VIRGINIA
MEGAPROJECTS

INTERSTATE 395 Express Lanes

NETWORK TRANSPORTATION MANAGEMENT PLAN

September 22, 2017

FHWA approval of the I-395 Express Lanes Network TMP transmitted via email on September 22, 2017

From:	Moore, Elliott (FHWA) <Elliott.Moore@dot.gov>
Sent:	Friday, September 22, 2017 9:17 AM
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Subject:	I-395 Express Lanes - Network TMP Approval
Attachments:	I-395 TMP Final_170920 Compressed.pdf

Paul,

We have reviewed the Network Transportation Management Plan (TMP) for the I-395 Express Lanes Project. The Network TMP outlines Traffic Control, Transportation Operations, and Public Information strategies with the goal to have positive impacts on the regional safety and mobility concerns related to the Project. We understand that this TMP is a living document, and its content may change during the construction of the Project due to monitoring different performance measures defined for the strategies. The TMP meets the intent of the requirements outlined in 23 CFR 630 Subpart J. Consider this email as our approval of the Network TMP for the I-395 Express Lanes Project. Please send us a final copy of the Network TMP. Thank you for working with our staff during the development of this document.

S. Elliott Moore, P.E.
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Table of Contents

1. Executive Summary 1

Acronyms / Abbreviations 2

2. Introduction 4

2.1 Purpose 4

2.2 TMP Goals & Objectives 5

2.3 Overview of Network TMP Development 5

2.3.1 Organization 6

2.3.2 Roles & Responsibilities 6

2.3.3 Key Performance Measures & MOE's 10

2.3.4 High Level Schedule 12

3. Project Overview 13

3.1 Scope of Work 13

3.2 Major Work Elements 14

3.2.1 I-395 Express Lanes Conversion 14

3.2.2 I-395 General Purpose (GP) Bridge Rehabilitation 15

3.2.3 Duke Street to Edsall Road Widening 15

3.2.4 Reconfiguration of Pentagon Parking & Bus Loop 16

3.3 Adjacent Construction Projects 16

3.3.1 Boundary Channel Interchange Project 17

3.3.2 Army Navy Drive Complete Street 17

3.3.3 Hayes Street Tour Bus Parking 17

3.3.4 I-66 Inside the Beltway 17

3.3.5 Landmark Mall Redevelopment 17

3.3.6 Other Related Projects 18

3.4 Contracting 18

3.5 Federal Environmental Review / NEPA 19

3.6 Project Schedule 19

3.7 Risks 20

4. Transportation Network Operations Assessment 21

4.1 Definition of Existing Network 21

4.2 Data Collection 21

4.3 Activity Centers 21

4.4 Known Constraints Within Project Limits 22

4.5 Traffic Operations Under Baseline and With Construction 23
4.5.1 Baseline Traffic Operations & "Hot Spots" 23
4.5.2 Under Construction Traffic Operations & "Hot Spots" 26
4.5.3 Existing Transit Operations 29
4.5.4 Origins-Destinations of I-395 Traffic 33
4.5.5 School & Holiday Schedules 34
4.5.6 Special Events 35
5. Maintenance of Traffic 36
5.1 Project Team 36
5.1.1 Organization 37
5.1.2 Roles & Responsibilities 37
5.2 MOT Approach Overview 39
5.3 Proposed MOT Phasing by Design-Builder 39
5.4 MOT Construction Planning 39
5.4.1 Roadway Lane and Shoulder Closure Restrictions 40
5.4.2 Temporary Roadway Closures in the Reversible HOV Facility 42
5.4.3 Incident Management 43
5.4.4 Project Coordination 44
5.4.5 Staffing 44
5.4.6 Review Process 45
6. Work Zone Impact Mitigation Strategies 47
6.1 Overview 47
6.2 Anticipated Construction Operations and "Hot Spots" 48
6.3 Temporary Traffic Control Strategies 52
6.3.1 Control Strategies 52
6.3.2 Traffic Control Devices 53
6.4 Transportation Operations Strategies 53
6.4.1 Regional Support Strategies 54
6.4.2 Local Network Operations Strategies 56
6.4.3 Transit & TDM Strategies 57
6.5 Work Zone Safety Management Strategies 63
6.5.1 Temporary Concrete Barrier Service 63
6.5.2 Crash Cushions 63
6.5.3 Portable Changeable Message Signs 63
6.6 Incident Management and Enforcement Strategies 64

6.6.1 Selective Police Enforcement 64
6.6.2 Supplemental Virginia State Police Troopers 64
6.6.3 Dedicated Portable Variable Message Signs 65
6.7 Public Information Strategies 66
6.7.1 Public Outreach and Advertising 66
6.7.2 Email Blasts 67
6.7.3 Printed Materials 67
6.7.4 Advertising 68
6.7.5 Traffic Advisories/Media Relations 68
6.7.6 Employer Outreach and Information Events 68
Appendices 69
Appendix A - Roles & Responsibilities Matrix 70
Appendix B – Potential Adjacent Projects List 75
Appendix C – Baseline Traffic Analysis Results 81
Appendix D – Construction Traffic Analysis (Single Lane) 98
Appendix E – Traffic Monitoring 114

VIRGINIA
MEGAPROJECTS

Section 1
Executive Summary

INTERSTATE 395 Express Lanes

1. Executive Summary

The primary objective of the Commonwealth's I-395 Express Lanes Project is to convert the two existing High Occupancy Vehicle (HOV) lanes on I-395 to three High Occupancy Toll (HOT) lanes, from the current northern terminus of the I-95 Express Lanes at Turkeycock Run, near Route 236 (Duke Street) in the south, to the 14th Street Bridge in the north. The completed I-395 Express Lanes will be subject to the same operating rules and regulations as the existing I-95 Express Lanes in northern Virginia. When completed, the two facilities will operate as a single, fully integrated I-95/I-395 Express Lanes facility.

A private consortium (Concessionaire), known as 95 EXPRESS LLC, led by Transuban (USA) Inc. is responsible for the development and implementation of the project specific Transportation Management Plan (TMP) in accordance with VDOT's I&IM-241/TE-351 for all proposed work associated with the construction of the I-395 Express Lanes Project. The intent of this Network TMP is to further expand on Federal Highway Administration's (FHWA) requirements and VDOT's need to develop and implement a broader TMP for the I-395 Express Lanes Project to assess and mitigate more regional impacts. This will be undertaken in coordination with the Concessionaire's Project TMP, Sequence of Construction, and Maintenance of Traffic Plans. This Network TMP proposes broader regional strategies to mitigate construction-related congestion beyond the construction corridor itself and considers the adjoining cross-streets, interstates and other regional network roadways. These broader strategies will be concentrated in four general focus areas:

- Traffic Operations
- Incident Management
- Transportation Demand Management
- Public Outreach

This Network TMP is a living document that will evolve as construction activities and phasing become more defined. It was prepared to highlight various best practices typically known to minimize project related impacts and delays that could develop regionally as a result of the project work zone. Public safety, a high level of mobility, and reliable information to allow travelers to better plan their trips throughout the construction efforts are each foundational to a well-managed project of this scale. The goal of this document is to define and implement strategies that will have positive impacts on the regional safety and mobility concerns related to the I-395 Express Lanes Project. Several Traffic Control, Transportation Operations, Transit & TDM and public outreach strategies are proposed along with performance measures and budgets. The effectiveness of each strategy, as it relates to this specific project, will be paramount. Methods of performance monitoring and best practices are presented and will be closely monitored of each mitigation strategy to ensure accountability and effectiveness as work zone impacts unfold.

Acronyms / Abbreviations

ADT	Average Daily Traffic
AM	Morning
API	Application Programming Interface
ATR	Automated Traffic Recording
CHART	Coordinated Highway Action Response Team
CONCESSIONAIRE	95 EXPRESS LANES LLC (a limited liability company)
DB	Design Build
DC	District of Columbia
DDOT	District Department of Transportation
DMS	Dynamic Message Signs
EA	Environmental Assessment
EMS	Emergency Medical Services
FEMS	Fire and Emergency Medical Services
FHWA	Federal Highway Administration
FY	Fiscal Year
GEC	General Engineering Consultant
GIS	Geographic Information System
HNTB	HNTB Corporation (Consulting Firm)
HSEMA	Homeland Security and Emergency Management Agency
INRIX	INRIX, Inc. - Real Time Traffic Information Provider
IT	Information Technology
LANE	Design-Build Contractor
LCAMS	Lane Closure Advisory Management System
LOS	Level of Service
MARC	Maryland Area Regional Commuter
MOE	Measure of Effectiveness

MOT	Maintenance of Traffic
MPD	Metropolitan Police Department
MSHA	Maryland State Highway Administration
NEPA	National Environmental Policy Act of 1969
PM	Afternoon
RITIS	Regional Integrated Transportation Information System
RK&K	Rummel, Klepper, & Kahl (Consulting Firm)
SOC	Sequence of Construction
T3	T3 Design Corporation (Consulting Firm)
TCP	Traffic Control Plan
TDM	Transportation Demand Management
TE	Traffic Engineer
TMC	Transportation Management Center
TMP	Transportation Management Plan
TO	Traffic Operations
TOC	Transportation Operations Center
TTC	Temporary Traffic Control
VDOT	Virginia Department of Transportation
WMATA	Washington Metropolitan Area Transit Authority

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Section 2
Introduction

INTERSTATE 395 Express Lanes

2. Introduction

2.1 Purpose

The purpose of this Network TMP is to satisfy the FHWA provisions in the Final Rule on Work Zone Safety and Mobility; in addition to all VDOT requirements as defined in IIM -LD-241.6 / TED-351.4 for Type C Projects (Significant Projects – Project Management Category V). In September 2004, the Federal Highway Administration (FHWA) published the Final Rule on Work Zone Safety and Mobility, 23 CFR 630 Sub part J. This rule, referred to as Work Zone Safety and Mobility, applies to state and local governments that receive Federal -aid highway funding. Transportation agencies were required to comply with the provisions of the Rule by October 12, 2007, to address present and future work zone issues.

The policy provisions in the Final Rule on Work Zone Safety and Mobility:

- Requires agencies to implement a policy for the systematic consideration and management of work zone impacts on all Federal -aid highway projects. Furthermore, it encourages agencies to implement the policy for non-Federal-aid projects and programs.
- Requires the policy to address work zone impacts throughout the various stages of the project's development and construction. The agency must consider work zone impacts during project development, management of work zone impacts during construction, and assessment of work zone performance after implementation. The agency must also consider communication with the public before and during the project.
- Recognizes the state policy may vary based on the characteristics and expected work zone impacts of individual projects or classes of projects.
- Requires transportation management plans.

VDOT is committed to providing safe and efficient movement of motorized and non-motorized traffic for all the traveling public through or around roadway work zones as well as providing protection for workers and equipment located within work zones.

On May 20, 2016, VDOT's Location and Design Division issued the most current Instructional and Information Memorandum (IIM -LD-241.6 / TED-351.4) pertaining to the development of the provisions of the FHWA's Final Rule on Work Zone Safety and Mobility to all work zone activities within state right of way and on all streets and highways that have been accepted into the State Highway System regardless of the funding source, as well as all other projects receiving State and/or Federal funding.

The I-395 Express Lanes project will be constructed as a Public-Private-Partnership (P3) project. This document outlines mitigation strategies and describes how these strategies will be implemented by the Design-Build contractor under the authority of the State's Concessionaire, and the VDOT / General Engineering Consultant (GEC); as required in the Project Contract and related Technical Provisions. It is important to note that the TMP development process is iterative and evolves through project design and implementation. Therefore, as the project needs evolve, it is necessary to reassess the

mitigation strategies set forth in this document to confirm the work zone impacts are constantly addressed and the necessary funding is available. Finally, the mitigation strategies proposed in this Network TMP will be monitored, reevaluated, and revised throughout the project to ensure all strategies are cost-effective or, if not, removed or refined appropriately.

2.2 TMP Goals & Objectives

VDOT's policy requires TMP goals and objectives focus on roadway visibility, functionality of temporary traffic control in work zones, and traffic flow through the work zone. The Policy requires that the work zone management strategies be identified and implemented beginning with the preliminary engineering stages and carried through to the completion of all work, including post construction reviews.

Various generalized work zone management strategies may be properly employed in most projects to minimize traffic delays, improve mobility, and enhance the safety of both workers and the traveling public. The goals and objectives of this document, developed specifically for the I-395 Express Lanes project, is to further focus and document selected strategies that will maximize benefits to the public, minimize traffic delays, and improve operations throughout the various stages of the project. Project specific strategies, intended to meet the goals and objectives of the project will be the primary objective of this Network TMP document.

The strategies are divided into three broad groups, as defined below.

Temporary Traffic Control Strategies

- Control strategies
- Traffic control devices
- Project coordination, contracting and innovative construction strategies

Public Communication Strategies

- Public awareness strategies
- Motorist information strategies

Transportation Operations Strategies

- Demand management strategies
- Corridor/network management strategies
- Work zone management strategies, and
- Traffic/incident management strategies

2.3 Overview of Network TMP Development

The Network TMP provides strategies for minimizing work zone impacts of the I-395 Express Lanes project and describes how these strategies will be implemented to streamline construction and maximize safety for workers, and the traveling public. It includes a Maintenance of Traffic overview as well as major work zone impact mitigation strategies

developed to broaden discussions concerning 1) Temporary Traffic Control, 2) Transportation Operations, 3) Work Zone Safety Management, 4) Traffic Operations, Incident Management & Enforcement, and 5) Public Information.

The development of the Network TMP for the project was a collaborative effort among members of the TMP Team. This Team includes VDOT, working with the General Engineering Consultant (GEC) Team, the Concessionaire / Design-Build (DB) Contractor, and significant stakeholders who participated in TMP meetings and/or provided feedback to the development team. The Network TMP is a "living" document that will be updated throughout design and construction.

2.3.1 Organization

The Concessionaire / Design-Build (DB) Contractor is responsible for developing, implementing, and monitoring all components of the Project Transportation Management Plan (TMP) related to construction of the I-395 Express Lanes Project. The I-395 Express Lanes Project shall be designated as a Type C (significant) project requiring a Temporary Traffic Control Plan, Public Communications Plan, and Transportation Operations Plan. The Concessionaire / Design-Build (DB) Contractor shall generate all traffic analysis for the construction of the I-395 Express Lanes Project and support public outreach efforts throughout construction. The Concessionaire shall be responsible for temporary lane and shoulder closures, road / ramp closures, detours, etc. for construction of the I-395 Express Lanes Project with VDOT.

VDOT and the GEC are responsible for the development, implementation, and monitoring of the Network TMP for regional activities for the I-395 Express Lanes Project including additional elements that may fall outside of the I-395 corridor (i.e. transit mitigation strategies, van pooling, etc.). VDOT will support and in some cases, facilitate coordination between the Concessionaire and other local, state, and federal agencies. VDOT will develop the I-395 Lane Closure Policy, monitor traffic during temporary lane closures and prepare any necessary MOU agreements among stakeholders and first responders.

2.3.2 Roles & Responsibilities

The development of this TMP network document, which is intended to augment the Design Builder's I-395 Project TMP, was a collaborative effort amongst members of the TMP team. The TMP team includes Susan Shaw, Megaprojects Director; and Paul Nishimoto, Project Manager. The Network TMP coordinator designated as the lead contact person for developing this plan is Scott Crumley of RK&K.

VDOT Megaprojects Director	Network TMP Coordinator	Project Manager
Susan Shaw, PE	Scott Crumley, PE, PTOE	Paul Nishimoto
Susan.Shaw@vdot.virginia.gov	scrumley@rkk.com	paul.nishimoto@vdot.virginia.gov

Lead development responsibilities for the development of this Network TMP have been assigned to the following Sub-Committees and lead staff:

- Traffic Operations, Barry Brandt, PE, PTOE
- Incident Management / Enforcement, David May
- Transit / Transportation Demand Management, Erin Murphy, AICP
- Public Outreach, Cherie Gibson & Bruce McLeod

The Network TMP Team consists of those individuals and stakeholders involved in the TMP meetings and/or development and review of the TMP. The current Network TMP team members of this development effort are:

1. Susan Shaw, VDOT
2. Charlie Warriach, VDOT
3. Paul Nishimoto, VDOT
4. Kamal Suliman, VDOT
5. Ivan Horodyskyj, VDOT
6. Michael Snare, GEC
7. Scott Crumley, GEC
8. Barry Brandt, GEC
9. Cherie Gibson, GEC
10. Jeff Parker, GEC
11. David May, GEC
12. Erin Murphy, GEC
13. Bruce McLeod, GEC
14. Josh Nicholas, Arlington County
15. Ravi Raut, City of Alexandria
16. Jim Turner, VDOT
17. Mike Wood, VDOT
18. 1st Sgt. Steven Mittendorf, Virginia State Police
19. Capt. Geoffrey Mayer, Arlington Co Fire/Rescue

Appendix A of this report includes a detailed matrix summary of the various responsibilities for developing, implementing and monitoring all components of the Transportation Management Plan (TMP) related to construction of the I-395 Express Lanes Project.

The following are the lead roles and responsibilities of others:

LANE / AECOM - Design-Builder Contractor roles and responsibilities include:

- Development and implementation of the I-395 Project TMP in accordance with I&IM-241/TE-351 for all proposed work associated with the construction of the I-395 Express Lanes Project.
- Developing and coordinating detour plans with local, state, and federal agencies (as applicable) and submitting and updating the MOT Plan well in advance of any planned detour activity. The DB Contractor shall be responsible for all planning, consultation and coordination with impacted parties, design, implementation and monitoring, and maintenance of detours-whether within or outside the I-395 Express Lanes Project Right of Way.
- Preparing traffic analyses and modeling for all MOT phases and stages, exclusive of closures identified in the I-395 Design Build Contract, to identify traffic impacts. The DB Contractor may use analytical/deterministic traffic

simulations, or other approved analyses. Traffic analyses and modeling shall also be required for all construction activities requiring a detour, requiring closure of multiple lanes, or deviating in any way from what is set forth in the I-395 Design-Build Contract.

- Performing, at a minimum, daily reviews of the work zone to ensure compliance with contract documents and establish specifications and standards.

95 EXPRESS LLC - Concessionaire roles and responsibilities include:

- Overseeing the development and implementation of the Concessionaire's Project TMP related to the construction of the I-395 Express Lanes Project.
- Directing the DB Contractor to take prompt action for any act or omission that violates requirements or conditions of the Contract. Concessionaire can act directly to address issues.
- Assisting VDOT and the DB Contactor with obtaining various Governmental approvals including authorizations and permits necessary for I-395 Express Lanes Project work on the Pentagon Reservation that are the DB Contractor's responsibility.

VDOT / General Engineering Consultant roles and responsibilities include:

- Working together to develop and implement a Network TMP for the I-395 Express Lanes Project, which will be undertaken in coordination with the Concessionaire's I-395 Express Lanes Project TMP, Maintenance of Traffic Plan, and Sequence of Construction Plan.
- Supporting and facilitating coordination between the Concessionaire and other local, state, and federal agencies.
- Reviewing for approval the Concessionaire's I-395 Project TMP to ensure it is compliant and consistent with the Department's goal of reducing work zone crashes and improving travel time, providing safe and efficient movement of motorized and non-motorized traffic for the traveling public through or around roadway work zones, as well as providing protection for workers and equipment located within work zones.
- Reviewing the project at each milestone to ensure appropriate action is taken to reduce work zone impacts on the public.
- Tracking, monitoring, and reporting of TMP expenditures as outlined in the approved project's TMP budget, and prepare monthly reports for VDOT management.

FHWA roles and responsibilities include:

- Overseeing compliance issues related to the FHWA's Final Rule on Work Zone Safety and Mobility.
- Approving the Network TMP.

2.3.3 Key Performance Measures & MOE's

The goal of the I-395 Express Lane Network TMP is to explore mitigation strategies that most likely will have positive impacts on the regional safety and mobility concerns related to the project. The effectiveness of each strategy, as it relates to this specific project, will be forefront. Methods of performance monitoring, and various related best practices, will be presented for ongoing evaluation of the various strategies to provide both accountability and flexibility as the project evolves throughout the expected construction schedule.

Performance measures are sets of defined, outcome-based conditions or response times that can be measured to evaluate success with pre-defined "Measures of Effectiveness".

For the I-395 Express Lane project it will be necessary to select performance measures that relate to the goals VDOT has set relative to mobility and safety impacts during construction of the project.

Mobility performance measures are those indications of how easy or difficult travel is along a certain corridor or in a region. Roadway mobility can be quantified in numerous ways through a variation of data collection techniques.

Table 2.1 provides a partial list of nationally recognized mobility performance measures and related data sources to be considered for this project.

Table 2.1: National Recognized Mobility Performance Measures

Mobility Performance Measures	
Nationally Recognized Mobility Performance Measures	**Nationally Recognized Mobility Data Sources**
• Travel time reliability • Queue length • Duration of queue • User costs • Level of service • % time at free-flow speed • % work zones meeting expectation for customer complaints / satisfaction ratings	• Use of existing vehicle counts including Automatic Traffic Recording (ATR) station data • Temporary data collection device • Manual sampling of travel times, queue lengths • Cameras • Point-to-point travel time data using technology

Formally established processes to collect data for some MOE's can be expensive and time consuming to implement, however the selection of appropriate measures will lead to proper evaluation of the project's impacts. The data collection plan developed for this TMP, along with efforts to use RITIS and INRIX information, to evaluate mobility performance should be considered when selecting project mobility measures.

Safety performance measures can be difficult to quantify outside of actual events. Crashes and injuries to both the traveling public and highway workers are generally accepted measures, as well as complaints from users. **Table 2.2** is a list of nationally recognized safety performance measures and related data sources to be considered to test the safety strategies selected for this project.

Table 2.2: National Recognized Safety Performance Measures

Safety Performance Measures	
Nationally Recognized Safety Performance Measures	**Nationally Recognized Safety Data Sources**
• Comparison of pre-construction work zone crashes using costs or crash rates • Crash frequency (i.e., total, by cause or severity) • Percentage of crashes in various categories (e.g., severity, crash type, causal factors, etc.) • Crash costs • Service patrol dispatch frequency • Speeds within work zones • Scores from work zone quality inspections • Worker fatalities and injuries • Work zone intrusion frequency	• Police crash reports • Agency/contractor supplemental data reports collected in the work zone • Inspection reports • Service patrols / fire department calls • Traffic Operations Center incident reports • Agency/contractor worker injury reports • Customer complaints / satisfaction ratings

2.3.4 High Level Schedule

VDOT and the Concessionaire has selected a Design-Build Contractor based on an RFP issued on October 3, 2016 and submissions received on December 1, 2016. A Contractor has been identified and Notice to Proceed with Construction is scheduled for mid-July, 2017. Construction duration is estimated to be approximately two and one-half years, with a scheduled "Service Commencement Date" for the Express Lane operations to begin in October, 2019.

Public Outreach:	Ongoing
Begin Preliminary Construction Activities:	Spring 2017
Begin Major Construction Activities:	Fall 2017
Completion of Pentagon Work:	Spring 2019
Express Lanes Service Commencement:	Fall 2019
Estimated project completion:	Spring 2020

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Section 3
Project Overview

INTERSTATE 395 Express Lanes

3. Project Overview

3.1 Scope of Work

The I-395 Express Lanes is a 7.7-mile extension of the existing I-95 Express Lanes in Fairfax County, the City of Alexandria, and Arlington County, Virginia. **Figure 1** shows a vicinity map of the I-395 Express Lanes Extension project.

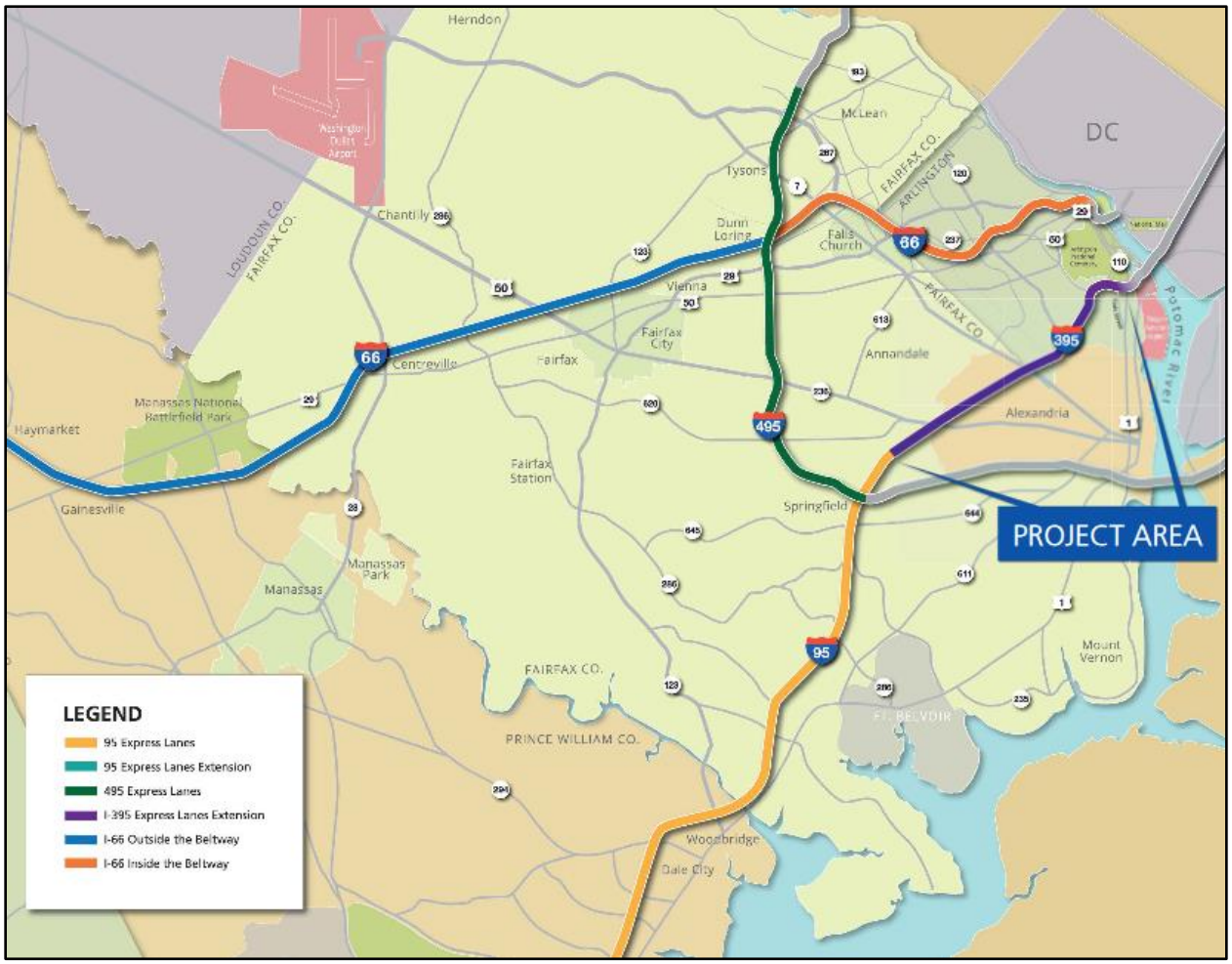

Figure 1: Vicinity Map for the I-395 Express Lanes Extension Project

The I-395 Express Lanes will extend along Interstate I-395 (I-395) from the current northern terminus of the I-95 Express Lanes at Turkeycock Run, near Route 236 (Duke Street) in the south, to the 14th Street Bridge in the north. I-395 currently operates with a variable three to four general purpose lanes in each direction and two barrier-separated reversible High Occupancy Vehicle (HOV) lanes in the center of the roadway.

The primary objective of the I-395 Express Lanes is to convert the existing HOV lanes on I-395 to three High Occupancy Toll (HOT) lanes, which can be used by HOV 3+ vehicles for free, and by other permitted vehicles for a fee (toll). The completed I-395 Express Lanes will be subject to the same operating rules and regulations as the existing I-95 Express

Lanes, and when completed the two will operate as a single, fully integrated I-95/I-395 Express Lanes facility.

3.2 Major Work Elements

The project will consist of three (3) major work elements as discussed in detail below.

3.2.1 I-395 Express Lanes Conversion

The major components of the I-395 Express Lanes Conversion include:

- Reconfiguration and reconstruction of the two existing HOV lanes to three HOT lanes between Turkeycock Run (current terminus of the I-95 Express Lanes) and to just south of the Eads Street interchange as shown in the roadway section as shown below in **Figure 2**:

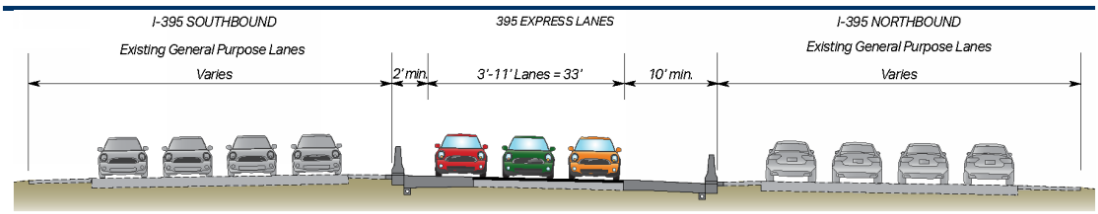

Figure 2: I-395 Express Lanes Typical Cross-Section

- Roadway construction work includes traffic control, barrier replacement, bridge repairs, drainage and pavement modifications, signing, pavement markings, and roadway lighting.
- Construction of modified entry and exit reversible connections to the HOT lanes at Eads Street and roadway improvements along Eads Street and South Rotary Road, including the construction of two new traffic signals along Eads Street, and modification to traffic signals at the Eads Street and Army intersection.
- Construction of two new traffic signals on the Pentagon Reservation.
- Installation of a comprehensive Traffic Management System (TMS).
- Installation of an electronic toll collection system (Tolling System).
- Signage, traffic signal and ITS enhancements within the I-395 Express Lanes vicinity (including some local roads, approach roadways to I-395, and improvements to facilitate improved traffic flow within the Pentagon Reservation.
- Installation of new sound walls in the vicinity of Seminary Road.

Access to and egress from the I-395 Express Lanes will be provided via dedicated entry and exit points from the adjoining arterial network. The entry and exit points are at the following locations:

- Turkeycock Run (interchange entry and exit points)

- Seminary Road
- Shirlington Circle
- Washington Boulevard (Route 27)
- Eads Street
- the Northern Terminus

3.2.2 I-395 General Purpose (GP) Bridge Rehabilitation

GP Lanes Bridge Rehabilitation will be performed at the following three (3) bridge structure locations:

- I-395 over Sanger Avenue – Structure Number 2805
- I-395 over West Braddock Road – Structure Number 2806
- I-395 (NB GP Lanes and HOV) over Route 27 NBL and Joyce Street – Structure Number 2040

Work includes, but is not limited to:

- Deck evaluation
- Type A and Type B Hydro-demolition of all or portion of bridge decks (and approach slab surface and overlay with latex-modified concrete
- Remove existing barrier and replace with a cast-in-place concrete parapet (FShape)
- Reconstruct expansion joints with elastomeric dams
- Perform deck slab closure (joint elimination)
- Painting of steel superstructure
- Replace bearings
- Perform substructure repairs
- Clean and wash abutments and piers
- Crack repairs (Type B)
- Waterproofing coating Duke St to Edsall Rd Widening (DEW)

3.2.3 Duke Street to Edsall Road Widening

The Duke Street to Edsall Road widening is a two and a half (2.5) mile widening of the I-395 southbound General Purpose lanes in Fairfax County and the City of Alexandria, Virginia. The general work extends from approximately 0.28 miles south of Edsall Road (Route 648) to 0.63 miles north of Duke Street (Route 236). Portions of the Duke Street and Edsall Road interchanges with I-395 and the Quantrell Avenue off-ramp from I-395 will also be improved.

The primary objective of the Duke-Edsall widening project is to widen I-395 southbound from three to four lanes within the project limits.

The general scope of the Duke-Edsall widening is as follows:

- Widen the I-395 southbound general purpose lanes to add a fourth through lane on right side of traffic
- Modify the interchanges at Duke Street and Edsall Road to improve the operations of the ramp connections and the I-395 southbound general purpose lanes
- Reconfigure the Duke Street eastbound to southbound I-395 on-ramp to merge into the I-395 general purpose lanes south of the Turkeycock flyover (Ramp B)
- Modify a portion of Duke Street on the east side of I-395 to accommodate U-turns to allow for traffic from points west on Route 236 to access the existing southbound Express Lane entrance at Turkeycock Run

3.2.4 Reconfiguration of Pentagon Parking & Bus Loop

The Pentagon Parking and Bus Loop effort involves the incorporation of new bus lanes and HOV commuter ("slug") lanes on the Pentagon's existing parking lot located just east of Eads Street and just north of I-395. These enhancements are designed to improve traffic flow and safety in a traditionally congested area of the Pentagon Reservation.

The work involves the following key components:

- New concrete pavement for the bus loop
- Enhancements to the storm drainage network to accommodate the new drainage patterns
- New pedestrian sidewalks with ornamental fencing and passive K-12 barrier system
- New signage and pavement marking to delineate the slug lanes and reconfigured parking lot layout
- Safety and security enhancements to accommodate the future improvements detailed in the Pentagon's Master Plan
- New lighting for the bus loop, sidewalk and slug lanes
- Conduit duct bank, vault and associated electrical and communications infrastructure

These components, once complete, will help minimize the traffic bottleneck at this critical interface point to the I-395 Express Lanes system.

3.3 Adjacent Construction Projects

The following current and planned projects may impact construction of the I-395 Express Lane project due to their proximity to the project area. The Project Team will monitor the schedules of these related projects to ensure that the traffic impacts from the work zones do not overlap, with a focus on avoiding overlapping detour routes.

3.3.1 Boundary Channel Interchange Project

The project goal is to upgrade the Boundary Channel Drive/I-395 interchange to improve traffic operations and safety for all users. The existing interchange is inadequate for current demands and for future planned growth in Crystal City. The interchange project also includes a connection to Long Bridge Park Drive and a bicycle connection from the Humpback Bridge to Long Bridge Park.

This project is a multiyear, multiphase project that is currently in the technical analysis phase. FHWA and VDOT approval of the Interchange Modification Report (IMR) are required before this project can proceed to the engineering design stage. The third iteration of the I-395/Boundary Channel Drive IMR was submitted to VDOT on January 30, 2017 and is currently under review by VDOT staff. IMR approval is expected in the Summer of 2017.

3.3.2 Army Navy Drive Complete Street

This project will consist of a rebalancing of the right-of-way (ROW) to permit improved bicycle, pedestrian and transit accommodations on Army Navy Drive.

3.3.3 Hayes Street Tour Bus Parking

This project will consist of the reconfiguration of the Hayes Street Parking lot for the relocation of tour bus parking services for visitors to the Pentagon. Construction of this effort is scheduled to start in August 2017.

3.3.4 I-66 Inside the Beltway

VDOT has started reconstruction of I-66 inside the beltway. This is a $60M project to be developed in two phases of construction.

Phase 1 consists of various tolling improvements, signing upgrades along I-66 inside the beltway local roadways, and ramp improvements. This effort started in 2016 and is expected to be completed in 2017.

Phase 2 of this project will be a four-mile widening of eastbound I-66 from the Dulles Connector Road to Ballston (Fairfax Drive/Glebe Road – Exit 71). This effort is expected to begin construction in 2018 and end in 2020.

3.3.5 Landmark Mall Redevelopment

This large redevelopment effort is located directly adjacent to the I-395 Interchange at Duke Street, and is encompassed by Van Dorn Street to the south. The current proposal submitted by The Howard Hughes Corporation calls for demolition of the two-story central area of the mall and replacement of this portion with a mixed-use residential and retail complex with a traditional street grid, sidewalks, trees, and open space. This application calls for approximately 250,000 to 300,000 square feet of retail and restaurants, along with approximately 350 to 400 apartments.

During construction, which started on February 1, 2017, the interior portion of the mall will be closed to the public. Sears will remain open as well as businesses operating on the outparcels/parking field portion of the mall. Additional scheduled construction efforts have not been determined.

3.3.6 Other Related Projects

Multiple jurisdictions in the project area have additional planned projects which may from time to time impact construction of the I-395 Express Lane project due to their proximity to the project. **Appendix B** is a more detailed list of such projects and includes known construction schedules.

The following is a partial list of projects which may be expected to be scheduled during times which may impact construction of the I-395 Express Lane project:

- The Arlington Memorial Bridge rehabilitation
- The Meade Street Bridge rehabilitation
- The King Street Bridge rehabilitation
- The Duke Street Bridge rehabilitation
- The Long Bridge Drive utility underground & roadway realignment
- Washington Boulevard Bridge over Route 110 rehabilitation
- The Key Bridge rehabilitation
- Development projects within the City of Alexandria
- Local Arlington County roadway projects
- The Beach Drive rehabilitation – Rock Creek and Potomac Parkway
- Various pavement resurfacing maintenance projects scheduled by VDOT and multiple local jurisdictions

3.4 Contracting

A comprehensive set of Technical Requirements was developed to identify the minimum scope and technical requirements required to advance the I-395 Express Lane project. These minimum technical work requirements will be undertaken by or on behalf of the Concessionaire. The Concessionaire, 95 Express LLC, is governed by a separate Agreement and remains responsible to the VDOT for the I-395 Express Lane project.

