TransAction2040

Transportation for Today and Tomorrow

NORTHERN VIRGINIA TRANSPORTATION PLAN

TECHNICAL REPORT





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1.1 Background

Purpose

The Northern Virginia Transportation Authority (NVTA) is charged by the Virginia General Assembly with preparing a regional transportation plan for Northern Virginia, including transportation improvements of regional significance. The NVTA revises and amends this plan every five years. The TransAction 2040 Northern Virginia Regional Transportation Plan represents an update of the TransAction 2030 Northern Virginia Regional Transportation Plan, which was endorsed by the NVTA in 2006.

TransAction 2040 is designed to extend the planning horizon, allowing for consistency with the National Capital Region Transportation Planning Board (TPB) Financially Constrained Long-Range Plan (CLRP). TransAction 2040 also includes new projects and introduces a revised evaluation and prioritization process, along with a benefit/cost (b/c) analysis. Like the plan that preceded it, TransAction 2040 is intended to provide a guide for funding future transportation projects in Northern Virginia. For purposes of this plan, Northern Virginia covers the Counties of Arlington, Fairfax, Loudoun, and Prince William; the Cities of Alexandria, Fairfax, Falls Church, Manassas, and Manassas Park; and the Towns of Dumfries, Herndon, Leesburg, Purcellville, and Vienna.

The TransAction 2040 Plan effort was guided by the TransAction 2030 Plan, which identified and prioritized improvements among the major corridors throughout Northern Virginia. The 2030 Plan conducted a multimodal analysis of a comprehensive range of highway, high-occupancy vehicle (HOV), transit, and bicycle/pedestrian trail projects to address existing and forecast system deficiencies.

The TransAction 2040 Plan is an update of the previous TransAction 2030 Plan in the following regards:

- Extends the planning horizon from 2030 to 2040 to match the TPB CLRP horizon;
- Uses the most recent adopted regional land use forecasts at the start of the effort (Round 8.0) from MWCOG;
- Uses the TPB Version 2.3 Travel Demand Forecasting Model to conduct the travel demand forecasting;

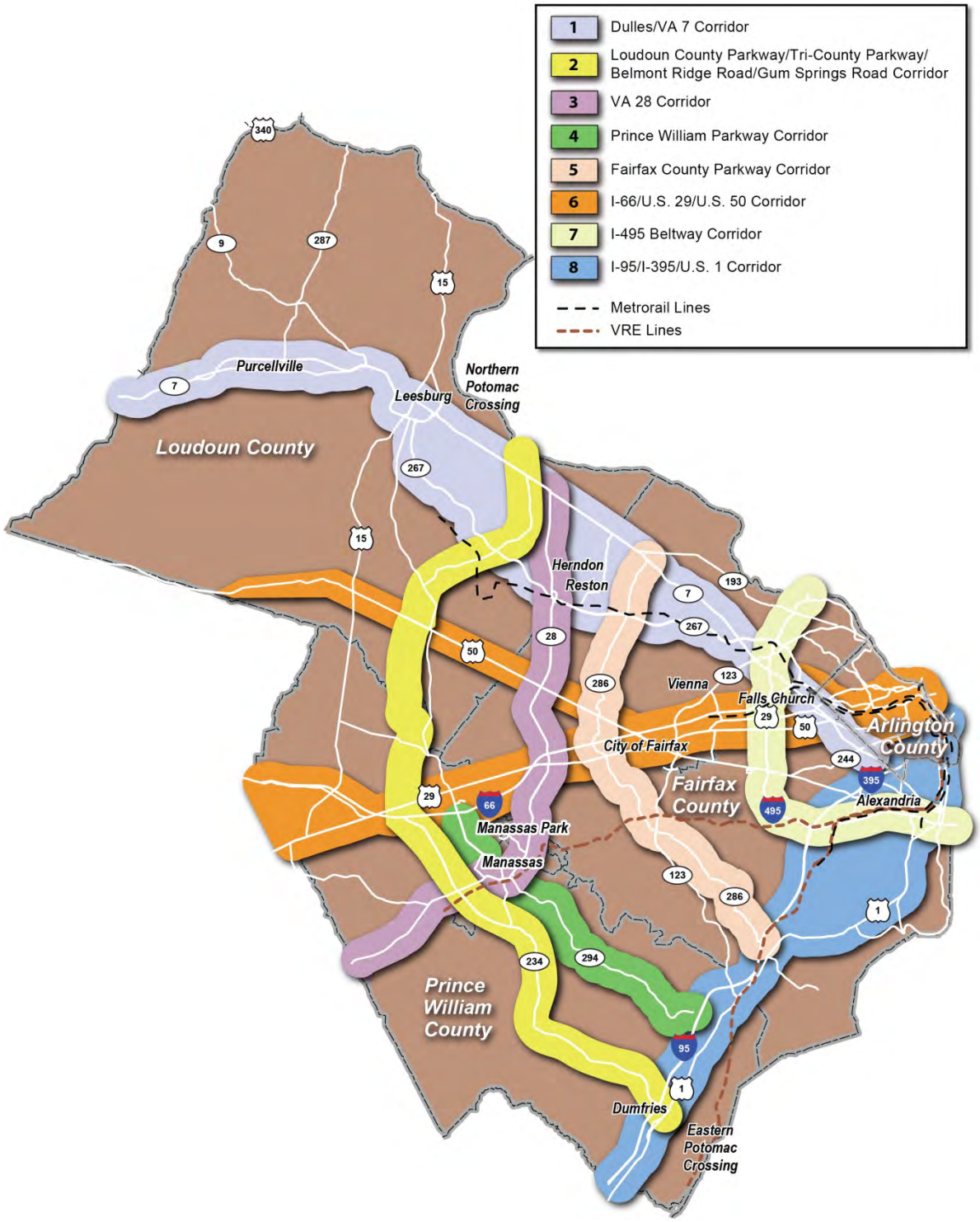
- Updates projects from the 2030 plan to reflect projects that had been completed or added to the CLRP and carried forward in the 2040 plan;
- Updates cost estimates for TransAction 2030 projects to 2011 dollars and revises based on currently available studies and information;
- Opens the project list to new projects and is not limited solely to projects proposed in previous TransAction plans;
- Develops a transparent evaluation and prioritization process to help decision-makers prioritize TransAction 2040 projects; and
- Considers benefit/cost calculations as part of the prioritization process.

Plan Area and Corridor Map

The TransAction 2040 Plan covers the Counties of Arlington, Fairfax, Loudoun, and Prince William; the Cities of Alexandria, Fairfax, Falls Church, Manassas, and Manassas Park; and the Towns of Dumfries, Herndon, Leesburg, Purcellville, and Vienna. The plan includes a category of noncorridor-specific improvements as well as roadway, HOV, transit, bicycle, and pedestrian projects in the eight corridors specified below:

- Virginia Route 7 and Dulles Toll Road Corridor, including the future Metrorail Silver Line;
- Loudoun County Parkway/Tri-County Parkway/Belmont Ridge Road/Gum Springs Road Corridor;
- Virginia Route 28 Corridor;
- Prince William Parkway Corridor;
- Fairfax County Parkway Corridor;
- I-66/U.S. Route 29/U.S. Route 50 Corridor, including the Metrorail Orange Line;
- Beltway (I-495) Corridor; and
- I-95/I-395/U.S. Route 1 Corridor, including the VRE and Metrorail Blue and Yellow Lines.

Figure 1.1 Plan Area Map



Vision and Goals

The TransAction 2040 vision follows the same vision that was developed for its predecessor plans and provides for an improved multimodal transportation system that facilitates achievement of specific regional goals.

The adopted vision states:

> *"In the 21st century, Northern Virginia will develop and sustain a multimodal transportation system that supports our economy and quality of life. It will be fiscally sustainable, promote areas of concentrated growth, manage both demand and capacity, and employ the best technology, joining rail, roadway, bus, air, water, pedestrian, and bicycle facilities into an interconnected network."*

The goals developed for the TransAction 2040 Plan built upon goals of the TransAction 2030 Plan:

- Provide an integrated, multimodal transportation system;
- Provide responsive transportation service to customers;
- Respect historical and environmental factors;
- Recognize the linkage between transportation and land use;
- Incorporate the benefits of technology;
- Identify funding and legislative initiatives needed to implement the Plan; and
- Enhance Northern Virginia relationships among jurisdictions, agencies, the public, and the business community.

Oversight and Coordination

The lead agency for the TransAction 2040 Plan is the NVTA. The TransAction 2040 Subcommittee was formed by the NVTA to monitor and guide the Plan process. Subcommittee members served as liaisons with their respective agencies and elected officials, and helped distribute information to citizens, interested groups, and stakeholders. The Subcommittee membership included transportation representatives from Arlington County, City of Alexandria, City of Fairfax, City of Falls Church, Fairfax County, Loudoun County, Northern Virginia Transportation Commission (NVTC), Potomac and Rappahannock Transportation Commission (PRTC), Prince William County, Town of Vienna, Virginia Railway Express (VRE), Virginia Department of Transportation (VDOT), Virginia Department of Rail and Public Transportation (DRPT), and the Washington Metropolitan Area Transit Authority (WMATA).

A management group from the TransAction 2040 Subcommittee provided near-weekly oversight, coordination, and guidance to a technical consultant team led by Cambridge Systematics,

Inc. (CS). NVTC provided contract administration. Supporting CS were four subconsultants: KFH Group, Inc.; Working Energy Enterprise, LLC; Travesky & Associates, Ltd.; and A.G. Samuel Group, Inc. (dba Foursquare Integrated Transportation Planning). Other oversight bodies that were involved throughout the TransAction 2040 update process and provided valuable feedback on the materials developed included:

- **Planning Coordination Advisory Committee (PCAC) –** The PCAC included elected officials who are not on the NVTA Board, but are from the NVTA member jurisdictions and advised on policy issues related to updates of the NVTA's Long-Range Transportation Plan.

- **Technical Advisory Committee (TAC) –** The TAC consisted of appointed individuals experienced in the field of transportation who reside or are employed in the NVTA member jurisdictions.

- **Jurisdiction and Agency Coordination Committee (JACC) –** The JACC was an advisory committee on technical matters, providing staff-level representation from the NVTA member jurisdictions and relevant agencies, including VDOT, DRPT, WMATA, VRE, NVTC, and PRTC.

Public Involvement

Both internal and external communication were key components of the TransAction 2040 Plan. The intent of the public information and outreach program was to: 1) solicit input and opinions to inform the project list and prioritization; and 2) disseminate timely information about the Plan. Throughout the course of the Plan, a variety of tools, including a public open house, a project webpage, and newsletters were used to either obtain appropriate input or disseminate information.

Public Open House

One public meeting was held on April 18, 2012 in Falls Church, Virginia. The meeting presented general information about the Plan and sought input on the TransAction 2040 project list and preliminary prioritization process.

Project Webpage

The Plan webpage is housed on the NVTA web site at http://www.thenovaauthority.org/. The webpage serves as a repository for the newsletters and materials from the Open House. It also provides information on the TransAction 2030 Plan.

Newsletters

Two newsletters were prepared over the course of the Plan to inform the public and other stakeholders about the Plan's progress and key findings. Included in Appendix A, the newsletters are also available for download on the Plan webpage.

1.2 Process

Technical Approach for Plan Development

A number of project activities were undertaken to identify future transportation improvements that are cost-effective and meet the goals for the Northern Virginia and Metropolitan Washington regions. This section highlights key activities in the final work program, which provided step-by-step guidance for the team.

Identify the Project List

This task identified the transportation projects that would be carried forward into the analysis portion of the TransAction 2040 development process. TransAction 2040 Subcommittee members provided lists of transportation system improvement projects in the Plan area and their associated cost estimates. Two primary types of projects were identified: 1) projects developed in the TransAction 2030 Plan; and 2) new projects since the TransAction 2030 Plan effort.

Analyze Projects Using the Computer Model

In this task, the TPB Version 2.3 Travel Demand Forecasting Model was used to evaluate three different scenarios: Current, Baseline, and Build. The Current Scenario showed the established transportation network and how it functions today. The Baseline Scenario showed how the transportation network will function in the year 2040, assuming the list of transportation projects in the CLRP are implemented. The Build Scenario showed how the transportation network will function in the year 2040, assuming the CLRP projects and the TransAction 2040 projects are implemented. The results from the three scenarios were used to illustrate and compare the effects of proposed highway and transit improvements in Northern Virginia.

Preliminary Project Prioritization

To effectively evaluate all the TransAction 2040 projects, the team developed a project scoring approach based on a comprehensive set of qualitative and quantitative evaluation measures and a benefit/cost analysis. A project prioritization process was then applied by corridor and by project type (e.g., bicycle/pedestrian, transit, highway). Prioritization of the 2040 projects can provide guidance on the order in which projects of each type should be undertaken within each corridor, with the most effective projects designated as the highest priorities.

Analyze New and Revised Projects

Based on input from the Subcommittee and attendees at the Open House, a fourth scenario, Build 2, was specified and evaluated to determine how additional actions beyond those proposed among the original list of TransAction 2040 projects could further enhance roadway and transit performance. The Build 2 Scenario elements are incorporated in the Plan map and are noted within the prioritized project list, presented in Section 4.0.

Final Project Prioritization

A final list of TransAction 2040 Plan projects is presented by corridor and type in Section 4.0. Within each grouping, the projects are presented in sort order based on their prioritization score. Together, with the benefit/cost rating, the project ranking is intended to inform decisions about priorities for investments, recognizing that funding for all the desired transportation improvements remains a challenge.

1.3 Organization of TransAction 2040 Plan

The TransAction 2040 Plan consists of a summary document, map insert, and this technical report. The remainder of the technical report is organized as follows:

- Section 2.0, Transportation and Land Use Characteristics, describes the population and employment density changes and the transportation factors that influenced the expanded project list;
- Section 3.0, System-Level Evaluation, covers the project inventory; the system-level forecasting process with an overview of the four scenarios; system-level measures of effectiveness; and system performance for 2007 Baseline, 2040 CLRP, 2040 TransAction Build Scenario, and 2040 TransAction Build 2 Scenario;
- Section 4.0, Prioritization of TransAction 2040 Plan Projects, presents the prioritization methodology and the prioritized project list by corridor with a benefit/cost analysis rating; and
- An Appendix presenting documentation of the public information and outreach program, copies of the project newsletters, a set of schematic maps highlighting roadway segment level of service and indicators of transit level of service along the Plan corridors, a set of charts showing corridor-level indicators, and copies of resolutions of support from jurisdictions involved in the plan.

2.0 Land Use and Transportation Inputs

Northern Virginia is the fastest growing area in the Commonwealth of Virginia in terms of population, employment, and households. Northern Virginia currently houses 27 percent of the population, hosts 29 percent of the employment, includes 23 percent of registered vehicles, and maintains 75 percent of transit ridership. Northern Virginia's expected growth may lead to various transportation challenges, but this Plan aims to proactively understand this growth as well as anticipated changes to the transportation network in order to make improvements to the future system.

The TPB Version 2.3 Travel Demand Forecasting Model is the tool that was used to understand the implications of transportation and land use decisions. Two basic inputs to the model are:

1. Forecasts of future population, households, and employment throughout the region, in this case using MWCOG's Round 8.0 Cooperative land use forecasts; and

2. Information about future transportation networks – changes that are planned, or potential changes to be tested – that would improve today's transportation system.

This section describes the demographic data for Northern Virginia, particularly the location of jobs and housing, since they are important indicators of transportation need. It also lists the key transportation projects used as inputs into the travel demand model to evaluate the potential improvements.

2.1 Land Use Factors

Land use considerations used as inputs in the travel demand forecasting model include demographic and economic changes, including the number and spatial distribution of residents and homes, and jobs and employers. For the TransAction 2040 Plan, the land use forecasts were drawn from the regional cooperative land use forecast known as Round 8.0. This forecast allocates future households and employment throughout the region to transportation analysis zones (TAZs) for further use with the travel demand forecasting model and other analytical tools. These data can be used to identify areas that could benefit from increased transportation options.

Growth patterns for Northern Virginia and the greater D.C. metropolitan region (according to MWCOG regional boundaries) are shown in Table 2.1 and Figures 2.1 through 2.6. Households and employment numbers and densities are the focus of these presentations since they are key inputs to the travel demand forecasting model. Currently, the D.C. metropolitan region contains 1.6 million households, and by 2040 the number of households is expected to grow by 646,500, or 40 percent. Currently, Northern Virginia contains 764,400 households, representing 47 percent of the D.C. metropolitan region. Northern Virginia's number of households is

expected to grow by 342,200, or 45 percent, by 2040. All told, household growth in Northern Virginia will represent 53 percent of all growth in the D.C. metropolitan region by 2040. Highlighting the projected changes in household density, Figure 2.3 indicates that the Rosslyn-Ballston corridor in Arlington, Tysons Corner, Reston, Gainesville, and Woodbridge are among the areas anticipated to experience the greatest household growth in Northern Virginia.

The 2.8 million jobs in the D.C. metropolitan region are expected to expand by 1.2 million, or 45 percent, to 4.0 million by 2040. In Northern Virginia alone, the current number of 1.2 million jobs, representing 45 percent of jobs in the D.C. metropolitan region, is expected to grow by 681,700, or 55 percent, by 2040. In total, employment growth in Northern Virginia will represent 55 percent of all growth in the region by 2040. Highlighting the projected changes in employment density, Figure 2.6 indicates more widespread growth in employment throughout Northern Virginia, particularly along major corridors such as VA 7 in eastern Loudoun County, VA 267 and U.S. 50 in both Fairfax and eastern Loudoun Counties, and VA 234 near Manassas. The anticipated growth in both households and jobs by 2040 will increase the demand for transportation infrastructure and services in Northern Virginia.

Table 2.1 Household and Employment Growth between 2007 and 2040

	Households	Percent Growth	Employment	Percent Growth
Current Land Use (2007)				
Region	1,626,600		2,768,200	
Northern Virginia	764,400		1,018,500	
Future Land Use (2040)				
Region	2,273,100	40%	4,011,800	45%
Northern Virginia	1,106,600	45%	1,661,900	63%

