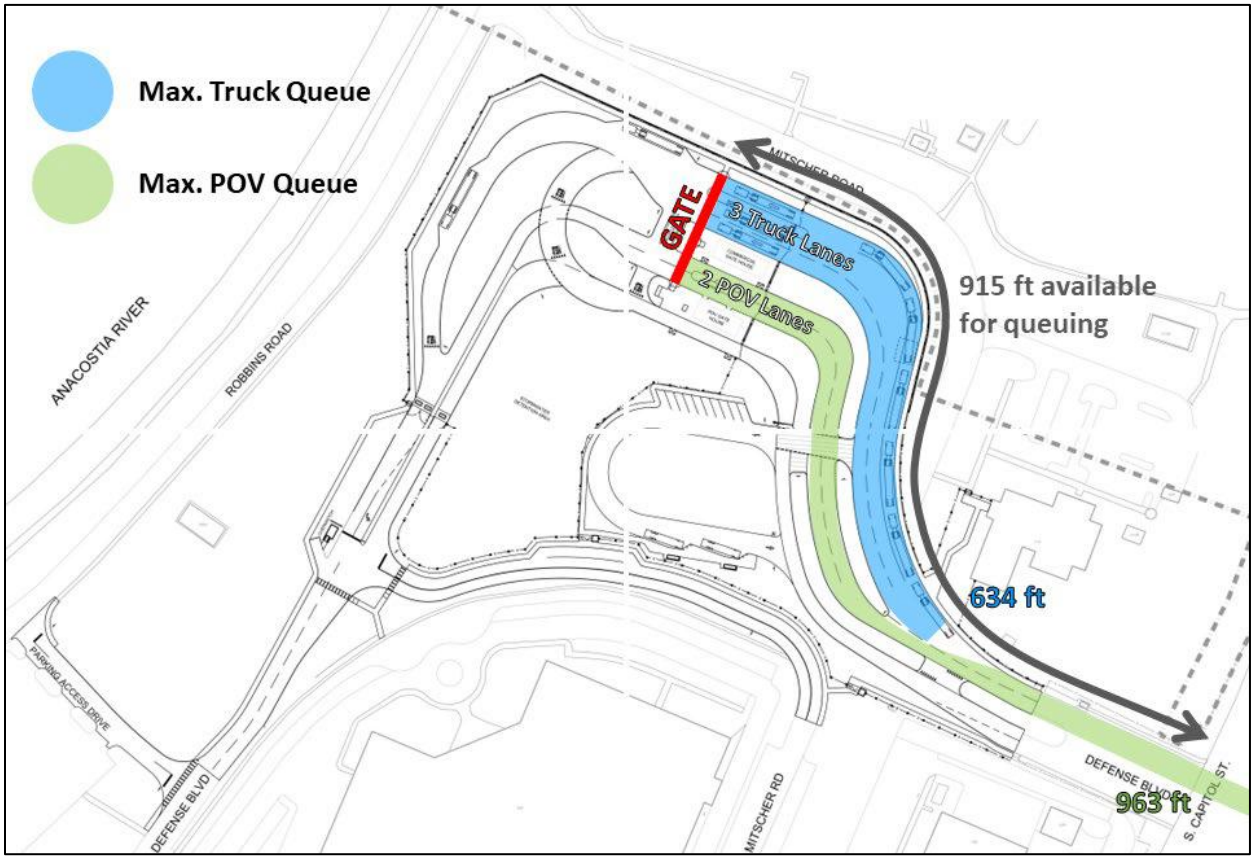


Figure 4-19 Action Alternative 1 – Maximum Queue Lengths from Sensitivity Analysis

Table 4-15 Vissim Action Alternative 1 – AM Operations and Queue Sensitivity Analysis