Under direction from VDOT, the Concessionaire, 95 Express LLC, developed a formal Request for Proposal and solicited multiple Design-Build teams to offer services in connection with the 395 Express Lanes Project. The RFP includes the development and implementation of a separate I-395 Project TMP for the I-395 corridor in accordance with VDOT's I&IM-241/TE-351 for all proposed work directly associated with the construction of the project.

The Design-Build team of The Lane Construction Corporation and AECOM were competitively selected to enter a Design-Build Contract with 95 Express LLC for all work

required in the RFP for the design and construction of the project. Subsequently, 95 Express LLC, has contracted the DB team to provide a MOT Manager and adequate staff, including a Traffic Engineer, to coordinate all technical and functional aspects related to MOT operations.

To assist VDOT with the development of this effort, VDOT competitively selected the services of the HNTB Corporation, in association with various Sub-consultants, to provide General Engineering Consultant services for the project.

3.5 Federal Environmental Review / NEPA

Based on the information presented in the Environmental Assessment (EA), as well as the Revised EA, public hearing comments, and other project documentation, FHWA finds that the project will not have a significant environmental impact. Therefore, an Environmental Impact Statement is not warranted, and a Finding of No Significant Impact (FONSI) was issued on February 28, 2017.

3.6 Project Schedule

Construction operations are organized logically and systematically into five (5) segments. Dividing the project based on segmentation and phasing allows the contractor to coordinate the elements of design and the construction approach and to manage resources required to work through permitting, ROW, stakeholder coordination, safety and the complexities of the geotechnical and utility relocations expected to be encountered.

Based on receiving NTP on July 25, 2017, the Contractor estimates the Express Lanes service commencement date will be in October 2019, followed by final completion by Spring 2020.

The key milestone dates for the project are the following:

Key Milestone	Milestone Date
Notice of Award Date	January 20, 2017
Contract Execution	February 24, 2017
Scope Validation Period Complete	May 26, 2017
NTP & Start of Construction	July 25, 2017
Pentagon Work Completion	March 2019
Service Commencement Date	October 2019
Final Completion	Spring, 2020

3.7 Risks

VDOT recognizes the key benefits related to the identification and implementation of appropriate TMP strategies for the I-395 Express Lanes project, and the various known mobility and safety risks associated with introducing work zone impacts to this already congested corridor and the region.

To minimize the known risks associated with the project, the following are the key expectations of this TMP and the minimum performance objectives of all parties associated with the project:

- Address the broader safety and mobility impacts of work zones at the corridor and network levels
- Promote more efficient and effective construction phasing and staging, minimize contract duration, and control costs
- Improve work zone safety for construction workers and the traveling public
- Minimize the traffic and mobility impacts of a work zone
- Improve public awareness
- Minimize complaints from the traveling public, local businesses and communities
- Minimize circulation, access, and mobility impacts to local communities and businesses
- Improve intra- and inter-agency coordination

VIRGINIA
MEGAPROJECTS

Section 4
Transportation Network Operations Assessment

INTERSTATE 395 Express Lanes

4. Transportation Network Operations Assessment

4.1 Definition of Existing Network

The existing network for the Network TMP is defined by the I-395 corridor (including general traffic and Express/High-Occupancy Vehicle (HOV) lanes) from just north of the I-95/495 interchange (i.e., the Springfield Interchange, Exit 1 in Virginia) to the Francis Case Memorial Bridge over the Washington Channel (near Exit 4 in Washington, DC). The study network also includes all entry and exit ramps to and from I-395 within these limits. Regionally, this TMP covers several significant signalized intersections along arterial roadways likely to carry traffic to and from, as well as parallel to, this I-395 corridor. These include roads such as US-1, S. Eads Street, VA-244 (Columbia Pike), VA-236 (Duke Street/Little River Turnpike), VA-401 (N. & S. Van Dorn Street), VA-120 (S. Glebe Road), Seminary Road, S. Walter Reed Drive, N. Beauregard Street, and N. Quaker Lane.

4.2 Data Collection

The GEC has prepared a detailed data collection plan for the Network TMP. The plan identifies sources of recent traffic volume data at key locations along the study area network, and provides contact information for staff at various agencies (VDOT, Arlington County, City of Alexandria, Fairfax County, and DDOT) who can supply this data upon request. The data collection plan also identified locations where data may be needed but is not readily available. Traffic counts were counted anew at these locations using guidelines established in the plan (such as conditions under which counts should/should not be performed). The types of data that were collected include freeway and ramp traffic volumes, intersection turning movement volumes, and travel time runs. Some data was gathered for both weekday and weekend dates, and for peak and off-peak time periods. The data collected was used to perform traffic operations analyses for the Network TMP.

4.3 Activity Centers

Activity centers are defined as areas or developments that typically generate a significant number of daily and peak hour vehicle trips. Within the Network TMP study area, the largest activity center is the Pentagon. Other major activity centers include Pentagon City and Crystal City (including Reagan Washington National Airport), Shirlington, Mark Center, Landmark/Lincolnia, plus Downtown Washington at the north end of the corridor, and Springfield at the south end. These activity centers primarily consist of office, retail, and hotel space. These centers are also significant regional transit hubs served by WMATA Metrobus and/or Metrorail, local jurisdiction bus routes (ART, DASH, etc.), and/or commuter buses (such as those serving Prince William and Loudoun Counties). Crystal City also hosts a Virginia Railway Express (VRE) commuter rail station.

The District of Columbia is a major employment center within the region which sees its day-time population rise by more than 400,000 commuters each workday. The Pentagon is the world's largest office building by floor area, with about 6,500,000 sq. ft. of which 3,700,000 sq. ft. are used as offices. Approximately 23,000 military and civilian employees and about 3,000 non-defense support personnel work in the Pentagon. The Mark Center

in Alexandria hosts approximately 6,400 administrative support personnel for the Department of Defense.[1]

4.4 Known Constraints Within Project Limits

Known constraints within the Network TMP project limits are mostly associated with time-of-day restrictions on usage of the Express Lanes and HOV lanes along I-395. The Express Lanes end and the HOV lanes begin on I-395 just north of Edsall Road. On weekdays, HOV-3 (three or more people in a vehicle) is in effect northbound from 6 AM to 9 AM and southbound from 3:30 PM to 6 PM. In the two-lane reversible section, the HOV lanes operate in the northbound direction between 2:30 AM and 11:00 AM. The HOV lanes operate in the southbound direction from 1:00 PM to 12:00 AM with HOV-3 restrictions in effect from 3:30 PM to 6:00 PM. During the summer months, the midday closure of the reversible HOV lanes to reverse the lanes from northbound to southbound travel occurs one hour earlier, beginning at 10:00 AM to accommodate higher traffic demands in both the general purpose, HOV, and Express Lanes. Nighttime closures remain the same during the summer months.[2]

Additionally, access to and from the I-395 HOV lanes is limited to the following locations:

Northbound HOV Lane Exits
Seminary Road (HOV-3 at all times)
VA-27 (Washington Boulevard – eastbound)
S. Eads Street/Pentagon
14th Street SW (DC)
I-395, prior to Case Bridge (DC)

Northbound HOV Lane Entrances
I-395 General Traffic Lanes (Turkeycock Run interchange, north of Edsall Road)
Seminary Road
Shirlington Circle
S. Eads Street/Pentagon
I-395 General Traffic Lanes (north of on-ramp from S. Rotary Road)

Southbound HOV Lane Exits
I-395 (south of Potomac River)
S. Eads Street/Pentagon
I-395 (south of S. Eads Street/Pentagon)
Shirlington Circle
Seminary Road
I-395 (Turkeycock Run interchange, north of Edsall Road)

Southbound HOV Lane Entrances
I-395, south of Case Bridge (DC)

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[1] *95 Express Lanes Project Transportation Management Plan*, August 2012, VDOT/Fluor-Lane95, LLC
[2] *I-395 Express Lanes Northern Extension Interchange Modification Report*, December 2016, VDOT

14th Street SW (DC), south of 14th Street Bridge (over Washington Channel & Ohio Drive SW)
S. Eads Street/Pentagon
VA-27 (Washington Boulevard – westbound)
Seminary Road (HOV-3 at all times)

Although current signage in DC along southbound 14th Street SW and southbound I-395 indicate these access points are subject to HOV restrictions, the restrictions along the southbound "HOV" lanes are not currently enforced by police until south of the Pentagon (S. Eads Street) interchange in Virginia. Similarly, HOV restrictions are not currently enforced in the northbound "HOV" lanes north of the S. Eads Street interchange. This currently provides a total of 12 general traffic lanes (6 per direction) on I-395 across the Potomac River in DC, which connect to a total of 13 travel lanes (on I-395 and 14th Street SW in DC).

Since access to and from the I-395 HOV lanes is limited compared to that of the general purpose lanes along I-395, this is a notable constraint that affects how ramp or roadway closures in the HOV lanes impact users in terms of detours and the resulting increases in travel times for those users.

4.5 Traffic Operations Under Baseline and With Construction

One of the purposes of the Network TMP is to provide the GEC with a means of measuring the impacts of the proposed construction activities on pre-construction transportation system conditions within the project area. This section of the Network TMP document summarizes these pre-construction conditions, that establishes a baseline to which conditions during construction activities can be compared. This comparison of conditions during construction to the baseline conditions can be used to support the development and selection of appropriate mitigation measures to offset the impacts of construction activities and maintain the efficiency of the transportation network. The assessment of baseline conditions will evaluate multiple transportation modes, including personal vehicle travel and transit operations.

4.5.1 Baseline Traffic Operations & "Hot Spots"

Baseline traffic operations for non-transit vehicular traffic were evaluated based on the recent traffic volume and travel time data obtained by the GEC as specified in the data collection plan, and traffic signal timing and phasing information provided by partner agencies (VDOT, Arlington County, and the City of Alexandria). Traffic volume data from prior years (back to 2013) was adjusted to Year 2018 levels to represent baseline conditions during the most intense period of construction activity for the project. These adjustments were based on growth rates calculated using historical VDOT annual average daily traffic (AADT) volumes on I-395 from 2013 to 2016. Tools used to evaluate the existing operations using these data include the Highway Capacity Software (HCS) and Synchro/SimTraffic. HCS was used to analyze traffic operations for freeway segments, ramp merge and diverge areas, and weave segments along northbound and southbound I-395 and the I-395 Express and HOV lanes. Synchro

was used to analyze traffic operations at signalized intersections, and the SimTraffic microsimulation was used only in certain instances where the results of the Synchro analyses indicated more in-depth evaluation should be performed. The measures of effectiveness (MOEs) evaluated along I-395 include Level of Service (LOS) and density (passenger cars per hour per lane). At intersections, MOEs include LOS and delay by approach.

Table 4.1 shows the analysis results for the locations determined to be "hot spots" resulting from the HCS analyses for I-395 segments. For this project, "hot spots" are defined as locations that operate as LOS D or worse during non-peak periods when traffic volumes are highest and a temporary single lane closure is allowed in the general-purpose lanes to accommodate construction activity. Under this definition, the two highest periods have been identified as 10 to 11am and 2 to 3pm on weekdays. Maps and tables are provided in the Appendix that show the analysis results for each basic freeway segment, ramp merge and diverge area, and weave area along I-395.

Table 4.1: Baseline (2018) "Hot Spot" I-395 Traffic Operations during Highest Non-Peak Hourly Periods

Location		Highest Non-Peak Hour	Highway Capacity Manual Analysis Type	Level of Service (LOS)	Density (pc/mi/ln)
Description	**Map ID Code**				
Edsall Rd WB Off-Ramp to Edsall Rd WB On-Ramp	SB01B31	PM	Basic	E	36.1
Edsall Rd WB On-Ramp to Edsall Rd EB Off-Ramp	SB01W32	PM	Weave	E	37.9
Edsall Rd EB Off-Ramp to Edsall Rd EB On-Ramp	SB01B33	PM	Basic	E	40.1
LR Tpke EB On-Ramp to TC HOV Off-Ramp	SB02W28a	PM	Weave	E	36.6
TC HOV Off-Ramp to TC HOV On-Ramp	SB02B29a	PM	Basic	D	28.8
TC HOV On-Ramp to Edsall Rd WB Off-Ramp	SB02W29b	PM	Weave	E	40.0
Seminary Rd HOV On-Ramp to TC HOV Off-Ramp	SB03B15	PM	Basic	D	26.6
TC HOV Off-Ramp to GP Lanes	SB03D16HOV	PM	Diverge	D	31.9
LR Tpke WB On-Ramp to Duke St EB Off-Ramp	SB03W26	PM	Weave	D	33.5
Duke St EB Off-Ramp to LR Tpke EB On-Ramp	SB03B27	PM	Basic	D	28.0
King St EB On-ramp to Seminary Rd Off-Ramp	SB05W20	PM	Weave	D	25.9
Shirlington Rd On-Ramp to King St WB Off-Ramp	SB06W17	PM	Weave	E	28.7
Shirlington Rd HOV Off-Ramp	SB07D10	PM	Diverge	D	31.1
S Glebe Rd/Shirlington Off-Ramp	SB07D15	PM	Diverge	D	34.9
S Glebe Rd/Shirlington Rd Off-Ramp to Shirlington Rd On-Ramp	SB07B16	PM	Basic	D	30.3
Washington Blvd HOV On-Ramp to Shirlington Rd HOV Off-Ramp	SB08D09	PM	Diverge	D	26.9
Boundary Channel EB On-Ramp to Route 1 NB Off-Ramp	SB11D06a	AM	Diverge	E	32.2
		PM		E	35.7
US Route 1 SB Off-Ramp	SB11W06	AM	Weave	D	16.5
		PM		D	19.8
14th St Bridge to GP HOV Off-Ramp at GWM Pkwy	SB12B01	PM	Basic	D	31.2
King St WB On-Ramp to Shirlington Rd/Quaker Ln Off-Ramp	NB05W16	AM	Weave	D	33.1
		PM		D	35.5
Shirlington Rd/Quaker Ln On-Ramp to S Glebe Rd EB Off-Ramp	NB07W18	AM	Weave	D	28.3
		PM		D	31.5
Boundary Channel Dr EB On-Ramp to Boundary Channel Dr WB Off-Ramp	NB11W31	PM	Diverge	E	21.4
GW Memorial Pkwy EB On-Ramp to GW Memorial Pkwy WB Off-Ramp	NB12W32	PM	Diverge	D	23.7
GW Memorial Pkwy WB On-Ramp	NB12M33	PM	Merge	D	40.4

Map ID Code Key – [Direction][Exit No.][HCM Segment Type][Overall Segment No.]
Direction – NB = Northbound, SB = Southbound
HCM Segment Types – B = Basic Freeway, M = Merge, D = Diverge, W = Weave
Example: SB08D09 is the Southbound Exit 8 Diverge and is segment #9 of all analyzed segments along I-395

Baseline traffic operations were also evaluated at key signalized intersections along arterial streets located near and parallel to I-395 that also serve to provide access to and from I-395. These roadways included VA 236 (Little River Turnpike and Duke Street), VA 420 (Seminary Road), VA 7 (King Street), VA 120 (S. Glebe Road), and Army Navy Drive. The analysis periods coincide with the same highest-volume non-peak periods identified for the analysis of traffic operations along I-395 (10 AM – 11 AM and 2 PM – 3 PM on weekdays). These intersection analyses were performed using Synchro to determine the baseline levels of service (LOS) and delay per vehicle, and the results of these analyses were used to identify "hot spots" that may be more likely to experience adverse effects during I-395 construction due to traffic diversions. A "hot spot" was defined as an intersection having an overall LOS of D or worse.

The results of the analysis showed there are two (2) intersections that meet the "hot spot" criteria: VA 236 at Beauregard Street in Fairfax County, and Seminary Road at Beauregard Street in the City of Alexandria. The former operates at LOS E during both the AM and PM analysis hours, and the latter operates at LOS D during only the PM analysis hour. All other intersections evaluated operate at LOS C or better during these critical periods under baseline conditions.

All of the intersections analyzed are shown on the Baseline Traffic Analysis Results maps and tables provided in the **Appendix C**, along with their LOS and overall delay.

4.5.2 Under Construction Traffic Operations & "Hot Spots"

Table 4.2 lists the locations along I-395 that would qualify as "hot spots" under construction during the highest-volume non-peak hours. Reducing the number of general purpose lanes by one throughout the study area created about a 33% increase in the number of locations with of levels of service of D or worse. There was also a significant increase in the number of locations with unacceptable LOS's in the AM peak hours. There were 8 locations where the lane reduction improved the level of service: NB07W18 diverge and merge, SB 11W06 diverge and merge, NB07W18 diverge, NB11W31 diverge and merge, and the NB12W32 diverge. As a result of the lane reduction, there are now 20 locations with LOS of F, compared to before when there were none. These results indicate that the traffic conditions on I-395 would worsen significantly during these highest-volume non-peak hours.

Table 4.2: "Hot Spot" I-395 Traffic Operations with Construction-related Single-Lane Closure during Highest Non-Peak Hourly Periods

Location		Highest Non-Peak Hour	Highway Capacity Manual Analysis Type	Level of Service (LOS)	Density (pc/mi/ln)
Description	Map ID Code				
King St WB Off-ramp to King St WB On-Ramp	SB05B18	PM	Basic	D	29.3
King St WB On-Ramp	SB05M19	PM	Merge	D	34.7
King Street EB On-ramp to Seminary Rd Off-Ramp	SB05W20	PM	Diverge	D	28.8
			Merge	D	33.0
Shirlington Rd On-Ramp to King St WB Off-Ramp	SB06W17	PM	Diverge	D	28.8
			Merge	D	32.8
S Glebe Rd/Shirlington Off-Ramp	SB07D15	AM	Diverge	D	35.3
		PM		F	--
S Glebe Rd/Shirlington Rd Off-Ramp to Shirlington Rd On-Ramp	SB07B16	AM	Basic	D	28.6
		PM		F	--
S Washington Blvd WB On-Ramp	SB08M12	PM	Merge	F	--
S Washington Blvd EB On-Ramp	SB08M13	PM	Merge	D	36.5
S Washington Blvd EB On-Ramp to S Glebe Rd/Shirlington Off-Ramp	SB0B14	PM	Basic	D	32.9
Boundary Channel Dr WB On-Ramp to Boundary Channel EB Off-Ramp	SB11W05	PM	Diverge	E	36.3
			Merge	D	35.5
Boundary Channel EB On-Ramp to US Route 1 NB Off-Ramp	SB11D06a	AM	Diverge	F	--
		PM		F	--
US Route 1 SB Off-Ramp	SB11W06	PM	Diverge	D	35.9
			Merge	D	35.3
GW Memorial Pkwy WB Off-Ramp	SB12D01	AM	Diverge	D	32.6
		PM		E	35.5
GW Memorial Pkwy EB Off-Ramp	SB12D02	AM	Diverge	D	32.0
		PM		D	31.3
GW Memorial Pkwy EB Off-Ramp to GW Memorial Pkwy EB On-Ramp	SB12B03	AM	Basic	E	37.5
		PM		D	31.0
GW Memorial Pkwy EB On-Ramp	SB12W04	PM	Diverge	D	26.9
			Merge	D	30.3
Seminary Rd On-Ramp to King St Off-Ramp	NB05W13	AM	Diverge	E	42.2
			Merge	E	47.1
		PM	Diverge	F	--
			Merge	F	--
King St Off-Ramp to King St EB On-Ramp	NB05B14	AM	Basic	D	33.3

		PM		E	37.0
King St WB On-Ramp	NB05M15	AM	Merge	E	44.8
		PM		F	--
King St WB On-Ramp to Shirlington Rd/Quaker Ln Off-Ramp	NB05W16	AM	Diverge	E	39.1
			Merge	E	43.0
		PM	Diverge	E	42.9
			Merge	E	48.2
Shirlington Rd/Quaker Ln On-Ramp to S Glebe Rd EB Off-Ramp	NB07W18	PM	Merge	D	29.8
S Glebe Rd EB On-Ramp to S Glebe Rd WB Off-Ramp	NB07W19	PM	Diverge	D	28.2
S Glebe Rd WB Off-Ramp to S Glebe Rd WB On-Ramp	NB07B20	PM	Basic	D	26.1
S Glebe Rd WB On-Ramp to Exit 8A Off-Ramp	NB07B22	PM	Basic	D	27.1
Exit 8A Off-Ramp	NB08D23	AM	Diverge	D	26.8
		PM		D	29.3
Exit 8B Off-Ramp	NB08D24	AM	Diverge	D	34.9
		PM		E	39.6
S Rotary Rd On-Ramp	NB10M28	PM	Merge	D	36.1
US Route 1 SB On-Ramp	NB11M29	PM	Merge	D	33.8
US Route 1 NB On-Ramp	NB11M30	PM	Merge	F	--
Boundary Channel Dr EB On-Ramp to Boundary Channel Dr WB Off-Ramp	NB11W31	AM	Diverge	D	31.9
			Merge	D	31.7
GW Memorial Pkwy EB On-Ramp to GW Memorial Pkwy WB Off-Ramp	NB12W32	AM	Diverge	D	31.6
			Merge	D	36.8
		PM		D	29.8
GW Memorial Pkwy WB On-Ramp	NB12M33	AM	Merge	F	--
		PM		F	--

Map ID Code Key – [Direction][Exit No.][HCM Segment Type][Overall Segment No.]
Direction – NB = Northbound, SB = Southbound
HCM Segment Types – B = Basic Freeway, M = Merge, D = Diverge, W = Weave
Example: SB08D09 is the Southbound Exit 8 Diverge and is segment #9 of all analyzed segments along I-395

4.5.3 Existing Transit Operations

Transit Service

Within the I-395 corridor, there are six main transit providers (five public and one private) that operate bus service. A brief description of each of their operations on or near I-395 is provided below.

- **Arlington Transit (ART)** – ART provides local bus service in Arlington County that supplements Metrobus service and connects neighborhoods to Metrorail stations as well as a complementary paratransit service. ART has one route that directly utilizes I-395 to serve the Pentagon in the off-peak direction, while additional routes use the local roadway network to connect the Pentagon to other Arlington destinations.
- **Alexandria Transit Company (DASH)** – DASH provides local and express bus services originating in the city of Alexandria. Two routes directly utilize I-395 to serve the Pentagon, while others connect to additional Alexandria destinations via local roadways.
- **Fairfax Connector** – Fairfax Connector provides fixed route, Metrorail feeder, and commuter bus service in Fairfax County. Four routes directly utilize I-395 to serve the Pentagon, three during peak periods and one during midday.
- **Potomac and Rappahannock Transportation Commission (PRTC)** – PRTC provides commuter bus (OmniRide), local bus (OmniLink), and ridesharing services in Prince William County and the cities of Manassas and Manassas Park. PRTC operates eleven commuter routes on I-395 that serve Washington, DC, the Pentagon, Crystal City, the Rosslyn-Ballston corridor, and the Mark Center. Commuter services primarily run at peak periods in peak directions, originating from park-and-ride lots in Prince William County.
- **Washington Metropolitan Area Transit Authority (WMATA)** – WMATA provides regional rail, bus, and paratransit services that cross jurisdictions. Multiple Metrobus service, including two "Express Routes" directly utilize I-395 during peak periods, while other service runs parallel to or connects the corridor to other regional destinations.
- **MARTZ** – MARTZ is a private company that operates peak period commuter bus service from Stafford and northern Spotsylvania Counties to the Pentagon, Pentagon City, and Washington, DC. MARTZ provides five roundtrips per day during early weekday peak periods and peak directions.

Tables 4.4 and Table 4.5 summarize the frequent bus service that operates along the I-395 corridor by showing the amount of buses per hour during the peak periods in the morning and afternoon. Both tables utilize data compiled from posted scheduled as of April, 2017. A three-hour peak period for a.m. and p.m. (6:30 - 9:30 and 4:00 - 7:00, respectively) was assumed.

Table 4.4: AM Peak Period Buses per Hour

Operators	AM Northbound			
	Peak Period (buses/hour)			
	I-395 - Between Edsall Road and Duke Street	I-395 - Between Glebe Road and Pentagon	Serves Pentagon (Via I-395)	Serves Pentagon (Via local roadways)
ART	0	0	0	13
DASH	0	7	7	0
Fairfax Connector	6	6	6	2
MARTZ	1	1	0	0
PRTC	12	12	7	2
WMATA	27	62	62	13
Total	**46**	**88**	**82**	**30**

Table 4.5: PM Peak Period Buses per Hour

Operators	PM Southbound			
	Peak Period (buses/hour)			
	I-395 - Between Edsall Road and Duke Street	I-395 - Between Glebe Road and Pentagon	Serves Pentagon (Via I-395)	Serves Pentagon (Via local roadways)
ART	0	0	0	13
DASH	0	6	6	0
Fairfax Connector	6	6	6	2
MARTZ	1	1	1	0
PRTC	20	20	16	2
WMATA	31	65	65	15
Total	**58**	**98**	**94**	**32**

The following transit providers also provide services in the greater I-95/I-395 corridor which provide additional travel choices and increase person throughput.

- **Fredericksburg Regional Transit (FRED)** – FRED provides local public transit service in Fredericksburg and the counties of Caroline, Spotsylvania, and Stafford. Five FRED routes provide direct access to commuter rail service and one route serves commuter park-and-ride lots to connect with PRTC service.
- **Virginia Railway Express (VRE)** – VRE provides commuter rail services that parallels the I-66 and I-95/I9395 corridor. The Fredericksburg Line extends south to Spotsylvania County and serves Alexandria, Crystal City and Washington, DC, providing primarily peak-period, peak-direction service.

  A more detailed description and summary of transit providers including specific route information as well as existing challenges and planned improvements can be found in the *I-95/I-395 Transit/TDM Study – Final Report*.

TDM Programs

Many Transportation Demand Management (TDM) programs are offered in the region to provide mobility choices to commuters. TDM programs are generally designed to encourage multimodal travel and reduce the number of single-occupant vehicles on the road, especially during peak periods. Many of these programs are heavily utilized by commuters on the I-395 corridor, especially those

who work at the Pentagon and Washington, DC, due to heavy congestion and limited parking options.

Some of the TDM programs are offered regionally through the Metropolitan Washington Council of Governments (MWCOG) Commuter Connections Program and Vanpool Alliance while others are area-specific. Some of the local organizations include GO Alex (City of Alexandria), Arlington County Commuter Services, Fairfax County Transportation Services Group, GW Ride Connect (Fredericksburg/Stafford), and PRTC OmniMatch (Greater Prince William County).

Generally, the types of services offered by these regional and local agencies include:

- **Ridematching** – MWCOG maintains a regional database of commuters interested in ridesharing. Commuter can apply online, by phone, or through employers and local jurisdictions to be matched with potential carpools and vanpools. Local TDM programs also provide supplemental ridematching and/or follow-up assistance to commuter who received matches.
- **Commuter Information Marketing and Promotion** – Through multiple media including online, print, radio, mobile, and in-person events, representatives from regional and local TDM programs convey and promote various options to help commuters find the most effective travel option that fits his or her needs.
- **Incentives** – Monetary and logistical assistance is provided to help form or maintain carpools and vanpools as well as incentivize transit and active (biking/walking) modes.
- **Teleworking Assistance** – Telework!VA is a statewide program administered by DRPT that offers information for businesses, individuals, and government agencies looking to implement or expand teleworking. Telework!VA, in coordination with other local and regional TDM agencies, also offers technical assistance and support to employers' teleworking programs.
- **Employer Outreach** – Local TDM programs often work directly with employers in their respective jurisdictions to help make sure employees are aware of commuting options, including Federal transit subsidies.
- **Infrastructure Support** – Regional and local TDM agencies work to leverage regional infrastructure investment such as Express Lanes, transit centers, and park-and-ride lots to help promote the benefits of multimodal travel options including transit, slugging (casual carpooling), and ridesharing.

The City of Alexandria has a current Transportation Demand Management Plan and Arlington County has a current Transportation Demand Management Plan. A more detailed description and summary of TDM programs by provider can be found in the *I-95/I-395 Transit/TDM Study – Final Report*.

4.5.4 Origins-Destinations of I-395 Traffic

The *I-95/I-395 Transit/TDM Study – Final Report* identified origin and destination patterns of traffic on I-395 at the Glebe Road interchange.

Using AM peak period data from the MWCOG Travel Model (2015 Network), it was identified that almost half of the northbound traffic on I-395 at Glebe Road originated in Fairfax County and about a quarter more from points south.

Almost two-thirds of the trips at the same locations are destined for DC, and one-third are destined for Arlington. **Figure 3** is excerpted below from the final report.

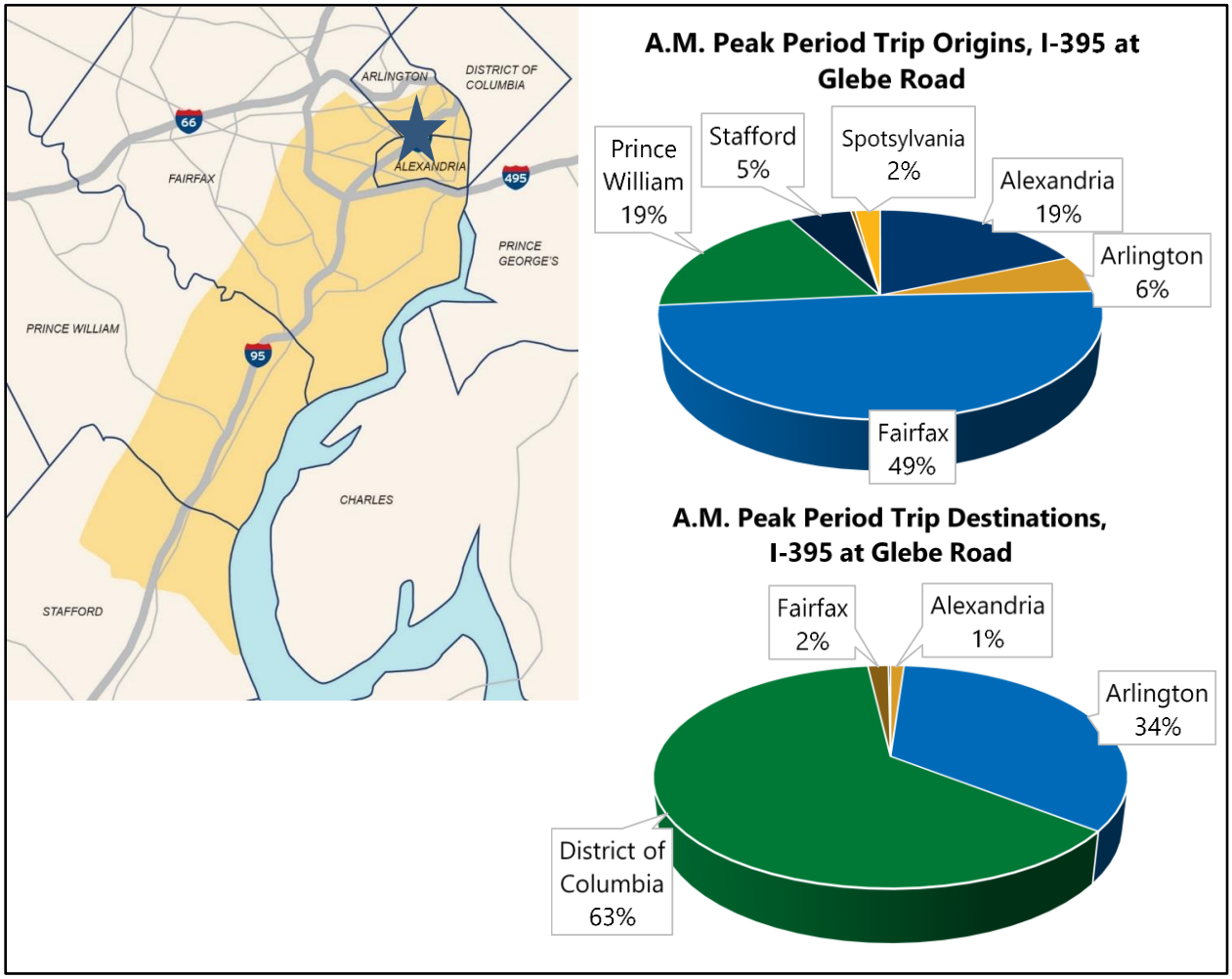


Figure 32: AM Peak Period Trip Origins and Destinations on I 395 (Source: MWCOG Travel Model, 2015 Network)

4.5.5 School & Holiday Schedules

Mobile, short duration, short-term stationary, or intermediate-term stationary temporary traffic control zone lane closures on mainline lanes, shoulders, or ramps shall not be performed during the following holiday time periods without the written permission of the Concessionaire. Additionally, a long-term stationary temporary traffic control zone shall not be initially put in place, adjusted, or removed during the following holiday time periods without the written permission of the Concessionaire:

- **January 1**: From 5:00 AM on the preceding day until 12:00 PM on the following day, except as indicated below.
- **Inauguration Day**: From 5:00 AM on the preceding day until 12:00 PM on the following day.
- **Martin Luther King, Jr. Day and Lee-Jackson Day**: From 5:00 AM on the preceding Thursday to 12:00 PM on the following Tuesday.
- **Presidents Day**: As indicated below.
- **Easter**: As indicated below.
- **Memorial Day**: As indicated below.
- **July 4**: From 5:00 AM on the preceding day until 12:00 PM on the following day, except as indicated below.
- **Labor Day**: As indicated below.
- **September 11**: No daytime closures.
- **Columbus Day**: As indicated below.
- **Veterans Day**: From 5:00 AM on the preceding day until 12:00 PM on the following day, except as indicated below.
- **Thanksgiving Day**: From 5:00 AM on the Wednesday preceding Thanksgiving Day until 12:00 PM on the Monday following Thanksgiving Day.
- **Christmas Day**: From 5:00 AM on the preceding day until 12:00 PM on the following day, except as indicated below.

If the holiday occurs on a Friday or Saturday: From 5:00 AM on the preceding Thursday to 12:00 PM on the following Monday.

If the holiday occurs on a Sunday or Monday: From 5:00 AM on the preceding Friday to 12:00 PM on the following Tuesday.

4.5.6 Special Events

Lane closures may need to be limited or restricted to account for certain special events in the area, including (but not limited to):

- Rolling Thunder motorcycle rally (Memorial Day weekend)
- Fourth of July Weekend
- Cherry Blossom Festival (typically late March)
- 9/11 events (September 11)
- America's 9/11 Ride (motorcycle rally, typically in August)
- Ride-2-Recovery (bicycle ride, typically in September)
- Marine Corps Marathon (road race, typically in October)
- Army 10 Miler (road race, typically in October)
- Various political rallies in Washington DC (ongoing throughout the year)
- Various sporting events in the Washington DC area (including Redskins, Nationals, Capitals and Wizards games)
- Other unannounced closures or work stoppages, to facilitate VIP visits to the Pentagon Reservation

VIRGINIA
MEGAPROJECTS

Section 5
Maintenance of Traffic

INTERSTATE 395 Express Lanes

5. Maintenance of Traffic

5.1 Project Team

The MOT management team is comprised of the key individuals within the overall Design-Build team who will have direct responsibility for planning and execution of MOT operations in accordance with the Project requirements. This MOT management team will also be responsible for coordinating all design and construction elements necessary for the effective execution of the MOT Plan for the Project. The MOT Management Team will meet regularly to ensure that the coordination of the MOT design and all related activities are consistent with VDOT's expectations and requirements. As the Design-Builder is responsible for developing the MOT plans, the MOT management team will be comprised of the following individuals:

- Jason Tracy, DB Project Manager
- Bill Hameza, Construction Manager
- James Compton, MOT Superintendent
- Geoff Vetter, DB Public Information Officer

The MOT Management Team will work closely with the Project Communications Team to ensure that accurate and timely MOT notices are published to meet the Project communication, outreach, and education requirements established for the Project. The Project Communications Team is led by 395 EXPRESS' Communications Director and includes the Public Information Manager for the Design-Build Team.

The VA Megaprojects Lane Closure-MOT Plans Coordination/Approval team will ensure timely approval of the detailed MOT Plans ("Traffic Control Plans") and assist VDOT in providing accurate and timely MOT notices to the public. The Lane Closure-MOT Plan Coordination team is supported by traffic impact analysis provided by the Local Network Operations teams. All MOT plan approval will conform with VDOT's Technical Requirements for the project, the Virginia Work Area Protection Manual (2011 Edition), and the FHWA Manual of Uniform Traffic Control Devices (MUTCD).

5.1.1 Organization

Figure 4 below is the proposed I-395 Express Lanes project's MOT Management Team organizational chart.