Figure 2.1 2007 Household Density

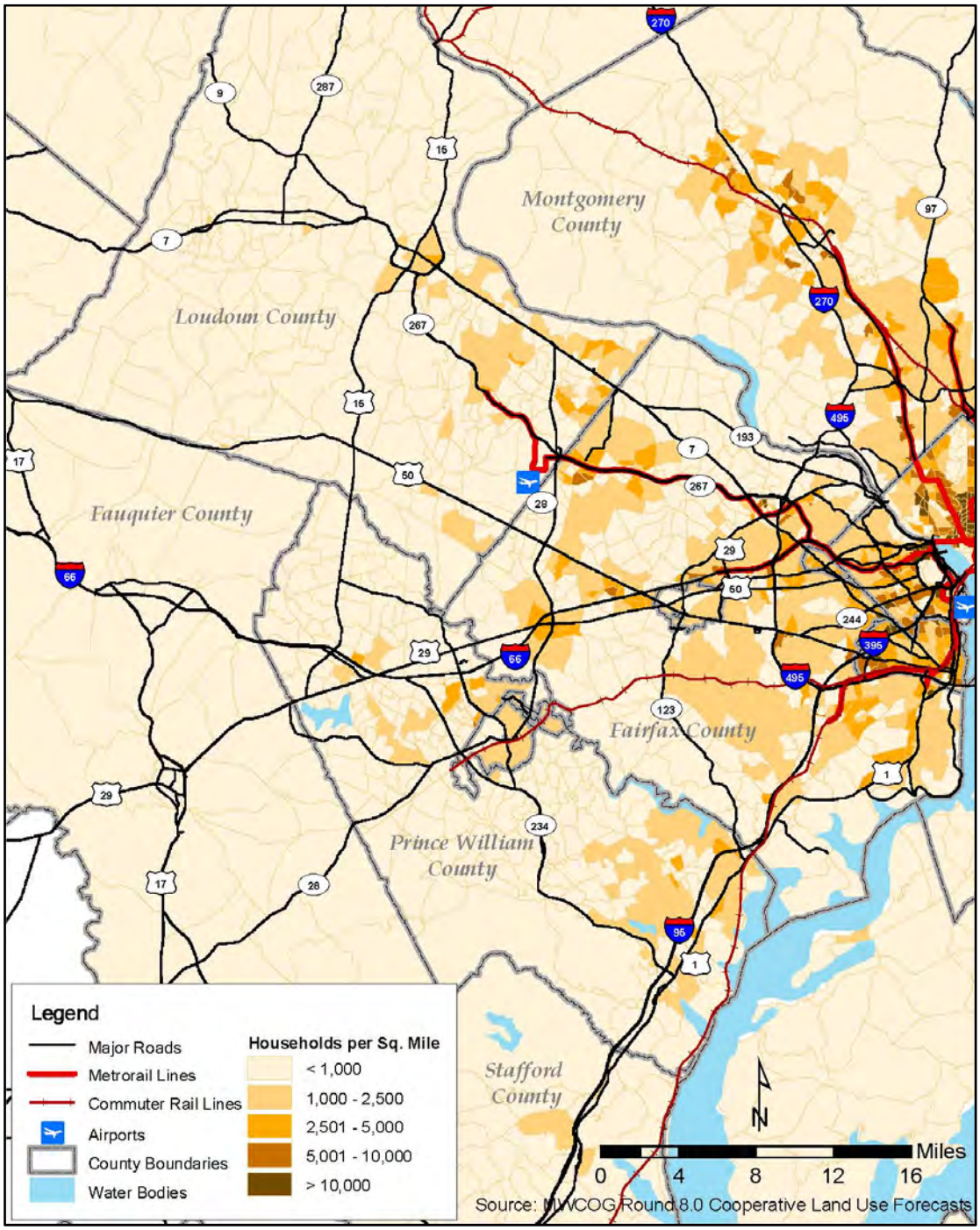


Figure 2.2 2040 Household Density

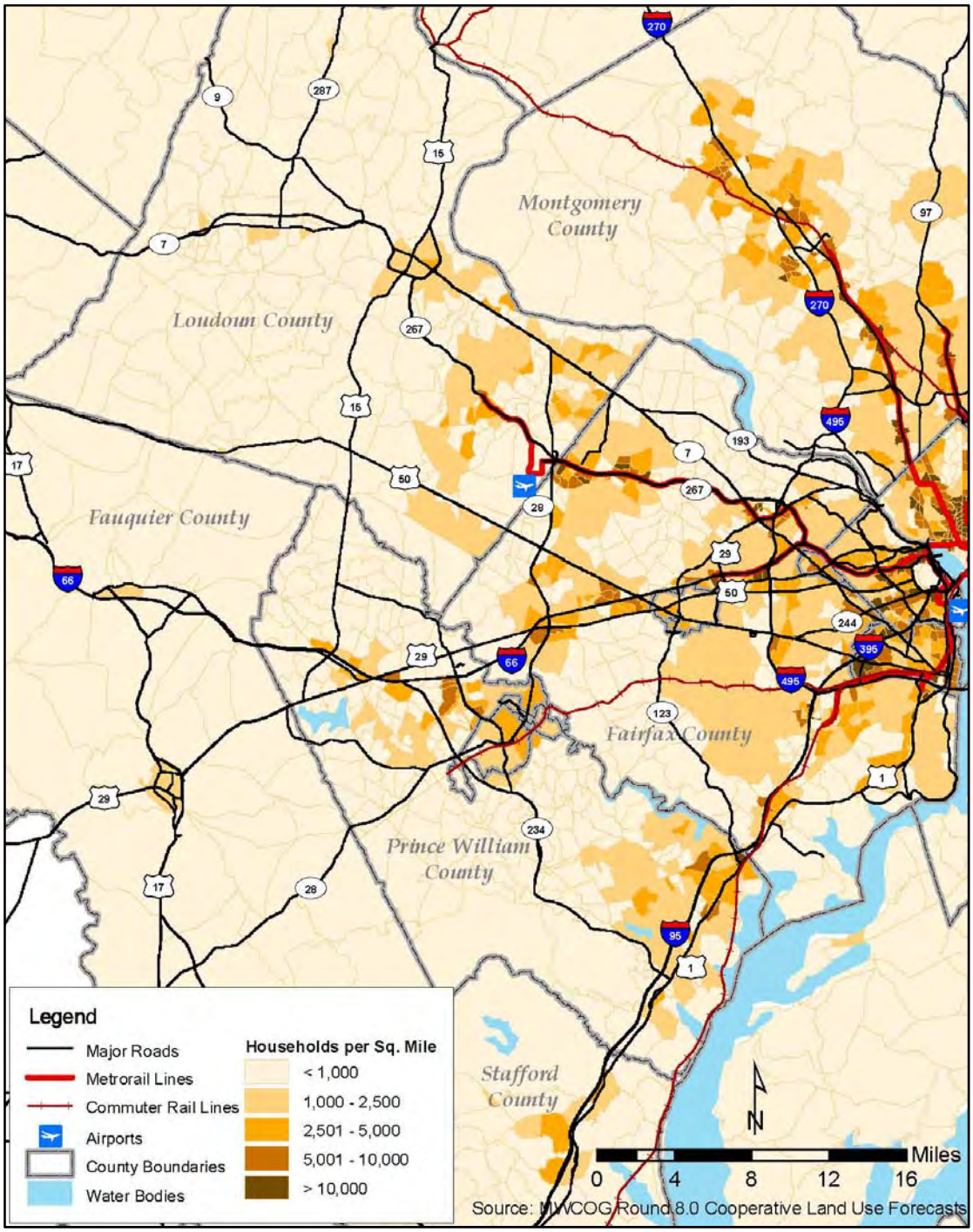


Figure 2.3 2007-2040 Change in Household Density

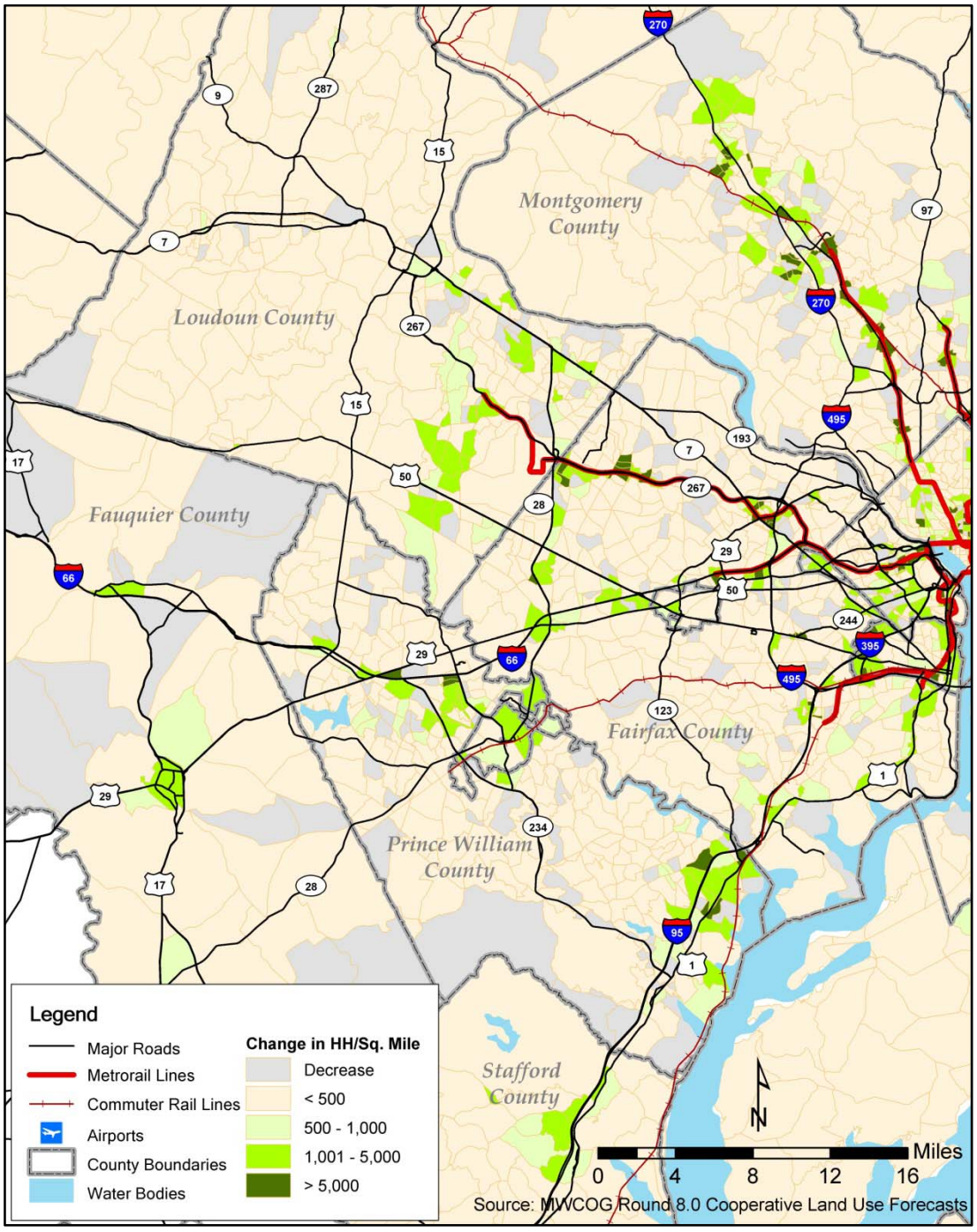


Figure 2.4 2007 Employment Density

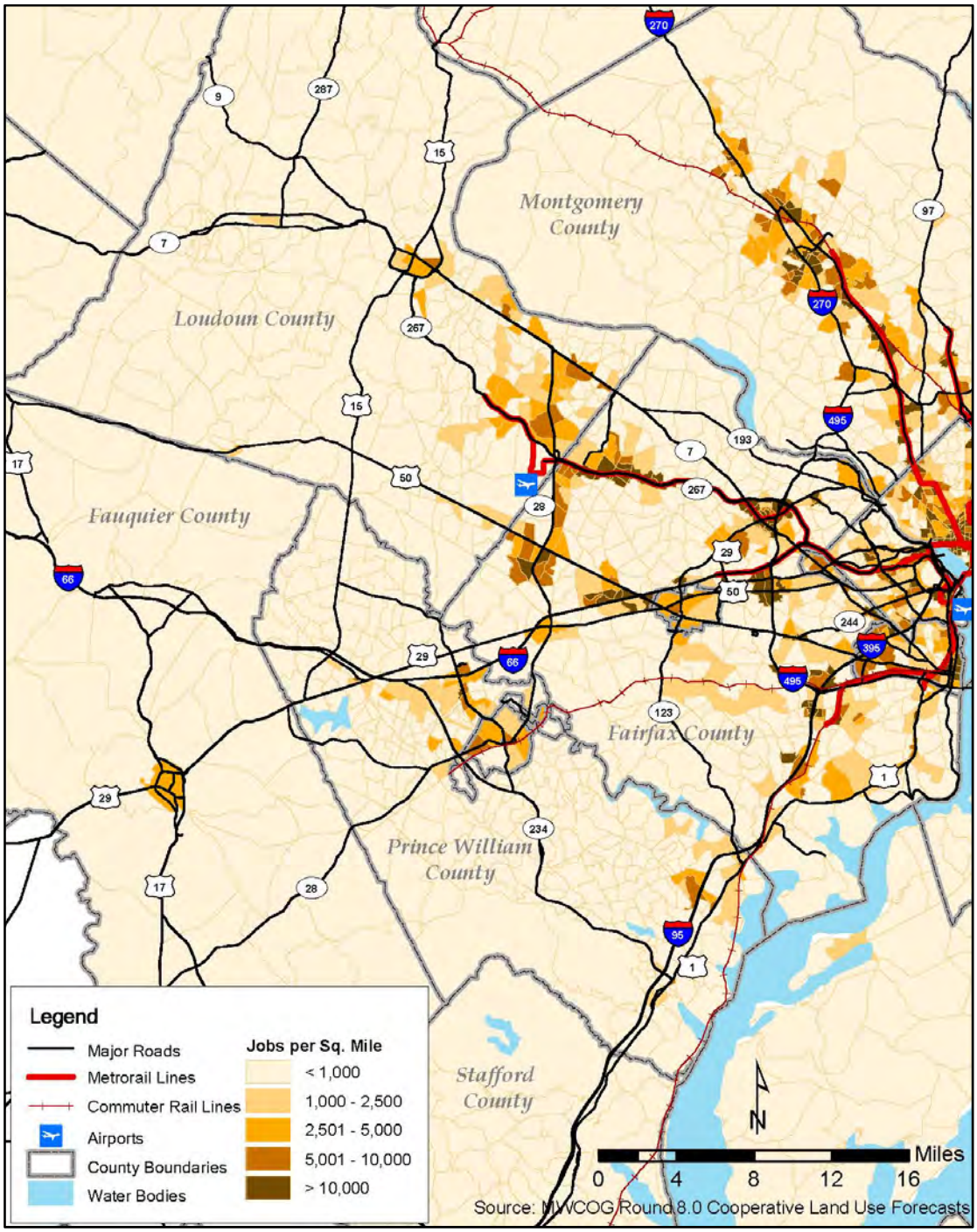


Figure 2.5 2040 Employment Density

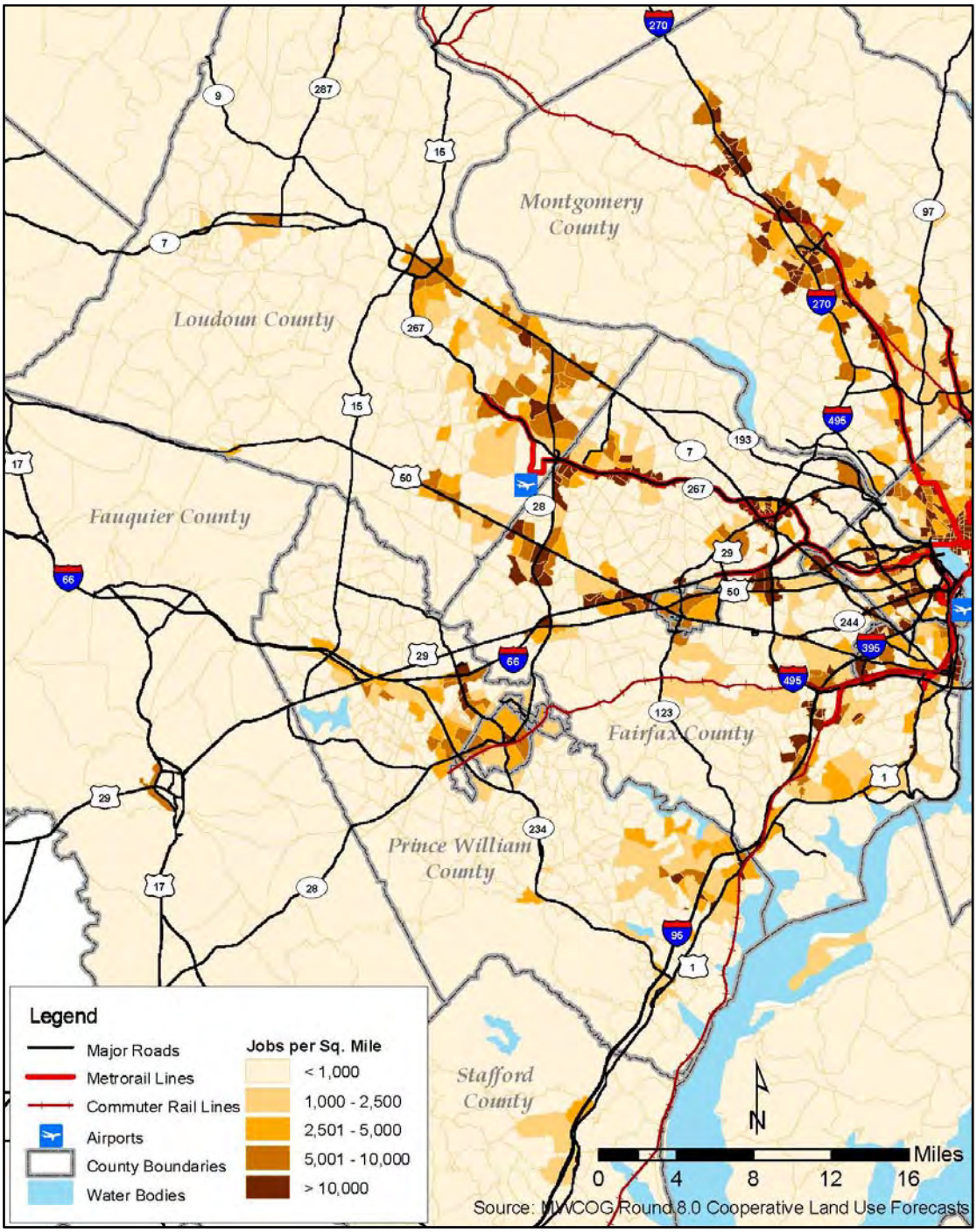
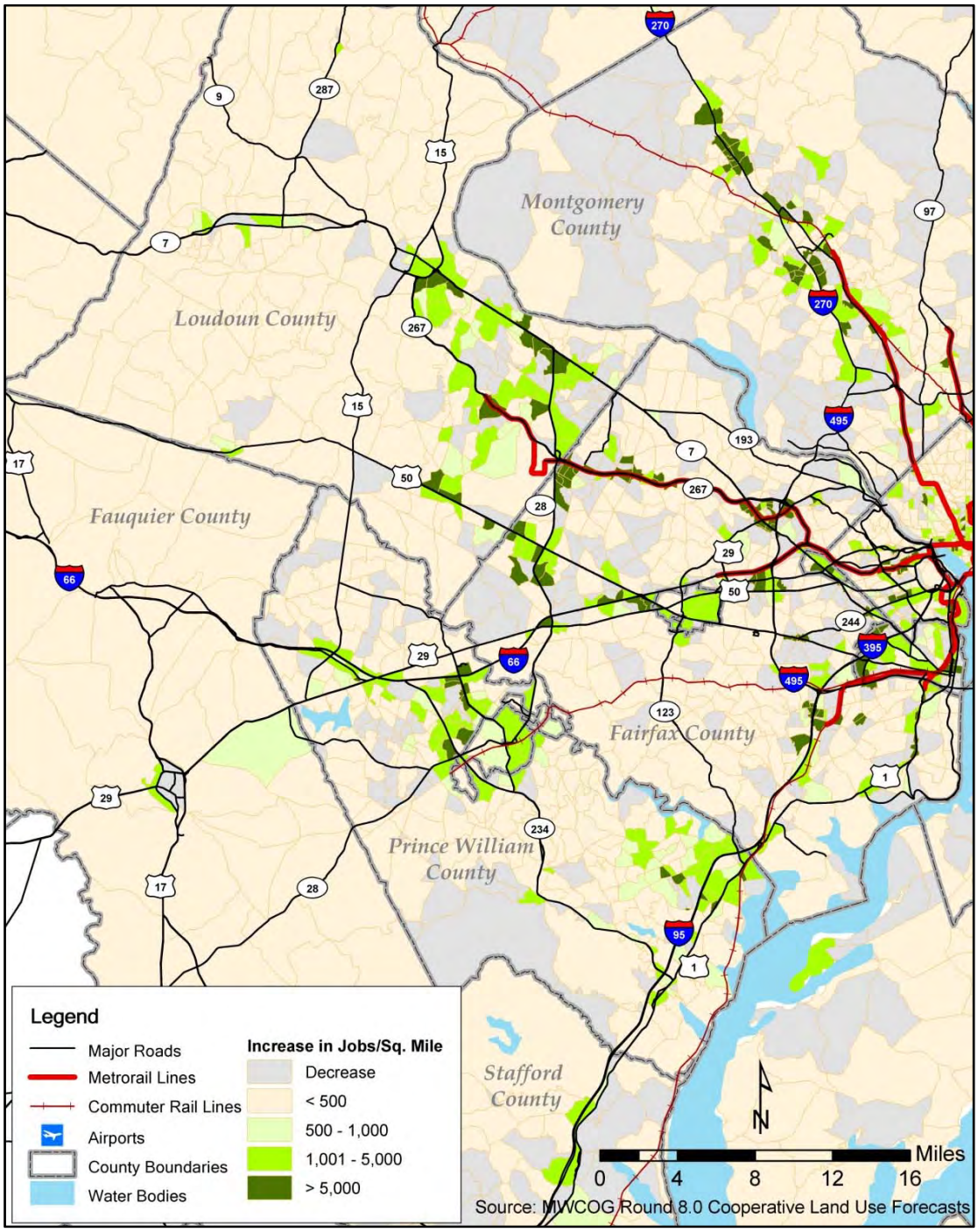


Figure 2.6 2007 to 2040 Changes in Employment Density



Land Use Findings

Commuting travel is a key factor in the development of transportation facilities. As a result, indicators of commuter travel are a key consideration in reviewing the concentration, balance, and mix of employment and residential opportunities from the Round 8.0 land use forecast. The TPB Version 2.3 Travel Demand Forecasting model permits a few observations about the land use inputs to be made, including:

- Northern Virginia will continue to grow and is forecast to have significant growth in both population and employment between now and 2040.
- The balance in the locations of jobs and residences shifts somewhat between 2007 and 2040, as proportionally more jobs are added in areas outside the D.C. core. Specifically:
  - Arlington is forecast to still have more jobs than worker residents;
  - Fairfax County starts to have more jobs than worker residents (in part as a result of the Silver Line Metrorail extension); and
  - Loudoun and Prince William Counties maintain a ratio of more worker residents than jobs in year 2040, leading to longer commutes for worker residents of those counties as average commuting speeds reduce.

Figures 2.7 and 2.8 depict the changes in work trip origins and destinations and in average work trip lengths, by jurisdiction, which reflect the above findings.

Figure 2.7 Work Trips by Jurisdiction

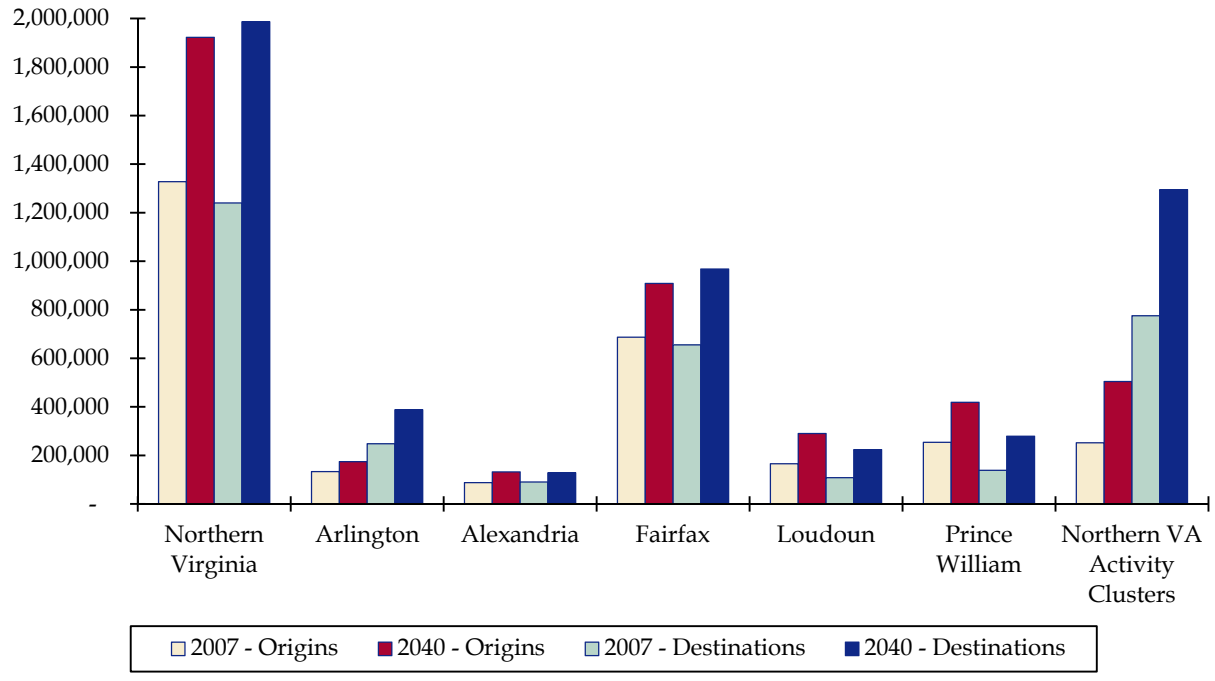
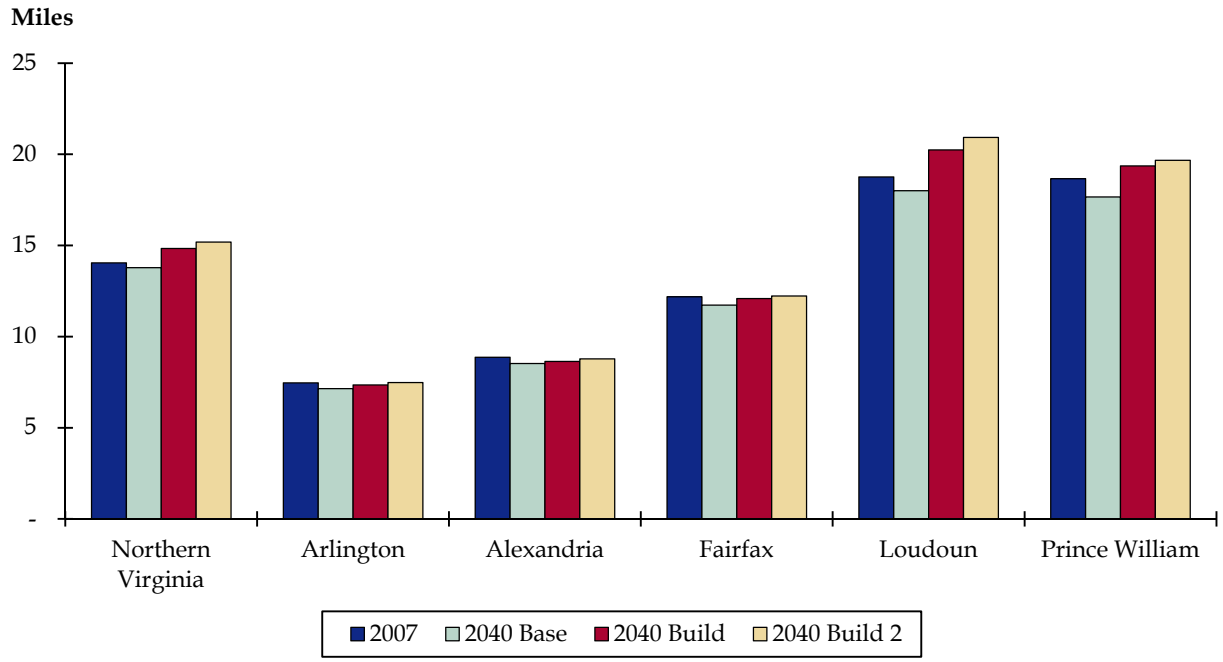


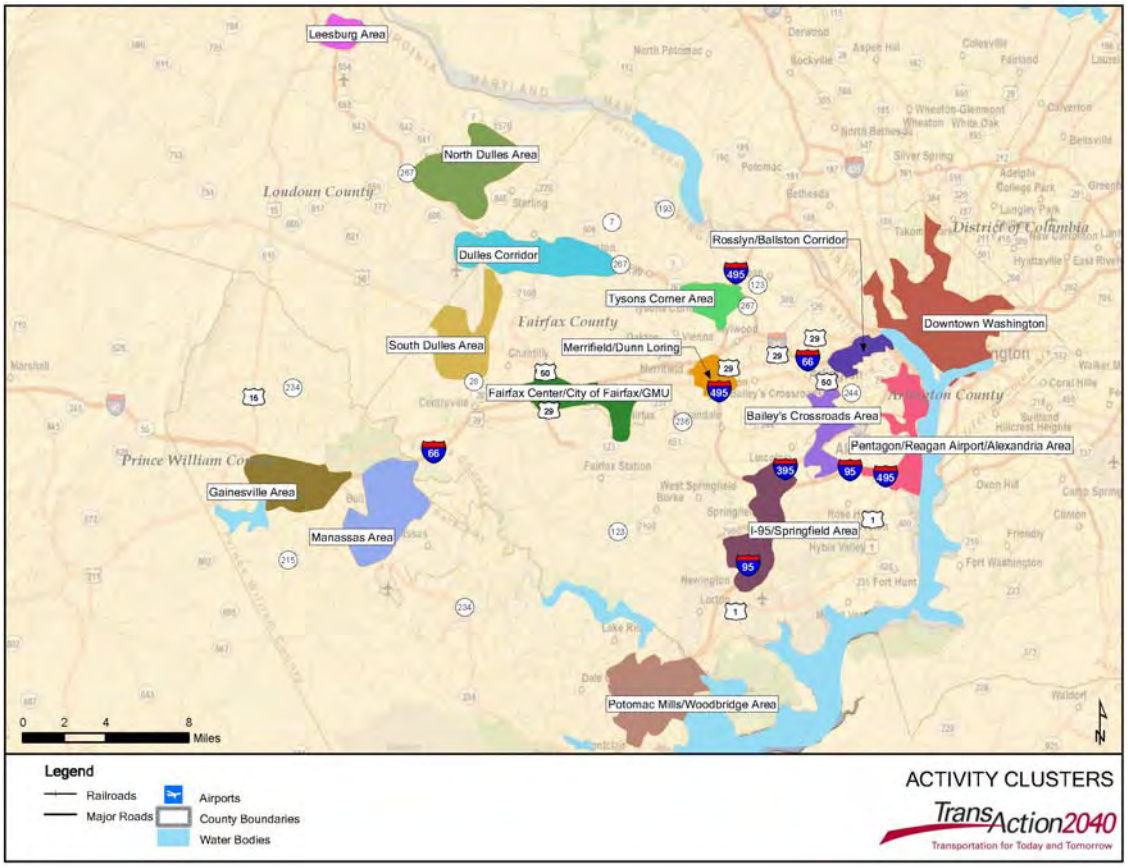
Figure 2.8 Average Work Trip Length



Activity Clusters

To increase the amount of employment or housing at targeted locations, MWCOG has adopted regional policy to guide land use and transportation planning decisions around designated Regional Activity Clusters. The clusters are intended to have a mix of jobs, housing, and services in a walkable environment, providing: 1) more choices for housing near employment opportunities; and 2) more transportation options to lower transportation costs and shorten travel times. A number of the clusters are located within or near the eight corridors for this TransAction Plan. Figure 2.9 shows 15 Activity Clusters, most in Northern Virginia, selected to represent a cross-section of Activity Centers in the D.C. metropolitan region. Table 2.2 shows the positive effects on multimodal travel when housing and employment are in a common location and transportation options are available.

Figure 2.9 Activity Clusters



Source: Regional Activity Clusters as defined by MWCOG.

Table 2.2 HOV and Transit Mode Share for Commuter Trips from and to Activity Clusters

	Trip Origins (From)			Trip Destinations (To)		
Activity Cluster	**2007**	**2040 Base**	**2040 Build**	**2007**	**2040 Base**	**2040 Build**
Downtown Washington	86%	86%	88%	68%	73%	75%
Pentagon/Airport/Alexandria	64%	65%	67%	54%	63%	63%
Dulles Corridor	28%	37%	39%	24%	33%	33%
Tysons Corner	32%	45%	47%	28%	45%	44%
Rosslyn/Ballston Corridor	71%	73%	75%	59%	67%	68%
Fairfax Center/City of Fairfax	28%	32%	37%	22%	27%	29%
South Dulles	23%	27%	29%	21%	25%	26%
North Dulles	21%	26%	28%	20%	24%	25%

Table 2.2 HOV and Transit Mode Share for Commuter Trips from and to Activity Clusters (continued)

	Trip Origins (From)			Trip Destinations (To)		
Activity Cluster	2007	2040 Base	2040 Build	2007	2040 Base	2040 Build
I-95/Springfield	36%	40%	41%	24%	31%	32%
Bailey's Crossroads	45%	46%	48%	28%	35%	34%
Merrifield/Dunn Loring	37%	41%	43%	27%	33%	34%
Manassas	22%	28%	32%	18%	20%	22%
Potomac Mills/Woodbridge	29%	37%	36%	21%	24%	25%
Leesburg	23%	31%	30%	19%	22%	23%
Gainesville	21%	28%	33%	17%	18%	21%

Note: HOV and transit mode shares for Activity Centers represents output from use of TPB Version 2.3 Travel Demand Forecasting Model. HOV and transit mode shares for other major U.S. cities range from 70 percent in New York, 57 percent in San Francisco, 50 percent in Boston, 28 percent in Baltimore, to 19 percent in Dallas. HOV and Transit mode shares to major Central Business Districts are higher, including 73 percent in San Francisco, 64 percent in Boston, and 28 percent in Dallas.

2.2 Transportation Factors

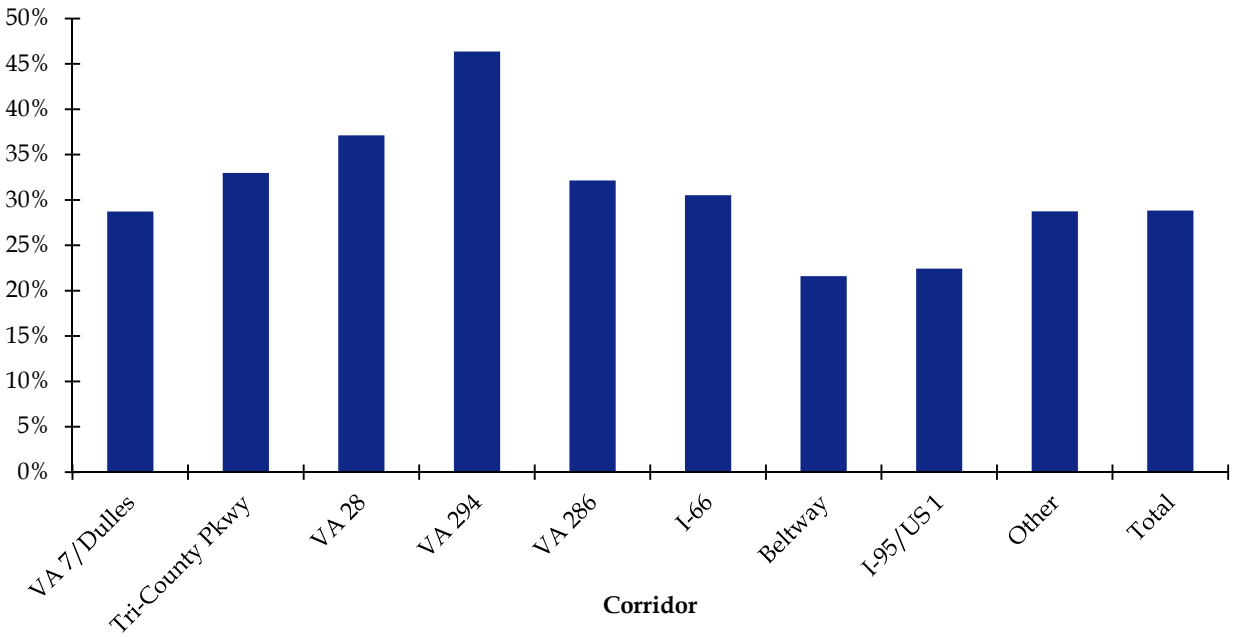
Not only does land use influence travel demand and subsequent transportation investments, but the physical transportation network also influences the locations where people choose to conduct activities and the mode by which they decide to travel. There is a need to consider land use in developing the proposed transportation infrastructure and vice versa. As a first step in considering the projects which should be included in the TransAction 2040 Plan, the existing CLRP project list was considered and forecasted highway metrics as well as current transit mode share data were reviewed. This information was useful in then formulating a list of projects for including in the TransAction 2040 Plan.

Highway Performance

Figure 2.10 displays the growth in daily vehicle-miles traveled (VMT), calculated by multiplying the traffic volume on a segment by the length of segment, for each major corridor in Northern Virginia. Based on the travel demand forecasting model results, a few observations were made which subsequently informed the targeted development of the proposed project list:

- The amount of VMT increases in 2040 compared to 2007;
- The highest growth in VMT is in outer jurisdictions; and
- The Beltway and I-95/U.S. 1 Corridors show the lowest growth, but still the VMT increases by more than 20 percent.

Figure 2.10 Growth in Daily VMT between 2007 and 2040 CLRP by Corridor



Source: Output from use of TPB Version 2.3 Travel Demand Forecasting Model.

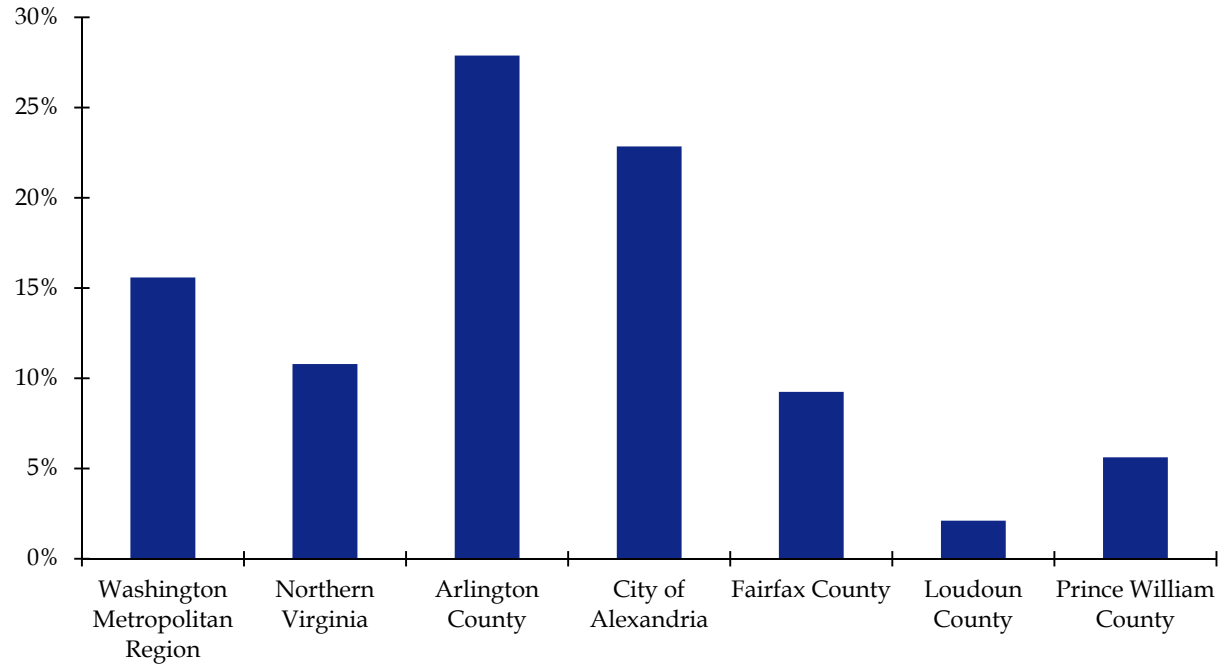
Transit Performance

Figure 2.11 shows the existing transit market shares for work trips by residents. Based on analysis of 2006-2008 Census Transportation Planning Products (CTPP) data:

- Generally, the transit mode share for work trips in Northern Virginia (11 percent) is lower than for the whole D.C. metropolitan region (16 percent); and
- Arlington and Alexandria have the highest transit mode shares for work trips in Northern Virginia.

Transit mode share is influenced by the availability of high-quality transit services and this fact informed the targeted development of the proposed project list.

Figure 2.11 Transit Mode Share
Work Trips by Residents



Note: Data from 2006-2008 Census Transportation Planning Products (CTPP).

Transportation Project Inputs

The TransAction 2040 Plan encompasses the CLRP transportation network and builds on it with additional projects to address highway and transit network performance as well as the region's Round 8.0 land use assumptions. The additional projects consisted of: 1) projects developed in the TransAction 2030 Plan that were not implemented; and 2) new projects since the TransAction 2030 Plan effort. Section 3.0, System-Level Evaluation, details how the combination of transportation projects in the TransAction 2040 Plan impacts regional mobility. The following subsections highlight some of the multimodal network elements included in the Plan.

Major Projects in the CLRP

All of the projects in the 2011 CLRP were included in both the Baseline and Build scenarios for TransAction 2040. The projects listed below represent a selection of some of the major CLRP projects; the CLRP web site or Plan map can be consulted for a more comprehensive listing:

- **I-495 High-Occupancy Toll (HOT) Lanes –** Two new HOT lanes in each direction from Springfield Interchange to Dulles Toll Road (12 miles);
- **Fairfax County Parkway/Fair Lakes Parkway/Monument Drive Interchange –** Grade separation and widening the Parkway from four lanes divided to six lanes divided (three lanes in each direction), primarily into the existing median from south of I-66 to north of Rugby Road (Route 750);
- **Dulles Metro Rail –** Twenty-three-mile extension of the existing Metrorail system from East Falls Church to Washington Dulles International Airport and west to Ashburn (11 new stations);
- **Dulles Access Road –** Widen Dulles Access Road from four to six lanes from Dulles Airport to VA 123; and
- **I-395/I-95 HOV and HOT Lanes –** Add additional HOV capacity and convert to a HOT facility from VA 610 (Garrisonville Road) in Stafford County to two miles north of interchange with I-495.

Major Projects Identified for TransAction 2040

An ambitious list of additional projects was developed for inclusion in the TransAction 2040 Plan, informed by local plans, review of the Baseline Scenario modeling results, and other knowledge of transportation needs in the region. The projects range in size from small, localized improvements to major new highways or LRT lines. Listed below is a sampling of the projects that are not in the 2011 CLRP (Baseline), but which are included in the Build scenarios for TransAction 2040. Table 2.3 summarizes the number of projects by type by Corridor.

Table 2.3 Summary of Projects by Type by Corridor

Corridor	Highway	Transit	Bicycle/Pedestrian
Dulles/VA 7 Corridor	18	5	4
Fairfax County Parkway Corridor	7	1	0
I-495 Beltway Corridor	5	4	5
I-66/U.S. 29/U.S. 50 Corridor	22	14	7
I-95/I-395/U.S. 1 Corridor	21	22	9
Loudoun County Parkway/Tri-County Parkway/ Belmont Ridge Road/Gum Springs Road Corridor	7	1	6
Prince William Parkway Corridor	3	0	0
VA 28 Corridor	15	2	3
Other	9	9	8

- Over 100 highway projects adding 785 lane-miles and numerous bicycle and pedestrian improvements, including:
  - Urban street grids at major activity centers (e.g., Tysons Corner, Crystal City, etc.);
  - HOV lanes on the Fairfax County Parkway;
  - Western Transportation Corridor; and
  - Eastern Potomac River Crossing.
- More than 50 transit projects, including:
  - Metrorail extensions to Gainesville and Potomac Mills;
  - High-capacity transit connections across the Wilson and Legion Bridges;[1]
  - Expansion of Metrorail fleet to all eight-car trains;
  - Light rail on VA 28;
  - High-capacity transit on VA 7[2];
  - VRE extensions to Haymarket and Fauquier County;[3]
  - Park-and-ride lot construction in outlying counties.
- Over 40 projects to improve bicycle/pedestrian conditions, including:
  - Grade-separated crossings;
  - Paths and bicycle trails; and
  - Bikeshare.

[1] The Build scenario includes these connections as Metrorail. The Build 2 scenario includes these connections as LRT connections.

[2] Project was modeled and analyzed as light-rail transit.

[3] Extension of VRE to Nokesville is dependent upon extension of VRE into Fauquier County.

3.0 System-Level Evaluation

System-level evaluation was undertaken as part of the TransAction 2040 Plan development process to identify the current transportation system conditions and to document expected future conditions under the scenarios tested. The system-level evaluation process and measures of effectiveness permit the illustration of the benefits of the TransAction 2040 Plan as a whole. This section is organized into three subsections: Scenarios Tested, Travel Demand Forecasting, and System-Level Measures of Effectiveness. Selected corridor-level findings and reporting are presented in the Technical Appendix.

3.1 Scenarios Tested

Three scenarios were initially defined for evaluation as part of TransAction 2040: Current, Baseline, and Build. Later, a Build 2 scenario was developed to address deficiencies in the network performance as indicated by the Build scenario model outputs. Each scenario is outlined in Table 3.1. The Current scenario permits showing how the established transportation network functions today. The output from the Baseline scenario shows how the transportation network will function in the year 2040, when projects in the CLRP have been implemented. The Build and Build 2 model outputs show how the transportation network will function in the year 2040, assuming the CLRP projects and the TransAction 2040 Plan projects have been built.

Table 3.1 Scenario Definitions

Scenario	Horizon Year	Land Use Input	Transportation Input
1: Current	2007	Existing	Existing transportation network
2: Baseline	2040	Round 8.0	All CLRP projects, including Silver Line and I-495 Express Lanes
3: Build	2040	Round 8.0	All CLRP projects plus all additional TransAction 2040 projects
4: Build 2	2040	Round 8.0	Build Scenario as amended by the TransAction 2040 Subcommittee, including additional projects

3.2 Travel Demand Forecasting

The Metropolitan Washington Council of Governments/National Capital Region Transportation Planning Board (TPB) Version 2.3 Travel Demand Forecasting Model was used to evaluate the scenarios. Cambridge Systematics (CS) prepared a preliminary set of forecasts for the Current,

Baseline, and Build scenarios using a preview version of the model. TPB staff were then tapped to produce a final set of forecasts for these scenarios when the adopted version of the model was ready. Later, when the Build 2 scenario was introduced and tested, CS performed a follow-up Build and Build 2 forecast to complete the requested reporting. All reporting was then made with reference to the runs previously performed by TPB staff.

The TPB Version 2.3 model is an enhanced tool as compared with that which was available for testing the TransAction 2030 Plan. The Version 2.3 model is based on the most-recent household travel survey data (from 2007-2008). The model incorporates a feedback loop allowing the trip table to respond and adapt to improvements in transportation system performance and improvements in its highway assignment algorithm. Most notably, the Version 2.3 model incorporates an enhanced mode choice model which permits study of bus and rail transit alternatives. It provides an excellent platform for reviewing the system-level performance of the Build scenario(s) compared with the Baseline.

