APPENDIX A

PURPOSE AND NEED

November 2018

U.S. Department of Transportation

Federal Highway Administration

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY ADMINISTRATION

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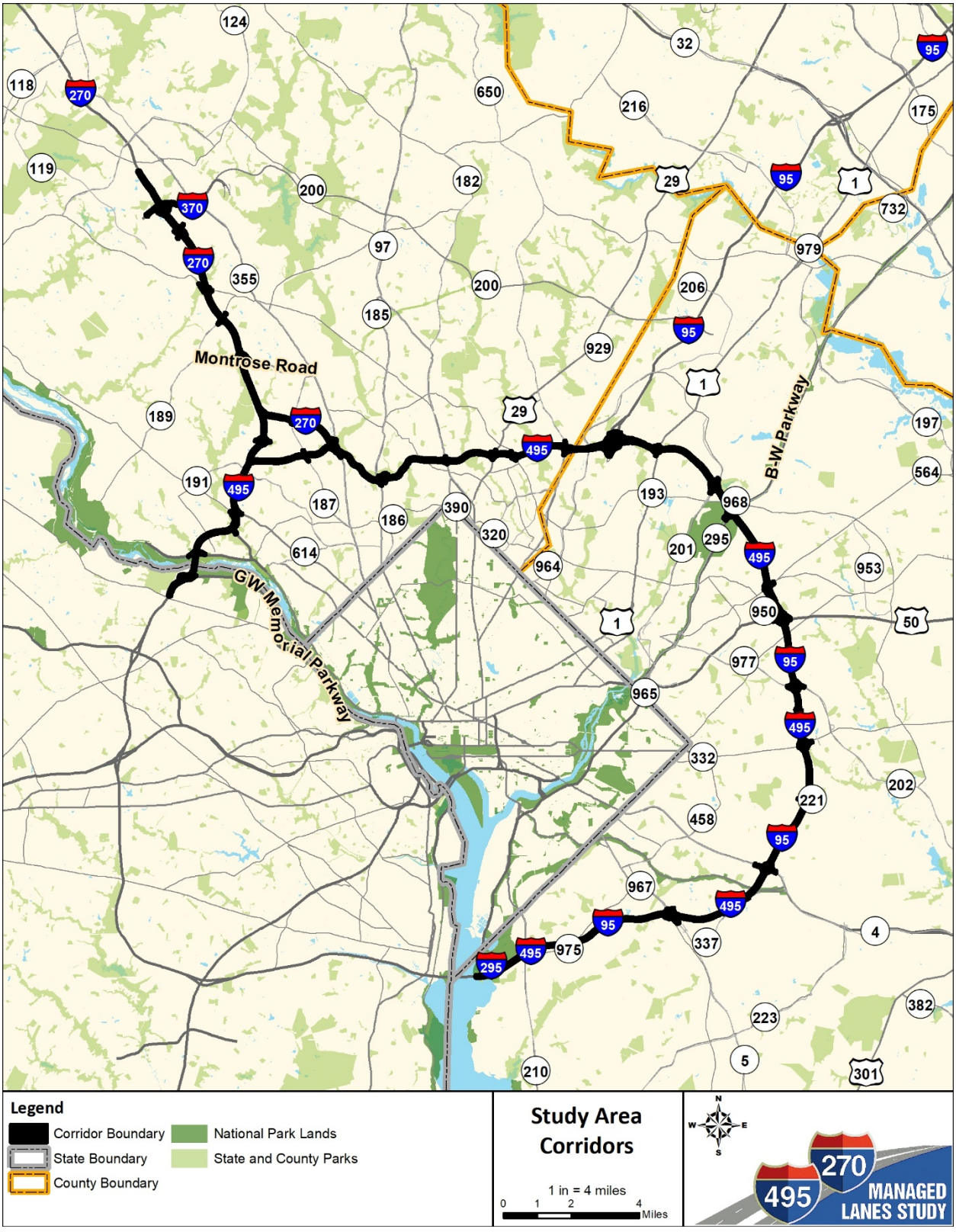
1 INTRODUCTION

The Federal Highway Administration (FHWA), as the Lead Federal Agency and Maryland Department of Transportation State Highway Administration (MDOT SHA), as the Local Project Sponsor, are preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA) for the I-495 & I-270 Managed Lanes Study. The I-495 & I-270 Managed Lanes Study is the first element of the broader I-495 & I-270 Public Private Partnership (P3) Program. The Program considers improvements along the entire length of I-495 (Capital Beltway), as well as the entire length of I-270 (Dwight D. Eisenhower Memorial Highway) up to I-70 in Frederick County, Maryland (**Figure 1-1**). This I-495 & I-270 Managed Lanes Study EIS will evaluate the potential environmental impacts of alternatives that address congestion within the specific study scope of I-495 from south of the American Legion Bridge in Fairfax County, Virginia to east of the Woodrow Wilson Bridge and on I-270 from I-495 to I-370, including the east and west I-270 spurs (**Figure 1-1**).

This EIS is prepared in accordance with FHWA and Council on Environmental Quality (CEQ) regulations implementing NEPA and provisions of the Fixing America's Surface Transportation (FAST) Act. The content of the EIS also conforms to CEQ guidelines, which provide direction regarding implementation of the procedural provisions of NEPA, and the FHWA's Guidance for *Preparing and Processing Environmental and Section 4(f) Documents* (Technical Advisory T6640.8A, October 1987).

The following sections provide additional details to support the general purpose and need statement that was shared with the Federal Highway Administration (FHWA) and MDOT SHA's regulatory partners. Summarized in this document is an overview of the I-495 and I-270 study corridors, a series of past studies or analyses that have considered congestion relief solutions within those corridors, and the factual bases to support the stated transportation needs for the I-495 & I-270 Managed Lanes Study.

Figure 1-1: I-495 & I-270 Managed Lanes Study Corridors



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2 OVERVIEW OF STUDY CORRIDORS

I-495 and I-270 in Maryland are the two most heavily traveled freeways in the National Capital Region, each with Average Annual Daily Traffic (AADT) volume up to 260,000 vehicles per day in 2016 (MDOT SHA, 2017). I-495 is the only circumferential route in the region that provides interregional connections to many radial routes in the National Capital Region, such as I-270, US 29 (Colesville Road), I-95, and MD 295/Baltimore-Washington Parkway (**Figure 1-1**). I-270 is the only freeway link between I-495 and the fast-growing northwest suburbs of Frederick County. In addition to heavy commuter traffic demand, I-495 is merged with I-95 in Maryland for 25 miles around the east side of Washington, D.C. providing connectivity along the East Coast.

I-270 is also the predominant route for freight and long-distance travel between the National Capital Region and points west (US Department of Transportation et al., 2009). The following summarizes the background of each study corridor.

2.1 I-495 Study Corridor

The federal government approved construction of I-495 in 1956 and construction began in 1957. The first section, from MD 355 to MD 185, opened to traffic in 1962 and the last section was opened in 1964. The original construction of all 41.7 miles of I-495 in Maryland was six lanes, three in each direction. I-495 has been widened in segments over time to its current configuration as a six to eight-lane freeway in each direction plus auxiliary lanes in some locations. The median width varies from approximately ten feet wide to 36 feet wide.

In Montgomery County, I-495 enters Maryland on the American Legion Bridge over the Potomac River as a ten-lane section with eight through lanes and two auxiliary lanes that connect Clara Barton Parkway in Maryland and George Washington Parkway in Virginia (**Figure 1-1**). Moving east, I-495 remains eight lanes except between the I-270 spurs where it remains only six-lanes wide. I-495 continues east through Prince George's County as an eight-lane roadway until east of the Woodrow Wilson Bridge where an express/local split occurs. This eastern half of I-495 is also designated I-95 and constitutes a link in the Maine to Florida I-95 system. Many radial roadway networks starting in the District of Columbia (DC) intersect I-495 over its 41.7 miles. Approximately 26 interchanges connect these radial routes to I-495 through the study corridor. Major, high volume north/south and east/west highways intersect I-495 including I-270, US 29, I-95, US 50, MD 5, and MD 210.

Numerous large and small retail centers, schools, sports stadiums, and major government and corporate employment centers are located immediately adjacent to I-495. The area surrounding the I-495 study corridor is highly populated and consists of low, medium and high-density residential uses. Within much of Montgomery County the corridor is flanked by low-density homes and parkland. Within Prince George's County the corridor consists of low density residential, numerous commercial centers and neighborhood parks. Over 24 miles of noise barriers extend along both sides of I-495 for an extensive portion in both Montgomery and Prince George's Counties.

2.2 I-270 Study Corridor

The oldest portions of I-270, originally known as US 240, were constructed from 1953 to 1960 between Bethesda and Frederick. These routes were incorporated into I-70S in 1956 after the creation of the Interstate System. The section of I-70S, north of the spur, was renumbered to I-270 in 1975, making a single highway designation from Frederick County to the Capital Beltway (AARoads, 2014). Today, I-270 is a fully access-controlled interstate with the number of lanes varying between four and twelve.

Where the I-270 east and west spurs intersect with I-495, I-270 carries six-lanes with the left lane of both directions used as a high-occupancy vehicle (HOV) lane during peak periods. North of the spurs, I-270 is a twelve-lane freeway with one HOV lane and five travel lanes in each direction. The median of I-270 is barrier-separated with full-width shoulders.

Between where the I-270 spurs join and the I-270/Montrose Road interchange, I-270 includes two collector-distributor (CD) lanes that are barrier-separated from the three mainline lanes and the HOV lane (**Figure 1-1**). I-270 intersects I-370 near Gaithersburg and connects to MD 200, the all-electronic toll highway that connects to I-95, north of I-495. I-370 also provides access to a park and ride lot and the Shady Grove Metro station, the northern-most station on the Washington Metropolitan Area Transit Authority (WMATA) Metrorail Red Line. Heading southbound, HOV restrictions begin north of the interchange with MD 117 and the northbound HOV restrictions end past the MD 121 interchange. I-270 narrows to a four-lane interstate as it continues north to Frederick.

The southern portion of I-270 near the east and west spurs consists of medium density residential land use with schools and mixed-use development. Suburban residential development and retail/commercial development continues along I-270 north of the spurs. Major government and corporate employment centers as well as commercial development are located adjacent to I-270 especially north of MD 28 to the interchange with I-370. Similar to I-495, noise barriers are located along a portion of the I-270 corridor with approximately 5.8 miles located along the length of the study area.

2.2.1 Regional Transportation Studies and Projects

A. Previous Regional Transportation Studies

Congestion has plagued this region for decades. MDOT SHA, MDOT Maryland Transit Administration (MTA) and Virginia Department of Transportation (VDOT) have performed numerous studies to evaluate a myriad of transportation solutions. Those solutions have demonstrated the need in this region for a synergistic system of transportation options. MDOT SHA and other regional transportation partners have studied and, in many cases, already constructed and improved elements of the transportation system. Those transportation facilities consist of interstate, circumferential and arterial highways, bus rapid

transit, local bus services, commuter and freight rail, one of the world's most extensive metro rail, and light rail systems that move people and goods throughout the region.

Since 1990, several studies have examined various sections of I-495 and I-270 within the current study limits in an effort to evaluate potential congestion relief and operational improvements. Each of these studies included, in part, proposed transportation solutions reflecting some of the operational and/or engineering alternatives that will be part of this EIS. In particular, the studies evaluated the implementation of managed lanes[1] including Express Toll Lanes[2] (ETL), High-Occupancy vehicle (HOV) lanes[3], High-Occupancy Toll (HOT) lanes[4] and parallel transit facilities on I-495, I-270 and I-95. These studies considered the potential to provide additional capacity along I-495 and I-270 that would connect with other regional transportation facilities.

The Maryland Department of Transportation (MDOT) sponsored the Statewide Commuter Assistance Study Corridor Profile Reports (MDOT, 1990) that identified, evaluated, and recommended actions that would improve travel along the state's 24 most heavily congested corridors. The study identified the need for additional capacity on the Capital Beltway (I-495) to handle existing and future traffic volumes, and recommended HOV lanes from MD 214 (Central Avenue) to I-295 and I-95 to the American Legion Bridge.

In 1992, the MDOT SHA initiated the Capital Beltway HOV Feasibility Study (MDOT SHA, 1992), which was renamed the Capital Beltway Corridor Transportation Study in 1998. The purpose of the study was to investigate the physical feasibility of adding an HOV lane on the Maryland portion of the Capital Beltway. This study concluded that the physical feasibility of implementing HOV lanes varies throughout the project area; however, the majority of the Capital Beltway would be able to accommodate an additional lane or the median lane would need to be converted to accommodate an HOV lane.
Following up on the 1992 HOV Feasibility Study, another study to include transit alternatives around the Capital Beltway was initiated by the Metropolitan Washington Council of Governments (MWCOG). The report titled *The Potential for Circumferential Transit in the Washington Region* (MWCOG, August 1993) concluded that sufficient demand exists for the staged addition of HOV lanes on the Capital Beltway along with additional radial HOV facilities, (i.e., I-270 and I-95). However, the study also concluded that the pattern of land use activity inherent in the 20-year forecasts done at that time did not provide a viable basis for circumferential rail transit along the Capital Beltway or along outer suburban corridors.

Consequently, in 2002, the Capital Beltway/Purple Line Study was initiated by MDOT SHA and MDOT MTA, which identified adding an HOV lane to I-495 and constructing the Purple Line as a transit alignment inside the Beltway. This study also concluded that fixed guideway transit was not recommended wholly along the Capital Beltway itself. A beltway corridor would take advantage of existing transportation right-of-

[1] **Managed Lanes** are highway facilities or a set of lanes where operational strategies are proactively implemented and managed in response to changing conditions. (https://ops.fhwa.dot.gov/publications/managelanes_primer/index.htm)

[2] **Express Toll Lane**s are dedicated managed lanes within highway rights-of-way that motorists may use by paying a variably priced toll. (https://www.fhwa.dot.gov/ipd/tolling_and_pricing/defined/demand_mgmt_tool.aspx)

[3] **High-occupancy Vehicle Lanes** are any preferential lane designated for exclusive use by vehicles with 2 or more occupants for all or part of a day, including a designated lane on a freeway, other highway or a street, or independent roadway on a separate right-of-way. (https://ops.fhwa.dot.gov/freewaymgmt/hovguidance/glossary.htm)

[4] **High-occupancy Toll Lanes** are HOV facilities that allow lower-occupancy vehicles, such as solo drivers, to use the facilities in return for toll payments, which could vary by time of day and level of congestion. (*National Cooperative Highway Research Program, Research Report 835, Guidelines for Implementing Managed Lanes*. Transportation Research Board. 2016)

way where available, but it does not effectively connect activity centers. Adding that people do not live and work "on the Beltway;" transit will better serve patrons by more directly connecting activity center locations.