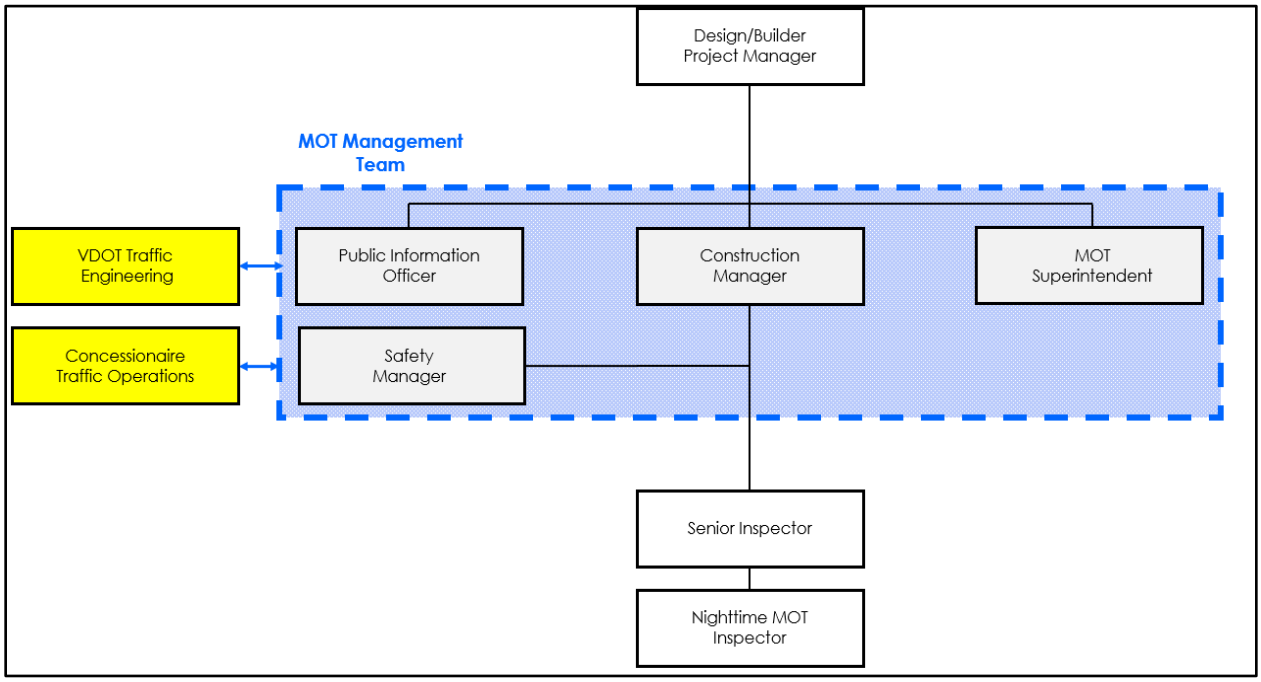


Figure 3: I-395 Express Lanes project MOT Management Team

5.1.2 Roles & Responsibilities

95 EXPRESS LANES Responsibilities

Coordination of MOT activities with 95 EXPRESS LANES will be through the Project Communications Team and is defined in the Public Information (PI) Plan. 95 EXPRESS LANES has assigned the coordination of MOT activities to Lane and AECOM, so its direct involvement in the MOT coordination will be minimal. However, the four (4) traffic signals at the I-395 / Eads Interchange will be owned, operated, and maintained by 95 EXPRESS LANES since they directly affect the operations of the express lanes.

LANE Responsibilities

The MOT Superintendent is responsible for developing the Traffic Control Plans (TCPs) for their respective areas, which will include construction details of shoulder closures, lane closures, total roadway closures, detours, intended placement of all temporary traffic devices, etc. The TCPs will be prepared in accordance with the Virginia Work Area Protection Manual. Conflicts in scheduling between the different work areas will be resolved by the DB Project Manager. The MOT Manager will be responsible for coordinating the overall MOT effort on the Project between the construction areas and providing technical and functional directions related to all aspects of MOT operations on the Project. The DB Project Manager

along with the MOT Manager will be responsible for submitting the completed TCPs to Virginia Megaprojects for its review and approval. On a weekly basis, the MOT Manager will also submit three week look-ahead schedules, which will provide the intended timing of all MOT operations to VDOT for its review and comments. Following Virginia Megaprojects' review, the TCPs and look-ahead schedules will also be forwarded to the Project Communications Team for its distribution to the media and Project stakeholders, including the broader community.

The MOT Manager will be responsible for notifying VDOT of any incidents related to MOT during the day shift and the night shift. The DB construction managers, assisted by the project field engineers, are responsible for daily inspection of MOT elements in their respective work areas as part of their normal work duties.

The Traffic Engineer is responsible for development of MOT plans and supporting calculations as necessary, including assessment of work zone traffic impacts using operational-level traffic analysis software where there are anticipated sustained work zone impacts at major interchanges, traffic switches, or detours.

Personnel responsible for design and or implementation of MOT / TCPs will be trained in accordance with the Virginia "Work Zone Traffic Control Training". The DB Public Information Officer is responsible for coordinating all MOT planning, as required, with the Project Communications Team, in accordance with the Public Information plan.

VDOT Responsibilities

VDOT Megaprojects shall be actively consulted by the MOT Management Team in the development of the MOT approach and corresponding MOT plans.

VDOT Megaprojects shall review the lane closure requests and traffic control plans expeditiously to keep the construction activities commencing at their intended scheduled time. The lane closure requests will meet the criteria specified in the Technical Requirements. VDOT shall be responsible for the testing and commissioning of all local signalized intersections and any retiming of existing traffic signals, following installation of new traffic signals by Lane (Lane will be responsible for timing of temporary signals and initial timing of new signal installations). Signal timings and re-timings shall follow the VDOT Traffic Engineering Design Standards and Guidelines, VDOT TE 306.1 memorandum, applicable VDOT NRO TE memoranda, the MUTCD and Virginia Supplement, and the Northern Region Special Provisions for Traffic Signal Construction.

VDOT Megaprojects will be responsible for advising the public of relevant MOT impacts, such as closures, detours, traffic switches, etc.

Virginia Megaprojects will be responsible for incident management on the I-395 general purpose lanes.

VDOT will be responsible for road weather management including advisory, control and treatment strategies and implementation.

5.2 MOT Approach Overview

Due to the significance that I-395 plays in the overall existing transportation network, attempts have been made where possible to preserve the existing number of lanes during all major phases of construction during peak hour operations for the Project.

All construction plans will be completed in accordance with the Virginia Work Area Protection Manual (VWAPM), as well as the MUTCD, and the Virginia Supplement to the MUTCD.

5.3 Proposed MOT Phasing by Design-Builder

The MOT Phasing proposed by the Design-Build team was developed to address the project needs in the shortest possible time frame, and ensure safe, quality construction operations.

5.4 MOT Construction Planning

All MOT construction planning by the Design-Builder and VDOT will focus on the project's need to only work within the roadway lanes and shoulders during approved times as defined in the VDOT's technical requirements. The Design-builder's project staffing, incident management plan, and public outreach efforts will be developed and implemented in a manner to mitigate construction-related congestion through all phases of construction. VDOT will work within the Design-builder's approach to MOT planning for the I-395 corridor with a focus as to how non-corridor network construction related congestion can be best addressed with additional planning efforts.

The Design-Build team's plan is to stage all construction activities by dividing the project into five (5) separate segments:

Segment 1 from the Turkeycock Run slip-ramp (Station 1533+65) to south of the bridge over Sanger Avenue (Station 1613+65)

Segment 2 from south of the bridge over Sanger Avenue (Station 613+65) to the Shirlington Rd interchange (Station 1758+65)

Segment 3 from the Shirlington Rd interchange (Station 1758+65) to the (end of reversible HOV section (Station 1882+20)

Segment 4 involves all work related to the Pentagon reservation and the surrounding areas

Segment 5 involves the widening related to Duke-Edsall widening, southbound between Duke Street and Edsall Road.

On the Express Lanes segments, all work will be constructed in four (4) phases:

Phase 1 involves strengthening of the shoulder of the Express Lanes. Shoulder closures and single lane closures will be implemented within the allowable lane closure periods to complete this work.

Phase 2 involves building up the shoulder to final grade (less surface course). Shoulder closures and single lane closures will be implemented within the allowable lane closure periods to complete this work.

Phase 3 involves shifting two lanes of HOV traffic to the west side (adjacent to the I-395 southbound general purpose lanes) to construct the east side of the Express Lanes. Lane widths on the I-395 northbound general purpose lanes will be reduced to eleven (11) feet. Shoulder closures and single lane closures will be implemented within the allowable lane closure periods to complete this work.

Phase 4 involves shifting two lanes of HOV traffic to the newly constructed east side (adjacent to the I-395 northbound general purpose lanes) to construct the west side of the Express Lanes. Lane widths on the I-395 southbound general purpose lanes will be reduced to eleven (11) feet. Shoulder closures, single lane closures, and full closures of the Express Lanes will be implemented within the allowable lane closure periods to complete this work.

5.4.1 Roadway Lane and Shoulder Closure Restrictions

To minimize the impacts on the level of service on the 395 Express Lanes Project and adjacent arterial roads, VDOT has imposed lane closure restrictions as represented in the project technical requirements and as indicated on **Tables 5.1 – 5.3** and accompanying paragraphs:

Table 5.1: VDOT Imposed Lane Closure Restrictions

INTERSTATE 395 & INTERSTATE 95					
WEEKDAY		**Northbound**			
		Single-Lane Closures or Shoulder	**Two-Lane Closures**	**Multiple-Lane Closures**	**Complete Road Closure**
Segment 1	**14th St. Bridge to Springfield Interchange**	10:00AM to 3:00PM 9:00PM to 5:00AM	10:00PM to 5:00AM	11:00PM to 5:00AM	12:00AM to 4:00AM
Segment 2	**Springfield Interchange to Rt.123**	9:30AM to 3:30PM 9:00PM to 5:00AM	10:00PM to 5:00AM	11:00PM to 5:00AM	12:00AM to 4:00AM
Segment 3	**Rt.123 to Prince William County line**	9:30AM to 3:30PM 9:00PM to 5:00AM	10:00PM to 4:30AM	11:00PM to 4:00AM	12:00AM to 4:00AM
All lanes open at 12:00 noon on Friday					
WEEKDAY		**Southbound**			
		Single-Lane Closures or Shoulder	**Two-Lane Closures**	**Multiple-Lane Closures**	**Complete Road Closure**
Segment 1	**14th St. Bridge to Springfield Interchange**	10:00AM to 2:30PM 9:30PM to 5:00AM	10:00PM to 5:00AM	11:00PM to 5:00AM	12:00AM to 4:00AM
Segment 2	**Springfield Interchange to Rt.123**	9:00AM to 2:00PM 9:30PM to 5:00AM	10:00PM to 5:00AM	11:00PM to 5:00AM	12:00AM to 4:00AM
Segment 3	**Rt.123 to Prince William County line**	9:00AM to 2:00PM 9:30PM to 6:00AM	10:00PM to 5:00AM	11:00PM to 5:00AM	12:00AM to 4:00AM
All lanes open at 11:00am on Friday					

WEEKEND	**Northbound/Southbound**		
	Single-Lane Closures or Shoulder	**Multiple-Lane Closures**	**Complete Road Closure**
Friday to Saturday	10:00PM to 9:00AM	11:00PM to 8:00AM	12:00AM to 5:00AM
Saturday to Sunday	10:00PM to 9:00AM	11:00PM to 9:00AM	12:00AM to 5:00AM
Sunday to Monday	10:00PM to 5:00AM	11:00PM to 4:00AM	12:00AM to 4:00AM

5.4.2 Temporary Roadway Closures in the Reversible HOV Facility

The existing reversible facility hours of operations (set forth in **Table 5.2**) shall remain in place during the Construction Period, unless otherwise specified by VDOT. During the Construction Period, 95 Express LLC shall be responsible for the operation of the existing reversible facility, including gate operations and reversal of the flow of traffic.

Table 5.2: Reversible Facility Hours of Operation

REVERSIBLE FACILITY HOURS OF OPERATIONS	
Monday - Thursday & Friday (until 6:00 p.m.)	
2:00 AM - 6:00 AM	Open to All Traffic - Northbound
6:00 AM - 9:00 AM	Open to HOV-3 Only - Northbound
9:00 AM - 11:00 AM	Open to All Traffic - Northbound
11:00 AM - 1:00 PM	Closed for Reversal Operations*
1:00 PM - 3:30 PM	Open to all Traffic - Southbound
3:30 PM - 6:00 PM	Open to HOV-3 Only - Southbound
6:00 PM - 12:00 AM	Open to all Traffic - Southbound
12:00 AM - 2:00 AM	Closed for Reversal Operations*
Friday Evening - Saturday - Sunday	
6:00 PM Friday - 2:00 PM Sunday	Open to all Traffic - Southbound
2:00 PM Saturday - 4:00 PM Saturday	Closed for Reversal Operations*
4:00 PM Saturday - 6:00 AM Monday	Open to All Traffic - Northbound
* Closures for reversal operations will start at times shown, except during summer travel season when closure for reversal operations may be adjusted to start at 10:00 AM Monday - Friday. End times shown approximate only and will vary daily. These closure periods are subject to change in case of major incidents and /or special events.	

The roadway closures listed in **Table 5.3** shall be permitted in the reversible roadway within the project limits for the Construction Project. These closure periods are subject to change in case of major incidents and/or special events. If adjustments to these periods are required to accommodate seasonal variations in traffic, the VDOT will notify the Concessionaire in writing 30 days in advance.

Table 5.3: VDOT Reversible Lanes (HOV & Express Lanes)

	REVERSIBLE LANES (HOV & EXPRESS LANES) *	
	Single-Lane Closures or Shoulder	**Complete Road Closure**
WEEKDAY	9:30PM (Sunday to Thursday) to 4:00AM (Monday to Friday)	11:00PM to 4:00AM
WEEKEND	11:00PM (Friday to Saturday) to 9:00AM (Saturday to Sunday)	11:00PM to 4:00AM
* Direction of traffic control for all lane closures in reversible lanes will need to be adjusted as necessary to face direction of traffic. ** Complete Road Closure on Express Lanes for 30 minutes or less		

5.4.3 Incident Management

The 395 TMP Team has established an Incident Management and Enforcement Committee to discuss and review incident management issues on the corridor. The Committee consists of representatives from VDOT, the GEC, the Concessionaire, police and emergency responders. The Committee is in the process of developing and refining regional mitigation strategies for use during the project duration. Chief among the mitigation strategies is the presence of a GEC representative on-site at the I-395 project office, able to coordinate incident management issues as they arise.

Within the work zone, the current procedures for requesting VDOT IMC support will be followed. Procedures will be invoked whenever any unplanned condition impacts the normal operation of the transportation system. Incidents may include traffic crashes, disabled vehicles, hazardous material spills, debris, road damage, police activity, or localized weather events.

The following steps must be accomplished by the contractor (Lane) in a timely and organized manner:

1. Identify and verify the incident
2. Notify appropriate responders
3. Secure area required to properly deal with the incident
4. Issue advisory information to VDOT TOC (for incidents impacting the general purpose lanes) and 95 Express Operations Center (for incidents impacting the express lanes) for provision of public notification so as to reduce traffic flow into an area and reduce exposure to secondary incidents

5. Provide for safety care of any individuals who may have been injured
6. Remove incident as safely and quickly as possible

5.4.4 Project Coordination

The level and extent of each Megaprojects' impact and complexity requires dedicated staff to process all Megaprojects' lane closure requests, identify conflicts, coordinate with project inspectors, and distribute daily construction updates to confirm closures happening during the day and night. Multiple major projects including the Boundary Channel Interchange Project, Army Navy Drive Complete Street, Hayes Street Tour Bus Parking, and Landmark Mall Redevelopment are likely to be under construction in the I-395 corridor concurrent with the 395 Express Lanes Project. In addition, general roadway maintenance performed under VDOT's TAMS contract should be considered. It is essential that lane closures, traffic shifts, and MOT activities are coordinated to avoid excessive impacts to the roadway network. The Megaprojects existing LCAMS process will provide this coordination function. This effort will be funded through the Network TMP.

Due to the number of projects in proximity to the I-395 Express Lanes Project, and the ongoing maintenance performed by VDOT's TAMS contractors, it is necessary to coordinate the lane closures between contractors. Weekly coordination meetings/conference calls will be held between VDOT, the GEC, 95 Express, and contractors to coordinate lane closure activities.

All lane closure requests are required to be approved by VDOT and the GEC (specifically, David May) and entered into LCAMS by the contractor and VATraffic by 95 Express. If more than one contractor has requested to work in the same area, then conflict notices are generated to the designated points of contact for each contractor. It is incumbent on the contractors to coordinate their lane closure requests with each other.

5.4.5 Staffing

Lane is committed to providing qualified, dedicated staff to lead the MOT effort from NTP through final acceptance. Appropriate staff from Design-Build team will be available during all construction working hours. They will be responsible for field implementation of the approved MOT Plan and for keeping records of the daily inspections and incident report. The Construction Supervisors will also be the field coordinator for all MOT operations and shall be required to have a copy of the approved MOT/TCP plans to ensure implementation is done in accordance to the approved plan. They will be responsible for maintaining accident reports and incident data along with the safety department.

Lane Construction Supervisors will provide the training and direct communications necessary to monitor and improve traffic conditions throughout the project. Routinely supervisors from the Design-build team will perform drive-through inspections of the corridor, call for assistance when necessary, and report any

defective traffic control devices. This effort is expected to result in a continuous safer travel environment, as there will be "more eyes on the road", and over time will save cost and efforts.

The Lane Construction Supervisors will be made available to cooperate with law enforcement to support the incident management approach, and provide physical assistance to maintain a safe traffic pattern during any emergency response periods.

The Traffic Engineer will identify EMS routes for access through the project on the approved MOT Traffic Control Plans on a regular basis.

Lane will provide and keep current names and contact information for the persons responsible for the Incident Response Plan.

Off-duty police officers will be used during night time closures.

Traffic control device inspections will take place daily. If corrective efforts are required, the Construction staff will have common replacement items on-site so that corrective measures can be implemented as soon as practicable.

5.4.6 Review Process

The following specific TCP conditions would be of concern and could prompt action by VDOT:

- TCP that would be of long term duration (as defined in the VA Work Area Protection Manual, more than 3 days)
- TCP that would reduce capacity on any road by 25 percent or more (e.g., one lane closure on a four-lane roadway)
- TCP that increases the delay per vehicle of 20 seconds (degradation of level of service by approximately one level) at a signalized intersection that is currently operating at a moderate level of congestion, Level of Service (LOS) D or worse
- TCP that increases the actual travel time greater than the expected travel time by more than 50%
- TCP that increases queuing from an arterial onto the interstate
- TCP that increases queuing from the interstate onto arterial roadways
- Temporary closure of an access to/from I-395
- Temporary or proposed detour along adjacent arterial roadways
- Potential safety issue to include large speed differentials, geometric restrictions of sight, ineffective emergency access or pull off areas, bicycle and pedestrian access safety concerns, and transit accessibility safety issues

Actions related to these conditions may include:

- Requests to modify the action to reduce the impact, in terms of duration or severity
- Denial of the TCP, and requirement to revise and resubmit
- Initiation of mitigation actions by VDOT and others, particularly concerning the local network nearby to the TCP actions
- Increased public communications on the potential effects of the TCP

VIRGINIA MEGAPROJECTS

Section 6
Work Zone Impact Mitigation Strategies

INTERSTATE 395 Express Lanes

6. Work Zone Impact Mitigation Strategies

6.1 Overview

The key to proper work zone impact mitigation is the correct balance of well-developed regional transportation management planning combined with aggressive active local network monitoring to achieve positive results that mitigate potential concerns. Best practices and tested mitigation strategies focus on the need to keep the work zone safe for the traveling public and workers, to maintain efficient traffic operations in the work zone and surrounding arterial network, and to minimize travel delays in the area during peak periods by keeping a wide audience informed of anticipated construction-related impacts and travel options.

The 395 TMP budget has been setup into four primary areas – Project Administration, Traffic Operations, Incident Management / Enforcement and Transit / TDM. Given the constraints along the I-395 corridor and the relatively short construction period, the mitigation strategies were customized to maximize the use of the existing network, proactively manage lane closures and encourage the use of alternative modes of travel. The table below outlines the TMP budget for the primary areas.

	Overview	Budget
Project Administration	TMP task oversight; working group meetings, team meetings, committee meetings; public outreach support; VDOT, FHWA, Concessionaire and DB Coordination.	$500,000
Traffic Operations	Traffic Control Plan reviews; baseline and construction operations assessment; temporary signal timing; arterial diversion evaluation; supplemental traffic study; DMS messaging; design and construction of relatively minor spot improvements at critical approaches.	$2,000,000
Incident Management / Enforcement	Oversee, streamline and coordinate lane closures and facilitate conflict resolution; coordinate emergency operations; monitor MOT traffic conditions; supplemental Virginia State Police support for HOV enforcement and incident management and during major work zone events (temporary stoppages, closures, etc.); dedicated Portable Variable Message Signs for project-specific messaging throughout construction.	$1,200,000
Transit / TDM	Oversee and coordinate transit and TDM strategies; monitor and coordinate transit operations; supplemental transit service for existing transit on I-395; carpool formation strategies including $100	$2,370,000

	additional per new carpooler; vanpool formation strategies including supplemental assistance using monthly step-down; teleworking implementation subsidy to businesses of up to $1,000 per new teleworker; additional employer outreach support ot local jurisdictional employer outreach efforts; replace part-time mobile Pentagon Commuter Store with permanent full-time Commuter Store at former WMATA sales center building on the Pentagon Reservation.	
	TOTAL	**$6,070.000**

6.2 Anticipated Construction Operations and "Hot Spots"

VDOT will direct traffic engineering activities in support of anticipated construction MOT operations, and continuously monitor known traffic "Hot Spots" that may result from such construction.

A Network Traffic Operations Committee has been established to identify and address anticipated construction operational issues and potential "Hot Spots". This Committee will continue to meet throughout the duration of construction to review impacts and help implement mitigation strategies.

Corridor data used to identify each potential "Hot Spot" will be maintained and updated to monitor and document traffic operations and changes in patterns throughout the TMP region. As necessary, traffic reviews and additional data collection and traffic analysis will be developed to monitor traffic operational issues that are directly related to construction impacts along the I-395 Express Lanes project.

The types of additional traffic data collection, reviews, and analysis may include:

- Traffic studies (i.e., IMRs, IJRs, Traffic Impact Studies)
- ADT & turning movement counts
- Ramp traffic volumes
- Crash data
- Travel time data
- Field observations
- Queue data
- Traffic signal & ramp meter operational data
- Transit operational information
- Emergency operations data

As necessary, MOT alternatives submitted by the Concessionaire / Design-Builder for various locations will be reviewed for existing conditions and MOT impacts to the local roadway network, including the validation of data and assumptions. This traffic analysis effort may include:

- Review of traffic analyses submitted by the Concessionaire / Design-Builder
- Review of crash & safety analyses by the Concessionaire / Design-Builder
- Supplemental independent crash & safety analyses (as-needed)

Work zone strategies and MOT plans submitted by the Concessionaire / Design-Builder will be reviewed and recommendations will be developed to assist VDOT, the local road jurisdictions, and key stakeholders with developing additional mitigation strategies and potential operational improvements on the roadway network including the Pentagon. Such improvements could include changes in temporary traffic control, minor geometric improvements, or additional public information elements.

A review of the recent weekday and weekend traffic volume data along I-395 and at selected intersections along key arterial roadways that provide access to and from I-395 indicated that the critical time periods for construction-related traffic impacts would be the weekday off-peak hours of 10:00 AM to 11:00 AM and 2:00 PM to 3:00 PM. These are the hours closest to the actual AM and PM peak hours during which a single general purpose lane closure per direction is allowable on I-395. Although two or more lanes can be closed during the overnight hours, the traffic volumes on I-395 during those hours are significantly lower than the volumes present during these weekday midday time periods; therefore, the nighttime hours are not deemed critical for operational analysis. Any construction-related traffic impacts and potential impact mitigation measures that would be effective during the weekday AM and PM highest off-peak hours would also be effective during the nighttime construction periods.

The Concessionaire may submit a request to VDOT to work outside of the allowable lane closure hours. In this instance, adequate justification must be provided to VDOT demonstrating the viability of the request.

Section 4.2 of this Network TMP report describes the tools, methodology, and assumptions made to perform the operational analyses of the baseline conditions, as well as the analysis results for locations shown to operate at LOS D or worse during the highest-volume off-peak hours described above. Section 4.2 also includes a summary of the traffic operations under construction with the allowable single-lane closure along I-395 during these same highest-volume non-peak hours. Maps and tables showing the traffic operational analysis results for each basic freeway segment, ramp merge and diverge area, and weave area along I-395 under baseline conditions and during construction can be found in **Appendix D**. The following is a qualitative description of the potential impacts a single-lane closure in the I-395 general purpose lanes might have on traffic operations within the project's area of influence due to reduced capacity and trip diversions. At this time, the high majority of MOT plans are still being developed and are not approved for construction. Only Phase 1 of the MOT plans have been approved by VDOT and are targeted to be implemented in October 2017. As a result, a single lane closure on the I-395 general purpose lanes has been assessed as a starting point. This

qualitative description of the potential impacts will be updated and refined as additional MOT plans are approved.

Northbound I-395

King St WB On-Ramp to Shirlington Rd/Quaker Ln Off-Ramp

- High impact AM and PM
- Right lane closure converts existing weave into short merge and diverge areas
    - Downstream diverge area would require two lane changes
    - Increased friction likely to increase delay in general purpose lanes
    - Longer queues likely along on-ramp
- Left lane closure less impactful; existing right side lane addition allows three travel lanes to be maintained with a shift to the right

Shirlington Rd/Quaker Ln On-Ramp to S Glebe Rd EB Off-Ramp

- Severe impact AM and PM
- Right lane closure requires full closure of on-ramp
    - Some traffic can be detoured into HOV lanes while operating northbound
    - Other traffic may be detoured onto local streets (Shirlington Rd & 24th St S.) to access VA-120 Glebe Road
    - Tendency for off-ramp queues to extend back into auxiliary lane on I-395 under baseline conditions may lead to queue spillback into the through lanes if auxiliary lane is closed
- Left lane closure less impactful; likely to result in additional delay for through traffic on I-395

GW Memorial Pkwy WB On-Ramp

- No construction-related lane closures are likely at this location

Southbound I-395

S Glebe Rd/Shirlington Rd Off-Ramp to Shirlington Rd On-Ramp

- High impact PM only
- Right lane closure in general purpose lanes is unlikely
- Right lane closure in parallel collector-distributor lanes more likely
    - May increase queues and delays along C-D lanes and ramps serving those lanes
- Left lane closure less impactful; likely to result in additional delay for through traffic on I-395

Shirlington Rd On-Ramp to King St WB Off-Ramp

- Marginal impact PM only

- Right lane closure recently implemented 24-hours long-term for retaining wall rehabilitation (2015 -2016)
    - No significant issues were observed
    - No significant impacts expected if similar closure is implemented during off-peak hours
- Left lane closure likely to result in additional delay for through traffic on I-395

VA-236 WB On-Ramp to VA-236 EB Off-Ramp

- Severe impact PM only
- Right lane closure may increase delays, depending on the stage of interchange reconstruction during which it is implemented
- Left lane closure could be significant due to existing reduction from four lanes to three lanes in this area; increased delays are likely and could exacerbate the delays that typically occur during the PM peak period after the lane is reopened

VA-236 EB Off-Ramp to VA-236 EB On-Ramp

- Severe impact PM only
- See issues described for upstream segment.

VA-236 EB On-Ramp to Turkeycock Run HOV Off-Ramp

- High impact PM only
- A right lane or left lane reduction results in reducing available lanes from three to two; increased delays and queuing are likely

Turkeycock Run HOV On-Ramp to Edsall Rd WB Off-Ramp

- Marginal impact PM only
- Right lane closure would convert weave section into merge and diverge areas
    - Increased friction likely to increase delay in general purpose lanes
    - Longer queues likely along on-ramp from HOV lanes
- Left lane reduction results in reducing available through lanes from three to two; increased delays and queuing are likely

Edsall Rd WB Off-Ramp to Edsall Rd WB On-Ramp

- High impact PM only
- A right lane or left lane reduction results in reducing available lanes from three to two; increased delays and queuing are likely

Edsall Rd WB On-Ramp to Edsall Rd EB Off-Ramp

- High impact PM only
- Right lane closure may increase delays, depending on the stage of interchange reconstruction during which it is implemented

- Left lane reduction results in reducing available through lanes from three to two; increased delays and queuing are likely

Edsall Rd EB Off-Ramp to Edsall Rd EB On-Ramp

- High impact PM only
- Right lane closure may increase delays due to significant lane changing activity in this area as vehicles position for the correct exit ramps approaching the Springfield Interchange at the Capital Beltway
- Left lane reduction results in reducing available through lanes from three to two; increased delays and queuing are likely

To address the traffic operational issues described above, the following potential mitigation measures are presented for consideration:

- Increased strategic usage of variable message signs
- Extending existing ramp metering operation schedule into the AM and PM off-peak hours
- Public information campaign to encourage more SOV drivers to use the HOV lanes during the AM and PM off-peak hours during construction
- Public information campaign to increase shuttle bus ridership to/from Pentagon

Additionally, the impending implementation of tolling on I-66 inside the Beltway eastbound during the AM peak hours and westbound during the PM peak hours may help divert some SOV drivers from I-395 to alleviate some leftover congestion remaining after the PM construction-related lane closures have been lifted.

6.3 Temporary Traffic Control Strategies

A variety of work zone impact management strategies can and should be used to minimize traffic delays, improve mobility, maintain or improve motorist and worker safety, complete roadwork in a timely manner, and maintain access for businesses and residents. The following provides a summary of several temporary traffic control strategies, application of temporary traffic control device strategies, and project coordination strategies considered appropriate for the I-395 Express Lane project.

The Network Traffic Operations and Incident Management/Enforcement Committees will collectively monitor all temporary traffic control strategies. Both Committees will continue to meet throughout the duration of construction to address necessary improvements.

6.3.1 Control Strategies

Traffic control strategies are used to accommodate road users within the work zone or adjoining corridor in an efficient and safe manner. They are also used to provide adequate access to the roadway for the required construction periods and to provide safety for the worker.

The follow is a list of possible traffic control strategies that may be implemented during periods of construction of the project:

- Appropriate construction phasing / staging
- Lane shifts or temporary lane closures
- Temporary ramp closures
- Reduced lane / shoulder widths
- Night work and weekend work
- Work hour restrictions
- temporary pavement

6.3.2 Traffic Control Devices

All traffic control devices (signs, channelizing devices, pavement markings, etc.) that will be used shall be in accordance with the 2009 edition of the MUTCD, the 2011 Virginia Supplement to the MUTCD, and the 2011 edition of the Virginia Work Area Protection Manual (VWAPM).

All temporary traffic control plans prepared by the Design-builder team will be reviewed for compliance with these standards.

The TTCP plans for the I-395 Express Lane project will be included in the Concessionaires required TMP document, and will not be duplicated within this report.

6.4 Transportation Operations Strategies

The construction of the I-395 Express Lanes project has the potential to not only impact the I-395 corridor, but as importantly the already congested adjacent arterials within the general region. What may be considered relatedly minor construction, or a minor lane-blocking incident along I-395 during significant hours of peak operations will likely have noteworthy impacts on traffic and bus services through-out the greater region. Therefore, a toolbox review of known best-practice network support strategies, local network operations (both before and during construction), and transit and TDM strategies to evaluate the potential of such to manage congestion and maintain traffic flow during construction is imperative.

A preliminary set of strategies has been identified and will be evaluated in more detail through discussion with various key stakeholders as the project develops.

The Network Traffic Operations Committee, which members includes the key stakeholders, will continue to meet throughout the duration of construction to address operational improvement and further develop additional strategies.

Of specific focus for the I-395 Express Lane project are those Network transportation operations strategies intended to help manage congestion and delay in and around the numerous large activity centers discussed in Section 4 of this Network TMP. The Pentagon and the Mark Center, being the largest activity center directly along the I-395 corridor generates a significant number of daily and peak hour vehicle trips, and will likely have the most significant impacts during various stages of construction of the project.

However, within the region a substantial number of daily and peak hour vehicle trips will likely be impacted, which can be expected to benefit from properly implemented operations strategies.

Implementation of rather similar regional support and local network operations strategies often go together. A single strategy typically considered primarily a regional approach to mitigating a greater adverse impact, may in fact have just as significant an impact if applied as a local network operational strategy. For discussion, regional support strategies will be considered those strategies which would seem to have the positive impact to greater regionals issues, and local network operations strategies primarily related to a specific arterial or collection of neighboring roads.

6.4.1 Regional Support Strategies

Regional support strategies are those mitigating strategies that if applied consistently will typically have greater impacts related to the entire region of the I-395 Express Lanes project and even improve safety and mobility widely beyond the limits of the construction efforts.

Such strategies include, but would not be limited to the following:

- Reviews of temporary traffic control plans and lane closures permits
- Use of existing dynamic messaging signs (DMS)
- Traffic monitoring during construction
- Other available mitigation resources

Temporary Traffic Control Plans and Lane Closures Permits

All traffic control plans and related applications for lane closures will be reviewed in detail to identify potential regional impacts with a focus on best practices that could help mitigate regional delay and improve safety. Diversion of traffic from I-395 will be viewed, and possibly require detailed analysis before being approved, to identify and mitigate potential excessive delay along the roadway network throughout the region.

Ramp Metering

The I-395 Express Lane project limits currently include ramps with metering as shown in **Table 6.1** below:

Table 6.1: Current Ramps with Metering

Ramp Location		Number of Ramp Lanes
I-395 NB General Purpose	EB / WB Edsall Rd	2
	Little River Tnpk / Duke St	2
	EB / WB Seminary Rd	2
	EB King St	1
	WB King Street	2
	NB Quaker Lane	2
	EB Glebe Rd	1
	WB Glebe Rd	1
	NB Jefferson Davis Hwy	2
	EB / WB Boundary Channel Dr	1
I-395 SB General Purpose	SB Shirlington Rd	2
	WB King St	1
	EB King St	1
	EB / WB Seminary Rd	2
	WB Duke St	1
	EB Little River Tnpk	1
	WB Edsall Rd	1

In addition, there are numerous ramps on the existing I-95 Express Lanes south of the I-395 that may require monitoring and time changes due to traffic impacted by the I-395 Express Lane project. To improve downstream traffic flow during construction activities that require lane closures, upstream ramp meter operations can be extended beyond the standard AM and PM weekday peak periods to restrict the flow of additional traffic into the work zone area until excessive delays subside. VDOT will monitor the operations of each location where ramp metering is currently implemented. An examination of each of the ramp merge areas, lane additions, and weave sections along I-395 showed that all locations where ramp metering could safely and effectively be implemented currently have ramp meters in place. Locations that currently do not have ramp meters are where mainline travel lanes are added from the on-ramp, or where the straight horizontal alignment of the on-ramp would be conducive to high speeds that are incompatible with a ramp metering traffic signal. Therefore, temporary ramp meters are not recommended for any currently unmetered ramps along I-395.

Performance Measures

- Reduction of queue lengths to ½-mile or less, as observed in the field or remotely using live open data from INRIX and/or Google

Dynamic Messaging Signs (DMS)

Extensive use of all DMS signs available throughout northern Virginia, the District of Columbia, and Maryland will be incorporated in an extensive network to provide enhanced communication of traffic advisories related to the I-395 Express Lane project. For temporary traffic control setups projected to have impacts to the public, VDOT PSTOC and the 95 Express Operations Center will be contacted to

ensure that messages are deployed in advance of and during activities. For activities projected to have significant impacts (i.e., full weekend closures of the HOV lanes), messages will be developed as part of the submitted traffic control plan. Standard messaging and implementation thresholds will be developed for routine construction conditions and incident management.

Traffic Monitoring During Construction

Traffic will be monitored throughout construction utilizing the Regional Integrated Transportation Information System (RITIS). A map of the proposed area to be monitored and a sample output is shown in **Appendix E.** Using a variety of information sources, RITIS is able to provide almost current traffic data throughout the area highlighted in **Appendix E.** The purpose of this strategy will be to identify any operational hot spots along the corridor as a result of construction activities on I-395 so that other mitigation strategies in this document can be applied.

Performance Measures

- Congestion scans in the study area will be checked 5 times/month during construction and analyzed for changes in traffic patterns

Other Available Mitigation Resources

VDOT has numerous additional operational resources which will be incorporated into the project or in some cases expended on an as needed basis. The VDOT Northern Region Operations (NRO) Transportation Operations Center (TOC) currently monitors a significant portion of the northern Virginia expressway system 24 hours a day, 7 days a week. This Public Safety Transportation Operation's Center currently operates ITS devices throughout the Northern Virginia region, including closed circuit television (CCTV) cameras and portable changeable message signs (PCMS), dispatches safety service patrol (SSP), and coordinates with other regional transportation and emergency management agencies. Specific resources of the NRO (including the IMC) will be made available to the I-395 Express Lane project at appropriate times if determined necessary.

6.4.2 Local Network Operations Strategies

Local network operations (LNO) strategies focus on the adverse impacts of larger construction project activities on the local roadways. During construction of the I-395 Express Lane project traffic is likely to be diverted to various arterials immediately within the area of construction activities. Therefore, those arterials as well as the local neighborhood streets feeding these arterials are likely to be impacted.