3.3 System-Level Measures of Effectiveness

A set of system-level performance criteria was developed to evaluate the benefits of adding the TransAction 2040 Plan projects. These criteria were related to the transportation planning objectives established for this Plan. The criteria described below were used to measure the performance of the entire transportation system; that is, all of the projects working together as a whole. The project team first looked at current conditions in 2007 and then evaluated conditions in the 2040 Baseline Scenario, Build Scenario, and Build 2 Scenario. The system-level performance criteria included:

- Daily vehicle-miles of travel (VMT);
- Daily person-miles of travel (PMT);
- Work trip length;
- Work trip mode share;
- Job accessibility;
- Screenline analysis; and
- Levels of service.

The system-level performance criteria and the modeling outcomes for each are described below. Section 4.0, Prioritization of TransAction 2040 Plan Projects, describes the criteria and process for evaluating and prioritizing individual projects.

Daily VMT

VMT per capita measures vehicle use within a geographic area, normalized by population. VMT per capita is determined by dividing the VMT in the jurisdiction by the population in the jurisdiction. Rising VMT per capita can represent an increase in mobility for individuals, but it

can come with societal costs: increased traffic congestion, air pollution, and greenhouse gas emissions.

The relationship between VMT, changes in land use, and improvements in the transportation network can be complex. Transit expansion projects tend to attract people to use transit, but as highway conditions improve, vehicle usage may increase. Highway expansion projects can also improve highway conditions and increase vehicle usage. The concept of a travel time budget also comes into play with the regional model. As travel time by car increases, the distance traveled in the same amount of time decreases. In this manner, congestion can have a dampening effect on VMT and congestion-relief may tend to increase VMT.

As shown in Figure 3.1, VMT per capita decreased between the Current and Base scenario. This was likely attributable to the travel time budget phenomenon noted above. The added travel demand brought forward by the growth assumed in the 2040 Round 8.0 land use forecast coupled with the scale of CLRP transportation network improvements led to slower highway travel times and shorter distance travel within the same travel time budget. However, the pattern of growth may also have influenced trip lengths. VMT per capita increased between the Base and Build scenario. The highway network additions and transit improvements in the Build scenario were thought to lead to faster highway travel times in the model and, thus, longer distance travel within the same travel time budget. The Build 2 scenario resulted in similar VMT per capita as was forecast in the Build scenario.

Figure 3.1 Daily Regional VMT per Capita in Northern Virginia

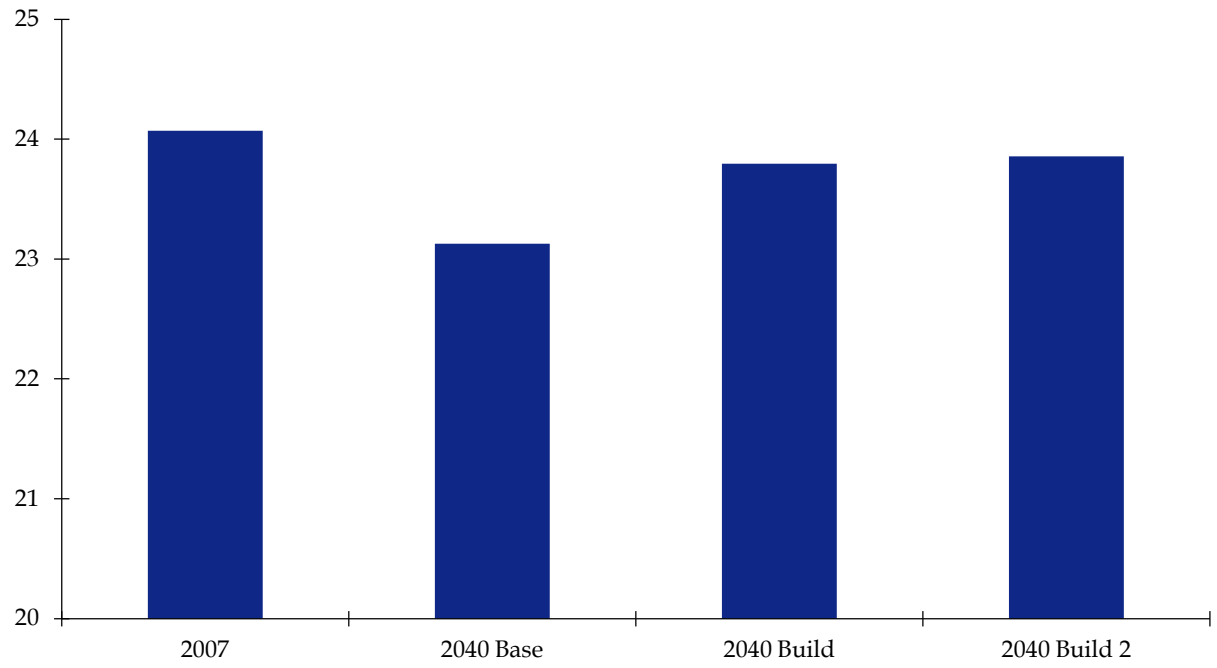
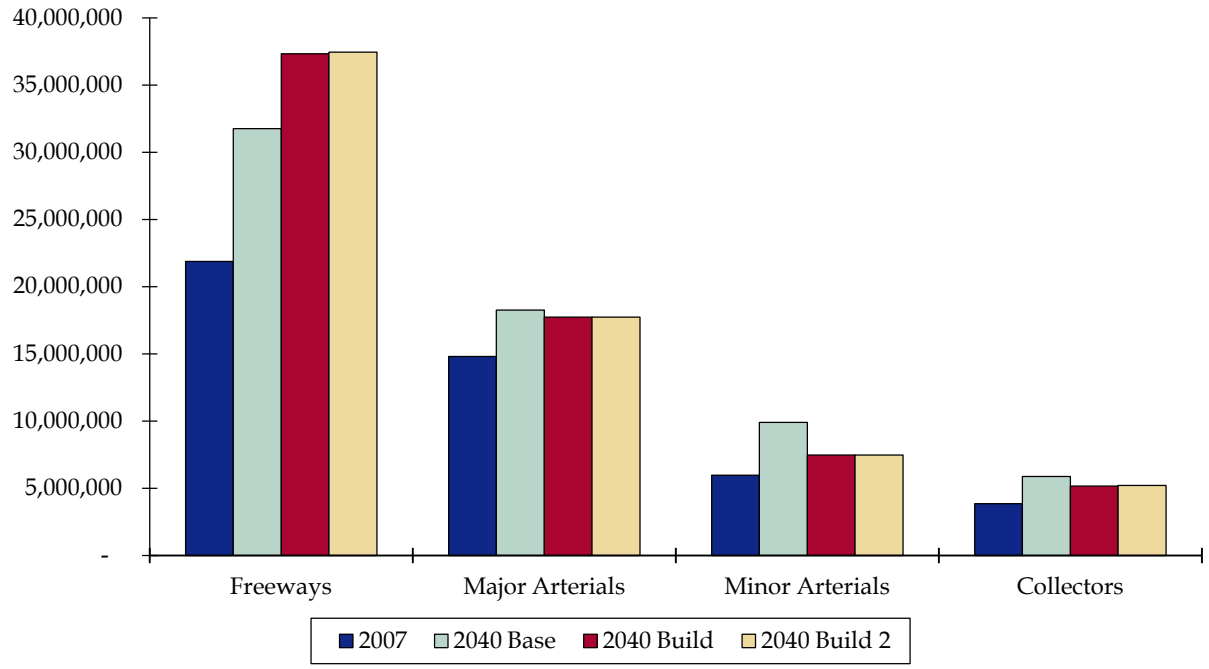


Figure 3.2 reports VMT by facility type for each scenario. The facility type groupings used correspond to the facility types in the TPB Version 2.3 Travel Demand Forecasting Model, except that the "Freeway" group includes the aggregated results of three closely associated facility types: "Freeways," "Expressways," and "Ramps." VMT increased between the Current scenario (2007) and the Base and Build scenarios (2040) due to the forecast growth in regional households and employment. Looking at the facility type differences, the Build scenarios resulted in lower VMT than the Base scenario for all facility types except freeways. VMT on freeways increased between the Base scenario and Build scenarios, likely due to the introduction of such facilities in the eastern and western transportation corridors.

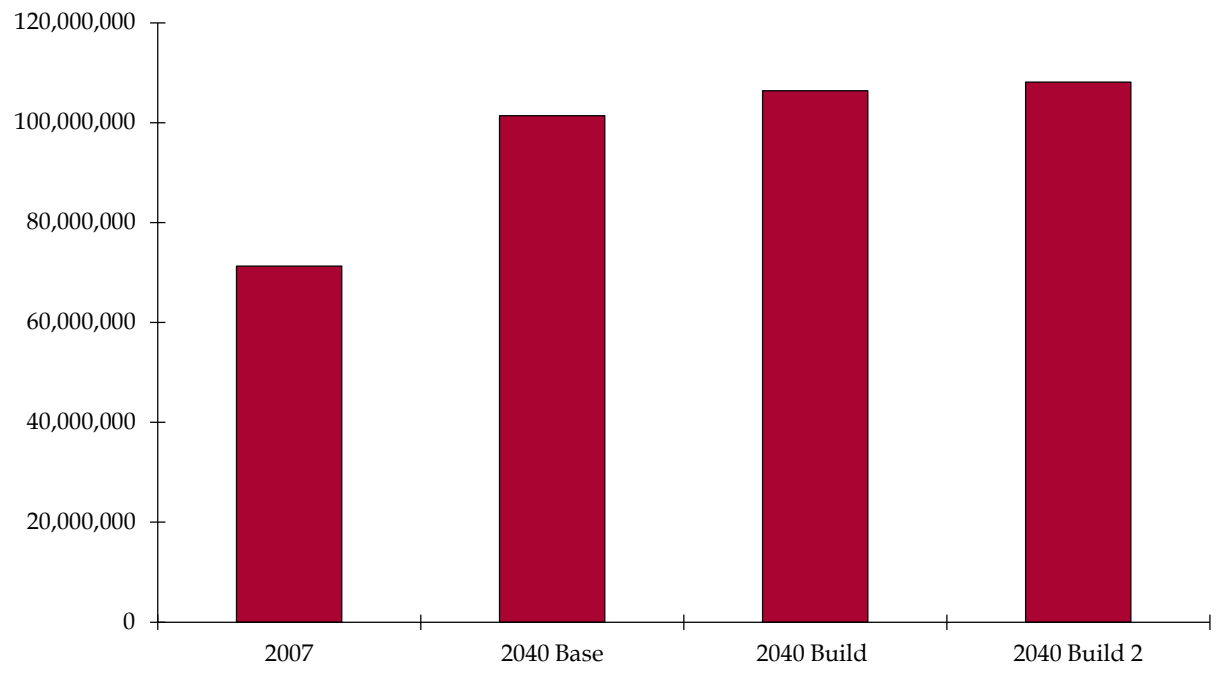
Figure 3.2 Daily Regional VMT by Facility Type in Northern Virginia



Daily PMT

PMT measures the miles of travel made by people whether in cars or on transit. PMT is an indicator of mobility, generally increasing when it is faster to travel longer distances. Figure 3.3 illustrates the model results for this measure. As with VMT, daily PMT increased between the Current and Base scenarios, likely due to the forecast growth in regional households and employment. Between the Base and Build scenarios, daily PMT increased again, likely due to the combination of increased VMT (shown in the previous section) and increased carpool and transit travel. For the same reason, the Build 2 scenario showed slightly higher PMT as compared with the Build scenario.

Figure 3.3 Daily Person-Miles Traveled

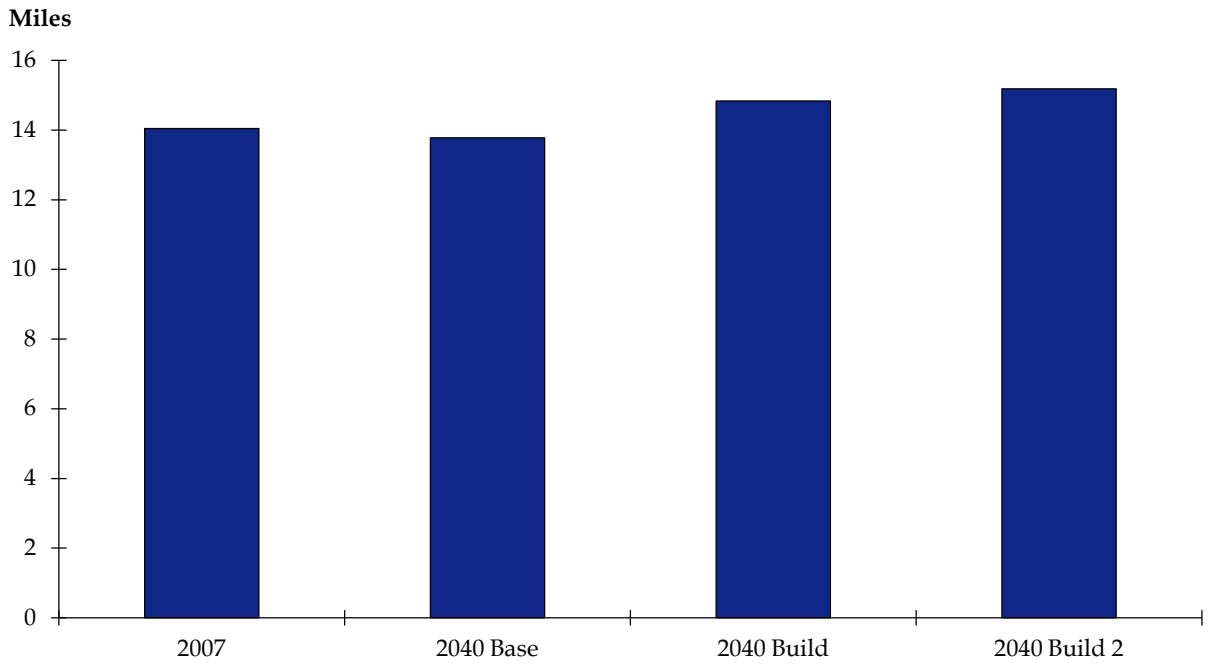


Average Work Trip Length

Average work trip length (in miles) was calculated from the model results. As discussed previously, the concept of a travel time budget comes into play with the regional model. As travel time increases, the distance traveled in the same amount of time decreases. Thus, increases in average work trip distance generally reflect improved mobility. However, the location of jobs and housing also influences the travel distances ultimately reported by the model.

Figure 3.4 presents the average work trip length in Northern Virginia for each scenario. From the 2007 Current to the 2040 Base scenario there is a relatively small decrease in average work trip length. For the 2040 scenarios, the same land use is present in each, so changes in average work trip length are most attributable to transportation network changes. From Base to Build and from Build to Build 2, the resulting average work trip length (in miles) increased, reflecting improved mobility under each scenario.

Figure 3.4 Average Work Trip Length in Northern Virginia



Work Trip Mode Share

Figure 3.5 and Figure 3.6 show the combined HOV and transit work trip mode share reported by the model for Northern Virginia and the Northern Virginia Activity Clusters for each of the four tested scenarios. Figure 3.5 looks at trips originating in Northern Virginia and Figure 3.6 looks at trips destined for Northern Virginia.

The largest change is reported in non-SOV mode share for work trips destined to Northern Virginia from 2007 to 2040. This may largely be explained by the introduction of the Metrorail Silver Line, providing improved rail transit access to a large number of employment destinations in the Dulles/Reston Corridor. There is also an increase in non-SOV mode share from 2007 to 2040 on the origins side, but the change in transit accessibility for trips originating in this corridor is muted due to the extensive connecting bus services currently available in the traditional commute direction.

From Base to Build and from Build to Build 2, non-SOV mode share increases for trips originating in Northern Virginia. The Build 2 focus on providing HOV and transit connections is reflected in these results. For trips ending in Northern Virginia, non-SOV mode share does not change substantially between Base and Build and Build 2, reflecting the challenge of serving Northern Virginia employment destinations with HOV and transit.

Figure 3.5 HOV and Transit Mode Share in Northern Virginia
Work Trip Origins

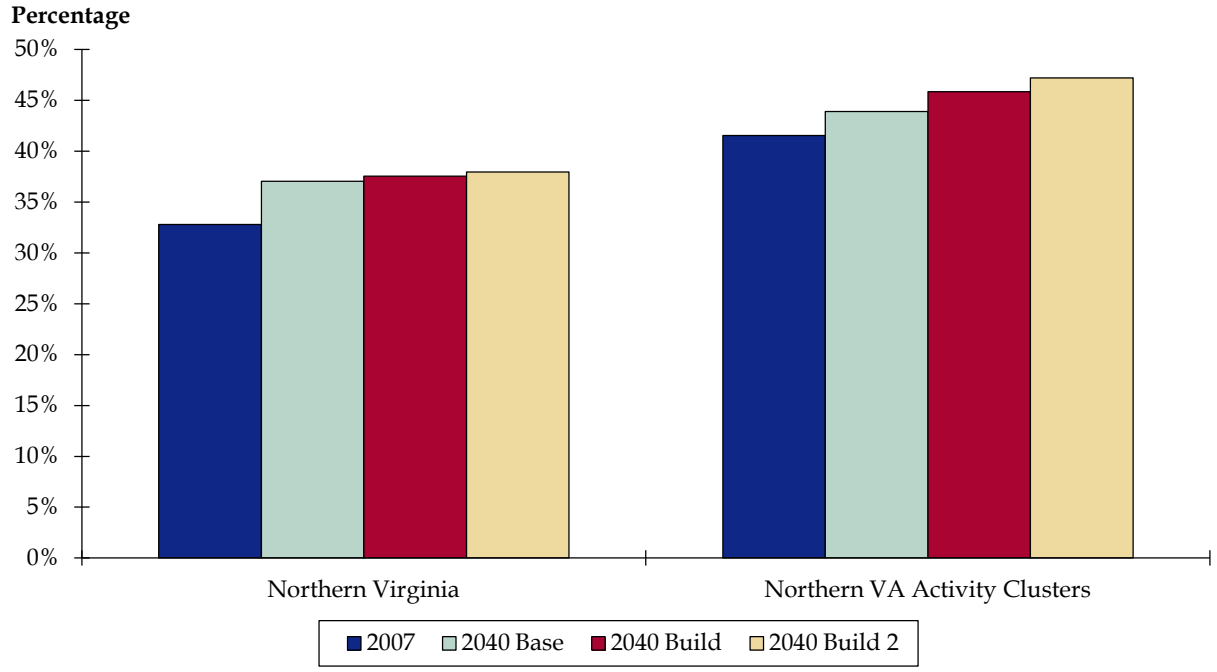
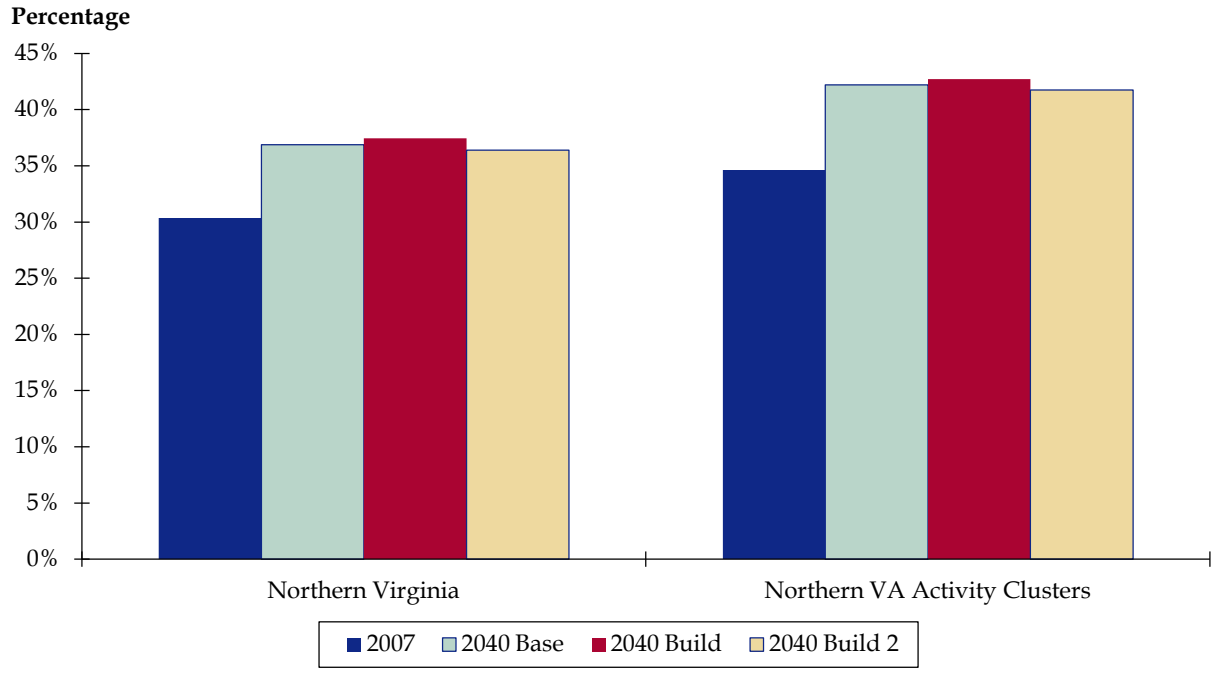


Figure 3.6 HOV and Transit Mode Share in Northern Virginia
Work Trip Destinations



Job Accessibility

The number of jobs within a 60-minute trip is one method to measure the job accessibility of a region or jurisdiction. Figure 3.7 and Figure 3.8 show the jobs accessible in Northern Virginia within 60 minutes by highway and transit modes, respectively. The 60-minute timeframe was chosen after first reviewing results using a 45-minute timeframe. The longer transit trips experienced in the outer jurisdictions were found to fall between these two thresholds and the 60-minute threshold was deemed a more representative measure.

From 2007 to 2040 Base, automobile and transit accessibility are reported to decrease in the model. This is likely a result of the forecast growth in households and jobs (and thus increased travel demand) leading to generally slower travel times on highways. The accessibility reported under the Build and Build 2 scenarios is nearly the same, but improved versus the Base scenario. The similarity in the accessibility measures between Build and Build 2 are expected since Build 2 focuses on improving the quality of the transit options available within the transit covered area, rather than significantly changing transit coverage.

Figure 3.7 Number of Jobs that are Accessible within 60 Minutes by Automobile *Per Household, in Northern Virginia*

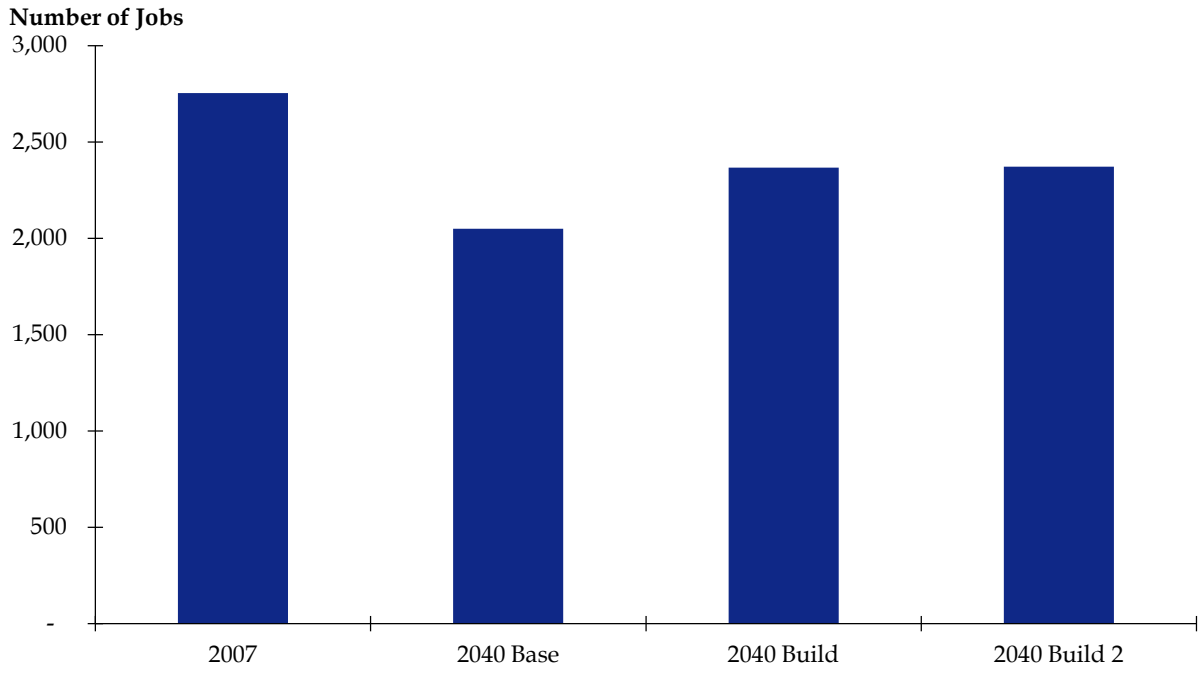
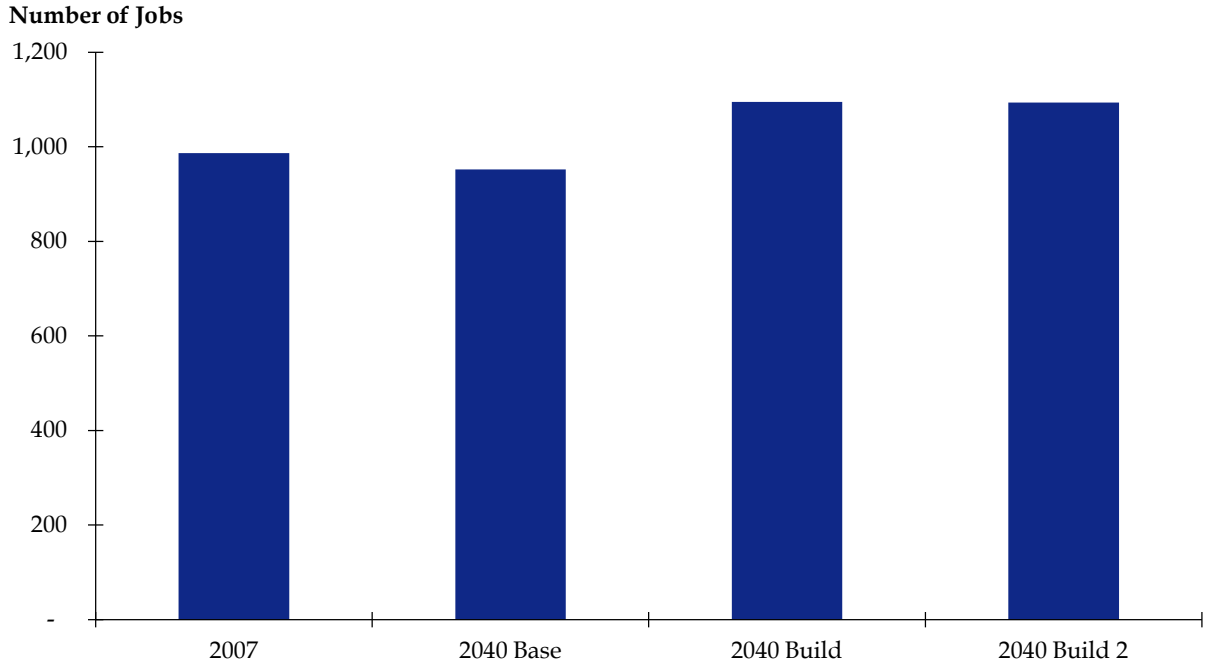


Figure 3.8 Number of Jobs that are Accessible within 60 Minutes by Transit
Per Household, in Northern Virginia



Screenline Analysis

Screenlines and cordon lines are imaginary lines that are placed across all roadways covering a specific movement. Screenlines usually follow a logical dividing line, such as a river, highway, or railroad tracks, permitting the Plan area to be divided into districts. As shown in Figure 3.9, 14 subregional screenlines, representing major corridor or environmental barriers such as rivers or streams in the area, were used to report travel condition information. Screenlines 1-7 are located at increasing distance from D.C. Screenlines 8-14 are located to permit understanding of specific flows. The screenlines are as follow:

- 1 – Along Arlington Boulevard/Washington Boulevard outside Pentagon;
- 2 – Along Arlington County line;
- 3 – Along Beltway alignment;
- 4 – Through central Fairfax County;
- 5 – Along Fairfax County line;
- 6 – West of VA 28 corridor and Dulles Airport;
- 7 – Western Prince William County extended across Loudoun County;
- 8 – Parallel to north side of I-95/U.S. 1 corridor;
- 9 – Parallel to I-66 corridor;

- 10 – Parallel to VA 267 corridor;
- 11 – Potomac River;
- 12 – Northern Loudoun County;
- 13 – Western Loudoun County; and
- 14 – Southern end of Plan area across I-95/U.S. 1.

The screenline analysis provides a further depiction of the impact of the Build network as compared with the Base network. The screenline analysis is depicted with reference to the 2007 network (i.e., a value greater than 1.0 means the volume to capacity (V/C) ratio of the depicted network scenario is greater than the volume to capacity ratio of the 2007 network for the same screenline). At many of the screenlines, there is additional capacity present under the Base network as compared with the 2007 network, potentially explaining values less than one. Under the Build network, additional capacity is present beyond the Base network at many of the screenlines. Additional volume may also be present, making use of the added capacity. In general, the analysis shows improved flow across screenlines (i.e., a lower relative volume to capacity ratio) with the Build network.

Figure 3.10 highlights the change in volume to capacity ratio from the 2007 scenario for the morning peak period and Figure 3.11 highlights the same for the evening peak period. Values over one indicate a higher volume to capacity ratio than in 2007. Overall the year 2040 Build scenario shows improved traffic flow across the screenlines and, at some screenlines, over 2007 conditions. For both morning peak and evening peak hours, the volume to capacity ratios from 2040 Build 2 scenario are similar to those from 2040 Build scenario. The values for Screenline 1 and Screenline 2 are lower as compared to the 2040 Build scenario, while the values are higher for other screenlines. This result is attributed to Screenline 1 and Screenline 2 being in inner jurisdictions where several of the transit improvements in the 2040 Build 2 Scenario have a noticeable effect. Screenline 13, as another example, shows the effect of the added capacity in the Plan of widening VA 7 from four to six lanes from Purcellville to U.S. 15.