In 2003, the transit and highway portions of the Capital Beltway/Purple Line Study were separated into two independent studies, the Purple Line Project and the Capital Beltway Study (MDOT SHA et al., 2013), with the justification that both projects were needed to meet the demands of the corridor. The Purple Line Project Final Environmental Impact Statement (FEIS) and Draft Section 4(f) Evaluation was signed in 2013 and a Record of Decision (ROD) was issued in 2014. This project is currently under construction with operation scheduled to begin in 2022 on a 16-mile, two-track light rail system from Bethesda to New Carrollton.

The 2004 Capital Beltway Study focused on roadway improvements that would address congestion of the Beltway. MDOT SHA carried three alternatives forward into the Alternatives Retained for Detailed Study (ARDS): 1) No-build; 2) Build Alternative 2 – six general-purpose and four ETLs; and 3) Build Alternative 3 – eight general-purpose and two ETLs. In 2004, environmental technical reports were completed analyzing the potential impacts to these three alternatives, in anticipation of completing the NEPA process. However, due to changes in transportation priorities, the NEPA process of the Capital Beltway Study was not completed and a Draft Environmental Impact Statement was not published.

In May 2002, the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) published a Draft Environmental Impact Statement (DEIS) for the I-270/US 15 Multi-Modal Corridor Study for public review and comment. The DEIS evaluated the impacts of 35 miles of highway improvements along the I-270/US 15 corridor and a 13.5-mile Corridor Cities Transitway (CCT). The DEIS evaluated three build alternatives (plus No-Build and TSM) from the Shady Grove Metrorail Station in Montgomery County to north of Biggs Ford Road in Frederick County; two of the build alternatives included HOV lanes. A selected alternative from the DEIS alternatives was not determined following the June 2002 Public Hearing. In 2003, MDOT initiated a feasibility evaluation of Express Toll Lanes for I-270. A subsequent Alternatives Analysis/Environmental Assessment (AA/EA) was completed in 2009 to evaluate the environmental effects of the two Express Toll Lane alternatives and reviewed the previously studied CCT alternatives using the updated ridership forecasting model to provide a comparison of overall study area conditions to the DEIS alternatives. The results of the AA/EA were presented at a 2009 public hearing; however, a final NEPA decision document was not prepared nor was a selected alternative determined by MDOT following the public hearing. In November 2010, the MDOT MTA completed a Supplemental Environmental Assessment (SEA) to provide more detailed environmental and engineering analysis on new CCT alternatives to better serve the proposed developments of Crown Farm, Life Sciences Center, and Kentlands. In December 2011, FHWA and FTA jointly concurred that the CCT had independent utility from the highway components of the I-270/US 15 Multi-Modal Corridor Study and the CCT would proceed with NEPA compliance separate from the highway alternatives of the I-270 Multi-Modal Corridor Study. MDOT MTA prepared an EA including alternative analysis and environmental technical studies. MDOT MTA published the EA with a preferred alternative in 2017. However, funding for design and construction of the project has been deferred until 2023; therefore, a final environmental document has not been prepared.

VDOT's I-495 Capital Beltway Study, reviewed proposed improvements to a 14-mile section of the Capital Beltway between the I-95/I-395/I-495 Interchange and the American Legion Bridge in Fairfax County, VA. The study identified improvements to increase the Beltway's capacity to accommodate expected growth in daily traffic volumes and remedy congestion, operational, and safety problems. The EIS led to a 2006 ROD which selected a 12-lane alternative to add two HOT lanes to the Capital Beltway in each direction with interchange modifications. A 2007 Reevaluation was conducted which updated traffic analysis and minor refinements to the 2006 Record of Decision selected alternative.

The Maryland's Statewide Express Toll Lanes Network Initiative (MDOT, 2007) provided an overview of the state's vision for regional connectivity through the implementation of managed lanes (including ETLs, HOV lanes, and HOT lanes) on major transportation routes. The implementation of ETLs on I-270 between I-495 and I-70, and HOT lanes along the entire portion of I-270 in Maryland, were included in the constrained long-range regional plan to identify individual studies.

The 2009 West Side Mobility Study, a joint study conducted by MDOT SHA and VDOT, evaluated potential improvements along I-495, the I-270 spurs, and the I-270 mainline between the VDOT HOT Lanes and I-370/Intercounty Connector/MD 200 (MDOT and VDOT, 2009). In this feasibility study, a wide range of alternatives were considered. The study resulted in a narrowed range of three alternatives and the recommended road widening and managed lane system consisted of one or two managed lanes in both directions that would connect the VDOT HOT lanes with the ETLs planned as part of the I-270/US 15 Multi-Modal Corridor Study and the all-electronic toll lanes on MD 200.

In April 2017, the Governor announced the $100 million I-270 Innovative Congestion Management Contract (ICM) to be implemented as a progressive design-build contract. The I-270 ICM is providing a series of projects to improve mobility and safety at key points along I-270. The programmatic approach is to implement a series of improvement projects targeted to reduce congestion at key bottlenecks along the corridor. The overall program would consist of fourteen distinct roadway improvements that increase capacity and vehicular throughput and address safety deficiencies by strategically reducing or eliminating these existing bottlenecks. The projects that make up this contract will result in an automated, smart traffic system on I-270 between I-70 and I-495. Improvements include the addition of general-purpose lanes, the addition or extension of auxiliary lanes, corridor wide, adaptive ramp metering, and active traffic management solutions such as dynamic message signs and dynamic speed limit signs. The additional lanes are being added through the narrowing of lanes and shoulders along with minimal widening where needed. All improvements are being implemented within the existing roadway right-of-way and will be completed by the end of 2019. While these improvements will improve mobility and safety, they will not address the long-term capacity need for the I-270 corridor.

In July 2017, the National Capital Region (TPB) at the MWCOG approved a set of 10 regional initiatives for further study, which includes analyzing managed lanes on the portions of I-495 and I-270 that are included in the I-495 & I-270 Managed Lanes Study. In September 2017, the Governor of Maryland announced the first portion of the statewide Traffic Relief Plan to evaluate additional capacity along sections of I-270, I-495, and the Baltimore-Washington Parkway (MD 295). The I-495 & I-270 Managed Lanes Study is the first element of this larger program.

Vision2045 was approved by the National Capital Region Transportation Planning Board on October 23, 2018. This plan includes the following financially constrained projects related to the I-495 & I-270 Managed Lanes Study:

- CLRP 1182: I-95/I-495 component of Traffic Relief Plan to include two managed lanes in each direction, between Baltimore Washington Parkway and Virginia Stateline/Potomac River (Woodrow Wilson Bridge), Montgomery and Prince George's Counties (www1.mwcog.org/clrp/projects/clrp-report.asp?PROJECT_ID=1182)

- CLRP 1186: I-270 component of Traffic Relief Plan, to include two managed lanes is each direction, between I-495 and I-70/US 40. Montgomery County. (www1.mwcog.org/clrp/projects/clrp-report.asp?PROJECT_ID=1186)

B. Long-Range Plans & Improvements

MWCOG and Montgomery and Prince George's Counties have adopted long-range transportation and master plans which include projects relevant to the study corridors and the transportation network in the National Capital region. A complete list of the project can be found through these agencies and is included in Appendix A of this Purpose and Need Statement.

Financially Constrained Long-Range Plan, 2016

The 2016 Financially Constrained Long-Range Plan (CLRP) Amendment document was approved by the National Capital Region TPB at the MWCOG in November 2016. "The CLRP identifies all the regionally significant capital improvements to the region's highway and transit systems that area transportation agencies expect to make and to be able to afford through 2040. The 2016 CLRP Amendment identifies more than 350 "regionally-significant" capital improvements that add or remove highway or transit capacity and therefore might affect future air quality. In all the plan includes 1,182 new lane-miles of roadway and 76 new miles of high-capacity transit." (2016 CLRP Amendment, page 18).

Montgomery County Plans and Improvements

The *Montgomery County General Plan*, adopted in 1964, relies on the concept of "wedges and corridors," which direct growth to be concentrated along the I-270 Corridor, Metrorail Red Line corridors and the urban ring communities closest to Washington, D.C. A master plan conveys land use policy for a defined geographic area and sets a vision for the future with specific recommendations intended to help implement that vision. It provides recommendations for land use, density, zoning, historic preservation, transportation, environment, parks and community facilities. The Master Plan of Highways and Transitways classifies each Montgomery County road in the transportation network and was recently amended by the County. Refer to Appendix A and http://montgomeryplanning.org/planning/master-plan-list/general-plans/ for additional information.

Prince George's County Plans and Improvements

Plan Prince George's 2035 was adopted in 2014 and includes comprehensive recommendations for guiding future development within Prince George's County. The plan includes general policy recommendations related to transportation and mobility such as expanding transit service, maintaining levels of service on roadways, and improving safety. The *Countywide Master Plan of Transportation for Prince George's County* was approved in 2009. This master plan includes recommendations for

transportation policies, strategies, and projects including bike and pedestrian, transit, highway, and other transportation improvements throughout Prince George's County. Refer to Appendix A and http://www.pgplanning.org/374/General-Plan for additional information.

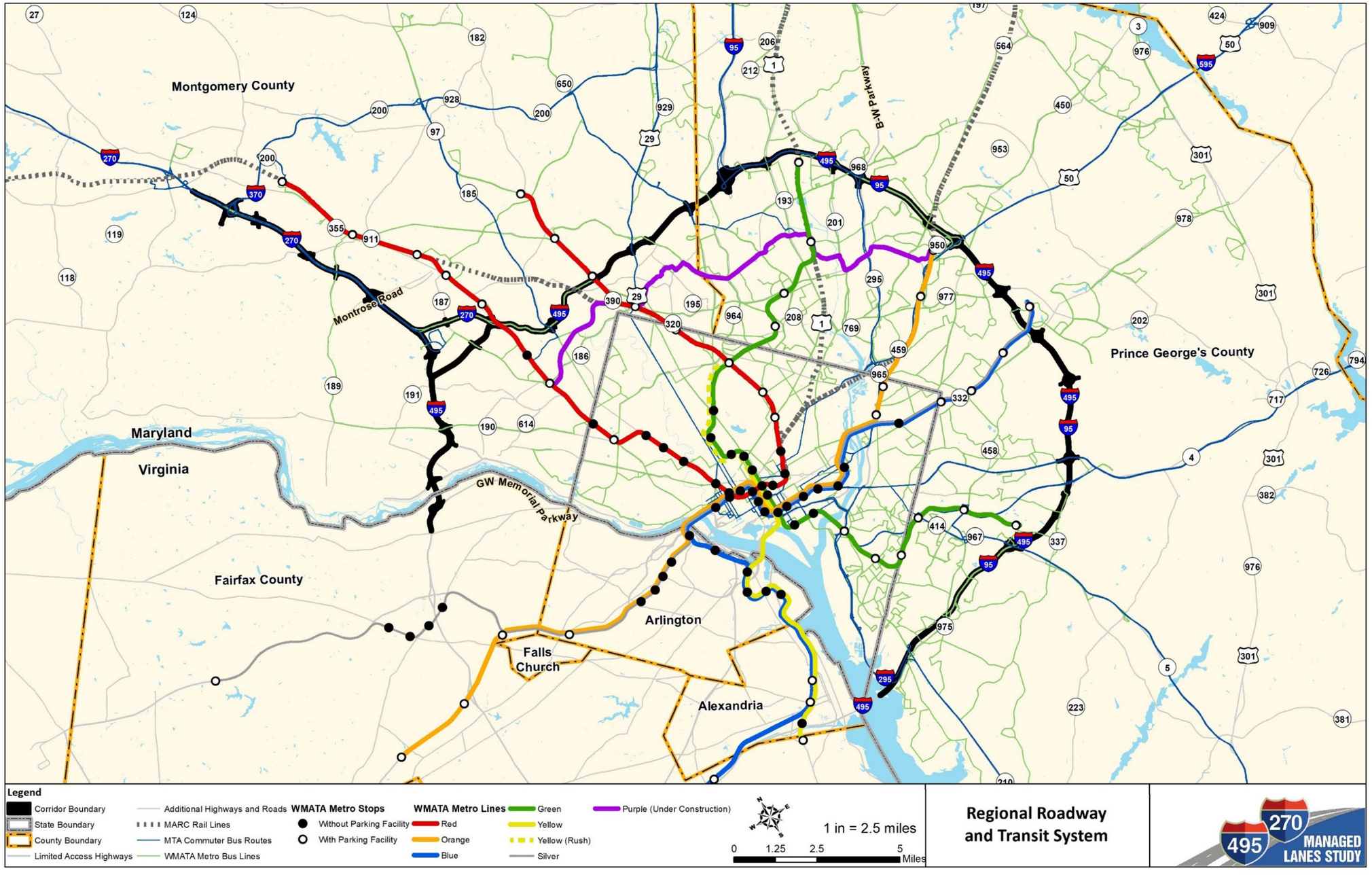
2.2.2 System Connectivity

System connectivity refers to the role of a specific transportation project in a larger transportation network. One of the objectives of any major investment study is to identify facility improvements that also improve the linkage of the regional transportation system. I-495 and I-270 are important elements of the National Highway System and the local transportation network. These highways have interregional connections to many radial routes in Maryland and Virginia that provide access to and from Washington, DC. Residential and employment activity centers and recreational facilities are located along I-495 and I-270. I-270 provides the highway link from I-495 to I-370/ MD 200 and to I-70. For long distance travelers, a portion of I-495 is also I-95 which serves as a critical link in the Maine to Florida interstate route. I-95 is designated as a portion of the National Highway System, a key element of the multimodal National Transportation System.