Therefore, the focus of the local network operations strategies will be to monitor and implement mitigation strategies identified in this document, as appropriate, to the local arterial network. As this Network TMP is being developed, analysis is underway to identify specific locations that will need to be addressed in the future

as the project develops. This effort will be developed and come from various sources including discussions with key local agency stakeholders.

Such strategies include, but would not be limited to the following:

- Baseline and routine operational assessment of the local arterial system
- Identification and improvement of potential "Hot Spots"
- Temporary signal timing adjustments
- Quantitative analysis of arterial diversions of DB Team's TTC plans and related MOT diversions
- Increased use of portable changeable message signing
- Monitoring complaints from citizens or public officials

Several principles must guide the planning and implementation of all LNO strategies related to this Network TMP; such as the known fact that most of the local network capacity is already constrained and this Network TMP cannot solve all the existing capacity problems on the local network, work with the local jurisdictions must be acceptable to them, and that mitigation of adverse impacts on local streets directly resulting from construction of the I-395 Express Lane project must be a high priority.

6.4.3 Transit & TDM Strategies

Introduction

To further mitigate construction impacts in the work zone, transit and TDM strategies have been developed to increase person throughput in the study area. The extent of these strategies includes supplemental transit operations on I-395 and a series of strategies to promote alternatives to single-occupant travel on I-395. Coordination is ongoing with the Transit/TDM Stakeholder Committee as implementation of these strategies progresses.

Staff Labor

Members from VDOT, DRPT, and the GEC team will oversee, coordinate, and monitor the implementation of the transit and TDM strategies. Monitoring the strategies with performance metrics enables the team to determine the effectiveness of the transit and TDM strategies and adjust as necessary to strive toward desired results. The team will play an important role in interfacing with the regional transit and TDM providers to implement the strategies and monitor performance. The team will also support the outreach aspects of the Network TMP, assisting with the communication of any messages related to transit and TDM strategies or changes in transit operations due to construction impacts.

Proposed Transit Strategies

Transit strategies consist of supplemental service on existing bus routes. Bus service supported by the Network TMP will operate on or parallel to the I-395 corridor. The project team, regional transit providers, and DRPT worked together to develop

specific routes and increases in service. In general, preference was given to routes that serve the Pentagon, were documented in the I-395 Transit/TDM Plan, are at or near existing capacity, and have the potential to mitigate impacts in the Duke-Edsall widening section.

There are three proposed routes for which additional service would be initially funded:

PRTC Dale City OmniRide (Dale City – Rosslyn/Ballston via the Pentagon)

WMATA 18P (Burke Center – Pentagon)

WMATA 21P (Edsall Road/Landmark-Pentagon)

These three routes satisfy the stated criteria and connect a variety of geographic areas to the Pentagon. Three to four additional daily trips during peak periods are expected for each of these routes. The transit providers have noted that they have the available bus capacity to operate these additional trips and for those that originate at park-and-ride lots, parking capacity is available.

Performance Measurement and Initial Investment

Performance measures for the proposed transit studies include ridership, passengers per revenue hour, and passengers per revenue mile. These measures are consistent with the measures that each transit provider regularly reports to DRPT.

Anticipated costs for the three bus routes over the course of the TMP is $1,060,000. This assumes an 18-month operating period to add the additional trips to each route.

Proposed TDM Strategies

Five additional TDM strategies were prioritized for non-transit modes:

- Carpools formation strategies
- Vanpools formation strategies
- Teleworking implementation subsidy
- Pentagon Commuter Store operations
- Employer outreach

Each strategy is targeted towards increasing the number of people that can be moved through the corridor and promotes non-single-occupant travel. The following sections describe these strategies in more detail.

Carpool Formation Strategies

The Network TMP will fund incentives to encourage the creation of new carpools along the corridor to take advantage of the existing HOV 3+ lanes along I-395.

Carpool incentives are anticipated to be administered through the MWCOG Commuter connections "Pool Rewards" program. Currently under the Pool Rewards program, commuters register in advance to receive cash payment in the amount of $2 per day over a 90-day reporting period up to a maximum $130 for vehicles with two or more passengers.

To facilitate three-person carpools, the Network TMP will further incentivize adding a third person to carpools by providing an additional incentive over a 90-day reporting period. This includes new three-person carpools and two-personal carpools that add a third passenger. It is anticipated that each carpooler of a new three-person carpool would receive an additional $100 over a three-month period.

All carpools are eligible for the Guaranteed Ride Home program, which provides a free ride home in case on unexpected circumstances (funded separately from the Network TMP).

Coordination is ongoing to determine the potential of providing an E-ZPass Flex transponder as a reward to some of the first carpoolers to sign up for the program. The $35 initial fee would be waived and recipients would receive an E-ZPass Flex with a balance of $0.

Performance Measurement and Initial Investment

The primary performance measure for carpool formation will be the number of carpools formed. Based on this number, assumptions can be made to estimate the number of vehicle trips reduced and vehicle miles reduced.

Carpool formation subsidies are initially allocated $70,000. Incentives are provided to the users as described above.

Vanpool Formation Strategies

The TMP will incentivize the formation of vanpools to encourage use of larger vehicles to increase vehicle occupancy on the facility. The vanpool program is anticipated to be administered through the Vanpool Alliance and GWRideConnect by providing supplemental funding modeled after the VanStart program.

The Network TMP will fund a subsidy for new vanpools in the I-395 corridor under the VanStart program. Vanpools started under the program and existing vanpools will be eligible for VanSave support if needed to sustain ridership.

Performance Measurement and Initial Investment

The primary performance measure for vanpool formation will be the number of vanpools formed. Based on this number, assumptions can be made to estimate the number of vehicle trips reduced and vehicle miles reduced.

Vanpool formation subsidies are initially allocated $120,000. Incentives are provided to the users through Vanpool Alliance and GWRideConnect.

Teleworking Implementation Subsidy

Teleworking allows employees the option to work off-site full or part-time, reducing average daily demand on the facility. The I-395 TMP would subsidize the cost of implementing new telework programs at employers within the study corridor for $1,000 per new teleworker up to $10,000 to offset teleworking startup costs. Employers would need to demonstrate that a significant number of effected employees use the I-395 corridor regularly. Selection for the program would be on a first-come, first-served basis. The program would be implemented and administered through the Telework!VA-NOVA program.

Performance Measurement and Initial Investment

The primary performance measure for teleworking implementation subsidy will be the number of new employees teleworking. Based on this number, assumptions can be made to estimate the number of I-395 vehicle trips reduced.

Teleworking implementation subsidies are initially allocated $150,000. Incentives are provided to the employers as described above.

Employer Outreach

Part of the previously mentioned strategies will be to engage employers located within study area to further promote the availability of travel choices within the corridor. The effort would aim to achieve the following objectives:

- Support the outreach and communications goals outlined in the approved TMP;
- Augment the transportation staff resources of the jurisdictions in their current outreach efforts to businesses;
- Educate the major employers along the corridor about the 395 Express Lanes project and how they and their employees can access timely construction information and alternative commuting methods and modes;
- Encourage employers to participate in existing jurisdictional TDM programs to reduce / minimize employee trips along 395 during the two-year construction period; and
- Provide employers and their employees with the information and tools necessary to choose alternative methods and modes of commuting to and from work.

For the purposes of this strategy, it is assumed that one additional staff member would be added to supplement ongoing jurisdictional outreach efforts, with a focus of targeting businesses along the I-395 corridor. Extremely close coordination would occur between the additional staff member and existing outreach efforts.

It is assumed that this staff would be hired and managed by the General Engineering Contract (GEC) that supports VDOT and DRPT on this project.

Given this is a new effort for the 395 Express Lanes project, it is assumed that this would begin with a dedicated part-time person. This will allow VDOT and the project team to assess the effectiveness over a 6-month period and determine whether or not the program should be continued, expanded or stay the same. The staff member's time would be spent focusing on jurisdictions adjacent to the corridor (Arlington County, City of Alexandria, and Fairfax County). During their time with each jurisdiction they would be working directly with their TDM staff.

Performance Measurement and Initial Investment

The following could be used as performance measurements:

- Number of employers engaged through a meeting/briefing on the project and TDM initiatives;
- Number of employees engaged on the project through sign-ups for construction alerts and information provided on commuting alternatives;
- Number of new van and carpools formed
- Estimate of number of trips reduced
- Number of new employees teleworking

Employer outreach is initially allocated $220,000. This cost will cover the salary of the staff member and direct expenses associated with the outreach.

Pentagon Commuter Store Operations

Currently Arlington County, through its contractor Convention Store, operates a Mobile Commuter Store at the Pentagon between one and three days a week. This mobile store temporarily parks within one of the bus bays at the Pentagon and provides commuter information and sells public transportation tickets. WMATA previously operated a sales center on the Pentagon Reservation which has since been closed in recent years. WMATA is proposing to convert this building; half of the building would serve as a driver lounge and the other half would be a permanent Commuter Store. Arlington County, in coordination with Washington Headquarters Service (WHS) and WMATA, are requesting operational, start-up, and partial construction funding to operate the new Commuter Store five days a week. This would serve employees of and visitors to the Pentagon with a Commuter Store throughout the week. As currently proposed, this strategy assumes an 18-month period of operations for the Commuter Store for five-day-a-week operations. Operational expenses funded through the TMP would directly be tied to the Commuter Store and not related to the WMATA driver's lounge. Further information regarding construction timeline has been requested from WMATA. It is noted that progress on construction must be made by March of 2018 for this strategy to remain in the recommended strategies.

Performance Measurement and Initial Investment

The primary performance measure for the Commuter Store operations will be the number of sales transactions.

The Pentagon Commuter Store is initially allocated $309,000. This cost includes an 18-month operating period at a cost of approximately $206,000 per year to fund staffing and day-to-day operations.

Additional costs to support the Commuter Store will be provided by others. WMATA is expected to contribute approximately $85,000 to fund the construction of the building reconfiguration. Arlington County or Washington Headquarters Service (WHS) is expected to contribute the approximately $22,500 worth of start-up costs for hardware, office supplies, and other one-time costs.

Additional Strategies for Consideration (Not Currently Proposed)

The following strategies are not currently included in the list of proposed strategies but could be added in the future based on performance of the initially proposed strategies.

Supplemental Transit Service (Additional Routes)

As part of the proposed strategies, three existing transit routes were identified for additional service. Alternative existing bus routes have been identified that could be implemented if the initially proposed routes are not successful. The alternative routes that have been identified include:

- PRTC Lake Ridge OmniRide (Lake Ridge – Washington)
- PRTC Dale City OmniRide (Dale City – Navy Yard)
- WMATA 17GH (Kings Park West – Pentagon)

Performance Measurement and Initial Investment

If these routes are included in the recommended strategies, performance measures include ridership, passengers per revenue hour, and passengers per revenue mile. These measures are consistent with the measures that each transit provider regularly reports to DRPT.

In the proposed budget, no funds have been allocated for these transit routes.

Coordination and Outreach Strategies

A key factor to the success of the transit and TDM strategies is the public awareness and understanding. It will be critical to work with the communication team and other regional partners to spread knowledge about the new services and incentives available to travelers.

The team will also work with members from the outreach team to make sure any messages related to changes in transit routes and/or slugging patterns due to

construction impacts are communicated early, clearly, and effectively. Where necessary, the transit team can develop alternative routes and travel choices for those individuals affected by the changes

6.5 Work Zone Safety Management Strategies

Work zone safety management strategies include devices, features, and management procedures used to address safety concerns in and around the work zones. Safety devices include temporary concrete barriers, crash cushions, portable changeable message signs, portable speed trailers, and portable closed-circuit television cameras. Work zone safety management techniques that promote safe work areas include a project safety task force/committee, daily supervision from construction safety supervisors and inspectors, and guidance from the Network TMP monitoring team. Strategies will be implemented for the I-395 Express Lanes project to enhance the safety of construction workers and the traveling public during construction. The following work zone safety management strategies are integrated in the Project TMP and will be implemented by the Design-Builder. In the future, additional strategies may be integrated into this Network TMP and implemented by VDOT.

The Incident Management/Enforcement Committee will monitor all temporary traffic control strategies. This Committee will continue to meet throughout the duration of construction to address necessary improvements work zone safety management strategies.

6.5.1 Temporary Concrete Barrier Service

Temporary concrete barriers will be used to prohibit motor vehicles from entering work areas, and to separate and protect workers from motor vehicle traffic. It provides positive physical separation between travel lanes and the adjacent work zone. Delineators will be mounted on the barriers to indicate the location of the barriers, especially at night or in adverse weather, if the barrier is within 15 feet of the edge of the traveled roadway. This strategy will be implemented via the Project TMP and TTCP developed by the Design-Builder.

6.5.2 Crash Cushions

Crash cushion will be used to mitigate the effects of errant vehicles that strike obstacles, either by smoothly decelerating the vehicle to a stop when hit head-on, or by redirecting the errant vehicle from the work zone. They prevent errant vehicles from intruding into a work zone, and protect drivers from the exposed ends of barriers, fixed objects, shadow vehicles, and other obstacles in the work zone. This strategy will be implemented via the Project TMP and TTCP developed by the Design-Builder.

6.5.3 Portable Changeable Message Signs

Portable changeable message signs (PCMS) will be used to advise road users of lane and road closures, work activities, incidents, potential work zone hazards, queues and slowed or stopped traffic ahead, and travel time or delay information,

as well as alternate routes in or around the work zone. They would be placed at key locations before potential diversion points to give motorists an opportunity to divert to an alternate route or take other appropriate measures based on the information provided. This strategy will be implemented via the Project TMP and TTCP developed by the Design-Builder.

The I-395 team, in coordination with stakeholders at the Pentagon, Arlington County, etc. will utilize PCMS signage for early awareness of impending construction at the Hayes Street lot, South Parking lot improvements, South Rotary Road turn lane and the Eads Street interchange reconfiguration. The content on the signage, location of it, approvals that will be needed for its placement, as well as the timing of installation and removal will all be coordinated with the Pentagon.

6.6 Incident Management and Enforcement Strategies

The construction of the I-395 Express Lanes has the potential to significantly affect the already congested roadways, including the I-95 and I-395 general purpose lanes, the I-395 reversible HOV lanes, the I-95 Express Lanes and adjacent arterials. Minor lane-blocking incidents can have significant impacts on traffic if they are not removed quickly, particularly during peak traffic hours. Therefore, the focus will be to maintain and enhance the flow of traffic through incident management measures and intelligent transportation systems (ITS) technologies. The strategies identified in this section will enable incident responders to quickly detect, verify, respond, and clear incidents, as well as coordinate lane closure activities on both project- and region-wide levels, thus keeping construction zone safe for the traveling public and workers.

For the I-395 Express Lanes Project, a Traffic Operations Committee and an Incident Management/Enforcement Committee have been established to evaluate a preliminary set of strategies to manage congestion and maintain traffic flow during the construction of the project. Both committees will continue to meet throughout the duration of construction to refine these strategies and identify new opportunities for improvements.

Preliminarily, the two committees identified several key strategies for consideration. The following strategies have been recommended for funding.

6.6.1 Selective Police Enforcement

Increased application of selective police enforcement activities, especially in the application of speed monitoring, may be considered throughout periods of construction.

6.6.2 Supplemental Virginia State Police Troopers

During intense periods of construction, narrowed and/or eliminated shoulders along the general purpose and HOV lanes will require additional resources to clear incidents in a timely manner. The I-395 Express Lanes Project will provide additional (supplemental) Virginia State Police (VSP) troopers dedicated to incident management in the project corridor. The supplemental VSP patrol hours will be adjusted depending on the construction schedule. The proposed coverage will

focus on the areas of significant construction impacts in the general purpose (GP) lanes and the reversible lanes.

Responsibilities of the VSP include:

- Assistance in incident detection
- Security of the incident scene
- Provision of emergency medical aid until help arrives
- Coordination with VDOT PSTOC and 95 Express Traffic Control Room for incident response and management
- Direction of traffic at the incident scene
- Supervision of scene clearance

A budget OF $200,000 has been allocated by VDOT for additional VSP troopers support.

6.6.3 Dedicated Portable Variable Message Signs

The benefit of dedicated Portable Variable Message Signs includes the following:

- To provide up-to-date traffic information to users of roads approaching the I-395 corridor for the duration of the I-395 Express Lanes Project. Traffic information can include, but is not limited to provision of travel times within the project area and advisories of traffic events (for example, lane closures, incidents, or changes in traffic patterns).
- Dedicated PCMS devices allow for specific I-395 Express Lanes project advisories to be disseminated while maintaining the use of the existing DMS infrastructure for region-wide advisories.
- Dedicated PCMS may be maintained by project resources without detracting from existing VDOT/Transurban resources.
- PCMS would be purchased (not leased) by VDOT and ultimately turned over to VDOT for use after completion of the I-395 Express Lanes Project.

PCMS offer the advance over available overhead DMS for the following reasons:

- Overhead DMS are operated by VDOT (on the general purpose lanes) or Transurban (on the Express lanes).
- Typically, these messages are used for regional information (travel time to destinations beyond the next couple of exits).
- On occasion, the owners/operators of the DMS may choose to use the devices for communication of other information to roadway users (for example, Amber alerts, Silver alerts, weather information, road conditions, etc.).

- On previous mega-projects (Woodrow Wilson Bridge Project), dedicated PCMS were used to advise motorists of upcoming traffic events and provide travel time information.
- Dedicated PCMS allow roadway users to process information similar to reading signs on the roadway, without having to process other devices that may distract from driving (radio, cell phone, apps, etc.).

It is expected that up to four (4) dedicated PCMS device will be employed thought out the network at various locations. The cost of this device is estimated at $ 100,000.00 each.

6.7 Public Information Strategies

A comprehensive public information and outreach program will be developed to support the goals and objectives of the Network TMP as provided by the guidance on public information and outreach strategies in the FHWA Work Zone Safety and Mobility Rule on September 9, 2004 in the Federal Register (69 FR 54562). After identifying the appropriate audiences and messages, the plan will include tactics designed to reach those most impacted by the project. The plan will be aligned with other project communications efforts to ensure consistency of message, tone and tactics. The budget for public information strategies is funded separately from the TMP budget and is not included in this document.

6.7.1 Public Outreach and Advertising

Websites and social media are now one of the primary tools for disseminating traveler information. The main I-395 Express Lanes website (395ExpressLanes.com) will include tabs for key audiences, e.g. Pentagon employees and sluggers, so anyone wanting information on the construction activity at the Pentagon reservation and its surrounding areas, can easily access it.

Housed within this area of the website will be fact sheets, construction alerts and news releases as they relate to specific projects and impacts to the Pentagon reservation and the surrounding areas.

In addition to the project website, VDOT will utilize its social media channels (Twitter, Facebook) to push out breaking news, construction related information, lane closures and suggestions for alternate routes.

VDOT will partner with travel apps and app developers to share project messaging and key construction information. For example, VDOT has a partnership with WAZE, a popular travel app that uses crowd-sourcing data to provide travelers with real time traffic information and suggestions for alternate routes. VDOT already shares work zone data with WAZE so a crucial strategy will be to ensure project work zone data are entered in a timely and accurate way to optimize its availability for customers using WAZE in real-time. In addition, event-driven information, such as large scale construction, can also be piped to WAZE via the Connected Citizens' program. VDOT will explore this partnership to determine how it can be leveraged in public involvement efforts including general project messaging, construction

alerts, lane closures, and pop up messages advertising TDM and alternative commute options provided by the Express Lanes.

VDOT will also work with to enhance Uber Commute, to encourage carpooling in the Express Lanes. Potential options to explore include incentives for free rides (with TMP subsidy to Uber) and extra pay to carpool drivers (with TMP subsidy to Uber) during construction. **Figure 3** shows three potential travel apps currently being considered by VDOT.

Figure 3: Three Potential Travel Apps being considered by VDOT.

Opportunities for using PCMS devices will be considered when appropriate, to provide new or changes in construction information as part of public outreach efforts.

6.7.2 Email Blasts

The I-395 Express Communications team manages an email database of stakeholders, elected officials, media, public meeting attendees and anyone else who wants to sign up to receive project updates. Email blasts to this list will be drafted to communicate breaking news, construction related information, lane closures and suggestions for alternate routes.

6.7.3 Printed Materials

The I-395 team will create specific collateral materials for the key construction areas within the project limits. The materials will be available on the project websites and as well as hard copies printed for distribution at commuter fairs and other events. As well, the materials will be made available to stakeholders and partners, like the Pentagon team for their use and distribution through their internal channels.

The collateral materials include but will not be limited to the following:

- Fact sheets
- Brochures

- Information flyers

6.7.4 Advertising

Limited but targeted advertising will be utilized to support the Network TMP and all project communications. The coordinated team may utilize geo-targeted Facebook ads to inform I-395 corridor commuters of construction activities and commuting options. Other advertising methods such as radio, traffic sponsorships, and digital ads will be explored if the coordinated communications team believes it may be helpful and they are determined to be within scope and budget.

6.7.5 Traffic Advisories/Media Relations

The I-395 team will draw upon the media to raise awareness of the I-395 Express Lanes Project and the specific construction associated with each specific construction phase. The tools used include but will not be limited to:

- News releases
- Traffic alerts
- Story pitches to 395/95 corridor publications, community newspapers and minority and Department of Defense publications

The I-395 team will work in concert with project partners and primary stakeholders to leverage its media relationships and contacts as well as those that exist with the I-395 team. The goal will be to provide accurate and timely responses to media inquiries in accordance with VDOT's Public Information and Communications protocols.

6.7.6 Employer Outreach and Information Events

The I-395 team will support VDOT with preparation, presence, and materials at public events within the project corridor such as at transportation fairs, public meetings, and employer outreach events. A schedule of proposed events will be developed in coordination with VDOT and the I-395 Communications team.

VIRGINIA
MEGAPROJECTS

Appendices

INTERSTATE 395 Express Lanes

Appendices

Appendix A - Roles & Responsibilities Matrix 70
Appendix B – Potential Adjacent Projects List 75
Appendix C – Baseline Traffic Analysis Results 81
Appendix D – Construction Traffic Analysis (Single Lane) 98
Appendix E – Traffic Monitoring 114

VIRGINIA
MEGAPROJECTS

Appendix A

Roles & Responsibilities Matrix

INTERSTATE 395 Express Lanes

Role and Responsibilities	Design-Builder (DB)	Concessionaire	VDOT / GEC	FHWA
Oversight related to the Final Rule on Work Zone Safety and Mobility.				✓
Development, implementation and management of the Project TMP related to the construction of the I-395 Express Lanes project in accordance with I&IM-241/TE-351.		✓		
Review and approve proposed temporary lane and/or shoulder closures following VDOT requirements.		✓		
Review detour plans for approval.		✓		
Direct the DB Contractor to remedy all actions / requirements that violate the Contract. Can act directly to address oversight issues related to the contract.		✓		
Provide timely reviews and approvals of all design submissions and construction documentation.		✓		
Obtain various Governmental approvals and assist the DB Contractor in obtaining all Governmental approvals that are the DB Contractor's responsibility.		✓		
Communicate work activities with the Department's Northern Region Operations Advanced Traffic Management System (ATMS) and any other regional ATMS.	✓			

Role and Responsibilities	Design-Builder (DB)	Concessionaire	VDOT / GEC	FHWA
Provide a MOT Manager and adequate staff, including a Traffic Engineer, to coordinate all technical and functional aspects related to MOT operations.	✓			
Provide a Communication Manager and adequate staff to support the community outreach and information activities.	✓			
Participate in public meetings as needed to provide updated technical information to the public.	✓			
Lead monthly progress meetings for the overall project and distribute minutes.	✓			
Provide assurance that all work is approved by the Concessionaire prior to execution.	✓			
Develop and coordinate detour plans with local, state and federal agencies (as applicable). Submit and update the MOT Plan well in advance of any planned detour activity. Responsible for all planning, consultation and coordination with impacted parties, design, implementation, monitoring, and maintenance of detours-whether within or outside the I-395 project Right of Way.	✓			
Use analytical/deterministic (HCM-based) or traffic simulation/optimization tools to prepare traffic analyses and modeling for all MOT phases and stages, exclusive of closures identified in the I-395 Design Build Contract; and for all construction activities requiring a detour, requiring closure of multiple lanes, or deviating in any way from what is set forth in the I-395 Design-Build Contract. Collect additional traffic data as required.	✓			

Role and Responsibilities	Design-Builder (DB)	Concessionaire	VDOT / GEC	FHWA
Develop MOT plans and supporting calculations as necessary, including assessment of work zone traffic impacts using operational-level traffic analysis software.	✓			
Assure construction personnel assigned to the project are trained in traffic control to a level appropriate in accordance with VDOT's work zone traffic control training guidelines.	✓			
Advise the Concessionaire and appropriate VDOT/GEC personnel of all work requiring lane shifts, lane closures and/or phase changes in the required time-frames prior to implementing such activity.	✓			
Advise the Concessionaire and appropriate VDOT/GEC personnel, of height, width and weight restrictions within the required time-frames prior to the imposition of such restrictions.	✓			
Perform, at a minimum, daily reviews of the work zone to ensure compliance with contract documents and establish specifications and standards.	✓			
Recommend traffic control improvements to the Concessionaire and appropriate VDOT/GEC personnel to address field conditions pertaining to traffic flow, visibility, and worker/motorist/pedestrian safety.	✓			
Provide coordination with local agencies and other contractors performing work in the vicinity of I-395.	✓			
Develop and implement a "Network" TMP for the I-395 Project in coordination with the Concessionaire's / DB's I-395 Project TMP, Maintenance of Traffic Plan and Sequence of Construction Plan.			✓	
Monitor and adjust Network TMP strategies based on performance and effectiveness during the construction period.			✓	

Role and Responsibilities	Design-Builder (DB)	Concessionaire	VDOT / GEC	FHWA
Assist coordination between the Concessionaire and other local, state and federal agencies.			✓	
Review and approve the Concessionaire's / DB's I-395 Project TMP when determined to be compliance and consistent with the Department's goals, and all applicable information is included in the document.			✓	
Ensure that both the I-395 Project TMP and the Network TMP is communicated to appropriate key audiences (motorists, police, businesses, residents, elected officials and media).			✓	
Monitor and use field observations, available crash data, and other relevant operational information to discuss preliminary and work zone management strategies in conjunction with alternative project options and design schemes.			✓	
Review Temporary Traffic Control Plans to ensure compliance with the information published in the Virginia Work Area Protection Manual. Ensure any deviations from the Virginia Work Area Protection Manual are approved by VDOT's Regional Traffic Engineer (RTE) and properly noted in the plans.			✓	
Solicit comments from other design disciplines such as Structure and Bridge, Environmental, Materials, etc., as appropriate, to verify that all safety and mobility concerns are addressed; and ensure all recommendations/corrections submitted by such disciplines are incorporated in final designs with the appropriate collaboration.			✓	
Review of the overall project activities at each milestone to ensure appropriate action is taken to reduce work zone impacts on the public.			✓	
Review appropriate documents to ensure the project can be constructed per the Plan Assembly, the Sequence of Construction and the Concessionaire's / DB's Project TMP.			✓	

Role and Responsibilities	Design-Builder (DB)	Concessionaire	VDOT / GEC	FHWA
Support "Network" TMP activities; engage other project team members at VDOT, GEC, Concessionaire, DB Contractor, and ultimately at various stakeholder meetings.			✓	
Engage in one-on-one stakeholder meetings to solicit input on problem areas and obtain buy-in on mitigation strategies. Host larger group stakeholder meetings when appropriate.			✓	
Assist coordination with the Pentagon to minimize impacts to buses.			✓	
Assess and assemble data and supporting documentation including studies, turning movement counts, ramp traffic volumes, traffic signal and ramp meter data, transit operational information, ITS inventory, GIS data, COG travel demand model and crash data.			✓	
Conduct field observations to assess current operations (baseline) along and across the I-395 corridor including travel times and queue lengths.			✓	
Supplement traffic analysis within Arlington County.			✓	

VIRGINIA
MEGAPROJECTS

Appendix B
Adjacent Project List

INTERSTATE 395 Express Lanes

I-395 Express Lanes project – Potential adjacent projects			
Project	**Arlington Memorial Bridge** **https://parkplanning.nps.gov/projectHome.cfm?projectID=37120**	**Meade Street Bridge** **https://projects.arlingtonva.us/projects/meade-street-bridge/**	**Boundary Channel Drive Interchange Project** **https://projects.arlingtonva.us/projects/boundary-channel-drive-interchange/**
Location	One of five bridges connecting Virginia and the District of Columbia across the Potomac River	Between Rosslyn and the U.S. Marine Corps War Memorial	Interchange of Boundary Channel Drive, Interstate 395 and Long Bridge Drive
Cost	**$250M (Total), Replacing the bascule span alone is estimated at $80 million** Phase 1 will focus on the approach spans, which are the most in need of repairs, at a total cost of US$166 million. Completion of Phase 1 will allow the bridge to remain open until 2030 while additional actions are taken. Phase 2, will focus on the reconstruction of main bascule span. • Rehabilitate or replace the steel draw span, called a bascule span; Repair deteriorated portions of the abutments, piers and concrete arch spans; • Replace the concrete bridge deck; and Resurfacing travel lanes. • The rehabilitation project also includes replacing concrete sidewalks and refitting granite curbs; repairing granite bridge railings, lamp posts, and access panels; installing a better drainage system; and making minor, nonstructural improvements.	**$5M** • All hardscape changes necessary to make the proposed pedestrian safety improvements • New street and sidewalk lighting • Aesthetic improvements to the bridge and its approaches • Rebuilding of the bridge deck to accommodate the proposed plan	**$19M** • Managing existing local and regional traffic generated by the Pentagon and I-395 • Managing future traffic generated by Long Bridge Park • Adding various bicycle/pedestrian connections to Long Bridge Drive from the Pentagon and the Mount Vernon Trail • Rebuilding all streets within the interchange areas to include new sidewalks, landscaping, and street lighting The project goal is to upgrade the Boundary Channel Drive/I-395 interchange to improve traffic operations and safety for all users. The existing interchange is inadequate for current demands and for future planned growth in Crystal City. The interchange project also includes a connection to Long Bridge Park Drive and a bicycle connection from the Humpback Bridge to Long Bridge Park. This project is a multiyear, multiphase project that is currently in the technical analysis phase. FHWA and VDOT approval of the Interchange Modification Report (IMR) are required before this project can proceed to the engineering design stage.
Schedule	RFP issued in May 2017. Expected 19-week selection schedule estimated to be completed in October 2017. NTP to DB Team TBD.	The design phase will be funded in fiscal 2017 and construction will be funded in fiscal 2019.	The third iteration of the I-395/Boundary Channel Drive IMR has been approved by VDOT and is currently under review by FHWA staff. IMR approval is expected in summer 2017

I-395 Express Lanes project – Potential adjacent projects			
Contact	Superintendent George Washington Memorial Parkway c/o Turkey Run Park McLean, Virginia 22101	**PM:** David Goodman; dgoodman@arlingtonva.us 703 228-3709 **Media:** Jessica Baxter; jebaxter@arlingtonva.us 703 228-3152	**PM:** Jon Lawler, 703 228-3724 **Media:** Catherine Matthews, 703 228-6596
Project	**Long Bridge Drive Utility Undergrounding & Roadway Realignment** **http://preview.tinyurl.com/y775jngz**	**Rehabilitation of I-395 HOV Bridge over Potomac River** **http://preview.tinyurl.com/y9c8bdbv**	**Rehabilitation of Theodore Roosevelt Bridge** **http://preview.tinyurl.com/y9c8bdbv**
Location	North end of Crystal City, on Long Bridge Drive between Boundary Channel Drive and 6th Street South.		
Cost	**Phase I - $1.2M** Utility undergrounding The first phase of the Long Bridge Drive project will remove the four overhead utility poles along the south side of Long Bridge Drive, underground the utilities and provide necessary utility connections for the future Long Bridge Park and aquatic, health and fitness facility. Doing this work now will help reduce the amount of disruptions and impacts along Long Bridge Drive when construction begins on the roadway realignment, because the overhead utilities are located within the future realigned Long Bridge Drive. **Phase II – $1.8M** Roadway realignment The second phase will extend the reconstructed section of Long Bridge Drive (formerly Old Route 1) to the Boundary Channel Drive/I-395 interchange. Long Bridge Drive will be realigned to tie into the future interchange at a less skewed and awkward angle. Improvements will include new sidewalks, bike lanes, landscaping, bus stops and street lighting.	**$38.5M** Repair extensive pier cracking, superstructure, and substructure rehabilitation.	**$28.5M** Rehabilitation of the Theodore Roosevelt Memorial Bridge Main Spans and Ramps, including pedestrian/bicyclist safety improvements; sidewalk widening; connection for downstream sidewalk to Virginia; modifications to zipper lane; and bridge lighting.
Schedule	Phase I – Construction completion Summer 2017 Phase 2 – Construction Start Fall 2017	Construction FY20	Design FY15, Construction FY21
Contact	TBD	TBD	TBD

I-395 Express Lanes project – Potential adjacent projects			
Project	**Rehabilitation of Washington Boulevard Bridge (Route 27) over Route 110** **http://preview.tinyurl.com/ydhxmcr4**	**I-66 Inside the Beltway** **http://inside.transform66.org/learn_more/default.asp**	**Miscellaneous Pavement Resurface Maintenance Projects**
Location		Between the Dulles Connector Road and Fairfax Drive/Glebe Road (Exit 71)	Various local area network projects to be staged on a fiscal basic (TBD by various jurisdictions)
Cost / Scope	**$31.5M** The bridge is being widened by nine feet to 105 feet, to accommodate a 14-foot shared-use path on the east side, and an eight-foot sidewalk on the west. The superstructure is being replaced and widened, expanding the length of the bridge to 470 feet by adding two new end spans. The slab vault structure behind the abutments is being completely replaced by two new piers and abutments, adding an additional span at each end of the bridge.	**$60.0M** Scope 1: T Tolling Infrastructure Improvements • Eight overhead electronic toll collection gantries • 125 signs along I 66 and local roads • Ramp improvements Scope 2: Widening Phase • Four-mile eastbound widening	
Schedule	Construction completion – Spring 2018	Tolling Improvement, Begin construction – 2016, End construction – 2017 Widening. Begin construction – 2018, End Construction - 2020	
Contact	**Judlau Contracting Inc.** Yusaf Masud, 703-259-2973 Charles Harvey, P.E., 703-259-3234	The project team may also be contacted by email: Transform66@VDOT.Virginia.gov, Media inquiries should be directed to Michelle Holland at 703-259-3378.	