Intersection	Approach	Movement	AM 2028 Action Alternative 1								
			Delay (s/veh)	LOS	Q Length Avg (ft)	Q Length Max (ft)	Avail-able Q Distance (ft)	Appr. Delay (s/veh)	Appr. LOS	Inter. Delay (s/veh)	Inter. LOS
6. St Elizabeth Rd SE & Stevens Rd SE & Firth Sterling Ave SE	EB	Thru	19.7	B	27	204		20.4	C	177.2	F
		Right	21.1	C	27	204					
		Sharp right	16.4	B	27	204					
	WB	Sharp Left	197.4	F	676	784		210.8	F		
		Left	113.6	F	678	786					
		Thru	285.3	F	678	786					
	NB	Left	420.7	F	400	616		288.1	F		
		Right	158.9	F	407	631					
		Sharp Right	122.8	F	430	655					
7. South Capitol St & Defense Blvd/Firth Sterling Ave SE	EB	Left	43.8	D	32	168		40.3	D	54.9	D
		Thru	47.4	D							
		Right	6.6	A	28	171					
	WB	Left	116.0	F	330	455		111.8	F		
		Thru	127.3	F							
		Right	89.2	F							
	NB	Left	168.9	F	155	566		37.6	D		
		Thru	33.0	C							
		Right	29.2	C							
	SB	Left	37.9	D	96	368		39.6	D		
		Thru	21.1	C							
		Right	79.4	E							
Firth Sterling Gate	WB	Truck Stop Line before Xray	126.6		32	210	565	31.9			
		Truck Gate	947.3		220	424	350	220.2			
		Car Gate Lane 1	247.1		713	963	915	247.1			
		Car Gate Lane 2	247.1		713	963					

5 Discussion of 2028 Condition Findings

5.1 Bicycle and Pedestrian Impacts

Bicycle and pedestrian networks, including existing sidewalk extents and widths, ADA compliance, and bicycle facilities are discussed in Sections 3.3 and 3.4. Impacts on the bicycle and pedestrian networks for all Action Alternatives were evaluated. No change to the pedestrian and bicycle network is anticipated as a result of the Action Alternatives.

5.2 Transit Impacts

Metrorail lines, local and commuter buses, and shuttles in the transit study area are discussed in Section 3.5. All three Action Alternatives were evaluated for impacts on these transit modes. Most of the impacts associated with the Action Alternatives would be distributed among transit options and absorbed by planned improvements described in the WMATA Momentum plan for the Metro system 2013–2025 and other routine route and schedule adjustments. Additionally, no impacts to regional commuter bus service or DoD-operated bus shuttles are anticipated.

5.3 Parking Impacts

The existing conditions parking facility inventory, discussed in Section 3.7, provides a basis for determining the impacts of the Action Alternatives on parking. Action Alternatives 1 and 2 will have a carpool area consisting of approximately 10 parking spaces for pick up and drop off. Four additional spaces will be allocated for security forces for a total of 14 spaces. Action Alternative 3 will not include any parking spaces because the existing gate would cease operations. DDOT and NCPC parking ratios are not applicable for an ACP. As such, no impacts to parking inventory are anticipated.

5.4 Truck Access Impacts

Existing truck access is discussed in Section 3.6. Under Alternatives 1 and 2, truck traffic would increase in both the short and long term from the construction-related truck trips and regularly scheduled deliveries to the installation, respectively. Minimal impacts on truck access in the study area are expected.

5.5 Study Area Intersection Analysis

The study relies on the HCM intersection analysis method (see Section 3.8.2 for a discussion of the HCM method). Based on the average vehicle delay, the HCM analysis determined the LOS (an A through F letter that rates the performance of an intersection from the perspective of the driver). Vehicle queuing within the lane groups of each study area intersection was also measured to determine if the available storage capacity can accommodate the queue. The differences between the projected 2028 No Action Alternative and Action Alternatives for each traffic study area intersection were measured.

5.5.1 No Action Alternative

Based on the Synchro analysis, under the No Action Alternative, queue lengths would generally increase compared to existing conditions. In some instances, queue lengths would decrease from existing conditions. Decreases in queuing under the future No-Action Alternative compared to Existing Conditions can be attributed to the optimization of the existing signal timing to accommodate projected traffic growth by 2028.

5.5.2 Action Alternative 1

Under Action Alternative 1, queues would exceed the available storage of lane groups at the same intersections as under the No Action Alternative. Queue lengths under the No Action Alternative and Action Alternative 1 would be similar. Under Action Alternative 1, several queues would increase slightly, while others would decrease slightly, but the overall effect would be comparable to the No Action Alternative. These changes can be attributed to the reassignment of truck trips from South Gate to Firth Sterling Gate, as previously discussed in Section 4.2.2.2.

5.5.3 Action Alternative 2

Action Alternative 2 has the same traffic operations results as Action Alternative 1 because the volumes, timings, and configurations at all study area intersections would be identical for both alternatives.