Figure 3.9 Subregional Screenlines

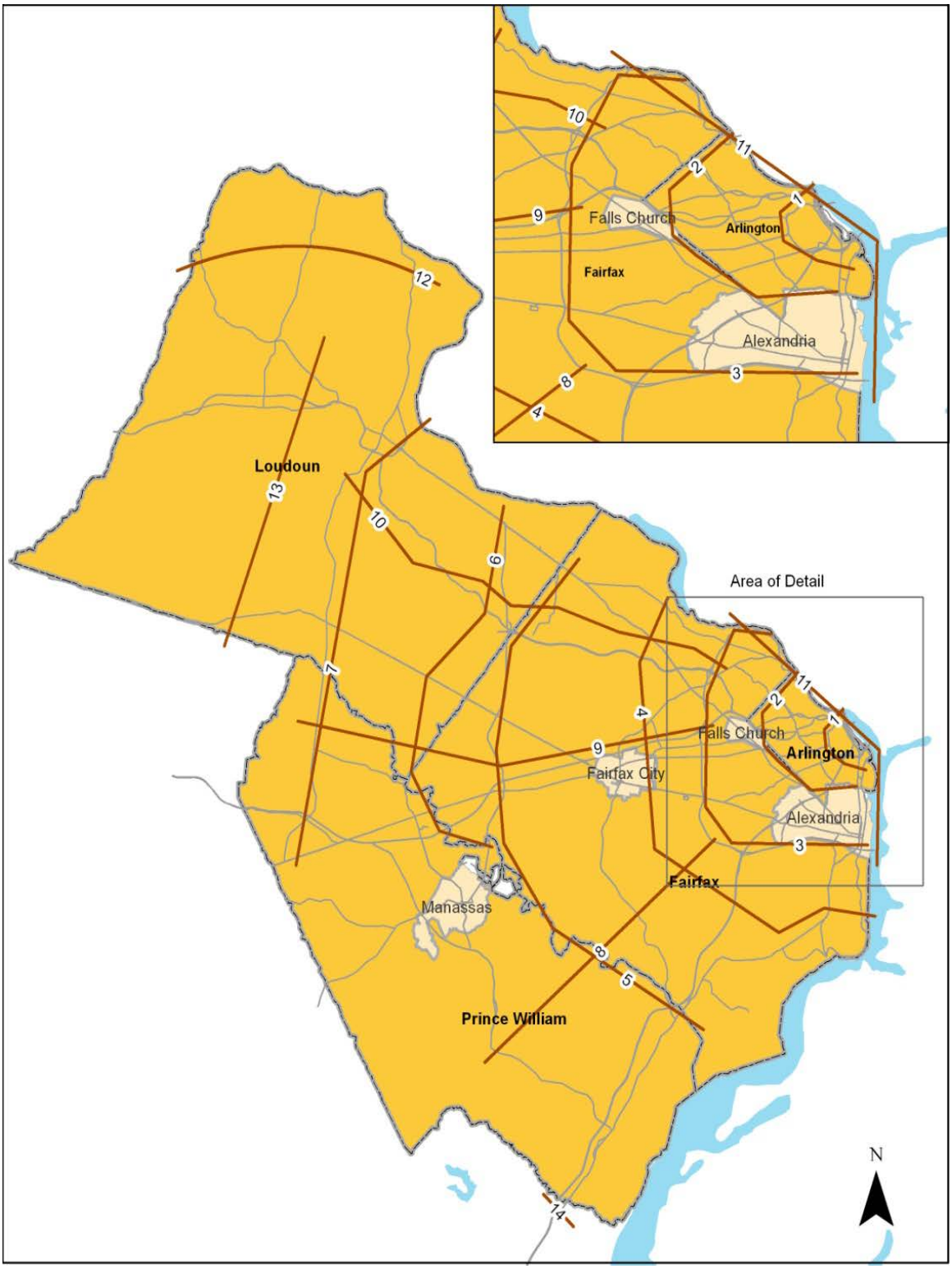


Figure 3.10 Morning Peak V/C Ratio Compared to 2007

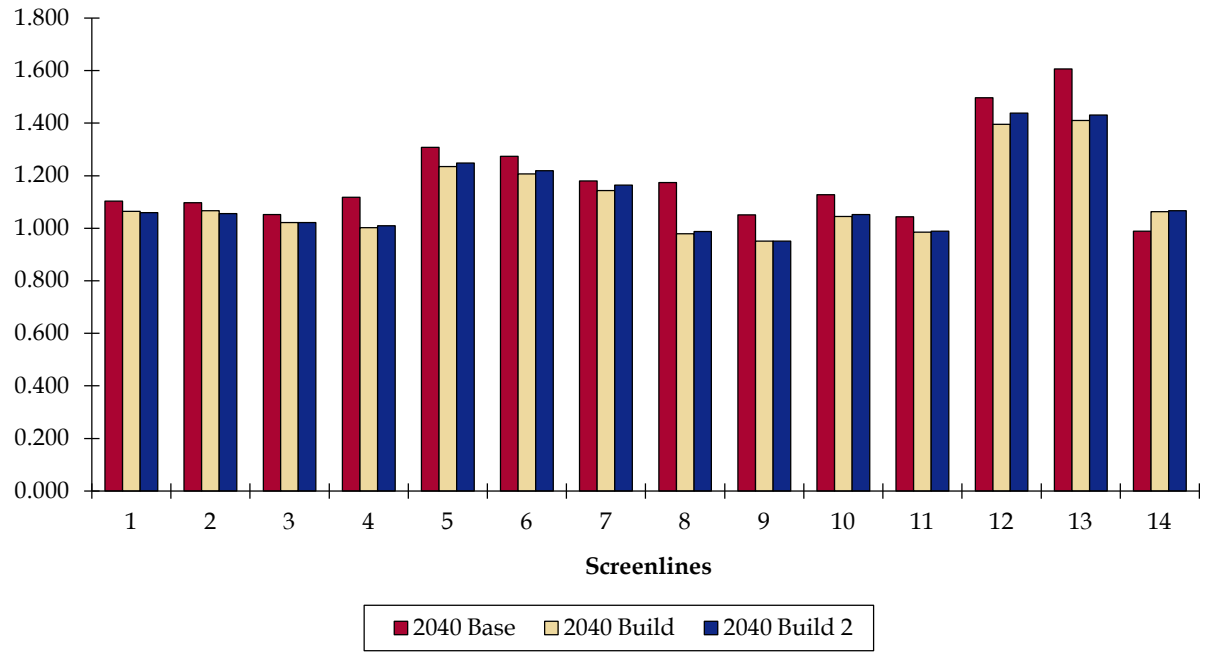
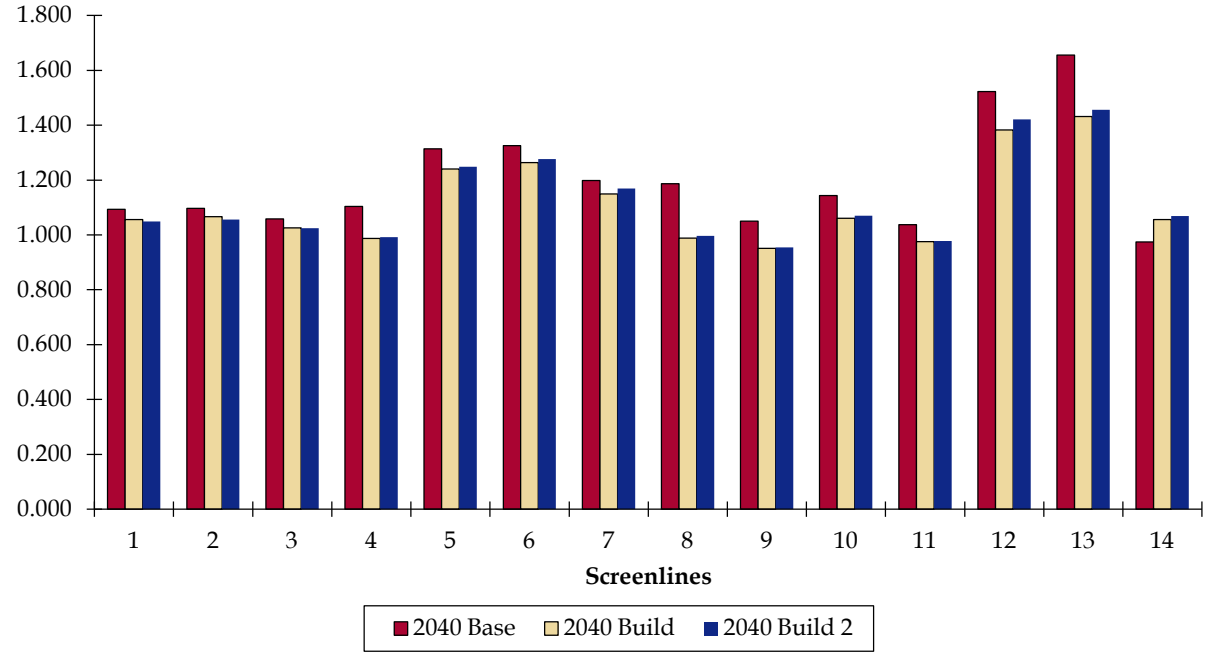


Figure 3.11 Evening Peak V/C Ratio Compared to 2007



Level of Service

Highway and transit level of service (LOS) indicators were calculated as part of TransAction 2040. The results presented below discuss the general trend of modal conditions within the region, rather than focusing on specific locations on specific highways where LOS may go up or down. The maps in the Technical Appendix provide specific LOS details for the major arterial segments of roadway in key corridors.

Highway

Using the highway assignment output from the model runs, Highway Capacity Manual techniques were used to calculate the reported conditions on major network links. Smoothing of the results was employed to help provide illustrations that would be useful to decision-makers. The resulting maps are shown in Figure 3.12, Figure 3.13, and Figure 3.14, showing 2007 Current, 2040 Base, and 2040 Build conditions, respectively.

Moving from 2007 to 2040, there is a degradation in highway performance conditions reported using the model. However, the 2040 Build scenario, which includes additional highway expansion as well as new transit options, improved highway performance results as compared with the 2040 Base scenario. In particular, additional circumferential capacity and related highway connections are seen to improve conditions (e.g., in Prince William County, including on VA 234; in Fairfax County on VA 28 and U.S. 1).

Figure 3.15 shows the distribution of peak-period VMT by level of service grouping (uncongested, near capacity, and over capacity) across Northern Virginia roadways. The chart shows the portion of VMT in uncongested conditions decreases and the portion of VMT in over capacity conditions increases moving from 2007 Current to the 2040 Base scenario. The 2040 Build scenario improves highway conditions, reducing the portion of VMT in over capacity conditions and increasing the portion of VMT in uncongested conditions.

Figure 3.12 2007 Highway LOS

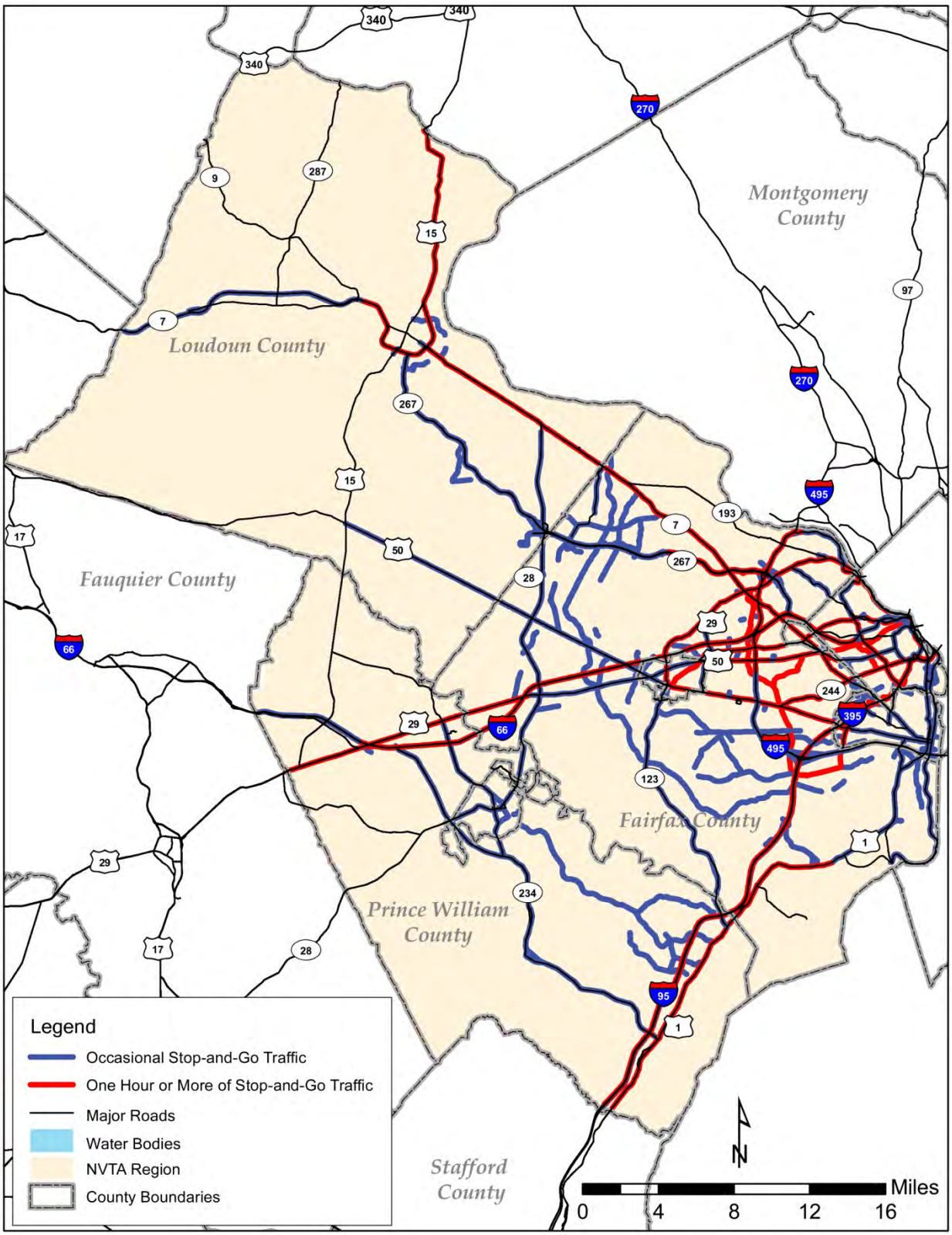


Figure 3.13 2040 Base Highway LOS

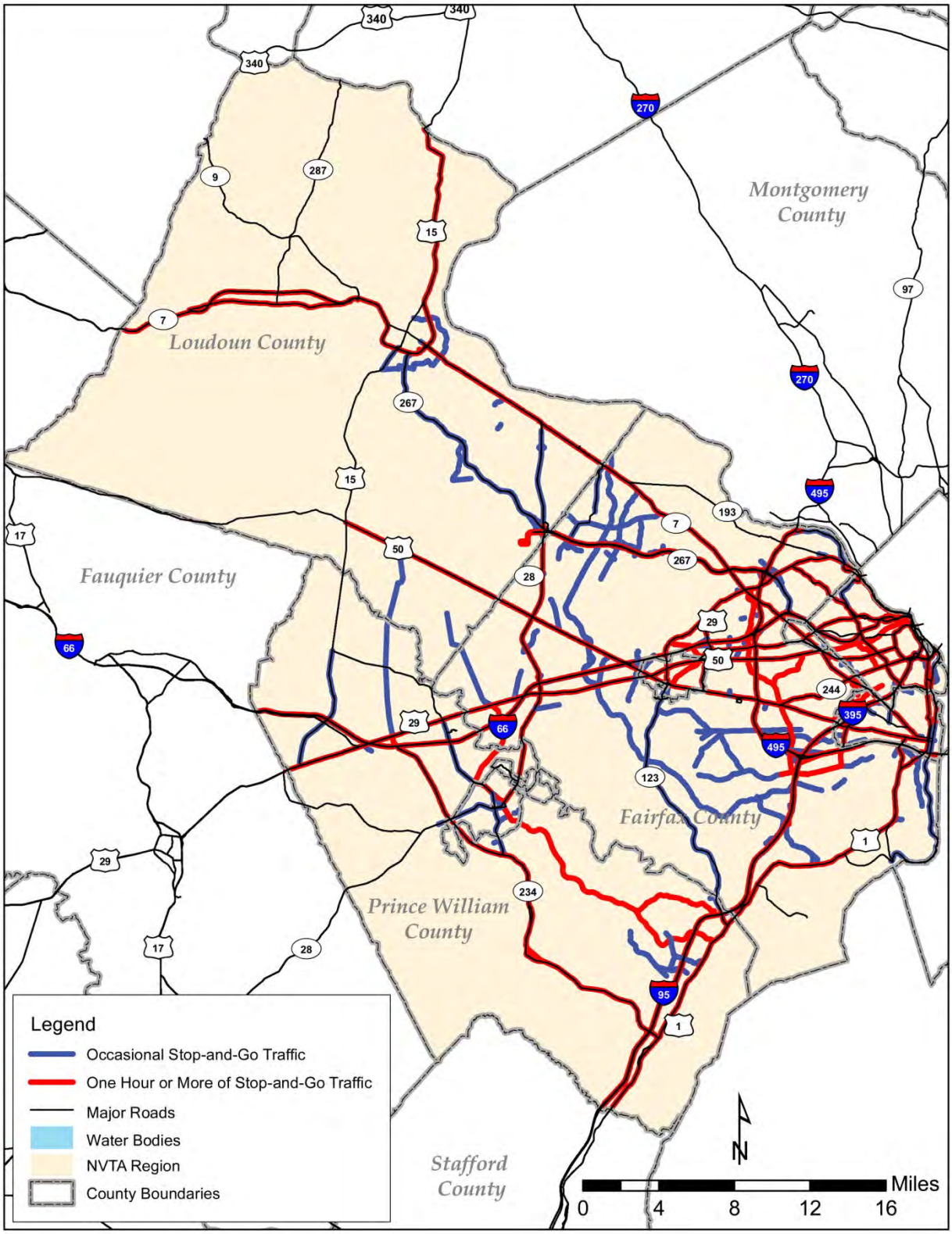


Figure 3.14 2040 Build Highway LOS

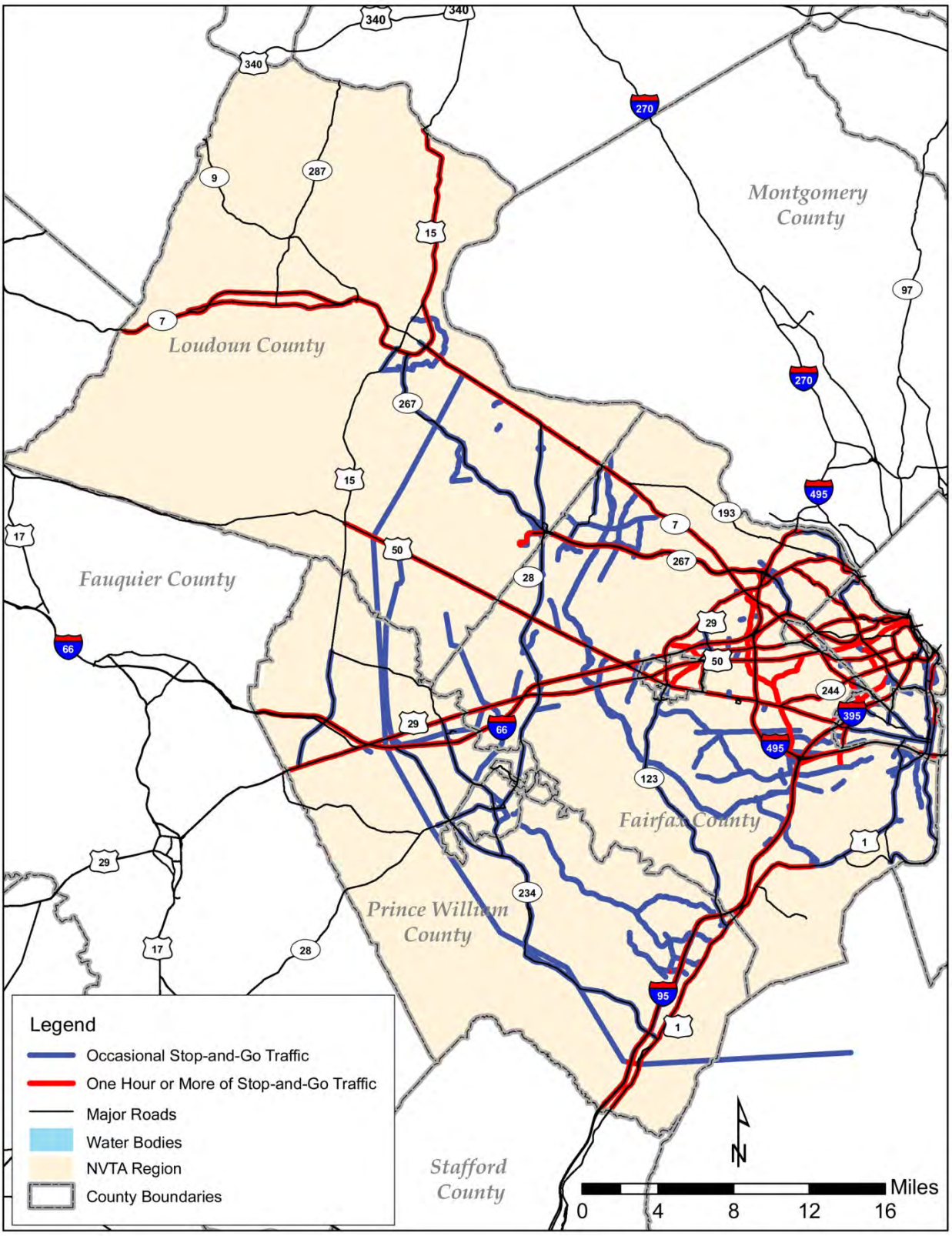
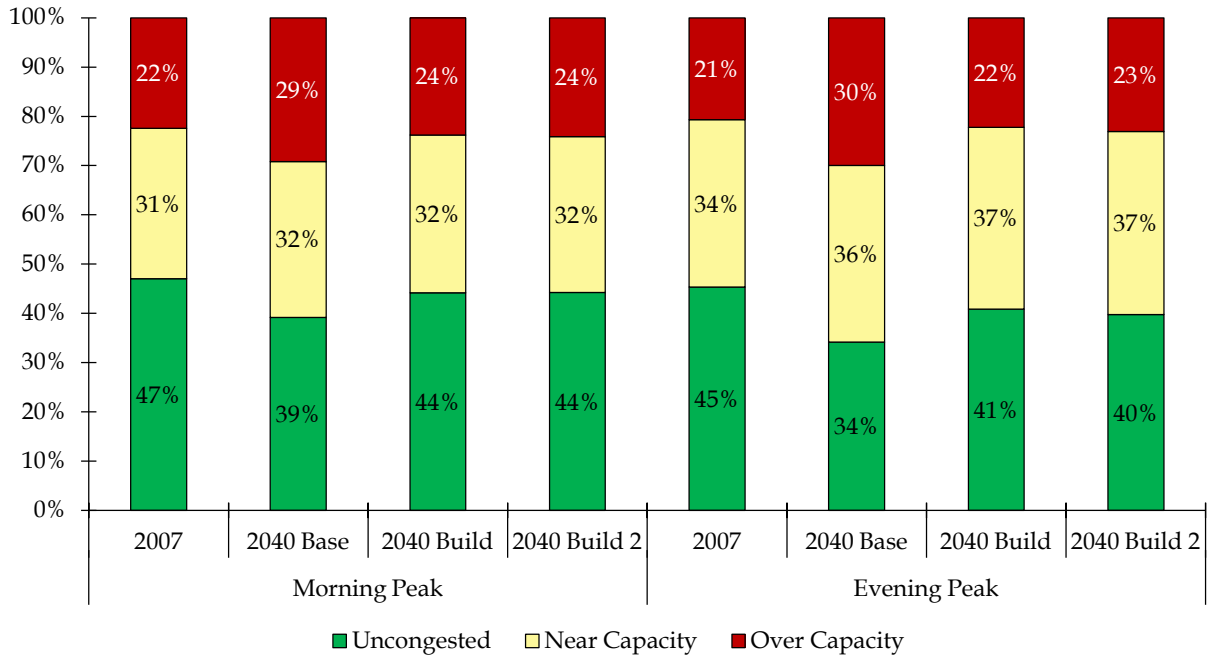


Figure 3.15 Northern Virginia – Distribution of Peak-Period VMT by Level of Service



Transit Service Coverage

Figures 3.16-3.18 show the transit service coverage for the 2007, 2040 Base, and 2040 Build TransAction network conditions. Similar to the TransAction 2030 Plan, an area is considered "transit-supportive" where household and/or employment densities are sufficient to support at least hourly transit service during the day. These transit-supportive areas have at least three households per gross acre and/or four jobs per gross acre.

The transit service coverage maps indicate that significant portions of Northern Virginia have some level of transit service, displayed in green (transit-supportive areas) and yellow (nontransit-supportive areas). The primary change in transit service coverage between 2007 and the 2040 Base Scenario is an increase in transit-supportive areas, indicating growth in housing and employment density. Several places of growth in the 2040 Base Scenario have some transit service, but others including Haymarket, Gainesville, Manassas, and parts of eastern Loudoun County are notable in their lack of transit service. The 2040 Build Scenario includes transit investments that add service to these areas, as well as new transit service in additional areas in northwestern Loudoun County and around Bristow (located in the western portion of Prince William County).

Figure 3.16 2007 Transit Service

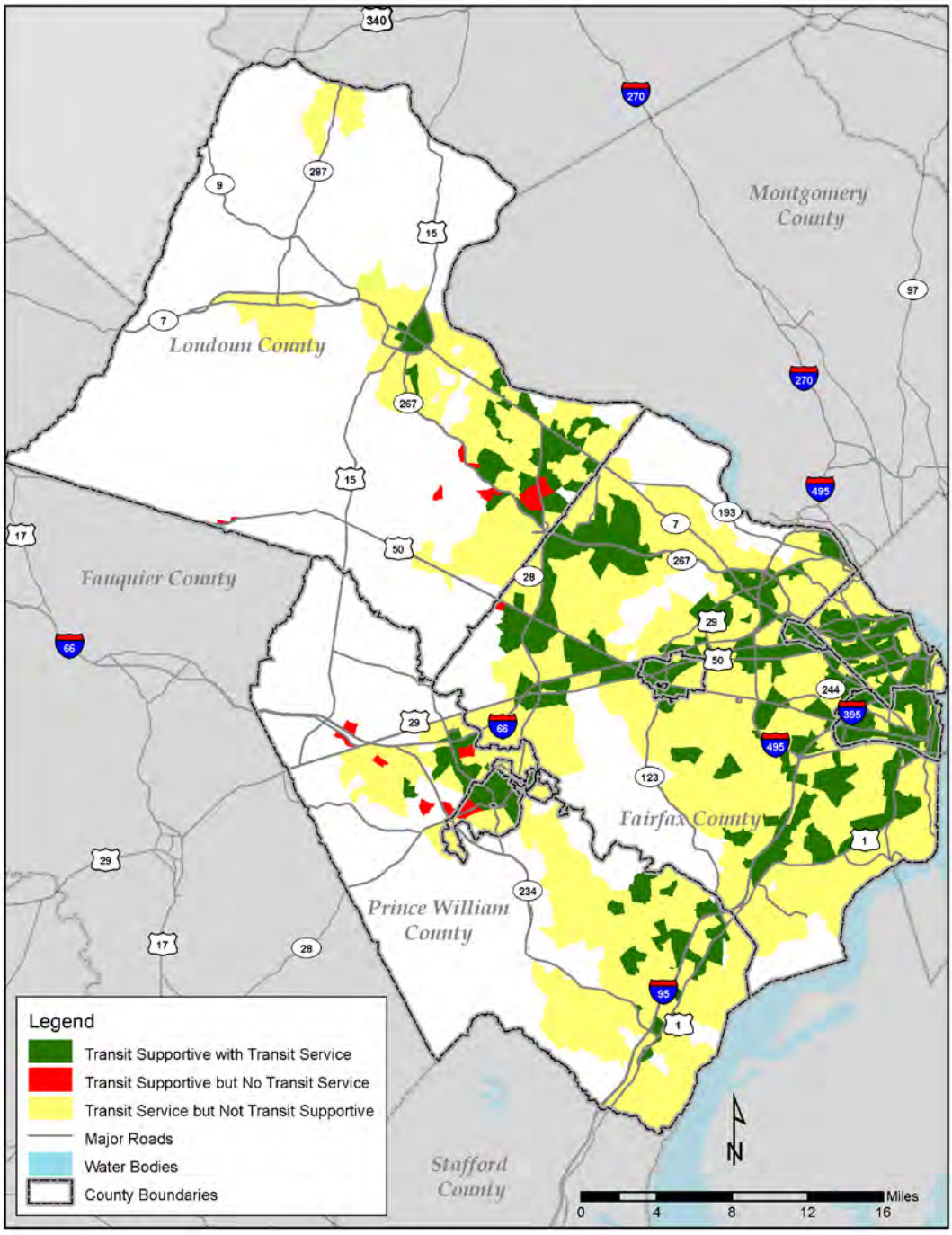


Figure 3.17 2040 Base Transit Service

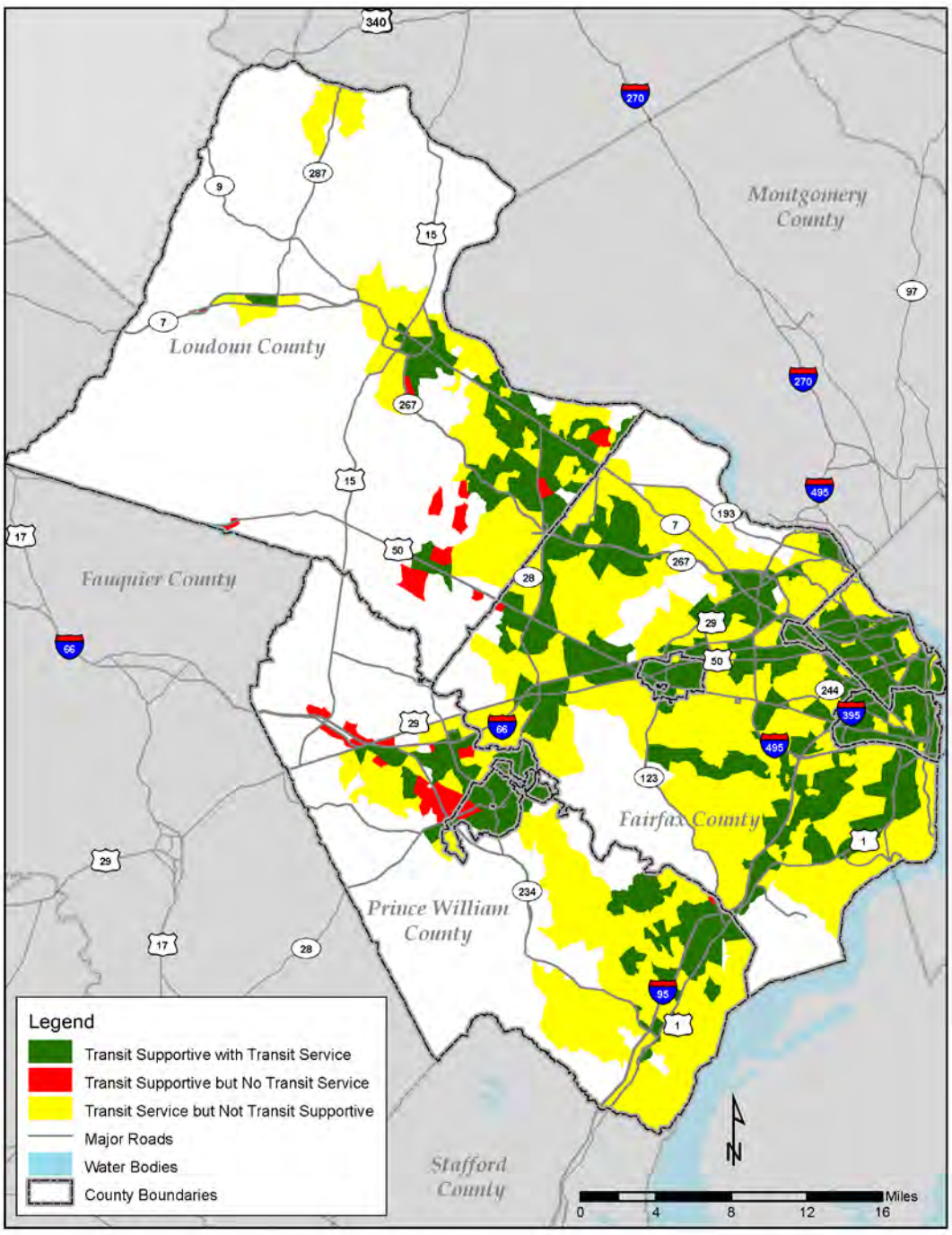
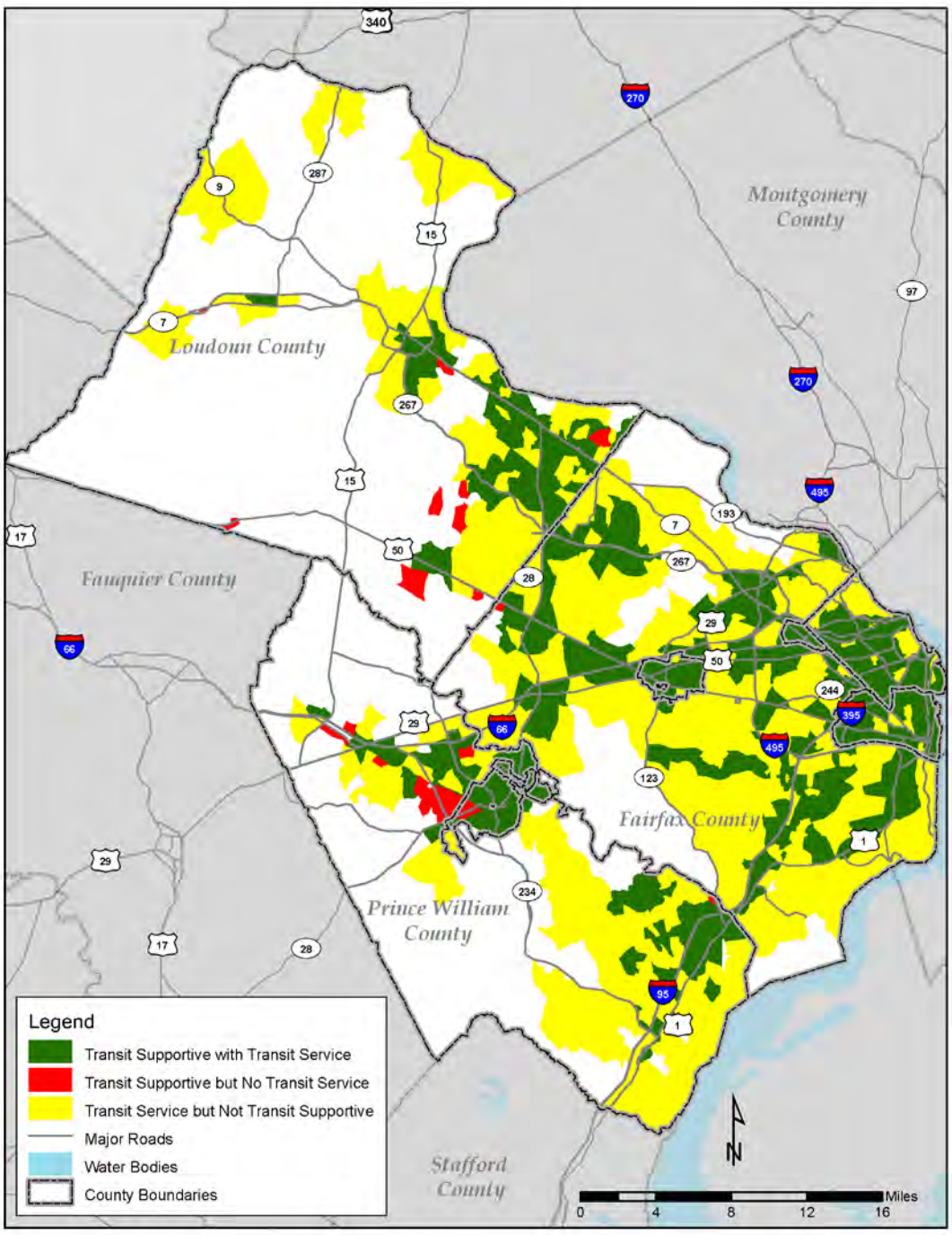


Figure 3.18 2040 Build Transit Service



Metrorail

Passenger load (passengers per rail car)[1] was utilized to gauge level of service for Metrorail service. The LOS standards used in the TransAction 2030 Plan have been updated for TransAction 2040, as shown in Table 3.2.