I-495 also provides a highway link to many of the region's other transportation modes including the Baltimore-Washington International, National and Dulles airports, and the Metrorail and Metrobus mass transit services operated by the WMATA. WMATA park and ride lots dot the perimeter of I-495; many of which also provide links to intercity and local bus and commuter rail transit services.

The regional roadway network and transit system are shown on **Figure 2-1.**

Figure 2-1: Regional Roadways and Transit System



A. Metrorail

The WMATA heavy rail system serves the National Capital region with primary service to and from the District of Columbia. Two branches of the Metrorail's Red Line serve Montgomery County extending to Shady Grove and Glenmont. The Green Line serves Prince George's County, intersecting the Beltway at Greenbelt and Branch Avenue. The Orange Line serves Prince George's County intersecting I-495 at New Carrollton. The Blue and Silver Lines serve Prince George's County at the Largo Town Center station.

B. Commuter Rail

The Maryland Area Regional Commuter (MARC) train service operated by the MDOT MTA connects Montgomery and Prince George's Counties to Washington DC, Baltimore and Martinsburg, West Virginia. The Penn and Camden MARC commuter rail line which extend from Washington, DC to Baltimore intersect with I-495 at New Carrollton and Greenbelt, respectively. Both of these stations also serve as Metrorail station stops. The MARC New Brunswick, Maryland and Martinsburg, West Virginia intersect with I-495 near Georgia Avenue. I-270 also serves access to the Gaithersburg and Metropolitan Grove MARC Stations on the New Brunswick Line.

C. Park and Ride, Commuter and Local Bus

Commuters also use the I-495 and I-270 to access park and ride lots throughout Montgomery and Prince George's Counties to board carpools, commuter rail, or transfer to public transit. Express bus service operates to and from area WMATA park and ride lots. Additional local bus service is provided to the Montgomery and Prince George's County by Metrobus and MDOT MTA. Montgomery County operates "Ride On" bus service and Prince George's County operates "The Bus" to supplement Metrobus service.

Montgomery County is developing an extensive bus rapid transit (BRT) system, as envisioned in the 2013 Countywide Transit Corridors Functional Master Plan. The first corridor to be implemented is along US Route 29 between Burtonsville and Silver Spring. The County is also moving forward with design of the MD 355 BRT corridor between Clarksburg and Bethesda. Additional BRT service has long been envisioned as part of the Corridor Cities Transitway, which generally parallels I-270. In addition, Montgomery County master plans including BRT service between the Red Line (either White Flint or Grosvenor) and Rock Spring and bus service on managed lanes between Rock Spring and Tysons, with a new HOV ramp at Fernwood Road.

As detailed in the *Southern Maryland Rapid Transit Alternatives Final Report*, the MDOT Maryland Transit Administration (MDOT MTA) has proposed an alignment for SMRT, an inter-county BRT system running along MD 5 from the Branch Avenue Metrorail Station in Prince George's County to the White Plains Station in Charles County. As proposed, the BRT system would cross the Capital Beltway/I-495 via an aerial structure at the Joint Base Andrews Station. Neither a system owner/operator and funding strategy, nor NEPA and preliminary engineering studies have been identified or completed yet for this proposed BRT system.

D. Bicycles and Pedestrians

The region contains hundreds of miles of on-street and off-street bikeways, trails and sidewalks. Many off-street bikeways also serve pedestrians. Most local jurisdictions in the area have developed bicycle and pedestrian transportation plans to coordinate the established bicycle and pedestrian transportation priorities and programs. Local jurisdictions encourage bicycling to Metrorail stations by providing

improved bicycle access, bicycle storage facilities, and bicycles on Metrorail trains during lower ridership periods. In the 2016 CLRP, MWCOG projects bike and pedestrian usage as a mode of commuting to increase by 47 percent by 2040.

E. Summary

Severe congestion on I-495 and I-270 adversely affects the regional and local roadway network, especially in and around the interchanges and arterial roads in the study area. The congestion on these corridors also has negative effects on access to and usage of other transportation modes. Besides enhanced performance on I-495 and I-270 themselves, improvements to provide congestion relief on these facilities will also enhance existing and proposed multimodal transportation services by improving connectivity and mobility through enhancing trip reliability and providing additional travel choices for efficient travel during times of extensive congestion. Improved direct and indirect connections to park and ride lots, Metrorail, bus and other transit facilities are anticipated to occur as a result of addressing congestion on these regional roadways, thus providing a system of systems approach to addressing overall transportation needs in the National Capital Region.

3

3 STUDY PURPOSE AND NEED

The study purpose and need were developed through a comprehensive process that included the examination of past studies, a review of existing regional plans, and an analysis of the environmental and socioeconomic conditions of the region. The purpose of the I-495 & I-270 Managed Lanes Study is to develop a travel demand management solution(s) that addresses congestion, improves trip reliability on I-495 and I-270 within the study limits and enhances existing and planned multimodal mobility and connectivity. The study will address the following needs.

- **Accommodate Existing Traffic and Long-Term Traffic Growth**. High travel demand from commuter, business, and recreational trips results in severe congestion from 7 to 10 hours per day on the study corridors, which is expected to deteriorate further by the planning horizon year of 2040. Additional capacity is needed to address existing and future travel demand and allow travelers to use the facilities efficiently.

- **Enhance Trip Reliability**. Congestion on I-495 and I-270 results in unpredictable travel times. Travelers and freight commodities place a high value on reaching their destinations in a timely and safe manner, and in recent years, the study corridors have become so unreliable that uncertain travel times are experienced daily. More dependable travel times are needed to ensure trip reliability.

- **Provide Additional Roadway Travel Choices**. Travelers on I-495 and I-270 do not have enough options for efficient travel during extensive periods of congestion. Additional roadway management options are needed to improve travel choices, while retaining the general-purpose lanes.

- **Accommodate Homeland Security.** The National Capital Region is considered the main hub of government, military, and community installations related to homeland security. These agencies and installations rely on quick, unobstructed roadway access during a homeland security threat. Additional capacity would assist in accommodating a population evacuation and improving emergency response access should an event related to homeland security occur.

- **Improve Movement of Goods and Services.** I-495 and I-270 are major regional transportation networks that support the movement of passenger and freight travel within the National Capital Region. Existing congestion along both corridors increases the cost of doing business due to longer travel times and unreliable trips. The effects of this congestion on the movement of goods and services is a detriment to the health of the local, regional, and national economy. Efficient and reliable highway movement is necessary to accommodate passenger and freight travel, moving goods and services through the region.

Additional capacity and improvements to enhance reliability must be financially viable. MDOT's traditional funding sources would be unable to effectively finance, construct, operate, and maintain improvements of this magnitude. Revenue sources that provide adequate funding, such as pricing options, are needed to achieve congestion relief and address existing high travel demand.

Given the highly constrained area surrounding the interstates, MDOT SHA recognizes the need to plan and design this project in an environmentally responsible manner. MDOT SHA will strive to avoid and minimize community, natural, cultural, and other environmental impacts, and mitigate for these unavoidable impacts at an equal or greater value. MDOT SHA will work with our federal, state, and local resource agency partners in a streamlined, collaborative, and cooperative way to meet all regulatory requirements to ensure the protection of significant environmental resources. Any build alternatives will adequately offset unavoidable impacts while prioritizing and coordinating comprehensive mitigation measures near the study area which are meaningful to the environment and the community.

The following sections describe existing conditions and transportation issues that shape the project needs.

3.1 Accommodate Existing Traffic and Long-Term Traffic Growth

The state of Maryland experiences the second longest commuting times in the nation, according to 2015 US Census American Community Survey data. The National Capital Region is the most congested region in the nation based on annual delay and congestion per auto commuter. Specifically, the I-270 and I-495 corridors are among the most congested corridors in Maryland. More than 240,000 vehicles travel on I-495 on a daily basis, and it is congested an average of 10 hours per day. Over 260,000 vehicles travel on I-270 on a daily basis, and it is congested seven hours per day on average. (MDOT SHA obtained the speed and travel time data from INRIX for the I-495 and I-270 corridors.)

The *2016 Maryland State Highway Mobility Report* (MODT SHA, 2016b)[5] documents substantial traffic growth in the National Capital Region as a result of increasing population and employment levels. This employment and population growth is occurring not only in Washington DC (DC), but also in the near and far suburbs of DC, creating demand for suburb-to-suburb travel in the region, as well as suburb to DC travel. Approximately 240,000 vehicles commute daily from Maryland into DC and an additional 120,000 vehicles commute to the suburbs of Montgomery and Prince George's Counties from out of state (MDOT SHA, 2016b). Both of these statistics show the large movement of people into and around the National Capital Region at peak periods and the movement of goods throughout the day; all of this movement focused around the major interstates.

[5] This Purpose and Need Statement was finalized in November 2018 and was based on the 2016 Mobility Report. The DEIS Purpose and Need Chapter 1 has been updated with the latest numbers from the 2018 Mobility Report.

3.2 Population and Employment Growth

I-495 connects key employment centers within the study area, many of which are undergoing redevelopment as multi-use activity centers with mixed land uses, including residential and retail activity. Bethesda, Rock Spring Technology Park, Silver Spring, Wheaton, College Park, Greenbelt, New Carrollton, Largo, and Suitland are all points of origin and destinations for large numbers of travelers. This creates travel demand during a broad range of time during the day and throughout the week as demonstrated by the fairly even traffic directional splits during the peak periods. The Outer Loop generally carries a little more traffic between I-95 and the Virginia Line during the AM and PM peak hours, carrying between 51 percent and 55 percent of the traffic, while the Inner Loop carries between 45 percent and 49 percent of the traffic. East of I-95, the Inner Loop carries more traffic during the AM peak hour (60 percent vs. 40 percent), while traffic is split nearly evenly during the PM peak.

Additionally, I-495 provides connections to many of the region's other transportation services including airports (Ronald Reagan National Airport and Washington Dulles International Airport), rail terminals (Amtrak, Maryland Rail Commuter stations), inter-city bus (Greyhound, Mega Bus), and rail transit services (Amtrak, Metrorail).

The I-270 corridor provides an essential connection between the National Capital Region, central and western Maryland, and longer-distance trips to the Midwestern United States, through use of I-70 and I-68. It is an important corridor for both local and long-distance trips. The area up to I-370 includes residential, retail/commercial, and growing mixed-use development including Downtown Crown in Gaithersburg. Major government and corporate employment centers such as National Institute Standards and Technology (NIST) and pharmaceutical corporations are spread throughout the county generating travel in both directions of I-270 during peak periods. However, there is a clear directional split in traffic on I-270. During the AM peak, the traffic split is approximately 65 percent/ 35 percent in favor of the southbound direction, while the traffic split is the opposite in the PM peak (approximately 65 percent/ 35 percent in favor of northbound).

I-270 is the primary route from the population centers around the National Capital Region to many recreational and tourism points of interest to the northwest including Monocacy National Battlefield, C&O Canal National Historical Park, Harpers Ferry National Historical Park, and Antietam National Battlefield. Traffic growth along I-495 and I-270 is related in part to increased regional population. A growing population results in the need for additional mobility to intended destinations such as work, school, sites of commerce, and recreational/tourism points of interest.

The population in Prince George's and Montgomery Counties have increased approximately 12.3 and 15.9 percent, respectively, between 2000 and 2015 (**Table 3-1**). The MWCOG estimates that between 2015 and 2040, the population in Montgomery County and Prince George's County will increase approximately 17.9 percent and 8.6 percent, respectively (**Table 3-1**). According to MWCOG 2000 and 2015 data, employment in Prince George's and Montgomery Counties has increased less than ten percent. The MWCOG estimates that between 2015 and 2040, employment in Montgomery County and Prince George's County will increase approximately 25.7 percent and 16.2 percent, respectively (**Table 3-2**).

Additionally, the population growth experienced in Calvert, Charles, and Frederick Counties (defined by MWCOG as inner DC suburbs) has increased by approximately 25.2 percent since 2000. This growth has created demand for suburb-to-suburb travel (circumferential travel) in the region, as well as suburb to DC travel (radial travel), resulting in congestion along the study corridors which provide access to, and between, the suburbs. Approximately 33.4 percent growth is predicted for Calvert, Charles, and Frederick Counties by 2040, which are serviced by the many radial feeder routes of I-495, including I-270. Similarly, the region has experienced an increase in employment levels since 2000, further contributing to traffic growth (**Table 2-2**).

Table 3-1: Regional Population Growth

Geography	2000	2015	% Increase Since 2000	2040 Forecast	% Increase Since 2015
Montgomery County	875,672	1,015,300	15.9%	1,197,100	17.9%
Prince George's County	805,723	904,400	12.3%	982,400	8.6%
Inner DC Suburbs[1]	390,386	488,900	25.2%	652,200	33.4%
Outer DC Suburbs[2]	891,273	1,039,200	16.6%	1,184,00	13.9%
MWCOG Planning Area Total	4,385,759	5,372,00	22.5%	6,665,300	24.1%

Sources: MWCOG (2006; 2016b)

[1] As defined by MWCOG and includes Calvert, Charles, and Frederick Counties.

[2] As defined by MWCOG and includes Anne Arundel, Carroll, and Howard Counties.

Table 3-2: Regional Employment Growth

Geography	2000	2015	% Increase Since 2000	2040 Forecast	Forecasted % Increase Since 2015
Montgomery County	474,602	520,200	9.6%	653,900	25.7%
Prince George's County	337,976	338,600	0.2%	393,300	16.2%
Inner DC Suburbs[1]	161,003	186,800	16.0%	235,800	26.2%
Outer DCSuburbs[2]	525,294	611,500	16.4%	769,700	25.9%
MWCOG Planning Area Total	2,791,859	3,151,700	12.9%	4,125,000	30.9%

Sources: MWCOG (2006; 2016b)

[1] Includes Calvert, Charles, and Frederick Counties.

[2] Includes Anne Arundel, Carrol, and Howard Counties.

Further, substantial employment growth has occurred in the inner and outer DC suburbs, including Calvert, Charles, Frederick, Anne Arundel, and Carroll Counties creating radial and circumferential demand along the study corridors within the National Capital Region. The increase in employment results in increased travel demand for resident and commuter workers and increased freight/goods to supply the businesses. Employment for the inner DC suburbs is projected to increase by 26.2 percent between 2015 and 2040. (**Table 3-2**).