I-395 Express Lanes project – Potential adjacent projects			
Project	**City of Alexandria - Development Projects** http://preview.tinyurl.com/yddgsyj5	**I-66 Inside the Beltway** https://projects.arlingtonva.us/types/transportation/	**Miscellaneous Pavement Resurface Maintenance Projects** https://projects.arlingtonva.us/projects/army-navy-drive-complete-streets/
Location			
Cost / Scope			This project will consist of a rebalancing of the right-of-way (ROW) to permit improved bicycle, pedestrian and transit accommodations on Army Navy Drive. Schedule is pending.
Schedule			In design
Contact			

I-395 Express Lanes project – Potential adjacent projects			
Project	**Hayes Street Tour Bus Parking**	**Landmark Mall Redevelopment** **http://thenewlandmark.com/**	**Beach Drive Rehabilitation** **https://www.nps.gov/rocr/learn/management/beach-drive-rehabilitation.htm**
Location			Rock Creek and Potomac Parkway to DC/MD border
Cost / Scope	This project will consist of the complete redevelopment of the Hayes Street Parking lot for the relocation of tour bus parking services for visitors to the Pentagon. Construction of this effort has been started.	Current proposal submitted by The Howard Hughes Corporation calls for demolition of the two-story central area of the mall and replacement of this portion with a mixed-use residential and retail complex with a traditional street grid, sidewalks, trees, and open space. This application calls for approximately 250,000 to 300,000 square feet of retail and restaurants, along with approximately 350 to 400 apartments. Schedule TBD	The project includes full depth pavement reconstruction, which requires excavating the entire area and placing a new gravel base before new asphalt paving; improvements to pedestrian and bicycle trails in collaboration with the DDOT; DC Water storm drain rehabilitation and improvement projects; installation and upgrades of raised pavement markers, centerline rumble strips, guardrails and road signs to provide safer road conditions for drivers; parking area reconstruction and rehabilitation; traffic signal and streetlight replacement; and the rehabilitation of six bridges.
Schedule			Begin construction – Fall 2016, End construction Fall 2019
Contact			

I-395 Express Lanes project – Potential adjacent projects				
Project	**Rehabilitation of Key Bridge** **http://keybridgeproject.com/**	**Canal Road Study** **http://preview.tinyurl.com/y9c8bdbv**	**Long Bridge** **http://longbridgeproject.com/**	**Special Events**
Location			Between the Virginia Railway Express (VRE) Crystal City Station in Arlington, Virginia and Control Point Virginia near 3rd Street, SW in Washington, DC The Long Bridge Project consists of potential improvements to the bridge and related railroad infrastructure located	
Cost / Scope	**$14.5M**			On average, there are 27 funerals held at Arlington National Cemetery every weekday. Some of these may have notable traffic impacts around the I-395 Express Lane Extension project.
Schedule	In construction		Phase III – Record of Decision – Spring 2019	
Contact				

VIRGINIA
MEGAPROJECTS

Appendix C
Baseline Traffic Analysis Results

INTERSTATE 395 Express Lanes

2018 BASELINE GP NB AM (TMP 10-11 am)

SEGMENT ID	SEGMENT DESCRIPTION	SEGMENT VOLUME		DENSITY		SPEED		LOS
NORTHBOUND I-395 GP AM PEAK								
NB01D01	Edsall Rd EB Off-Ramp	4760	veh/hr	30.5	pc/mi/ln	54.9	mph	B
NB01D02	Edsall Rd WB Off-Ramp	4235	veh/hr	28.0	pc/mi/ln	53.3	mph	C
NB01B03	Edsall Rd WB Off-Ramp to Edsall Rd On-Ramp	3795	veh/hr	22.3	pc/mi/ln	60.0	mph	C
NB02W04	Edsall Rd EB/WB On-Ramp to TC HOV On-Ramp	4315	veh/hr	24.0	pc/mi/ln	47.4	mph	C
NB02B05	TC HOV On-Ramp to TC HOV Off-Ramp	3750	veh/hr	22.0	pc/mi/ln	60.0	mph	C
NB02W06	TC HOV Off-Ramp to Duke St EB Off-Ramp	3950	veh/hr	20.7	pc/mi/ln	50.4	mph	C
NB03D07	LR Tpke WB Off-Ramp	3520	veh/hr	22.4	pc/mi/ln	55.3	mph	B
NB03B08	LR Tpke WB Off-Ramp to Duke St/LR Tpke On-Ramp	3165	veh/hr	18.6	pc/mi/ln	60.0	mph	C
NB03M09	Duke St/LR Tpke On-Ramp	4325	veh/hr	27.7	pc/mi/ln	55.0	mph	C
NB03B10	Duke St/LR Tpke On-Ramp to Seminary Rd Off-Ramp	4325	veh/hr	19.0	pc/mi/ln	60.0	mph	C
NB04D11	Seminary Rd Off-Ramp	4325	veh/hr	27.6	pc/mi/ln	55.2	mph	A
NB04B12	Seminary Rd Off-Ramp to Seminary Rd On-Ramp	3585	veh/hr	21.0	pc/mi/ln	60.0	mph	C
NB05W13	Seminary Rd On-Ramp to King St Off-Ramp	4280	veh/hr	24.4	pc/mi/ln	46.3	mph	C
NB05B14	King St Off-Ramp to King St EB On-Ramp	3660	veh/hr	21.5	pc/mi/ln	60.0	mph	C
NB05M15	King St WB On-Ramp	4150	veh/hr	26.6	pc/mi/ln	55.0	mph	C
NB05W16	King St WB On-Ramp to Shirlington Rd/Quaker Ln Off-Ramp	4465	veh/hr	24.0	pc/mi/ln	49.1	mph	C
NB06B17	Shirlington Rd/Quaker Ln Off-Ramp to Shirlington Rd/Quaker Ln On-Ramp	4045	veh/hr	17.8	pc/mi/ln	60.0	mph	B
NB07W18	Shirlington Rd/Quaker Ln On-Ramp to S Glebe Rd EB Off-Ramp	4760	veh/hr	22.1	pc/mi/ln	45.5	mph	C
NB07W19	S Glebe Rd EB On-Ramp to S Glebe Rd WB Off-Ramp	4315	veh/hr	17.5	pc/mi/ln	52.2	mph	B
NB07B20	S Glebe Rd WB Off-Ramp to S Glebe Rd WB On-Ramp	4040	veh/hr	17.8	pc/mi/ln	60.0	mph	B
NB07M21	S Glebe Rd WB On-Ramp	4215	veh/hr	19.7	pc/mi/ln	56.4	mph	B
NB07B22	S Glebe Rd WB On-Ramp to Exit 8A Off-Ramp	4215	veh/hr	18.6	pc/mi/ln	60.0	mph	C
NB08D23	Exit 8A Off-Ramp	4215	veh/hr	19.3	pc/mi/ln	57.6	mph	B
NB08D24	Exit 8B Off-Ramp	3425	veh/hr	21.9	pc/mi/ln	55.1	mph	B

2018 BASELINE GP NB AM (TMP 10-11 am)

SEGMENT ID	SEGMENT DESCRIPTION	SEGMENT VOLUME		DENSITY		SPEED		LOS
NORTHBOUND I-395 GP AM PEAK								
NB08D25	Exit 8C Off-Ramp	2500	veh/hr	16.2	pc/mi/ln	54.4	mph	B
NB09B26	Exit 8C Off-Ramp to S Washington Blvd/S Arlington Ridge Rd On-Ramp	1915	veh/hr	11.2	pc/mi/ln	60.0	mph	B
NB09M27	S Washington Blvd/S Arlington Ridge Rd On-Ramp	2805	veh/hr	17.2	pc/mi/ln	57.5	mph	A
NB10M28	S Rotary Rd On-Ramp	2840	veh/hr	18.4	pc/mi/ln	54.3	mph	C
NB11M29	US Route 1 SB On-Ramp	2370	veh/hr	15.3	pc/mi/ln	56.2	mph	B
NB11M30	US Route 1 NB On-Ramp	3055	veh/hr	18.5	pc/mi/ln	58.3	mph	A
NB11W31	Boundary Channel Dr EB On-Ramp to Boundary Channel Dr WB Off-Ramp	3265	veh/hr	12.8	pc/mi/ln	53.8	mph	B
NB12W32	GW Memorial Pkwy EB On-Ramp to GW Memorial Pkwy WB Off-Ramp	3750	veh/hr	17.9	pc/mi/ln	55.2	mph	B
NB12M33	GW Memorial Pkwy WB On-Ramp	4740	veh/hr	30.7	pc/mi/ln	54.4	mph	C

2018 BASELINE GP SB AM (TMP 10-11 am)

SEGMENT ID	SEGMENT DESCRIPTION	SEGMENT VOLUME		DENSITY		SPEED		LOS
SOUTHBOUND I-395 GP AM PEAK								
SB12D01	GW Memorial Pkwy WB Off-Ramp	5110	veh/hr	23.4	pc/mi/ln	57.1	mph	C
SB12D02	GW Memorial Pkwy EB Off-Ramp	4835	veh/hr	23.0	pc/mi/ln	55.0	mph	C
SB12B03	GW Memorial Pkwy EB Off-Ramp to GW Memorial Pkwy EB On-Ramp	3990	veh/hr	23.2	pc/mi/ln	60.0	mph	C
SB12W04	GW Memorial Pkwy EB On-Ramp to US Route 1 NB Off-Ramp	4430	veh/hr	18.2	pc/mi/ln	50.8	mph	B
SB11W05	Boundary Channel Dr WB On-Ramp to Boundary Channel EB Off-Ramp	4025	veh/hr	19.3	pc/mi/ln	54.5	mph	B
SB11D06a	Boundary Channel EB On-Ramp to US Route 1 NB Off-Ramp	4835	veh/hr	32.2	pc/mi/ln	52.3	mph	E
SB11W06	US Route 1 SB Off-Ramp	3790	veh/hr	16.5	pc/mi/ln	48.0	mph	B
SB11D07	Exit 8A Off-Ramp	2850	veh/hr	13.8	pc/mi/ln	53.9	mph	B
SB10B08	Exit 8A Off-Ramp to I-395 HOV Slip On-Ramp at Pentagon	1875	veh/hr	10.9	pc/mi/ln	60.0	mph	A
SB09M09	I-395 HOV Slip On-Ramp at Pentagon	2125	veh/hr	13.2	pc/mi/ln	56.2	mph	B
SB09M10	S Hayes St On-Ramp	2055	veh/hr	9.4	pc/mi/ln	57.0	mph	A

2018 BASELINE GP SB AM (TMP 10-11 am)

SEGMENT ID	SEGMENT DESCRIPTION	SEGMENT VOLUME		DENSITY		SPEED		LOS
SOUTHBOUND I-395 GP AM PEAK								
SB08B11	S Hayes St On-Ramp to S Washington Blvd WB On-Ramp	2305	veh/hr	13.4	pc/mi/ln	60.0	mph	B
SB08M12	S Washington Blvd WB On-Ramp	2985	veh/hr	18.0	pc/mi/ln	57.8	mph	A
SB08M13	S Washington Blvd EB On-Ramp	3500	veh/hr	16.2	pc/mi/ln	56.6	mph	B
SB08B14	S Washington Blvd EB On-Ramp to S Glebe Rd/Shirlington Off-Ramp	3500	veh/hr	15.2	pc/mi/ln	60.0	mph	B
SB07D15	S Glebe Rd/Shirlington Off-Ramp	3500	veh/hr	22.0	pc/mi/ln	55.5	mph	C
SB07B16	S Glebe Rd/Shirlington Rd Off-Ramp to Shirlington Rd On-Ramp	3275	veh/hr	19.0	pc/mi/ln	60.0	mph	C
SB07M16a	Shirlington Rd On-Ramp	3495	veh/hr	21.6	pc/mi/ln	55.1	mph	C
SB06W17	Shirlington Rd On-Ramp to King St WB Off-Ramp	3810	veh/hr	16.3	pc/mi/ln	49.0	mph	B
SB05B18	King St WB Off-ramp to King St WB On-Ramp	3170	veh/hr	14.4	pc/mi/ln	60.0	mph	B
SB05M19	King St WB On-Ramp	3370	veh/hr	15.6	pc/mi/ln	56.6	mph	B
SB05W20	King St EB On-ramp to Seminary Rd Off-Ramp	3635	veh/hr	15.0	pc/mi/ln	50.8	mph	B
SB04B21	Seminary Rd Off-ramp to Seminary Rd On-Ramp	3165	veh/hr	13.8	pc/mi/ln	60.0	mph	B
SB04M22	Seminary Rd On-Ramp	3795	veh/hr	17.6	pc/mi/ln	56.3	mph	B
SB03B23	Seminary Rd On-Ramp to LR Tpke WB Off-Ramp	3795	veh/hr	16.5	pc/mi/ln	60.0	mph	B
SB03D24	LR Tpke WB Off-Ramp	3795	veh/hr	17.1	pc/mi/ln	57.9	mph	B
SB03B25	LR Tpke WB Off-Ramp to Duke St EB On-Ramp	3395	veh/hr	14.8	pc/mi/ln	60.0	mph	B
SB03W26	LR Tpke WB On-Ramp to Duke St EB Off-Ramp	3950	veh/hr	21.9	pc/mi/ln	47.1	mph	C
SB03B27	Duke St EB Off-Ramp to LR Tpke EB On-Ramp	3520	veh/hr	20.4	pc/mi/ln	60.0	mph	C
SB02M28	LR Tpke EB On-Ramp	4015	veh/hr	25.5	pc/mi/ln	54.8	mph	C
SB02B29	LR Tpke EB On-Ramp to Edsall Road WB Off-Ramp	4015	veh/hr	23.3	pc/mi/ln	60.0	mph	C
SB02D30	Edsall Rd WB Off-Ramp	4015	veh/hr	25.3	pc/mi/ln	55.4	mph	B
SB01B31	Edsall Rd WB Off-Ramp to Edsall Rd WB On-Ramp	3725	veh/hr	21.6	pc/mi/ln	60.0	mph	C
SB01W32	Edsall Rd WB On-Ramp to Edsall Rd EB Off-Ramp	4285	veh/hr	23.2	pc/mi/ln	48.2	mph	C
SB01B33	Edsall Rd EB Off-Ramp to Edsall Rd EB On-Ramp	4090	veh/hr	23.8	pc/mi/ln	60.0	mph	C
SB01M34	Edsall Rd EB On-Ramp	4570	veh/hr	21.3	pc/mi/ln	56.0	mph	B

2018 BASELINE GP NB PM (TMP 2-3 pm)

SEGMENT ID	SEGMENT DESCRIPTION	SEGMENT VOLUME		DENSITY		SPEED		LOS
NORTHBOUND I-395 GP PM PEAK								
NB01D01	Edsall Rd EB Off-Ramp	4695	veh/hr	30.8	pc/mi/ln	54.8	mph	B
NB01D02	Edsall Rd WB Off-Ramp	4150	veh/hr	28.0	pc/mi/ln	53.3	mph	C
NB01B03a	Edsall Rd WB Off-Ramp to Edsall Rd On-Ramp	3680	veh/hr	22.0	pc/mi/ln	60.0	mph	C
NB02M04a	Edsall Rd On-Ramp	4260	veh/hr	28.0	pc/mi/ln	54.8	mph	B
NB02B04b	Edsall Rd On-Ramp to Duke St EB Off-Ramp	4260	veh/hr	25.5	pc/mi/ln	60.0	mph	C
NB02D06a	Duke St EB Off-Ramp	4260	veh/hr	20.0	pc/mi/ln	57.4	mph	C
NB03D07	LR Tpke WB Off-Ramp	3725	veh/hr	24.3	pc/mi/ln	55.2	mph	B
NB03B08	LR Tpke WB Off-Ramp to Duke St/LR Tpke On-Ramp	3300	veh/hr	19.8	pc/mi/ln	60.0	mph	C
NB03M09	Duke St/LR Tpke On-Ramp	4270	veh/hr	20.4	pc/mi/ln	56.5	mph	B
NB03B10	Duke St/LR Tpke On-Ramp to Seminary Rd Off-Ramp	4270	veh/hr	19.2	pc/mi/ln	60.0	mph	C
NB04D11	Seminary Rd Off-Ramp	4270	veh/hr	27.8	pc/mi/ln	55.3	mph	A
NB04B12	Seminary Rd Off-Ramp to Seminary Rd On-Ramp	3595	veh/hr	21.5	pc/mi/ln	60.0	mph	C
NB05W13	Seminary Rd On-Ramp to King St Off-Ramp	4435	veh/hr	26.5	pc/mi/ln	45.1	mph	C
NB05B14	King St Off-Ramp to King St EB On-Ramp	3840	veh/hr	23.0	pc/mi/ln	60.0	mph	C
NB05M15	King St WB On-Ramp	4425	veh/hr	29.1	pc/mi/ln	54.7	mph	C
NB05W16	King St WB On-Ramp to Shirlington Rd/Quaker Ln Off-Ramp	4670	veh/hr	25.6	pc/mi/ln	49.1	mph	C
NB06B17	Shirlington Rd/Quaker Ln Off-Ramp to Shirlington Rd/Quaker Ln On-Ramp	4255	veh/hr	19.1	pc/mi/ln	60.0	mph	C
NB07W18	Shirlington Rd/Quaker Ln On-Ramp to S Glebe Rd EB Off-Ramp	5050	veh/hr	24.6	pc/mi/ln	44.2	mph	C
NB07W19	S Glebe Rd EB On-Ramp to S Glebe Rd WB Off-Ramp	4590	veh/hr	19.0	pc/mi/ln	52.2	mph	B
NB07B20	S Glebe Rd WB Off-Ramp to S Glebe Rd WB On-Ramp	4360	veh/hr	19.6	pc/mi/ln	60.0	mph	C
NB07M21	S Glebe Rd WB On-Ramp	4520	veh/hr	21.7	pc/mi/ln	56.1	mph	B
NB07B22	S Glebe Rd WB On-Ramp to Exit 8A Off-Ramp	4520	veh/hr	20.3	pc/mi/ln	60.0	mph	C
NB08D23	Exit 8A Off-Ramp	4520	veh/hr	21.2	pc/mi/ln	57.6	mph	C
NB08D24	Exit 8B Off-Ramp	3800	veh/hr	24.8	pc/mi/ln	55.1	mph	B
NB08D25	Exit 8C Off-Ramp	2455	veh/hr	16.2	pc/mi/ln	54.5	mph	B
NB09B26	Exit 8C Off-Ramp to S Washington Blvd/S Arlington Ridge Rd On-Ramp	2330	veh/hr	14.0	pc/mi/ln	60.0	mph	B

2018 BASELINE GP NB PM (TMP 2-3 pm)

SEGMENT ID	SEGMENT DESCRIPTION	SEGMENT VOLUME		DENSITY		SPEED		LOS
NORTHBOUND I-395 GP PM PEAK								
NB09M27	S Washington Blvd/S Arlington Ridge Rd On-Ramp	3395	veh/hr	21.4	pc/mi/ln	57.0	mph	A
NB10M28	S Rotary Rd On-Ramp	3455	veh/hr	22.5	pc/mi/ln	55.3	mph	B
NB11M29	US Route 1 SB On-Ramp	3270	veh/hr	21.2	pc/mi/ln	55.5	mph	B
NB11M30	US Route 1 NB On-Ramp	4300	veh/hr	27.1	pc/mi/ln	57.1	mph	A
NB11W31	Boundary Channel Dr EB On-Ramp to Boundary Channel Dr WB Off-Ramp	4645	veh/hr	21.4	pc/mi/ln	46.9	mph	C
NB12W32	GW Memorial Pkwy EB On-Ramp to GW Memorial Pkwy WB Off-Ramp	4745	veh/hr	23.7	pc/mi/ln	53.9	mph	C
NB12M33	GW Memorial Pkwy WB On-Ramp	5795	veh/hr	39.8	pc/mi/ln	52.4	mph	D

2018 BASELINE GP SB PM (TMP 2-3 pm)

SEGMENT ID	SEGMENT DESCRIPTION	SEGMENT VOLUME		DENSITY		SPEED		LOS
SOUTHBOUND I-395 GP PM PEAK								
SB12D01	GW Memorial Pkwy WB Off-Ramp	5250	veh/hr	25.6	pc/mi/ln	55.8	mph	C
SB12D02	GW Memorial Pkwy EB Off-Ramp	4480	veh/hr	22.5	pc/mi/ln	54.2	mph	C
SB12B03	GW Memorial Pkwy EB Off-Ramp to GW Memorial Pkwy EB On-Ramp	3360	veh/hr	20.4	pc/mi/ln	60.0	mph	C
SB12W04	GW Memorial Pkwy EB On-Ramp to US Route 1 NB Off-Ramp	4545	veh/hr	19.6	pc/mi/ln	50.6	mph	B
SB11W05	Boundary Channel Dr WB On-Ramp to Boundary Channel EB Off-Ramp	3385	veh/hr	16.7	pc/mi/ln	55.1	mph	B
SB11D06a	Boundary Channel EB On-Ramp to US Route 1 NB Off-Ramp	5165	veh/hr	35.7	pc/mi/ln	52.5	mph	E
SB11W06	US Route 1 SB Off-Ramp	4265	veh/hr	19.8	pc/mi/ln	47.0	mph	B
SB11D07	Exit 8A Off-Ramp	3340	veh/hr	17.2	pc/mi/ln	53.0	mph	B
SB10B08	Exit 8A Off-Ramp to I-395 HOV Slip On-Ramp at Pentagon	2120	veh/hr	12.8	pc/mi/ln	60.0	mph	B
SB09B09	I-395 HOV Slip On-Ramp at Pentagon	200	veh/hr	1.2	pc/mi/ln	60.0	mph	A
SB09M09a	I-395 HOV Slip On-Ramp at Pentagon	2320	veh/hr	15.2	pc/mi/ln	55.6	mph	B
SB09M10	S Hayes St On-Ramp	2520	veh/hr	12.1	pc/mi/ln	56.9	mph	B
SB08B11	S Hayes St On-Ramp to S Washington Blvd WB On-Ramp	2720	veh/hr	16.5	pc/mi/ln	60.0	mph	B

2018 BASELINE GP SB PM (TMP 2-3 pm)

SEGMENT ID	SEGMENT DESCRIPTION	SEGMENT VOLUME		DENSITY		SPEED		LOS
SOUTHBOUND I-395 GP PM PEAK								
SB08M12	S Washington Blvd WB On-Ramp	4330	veh/hr	27.9	pc/mi/ln	56.3	mph	A
SB08M13	S Washington Blvd EB On-Ramp	5270	veh/hr	26.0	pc/mi/ln	55.3	mph	C
SB08B14	S Washington Blvd EB On-Ramp to S Glebe Rd/Shirlington Off-Ramp	5270	veh/hr	23.9	pc/mi/ln	60.0	mph	C
SB07D15	S Glebe Rd/Shirlington Off-Ramp	5270	veh/hr	34.9	pc/mi/ln	54.9	mph	D
SB07B16	S Glebe Rd/Shirlington Rd Off-Ramp to Shirlington Rd On-Ramp	4945	veh/hr	30.3	pc/mi/ln	59.3	mph	D
SB07M16a	Shirlington Rd On-Ramp	5300	veh/hr	35.5	pc/mi/ln	53.0	mph	D
SB06W17	Shirlington Rd On-Ramp to King St WB Off-Ramp	5745	veh/hr	28.7	pc/mi/ln	43.7	mph	D
SB05B18	King St WB Off-ramp to King St WB On-Ramp	4815	veh/hr	21.9	pc/mi/ln	60.0	mph	C
SB05M19	King St WB On-Ramp	5065	veh/hr	25.0	pc/mi/ln	55.3	mph	B
SB05W20	King St EB On-ramp to Seminary Rd Off-Ramp	5495	veh/hr	25.9	pc/mi/ln	46.2	mph	C
SB04B21	Seminary Rd Off-ramp to Seminary Rd On-Ramp	4840	veh/hr	22.0	pc/mi/ln	60.0	mph	C
SB04M22	Seminary Rd On-Ramp	5680	veh/hr	28.1	pc/mi/ln	55.0	mph	C
SB03B23	Seminary Rd On-Ramp to LR Tpke WB Off-Ramp	5680	veh/hr	25.8	pc/mi/ln	60.0	mph	C
SB03D24	LR Tpke WB Off-Ramp	5680	veh/hr	27.5	pc/mi/ln	56.3	mph	C
SB03B25	LR Tpke WB Off-Ramp to Duke St EB On-Ramp	4795	veh/hr	21.8	pc/mi/ln	60.0	mph	C
SB03W26	LR Tpke WB On-Ramp to Duke St EB Off-Ramp	5315	veh/hr	33.5	pc/mi/ln	43.3	mph	D
SB03B27	Duke St EB Off-Ramp to LR Tpke EB On-Ramp	4615	veh/hr	28.0	pc/mi/ln	59.9	mph	D
SB02W28a	LR Tpke EB On-Ramp to TC HOV Off-Ramp	5140	veh/hr	36.6	pc/mi/ln	51.0	mph	E
SB02B29a	TC HOV Off-Ramp to TC HOV On-Ramp	4730	veh/hr	28.8	pc/mi/ln	59.7	mph	D
SB02W29b	TC HOV On-Ramp to Edsall Rd WB Off-Ramp	6010	veh/hr	40.0	pc/mi/ln	40.9	mph	E
SB01B31	Edsall Rd WB Off-Ramp to Edsall Rd WB On-Ramp	5610	veh/hr	36.1	pc/mi/ln	56.5	mph	E
SB01W32	Edsall Rd WB On-Ramp to Edsall Rd EB Off-Ramp	6215	veh/hr	37.9	pc/mi/ln	44.7	mph	E
SB01B33	Edsall Rd EB Off-Ramp to Edsall Rd EB On-Ramp	5970	veh/hr	40.1	pc/mi/ln	54.1	mph	E
SB01M34	Edsall Rd EB On-Ramp	6775	veh/hr	34.2	pc/mi/ln	54.0	mph	C

2018 BASELINE HOV NB AM (TMP 10-11 am)

SEGMENT ID	SEGMENT DESCRIPTION	SEGMENT VOLUME		DENSITY		SPEED		LOS
NORTHBOUND I-395 HOV AM PEAK								
NB01B01 HOV	Edsall Rd to TC HOV to GP Off-Ramp	1590	veh/hr	9.3	pc/mi/ln	60.0	mph	A
NB02D02 HOV	TC HOV Off-Ramp to GP	1590	veh/hr	10.2	pc/mi/ln	54.9	mph	B
NB02B03 HOV	TC HOV Off-Ramp to On-Ramp (3-Lane)	1790	veh/hr	10.5	pc/mi/ln	60.0	mph	A
NB02B03a HOV	TC HOV Off-Ramp to On-Ramp (2-Lane)	1790	veh/hr	15.8	pc/mi/ln	60.0	mph	B
NB02M04 HOV	GP to TC HOV On-Ramp	2355	veh/hr	22.8	pc/mi/ln	54.6	mph	B
NB02B05 HOV	TC HOV On-Ramp to Seminary Rd HOV Off-Ramp	2355	veh/hr	20.7	pc/mi/ln	60.0	mph	C
NB04D06 HOV	Seminary Rd HOV Off-Ramp	2355	veh/hr	23.9	pc/mi/ln	52.1	mph	B
NB04B07 HOV	Seminary Rd HOV Off-Ramp to Seminary Rd HOV On-Ramp	2265	veh/hr	19.9	pc/mi/ln	60.0	mph	C
NB05M08 HOV	Seminary Rd HOV On-Ramp	2300	veh/hr	22.3	pc/mi/ln	54.4	mph	B
NB05B09 HOV	Seminary Rd HOV On-Ramp to Shirlington Rd HOV On-Ramp	2300	veh/hr	20.2	pc/mi/ln	60.0	mph	C
NB07M10 HOV	Shirlington Rd HOV On-Ramp	2410	veh/hr	23.4	pc/mi/ln	54.3	mph	C
NB07B11 HOV	Shirlington Rd HOV On-Ramp to Washington Blvd HOV Off-Ramp	2410	veh/hr	21.2	pc/mi/ln	60.0	mph	C
NB08D12 HOV	Washington Blvd HOV Off-Ramp	2410	veh/hr	25.2	pc/mi/ln	50.6	mph	B
NB08B13 HOV	Washington Blvd HOV Off-Ramp to Eads St HOV Off-Ramp	1415	veh/hr	12.5	pc/mi/ln	60.0	mph	B
NB09D14 HOV	Eads St HOV Off-Ramp	1415	veh/hr	14.9	pc/mi/ln	50.3	mph	B
NB10B15 HOV	Eads St HOV Off-Ramp to Eads St HOV On-Ramp	250	veh/hr	2.2	pc/mi/ln	60.0	mph	A
NB11M16 HOV	Eads St HOV On-Ramp	695	veh/hr	6.7	pc/mi/ln	54.9	mph	A
NB11M17 HOV	GP HOV On-Ramp at Eads St	1360	veh/hr	13.1	pc/mi/ln	13.1	mph	B
NB12B18 HOV	GP HOV On-Ramp at Eads St to 14th St Bridge	1360	veh/hr	12.0	pc/mi/ln	60.0	mph	B

2018 HOV NB PM (TMP 2-3 pm)

SEGMENT ID	SEGMENT DESCRIPTION	SEGMENT VOLUME		DENSITY		SPEED		LOS
NORTHBOUND I-395 HOV PM PEAK								
NB11M16 HOV	Eads St HOV On-Ramp	665	veh/hr	6.5	pc/mi/ln	54.9	mph	A
NB11M17 HOV	GP HOV On-Ramp at Eads St	1505	veh/hr	14.8	pc/mi/ln	55.0	mph	B
NB12B18 HOV	GP HOV On-Ramp at Eads St to 14th St Bridge	1505	veh/hr	13.5	pc/mi/ln	60.0	mph	B

2018 BASELINE HOV SB AM (10-11 am)

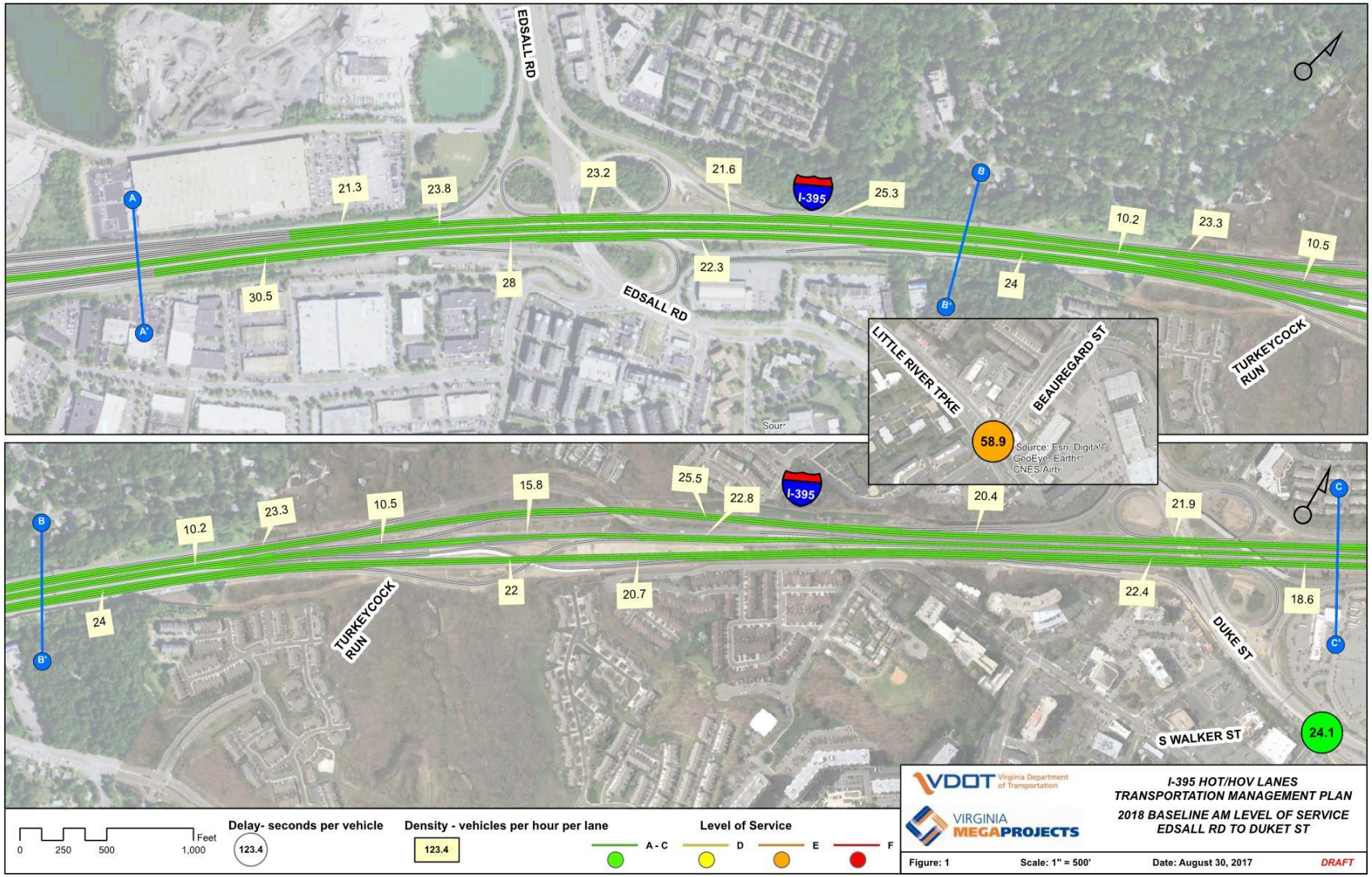
SEGMENT ID	SEGMENT DESCRIPTION	SEGMENT VOLUME		DENSITY		SPEED		LOS
SOUTHBOUND I-395 HOV AM PEAK								
SB12B01 HOV	14th St Bridge to GP HOV Off-Ramp at GWM Pkwy	1155	veh/hr	10.1	pc/mi/ln	60.0	mph	A
SB12D02 HOV	GP HOV Off-Ramp at GWM Pkwy	1155	veh/hr	11.9	pc/mi/ln	50.9	mph	B
SB12B03 HOV	GP HOV Off-Ramp at GWM Pkwy to Eads St HOV Off-Ramp	315	veh/hr	2.7	pc/mi/ln	60.0	mph	A
SB11D04 HOV	Eads St HOV Off-Ramp	315	veh/hr	3.2	pc/mi/ln	52.1	mph	A
SB10B05 HOV	Eads St HOV Off-Ramp to Eads St HOV On-Ramp	220	veh/hr	1.9	pc/mi/ln	60.0	mph	A
SB09W06 HOV	Eads St HOV On-Ramp to GP HOV Off-Ramp at Eads St	250	veh/hr	1.6	pc/mi/ln	55.0	mph	A

2018 HOV SB PM (TMP 2-3 pm)

SEGMENT ID	SEGMENT DESCRIPTION	SEGMENT VOLUME		DENSITY		SPEED		LOS
SOUTHBOUND I-395 HOV PM PEAK								
SB12B01 HOV	14th St Bridge to GP HOV Off-Ramp at GWM Pkwy	3375	veh/hr	31.2	pc/mi/ln	59.0	mph	D
SB12D02 HOV	GP HOV Off-Ramp at GWM Pkwy	3375	veh/hr	37.5	pc/mi/ln	49.1	mph	D
SB12B03 HOV	GP HOV Off-Ramp at GWM Pkwy to Eads St HOV Off-Ramp	1565	veh/hr	14.2	pc/mi/ln	60.0	mph	B
SB11D04 HOV	Eads St HOV Off-Ramp	1565	veh/hr	16.5	pc/mi/ln	51.8	mph	B

2018 HOV SB PM (TMP 2-3 pm)

SEGMENT ID	SEGMENT DESCRIPTION	SEGMENT VOLUME		DENSITY		SPEED		LOS
SOUTHBOUND I-395 HOV PM PEAK								
SB10B05 HOV	Eads St HOV Off-Ramp to Eads St HOV On-Ramp	1300	veh/hr	11.8	pc/mi/ln	60.0	mph	B
SB09W06 HOV	Eads St HOV On-Ramp to GP HOV Off-Ramp at Eads St	2210	veh/hr	17.2	pc/mi/ln	46.8	mph	B
SB08B07 HOV	GP HOV Off-Ramp at Eads St to Washington Blvd HOV On-Ramp	2010	veh/hr	18.3	pc/mi/ln	60.0	mph	C
SB08M08 HOV	Washington Blvd HOV On-Ramp	2965	veh/hr	29.9	pc/mi/ln	54.0	mph	C
SB08B09 HOV	Washington Blvd HOV On-Ramp to Shirlington Rd HOV Off-Ramp	2965	veh/hr	26.9	pc/mi/ln	60.0	mph	D
SB07D10 HOV	Shirlington Rd HOV Off-Ramp	2965	veh/hr	31.1	pc/mi/ln	52.0	mph	D
SB07B11 HOV	Shirlington Rd HOV Off-Ramp to Seminary Rd HOV Off-Ramp	2770	veh/hr	25.2	pc/mi/ln	60.0	mph	C
SB05D12 HOV	Seminary Rd HOV Off-Ramp	2770	veh/hr	28.9	pc/mi/ln	52.2	mph	C
SB05B13 HOV	Seminary Rd HOV Off-Ramp to Seminary Rd HOV On-Ramp	2740	veh/hr	24.9	pc/mi/ln	60.0	mph	C
SB04M14 HOV	Seminary Rd HOV On-Ramp	2925	veh/hr	29.9	pc/mi/ln	53.3	mph	C
SB03B15 HOV	Seminary Rd HOV On-Ramp to TC HOV Off-Ramp	2925	veh/hr	26.6	pc/mi/ln	60.0	mph	D
SB03D16 HOV	TC HOV Off-Ramp to GP	2925	veh/hr	31.9	pc/mi/ln	50.0	mph	D
SB03B17 HOV	TC HOV Off-Ramp to On-Ramp (2-Lane)	1645	veh/hr	14.9	pc/mi/ln	60.0	mph	B
SB03B17a HOV	TC HOV Off-Ramp to On-Ramp (3-Lane)	1645	veh/hr	10.0	pc/mi/ln	60.0	mph	A
SB02M18 HOV	GP to TC HOV On-Ramp	2055	veh/hr	13.3	pc/mi/ln	56.3	mph	B
SB01B19 HOV	TC HOV On-Ramp to I-495	2055	veh/hr	12.4	pc/mi/ln	60.0	mph	B