5.5.4 Action Alternative 3

Under Action Alternative 3, queue lengths would be comparable to the No Action Alternative. Queues would exceed the available storage distances for lane groups at about the same number of intersections as under the No Action Alternative, varying by AM vs PM peak hour. Under Action Alternative 3, several queues would increase slightly, while others would decrease slightly, but the overall effect would be comparable to the No Action Alternative.

The PM peak hour 95th percentile queue of the southeast-bound right turn at Overlook Avenue SW and Chappie James Boulevard (Intersection #14, adjacent to South Gate) would slightly exceed the available storage under Action Alternative 3, compared with adequately stored queues under the No Action Alternative. The PM peak hour 50th percentile queue of the southbound through movement at Overlook Avenue SW and Chesapeake Street SW (Intersection #15) would increase by about 300 feet under Action Alternative 3 compared to the No Action Alternative. The increases in queue lengths under Action Alternative 3 compared to the No Action Alternative can be attributed to the shifting of all inbound and outbound traffic from Firth Sterling Gate to the other two JBAB gates.

5.6 Gate Impacts

5.6.1 Action Alternative 1

The Vissim simulation of the AM and PM peak hour operations at Firth Sterling Gate under Action Alternative 1 showed that all traffic entering Firth Sterling Gate would experience delays commensurate with the typical vehicle inspection process described by the Air Force. This process assumes a certain percentage of trucks undergo more extensive screening than others. However, despite delays associated with the screening process, the maximum queues for POVs and trucks would remain well within the available storage distance between the stop line for sorting trucks prior to inspection and the adjacent upstream signalized intersection of Firth Sterling Avenue SE at South Capitol Street – a storage distance of 565 feet. During the PM peak hour, POVs entering the installation at Firth Sterling Gate would not experience significant delays during inspection, but trucks would continue to experience some nominal inspection-related delays. Because there would be fewer trucks entering during the PM peak hour than during the AM peak hour, the PM peak queues for trucks would be shorter than the AM peak queues and still well within the available storage distance to the adjacent signalized intersection at South Capitol Street.

5.6.2 Action Alternative 2

Similar to Action Alternative 1, the Vissim simulation of the AM and PM peak hour operations at Firth Sterling Gate under Action Alternative 2 show that all traffic entering Firth Sterling Gate would experience delays commensurate with the typical vehicle inspection process described by the Air Force. Although this alternative would have one fewer lane available for truck inspections, the maximum queues for POVs and trucks would remain well within the available storage distance between the stop line for sorting trucks prior to inspection and the adjacent upstream signalized intersection of Firth Sterling Avenue SE at South Capitol Street.

This page intentionally left blank.

6 Proposed Action Recommendations

6.1 Pedestrian/Bicycle Network

Ample existing and planned sidewalk and bicycle facilities would exist throughout the Action Alternatives and the surrounding area to accommodate new pedestrian and bicycle trips. The recently completed South Capitol Bridge project and the DHS Access Road trail enhanced pedestrian and bicycle connections in the area. A planned trail improvement south of Firth Sterling Gate will provide new connections to Arnold Gate and South Gate. Therefore, no mitigation measures are recommended for the bicycle or pedestrian network for the Action Alternatives.

6.2 Transit

An increase in transit ridership distributed among Metrorail, Metrobus, and the DC Circulator is anticipated under all Action Alternatives. Increased transit ridership is expected to be absorbed through the WMATA Momentum plan for the Metro system 2013–2025, Metrobus initiatives such as the Priority Corridor Network and Service Evaluation Studies, and other routine route and schedule adjustments. Therefore, no mitigation measures are recommended for the transit network. However, it is recommended that JBAB and the Air Force collaborate with WMATA on the operation of an MTC to create additional strategies that would promote transit use on the installation.