The regional population and employment trends and projections, as shown in Tables 1-1 and 1-2, reveal that the growth in Montgomery and Prince George's Counties has steadily increased over the last 15 to 20 years and is expected to continue to grow, regardless of the congestion relief solutions in the region. This residential and employment growth is occurring and projected to occur in the inner and outer DC Suburb counties at an even higher rate. This continuing growth in the surrounding DC suburb counties is contributing to the congestion and long commuting times residents and employees experience on a daily basis.

3.3 Traffic Growth

Maryland measures traffic volume using the annual average daily traffic (AADT) statistic. The AADT is the total volume of vehicle traffic on a highway or road for a year divided by 365 days. The top five highest MDOT SHA, AADT volume freeway sections in 2016 were located within the study corridors (**Table 3-3 and Figure 1-1**). The highest demand in the region occurred along I-270 north of Montrose Road, with an AADT higher than 256,000 vehicles. The highest AADT observed along I-495 in the study corridor occurred between the MD 650 (New Hampshire Avenue, Exit 28) interchange and the I-95 interchange (Exit 27).

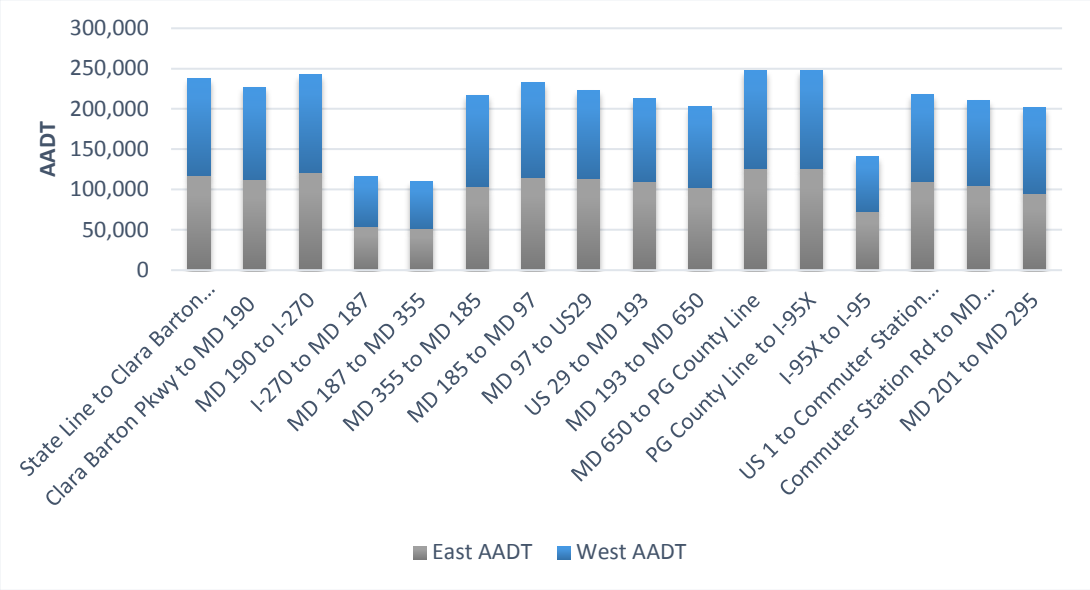
Table 3-3: Maryland Top Five Highest Freeway AADT Volumes

Freeway Section	2016 AADT
I-270 (Montrose Road to MD 189)	257,000
I-495 (MD 650 to I-95 Interchange)	248,000
I-495 (MD 190 to I-270)	243,000
I-270 (MD 189 to MD 28)	242,000
I-495 (VA State Line to Clara Barton Pkwy)	238,000

Source: MDOT SHA (2017)

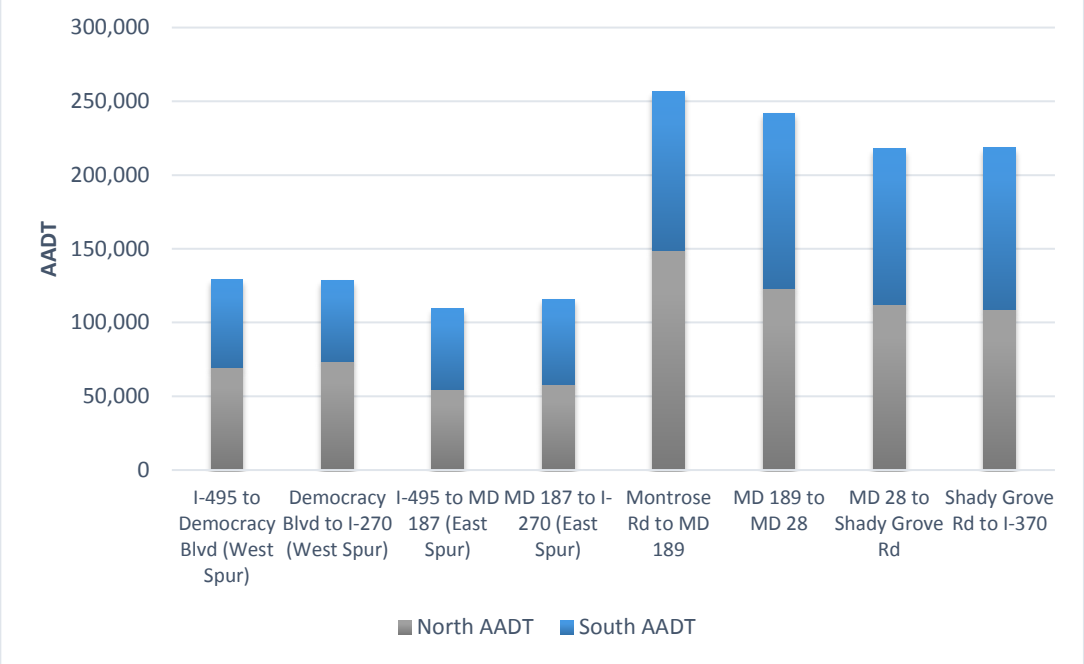
AADT volumes in 2016, along I-495, averaged over 200,000 vehicles per day for all roadway sections except for those between the I-270 spurs and within the I-95 interchange (**Figure 3-1**). Along I-270, traffic volumes appear to decrease south of Montrose Road to I-495 (**Figure 3-2**), however, traffic volumes in that area are split between those traveling to, or from, I-495 to the west and east spurs of I-270. Combined, volumes along the spurs reached an average of 245,392 vehicles per day in 2016.

Figure 3-1: Existing (2016) I-495 Study Corridor AADT



Source: MDOT SHA (2017)

Figure 3-2: Existing (2016) I-270 Study Corridor AADT



Source: MDOT SHA (2017)

3.4 Resulting Congestion

The high demand depicted in **Figure 3-1** and **Figure 3-2** results from commuter, commercial, and recreational use of the study corridors and has created congestion along the roadways. The congestion occurs during peak travel periods when demand exceeds roadway capacity. Along I-495, these peak travel periods occur at various times throughout the day, not just during the typical AM and PM peak periods, for as long as 10 hours per day. This type of recurring congestion makes roadways in the study corridors susceptible to exponential increases in delay, as the systems have a fixed capacity base (Cambridge Systematics, Inc., 2005). This exponential increase in delay occurs after a traffic queue has formed and new vehicles arrive, thereby increasing the delay for those vehicles arriving behind them (Cambridge Systematics, Inc., 2005).

Additionally, as the congestion increases, the speeds decrease and the roadways in the study corridors become more susceptible to traffic incidents, such as vehicle crashes which cause non-recurring congestion. Crashes are unpredictable and can result from decreased vehicle spacing (rear end collisions) and weaving and merging maneuvers (sideswipes) to change lanes. Heavily trafficked areas and construction zones are especially prone to these types of incidents (TPB, 2016d). After a crash occurs, it produces stop-and-go traffic movements and can result in lane closures on these capacity-limited systems. These non-recurring delays make the highway systems unreliable, thus negatively affecting travel times and speeds.

Long-term traffic management options are needed to address the existing and future recurring congestion along the study corridors. If the capacity is increased by adding general-purpose travel lanes, those lanes may draw from the local, slower road network or from users who switch from transit/carpooling to driving on the expanded roadway, thereby resulting in congested conditions on the new lanes, sooner than expected. In the National Capital Region, as well as across the country, the addition of roadway capacity cannot keep up with the growing demand for mobility due to the expanding populations and growth in and around the cities.

Therefore, the need exists to provide options/choices and reliable travel times for automobile occupants and transit riders in order to provide users with choice of how, where, and when they travel to avoid recurring and non-recurring congestion, which cannot be predicted at the beginning of a trip. Management strategies are one option in the transportation "tool-kit" that could be used to address the growing congestion. Managed lanes will maintain traffic operations at a relatively free-flow condition with little congestion because the number of vehicles entering the lanes is controlled. Management strategies were evaluated in the prior studies for these corridors: Capital Beltway Study, I-270 Multi-modal Corridor Study, and the West Side Mobility Study. The management strategies previously evaluated include HOV, HOT, or express toll lanes (ETLs).

3.5 Enhance Trip Reliability

Current high travel demand is negatively affecting performance along the study corridors. As described, this high demand from commuter, commercial, and recreational trips have increased, and will continue to do so, with population and employment growth. As demand has increased, these roadway systems operate poorly, negatively affecting the efficient movement of people and goods.

Changes in travel time and planning time indices reveal these growing congestion trends. Past trends indicate that the region's rapid growth, combined with its high traffic volume, commuting patterns, and limited capacity, has caused congestion to increase considerably, thus increasing travel and planning times.

MDOT SHA uses the Travel Time Index (TTI) as one of the primary measures of congestion on freeways/expressways. The TTI compares the 50th percentile travel time of a trip on a segment of freeway/expressway for a particular hour to the travel time of a trip during off peak (free-flow or uncongested) conditions. The higher the TTI, for a given hour of the day, the longer the travel times (MDOT SHA, 2016b). Free flow conditions equate to TTI 1.0, and a TTI of 2.0 indicates a trip takes twice as long as free flow conditions, and greater than 2.0 indicated severe congestion (**Tables 3-4** and **3-5**).

However, longer travel times are only part of the congestion picture along the study corridors. A user can plan accordingly if they know their trip will take extra time; however, when travel times vary greatly such as within the study corridors, trip reliability is uncertain (MDOT SHA, 2016b).

MDOT SHA measures trip reliability using the Planning Time Index (PTI). The PTI represents the total time travelers should allow to ensure they arrive at their destination on-time while taking into account potential delays due to non-recurring congestion. In Maryland, the 95th percentile travel time for a section of roadway is used as the baseline. Travelers travelling in free flow conditions that take five minutes to traverse a section of roadway should allow for 15 minutes to ensure arriving on time when the PTI is 3.0. The lower the PTI number, the more reliable the trip. The higher the value, the less reliable and longer a trip might take (MDOT SHA, 2016b) (**Tables 3-4 and 3-5)**.

Users traveling along roadways that experience high levels of congestion are more likely to be impacted by minor incidents. These incidents can produce severe back-ups and system level unreliable conditions for hours. Therefore, there is a strong correlation between average congestion and reliability (MDOT SHA, 2016b). Recent trends indicate that congestion is continuing to negatively affect the region. In the 2016 *Maryland State Highway Mobility Report* and 2014 *Maryland State Highway Mobility Report,* MDOT SHA lists the top 30 congested freeway/expressway segments, for the AM and PM peaks, and their reliability values, for 2015 and 2014, and 2013, respectively. Those segments occurring in the study corridors ranked in the top 15, for 2015, are provided below in **Table 3-4** and **Table 3-5**.

All roadway segments listed and ranked in **Table 3-4** and **Table 3-5** experienced severe congestion (TTI > 2.0) during the peak travel times for 2015, 2014, and 2013. All roadway segments listed, and ranked, also experienced high to extreme unreliability (PTI > 2.5) during the three reported years.

Table 3-4: Top Congested Segments in the Study Area and Associated Reliability Values (AM Peak)

Road	Location	Direction	2015 Rank (TTI)	2014 Rank (TTI)	2013 Rank (TTI)	2015 Rank (PTI)	2014 Rank (PTI)	2013 Rank (PTI)
I-495	MD 650 to MD 193	Outer	1 (4.4)	2 (3.9)	2 (3.83)	6 (8.5)	6 (7.5)	10 (7.13)
I-495	@ MD 650	Outer	2 (4.4)	1 (4.0)	1 (4.14)	1 (9.2)	1 (9.0)	1 (8.29)
I-495	PG County Line to MD 650	Outer	3 (3.7)	3 (3.6)	3 (3.56)	2 (9.1)	2 (8.7)	3 (7.86)
I-495	MD 193 to US 29	Outer	4 (3.6)	4 (3.2)	4 (3.15)	15 (6.3)	15 (5.8)	22 (5.45)
I-495	US 29 to MD 97	Outer	8 (2.8)	7 (2.5)	17 (2.42)	48 (4.4)	47 (4.0)	NL
I-270	@MD 189	South	13 (2.5)	17 (2.2)	15 (2.44)	36 (4.9)	43 (4.2)	NL
I-270	Shady Grove Rd to MD 28	South	14 (2.4)	10 (2.5)	9 (2.66)	20 (5.6)	17 (5.6)	14 (6.18)
I-495	I-95 to Mont. County Line	Outer	15 (2.4)	8 (2.5)	12 (2.52)	4 (9.0)	3 (8.6)	2 (8.18)

Source: MDOT SHA (2015; 2016b)

Note: NL=Not listed in ranking.

MDOT SHA defines the various levels of congestion in four categories based on TTI. These are:

- Uncongested (TTI < 1.15);
- Moderate Congestion (1.15 < TTI < 1.3);
- Heavy Congestion (1.3 < TTI < 2.0); or
- Severe Congestion (TTI > 2.0).