EDSALL RD
EDSALL RD
I-395
I-395
LITTLE RIVER TPKE
BEAUREGARD ST
TURKEYCOCK RUN
TURKEYCOCK RUN
DUKE ST
S WALKER ST
A
A'
B
B'
C
C'
21.3
23.8
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25.3
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30.5
28
22.3
24
58.9
15.8
25.5
22.8
20.4
21.9
10.2
23.3
10.5
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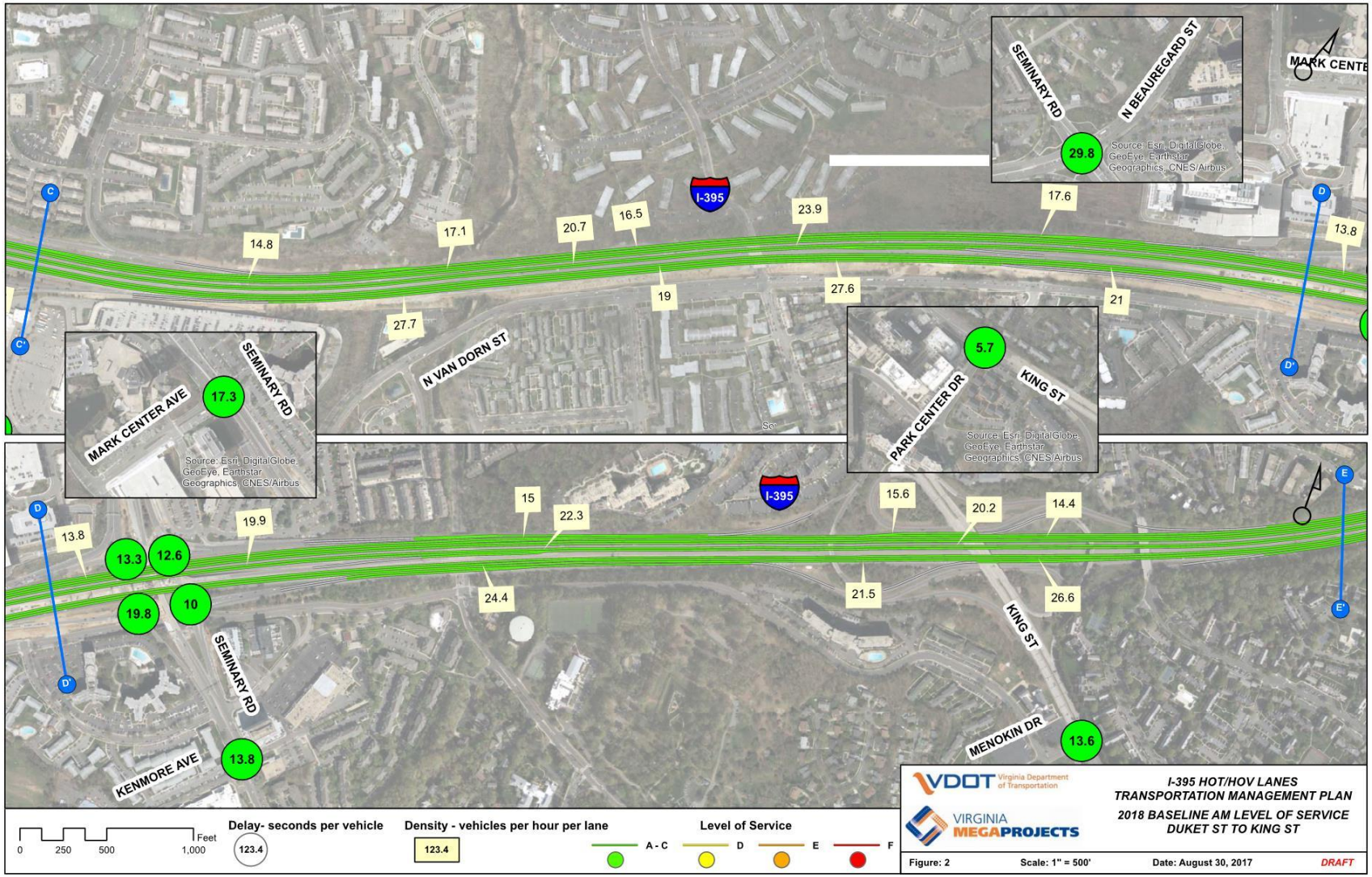
22
20.7
22.4
18.6
24.1
Source: Esri, Digital GeoEye, Earthstar Geographics, CNES/Airbus
0 250 500 1,000 Feet
Delay- seconds per vehicle
123.4
Density - vehicles per hour per lane
123.4
Level of Service
A - C
D
E
F
VDOT Virginia Department of Transportation
VIRGINIA MEGAPROJECTS
I-395 HOT/HOV LANES
TRANSPORTATION MANAGEMENT PLAN
2018 BASELINE AM LEVEL OF SERVICE
EDSALL RD TO DUKET ST
Figure: 1
Scale: 1" = 500'
Date: August 30, 2017
DRAFT


I-395 HOT/HOV LANES
TRANSPORTATION MANAGEMENT PLAN
2018 BASELINE AM LEVEL OF SERVICE
DUKET ST TO KING ST
VDOT Virginia Department of Transportation
VIRGINIA MEGAPROJECTS
Figure: 2
Scale: 1" = 500'
Date: August 30, 2017
DRAFT
Delay- seconds per vehicle
Density - vehicles per hour per lane
Level of Service
A - C
D
E
F
0 250 500 1,000 Feet
SEMINARY RD
N BEAUREGARD ST
MARK CENTER AVE
N VAN DORN ST
PARK CENTER DR
KING ST
KENMORE AVE
MENOKIN DR
I-395
29.8
17.3
5.7
13.3
12.6
19.8
10
13.8
13.6
14.8
17.1
20.7
16.5
23.9
17.6
13.8
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21
19.9
15
22.3
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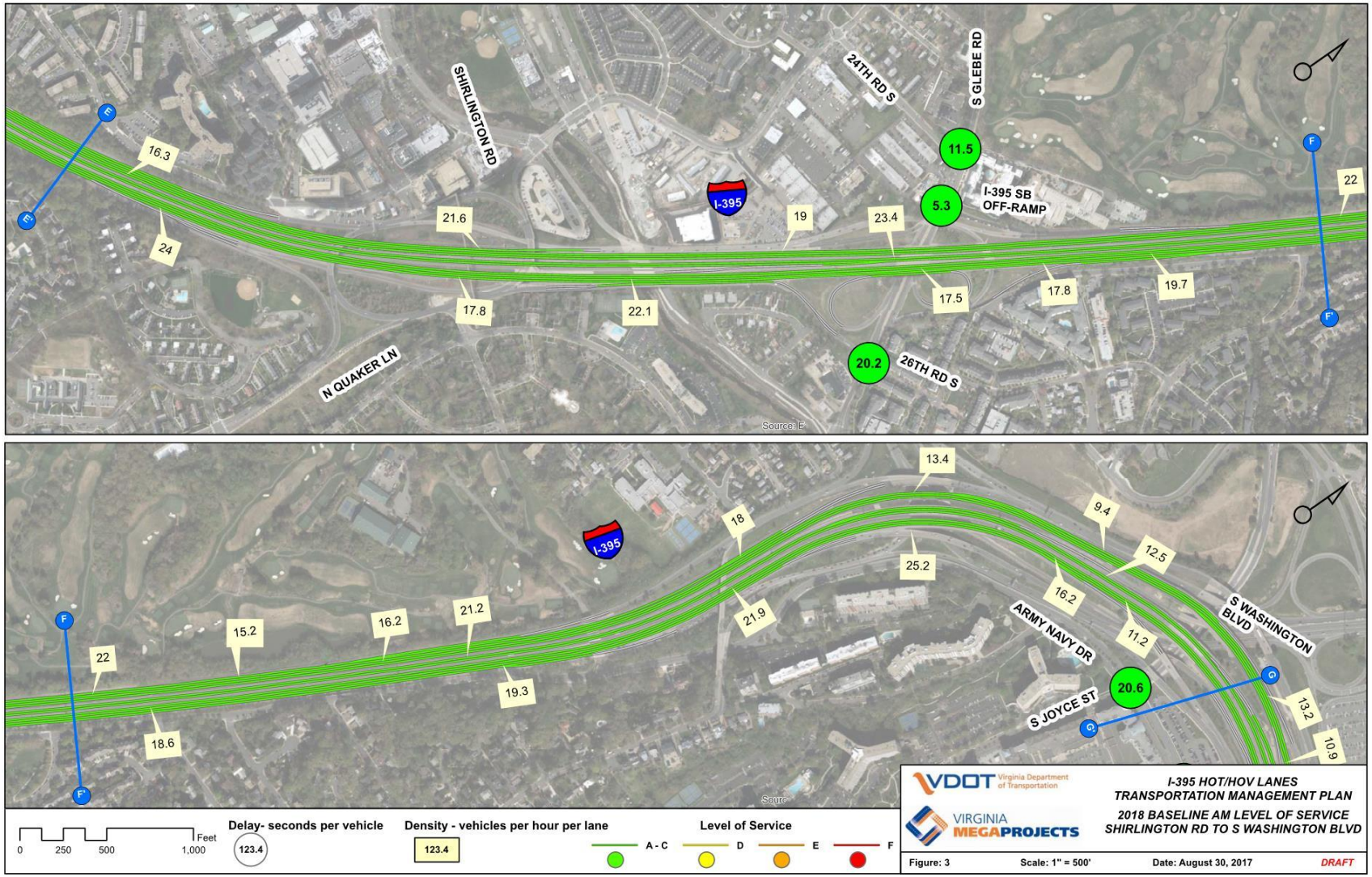
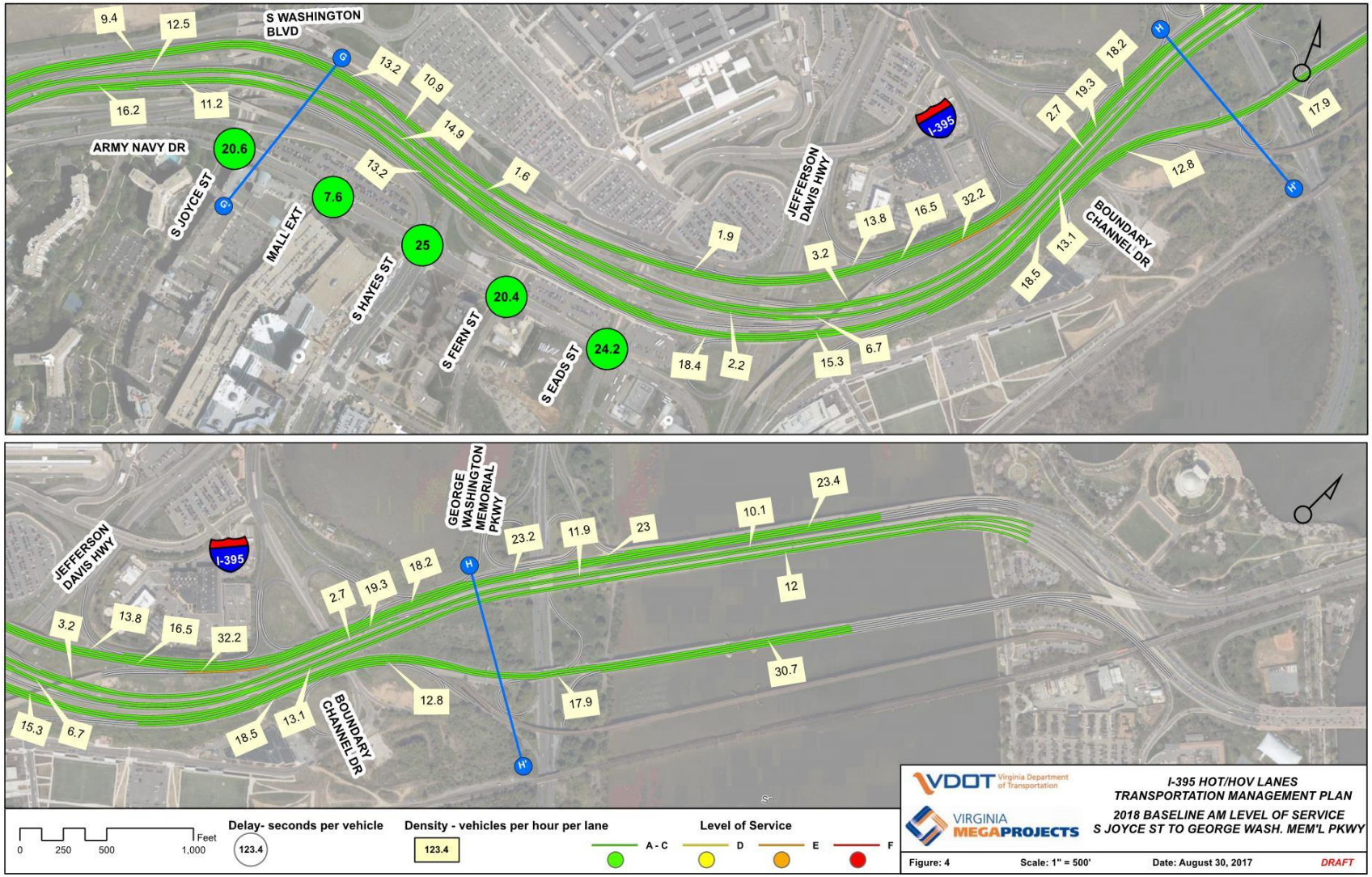
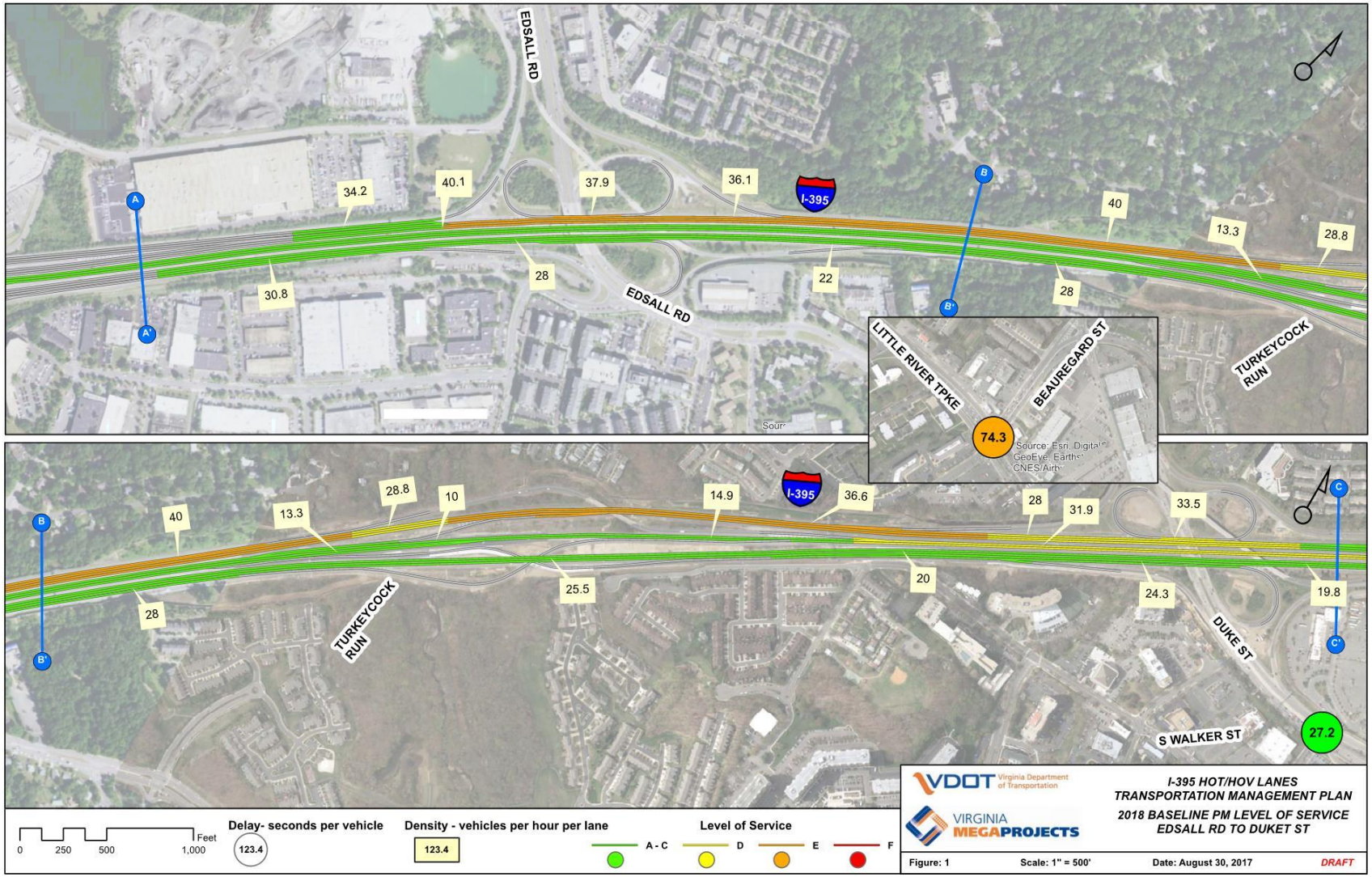
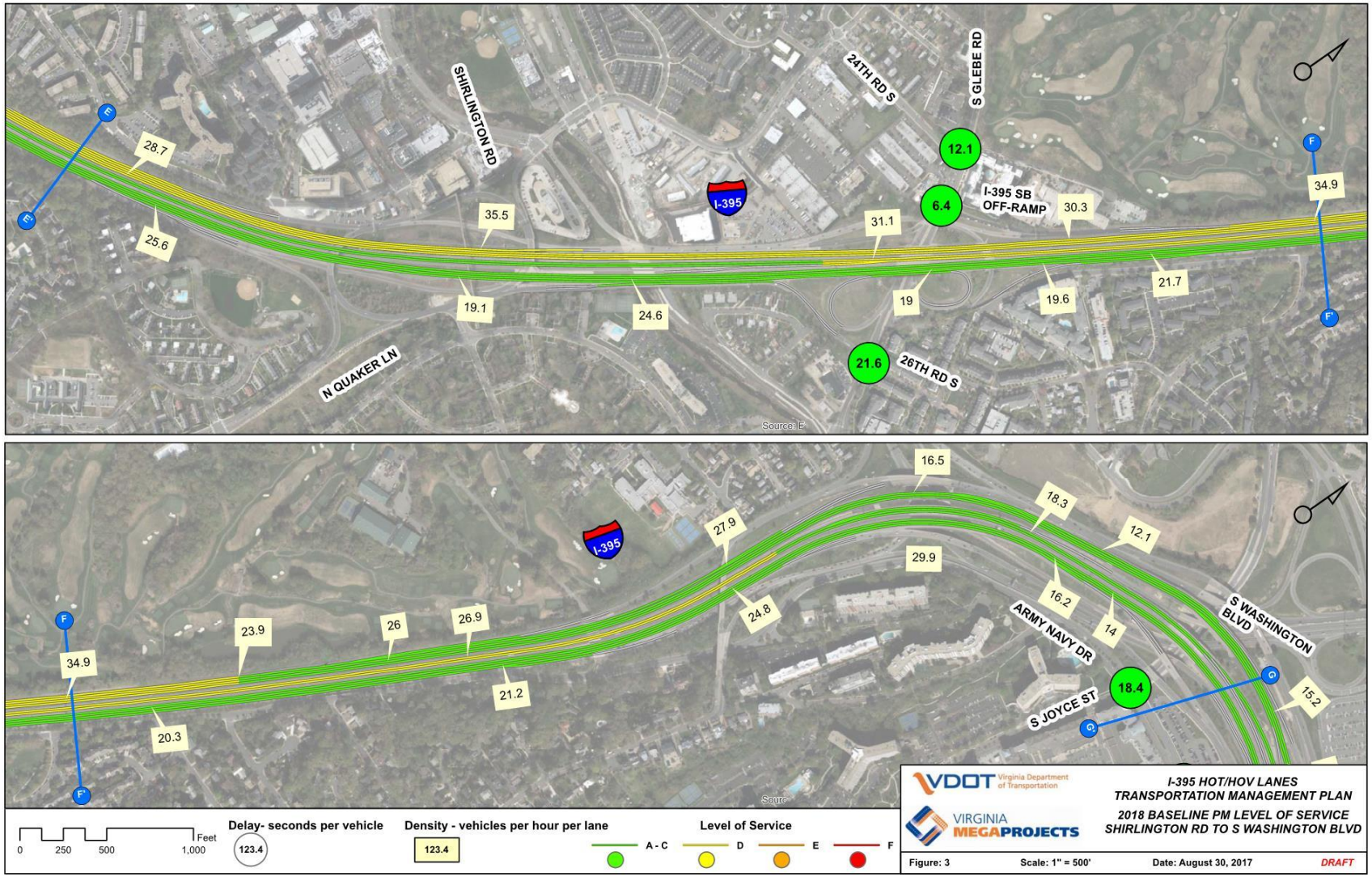
20.2
14.4
24.4
21.5
26.6

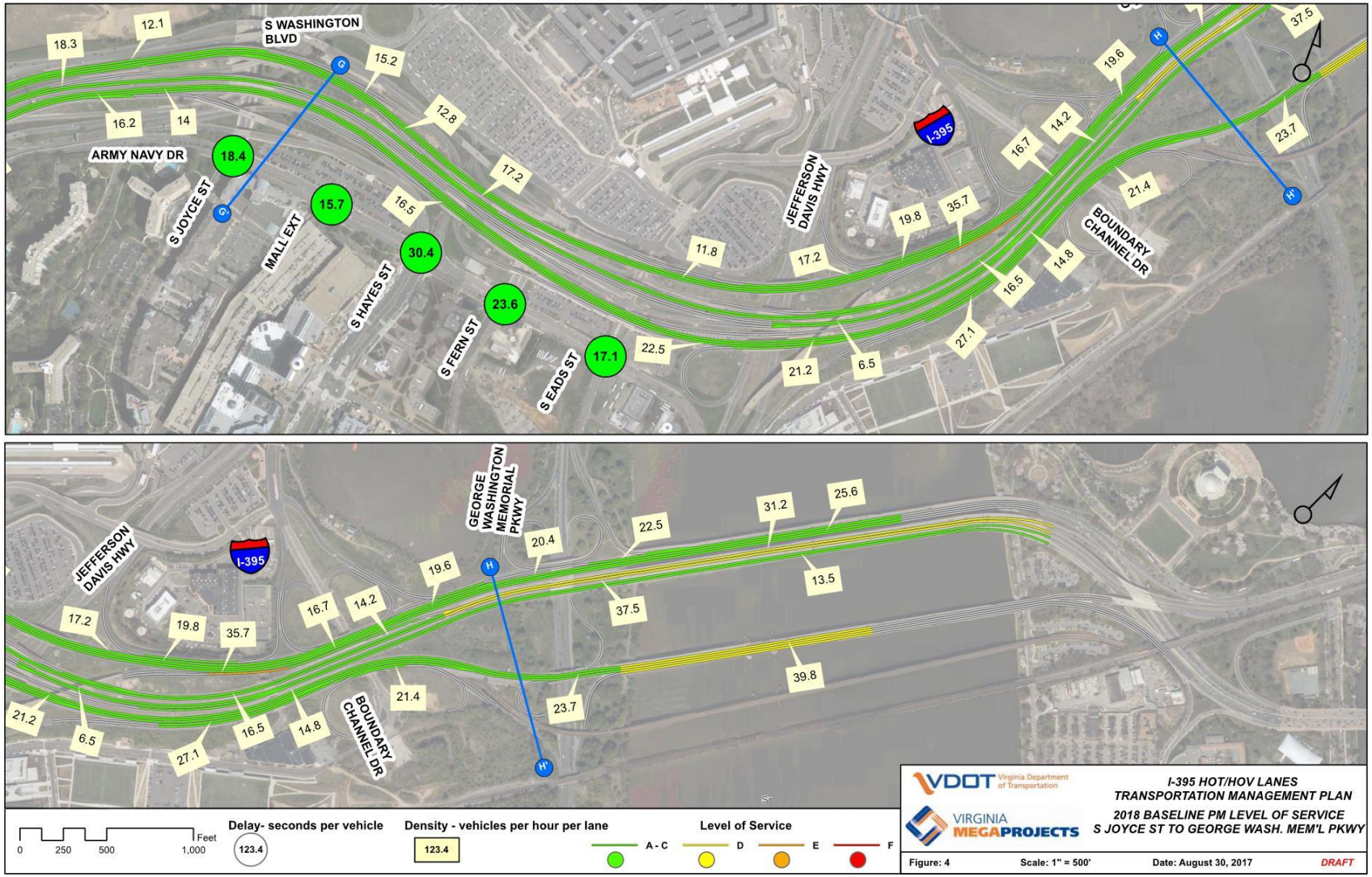

SHIRLINGTON RD
24TH RD S
S GLEBE RD
I-395
I-395 SB OFF-RAMP
N QUAKER LN
26TH RD S
11.5
5.3
20.2
16.3
24
21.6
17.8
22.1
19
23.4
17.5
17.8
19.7
22
ARMY NAVY DR
S WASHINGTON BLVD
S JOYCE ST
20.6
13.4
18
25.2
21.9
9.4
12.5
16.2
11.2
13.2
10.9
15.2
16.2
21.2
19.3
18.6
Delay- seconds per vehicle
Density - vehicles per hour per lane
Level of Service
A - C
D
E
F
Feet
0
250
500
1,000
VDOT Virginia Department of Transportation
VIRGINIA MEGAPROJECTS
I-395 HOT/HOV LANES
TRANSPORTATION MANAGEMENT PLAN
2018 BASELINE AM LEVEL OF SERVICE
SHIRLINGTON RD TO S WASHINGTON BLVD
Figure: 3
Scale: 1" = 500'
Date: August 30, 2017
DRAFT


S WASHINGTON BLVD
ARMY NAVY DR
S JOYCE ST
MALL EXT
S HAYES ST
S FERN ST
S EADS ST
JEFFERSON DAVIS HWY
I-395
BOUNDARY CHANNEL DR
GEORGE WASHINGTON MEMORIAL PKWY
9.4
12.5
16.2
11.2
13.2
10.9
14.9
13.2
1.6
20.6
7.6
25
20.4
24.2
1.9
18.4
2.2
15.3
6.7
3.2
13.8
16.5
32.2
18.5
13.1
12.8
2.7
19.3
18.2
17.9
23.2
11.9
23
10.1
23.4
12
30.7
Delay- seconds per vehicle
Density - vehicles per hour per lane
Level of Service
A - C
D
E
F
Feet
0
250
500
1,000
VDOT Virginia Department of Transportation
VIRGINIA MEGAPROJECTS
I-395 HOT/HOV LANES
TRANSPORTATION MANAGEMENT PLAN
2018 BASELINE AM LEVEL OF SERVICE
S JOYCE ST TO GEORGE WASH. MEM'L PKWY
Figure: 4
Scale: 1" = 500'
Date: August 30, 2017
DRAFT


EDSALL RD
I-395
34.2
40.1
37.9
36.1
40
13.3
28.8
30.8
28
22
28
A
A'
B
B'
LITTLE RIVER TPKE
BEAUREGARD ST
74.3
TURKEYCOCK RUN
40
13.3
28.8
10
14.9
36.6
28
31.9
33.5
28
25.5
20
24.3
19.8
C
C'
DUKE ST
S WALKER ST
27.2
0 250 500 1,000 Feet
Delay- seconds per vehicle
123.4
Density - vehicles per hour per lane
123.4
Level of Service
A - C
D
E
F
VDOT Virginia Department of Transportation
VIRGINIA MEGAPROJECTS
I-395 HOT/HOV LANES
TRANSPORTATION MANAGEMENT PLAN
2018 BASELINE PM LEVEL OF SERVICE
EDSALL RD TO DUKET ST
Figure: 1
Scale: 1" = 500'
Date: August 30, 2017
DRAFT

I-395 HOT/HOV LANES
TRANSPORTATION MANAGEMENT PLAN
2018 BASELINE PM LEVEL OF SERVICE
DUKET ST TO KING ST
VDOT Virginia Department of Transportation
VIRGINIA MEGAPROJECTS
Figure: 2
Scale: 1" = 500'
Date: August 30, 2017
DRAFT
Delay- seconds per vehicle
Density - vehicles per hour per lane
Level of Service
A - C
D
E
F
Feet
0
250
500
1,000
SEMINARY RD
N BEAUREGARD ST
MARK CENTER AVE
N VAN DORN ST
PARK CENTER DR
KING ST
MENOKIN DR
KENMORE AVE
I-395
38.4
21.9
15.4
12.6
21.4
19.4
15.6
14.3
16.9
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus


SHIRLINGTON RD
24TH RD S
S GLEBE RD
I-395
I-395 SB OFF-RAMP
N QUAKER LN
26TH RD S
12.1
6.4
21.6
28.7
25.6
35.5
31.1
30.3
34.9
19.1
24.6
19
19.6
21.7
16.5
18.3
12.1
27.9
29.9
16.2
14
24.8
23.9
26
26.9
21.2
20.3
ARMY NAVY DR
S WASHINGTON BLVD
S JOYCE ST
18.4
15.2
Feet
0
250
500
1,000
Delay- seconds per vehicle
123.4
Density - vehicles per hour per lane
123.4
Level of Service
A - C
D
E
F
VDOT Virginia Department of Transportation
VIRGINIA MEGAPROJECTS
I-395 HOT/HOV LANES
TRANSPORTATION MANAGEMENT PLAN
2018 BASELINE PM LEVEL OF SERVICE
SHIRLINGTON RD TO S WASHINGTON BLVD
Figure: 3
Scale: 1" = 500'
Date: August 30, 2017
DRAFT


S WASHINGTON BLVD
ARMY NAVY DR
S JOYCE ST
MALL EXT
S HAYES ST
S FERN ST
S EADS ST
JEFFERSON DAVIS HWY
BOUNDARY CHANNEL DR
GEORGE WASHINGTON MEMORIAL PKWY
I-395
18.4
15.7
30.4
23.6
17.1
Delay- seconds per vehicle
Density - vehicles per hour per lane
Level of Service
A - C
D
E
F
Feet
0
250
500
1,000
VDOT Virginia Department of Transportation
VIRGINIA MEGAPROJECTS
I-395 HOT/HOV LANES
TRANSPORTATION MANAGEMENT PLAN
2018 BASELINE PM LEVEL OF SERVICE
S JOYCE ST TO GEORGE WASH. MEM'L PKWY
Figure: 4
Scale: 1" = 500'
Date: August 30, 2017
DRAFT

VIRGINIA MEGAPROJECTS

Appendix D
Construction Traffic Analysis (Single Lane)

INTERSTATE 395 Express Lanes

2018 UNDER CONSTRUCTION GP NB AM (TMP-1LC 10-11 am)

SEGMENT ID	SEGMENT DESCRIPTION	SEGMENT VOLUME		DENSITY		SPEED		LOS
NORTHBOUND I-395 GP AM PEAK								
NB01D01	Edsall Rd EB Off-Ramp	4760	veh/hr	-	pc/mi/ln	-	mph	F
NB01D02	Edsall Rd WB Off-Ramp	4235	veh/hr	45.5	pc/mi/ln	49.2	mph	E
NB01B03	Edsall Rd WB Off-Ramp to Edsall Rd On-Ramp	3795	veh/hr	35.2	pc/mi/ln	57.0	mph	E
NB02W04-M	Edsall Rd EB/WB On-Ramp to TC HOV On-Ramp	4315	veh/hr	47.7	pc/mi/ln	47.8	mph	E
NB02W04-D	Edsall Rd EB/WB On-Ramp to TC HOV On-Ramp	4315	veh/hr	44.4	pc/mi/ln	51.3	mph	E
NB02B05	TC HOV On-Ramp to TC HOV Off-Ramp	3750	veh/hr	34.5	pc/mi/ln	57.4	mph	D
NB02W06-M	TC HOV Off-Ramp to Duke St EB Off-Ramp	3950	veh/hr	41.7	pc/mi/ln	50.0	mph	E
NB02W06-D	TC HOV Off-Ramp to Duke St EB Off-Ramp	3950	veh/hr	40.4	pc/mi/ln	51.6	mph	E
NB03D07	LR Tpke WB Off-Ramp	3520	veh/hr	36.0	pc/mi/ln	51.7	mph	D
NB03B08	LR Tpke WB Off-Ramp to Duke St/LR Tpke On-Ramp	3165	veh/hr	27.9	pc/mi/ln	59.9	mph	D
NB03M09	Duke St/LR Tpke On-Ramp	4325	veh/hr	47.7	pc/mi/ln	47.9	mph	E
NB03B10	Duke St/LR Tpke On-Ramp to Seminary Rd Off-Ramp	4325	veh/hr	25.4	pc/mi/ln	60.0	mph	C
NB04D11	Seminary Rd Off-Ramp	4325	veh/hr	44.8	pc/mi/ln	51.0	mph	E
NB04B12	Seminary Rd Off-Ramp to Seminary Rd On-Ramp	3585	veh/hr	32.4	pc/mi/ln	58.4	mph	D
NB05W13-D	Seminary Rd On-Ramp to King St Off-Ramp	4280	veh/hr	46.6	pc/mi/ln	48.5	mph	E
NB05W13-M	Seminary Rd On-Ramp to King St Off-Ramp	4280	veh/hr	43.1	pc/mi/ln	52.4	mph	E
NB05B14	King St Off-Ramp to King St EB On-Ramp	3660	veh/hr	33.3	pc/mi/ln	58.0	mph	D
NB05M15	King St WB On-Ramp	4150	veh/hr	44.8	pc/mi/ln	48.9	mph	E
NB05W16-M	King St WB On-Ramp to Shirlington Rd/Quaker Ln Off-Ramp	4465	veh/hr	-	pc/mi/ln	-	mph	F
NB05W16-D	King St WB On-Ramp to Shirlington Rd/Quaker Ln Off-Ramp	4465	veh/hr	-	pc/mi/ln	-	mph	F
NB06B17	Shirlington Rd/Quaker Ln Off-Ramp to Shirlington Rd/Quaker Ln On-Ramp	4045	veh/hr	23.7	pc/mi/ln	60.0	mph	C
NB07W18-M	Shirlington Rd/Quaker Ln On-Ramp to S Glebe Rd EB Off-Ramp	4760	veh/hr	31.3	pc/mi/ln	53.5	mph	D
NB07W18-D	Shirlington Rd/Quaker Ln On-Ramp to S Glebe Rd EB Off-Ramp	4760	veh/hr	29.7	pc/mi/ln	56.5	mph	D
NB07W18-B	S Glebe Rd EB Off-Ramp to S Glebe Rd WB Off-Ramp	4170	veh/hr	24.5	pc/mi/ln	60.0	mph	C

2018 UNDER CONSTRUCTION GP NB AM (TMP-1LC 10-11 am)

SEGMENT ID	SEGMENT DESCRIPTION	SEGMENT VOLUME		DENSITY		SPEED		LOS
NORTHBOUND I-395 GP AM PEAK								
NB07W19-M	S Glebe Rd EB On-Ramp to S Glebe Rd WB Off-Ramp	4315	veh/hr	28.4	pc/mi/ln	54.0	mph	C
NB07W19-D	S Glebe Rd EB On-Ramp to S Glebe Rd WB Off-Ramp	4315	veh/hr	28.3	pc/mi/ln	53.6	mph	D
NB07B20	S Glebe Rd WB Off-Ramp to S Glebe Rd WB On-Ramp	4040	veh/hr	23.7	pc/mi/ln	60.0	mph	C
NB07M21	S Glebe Rd WB On-Ramp	4215	veh/hr	27.3	pc/mi/ln	54.3	mph	C
NB07B22	S Glebe Rd WB On-Ramp to Exit 8A Off-Ramp	4215	veh/hr	24.7	pc/mi/ln	60.0	mph	C
NB08D23	Exit 8A Off-Ramp	4215	veh/hr	26.8	pc/mi/ln	55.4	mph	D
NB08D24	Exit 8B Off-Ramp	3425	veh/hr	34.9	pc/mi/ln	51.9	mph	D
NB08D25	Exit 8C Off-Ramp	2500	veh/hr	25.7	pc/mi/ln	51.3	mph	C
NB09B26	Exit 8C Off-Ramp to S Washington Blvd/S Arlington Ridge Rd On-Ramp	1915	veh/hr	16.9	pc/mi/ln	60.0	mph	B
NB09M27	S Washington Blvd/S Arlington Ridge Rd On-Ramp	2805	veh/hr	27.6	pc/mi/ln	53.7	mph	C
NB10M28	S Rotary Rd On-Ramp	2840	veh/hr	28.2	pc/mi/ln	53.1	mph	C
NB11M29	US Route 1 SB On-Ramp	2370	veh/hr	24.0	pc/mi/ln	53.6	mph	C
NB11M30	US Route 1 NB On-Ramp	3055	veh/hr	30.0	pc/mi/ln	53.7	mph	C
NB11W31-M	Boundary Channel Dr EB On-Ramp to Boundary Channel Dr WB Off-Ramp	3265	veh/hr	20.9	pc/mi/ln	54.9	mph	C
NB11W31-D	Boundary Channel Dr EB On-Ramp to Boundary Channel Dr WB Off-Ramp	3265	veh/hr	21.7	pc/mi/ln	53.0	mph	C
NB11W31-B	Boundary Channel Dr WB Off-Ramp to GW Memorial Pkwy EB On-Ramp	3150	veh/hr	27.8	pc/mi/ln	59.9	mph	D
NB12W32-M	GW Memorial Pkwy EB On-Ramp to GW Memorial Pkwy WB Off-Ramp	3750	veh/hr	39.1	pc/mi/ln	50.6	mph	E
NB12W32-D	GW Memorial Pkwy EB On-Ramp to GW Memorial Pkwy WB Off-Ramp	3750	veh/hr	39.9	pc/mi/ln	49.6	mph	E
NB12W32-B	GW Memorial Pkwy WB Off-Ramp to GW Memorial Pkwy WB On-Ramp	3570	veh/hr	32.2	pc/mi/ln	58.5	mph	D
NB12M33	GW Memorial Pkwy WB On-Ramp	4740	veh/hr	-	pc/mi/ln	-	mph	F