Table 3.2 Metrorail Passenger Load Level of Service Changes

LOS	Passengers/Car	Description	TransAction 2040 Changes
A	<37	No passenger need to sit next to another	No change
B	37-54	Passengers can choose where to sit	No change
C	55-71	All passengers can sit	No change
D	72-120	Comfortable standee load for design	72-100[a]
E	120-185	Maximum schedule load	100-120[a]
F	>185	Crush load	120+[b]

[a] At 100 passengers per car, averaged over the peak hour, some cars and entire trains become so full that, on occasion, passengers are unable to board and need to wait for a second train. When the average approaches 120, unsuccessful boardings become commonplace and passengers sometimes wait for more than two trains before being able to board.

[b] As the passenger per car level approaches 120, not only do passengers need to wait for more than one train before boarding, the high density of standees in the more crowded cars of each train hinders expeditious exiting from the cars, especially at transfer points. The dwell time at these busy stations increases so that the practical train throughput of 26 trains per hour becomes unachievable. Trains back up in a queue from the busy transfer stations, leading to multiple stops between stations and an overall increase in travel time.

Metrorail passenger load LOS under the 2007, 2040 Base, and 2040 Build Scenarios is shown in Figures 3.19-3.21. Between 2007 and 2040 Base, the most significant changes are higher peak-hour passenger loads on the service segments closest to Washington, D.C. and the new Silver Line, which includes LOS E and F segments from East Falls Church to the stations serving Tysons Corner. The 2040 Build Scenario improves these segments on the Silver Line to LOS D or better. Nearly all the Orange and Blue Line segments that exist in the 2040 Base Scenario also experience passenger load LOS improvements in the 2040 Build Scenario. In addition, 2040 Build implements new Metrorail service beyond Franconia/Springfield and Vienna, as well as a new connection from Dunn Loring to Tysons Corner, all of which are projected to have LOS A passenger loads.

[1] Metrorial passenger load for 2007 and 2040 Base scenarios assumes an average of 650 seats per train (1 8-car train, 3 6-car trains, 100 persons per car). The 2040 Build scenario assumes an average of 800 seats per train (all 8-car trains, 100 persons per car).

Figure 3.19 2007 Metrorail Passenger Load

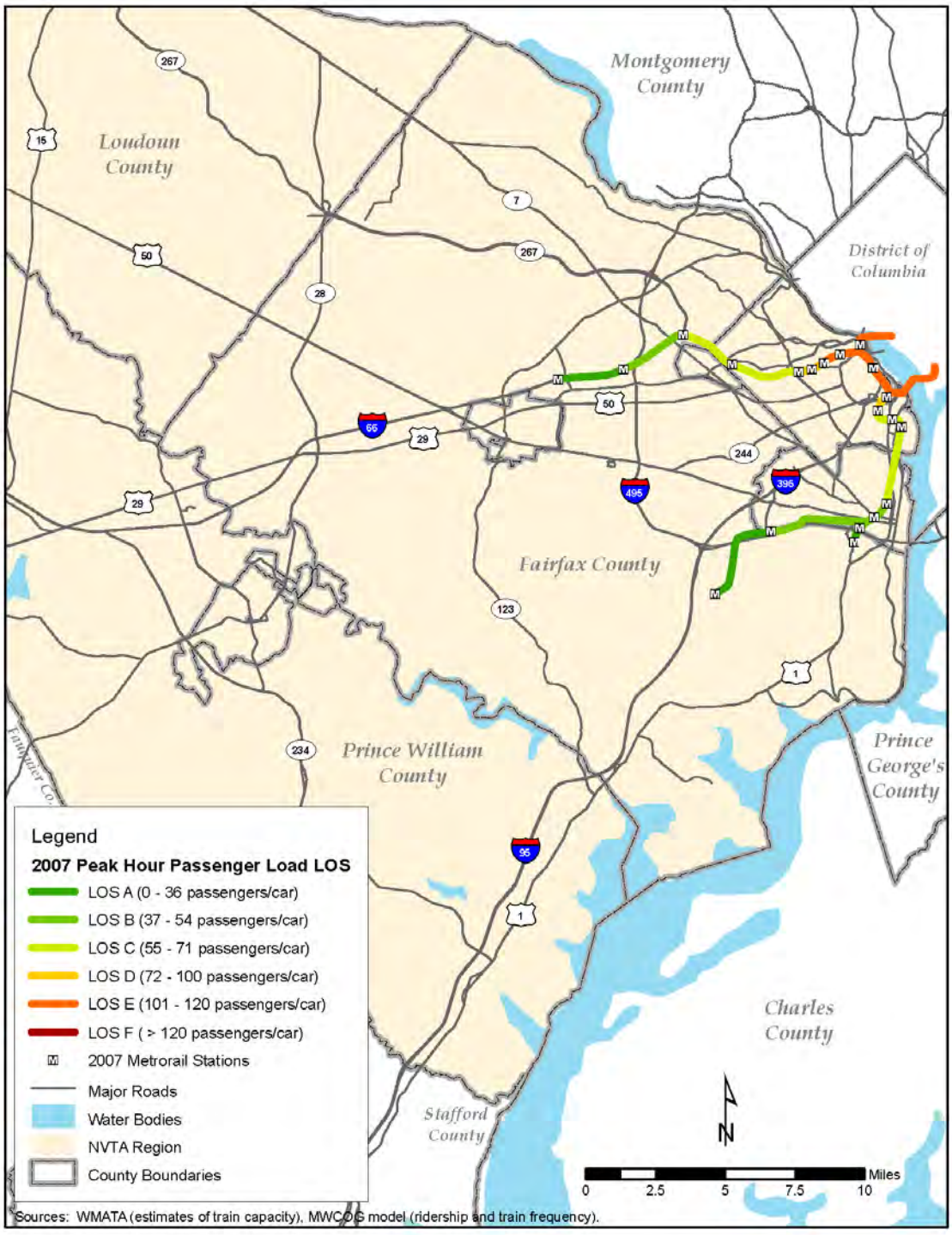


Figure 3.20 2040 Base Metrorail Passenger Load

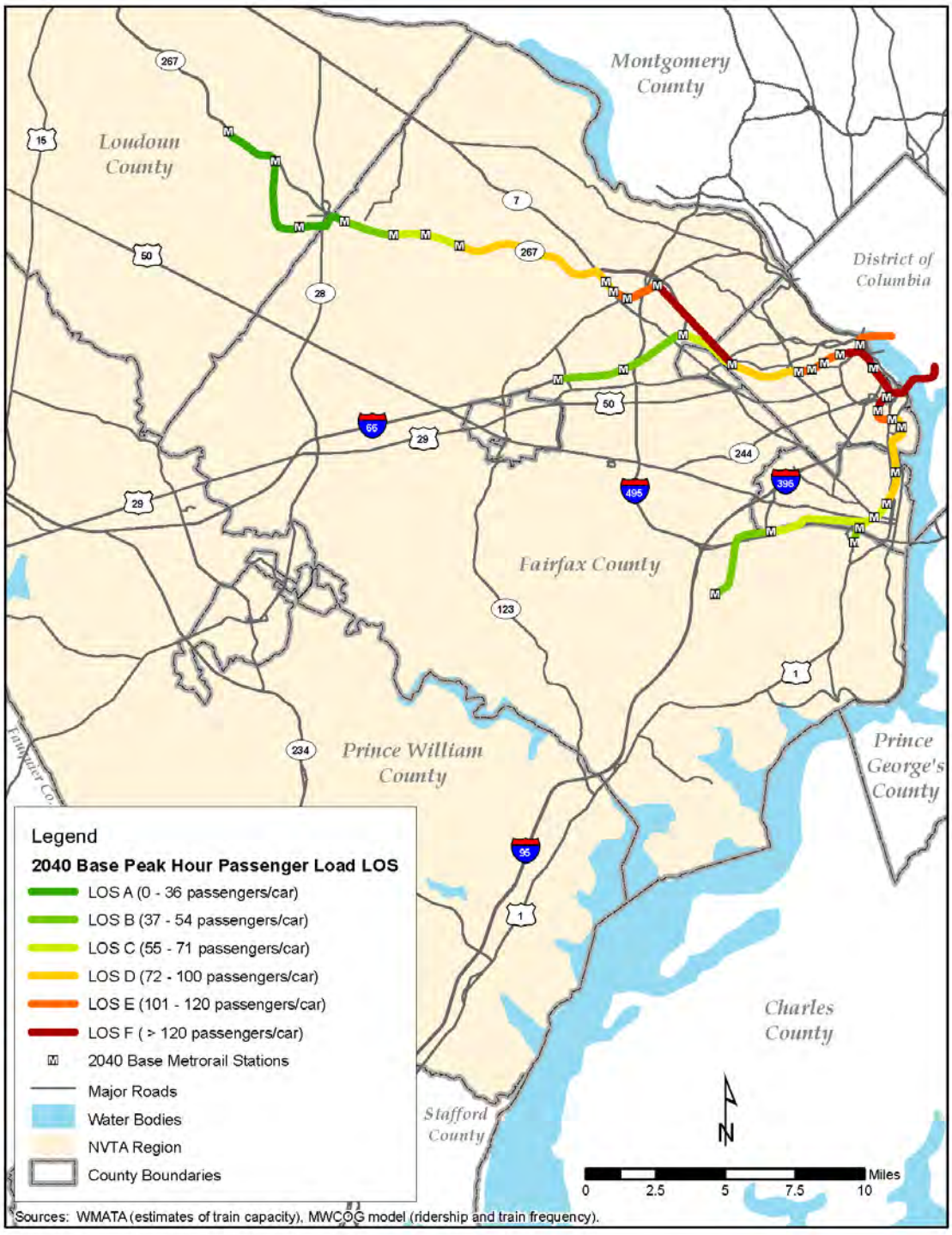
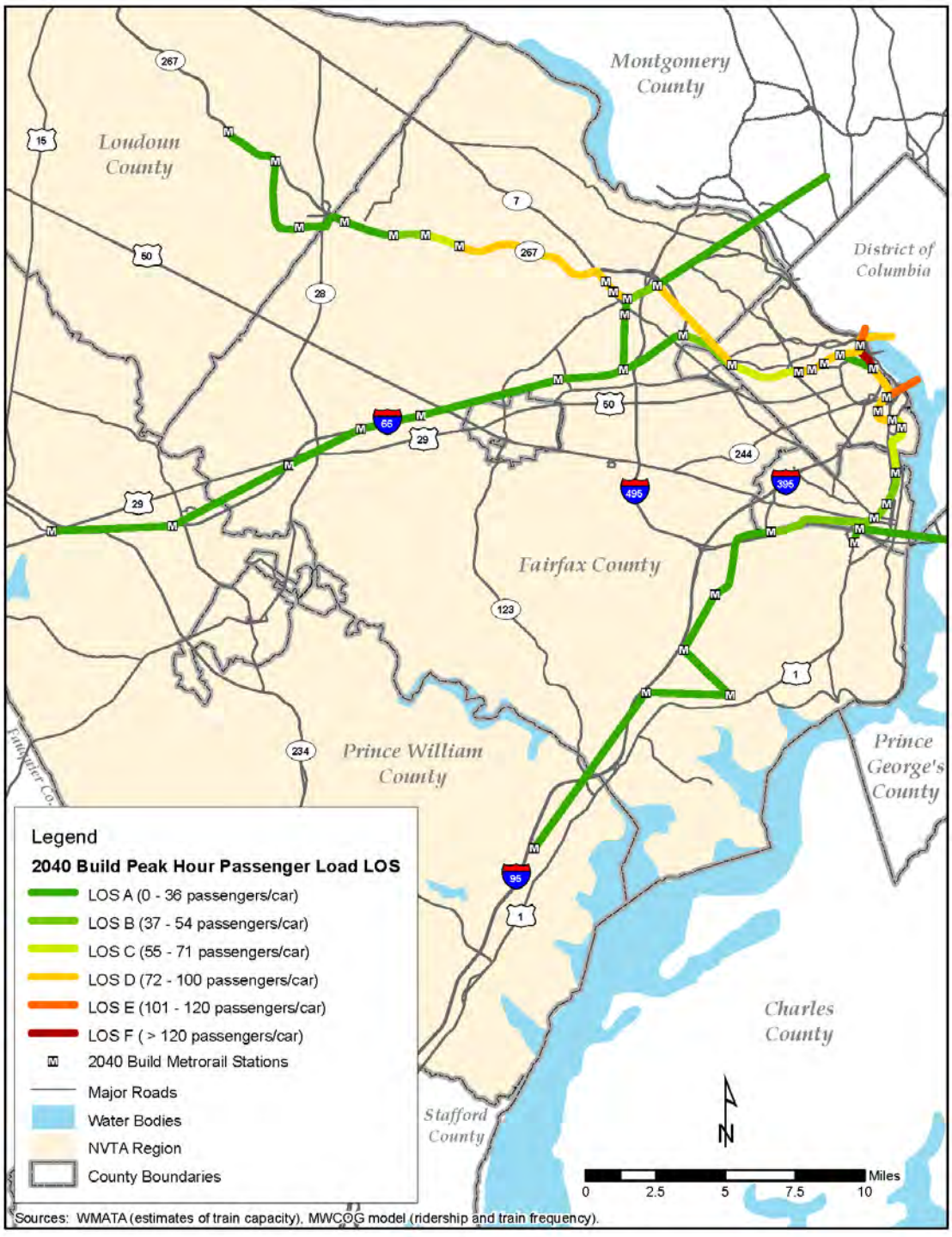


Figure 3.21 2040 Build Metrorail Passenger Load



Virginia Railway Express (VRE)

VRE passenger load[2] levels of service under the 2007, 2040 Base, and 2040 Build conditions are shown in Figures 3.22-3.24. The changes from 2007 to 2040 Base include higher peak-period passenger loads on the Manassas Line, between Manassas and Manassas Park and between Burke Centre and Backlick Road, though these loads are still acceptable at LOS C or better, where passengers are likely able to get seats. On the Fredericksburg Line, the peak-period passenger loads increase in the 2040 Base Scenario between Rippon and Woodbridge and between Lorton and Alexandria. The passenger loads on the latter segment increase to less comfortable conditions for passengers, at LOS D between Lorton and Franconia/Springfield and at LOS E between Franconia/Springfield and Alexandria.

The 2040 Build Scenario improves the VRE service between Lorton and Alexandria back to LOS C. In addition to LOS improvements between Rippon and Woodbridge, Manassas and Manassas Park, and Burke Centre and Alexandria, the 2040 Build Scenario includes new VRE service extending from Manassas northwest to Haymarket and from Broad Run/Airport southwest to Nokesville and Fauquier County. These new VRE lines are projected to have LOS A passenger loads under the 2030 Build Scenario.

[2] VRE passenger load for 2007 assumes an average of 820 seats per train (6-car trains, 137 seats per car). The 2040 Base and Build scenarios assumes an average of 1,100 seats per train (all 8-car trains, 137 seats per car).

Figure 3.22 2007 VRE Passenger Load

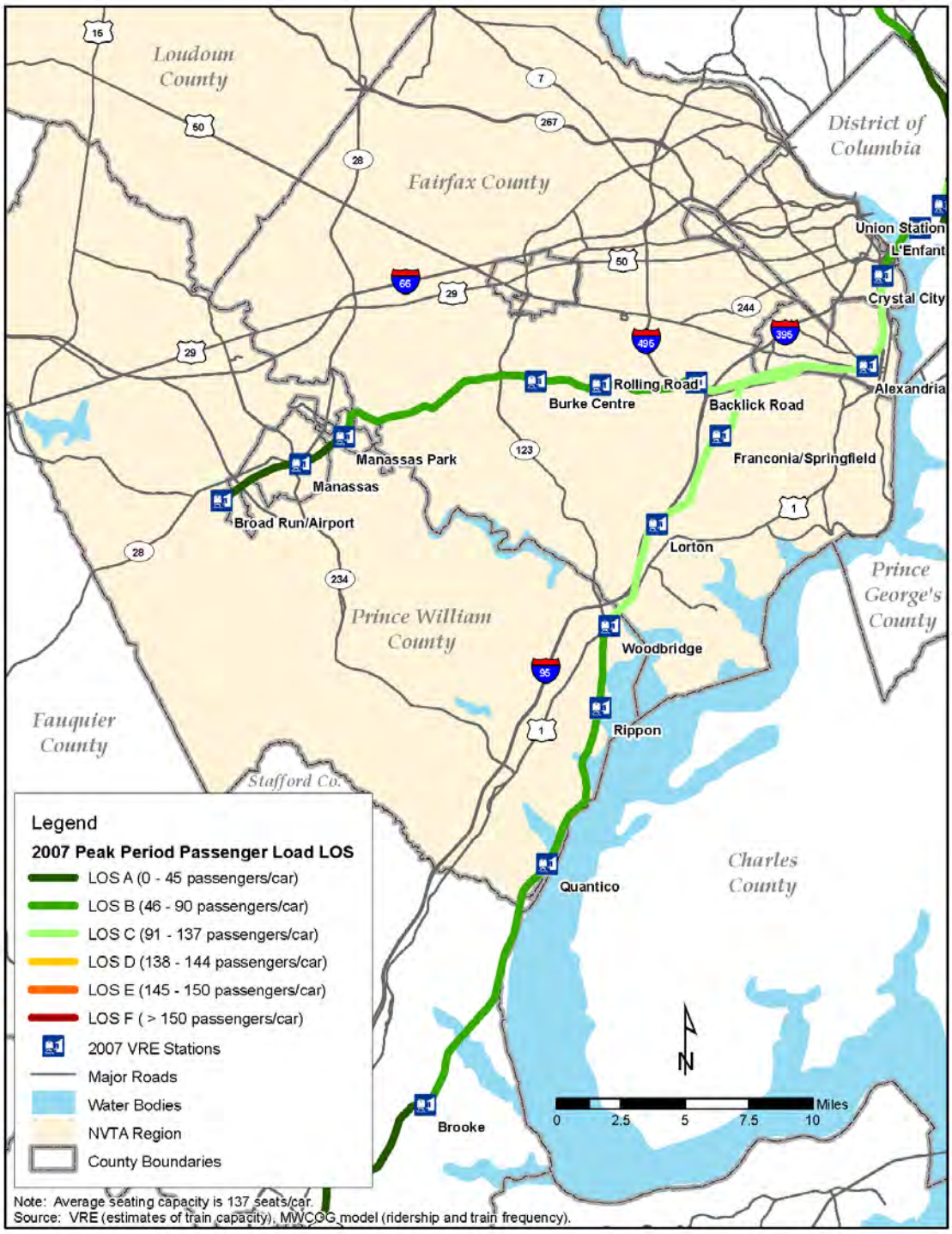


Figure 3.23 2040 Base VRE Passenger Load

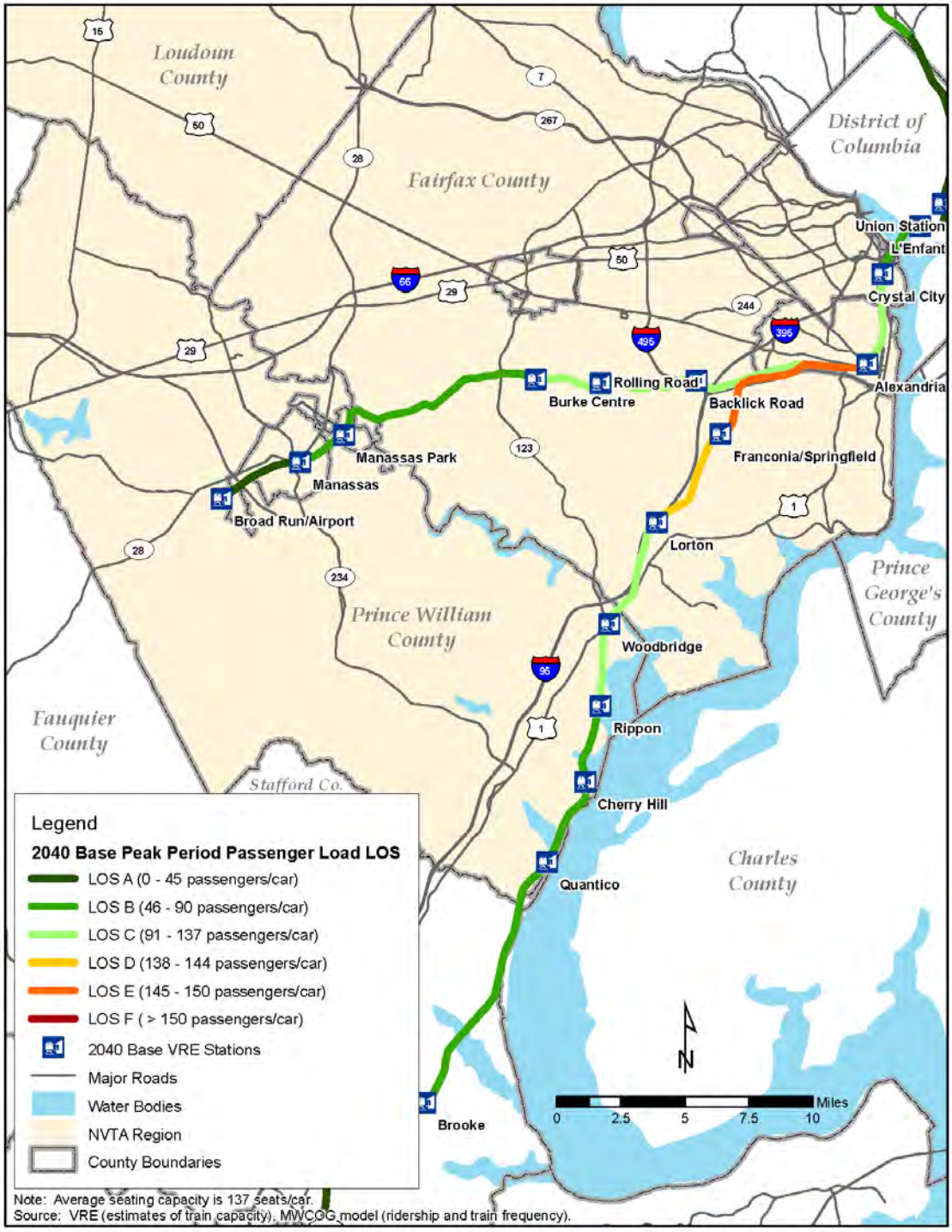
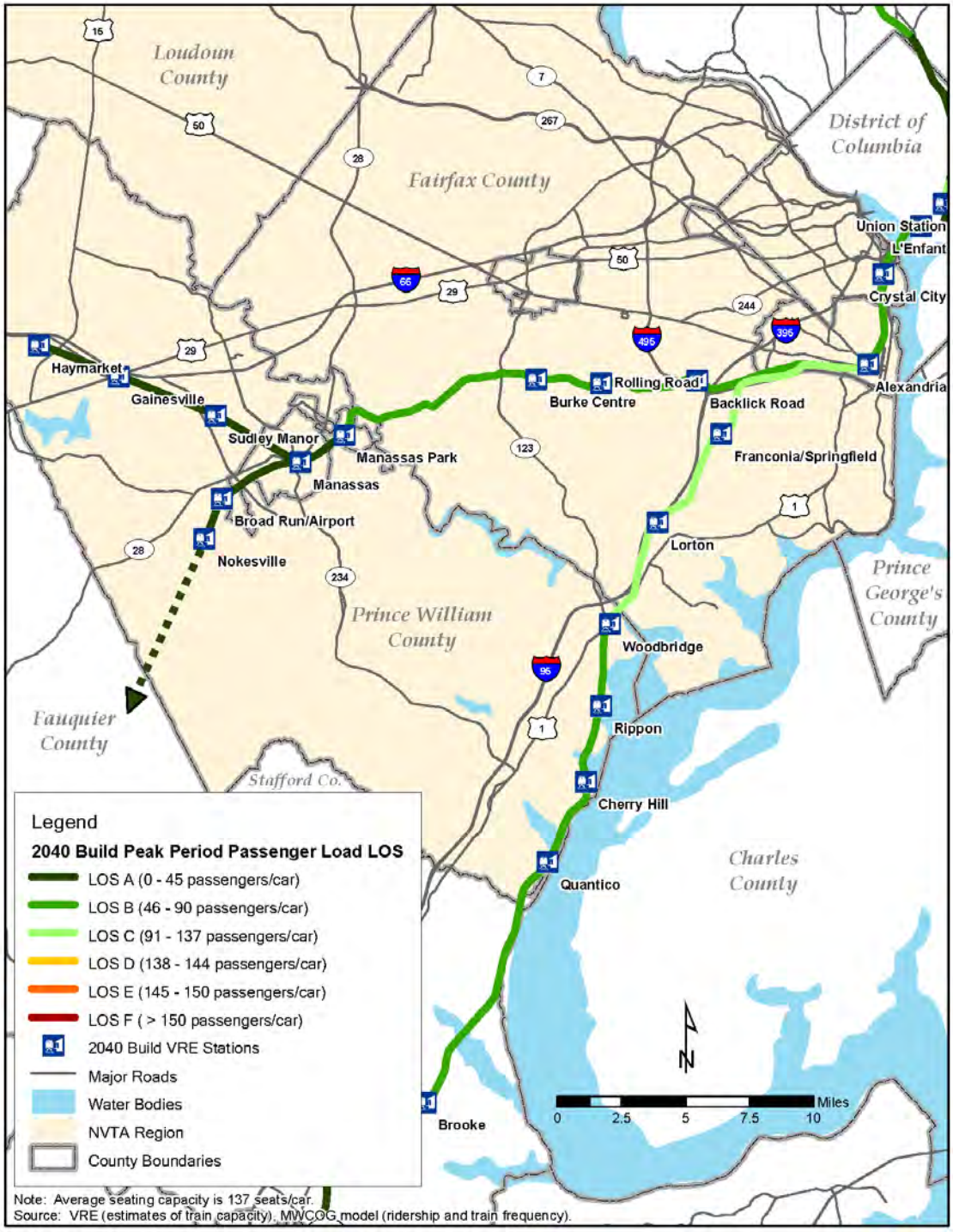


Figure 3.24 2040 Build VRE Passenger Load



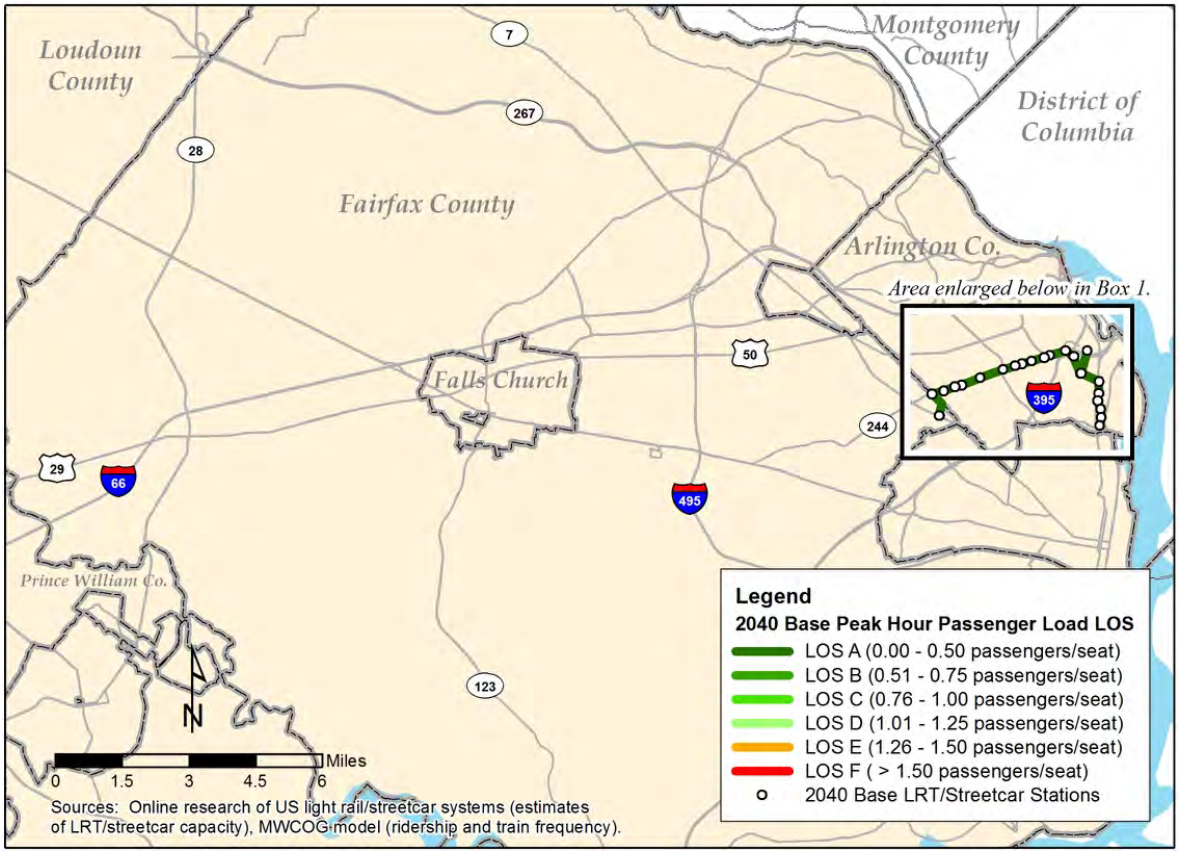
Note: Extension of VRE to Nokesville is dependent upon extension into Fauquier County.

Light Rail Transit and Streetcar

The TransAction 2040 Plan includes new light rail transit (LRT) and Streetcar lines. Peak-hour passenger load levels of service[3] under the 2040 Base and 2040 Build Scenarios are shown in Figures 3.25 and 3.26. The 2040 Base Scenario includes the Columbia Pike Streetcar and the Arlington portion of the Crystal City/Potomac Yard Transitway. The 2040 Build Scenario adds the Alexandria portion of the Crystal City/Potomac Yard Transitway, as well as new LRT lines on VA 7 and VA 28. All lines in both scenarios are projected to have LOS A passenger loads.

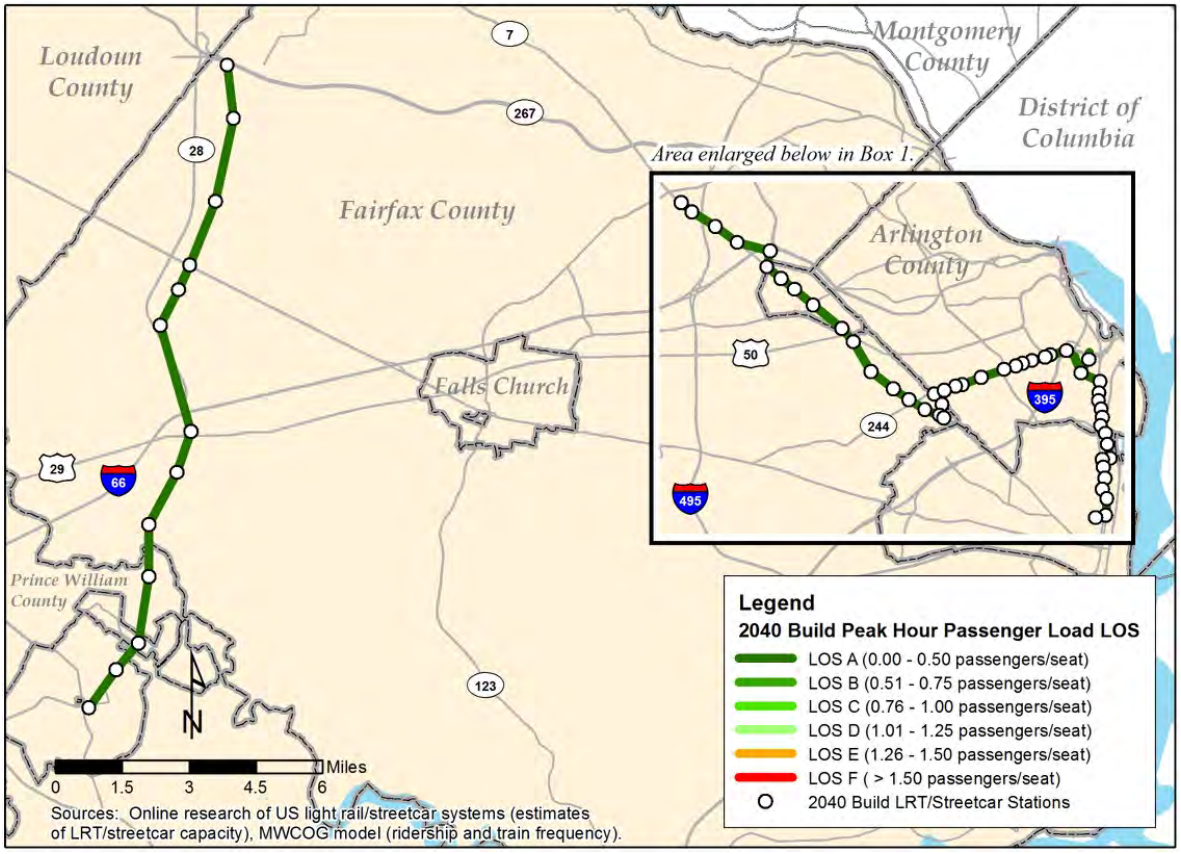
[3] There are no differences in the LOS standards/service characteristics of streetcars and LRT. The terms are used interchangeably. LRT/Streetcar passenger load for 2040 Base and Build scenarios assumes an average of 520 seats per train.