Table 3-5: Top Congested Segments in the Study Area and Associated Reliability Values (PM Peak)

Road	Location	Direction	2015 Rank (TTI)	2014 Rank (TTI)	2013 Rank (TTI)	2015 Rank (PTI)	2014 Rank (PTI)	2013 Rank (PTI)
I-495	Cabin John Pkwy to MD 190	Inner	4 (3.7)	3 (3.6)	1 (3.81)	9 (7.4)	9 (7.1)	8 (6.96)
I-270 Spur	@ I-495	South	5 (3.6)	50 (2.0)	NL	2 (12.0)	3 (9.6)	2 (8.86)
I-495	Clara Barton Pkwy to Cabin John Pkwy	Inner	8 (3.2)	7 (3.1)	6 (3.06)	17 (6.3)	20 (5.6)	25 (5.17)
I-495	MD 190 to I-270 Spur (West)	Inner	9 (3.1)	8 (3.1)	8 (2.95)	38 (5.1)	26 (5.3)	NL
I-495	@ Clara Barton Pkwy	Inner	11 (3.0)	11 (2.9)	10 (2.84)	27 (5.5)	25 (5.3)	NL
I-270 Spur	@Democracy Blvd	South	12 (3.0)	74 (1.8)	24 (2.31)	1 (15.0)	1 (11.7)	1 (9.30)

Road	Location	Direction	2015 Rank (TTI)	2014 Rank (TTI)	2013 Rank (TTI)	2015 Rank (PTI)	2014 Rank (PTI)	2013 Rank (PTI)
I-495	MD 191 to MD 190	Outer	13 (2.9)	62 (1.9)	NL	19 (6.2)	40 (4.7)	NL
I-495	US 1 to Greenbelt Metro	Inner	14 (2.9)	16 (2.5)	27 (2.26)	40 (5.0)	48 (4.6)	NL

Source: MDOT SHA (2015; 2016b)
Note: NL=Not listed in ranking.
For reporting purposes, MDOT SHA categorize PTI for freeways/expressways as:

- Reliable (PTI < 1.5);
- Moderately Unreliable (1.5 < PTI < 2.5); or
- Highly to Extremely Unreliable (PTI > 2.5).

The 2040 TTI projections show even greater travel times with over a 25 percent increase in travel times in all locations along I-495 in the AM peak period, and even greater travel time increases in the 2040 PM peak condition, as shown in **Table 3-6** and **Table 3-7.** Travel times along the study corridors will increase and users will have to increase their planned time to reach their intended destinations. In addition, increased amounts of congestion will decrease vehicle spacing along the roadways, thereby increasing the potential for congestion-related crashes (rear end and sideswipe collisions). When these occur, traffic incidents and non-recurring congestion will further degrade the performance and reliability of I-495 and I-270, causing delay for over 300,000 commuters each weekday by 2040 and increasing travel costs.

Table 3-6: 2015 and 2040 No-Build Study Corridors TTI (AM Peak)

Road	Location	Direction	2015 TTI	2040 TTI	Forecasted % Increase
I-495	MD 650 to MD 193	Outer	4.4	5.6	27%
I-495	at MD 650	Outer	4.4	5.6	27%
I-495	PG County Line to MD 650	Outer	3.7	4.7	27%
I-495	MD 193 to US 29	Outer	3.6	4.6	28%
I-495	US 29 to MD 97	Outer	2.8	3.6	36%
I-270	at MD 189	South	2.5	2.5	0%
I-270	Shady Grove Rd to MD 28	South	2.4	2.4	0%
I-495	I-95 to Mont. County Line	Outer	2.4	3.1	29%

Source: MDOT SHA (2016b) Note: MDOT SHA defines the various levels of congestion in four categories based on TTI. These are:

- Uncongested (TTI < 1.15);
- Moderate Congestion (1.15 < TTI < 1.3);
- Heavy Congestion (1.3 < TTI < 2.0); or
- Severe Congestion (TTI > 2.0).

Table 3-7: 2015 and 2040 No-Build Study Corridors TTI (PM Peak)

Road	Location	Direction	2015 TTI	2040 TTI	Forecasted % Increase
I-495	Cabin John Pkwy to MD 190	Inner	3.7	6.6	78%
I-270 Spur	at I-495	South	3.6	4.5	25%
I-495	Clara Barton Pkwy to Cabin John Pkwy	Inner	3.2	5.7	78%
I-495	MD 190 to I-270 Spur (West)	Inner	3.1	5.5	77%
I-495	at Clara Barton Pkwy	Inner	3.0	5.4	80%
I-270 Spur	At Democracy Blvd	South	3.0	3.8	27%
I-495	MD 191 to MD 190	Outer	2.9	5.2	79%
I-495	US 1 to Greenbelt Metro	Inner	2.9	2.9	0%

Source: MDOT SHA (2016b)

Note: MDOT SHA defines the various levels of congestion in four categories based on TTI. These are:

- Uncongested (TTI < 1.15);
- Moderate Congestion (1.15 < TTI < 1.3);
- Heavy Congestion (1.3 < TTI < 2.0); or
- Severe Congestion (TTI > 2.0).

Overall, this TTI and PTI data shows that users in the corridor need an option for a reliable trip when the general-purpose lanes are congested due to recurring or non-reoccurring congestion. Managed lanes are an option to provide users with a more reliable travel time for their trip. Managed lanes are designed to operate at an acceptable level of service even when the adjacent general-purpose lanes are congested, because they are managed to control the number of vehicles using the lane to keep them flowing, thus providing users with a more reliable option to reach their destinations.

3.6 Provide Additional Roadway Travel Choice

Travelers on I-495 and I-270 do not have free-flowing travel options in the study corridors during peak periods. Existing low-occupancy vehicle, truck, bus, carpool, and vanpool users are limited to general-purpose lanes along these roadways. These users must either plan for recurring delays during peak periods, attempt to bypass high volume ramps/locations using arterial streets, or adjust their travel schedule to avoid these typical delays. In addition, other than choosing alternate non-freeway routes, no options exist for roadway users to avoid non-recurring delays, such as during crashes, which can close travel lanes on these interstates in the study corridors. Additional roadway management options are needed to improve travel choice for time-sensitive trips, provide opportunities to bypass delays, and manage demand, while improving reliability and maintaining the existing number of general-purpose lanes in the study corridors.

Managed lanes are an option to provide drivers with a choice to carpool or pay for a less congested trip because they are managed to control the number of vehicles using the lanes. The option allows drivers to choose the managed lanes if their particular trip purpose warrants a relatively free-flow condition. The management strategies could include HOV, HOT, or express toll lanes (ETLs). Managed lanes also can provide reliable, more efficient transit service such as express and commuter bus routes. Optimizing free flow conditions has the potential to increase overall mobility by making transit usage on those lanes faster

and more effective. Accommodating transit usage on the managed lanes, coupled with enhancing connectivity through reduced congestion on the study corridors, presents the opportunity to incorporate multimodal solutions to the identified transportation needs.

When travelers on I-495 and I-270 experience seven to ten hours of congestion, a region-wide transportation system "toolkit" is needed to address congestion. The State, therefore, is considering other transportation improvements, outside the scope of the I-495 and I-270 Managed Lanes Study, to provide additional travel choices for residents, including the Purple Line light rail project, increased annual funding for WMATA bus and Metro improvements, Smart Signal timing systems, and additional capacity on MD 295.

3.7 Accommodate Homeland Security

The National Capital Region is one of our nation's primary hubs for government agencies, military installations, and other facilities related to homeland security. During a homeland security event, these facilities along the I-495 and I-270 study corridors, as well as beyond the limits of the study corridors into the Baltimore Metropolitan Area and Northern Virginia, may be required to utilize I-495 and I-270 to perform the following actions:

- Mobilize military, law enforcement, and specialized incident management personnel;
- Connect affected populations to medical services;
- Provide emergency evacuation and rescue/recovery from natural resource disasters and man-made threats;
- Provide protection for critical infrastructure, agriculture, food, and animals;
- Provide access to medical services; and
- Redistribute food and fuel.

An overview of these homeland and emergency response agencies and facilities is provided in **Table 3-8**, and an overview of major hospitals is provided in **Table 3-9**.

As shown in **Figure 3-3**, a variety of radial corridors in the National Capital Region are designated emergency evacuation routes, all of which lead from downtown DC to I-495. I-495 and I-270 are primary connections to and from densely populated communities in the National Capital Region, and the daily high travel demand on these highways results in severe congestion. Mobility and access for emergency response vehicles are limited by the traffic conditions on these highways, where high vehicle volume may reduce the ability for emergency response vehicles to navigate and pass through congestion. This may result in longer response times. The study, *Emergency Medical Service Providers' Experiences with Traffic Congestion*, based on surveys from Emergency Medical Services (EMS) first responders, supports this idea. The study results indicate that traffic congestion is more often experienced on interstates and national highways than city streets, and that traffic congestion, on average, contributes to an extra ten minutes in emergency response time (Griffin and McGwin, 2013).

Furthermore, congestion would be exacerbated in the event of an emergency evacuation and/or homeland security event in the National Capital Region. Per the FHWA study, *Highway Evacuations in Selected Metropolitan Areas: Assessment of Impediments*, a primary impediment to effective large-scale evacuations in National Capital Region is limited by roadway capacity (FHWA, 2010).

Table 3-8: Emergency Response Agencies and Facilities in the National Capital Region

FEDERAL	AGENCY	AREA/COUNTY
U.S. Department of Homeland Security (DHS)	U.S. Citizenship and Immigration Services (USCIS)	Washington, DC
	U.S. Customs and Border Protection (CBP)	Washington, DC
	U.S. Coast Guard (USCG)	Washington, DC
	Federal Emergency Management Agency (FEMA)	Washington, DC
	Federal Law Enforcement Training Center (FLETC)	Washington, DC
	U.S. Immigration and Customs Enforcement (ICE)	Washington, DC
	Transportation Security Administration (TSA)	Washington, DC
	United States Secret Service (USSS)	Washington, DC
	Directorate for Management	Washington, DC
	National Protection and Programs Directorate	Washington, DC
	Science and Technology Directorate	Washington, DC
	Countering Weapons of Mass Destruction Office	Washington, DC
	Office of Intelligence and Analysis	Washington, DC
	Office of Operations Coordination	Washington, DC
U.S. Department of Defense (DoD)—Offices/ Headquarters	National Geospatial-Intelligence Agency	Washington, DC
	Defense Intelligence Agency	Washington, DC & Bethesda, MD
	Defense Logistics Agency	Fort Belvoir, VA
	Defense Commissary Agency	Fort Lee, VA
	National Reconnaissance Office	Chantilly, VA
	Air National Guard	The Pentagon; Arlington County, VA
	U.S. Marine Corps	Arlington County, VA
	U.S. Department of the Army	The Pentagon; Arlington County, VA
	U.S. Department of the Navy	The Pentagon; Arlington County, VA
	U.S. Department of the Air Force	The Pentagon; Arlington County, VA
U.S. Department of State		Washington, DC

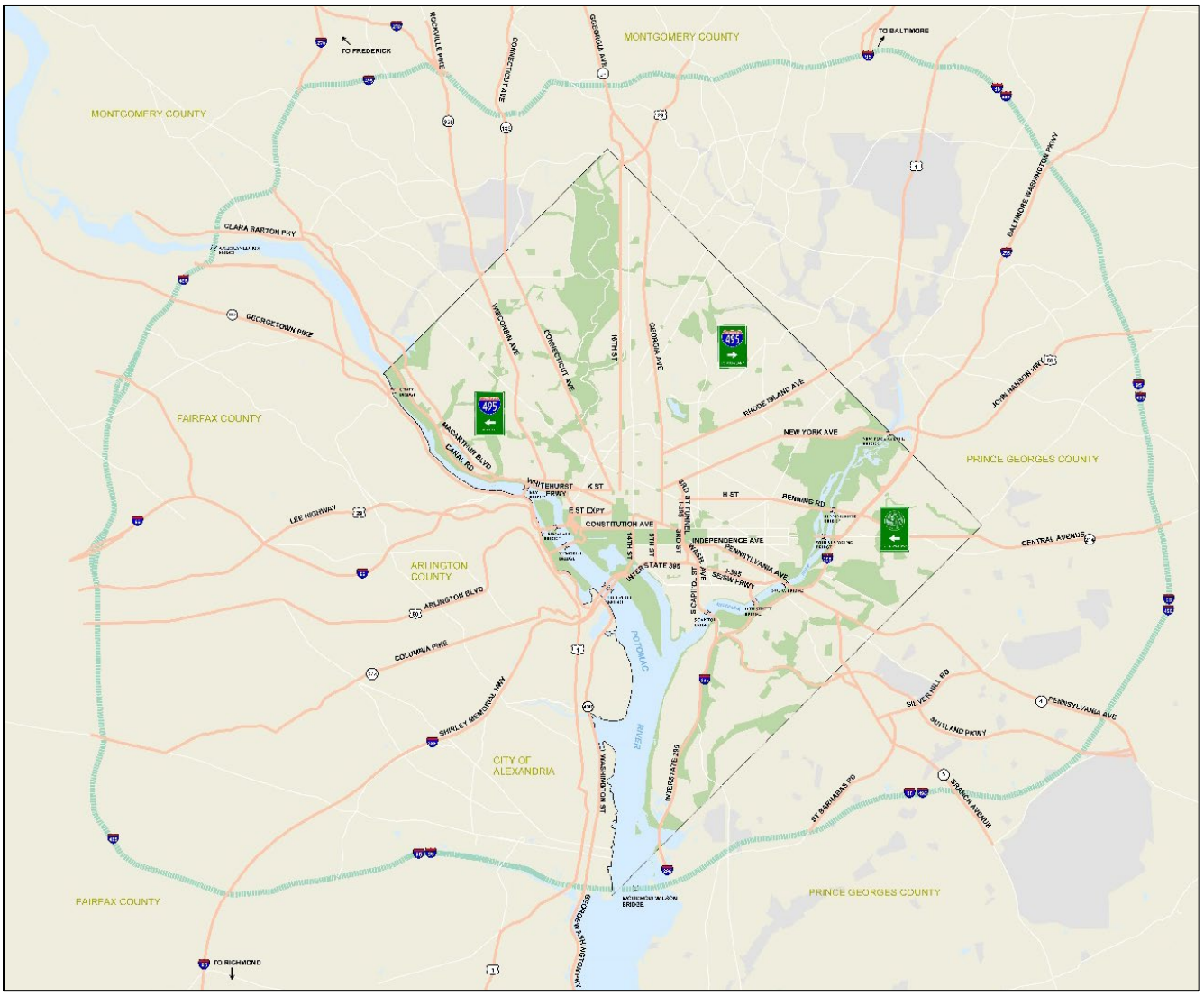
FEDERAL	AGENCY	AREA/COUNTY
U.S. Department of Veterans Affairs		Washington, DC
Central Intelligence Agency		McLean, VA
The National Counterterrorism Center		McLean, VA
The Defense Advanced Research Projects Agency (DARPA)		Arlington County, VA
Federal Bureau of Investigation		Washington, DC
National Security Agency		Fort Meade, MD
U.S. Dept. of Justice	Drug Enforcement Agency	Springfield, VA
National Maritime Intelligence Integration Office (U.S. Navy)		Prince George's County, MD