2018 UNDER CONSTRUCTION GP SB AM (TMP-1LC 10-11 am)

SEGMENT ID	SEGMENT DESCRIPTION	SEGMENT VOLUME		DENSITY		SPEED		LOS
SOUTHBOUND I-395 GP AM PEAK								
SB12D01	GW Memorial Pkwy WB Off-Ramp	5110	veh/hr	32.6	pc/mi/ln	54.6	mph	D
SB12D02	GW Memorial Pkwy EB Off-Ramp	4835	veh/hr	32.0	pc/mi/ln	52.6	mph	D
SB12B03	GW Memorial Pkwy EB Off-Ramp to GW Memorial Pkwy EB On-Ramp	3990	veh/hr	37.5	pc/mi/ln	55.7	mph	E
SB12W04-M	GW Memorial Pkwy EB On-Ramp	4075	veh/hr	28.6	pc/mi/ln	53.9	mph	C
SB12W04-D	US Route 1 NB Off-Ramp	4075	veh/hr	25.9	pc/mi/ln	54.8	mph	D
SB12W04-B	GW Memorial Pkwy EB On-Ramp to Boundary Channel Dr WB On-Ramp	4000	veh/hr	37.6	pc/mi/ln	55.6	mph	E
SB11W05-M	Boundary Channel Dr WB On-Ramp to Boundary Channel EB Off-Ramp	4025	veh/hr	42.5	pc/mi/ln	49.5	mph	E
SB11W05-D	Boundary Channel Dr WB On-Ramp to Boundary Channel EB Off-Ramp	4025	veh/hr	42.2	pc/mi/ln	49.9	mph	E
SB11W05-B	Boundary Channel EB Off-Ramp to US Route 1 SB On-Ramp	3995	veh/hr	23.2	pc/mi/ln	60.0	mph	C
SB11D06a	HOV Off-Ramp	4835	veh/hr	-	pc/mi/ln	-	mph	F
SB11W06-M	US Route 1 SB On-Ramp	3790	veh/hr	24.2	pc/mi/ln	54.5	mph	C
SB11W06-D	US Route 1 SB Off-Ramp	3790	veh/hr	24.8	pc/mi/ln	53.2	mph	C
SB11D07	Exit 8A Off-Ramp	2850	veh/hr	19.2	pc/mi/ln	51.7	mph	C
SB10B08	Exit 8A Off-Ramp to I-395 HOV Slip On-Ramp at Pentagon	1875	veh/hr	16.3	pc/mi/ln	60.0	mph	B
SB09M09	I-395 HOV Slip On-Ramp at Pentagon	2125	veh/hr	20.6	pc/mi/ln	53.9	mph	C
SB09M10	S Hayes St On-Ramp	2055	veh/hr	12.8	pc/mi/ln	56.0	mph	B
SB08B11	S Hayes St On-Ramp to S Washington Blvd WB On-Ramp	2305	veh/hr	20.1	pc/mi/ln	60.0	mph	C
SB08M12	S Washington Blvd WB On-Ramp	2985	veh/hr	29.1	pc/mi/ln	53.6	mph	C
SB08M13	S Washington Blvd EB On-Ramp	3500	veh/hr	22.2	pc/mi/ln	54.9	mph	C
SB08B14	S Washington Blvd EB On-Ramp to S Glebe Rd/Shirlington Off-Ramp	3500	veh/hr	20.3	pc/mi/ln	60.0	mph	C
SB07D15	S Glebe Rd/Shirlington Off-Ramp	3500	veh/hr	35.3	pc/mi/ln	51.9	mph	D
SB07B16	S Glebe Rd/Shirlington Rd Off-Ramp to Shirlington Rd On-Ramp	3275	veh/hr	28.6	pc/mi/ln	59.8	mph	D
SB07M16a	Shirlington Rd On-Ramp	3495	veh/hr	34.2	pc/mi/ln	52.2	mph	D
SB06W17-M	Shirlington Rd On-Ramp to King St WB Off-Ramp	3810	veh/hr	24.4	pc/mi/ln	54.5	mph	C
SB06W17-D	Shirlington Rd On-Ramp to King St WB Off-Ramp	3810	veh/hr	23.8	pc/mi/ln	55.7	mph	C
SB05B18	King St WB Off-ramp to King St WB On-Ramp	3170	veh/hr	19.2	pc/mi/ln	60.0	mph	C

2018 UNDER CONSTRUCTION GP SB AM (TMP-1LC 10-11 am)

SEGMENT ID	SEGMENT DESCRIPTION	SEGMENT VOLUME		DENSITY		SPEED		LOS
SOUTHBOUND I-395 GP AM PEAK								
SB05M19	King St WB On-Ramp	3370	veh/hr	21.4	pc/mi/ln	54.9	mph	C
SB05W20-M	King St EB On-ramp to Seminary Rd Off-Ramp	3900	veh/hr	23.1	pc/mi/ln	54.8	mph	C
SB05W20-D	King St EB On-ramp to Seminary Rd Off-Ramp	3900	veh/hr	22.6	pc/mi/ln	56.0	mph	C
SB04B21	Seminary Rd Off-ramp to Seminary Rd On-Ramp	3165	veh/hr	18.4	pc/mi/ln	60.0	mph	C
SB04M22	Seminary Rd On-Ramp	3795	veh/hr	24.2	pc/mi/ln	54.6	mph	C
SB03B23	Seminary Rd On-Ramp to LR Tpke WB Off-Ramp	3795	veh/hr	22.0	pc/mi/ln	60.0	mph	C
SB03D24	LR Tpke WB Off-Ramp	3795	veh/hr	24.0	pc/mi/ln	55.2	mph	C
SB03B25	LR Tpke WB Off-Ramp to Duke St EB On-Ramp	3395	veh/hr	19.7	pc/mi/ln	60.0	mph	C
SB03B25a	LR Tpke WB Off-Ramp to Duke St EB On-Ramp	3395	veh/hr	29.8	pc/mi/ln	59.5	mph	D
SB03W26-M	LR Tpke WB On-Ramp to Duke St EB Off-Ramp	3950	veh/hr	41.4	pc/mi/ln	49.9	mph	E
SB03W26-D	LR Tpke WB On-Ramp to Duke St EB Off-Ramp	3950	veh/hr	43.0	pc/mi/ln	48.0	mph	E
SB03B27	Duke St EB Off-Ramp to LR Tpke EB On-Ramp	3520	veh/hr	31.2	pc/mi/ln	59.0	mph	D
SB02M28	LR Tpke EB On-Ramp	4015	veh/hr	42.2	pc/mi/ln	49.7	mph	E
SB02B29	LR Tpke EB On-Ramp to Edsall Road WB Off-Ramp	4015	veh/hr	37.8	pc/mi/ln	55.5	mph	E
SB02D30	Edsall Rd WB Off-Ramp	4015	veh/hr	40.5	pc/mi/ln	51.8	mph	E
SB01B31	Edsall Rd WB Off-Ramp to Edsall Rd WB On-Ramp	3725	veh/hr	33.7	pc/mi/ln	57.8	mph	D
SB01W32-M	Edsall Rd WB On-Ramp to Edsall Rd EB Off-Ramp	4285	veh/hr	-	pc/mi/ln	-	mph	F
SB01W32-D	Edsall Rd WB On-Ramp to Edsall Rd EB Off-Ramp	4285	veh/hr	-	pc/mi/ln	-	mph	F
SB01B33	Edsall Rd EB Off-Ramp to Edsall Rd EB On-Ramp	4090	veh/hr	39.1	pc/mi/ln	54.7	mph	E
SB01M34	Edsall Rd EB On-Ramp	4570	veh/hr	29.5	pc/mi/ln	53.9	mph	C

2018 UNDER CONSTRUCTION GP NB PM (TMP-1LC 2-3 pm)

SEGMENT ID	SEGMENT DESCRIPTION	SEGMENT VOLUME		DENSITY		SPEED		LOS
NORTHBOUND I-395 GP PM PEAK								
NB01D01	Edsall Rd EB Off-Ramp	4695	veh/hr	-	pc/mi/ln	-	mph	F
NB01D02	Edsall Rd WB Off-Ramp	4150	veh/hr	45.6	pc/mi/ln	49.1	mph	E
NB01B03a	Edsall Rd WB Off-Ramp to Edsall Rd On-Ramp	3680	veh/hr	34.6	pc/mi/ln	57.3	mph	D
NB02M04a	Edsall Rd On-Ramp	4260	veh/hr	48.3	pc/mi/ln	47.6	mph	E
NB02B04b	Edsall Rd On-Ramp to Duke St EB Off-Ramp	4260	veh/hr	44.9	pc/mi/ln	51.2	mph	E
NB02D06a	Duke St EB Off-Ramp	4260	veh/hr	27.8	pc/mi/ln	55.0	mph	D
NB03D07	LR Tpke WB Off-Ramp	3725	veh/hr	38.9	pc/mi/ln	51.6	mph	E
NB03B08	LR Tpke WB Off-Ramp to Duke St/LR Tpke On-Ramp	3300	veh/hr	30.0	pc/mi/ln	59.4	mph	D
NB03M09	Duke St/LR Tpke On-Ramp	4270	veh/hr	28.4	pc/mi/ln	54.1	mph	C
NB03B10	Duke St/LR Tpke On-Ramp to Seminary Rd Off-Ramp	4270	veh/hr	25.6	pc/mi/ln	60.0	mph	C
NB04D11	Seminary Rd Off-Ramp	4270	veh/hr	-	pc/mi/ln	-	mph	F
NB04B12	Seminary Rd Off-Ramp to Seminary Rd On-Ramp	3595	veh/hr	33.5	pc/mi/ln	57.9	mph	D
NB05W13-M	Seminary Rd On-Ramp to King St Off-Ramp	4435	veh/hr	41.3	pc/mi/ln	50.2	mph	E
NB05W13-D	Seminary Rd On-Ramp to King St Off-Ramp	4435	veh/hr	30.9	pc/mi/ln	52.4	mph	D
NB05B14	King St Off-Ramp to King St EB On-Ramp	3840	veh/hr	37.0	pc/mi/ln	56.0	mph	E
NB05M15	King St WB On-Ramp	4425	veh/hr	-	pc/mi/ln	-	mph	F
NB05W16-M	King St WB On-Ramp to Shirlington Rd/Quaker Ln Off-Ramp	4670	veh/hr	-	pc/mi/ln	-	mph	F
NB05W16-D	King St WB On-Ramp to Shirlington Rd/Quaker Ln Off-Ramp	4670	veh/hr	-	pc/mi/ln	-	mph	F
NB06B17	Shirlington Rd/Quaker Ln Off-Ramp to Shirlington Rd/Quaker Ln On-Ramp	4255	veh/hr	25.5	pc/mi/ln	60.0	mph	C
NB07W18-M	Shirlington Rd/Quaker Ln On-Ramp to S Glebe Rd EB Off-Ramp	5050	veh/hr	34.3	pc/mi/ln	53.0	mph	D
NB07W18-D	Shirlington Rd/Quaker Ln On-Ramp to S Glebe Rd EB Off-Ramp	5050	veh/hr	32.2	pc/mi/ln	56.4	mph	D
NB07W18-B	S Glebe Rd EB Off-Ramp to S Glebe Rd WB Off-Ramp	4450	veh/hr	26.7	pc/mi/ln	60.0	mph	D
NB07W19-M	S Glebe Rd EB On-Ramp to S Glebe Rd WB Off-Ramp	4590	veh/hr	30.8	pc/mi/ln	53.6	mph	C
NB07W19-D	S Glebe Rd EB On-Ramp to S Glebe Rd WB Off-Ramp	4590	veh/hr	30.8	pc/mi/ln	53.6	mph	D
NB07B20	S Glebe Rd WB Off-Ramp to S Glebe Rd WB On-Ramp	4360	veh/hr	26.1	pc/mi/ln	60.0	mph	D
NB07M21	S Glebe Rd WB On-Ramp	4520	veh/hr	30.1	pc/mi/ln	53.9	mph	C

2018 UNDER CONSTRUCTION GP NB PM (TMP-1LC 2-3 pm)

SEGMENT ID	SEGMENT DESCRIPTION	SEGMENT VOLUME		DENSITY		SPEED		LOS
NORTHBOUND I-395 GP PM PEAK								
NB07B22	S Glebe Rd WB On-Ramp to Exit 8A Off-Ramp	4520	veh/hr	27.1	pc/mi/ln	60.0	mph	D
NB08D23	Exit 8A Off-Ramp	4520	veh/hr	29.3	pc/mi/ln	55.5	mph	D
NB08D24	Exit 8B Off-Ramp	3800	veh/hr	39.6	pc/mi/ln	51.8	mph	E
NB08D25	Exit 8C Off-Ramp	2455	veh/hr	25.8	pc/mi/ln	51.4	mph	C
NB09B26	Exit 8C Off-Ramp to S Washington Blvd/S Arlington Ridge Rd On-Ramp	2330	veh/hr	20.9	pc/mi/ln	60.0	mph	C
NB09M27	S Washington Blvd/S Arlington Ridge Rd On-Ramp	3395	veh/hr	34.7	pc/mi/ln	52.8	mph	C
NB10M28	S Rotary Rd On-Ramp	3455	veh/hr	36.1	pc/mi/ln	51.6	mph	D
NB11M29	US Route 1 SB On-Ramp	3270	veh/hr	33.8	pc/mi/ln	52.1	mph	D
NB11M30	US Route 1 NB On-Ramp	4300	veh/hr	-	pc/mi/ln	-	mph	F
NB11W31-M	Boundary Channel Dr EB On-Ramp to Boundary Channel Dr WB Off-Ramp	4645	veh/hr	31.2	pc/mi/ln	53.6	mph	D
NB11W31-D	Boundary Channel Dr EB On-Ramp to Boundary Channel Dr WB Off-Ramp	4645	veh/hr	25.6	pc/mi/ln	52.0	mph	C
NB11W31-B	Boundary Channel Dr WB Off-Ramp to GW Memorial Pkwy EB On-Ramp	4045	veh/hr	40.5	pc/mi/ln	53.9	mph	E
NB12W32-M	GW Memorial Pkwy EB On-Ramp to GW Memorial Pkwy WB Off-Ramp	4745	veh/hr	-	pc/mi/ln	-	mph	F
NB12W32-D	GW Memorial Pkwy EB On-Ramp to GW Memorial Pkwy WB Off-Ramp	4745	veh/hr	-	pc/mi/ln	-	mph	F
NB12W32-B	GW Memorial Pkwy WB Off-Ramp to GW Memorial Pkwy WB On-Ramp	4455	veh/hr	-	pc/mi/ln	-	mph	F
NB12M33	GW Memorial Pkwy WB On-Ramp	5795	veh/hr	-	pc/mi/ln	-	mph	F

2018 UNDER CONSTRUCTION GP SB PM (TMP-1LC 2-3 pm)

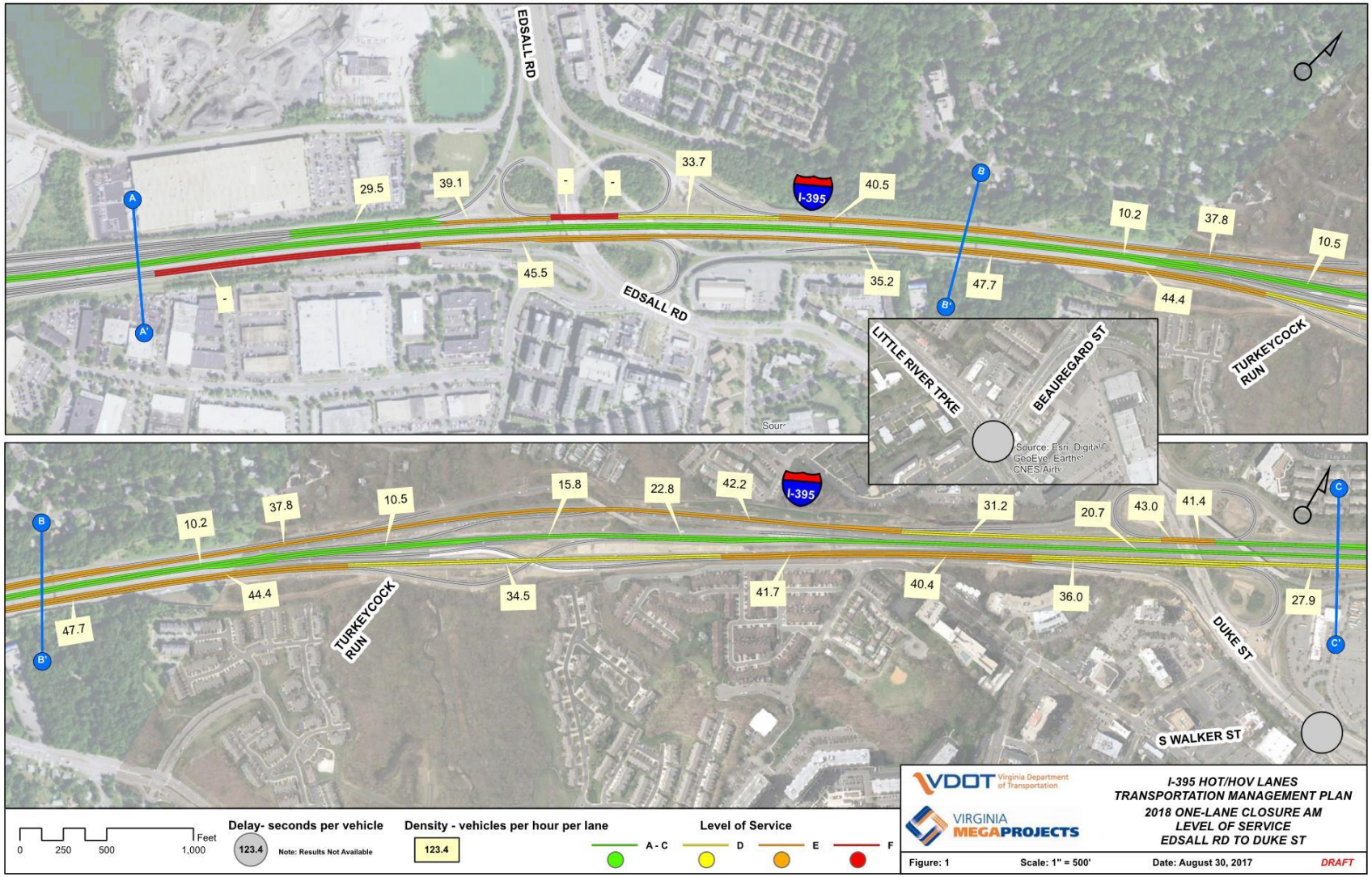
SEGMENT ID	SEGMENT DESCRIPTION	SEGMENT VOLUME		DENSITY		SPEED		LOS
SOUTHBOUND I-395 GP PM PEAK								
SB12D01	GW Memorial Pkwy WB Off-Ramp	5250	veh/hr	35.5	pc/mi/ln	53.8	mph	E
SB12D02	GW Memorial Pkwy EB Off-Ramp	4480	veh/hr	31.3	pc/mi/ln	52.0	mph	D
SB12B03	GW Memorial Pkwy EB Off-Ramp to GW Memorial Pkwy EB On-Ramp	3360	veh/hr	31.0	pc/mi/ln	59.0	mph	D
SB12W04-M	GW Memorial Pkwy EB On-Ramp to US Route 1 NB Off-Ramp	4545	veh/hr	30.8	pc/mi/ln	53.6	mph	D

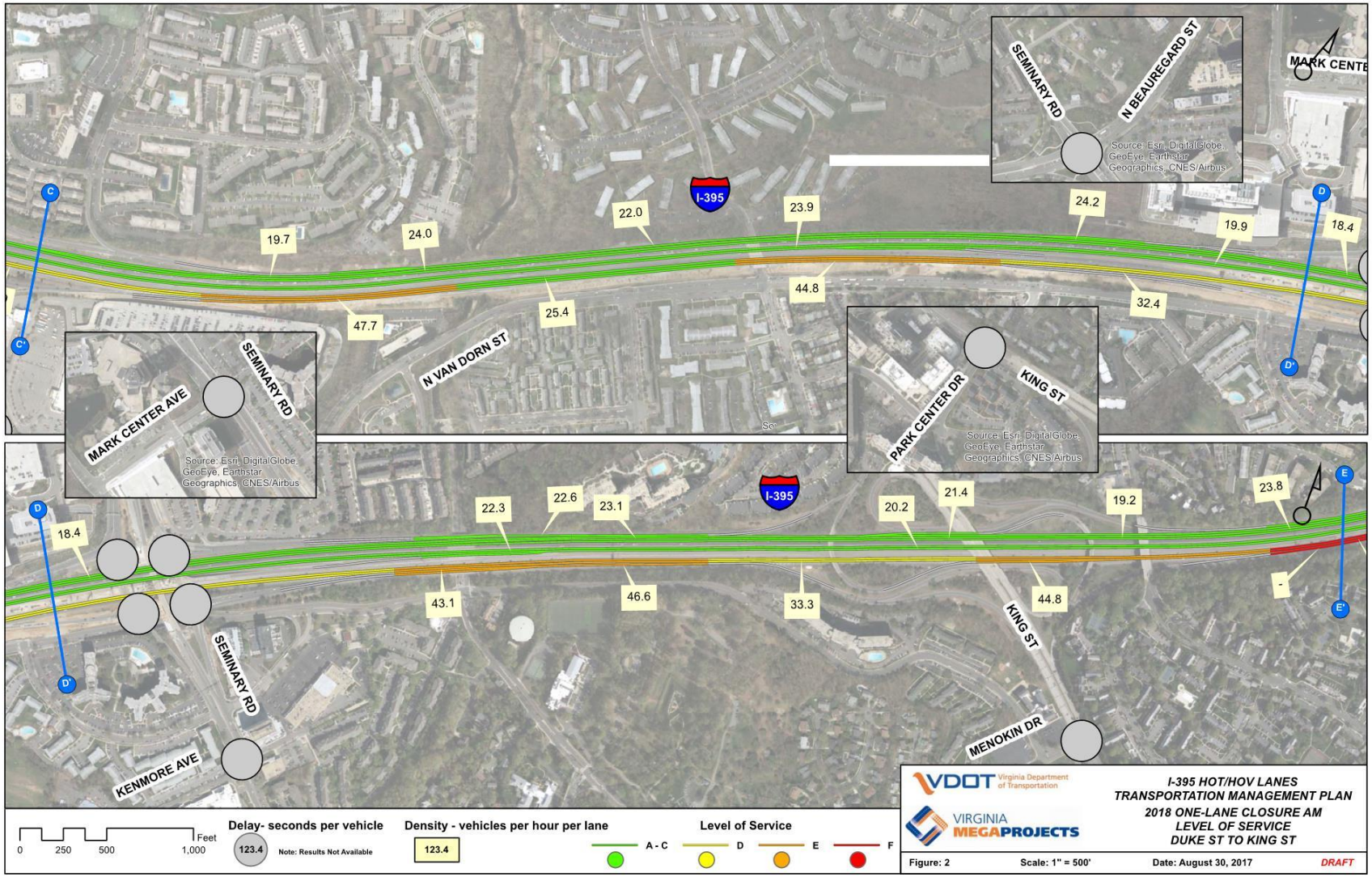
2018 UNDER CONSTRUCTION GP SB PM (TMP-1LC 2-3 pm)

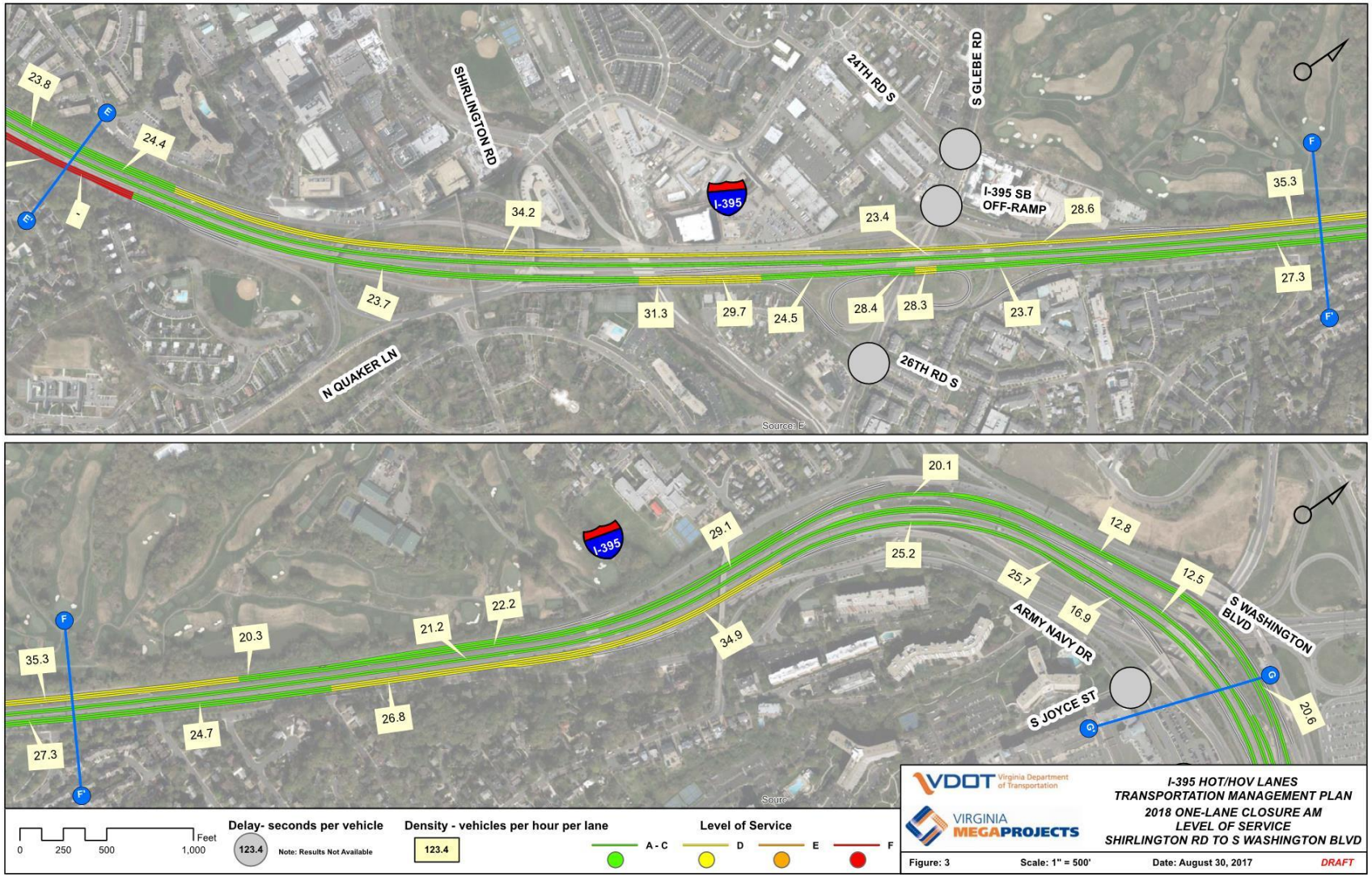
SEGMENT ID	SEGMENT DESCRIPTION	SEGMENT VOLUME		DENSITY		SPEED		LOS
SOUTHBOUND I-395 GP PM PEAK								
SB12W04-D	GW Memorial Pkwy EB On-Ramp to US Route 1 NB Off-Ramp	4545	veh/hr	30.4	pc/mi/ln	54.7	mph	D
SB12W04-B	GW Memorial Pkwy EB On-Ramp to Boundary Channel Dr WB On-Ramp	4505	veh/hr	-	pc/mi/ln	-	mph	F
SB11W05-M	Boundary Channel Dr WB On-Ramp to Boundary Channel EB Off-Ramp	3385	veh/hr	35.9	pc/mi/ln	51.4	mph	D
SB11W05-D	Boundary Channel Dr WB On-Ramp to Boundary Channel EB Off-Ramp	3385	veh/hr	37.0	pc/mi/ln	49.9	mph	E
SB11W05-B	Boundary Channel EB Off-Ramp to US Route 1 SB On-Ramp	3355	veh/hr	20.3	pc/mi/ln	60.0	mph	C
SB11D06a	HOV Off-Ramp	5165	veh/hr	-	pc/mi/ln	-	mph	F
SB11W06-M	US Route 1 SB Off-Ramp	4265	veh/hr	28.8	pc/mi/ln	53.9	mph	C
SB11W06-D	US Route 1 SB Off-Ramp	4265	veh/hr	29.1	pc/mi/ln	53.3	mph	D
SB11D07	Exit 8A Off-Ramp	3340	veh/hr	23.7	pc/mi/ln	51.3	mph	C
SB10B08	Exit 8A Off-Ramp to I-395 HOV Slip On-Ramp at Pentagon	2120	veh/hr	19.3	pc/mi/ln	60.0	mph	C
SB09B09	I-395 HOV Slip On-Ramp at Pentagon	200	veh/hr	1.8	pc/mi/ln	60.0	mph	A
SB09M09a	I-395 HOV Slip On-Ramp at Pentagon	2320	veh/hr	23.7	pc/mi/ln	53.4	mph	C
SB09M10	S Hayes St On-Ramp	2520	veh/hr	16.4	pc/mi/ln	55.7	mph	B
SB08B11	S Hayes St On-Ramp to S Washington Blvd WB On-Ramp	2720	veh/hr	24.7	pc/mi/ln	60.0	mph	C
SB08M12	S Washington Blvd WB On-Ramp	4330	veh/hr	-	pc/mi/ln	-	mph	F
SB08M13	S Washington Blvd EB On-Ramp	5270	veh/hr	36.5	pc/mi/ln	52.5	mph	D
SB08B14	S Washington Blvd EB On-Ramp to S Glebe Rd/Shirlington Off-Ramp	5270	veh/hr	32.9	pc/mi/ln	58.2	mph	D
SB07D15	S Glebe Rd/Shirlington Off-Ramp	5270	veh/hr	-	pc/mi/ln	-	mph	F
SB07B16	S Glebe Rd/Shirlington Rd Off-Ramp to Shirlington Rd On-Ramp	4945	veh/hr	-	pc/mi/ln	-	mph	F
SB07M16a	Shirlington Rd On-Ramp	5300	veh/hr	-	pc/mi/ln	-	mph	F
SB06W17-M	Shirlington Rd On-Ramp to King St WB Off-Ramp	5745	veh/hr	40.1	pc/mi/ln	51.7	mph	D
SB06W17-D	Shirlington Rd On-Ramp to King St WB Off-Ramp	5745	veh/hr	38.1	pc/mi/ln	54.8	mph	E
SB05B18	King St WB Off-ramp to King St WB On-Ramp	4815	veh/hr	29.3	pc/mi/ln	59.6	mph	D
SB05M19	King St WB On-Ramp	5065	veh/hr	34.7	pc/mi/ln	53.0	mph	D
SB05W20-D	King St EB On-ramp to Seminary Rd Off-Ramp	5495	veh/hr	38.2	pc/mi/ln	52.3	mph	D
SB05W20-M	King St EB On-ramp to Seminary Rd Off-Ramp	5495	veh/hr	36.2	pc/mi/ln	55.2	mph	E

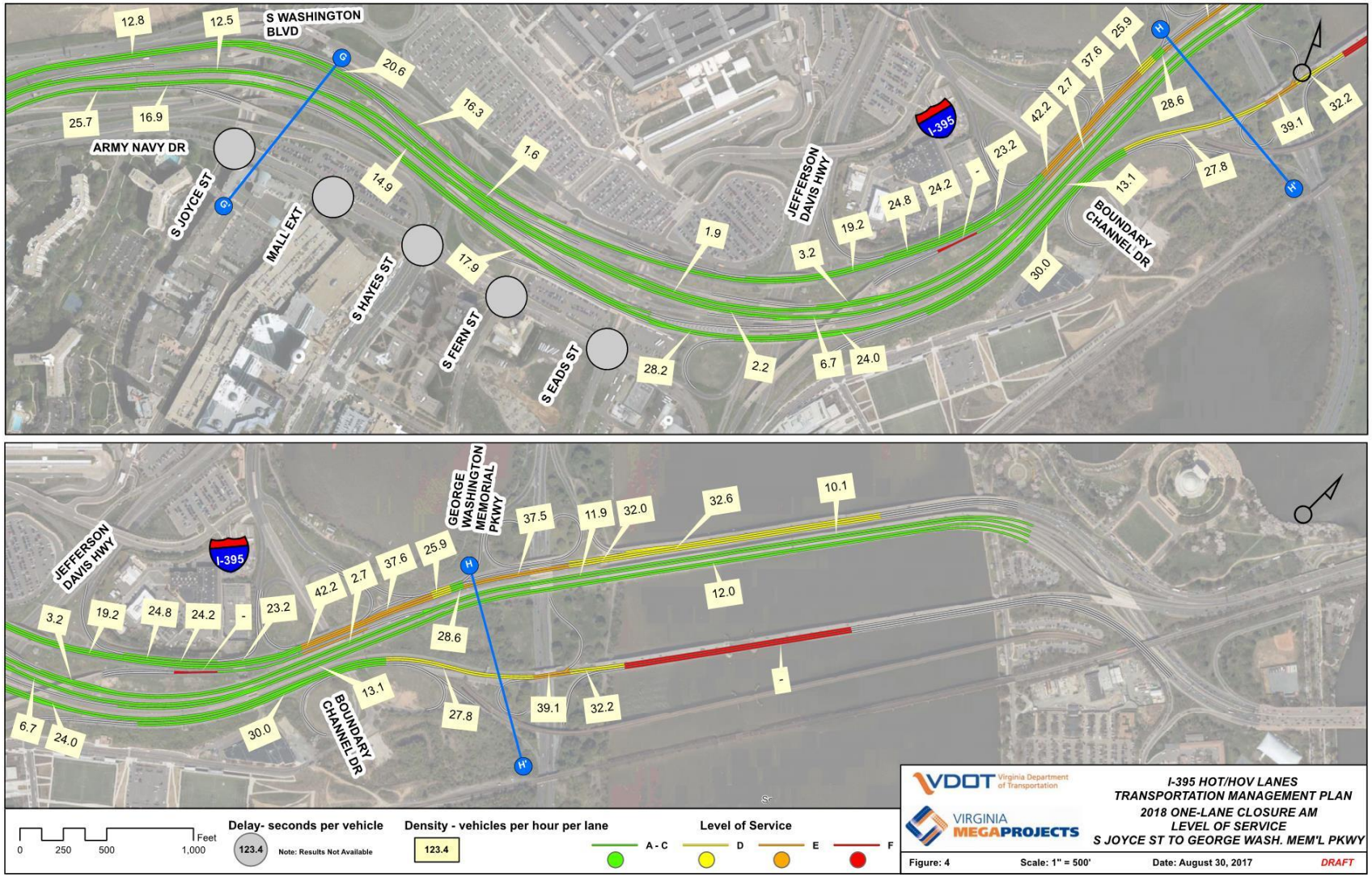
2018 UNDER CONSTRUCTION GP SB PM (TMP-1LC 2-3 pm)