Figure 3.25 2040 Base LRT/Streetcar Passenger Load

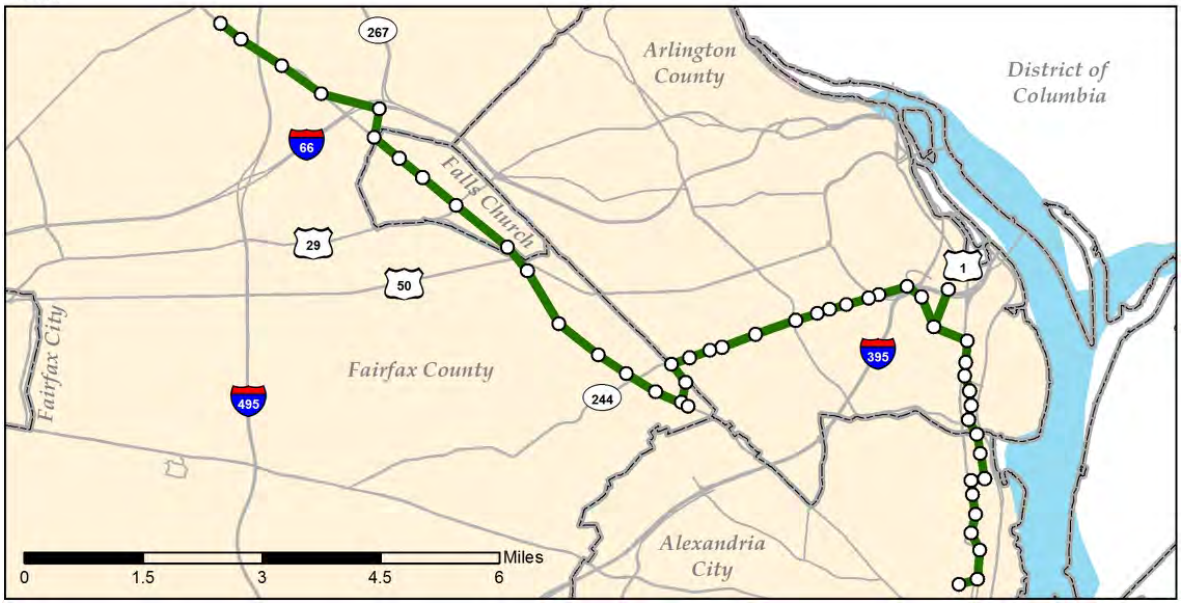


Box 1

Figure 3.26 2040 Build LRT/Streetcar Passenger Load



Box 1



3.4 Corridor-Level Performance

In addition to looking at the full model runs at the system level, several corridor-level reviews were also performed. The products of these reviews are included in the Technical Appendix:

- Corridor summaries of VMT by LOS grouping;
- Summaries of highway LOS for key arterial segments in applicable corridors; and
- Summaries of indicators of bus transit LOS for the same segments in applicable corridors.

4.0 Prioritization of TransAction 2040 Plan Projects

4.1 Prioritization Methodology

Section 3.0, System-Level Evaluation, presented performance measures showing benefits from the combined effect of the TransAction 2040 projects. In addition to looking at system level performance, effort was also undertaken to rate, score, and prioritize the individual projects making up the TransAction 2040 Plan. An important element of TransAction 2040 was ensuring that this project prioritization process was conducted using a data-driven and transparent method that provides the public and decision-makers with a clear view of why and how projects were ranked and prioritized. It also was critical to identify the projects that best met the goals and objectives of the Plan.

Each project was individually scored using a set of project-based performance evaluation criteria. The project-level performance assessment provided feedback on how each project addressed the region's defined goals and performance objectives. This included a quantitative evaluation to measure the effects of a project on the transportation system with respect to the performance objectives, and a qualitative policy assessment to assess how well projects met broader considerations embodied in the region's goals. In addition to identifying the performance-based benefits for each project, a benefit/cost analysis was introduced to the prioritization process. The project prioritization process was applied within corridors and by project type (e.g., bicycle/pedestrian, transit, highway) and is described in more detail in the subsections which follow.

Goals and Performance Measures

A four step process was used to define the performance measures used to evaluate the projects. The first step was to identify the NVTA goals and objectives for the TransAction 2040 Plan. Then, performance evaluation criteria (PEC) were selected to address the indicated goals and objectives. Next, performance measures were articulated for each PEC. The two most important considerations for developing these measures were: 1) that they support NVTA goals and objectives; and 2) that they could be calculated with available data or models. The adopted performance measures for TransAction 2040 include several quantitative measures that are new as compared with the all-qualitative rating system for TransAction 2030. TransAction 2040 also continues to use many measures that were part of TransAction 2030 rather than replacing them with new measures. In the fourth step, relative weights were assigned to each performance measure to permit development of a project score on a 100-point scale. The selected weighting approach assigned equal weight to each PEC. Table 4.1 shows the goals of the TransAction 2040 Plan, the related performance measures, and the scoring weights that were adopted.

Table 4.1 TransAction 2040 Goals and Performance Measures

Performance Evaluation Criteria (PEC)	TransAction 2040 Performance Measure	Weighting (100 points)
Goal: Provide an integrated, multimodal transportation system		**20.00**
Freight Movement	Project improves the capacity and reliability of freight while also improving other impacted systems such as highways or passenger rail.	6.67
Improved Bicycle and Pedestrian Travel Options	Project supports multiple use development patterns in a walkable environment.	6.67
Multimodal Choices	Project creates multimodal choices for travelers as indicated by increases in non-SOV mode share.	3.33
	Project creates multimodal choices for travelers as indicated by increases in transit capacity.	3.33
Goal: Provide responsive transportation service to customers		**46.67**
Urgency	Project addresses existing significant level of service (LOS) deficiencies for all modes of transportation.	3.33
	Project addresses existing structural and maintenance deficiencies for all modes of transportation.	3.33
Project Readiness	Project is able to be readily implemented as indicated by percent environmental clearance complete; percent preliminary engineering complete; or other factors (e.g., right-of-way acquired).	6.67
Reduce VMT	Project reduces vehicle-miles traveled.	6.67
Safety	Project improves the safety of the transportation system.	6.67
Person Throughput	Project increases person-miles traveled by non-SOV modes.	3.33
	Project increases person-miles traveled by SOV mode.	3.33
Reduce Roadway Congestion	Project reduces roadway congestion.	6.67
Reduce Time Spent Traveling	Project reduces person-hours traveled.	6.67
Goal: Respect historical and environmental factors		**6.67**
Environmental Sensitivity	Project right-of-way minimizes impacts on sensitive areas.	6.67
Goal: Maximize community connectivity by addressing transportation and land use together		**13.33**
Activity Center Connections	Project improves connections between multiple Activity Centers.	6.67
Land Use Supports Transportation Investment	Project is supported by a Comprehensive plan.	6.67
Goal: Incorporate the benefits of technology		**6.67**
Management and Operations	Project improves the management and operation of existing facilities through technology applications.	6.67
Goal: Identify funding and legislative initiatives needed to implement the Plan		**6.67**
Cost Sharing	Project leverages private or other outside funding.	6.67

Project Rating Approach

Using the adopted weighting approach, each TransAction 2040 Plan project could achieve a maximum score of 100 (and a minimum score of approximately 33.33). Each measure was valued using a three-level rating system of 1=Low, 2=Medium, and 3=High. Most of the measures identify the extent to which individual projects impacted transportation system performance. The remaining measures help distinguish between projects receiving the same score in the transportation system performance dimensions, and to identify the projects that would better meet Northern Virginia's transportation needs. Table 4.2 shows the specific criteria used to rate each project.

For projects that were present in TransAction 2030, the ratings for performance measures that are identical between the projects were copied. In a few limited cases, concerns with the TransAction 2030 rating were identified and a revised rating was offered. For projects that were not present in TransAction 2030, the supplied project description was relied upon to assign ratings in accordance with the adopted rating system. In some cases, the original project description had additional detail as compared with other similar projects which made some projects easier to provide ratings for than others. A Baseline run of the regional model was used to generate highway level of service information to assist in assigning the qualitative rating for the first Urgency measure for new projects that did not have this rating assigned in TransAction 2030.

Network coding was performed for projects that could be represented in the regional model (e.g., new roadways, roadway widening, new interchanges, new transit services). The ratings for the new quantitative measures were assigned using a modeling process involving the TPB Version 2.3 model and a process whereby each project was run individually along with the Baseline network to obtain the modeled benefit measures of the individual project. Table 4.3 shows the specific look-up table used for rating these projects (the scale was developed after all of the projects had been run through the process to permit each rating to apply to roughly one-third of each type project). For projects that could not be modeled through network coding (e.g., intersection improvements, trail projects, nonfacility projects) ratings were asserted that would permit comparison with other projects while not unduly biasing the prioritization.

Planning-level capital and operating cost estimates were assembled for all projects. TransAction 2030 costs were used (factored to 2011 dollars) for projects that were present in that plan. Most projects that were new to TransAction 2040 were based on jurisdiction or agency plans and therefore planning-level cost information could be supplied (and factored to 2011 dollars).

Participating agencies were asked to review the resulting ratings and costs to identify potential issues which may have been present in the project descriptions or the prior TransAction 2030 ratings. All requests for changes in ratings were reviewed. In most cases, additional information (i.e., a justification) was provided by the agency which permitted the change to be accommodated. In some cases, due to the need to ensure that the adopted rating system was being applied uniformly across the project universe, rating changes were not able to be accommodated based on the information provided. The final set of ratings were accepted by the TransAction 2040 Subcommittee.

Table 4.2 TransAction 2040 Rating Scale

Freight Movement	
Project improves the capacity and reliability of freight while also improving other impacted systems such as highways or passenger rail.	
● High	Project increases the reliability and capacity of freight and passenger rail, and improves overall highway system.
◎ Medium	Project improves the reliability and capacity of freight rail and passenger rail but has little or no impact on the overall highway system.
○ Low	Project improves freight rail reliability and capacity but has no or negative impact on passenger rail efficiencies or overall highway system efficiencies.
Improved Bicycle and Pedestrian Travel Options	
Project supports multiple use development patterns in a walkable environment.	
● High	Project adds or extends nonmotorized facility to and within activity center.
◎ Medium	Project improves existing nonmotorized facility to and within activity center.
○ Low	Project does not improve or provide a nonmotorized facility to and within activity center.
Multimodal Choices	
1) Project creates multimodal choice for travelers as indicated by increases in non-SOV mode share.	
2) Project creates multimodal choice for travelers as indicated by increases in transit capacity.	
● High ◎ Medium ○ Low	Scale for Measure 1 and Measure 2 were determined based on normalization of output (see Table 4.3 at end).
Urgency 1	
Project addresses existing significant level of service (LOS) deficiencies for all modes of transportation.	
● High	Project addresses existing LOS F condition.
◎ Medium	Project addresses existing LOS E condition.
○ Low	Project addresses existing LOS A, B, C, or D condition.
Urgency 2	
Project addresses structural and maintenance deficiencies for all modes of transportation.	
● High	Project addresses major structural and maintenance deficiencies.
◎ Medium	Project addresses minor structural and maintenance deficiencies.
○ Low	Project does not address structural and maintenance deficiencies.
Project Readiness	
Project is able to be readily implemented as indicated by percent environmental clearance complete; percent preliminary engineering complete; or other factors (e.g., right-of-way acquired).	
● High	Project can be implemented in the near term (<6 years).
◎ Medium	Project can be implemented in the short term (6-12 years).
○ Low	Project can be implemented in the long term (>12 years).

Table 4.2 TransAction 2040 Rating Scale (continued)

Reduce VMT	
Project reduces vehicle-miles traveled (VMT).	
● High	Project directly reduces VMT (i.e., transit project, park-and-ride lot, new HOV lane(s), new pedestrian and bicycle trail).
◎ Medium	Project indirectly or through expansion reduces VMT (i.e., expansion of HOV, transit improvement, or expansion).
○ Low	Project does not reduce VMT.

Safety	
Project improves the safety of the transportation system.	
● High	Project designed to specifically improve system safety and/or address an existing safety deficiency.
◎ Medium	Project will generally result in a safety improvement.
○ Low	Project will have no discernible positive effect on safety.

Person Throughput	
1) Project increases in person-miles traveled by non-SOV modes. 2) Project increases person-miles traveled by SOV mode.	
● High ◎ Medium ○ Low	Scale for Measure 1 and Measure 2 were determined based on normalization of output (see Table 4.3 at end).

Reduce Roadway Congestion	
Project reduces roadway congestion.	
● High	Project will significantly improve traffic flow.
◎ Medium	Project will moderately improve traffic flow.
○ Low	Project will have minimal to no effect on traffic flow.

Reduce Time Spent Traveling	
Project reduces person-hours traveled.	
● High	
◎ Medium	Scale was determined based on normalization of model output (see Table 4.3 at end).
○ Low	

Environmental Sensitivity	
Project right-of-way (ROW) impacts on sensitive areas.	
● High	No additional ROW needed.
◎ Medium	Minimal ROW required and project does not impact sensitive area.
○ Low	Additional ROW required and project does impact sensitive area.

Activity Center Connections	
Project improves connections between multiple activity centers.	
● High	Project improves connectivity between three or more activity centers.
◎ Medium	Project improves connectivity between two activity centers.
○ Low	Project improves connectivity to one activity center only.

Table 4.2 TransAction 2040 Rating Scale (continued)

Land Use Supports Transportation Investment	
Project is supported by a Comprehensive Plan.	
● High	Project is identified in an approved Comprehensive Plan.
◎ Medium	Project is being considered for inclusion in a Comprehensive Plan.
○ Low	Project is not identified in a Comprehensive Plan.

Management and Operations	
Project improves the management and operation of existing facilities through technology applications.	
● High	Project improves technological management and operations of an existing transportation facility.
◎ Medium	Project improves technological management and operations of an expansion of an existing transportation facility.
○ Low	No improvement to management and operations of a facility.

Cost Sharing	
Project leverages private or other outside funding	
● High	Project leverages private or other outside funding.
◎ Medium	Project leverages modest private or other outside funding.
○ Low	Project has no leveraged private or other outside funding.

Table 4.3 TransAction 2040 Quantitative Criteria

Performance Evaluation Criteria		Multimodal Choices 1	Multimodal Choices 2	Person Throughput 1	Person Throughput 2	Travel Time
Performance Measures		*Total HBW non-SOV Productions and Attractions*	*Change in Transit-Vehicle Miles*	*PMT by non-SOV*	*PMT by SOV*	*PHT*
Rating	*Project Type*					
High	Highway	>940,000	>400	>44,220,000	>44.,239,600	>5,336,000
	Transit	>1,230,000		>48,800,000	>38,500,000	>3,758,000
Medium	Highway	939,380-940,000	1-400	44,200,000-44,220,000	44,231,000-44,239,600	5,328,000-5,336,000
	Transit	1,223,875-1,230,000		48,692,000-48,800,000	38,400,000-38,500,000	3,725,000-3,758,000
Low	Highway	<939,380	No Change	<44,200,000	<44,231,000	<5,328,000
	Transit	<1,223,875		<48,692,000	<38,400,000	<3,725,000

Benefit/Cost Analysis

The benefit/cost analysis approach employed for TransAction 2040 also made use of the project rating system described above. The rationale for this approach was that individual project benefits were thought best captured by the performance measures that had been defined in relation to the TransAction 2040 goals and objectives. The approach to the benefit/cost analysis was influenced by the level of detail available in the individual project descriptions, the stage in the project development process that the majority of projects were in, and the wide range of project types and size (measured in the range of benefits and capital costs).

The adopted benefit/cost analysis approach used a three-level rating system similar to that used for assessing the performance measures (i.e., high, medium, low). A benefit component and a cost component entered into the determination of this rating. The benefit component was based on the project rating. The cost component was based on the capital cost estimate. Within each project type (e.g., highway, transit, trail), the project ratings were converted to a percentile-based benefit component index. Similarly, within each project type, the capital cost estimates were also converted into a percentile-based cost component index. Next, the resulting benefit/cost ratios for each project type were arrayed into a 100-point percentile rating and divided into thirds. Within each project type, projects receiving a benefit/cost ratio index in roughly the top-third received a high rating; projects in roughly the bottom-third received a low rating; and, the rest received a medium-rating.

The resulting benefit/cost rating is presented alongside the score-based project ranking. The benefit/cost rating is intended to be used in conjunction with the project ranking to provide additional useful information to decision-makers considering project priority under limited funding scenarios. However, it does not itself enter into the score-based project ranking.

4.2 Prioritized Project List by Corridor with Benefit/Cost Rating

Projects were placed in priority order within each corridor and within each project type (e.g., bicycle/pedestrian, transit, highway) through use of the project rating and weighting approach described above. This section provides the resulting prioritization tables.

Each project is listed in priority order within its grouping and spans across two pages. The first several columns in the prioritization tables show the ratings of each project against the project-based performance criteria. The final columns in each table show each project's priority within its mode, capital and operating costs in year 2011 dollars, and the benefit/cost rating. In some cases, projects were given the same priority level because multiple projects had the same rating against the performance criteria.

Consistent with the methodology, prioritization tables are organized by corridor and then by project type. The projects that were added to the project list as part of the Build 2 scenario (described in Section 3.0) are marked with "**" in the tables. During the time that elapsed in preparing the TransAction 2040 Plan, the status of some projects included on the list may have changed (e.g., construction/implementation started, project added to the CLRP, project added or removed from the underlying jurisdiction Comprehensive Plan). The prioritized project list

is intended to serve as guidance, but it is expected that specific implementation will be informed by the latest information available.

The corridor information is presented as follows:

- Table 4.4 – Dulles/VA 7 Corridor;
- Table 4.5 – Loudoun County Parkway/Tri-County Parkway/Belmont Ridge Road/Gum Springs Road Corridor;
- Table 4.6 – VA 28 Corridor;
- Table 4.7 – Prince William Parkway Corridor;
- Table 4.8 – Fairfax County Parkway Corridor;
- Table 4.9 – I-66/U.S. 29/U.S. 50 Corridor;
- Table 4.10 – I-495 Beltway Corridor;
- Table 4.11 – I-95/I-395/U.S. 1 Corridor; and
- Table 4.12 – Other.

Colored circles are used in the prioritization tables to indicate the rating level for each included measure as high, medium, or low, as illustrated in Figure 4.1.

Figure 4.1 Rating Key for Prioritization Tables

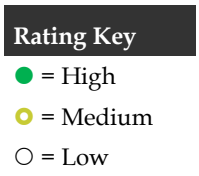


Table 4.4 Corridor 1 – Dulles/VA 7

Description	Freight Movement	Improved Bicycle/ Pedestrian Options	Multimodal Choices 1	Multimodal Choices 2	Urgency 1	Urgency 2	Project Readiness	Reduce VMT	Safety	Person Throughput 1	Person Throughput 2
Highway											
Widen VA 7 to six lanes from Brook Road/Lewinsville Road to Dulles Toll Road	○	●	○	○	◎	○	○	○	○	◎	●
Widen Dulles Greenway from six to eight lanes between Leesburg Bypass and VA 28	○	○	○	○	◎	○	○	○	○	●	●
Reconstruct Elden Street from Monroe Street to Center Street	○	◎	○	○	○	◎	●	○	●	○	○
Reconstruct East Elden Street from Fairfax County Parkway to Monroe Street	○	◎	○	○	○	◎	◎	○	●	○	○
Reconstruct South Elden Street from Herndon Parkway to Sterling Road	○	◎	○	○	○	◎	○	○	●	○	○
Widen VA 7 to eight lanes from West Market Street to VA 9	○	○	○	○	◎	○	◎	○	○	●	●
Construct Interchange at U.S. 15 and Battlefield Parkway	○	●	○	○	◎	○	○	○	◎	○	○
Construct Interchange at VA 7 and Battlefield Parkway	○	●	○	○	◎	○	○	○	◎	○	○
Construct partial grade-separated interchanges at VA 267 and Greensboro Drive and VA 267 and Boone Boulevard	○	○	●	○	◎	○	○	○	◎	◎	●
Construct intersection improvements at King Street/Quaker Lane/Braddock Road	○	●	○	○	◎	○	●	○	◎	○	○
Widen VA 7 to six lanes from I-495 to the City of Falls Church	○	○	○	○	◎	○	○	○	○	◎	◎
Extend Soapstone Drive across Dulles Toll Road	○	○	○	○	◎	○	○	○	◎	◎	●
Widen VA 7 to six lanes from Berlin Road to West Market Street	○	○	◎	○	◎	○	○	○	○	●	●
Construct Collector-Distributor Roads along Dulles Toll Road from Hunter Mill Road to Greensboro Drive	○	○	○	○	●	○	○	○	○	◎	◎
Construct an improved grid network of streets in Tysons Corner	○	◎	○	○	◎	○	○	○	◎	◎	◎
Construct intersection improvements at Van Buren Street and Herndon Parkway	○	◎	○	○	◎	○	●	○	◎	○	○
Construct multimodal access improvements from Herndon Parkway to the Dulles Metrorail Station	○	◎	○	○	○	○	●	○	◎	○	○
Widen VA 7 to eight lanes from Battlefield Parkway to Leesburg	○	○	○	○	◎	○	○	○	○	◎	◎

Table 4.4 Corridor 1 – Dulles/VA 7 (continued)

Description	Reduce Roadway Congestion	Reduce Time Spent Traveling	Enviro. Sensitivity	Activity Center Connections	Land Use Supports Transport. Investment	Management and Operations	Cost Sharing	Score-Based Project Ranking	Project Cost (in Millions of 2011 $)	Annual Operating Cost (in Thousands of 2011 $)	B/C Rating
Highway											
Widen VA 7 to six lanes from Brook Road/Lewinsville Road to Dulles Toll Road	◎	●	◎	◎	◎	○	○	1	19.8	23	●
Widen Dulles Greenway from six to eight lanes between Leesburg Bypass and VA 28	◎	●	◎	◎	●	○	○	2	93.0	481	◎
Reconstruct Elden Street from Monroe Street to Center Street	○	○	●	○	●	○	○	2	3.3	–	●
Reconstruct East Elden Street from Fairfax County Parkway to Monroe Street	○	○	●	○	●	○	○	4	22.4	36	●
Reconstruct South Elden Street from Herndon Parkway to Sterling Road	○	○	●	○	●	○	○	5	12.0	77	●
Widen VA 7 to eight lanes from West Market Street to VA 9	◎	○	◎	○	●	○	○	6	39.7	–	◎
Construct Interchange at U.S. 15 and Battlefield Parkway	◎	○	◎	○	●	○	○	6	30.0	20	◎
Construct Interchange at VA 7 and Battlefield Parkway	◎	○	◎	○	●	○	○	6	30.0	20	◎
Construct partial grade-separated interchanges at VA 267 and Greensboro Drive and VA 267 and Boone Boulevard	◎	◎	◎	○	○	○	○	9	83.7	39	○
Construct intersection improvements at King Street/Quaker Lane/Braddock Road	◎	○	○	○	○	○	○	10	2.5	–	●
Widen VA 7 to six lanes from I-495 to the City of Falls Church	◎	◎	◎	●	○	○	○	11	37.0	108	○
Extend Soapstone Drive across Dulles Toll Road	●	◎	○	○	○	○	○	12	61.7	7	○
Widen VA 7 to six lanes from Berlin Road to West Market Street	◎	○	◎	◎	○	○	○	12	69.0	159	○
Construct Collector-Distributor Roads along Dulles Toll Road from Hunter Mill Road to Greensboro Drive	◎	○	◎	●	○	○	○	12	158.7	372	○
Construct an improved grid network of streets in Tysons Corner	◎	◎	○	○	○	○	○	15	1235.0	971	○
Construct intersection improvements at Van Buren Street and Herndon Parkway	◎	○	○	○	○	○	○	15	3.0	–	◎
Construct multimodal access improvements from Herndon Parkway to the Dulles Metrorail Station	◎	○	○	○	○	○	○	17	3.0	–	◎
Widen VA 7 to eight lanes from Battlefield Parkway to Leesburg	◎	◎	◎	○	○	○	○	18	58.9	33	○

Table 4.4 Corridor 1 – Dulles/VA 7 (continued)

Description	Freight Movement	Improved Bicycle/ Pedestrian Options	Multimodal Choices 1	Multimodal Choices 2	Urgency 1	Urgency 2	Project Readiness	Reduce VMT	Safety	Person Throughput 1	Person Throughput 2
Transit											
Implement Phase III bus service in Loudoun County, including local, express, intercounty, commuter, and demand-response services	○	○	○	●	◎	○	◎	●	◎	◎	●
Construct high-capacity transit along VA 7 from Tysons Corner to Baileys Crossroads[a]	○	○	◎	●	●	○	○	●	◎	○	●
Implement Tysons Corner Circulator System	○	○	○	◎	◎	○	◎	●	◎	○	●
Construct three new park-and-ride lots in Loudoun County (VA 606, VA 659, and Russell Branch Parkway)	○	○	○	◎	◎	○	●	●	◎	○	◎
Construct three new park-and-ride lots in Loudoun County (Round Hill, Hillsboro, and Lucketts)	○	○	○	◎	◎	○	○	●	◎	○	●
Trail											
Construct W&OD Trail Crossing (improvements) at Crestview Drive	○	●	◎	○	◎	○	●	●	●	◎	○
Construct trail along VA 7 from Leesburg to Alexandria	○	●	◎	○	◎	○	○	●	●	◎	○
Construct Van Buren Street Trail to Dulles Metrorail Station (extension from Folly Lick Trail)	○	●	◎	○	◎	○	●	●	●	◎	○
Construct the Sugarland Run Trail from existing terminus to pedestrian access pavilion of the future Herndon Metrorail station	○	●	◎	○	◎	○	◎	●	●	◎	○

[a]This project was modeled and rated as a light rail transit (LRT) project.

Table 4.4 Corridor 1 – Dulles/VA 7 (continued)

Description	Reduce Roadway Congestion	Reduce Time Spent Traveling	Enviro. Sensitivity	Activity Center Connections	Land Use Supports Transport. Investment	Management and Operations	Cost Sharing	Score-Based Project Ranking	Project Cost (in Millions of 2011 $)	Annual Operating Cost (in Thousands of 2011 $)	B/C Rating
Transit											
Implement Phase III bus service in Loudoun County, including local, express, intercounty, commuter, and demand-response services	◎	●	●	●	●	○	○	1	11.1	–	●
Construct high-capacity transit along VA 7 from Tysons Corner to Baileys Crossroads	●	●	◎	●	◎	○	○	2	536.2	4,159	◎
Implement Tysons Corner Circulator System	◎	●	●	○	●	○	○	3	504.1	15,122	◎
Construct three new park-and-ride lots in Loudoun County (VA 606, VA 659, and Russell Branch Parkway)	◎	●	◎	○	●	○	○	4	9.6	43	◎
Construct three new park-and-ride lots in Loudoun County (Round Hill, Hillsboro, and Lucketts)	◎	●	◎	○	●	○	○	5	7.2	30	◎
Trail											
Construct W&OD Trail Crossing (improvements) at Crestview Drive	○	○	◎	●	●	○	○	1	0.3	–	●
Construct trail along VA 7 from Leesburg to Alexandria	○	○	◎	●	●	○	○	2	84.7	–	◎
Construct Van Buren Street Trail to Dulles Metrorail Station (extension from Folly Lick Trail)	○	○	◎	○	●	○	○	3	0.6	–	●
Construct the Sugarland Run Trail from existing terminus to pedestrian access pavilion of the future Herndon Metrorail station	○	○	◎	○	●	○	○	4	1.0	–	◎

Table 4.5 Corridor 2 – Loudoun County Parkway/Tri-County Parkway/Belmont Ridge Road/Gum Springs Road

Description	Freight Movement	Improved Bicycle/ Pedestrian Options	Multimodal Choices 1	Multimodal Choices 2	Urgency 1	Urgency 2	Project Readiness	Reduce VMT	Safety	Person Throughput 1	Person Throughput 2
Highway											
Widen Godwin Drive to six lanes between Sudley Road and VA 28	○	◎	○	○	●	○	○	○	●	○	◎
Construct the Manassas Battlefield Bypass between VA 234 Bypass and Fairfax County	○	◎	○	○	●	○	○	○	◎	○	◎
Widen U.S. 15 to four lanes between Loudoun County Line and VA 234, including a trail on the east side of the roadway	○	◎	○	○	●	○	○	○	◎	○	●
Construct an interchange at VA 234 Bypass and Liberia Avenue (VA 3000)	○	○	○	○	◎	○	○	○	●	○	◎
Construct a grade-separated interchange at Prince William Parkway and Liberia Avenue	○	○	○	○	◎	○	○	○	◎	○	◎
Widen Loudoun County Parkway to eight lanes between Arcola Boulevard and U.S. 50	○	○	○	○	●	○	○	○	○	○	◎
Reconstruct the interchange at VA 28 and Prince William Parkway	○	○	○	○	◎	○	○	○	○	○	◎
Transit											
Construction of Leesburg North Park-and-Ride Lot with 300 spaces	○	○	○	◎	●	○	●	●	◎	○	◎
Trail											
Construct a trail along Claiborne Parkway from Loudoun County Parkway to Ryan Road	○	●	◎	○	◎	○	●	●	●	◎	○
Construct a trail along VA 772 from Belmont Ridge Road to Ryan Road	○	●	◎	○	◎	○	●	●	●	◎	○
Construct a trail along Godwin Drive from Nokesville Road to Sudley Road	○	●	◎	○	◎	○	●	●	●	◎	○
Construct a trail along VA 659 (Belmont Ridge Road) from VA 7 to Ryan Road	○	●	◎	○	◎	○	○	●	●	◎	○
Construct a trail along Prince William Parkway from Nokesville Road to Dumfries Road	○	●	◎	○	◎	○	○	●	●	◎	○
Construct a trail along the Tri-County Parkway from Braddock Road to Sudley Road	○	●	◎	○	◎	○	○	●	●	◎	○

Table 4.5 Corridor 2 – Loudoun County Parkway/Tri-County Parkway/Belmont Ridge Road/Gum Springs Road (continued)

Description	Reduce Roadway Congestion	Reduce Time Spent Traveling	Enviro. Sensitivity	Activity Center Connections	Land Use Supports Transport. Investment	Management and Operations	Cost Sharing	Score-Based Project Ranking	Project Cost (in Millions of 2011 $)	Annual Operating Cost (in Thousands of 2011 $)	B/C Rating
Highway											
Widen Godwin Drive to six lanes between Sudley Road and VA 28	●	◎	●	○	●	○	○	1	20.3	28	●
Construct the Manassas Battlefield Bypass between VA 234 Bypass and Fairfax County	●	◎	○	○	●	○	○	2	85.6	199	◎
Widen U.S. 15 to four lanes between Loudoun County Line and VA 234, including a trail on the east side of the roadway	◎	○	◎	○	●	○	○	3	86.5	175	○
Construct an interchange at VA 234 Bypass and Liberia Avenue (VA 3000)	●	◎	◎	○	◎	○	○	3	66.9	20	◎
Construct a grade separated interchange at Prince William Parkway and Liberia Avenue	◎	◎	◎	○	●	○	○	5	51.0	20	○
Widen Loudoun County Parkway to eight lanes between Arcola Boulevard and U.S. 50	◎	◎	◎	○	●	○	○	6	10.2	33	◎
Reconstruct the interchange at VA 28 and Prince William Parkway	◎	◎	◎	○	●	○	○	7	14.9	–	○
Transit											
Construction of Leesburg North Park-and-Ride Lot with 300 spaces	◎	◎	◎	○	●	○	○	1	3.8	17	●
Trail											
Construct a trail along Claiborne Parkway from Loudoun County Parkway to Ryan Road	○	○	◎	○	●	○	○	1	0.3	–	●
Construct a trail along VA 772 from Belmont Ridge Road to Ryan Road	○	○	◎	○	●	○	○	1	0.5	–	●
Construct a trail along Godwin Drive from Nokesville Road to Sudley Road	○	○	◎	○	●	○	○	1	0.6	–	●
Construct a trail along VA 659 (Belmont Ridge Road) from VA 7 to Ryan Road	○	○	◎	○	●	○	○	4	4.4	–	○
Construct a trail along Prince William Parkway from Nokesville Road to Dumfries Road	○	○	◎	○	●	○	○	4	0.9	–	◎
Construct a trail along the Tri-County Parkway from Braddock Road to Sudley Road	○	○	◎	○	●	○	○	4	1.3	–	○