Table 3-9: Major Hospitals in the National Capital Region

Military Health System	Andrew Radar Army Health Clinic	Fort Myer, VA
	DiLorenzo TRICARE Health Clinic	The Pentagon; Arlington County, VA
	Dumfries Health Center	Dumfries, VA
	Fairfax Health Center	Fairfax, VA
	Fort Belvoir Community Hospital	Fort Belvoir, VA
	Fort McNair Army Health Clinic	Washington, D.C.
	Joint Base Anacostia-Bolling Clinic	Washington, D.C.
	Kimbrough Ambulatory Care Center	Fort George G. Meade, MD
	Malcolm Grow Medical Clinics and Surgery Center	Joint Base Andrews, MD
	Naval Health Clinic Annapolis	Annapolis, MD
	Naval Health Clinic Quantico	Quantico, VA
	Naval Health Clinic Washington Navy Yard	Washington, D.C.
	Walter Reed National Military Medical Center	Bethesda, MD
Montgomery County, MD	Adventist Healthcare	Takoma Park, MD Rockville, MD Germantown, MD
	Holy Cross Germantown Hospital	Germantown, MD
	Holy Cross Hospital	Silver Spring, MD
	Montgomery Medical Center	Olney, MD
	National Institutes of Health Clinical Center	Bethesda, MD
	Suburban Hospital	Bethesda, MD
Prince George's County, MD	Doctors Community Hospital	Lanham, MD
	Fort Washington Medical Center	Fort Washington, MD
	Prince George's Hospital Center	Cheverly, MD
	Southern Maryland Hospital Center	Clinton, MD
	University of Maryland Bowie Health Center	Bowie, MD
	University of Maryland Laurel Regional Hospital	Laurel, MD

Source: Maryland Hospitals, Maryland Manual On-Line,
http://msa.maryland.gov/msa/mdmanual/01glance/html/hospital.html#mo

Figure 3-3: National Capital Region Emergency Event Routes



Source: District Department of Transportation (https://ddot.dc.gov/node/481502)

3.8 Improve Movement of Goods and Services

The transportation connections that I-495 and I-270 provide are essential to the productivity of the National Capital Region's economy. The study corridors allow the movement of goods and services, including freight and commuting employees, throughout the region.

The ability to move freight, services and commuting employees through the study corridors will increasingly depend on the performance of the existing travel lanes on I-495 and I-270. Travelers, commuting employees, and freight trucks are especially sensitive to non-recurring delays (unanticipated disruptions), which are indicative of poor reliability, as they disrupt scheduled activities and manufacturing/distribution activities (TPB, 2016d). The MDOT SHA has estimated the cost of delays and unreliability to users on the freeway/expressway network on a statewide and regional basis. For the reported years (2015, 2014, and 2013), the total congestion cost to users in the National Capital Region has exceeded all other regions in the state of Maryland (**Table 3-10**). In 2015, the percentage of

congestion cost by source was attributed to auto delay (89 percent), freight truck delay (five percent), wasted fuel (three percent), and air emissions cost (three percent) (MDOT SHA, 2016b).

Table 3-10: Total Cost of Congestion on Maryland Freeways/Expressways ($ Millions)

Region	2013	2014	2015	Change 2013 to 2015
Statewide	$1,676	$1,698	$2,052	+$376
National Capital	$949	$954	$1,222	+$273
Baltimore	$681	$686	$806	+$125
Eastern Shore	$31	$47	$20	-$11
Southern	$4	$5	$1	-$3
Western	$11	$6	$3	-$8

Source: MDOT SHA (2016b)

3.9 Movement of Freight Goods

Freight-dependent industries, including goods transportation services, raw materials/intermediate products transportation services, and retail/consumer outlets, account for 19 percent of the National Capital Region's Gross Domestic Product (GDP), which totaled $464 billion in 2013 (National Capital Region Transportation Planning Board, 2016c). Among these industries within the National Capital Region, the truck transportation mode accounts for 86 percent of the total weight and 79 percent of the total value of freight moved (National Capital Region Transportation Planning Board, 2016c).[6] Reliable travel times are critical to the movement of freight trucks and, therefore, the economy of the National Capital Region.

The I-95 corridor is a nationally important highway providing for freight movement along the East Coast from Maine to the southern tip of Florida, also providing connections to/from the Port of Baltimore. It connects the largest population centers along the East Coast, serving as a key connection and fundamental backbone of roadway transportation in the eastern US. As such, the portion of I-95 which coincides with the east side of I-495 and serves as a through route for freight, is an important link in a much larger system. Therefore, maintaining the movement of freight goods is important to the economy of the region as well as the entire East Coast.

As shown in **Figure 3-4**, both I-495 and I-270 are designated Tier 1 truck routes under the Regional Freight-Significant Network. Tier 1 roadways are state-designated truck routes, interstates, and other high-volume roadways on which most freight enters and leaves the National Capital Region and are typically used by pass-through trucks. I-495 provides connections for freight trucks from the Virginia-Maryland state line, through the Montgomery County-Prince George's County line, to I-95. I-270 provides similar connections from I-495, through the Montgomery County-Frederick County line, to I-70.

[6] The freight weight and value percentages presented here are based on the National Capital Region Transportation Planning Board's *National Capital Region Freight Plan* (July 2016). The most recently available freight demand analysis data used in the 2016 *Freight Plan* is from 2007. See page 45 of the 2016 *Freight Plan* for additional information.

Freight trucks contribute to daily traffic flow conditions along I-495 and I-270. As shown in **Figure 3-5**, the study corridors experience the highest volume of freight trucks and greater percentages of freight trucks relative to other vehicles in the Freight-Significant Network. Based on annual average data, both the I-495 study corridor and I-270 study corridor serve between 12,000 and 20,000, and over 20,000, trucks per day.

Based on 2016 MDOT SHA truck data, daily truck percentages on these study corridors are:

- I-270 between I-495 and I-370: approximately 4 to 9% trucks
- I-495 between American Legion Bridge and US 29: approximately 8 to 9% trucks
- I-495 between US 29 and I-95: approximately 5 to 6% trucks
- I-495 between I-95 and Baltimore-Washington Parkway: approximately 8 to 9% trucks

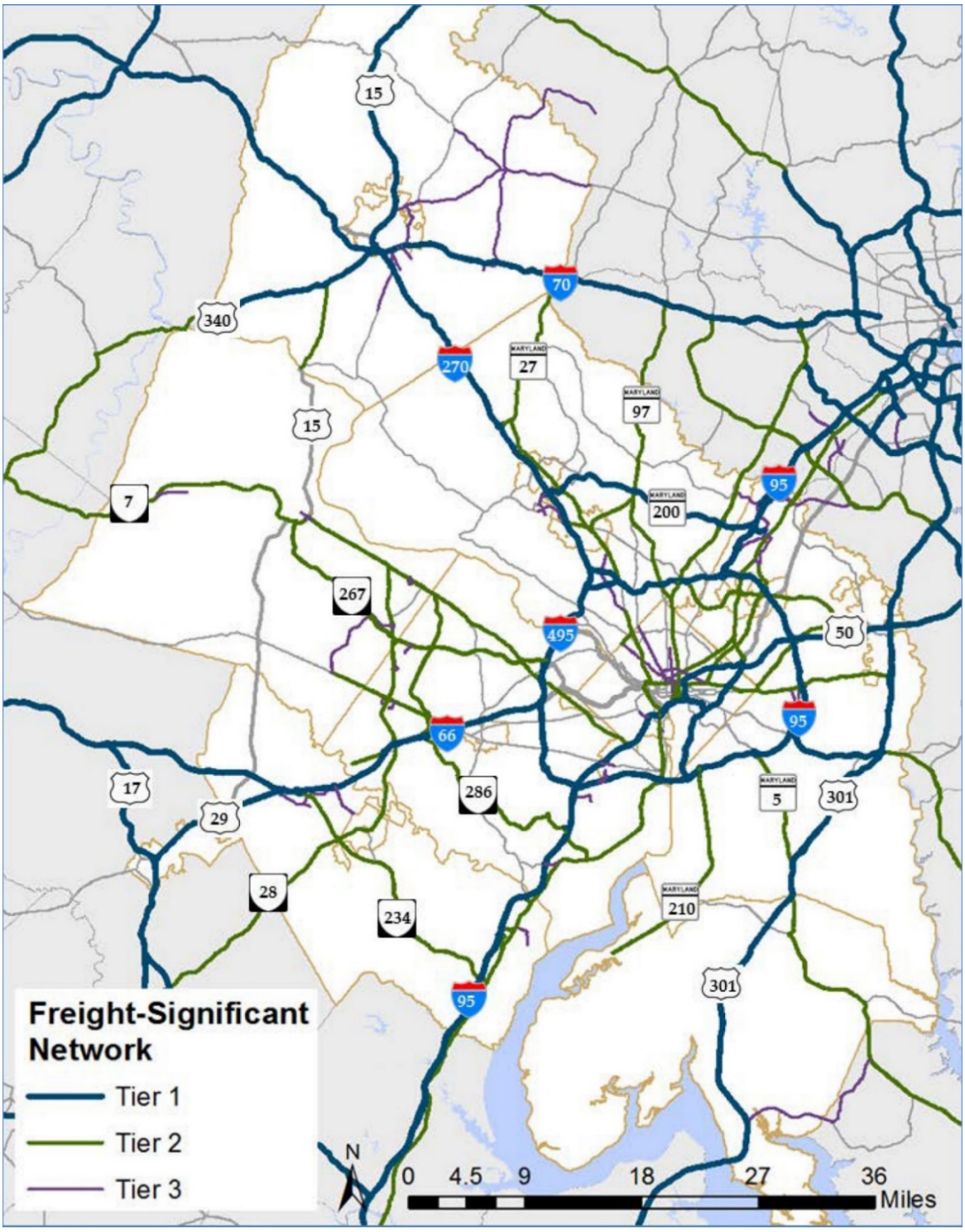
Freight trucks provide vital connections in multimodal supply chains, including air cargo operations. The I-495 and I-270 study corridors provide freight truck access to international airports in the region, including Baltimore-Washington International Airport (BWI), which serves five cargo airlines, and Washington Dulles International Airport (IAD), which serves 34 cargo airlines. In 2016, BWI processed 118,054 metric tons of freight and mail and IAD processed 266,000 metric tons of freight and mail (Federal Aviation Administration, 2016).

Per the National Capital Region Freight Plan (National Capital Region Transportation Planning Board, 2016c):

> *The ultimate efficiency of airport cargo facilities depends largely on the degree of connectivity among freight forwarders, cross-dock and warehouse facilities, and off airport properties. Access in and out of the airport is important to air cargo businesses, and truck transportation is the critical link to the end-user.* (National Capital Region Transportation Planning Board, pg. 73)

The demand for freight increases with population size. Each person in the United States generates demand for more than 60 tons of freight per year (MWCOG, 2016a), and with each new resident added, the demand for consumer goods increases. Therefore, as the population increases in the region, so does a corresponding demand for freight transportation.

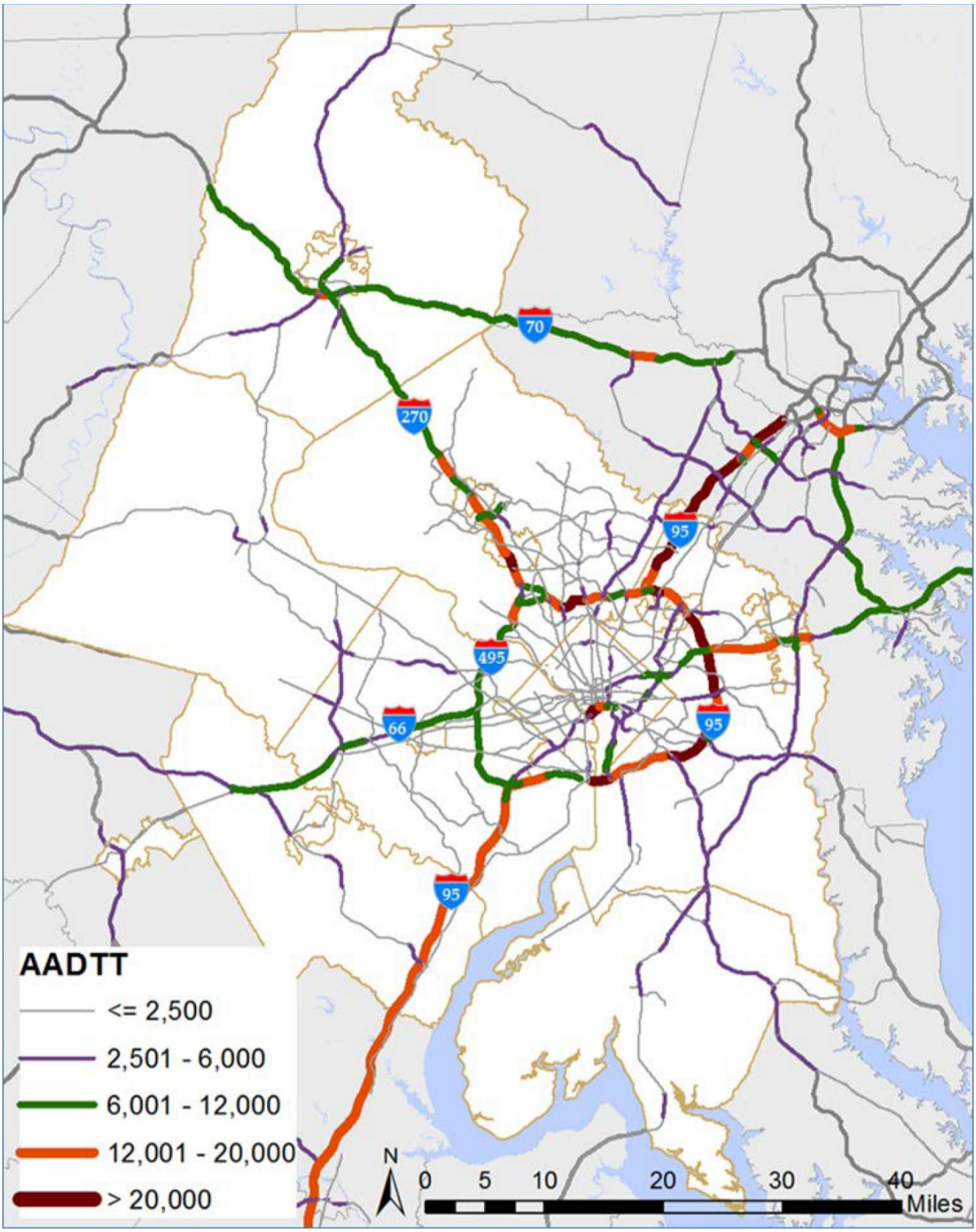
Figure 3-4: Regional Freight-Significant Network



Note: Tier 1 - roadways in this tier include state-designated truck routes, interstates, and other high-volume roadways. These roads are the means by which most freight enters and leaves the Region and are typically used by pass-through trucks. Tier 2 - roadways in this tier allow trucks to permeate the Region and provide access to important freight generators and attractors. Tier 3 - roadways in this tier provide last mile connectivity.