6.3 Traffic

Based on DDOT's Significant Impact Policy in the DDOT Comprehensive Transportation Review guidelines, mitigation is required when the project under the Action Alternative triggers substantial changes to the vehicle delays, queuing, or v/c ratios of an intersection. In terms of vehicle delays, if an alternative causes an unfailing intersection approach to fail (LOS E or F), or the alternative causes a 5% or more increase to an intersection approach that is failing in the No Action Alternative, then mitigation is required. Using the criteria of the v/c ratio, when the Action Alternative causes an intersection lane group's v/c ratio to exceed 1.0 or the Action Alternative increases, by 5 percent or more, the v/c ratio of a lane group that is exceeding 1.0 in the No Action Alternative, mitigation is required. Lastly, the queuing criteria require mitigation when the Action Alternative causes a queue to exceed the available storage of a lane group or if the Action Alternative causes a failing queue to increase by 150 feet or more (DDOT, 2022a). Table 6-1 summarizes these thresholds. Based on the Synchro analysis performed for this study, when comparing the No Action Alternative with Action Alternatives 1 and 2, no intersections would require mitigation. However, the comparison of analysis results for Action Alternative 3 vs the No-Action Alternative meets the DDOT requirements for mitigation at three intersections near JBAB South Gate due to PM peak hour performance:

- Intersection #14: Overlook Avenue SW at Chappie James Boulevard
- Intersection #15: Overlook Avenue SW at Chesapeake Street SW
- Intersection #16: Overlook Avenue SW at Laboratory Road SW/NRL Entrance

PM peak hour operations at each of these three intersections would be severely degraded under both the No-Action Alternative and Action Alternative 3 due to downstream congestion along I-295. This congestion spills back through these intersections along Overlook Avenue SW under both alternatives, but the additional traffic diverted to Overlook Avenue SW under Action Alternative 3 exacerbates these delays. The only potential mitigation option that could be implemented to improve traffic performance

along Overlook Avenue SW during the PM peak hour is to add a second southbound travel lane between Chesapeake Street SW and Laboratory Road SW. However, the poor intersection performance would remain, even with this additional capacity, since the delays along Overlook Avenue SW are caused by capacity constraints along southbound I-295 at the interchange with the Capital Beltway (I-95/I-495) in Maryland (specifically, the single-lane ramp to the Beltway Inner Loop leading to Virginia via the Woodrow Wilson Memorial Bridge). Therefore, it is not recommended that any mitigation options be implemented for Action Alternative 3. If the downstream constraint is eventually eliminated by the Maryland Department of Transportation (MDOT) then the need for mitigation of Action Alternative 3 could be revisited at that time.

Table 6-1 Summary of DDOT Mitigation Thresholds

Operational Measure	Mitigation Required If Action Causes…
Vehicle Delay	Intersection approach fails at LOS E or LOS F
	Intersection approach delay increases by ≥ 5% if already failing under No Action
Volume to Capacity (v/c) Ratio	Intersection lane group v/c ratio exceeds 1.0
	Intersection lane group v/c ratio increases by ≥ 5% if already exceeding 1.0 under No Action
Queue Length	Exceeds the available storage of a lane group (i.e., failing queue)
	Causes an already failing queue to increase by 150 feet or more

This page intentionally left blank.

7 Construction Impacts

7.1 Parking

All Action Alternatives would require a temporary parking area for construction workers and trucks—Alternatives 1 and 2 for demolition of existing infrastructure and construction of new infrastructure and Alternative 3 for demolition of existing infrastructure for gate closure. To minimize impacts, the installation would limit parking for construction workers to within the construction sites and laydown areas. Contractor work and storage (laydown) areas would be necessary for parking lot demolition activities and new building construction activities. Construction laydown areas would be used to stage the installation of precast concrete segments; assemble building components; and store large materials to be installed, excavated materials, equipment, and supplies. Construction laydown areas would also serve as a parking location for contractor field offices, contractor management staff, on-site government representatives, and visitors. Construction laydown areas would be located near or at the construction sites to eliminate the need for any additional traffic control treatments; these areas may be temporary or may be used during the entire construction duration, depending on construction needs.

The number of peak trips to the site may temporarily increase from construction worker trips during the construction period. The installation would seek to minimize impacts on parking and the road network during this period by ensuring construction worker parking is addressed and the parking recommendations discussed in Section 8 are implemented.

7.2 Sidewalk Impacts

During the construction period, pedestrians along South Capitol Street and Defense Boulevard SW by Firth Sterling Gate would experience temporary sidewalk closings; temporary new sidewalk connections provided to compensate for the sidewalk closings, when necessary; and sidewalk impacts such as narrowed or torn-up sidewalks. These impacts would be short term, and no long-term impacts would occur. The installation would seek to minimize these impacts by employing the recommendations discussed in Section 8.