Table 4.6 Corridor 3 – VA 28

Description	Freight Movement	Improved Bicycle/ Pedestrian Options	Multimodal Choices 1	Multimodal Choices 2	Urgency 1	Urgency 2	Project Readiness	Reduce VMT	Safety	Person Throughput 1	Person Throughput 2
Highway											
Widen Balls Ford Road to four lanes from Wellington Road to Prince William Parkway, including a sidewalk and interchange with VA 234	○	○	○	○	●	○	○	○	◎	◎	◎
Widen Sudley Road to six lanes from I-66 to Balls Ford Road, including a sidewalk	○	●	○	○	●	○	○	○	◎	○	○
Widen Devlin Road to four lanes between Linton Hall Road and Wellington Road, including sidewalk and trail	○	○	○	○	◎	○	○	○	◎	◎	●
Grade separation of Wellington Road railroad crossing	○	◎	○	○	◎	○	○	○	◎	○	○
Widen VA 28 to 10 lanes between I-66 and Loudoun County	○	○	◎	○	●	○	○	○	○	●	●
Widen Bristow Road to four lanes between Independent Hill Road to Dumfries Road, including a sidewalk	○	○	○	○	○	○	○	○	◎	◎	●
Widen Fleetwood Drive to four lanes between Fauquier County and Aden Road, including sidewalk and trail	○	○	○	○	○	○	○	○	◎	◎	●
Widen Prince William Parkway to six lanes between I-66 Brentsville Road, including a trail on the east side of the roadway	○	◎	○	○	◎	○	○	○	◎	○	○
Widen Vint Hill Road to four lanes between Fauquier County and Nokesville Road, including a sidewalk and trail	○	◎	○	○	◎	○	○	○	◎	○	○
Reconstruct Sterling Road between Herndon Parkway and Rock Hill Road	○	◎	○	○	●	○	○	○	◎	○	○
Construct an interchange at VA 28 and New Braddock Road	○	○	○	○	◎	○	○	○	●	◎	◎
Widen Frying Pan Road to six lanes between VA 28 and VA 657 (Centreville Road)	○	○	○	○	●	○	○	○	○	◎	◎
Widen VA 657 (Centreville Road) to six lanes between Frying Pan Road and McLearen Road	○	○	○	○	◎	○	○	○	○	◎	◎
Widen VA 28 to six lanes between Conner Drive and Old Centreville Road	○	○	○	○	●	○	○	○	○	○	○
Widen VA 28 to six lanes between Prince William County and U.S. 29	○	○	○	○	●	○	○	○	○	○	○

Table 4.6 Corridor 3 – VA 28 (continued)

Description	Reduce Roadway Congestion	Reduce Time Spent Traveling	Enviro. Sensitivity	Activity Center Connections	Land Use Supports Transport. Investment	Management and Operations	Cost Sharing	Score-Based Project Ranking	Project Cost (in Millions of 2011 $)	Annual Operating Cost (in Thousands of 2011 $)	B/C Rating
Highway											
Widen Balls Ford Road to four lanes from Wellington Road to Prince William Parkway, including a sidewalk and interchange with VA 234	●	◎	◎	◎	●	○	○	1	12.2	26	●
Widen Sudley Road to six lanes from I-66 to Balls Ford Road, including a sidewalk	◎	●	◎	○	●	○	○	1	4.9	7	●
Widen Devlin Road to four lanes between Linton Hall Road and Wellington Road, including sidewalk and trail	●	◎	◎	○	●	○	○	3	32.0	68	●
Grade separation of Wellington Road railroad crossing	●	○	●	○	●	○	○	4	47.3	7	◎
Widen VA 28 to 10 lanes between I-66 and Loudoun County	◎	○	◎	◎	●	○	○	4	61.2	39	◎
Widen Bristow Road to four lanes between Independent Hill Road to Dumfries Road, including a sidewalk	●	◎	◎	○	●	○	○	4	7.8	33	●
Widen Fleetwood Drive to four lanes between Fauquier County and Aden Road, including sidewalk and trail	●	◎	◎	○	●	○	○	4	34.2	144	◎
Widen Prince William Parkway to six lanes between I-66 Brentsville Road, including a trail on the east side of the roadway	◎	●	◎	○	●	○	○	4	209.4	282	◎
Widen Vint Hill Road to four lanes between Fauquier County and Nokesville Road, including a sidewalk and trail	●	◎	◎	○	●	○	○	4	110.9	244	◎
Reconstruct Sterling Road between Herndon Parkway and Rock Hill Road	●	○	◎	○	●	○	○	10	7.0	–	●
Construct an interchange at VA 28 and New Braddock Road	◎	○	◎	○	●	○	○	11	74.5	19	◎
Widen Frying Pan Road to six lanes between VA 28 and VA 657 (Centreville Road)	◎	◎	◎	○	●	○	○	12	20.0	36	◎
Widen VA 657 (Centreville Road) to six lanes between Frying Pan Road and McLearen Road	◎	◎	◎	○	●	○	○	13	9.4	46	◎
Widen VA 28 to six lanes between Conner Drive and Old Centreville Road	◎	◎	◎	○	●	○	○	14	81.1	94	○
Widen VA 28 to six lanes between Prince William County and U.S. 29	◎	◎	◎	○	●	○	○	14	8.5	10	○

Table 4.6 Corridor 3 – VA 28 (continued)

Description	Freight Movement	Improved Bicycle/ Pedestrian Options	Multimodal Choices 1	Multimodal Choices 2	Urgency 1	Urgency 2	Project Readiness	Reduce VMT	Safety	Person Throughput 1	Person Throughput 2
Transit											
Extend VRE Service into Fauquier County	●	○	◎	◎	●	○	○	●	◎	●	◎
Construct Light Rail on VA 28 from Manassas to Dulles Airport	○	○	●	●	●	○	○	●	◎	●	○
Trail											
Construct a trail along Atlantic Boulevard from VA 7 to Church Road	○	●	◎	○	◎	○	◎	●	●	◎	○
Construct a trail along VA 28 from Walney Road to Dulles Toll Road	○	●	◎	○	◎	○	○	●	●	◎	○
Construct a trail along Shaw Road from the W&OD trail to Dulles Toll Road	○	●	◎	○	◎	○	○	●	●	◎	○

Table 4.6 Corridor 3 – VA 28 (continued)

Description	Reduce Roadway Congestion	Reduce Time Spent Traveling	Enviro. Sensitivity	Activity Center Connections	Land Use Supports Transport. Investment	Management and Operations	Cost Sharing	Score-Based Project Ranking	Project Cost (in Millions of 2011 $)	Annual Operating Cost (in Thousands of 2011 $)	B/C Rating
Transit											
Extend VRE Service into Fauquier County	●	○	◎	○	●	○	○	1	66.1	993	◎
Construct Light Rail on VA 28 from Manassas to Dulles Airport	●	○	◎	◎	○	○	○	2	1,459.9	6,525	○
Trail											
Construct a trail along Atlantic Boulevard from VA 7 to Church Road	○	○	◎	◎	●	○	○	1	2.0	–	●
Construct a trail along VA 28 from Walney Road to Dulles Toll Road	○	○	◎	◎	●	○	○	2	23.8	–	○
Construct a trail along Shaw Road from the W&OD trail to Dulles Toll Road	○	○	◎	◎	●	○	○	2	2.1	–	◎

Table 4.7 Corridor 4 – Prince William Parkway

Description	Freight Movement	Improved Bicycle/ Pedestrian Options	Multimodal Choices 1	Multimodal Choices 2	Urgency 1	Urgency 2	Project Readiness	Reduce VMT	Safety	Person Throughput 1	Person Throughput 2
Highway											
Widen Prince William Parkway to six lanes between the I-95 on/off ramps, including a sidewalk and bicycle path	○	○	○	○	●	○	●	○	◎	◎	●
Widen Dumfries Road to four lanes between Donner Drive to the City of Manassas	○	●	○	○	○	○	◎	○	○	◎	◎
Widen Dumfries Road to six lanes between Brentsville Road and Waterway Drive	○	○	○	○	●	○	○	○	◎	◎	●

Table 4.7 Corridor 4 – Prince William Parkway (continued)

Description	Reduce Roadway Congestion	Reduce Time Spent Traveling	Enviro. Sensitivity	Activity Center Connections	Land Use Supports Transport. Investment	Management and Operations	Cost Sharing	Score-Based Project Ranking	Project Cost (in Millions of 2011 $)	Annual Operating Cost (in Thousands of 2011 $)	B/C Rating
Highway											
Widen Prince William Parkway to six lanes between the I-95 on/off ramps, including a sidewalk and bicycle path	●	◎	◎	◎	●	○	◎	1	3.2	16	●
Widen Dumfries Road to four lanes between Donner Drive to the City of Manassas	●	●	◎	○	●	○	○	2	3.0	10	●
Widen Dumfries Road to six lanes between Brentsville Road and Waterway Drive	●	○	◎	○	●	○	○	3	263.6	376	◎

Table 4.8 Corridor 5 – Fairfax County Parkway

Description	Freight Movement	Improved Bicycle/ Pedestrian Options	Multimodal Choices 1	Multimodal Choices 2	Urgency 1	Urgency 2	Project Readiness	Reduce VMT	Safety	Person Throughput 1	Person Throughput 2
Highway											
Widen Fairfax County Parkway by adding HOV lanes from Dulles Toll Road to VA 7	○	○	●	○	◎	○	○	◎	○	◎	●
Widen Fairfax County Parkway by adding HOV lanes from Franconia Springfield Parkway to I-66	○	○	●	○	◎	○	○	◎	○	●	○
Construct interchange at Fairfax County Parkway and Kingman Road	○	○	○	○	◎	○	○	○	◎	◎	●
Construct interchange at Fairfax County Parkway and U.S. 1	○	○	○	○	◎	○	○	○	◎	◎	◎
Widen Rolling Road to four lanes from Fullerton Road to DeLong Drive	○	○	○	○	◎	○	○	○	○	◎	◎
Widen Rolling Road to four lanes from Fairfax County Parkway to VA 644	○	○	○	○	◎	○	○	○	○	◎	◎
Widen Fairfax County Parkway to six lanes from VA 123 to Sydenstricker Road	○	○	○	○	◎	○	○	○	○	◎	◎
Transit											
Implement Priority Bus service on Fairfax County Parkway between Herndon/Monroe Metrorail station and Ft. Belvoir	○	○	◎	●	○	○	◎	●	◎	◎	◎

Table 4.8 Corridor 5 – Fairfax County Parkway (continued)

Description	Reduce Roadway Congestion	Reduce Time Spent Traveling	Enviro. Sensitivity	Activity Center Connections	Land Use Supports Transport. Investment	Management and Operations	Cost Sharing	Score-Based Project Ranking	Project Cost (in Millions of 2011 $)	Annual Operating Cost (in Thousands of 2011 $)	B/C Rating
Highway											
Widen Fairfax County Parkway by adding HOV lanes from Dulles Toll Road to VA 7	◎	◎	◎	●	●	○	○	1	71.7	145	◎
Widen Fairfax County Parkway by adding HOV lanes from Franconia Springfield Parkway to I-66	◎	○	◎	●	●	○	○	2	242.2	490	◎
Construct interchange at Fairfax County Parkway and Kingman Road	◎	◎	◎	○	○	○	○	3	75.6	20	○
Construct interchange at Fairfax County Parkway and U.S. 1	◎	○	◎	○	○	○	○	4	75.6	20	○
Widen Rolling Road to four lanes from Fullerton Road to DeLong Drive	◎	◎	◎	○	○	○	○	4	24.8	36	○
Widen Rolling Road to four lanes from Fairfax County Parkway to VA 644	◎	○	◎	○	○	○	○	6	30.9	57	○
Widen Fairfax County Parkway to six lanes from VA 123 to Sydenstricker Road	◎	○	◎	○	○	○	○	6	17.6	226	○
Transit											
Implement Priority Bus service on Fairfax County Parkway between Herndon/Monroe Metrorail station and Ft. Belvoir	◎	◎	●	●	●	○	○	1	2.5	2,621	●

Table 4.9 Corridor 6 – I-66/U.S. 29/U.S. 50

Description	Freight Movement	Improved Bicycle/ Pedestrian Options	Multimodal Choices 1	Multimodal Choices 2	Urgency 1	Urgency 2	Project Readiness	Reduce VMT	Safety	Person Throughput 1	Person Throughput 2
Highway											
Widen U.S. 50 from Jermantown Road to Bevan Drive to include a third westbound lane and replace traffic signals	○	○	○	○	◎	●	●	○	●	○	◎
Construct intersection and storm drainage improvements at the intersection of U.S. 29, U.S. 50, and VA 123	○	◎	○	○	◎	●	●	○	●	○	○
Construct intersection improvements at the intersection of U.S. 29, U.S. 50, and VA 236 in the City of Fairfax	○	◎	○	○	◎	●	●	○	●	○	○
Construct intersection improvements at the intersection of U.S. 50 and Jermantown Road	○	◎	○	○	●	○	●	○	○	◎	◎
Implementation of Active Traffic Management (ATM) strategies along I-66 between U.S. 29 in Centreville and I-495	○	○	○	○	●	○	●	○	●	○	○
Reconstruct U.S. 50 from Rebel Run to Eaton Place	○	◎	○	○	●	◎	●	○	◎	○	○
Construct multimodal improvements at Clarendon Circle	○	◎	○	○	●	○	◎	◎	●	○	○
Reconstruct interchange of I-66 and U.S. 29 in Centreville	○	○	○	○	◎	●	○	○	●	○	○
Reconstruct U.S. 29 between N. Quincy Street and N. Kenmore Street	○	◎	○	○	◎	●	○	○	●	○	○
Replace the existing VA 123 bridge over Accotink Creek	○	◎	○	○	◎	●	●	○	◎	○	○
Widen U.S. 29 to six lanes from I-495 to VA 7	○	○	○	○	●	○	○	○	◎	○	○
Construct interchange at U.S. 50 and VA 665 (Waples Mill Road)	○	○	○	○	●	○	○	◎	◎	○	●
Reconstruct median barrier on U.S. 50 from N. Jackson Street to Fillmore Street	○	○	○	○	◎	●	○	○	●	○	○
Widen John Marshall Highway from two to four lanes between Thoroughfare Road and Catharpin Road and from four to six lanes between Catharpin Road and Lee Highway	○	◎	○	○	●	○	○	○	○	○	◎

Table 4.9 Corridor 6 – I-66/U.S. 29/U.S. 50 (continued)

Description	Reduce Roadway Congestion	Reduce Time Spent Traveling	Enviro. Sensitivity	Activity Center Connections	Land Use Supports Transport. Investment	Management and Operations	Cost Sharing	Score-Based Project Ranking	Project Cost (in Millions of 2011 $)	Annual Operating Cost (in Thousands of 2011 $)	B/C Rating
Highway											
Widen U.S. 50 from Jermantown Road to Bevan Drive to include a third westbound lane and replace traffic signals	◎	◎	●	◎	●	◎	○	1	4.0	4	●
Construct intersection and storm drainage improvements at the intersection of U.S. 29, U.S. 50, and VA 123	◎	○	●	◎	●	◎	○	2	14.9	–	●
Construct intersection improvements at the intersection of U.S. 29, U.S. 50, and VA 236 in the City of Fairfax	◎	○	●	○	●	◎	○	3	5.0	–	●
Construct intersection improvements at the intersection of U.S. 50 and Jermantown Road	●	◎	◎	○	●	○	○	4	4.0	4	●
Implementation of Active Traffic Management (ATM) strategies along I-66 between U.S. 29 in Centreville and I-495	◎	○	●	○	○	●	○	5	31.4	–	●
Reconstruct U.S. 50 from Rebel Run to Eaton Place	○	○	●	○	●	○	○	6	1.3	–	●
Construct multimodal improvements at Clarendon Circle	○	○	◎	○	●	○	○	7	2.0	–	●
Reconstruct interchange of I-66 and U.S. 29 in Centreville	◎	○	●	○	●	○	○	8	102.9	–	◎
Reconstruct U.S. 29 between N. Quincy Street and N. Kenmore Street	○	○	●	○	●	○	○	8	2.3	–	●
Replace the existing VA 123 bridge over Accotink Creek	○	○	◎	○	●	○	○	8	5.0	7	●
Widen U.S. 29 to six lanes from I-495 to VA 7	●	◎	◎	○	●	○	○	11	26.8	118	◎
Construct interchange at U.S. 50 and VA 665 (Waples Mill Road)	◎	○	◎	○	●	○	○	11	75.6	20	◎
Reconstruct median barrier on U.S. 50 from N. Jackson Street to Fillmore Street	○	○	●	○	●	○	○	13	2.7	–	●
Widen John Marshall Highway from two to four lanes between Thoroughfare Road and Catharpin Road and from four to six lanes between Catharpin Road and Lee Highway	◎	◎	◎	○	●	○	○	14	54.3	144	◎

Table 4.9 Corridor 6 – I-66/U.S. 29/U.S. 50 (continued)

Description	Freight Movement	Improved Bicycle/ Pedestrian Options	Multimodal Choices 1	Multimodal Choices 2	Urgency 1	Urgency 2	Project Readiness	Reduce VMT	Safety	Person Throughput 1	Person Throughput 2
Highway											
Widen U.S. 50 to six lanes between Waples Mill Road and U.S. 29	○	○	○	○	●	○	○	○	○	○	◎
Reconstruct I-66 interchanges with VA 28, Stringfellow Road, U.S. 50, VA 123, and Nutley Street	○	○	○	○	○	●	○	○	●	○	○
Widen U.S. 29 to six lanes between VA 309 to Kenmore Street	○	○	○	○	◎	◎	○	○	○	○	●
Construct the Haymarket Bypass	○	◎	○	○	◎	○	○	○	◎	○	◎
Widen U.S. 29 to six lanes between Pickwick Road and VA 665 (Shirley Gate Road)	○	○	○	○	●	○	○	○	○	○	◎
Construct Alternate U.S. 29 in Prince William County	○	◎	○	○	●	○	○	○	◎	○	○
Widen U.S. 29 to six lanes between VA 609 (Pleasant Valley Road) and I-66	○	○	○	○	●	○	○	○	○	○	○
Widen U.S. 29 from four to six lanes between Fauquier County and Virginia Oaks Drive in Prince William County	○	○	○	○	●	○	○	○	○	○	○
Transit											
Extend VRE service to Gainesville and Haymarket	●	○	◎	◎	◎	○	◎	●	◎	●	◎
Extend Metrorail Orange Line from Vienna to Centreville	○	○	●	●	●	○	○	●	◎	●	○
Implement Express Priority Bus service along I-66 from Gainesville to Washington, D.C.	○	○	◎	●	●	○	●	●	◎	○	◎
Implement Priority Bus service along U.S. 29 between Fair Oaks and Washington, D.C.	○	○	◎	●	◎	○	●	◎	◎	○	◎
Implement Priority Bus service along U.S. 50 between Chantilly and the City of Fairfax	○	○	◎	◎	○	○	◎	◎	◎	◎	◎
Extend Metrorail Orange Line to Gainesville	○	○	●	●	◎	○	○	●	◎	●	○
Implement Priority Bus service along U.S. 50 between Fair Oaks and Washington, D.C.	○	○	◎	●	○	○	○	◎	◎	○	◎
Construct City of Falls Church Intermodal Transit Plaza	○	●	○	○	◎	○	●	◎	◎	◎	○

Table 4.9 Corridor 6 – I-66/U.S. 29/U.S. 50 (continued)

Description	Reduce Roadway Congestion	Reduce Time Spent Traveling	Enviro. Sensitivity	Activity Center Connections	Land Use Supports Transport. Investment	Management and Operations	Cost Sharing	Score-Based Project Ranking	Project Cost (in Millions of 2011 $)	Annual Operating Cost (in Thousands of 2011 $)	B/C Rating
Highway											
Widen U.S. 50 to six lanes between Waples Mill Road and U.S. 29	◎	◎	◎	◎	●	○	○	15	23.6	25	◎
Reconstruct I-66 interchanges with VA 28, Stringfellow Road, U.S. 50, VA 123, and Nutley Street	○	○	●	○	●	○	○	16	446.8	–	○
Widen U.S. 29 to six lanes between VA 309 to Kenmore Street	◎	◎	◎	○	●	○	○	16	33.2	44	○
Construct the Haymarket Bypass	◎	◎	○	○	●	○	○	16	32.2	106	○
Widen U.S. 29 to six lanes between Pickwick Road and VA 665 (Shirley Gate Road)	◎	◎	◎	○	●	○	○	19	16.7	166	◎
Construct Alternate U.S. 29 in Prince William County	◎	◎	○	○	◎	○	○	20	83.9	417	○
Widen U.S. 29 to six lanes between VA 609 (Pleasant Valley Road) and I-66	◎	○	◎	○	●	○	○	21	6.5	64	○
Widen U.S. 29 from four to six lanes between Fauquier County and Virginia Oaks Drive in Prince William County	◎	◎	◎	○	◎	○	○	22	28.3	134	○
Transit											
Extend VRE service to Gainesville and Haymarket	●	○	●	○	●	○	◎	1	160.2	4,032	◎
Extend Metrorail Orange Line from Vienna to Centreville	●	○	●	●	●	○	○	2	1,126.1	11,343	◎
Implement Express Priority Bus service along I-66 from Gainesville to Washington, D.C.	◎	◎	●	●	◎	○	○	2	1.0	218	●
Implement Priority Bus service along U.S. 29 between Fair Oaks and Washington, D.C.	◎	◎	●	●	●	○	○	4	7.4	6,849	●
Implement Priority Bus service along U.S. 50 between Chantilly and the City of Fairfax	◎	◎	●	●	◎	●	○	5	8.9	2,421	●
Extend Metrorail Orange Line to Gainesville	●	○	◎	●	●	○	○	6	1,080.0	45,000	◎
Implement Priority Bus service along U.S. 50 between Fair Oaks and Washington, D.C.	◎	◎	●	●	◎	●	○	7	7.4	7,160	●
Construct City of Falls Church Intermodal Transit Plaza	◎	○	◎	◎	●	○	○	8	1.0	–	●

Table 4.9 Corridor 6 – I-66/U.S. 29/U.S. 50 (continued)

Description	Freight Movement	Improved Bicycle/ Pedestrian Options	Multimodal Choices 1	Multimodal Choices 2	Urgency 1	Urgency 2	Project Readiness	Reduce VMT	Safety	Person Throughput 1	Person Throughput 2
Transit											
Implement bus-only shoulder lanes along U.S. 50 during the peak periods**	○	○	◎	○	○	○	○	●	◎	◎	◎
Construct multimodal improvements to the East Falls Church Metrorail station, including new bus bays, pedestrian walkways, and a new western mezzanine	○	◎	○	◎	◎	○	○	◎	◎	◎	○
Construct second entrance to Ballston-MU Metrorail Station	○	◎	○	◎	◎	○	◎	◎	◎	◎	○
Add approximately 2,900 parking spaces on the VRE Manassas Line	○	○	○	◎	●	○	○	●	◎	◎	○
Improve vertical access to Court House Metrorail Station	○	◎	○	◎	◎	○	○	◎	◎	◎	○
Expand platforms at VRE Manassas Line stations, including Broad Run, Manassas, Manassas Park, Burke Centre, Rolling Road, and Backlick Road	◎	○	○	◎	◎	○	○	◎	◎	◎	○
Trail											
Introduce and expand bikesharing services in the Arlington portion of the corridor	○	●	◎	○	◎	○	●	●	●	◎	○
Reconstruct Rosslyn Circle with "Complete Streets" improvements	○	●	◎	○	◎	○	●	●	●	◎	○
City of Falls Church Pedestrian, Bicycle, and Traffic Calming improvements	○	●	◎	○	◎	○	●	●	●	◎	○
Expand and enhance Arlington's network of on- and off-street bicycle/pedestrian facilities to facilitate expanded use of bicycles in the corridor	○	●	◎	○	◎	○	○	●	●	◎	○
Construct a trail along I-66 from Sully Road to Paddington Lane	○	●	◎	○	◎	○	○	●	●	◎	○
Complete trail along U.S. 29 between Dixie Hill Road and Vietch Street	○	●	◎	○	◎	○	○	●	●	◎	○
Construct a trail along U.S. 50 from Nutley Street to Arlington Road	○	●	◎	○	◎	○	○	●	●	◎	○

** Added to the project list as part of the Build 2 scenario.

Table 4.9 Corridor 6 – I-66/U.S. 29/U.S. 50 (continued)

Description	Reduce Roadway Congestion	Reduce Time Spent Traveling	Enviro. Sensitivity	Activity Center Connections	Land Use Supports Transport. Investment	Management and Operations	Cost Sharing	Score-Based Project Ranking	Project Cost (in Millions of 2011 $)	Annual Operating Cost (in Thousands of 2011 $)	B/C Rating
Transit											
Implement bus-only shoulder lanes along U.S. 50 during the peak periods	◎	●	◎	●	○	◎	○	9	116.8	781	○
Construct multimodal improvements to the East Falls Church Metrorail station, including new bus bays, pedestrian walkways, and a new western mezzanine	◎	○	●	○	●	○	○	10	59.6	496	○
Construct second entrance to Ballston-MU Metrorail Station	◎	○	◎	○	●	○	○	10	74.5	496	○
Add approximately 2,900 parking spaces on the VRE Manassas Line	◎	○	◎	○	●	○	○	12	41.3	164	○
Improve vertical access to Court House Metrorail Station	◎	○	◎	○	◎	○	○	13	28.3	471	○
Expand platforms at VRE Manassas Line stations, including Broad Run, Manassas, Manassas Park, Burke Centre, Rolling Road, and Backlick Road	◎	○	●	○	○	○	○	13	42.4	2,000	○
Trail											
Introduce and expand bikesharing services in the Arlington portion of the corridor	○	○	●	●	●	○	○	1	3.2	620	●
Reconstruct Rosslyn Circle with "Complete Streets" improvements	○	○	◎	◎	●	○	○	2	5.5	–	◎
City of Falls Church Pedestrian, Bicycle, and Traffic Calming improvements	◎	○	◎	○	●	○	○	3	2.0	–	●
Expand and enhance Arlington's network of on- and off-street bicycle/pedestrian facilities to facilitate expanded use of bicycles in the corridor	○	○	◎	◎	●	○	○	4	10.0	–	◎
Construct a trail along I-66 from Sully Road to Paddington Lane	○	○	◎	◎	●	○	○	4	6.0	–	◎
Complete trail along U.S. 29 between Dixie Hill Road and Vietch Street	○	○	◎	◎	●	○	○	4	1.9	–	◎
Construct a trail along U.S. 50 from Nutley Street to Arlington Road	○	○	◎	◎	●	○	○	4	19.9	–	○

Table 4.10 Corridor 7 – I-495 Beltway

Description	Freight Movement	Improved Bicycle/ Pedestrian Options	Multimodal Choices 1	Multimodal Choices 2	Urgency 1	Urgency 2	Project Readiness	Reduce VMT	Safety	Person Throughput 1	Person Throughput 2
Highway											
Reconstruct Duke Street from Wheeler Avenue to Jordan Street with a center left-turn lane	○	●	○	○	◎	○	◎	◎	●	○	○
Construct interchange at VA 613 (Van Dorn Street) and VA 644 (Franconia Road)	○	○	○	○	●	○	◎	○	◎	◎	◎
South Van Dorn Street Improvements to improve access between the Metrorail station and I-95	○	○	○	○	●	○	●	◎	○	◎	◎
Reconstruct the I-495 auxiliary lane from VA 7 to I-66	○	○	○	○	●	○	○	○	◎	○	○
Construct Scotts Crossing Connector between Jones Branch Drive to Scotts Crossing Road with connections to I-495 HOT Lanes and Dulles Toll Road	○	○	○	○	◎	○	○	○	○	◎	◎
Transit											
Implement I-495 corridor-wide Priority Bus service	○	○	◎	●	●	○	●	●	◎	◎	◎
Construct a four-mile segment of the high-capacity transitway on Duke Street within Alexandria	○	◎	◎	◎	◎	○	◎	●	◎	◎	◎
Construct Metrorail extension across the Wilson Bridge between Eisenhower Avenue station and Branch Avenue station, including new stations at St. Barnabas Road and Oxon Hill Road	○	○	○	●	●	○	○	●	◎	●	◎
Construct LRT from Eisenhower Avenue Metrorail station to Branch Avenue Metrorail station**, [a]	○	○	○	●	●	○	○	●	◎	○	◎
Construct LRT from Bethesda to Fairfax Hospital via Dunn Loring**, [b]	○	○	◎	●	●	○	○	●	◎	○	◎
Construct Metrorail line from Bethesda to Dunn Loring station	○	○	◎	●	●	○	○	●	◎	◎	◎

** Added to the project list as part of the Build 2 scenario.

[a] This Build 2 scenario LRT project replaces the Metrorail project listed above it and is the only project of the pair shown on the Plan Map.

[b] This Build 2 scenario LRT project replaces the Metrorail project listed below it and is the only project of this pair shown on the Plan Map.