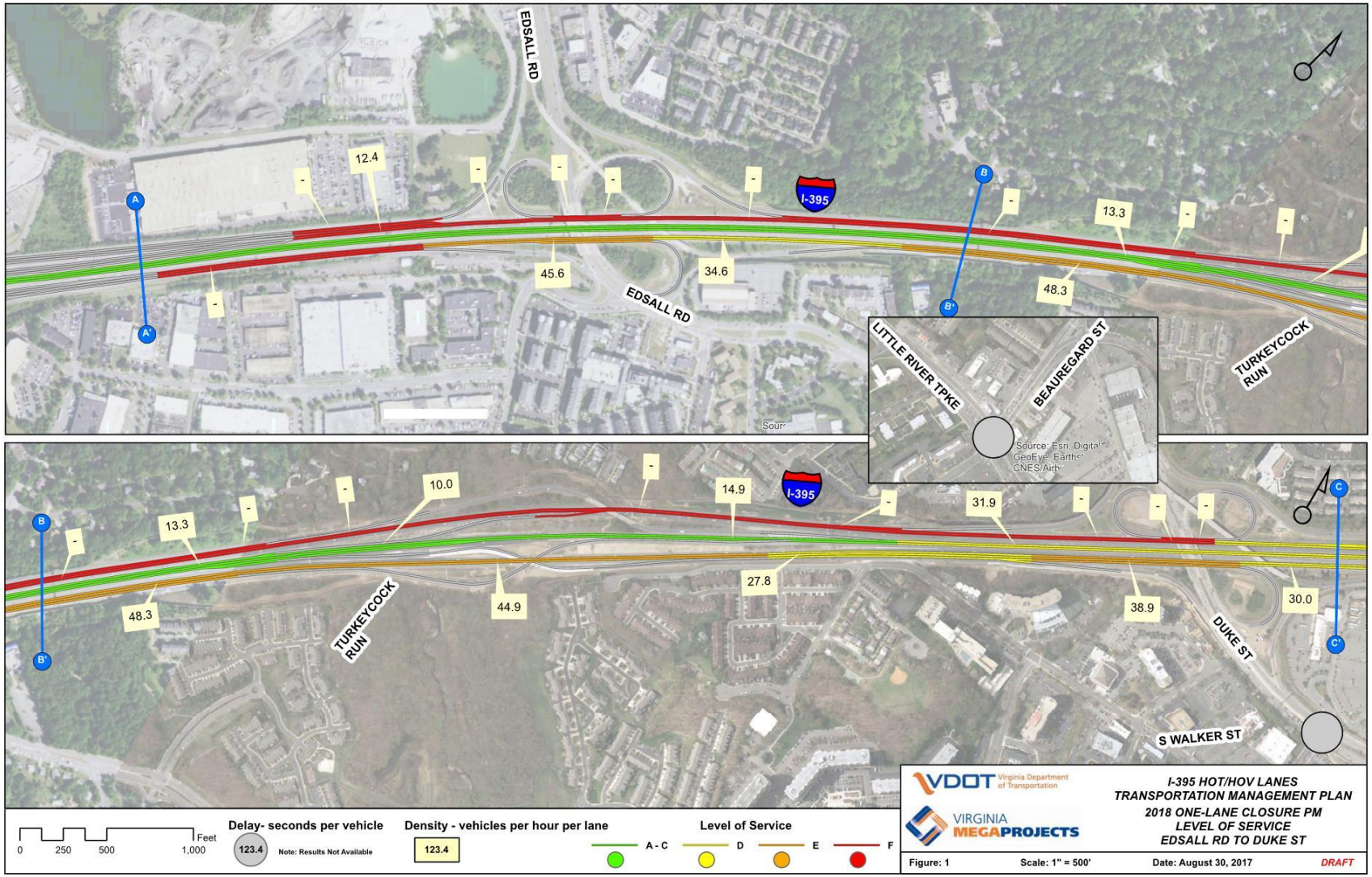
SEGMENT ID	SEGMENT DESCRIPTION	SEGMENT VOLUME		DENSITY		SPEED		LOS
SOUTHBOUND I-395 GP PM PEAK								
SB04B21	Seminary Rd Off-ramp to Seminary Rd On-Ramp	4840	veh/hr	29.6	pc/mi/ln	59.5	mph	D
SB04M22	Seminary Rd On-Ramp	5680	veh/hr	39.8	pc/mi/ln	51.8	mph	D
SB03B23	Seminary Rd On-Ramp to LR Tpke WB Off-Ramp	5680	veh/hr	36.8	pc/mi/ln	56.1	mph	E
SB03D24	LR Tpke WB Off-Ramp	5680	veh/hr	38.2	pc/mi/ln	54.0	mph	E
SB03B25	LR Tpke WB Off-Ramp to Duke St EB On-Ramp	4795	veh/hr	29.2	pc/mi/ln	59.6	mph	D
SB03B25a	LR Tpke WB Off-Ramp to Duke St EB On-Ramp	4795	veh/hr	-	pc/mi/ln	-	mph	F
SB03W26-M	LR Tpke WB On-Ramp to Duke St EB Off-Ramp	5315	veh/hr	-	pc/mi/ln	-	mph	F
SB03W26-D	LR Tpke WB On-Ramp to Duke St EB Off-Ramp	5315	veh/hr	-	pc/mi/ln	-	mph	F
SB03B27	Duke St EB Off-Ramp to LR Tpke EB On-Ramp	4615	veh/hr	-	pc/mi/ln	-	mph	F
SB02W28a-M	LR Tpke EB On-Ramp to TC HOV Off-Ramp	5140	veh/hr	-	pc/mi/ln	-	mph	F
SB02W28a-D	LR Tpke EB On-Ramp to TC HOV Off-Ramp	5140	veh/hr	-	pc/mi/ln	-	mph	F
SB02B29a	TC HOV Off-Ramp to TC HOV On-Ramp	4730	veh/hr	-	pc/mi/ln	-	mph	F
SB02W29b-M	TC HOV On-Ramp to Edsall Rd WB Off-Ramp	6010	veh/hr	-	pc/mi/ln	-	mph	F
SB02W29b-D	TC HOV On-Ramp to Edsall Rd WB Off-Ramp	6010	veh/hr	-	pc/mi/ln	-	mph	F
SB01B31	Edsall Rd WB Off-Ramp to Edsall Rd WB On-Ramp	5610	veh/hr	-	pc/mi/ln	-	mph	F
SB01W32-M	Edsall Rd WB On-Ramp to Edsall Rd EB Off-Ramp	6215	veh/hr	-	pc/mi/ln	-	mph	F
SB01W32-D	Edsall Rd WB On-Ramp to Edsall Rd EB Off-Ramp	6215	veh/hr	-	pc/mi/ln	-	mph	F
SB01B33	Edsall Rd EB Off-Ramp to Edsall Rd EB On-Ramp	5970	veh/hr	-	pc/mi/ln	-	mph	F
SB01M34	Edsall Rd EB On-Ramp	6775	veh/hr	-	pc/mi/ln	-	mph	F

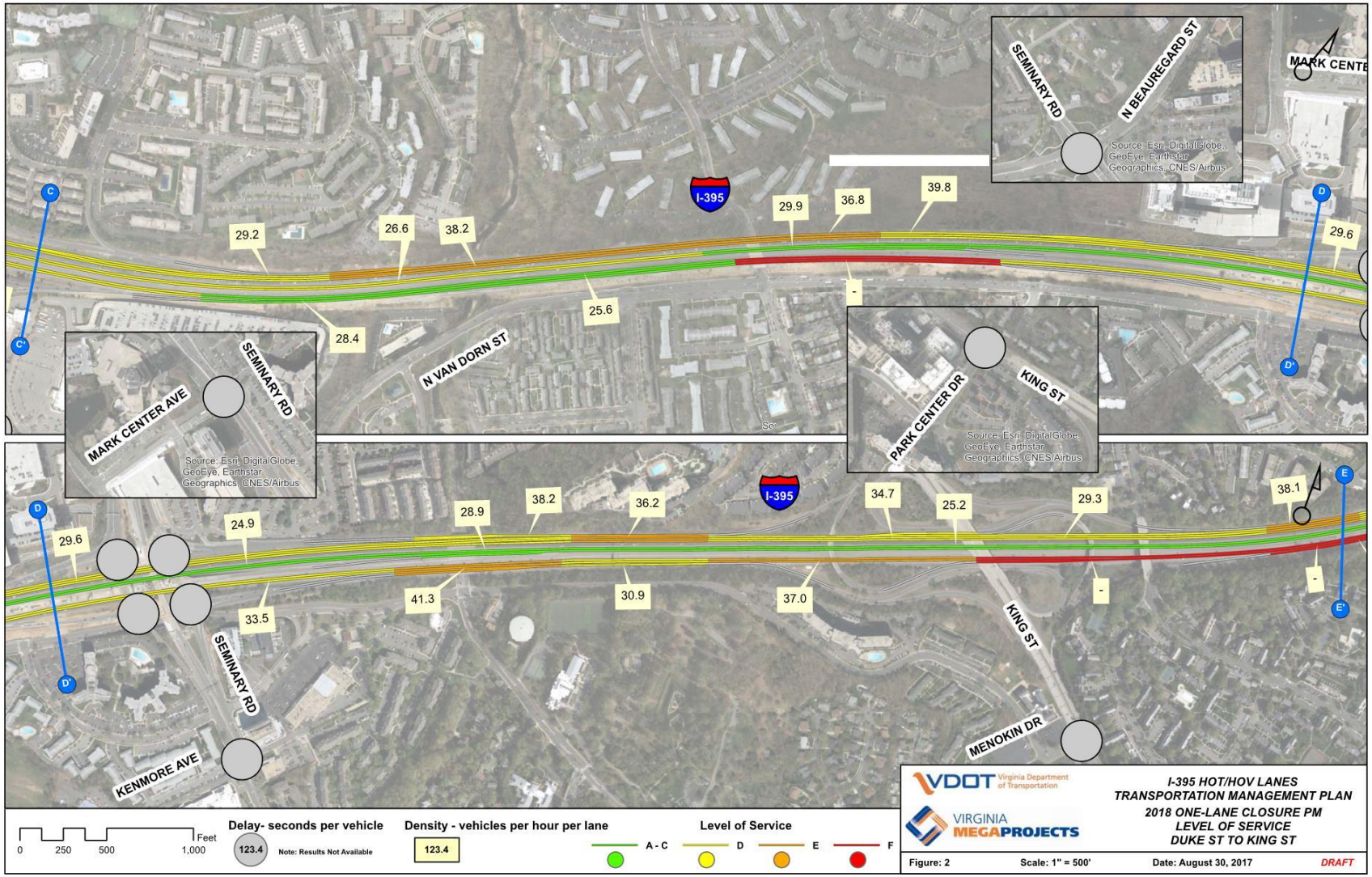

EDSALL RD
EDSALL RD
I-395
I-395
LITTLE RIVER TPKE
BEAUREGARD ST
TURKEYCOCK RUN
TURKEYCOCK RUN
DUKE ST
S WALKER ST
A
A'
B
B'
C
C'
29.5
39.1
33.7
40.5
10.2
37.8
10.5
45.5
35.2
47.7
44.4
15.8
22.8
42.2
31.2
20.7
43.0
41.4
37.8
10.5
10.2
44.4
47.7
34.5
41.7
40.4
36.0
27.9
Feet
0
250
500
1,000
Delay- seconds per vehicle
123.4
Note: Results Not Available
Density - vehicles per hour per lane
123.4
Level of Service
A - C
D
E
F
VDOT Virginia Department of Transportation
VIRGINIA MEGAPROJECTS
I-395 HOT/HOV LANES
TRANSPORTATION MANAGEMENT PLAN
2018 ONE-LANE CLOSURE AM
LEVEL OF SERVICE
EDSALL RD TO DUKE ST
Figure: 1
Scale: 1" = 500'
Date: August 30, 2017
DRAFT

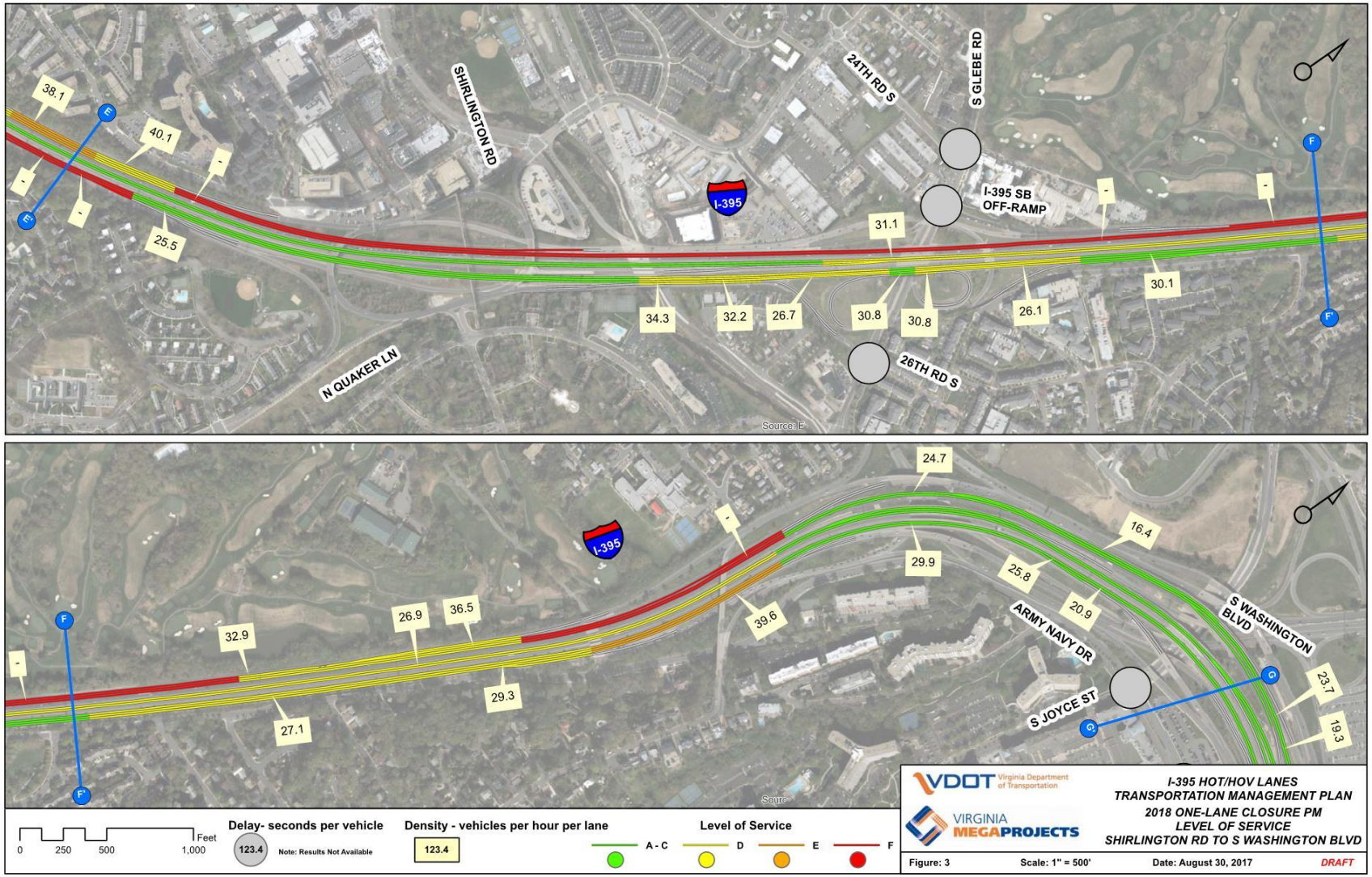

I-395
SEMINARY RD
N BEAUREGARD ST
MARK CENTE
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus
19.7
24.0
22.0
23.9
24.2
19.9
18.4
44.8
32.4
47.7
25.4
N VAN DORN ST
MARK CENTER AVE
PARK CENTER DR
KING ST
22.3
22.6
23.1
20.2
21.4
19.2
23.8
43.1
46.6
33.3
44.8
KENMORE AVE
MENOKIN DR
C
C'
D
D'
E
E'
0 250 500 1,000 Feet
Delay- seconds per vehicle
123.4
Note: Results Not Available
Density - vehicles per hour per lane
123.4
Level of Service
A - C
D
E
F
VDOT Virginia Department of Transportation
VIRGINIA MEGAPROJECTS
I-395 HOT/HOV LANES
TRANSPORTATION MANAGEMENT PLAN
2018 ONE-LANE CLOSURE AM
LEVEL OF SERVICE
DUKE ST TO KING ST
Figure: 2
Scale: 1" = 500'
Date: August 30, 2017
DRAFT

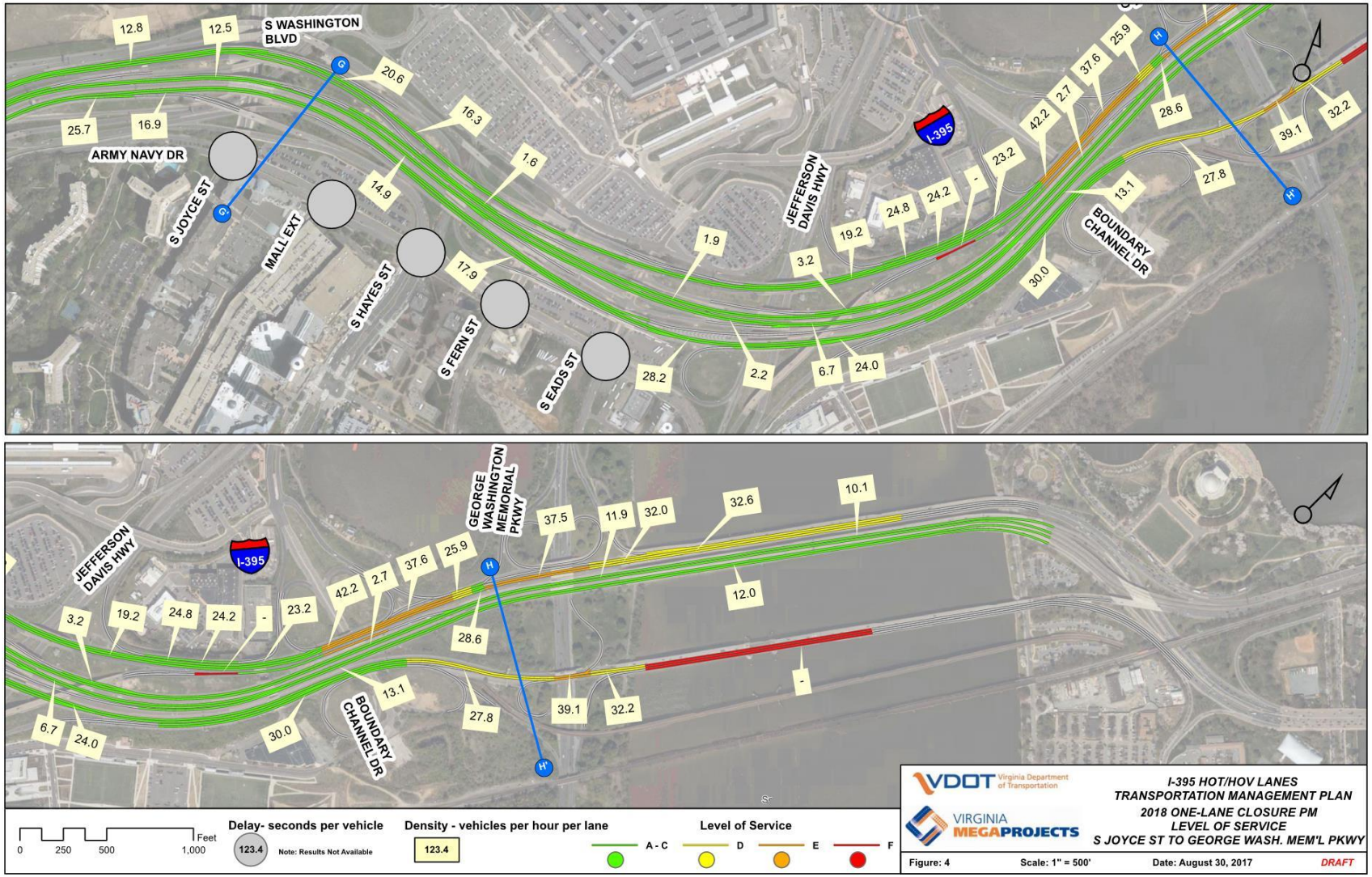

23.8
24.4
SHIRLINGTON RD
34.2
I-395
24TH RD S
S GLEBE RD
I-395 SB
OFF-RAMP
23.4
28.6
35.3
27.3
23.7
31.3
29.7
24.5
28.4
28.3
23.7
N QUAKER LN
26TH RD S
20.1
29.1
25.2
12.8
25.7
12.5
16.9
ARMY NAVY DR
S WASHINGTON BLVD
22.2
21.2
20.3
34.9
35.3
26.8
24.7
27.3
S JOYCE ST
20.6
0 250 500 1,000 Feet
Delay- seconds per vehicle
123.4
Note: Results Not Available
Density - vehicles per hour per lane
123.4
Level of Service
A - C
D
E
F
VDOT Virginia Department of Transportation
VIRGINIA MEGAPROJECTS
I-395 HOT/HOV LANES
TRANSPORTATION MANAGEMENT PLAN
2018 ONE-LANE CLOSURE AM
LEVEL OF SERVICE
SHIRLINGTON RD TO S WASHINGTON BLVD
Figure: 3
Scale: 1" = 500'
Date: August 30, 2017
DRAFT


S WASHINGTON BLVD
ARMY NAVY DR
S JOYCE ST
MALL EXT
S HAYES ST
S FERN ST
S EADS ST
JEFFERSON DAVIS HWY
I-395
BOUNDARY CHANNEL DR
GEORGE WASHINGTON MEMORIAL PKWY
12.8
12.5
20.6
25.7
16.9
16.3
1.6
14.9
17.9
1.9
3.2
19.2
24.8
24.2
-
23.2
42.2
2.7
37.6
25.9
28.6
13.1
27.8
30.0
6.7
24.0
2.2
28.2
39.1
32.2
37.5
11.9
32.0
32.6
10.1
12.0
Delay- seconds per vehicle
Density - vehicles per hour per lane
Level of Service
A - C
D
E
F
Feet
0
250
500
1,000
123.4
Note: Results Not Available
VDOT Virginia Department of Transportation
VIRGINIA MEGAPROJECTS
I-395 HOT/HOV LANES
TRANSPORTATION MANAGEMENT PLAN
2018 ONE-LANE CLOSURE AM
LEVEL OF SERVICE
S JOYCE ST TO GEORGE WASH. MEM'L PKWY
Figure: 4
Scale: 1" = 500'
Date: August 30, 2017
DRAFT

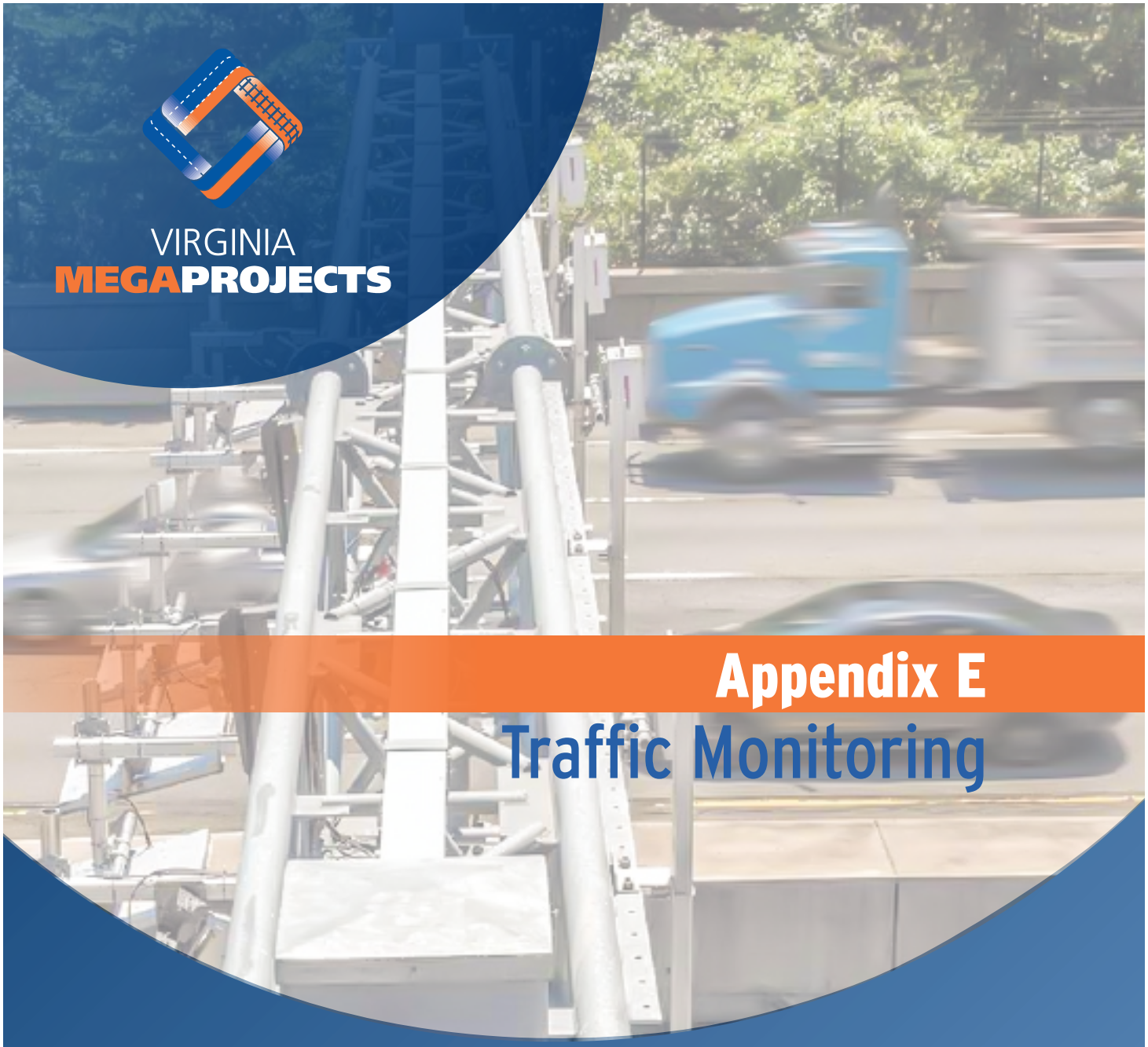

EDSALL RD
EDSALL RD
I-395
I-395
LITTLE RIVER TPKE
BEAUREGARD ST
TURKEYCOCK RUN
TURKEYCOCK RUN
DUKE ST
S WALKER ST
A
A'
B
B'
C
C'
12.4
45.6
34.6
13.3
48.3
10.0
13.3
48.3
44.9
14.9
27.8
31.9
38.9
30.0
0 250 500 1,000 Feet
Delay- seconds per vehicle
123.4
Note: Results Not Available
Density - vehicles per hour per lane
123.4
Level of Service
A - C
D
E
F
VDOT Virginia Department of Transportation
VIRGINIA MEGAPROJECTS
I-395 HOT/HOV LANES
TRANSPORTATION MANAGEMENT PLAN
2018 ONE-LANE CLOSURE PM
LEVEL OF SERVICE
EDSALL RD TO DUKE ST
Figure: 1
Scale: 1" = 500'
Date: August 30, 2017
DRAFT


I-395
29.2
26.6
38.2
29.9
36.8
39.8
29.6
28.4
25.6
-
N VAN DORN ST
SEMINARY RD
N BEAUREGARD ST
MARK CENTE
MARK CENTER AVE
PARK CENTER DR
KING ST
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus
C
C'
D
D'
E
E'
24.9
28.9
38.2
36.2
34.7
25.2
29.3
38.1
33.5
41.3
30.9
37.0
KENMORE AVE
MENOKIN DR
0 250 500 1,000 Feet
Delay- seconds per vehicle
123.4
Note: Results Not Available
Density - vehicles per hour per lane
123.4
Level of Service
A - C
D
E
F
VDOT Virginia Department of Transportation
VIRGINIA MEGAPROJECTS
I-395 HOT/HOV LANES
TRANSPORTATION MANAGEMENT PLAN
2018 ONE-LANE CLOSURE PM
LEVEL OF SERVICE
DUKE ST TO KING ST
Figure: 2
Scale: 1" = 500'
Date: August 30, 2017
DRAFT


SHIRLINGTON RD
24TH RD S
S GLEBE RD
I-395 SB OFF-RAMP
I-395
N QUAKER LN
26TH RD S
38.1
40.1
25.5
34.3
32.2
26.7
30.8
30.8
31.1
26.1
30.1
24.7
16.4
29.9
25.8
20.9
39.6
36.5
26.9
32.9
29.3
27.1
ARMY NAVY DR
S WASHINGTON BLVD
S JOYCE ST
23.7
19.3
Source: E
Source:
0 250 500 1,000 Feet
Delay- seconds per vehicle
123.4
Note: Results Not Available
Density - vehicles per hour per lane
123.4
Level of Service
A - C
D
E
F
VDOT Virginia Department of Transportation
VIRGINIA MEGAPROJECTS
I-395 HOT/HOV LANES
TRANSPORTATION MANAGEMENT PLAN
2018 ONE-LANE CLOSURE PM
LEVEL OF SERVICE
SHIRLINGTON RD TO S WASHINGTON BLVD
Figure: 3
Scale: 1" = 500'
Date: August 30, 2017
DRAFT

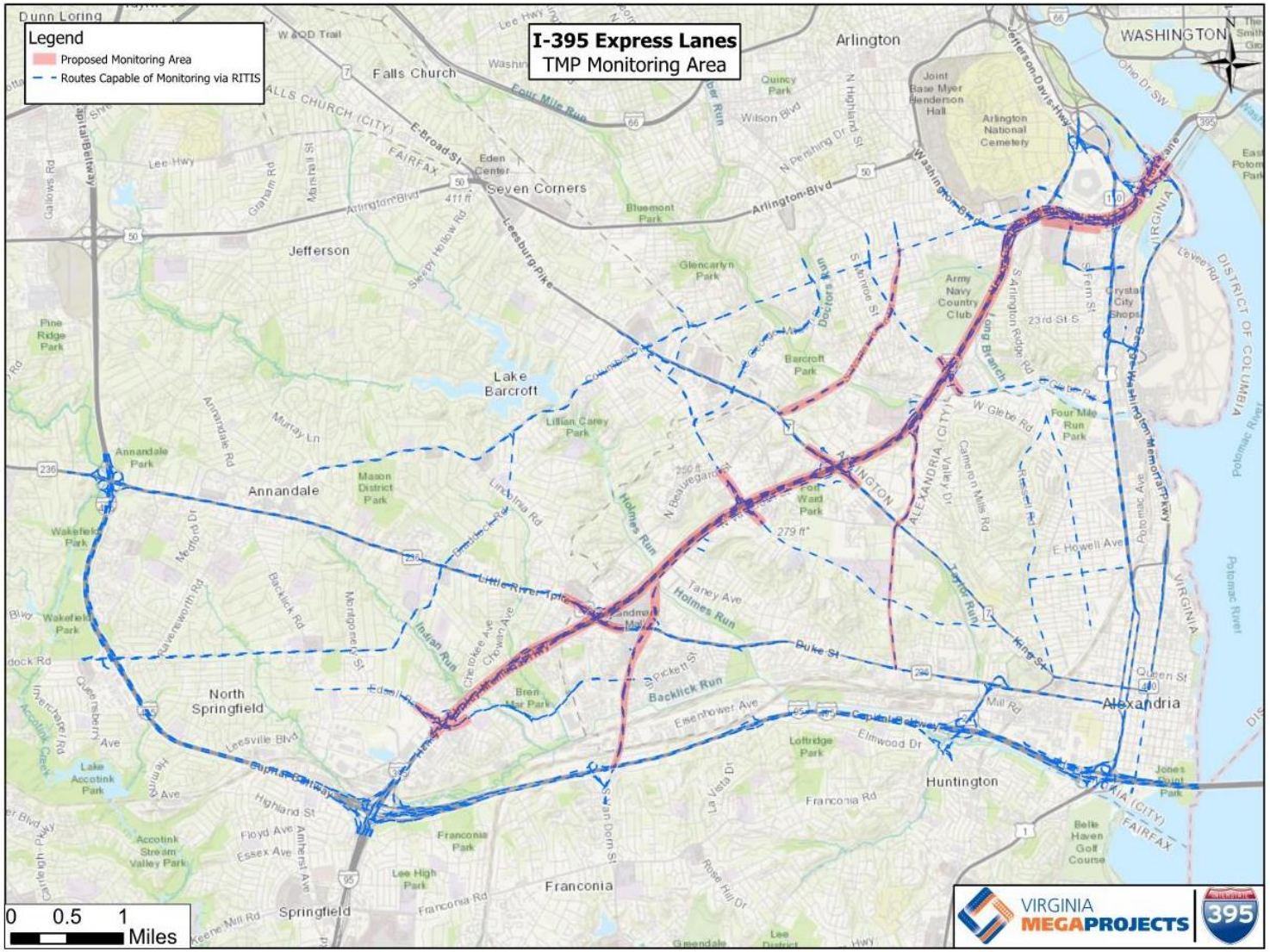

S WASHINGTON BLVD
ARMY NAVY DR
S JOYCE ST
MALL EXT
S HAYES ST
S FERN ST
S EADS ST
JEFFERSON DAVIS HWY
I-395
BOUNDARY CHANNEL DR
GEORGE WASHINGTON MEMORIAL PKWY
12.8
12.5
20.6
25.7
16.9
16.3
14.9
1.6
17.9
1.9
28.2
2.2
6.7
24.0
3.2
19.2
24.8
24.2
23.2
42.2
2.7
37.6
25.9
28.6
13.1
30.0
27.8
39.1
32.2
37.5
11.9
32.0
32.6
10.1
12.0
Feet
0
250
500
1,000
Delay- seconds per vehicle
123.4
Note: Results Not Available
Density - vehicles per hour per lane
123.4
Level of Service
A - C
D
E
F
VDOT Virginia Department of Transportation
VIRGINIA MEGAPROJECTS
I-395 HOT/HOV LANES
TRANSPORTATION MANAGEMENT PLAN
2018 ONE-LANE CLOSURE PM
LEVEL OF SERVICE
S JOYCE ST TO GEORGE WASH. MEM'L PKWY
Figure: 4
Scale: 1" = 500'
Date: August 30, 2017
DRAFT

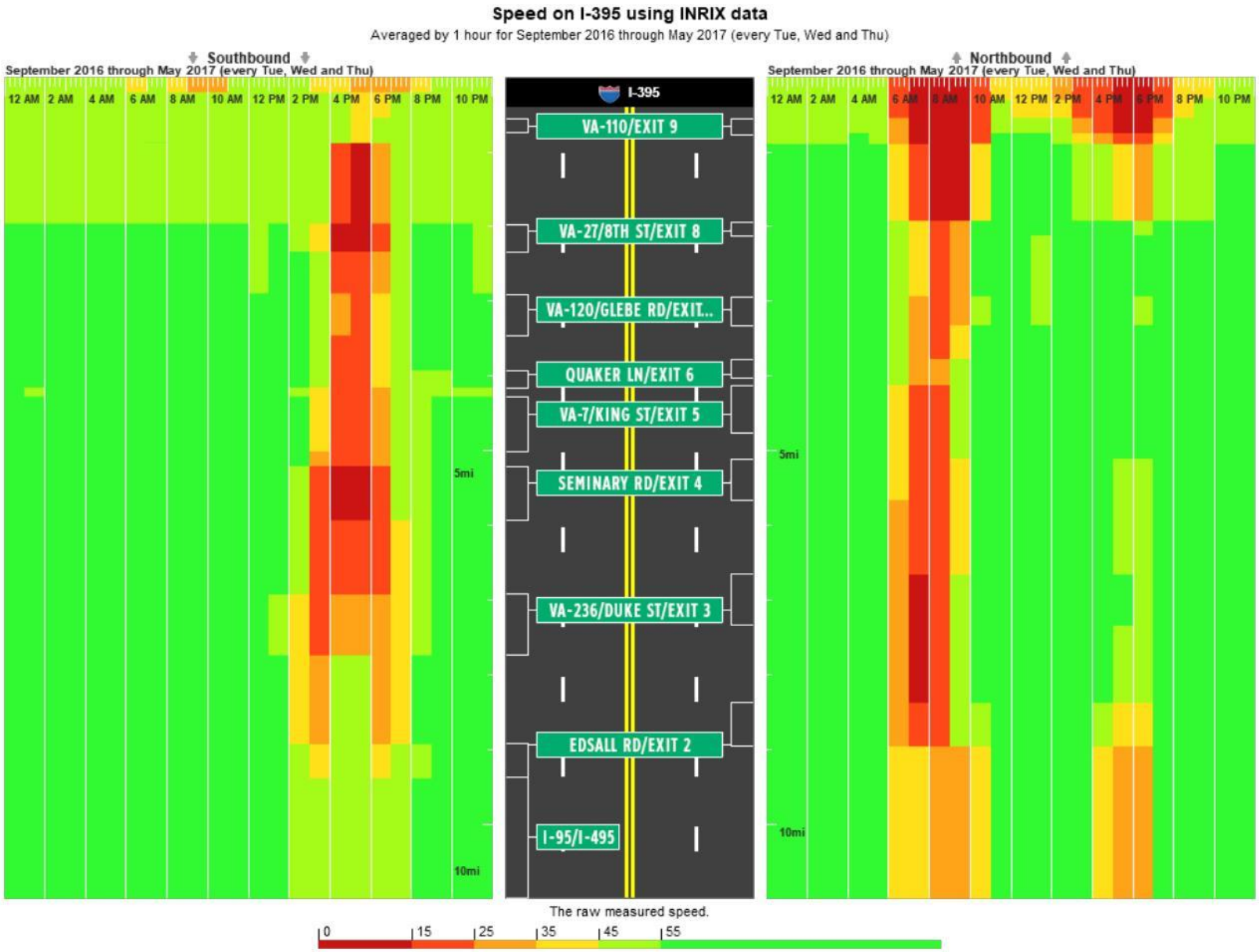
VIRGINIA
MEGAPROJECTS



Appendix E
Traffic Monitoring

INTERSTATE 395 Express Lanes


I-395 Express Lanes
TMP Monitoring Area
Legend
Proposed Monitoring Area
Routes Capable of Monitoring via RITIS
0 0.5 1 Miles
VIRGINIA MEGAPROJECTS
395


Speed on I-395 using INRIX data
Averaged by 1 hour for September 2016 through May 2017 (every Tue, Wed and Thu)
Southbound
September 2016 through May 2017 (every Tue, Wed and Thu)
12 AM 2 AM 4 AM 6 AM 8 AM 10 AM 12 PM 2 PM 4 PM 6 PM 8 PM 10 PM
5mi
10mi
I-395
VA-110/EXIT 9
VA-27/8TH ST/EXIT 8
VA-120/GLEBE RD/EXIT...
QUAKER LN/EXIT 6
VA-7/KING ST/EXIT 5
SEMINARY RD/EXIT 4
VA-236/DUKE ST/EXIT 3
EDSALL RD/EXIT 2
I-95/I-495
Northbound
September 2016 through May 2017 (every Tue, Wed and Thu)
12 AM 2 AM 4 AM 6 AM 8 AM 10 AM 12 PM 2 PM 4 PM 6 PM 8 PM 10 PM
5mi
10mi
The raw measured speed.
0 15 25 35 45 55

VIRGINIA
MEGAPROJECTS