Source: National Capital Region Freight Plan, page 27. National Capital Region Transportation Planning Board, 2016c.

Figure 3-5: Average Annual Daily Truck Traffic



Source: National Capital Region Freight Plan, page 31. National Capital Region Transportation Planning Board, 2016.

3.10 Movement of Commuting Employees

Thousands of employers in the National Capital Region depend on the study corridors for employee commuting and delivery access. Major employers, in particular, draw a large number of people to and from employment locations each day. Major employers, those companies having 1,000 or more employees, in Montgomery County and Prince George's County are listed in **Table 3-11**. While a few of the major employers in **Table 3-11** have locations throughout the respective counties, the majority of the employers are located less than ten miles from the I-495 and I-270 study area corridors.

Table 3-11: Major Employers in Montgomery County and Prince George's County

Montgomery County			Prince George's County		
Company	**Location**	**Number Employed**	**Company**	**Location**	**Number Employed**
National Institutes of Health	North Bethesda, Rockville	17,300	**University System of Maryland**	Bowie, College Park	18,726
U.S. Food and Drug Administration	Silver Spring	13,130	**Joint Base Andrews Naval Air Facility**	Clinton-area	17,500
Naval Support Activity Bethesda	Bethesda	11,690	**U.S. Internal Revenue Service**	Landover, Lanham	5,539
Marriott International	Bethesda	5,500	**U.S. Census Bureau**	Suitland	4,414
Lockheed Martin	North Bethesda, Gaithersburg	4,690	**United Parcel Service (UPS)**	(throughout)	4,220
National Oceanic and Atmospheric Administration	Silver Spring	4,600	**NASA - Goddard Space Flight Center**	Greenbelt	3,397
Adventist HealthCare	Rockville, Germantown	4,290	**Giant Food**	(throughout)	3,000
Holy Cross Hospital	Silver Spring	3,900	**Prince George's Community College**	Largo	2,785
Giant Food	(throughout)	3,150	**Verizon**	(throughout)	2,738
Verizon	(throughout)	2,870	**Dimensions Healthcare System**	Cheverly	2,500
Montgomery College	Takoma Park/ Silver Spring, Rockville, Germantown	2,850	**Marriott International/Gaylord Resort and Convention Center**	National Harbor	2,412
National Institute of Standards and Technology	Gaithersburg	2,730	**Shoppers Food Warehouse**	(throughout)	1,975

Montgomery County			Prince George's County		
Company	**Location**	**Number Employed**	**Company**	**Location**	**Number Employed**
U.S. Nuclear Regulatory Commission	North Bethesda, Rockville	2,700	**U.S. Department of Agriculture**	Beltsville	1,850
Kaiser Foundation Health Plan	North Bethesda, Rockville, Gaithersburg	2,640	**National Maritime Intelligence-Integration Office**	Suitland	1,724
MedImmune	Gaithersburg	2,290	**MedStar Southern Maryland Hospital Center**	Clinton	1,709
Westat	Rockville	2,280	**Safeway**	(throughout)	1,605
GEICO	(throughout)	2,270	**Melwood**	Upper Marlboro	1,428
U.S. Department of Energy	Germantown	1,800	**Target**	(throughout)	1,400
The Henry M. Jackson Foundation for the Advancement of Military Medicine	Bethesda	1,780	**National Oceanic and Atmospheric Administration (NOAA)**	Suitland	1,350
Suburban Hospital	Bethesda	1,770	**Doctors Community Hospital**	Lanham	1,300
Red Coats	Silver Spring, Bethesda, Rockville	1,640	**Adelphi Laboratory Center**	Adelphi	1,200
Naval Surface Warfare Center, Carderock Division	Bethesda	1,580	**Walmart**	(throughout)	1,200
Whole Foods Market	(throughout)	1,280	**Home Depot**	(throughout)	1,184
IBM	North Bethesda	1,500	**U.S. Food and Drug Administration**	College Park, Beltsville	1,061
Riderwood Village	Silver Spring	1,330			
Hughes Network Systems	Germantown	1,300			

Note: Excludes post offices, state and local governments.

Sources: Montgomery County Department of Economic and Maryland Department of Commerce, October 2015; Prince George's County Economic Development Corporation and Maryland Department of Commerce, October 2015.

In Montgomery County, 54 percent of residents travel ten or more miles from their homes for work (MD DLLR, 2018). As shown in **Figure 3-6** and **Figure 3-7** and detailed in **Table 3-12**, both Montgomery County residents' employment destinations and Montgomery County workers' home destinations are densely clustered along the I-495 and I-270 study corridors.

In Prince George's County, 56 percent of residents travel ten or more miles from their homes for work with the greatest majority traveling into DC (MD DLLR, 2018). As shown in **Figure 3-8** and **Figure 3-9**, and detailed in **Table 3-12**, both Prince George's County residents' employment destinations and Prince George's County workers' home destinations are densely clustered within and along the eastern portion of the I-495 study corridor.

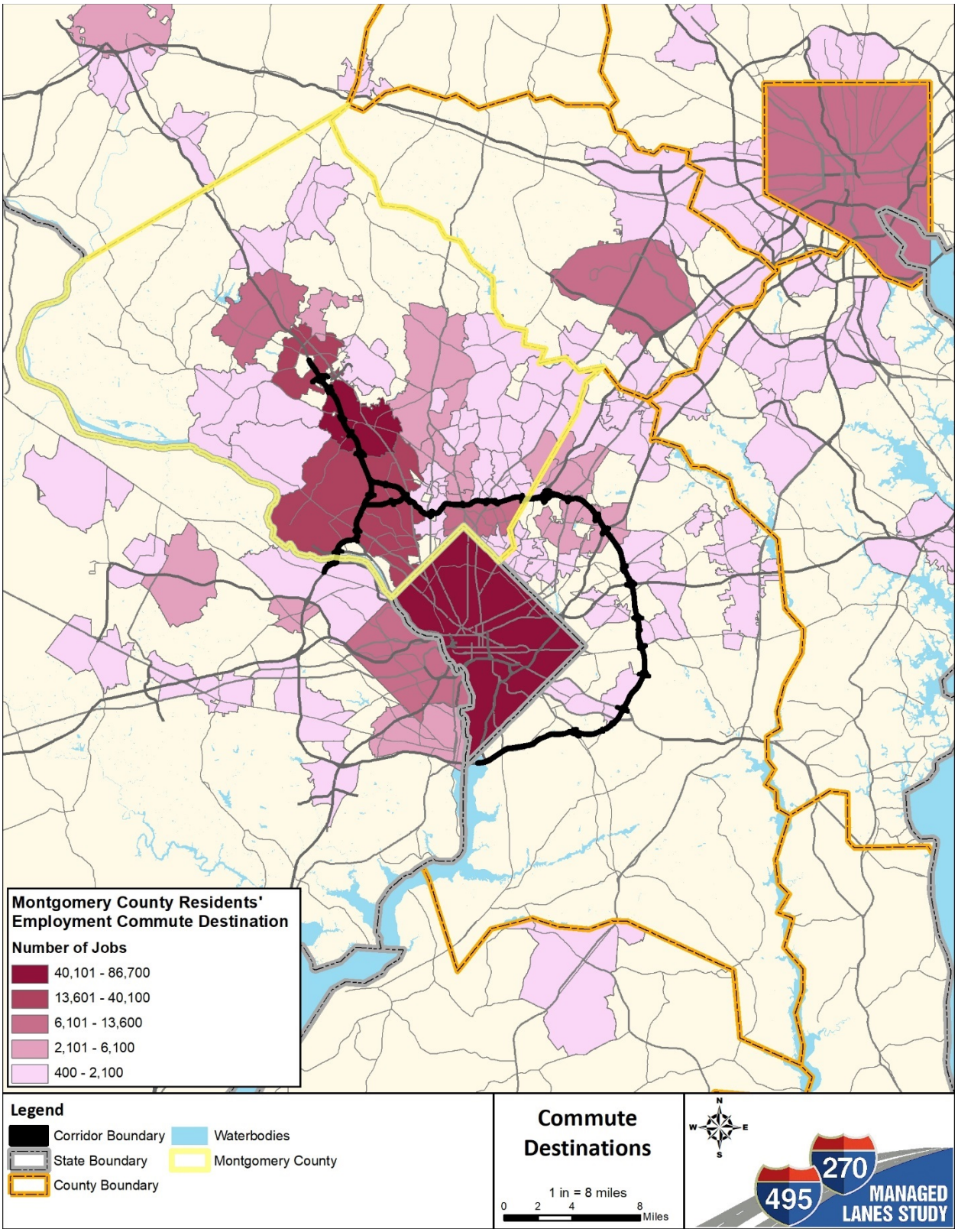
Table 3-12: Employment and Home Commute Destinations

Top Five Employment Destinations for County Residents		Top Five Home Destinations for County Workers	
Montgomery County			
Washington, D.C.	19.3%	**Germantown, MD**	5.7%
Rockville, MD	9.0%	**Washington, D.C.**	5.0%
Bethesda, MD	7.5%	**Gaithersburg, MD**	3.8%
North Bethesda, MD	5.1%	**Rockville, MD**	3.4%
Gaithersburg, MD	5.0%	**Silver Spring, MD**	2.7%
Prince George's County			
Washington, D.C.	30.3%	**Washington, D.C.**	6.1%
Arlington, VA	2.7%	**Bowie, MD**	3.0%
Baltimore, MD	2.2%	**Baltimore, MD**	2.3%
College Park, MD	2.1%	**Waldorf, MD**	2.2%
Bethesda, MD	2.1%	**Clinton, MD**	1.7%
Anne Arundel County			
Baltimore, MD	10.2%	**Baltimore, MD**	8.1%
Parole, MD	7.8%	**Glen Burnie, MD**	5.7%
Washington, D.C.	5.5%	**Annapolis, MD**	3.7%
Annapolis, MD	4.8%	**Severna Park, MD**	3.2%
Glen Burnie, MD	4.0%	**Severn, MD**	3.0%
Calvert County			
Prince Frederick, MD	10.5%	**Chesapeake Ranch Estates, MD**	6.5%
Washington, D.C.	6.4%	**Chesapeake Beach, MD**	2.9%
Waldorf, MD	2.5%	**Prince Frederick, MD**	2.1%
California, MD	2.2%	**Huntington, MD**	2.0%
Melwood, MD	2.2%	**Waldorf, MD**	1.9%

Top Five Employment Destinations for County Residents		Top Five Home Destinations for County Workers	
Carroll County			
Baltimore, MD	8.7%	**Westminster, MD**	6.1%
Westminster, MD	8.2%	**Eldersburg, MD**	6.1%
Eldersburg, MD	4.7%	**Baltimore, MD**	3.1%
Columbia, MD	4.7%	**Taneytown, MD**	2.5%
Cockeysville, MD	2.8%	**Hampstead, MD**	1.9%
Charles County			
Washington, D.C.	19.9%	**Waldorf, MD**	17.9%
Waldorf, MD	11.3%	**La Plata, MD**	3.8%
La Plata, MD	6.1%	**Bensville, MD**	2.8%
Arlington, VA	2.5%	**Bryans Road, MD**	1.9%
Alexandria, VA	2.1%	**Clinton, MD**	1.4%
Frederick County			
Frederick (City), MD	20.8%	**Frederick (City), MD**	15.4%
Ballenger Creek, MD	6.8%	**Ballenger Creek, MD**	3.9%
Rockville, MD	4.8%	**Hagerstown, MD**	2.1%
Gaithersburg, MD	3.9%	**Thurmont, MD**	1.8%
Washington, D.C.	2.7%	**Linganore, MD**	1.6%
Howard County			
Columbia, MD	14.7%	**Columbia, MD**	9.2%
Baltimore, MD	13.0%	**Baltimore, MD**	7.9%
Washington, D.C.	5.4%	**Ellicott City, MD**	5.8%
Ellicott City, MD	5.0%	**Ilchester, MD**	2.2%
Rockville, MD	1.8%	**Catonsville, MD**	2.0%