7.3 Construction Truck Impacts

Short-term impacts on traffic from South Capitol Street and Defense Boulevard SW would occur as trucks (e.g., dump trucks, cement mixer trucks, and other delivery trucks) deliver construction equipment, materials, and refuse to and from sites. Dump trucks would be used to remove debris from the construction site during the demolition of the existing parking lot that currently occupies the proposed site and during the new construction of either Alternative 1 or Alternative 2. Cement mixer trucks would deliver cement for foundation and support structures, and additional trucks would deliver building materials for the gate houses. Contractors are expected to follow a construction management plan to reduce construction impacts from trucking activity on the roadway network during peak hours.

This page intentionally left blank.

8 Construction Recommendations

To minimize impacts on parking from construction workers, the installation would limit parking for construction workers to within the construction sites, designated overflow areas, and laydown areas. Contractor management staff, on-site government representatives, and visitors are expected to use the limited construction parking. These steps would minimize the impact of the construction on South Capitol Street and Defense Boulevard SW at Firth Sterling Gate.

To address the need for the public to safely and easily pass the site access driveways, the installation in coordination with DDOT, would provide signs to alert pedestrians of closed sidewalks and direct them to temporary or alternative existing sidewalks through construction zones. In addition, the installation's construction contractors, in coordination with DDOT, would install temporary barriers to protect pedestrians from vehicular traffic in areas where sidewalks are narrowed or shifted closer to the roadway. Lastly, any sidewalk shifts or closures would include signs to alert potential users of the pending sidewalk system changes.

The installation would contractually limit the construction contractors to stagger truck arrivals to prevent trucks from potentially blocking the road while waiting to access either site. This approach may be more warranted for South Capitol Street to minimize truck traffic during AM and PM peak hours.

This page intentionally left blank.

9 References

Air Force. (2021a). *Joint Base Anacostia-Bolling Installation Development Plan.*

Air Force. (2021b). *Supplemental Environmental Assessment for Real Estate Outgrant for a Charter School at JBAB, Washington, DC.* Retrieved April 19, 2023, from https://www.jbab.jb.mil/Portals/51/Final%20SEA-JBAB%20CHARTER%20SCHOOL_20210115.pdf

Air Force. (2022, February). *Joint Base Anacostia-Bolling Transportation Management Program.*

Building Bridges Across the River. (2017). *11th Street Bridge Park.* Retrieved April 11, 2023, from http://www.bridgepark.org/

Capital Bikeshare. (2022). *System Data*. Retrieved April 2023, from https://www.capitalbikeshare.com/system-data

CH2MHill. (2013). *South Capitol Street Project Initial Financial Plan F.A.P. No. 8888(286).* Retrieved May 31, 2023, from http://ddotsites.com/documents/FHWA/SouthCapitolStreetProject_InitialFinancialPlan.pdf

CNIC. (n.d.). *Washington Navy Yard Map.* Retrieved April 18, 2023, from https://www.cnic.navy.mil/Operations-and-Management/Operating-Forces-Support/Training-and-Readiness/Map/

DC Circulator. (2017, December). *2017 Transit Development Plan Update.* Retrieved April 18, 2023, from https://www.dccirculator.com/wp-content/uploads/2017/12/2017-Circulator-TDP-Update-for-public-comment.pdf

DC Circulator. (2021). *Transit Development Plan 2020 Update (Draft).* Retrieved February 23, 2023, from https://www.dccirculator.com/wp-content/uploads/2021/04/2020-TDP-Update_04.12.21-Updated-Final.pdf

DC Circulator. (2023a). *Schedule.* Retrieved February 2023, from http://www.dccirculator.com/ride/rider-tools/schedule/

DC Circulator. (2023b). *Congress Heights-Union Station Metro Route.* Retrieved April 18, 2023, from https://www.dccirculator.com/explore/where-we-go/congress-heights-union-station/

DC Office of Zoning. (n.d.). *Summary of Zone Districts*. Retrieved April 18, 2023, from DC Office of Zoning: http://dcoz.dc.gov/page/summary-zone-districts

DCOP. (2003, September). *The Anacostia Waterfront Initiative Framework Plan.* Retrieved April 18, 2023, from https://planning.dc.gov/sites/default/files/dc/sites/op/publication/attachments/The%20Anacostia%20Waterfront%20Framework%20Plan%202003.pdf