Table 4.10 Corridor 7 – I-495 Beltway (continued)

Description	Reduce Roadway Congestion	Reduce Time Spent Traveling	Enviro. Sensitivity	Activity Center Connections	Land Use Supports Transport. Investment	Management and Operations	Cost Sharing	Score-Based Project Ranking	Project Cost (in Millions of 2011 $)	Annual Operating Cost (in Thousands of 2011 $)	B/C Rating
Highway											
Reconstruct Duke Street from Wheeler Avenue to Jordan Street with a center left-turn lane	◎	○	●	○	●	○	○	1	2.3	–	●
Construct interchange at VA 613 (Van Dorn Street) and VA 644 (Franconia Road)	●	◎	◎	○	●	○	○	2	89.4	19	◎
South Van Dorn Street Improvements to improve access between the Metrorail station and I-95	◎	○	◎	○	●	○	○	3	6.0	4	●
Reconstruct the I-495 auxiliary lane from VA 7 to I-66	◎	○	●	○	●	○	○	4	5.0	–	●
Construct Scotts Crossing Connector between Jones Branch Drive to Scotts Crossing Road with connections to I-495 HOT Lanes and Dulles Toll Road	◎	◎	◎	○	○	○	○	5	20.2	28	○
Transit											
Implement I-495 corridor-wide Priority Bus service	◎	◎	●	●	◎	○	○	1	12.4	5,351	●
Construct a four-mile segment of the high-capacity transitway on Duke Street within Alexandria	●	●	○	●	●	○	○	2	29.8	1,589	◎
Construct Metrorail extension across the Wilson Bridge between Eisenhower Avenue station and Branch Avenue station, including new stations at St. Barnabas Road and Oxon Hill Road	●	○	◎	●	●	○	◎	3	666.0	11,550	◎
Construct LRT from Eisenhower Avenue Metrorail station to Branch Avenue Metrorail station	●	◎	◎	●	●	○	◎	3	500.0	5,000	◎
Construct LRT from Bethesda to Fairfax Hospital via Dunn Loring	●	◎	◎	●	●	○	○	5	1,100.0	12,158	◎
Construct Metrorail line from Bethesda to Dunn Loring station	●	○	◎	●	●	○	○	6	1,977.9	15,880	◎

Table 4.10 Corridor 7 – I-495 Beltway (continued)

Description	Freight Movement	Improved Bicycle/ Pedestrian Options	Multimodal Choices 1	Multimodal Choices 2	Urgency 1	Urgency 2	Project Readiness	Reduce VMT	Safety	Person Throughput 1	Person Throughput 2
Trail											
Construct a trail along Holland Avenue in Alexandria	○	●	◎	○	◎	○	●	●	●	◎	○
Construct the Backlick Run trail from Backlick Road to Clermont Avenue	○	●	◎	○	◎	○	○	●	●	◎	○
Construct the Beltway Trail from Dolley Madison Boulevard to Live Oak Drive	○	●	◎	○	◎	○	○	●	●	◎	○
Construct the Potomac Heritage Trail from the Beltway Trail to the American Legion Bridge	○	●	◎	○	◎	○	○	●	●	◎	○
Construct a trail along Backlick Road from Less Highway to I-495	○	●	◎	○	◎	○	○	●	●	◎	○

Table 4.10 Corridor 7 – I-495 Beltway (continued)

Description	Reduce Roadway Congestion	Reduce Time Spent Traveling	Enviro. Sensitivity	Activity Center Connections	Land Use Supports Transport. Investment	Management and Operations	Cost Sharing	Score-Based Project Ranking	Project Cost (in Millions of 2011 $)	Annual Operating Cost (in Thousands of 2011 $)	B/C Rating
Trail											
Construct a trail along Holland Avenue in Alexandria	○	○	◎	◎	●	○	○	1	5.0	–	◎
Construct the Backlick Run trail from Backlick Road to Clermont Avenue	○	○	◎	◎	●	○	○	2	15.9	–	○
Construct the Beltway Trail from Dolley Madison Boulevard to Live Oak Drive	○	○	◎	◎	●	○	○	2	11.9	–	○
Construct the Potomac Heritage Trail from the Beltway Trail to the American Legion Bridge	○	○	◎	◎	●	○	○	2	235.1	–	○
Construct a trail along Backlick Road from Less Highway to I-495	○	○	◎	◎	●	○	○	2	9.9	–	◎

Table 4.11 Corridor 8 – I-95/I-395/U.S. 1

Description	Freight Movement	Improved Bicycle/ Pedestrian Options	Multimodal Choices 1	Multimodal Choices 2	Urgency 1	Urgency 2	Project Readiness	Reduce VMT	Safety	Person Throughput 1	Person Throughput 2
Highway											
Construct intersection improvements at Crystal Drive and U.S. 1	○	◎	○	○	●	○	●	◎	●	○	○
Widen U.S. 1 from four to six lanes from Joplin Road to Russell Road. Project includes a trail on the west side of U.S. 1	○	●	○	○	●	○	○	○	◎	○	●
Build an entrance to the I-95 general purpose lanes at Franconia-Springfield Parkway	○	○	○	○	◎	○	○	○	◎	○	●
Widen U.S. 1 from four to six lanes from VA 642 (Reddy Drive) to Fairfax County Line. Project includes a trail on the west side of U.S. 1	○	●	○	○	●	○	○	○	◎	○	◎
Construct an interchange at U.S. 1 and Huntington Avenue/Fort Hunt Road	○	○	○	○	●	○	○	○	●	○	◎
Widen Gideon Drive from four to six lanes between Dale Boulevard and Smoketown Road. A sidewalk and trail will be constructed with the roadway widening	○	◎	○	○	●	○	○	○	◎	○	◎
Widen Telegraph Road from two to four lanes between Prince William Parkway and Opitz Boulevard. The widening will include a sidewalk and trail	○	◎	○	○	●	○	○	○	◎	○	◎
Widen Dale Boulevard to six lanes from I-95 to U.S. 1	○	◎	○	○	◎	○	○	○	◎	○	◎
Widen Neabsco Mills Road from two to four lanes between Dale Boulevard and U.S. 1, including a sidewalk and trail	○	◎	○	○	◎	○	○	○	◎	○	◎
Widen Opitz Boulevard to six lanes between Telegraph Road to U.S. 1, including a sidewalk and trail	○	◎	○	○	◎	○	○	○	◎	○	◎
Widen River Heritage Boulevard to four lanes between River Ridge Road and Harbor Station Parkway, including a sidewalk and trail	○	◎	○	○	◎	○	○	○	◎	○	◎
Widen Cardinal Drive to six lanes between Minnieville Road and U.S. 1	○	◎	○	○	○	○	○	○	◎	○	◎
Reconstruct interchange at I-95 and Fairfax County Parkway	○	○	○	○	●	○	◎	○	◎	○	○
Construct interchange at U.S. 1 and VA 611 (Telegraph Road)	○	○	○	○	●	○	◎	○	◎	○	○

Table 4.11 Corridor 8 – I-95/I-395/U.S. 1 (continued)

Description	Reduce Roadway Congestion	Reduce Time Spent Traveling	Enviro. Sensitivity	Activity Center Connections	Land Use Supports Transport. Investment	Management and Operations	Cost Sharing	Score-Based Project Ranking	Project Cost (in Millions of 2011 $)	Annual Operating Cost (in Thousands of 2011 $)	B/C Rating
Highway											
Construct intersection improvements at Crystal Drive and U.S. 1	○	○	◎	○	●	○	○	1	25.0	–	●
Widen U.S. 1 from four to six lanes from Joplin Road to Russell Road. Project includes a trail on the west side of U.S. 1	◎	○	◎	○	●	○	◎	1	55.2	78	●
Build an entrance to the I-95 general purpose lanes at Franconia-Springfield Parkway	◎	●	●	○	●	○	○	3	49.2	10	●
Widen U.S. 1 from four to six lanes from VA 642 (Reddy Drive) to Fairfax County Line. Project includes a trail on the west side of U.S. 1	◎	○	◎	○	●	○	◎	3	58.7	83	◎
Construct an interchange at U.S. 1 and Huntington Avenue/Fort Hunt Road	●	◎	◎	○	●	○	○	5	99.3	19	◎
Widen Gideon Drive from four to six lanes between Dale Boulevard and Smoketown Road. A sidewalk and trail will be constructed with the roadway widening	◎	◎	◎	○	●	○	○	6	19.9	28	●
Widen Telegraph Road from two to four lanes between Prince William Parkway and Opitz Boulevard. The widening will include a sidewalk and trail	◎	◎	◎	○	●	○	○	6	17.6	38	●
Widen Dale Boulevard to six lanes from I-95 to U.S. 1	◎	◎	◎	○	●	○	○	8	5.1	18	●
Widen Neabsco Mills Road from two to four lanes between Dale Boulevard and U.S. 1, including a sidewalk and trail	◎	◎	◎	○	●	○	○	8	17.1	39	●
Widen Opitz Boulevard to six lanes between Telegraph Road to U.S. 1, including a sidewalk and trail	◎	◎	◎	○	●	○	○	8	29.9	43	◎
Widen River Heritage Boulevard to four lanes between River Ridge Road and Harbor Station Parkway, including a sidewalk and trail	◎	◎	◎	○	●	○	○	8	11.8	39	●
Widen Cardinal Drive to six lanes between Minnieville Road and U.S. 1	◎	◎	◎	○	●	○	○	12	68.1	134	○
Reconstruct interchange at I-95 and Fairfax County Parkway	◎	○	◎	○	●	○	○	13	75.6	–	○
Construct interchange at U.S. 1 and VA 611 (Telegraph Road)	◎	○	◎	○	●	○	○	13	75.6	20	○

Table 4.11 Corridor 8 – I-95/I-395/U.S. 1 (continued)

Description	Freight Movement	Improved Bicycle/ Pedestrian Options	Multimodal Choices 1	Multimodal Choices 2	Urgency 1	Urgency 2	Project Readiness	Reduce VMT	Safety	Person Throughput 1	Person Throughput 2
Highway											
Widen Summit School Road to six lanes from Minnieville Road to Telegraph Road, including a sidewalk and trail	○	◎	○	○	●	○	○	○	◎	○	○
Widen Harbor Station Parkway to four lanes between River Heritage Boulevard and Cherry Hill Road	○	◎	○	○	◎	○	○	○	◎	○	◎
Realign and reconstruct Clark and Bell Streets through Crystal City	○	◎	○	○	◎	○	○	◎	◎	○	○
Construct an improved grid network of streets in Crystal City	○	◎	○	○	◎	○	○	◎	◎	○	○
Widen U.S. 1 to eight lanes from VA 235 to I-495	○	○	○	○	◎	○	○	○	◎	○	○
Widen Gordon Boulevard to six lanes from I-95 to U.S. 1	○	○	○	○	●	○	○	○	◎	○	○
Construct Frontier Drive extension from VA 7900 (Franconia-Springfield Parkway) to Loisdale Road	○	○	○	○	◎	○	○	○	○	○	◎
Transit											
Construct the Crystal City-Potomac Yards Transitway along U.S. 1	○	◎	○	◎	●	○	●	●	◎	◎	◎
Implement a new OmniRide express route from Woodbridge to Merrifield using the HOT/HOV lanes on I-95 and I-495	○	○	●	●	●	○	●	●	◎	●	○
DASH Bus Service Enhancements, including new cross-town services and funding for additional buses to expand service on existing routes	○	○	◎	◎	◎	○	◎	◎	◎	○	◎
Implement a new OmniRide route from Lake Ridge to Seminary Road (Mark Center) using the HOT/HOV lanes on I-95 and I-395	○	○	○	◎	●	○	●	●	◎	◎	◎
Construct a four-mile segment of the dedicated bus lanes between the Van Dorn Metro station and Arlington County. The project also will provide pedestrian facilities on Van Dorn Street over Duke Street	○	◎	◎	○	◎	○	◎	●	◎	○	◎
Construct bus lanes between Pentagon Transit Center and 14th Street using inside shoulders of Rochambeau Memorial Bridge (I-395) **	○	○	◎	○	●	○	●	●	○	○	●

** Added to the project list as part of the Build 2 scenario.

Table 4.11 Corridor 8 – I-95/I-395/U.S. 1 (continued)

Description	Reduce Roadway Congestion	Reduce Time Spent Traveling	Enviro. Sensitivity	Activity Center Connections	Land Use Supports Transport. Investment	Management and Operations	Cost Sharing	Score-Based Project Ranking	Project Cost (in Millions of 2011 $)	Annual Operating Cost (in Thousands of 2011 $)	B/C Rating
Highway											
Widen Summit School Road to six lanes from Minnieville Road to Telegraph Road, including a sidewalk and trail	◎	○	◎	○	●	○	○	13	23.2	12	◎
Widen Harbor Station Parkway to four lanes between River Heritage Boulevard and Cherry Hill Road	◎	◎	○	○	●	○	○	13	30.7	47	○
Realign and reconstruct Clark and Bell Streets through Crystal City	○	○	◎	○	●	○	○	17	10.0	–	◎
Construct an improved grid network of streets in Crystal City	○	○	◎	○	●	○	○	17	20.0	10	○
Widen U.S. 1 to eight lanes from VA 235 to I-495	◎	◎	◎	○	●	○	○	17	158.6	158	○
Widen Gordon Boulevard to six lanes from I-95 to U.S. 1	◎	○	◎	○	●	○	○	20	10.7	15	○
Construct Frontier Drive extension from VA 7900 (Franconia-Springfield Parkway) to Loisdale Road	◎	◎	○	○	●	○	○	21	16.1	53	○
Transit											
Construct the Crystal City-Potomac Yards Transitway along U.S. 1	●	◎	◎	◎	●	○	●	1	32.8	11,418	◎
Implement a new OmniRide express route from Woodbridge to Merrifield using the HOT/HOV lanes on I-95 and I-495	◎	○	●	●	◎	○	○	2	2.0	268	●
DASH Bus Service Enhancements, including new cross-town services and funding for additional buses to expand service on existing routes	◎	●	●	●	●	○	○	3	8.4	1,919	●
Implement a new OmniRide route from Lake Ridge to Seminary Road (Mark Center) using the HOT/HOV lanes on I-95 and I-395	◎	◎	●	◎	◎	○	○	4	1.5	230	●
Construct a four-mile segment of the dedicated bus lanes between the Van Dorn Metro station and Arlington County. The project also will provide pedestrian facilities on Van Dorn Street over Duke Street	●	◎	◎	○	●	○	○	5	32.7	1,589	◎
Construct bus lanes between Pentagon Transit Center and 14th Street using inside shoulders of Rochambeau Memorial Bridge (I-395)	◎	●	●	○	◎	○	○	5	5.3	26	●

Table 4.11 Corridor 8 – I-95/I-395/U.S. 1 (continued)

Description	Freight Movement	Improved Bicycle/ Pedestrian Options	Multimodal Choices 1	Multimodal Choices 2	Urgency 1	Urgency 2	Project Readiness	Reduce VMT	Safety	Person Throughput 1	Person Throughput 2
Transit											
Implementation of a new OmniRide route from Central Prince William County to Downtown Alexandria using the HOT/HOV lanes on I-95	○	○	○	◎	●	○	◎	●	◎	◎	◎
Relocation of Metrorail Yellow Line under 10th Street SW and NW west of the existing Green Line tunnel. Project also provides a station at East Potomac Park and requires additional rail cars and storage facilities	○	○	◎	○	●	○	○	●	◎	●	◎
Extend the Metrorail Blue Line from Springfield to Potomac Mills	○	○	●	●	●	○	○	●	◎	●	○
Widen the Long Bridge to include additional rail capacity for commuter rail and provide a Light Rail connection**	◎	○	○	◎	◎	○	○	●	◎	○	◎
Implementation of Union Street Trolley service between Old Town and Potomac Yard via the Braddock Metrorail station	○	○	○	○	◎	○	●	●	◎	◎	◎
Conversion of the Crystal City – Potomac Yard dedicated busway to a streetcar system.	○	○	◎	◎	○	○	○	●	◎	◎	◎
Implement Crystal City Circulator bus service	○	◎	○	◎	◎	○	○	◎	◎	◎	◎
Implement multimodal improvements at the King Street Metro Station, including improve access to parking lot and bus facilities, construction of new shelters, and a planned transit store	○	●	○	○	◎	○	●	◎	◎	◎	○
Construct a multimodal bridge from Van Dorn Metro Station to Pickett Street	○	●	○	○	◎	○	◎	◎	◎	○	◎
Construction of a new pedestrian tunnel between Alexandria Union Station and the King Street Metrorail station	○	◎	○	○	◎	○	●	◎	●	◎	○
Add approximately 1,100 parking spaces on the VRE Fredericksburg Line	○	○	○	◎	●	○	○	●	◎	◎	○
Enhance bus docking capacity and passenger facilities at the Crystal City Metro station	○	◎	○	◎	◎	○	○	◎	◎	◎	○
Construct a second entrance to the Crystal City Metro station (near Crystal Drive and 18th Street S)	○	◎	○	◎	◎	○	◎	◎	◎	◎	○

** Added to the project list as part of the Build 2 scenario.

Table 4.11 Corridor 8 – I-95/I-395/U.S. 1 (continued)

Description	Reduce Roadway Congestion	Reduce Time Spent Traveling	Enviro. Sensitivity	Activity Center Connections	Land Use Supports Transport. Investment	Management and Operations	Cost Sharing	Score-Based Project Ranking	Project Cost (in Millions of 2011 $)	Annual Operating Cost (in Thousands of 2011 $)	B/C Rating
Transit											
Implementation of a new OmniRide route from Central Prince William County to Downtown Alexandria using the HOT/HOV lanes on I-95	◎	◎	●	◎	◎	○	○	5	2.0	266	●
Relocation of Metrorail Yellow Line under 10th Street SW and NW west of the existing Green Line tunnel. Project also provides a station at East Potomac Park and requires additional rail cars and storage facilities	●	○	◎	●	○	○	◎	8	322.5	3,880	◎
Extend the Metrorail Blue Line from Springfield to Potomac Mills	●	○	◎	●	○	○	○	9	1,519.8	14,168	○
Widen the Long Bridge to include additional rail capacity for commuter rail and provide a Light Rail connection	●	◎	◎	◎	◎	○	○	10	1,770.0	1,350	○
Implementation of Union Street Trolley service between Old Town and Potomac Yard via the Braddock Metrorail station	◎	◎	●	○	◎	○	○	11	3.6	993	●
Conversion of the Crystal City – Potomac Yard dedicated busway to a streetcar system	●	◎	◎	◎	◎	○	○	12	32.8	2,482	◎
Implement Crystal City Circulator bus service	●	◎	●	○	◎	○	○	13	2.5	993	●
Implement multimodal improvements at the King Street Metro Station, including improve access to parking lot and bus facilities, construction of new shelters, and a planned transit store	◎	○	●	○	◎	○	○	13	2.2	–	●
Construct a multimodal bridge from Van Dorn Metro Station to Pickett Street	◎	◎	◎	○	◎	○	○	15	22.2	39	○
Construction of a new pedestrian tunnel between Alexandria Union Station and the King Street Metrorail station	○	○	●	○	◎	○	○	15	7.9	10	◎
Add approximately 1,100 parking spaces on the VRE Fredericksburg Line	◎	○	◎	○	●	○	○	17	14.4	62	○
Enhance bus docking capacity and passenger facilities at the Crystal City Metro station	◎	○	◎	○	◎	◎	○	18	0.5	–	●
Construct a second entrance to the Crystal City Metro station (near Crystal Drive and 18th Street S)	◎	○	◎	○	◎	○	○	18	35.7	496	○

Table 4.11 Corridor 8 – I-95/I-395/U.S. 1 (continued)

Description	Freight Movement	Improved Bicycle/ Pedestrian Options	Multimodal Choices 1	Multimodal Choices 2	Urgency 1	Urgency 2	Project Readiness	Reduce VMT	Safety	Person Throughput 1	Person Throughput 2
Transit											
Expand platforms on the VRE Fredericksburg Line, including Rippon, Woodbridge, and Lorton	◎	○	○	◎	●	○	○	◎	◎	◎	○
Reconstruct the VRE Crystal City Metro station to provide bidirectional access for trains and improved passenger and local transit connections	○	○	○	○	◎	○	○	◎	◎	◎	○
Conduct a transit study and alternatives analysis for U.S. 1 from Quantico to Huntington	○	○	○	○	◎	○	●	○	○	◎	○
Trail											
Introduce and expand bikesharing services in the Arlington portion of the corridor	○	●	◎	○	◎	○	●	●	●	◎	○
Reconstruct Holmes Run Trail from North Ripley Street to I-395	○	●	◎	○	◎	◎	●	●	●	◎	○
Construct trail along Metrorail from Cameron Street to Crystal City	○	●	◎	○	◎	○	●	●	●	◎	○
Construct a trail along U.S. 1 from Stafford County to I-95/I-495 in Fairfax County	○	●	◎	○	◎	○	○	●	●	◎	○
Expand and enhance Arlington's network of on- and off-street bicycle/pedestrian facilities to facilitate expanded use of bicycles in the corridor	○	●	◎	○	◎	○	○	●	●	◎	○
Construct a South County East-West Trail from Manassas/Clifton to I-395	○	●	◎	○	◎	○	○	●	●	◎	○
Construct a trail along Telegraph Road from Richmond Highway to Kings Highway	○	●	◎	○	◎	○	○	●	●	◎	○
Construct and enhance a network of pedestrian and bicycle facilities in Crystal City in support of mixed-use redevelopment	○	●	◎	○	◎	○	○	●	●	◎	○
Construct trails along local streets in the Alexandria portion of the corridor	○	●	◎	○	◎	○	◎	●	●	◎	○
Other											
Funding for transportation technologies to improve system efficiencies in the Duke Street and Beauregard/Van Dorn Street corridors in the City of Alexandria	○	○	○	○	◎	○	◎	○	○	○	○

Table 4.11 Corridor 8 – I-95/I-395/U.S. 1 (continued)

Description	Reduce Roadway Congestion	Reduce Time Spent Traveling	Enviro. Sensitivity	Activity Center Connections	Land Use Supports Transport. Investment	Management and Operations	Cost Sharing	Score-Based Project Ranking	Project Cost (in Millions of 2011 $)	Annual Operating Cost (in Thousands of 2011 $)	B/C Rating
Transit											
Expand platforms on the VRE Fredericksburg Line, including Rippon, Woodbridge, and Lorton	◎	○	●	○	○	○	○	20	20.3	1,688	○
Reconstruct the VRE Crystal City Metro station to provide bidirectional access for trains and improved passenger and local transit connections	○	○	●	○	◎	○	○	21	59.6	50	○
Conduct a transit study and alternatives analysis for U.S. 1 from Quantico to Huntington	○	○	●	○	○	○	○	22	1.0	–	◎
Trail											
Introduce and expand bikesharing services in the Arlington portion of the corridor	○	○	●	●	●	○	○	1	1.9	372	●
Reconstruct Holmes Run Trail from North Ripley Street to I-395	○	○	◎	●	●	○	○	2	5.0	–	●
Construct trail along Metrorail from Cameron Street to Crystal City	○	○	◎	◎	●	○	○	3	1.0	–	●
Construct a trail along U.S. 1 from Stafford County to I-95/I-495 in Fairfax County	○	○	◎	●	●	○	○	4	75.5	–	◎
Expand and enhance Arlington's network of on- and off-street bicycle/pedestrian facilities to facilitate expanded use of bicycles in the corridor	○	○	◎	◎	●	○	○	5	5.0	–	◎
Construct a South County East-West Trail from Manassas/Clifton to I-395	○	○	◎	●	◎	○	○	5	51.6	–	○
Construct a trail along Telegraph Road from Richmond Highway to Kings Highway	○	○	◎	◎	●	○	○	5	9.9	–	◎
Construct and enhance a network of pedestrian and bicycle facilities in Crystal City in support of mixed-use redevelopment	○	○	◎	○	●	○	○	8	2.0	–	○
Construct trails along local streets in the Alexandria portion of the corridor	○	○	◎	○	◎	○	○	8	4.0	–	○
Other											
Funding for transportation technologies to improve system efficiencies in the Duke Street and Beauregard/Van Dorn Street corridors in the City of Alexandria	◎	○	●	○	○	●	○	1	4.5	50	◎

Table 4.12 Other Major Improvements (Outside Corridor)

Description	Freight Movement	Improved Bicycle/ Pedestrian Options	Multimodal Choices 1	Multimodal Choices 2	Urgency 1	Urgency 2	Project Readiness	Reduce VMT	Safety	Person Throughput 1	Person Throughput 2
Highway											
Widen VA 123 to six lanes Between City of Fairfax and Town of Vienna	○	○	○	○	◎	○	○	○	○	◎	●
Construct interchange at U.S. 50 and VA 645 (Stringfellow Road)	○	○	○	○	●	○	○	○	◎	○	○
Construct interchange at VA 123 and Braddock Road	○	○	○	○	●	○	○	○	●	○	○
Widen VA 123 to six lanes between Braddock Road to City of Fairfax	○	○	○	○	◎	○	○	○	○	◎	●
Construct a Western Transportation Corridor from I-95 to I-270 in Maryland	○	○	○	○	●	○	○	○	◎	◎	●
Construct Eastern Potomac River Crossing from I-95 to U.S. 301 in Maryland	○	○	○	○	●	○	○	○	◎	◎	●
Widen VA 123 to six lanes between VA 7 and Old Courthouse Road	○	○	○	○	◎	○	○	○	○	○	○
Add HOV lanes on Braddock Road from I-495 to Burke Lake Road**	○	○	◎	○	●	○	○	◎	○	○	○
Construct a new Belmont Bay Drive between Pallisades Street and Gordon Boulevard	○	○	○	○	○	○	○	○	◎	○	○
Transit											
Implement Priority Bus service on VA 236 from Alexandria to the City of Fairfax	○	○	●	●	○	○	●	◎	◎	◎	◎
Add Priority Bus service along VA 123**	○	○	◎	●	◎	○	○	●	◎	◎	◎
Add Priority Bus service along VA 236**	○	○	◎	◎	○	○	○	●	◎	◎	◎
Expand Metrorail fleet to enable operation of 100 percent eight-car trains	○	○	○	●	●	○	◎	●	◎	◎	○
Relocate Metrorail Blue Line in a new tunnel into Georgetown, including nine new stations	○	○	◎	○	◎	○	○	●	◎	●	◎
Construct an interline connection between Courthouse Metrorail and Arlington Cemetery Metrorail	○	○	◎	●	◎	○	○	●	◎	●	◎
Expand Metrobus fleet to enable increased frequencies and improved service	○	○	○	●	◎	○	◎	●	◎	◎	○
Construct a pedestrian connection between Farragut West and Farragut North stations	○	◎	○	○	◎	○	○	◎	●	◎	◎

** Added to the project list as part of the Build 2 scenario.

Table 4.12 Other Major Improvements (Outside Corridor) (continued)

Description	Reduce Roadway Congestion	Reduce Time Spent Traveling	Enviro. Sensitivity	Activity Center Connections	Land Use Supports Transport. Investment	Management and Operations	Cost Sharing	Score-Based Project Ranking	Project Cost (in Millions of 2011 $)	Annual Operating Cost (in Thousands of 2011 $)	B/C Rating
Highway											
Widen VA 123 to six lanes Between City of Fairfax and Town of Vienna	●	◎	◎	◎	●	○	○	1	102.9	87	◎
Construct interchange at U.S. 50 and VA 645 (Stringfellow Road)	●	◎	◎	○	●	○	○	2	75.6	20	◎
Construct interchange at VA 123 and Braddock Road	◎	◎	◎	○	●	○	○	3	74.5	19	◎
Widen VA 123 to six lanes between Braddock Road to City of Fairfax	◎	◎	◎	◎	●	○	○	3	27.1	26	◎
Construct a Western Transportation Corridor from I-95 to I-270 in Maryland	●	◎	○	○	◎	○	○	5	2,000.4	5,532	○
Construct Eastern Potomac River Crossing from I-95 to U.S. 301 in Maryland	●	◎	○	○	○	○	○	6	1,231.0	2,517	○
Widen VA 123 to six lanes between VA 7 and Old Courthouse Road	◎	◎	◎	○	●	○	○	7	21.2	13	○
Add HOV lanes on Braddock Road from I-495 to Burke Lake Road	○	◎	◎	○	◎	○	○	7	51.4	55	○
Construct a new Belmont Bay Drive between Pallisades Street and Gordon Boulevard	●	○	○	○	●	○	○	9	11.3	5	○
Transit											
Implement Priority Bus service on VA 236 from Alexandria to the City of Fairfax	●	◎	●	●	◎	●	○	1	5.0	2,812	●
Add Priority Bus service along VA 123	●	●	●	●	○	●	○	2	56.1	4,048	◎
Add Priority Bus service along VA 236	●	◎	●	●	◎	●	○	3	36.9	7,790	◎
Expand Metrorail fleet to enable operation of 100 percent eight-car trains	●	○	●	○	○	○	◎	4	496.0	–	○
Relocate Metrorail Blue Line in a new tunnel into Georgetown, including nine new stations	●	○	◎	●	○	○	◎	4	1,136.4	13,700	○
Construct an interline connection between Courthouse Metrorail and Arlington Cemetery Metrorail	●	○	◎	●	○	○	○	6	375.0	5,000	○
Expand Metrobus fleet to enable increased frequencies and improved service	◎	○	●	●	○	○	○	7	66.4	42,375	○
Construct a pedestrian connection between Farragut West and Farragut North stations	◎	◎	●	○	○	○	◎	8	23.6	496	○

Table 4.12 Other Major Improvements (Outside Corridor) (continued)

Description	Freight Movement	Improved Bicycle/ Pedestrian Options	Multimodal Choices 1	Multimodal Choices 2	Urgency 1	Urgency 2	Project Readiness	Reduce VMT	Safety	Person Throughput 1	Person Throughput 2
Transit											
Construct a pedestrian connection between Gallery Place and Metro Center stations	○	◎	○	○	◎	○	○	◎	●	◎	◎
Trail											
Introduce and expand bikesharing services in Arlington	○	●	◎	○	◎	○	●	●	●	◎	○
Construct a trail along John Marshall Highway between I-66 and Lee Highway	○	●	◎	○	◎	○	●	●	●	◎	○
Expand and enhance Arlington's network of on- and off-street bicycle and pedestrian facilities	○	●	◎	○	◎	○	○	●	●	◎	○
Construct a trail along Old Bridge Road from Prince William Parkway to Poplar Lane	○	●	◎	○	◎	○	◎	●	●	◎	○
Expand and enhance the Fairfax County trail network	○	●	◎	○	◎	○	○	●	●	◎	○
Construct a trail along Rolling Road between the South County East-West trail and I-95 in Fairfax County	○	●	◎	○	◎	○	○	●	●	◎	○
Construct a trail along Gordon Boulevard between U.S. 1 and Commerce Street	○	●	◎	○	◎	○	○	●	●	◎	○
Construct a trail along Dale Boulevard between Delany Road and U.S. 1	○	●	◎	○	◎	○	○	●	●	◎	○
ITS											
Implement Transportation System Management and communication upgrade throughout Arlington County	○	○	○	○	◎	●	●	○	◎	○	○
Enhance Traffic System and Technology to a Smart Traffic Signal system in Arlington County	○	○	○	○	◎	●	○	○	◎	○	○
TDM											
Implement major enhancements to Arlington County Commuter Services, including new commuter stores and next generation IT services	○	○	○	○	◎	○	○	●	○	○	○
Improve and expand the commuter assistance and other programs provided by Arlington County Commuter Services	○	○	○	○	◎	○	○	●	○	○	○

Table 4.12 Other Major Improvements (Outside Corridor) (continued)

Description	Reduce Roadway Congestion	Reduce Time Spent Traveling	Enviro. Sensitivity	Activity Center Connections	Land Use Supports Transport. Investment	Management and Operations	Cost Sharing	Score-Based Project Ranking	Project Cost (in Millions of 2011 $)	Annual Operating Cost (in Thousands of 2011 $)	B/C Rating
Transit											
Construct a pedestrian connection between Gallery Place and Metro Center stations	◎	◎	●	○	○	○	◎	8	32.8	496	○
Trail											
Introduce and expand bikesharing services in Arlington	○	○	●	●	●	○	○	1	1.3	248	●
Construct a trail along John Marshall Highway between I-66 and Lee Highway	○	○	◎	◎	◎	○	○	2	0.5	–	●
Expand and enhance Arlington's network of on- and off-street bicycle and pedestrian facilities	○	○	◎	○	●	○	○	3	5.0	-	○
Construct a trail along Old Bridge Road from Prince William Parkway to Poplar Lane	○	○	◎	○	◎	○	○	3	0.1	–	●
Expand and enhance the Fairfax County trail network	○	○	◎	○	◎	○	○	5	1.1	–	○
Construct a trail along Rolling Road between the South County East-West trail and I-95 in Fairfax County	○	○	◎	○	◎	○	○	5	23.8	–	○
Construct a trail along Gordon Boulevard between U.S. 1 and Commerce Street	○	○	◎	○	◎	○	○	5	0.4	–	◎
Construct a trail along Dale Boulevard between Delany Road and U.S. 1	○	○	◎	○	◎	○	○	5	1.3	–	○
ITS											
Implement Transportation System Management and communication upgrade throughout Arlington County	○	○	●	○	●	●	○	1	18.7	496	●
Enhance Traffic System and Technology to a Smart Traffic Signal system in Arlington County	◎	○	●	○	●	●	○	2	35.0	500	○
TDM											
Implement major enhancements to Arlington County Commuter Services, including new commuter stores and next generation IT services	◎	○	●	○	●	○	○	1	24.4	24,400	●
Improve and expand the commuter assistance and other programs provided by Arlington County Commuter Services	◎	○	●	○	●	○	○	1	34.0	34,000	○

4.3 Project Cost Summary

The TransAction 2040 Plan combines projects in the Northern Virginia portion of the 2011 CLRP with additional TransAction 2040 improvements recommended in this report. Cost estimates for individual CLRP projects were drawn from the TPB on-line database or estimated as necessary. Capital and operating cost estimates for the TransAction 2040 improvements were supplied by the contributing jurisdictions, adapted from TransAction 2030 data, or estimated as appropriate. A capital cost estimate for each project is shown on the Plan map. Capital and operating cost estimates for each TransAction 2040 improvement project is shown in the relevant corridor project listing (see Table 4.4 through Table 4.12).

Although the 2011 CLRP serves as the basis for the TransAction 2040 Plan project list and analysis, the 2011 CLRP represents an update to the 2010 CLRP, which was subject to detailed financial analysis and reporting. As a result, summary cost reporting on the CLRP is based on information from the Cambridge Systematics report, "Analysis of Resources for the 2010 Financially Constrained Long-Range Transportation Plan for the Washington Region." This report indicates that 2010 CLRP expenditures in Northern Virginia from 2011 to 2040 were anticipated to total $58.2 billion. Of this figure, $7.7 billion was attributed to highway expansion (capital costs), $10.9 billion to transit expansion, $21.1 billion to "highway operations and preservation," and $18.5 billion to "transit operations and preservation." Although these figures do not include changes resulting from the amendments to achieve the 2011 CLRP, the 2011 CLRP included only five changes in Northern Virginia that were considered by TPB to be regionally significant.[1]

The projects beyond the 2011 CLRP prioritized as part of TransAction 2040 carry a capital cost estimate of $23.2 billion.[2] In year 2040, the estimated annual operating cost of these projects is $330 million.[3] Based on the potential implementation dates of the various projects, a sum of expenditures figure of $4.3 billion in operating costs was developed.

The CLRP and the TransAction 2040 additional recommended improvements represent nearly $42 billion in transportation infrastructure and service expansion and $44 billion in highway and transit operations and preservation from 2011 to 2040. All figures are in 2011 dollars. Table 4.13 provides a summary.

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[1] One of these changes was revising the limits and specifications of the I-395/I-95 HOV and HOT Lanes project. The total cost of the other four added/changed projects is approximately $400 million in capital cost, including approximately $160 million for transit.

[2] This figure includes $1.6 billon for the two added LRT projects in the I-495 corridor which were introduced in the Build 2 scenario, but does not include $2.6 billion for the two Build scenario Metrorail projects which these LRT projects replace.

[3] This figure include $17 million per year for the two added LRT projects; does not include $27 million for the two proposed Metrorail projects which these LRT projects replace.

Table 4.13 TransAction 2040 Cost Summary

Project Type	Capital Costs (2011 $)	Operating Costs (2011 $)	Total Costs (2011 $)
Northern Virginia Portion of Region's Constrained Long Range Plan[a]			
	(2011 – 2040)	(2011 – 2040)	(2011 – 2040)
Highway	$7.7 billion	$21.1 billion	
Transit	$10.9 billion	$18.5 billion	
Total	**$18.5 billion**	**$39.7 billion**	**$58.2 billion**
TransAction 2040 Additional Projects			
Project Types	(2011 – 2040)	(2040)	(2011 – 2040)
Highway	$9.3 billion	$16 million	
Transit[b]	$13.2 billion	$312 million	
Bicycle/Pedestrian	$640 million	$1.2 million	
Technology	$58 million	$1.0 million	
Total	**$23.2 billion**	**$330 million[c]**	**$27.5 billion[d]**
Combined Project List			
	(2011 – 2040)	(2011 – 2040)	(2011 – 2040)
Total	**$41.7 billion**	**$44.0 billion**	**$85.7 billion**

Notes:

(a) Data Source: Analysis of Resources for the 2010 Financially Constrained Long-Range Transportation Plan for the Washington Region, Cambridge Systematics, November 2010. Since this is the most recent such report, CLRP figures do not account for additions and changes in Northern Virginia to arrive at the 2011 CLRP.

(b) Figures include all projects in the Build 2 scenario.

(c) Figure represents the reported operating cost for year 2040. Total operating cost for the period 2011 to 2040 is estimated as $4.3 billion based on aggregating the annual operating cost for each project multiplied by the number of operating years for the project as derived based on its project readiness ratings.

(d) Determined by adding the capital cost and derived operating cost for the indicated period.