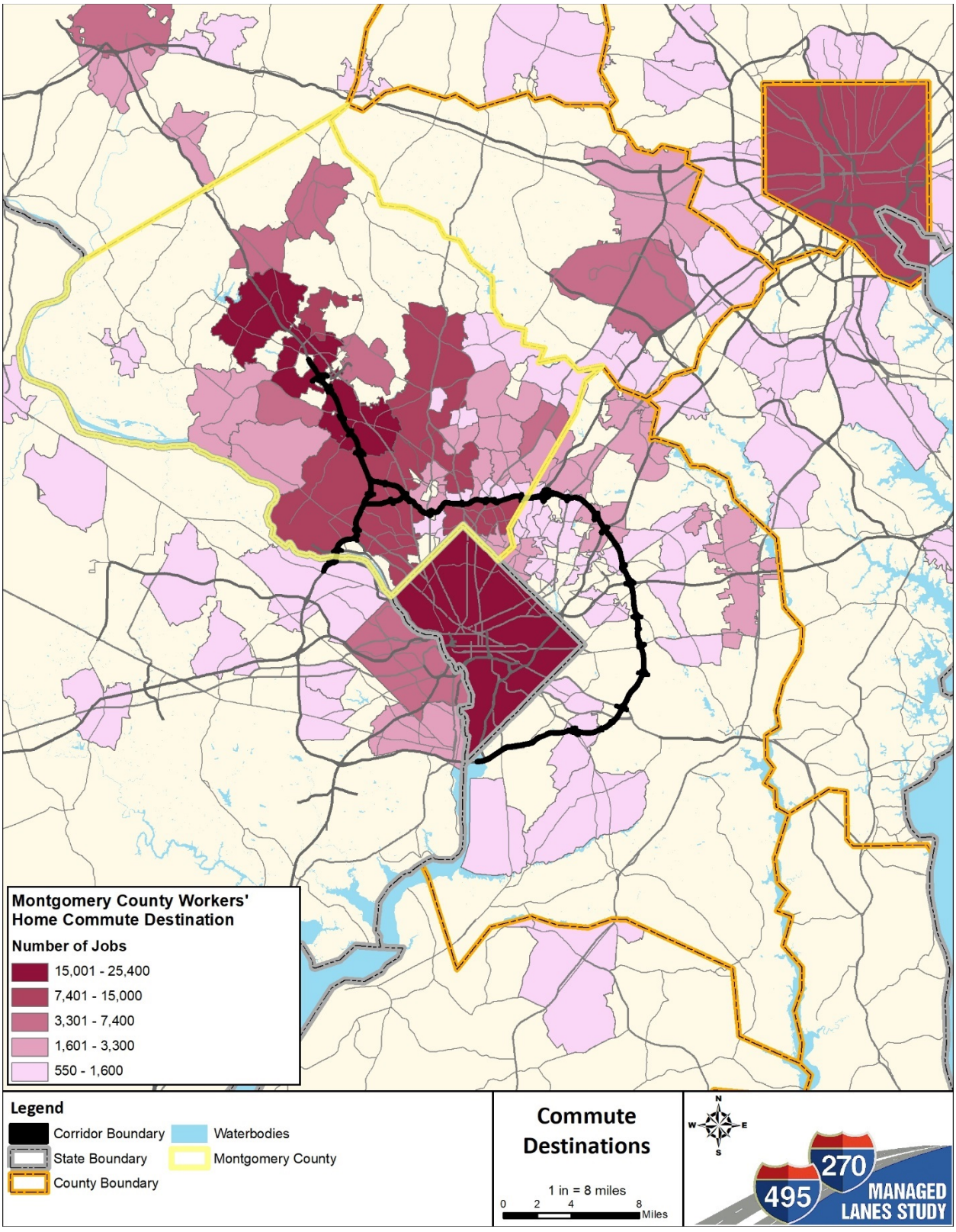
Source: Commuting Pattern: for Montgomery, Prince George's, Calvert, Charles, Frederick, Anne Arundel, Carrol, and Howard Workforce Regions, Maryland Department of Labor, Licensing, and Regulation, 2018.

Figure 3-6: Montgomery County Residents' Employment Commute Destinations



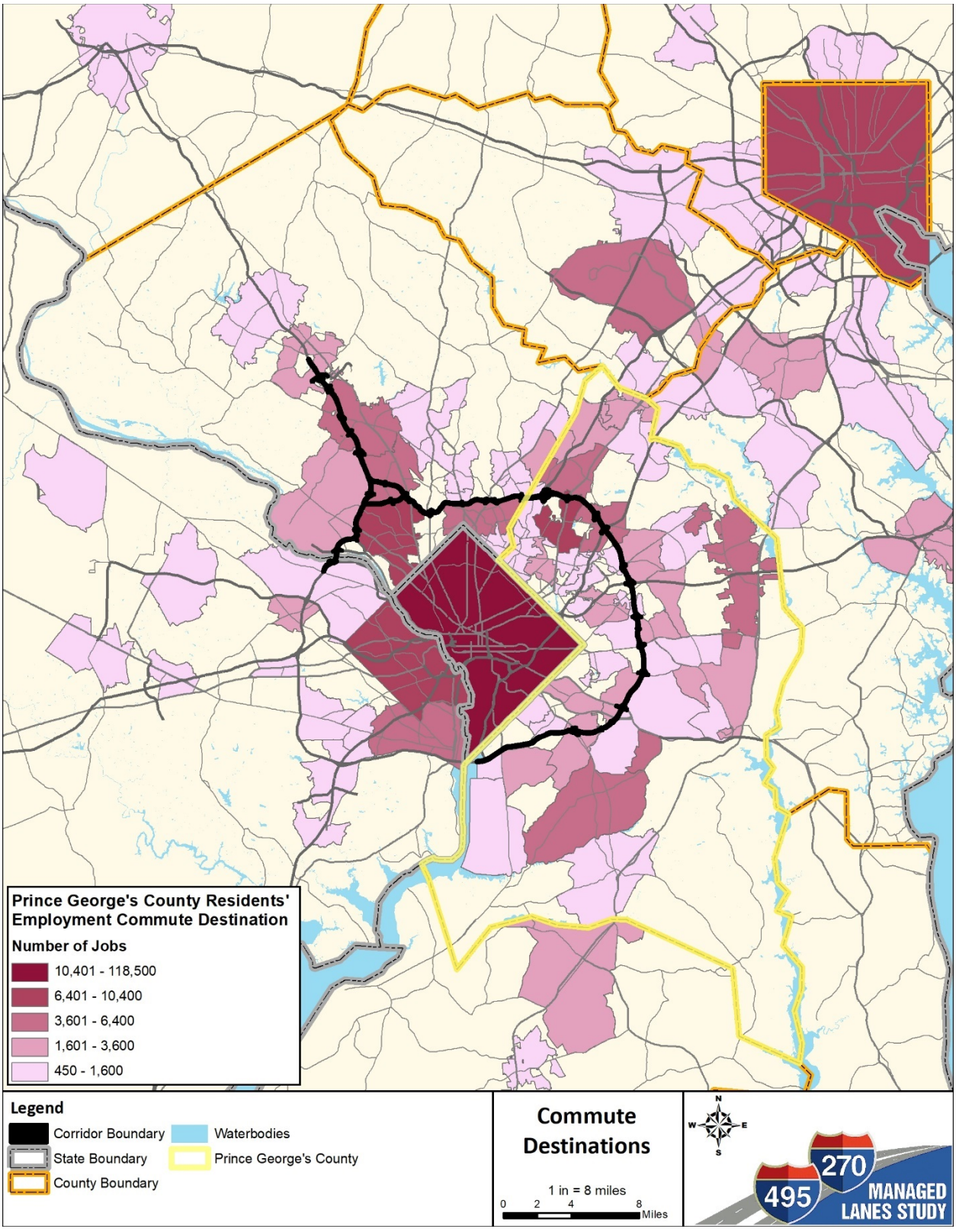
Source: U.S. Census Bureau, Center for Economic Studies, OnTheMap (https://onthemap.ces.census.gov)

Figure 3-7: Montgomery County Workers' Home Commute Destinations



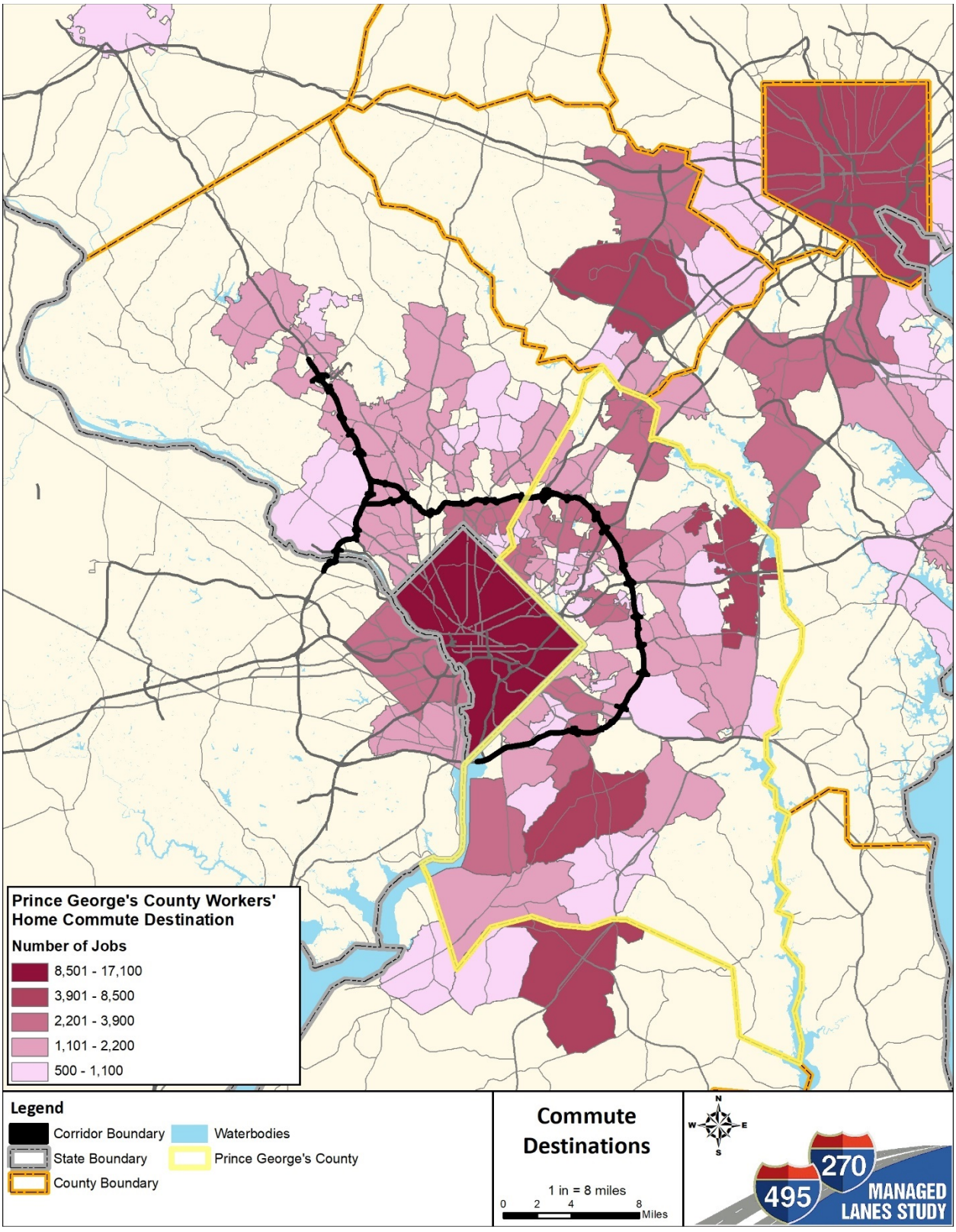
Source: U.S. Census Bureau, Center for Economic Studies, OnTheMap (https://onthemap.ces.census.gov)

Figure 3-8: Prince George's County Residents' Employment Commute Destinations



Source: U.S. Census Bureau, Center for Economic Studies, OnTheMap (https://onthemap.ces.census.gov)

Figure 3-9: Prince George's County Workers' Home Commute Destinations



Source: U.S. Census Bureau, Center for Economic Studies, OnTheMap (https://onthemap.ces.census.gov)

3.11 Incorporate Funding Sources for Financial Viability

The State of Maryland is committed to provide timely transportation improvements that can accommodate existing and long-term traffic growth. Typical roadway infrastructure improvements are funded through use of Maryland's Transportation Trust Fund. The Trust Fund primarily comprises revenue from the gas tax and motor vehicle registration and titling fees. All funds dedicated to MDOT are deposited in the Trust Fund, and disbursements for all programs and projects are made from the Trust Fund. Revenues are not earmarked for specific programs.

However, the State's traditional funding sources, including the Trust Fund, may be unable to effectively finance, construct, operate, and maintain highway systems of the magnitude which may be needed to enhance trip reliability in these study corridors, due to the fiscal constraints of the program and the state-wide transportation needs. For these types of large projects, revenue sources that provide adequate funding are needed to support more immediate capacity improvements.

Large-scale improvements over 55 miles, such as those being considered with the I-495 & I-270 Managed Lanes Study, would require decades to accumulate enough revenue in the State's Transportation Trust Fund to deliver the improvements with traditional funding. For large-scale improvements, MDOT SHA may seek to use innovative financing methods such as a Public-Private Partnership (P3) in order to design, construct, operate, and maintain the infrastructure improvements.

The use of alternative funding approaches, such as pricing options, provides needed large-scale improvements decades earlier than would otherwise be realized using traditional funding and allows the project to be fiscally-constrained in the metropolitan transportation plan. This is a critical step in the NEPA decision process, as current federal policy restricts issuance of a NEPA decision document unless the project is fiscally-constrained.

3.12 Environmental Responsibility

Given the highly constrained area surrounding the interstates in the study area, the natural, cultural, historical, and recreational amenities that exist along this alignment are finite resources that cannot be easily replaced or replenished. MDOT SHA will commit to avoid and minimize community, cultural, environmental, and parkland impacts, and mitigate for unavoidable impacts at an equal or greater value. MDOT SHA will work with our federal, state, and local resource agency partners in a streamlined, collaborative, and cooperative way to meet all regulatory requirements to ensure the protection of significant environmental and community resources.

In planning mitigation for a build alternative, MDOT SHA will strive to provide meaningful benefits to adjacent resources and improve the values, services, attributes, and functions which may be compromised. MDOT SHA will work in good faith with our agency partners to plan comprehensive mitigation based on identified priorities that would, at a minimum, bring no net loss to impacted resources, with a goal of net benefit. Innovative, creative solutions, including modern urban stormwater management and environmentally sensitive design techniques, will be utilized to mitigate for unavoidable impacts resulting from the project. Mitigation commitments will be identified and included in the Record of Decision. Commitments in the combined Final Environmental Impact Statement/ Record of Decision will also be included in any contract documents regardless of project delivery method, including a P3.

4

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