DCOP. (2021). *District of Columbia Comprehensive Plan.* Retrieved April 18, 2023, from https://planning.dc.gov/page/comprehensive-plan

DDOT. (2009, April). *District of Columbia Pedestrian Master Plan.* Retrieved April 18, 2023, from https://ddot.dc.gov/sites/default/files/dc/sites/ddot/publication/attachments/pedestrianmasterplan_2009.pdf

DDOT. (2015a, December). *Vision Zero Safe Streets fo Washington, DC - A Plan of Action*. Retrieved April 18, 2023, from DDOT: https://ddot.dc.gov/sites/default/files/dc/sites/ddot/page_content/attachments/VZActionPlan_forWebsite_FINAL-UPDATED_Part1_0.pdf

DDOT. (2015b, September). *The District of Columbia's Capital Bikeshare Development Plan (Draft).* Retrieved April 19, 2023, from https://ddot.dc.gov/sites/default/files/dc/sites/ddot/page_content/attachments/Draft%20DDOT%20Bikeshare%20Development%20FINAL%20reduced.pdf

DDOT. (2016, September). *District of Columbia Functional Classification Map.* Retrieved April 18, 2023, from https://ddot.dc.gov/sites/default/files/dc/sites/ddot/publication/attachments/FunctionalClass_2016.pdf

DDOT. (2017, April). *2016 High Crash Intersection Site Visits*. Retrieved April 18, 2023, from DDOT: https://ddot.dc.gov/sites/default/files/dc/sites/ddot/page_content/attachments/2016%20High%20Crash%20Intersection%20Site%20Visits%20Report.pdf

DDOT. (2019a). *2019 Traffic Volume.* Retrieved from https://opendata.dc.gov/datasets/DCGIS::2019-traffic-volume/about?uiVersion=content-views

DDOT. (2019b, January). *Design and Engineering Manual.* Retrieved April 18, 2023, from https://ddot.dc.gov/sites/default/files/dc/sites/ddot/page_content/attachments/DEM-2019-01-01_DDOT_DEM_Updates_FINAL.PDF

DDOT. (2019c, March). *Public Realm Design Manual. A Summary of District of Columbia Regulations and Specifications for the Design of Public Space Elements.* Retrieved April 18, 2023, from https://ddot.dc.gov/sites/default/files/dc/sites/ddot/page_content/attachments/DDOT_Public_Space_Design_Realm_Guide_Final_updated_2019.03.15-1_0.pdf

DDOT. (2020). *Capital Bikeshare Development Plan Update.*

DDOT. (2021a, December). *MoveDC. The District of Columbia's Multimodal Long-Range Transportation Plan.* Retrieved April 18, 2023, from https://dcgis.maps.arcgis.com/sharing/rest/content/items/a783c2bbeb034ef681094584d086e428/data

DDOT. (2021b, January). Retrieved April 18, 2023, from moveDC Snapshot: https://movedc-dcgis.hub.arcgis.com/apps/abe15342d9a348d4bc781d15b12eabfe/explore

DDOT. (2021c). *Bus Priority Plan.* Washington, District of Colubia: District Department of Transportation.

DDOT. (2021d). *moveDC Mobility Priority Networks*. Retrieved April 18, 2023, from https://movedc-dcgis.hub.arcgis.com/pages/mobility-priority-networks

DDOT. (2022a, January). *DDOT Guidelines for Comprehensive Transportation Review (CTR) Requirements.* Retrieved April 18, 2023, from https://ddot.dc.gov/sites/default/files/dc/sites/ddot/CTR%20Guidance%20-%20January%202022%20Version%202.0.pdf

DDOT. (2022b). *Anacostia Riverwalk Trail.* Retrieved April 18, 2023, from https://ddot.dc.gov/page/anacostia-riverwalk-trail

DDOT. (2022c, July 6). *DC Circulator Transit Development 2020 Plan Update.* Retrieved April 17, 2023, from https://www.dccirculator.com/wp-content/uploads/2022/07/DC-Circulator-2020-TDP_052022_Final.pdf

DMPED. (2022, August 17). *Mayor Bowser Highlights Financial Close for DCHA's First On-Site Housing at Barry Farm*. Retrieved from Office of the Deputy Mayor for Planning and Economic Development: https://dmped.dc.gov/release/mayor-bowser-highlights-financial-close-dcha%E2%80%99s-first-site-housing-barry-farm

DMPED. (2023a). *Project Pipeline Database (PPD) Public Access Dashboard*. Retrieved from Real Estate Development Projects Howard Road: https://octo.quickbase.com/db/bgmd3dpcb?a=dr&rid=343&rl=fr3

DMPED. (2023b). *Project Pipeline Database (PPD) Public Access Dashboard*. Retrieved from https://octo.quickbase.com/db/bgk8b4c4n

DOJ. (2010, September 15). *2010 ADA Standards for Accessible Design.* Retrieved April 18, 2023, from https://www.ada.gov/regs2010/2010ADAStandards/2010ADAStandards.pdf

FHWA. (2009). *Manual on Uniform Traffic Control Devices. Chapter 4E. Pedestrian Control Features.* Retrieved March 20, 2020, from https://mutcd.fhwa.dot.gov/htm/2009/part4/part4e.htm

FHWA. (2016). *Designing Sidewalks and Trails for Access.* Retrieved April 18, 2023, from https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/sidewalk2/sidewalks204.cfm

Metro. (2022, April 7). *Metro releases first-ever 10-year Strategic Plan for Joint Development to accelerate transit-oriented development.* Retrieved from https://wmata.com/about/news/Joint-Development-Strategic-Plan.cfm

Metro. (2023, November 1). *Blue/Orange/Silver Capacity and Reliability Study.* Retrieved from https://www.wmata.com/initiatives/plans/BOS-Capacity-Reliability-Study/BOS-Concepts.cfm

MTA. (2023). *Commuter Bus*. Retrieved April 19 2023, from https://www.mta.maryland.gov/schedule/630

NACTO. (2005, April). *District of Columbia Bicycle Master Plan*. Retrieved April 18, 2023, from https://nacto.org/wp-content/uploads/2011/03/District-of-Columbia-Bicycle-Master-Plan-2005.pdf

NCPC. (2009). *Monumental Core Framwork Plan, Connecting New Destinations with the National Mall.* Retrieved April 18, 2023, from https://www.ncpc.gov/docs/FrameworkPlan1_Intro.pdf

NCPC. (2021). *Comprehensive Plan for the National Capital: Federal Elements.* Retrieved May 26, 2023, from https://www.ncpc.gov/compplan/

Sustainable DC. (2019). Retrieved April 18, 2023, from Sustainable DC Plan: https://sustainable.dc.gov/sites/default/files/dc/sites/sustainable/page_content/attachments/sdc%202.0%20Edits%20V5_web_0.pdf

TRB. (2010). *Highway Capacity Manual.* Washington DC: Transportation Research Board.

WMATA. (2013). *Metro Momentum. The Next Generation of Metro.* Retrieved April 18, 2023, from https://www.wmata.com/initiatives/plans/upload/2013-Momentum-Strategic-Plan-for-2025.pdf

WMATA. (2022, October). *Bus Ridership Data Viewer.* Retrieved April 18, 2023, from Washington Metropolitan Area Transit Authority: https://www.wmata.com/initiatives/ridership-portal/Bus-Data-Portal.cfm

WMATA. (2023a). *Timetables*. Retrieved February 2023, from Washington Metropolitan Area Transit Authority: https://www.wmata.com/schedules/timetables/

WMATA. (2023b, February 10). *District of Columbia Timetables*. Retrieved February 2023, from https://www.wmata.com/schedules/timetables/all-routes.cfm

WMATA. (2023c). *Your Metro, The Way Forward. Strategic Transformation Plan.* Retrieved 11 2, 2023, from https://www.wmata.com/initiatives/strategic-plan/upload/230314_STP_Report.pdf

WSP. (2020). *Transportation Study for Real Estate Outgrant for a Charter School at JBAB, Washington, DC.*

WSP. (2022a, November 24 and 25). Site Visit Notes: Pedestrian and Parking Network Inventory.

WSP. (2022b, November 15, 16, and 17). Site Visit Notes: Bus Stop Inventory.

Attachment 1 DDOT CTR Scoping Form

This page intentionally left blank.

Attachment 2 Traffic Counts

Attachment 3 Planned External Development Trip Distribution

Source: Section 4.1.7.3 of the June 2020 *Preliminary Final Transportation Study For Real Estate Outgrant for a Charter School at Joint Base Anacostia-Bolling, Washington, D.C.*

This page intentionally left blank.